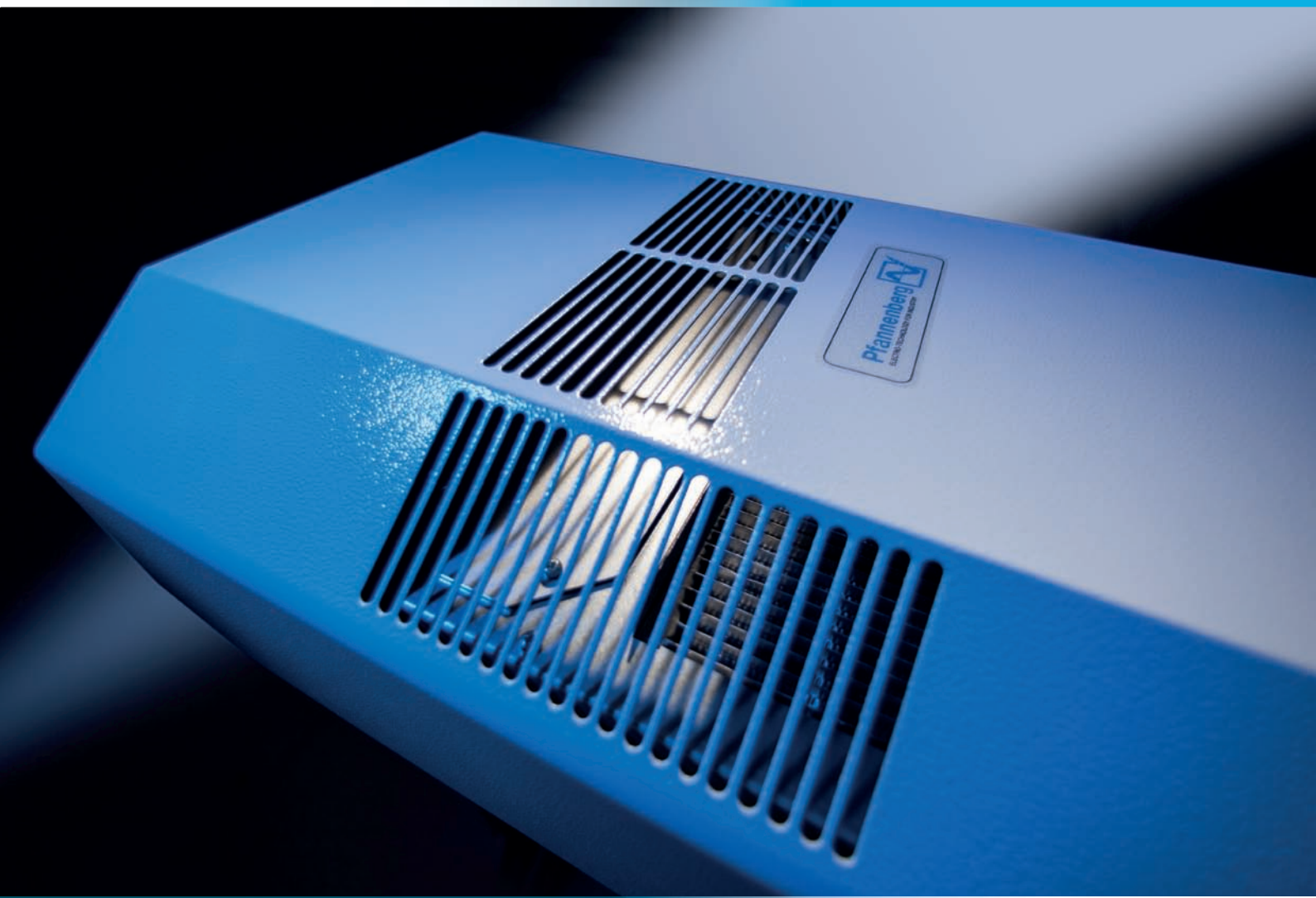
Thermal management of electrical enclosures

Cooling units · Air/water heat exchangers · Chillers
Air/air heat exchangers · Filterfans · Heaters, thermostats and hygrostats

Main catalogue · Edition 13



SHARING COMPETENCE

Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY



Safety for man, machine and the environment



Thermal management and process cooling of electrical enclosures

Pfannenberg is one of the few companies in the world which develops and manufactures the whole range of industrial thermal management products. Thus, we supply everything “from one hand”. Together with our sales associates and subsidiary companies we are your qualified, competent and flexible partners.

Your ideas are constantly used for product development and we define milestones over and over again for user-friendly products. We have development departments in Germany, Italy, and the USA and since the beginning of 2010, also in China, which makes us one of the leading companies in the area of implementation of market demands.

The efficient use of resources, i.e. energy consumption is a topic our end-users are focusing on more and more. We make our contribution by means of energy-efficient equipment.
Utilize or competencies and contact us. By means of our Global Services we are not only in a position to help you with your customer-specific development, but we are also in the position to accompany you with our products on a global level.

Thank you for your trust!

Yours,

Andreas Pfannenberg
CEO



SHARING COMPETENCE

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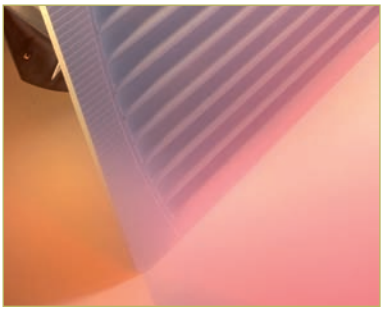
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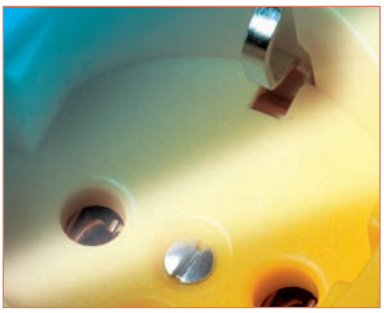
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Why reliable cooling units are so important for your electrical enclosure

A Pfannenberg cooling unit for your electrical enclosure is much more than just an accessory. In fact, it is basically the backbone of your entire production process because trouble-free production is only guaranteed if the sensitive climate inside your electrical enclosures is maintained.

Even the slightest overheating of the electronic controller units can result in serious consequences such as long standstills, delivery problems or total breakdown. Therefore, we not only take into account the demands placed on your equipment, but on the cooling unit as well.

As an example, how large are the fluctuations in the ambient temperature? Is the control cabinet placement in an environment where the air is full of dust or oil? Is the equipment to be cooled exposed to the weather, i.e. moisture and sunshine? How large are the designated dimensions of the required cooling units?

Once these questions have been clarified completely, Pfannenberg supplies you with highly efficient air conditioning solutions that guarantee the highest degree of safety and energy efficiency.

Air/water heat exchanger
from the Pfannenberg PWS series



Cooling unit
from the Pfannenberg DTI series



Why you should choose air conditioning products from Pfannenberg

Whereas as most of our competitors offer only ‘off the shelf’ products, we additionally offer customised solutions.

This means that our units or unit combinations are precisely tailored to your needs, i.e. neither over nor under-dimensioned and, therefore, always particularly energy-efficient. This is an aspect that is playing an ever larger part in climate control considerations.

In choosing Pfannenberg products, you additionally benefit from high quality, robustness and precision, as well as simple mounting and service friendliness. Many of our products, such as our patented filterfan, can even be mounted and serviced without tools.

As you can see, many reasons speak in favour of Pfannenberg. Let us know your requirements; we will then supply you with an individual solution at a fair price without delay.

Side mounted cooling units
from the Pfannenberg DTS series



Determine the correct air conditioning products

When can Filterfans be used?

If the ambient temperature is always lower than the temperature required in the electrical enclosure, then filterfans represent an economical solution for thermal management of electrical enclosures.



Important for the use of Filterfans:

Use filterfans to force the surrounding air into the electrical enclosure, so that a slight overpressure builds up inside the enclosure. The surrounding air enters the electrical cabinet exclusively via the filterfan, which ensures that it is filtered.
Install the filterfan in the lower third of the electrical enclosure and the exhaust filter as close to the top as possible. This assists the natural convection of the air and avoids hot spots within the enclosure.

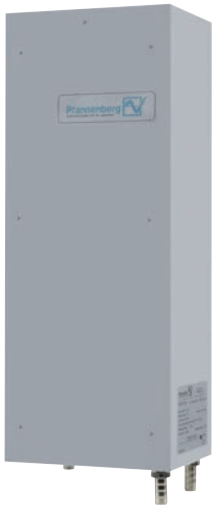


When are cooling units necessary?

- if cooling cannot be accomplished by the outside air
- if the temperature required inside the electrical cabinet should be equal to or lower than the ambient temperature
- if the ambient air is strongly contaminated with oil or conductive dusts

Important for the use of cooling units:

- ensure a good supply of air intake and outtake from the external circuit of the cooling unit, so that thermal energy can be transferred to the surroundings
- the lowest temperature inside the enclosure may not necessarily be the best. The 35 °C preset by Pfannenberg represents a good compromise between service life and the accumulation of condensation.



When must air/water heat exchangers be used?

- if the thermal energy may not be dispersed to the surroundings
- if aggressive ambient air restricts the use of conventional cooling units
- if a very high IP class is required (up to IP 65)
- if a maintenance-free cooling unit is required

PSS Climatisation – Pfannenberg Sizing Software for the thermal management of electronic enclosures

PSS Climatisation, a new JAVA based software package will help you size filterfans, cooling units, air/water heat exchangers and heaters for your electronic enclosures. The software accounts for both indoor and outdoor applications and can assist you in calculating the heat dissipation within your enclosure, component by component.

Please go to http://pss.pfannenberg.com to download the software.



Combined use as a system solution

Air/water heat exchangers and Chillers

The combination of air/water heat exchangers and chillers offers an ideal system solution for the cooling of your processes, machines and controllers. All cooling tasks in a system or machine and also on a control cabinet can be taken care of simply and economically via a closed pipeline system.



- through the highly economical supply of water as the cooling medium for the air conditioning of control cabinets with air/water heat exchangers
- and 100% independence from the ambient temperature at the installation location

Filterfans and Thermostats

With a combination of filterfans and thermostats you can additionally achieve energy savings, material and time plus a significantly longer service life. This results in an optimised environmental balance as well as greater reliability of your production process:



- through reduced energy consumption and improvement of the filterfan efficiency
- through the reduction of the time required for cleaning the filter mats and
- through a reduction in the consumption of filter mats

Thermostats, Hygrostats and Heaters

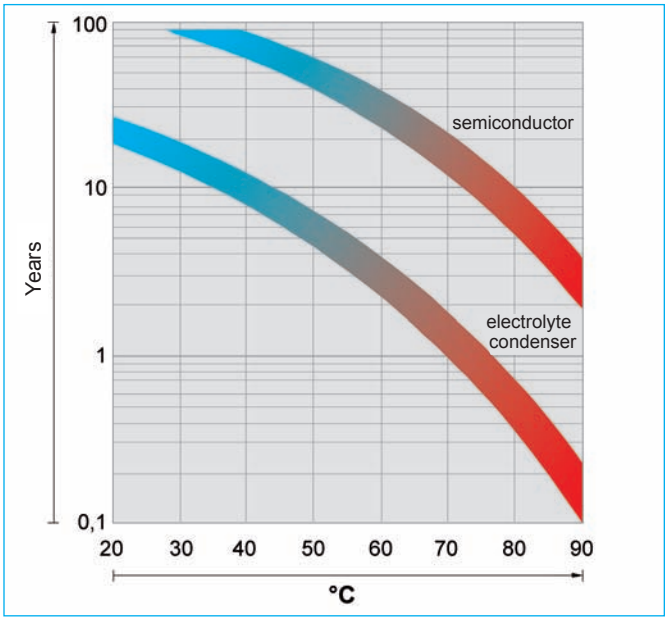
Electrical enclosure heaters in combination with thermostats and hygrostats ensure that the correct temperature is always available. In addition to savings on energy and, therefore, a better environmental balance, the combination of heaters with thermostats and hygrostats offers greater reliability of the production process:



- through pinpoint distribution and constant temperatures in the electrical enclosure
- through reduced energy consumption and improvement of the heater efficiency

The Technology of Cooling

Due to the increasing automation of processes, electro-technical components are used more and more. Therefore, the development of warmth inside the cabinet increases.
The diagram below shows the effects of the increased heat load on random components' service life. The process reliability and keeping service intervals within an economic framework are special challenges thermal management of control cabinets is faced with special challenges such as process reliability and keeping service intervals within an economic framework. Therefore, the choice of the cooling method can be pivotal with regards to it's advantages.





Three basic cooling methods

When selecting a cooling method there are three types to consider:

Natural Convection

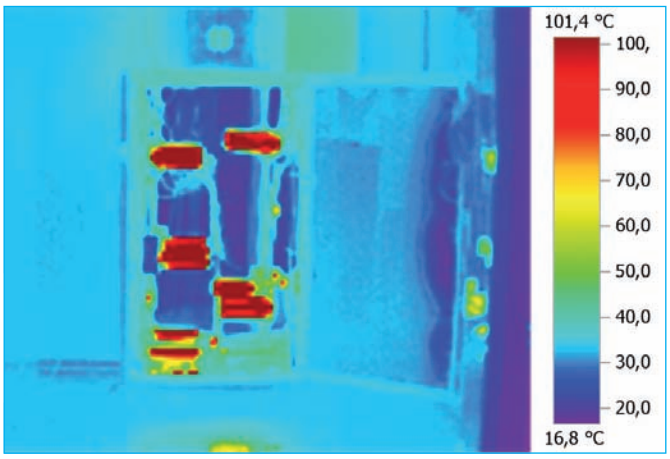
If there is only a minimal heat loss in your application, use of louvers or grills with filters can be effective. This method, however, usually provides less cooling effect than is necessary with today's components.

Forced convection

If the installation will be in a clean, non-hazardous environment with an acceptable ambient (outside the enclosure) temperature range, a simple forced-air cooling system utilizing outside air is usually adequate. Combined with an air filter, such devices generally meet the heat removal needs of typical electronic equipment and many electrical applications. An example of forced convection air cooling is filterfans.

Closed-loop cooling

In harsh environments involving high temperatures, wash-down requirements, heavy particulate matter or the presence of chemicals capable of damaging components (NEMA 4 or 12 environments), ambient air must be kept out of the enclosure. Closed-loop cooling consists of two separate circulation systems. One system seals out the ambient air, cooling and re-circulating clean, cool air throughout the enclosure. The second system uses ambient air or water to remove and discharge the heat. Example of closed-loop cooling equipment employed with electronics and process controls are cooling units and heat exchangers.



Cooling by natural convection

Rules of thumb:

- **limited to roughly + 25 Kelvin rise above ambient -** in general, the temperature rise inside the enclosure would be roughly + 25 Kelvin utilizing natural convection
- **no moving parts -** by eliminating external fans, you create a zero maintenance application
- **no dirt -** utilizing exhaust filters prevents dirt from entering cabinet, dirt can damage electronics as fast as heat!

If the ambient temperature is lower than the temperature inside the electronic cabinet, the dissipated heat escapes into the atmosphere throughout the surface of the electronic cabinet. The following simple equation is used to calculate the level of heat radiated from the electronic cabinet:

$$P_R(W) = C \times A \times \Delta T$$

- **P_R[Watt]: Radiation Power**: Thermal power radiated from the surface area of the electronic cabinet into the ambience into the electronic cabinet
- **C[W/m²K]: Coefficient of heat transmission**: Radiation power per 1 m² surface area and is difference in temperature. This constant is determined by the material:
  sheet steel - 5.5 W/m²K
  stainless steel - 5.5 W/m²K
  aluminium - 12.0 W/m²K
  plastic - 3.5 W/m²K
- **A[m²]: Surface area of electronic cabinet**: Effective surface area of a electronic cabinet measured according to the specifications of VDE 0660, part 500
- **ΔT[K]:** Difference between ambient air temperature and inside air temperature

Cooling with filterfans

Rules of thumb:

- **limited to roughly + 10 Kelvin rise above ambient -** in general, the temperature rise inside the enclosure would be roughly + 10 Kelvin
- **multiple configurations possible -** filterfans can be located in a number of locations within complex enclosure configurations
- **size fans to include static pressure -** understanding how static pressure effects the performance of a fan is very important when sizing filterfans, see chart below!

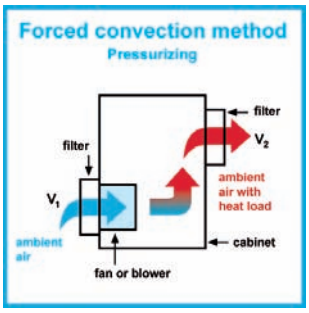
Follow this simple equation for calculating the required airflow:

$$V = \frac{3.1\ (P_D)}{\Delta T}\ [m^3/h]$$

- **V[m³/h]:** Airflow volume of filterfans
- **P_D[Watt]: Dissipation loss**: Thermal power generated inside a cabinet by the dissipation loss of components
- **ΔT:** Difference in temperature between the ambience and inside the electronic cabinet

V_1 - Fan with filter and louver rating (free flow)

V_2 - System rating with exhaust
(includes static pressure drop)



Model	V_1 [m³/h]	V_2 [m³/h]
PF 11.000	25	16
PF 22.000	61	44
PF 32.000	110	82
PF 42.500	156	116
PF 43.000	256	231
PF 65.000	480	370
PF 66.000	640	445
PF 67.000	845	560

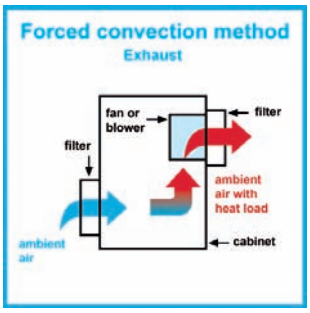
NOTE:
Always calculate cooling capacity of filterfans with the V_2 value.

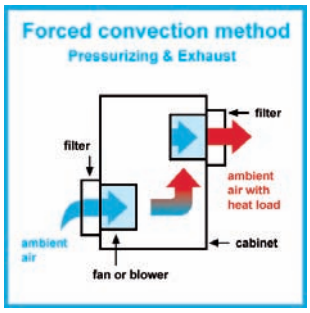
When utilizing filterfans

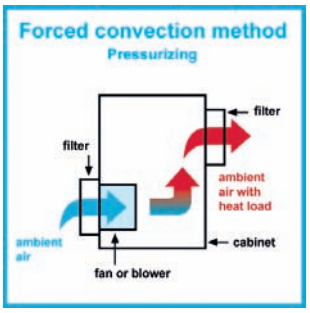
Always use the filterfan to propel the cool ambient air into enclosure. This ensures that slight positive pressure builds up inside the electronic cabinet in comparison to the ambience and that only air filtered by the filterfans flows into the enclosure. The air propelled into the cabinet displaces the warm air which exits through the exhaust filter. If, however, the air is drawn out of the electronic cabinet by suction power, unfiltered air can also enter through poor seals and cable entries.

If you install a combination of filterfan/exhaust filter, fit the filterfan in the lower third of the electronic cabinet if possible. The exhaust filter must be installed as near to the top as possible to prevent heat pockets in the upper part of the cabinet.

Install a FLZ 530 thermostat to control your filterfan. This will increase the life of the fan and decrease the amount of maintenance required to clean the filters.







Cooling with closed loop cooling units

Rules of thumb:

- **only method for reducing cabinet temperature below ambient -** if the ambient temperature is greater than the target internal temperature of the enclosure, active cooling is required
- **applications from NEMA type 12 to 4x -** closed loop systems can maintain the NEMA type rating of the cabinet
- **designer must size per ambient temperatures -** by utilizing performance charts, be sure to correctly size your system!

Pfannenberg cooling units operate on the principle of the Carnot cycle. This means that the cooling unit functions as a heat pump that “pumps” the thermal energy transferred from the electronic cabinet (heat dissipated from the components) up to a higher level of temperature (the ambient temperature can reach levels as high as + 55 °C). The air inside the enclosure is cooled down by the evaporator and at the same time dehumidified.

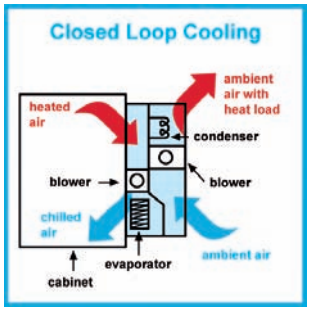
Cooling units are used if:

- the outside air cannot be used for cooling
- the required temperature inside the enclosure should be equal-to or lower-than the required ambient temperature
- the ambient air is extremely oily or dirty

Steps for sizing a cooling unit

Proper selection of a cooling unit is determined by the following criteria:

- required cooling capacity in Watt
- mounting requirements
  (side, integrated or top mount)
- dimensions of cooling unit and enclosure



Follow this simple equation for calculating the required cooling capacity:

$$P_C = P_D - P_R$$

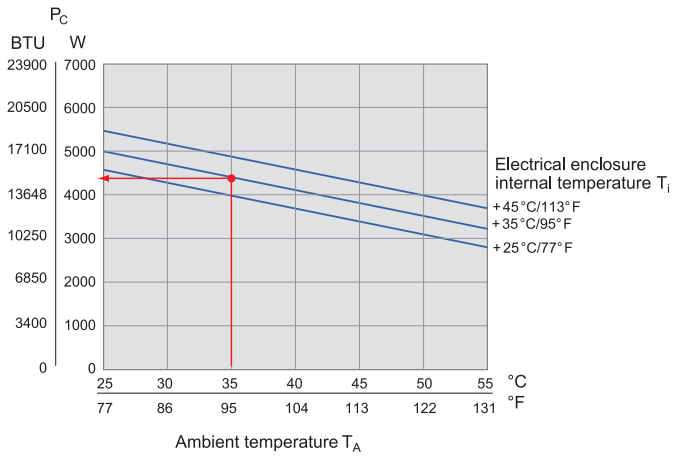
$$P_R = C \times A \times \Delta T$$

- **P_C[Watt]:** Refrigeration capacity of a cooling unit
- **P_D[Watt]: Dissipation loss**: Thermal power generated inside a cabinet by the dissipation loss of components
- **P_R[Watt]: Radiant heat gain/loss**: Heat transfer through the skin of the enclosure (insulation factor not included)

- **C[W/m²K]: Coefficient of heat transmission**
- **A[m²]: Surface area of electronic cabinet**
- **ΔT[K]:** Difference in temperature between the ambience and inside the electronic cabinet

Utilizing performance curves to properly size cooling units:

Pfannenberg utilizes the DIN standard 35/35 °C when rating our cooling units. Many other companies use 50/50 °C, which provides a higher, non-usable value. Customers should use their own application temperatures to determine the proper cooling capacity of the system.



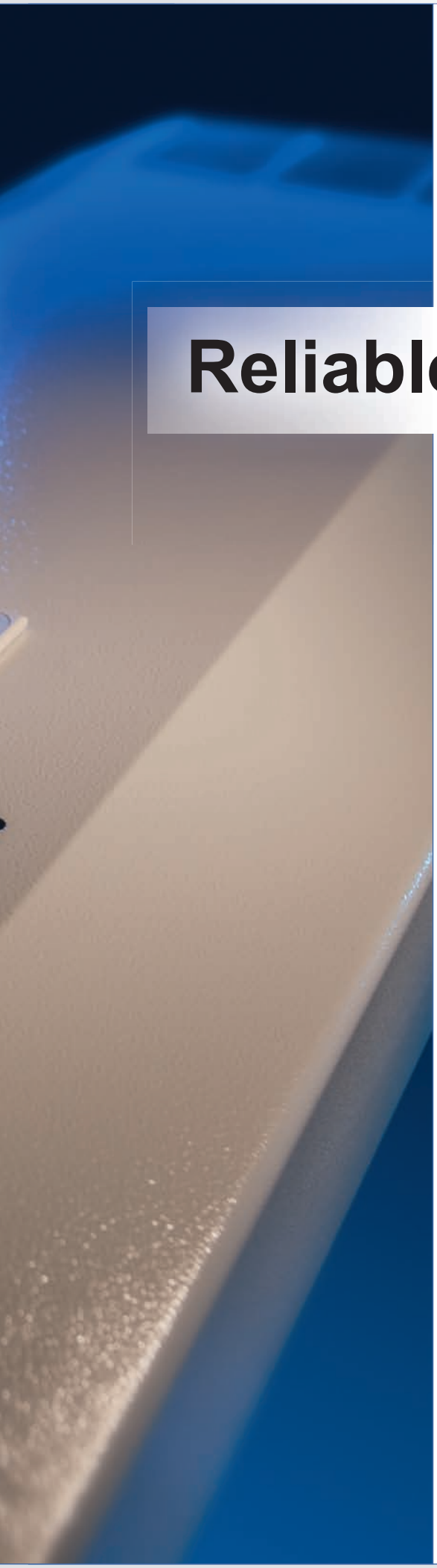
Important information when utilizing cooling units:

- the refrigeration capacity should exceed the dissipation loss from the installed components by approximately 10%
- the enclosure should be sealed to prevent the inflow of ambient air
- use the door contact switch to impede operation with open doors and consequent excessive accumulation of condensation
- use cooling units with maximum clearance between air inflow and air outflow to prevent poor circulation
- make sure that the air inflow and air outflow in the external circuit is not hindered, preventing proper heat exchanging at the condenser
- when using top-mounted cooling units, make sure that components with their own fans do not expel the air directly into the cooling unit's cool air outflow. Make sure unit is level.
- setting the temperature to the lowest setting is not the optimal solution due to the condensation issues. The value we have preset on the cooling unit is a sound compromise between cooling the inside of the enclosure and the accumulation of condensation.



Use the Pfannenberg Sizing Software, PSS considers self-convection for calculation and demonstrates it. You can download a free version on www.pfannenberg.com


M 2



Reliable to the farthest corner

DTS, DTI and DTT Cooling unit series

In addition to quality, function and performance, we have also taken into account the subject of ‘service-friendliness’ while developing our cooling units.

The trouble-free running of your process controller is always at the centre of attention in the realisation phase of our products, as well as optimised energy consumption and usage of materials and time.

The DTI and DTS series are two extraordinary cooling unit product lines available to you. These satisfy all requirements for partially recessed (DTI) and side mounted (DTS) installation for every size of enclosure.

Furthermore, an absolute world innovation: DTT. The top mounted cooling units offer unique security through the innovative, patented condensate management system and it is installable in the most limited of spaces.

The ℰCOOL Family from Pfannenberg

Everywhere you see the new ℰCOOL logo it stands for a Pfannenberg product that distinguishes itself by:
- energy-efficiency
- environment
- easy-handling

ℰCOOL – the standard of the future

With its new product range Pfannenberg is responding to the users' increasing demands and to the growing climate awareness. The aim in developing the **ℰCOOL** series is the largest possible cost efficiency with the best possible performance.

Optimum in energy-efficiency

The **ℰCOOL** series has made an enormous leap in development compared with the tried and tested DTI/DTS units, in particular in energy efficiency.
Especially developed components combined with intelligent electronics of the newest generation reduce the energy consumption by up to 43%; in stand-by mode by a further 10%.



ℰCOOL DTI/DTS und DTT

The time-tested, high-quality industrial standard of the DTI/DTS completely covers the needs for side-mounting and door-mounting, as well as for the partially sunk-in mounting (DTI) of every cabinet size.
Additionally Pfannenberg's DTT series provides, thanks to its innovative, patented condensate management a safety standard for roof-mounted cooling units that has never been attained before.
The **ℰCOOL** series is a role model for a new generation of cooling units.

ℰfficiency

ℰCOOL means cutting-edge technology which provides the users with enormous cost benefits over the entire running term. Records for the energy efficiency and the service factors MTTR and MTBF guarantee a high Return On Investment.

ℰCOOL

The distinctly increased EER (Energy Efficiency Ratio) of the ℰCOOL series is globally market-leading!

$$\varepsilon = \frac{\dot{Q}_K}{P_{el}}$$

The **Energy Efficiency Ratio (EER)** is defined as the quotient of the actual cooling capacity of the cooling unit and its nominal power consumption. The cooling capacity factor **ℰ** corresponds therefore to the efficiency ratio. The higher the value, the less energy consumption is needed in order to provide the cooling performance.

Up to 10% less energy consumption in stand-by mode

Up to 43% less energy consumption

Up to 48% less CO_2 emissions

Up to 80% shorter service / repair times

... in comparison to conventional cooling units

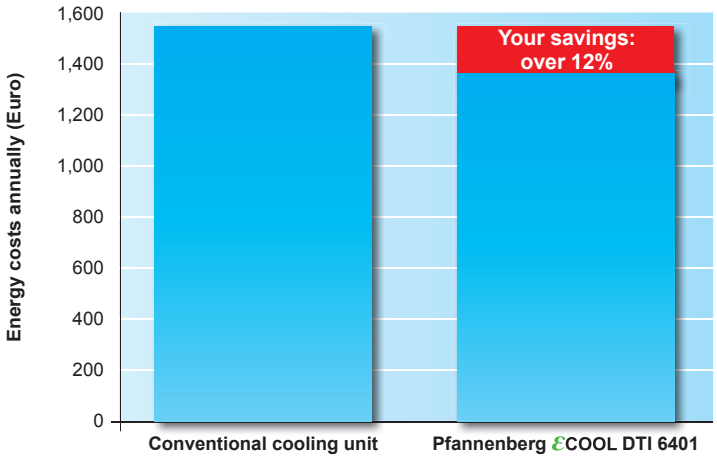
Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY

Effective Cost Savings with Pfannenberg ECOOL Cooling Units



Take a small business with 5 cooling units, which works in two shifts as an example. In comparison to the **ECOOL** DTI 6401 with a 2000 W cooling capacity and a comparable unit available on the market.

Energy savings comparison:
Savings of over 12%



The ECOOL DTI 6401 saves 12% in energy costs in comparison to conventional cooling units.

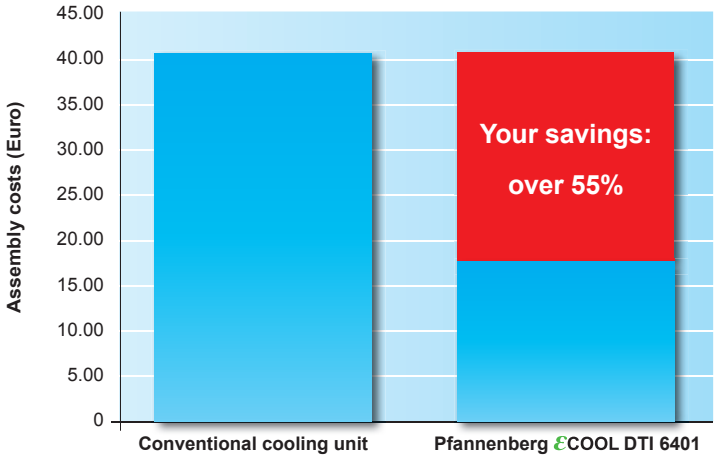
Basic parameter for energy comparison

Uptime at full performance	70%
Uptime at partial performance	30%
Total uptime per day	16 hes
Total uptime per year	240 days
Electricity price in Germany*	0.1233 €/kWh*
Number of units	5 pieces
Cooling capacity	2000 W

*Ø electricity price 2012 according to BDEW

Energy costs	
Conventional cooling units	1554.64 € annually
ECOOL DTI 6401	1359.61 € annually
Your savings	**195.02 € annually**

Assembly cost comparison:
Savings of over 55%



Another large potential for savings is the reduction of service and assembly time (MTTR).

Assembly and service times (MTTR) [min]

	Conventional cooling units	**ECOOL** *cooling units*
Assembly	25	3
External fan change	6	6
Internal fan change	6	6
Fuse replacement	8	1
Filter change	2	1
Control board change	15	10
Total	**62**	**27**

Calculated hourly wage of technician	40 €
Number of units	5

Assembly costs	
Conventional cooling units	206.67 €
ECOOL DTI 6401	90.00 €
Your savings	**116.67 €**

The ECOOL product family unites total savings potential in one unit.

New advantages of the ECOOL Cooling Unit Series

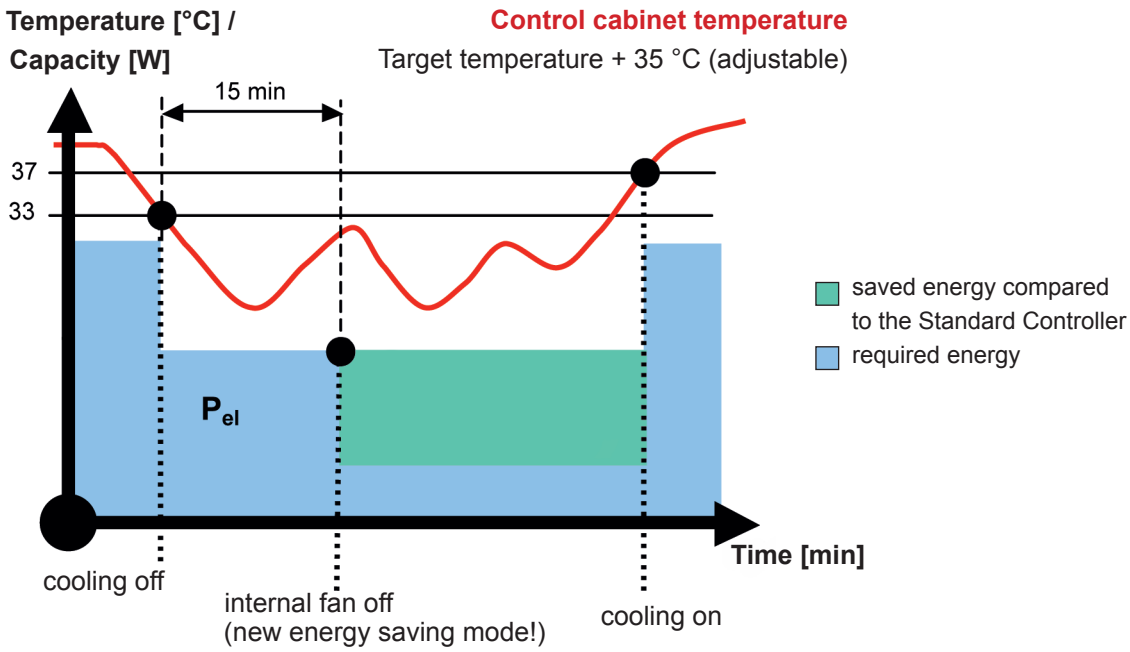
New Filter Adapter

- Optionally available adapter for multiple use and all filter inserts
- Optional filter inserts (aluminum, fleece or fluted filter inserts) depending on the environmental conditions / application
- Patented fluted filter mats extend the service intervals by 300%
- Tool-less installation and tool-less filter replacement
- Filter replacement in less than one minute
- Filter adapter available in several colors

Filter Adapter

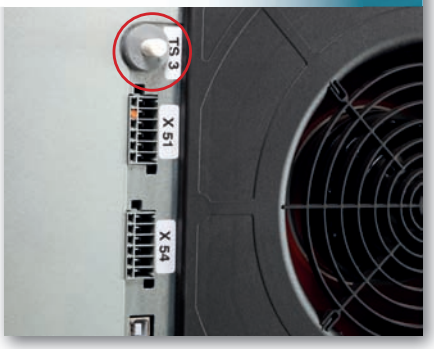


New Energy Saving Mode with additional temperature probe



- Pfannenberg „MultiController“ (MC) has now been upgraded with the energy savings mode (ESM) as a standard feature (DTI/DTS 6000 series)
- Internal fan switches off when no temperature increase is registered, condensate evaporator will be deactivated too
- Cooling mode starts automatically upon exceeding the required cabinet temperature
- Additional temperature probe for precise measurement of the internal cabinet temperature and to ensure correct operation of the energy savings mode
- No intermediate start-up of the internal fan necessary for temperature monitoring of the cabinet
- Fan’s length of life is significantly longer

Multi Controller



Easy Handling: perfect service-friendliness decreases routine costs

Thought-out solutions for installation and service

From the cut-out compatibility to the flexible software solutions:

Pfannenberg' **ECOOL** series takes excellent accessibility and simple maintenance into consideration.

- Large condenser fin spacing allow for longer maintenance periods, even without an additional Nano coating
- One mounting cut-out for 5 different performances, 1000 W – 4000 W
- Mounting possible by 1 man in a few minutes
- Simple accessibility to all the relevant components
- Plug & Play: fast component replacement
- Integration in established net-work possible
- Versatile voltage supply of 380 – 460 V via built-in transformer
- Integrated condensate evaporation system

Time-saving

Efficient assembly; the tool-less, quick and patented mounting method reduces process costs considerably. Don't just take our word for it! See our video demonstration on the web. Follow the „single-handed installation" at **www.pfannenberg.com** to see how you can save time and money.

Easy mounting

Pfannenberg offers cooling units with the largest possible cut-out compatibility in order to be able to provide a unit replacement with the least possible installation work. Intelligent mounting systems minimize work during unit installation and replacement.

Pfannenberg Sizing Software (PSS)

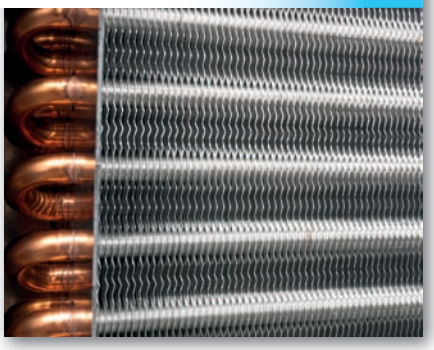
Pfannenberg's Sizing Software determines your cooling requirements, calculates the necessary cooling capacity and recommends the appropriate equipment components. Thus, you receive a tailor-made solution which gives you the security of a perfect dimensioning and prevents costly over-dimensioning. Download the PSS free of charge or calculate directly online on www.pfannenberg.com/en/support/pss-sizing-software.html.

Available as an APP:

PSS-APP and

Online PSS

Large fin spacing



Simple installation



Condensate evaporation system



PSS



DTT provides 100% protection against condensation for top-mounted devices

All the hazards of the past in standard systems have been effectively eliminated by Pfannenberg by means of the new DTT series.

1st hazard: Condensation build up on the outer area (bottom) of the top-mount cooling units, in which a particular amount ends up within the electrical enclosure.

Pfannenberg solution: In the DTT concept, the condensation build up is in the upper portion of the cooling unit. In contrast to the earlier norm, the „cold“ side is now at the top. Condensate build up is routed safely into the integrated condensate evaporator.

2nd hazard: When the warm and moist air from the enclosure cools down condensation builds up on the vapourizer. A certain amount of condensate droplets can be collected and routed into the flow of cold air and end up in the electrical enclosure.

Pfannenberg solution: The new design of the DTT series leads to an extensive separation of the routing of the air and vapourizer. The air speed at the vapourizer is therefore reduced significantly. This ensures the prevention of condensate turbulence.

3rd hazard: In the cold side of the cooling unit, condensation can form on the ceiling within the electrical enclosure and drip into enclosure. Traditionally, this is located at the bottom portion of the cooling unit and borders with the warm top portion of the electrical enclosure.

Pfannenberg solution: The innovative DTT concept puts the internal air circuits in the reverse order. As a result, a large temperature difference between the surface of the DTT and the electrical enclosure is avoided and the possibility of condensation build up is eliminated.

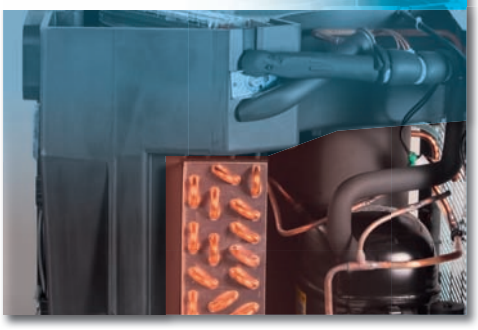
4th hazard: On the outer surfaces of the air routing duct, the cold air leaving the duct and warm air within the enclosure collide with one another and due to a “shock effect” condensation can occur within the electrical enclosure.

Pfannenberg solution: The DTT top mount cooling unit has eliminated the need for an air routing duct. Instead, the DTT uses high performance fans and therefore, due to special air channels, an increase of air speed is achieved and as a result, the cold air routing to the bottom section of the electrical enclosure is guaranteed.

DTT – Safety with 4X condensate protection!

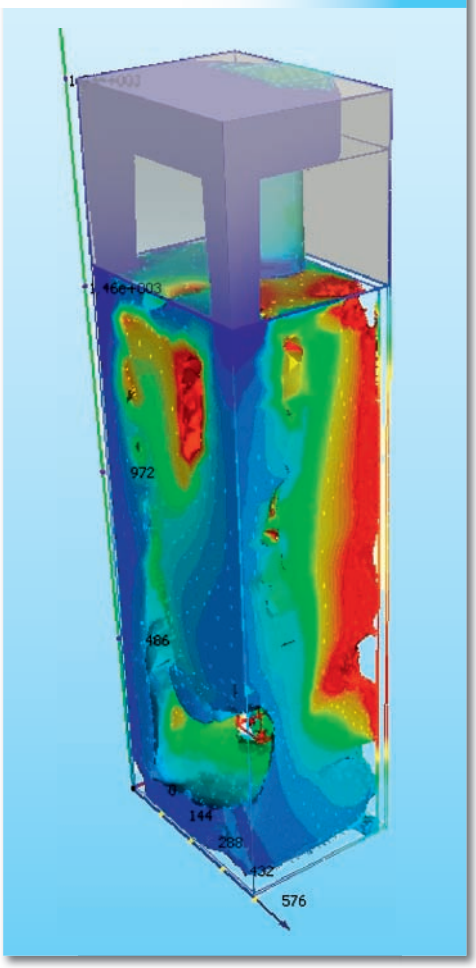
1. **No penetration of condensate into the electrical enclosure**
2. **No condensate turbulence in the air flow**
3. **No condensate build up on the bottom area of the cooling unit**
4. **No condensate-prone air routing duct (hoses)**

DTT Concept



The innovative order of the cold area above the warm parts of the cooling unit ensures the prevention of condensate build up in the enclosure’s interior

Optimised air conduction



A high airflow speed and optimised cold air passage into the electrical enclosure ensures 100% efficient cooling of the enclosure without any additional air routing

Easy andling: Cut costs with the DTT service and maintenance friendliness

An easy assembly, operation and maintenance of the cooling units are an advantage especially in places where there is limited space. The DTT series gives you several beneficial product features at once.

Very long service intervals

The condenser's large fin spacing extends the service intervals significantly, also without an additional nano-coating. Thus, in many application areas no pre-filter is needed at all.

Filter change in seconds

The front cover can be opened with one movement and the pre-filter can be changed in seconds. There is an aluminum filter available for filter operation.

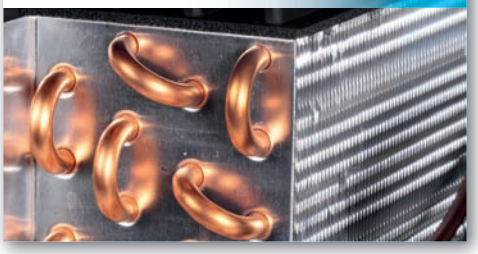
Perfect access to electronics and fan motor

The most important components can be easily accessed using the service panel on the front of the unit. The whole cover can be removed by pulling forward for easy access without disassembling.

Intelligent mounting via Twist & Fit

Mounting without screws using turnbuckle makes a tool-free assembly and exact adjustment by hand possible.

Large fin spacing



Perfect accessibility



Twist & Fit mounting





Environment: Responsibility for the environment and resources

In light of the growing climate and environment problems, Pfannenberg is dedicated more than ever to the safety of man, machine and the environment. That is why environment-friendly production process and careful use of available resources define our actions. Decreasing your thermal management costs through first-class energy efficiency and exemplary Life Cycle Advantage is our foremost goal with the **ECOOL** series.



All cooling units at a glance

Type	Cooling capacity	Rated voltage	Dimensions (HxWxD)	Approvals					Page
				UR	UL	cUL	GOST	CE	
Cooling units from the DTI and DTS series – cooling units in installation and surface mounting variants for side and door mounting									
DTI 6801	4000 W	400 V 3~	1539 x 485 x 372 mm	●		○	●	●	24
DTS 6801			1549 x 485 x 372 mm						
DTI 6501	2500 W	400 V 3~	1536 x 485 x 278 mm	●		○	●	●	25
DTS 6501			1543 x 485 x 278 mm						
DTI 6401	2000 W	230 V / 400 V 3~	1536 x 485 x 278 mm	●		○	●	●	28
DTS 6401			1543 x 485 x 278 mm						
DTI 6301	1500 W	115 V / 230 V / 400 V 2~	1536 x 485 x 218 mm	●		○	●	●	30
DTS 6301			1539 x 485 x 218 mm						
DTI 6201	1000 W	115 V / 230 V / 400 V 2~	1536 x 485 x 218 mm	●		○	●	●	32
DTS 6201			1539 x 485 x 218 mm						
DTI 9141	950 W	115 V / 230 V / 400 V 2~	958 x 410 x 248 mm	●		●	●	●	34
DTS 9141			964x 410 x 248 mm						
DTI 9341C	1500 W	115 V / 230 V / 400 V 2~	958 x 410 x 248 mm	●		●	●	●	34
DTS 9341C			964 x 410 x 248 mm						
DTI 9041	870 W	115 V / 230 V / 400 V 2~	599 x 380 x 231/231/363 mm	●		●	●	●	36
DTS 9041			604 x 380 x 231/231/363 mm						
DTI 9031	510 W	115 V / 230 V / 400 V 2~	562 x 310 x 212/212/353 mm	●		●	●	●	38
DTS 9031			565 x 310 x 212/212/353 mm						
DTFI 9021	320 W	115 V / 230 V / 400 V 2~	326/326/464 x 385 x 252 mm	●		●	●	●	40
DTI 9021	320 W	115 V / 230 V	329 x 385 x 252 mm	●		●	●	●	40
DTS 9011H	300 W	230 V	300 x 495 x 140 mm	●		●		●	42
DTS 7541	2500 W	400 V 3~[2]	1350 x 397 x 270 mm	●		●	●	●	44
DTS 7441	2000 W	400 V 3~ [2]	1350 x 397 x 270 mm	●		●	●	●	44
DTS 7341	1500 W	115 V / 230 V / 400 V 2~[1]	1350 x 390 x 200 mm	●		●	●	●	46
DTS 7241	1000 W	115 V / 230 V	1350 x 390 x 200 mm	●		●	●	●	46
Cooling units from the DTS series – cooling units for side mounting in outdoor areas									
DTS 3661/3681	5500 W	400 V 3~	1667 x 483 x 623 mm		●	●	●	●	48
DTS 3561/3581	4000 W	400 V 3~	1502 x 483 x 534 mm		●	●	●	●	50
DTS 3361/3381	2800 W	400 V 3~	1502 x 403 x 468 mm		●	●	●	●	52
DTS 3265/3285	2900 W	230 V / 400 V 3~	1347 x 411 x 301 mm		●	●	●	●	54
DTS 3261/3281	2000 W	115 V / 230 V / 400 V 3~	1209 x 395 x 326 mm		●	●	●	●	56
DTS 3165/3185	1600 W	230 V / 400 V 3~	914 x 305 x 302 mm		●	●	●	●	58
DTS 3161/3181	1100 W	115 V / 230 V / 400 V 2~	748 x 395 x 294 mm		●	●	●	●	60
DTS 3061/3081	680 W	115 V / 230 V	512 x 256 x 274 mm		●	●	●	●	62

[1] variant without UR
[2] MC variant without UR

● available
○ pending

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ELECTRO-TECHNOLOGY FOR INDUSTRY

All cooling units at a glance

Type	Cooling capacity	Rated voltage	Dimensions (HxWxD)	Approvals					Page
				UR	UL	cUL	GOST	CE	
High temperature cooling units from the DTS series – cooling units for side mounting in outdoor areas									
DTS 3265 HT	2800 W	230 V	1209 x 395 x 326 mm		●	●		●	64
DTS 3165 HT	1600 W		914 x 305 x 302 mm		●	●		●	64
DTS 3061 HT	600 W		512 x 256 x 274 mm		●	●		●	64
Roof-mounted cooling units from the DTT series – cooling units for top mounting									
DTT 6801	4000 W	400 V 3~	485 x 795 x 575 mm	●		●	○	●	66
DTT 6601	3000 W	400 V 3~	485 x 795 x 575 mm	●		●	○	●	66
DTT 6401	2000 W	115 V / 230 V / 400 V 3~	435 x 595 x 495 mm	●		●	○	●	68
DTT 6301	1500 W	115 V / 230 V / 400 V 2~	435 x 595 x 495 mm	●		●	○	●	68
DTT 6201	1000 W	115 V / 230 V / 400 V 2~	435 x 595 x 395 mm	●		●	○	●	70
DTT 6101	500 W	115 V / 230 V	435 x 595 x 395 mm	●		●	○	●	70
Peltier Cooling units									
PTM 100	100 W	24 V DC	367 x 181 x 151 mm					●	72
PTM 150	150 W	24 V DC	495 x 181 x 151 mm					●	72
Accessories									
Pre-filter, aluminium									75
ECOOL filter									75
Filter kits for DTS 3xxx series									74
External condensate evaporation system		230 V							74
Condensate bottle									74
Transport eye bolts									74
Cooling unit controller									74
ECOOL-Plant Software									74
Quick installation frame									75
Internal enclosure fan PEF 180		24 V DC / 115 V AC / 230 V AC							75
Air diverter internal									75
Air baffle internal									75

[1] variant without UL

● available
○ pending



Further information can be found on the Internet:
www.pfannenberg.com · **www.pfannenberg-spareparts.com**
Keep up to date. Subscribe to the newsletter now:
newsletter.pfannenberg.com

ECOOL Cooling units 4000 W
DTI/DTS 6801



DTI: for partially recessed mounting of the cooling unit in the door or side
DTS: for outer mounting of the cooling unit on the door or side

- top EER (energy efficiency ratio)
- energy efficient: reduced CO_2 emissions = environment-friendly
- condenser with large fin spacing for highly effective protection in strongly contaminated ambient air
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- exceptional serviceability
- new USB port for easy retrieval of parameter settings/history (Pfannenberg **ECOOL-**Plant software necessary)
- optional filter (easy to retrofit)
- energy-saving mode by default integrated into the Multi Controller

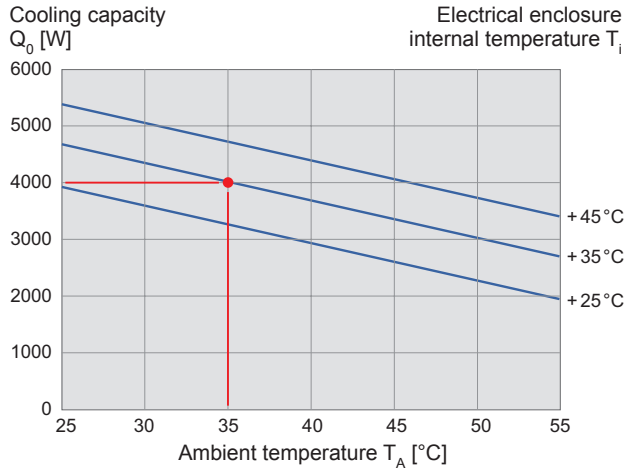
Data		DTI 6801	DTS 6801	Unit
Article number	Standard Controller	13896812055	13886812055	
	Multi Controller	13896822055	13886822055	
	V2A, Standard Controller	13896812015	13886812015	
	V2A, Multi Controller	13896822015	13886822015	
Rated voltage [1] ± 10%		AC 50 / 60		Hz
		400 / 460 3~		V
Cooling performance according to EN 14511	L35/L35	4000		W
	L35/L50	3050		
Power consumption	L35/L35	1918 / 2369		
Current consumption	L35/L35	4.5 / 4.6		A
Starting current	L35/L35	28.3		
Energy efficiency ratio $\varepsilon_{ke} = \frac{Q_0}{P}$ ➛COP		2.09		
Unimpeded airflow (free flow)	internal	1450		m^3/h
	external	1450		
Pre fuse T		16		A
Type of connection		spring-type terminal included with plug		
Noise level according to EN ISO 3741		< 70		dB (A)
Weight (without packaging)		91	95	kg
Ambient temperature range		+ 15 … + 55 / + 59 … + 131		°C / °F
Control range (adjustable)	SC	+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95		
	MC	+ 25 … + 50 / + 77 … + 122; factory setting + 35 / + 95		
Refrigerant	R134a	2000		g
Condensate management		integrated condensate evaporation system with safety overflow		
Protection system according to EN 60529	IP54	towards the electrical enclosure if used as intended by the manufacturer		
	IP34	towards the surroundings if used as intended by the manufacturer		
Design	housing	galvanised sheet steel		
	cover	electrostatically powder coated (200 °C), or stainless steel		
Colour		RAL 7035 (different colours available on request) or stainless steel		

Accessories	Piece	Article number	Information on page
Filter adapter	1	18310000151	75
Aluminium filter	1	18300000149	75
Vlies filter	5	18300000147	75
Fluted filter	5	18300000148	75

[1] Suitable for various supply voltages (see technical data sheet).
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

DTI/DTS 6801



Dimensions

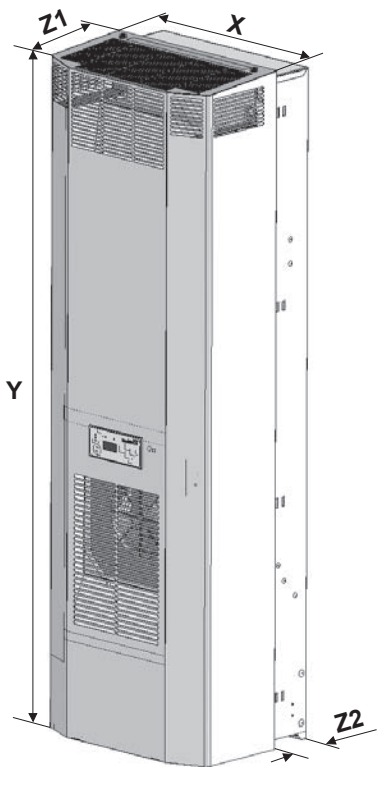
DTI	X	Y	Z1	Z2	K	L
mm	485	1539	252	120	1510	450

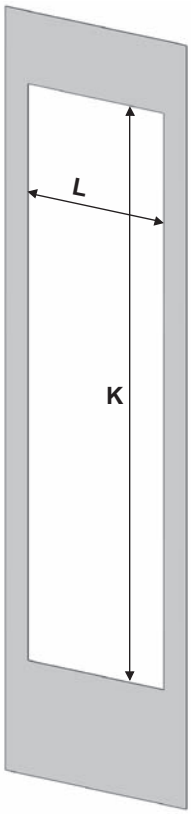
DTI variants partially recessed by 120 mm after installation

DTS	X	Y	Z	A	B	C	D	E	F	G	H	I
mm	485	1549	372	700	282	220	10	450	510	290	315	350

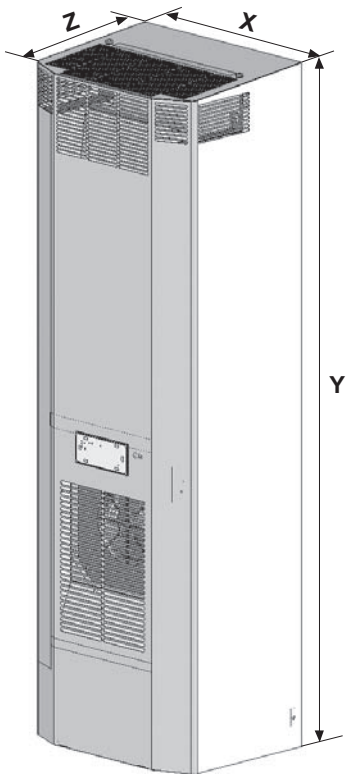
Mounting holes Ø 8 mm and cut-out radii R20

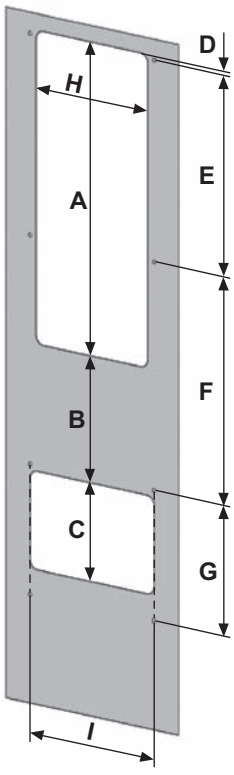
DTI 6801





DTS 6801





ECOOL Cooling units 2500 W
DTI/DTS 6501



DTI: for partially recessed mounting of the cooling unit in the door or side
DTS: for outer mounting of the cooling unit on the door or side

- top EER (energy efficiency ratio)
- energy efficient: reduced CO_2 emissions = environment-friendly
- condenser with large fin spacing for highly effective protection in strongly contaminated ambient air
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- exceptional serviceability
- new USB port for easy retrieval of parameter settings/history (Pfannenberg **ECOOL-**Plant software necessary)
- optional filter (easy to retrofit)
- energy-saving mode by default integrated into the Multi Controller

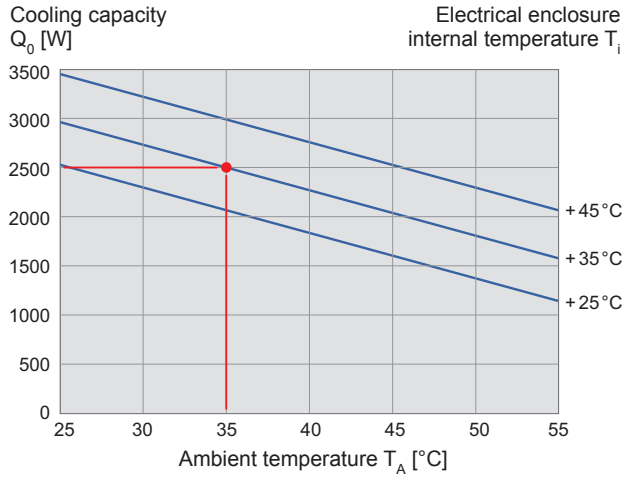
Data		DTI 6501	DTS 6501	Unit
Article number	Standard Controller	13896512055	13886512055	
	Multi Controller	13896522055	13886522055	
	V2A, Standard Controller	13896512015	13886512015	
	V2A, Multi Controller	13896522015	13886522015	
Rated voltage [1] ± 10%		AC 50 / 60		Hz
		400 / 460 3~		V
Cooling performance according to EN 14511	L35/L35	2500		W
	L35/L50	1800		
Power consumption	L35/L35	1048 / 1247		
Current consumption	L35/L35	3.27 / 3.1		A
Starting current	L35/L35	16		
Energy efficiency ratio $\varepsilon_{ke} = \frac{Q_0}{P} \rightarrow$ COP		2.39		
Unimpeded airflow (free flow)	internal	935		m^3/h
	external	1260		
Pre fuse T		16		A
Type of connection		spring-type terminal included with plug		
Noise level according to EN ISO 3741		< 65		dB (A)
Weight (without packaging)		67	71	kg
Ambient temperature range		+ 15 … + 55 / + 59 … + 131		°C / °F
Control range (adjustable)	SC	+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95		
	MC	+ 25 … + 50 / + 77 … + 122; factory setting + 35 / + 95		
Refrigerant	R134a	1400		g
Condensate management		integrated condensate evaporation system with safety overflow		
Protection system according to EN 60529	IP54	towards the electrical enclosure if used as intended by the manufacturer		
	IP34	towards the surroundings if used as intended by the manufacturer		
Design	housing	galvanised sheet steel		
	cover	electrostatically powder coated (200 °C), or stainless steel		
Colour		RAL 7035 (different colours available on request) or stainless steel		

Accessories	Piece	Article number	Information on page
Filter adapter	1	18310000151	75
Aluminium filter	1	18300000149	75
Vlies filter	5	18300000147	75
Fluted filter	5	18300000148	75

[1] Suitable for various supply voltages (see technical data sheet).
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

DTI/DTS 6501



Dimensions

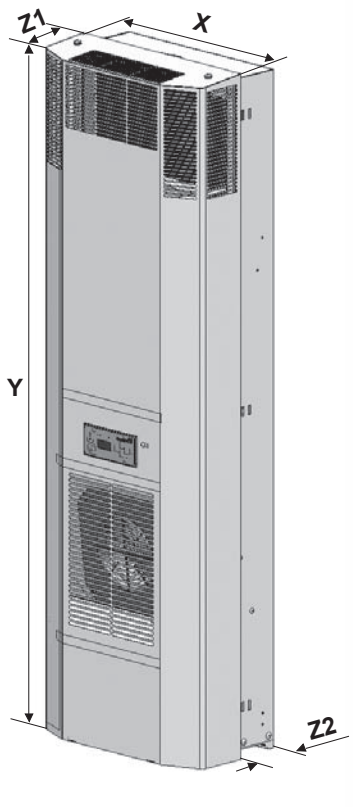
DTI	X	Y	Z1	Z2	K	L
mm	485	1536	158	120	1510	450

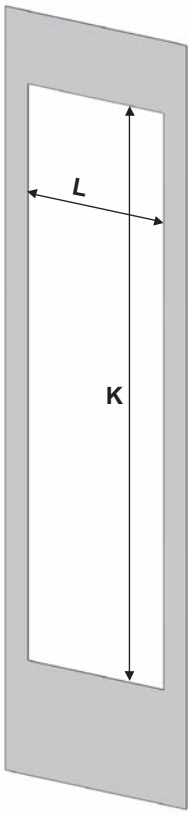
DTI variants partially recessed by 120 mm after installation

DTS	X	Y	Z	A	B	C	D	E	F	G	H	I
mm	485	1543	278	700	282	220	10	450	510	290	315	350

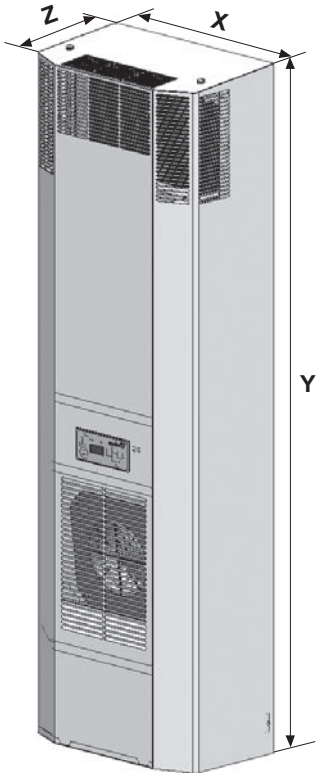
Mounting holes Ø 8 mm and cut-out radii R20

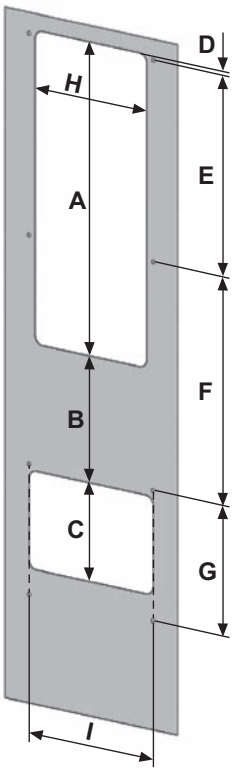
DTI 6501





DTS 6501





ECOOL Cooling units 2000 W
DTI/DTS 6401



DTI: for partially recessed mounting of the cooling unit in the door or side
DTS: for outer mounting of the cooling unit on the door or side

- top EER (energy efficiency ratio)
- energy efficient: reduced CO_2 emissions = environment-friendly
- condenser with large fin spacing for highly effective protection in strongly contaminated ambient air
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- exceptional serviceability
- new USB port for easy retrieval of parameter settings/history (Pfannenberg **ECOOL-**Plant software necessary)
- optional filter (easy to retrofit)
- energy-saving mode by default integrated into the Multi Controller

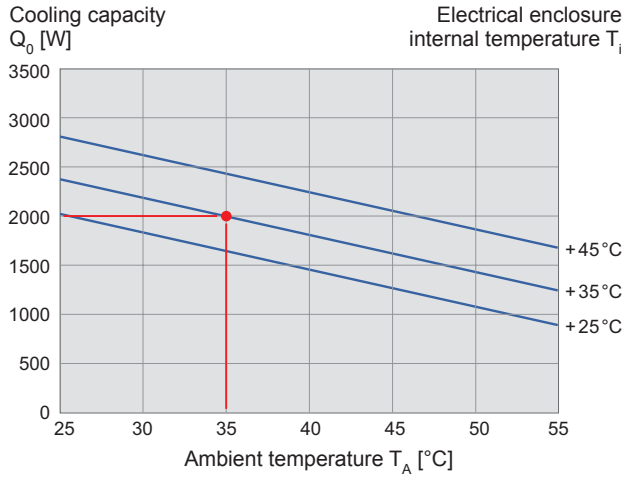
Data		DTI 6401		DTS 6401		Unit
Article number	Standard Controller	13896412055	13896411055	13886412055	13886411055	
	Multi Controller	13896422055	13896421055	13886422055	13886421055	
	V2A, Standard Controller	13896412015	13896411015	13886412015	13886411015	
	V2A, Multi Controller	13896422015	13896421015	13886422015	13886421015	
Rated voltage [1] ± 10%		AC 50 / 60				Hz
		400 / 460 3~	230	400 / 460 3~	230	V
Cooling performance according to EN 14511	L35/L35	2000				W
	L35/L50	1440				
Power consumption	L35/L35	753 / 908	1047 / 1273	753 / 908	1047 / 1273	
Current consumption	L35/L35	2.71 / 2.59	5.45 / 6	2.71 / 2.59	5.45 / 6	A
Starting current	L35/L35	12.0	21.4	12.0	21.4	
Energy efficiency ratio $\varepsilon_{ke} = \frac{Q_0}{P}$ ➛ COP		2.66	1.91	2.66	1.91	
Unimpeded airflow (free flow)	internal	935				m^3/h
	external	1260				
Pre fuse T		16				A
Type of connection		spring-type terminal included with plug				
Noise level according to EN ISO 3741		< 65				dB (A)
Weight (without packaging)		67		71		kg
Ambient temperature range		+ 15 … + 55 / + 59 … + 131				°C / °F
Control range (adjustable)	SC	+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95				
	MC	+ 25 … + 50 / + 77 … + 122; factory setting + 35 / + 95				
Refrigerant	R134a	1400	1200	1400	1200	g
Condensate management		integrated condensate evaporation system with safety overflow				
Protection system according to EN 60529	IP54	towards the electrical enclosure if used as intended by the manufacturer				
	IP34	towards the surroundings if used as intended by the manufacturer				
Design	housing	galvanised sheet steel				
	cover	electrostatically powder coated (200 °C), or stainless steel				
Colour		RAL 7035 (different colours available on request) or stainless steel				

Accessories	Piece	Article number	Information on page
Filter adapter	1	18310000151	75
Aluminium filter	1	18300000149	75
Vlies filter	5	18300000147	75
Fluted filter	5	18300000148	75

[1] Suitable for various supply voltages (see technical data sheet).
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

DTI/DTS 6401



Dimensions

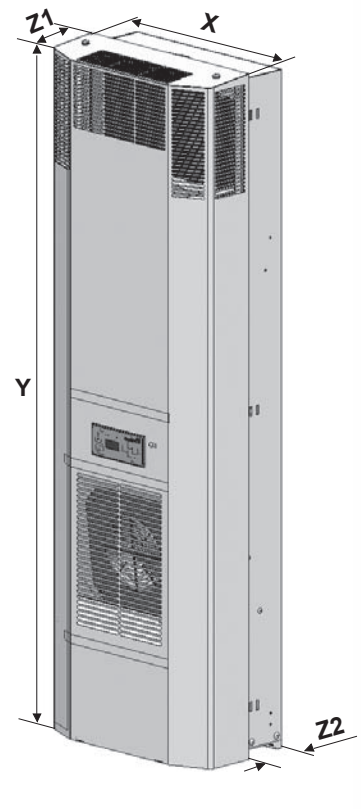
DTI	X	Y	Z1	Z2	K	L
mm	485	1536	158	120	1510	450

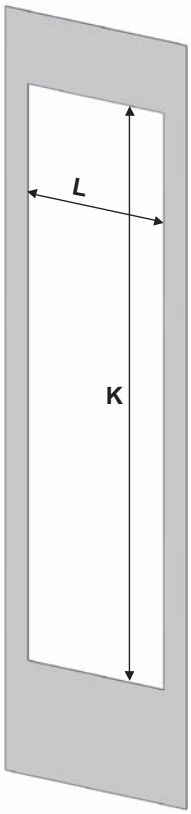
DTI variants partially recessed by 120 mm after installation

DTS	X	Y	Z	A	B	C	D	E	F	G	H	I
mm	485	1543	278	700	282	220	10	450	510	290	315	350

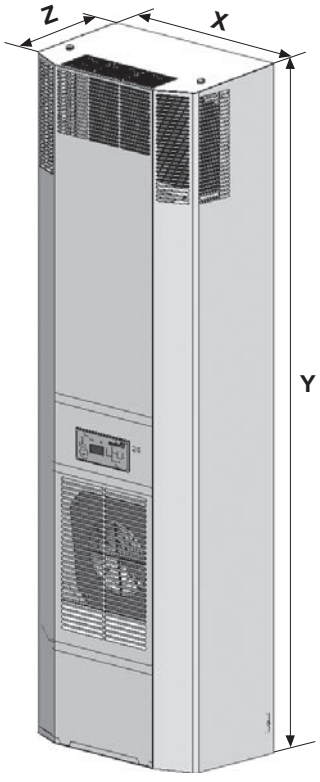
Mounting holes Ø 8 mm and cut-out radii R20

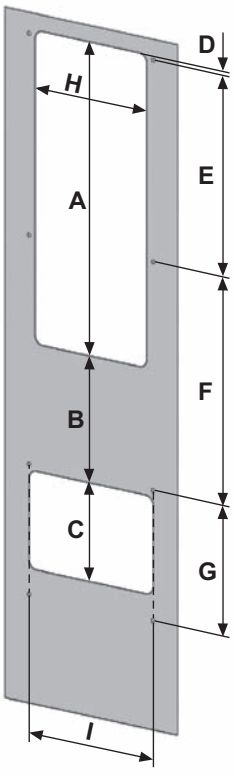
DTI 6401





DTS 6401





ECOOL Cooling units 1500 W
DTI/DTS 6301



DTI: for partially recessed mounting of the cooling unit in the door or side
DTS: for outer mounting of the cooling unit on the door or side

- top EER (energy efficiency ratio)
- energy efficient: reduced CO_2 emissions = environment-friendly
- condenser with large fin spacing for highly effective protection in strongly contaminated ambient air
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- exceptional serviceability
- new USB port for easy retrieval of parameter settings/history (Pfannenberg **ECOOL-**Plant software necessary)
- optional filter (easy to retrofit)
- energy-saving mode by default integrated into the Multi Controller

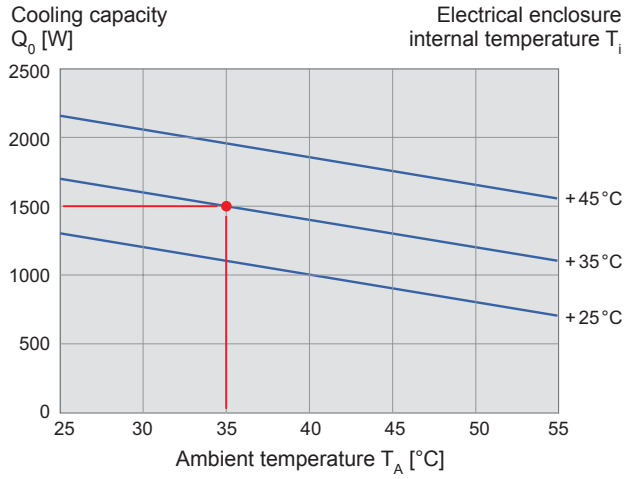
Data		DTI 6301		DTS 6301		Unit
Article number	Standard Controller	13896319055	13896311055	13886319055	13886311055	
	Multi Controller	13896329055	13896321055	13886329055	13886321055	
	V2A, Standard Controller	13896319015	13896311015	13886319015	13886311015	
	V2A, Multi Controller	13896329015	13896321015	13886329015	13886321015	
Rated voltage [1] ± 10%		AC 50 / 60				Hz
		400 / 460 3~	230	400 / 460 3~	230	V
Cooling performance according to EN 14511	L35/L35	1500				W
	L35/L50	1200				
Power consumption	L35/L35	786 / 863	727 / 868	786 / 863	727 / 868	
Current consumption	L35/L35	3.65 / 3.35	5.08 / 5.17	3.65 / 3.35	5.08 / 5.17	A
Starting current	L35/L35	19.7				
Energy efficiency ratio $\varepsilon_{ke} = \frac{Q_0}{P} \frac{\rightarrow}{COP}$		1.91	2.06	1.91	2.06	
Unimpeded airflow (free flow)	internal	935				m³/h
	external	938				
Pre fuse T		6	16	6	16	A
Type of connection		spring-type terminal included with plug				
Noise level according to EN ISO 3741		< 62				dB (A)
Weight (without packaging)		55	50	56	51	kg
Ambient temperature range		+ 15 … + 55 / + 59 … + 131				°C / °F
Control range (adjustable)	SC	+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95				
	MC	+ 25 … + 50 / + 77 … + 122; factory setting + 35 / + 95				
Refrigerant	R134a	600				g
Condensate management		integrated condensate evaporation system with safety overflow				
Protection system according to EN 60529	IP54	towards the electrical enclosure if used as intended by the manufacturer				
	IP34	towards the surroundings if used as intended by the manufacturer				
Design	housing	galvanised sheet steel				
	cover	electrostatically powder coated (200 °C), or stainless steel				
Colour		RAL 7035 (different colours available on request) or stainless steel				

Accessories	Piece	Article number	Information on page
Filter adapter	1	18310000151	75
Aluminium filter	1	18300000149	75
Vlies filter	5	18300000147	75
Fluted filter	5	18300000148	75

[1] 115 V on request, suitable for various supply voltages (see technical data sheet).
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet.
This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

DTI/DTS 6301



Dimensions

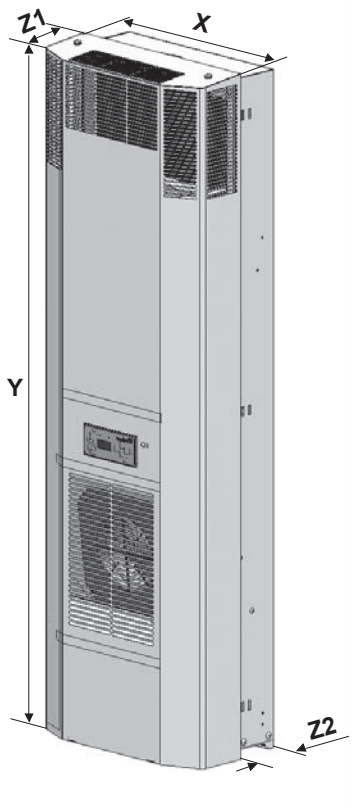
DTI	X	Y	Z1	Z2	K	L
mm	485	1536	158	60	1510	450

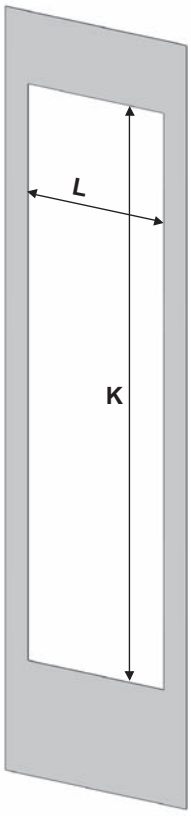
DTI variants partially recessed by 60 mm after installation

DTS	X	Y	Z	A	B	C	D	E	F	G	H	I
mm	485	1539	218	700	282	220	10	450	510	290	315	350

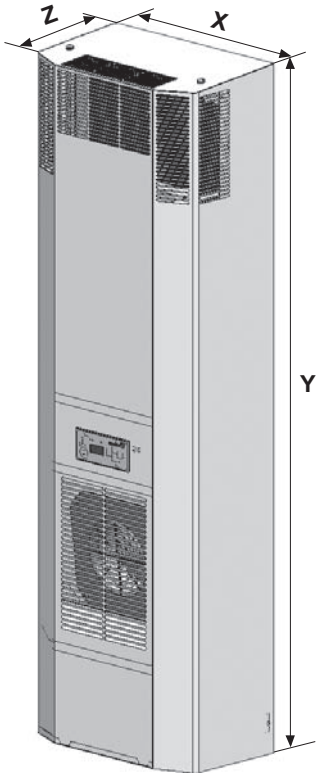
Mounting holes Ø 8 mm and cut-out radii R20

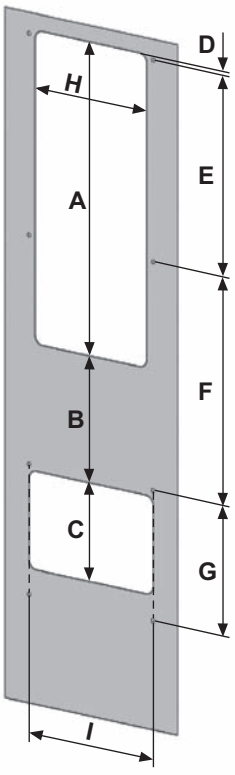
DTI 6301





DTS 6301





ECOOL Cooling units 1000 W
DTI/DTS 6201



DTI: for partially recessed mounting of the cooling unit in the door or side
DTS: for outer mounting of the cooling unit on the door or side

- top EER (energy efficiency ratio)
- energy efficient: reduced CO_2 emissions = environment-friendly
- condenser with large fin spacing for highly effective protection in strongly contaminated ambient air
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- exceptional serviceability
- new USB port for easy retrieval of parameter settings/history (Pfannenberg **ECOOL-**Plant software necessary)
- optional filter (easy to retrofit)
- energy-saving mode by default integrated into the Multi Controller

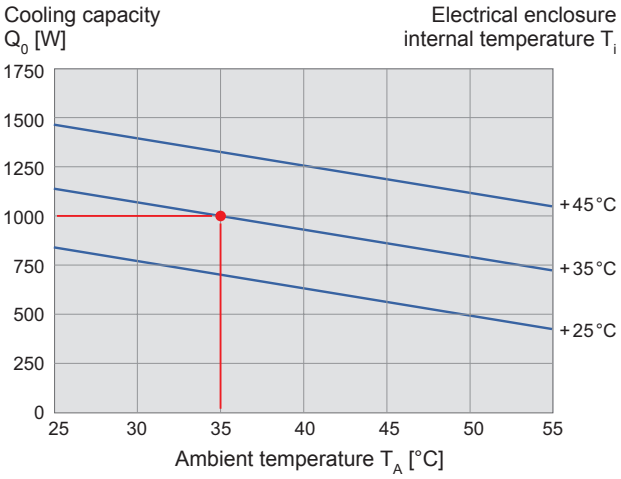
Data		DTI 6201		DTS 6201		Unit
Article number	Standard Controller	13896219055	13896211055	13886219055	13886211055	
	Multi Controller	13896229055	13896221055	13886229055	13886221055	
	V2A, Standard Controller	13896219015	13896211015	13886219015	13886211015	
	V2A, Multi Controller	13896229015	13896221015	13886229015	13886221015	
Rated voltage [1] ± 10%		AC 50 / 60				Hz
		400/460 2~	230	400/460 2~	230	V
Cooling performance according to EN 14511	L35/L35	1000				W
	L35/L50	780				
Power consumption	L35/L35	490 / 570	454 / 567	490 / 570	454 / 567	
Current consumption	L35/L35	2.33 / 2.54	3.08 / 3.65	2.33 / 2.54	3.08 / 3.65	A
Starting current	L35/L35	9.1				
Energy efficiency ratio $\varepsilon_{ke} = \frac{Q_0}{P} \nearrow$ COP		2.04	2.2	2.04	2.2	
Unimpeded airflow (free flow)	internal	935				m³/h
	external	938				
Pre fuse T		4	16	4	16	A
Type of connection		spring-type terminal included with plug				
Noise level according to EN ISO 3741		< 62				dB (A)
Weight (without packaging)		55	50	56	51	kg
Ambient temperature range		+ 15 … + 55 / + 59 … + 131				°C / °F
Control range (adjustable)	SC	+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95				
	MC	+ 25 … + 50 / + 77 … + 122; factory setting + 35 / + 95				
Refrigerant	R134a	600				g
Condensate management		integrated condensate evaporation system with safety overflow				
Protection system according to EN 60529	IP54	towards the electrical enclosure if used as intended by the manufacturer				
	IP34	towards the surroundings if used as intended by the manufacturer				
Design	housing	galvanised sheet steel				
	cover	electrostatically powder coated (200 °C), or stainless steel				
Colour		RAL 7035 (different colours available on request) or stainless steel				

Accessories	Piece	Article number	Information on page
Filter adapter	1	18310000151	75
Aluminium filter	1	18300000149	75
Vlies filter	5	18300000147	75
Fluted filter	5	18300000148	75

[1] 115 V on request, suitable for various supply voltages (see technical data sheet).
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet.
This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

DTI/DTS 6201



Dimensions

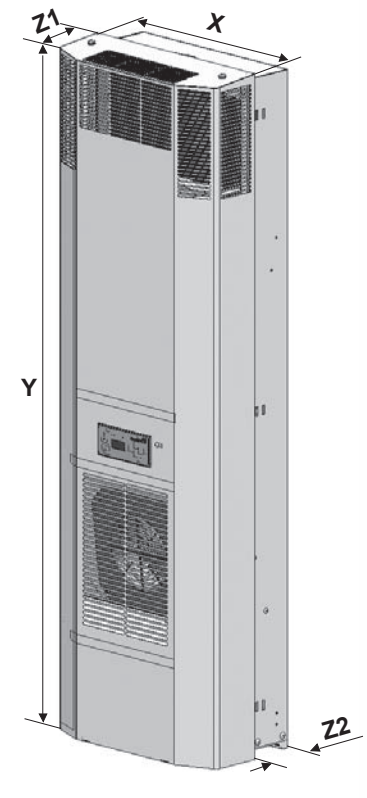
DTI	X	Y	Z1	Z2	K	L
mm	485	1536	158	60	1510	450

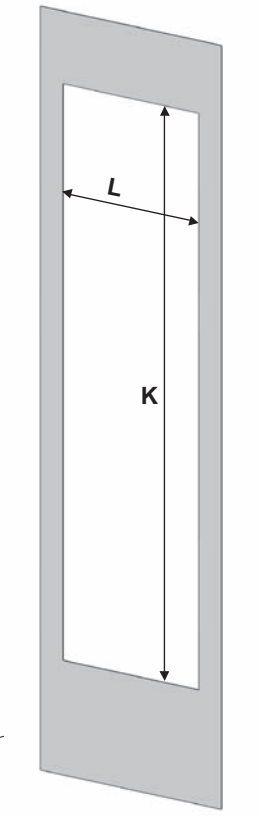
DTI variants partially recessed by 60 mm after installation

DTS	X	Y	Z	A	B	C	D	E	F	G	H	I
mm	485	1539	218	700	282	220	10	450	510	290	315	350

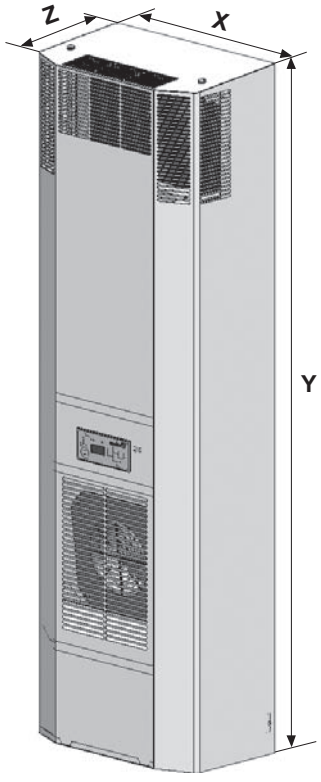
Mounting holes Ø 8 mm and cut-out radii R20

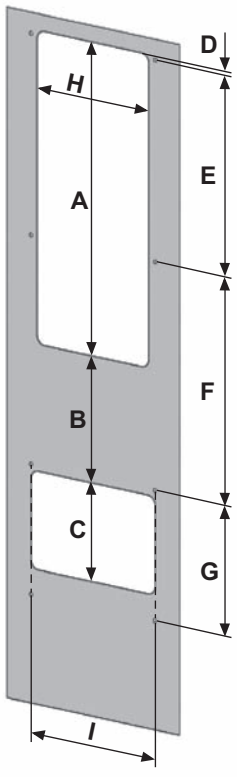
DTI 6201





DTS 6201





Cooling units 950 / 1500 W
DTI/DTS 9141
DTI/DTS 9341C



DTI: for partially recessed mounting of the cooling unit in the door or side
DTS: for outer mounting of the cooling unit on the door or side

- suitable for use with a door width of 500 mm
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- integrated fault and door contact
- optionally available with integrated condensate evaporation system
- DTI variants: fast mounting without drilling and adhering the electrical enclosure seal

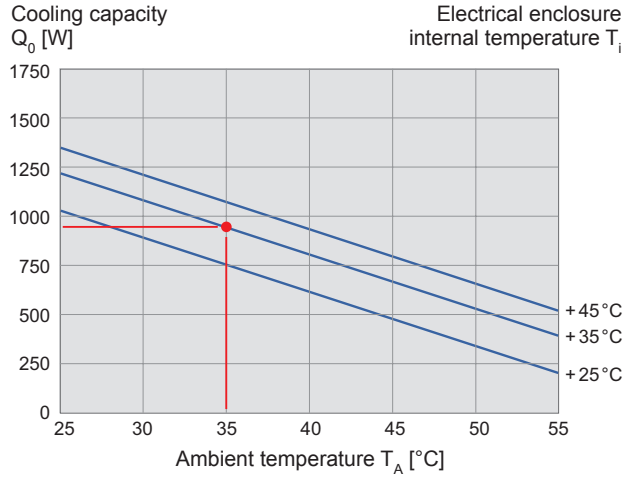
Data		DTI/DTS 9141			DTI/DTS 9341C			Unit
Article number	DTI Standard Controller	13299149055	13299141055	13299144055	13291549055	13291541055	13291544055	
	DTI Multi Controller	13299179055	13299171055	13299174055	13291579055	13291571055	13291574055	
	DTS Standard Controller	13249149055	13249141055	13249144055	13241549055	13241541055	13241544055	
	DTS Multi Controller	13249179055	13249171055	13249174055	13241579055	13241571055	13241574055	
Rated voltage ± 10%		AC 50 / 60		AC 60	AC 50 / 60		AC 60	Hz
		400 2~[1]	230	115	400 2~[1]	230	115	V
Cooling performance according to EN 14511	L35/L35	950			1500			W
	L35/L50	520			750			
Power consumption	L35/L35	576 / 697	515 / 623	842	950	907 / 1047	1220	
Current consumption	L35/L35	2.73 / 2.98	2.98 / 3.25	9.1	3.2	5.4 / 6	13.5	A
Starting current	L35/L35	13.94 / 15.19	23.3 / 25.4	33.2	20	33.2 / 27.6	31.7	
Unimpeded airflow (free flow)	internal	570			885			m^3/h
	external	570			885			
Pre fuse T		4	10	16	6	10	16	A
Type of connection		spring-type terminal included with plug						
Noise level according to EN ISO 3741		< 62						dB (A)
Weight (without packaging)	DTI	43	36		46	39		kg
	DTS	45	38		48	41		
Ambient temperature range		+15 … +55 / +59 … +131						°C / °F
Control range (adjustable)	SC	+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95						
	MC	+ 25 … + 50 / + 77 … + 122; factory setting + 35 / + 95						
Refrigerant	R134a	400						g
Duty cycle		100						%
Condensate management		condensate drain; integrated condensate evaporation system optional						
Protection system according to EN 60529	IP 54	towards the electrical enclosure if used as intended by the manufacturer						
	IP 34	towards the surroundings if used as intended by the manufacturer						
Design	housing	galvanised sheet steel						
	cover	galvanised/electrostatically powder coated (200 °C); stainless steel on request						
Colour (cover)		RAL 7035, different colours available on request						

Accessories	Piece	Article number	Information on page
External condensate evaporation system	1	18314000001	74
Condensate bottle	1	18314000100	74

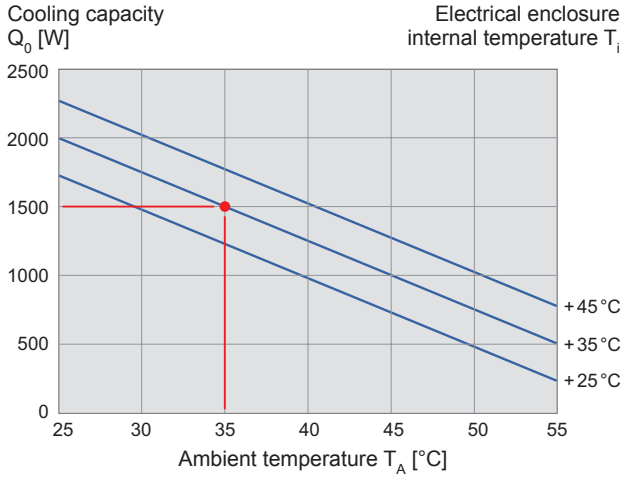
[1] suitable for various supply voltages (see technical specific data sheet)
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

DTI/DTS 9141



DTI/DTS 9341C

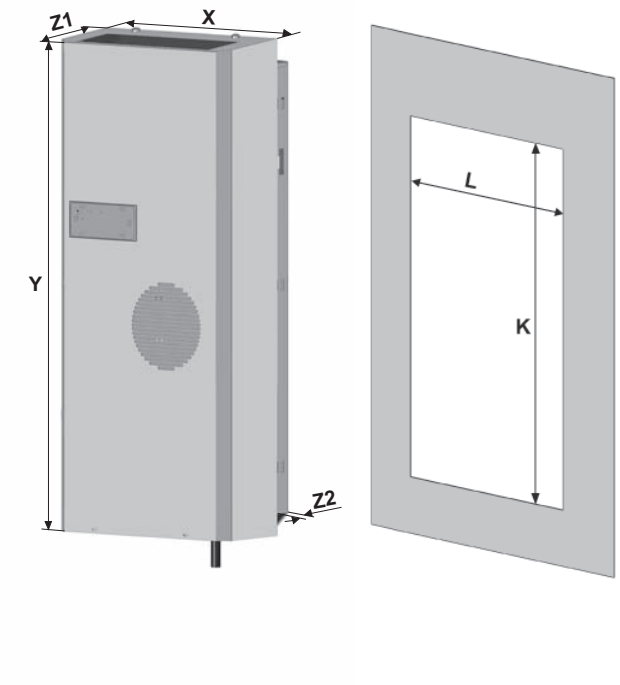


Dimensions

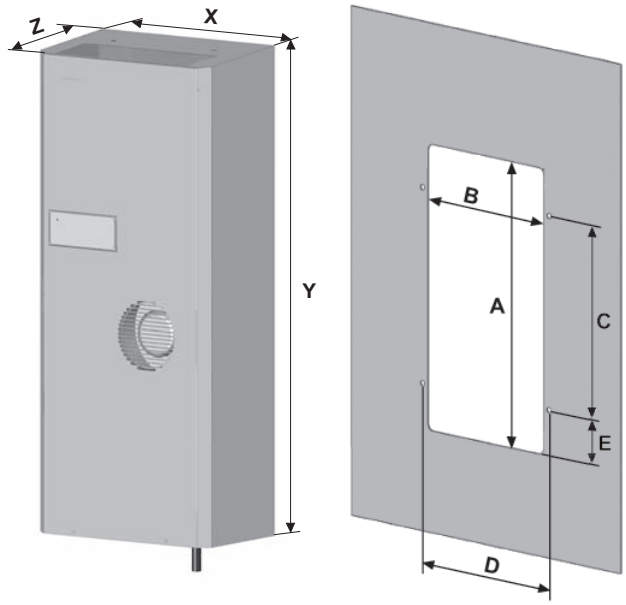
DTI	X	Y	Z1	Z2	K	L
mm	410	958	188	60	900	380
DTI variants partially recessed by 60 mm after installation						

DTS	X	Y	Z	A	B	C	D	E
mm	410	964	248	662	320	562	350	55
Mounting holes Ø 8 mm and cut-out radii R20								

DTI 9141/DTI 9341C



DTS 9141/DTS 9341C



Cooling unit 870 W
DTI/DTS 9041



DTI: for partially recessed mounting of the cooling unit in the door or side
DTS: for outer mounting of the cooling unit on the door or side

- suitable for use with a door width of 400 mm
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- integrated fault and door contact
- optionally available with integrated condensate evaporation system
- DTI variants: fast mounting without drilling and adhering the electrical enclosure seal

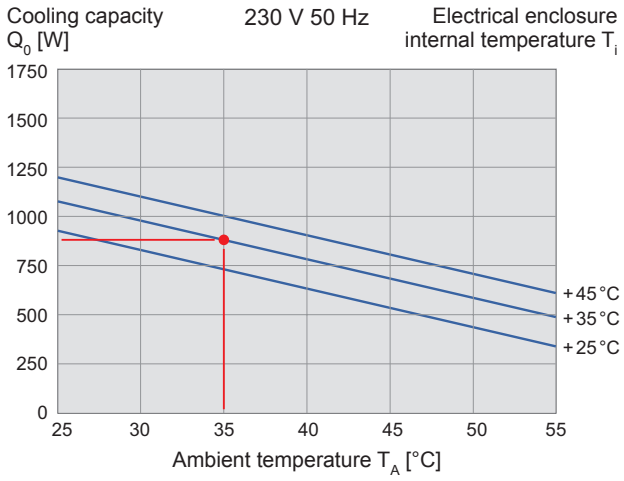
Data		DTI/DTS 9041			Unit
Article number	DTI Standard Controller	13299049055	13299041055	13299044055	
	DTI Multi Controller	13299079055	13299071055	13299074055	
	DTS Standard Controller	13249049055	13249041055	13249044055	
	DTS Multi Controller	13249079055	13249071055	13249074055	
Rated voltage ± 10%		AC 50 / 60		AC 60	Hz
		400 2~[1]	230	115	V
Cooling performance according to EN 14511	L35/L35	810	870	790	W
	L35/L50	483	580	590	
Power consumption	L35/L35	580 / 702	524 / 634	783	
Current consumption	L35/L35	3.2 / 3.49	3.06 / 3.34	7.6	A
Starting current	L35/L35	20.2 / 22.02	22.16 / 24.15	40.1	
Unimpeded airflow (free flow)	internal	570			m^3/h
	external	570			
Pre fuse T		4	10	16	A
Type of connection		spring-type terminal included with plug			
Noise level according to EN ISO 3741		< 63		< 64	dB (A)
Weight (without packaging)	DTI	37	29.5		kg
	DTS	37	29.5		
Ambient temperature range		+ 15 … + 55 / + 59 … + 131			°C / °F
Control range (adjustable)	SC	+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95			
	MC	+ 25 … + 50 / + 77 … + 122; factory setting + 35 / + 95			
Refrigerant	R134a	400			g
Duty cycle		100			%
Condensate management		condensate drain; integrated condensate evaporation system optional			
Protection system according to EN 60529	IP 54	towards the electrical enclosure if used as intended by the manufacturer			
	IP 34	towards the surroundings if used as intended by the manufacturer			
Design	housing	galvanised sheet steel			
	cover	galvanised/electrostatically powder coated (200 °C); stainless steel on request			
Colour (cover)		RAL 7035, different colours available on request			

Accessories	Piece	Article number	Information on page
External condensate evaporation system	1	18314000001	74
Condensate bottle	1	18314000100	74

[1] suitable for various supply voltages (see technical specific data sheet)
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

DTI/DTS 9041

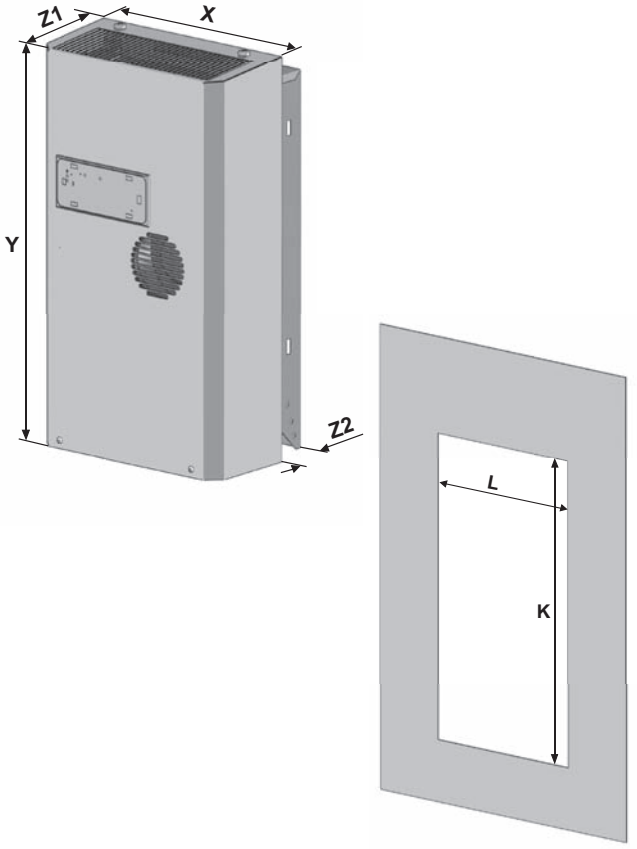


Dimensions

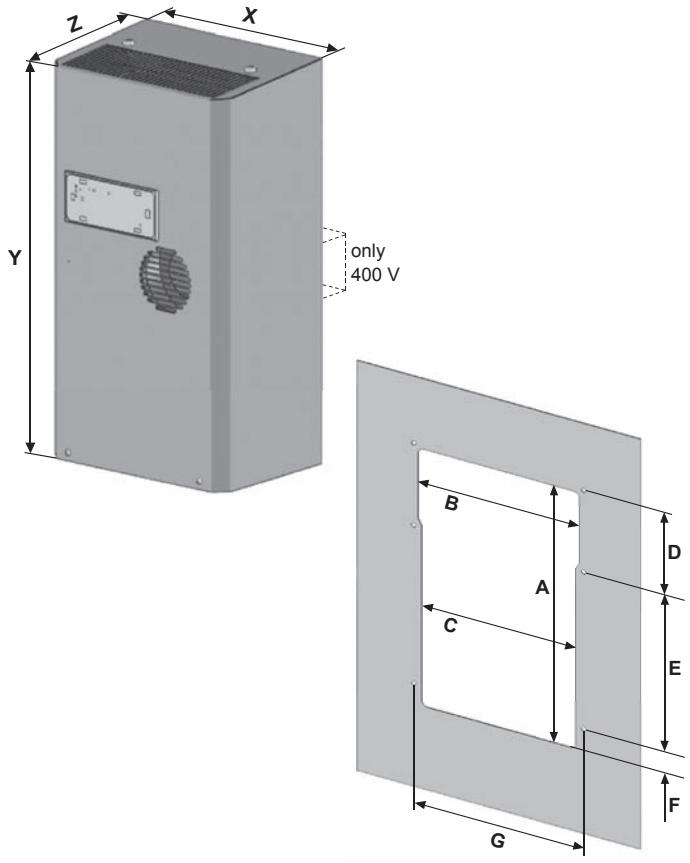
DTI	X	Y	Z1	Z2 115V / 230V	Z2 400V	K	L
mm	380	599	171	60	192	577	350
DTI variants partially recessed by 60 mm after installation							

DTS	X	Y	Z 115V / 230V	Z 400V	A	B	C	D	E	F	G
mm	380	604	231	363	472	285	272	150	288	40	300
Mounting holes Ø 8 mm and cut-out radii R20											

DTI 9041



DTS 9041



Cooling unit 510 W
DTI/DTS 9031



DTI: for partially recessed mounting of the cooling unit in the door or side
DTS: for outer mounting of the cooling unit on the door or side

- suitable for use with a door width of 400 mm
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- integrated fault and door contact
- DTI variants: fast mounting without drilling and adhering the electrical enclosure seal

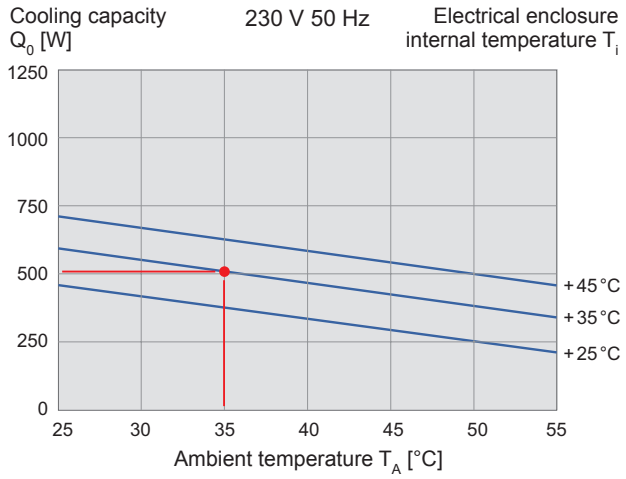
Data		DTI/DTS 9031			Unit
Article number	DTI Standard Controller	13295049055	13295041055	13295044055	
	DTI Multi Controller	13295079055	13295071055	13295074055	
	DTS Standard Controller	13245049055	13245041055	13245044055	
	DTS Multi Controller	13245079055	13245071055	13245074055	
Rated voltage ± 10%		AC 50 / 60		AC 60	Hz
		400 2~[1]	230	115	V
Cooling performance according to EN 14511	L35/L35	410 / 540	510 / 580	585	W
	L35/L50	305 / 360	365 / 395	545	
Power consumption	L35/L35	297 / 354	283 / 337	322	
Current consumption	L35/L35	1.59 / 1.53	1.58 / 1,64	3.29	A
Starting current	L35/L35	8.63 / 7.86	14.31 / 13.8	26.15	
Unimpeded airflow (free flow)	internal	280			m^3/h
	external	345			
Pre fuse T		4	6	10	A
Type of connection		spring-type terminal included with plug			
Noise level according to EN ISO 3741		63			dB (A)
Weight (without packaging)	DTI	26	21		kg
	DTS	27	22		
Ambient temperature range		+ 15 … + 55 / + 59 … + 131			°C / °F
Control range (adjustable)	SC	+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95			
	MC	+ 25 … + 50 / + 77 … + 122; factory setting + 35 / + 95			
Refrigerant	R134a	250			g
Duty cycle		100			%
Condensate management		condensate drain			
Protection system according to EN 60529	IP 54	towards the electrical enclosure if used as intended by the manufacturer			
	IP 34	towards the surroundings if used as intended by the manufacturer			
Design	housing	galvanised sheet steel			
	cover	galvanised/electrostatically powder coated (200 °C); stainless steel on request			
Colour (cover)		RAL 7035, different colours available on request			

Accessories	Piece	Article number	Information on page
External condensate evaporation system	1	18314000001	74
Condensate bottle	1	18314000100	74

[1] suitable for various supply voltages (see technical specific data sheet)
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

DTI/DTS 9031

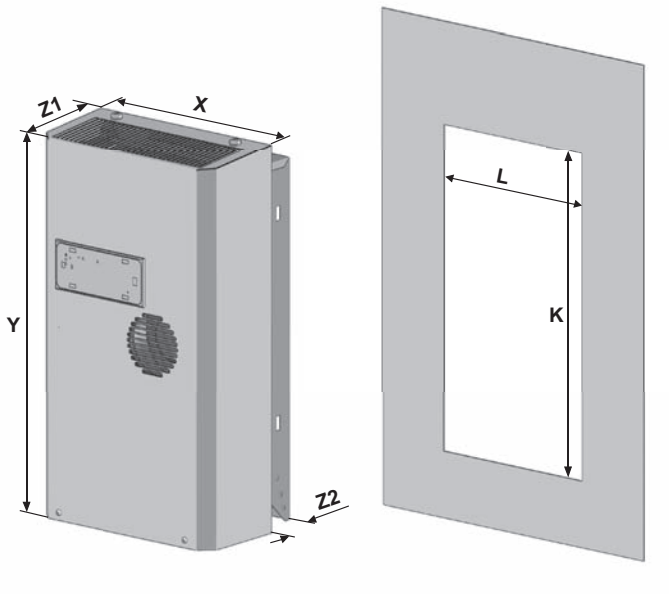


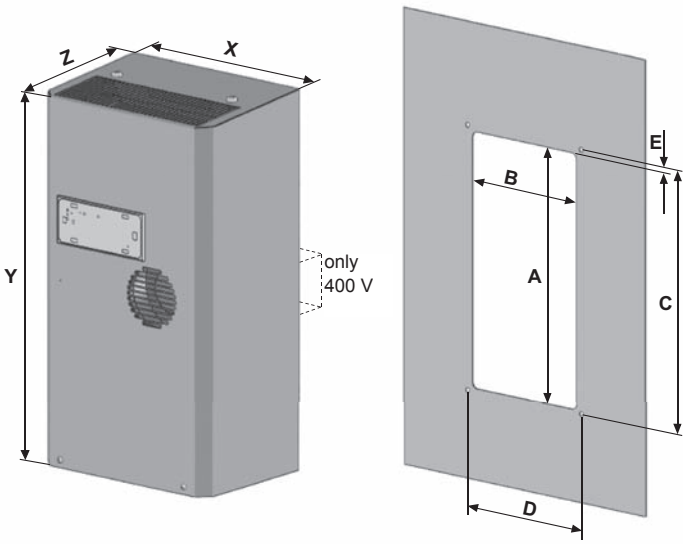
Dimensions

DTI	X	Y	Z1	Z2 115V / 230V	Z2 400V	K	L
mm	310	562	145	67	208	495	265
DTI variants partially recessed by 67 mm after installation							

DTS	X	Y	Z 115V / 230V	Z 400V	A	B	C	D	E
mm	310	565	212	353	422	215	435	235	8
Mounting holes Ø 8 mm and cut-out radii R20									

DTI 9031 | **DTS 9031**





Cooling units 320 W
DTFI 9021
DTI 9021



- compact design, ideal for flat control cabinets, control consoles and operating units
- diagnostic message via operating display
- integrated fault and door contact
- optionally available with integrated condensate evaporation system

DTFI variants:

- simple and fast mounting without drilling
- small structural height for integration in machine control cabinets
- cut-out compatible with 3rd and 4th Generation Filterfans, installation size 6

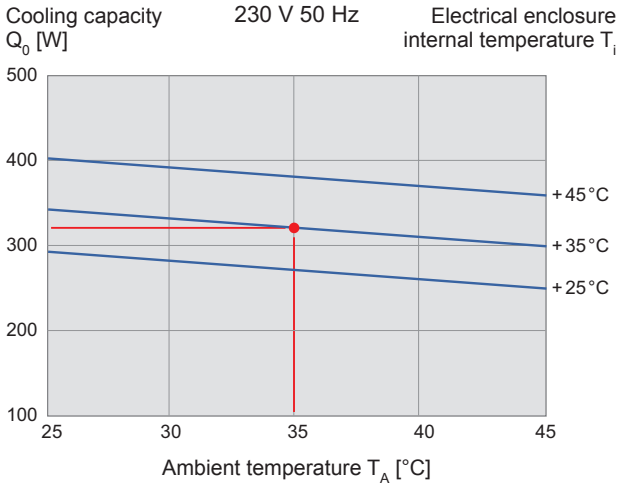
Data		DTFI 9021			DTI 9021		Unit
Article number	Standard Controller	13293149055	13293141055	13293144055	13293041055	13293044055	
Rated voltage ± 10%		AC 50 / 60		AC 60	AC 50 / 60	AC 60	Hz
		400 2~[1]	230	115	230	115	V
Cooling performance according to EN 14511	L35/L35	230 / 290	320 / 340	320	320 / 340	320	W
	L35/L45	220 / 280	300 / 330	250	300 / 330	250	
Power consumption	L35/L35	200 / 200	230 / 240	240	230 / 240	240	
Current consumption	L35/L35	1 / 0.9	1.6	2.7	1.6	2.7	A
Starting current	L35/L35	6.6 / 5.9	11.7 / 10.9	11.4	11.7 / 10.9	11.4	
Unimpeded airflow (free flow)	internal	282					m^3/h
	external	282					
Pre fuse T		4	6	6	6	6	A
Type of connection		spring-type terminal included with plug					
Noise level according to EN ISO 3741		< 62					dB (A)
Weight (without packaging)		22	16		17		kg
Ambient temperature range		+ 15 … + 45 / + 59 … + 113					°C / °F
Control range (adjustable)		+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95					
Refrigerant	R134a	350					g
Duty cycle		100					%
Condensate management		condensate drain; integrated condensate evaporation system optional					
Protection system according to EN 60529	IP 54	towards the electrical enclosure if used as intended by the manufacturer					
	IP 34	towards the surroundings if used as intended by the manufacturer					
Design	housing	galvanised sheet steel					
	cover	galvanised/electrostatically powder coated (200 °C); stainless steel on request					
Colour (cover)		RAL 7035, different colours available on request					

Accessories	Piece	Article number	Information on page
External condensate evaporation system	1	18314000001	74
Condensate bottle	1	18314000100	74

[1] suitable for various supply voltages (see technical specific data sheet)
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

DTFI 9021 / DTI 9021



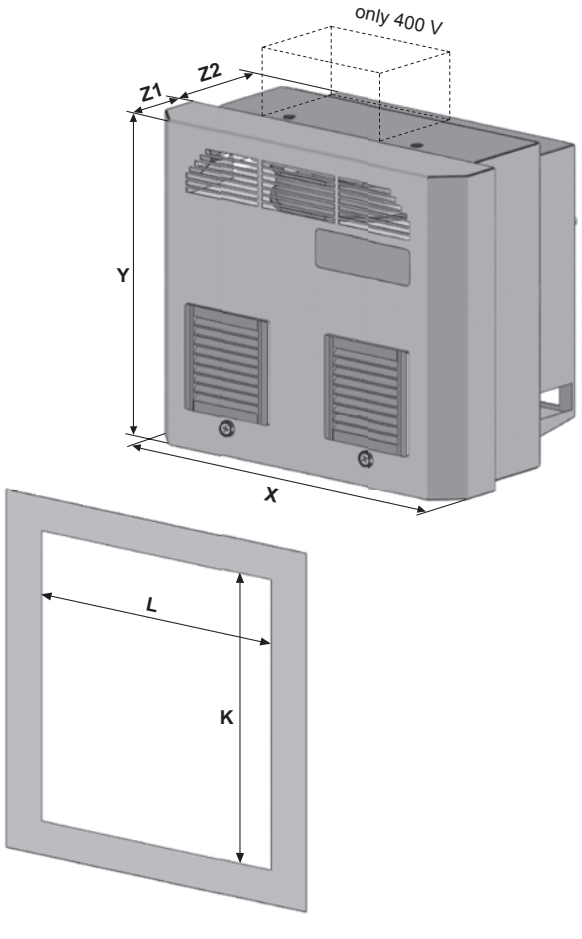
Dimensions

DTFI	X	Y 115V / 230V	Y 400V	Z1	Z2	K	L
mm	385	326	464	75	170	291	291

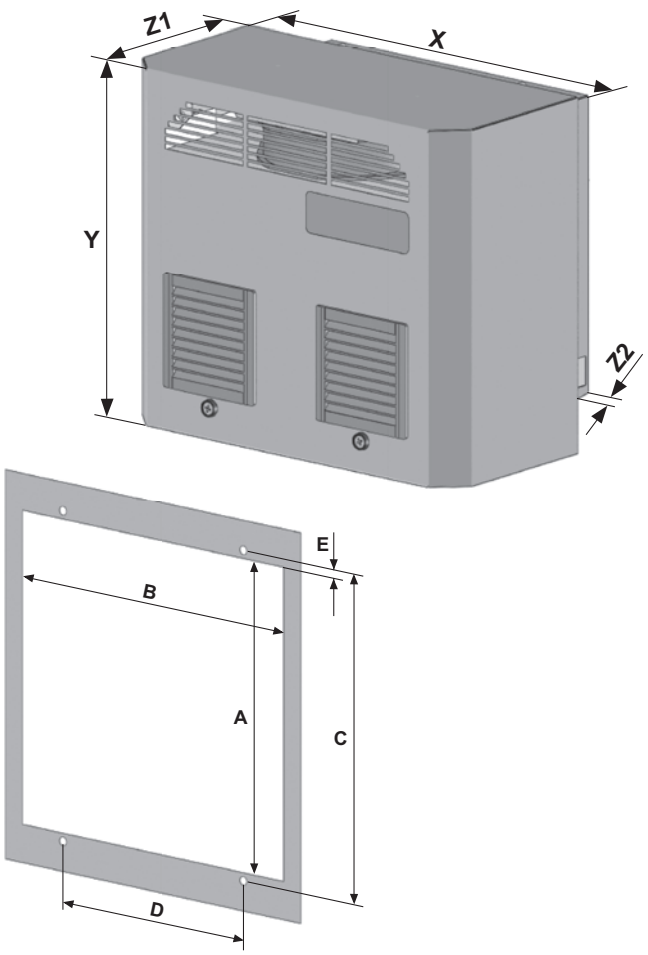
DTI	X	Y 115V / 230V	Z1	Z2	A	B	C	D	E
mm	385	329	178	67	289	304	304	210	7.5

Mounting holes Ø 8 mm and cut-out radii R20

DTFI 9021



DTI 9021



Cooling unit 300 W
DTS 9011H



- service-friendly, compact design
- small mounting area, ideal for small electrical enclosures and larger electrical enclosures for the cooling of hot spots
- simple and fast mounting with brackets for door or side mounting
- powerful radial fans ensure optimum air circulation inside the enclosure
- integrated collective fault and door contact (potential-free)
- 100% reliability with controllers by Pfannenberg

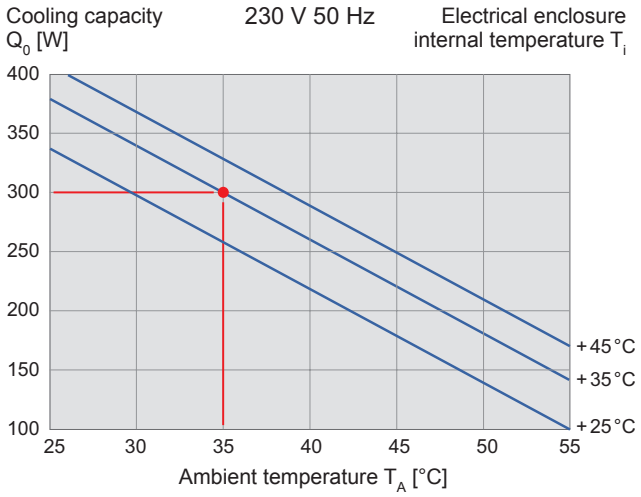
Data		DTS 9011H	Unit
Article number	Standard Controller	13242541055	
Rated voltage ± 10%		AC 50 / 60	Hz
		230	V
Cooling performance according to EN 14511	L35/L35	300	W
	L35/L45	180	
Power consumption	L35/L35	275 / 290	
Current consumption	L35/L35	1.52 / 1.56	A
Starting current	L35/L35	4.52 / 4.66	
Unimpeded airflow (free flow)	internal	160	m^3/h
	external	160	
Pre fuse T		16	A
Type of connection		spring-type terminal included with plug	
Noise level according to EN ISO 3741		< 65	dB (A)
Weight (without packaging)		15	kg
Ambient temperature range		+ 15 … + 45 / + 59 … + 113	°C / °F
Control range (adjustable)		+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95	
Refrigerant	R134a	130	g
Duty cycle		100	%
Condensate management		condensate drain	
Protection system according to EN 60529	IP 54	towards the electrical enclosure if used as intended by the manufacturer	
	IP 34	towards the surroundings if used as intended by the manufacturer	
Design	housing	galvanised sheet steel	
	cover	galvanised/electrostatically powder coated (200 °C); stainless steel on request	
Colour (cover)		RAL 7035, different colours available on request	

Accessories	Piece	Article number	Information on page
External condensate evaporation system	1	18314000001	74
Condensate bottle	1	18314000100	74

Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

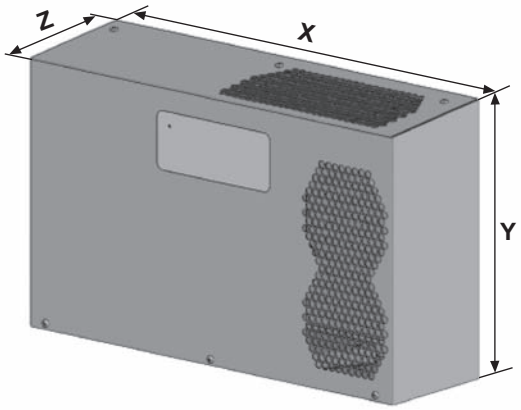
DTS 9011H

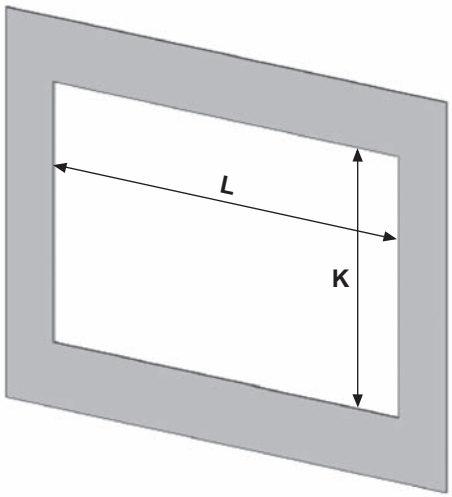


Dimensions

	X	Y	Z	K	L
mm	495	300	140	281	471

DTS 9011H





Cooling units 2500 / 2000 W
DTS 7541
DTS 7441



- powerful radial fans ensure optimum air circulation inside the enclosure
- sealed with protective edging, no extensive work on the installation cut-out necessary
- new standard electronics

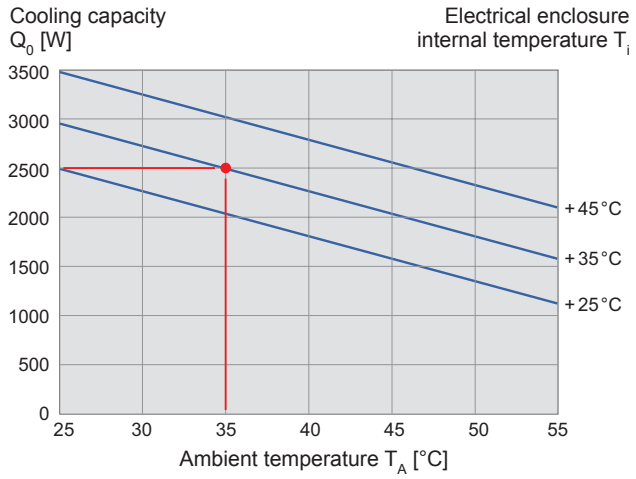
Data		DTS 7541	DTS 7441	Unit
Article number	Standard Controller	13287532055	13287432055	
	Multi Controller	13087562055	13087462055	
Rated voltage [1] ± 10%		AC 50 / 60		Hz
		400 / 460 3~		V
Cooling performance according to EN 14511	L35/L35	2500	2000	W
	L35/L50	1800	1500	
Power consumption	L35/L35	1400	1200	
Current consumption	L35/L35	3.2	2.8	A
Starting current	L35/L35	11.5	10.4	
Unimpeded airflow (free flow)	internal	900	850	m^3/h
	external	1000	1000	
Pre fuse T		10		A
Type of connection		spring-type terminal included with plug		
Noise level according to EN ISO 3741		< 65		dB (A)
Weight (without packaging)		75		kg
Ambient temperature range		+ 15 … + 55 / + 59 … + 131		°C / °F
Control range (adjustable)	SC	+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95		
	MC	+ 25 … + 50 / + 77 … + 122; factory setting + 35 / + 95		
Refrigerant	R134a	850		g
Duty cycle		100		%
Condensate management		condensate drain		
Protection system according to EN 60529	IP 54	towards the electrical enclosure if used as intended by the manufacturer		
	IP 34	towards the surroundings if used as intended by the manufacturer		
Design	housing	galvanised sheet steel		
	cover	galvanised/electrostatically powder coated (200 °C); stainless steel on request		
Colour (cover)		RAL 7035, different colours available on request		

Accessories	Piece	Article number	Information on page
External condensate evaporation system	1	18314000001	74
Condensate bottle	1	18314000100	74

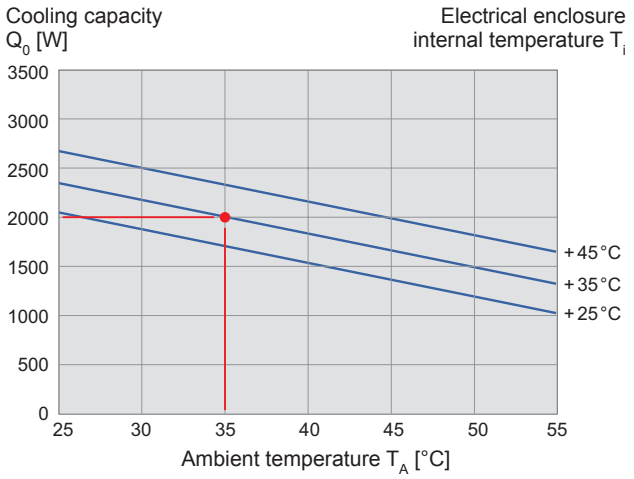
[1] suitable for various supply voltages (see technical specific data sheet)
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

DTS 7541



DTS 7441

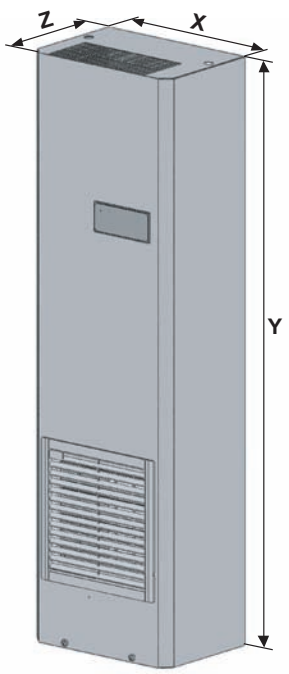


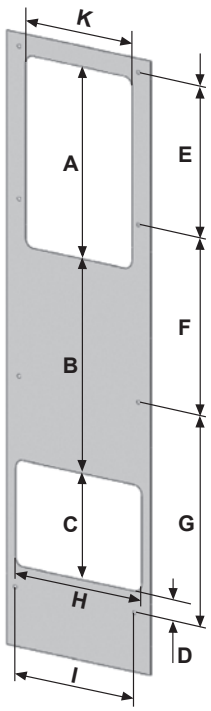
Dimensions

	X	Y	Z	A	B	C	D	E	F	G	H	I	K
mm	397	1350	270	421.5	471.5	234	47.5	335	390	465	350	330	295

Mounting holes Ø 8 mm and cut-out radii R20

DTS 7541 / DTS 7441





Cooling units 1500 / 1000 W
DTS 7341
DTS 7241



- powerful radial fans ensure optimum air circulation inside the enclosure
- sealed with protective edging, no extensive work on the installation cut-out necessary
- temperature regulated by integrated thermostat

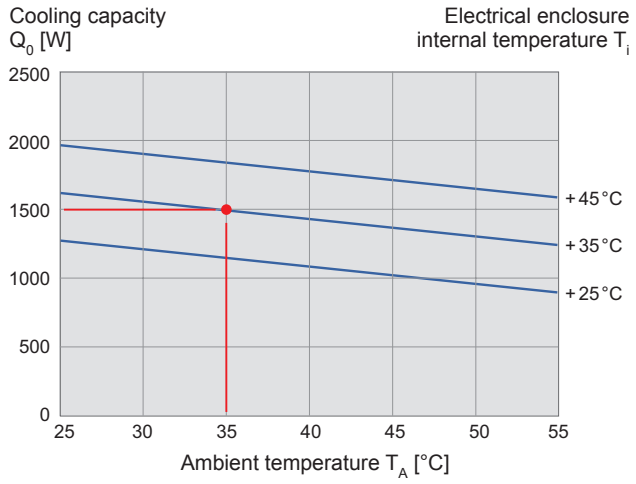
Data		DTS 7341			DTS 7241		Unit
Article number	thermostat control	13087319055	13287311055	13287314055	13287211055	13287214055	
Rated voltage ± 10%		AC 50 / 60		AC 60	AC 50 / 60	AC 60	Hz
		400 2~[1]	230	115	230	115	V
Cooling performance according to EN 14511	L35/L35	1500			1000		W
	L35/L50	1200			780		
Power consumption	L35/L35	920	810	1100	670	780	W
Current consumption	L35/L35	2.3	4.3	13.4	3.0	7.4	A
Starting current	L35/L35	9.3	16.5	26.8	14.7	24.9	A
Unimpeded airflow (free flow)	internal	560	270		270		m^3/h
	external	760	450		450		
Pre fuse T		6	16				A
Type of connection		connection cable > 2000 mm					
Noise level according to EN ISO 3741		< 62					dB (A)
Weight (without packaging)		58			53		kg
Ambient temperature range		+ 15 … + 55 / + 59 … + 131					°C / °F
Control range (adjustable)		+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95					
Refrigerant	R134a	530			480		g
Duty cycle		100					%
Condensate management		condensate drain					
Protection system according to EN 60529	IP 54	towards the electrical enclosure if used as intended by the manufacturer					
	IP 34	towards the surroundings if used as intended by the manufacturer					
Design	housing	galvanised sheet steel					
	cover	galvanised/electrostatically powder coated (200 °C); stainless steel on request					
Colour (cover)		RAL 7035, different colours available on request					

Accessories	Piece	Article number	Information on page
External condensate evaporation system	1	18314000001	74
Condensate bottle	1	18314000100	74

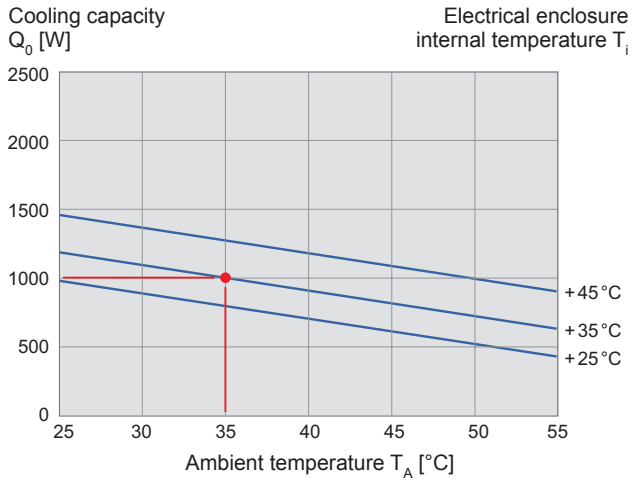
[1] suitable for various supply voltages (see technical specific data sheet)
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

DTS 7341



DTS 7241

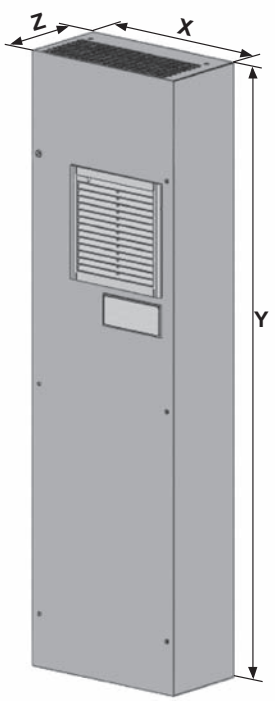


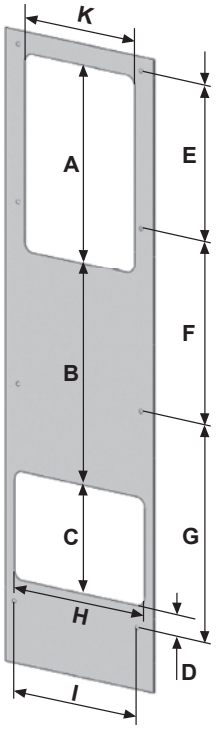
Dimensions

	X	Y	Z	A	B	C	D	E	F	G	H	I	K
mm	390	1350	200	421.5	471.5	234	47.5	335	390	465	350	330	295

Mounting holes Ø 8 mm and cut-out radii R20

DTS 7341 / DTS 7241





Cooling units 5500 W
DTS 3661 (NEMA 3R/4)
DTS 3681 (NEMA 4/4X)



- particularly suitable for the food industry and outdoor applications
- high protection system IP 56, maintenance-free
- maintains a UL tested NEMA type 3R/4 seal against the enclosure
- condenser with 3 mm fin spacing, highly effective protection against strongly contaminated ambient air
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- integrated condensate evaporation system

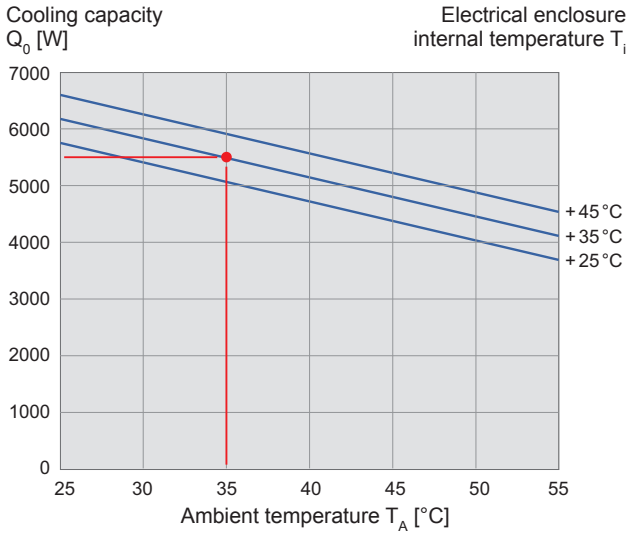
Data		DTS 3661 (NEMA 3R/4)	DTS 3681 (NEMA 4/4X)	Unit
Article number	Standard Controller	13383932355	13383932158	
	LAP [1]	13383936375	13383936178	
Rated voltage ± 10%		AC 50 / 60		Hz
		400 / 460 3~		V
Cooling performance according to EN 14511	L35/L35	5500		W
	L35/L50	4400		
Power consumption	L35/L35	2275 / 2920		
Current consumption	L35/L35	6.3		A
Starting current	L35/L35	25		
Unimpeded airflow (free flow)	internal	2740		m^3/h
	external	2740		
Pre fuse T		10		A
Type of connection		spring-type terminal included with plug		
Noise level according to EN ISO 3741		< 73		dB (A)
Weight (without packaging)		108	109	kg
Ambient temperature range	SC	+ 15 … + 55 / + 59 … + 131		°C / °F
	LAP	- 40 … + 55 / - 40 … + 131		
Control range (adjustable)		+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95		
Refrigerant	R134a	1300		g
Duty cycle		100		%
Condensate management		integrated condensate evaporation system with safety overflow		
Protection system according to NEMA type	3R/4	towards the electrical enclosure if used as intended by the manufacturer	-	
	4/4X	-	towards the electrical enclosure if used as intended by the manufacturer	
	1	towards the surroundings if used as intended by the manufacturer		
Design	housing	galvanised sheet steel		
	cover	galvanised/electrostatically powder coated (200 °C)	304 rust proof stainless steel	
Colour (cover)		RAL 7035, different colours available on request	-	

Accessories	Piece	Article number	Information on page
Condensate bottle	1	18314000100	74
Filter kit	1	18881500004	74

[1] LAP (Low Ambient Package): includes 1400 W enclosure heater and a thermostat to be placed inside the enclosure
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

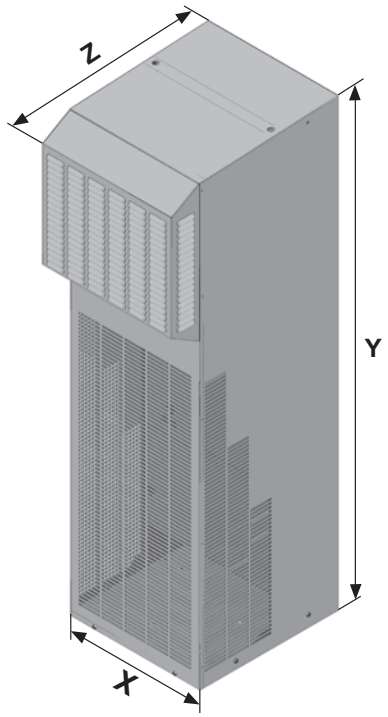
DTS 3661/3681

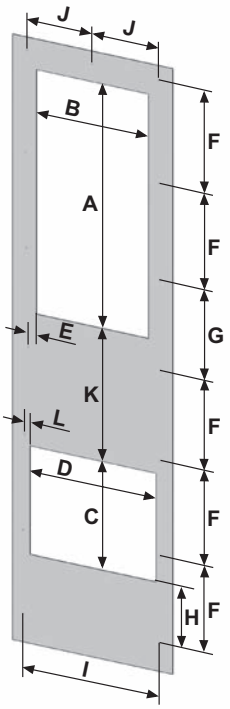


Dimensions

	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L
mm	483	1667	623	635	350	285	360	35	240	350	139	420	210	425	28.5
Mounting holes Ø 10 mm															

DTS 3661/3681





Cooling units 4000 W
DTS 3561 (NEMA 3R/4)
DTS 3581 (NEMA 4/4X)



- particularly suitable for the food industry and outdoor applications
- high protection system IP 56, maintenance-free
- maintains a UL tested NEMA type 3R/4 seal against the enclosure
- condenser with 3 mm fin spacing, highly effective protection against strongly contaminated ambient air
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- integrated condensate evaporation system

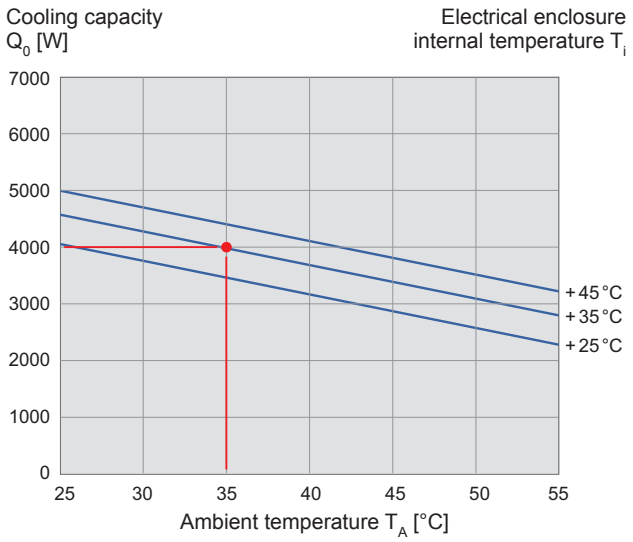
Data		DTS 3561 (NEMA 3R/4)	DTS 3581 (NEMA 4/4X)	Unit
Article number	Standard Controller	13383532355	13383532158	
	LAP [1]	13383536375	13383536178	
Rated voltage ± 10%		AC 50 / 60		Hz
		400 / 460 3~		V
Cooling performance according to EN 14511	L35/L35	4000		W
	L35/L50	3100		
Power consumption	L35/L35	1365 / 1815		
Current consumption	L35/L35	4.4		A
Starting current	L35/L35	16		
Unimpeded airflow (free flow)	internal	1340		m^3/h
	external	2380		
Pre fuse T		10		A
Type of connection		spring-type terminal included with plug		
Noise level according to EN ISO 3741		< 72		dB (A)
Weight (without packaging)		104	105	kg
Ambient temperature range	SC	+ 15 … + 55 / + 59 … + 131		°C / °F
	LAP	- 40 … + 55 / - 40 … + 131		
Control range (adjustable)		+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95		
Refrigerant	R134a	1200		g
Duty cycle		100		%
Condensate management		integrated condensate evaporation system with safety overflow		
Protection system according to NEMA type	3R/4	towards the electrical enclosure if used as intended by the manufacturer	-	
	4/4X	-	towards the electrical enclosure if used as intended by the manufacturer	
	1	towards the surroundings if used as intended by the manufacturer		
Design	housing	galvanised sheet steel		
	cover	galvanised/electrostatically powder coated (200 °C)	304 rust proof stainless steel	
Colour (cover)		RAL 7035, different colours available on request	-	

Accessories	Piece	Article number	Information on page
Condensate bottle	1	18314000100	74
Filter kit	1	18881500003	74

[1] LAP (Low Ambient Package): includes 1400 W enclosure heater and a thermostat to be placed inside the enclosure
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

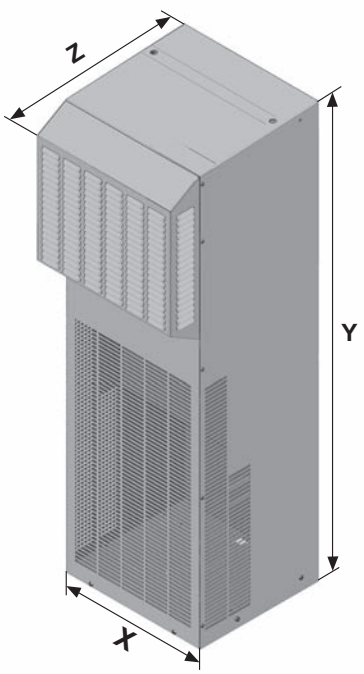
DTS 3561/3581

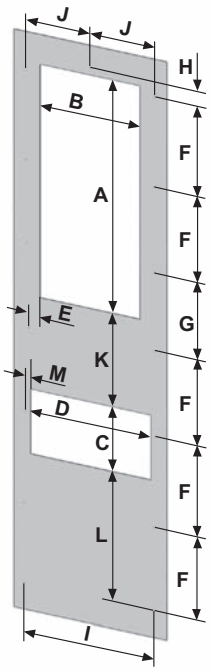


Dimensions

	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M
mm	483	1502	534	590	285	150	380	67.5	216	280	26	420	210	310	320	20
Mounting holes Ø 10 mm																

DTS 3561/3581





Cooling units 2800 W
DTS 3361 (NEMA 3R/4)
DTS 3381 (NEMA 4/4X)



- particularly suitable for the food industry and outdoor applications
- high protection system IP 56, maintenance-free
- maintains a UL tested NEMA type 3R/4 seal against the enclosure
- condenser with 3 mm fin spacing, highly effective protection against strongly contaminated ambient air
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- integrated condensate evaporation system

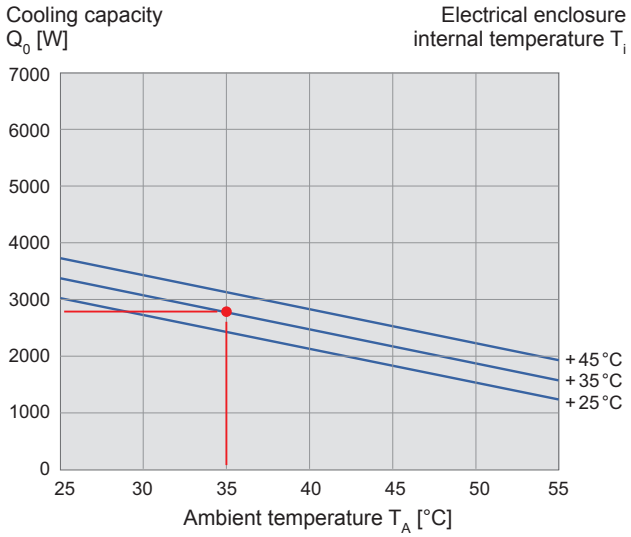
Data		DTS 3361 (NEMA 3R/4)	DTS 3381 (NEMA 4/4X)	Unit
Article number	Standard Controller	13383032355	13383032158	
	LAP [1]	13383036375	13383036178	
Rated voltage ± 10%		AC 50 / 60		Hz
		400 / 460 3~		V
Cooling performance according to EN 14511	L35/L35	2800		W
	L35/L50	1800		
Power consumption	L35/L35	1200 / 1600		
Current consumption	L35/L35	3.6		A
Starting current	L35/L35	16		
Unimpeded airflow (free flow)	internal	1400		m^3/h
	external	1685		
Pre fuse T		6		A
Type of connection		spring-type terminal included with plug		
Noise level according to EN ISO 3741		< 72		dB (A)
Weight (without packaging)		101		kg
Ambient temperature range	SC	+ 15 … + 55 / + 59 … + 131		°C / °F
	LAP	- 40 … + 55 / - 40 … + 131		
Control range (adjustable)		+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95		
Refrigerant	R134a	1000		g
Duty cycle		100		%
Condensate management		integrated condensate evaporation system with safety overflow		
Protection system according to NEMA type	3R/4	towards the electrical enclosure if used as intended by the manufacturer	-	
	4/4X	-	towards the electrical enclosure if used as intended by the manufacturer	
	1	towards the surroundings if used as intended by the manufacturer		
Design	housing	galvanised sheet steel		
	cover	galvanised/electrostatically powder coated (200 °C)	304 rust proof stainless steel	
Colour (cover)		RAL 7035, different colours available on request	-	

Accessories	Piece	Article number	Information on page
Condensate bottle	1	18314000100	74
Filter kit	1	18881500002	74

[1] LAP (Low Ambient Package): includes 1400 W enclosure heater and a thermostat to be placed inside the enclosure
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

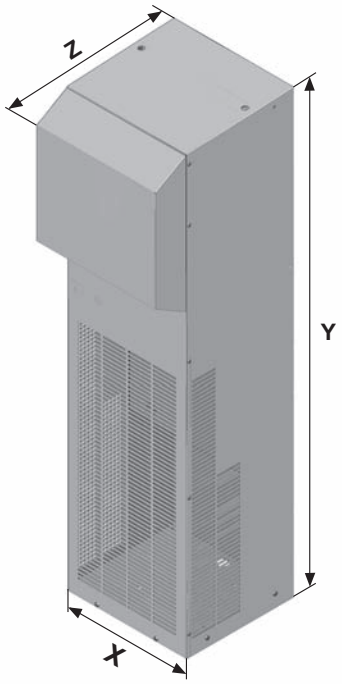
DTS 3361/3381

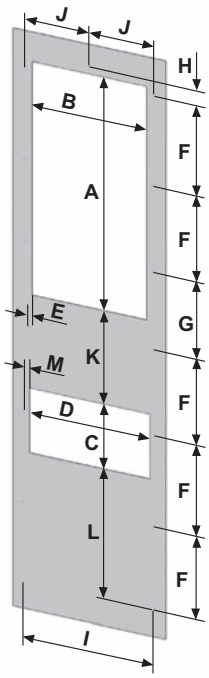


Dimensions

	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M
mm	403	1502	468	590	285	160	310	32.5	216	280	26	350	175	280	340	20
Mounting holes Ø 10 mm																

DTS 3361/3381





Cooling units 2900 W
DTS 3265 (NEMA 3R/4)
DTS 3285 (NEMA 4/4X)



- particularly suitable for the food industry and outdoor applications
- high protection system IP 56, maintenance-free
- maintains a UL tested NEMA type 3R/4 seal against the enclosure
- condenser with 3 mm fin spacing, highly effective protection against strongly contaminated ambient air
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- integrated condensate evaporation system

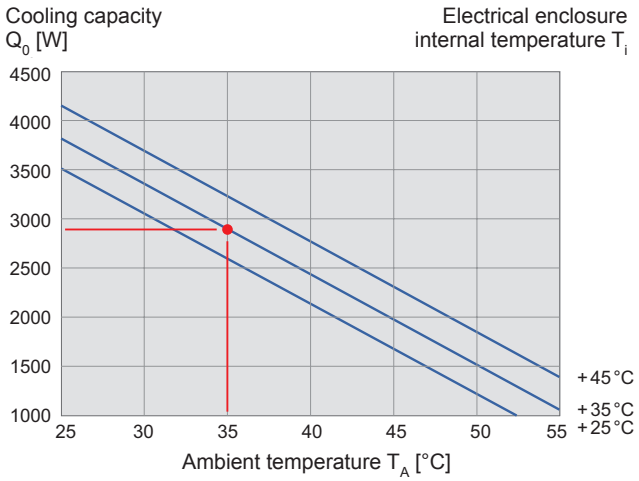
Data		DTS 3265 (NEMA 3R/4)		DTS 3285 (NEMA 4/4X)		Unit
Article number	Standard Controller	13383836355	13383839355	13383836158	13383839158	
	LAP [1]	13383836375	13383839375	13383836178	13383839178	
Rated voltage ± 10%		AC 50 / 60				Hz
		400 / 460 3~	230	400 / 460 3~	230	V
Cooling performance according to EN 14511	L35/L35	2900		2900		W
	L35/L50	1520		1520		
Power consumption	L35/L35	1700	1600	1700	1600	
Current consumption	L35/L35	2.6	7	2.6	7	A
Starting current	L35/L35	8	10	8	10	
Unimpeded airflow (free flow)	internal	1200				m^3/h
	external	1200				
Pre fuse T		5	15	5	15	A
Type of connection		spring-type terminal included with plug				
Noise level according to EN ISO 3741		< 73				dB (A)
Weight (without packaging)		68				kg
Ambient temperature range	SC	+ 15 … + 55 / + 59 … + 131				°C / °F
	LAP	- 40 … + 55 / - 40 … + 131				
Control range (adjustable)		+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95				
Refrigerant	R134a	1200				g
Duty cycle		100				%
Condensate management		integrated condensate evaporation system with safety overflow				
Protection system according to NEMA type	3R/4	towards the electrical enclosure if used as intended by the manufacturer		-		
	4/4X	-		towards the electrical enclosure if used as intended by the manufacturer		
	1	towards the surroundings if used as intended by the manufacturer				
Design	housing	galvanised sheet steel				
	cover	galvanised/electrostatically powder coated (200 °C)		304 rust proof stainless steel		
Colour (cover)		RAL 7035, different colours available on request		-		

Accessories	Piece	Article number	Information on page
Condensate bottle	1	18314000100	74
Filter kit	1	18881500007	74

[1] LAP (Low Ambient Package): includes 900 W enclosure heater and a thermostat to be placed inside the enclosure
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

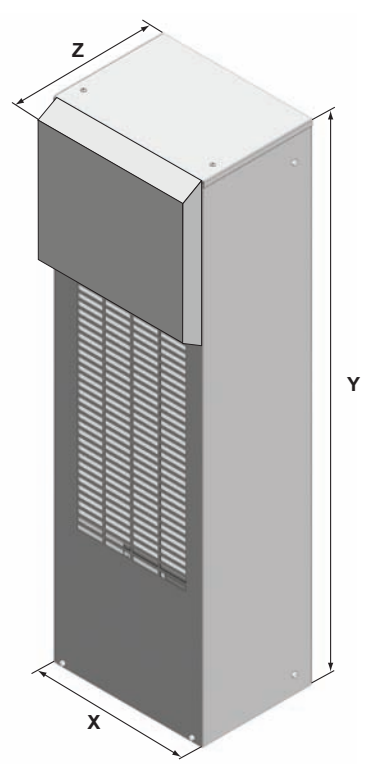
DTS 3265/3285

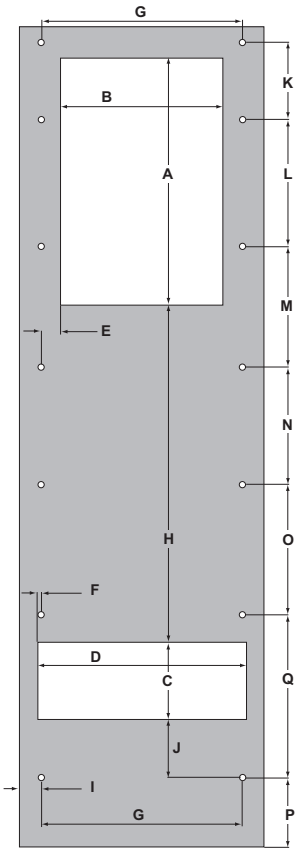


Dimensions

	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
mm	406	1347	367	427	280	135	348	25	9	330	537	35	92	126	209	198	192	214	114	267
Mounting holes Ø 8 mm																				

DTS 3265/3285





Cooling units 2000 W
DTS 3261 (NEMA 3R/4)
DTS 3281 (NEMA 4/4X)



- compact design, ideal for small control cabinets and larger control cabinets for the cooling of hot spots
- particularly suitable for the food industry and outdoor applications
- high protection system IP 56, maintenance-free
- maintains a UL tested NEMA type 3R/4 seal against the enclosure
- condenser with 3 mm fin spacing, highly effective protection against strongly contaminated ambient air
- integrated condensate evaporation system

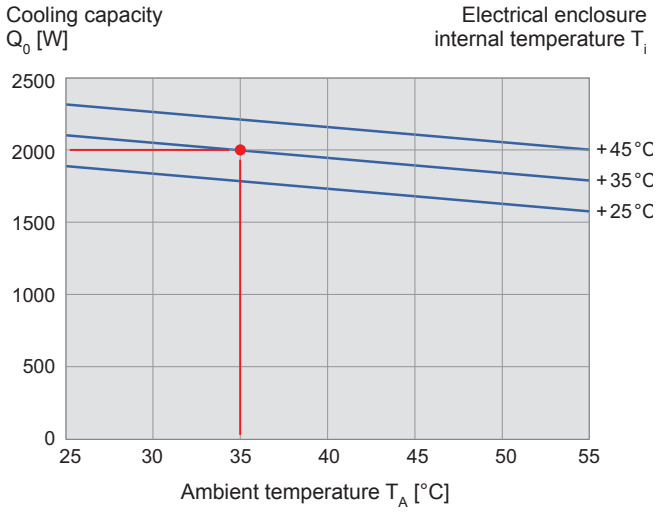
Data		DTS 3261 (NEMA 3R/4)			DTS 3281 (NEMA 4/4X)			Unit
Article number	Standard Controller	13385736355	13385741355	13385744355	13385736158	13385741158	13385744158	
	LAP [1]	13385736375	13385741375	13385744375	13385736178	13385741178	13385744178	
Rated voltage ± 10%		AC 50 / 60		AC 60	AC 50 / 60		AC 60	Hz
		400 / 460 3~	230	115	400 / 460 3~	230	115	V
Cooling performance according to EN 14511	L35/L35	2000						W
	L35/L50	1850						
Power consumption	L35/L35	1400	1425	1680	1400	1425	1680	
Current consumption	L35/L35	3.5	6.3	14.6	3.5	6.3	14.6	A
Starting current	L35/L35	10	21.8	53	10	21.8	53	
Unimpeded airflow (free flow)	internal	985						m^3/h
	external	985						
Pre fuse T		6	10	20	6	10	20	A
Type of connection		spring-type terminal included with plug						
Noise level according to EN ISO 3741		< 73						dB (A)
Weight (without packaging)		54			60			kg
Ambient temperature range	SC	+ 15 … + 55 / + 59 … + 131						°C / °F
	LAP	- 40 … + 55 / - 40 … + 131						
Control range (adjustable)		+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95						
Refrigerant	R134a	700						g
Duty cycle		100						%
Condensate management		integrated condensate evaporation system with safety overflow						
Protection system according to NEMA type	3R/4	towards the electrical enclosure if used as intended by the manufacturer			-			
	4/4X	-			towards the electrical enclosure if used as intended by the manufacturer			
	1	towards the surroundings if used as intended by the manufacturer						
Design	housing	galvanised sheet steel						
	cover	galvanised/electrostatically powder coated (200 °C)			304 rust proof stainless steel			
Colour (cover)		RAL 7035, different colours available on request			-			

Accessories	Piece	Article number	Information on page
Condensate bottle	1	18314000100	74
Filter kit	1	18881500004	74

[1] LAP (Low Ambient Package): includes 900 W enclosure heater and a thermostat to be placed inside the enclosure
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

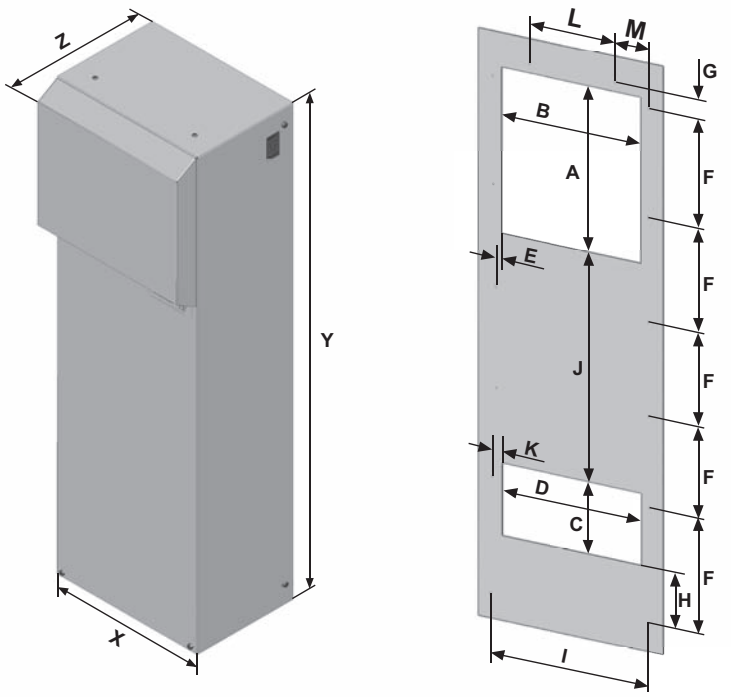
DTS 3261/3281



Dimensions

	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M
mm	395	1209	326	350	330	100	292	15	228.6	38.1	162.3	360	545	34	200	80
Mounting holes Ø 8 mm																

DTS 3261/3281



Cooling units 1600 W
DTS 3165 (NEMA 3R/4)
DTS 3185 (NEMA 4/4X)



- particularly suitable for the food industry and outdoor applications
- high protection system IP 56, maintenance-free
- maintains a UL tested NEMA type 3R/4 seal against the enclosure
- condenser with 3 mm fin spacing, highly effective protection against strongly contaminated ambient air
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- integrated condensate evaporation system

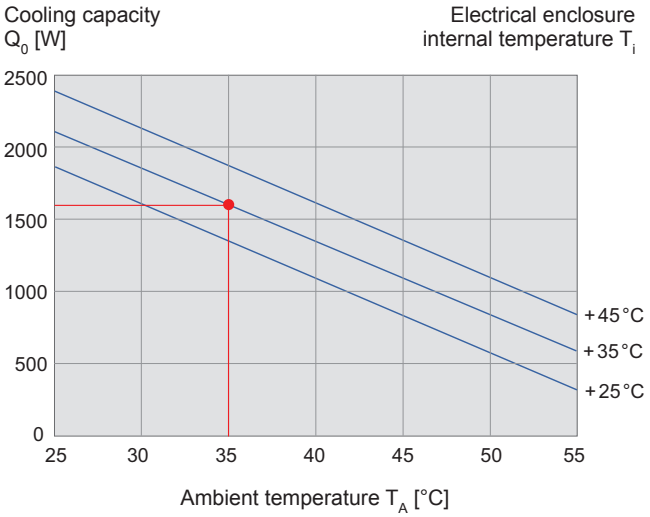
Data		DTS 3165 (NEMA 3R/4)		DTS 3185 (NEMA 4/4X)		Unit
Article number	Standard Controller	13383636355	13383639355	13383636158	13383639158	
	LAP [1]	13383636375	13383639375	13383636178	13383639178	
Rated voltage ± 10%		AC 50 / 60				Hz
		400 / 460 3~	230	400 / 460 3~	230	V
Cooling performance according to EN 14511	L35/L35	1600		1600		W
	L35/L50	832		832		
Power consumption	L35/L35	1283	1020	1283	1020	
Current consumption	L35/L35	3	4.5	3	4.5	A
Starting current	L35/L35	8	10	8	10	
Unimpeded airflow (free flow)	internal	580				m^3/h
	external	1200				
Pre fuse T		5	10	5	10	A
Type of connection		spring-type terminal included with plug				
Noise level according to EN ISO 3741		< 70				dB (A)
Weight (without packaging)		49				kg
Ambient temperature range	SC	+ 15 … + 55 / + 59 … + 131				°C / °F
	LAP	- 40 … + 55 / - 40 … + 131				
Control range (adjustable)		+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95				
Refrigerant	R134a	400		900		g
Duty cycle		100				%
Condensate management		integrated condensate evaporation system with safety overflow				
Protection system according to NEMA type	3R/4	towards the electrical enclosure if used as intended by the manufacturer		-		
	4/4X	-		towards the electrical enclosure if used as intended by the manufacturer		
	1	towards the surroundings if used as intended by the manufacturer				
Design	housing	galvanised sheet steel				
	cover	galvanised/electrostatically powder coated (200 °C)		304 rust proof stainless steel		
Colour (cover)		RAL 7035, different colours available on request		-		

Accessories	Piece	Article number	Information on page
Condensate bottle	1	18314000100	74
Filter kit	1	18881500006	74

[1] LAP (Low Ambient Package): includes 900 W enclosure heater and a thermostat to be placed inside the enclosure
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

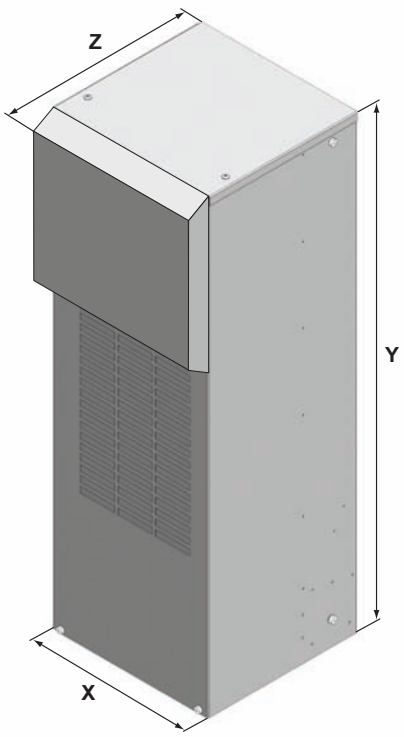
DTS 3165/3185

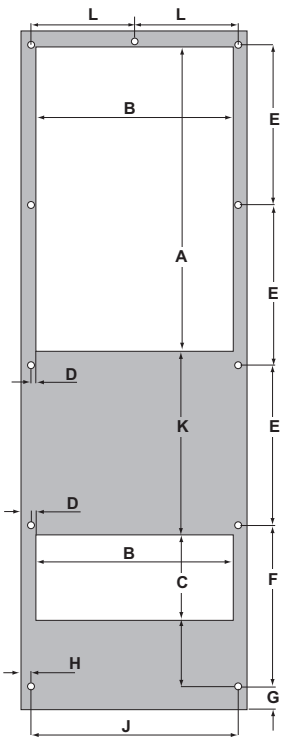


Dimensions

	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L
mm	311	914	367	430	264	118	8	216	216	32	13	80	279	228	139.5
Mounting holes Ø 10 mm															

DTS 3165/3185





Cooling units 1100 W
DTS 3161 (NEMA 3R/4)
DTS 3181 (NEMA 4/4X)



- compact design, ideal for small control cabinets and larger control cabinets for the cooling of hot spots
- particularly suitable for the food industry and outdoor applications
- maintains a UL tested NEMA type 3R/4 seal against the enclosure
- high protection system IP 56, maintenance-free
- condenser with 3 mm fin spacing, highly effective protection against strongly contaminated ambient air
- integrated condensate evaporation system

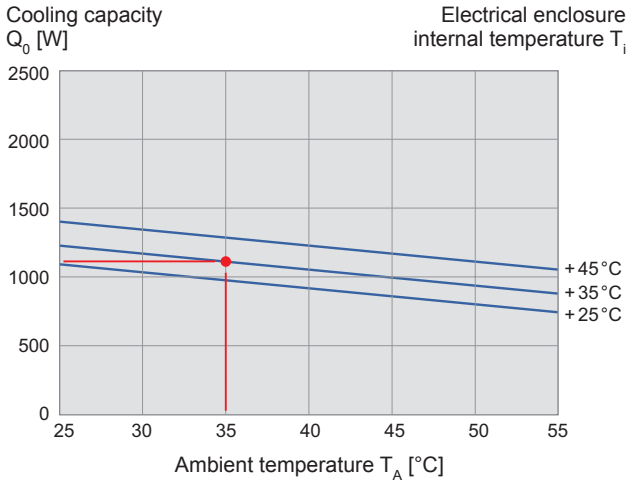
Data		DTS 3161 (NEMA 3R/4)			DTS 3181 (NEMA 4/4X)			Unit
Article number	Standard Controller	13385436355	13385441355	13385444355	13385436158	13385441158	13385444158	
	LAP [1]	13385436375	13385441375	13385444375	13385436178	13385441178	13385444178	
Rated voltage ± 10%		AC 50 / 60		AC 60	AC 50 / 60		AC 60	Hz
		400 2~	230	115	400 2~	230	115	V
Cooling performance according to EN 14511	L35/L35	1100						W
	L35/L50	950						
Power consumption	L35/L35	860	860	950	860	860	950	
Current consumption	L35/L35	1.9	3.9	7.9	1.9	3.9	7.9	A
Starting current	L35/L35	8	14.9	29.9	8	14.9	29.9	
Unimpeded airflow (free flow)	internal	595						m^3/h
	external	595						
Pre fuse T		6	6	10	6	6	10	A
Type of connection		spring-type terminal included with plug						
Noise level according to EN ISO 3741		< 70						dB (A)
Weight (without packaging)		43			45			kg
Ambient temperature range	SC	+ 15 … + 55 / + 59 … + 131						°C / °F
	LAP	- 40 … + 55 / - 40 … + 131						
Control range (adjustable)		+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95						
Refrigerant	R134a	400						g
Duty cycle		100						%
Condensate management		integrated condensate evaporation system with safety overflow						
Protection system according to NEMA type	3R/4	towards the electrical enclosure if used as intended by the manufacturer			-			
	4/4X	-			towards the electrical enclosure if used as intended by the manufacturer			
	1	towards the surroundings if used as intended by the manufacturer						
Design	housing	galvanised sheet steel						
	cover	galvanised/electrostatically powder coated (200 °C)			304 rust proof stainless steel			
Colour (cover)		RAL 7035, different colours available on request			-			

Accessories	Piece	Article number	Information on page
Condensate bottle	1	18314000100	74
Filter kit	1	18881500000	74

[1] LAP (Low Ambient Package): includes 900 W enclosure heater and a thermostat to be placed inside the enclosure
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

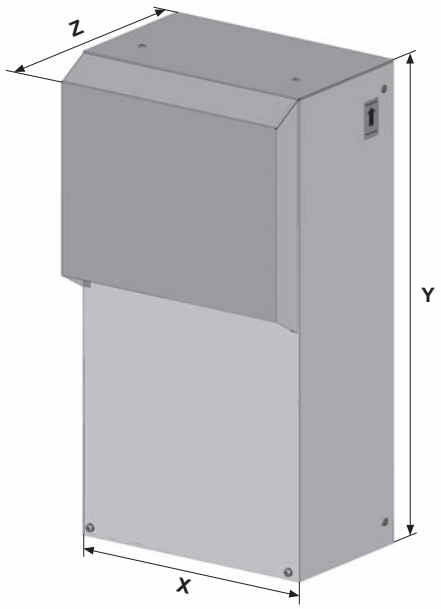
DTS 3161/3181

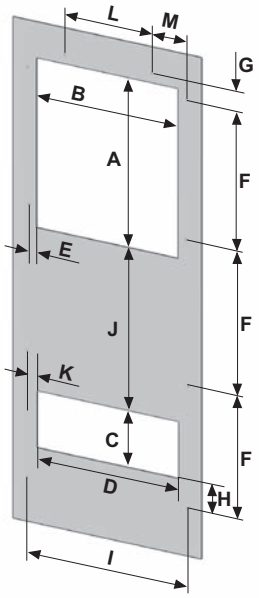


Dimensions

	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M
mm	395	748	294	300	310	56	292	25	228.6	38.1	81	360	265	34	200	80
Mounting holes Ø 8 mm																

DTS 3161/3181





Cooling units 680 W
DTS 3061 (NEMA 3R/4)
DTS 3081 (NEMA 4/4X)



- compact design, ideal for small control cabinets and larger control cabinets for the cooling of hot spots
- particularly suitable for the food industry and outdoor applications
- maintains a UL tested NEMA type 3R/4 seal against the enclosure
- high protection system IP 56, maintenance-free
- condenser with 3 mm fin spacing, highly effective protection against strongly contaminated ambient air

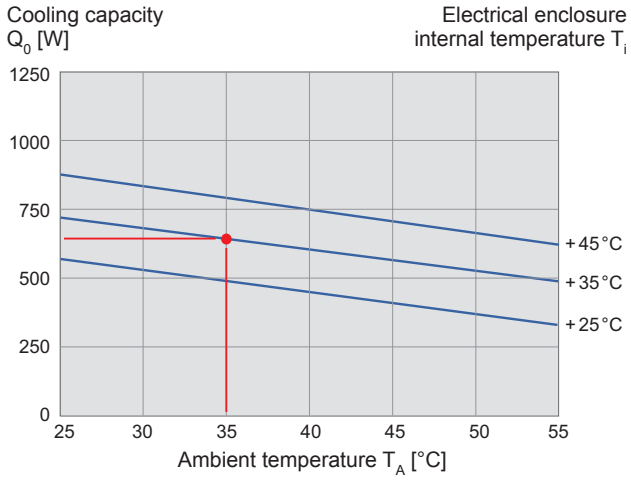
Data		DTS 3061 (NEMA 3R/4)	DTS 3081 (NEMA 4/4X)	Unit
Article number	Standard Controller	13382341355	13382341300	
	LAP [1]	13382341375	13382341178	
Rated voltage ± 10%		AC 50 / 60		Hz
		230		V
Cooling performance according to EN 14511	L35/L35	680		W
	L35/L50	475		
Power consumption	L35/L35	724		
Current consumption	L35/L35	3.3		A
Starting current	L35/L35	14.4		
Unimpeded airflow (free flow)	internal	325		m^3/h
	external	148		
Pre fuse T		16		A
Type of connection		spring-type terminal included with plug		
Noise level according to EN ISO 3741		< 64		dB (A)
Weight (without packaging)		23	25	kg
Ambient temperature range	SC	+ 15 … + 55 / + 59 … + 131		°C / °F
	LAP	- 40 … + 55 / - 40 … + 131		
Control range (adjustable)		+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95		
Refrigerant	R134a	400		g
Duty cycle		100		%
Condensate management		condensate drain		
Protection system according to NEMA type	3R/4	towards the electrical enclosure if used as intended by the manufacturer	-	
	4/4X	-	towards the electrical enclosure if used as intended by the manufacturer	
	1	towards the surroundings if used as intended by the manufacturer		
Design	housing	galvanised sheet steel		
	cover	galvanised/electrostatically powder coated (200 °C)	304 rust proof stainless steel	
Colour (cover)		RAL 7035, different colours available on request	-	

Accessories	Piece	Article number	Information on page
Condensate bottle	1	18314000100	74

[1] LAP (Low Ambient Package): includes 900 W enclosure heater and a thermostat to be placed inside the enclosure
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

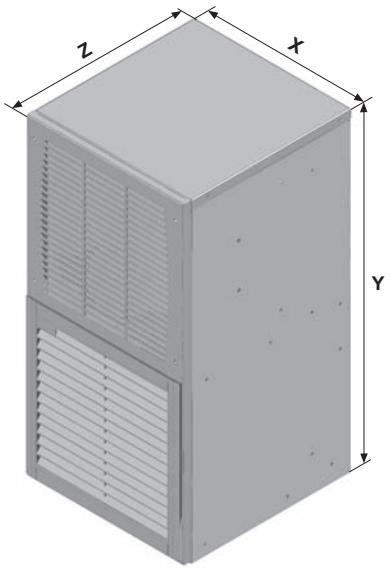
DTS 3061/3081

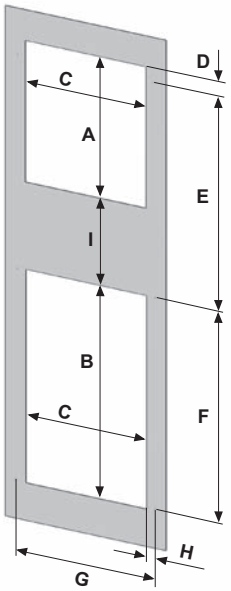


Dimensions

	X	Y	Z	A	B	C	D	E	F	G	H	I
mm	256	512	274	152.4	230.3	209.6	26.1	203.2	225.6	238.1	14.3	76.1
Mounting holes Ø 7.9 mm												

DTS 3061/3081





High temperature cooling units

DTS 3265 HT (NEMA 3R/4)
DTS 3165 HT (NEMA 3R/4)
DTS 3061 HT (NEMA 3R/4)

- suitable for outdoor applications
- operation under extreme high temperature conditions (+ 60 °C)
- maintains a UL tested NEMA type 3R/4 seal against the enclosure
- high protection system IP 56, maintenance-free
- condenser with 3 mm fin spacing, highly effective protection against strongly contaminated ambient air
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- integrated condensate evaporation system



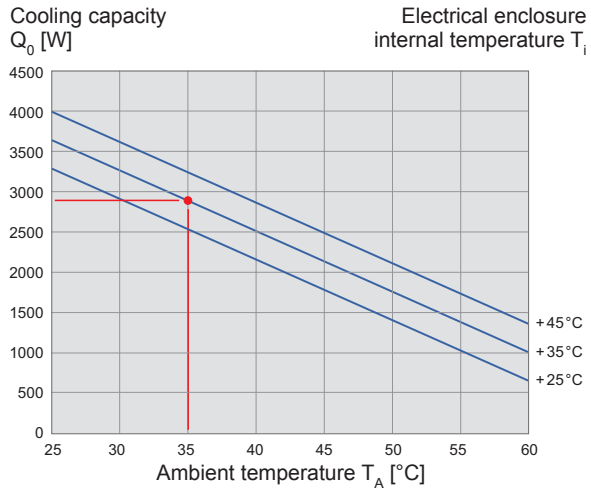
Data		DTS 3265 HT	DTS 3165 HT	DTS 3061 HT	Unit
Article number		13393841001	13393641001	13392341005	
Rated voltage ± 10%		AC 50 / 60			Hz
		230			V
Cooling performance according to EN 14511	L35/L35	2800	1600	680	W
	L40/L60	1250	750	280	
Power consumption	L35/L35	1360	860	360	
Current consumption	L35/L35	7.0	7.8	1.9	A
Starting current	L35/L35	38.0	26.0	6.5	
Unimpeded airflow (free flow)	internal	1200	1200	325	m^3/h
	external	1200	580	150	
Pre fuse T		15	10	10	A
Type of connection		spring-type terminal included with plug			
Noise level according to EN ISO 3741		< 73	< 70	< 64	dB (A)
Weight (without packaging)		68	49	23	kg
Ambient temperature range		0 … + 60 / + 52 … + 140			°C / °F
Control range (adjustable)		+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95			
Refrigerant	R134a	1200	900	400	g
Duty cycle		100			%
Condensate management		integrated condensate evaporation system with safety overflow			
Protection system according to NEMA type	3R/4	towards the electrical enclosure if used as intended by the manufacturer			
	1	towards the surroundings if used as intended by the manufacturer			
Design	housing	galvanised sheet steel			
	cover	galvanised/electrostatically powder coated (200 °C)			
Colour (cover)		RAL 7035, different colours available on request			

Accessories	Piece	Article number	Information on page
Condensate bottle	1	18314000100	74

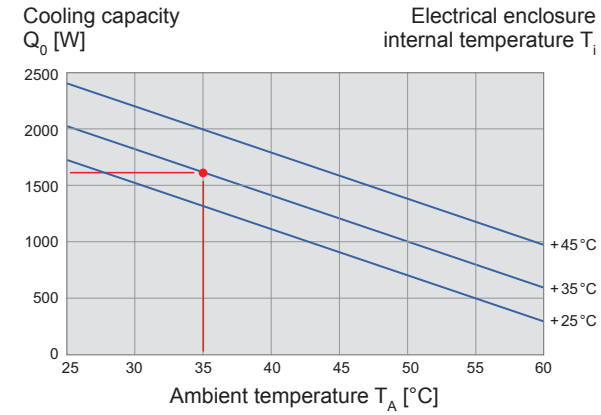
Approvals see page 23. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

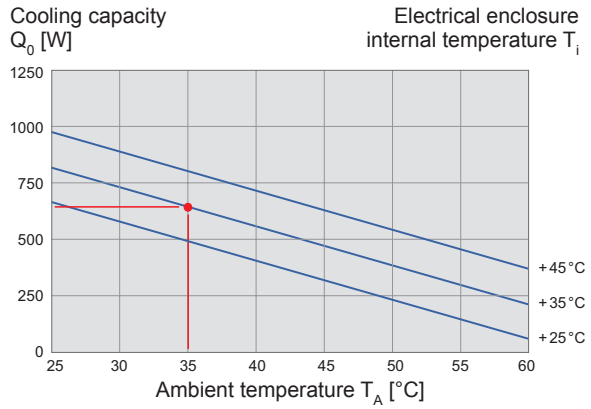
DTS 3265 HT



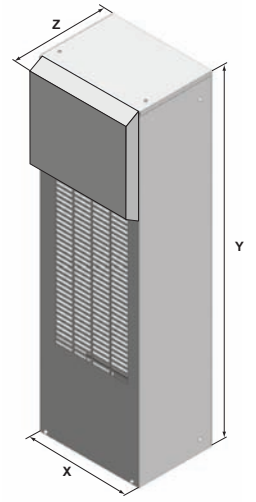
DTS 3165 HT

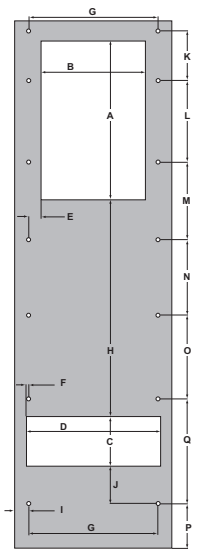


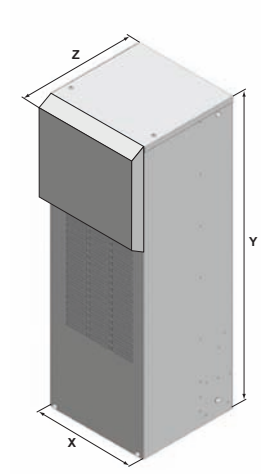
DTS 3061 HT

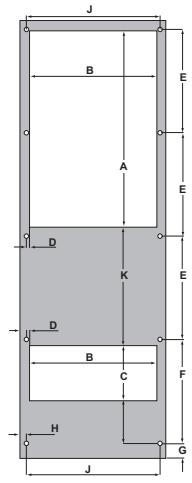


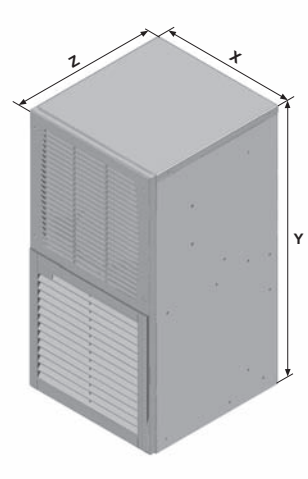
Dimensions

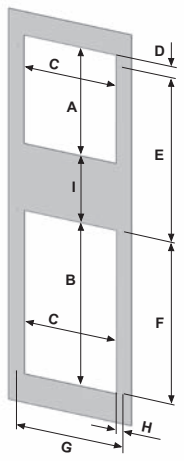












DTS 3265 HT	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
mm	406	1347	367	427	280	135	348	25	9	330	537	35	92	126	209	198	192	214	114	267
Mounting holes Ø 8 mm																				

DTS 3165 HT	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K
mm	311	914	367	430	264	118	8	216	216	32	13	80	279	228
Mounting holes Ø 10 mm														

DTS 3061 HT	X	Y	Z	A	B	C	D	E	F	G	H	I
mm	256	512	274	152.4	230.3	209.6	26.1	203.2	225.6	238.1	14.3	76.1
Mounting holes Ø 7.9 mm												

ECOOL Top mounted Cooling units 4000 / 3000 W

DTT 6801 / DTT 6601



- product variety: 3 installation sizes and 6 performances
- safety: 4-fold protection against condensate thanks to ideal, patented condensate management system
- service-friendly: toolless mounting and maintenance thanks to quick installation frame
- service-friendly: complete cover removable towards the front. Easily accessible filter mats (optional) and control elements in front area.
- energy efficiency: around 20% saving on energy thanks to the use of more effective, lighter components
- energy efficiency: optional multi-controller with energy-saving mode
- design and colour matching: perfect mixture of functionality and design
- available in stainless steel

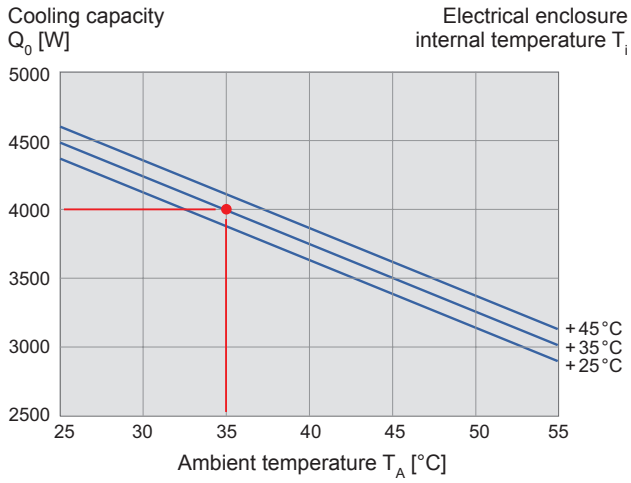
Data		DTT 6801	DTT 6601	Unit
Article number	Standard Controller	13216832055	13216632055	
	Multi Controller	13216862055	13216662055	
	V2A, Standard Controller	13216832015	13216632015	
	V2A, Multi Controller	13216862015	13216662015	
Rated voltage ± 10%		AC 50 / 60		Hz
		400 / 460 3~[1]	400 / 460 3~[1]	V
Cooling performance according to EN 14511	L35/L35	4000 / 4250	3000 / 3200	W
	L35/L50	3260 / 3495	2000 / 2250	
Power consumption	L35/L35	1618 / 2050	1700 / 2100	
Current consumption	L35/L35	7.07 / 5	3.16 / 4.5	A
Starting current	L35/L35	17.1 / 19.5	8.9 / 9.9	
Unimpeded airflow (free flow)	internal	1420 / 1530		m^3/h
	external	1970 / 2180		
Pre fuse T		10	10	A
Type of connection		spring-type terminal included with plug		
Noise level according to EN ISO 3741		< 62		dB (A)
Weight (without packaging)		77	75	kg
Ambient temperature range		+ 15 … + 55 / + 59 … + 131		°C / °F
Control range (adjustable)	SC	+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95		
	MC	+ 25 … + 50 / + 77 … + 122; factory setting + 35 / + 95		
Refrigerant	R134a	1250		g
Duty cycle		100		%
Condensate management		integrated condensate evaporation system with safety overflow		
Protection system according to EN 60529	IP54	towards the electrical enclosure if used as intended by the manufacturer		
	IP34	towards the surroundings if used as intended by the manufacturer		
Design	housing	galvanised sheet steel		
	cover	galvanised/electrostatically powder coated (200 °C), or stainless steel		
Colour (cover)		RAL 7035 (different colours available on request) or stainless steel		

Accessories	Piece	Article number	Information on page
Condensate bottle	1	18314000100	74
Pre-filter, aluminium	1	18311500000	74
Quick installation frame	1	18300000146	75

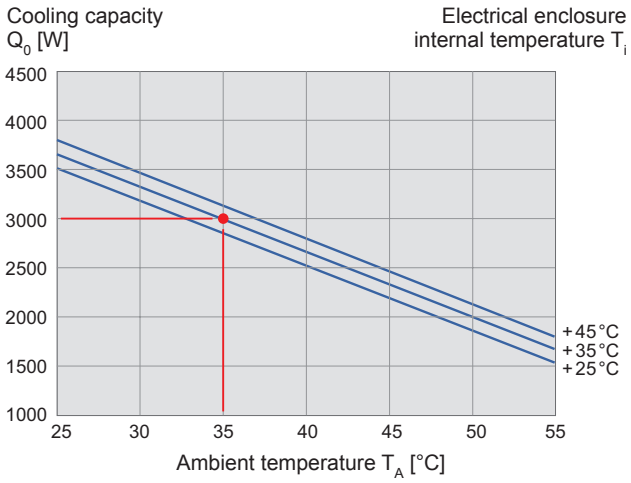
[1] suitable for various supply voltages (see technical specific data sheet)
Approvals see page 23. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

DTT 6801



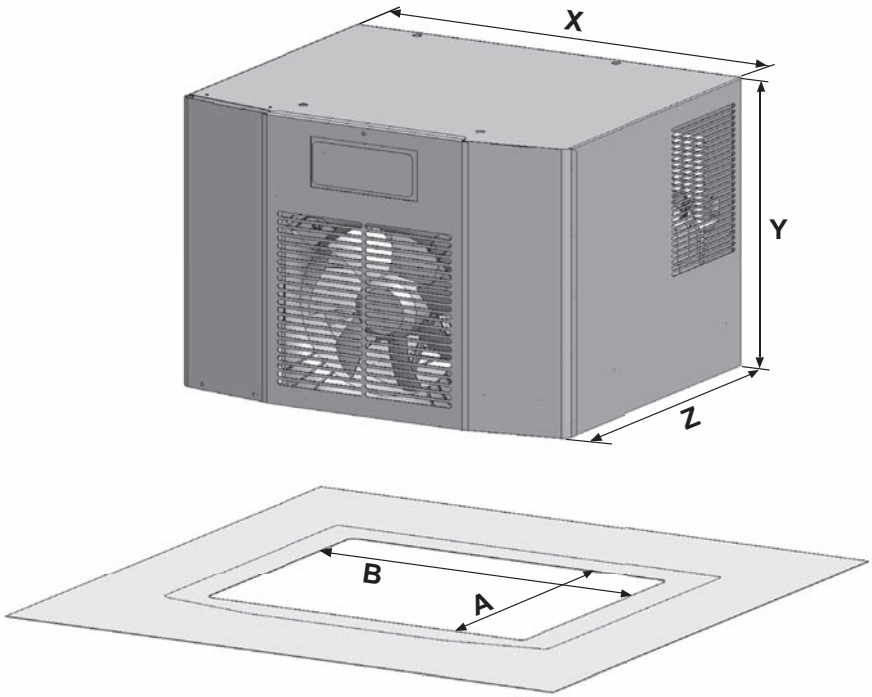
DTT 6601



Dimensions

	X	Y	Z	A	B
mm	795	485	575	392	692

DTT 6801 / DTT 6601



Top mounted Cooling units 2000 / 1500 W

DTT 6401 / DTT 6301



- product variety: 3 installation sizes and 6 performances
- safety: 4-fold protection against condensate thanks to ideal, patented condensate management system
- service-friendly: toolless mounting and maintenance thanks to quick installation frame
- service-friendly: complete cover removable towards the front. Easily accessible filter mats (optional) and control elements in front area.
- energy efficiency: around 20% saving on energy thanks to the use of more effective, lighter components
- energy efficiency: optional multi-controller with energy-saving mode
- design and colour matching: perfect mixture of functionality and design
- available in stainless steel

Data		DTT 6401			DTT 6301			Unit
Article number	Standard Controller	13216432055	13216441055	13216444055	13216349055	13216341055	13216344055	
	Multi Controller	13216462055	13216471055	13216474055	13216379055	13216371055	13216374055	
	V2A, Standard Controller	13216432015	13216441015	13216444015	13216349015	13216341015	13216344015	
	V2A, Multi Controller	13216462015	13216471015	13216474015	13216379015	13216371015	13216374015	
Rated voltage ± 10%		AC 50 / 60		AC 60	AC 50 / 60		AC 60	Hz
		400 / 460 3~[1]	230	115	400 2~[1]	230	115	V
Cooling performance according to EN 14511	L35/L35	2000 / 2100			1500 / 1620			W
	L35/L50	1540 / 1600			1000 / 1160			
Power consumption	L35/L35	1300 / 1598	1049 / 1275	1894	962 / 1150	980 / 1140	1027	
Current consumption	L35/L35	3 / 3.3	6.2 / 7	20	3.75 / 3.6	5.73 / 7	15	A
Starting current	L35/L35	10 / 12	16.8 / 20	34	9.8 / 11.6	19.7 / 23.2	32	
Unimpeded airflow (free flow)	internal	885 / 990						m^3/h
	external	1820 / 1970						
Pre fuse T		6	10	20	6	10	20	A
Type of connection		spring-type terminal included with plug						
Noise level according to EN ISO 3741		< 62						dB (A)
Weight (without packaging)		51	46	44	50.5	45	40	kg
Ambient temperature range		+ 15 … + 55 / + 59 … + 131						°C / °F
Control range (adjustable)	SC	+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95						
	MC	+ 25 … + 50 / + 77 … + 122; factory setting + 35 / + 95						
Refrigerant	R134a	750			725			g
Duty cycle		100						%
Condensate management		integrated condensate evaporation system with safety overflow						
Protection system according to EN 60529	IP54	towards the electrical enclosure if used as intended by the manufacturer						
	IP34	towards the surroundings if used as intended by the manufacturer						
Design	housing	galvanised sheet steel						
	cover	galvanised/electrostatically powder coated (200 °C), or stainless steel						
Colour (cover)		RAL 7035 (different colours available on request) or stainless steel						

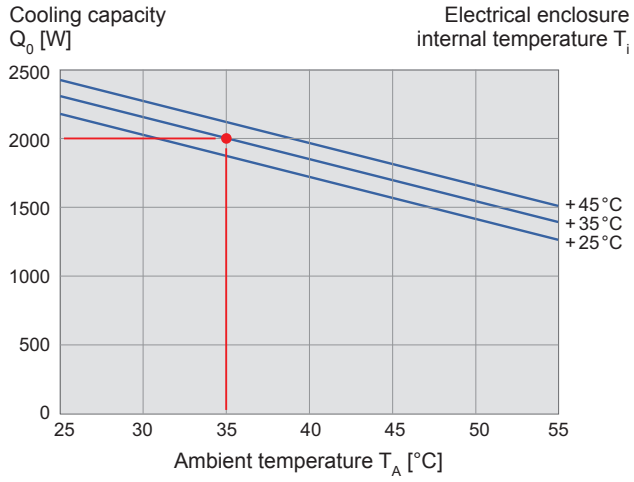
Accessories	Piece	Article number	Information on page
Condensate bottle	1	18314000100	74
Pre-filter, aluminium	1	18311500000	74
Quick installation frame	1	18300000145	75

[1] suitable for various supply voltages (see technical specific data sheet)

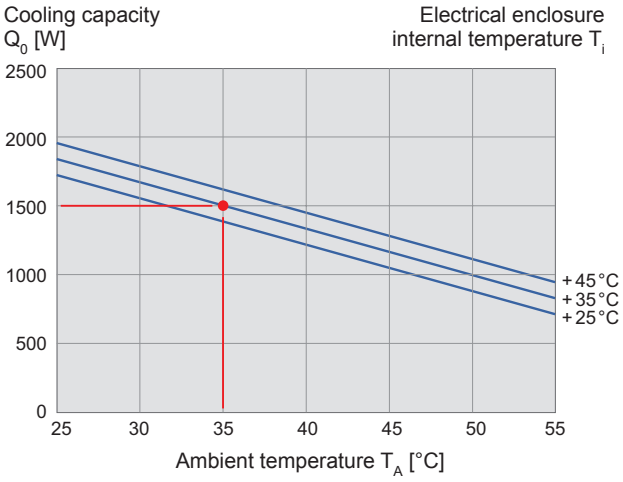
Approvals see page 23. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

DTT 6401



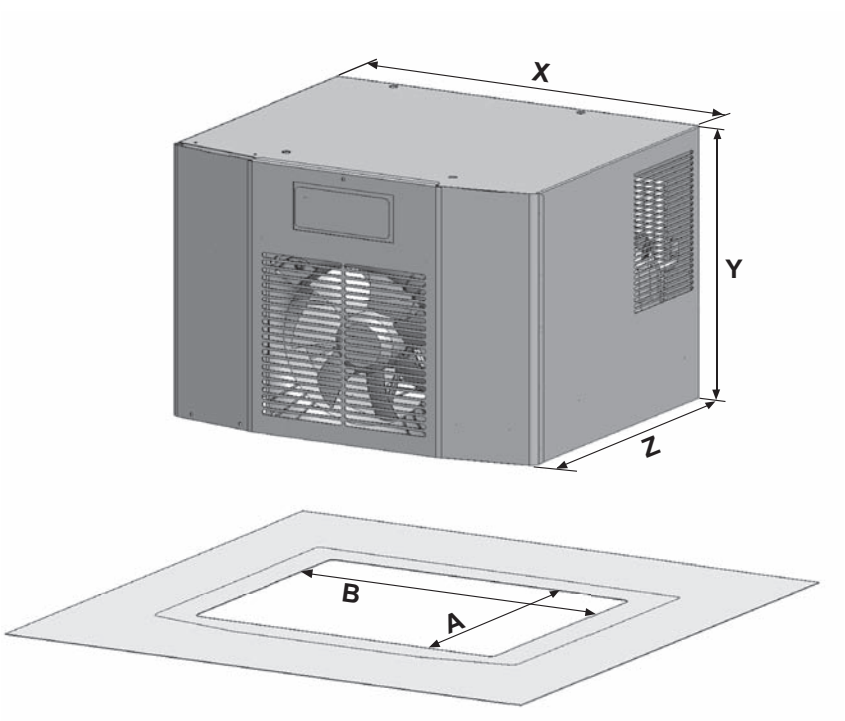
DTT 6301



Dimensions

	X	Y	Z	A	B
mm	595	435	495	390	490

DTT 6401 / DTT 6301



Top mounted Cooling units 1000 / 500 W

DTT 6201 / DTT 6101



- product variety: 3 installation sizes and 6 performances
- safety: 4-fold protection against condensate thanks to ideal, patented condensate management system
- service-friendly: toolless mounting and maintenance thanks to quick installation frame
- service-friendly: complete cover removable towards the front. Easily accessible filter mats (optional) and control elements in front area.
- energy efficiency: around 20% saving on energy thanks to the use of more effective, lighter components
- energy efficiency: optional multi-controller with energy-saving mode
- design and colour matching: perfect mixture of functionality and design
- available in stainless steel

Data		DTT 6201			DTT 6101		Unit
Article number	Standard Controller	13216249055	13216241055	13216244055	13216141055	13216144055	
	Multi Controller	13216279055	13216271055	13216274055	13216171055	13216174055	
	V2A, Standard Controller	13216249015	13216241015	13216244015	13216141015	13216144015	
	V2A, Multi Controller	13216279015	13216271015	13216274015	13216171015	13216174015	
Rated voltage ± 10%		AC 50 / 60		AC 60	AC 50 / 60	AC 60	Hz
		400 2~[1]	230	115	230	115	V
Cooling performance according to EN 14511	L35/L35	1000 / 1100			500 / 665		W
	L35/L50	600 / 640			370 / 400		
Power consumption	L35/L35	706 / 845	663 / 805	877	458 / 532	569	
Current consumption	L35/L35	2.82 / 2.5	3.98 / 4.5	10	2.36 / 3	5.6	A
Starting current	L35/L35	8.5 / 9.3	14.8 / 17.4	17.4	19.7 / 23	23	
Unimpeded airflow (free flow)	internal	570 / 582					m^3/h
	external	1820 / 1970					
Pre fuse T		6	10	20	10	20	A
Type of connection		spring-type terminal included with plug					
Noise level according to EN ISO 3741		< 62					dB (A)
Weight (without packaging)		41	35		33		kg
Ambient temperature range		+ 15 … + 55 / + 59 … + 131					°C / °F
Control range (adjustable)	SC	+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95					
	MC	+ 25 … + 50 / + 77 … + 122; factory setting + 35 / + 95					
Refrigerant	R134a	400					g
Duty cycle		100					%
Condensate management		integrated condensate evaporation system with safety overflow					
Protection system according to EN 60529	IP54	towards the electrical enclosure if used as intended by the manufacturer					
	IP34	towards the surroundings if used as intended by the manufacturer					
Design	housing	galvanised sheet steel					
	cover	galvanised/electrostatically powder coated (200 °C), or stainless steel					
Colour (cover)		RAL 7035 (different colours available on request) or stainless steel					

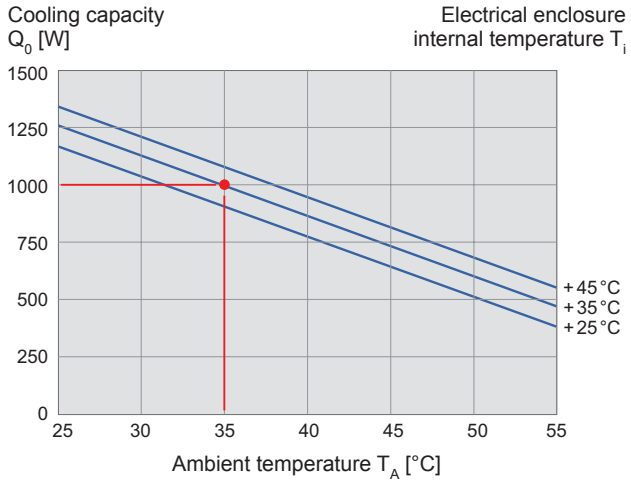
Accessories	Piece	Article number	Information on page
Condensate bottle	1	18314000100	74
Pre-filter, aluminium	1	18311500000	74
Quick installation frame	1	18300000144	75

[1] suitable for various supply voltages (see technical specific data sheet)

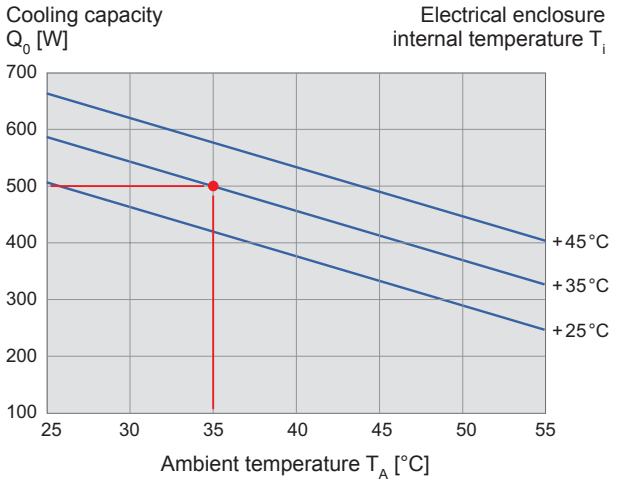
Approvals see page 23. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

DTT 6201



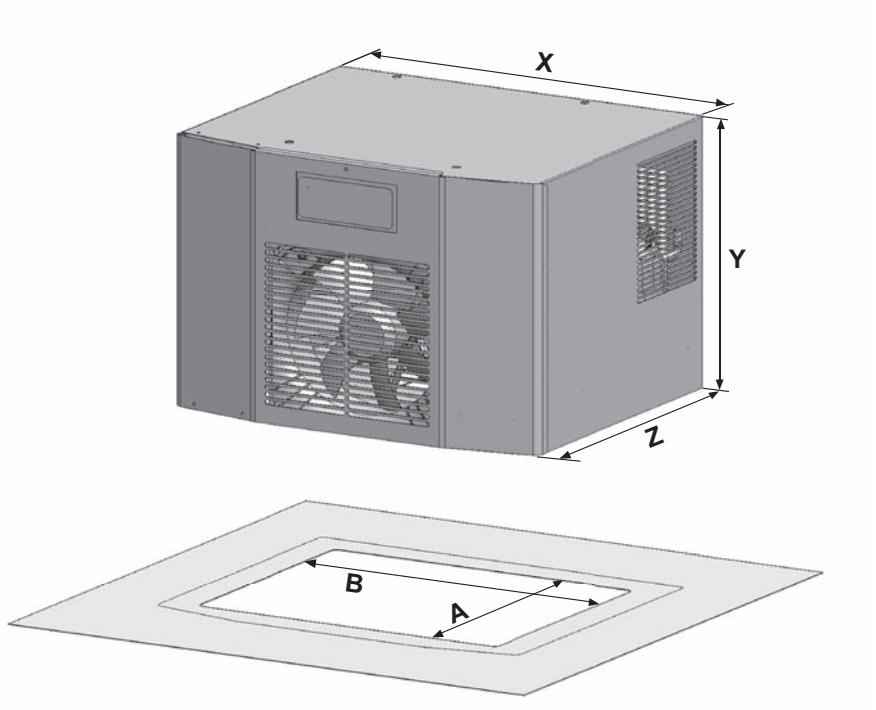
DTT 6101



Dimensions

	X	Y	Z	A	B
mm	595	435	395	260	475

DTT 6201 / DTT 6101



Peltier Cooling units 100–150 W
PTM 100 / PTM 150



Peltier cooling unit product line for use in sensitive areas, circuitry and small control cabinets.

- ideal for the cooling of operating and control elements
- particularly suitable for support arm systems
- vibration-free, also usable for precision processes
- pinpoint cooling of hotspots

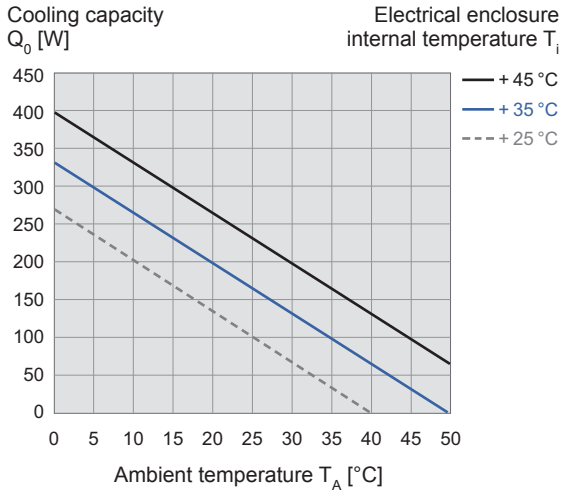
Data		PTM 100	PTM150	Unit
Article number	horizontal	15310080055	15315080055	
	vertical	15310180055	15315180055	
Rated voltage ± 10%		24 DC	24 DC	V
Cooling performance according to EN 14511	L35/L35	100	150	W
Power consumption	L35/L35	102	240	
Current consumption	L35/L35	4.25	10	A
Unimpeded airflow (free flow)	internal	76	114	m^3/h
	external	156	234	
Pre fuse T		6	16	A
Type of connection		connection via terminal strip, max. 2.5 mm² / AWG 16		
Sensor cable length		1200		mm
Noise level according to EN ISO 3741		47		dB (A)
Weight (without packaging)		6.7	9.16	kg
Ambient temperature range		- 40 … + 50 / - 40 … + 122		°C / °F
Control range (adjustable)		+ 0 … + 50 / + 32 … + 122		
Duty cycle		100		%
Condensate management		condensate drain		
Protection system according to EN 60529	IP 54	towards the electrical enclosure if used as intended by the manufacturer		
	IP 24	towards the surroundings if used as intended by the manufacturer		
Design	housing	galvanised sheet steel		
	cover	galvanised/electrostatically powder coated (200 °C)		
Installation location		H - horizontal / V - vertical		
Colour (cover)		RAL 7035, different colours available on request		

Accessories	Piece	Article number	Information on page
External condensate evaporation system	1	18314000001	74
Condensate bottle	1	18314000100	74

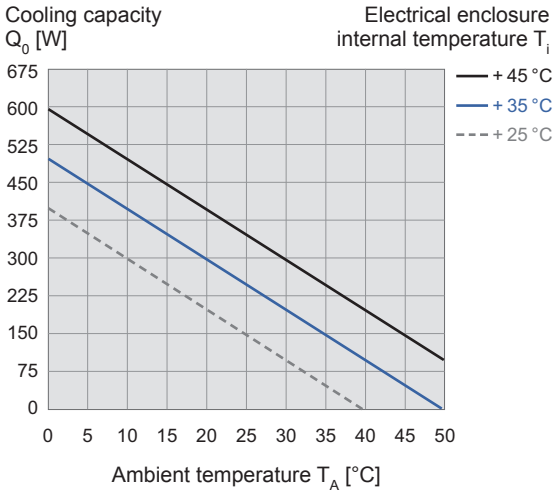
Approvals see page 23. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

PTM 100

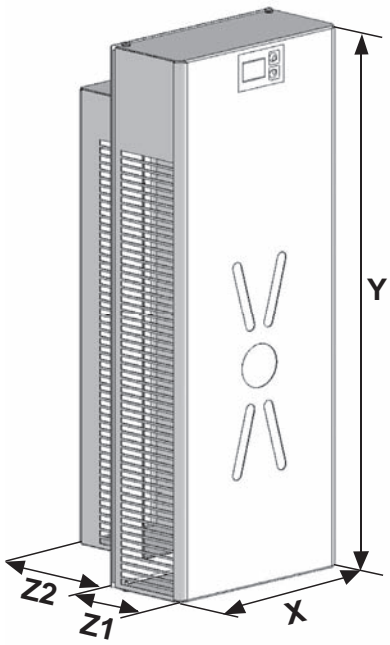


PTM 150



Dimensions

mm	PTM 100	PTM 150
X	181	181
Y	367	495
Z1	151	151
Z2	75	75



Accessories



Filter kit

Aluminium mesh.

Suitable for ...	Article number
DTS 3161/3181	18881500000
DTS 3261/3281	18881500001
DTS 3361/3381	18881500002
DTS 3561/3581	18881500003
DTS 3661/3681	18881500004
DTS 3165/3185	18881500006
DTS 3265/3285	18881500007



External condensate evaporation system 230V 50/60 Hz

External condensate evaporator for the accumulated condensed water.

Suitable for ...	Article number
all units	18314000001



Condensate bottle

External container for collecting the accumulating condensed water.

Suitable for ...	Article number
all units	18314000100



Transport eye bolts

Eye bolts to lift the cooling unit with cranes or lifters.

Suitable for ...	Article number
all unit of the 6000 series	18310000154



External temperature probe

For positioning of the ESM temperature probe inside the enclosure. Cable length 2.9 m.

Suitable for ...	Article number
DTI/DTS 6000 with Multi Controller	18310000153



Cooling unit controller with energy-saving mode

Cooling unit PCB with integrated energy-saving function.

Suitable for ...	Article number
all multi-controller capable units	note when ordering



ECOOL-Plant Software

Cooling unit software for external diagnosis and parameterisation of the cooling units (incl. USB cable).

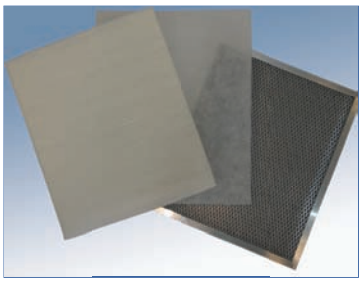
Suitable for ...	Article number
all multi-controller capable units	18310000002



Pre-filter, aluminium

Retrofittable pre-filter.

Suitable for ...	Article number
all DTT units	18311500000



ECOOL Filter

3 different type of filters for the different environmental conditions.

Product	Article number
Vlies filter for DTI/DTS 6201-6801	18300000147
Vlies filter for PAI/PAS 6043-6133	18066100001
Fluted filter for DTI/DTS 6201-6801	18300000148
Aluminium filter for DTI/DTS 6201-6801	18300000149
Filter adapter [1] for DTI/DTS 6201-6801 (RAL 7035, different colours available on request)	18310000151

[1] filter adapter only needed one time, all filters fits to the adapter



Quick installation frame

For quick and easy installation or replacement.

Suitable for ...	Article number
DTT 61/6201	18300000144
DTT 63/6401	18300000145
DTT 66/6801	18300000146



Internal enclosure fan

Distribution of cold air inside the control cabinet.

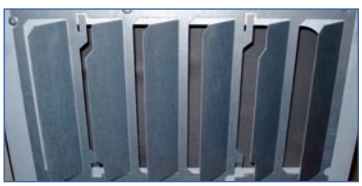
Product	Article number
PEF 180 mounting bracket 230 V AC	18110000000
PEF 180 mounting bracket 115 V AC	18110000001
PEF 180 mounting bracket 24 V DC	18110000002



Air diverter internal

For diverting the cold air downwards.

Suitable for ...	Article number
DTI/DTS 6201–6801	18300000201



Air baffle internal

For diverting the cold air optionally to the right or to the left.

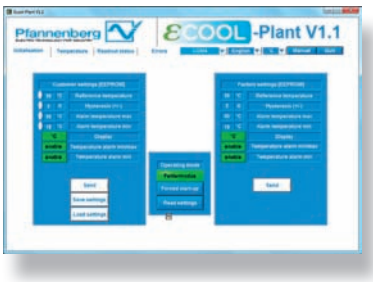
Suitable for ...	Article number
DTI/DTS 6201–6801	18300000141

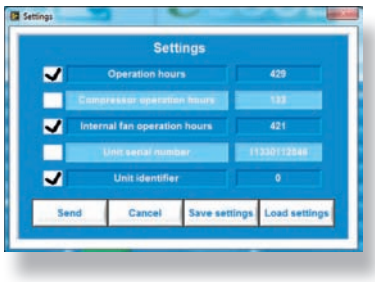
ECOOL-Plant Software

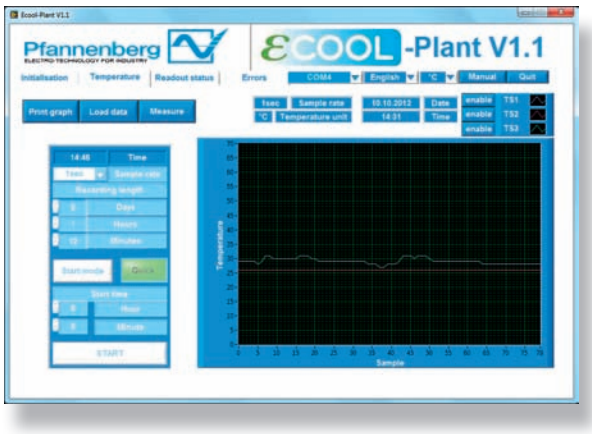
Pfannenberg cooling units with electronic control, which are designed as **Pfannenberg Multi Controller**, can be configured and interrogated by means of a remote optical interface with a scanner head with magnetic holder or by means of an integrated USB connection (DTI/DTS 6000 series) and the program **ECOOL-Plant**.

The following parameters can be set using this program:

- **Nominal value for switch cabinet interior temperature**
- **Switching hysteresis and nominal temperature of switch cabinet**
- **Upper temperature limit T_{max} above which an error message is issued**
- **Lower temperature limit T_{min} below which an error message is issued**
- **Changeover of temperature indication on display of the Pfannenberg Multi Controller between °C / °F**
- **Suppression of error message when lower temperature limit T_{min} is reached, and when upper temperature limit T_{max} is reached**
- **Suppression of error message when lower temperature limit T_{min} is reached**
- **Input of operating hours, including operating hours of compressor and internal fan, as well as appliance serial number and ID designation**

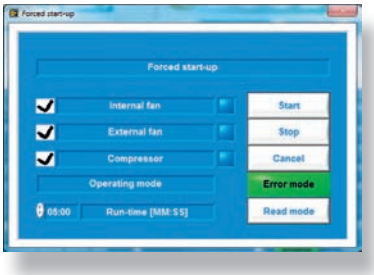


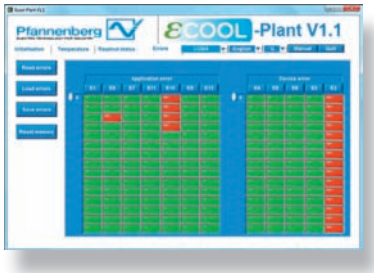


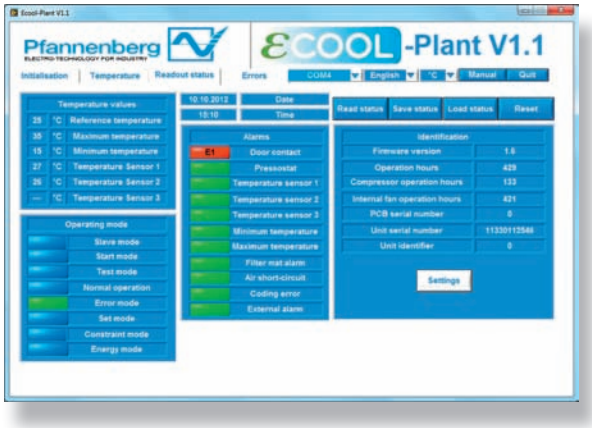


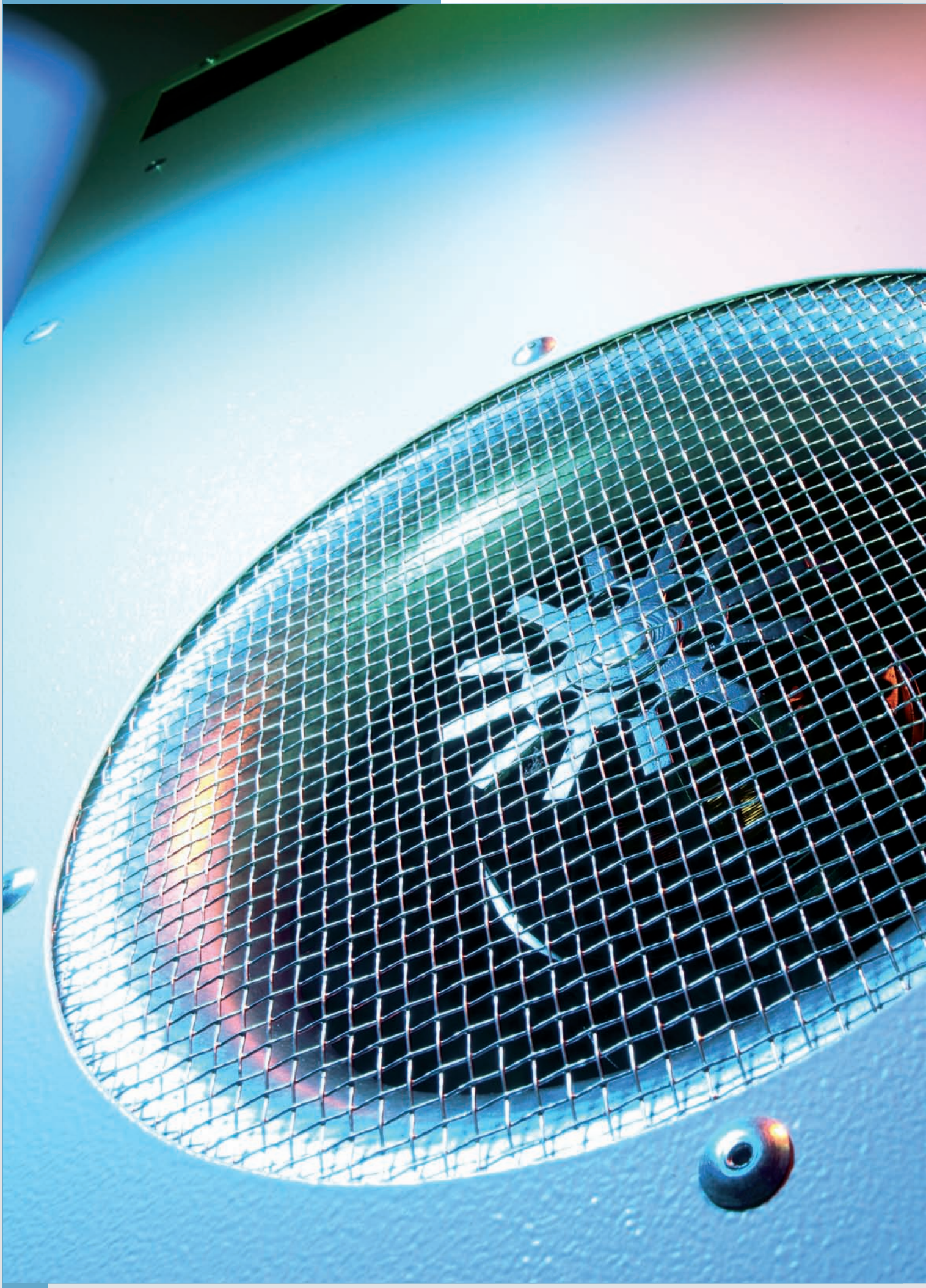
The following actions can be triggered using this program:

- Reset of electronic feedback (closed loop) controller
- Interrogating and restoring the factory setting
- Saving and loading the customer settings
- Recording, saving, loading and printing temperature profiles
- Interrogating current errors
- Interrogating the firmware version, operating hours, PCB serial number and appliance serial number
- Interrogating the current operating status
- Interrogating temperature sensor readings
- Saving the current status
- Loading a status
- Interrogating and saving the last 31 application errors
- Loading 31 application errors
- Interrogating and saving the last 31 appliance/device errors
- Loading 31 appliance/device errors
- Deleting the cyclical error memory with application and appliance/ device errors
- Saving and loading operating hours, including operating hours of compressor and internal fan, as well as appliance serial number and ID designation into and/or from a file
- Switching on the components of internal fans, external fans and compressors (forced start-up) and automatic shut-down after a specified period of time

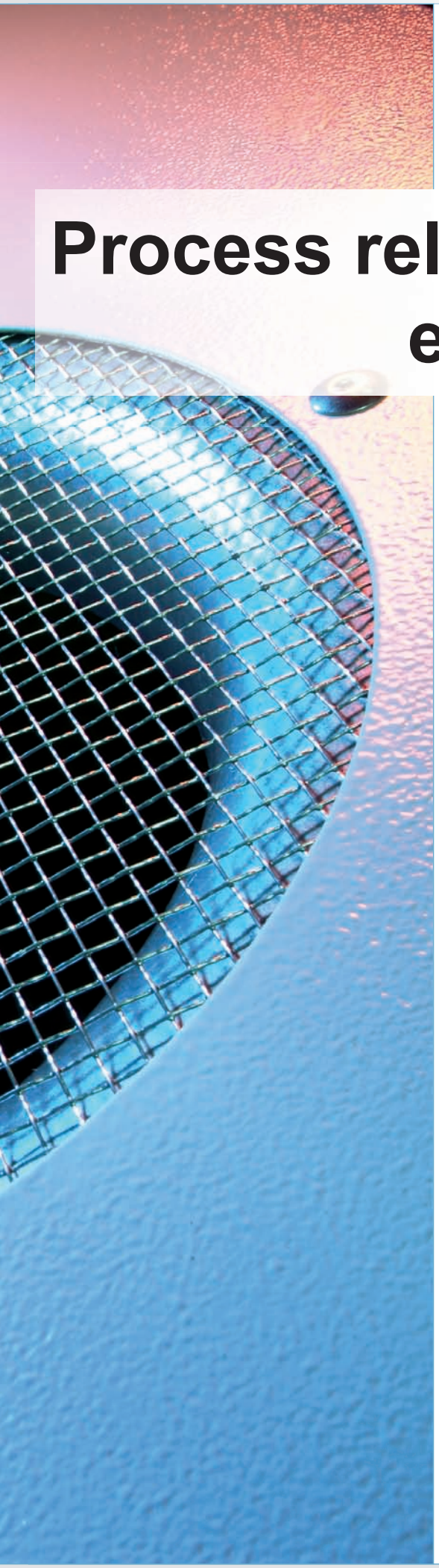








Process reliability even under extreme conditions



Air/Water Heat exchangers from the PWS and PWD series

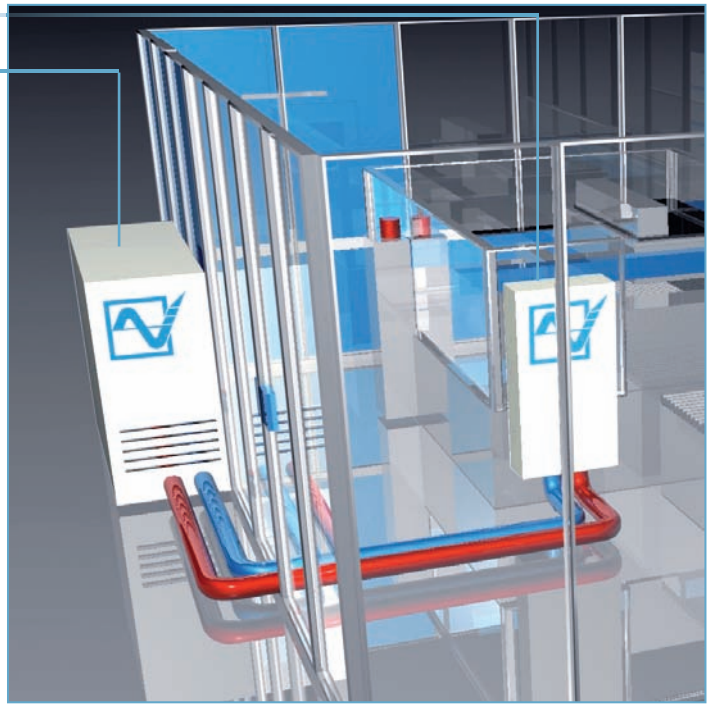
The use of Pfannenberg air/water heat exchangers is particularly suitable where ambient temperatures are high or the atmosphere proves to be particularly oily or aggressive.
Their main advantages over other air conditioner units for control cabinets are their maintenance-free operation and extremely low noise emission.

Ideal areas of use for air/water heat exchangers are wherever machines or production processes are cooled by tempered water and water is thus already provided.

The biggest advantage of water cooling is the 100% system solution

The combination of air/water heat exchangers and chillers offers an ideal system solution for the cooling of your processes, machines and controllers.

Chillers ensure central, economic cooling and provision of water as the cooling medium. All cooling tasks in a system or machine and also on a control cabinet can be accomplished simply and economically via a closed pipeline system.



The special product characteristics of the PWS series



Economy

- system-compatible with chillers
- can be integrated in existing cooling circuits
- integrated thermostat and solenoid valve for energy-efficient temperature control

Process reliability

- high airflow rate and cooling capacity
- any power losses that occur are not given off into the room
- integrated temperature monitoring with alarm contact

Resilience

- very high IP protection (up to IP 65)
- usable under aggressive environmental conditions
- independent from the ambient temperature at the place of installation

Service and mounting-friendliness

- compact design
- seal requires no elaborate reworking of the mounting cut-out
- maintenance-free

All air/water heat exchangers at a glance

Type	Cooling capacity	Rated voltage	Dimensions (HxWxD)	Approvals					Page
				UR	cUL	GOST	CSA	CE	
Heat exchangers from the PWS series – air/water heat exchangers for side and door mounting									
PWS 71002	10000 W	230 V / 400 V[1]	1800 x 600 x 315 mm	●	●	●		●	82
PWS 7702	7000 W	230 V / 400 V[1]	1800 x 460 x 310 mm	●	●	●		●	84
PWS 7702 SL	7000 W	230 V / 400 V	1800 x 460 x 255 mm	●	●	○		●	84
PWS 7502	5200 W	115 V / 230 V	1400 x 460 x 235 mm	●	●	●		●	86
PWS 7332	3150 W	115 V / 230 V	950 x 400 x 190 mm	●	●	●		●	88
PWS 7332 L	3150 W	115 V / 230 V	1350 x 400 x 190 mm	●	●	●		●	90
PWS 7152	1500 W	115 V / 230 V	950 x 400 x 115 mm	●	●	●		●	88
PWS 7102	950 W	115 V / 230 V	500 x 200 x 150 mm	●	●	●		●	92
PWS 7062	600 W	115 V / 230 V	500 x 200 x 100 mm	●	●	●		●	92
Roof-mounted heat exchangers from the PWD series – air/water heat exchangers for roof mounting									
PWD 5402	3400 W	230 V	190 x 720 x 465 mm			●		●	94
PWD 5302	2150 W	230 V	140 x 600 x 390 mm			●		●	94
Accessories									
Internal enclosure fan PEF 180		24 V DC / 115 V AC / 230 V AC							96
External condensate evaporation system		230 V							96
Condensate bottle									96
Device-side water connection with G3/8“ internal thread									96

[1] variant without UL

● available
○ pending



Further information can be found on the Internet:
www.pfannenberg.com · **www.pfannenberg-spareparts.com**
Keep up to date. Subscribe to the newsletter now:
newsletter.pfannenberg.com

Air/Water Heat Exchanger 10000 W
PWS 71002



- maintenance-free
- mounting-friendly seal, no elaborate reworking of the mounting cut-out
- integrated thermostat and solenoid valve for temperature control
- integrated temperature monitoring with alarm contact

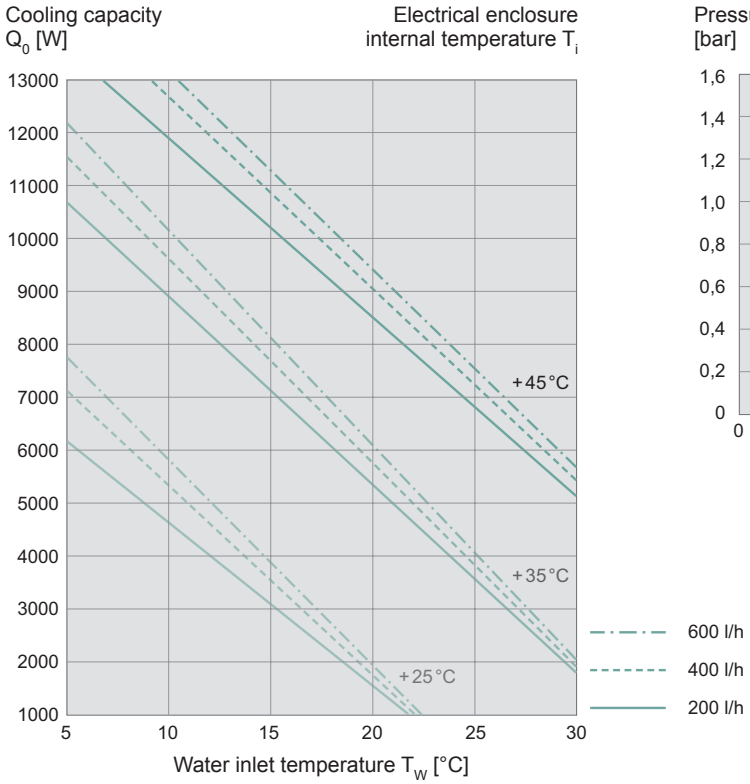
Data		PWS 71002		Unit
Article number		12057802055	12057810055	
Rated voltage ± 10 %		AC 50 Hz / 60 Hz	AC 50 Hz / 60 Hz	
		400 3~	230	V
Cooling capacity at 600 l/h	W10/L35	10000		W
Power consumption	W10/L35	1050 / 1450	820 / 1200	
Current consumption	W10/L35	1.9 / 2.2	3.8 / 5.2	A
Starting current	W10/L35	8.3 / 9.4	13.5 / 18.8	
Unimpeded airflow (free flow)	internal	5900	6250	m³/h
Pre fuse T		10		A
Type of connection	electro	spring-type terminal included with plug		
	fluid	13 mm hose nozzle; other connectors on request		
Noise level (according to EN ISO 3741)		66		dB (A)
Weight (without packaging)		73	75	kg
Ambient temperature range		> + 1 … + 70 / > + 34 … + 158		°C / °F
Control range (adjustable)		+ 8 … + 50 / + 47 … + 122; factory setting + 35 / + 95		
Water outlet temperature		> + 1 … + 35 / > + 34 … + 95		
Permissible operating pressure		max. 10		bar
Duty cycle		100%		
Condensate management		condensate drain		
System of protection according to EN 60529	IP 55	towards the electrical enclosure if used as intended by the manufacturer		
	IP 65	on request		
Design	housing	galvanised steel/electrostatically powder-coated (200 °C); on request: stainless steel		
	heat exchanger	copper pipe with aluminium fins; stainless steel piping on request		
Colour (cover)		RAL 7035, different colours available on request		

Accessories	Piece	Article number	Informationen on page
External condensate evaporation system	1	18314000001	96
Condensate bottle	1	18314000100	96

Approvals see page 81

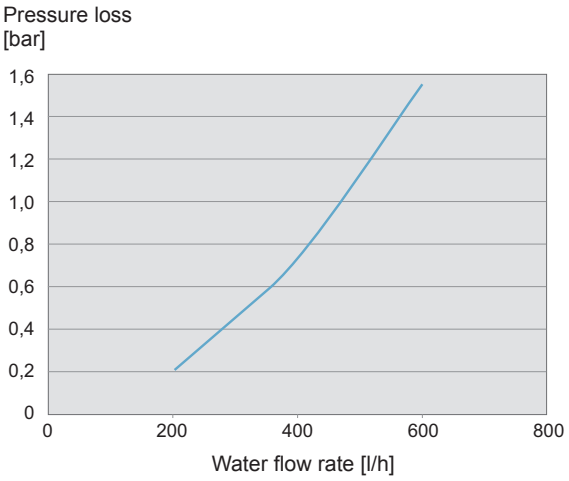
Cooling capacity performance curves

PWS 71002



Pressure loss performance curve

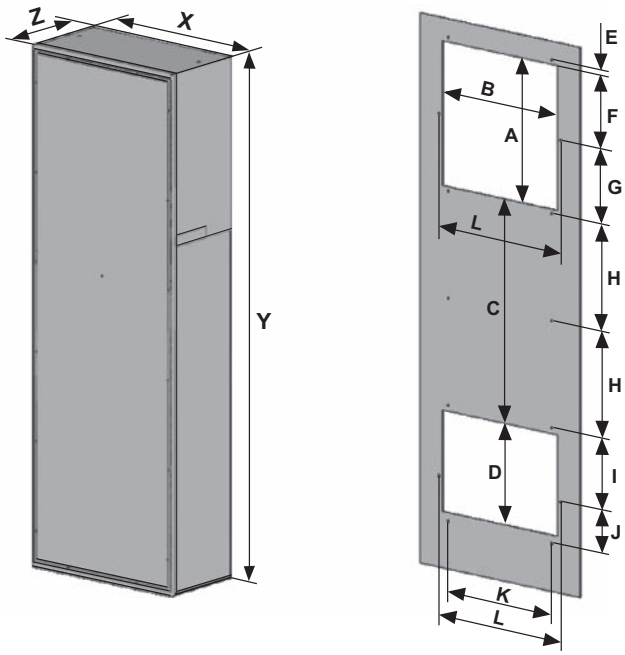
PWS 71002



Dimensions

	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L
mm	600	1800	315	500	500	775	350	15	270	260	370	250	150	450	530
Mounting holes Ø 8 mm															

PWS 71002



Air/Water Heat Exchanger 7000 W
PWS 7702
Slim Line Air/Water Heat Exchanger 7000 W
PWS 7702 SL



- maintenance-free
- mounting-friendly seal, no elaborate reworking of the mounting cut-out
- integrated thermostat and solenoid valve for temperature control
- integrated temperature monitoring with alarm contact

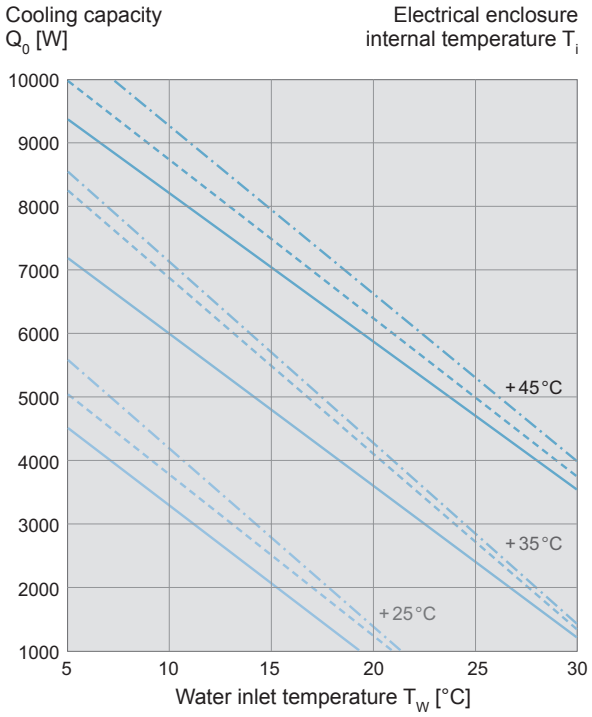
Data		PWS 7702		PWS 7702 SL		Unit
Article number		12057702055	12057710055	12057702155	12057710155	
Rated voltage ± 10 %		AC 50 Hz / 60 Hz				
		400 3~	230	400 3~	230	V
Cooling capacity at 500 l/h	W10/L35	7000				W
Power consumption	W10/L35	550 / 790	520 / 680	550 / 790	520 / 680	
Current consumption	W10/L35	0.8 / 0,95	2.4 / 3.2	0.8 / 0.95	2.4 / 3.2	A
Starting current	W10/L35	3.0 / 3.8	9.2 / 12	3.0 / 3.8	9.2 / 12	
Unimpeded airflow (free flow)	internal	3630	4600	3630	4600	m^3/h
Pre fuse T		10				A
Type of connection	electro	spring-type terminal included with plug				
	fluid	13 mm hose nozzle; other connectors on request				
Noise level (according to EN ISO 3741)		63				dB (A)
Weight (without packaging)		58		57		kg
Ambient temperature range		> + 1 … + 70 / > + 34 … + 158				°C / °F
Control range (adjustable)		+ 8 … + 50 / + 47 … + 122; factory setting + 35 / + 95				
Water outlet temperature		> + 1 … + 35 / > + 34 … + 95				
Permissible operating pressure		max. 10				bar
Duty cycle		100%				
Condensate management		condensate drain				
System of protection according to EN 60529	IP 55	towards the electrical enclosure if used as intended by the manufacturer				
	IP 65	on request				
Design	housing	galvanised steel/electrostatically powder-coated (200 °C); on request: stainless steel				
	heat exchanger	copper pipe with aluminium fins; stainless steel piping on request				
Colour (cover)		RAL 7035, different colours available on request				

Accessories	Piece	Article number	Informationen on page
External condensate evaporation system	1	18314000001	96
Condensate bottle	1	18314000100	96

Approvals see page 81

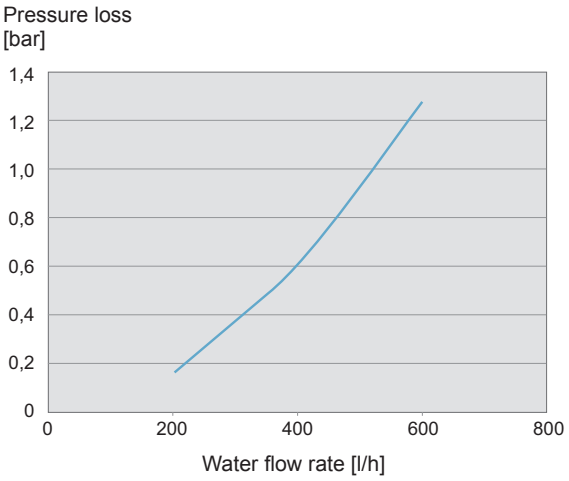
Cooling capacity performance curves

PWS 7702 / 7702 SL



Pressure loss performance curve

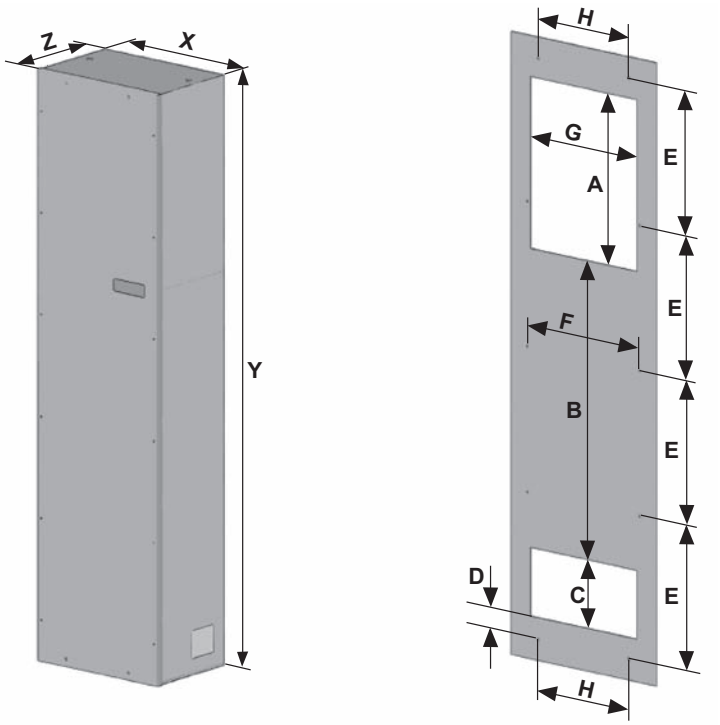
PWS 7702 / 7702 SL



Dimensions

PWS 7702	X	Y	Z	A	B	C	D	E	F	G	H
mm	460	1800	310	525	910	210	65	442.5	433.5	410	350
PWS 7702 SL	**X**	**Y**	**Z**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**
mm	460	1800	255								
Mounting holes Ø 8 mm											

PWS 7702 / 7702 SL



Air/Water Heat Exchanger 5200 W
PWS 7502



- maintenance-free
- mounting-friendly seal, no elaborate reworking of the mounting cut-out
- integrated thermostat and solenoid valve for temperature control
- integrated temperature monitoring with alarm contact

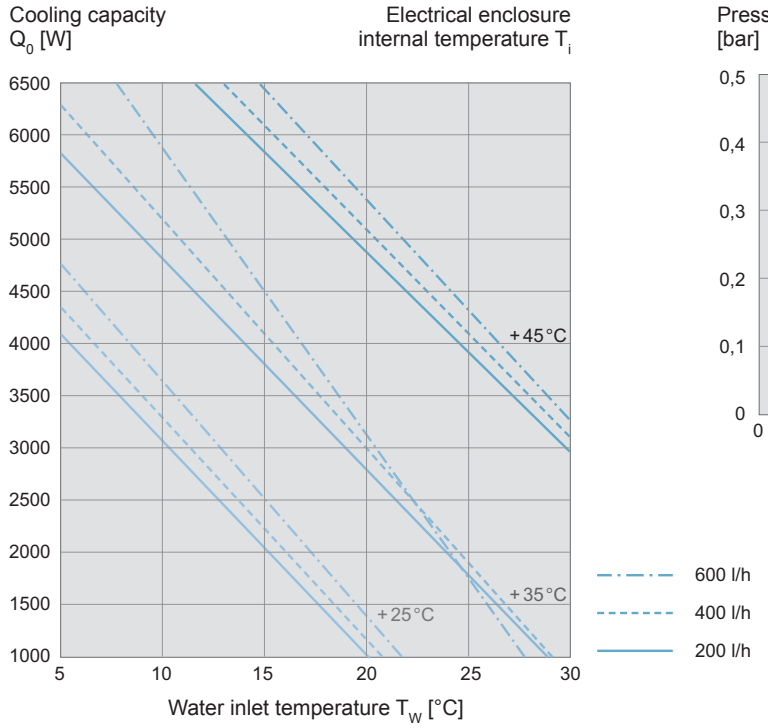
Data		PWS 7502		Unit
Article number		12055010055	12055017055	
Rated voltage ± 10 %		AC 50 Hz / 60 Hz	AC 60 Hz	
		230	115	V
Cooling capacity at 400 l/h	W10/L35	5200		W
Power consumption	W10/L35	295 / 385	384	
Current consumption	W10/L35	1.3 / 1.7	3.45	A
Starting current	W10/L35	5.8 / 6.6	8.33	
Unimpeded airflow (free flow)	internal	1670		m^3/h
Pre fuse T		6		A
Type of connection	electro	spring-type terminal included with plug		
	fluid	13 mm hose nozzle; other connectors on request		
Noise level (according to EN ISO 3741)		57		dB (A)
Weight (without packaging)		39		kg
Ambient temperature range		> + 1 … + 70 / > + 34 … + 158		°C / °F
Control range (adjustable)		+ 8 … + 50 / + 47 … + 122; factory setting + 35 / + 95		
Water outlet temperature		> + 1 … + 35 / > + 34 … + 95		
Permissible operating pressure		max. 10		bar
Duty cycle		100%		
Condensate management		condensate drain		
System of protection according to EN 60529	IP 55	towards the electrical enclosure if used as intended by the manufacturer		
	IP 65	on request		
Design	housing	galvanised steel/electrostatically powder-coated (200 °C); on request: stainless steel		
	heat exchanger	copper pipe with aluminium fins; stainless steel piping on request		
Colour (cover)		RAL 7035, different colours available on request		

Accessories	Piece	Article number	Informationen on page
External condensate evaporation system	1	18314000001	96
Condensate bottle	1	18314000100	96

Approvals see page 81

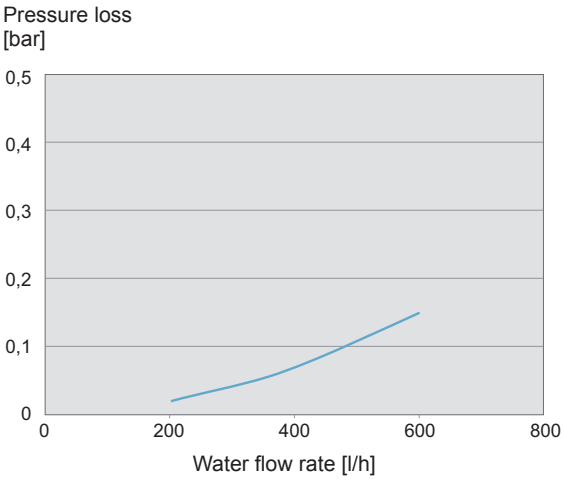
Cooling capacity performance curves

PWS 7502



Pressure loss performance curve

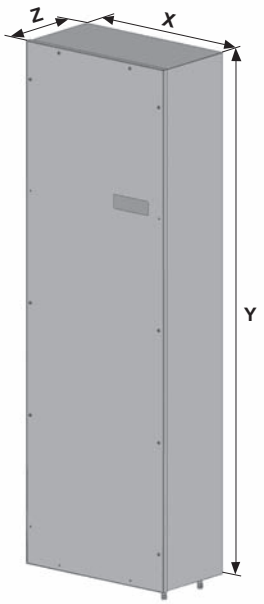
PWS 7502

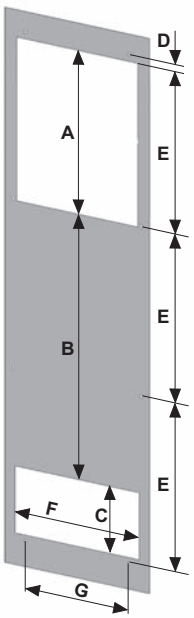


Dimensions

	X	Y	Z	A	B	C	D	E	F	G
mm	460	1400	239	440	711.5	180	20	455	420	350
Mounting holes Ø 8 mm										

PWS 7502





Air/Water Heat Exchanger 3150 W / 1500 W

PWS 7332
PWS 7152



- two performance classes, cut-out compatible
- completely installable or mountable externally and internally
- maintenance-free
- mounting-friendly seal, no elaborate reworking of the mounting cut-out
- integrated thermostat and solenoid valve for temperature control
- integrated temperature monitoring with alarm contact

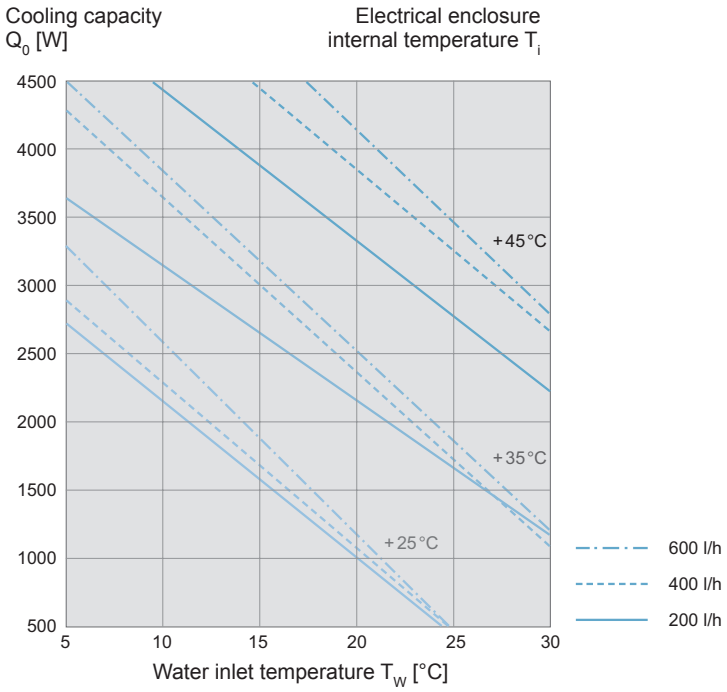
Data		PWS 7332		PWS 7152		Unit
Article number		12053010055	12053017055	12051510055	12051517055	
Rated voltage ± 10 %		AC 50 Hz / 60 Hz	AC 60 Hz	AC 50 Hz / 60 Hz	AC 60 Hz	
		230	115	230	115	V
Cooling capacity at 200 l/h	W10/L35	3150		1500		W
Power consumption	W10/L35	295 / 385	453	125 / 182	186	W
Current consumption	W10/L35	1.3 / 1.7	4.1	0.55 / 0.75	1.5	A
Starting current	W10/L35	5.8 / 6.6	8.62	2 / 2	3.9	A
Unimpeded airflow (free flow)	internal	1670		850		m³/h
Pre fuse T		6	16	4	6	A
Type of connection	electro	spring-type terminal included with plug				
	fluid	13 mm hose nozzle; other connectors on request				
Noise level (according to EN ISO 3741)		54		53		dB (A)
Weight (without packaging)		23		21		kg
Ambient temperature range		> + 1 … + 70 / > + 34 … + 158				°C / °F
Control range (adjustable)		+ 8 … + 50 / + 47 … + 122; factory setting + 35 / + 95				
Water outlet temperature		> + 1 … + 35 / > + 34 … + 95				
Permissible operating pressure		max. 10				bar
Duty cycle		100%				
Condensate management		condensate drain				
System of protection according to EN 60529	IP 55	towards the electrical enclosure if used as intended by the manufacturer				
	IP 65	on request				
Design	housing	galvanised steel/electrostatically powder-coated (200 °C); on request: stainless steel				
	heat exchanger	copper pipe with aluminium fins; stainless steel piping on request				
Colour (cover)		RAL 7035, different colours available on request				

Accessories	Piece	Article number	Informationen on page
External condensate evaporation system	1	18314000001	96
Condensate bottle	1	18314000100	96

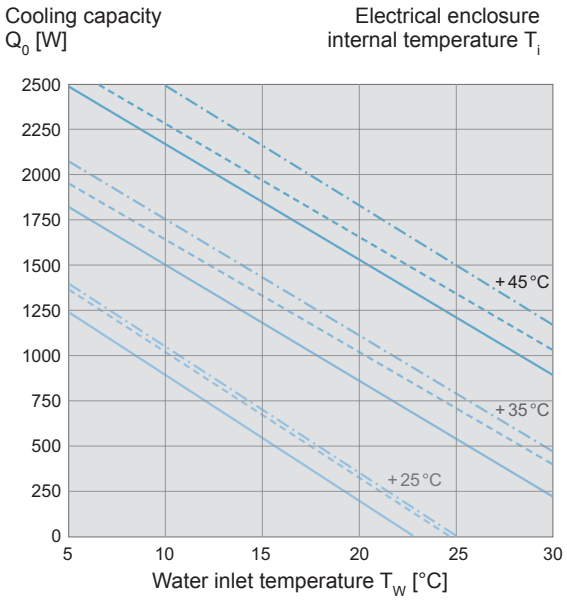
Approvals see page 81

Cooling capacity performance curves

PWS 7332

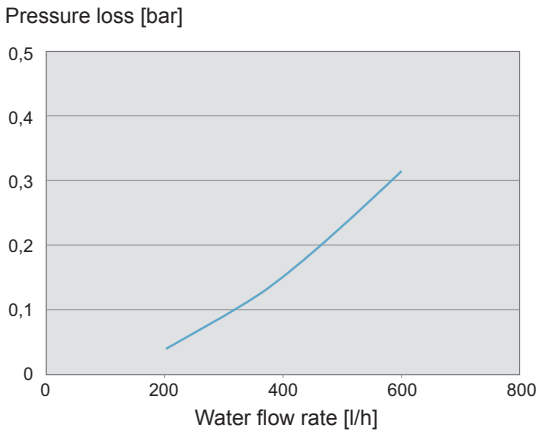


PWS 7152

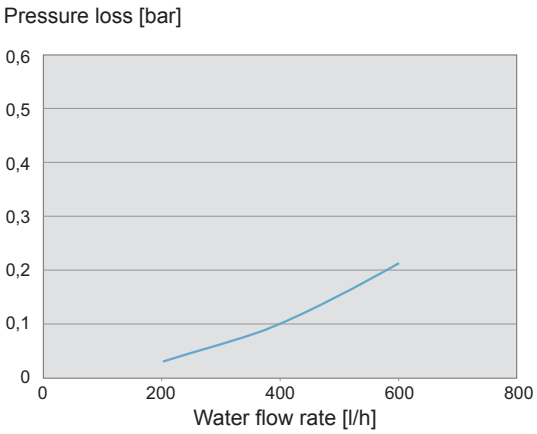


Pressure loss performance curves

PWS 7332

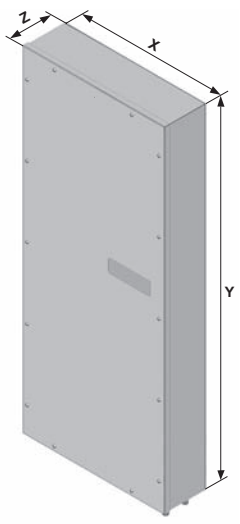


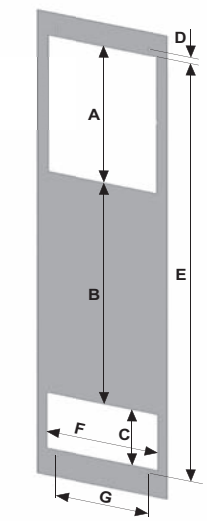
PWS 7152



Dimensions

mm	PWS 7332	PWS 7152
X	400	
Y	950	
Z	190	115
A	280	
B	463	
C	112	
D	37	
E	904	
F	340	
G	280	
Mounting holes Ø 8 mm		





Air/Water Heat Exchanger 3150 W
PWS 7332 L



- long passage of air
- compatible with DTS 9x41 cooling unit series
- maintenance-free
- mounting-friendly seal, no elaborate reworking of the mounting cut-out
- integrated thermostat and solenoid valve for temperature control
- integrated temperature monitoring with alarm contact

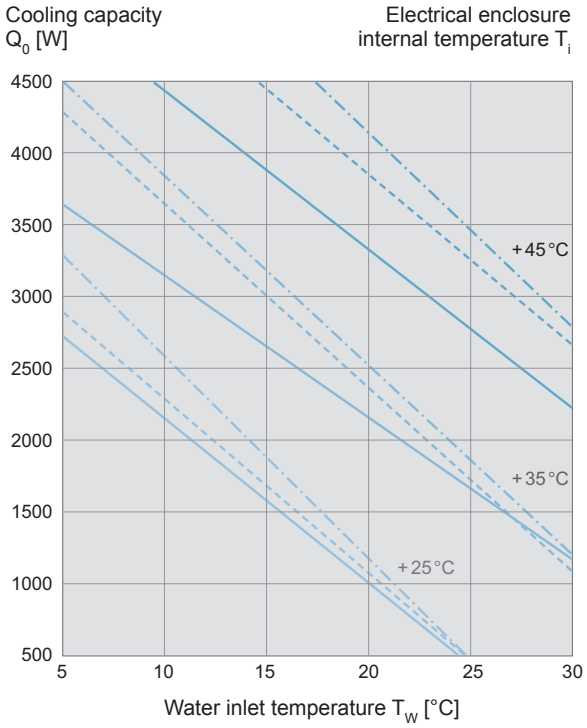
Data		PWS 7332 L		Unit
Article number		12053010063	12053017063	
Rated voltage ± 10 %		AC 50 Hz / 60 Hz	AC 60 Hz	
		230	115	V
Cooling capacity at 200 l/h	W10/L35	3150		W
Power consumption	W10/L35	161 / 226	193	
Current consumption	W10/L35	0.7 / 1	1.7	A
Starting current	W10/L35	2.6 / 2	3	
Unimpeded airflow (free flow)	internal	1200		m^3/h
Pre fuse T		6		A
Type of connection	electro	spring-type terminal included with plug		
	fluid	13 mm hose nozzle; other connectors on request		
Noise level (according to EN ISO 3741)		54		dB (A)
Weight (without packaging)		35		kg
Ambient temperature range		> + 1 … + 70 / > + 34 … + 158		°C / °F
Control range (adjustable)		+ 8 … + 50 / + 47 … + 122; factory setting + 35 / + 95		
Water outlet temperature		> + 1 … + 35 / > + 34 … + 95		
Permissible operating pressure		max. 10		bar
Duty cycle		100%		
Condensate management		condensate drain		
System of protection according to EN 60529	IP 55	towards the electrical enclosure if used as intended by the manufacturer		
	IP 65	on request		
Design	housing	galvanised steel/electrostatically powder-coated (200 °C); on request: stainless steel		
	heat exchanger	copper pipe with aluminium fins; stainless steel piping on request		
Colour (cover)		RAL 7035, different colours available on request		

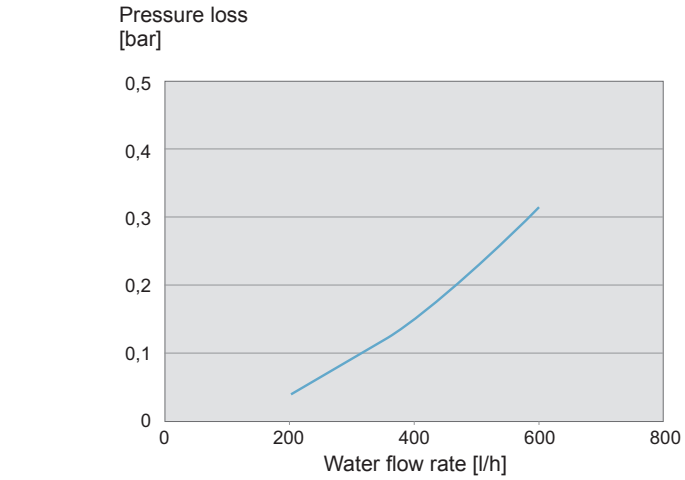
Accessories	Piece	Article number	Informationen on page
External condensate evaporation system	1	18314000001	96
Condensate bottle	1	18314000100	96

Approvals see page 81

Cooling capacity performance curves

PWS 7332 L





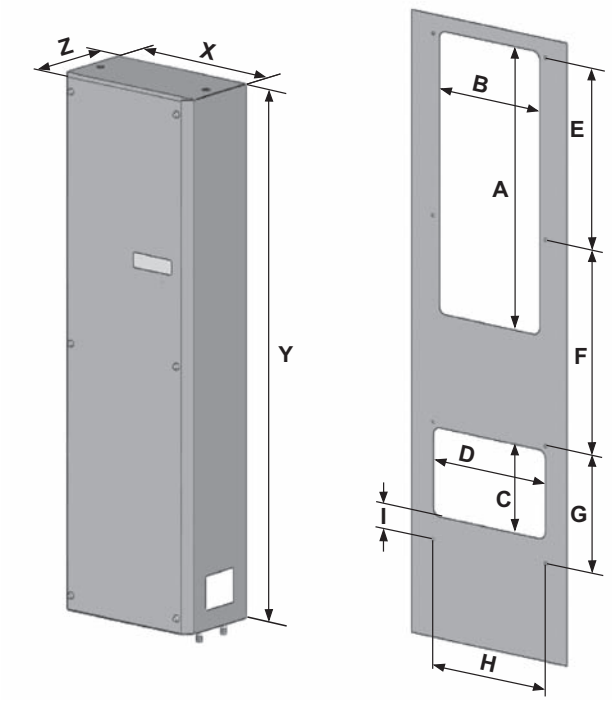
Pressure loss performance curve

PWS 7332 L

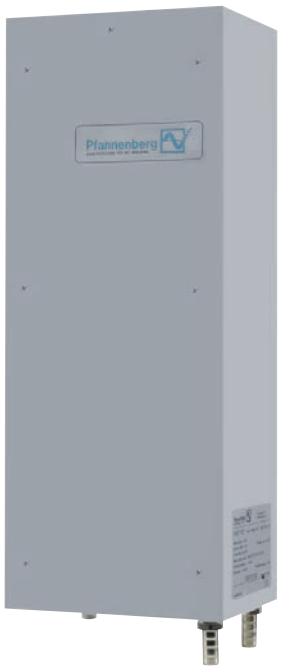
Dimensions

	X	Y	Z	A	B	C	D	E	F	G	H	I
mm	400	1350	190	700	315	220	350	450	510	290	350	58
Mounting holes Ø 8 mm and cut-out radii R20												

PWS 7332 L



Air/Water Heat Exchanger 950 W / 600 W
PWS 7102
PWS 7062



- two performance classes, cut-out compatible
- completely installable or mountable externally and internally
- maintenance-free
- mounting-friendly seal, no elaborate reworking of the mounting cut-out
- integrated thermostat and solenoid valve for temperature control
- integrated temperature monitoring with alarm contact

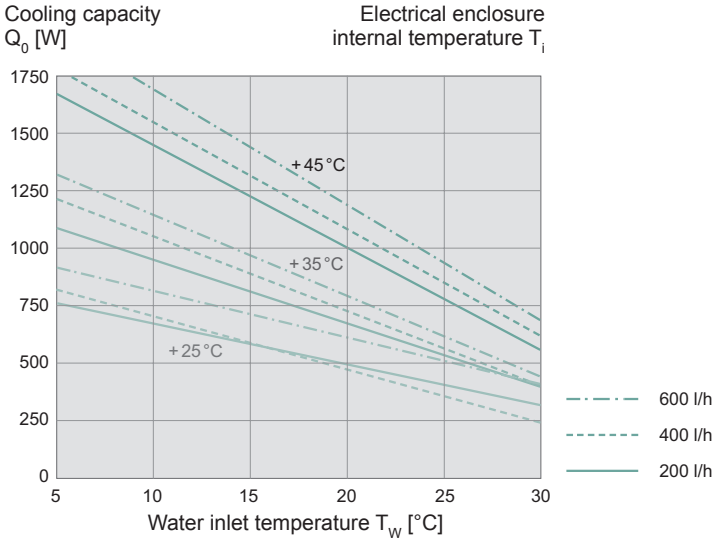
Data		PWS 7102		PWS 7062		Unit
Article number		12051010055	12051017055	12050610055	12050617055	
Rated voltage ± 10 %		AC 50 Hz / 60 Hz	AC 60 Hz	AC 50 Hz / 60 Hz	AC 60 Hz	
		230	115	230	115	V
Cooling capacity at 200 l/h	W10/L35	950		600		W
Power consumption	W10/L35	82 / 84	82	68 / 70	60	
Current consumption	W10/L35	0.35 / 0.4	0,69	0.35 / 0.38	0.65	A
Starting current	W10/L35	1.7 / 1.95	1.4	1.5 / 1.8	1.3	
Unimpeded airflow (free flow)	internal	570		440		
Pre fuse T		4				A
Type of connection	electro	spring-type terminal included with plug				
	fluid	13 mm hose nozzle; other connectors on request				
Noise level (according to EN ISO 3741)		≤ 48				dB (A)
Weight (without packaging)		7.5		6		kg
Ambient temperature range		> + 1 … + 70 / > + 34 … + 158				°C / °F
Control range (adjustable)		+ 8 … + 50 / + 47 … + 122; factory setting + 35 / + 95				
Water outlet temperature		> + 1 … + 35 / > + 34 … + 95				
Permissible operating pressure		max. 10				bar
Duty cycle		100%				
Condensate management		condensate drain				
System of protection according to EN 60529	IP 55	towards the electrical enclosure if used as intended by the manufacturer				
	IP 65	on request				
Design	housing	galvanised steel/electrostatically powder-coated (200 °C); on request: stainless steel				
	heat exchanger	copper pipe with aluminium fins				
Colour (cover)		RAL 7035, different colours available on request				

Accessories	Piece	Article number	Informationen on page
External condensate evaporation system	1	18314000001	96
Condensate bottle	1	18314000100	96

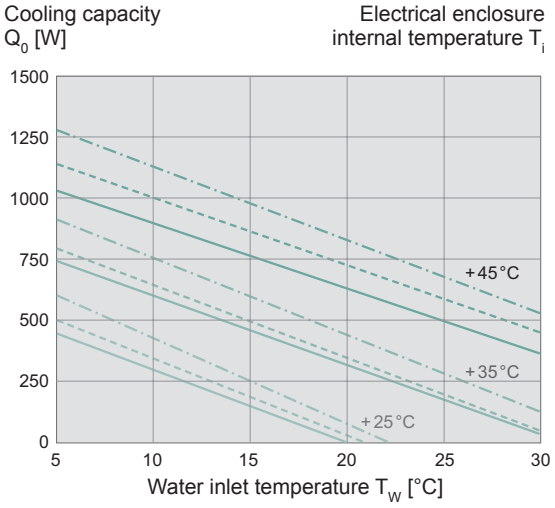
Approvals see page 81

Cooling capacity performance curves

PWS 7102

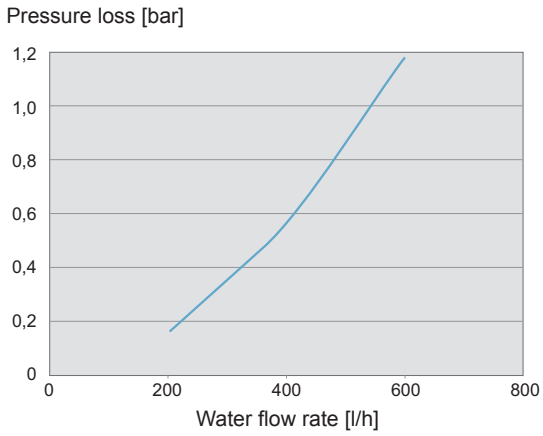


PWS 7062

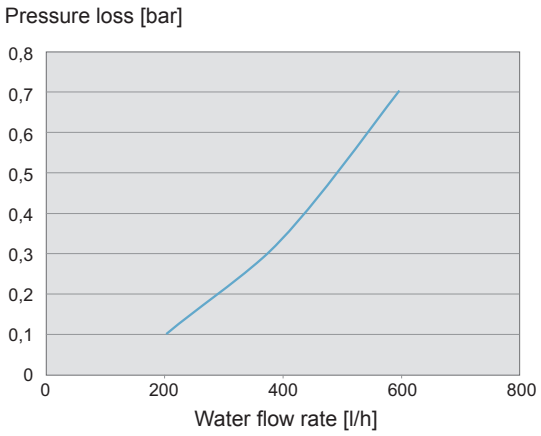


Pressure loss performance curves

PWS 7102

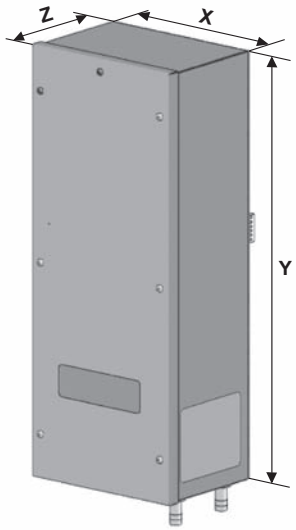


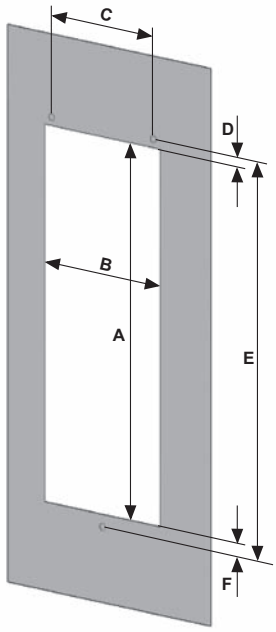
PWS 7062



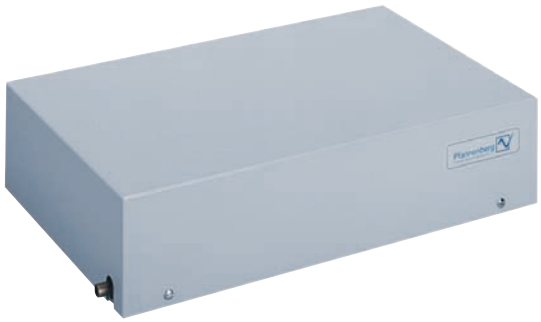
Dimensions

mm	PWS 7102	PWS 7062
X	200	
Y	500	
Z	150	100
A	440	
B	170	
C	150	
D	10	
E	465	
F	15	
Mounting holes Ø 8 mm		





Air/Water Heat Exchanger 3400 W / 2150 W
PWD 5402
PWD 5302



- water circuit pressure-tested to 30 bar
- surface seal to protect against the penetration of water via the roof surface of the control cabinet
- simple temperature control with integrated thermostat and solenoid valve
- 10 bar maximum operating pressure
- piping and heat exchanger optionally available in V4A (1.4571)

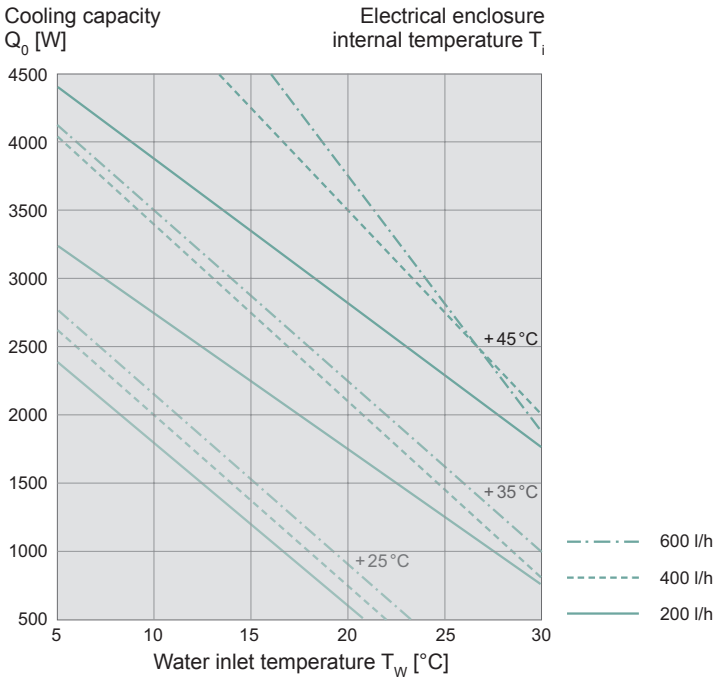
Data		PWD 5402	PWD 5302	Unit
Article number		12065410055	12065310055	
Rated voltage ± 10 %		AC 50 Hz / 60 Hz		
		230		V
Cooling capacity at 400 l/h	W10/L35	3400	2150	W
Power consumption	W10/L35	115 / 165	85 / 100	
Current consumption	W10/L35	0.84	0.4	A
Starting current	W10/L35	4	3	
Unimpeded airflow (free flow)	internal	720	500	m³/h
Pre fuse T		6		A
Type of connection	electro	3.5 metres of cable 3 x 0.75 mm²		
	fluid	13 mm hose nozzle; other connectors on request		
Noise level (according to EN ISO 3741)		64	54	dB (A)
Weight (without packaging)		30	21	kg
Ambient temperature range		> + 1 … + 70 / > + 34 … + 158		°C / °F
Control range (adjustable)		+ 8 … + 50 / + 47 … + 122; factory setting + 35 / + 95		
Water outlet temperature		> + 1 … + 35 / > + 34 … + 95		
Permissible operating pressure		max. 10		bar
Duty cycle		100%		
Condensate management		condensate drain		
System of protection according to EN 60529	IP 55	towards the electrical enclosure if used as intended by the manufacturer		
	IP 65	on request		
Design	housing	galvanised steel/electrostatically powder-coated (200 °C); on request: stainless steel		
	heat exchanger	copper pipe with aluminium fins; stainless steel piping on request		
Colour (cover)		RAL 7035, different colours available on request		

Accessories	Piece	Article number	Informationen on page
External condensate evaporation system	1	18314000001	96
Condensate bottle	1	18314000100	96

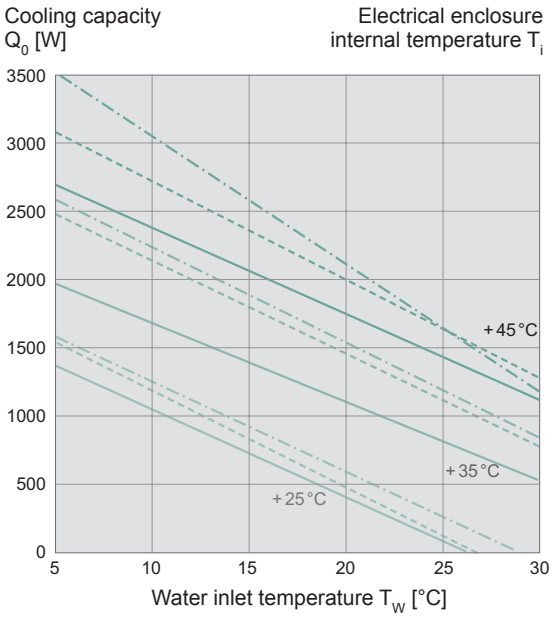
Approvals see page 81

Cooling capacity performance curves

PWD 5402

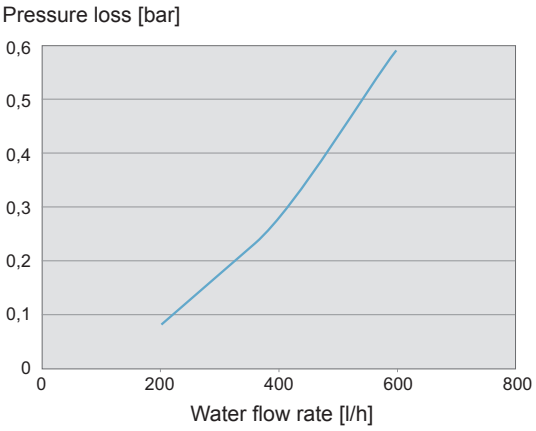


PWD 5302

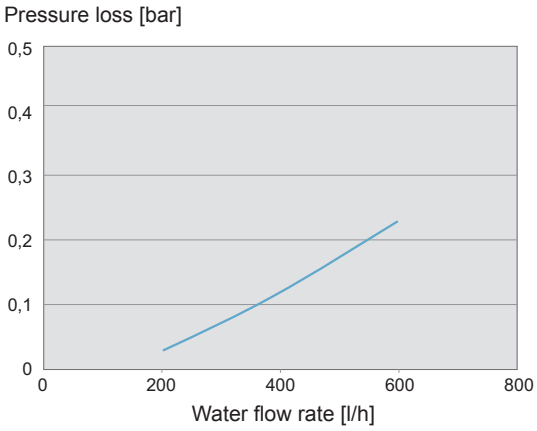


Pressure loss performance curves

PWD 5402

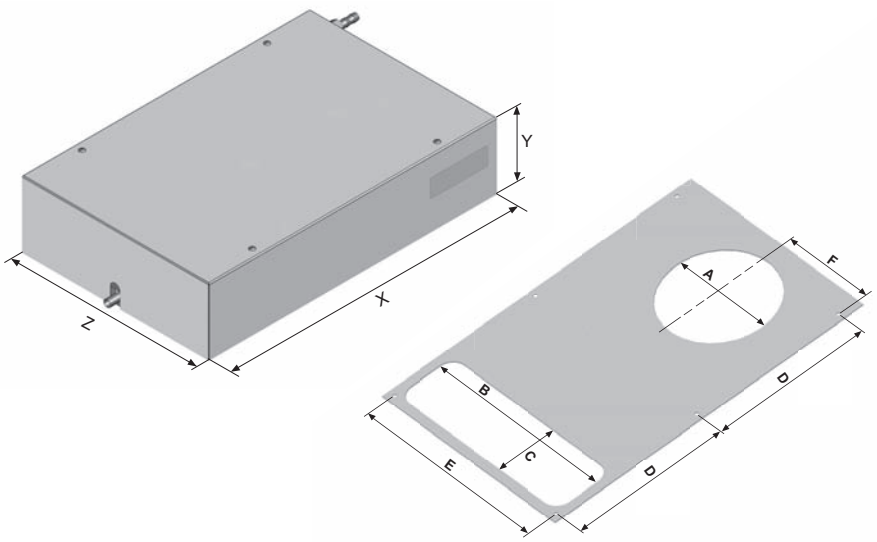


PWD 5302



Dimensions

mm	PWD 5402	PWD 5302
X	720	600
Y	190	140
Z	465	390
A	230	230
B	425	360
C	128	105
D	330	270
E	434	358
F	191	143
Cut-out radii R30		



Accessories



Internal enclosure fan

Distribution of cold air inside the control cabinet

Product	Article number
PEF 180 mounting bracket 230 V	18110000000
PEF 180 mounting bracket 115 V	18110000001
PEF 180 mounting bracket 24 V DC	18110000002



External condensate evaporation system 230 V 50/60 Hz

External condensate evaporator for the accumulated condensed water

Suitable for ...	Article number
all units	18314000001



Condensate bottle

External container for collecting the accumulating condensed water

Suitable for ...	Article number
all units	18314000100



Device-side water connection with G 3/8” internal thread

variable connection possibilities:

e.g.
- hose nozzle 3/8“ x 12 with o-ring
- double nipple 3/8“
- quick-coupling 12 mm
- quick-coupling 10 mm

etc.

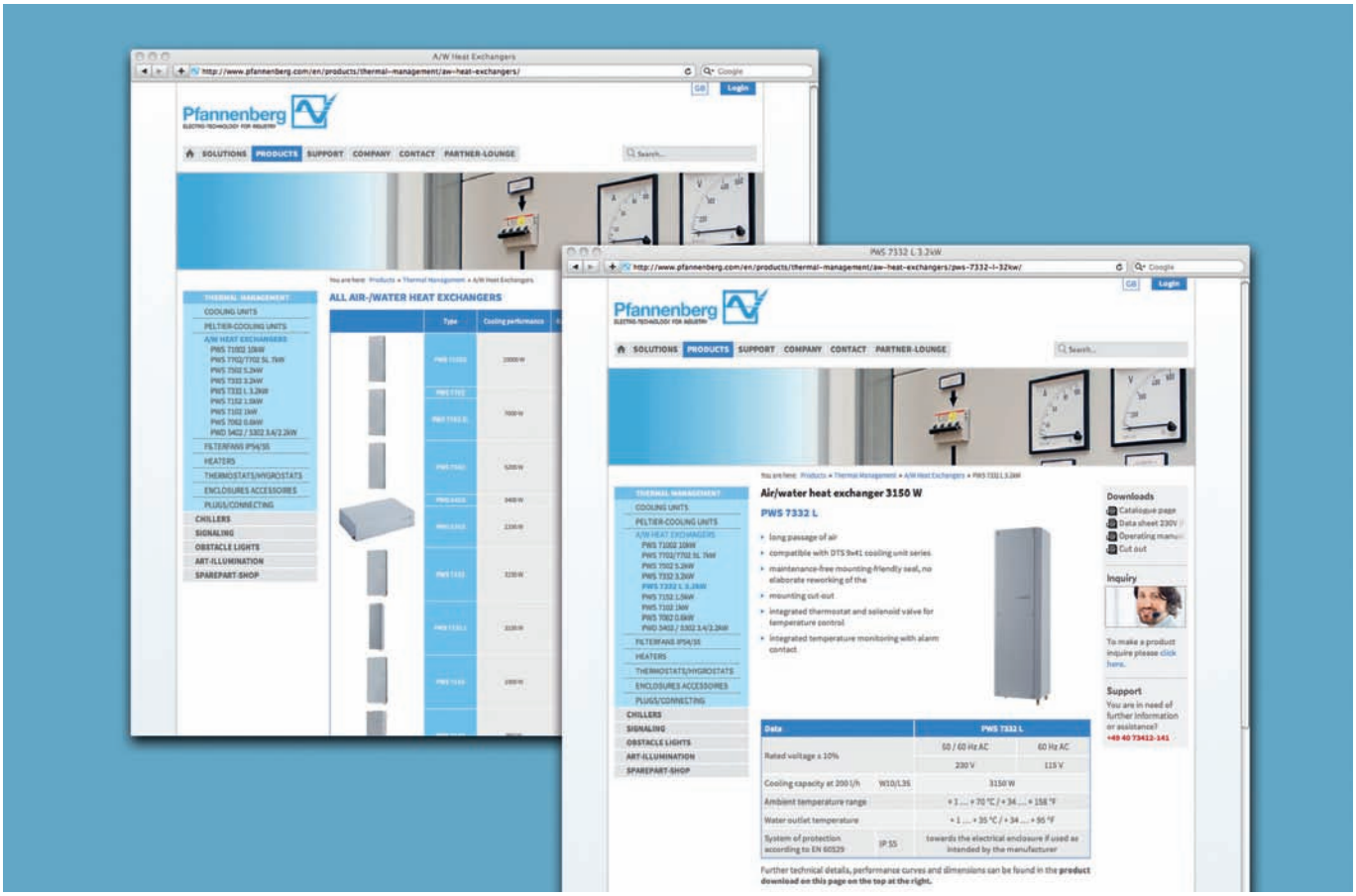
Suitable for ...	Article number
all heat exchangers	on request

Air/water heat exchangers on the Internet

As with all of our products, you can find a large amount of online information about the air/water heat exchangers. At **www.pfannenberg.com**, just click ‘Products’ in the menu bar. This will open a sub-menu on the left-hand side with all categories. With a few clicks you can find all of the important information about the individual air/water heat exchangers that you need.

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Pfannenberg



When it's about economy and long service life

Chillers from the Rack, CC, EB, HK, AR and PWW series

Pfannenberg's chillers – including the new CC chillers from the **ECOOL** series – guarantee both a central and economic provision and cooling of the media water, emulsion and oil. All the cooling tasks are realized with devices which are both compact and maintenance friendly. The areas of applications for Pfannenberg's chillers range from machine tools, lasers, plastic processing and alternative energy to the food, drinks and pharmaceutical industry.

The Pfannenberg group offers a variety of designs for your specific tasks:

- Air or water chillers
- Pressurized chillers
- Passive chillers
- Outdoor for low and high temperature conditions
- Stand-alone design
- Enclosure chillers

Expertise in process cooling!

In this day and age, if you want to be the best in process cooling, you have offer more than just superior quality. The ability to partner with customers and sharing competence, as well as offer excellent service is an absolute must - and that requires the highest level of innovation and technology.

From the idea to the product

No matter whether it is a question of air conditioners or large projects, standard solutions or individual developments, your problems and avtivities will be in good hands with us. We can guarantee you a face to face meeting on site. Using successful solutions, we would like to introduce our company as a solid, flexible and reliable partner.



Everything from a single source

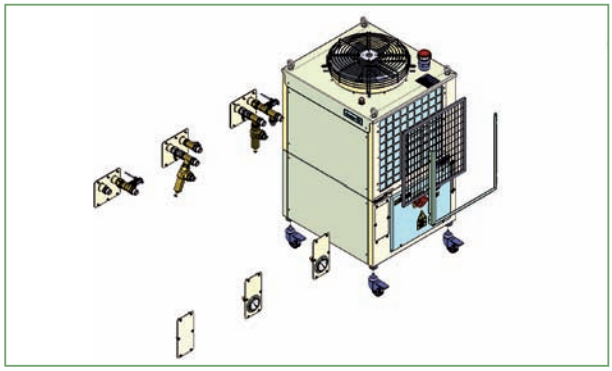
Within a prescribed period, innovative technology is developed and successfully implemented. For target markets, we not only carry out development together with our customers, but also provide consulting for installation and project management.

Process chiller design

Pfannenberg process chillers are designed based on three main areas: the refrigeration circuit, the hydraulic circuit and controls.

Refrigeration circuit

The refrigeration circuit‘s main purpose is to guarantee the heat transfer from the medium, which is passing through the evaporator and therefore, to cool the particular medium down to the desired temperature for the particular application. The heat, which is transferred from the medium to the refrigerant is then carried back to a compressor and then passes on to the different phases of the refrigeration cycle. This is an continuous cycle, which we are rejecting heat (condenser) and in wich we are absorbing heat (evaporator).



Hydraulic circuit

The hydraulic circuit is specifically designed to deliver a certain medium at a calculated flow rate, temperaure and pressure to the consumers‘s application. The flow rate, temperature and pressure varies based on the particular application.

Controls

In order to guarantee the accurate delivery of the medium to the consumer‘s application, proper controls are necessary.

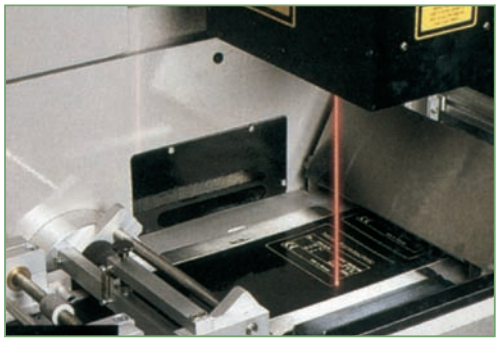
For example, a standard method of controlling a temperature is by using a digital controller with a medium sensor and based on the set-point, will control the refrigeration circuit in order to maintain the accurate temperature for the particular application.

There are many methods of providing accurate controlling of the refrigeration and hydraulic circuits and these are based on the application criteria. At Pfannenberg, we have the competence to provide consultation to determine sizing and ensure proper configuration of a process chiller in order to meet your application needs.

The perfect solution...

High-tech machines need high-tech components and systems, such as:

- spindle, linear and torque motors
- all types of motors
- laser souces
- print systems
- x-ray tubes



Heat is created wherever these items are in use, in addition to the ambient termperature which in some areas can be very high during certain seasons. This must be controlled since too much heat leads to machine failure or shutdown, in turn causing a loss of production.

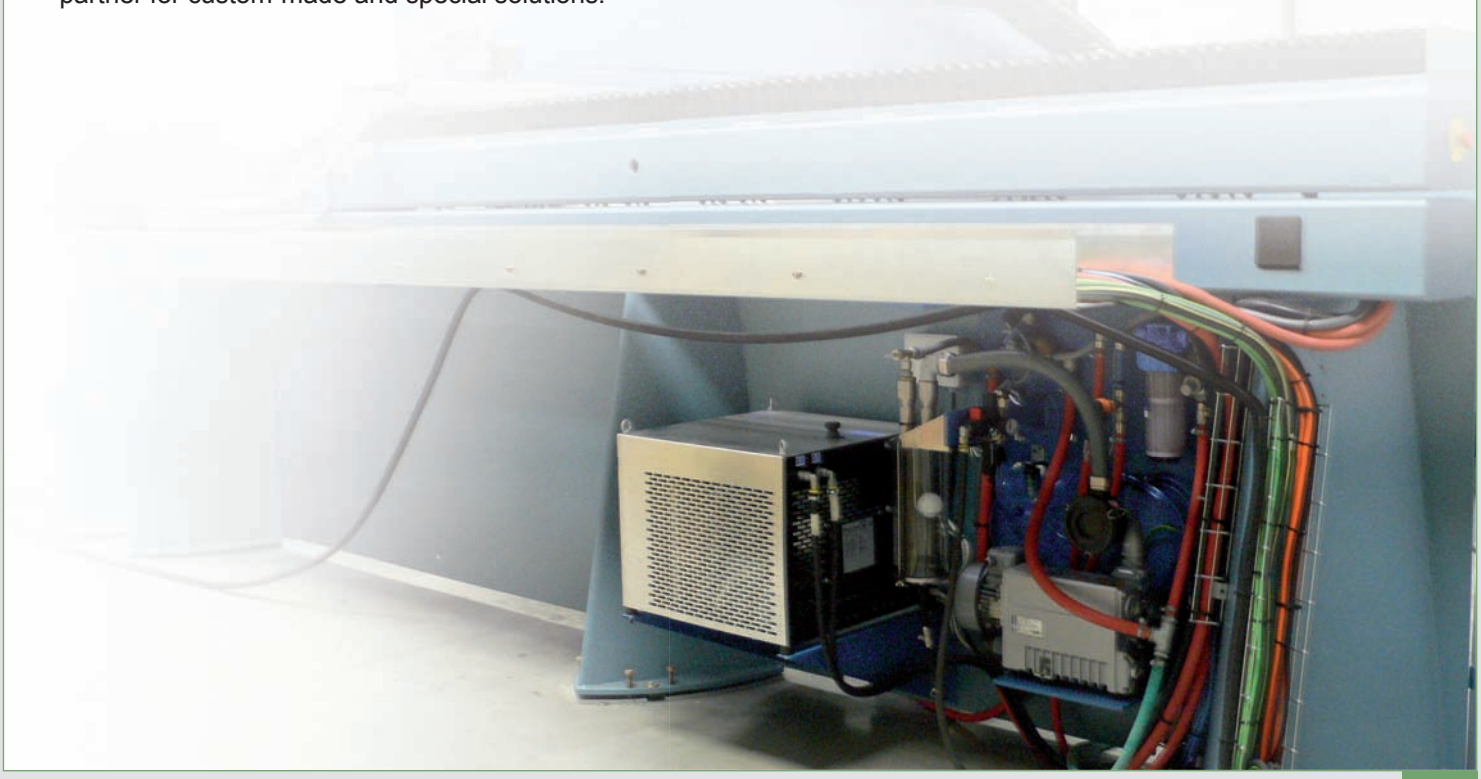
Wherever precise, exact temperatures are required, water is a proven cooling agent and it is impossible to imagine cooling whithout it. This is where chillers are used. Chillers produce cold water (10 °C – 35 °C) as a cooling agent - or bring water, oil and emulsions to the exact temperature required.



...whatever the application

Our many years of experience from across such varied industries as the cooling of complex machine tools anc machining centers, colour systems for printing presses, glue and colour cooling for wood working machines, welding systems for plastic film for packaging machines, laser sources for marking lasers, x-ray tubes for measuring systems all combine to guarantee precision and quality. Our successful engineering team is constantly developing and improving chiller technology. We are also your competent partner for custom-made and special solutions.





Cost-efficiency Master Plan

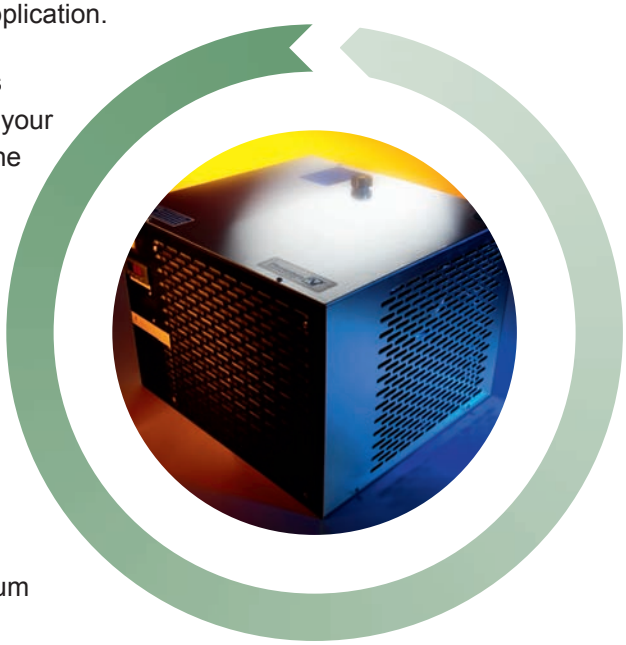
We secure your future with our modern philosophy

Pfannenberg subscribes to a corporate philosophy which focuses on the concerns and objectives of the users with respect to cost efficiency. This starts during the planning phase and extends far beyond the operation phase. Furthermore, Pfannenberg is one of the few suppliers who can supply a complete solution, i.e. a chiller solution as well as the complete handling and maintenance of your cabinet thermal management.

Pre-sales The right product at the right time – at Pfannenberg, service starts even before delivery. An analysis of the business environment, of the objectives and of the technology which the user has available is our investment in a sustainably successful cooperation.

Concept design Design that is perfectly adjusted to your application.

Installation and start-up operation Pfannenberg offers support in the installation and start-up operation of the chiller at your site. This ensures a smooth start and contributes to extending the long service life of the chiller.



Coaching and service Training courses by Pfannenberg experts, in combination with customised maintenance and repair packages, ensure that your production processes run smoothly and guarantee longer service life.

Energy efficiency Our chillers achieve top grades in energy consumption.

Reliability More than 20 years of experience in the field of recooling and the use of high-quality components ensure optimum long-term stability and top MTBF (mean time between failures).

Service friendliness Minimum MTTR (mean time to repair) and the shortest time needed to replace units thanks to perfect accessibility, standardised parts and a carefully thought-through plug-and-play concept minimise your repair costs and downtimes.

Benefits: risk minimisation and cost savings

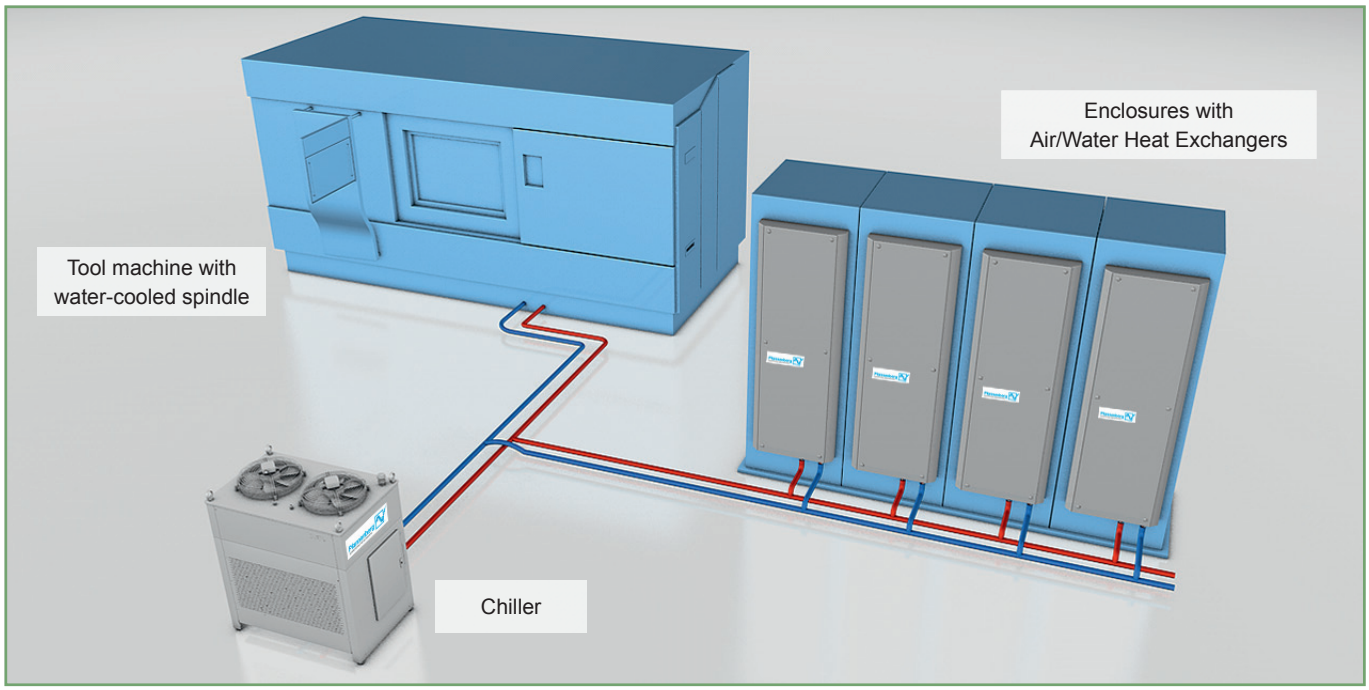
Pfannenberg's master plan as described above spells crucial benefits for manufacturers and users. After all, Pfannenberg makes sure that the total cost of ownership (TCO) of your components is considerably reduced while your return on investment (ROI) receives a powerful boost.



The 100% system solution for all branches of industry

The Pfannenberg chillers offer decisive advantages in combination with the Pfannenberg air/water heat exchangers:

- in applications where power losses must not enter the surrounding space
- if aggressive ambient air restricts the use of conventional cooling units
- if a very high IP class is required (up to IP 65)
- if maintenance-free cooling units are necessary



Planning on making new acquisitions for your production or thinking about expanding? Then you'll definitely be on the safe side with solutions for water-cooling.

Every change in production conditions involves, first and foremost, medium or long-term investments. Despite the rather high purchase price, the use of chillers normally pays off – owing to the long durability, low maintenance costs and high energy efficiency.

Pfannenberg Sizing Software (PSS):
Calculation software for your customized solution

The Pfannenberg sizing software determines your cooling requirements, calculates the necessary cooling capacity and recommends the correct device components. Thus, you get a customized solution which gives you the security of a perfect dimensioning and prevents expensive over-dimensioning. Download PSS free of charge or calculate directly online on **www.pfannenberg.com/support**.



Six series for every application

Rack
The compact design of the unit allows it to be attached to the widest variety of machine types. This unit is used in the fields of laboratory equipment, pharmaceutical and medical equipment, laser equipment, automation equipment and also in industrial automation for work spindles.

NEW

CC
The chillers of the CC-series are available in 6 power classes and their compact design makes them especially space-saving. The chillers, which can also be installed as top-mounting devices, are safe and an installation in compact plants is made easier by their design. Additionally, they reach an especially high coefficient of performance (COP). And the UL 1995 certification makes them particularly interesting for machine manufacturers who work internationally.
6 different performance classes in just 2 sizes make it possible to make a flexible and late adjustment in the device you choose. This change can be effected in the planning phase and also during the operation of the plant without you having to dimension the essential connections or floor space again. Due to the number of available options, the CC chillers can be configured flexibly, this enables them to be used in virtually all industry sectors. The high system of protection IP 54 also supports the operation of the devices in harsh ambient conditions.

EB
The EB series has been specially developed for applications that require stable temperature control. Equipped with a programmable control module, these units can be used to realise small hystereses of the fluid temperature. For monitoring the functions of the chiller, a control module is optionally available that indicates the individual function statuses via an LED display.

HK
The HK series has been designed for indoor and outdoor applications for the cooling of water, oil and emulsions. These units have a ‘stand-alone’ design for automatic operation. They can be used throughout the entire range of industries. The cooling circuit is controlled by a programmable temperature module; this ensures high temperature accuracy.

AR
The AR series arose from the requirements of the application area of the mechanical engineering sector as well as the cigarette and packaging industry. The characteristic feature of this series is the implementation of the housing, which is based on standard control cabinet sizes. This allows optimum integration of the cooler in switchgear.

PWW
The PWW series is a new generation of cooling units based on the passive cooling principle. It has been specially designed for applications where process water is already available. Process water flowing through the integrated heat exchanger on the primary side will be regulated to keep the cooling water on the secondary side at a stable temperature. Due to the smart design of the closed loop circuit the PWW can be easily adapted to the existing water supply.



All Chillers at a glance

Type	Cooling capacity [1]	Rated voltage [2]	Dimensions (HxWxD)	Approvals					Page
				UL	cUL	GOST	CSA	CE	
Rack Chillers (water)									
Rack 1100	1100 W	230 V AC	395 x 450 x 480 mm	◉	◉	◉		●	106
Rack 1700	1700 W			◉	◉	◉		●	106
Rack 2400	2400 W		500 x 580 x 580 mm	◉	◉	◉		●	106
CC Chillers									
CC 6101	1100 W	115 V / 230 V	626 x 600 x 480 mm	●	◉	◉		●	108
CC 6201	1700 W			●	◉	◉		●	108
CC 6301	2400 W			●	◉	◉		●	108
CC 6401	3500 W	400 V / 460 V 3 ~	984 x 601 x 670 mm	●	◉	◉		●	110
CC 6501	5000 W			●	◉	◉		●	110
CC 6601	6500 W			●	◉	◉		●	110
EB Chillers (water)									
EB 30 WT	3000 W	400 V / 460 V 3 ~	955 x 550 x 610 mm	◉	◉	◉		●	112
EB 43 WT	4300 W			◉	◉	◉		●	112
EB 60 WT	6000 W			◉	◉	◉		●	112
EB 75 WT	7500 W		1290 x 705 x 765 mm	◉	◉	◉		●	114
EB 90 WT	9000 W			◉	◉	◉		●	114
EB 130 WT	13000 W			◉	◉	◉		●	114
EB 150 WT	15000 W			◉	◉	◉		●	114
EB 190 WT	19000 W		1410 x 1230 x 790 mm	◉	◉	◉		●	116
EB 250 WT	25000 W			◉	◉	◉		●	116
EB 300 WT	30000 W		1410 x 1680 x 790 mm	◉	◉	◉		●	118
EB 350 WT	35000 W			◉	◉	◉		●	118
EB 400 WT	40000 W			◉	◉	◉		●	118
EB Chillers (oil)									
EB 30 (oil)	3000 W	400 V / 460 V 3 ~	955 x 550 x 610 mm	◉	◉	◉		●	120
EB 43 (oil)	4300 W			◉	◉	◉		●	120
EB 60 (oil)	6000 W			◉	◉	◉		●	120
EB 75 (oil)	7500 W		1290 x 705 x 765 mm	◉	◉	◉		●	122
EB 90 (oil)	9000 W			◉	◉	◉		●	122
EB 130 (oil)	13000 W			◉	◉	◉		●	122
EB 150 (oil)	15000 W			◉	◉	◉		●	122
EB 190 (oil)	19000 W		1410 x 1230 x 790 mm	◉	◉	◉		●	124
EB 250 (oil)	25000 W			◉	◉	◉		●	124
EB 300 (oil)	30000 W		1410 x 1680 x 790 mm	◉	◉	◉		●	126
EB 350 (oil)	35000 W			◉	◉	◉		●	126
EB 400 (oil)	40000 W			◉	◉	◉		●	126
HK Chillers (WT)									
HK 55 (WT)	55000 W	400 V / 460 V 3 ~	1800 x 2500 x 1110 mm	◉	◉	◉		●	128
HK 62 (WT)	62000 W			◉	◉	◉		●	128
HK 70 (WT)	70000 W			◉	◉	◉		●	128
AR Chillers (WT)									
AR 10 WT	10000 W	400 V / 460 V 3 ~	2000 x 1000 x 600 mm	◉	◉	◉		●	130
AR 12 WT	12000 W			◉	◉	◉		●	130
AR 15 WT	15000 W		2001 x 1000 x 800 mm	◉	◉	◉		●	130
AR 18 WT	18000 W			◉	◉	◉		●	130
PWW Chillers									
PWW 9.000	9000 W	230 V AC	500 x 580 x 580 mm	◉	◉	◉		●	132
PWW 12.000	12000 W			◉	◉	◉		●	132
PWW 18.000	18000 W			◉	◉	◉		●	132
PWW 24.000	24000 W			◉	◉	◉		●	132

[1] performance data based on 50Hz operation
[2] different voltages available on request

● available
○ pending
◉ upon request



Further information can be found on the Internet:
www.pfannenberg.com · **www.pfannenberg-spareparts.com**
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newsletter.pfannenberg.com

Chillers 1100–2400 W
Rack 1100 / Rack 1700
Rack 2400



- stand-alone chiller
- fluid cooling with water, water/glycol mixtures and low-viscosity oils*
- anodised aluminium housing cover
- basic housing made of powder-coated sheet steel
- robust laboratory and industry standard in 3 performance classes
- integration of project-specific additional components is possible on request

Further options for the Rack series chillers can be found on page 134.

* maximum viscosity 10 cSt (10 mm²/s) @ + 40 °C

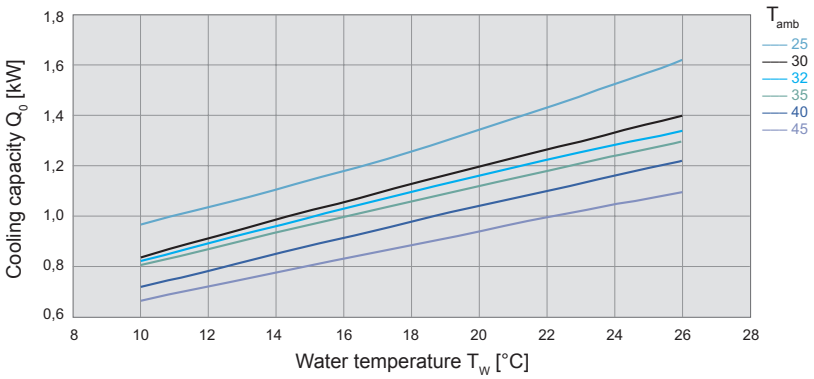
Data		Rack 1100	Rack 1700	Rack 2400	Unit
Article number		42010110003	42010170008	42010240001	
Rated voltage ± 10%		AC 50 / 60			Hz
		230 1~			V
Cooling capacity (with pump)[1]	W18/L32	1.1 / 1.35	1.7 / 2.05	2.4 / 2.7	kW
	W10/L32	0.82 / 1.01	1.28 / 1.61	1.92 / 2.14	
Flow rate (pump)[2]		12		14	l/min
Pressure (head) (pump)		2		2.5	bar
Ambient temperature range		+ 15 … + 45 / + 59 … + 113		+ 15 … + 40 / + 59 … + 104	°C / °F
Control range (refrigerant outlet temperature)		+ 10 … + 35 / + 50 … + 95; factory setting + 18 / + 64			
Target value tolerance		± 2			K
Refrigerant	type	R134a		R404A	
	quantity	700	800	1000	g
Power consumption	W18/L32	0.632 / 0.782	0.724 / 0.826	1.8 / 2.12	kW
Current consumption	W18/L32	4.16 / 3.97	3.8 / 3.94	11.22 / 11.72	A
Starting current	W18/L32	14.67 / 16.3	23.58 / 26.2	33.57 / 37.3	A
Control voltage		230			V
Pre fuse T		10	10	on request	A
Volumetric airflow	external	806	1182	1000	m³/h
Tank volume		5		10	l
Connections (medium)	IG	3/8"			BSPP
Noise level according to EN ISO 3741		< 66		68	dB (A)
Weight (without packaging)		42		61	kg
System of protection (electrical equipment)		IP 20			
Colour		RAL 9005 (different colours on request); cover: aluminium			

Accessories		Article number
Overflow valve (internal)		48000009680
Flow monitor		48000009682
Casters		45000009678
20% Propyleneglycol pre-mix	20 l	45783000123
20% Ethyleneglycol pre-mix	20 l	45783000125

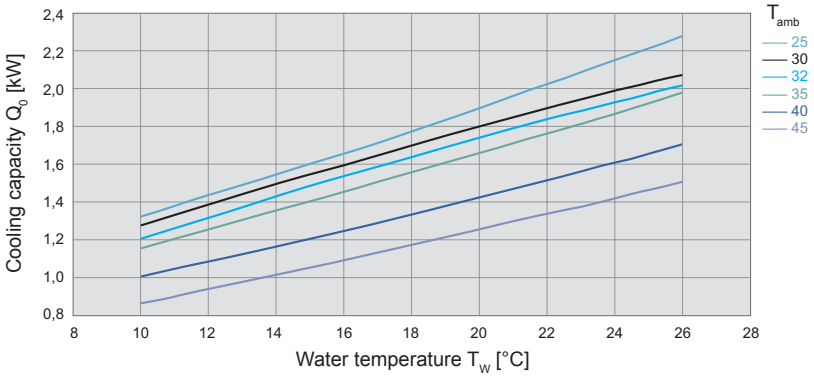
[1] cooling capacity incl. power loss in the pump, refrigerant outlet temperature + 18 °C, ambient temperature + 32 °C
[2] performance data based on 50 Hz operation
Approvals see page 105

Cooling capacity performance curves

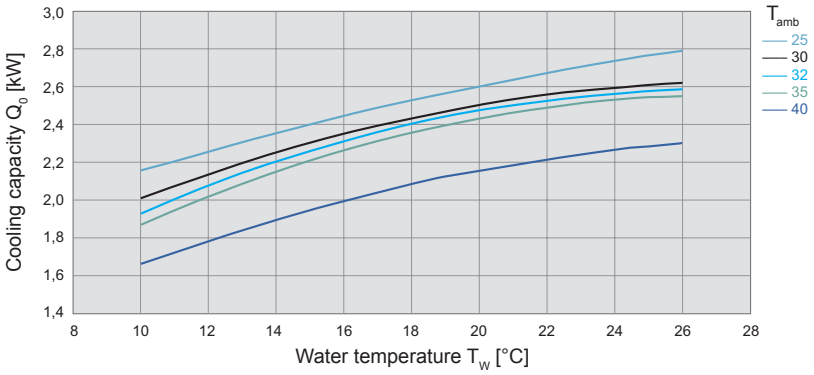
Rack 1100 (50 Hz)[1]



Rack 1700 (50 Hz)[1]

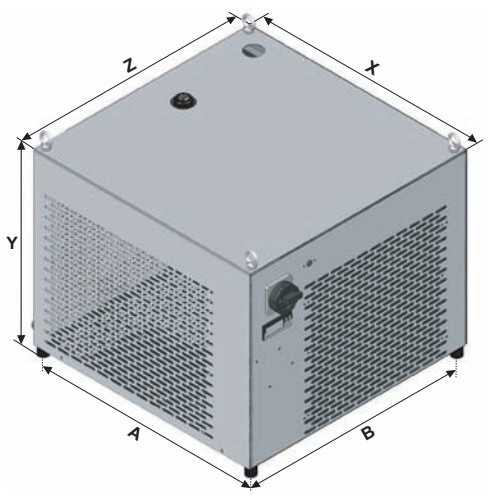


Rack 2400 (50 Hz)[1]



Dimensions

mm	Rack 1100/1700	Rack 2400
X	450	580
Y	395	500[2]
Z	480	580
A	425	555
B	450	550



[1] the performance curves for the 60 Hz version can be obtained from your Pfannenberg advisor or at www.pfannenberg.com

[2] without eye bolts

ECOOL Chillers 1100–2400 W

CC 6101 / CC 6201 / CC 6301



- stand-alone chiller
- fluid cooling with water, water/glycol mixtures and low-viscosity oils*
- steel housing with thick powder coating
- robust industry standard
- mounting on top of the enclosure is possible
- integration of project-specific additional components is possible on request
- separate cooling circuit and hydraulic circuit
- equipped with a programmable control module that allows small hystereses of the temperature of the cooling medium

Further options for the CC series chillers can be found on page 134.

* maximum viscosity 10 cSt (10 mm²/s) @ + 40 °C

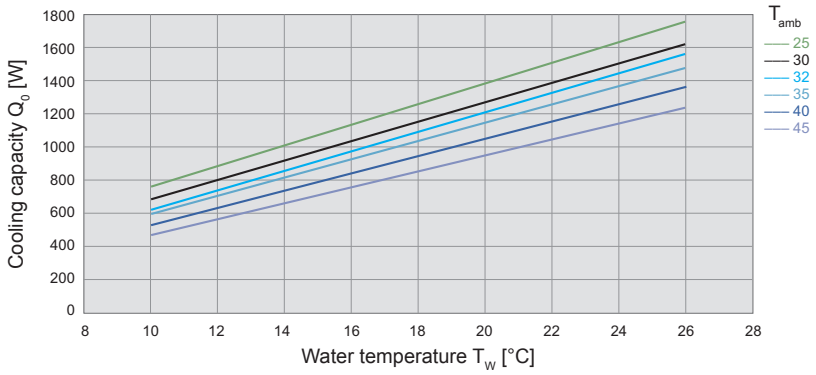
Data		CC 6101		CC 6201		CC 6301		Unit
Article number		42630115200	42630115100	42630175200	42630175100	42630245200	42630245100	
Rated voltage ± 10%		AC 50 / 60	AC 60	AC 50 / 60	AC 60	AC 50 / 60	AC 60	Hz
		230 1~	115 1~	230 1~	115 1~	230 1~	115 1~	V
Cooling capacity (with pump)[1]	W18/L32	1.1	1.3	1.7	1.92	2.4	2.68	kW
	W10/L32	0.64	0.753	0.99	1.165	1.396	1.642	
Flow rate (pump)[2]		12						l/min
Pressure (head) (pump)		3						bar
Ambient temperature range		+ 15 … + 45 / + 59 … + 113						°C / °F
Control range (refrigerant outlet temperature)		+ 10 … + 35 / + 50 … + 95; factory setting + 18 / + 64						
Target value tolerance		± 2						K
Refrigerant	R134a	650						g
Power consumption	W18/L32	1.15	1.38	1.325 / 1.59	1.59	2.926 / 3.511	3.511	kW
Current consumption	W18/L32	5 / 6.1	12.8	5.7 / 7.1	13.8	7.4 / 8.9	30.5	A
Starting current	W18/L32	17.5 / 21.35	32	20 / 24.9	34.5	25.9 / 31.15	54.9	A
Control voltage		230 AC						V
Pre fuse T		15		15	20	20	25	A
Volumetric airflow	external	1300 / 1450	1450	1300 / 1450	1450	1300 / 1450	1450	m³/h
Tank volume		10						l
Connections (medium)	IG	1/2"						BSPP
Noise level according to EN ISO 3741		< 62						dB (A)
Weight (without packaging)		67		67		72		kg
System of protection (electrical equipment)		IP 54						
Colour		RAL 7035, different colours available on request						

Accessories		Article number
Overflow valve (internal)		48700956146
Flow monitor		48700956148
Aluminium pre-filter (condenser)		45700956150
20% Propyleneglycol pre-mix	20 l	45783000123
20% Ethyleneglycol pre-mix	20 l	45783000125

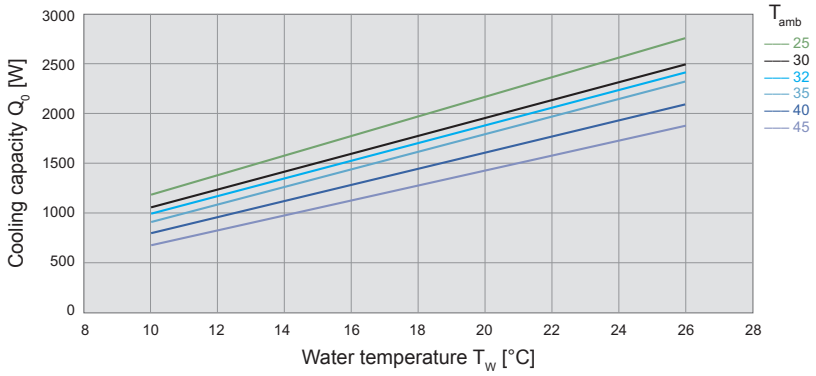
[1] cooling capacity incl. power loss in the pump, refrigerant outlet temperature + 18 °C, ambient temperature + 32 °C
[2] performance data based on 50 Hz operation
Approvals see page 105

Cooling capacity performance curves

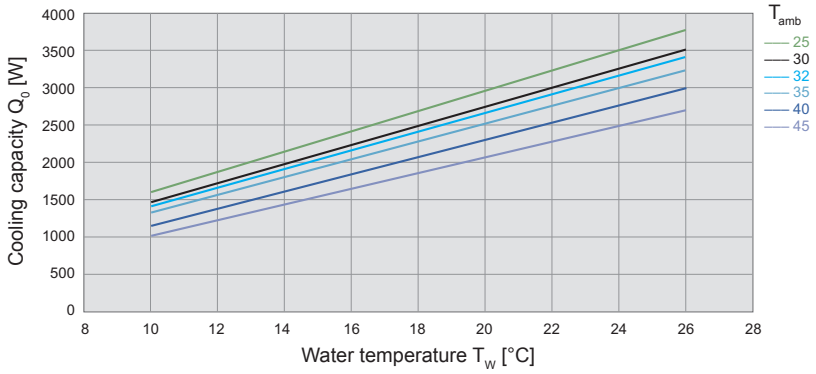
CC 6101 (50 Hz)[1]



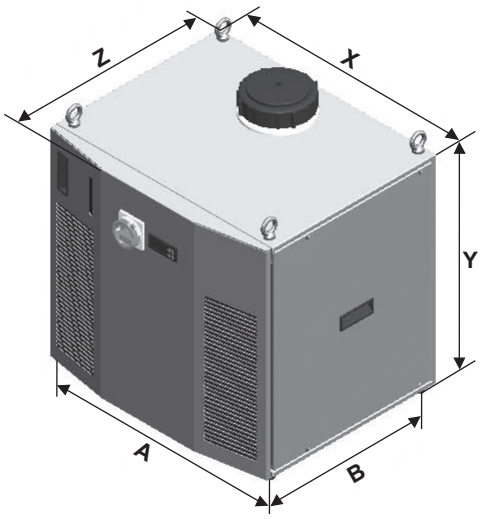
CC 6201 (50 Hz)[1]



CC 6301 (50 Hz)[1]



Dimensions	
mm	CC 6101/6201/6301
X	600
Y	626[2]
Z	480
A	540
B	412



[1] the performance curves for the 60 Hz version can be obtained from your Pfannenberg advisor or at www.pfannenberg.com

[2] without eye bolts

ECOOL Chillers 3500–6500 W

CC 6401 / CC 6501 / CC 6601



- stand-alone chiller
- fluid cooling with water, water/glycol mixtures and low-viscosity oils*
- steel housing with thick powder coating
- robust industry standard
- mounting on top of the enclosure is possible
- integration of project-specific additional components is possible on request
- separate cooling circuit and hydraulic circuit
- equipped with a programmable control module that allows small hystereses of the temperature of the cooling medium

Further options for the CC series chillers can be found on page 134.

* maximum viscosity 10 cSt (10 mm²/s) @ + 40 °C

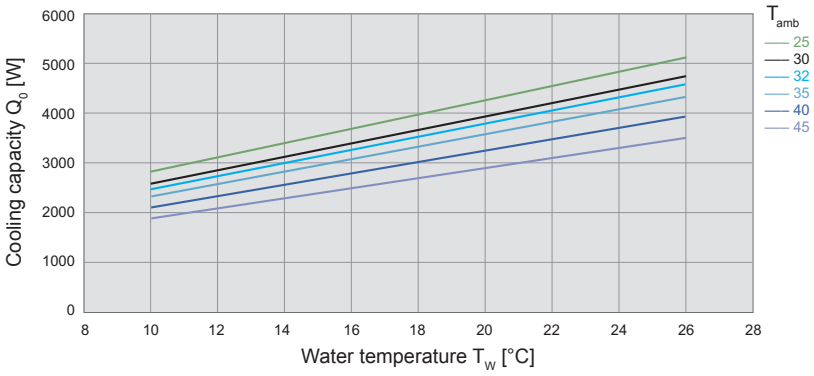
Data		CC 6401	CC 6501	CC 6601	Unit
Article number		42630355300	42630505300	42630655300	
Rated voltage ± 10%		AC 50 / 60	AC 50 / 60	AC 50 / 60	Hz
		400 / 460 3~	400 / 460 3~	400 / 460 3~	V
Cooling capacity (with pump)[1]	W18/L32	3.5	5	6.5	kW
	W10/L32	2.45	3.5	4.55	
Flow rate (pump)[2]		22			l/min
Pressure (head) (pump)		3			bar
Ambient temperature range		+ 15 … + 45 / + 59 … + 113			°C / °F
Control range (refrigerant outlet temperature)		+ 10 … + 35 / + 50 … + 95; factory setting + 18 / + 64			
Target value tolerance		± 2			K
Refrigerant	R134a	1400		1500	g
Power consumption	W18/L32	2.178	2.962	3.294	kW
Current consumption	W18/L32	3.6	4.5	5.3	A
Starting current	W18/L32	12.6	15.75	18.55	A
Control voltage		24 AC			V
Pre fuse T		9		12	A
Volumetric airflow	external	2300			m³/h
Tank volume		30			l
Connections (medium)	IG	3/4"			BSPP
Noise level according to EN ISO 3741		< 62			dB (A)
Weight (without packaging)		109	111	114	kg
System of protection (electrical equipment)		IP 54			
Colour		RAL 7035, different colours available on request			

Accessories		Article number
Overflow valve (internal)		48700956147
Flow monitor		48700956149
Aluminium pre-filter (condenser)		45700956151
20% Propyleneglycol pre-mix	20 l	45783000123
20% Ethyleneglycol pre-mix	20 l	45783000125

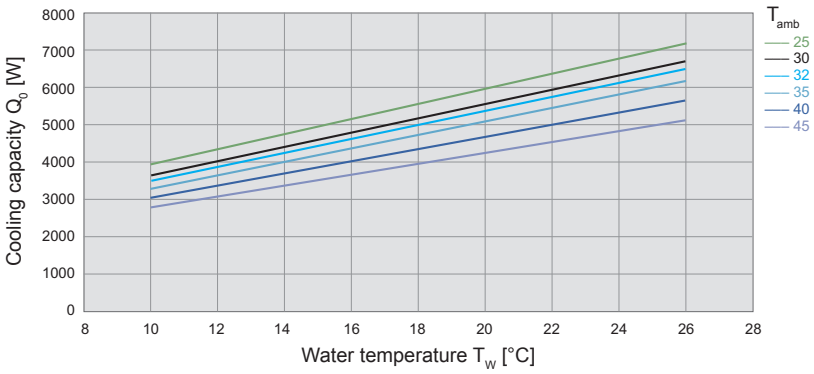
[1] cooling capacity incl. power loss in the pump, refrigerant outlet temperature + 18 °C, ambient temperature + 32 °C
[2] performance data based on 50 Hz operation
Approvals see page 105

Cooling capacity performance curves

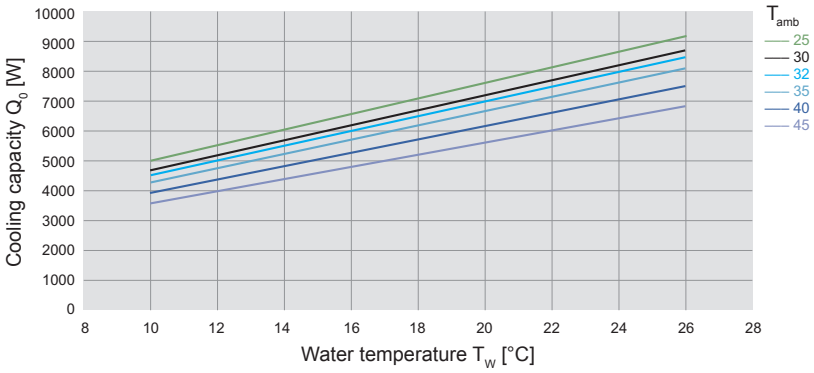
CC 6401 (50 Hz)[1]



CC 6501 (50 Hz)[1]

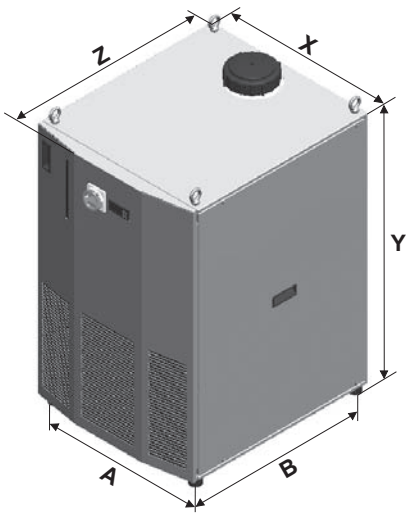


CC 6601 (50 Hz)[1]



Dimensions

mm	CC 6401/6501/6601
X	601
Y	984
Z	670
A	540
B	612



[1] the performance curves for the 60 Hz version can be obtained from your Pfannenberg advisor or at www.pfannenberg.com

[2] without eye bolts

Chillers 3000– 6000 W
EB 30 WT / EB 43 WT / EB 60 WT



- robust industry standard
- fluid cooling with water, water/glycol mixtures and low-viscosity oils*
- steel housing with thick powder coating
- identical basic housing for oil and water cooling
- separate cooling circuit and hydraulic circuit
- equipped with a programmable control module that allows small hystereses of the temperature of the cooling medium
- integration of project-specific additional components is possible on request

Further options for the EB series chillers can be found on page 135.

* maximum viscosity 10 cSt (10 mm²/s) @ + 40 °C

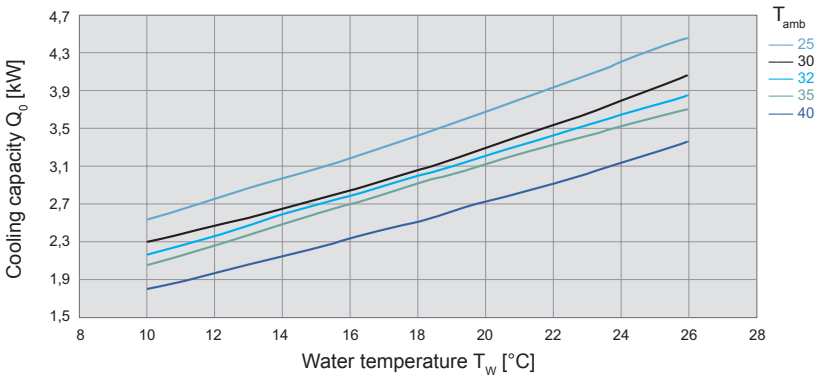
Data		EB 30 WT	EB 43 WT	EB 60 WT	Unit
Article number		42030300003	42030430003	42030600022	
Rated voltage ± 10%		AC 50 / 60			Hz
		400 / 460 3~			V
Cooling capacity (with pump) [1]	W18/L32	3 / 3.3	4.3 / 4.7	6 / 6.5	kW
	W10/L32	2.1 / 2.3	3 / 3.2	3.8 / 3.8	
Flow rate (pump)[2]		14			l/min
Pressure (head) (pump)		2.5			bar
Ambient temperature range		+ 15 … + 40 / + 59 … + 104			°C / °F
Control range (refrigerant outlet temperature)		+ 10 … + 35 / + 50 … + 95; factory setting + 18 / + 64			
Target value tolerance		± 2			K
Refrigerant	R404A	1100	1200	1600	g
Power consumption	W18/L32	2.08 / 2.43	2.78 / 3.25	3.4 / 4.1	kW
Current consumption	W18/L32	4.7 / 4.8	6.5 / 6.8	7.2 / 7.2	A
Starting current	W18/L32	18.7 / 20.8	20.4 / 22.5	28.7 / 30.2	A
Control voltage		24 V AC			V
Pre fuse T		20	20	25	A
Volumetric airflow	external	2000		3000	m³/h
Tank volume		30			l
Connections (medium)	IG	3/4"			BSPP
Noise level according to EN ISO 3741		< 66		< 70	dB (A)
Weight (without packaging)		95	120	150	kg
System of protection (enclosure electrical components)		IP 56			
Colour		RAL 7035, different colours available on request			

Accessories		Article number
Overflow valve (internal)		48000012266
Flow monitor		48000012268
Aluminium pre-filter (condenser)		45000012286
Casters		45000012284
20% Propyleneglycol pre-mix	20 l	45783000123
20% Ethyleneglycol pre-mix	20 l	45783000125

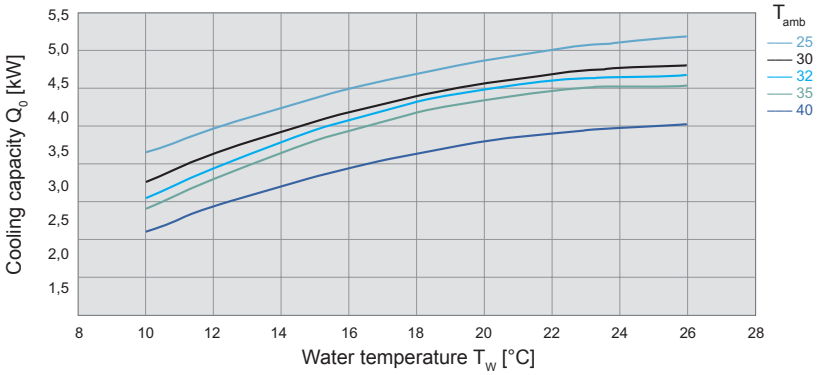
[1] cooling capacity incl. power loss in the pump, refrigerant outlet temperature + 18 °C, ambient temperature + 32 °C
[2] performance data based on 50 Hz operation
Approvals see page 105

Cooling capacity performance curves

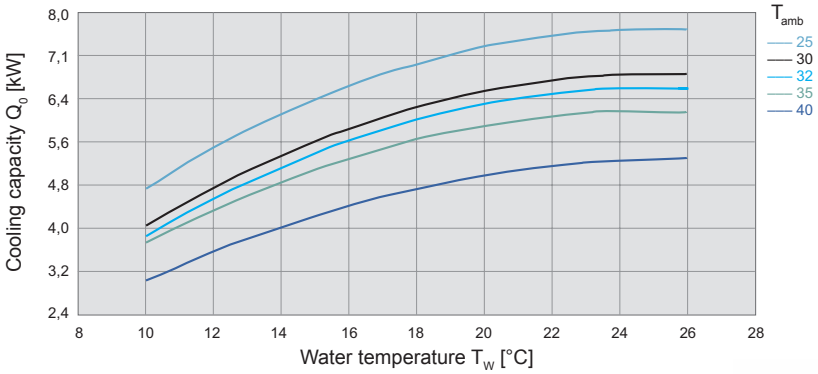
EB 30 WT (50 Hz)[1]



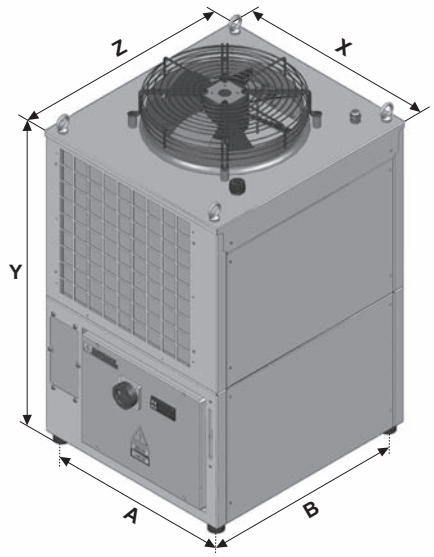
EB 43 WT (50 Hz)[1]



EB 60 WT (50 Hz)[1]



Dimensions	
mm	EB 30/43/60 WT
X	555
Y	955[2]
Z	610
A	495
B	550



[1] the performance curves for the 60 Hz version can be obtained from your Pfannenberg advisor or at www.pfannenberg.com

[2] incl. fan

Chillers 7500 – 15000 W
EB 75 WT / EB 90 WT / EB 130 WT / EB 150 WT



- robust industry standard
- fluid cooling with water, water/glycol mixtures and low-viscosity oils*
- steel housing with thick powder coating
- identical basic housing for oil and water cooling
- separate cooling circuit and hydraulic circuit
- equipped with a programmable control module that allows small hystereses of the temperature of the cooling medium
- integration of project-specific additional components is possible on request

Further options for the EB series chillers can be found on page 135.

* maximum viscosity 10 cSt (10 mm²/s) @ + 40 °C

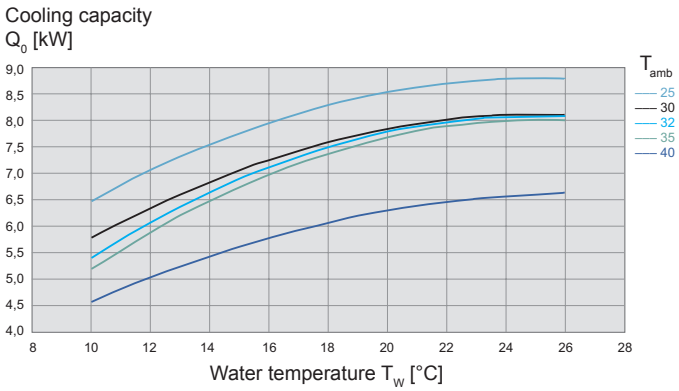
Data		EB 75 WT	EB 90 WT	EB 130 WT	EB 150 WT	Unit
Article number		42030750003	42030900009	42031300001	42031500001	
Rated voltage ± 10%		AC 50 / 60				Hz
		400 / 460 3~				V
Cooling capacity (with pump)[1]	W18/L32	7.5 / 8.3	9 / 10	13 / 14.3	15 / 16.6	kW
	W10/L32	5.4 / 5.7	6.9 / 7.5	10.5 / 11.4	11.8 / 12.8	
Flow rate (pump)[2]		35				l/min
Pressure (head) (pump)		3				bar
Ambient temperature range		+ 15 … + 40 / + 59 … + 104				°C / °F
Control range (refrigerant outlet temperature)		+ 10 … + 35 / + 50 … + 95; factory setting + 18 / + 64				
Target value tolerance		± 2				K
Refrigerant	R404A	2000	2300	3500	3400	g
Power consumption	W18/L32	4.87 / 5.76	6.48 / 7.1	8 / 10	8.86 / 11.01	kW
Current consumption	W18/L32	9.7 / 9.7	13.17 / 13	14.5 / 15.8	16.39 / 17.91	A
Starting current	W18/L32	30.6 / 31.4	42.5 / 46.6	65.4 / 68.9	72.8 / 75.9	A
Control voltage		24 V AC				V
Pre fuse T		25	25	on request	on request	A
Volumetric airflow	external	3000	5000			m³/h
Tank volume		50				l
Connections (medium)	IG	1"				BSPP
Noise level according to EN ISO 3741		< 72				dB (A)
Weight (without packaging)		160	180	205	225	kg
System of protection (enclosure electrical components)		IP 56				
Colour		RAL 7035, different colours available on request				

Accessories		Article number
Overflow valve (internal)		48000012267
Flow monitor		48000012269
Aluminium pre-filter (condenser)		45000012287
Casters		45000012285
20% Propyleneglycol pre-mix	20 l	45783000123
20% Ethyleneglycol pre-mix	20 l	45783000125

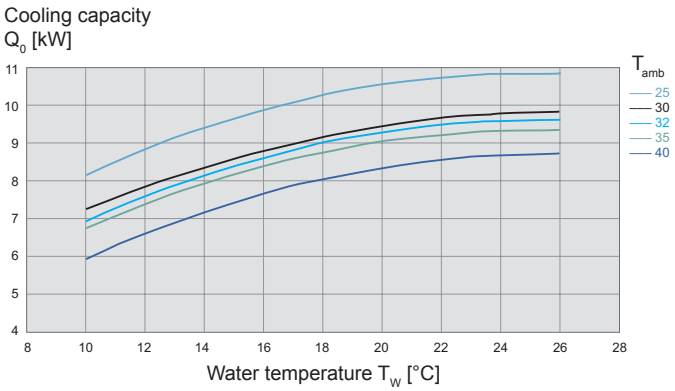
[1] cooling capacity incl. power loss in the pump, refrigerant outlet temperature + 18 °C, ambient temperature + 32 °C
[2] performance data based on 50 Hz operation
Approvals see page 105

Cooling capacity performance curves

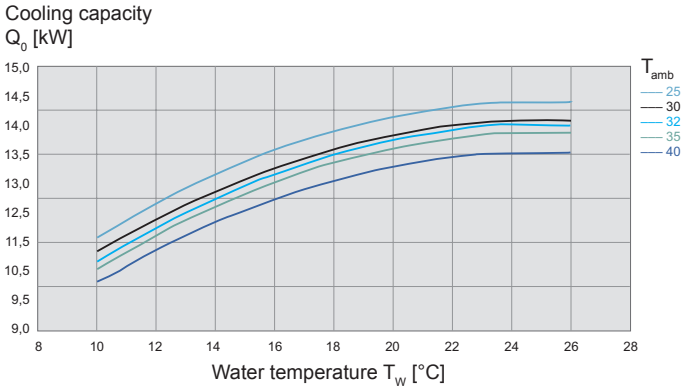
EB 75 WT (50 Hz)[1]



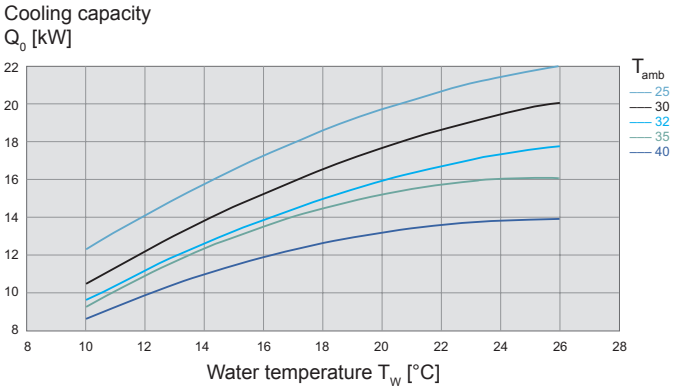
EB 90 WT (50 Hz)[1]



EB 130 WT (50 Hz)[1]

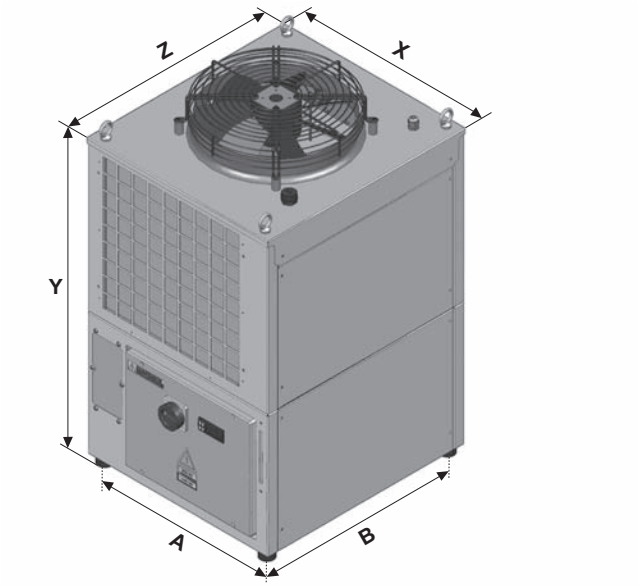


EB 150 WT (50 Hz)[1]



Dimensions

mm	EB 75/90/130/150 WT
X	705
Y	1290[2]
Z	765
A	645
B	700



[1] the performance curves for the 60 Hz version can be obtained from your Pfannenberg advisor or at www.pfannenberg.com

[2] incl. fan

Chillers 19000–25000 W
EB 190 WT
EB 250 WT



- robust industry standard
- fluid cooling with water, water/glycol mixtures and low-viscosity oils*
- steel housing with thick powder coating
- identical basic housing for oil and water cooling
- separate cooling circuit and hydraulic circuit
- equipped with a programmable control module that allows small hystereses of the temperature of the cooling medium
- integration of project-specific additional components is possible on request

Further options for the EB series chillers can be found on page 135.

* maximum viscosity 10 cSt (10 mm²/s) @ + 40 °C

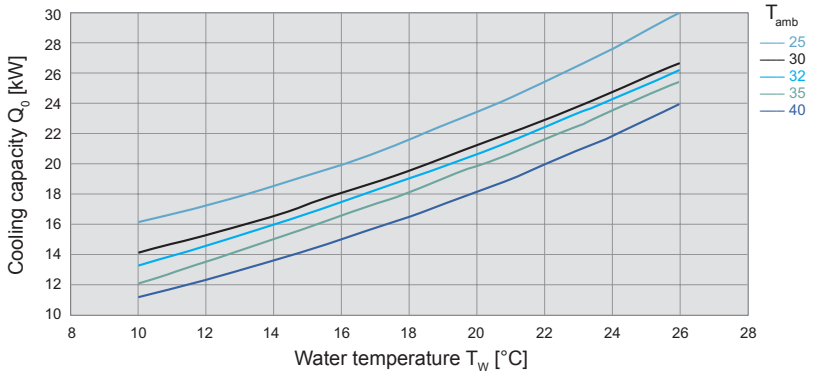
Data		EB 190 WT	EB 250 WT	Unit
Article number		42031900001	42032500001	
Rated voltage ± 10%		AC 50 / 60		Hz
		400 / 460 3~		V
Cooling capacity (with pump)[1]	W18/L32	19 / 21	25 / 27.7	kW
	W10/L32	13.3 / 14.8	17.7 / 19.7	
Flow rate (pump)[2]		50		l/min
Pressure (head) (pump)		3		bar
Ambient temperature range		+ 15 … + 40 / + 59 … + 104		°C / °F
Control range (refrigerant outlet temperature)		+ 10 … + 35 / + 50 … + 95; factory setting + 18 / + 64		
Target value tolerance		± 2		K
Refrigerant	R407C	10000		g
Power consumption	W18/L32	10.7 / 13.7	12.3 / 15.7	kW
Current consumption	W18/L32	20.2 / 21.1	22.5 / 23.1	A
Starting current	W18/L32	123.9 / 126.2	148.2 / 152.8	A
Control voltage		24 V AC		V
Pre fuse T		on request		A
Volumetric airflow	external	11800 / 12980		m³/h
Tank volume		70	70	l
Connections (medium)	IG	1"		BSPP
Noise level according to EN ISO 3741		< 73		dB (A)
Weight (without packaging)		389	403	kg
System of protection (enclosure electrical components)		IP 56		
Colour		RAL 7035, different colours available on request		

Accessories		Article number
Overflow valve (internal)		48000012865
Flow monitor		48000012866
Aluminium pre-filter (condenser)		45000012763
Casters		45000012867
20% Propyleneglycol pre-mix	20 l	45783000123
20% Ethyleneglycol pre-mix	20 l	45783000125

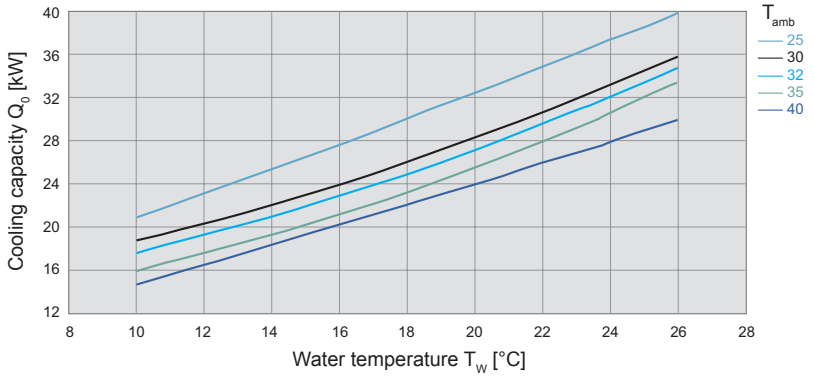
[1] cooling capacity incl. power loss in the pump, refrigerant outlet temperature + 18 °C, ambient temperature + 32 °C
[2] performance data based on 50 Hz operation
Approvals see page 105

Cooling capacity performance curves

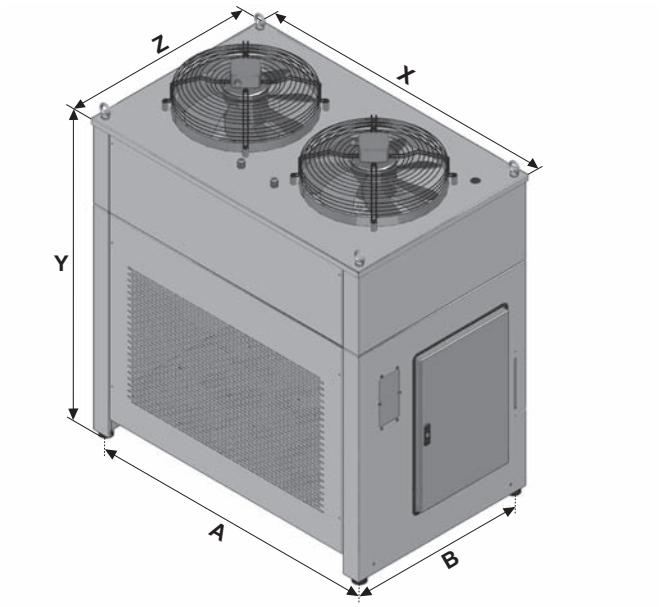
EB 190 WT (50 Hz)[1]



EB 250 WT (50 Hz)[1]



Dimensions	
mm	EB 190/250 WT
X	1230
Y	1410[2]
Z	790
A	1145
B	695



[1] the performance curves for the 60 Hz version can be obtained from your Pfannenberg advisor or at www.pfannenberg.com

[2] incl. fan

Chillers 30000–40000 W
EB 300 WT / EB 350 WT / EB 400 WT



- robust industry standard
- fluid cooling with water, water/glycol mixtures and low-viscosity oils*
- steel housing with thick powder coating
- identical basic housing for oil and water cooling
- separate cooling circuit and hydraulic circuit
- equipped with a programmable control module that allows small hystereses of the temperature of the cooling medium
- integration of project-specific additional components is possible on request

Further options for the EB series chillers can be found on page 135.

* maximum viscosity 10 cSt (10 mm²/s) @ + 40 °C

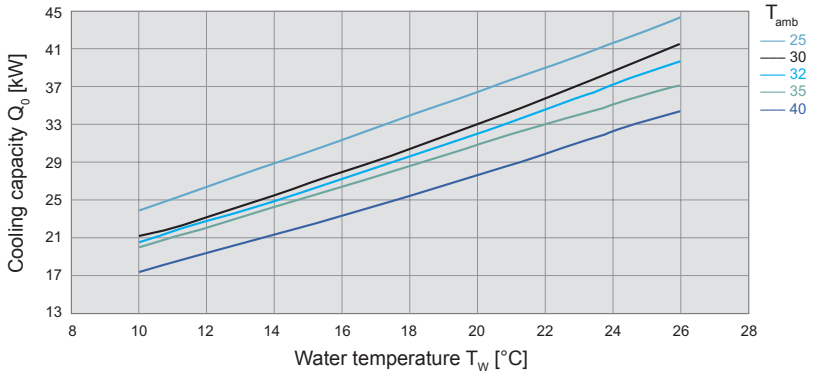
Data		EB 300 WT	EB 350 WT	EB 400 WT	Unit
Article number		42033000001	42033500001	42034000001	
Rated voltage ± 10%		AC 50 / 60			Hz
		400 / 460 3~			V
Cooling capacity (with pump)[1]	W18/L32	30 / 32.8	35 / 38.3	40 / 44.4	kW
	W10/L32	20.6 / 22.9	23.4 / 26	27.6 / 30.6	
Flow rate (pump)[2]		80			l/min
Pressure (head) (pump)		3.5			bar
Ambient temperature range		+ 15 … + 40 / + 59 … + 104			°C / °F
Control range (refrigerant outlet temperature)		+ 10 … + 35 / + 50 … + 95; factory setting + 18 / + 64			
Target value tolerance		± 2			K
Refrigerant	R407C	13000	12000	13000	g
Power consumption	W18/L32	14.8 / 18.5	17.3 / 22.0	19.5 / 24.4	kW
Current consumption	W18/L32	27.8 / 28.1	31.3 / 32.2	35.4 / 36.4	A
Starting current	W18/L32	157.8 / 161.1	182.8 / 191.1	212.9 / 216.1	A
Control voltage		24 V AC			V
Pre fuse T		on request			A
Volumetric airflow	external	14100 / 15510			m³/h
Tank volume		120			l
Connections (medium)	IG	1-1/2"			BSPP
Noise level according to EN ISO 3741		< 73			dB (A)
Weight (without packaging)		434	448	476	kg
System of protection (enclosure electrical components)		IP 56			
Colour		RAL 7035, different colours available on request			

Accessories		Article number
Overflow valve (internal)		48000012869
Flow monitor		48000012870
Aluminium pre-filter (condenser)		45000012868
Casters		45000012867
20% Propyleneglycol pre-mix	20 l	45783000123
20% Ethyleneglycol pre-mix	20 l	45783000125

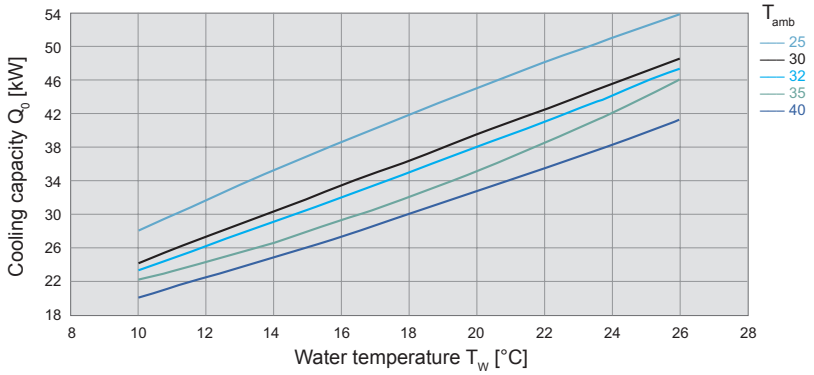
[1] cooling capacity incl. power loss in the pump, refrigerant outlet temperature + 18 °C, ambient temperature + 32 °C
[2] performance data based on 50 Hz operation
Approvals see page 105

Cooling capacity performance curves

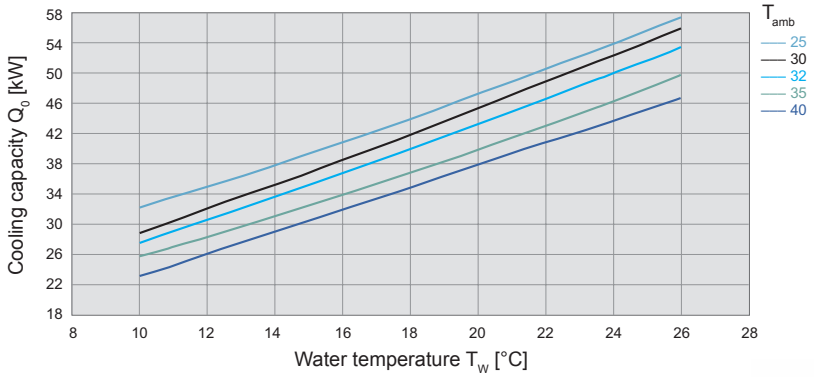
EB 300 WT (50 Hz)[1]



EB 350 WT (50 Hz)[1]

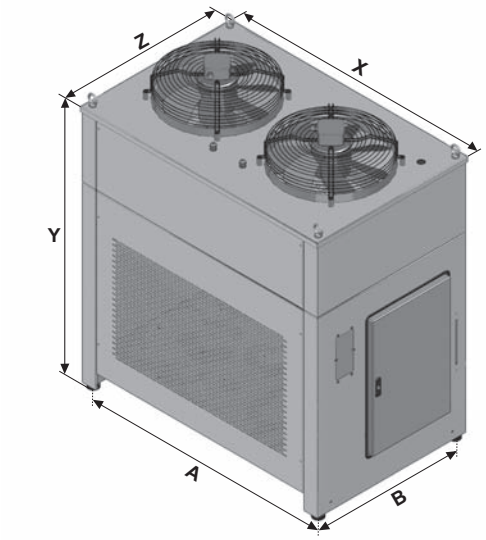


EB 400 WT (50 Hz)[1]



Dimensions

mm	EB 300/350/400 WT
X	1680
Y	1410[2]
Z	790
A	1595
B	695



[1] the performance curves for the 60 Hz version can be obtained from your Pfannenberg advisor or at www.pfannenberg.com

[2] incl. fan

Chillers 3000–6000 W
EB 30 (oil) / EB 43 (oil) / EB 60 (oil)



- robust industry standard
- fluid cooling with oil*
- steel housing with thick powder coating
- identical basic housing for oil and water cooling
- separate cooling circuit and hydraulic circuit
- equipped with a programmable control module that allows small hystereses of the temperature of the cooling medium
- integration of project-specific additional components is possible on request

Further options for the EB series chillers can be found on page 135.

* viscosity in the standard 10 cSt (10 mm²/s) to 32 cSt (32 mm²/s) @ + 40 °C

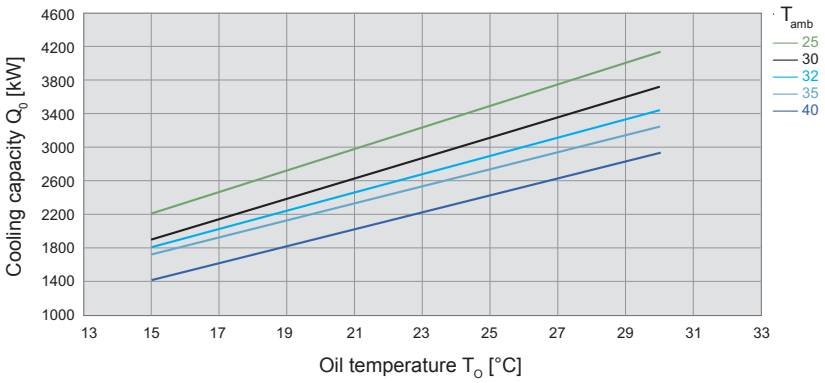
Data	EB 30 (oil)	EB 43 (oil)	EB 60 (oil)	Unit
Article number	43030300003	43030430003	43030600001	
Rated voltage ± 10%	AC 50 / 60			Hz
	400 / 460 3~			V
Cooling capacity (with pump)[1] O26/L32	3 / 3.3	4.3 / 4.7	6 / 6.5	kW
Flow rate (pump)[2]	10	25	25	l/min
Pressure (head) (pump)	10			bar
Ambient temperature range	+ 15 … + 40 / + 59 … + 104			°C / °F
Control range (refrigerant outlet temperature)	+20 … + 35 / + 68 … + 95; factory setting + 26 / + 79			
Target value tolerance	± 2			K
Refrigerant R404A	1100	1200	1600	g
Power consumption O26/L32	2.38 / 2.73	3.08 / 3.55	3.00 / 3.72	kW
Current consumption O26/L32	5.17 / 5.9	7.18 / 7.48	5.44 / 5.76	A
Starting current O26/L32	19.5 / 21.5	20.9 / 23.2	29.5 / 31.5	A
Control voltage	24 V AC			V
Pre fuse T	20	20	25	A
Volumetric airflow external	2000		3000	m³/h
Tank volume	–			l
Connections (medium) IG	3/4"			BSPP
Noise level according to EN ISO 3741	< 66		< 70	dB (A)
Weight (without packaging)	95	120	150	kg
System of protection (enclosure electrical components)	IP 56			
Colour	RAL 7035, different colours available on request			

Accessories	Article number	
Overflow valve (internal)	48700956059	48700956067
Flow monitor	48000012875	
Oil filter (90 µm)	45700956063	
Aluminium pre-filter (condenser)	45000012286	
Casters	45000012284	

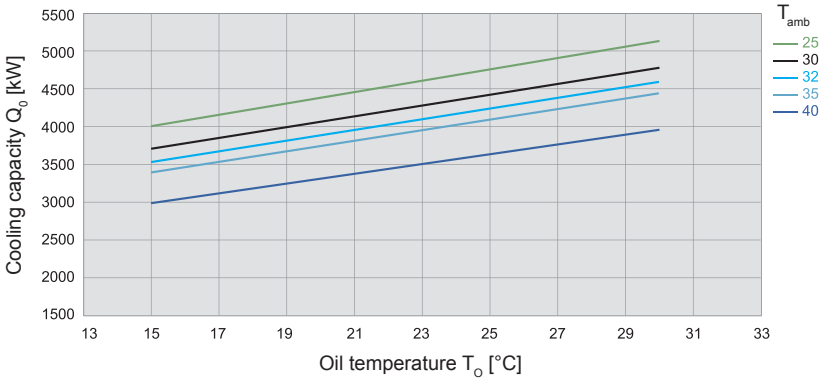
[1] cooling capacity incl. power loss in the pump, oil outlet temperature + 26 °C, ambient temperature + 32 °C, oil viscosity 22 cSt @ + 40 °C
[2] performance data based on 50 Hz operation
Approvals see page 105

Cooling capacity performance curves

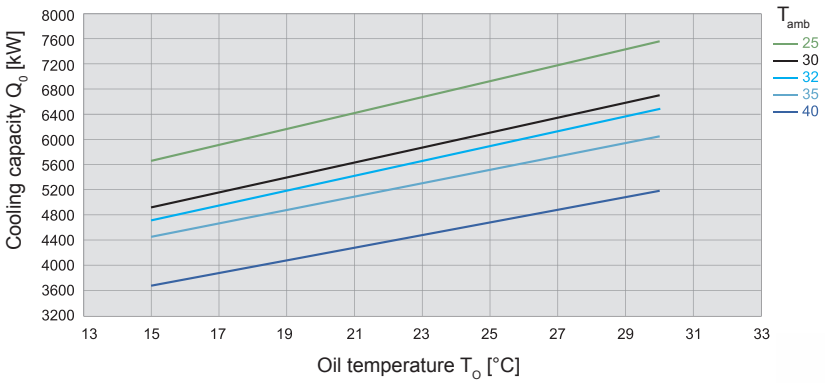
EB 30 (oil) (50 Hz)[1]



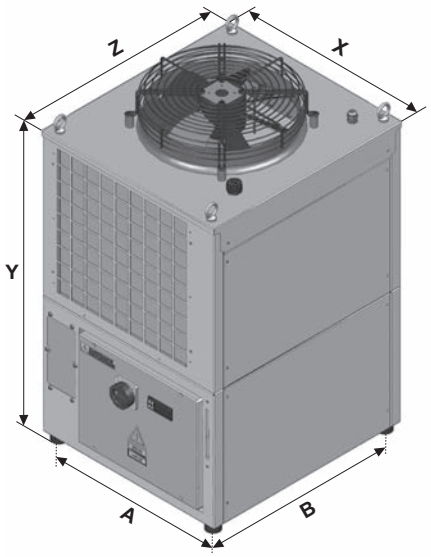
EB 43 (oil) (50 Hz)[1]



EB 60 (oil) (50 Hz)[1]



Dimensions	
mm	EB 30/43/60 (oil)
X	555
Y	955[2]
Z	610
A	495
B	550



[1] the performance curves for the 60 Hz version can be obtained from your Pfannenberg advisor or at www.pfannenberg.com

[2] incl. fan

Chillers 7500–15000 W
EB 75 (oil) / EB 90 (oil) / EB 130 (oil) / EB 150 (oil)



- robust industry standard
- fluid cooling with oil*
- steel housing with thick powder coating
- identical basic housing for oil and water cooling
- separate cooling circuit and hydraulic circuit
- equipped with a programmable control module that allows small hystereses of the temperature of the cooling medium
- integration of project-specific additional components is possible on request

Further options for the EB series chillers can be found on page 135.

* viscosity in the standard 10 cSt (10 mm²/s) to 32 cSt (32 mm²/s) @ + 40 °C

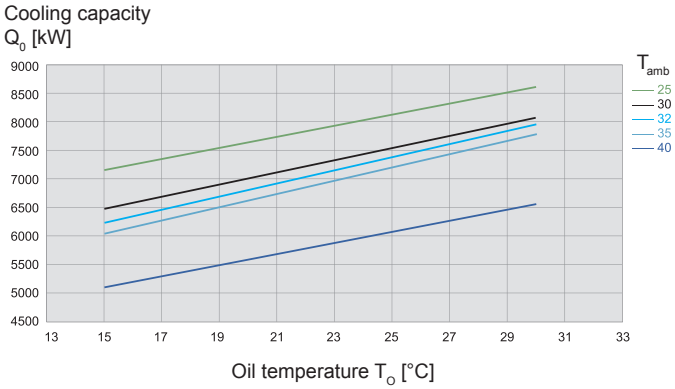
Data	EB 75 (oil)	EB 90 (oil)	EB 130 (oil)	EB 150 (oil)	Unit
Article number	43030750001	43030900001	43031300001	43031500001	
Rated voltage ± 10%	AC 50 / 60				Hz
	400 / 460 3~				V
Cooling capacity (with pump)[1] O26/L32	7.5 / 8.3	9 / 10	13 / 14.3	15 / 16.6	kW
Flow rate (pump)[2]	35	35	60	60	l/min
Pressure (head) (pump)	10				bar
Ambient temperature range	+ 15 … + 40 / + 59 … + 104				°C / °F
Control range (refrigerant outlet temperature)	+20 … + 35 / + 68 … + 95; factory setting + 26 / + 79				
Target value tolerance	± 2				K
Refrigerant R404A	2000	2300	3500	3400	g
Power consumption O26/L32	5.27 / 6.26	6.88 / 8.11	8.4 / 10.5	9.36 / 12.61	kW
Current consumption O26/L32	10.6 / 11.1	14.07 / 14.4	15.4 / 17.2	17.79 / 19.31	A
Starting current O26/L32	31.3 / 31.4	43.94 / 48.6	67.0 / 70.1	74.1 / 77.3	A
Control voltage	24 V AC				V
Pre fuse T	25	25	on request	on request	A
Volumetric airflow external	3000	5000			m³/h
Tank volume	–				l
Connections (medium) IG	1"				BSPP
Noise level according to EN ISO 3741	< 72				dB (A)
Weight (without packaging)	160	180	205	225	kg
System of protection (enclosure electrical components)	IP 56				
Colour	RAL 7035, different colours available on request				

Accessories	Article number	
Overflow valve (internal)	48700956060	48700956061
Flow monitor	48000012873	
Oil filter (90 µm)	45700956064	
Aluminium pre-filter (condenser)	45000012287	
Casters	45000012285	

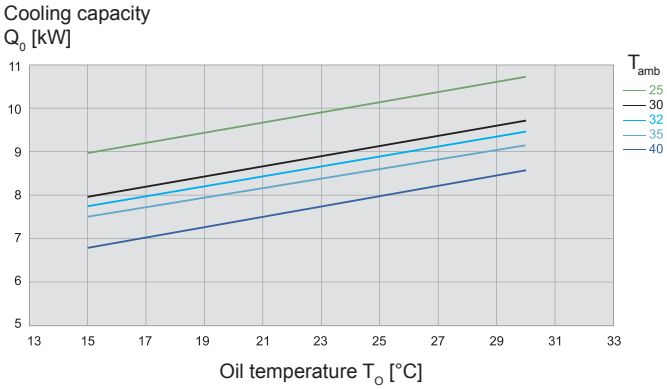
[1] cooling capacity incl. power loss in the pump, oil outlet temperature + 26 °C, ambient temperature + 32 °C, oil viscosity 22 cSt @ + 40 °C
[2] performance data based on 50 Hz operation
Approvals see page 105

Cooling capacity performance curves

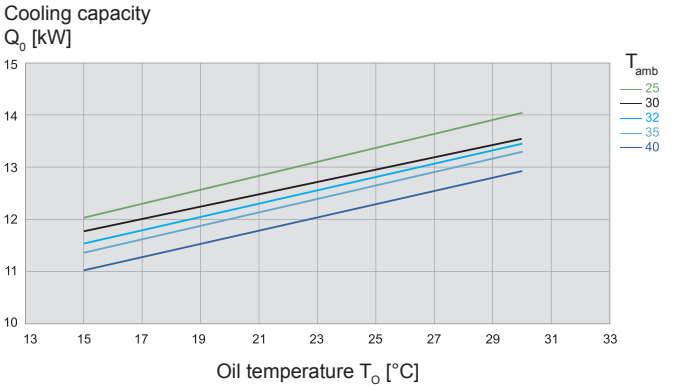
EB 75 (oil) (50 Hz)[1]



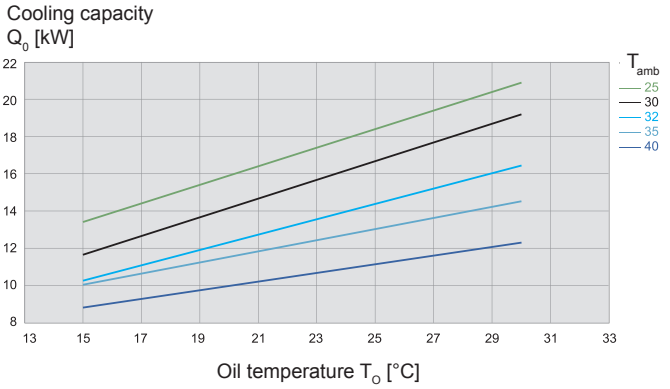
EB 90 (oil) (50 Hz)[1]



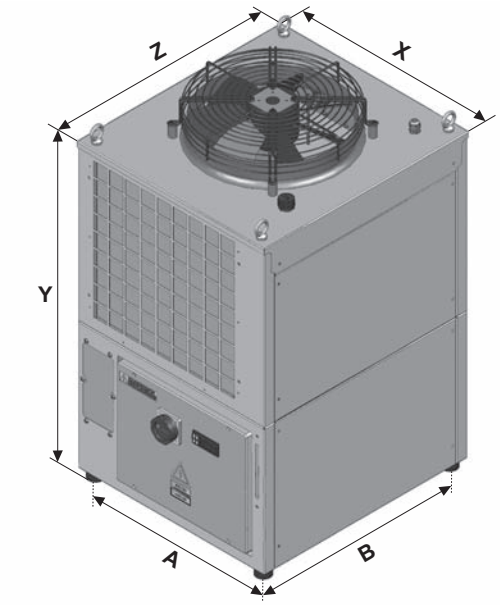
EB 130 (oil) (50 Hz)[1]



EB 150 (oil) (50 Hz)[1]



Dimensions	
mm	EB 75/90/130/150 (oil)
X	705
Y	1290[2]
Z	765
A	645
B	700



[1] the performance curves for the 60 Hz version can be obtained from your Pfannenberg advisor or at www.pfannenberg.com

[2] incl. fan

Chillers 19000–25000 W
EB 190 (oil) / EB 250 (oil)



- robust industry standard
- fluid cooling with oil*
- steel housing with thick powder coating
- identical basic housing for oil and water cooling
- separate cooling circuit and hydraulic circuit
- equipped with a programmable control module that allows small hystereses of the temperature of the cooling medium
- integration of project-specific additional components is possible on request

Further options for the EB series chillers can be found on page 135.

* viscosity in the standard 10 cSt (10 mm²/s) to 32 cSt (32 mm²/s) @ + 40 °C

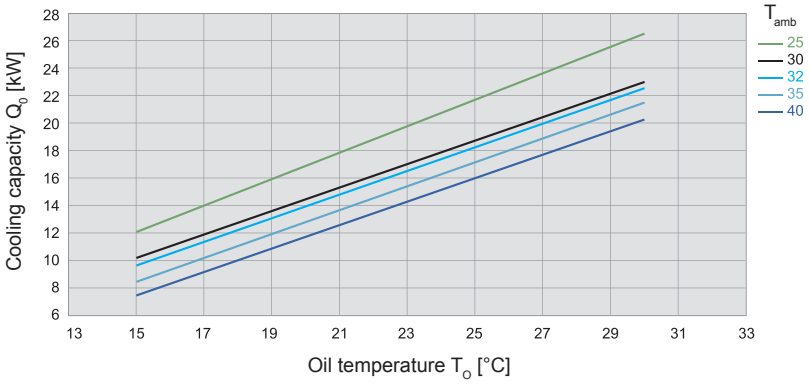
Data		EB 190 (oil)	EB 250 (oil)	Unit
Article number		43031900001	43032500001	
Rated voltage ± 10%		AC 50 / 60		Hz
		400 / 460 3~		V
Cooling capacity (with pump)[1]	O26/L32	19 / 21	25 / 27.7	kW
Flow rate (pump)[2]		60		l/min
Pressure (head) (pump)		10		bar
Ambient temperature range		+ 15 … + 40 / + 59 … + 104		°C / °F
Control range (refrigerant outlet temperature)		+20 … + 35 / + 68 … + 95; factory setting + 26 / + 79		
Target value tolerance		± 2		K
Refrigerant	R407C	10000		g
Power consumption	O26/L32	12.0 / 14.2	14.7 / 17.6	kW
Current consumption	O26/L32	20.8 / 20.8	24.7 / 25.1	A
Starting current	O26/L32	125.6 / 126.7	151.3 / 153.2	A
Control voltage		24 V AC		V
Pre fuse T		on request		A
Volumetric airflow	external	11800 / 12980		m³/h
Tank volume		–		l
Connections (medium)	IG	1"		BSPP
Noise level according to EN ISO 3741		< 73		dB (A)
Weight (without packaging)		350	390	kg
System of protection (enclosure electrical components)		IP 56		
Colour		RAL 7035, different colours available on request		

Accessories	Article number
Overflow valve (internal)	48000012873
Flow monitor	48000012871
Aluminium pre-filter (condenser)	45000012763
Casters	45000012867

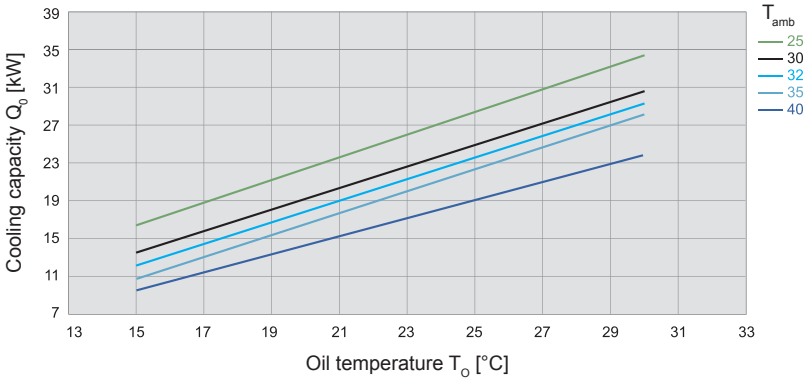
[1] cooling capacity incl. power loss in the pump, oil outlet temperature + 26 °C, ambient temperature + 32 °C, oil viscosity 22 cSt @ + 40 °C
[2] performance data based on 50 Hz operation
Approvals see page 105

Cooling capacity performance curves

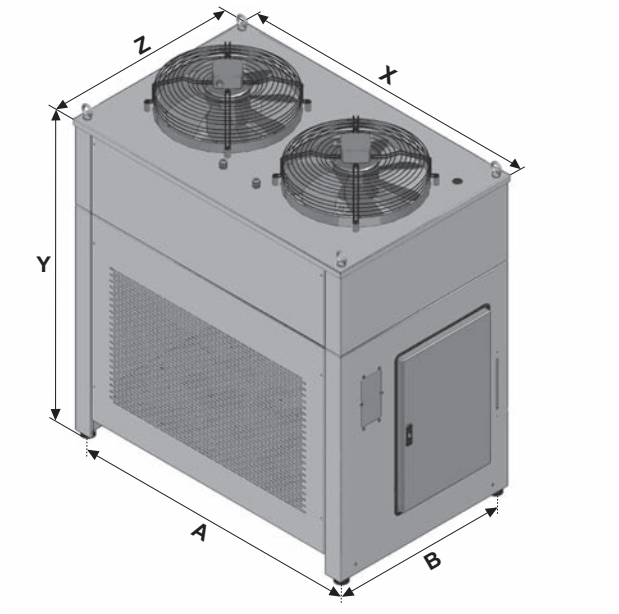
EB 190 (oil) (50 Hz)[1]



EB 250 (oil) (50 Hz)[1]



Dimensions	
mm	EB 190/250 (oil)
X	1230
Y	1410[2]
Z	790
A	1145
B	695



[1] the performance curves for the 60 Hz version can be obtained from your Pfannenberg advisor or at www.pfannenberg.com

[2] incl. fan

Chillers 30000–40000 W
EB 300 (oil) / EB 350 (oil) / EB 400 (oil)



- robust industry standard
- fluid cooling with oil*
- steel housing with thick powder coating
- identical basic housing for oil and water cooling
- separate cooling circuit and hydraulic circuit
- equipped with a programmable control module that allows small hystereses of the temperature of the cooling medium
- integration of project-specific additional components is possible on request

Further options for the EB series chillers can be found on page 135.

* viscosity in the standard 10 cSt (10 mm²/s) to 32 cSt (32 mm²/s) @ + 40 °C

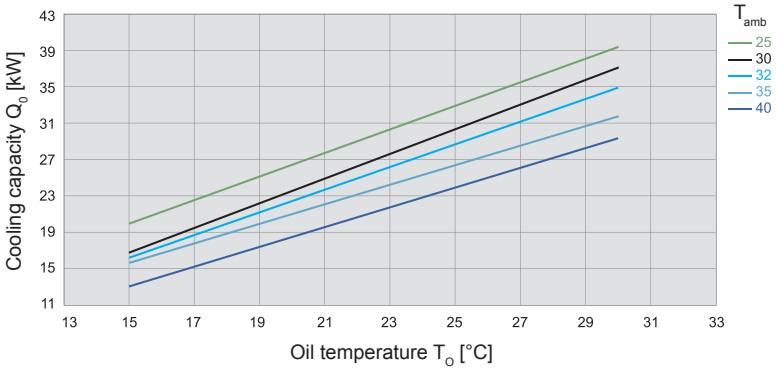
Data	EB 300 (oil)	EB 350 (oil)	EB 400 (oil)	Unit
Article number	43033000001	43033500001	43034000001	
Rated voltage ± 10%	AC 50 / 60			Hz
	400 / 460 3~			V
Cooling capacity (with pump)[1] O26/L32	30 / 32.8	35 / 38.3	40 / 44.4	kW
Flow rate (pump)[2]	80			l/min
Pressure (head) (pump)	10			bar
Ambient temperature range	+ 15 … + 40 / + 59 … + 104			°C / °F
Control range (refrigerant outlet temperature)	+20 … + 35 / + 68 … + 95; factory setting + 26 / + 79			
Target value tolerance	± 2			K
Refrigerant R407C	13000	12000	13000	g
Power consumption O26/L32	14.8 / 18.3	19.4 / 22.3	21.3 / 25.6	kW
Current consumption O26/L32	27.2 / 28.1	33.1 / 34.5	38.3 / 39.2	A
Starting current O26/L32	159.1 / 164.1	184.2 / 193.5	214.6 / 219.2	A
Control voltage	24 V AC			V
Pre fuse T	on request			A
Volumetric airflow external	14100 / 15510			m³/h
Tank volume	–			l
Connections (medium) IG	1 1/2"			BSPP
Noise level according to EN ISO 3741	< 73			dB (A)
Weight (without packaging)	424	438	466	kg
System of protection (enclosure electrical components)	IP 56			
Colour	RAL 7035, different colours available on request			

Accessories	Article number
Overflow valve (internal)	48000012874
Flow monitor	48000012872
Aluminium pre-filter (condenser)	45000012868
Casters	45000012867

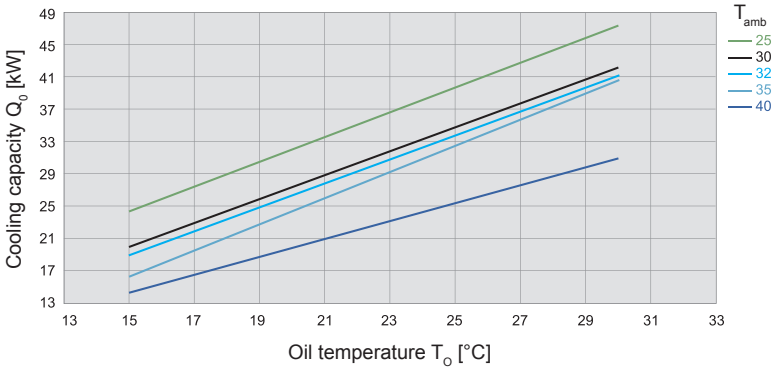
[1] cooling capacity incl. power loss in the pump, oil outlet temperature + 26 °C, ambient temperature + 32 °C, oil viscosity 22 cSt @ + 40 °C
[2] performance data based on 50 Hz operation
Approvals see page 105

Cooling capacity performance curves

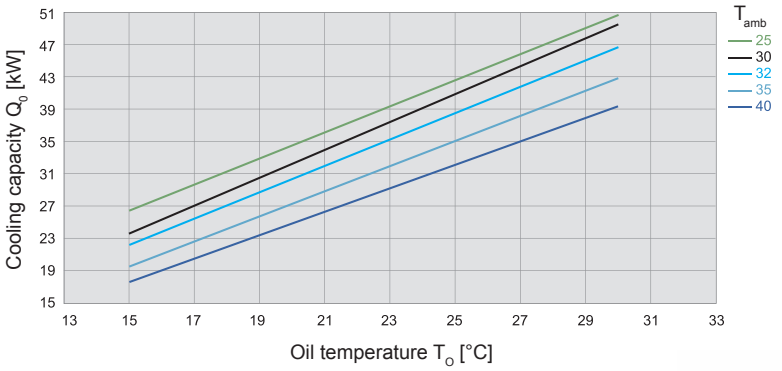
EB 300 (oil) (50 Hz)[1]



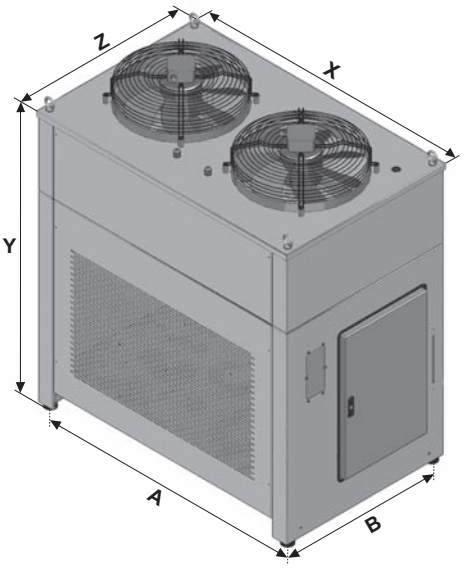
EB 350 (oil) (50 Hz)[1]



EB 400 (oil) (50 Hz)[1]



Dimensions	
mm	EB 300/350/400 (oil)
X	1680
Y	1410[2]
Z	790
A	1595
B	695



[1] the performance curves for the 60 Hz version can be obtained from your Pfannenberg advisor or at www.pfannenberg.com

[2] incl. fan

Chillers 55000–70000 W
HK 55 WT / HK 62 WT / HK 70 WT



- stand-alone chiller, automatic operation
- fluid cooling with water, water/glycol mixtures, emulsions and low-viscosity oils*
- particularly suitable for outdoors and aggressive environmental conditions
- powder-coated steel housing
- cooling circuit controlled via a programmable temperature module
- anti-freeze thermostat
- transport eye bolts on housing
- integration of project-specific additional components is possible on request
- fluid cooling with oil on request

Further options for the HK series chillers can be found on page 135.

* maximum viscosity 10 cSt (10 mm²/s) @ + 40 °C

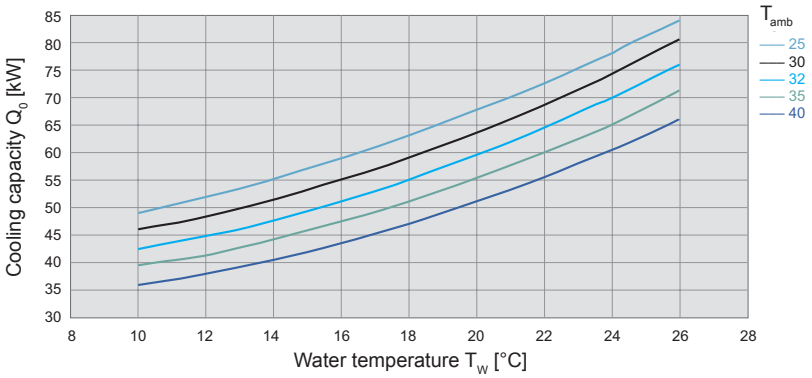
Data		HK 55 WT	HK 62 WT	HK 70 WT	Unit
Article number		42105500002	42106200001	42107000001	
Rated voltage ± 10%		AC 50 / 60			Hz
		400 / 460 3~			V
Cooling capacity (with pump)[1]	W18/L32	55 / 72.5	62 / 72.5	70 / 89	kW
	W10/L32	42.5 / 51.5	49.5 / 58	53 / 63	
Flow rate (pump)[2]		85	160	160	l/min
Pressure (head) (pump)		3			bar
Ambient temperature range		+ 15 … + 40 / + 59 … + 104			°C/°F
Control range (refrigerant outlet temperature)		+ 10 … + 35 / + 50 … + 95; factory setting + 18 / + 64			
Target value tolerance		± 2			K
Refrigerant	R407C	14500	16000	19000	g
Power consumption	W18/L32	19.7 / 25.9	23.8 / 28.0	28.5 / 33.3	kW
Current consumption	W18/L32	37.4 / 46.5	40.5 / 50.4	48.8 / 56.7	A
Starting current	W18/L32	220.8 / 266.8	232.6 / 267.5	311.7 / 334.6	A
Control voltage		24 V AC			V
Pre fuse T		on request			A
Volumetric airflow	external	14100 / 15510			m³/h
Tank volume		300			l
Connections (medium)	IG	1 1/2“			BSPP
Noise level according to EN ISO 3741		< 73			dB (A)
Weight (without packaging)		1081	1210	1315	kg
System of protection (enclosure electrical components)		IP 56			
Colour		RAL 7035, different colours available on request			

Accessories		Article number	
Overflow valve (internal)		48000012877	48000012884
Differential thermostat + 2 m sensor		48000012878	48000012885
Aluminium pre-filter (condenser)		45000012291	
20% Propyleneglycol pre-mix	20 l	45783000123	
20% Ethyleneglycol pre-mix	20 l	45783000125	

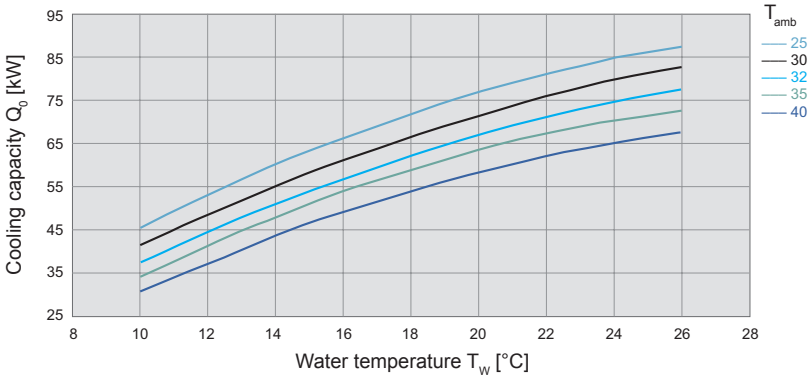
[1] cooling capacity incl. power loss in the pump, refrigerant outlet temperature + 18 °C, ambient temperature + 32 °C
[2] performance data based on 50 Hz operation
Approvals see page 105

Cooling capacity performance curves

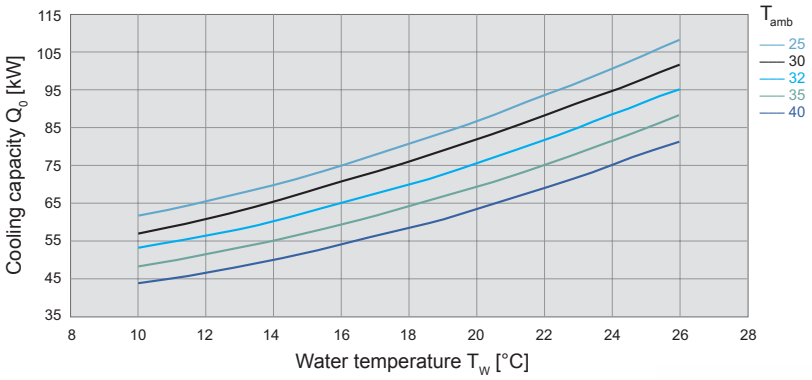
HK 55 WT (50 Hz)[1]



HK 62 WT (50 Hz)[1]

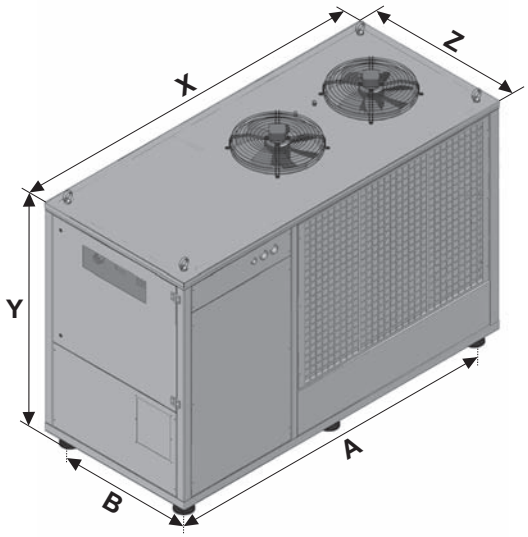


HK 70 WT (50 Hz)[1]



Dimensions

mm	HK 55/62/70 WT
X	2500
Y	1800[2]
Z	1110
A	2295
B	900



[1] the performance curves for the 60 Hz version can be obtained from your Pfannenberg advisor or at www.pfannenberg.com

[2] incl. fan

Chillers 10000–18000 W
AR 10 WT / AR 12 WT / AR 15 WT / AR 18 WT



- housing concept based on standard control cabinets
- optimum integration in switchgear
- fluid cooling with water, water/glycol mixtures, emulsions and low-viscosity oils*
- steel housing with thick powder coating
- condenser with 3 mm fin spacing, highly effective protection against strongly contaminated and aggressive ambient air
- transport eye bolts on housing
- integration of project-specific additional components is possible on request
- fluid cooling with oil on request

Further options for the AR series chillers can be found on page 135.

* maximum viscosity 10 cSt (10 mm²/s) @ + 40 °C

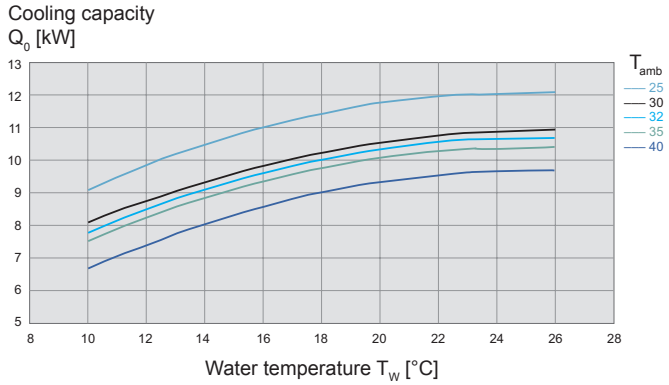
Data		AR 10 WT	AR 12WT	AR 15WT	AR 18 WT	Unit
Article number		42051000004	42051200004	42051500005	42051800003	
Rated voltage ± 10%		AC 50 / 60				Hz
		400 / 460 3~				V
Cooling capacity (with pump)[1]	W18/L32	10 / 11.1	12 / 15.7	15 / 16.6	18 / 21	kW
	W10/L32	7.7 / 8.3	9.7 / 12.5	11.8 / 12.8	16.6 / 18.8	
Flow rate (pump)[2]		35	35	50	50	l/min
Pressure (head) (pump)		3				bar
Ambient temperature range		+ 15 … + 40 / + 59 … + 104				°C/°F
Control range (refrigerant outlet temperature)		+ 10 … + 35 / + 50 … + 95; factory setting + 18 / + 64				
Target value tolerance		± 2				K
Refrigerant	R404A	2600	3300	3400	9300	g
Power consumption	W18/L32	7.1 / 7.7	7.4 / 8.0	8.3 / 10.4	10.4 / 12.3	kW
Current consumption	W18/L32	13.0 / 13.5	14.57 / 15.8	16.39 / 17.91	18.8 / 19.0	A
Starting current	W18/L32	49.3 / 51.1	63.8 / 65.1	67.2 / 71.5	71.2 / 75.4	A
Control voltage		24 V AC				V
Pre fuse T		25	32	on request	on request	A
Volumetric airflow	external	5000		5800		m³/h
Tank volume		50				l
Connections (medium)	IG	1"				BSPP
Noise level according to EN ISO 3741		< 73				dB (A)
Weight (without packaging)		250	265	285	300	kg
System of protection (enclosure electrical components)		IP 56				
Colour		RAL 7035, different colours available on request				

Accessories		Article number	
Overflow valve (internal)		48000012881	48000012886
Flow monitor		48000012882	48000012887
Aluminium pre-filter (condenser)		45000012883	45000012888
Casters			
20% Propyleneglycol pre-mix	20 l	45783000123	
20% Ethyleneglycol pre-mix	20 l	45783000125	

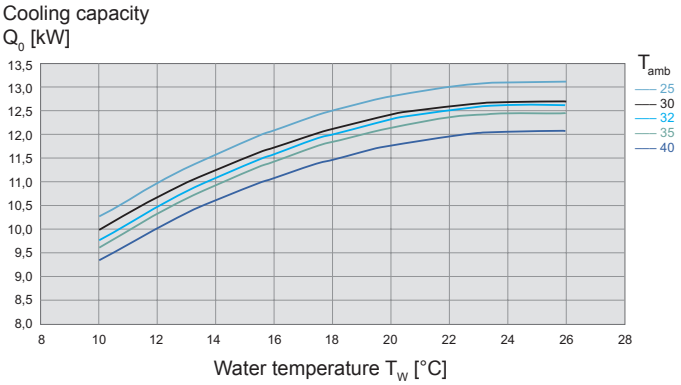
[1] cooling capacity incl. power loss in the pump, refrigerant outlet temperature + 18 °C, ambient temperature + 32 °C
[2] performance data based on 50 Hz operation
Approvals see page 105

Cooling capacity performance curves

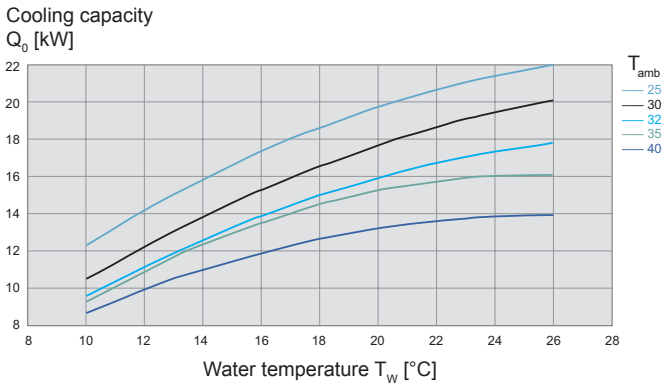
AR 10 WT (50 Hz)[1]



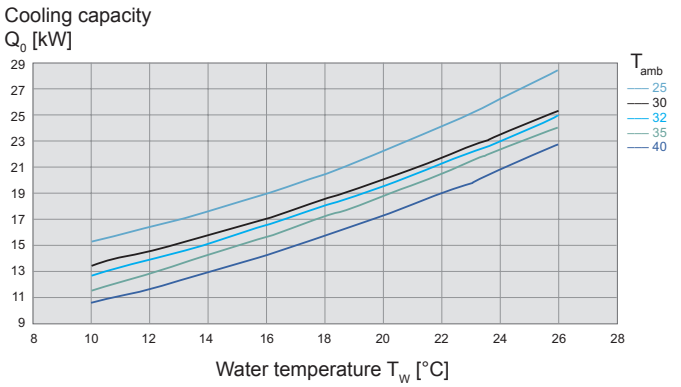
AR 12 WT (50 Hz)[1]



AR 15 WT (50 Hz)[1]

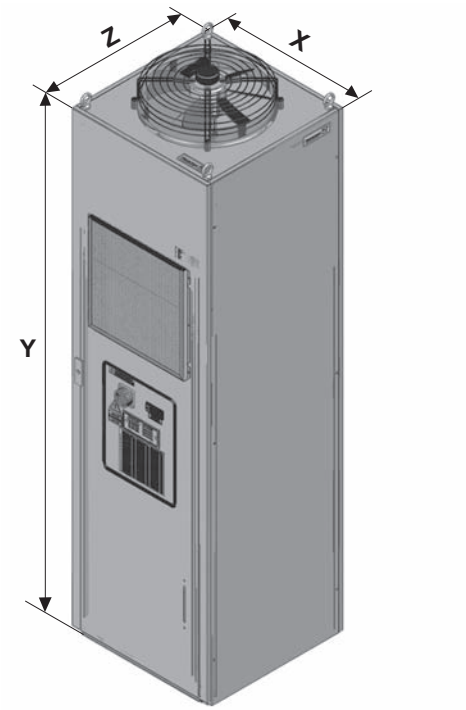


AR 18 WT (50 Hz)[1]



Dimensions

mm	AR 10/12 WT[2]	AR 15/18 WT[2]
X	1000	1000
Y	2000	2000
Z	600	800



[1] the performance curves for the 60 Hz version can be obtained from your Pfannenberg advisor or at www.pfannenberg.com

[2] housing only

Chillers 9000–24000 W
PWW 9.000 / PWW 12.000 / PWW 18.000 / PWW 24.000

- easily removable panels for easy access to interior components
- corrosion prevention with nonferrous construction
- closed loop system
- primary water regulation valve (AVTA)
- control circuit on/off switch for service convenience
- corrosion-resistant fixed piping for water circulation
- programmable controller (solid-state)
- multi stage centrifugal pump
- customer specific modification upon request



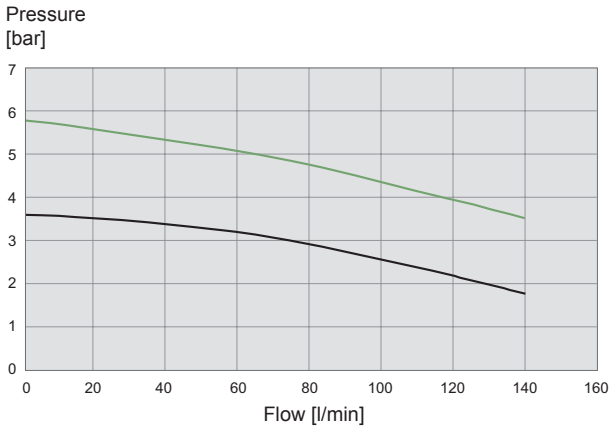
Data		PWW 9.000	PWW 12.000	PWW 18.000	PWW 24.000	Unit
Article number		42120905001	42121205001	42121805001	42122405001	
Rated voltage ± 10%		AC 50 / 60				Hz
		230 1~				V
Cooling capacity [1] (flow rate ration primary/ secondary = 1/1)	W15/W20	9	12	18	24	kW
	W15/W25	10	13.5	20	27	
Primary water inlet	temperature range	+ 10 … + 35 / + 50 … + 95; factory setting + 20 / + 68				°C/°F
	flow rate	70				l/min
	pressure	3				bar
Secondary water outlet	temperature range	+ 5 … + 15 / + 41 … + 59				°C/°F
	flow range	min. 35	min. 35	min. 70	min. 70	l/min
	pressure	1.5				bar
Ambient temperature range		> + 1 … + 70 / > + 34 … + 158				°C/°F
Target value tolerance		± 2				K
Power consumption	W15/W20	1720 / 2610				W
Current consumption	W15/W20	4.37 / 4.32				A
Starting current	W15/W20	17.48 / 17.28				A
Connections (medium)	IG	1/2"				BSPP
Noise level according to EN ISO 3741		< 62				dB (A)
Weight (without packaging)		50	53	60	65	kg
System of protection (enclosure electrical components)		IP 56				
Colour		RAL 7035, different colours available on request				

Accessories		Article number
Temperature display		48700952805
Overflow valve (internal)		48700952806
Flow monitor		48700952807
Water inlet filter	60 µ	48700952808
Casters		45700952809
20% Propyleneglycol pre-mix	20 l	45783000123
20% Ethyleneglycol pre-mix	20 l	45783000125

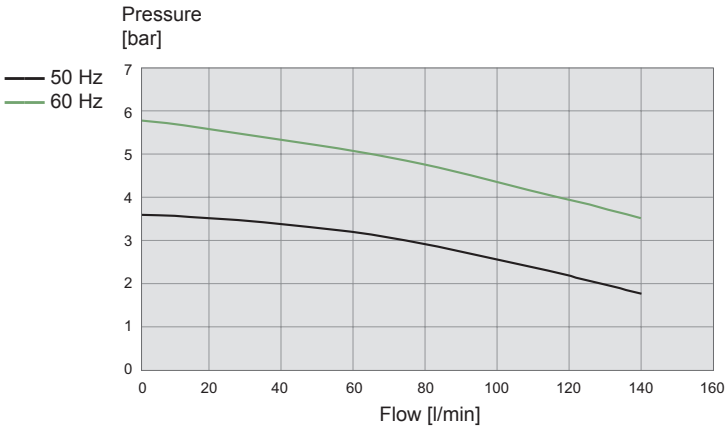
[1] cooling capacity incl. power loss in the pump, primary water inlet temperature/secondary water outlet temperature
[2] performance data based on 50 Hz operation
Approvals see page 105

Pump performance curves

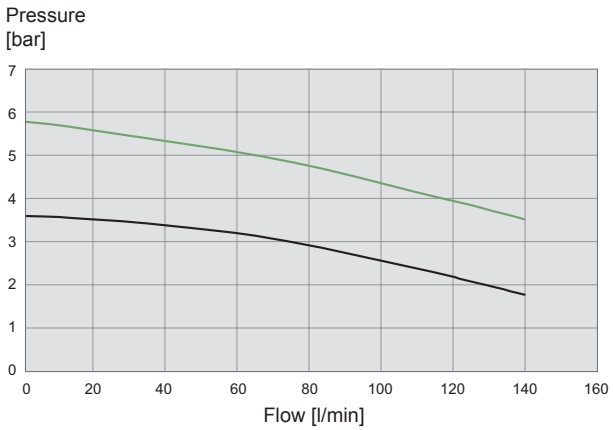
PWW 9.000



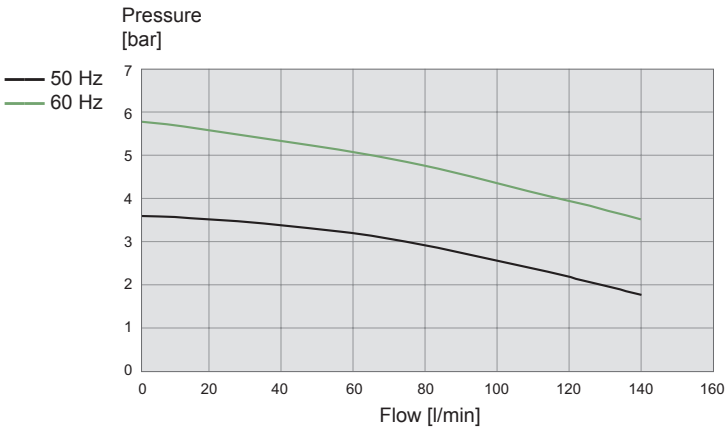
PWW 12.000



PWW 18.000

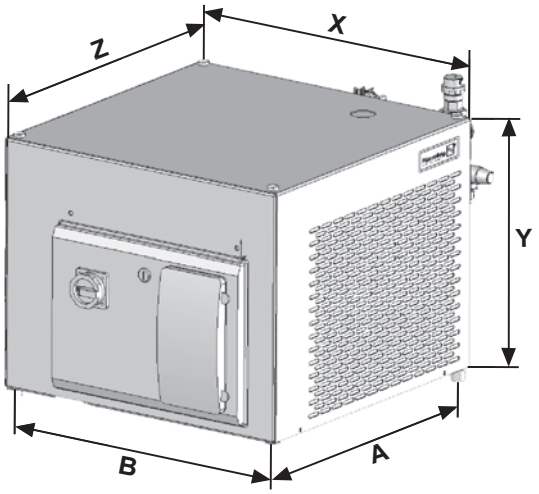


PWW 24.000



Dimensions

mm	PWW 9.000 - 24.000
X	580
Y	500 [1]
Z	580
A	555
B	550



[1] without eye bolts

Options

Start up / Service case

Service case for closed loop systems	Article number
Service case **Box incl. pump, pipes, connections, gaskets**	45700952648



Pfannenberg Protect

Water/glycol-mixture in different concentrations and for several applications.

	Glycol content	Quantity	Article number
Pfannenberg Protect 20P (PP20P)	20% Propyleneglycol	20 kg	45783000123
Pfannenberg Protect 30P (PP30P)	30% Propyleneglycol	20 kg	45783000124
Pfannenberg Protect 50P (PP50P)	54% Propyleneglycol	20 kg	45783000128
Pfannenberg Protect 20E (PP20E)	20% Ethyleneglycol	20 kg	45783000125
Pfannenberg Protect 30E (PP30E)	30% Ethyleneglycol	20 kg	45783000126
Pfannenberg Protect 50E (PP50E)	50% Ethyleneglycol	20 kg	45783000127

Rack series

- maximum temperature alarm
- bypass in hydraulic circuit with manometer and manual controller
- UL conformity
- other supply voltages
- flow monitor
- Harting plug for power supply



CC series

- castors
- different RAL colours (5002, 5010, 5015, 6011, 7037, 9002 and 9010)
- different pumps
- differential temperature control
- control circuit 24 V DC
- pre-filter, aluminium
- flow monitor
- Harting plug for power supply
- Harting plug for single alarm
- heating gas bypass
- hydraulic bypass
- minimum/maximum temperature alarm
- stainless steel housing
- water pressure gauge 0...10 bar



EB series



- electric level control
- differential temperature control
- minimum/maximum temperature alarm
- flow monitor
- heating gas bypass
- UL conformity
- heater for tempering the fluid
- pressure-sealed system
- control accuracy +/- 0.1K
- other supply voltages
- other ambient temperature ranges
- unit for outdoor installation
- refrigerant R134a
- monitoring of air intake filter
- water filter
- oil filter
- shut-off valves for feed/return
- automatic tank refilling
- water circuit in PVC for DI water
- dual-circuit system
- water-cooled condenser
- control circuit 24 V DC
- phase protection relay
- electronic speed control for condenser fan
- Harting plug for power supply
- Harting plug for single alarm
- different pumps

HK series



- differential temperature control
- minimum/maximum temperature alarm
- oil version according to customer specification
- UL conformity
- heater for tempering the fluid
- heating gas bypass
- pressure-sealed system
- other supply voltages
- other connection systems
- flow monitor
- Harting plug for power supply
- Harting plug for single alarm
- different pumps

AR series



- pump seal made from FPM (Viton)
- electric level control
- diagnostic module
- differential temperature control
- minimum/maximum temperature alarm
- heater for tempering the fluid
- heating gas bypass
- other supply voltages
- flow monitor
- Harting plug for power supply
- Harting plug for single alarm
- different pumps


Pfannenberg

New standards in efficient cooling



εCOOL Air/Air Heat Exchangers from the PAI and PAS series

Using the ambient air for the thermal management of the enclosure is the most economical and energy efficient type of cooling. In many applications the ambient air is contaminated by dust, liquid or gases, so that components which are integrated in the enclosure can be damaged when contact occurs. The use of a filter fan is therefore no longer possible.

The Pfannenberg air/air heat exchangers make the ideal solution for these application areas. Due to the integrated heat exchangers a complete separation of the internal and external air flow is possible. The interior of the enclosure is thus hermetically separated from the atmosphere. Harmful dust and fluids can't cause any damage to the integrated components any more. The **εCOOL** air/air heat exchangers are thus an alternative to filter fans.

The robust steel construction of the air/air heat exchangers makes their operation in harsh industrial routines possible. According to our **εCOOL**-motto special focus has been placed on maintenance friendliness. Assembly and maintenance has been reduced to a uniquely low amount of time. Energy efficiency and maintenance friendliness form the optimal basis for process safety, reliability and cost advantages.

Cut-out compatibility with active cooling units from the DTI/DTS series

Components in the enclosure are often updated and the requirements to thermal management change. An air/air heat exchanger which was previously the optimal solution is not suitable any more. The refitting of an active **ECOOL** cooling unit can be carried out easily and without problems, because the units have the same cut-out dimensions. Thus, the process stability is also ensured after extensive modifications.



Cooling unit *Air/air heat exchanger*

The advantages at a glance



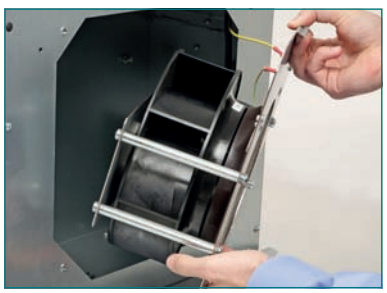
- tool-free assembly for partially recessed mounting
- tried and tested partially recessed mounting
- integrated handles makes it possible for one mechanic to assemble the device
- assembly possible in less than 3 minutes
- simple colour matching
- robust front design



- tool-free retrofit of filter adapter
- tool-free filter change
- filter change in less than one minute



- temperature adjusting occurs via the mechanical thermostat
- additional alarm thermostat makes optimal adjusting of the alarm limit possible



- high maintenance friendliness
- all fans are easily accessible from the outside
- not necessary to open the enclosure
- exchange of the fan in less than 6 minutes
- secure selection via PSS



All ECOOL air/air heat exchangers at a glance

PAI: for partially recessed mounting of the cooling unit in the door or side
PAS: or outer mounting of the cooling unit on the door or side

Type	Specific cooling capacity	Rated voltage	Dimensions (HxWxD)	Approvals					Page
				UR	cUL	GOST	CSA	CE	
Heat exchangers from the PAI and PAS series – air/air heat exchangers for side and door mounting									
PAI 6203	100 W/K	115 V / 230 V	1549 x 485 x 252 mm	○		○		●	140
PAS 6203			1555 x 485 x 252 mm	○		○		●	
PAI 6173	85 W/K	115 V / 230 V	1549 x 485 x 252 mm	○		○		●	140
PAS 6173			1555 x 485 x 252 mm	○		○		●	
PAI 6133	65 W/K	115 V / 230 V	933 x 410 x 199 mm	○		○		●	142
PAS 6133			937 x 410 x 199 mm	○		○		●	
PAI 6103	50 W/K	115 V / 230 V	933 x 410 x 199 mm	○		○		●	142
PAS 6103			937 x 410 x 199 mm	○		○		●	
PAI 6073	35 W/K	115 V / 230 V	933 x 410 x 199 mm	○		○		●	144
PAS 6073			937 x 410 x 199 mm	○		○		●	
PAI 6043	20 W/K	115 V / 230 V	612 x 380 x 212 mm	○		○		●	144
PAS 6043			618 x 380 x 212 mm	○		○		●	

● available
○ pending



Further information can be found on the Internet:
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Air/Air Heat Exchanger 85 / 100 W/K

PAI/PAS 6173
PAI/PAS 6203



PAI: for partially recessed mounting of the cooling unit in the door or side
PAS: for outer mounting of the cooling unit on the door or side

- cut-out compatible with the complete DTI/DTS 6000 cooling unit series
- mounting-friendly seal, no elaborate reworking of the mounting cut-out
- integrated thermostat for temperature control
- additional thermostat for excessive temperature warning
- maintenance-free
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated

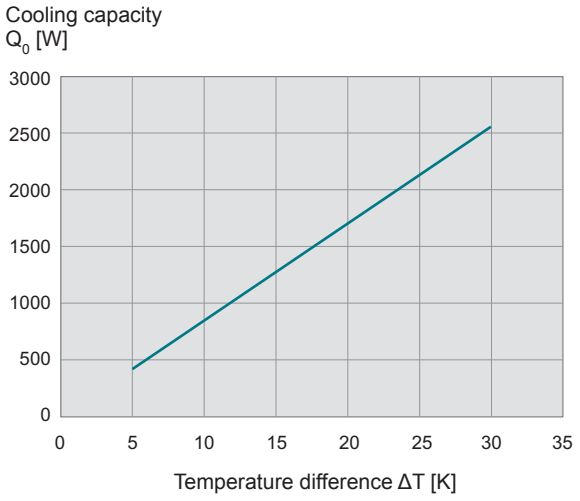
Data		PAI/PAS 6173		PAI/PAS 6203		Unit
Article number	PAI	12993511055	12993514055	12993611055	12993614055	
	PAS	12983511055	12983514055	12983611055	12983614055	
Rated voltage ± 10%		AC 50 / 60	AC 60	AC 50 / 60	AC 60	Hz
		230	115	230	115	V
Specific cooling capacity		85		100		W/K
Power consumption		310 / 420	420	310 / 420	420	W
Current consumption		1.3 / 1.7	3.4	1.3 / 1.7	3.4	A
Starting current		3.5 / 3.3	7.8	3.5 / 3.3	7.8	
Unimpeded airflow (free flow)	intern	1175 / 1300	1340	1175 / 1300	1340	m^3/h
	extern	1175 / 1300	1340	1175 / 1300	1340	
Pre use T		4	8	4	8	A
Type of connection		spring-type terminal included with plug				
Noise level according to EN ISO 3741		< 69				dB (A)
Weight (without packaging)	PAI	46		46		kg
	PAS	46.3		46.3		
Ambient temperature range		-25 … +55 / -13 … +131				°C / °F
Control range (adjustable)	control thermostat	+ 20 … + 55 / + 68 … + 131; factory setting + 35 / + 95				
	alarm thermostat	+ 30 … + 65 / + 86 … + 149; factory setting + 45 / + 113				
Duty cycle		100				%
Protection system according to EN 60529	IP 54	towards the electrical enclosure if used as intended by the manufacturer				
	IP 34	towards the surroundings if used as intended by the manufacturer				
Design	housing	galvanised sheet steel				
	cover	galvanised / electrostatically powder coated (200 °C)				
Colour (cover)		RAL 7035, different colours available on request				

Accessories	Piece	Article number
Filter adapater (RAL 7035)	1	18310000151
Vlies filter	5	18300000147

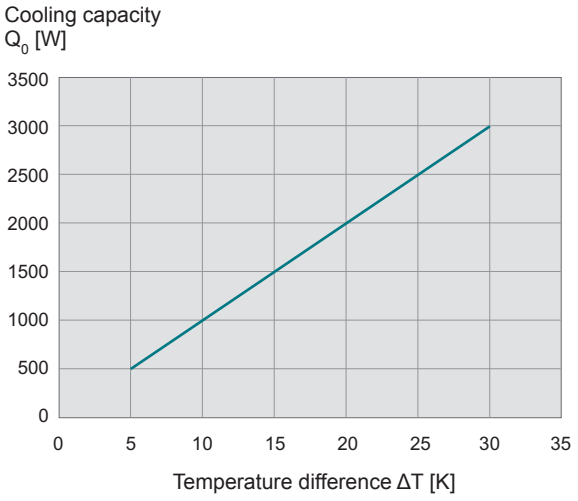
Approvals see page 139

Cooling capacity performance curves

PAI/PAS 6173



PAI/PAS 6203



Dimensions

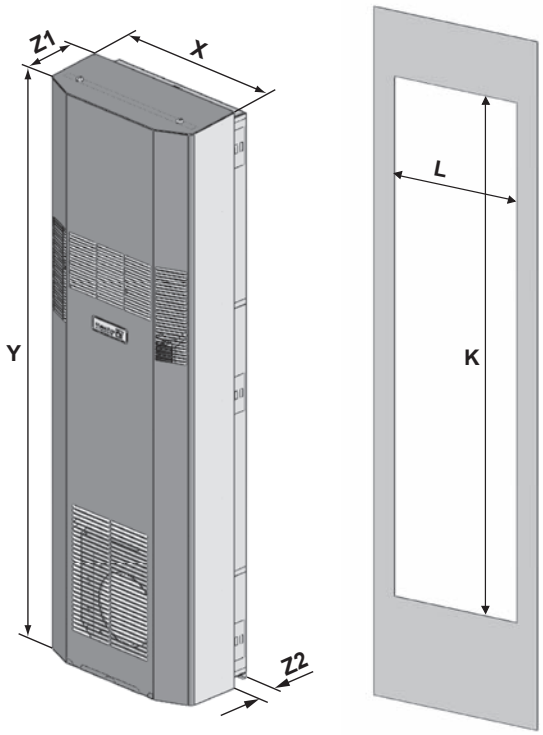
PAI	X	Y	Z1	Z2	K	L
mm	485	1549	252	120	1510	450

PAI variants partially recessed by 120 mm after installation

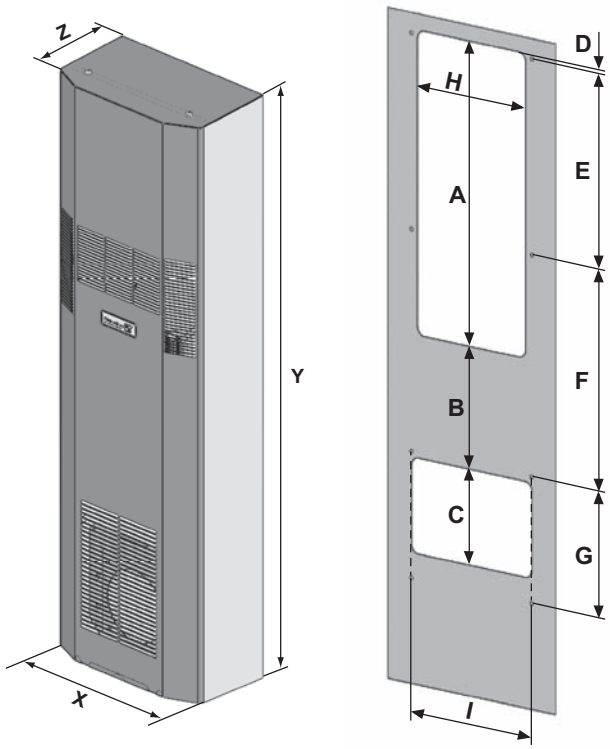
PAS	X	Y	Z	A	B	C	D	E	F	G	H	I
mm	485	1555	372	700	282	220	10	450	510	290	315	350

Mounting holes Ø 8 mm and cut-out radii R20

PAI 6173 / PAI 6203



PAS 6173 / PAS 6203



ECOOL Air/Air Heat Exchanger 35 / 50 / 65 W/K

PAI/PAS 6073
PAI/PAS 6103
PAI/PAS 6133



PAI: for partially recessed mounting of the cooling unit in the door or side
PAS: for outer mounting of the cooling unit on the door or side

- cut-out compatible with DTI/DTS 9341C and DTI/DTS 9141
- mounting-friendly seal, no elaborate reworking of the mounting cut-out
- integrated thermostat for temperature control
- additional thermostat for excessive temperature warning
- maintenance-free
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated

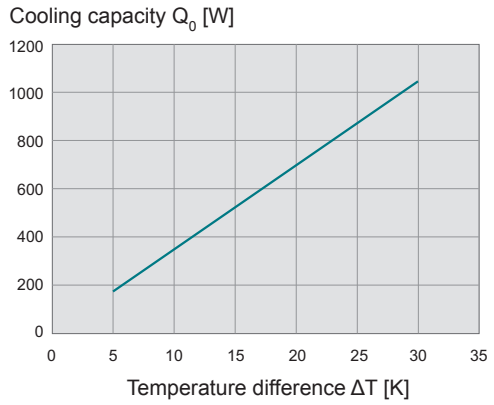
Data		PAI/PAS 6073		PAI/PAS 6103		PAI/PAS 6133		Unit
Article number	PAI	12992211055	12992214055	12992311055	12992314055	12992411055	12992414055	
	PAS	12982211055	12982214055	12982311055	12982314055	12982411055	12982414055	
Rated voltage ± 10%		AC 50 / 60	AC 60	AC 50 / 60	AC 60	AC 50 / 60	AC 60	Hz
		230	115	230	115	230	115	V
Specific cooling capacity		35		50		65		W
Power consumption		170 / 180	260	170 / 180	260	310 / 420	420	
Current consumption		0.8 / 1	2.45	0.8 / 1	2.45	1.3 / 1.8	3.6	A
Starting current		1.9 / 1.8	5.1	1.9 / 1.8	5.1	3.6 / 3.7	8.2	
Unimpeded airflow (free flow)	intern	850 / 900	1070	850 / 900	1070	1175 / 1300	1340	m^3/h
	extern	850 / 900	1070	850 / 900	1070	1175 / 1300	1340	
Pre use T		2	6	2	6	4	8	A
Type of connection		spring-type terminal included with plug						
Noise level according to EN ISO 3741		< 64	< 68	< 64	< 68	< 70	< 71	dB (A)
Weight (without packaging)	PAI	23.9		23.9		23.9		kg
	PAS	24.9		24.9		24.9		
Ambient temperature range		-25 … +55 / -13 … +131						°C / °F
Control range (adjustable)	control thermostat	+ 20 … + 55 / + 68 … + 131; factory setting + 35 / + 95						
	alarm thermostat	+ 30 … + 65 / + 86 … + 149; factory setting + 45 / + 113						
Duty cycle		100						%
Protection system according to EN 60529	IP 54	towards the electrical enclosure if used as intended by the manufacturer						
	IP 34	towards the surroundings if used as intended by the manufacturer						
Design	housing	galvanised sheet steel						
	cover	galvanised / electrostatically powder coated (200 °C)						
Colour (cover)		RAL 7035, different colours available on request						

Accessories	Piece	Article number
Filter adapater (RAL 7035)	1	18060200001
Vlies filter	5	18066100001

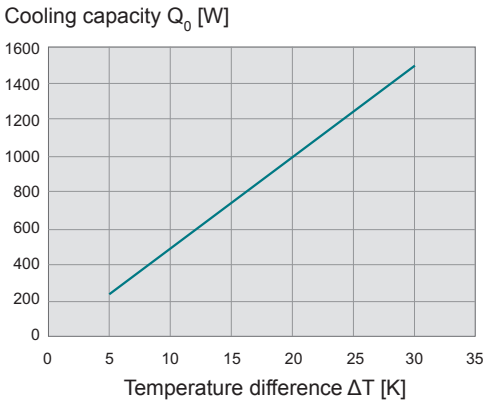
Approvals see page 139

Cooling capacity performance curves

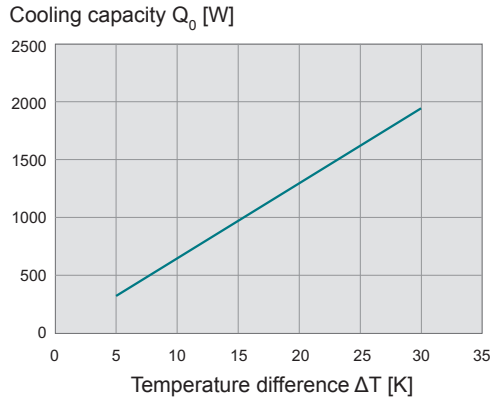
PAI/PAS 6073



PAI/PAS 6103



PAI/PAS 6133

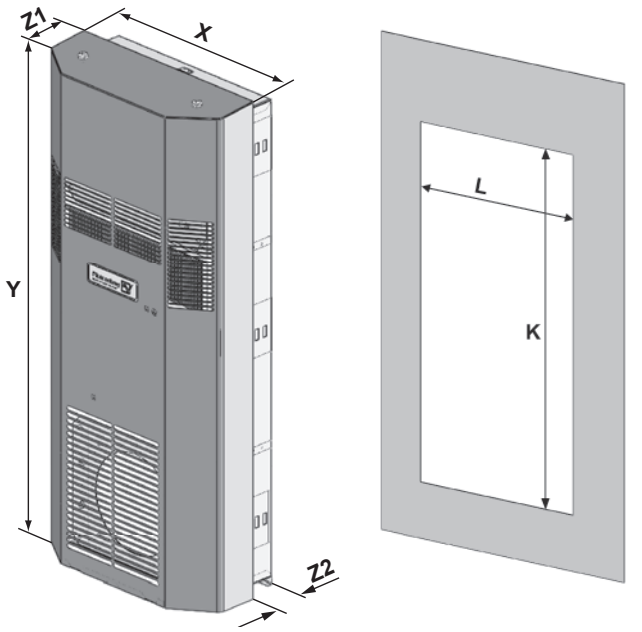


Dimensions

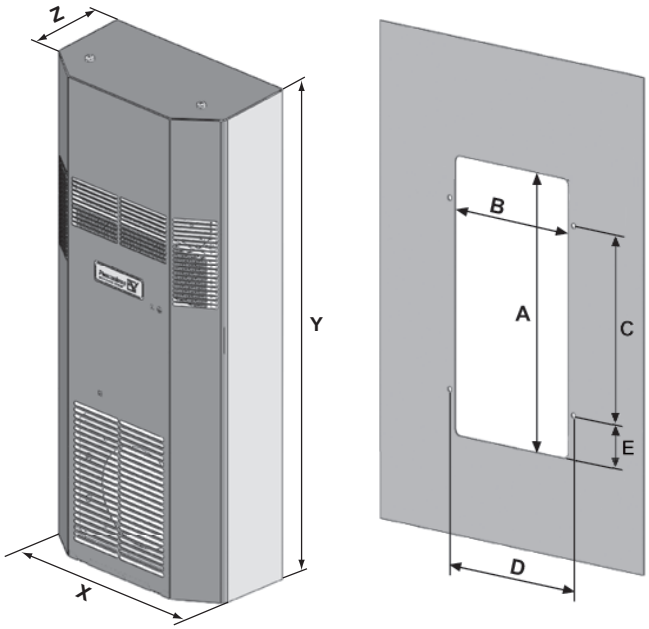
PAI	X	Y	Z1	Z2	K	L
mm	410	933	192	60	900	380
PAI variants partially recessed by 60 mm after installation						

PAS	X	Y	Z	A	B	C	D	E
mm	410	937	199	662	320	562	350	55
Mounting holes Ø 8 mm and cut-out radii R20								

PAI 6073 / PAI 6103 / PAI 6133



PAS 6073 / PAS 6103 / PAS 6133



ECOOL Air/Air Heat Exchanger 20 W/K
PAI/PAS 6043



PAI: for partially recessed mounting of the cooling unit in the door or side
PAS: for outer mounting of the cooling unit on the door or side

- cut-out compatible with DTI/DTS 9041
- mounting-friendly seal, no elaborate reworking of the mounting cut-out
- integrated thermostat for temperature control
- additional thermostat for excessive temperature warning
- maintenance-free
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated

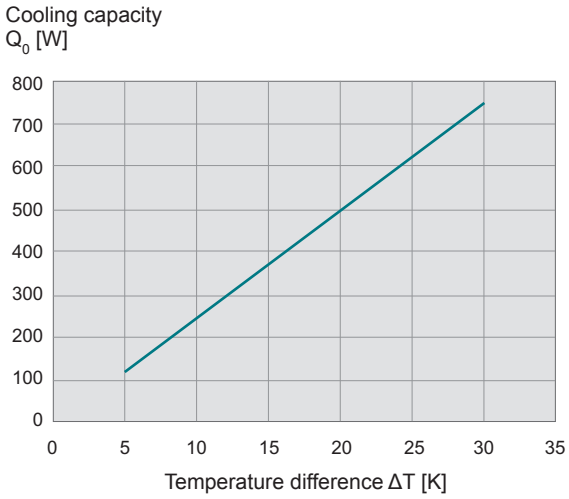
Data		PAI/PAS 6043		Unit
Article number	PAI	12991111055	12991114055	
	PAS	12981111055	12981114055	
Rated voltage ± 10%		AC 50 / 60	AC 60	Hz
		230	115	V
Specific cooling capacity		20		W/K
Power consumption		50 / 56	56	W
Current consumption		0.25 / 0.26	0.52	A
Starting current		0.7 / 0.8	1.3	
Unimpeded airflow (free flow)	intern	240 / 280	280	m^3/h
	extern	240 / 280	280	
Pre use T		1		A
Type of connection		spring-type terminal included with plug		
Noise level according to EN ISO 3741		< 61	< 63	dB (A)
Weight (without packaging)	PAI	15.2		kg
	PAS	15.5		
Ambient temperature range		- 25 … + 55 / - 13 … + 131		°C / °F
Control range (adjustable)	control thermostat	+ 20 … + 55 / + 68 … + 131; factory setting + 35 / + 95		
	alarm thermostat	+ 30 … + 65 / + 86 … + 149; factory setting + 45 / + 113		
Duty cycle		100		%
Protection system according to EN 60529	IP 54	towards the electrical enclosure if used as intended by the manufacturer		
	IP 34	towards the surroundings if used as intended by the manufacturer		
Design	housing	galvanised sheet steel		
	cover	galvanised / electrostatically powder coated (200 °C)		
Colour (cover)		RAL 7035, different colours available on request		

Accessories	Piece	Article number
Filteradpater	1	18060200000
Vlies filter	5	18061600000

Approvals see page 139

Cooling capacity performance curves

PAI/PAS 6043

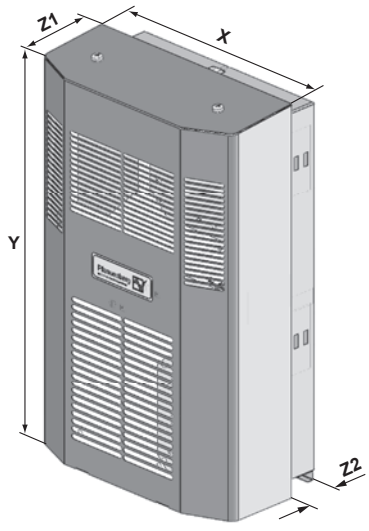


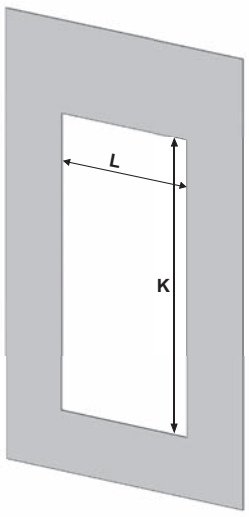
Dimensions

PAI	X	Y	Z1	Z2	K	L
mm	380	612	152	60	577	350
PAI variants partially recessed by 60 mm after installation						

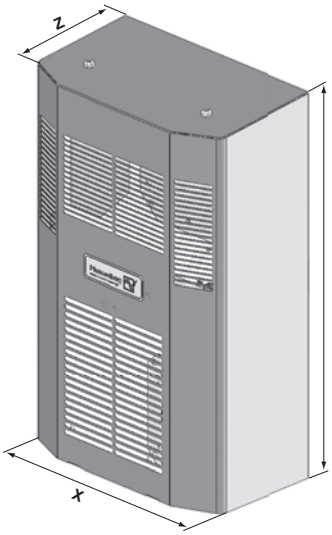
PAS	X	Y	Z	A	B	C	D	E	F	G
mm	380	618	212	472	285	272	150	288	40	300
Mounting holes Ø 8 mm and cut-out radii R20										

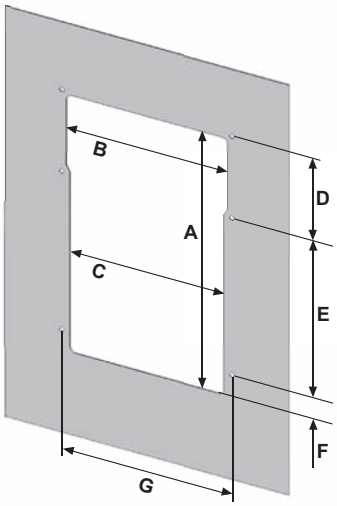
PAI 6043

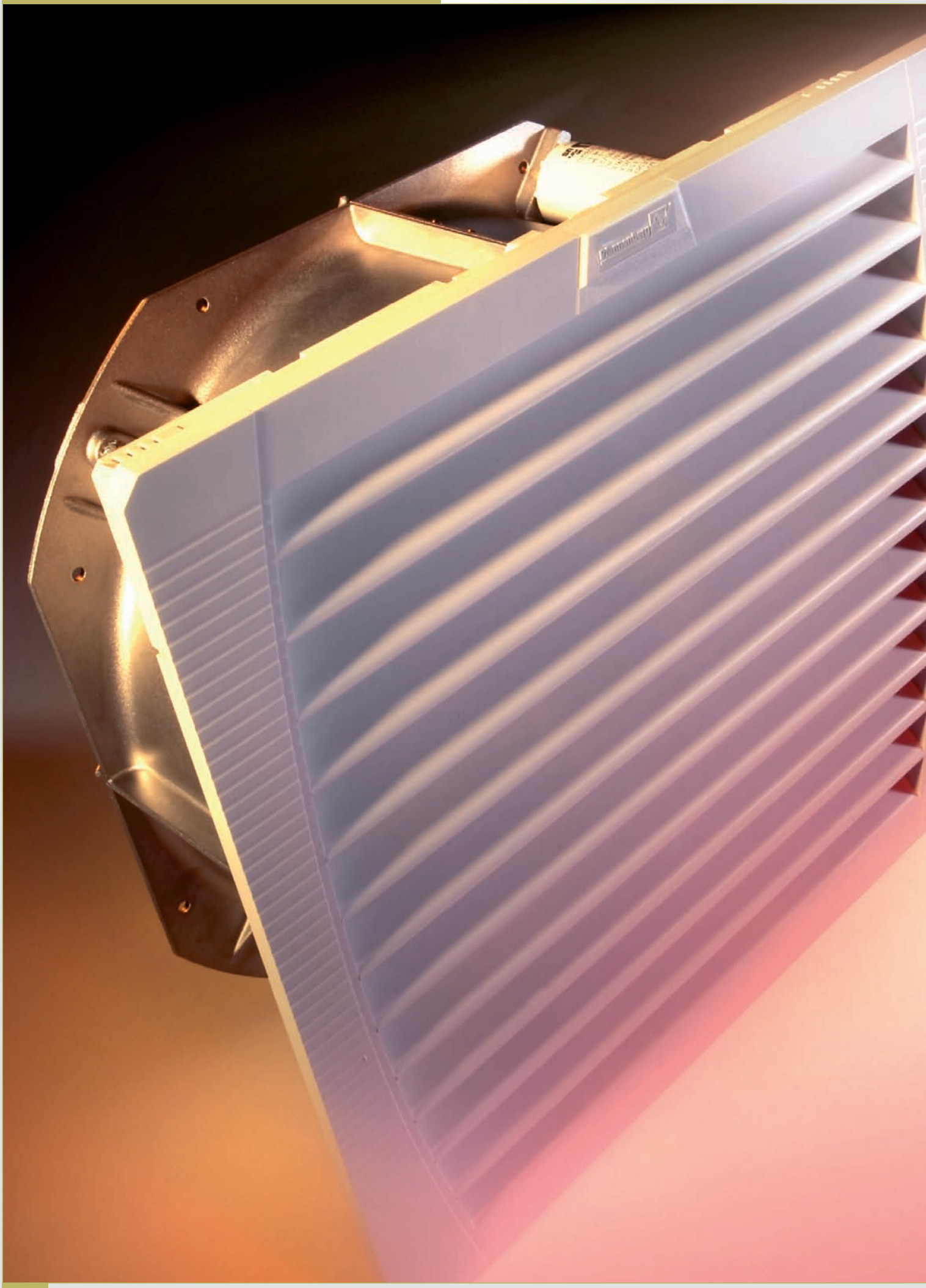


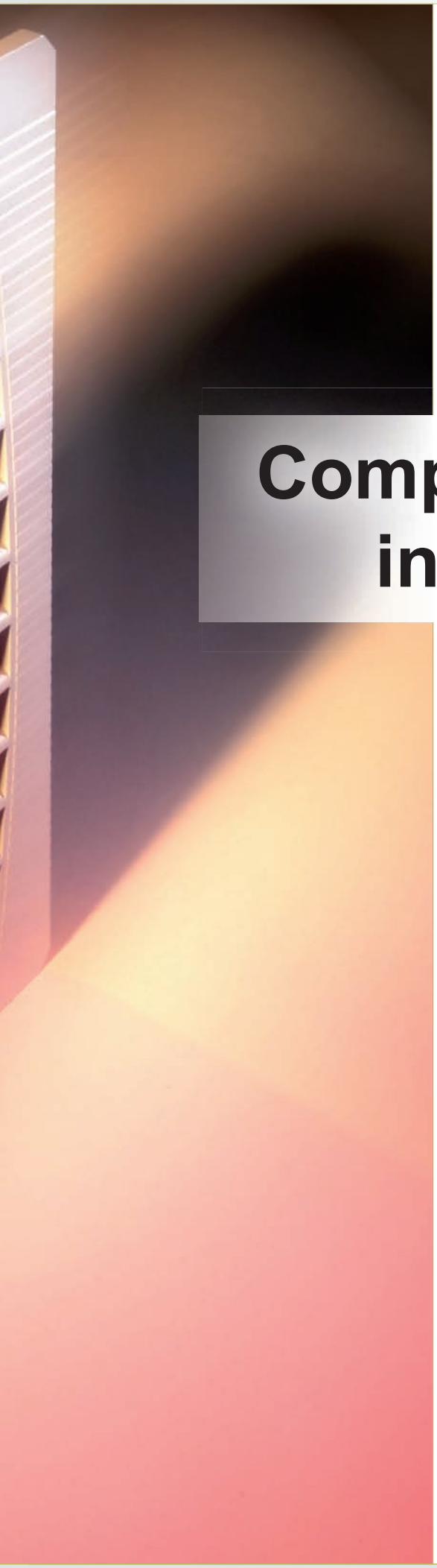


PAS 6043









Competence advantage in the 4th Generation

ECOOL Filterfans

You can save energy, resources and valuable time through the use of Pfannenberg's 4th Generation **ECOOL** Filterfans.

Over and above that, they provide for more reliability in the production process, because the innovative Filterfans and filter mats from the 4th Generation enable an increase in the air flow of over 100% (protection class IP 55), leading to expanded operating life that is several times longer and thus to longer service intervals.

Practical tests under the toughest conditions in the woodworking industry showed that service intervals were prolonged by one to two and sometimes even three weeks. In addition, the mounting and service-friendliness of the Filterfans was confirmed, also for cleaning by means of compressed air and dispensing with the bothersome cutting to size of filter mats.

Using a combination of Filterfans with thermostats and hygrostats from the FLZ series (see page 208), you can additionally achieve savings on energy, materials and time plus a significantly longer life span. This results in an optimised environmental balance as well as greater reliability of your production process.

Assembly, energy, air, maintenance - Your advantage

Well thought out details optimize your balance sheet:



Compatibility

The 4th generation Filterfans can be integrated into existing applications without any problems, because most of the enclosure cut-outs correspond to the Pfannenberg standard.



Time

The patented 4-corner snap fastener makes a tool-free installation possible in seconds and guarantees a secure fit.



Maintenance

The cover enables a filter mat change in seconds.



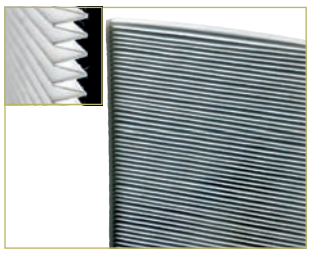
Air

Fins and rotor blades that are optimized for the current guarantee maximal airflow and a minimal energy consumption.



Efficiency

The 4th generation Filterfans can be equipped with a thermostat (optional): they operate only when cooling is really necessary.



Life span

The 4th generation Filterfans achieve the system of protection IP 55 with the patented fluted filter mats. The intervals when they need to be exchanged are 300% longer in comparison to conventional filter media.

All 4th Generation ECOOL Filterfans at a glance

Type	Airflow rate [1] IP 54 / IP 55	Rated voltage	Cut-out dimensions (HxW) [2]	Approvals UR	cUL	GOST	CSA	CE	Page
PF series Filterfans									
PF 11.000	25 / - m³/h	115 V / 230 V AC 12 V / 24 V / 48 V DC	92 x 92 mm	●	●	●		●	150
PF 22.000	61 / 56 m³/h	115 V / 230 V AC 12 V / 24 V / 48 V DC	125 x 125 mm	●	●	●		●	152
PF 32.000	110 / 100 m³/h	115 V / 230 V AC 12 V / 24 V / 48 V DC	177 x 177 mm	●	●	●		●	154
PF 42.500	156 / 145 m³/h	115 V / 230 V AC 12 V / 24 V / 48 V DC	223 x 223 mm	●	●	●		●	156
PF 43.000	256 / 233 m³/h	115 V / 230 V AC 12 V / 24 V / 48 V DC	223 x 223 mm	●	●	●		●	160
PF 65.000	480 / 505 m³/h	115 V / 230 V AC	291 x 291 mm	●	●	●		●	160
PF 66.000	640 / 770 m³/h	400 V / 460 V 3 ~ 115 V / 230 V AC	291 x 291 mm	●	●	●		●	162
PF 67.000	845 / 925 m³/h	400 V / 460 V 3 ~ 115 V / 230 V AC	291 x 291 mm	●	●	●		●	164
PFA series exhaust filters									
PFA 10.000			92 x 92 mm	●	●	●		●	190
PFA 20.000			125 x 125 mm	●	●	●		●	190
PFA 30.000			177 x 177 mm	●	●	●		●	190
PFA 40.000			223 x 223 mm	●	●	●		●	190
PFA 60.000			291 x 291 mm	●	●	●		●	190
PF Slim Line Filterfans									
PF 65.000 SL	500 m³/h	115 V / 230 V AC	291 x 291 mm	●	●	●		●	166
PF 67.000 SL	705 m³/h	400 V / 460 V 3 ~ 115 V / 230 V AC	291 x 291 mm	●	●	●		●	168
PF series EMC Filterfans									
PF 11.000 EMC	as for PF series	as for PF series	93 x 93 mm	●	●	●		●	170
PF 22.000 EMC			126 x 126 mm	●	●	●		●	172
PF 32.000 EMC			178 x 178 mm	●	●	●		●	174
PF 42.500 EMC			224 x 224 mm	●	●	●		●	176
PF 43.000 EMC			224 x 224 mm	●	●	●		●	178
PF 65.000 EMC			292 x 292 mm	●	●	●		●	180
PF 66.000 EMC			292 x 292 mm	●	●	●		●	182
PF 67.000 EMC			292 x 292 mm	●	●	●		●	184
PFA series EMC exhaust filters									
PFA 10.000 EMC			93 x 93 mm	●	●	●		●	190
PFA 20.000 EMC			126 x 126 mm	●	●	●		●	190
PFA 30.000 EMC			178 x 178 mm	●	●	●		●	190
PFA 40.000 EMC			224 x 224 mm	●	●	●		●	190
PFA 60.000 EMC			292 x 292mm	●	●	●		●	190
PTF series top-mounted Filterfans – Filterfans for top mounting									
PTF 60.500	500 / 350 m³/h	115 V / 230 V AC	291 x 291 mm	●	●	●		●	188
PTF 60.700	700 / 550 m³/h	115 V / 230 V AC	291 x 291 mm	●	●	●		●	188
PTF 61.000	1000 / 750 m³/h	115 V / 230 V AC	291 x 291 mm	●	●	●		●	188
PTFA series top exhaust filters									
PTFA 60.000			291 x 291 mm	●	●	●		●	190

[1] free-blowing
[2] for material thicknesses up to 2 mm

● available
○ pending



Further information can be found on the Internet:
www.pfannenberg.com · **www.pfannenberg-spareparts.com** · **www.filterfan.com**
Keep up to date. Subscribe to the newsletter now:
newsletter.pfannenberg.com

ECOOL Filterfan
PF 11.000
ECOOL Exhaust filter
PFA 10.000



- installation size 1, air flow rate up to 29 m³/h
- system of protection IP 54, NEMA type 12
- UL, cUL approval
- cut-out compatible with installation size 1 from the 3rd Generation

Data		PF 11.000					Unit
Article number	IP 54	11611101055	11611151055	11611851055	11611801055	11611701055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz		DC			
		230	115	12	24	48	V
Unimpeded airflow		25 / 29					m³/h
Airflow rate in combination (PF + PFA 10.000)		16 / 18					
Power consumption		12 / 11	12 / 11	2.4	2.4	2.6	W
Current consumption		0.07 / 0.06	0.15 / 0.15	0.2	0.1	0.05	A
Noise level (according to EN ISO 3741)		33 / 33		33			dB (A)
Weight		0.55		0.16			kg
Type of connection		cable, 2-core, length 310 mm					
Fuse		6					A
System of protection according to EN 60529 / UL 50		NEMA type 12 - standard filter					
Filtration efficiency		88					%
Filter mat quality class according to EN 779		G 3					
Duty cycle		100					%
Bearing type		sleeve bearing		ball bearing			
Service life L_{10} (+ 40 °C)[1]		52500	55000	70000			h
Temperature range		- 40 … + 55 / - 40 … + 131					°C / °F
Design (housing and protection against accidental contact)		made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO					
Colour		RAL 7035, different colours available on request					

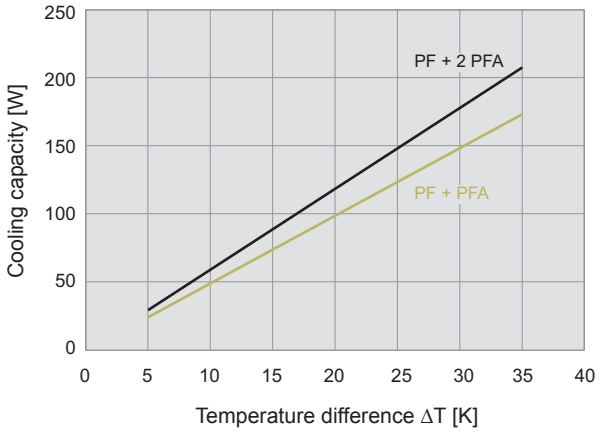
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 10.000	IP 54	1	11710001055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

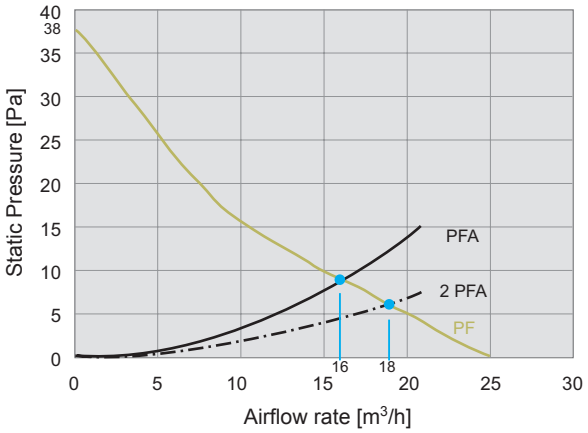
Cooling capacity performance curves

PF 11.000



Static pressure performance curves

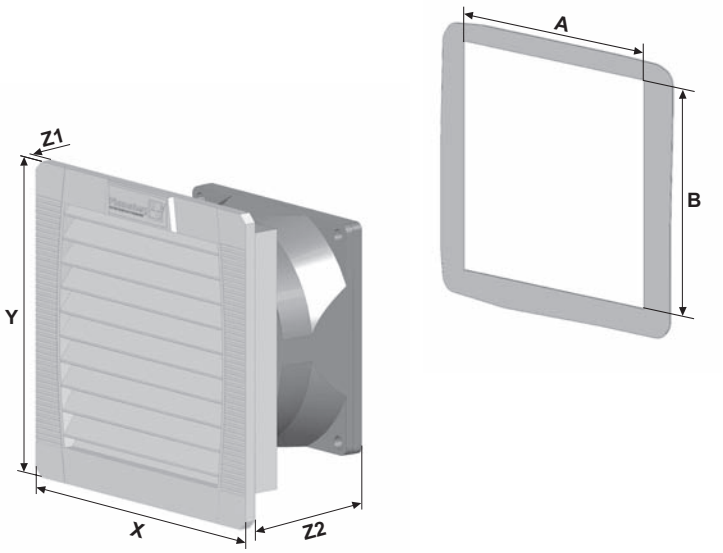
PF 11.000



Dimensions

mm	PF 11.000		PFA 10.000
	AC	DC	
X	109	109	109
Y	109	109	109
Z1	4	4	4
Z2	62	49	19
A[1]	92	92	92
B[1]	92	92	92

[1] for material thicknesses up to 2 mm
+ 1 mm for thickness of material > 2 mm ≤ 3 mm



ecool Filterfan
PF 22.000
ecool Exhaust filter
PFA 20.000



- installation size 2, air flow rate up to 70 m³/h
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)
- cut-out compatible with installation size 2 from the 3rd Generation

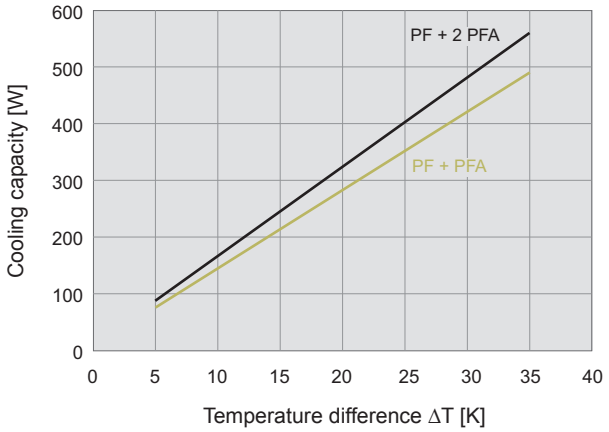
Data		PF 22.000					Unit
Article number	IP 54	11622101055	11622151055	11622851055	11622801055	11622701055	
	IP 55	11622103055	11622153055	11622853055	11622803055	11622703055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz		DC			
		230	115	12	24	48	V
Unimpeded airflow	IP 54	61 / 70					m³/h
	IP 55	56 / 64					
Airflow rate in combination (PF + PFA 20.000)	IP 54	44 / 52					
	IP 55	40 / 46					
Power consumption		19 / 18	20 / 20	5	5	5	W
Current consumption		0.12 / 0.18	0.24 / 0.23	0.42	0.21	0.1	A
Noise level (according to EN ISO 3741)	IP 54	44 / 44		44			dB (A)
	IP 55						
Weight		0.7		0.44			kg
Type of connection		terminal strip		cable, 2-core, length 310 mm			
Fuse		6					A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter					
	IP 55	NEMA type 12 - fluted filter					
Filtration efficiency	IP 54	88					%
	IP 55	91					
Filter mat quality class according to EN 779	IP 54	G 3					
	IP 55	G 4					
Duty cycle		100					%
Bearing type		sleeve bearing		ball bearing			
Service life L_{10} (+ 40 °C)[1]		37500	40000	62500			h
Temperature range		- 40 … + 55 / - 40 … + 131					°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO					
	IP 55	additional: UV-resistant					
Colour		RAL 7035, different colours available on request					

Accessories		Piece	Article number	Information on page
Exhaust filter PFA 20.000	IP 54	1	11720001055	190
	IP 55	1	11720003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary
Approvals see page 149.

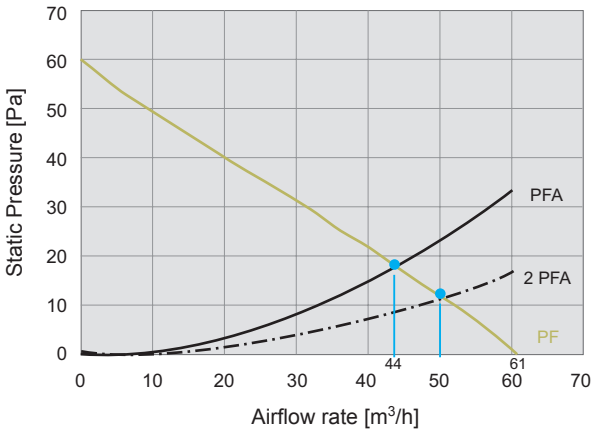
Cooling capacity performance curves

PF 22.000 IP 54

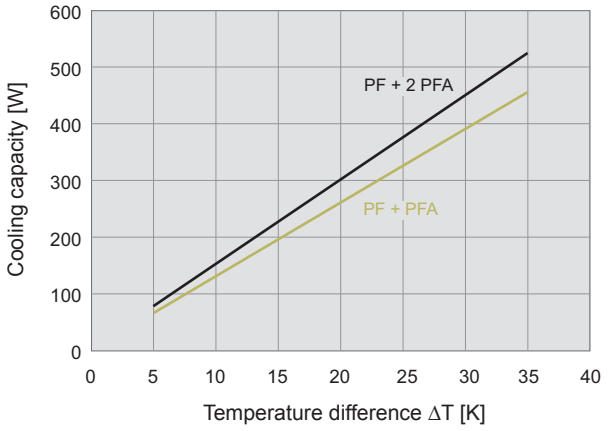


Static pressure performance curves

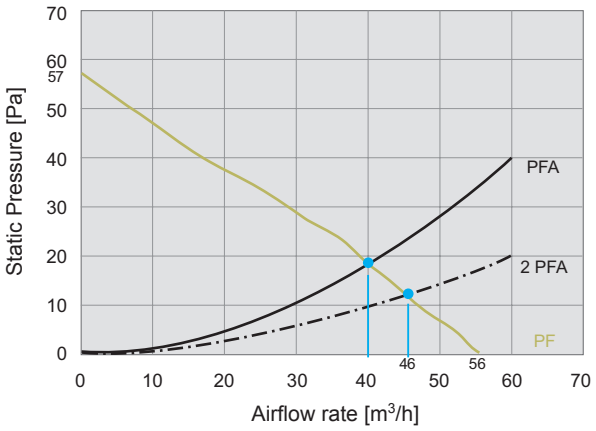
PF 22.000 IP 54



PF 22.000 IP 55



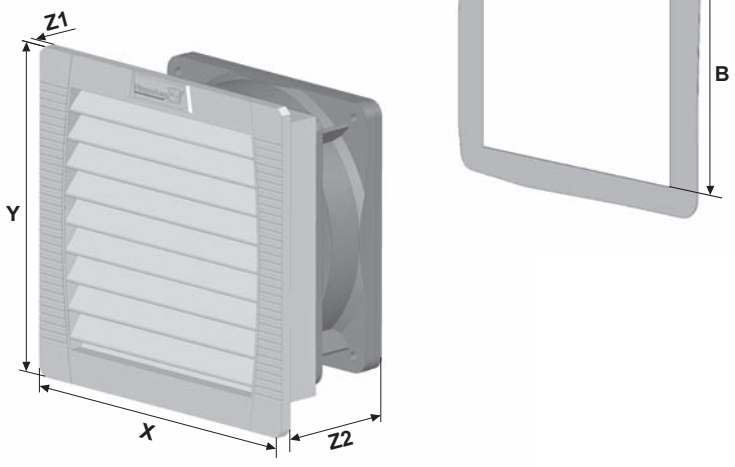
PF 22.000 IP 55



Dimensions

mm	PF 22.000		PFA 20.000
	AC	DC	
X	145	145	145
Y	145	145	145
Z1	5	5	5
Z2	70	64	26
A[1]	125	125	125
B[1]	125	125	125

[1] for material thicknesses up to 2 mm
+ 1 mm for thickness of material > 2 mm ≤ 3 mm



ECOOL Filterfan
PF 32.000
ECOOL Exhaust filter
PFA 30.000



- installation size 3, air flow rate up to 125 m³/h
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)

Data		PF 32.000					Unit
Article number	IP 54	11632101055	11632151055	11632851055	11632801055	11632701055	
	IP 55	11632103055	11632153055	11632853055	11632803055	11632703055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz		DC			
		230	115	12	24	48	V
Unimpeded airflow	IP 54	110 / 125					m³/h
	IP 55	100 / 110					
Airflow rate in combination (PF + PFA 30.000)	IP 54	82 / 93					
	IP 55	55 / 64					
Power consumption		19 / 18	20 / 20	5	5	5	W
Current consumption		0.12 / 0.18	0.24 / 0.23	0.42	0.21	0.1	A
Noise level (according to EN ISO 3741)	IP 54	40 / 40		40			dB (A)
	IP 55						
Weight		0.87		0.61			kg
Type of connection		terminal strip		cable, 2-core, length 310 mm			
Fuse		6					A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter					
	IP 55	NEMA type 12 - fluted filter					
Filtration efficiency	IP 54	88					%
	IP 55	91					
Filter mat quality class according to EN 779	IP 54	G 3					
	IP 55	G 4					
Duty cycle		100					%
Bearing type		sleeve bearing		ball bearing			
Service life L_{10} (+ 40 °C)[1]		37500	40000	62500			h
Temperature range		- 40 … + 55 / - 40 … + 131					°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO					
	IP 55	additional: UV-resistant					
Colour		RAL 7035, different colours available on request					

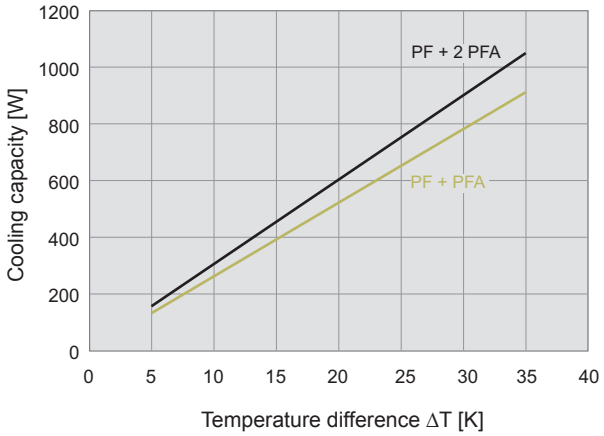
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 30.000	IP 54	1	11730001055	190
	IP 55	1	11730003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

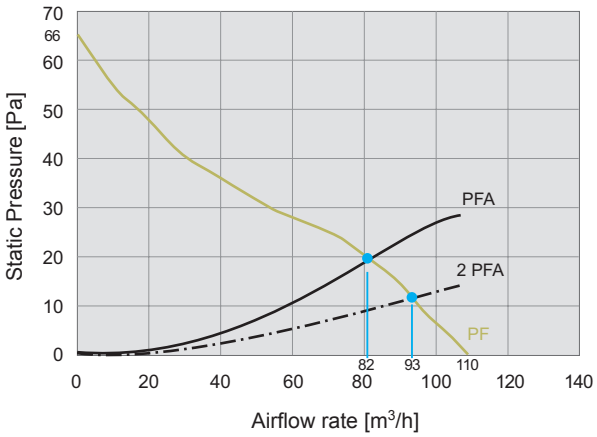
Cooling capacity performance curves

PF 32.000 IP 54

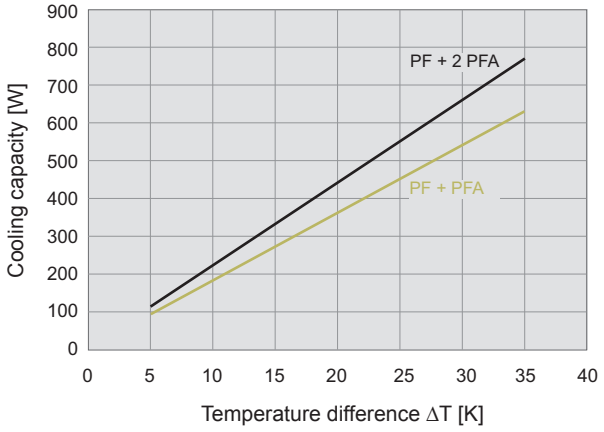


Static pressure performance curves

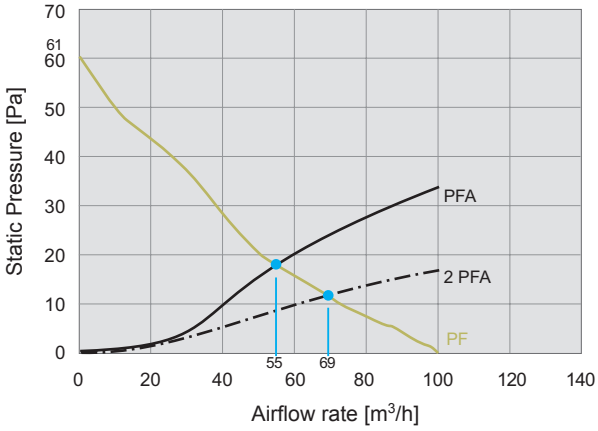
PF 32.000 IP 54



PF 32.000 IP 55



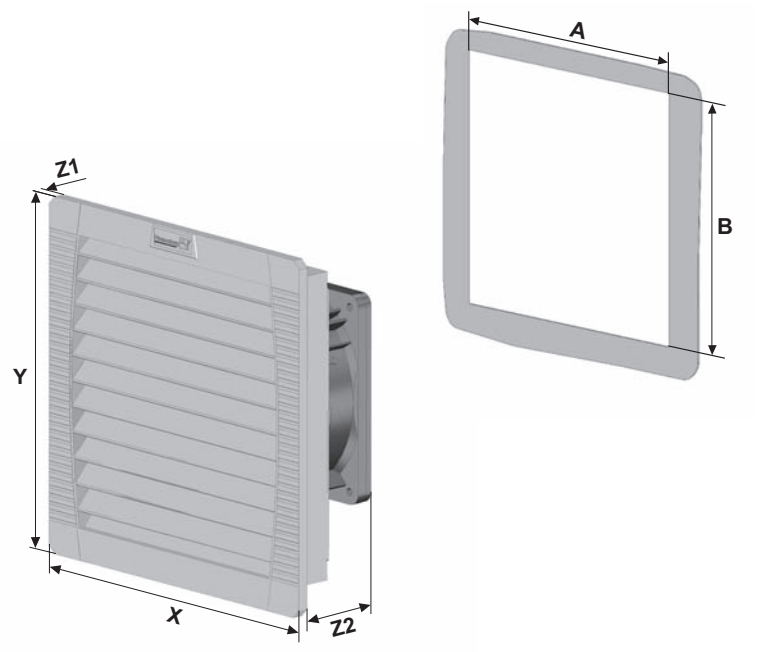
PF 32.000 IP 55



Dimensions

mm	PF 32.000		PFA 30.000
	AC	DC	
X	202	202	202
Y	202	202	202
Z1	6	6	6
Z2	87	81	34
A[1]	177	177	177
B[1]	177	177	177

[1] for material thicknesses up to 2 mm
+ 1 mm for thickness of material > 2 mm ≤ 3 mm



ecool Filterfan
PF 42.500
ecool Exhaust filter
PFA 40.000



- installation size 4, air flow rate up to 171 m³/h
- two performance classes, cut-out compatible
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)
- cut-out compatible with installation size 4 from the 3rd Generation

Data		PF 42.500					Unit
Article number	IP 54	11642101055	11642151055	11642851055	11642801055	11642701055	
	IP 55	11642103055	11642153055	11642853055	11642803055	11642703055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz		DC			
		230	115	12	24	48	V
Unimpeded airflow	IP 54	156 / 171					m³/h
	IP 55	145 / 160					
Airflow rate in combination (PF + PFA 40.000)	IP 54	116 / 127					
	IP 55	109 / 113					
Power consumption		18 / 17	18 / 17	6	4.7	4.6	W
Current consumption		0.12 / 0.1	0.25 / 0.25	0.5	0.2	0.1	A
Noise level (according to EN ISO 3741)	IP 54	40 / 43		40			dB (A)
	IP 55						
Weight		1.18		0.92			kg
Type of connection		spring-type terminal					
Fuse		6					A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter					
	IP 55	NEMA type 12 - fluted filter					
Filtration efficiency	IP 54	88					%
	IP 55	91					
Filter mat quality class according to EN 779	IP 54	G 3					
	IP 55	G 4					
Duty cycle		100					%
Bearing type		ball bearing					
Service life L_{10} (+ 40 °C)[1]		40000	42500	57500	70000		h
Temperature range		- 40 … + 55 / - 40 … + 131					°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO					
	IP 55	additional: UV-resistant					
Colour		RAL 7035, different colours available on request					

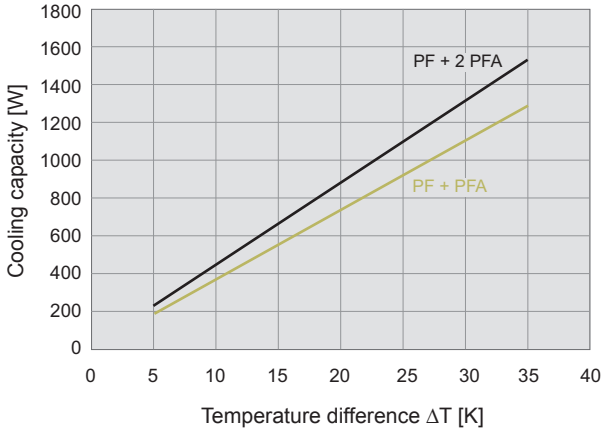
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 40.000	IP 54	1	11740001055	190
	IP 55	1	11740003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

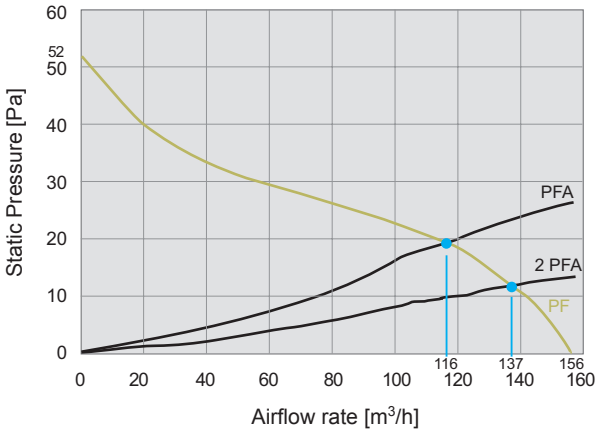
Cooling capacity performance curves

PF 42.500 IP 54

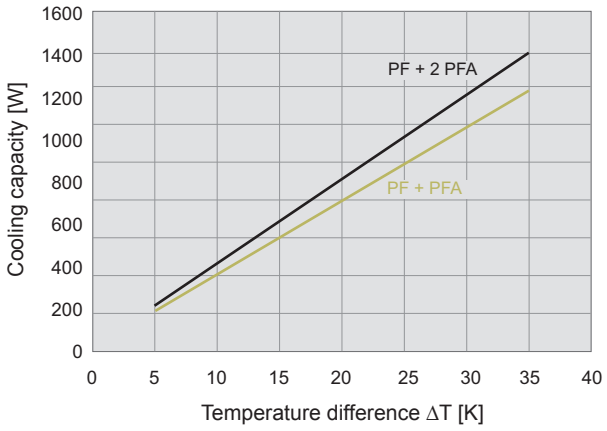


Static pressure performance curves

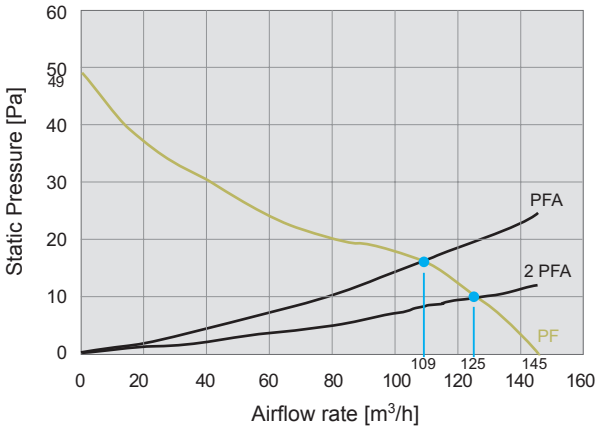
PF 42.500 IP 54



PF 42.500 IP 55



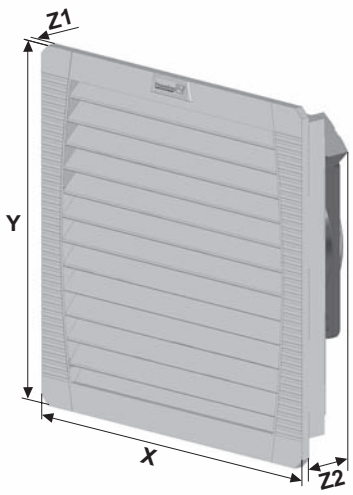
PF 42.500 IP 55

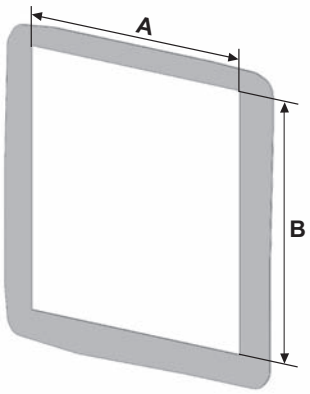


Dimensions

mm	PF 42.500	PFA 40.000
X	252	252
Y	252	252
Z1	6	6
Z2	97	38
A[1]	223	223
B[1]	223	223

[1] for material thicknesses up to 2 mm
+ 1 mm for thickness of material > 2 mm ≤ 3 mm





ecool Filterfan PF 43.000

ecool Exhaust filter PFA 40.000



- installation size 4, air flow rate up to 292 m³/h
- two performance classes, cut-out compatible
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)
- cut-out compatible with installation size 4 from the 3rd Generation

Data		PF 43.000					Unit
Article number	IP 54	11643101055	11643151055	11643851055	11643801055	11643701055	
	IP 55	11643103055	11643153055	11643853055	11643803055	11643703055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz		DC			
		230	115	12	24	48	V
Unimpeded airflow	IP 54	256 / 292					m³/h
	IP 55	233 / 265					
Airflow rate in combination (PF + PFA 40.000)	IP 54	231 / 265					
	IP 55	180 / 207					
Power consumption		45 / 39	40 / 40	12	12	12	W
Current consumption		0.32 / 0.26	0.5 / 0.5	1	0.5	0.25	A
Noise level (according to EN ISO 3741)	IP 54	42 / 46		42			dB (A)
	IP 55						
Weight		1.67		1.51			kg
Type of connection		spring-type terminal					
Fuse		6					A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter					
	IP 55	NEMA type 12 - fluted filter					
Filtration efficiency	IP 54	88					%
	IP 55	91					
Filter mat quality class according to EN 779	IP 54	G 3					
	IP 55	G 4					
Duty cycle		100					%
Bearing type		ball bearing					
Service life L_{10} (+ 40 °C)[1]		40000		80000			h
Temperature range		- 40 … + 55 / - 40 … + 131					°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO					
	IP 55	additional: UV-resistant					
Colour		RAL 7035, different colours available on request					

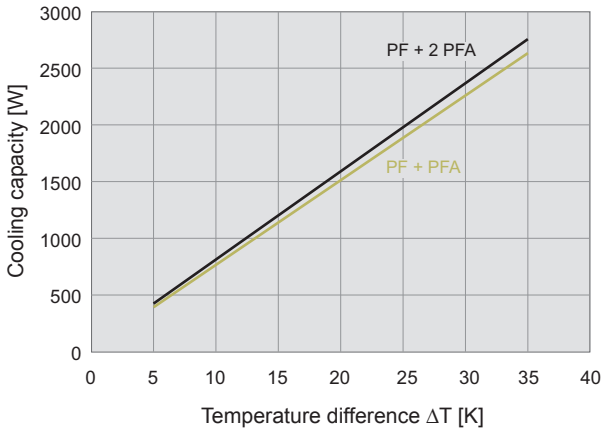
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 40.000	IP 54	1	11740001055	190
	IP 55	1	11740003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

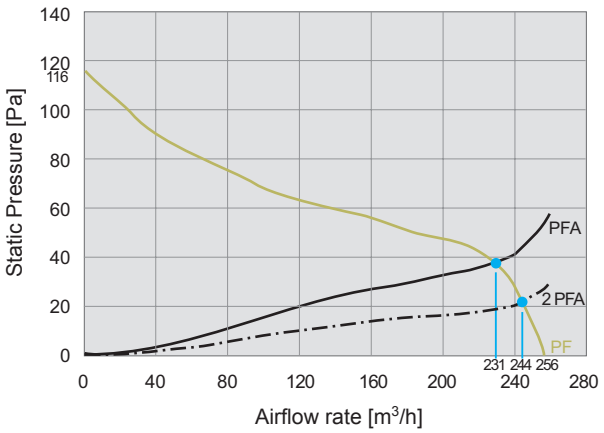
Cooling capacity performance curves

PF 43.000 IP 54

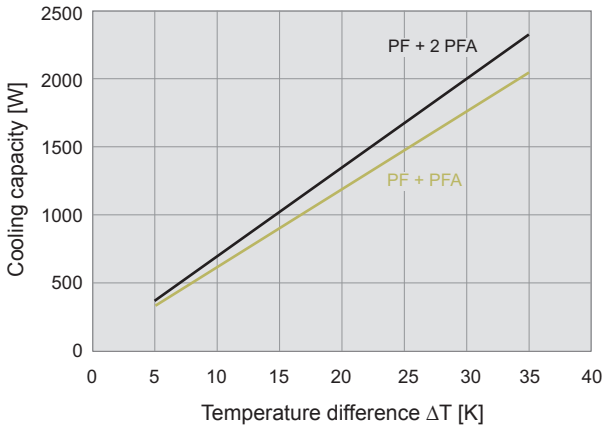


Static pressure performance curves

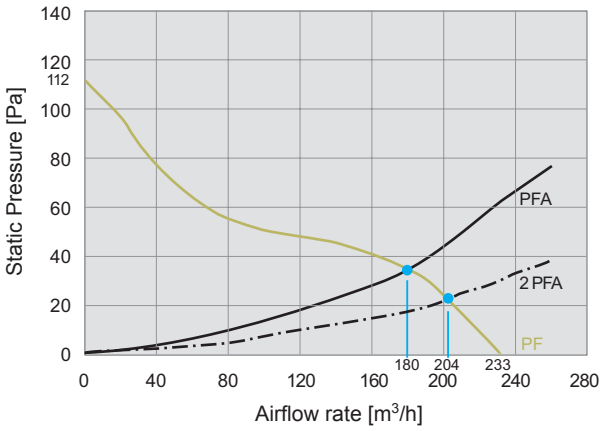
PF 43.000 IP 54



PF 43.000 IP 55



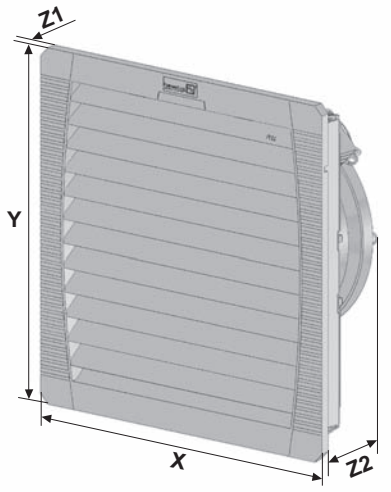
PF 43.000 IP 55

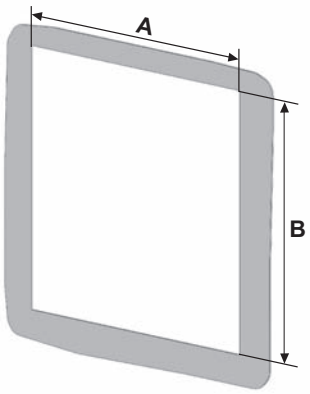


Dimensions

mm	PF 43.000		PFA 40.000
	AC	DC	
X	252	252	252
Y	252	252	252
Z1	6	6	6
Z2	113	97	38
A[1]	223	223	223
B[1]	223	223	223

[1] for material thicknesses up to 2 mm
+ 1 mm for thickness of material > 2 mm ≤ 3 mm





ECOOL Filterfan
PF 65.000
ECOOL Exhaust filter
PFA 60.000



- installation size 6, air flow rate up to 505 m³/h
- three performance classes, cut-out compatible
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)
- cut-out compatible with installation size 6 from the 3rd Generation and with cooling unit DTFI 9021 (see page 36)

Data		PF 65.000		Unit
Article number	IP 54	11665102055	11665152055	
	IP 55	11665103055	11665153055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz		
		230	115	V
Unimpeded airflow	IP 54	480 / 480		m³/h
	IP 55	505 / 505		
Airflow rate in combination (PF + PFA 60.000)	IP 54	370 / 370		
	IP 55	380 / 380		
Power consumption		65 / 80	75 / 90	W
Current consumption		0.3 / 0.36	0.66 / 0.8	A
Noise level (according to EN ISO 3741)	IP 54	54 / 52		dB (A)
	IP 55			
Weight		3.2		kg
Type of connection		spring-type terminal		
Fuse		6		A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter		
	IP 55	NEMA type 12 - fluted filter		
Filtration efficiency	IP 54	91		%
	IP 55			
Filter mat quality class according to EN 779	IP 54	G 4		
	IP 55			
Duty cycle		100		%
Bearing type		ball bearing		
Service life L_{10} (+ 40 °C)[1]		40000		h
Temperature range		- 40 … + 55 / - 40 … + 131		°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 V0		
	IP 55	additional: UV-resistant		
Colour		RAL 7035, different colours available on request		

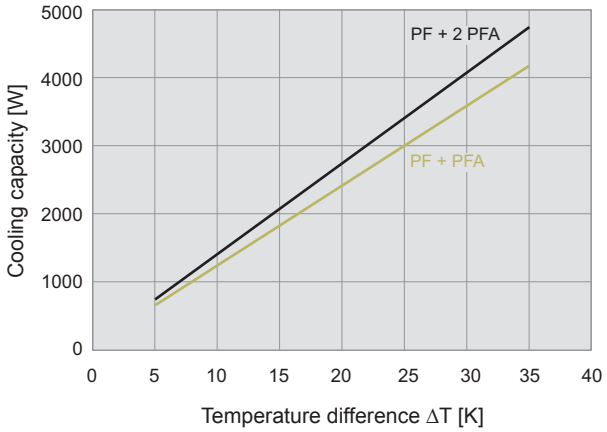
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 60.000	IP 54	1	11760002055	190
	IP 55	1	11760003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

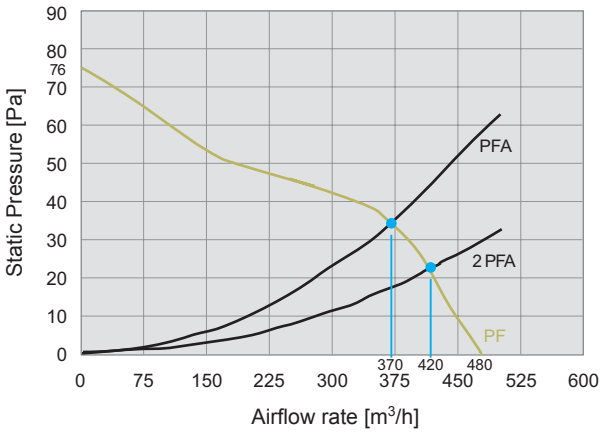
Cooling capacity performance curves

PF 65.000 IP 54

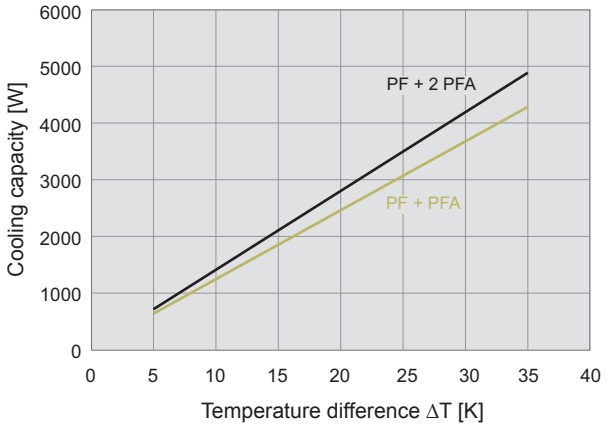


Static pressure performance curves

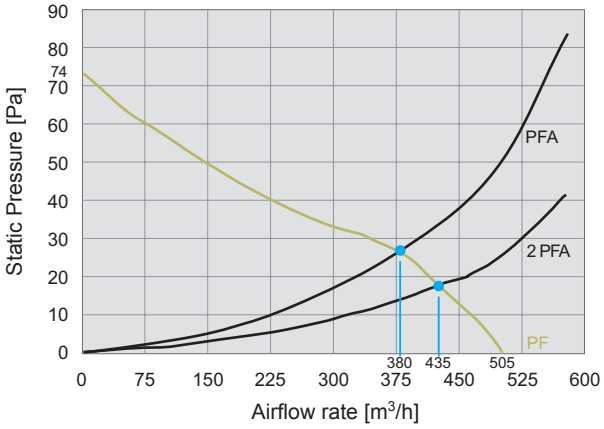
PF 65.000 IP 54



PF 65.000 IP 55



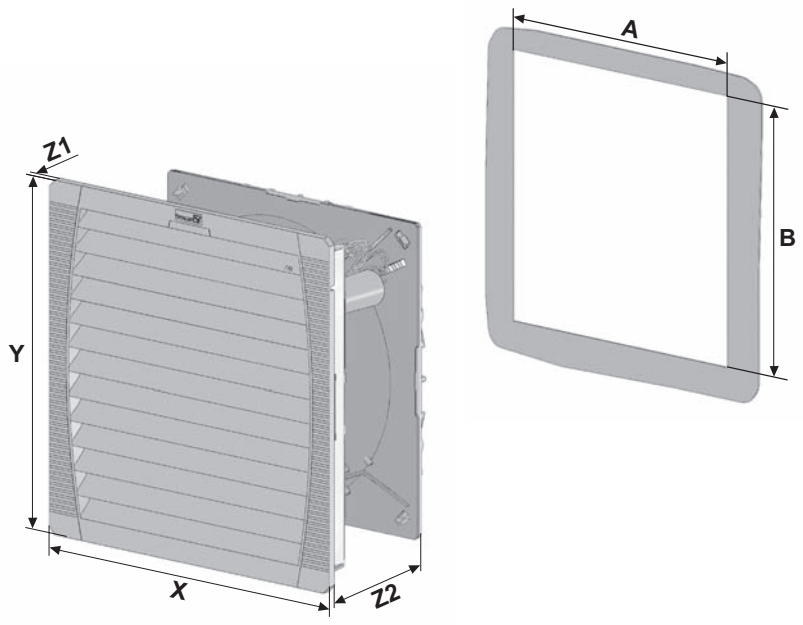
PF 65.000 IP 55



Dimensions

mm	PF 65.000	PFA 60.000
X	320	320
Y	320	320
Z1	7	7
Z2	150	39
A[1]	291	291
B[1]	291	291

[1] for material thicknesses up to 2 mm
+ 1 mm for thickness of material > 2 mm ≤ 3 mm



ECOOL Filterfan
PF 66.000
ECOOL Exhaust filter
PFA 60.000



- installation size 6, air flow rate up to 785 m³/h
- three performance classes, cut-out compatible
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)
- cut-out compatible with installation size 6 from the 3rd Generation and with cooling unit DTFI 9021 (see page 36)

Data		PF 66.000			Unit
Article number	IP 54	11666022055	11666102055	11666152055	
	IP 55	11666023055	11666103055	11666153055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz			
		400 / 460 3 ~	230	115	V
Unimpeded airflow	IP 54	640 / 653			m³/h
	IP 55	770 / 785			
Airflow rate in combination (PF + PFA 60.000)	IP 54	445 / 445			
	IP 55	490 / 501			
Power consumption		120 / 155	115 / 150	110 / 160	W
Current consumption		0.26 / 0.25	0.51 / 0.66	0.96 / 1.4	A
Noise level (according to EN ISO 3741)	IP 54	63 / 64			dB (A)
	IP 55				
Weight		3.2			kg
Type of connection		spring-type terminal			
Fuse		6			A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter			
	IP 55	NEMA type 12 - fluted filter			
Filtration efficiency	IP 54	91			%
	IP 55				
Filter mat quality class according to EN 779	IP 54	G 4			
	IP 55				
Duty cycle		100			%
Bearing type		ball bearing			
Service life L_{10} (+ 40 °C)[1]		40000			h
Temperature range		- 40 … + 55 / - 40 … + 131			°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO			
	IP 55	additional: UV-resistant			
Colour		RAL 7035, different colours available on request			

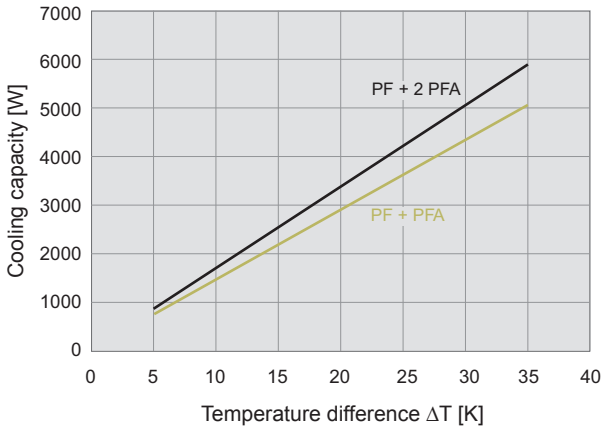
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 60.000	IP 54	1	11760002055	190
	IP 55	1	11760003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

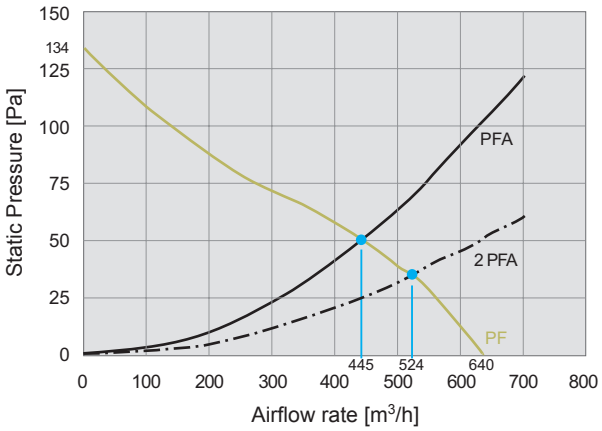
Cooling capacity performance curves

PF 66.000 IP 54

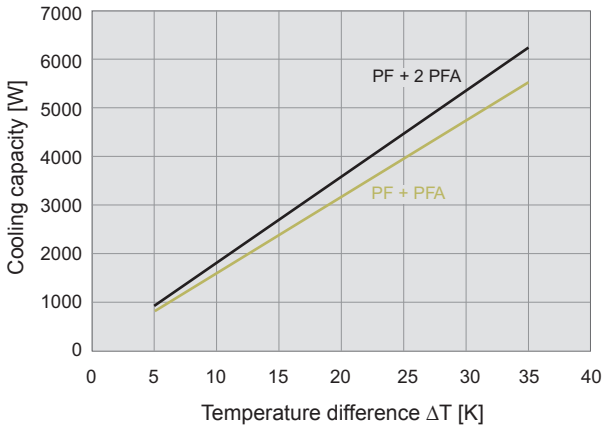


Static pressure performance curves

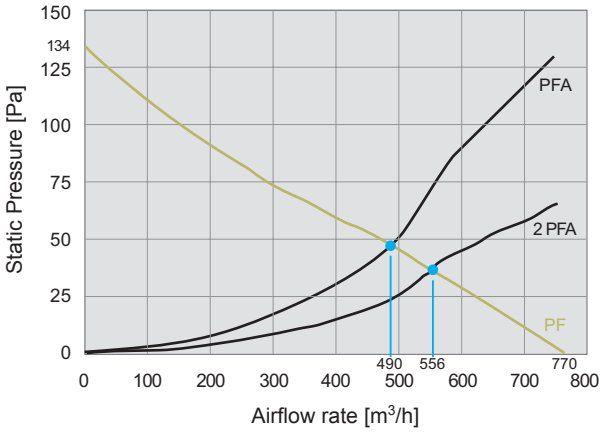
PF 66.000 IP 54



PF 66.000 IP 55



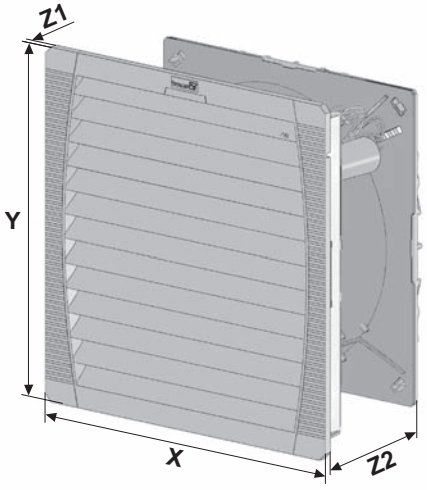
PF 66.000 IP 55

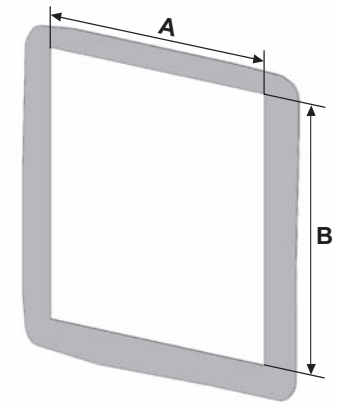


Dimensions

mm	PF 66.000	PFA 60.000
X	320	320
Y	320	320
Z1	7	7
Z2	150	39
A[1]	291	291
B[1]	291	291

[1] for material thicknesses up to 2 mm
+ 1 mm for thickness of material > 2 mm ≤ 3 mm





ecool Filterfan
PF 67.000
ecool Exhaust filter
PFA 60.000



- installation size 6, air flow rate up to 950 m³/h
- three performance classes, cut-out compatible
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)
- cut-out compatible with installation size 6 from the 3rd Generation and with cooling unit DTFI 9021 (see page 36)

Data		PF 67.000			Unit
Article number	IP 54	11667022055	11667102055	11667152055	
	IP 55	11667023055	11667103055	11667153055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz			
		400 / 460 3 ~	230	115	V
Unimpeded airflow	IP 54	845 / 875			m³/h
	IP 55	925 / 950			
Airflow rate in combination (PF + PFA 60.000)	IP 54	560 / 625			
	IP 55	570 / 625			
Power consumption		140 / 170	135 / 200	140 / 195	W
Current consumption		0.35 / 0.43	0.59 / 0.88	1.23 / 1.71	A
Noise level (according to EN ISO 3741)	IP 54	66 / 69			dB (A)
	IP 55				
Weight		3.7			kg
Type of connection		spring-type terminal			
Fuse		6			A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter			
	IP 55	NEMA type 12 - fluted filter			
Filtration efficiency	IP 54	91			%
	IP 55				
Filter mat quality class according to EN 779	IP 54	G 4			
	IP 55				
Duty cycle		100			%
Bearing type		ball bearing			
Service life L_{10} (+ 40 °C)[1]		40000			h
Temperature range		- 40 … + 55 / - 40 … + 131			°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO			
	IP 55	additional: UV-resistant			
Colour		RAL 7035, different colours available on request			

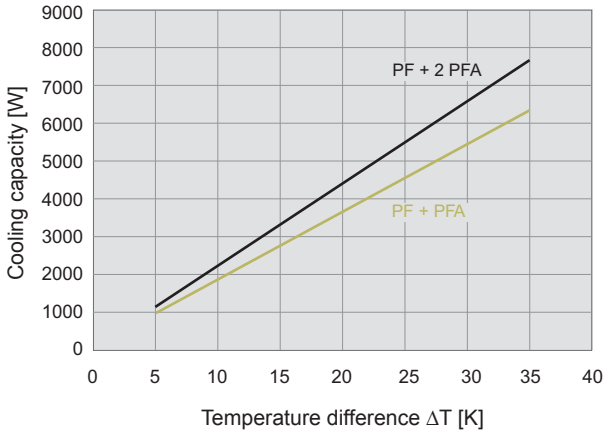
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 60.000	IP 54	1	11760002055	190
	IP 55	1	11760003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

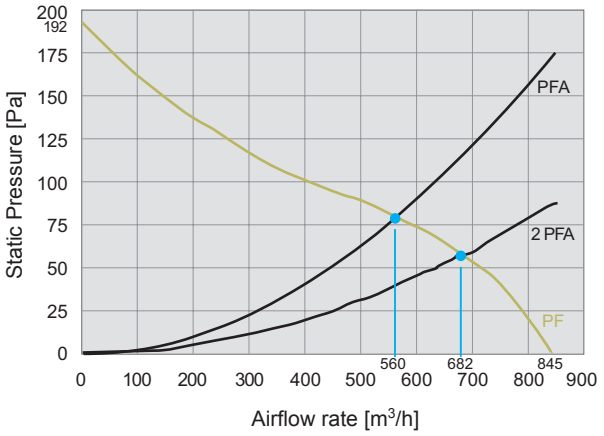
Cooling capacity performance curves

PF 67.000 IP 54

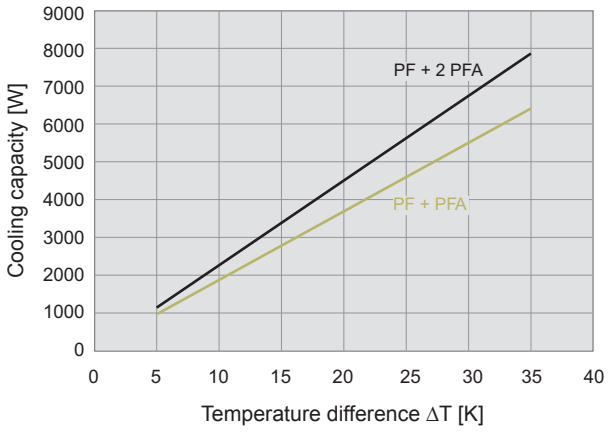


Static pressure performance curves

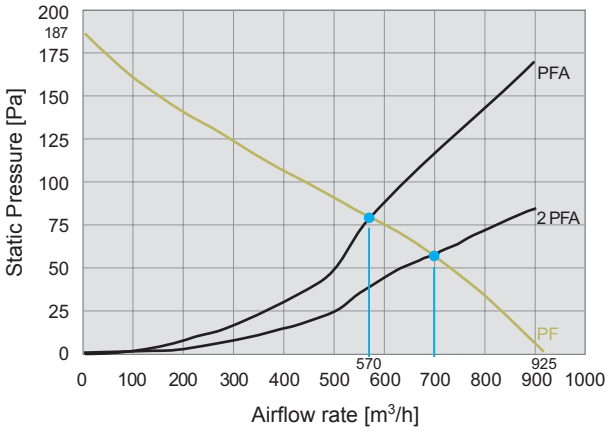
PF 67.000 IP 54



PF 67.000 IP 55



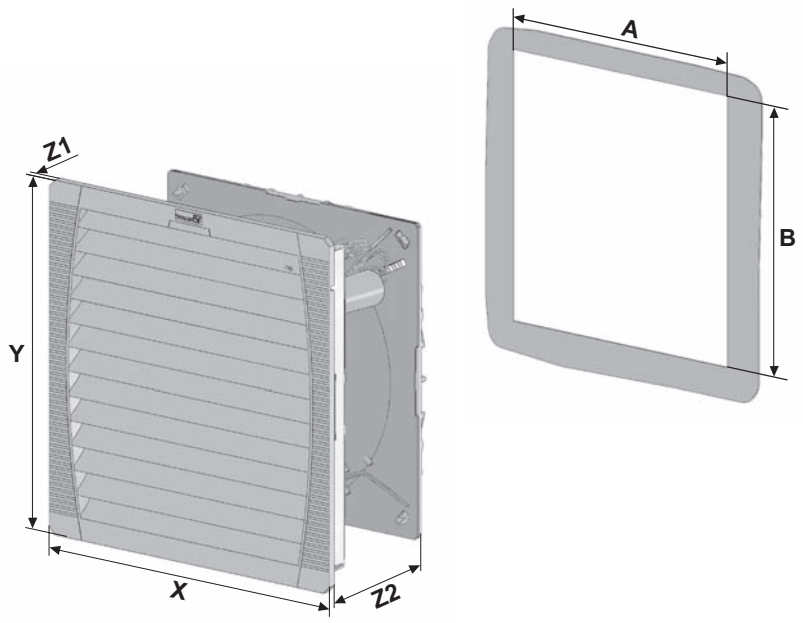
PF 67.000 IP 55



Dimensions

mm	PF 67.000	PFA 60.000
X	320	320
Y	320	320
Z1	7	7
Z2	150	39
A[1]	291	291
B[1]	291	291

[1] for material thicknesses up to 2 mm
+ 1 mm for thickness of material > 2 mm ≤ 3 mm



ecool Slim Line Filterfan
PF 65.000 SL



Pfannenberg 4th Generation filterfan with low installation depth
- installation size 6, air flow rate up to 550 m³/h
- three performance classes, cut-out compatible
- system of protection IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)

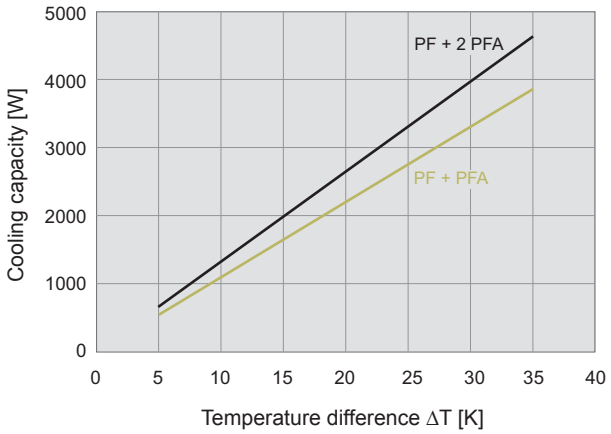
Data		PF 65.000 SL		Unit
Article number	IP 55	11675103055	11675153055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz		
		230	115	V
Unimpeded airflow		500 / 550		m³/h
Airflow rate in combination (PF + PFA 60.000)		345 / 423		
Power consumption		64 / 80		W
Current consumption		0.29 / 0.35	0.58 / 0.7	A
Noise level (according to EN ISO 3741)		54 / 52		dB (A)
Weight		3.3		kg
Type of connection		screw terminal		
Fuse		6		A
System of protection according to EN 60529 / UL 50		NEMA type 12 - fluted filter		
Filtration efficiency		91		%
Filter mat quality class according to EN 779		G 4		
Duty cycle		100		%
Bearing type		ball bearing		
Service life L_{10} (+ 40 °C)[1]		40000		h
Temperature range		- 40 … + 55 / - 40 … + 131		°C / °F
Design (housing and protection against accidental contact)		made of injection-moulded thermoplastic, self-extinguishing, UL 94 V0, UV-resistant		
Colour		RAL 7035, different colours available on request		

Accessories		Piece	Article number	Information on page
Exhaust filter PFA 60.000	IP 55	1	11760003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary
Approvals see page 149.

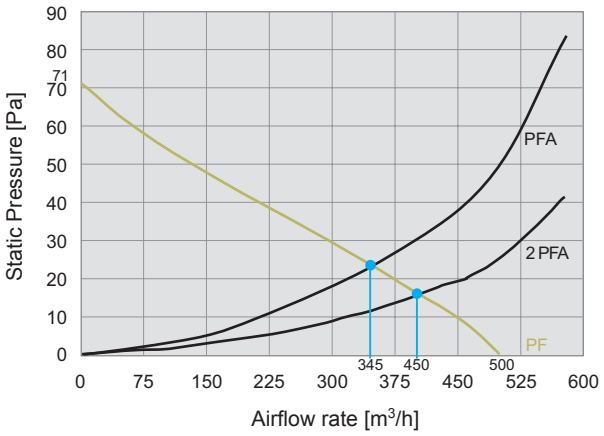
Cooling capacity performance curves

PF 65.000 SL IP 55



Static pressure performance curves

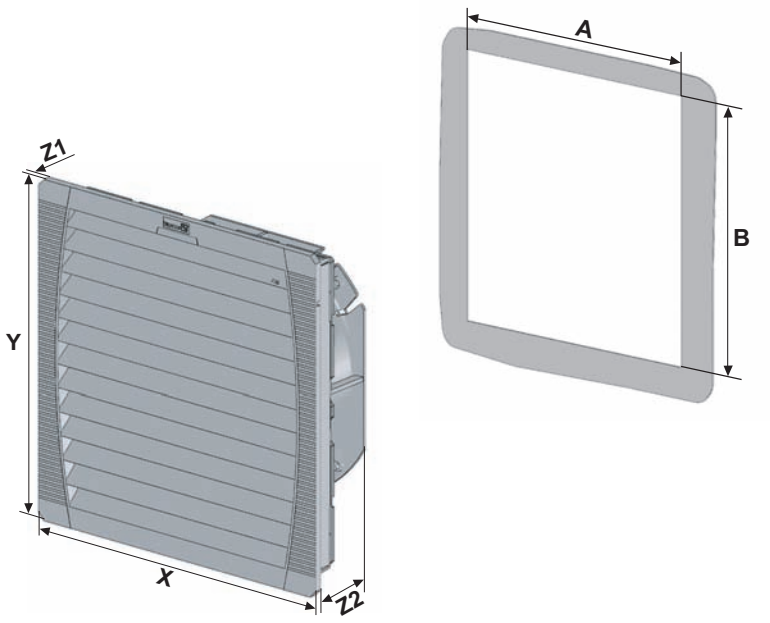
PF 65.000 SL IP 55



Dimensions

mm	PF 65.000 SL	PFA 60.000
X	320	320
Y	320	320
Z1	7	7
Z2	124	39
A[1]	291	291
B[1]	291	291

[1] for material thicknesses up to 2 mm
+ 1 mm for thickness of material > 2 mm ≤ 3 mm



ecool Slim Line Filterfan
PF 67.000 SL



Pfannenberg 4th Generation filterfan with low installation depth
- installation size 6, air flow rate up to 725 m³/h
- three performance classes, cut-out compatible
- system of protection IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)

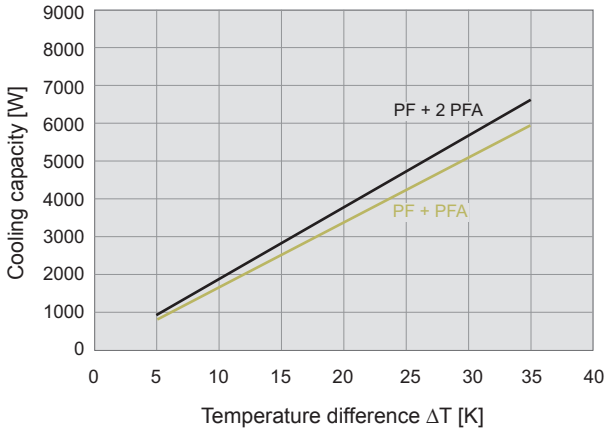
Data		PF 67.000 SL			Unit
Article number	IP 55	11677023055	11677103055	11677153055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz			
		400 / 460 3 ~	230	115	V
Unimpeded airflow		705 / 725			m³/h
Airflow rate in combination (PF + PFA 60.000)		530 / 580			
Power consumption		110 / 165	127 / 180	120 / 165	W
Current consumption		0.2 / 0.23	0.56 / 0.79	1.05 / 1.45	A
Noise level (according to EN ISO 3741)		66 / 69			dB (A)
Weight		3.85	4.05	4.00	kg
Type of connection		screw terminal			
Fuse		6			A
System of protection according to EN 60529 / UL 50		NEMA type 12 - fluted filter			
Filtration efficiency		91			%
Filter mat quality class according to EN 779		G 4			
Duty cycle		100			%
Bearing type		ball bearing			
Service life L_{10} (+ 40 °C)[1]		40000			h
Temperature range		- 40 … + 55 / - 40 … + 131			°C / °F
Design (housing and protection against accidental contact)		made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO, UV-resistant			
Colour		RAL 7035, different colours available on request			

Accessories		Piece	Article number	Information on page
Exhaust filter PFA 60.000	IP 55	1	11760003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary
Approvals see page 149.

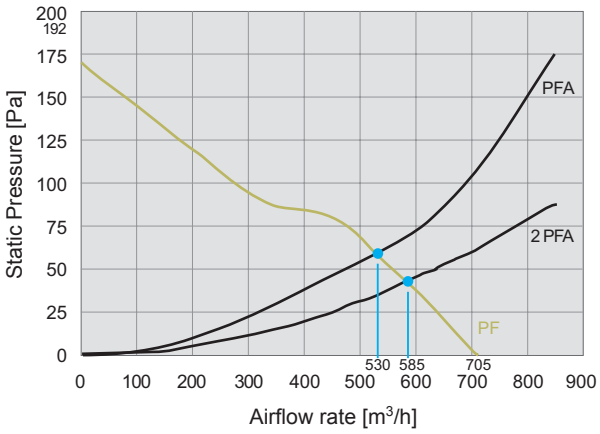
Cooling capacity performance curves

PF 67.000 SL IP 55



Static pressure performance curves

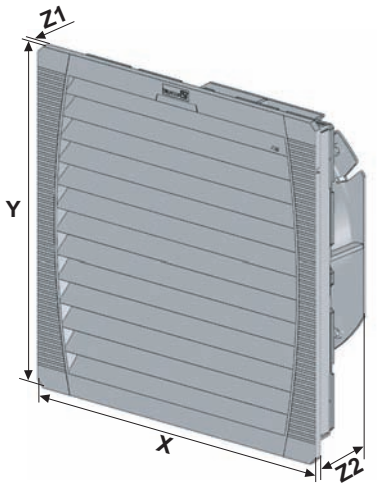
PF 67.000 SL IP 55

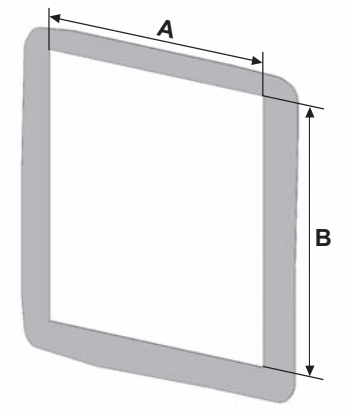


Dimensions

mm	PF 67.000 SL	PFA 60.000
X	320	320
Y	320	320
Z1	7	7
Z2	127	39
A[1]	291	291
B[1]	291	291

[1] for material thicknesses up to 2 mm
+ 1 mm for thickness of material > 2 mm ≤ 3 mm





ECOOL Filterfan
PF 11.000 EMC
ECOOL Exhaust filter
PFA 10.000 EMC



- installation size 1, air flow rate up to 29 m³/h
- secure contact due to improved contact springs on the screen grid
- system of protection IP 54, NEMA type 12
- UL, cUL approval
- cut-out compatible to installation size 1 of the 3rd and 4th Generation

Data		PF 11.000 EMC					Unit
Article number	IP 54	11811101055	11811151055	11811851055	11811801055	11811701055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz		DC			
		230	115	12	24	48	V
Unimpeded airflow		25 / 29					m³/h
Airflow rate in combination (PF + PFA 10.000 EMC)		16 / 18					
Power consumption		12 / 11	12 / 11	2.4	2.4	2.6	W
Current consumption		0.07 / 0.06	0.15 / 0.15	0.2	0.1	0.05	A
Noise level (according to EN ISO 3741)		33 / 33		33			dB (A)
Weight		0.58		0.19			kg
Type of connection		cable, 2-core, length 310 mm					
Fuse		6					A
System of protection according to EN 60529 / UL 50		NEMA type 12 – standard filter					
Filtration efficiency		88					%
Filter mat quality class according to EN 779		G 3					
Duty cycle		100					%
Bearing type		sleeve bearing		ball bearing			
Service life L_{10} (+ 40 °C)[1]		52500	55000	70000			h
Temperature range		- 40 … + 55 / - 40 … + 131					°C / °F
Design (housing and protection against accidental contact)		made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO					
EMC screen		**stainless steel**					
Colour		RAL 7035, different colours available on request					

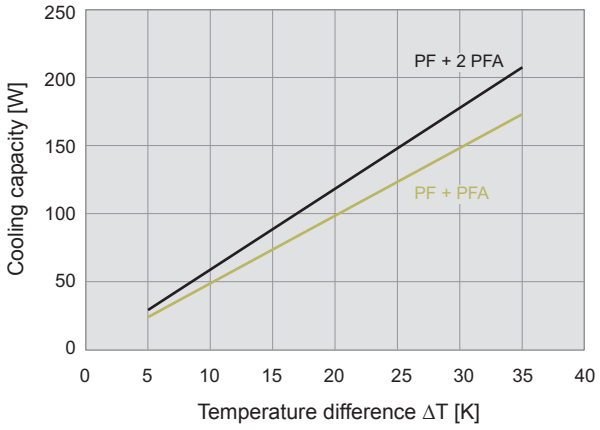
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 10.000 EMC	IP 54	1	11910001055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

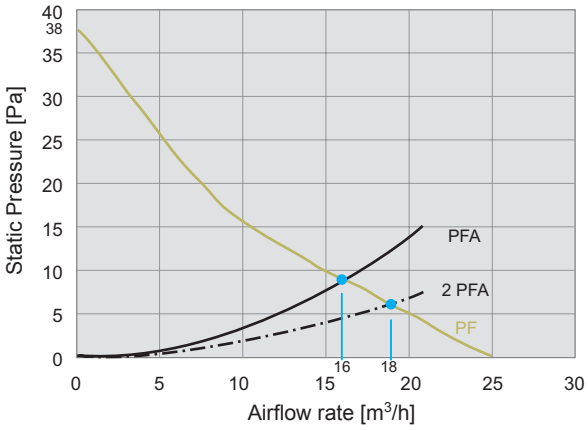
Cooling capacity performance curves

PF 11.000 EMC



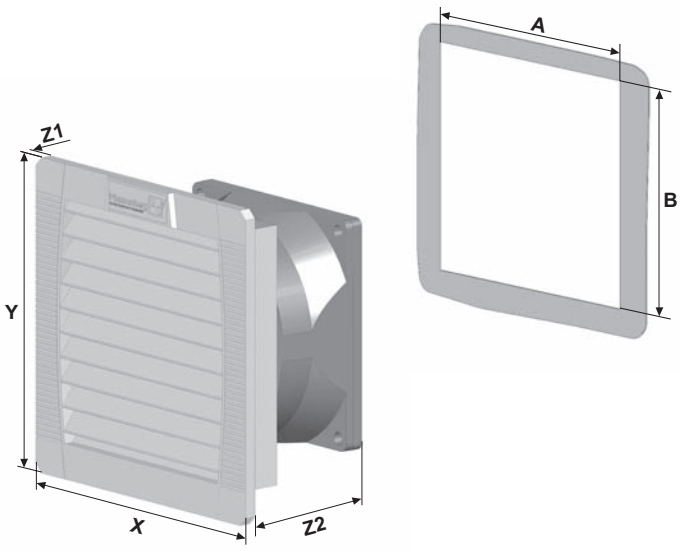
Static pressure performance curves

PF 11.000 EMC



Dimensions

mm	PF 11.000 EMC		PFA 10.000 EMC
	AC	DC	
X	109	109	109
Y	109	109	109
Z1	4	4	4
Z2	62	49	19
A	93	93	93
B	93	93	93



Further information on the EMC Filterfans (EMC series) can be found on page 186.

ECOOL Filterfan
PF 22.000 EMC
ECOOL Exhaust filter
PFA 20.000 EMC



- installation size 2, air flow rate up to 70 m³/h
- secure contact due to improved contact springs on the screen grid
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)
- cut-out compatible to installation size 2 of the 3rd and 4th Generation

Data		PF 22.000 EMC					Unit
Article number	IP 54	11822101055	11822151055	11822851055	11822801055	11822701055	
	IP 55	11822103055	11822153055	11822853055	11822803055	11822703055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz		DC			
		230	115	12	24	48	V
Unimpeded airflow	IP 54	61 / 70					m³/h
	IP 55	56 / 64					
Airflow rate in combination (PF + PFA 20.000 EMC)	IP 54	44 / 52					
	IP 55	40 / 46					
Power consumption		19 / 18	20 / 20	5	5	5	W
Current consumption		0.12 / 0.18	0.24 / 0.23	0.42	0.21	0.1	A
Noise level (according to EN ISO 3741)	IP 54	44 / 44		44			dB (A)
	IP 55						
Weight		0.78		0.49			kg
Type of connection		terminal strip		cable, 2-core, length 310 mm			
Fuse		6					A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter					
	IP 55	NEMA type 12 - fluted filter					
Filtration efficiency	IP 54	88					%
	IP 55	91					
Filter mat quality class according to EN 779	IP 54	G 3					
	IP 55	G 4					
Duty cycle		100					%
Bearing type		sleeve bearing		ball bearing			
Service life L_{10} (+ 40 °C)[1]		37500	40000	62500			h
Temperature range		- 40 … + 55 / - 40 … + 131					°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO					
	IP 55	additional: UV-resistant					
EMC screen		**stainless steel**					
Colour		RAL 7035, different colours available on request					

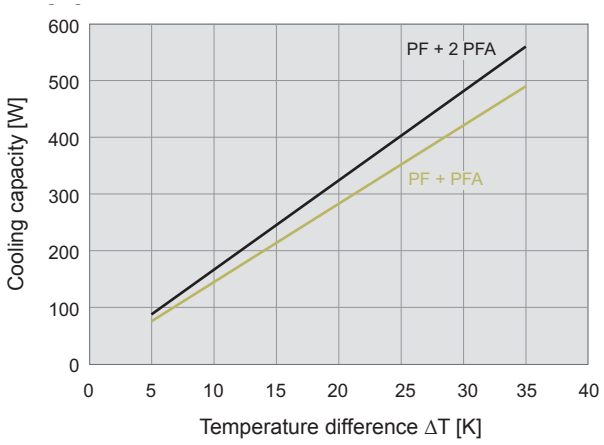
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 20.000 EMC	IP 54	1	11920001055	190
	IP 55	1	11920003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

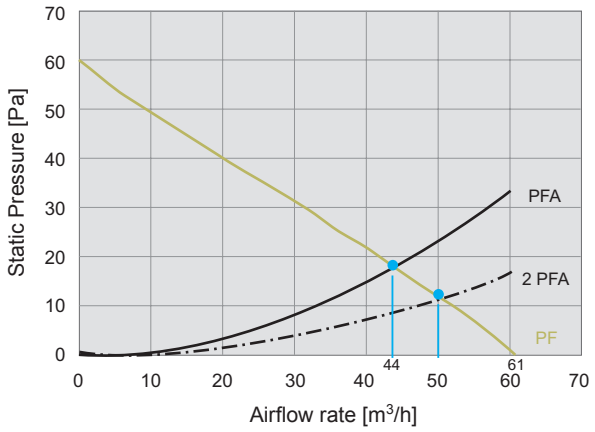
Cooling capacity performance curves

PF 22.000 EMC IP 54

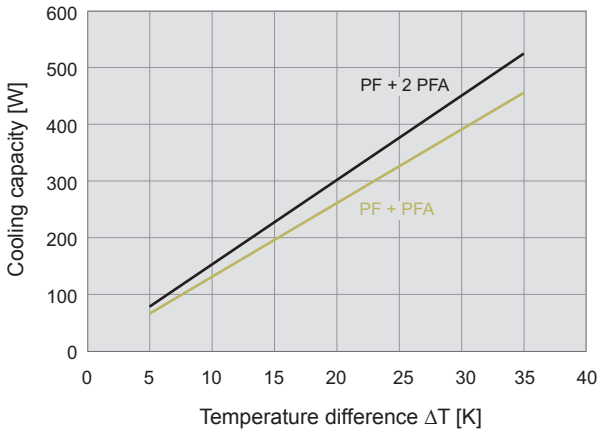


Static pressure performance curves

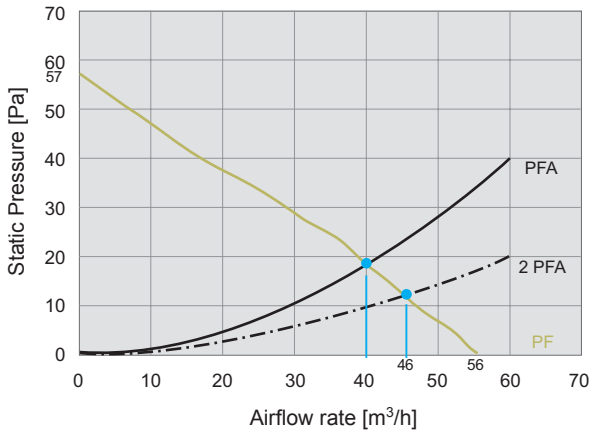
PF 22.000 EMC IP 54



PF 22.000 EMC IP 55

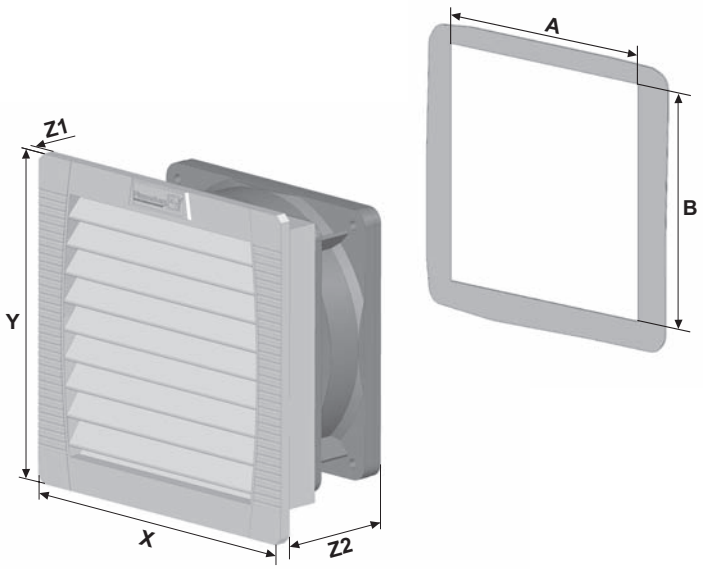


PF 22.000 EMC IP 55



Dimensions

mm	PF 22.000 EMC		PFA 20.000 EMC
	AC	DC	
X	145	145	145
Y	145	145	145
Z1	5	5	5
Z2	70	64	26
A	126	126	126
B	126	126	126



Further information on the EMC Filterfans (EMC series) can be found on page 186.

ECOOL Filterfan
PF 32.000 EMC
ECOOL Exhaust filter
PFA 30.000 EMC



- installation size 3, air flow rate up to 125 m³/h
- secure contact due to improved contact springs on the screen grid
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)

Data		PF 32.000 EMC					Unit
Article number	IP 54	11832101055	11832151055	11832851055	11832801055	11832701055	
	IP 55	11832103055	11832153055	11832853055	11832803055	11832703055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz		DC			
		230	115	12	24	48	V
Unimpeded airflow	IP 54	110 / 125					m³/h
	IP 55	100 / 110					
Airflow rate in combination (PF + PFA 30.000 EMC)	IP 54	82 / 93					
	IP 55	55 / 64					
Power consumption		19 / 18	20 / 20	5	5	5	W
Current consumption		0.12 / 0.18	0.24 / 0.23	0.42	0.21	0.1	A
Noise level (according to EN ISO 3741)	IP 54	40 / 40		40			dB (A)
	IP 55						
Weight		0.96		0.7			kg
Type of connection		terminal strip		cable, 2-core, length 310 mm			
Fuse		6					A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter					
	IP 55	NEMA type 12 - fluted filter					
Filtration efficiency	IP 54	88					%
	IP 55	91					
Filter mat quality class according to EN 779	IP 54	G 3					
	IP 55	G 4					
Duty cycle		100					%
Bearing type		sleeve bearing		ball bearing			
Service life L_{10} (+ 40 °C)[1]		37500	40000	62500			h
Temperature range		- 40 … + 55 / - 40 … + 131					°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO					
	IP 55	additional: UV-resistant					
EMC screen		**stainless steel**					
Colour		RAL 7035, different colours available on request					

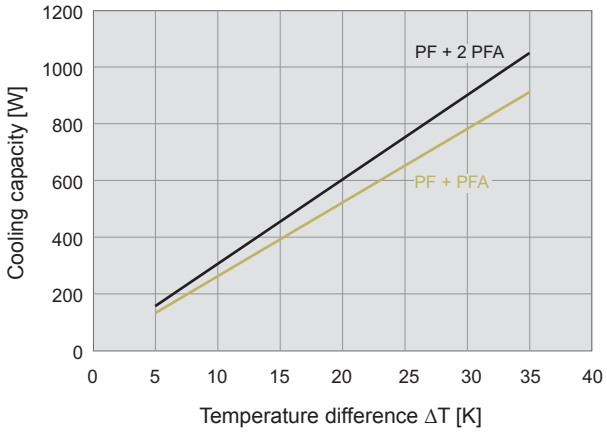
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 30.000 EMC	IP 54	1	11930001055	190
	IP 55	1	11930003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

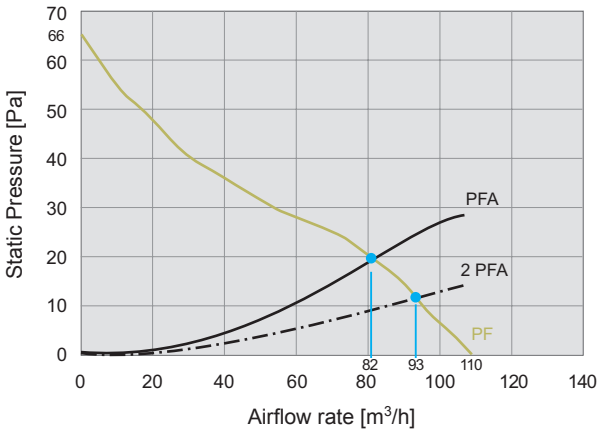
Cooling capacity performance curves

PF 32.000 EMC IP 54

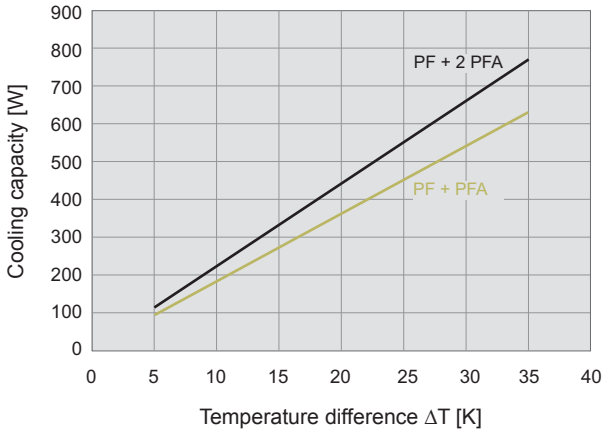


Static pressure performance curves

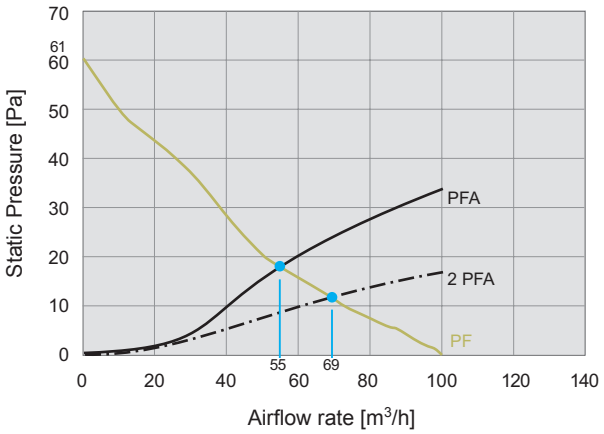
PF 32.000 EMC IP 54



PF 32.000 EMC IP 55

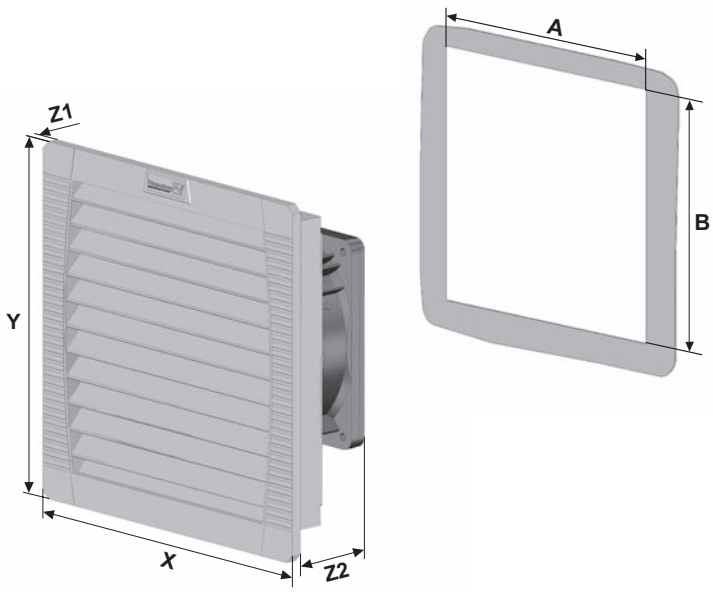


PF 32.000 EMC IP 55



Dimensions

mm	PF 32.000 EMC		PFA 30.000 EMC
	AC	DC	
X	202	202	202
Y	202	202	202
Z1	6	6	6
Z2	87	81	34
A	178	178	178
B	178	178	178



Further information on the EMC Filterfans (EMC series) can be found on page 186.

ecool Filterfan
PF 42.500 EMC
ecool Exhaust filter
PFA 40.000 EMC



- installation size 4, air flow rate up to 171 m³/h
- two performance classes, cut-out compatible
- secure contact due to improved contact springs on the screen grid
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)
- cut-out compatible to installation size 4 of the 3rd and 4th Generation

Data		PF 42.500 EMC					Unit
Article number	IP 54	11842101055	11842151055	11842851055	11842801055	11842701055	
	IP 55	11842103055	11842153055	11842853055	11842803055	11842703055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz		DC			
		230	115	12	24	48	V
Unimpeded airflow	IP 54	156 / 171					m³/h
	IP 55	145 / 160					
Airflow rate in combination (PF + PFA 40.000 EMC)	IP 54	116 / 127					
	IP 55	109 / 113					
Power consumption		18 / 17	18 / 17	6	4.7	4.6	W
Current consumption		0.12 / 0.1	0.25 / 0.25	0.5	0.2	0.1	A
Noise level (according to EN ISO 3741)	IP 54	40 / 43		40			dB (A)
	IP 55						
Weight		1.34		1.08			kg
Type of connection		spring-type terminal					
Fuse		6					A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter					
	IP 55	NEMA type 12 - fluted filter					
Filtration efficiency	IP 54	88					%
	IP 55	91					
Filter mat quality class according to EN 779	IP 54	G 3					
	IP 55	G 4					
Duty cycle		100					%
Bearing type		ball bearing					
Service life L_{10} (+ 40 °C)[1]		40000	42500	57500	70000		h
Temperature range		- 40 … + 55 / - 40 … + 131					°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO					
	IP 55	additional: UV-resistant					
EMC screen		**stainless steel**					
Colour		RAL 7035, different colours available on request					

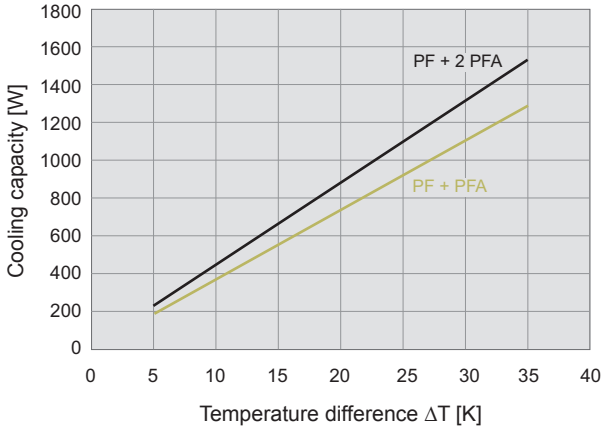
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 40.000 EMC	IP 54	1	11940001055	190
	IP 55	1	11940003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

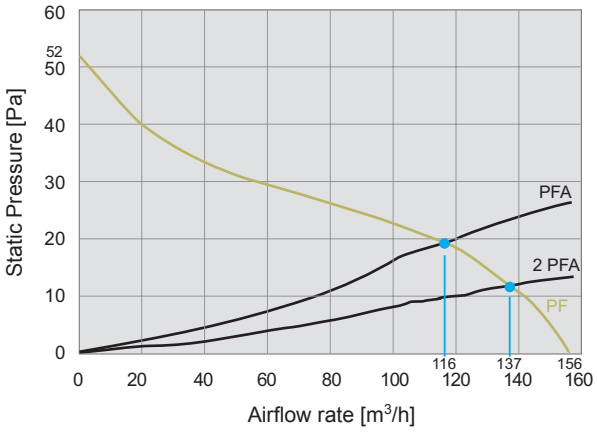
Cooling capacity performance curves

PF 42.500 EMC IP 54

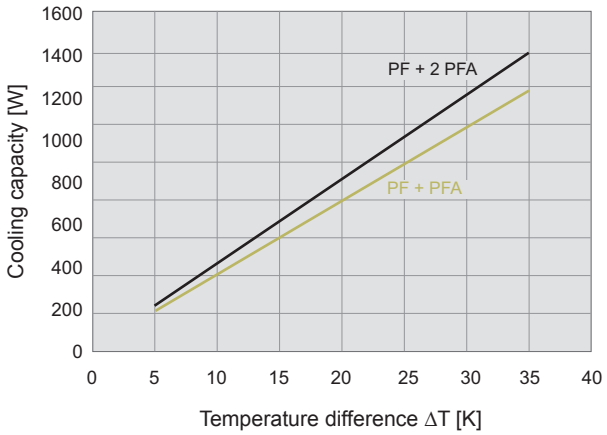


Static pressure performance curves

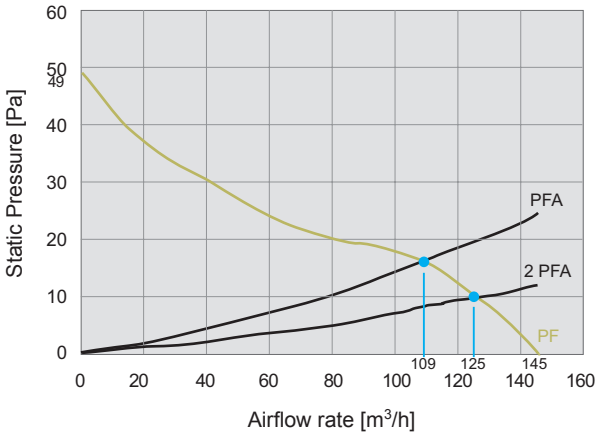
PF 42.500 EMC IP 54



PF 42.500 EMC IP 55

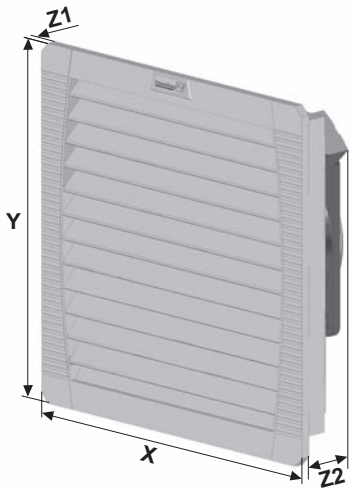


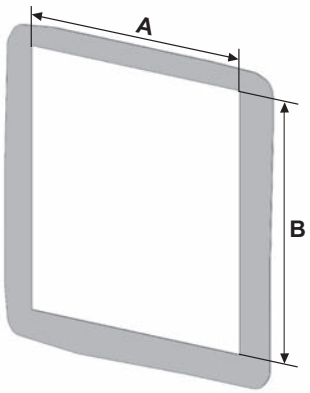
PF 42.500 EMC IP 55



Dimensions

mm	PF 42.500 EMC	PFA 40.000 EMC
X	252	252
Y	252	252
Z1	6	6
Z2	97	38
A	224	224
B	224	224





Further information on the EMC Filterfans (EMC series) can be found on page 186.

ecool Filterfan
PF 43.000 EMC
ecool Exhaust filter
PFA 40.000 EMC



- installation size 4, air flow rate up to 292 m³/h
- two performance classes, cut-out compatible
- secure contact due to improved contact springs on the screen grid
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)
- cut-out compatible to installation size 4 of the 3rd and 4th Generation

Data		PF 43.000 EMC					Unit
Article number	IP 54	11843101055	11843151055	11843851055	11843801055	11843701055	
	IP 55	11843103055	11843153055	11843853055	11843803055	11843703055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz		DC			
		230	115	12	24	48	V
Unimpeded airflow	IP 54	256 / 292					m³/h
	IP 55	233 / 265					
Airflow rate in combination (PF + PFA 40.000 EMC)	IP 54	231 / 265					
	IP 55	180 / 207					
Power consumption		45 / 39	40 / 40	12	12	12	W
Current consumption		0.32 / 0.26	0.5 / 0.5	1	0.5	0.25	A
Noise level (according to EN ISO 3741)	IP 54	42 / 46		42			dB (A)
	IP 55						
Weight		1.83		1.77			kg
Type of connection		spring-type terminal					
Fuse		6					A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter					
	IP 55	NEMA type 12 - fluted filter					
Filtration efficiency	IP 54	88					%
	IP 55	91					
Filter mat quality class according to EN 779	IP 54	G 3					
	IP 55	G 4					
Duty cycle		100					%
Bearing type		ball bearing					
Service life L_{10} (+ 40 °C)[1]		40000		80000			h
Temperature range		- 40 … + 55 / - 40 … + 131					°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO					
	IP 55	additional: UV-resistant					
EMC screen		**stainless steel**					
Colour		RAL 7035, different colours available on request					

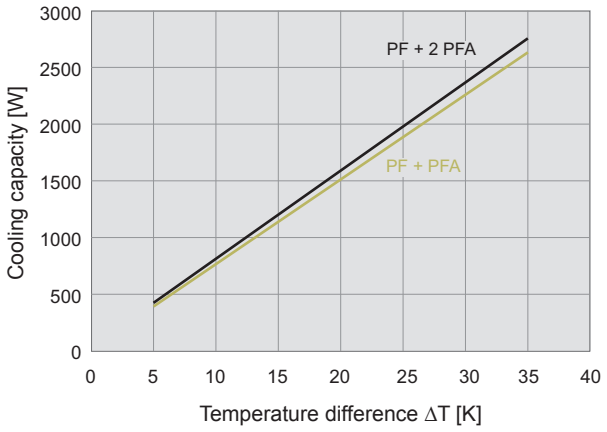
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 40.000 EMC	IP 54	1	11940001055	190
	IP 55	1	11940003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

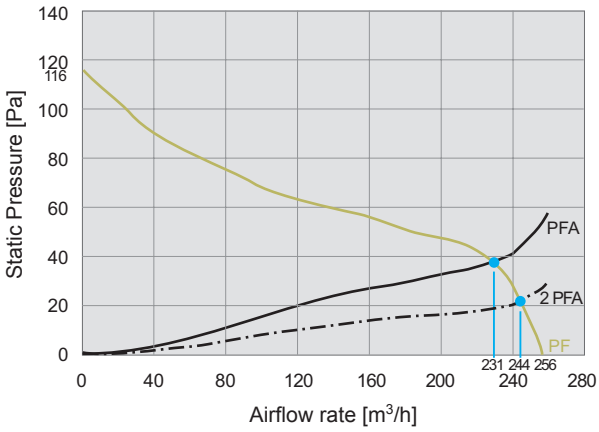
Cooling capacity performance curves

PF 43.000 EMC IP 54

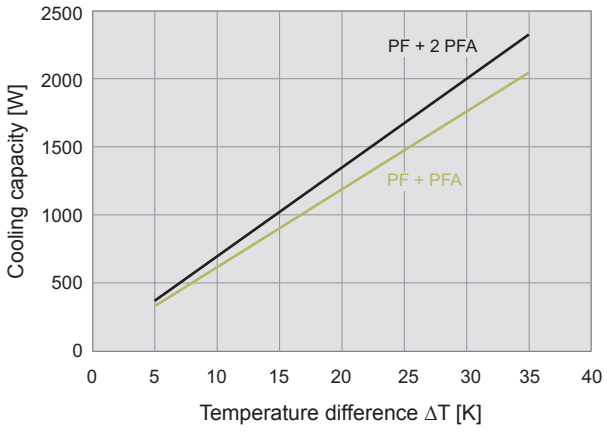


Static pressure performance curves

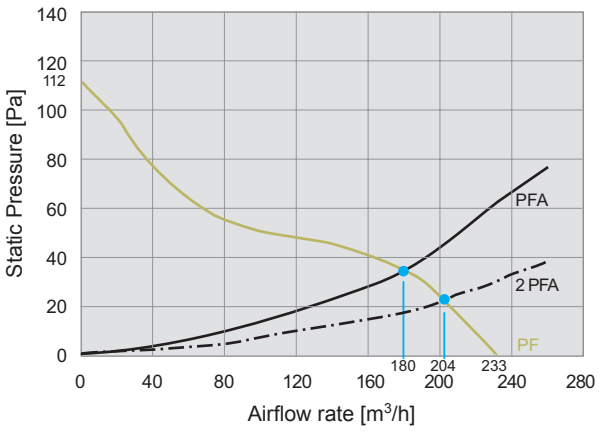
PF 43.000 EMC IP 54



PF 43.000 EMC IP 55

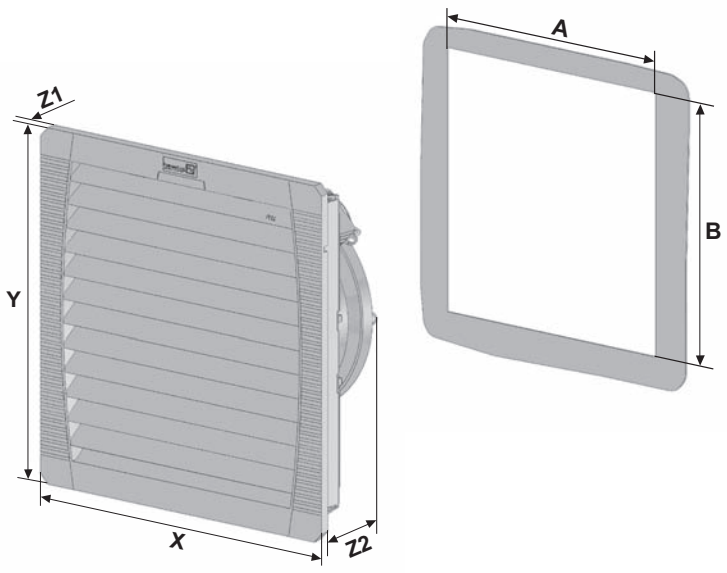


PF 43.000 EMC IP 55



Dimensions

mm	43.000 EMC		PFA 40.000 EMC
	AC	DC	
X	252	252	252
Y	252	252	252
Z1	6	6	6
Z2	113	97	38
A	224	224	224
B	224	224	224



Further information on the EMC Filterfans (EMC series) can be found on page 186.

ECOOL Filterfan
PF 65.000 EMC
ECOOL Exhaust filter
PFA 60.000 EMC



- installation size 6, air flow rate up to 505 m³/h
- three performance classes, cut-out compatible
- secure contact due to improved contact springs on the screen grid
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)
- cut-out compatible to installation size 6 of the 3rd and 4th Generation

Data		PF 65.000 EMC		Unit
Article number	IP 54	11865102055	11865152055	
	IP 55	11865103055	11865153055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz		
		230	115	V
Unimpeded airflow	IP 54	480 / 480		m³/h
	IP 55	505 / 505		
Airflow rate in combination (PF + PFA 60.000 EMC)	IP 54	370 / 370		
	IP 55	380 / 380		
Power consumption		65 / 80	75 / 90	W
Current consumption		0.3 / 0.36	0.66 / 0.8	A
Noise level (according to EN ISO 3741)	IP 54	54 / 52		dB (A)
	IP 55			
Weight		3.43		kg
Type of connection		spring-type terminal		
Fuse		6		A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter		
	IP 55	NEMA type 12 - fluted filter		
Filtration efficiency	IP 54	91		%
	IP 55			
Filter mat quality class according to EN 779	IP 54	G 4		
	IP 55			
Duty cycle		100		%
Bearing type		ball bearing		
Service life L_{10} (+ 40 °C)[1]		40000		h
Temperature range		- 40 … + 55 / - 40 … + 131		°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO		
	IP 55	additional: UV-resistant		
EMC screen		**stainless steel**		
Colour		RAL 7035, different colours available on request		

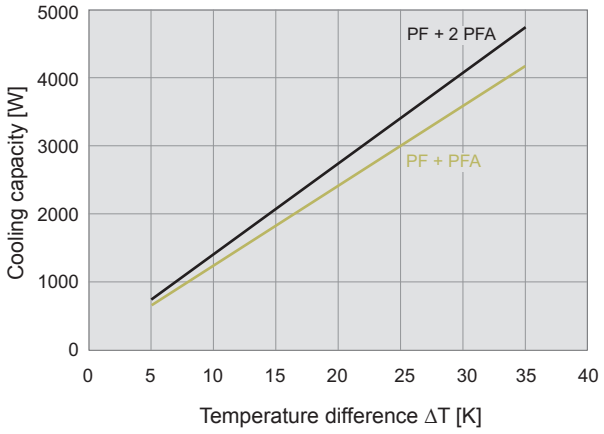
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 60.000 EMC	IP 54	1	11960002055	190
	IP 55	1	11960003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

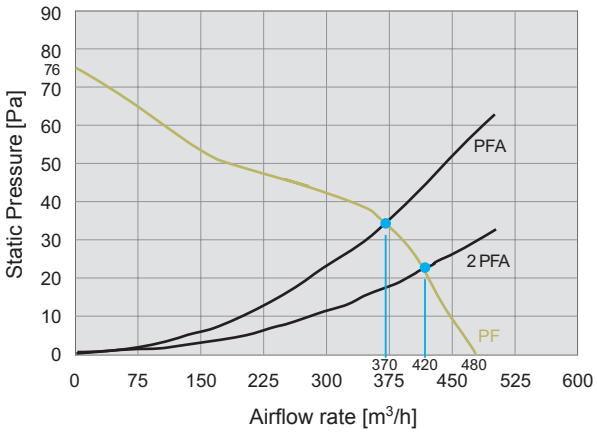
Cooling capacity performance curves

PF 65.000 EMC IP 54

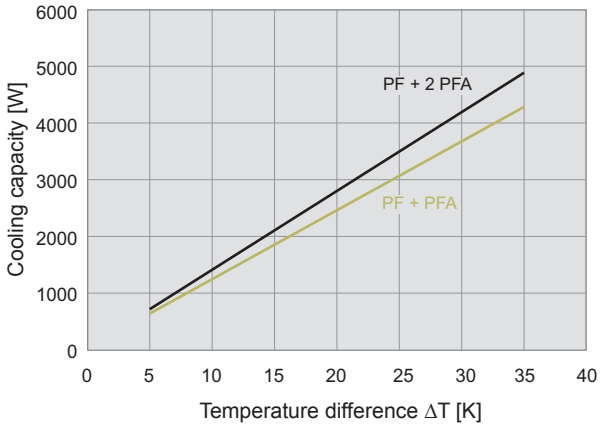


Static pressure performance curves

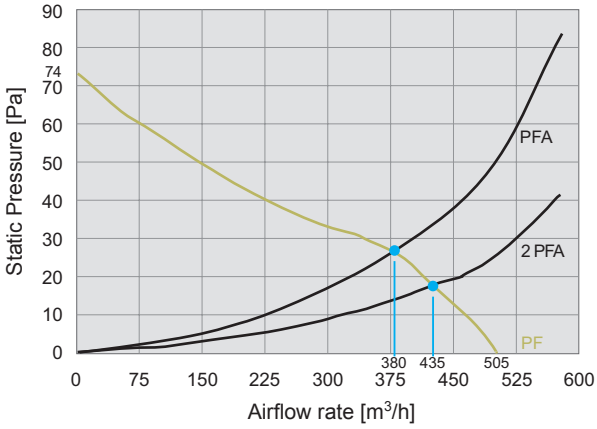
PF 65.000 EMC IP 54



PF 65.000 EMC IP 55

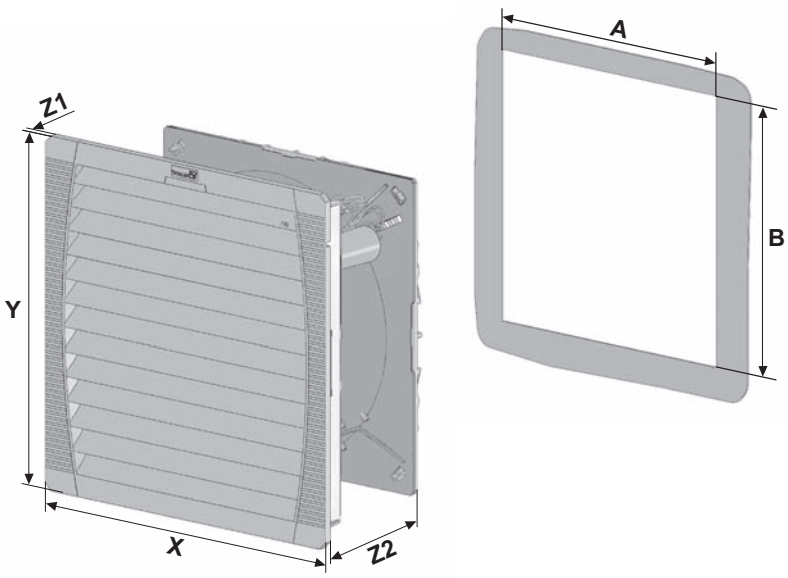


PF 65.000 EMC IP 55



Dimensions

mm	PF 65.000 EMC	PFA 60.000 EMC
X	320	320
Y	320	320
Z1	7	7
Z2	150	39
A	292	292
B	292	292



Further information on the EMC Filterfans (EMC series) can be found on page 186.

ECOOL Filterfan
PF 66.000 EMC
ECOOL Exhaust filter
PFA 60.000 EMC



- installation size 6, air flow rate up to 785 m³/h
- three performance classes, cut-out compatible
- secure contact due to improved contact springs on the screen grid
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)
- cut-out compatible to installation size 6 of the 3rd and 4th Generation

Data		PF 66.000 EMC			Unit
Article number	IP 54	11866022055	11866102055	11866152055	
	IP 55	11866023055	11866103055	11866153055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz			
		400 / 460 3 ~	230	115	V
Unimpeded airflow	IP 54	640 / 653			m³/h
	IP 55	770 / 785			
Airflow rate in combination (PF + PFA 60.000 EMC)	IP 54	445 / 445			
	IP 55	490 / 501			
Power consumption		120 / 155	115 / 150	110 / 160	W
Current consumption		0.26 / 0.25	0.51 / 0.66	0.96 / 1.4	A
Noise level (according to EN ISO 3741)	IP 54	63 / 64			dB (A)
	IP 55				
Weight		3.43			kg
Type of connection		spring-type terminal			
Fuse		6			A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter			
	IP 55	NEMA type 12 - fluted filter			
Filtration efficiency	IP 54	91			%
	IP 55				
Filter mat quality class according to EN 779	IP 54	G 4			
	IP 55				
Duty cycle		100			%
Bearing type		ball bearing			
Service life L_{10} (+ 40 °C)[1]		40000			h
Temperature range		- 40 … + 55 / - 40 … + 131			°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO			
	IP 55	additional: UV-resistant			
EMC screen		**stainless steel**			
Colour		RAL 7035, different colours available on request			

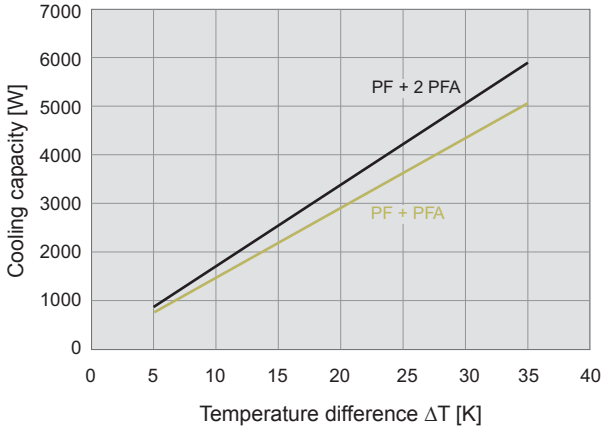
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 60.000 EMC	IP 54	1	11960002055	190
	IP 55	1	11960003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

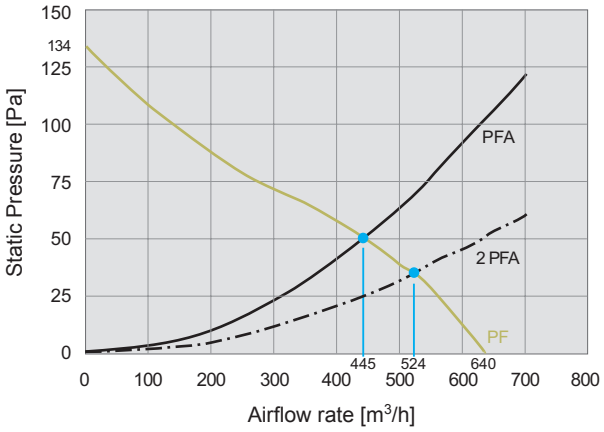
Cooling capacity performance curves

PF 66.000 EMC IP 54

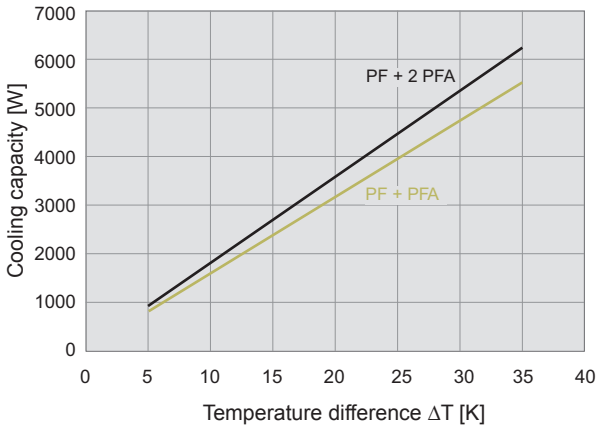


Static pressure performance curves

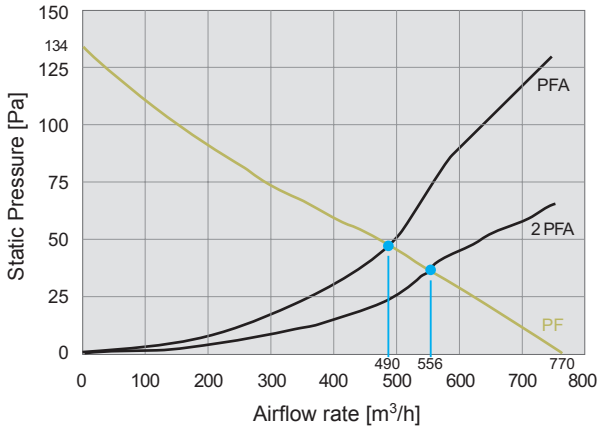
PF 66.000 EMC IP 54



PF 66.000 EMC IP 55

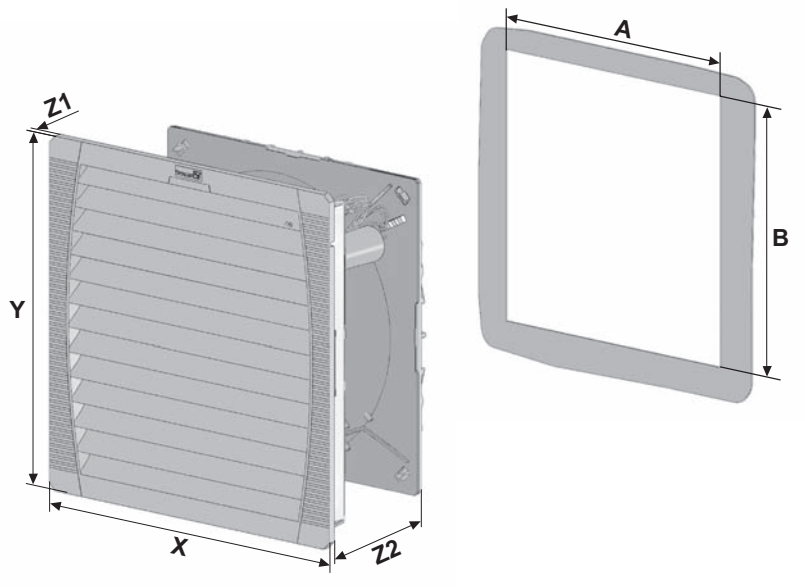


PF 66.000 EMC IP 55



Dimensions

mm	PF 66.000 EMC	PFA 60.000 EMC
X	320	320
Y	320	320
Z1	7	7
Z2	150	39
A	292	292
B	292	292



Further information on the EMC Filterfans (EMC series) can be found on page 186.

ecool Filterfan
PF 67.000 EMC
ecool Exhaust filter
PFA 60.000 EMC



- installation size 6, air flow rate up to 950 m³/h
- three performance classes, cut-out compatible
- secure contact due to improved contact springs on the screen grid
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)
- cut-out compatible to installation size 6 of the 3rd and 4th Generation

Data		PF 67.000 EMC			Unit
Article number	IP 54	11867022055	11867102055	11867152055	
	IP 55	11867023055	11867103055	11867153055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz			
		400 / 460 3 ~	230	115	V
Unimpeded airflow	IP 54	845 / 875			m³/h
	IP 55	925 / 950			
Airflow rate in combination (PF + PFA 60.000 EMC)	IP 54	560 / 625			
	IP 55	570 / 625			
Power consumption		140 / 170	135 / 200	140 / 195	W
Current consumption		0.35 / 0.43	0.59 / 0.88	1.23 / 1.71	A
Noise level (according to EN ISO 3741)	IP 54	66 / 69			dB (A)
	IP 55				
Weight		3.93			kg
Type of connection		spring-type terminal			
Fuse		6			A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter			
	IP 55	NEMA type 12 - fluted filter			
Filtration efficiency	IP 54	91			%
	IP 55				
Filter mat quality class according to EN 779	IP 54	G 4			
	IP 55				
Duty cycle		100			%
Bearing type		ball bearing			
Service life L_{10} (+ 40 °C)[1]		40000			h
Temperature range		- 40 … + 55 / - 40 … + 131			°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO			
	IP 55	additional: UV-resistant			
EMC screen		**stainless steel**			
Colour		RAL 7035, different colours available on request			

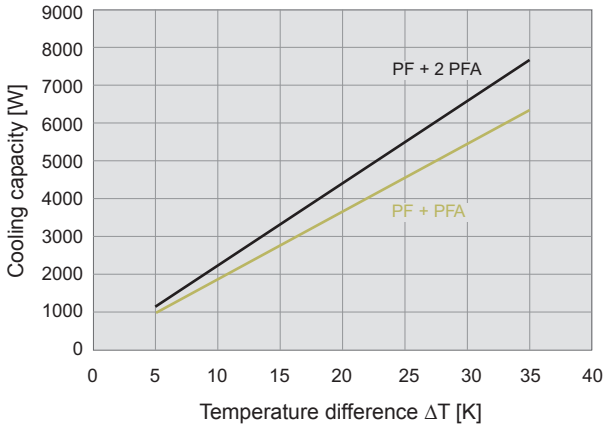
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 60.000 EMC	IP 54	1	11960002055	190
	IP 55	1	11960003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

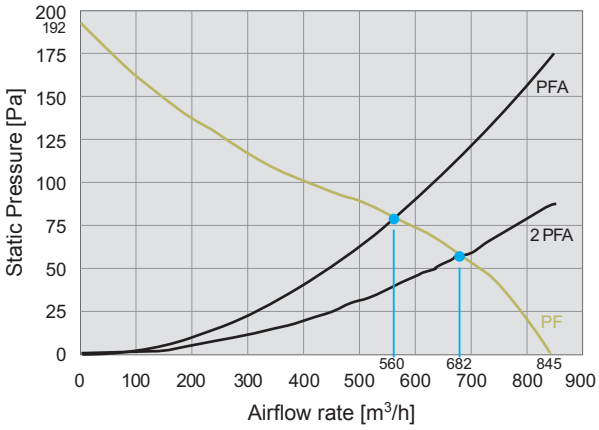
Cooling capacity performance curves

PF 67.000 EMC IP 54

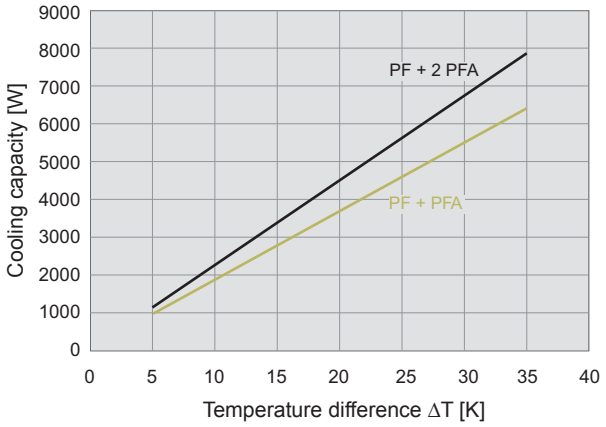


Static pressure performance curves

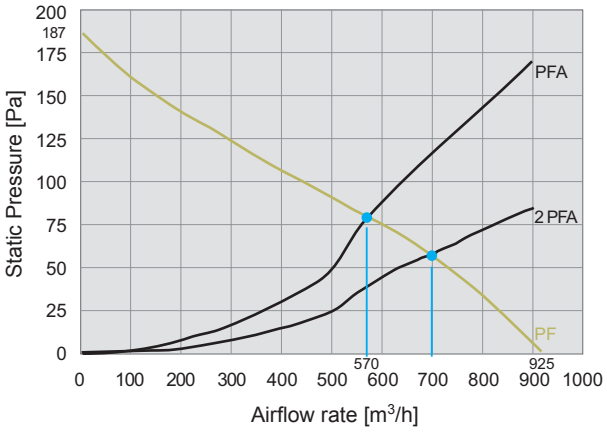
PF 67.000 EMC IP 54



PF 67.000 EMC IP 55

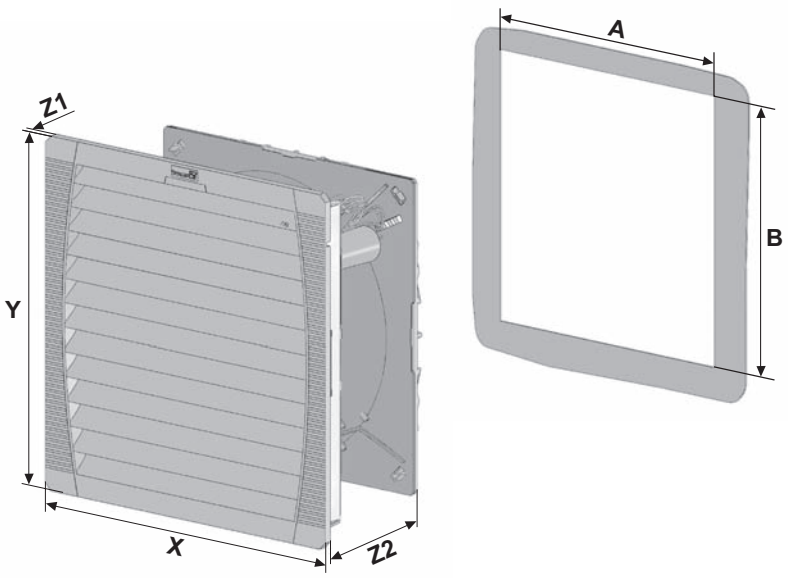


PF 67.000 EMC IP 55



Dimensions

mm	PF 67.000 EMC	PFA 60.000 EMC
X	320	320
Y	320	320
Z1	7	7
Z2	150	39
A	292	292
B	292	292

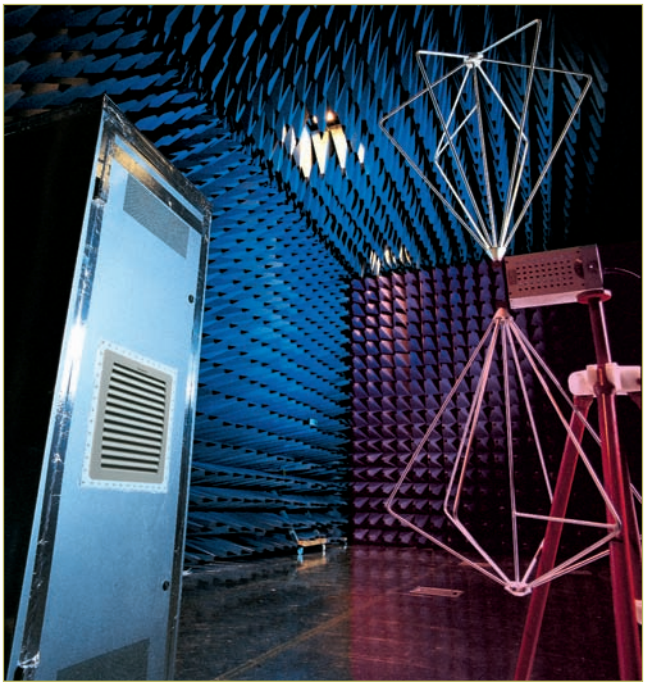


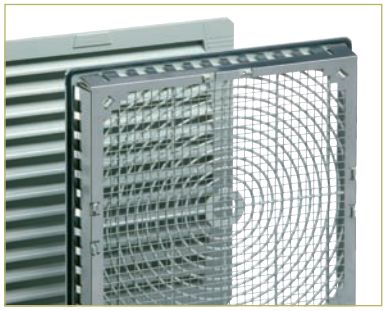
Further information on the EMC Filterfans (EMC series) can be found on page 186.

EMC Filterfans (EMC series)

If filterfans are used for thermal management, openings must exist in the cabinet. These can allow electromagnetic radiation to pass in or out unhindered. Pfannenberg offers the widest range of EMC Filterfans as solutions to this problem.

You too can find the right combination of EMC filterfan and exhaust filter for airflow rates from 25 m^3/h to 950 m^3/h.





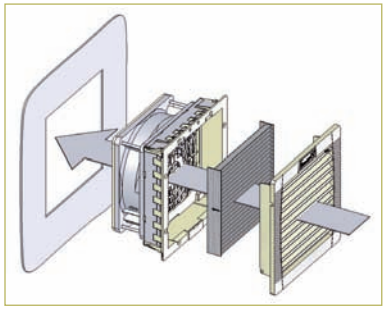
In accordance with the basic principle of our company we have dispensed with the use of metallised plastics, because these are difficult to recycle.



contact springs

New metal shielding

- unequalled worldwide: contact surfaces without beryllium-copper seal!



No elaborate reworking of the cut-out

- no adhering of copper tape or similar aids
- no time-consuming scratching off of coatings in order to ensure a good contact
- contact is made via the cut edge of the cut-out for the filterfan or exhaust filter

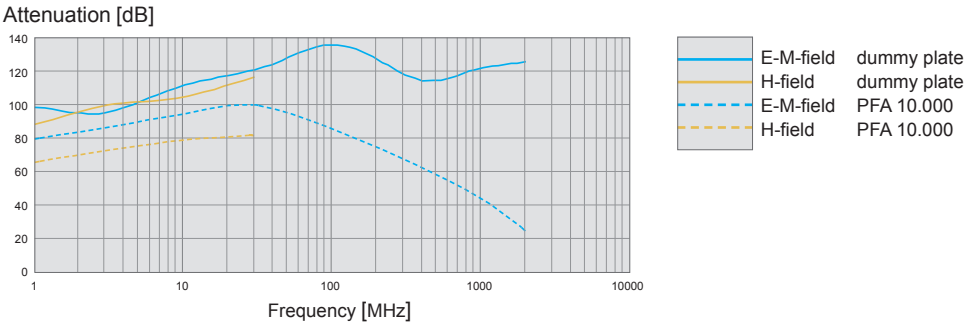
EMC – electromagnetic compatibility

In standards, electromagnetic compatibility, or 'EMC' for short, is defined as the ability of a component, device or system to function satisfactorily under the influence of electromagnetic fields in its surroundings, without influencing its surroundings, to which other electrical equipment also belongs, in an impermissible way.
We guarantee that our EMC shielded filterfans provide protection against electromagnetic interference by ensuring continuity between the shielding part of the fan and the metal structure of the cabinet based on the attenuation characteristics below:

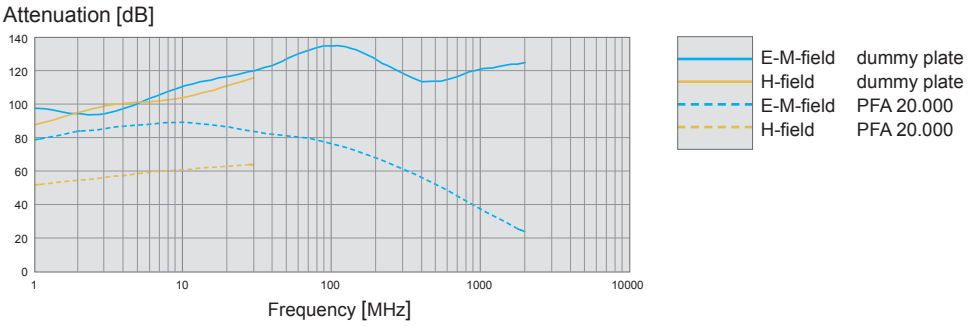
Attenuation at 30 MHz approx. 71 dB
Attenuation at 400 MHz approx. 57 dB
Measured in accordance with EN 50 147-1 (1996): absorber rooms, part 1, measurement of screening attenuation.

Shielding effectiveness

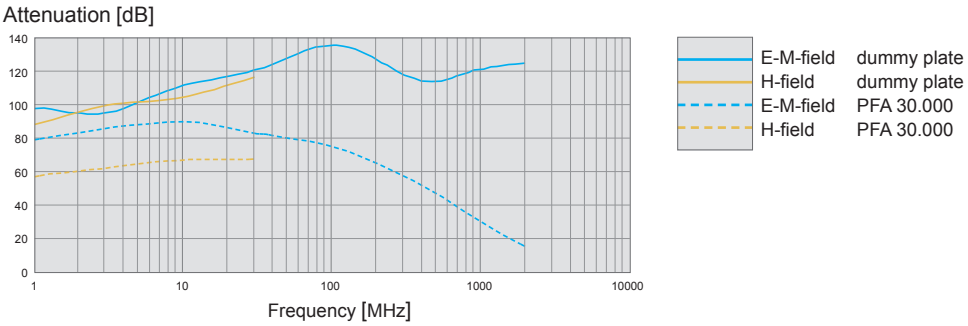
PF 11.000 EMC / PFA 10.000 EMC



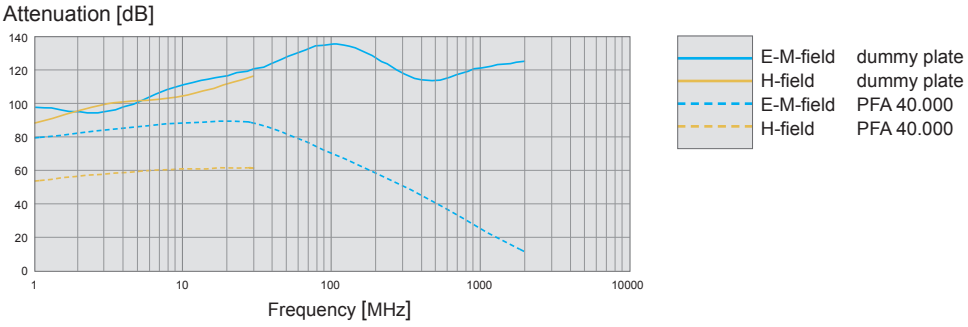
PF 22.000 EMC / PFA 20.000 EMC



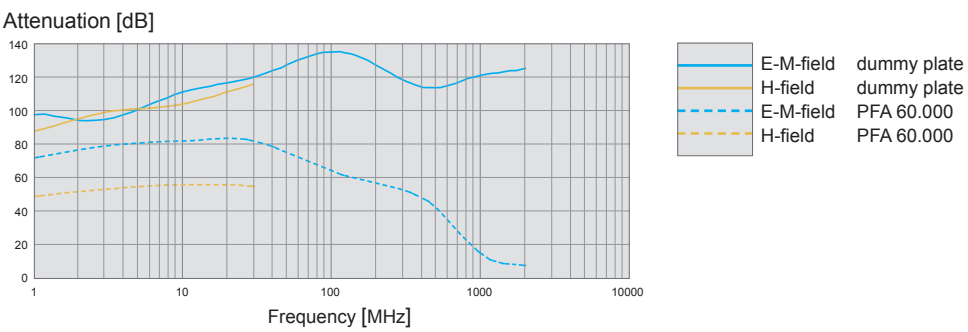
PF 32.000 EMC / PFA 30.000 EMC



PF 42.500 EMC / PF 43.000 EMC / PFA 40.000 EMC



PF 65.000 EMC / PF 66.000 EMC / PF 67.000 EMC / PFA 60.000 EMC



ECOOL Filterfans for roof mounting

PTF 60.500
PTF 60.700
PTF 61.000



ECOOL Top exhaust filter for roof mounting

PTFA 60.000

- 2 installation sizes, air flow rate up to 1000 m³/h
- three performance classes, cut-out compatible
- system of protection IP 33 and IP 54
- optimum passage of air and even temperature distribution (natural air convection is supported)
- toolless mounting, patented quick fastening system
- UL, cUL approval

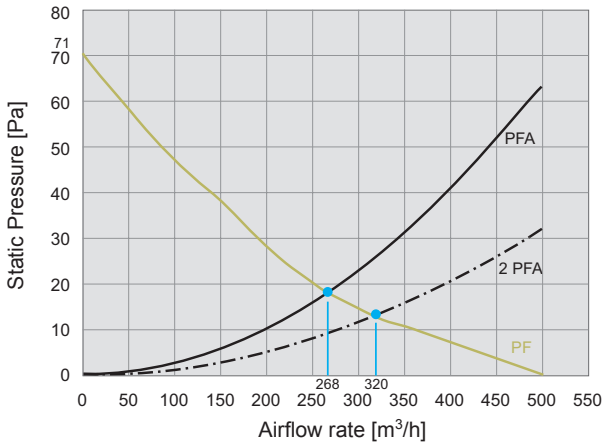
Data		PTF 60.500		PTF 60.700		PTF 61.000		Unit
Article number	IP 54	11685101055	11685151055	11687102055	11687152055	11681102055	11681152055	
	IP 33	11685100055	11685150055	11687100055	11687150055	11681100055	11681150055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz						
		230	115	230	115	230	115	V
Unimpeded airflow	IP 54	350		550		750		m³/h
	IP 33	500		700		1000		
Airflow rate in combination (PTF + PFA 60.000)	IP 54	242		370		500		
	IP 33	268		427		582		
Power consumption		4 x 28 / 29	4 x 29 / 24	65 / 80	75 / 90	115 / 150	110 / 160	W
Current consumption		4 x 0.2 / 0.2	4 x 0.3 / 0.3	0.3 / 0.36	0.66 / 0.8	0.51 / 0.66	0.96 / 1.4	A
Noise level (according to EN ISO 3741)	IP 54 / IP 33	67		69		77		dB (A)
Weight		4.8		4.1		4.3		kg
Type of connection		terminal strip						
Fuse		6						A
System of protection according to EN 60529 / UL 50		IP 33, IP 54						
Filtration efficiency	IP 54	81						%
	IP 33	0 (no filter mat)						
Filter mat quality class according to EN 779	IP 54	G 3						
	IP 33	no filter mat						
Duty cycle		100						%
Bearing type		ball bearing						
Service life L_{10} (+ 40 °C)[1]		approx. 50000[2]		approx. 40000		approx. 40000		h
Temperature range		- 15 … + 55 / + 5 … + 131						°C / °F
Design (housing and protection against accidental contact)		sheet steel, cover powder-coated; snap-in housing made of injection-moulded thermoplastic (ABS-FR) self-extinguishing, UL 94 VO						
Colour		RAL 7035, different colours available on request						

Accessories		Piece	Article number	Information on page
Exhaust filter PTFA 60.000	IP 54	1	11786001055	190
	IP 33	1	11786000055	190
Thermostat		1	17121000000	208/210

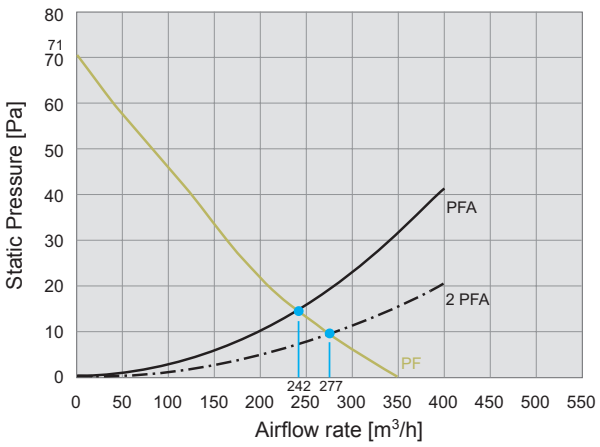
[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary
[2] L_{10} (+25 °C)
Approvals see page 149.

Static pressure performance curves

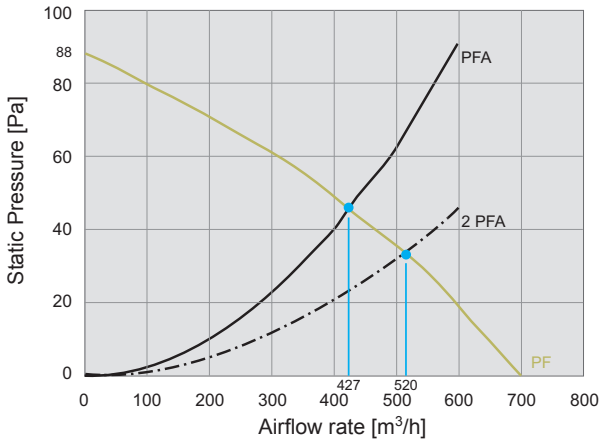
PTF 60.500 IP 33



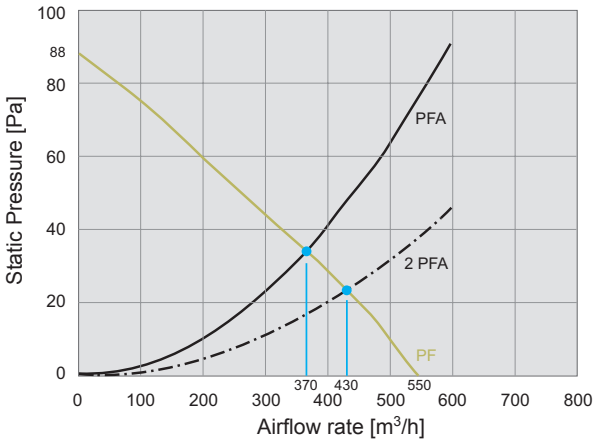
PTF 60.500 IP 54



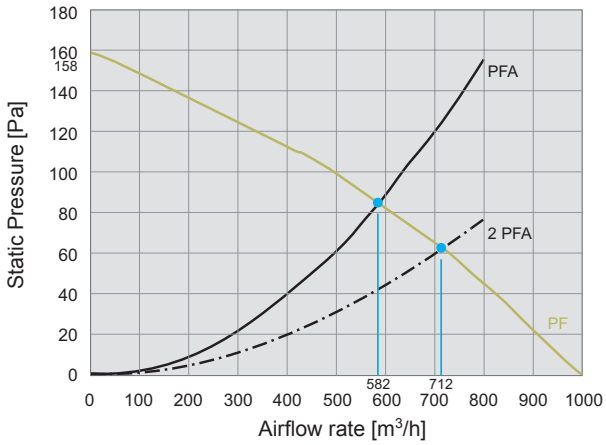
PTF 60.700 IP 33



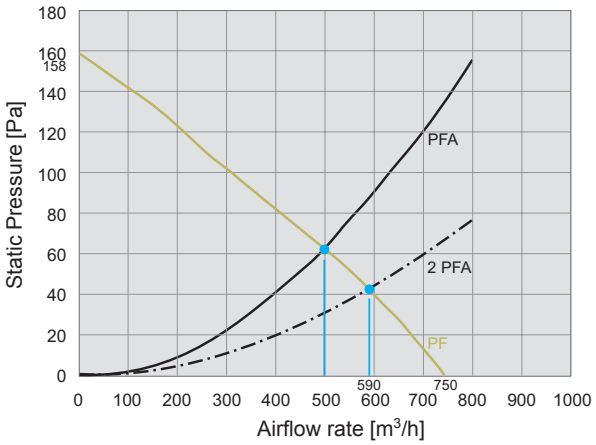
PTF 60.700 IP 54



PTF 61.000 IP 33

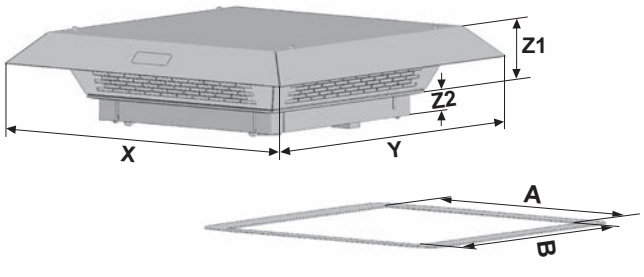


PTF 61.000 IP 54



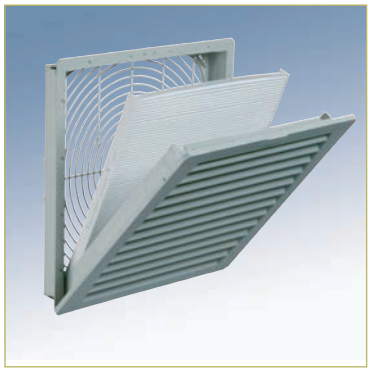
Dimensions

mm	PTF 60.500	PTF 60.700	PTF 61.000	PTFA 60.000
X	436	470	470	436
Y	436	470	470	436
Z1	72	95	95	72
Z2	34	57	57	34
A[1]	291	291	291	291
B[1]	291	291	291	291



[1] for material thicknesses up to 2 mm
+ 1 mm for thickness of material > 2 mm ≤ 3 mm

Options



Exhaust filters for all PF Filterfans

- same design as the PF series filterfans
- snap fastener developed and patented by Pfannenberg
- door mounting without screws in accordance with VDE 0113 (EN 60204)
- simple filter mat exchange during operation
- with integrated foam seal to enclosure

Product	Cut-out	Article number (IP 54)	Article number (IP 55)
PFA 10.000	92 x 92 mm	11710001055	–
PFA 20.000	125 x 125 mm	11720001055	11720003055
PFA 30.000	177 x 177 mm	11730001055	11730003055
PFA 40.000	223 x 223 mm	11740001055	11740003055
PFA 60.000	291 x 291 mm	11760002055	11760003055
PFA 10.000 EMC	93 x 93 mm	11910001055	–
PFA 20.000 EMC	126 x 126 mm	11920001055	11920003055
PFA 30.000 EMC	178 x 178 mm	11930001055	11930003055
PFA 40.000 EMC	224 x 224 mm	11940001055	11940003055
PFA 60.000 EMC	293 x 293 mm	11960002055	11960003055



Product	Cut-out	Article number (IP 54)	Article number (IP 33)
PTFA 60.000	291 x 291 mm	11786001055	11786000055



Weather protection hoods

Weather protection hood in VA or powder-coated.

Suitable for ...	Version	Article number
Installation size 1 and 2	VA	18102000014
	RAL 7035	18102000013
Installation size 3 and 4	VA	18102000017
	RAL 7035	18102000016
Installation size 6	VA	18102000020
	RAL 7035	18102000019



Thermostat and Hygrostat

In combination with thermostats and hygrostats from the FLZ series (see page 208), Pfannenberg Filterfans additionally achieve savings on energy, materials and time plus a significantly longer service life. This results in an optimised environmental balance as well as greater reliability of your production process. Suitable for all Pfannenberg Filterfans.

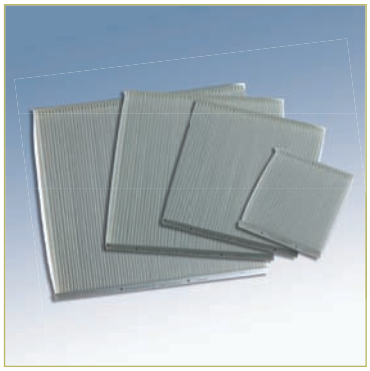
Product	Article number	Page
FLZ 530 Thermostat 0 ... 60 °C	17121000000	208
FLZ 543 Twin Thermostat 0 ... 60 °C	17143000000	210
FLZ 600 Hygrostat 40 ... 90% R.H.	17207000000	212
FLZ 610 Thermostat/Hygrostat 0 … 60 °C / 40 ... 90% R.H.	17218100000	212

Filter mats for filterfans and exhaust filters



Suitable for ...	Article number (IP 54)	Dimensions	Material
Installation size 1 [1]	18611600029	87 x 87 mm	LG3318
Installation size 2 [1]	18611600030	119 x 119 mm	LG3318
Installation size 3 [1]	18611600031	170 x 170 mm	LG3318
Installation size 4 [1]	18611600032	216 x 216 mm	LG3318
Installation size 6 [1]	18611600033	284 x 284 mm	LG3318
PTF 60.500 and PTFA 60.000 [2]	18611600124	290 x 70 mm	LG3318
PTF 60.700 and PTF 61.000 [2]	18611600143	390 x 100 mm	LG3318

[1] set with 5 pieces, [2] set with 20 pieces

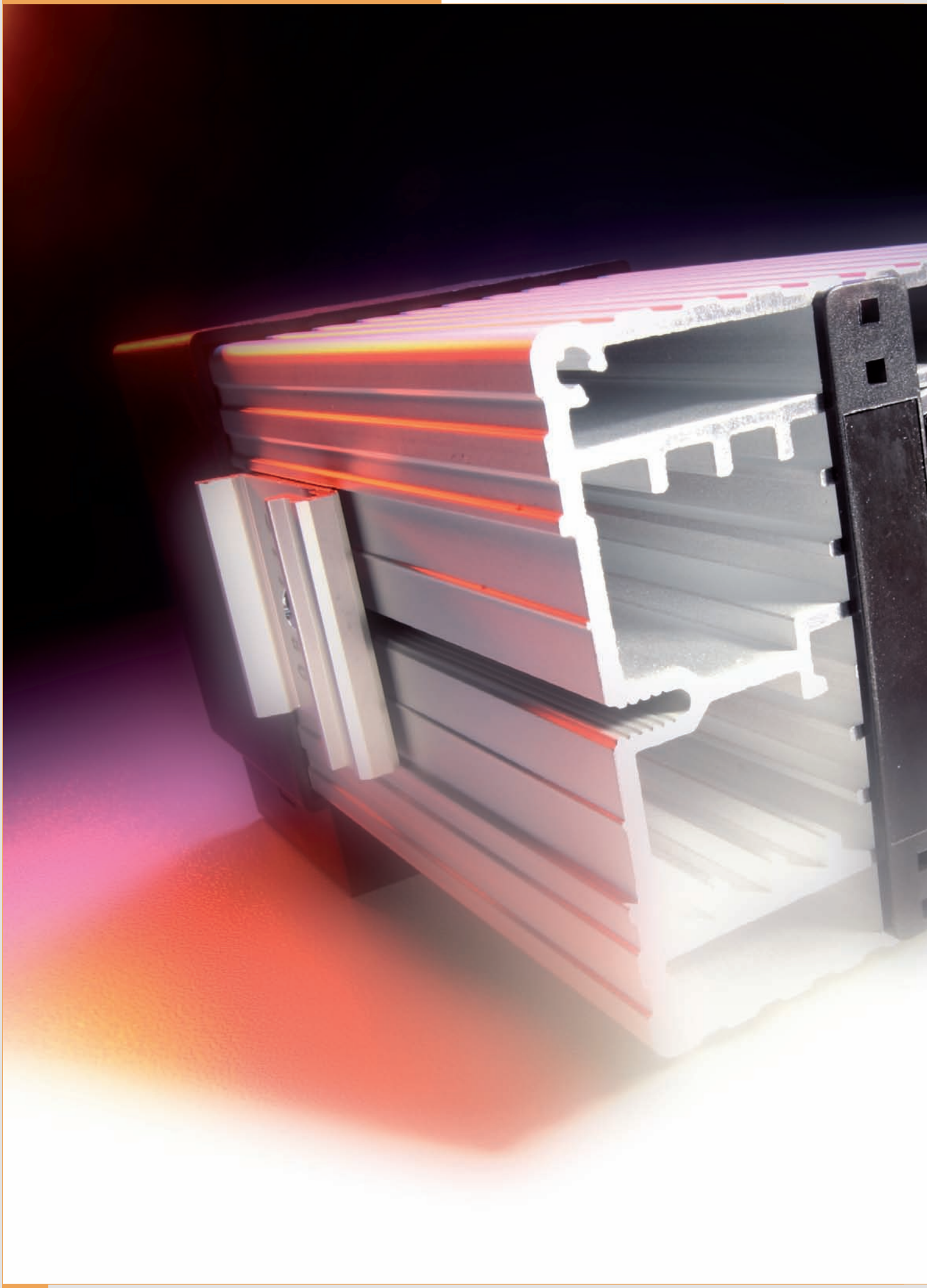


Suitable for ...	Article number (IP 55)	Dimensions	Material
Installation size 2 [1]	18611600034	116 x 108 mm	BN 2.208
Installation size 3 [1]	18611600035	166 x 156 mm	BN 2.208
Installation size 4 [1]	18611600036	212 x 200 mm	BN 2.208
Installation size 6 [1]	18611600037	279 x 264 mm	BN 2.208

[1] set with 5 pieces



Further information can be found on the Internet:
www.pfannenberg.com · **www.pfannenberg-spareparts.com** · **www.filterfan.com**
Keep up to date. Subscribe to the newsletter now:
newsletter.pfannenberg.com





The formation of condensation is one of the biggest dangers for electrical enclosures. As long as they are working under load, the heat dissipation from the components will prevent any condensation from forming within the enclosure.
When there is no longer any heat load due to system downtime, there is a potential danger that components within the cabinet will form condensation. This varies based on the dew point. And this is precisely where the function of the Pfannenberg control cabinet heaters begins (radiant heaters and fan heaters).
With the addition of the new FLH-T series, which is a new range of fan heaters with an internal thermostat for the regulation of the fan and heater, prevention of condensation in the cabinet is guaranteed.
Various performance classes of FLH control cabinet heaters are ideally complemented by thermostats and hygrostats from the FLZ series. Combined, they ensure that the temperature inside the control cabinet is always correct and that the formation of condensation is prevented.

The control of 4th generation filterfans by thermostats from the FLZ series represents an intelligent use of filterfans for control cabinet air conditioning to suit individual needs. It increases energy efficiency and reduces CO_2 emissions.

Accordingly, the combination with thermostats and hygrostats from the FLZ series offers a better environmental balance through higher energy efficiency. It also results in greater reliability of your production process. The reasons for this are:

- pinpoint distribution and constant temperature in the control cabinet
- reduced energy consumption and optimisation of the efficiency of the heaters and
- additional savings on energy, materials and time

Pfannenberg's heaters, thermostats and hygrostats perfectly complement Pfannenberg's filterfans, heat exchangers and air conditioner units.

Life insurance for your electronics

Heaters, Thermostats and Hygrostats

The Pfannenberg Thermal Management Team



FLZ Thermostats

Thermostats are used as temperature controllers and, therefore, for the control of filterfans or electrical enclosure heaters. They are available with N.C. (normally closed) / N.O. (normally open) and changeover contacts. In combination with control cabinet heaters you can ensure, besides temperature control, that the control cabinet is ‘artificially’ dehumidified, in particular in outdoor applications. That means that the temperature is kept above the dew point so that no water condenses out of the air, which could lead to short circuits due to the formation of condensation.
The combination with filterfans offers additional savings on energy, materials and time and, as well as a better environmental balance and greater reliability of the production process due to reduced energy consumption and improvement of the efficiency of the filterfans.
The twin thermostat series unites two thermostats in all combinations for multiple switching tasks!



FLZ Hygrostats/Hygrostat-Thermostat Combination

Hygrostats switch on electrical enclosure heaters or filterfans when a preset relative humidity is exceeded. The relative humidity is kept above the dew point and the condensation of water on electrical components and the corrosion of unprotected sheet metal is prevented. A new electronic combination device unites thermostat and hygrostat in one housing.



FLH Radiant Heaters

Radiant heaters are built very compactly and cover a wide operating range. They are used in combination with a thermostat or hygrostat, predominantly for the avoidance of excessively low temperatures or excessively high humidity in the control cabinet and, last but not least, help to avoid the formation of corrosion.

The mini-heaters and surface temperature-limited heaters by Pfannenberg are particularly suitable for use in small housings or for the heating of isolated spots in sensitive areas.



FLH Fan Heaters

This type of heating is ideal for use in larger electrical enclosure. They have an integrated fan that assists the natural convection and provides for fast and even distribution of the heat in the electrical enclosure.

The fan heaters are used in combination with a thermostat or hygrostat, predominantly for the avoidance of excessively low temperatures or excessively high humidity in the electrical enclosure and also help to avoid the formation of corrosion.

The new heater line FLH-T with integrated thermostat has been specifically developed for demanding environments, espacially wind turbines and for use in the telecommunications sector.

All heaters, thermostats and hygrostats at a glance

Type	Heating performance	Rated voltage	Dimensions (HxWxD)	Approvals						Page
				UR	cUL	GOST	CSA	VDE	CE	
FLH series Radiant Heaters										
FLH 010	10 W	230 V AC [1]	100 x 70 x 50 mm	●	●	●			●	196
FLH 015	15 W	230 V AC [1]	100 x 70 x 50 mm	●	●	●			●	196
FLH 030	30 W	230 V AC [1]	100 x 70 x 50 mm	●	●	●			●	196
FLH 045	45 W	230 V AC [1]	100 x 70 x 50 mm	●	●	●			●	196
FLH 060	60 W	230 V AC [1]	175 x 70 x 50 mm	●	●	●			●	196
FLH 075	75 W	230 V AC [1]	175 x 70 x 50 mm	●	●	●			●	196
FLH 100	100 W	230 V AC [1]	175 x 70 x 50 mm	●	●	●			●	196
FLH 150	150 W	230 V AC [1]	250 x 70 x 50 mm	●	●	●			●	196
Surface temperature-limited Radiant Heaters from the FLH series										
FLH-LST 020	20 W	230 V AC [1]	100 x 70 x 50 mm	●	●	●			●	198
FLH-LST 030	30 W	230 V AC [1]	100 x 70 x 50 mm	●	●	●			●	198
FLH-LST 050	50 W	230 V AC [1]	100 x 70 x 50 mm	●	●	●			●	198
FLH series Mini-Radiant Heaters										
FLH 010-M	10 W	230 V AC [1]	45 x 50 x 29.5 mm	●	●	●			●	200
FLH 020-M	20 W	230 V AC [1]	45 x 75 x 29.5 mm	●	●	●			●	200
FLH 030-M	30 W	230 V AC [1]	45 x 75 x 29.5 mm	●	●	●			●	200
FLH series Fan Heaters										
FLH 250	250 W	115 V / 230 V AC	186.5 x 85 x 104 mm	●	●	●			●	202
FLH 400	400 W	115 V / 230 V AC	226.5 x 85 x 104 mm	●	●	●			●	202
FLH 250 SL	250 W	230 V AC	170.5 x 126.5 x 103 mm	○	○				●	204
FLH 275 SLM	275 W	230 V AC	108 x 91 x 115 mm	○	○				●	204
FLH-T series Fan Heaters with integrated thermostat										
FLH-T 250	250 W	115 V / 230 V AC	100 x 150 x 164 mm	●					●	206
FLH-T 400	400 W	115 V / 230 V AC	100 x 150 x 164 mm	●					●	206
FLH-T 600	600 W	115 V / 230 V AC	100 x 150 x 164 mm	●					●	206
FLH-T 800	800 W	115 V / 230 V AC	100 x 150 x 164 mm	●					●	206
FLH-T 1000	1000 W	115 V / 230 V AC	100 x 150 x 164 mm	●					●	206
FLZ series Thermostats and Hygrostats										
FLZ 510		AC / DC	64 x 37 x 46 mm	●	●	●			●	208
FLZ 520		AC / DC	72 x 40 x 36 mm	●	●	●	●		●	208
FLZ 530		AC / DC	72 x 40 x 36 mm	●	●	●	●		●	208
FLZ 541		AC / DC	80.5 x 59 x 38 mm	●	●	●			●	210
FLZ 542		AC / DC	80.5 x 59 x 38 mm	●	●	●			●	210
FLZ 543		AC / DC	80.5 x 59 x 38 mm	●	●	●			●	210
FLZ 600		AC / DC	64 x 37 x 46 mm	●	●	●			●	212
FLZ 610		AC / DC	80.5 x 59 x 38 mm	●	●	●			●	212

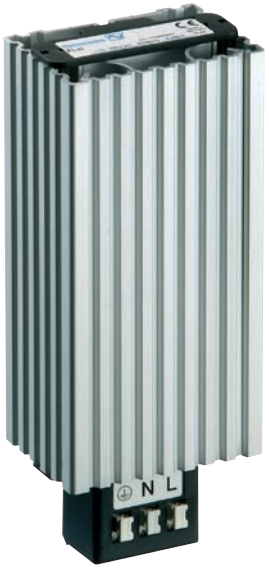
[1] voltage range 110 V - 250 V AC

● available
○ pending



Further information can be found on the Internet:
www.pfannenberg.com · **www.pfannenberg-spareparts.com**
Keep up to date. Subscribe to the newsletter now:
newsletter.pfannenberg.com

Radiant Heaters
FLH 010 – FLH 150



FLH radiant heaters are used in combination with a thermostat or hygrostat, predominantly for the avoidance of excessively low temperatures or excessively high humidity in the control cabinet. Different performance ratings from 10 to 150 Watts ensure that the correct heating power is always available.
The total required heat can be distributed in a control cabinet according to needs.
Available with either terminal or connecting cable.

Data		FLH 010	FLH 015	FLH 030	FLH 045	Unit
Article number	with terminal	17001005007	17001505007	17003005007	17004505007	
	with connecting cable	17001005017	17001505017	17003005017	17004505017	
Heating performance (Ta = +20 °C)		10	15	30	45	W
Max. surface temperature		55	65	90	105	°C
Power consumption		10	15	30	45	W
Starting current		1.0	1.1	1.2	1.8	A
Sytem of protection for intended purpose of use		IP 44 (connecting cable) and IP 20 (plug terminal connector)				
Weight		250	250	250	250	g

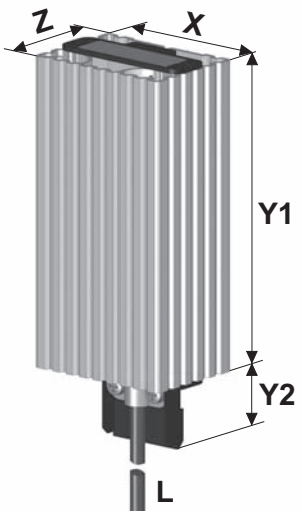
Data		FLH 060	FLH 075	FLH 100	FLH 150	Unit
Article number	with terminal	17006005007	17007505007	17010005007	17015005007	
	with connecting cable	17006005017	17007505017	17010005017	17015005017	
Heating performance (Ta = +20 °C)		60	75	100	150	W
Max. surface temperature		105	120	130	150	°C
Power consumption		60	75	100	150	W
Starting current		2.5	4.5	5.0	7.5	A
Sytem of protection for intended purpose of use		IP 44 (connecting cable) and IP 20 (plug terminal connector)				
Weight		450	510	510	770	g
Rated voltage [1]		230 V AC 50 / 60 Hz				
Functional range		110 - 250 V AC 50 / 60 Hz				
Duty cycle		100%				
Operating temperature range		- 40 … + 70 (- 40 … + 158)				°C
Storage temperature range		- 40 … + 70 (- 40 … + 158)				
Installation orientation		as desired, preferably vertical				
Device construction		aluminium profile, brightly anodised				
Type of mounting		snap fastening for 35 mm profile bars according to EN 60715				
Protection class		I				
Type of connection		connecting cable (500 mm) or plug terminal connector				
Clamping range of connecting terminal		single wire: 2 x 0.5 - 2.5 mm², fine-stranded: (tinned, with ferrule, with pin cable lug) 2 x 0.5 - 1.5 mm²				

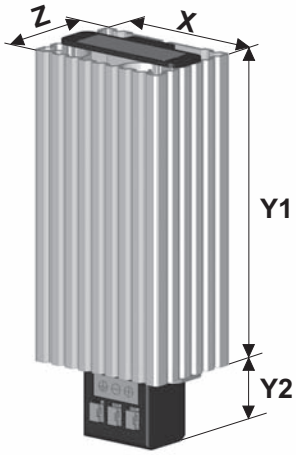
Accessories	Piece	Article number	Information on page
Thermostat	1	17111000000	208/210
Hygrostat	1	17207000000	212
Internal enclosure fan	1	18110000000	75

[1] other voltages avaibale on request
Approvals see page 195.

Dimensions

mm	FLH 010 ... 045	FLH 060 ... 100	FLH 150
X	70	70	70
Y1	65	140	215
Y2	35	35	35
Z	50	50	50
L	500	500	500





Surface temperature-limited Radiant Heaters
FLH-LST 020 – FLH-LST 050



The FLH series of radiant heaters with limitation of the radiator surface temperature consists of three versions with heating performance ratings of 20, 30 and 50 Watts.
Typical applications are to be found within building installations, where accidental contact with radiant heaters inside control cabinets is possible, where safety regulations prohibit open sources of heat, or where neighbouring structural elements are negatively influenced by the increased development of heat.

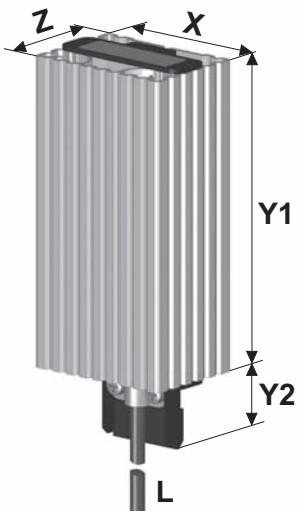
Data		FLH-LST 020	FLH-LST 030	FLH-LST 050	Unit
Article number	with terminal	17002105007	17003105007	17005105007	
	with connecting cable	17002105017	17003105017	17005105017	
Heating performance (Ta = +20 °C)		20	30	50	W
Max. surface temperature		55 [1]			°C
Power consumption		20	30	50	W
Starting current		1.1	1.2	2.3	A
Sytem of protection for intended purpose of use		IP 44 (connecting cable) and IP 20 (plug terminal connector)			
Weight		320	450	770	g
Rated voltage		230 V AC 50 / 60 Hz			
Functional range		110 - 250 V AC 50 / 60 Hz			
Duty cycle		100%			
Operating temperature range		- 40 … + 70 (- 40 … + 158)			°C (°F)
Storage temperature range		- 40 … + 70 (- 40 … + 158)			
Installation orientation		as desired, preferably vertical			
Device construction		aluminium profile, brightly anodised			
Type of mounting		snap fastening for 35 mm profile bars according to EN 60715			
Protection class		I			
Type of connection		connecting cable (500 mm) or plug terminal connector			
Clamping range of connecting terminal		single wire: 2 x 0.5 - 2.5 mm², fine-stranded: (tinned, with ferrule, with pin cable lug) 2 x 0.5 - 1.5 mm²			

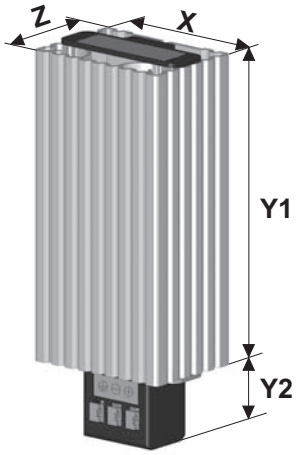
Accessories	Piece	Article number	Information on page
Thermostat	1	17111000000	208/210
Hygrostat	1	17207000000	212
Internal enclosure fan	1	18110000000	75

[1] surface temperature by a max. internal enclosure temperature of + 35 °C
Approvals see page 195.

Dimensions

mm	FLH-LST 020	FLH-LST 030	FLH-LST 050
X	70	70	70
Y1	95	140	215
Y2	37	37	37
Z	50	50	50
L	500	500	500





Mini-Radiant Heaters
FLH 010-M – FLH 030-M



The FLH Mini series of radiant heaters consists of three versions with heating performance ratings of 10, 20 and 30 Watts. The new mini-heaters by Pfannenberg are particularly suitable for use in small housings or for the heating of isolated spots in sensitive areas.

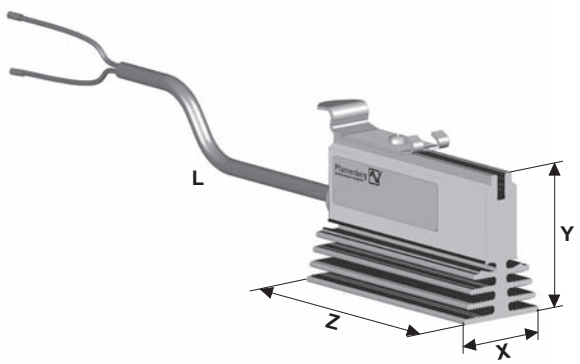
Data	FLH 010-M	FLH 020-M	FLH 030-M	Unit
Article number	17000105017	17000205017	17000305017	
Heating performance (Ta = +20 °C)	10	20	30	W
Max. surface temperature	95	115	140	°C
Power consumption	10	20	30	W
Starting current	1.0	1.1	1.2	A
Sytem of protection for intended purpose of use	IP 54			
Weight	85	120	120	g
Rated voltage	230 V AC 50 / 60 Hz			
Functional range	110 - 250 V AC 50 / 60 Hz			
Duty cycle	100%			
Operating temperature range	- 40 … + 70 (- 40 … + 158)			°C (°F)
Storage temperature range	- 40 … + 70 (- 40 … + 158)			
Installation orientation	as desired, preferably vertical			
Device construction	aluminium profile, black anodised			
Type of mounting	snap fastening for 35 mm profile bars according to EN 60715			
Protection class	II			
Type of connection	connecting cable (300 mm)			

Accessories	Piece	Article number	Information on page
Thermostat	1	17111000000	208/210
Hygrostat	1	17207000000	212
Internal enclosure fan	1	18110000000	75

Approvals see page 195.

Dimensions

mm	FLH 010-M	FLH 020-M / 030-M
X	29.5	29.5
Y	45	45
Z	50	75
L	300	300



Fan Heater
FLH 250 – FLH 400



The FLH series of fan heaters consists of two versions with heating performance ratings of 250 and 400 Watts. This type of heating is ideal for use in larger electrical enclosures. It has an integrated fan that assists the natural convection and thus provides for fast and even distribution of the heat in the control cabinet.

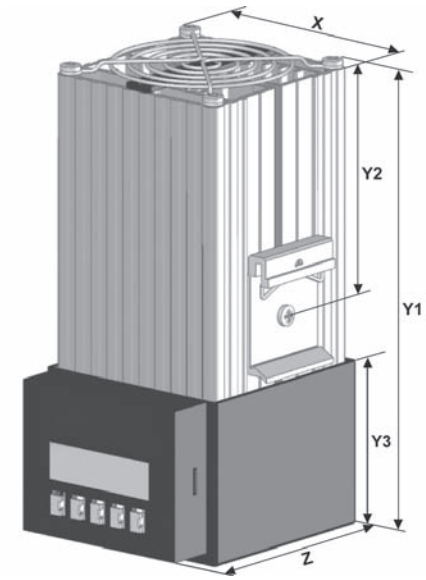
Data	FLH 250	FLH 400	Unit
Article number	17025010007	17040010007	
plus a 2nd protective grille	17025010107	17040010107	
Heating performance (Ta = +20 °C)	250	400	W
Max. surface temperature	70	85	°C
Power consumption	260	410	W
Starting current	2.2 / 1.1	3.6 / 1.8	A
Sytem of protection for intended purpose of use	IP 20		
Weight	1035	1200	g
Volumetric air flow	50 (50 Hz) / 61 (60 Hz)		m^3/h
Rated voltage [1]	230 V AC 50 / 60 Hz		
Functional range	207 - 258 V AC 50 / 60 Hz		
Duty cycle	100%		
Operating temperature range	- 40 … + 70 (- 40 … + 158)		°C (°F)
Storage temperature range	- 40 … + 70 (- 40 … + 158)		
Installation orientation	as desired, preferably vertical		
Device construction	aluminium profile, brightly anodised		
Type of mounting	snap fastening for 35 mm profile bars according to EN 60715		
Protection class	I		
Type of connection	plug terminal connector		
Clamping range of connecting terminal	single wire: 2 x 0.5 - 2.5 mm², fine-stranded: (tinned, with ferrule, with pin cable lug) 2 x 0.5 - 1.5 mm²		

Accessories	Piece	Article number	Information on page
Thermostat	1	17111000000	208/210
Hygrostat	1	17207000000	212
Internal enclosure fan	1	18110000000	75

[1] other voltages avaibale on request
Approvals see page 195.

Dimensions

mm	FLH 250	FLH 400
X	85	85
Y1	186.5	226.5
Y2	90	90
Y3	65	65
Z	104	104



Fan Heater
FLH 250 SL
FLH 275 SLM



The FLH 250 SL and FLH 275 SLM fan heater prevents formation of condensation and provides an evenly distributed interior air temperature in enclosures.

- all tests were performed according to European Norms, EN 60068-2-6 / 60068-2-27 / 60068-2-29 **Railway applications - Rolling stock equipment - Shock and vibration tests** and therefore are unique to the industry
- can be used under extreme conditions (- 40 °C…+ 70 °C)
- fan design with ball bearing: guaranteed long service life
- the heater is connected using the internal terminal connectors
- the heaters compact design make it ideal for use in enclosures where space is at a premium

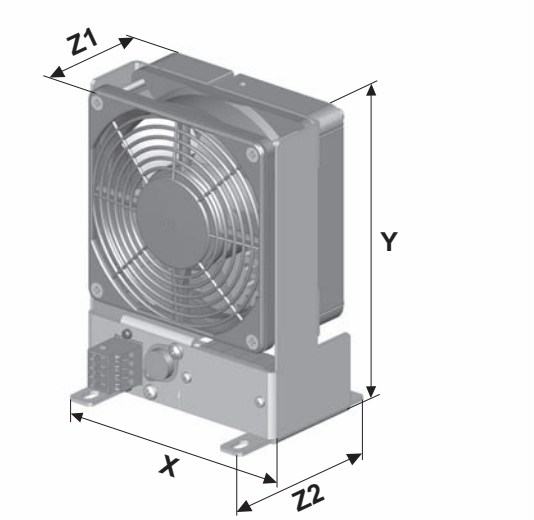
Data	FLH 250 SL	FLH 275 SLM	Unit
Article number	17025110007	17027610007	
Heating performance (Ta = +20 °C)	250	275	W
Max. surface temperature	70	70	°C
Power consumption	269	287	W
Starting current	2.4	1.5	A
Sytem of protection for intended purpose of use	IP 20		
Weight	1500	955	g
Volumetric air flow	160	50	m^3/h
Rated voltage	230 V AC 50 / 60 Hz		
Functional range	207 - 258 V AC 50 / 60 Hz		
Duty cycle	100%		
Operating temperature range	- 40 … + 70 (- 40 … + 158)		°C (°F)
Storage temperature range	- 40 … + 70 (- 40 … + 158)		
Installation orientation	as desired, preferably vertical		
Device construction	galvanised sheet steel		
Type of mounting	M6 screw fastening		
Protection class	I		
Type of connection	plug terminal connector		
Clamping range of connecting terminal	single wire: 0.08 - 4.0 mm² (AWG 28-12), fine-stranded: (tinned, with ferrule, with pin cable lug) 0.08 - 2.5 mm² (AWG 28-14)		

Accessories	Piece	Article number	Information on page
Thermostat	1	17111000000	208/210
Hygrostat	1	17207000000	212
Internal enclosure fan	1	18110000000	75

Approvals see page 195.

Dimensions

mm	FLH 250 SL	FLH 275 SLM
X	126.5	91
Y	170.5	108
Z1	75	89
Z2	103	115



Fan Heater with integrated thermostat
FLH-T



New Pfannenberg heater line with integrated thermostat. This new line has been specifically developed for demanding environments, especially wind turbines and for use in the telecommunications sector.

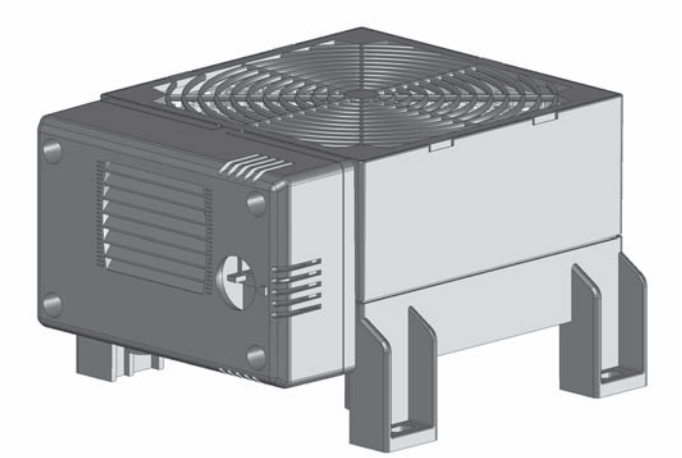
- all tests were performed according to European Norms, EN 60068-2-6 / 60068-2-27 / 60068-2-29 **Railway applications - Rolling stock equipment - Shock and vibration tests** and therefore are unique to the industry
- can be used under extreme conditions (- 40 °C…+ 70 °C)
- fan design with ball bearing: guaranteed long service life
- voltage range: 230 V / 115 V / 50/60 Hz

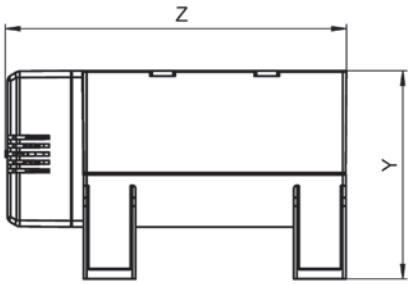
Data		FLH-T 250	FLH-T 400	FLH-T 600	FLH-T 800	FLH-T 1000	Unit
Article number	230 V	17025310007	17040310007	17060310007	17080310007	17099310007	
	115 V	17025315007	17040315007	17060315007	17080315007	17099315007	
Heating performance (Ta = +20 °C)		250	400	600	800	1000	W
Power consumption		300	450	650	850	1050	W
Starting current		0.7	2.6	3.4	4.3	5.2	A
Bearing type	fan	ball bearing					
Service life L_{10} (+ 25 °C)		52500					h
Sytem of protection according to EN 60529		IP 20					
Weight		1.0	1.1	1.2	1.4		kg
Volumetric air flow	50 Hz	160					m^3/h
	60 Hz	180					
Rated voltage		115 V or 230 V AC 50/60 Hz					
Functional range		104 - 127 V or 207 - 253 V AC 50/60 Hz					
Duty cycle		100%					
Temperature setting range		- 20 … + 40 (- 4 … + 104)					°C (°F)
Switching temperature difference		< 7					K
Switching point tolerance		± 4					
Operating temperature range		- 40 … + 70 (- 40 … + 158)					°C (°F)
Storage temperature range		- 40 … + 70 (- 40 … + 158)					
Installation orientation		as desired, preferably vertical					
Device construction		plastic UL 94V-O, black					
Type of mounting		4 x M5 screws (not included)					
Protection class		II (double insulation)					
Type of connection		2-pole terminal strip					
Clamping range of connecting terminal		2.5 mm² (AWG 14); clamping torque 0.51 Nm					

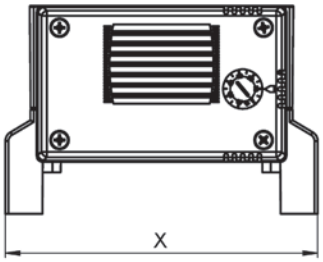
Accessories	Piece	Article number	Information on page
Hygrostat	1	17207000000	212
Internal enclosure fan	1	18110000000	75

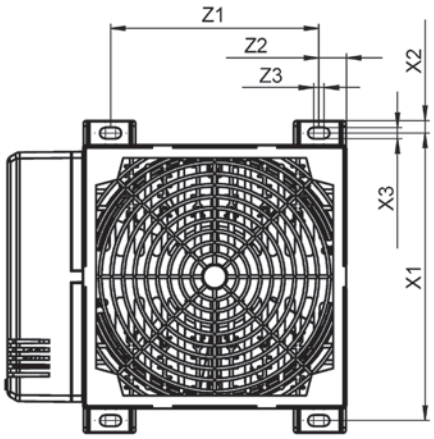
Dimensions

mm	FLH-T
X	150
X1	138
X2	6
X3	5.4
Y	100
Z	164
Z1	100
Z2	13.3
Z3	5









Thermostats
FLZ 510 – FLZ 530



The FLZ series of thermostats consists of three versions. They are available with N.C. / N.O.[1] and changeover contacts. In combination with control cabinet heaters, they serve for temperature control inside the control cabinet. In combination with filterfans, they provide for additional savings on energy, materials and time and, hence, for a better environmental balance. All in all, this results in greater reliability of the production process, reduced energy consumption due to need-based use and an improvement in the efficiency of the controlled heaters and filterfans.

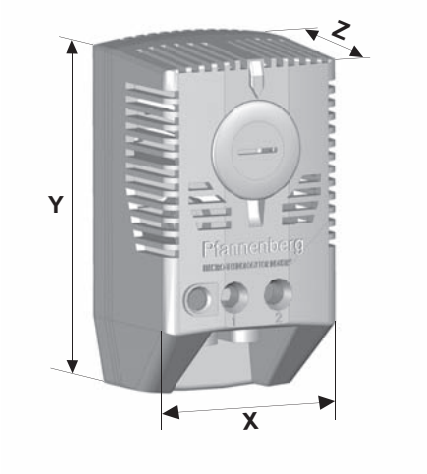
Data		FLZ 510			FLZ 520	FLZ 530	Unit
Article number	-20 °C (-4 °F) … +40 °C (+104 °F)	17103000003	17105000003	17106000003	17111000003	17121000003	
	0 °C (+32 °F) … +60 °C (+140 °F)	17103000000	17105000000	17106000000	17111000000	17121000000	
	+20 °C (+68 °F) … +80 °C (+176 °F)	17103000004	17105000004	17106000004	17111000004	17121000004	
Type of contact		changeover with spring contact			N.C. with spring contact	N.O. with spring contact	
Switching temperature difference		1[2]	3	7	< 7		K
Switching point tolerance		± 3			± 4		K
Max. switching power value in brackets: inductive load at cos φ = 0.6		N.C. 100 - 250 V AC / 10 (2)			240 V AC / 10 (2)		A
		N.O. 100 - 250 V AC / 5 (2)			120 V AC / 15 (2)		A
	DC	max. 30			max. 30		W
Operating temperature range		- 40 … + 80 (- 40 … + 176)					°C (°F)
Storage temperature range		- 40 … + 80 (- 40 … + 176)					°C (°F)
Probe type		bimetal		capillary probe (1.5 m)	bimetal		
System of protection		IP 20					
Weight		75			50		g
Type of connection		screw terminal for cable cross-section 0.5 to 2.5 mm²					
Special feature		thermal return[2]	–				
Suitable for the operation of		fan and heater			heater	fan	
Type of mounting		snap fastening for 35 mm profile bars according to EN 60715					
Colour		RAL 7035					

Accessories	Piece	Article number	Information on page
Hygrostat	1	17207000000	212
Internal enclosure fan	1	18110000000	75

[1] N.C. = normally closed / N.O. = normally open
[2] for 230 V AC operation only
Approvals see page 195.

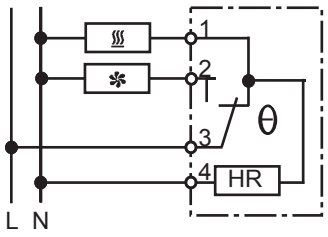
Dimensions

mm	FLZ 510	FLZ 520	FLZ 530
X	37	40	40
Y	64	72	72
Z	46	36	36

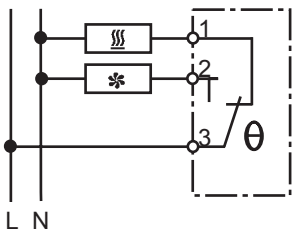


Schematics

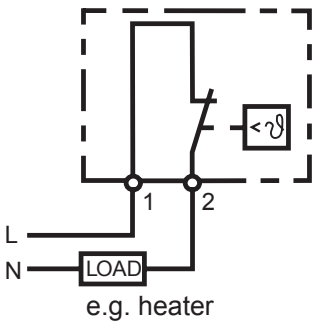
FLZ 510 1K



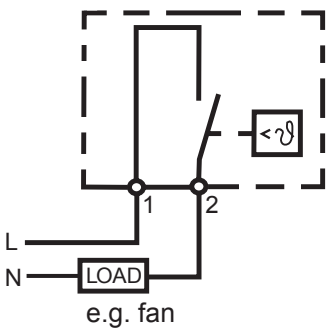
FLZ 510 3K / 7K



FLZ 520 N.C.



FLZ 530 N.O.



Twin Thermostats
FLZ 541 – FLZ 543



The FLZ series of twin thermostats integrates two independently switchable thermostats. They are available with N.C./N.O.[1], N.C./N.C. and N.O./N.O. contacts. Unlike thermostats with changeover contacts, connected devices can be switched in different temperature ranges.

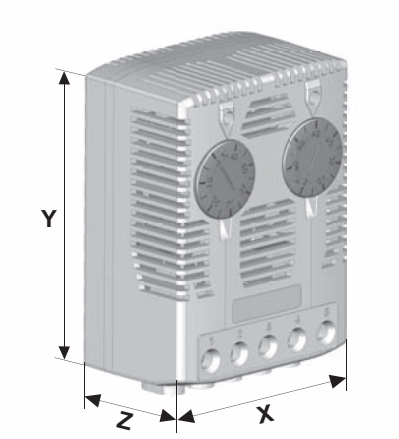
Data		FLZ 541	FLZ 542	FLZ 543	Unit
Article number		17141000000	17142000000	17143000000	
Type of contact		N.C. / N.O. with spring contact	N.C. / N.C. with spring contact	N.O. / N.O. with spring contact	
Setting range		0 °C (+32 °F) … +60 °C (+140 °F)			
Switching temperature difference		< 7			K
Switching point tolerance		± 4			
Max. switching power value in brackets: inductive load at cos φ = 0.6	N.C.	240 V AC / 10 (2)			A
	N.O.	120 V AC / 15 (2)			
	DC	max. 30			W
Operating temperature range		- 40 … + 80 (- 40 … + 176)			°C (°F)
Storage temperature range		- 40 … + 80 (- 40 … + 176)			
Probe type		bimetal			
System of protection		IP 20			
Weight		95			g
Type of connection		screw terminal for cable cross-section 0.5 to 2.5 mm²			
Suitable for the operation of		fan and heater	heaters	fans	
Type of mounting		snap fastening for 35 mm profile bars according to EN 60715			
Colour		RAL 7035			

Accessories	Piece	Article number	Information on page
Hygrostat	1	17207000000	212
Internal enclosure fan	1	18110000000	75

[1] N.C. = normally closed / N.O. = normally open
Approvals see page 195.

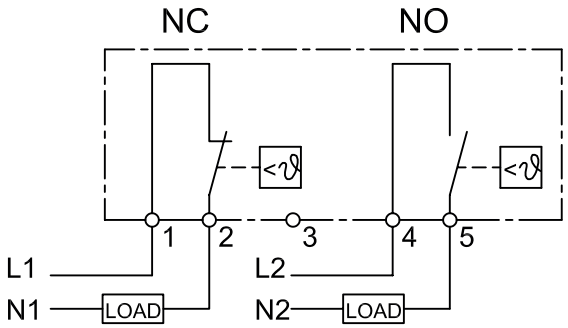
Dimensions

mm	FLZ 541	FLZ 542	FLZ 543
X	59		
Y	80.5		
Z	38		

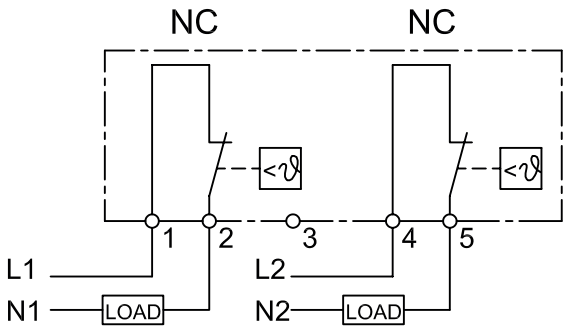


Schematics

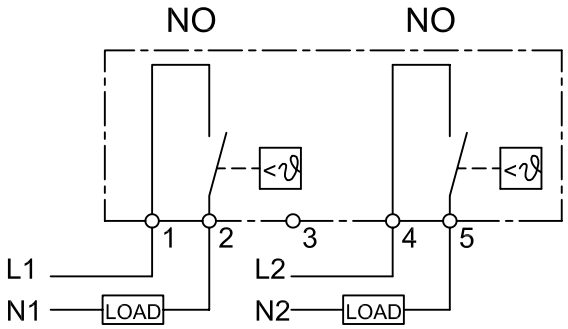
FLZ 541



FLZ 542



FLZ 543



Hygrostat
FLZ 600
Hygrostat-thermostat combination device
FLZ 610



Hygrostats from the FLZ series switch on control cabinet heaters or filterfans when a preset relative humidity is exceeded. The relative humidity is kept above the dew point and the condensation of water on electrical components and the corrosion of unprotected sheet metal is prevented. The electronic combination device unites thermostat and hygrostat in one housing and, at the same time, monitors the relative humidity and the temperature independently of each other.

Data		FLZ 600	FLZ 610	Unit
Article number		17207000000	17218100000	
Device implementation		mechanical hygrostat	electronic hygrostat-thermostat combination device	
Type of contact		changeover with spring contact	changeover/relay	
Rated voltage		–	230 V AC 50 / 60 Hz [1]	
Setting range			0 °C (+32 °F) … +60 °C (+140 °F)	
		40 - 90% R.H.	40 - 90% R.H.	
Switching temperature difference		approx. 5%	approx. 2 K ± 1 K / approx. 4% R.H. ± 1%	
Switching point tolerance		± 4[2]	–	K
Contact resistance		–	< 10	mΩ
Max. switching power value in brackets: inductive load at cos φ = 0.6	N.C.	24 - 250 V AC / 2 (0.2) A – min. 100 mA	240 V AC, 8 (3) A or 120 V AC, 8 (3) A	
	N.O.	24 - 250 V AC / 5 (0.2) A – min. 100 mA	24 V DC, 4 A	
	DC	max. 30	–	W
Operating temperature range		0 … + 60 (+ 30 … + 140)	- 20 … + 60 (- 4 … + 140)	°C (°F)
Storage temperature range		- 40 … + 80 (- 40 … + 176)		
Probe type		polyamide belt	–	
System of protection		IP 20		
Weight		55	85	g
Type of connection		screw terminal for cable cross-section 0.5 to 2.5 mm²		
Operating display		–	LED	
Suitable for the operation of		fan and heater		
Type of mounting		snap fastening for 35 mm profile bars according to EN 60715		
Colour		RAL 7035		

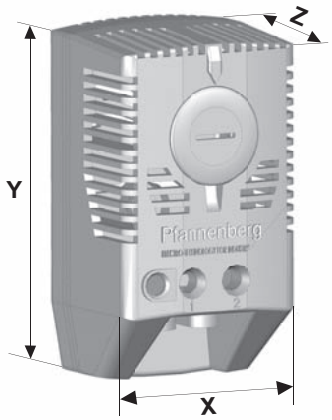
Accessories	Piece	Article number	Information on page
Thermostat	1	17207000000	208/210
Internal enclosure fan	1	18110000000	75

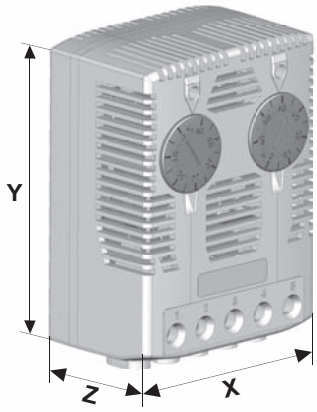
[1] alternatively available in 115 V AC (17218151000)
[2] in relation to 50% R.H.
Approvals see page 195.

Dimensions

mm	FLZ 600	FLZ 610
X	37	59
Y	64	80.5
Z	46	38

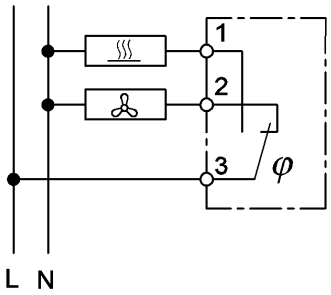
FLZ 600 | **FLZ 610**



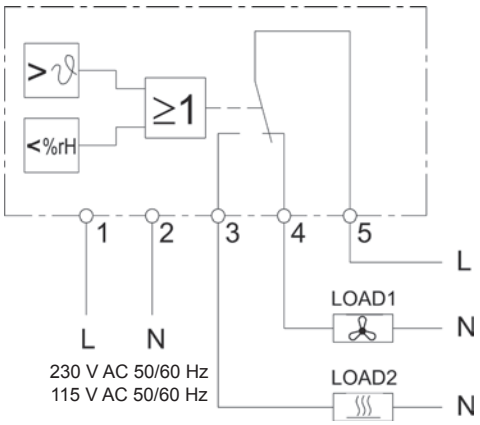


Schematics

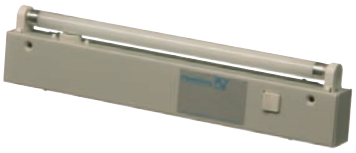
FLZ 600



FLZ 610



Pfannenberg electrical enclosure accessories



PLS Lamp Systems

A large selection of different options is available for illuminating your control cabinets. Whether with sockets, connector for door contact, integrated door limit switch or for the simple series switching of several lights - everything is possible. Light bulb covers are additionally available.



PLS-C Mains/Connection Plugs

In order to integrate the Pfannenberg lamp system simply and effectively in the switch cabinet, we offer you a series of preassembled connectors of various lengths.



PPS Sockets

For simple snap fastening to 35 mm profile bars, available in the country versions Germany, France and USA (incl. UL approval). The electrical connection is made via screw clamps up to a line cross-section of 4 mm^2 (single wire).



PPC Pressure Compensation Device

Temperature fluctuations in a housing in relation to the environment - caused by installed heat generating components and fluctuations in the ambient temperature – result in changing pressure conditions. These pressure changes can lead to the penetration of dust and humidity into the enclosure. In order to compensate for these pressure fluctuations, it is recommended to install a pressure-balancing element whilst retaining the highest protection types (up to IP 69K, high pressure/steam jet cleaning).



BR Machine Identification Lights

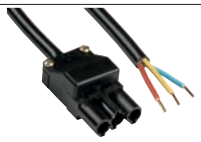
Supplementary to their air-conditioning equipment, Pfannenberg also manufactures machine identification lights for control equipment and automation systems. Irrespective of whether in the electrical industry, in medical equipment, in laboratories, in mechanical engineering or in the automation of manufacturing, Pfannenberg's signal towers are used with ever increasing frequency.
Their slim, elegant form and the quality of the components are convincing.



Internal enclosure fan

For an optimal distribution of cold air inside the control cabinet, (see page 75).

Plugs/connecting cables for PLS/PLS SL
PLS-C

	Length	Sales unit (piece)	Article number	Picture
Mains connection cable with safety plug and GST18/3 socket	1.0 m	1	17399091090	
		5	17399591090	
	3.0 m	1	17399095090	
		5	17399595090	
Mains connection cable with GST18/3 plug	1.0 m	1	17399091092	
		5	17399591092	
	3.0 m	1	17399095092	
		5	17399595092	
Mains connection cable with GST18/3 socket	1.0 m	1	17399091091	
		5	17399591091	
	3.0 m	1	17399095091	
		5	17399595091	
Connecting cable with GST18/3 plug and socket	0.5 m	1	17398089093	
		5	17398589093	
	1.0 m	1	17398091093	
		5	17398591093	
	2.0 m	1	17398093093	
		5	17398593093	

Sockets
PPS




NEMA 5-15

Data	PPS D	PPS F	PPS USA	Unit
Article number	17401000000	17402000000	17403000000	
Rated voltage	250 V AC		125 V AC	
Nominal current	10 A DC / 16 A AC		15 A AC	
Contact material	CuZn37			
Insulation material	PA			
Colour	grey			
Operating temperature	- 20 ... + 60 (- 4 ... + 140)			°C (°F)
Montage	snap fastening for 35 mm profile bars according to EN 60715			
Cable cross-section	single wire: 0.2 – 4 mm² / fine-stranded: 0.2 – 2.5 mm² / AWG 24 – AWG 12			
Insulation stripping length	8 mm			mm
Standards/approvals	IEC 83, DIN 49440-1		UL	

Pressure compensation device
PPC



Data	PPC	Unit
Article number	17410050000	
Thread	M12 x 1.5 - 10 mm	
Material	polyamide 6, O ring: perbunan	
Operating temperature	- 40 ... + 120 (- 40 ... + 248)	°C (°F)
Colour	RAL 7035	
System of protection	IP 66, 68 + 69K	
Sales unit	5	piece

Mounting support
PDR



Data	PDR	Unit
Article number	17411000000	
Fastening	self-adhesive	
Material	sheet steel, galvanised	
Operating/storage temperature	- 30 ... + 70 (- 22 ... + 158)	°C (°F)
Dimensions (HxWxD)	35 x 70 x 7	mm
Weight	approx. 25	g
Load capacity after 24h waiting period	500	

Standard Lamp Systems
PLS 008 Mini
PLS 013 Mini
PLS 014



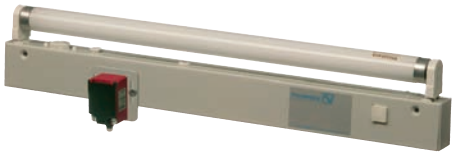
Data	PLS 008 Mini	PLS 013 Mini	PLS 014			Unit
Article number	17308210010	17313210010	17314010110	17314010102	17314010103	
Rated voltage ± 10 %	230 V 50 / 60 Hz					
Current consumption	0.07	0.11 A	0.39			A
Fluorescent tubes	8	13	14			W
Tube type	T5		T8			
Light intensity	450	640	700			Lm
Duty cycle	8000					h
Operating temperature	- 10 ... + 45 (+ 14 ... + 113)					°C (°F)
Storage temperature	- 10 ... + 45 (+ 14 ... + 113)					
Installation location	variable					
System of protection	IP 20					
Protection class	II		I			
Housing colour	white		RAL 7035			
Certification	GS (ITS)		ENEC (KEMA)			
Weight	0.17	0.26	1.31	1.22		kg
Type of connection	mains cable with plug included		cable (1.5 m)	GST 18/3 plug		
Additional connections	–			GST 18/3 socket		
				door contact	integrated door end switch	

Special Lamp Systems
PLS 015



Data	PLS 015				Unit
Article number	17315010111	17315010101	17315010102	17315010103	
Rated voltage ± 10 %	230 V 50 / 60 Hz (US: 120 V 60 Hz)				
Current consumption	0.29 (US: 0.38)				A
Fluorescent tubes	15				W
Tube type	T8				
Light intensity	720				Lm
Duty cycle	8000				h
Operating temperature	- 10 ... + 45 (+ 14 ... + 113)				°C (°F)
Storage temperature	- 10 ... + 45 (+ 14 ... + 113)				
Installation location	variable				
System of protection	IP 20				
Protection class	I				
Housing colour	RAL 7035				
Certification	ENEC (KEMA)				
Weight	1.36	1.25	1.29		kg
Socket	D				
Type of connection	cable (1.5 m)	GST 18/3 plug			
Additional connections		GST 18/3 socket			
			door contact	integrated door end switch	

Special Lamp Systems
PLS 015 SL



Data	PLS 015 SL					Unit
Article number	17315110010[1]	17315110011	17315110001	17315110002	17315110003	
Rated voltage ± 10 %	230 V 50 / 60 Hz (US: 120 V 60 Hz)					
Current consumption	0.29 (US: 0.38)					A
Fluorescent tubes	15					W
Tube type	T8					
Light intensity	720					Lm
Duty cycle	8000					h
Operating temperature	- 10 ... + 45 (+ 14 ... + 113)					°C (°F)
Storage temperature	- 10 ... + 45 (+ 14 ... + 113)					
Installation location	variable					
System of protection	IP 20					
Protection class	I					
Housing colour	RAL 7035					
Certification	ENEC (KEMA)					
Weight	1.43	1.28	1.30	1.32	1.35	kg
Type of connection	cable (1.5 m)		GST 18/3 plug			
Additional connections		GST 18/3 socket				
				door contact	integrated door end switch	

Special Lamp Systems
PLS 008 SL



Data	PLS 008 SL					Unit
Article number	17308110010[1]	17308110011	17308110001	17308110002	17308110003	
Rated voltage ± 10 %	230 V 50 / 60 Hz (US: 120 V 60 Hz)					
Current consumption	0.16 (US: 0.25)					A
Fluorescent tubes	8					W
Tube type	T5					
Light intensity	450					Lm
Duty cycle	8000					h
Operating temperature	- 10 ... + 45 (+ 14 ... + 113)					°C (°F)
Storage temperature	- 10 ... + 45 (+ 14 ... + 113)					
Installation location	variable					
System of protection	IP 20					
Protection class	I					
Housing colour	RAL 7035					
Certification	ENEC (KEMA)					
Weight	0.89	0.75		0.78	0.82	kg
Type of connection	cable (1.5 m)		GST 18/3 plug			
Additional connections		GST 18/3 socket				
				door contact	integrated door end switch	

[1] without socket GST 18/3


Spare parts
Maintenance
Pfannenberg
Global Services
Commissioning
Product
validation



Customised Services for your Thermal Management

Pfannenberg Global Services

In order to ensure the trouble-free functioning of your production process, Pfannenberg maintains a global service network of competent partners. True to the company's motto 'safety for man, machine and the environment' we offer a broad range of additional services besides pure sales, which are available worldwide, fast and individually tailored to your company's requirements.

Ask us about our services: call +49 40 734 12-0 or send an email to technical.support@pfannenberg.com. Our Service Management will be pleased to offer you comprehensive and competent advice.

Our service prolongs the availability of your machines

Maintenance

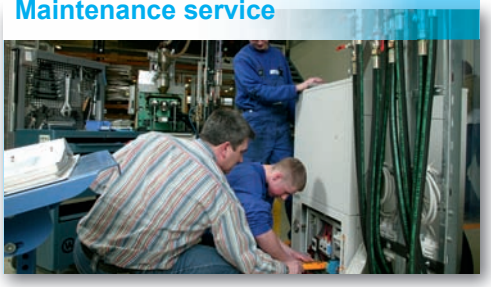
Pfannenberg's products are designed and manufactured to the highest quality standards. That pays off for you - in the form of particularly long running times, even under extreme operating and environmental conditions. In addition to that, the taking out of a service contract ensures the optimal functioning of our products and prevents expensive downtimes. Regular maintenance just once or twice per year already significantly reduces the probability of failure and contributes to a considerable improvement in machine availability.

In addition, our service supports you in the optimisation of your plants and production with equipment cleaning, inspections and further maintenance measures.

Regular service



Maintenance service



Maintenance includes:

- **checking the essential functions of the unit**
- **checking and exchanging consumable parts**
- **performance of necessary cleaning**
- **readjustment of control and regulating modules**
- **provision of tools and measuring instruments**
- **preparation of a maintenance report and a list of any parts needed for repairs**

NATURALLY EFFICIENT.

Regular maintenance ensures the high energy efficiency of Pfannenberg products. That lowers your energy costs and also benefits our environment.

Maintenance frequency

Regular maintenance is necessary even for the most reliable devices. Depending upon operating conditions, individually adapted maintenance intervals can significantly increase operational reliability and availability. You can be safe with your individual service level within the context of a service contract.

Warranty extension is your security

By taking out a service contract it is possible to extend the warranty on your Pfannenberg product up to five years. Depending on your chosen level, the warranty period amounts to ...

Level 1 ... 2 years

Level 2 ... 3 years

Level 3 ... 5 years.

Spare and consumable parts

Spare part availability

Pfannenberg ensures the short-notice, global availability of its consumable and spare parts, so that they can be delivered quickly to you if need be. No matter where in the world you need them.

Four different options are available, depending upon needs:

Standard order Level 1

Standard spare parts are always on stock in at least one of our service centres and are dispatched within 24 hours.

Manufactured spare parts are not always in stock and are in part only manufactured to order (procurement time up to 48 hours).

Custom spare parts are only special ordered.

Part stock at Pfannenberg Level 2

On request, customer-specific spare part stock can be set up in the Pfannenberg service centres. This makes particular sense in the case of non-standard spare parts. These parts are dispatched within 24 hours when needed.

Part stock at your premises Level 3

In order to guarantee the maximum availability of your production plants, defined parts can also be stocked at your own premises. This way they are always immediately available at the place of use.

Online Spare Parts Shop

www.pfannenberg-spareparts.com

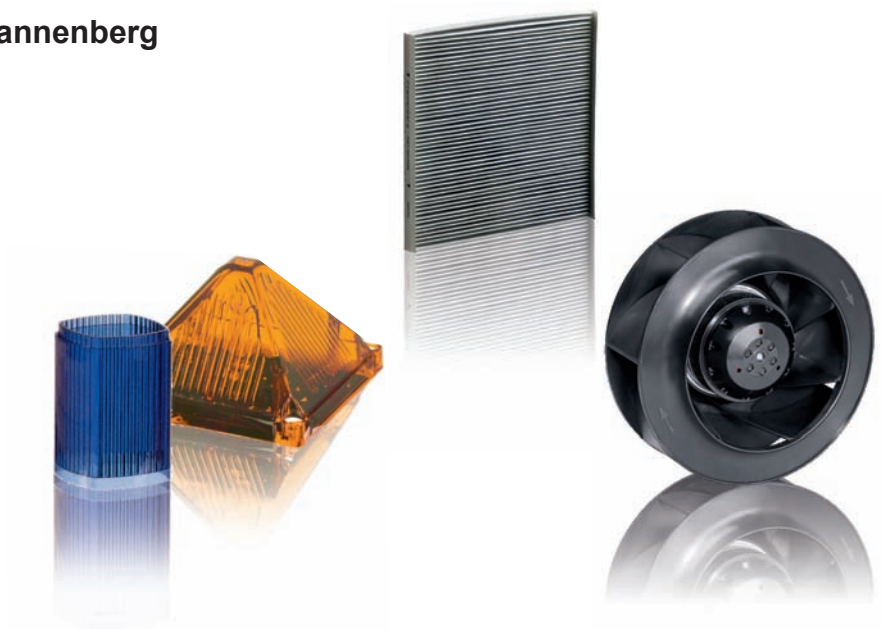
Online parts ordering by mouse click; search comfortably, find quickly, order directly - from anywhere in the world. Ordering that is handy, fast and reliable.

Simply click **www.pfannenberg-spareparts.com** and enter the desired part into the search function, or directly enter the part number of the desired part. The price and shipping costs will be displayed to you immediately. Ordering original parts from Pfannenberg is as simple as that.
From anywhere in the world, 24 hours a day, 7 days a week.

Wherever you are in the world, the Pfannenberg Online Spare Parts Shop delivers to you quickly, comfortably and reliably.

Only with original parts from Pfannenberg can you be sure that ...

... they are the correct parts
... they fit
... they are available
... they can be delivered quickly
... you won't lose valuable time
... their proper function is guaranteed
... your warranty remains intact



Before commissioning – call Pfannenberg

Pfannenberg offers you worldwide professional commissioning in order to avoid malfunctions and damage to machines right at the start of production. Incorrect installations otherwise pose the danger of causing expensive machine failures and losses of production, in particular under the complex conditions for water chillers.

We offer you the professional commissioning of your cooling systems anywhere in the world.

Our service technicians support you in:

- **the conversion, expansion or relocation of your existing cooling solution**
- **questions of technical support for your cooling applications**
- **commissioning of new devices in your manufacturing facilities**
- **organisation and completion of commissioning**

Training courses

In order for your employees to develop a better understanding of thermal management technology, we also offer training courses.

This allows your employees to recognise malfunctions faster and to make the correct decisions for the repair and resumption of production with greater reliability. The result is more economical operation of the systems with less trouble.

Pfannenberg's range of services therefore includes practical training courses, in which suitable methods of assistance are learned and fast intervention in the case of faults is practised. These training courses are held at Pfannenberg, but of course they can also take place at your company.

The standard contents of a training course are:

- **general information on refrigeration technology (circuit, components, functional sequences)**
- **the refrigeration unit - in direct relationship to the customer's application**
- **commissioning of a refrigeration unit and the customer's system**
- **fault simulation, fault recognition**
- **remedial actions in the event of faults during commissioning**
- **information about making contact in the event of a fault**
- **information about the work processes and the flow of documentation in the event of a fault**



Use our knowledge for putting your product ideas into practice

Product development

Benefit from the Pfannenberg R&D service for the testing of your own product ideas, e.g. during component development in the fields of system air conditioning, thermal management and signaling. Here, we can place the complete range of services of a well-rehearsed engineering consultancy at your disposal – to suit your needs and pocket. This way you can put your own ideas into practice, even if you have neither the resources nor the experience necessary to be able to do so.

That gives you several advantages at once. On the one hand, you can fall back on external know-how and rely on a professional team of specialists. On the other, you lower your fixed costs, since you do not tie up any of your own R&D capacities for long periods and do not need to take care of staffing issues. Instead, you can concentrate 100% on your own core competency.

Air test facility



Our R&D department offers to you the complete service of an engineering consultancy:

- **conception**
- **development of specifications and test plans (design)**
- **design**
- **flow simulation (CFD)**
- **prototype construction**
- **validation of prototypes with regard to relevant requirements**
- **production of the design and manufacturing documents**

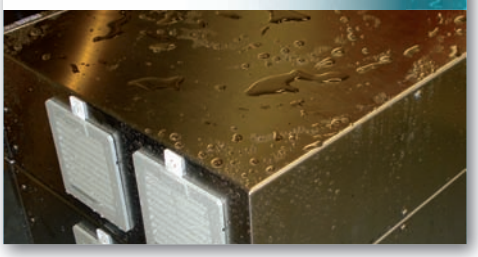
We put your products through their paces

Product validation

Many companies are very reluctant to invest in efficient test laboratories because both their acquisition and maintenance are too cost-intensive given the infrequency of their use. The inexpensive alternative is to use Pfannenberg's test laboratories. There is no need to maintain any permanent testing facilities at your company, but you still have access at all times to professional testing facilities, including expert technical staff.

In order to test the characteristics of your products in detail, we place an extensive range of services at your disposal.

IP test equipment





Further information can be found in our new Service Flyer.
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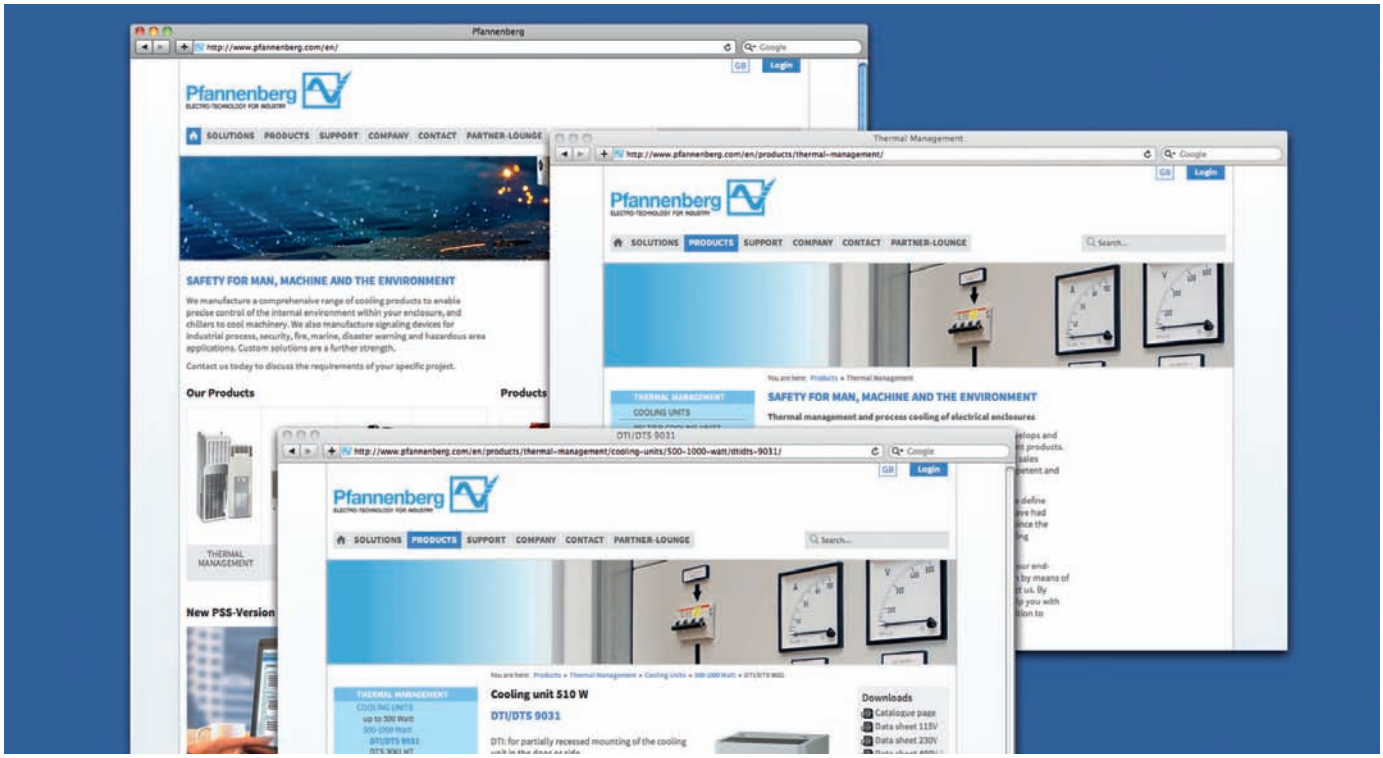
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Our special service to you: the download area! With a mouse click here you can conveniently download data sheets, operating manuals, drilling templates and construction drawings to your PC and print them out.

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Thermal Management & Signaling Technology

You can also benefit from Pfannenberg’s long-standing competence in the field of signaling technology. You too will be convinced by our economical solutions.

We look forward to your call or just send an email to: **customercare@pfannenberg.com**. Order your ‘signaling’ catalogue today.

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- **Flashing lights**
- **Sounders**
- **LED lights**
- **Signal towers**
- **Traffic lights**
- **Ex-ATEX signaling devices**
- **Obstruction lights**

Do you require further information?

Do you have any questions on our products and services? Would you like to arrange an appointment with one of our technicians? Do you require further information? Then just call us on **+ 49 40 7 34 12 - 0** or send an email to **info@pfannenberg.com**.

You can also fill in this fax form and send it to the number shown below. Whichever way you choose to contact us, we will respond promptly to your questions, requests and suggestions.



+ 49 40 7 34 12 - 101

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Contact person	
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Post code/town	
Country	
Email	

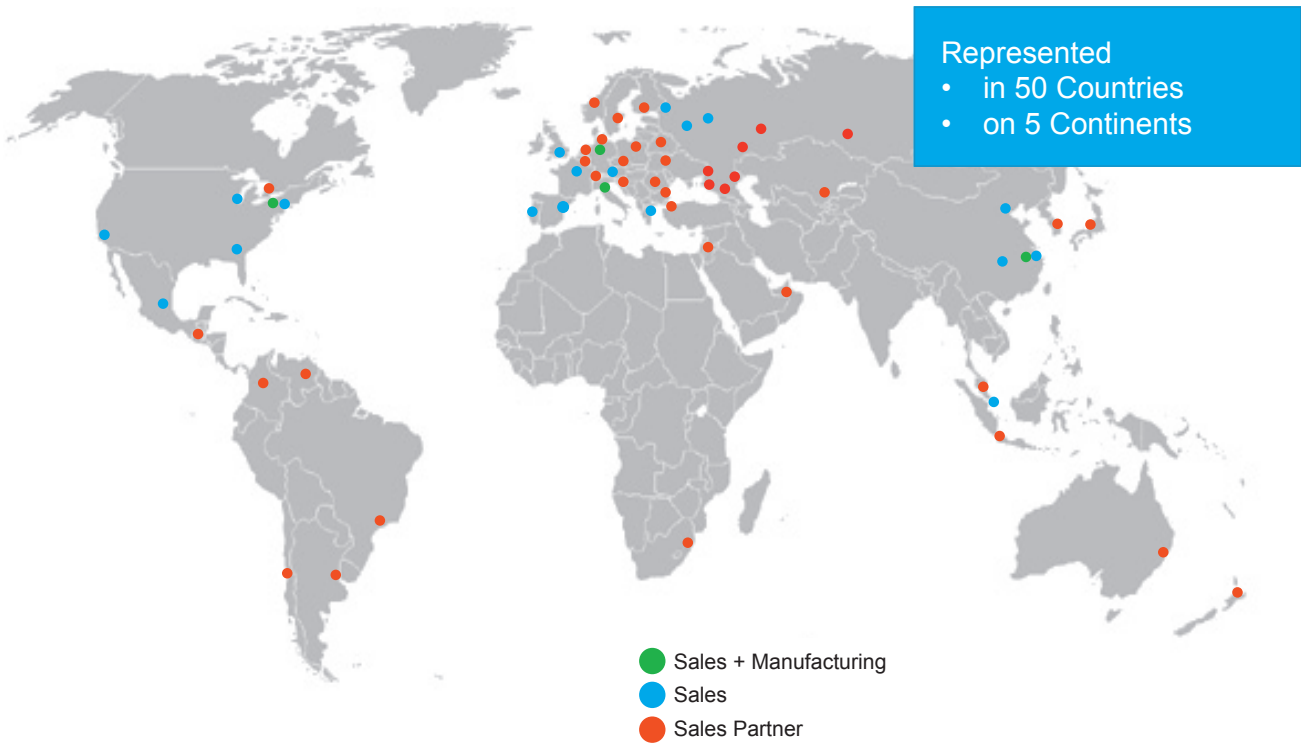
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My suggested date:	

My concern is as follows:

Pfannenberg – worldwide expertise in thermal management and signaling technology



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Main catalogue · Edition 13



Indication



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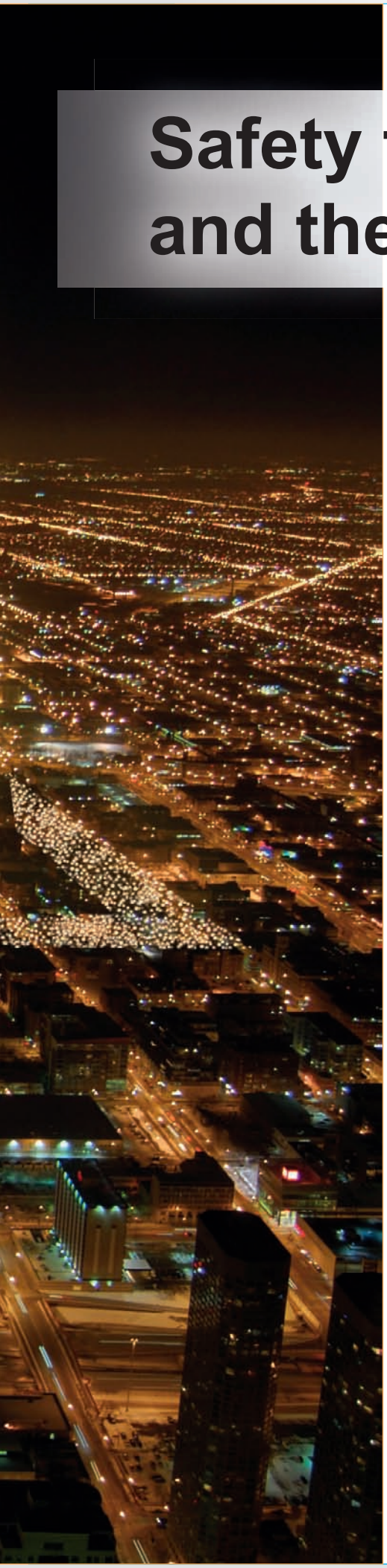


Alarm

SHARING COMPETENCE

Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY





Safety for man, machine and the environment

Pfannenberg is your reliable and competent partner when it comes to visual and acoustic indication, warning and alarm signals

Hardly any other company worldwide can comprehensively advise you in this area and supply you from one source the way Pfannenberg can. With the new innovative signaling product series, PATROL, Pfannenberg clearly sets new standards. We are pleased to present this new series to you. Thus, we now cover the complete industrial range. We offer you standard solutions from one source, as well as, if desired, countless customized solutions.

Pfannenberg's utmost priority is to know and really understand our customers' requirements in order to be in a position to tailor and optimise our products and services to suit your needs. That also applies to our new business sector, Global Services, which is particularly valuable in the signal technology sector. Our product specialists will be pleased to offer you comprehensive advice on your special requirements.

Following the concept of 'Sharing Competence' employee potentials unite to form products to suit needs: regular training, seminars and many years of experience put our employees in a position to conduct dialogue with customers professionally, in a goal-orientated manner and to achieve the best results and at a high level when solving tasks. Likewise, the experiences and knowledge gained are proactively made available and are in demand; hence, the organisational development at Pfannenberg is not only permanently promoted, but also shared.

Last but not least, energy efficiency also plays a large part in the newest generations of our devices. Ultimately, we feel obliged to remain true to our company motto: 'Safety for man, machine and the environment!'.

With best wishes

Andreas Pfannenberg
CEO



SHARING COMPETENCE

Reliable signaling devices – indispensable for machines, plants and buildings

‘Safety for man, machine and the environment’ is always priority at Pfannenberg GmbH. In order to ensure this, absolutely reliable signaling devices are indispensable.

Whether in factory buildings, on machines, aboard ships or on large structures, motorways, bridges and in tunnels – Pfannenberg signals warn everywhere of danger, fire, accidents or technical defect. For decades, Pfannenberg has been reliably protecting the most precious commodity of all - human life. Early detection of failures and the associated alarm signals are also indispensable for a trouble-free production process. Usually, priority is to minimise process disruptions and dangerous situations, which require an alarm. Unfortunately, this can never be completely avoided and it is therefore, important to take precautions.

As a result, not only will the risk of an accident be reduced, but unnecessary downtime or interruptions will be minimised, thus guaranteeing continuity and preventing unnecessary costs.

A signal device is not just an accessory for production equipment, machines or buildings, which serves to fulfill applicable regulations. Over and above that, it can also help to optimise company processes and to avert danger. Accordingly, functional reliability is extremely important in an emergency. The motto ‘not just any old device, but the right device’ should be the motto when choosing the right signaling device. Pfannenberg is proud to support its customers in selecting the right signaling device to suit their needs.

Benefit from our competence.



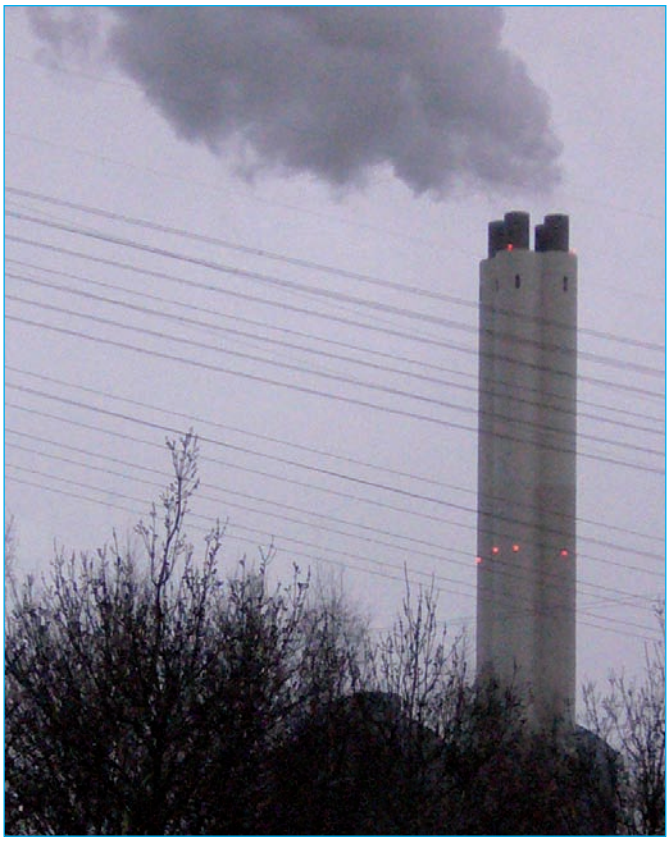


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5 good reasons to choose Pfannenberg

Absolute safety

The Pfannenberg Group's signaling technology is innovative, modern and durable. It offers absolutely secure alarm ability.



Photo: ©Marit Peters/PIXELIO

All-round care

Pfannenberg has organised sales in 42 countries on all 5 continents, thus ensuring optimal support. Whether it's about on-site service, comprehensive application advice or the creation of individual solutions, Pfannenberg offers its customers top support around the clock and around the world in the respective national language.

Reliability and innovation

The Pfannenberg Group's corporate values are reliable parameters for all customers: highest efficiency in all business processes, energy-saving products and maintenance-free solutions go hand-in-hand with environmental and social consciousness, as well as fairness in dealing with business partners and employees.
Pfannenberg is a family-owned company in the second generation. It has a long-standing tradition of outstanding innovative product developments, such as shock-resistant and energy-efficient flashing LED lights, wall-penetrating sounders, self-monitoring alarm signals for machines and cost-optimised rotating mirror lights.



Individual advice

The Pfannenberg Group offers its customers the necessary competence for individual solutions in the most diverse branches of industry (examples):

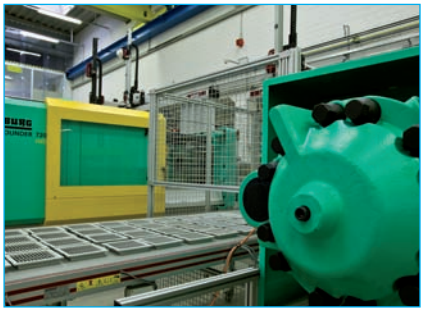
• Machine safety	– Function-monitored flashing lights
• Renewable energies	– Voice alarms in bio-gas combined heating and power plants
• Building equipment	– Obstruction lights
• Fire prevention	– Acoustic alarms in gas-fired power stations
• Art illumination	– Illumination of the Eiffel Tower with 20,000 flashing lights



Photo: ©JuwelTop/PIXELIO

Production around the world

The Pfannenberg Group is constantly optimising its production in order to directly serve customers all over the world on a local basis and to establish a strong network. Pfannenberg links its production in Germany, Italy, USA and China optimally to plastics processing, state-of-the-art sheet metal working and VdS-approved manufacturing.
Our own environmental simulation laboratory enables the manufacturing of 'tested' products for the most extreme application conditions, naturally also with VdS and UL approval.



Plastic injection moulding plant, Pfannenberg, Hamburg

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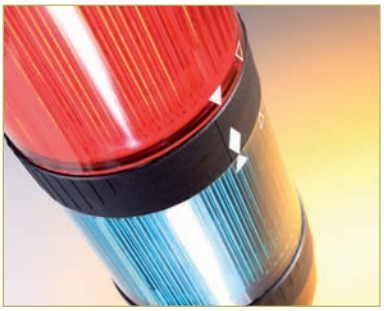
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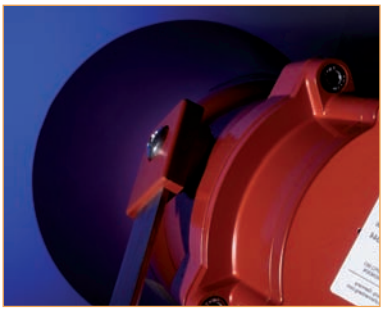
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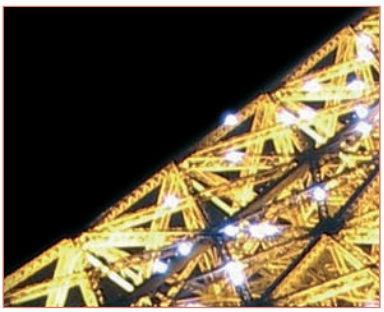
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New Products



Sounder series PATROL

PATROL - the new generation of sounders.
Three dimensional innovation.

- **Safe** - an incorrect installation is virtually impossible
- **Easy** - significantly shorter assembly and installation times
- **Economical** - extremely high efficiency and good penetration of acoustical obstacles significantly reduce the required number of sounders

PA1, PA 5 136
PA 10, PA 20 138



PATROL series signaling combinations

The new combi-devices are not only impressive due to the advantages of the PATROL series and the nicely shaped design:

- Pre-wired sounder and light ex works
  - electrical connection only in sounder part
- Matched flash intensity - for combination flashing sounders, higher dB rated sounders are complemented with higher energy flashing lights

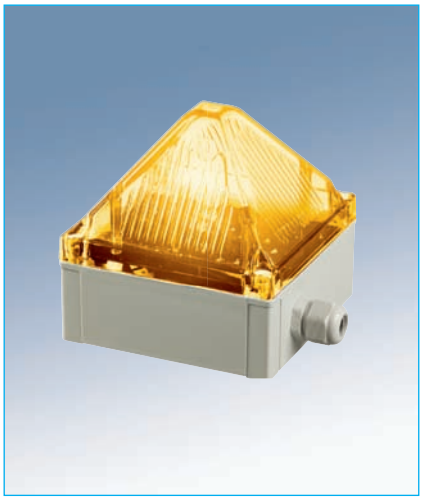
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PA X 10-10, PA X 10-15,
PA X 20-10, PA X 20-15 170



Flashing light series PY X-S-05

The compact flashing light is not only adaptable to many applications, but it is also impressive due to its safe and easy mounting.

PY X-S-05 58

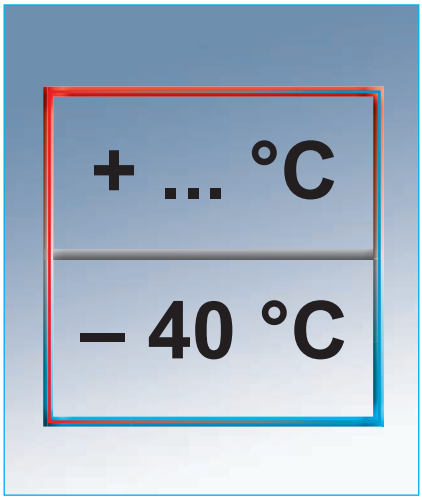


LED multi-function light Quadro-LED-HI

Designed for tough requirements under industrial conditions.

- innovative LED light with large signaling effect
- suitable for indoor and outdoor use
- extremely insensitive to shock and vibration
- internally and externally selectable operating mode as standard
- 3 different signal options can be selected:
  - continuous light
  - blinking light
  - flashing light

Quadro-LED-HI 74



Expansion of the operating temperature range

Expansion of the operating temperature range to - 40°C for a variety of products for global utilization.

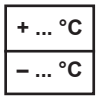


Obstruction light series POL

The new generation of obstructions lights for flight safety.

POL 10, POL 32 106
POL 170, POL 2.000 108
POL 2.000, POL 20.000 110

Pictograms



Operating temperature range.
Highest and lowest temperature values ensured by the technical data.



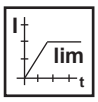
Protection system specification according to DIN EN 60529. General information on the protection of electrical equipment against contact, foreign particles and water. Devices with IP 54 can be used outdoors.



Impact-proof housing.
Protection system specification according to DIN EN 50102.



Activation input with
opto-coupler 24 V DC / 2 mA.



Equipment with inrush
current limitation.



Optional flash rate
(standard: 60 flashes/min.).



Protective cage made of rustproof metal.
Active protection against contact and sabotage, plus operation under ‘tough‘ conditions.



External flash monitoring for visual alarms. The flash is detected and monitored via a fibre-optic cable. In the case of a malfunction, an alarm is given in the form of a ’normally closed function’ (floating contact).



Volume control.
For the optimal adaptation of the signal to the surroundings and the avoidance of startled reactions.



Optional brightness,
e.g. 3 Joules.



External tone selection.
For controlling various types of tones in a device.



Reception range of the signaling device, within which the signal is adequately perceived.



Synchronous operation of several signaling devices. Light pulses or tones are rendered in absolute synchronisation.



Noise level reduction by means of external switch.



Light sensor.
Automatic adjustment to the ambient light.



Acoustic penetration.
Excellent acoustic penetration of acoustic obstacles such as walls and doors.

Approvals and test symbols

Germanischer Lloyd

Germanischer Lloyd sets standards in technology, quality and safety for shipping and industry. Germanischer Lloyd is additionally a leading certifying body in the fields of wind power, environmental protection, the oil and gas industry and building technology.

C UL US
LISTED

The Underwriters Laboratories test and register products in accordance with the requirements of the North American market. The approvals are valid for the USA and Canada.

VdS

VdS-Zulassung
VdS Schadenverhütung GmbH

The Verband der Sachversicherer (VdS) [= Association of Material Insurers] tests and certifies components for facilities dealing with damage prevention. The VdS guidelines contain requirements for components used for protection against fire and burglary.

GOST

GOST certification applies to products tested in accordance with the requirements and standards of the Russian Federation. The GOST standards cover over 20 industries.

Russian Maritime Register of Shipping (RS)

The Russian Maritime Register of Shipping sets the standards for technology, quality and safety for shipping and industry in the Russian Federation. It additionally functions as a certifying body, for example in the fields of defence, the oil and gas industry and building technology.

PTB

The ‘Physikalish-Technische Bundesanstalt’ (PTB) [= Federal Physical/Technical Institute] is a material testing and calibrating body. It is subdivided into several laboratories and, among other things, tests and approves technical equipment for potentially explosive areas. The existing CENELEC standards form the basis. The PTB is the authorised EU testing body for the Federal Republic of Germany.

Bundesamt für Wehrtechnik und Beschaffung

The ‘Bundesamt für Wehrtechnik und Beschaffung’ (BWB) [= Federal Office of Military Equipment and Procurement] administers and catalogues the technical equipment of the armed forces. Affiliated to it are technical defence authorities and arsenals, in which type testing is carried out in accordance with VG standards. These materials are listed in the SAK catalogue.

Ex

Products marked with the Ex test symbol and test number are approved for use in potentially explosive areas (further details from page 194 onward).

ASi INTERFACE

The AS-i (Actuator Sensor Interface) is an inexpensive, fast bus system for the transmission of data and energy that reduces cabling and saves on I/O cards and terminal strips. AS-Interface products conform to the EN 50295 and IEC 62026-2 specifications.

The ‘International Civil Aviation Organization’ sets standards for technology, quality and safety in international air traffic.
The ‚Allgemeine Verwaltungsvorschrift zur Kennzeichnung von Luftfahrthindernissen‘ (AVV) [= General Administrative Rules for the Identification of Aviation Obstacles] sets the standards for technology, quality and safety in air traffic in Germany.

Schweizerische Eidgenossenschaft

The Bundesamt für Verkehr (Federal Ministry of Transport) governs public transportation in Switzerland. It covers transport by rail and cable car, freight trains, buses and ships.

EN 54-3

The European standard for the approval of acoustic alarms in fire protection facilities.

EN 54-23

The European standard for the approval of visual alarms in fire protection facilities.



SIGNALING TECHNOLOGY

Pfannenberg supplies the entire range of signaling technology from one source, regardless for which application and area of use you want to implement the device. Furthermore, we offer appropriate solutions that are customized to the relevant requirements of the various areas of signaling technology:

- Indication
- Warning
- Alarm



E. g. operation display of a machine informs the operator by means of a signaling device. These types of devices inform personnel who are nearby. These devices are not used for the indication of dangerous situations.

The signaling can, e.g. contain the following information:
- status of a machine, process, test procedure
- lack of ingoing material / material supply is in danger
- quality defect, good / defective information
- process has ended, standby position
- notification and display of errors
- display of room occupancy



E. g. as a start-up signal for a machine.
These types of devices warn about situations that could occur.

The warning can, e.g. be executed for the following events:
- caution: Critical status, proceed with caution
- ready for handling
- attention is necessary
- dangerous situations can occur when no measures are in place
- corrective action is necessary within a suitable amount of time
- warning of economic and health damages
- process is outside the normal operating limit but within an acceptable error limit
- a status change is being executed

Reaction of the user: Monitor and / or take corrective action



E. g. the evacuation alarm in case of a fire. Devices of this nature generate an alarm for emergency situations and have the highest priority.

The alarm can, e.g. be executed for the following events:
- a dangerous situation has already occurred
- danger of life and limb
- acute health risk
- risk for the environment
- abnormal process status
- exceeds maximum tolerance limits

Reaction of the user: Immediate reaction is necessary

Protection system



IP protection system

The protection system for devices in accordance with DIN EN 60529 (DIN VDE 0470 IEC 60529) indicates suitability for various environmental conditions.

1st digit	Protection against foreign particles	2nd digit	Protection against water
0	no protection	0	no protection
1	large foreign matter (Ø from 50 mm)	1	vertically dripping water
2	medium-sized foreign matter (Ø from 12.5 mm, length up to 80 mm)	2	water dripping at an angle (up to 15°)
3	small foreign matter (Ø from 2.5 mm)	3	falling spray water up to 60° from the vertical
4	foreign matter in the form of grains (Ø from 1 mm)	4	spray water from all sides
5	dust deposits in non-damaging quantities	4k	spray water from all sides under increased pressure; applies only to road vehicles
6	no entry of dust	5	Water stream (jets) from any angle
		6	strong water stream (jets) (flooding)
		6k	strong water stream (jets) under increased pressure (flooding); applies only to road vehicles
		7	temporary immersion
		8	permanent immersion
		9k	high pressure water/steam cleaning; applies only to road vehicles



Comparison of NEMA and IEC protection systems – classification

The ‘National Electrical Manufacturers Association’ (NEMA) sets standards and norms in the USA.

NEMA protection system	Protection	IEC protection system
1	falling dirt	IP 10
2	dripping water and falling dirt	IP 11
3	wind-blown dust, rain and hail; no damage due to external ice formation	IP 54
3 R	rain and hail; no damage due to external ice formation	IP 14
3 S	wind-blown dust, rain and hail; also usable in the case of external ice formation	IP 54
4	wind-blown dust, rain, spray water and water streams; no damage due to external ice formation	IP 56
4 X	wind-blown dust, rain, spray water and water streams; no damage due to external ice formation, protection against corrosion	
5	dust, falling dirt, dripping non-corrosive fluids	IP 52
6	water streams, temporary immersion; no damage due to external ice formation	IP 67
6 P	water streams, longer periods of immersion	IP 67
12 and 12 K	swirling dust, falling dirt, dripping non-corrosive fluids	IP 52
13	dust, spray water, oil, non-corrosive fluids	IP 54

Please note: IP and NEMA codes are not directly, but rather only approximately, comparable

Life cycle – Maintenance-free

Life cycle

The life cycle of Pfannenberg signaling devices is defined as follows:

Xenon flashing lights

When the light emission from the flash tube has decreased by 30% after a certain number of flashes. The tube is still not defective, but has become darker (can only be measured with electronic measuring instruments). On account of the special Pfannenberg capacitors and flash tubes, as well as many years of experience in flashing light technology, Pfannenberg lights have a very long life cycle (light emission still 70% after up to 12 million flashes).



LED lights

LEDs have a very long life cycle of more than 50,000 hours. Like flash tubes, LEDs are not defective after reaching the end of their service life, but rather the light output is reduced by a certain proportion. Thanks to the careful dimensioning of the LED lights, taking into account all environmental influences, Pfannenberg lights attain a much longer life cycle.



Maintenance-free

We guarantee a very long, completely maintenance-free service life for sounders. This is due to the fact that no mechanically wearing parts are used.



Pfannenberg signaling technology protects people

The field of signaling technology is essentially made up of three product sectors. People are warned by purely visual alarms and, on the other hand, by purely acoustic alarms. The third sector, which is growing strong, is the combination of visual and acoustic signals.

This is the most reliable way of informing operators or users. Due to their extreme sturdiness and the associated durability and freedom from maintenance, Pfannenberg signaling devices are frequently found in extreme applications, whether it be in the toughest of environmental conditions or in demanding mounting locations.

Note: Like in other electronic devices, a greatly increased current can flow for a very short moment when flashing beacons switch on. Many devices featuring initial current limitation are available in the Pfannenberg range for special requirements; we will be pleased to help you select the right device.

On the following pages you will find further valuable information on the optimum selection and use of Pfannenberg signaling devices for machine safety, building technology, obstruction lighting, automation technology, fire alarms and much more.





SIL/PL-Compliant Signaling Technology

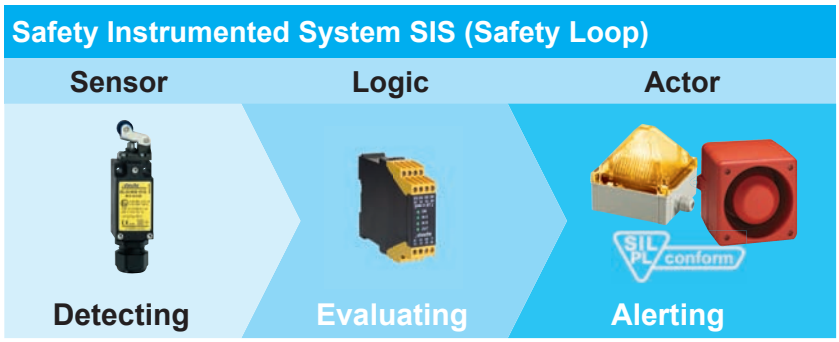
With the new Machinery Directive, which will apply Europe-wide from 2010 onwards, there will be a change in the requirements for machine safety. More than ever before, certification and market opportunities depend on safety-related products. The new SIL/PL-conform alarm devices from Pfannenberg give machine and plant manufacturers more planning safety; the acceptance process is simplified and accelerated.

The goal of the new standards is risk minimization in the operation of machines to avoid harm to persons. Naturally, the availability of the machine and plant is also increased as a result, which on the other hand has a positive effect on the TCO-evaluation, with immediate effect, probability considerations will henceforth also play a role in the determination of component safety. **SIL** (Safety Integrity Level) and **PL** (Performance Level) have become central terms in the categorisation of risks and safety.

In many cases, purely constructional measures on the machines don‘t go far enough to minimize risk. **In order to keep the existing residual risk of a machine or a plant low, reliable alarms are required, which draw attention to hazards through visual or acoustic warning signals.** For example, as a start-up warning or in muting operation, while protective functions have been disabled. Alerting of personnel in case of gas or chemical leaks requires 100% operational reliability of the signaling devices.







Causes of work accidents at machines

The statistics on the cause of work accidents show a clear picture: Human error is responsible for half of all accidents. These have to be reduced further by means of secure alarm raising.

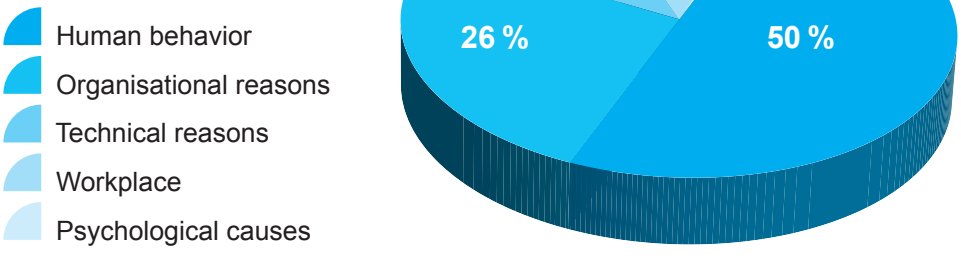


Diagram from safety-network.de

Further information can be found in the download area under „Academy“ at www.pfannenberg.com!

The New Machinery Directive 2006/42/EC

The transition period for the new Machinery Directive 2006/42/EC ends on 1 January 2010. It has already been signed on 17 May 2006 and published on 9 June 2006 in the official gazette of the European Union (Abl. L 157).

Two new safety standards are coming into effect with the Machinery Directive. Firstly, DIN EN ISO 13849-1, which replaces the standard DIN EN 954-1 of the old Machinery Directive 98/37/EG. The other is DIN EN 62061.

The goal of these new safety standards is risk minimization in the operation of machines. Therefore, the requirements with regard to certification of products for manufacturers of plants and machines were made more stringent. Now, probability considerations are also taken as inputs in determining the safety of components.

Planning security and market opportunities of manufacturers of machines and plants are thus supported by a safety-related visual and acoustic alarm system from Pfannenberg.

SIL/PL Gradation

Allocation of the level after a risk analysis. What is calculated here is the probability of failure of the system.

Average probability of a dangerous failure per hour.

PFH_D	Performance Level DIN EN ISO 13849-1	Safety Integrity Level DIN EN 62061
10^{-4}	PL a	---
10^{-5}	PL b	SIL 1
$3 \cdot 10^{-5}$	PL c	
10^{-6}	PL d	SIL 2
10^{-7}	PL e	SIL 3
10^{-8}	---	SIL 4
10^{-9}		

Safety from the beginning: SIL/PL-conform signaling by Pfannenberg

As with all chains, the safety chain is only as strong as its weakest link!

This integral view of safety functions is the foundation of the respective norms from process and systems engineering, as well as mechanical engineering.

Visual and audible warning devices are, as the definition clearly states, devices, which warn people about acute dangers. Therefore, these need to be implemented into safety chains of many applications. This is the link of the change that reaches people!

The integration of visual and audible warning devices in the safety chain is required by norm in many applications. For example, machines that are hard to view as a whole must be equipped with start-up alarms according to SIL 1 and respectively, PLc. Machines are defined as hard to view when they have a length of 7m or more.

Further applications for SIL-capable signaling devices are, amongst others
- muting indication (i.e. during safety function bypassed by the safety-related controller)
- excess rotation speed warning
- machine stop delay warning

Applications in process and plant safety (Control Technology/PCS), e.g. in case of
- leaks / gas warning
- high-pressure / overfilling

Functional safety in process automation normally based on the statutory order of hazardous incidents. The statutory order refers to the design of safety-relevant devices in EN 61508 and EN 61511 respectively. They define the safety steps which describe the measures to control risks of equipment.

Among others, the VDMA (German Association of Machinery Manufacturers) and the ZVEI (German Electrical and Electronics Industry Association) inform intensively about the implementation of safety standards.

SIL compliant signaling devices by Pfannenberg can be found on pages 114, 116 and 144.

Visual signaling devices by Pfannenberg

Our comprehensive range includes:
- xenon flashing lights
- halogen blinking and continuous lights
- blinking and continuous lights with filament lamps
- LED multifunction lights
- rotating mirror lights
- panel mount blinking and continuous indicators
- combination lights
- traffic light lights
- signal towers
- visual signaling devices for the Ex area
- SIL conform visual signaling devices
- obstacle lights





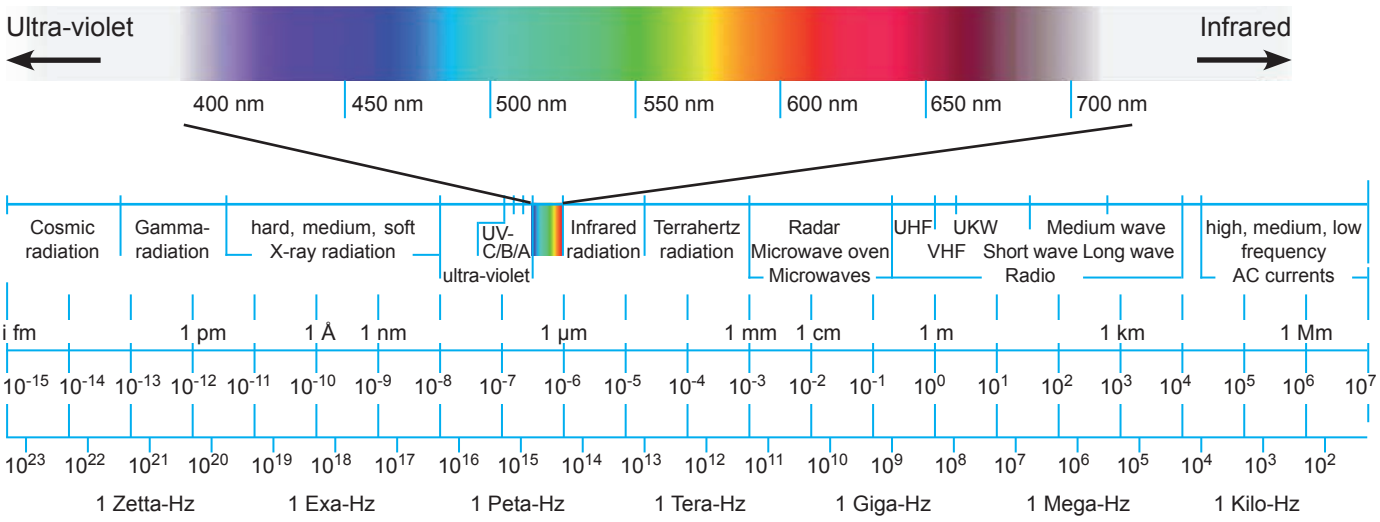
A large proportion of our signaling devices are provided with the following features, which make their use in special applications possible, such as in safety-relevant applications:
- synchronisation of several lights
- redundant structure
- integrated function monitoring
- limitation of initial current

Basic principles of optics

Light moves as electromagnetic wave, which are distinguished from one another by their wavelength. The wavelengths of that part of the electromagnetic spectrum, which are visible to the human eye lie between 380 nm and 780 nm and are called the visible spectrum.

The visible spectrum itself is in turn made up of different electromagnetic waves that generate the perception of different colours in our eyes. The limits of the visible spectrum are represented by infrared and ultra-violet light.

The spectrum visible to the human eye (light)



Types of light generation

There are several ways of generating light in signaling technology.



Filament lamp

In the filament lamp, an electric conductor (filament) is heated up by an electric current to the point where it glows and is perceived as a source of light. In order to protect the tungsten filament against the oxygen in the air and to prolong its service life, it is shielded by a vacuum in a glass bulb. The power of a filament lamp is expressed in Watts and is calculated as follows:

Power (P) = Voltage (U) • Current (I)

Although this type of light generation is still being used, it is being displaced more and more in the market due to its very limited service life and poor light production.



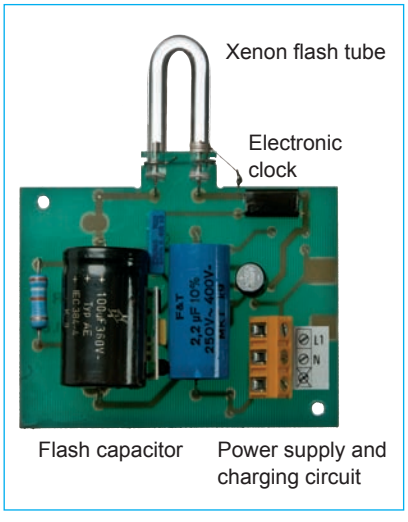
Halogen lamp

The glass bulb of a halogen lamp is filled with halogen bromine, which virtually doubles the service life of this lamp compared to the ‚normal' filament lamp, as well as increases the light production and allows the bulb to be operated at higher temperatures. The light output of a halogen lamp remains virtually constant throughout its service life.



LED Lamp

A light-emitting diode is an electronic semiconductor. If current flows through the diode in the conducting direction, it emits light. The light energy is released in the form of photons. Light diodes are not temperature radiators. They are insensitive to impacts and vibration and consume little current. The service life of an LED is described as the time period over which the light yield decreases to half of its initial value and is usually more than 50,000 hours. Since LEDs are available in all normal colours, the use of colour filters is not necessary. LED lamps are available in exchangeable versions with a fitting or as permanently installed LED arrays.



Gas discharge lamps

The energy stored in the capacitor discharges in the gas-filled glass tube and forms a light arc. Xenon gas is predominantly used in signal technology. The flash energy per individual flash is calculated according to the following equation:

$$E = 1/2 \cdot C \cdot U^2$$

E = Flash energy (Joules)
C = Capacity of flash capacitor (Farads)
U = Charging voltage (Volts)

The electrode material is subjected to a very large load during the discharge. Although very hard metals such as tungsten are used for the electrode, a certain amount of the metal is removed depending on the load and is deposited as a dark film on the inside of the flash tube. The advantage of this technology is the high signaling effect due to the concentrated light pulse.

Xenon technology versus LED technology:

Currently, the LED technology is the buzz in the area of generating light. In signaling technology, LED is being used increasingly. Thereby, LED is connected with positive characteristics such as energy efficiency, life span and insensitivity to mechanical influences, which cancel out the negative side, the price.

Visual signaling technology must cover various application in three areas:

- Indication
- Warning
- Alarm

in which there are different requirements, e.g. special visual appearance, for the products.

While the positive characteristics of LED technology come to use almost to 100% in the area of “Informing”, in the areas “Warning” and “Alarm”, the advantages of the LED technology are scarcely considered. When taking the area “Alarm” into consideration, the perceptibility is in the foreground in order to convey the signal and therewith, the urgency of the alarm to the observer. Here, devices based on Xenon technology exhibit distinct advantages, e.g. the differential luminance, which can be ascribed to the formation of the light impulse.

A Xenon flashing light creates a very short (approx. 250 ms), yet very intense impulse with a peak value of well over 100 000 cd, which cannot be produced by means of LED technology. Typical curve progressions are depicted in figures 1 and 2. It is clearly visible that the light intensity of the LEDs only has a flat progression, in contrast to the Xenon flash tubes. Both lights have almost the same effective luminous intensity.

When comparing the bottom line of the expense of energy for both technologies, the LED is also, in this aspect, not advantageous. The effective power consumption of a Xenon flashing light is lower when compared to a LED flashing light that has almost the same effective luminous intensity as the Xenon light. Furthermore, LED lights with the same effective luminous intensity as compared to Xenon lights are significantly more expensive. I.e. not only are the operating costs, but also the acquisition costs in favor of the Xenon technology.

Luminous intensity / course of time of a Xenon flashing light

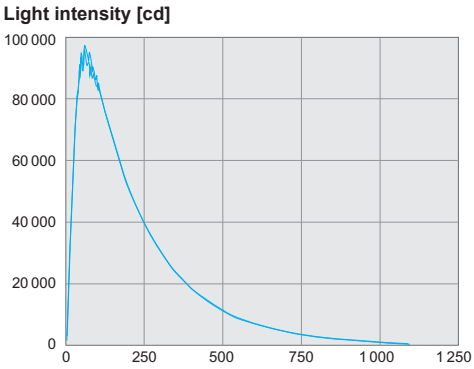


Figure 1

Luminous intensity / course of time of a LED flashing light

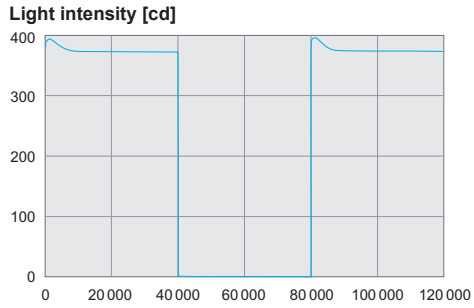


Figure 2

Another advantage of Xenon lights are the emission characteristics. Whilst in LED technology, these only produce an approximate omni-directional characteristic through the arrangement of the LEDs in the casing, the Xenon technology has a radiating point of light that provides for this from the get go. The emission characteristics are identical in all directions and thus, no „optical gaps“ are created in all directions of light.

The duty cycle is a positive LED characteristic that offers an advantage over Xenon technology. Yet when you take into consideration that special alarm devices are only needed and activated in dangerous situations, the life span of the lights is not crucial criteria. Pfannenberg Xenon flashing lights have a life span of a minimum 8 million flashes; this is adequate to warn of dangerous situations, in most cases, for a period of at least 20 years. All Xenon flashing light tubes are secured by means of an additional steel rod in Pfannenberg products so that the mechanical influences (shock/vibration) are reduced to a minimum.

In applications where the signaling devices are not just used frequently but also function as a permanent beacon, the advantage of LED-based devices is obvious: The duty cycle and low power consumption cannot be surpassed.

The most important light variables in signaling technology are:

- light intensity
- luminous flux
- illumination intensity

Light intensity is measured in Candela [cd].
The light intensity is the radiation power of a light source per dihedral angle, weighted with the spectral sensitivity of the eye. The directional dependence of the luminous flux is represented. This is particularly important in signal technology, since it is not about illuminating a room, but rather about the directed transmission of light to the observer.

light intensity [cd] = luminous flux [lm] / dihedral angle [sr]

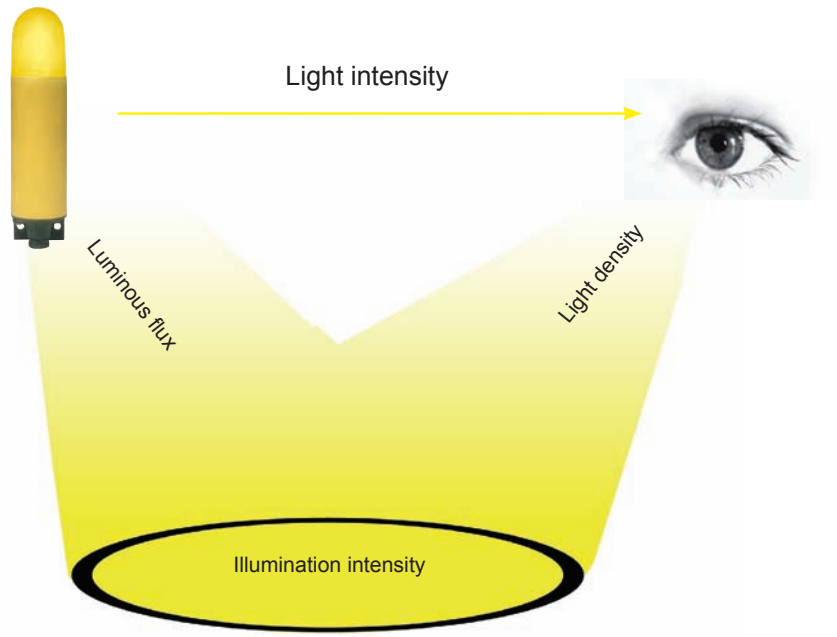
For example, the light intensity of a household candle is around 1 cd.

Luminous flux Φ is expressed in Lumen [lm].
The luminous flux is a measure of the entire visible radiation that is radiated in all directions from a source of light and, as opposed to light intensity, is not directionally dependent.

Illumination intensity is expressed in Lux [lx].
The illumination intensity describes the amount of the luminous flux that strikes a given area. It is the quotient of luminous flux and area.

illumination intensity [lx] = luminous flux [lm] / area A (m^2)

The illumination intensity is inversely proportional to the square of the distance. A doubling of the distance therefore results in the illumination intensity being reduced to one quarter.



Types of beacon

Visual signaling takes place by means of colour, light intensity and lighting duration. Four types of beacons with different signaling effects are essentially offered in signal technology;

Continuous lights – lowest signaling effect

The light intensity of the continuous light changes with the power of the lamp and the use of different colours and types of lenses. This type of beacon is normally used to display a status and serves to a lesser extent as a means of an alarm.

Blinking lights – increased signaling effect

The observer's attention is increased by means of switching the lamp on and off with a blinking frequency of normally 1 to 2 Hz. This type of beacon is used, for example, as a warning signal.

Rotating mirror lights – high signaling effect

A rotating light cone is generated by means of diverting the light using the internal rotating mirror. Higher attention is gained at faster rotary speeds. Smooth lenses are used for these beacons in order to exploit the light effect to its fullest and to avoid scattering effects. As opposed to flashing beacons, the dazzling effect is reduced with rotating mirror beacons.

Flashing lights – highest signaling effect

The charged capacitor discharges its energy into the gas-filled glass tube and forms a light arc. This very short and very intensive light effect generates the highest signal attention. Among other things, this type of beacon is used as a top priority alarm.

Meaning of the colours in visual signaling

The signal colours red, amber, yellow, green, blue and clear are mainly used in signal technology.
Different lamp colours convey different messages to the observer in accordance with EN 60078, EN 981 and DIN VDE 0199.

Colour	Process status (as per IEC 73)	Process data (as per IEC 73)	Meaning / message category	Purpose	User reaction (as per DIN VDE 0199)	Example application
red	emergency	limit value exceeded	• danger • abnormal status • act immediately • urgent rescue or protection measure	• emergency • alarm • stop • prohibited • failure	immediate reaction	• stop sign • prohibiting sign • emergency stop devices
yellow / amber	abnormal	warning limit reached	• caution • be prepared • act if necessary	• attention required • change of status • intervention	monitor and/or intervene	indication of dangers, such as: fire, explosion, radiation, chemical influences, obst-ructions etc.
green	normal	within normal range	• everything ok • normal status • safe • no danger • danger is pastr • first aid	• return to normal process • continue	no action required	• identification of escape routes and emergency exits • first aid and rescue stations
blue	specified meaning	specified meaning	• display of necessity for specified action • command sign • notice • machine-specific	• action • protection • extraordinary attention • safety-relevant regulation or precaution with priority	specified action	• obligation to wear personal protective equipment • location of a telephone • etc.
white / clear	neutral		not assigned any particular meaning			
other	neutral					

Light permeability of coloured lenses

Depending on the respective light source and the various lens colours, the following percentage of light typically penetrates through:



Colour	Filament lamp	Halogen lamp	Xenon lamp
clear	100%	100%	100%
yellow	95%	94%	93%
amber	70%	70%	70%
red	17%	27%	23%
green	12%	15%	25%
blue	15%	20%	24%

This reduction in the light intensity must be taken into consideration when selecting the right signaling device!

Due to the narrow spectrum of LED light sources, only a small reduction in the light is to be expected if the colour of the lens corresponds to the colour of the LED.

Planning visual signaling

EN 54-23 for Europe and NFPA 72 for the USA offer a tangible basis for the design of visual signaling:

The table below is based on the following calculation equation and can also be used for other room sizes or distances:

$$d = \sqrt{I_{Eff} / E}$$

d is the distance between the observer and the alarm device in metres [m]
I_{eff} is the effective light intensity in Candela [cd]
E is the illumination intensity in Lux [lx]

The illumination intensity E must not fall below 0.4 lx at any place within the defined signal reception area.

Examples of the signaling devices to be used, depending on the room size

maximum room size (m x m)	minimum light intensity (effective intensity [cd])		
	1 light/room	2 lights/room	3 lights/room (synchronised)
6 x 6	15	not permitted	not permitted
12 x 12	60	30	15
18 x 18	135	95	30
24 x 24	240	135	60

Due to the complexity when considering visual signaling, we recommend checking the efficiency of the alarm on-site by using a representative group of people. In doing so, a ‘worst case’ scenario must always be performed based on the environmental conditions.

Perception of the brightness of light for warnings and alarms

A few tips to assist you in selecting the right visual signaling devices:
Doubling the distance reduces the light power by 75% to 1/4 of its strength. If the distance is quadrupled, the light power is reduced to 1/16.
Visual alarms are ideal when there is a direct (unobstructed) line of sight between the beacon and the observer.
Reflected light can be perceived inadequately.

In an alarm area (dangerous condition, immediate action), the beacon will also be perceived without direct visual contact provided that **the light intensity of the alarm device is 10 times brighter than the ambient light.**
In a warning area (critical condition, intervene), the signal will be perceived adequately via direct visual contact or reflection provided that **the light intensity of the warning device is 5 times brighter than the ambient light.**

Optical and electronic monitoring

Monitoring of visual alarm devices plays a very important role, especially in the case of safety-relevant applications. Monitoring is offered in two different technical versions.

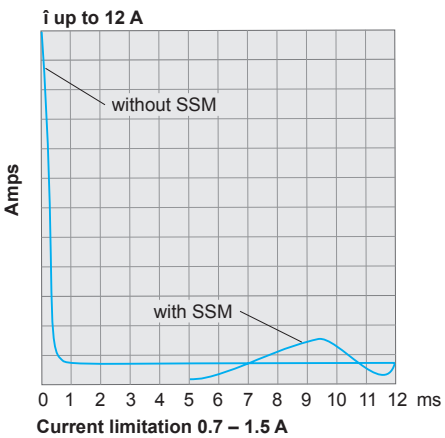
One method is to monitor the correct function of a flashing light by opto-electronic means. The light flash from the flashing light is fed via an optical fibre to a phototransistor, which converts the optical impulse to an electrical impulse. The optical fibre is located in the housing of the flashing light and directed downwards, which excludes false triggering due to the effect of daylight. Additionally, any flashing light with a 1 Hz flash rate can be retrofitted with an external flash monitor. The downstream circuitry evaluates the pulse and its regular repetition.

As soon as the operating voltage is applied, the evaluation relay closes the error contact. If the operating voltage fails, the relay opens immediately. This method of operation represents the fail-safe normally-closed circuit function and guarantees an alarm even if the operating voltage fails. On the other hand, the error message contact serves the continuative alarming, e.g. in an error message line, or the direct blocking of further machine processes. It is possible to relay the error alarm as a normally-closed function. The second method of electronic monitoring is to integrate a flash monitor in the processor of the flashing beacon. In this case the regular charging and discharging of the flashing beacon capacitor is monitored. If one status is not present, an error message is relayed via a floating, normally-closed contact.

Inrush current limitation

Visual alarm devices can draw a greatly increased initial current for a very short period of time. This is due to the circuit-related input capacity. This can lead an overload of the relay contacts at the moment when power is turned on and to the premature triggering of overcurrent circuit breakers.
For special requirements, Pfannenberg can supply you with visual alarm devices that are factory fitted with an initial current limiter. Pfannenberg also offers external current limiting modules, so-called soft-start modules (SSM), for retrofitting or supplementing visual signaling devices.

Example of the current curve with and without a soft-start module



Current limitation 0.7 – 1.5 A

Audible signaling devices by Pfannenberg

Our comprehensive range includes:
- electronic multi-tone sounders
- electronic multi-tone sirens and horns
- programmable voice sounders (also in synchronised versions)
- loudspeakers
- combined signaling devices
- buzzers and panel mounted buzzers
- acoustic signaling devices for the Ex area
- SIL conform audible signaling devices

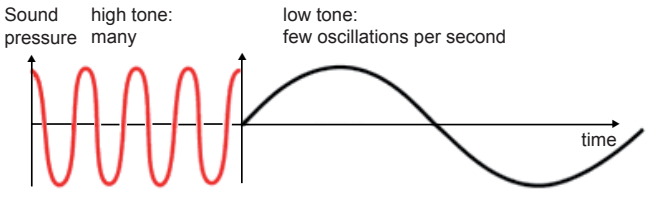


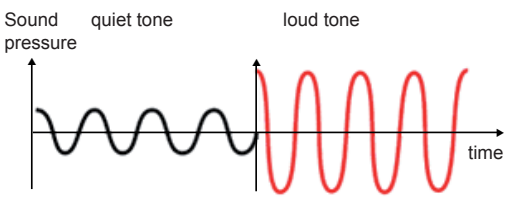
Basic principles of acoustics

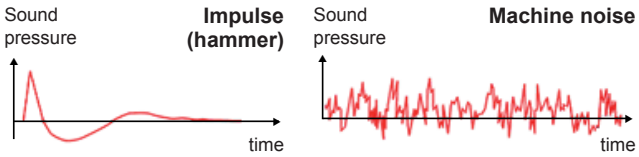
A source of sound causes the air to oscillate, resulting in alternating compression and relaxation of the air. This pressure wave propagates itself in the form of a wave and causes the eardrum to oscillate, triggering the process of hearing.
The sound pressure of oscillation is measured in microbars (µbar). The number of oscillations per second is called the frequency. Its unit of measurement is Hertz (Hz).

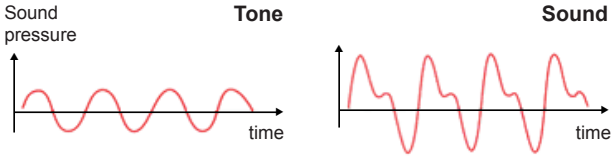
Different types of sound

- a harmonic oscillation produces a tone
- a sound represents a mixture of tones
- noise is the name given to a mixture of numerous tones, rapidly changing frequencies and rapidly changing sound volumes
- a bang is produced by a sudden beginning of a mechanical oscillation of very short duration and great loudness









Properties of sound waves:
- the number of vibrations per unit of time = frequency
- range of the oscillation = amplitude

Frequency range and sound pressure level

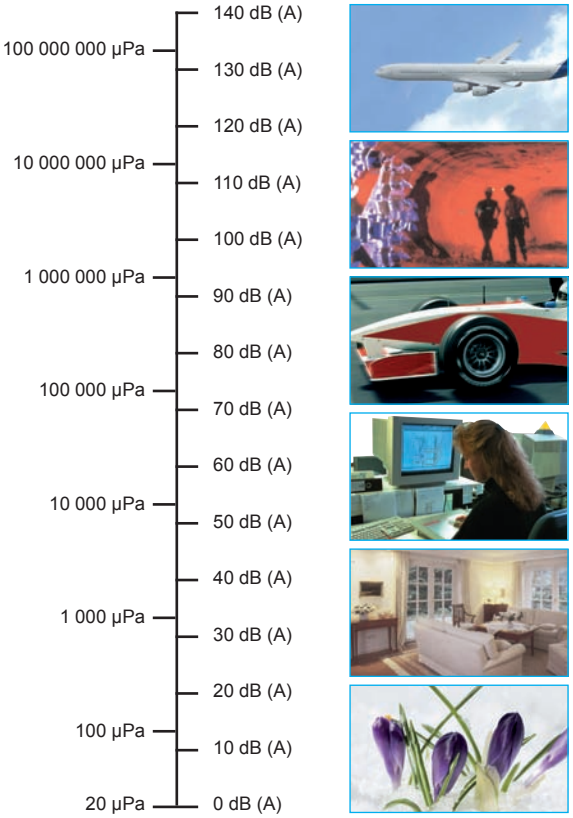
The range of human hearing is from 20 to 20,000 Hz. Deeper sounds (infrasound) and higher sounds (ultrasound) cannot be heard. The human ear is most sensitive to sound between 500 Hz and 3 kHz. With regard to volume, a sound pressure of 2/10,000 = 0.0002 µbar is just barely audible.

This limit value is called ‘hearing threshold pressure’.
A sound pressure of 200 µbar and above causes pain.
This is known as the pain threshold.

In order to make the hearing range more manageable in terms of numbers, the ratio of the actual measured sound pressure to the hearing threshold pressure is converted to a logarithm. This logarithmic relationship is known as the sound pressure level and is expressed in decibels (dB).

The equation is:

$$Lp = 20 \times \log \frac{\text{measured sound pressure in µbar}}{\text{hearing threshold pressure in µbar}} \text{ dB}$$



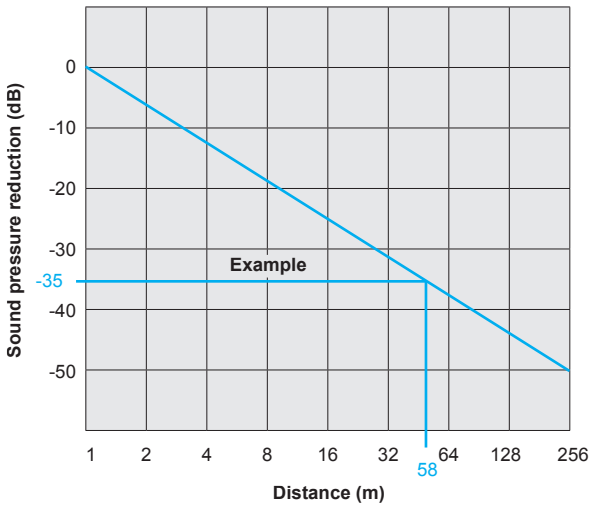
Basic principles of acoustic audibility

The loudness of a sounder is expressed in dB (A) and measured at a distance of 1 metre (USA 10 feet). The smallest increase in the sound level that the human ear can detect is 3 dB. An increase of 6 dB is equivalent to a doubling of the sound pressure. An increase of around 10 dB is perceived as being twice as loud.

Lower frequencies (at the same sound level) are perceived to be quieter. This is all the more pronounced at lower sound levels.
Alarm signals can be better heard when the difference between the frequency of the ambient noise and that of the sounder is greater. Interfering factors are, for example, damping, fog, obstructions, wind speed and direction, rain and air humidity.

A doubling of the distance to the source of the sound is equivalent to a reduction in the sound level of around 6 dB, e.g. there is a sound pressure level reduction of 35 dB at a distance of 58 m.

Reduction in the sound pressure level in relation to the distance between the sounder and the listener’s ear



A large number of audio samples of different tones are available at **www.pfannenberg.com/support**.

Types of sound generation

Sound capsule – electromagnetic sound generation

In the sound capsule, anchors connected to the membrane are pre-magnetised by a permanent magnet. When a voltage is applied, the membrane is stimulated to oscillate, generating sound waves that are perceived as an audible tone. Despite its relatively simple and compact structure, the sound capsule has a relatively high efficiency level. For that reason this technology is often used in appliances with small dimensions.



Loudspeaker – electro-dynamic sound generation

The electro-dynamic loudspeaker consists of a membrane connected to a central oscillating coil. This coil is located within the magnetic field of a permanent magnet. If the voltage of the signal to be transmitted is applied to this coil, an alternating electromagnetic field is generated that causes the membrane to move and, hence, to generate sound pressure.
Various membranes (smaller or larger, softer or harder) and different coils and permanent magnets are used, depending on the frequency range. Electrodynamic loudspeakers are ideally suited for generating high sound pressure.



Horn loudspeaker – electro-dynamic sound generation

The membrane in a horn loudspeaker acts on a very small space – the pressure chamber. The velocity of the air particles is increased in this pressure chamber due to its small cross-sectional size. This principle increases efficiency considerably in comparison to other designs. Due to the high sound pressure, which can be attained and the high frequency range that can be transmitted, horn loudspeakers are ideal for the transmission of sound in large areas. Horn loudspeakers are usually insensitive to weather and are very robust.



Piezo-electric effect

At the heart of a piezo loudspeaker is a crystal. When a voltage is applied to this crystal, it deforms as a result and is thus set in motion. Piezo loudspeakers essentially transmit only higher frequency ranges and are not suitable for penetrating through obstructions such as walls. The advantage of these systems lies in their high impedance and, therefore, low power consumption.



Planning audible signaling



In order to determine the acoustic alarm, it is important to know the 'starting value' (existing ambient noise level) and the 'target value' to be calculated.
According to the EN ISO 7731 standard (replacement for EN 457), a sounder should have a minimum sound level of 65 dB (A)

Standard	Minimum difference to the ambient noise level	Application
EN ISO 7731	at least 15 dB (A)	Public areas and workplaces
DIN VDE 0833 EN 60849	at least 10 dB (A)	Fire alarm (in fire alarm systems) Evacuation signal (in alarm systems)

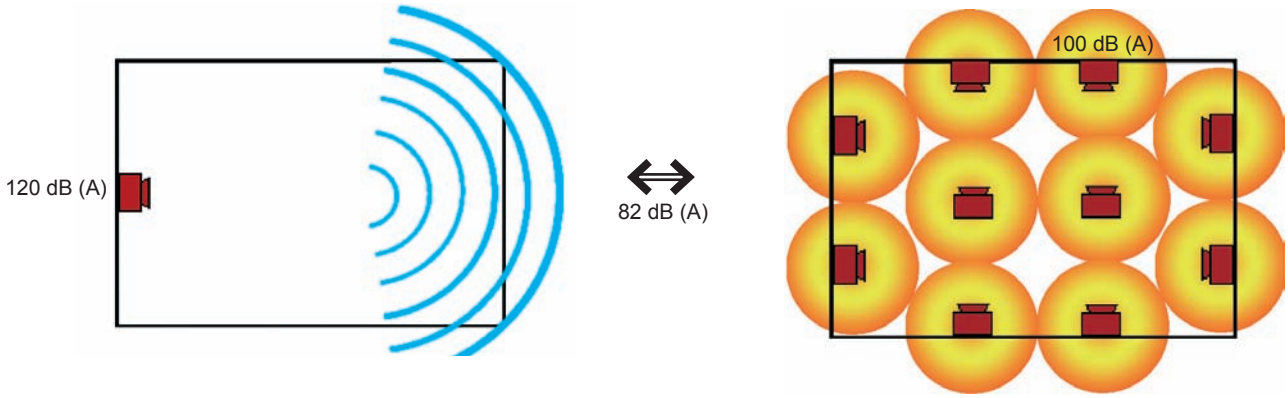


From a required sound level of 110 dB (A) upwards, it is recommended to use visual signaling devices in addition to acoustic alarms.

Example calculation

There are various possibilities of achieving 82 dB (A) for an area of 50 x 30 m:

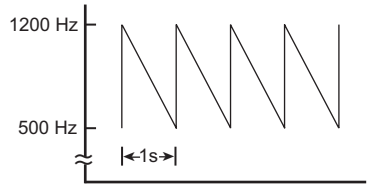
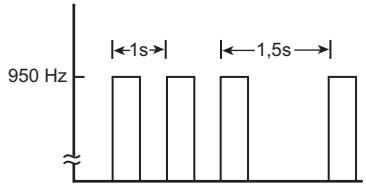
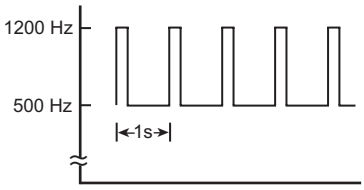
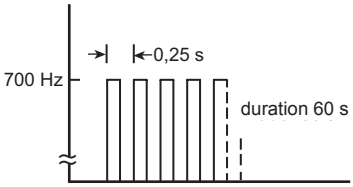
1 x 120 dB (A) or 10 x 100 dB (A) sounders are required.
Sound transmission area of a 100 dB (A) sounder in order to achieve 82 dB (A) = 200 m^2
Sound transmission area of a 120 dB (A) sounder in order to achieve 82 dB (A) = 20,000 m^2



The type of signaling (number of sounders) used is essentially determined by the geometric properties of the room, the shape of any obstructions and the maximum permissible sound pressure level of the sounder. When using a sounder with, for example, 120 dB (A), it must be ensured that people cannot be in the near vicinity of the sounder. If this is not possible, a divided installation should to be chosen.

The meaning of different tones

Pfannenberg sounders can generate up to 45 different tones. All tones can selected individually and must be adapted to suit the respective environmental conditions. Therefore, some of the pre-installed tones have a pre-defined meaning.

Standard		
DIN 33404	Acoustic alarm signal for workplaces in cases of fire, gas, explosion or radiation danger	
ISO 8201	Emergency evacuation signal	
NFS 32-001	Fire alarm in France	
SS 031711	Emergency signal in Sweden	

A large number of audio samples of different tones are available at **www.pfannenberg.com/support**.

Monitoring: standby current

There are two ways of monitoring the standby current electronically using a terminal resistor in order to monitor acoustic signaling devices:

- measurement of the current below the lower nominal voltage limit of the device, or
- measurement of the standby current by reversing the supply voltage poles

Inrush current limitation

Acoustic alarm devices can draw a strongly increased initial current for a very short period of time. This is caused by the circuit-related input capacity. For special requirements, acoustic alarm devices are available with an initial current limiter.





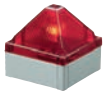
A flash says more than a thousand words!

Visual signaling devices ensure safety at first sight

Regardless of whether you use flashing lights or continuous lights – Pfannenberg's visual signaling devices are ‚eye-catchers' that can save lives in every respect. They ensure any process status can be displayed in a timely manner. Thanks to their unmistakable demand for action, they offer the best prerequisites for running trouble-free production processes.

Benefit from top quality standards and a unique complete range.

All visual signaling devices at a glance

	Type	Maximum signal reception range as per EN 54-23 in metres (m) [1]					Flash energy	Protection system	Dimensions (HxWxD) mm	Approvals / Standards					Page
		2.5	5	10	25	50				GL	GOST	UL	VdS	RS	
	Flashing Lights														
	PMF 2030						30 J	IP 55	direct mounting 185 x Ø 177 bracket mounting 170.5 x Ø 130		●				36
	PMF 2020						7 J			●	●			●	38
	PMF 2015						7 J				●				
	ABL / ABS						15 J	IP 54	ohne Winkel 242 x Ø 80	●	●			●	40
	P 400 STR						15 J	IP 65	220 x Ø 140		○				42
	P 400 STS						15 J				○				
	Quadro F12						13 J	IP 66 IP 67 IK 08	130 x 130 x 130		●				44
	Quadro S						13 J				●				
	PB 2010						10 J	IP 55	128 x 166.2 x 111.2	●	●			●	46
	PMB 2010						5 J			●	●			●	48
	PB 2005						5 J			●	●			●	50
	WBL / WBS						5 J	IP 54	200 x Ø 54	●	●			●	52
	WBL-PX						5 J	IP 54	200 x Ø 54						
	WBLR						5 J	IP 65	144 x 120 x 85	●	●		○ [1]	●	54
	WBSR									●	●		●	●	
	P 300 STR						5 J	IP 65	150 x Ø 100		○				56
	P 300 STS						5 J				○				
	P 300 STF						5 J				○				
	PY X-S-05						5 J	IP 66	85 x 109.5 x 80.6	● [1]	○	○	●		58
	DWBL / DWBS						2.5 J	IP 54	200 x Ø 54	●	●			●	60
	P 100 STR						1 J	IP 65	65.5 x Ø 60		○				62
	P 200 STR						1 J	IP 65	80 x Ø 60		○				62

[1] with a clear lens

● available
○ in preparation
[1] Option

	Type	Maximum signal reception range as per EN 54-23 in metres (m) [1]					Light power	Protection system	Dimensions (HxWxD) mm	Approvals / Standards					Page
		2.5	5	10	25	50				GL	GOST	UL	VdS	RS	
	Blinking Lights														
	**P 400 FLF**						40 W	IP 65	220 x Ø 140		○				64
	P 400 FLH						35 / 40 W				○				
	**P 300 FLF**						25 W	IP 65	150 x Ø 100		○				66
	P 300 FLH						20 / 25 W				○				
	**P 200 FLF**						5 W	IP 65	80 x Ø 60		○				68
	**P 100 FLF**						5 W	IP 65	65.5 x Ø 60		○				68
	LED Lights														
	**PMF-LED Flex**						30 cd	IP 55	direct mounting 185 x Ø 177 bracket mounting 170.5 x Ø 130		●				70
	**P 400 LDA**						30 cd	IP 65	220 x Ø 140		○				72
	**P 300 LDA**						20 cd	IP 65	150 x Ø 100		○				72
	**Quadro-LED-HI**						100 cd	IP 66/67 IK 08	130 x 130 x 130		●				74
	**PD 2100-LED**						5 cd	IP 55	128 x 166.2 x 111.2		●				76
	**P 200 LDA**						5 cd	IP 65	80 x Ø 60		○				78
	**P 100 LDA**						5 cd	IP 65	65.5 x Ø 60		○				78
	**Quadro-LED-TL**						80 cd	IP 66 IK 08	130 x 130 x 396						80

[1] with a clear lens

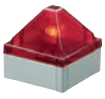
● available
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All visual signaling devices at a glance

	Type	Maximum signal reception range as per EN 54-23 in metres (m) [1]					Light power / light intensity	Protection system	Dimensions (HxWxD) mm	Approvals / Standards					Page
		2.5	5	10	25	50				GL	GOST	UL	VdS	RS	
	LED Lights														
	P 450 TLA						60 cd	IP 65	177 x Ø 140		○				82
	P 350 TLA						45 cd	IP 65	140 x Ø 100		○				82
	P 22 D						–	IP 65	52 x Ø 29						84
	P 22 DFS						–	IP 65	52 x Ø 29						84
	Continuous Lights														
	P 400 SLF						40 W	IP 65	220 x Ø140		○				86
	P 400 SLH						35 / 40 W				○				
	P 300 SLF						15 W	IP 65	150 x Ø 100		○				88
	P 300 SLH						20 / 25 W				○				
	PD 2100						15 W	IP 55	128 x 166.2 x 111.2		●				90
	P 200 SLF						5 W	IP 65	80 x Ø 60		○				92
	P 100 SLF						5 W	IP 65	65.5 x Ø 60		○				92
	P 450 TSB						25 W	IP 65	177 x Ø 140		○				94
	P 450 TDB						2 x 15 W				○				
	P 350 TSB						15 W	IP 65	140 x Ø 100		○				94
	Rotating Mirror Lights														
	P 400 RTH						35 / 40 W	IP 65	220 x Ø 140		○				96
	P 300 RTH						20 / 25 W	IP 65	150 x Ø 100		○				96

[1] with a clear lens

● available
○ in preparation

	Type	Maximum signal reception range as per EN 54-23 in metres (m) [1]					Flash energy / light intensity	Protection system	Dimensions (HxWxD) mm	Approvals / Standards					Page
		2.5	5	10	25	50				GL	GOST	UL	VdS	RS	
	Function-monitored Lights														
	Quadro S-M-Flex						13 J	IP 66 IP 67 IK 08	130 x 130 x 130		●				98
	WBL-M / WBS-M						5 J	IP 54	242 x Ø 80	●	●			●	100
	PMF 2015-M						7 J	IP 55	direct mounting 185 x Ø 177 bracket mounting 170.5 x Ø 130		●				102
	PD 2100-M-AS-i (LED)						5 cd	IP 55	128 x 166.2 x 111.2		●				104
	PD 2100-LED-M						5 cd	IP 55	128 x 166.2 x 111.2		●				104
	Obstacle Lights														
	POL 32-M						32 cd	IP 68	240 x Ø 114						106
	POL 10-M						10 cd								
	POL 10-M-R						10 cd								
	POL 10-M-RA						10 cd								
	POL 170W-R						170 cd	IP 68	100 x Ø 258						108
	POL 170W-R-ES						170 cd		183 x Ø 352						
	POL 2.000R						2 000 cd		183 x Ø 352						
	POL 20.000 / 2.000R						20 000 cd	IP 68	183 x Ø 352						110
	POL 20.000 / 170W-R						170 cd								
	POL 20.000 / 2.000W						2 000 cd								
	Safety-related Lights														
	Quadro F12-SIL						10 J	IP 66 IP 67 IK 08	130 x 130 x 130		●				114
	PMF 2015-SIL						10 J	IP 55	direct mounting 185 x Ø 177 bracket mounting 170.5 x Ø 130		●				116

[1] with a clear lens

● available
○ in preparation



Further information can be found on the Internet:
www.pfannenberg.com · **www.pfannenberg-spareparts.com**
Keep up to date. Subscribe to our newsletter now:
newsletter.pfannenberg.com

All-Round Flashing Light 30 Joules
PMF 2030



Secure 360° alarm for large distances (indoors or outdoors)

- extremely reliable and durable due to the use of state-of-the-art electronic components – no replacement of mechanical or electrical wearing parts necessary
- reliable performance even under the toughest working and production conditions, e.g. possible voltage fluctuations, high ambient temperatures up to + 55 °C, high relative humidity up to 90%
- mounting-friendly; large variety of mounting methods
- bracket-mounting using solid stainless steel bracket or direct mounting with enclosed flat seal
- maximum flash energy 30 Joules
- good light bundling is achieved in the horizontal plane thanks to the lens in the form of a fresnel lens and the special xenon flash tube
- very good perceptibility over great distances; low power consumption



Range as per EN 54



Protection system



Operating temperature

Electrical data		PMF 2030			
Rated voltage		230 V AC			
Rated frequency		50 / 60 Hz			
Operating range		195 – 253 V			
Nominal current consumption	@ 30 J	1 Hz: 450 mA	0.75 Hz: 380 mA	0.5 Hz: 310 mA	0.1 Hz: 150 mA
	@ 20 J	1 Hz: 400 mA	0.75 Hz: 340 mA	0.5 Hz: 290 mA	0.1 Hz: 140 mA

Mechanical data		PMF 2030
Light source		xenon flash tube
Flash rate		1 Hz = 60 flashes/min., see flash frequency table
Flash energy		max. 30 J, switchable to 20 J
Light intensity (DIN 5037) [1]		1500 cd
Lens colours		clear, amber, red, green, blue
Lens type		lens with fresnel characteristic
Beam angle	vertical	approx. 16°
	horizontal	360°
Operating temperature		- 40 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 55 (vertical mounting)
Duty cycle		100%
Service life of the flash tube		light emission still 70% after 8 000 000 flashes
Material	lens	polycarbonate (PC)
	housing	bracket mounting: polycarbonate (PC) / direct mounting: acrylonitrile butadiene styrene (ABS)
Cable entry	bracket mounting	M20 x 1.5
Connecting terminals		single wire 0.5 – 2.5 mm², fine wire 0.5 – 1.5 mm², with cable end sleeves DIN 46228/1
Weight	bracket mounting	1.25 kg
	direct mounting	0.75 kg

[1] with a clear lens

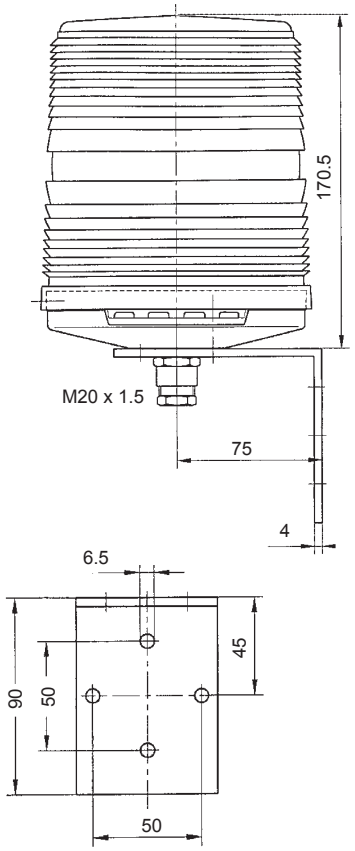
Flash frequencies

S1				Flash energy	Flash rate
1	2	3	4		
OFF	OFF	OFF	OFF	30 J	1 Hz
ON	OFF	OFF	OFF		0.75 Hz
OFF	ON	OFF	OFF		0.5 Hz
ON	ON	OFF	OFF		0.1 Hz

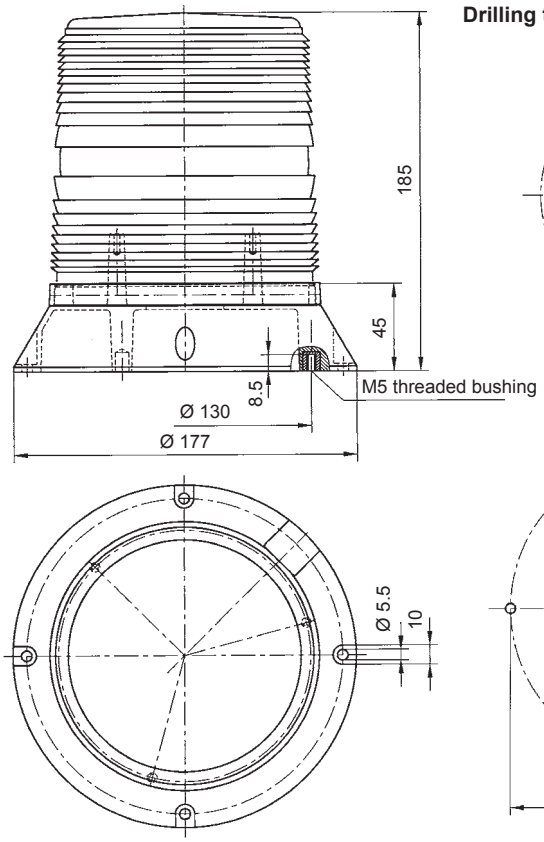
S1				Flash energy	Flash rate
1	2	3	4		
OFF	OFF	ON	OFF	20 J	1 Hz
ON	OFF	ON	OFF		0.75 Hz
OFF	ON	ON	OFF		0.5 Hz
ON	ON	ON	OFF		0.1 Hz

Dimensions

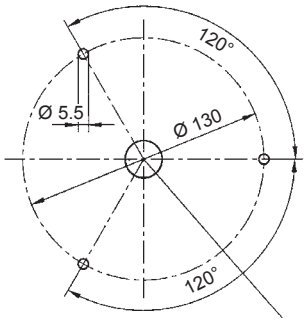
Bracket mounting



Direct mounting

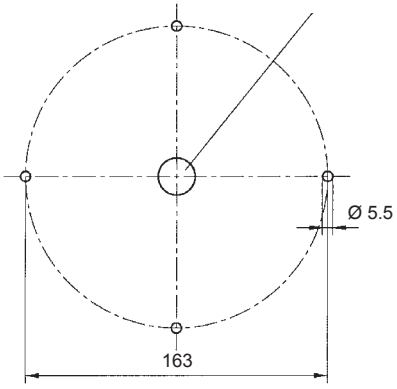


Drilling template 1 (for M5 threaded bushing)



Drilling template 2

diameter variable depending on cable entry



Two different drilling templates are available for fixing the light (direct mounting). M5 x 8 threaded bushes are set into the base of the light for fixing according to drilling template 1. Drilling template 2 allows the light to be fixed using 4 through bolts or similar from above.

Ordering details

Article numbers		PMF 2030 direct mounting	PMF 2030 bracket mounting
Lens colour	**Rated voltage**	230 V AC	230 V AC
amber		210 10 10 4 000	210 10 10 4 010
red		210 10 10 5 000	210 10 10 5 010

Article numbers for other colours and voltages on request

Options / Accessories



GOST

See page 118 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **"Machine safety - visual alarm signals".**
Requirements contained in the DIN EN 981 standard: **"Machine safety - system of acoustic and visual alarm and information signals",** can be fulfilled.

The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
"Coding of display devices and control elements using colours and supplementary means".

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

All-Round Flashing Lights 14 Joules
PMF 2020 / PMF 2015



Extremely bright due to 14 Joules total flash energy of the impulse group and light bundling with fesnel lens, low power consumption (energy-saving)

- choice of three different flash combinations with fast flash rate (PMF 2015: two flash combinations)
- extremely reliable and durable due to the use of state-of-the-art electronic components – no replacement of mechanical or electrical wearing parts necessary
- large variety of mounting methods – direct or using a bracket
- exchangeable due to broadly used drilling template
- extremely reliable and durable: fit it and forget it!
- especially suitable for cranes and floor conveyors
- highest mechanical stability, shock tested as per DIN EN 60069-2-29 (PMF 2020, GL approval is standard)
- flash tube additionally secured by a steel clamp



Range as per EN 54



Protection system



Operating temperature

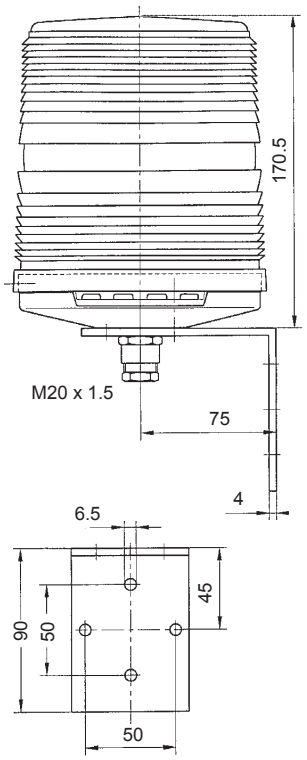
Electrical data		PMF 2020				PMF 2015			
Rated voltage		230 V AC	110 V AC	24 V DC	12 V DC	230 V AC	110 V AC	24 V DC	12 V DC
Rated frequency		50 / 60 Hz	50 / 60 Hz			50 / 60 Hz	50 / 60 Hz		
Operating range		195 – 253 V	90 – 135 V	18 – 30 V	11 – 15 V	195 – 253 V	90 – 135 V	18 – 30 V	11 – 15 V
Nominal current consumption	4 flashes	0.08 A	0.14 A	0.75 A	1.1 A	0.07 A	0.14 A	0.6 A	1.1 A
	2 flashes	0.09 A	0.15 A	0.8 A	1.15 A	0.08 A	0.16 A	0.65 A	1.2 A
	single flash	0.14 A	0.23 A	1 A	1.35 A				

Mechanical data		PMF 2020	PMF 2015
Operating mode		quad, double, single flash	quad, double flash
Flash energy of the main flash		7 J (12 V: 5 J)	7 J
Light intensity (DIN 5037) [1]		200 cd	
Lens colours		clear, amber, red, green, blue	
Lens type		lens with fresnel characteristic	
Beam angle	vertical	approx. 16 °	
	horizontal	360 °	
Operating temperature		- 40 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 55 (vertical mounting)	
Duty cycle		100%	
Service life of the flash tube		light emission still 70% after 8 000 000 flashes	
Material	lens	polycarbonate (PC)	
	housing	bracket mounting: polycarbonate (PC) / direct mounting: acrylonitrile butadiene styrene (ABS)	
Cable entry	bracket mounting	M20 x 1.5	M20 x 1.5 for cables 6.5 - 13.5 mm
Connecting terminals		single wire 0.5 – 2.5 mm², fine wire 0.5 – 1.5 mm², with cable end sleeves DIN 46228/1	
Weight	bracket mounting	AC: 1.1 kg / DC: 1.2 kg	
	direct mounting	AC: 0.6 kg / DC: 0.7 kg	

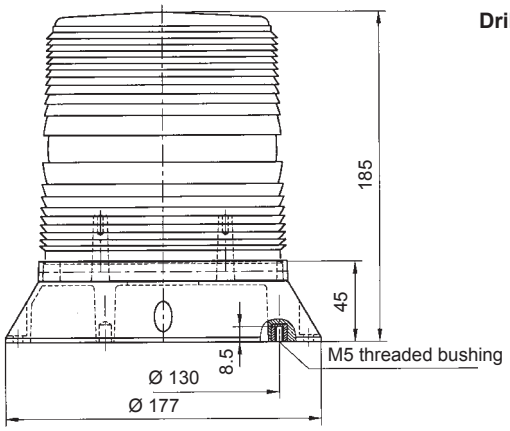
[1] with a clear lens

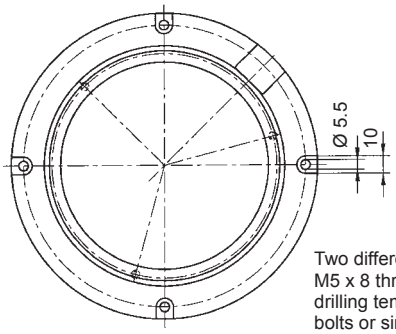
Dimensions

Bracket mounting

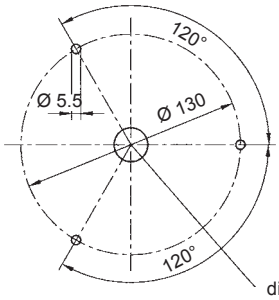


Direct mounting



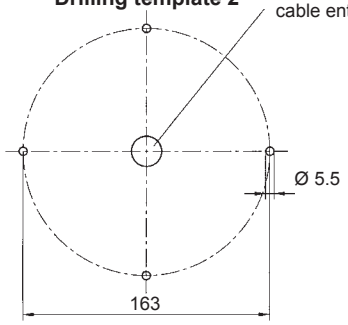


Drilling template 1 (for M5 threaded bushing)



Drilling template 2

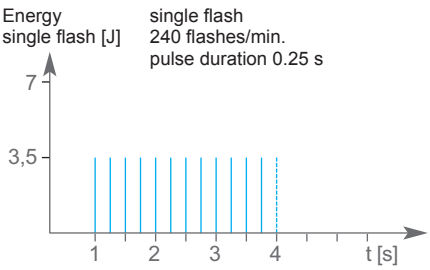
diameter variable depending on cable entry



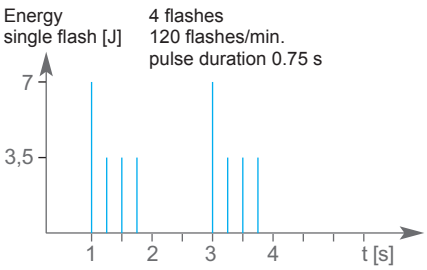
Two different drilling templates are available for fixing the light (direct mounting). M5 x 8 threaded bushes are set into the base of the light for fixing according to drilling template 1. Drilling template 2 allows the light to be fixed using 4 through bolts or similar from above.

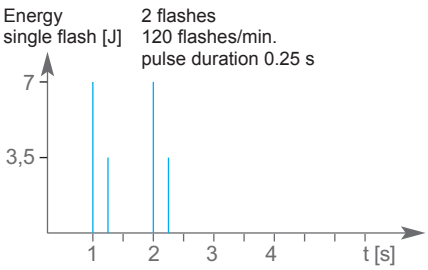
Flash rate

PMF 2020



PMF 2020 / PMF 2015





Ordering details

Article numbers		PMF 2020 direct mounting GL		PMF 2020 bracket mounting GL		PMF 2015 direct mounting		PMF 2015 bracket mounting	
Lens colour	**Rated voltage**	230 V AC	24 V DC	230 V AC	24 V DC	230 V AC	24 V DC	230 V AC	24 V DC
amber		21009104001	21009804001	21009104011	21009804011	21007104000	21007804000	21007104010	21007804010
red		21009105001	21009805001	21009105011	21009805011	21007105000	21007805000	21007105010	21007805010

Article numbers for other colours and voltages on request

Options / Accessories





GOST



GL

See page 118 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **"Machine safety - visual alarm signals".**
Requirements contained in the DIN EN 981 standard: **"Machine safety - system of acoustic and visual alarm and information signals",** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
"Coding of display devices and control elements using colours and supplementary means".

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Flashing Alarm Lights 15 Joules ABL/ABS



The powerful flashing light in a metal housing

- designed for alarm functions outdoors and in large halls and plants
- also available with GL approval
- housing and fixing bracket made of sturdy anodised aluminium
- aggressive environmental conditions or driving rain cannot damage the light
- impact-proof lens
- ideally suited for tough industrial environments
- flash tube additionally secured by a steel clamp



Range as per EN 54



Protection system



Operating temperature

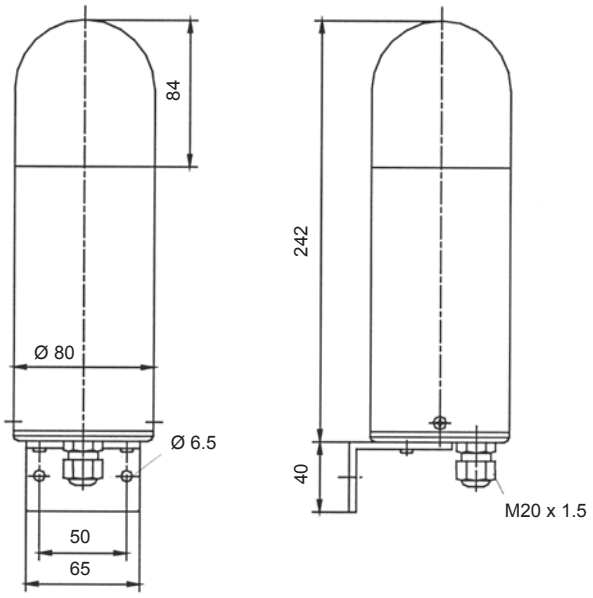
Electrical data AC	ABL					
Rated voltage	230 V AC	127 V AC	110 V AC	48 V AC	42 V AC	24 V AC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Operating range	185 – 255 V	108 – 140 V	95 – 127 V	40 – 54 V	35 – 50 V	20 – 30 V
Nominal current consumption	0.18 A	0.25 A	0.33 A	0.69 A	0.78 A	1.29 A

Electrical data DC	ABS				
Rated voltage	60 V DC	48 V DC	36 V DC	24 V DC	12 V DC
Operating range	50 – 72 V	40 – 60 V	29 – 43 V	18 – 30 V	10 – 15 V
Nominal current consumption	0.26 A	0.35 A	0.55 A	0.7 A	1.5 A

Mechanical data		ABL	ABS
Flash rate		1 Hz = 60 flashes/min.	
Flash energy		15 J	
Light intensity (DIN 5037) [1]		214 cd	
Lens colours		clear, white, yellow, amber, red, green, blue	
Operating temperature		- 40 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 54 (vertical mounting)	
Duty cycle		100%	
Service life of the flash tube		light emission still 70% after 8 000 000 flashes	
Material	lens	polycarbonate (PC)	
	housing	aluminium (Al Mg Si 1), yellow anodised	
	base	polycarbonate (PC) with fibre glass	
Cable entry		M20 x 1.5	
Connecting terminals		single wire 0.5 – 2.5 mm², fine wire 0.5 – 1.5 mm², with cable end sleeves DIN 46228/1	
Weight	AC	650 g	
	DC		800 g

[1] with a clear lens

Dimensions



Ordering details

Article numbers		ABL		ABS
Lens colour	Rated voltage	230 V AC	110 V AC	24 V DC
yellow		210 01 10 3 000	210 01 16 3 000	210 01 80 3 000
amber		210 01 10 4 000	210 01 16 4 000	210 01 80 4 000
red		210 01 10 5 000	210 01 16 5 000	210 01 80 5 000

Article numbers for other colours and voltages on request

Options / Accessories







Article number:
287 10 50 0 042



GOST

GL

See pages 118/119 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **"Machine safety - visual alarm signals".**
Requirements contained in the DIN EN 981 standard: **"Machine safety - system of acoustic and visual alarm and information signals",** can be fulfilled.

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DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

SPECTRA series Flashing Lights 15 Joules
P 400 STR / P 400 STS (Ø 140 mm)



Powerful flashing alarm light for universal use

- large variety of mounting methods due to modular design principle:
  – surface-mounted devices for mounting directly or on a wall bracket or a tubular stand
  – also for exposed installation locations through combination of wall bracket and tubular stand
  – cable entry at the side (2 x) or through the base of the housing
- durable, sturdy and functionally reliable due to the use of high-quality plastic
- optimum illumination due to prismatic coloured lens
- electronic components mechanically protected for highest mounting security
- attracts maximum attention due to adjustable flash rates
- also available in a synchronised version (STS)



Range as per EN 54



Protection system



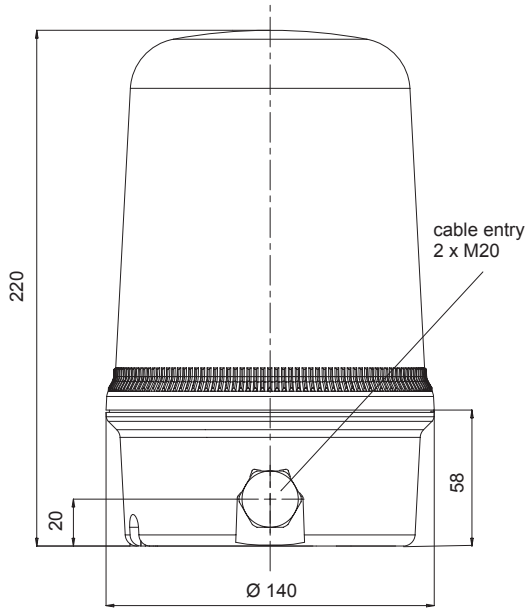
Operating temperature

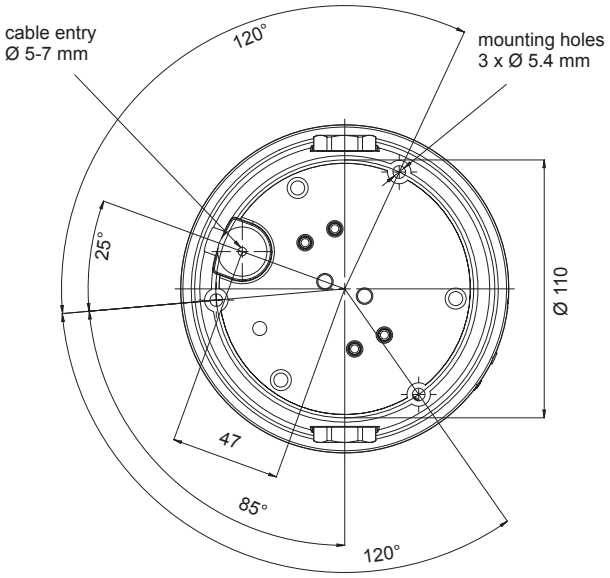
Electrical data	P 400 STR			P 400 STS		
Rated voltage	230 V AC	115 V AC	24 V AC/DC	230 V AC	115 V AC	24 V AC/DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz / DC	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz / DC
Operating range	207 – 253 V	100 – 130 V	20 – 28 V	207 – 253 V	100 – 130 V	20 – 28 V
Nominal current consumption	225 mA	400 mA	870 mA	225 mA	400 mA	870 mA

Mechanical data		P 400 STR		P 400 STS
Operating mode		3 flashing modes selectable on the device	flashing light	synchronised flashing light
Light source		xenon flash tube		
Flash energy	mode 1	double flash 15 J + 10 J @ 0.75 Hz	15 J @ 1 Hz	15 J @ 1 Hz
	mode 2	single flash 15 J @ 1 Hz		
	mode 3	triple flash 15 J + 10 J + 10 J @ 0.5 Hz		
Light intensity (DIN 5037) [1]		165 cd		
Lens colours		clear, yellow, amber, red, green, blue		
Lens type		prismatic		
Operating temperature		- 25 °C ... + 50 °C		
Relative humidity		90% @ + 20 °C		
Protection system according to EN 60529		IP 65		
Service life of the flash tube		light emission still 70% after 5 000 000 flashes		
Material		polycarbonate (PC)		
Design		bayonet with anti-tamper locking screw		
Mounting		surface mounting (wall bracket and tubular stand available as accessories)		
Cable entry		1 x 5-7 mm push through grommet (bottom side); 2 x M20 cable entries sideways		
Connecting terminals		screw terminals 1.5 mm²		
Weight	AC	632 g		
	DC	696 g		

[1] with a clear lens

Dimensions





Ordering details

Article numbers		P 400 STR			P 400 STS		
Lens colour	**Rated voltage**	230 V AC	115 V AC	24 V AC/DC	230 V AC	115 V AC	24 V AC/DC
yellow		213 44 10 3 000	213 44 15 3 000	213 44 40 3 000	213 45 10 3 000	213 45 15 3 000	213 45 40 3 000
amber		213 44 10 4 000	213 44 15 4 000	213 44 40 4 000	213 45 10 4 000	213 45 15 4 000	213 45 40 4 000
red		213 44 10 5 000	213 44 15 5 000	213 44 40 5 000	213 45 10 5 000	213 45 15 5 000	213 45 40 5 000

Article numbers for other colours and voltages on request

Options / Accessories

Wall bracket
Article number:
213 94 00 0 000

Tubular stand 145 mm
Article number:
213 95 00 0 000

Wall holder
only in combination with tubular stand
Article number:
282 50 20 0 000

See pages 120/121 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **"Machine safety - visual alarm signals".**
Requirements contained in the DIN EN 981 standard: **"Machine safety - system of acoustic and visual alarm and information signals",** can be fulfilled.

The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
"Coding of display devices and control elements using colours and supplementary means".

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Flashing Lights 13 Joules
Quadro F12 / Quadro S



Quadro F12

- industrial successor to the legendary Eiffel Tower light
- design adapted to suit industrial requirements; mounted via concealed interior holes or external lugs; fast, flexible and secure
- outstanding mechanical strength with IP 66, IP 67 and IK 08;
- whether in the open air, in a hailstorm or when high pressure cleaning systems are used, the Quadro stays sealed and signals reliably

Quadro S

- automatic synchronised flashing light
- a maximum of 10 flashing lights can be operated parallel and synchronously an unlimited time period; i.e. the flashes of all lights are generated simultaneously



Range as per EN 54



Protection system



Protection system



Impact-proof housing



Operating temperature





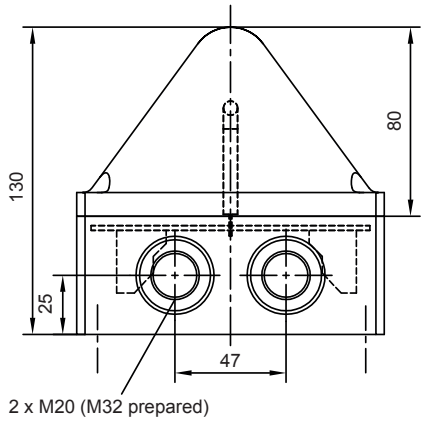
Electrical data	Quadro F12			Quadro S
Rated voltage	230 V AC	115 V AC	24 V DC	230 V AC
Rated frequency	50 / 60 Hz	50 / 60 Hz		50 / 60 Hz
Operating range	195 – 253 V	95 – 127 V	18 – 30 V	195 – 253 V
Nominal current consumption	250 mA	340 mA	700 mA	250 mA
Initial current limited to	< 7 A / 150 µs	< 7 A / 150 µs	< 5 A / 2 ms	< 1 A / 50 ms

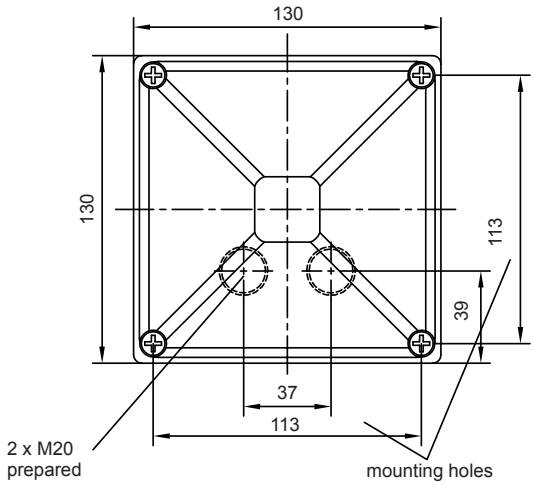
Mechanical data		Quadro F12	Quadro S
Flash rate		1 Hz = 60 flashes/min.	
Flash energy		13 J	
Light intensity (DIN 5037) [1]		140 cd	
Lens colours		clear, white, yellow, amber, red, green, blue	
Operating temperature		- 40 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		100%	
Protection system according to EN 60529		IP 66, IP 67, mounting arbitrary	
Impact resistance as per EN 50102		IK 08	
Protection class		II	
Duty cycle		100%	
Service life of the flash tube		light emission still 70% after 12 000 000 flashes	
Material	lens	polycarbonate (PC)	
	housing	polycarbonate (PC), RAL 7035	
Cable entry		2 x M20 bottom side / 2 x M20/M32 sideways	2 x M20 sideways
Connecting terminals		cage clamp terminal 0.08 - 2.5 mm²	
Mounting	external lugs	113 x 153 mm – M5 or 127.1 x 127.1 mm – M5	
	internal holes	113 x 113 mm	
Weight		600 g	

[1] with a clear lens

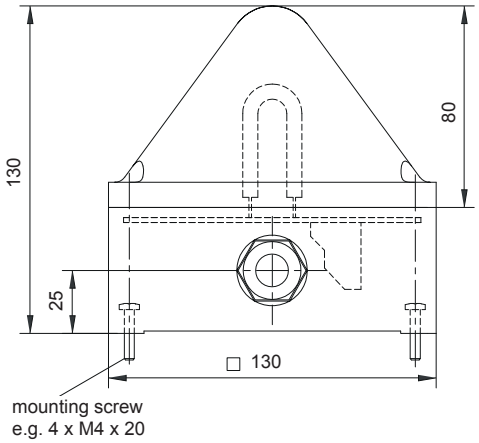
Dimensions

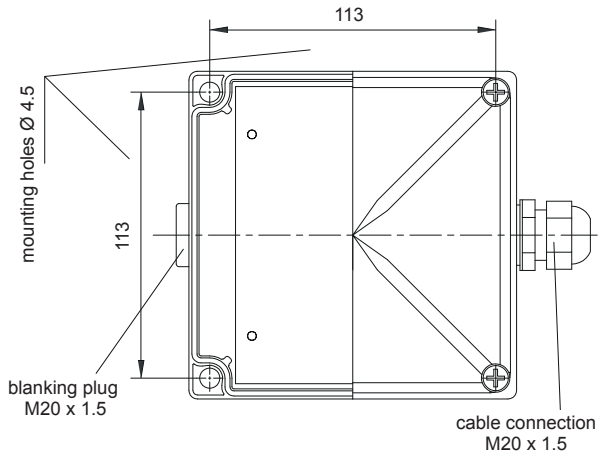
Quadro F12





Quadro S





Additional mounting possible via external lugs (included).

Ordering details

Article numbers		Quadro F12			Quadro S
Lens colour	**Rated voltage**	230 V AC	115 V AC	24 V DC	230 V AC
clear		210 41 10 1 000	210 41 16 1 000	210 41 80 1 000	210 42 10 1 000
yellow		210 41 10 3 000	210 41 16 3 000	210 41 80 3 000	210 42 10 3 000
amber		210 41 10 4 000	210 41 16 4 000	210 41 80 4 000	210 42 10 4 000
red		210 41 10 5 000	210 41 16 5 000	210 41 80 5 000	210 42 10 5 000

Article numbers for other colours and voltages on request

Options / Accessories

GOST

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **"Machine safety - visual alarm signals".**
Requirements contained in the DIN EN 981 standard: **"Machine safety - system of acoustic and visual alarm and information signals",** can be fulfilled.

The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
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DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Flashing Lights 10 Joules
PB 2010



A beautiful classic flashing light for indoors and outdoors

- high reliability and long service life due to full on-board electronics
- large variety of mounting methods – cable entry at the side or through the base of the housing
- extremely safe and reliable
- increased dispersion of light due to micro-prisms in the surface of the lens
- capable of being integrated in any application thanks to the pyramid design
- flash tube additionally secured by a steel clamp



Range as per EN 54



Protection system



Operating temperature

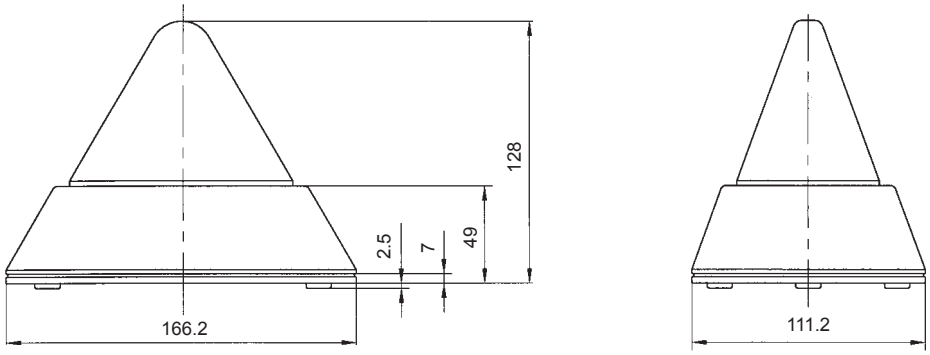
Electrical data AC	PB 2010			
Rated voltage	230 V AC	110 V AC	42 V AC	24 V AC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Operating range	185 – 255 V	90 – 135 V	35 – 50 V	20 – 30 V
Nominal current consumption	0.14 A	0.23 A	0.72 A	1.5 A

Electrical data DC	PB 2010					
Rated voltage	80 V DC	60 V DC	48 V DC	36 V DC	24 V DC	12 V DC
Operating range	64 – 96 V	50 – 72 V	40 – 60 V	36 – 45 V	18 – 30 V	10 – 15 V
Nominal current consumption	0.18 A	0.21 A	0.3 A	0.45 A	0.56 A	1.21 A

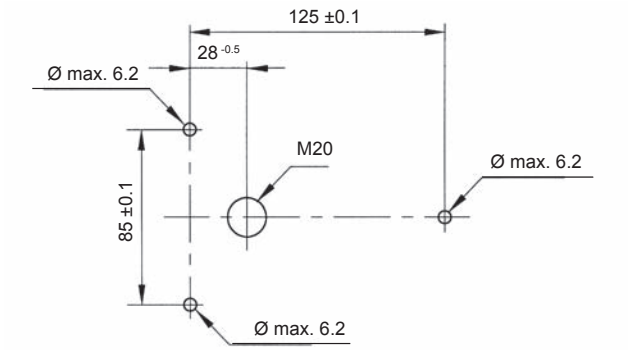
Mechanical data		PB 2010
Flash rate		1 Hz = 60 flashes/min.
Flash energy		10 J
Light intensity (DIN 5037) [1]		118 cd
Lens colours		clear, white, yellow, amber, red, green, blue
Operating temperature		- 40 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 55 (if mounted vertically/horizontally)
Duty cycle		100%
Service life of the flash tube		light emission still 70% after 8 000 000 flashes
Material	lens	polycarbonate (PC)
	housing	ABS, light grey similar to RAL 7035 (optionally graphite grey RAL 7024)
	base	ABS, light grey similar to RAL 7035 (optionally graphite grey RAL 7024)
Cable entry		M20 x 1.5, either at the side or underneath
Connecting terminals		screw terminals 1.5 mm²
Weight	AC	340 g
	DC	400 g

[1] with a clear lens

Dimensions



Mounting holes



Ordering details

Article numbers		PB 2010		
Lens colour	Rated voltage	230 V AC	110 V AC	24 V DC
yellow		210 30 10 3 000	210 30 16 3 000	210 30 80 3 000
amber		210 30 10 4 000	210 30 16 4 000	210 30 80 4 000
red		210 30 10 5 000	210 30 16 5 000	210 30 80 5 000

Article numbers		PB 2010 with GL approval	
Lens colour	Rated voltage	230 V AC	24 V DC
yellow		210 30 10 3 001	210 30 80 3 001
amber		210 30 10 4 001	210 30 80 4 001
red		210 30 10 5 001	210 30 80 5 001

Article numbers for other colours and voltages on request

Options / Accessories







Article number:
287 10 50 0 040





GOST



GL

See pages 118/119 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **"Machine safety - visual alarm signals".**
Requirements contained in the DIN EN 981 standard: **"Machine safety - system of acoustic and visual alarm and information signals",** can be fulfilled.

The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
"Coding of display devices and control elements using colours and supplementary means".

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Multiple Flashing Light 5 Joules
PMB 2010



A beautiful classic flashing light for indoors and outdoors
- high reliability and long service life due to full on-board electronics
- large variety of mounting methods – cable entry at the side or through the base of the housing
- extremely safe and reliable
- choice of three different flash combinations with fast flash rate – draws increased attention
- various flash combinations can be controlled externally (for 24 V DC)
- very bright due to up to 10 Joules total flash energy of the pulse group
- increased dispersion of light due to micro-prisms in the surface of the lens
- flash tube additionally secured by a steel clamp



Range as per EN 54



Protection system



Operating temperature

Electrical data	PMB 2010			
Rated voltage	230 V AC	110 V AC	24 V DC	48 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz		
Operating range	195 – 253 V	90 – 135 V	18 – 30 V	40 – 60 V
Nominal current consumption	see flash rate table			

Mechanical data	PMB 2010		
Operating mode	quad flash	double flash	single flash
Flash rate	120 flashes/min.	120 flashes/min.	240 flashes/min.
Total flash energy	up to 10 J		
Light intensity (DIN 5037) [1]	44 cd		
Lens colours	clear, white, yellow, amber, red, green, blue		
Operating temperature	- 40 °C ... + 55 °C		
Storage temperature	- 40 °C ... + 70 °C		
Relative humidity	90%		
Protection system according to EN 60529	IP 55 (if mounted vertically/horizontally)		
Duty cycle	100%		
Service life of the flash tube	light emission still 70% after 8 000 000 flashes		
Material – lens	polycarbonate (PC)		
Material – housing and base	ABS, light grey similar to RAL 7035 (optionally graphite grey RAL 7024)		
Cable entry	M20 x 1.5, either at the side or underneath		
Connecting terminals	screw terminals 1.5 mm²		
Weight	AC: 305 g / DC: 360 g		

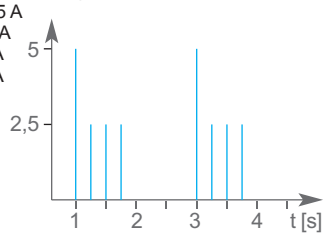
[1] with a clear lens

Flash rate

Quad flash

Current consumption
230V AC: 0.055 A
110V AC: 0.13 A
48V DC: 0.22 A
24V DC: 0.45 A

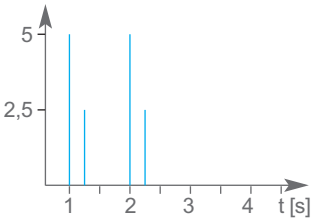
Energy single flash [J]



Double flash

Current consumption
230V AC: 0.06 A
110V AC: 0.14 A
48V DC: 0.25 A
24V DC: 0.5 A

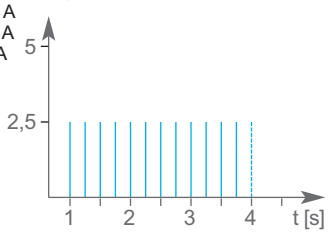
Energy single flash [J]



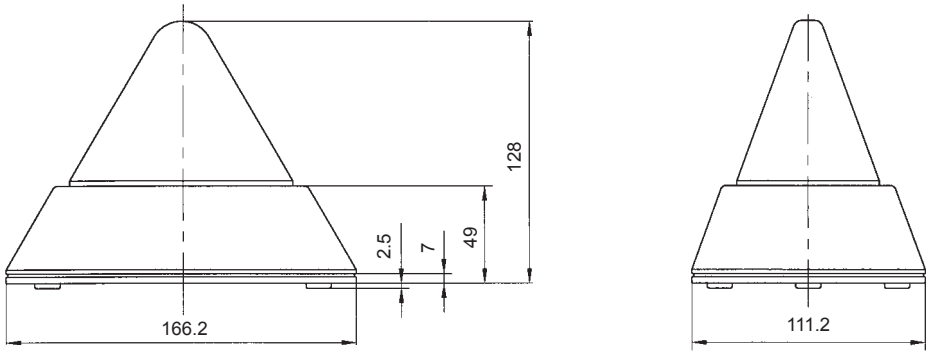
Single flash

Current consumption
230V AC: 0.09 A
110V AC: 0.22 A
48V DC: 0.35 A
24V DC: 0.7 A

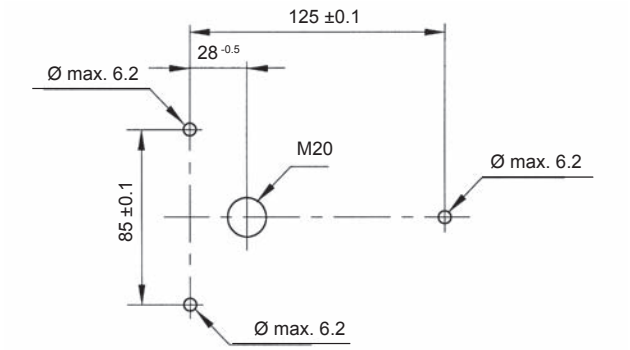
Energy single flash [J]



Dimensions



Mounting holes



Ordering details

Article numbers		PMB 2010	
Lens colour	**Rated voltage**	230 V AC	24 V DC
yellow		210 06 10 3 000	210 06 80 3 000
amber		210 06 10 4 000	210 06 80 4 000
red		210 06 10 5 000	210 06 80 5 000

Article numbers for other colours and voltages on request

Options / Accessories





Article number:
287 10 50 0 040

GOST

GL

See pages 118/119 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **"Machine safety - visual alarm signals".**
Requirements contained in the DIN EN 981 standard: **"Machine safety - system of acoustic and visual alarm and information signals",** can be fulfilled.

The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
"Coding of display devices and control elements using colours and supplementary means".

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Flashing Lights 5 Joules
PB 2005



A beautiful classic flashing light for indoors and outdoors

- high reliability and long service life due to full on-board electronics
- large variety of mounting methods – cable entry at the side or through the base of the housing
- extremely safe and reliable
- increased dispersion of light due to micro-prisms in the surface of the lens
- capable of being integrated in any application thanks to the pyramid design
- flash tube additionally secured by a steel clamp



Range as per EN 54



Protection system



Operating temperature

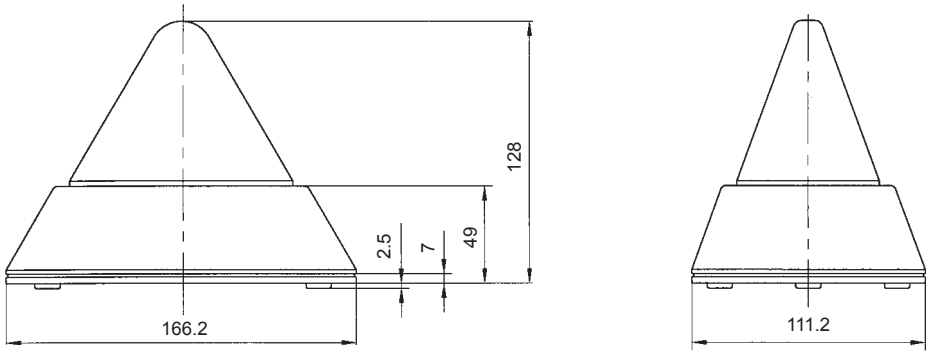
Electrical data AC	PB 2005						
Rated voltage	230 V AC	127 V AC	110 V AC	48 V AC	42 V AC	24 V AC	12 V AC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Operating range	185 – 255 V	110 – 148 V	90 – 135 V	40 – 54 V	35 – 50 V	20 – 30 V	9 – 15 V
Nominal current consumption	0.07 A	0.115 A	0.1 A	0.47 A	0.5 A	0.77 A	0.99 A

Electrical data DC	PB 2005				
Rated voltage	80 V DC	60 V DC	48 V DC	24 V DC	12 V DC
Operating range	64 – 96 V	50 – 72 V	40 – 60 V	18 – 30 V	10 – 15 V
Nominal current consumption	0.11 A	0.13 A	0.18 A	0.25 A	0.6 A

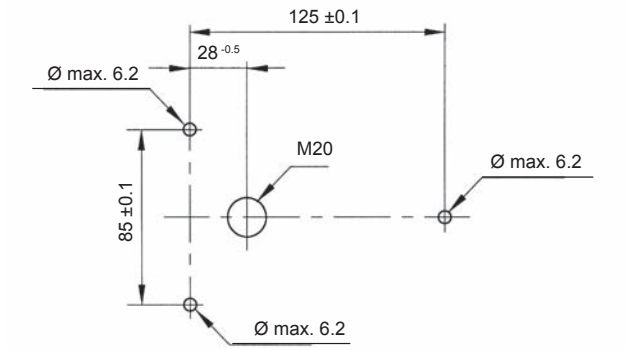
Mechanical data		PB 2005
Flash rate		1 Hz = 60 flashes/min.
Flash energy		5 J
Light intensity (DIN 5037) [1]		44 cd
Lens colours		clear, white, yellow, amber, red, green, blue
Operating temperature		- 40 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 55 (if mounted vertically/horizontally)
Duty cycle		100%
Service life of the flash tube		light emission still 70% after 8 000 000 flashes
Material	lens	polycarbonate (PC)
	housing	ABS, light grey similar to RAL 7035 (optionally graphite grey RAL 7024)
	base	ABS, light grey similar to RAL 7035 (optionally graphite grey RAL 7024)
Cable entry		M20 x 1.5, either at the side or underneath
Connecting terminals		screw terminals 1.5 mm²
Weight	AC	275 g
	DC	310 g

[1] with a clear lens

Dimensions



Mounting holes



Ordering details

Article numbers		PB 2005		
Lens colour	Rated voltage	230 V AC	110 V AC	24 V DC
yellow		210 25 10 3 000	210 25 16 3 000	210 25 80 3 000
amber		210 25 10 4 000	210 25 16 4 000	210 25 80 4 000
red		210 25 10 5 000	210 25 16 5 000	210 25 80 5 000

Article numbers		PB 2005 with GL approval	
Lens colour	Rated voltage	230 V AC	24 V DC
yellow		210 25 10 3 001	210 25 80 3 001
amber		210 25 10 4 001	210 25 80 4 001
red		210 25 10 5 001	210 25 80 5 001

Article numbers for other colours and voltages on request

Options / Accessories







Article number:
287 10 50 0 040





GOST



GL

See pages 118/119 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **"Machine safety - visual alarm signals".**
Requirements contained in the DIN EN 981 standard: **"Machine safety - system of acoustic and visual alarm and information signals",** can be fulfilled.

The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
"Coding of display devices and control elements using colours and supplementary means".

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Flashing Warning Lights 5 Joules
WBL/WBS / WBL-PX



The classics of flashing lights
- sturdy metal housing
- universally usable
- also available with GL approval
- housing and fixing bracket made of sturdy anodised aluminium
- aggressive environmental conditions or driving rain cannot damage the light
- impact-proof lens
- ideally suited for tough industrial environments
- flash tube additionally secured by a steel clamp



Range as per EN 54



Protection system



Operating temperature



WBL-PX

Electrical data AC	WBL				
Rated voltage	230 V AC	110 V AC	48 V AC	42 V AC	24 V AC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Operating range	185 – 255 V	90 – 135 V	40 – 54 V	35 – 50 V	20 – 30 V
Nominal current consumption	0.07 A	0.1 A	0.47 A	0.5 A	0.77 A

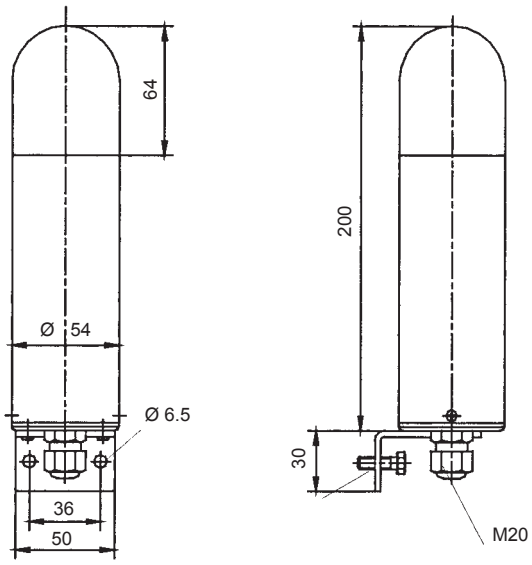
Electrical data DC	WBS					
Rated voltage	110 V DC	80 V DC	60 V DC	48 V DC	24 V DC	12 V DC
Operating range	88 – 132 V	64 – 96 V	50 – 72 V	40 – 60 V	18 – 35 V	10 – 15 V
Nominal current consumption	0.09 A	0.11 A	0.13 A	0.18 A	0.25 A	0.6 A

Electrical data	WBL-PX
Rated voltage	230 V AC
Rated frequency	50 / 60 Hz
Operating range	185 – 255 V
Nominal current consumption	0.055 A
Initial current limited to	≤ 6 A / 110 µs

Mechanical data		WBL	WBS	WBL-PX
Flash rate		1 Hz = 60 flashes/min.		
Flash energy		5 J		
Light intensity (DIN 5037) [1]		44 cd		
Lens colours		clear, white, yellow, amber, red, green, blue		
Operating temperature		- 40 °C ... + 55 °C		
Storage temperature		- 40 °C ... + 70 °C		
Relative humidity		90%		
Protection system according to EN 60529		IP 54 (vertical mounting)		
Duty cycle		100%		
Service life of the flash tube		light emission still 70% after 8 000 000 flashes		
Material	lens	polycarbonate (PC)		
	housing	aluminium (Al Mg Si 1), yellow anodised		
	base	polycarbonate (PC) with fibre glass		
Cable entry		M20 x 1.5		
Connecting terminals		single wire 0.5 – 2.5 mm², fine wire 0.5 – 1.5 mm², with cable end sleeves DIN 46228/1		
Weight	AC	260 g		260 g
	DC		300 g	

[1] with a clear lens

Dimensions



Ordering details

Article numbers		WBL		WBS	
Lens colour	Rated voltage	230 V AC	110 V AC	60 V DC	24 V DC
yellow		210 03 10 3 000	210 03 16 3 000	210 03 65 3 000	210 03 80 3 000
amber		210 03 10 4 000	210 03 16 4 000	210 03 65 4 000	210 03 80 4 000
red		210 03 10 5 000	210 03 16 5 000	210 03 65 5 000	210 03 80 5 000

Article numbers		WBL-PX
Lens colour	Rated voltage	230 V AC
yellow		210 03 10 3 175

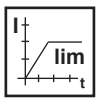
Article numbers for other colours and voltages on request

Options / Accessories











Article number:
287 10 50 0 041





GOST



GL

See pages 118/119 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **“Machine safety - visual alarm signals“.**
Requirements contained in the DIN EN 981 standard: **“Machine safety - system of acoustic and visual alarm and information signals“,** can be fulfilled.

The colours ‘red’ for the emergency signal and ‘yellow’ for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
“Coding of display devices and control elements using colours and supplementary means“.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Flashing Warning Lights 5 Joules WBLR/WBSR



Visual alarm in compact plastic housing

- especially suitable for outdoor applications due to high protection system
- mounting via concealed interior holes
- safe mounting without breaching IP protection
- flash tube additionally secured by a steel clamp



Range as per EN 54



Protection system



Operating temperature



24 V DC, 48 V DC

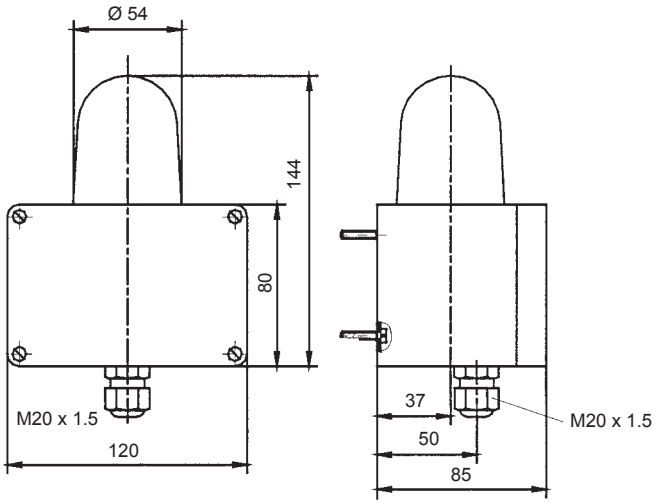
Electrical data AC	WBLR				
Rated voltage	230 V AC	110 V AC	48 V AC	42 V AC	24 V AC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Operating range	185 – 255 V	90 – 135 V	40 – 54 V	35 – 50 V	20 – 30 V
Nominal current consumption	0.07 A	0.1 A	0.47 A	0.5 A	0.77 A

Electrical data DC	WBSR					
Rated voltage	110 V DC	80 V DC	60 V DC	48 V DC	24 V DC	12 V DC
Operating range	88 – 132 V	64 – 96 V	50 – 72 V	40 – 60 V	18 – 35 V	10 – 15 V
Nominal current consumption	0.09 A	0.11 A	0.13 A	0.18 A	0.25 A	0.6 A

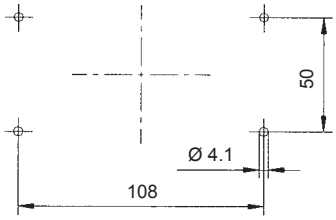
Mechanical data		WBLR / WBSR
Flash rate		1 Hz = 60 flashes/min.
Flash energy		5 J
Light intensity (DIN 5037) [1]		44 cd
Lens colours		clear, white, yellow, amber, red, green, blue
Operating temperature		- 40 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 65
Duty cycle		100%
Service life of the flash tube		light emission still 70% after 8 000 000 flashes
Material	lens	polycarbonate (PC)
	housing	ABS, light grey, similar to RAL 7035
Cable entry		M20 x 1.5
Connecting terminals		single wire 0.5 – 2.5 mm², fine wire 0.5 – 1.5 mm², with cable end sleeves DIN 46228/1
Weight	AC	290 g
	DC	300 g

[1] with a clear lens

Dimensions



Mounting holes



Ordering details

Article numbers		WBLR		WBSR
Lens colour	**Rated voltage**	230 V AC	110 V AC	24 V DC
yellow		210 04 10 3 000	210 04 16 3 000	210 04 80 3 000
amber		210 04 10 4 000	210 04 16 4 000	210 04 80 4 000
red		210 04 10 5 000	210 04 16 5 000	210 04 80 5 000

Article numbers for other colours and voltages on request

Options / Accessories









Article number:
287 10 50 0 043



GOST

GL

See pages 118/119 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **"Machine safety - visual alarm signals".**
Requirements contained in the DIN EN 981 standard: **"Machine safety - system of acoustic and visual alarm and information signals",** can be fulfilled.

The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
"Coding of display devices and control elements using colours and supplementary means".

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

SPECTRA series Flashing Lights 5 Joules
P 300 STR / P 300 STS / P 300 STF (∅ 100 mm)



Flashing warning light for universal use

- large variety of mounting methods due to modular design principle:
  – surface-mounted devices for mounting directly or on a wall bracket or a tubular stand
  – also for exposed installation locations through combination of wall bracket and tubular stand
  – cable entry at the side or through the base of the housing
- durable, sturdy and functionally reliable due to the use of high-quality plastic
- optimum illumination due to prismatic coloured lens
- electronic components mechanically protected for highest mounting security
- also available in a synchronised version (STS) or with adjustable flash frequency (STF)



Range as per EN 54



Protection system



Operating temperature

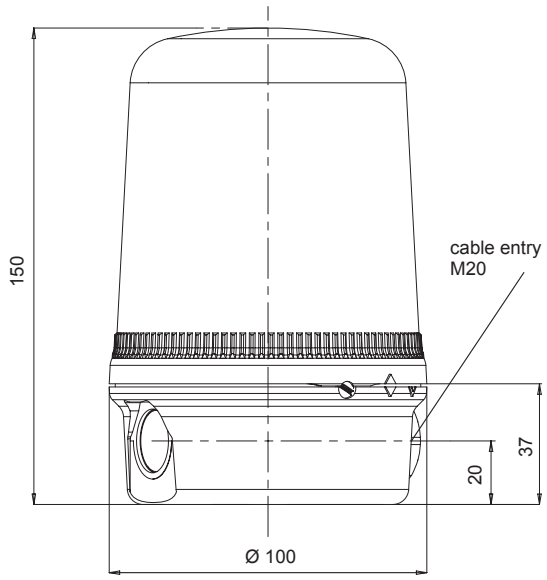
Electrical data AC	P 300 STR		P 300 STS	
Rated voltage	230 V AC	115 V AC	230 V AC	115 V AC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Operating range	207 – 253 V	100 – 130 V	207 – 253 V	100 – 130 V
Nominal current consumption	35 mA	70 mA	35 mA	70 mA

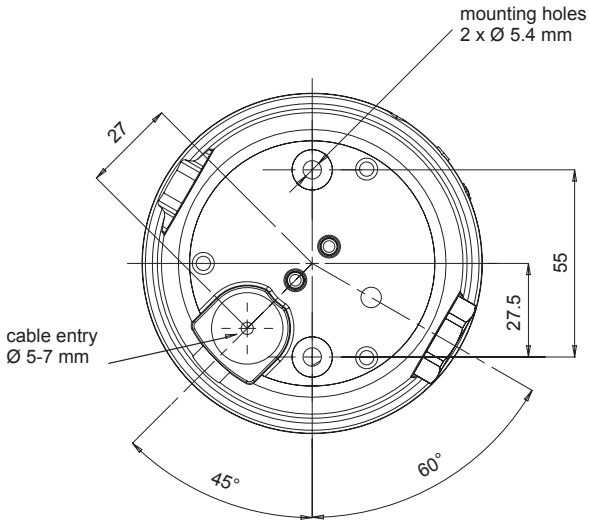
Electrical data AC/DC	P 300 STR	P 300 STS	P 300 STF	
Rated voltage	24 V AC/DC	24 V AC/DC	12 V AC/DC	24 V AC/DC
Operating range	20 – 28 V	20 – 28 V	10 – 15 V	20 – 28 V
Nominal current consumption	250 mA / 300 mA	250 mA / 300 mA	500 mA / 600 mA	250 mA / 300 mA

Mechanical data		P 300 STR	P 300 STS	P 300 STF
Operating mode		flashing light	synchronised flashing light	multi-frequency flashing light
Light source		xenon flash tube	xenon flash tube	xenon flash tube
Flash energy		5 J @ 1 Hz	5 J @ 1 Hz	5 J @ 1 Hz or 2 Hz
Light intensity (DIN 5037) [1]		40 cd		
Lens colours		clear, yellow, amber, red, green, blue		
Lens type		prismatic		
Operating temperature		- 25 °C ... + 50 °C		
Relative humidity		90% @ + 20 °C		
Protection system according to EN 60529		IP 65		
Service life of the flash tube		light emission still 70% after 5 000 000 flashes		
Material		polycarbonate (PC), UL 94 VO f1		
Design		bayonet with anti-tamper locking screw		
Mounting		surface mounting (wall bracket and tubular stand available as accessories)		
Cable entry		1 x 5-7 mm push through grommet (bottom side); 1 x M20 cable entry sideways		
Connecting terminals		screw terminals 1.5 mm²		
Weight	AC	300 g		325 g
	DC	325 g		325 g

[1] with a clear lens

Dimensions





Ordering details

Article numbers AC		P 300 STR		P 300 STS	
Lens colour	Rated voltage	230 V AC	115 V AC	230 V AC	115 V AC
yellow		213 34 10 3 000	213 34 15 3 000	213 35 10 3 000	213 35 15 3 000
amber		213 34 10 4 000	213 34 15 4 000	213 35 10 4 000	213 35 15 4 000
red		213 34 10 5 000	213 34 15 5 000	213 35 10 5 000	213 35 15 5 000

Article numbers AC/DC		P 300 STR	P 300 STS	P 300 STF	
Lens colour	Rated voltage	24 V AC/DC	24 V AC/DC	12 V AC/DC	24 V AC/DC
yellow		213 34 40 3 000	213 35 40 3 000	213 36 41 3 000	213 36 40 3 000
amber		213 34 40 4 000	213 35 40 4 000	213 36 41 4 000	213 36 40 4 000
red		213 34 40 5 000	213 35 40 5 000	213 36 41 5 000	213 36 40 5 000

Article numbers for other colours and voltages on request

Options / Accessories

Wall bracket
Article number:
213 92 00 0 000

Tubular stand 140 mm
Article number:
213 93 00 0 000

Wall holder only in combination with tubular stand
Article number:
282 50 20 0 000

See pages 120/121 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **"Machine safety - visual alarm signals".**
Requirements contained in the DIN EN 981 standard: **"Machine safety - system of acoustic and visual alarm and information signals",** can be fulfilled.

The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
"Coding of display devices and control elements using colours and supplementary means".

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Compact Flashing Light 5 Joules
PY X-S-05



The compact flashing light is not only adaptable to many applications, but it is also impressive due to its safe and simple mounting

- installation options with external lugs or internal holes
- simple electrical connection on the bottom of the casing
- impact-proof lens
- suitable for panel mounting
- housing colours: red, grey or white
- optional with Soft-Start-Module for reduction of starting current

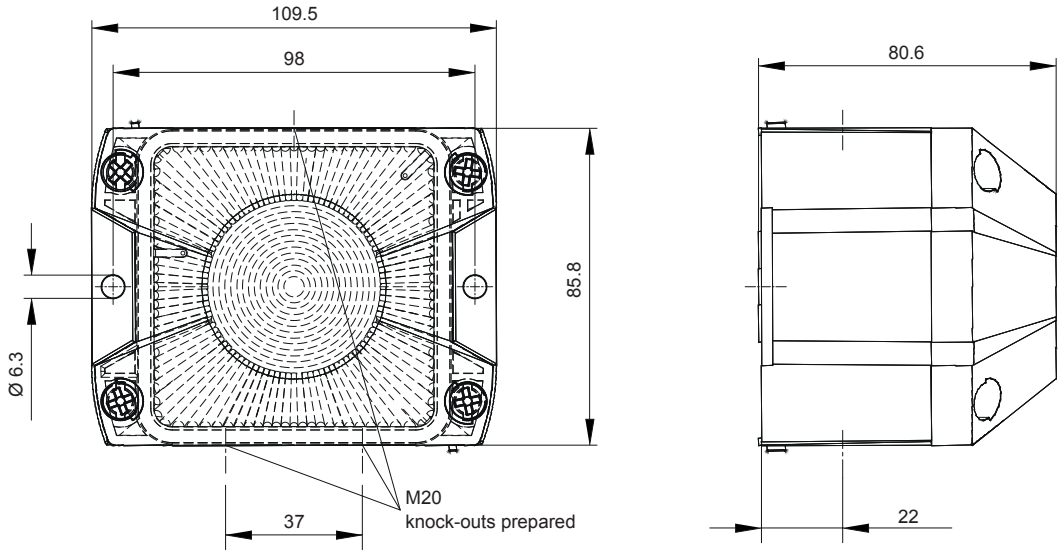
r = 11 m	IP 66	+ 55 °C / - 40 °C	EN 54-23	VdS	UL
Range as per EN 54	Protection system	Operating temperature	24 V DC, 48 V DC	24 V DC, 48 V DC	

Electrical data	PY X-S-05					
Rated voltage	230 V AC	115 V AC	24 V AC	48 V DC	24 V DC	12 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz			
Operating range	187 – 255 V	90 – 135 V	18 – 30 V	40 – 60 V	18 – 30 V	12 – 15 V
Nominal current consumption	55 mA	100 mA	800 mA	170 mA	300 mA	600 mA

Mechanical data		PY X-S-05
Flash rate		1 Hz = 60 flashes/min.
Flash energy		5 J
Light intensity (DIN 5037) [1]		44 cd
Lens colours		clear, white, yellow, amber, red, green, blue
Operating temperature		- 40 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		max. 90%
Protection system according to EN 60529		IP 66
Protection class		II
Duty cycle		100%
Service life of the flash tube		light emission still 70% after 8 000 000 flashes
Material	lens	polycarbonate (PC)
	housing	PC / ABS blend
Colour	housing	similar to RAL 3000 (flame red) / RAL 7035 (light grey) / RAL 9003 (signal white)
Cable entry		3 x M20 knock-outs on side, 1 knock-out on back
Integrated seal with cable entry		6 – 13 mm (feed-through grommet)
Connecting terminals		2.5 mm² fine wire with cable end sleeve, AWG 16
Weight	AC	165 g
	DC	200 g

[1] with a clear lens

Dimensions



Ordering details

Article numbers		PY X-S-05 – housing red		
Lens colour	Rated voltage	230 V AC	115 V AC	24 V DC
yellow		215 10 10 3 000	215 10 15 3 000	215 10 80 3 000
amber		215 10 10 4 000	215 10 15 4 000	215 10 80 4 000
red		215 10 10 5 000	215 10 15 5 000	215 10 80 5 000
Article numbers		**PY X-S-05 – housing grey**		
Lens colour	Rated voltage	230 V AC	115 V AC	24 V DC
yellow		215 10 10 3 055	215 10 15 3 055	215 10 80 3 055
amber		215 10 10 4 055	215 10 15 4 055	215 10 80 4 055
red		215 10 10 5 055	215 10 15 5 055	215 10 80 5 055

Article numbers for other colours and voltages on request

Options / Accessories

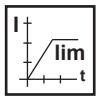
GL

Enclo-sure fitting

Surface gasket

Tamper-proof sealing

Panel mount-ing kit



SSM
(only for 24 V DC)

See page 119 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **"Machine safety - visual alarm signals".**
Requirements contained in the DIN EN 981 standard: **"Machine safety - system of acoustic and visual alarm and information signals",** can be fulfilled.

The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
"Coding of display devices and control elements using colours and supplementary means".

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Flashing Warning Lights 2.5 Joules DWBL/DWBS



Flashing light for direct installation at the workstation

- no dazzle – but secure alarm function
- also available with GL approval
- housing and fixing bracket made of sturdy anodised aluminium
- impact-proof lens
- flash tube additionally secured by a steel clamp



Range as per EN 54



Protection system



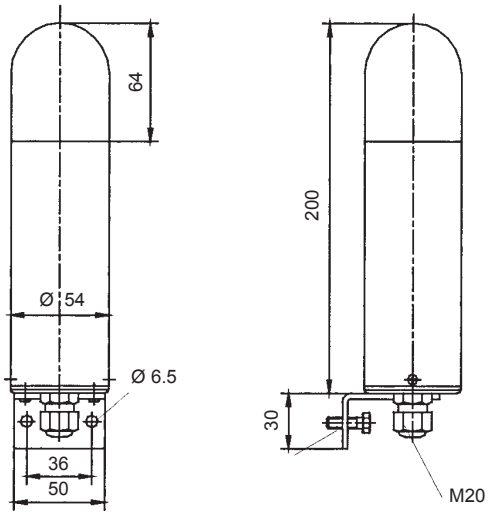
Operating temperature

Electrical data AC	DWBL				
Rated voltage	230 V AC	110 V AC	48 V AC	42 V AC	24 V AC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Operating range	185 – 255 V	90 – 135 V	40 – 54 V	35 – 50 V	20 – 30 V
Nominal current consumption	0.04 A	0.05 A	0.26 A	0.29 A	0.5 A
Electrical data DC	**DWBS**				
Rated voltage	12 V DC	24 V DC	48 V DC	60 V DC	80 V DC
Operating range	10 – 15 V	18 – 30 V	40 – 60 V	50 – 72 V	64 – 96 V
Nominal current consumption	0.27 A	0.15 A	0.1 A	0.07 A	0.067 A

Mechanical data		DWBL	DWBS
Flash rate		1 Hz = 60 flashes/min.	
Flash energy		2.5 J	
Light intensity (DIN 5037) [1]		8 cd	
Lens colours		clear, white, yellow, amber, red, green, blue	
Operating temperature		- 40 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 54 (vertical mounting)	
Duty cycle		100%	
Service life of the flash tube		light emission still 70% after 8 000 000 flashes	
Material	lens	polycarbonate (PC)	
	housing	aluminium (Al Mg Si 1), yellow anodised	
	base	polycarbonate (PC) with fibre glass	
Cable entry		M20 x 1.5	
Connecting terminals		single wire 0.5 – 2.5 mm², fine wire 0.5 – 1.5 mm², with cable end sleeves DIN 46228/1	
Weight	AC	270 g	
	DC		300 g

[1] with a clear lens

Dimensions



Ordering details

Article numbers		DWBL		DWBS
Lens colour	Rated voltage	230 V AC	110 V AC	24 V DC
yellow		210 05 10 3 000	210 05 16 3 000	210 05 80 3 000
amber		210 05 10 4 000	210 05 16 4 000	210 05 80 4 000
red		210 05 10 5 000	210 05 16 5 000	210 05 80 5 000

Article numbers for other colours and voltages on request

Options / Accessories

30 90 120

Article number:
287 10 50 0 041

GOST GL

See pages 118/119 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **"Machine safety - visual alarm signals".**
Requirements contained in the DIN EN 981 standard: **"Machine safety - system of acoustic and visual alarm and information signals",** can be fulfilled.

The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
"Coding of display devices and control elements using colours and supplementary means".

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

SPECTRA series Compact Flashing Lights 1 Joules P 200 STR / P 100 STR (∅ 60 mm)



Compact flashing light series, also for use where space is limited

- large variety of mounting methods due to modular design principle:
  – panel-mounted devices with convenient plug contact (P 100)
  – surface-mounted devices for mounting directly or on a wall bracket or a tubular stand (P 200)
- durable, sturdy and functionally reliable due to the use of high-quality plastic
- optimum illumination due to prismatic coloured lens
- also for exposed installation locations by combining wall bracket and tubular stand
- high IP protection in any installation position



Range as per EN 54



Protection system



Operating temperature

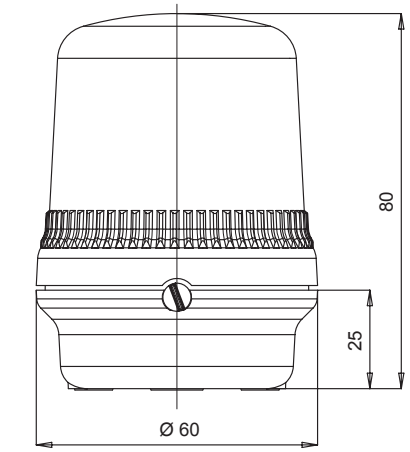
Electrical data	P 200 STR			P 100 STR		
Rated voltage	230 V AC	115 V AC	12 / 24 V AC/DC	230 V AC	115 V AC	12 / 24 V AC/DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz / DC	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz / DC
Operating range	207 – 253 V	100 – 130 V	10 – 30 V	207 – 253 V	100 – 130 V	10 – 30 V
Nominal current consumption	20 mA	30 mA	135 mA @ 24 V DC	20 mA	30 mA	135 mA @ 24 V DC

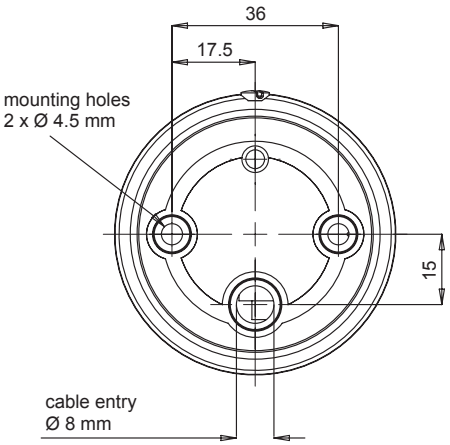
Mechanical data		P 200 STR	P 100 STR
Operating mode		flashing light	
Light source		xenon flash tube	
Flash energy		1 J @ 0.75 Hz	
Light intensity (DIN 5037) [1]		1 cd	
Lens colours		clear, yellow, amber, red, green, blue	
Lens type		prismatic	
Operating temperature		- 25 °C ... + 50 °C	
Relative humidity		90% @ + 20 °C	
Protection system according to EN 60529		IP 65	
Service life of the flash tube		light emission still 70% after 5 000 000 flashes	
Material		polycarbonate (PC), UL 94 VO f1	
Design		bayonet with anti-tamper locking screw	
Mounting		surface mounting (wall bracket and tubular stand available as accessories)	panel-mounting: Ø 27.5 mm (PG29)
Connecting terminals		screw terminals 1.5 mm²	screw terminals 1.5 mm² pluggable
Weight	AC	89 g	105 g
	DC	84 g	100 g

[1] with a clear lens

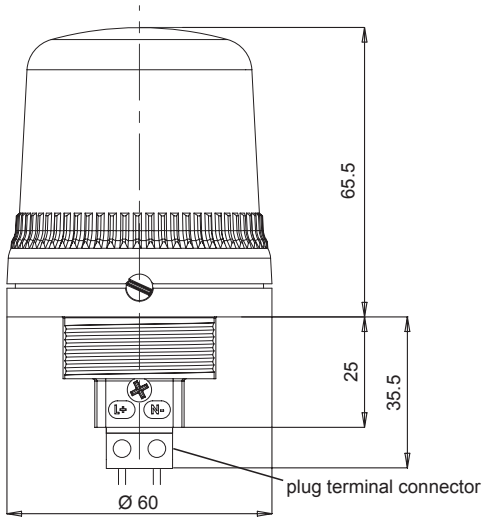
Dimensions

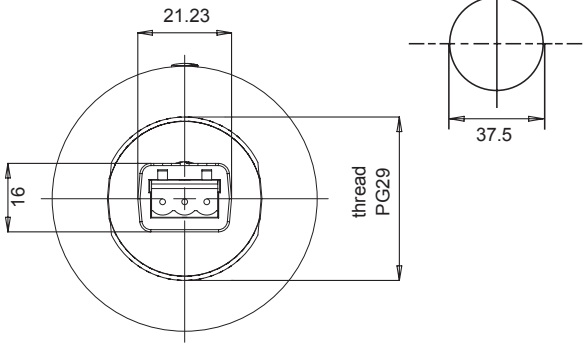
P 200 STR





P 100 STR





Ordering details

Article numbers		P 200 STR			P 100 STR		
Lens colour	**Rated voltage**	230 V AC	115 V AC	12/24 V AC/DC	230 V AC	115 V AC	12/24 V AC/DC
yellow		213 24 10 3 000	213 24 15 3 000	213 24 89 3 000	213 14 10 3 000	213 14 15 3 000	213 14 89 3 000
amber		213 24 10 4 000	213 24 15 4 000	213 24 89 4 000	213 14 10 4 000	213 14 15 4 000	213 14 89 4 000
red		213 24 10 5 000	213 24 15 5 000	213 24 89 5 000	213 14 10 5 000	213 14 15 5 000	213 14 89 5 000

Article numbers for other colours on request

Options / Accessories

Wall bracket only for P 200 STR
Article number:
213 90 00 0 000

Tubular stand 137 mm only for P 200 STR
Article number:
213 91 00 0 000

Wall holder only in combination with tubular stand
Article number:
282 50 20 0 000

See pages 120/121 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **"Machine safety - visual alarm signals".**
Requirements contained in the DIN EN 981 standard: **"Machine safety - system of acoustic and visual alarm and information signals",** can be fulfilled.

The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
"Coding of display devices and control elements using colours and supplementary means".

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

SPECTRA series Blinking Lights 40 Watt
P 400 FLF / P 400 FLH (∅ 140 mm)



P 400 FLF



Range as per EN 54

P 400 FLH



Range as per EN 54



Protection system



Operating temperature

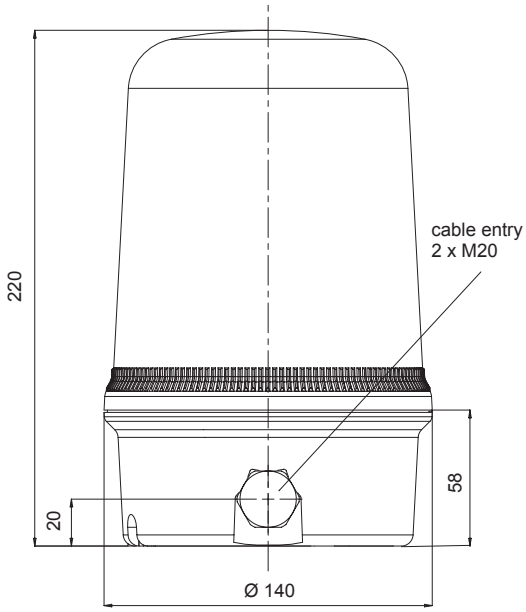
Powerful blinking light for universal use

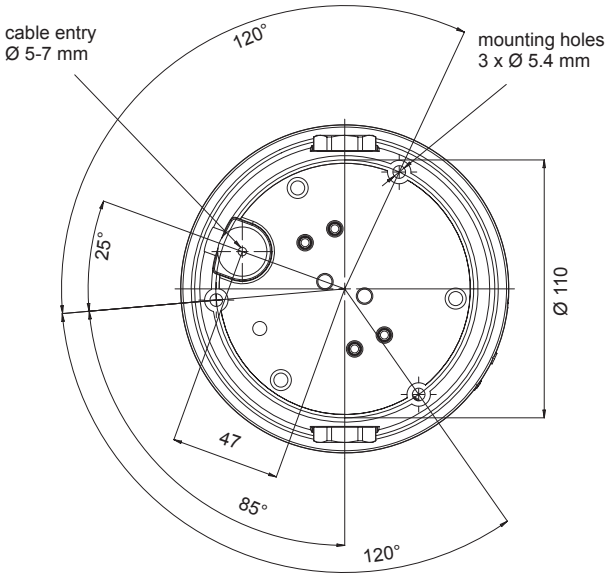
- optionally with halogen lamp or filament lamp
- large variety of mounting methods due to modular design principle:
  – surface-mounted devices for mounting directly or on a wall bracket or a tubular stand
  – also for exposed installation locations through combination of wall bracket and tubular stand
  – cable entry at the side or through the base of the housing
- durable, sturdy and functionally reliable due to the use of high-quality plastic
- optimum illumination due to prismatic coloured lens
- electronic components mechanically protected for highest mounting security
- standard with on-site selectable blink frequency

Electrical data	P 400 FLF			P 400 FLH		
Rated voltage	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz		50 / 60 Hz	50 / 60 Hz	
Operating range	207 – 253 V	100 – 130 V	20 – 28 V	207 – 253 V	100 – 130 V	20 – 28 V
Nominal current consumption	118 mA	340 mA	1.14 A	178 mA	321 mA	2.05 A
Capacity of light source	40 W	40 W	40 W	40 W	40 W	35 W

Mechanical data	P 400 FLF	P 400 FLH
Operating mode	blinking light	halogen blinking light
Light source	filament lamp E14	halogen lamp G6.35 / GY6.35
Light power adjustable on the device	40 W @ 0.5 Hz / 1 Hz / 2 Hz	35 W / 40 W @ 0.5 Hz / 1 Hz / 2 Hz
	3 blink frequencies – adjustable during installation	
Lens colours	clear, yellow, amber, red, green, blue	
Lens type	prismatic	
Operating temperature	- 25 °C ... + 50 °C	
Relative humidity	90% @ + 20 °C	
Protection system according to EN 60529	IP 65	
Material	polycarbonate (PC), UL 94 VO f1	
Design	bayonet with anti-tamper locking screw	
Mounting	surface mounting (wall bracket and tubular stand available as accessories)	
Cable entry	1 x 5-7 mm push through grommet (bottom side); 1 x M20 cable entry sideways	
Connecting terminals	screw terminals 1.5 mm^2	
Weight	535 g	

Dimensions





Ordering details

Article numbers		P 400 FLF			P 400 FLH		
Lens colour	**Rated voltage**	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
yellow		213 41 10 3 000	213 41 15 3 000	213 41 80 3 000	213 43 10 3 000	213 43 15 3 000	213 43 80 3 000
amber		213 41 10 4 000	213 41 15 4 000	213 41 80 4 000	213 43 10 4 000	213 43 15 4 000	213 43 80 4 000
red		213 41 10 5 000	213 41 15 5 000	213 41 80 5 000	213 43 10 5 000	213 43 15 5 000	213 43 80 5 000

Article numbers for other colours and voltages on request

Options / Accessories

Wall bracket
Article number:
213 94 00 0 000

Tubular stand 145 mm
Article number:
213 95 00 0 000

Wall holder only in combination with tubular stand
Article number:
282 50 20 0 000

Light source

See pages 120-122 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **“Machine safety - visual alarm signals“.**
Requirements contained in the DIN EN 981 standard: **“Machine safety - system of acoustic and visual alarm and information signals“,** can be fulfilled.

The colours ‘red’ for the emergency signal and ‘yellow’ for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
“Coding of display devices and control elements using colours and supplementary means“.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

SPECTRA series Blinking Lights 25 Watt
P 300 FLF / P 300 FLH (∅ 100 mm)



Blinking light for universal use
- optionally with halogen lamp or filament lamp
- large variety of mounting methods due to modular design principle:
  – surface-mounted devices for mounting directly or on a wall bracket or a tubular stand
  – also for exposed installation locations through combination of wall bracket and tubular stand
  – cable entry at the side or through the base of the housing
- durable, sturdy and functionally reliable due to the use of high-quality plastic
- optimum illumination due to prismatic coloured lens
- electronic components mechanically protected for highest mounting security
- standard with on-site selectable blink frequency

P 300 FLF



Range as per EN 54

P 300 FLH



Range as per EN 54



Protection system

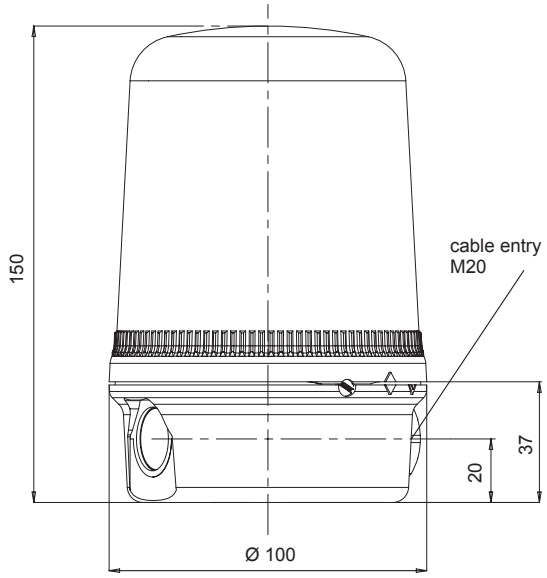


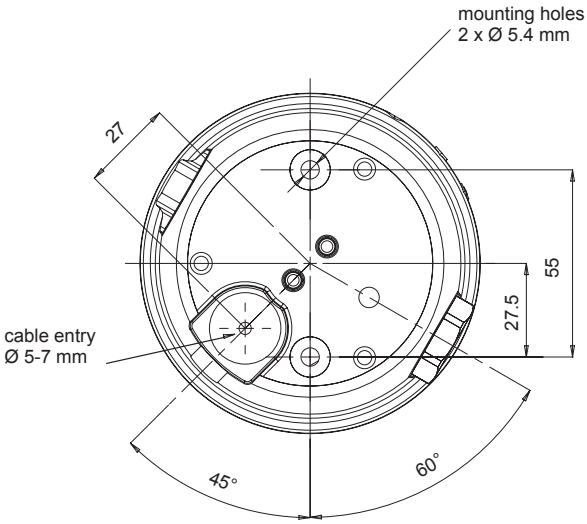
Operating temperature

Electrical data	P 300 FLF			P 300 FLH		
Rated voltage	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz		50 / 60 Hz	50 / 60 Hz	
Operating range	207 – 253 V	100 – 130 V	20 – 28 V	207 – 253 V	100 – 130 V	20 – 28 V
Nominal current consumption	130 mA	255 mA	1.1 A	116 mA	208 mA	1 A
Capacity of light source	25 W	25 W	25 W	25 W	25 W	20 W

Mechanical data	P 300 FLF	P 300 FLH
Operating mode	blinking light	halogen blinking light
Light source	filament lamp E14	halogen lamp G6.35 / GY6.35
Light power adjustable on the device	25 W @ 0.5 Hz / 1 Hz / 2 Hz	20 W / 25 W @ 0.5 Hz / 1 Hz / 2 Hz
	3 blink frequencies – adjustable during installation	
Lens colours	clear, yellow, amber, red, green, blue	
Lens type	prismatic	
Operating temperature	- 25 °C ... + 50 °C	
Relative humidity	90% @ + 20 °C	
Protection system according to EN 60529	IP 65	
Material	polycarbonate (PC), UL 94 VO f1	
Design	bayonet with anti-tamper locking screw	
Mounting	surface mounting (wall bracket and tubular stand available as accessories)	
Cable entry	1 x 5-7 mm push through grommet (bottom side); 1 x M20 cable entry sideways	
Connecting terminals	screw terminals 1.5 mm^2	
Weight	283 g	279 g

Dimensions





Ordering details

Article numbers		P 300 FLF			P 300 FLH		
Lens colour	**Rated voltage**	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
yellow		213 31 10 3 000	213 31 15 3 000	213 31 80 3 000	213 33 10 3 000	213 33 15 3 000	213 33 80 3 000
amber		213 31 10 4 000	213 31 15 4 000	213 31 80 4 000	213 33 10 4 000	213 33 15 4 000	213 33 80 4 000
red		213 31 10 5 000	213 31 15 5 000	213 31 80 5 000	213 33 10 5 000	213 33 15 5 000	213 33 80 5 000

Article numbers for other colours and voltages on request

Options / Accessories

Wall bracket
Article number:
213 92 00 0 000

Tubular stand 140 mm
Article number:
213 93 00 0 000

Wall holder
only in combination with tubular stand
Article number:
282 50 20 0 000

Light source

See pages 120-122 for further information

Conformity to standards

The visual characteristics of blinking lights conform to the European standard DIN EN 842: **"Machine safety - visual alarm signals".**
Requirements contained in the DIN EN 981 standard: **"Machine safety - system of acoustic and visual alarm and information signals",** can be fulfilled.

The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
"Coding of display devices and control elements using colours and supplementary means".

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

SPECTRA series Compact Blinking Lights 5 Watt P 200 FLF / P 100 FLF (Ø 60 mm)



Compact blinking light series, also for use where space is limited

- large variety of mounting methods due to modular design principle:
  – panel-mounted devices with convenient plug contact (P 100)
  – surface-mounted devices for mounting directly or on a wall bracket or a tubular stand (P 200)
- durable, sturdy and functionally reliable due to the use of high-quality plastic
- optimum illumination due to prismatic coloured lens
- also for exposed installation locations by combining wall bracket and tubular stand
- high IP protection in any installation position



Range as per EN 54



Protection system



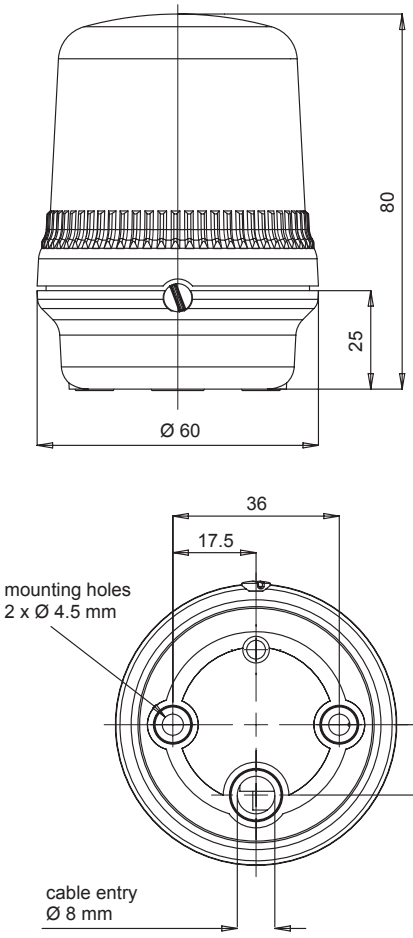
Operating temperature

Electrical data	P 200 FLF			P 100 FLF		
Rated voltage	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz		50 / 60 Hz	50 / 60 Hz	
Operating range	207 – 253 V	100 – 130 V	10 – 30 V	207 – 253 V	100 – 130 V	20 – 28 V
Nominal current consumption	25 mA	35 mA	250 mA	25 mA	35 mA	250 mA

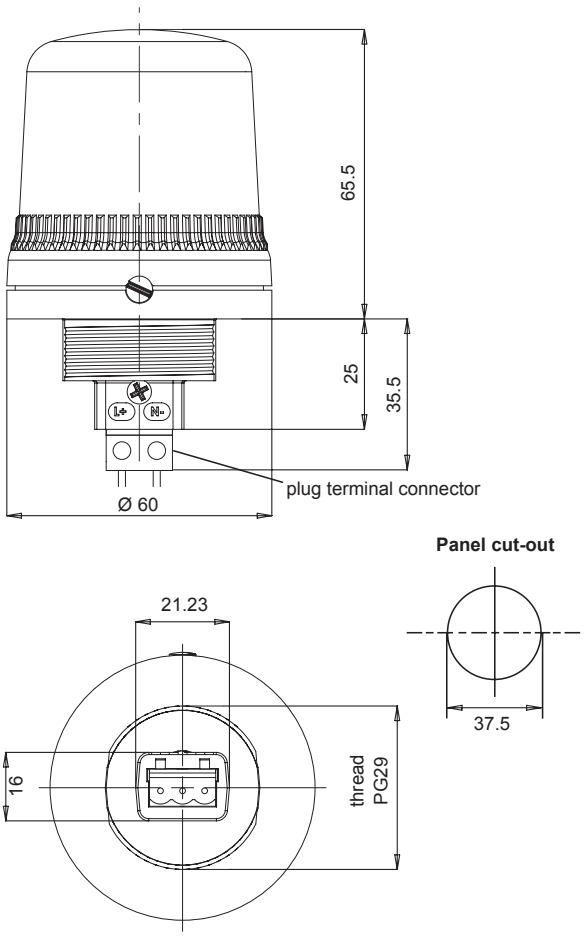
Mechanical data	P 200 FLF	P 100 FLF
Operating mode	blinking light	
Light source	filament lamp BA9s	
Light power	5 W @ 1 Hz	
Lens colours	clear, yellow, amber, red, green, blue	
Lens type	prismatic	
Operating temperature	- 25 °C ... + 50 °C	
Relative humidity	90% @ + 20 °C	
Protection system according to EN 60529	IP 65	
Material	polycarbonate (PC), UL 94 VO f1	
Design	bayonet with anti-tamper locking screw	
Mounting	surface mounting (wall bracket and tubular stand available as accessories)	panel-mounting: Ø 37.5 mm (PG29)
Connecting terminals	screw terminals 1.5 mm²	screw terminals 1.5 mm² pluggable
Weight	79 g	93 g

Dimensions

P 200 FLF



P 100 FLF



Ordering details

Article numbers		P 200 FLF			P 100 FLF		
Lens colour	**Rated voltage**	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
yellow		213 21 10 3 000	213 21 15 3 000	213 21 80 3 000	213 11 10 3 000	213 11 15 3 000	213 11 80 3 000
amber		213 21 10 4 000	213 21 15 4 000	213 21 80 4 000	213 11 10 4 000	213 11 15 4 000	213 11 80 4 000
red		213 21 10 5 000	213 21 15 5 000	213 21 80 5 000	213 11 10 5 000	213 11 15 5 000	213 11 80 5 000

Article numbers for other colours on request

Options / Accessories

Wall bracket only for P 200 FLF
Article number:
213 90 00 0 000

Tubular stand 137 mm only for P 200 FLF
Article number:
213 91 00 0 000

Wall holder only in combination with tubular stand
Article number:
282 50 20 0 000


Light source

See pages 120-122 for further information

Conformity to standards

The visual characteristics of blinking lights conform to the European standard DIN EN 842: **“Machine safety - visual alarm signals“.**
Requirements contained in the DIN EN 981 standard: **“Machine safety - system of acoustic and visual alarm and information signals“,** can be fulfilled.

The colours ‘red’ for the emergency signal and ‘yellow’ for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
“Coding of display devices and control elements using colours and supplementary means“.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

LED Multi-function Light
PMF-LED Flex



Multi-function light with the brightest LED technology
- rotating mirror effect, extremely low power consumption
- highly insensitive to vibration
- maintenance-free service life exceeding 50 000 hrs
- externally selectable operating mode, one device for 4 different alarms:
  – continuous light
  – blinking light
  – flashing light
  – rotating beacon effect without susceptible mechanics
- inexpensive and flexible; wide range power supplies as standard
- 24 V AC/DC devices as standard with soft-start module
- can be operated directly via 24 V transistor PLC output, no additional relay control necessary
- long-life replacement for conventional rotating mirror lights



Range as per EN 54



Protection system



Operating temperature

Electrical data	PMF-LED Flex			
Rated voltage	115 V AC	230 V AC	230 V DC	24 V AC/DC
Operating range	95 – 253 V AC		100 – 350 V DC	10 – 60 V DC / 15 – 40 V AC
Current consumption in continuous light mode	90 mA	60 mA	55 mA	DC: 250 mA

Mechanical data		PMF-LED Flex			
Operating mode		continuous light	blinking light	flashing light	rotating all-round light
Flash rate of the main flash			1.5 Hz	1 Hz	2.5 Hz
Light source		8 x 2 LEDs (3 chip version)			
Light intensity (DIN 5037) [1]		30 cd			
Lens colours		amber, red, green, blue			
Lens type		lens with fresnel characteristic			
Beam angle	vertical	approx. 16°			
	horizontal	360°			
Operating temperature		- 30 °C ... + 55 °C			
Storage temperature		- 40 °C ... + 70 °C			
Relative humidity		90%			
Protection system according to EN 60529		IP 55 (vertical mounting)			
Duty cycle		100%			
Service life of light source		> 50 000 hrs			
Material	lens	polycarbonate (PC)			
	housing	bracket mounting: polycarbonate (PC) / direct mounting: acrylonitrile butadiene styrene (ABS)			
Cable entry	bracket mounting	M20 x 1.5			
Connecting terminals		cage clamp terminal 0.08 - 2.5 mm²			
Weight		direct mounting: 620 g / bracket mounting: 900 g			

[1] with a clear lens

Operating modes

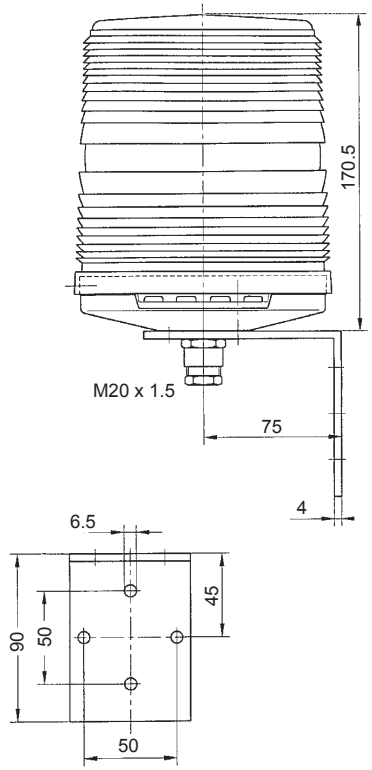
S1			Selection via internal DIP switch	
1	2	3		
OFF	OFF	OFF	OFF	
OFF	OFF	ON	all-round light	2.5 Hz
OFF	ON	OFF	continuous light	
OFF	ON	ON	blinking light	1.5 Hz
ON	OFF	OFF	flashing light	1 Hz
ON	OFF	ON	all-round light	2.5 Hz
ON	ON	OFF	continuous light	
ON	ON	ON	blinking light	1.5 Hz

S1 - 1	X1 - 1	2	3	4	Selection via external control	
(S1-2 = OFF, S1-3 = OFF)						
OFF	-/N	+/L			OFF (standby)	
OFF	-/N	+/L		+/L	all-round light	2.5 Hz
OFF	-/N	+/L	+/L		continuous light	
OFF	-/N	+/L	+/L	+/L	blinking light	1.5 Hz
ON	-/N	+/L			flashing light	1 Hz
ON	-/N	+/L		+/L	all-round light	2.5 Hz
ON	-/N	+/L	+/L		continuous light	
ON	-/N	+/L	+/L	+/L	blinking light	1.5 Hz

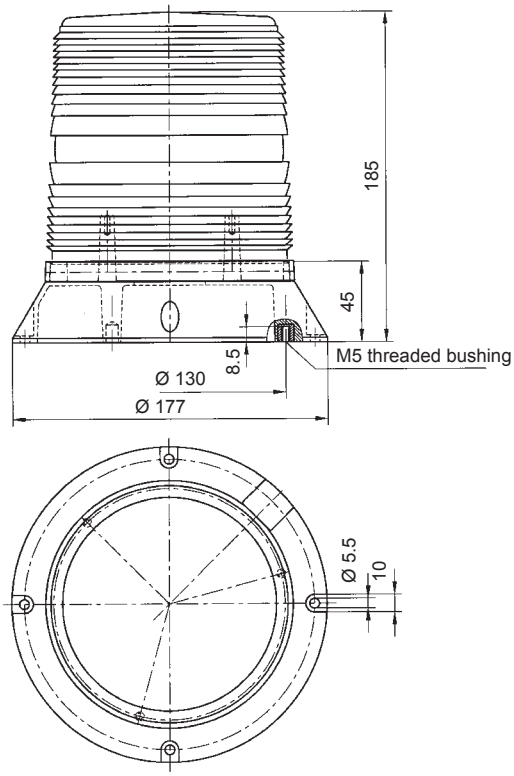
S1 - 1	X1 - 1	2	3	4	Selection via BAV option (24 V AC/DC only)	
(S1-2 = OFF, S1-3 = OFF)						
OFF	-/N			+/L	all-round light	2.5 Hz
OFF	-/N		+/L		continuous light	
OFF	-/N		+/L	+/L	blinking light	1.5 Hz
ON	-/N	+/L			flashing light	1 Hz
ON	-/N			+/L	all-round light	2.5 Hz
ON	-/N		+/L		continuous light	
ON	-/N		+/L	+/L	blinking light	1.5 Hz

Dimensions

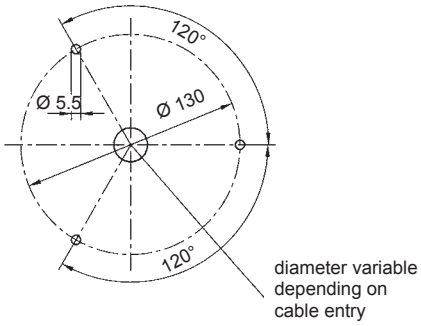
Bracket mounting



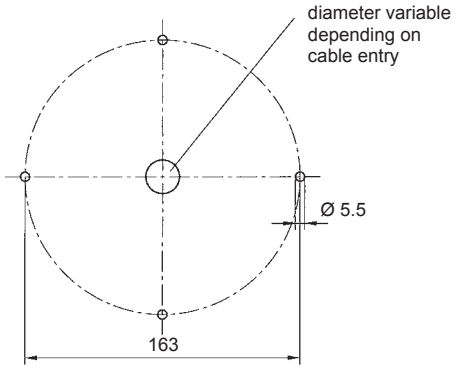
Direct mounting



Drilling template 1 for M5 threaded bushing



Drilling template 2



Ordering details

Article numbers		PMF-LED Flex direct mounting		PMF-LED Flex bracket mounting	
Lens colour	**Rated voltage**	230 V	24 V AC/DC	230 V	24 V AC/DC
amber		211 51 64 4 006	211 51 63 4 006	211 51 64 4 007	211 51 63 4 007
red		211 51 64 5 006	211 51 63 5 006	211 51 64 5 007	211 51 63 5 007

Article numbers for other colours on request

Conformity to standards

The visual characteristics of LED lights conform to the European standard DIN EN 842: **“Machine safety - visual alarm signals“.**
Requirements contained in the DIN EN 981 standard: **“Machine safety - system of acoustic and visual alarm and information signals“,** can be fulfilled.

The colours ‘red’ for the emergency signal and ‘yellow’ for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
“Coding of display devices and control elements using colours and supplementary means“.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

SPECTRA series LED Multi-function Lights
P 400 LDA (∅ 140 mm) / P 300 LDA (∅ 100 mm)



P 400 LDA



Range as per EN 54

P 300 LDA



Range as per EN 54



Protection system



Operating temperature

LED multi-function lights for extreme requirements

- energy-saving and durable thanks to the use of maintenance-free LED technology
- as standard with on-site selectable signaling mode (9 different modes)
- externally switchable signaling mode (for DC versions only)
- large variety of mounting methods due to modular design principle:
  – surface-mounted devices for mounting directly or on a wall bracket or a tubular stand
  – also for exposed installation locations through combination of wall bracket and tubular stand
  – cable entry at the side or through the base of the housing
- durable, sturdy and functionally reliable due to the use of high-quality plastic
- optimum illumination due to prismatic coloured lens

Electrical data	P 400 LDA			P 300 LDA	
Rated voltage	115 V AC	230 V AC	12 / 24 V DC	115 / 230 V AC	12 / 24 V DC
Operating range	100 – 130 V	207 – 253 V	10 – 50 V	90 – 253 V	10 – 50 V
Nominal current consumption	140 mA	70 mA	400 mA @ 24 V DC	90 mA @ 115 V AC 50 mA @ 230 V AC	130 mA @ 24 V DC

Mechanical data		P 400 LDA	P 300 LDA
Operating mode		LED multi-function light with 9 internally selectable operating modes	
Light source		high output LED array	
Light intensity (DIN 5037) [1]		30 cd	20 cd
Lens colours		yellow, amber, red, green, blue	
Lens type		prismatic	
Operating temperature		- 25 °C ... + 50 °C	
Relative humidity		90% @ + 20 °C	
Protection system according to EN 60529		IP 65	
Service life of light source		> 50 000 hrs	
Material		polycarbonate (PC), UL 94 VO f1	
Design		bayonet with anti-tamper locking screw	
Mounting		surface mounting (wall bracket and tubular stand available as accessories)	
Cable entry		1 x 5-7 mm push through grommet (bottom side); 2 x M20 cable entries sideways	
Connecting terminals		screw terminals 1.5 mm²	
Weight	AC	595 g	285 g
	DC	845 g	285 g

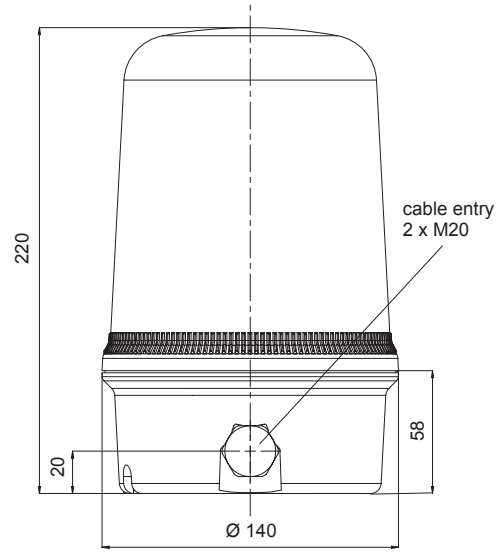
[1] with a clear lens

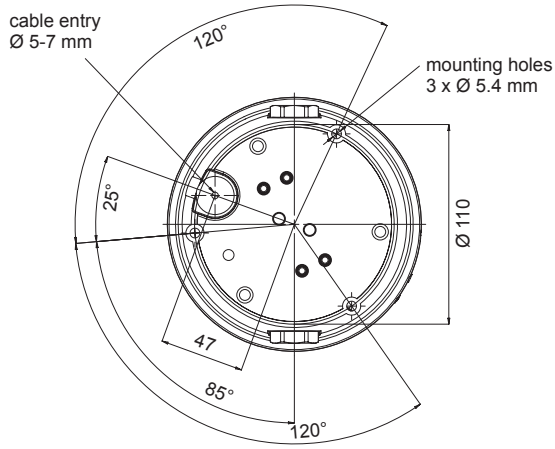
Operating modes Stage 1: internally selectable, stages 2 & 3 externally controllable (DC lights only)

	P 400 LDA			P 300 LDA	
Mode	**Stage 1**	**Stage 2 (only DC)**	**Stage 3 (only DC)**	**Stage 1**	**Stage 2 (only DC)**
1	all LEDs on	alternating flash 2 Hz	double flash 2 Hz	all LEDs on	alternating flash 2 Hz
2	rotation: slow “on”	alternating flash 2 Hz	all LEDs on	rotation: slow “on”	alternating flash 2 Hz
3	single flash 2 Hz	rotation: fast “off”	all LEDs on	single flash 2 Hz	rotation: fast “off”
4	rotation: fast “on”	single flash 2 Hz	all LEDs on	rotation: fast “on”	single flash 2 Hz
5	rotation: slow “off”	double flash 1 Hz	all LEDs on	rotation: slow “off”	double flash 1 Hz
6	double flash 1 Hz	rotation: fast “off”	all LEDs on	double flash 1 Hz	rotation: fast “off”
7	rotation: fast “off”	double flash 2 Hz	all LEDs on	rotation: fast “off”	double flash 2 Hz
8	double flash 2 Hz	alternating flash 2 Hz	double flash 2 Hz	alternating flash 2 Hz	all LEDs on
9	alternating flash 2 Hz	rotation: fast “off”	alternating flash 2 Hz	rotation: fast “off”	all LEDs on

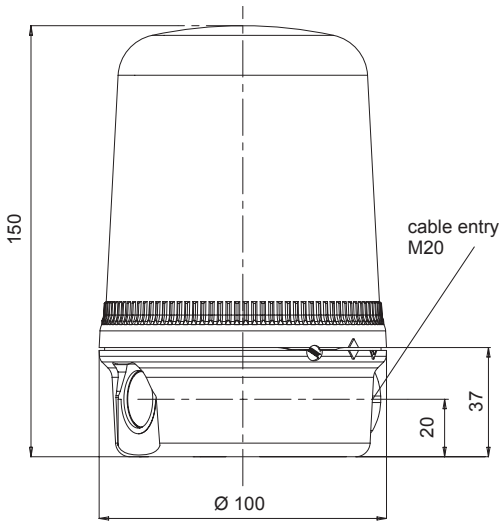
Dimensions

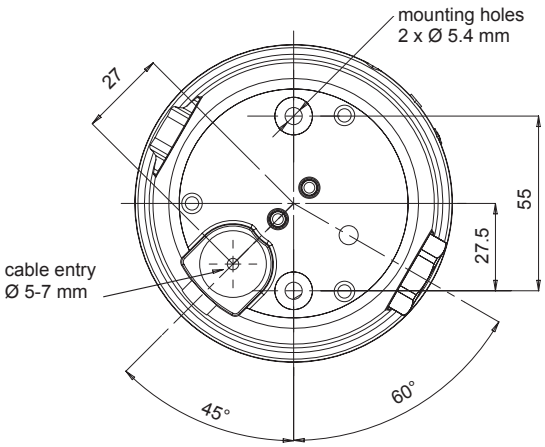
P 400 LDA





P 300 LDA





Ordering details

Article numbers		P 400 LDA			P 300 LDA	
Lens colour	**Rated voltage**	230 V AC	115 V AC	12 / 24 V DC	115 / 230 V AC	12 / 24 V DC
yellow		213 48 10 3 000	213 48 15 3 000	213 48 90 3 000	213 38 17 3 000	213 38 90 3 000
amber		213 48 10 4 000	213 48 15 4 000	213 48 90 4 000	213 38 17 4 000	213 38 90 4 000
red		213 48 10 5 000	213 48 15 5 000	213 48 90 5 000	213 38 17 5 000	213 38 90 5 000

Article numbers for other colours on request

Options / Accessories

Wall bracket for P 400
Article number: **213 94 00 0 000**

Wall bracket for P 300
Article number: **213 92 00 0 000**

Tubular stand 145 mm for P 400
Article number: **213 95 00 0 000**

Tubular stand 140 mm for P 300
Article number: **213 93 00 0 000**

Wall holder only in combination with tubular stand
Article number: **282 50 20 0 000**

See pages 120/121 for further information

Conformity to standards

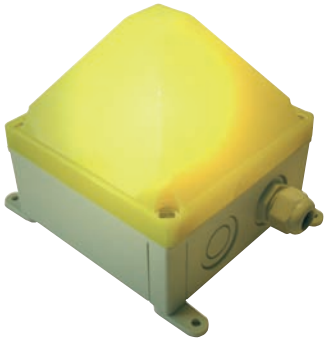
The visual characteristics of LED lights conform to the European standard DIN EN 842: **“Machine safety - visual alarm signals“.**
Requirements contained in the DIN EN 981 standard: **“Machine safety - system of acoustic and visual alarm and information signals“,** can be fulfilled.

The colours ‘red’ for the emergency signal and ‘yellow’ for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
“Coding of display devices and control elements using colours and supplementary means“.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

LED Multi-function Light Quadro-LED-HI



Designed for tough requirements under industrial conditions
- innovative LED light with large signaling effect
- suitable for indoor and outdoor use
- extremely insensitive to shock and vibration
- internally and externally selectable operating mode as standard
- 3 different signal options can be selected:
  – continuous light
  – blinking light
  – flashing light
- 24 V AC/DC devices as standard with soft-start module
- can be operated directly via 24 V transistor PLC output, no additional relay control necessary
- inexpensive and flexible; wide range power supplies as standard



Range as per EN 54



Protection system



Protection system



Impact-proof housing



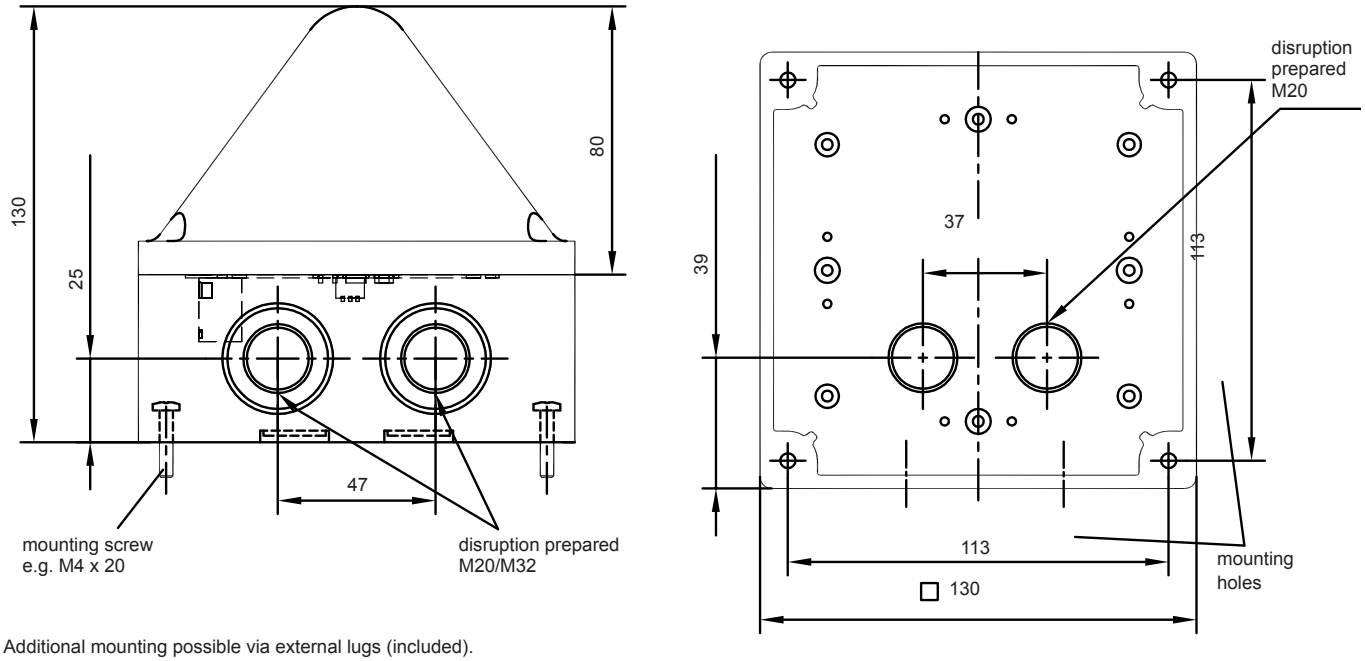
Operating temperature

Electrical data		Quadro-LED-HI	
Rated voltage		115 / 230 V AC/DC	24 V AC/DC
Rated frequency		50 / 60 Hz / DC	50 / 60 Hz / DC
Operating range	AC	95 – 253 V	15 – 40 V
	DC	100 – 350 V	10 – 60 V
Current consumption in continuous light mode		100 mA	1 A

Mechanical data		Quadro-LED-HI		
Operating mode (internally and externally selectable)		continuous light	blinking light	flashing light
Light alternation frequency			1.5 Hz	1 Hz
Light source		high output LED		
Light intensity (DIN 5037) [1]		100 cd		
Lens colours		clear, white, yellow, amber, red, green, blue		
Operating temperature		- 30 °C ... + 55 °C		
Storage temperature		- 40 °C ... + 70 °C		
Relative humidity		100%		
Protection system according to EN 60529		IP 66, IP 67, mounting arbitrary		
Impact resistance as per EN 50102		IK 08		
Protection class		II		
Service life of light source		≥ 50 000 hrs		
Material	lens	polycarbonate (PC)		
	housing	polycarbonate (PC), grey RAL 7035		
Cable entry		2 x M20/M32 sideways, 2 x M20 bottom side		
Connecting terminals		cage clamp terminal 0.08 – 2.5 mm²		
Weight		500 g		

[1] with a clear lens

Dimensions



Additional mounting possible via external lugs (included).

Ordering details

Article numbers		Quadro-LED-HI	
Lens colour	**Rated voltage**	230 V AC/DC	24 V AC/DC
yellow		on request	on request
amber		on request	on request
red		on request	on request

Article numbers for other colours on request

Options / Accessories

GOST

Conformity to standards

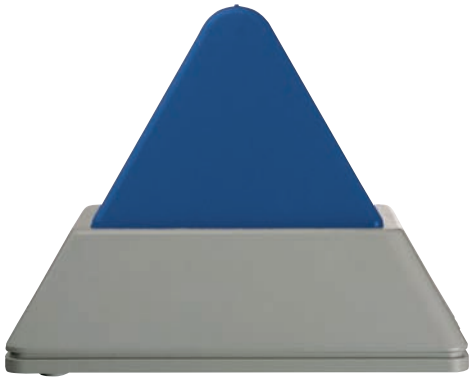
The visual characteristics of LED lights conform to the European standard DIN EN 842: **“Machine safety - visual alarm signals“.**
Requirements contained in the DIN EN 981 standard: **“Machine safety - system of acoustic and visual alarm and information signals“,** can be fulfilled.

The colours ‘red’ for the emergency signal and ‘yellow’ for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
“Coding of display devices and control elements using colours and supplementary means“.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

LED Continuous Light
PD 2100-LED



Machine lights in an elegant pyramid design, equipped with LED light source for extremely long service life (> 50 000 hrs)

- vibration/shock-resistant
- low power consumption
- minimised maintenance costs
- non-compromising safety
- outstanding illumination of the coloured lens due to scattering lens



Range as per EN 54



Protection system



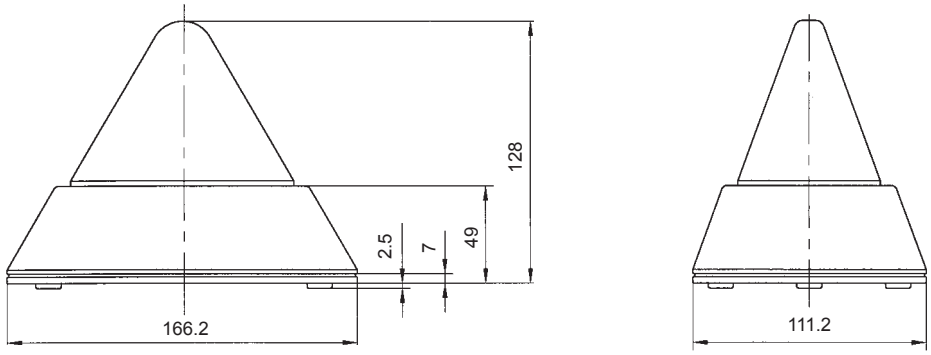
Operating temperature

Electrical data	PD 2100-LED		
Rated voltage	230 V AC	115 V AC	24 V AC/DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz / DC
Operating range	± 10%	± 10%	AC: 18 – 27 V DC: 19 – 30 V
Nominal current consumption	12 mA	24 mA	AC: 115 mA DC: 65 mA

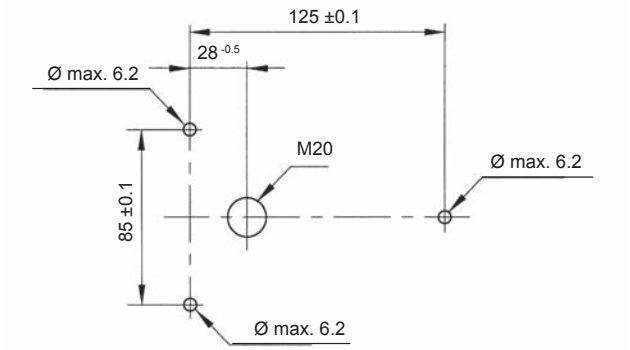
Mechanical data		PD 2100-LED
Light source		LED
Light intensity (DIN 5037) [1]		5 cd
Lens colours		clear, white, yellow, amber, red, green, blue
Operating temperature		- 25 °C ... + 55 °C
Storage temperature		- 40 °C ... + 80 °C
Relative humidity		90%
Protection system according to EN 60529		IP 55 (if mounted vertically/horizontally)
Protection class		II
Duty cycle		100%
Service life of light source		> 50 000 hrs
Material	lens	polycarbonate (PC)
	housing	ABS, light grey similar to RAL 7035
	baseplate	ABS, light grey similar to RAL 7035
Cable entry		M20 x 1.5, either at the side or underneath
Connecting terminals		fine wire 0.14 – 2.5 mm²
Weight	AC	380 g
	AC/DC	270 g

[1] with a clear lens

Dimensions



Mounting holes



Ordering details

Article numbers		PD 2100-LED	
Lens colour	Rated voltage	230 V AC	24 V AC/DC
clear		211 20 61 1 000	211 20 60 1 000
yellow		211 20 61 3 000	211 20 60 3 000
amber		211 20 61 4 000	211 20 60 4 000
red		211 20 61 5 000	211 20 60 5 000
green		211 20 61 6 000	211 20 60 6 000
blue		211 20 61 7 000	211 20 60 7 000

Options / Accessories



Article number:
287 10 50 0 040

GOST

See page 119 for further information

Conformity to standards

The visual characteristics of LED lights conform to the European standard DIN EN 842: **"Machine safety - visual alarm signals".**
Requirements contained in the DIN EN 981 standard: **"Machine safety - system of acoustic and visual alarm and information signals",** can be fulfilled.

The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
"Coding of display devices and control elements using colours and supplementary means".

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

SPECTRA series Compact LED Continuous Lights P 200 LDA / P 100 LDA (Ø 60 mm)



Compact LED light series, also for installation where space is limited

- energy-saving and durable thanks to the use of maintenance-free LED technology
- large variety of mounting methods due to modular design principle:
  – panel-mounted devices with convenient plug contact (P 100)
  – surface-mounted devices for mounting directly or on a wall bracket or a tubular stand (P 200)
- durable, sturdy and functionally reliable due to the use of high-quality plastic
- optimum illumination due to prismatic coloured lens
- also for exposed installation locations by combining wall bracket and tubular stand
- high IP protection in any installation position



Range as per EN 54



Protection system



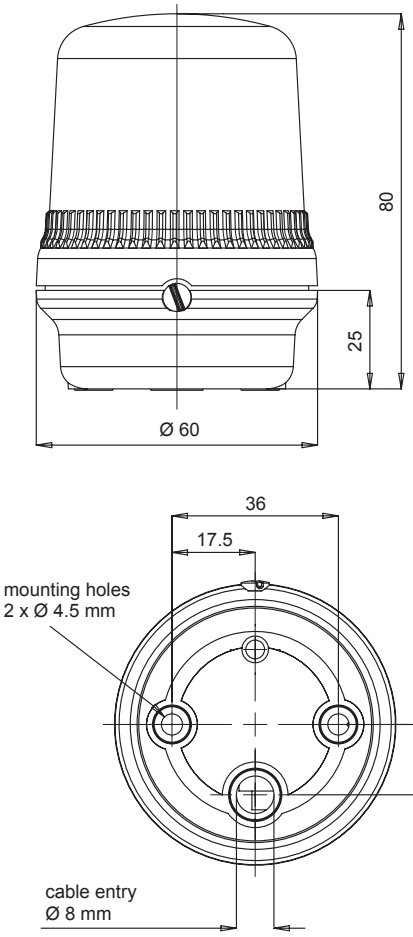
Operating temperature

Electrical data	P 200 LDA		P 100 LDA	
Rated voltage	115 / 230 V AC	12 / 24 V DC	115 / 230 V AC	12 / 24 V DC
Rated frequency	50 / 60 Hz		50 / 60 Hz	
Operating range	90 – 253 V	10 – 30 V	90 – 253 V	10 – 30 V
Nominal current consumption	32 mA	80 mA	12 mA	80 mA

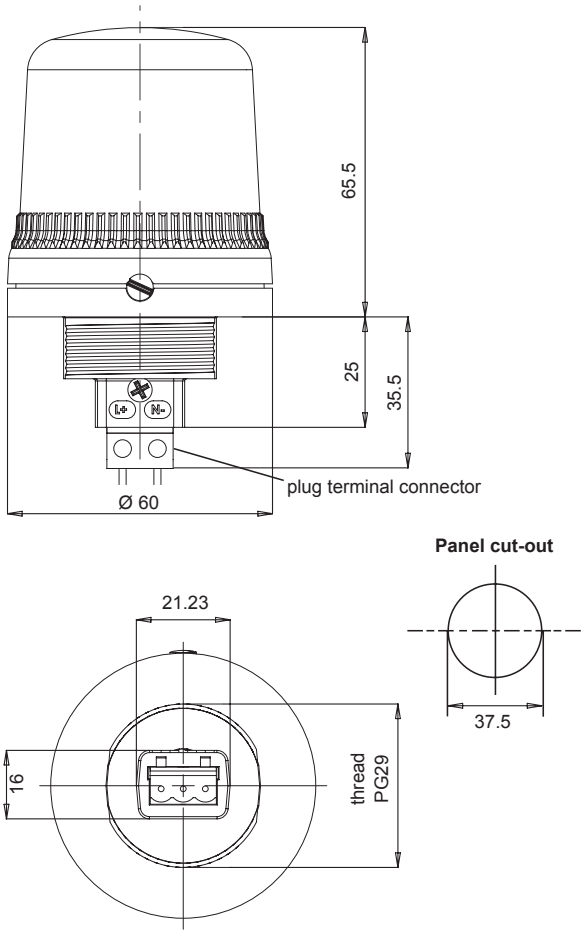
Mechanical data	P 200 LDA	P 100 LDA
Operating mode	LED continuous light	
Light source	9 high output LEDs	
Lens colours	yellow, amber, red, green, blue	
Lens type	prismatic	
Operating temperature	- 25 °C ... + 50 °C	
Relative humidity	90% @ + 20 °C	
Protection system according to EN 60529	IP 65	
Service life of light source	> 50 000 hrs	
Material	polycarbonate (PC), UL 94 VO f1	
Design	bayonet with anti-tamper locking screw	
Mounting	surface mounting (wall bracket and tubular stand available as accessories)	panel-mounting: Ø 37.5 mm (PG29)
Connecting terminals	screw terminals 1.5 mm²	screw terminals 1.5 mm² pluggable
Weight	78 g	93 g

Dimensions

P 200 LDA



P 100 LDA



Ordering details

Article numbers		P 200 LDA		P 100 LDA	
Lens colour	**Rated voltage**	115 / 230 V AC	12 / 24 V DC	115 / 230 V AC	12 / 24 V DC
yellow		213 28 64 3 000	213 28 63 3 000	213 18 64 3 000	213 18 63 3 000
amber		213 28 64 4 000	213 28 63 4 000	213 18 64 4 000	213 18 63 4 000
red		213 28 64 5 000	213 28 63 5 000	213 18 64 5 000	213 18 63 5 000

Article numbers for other colours on request

Options / Accessories

Wall bracket only for P 200 LDA
Article number:
213 90 00 0 000

Tubular stand 137 mm only for P 200 LDA
Article number:
213 91 00 0 000

Wall holder only in combination with tubular stand
Article number:
282 50 20 0 000

See pages 120/121 for further information

Conformity to standards

The visual characteristics of LED lights conform to the European standard DIN EN 842: **"Machine safety - visual alarm signals".**
Requirements contained in the DIN EN 981 standard: **"Machine safety - system of acoustic and visual alarm and information signals",** can be fulfilled.

The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
"Coding of display devices and control elements using colours and supplementary means".

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Traffic Light Quadro LED-TL



Bright LED signal lights for traffic light applications, e.g. for
- traffic routing in non-public areas
- conveyer and storage systems
- crane safety (see also ‘Regulations and standards for crane applications’, page 81)
- container handling systems

- extraordinary housing protection (IP 66, IK0 8 and UV-protected PC housing) and innovative LED technology provide for very bright signals, long service lives and reliable operation
- mounted using external lugs or internal holes that do not impair the IP protection; mounting can be performed in any direction
- preassembled as traffic light and ready to connect
- also available as non-preassembled version
- optionally with integrated light sensor for optimal adaptation to the ambient light (glare avoidance)



Protection system



Impact-proof housing



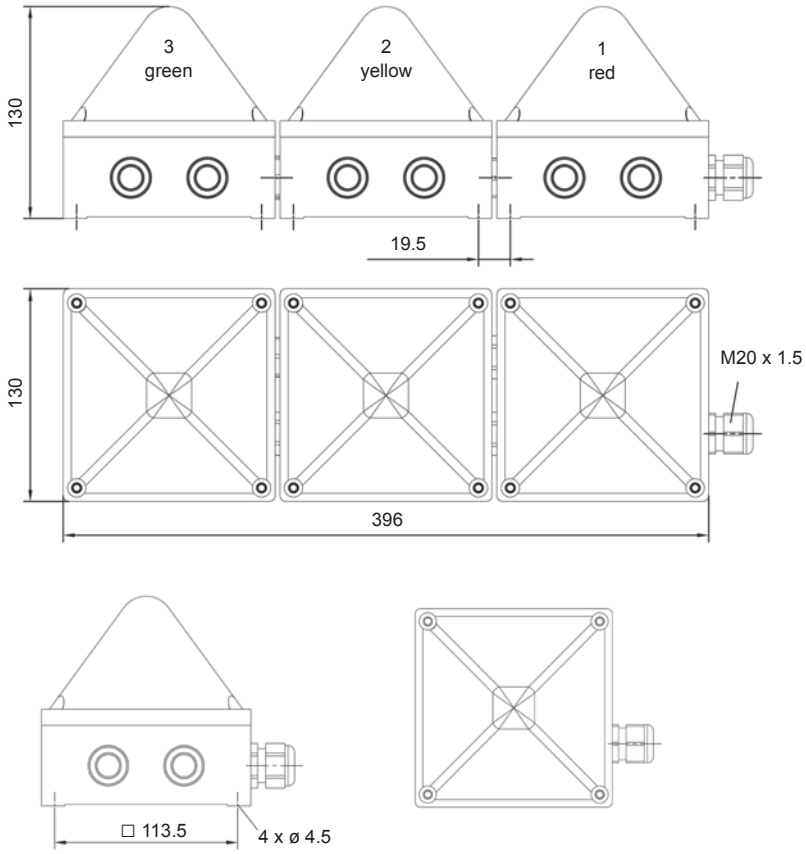
Operating temperature


Light sensor (optional)

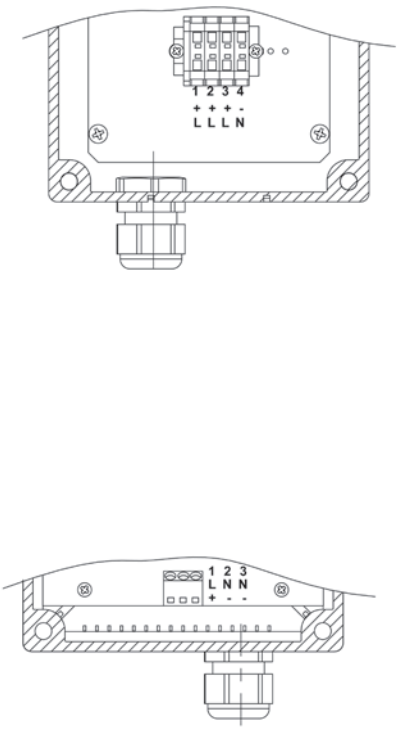
Electrical data	Quadro LED-TL	
Rated voltage	115 / 230 V AC	24 V DC
Rated frequency	50 / 60 Hz	
Operating range	85 – 265 V	10 – 30 V
Max. current consumption	60 mA / 30 mA	1.06 A

Mechanical data		Quadro LED-TL
Operating mode		LED continuous light
Light source		high output LED array
Light intensity (DIN 5037)		> 80 cd
Lens colours		red / yellow / green
Operating temperature		- 30 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		95%
Protection system according to EN 60529		IP 66; IK 08 (EN 50102), mounting arbitrary
Duty cycle		100%
Service life of light source		> 50 000 hrs
Material	lens	polycarbonate (PC), UV-resistant
	housing	polycarbonate (PC), UV-resistant, RAL 7035
Cable entry		M20/M32 sideways, other imprints prepared
Connecting terminals		cage clamp terminal 0.08 – 2.5 mm² (in the red light)
Mounting		external lugs or internal holes
Weight		1.32 kg

Dimensions



Connection diagrams



Ordering details

Article numbers		Quadro LED-TL		Quadro LED-TLi (with light sensor)	
Lens colour	**Rated voltage**	115/230 V AC	24 V DC	115/230 V AC	24 V DC
red / yellow / green		211 06 64 0 008	211 06 63 0 008	211 07 64 0 008	211 07 63 0 008
yellow		211 06 64 3 000	211 06 63 3 000	211 07 64 3 000	211 07 63 3 000
red		211 06 64 5 000	211 06 63 5 000	211 07 64 5 000	211 07 63 5 000
green		211 06 64 6 000	211 06 63 6 000	211 07 64 6 000	211 07 63 6 000

Article numbers for other combinations on request

Conformity to standards

The visual characteristics of LED lights conform to the European standard DIN EN 842: **"Machine safety - visual alarm signals".**
Requirements contained in the DIN EN 981 standard: **"Machine safety - system of acoustic and visual alarm and information signals",** can be fulfilled.

The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
"Coding of display devices and control elements using colours and supplementary means".

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Regulations and standards for crane applications		
DIN-EN 13000:2004-09 Cranes – truck-mounted cranes	Visual warning to the driver (EN 842) in the case of	- approaching the load capacity (at 90 - 98.5% of the permissible load capacity) - triggering of the overload safety system - overriding of the overload safety system
DIN-EN 14439:2006 Safety – rotating tower cranes	Visual warning by the crane driver (EN 457) to persons in the vicinity in the case of	- remote control – green, continuous light - anti-collision – white, blinking light - rotating (in some cases when required by local authorities) – green, blinking light
	Visual warning to the driver (EN 842) in the case of	- approaching the load capacity (at 90 - 95% of the permissible load capacity) – yellow, continuous light - wind warning and alarm – yellow, blinking light and red, blinking light

SPECTRA series Traffic Lights
P 450 TLA (∅ 140 mm) / P 350 TLA (∅ 100 mm)







Signal lights for traffic light applications
- simple to combine for horizontal or vertical configuration
- convenient electrical connection of combined traffic lights
- safe and maintenance-free even under the influence of extreme vibration thanks to LED technology
- clear signalling even in extremely bright surroundings thanks to the use of clear lenses
- stable fixing bracket for flexible alignment and mounting (optional)
- durable, sturdy and functionally reliable due to the use of high-quality plastic
- high signaling effect due to prismatic coloured lens
- glare protection adjustable to suit local conditions
- high IP protection in any installation position
- connecting piece for traffic light combinations included

P 450 TLA



Range as per EN 54

P 350 TLA



Range as per EN 54



Protection system



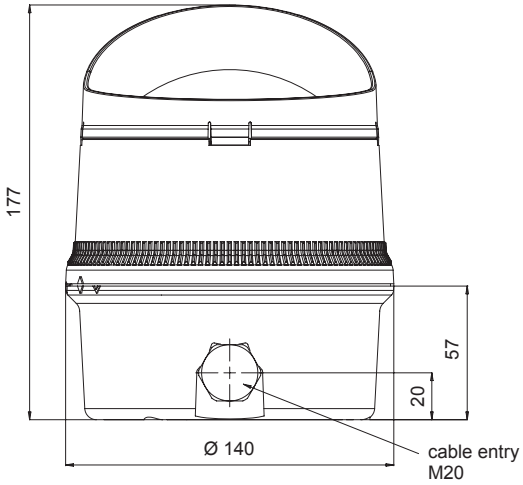
Operating temperature

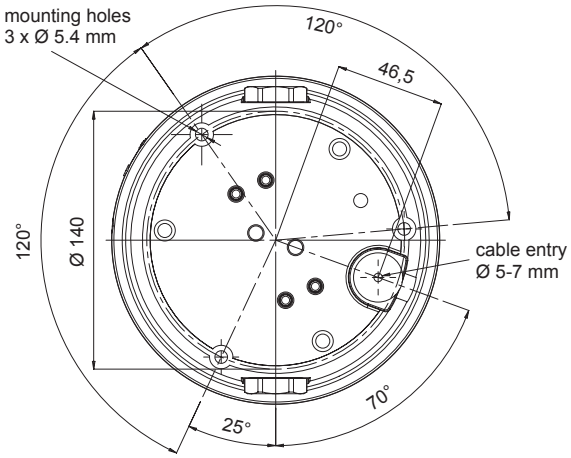
Electrical data	P 450 TLA		P 350 TLA	
Rated voltage	115 / 230 V AC	12 / 24 V DC	115 / 230 V AC	12 / 24 V DC
Operating range	90 – 253 V	10 – 30 V	90 – 253 V	10 – 30 V
Nominal current consumption	15 – 40 mA	175 mA	10 – 40 mA	140 mA

Mechanical data	P 450 TLA	P 350 TLA
Operating mode	LED continuous light	LED continuous light
Light source	high output LED array	
Light intensity (DIN 5037)	60 cd	45 cd
Lens colour	clear	
Operating temperature	- 25 °C ... + 50 °C	
Relative humidity	90% @ + 20 °C	
Protection system according to EN 60529	IP 65	
Duty cycle	100%	
Service life of light source	> 50 000 hrs	
Material	polycarbonate (PC), UL 94 VO f1	
Design	bayonet with anti-tamper locking screw	
Mounting	surface mounting (wall bracket available as accessories)	
Connecting terminals	screw terminals 2 x 1.5 mm²	screw terminals 2 x 1.5 mm²
Cable entry	1 x 5-7 mm push through grommet (bottom side); 2 x M20 cable entries sideways (incl. connecting piece)	1 x 5-7 mm push through grommet; 2 x M20 cable entries (incl. connecting piece)
Weight	410 g	230 g

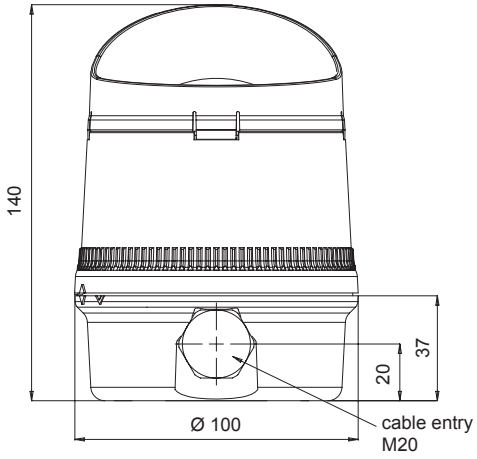
Dimensions

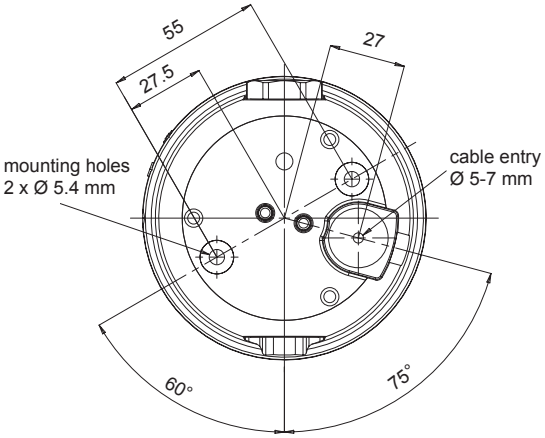
P 450 TLA





P 350 TLA





Ordering details

Article numbers		P 450 TLA		P 350 TLA	
Lens colour	**Rated voltage**	115 / 230 V AC	12 / 24 V DC	115 / 230 V AC	12 / 24 V DC
amber		213 55 64 4 000	213 55 63 4 000	213 52 64 4 000	213 52 63 4 000
red		213 55 64 5 000	213 55 63 5 000	213 52 64 5 000	213 52 63 5 000
green		213 55 64 6 000	213 55 63 6 000	213 52 64 6 000	213 52 63 6 000

Options / Accessories

Wall bracket for single mounting P 450
Article number:
213 99 00 0 000

Wall bracket for single mounting P 350
Article number:
213 98 00 0 000

Wall bracket-set for combinations of 2 or 3 P 450
Article number:
213 97 00 0 000

Wall bracket-set for combinations of 2 or 3 P 350
Article number:
213 96 00 0 000

See pages 120-122 for further information

Continuous LED Panel Mount Indicator P 22 D
Blinking LED Panel Mount Indicator P 22 DFS



Indicator lamps for 22.5 mm mounting hole

- guaranteed high protection class (IP 65) to the housing
- superior shape, hence high signaling effect on all sides
- optimum illumination through the use of multi-chip LED array
- easy to mount labels holders available as accessories
- simple electrical connection by means of screw terminals

IP 65
Protection system

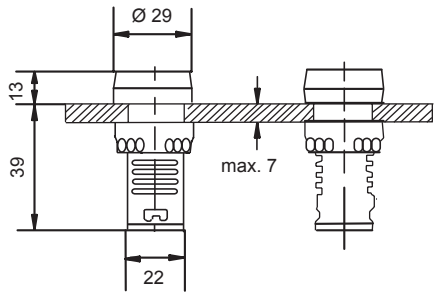
+ 50 °C
- 25 °C
Operating temperature

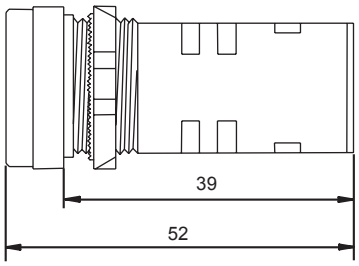
Electrical data	P 22 D red / amber				
Rated voltage	230 V AC	115 V AC	48 V AC/DC	24 V AC/DC	12 V AC/DC
Nominal current consumption	25 mA	25 mA	20 mA	80 mA	80 mA
Electrical data	**P 22 D white / green / blue**				
Rated voltage	230 V AC	115 V AC	48 V AC/DC	24 V AC/DC	12 V AC/DC
Nominal current consumption	25 mA	25 mA	20 mA	20 mA	20 mA
Electrical data	**P 22 DFS**				
Rated voltage	230 V AC	115 V AC	48 V AC/DC	24 V AC/DC	
Nominal current consumption	15 – 30 mA				

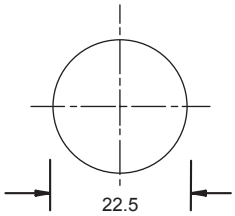
Mechanical data	P 22 D	P 22 DFS
Operating mode	continuous light	1 Hz blinking light
Light source	LED array	
Lens colours	white, amber, red, green, blue	red
Operating temperature	- 25 °C ... + 50 °C	
Storage temperature	90% @ + 20 °C	
Protection system according to EN 60529	IP 65 (to housing)	
Service life of light source	> 50 000 hrs	
Mounting	panel-mounting: Ø 22.5 mm	
Connecting terminals	screw terminals 1.5 mm^2	
Weight	90 g	

Dimensions — Panel cut-out

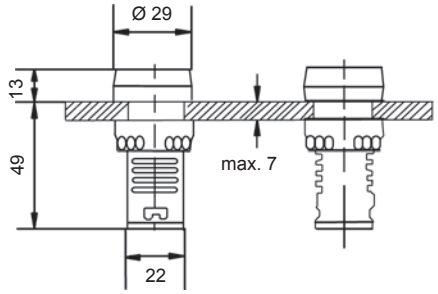
P 22 D

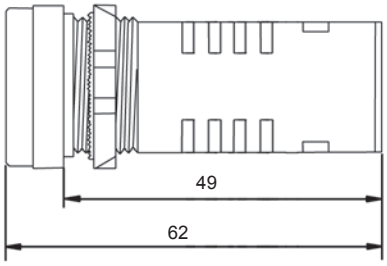


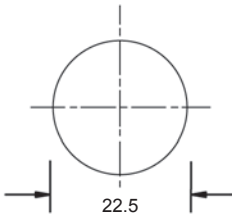




P 22 DFS







Ordering details

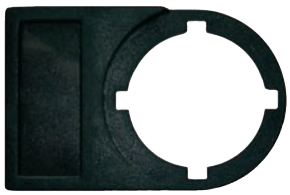
Article numbers		P 22 D				
Lens colour	Rated voltage	230 V AC	115 V AC	48 V AC/DC	24 V AC/DC	12 V AC/DC
white		232 73 10 2 000	232 73 15 2 000	232 73 70 2 000	232 73 80 2 000	232 73 85 2 000
amber		232 73 10 4 000	232 73 15 4 000	232 73 70 4 000	232 73 80 4 000	232 73 85 4 000
red		232 73 10 5 000	232 73 15 5 000	232 73 70 5 000	232 73 80 5 000	232 73 85 5 000
green		232 73 10 6 000	232 73 15 6 000	232 73 70 6 000	232 73 80 6 000	232 73 85 6 000
blue		232 73 10 7 000	232 73 15 7 000	232 73 70 7 000	232 73 80 7 000	232 73 85 7 000

Article numbers		P 22 DFS			
Lens colour	Rated voltage	230 V AC	115 V AC	48 V AC/DC	24 V AC/DC
red		232 71 10 5 000	232 71 15 5 000	232 71 70 5 000	232 71 80 5 000

Options / Accessories

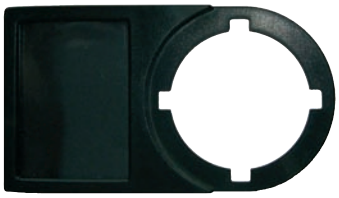
Label holder — **25 x 10 mm**

Article number:
232 92 00 0 000



Label holder — **25 x 18 mm**

Article number:
232 91 00 0 000



SPECTRA series Status Lights
P 400 SLF / P 400 SLH (Ø 140 mm)



Powerful status lights for universal use

- optionally with halogen lamp or filament lamp
- large variety of mounting methods due to modular design principle:
  – surface-mounted devices for mounting directly or on a wall bracket or a tubular stand
  – also for exposed installation locations through combination of wall bracket and tubular stand
  – cable entry at the side or through the base of the housing
- durable, sturdy and functionally reliable due to the use of high-quality plastic
- optimum illumination due to prismatic coloured lens

P 400 SLF



Range as per EN 54

P 400 SLH



Range as per EN 54



Protection system



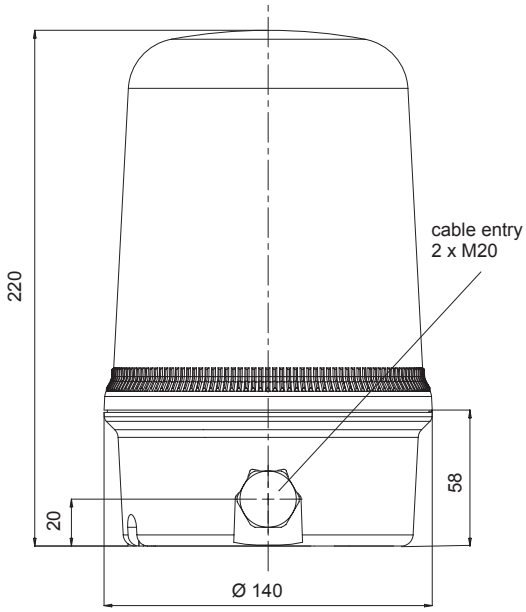
Operating temperature

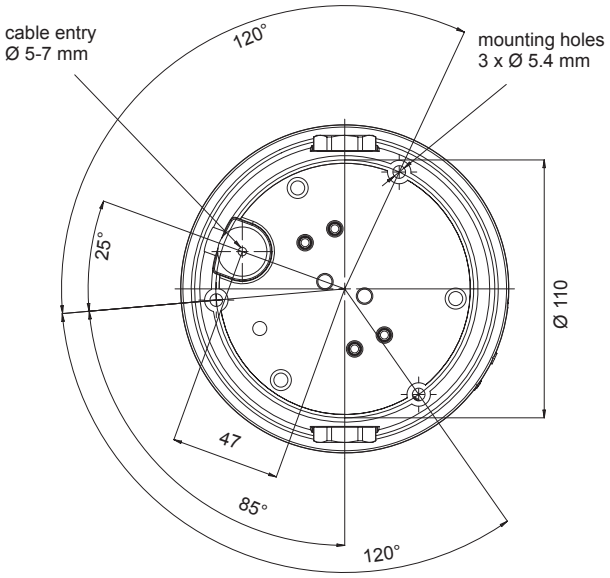
Electrical data	P 400 SLF	P 400 SLH
Rated voltage	12 – 250 V *	12 – 250 V *
Power consumption	40 W	12/24 V: 35 W / 115/230 V: 40 W

* light source not included

Mechanical data	P 400 SLF	P 400 SLH
Operating mode	continuous light	halogen continuous light
Light source	filament lamp E14	halogen lamp G6.35 / GY6.35
Light power	40 W	35 / 40 W
Lens colours	clear, yellow, amber, red, green, blue	
Lens type	prismatic	
Operating temperature	- 25 °C ... + 50 °C	
Relative humidity	90% @ + 20 °C	
Protection system according to EN 60529	IP 65	
Material	polycarbonate (PC), UL 94 VO f1	
Design	bayonet with anti-tamper locking screw	
Mounting	surface mounting (wall bracket and tubular stand available as accessories)	
Cable entry	1 x 5-7 mm push through grommet (bottom side); 2 x M20 cable entries sideways	
Connecting terminals	screw terminals 1.5 mm^2	
Weight	510 g	

Dimensions





Ordering details

Article numbers		P 400 SLF	P 400 SLH
Lens colour	Rated voltage	12 – 250 V *	12 – 250 V *
clear		213 40 62 1 000	213 42 61 1 000
yellow		213 40 62 3 000	213 42 61 3 000
amber		213 40 62 4 000	213 42 61 4 000
red		213 40 62 5 000	213 42 61 5 000
green		213 40 62 6 000	213 42 61 6 000
blue		213 40 62 7 000	213 42 61 7 000

* please order light bulb separately

Options / Accessories

Wall bracket
Article number:
213 94 00 0 000

Tubular stand 145 mm
Article number:
213 95 00 0 000

Wall holder only in combination with tubular stand
Article number:
282 50 20 0 000

Light source

See pages 120-122 for further information

Conformity to standards

The visual characteristics of continuous lights conform to the European standard DIN EN 842: **“Machine safety - visual alarm signals“.**
Requirements contained in the DIN EN 981 standard: **“Machine safety - system of acoustic and visual alarm and information signals“,** can be fulfilled.

The colours ‘red’ for the emergency signal and ‘yellow’ for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
“Coding of display devices and control elements using colours and supplementary means“.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

SPECTRA series Status Lights
P 300 SLF / P 300 SLH (∅ 100 mm)



Status lights for universal use

- optionally with halogen lamp or filament lamp
- large variety of mounting methods due to modular design principle:
  – surface-mounted devices for mounting directly or on a wall bracket or a tubular stand
  – also for exposed installation locations through combination of wall bracket and tubular stand
  – cable entry at the side or through the base of the housing
- durable, sturdy and functionally reliable due to the use of high-quality plastic
- optimum illumination due to prismatic coloured lens

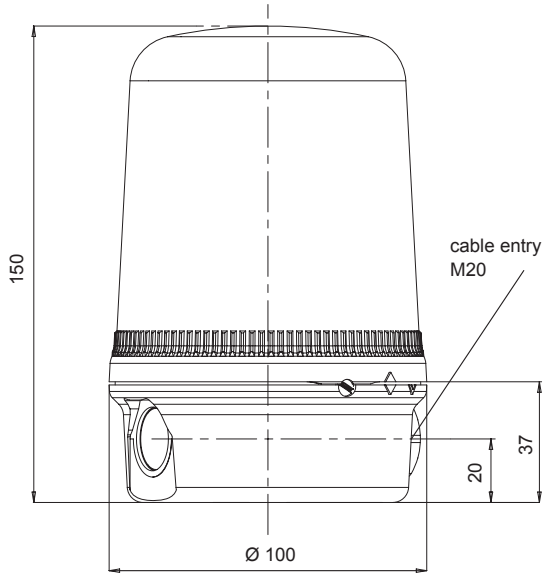
P 300 SLF	P 300 SLH		
r = 6 m	r = 11 m	IP 65	+ 50 °C / - 25 °C
Range as per EN 54	Range as per EN 54	Protection system	Operating temperature

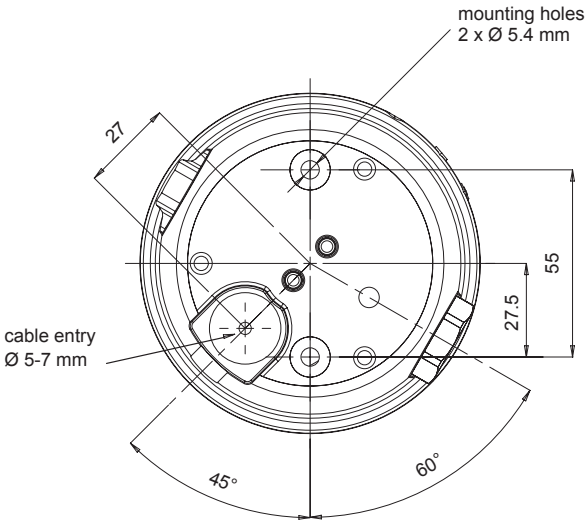
Electrical data	P 300 SLF	P 300 SLH
Rated voltage	12 – 250 V *	12 – 250 V *
Power consumption	15 W	12/24 V: 20 W / 115/230 V: 25 W

* light source not included

Mechanical data	P 300 SLF	P 300 SLH
Operating mode	continuous light	halogen continuous light
Light source	filament lamp E14	halogen lamp G6.35 / GY6.35
Light power	15 W	20 / 25 W
Lens colours	clear, yellow, amber, red, green, blue	
Lens type	prismatic	
Operating temperature	- 25 °C ... + 50 °C	
Relative humidity	90% @ + 20 °C	
Protection system according to EN 60529	IP 65	
Material	polycarbonate (PC), UL 94 VO f1	
Design	bayonet with anti-tamper locking screw	
Mounting	surface mounting (wall bracket and tubular stand available as accessories)	
Cable entry	1 x 5-7 mm push through grommet (bottom side); 1 x M20 cable entry sideways	
Connecting terminals	screw terminals 1.5 mm^2	
Weight	262 g	

Dimensions





Ordering details

Article numbers		P 300 SLF	P 300 SLH
Lens colour	Rated voltage	12 – 250 V *	12 – 250 V *
clear		213 30 62 1 000	213 32 61 1 000
yellow		213 30 62 3 000	213 32 61 3 000
amber		213 30 62 4 000	213 32 61 4 000
red		213 30 62 5 000	213 32 61 5 000
green		213 30 62 6 000	213 32 61 6 000
blue		213 30 62 7 000	213 32 61 7 000

* please order light bulb separately

Options / Accessories

Wall bracket
Article number:
213 92 00 0 000

Tubular stand 140 mm
Article number:
213 93 00 0 000

Wall holder
only in combination with tubular stand
Article number:
282 50 20 0 000


Light source

See pages 120-122 for further information

Conformity to standards

The visual characteristics of continuous lights conform to the European standard DIN EN 842: **"Machine safety - visual alarm signals".**
Requirements contained in the DIN EN 981 standard: **"Machine safety - system of acoustic and visual alarm and information signals",** can be fulfilled.

The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
"Coding of display devices and control elements using colours and supplementary means".

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Continuous Light PD 2100



Status lights for universal use

- machine light in an elegant pyramid design

r = 6 m
Range as per EN 54

IP 55
Protection system

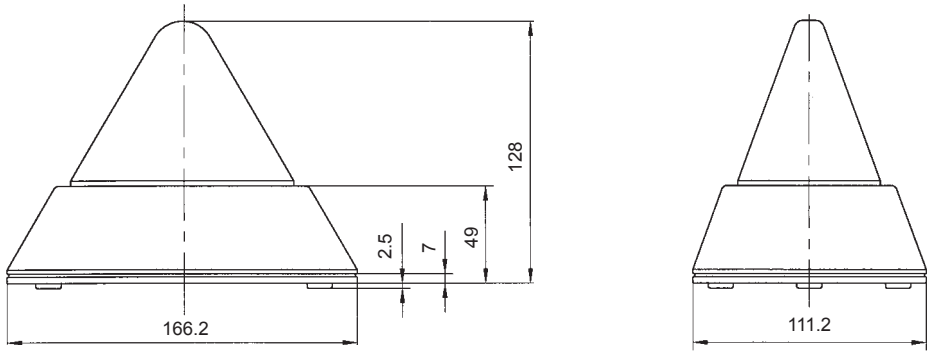
+ 32 °C
- 40 °C
Operating temperature

Electrical data	PD 2100
Rated voltage	max. 250 V
Power consumption	max. 15 W *

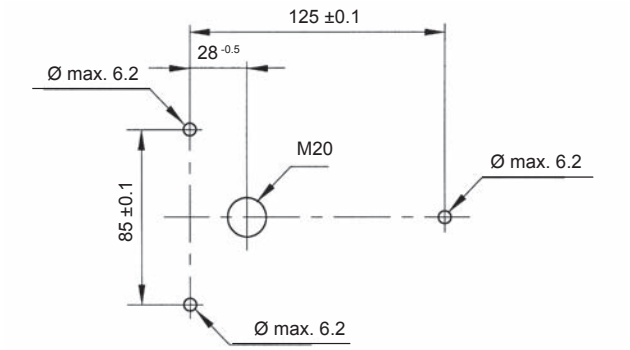
* light source not included

Mechanical data		PD 2100
Operating mode		continuous light
Light source		BA15d, E14
Light power		max. 15 W
Lens colours		clear, yellow, amber, red, green, blue
Operating temperature		- 40 °C ... + 32 °C
Storage temperature		- 40 °C ... + 80 °C
Relative humidity		90%
Protection system according to EN 60529		IP 55 (vertical/horizontal)
Duty cycle		100%
Material	lens	polycarbonate (PC)
	housing	ABS, light grey similar to RAL 7035, (optionally graphite grey RAL 7024)
Cable entry		M20 x 1.5 either at the side or underneath
Weight		250 g

Dimensions



Mounting holes



Ordering details

Article numbers		PD 2100	
Lens colour	**Fassung**	BA15d	E14
clear		211 20 30 1 000	211 20 10 1 000
yellow		211 20 30 3 000	211 20 10 3 000
amber		211 20 30 4 000	211 20 10 4 000
red		211 20 30 5 000	211 20 10 5 000
green		211 20 30 6 000	211 20 10 6 000
blue		211 20 30 7 000	211 20 10 7 000

* please order light bulb separately

Options / Accessories

Light source

Article number:
287 10 50 0 042

GOST

See page 119 for further information/122

Conformity to standards

The visual characteristics of continuous lights conform to the European standard DIN EN 842: **"Machine safety - visual alarm signals".**
Requirements contained in the DIN EN 981 standard: **"Machine safety - system of acoustic and visual alarm and information signals"**, can be fulfilled.

The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
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DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

SPECTRA series Compact Status Lights
P 200 SLF / P 100 SLF (Ø 60 mm)



Compact status light series, also for use where space is limited

- large variety of mounting methods due to modular design principle:
  – panel-mounted devices with convenient plug contact (P 100)
  – surface-mounted devices for mounting directly or on a wall bracket or a tubular stand (P 200)
- durable, sturdy and functionally reliable due to the use of high-quality plastic
- optimum illumination due to prismatic coloured lens
- also for exposed installation locations by combining wall bracket and tubular stand
- high IP protection in any installation position



Range as per EN 54



Protection system



Operating temperature

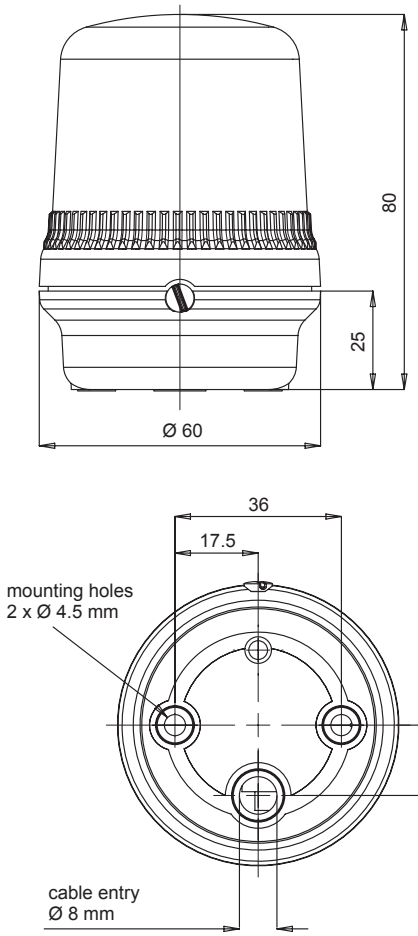
Electrical data	P 200 SLF	P 100 SLF
Rated voltage	12 – 250 V *	12 – 250 V *
Power consumption	5 W	5 W

* light source not included

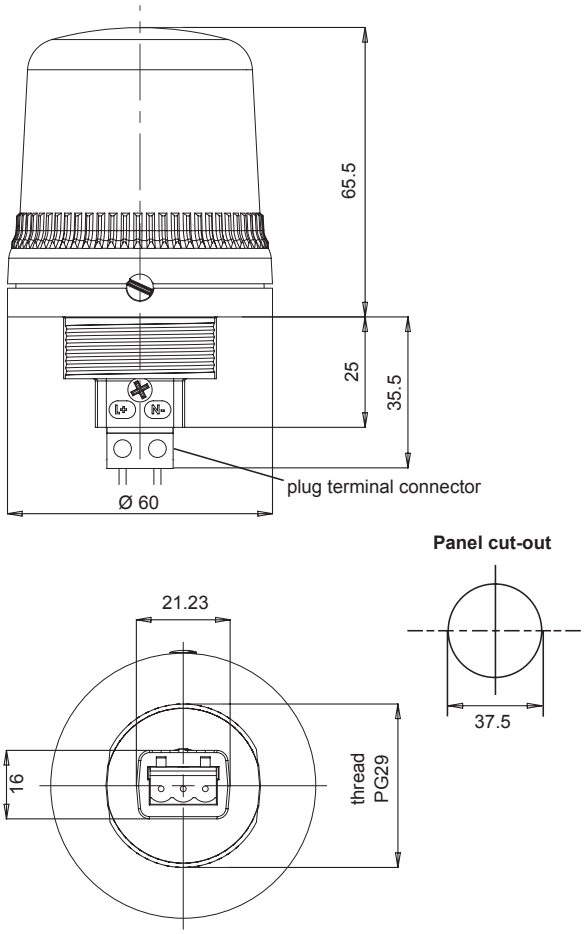
Mechanical data	P 200 SLF	P 100 SLF
Operating mode	continuous light	
Light source	filament lamp BA9s	
Light power	5 W	
Lens colours	clear, yellow, amber, red, green, blue	
Lens type	prismatic	
Operating temperature	- 25 °C ... + 50 °C	
Relative humidity	90% @ + 20 °C	
Protection system according to EN 60529	IP 65	
Material	polycarbonate (PC), UL 94 VO f1	
Design	bayonet with anti-tamper locking screw	
Mounting	surface mounting (wall bracket and tubular stand available as accessories)	panel-mounting: Ø 37.5 mm (PG29)
Connecting terminals	screw terminals 1.5 mm²	screw terminals 1.5 mm² pluggable
Weight	77 g	90 g

Dimensions

P 200 SLF



P 100 SLF



Ordering details

Article numbers		P 200 SLF	P 100 SLF
Lens colour	**Rated voltage**	12 – 250 V *	12 – 250 V *
clear		213 20 61 1 000	213 10 61 1 000
yellow		213 20 61 3 000	213 10 61 3 000
amber		213 20 61 4 000	213 10 61 4 000
red		213 20 61 5 000	213 10 61 5 000
green		213 20 61 6 000	213 10 61 6 000
blue		213 20 61 7 000	213 10 61 7 000

* please order light bulb separately

Options / Accessories

Wall bracket only for P 200 SLF
Article number:
213 90 00 0 000

Tubular stand 137 mm only for P 200 SLF
Article number:
213 91 00 0 000

Wall holder only in combination with tubular stand
Article number:
282 50 20 0 000

Light source

See pages 120-122 for further information

Conformity to standards

The visual characteristics of continuous lights conform to the European standard DIN EN 842: **“Machine safety - visual alarm signals“.**
Requirements contained in the DIN EN 981 standard: **“Machine safety - system of acoustic and visual alarm and information signals“,** can be fulfilled.
The colours ‘red’ for the emergency signal and ‘yellow’ for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
“Coding of display devices and control elements using colours and supplementary means“.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

SPECTRA series Traffic Lights P 450 TSB / P 450 TDB (∅ 140 mm) / P 350 TSB (∅ 100 mm)



Signal lights for traffic light applications
- simple to combine for horizontal or vertical configuration
- also for safety-relevant applications through use of two light sources (TDB)
- stable fixing bracket for flexible alignment and mounting (optional)
- durable, sturdy and functionally reliable due to the use of high-quality plastic
- high signaling effect due to prismatic coloured lens
- glare protection adjustable to suit local conditions
- high IP protection in any installation position
- connecting piece for traffic light combinations included

P 450 TSB	P 450 TDB	P 350 TSB		
r = 10 m	r = 6 m	r = 6 m	IP 65	+ 50 °C / - 25 °C
Range as per EN 54	Range as per EN 54	Range as per EN 54	Protection system	Operating temperature

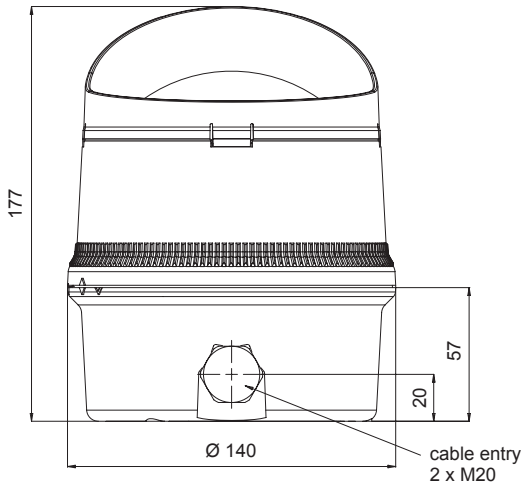
Electrical data	P 450 TSB	P 450 TDB	P 350 TSB
Rated voltage	12 – 250 V *	12 – 250 V *	12 – 250 V *
Power consumption	25 W	2 x 15 W	15 W

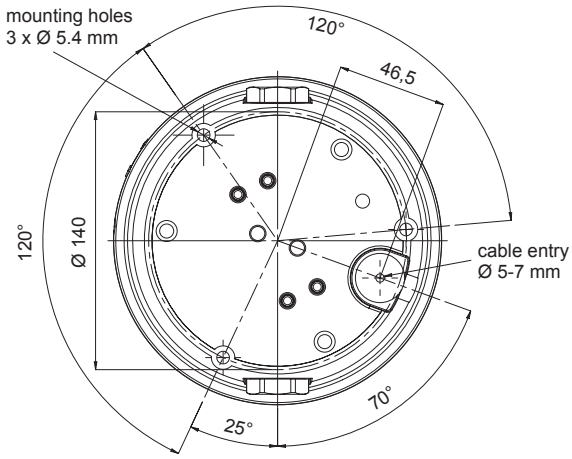
* light source not included

Mechanical data	P 450 TSB	P 450 TDB	P 350 TSB
Operating mode	continuous light	continuous light (redundant)	continuous light
Light source	filament lamp E27	2 x filament lamp E14	filament lamp E14
Lens colours	amber, red, green		
Operating temperature	- 25 °C ... + 50 °C		
Relative humidity	90% @ + 20 °C		
Protection system according to EN 60529	IP 65		
Material	polycarbonate (PC), UL 94 VO f1		
Design	bayonet with anti-tamper locking screw		
Mounting	surface mounting (wall bracket available as accessories)		
Cable entry	1 x 5-7 mm push through grommet; 1 x M20 cable entry (incl. connecting piece)	1 x 5-7 mm push through grommet (bottom side); 2 x M20 cable entries sideways (incl. connecting piece)	1 x 5-7 mm push through grommet; 1 x M20 cable entry (incl. connecting piece)
Connecting terminals	screw terminals 1.5 mm²		
Weight	395 g	380 g	210 g

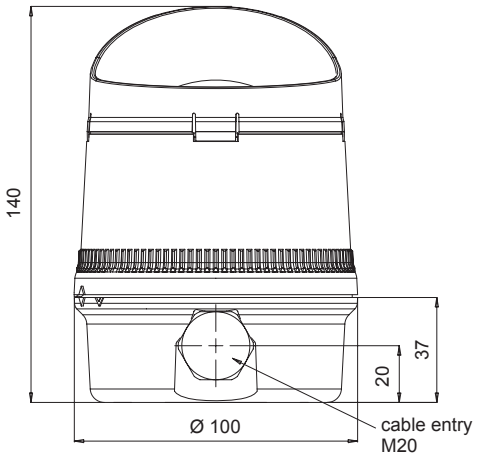
Dimensions

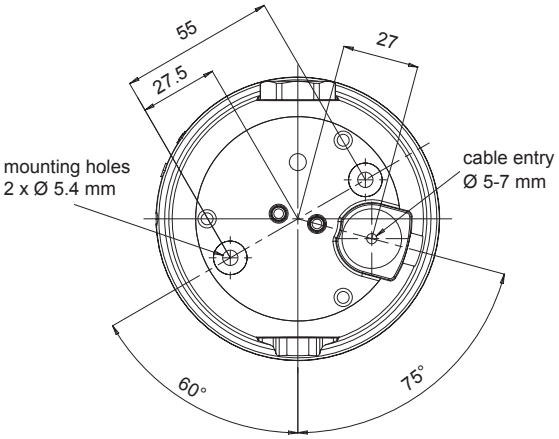
P 450 TSB / P 450 TDB





P 350 TSB





Ordering details

Article numbers		P 450 TSB	P 450 TDB	P 350 TSB
Lens colour	**Rated voltage**	12 – 250 V *	12 – 250 V *	12 – 250 V *
amber		213 54 65 4 000	213 53 62 4 000	213 51 62 4 000
red		213 54 65 5 000	213 53 62 5 000	213 51 62 5 000
green		213 54 65 6 000	213 53 62 6 000	213 51 62 6 000

* please order light bulb separately

Options / Accessories

Wall bracket for single mounting P 450
Article number: **213 99 00 0 000**

Wall bracket for single mounting P 350
Article number: **213 98 00 0 000**

Wall bracket-set for combinations of 2 or 3 P 450
Article number: **213 97 00 0 000**

Wall bracket-set for combinations of 2 or 3 P 350
Article number: **213 96 00 0 000**

Light source

See pages 120-122 for further information

Conformity to standards

The visual characteristics of continuous lights conform to the European standard DIN EN 842: **“Machine safety - visual alarm signals“.**
Requirements contained in the DIN EN 981 standard: **“Machine safety - system of acoustic and visual alarm and information signals“,** can be fulfilled.
The colours ‘red’ for the emergency signal and ‘yellow’ for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199: **“Coding of display devices and control elements using colours and supplementary means“.**

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

SPECTRA series Rotating Mirror Lights
P 400 RTH (∅ 140 mm) / P 300 RTH (∅ 100 mm)





Sturdy rotating mirror lights, also for installation where space is limited

- very high signaling effect due to the use of halogen lamps
- large variety of mounting methods due to modular design principle:
  – surface-mounted devices for mounting directly or on a wall bracket or a tubular stand
  – also for exposed installation locations through combination of wall bracket and tubular stand
  – cable entry at the side or through the base of the housing
- durable, sturdy and functionally reliable due to the use of high-quality plastic

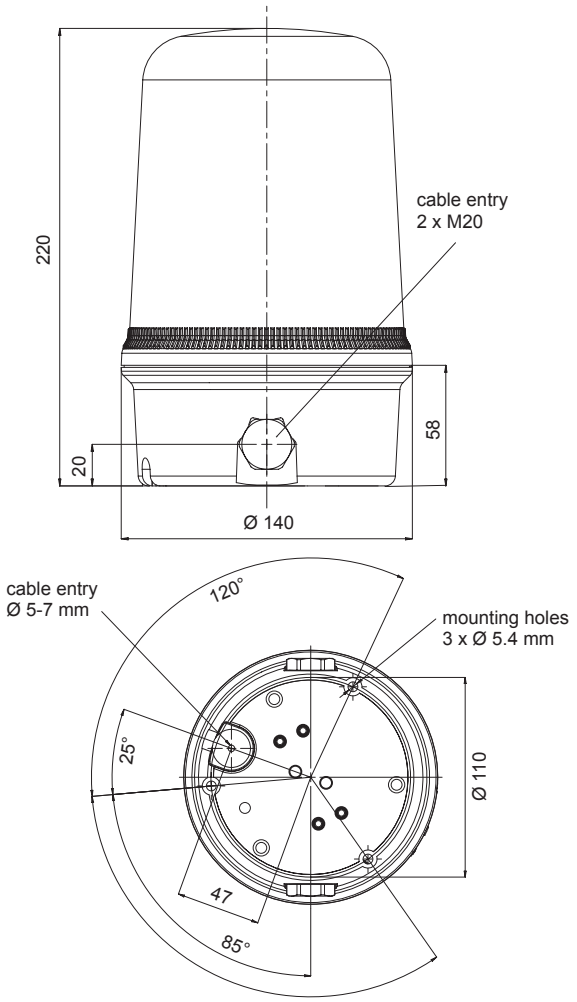
P 400 RTH	P 300 RTH		
r = 20 m	r = 12.5m	IP 65	+ 50 °C / - 25 °C
Range as per EN 54	Range as per EN 54	Protection system	Operating temperature

Electrical data	P 400 RTH				P 300 RTH			
Rated voltage	230 V AC	115 V AC	24 V DC	12 V DC	230 V AC	115 V AC	24 V DC	12 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz			50 / 60 Hz	50 / 60 Hz		
Nominal current consumption	186 mA	338 mA	1.54 A	3 A	117 mA	216 mA	0.91 A	1.72 A
Capacity of light source	40 W	40 W	35 W	35 W	25 W	25 W	20 W	20 W

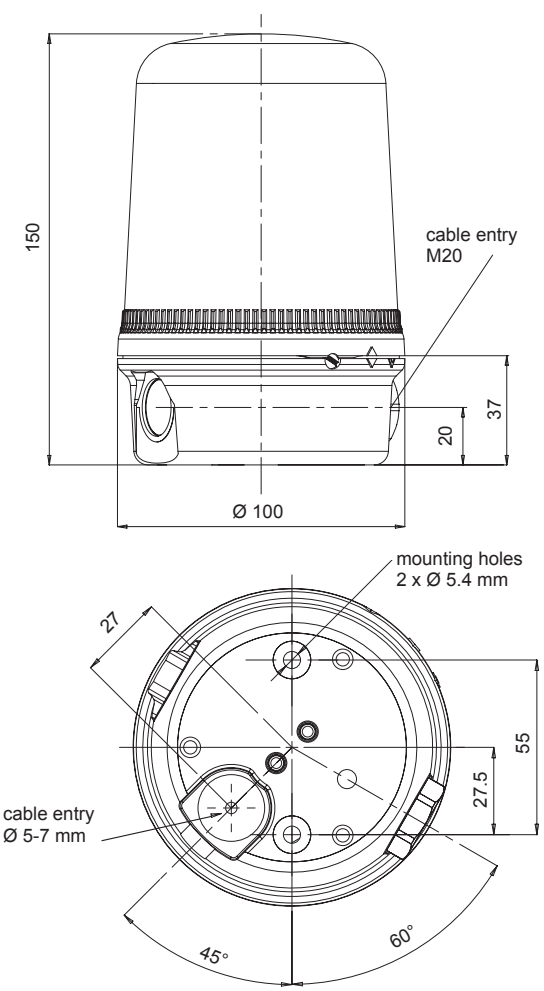
Mechanical data	P 400 RTH	P 300 RTH
Operating mode	halogen rotating mirror light	
Light source	halogen lamp G6.35 / GY6.35	
Rotation	approx. 180 rpm	
Lens colours	clear, yellow, amber, red, green, blue	
Lens type	plain, transparent	
Operating temperature	- 25 °C ... + 50 °C	
Relative humidity	90% @ + 20 °C	
Protection system according to EN 60529	IP 65	
Duty cycle	100%	
Lebensdauer	> 5 000 hrs	
Material	polycarbonate (PC), UL 94 VO f1	
Design	bayonet with anti-tamper locking screw	
Mounting	surface mounting (wall bracket and tubular stand available as accessories)	
Installation position	arbitrary	
Connecting terminals	screw terminals 1.5 mm^2	
Cable entry	1 x 5-7 mm push through grommet (bottom side); 1 x M20 cable entry sideways	
Weight	578 g	370 g

Dimensions

P 400 RTH



P 300 RTH



Ordering details

Article numbers		P 400 RTH				P 300 RTH			
Lens colour	**Rated voltage**	230 V AC	115 V AC	24 V DC	12 V DC	230 V AC	115 V AC	24 V DC	12 V DC
yellow		21347103000	21347153000	21347803000	21347853000	21337103000	21337153000	21337803000	21337853000
amber		21347104000	21347154000	21347804000	21347854000	21337104000	21337154000	21337804000	21337854000
red		21347105000	21347155000	21347805000	21347855000	21337105000	21337155000	21337805000	21337855000

Article numbers for other colours on request

Options / Accessories

Wall bracket for P 400
Article number:
213 94 00 0 000

Wall bracket for P 300
Article number:
213 92 00 0 000

Tubular stand 145 mm for P 400
Article number:
213 95 00 0 000

Tubular stand 140 mm for P 300
Article number:
213 93 00 0 000

Wall holder only in combination with tubular stand
Article number:
282 50 20 0 000

See pages 120/121 for further information

Conformity to standards

The visual characteristics of rotating mirror lights conform to the European standard DIN EN 842: **"Machine safety - visual alarm signals".**
Requirements contained in the DIN EN 981 standard: **"Machine safety - system of acoustic and visual alarm and information signals",** can be fulfilled.

The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
"Coding of display devices and control elements using colours and supplementary means".

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Flashing Light 13 Joules
Quadro S-M-Flex



Proven tunnel safety light; conforms to the guideline of the Swiss Federal Highways Authority: 'Signaling systems of safety devices in tunnels'

- synchronised flashing of up to 10 beacons in series with no additional controller
- initial current limited to below 1 A
- integrated function monitoring with fault message contact
- variable brightness and flash frequency settings on-site on the device
- use of double-pole terminals for the simple connection of parallel operated lights



Range as per EN 54



Protection system



Protection system



Impact-proof housing



Inrush current limited to < 1A





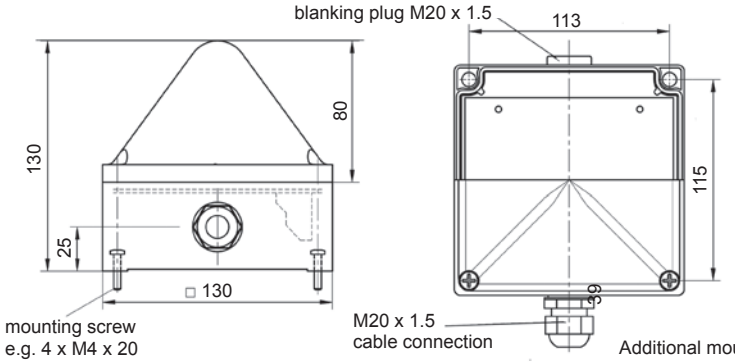
Operating temperature

Electrical data	Quadro S-M-Flex	
Rated voltage	230 V AC	115 V AC
Rated frequency	50 / 60 Hz	50 / 60 Hz
Operating range	195 – 253 V	95 – 127 V
Nominal current consumption	250 mA (1 Hz / 13 J)	350 mA (1 Hz / 13 J)
Initial current limited to	< 1 A / 10 ms	
Alarm output	230 V / 80 mA	

Mechanical data		Quadro S-M-Flex
Flash rate		adjustable (1 Hz = 60 flashes/min. factory setting)
Flash energy		max. 13 J
Light intensity (DIN 5037) [1]		140 cd
Lens colours		clear, white, yellow, amber, red, green, blue
Operating temperature		- 25 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		100%
Protection system according to EN 60529		IP 66, IP 67; mounting arbitrary
Impact resistance as per EN 50102		IK 08
Protection class		II
Duty cycle		100%
Service life of the flash tube		light emission still 70% after 12 000 000 flashes
Material	lens	polycarbonate (PC)
	housing	polycarbonate (PC), RAL 7035
Connecting terminals		cage clamp terminal 0.08 - 2.5 mm²
Cable entry (prepared)		2 x M20 x 1.5 sideways
Mounting	external lugs	113 x 153 mm – M5 or 127.1 x 127.1 mm – M5
	internal holes	113 x 113 mm
Weight		600 g

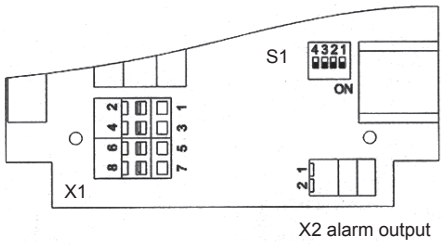
[1] with a clear lens

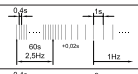
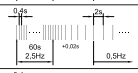
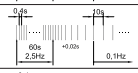
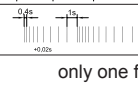
Dimensions



Additional mounting possible via external lugs (included).

Fault message contact



DIP switch setting				Setting for Quadro S-M-Flex	
4	3	2	1	Frequency (Hz)	Flash energy (J)
				1	13
			ON	2	13
		ON		0.5	13
		ON	ON	0.1	13
	ON			1	7.5
	ON		ON	2	7.5
	ON	ON		0.5	7.5
	ON	ON	ON	0.1	7.5
ON				1.5	13
ON			ON	1.75	13
ON		ON		2.5	13
ON		ON	ON		13
ON	ON				13
ON	ON		ON		13
ON	ON	ON		 repeating	7.5
ON	ON	ON	ON	only one flash	13

Ordering details

Article numbers		Quadro S-M-Flex
Lens colour	Rated voltage	230 V AC
clear		210 42 10 1 179
yellow		210 42 10 3 179
amber		210 42 10 4 179
red		210 42 10 5 179

Article numbers for other colours and voltages on request

Options / Accessories

GOST

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **“Machine safety - visual alarm signals“.**
Requirements contained in the DIN EN 981 standard: **“Machine safety - system of acoustic and visual alarm and information signals“,** can be fulfilled.
The colours ‘red’ for the emergency signal and ‘yellow’ for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
“Coding of display devices and control elements using colours and supplementary means“.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Flashing Warning Lights 5 Joules
WBL-M / WBS-M



Flashing light with integrated flash monitoring and fault message contact

- for systems with safety-relevant applications, such as X-ray and laser equipment
- housing and fixing bracket made of sturdy anodised aluminium
- also available with GL approval
- ideally suited for tough industrial environments
- flash tube secured by additional steel clamp
- impact-proof lens



Range as per EN 54



Protection system



Operating temperature

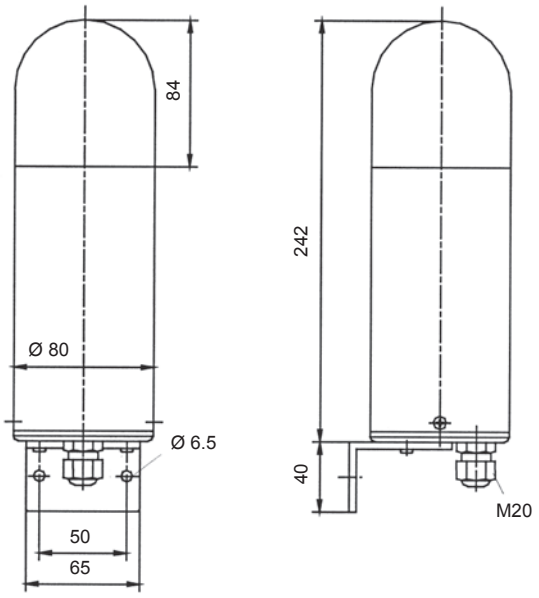
Electrical data	WBL-M		WBS-M		
Rated voltage	230 V AC	42 V AC	48 V DC	24 V DC	12 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz			
Operating range	185 – 242 V	37 – 47 V	40 – 57 V	18 – 35 V	10 – 15 V
Nominal current consumption	0.07 A	0.5 A	0.18 W	0.25 A	0.6 A

Switching capacity of the faiure indication	
Switching voltage	max. 250 V AC
Switching current	max. 3 A

Mechanical data		WBx-M
Flash rate		1 Hz = 60 flashes/min.
Flash energy		5 J
Light intensity (DIN 5037) [1]		44 cd
Lens colours		clear, white, yellow, amber, red, green, blue
Operating temperature		- 20 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 54 (vertical mounting)
Duty cycle		100%
Service life of the flash tube		light emission still 70% after 8 000 000 flashes
Material	lens	polycarbonate (PC)
	housing	aluminium (Al Mg Si 1), yellow anodised
	base	polycarbonate (PC) with fibre glass
Cable entry		M20 x 1.5
Connecting terminals		single wire 0.5 – 2.5 mm², fine wire 0.5 – 1.5 mm², with cable end sleeves DIN 46228/1
Weight		700 g

[1] with a clear lens

Dimensions

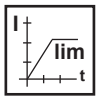


Ordering details

Article numbers		WBL-M		WBS-M
Lens colour	Rated voltage	230 V AC	115 V AC	24 V DC
yellow		210 03 10 3 156	210 03 16 3 156	210 03 80 3 156
amber		210 03 10 4 156	210 03 16 4 156	210 03 80 4 156
red		210 03 10 5 156	210 03 16 5 156	210 03 80 5 156

Article numbers for other colours and voltages on request

Options / Accessories





Article number:
287 10 50 0 042

GOST

GL

See page 119 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **“Machine safety - visual alarm signals“.**
Requirements contained in the DIN EN 981 standard: **“Machine safety - system of acoustic and visual alarm and information signals“,** can be fulfilled.

The colours ‘red’ for the emergency signal and ‘yellow’ for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
“Coding of display devices and control elements using colours and supplementary means“.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

All-Round Flashing Light PMF 2015-M



Extremely bright due to 14 Joules total flash energy of the impulse group and light bundling with fesnel lens, low power consumption (energy-saving)

- the function of the flashing light is monitored internally via an optical sensor and evaluation circuitry
- both sub-systems (flashing light and monitoring unit) have separate operating voltage connections
- the light is extremely failure-tolerant and carries type approval from the Swiss Ministry of Transport
- independent technical safety report within the definitions of EN 50129 exists



Range as per EN 54



Protection system



Operating temperature

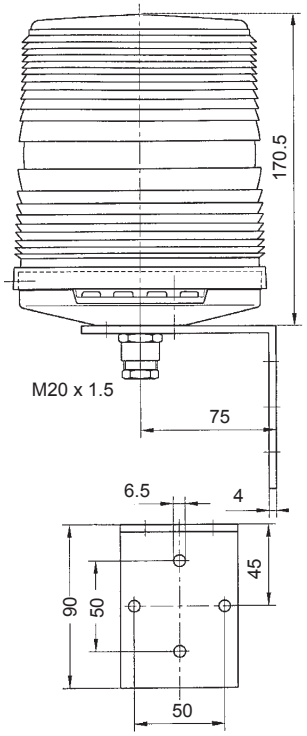
Electrical data		PMF 2015-M
Rated voltage		24 V DC
Operating range		18 – 30 V
Current consumption	flashing light	0.65 A
	monitoring unit	0.05 A
Alarm contact	contact version	positively driven contact (1 x NC, 1 x NO)
	switching current	max. 6 A
	switching voltage	max. 250 V AC
	max. switching power (AC)	1 500 VA
	recommended minimum load	> 50 mW

Mechanical data		PMF 2015-M
Operating mode		double flash
Light source		xenon flash tube
Flash rate of the main flash		1 Hz = 60 flashes/min.
Flash energy of the main flash		7 J
Light intensity (DIN 5037) [1]		200 cd
Lens colours		clear, amber, red, green, blue
Lens type		lens with fresnel characteristic
Beam angle	vertical	approx. 16°
	horizontal	360°
Operating temperature		- 30 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 55 (vertical mounting)
Duty cycle		100%
Service life of the flash tube		light emission still 70% after 8 000 000 flashes
Material	lens	polycarbonate (PC)
	housing	bracket mounting: polycarbonate (PC) / direct mounting: acrylonitrile butadiene styrene (ABS)
Cable entry	bracket mounting	M20 x 1.5 for cables 6.5 – 13.5 mm
Connecting terminals		0.08 – 2.5 mm²

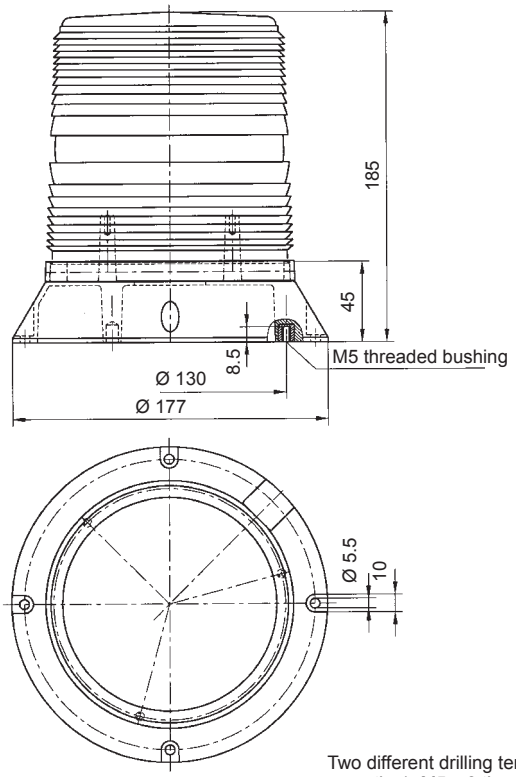
[1] with a clear lens

Dimensions

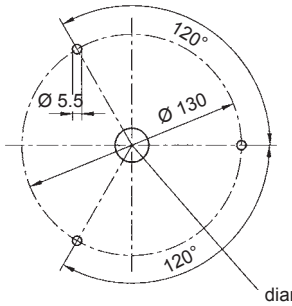
Bracket mounting



Direct mounting

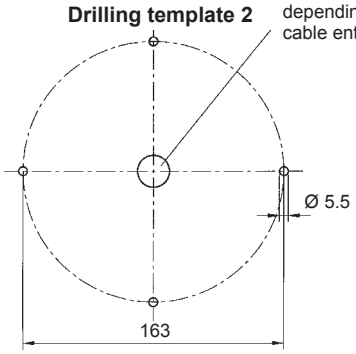


Drilling template 1



diameter variable depending on cable entry

Drilling template 2

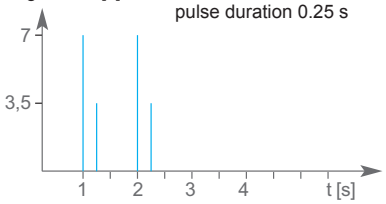


Two different drilling templates are available for fixing the light (direct mounting). M5 x 8 threaded bushes are set into the base of the light for fixing according to drilling template 1. Drilling template 2 allows the light to be fixed using 4 through bolts or similar from above.

Flash rate

Energy single flash [J]

2 flashes,
120 flashes/min.
pulse duration 0.25 s



Ordering details

Article numbers		PMF 2015-M bracket mounting
Lens colour	**Rated voltage**	24 V DC
amber		210 07 80 4 012
red		210 07 80 5 012

Article numbers for other colours on request

Options / Accessories

GOST

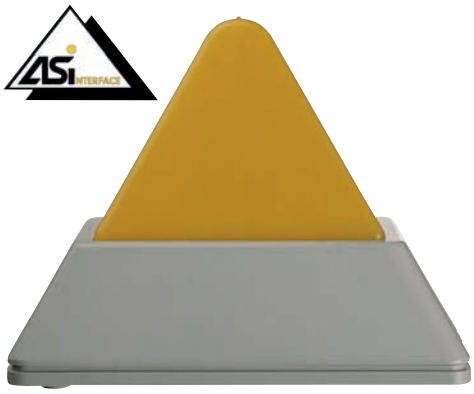
Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **"Machine safety - visual alarm signals".**
Requirements contained in the DIN EN 981 standard: **"Machine safety - system of acoustic and visual alarm and information signals",** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
"Coding of display devices and control elements using colours and supplementary means".

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV
EN 50129:2003	Railway applications – telecommunication technology, signalling technology and data processing systems – safety-relevant electronic systems for signal technology
EN 12352:2000	Traffic routing systems, warning and safety lights class: L1 C red F3 O3 M0 T1 S3

LED Continuous Lights
PD 2100-M-AS-i / PD 2100-LED-M



Machine lights in an elegant pyramid design, equipped with LED light source for extremely long service life (> 50 000 hrs)

- vibration/shock-resistant
- low power consumption
- minimised maintenance costs
- non-compromising safety
- outstanding illumination of the coloured lens due to scattering lens
- integrated function monitoring with potential-free fault contact
- for safety-relevant applications, such as X-ray and laser equipment

Additional for AS-i-Bus light:

- supplying of the light directly by bus system
- control and function monitoring directly via AS interface

		M-AS-i	LED-M
r = 4 m	IP 55	+ 45 °C / - 25 °C	+ 55 °C / - 25 °C
Range as per EN 54	Protection system	Operating temperature	Operating temperature

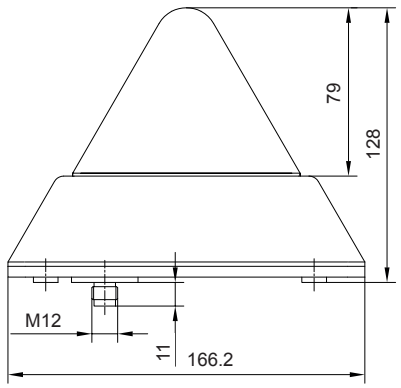
Electrical data	PD 2100-M-AS-i	PD 2100-LED-M	
Rated voltage	28 V	230 V AC	24 V DC
Nominal current consumption	approx. 250 mA	12 mA	65 mA
Rated frequency		50 / 60 Hz	
Operating range	26.5 – 32.6 V	± 10%	21 – 29 V
Alarm output	via AS-i Bus	230 V / 80 mA (MOS relay, $R_{ON\ max.}$ = 35 Ω) (NC)	

Mechanical data		PD 2100-M-AS-i	PD 2100-LED-M
Operating mode		continuous light	
Light source		LED	
Light intensity (DIN 5037) [1]		5 cd	
Lens colours		clear, white, yellow, amber, red, green, blue	
Operating temperature		- 25 °C ... + 45 °C	- 25 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 55 (if mounted vertically/horizontally)	
Protection class			II
Duty cycle		100%	
Service life of light source		> 50 000 hrs	
Material	lens	polycarbonate (PC)	
	housing	ABS, light grey similar to RAL 7035	
	baseplate	ABS, light grey similar to RAL 7035	
Cable entry			M20 x 1.5, either at the side or underneath
Connecting terminals			fine wire 0.14 – 2.5 mm²
Type of connection		M12 plug connector, 4-pole	
	Pin 1	AS-i +	
	Pin 2	NC	
	Pin 3	AS-i –	
	Pin 4	NC	
Addressing socket		DC jack, Ø 1.3 mm — AS-i +, AS-i –	
AS-i spezification		AS-i 2.1, A/B capable EN 50295	
Weight		300 g	AC: 380 g / DC: 270 g

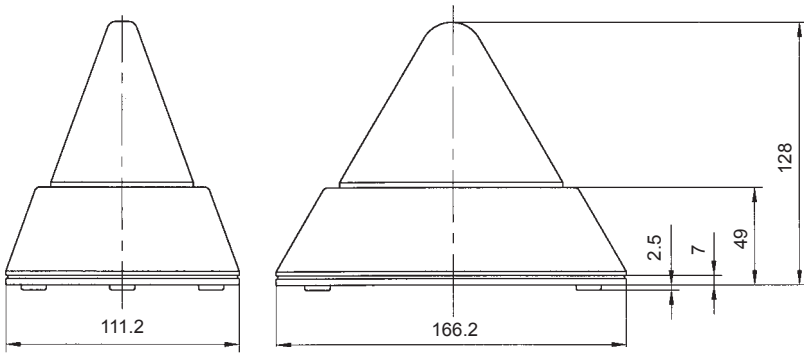
[1] with a clear lens

Dimensions

PD 2100-M-AS-i

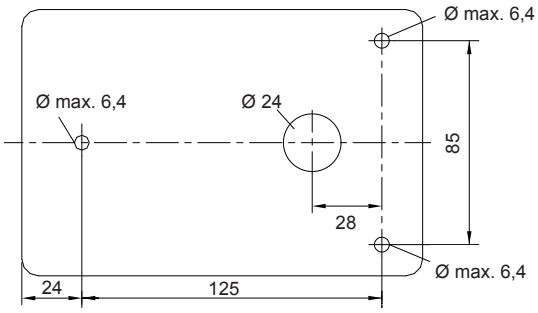


PD 2100-LED-M

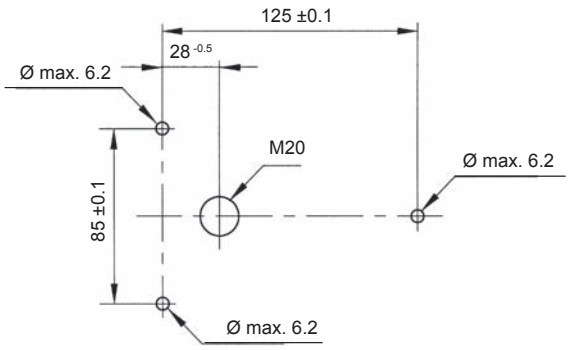


Mounting holes

PD 2100-M-AS-i



PD 2100-LED-M



Ordering details

Article numbers		PD 2100-M-AS-i	PD 2100-LED-M	
Lens colour	**Rated voltage**	26.5 V – 32.6 V	230 V AC	24 V DC
white		211 20 50 2 004		
yellow			211 20 61 3 005	211 20 60 3 005
amber			211 20 61 4 005	211 20 60 4 005
red		211 20 50 5 004	211 20 61 5 005	211 20 60 5 005

Article numbers for other colours on request

Options / Accessories

Article number:
287 10 50 0 040

GOST

See page 119 for further information

Conformity to standards

The visual characteristics of continuous lights conform to the European standard DIN EN 842: **“Machine safety - visual alarm signals“.**
Requirements contained in the DIN EN 981 standard: **“Machine safety - system of acoustic and visual alarm and information signals“,** can be fulfilled.

The colours ‘red’ for the emergency signal and ‘yellow’ for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
“Coding of display devices and control elements using colours and supplementary means“.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

LED Obstacle Lights
POL 32 / POL 10



LED obstacle lights, AVV-approved, conforms to ICAO, Annex 14, Volume 1, Chapter 6

- omnidirectional light with a radiation angle of 360° for operation at night and at twilight (night identification of aviation obstacles)
- 2 in 1: optional completely redundant construction of LED, electronics and power supply in one housing. A 2nd light is therefore not necessary.
- automatic switching over to standby light in case of error or by means of external control system
- integrated function monitoring with potential-free fault contact
- extremely long service life of over 50,000 hrs., hence maintenance-free
- optionally equipped with mounting-friendly plug contact

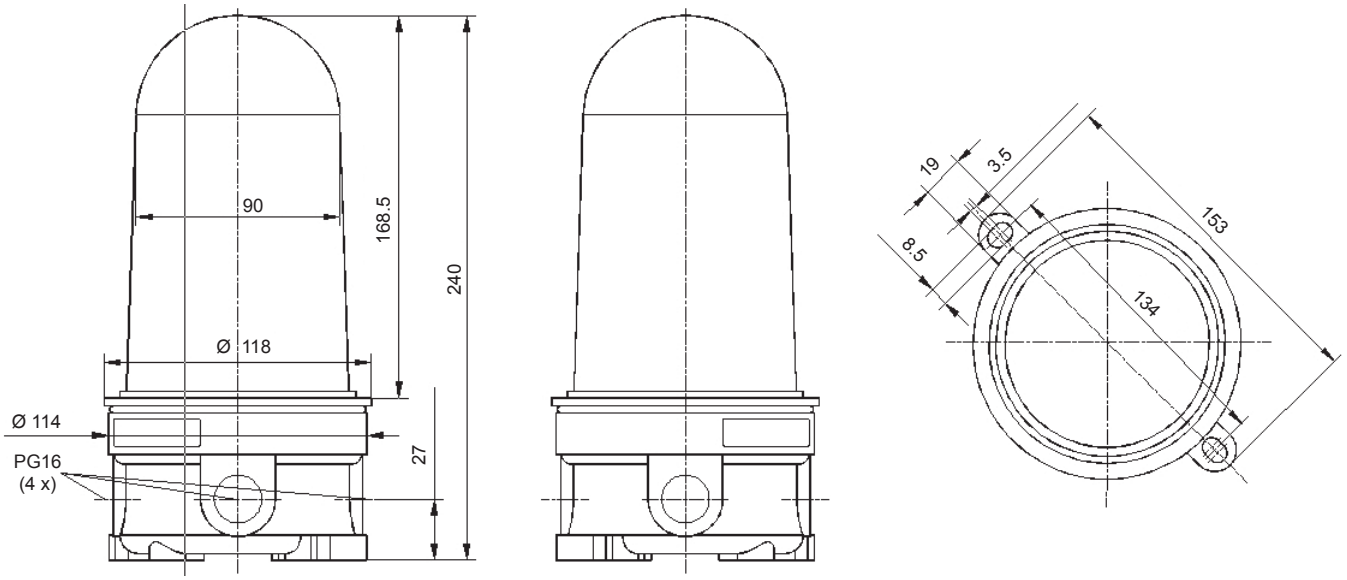
IP 68
Protection system

+ 55 °C
- 40 °C
Operating temperature

Electrical data		POL 32			POL 10		
Rated voltage		115 / 230 V AC	48 V DC	12 / 24 V DC	115 / 230 V AC	48 V DC	12 / 24 V DC
Rated frequency		50 / 60 Hz			50 / 60 Hz		
Operating range		85 – 265 V	40 – 57 V	9.6 – 28.8 V	85 – 265 V	40 – 57 V	9.6 – 28.8 V
Current consumption, determined arithmetically	115 V	96 mA			60 mA		
	230 V	45 mA			40 mA		
	48 V		270 mA			180 mA	
	24 V			430 mA			350 mA
	12 V			800 mA			600 mA
Fault contact	NC	max. 230 V, 80 mA					

Mechanical data		POL 32-M	POL 10-M	POL 10-M-R	POL 10-M-RA
Operating mode		continuous light			
Light source		LED array (red)		2 x LED array	
Version	monitored (standard)	●	●	●	●
	redundant			●	●
Activation of standby light in case of error by means of				external switching	automatic switching
Light intensity (DIN 5037)		> 32 cd	> 10 cd		
Lens colour		clear			
Light colour		aviation red			
Beam angle	vertical	approx. ± 35°			
	horizontal	360°			
Operating temperature		- 40 °C ... + 55 °C			
Storage temperature		- 40 °C ... + 70 °C			
Relative humidity		100%			
Protection system according to EN 60529		IP 68			
Duty cycle		100%			
Service life of light source		> 50 000 hrs			
Material	lens	polycarbonate (PC)			
	base	polybutylene terephthalate (PBT)			
Mounting		direct mounting			
Connecting terminals		0.5 - 1.5 mm² fine wire - H05(07)V-K 0.5 - 2.5 mm² single wire - H05(07)V-U			
Weight		approx. 750 g			

Dimensions



Ordering details

Article numbers	POL 32-M	POL 10-M	POL 10-M-R	POL 10-M-RA
Rated voltage				
115 / 230 V AC	211 05 68 1 005	211 05 64 1 005	211 05 64 1 011	211 05 64 1 010
48 V DC	211 05 66 1 005	211 05 65 1 005	211 05 65 1 011	211 05 65 1 010
12 / 24 V DC	211 05 67 1 005	211 05 63 1 005	211 05 63 1 011	211 05 63 1 010

Options / Accessories

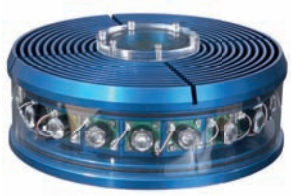
Plug connec-tor

Conformity to standards

The light complies with the requirements of ICAO Annex 14, Volume 1, Chapter 6. The light is approved in Germany in accordance with the General Administrative Rules for the Identification of Aircraft Obstructions (AVV).



LED Obstruction Lights
POL 170W-R, POL 2.000R





LED obstruction lights for the night identification of aviation obstructions such as wind energy turbines and high buildings/structures

- dimmable light intensity depending upon the visual range
- integrated degradation and function monitoring of the LEDs
- integrated lightning protection
- passive cooling; no wearing parts requiring maintenance
- extremely long useful life of more than 20 years (depending upon ambient temperature)
- extreme vibration resistance due to LED technology
- sea-water resistant housing material
- mechanically compatible to combi lights
- integrated GPS for synchronisation of several lights
- integrated twilight switch for switching between day/night operation
- integrated data logger for visibility adjustment

AVV	ICAO	Off-shore	IP 68	+ 50 °C / - 40 °C
Approval (POL 170W-R, POL 2.000R)	Approval (POL 2.000R)	Sea water resistance	Protection system	Operating temperature

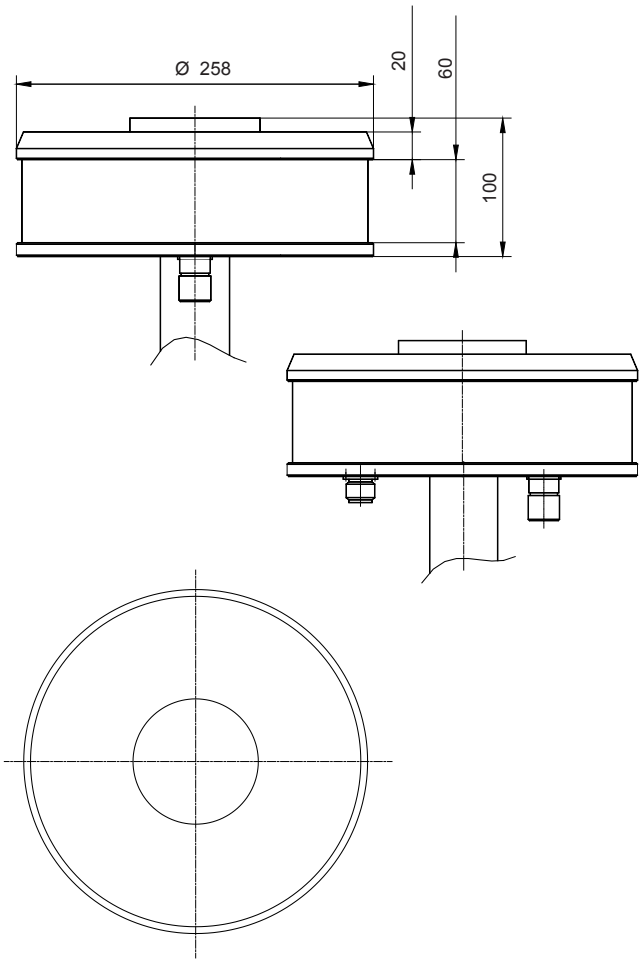
Electrical data		POL 170W-RED	POL 170W-RED-ES [1]	POL 2.000R
Rated voltage		24 V DC (15 - 30 V DC)		
Power consumption	@ 100%	25 W	25 W	90 W

Mechanical data		POL 170W-RED	POL 170W-RED-ES [1]	POL 2.000R
Operating mode		blinking light	blinking light	blinking or continuous light
Light source		18 high output LEDs	144 medium output LEDs	24 high output LEDs
Blinking rate		1 s ON - 0.5 s OFF - 1 s ON - 1.5 s OFF	1 s ON - 0.5 s OFF - 1 s ON - 1.5 s OFF	20/min. or 40/min. (type B) steady (type C)
Light intensity (DIN 5037)		170 cd according to AVV	170 cd according to AVV	2 000 cd according to ICAO
Intensity control		30% / 10% (only in connection with a visibility measuring device)		
Lens colour		clear		
Light colour		aviation red		
Operating temperature		- 40 °C ... + 50 °C		
Storage temperature		- 55 °C ... + 55 °C		
Relative humidity		100%		
Protection system according to EN 60529		IP 68		
Duty cycle		100%		
Service life of light source		> 100 000 hrs @ 25 °C		
Material	lens	polymethyl methacrylate (PMMA), UV resistant		
	housing	sea water-resistant aluminium (anodised) and sea water-resistant stainless steel		
Type of connection		plug connection, Hummel M23		
Weight		8 kg	15 kg	15 kg
Approvals		AVV	AVV	ICAO / AVV
ICAO type		–	–	Medium Intensity, type B or C

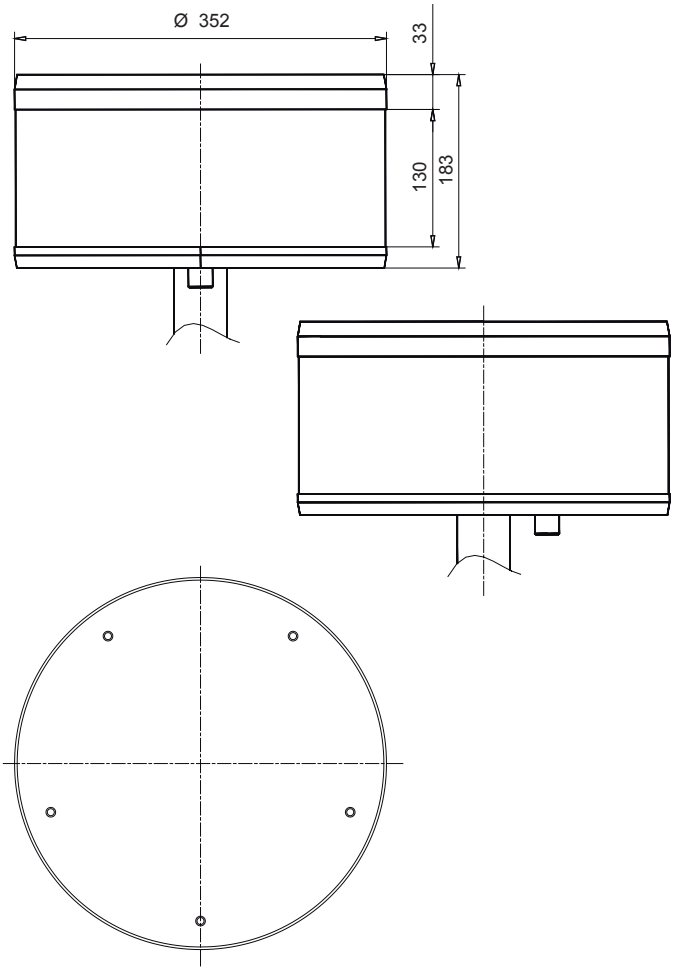
[1] ES = Extended Specification acccording to AVV

Dimensions

POL 170W-RED



POL 170W-RED-ES / POL 2.000R



Ordering details

Article numbers	POL 170W-RED	POL 170W-RED-ES	POL 2.000R-B	POL 2.000R-C
Standard	2146131010	21461631011	21464631004	21464631006
with radio transmitter	2146131013	21461631012	21464631005	21464631007

Options / Accessories

Visibility sensor
Article number:
see page 112

Assembly kit
Article number:
see page 113

Connecting cable
Article number:
see page 113

Conformity to standards

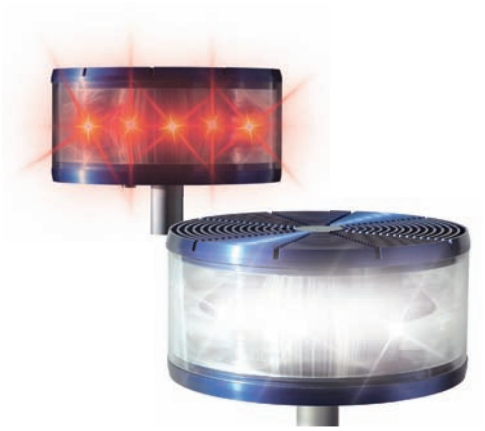
The light complies with the requirements of ICAO Annex 14, Volume 1, Chapter 6. The light is approved in Germany in accordance with the General Administrative Rules for the Identification of Aircraft Obstructions (AVV).







LED (Combi) Obstruction Lights POL 20.000/2.000R POL 20.000/170W-R, POL 20.000/2.000W



LED obstruction lights for the night identification of aviation obstructions such as wind energy turbines and high buildings/structures

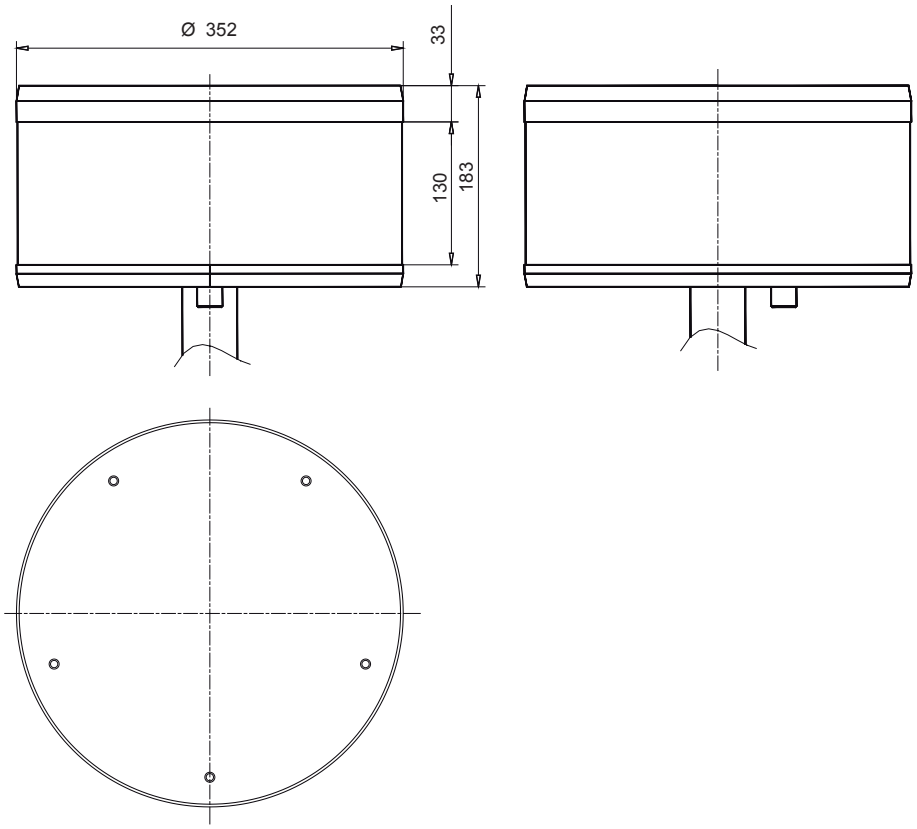
- dimmable light intensity depending upon the visual range
- integrated degradation and function monitoring of the LEDs
- integrated lightning protection
- passive cooling; no wearing parts requiring maintenance
- extremely long useful life of more than 20 years (depending upon ambient temperature)
- extreme vibration resistance due to LED technology
- sea-water resistant housing material
- integrated GPS for synchronisation of several lights
- integrated twilight switch for switching between day/night operation
- integrated data logger for visibility adjustment

AVV	ICAO	Off-shore		IP 68	+ 50 °C / - 40 °C
Approval	Approval	Sea water resistance	Combi light (Day/Night)	Protection system	Operating temperature

Electrical data		POL 20.000/2.000R-C	POL 20.000/170W-RED-ES	POL 20.000/2.000R-B	POL 20.000/2.000W
Rated voltage		24 V DC (15 - 30 V DC)			
Power consumption	@ 100%	240 W / 90 W	240 W / 25 W	240 W / 90 W	240 W / 90 W

Mechanical data		POL 20.000/2.000R-C	POL 20.000/170W-RED-ES	POL 20.000/2.000R-B	POL 20.000/2.000W
Operating mode		blinking or continuous light	blinking light		
Light source		24 LEDs (white) & 24 LEDs (red)	24 LEDs (white) & 144 LEDs (red)	24 LEDs (white) & 24 LEDs (red)	24 LEDs (white)
Blinking rate		20/min. or 40/min. / steady	20/min. or 40/min. / 1 s ON - 0.5 s OFF - 1 s ON - 1.5 s OFF	20/min. or 40/min. / 20/min. or 40/min.	20/min. or 40/min. / 20/min. or 40/min.
Light intensity (DIN 5037)	day identification	20 000 according to ICAO			
	night identification	2 000 cd according to ICAO	170 cd according to AVV	2 000 cd according to ICAO	2 000 cd
Intensity control		30% / 10% (only in connection with a visibility measuring device)			
Lens colour		clear			
Light colour	day identification	white	white	white	white
	night identification	red	red	red	white
Operating temperature		- 40 °C ... + 50 °C			
Storage temperature		- 55 °C ... + 55 °C			
Relative humidity		100%			
Protection system according to EN 60529		IP 68			
Duty cycle		100%			
Service life of light source		> 100 000 hrs @ 25 °C			
Material	lens	polymethyl methacrylate (PMMA), UV resistant			
	housing	sea water-resistant aluminium (anodised) and sea water-resistant stainless steel			
Type of connection		plug connection, Hummel M23			
Weight		15 kg			
Approvals		ICAO / AVV	AVV	ICAO / AVV	ICAO
ICAO type		Medium Intensity, type A&C	Medium Intensity, type A	Medium Intensity, type A&B	Medium Intensity, type A&A

Dimensions



Ordering details

Article numbers	POL 20.000/2.000R-C	POL 20.000/170W-RED-ES	POL 20.000/2.000R-B	POL 20.000/2.000W
Standard	21460631006	21460631011	21460631004	21460631008
with radio transmitter	21460631007	21460631012	21460631005	21460631009

Options / Accessories

Visibility sensor
Article number: see page 112

Assembly kit
Article number: see page 113

Connecting cable
Article number: see page 113

Conformity to standards

The light complies with the requirements of ICAO Annex 14, Volume 1, Chapter 6. The light is approved in Germany in accordance with the General Administrative Rules for the Identification of Aircraft Obstructions (AVV).







Accessories for obstruction lights



Power Supply / Battery Backup

- power supply unit for the 230 V power supply / main supply of the entire cabinet
- charge monitor for generating the temperature-controlled battery charging current
- fuse (40 A) to protect the battery circuit
- two high-strength rechargeable batteries
- fan with connected thermostat for control
- terminal clamps for 230 V power supply, two beacon systems, visibility meter, RS485 terminal port and error signal loop

Technical data	for POL 170W-RED	for all others
Rated voltage	200 – 240 V / 3.5 A	200 – 240 V / 5 A
Rated frequency	50 / 60 Hz	50 / 60 Hz
Output voltage	24 V / 22 A	2 x 24 V / 22 A
Rated charge	51 Ah	51 Ah
Operating temperature	- 15 °C ... + 50 °C	- 15 °C ... + 50 °C
Storage temperature	- 20 °C ... + 65 °C	- 20 °C ... + 65 °C
Dimensions (HxWxD)	540 x 500 x 225 mm	540 x 500 x 225 mm
Weight	approx. 50 kg	approx. 50 kg

Ordering details	
Article numbers	Power Supply / Battery Backup
for POL 170W-RED	28011000002
for all others	28011000003



Visibility Sensor

The visibility sensor identifies different precipitation types, such as rain, drizzle, leet, snow and other weather-related constraint factors such as fog, mist or haze caused by smoke and sand. It allows a reliable determination of visibility over a range from 10 to 20,000 meters and is designed for both onshore and offshore use.

Technical data		Visibility Sensor
Rated voltage	electronics	12 – 50 V DC
	hood heating	24 V AC/DC
Power consumption	incl. window heater	3 W @ 12 V DC
	incl. hood heating	65 W
Functional principle		optical forward scattering
Relay contacts		3 pieces, programmable visibility alarm thresholds and delays can be configured, error message
Serial ports		RS-232, RS 485
Analog exit		0 – 1 mA, 4 – 20 mA
Operating temperature		- 40 °C ... + 60 °C
Relative humidity		0 – 100%
Protection system		IP 66
Dimensions (HxWxD)		199 x 695 x 404 mm
Weight		3 kg

Ordering details	
Article number	Visibility Sensor
PWD 20W	28013000001



Thermo-Reflector

Use in regions with strong sunlight: The heat shield, made of 1 mm stainless steel sheet enhances the effectiveness of the passive cooling systems of obstruction lights of the Pfannenberg POL series.

Ordering details

Article number	Thermo-Reflector
POL-Thermo-Reflector	28013000004



Assembly kits

The range of accessories for Pfannenberg obstruction lights includes several assembly kits, where the extent and compilation of components vary depending on the respective installation tasks.
In general, the Pfannenberg package for the provision of obstructions lights and their installation also includes the corresponding sets.

Ordering details

Assembly components	Article numbers
Mounting base, aluminium (seawater-resistant)	on request
Mounting pillar, aluminium (seawater-resistant)	
Outrigger, aluminium, as support for lightning arrester	
Fixing screw set stainless steel (A4) natural	
Stainless steel cable ties, natural, for outdoor use, minimum retention force 670 N	
Cable ties, plastic for indoor installation	
Sturdy UV and weather-resistant special cables of various lengths, finished on the lamp side with a Hummel M23 stainless steel connector. The side opposite the cable can be customized freely	
Cable glands, filler plugs and selaing plugs	
Cable lugs / cable end ferrules for replacement sets	
Fuses for replacement sets	
Service terminals	
Lighting arrester for installation at the outrigger	
Mounting magnet, rubberised, M6, 40 kg holding load, NdFeB magnet system, anisotropic, 88 x 8.5 mm, threaded pin M8x15; for power supply cabinet	
Mounting magnet, rubberised, M10, 175 kg holding load, NdFeB flat pot magnet, with female thread (galvanised); for power supply cabinet	

Overview	AVV	ICAO type A	ICAO type B	ICAO type C	beacon w, red	beacon w, red ES	20,000 cd white	GPS	visibility control	logbook	onshore/ offshore	trans- mitter
POL 10-M	●	●									●	
POL 10-M-R	●	●									●	
POL 10-M-RA	●	●									●	
POL 32-M			●								●	
POL 170W-RED	●				●			●	●	●	●	○
POL 170W-RED-ES [1]	●					●		●	●	●	●	○
POL 2.000R-B			●					●	●	●	●	○
POL 2.000R-C				●				●	●	●	●	○
POL 20.000/2.000R-C		●		●			●	●	●	●	●	○
POL 20.000/170W-RED-ES	●	●				●	●	●	●	●	●	○
POL 20.000/2.000R-B	●	●	●				●	●	●	●	●	○
POL 20.000/2.000W	●	●					●	●	●	●	●	○

● Standard, ○ Option

[1] ES = Extended Specification acccording to AVV

Flashing Light 10 Joules
Quadro F12-SIL



Integrated safety in sturdy Quadro-Design

- to signal dangerous situations in safety-relevant application such as process and plant safety, e.g.
  - leaks / gas warning
  - high-pressure / overfilling

  and machine safety, e.g. as
  - start-up warning
  - muting indication
  - machine stop delay warning
- by means of integrated self-monitoring of the devices the normative required, regular inspection of warning devices is ensured
- the warning devices can be implemented in Safety Instrumented Systems (SIS) up to **SIL 2/PLd**

We would be more than happy to provide all safety-technical key data.

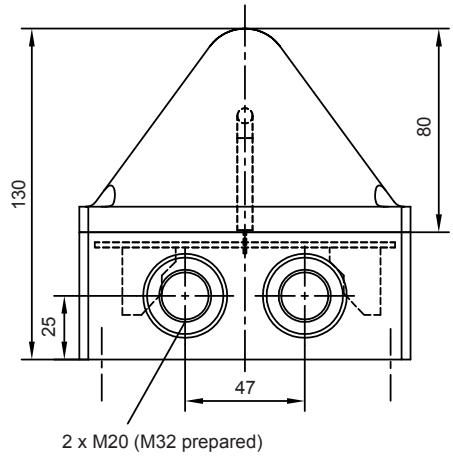
r = 17 m	IP 66	IP 67	IK 08	+ 55 °C / - 30 °C
Range as per EN 54	Protection system	Protection system	Impact-proof housing	Operating temperature

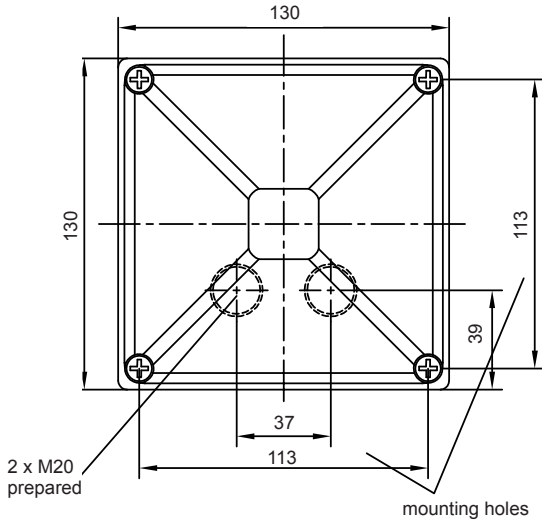
Electrical data		Quadro F12-SIL		
Rated voltage		230 V AC	115 V AC	24 V DC
Rated frequency		50 / 60 Hz	50 / 60 Hz	
Operating range		195 – 253 V	95 – 127 V	18 – 30 V
Nominal current consumption	flashing light	250 mA	350 mA	700 mA
	diagnostics channel	100 mA	100 mA	65 mA
Alarm contact	contact version	positively driven contact (1 x NC, 1 x NO)		
	switching current	max. 6 A		
	switching voltage	max. 250 V AC		
	max. switching power (AC)	1 500 VA		
	recommended minimum load	> 50 mW		

Mechanical data		Quadro F12-SIL
Flash rate		1 Hz = 60 flashes/min.
Flash energy		10 J
Light intensity (DIN 5037) [1]		118 cd
Lens colours		clear, white, yellow, amber, red, green, blue
Operating temperature		- 30 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		100%
Protection system according to EN 60529		IP 66, IP 67, mounting arbitrary
Impact resistance as per EN 50102		IK 08
Protection class		II
Duty cycle		100%
Service life of the flash tube		light emission still 70% after 8 000 000 flashes
Material	lens	polycarbonate (PC)
	housing	polycarbonate (PC), RAL 7035
Cable entry		2 x M20 bottom side / 2 x M20/M32 sideways
Connecting terminals		cage clamp terminal 0.08 - 2.5 mm^2
Mounting	external lugs	113 x 153 mm – M5 or 127.1 x 127.1 mm – M5
	internal holes	113 x 113 mm
Weight		600 g

[1] with a clear lens

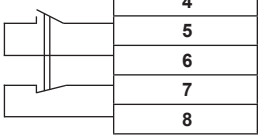
Dimensions





Additional mounting possible via external lugs (included).

Connection diagram



1	L/+ Operating voltage flashing light
2	N/- Operating voltage flashing light
3	L/+ Operating voltage monitoring channel
4	N/- Operating voltage monitoring channel
5	Alarm relay NO (mechanical safety relay,
6	Alarm relay NO positively driven contacts,
7	Alarm relay NC voltage rating 250V/6A
8	Alarm relay NC minimum contact load 10mA/5V)

Ordering details

Article numbers		Quadro F12-SIL		
Lens colour	**Rated voltage**	230 V AC	115 V AC	24 V DC
yellow		210 41 10 3 601	210 41 16 3 601	210 41 80 3 601
amber		210 41 10 4 601	210 41 16 4 601	210 41 80 4 601
red		210 41 10 5 601	210 41 16 5 601	210 41 80 5 601

Article numbers for other colours and voltages on request

Options / Accessories

GOST

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **"Machine safety - visual alarm signals".**
Requirements contained in the DIN EN 981 standard: **"Machine safety - system of acoustic and visual alarm and information signals",** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 01990:
"Coding of display devices and control elements using colours and supplementary means".

The visual alarms fulfill the requirements to the functional safety according to:
EN 61508 Functional safety of electrical/electronic/programmable electronic safety-related systems
EN 61511 Functional safety - Safety instrumented systems for the process industry sector

The devices can be used in safety related control systems in accordance with the following standards:
EN ISO 13849-1 Safety of machinery - Safety related parts of control systems – part 1
EN 62061 Safety of machinery - Functional safety of electrical/electronic/programmable electronic safety-related systems

All-Round Flashing Light 10 Joules
PMF 2015-SIL



Extremely bright flashing light by light bundling with fesnel lens, low power consumption

- to signal dangerous situations in safety-relevant application such as process and plant safety, e.g.
  - leaks / gas warning
  - high-pressure / overfilling

  and machine safety, e.g. as
  - start-up warning
  - muting indication
  - machine stop delay warning
- by means of integrated self-monitoring of the devices the normative required, regular inspection of warning devices is ensured
- the warning devices can be implemented in Safety Instrumented Systems (SIS) up to **SIL 2/PLd**

We would be more than happy to provide all safety-technical key data.



Range as per EN 54



Protection system



Operating temperature

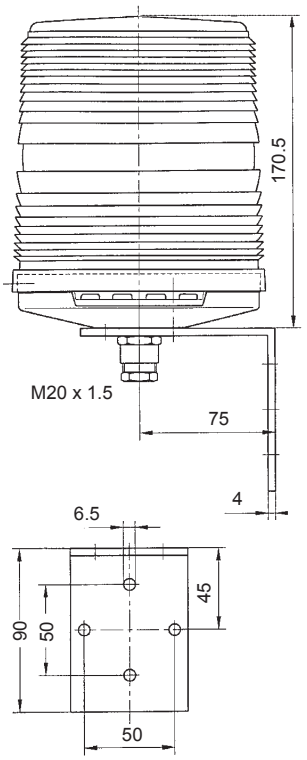
Electrical data		PMF 2015-SIL	
Rated voltage		230 V AC	24 V DC
Rated frequency		50 / 60 Hz	
Operating range		195 – 253 V	18 – 30 V
Nominal current consumption	flashing light	250 mA	700 mA
	diagnostics channel	100 mA	65 mA
Alarm contact	contact version	positively driven contact (1 x NC, 1 x NO)	
	switching current	max. 6 A	
	switching voltage	max. 250 V AC	
	max. switching power (AC)	1 500 VA	
	recommended minimum load	> 50 mW	

Mechanical data		PMF 2015-SIL
Flash rate of the main flash		1 Hz = 60 flashes/min.
Flash energy of the main flash		10 J
Light intensity (DIN 5037) [1]		200 cd
Lens colours		clear, amber, red, green, blue
Lens type		lens with fresnel characteristic
Beam angle	vertical	approx. 16 °
	horizontal	360 °
Operating temperature		- 30 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 55 (vertical mounting)
Duty cycle		100%
Service life of the flash tube		light emission still 70% after 8 000 000 flashes
Material	lens	polycarbonate (PC)
	housing	bracket mounting: polycarbonate (PC) / direct mounting: acrylonitrile butadiene styrene (ABS)
Cable entry	bracket mounting	M20 x 1.5 for cables 6.5 - 13,5 mm
Connecting terminals		single wire 0.5 – 2.5 mm^2, fine wire 0.5 – 1.5 mm^2, with cable end sleeves DIN 46228/1
Weight	bracket mounting	AC: 1.1 kg / DC: 1.2 kg
	direct mounting	AC: 0.6 kg / DC: 0.7 kg

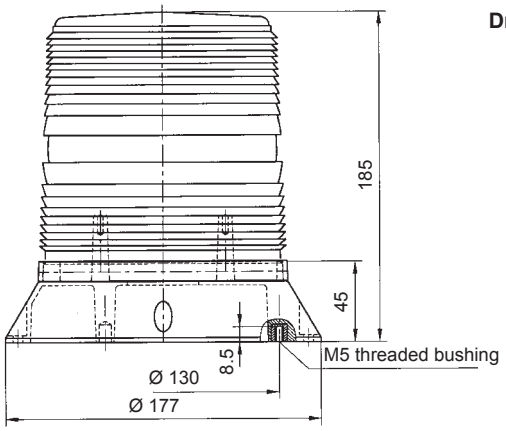
[1] with a clear lens

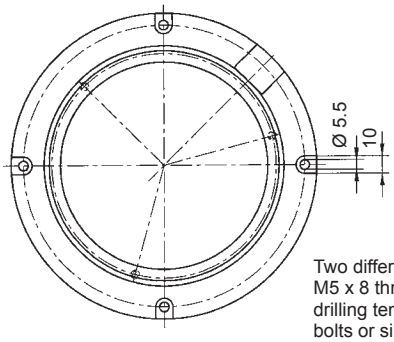
Dimensions

Bracket mounting

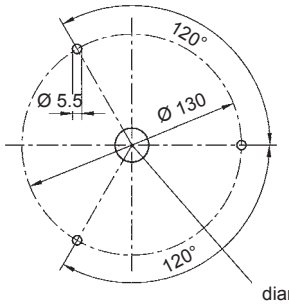


Direct mounting



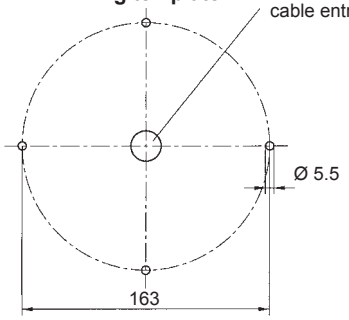


Drilling template 1 (for M5 threaded bushing)



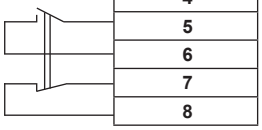
Drilling template 2

diameter variable depending on cable entry



Two different drilling templates are available for fixing the light (direct mounting). M5 x 8 threaded bushes are set into the base of the light for fixing according to drilling template 1. Drilling template 2 allows the light to be fixed using 4 through bolts or similar from above.

Connection diagram



1	L/+ Operating voltage flashing light
2	N/- Operating voltage flashing light
3	L/+ Operating voltage monitoring channel
4	N/- Operating voltage monitoring channel
5	Alarm relay NO (mechanical safety relay,
6	Alarm relay NO positively driven contacts,
7	Alarm relay NC voltage rating 250V/6A
8	Alarm relay NC minimum contact load 10mA/5V)

Ordering details

Article numbers		PMF 2015-SIL direct mounting		PMF 2015-SIL bracket mounting	
Lens colour	**Rated voltage**	230 V AC	24 V DC	230 V AC	24 V DC
amber		210 07 10 4 601	210 07 80 4 601	210 07 10 4 611	210 07 80 4 611
red		210 07 10 5 601	210 07 80 5 601	210 07 10 5 611	210 07 80 5 611

Article numbers for other colours and voltages on request

Options / Accessories

GOST

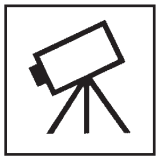
Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **"Machine safety - visual alarm signals".**
Requirements contained in the DIN EN 981 standard: **"Machine safety - system of acoustic and visual alarm and information signals",** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
"Coding of display devices and control elements using colours and supplementary means".

The visual alarms fulfill the requirements to the functional safety according to:
EN 61508 Functional safety of electrical/electronic/programmable electronic safety-related systems
EN 61511 Functional safety - Safety instrumented systems for the process industry sector

The devices can be used in safety related control systems in accordance with the following standards:
EN ISO 13849-1 Safety of machinery - Safety related parts of control systems – part 1
EN 62061 Safety of machinery - Functional safety of electrical/electronic/programmable electronic safety-related systems

Accessories



External flash monitoring system

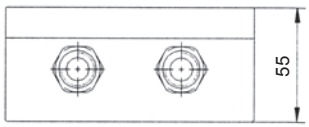
This device monitors the correct functioning of a flashing light by opto-electronic means. The flash from the light is fed via an optical fibre to a phototransistor, which converts the optical impulse to an electrical impulse. The electronic circuit evaluates the pulse and its regular repetition. As soon as the operating voltage is applied, the evaluation relay closes the changeover contact. If the operating voltage fails, the relay opens immediately.

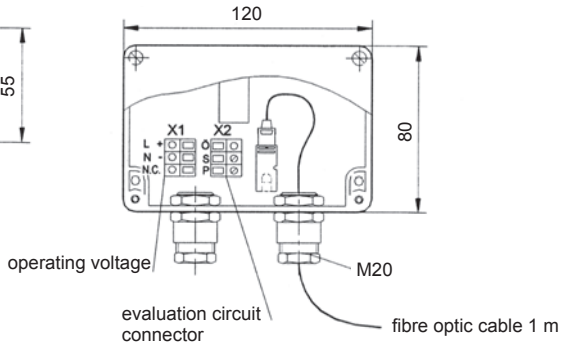
This method of operation represents the fail-safe normally-closed circuit function and guarantees an alarm even if the operating voltage fails. On the other hand, the changeover contact serves to continue an alarm, e.g. in an failure message line, or the direct blocking of further machine processes.

Electrical data	External flash monitoring			
Rated voltage	230 V AC	12 V DC	24 V DC	48 V DC
Rated frequency	50 / 60 Hz			
Operating range	198 – 242 V	11 – 15 V	16 – 34 V	38 – 52 V
Nominal current consumption	0.001 A	0.05 A	0.05 A	0.05 A

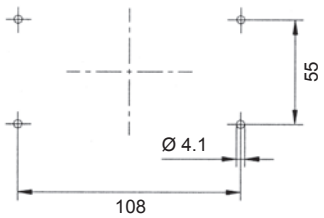
Mechanical data		External flash monitoring
Fibre optic cable		1 m
Duty cycle		100%
Switching capacity of the evaluation circuit		max. 230 V AC: 2 A
Operating temperature		- 20 °C ... + 50 °C
Storage temperature		- 40 °C ... + 50 °C
Relative humidity		90%
Protection system according to EN 60529		IP 55
Material		acrylonitrile butadiene styrene (ABS)
Colour		similar to RAL 7035
Cable entry		2 x M20
Weight	AC	330 g
	DC	230 g

Dimensions





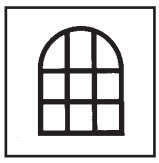
Mounting holes



Ordering details

suitable for ...	Rated voltage	Article number
any flashing light with a 1 Hz flash rate	24 V DC	291 30 80 0 000

Article numbers for other voltages on request



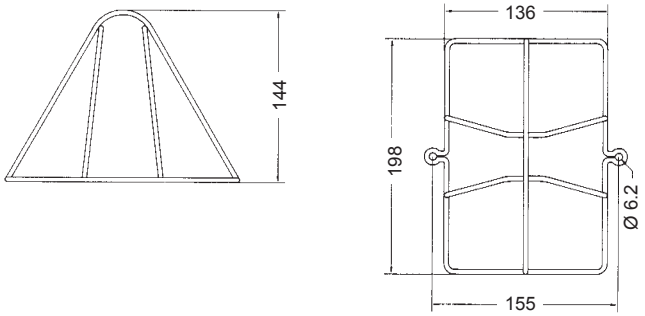
Protective cages

For protection against large mechanical demands. A very useful accessory for visual signaling devices fitted to vehicles, such as fork lift trucks or driverless transport vehicles.

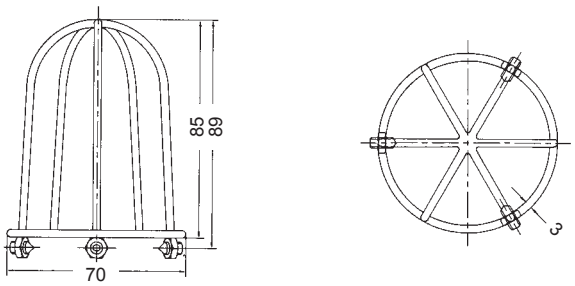
Mechanical data	Protective cages
Material	steel, powder-coated
Colour	white, similar to RAL 9016

Dimensions

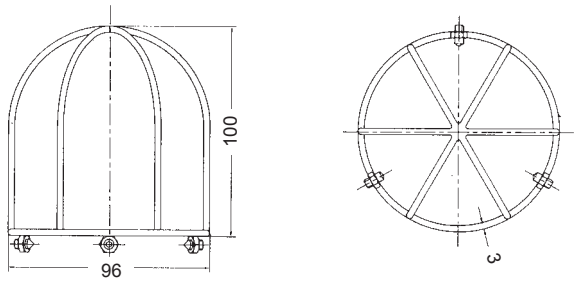
for PB- / PD series



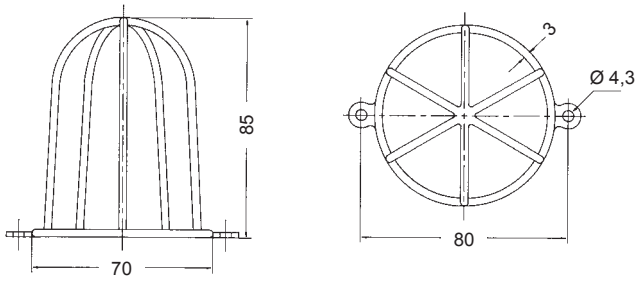
for WBL/WBS, DWBL/DWBS



for ABL/ABL, WB-M



for WBLR/WBSR



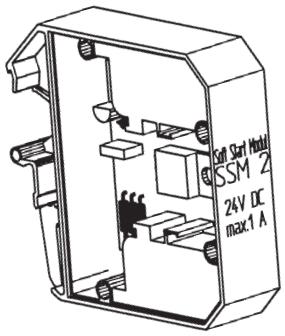
Ordering details

suitable for ...	Weight	Article number
PB-/PD series	165 g	287 10 50 0 040
WBL/WBS, DWBL/DWBS	55 g	287 10 50 0 041
ABL/ABS, WBL-M/WBS-M	65 g	287 10 50 0 042
WBLR/WBSR	52 g	287 10 50 0 043

Accessories flashing light PY-S

Ordering details

Article numbers		PY-S
Enclosure fitting	For connection (daisy-chaining) of several flashing lights of the PY series.	283 00 00 0 003
Surface gasket	Sealing of the flashing light installation surface when, e.g. cable entry is executed from the back.	283 00 00 0 004
Tamper-proof sealing (pack of 4)	Anti-tamper sealing for fasteners of the PY-S devices after installation in order to prevent manipulation of the devices.	283 00 00 0 002
Panel mount installation kit PY	The PY-S devices are also suitable for panel mounting. This kit consists of a plug connector for the electrical contact, as well as all installation materials.	283 00 00 0 010

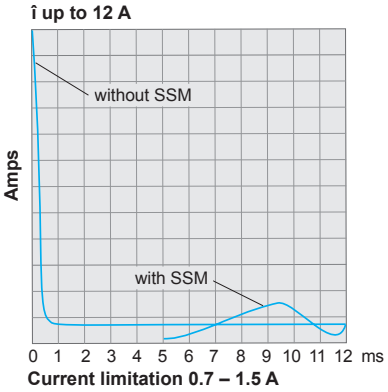


Soft start module SSM2

The module enables the soft start and limitation of the large initial current peaks of capacitive consumers. This includes all DC devices with a smoothing capacitor on the voltage input, regardless of whether the devices are sounders or flashing lights. The SSM soft start module prevents the overloading of the relay contacts when switching on and the premature triggering of overcurrent circuit breakers (e.g. PLC controller). The module is available as a built-in housing for DIN rail mounting or is already integrated in various devices.

Data	SSM2
Rated voltage	24 V DC
Operating range	18 – 30 V
Nominal current consumption	1 A
Operating temperature	- 40 °C ... + 50 °C
Storage temperature	- 40 °C ... + 70 °C
Relative humidity	90%

Ordering details	
suitable for ...	**Article number**
DC devices	410 00 00 0 500



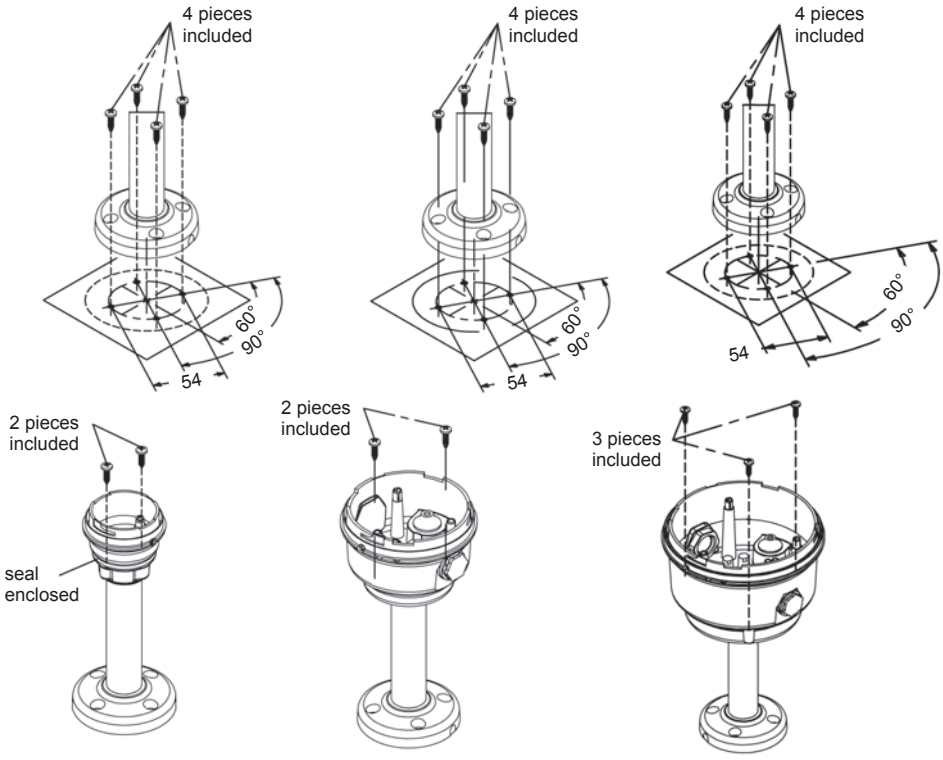


Tubular stands

Tubular stands for mounting SPECTRA lights.

Dimensions

P 200 TMA001	P 300 TMA001	P 400 TMA001



Ordering details				
Article numbers	**Height**	**P 200 TMA001**	**P 300 TMA001**	**P 400 TMA001**
for P 200 series	**137 mm**	213 91 00 0 000	–	–
for P 300 series	**140 mm**	–	213 93 00 0 000	–
for P 400 series	**145 mm**	–	–	213 95 00 0 000

further tubular stand lengths on enquiry

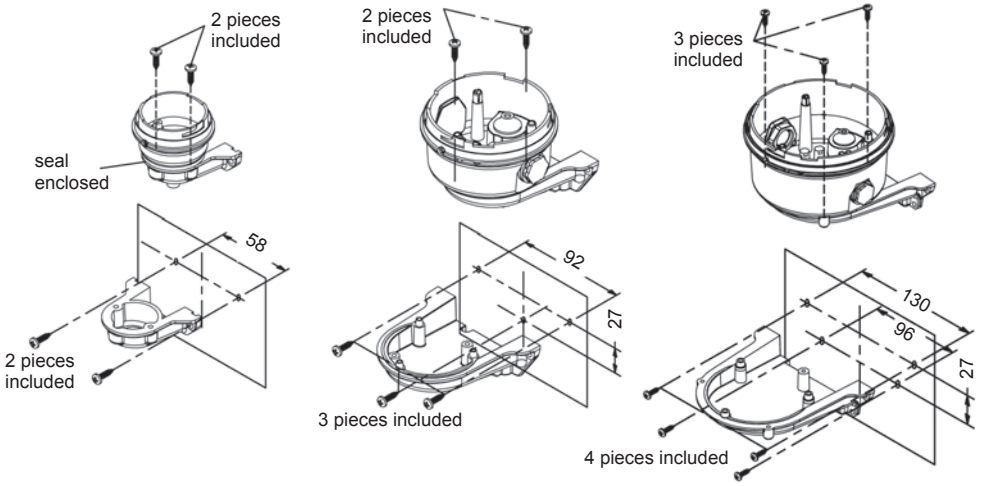


Wall bracket

Wall bracket for mounting SPECTRA lights.

Dimensions

P 200 RAB001	P 300 RAB001	P 400 RAB001



Ordering details

Article numbers	P 200 RAB001	P 300 RAB001	P 400 RAB001
for P 200 series	213 90 00 0 000	–	–
for P 300 series	–	213 92 00 0 000	–
for P 400 series	–	–	213 94 00 0 000

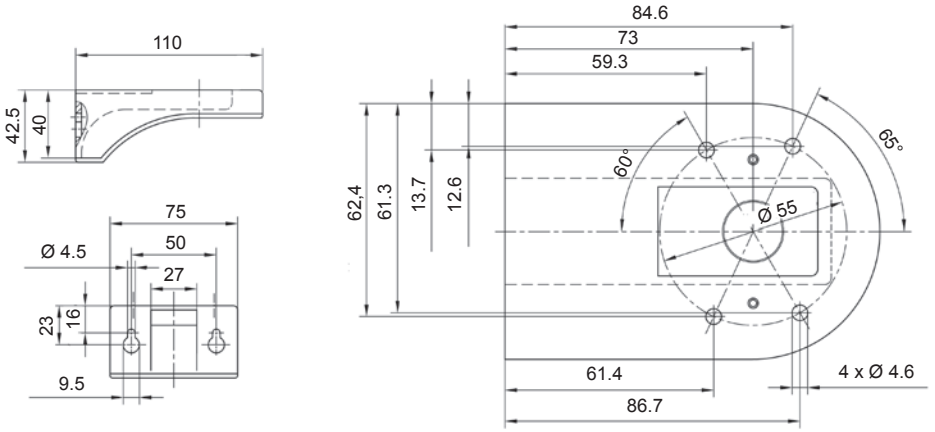


Wall holder with hood

Wall holder for mounting SPECTRA lights on tubular stands.

Dimensions

BR 50-W



Ordering details

suitable for ...	Article number
mounting the P 200 / P 300 / P 400 series on tubular stands	282 50 20 0 000

Wall bracket for traffic lights

Metal wall bracket for traffic lights and combinations.

Ordering details

Article numbers	P 350 TMB	P 450 TMB
Wall bracket for single mounting of the P 350	213 98 00 0 000	–
Wall bracket for single mounting of the P 450	–	213 99 00 0 000
Wall bracket set for combinations of 2 or 3 P 350	213 96 00 0 000	–
Wall bracket set for combinations of 2 or 3 P 450	–	213 97 00 0 000

Light source



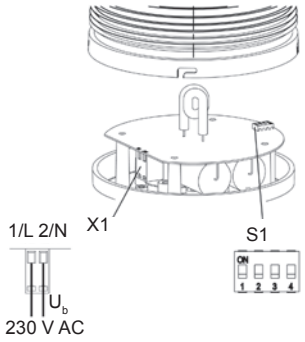
Filament lamps

Filament lamps for Pfannenberg lights with socket

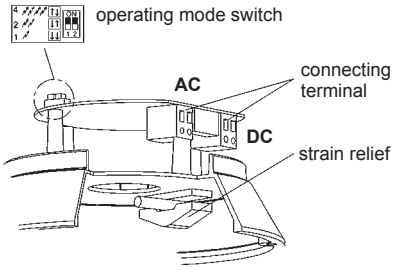
Product	suitable for ...	Rated voltage	Article number
Filament lamp E14 15 W	PD / P 350 TSB / P 450 TDB	24 V	281 13 00 0 000
Filament lamp E14 15 W	PD / P 350 TSB / P 450 TDB	12 V	281 13 00 0 001
Filament lamp E14 15 W	PD / P 350 TSB / P 450 TDB	48 V	281 13 00 0 002
Filament lamp E14 15 W	PD / P 350 TSB / P 450 TDB	110 V	281 13 00 0 003
Filament lamp E14 15 W	PD / P 350 TSB / P 450 TDB	240 V	281 13 00 0 004
Filament lamp E14 25 W	P 300 SLF / P 300 FLF	12 V	281 13 00 0 010
Filament lamp E14 25 W	P 300 SLF / P 300 FLF	24 V	281 13 00 0 011
Filament lamp E14 25 W	P 300 SLF / P 300 FLF	48 V	281 13 00 0 012
Filament lamp E14 25 W	P 300 SLF / P 300 FLF	115 V	281 13 00 0 013
Filament lamp E14 25 W	P 300 SLF / P 300 FLF	230 V	281 13 00 0 014
Filament lamp E14 40 W	P 400 SLF / P 400 FLF	12 V	281 13 00 0 015
Filament lamp E14 40 W	P 400 SLF / P 400 FLF	24 V	281 13 00 0 016
Filament lamp E14 40 W	P 400 SLF / P 400 FLF	115 V	281 13 00 0 017
Filament lamp E14 40 W	P 400 SLF / P 400 FLF	230 V	281 13 00 0 018
Filament lamp E27 25 W	P 450 TSB	24 V	281 13 00 0 019
Filament lamp E27 25 W	P 450 TSB	115 V	281 13 00 0 020
Filament lamp E27 25 W	P 450 TSB	230 V	281 13 00 0 021
Filament lamp BA9s 5 W	P 100 FLF / P 100 SLF / P 200 FLF / P 200 SLF	12 V	281 13 00 0 022
Filament lamp BA9s 5 W	P 100 FLF / P 100 SLF / P 200 FLF / P 200 SLF	24 V	281 13 00 0 023
Filament lamp BA9s 5 W	P 100 FLF / P 100 SLF / P 200 FLF / P 200 SLF	48 V	281 13 00 0 024
Filament lamp BA9s 5 W	P 100 FLF / P 100 SLF / P 200 FLF / P 200 SLF	115 V	281 13 00 0 025
Filament lamp BA9s 5 W	P 100 FLF / P 100 SLF / P 200 FLF / P 200 SLF	230 V	281 13 00 0 026
Halogen lamp G6.35/GY6.35 20 W	P 300 SLH / P 300 FLH / P 300 RTH	12 V	281 13 00 0 027
Halogen lamp G6.35/GY6.35 20 W	P 300 SLH / P 300 FLH / P 300 RTH	24 V	281 13 00 0 028
Halogen lamp G6.35/GY6.35 25 W	P 300 SLH / P 300 FLH / P 300 RTH	115 V	281 13 00 0 029
Halogen lamp G6.35/GY6.35 25 W	P 300 SLH / P 300 FLH / P 300 RTH	230 V	281 13 00 0 030
Halogen lamp G6.35/GY6.35 35 W	P 400 SLH / P 400 FLH / P 400 RTH	12 V	281 13 00 0 031
Halogen lamp G6.35/GY6.35 35 W	P 400 SLH / P 400 FLH / P 400 RTH	24 V	281 13 00 0 032
Halogen lamp G6.35/GY6.35 40 W	P 400 SLH / P 400 FLH / P 400 RTH	115 V	281 13 00 0 033
Halogen lamp G6.35/GY6.35 40 W	P 400 SLH / P 400 FLH / P 400 RTH	230 V	281 13 00 0 034

Connection diagrams

PMF 2030

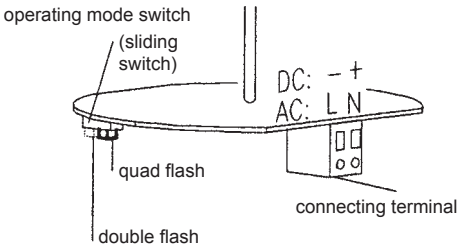


PMF 2020



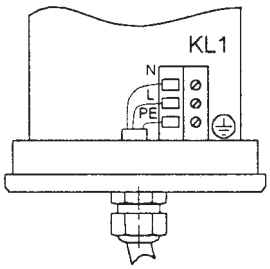
The operating modes quad flash (factory setting), double flash and single flash can be set via the DIP switch, which is accessible from the side.

PMF 2015

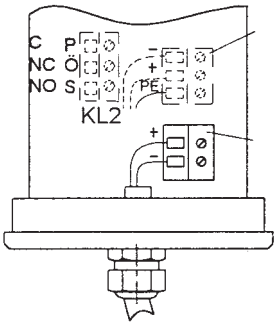


The operating modes quad flash (factory setting) and double flash can be set via the DIP switch, which is accessible from the side.

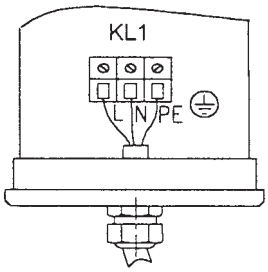
ABL



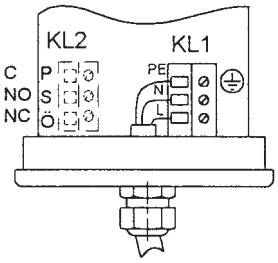
ABS / WBS / DWBS WBS-M



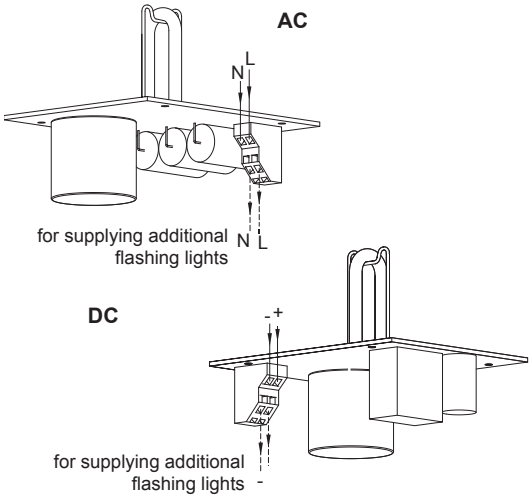
WBL / WBL-PX DWBL



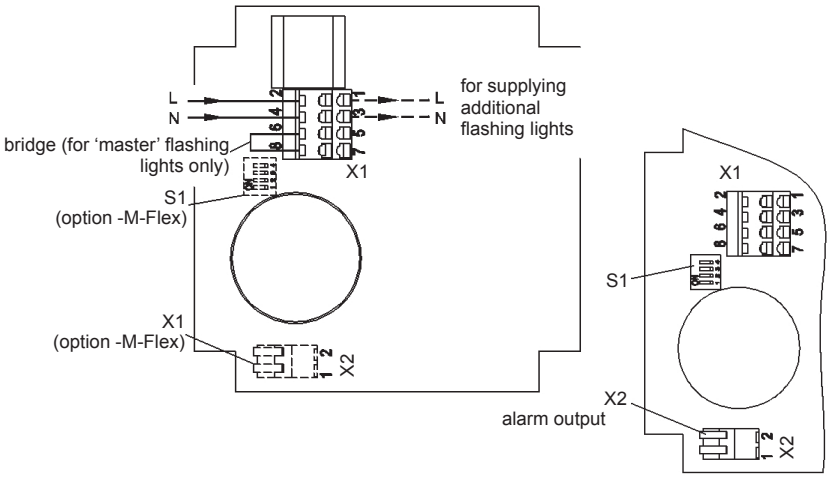
WBL-M 230 V AC



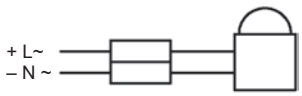
Quadro F12



Quadro S / Quadro S-M-Flex



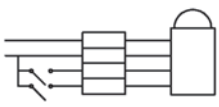
P 300/400 STR / P 300/400 STS P 300/400 FLF / P 300/400 FLH P 300/400 SLF / P 300/400 SLH

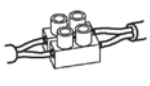


Colour	D/C	A/C
brown	+	L~
blue	–	N ~

P 400 LDA

+ red L~ brown
– N ~ blue
– N ~ green stage 2
– N ~ yellow stage 3

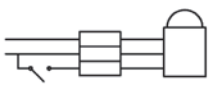


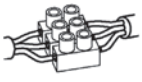


Colour	D/C	A/C
red / brown	+	L~
blue	–	N ~
green stage 2	–	
yellow stage 3	–	

P 300 STF

+ L~ red
– N ~ blue 1 Hz
– N ~ green 2 Hz

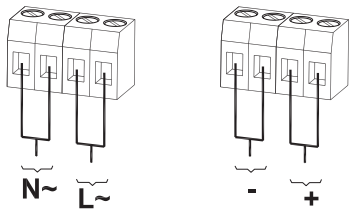




Colour	D/C	A/C
red	+	L~
blue	–	N ~
green	–	N ~

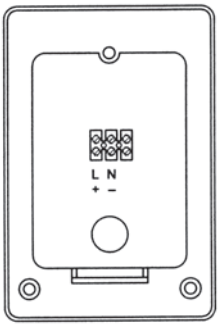
PMB 010 / PMB 005

AC | DC

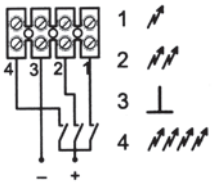


PB 2010 / PMB 2010 / PB 2005

standard version

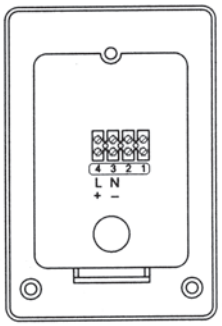


flash rate is set via the DIP switch in the PMB (standard version)



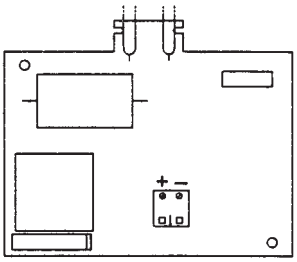
PMB 2010 external operation controller [1]

version for external operating controller

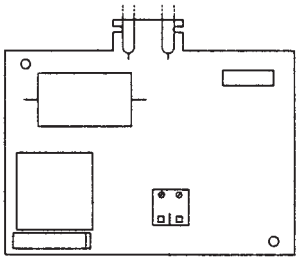


[1] optional for DC types from the PMB 2000 series

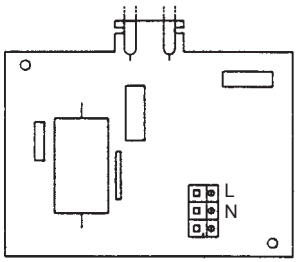
WBSR



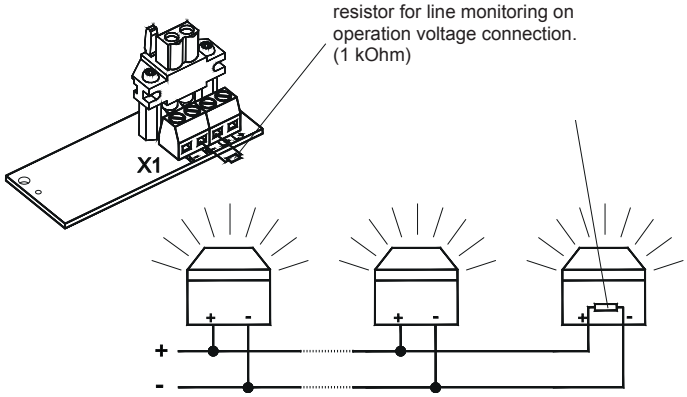
WBLR (< 42 V AC)

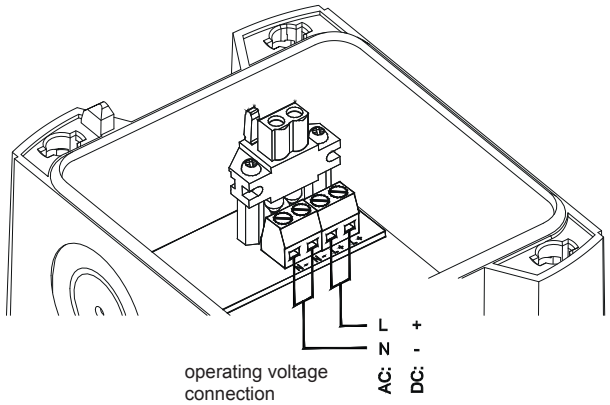


WBLR (> 110 V AC)

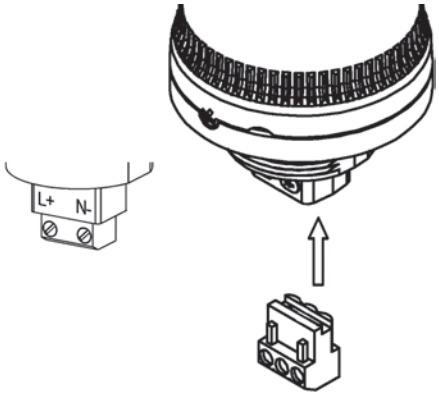


PY X-S-05

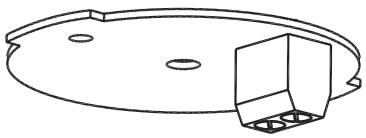




P 100 STR / P 100 FLF P 100 SLF / P 100 LDA

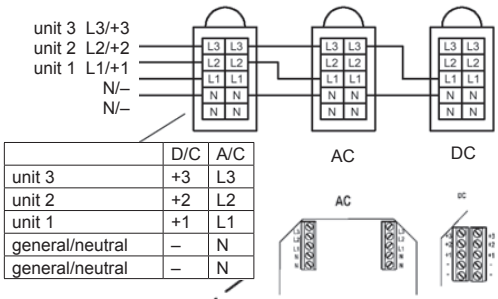


P 200 STR / P 200 FLF P 200 SLF / P 200 LDA



DC	AC
+	L~
-	N~

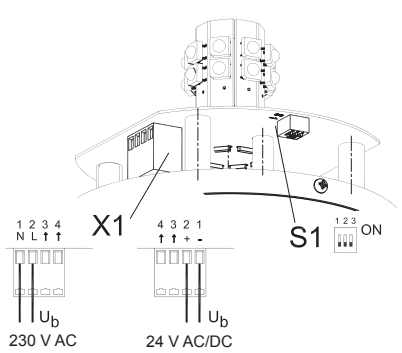
P 450 TLA / P 350 TLA

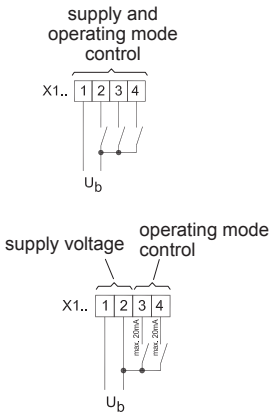


	D/C	A/C
unit 3	+3	L3
unit 2	+2	L2
unit 1	+1	L1
general/neutral	–	N
general/neutral	–	N

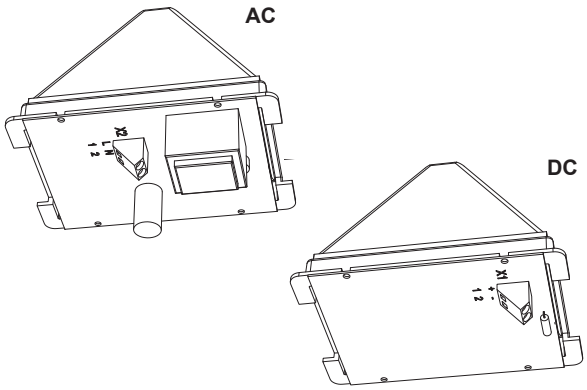


PMF-LED Flex

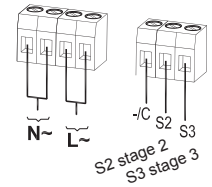


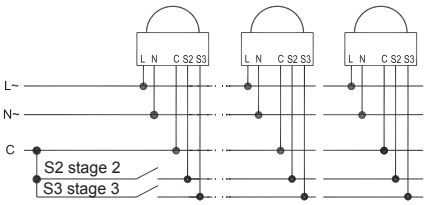


PD 2100-LED

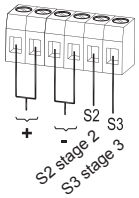


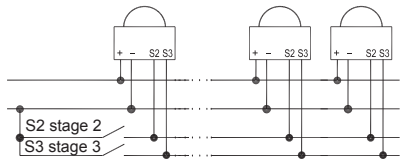
PMBL1 – AC



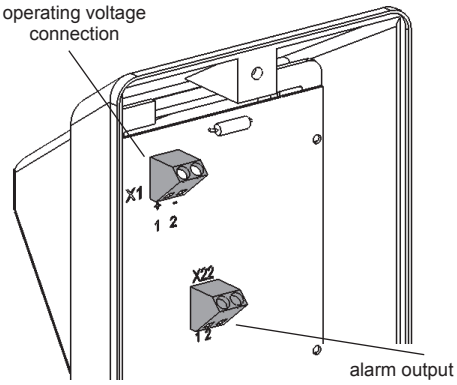


PMBL1 – DC

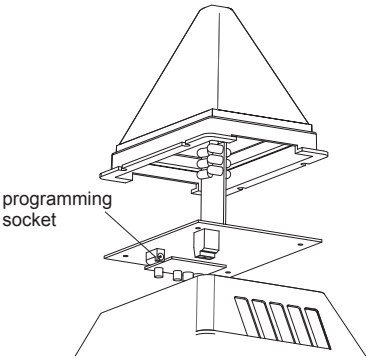




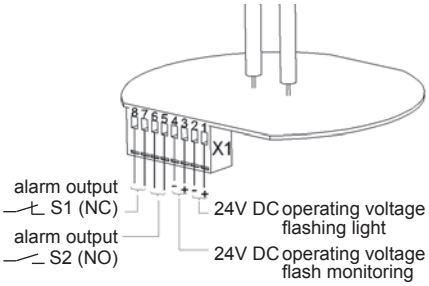
PD 2100-LED-M

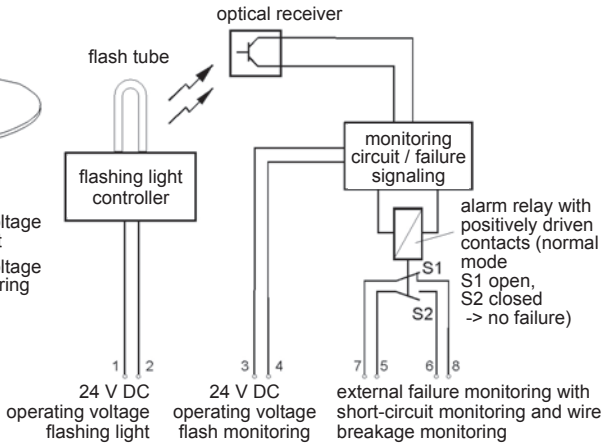


PD 2100-M-AS-i

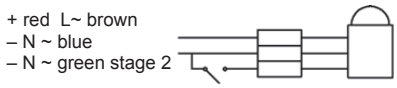


PMF 2015-M

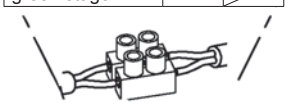




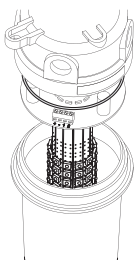
P 300 LDA



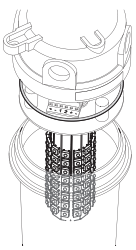
Colour	D/C	A/C
red / brown	+	L~
blue	–	N ~
green stage 2	–	

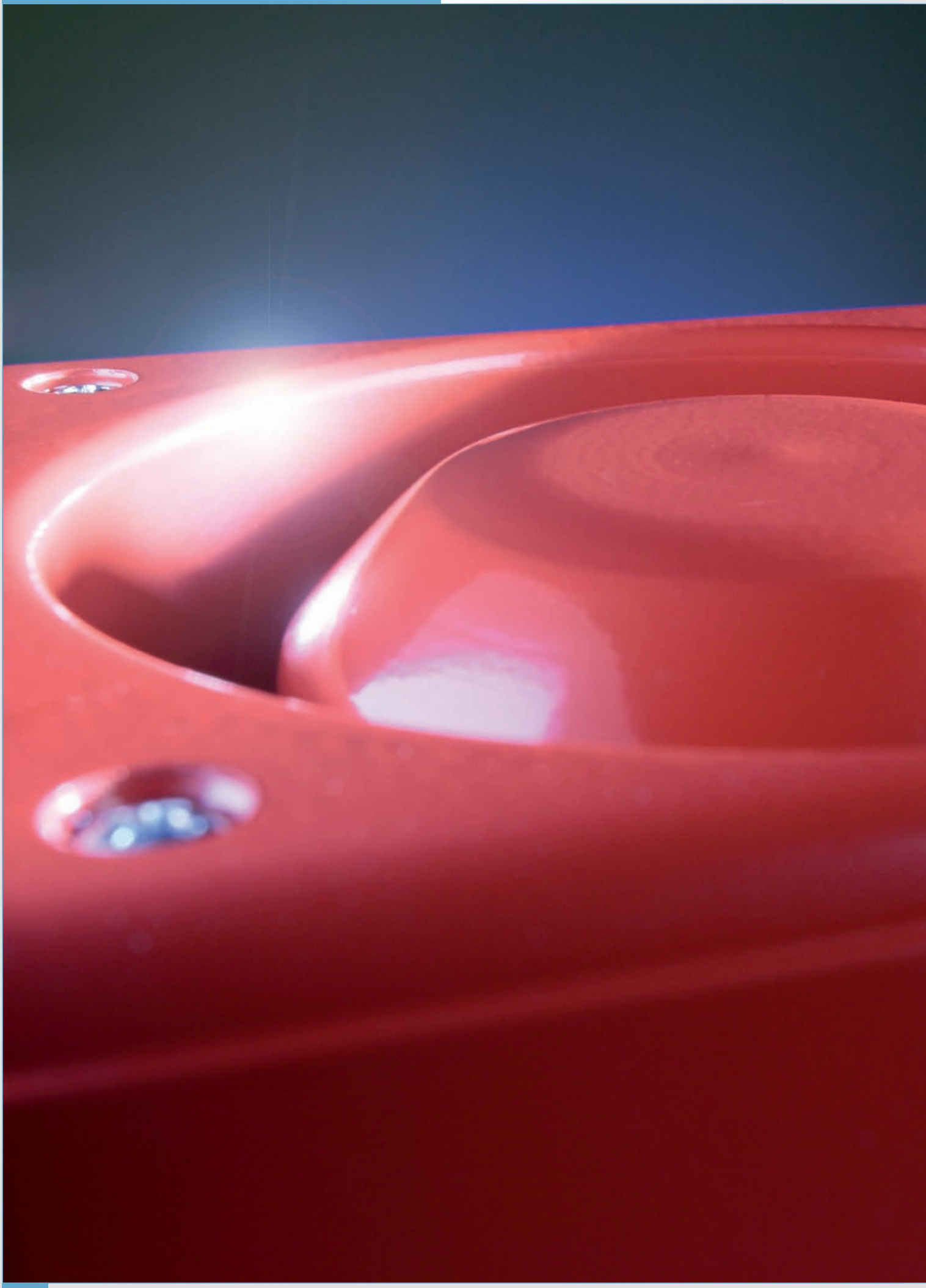


POL 32-M



POL 10







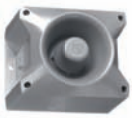
Sound waves are a language that everybody understands!

Use our range of audible signaling devices for all industrial areas of application

A baby's cry, cars sounding their horns, the front door bell – acoustic signals are part of our life right from the very beginning. All over the world. Everybody who hears a loud acoustic signal feels called upon to act in some way, regardless of the situation.

On the basis of these conditions, the use of acoustic signaling devices is also of great advantage in the industrial sector. Malfunctions are reported immediately, dangerous situations are displayed without delay. Benefit from our wide range of acoustic signaling devices, which are guaranteed to draw the necessary attention in your company - when it really matters.

All audible signaling devices at a glance

	Type	Maximum signal reception range for a 65 dB ambient noise level in metres [1]					Sound pressure level	Protection system	Dimensions (HxWxD) mm	Approvals / Standards						Page
		10	100	250	500	1500				GL	GOST	UL	VdS	EN 54-3	RS	
	Sounders															
	SON 2						100 dB (A)	IP 56	86 x 86 x AC: 89.5 DC: 64.5		○					130
	SON F1						100 dB (A)		86 x 86 x 64.5		○	●	●	●		
	DS 5						105 dB (A)	IP 66 IP 67	133.5 x 133.5 x 143	●	●	●	●	●	●	132
	DS 10						110 dB (A)			●	●	●	●	●	●	
	DS 5-DN						105 dB (A)	IP 66 IP 67	133.5 x 133.5 x 143							134
	PA 1						100 dB (A)	IP 66	86 x 109.5 x 80.6	● [1]	●	○	●	●	●	136
	PA 5						105 dB (A)	IP 66	135 x 163.4 x 132	● [1]	●	○	●	●	●	136
	PA 10						110 dB (A)	IP 66	170 x 214 x 156	● [1]	●	○	●	●	●	138
	PA 20						120 dB (A)	IP 66	170 x 214 x 181	● [1]	●	○	●	●	●	138
	PA 130						130 dB (A)	IP 54	285 x 490 x 595		●					142
	Safety-related Sounders															
	DS 5-SIL						105 dB (A)	IP 66 IP 67	133.5 x 133.5 x 143	●	●	●	●	●	●	144
	DS 10-SIL						110 dB (A)			●	●	●	●	●	●	144

● available
○ in preparation
[1] option

	Type	Maximum signal reception range for a 65 dB ambient noise level in metres [1]					Sound pressure level	Protection system	Dimensions (HxWxD) mm	Approvals / Standards						Page
		10	100	250	500	1500				GL	GOST	UL	VdS	EN 54-3	RM	
	Voice Sounders															
	**PAS 110**						110 dB (A)	IP 66	168 x 168 x 156.5		●					146
	**PAS 106**						105 dB (A)	IP 66	DC: 130 x 130 x 132 AC: 130 x 185 x 132		●					146
	**PAS 106 SYNC**						100 dB (A)	IP 66	130 x 130 x 132		●					148
	Loudspeakers															
	**PS15R**						122 dB (A)	IP 54	117 x 181 x 230		●					150
	**PS15B**										●					150
	**PS50B**						125 dB (A)	IP 66	144 x 218 x 145		●					151
	Electronic Buzzers															
	**P 22 DBZ**						80 dB (A) @ 10 cm	IP 65	Ø 29 x 62							152
	**P 28 DMC948**						91 dB (A)	IP 65	Ø 35.8 x 38.2							
	P 28 DMC201						91 dB (A)									
	P 28 DMC301						91 dB (A)									
	P 28 DMB530						91 dB (A)									

[1] The specification for the alarm signal reception range assumes an existing ambient noise level of 65 dB (A). In accordance with applicable regulations, the calculated alarm range for the sound level 65 dB (A) was given + 10 dB (A) = 75 dB (A).

● available
○ in preparation

Note:
Using sounders with a sound pressure level of ≥ 120 dB (A) can lead to hearing damage. People must not be permitted to stay in the near vicinity of the sounder. All specified sound pressure levels are based on a measurement distance of 1 m, provided that nothing different is specified.



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Sounders 100 dB(A)
SON 2 / SON F1



- reverse polarity protection
- automatic synchronisation of several sounders
- volume control
- SON 2: choice of 32 different tones, 2 additional externally selectable tones
- SON F1: choice of 10 different tones, 1 additional externally selectable tone
- compact design
- ideal for fire alarm systems due to low power consumption

r = 18 m
max. signal reception range

IP 56
Protection system

+ 55 °C
- 25 °C
Operating temperature

EN 54-3
Standard

VdS G209080
Standard

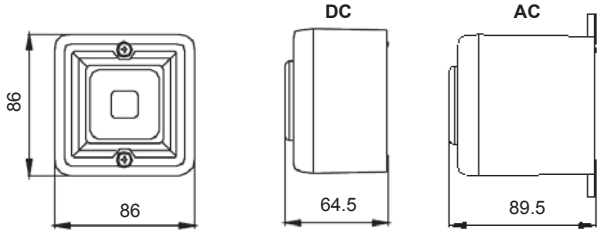
only for SON F1 24 V DC

Electrical data	SON 2			SON F1
Rated voltage	230 V AC	115 V AC	24 V DC	24 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz		
Operating range	± 10%	± 10%	± 25%	10 – 30 V
Nominal current consumption	12 mA	24 mA	20–80 mA	25 mA

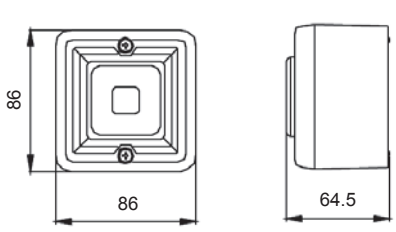
Mechanical data		SON 2	SON F1
Sound pressure level		100 dB (A) @ 1 m	100 dB (A) @ 1 m
Sound level reduction		by - 2 / - 6 dB	by - 9 dB
Alarm tones		32 tones / 3-stage alarm	10 tones / 2-stage alarm
Duty cycle		100%	
Operating temperature		- 25 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 56	
Material		UL 94 VO & 5VA classified ABS	
Colour		RAL 3000 (flame red)	
Cable entry		4 knock-outs prepared on the side and bottom	
Connecting terminals		0.5 – 2.5 mm²	
Weight	AC	400 g	260 g
	DC	300 g	260 g

Dimensions

SON 2



SON F1



Tone table SON 2

Tone	Description - Frequency		Stage 2	Stage 3
1	Continuous tone	340 Hz	2	5
2	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	1000 Hz / 800 Hz, 0,25 s, 0,25 s, EN54-3	17	5
3	Slow whoop, evacuation alarm Netherlands NEN 2575	1200 Hz / 500 Hz, 3,5 s, 0,5 s, EN54-3	2	5
4	Sweeping (fast)	1000 Hz / 800 Hz, 10 ms, 10 ms	6	5
5	Continuous tone	2400 Hz	3	20
6	Sweeping	2900 Hz / 2400 Hz, 70 ms, 70 ms	7	5
7	Sweeping (fast)	2900 Hz / 2400 Hz, 10 ms, 10 ms	10	5
8	Sweeping	1200 Hz / 500 Hz, 3 s, 3 s	2	5
9	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz / 500 Hz, 1 s, EN54-3	15	2
10	Alternating tone	2900 Hz / 2400 Hz, 20 ms, 20 ms	7	5
11	Interrupted tone	1000 Hz, 10 ms, 10 ms	2	5
12	Alternating tone	1000 Hz / 800 Hz, 0,875 s, 0,875 s	4	5
13	Interrupted tone	2400 Hz, 10 ms, 10 ms	15	5
14	Interrupted tone	800 Hz, 0,25 s, 1 s	4	5
15	Continuous tone	800 Hz	2	5
16	Interrupted tone	660 Hz, 150 ms, 150 ms, EN54-3	18	5
17	Alternating tone, France NFS 32-001 (fire alarm)	554 Hz / 440 Hz, 0,1 s, 0,4 s, EN54-3	2	27
18	Interrupted tone, Sweden SS031711 (air raid warning)	660 Hz, 1,8 s, 1,8 s	2	5
19	Sweeping, France NFC48-265	1600 Hz / 1400 Hz, 1 s, 0,5 s	2	5
20	Continuous tone, Sweden SS031711 (all-clear signal)	660 Hz	2	5
21	Alternating tone	554 Hz / 440 Hz, 10 ms, 10 ms	2	5
22	Interrupted tone	544 Hz, 0,875 s, 0,875 s	2	5
23	Interrupted tone	800 Hz, 20 ms, 20 ms	6	5
24	Sweeping (medium), UK BS5839-1	1000 Hz / 800 Hz, 0,5 s, 0,5 s	29	5
25	Sweeping	2900 Hz / 2400 Hz, 0,5 s, 0,5 s	29	5
26	Simulated bell	1450 Hz, 0,69 ms	2	15
27	Continuous tone	800 Hz	26	5
28	Continuous tone	440 Hz	2	5
29	Sweeping (fast), UK BS5839-1	1000 Hz / 800 Hz, 70 ms, 70 ms	7	5
30	Interrupted tone, Australia AS2220, AS1610, AS1670	420 Hz, 0,625 s, 0,625 s	32	26
31	Sweeping	1200 Hz / 660 Hz, 10 ms, 10 ms	26	5
32	Slow whoop, Australian evacuation alarm AS2220	1200 Hz / 500 Hz, 3,75 s, 0,25 s	30	26

Tone table SON F1

Tone	Description - Frequency		Stage 2
1	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	1000 Hz / 800 Hz, 0,25 s, 0,25 s, EN54-3	8
2	Slow whoop, evacuation alarm Netherlands NEN 2575	1200 Hz / 500 Hz, 3,5 s, 0,5 s, EN54-3	1
3	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz / 500 Hz, 1 s, EN54-3	8
4	Alternating tone, France NFS 32-001 (fire alarm)	554 Hz / 440 Hz, 0,1 s, 0,4 s, EN54-3	9
5	Simulated bell	1450 Hz, 0,69 ms	1
6	Sweeping (fast), UK BS5839-1	1000 Hz / 800 Hz, 70 ms, 70 ms	8
7	Slow whoop, Australian evacuation alarm AS2220	1200 Hz / 500 Hz, 3,75 s, 0,25 s	10
8	Continuous tone	1000 Hz	-
9	Continuous tone	554 Hz	-
10	Interrupted tone, Australia AS2220, AS1610, AS1670	420 Hz, 0,625 s, 0,625 s	-

Ordering details

Article numbers	SON 2			SON F1
Rated voltage	230 V AC	115 V AC	24 V DC	24 V DC
	232 20 10 0 010	232 20 15 0 010	232 20 80 0 010	232 50 80 0 010

Article numbers for other voltages and versions on request

Options / Accessories

c UL us

Sounders 105 / 110 dB(A)
DS 5 / DS 10



The sounders from the DS 10 / DS 5 series can be used for tough demands under industrial conditions and as universal alarms. The sounders, which are suitable for use both indoors and outdoors, generate warning signals in 31 different tones can be selected with the aid of an internal switch. Optionally, a maximum of 3 additional tones can be switched to by means of an external controller. In addition to the factory settings, the tone combination can be individually selected by means of on-site programming (tone 32).
Custom versions are available for special applications. The GL version is especially resistant to shock and vibration.

- volume control (DS 5)

DS 5	DS 10					
r = 32 m	r = 56 m	IP 66 IP 67	EN 54-3	VdS G28609	+ 55 °C / - 40 °C	
max. signal reception range	max. signal reception range	Protection system	Standard	Standard	Operating temperature	Acoustic penetration

Electrical data	DS 5					
Rated voltage	230 V AC	115 V AC	24 V AC	12 V DC	24 V DC	48 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz			
Operating range	195 – 253 V	95 – 127 V	19 – 29 V	10 – 15 V	19 – 29 V	41 – 53 V
Nominal current consumption	0.03 A	0.06 A	0.28 A	0.28 A	0.28 A	0.28 A
Electrical data	**DS 10**					
Rated voltage	230 V AC	115 V AC	24 V AC	12 V DC	24 V DC	48 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz			
Operating range	195 – 253 V	95 – 127 V	19 – 29 V	10 – 15 V	19 – 29 V	41 – 53 V
Nominal current consumption	0.06 A	0.12 A	0.42 A	0.3 A	0.42 A	0.42 A

Mechanical data		DS 5	DS 10
Sound pressure level		105 dB (A)	110 dB (A)
Sound level reduction		by - 20 dB via potentiometer (optional)	
Operating temperature		- 40 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 66, IP 67	
Duty cycle		100%	
Material		die-cast aluminium GD-Al Si12 Cu	
Surface coating		epoxy resin paint RAL 3000, flame red	
Cable bushing		2 x M20 (1 x chrome-plated brass cable fitting, 1 x chrome-plated brass blanking plug)	
Clamping range of the cable fitting		8 – 12 mm	
Connecting terminals		max. 2.5 mm²	
Weight	AC	2.15 kg	
	DC	1.95 kg	

Options / Accessories

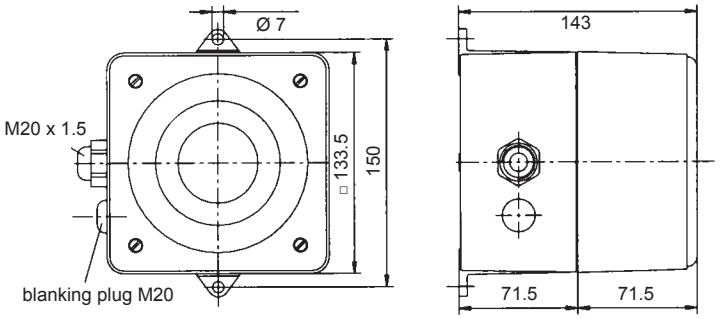
External tone selection (2 variants) for controlling several tones over great distances:
1: for all voltages = potential-free NO function
2. for 12 V / 24 V = voltage input

GOST

GL
30457-83-HH

C UL US

Dimensions



Tone table

Tone	Description - Basic tone (preset: tone no. 1)	Stage 2	3	4
0	no tone	1	5	4
1	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	3	2	4
2	Interrupted tone, ISO 8201 (emergency evacuation signal)	1	4	3
3	Alternating tone	1	2	4
4	Continuous tone, UK BS5839-1	1	3	5
5	Interrupted tone	1	4	3
6	Sweeping	1	4	9
7	Alternating tone, France NFS 32-001 (fire alarm)	3	10	4
8	Interrupted tone, Sweden SS031711 (emergency signal)	2	3	4
9	Interrupted tone (fast), horn	1	3	4
10	Continuous tone	27	9	26
11	Continuous tone	1	17	9
12	Continuous tone	27	9	26
13	Continuous tone	1	5	3
14	Continuous tone	1	4	10
15	Interrupted tone	1	24	12
16	Interrupted tone	1	24	15
17	Interrupted tone	1	11	9
18	Interrupted tone	19	7	4
19	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	27	13	23
20	Interrupted tone, IMO SOLAS III/50 + SOLAS III/6.4 (general alarm)	9	21	26
21	Interrupted tone, IMO (leave ship)	20	9	26
22	Slow whoop, evacuation alarm Netherlands NEN 2575	19	14	2
23	Siren	27	12	2
24	Alternating tone	1	16	12
25	Alternating tone	1	14	5
26	Alternating tone	4	9	27
27	Siren	13	23	19
28	Sweeping	7	10	4
29	Pulsating tone, industrial alarm Germany	1	30	9
30	Interrupted tone, industrial alarm (Germany)	1	4	26
31	Sweeping, France NFC48-265	3	14	4
32	selection of available tone combinations in stages 2, 3 and 4			

Ordering details

Article numbers		DS 5			DS 10		
Version	Rated voltage	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
Standard		231 06 10 0 000	231 06 15 0 000	231 06 80 0 000	231 11 10 0 000	231 11 15 0 000	231 11 80 0 000
GL		231 06 10 0 001	231 06 15 0 001	231 06 80 0 001	231 11 10 0 001	231 11 15 0 001	231 11 80 0 001
LSR (volume control)		231 06 10 0 151	231 06 15 0 151	231 06 80 0 151			
TAS (external tone selection via closed function of the control voltage)		231 06 10 0 152	231 06 15 0 152	231 06 80 0 152	231 11 10 0 152	231 11 15 0 152	231 11 80 0 152

Article numbers for other voltages and versions on request

Conformity to standards

DIN EN 54-3: 2001 + DIN EN 54-3/A1: 2001	Fire alarm systems - part 3: fire alarm devices; Audible signaling devices and annex A1
EN 50 130-4: 1996	Stability of system components for fire and burglar alarm systems
EN 61 000-6-2	EMV, stability for industrial areas
EN 61 000-6-3	EMV, emission standard for residential commercial, and light-industrial environments
EN 60 947-1: 2003	Low voltage switchgear standard
EN 60 529: 2000	Protection system by enclosure (IP code)
DIN EN ISO 7731	Ergonomic – alarms for public areas and workplaces – acoustic alarms
DIN 33 404/3: 1982	Alarms for workplaces, unified emergency signal
ISO 8201: 1987	Evacuation alarm
DIN EN 981: 1997	System of acoustic and visual alarm signals and information signals
ISO 11 429: 1996	System of acoustic and visual alarm signals and information signals

Sounder 105 dB(A)
DS 5-DN



- sounder with 2 externally controllable volume levels
- wherever sounders need to be operated virtually 24 hours a day for alarm purposes, e.g. in port areas, container terminals, conveyor belts in coal mines or for supplying power stations, it is important to disturb local residents as little as possible. This is especially the case in the evening and at night, when the ambient noise level is also lower.
- can also be used to avoid startled reactions by starting the alarm with a reduced sound level and increasing it in steps (soft alarm)
- the sound level can be reduced by an external controller or via a floating contact
- the reduction may be preselected during the installation in accordance with local conditions (0 to - 20 dB)



max. signal reception range



Protection system



Operating temperature




Acoustic penetration

Electrical data	DS 5-DN					
Rated voltage	230 V AC	115 V AC	24 V AC	12 V DC	24 V DC	48 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz			
Operating range	195 – 253 V	95 – 127 V	19 – 29 V	10 – 15 V	19 – 29 V	41 – 53 V
Nominal current consumption	0.03 A	0.06 A	0.28 A	0.28 A	0.28 A	0.28 A

Mechanical data		DS 5-DN
Sound pressure level		105 dB (A)
Sound level reduction		externally adjustable up to - 20 dB via potentiometer
Alarm tones		32 tones (see tone table page 133)
Operating temperature		- 40 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 66, IP 67
Duty cycle		100%
Material		die-cast aluminium GD-Al Si12 Cu
Surface coating		epoxy resin paint RAL 3000, flame red
Cable bushing		2 x M20 (1 x chrome-plated brass cable fitting, 1 x chrome-plated brass blanking plug)
Clamping range of the cable fitting		8 – 12 mm
Connecting terminals		max. 2.5 mm²
Weight	AC	2.15 kg
	DC	1.95 kg

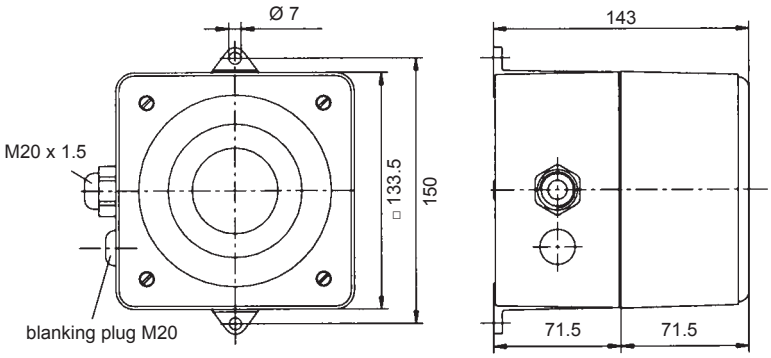
Options / Accessories



External tone selection (2 variants) for controlling several tones over great distances:
1: for all voltages = potential-free NO function
2. for 12 V / 24 V = voltage input


GOST

Dimensions





Ordering details

Article numbers		DS 5-DN		
Version	**Rated voltage**	230 V AC	115 V AC	24 V DC
Standard		231 06 10 0 163	231 06 15 0 163	231 06 80 0 163
TAS (external tone selection via closed function of the control voltage)		231 06 10 0 162	231 06 15 0 162	231 06 80 0 162

Article numbers for other voltages and versions on request

Conformity to standards

EN 61 000-6-2	EMV, stability for industrial areas
EN 61 000-6-3	EMV, emission standard for residential commercial, and light-industrial environments
EN 60 947-1: 2003	Low voltage switchgear standard
EN 60 529: 2000	Protection system by enclosure (IP code)
DIN EN ISO 7731	Ergonomic – alarms for public areas and workplaces – acoustic alarms
DIN 33 404/3: 1982	Alarms for workplaces, unified emergency signal
ISO 8201: 1987	Evacuation alarm
DIN EN 981: 1997	System of acoustic and visual alarm signals and information signals
ISO 11 429: 1996	System of acoustic and visual alarm signals and information signals

Sounders PATROL series 100 / 105 dB(A)
PA 1 / PA 5



PATROL - the new generation of sounders.

Three dimensional innovation;

- safe; an incorrect installation is virtually impossible
- easy; significantly shorter assembly and installation times
- economical; extremely high efficiency and good penetration of acoustical obstacles significantly reduce the required number of sounders

PA 1 — r = 18 m — max. signal reception range

PA 5 — r = 32 m — max. signal reception range

IP 66 — Protection system

+ 55 °C / - 40 °C — Operating temperature

Acoustic penetration

EN 54-3 — 24–48 V DC

VdS — 24–48 V DC

UL

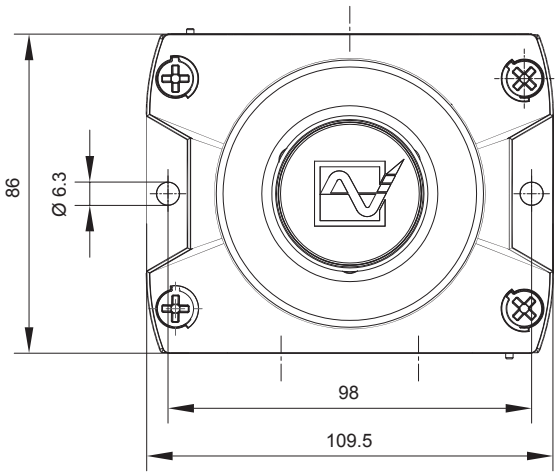
Electrical data	PA 1			
Rated voltage	230 V AC	115 V AC	24 V AC	10 – 57 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	
Operating range	195 – 253 V	95 – 127 V	18 – 30 V	10 – 57 V
Nominal current consumption	9 – 15 mA	8 – 30 mA	59 – 120 mA	6 – 80 mA
Electrical data	**PA 5**			
Rated voltage	230 V AC	115 V AC	24 V AC	10 – 57 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	
Operating range	± 10%	± 10%	± 10%	10 – 57 V
Nominal current consumption [1]	9 – 15 mA	8 – 30 mA	59 – 120 mA	6 – 80 mA

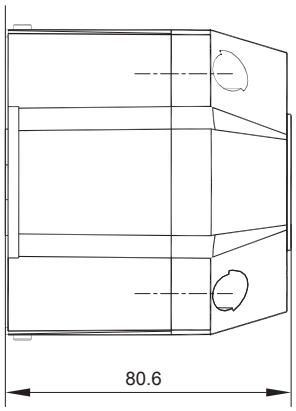
[1] power consumption dependent on operating voltage

Mechanical data		PA 1	PA 5
Sound pressure level		100 dB (A)	105 dB (A)
Sound level reduction		max. - 16 dB via potentiometer	
Alarm tones		80 (see tone table page 140/141)	
Operating temperature		- 40 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 66	
Protection class		II	
Duty cycle		100%	
Material		PC / ABS blend	
Colour		similar to RAL 3000 (flame red) / RAL 7035 (light grey) / RAL 9003 (signal white)	
Cable entry		3 x M20 knock-outs on side, 1 knock-out on back	5 x M20 knock-outs on side, 1 knock-out on back
Integrated seal with cable entry		6 – 13 mm (feed-through grommet)	
Connecting terminals		2.5 mm² fine wire with cable end sleeve, AWG 16	
Weight	AC	405 g	778 g
	DC	270 g	643 g

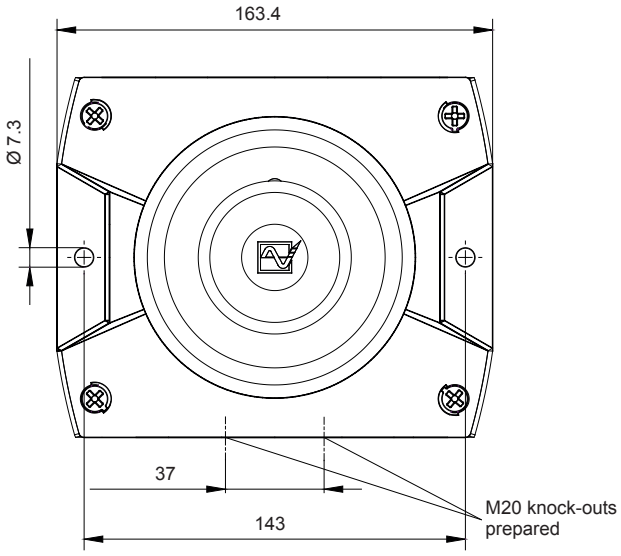
Dimensions

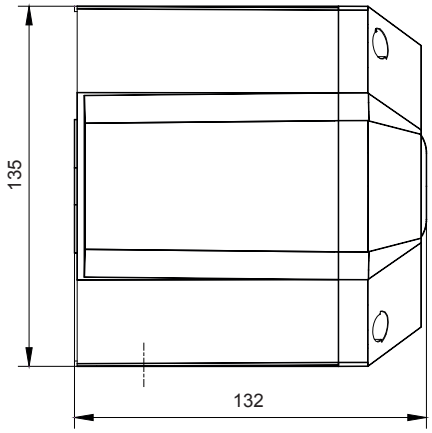
PA 1





PA 5





Ordering details

Article numbers		PA 1			PA 5		
Version	**Rated voltage**	230 V AC	115 V AC	10-57 V DC	230 V AC	115 V AC	10-57 V DC
Standard	**housing red**	233 10 10 0 000	233 10 15 0 000	233 10 63 0 000	233 50 10 0 000	233 50 15 0 000	233 50 63 0 000
GL	**housing red**	233 10 10 0 001	233 10 15 0 001	233 10 63 0 001	233 50 10 0 001	233 50 15 0 001	233 50 63 0 001
Standard	**housing grey**	233 10 10 0 055	233 10 15 0 055	233 10 63 0 055	233 50 10 0 055	233 50 15 0 055	233 50 63 0 055
GL	**housing grey**	233 10 10 0 056	233 10 15 0 056	233 10 63 0 056	233 50 10 0 056	233 50 15 0 056	233 50 63 0 056

Article numbers for other voltages and versions on request

Options / Accessories

GL

Enclosure fitting

Surface gasket

Tamper-proof sealing

Panel mounting kit

SSM
(only for 24 V DC)

See page 141 for further information

Conformity to standards

The acoustic parameters conform to the European standard DIN EN ISO 7731;
"Ergonomic – alarm signals for public areas and workplaces – acoustic alarm signals".

The requirement for an acoustic alarm signal can be found in the harmonised standards:

EN 60204-1	Electrical equipment of machines
EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837

Sounders PATROL series 110 / 120 dB(A)
PA 10 / PA 20



PATROL - the new generation of sounders.

Three dimensional innovation;

- safe; an incorrect installation is virtually impossible
- easy; significantly shorter assembly and installation times
- economical; extremely high efficiency and good penetration of acoustical obstacles significantly reduce the required number of sounders

PA 10
r = 56 m
max. signal reception range

PA 20
r = 178 m
max. signal reception range

IP 66
Protection system

+ 55 °C
- 40 °C
Operating temperature

Acoustic penetration

EN 54-3
24–48 V DC
115–230 V AC

VdS
24–48 V DC
115–230 V AC

UL

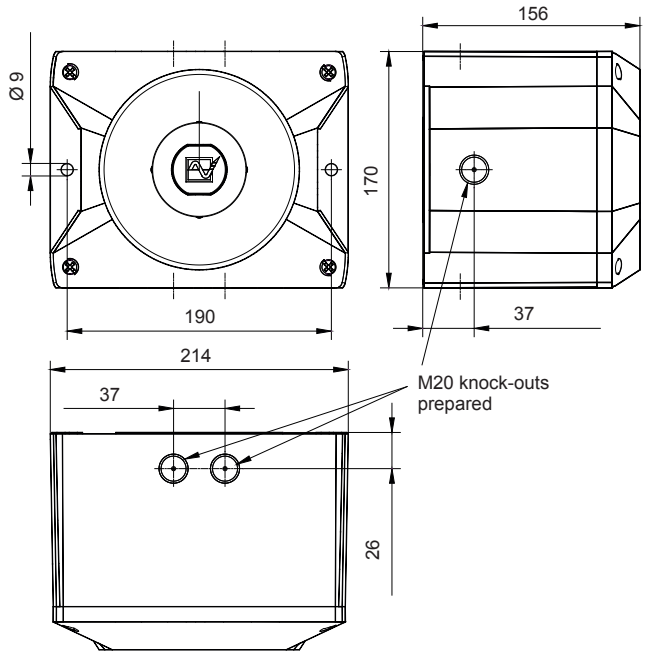
Electrical data	PA 10		
Rated voltage	95 – 265 V AC	24 V AC	10 – 60 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	
Operating range	95 – 265 V	20 - 30 V	10 – 60 V
Nominal current consumption	20 – 115 mA	250 – 900 mA	60 – 485 mA
Electrical data	**PA 20**		
Rated voltage	95 – 265 V AC	24 V AC	10 – 60 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	
Operating range	95 – 265 V	20 - 30 V	10 – 60 V
Nominal current consumption [1]	75 – 330 mA	500 – 1 800 mA	120 – 880 mA

[1] power consumption dependent on operating voltage

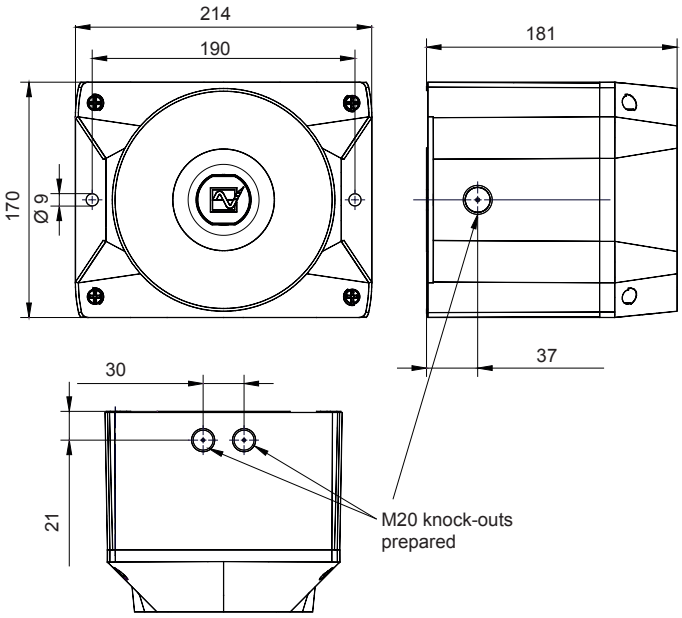
Mechanical data		PA 10	PA 20
Sound pressure level		110 dB (A)	120 dB (A)
Sound level reduction		max. - 12 dB via potentiometer	
Alarm tones		80 (see tone table page 140/141)	
Duty cycle		100%	
Operating temperature		- 40 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 66	
Protection class		II	
Material		PC / ABS blend	
Colour		similar to RAL 3000 (flame red) / RAL 7035 (light grey) / RAL 9003 (signal white)	
Cable entry		5 x M20 knock-outs on side, 1 knock-out on back	
Integrated seal with cable entry		6 – 13 mm (feed-through grommet)	
Connecting terminals		2.5 mm² fine wire with cable end sleeve, AWG 16	
Weight	AC	1 060 g	1 200 g
	DC	1 050 g	1 090 g

Dimensions

PA 10



PA 20



Ordering details

Article numbers		PA 10			PA 20		
Version	**Rated voltage**	95-265 V AC	24 V AC	10-60 V DC	95-265 V AC	24 V AC	10-60 V DC
Standard	**housing red**	233 60 64 0 000	233 60 30 0 000	233 60 63 0 000	233 70 64 0 000	233 70 30 0 000	233 70 63 0 000
GL	**housing red**	233 60 64 0 001	233 60 30 0 001	233 60 63 0 001	233 70 64 0 001	233 70 30 0 001	233 70 63 0 001
Standard	**housing grey**	233 60 64 0 055	233 60 30 0 055	233 60 63 0 055	233 70 64 0 055	233 70 30 0 055	233 70 63 0 055
GL	**housing grey**	233 60 64 0 056	233 60 30 0 056	233 60 63 0 056	233 70 64 0 056	233 70 30 0 056	233 70 63 0 056

Article numbers for other voltages and versions on request

Options / Accessories

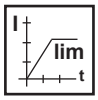
GL

Enclo-sure fitting

Surface gasket

Tamper-proof sealing

Panel mount-ing kit



SSM
(only for 24 V DC)

See page 141 for further information

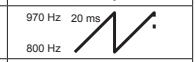
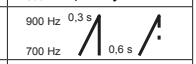
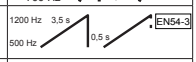
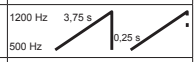
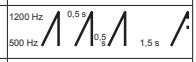
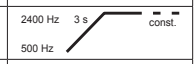
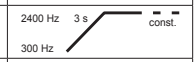
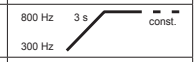
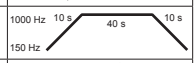
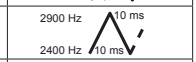
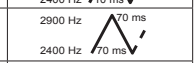
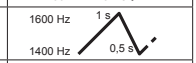
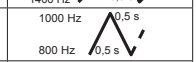
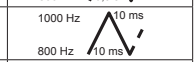
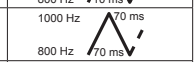
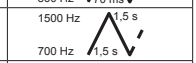
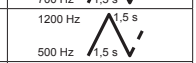
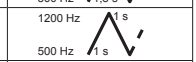
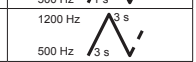
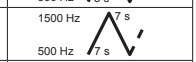
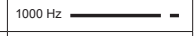
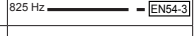
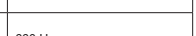
Conformity to standards

The acoustic parameters conform to the European standard DIN EN ISO 7731;
"Ergonomic – alarm signals for public areas and workplaces – acoustic alarm signals".

The requirement for an acoustic alarm signal can be found in the harmonised standards:

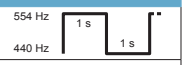
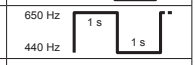
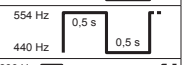
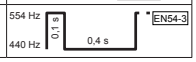
EN 60204-1	Electrical equipment of machines
EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837

Tone table PA 1 / PA 5 / PA 10 / PA 20

Basic tone no.	Description	
1	no tone	
2	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	
9	Slow whoop, fire alarm, UK BS5839-1	
11	Interrupted tone (fast)	
13	Interrupted tone	
15	Slow whoop, evacuation alarm Netherlands NEN 2575	
16	Slow whoop, Australian evacuation alarm AS2220	
18	Slow whoop, NFPA	
22	Pulsating tone, Australien alert AS1670, ISO8201	
23	Siren	
24	Siren	
25	Siren	
26	Pulsating tone, industrial alarm Germany	
27	Sweeping	
29	Sweeping (fast)	
30	Sweeping	
31	Sweeping, France NFC48-265	
33	Sweeping (medium), UK BS5839-1	
34	Sweeping (fast)	
35	Sweeping (fast), UK BS5839-1	
36	Sweeping	
43	Sweeping	
44	Sweeping, IMO 3d, Germany KTA3901 evacuation alarm	
45	Sweeping	
46	Sweeping, general alarm Finland	
52	Continuous tone	
53	Continuous tone	
54	Continuous tone, Finland (all-clear signal)	
55	Continuous tone, PFEER gasalarm	
56	Continuous tone	
57	Continuous tone, UK BS5839-1	
59	Continuous tone	
60	Continuous tone	
61	Continuous tone	
63	Continuous tone	
65	Continuous tone, Sweden SS031711 (all-clear signal)	
66	Continuous tone	
67	Continuous tone, Germany KTA3901 (all-clear signal)	
68	Continuous tone	

Basic tone no.	Description	
69	Continuous tone	
71	Continuous tone	
77	Interrupted tone	
82	Interrupted tone, PFEER (general alarm), UK BS5839-1 (back-up alarm)	
83	Interrupted tone, PFEER (general alarm)	
88	Interrupted tone	
90	Interrupted tone	
91	Interrupted tone	
92	Interrupted tone	
93	Interrupted tone (fast), electromechanical horn	
97	Interrupted tone	
98	Interrupted tone, Sweden SS031711 (emergency signal)	
100	Interrupted tone, industrial alarm (Germany)	
101	Interrupted tone, Sweden SS031711 (important message (pres-mess))	
102	Interrupted tone, Sweden SS031711 (local warning)	
103	Interrupted tone, Sweden SS031711 (air raid warning)	
104	Interrupted tone, Sweden SS031711 (emergency signal)	
107	Interrupted tone, Germany KTA3901 (evacuation alarm)	
109	Interrupted tone, Australia AS2220, AS1610, AS1670	
110	Interrupted tone, (fast variable), bell	
111	Interrupted tone, ISO8201 (emergency evacuation signal), USA (evacuation alarm)	
112	Interrupted tone, ISO8201 (emergency evacuation signal)	
113	Interrupted tone, ISO8201 (emergency evacuation signal), sweeping	
115	Interrupted tone, IMO (telephone call)	
116	Interrupted tone, IMO (leave ship)	
117	Interrupted tone, IMO SOLAS III/50 + SOLAS III/6.4 (general alarm)	
122	Alternating tone	
123	Alternating tone	
124	Alternating tone, Singapore	
125	Alternating tone	
128	Alternating tone	
130	Alternating tone, UK BS5839-1 (fire alarm)	
131	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	
135	Alternating tone, UK BS5839-1 (fire alarm, increased urgency - railway crossing)	
142	Alternating tone	

Tone table PA 1 / PA 5 / PA 10 / PA 20

Basic tone no.	Description		Basic tone no.	Description	
143	Alternating tone, industrial alarm (Germany)		147	Alternating tone, Sweden SS031711	
144	Alternating tone		148	Alternating tone, Sweden SS031711	
146	Alternating tone, France NFS 32-001 (fire alarm)		152	Alternating tone (two tone chime)	

Control of the tones

Tone selection switch/DIP-Switch (setting of basic tone)							External tone selection		
							C1	C2	C1+C2
1	2	3	4	5	6	Basic tone no.	Tone no.		
						1	2	88	57
ON						2 *	128	112	57
	ON					2	26	100	93
ON	ON					2	61	131	112
		ON				9	57	11	82
ON		ON				15	131	52	112
	ON	ON				16	109	52	56
ON	ON	ON				18	111	57	68
			ON			22	16	109	68
ON			ON			23	131	52	112
	ON		ON			24	131	52	131
ON	ON		ON			25	131	52	92
		ON	ON			26	2	100	93
ON		ON	ON			27	123	52	92
	ON	ON				29	35	52	61
ON	ON	ON				30	27	52	77
				ON		31	131	52	57
ON				ON		33	30	52	35
	ON			ON		34	35	52	93
ON	ON			ON		35	27	52	110
		ON		ON		36	146	67	57
ON		ON		ON		43	131	52	91
	ON	ON		ON		45	2	57	93
ON	ON	ON		ON		52	15	65	82
			ON	ON		54	46	54	131
ON			ON	ON		55	131	52	128
	ON		ON	ON		56	82	35	33
ON	ON		ON	ON		59	143	59	101
			ON	ON		60	131	52	125
ON		ON	ON	ON		65	131	52	93
	ON	ON	ON	ON		66	110	52	107
ON	ON	ON	ON	ON		69	131	52	110

Tone selection switch/DIP-Switch (setting of basic tone)							External tone selection		
							C1	C2	C1+C2
1	2	3	4	5	6	Basic tone no.	Tone no.		
					ON	71	131	52	93
ON					ON	77	61	52	122
	ON				ON	82	131	52	83
ON	ON				ON	83	56	2	82
		ON			ON	88	2	57	128
ON		ON			ON	90	131	52	125
	ON	ON			ON	91	30	52	110
ON	ON	ON			ON	92	33	52	57
			ON		ON	93	2	128	57
ON			ON		ON	97	2	63	93
	ON		ON		ON	100	131	52	125
ON	ON		ON		ON	101	98	102	65
		ON	ON		ON	103	131	65	147
ON		ON	ON		ON	104	103	65	101
	ON	ON	ON		ON	109	16	52	22
ON	ON	ON	ON		ON	110	131	61	91
				ON	ON	112	2	57	128
ON				ON	ON	113	52	123	104
	ON			ON	ON	115	117	116	44
ON	ON			ON	ON	116	117	93	125
		ON		ON	ON	117	93	116	125
ON		ON		ON	ON	123	27	52	77
	ON	ON		ON	ON	124	53	83	2
ON	ON	ON		ON	ON	130	2	107	67
			ON	ON	ON	131	2	112	57
ON			ON	ON	ON	135	16	56	109
	ON		ON	ON	ON	142	2	54	88
ON	ON		ON	ON	ON	143	59	93	33
		ON	ON	ON	ON	144	110	61	2
ON		ON	ON	ON	ON	146	31	67	57
		ON	ON	ON	ON	148	131	52	92
ON	ON	ON	ON	ON	ON	152	110	61	13

* factory setting

Accessories

Ordering details

Article numbers		PA 1	PA 5	PA 10 / PA 20
Enclosure fitting	For connection (daisy-chaining) of several sounders of the PATROL series	283 00 00 0 003		
Surface gasket	Sealing of the sounder installation surface when, e.g. cable entry is executed from the back.	283 00 00 0 004	283 00 00 0 005	283 00 00 0 006
Tamper-proof sealing (pack of 4)	Anti-tamper sealing for fasteners of the PATROL devices after installation in order to prevent manipulation of the devices.	283 00 00 0 002		
Panel mount installation kit PATROL	The PATROL devices are also suitable for panel mounting. This kit consists of a plug connector for the electrical contact, as well as all installation materials.	283 00 00 0 007	283 00 00 0 008	283 00 00 0 009

Sounder 130 dB(A)
PA 130



- secure alarming in the loudest environments and over large areas
- also dimensioned for use as warning devices in civil defence
- with just one sounder, reaction to the most diverse alarm situations is possible by means of remote control of up to 9 of currently 80 pre-installed tones
- integrated self-monitoring, test function and malfunction message relay
- maintenance-free
- power-saving standby mode with automatic self-test function
- suitable for indoor and outdoor operation
- switchable 4.7 kOhm terminal resistor for cable monitoring

optionally avaibale:

- voice transmisssion possible via audio input
- can be mounted in a cluster by means of stable mast holder



max. signal reception range



Protection system



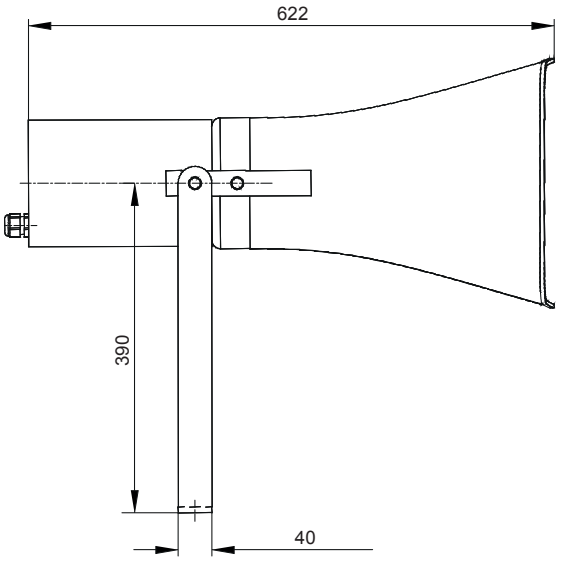
Operating temperature

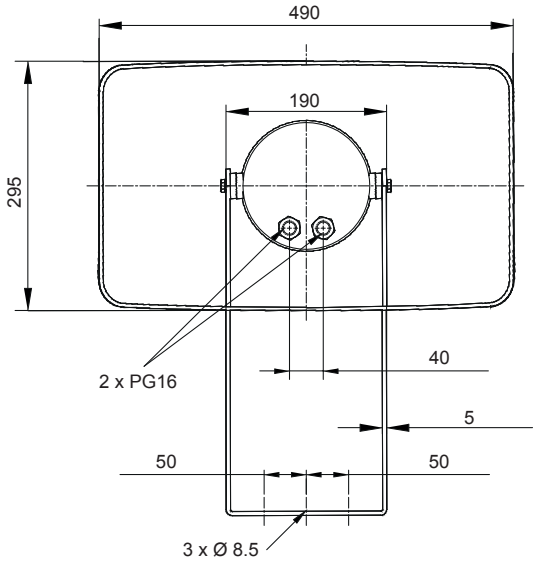


Electrical data		PA 130	
Rated voltage		230 V AC	20-60 V DC
Rated frequency		50 / 60 Hz	
Operating range		- 25% / + 15%	20 V – 60 V
Nominal current consumption		1 A	4 A
	in standby mode	< 15 mA	< 40 mA
Malfunction message relay/auxiliary relay		0.5 A, 50 V / NO or NC potential free, configurable	

Mechanical data		PA 130
Sound pressure level		130 dB (A)
Alarm tones		80, incl. DIN tone
Remote controlled tones		9 tones, externally controllable
Operating temperature		- 20 °C ... + 50 °C
Storage temperature		- 20 °C ... + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 54
Material	housing - horn	MOPLEN plastic, light grey
	housing - circuitry	aluminium, painted in light grey
Cable entry		2 x PG16 for simple series connection of up to 4 sounders
Type of connection		2 x 2.5 mm^2
Weight	AC	7.45 kg
	DC	5.85 kg

Dimensions





Ordering details

Article numbers	PA 130	
Rated voltage	230 V AC	20–60 V DC
	230 26 10 0 000	230 26 91 0 000

Options / Accessories

GOST

Sounders 105 / 110 dB(A)
DS 5-SIL / DS 10-SIL



- integrated safety tough demands under industrial conditions
- to signal dangerous situations in safety-relevant application such as process and plant safety, e.g.
  - leaks / gas warning
  - high-pressure / overfilling

  and machine safety, e.g. as
  - start-up warning
  - excess rotation speed warning
  - machine stop delay warning
- by means of integrated self-monitoring of the devices the normative required, regular inspection of warning devices is ensured
- the warning devices can be implemented in Safety Instrumented Systems (SIS) up to **SIL 2/PLd**

We would be more than happy to provide all safety-technical key data.

DS 5-SIL



max. signal reception range

DS 10-SIL



max. signal reception range



Protection system



Operating temperature

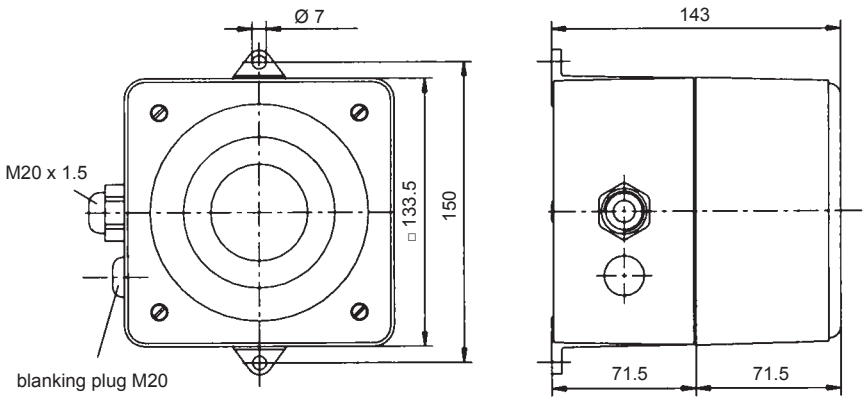


Acoustic penetration

Electrical data		DS 5-SIL			DS 10-SIL		
Rated voltage		230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
Rated frequency		50 / 60 Hz	50 / 60 Hz		50 / 60 Hz	50 / 60 Hz	
Operating range		195 – 253 V	95 – 127 V	19 – 29 V	195 – 253 V	95 – 127 V	19 – 29 V
Nominal current consumption		0.03 A	0.06 A	0.28 A	0.06 A	0.12 A	0.42 A
Diagnostics channel	current consumption	15 mA	15 mA	20 mA	15 mA	15 mA	20 mA
	switching power	230 V / 80 mA					

Mechanical data		DS 5-SIL	DS 10-SIL
Sound pressure level		105 dB (A)	110 dB (A)
Alarm tones		32 tones (see tone table page 133)	
Operating temperature		- 25 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 66, IP 67	
Duty cycle		100%	
Material		die-cast aluminium GD-Al Si12 Cu	
Surface coating		epoxy resin paint RAL 3000, flame red	
Cable bushing		2 x M20 (1 x chrome-plated brass cable fitting, 1 x chrome-plated brass blanking plug)	
Clamping range of the cable fitting		8 – 12 mm	
Connecting terminals		max. 2.5 mm²	
Weight	AC	2.15 kg	
	DC	1.95 kg	

Dimensions



Connection diagram

X1
Sounder channel

1	PE
2	PE
3	L/+ Operating voltage
4	L/+ Operating voltage
5	N/- Operating voltage
6	N/- Operating voltage

X2
optional external tone selection (option -TAS or -TAV)

1	L/+ Stage S2
2	L/+ Stage S2
3	L/+ Stage S3
4	L/+ Stage S3

X1
Monitoring channel

1	L/+ Operating voltage
2	L/+ Operating voltage
3	N/- Operating voltage
4	N/- Operating voltage
5	Alarm relay (MOS-Relay 230V~, 80mA, 35Ω,
6	Alarm relay conductive, if function
7	Alarm relay channel is acoustically
8	Alarm relay active)

Ordering details

Article numbers		DS 5-SIL			DS 10-SIL		
Version	**Rated voltage**	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
Standard		231 06 10 0 601	231 06 15 0 601	231 06 80 0 601	231 11 10 0 601	231 11 15 0 601	231 11 80 0 601
TAS (external tone selection via closed function of the control voltage)		231 06 10 0 603	231 06 15 0 603	231 06 80 0 603	231 11 10 0 603	231 11 15 0 603	231 11 80 0 603

Article numbers for other voltages and versions on request

Options / Accessories

External tone selection for controlling several tones over great distances

GOST

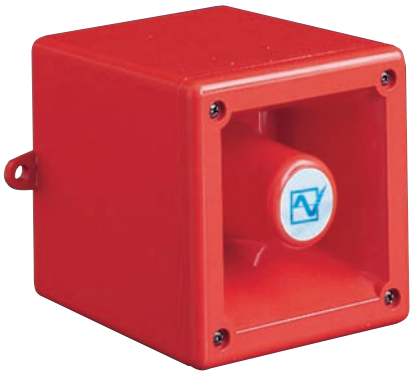
Conformity to standards

The sounders fulfill the requirements to the functional safety according to:
EN 61508 Functional safety of electrical/electronic/programmable electronic safety-related systems
EN 61511 Functional safety - Safety instrumented systems for the process industry sector

The devices can be used in safety related control systems in accordance with the following standards:
EN ISO 13849-1 Safety of machinery - Safety related parts of control systems – part 1
EN 62061 Safety of machinery - Functional safety of electrical/electronic/programmable electronic safety-related systems

The devices conform to the following standards:
EN 61310-1 Safety of machinery - Indication, marking and actuation - part 1: Requirements for visual, acoustic and tactile signals
EN ISO 7731 Ergonomic – alarms for public areas and workplaces – acoustic alarms
EN 981 Safety of machinery - System of acoustic and visual alarm signals and information signals
DIN 33404-1 Alarms for workplaces, uniform emergency signal
ISO 8201 Acoustics - Audible emergency evacuation signal

Sounder with speech reproduction 100 / 105 dB(A) PAS 106 / PAS 110



- easy text programming without programming device (integrated microphone)
- max. 16 seconds speech reproduction or two 8 seconds messages
- 9 different tones (DIN tone)
- volume control via potentiometer up to - 20 dB (A)
- combinaton of tone / spoken message
- precice definition of alarms and warnings
- low power consumption, therefore long alarm durations possible using emergency voltage
- suitable for UPS systems due to 24V rated voltage
- playback of behavioural rules
- no PA system required for speech reprodction

PAS 106



max. signal reception range

PAS 110



max. signal reception range



Protection system



Operating temperature

Electrical data	PAS 106			
Rated voltage	230 V AC	110 V AC	24 V DC	12 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz		
Operating range	± 10%	± 10%	18 – 30 V	9 – 15 V
Nominal current consumption	20 mA	40 mA	180 mA[1]	150 mA[1]
Electrical data	**PAS 110**			
Rated voltage	230 V AC	110 V AC	24 V DC	12 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz		
Operating range	± 10%	± 10%	18 – 30 V	9 – 15 V
Nominal current consumption	35 mA	70 mA	440 mA[1]	400 mA[1]

[1] at maximum volume

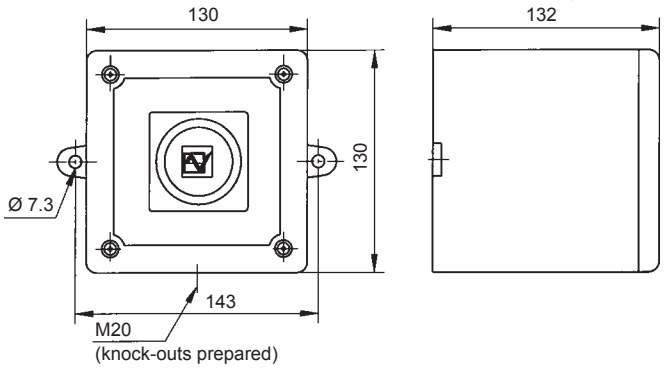
Mechanical data		PAS 106	PAS 110
Sound pressure level		105 dB (A), speech reproduction 5 dB lower	110 dB (A), speech reproduction 5 dB lower
Sound level reduction		by 20 dB via potentiometer	
Duty cycle		100%	
Operating temperature		- 25 °C ... + 55 °C	
Storage temperature		- 25 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 66	
Material		ABS, self-extinguishing, similar UL 94 VO	
Colour		similar to RAL 3000 (flame red), optionally grey or white	
Cable entry		M20 knock-outs prepared	
Weight	AC	1 kg	2.1 kg
	DC	0.75 kg	1.8 kg

Options / Accessories

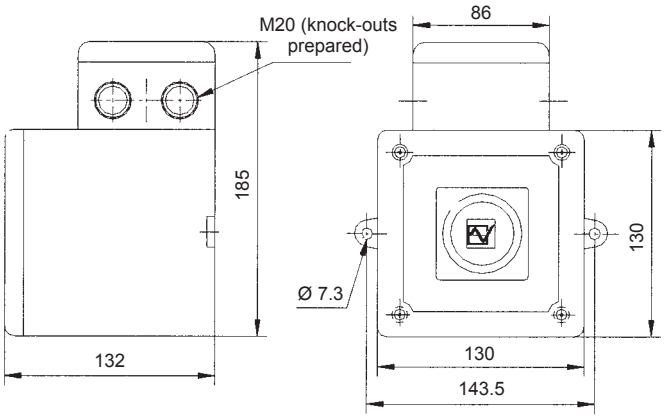
GOST

Dimensions

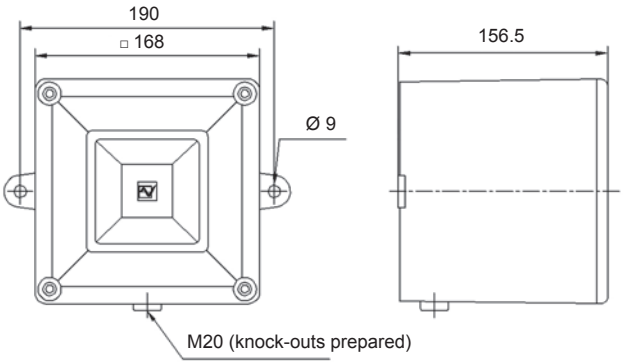
PAS 106 – DC



PAS 106 – AC



PAS 110



Tone table

Stage 1	Frequency description	Tone length	Stage 2
1	Alternating tone, UK BS5839-1 (fire alarm)	1000 Hz / 800 Hz, 0,5 s / 0,5 s	4 cycles	1
2	Slow whoop	1200 Hz / 500 Hz, 2,5 s / 0,5 s	2 cycles	2
3	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz / 500 Hz, 1 s, EN54-3	4 cycles	3
4	Alternating tone, France NFS 32-001 (fire alarm)	554 Hz / 440 Hz, 0,1 s, 0,4 s, EN54-3	4 cycles	4
5	Continuous tone	1000 Hz	3	5
6	Simulated bell	1450 Hz, 0,69 ms	7	6
7	Interrupted tone, PFEER (general alarm)	1000 Hz, 1 s / 1 s	3 cycles	7
8	Interrupted tone, Australia AS2220, AS1610, AS1670	420 Hz, 0,625 s / 0,625 s	4 cycles	8
9	Pulsating tone, Australien alert AS1670, ISO8201	1200 Hz / 500 Hz, 0,5 s, 0,5 s, 1,5 s	2 cycles	9
10	no tone - 0.5 s gap between messages or 2 s gap, if 2nd message option is selected			10

Important: total speech reproduction max. 16 s or 2 messages of max. 8 s each!

Ordering details

Article numbers

Rated voltage	230 V AC	110 V AC	24 V DC	12 V DC
PAS 106	230 81 10 0 029	230 81 16 0 029	230 81 80 0 029	230 81 85 0 029
PAS 110	230 85 10 0 029	230 85 16 0 029	230 85 80 0 029	230 85 85 0 029

Sounder with speech reproduction 100 dB (A) synchronised PAS 106 SYNC



- fully synchronised playback if several sounders are present; no synchronisaton cable required
- all sounders are programmed using the same memory module
- multiple re-programming possible
- user-defined text programmable in all languages
- 14 different tones (DIN tone)
- volume control: 3 settings and potentiometer
- max. 16 second tone playback at 3 different levels
- external tone selection
- excellent speech reproduction
- ideal for fire and evacuation alarms
- suitable for UPS systems due to 24V rated voltage
- low power consumption, hence long alarm durations possible using emergency voltage

r = 18 m
max. signal reception range

IP 66
Protection system

+ 55 °C
- 25 °C
Operating temperature

Electrical data		PAS 106 SYNC	
Rated voltage		230 V AC	24 V DC
Rated frequency		50 / 60 Hz	
Operating range		210 V – 253 V	10 – 30 V
Nominal current consumption	100 dB (A)	30 mA	< 130 mA
	97 dB (A)		< 80 mA
	94 dB (A)		< 50 mA

Mechanical data		PAS 106 SYNC
Sound pressure level		100 dB (A), speech reproduction approx. 3–5 dB (A) lower, selectable via jumper
Duty cycle		100%
Operating temperature		- 25 °C ... + 55 °C
Storage temperature		- 25 °C ... + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 66
Material		ABS, self-extinguishing, similar UL 94 VO
Colour		similar to RAL 3000 (flame red), optionally grey or white
Cable entry		M20
Weight	AC	1 kg
	DC	0.75 kg

Options / Accessories

GOST

Pro-gram-ming device

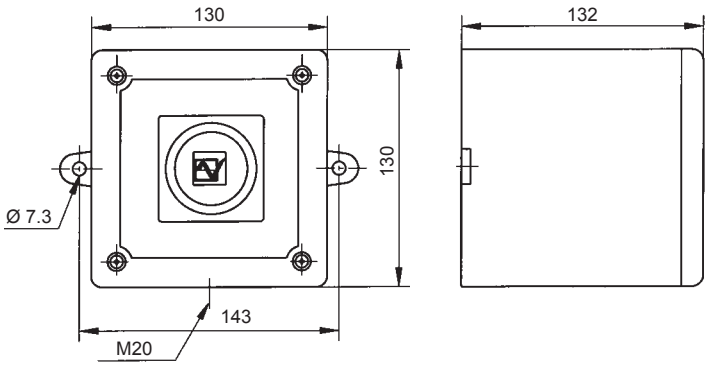
Microphone integrated, possible to connect an external sound source (availbale for weekly rental)

Article number:
293 23 00 0 000

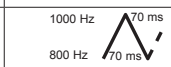
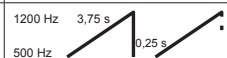
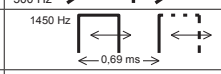
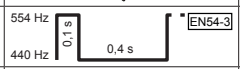
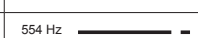
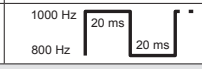
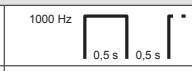
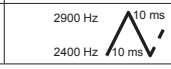
Memory module

Article number:
293 23 00 0 010

Dimensions



Tone table

Tone	Description		Stage 2 + 3 tone selection		
			Tone A	Tone B	Tone C
1	Pulsating tone, Australien alert AS1670, ISO8201		5	8	4
2	Slow whoop, evacuation alarm Netherlands NEN 2575		10	8	12
3	Sweeping (fast), UK BS5839-1		8	14	10
4	Slow whoop, Australian evacuation alarm AS2220		1	8	5
5	Simulated bell		10	13	2
6	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP		13	2	10
7	Alternating tone, France NFS 32-001 (fire alarm)		10	5	9
8	Continuous tone		10	11	5
9	Continuous tone		5	7	12
10	Alternating tone		8	6	11
tones 11 to 14 are only available for stage 2 or 3					
11	Interrupted tone, PFEER (general alarm), UK BS5839-1 (back-up alarm)		–	–	–
12	Continuous tone		–	–	–
13	Continuous tone		–	–	–
14	Sweeping (fast)		–	–	–

External tone / speech reproduction possible

	Stage 1	Stage 2	Stage 3	
Mode 1	tone - message 1	tone - message 2	tone - message 3	Stage 1 = factory setting Stage 2 & 3 can be selected externally via ground connection. Each stage can contain a different time interval.
Mode 2	message 1	message 2	message 3	
Mode 3	tone - message 1 - message 1	tone - message 2 - message 2	tone - message 2 - message 3	
	(tones 1–10 possible)	(tones 1–14 possible)		

Important: total speech reproduction max. 16 s!

Ordering details

Article numbers	PAS 106 SYNC	
Rated voltage	230 V AC	24 V DC
PAS 106 SNYC	230 81 10 0 027	230 81 80 0 027

Loudspeakers 122 dB(A)
PS15R / PS15B



- powerful loudspeakers, up to 122 dB (A)
- adjustable volume
- sturdy IP 54 implementation
- for industrial and workshop applications both indoors and outdoors
- excellent transmission of speech, music and tones



max. signal reception range



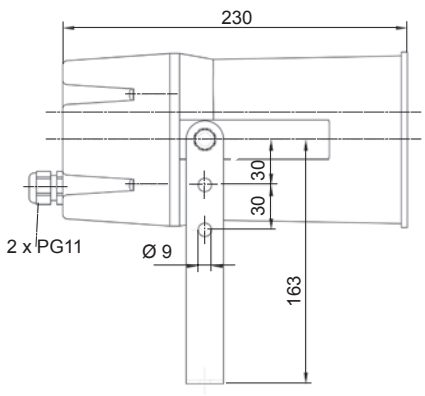
Protection system

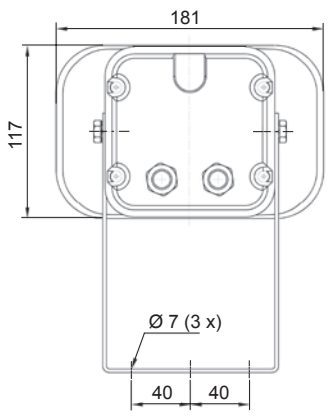


Operating temperature

Mechanical data		PS15R	PS15B
Sound pressure level		122 dB (A) @ 25 W	
Volume control		potentiometer	
Rated power		25 W	
Frequency range		350 Hz – 8 000 Hz	
Dispersion		90°	
Impedance		16 Ω	
Operating temperature		- 10 °C ... + 40 °C	
Storage temperature		- 30 °C ... + 60 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 54	
Duty cycle		100%	
Material	housing	acrylonitrile butadiene styrene (ABS)	
	mounting bracket	aluminium	
Colour		red	black
Type of connection		2 x max. 2.5 mm²	
Cable entry		2 x (1 x blanking plug enclosed) for cable Ø 6–11 mm	
Weight		1.6 kg	

Dimensions





Ordering details

Article numbers	PS15R	PS15B
	231 93 00 0 000	231 92 00 0 000

Loudspeaker 125 dB(A)
PS50B



- for industrial and workshop applications both indoors and outdoors
- adjustable volume
- powerful loudspeaker, up to 125 dB (A)
- transmission of music and tones
- sturdy IP 66 implementation



Range as per EN 54



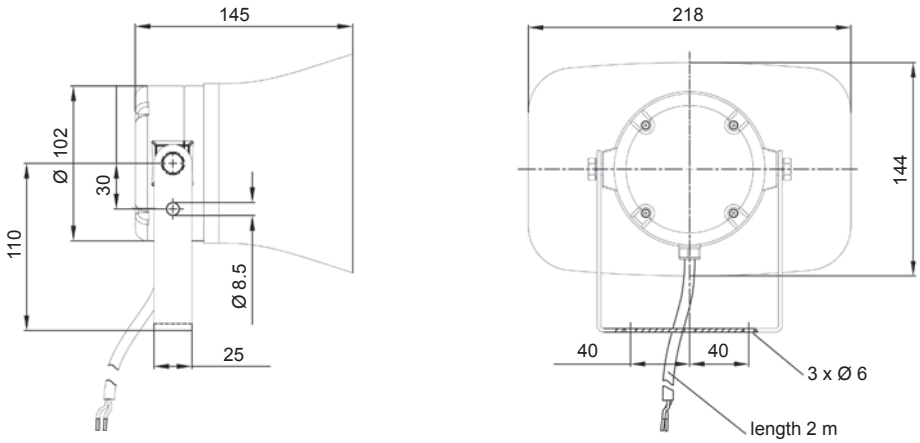
Protection system



Operating temperature

Mechanical data		PS50B
Sound pressure level		125 dB (A) @ 50 W
Rated power		50 W
Frequency range		600 Hz – 5 000 Hz
Dispersion		90°
Impedance		16 Ω
Operating temperature		- 25 °C ... + 50 °C
Storage temperature		- 30 °C ... + 60 °C
Relative humidity		100%
Protection system according to EN 60529		IP 66
Material	housing	polycarbonate (PC)
	mounting bracket	steel, galvanised
Colour		black
Type of connection		connecting cable (2 m)
Weight		1.3 kg

Dimensions



Ordering details

Article number	PS50B
	231 95 00 0 000

Panel Mount Buzzers
P 22 DBZ / P 28 DMC / P 28 DMB



- acoustic signaling device for 22.5 mm and 28.6 mm mounting holes
- available with 2 different types of signals in one device (continuous and pulsating tone)
- guaranteed high protection class (IP 65) to the housing
- also availbale wih easily adjustable volume control

P22 DBZ
r = 2 m
max. signal reception range

P28-Serie
r = 6 m
max. signal reception range

IP 65
Protection system

+ 50 °C
- 25 °C
Operating temperature

Electrical data	P 22 DBZ			
Rated voltage	24 V AC/DC	48 V AC/DC	115 V AC	230 V AC
Nominal current consumption	15 – 30 mA			

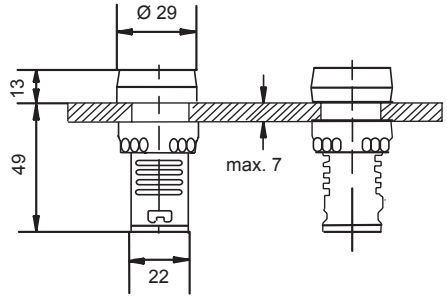
Electrical data	P 28 DMC948	P 28 DMC201	P 28 DMC301	P 28 DMB530
Rated voltage	48 V DC	110 V AC	230 V AC	30 V DC
Operating range	9 V – 48 V	30 V – 120 V	130 V – 230 V	5 V – 30 V
Nominal current consumption	5 mA @ 9 V 20 mA @ 48 V	7 mA @ 30 V 40 mA @ 120 V	20 mA @ 130 V 40 mA @ 220 V	2 mA @ 5 V 20 mA @ 30 V

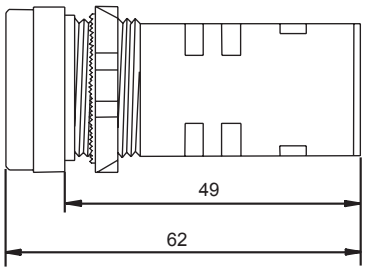
Mechanical data	P 22 DBZ	P 28 DMC948	P 28 DMC201	P 28 DMC301	P 28 DMB530
Operating mode	pulsating tone	continuous tone	continuous tone	continuous tone	continuous tone / pulsating tone
Sound pressure level	80 dB (A) @ 10 cm	91 dB (A) @ 48 V	91 dB (A) @ 120 V	91 dB (A) @ 230 V	91 dB (A) @ 30 V
Sound level reduction	–	up to 20 dB			
Duty cycle	> 50 000 hrs	> 50 000 hrs			
Operating temperature	- 25 °C ... + 50 °C	- 25 °C ... + 65 °C			
Storage temperature		- 40 °C ... + 85 °C			
Relative humidity	90% @ + 20 °C	90% @ + 40 °C			
Protection system according to EN 60529	IP 65	IP 65			
Material housing	polycarbonate (PC)	plastic “NORYL® N-190”, UL 49-VO, black			
Mounting	panel-mounting: Ø 22.5 mm	panel-mounting: Ø 28.6 mm			
Type of connection	screw terminals 1.5 mm²	quick connect blades, 6.3 mm wide, 0.8 mm thick			
Weight	30 g	40 g			

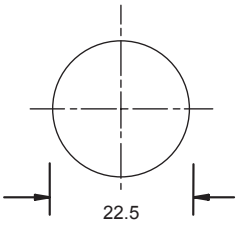
Dimensions

Panel cutouts

P 22 DBZ

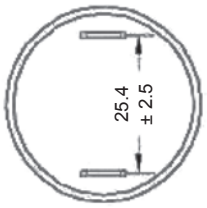




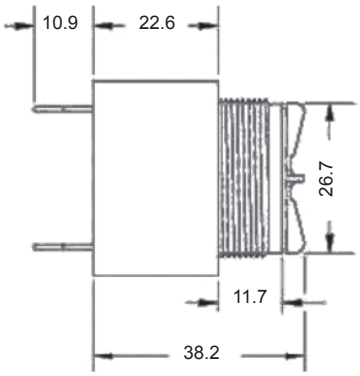


P 28 DMC948 / P 28 DMC201 / P 28 DMC301

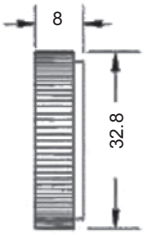
Rear view



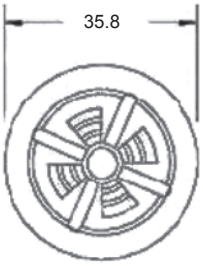
Side view

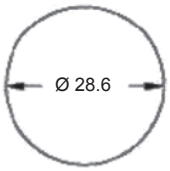


Ring



Front view

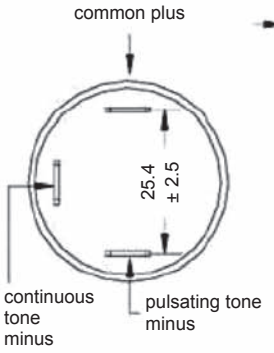




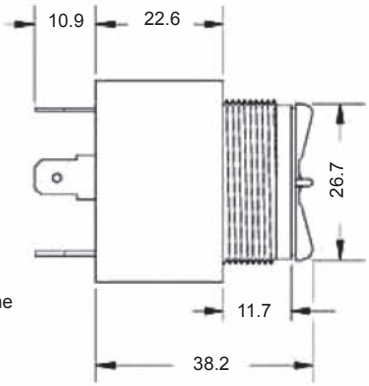
for mounting panels up to 6.3 mm thick

P 28 DMB530

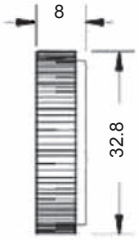
Rear view



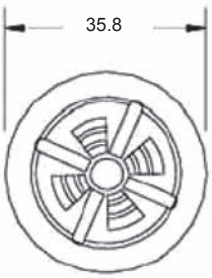
Side view

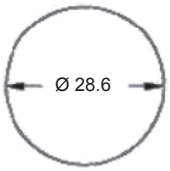


Ring



Front view





for mounting panels up to 6.3 mm thick

Ordering details

Article numbers	P 22 DBZ			
Rated voltage	24 V AC/DC	48 V AC/DC	115 V AC	230 V AC
	232 70 80 0 000	232 70 70 0 000	232 70 15 0 000	232 70 10 0 000
Article numbers	**P 28 DMC948**	**P 28 DMC201**	**P 28 DMC301**	**P 28 DMB530**
Rated voltage	48 V DC	110 V AC	230 V AC	30 V DC
	232 60 70 0 000	232 60 16 0 000	232 60 11 0 000	232 65 80 0 000

Options / Accessories

Label holder
25 x 10 mm
only for P 22 DBZ

Article number:
232 92 00 0 000

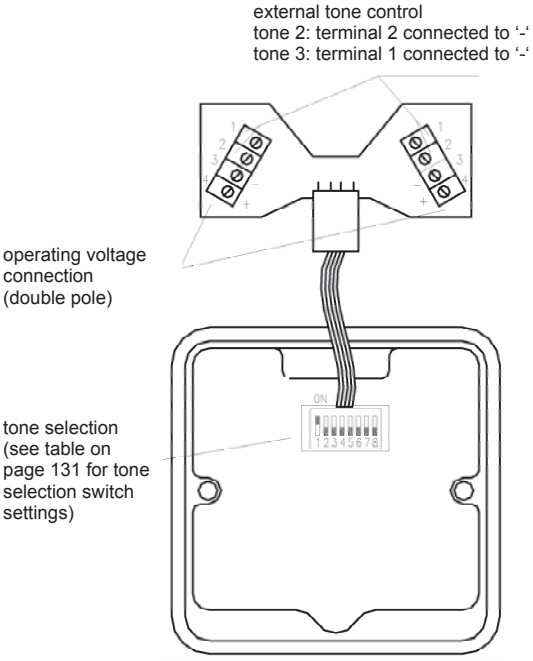
Label holder
25 x 18 mm
only for P 22 DBZ

Article number:
232 91 00 0 000

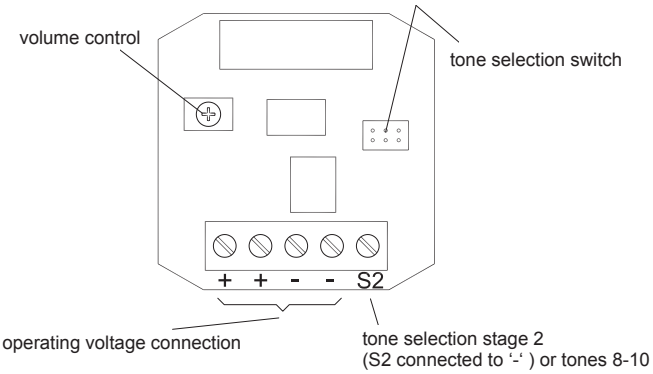
See page 85 for illustrations

Connection diagrams

SON 2



SON F1

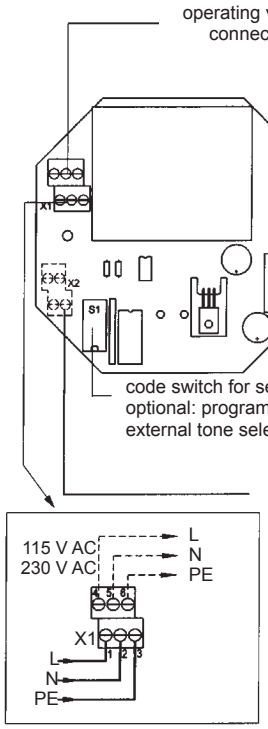


Tone

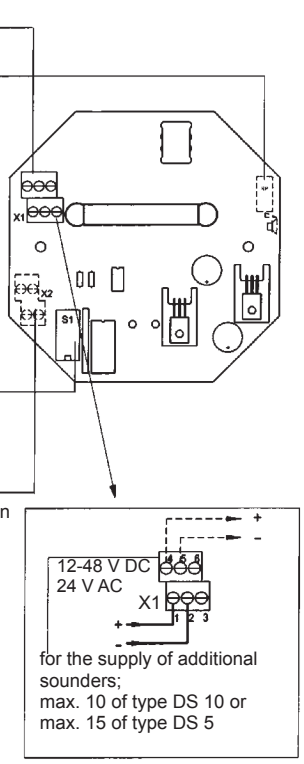
1	2	3	4	5	6	7	*8	*9	*10

* to select tones 8-10: connect S2 to '-'

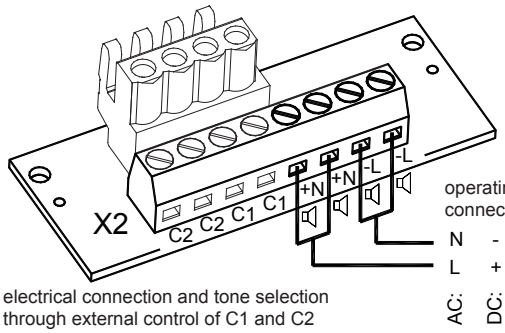
DS 5 / DS 10 – AC



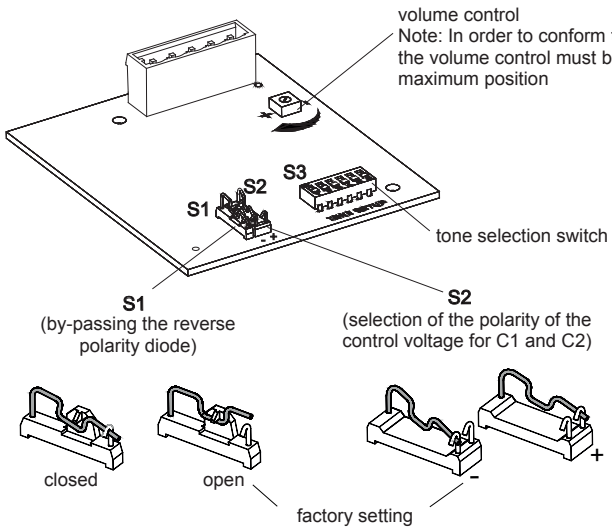
DS 5 / DS 10 – DC



PA 1 / PA 5

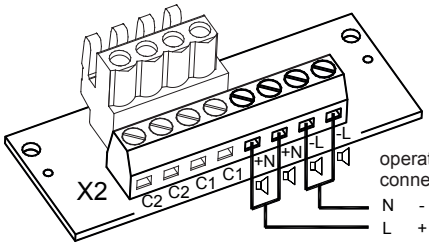


electrical connection and tone selection through external control of C1 and C2

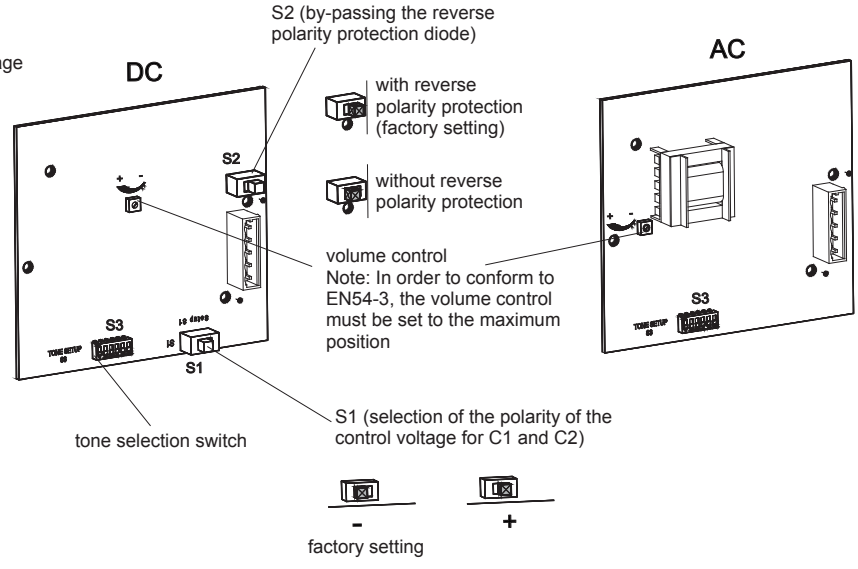


Caution:
Position of changeover switch S2 only at „-“ or „+“
„open“ position is not permitted and leads to malfunction.

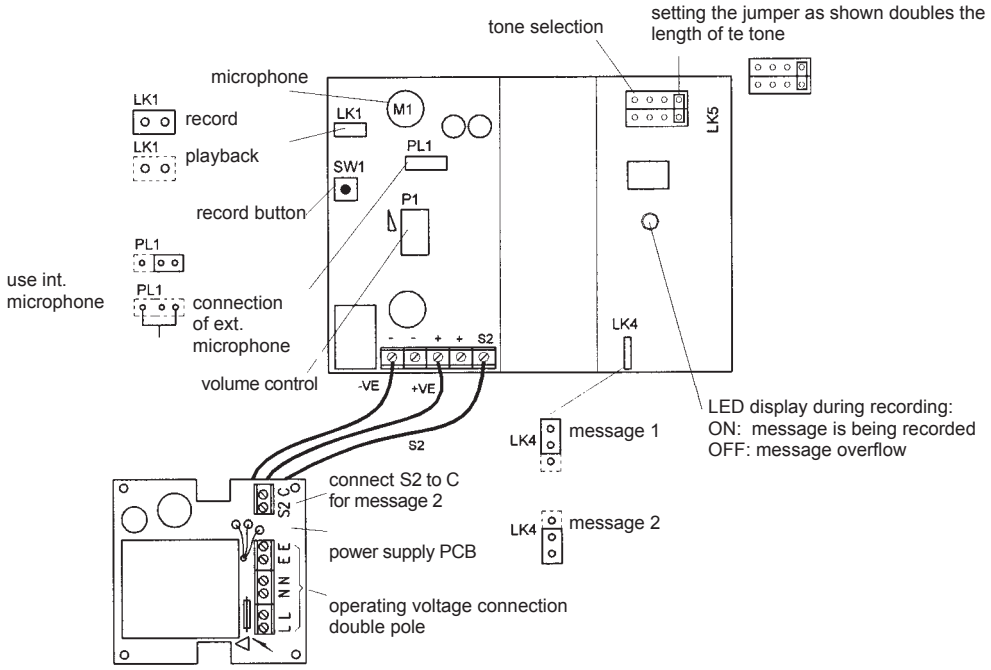
PA 10 / PA 20



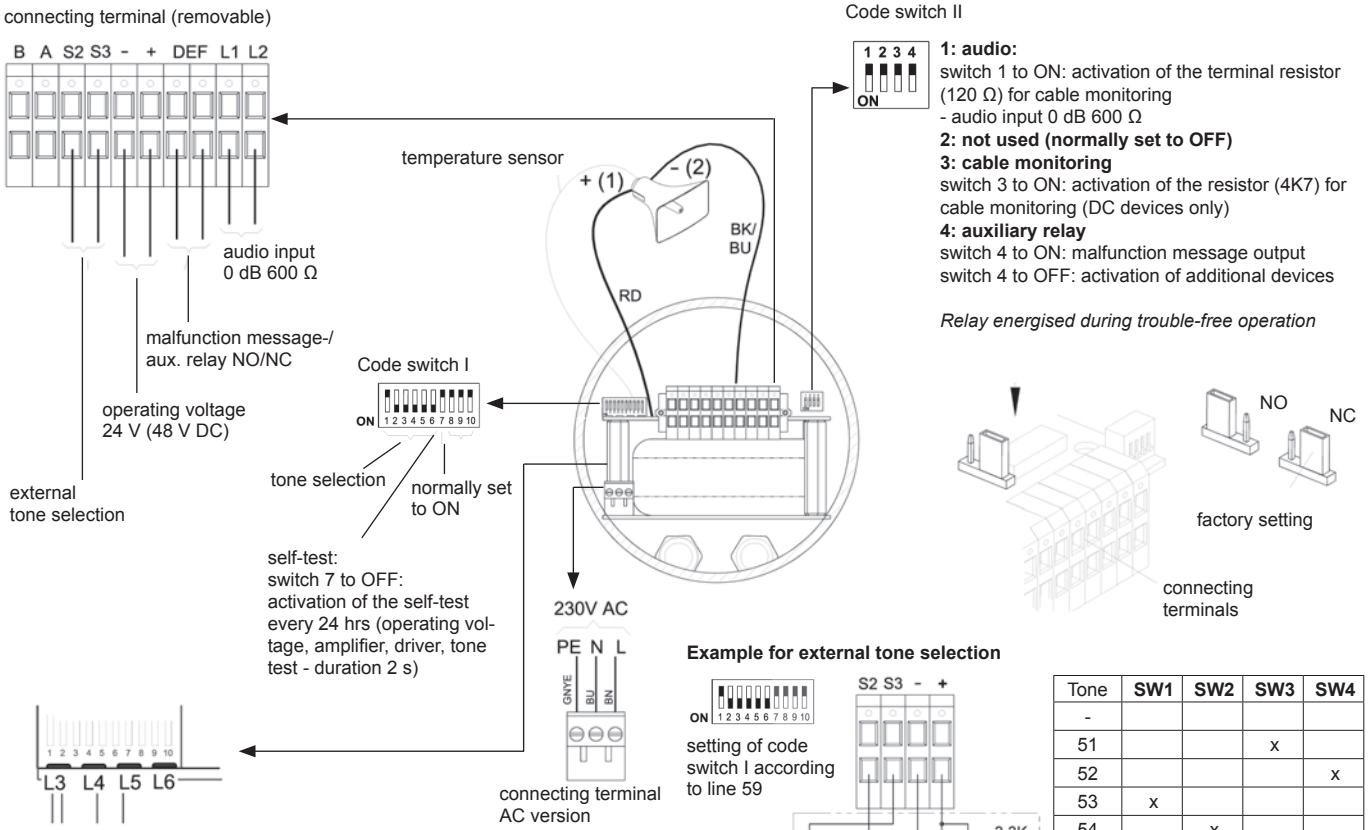
electrical connection and tone selection through external control of C1 and C2



PAS 106 / PAS 110 – AC



PA 130

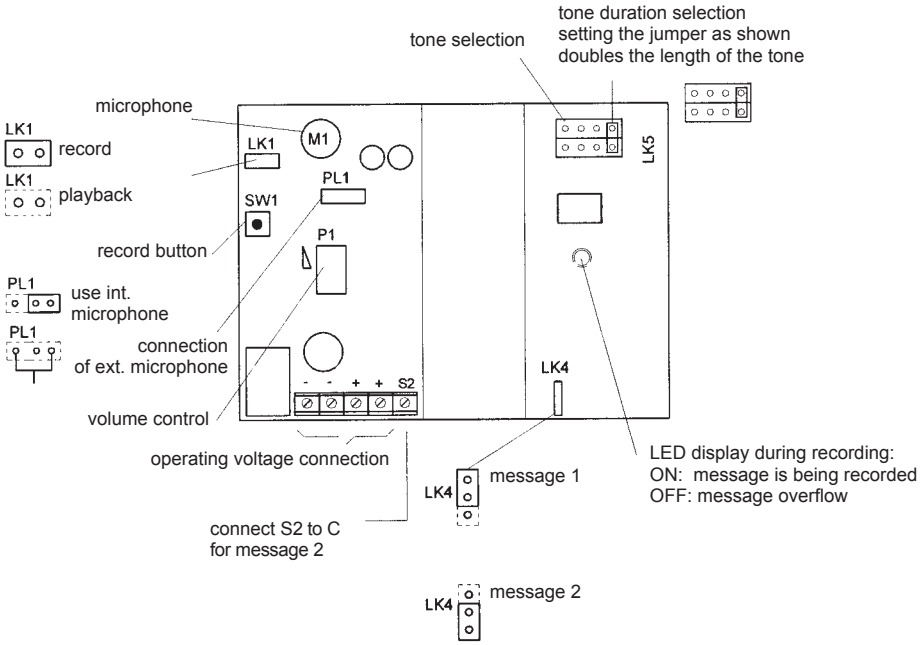


L3-L5	LED's - OFF during troule-free operation
L3	operating voltage failure
L4	overheating
L5	driver not operating
L6	not used

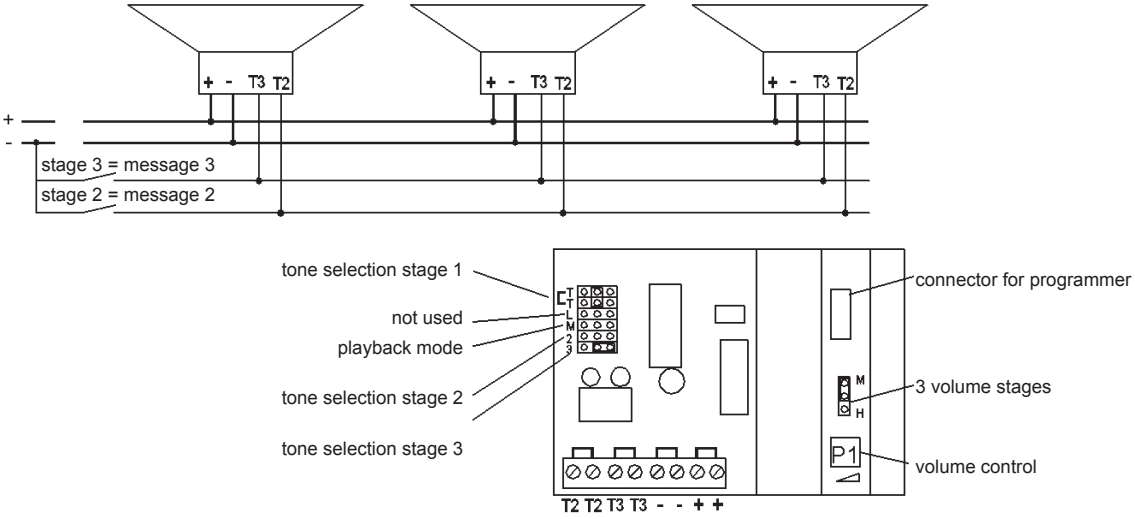
Tone	SW1	SW2	SW3	SW4
-				
51			x	
52				x
53	x			
54		x		
audio	x		x	
55	x			x
–		x	x	
56		x		x

x = closed

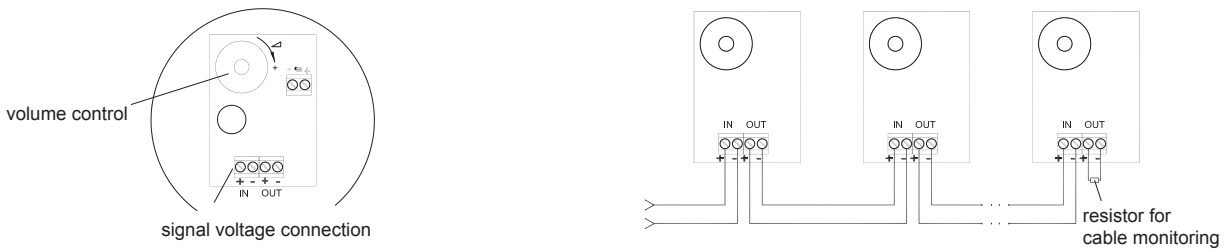
PAS 106 / PAS 110 – DC



PAS 106 SYNC



PS15R / PS15B







Seeing and hearing – double alarms warn better!

Visual-audible signaling devices offer double the amount of safety in one package

There are many industrial areas of use for signaling devices that are associated with adverse environmental conditions and higher demands, making the mutual assistance of acoustic and visual signals necessary. For example, when signals need to be noticed at great distances.

Two scenarios make this clear. Visual signals, for example, are easily recognisable in the dark. However, as soon as there is sunlight, other lights, the factory lighting or welding flashes, the observer is faced with a barely distinguishable light smog. Therefore, acoustic assistance of the visual signal is necessary.

The same applies to acoustic signals that have to penetrate through machine noise, environmental noise, voice noise, echoes, running motors and hearing protection. They are only reliable in being noticed with visual assistance.

All visual-audible signaling devices at a glance

	Type	Maximum signal reception range for a 65 dB ambient noise level in metres [1]					Sound pressure level (tone) / Light power	Protection system	Dimensions (HxWxD) mm	Approvals / Standards					Page
		2.5	5	25	75	150				GL	GOST	UL	VdS	EN 54-3 54-23	
	P 22 DBF						80 dB (A) @ 10 cm	IP 65	Ø 29 x 52						161
	SON 4						100 dB (A) 0.25 J	IP 56	86 x 86 x AC: 120 DC: 102		●		●	●	162
	SON 4L						100 dB (A)				●		●	●	
	SON FL1						100 dB (A) 5 J	IP 55	172 x 86 x 83		●	●			164
	DSF 5						105 dB (A) 13 J	IP 66 IP 67	263,5 x 133.5 x 143		●				166
	DSF 10						110 dB (A) 13 J				●				
	PA X 1-05						100 dB (A) 5 J	IP 66	172,4 x 109.5 x 80.6	● [1]	●	○	●	●	168
	PA X 5-05						105 dB (A) 5 J	IP 66	215 x 163.4 x 132	● [1]	●	○			168
	PA X 5-10						105 dB (A) 10 J			● [1]	●	○			
	PA X 10-10						110 dB (A) 10 J	IP 66	270 x 214 x 156	● [1]	●	○			170
	PA X 10-15						110 dB (A) 15 J			● [1]	●	○			
	PA X 20-10						120 dB (A) 10 J	IP 66	270 x 214 x 181	● [1]	●	○			170
	PA X 20-15						120 dB (A) 15 J			● [1]	●	○			

[1] The specification for the alarm signal reception range assumes an existing ambient noise level of 65 dB (A). In accordance with applicable regulations, the calculated alarm range for the sound level 65 dB (A) was given + 10 dB (A) = 75 dB (A).

● available
○ in preparation
[1] Option

Note:
Using sounders with a sound pressure level of ≥ 120 dB (A) can lead to hearing damage. People must not be permitted to stay in the near vicinity of the sounder. All specified sound pressure levels are based on a measurement distance of 1 m, provided that nothing different is specified.



Further information can be found on the Internet:
www.pfannenberg.com · www.pfannenberg-spareparts.com
Keep up to date. Subscribe to our newsletter now:
newsletter.pfannenberg.com

Blinking LED Panel Mount Indicator with Buzzer P 22 DBF



- indicator lamp/buzzer combination for 22.5 mounting hole
- guaranteed high protection class (IP 65) to the housing
- superior shape, hence high signaling effect on all sides
- space-saving combination of buzzer and blinking LED indicator for increasing the effect of the signal
- easy to mount label holders available as an accessory
- simple electrical connection by means of screw terminals



Acoustic range according to EN 54



Protection system

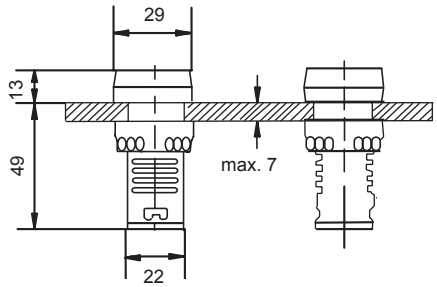


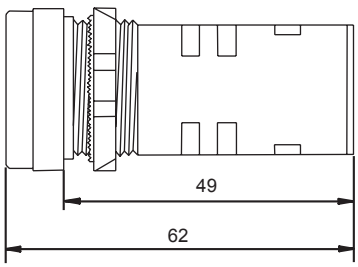
Operating temperature

Electrical data	P 22 DBF			
Rated voltage	230 V AC	115 V AC	48 V AC/DC	24 V AC/DC
Nominal current consumption	max. 30 mA			

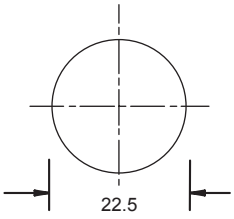
Mechanical data	P 22 DBF
Operating mode	1 Hz blinking light with buzzer (pulsating tone)
Sound pressure level	80 dB (A) @ 10 cm
Light source	LED array
Service life of light source	> 50 000 hrs
Lens colours	red
Operating temperature	- 25 °C ... + 50 °C
Relative humidity	90% @ + 20 °C
Protection system according to EN 60529	IP 65 (to housing)
Mounting	panel-mounting: Ø 22.5 mm
Type of connection	screw terminals 1.5 mm²
Weight	90 g

Dimensions





Panel cut-out



Ordering details

Article numbers

Lens colour	Rated voltage	230 V AC	115 V AC	48 V AC/DC	24 V AC/DC
red		232 72 10 5 000	232 72 15 5 000	232 72 70 5 000	232 72 80 5 000

Options / Accessories



25 x 10 mm

Article number:
232 92 00 0 000



25 x 18 mm

Article number:
232 91 00 0 000

See page 85 for illustrations

Flashing Sounder 100 dB(A) / 0.25 Joules SON 4
LED Blinking Sounder 100 dB(A) SON 4L



- automatic synchronisation in system mode
- volume control
- reverse polarity protection
- choice of 32 different tones
- 2 additional externally selectable tones
- ideal for fire alarm systems due to low power consumption

r = 18 m	IP 56	+ 55 °C / - 25 °C	EN 54-3	VdS G209080
Acoustic range	Protection system	Operating temperature	Standard	Standard

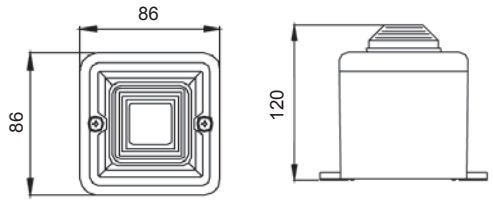
Electrical data	SON 4			
Rated voltage	230 V AC	115 V AC	24 V AC	24 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	
Operating range	± 10%	± 10%	± 10%	± 25%
Nominal current consumption	30 mA	50 mA	180 mA	150 mA

Electrical data	SON 4L					
Rated voltage	230 V AC	115 V AC	24 V AC	48 V DC	24 V DC	12 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz			
Operating range	± 10%	± 10%	± 10%	± 25%	± 25%	± 25%
Nominal current consumption	20 mA	25 mA	60 mA	40 mA	50 mA	50 mA

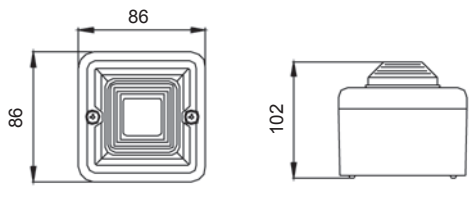
Mechanical data		SON 4	SON 4L
Sound pressure level		100 dB (A)	
Alarm tones		32, 3-stage alarm	
Sound level reduction		by - 2 / - 6 dB	by - 9 dB
Flash energy		0.25 J	
Flashing / Blinking rate		1 Hz	2 Hz
Light source		xenon flash tube	5 high output LEDs
Lens colours		yellow, amber, red, green, blue	amber, red
Operating temperature		- 25 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 56	
Duty cycle		100%	
Material	lens	polycarbonate (PC)	
	housing	UL 94 VO & 5VA classified ABS	
Colour	housing	RAL 3000 (flame red), optionally grey or white	
Cable entry		4 knock-outs prepared on the side and bottom	
Connecting terminals		0.5 – 2.5 mm²	
Weight		AC: 400 g / DC: 300 g	

Dimensions

SON 4 / SON 4L – AC



SON 4 / SON 4L – DC



Tone table SON 4

Tone	Description - Frequency		Stage 2	Stage 3
1	Continuous tone	340 Hz	2	5
2	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	1000 Hz / 800 Hz, 0,25 s / 0,25 s, EN54-3	17	5
3	Slow whoop, evacuation alarm Netherlands NEN 2575	1200 Hz / 500 Hz, 3,5 s / 0,5 s, EN54-3	2	5
4	Sweeping (fast)	1000 Hz / 800 Hz, 10 ms / 10 ms	6	5
5	Continuous tone	2400 Hz	3	20
6	Sweeping	2900 Hz / 2400 Hz, 70 ms / 70 ms	7	5
7	Sweeping (fast)	2900 Hz / 2400 Hz, 10 ms / 10 ms	10	5
8	Sweeping	1200 Hz / 500 Hz, 3 s / 3 s	2	5
9	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz / 500 Hz, 1 s, EN54-3	15	2
10	Alternating tone	2900 Hz / 2400 Hz, 20 ms / 20 ms	7	5
11	Interrupted tone	1000 Hz, 10 ms / 10 ms	2	5
12	Alternating tone	1000 Hz / 800 Hz, 0,875 s / 0,875 s	4	5
13	Interrupted tone	2400 Hz, 10 ms / 10 ms	15	5
14	Interrupted tone	800 Hz, 0,25 s / 1 s	4	5
15	Continuous tone	800 Hz	2	5
16	Interrupted tone	660 Hz, 150 ms / 150 ms, EN54-3	18	5
17	Alternating tone, France NFS 32-001 (fire alarm)	554 Hz / 440 Hz, 0,1 s / 0,4 s, EN54-3	2	27
18	Interrupted tone, Sweden SS031711 (air raid warning)	660 Hz, 1,8 s / 1,8 s	2	5
19	Sweeping, France NFC48-265	1600 Hz / 1400 Hz, 1 s / 0,5 s	2	5
20	Continuous tone, Sweden SS031711 (all-clear signal)	660 Hz	2	5
21	Alternating tone	554 Hz / 440 Hz, 10 ms / 10 ms	2	5
22	Interrupted tone	544 Hz, 0,875 s / 0,875 s	2	5
23	Interrupted tone	800 Hz, 20 ms / 20 ms	6	5
24	Sweeping (medium), UK BS5839-1	1000 Hz / 800 Hz, 0,5 s / 0,5 s	29	5
25	Sweeping	2900 Hz / 2400 Hz, 0,5 s / 0,5 s	29	5
26	Simulated bell	1450 Hz, 0,69 ms	2	15
27	Continuous tone	800 Hz	26	5
28	Continuous tone	440 Hz	2	5
29	Sweeping (fast), UK BS5839-1	1000 Hz / 800 Hz, 70 ms / 70 ms	7	5
30	Interrupted tone, Australia AS2220, AS1610, AS1670	420 Hz, 0,625 s / 0,625 s	32	26
31	Sweeping	1200 Hz / 660 Hz, 10 ms / 10 ms	26	5
32	Slow whoop, Australian evacuation alarm AS2220	1200 Hz / 500 Hz, 3,75 s / 0,25 s	30	26

Tone table SON 4L

Tone	Description - Frequency		Stage 2
1	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	1000 Hz / 800 Hz, 0,25 s / 0,25 s, EN54-3	8
2	Slow whoop, evacuation alarm Netherlands NEN 2575	1200 Hz / 500 Hz, 3,5 s / 0,5 s, EN54-3	1
3	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz / 500 Hz, 1 s, EN54-3	8
4	Alternating tone, France NFS 32-001 (fire alarm)	554 Hz / 440 Hz, 0,1 s / 0,4 s, EN54-3	9
5	Simulated bell	1450 Hz, 0,69 ms	1
6	Sweeping (fast), UK BS5839-1	1000 Hz / 800 Hz, 70 ms / 70 ms	8
7	Slow whoop, Australian evacuation alarm AS2220	1200 Hz / 500 Hz, 3,75 s / 0,25 s	10
8	Continuous tone	1000 Hz	-
9	Continuous tone	554 Hz	-
10	Interrupted tone, Australia AS2220, AS1610, AS1670	420 Hz, 0,625 s / 0,625 s	-

Ordering details

Article numbers		SON 4			SON 4L		
Lens colour	**Rated voltage**	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
amber		232 40 10 4 010	232 40 15 4 010	232 40 80 4 010	232 41 10 4 010	232 41 15 4 010	232 41 80 4 010
red		232 40 10 5 010	232 40 15 5 010	232 40 80 5 010	232 41 10 5 010	232 41 15 5 010	232 41 80 5 010

Article numbers for other voltages and versions on request

Flashing Sounder 100 dB(A) / 5 Joules SON FL1
LED Blinking Sounder 100 dB(A) / SON FL1L



- choice of 10 different tones
- 1 additional externally selectable tone
- automatic synchronisation in system mode
- reverse polarity protection
- volume control
- ideal for fire alarm systems due to low power consumption



Acoustic range



Protection system



Operating temperature

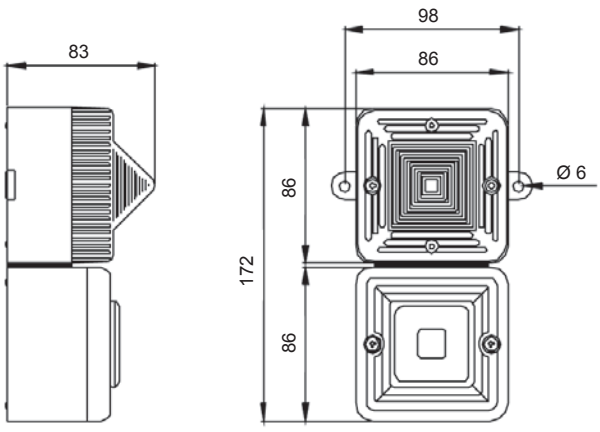


Standard

Electrical data	SON FL1		SON FL1L
Rated voltage	24 V DC	12 V DC	24 V DC
Operating range	20 – 28 V	10 V – 14 V	20 – 28 V
Nominal current consumption	275 mA	525 mA	125 mA

Mechanical data		SON FL1	SON FL1L
Sound pressure level		100 dB (A)	
Alarm tones		10, 2-stage alarm	
Flash energy		5 J	
Flashing / Blinking rate		1 Hz	2 Hz, can be set to blinking or continuous light
Light source		xenon flash tube	8 high output LEDs
Lens colours		clear, yellow, amber, red, green, blue	
Operating temperature		- 25 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 55	
Duty cycle		100%	
Material	lens	polycarbonate (PC)	
	housing	UL 94 VO & 5VA classified ABS	
Colour	housing	RAL 3000 (flame red), optionally grey or white	
Cable entry		4 knock-outs prepared on the side and bottom	
Connecting terminals		0.5 – 2.5 mm²	
Weight		260 g	460 g

Dimensions



Tone table

Tone	Description - Frequency		Stage 2
1	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	1000 Hz / 800 Hz, 0,25 s / 0,25 s, EN54-3	8
2	Slow whoop, evacuation alarm Netherlands NEN 2575	1200 Hz / 500 Hz, 3,5 s / 0,5 s, EN54-3	1
3	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz / 500 Hz, 1 s, EN54-3	8
4	Alternating tone, France NFS 32-001 (fire alarm)	554 Hz / 440 Hz, 0,1 s / 0,4 s, EN54-3	9
5	Simulated bell	1450 Hz, 0,69 ms	1
6	Sweeping (fast), UK BS5839-1	1000 Hz / 800 Hz, 70 ms / 70 ms	8
7	Slow whoop, Australian evacuation alarm AS2220	1200 Hz / 500 Hz, 3,75 s / 0,25 s	10
8	Continuous tone	1000 Hz	-
9	Continuous tone	554 Hz	-
10	Interrupted tone, Australia AS2220, AS1610, AS1670	420 Hz, 0,625 s / 0,625 s	-

Ordering details

Article numbers		SON FL1	SON FL1L
Lens colour	Rated voltage	24 V DC	24 V DC
amber		232 52 80 4 010	232 53 80 4 010
red		232 52 80 5 010	232 53 80 5 010

Article numbers for other voltages and versions on request

Options / Accessories

IP 56
Protection system

c UL us LISTED

Flashing Sounders 105 / 110 dB(A) / 13 Joules
DSF 5 / DSF 10



The powerful flashing sounders
- extremely bright and loud due to 13 Joules, 105 dB (A) or 110 dB (A)
- high reliability and long service life
- 31 different sound signals can be set
- up to four externally selectable tones (optional)

Further detailed specifications for the Quadro flashing light on page 44.

DSF 5	DSF 10				
r = 32 m	r = 56 m	IP 66	IP 67	+ 55 °C / - 40 °C	
Acoustic range	Acoustic range	Protection system	Protection system	Operating temperature	Acoustic penetration

Electrical data	DSF 5			DSF 10		
Rated voltage	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz		50 / 60 Hz	50 / 60 Hz	
Operating range	195 – 253 V	95 – 127 V	19 – 29 V	195 – 253 V	95 – 127 V	19 – 29 V
Nominal current consumption	0.19 A	0.40 A	0.98 A	0.22 A	0.46 A	1.12 A

Mechanical data		DSF 5	DSF 10
Sound pressure level		105 dB (A)	110 dB (A)
Flash energy		13 J	
Lens colour		clear, yellow, amber, red, green, blue	
Operating temperature		- 40 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 66, IP 67	
Impact resistance of the flashing light		IK 08 (as per EN 50102)	
Duty cycle		100%	
Service life of light source		light emission still 70% after 8 000 000 flashes	
Material	sounder	die-cast aluminium GD-Al Si12 Cu	
	flashing light	polycarbonate (PC)	
Surface coating	sounder	epoxy resin paint RAL 3000, flame red	
Cable bushing		2 x M20 x 1.5	
Clamping range of the cable fitting		8 – 12 mm	
Connecting terminal cross-section		max. 2.5 mm²	
Mounting		do not direct the opening of the sound horn upwards	
Weight		2.6 kg	

Ordering details

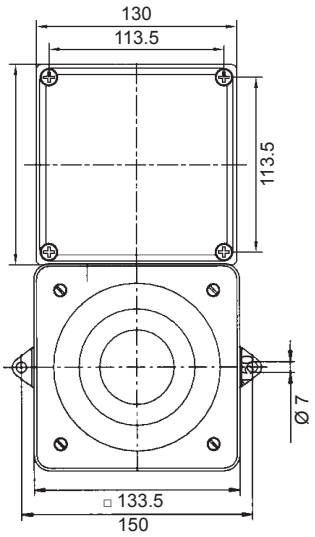
Article numbers		DSF 5			DSF 10		
Version	Rated voltage	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
Standard; red lens		231 07 10 5 000	231 07 15 5 000	231 07 80 5 000	231 12 10 5 000	231 12 15 5 000	231 12 80 5 000
TAS (external tone selection); red lens		231 07 10 5 152	231 07 15 5 152	231 07 80 5 152	231 12 10 5 152	231 12 15 5 152	231 12 80 5 152

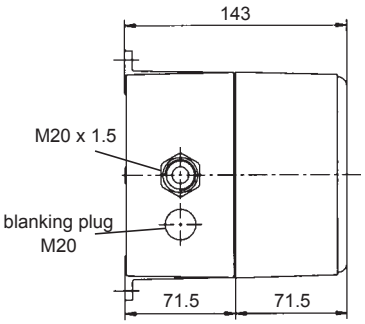
Options / Accessories

External tone selection (4 variants)

GOST

Dimensions





Tone table

Tone	Description - Basic tone (preset: tone no. 1)		Stage 2	3	4
0	no tone		1	5	4
1	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz / 500 Hz, 1 s, EN54-3	3	2	4
2	Interrupted tone, ISO 8201 (emergency evacuation signal)	950 Hz, 0,5 s, 0,5 s, 1,5 s	1	4	3
3	Alternating tone	1025 Hz / 825 Hz, 0,25 s, 0,25 s	1	2	4
4	Continuous tone, UK BS5839-1	950 Hz	1	3	5
5	Interrupted tone	950 Hz, 1 s, 1 s	1	4	3
6	Sweeping	1200 Hz / 500 Hz, 3 s, 3 s	1	4	9
7	Alternating tone, France NFS 32-001 (fire alarm)	554 Hz / 440 Hz, 0,1 s, 0,4 s, EN54-3	3	10	4
8	Interrupted tone, Sweden SS031711 (emergency signal)	700 Hz, 0,125 s, 0,125 s	2	3	4
9	Interrupted tone (fast), horn	800 Hz, 4 ms, 4 ms	1	3	4
10	Continuous tone	500 Hz	27	9	26
11	Continuous tone	725 Hz	1	17	9
12	Continuous tone	825 Hz, EN54-3	27	9	26
13	Continuous tone	1200 Hz	1	5	3
14	Continuous tone	1500 Hz	1	4	10
15	Interrupted tone	500 Hz, 0,5 s, 0,5 s	1	24	12
16	Interrupted tone	825 Hz, 0,5 s, 0,5 s	1	24	15
17	Interrupted tone	725 Hz, 0,7 s, 0,3 s	1	11	9
18	Interrupted tone	800 Hz, 0,25 s, 1 s	19	7	4
19	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	1000 Hz / 800 Hz, 0,25 s, 0,25 s, EN54-3	27	13	23
20	Interrupted tone, IMO SOLAS III/50 + SOLAS III/6.4 (general alarm)	825 Hz, 2,5 s, 2,5 s, 7 s	9	21	26
21	Interrupted tone, IMO (leave ship)	950 Hz, 1 s, 1 s, 3 s, 1 s	20	9	26
22	Slow whoop, evacuation alarm Netherlands NEN 2575	1200 Hz / 500 Hz, 3,5 s, 0,5 s, EN54-3	19	14	2
23	Siren	2400 Hz / 500 Hz, 3 s, const.	27	12	2
24	Alternating tone	1075 Hz / 825 Hz, 0,5 s, 0,5 s	1	16	12
25	Alternating tone	900 Hz / 500 Hz, 0,25 s, 0,25 s	1	14	5
26	Alternating tone	1400 Hz / 1200 Hz, 20 ms, 20 ms	4	9	27
27	Siren	1200 Hz / 300 Hz, 3 s, const.	13	23	19
28	Sweeping	1500 Hz / 700 Hz, 1,5 s, 1,5 s	7	10	4
29	Pulsating tone, industrial alarm Germany	1000 Hz / 150 Hz, 10 s, 40 s, 10 s	1	30	9
30	Interrupted tone, industrial alarm (Germany)	680 Hz, 0,875 s, 0,875 s	1	4	26
31	Sweeping, France NFC48-265	1600 Hz / 1400 Hz, 1 s, 0,5 s	3	14	4
32	selection of available tone combinations in stages 2, 3 and 4				

Conformity to standards

DIN EN 54-3: 2001 + DIN EN 54-3/A1: 2001	Fire alarm systems - part 3: fire alarm devices; Audible signaling devices and annex A1
EN 50 130-4: 1996	Stability of system components for fire and burglar alarm systems
EN 61 000-6-2	EMV, stability for industrial areas
EN 61 000-6-3	EMV, emission standard for residential commercial, and light-industrial environments
EN 60 947-1: 2003	Low voltage switchgear standard
EN 60 529: 2000	Protection system by enclosure (IP code)
DIN EN ISO 7731	Ergonomic – alarms for public areas and workplaces – acoustic alarms
DIN 33 404/3: 1982	Alarms for workplaces, unified emergency signal
ISO 8201: 1987	Evacuation alarm
DIN EN 981: 1997	System of acoustic and visual alarm signals and information signals
ISO 11 429: 1996	System of acoustic and visual alarm signals and information signals

Flashing Sounders PATROL series 100/105 dB(A) / 5/10 J
PA X 1-05 / PA X 5-05 / PA X 5-10





PATROL - the new generation of sounder/flashing light combinations.
Three dimensional innovation;

- safe; an incorrect installation is virtually impossible
- easy; significantly shorter assembly and installation times
- economical; extremely high efficiency and good penetration of acoustical obstacles significantly reduce the required number of sounders

- pre-wired sounder and light ex works
- corresponding light intensity available for every sound pressure level

PA X 1	PA X 5					PA X 1	PA X 1	PA X 1	
r = 18 m	r = 32 m	IP 66	+ 55 °C / - 40 °C			EN 54-3	EN 54-23	VdS	UL
Acoustic range	Acoustic range	Protection system	Operating temperature		Acoustic penetration	24 V DC, 48 V DC	24 V DC, 48 V DC	24 V DC, 48 V DC	

Electrical data		PA X 1-05					
Rated voltage		230 V AC	115 V AC	24 V AC	48 V DC	24 V DC	12 V DC
Rated frequency		50 / 60 Hz	50 / 60 Hz	50 / 60 Hz			
Operating range		187 – 255 V	90 – 135 V	18 – 30 V	40 – 60 V	18 – 30 V	12 – 15 V
Nominal current consumption [1]		65 – 70 mA	110 – 130 mA	860 – 920 mA	190 – 150 mA	315 – 365 mA	610 – 625 mA
Electrical data		**PA X 5**					
Rated voltage		230 V AC	115 V AC	24 V AC	48 V DC	24 V DC	12 V DC
Rated frequency		50 / 60 Hz	50 / 60 Hz	50 / 60 Hz			
Operating range		187 – 255 V	90 – 135 V	18 – 30 V	40 – 60 V	18 – 30 V	12 – 15 V
Nominal current consumption [1]	5 J	65 – 70 mA	110 – 130 mA	860 – 920 mA	190 – 150 mA	315 – 365 mA	610 – 625 mA
	10 J	150 – 155 mA	250 – 260 mA	1 460 – 1 520 mA	320 – 380 mA	565 – 620 mA	1 200 – 1 220 mA

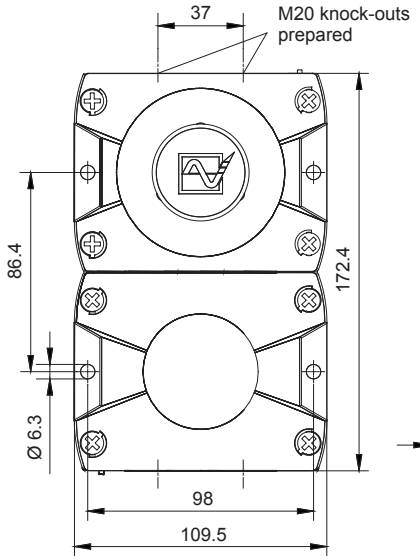
[1] power consumption dependent on operating voltage

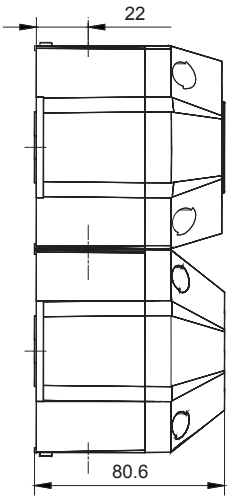
Mechanical data		PA X 1-05	PA X 5-05	PA X 5-10
Sound pressure level		100 dB (A)	105 dB (A)	105 dB (A)
Sound level reduction		max. - 16 dB via potentiometer		
Alarm tones		80 (see tone table page 172/173)		
Flash energy		5 J	5 J	10 J
Flash rate		1 Hz = 60 flashes/min.		
Light intensity (DIN 5037) [1]		44 cd	47 cd	92 cd
Operating temperature		- 40 °C ... + 55 °C		
Storage temperature		- 40 °C ... + 70 °C		
Relative humidity		90%		
Protection system according to EN 60529		IP 66		
Protection class		II		
Duty cycle		100%		
Service life of the flash tube		light emission still 70% after 8 000 000 flashes		
Material	sounder	PC / ABS blend		
	lens flashing light	polycarbonate (PC)		
Colour	housing	similar to RAL 3000 (flame red) / RAL 7035 (light grey) / RAL 9003 (signal white)		
	lens flashing light	clear, white, yellow, amber, red, green, blue		
Cable entry		3 x M20 knock-outs on side, 1 knock-out on back		
Integrated seal with cable entry		6 – 13 mm (feed-through grommet)		
Connecting terminals		2.5 mm² fine wire with cable end sleeve, AWG 16		
Weight	AC	725 g	983 g	
	DC	560 g	800 g	

[1] with a clear lens

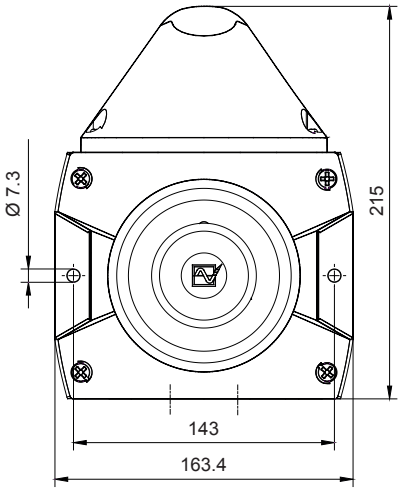
Dimensions

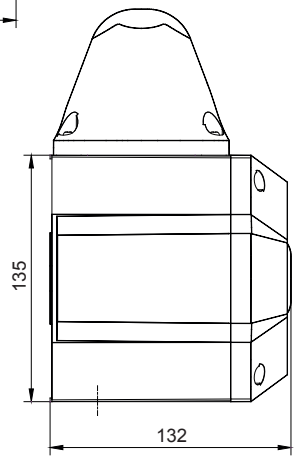
PA X 1-05





PA X 5-05





Ordering details

Article numbers		PA X 1-05 – housing red			PA X 1-05 – housing grey		
Version	**Rated voltage**	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
yellow lens		233 11 10 3 000	233 11 15 3 000	233 11 80 3 000	233 11 10 3 055	233 11 15 3 055	233 11 80 3 055
amber lens		233 11 10 4 000	233 11 15 4 000	233 11 80 4 000	233 11 10 4 055	233 11 15 4 055	233 11 80 4 055
red lens		233 11 10 5 000	233 11 15 5 000	233 11 80 5 000	233 11 10 5 055	233 11 15 5 055	233 11 80 5 055

Article numbers		PA X 5-05 – housing red			PA X 5-05 – housing grey		
Version	**Rated voltage**	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
yellow lens		233 51 10 3 000	233 51 15 3 000	233 51 80 3 000	233 51 10 3 055	233 51 15 3 055	233 51 80 3 055
amber lens		233 51 10 4 000	233 51 15 4 000	233 51 80 4 000	233 51 10 4 055	233 51 15 4 055	233 51 80 4 055
red lens		233 51 10 5 000	233 51 15 5 000	233 51 80 5 000	233 51 10 5 055	233 51 15 5 055	233 51 80 5 055

Article numbers for other voltages and versions on request

Options / Accessories

GL

Enclosure fitting

Surface gasket

Tamper-proof sealing

See page 173 for further information

Conformity to standards

The acoustic parameters conform to the European standard DIN EN ISO 7731;
"Ergonomic – alarm signals for public areas and workplaces – acoustic alarm signals".

The requirement for an acoustic alarm signal can be found in the harmonised standards:

EN 60204-1	Electrical equipment of machines
EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837

Flashing Sounders PATROL series 110/120 dB(A) / 10/15 J
PA X 10-10 / PA X 10-15 / PA X 20-10 / PA X 20-15



PATROL - the new generation of sounder/flashing light combinations.
Three dimensional innovation;

- safe; an incorrect installation is virtually impossible
- easy; significantly shorter assembly and installation times
- economical; extremely high efficiency and good penetration of acoustical obstacles significantly reduce the required number of sounders

- pre-wired sounder and light ex works
- corresponding light intensity available for every sound pressure level

PA X 10	PA X 20				
r = 56m	r = 178m	IP 66	+ 55 °C - 40 °C		UL
Acoustic range	Acoustic range	Protection system	Operating temperature		Acoustic penetration

Electrical data		PA X 10					
Rated voltage		230 V AC	115 V AC	24 V AC	48 V DC	24 V DC	12 V DC
Rated frequency		50 / 60 Hz	50 / 60 Hz	50 / 60 Hz			
Operating range		187 – 255 V	90 – 135 V	18 – 30 V	40 – 60 V	18 – 30 V	12 –15 V
Nominal current consumption [1]	10 J	160 – 215 mA	260 – 345 mA	1 650 – 2 300 mA	360 – 490 mA	665 – 935 mA	1 335 – 1 685 mA
	15 J	210 – 265 mA	360 – 445 mA	1 650 – 2 300 mA	420 – 540 mA	765 – 1 035 mA	1 535 – 1 885 mA
Electrical data		**PA X 20**					
Rated voltage		230 V AC	115 V AC	24 V AC	48 V DC	24 V DC	12 V DC
Rated frequency		50 / 60 Hz	50 / 60 Hz	50 / 60 Hz			
Operating range		187 – 255 V	90 – 135 V	18 – 30 V	40 – 60 V	18 – 30 V	12 –15 V
Nominal current consumption [1]	10 J	215 – 335 mA	340 – 560 mA	1 900 – 3 200 mA	495 – 800 mA	845 – 1 430 mA	1 220 – 1 690 mA
	15 J	165 – 385 mA	440 – 660 mA	1 900 – 3 200 mA	545 – 850 mA	945 – 1 540 mA	1 520 – 1 890 mA

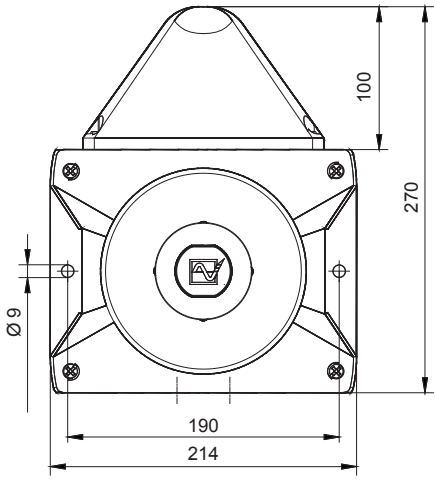
[1] power consumption dependent on operating voltage

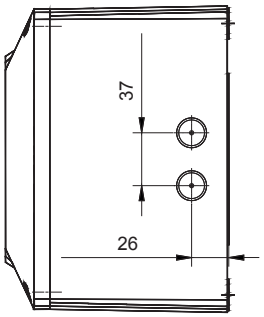
Mechanical data		PA X 10-10	PA X 10-15	PA X 20-10	PA X 20-15
Sound pressure level		110 dB (A)		120 dB (A)	
Sound level reduction		max. - 12 dB via potentiometer			
Alarm tones		80 (see tone table page 172/173)			
Flash energy		10 J	15 J	10 J	15 J
Flash rate		1 Hz = 60 flashes/min.			
Light intensity (DIN 5037) [1]		129 cd	190 cd	129 cd	190 cd
Operating temperature		- 40 °C ... + 55 °C			
Storage temperature		- 40 °C ... + 70 °C			
Relative humidity		90%			
Protection system according to EN 60529		IP 66			
Protection class		II			
Duty cycle		100%			
Service life of the flash tube		light emission still 70% after 8 000 000 flashes			
Material	sounder	PC / ABS blend			
	lens flashing light	polycarbonate (PC)			
Colour	housing	similar to RAL 3000 (flame red) / RAL 7035 (light grey) / RAL 9003 (signal white)			
	lens flashing light	clear, white, yellow, amber, red, green, blue			
Cable entry		4 x M20 knock-outs on side, 1 knock-out on back			
Integrated seal with cable entry		6 – 13 mm (feed-through grommet)			
Connecting terminals		2.5 mm² fine wire with cable end sleeve, AWG 16			
Weight	AC	2 133 g	2 163 g	2 268 g	2 298 g
	DC	2 056 g	2 086 g	2 191 g	2 221 g

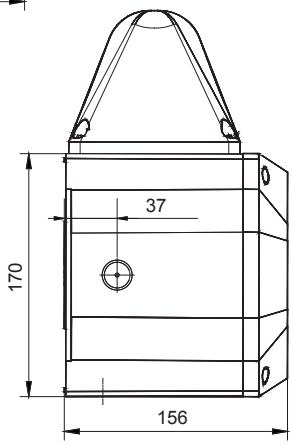
[1] with a clear lens

Dimensions

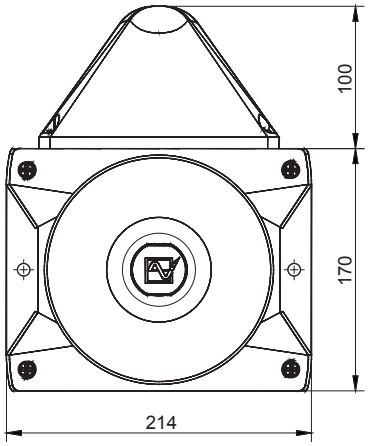
PA X 10-10 / PA X 10-15

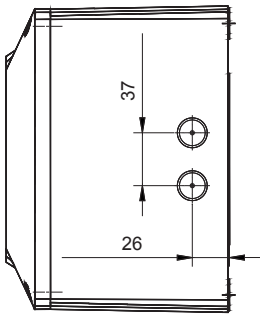


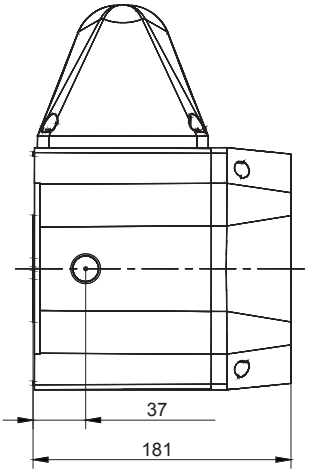




PA X 20-10 / PA X 20-15







Ordering details

Article numbers		PA X 10-10			PA X 20-15		
Version	**Rated voltage**	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
yellow lens	**housing red**	233 61 10 3 000	233 61 15 3 000	233 61 80 3 000	233 72 10 3 000	233 72 15 3 000	233 72 80 3 000
amber lens	**housing red**	233 61 10 4 000	233 61 15 4 000	233 61 80 4 000	233 72 10 4 000	233 72 15 4 000	233 72 80 4 000
red lens	**housing red**	233 61 10 5 000	233 61 15 5 000	233 61 80 5 000	233 72 10 5 000	233 72 15 5 000	233 72 80 5 000
yellow lens	**housing grey**	233 61 10 3 055	233 61 15 3 055	233 61 80 3 055	233 72 10 3 055	233 72 15 3 055	233 72 80 3 055
amber lens	**housing grey**	233 61 10 4 055	233 61 15 4 055	233 61 80 4 055	233 72 10 4 055	233 72 15 4 055	233 72 80 4 055
red lens	**housing grey**	233 61 10 5 055	233 61 15 5 055	233 61 80 5 055	233 72 10 5 055	233 72 15 5 055	233 72 80 5 055

Article numbers for other voltages and versions on request

Options / Accessories

GL

Enclo-sure fitting

Surface gasket

Tamper-proof sealing

SSM
(only for 24 V DC)

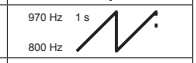
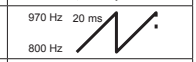
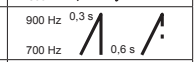
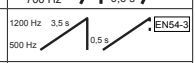
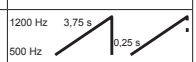
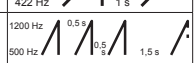
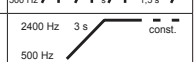
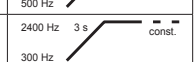
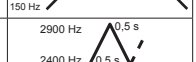
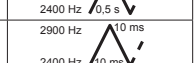
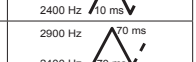
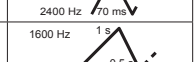
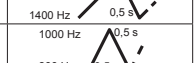
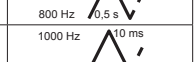
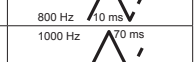
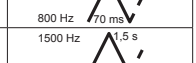
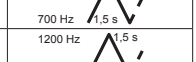
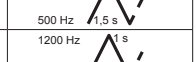
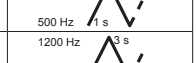
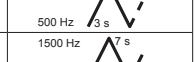
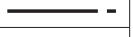
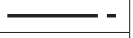
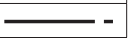
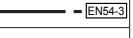
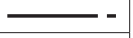
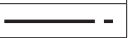
See page 173 for further information

Conformity to standards

The acoustic parameters conform to the European standard DIN EN ISO 7731;
"Ergonomic – alarm signals for public areas and workplaces – acoustic alarm signals".
The requirement for an acoustic alarm signal can be found in the harmonised standards:

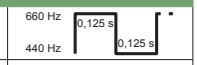
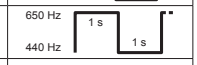
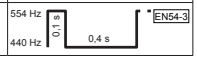
EN 60204-1	Electrical equipment of machines
EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837

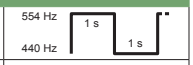
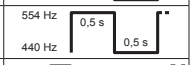
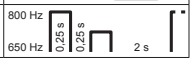
Tone table PA X 1 / PA X 5 / PA X 10 / PA X 20

Basic tone no.	Description	
1	no tone	
2	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	
9	Slow whoop, fire alarm, UK BS5839-1	
11	Interrupted tone (fast)	
13	Interrupted tone	
15	Slow whoop, evacuation alarm Netherlands NEN 2575	
16	Slow whoop, Australian evacuation alarm AS2220	
18	Slow whoop, NFPA	
22	Pulsating tone, Australien alert AS1670, ISO8201	
23	Siren	
24	Siren	
25	Siren	
26	Pulsating tone, industrial alarm Germany	
27	Sweeping	
29	Sweeping (fast)	
30	Sweeping	
31	Sweeping, France NFC48-265	
33	Sweeping (medium), UK BS5839-1	
34	Sweeping (fast)	
35	Sweeping (fast), UK BS5839-1	
36	Sweeping	
43	Sweeping	
44	Sweeping, IMO 3d, Germany KTA3901 evacuation alarm	
45	Sweeping	
46	Sweeping, general alarm Finland	
52	Continuous tone	
53	Continuous tone	
54	Continuous tone, Finland (all-clear signal)	
55	Continuous tone, PFEER gasalarm	
56	Continuous tone	
57	Continuous tone, UK BS5839-1	
59	Continuous tone	
60	Continuous tone	
61	Continuous tone	
63	Continuous tone	
65	Continuous tone, Sweden SS031711 (all-clear signal)	
66	Continuous tone	
67	Continuous tone, Germany KTA3901 (all-clear signal)	
68	Continuous tone	

Basic tone no.	Description	
69	Continuous tone	
71	Continuous tone	
77	Interrupted tone	
82	Interrupted tone, PFEER (general alarm), UK BS5839-1 (back-up alarm)	
83	Interrupted tone, PFEER (general alarm)	
88	Interrupted tone	
90	Interrupted tone	
91	Interrupted tone	
92	Interrupted tone	
93	Interrupted tone (fast), horn	
97	Interrupted tone	
98	Interrupted tone, Sweden SS031711 (emergency signal)	
100	Interrupted tone, industrial alarm (Germany)	
101	Interrupted tone, Sweden SS031711 (important message (pres-mess))	
102	Interrupted tone, Sweden SS031711 (local warning)	
103	Interrupted tone, Sweden SS031711 (air raid warning)	
104	Interrupted tone, Sweden SS031711 (emergency signal)	
107	Interrupted tone, Germany KTA3901 (evacuation alarm)	
109	Interrupted tone, Australia AS2220, AS1610, AS1670	
110	Interrupted tone, (fast variable), bell	
111	Interrupted tone, ISO8201 (emergency evacuation signal), USA (evacuation alarm)	
112	Interrupted tone, ISO8201 (emergency evacuation signal)	
113	Interrupted tone, ISO8201 (emergency evacuation signal), Sweeping	
115	Interrupted tone, IMO (telephone call)	
116	Interrupted tone, IMO (leave ship)	
117	Interrupted tone, IMO SOLAS III/50 + SOLAS III/6.4 (general alarm)	
122	Alternating tone	
123	Alternating tone	
124	Alternating tone, Singapore	
125	Alternating tone	
128	Alternating tone	
130	Alternating tone, UK BS5839-1 (fire alarm)	
131	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	
135	Alternating tone, UK BS5839-1 (fire alarm, increased urgency - railway crossing)	
142	Alternating tone	

Tone table PA X 1 / PA X 5 / PA X 10 / PA X 20

Basic tone no.	Description	
143	Alternating tone, industrial alarm (Germany)	
144	Alternating tone	
146	Alternating tone, France NFS 32-001 (fire alarm)	

Basic tone no.	Description	
147	Alternating tone, Sweden SS031711	
148	Alternating tone, Sweden SS031711	
152	Alternating tone (two tone chime)	

Control of the tones

Tone selection switch/DIP-Switch (setting of basic tone)							External tone selection		
1	2	3	4	5	6	Basic tone no.	C1	C2	C1+C2
							Tone no.		
						1	2	88	57
ON						2 *	128	112	57
	ON					2	26	100	93
ON	ON					2	61	131	112
		ON				9	57	11	82
ON		ON				15	131	52	112
	ON	ON				16	109	52	56
ON	ON	ON				18	111	57	68
			ON			22	16	109	68
ON			ON			23	131	52	112
	ON		ON			24	131	52	131
ON	ON		ON			25	131	52	92
		ON	ON			26	2	100	93
ON		ON	ON			27	123	52	92
	ON	ON				29	35	52	61
ON	ON	ON				30	27	52	77
				ON		31	131	52	57
ON				ON		33	30	52	35
	ON			ON		34	35	52	93
ON	ON			ON		35	27	52	110
		ON		ON		36	146	67	57
ON		ON		ON		43	131	52	91
	ON	ON		ON		45	2	57	93
ON	ON	ON		ON		52	15	65	82
			ON	ON		54	46	54	131
ON			ON	ON		55	131	52	128
	ON		ON	ON		56	82	35	33
ON	ON		ON	ON		59	143	59	101
			ON	ON		60	131	52	125
ON		ON	ON	ON		65	131	52	93
	ON	ON	ON	ON		66	110	52	107
ON	ON	ON	ON	ON		69	131	52	110

Tone selection switch/DIP-Switch (setting of basic tone)							External tone selection		
1	2	3	4	5	6	Basic tone no.	C1	C2	C1+C2
							Tone no.		
					ON	71	131	52	93
ON					ON	77	61	52	122
	ON				ON	82	131	52	83
ON	ON				ON	83	56	2	82
		ON			ON	88	2	57	128
ON		ON			ON	90	131	52	125
	ON	ON			ON	91	30	52	110
ON	ON	ON			ON	92	33	52	57
			ON		ON	93	2	128	57
ON			ON		ON	97	2	63	93
	ON		ON		ON	100	131	52	125
ON	ON		ON		ON	101	98	102	65
		ON	ON		ON	103	131	65	147
ON		ON	ON		ON	104	103	65	101
	ON	ON	ON		ON	109	16	52	22
ON	ON	ON	ON		ON	110	131	61	91
				ON	ON	112	2	57	128
ON				ON	ON	113	52	123	104
	ON			ON	ON	115	117	116	44
ON	ON			ON	ON	116	117	93	125
		ON		ON	ON	117	93	116	125
ON		ON		ON	ON	123	27	52	77
	ON	ON		ON	ON	124	53	83	2
ON	ON	ON		ON	ON	130	2	107	67
			ON	ON	ON	131	2	112	57
ON			ON	ON	ON	135	16	56	109
	ON		ON	ON	ON	142	2	54	88
ON	ON		ON	ON	ON	143	59	93	33
		ON	ON	ON	ON	144	110	61	2
ON		ON	ON	ON	ON	146	31	67	57
		ON	ON	ON	ON	148	131	52	92
ON	ON	ON	ON	ON	ON	152	110	61	13

* factory setting

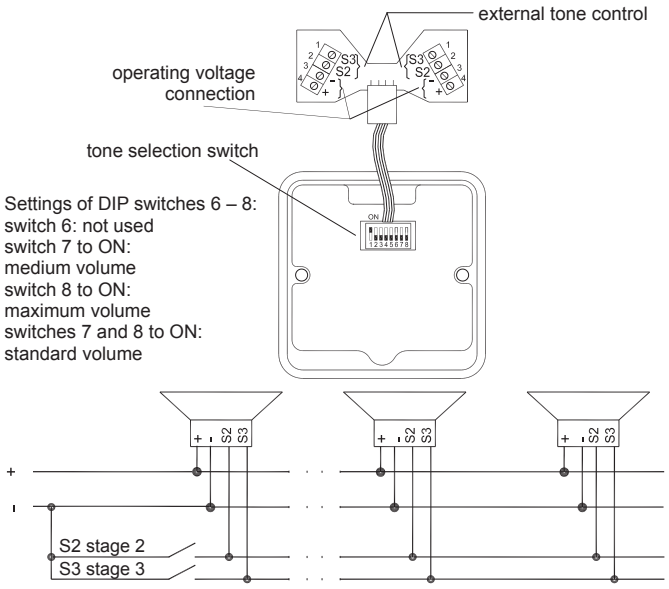
Accessories

Ordering details

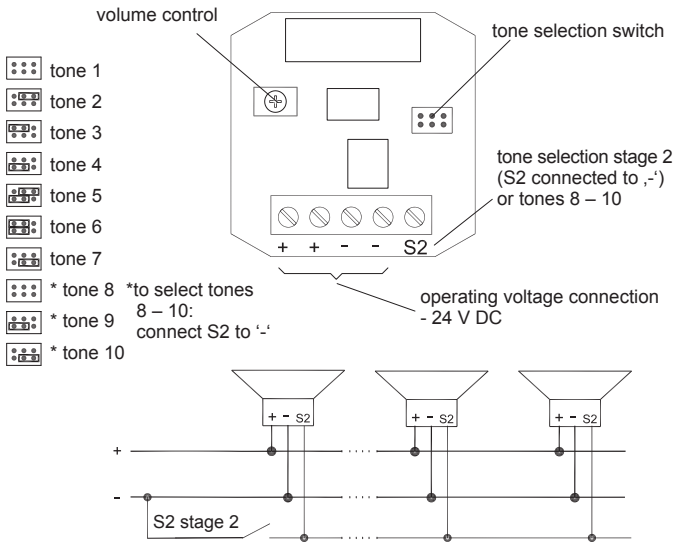
Article numbers		PA X 1-05	PA X 5-05	PA 10 X / PA 20 X
Enclosure fitting	For connection (daisy-chaining) of several sounders of the PATROL series	283 00 00 0 003		
Surface gasket	Sealing of the sounder installation surface when, e.g. cable entry is executed from the back.	283 00 00 0 004	283 00 00 0 005	283 00 00 0 006
Tamper-proof sealing (pack of 4)	Anti-tamper sealing for fasteners of the PATROL devices after installation in order to prevent manipulation of the devices.	283 00 00 0 002		

Connection diagrams

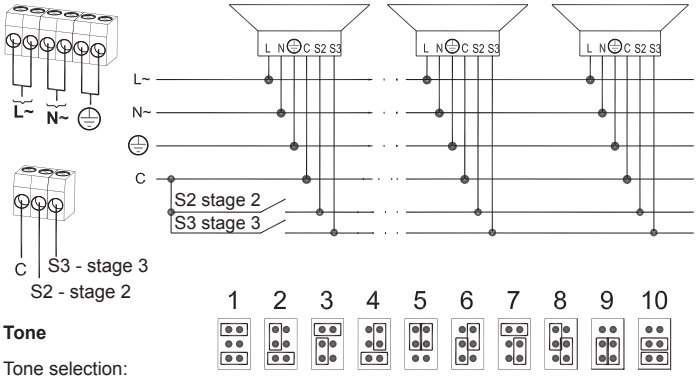
SON 4



SON FL1



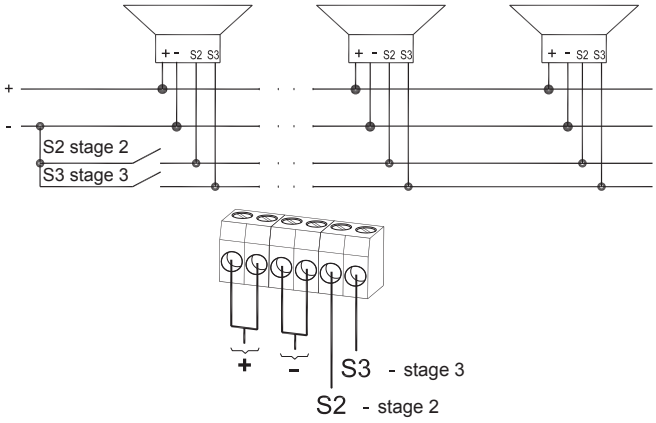
SON 4L – AC



Tone

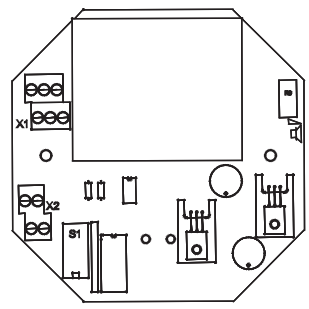
Tone selection:
to select a tone, place the jumper in the positions shown above

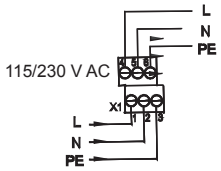
SON 4L – DC



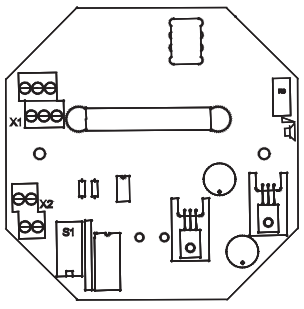
DSF 5 / DSF 10 sounder

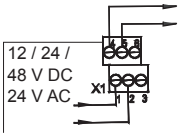
AC





DC

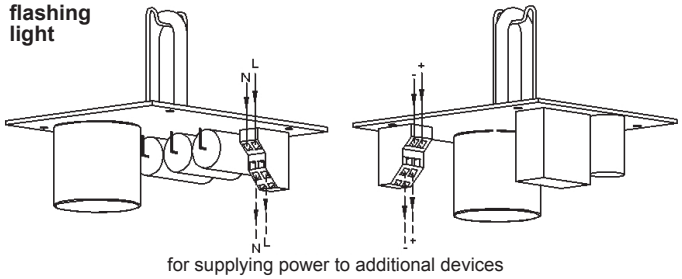




for supplying power to additional sounders;
max. 10 of type DS 10 or
max. 15 of type DS 5

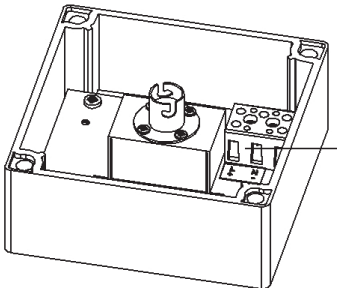
DSF 5 / DSF 10 flashing/continuous light

flashing light



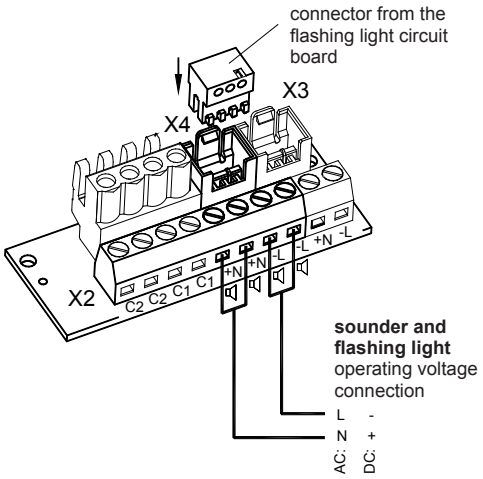
for supplying power to additional devices

continuous light

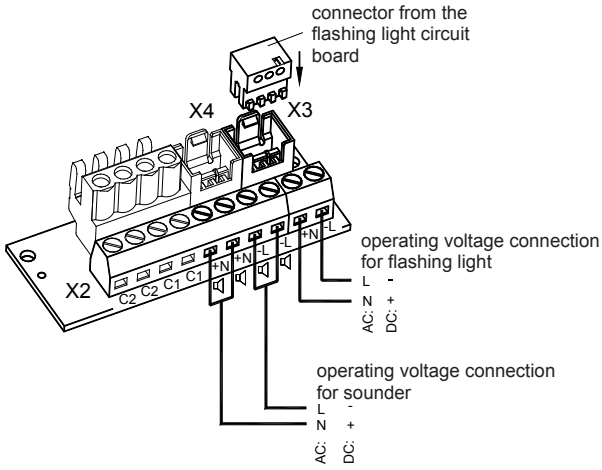


PA X 1-05 / PA X 5-05 / PA X 10-05 / PA X 10-10 / PA X 20-10 / PA X 20-15

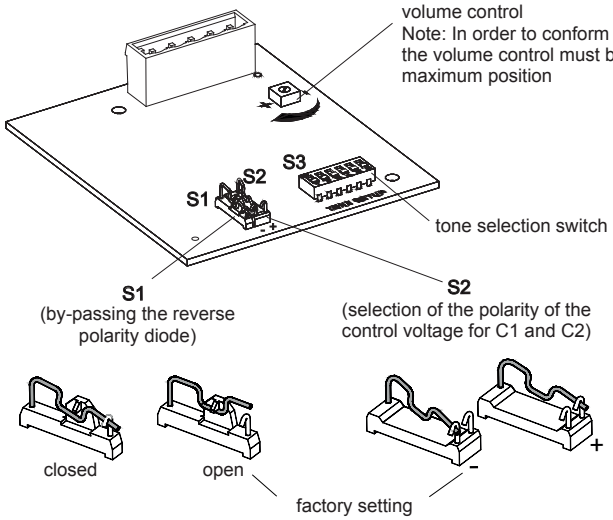
Common connection of flashing lights and sounders (delivery condition)



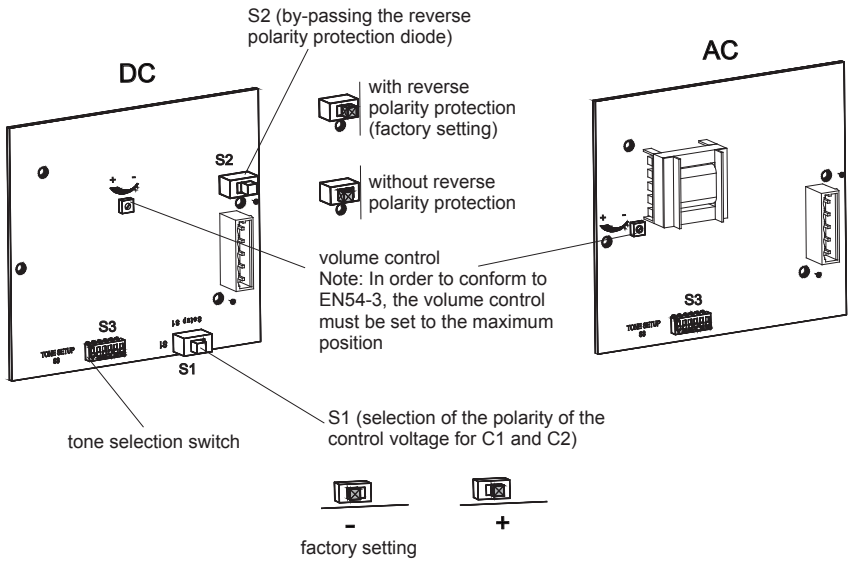
Separated connection of flashing light and sounder



PA X 1-05 / PA X 5-05



PA X 10-05 / PA X 10-10 / PA X 20-10 / PA X 20-15




BR 50



Signal Towers – an important component of your process reliability!

Benefit from the versatile uses of our range of signal towers

Just imagine a simple traffic light, equipped with the shining colours red, yellow and green. Everybody knows what the colours mean; a particular situation in the road traffic process. This traffic light could theoretically also be equipped with acoustic assistance. If the light is red, a tone is heard that means ‚stop'; if it's yellow, ‚attention: get ready to go' is signalled acoustically etc.

You can assemble Pfannenberg signal lights with their stable stainless steel tubular stands individually according to this example and exactly as your machine pool demands it. One look at the signal tower and the observer knows and hears instantly which process state the machine in question is in. For example, 'start', 'warm-up phase', 'optimum operating temperature', 'overheating' etc.
Signal technology can be as intelligent as that.

Our signal lights can be supplied as continuous, LED, blinking or flashing lights for safety-relevant applications and carry UL and GOST approvals in addition to the obligatory CE marking.

Signal tower ∅ 54 mm
BR 50



- modular design with sturdy housing for all indoor and outdoor applications in tough conditions
- wherever machine status needs to be displayed and warning signals given
- high protection system IP 54 (optionally IP 65)
- flexible building kit system guarantees easy handling
- up to 5 modules with 6 lens colours can be combined as desired by simply plugging together, even retrospectively
- mechanical and electronic components are uncoupled, resulting in a more stable structure that is less sensitive to vibration
- many different variations are possible, can be fixed by means of tubular stand, tube or direct mounting
- made of environmentally-friendly materials as per DIN ISO 14000
- monitored module for greater safety; the light bulb has two separate LED strands. If one strand fails, the alarm contact is activated and the second strand continues to light

IP 54	IP 65	UL	+ 50 °C - 25 °C
Protection system	Option		Operating temperature

Technical data		BR 50 (standard modules)					
Modules		continuous light		blinking light 1.5 Hz		flashing light	sounder
Colours		clear, yellow, amber, red, green, blue					
Segment stages (total)		max. 5 (order and colour can be selected individually)					
Dispersion		360°					
Light source [1]		bulb BA15d	LED	bulb BA15d	LED		
Rated power	per stage	7 W	depending on voltage	7 W	depending on voltage		
	per stage if 5 stages	5 W		5 W			
Flash energy	230 V / 115 V AC					0.6 J	
	24 V AC/DC					24 V: 1 J	
Flash frequency						approx. 1 Hz	
Sound pressure level							85 dB (A)
Alarm tones							7
Nominal current consumption (50/60 Hz)	230 V AC	35 mA	15 mA	35 mA	–	10.5 mA	15 mA
	115 V AC	64 mA	15 mA	–	–	20 mA	15 mA
	operating range	- 15% ... + 10%				- 10% ... + 15%	- 15% ... + 10%
Nominal current consumption	24 V	DC: 300 mA	DC: 30 mA	DC: 250 mA	DC: 30 mA	AC/DC: 100 mA	12 mA
	operating range	- 15% ... + 20%		10 V – 30 V		AC: 10 V – 27 V DC: 10 V – 35 V	- 15% ... + 20%
Operating temperature	with bulb	- 25 °C ... + 50 °C		- 25 °C ... + 50 °C			- 10 °C ... + 45 °C
	with LED	- 30 °C ... + 60 °C					
Relative humidity		90%					
Protection system according to EN 60529		IP 54					IP 43
Duty cycle		100%					
Service life of light source		approx. 1 500 h	approx. 50 000 h	approx. 1 500 h	approx. 50 000 h	light emission still 70% after 8 000 000 flashes	
Material	base	acrylonitrile butadiene styrene (ABS)					
	lens	polycarbonate (PC)					
	tube	stainless steel					
Tube thread		30 mm, M16 x 1,5					
Mounting		vertical or horizontal					
Mounting information		the sounder module or the monitored module is always the uppermost module; a maximum of 1 monitored module may be used per signal tower					
Weight	module	80 g		90 g		90 g	230 g
	base	mounting stand: approx. 220 g / tube mounting: approx. 200 g / direct mounting: approx. 180 g					

[1] please order light source separately

Technical data		monitored continuous light module	BR 50 AS-i Bus slave	
Modules			AS-i	AS-i-AB
Module types		monitored continuous light	LED module, sounder module, continuous light module, blinking light module	
Colours		yellow, red		
Segment stages (total)		max. 3	max. 4	max. 3
Dispersion		360°		
Light source		2 x 8 LED (not exchangeable)		
AS-i profile			S-8.F.E	S-8.A.E
AS-i specification			AS-i 3.0 / EN 50295	
Programming			DC-Jack, Ø 1.3 mm	
max. slave/master			31	62
Alarm output		max. 230 V / 80 mA, R_{ONmax} = 35 Ω (closed at error-free operation)		
Rated power		24 V DC		
Nominal current consumption		approx. 35 mA	< 0,25 A	
Operating range		- 15% ... + 20%	26.5 V – 31.6 V	
Operating temperature		- 30 °C ... + 60 °C		
Relative humidity		90%		
Protection system according to EN 60529		IP 54		
Duty cycle		100%		
Service life of light source		50 000 hrs @ 24 °C, 40% R.H.		
Material	base	acrylonitrile butadiene styrene (ABS)		
	lens	polycarbonate (PC)		
Mounting		vertical or horizontal		
Mounting information			the AS-i / AS-i-AB module is always used as the lowest module	
Weight		90 g	90 g	

Connection and configuration options for monitored modules

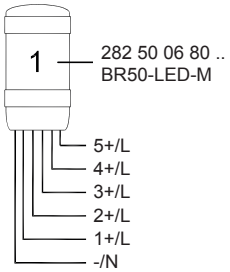
- Use of one monitored module per signal tower:
  - configuration as „top“ module (top module is monitored)
  - configuration as „bottom“ module (bottom module is monitored)
- Use of 2 monitored modules per signal tower

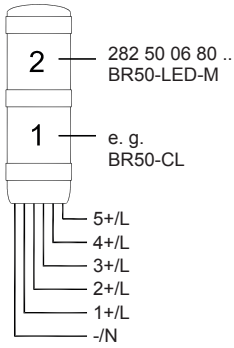
Configuration as „top“ module (top module is monitored)

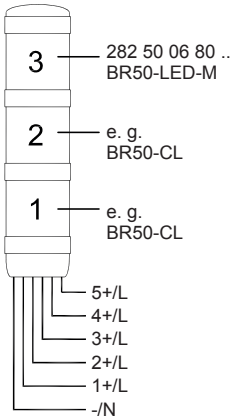
Base module + 1st stage monitored	
-/N	supply voltage (-), common connection for all stages
1+/L	supply voltage (+), activation of monitored module
2+/L	potential-free alarm output contact 1
3+/L	potential-free alarm output contact 2
4+/L	n.c.
5+/L	n.c.

Base module + 1st stage not monitored, 2nd stage monitored	
-/N	supply voltage (-), common connection for all stages
1+/L	supply voltage (+), activation of 1st stage
2+/L	supply voltage (+), activation of 2nd stage (monitored)
3+/L	potential-free alarm output contact 1
4+/L	potential-free alarm output contact 2
5+/L	n.c.

Base module + 1st/2nd stage not monitored, 3rd stage monitored	
-/N	supply voltage (-), common connection for all stages
1+/L	supply voltage (+), activation of 1st stage
2+/L	supply voltage (+), activation of 2nd stage
3+/L	supply voltage (+), activation of 3rd stage (monitored)
4+/L	potential-free alarm output contact 1
5+/L	potential-free alarm output contact 2





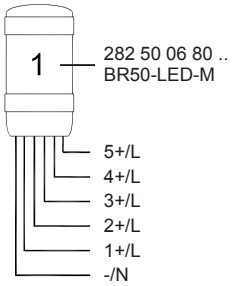


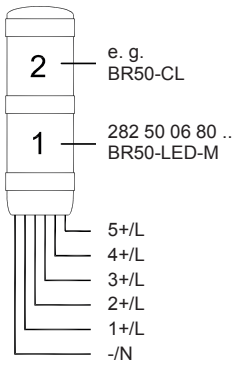
Configuration as „bottom“ module (bottom module is monitored)

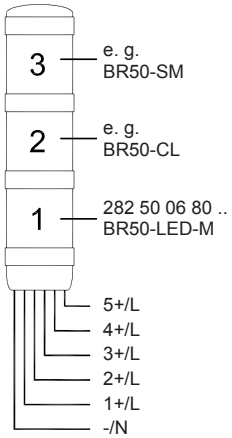
Base module + 1st stage monitored	
-/N	supply voltage (-), common connection for all stages
1+/L	supply voltage (+), activation of monitored module
2+/L	n.c.
3+/L	n.c.
4+/L	potential-free alarm output contact 1
5+/L	potential-free alarm output contact 2

Base module + 1st stage monitored, 2nd stage not monitored	
-/N	supply voltage (-), common connection for all stages
1+/L	supply voltage (+), activation of 1st stage (monitored)
2+/L	supply voltage (+), activation of 2nd stage
3+/L	n.c.
4+/L	potential-free alarm output contact 1
5+/L	potential-free alarm output contact 2

Base module + 1st stage monitored, 2nd/3rd stage not monitored	
-/N	supply voltage (-), common connection for all stages
1+/L	supply voltage (+), activation of 1st stage (monitored)
2+/L	supply voltage (+), activation of 2nd stage
3+/L	supply voltage (+), activation of 3rd stage
4+/L	potential-free alarm output contact 1
5+/L	potential-free alarm output contact 2

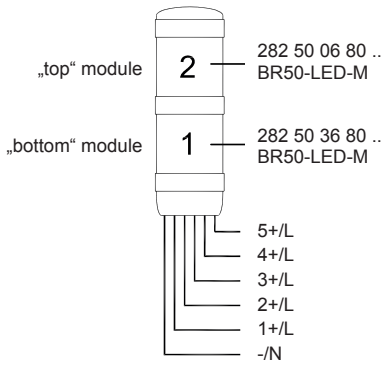


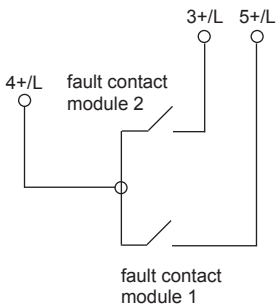




Use of 2 monitored modules per signal tower

Base module + 1st/2nd stage monitored	
-/N	supply voltage (-), common connection for all stages
1+/L	supply voltage (+), activation of 1st stage (monitored)
2+/L	supply voltage (+), activation of 2nd stage (monitored)
3+/L	alarm output module 2
4+/L	common connection alarm outputs
5+/L	alarm output module 1

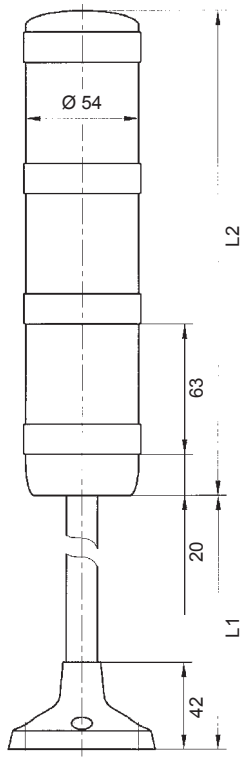


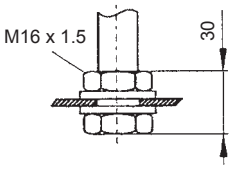


The alarm outputs of both levels have a shared contact!

Caution: Max. 2 modules can be utilized

Dimensions

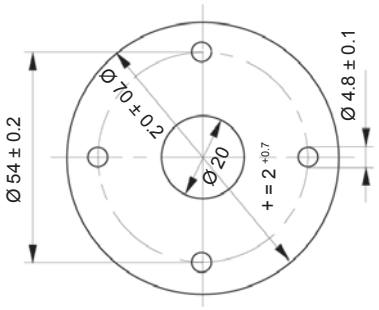




	L1 tube mounting	L1 mounting stand
Tube length 100	78	88
Tube length 250	228	238
Tube length 400	378	388

	L2
1-stage	107
2-stage	170
3-stage	233
4-stage	296
5-stage	359

Stand mounting gasket







Bayonet connection allows fast, simple and safe mounting




Base and end module


Light module clear


Light module yellow


Light module amber


Light module red


Light module green


Light module blue


AS-i module


Sounder module

Configuration alternatives



Sounder module



Stage 5



Flashing light module





Stage 4



Continuous light module with LED





Stage 3



Blinking light module







Monitored module

Stage 2



Continuous light module

AS-i-module







Stage 1

Mounting variants









Ordering details

Article numbers			BR 50 modules		
Version		Rated voltage	230 V AC	115 V AC	24 V DC
Base and end module		BR50-BC	282 50 01 0 000		
Continuous light module	clear	BR50-CL-CL	282 50 04 0 010		
	yellow	BR50-CL-YE	282 50 04 0 030		
	amber	BR50-CL-AM	282 50 04 0 040		
	red	BR50-CL-RE	282 50 04 0 050		
	green	BR50-CL-GR	282 50 04 0 060		
	blue	BR50-CL-BL	282 50 04 0 070		
Blinking light module	clear	BR50-BL-CL	282 50 05 1 010	282 50 05 1 610	282 50 05 8 010
	yellow	BR50-BL-YE	282 50 05 1 030	282 50 05 1 630	282 50 05 8 030
	amber	BR50-BL-AM	282 50 05 1 040	282 50 05 1 640	282 50 05 8 040
	red	BR50-BL-RE	282 50 05 1 050	282 50 05 1 650	282 50 05 8 050
	green	BR50-BL-GR	282 50 05 1 060	282 50 05 1 660	282 50 05 8 060
	blue	BR50-BL-BL	282 50 05 1 070	282 50 05 1 670	282 50 05 8 070
Flashing light module	clear	BR50-FL-CL	282 50 07 1 010	282 50 07 1 610	282 50 07 8 010
	yellow	BR50-FL-YE	282 50 07 1 030	282 50 07 1 630	282 50 07 8 030
	amber	BR50-FL-AM	282 50 07 1 040	282 50 07 1 640	282 50 07 8 040
	red	BR50-FL-RE	282 50 07 1 050	282 50 07 1 650	282 50 07 8 050
	green	BR50-FL-GR	282 50 07 1 060	282 50 07 1 660	282 50 07 8 060
	blue	BR50-FL-BL	282 50 07 1 070	282 50 07 1 670	282 50 07 8 070
LED module, monitored (top module)	yellow	BR50-LED-M-YE	–	–	282 50 06 8 030
	red	BR50-LED-M-RE	–	–	282 50 06 8 050
LED module, monitored (bottom module)	yellow	BR50-LED-M-YE	–	–	282 50 36 8 030
	red	BR50-LED-M-RE	–	–	282 50 36 8 050
Sounder module		BR50-SM	282 50 08 1 000	282 50 08 1 600	282 50 08 8 000
AS-i module		BR50-AS-i	282 50 14 8 300		
AS-i-AB module		BR50-AS-i-AB	282 50 17 8 300		
Information module		BR50-IM	282 50 27 0 000		
Tubular stand with plinth	100 mm	BR50-S100	282 50 15 0 010		
	250 mm	BR50-S250	282 50 15 0 020		
	400 mm	BR50-S400	282 50 15 0 040		
Tube with thread and bracket (excl. seal and cable)	100 mm	BR50-T100	282 50 16 0 010		
	250 mm	BR50-T250	282 50 16 0 020		
	400 mm	BR50-T400	282 50 16 0 040		

Light bulbs for constant light and blinking light modules must be ordered separately

Options / Accessories

Lamp remover
Article number:
282 50 25 0 000

Wall bracket for mounting stand
Article number:
282 50 20 0 000

Mounting kit for direct mounting
Article number:
282 50 21 0 000

Gaskets IP 65
Article number:
282 50 22 0 000
282 50 23 0 000


Light source

c UL us LISTED

GOST

See pages 188/189 for further information

Ordering example

Signal tower 5-stage, IP 65	Article numbers		
	Version	230 V AC	24 V DC
 Sounder module	**BR50-SM**	282 50 08 1 000	282 50 08 8 000
	+		
 Flashing light module	**BR50-MG** + **BR50-FL**	282 50 22 0 000	
		282 50 07 1 050	282 50 07 8 050
	+		
 Continuous light module with bulb or LED	**BR50-MG** + **BR50-CL** + **bulb** or **LED BA 15d**	282 50 22 0 000	
		282 50 04 0 060	
		282 13 00 0 004	282 13 00 0 000
		282 13 00 0 018	282 13 00 0 011
	+		
 Blinking light module with bulb or LED	**BR50-MG** + **BR50-BL** + **bulb** or **LED BA 15d**	282 50 22 0 000	
		282 50 05 1 030	282 50 05 8 030
		282 13 00 0 004	282 13 00 0 000
		282 13 00 0 030	282 13 00 0 007
	+		
 Continuous light module with bulb or LED	**BR50-MG** + **BR50-CL** + **bulb** or **LED BA 15d** + **BR50-MG** + **BR50-BC**	282 50 22 0 000	
		282 50 04 0 010	
		282 13 00 0 004	282 13 00 0 000
		282 13 00 0 014	282 13 00 0 006
		282 50 22 0 000	
		282 50 01 0 000	
	+		
 Mounting stand (100 mm) and seal	**BR50-TG**	282 50 23 0 000	
	BR50-S100	282 50 15 0 010	

Signal tower ∅ 35 mm
BR 35



- modular design with six different colour elements and four mounting methods offers endless combination possibilities
- high protection system
- the light is amplified by the internal prisms of the impact-proof, heat-resistant and dustproof polycarbonate lens and can be easily identified from all sides
- appealing design with a diameter of just 35 mm
- the BR 35 signal tower is the attractive icing on the cake for machine and production lines
- for use in electronic production, in laboratories, in medical technology and in all other indoor applications
- the technically and economically optimum solution for every application
- registered design no. Nr. 9706583.8, utility patent no. 29716867.3

IP 54	+ 55 °C - 35 °C	+ 45 °C - 35 °C
Protection system	LED	Filament lamp

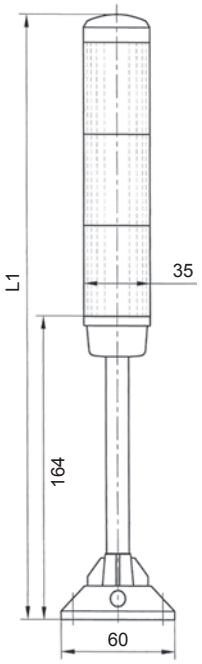
Electrical data	BR 35			
Rated voltage	230 V AC	115 V AC	24 V DC	12 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz		
Operating range	- 15% / + 10%	- 15% / + 10%	- 15% / + 20%	- 15% / + 20%
Capacity of light source	3 W	3 W	4 W	4 W

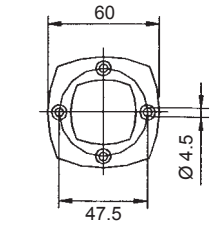
Mechanical data		BR 35
Light source	AC	BA9s, 3 W (previously installed)
	DC	BA9s, max. 4 W (previously installed)
Number of modules		max. 4
Lens colours		clear, yellow, amber, red, green, blue
Sound pressure level, sounder module		75 dB (A)
Operating temperature	LED	- 35 °C ... + 55 °C
	filament lamp	- 35 °C ... + 45 °C
Lagertemperatur		- 45 °C ... + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 54
Duty cycle		100%
Service life of light source		approx. 1 000 hrs
Material	housing	acrylonitrile butadiene styrene (ABS)
	lens	polycarbonate (PC)
	tube	Edelstahl
Type of connection		cable length 0.5 m tube mounting; 0.65 panel mounting
Terminal cross-section		single wire: 1.5 mm², fine wire: 0.14 – 1.5 mm²
Mounting information		just one screw is sufficient for exchanging beacon filters or light source
Mounting methods		mounting stand, plinth mounting, tube mounting, panel mounting (see drawings on page 186)



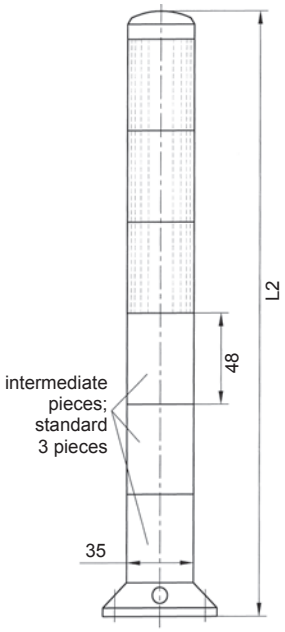
Dimensions

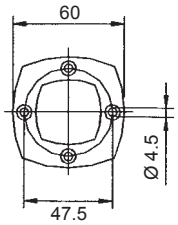
Stand mounting



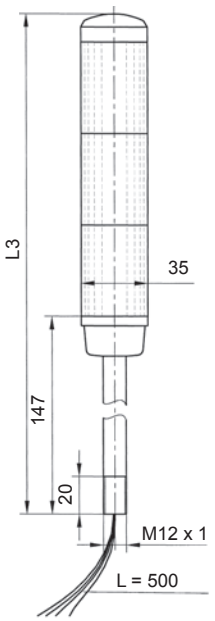


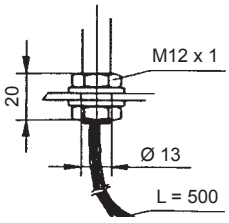
Plinth mounting



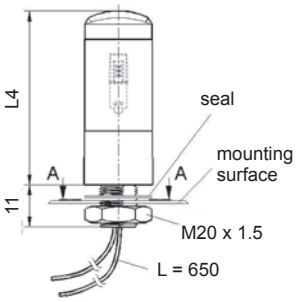


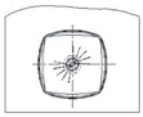
Tube mounting



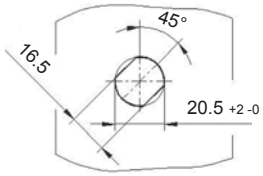


Panel mounting





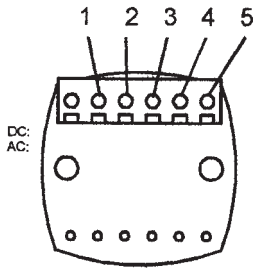
Panel cut-out



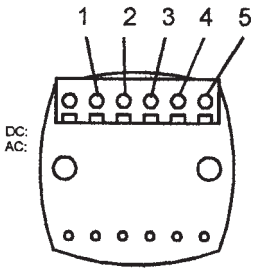
	L1	L2	L3	L4
1-stage	228	228	210	91
2-stage	276	276	258	142
3-stage	324	324	306	190
4-stage	372	372	354	238
5-stage	420	420	402	286

Connection diagrams

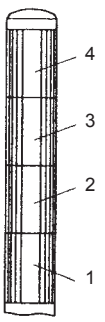
Stand mounting

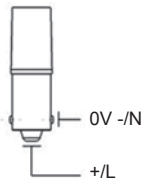


Plinth mounting



Tube mounting / Panel mounting





Wire-number	Light segment
1	1
2	2
3	3
4	4
N	-/N

Ordering details

Article numbers		BR 35 mounting stand	
Version	**Rated voltage**	230 V AC	24 V DC
1-stage BR 35-1-S		220 80 10 1 000	220 80 80 1 000
2-stage BR 35-2-S		220 80 10 2 000	220 80 80 2 000
3-stage BR 35-3-S		220 80 10 3 000	220 80 80 3 000
4-stage BR 35-4-S		220 80 10 4 000	220 80 80 4 000
3-stage with fixed colour order: top: red, middle: yellow, bottom: green		220 80 10 0 000	220 80 80 0 000
Article numbers		**BR 35 plinth mounting**	
Version	**Rated voltage**	230 V AC	24 V DC
1-stage BR 35-1-P		220 81 10 1 000	220 81 80 1 000
2-stage BR 35-2-P		220 81 10 2 000	220 81 80 2 000
3-stage BR 35-3-P		220 81 10 3 000	220 81 80 3 000
4-stage BR 35-4-P		220 81 10 4 000	220 81 80 4 000
Article numbers		**BR 35 tube mounting**	
Version	**Rated voltage**	230 V AC	24 V DC
1-stage BR 35-1-T		220 82 10 1 000	220 82 80 1 000
2-stage BR 35-2-T		220 82 10 2 000	220 82 80 2 000
3-stage BR 35-3-T		220 82 10 3 000	220 82 80 3 000
4-stage BR 35-4-T		220 82 10 4 000	220 82 80 4 000
Article numbers		**BR 35 panel mounting**	
Version	**Rated voltage**	230 V AC	24 V DC
1-stage BR 35-1-PM		220 83 10 1 000	220 83 80 1 000
2-stage BR 35-2-PM		220 83 10 2 000	220 83 80 2 000
3-stage BR 35-3-PM		220 83 10 3 000	220 83 80 3 000
4-stage BR 35-4-PM		220 83 10 4 000	220 83 80 4 000

Article numbers for other voltages on request

Options / Accessories

Mounting bracket for stand- or plinth mounting (plastic)
Article number: **282 35 20 0 020**

Mounting bracket for tube mounting (metal)
Article number: **282 35 20 0 010**

Assembly kit sounder module
Article number: **282 35 80 8 000**

Short foot plinth-mounted device with short foot

Light source

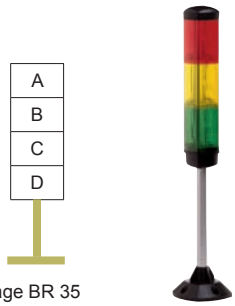
cULus LISTED

GOST

See page 189 for further information

Ordering examples

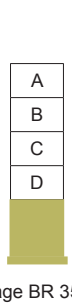
Stand mounting



3-stage BR 35
with mounting stand
24 V DC, colour order: A = red
B = yellow
C = green

Article number:
220 80 80 3 000

Plinth mounting

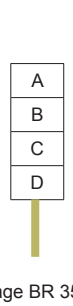




3-stage BR 35
with plinth mounting
230 V AC, colour order: A = red
B = yellow
C = green

Article number:
220 81 10 3 000

Tube mounting

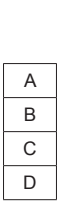




3-stage BR 35
with tube mounting
24 V DC, colour order: A = yellow
B = clear
C = green

Article number:
220 82 80 3 000

Panel mounting





1-stage BR 35
for panel mounting
230 V AC, colour order: A = red

Article number:
220 83 10 1 000

Please indicate color sequence (A/B/C/D) in your order as depicted above.

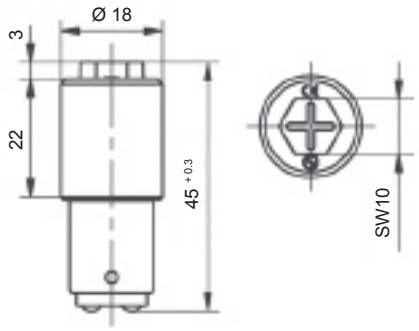
Accessories for BR 50



Multi-LED BA15d filament lamps

Energy and cost-saving high output SMD LEDs replace filament lamps

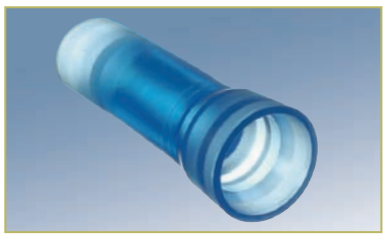
- extremely long service life (> 50,000 hrs)
- low power consumption (e.g. 30 mA at 24 V)
- shock/vibration-resistant
- same brightness for all voltages
- resistant to environmental influences
- option ‘plus’ = extra bright



Ordering details

Article numbers		LED BA15d		
Version	Rated voltage	230 V AC [1]	115 V AC	24 V AC/DC
white	standard plus	282 13 00 0 013	282 13 00 0 021	
white	standard	282 13 00 0 014	282 13 00 0 022	282 13 00 0 006
yellow	standard plus			282 13 00 0 007
yellow	standard	282 13 00 0 015	282 13 00 0 023	282 13 00 0 008
red	standard plus			282 13 00 0 009
red	standard	282 13 00 0 016	282 13 00 0 024	282 13 00 0 010
green	standard plus	282 13 00 0 017	282 13 00 0 025	
green	standard	282 13 00 0 018	282 13 00 0 026	282 13 00 0 011
blue	standard plus	282 13 00 0 019	282 13 00 0 027	
blue	standard	282 13 00 0 020	282 13 00 0 028	282 13 00 0 012
Article numbers		**Filament lamps BA15d**		
BR50-L	7 W	282 13 00 0 004	282 13 00 0 002	282 13 00 0 000
BR50-L	5 W	282 13 00 0 005	282 13 00 0 003	282 13 00 0 001

[1] not for flashing light module BR 50-FL, article numbers upon request

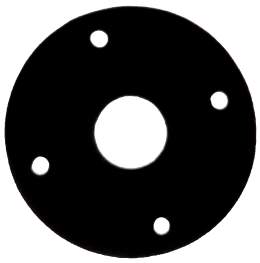


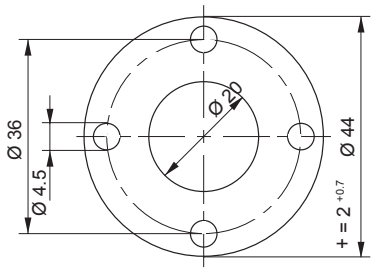
Lamp remover

Lamp remover for simple bulb replacement.

Ordering details

Article numbers	Lamp remover
BR50-LS	282 50 25 0 000



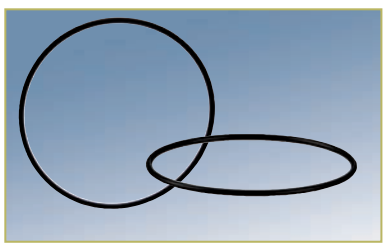


Direct mounting set

Gasket and mounting materials for direct mounting.

Ordering details

Article number	Direct mounting set
BR50-BG	282 50 21 0 000

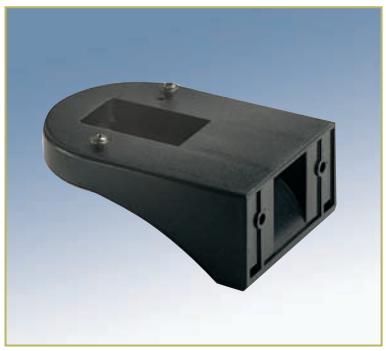


Option IP 65

Gaskets for higher protection system IP 65.

Ordering details

Article numbers	IP 65 gaskets
Module gasket BR50-MG (1 x per light module plus 1 x base module)	282 50 22 0 000
Tube gasket BR50-TG (for tubular stand or tube mounting only)	282 50 23 0 000

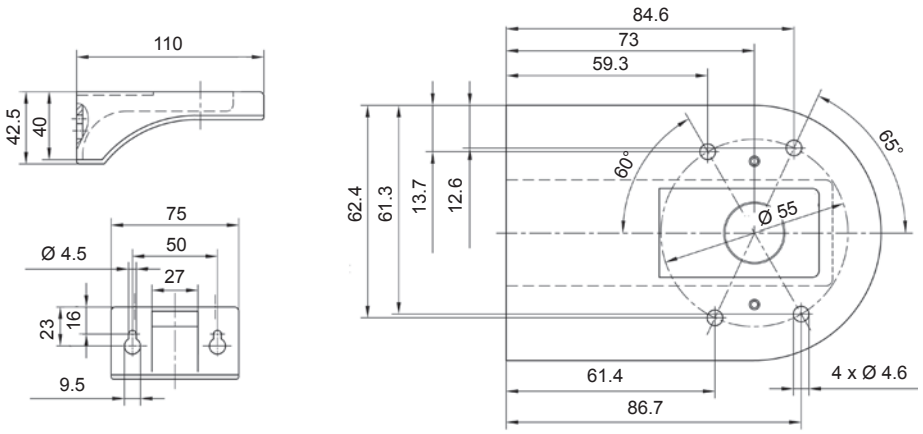


Wall bracket with hood

Plastic wall holder for mounting the BR 50 on a tubular stand.

Dimensions

BR 50-W



Ordering details

Article number	BR50-W
Plastic wall bracket with hood	282 50 20 0 000

Accessories for BR 35



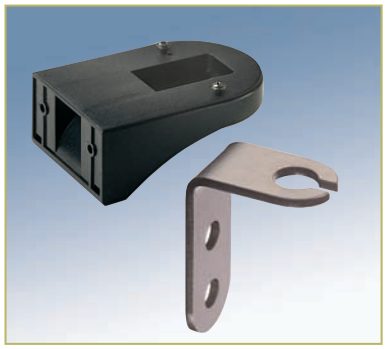


Light source

Filament lamps and LEDs for signal towers from the BR 35 series.

Ordering details

Article numbers		LED
Colour	Rated voltage	12 V / 24 V DC
white		286 13 00 0 000
yellow		286 13 00 0 001
red		286 13 00 0 002
green		286 13 00 0 003
blue		286 13 00 0 004
Article numbers		**Filament lamps BA9s**
Rated voltage		pack of 5
12 V DC 4 W		288 13 00 0 003
24 V DC 4 W		288 13 00 0 002
115 V AC 3 W		288 13 00 0 001
230 V AC 3 W		288 13 00 0 000



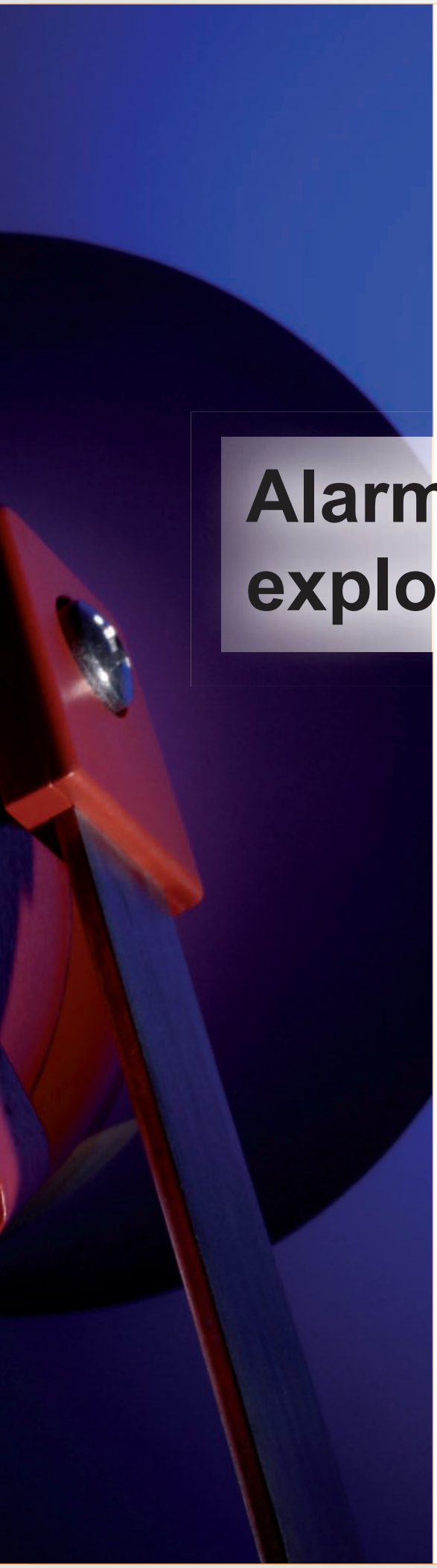
Mounting bracket

Bracket for mounting the BR 35.

Ordering details

Article numbers		Mounting bracket
Plastic bracket for mounting on tubular stand or plinth	BR35-W	282 35 20 0 020
Metal bracket for tube mounting	BR35-A	282 35 20 0 010


BExS120E
ALARMSCHALLGEBER
NENNSPANNUNG: 24V DC
NENNSTROM: 800mA
II 2G Ex de IIC T4 für Ta -50° bis +55°C
Ex de IIB T4 für Ta -50° bis +70°C
KEMA 99ATEX7906
CE 0344
Kabeleinführung
M20x1,5
Jahr / Serien Nummer
09 / 3S22000641
"WARNUNG"
DECKELSCHRAUBEN KLASSE A4-80
NICHT ÖFFNEN, WENN EXPLOSIVE
ATMOSPHÄREN VORHANDEN SIND
NUR HITZEBESTÄNDIGE KABEL UND
KABELVERSCHRAUBUNGEN (ZUGELASSEN BIS +110°C) BEI
UMGEBUNGSTEMPERATUREN ÜBER +40°C VERWENDEN
D-21035 Hamburg, Germany
www.pfannenberg.com
Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY



Alarm safety even in explosive areas

Ex signaling devices are used wherever explosive gases, vapours and dusts can become dangerous

Our Ex-series visual and acoustic signaling devices stand out with their particularly sturdy construction and insensitivity to environmental influences and chemicals.

These are information, warning and emergency signals for safety, hazard and fire alarm systems; for building, industrial and commercial automation; for disaster warnings and for hazardous areas.

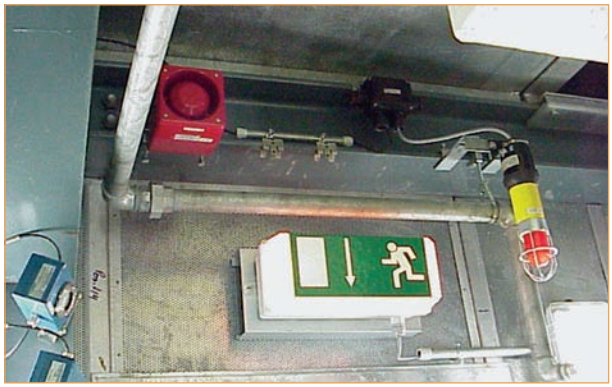
Your safety – worldwide – is safe in our hands

As a globally operative company, Pfannenberg is present wherever the safety of man, machine and environment is concerned.

All Ex signaling devices by Pfannenberg are ATEX certified and offer unlimited quality and safety. The needs of the customer are Pfannenberg's utmost priority. Inventiveness and numerous product innovations have made Pfannenberg one of the market leaders in the Ex alarm product sector.

Many customers, from the most diverse industries where explosive atmospheres can be formed, have been placing their trust in Pfannenberg's know-how, quality and flexibility for decades.

On the following pages we have gathered together numerous new products, applications and references, intended to provide you with ideas for the tasks that you need to solve in the Ex area.

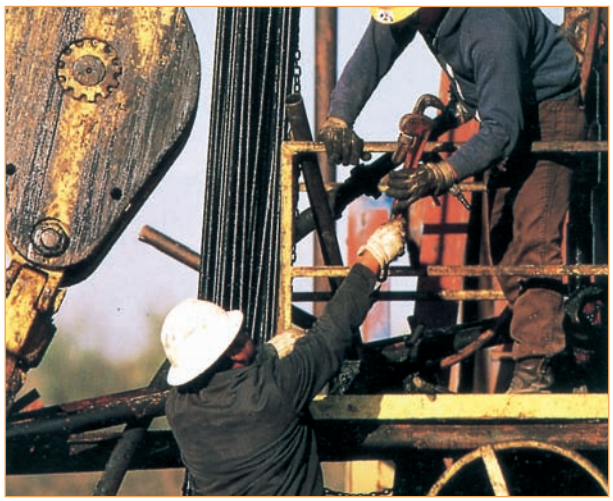


Gas detection with visual and acoustic alarms: DS 10 ATEX Ex sounder and CWB-ATEX Ex flashing light



Acoustic alarm in a gas-fired power station: BExS 120 ATEX Ex sounder





Safety has no limits

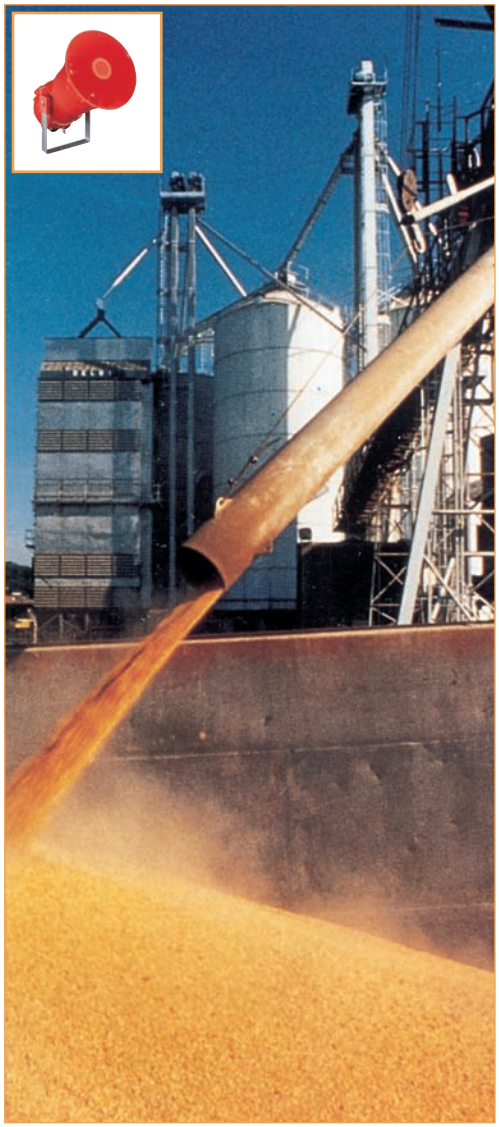
There is a danger of explosion wherever combustible gases, vapours, fluids or dusts occur and can mix with air, oxygen or another reactive gas. The danger can arise in very diverse locations, e.g. in the petrochemical and chemical industry or at filling stations and oil/gas rigs. However, facilities such as corn silos and coating plants are also potentially at risk of an explosion. Explosions endanger man and the environment.

For this reason, international measures have been developed that are intended to prevent explosions or to minimise their effects.

Our Ex signaling devices meet the toughest requirements and are subjected to the most stringent checks. Their quality and safety are checked by responsible bodies for compliance with the highest quality standards.



Visual alarm on a gas turbine generator: CWB-ATEX Ex flashing light





The CWB-ATEX Ex flashing light and the BExS 120 ATEX Ex sounder signal danger here without becoming a danger themselves – highly visible and highly audible

Safety for man, machine and the environment

If it's about safety, Pfannenberg is always the right choice, because the Pfannenberg brand stands for 'safety for man, machine and the environment'.

Global references speak a clear language. Ex-protected visual and acoustic signaling devices by Pfannenberg are subjected to the toughest demands every day and are in use wherever explosive atmospheres can be formed, e.g. in oil and gas drilling in the North Sea - by Shell DEA, Exxon Mobil ...- or in refineries and chemical plants - at BASF, Bayer, Degussa …

Regardless of whether it's about corrosion, vibration, shock or alternating climates, you are always on the safe side with Ex alarm products by Pfannenberg!



Process gas analysis: CWB-ATEX Ⓔx flashing light



Oil and gas drilling in the sea. Man and technology in the most confined space. BExS 120 ATEX Ⓔx sounder



Photo: © Dieter Schütz/PIXELIO



ATEX guarantees your safety

Directives

In the Ex-Directive 94/9/EU, the European Union has provided a basis for binding uniform requirements for characteristics with regard to the protection of systems, appliances and components against explosion. With these standards, the manufacturer can assume when designing and assessing the explosion protection that he is developing explosion-protected systems, appliances and components that conform to the Ex-Directive 94/9/EU and which are then subjected to uniform binding test procedures by an appointed body of the European Union.

A uniform classification of explosion-endangered plants is the basis for the selection, assignment and installation of systems, appliances and components. In order to protect employees, the user is obliged by Directive 1999/92/EU to assess the explosion risk of the plant, to divide the plant into danger zones and to draw up an explosion protection document or a series of documents, which fulfil the requirements contained in this directive, and to keep them up to date.

Through directives 94/9/EU and 1999/92/EU, the prerequisites have been created for a complete unification of the regulations for protection against explosion in the European Union and form a closed system, with which explosions can be effectively avoided in order to protect man, machine and environment.

Selecting suitable Ex alarm products

The selection of suitable alarm products is essentially governed by two factors, which can be distinguished as follows:

a) Ex environmental requirements
b) Functional requirements

Ex environmental requirements

Groups and gases

Explosion-protected products are catalogued with regard to their different purposes of use. The first distinguishing criteria is whether usage is underground or above ground:

Group I: operating equipment for underground mining with a ‘firedamp risk’
Group II: operating equipment for all other (non-group I) areas

A further distinction is made in Group II according to the types of gases present in the operation environment and the temperature class. On the one hand, this describes the maximum surface temperature of the explosion-protected device and, on the other, the minimum ignition temperature of the gas or vapour. For secure protection against explosion, it must be ensured that the surface temperature of the device (e.g. the flashing light) is always lower than the ignition temperature of the gas.

Classification of gases and vapours into temperature classes and gas groups

	T1 ≤ 450°C	T2 ≤ 300°C	T3 ≤ 200°C	T4 ≤ 135°C	T5 ≤ 100°C	T6 ≤ 85°C
I	Methane					
IIA	Acetone Ethane Ethyl acetate Benzene Acetic acid Ammonia Carbon monoxide Methane Toluene Propane Methanol	Ethyl alcohol i-amyl acetate n-butane n-butyl alcohol	Petrol Diesel Aviation fuel n-hexane Heating oil	Acetyl aldehyde		
IIB	Town gas	Ethylene		–		
IIC	Hydrogen	Acetylene		–		CS_2

The gases are classified in groups ABC according to their flammability. This in turn generates different requirements for the enclosures of electrical equipment. For explosion-proof enclosures, these include the dimensions of the closure gap. The gas groups are upwardly compatible, i.e. devices that are suitable for use in group IIC can also be used in the groups IIB or IIA. The same compatibility applies to the temperature classes, according to which devices from temperature class T6 can also be used in all other temperature classes. However, devices from temperature class T4 are adequate for most applications.

ATEX guarantees your safety

Zones and categories

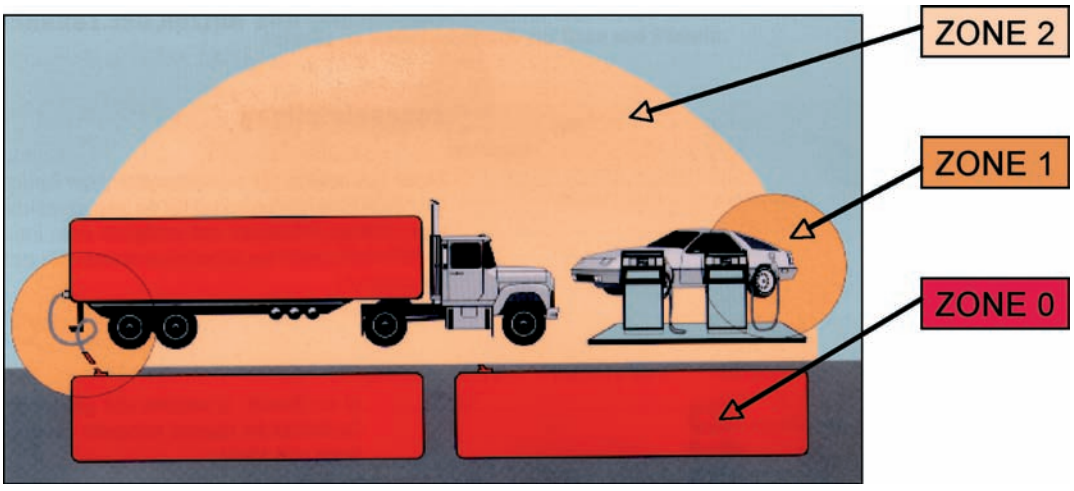
Potentially explosive areas are defined in section 2 of ElexV (Germany) as areas in which the atmosphere may be capable of explosion due to local and operational conditions.

It has proven to be useful to divide potentially explosive areas into zones, taking into account different hazards caused by explosive atmospheres.

Definition of the zones according to section 2 para. 4 ELX (96)

Potentially explosive areas due to combustible gases		
Zone 0	**Zone 1**	**Zone 2**
Areas in which an explosive atmosphere of gases, vapours or mists exists constantly, over long periods or frequently.	Areas in which an explosive atmosphere of gases, vapours or mists occasionally occurs.	Areas in which explosive atmospheres of gases, vapours and mists normally never occur, but if they do, then only rarely and only for short time periods.

Potentially explosive areas due to combustible dusts		
Zone 20	**Zone 21**	**Zone 22**
Areas in which an explosive dust atmosphere exists constantly, over long periods or frequently.	Areas in which an explosive dust atmosphere occasionally occurs.	Areas in which explosive dust atmospheres normally never occur, but if they do, then only rarely and only for short time periods.



The Ex devices are sub-divided analogue to the Ex zones into the following device categories

Device classification according to groups and categories:							
Group I		**Group II**					
Category M		**Category 1**		**Category 2**		**Category 3**	
		G	D	G	D	G	D
1	2	(gas) Zone 0	(dust) Zone 20	(gas) Zone 1	(dust) Zone 21	(gas) Zone 2	(dust) Zone 22

ATEX guarantees your safety

Types of protection systems

The European standards describe eight different explosion protection methods that can be applied in order to make electrical equipment suitable for use in the various ex zones. The different types of protection vary widely with regard to the degree of complexity and some of them are not usable with mobile equipment, for example. The type of ignition protection is selected with the greatest of care for Pfannenberg devices in order to guarantee the best possible cost-benefit ratio. Pfannenberg uses the following protection systems for its alarm equipment:



Flame proof enclosure **'d'**

In the case of pressure-resistant encapsulation, the actual operating equipment is built into a pressure-resistant housing. In the event of an explosion inside, the housing prevents an ignition breakthrough into the surrounding area. The explosion is therefore restricted to the interior of the device. On account of the necessary wall thickness, devices in this protection system are of a very sturdy construction and thus also often very well suited for adverse environmental conditions.



Photo: © Knase/PIXELIO

Enhanced safety 'e'

This type of enhanced protection is usable with only a few types of equipment/components (e.g. terminals). This type of protection is conveniently often combined with pressure-resistant encapsulation. In alarm products, this means that all essential components are housed in the pressure-resistant housing and only the connection terminals are accessible in the increased safety housing. For this reason Pfannenberg also offers most devices with an 'e connection box' in order to enable simple and safe electrical connections to be made. The sensitive electronic components are therefore protected against accidental damage during mounting.



Intrinsically safety 'i'

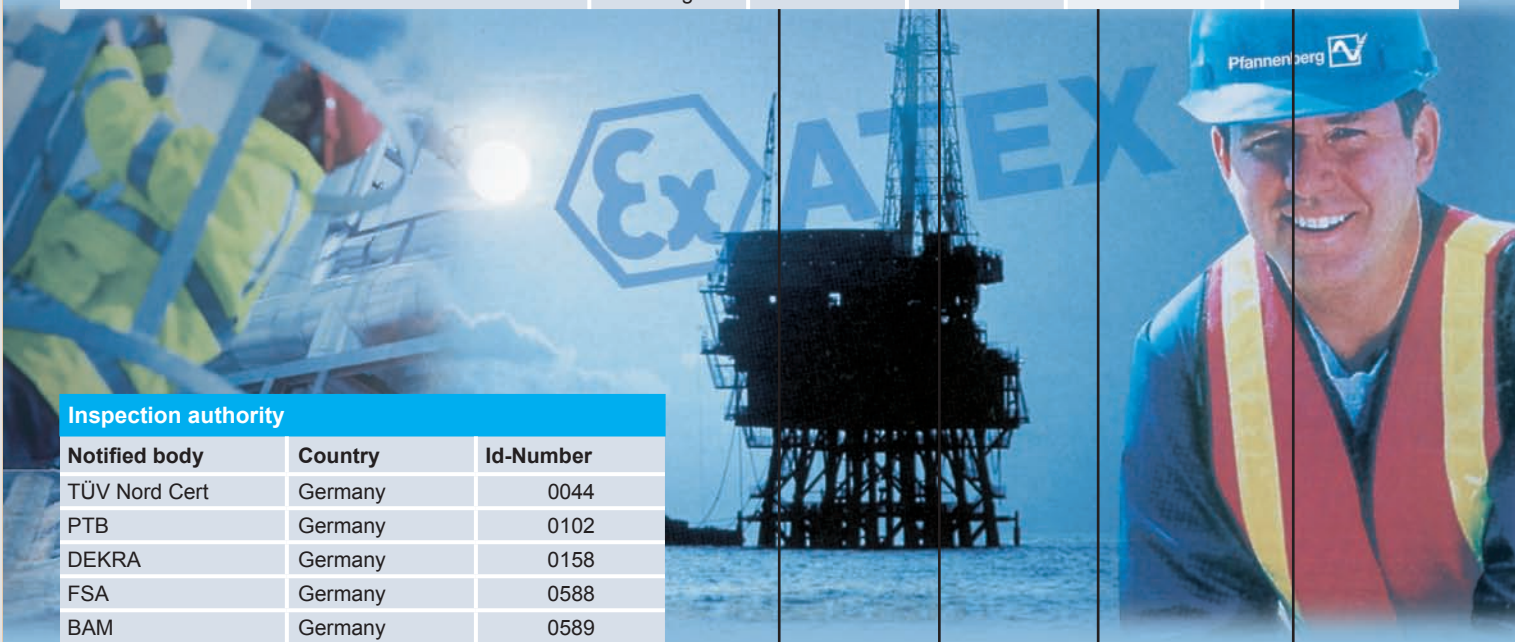
In the ignition protection type 'i', the current and voltage of all energy storage devices as well as the complete device are limited to the extent that no ignition sparks and no excessively hot surfaces can be generated. An explosive atmosphere can develop, but it will not be ignited.



Photo: © emuman/aboutpixel

ATEX - Designation of electrical equipment for potentially explosive environments!

Conditions in potentially explosive areas						
Combustible substances	**Temporary behaviour of the combustible substance in the Ex area**	**Classification of the potentially explosive areas**			**Required marking of the operating equipment to be used according to CENELEC**	
		CENELEC/IEC	**US NEC 505**	**US NEC 500**	**Device group**	**Device category**
gases, vapours	are present constantly, for long periods or frequently	Zone 0	Class I Zone 0	Class I Division 1	II	1G
	occur occasionally	Zone 1	Class I Zone 1		II	2G or 1G
	probably do not occur, but if so, then only rarely or for short periods	Zone 2	Class I Zone 2	Class I Division 2	II	3G or 2G or 1G
dusts	are present constantly, for long periods or frequently	Zone 20	–	Class II Division 1	II	1D
	occur occasionally	Zone 21	–		II	2D or 1D
	probably do not occur due to swirling dust, but if so, then only rarely or for short periods	Zone 22	–	Class II Division 2	II	3D or 2D or 1D
methane, dust	– –	Mining Mining	– –	Mining –	I I	M1 M2 or M1



Inspection authority		
Notified body	**Country**	**Id-Number**
TÜV Nord Cert	Germany	0044
PTB	Germany	0102
DEKRA	Germany	0158
FSA	Germany	0588
BAM	Germany	0589
IBExU	Germany	0637
INERIS	France	0080
LCIE	France	0081
KEMA	Netherlands	0344
SP	Sweden	0402
LOM	Spain	0163
EECS (BASEEFA)	UK	1180
SIRA	UK	0518

NEC 500
NEC 505
IEC
CENELEC

CE 0158

Class I
Class I

II

Division 1
Zone 1

2G

TIP: This double page can be ordered free of charge from Pfannenberg as a poster (A2). Article number: 075000019

Temperature classes and highest permissible surface temperatures of the equipment

Highest permissible surface temperature	USA (NEC 500)	Usability of the equipment	Temperature classes according to CENELEC/IEC NEC 505	Max. surface temperature of the equipment	Ignition temperature of the combustible substances
450 °C	T1	T1	T1	450 °C	> 450 °C
300 °C	T2	T2	T2	300 °C	> 300 °C < 450 °C
280 °C	T2A	T3	T3	200 °C	> 200 °C < 300 °C
260 °C	T2B	T4	T4	135 °C	> 135 °C < 200 °C
230 °C	T2C	T5	T5	100 °C	> 100 °C < 135 °C
215 °C	T2D	T6	T6	85 °C	> 85 °C < 100 °C
200 °C	T3				
180 °C	T3A				
165 °C	T3B				
160 °C	T3C				
135 °C	T4				
120 °C	T4A				
100 °C	T5				
85 °C	T6				

Classification of gases and vapours into explosion groups and temperature classes

Classification into temperature classes / gas groups (extract)						
	T1	T2	T3	T4	T5	T6
I	Methane	–	–	–	–	–
IIA	Acetone Acetic acid Ammonia Propane *	Ethyl alcohol n-butane n-butyl alcohol	Petrols Heating oil Diesel	Acetaldehyde Ethyl ether	–	–
IIB	Town gas	Ethylene *		–	–	
IIC	Hydrogen *	Acetylene *		–	–	Carbon bisulphide

* typical ignitable gas

Protective systems

Protective system	Marking	Protection principle	Zone	IEC	EN	FM / UL	Applications
general requirements	–	–	–	60079-0	60079-0		all applications
flame proof enclosure	Ex d	transmission of an explosion to the outside is excluded	1 or 2	60079-1	60079-1	FM 3600 UL 60079-1	switchgear, controllers, motors, command and alarm devices, power electronics
enhanced safety	Ex e	avoidance of sparks and high temperatures	1 or 2	60079-7	60079-7	FM 3600 UL 60079-7	junction and terminal boxes, enclosures, motors, beacons, terminals
intrinsically safety	Ex i	limitation of the energy of sparks and temperatures	0, 1 or 2 [3]	60079-11	60079-11	FM 3610 UL 60079-11	measurement, control and regulating equipment, sensors, actuators, instrumentation
pressurized enclosure	Ex p	Ex atmosphere is kept away from the source of ignition	1 or 2	60079-2	60079-2	FM 3620 NFPA 496 UL 60079-2	power and control cabinets, motors, measurement and analysis devices, computers
encapsulation	Ex m	Ex atmosphere is kept away from the source of ignition	1 or 2	60079-18	60079-18	FM 3600 UL 60079-18	relay and motor coils, circuitry, solenoid valves, connecting systems
oil immersion	Ex o	Ex atmosphere is kept away from the source of ignition	1 or 2	60079-6	60079-6	FM 3600 UL 60079-6	transformers, relays, start-up controllers, switching devices
powder filling	Ex q	transmission of an explosion to the outside is excluded	1 or 2	60079-5	60079-5	FM 3600 UL 60079-5	transformers, relays, capacitors
type 'n' protection	Ex n [4]	various protection principles for Zone 2	2	60079-15	60079-15	FM 3600 UL 60079-15	all applications for Zone 2
protective enclosure	IP	Ex atmosphere is kept away from the source of ignition	0/21/22	61241-1	61241-1		all applications

[1] devices, [2] systems
[3] ia use in Zones 0, 1, 2 / ib use in Zones 1, 2
[4] nA = non-sparking, nC = sparking equipment (suitable protection), nR = vapour-proof enclosure, nL = energy-limited (differences between North America and Europe)

Additional conditions

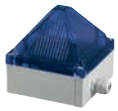
Conditions	Marking
Equipment usable without restriction	–
Observe special conditions for use	X
Ex component with partial certification, not capable of operation alone; CE conformity is only certified after installation in complete equipment	

Group A, B, C, D

AEx d	IIC	T6
Ex de	IIC	T6
Ex de	IIC	T6

PTB 01 ATEX 1234 X

All Ex signaling devices at a glance

	Type	Suitable for use in zones						Maximum signal reception range as per EN 54-23 in metres (m)[1]					Light intensity/ Sound pressure level	Pro-tection system	Approvals / Standards						Page
		0	1	2	20	21	22	5	25	50	100	125			GL	GOST	UL	VdS	EN 54-3	IEC	
	Visual signaling devices																				
	Quadro F12-3G/3D			●			●						7.5 J	IP 66 IK 08		●					202
	Quadro-LED Flex-3G/3D			●			●						9 cd	IP 66 IK 08		●					204
	BR 50-LED 3G/3D			●			●							IP 65		●					206
	CWB-ATEX		●	●		●	●						5 J	IP 66	●	●					208
	BExBG 15		●	●		●	●						15 J	IP 66 IP 67		●					210
	BExBG 10		●	●		●	●						10 J			●					
	BExBG 05		●	●		●	●						5 J			●					
	BExBG L1		●	●		●	●						9 cd			●					212
	IS-mB1	●	●	●									6 cd	IP 65		●					214
	Audible signaling devices **Sounders**																				
	DS 10 3G/3D			●			●						110 dB (A)	IP 66 IP 67	●	●		●	●		216
	DS 5 3G/3D			●			●						105 dB (A)		●	●		●	●		
	BExS 120 d/e		●	●									117 dB (A)	IP 66 IP 67		●		●[2]	●[2]	●[2]	218
	BExDS 120 d/e		●	●		●	●														
	BExS 110 d/e		●	●									110 dB (A)			●		●[2]	●[2]	●[2]	220
	BExDS 110 d/e		●	●		●	●														
	IS-A105N	●	●	●									105 dB (A)	IP 66		●					222
	IS-mA1	●	●	●									100 dB (A)	IP 65		●					224

● available
○ in preparation

[2] only d version

	Type	Suitable for use in zones						Maximum signal reception range for a 65 dB ambient noise level in metres (m)[1]					Sound pressure level / Light intensity	Pro-tection system	Approvals / Standards						Page
		0	1	2	20	21	22	5	25	50	100	125			GL	GOST	UL	VdS	EN 54-3	IEC	
	Audible signaling devices							**Loudspeakers**													
	**BExL 25 d/e**		●	●									117 dB (A)	IP 66 IP 67		●					226
	BExL 15 d/e		●	●									113 dB (A)			●					
	Combined visual-audible signaling devices																				
	**BExCS 110-05D**		●	●									110 dB (A) 5 J	IP 67		●					228
	BExDCS 110-05D		●	●		●	●									●					
	BExCL 15-05D		●	●									113 dB (A) 5 J			●					230
	**IS-mC1**	●	●	●									100 dB (A) / 6 cd	IP 65		●					232
	Accessories																				
	**Zener barriers**																				234

[1] The specification for the alarm signal reception range assumes an existing ambient noise level of 65 dB (A). In accordance with applicable regulations, the calculated alarm range for the sound level 65 dB (A) was given + 10 dB (A) = 75 dB (A).

● available
○ in preparation

Note:
Using sounders with a sound pressure level of ≥ 120 dB (A) can lead to hearing damage. People must not be permitted to stay in the near vicinity of the sounder. All specified sound pressure levels are based on a measurement distance of 1 m, provided that nothing different is specified.



Further information can be found on the Internet:
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Flashing Light 7.5 Joules Quadro F12-3G/3D ATEX



The Quadro F12 3G/3D flashing light is designed for tough demands under industrial conditions and is usable as a visual alarm. The flashing light, which is suitable for use both indoors and out, generates bright light impulses with a high attention-drawing effect.

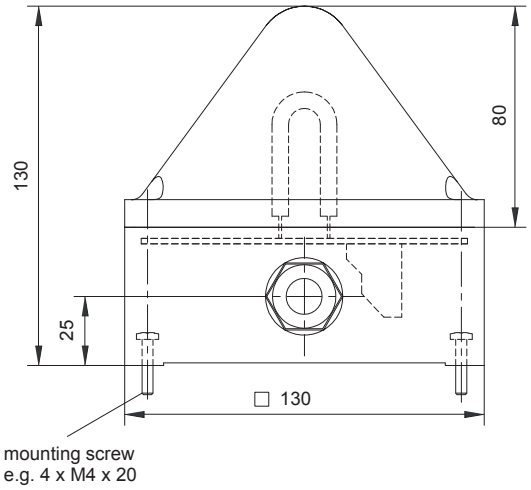
- for use in potentially explosive areas in Zone 2 as per EN 60079-10 and Zone 22 as per EN 61241-10
- the requirements of the EN 60079-0, EN 60079-15, EN 61241-0, EN 61241-0 (2007) and EN 61241-1 (2005) standards are fulfilled
- usable for gases in the temperature classes T1, T2, T3 and T4, as well as for non-conductive dusts, provided that the surface temperature of the equipment does not exceed + 105 °C

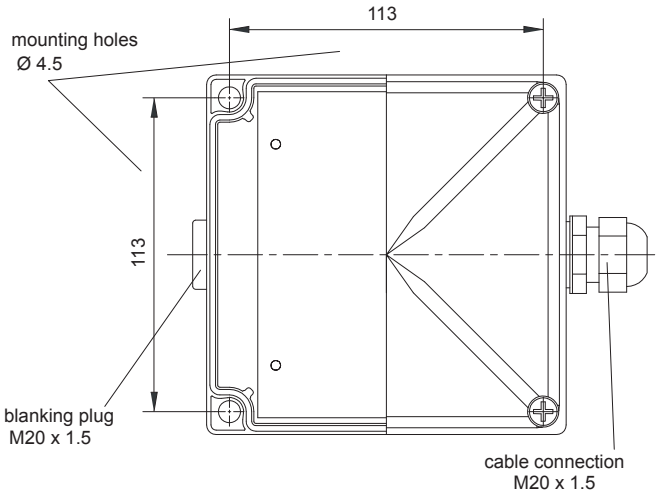
r = 15 m	IP 66	IK 08	+ 45 °C / - 20 °C
Range as per EN 54	Protection system	Impact-proof housing	Operating temperature

Electrical data	Quadro F12-3G/3D ATEX		
Rated voltage	230 V AC	115 V AC	24 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	
Operating range	195 – 253 V	95 – 127 V	18 – 30 V
Nominal current consumption	90 mA	140 mA	360 mA
Initial current limited to	< 7 A / 150 µs	< 7 A / 150 µs	< 5 A / 2 ms

Mechanical data		Quadro F12-3G/3D ATEX
Explosion protection		II 3G Ex nR IIC T4 - 20 °C ≤ Ta ≤ + 45 °C II 3D Ex tD A22 IP66 T105 °C - 20 °C ≤ Ta ≤ + 45 °C
Category (area of use)		3G (Zone 2) 3D (Zone 22)
Conformity to standards		Guideline 94/9/EG (ATEX 100a)
Testing body		Pfannenberg
Special conditions		X: according to the requirements of prDIN EN 60 079-0, DIN EN 61241-0 (2007) and DIN EN 61241-1 (2005), the equipment is suitable for applications with a low degree of mechanical danger. It must therefore be ensured that the flashing light is mounted with sufficient protection against impacts. A protective cage is not mandatory.
Flash rate		0.83 Hz = 50 flashes/min.
Flash energy		7.5 J
Light intensity (DIN 5037)	clear lens	84 cd
Lens colours		clear, white, yellow, amber, red, green, blue
Operating temperature		- 20 °C ... + 45 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		100%
Protection system according to EN 60529		IP 66; mounting arbitrary
Impact resistance as per EN 50102		IK 08
Protection class		II
Duty cycle		100%
Service life of the flash tube		light emission still 70% after 8 000 000 flashes
Material	lens	polycarbonate (PC)
	housing	polycarbonate (PC), RAL 7035 (optionally RAL 3000)
Connecting terminals		cage clamp terminal 0.08 – 2.5 mm²
Cable entry		2 x M20 sideways (1 x blanking plug, 1 x cable connection)
Weight		600 g

Dimensions





Ordering details

Article numbers		Quadro F12-3G/3D ATEX	
Lens colour	**Rated voltage**	230 V AC	24 V DC
clear		210 41 10 1 008	210 41 80 1 008
yellow		210 41 10 3 008	210 41 80 3 008
amber		210 41 10 4 008	210 41 80 4 008
red		210 41 10 5 008	210 41 80 5 008

Article numbers for other colours and voltages on request

Options / Accessories

GOST

Manufacturer's declaration

We hereby declare that the explosion-protected means of alarm with the type designation **Quadro F12 3G/3D** has been developed and manufactured in accordance with the requirements as per EN 50014.

This declaration is based on compliance with the following regulations and standards:

DIN EN 60079-0	Electrical equipment for areas at risk of gas explosions – Part 0: General requirements
DIN EN 60079-15	Electrical equipment for areas at risk of explosions – Part 15: type of protection type 'n'
DIN EN 61241-0	Electrical equipment for use in areas with combustible dust – General requirements
DIN EN 61241-1	Electrical equipment for use in areas with combustible dust – protection by enclosure 'tD'
DIN EN 60598-1	Lights – Part 1: General requirements and tests
DIN EN 60947-1	Low-voltage switchgear – Part 1: General specifications
DIN EN 60529	Types of protection by enclosure (IP code)
DIN EN 50102	Types of protection by enclosure for electrical equipment against external mechanical stresses (IK code)
DIN EN 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards, noise immunity for industrial areas
DIN EN 61000-6-3	Electromagnetic compatibility (EMC) – Part 6-3: Generic standards, interference emission for residential areas, business and commercial areas as well as small companies
DIN EN 981	Machine safety - System of acoustic and visual alarm signals and information signals
ISO 11429	System of acoustic and visual alarm signals and information signals
UVV-BGV A3(VBG4)	Electrical plants and equipment
GSGV	German Appliance Safety Act

The Quadro F12 3G/3D flashing lights are approved for use in potentially explosive areas in Zones 2 and 22 as per 94/9/EU.

LED Multi-function Light Quadro-LED Flex-3G/3D



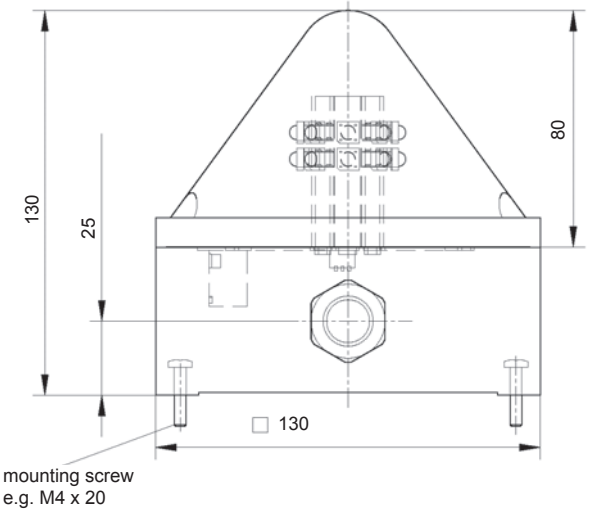
- designed for tough requirements under industrial conditions
- suitable for indoor and outdoor use
- suitable for use in potentially explosive areas in Zones 2 and 22
- extremely insensitive to shock and vibration
- maintenance-free service life exceeding 50 000 hrs
- internally and externally selectable operating mode as standard; one device for 4 different alarms:
  – continuous light
  – blinking light
  – flashing light
  – rotating light (non-wearing)
- 24 V AC/DC devices as standard with soft-start module
- can be operated directly via 24 V transistor PLC output, no additional relay control necessary
- inexpensive and flexible; wide range power supplies as standard

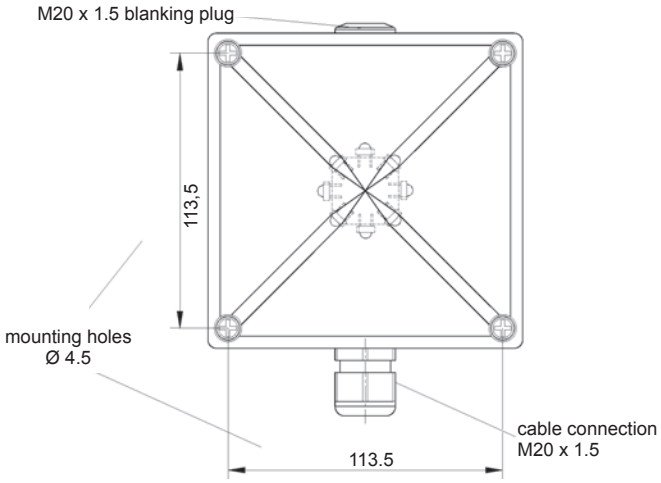
r = 5 m	IP 66	IK 08	+ 55 °C / - 20 °C
Range as per EN 54	Protection system	Impact-proof housing	Operating temperature

Electrical data		Quadro-LED Flex 3G/3D ATEX	
Rated voltage		115 V / 230 V AC	24 V AC/DC
Rated frequency		50 / 60 Hz	50 / 60 Hz
Operating range	AC	95 – 253 V	15 – 40 V
	DC		10 – 60 V
Current consumption in continuous light mode		60 mA	250 mA

Mechanical data		Quadro-LED Flex 3G/3D ATEX			
Explosion protection		II3G Ex nR II T5 X - 20 °C ≤ Ta ≤ + 55 °C II3G Ex nR II T6 X - 20 °C ≤ Ta ≤ + 50 °C II3D IP66 T 85°C X - 20 °C ≤ Ta ≤ + 55 °C			
Category (area of use)		3G (Zone 2), 3D (Zone 22)			
Conformity to standards		Guideline 94/9/EG (ATEX 100a)			
Testing body		Pfannenberg			
Special conditions		X: according to the requirements of prDIN EN 60 079-0, DIN EN 61241-0 (2007) and DIN EN 61241-1 (2005), the equipment is suitable for applications with a low degree of mechanical danger. It must therefore be ensured that the flashing light is mounted with sufficient protection against impacts. A protective cage is not mandatory.			
Operating mode (internally and externally selectable)		continuous light	blinking light	flashing light	rotating all-round light
Light alternation frequency			1.5 Hz	1 Hz	2.5 Hz
Light source		8 x 2 LEDs (3 chip version)			
Light intensity (DIN 5037)	clear lens	9 cd			
Lens colours		clear, white, yellow, amber, red, green, blue			
Operating temperature		- 20 °C ... + 50 °C (T6) / - 20 °C ... + 55 °C (T5)			
Storage temperature		- 40 °C ... + 70 °C			
Relative humidity		100%			
Protection system according to EN 60529		IP 66; mounting arbitrary			
Impact resistance as per EN 50102		IK 08			
Protection class		II			
Duty cycle		100%			
Service life of light source		> 50 000 hrs			
Material	lens	polycarbonate (PC)			
	housing	polycarbonate (PC), light grey RAL 7035			
Connecting terminals		cage clamp terminal 0.08 – 2.5 mm²			
Cable entry		2 x M20 x 1.5 (1 x blanking plug, 1 x cable connection)			
Weight		500 g			

Dimensions





Operating modes

S1			Selection via internal DIP switch	
1	2	3		
OFF	OFF	OFF	OFF	
OFF	OFF	ON	all-round light	2.5 Hz
OFF	ON	OFF	continuous light	
OFF	ON	ON	blinking light	1.5 Hz
ON	OFF	OFF	flashing light	1 Hz
ON	OFF	ON	all-round light	2.5 Hz
ON	ON	OFF	continuous light	
ON	ON	ON	blinking light	1.5 Hz

S1 - 1	X1 - 1	2	3	4	Selection via external control	
(S1-2 = OFF, S1-3 = OFF)						
OFF	-/N	+/L			OFF (standby)	
OFF	-/N	+/L		+/L	all-round light	2.5 Hz
OFF	-/N	+/L	+/L		continuous light	
OFF	-/N	+/L	+/L	+/L	blinking light	1.5 Hz
ON	-/N	+/L			flashing light	1 Hz
ON	-/N	+/L		+/L	all-round light	2.5 Hz
ON	-/N	+/L	+/L		continuous light	
ON	-/N	+/L	+/L	+/L	blinking light	1.5 Hz

Ordering details

Article numbers		Quadro-LED Flex 3G/3D ATEX	
Lens colour	Rated voltage	115 V / 230 V AC	24 V AC/DC
yellow		211 04 64 3 009	211 04 63 3 009
amber		211 04 64 4 009	211 04 63 4 009
red		211 04 64 5 009	211 04 63 5 009

Article numbers for other colours and voltages on request

Options / Accessories

GOST

Manufacturer's declaration

We hereby declare that the explosion-protected means of alarm with the type designation **Quadro-LED Flex 3G/3D** has been developed and manufactured in accordance with the requirements as per EN 60079.

This declaration is based on compliance with the following regulations and standards:

DIN EN 60079-0	Electrical equipment for areas at risk of gas explosions – Part 0: General requirements
DIN EN 60079-15	Electrical equipment for areas at risk of explosions – Part 15: type of protection type 'n'
DIN EN 61241-0	Electrical equipment for use in areas with combustible dust – General requirements
DIN EN 61241-1	Electrical equipment for use in areas with combustible dust – protection by enclosure 'tD'
DIN EN 60598-1	Lights – Part 1: General requirements and tests
DIN EN 60947-1	Low-voltage switchgear – Part 1: General specifications
DIN EN 60529	Types of protection by enclosure (IP code)
DIN EN 50102	Types of protection by enclosure for electrical equipment against external mechanical stresses (IK code)
DIN EN 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards, noise immunity for industrial areas
DIN EN 61000-6-3	Electromagnetic compatibility (EMC) – Part 6-3: Generic standards, interference emission for residential areas, business and commercial areas as well as small companies
DIN EN 981	Machine safety - System of acoustic and visual alarm signals and information signals
ISO 11429	System of acoustic and visual alarm signals and information signals
UVV-BGV A3(VBG4)	Electrical plants and equipment
GSGV	German Appliance Safety Act

The Quadro-LED Flex 3G/3D multifunction lights are approved for use in potentially explosive areas in Zones 2 and 22 as per 94/9/EU.

Signal Tower
BR 50-LED 3G/3D



BR 50 for Ex applications in the categories 3G and 3D for zones 2 and 22.

- extremely long service life (> 50 000 hrs)
- the light is amplified by the internal prisms of the impact-proof, heat-resistant and dustproof polycarbonate lens and can be easily recognized from all sides
- the technically and economically optimum solution for every application

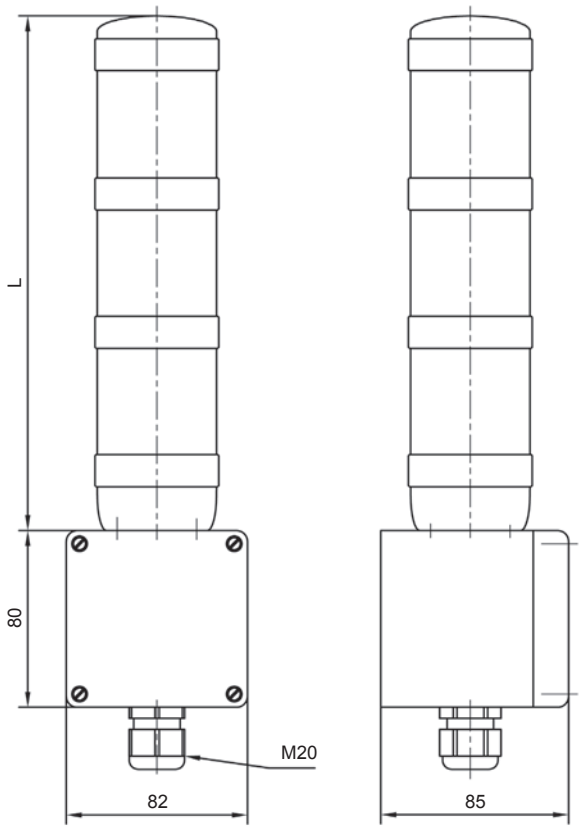
IP 65
Protection system

+ 50 °C
- 20 °C
Operating temperature

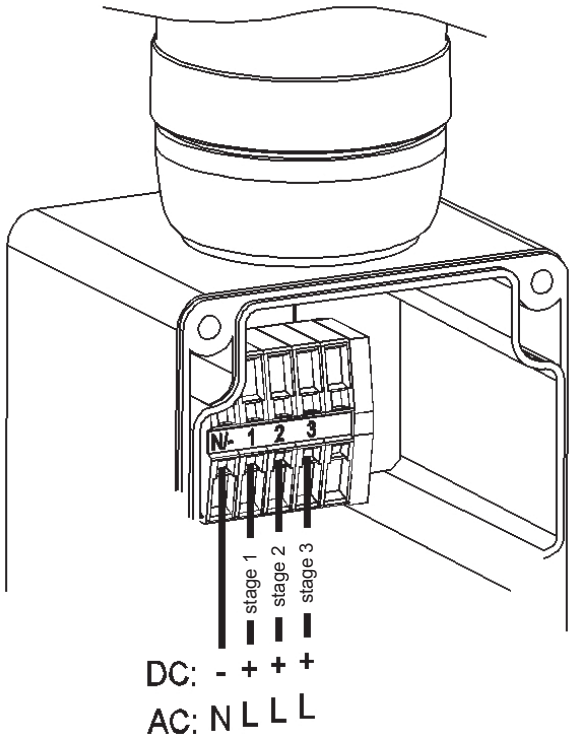
Electrical data		BR 50-LED 3G/3D			
Version		1-stage	2-stage		3-stage
Colour order		red	red / green	yellow / green	red / yellow / green
Nominal current consumption	230 V AC 50/60 Hz	9 mA	16 mA	16 mA	24 mA
	24 V AC 50/60 Hz	60 mA	90 mA	80 mA	130 mA
	24 V DC	50 mA	80 mA	70 mA	120 mA
Operating range	230 V AC 50/60 Hz	195 – 253 V			
	24 V AC 50/60 Hz	18 – 28 V			
	24 V DC	18 – 28 V			

Mechanical data		BR 50-LED 3G/3D
Explosion protection		II 3G Ex nA II T5 X - 20 °C ≤ Ta ≤ + 50 °C II 3D tDA22 IP65 T85°C X - 20 °C ≤ Ta ≤ + 50 °C
Category (area of use)		3G (Zone 2) 3D (Zone 22)
Testing body		Pfannenberg
Temperature class T		T5
Special conditions		X: according to the requirements of prDIN EN 60 079-0, DIN EN 61241-0 (2007) and DIN EN 61241-1 (2005), the equipment is suitable for applications with a low degree of mechanical danger. It must therefore be ensured that the flashing light is mounted with sufficient protection against impacts. A protective cage is not mandatory.
Light source		LED
Operating temperature		- 20 °C … + 50 °C
Storage temperature		- 40 °C … + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 65
Duty cycle		100%
Service life of light source		> 50 000 hrs
Material	lens	polycarbonate (PC)
	housing	acrylonitrile butadiene styrene (ABS)
	connector housing	polycarbonate (PC), light grey RAL 7035
Mounting		arbitrary
Connecting terminals		cage clamp terminal 0.08 – 2.5 mm²
Cable entry		M20 bottom side

Dimensions



Connection diagram



	L
1-stage	107
2-stage	170
3-stage	233
Mounting holes H 50 mm x W 70 mm Ø 4.2	

Ordering details

Article numbers	BR 50-LED 3G/3D	
Version	230 V AC	24 V AC/DC
1-stage red	220 93 10 1 000	220 93 40 1 000
2-stage red/green	220 93 10 2 300	220 93 40 2 300
2-stage yellow/green	220 93 10 2 301	220 93 40 2 301
3-stage red/yellow/green	220 93 10 3 000	220 93 40 3 000

Options / Accessories

GOST

Manufacturer's declaration

We hereby declare that the explosion-protected means of alarm with the type designation **BR 50-LED 3G/3D** has been developed and manufactured in accordance with the requirements as per EN 60079-0.

This declaration is based on compliance with the following regulations and standards:
DIN EN 60079-15 Electrical equipment for areas at risk of explosions – type of protection type 'n'
DIN EN 50281-1-1 Electrical equipment for use in areas with combustible dust

The BR 50-LED 3G/3D signal towers are approved for use in potentially explosive areas in Zones 2 and 22 as per 94/9/EU.

Flashing Light 5 Joules CWB-ATEX



The flashing lights from the CWB-ATEX series are explosion-protected equipment and serve as visual alarms in potentially explosive workplaces in Zones 1, 2, 21 and 22

- housing made of aluminium, therefore usable in all chemical and petrochemical plants as well as offshore plants
- high protection system and stable mechanical construction allow use under the toughest operating conditions
- various mounting brackets and a protective cage are available as accessories

r = 11 m
Range as per EN 54

IP 66
Protection system

+ 50 °C
- 20 °C
Operating temperature

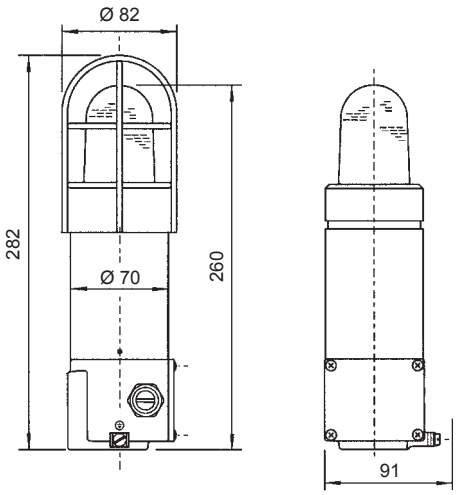
CCC

GL Approval

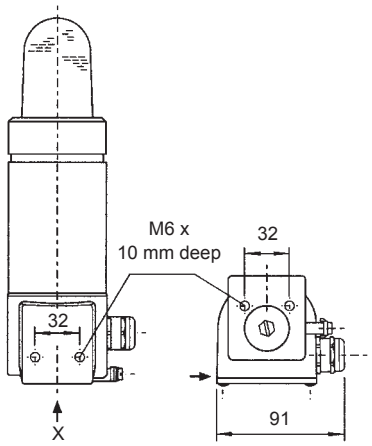
Electrical data	CWB-ATEX					
Rated voltage	230 V AC	110–127 V AC	24–42 V AC	60–80 V DC	12–48 V DC	24 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz			
Operating range	± 10%	± 10%	± 10%	± 10%	± 10%	± 10%
Nominal current consumption	0.08 A	0.11 A	0.5 – 0.3 A	0.11 A – 0.13 A	0.5 – 0.3 A	0.4 A

Mechanical data		CWB-ATEX
Type of protection		'd' flame proof enclosure for light housing 'e' enhanced safety for terminal box
Explosion protection		II 2G Ex de IIC T6 II 2G Ex de IIC T5 IID Ex dt A21 IP 66 T80°C IID Ex dt A21 IP 66 T100°C
Category (area of use)		2G (Zone 1) / 3G (Zone 2) 2D (Zone 21) / 3D (Zone 22)
Certificate of conformity		LCIE 02 ATEX 6113
Testing body		LCIE
Flash energy		5 J
Flash rate		approx. 1 Hz
Lens colours		clear, yellow, amber, red, green, blue
Temperature class T		T6, II 2D T80°C - 20 °C ... + 40 °C T5, II 2D T100°C - 20 °C ... + 50 °C
Storage temperature		- 20 °C ... + 80 °C
Relative humidity		90%
Protection system according to EN 60529		IP 66 (when used for design purpose)
Duty cycle		100%
Service life of the flash tube		light emission still 70% after 8 000 000 flashes
Material	lens	polycarbonate (PC)
	protective cage	stainless steel
	housing	aluminium alloy yellow; plinth black
Type of connection		screw terminals
	terminal area	(max.) 2 x 4 mm² (single wire) 2 x 2.5 mm² (fine wire)
Cable entry		1 x cable gland M20 x 1.5, chrome-plated, clamping range 6 –13 mm 1 x blanking plug, M20 x 1.5
Weight		approx. 1.24 kg

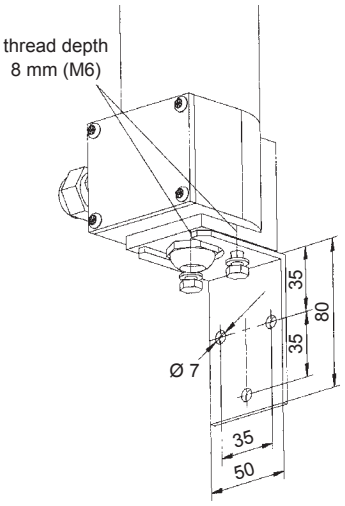
Dimensions



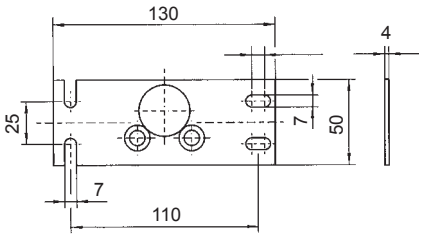
Direct mounting to wall/floor



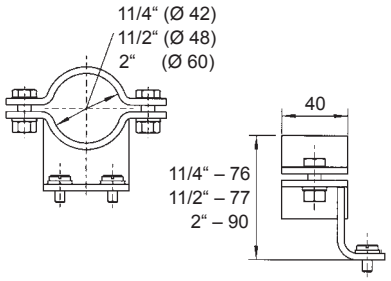
Standard bracket



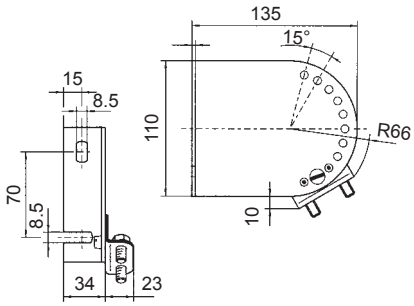
Mounting plate



Pipe clamp



Mounting bracket



Ordering details

Article numbers		CWB-ATEX			
Lens colour	**Rated voltage**	230 V AC	110–127 V AC	60–80 V DC	24–42 V AC / 12–48 V DC
yellow		310 06 10 3 000	310 06 13 3 000	310 06 58 3 000	310 06 90 3 000
amber		310 06 10 4 000	310 06 13 4 000	310 06 58 4 000	310 06 90 4 000
red		310 06 10 5 000	310 06 13 5 000	310 06 58 5 000	310 06 90 5 000

Article numbers for other colours on request

Options / Accessories

Pipe clamps
Stainless steel
Article number:
R1 1/4“: 38108101000
R1 1/2“: 38108101200
R2“: 38108102000

Mounting bracket
Stainless steel
Article number:
38108100100

Mounting plate
Stainless steel
Article number:
38108100000

Standard bracket set
Stainless steel
Article number:
38108100150

Stainless steel
Article number:
38108100200

GOST

Manufacturer’s declaration

We hereby declare that the explosion-protected flashing light with the type designation **Ex-CWB-ATEX** has been developed and manufactured in accordance with EN 60079-0.

This declaration is based on compliance with the following regulations and standards:

94/9/EG	CE conformity
EN 60079-0	Electrical equipment for areas at risk of explosions – General requirements
EN 60079-1	Pressure-resistant encapsulation ‘d’
EN 60079-7	Enhanced safety ‘e’
EN 61241-0	Electrical equipment for use in areas with combustible dust
EN 60598	Lights
EN 60529	Types of protection by enclosure (IP code)
EN 60400 / IEC 61	Lamp sockets for tube-shaped fluorescent lamps and starter sockets
2004/108/EG	‘Electromagnetic compatibility’

The flashing light is approved for use in potentially explosive areas in Zones 1, 2, 21 and 22 as per 94/9/EU.

Flashing Lights 5 / 10 / 15 Joules BExBG05 / BExBG10 / BExBG15 ATEX



The flashing light is ideal for almost all mounting requirements: side, ceiling and floor mounting

- categories 2G (Zones 1 and 2), 2D (Zones 21 and 22)
- extremely bright at up to 15 Joules flash energy
- large connection box for simple mounting
- also available with connection box in increased safety version
- very sturdy, manufactured from seawater-resistant aluminium and stainless steel protection cage
- BExBG05 can be mounted in all operating positions

5 Joules	10 Joules	15 Joules		
r = 11 m	r = 17 m	r = 23 m	IP 67	+70 °C / - 50 °C
Range as per EN 54	Range as per EN 54	Range as per EN 54	Protection system	Operating temperature

Electrical data AC	BExBG05		BExBG10		BExBG15	
Rated voltage	230 V AC	115 V AC	230 V AC	115 V AC	230 V AC	115 V AC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Operating range	± 10%	± 10%	± 10%	± 10%	± 10%	± 10%
Nominal current consumption	55 mA	140 mA	110 mA	250 mA	170 mA	360 mA

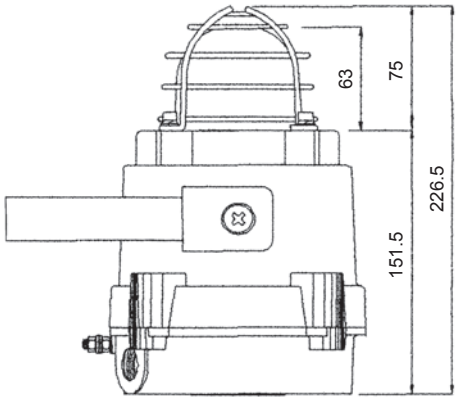
Electrical data DC	BExBG05			BExBG10			BExBG15	
Rated voltage	48 V DC	24 V DC	12 V DC	48 V DC	24 V DC	12 V DC	48 V DC	24 V DC
Operating range	± 25%	± 25%	± 25%	± 25%	± 25%	± 25%	± 25%	± 25%
Nominal current consumption	180 mA	300 mA	750 mA	340 mA	660 mA	1450 mA	480 mA	860 mA

Mechanical data		BExBG05D/BExBG05E	BExBG10D/BExBG10E	BExBG15D/BExBG15E
Type of protection		Ex d IP 67 / Ex de IP 66		
Explosion protection [1]		II2G Ex d IIC T4, T5 or T6 II2G Ex de IIC T4, T5 or T6 II2D Ex tD A21 IP67 T85, T100 or T115	II2G Ex d IIC T4 or T5 II2G Ex de IIC T4 or T5 II2D Ex tD A21 IP67 T95, T110 or T125	
Category (area of use)		2G (Zone 1, 2) 2D (Zone 21, 22)		
Certificate of conformity		KEMA 01 ATEX 2030		
Testing body		KEMA		
Flash energy		5 J	10 J	15 J
Flash rate		60 flashes/min., stabilised		
Lens colours		clear, yellow, amber, red, green, blue		
Temperature class T		T4 / T115°C @ Ta - 50 °C ... + 70 °C T5 / T100°C @ Ta - 50 °C ... + 55 °C T6 / T85°C @ Ta - 50 °C ... + 40 °C	T4 / T125°C @ Ta - 50 °C ... + 70 °C T110°C @ Ta - 50 °C ... + 55 °C T5 / T85°C @ Ta - 50 °C ... + 40 °C	
Storage temperature		- 50 °C … + 70 °C		
Relative humidity		90%		
Duty cycle		100%		
Service life of the flash tube		light emission still 70% after 8 000 000 flashes		
Material	lens	glass		
	housing	die-cast aluminium, resistant to salt water, marine grade LM6, red (RAL 3000)		
	protective cage and bracket	stainless steel		
Type of connection		1 x 4 mm² or 2 x 2.5 mm²		
Cable entry [1]		2 x M20, of which one open, optionally PG13.5 or 1/2" NPT		
Weight	Exd	2.45 kg		
	Exde	2.75 kg		

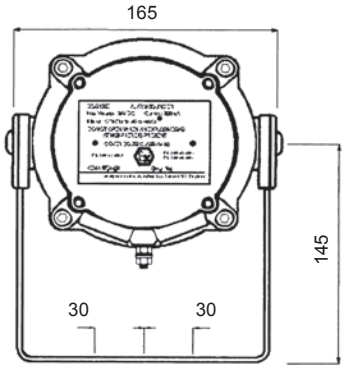
[1] Ex cable gland not included

Dimensions

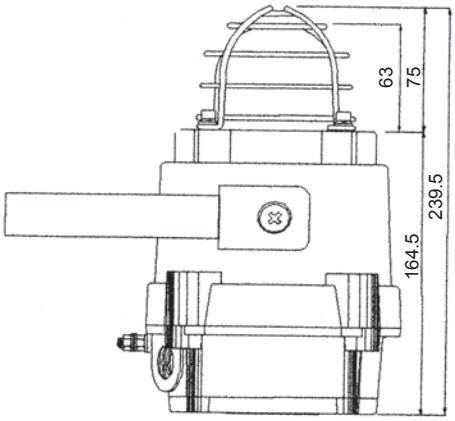
Ex d



Ex de



3 x 7 mm Ø mounting holes



Ordering details

Article numbers		BExBG05-E		BExBG05-D	
Lens colour	**Rated voltage**	230 V AC	24 V DC	230 V AC	24 V DC
yellow		311 30 10 3 000	311 30 80 3 000	311 31 10 3 000	311 31 80 3 000
amber		311 30 10 4 000	311 30 80 4 000	311 31 10 4 000	311 31 80 4 000
red		311 30 10 5 000	311 30 80 5 000	311 31 10 5 000	311 31 80 5 000
Article numbers		**BExBG10-E**		**BExBG10-D**	
Lens colour	**Rated voltage**	230 V AC	24 V DC	230 V AC	24 V DC
yellow		311 20 10 3 000	311 20 80 3 000	311 21 10 3 000	311 21 80 3 000
amber		311 20 10 4 000	311 20 80 4 000	311 21 10 4 000	311 21 80 4 000
red		311 20 10 5 000	311 20 80 5 000	311 21 10 5 000	311 21 80 5 000
Article numbers		**BExBG15-E**		**BExBG15-D**	
Lens colour	**Rated voltage**	230 V AC	24 V DC	230 V AC	24 V DC
yellow		311 10 10 3 000	311 10 80 3 000	311 11 10 3 000	311 11 80 3 000
amber		311 10 10 4 000	311 10 80 4 000	311 11 10 4 000	311 11 80 4 000
red		311 10 10 5 000	311 10 80 5 000	311 11 10 5 000	311 11 80 5 000

Article numbers for other colours and voltages on request

Options / Accessories

GOST

Manufacturer's declaration

We hereby declare that the explosion-protected flashing light with the type designation **BExBG05 … 15 d or e ATEX** has been developed and manufactured in accordance with section 5.1.2 of EN 50014.

This declaration is based on compliance with the following regulations and standards:

94/9/EG	CE conformity
EN 50014	Electrical equipment for areas at risk of explosions – General requirements
EN 50018	Pressure-resistant encapsulation 'd'
EN 50019	Enhanced safety 'e'
EN 50281-1-1	Electrical equipment for use in areas with combustible dust
EN 60529	Types of protection by enclosure (IP code)
89/336/EWG	'Electromagnetic compatibility'

The Ex-BExBG05 - 15 d or e flashing lights are approved for use in potentially explosive areas in Zones 1, 2, 21 and 22 as per 94/9/EU.

LED Light
BExBG L1D ATEX



The LED light is ideal for almost all mounting requirements: side, ceiling and floor mounting

- categories 2G (Zones 1 and 2), 2D (Zones 21 and 22)
- large connection box for simple mounting
- also available with connection box in increased safety version
- very sturdy, manufactured from seawater-resistant aluminium and stainless steel protection cage
- can be mounted in all operating positions
- a total of 9 different operating modes can be set
- 2 additional operating modes can be controlled externally



Range as per EN 54



Protection system



Operating temperature

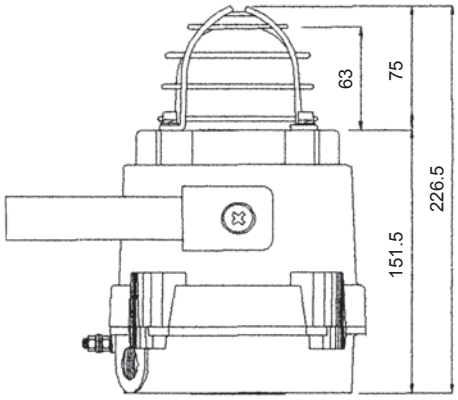
Electrical data	BExBG L1D
Rated voltage	230 V AC
Rated frequency	50 / 60 Hz
Operating range	± 10%
Nominal current consumption	70 mA

Mechanical data		BExBG L1D
Type of protection		Ex d IP 67
Explosion protection [1]		II 2G EEx d IIC T4 or T5 II 2G EEx de IIC T4 or T5 II 2D T135°C or T100°C
Category (area of use)		2G (Zone 1, 2) 2D (Zone 21, 22)
Certificate of conformity		KEMA 01 ATEX 2006 X
Testing body		KEMA
Light source		32 LEDs
Lens colours		yellow, amber, red, green, blue
Temperature class T		T4 / T135°C @ Ta - 50 °C ... + 55 °C T5 / T100°C @ Ta - 50 °C ... + 40 °C
Storage temperature		- 50 °C … + 70 °C
Relative humidity		90%
Duty cycle		100%
Service life of the flash tube		> 50 000 hrs
Material	lens	glass
	housing	die-cast aluminium, resistant to salt water, marine grade LM6, red (RAL 3000)
	protective cage and bracket	stainless steel
Type of connection		1 x 4 mm² or 2 x 2.5 mm²
Cable entry [1]		2 x M20, of which one open, optionally PG13.5 or 1/2“ NPT
Weight		2.75 kg

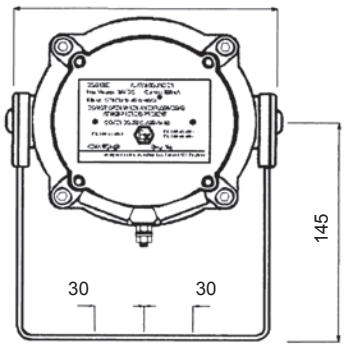
[1] Ex cable gland not included

Dimensions

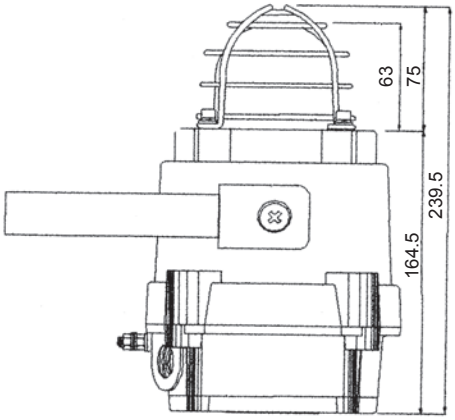
EEx d



EEx de



3 x 7 mm Ø mounting holes



Operating modes

Mode	internal	external	
	stage 1	stage 2	stage 3
1	all on	9	8
2	rotation 3 LED fast “AN“	7	1
3	rotation 6 LED fast “AN“	8	1
4	rotation 3 LED slow “AN“	9	1
5	rotation 6 LED slow “AN“	6	1

Mode	internal	external	
	stage 1	stage 2	stage 3
6	double flash 1 Hz	9	1
7	single flash 2 Hz	3	1
8	double flash 2 Hz	3	1
9	alternating flash 1:1 2 Hz	3	1

Ordering details

Article numbers		BExBG L1D
Lens colour	Rated voltage	230 V AC
amber		311 51 10 4 000

Article numbers for other colours and voltages on request

Options / Accessories

GOST

Manufacturer’s declaration

We hereby declare that the explosion-protected LED light with the type designation **BExBG L1D ATEX** has been developed and manufactured in accordance with section 5.1.2 of EN 50014.

This declaration is based on compliance with the following regulations and standards:

94/9/EG	CE conformity
EN 50014	Electrical equipment for areas at risk of explosions – General requirements
EN 50018	Pressure-resistant encapsulation ‘d’
EN 50019	Enhanced safety ‘e’
EN 50281-1-1	Electrical equipment for use in areas with combustible dust
EN 60529	Types of protection by enclosure (IP code)
89/336/EWG	‘Electromagnetic compatibility’

The BExBG L1D ATEX LED light is approved for use in potentially explosive areas in Zones 1, 2, 21 and 22 as per 94/9/EU.

IS-Mini series LED Blinking Light
IS-mB1



Very economical visual alarm

- certified for use in Ex-Zones 0, 1 and 2!
- compact design with a diameter of just 88 m
- blinking light operated via certified zener barriers or galvanic isolators
- super-bright LEDs in red, green, blue and yellow/amber
- very well suited for fire alarm systems and direct control due to low power consumption

See pages 234 and 235 for suitable zener barriers



Range as per EN 54



Protection system



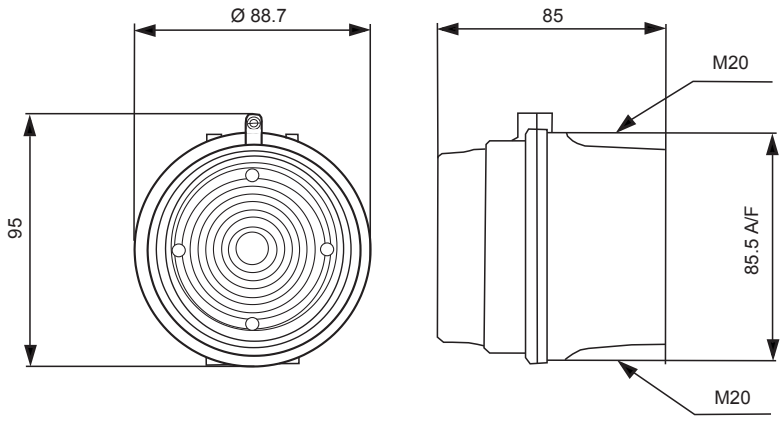
Operating temperature

Electrical data	IS-mB1
Rated voltage	24 V DC
Operating range	16 – 28 V
Nominal current consumption	25 mA [1]

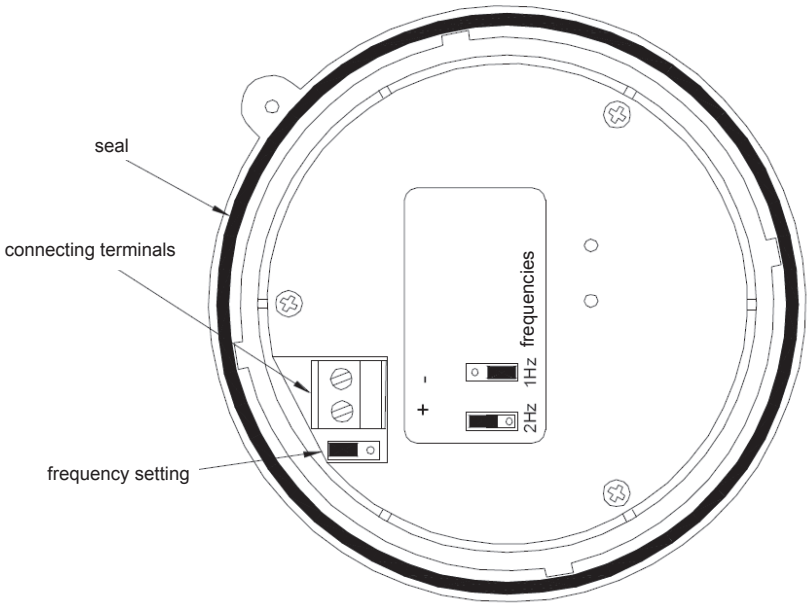
[1] typical for connection to 24 V DC via 28 V / 300 Ω zener barrier.
Power must be connected via a zener barrier (max. 28 V DC, 93 mA DC, 0.66 W) or a galvanic isolator, specified by the system certificate (see page 235)

Mechanical data		IS-mB1
Type of protection		"ia" inherently safe
Explosion protection		II 1G EEx ia IIC T4
Category (area of use)		1G (Zone 0) 2G (Zone 1) 3G (Zone 2)
Certificate		SIRA 05 ATEX2084 X
Testing body		SIRA
Flash rate		can be set to 2 Hz or 1 Hz
Lens colour		clear, with red, yellow/amber, blue or green LEDs
Temperature class T		T4 @ Ta - 40 °C ... + 60 °C
Storage temperature		- 40 °C … + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 65
Duty cycle		100%
Material	lens	polycarbonate (PC)
	housing	ABS, self-extinguishing UL94V0 & 5VA, similar to RAL 3000 (flame red)
Connecting terminals		0.5 – 2.5 mm²
Cable entry		2 x M20 (knock-outs prepared)
Weight		210 g

Dimensions



Connection diagram



Ordering details

Article numbers		IS-mB1
Colour	**Rated voltage**	24 V DC
yellow/amber		310 08 80 4 000
red		310 08 80 5 000
green		310 08 80 6 000
blue		310 08 80 7 000

Options / Accessories

GOST

Zener barrier

See pages 234/235 for further information

Manufacturer's declaration

Developed and manufactured in accordance with the following regulations and standards:

EN 50014 Electrical equipment for areas at risk of explosions – General requirements
EN 50020 Electrical equipment for areas at risk of explosions – intrinsically safety 'i'
EN 50284 Special requirements for the design, testing and marking of electrical equipment in appliance group II, category 1G

Sounders 105 / 110 dB(A) DS 5 / DS 10 3G/3D ATEX



Gas and dust protection

- the industrial sounder for tough applications. Proven 100 000 times over in shipping. ‘When nothing else works, this still does!‘ ‘Heavy duty’ but still light!
- for use as an acoustic alarm in potentially explosive workplaces of category 3G (Zone 2) and 3D (Zone 22)
- category for gas and dust protection
- IP 67 for safe operation under extreme environmental conditions
- individual selection of 32 different tones

optionally:

- 4-stage external tone selection (options: TAS, TAV)
- all tones can be individually combined with one another when externally controlled (programming function, tone 32)

DS 5 3G/3D	DS 10 3G/3D				
r = 32 m	r = 56 m	IP 66 IP 67	VdS G28609	EN 54-3	+ 55 °C / - 25 °C
max. signal reception range	max. signal reception range	Protection system	Standard	Standard	Operating temperature

Electrical data	DS 5 3G/3D				
Rated voltage	230 V AC	115 V AC	24 V AC[1]	24 V DC	12 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz		
Operating range	195 – 253 V	95 – 127 V	19 – 29 V	19 – 29 V	10 – 15 V
Nominal current consumption	0.03 A	0.06 A	0.28 A	0.28 A	0.28 A
Electrical data	**DS 10 3G/3D**				
Rated voltage	230 V AC	115 V AC	24 V AC[1]	24 V DC	12 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz		
Operating range	195 – 253 V	95 – 127 V	19 – 29 V	19 – 29 V	10 – 15 V
Nominal current consumption	0.06 A	0.12 A	0.42 A	0.42 A	0.3 A

[1] Temperature class T3

Mechanical data	DS 5 3G/3D	DS 10 3G/3D
Explosion protection	II 3G Ex nA II T4 (all voltages except 24 V AC) II 3G Ex nA II T3 (only 24 V AC) II 3D Ex tD A22 IP 67 T135°C	
Category (area of use)	3G (Zone 2), 3D (Zone 22)	
Testing body	Pfannenberg	
Sound pressure level	105 dB (A) ± 3 dB (A)	110 dB (A) ± 3 dB (A)
Temperature class	T4 / T3 @ - 25 °C ... + 55 °C	
Storage temperature	- 40 °C ... + 70 °C	
Protection system according to EN 60529	IP 66, IP 67	
Duty cycle	100%	
Material	die-cast aluminium GD-Al Si12 Cu	
Surface coating	epoxy resin paint RAL 3000, flame red	
Cable bushing	2 x M20 x 1.5 (1 x plastic cable gland, 1 x plug)	
Clamping range of the cable fitting	6 – 13 mm	
Connecting terminal cross-section	min. 0.08 mm² ... max. 2.5 mm² AWG 28 - 12 (AWG12 THHN, THWN)	
Weight	AC: 2.15 kg / DC: 1.95 kg	

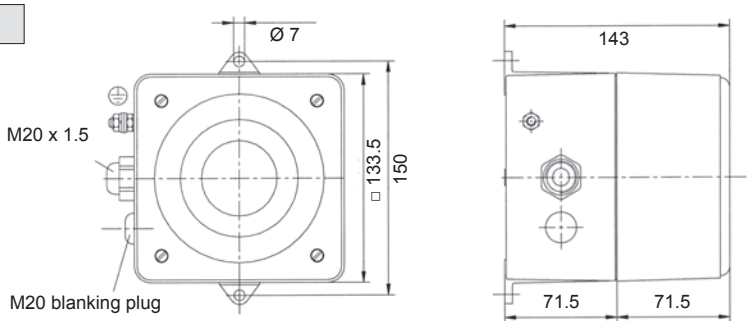
Options / Accessories

External tone selection control /
4-stage external tone selection
TAV: control by means of external voltage input (12 V and 24 V DC only)
TAS: control by means of control voltage

GOST

GL 30457-83-HH

Dimensions



Tone table

Tone	Description - Basic tone (preset: tone no. 1)	Stage 2	3	4
0	no tone	1	5	4
1	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	3	2	4
2	Interrupted tone, ISO 8201 (emergency evacuation signal)	1	4	3
3	Alternating tone	1	2	4
4	Continuous tone, UK BS5839-1	1	3	5
5	Interrupted tone	1	4	3
6	Sweeping	1	4	9
7	Alternating tone, France NFS 32-001 (fire alarm)	3	10	4
8	Interrupted tone, Sweden SS031711 (emergency signal)	2	3	4
9	Interrupted tone (fast), horn	1	3	4
10	Continuous tone	27	9	26
11	Continuous tone	1	17	9
12	Continuous tone	27	9	26
13	Continuous tone	1	5	3
14	Continuous tone	1	4	10
15	Interrupted tone	1	24	12
16	Interrupted tone	1	24	15
17	Interrupted tone	1	11	9
18	Interrupted tone	19	7	4
19	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	27	13	23
20	Interrupted tone, IMO SOLAS III/50 + SOLAS III/6.4 (general alarm)	9	21	26
21	Interrupted tone, IMO (leave ship)	20	9	26
22	Slow whoop, evacuation alarm Netherlands NEN 2575	19	14	2
23	Siren	27	12	2
24	Alternating tone	1	16	12
25	Alternating tone	1	14	5
26	Alternating tone	4	9	27
27	Siren	13	23	19
28	Sweeping	7	10	4
29	Pulsating tone, industrial alarm Germany	1	30	9
30	Interrupted tone, industrial alarm (Germany)	1	4	26
31	Sweeping, France NFC48-265	3	14	4
32	selection of available tone combinations in stages 2, 3 and 4			

Ordering details

Article numbers		DS 10 3G/3D			DS 5 3G/3D		
Ausführung	**Rated voltage**	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
Standard		231 11 10 0 007	231 11 15 0 007	231 11 80 0 007	231 06 10 0 007	231 06 15 0 007	231 06 80 0 007
TAS		231 11 10 0 155	231 11 15 0 155	231 11 80 0 155	231 06 10 0 155	231 06 15 0 155	231 06 80 0 155

Article numbers for other voltages and versions on request

Manufacturer's declaration

We hereby declare that the explosion-protected means of alarm with the type designation **DS 10 3G/3D, DS 5 3G/3D** fullfils the requirements of the EN 60079-0, EN 60079-15, EN 61241-0 and EN 61241-1 standards in their latest editions.

This declaration is based on compliance with the following regulations and standards:

DIN EN 60079-0	Electrical equipment for areas at risk of gas explosions - General requirements
DIN EN 60079-15	Electrical equipment for areas at risk of gas explosions - Type of protection "n"
DIN EN 61241-0	Electrical equipment for use in areas with combustible dust - General requirements
DIN EN 61241-1	Electrical equipment for use in areas with combustible dust brennbarem Staub - part 1: protection by enclosure 'tD'
DIN EN 61000-6-2	Generic standard, interference immunity for industrial areas
DIN EN 61000-6-3	Generic standard, interference emission for residential areas
DIN EN 50130-4	Electromagnetic compatibility; product family standard: requirements for the interference immunity of system components for fire and burglar alarms and well as social alarm systems
DIN EN ISO7731	Ergonomic – alarms for public areas and workplaces – acoustic alarms
UVV-BGV A3 (VBG4)	Electrical plants and equipment
DIN EN 54-3	Fire alarm systems – Part 3: fire alarm devices; Acoustic alarms
DIN EN 981	Machine safety - System of acoustic and visual alarm signals and information signals
DIN EN 50262	Metric cable glands for electrical installations
DIN IEC 60038	IEC standard voltages
DIN 33404/3	Alarm signals for workplaces; acoustic alarm signals; uniform emergency signal; technical safety requirements, tests
DIN EN 60947-1	Low-voltage switchgear – Part 1: General specifications
DIN EN 60950-1	Safety of information technology equipment
DIN EN 60529	Types of protection by enclosure (IP code)
9. GPSG	Appliance and product safety act
Guideline 94/9/EG (ATEX 100a)	
DIN EN 60079-0 / DIN EN 60079-15 / DIN EN 61241-0 / DIN EN 61241-1	

The DS 10 3G/3D, DS 5 3G/3D sounders are approved for use in potentially explosive areas in Zones 2 and 22 as per 94/9/EU.

Sounders 117 dB(A)
BExS 120 d/e, BExDS 120 d/e



- 32 different tones can be set; UKOOA/PFEER conform
- 117 dB (A) ± 3 dB (A) sound pressure
- 3 externally selectable tones – positive and negative control possible in the case of DC devices
- quartz-stabilised tone synchronisation
- adjustable volume (except 12 V DC)
- ATEX and optionally IECEx approval
- housing made of die-cast aluminium LM6, horn made of ABS
- stainless steel mounting bracket for 360° positioning
- categories 2G and 3G (Zones 1 and 2)
- also available as categories 2D & 3D (Zones 21 & 22) for dust zones
- amendment 2; extended approval/temperature range + 70 °C

r = 126m
max. signal reception range

IP 66
IP 67
Protection system

+ 70 °C
- 50 °C
Operating temperature

EN 54-3
Exd 24 V DC
Standard

VdS G209081
Exd 24 V DC
Standard

Electrical data	BExS 120 d/e / BExDS 120 d/e				
Rated voltage	230 V AC	115 V AC	48 V DC	24 V DC	12 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz			
Operating range	± 10%	± 10%	± 25%	± 25%	± 25%
Nominal current consumption	90 mA	180 mA	420 mA	800 mA	850 mA

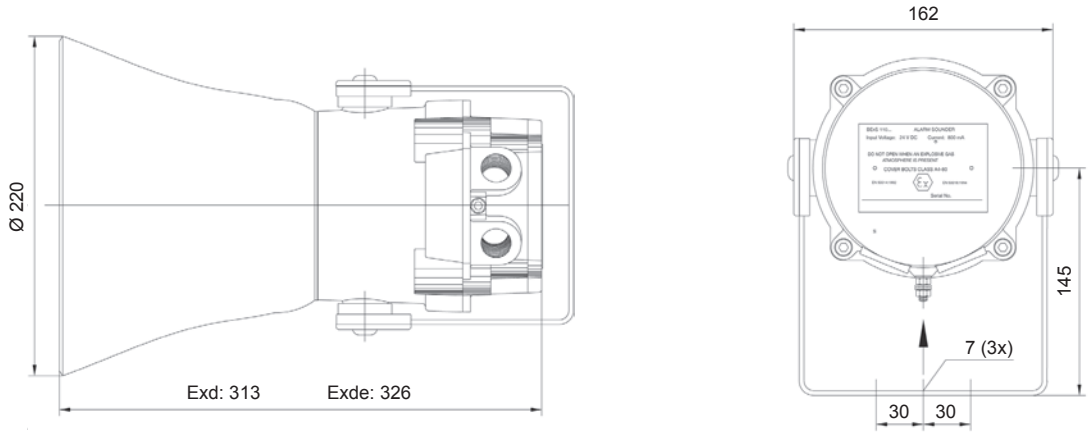
Mechanical data		BExS 120 d/e	BExDS 120 d/e
Protection system		“d” = IP 67; or “e” = IP 66	
Explosion protection		II 2G Ex d IIC T4 / II 2G Ex de IIC T4 II 2G Ex d IIB T4 / II 2G Ex de IIB T4	II 2G/D Ex d IIC T4 100°C / II 2G/D Ex de IIC T4 100°C II 2G/D Ex d IIB T4 115°C / II 2G/D Ex de IIB T4 115°C
Category (area of use)		2G (Zone 1) 3G (Zone 2)	2G (Zone 1) / 2D (Zone 21) 3G (Zone 2) / 3D (Zone 22)
Certificate of conformity		KEMA 99 ATEX 7906	KEMA 99 ATEX 6312
Testing body		KEMA	KEMA
Sound pressure level		117 dB (A) ± 3 dB (A)	117 dB (A) ± 3 dB (A)
Temperature class T		IIC: T4 @ - 50 °C ... + 55 °C Ta IIB: T4 @ - 50 °C ... + 70 °C Ta	T4 @ - 50 °C ... + 55 °C Ta
Storage temperature		- 50 °C … + 70 °C	
Relative humidity		90%	
Duty cycle		100%	
Material	housing	die-cast aluminium LM6, similar to RAL 3000 (flame red)	
	horn	ABS self-extinguishing, similar UL 94 VO & 5VA FR ABS, Ex II 2D anti-static ABS, black	
Connecting terminals	Exd	1 x 4 mm² or 2 x 2.5 mm²	
	Exde	2 x 2.5 mm²	
Cable entry		2 / 1 x closed, 1 x open (M20), optionally PG13.5 or 1/2“ NPT	
Weight	Exd	AC: 3.88 kg / DC: 3.42 kg	
	Exde	AC: 4.14 kg / DC: 3.38 kg	

Options / Accessories

GOST

IECEx No SIM 04.0001
Exd BExDS

Dimensions



Tone table

Tone	Description - Basic tone	Stage 2	Stage 3
1	Continuous tone	31	11
2	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	17	5
3	Slow whoop	2	5
4	Sweeping (fast)	6	5
5	Continuous tone	3	27
6	Sweeping	7	5
7	Sweeping (fast)	10	5
8	Sweeping	2	5
9	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	15	2
10	Alternating tone	7	5
11	Interrupted tone	31	1
12	Alternating tone	4	5
13	Interrupted tone	15	5
14	Interrupted tone	4	5
15	Continuous tone	2	5
16	Interrupted tone	18	5
17	Alternating tone, France NFS 32-001 (fire alarm)	2	27
18	Interrupted tone, Sweden SS031711 (air raid warning)	2	5
19	Sweeping, France NFC48-265	2	5
20	Continuous tone, Sweden SS031711 (all-clear signal)	2	5
21	Alternating tone	2	5
22	Interrupted tone	2	5
23	Interrupted tone	6	5
24	Sweeping (medium), UK BS5839-1	29	5
25	Sweeping	29	5
26	Simulated bell	2	1
27	Continuous tone	26	5
28	Continuous tone	2	5
29	Sweeping (fast), UK BS5839-1	7	5
30	Interrupted tone, Australia AS2220, AS1610, AS1670	32	5
31	Sweeping, IMO 3d, Germany KTA3901 evacuation alarm	11	1
32	Slow whoop, Australian evacuation alarm AS2220	26	1

The sounder can be set externally to the respective tones of stage 2 & 3.
Tone 2 is preset.

Ordering details

Article numbers	BExS 120D		BExS 120E		BExDS 120D	BExDS 120E
Rated voltage	230 V AC	24 V DC	230 V AC	24 V DC	230 V AC	230 V AC
	320 76 10 0 000	320 76 80 0 000	320 78 10 0 000	320 78 80 0 000	320 89 10 0 000	320 81 10 0 000

Article numbers for other voltages on request

Sounders 110 dB(A)
BExS 110 d/e, BExDS 110 d/e



- 32 different tones can be set; UKOOA/PFEER conform
- 110/117 dB (A) ± 3 dB (A) sound pressure
- 3 externally selectable tones – positive and negative control possible in the case of DC devices
- quartz-stabilised tone synchronisation
- adjustable volume (except 12 V DC)
- ATEX and optionally IECEx approval
- housing made of die-cast aluminium LM6, horn made of ABS
- stainless steel mounting bracket for 360° positioning
- categories 2G and 3G (Zones 1 and 2)
- also available as categories 2D & 3D (Zones 21 & 22) for dust zones
- amendment 2; extended approval/temperature range + 70 °C

r = 56m
max. signal reception range

IP 66
IP 67
Protection system

+ 70 °C
- 50 °C
Operating temperature

EN 54-3
Exd
24 V DC
Standard

VdS G209081
Exd
24 V DC
Standard

Electrical data	BExS 110 d/e / BExDS 110 d/e				
Rated voltage	230 V AC	115 V AC	48 V DC	24 V DC	12 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz			
Operating range	± 10%	± 10%	± 25%	± 25%	± 25%
Nominal current consumption	56 mA	110 mA	130 mA	250 mA	195 mA

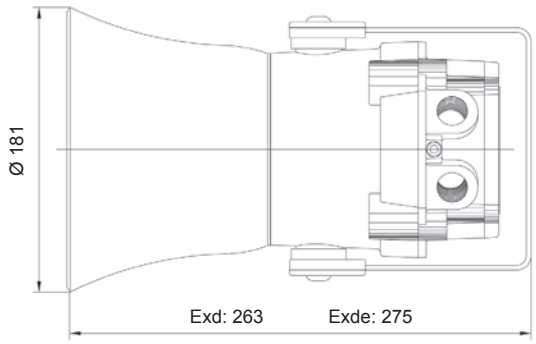
Mechanical data		BExS 110 d/e	BExDS 110 d/e
Protection system		“d” = IP 67; or “e” = IP 66	
Explosion protection		II 2G Ex d IIC T4 / II 2G Ex de IIC T4 II 2G Ex d IIB T4 / II 2G Ex de IIB T4	II 2G/D Ex d IIC T4 100°C / II 2G/D Ex de IIC T4 100°C II 2G/D Ex d IIB T4 115°C / II 2G/D Ex de IIB T4 115°C
Category (area of use)		2G (Zone 1) 3G (Zone 2)	2G (Zone 1) / 2D (Zone 21) 3G (Zone 2) / 3D (Zone 22)
Certificate of conformity		KEMA 99 ATEX 7906	KEMA 99 ATEX 6312
Testing body		KEMA	KEMA
Sound pressure level		110 dB (A) ± 3 dB (A)	110 dB (A) ± 3 dB (A)
Temperature class T		IIC: T4 @ - 50 °C ... + 55 °C Ta IIB: T4 @ - 50 °C ... + 70 °C Ta	T4 @ - 50 °C ... + 55 °C Ta
Storage temperature		- 50 °C … + 70 °C	
Relative humidity		90%	
Duty cycle		100%	
Material	housing	die-cast aluminium LM6, similar to RAL 3000 (flame red)	
	horn	ABS self-extinguishing, similar UL 94 VO & 5VA FR ABS, Ex II 2D anti-static ABS, black	
Connecting terminals	Exd	1 x 4 mm² or 2 x 2.5 mm²	
	Exde	2 x 2.5 mm²	
Cable entry		2 / 1 x closed, 1 x open (M20), optionally PG13.5 or 1/2“ NPT	
Weight	Exd	AC: 3.42 kg / DC: 3.16 kg	
	Exde	AC: 3.68 kg / DC: 3.42 kg	

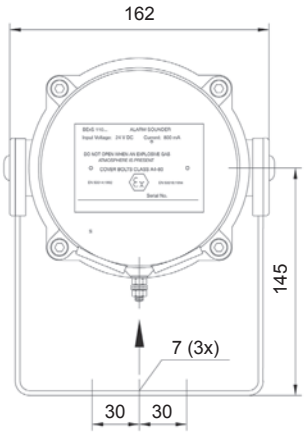
Options / Accessories

GOST

IECEx
No SIM
04.0001
Exd
BExDS

Dimensions





Tone table

Tone	Description - Basic tone		Stage 2	Stage 3
1	Continuous tone	1000 Hz	31	11
2	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	1000 Hz / 800 Hz, 0,25 s, 0,25 s, EN54-3	17	5
3	Slow whoop	1200 Hz / 500 Hz, 3,0 s, 0,5 s	2	5
4	Sweeping (fast)	1000 Hz / 800 Hz, 10 ms, 10 ms	6	5
5	Continuous tone	2400 Hz	3	27
6	Sweeping	2900 Hz / 2400 Hz, 70 ms, 70 ms	7	5
7	Sweeping (fast)	2900 Hz / 2400 Hz, 10 ms, 10 ms	10	5
8	Sweeping	1200 Hz / 500 Hz, 3 s, 3 s	2	5
9	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz / 500 Hz, 1 s, EN54-3	15	2
10	Alternating tone	2900 Hz / 2400 Hz, 20 ms, 20 ms	7	5
11	Interrupted tone	1000 Hz, 10 ms, 10 ms	31	1
12	Alternating tone	1000 Hz / 800 Hz, 0,875 s, 0,875 s	4	5
13	Interrupted tone	2400 Hz, 10 ms, 10 ms	15	5
14	Interrupted tone	800 Hz, 0,25 s, 1 s	4	5
15	Continuous tone	800 Hz	2	5
16	Interrupted tone	554 Hz / 440 Hz, 0,1 s, 0,4 s, EN54-3	18	5
17	Alternating tone, France NFS 32-001 (fire alarm)	660 Hz, 150 ms, 150 ms, EN54-3	2	27
18	Interrupted tone, Sweden SS031711 (air raid warning)	660 Hz, 1,8 s, 1,8 s	2	5
19	Sweeping, France NFC48-265	1600 Hz / 1400 Hz, 1 s, 0,5 s	2	5
20	Continuous tone, Sweden SS031711 (all-clear signal)	660 Hz	2	5
21	Alternating tone	554 Hz / 440 Hz, 10 ms, 10 ms	2	5
22	Interrupted tone	544 Hz, 0,875 s, 0,875 s	2	5
23	Interrupted tone	800 Hz, 20 ms, 20 ms	6	5
24	Sweeping (medium), UK BS5839-1	1000 Hz / 800 Hz, 0,5 s, 0,5 s	29	5
25	Sweeping	2900 Hz / 2400 Hz, 0,5 s, 0,5 s	29	5
26	Simulated bell	1450 Hz, 0,69 ms	2	1
27	Continuous tone	554 Hz	26	5
28	Continuous tone	440 Hz	2	5
29	Sweeping (fast), UK BS5839-1	1000 Hz / 800 Hz, 70 ms, 70 ms	7	5
30	Interrupted tone, Australia AS2220, AS1610, AS1670	420 Hz, 0,625 s, 0,625 s	32	5
31	Sweeping, IMO 3d, Germany KTA3901 evacuation alarm	1200 Hz / 500 Hz, 1 s, 1 s	11	1
32	Slow whoop, Australian evacuation alarm AS2220	1200 Hz / 500 Hz, 3,75 s, 0,25 s	26	1

The sounder can be set externally to the respective tones of stage 2 & 3.
Tone 2 is preset.

Ordering details

Article numbers	BExS 110D		BExS 110E		BExDS 110D	BExDS 110E
Rated voltage	230 V AC	24 V DC	230 V AC	24 V DC	230 V AC	230 V AC
	320 80 10 0 000	320 80 80 0 000	320 82 10 0 000	320 82 80 0 000	320 75 10 0 000	320 85 10 0 000

Article numbers for other voltages on request

Sounder 105 dB(A) IS-A105N



These sounders are used in workplaces where dangerous, explosive atmospheres are to be expected

- free selection of 49 different tones UKOOA/PFEER conform
- high sound pressure level of 105 dB (A), can be reduced by up to 15 dB (A) via a potentiometer
- up to 2 tones can be selected externally in order to signal different alarms
- works on DC voltages between 10 and 28 V DC, rated voltage 24 V DC
- an input protector prevents damage due to incorrect connection without a Zener barrier or galvanic isolation
- can also be used outdoors thanks to housing made of self-extinguishing ABS and IP 66 protection system
- categories 1G, 2G and 3G (Zones 0, 1 and 2)

See pages 234 and 235 for suitable zener barriers



max. signal reception range



Protection system



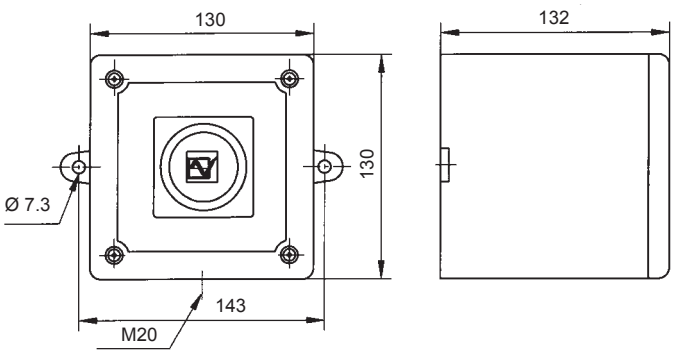
Operating temperature

Electrical data	IS-A105N
Rated voltage	24 V DC
Operating range	10 – 28 V
Nominal current consumption	25 mA (typical for connection to 24 V DC via 28 V / 300 Ω zener barrier)

Power must be connected via a zener barrier (max. 28 V DC, 93 mA DC, 0.66 W) or a galvanic isolator, specified by the system certificate (see page 235)

Mechanical data	IS-A105N
Type of protection	"ia" inherently safe
Explosion protection	II 1G Ex ia IIC T4 - 40 °C ... + 60 °C Ta
Category (area of use)	1G (Zone 0) / 2G (Zone 1) / 3G (Zone 2)
Certificate of conformity	SIRA 04 ATEX 2301 X
Testing body	SIRA
Sound pressure level	up to 105 dB (A) ± 3 dB (A) can be reduced by up to 15 dB (A) via an internal potentiometer
Alarm tones	49 different tones can be set via DIP switch, of which 2 tones are externally selectable
Storage temperature	- 40 °C … + 70 °C
Relative humidity	90% @ + 50 °C
Duty cycle	100%
Material	ABS self-extinguishing, similar UL 94 VO
Colour	similar to RAL 3000 (flame red), optionally grey RAL 7038 or white RAL 9010
Connecting terminals	0.5 – 2.5 mm²
Cable entry	20 mm
Weight	0.75 kg

Dimensions



Tone table

Tone	Description - Frequency	Stage 2	Stage 3
1	Continuous tone	2	5
2	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	17	5
3	Slow whoop, evacuation alarm Netherlands NEN 2575	2	5
4	Sweeping (fast)	6	5
5	Continuous tone	3	20
6	Sweeping	7	5
7	Sweeping (fast)	10	5
8	Sweeping	2	5
9	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	15	2
10	Alternating tone	7	5
11	Interrupted tone	2	5
12	Alternating tone	4	5
13	Interrupted tone	15	5
14	Interrupted tone	4	5
15	Continuous tone	2	5
16	Interrupted tone	18	5
17	Alternating tone, France NFS 32-001 (fire alarm)	2	27
18	Interrupted tone, Sweden SS031711 (air raid warning)	2	5
19	Sweeping, France NFC48-265	2	5
20	Continuous tone, Sweden SS031711 (all-clear signal)	2	5
21	Alternating tone	2	5
22	Interrupted tone	2	5
23	Interrupted tone	6	5
24	Sweeping (medium), UK BS5839-1	29	5
25	Sweeping	29	5
26	Simulated bell	2	15
27	Continuous tone	26	5
28	Continuous tone	2	5
29	Sweeping (fast), UK BS5839-1	7	5
30	Continuous tone	2	5
31	Sweeping	26	5
32	2-tone bell sound	26	15
33	Interrupted tone	2	5
34	Alternating tone, Singapore	38	45
35	Interrupted tone, Australian alert	36	5
36	Sweeping, IMO 3d, Germany KTA3901 evacuation alarm	35	5
37	Continuous tone	9	45
38	Continuous tone	34	45
39	Interrupted tone	23	17
40	Alternating tone, France NFS 32-001 (fire alarm)	31	27
41	Motor siren	2	5
42	Motor siren	2	5
43	Continuous tone, PFEER gasalarm	2	5
44	Motor siren	2	5
45	Interrupted tone, PFEER (general alarm)	38	34
46	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	47	37
47	Interrupted tone, PFEER (general alarm)	46	37
48	Interrupted tone, Australia AS2220, AS1610, AS1670	49	5
49	Sweeping, IMO 3d, Germany KTA3901 evacuation alarm	26	37

Ordering details

Article number	IS-A105N
24 V DC	320 33 80 0 000

Options / Accessories

GOST

Manufacturer's declaration

Developed and manufactured in accordance with EN 50014 (general requirements), EN 50020 (intrinsically safety), EMC Directive 89/336/EEC.

IS-Mini series Sounders 100 dB(A)
IS-mA1



Very economical acoustic alarm
- certified for use in Ex-Zones 0, 1 and 2!
- compact design with a diameter of just 88 m
- sounder operated via certified zener barriers or galvanic isolators
- 49 loud tones at 100 dB (A)
- very well suited for fire alarm systems and direct control due to low power consumption
- self-synchronising sounder for clear tone perception
- 2 different externally controllable tones
- volume control
- also available as mining-certified device (IM1 EEx ia)

See pages 234 and 235 for suitable zener barriers



max. signal reception range



Protection system



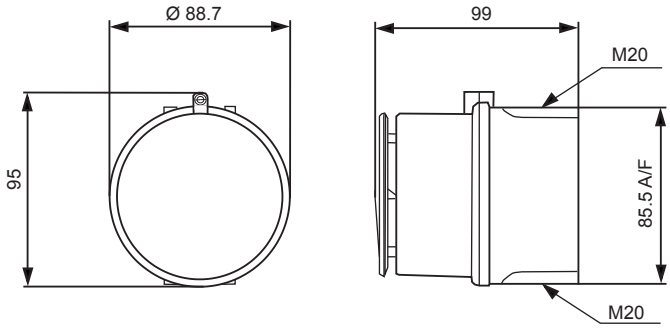
Operating temperature

Electrical data	IS-mA1
Rated voltage	24 V DC
Operating range	16 – 28 V
Nominal current consumption	25 mA (typical for connection to 24 V DC via 28 V / 300 Ω zener barrier)

Power must be connected via a zener barrier (max. 28 V DC, 93 mA DC, 0.66 W) or a galvanic isolator, specified by the system certificate (see page 235)

Mechanical data	IS-mA1
Type of protection	"ia" inherently safe
Explosion protection	II 1G EEx ia IIC T4 - 40 °C ... + 60 °C Ta
Category (area of use)	1G (Zone 0) / 2G (Zone 1) / 3G (Zone 2)
Certificate	SIRA 05 ATEX2084 X
Testing body	SIRA
Sound pressure level	100 dB (A)
Sound level reduction	by - 20 dB
Storage temperature	- 40 °C … + 70 °C
Relative humidity	90%
Protection system according to EN 60529	IP 65
Duty cycle	100%
Material	ABS, self-extinguishing UL94VO & 5VA, similar to RAL 3000 (flame red)
Connecting terminals	0.5 – 2.5 mm²
Cable entry	2 x M20 (knock-outs prepared)
Weight	230 g

Dimensions



Tone table

Tone	Description - Frequency		Stage 2	Stage 3
1	Continuous tone	340 Hz	2	5
2	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	1000 Hz / 800 Hz, 0,25 s / 0,25 s, EN54-3	17	5
3	Slow whoop, evacuation alarm Netherlands NEN 2575	1200 Hz / 500 Hz, 3,5 s / 0,5 s, EN54-3	2	5
4	Sweeping (fast)	1000 Hz / 800 Hz, 10 ms / 10 ms	6	5
5	Continuous tone	2400 Hz	3	20
6	Sweeping	2900 Hz / 2400 Hz, 70 ms / 70 ms	7	5
7	Sweeping (fast)	2900 Hz / 2400 Hz, 10 ms / 10 ms	10	5
8	Sweeping	1200 Hz / 500 Hz, 3 s / 3 s	2	5
9	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz / 500 Hz, 1 s, EN54-3	15	2
10	Alternating tone	2900 Hz / 2400 Hz, 20 ms / 20 ms	7	5
11	Interrupted tone	1000 Hz, 10 ms / 10 ms	2	5
12	Alternating tone	1000 Hz / 800 Hz, 0,875 s / 0,875 s	4	5
13	Interrupted tone	2400 Hz, 10 ms / 10 ms	15	5
14	Interrupted tone	800 Hz, 0,25 s / 1 s	4	5
15	Continuous tone	800 Hz	2	5
16	Interrupted tone	660 Hz, 150 ms / 150 ms, EN54-3	18	5
17	Alternating tone, France NFS 32-001 (fire alarm)	554 Hz / 440 Hz, 0,1 s / 0,4 s, EN54-3	2	27
18	Interrupted tone, Sweden SS031711 (air raid warning)	660 Hz, 1,8 s / 1,8 s	2	5
19	Sweeping, France NFC48-265	1600 Hz / 1400 Hz, 1 s / 0,5 s	2	5
20	Continuous tone, Sweden SS031711 (all-clear signal)	660 Hz	2	5
21	Alternating tone	554 Hz / 440 Hz, 10 ms / 10 ms	2	5
22	Interrupted tone	544 Hz, 0,875 s / 0,875 s	2	5
23	Interrupted tone	800 Hz, 20 ms / 20 ms	6	5
24	Sweeping (medium), UK BS5839-1	1000 Hz / 800 Hz, 0,5 s / 0,5 s	29	5
25	Sweeping	2900 Hz / 2400 Hz, 0,5 s / 0,5 s	29	5
26	Simulated bell	1450 Hz, 0,69 ms	2	15
27	Continuous tone	800 Hz	26	5
28	Continuous tone	440 Hz	2	5
29	Sweeping (fast), UK BS5839-1	1000 Hz / 800 Hz, 70 ms / 70 ms	7	5
30	Continuous tone	300 Hz	2	5
31	Sweeping	1200 Hz / 660 Hz, 10 ms / 10 ms	26	5
32	2-tone bell sound	800 Hz / 650 Hz, 0,25 s / 0,25 s / 2 s	26	15
33	Interrupted tone	745 Hz, 10 ms / 10 ms	2	5
34	Alternating tone, Singapore	2000 Hz / 1000 Hz, 0,5 s / 0,5 s	38	45
35	Interrupted tone – Australian alert	420 Hz, 0,625 s / 0,625 s	36	5
36	Sweeping, IMO 3d, Germany KTA3901 evacuation alarm	1200 Hz / 500 Hz, 1 s / 1 s	35	5
37	Continuous tone	1000 Hz	9	45
38	Continuous tone	2000 Hz	34	45
39	Interrupted tone	800 Hz, 0,25 s / 1 s	23	17
40	Alternating tone, France NFS 32-001 (fire alarm)	554 Hz / 440 Hz, 0,1 s / 0,4 s, EN54-3	31	27
41	Motor siren	1200 Hz, const.	2	5
42	Motor siren	800 Hz, const.	2	5
43	Continuous tone, PFEER gasalarm	1200 Hz	2	5
44	Motor siren	2400 Hz, const.	2	5
45	Interrupted tone, PFEER (general alarm)	1000 Hz, 1 s / 1 s	38	34
46	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz / 500 Hz, 1 s, EN54-3	47	37
47	Interrupted tone, PFEER (general alarm)	1000 Hz, 1 s / 1 s	46	37
48	Interrupted tone, Australia AS2220, AS1610, AS1670	420 Hz, 0,625 s / 0,625 s	49	5
49	Sweeping, IMO 3d, Germany KTA3901 evacuation alarm	1200 Hz / 500 Hz, 1 s / 1 s	26	37

Ordering details

Article numbers	IS-mA1
Rated voltage	24 V DC
	320 34 80 0 000

Options / Accessories

GOST

Loudspeakers 117 / 113 dB(A)
BExL 25 d/e / BExL 15 d/e



- EEx d IIC T4 / EEx de IIC T4
- KEMA certified
- ATEX approval, optionally IEC and GOST approvals
- housing made of die-cast aluminium LM6, horn made of ABS
- categories 2G and 3G (Zones 1 and 2)
- also available as category 2D/3D for dust zones 21 and 22
- chromated polyester powder coating, resistant to moisture and salt spray, good resistance to most acids, alkalis and oils

BExL 15

r = 79 m

max. signal reception range

BExL 25

r = 126 m

max. signal reception range

IP 66
IP 67

Protection system

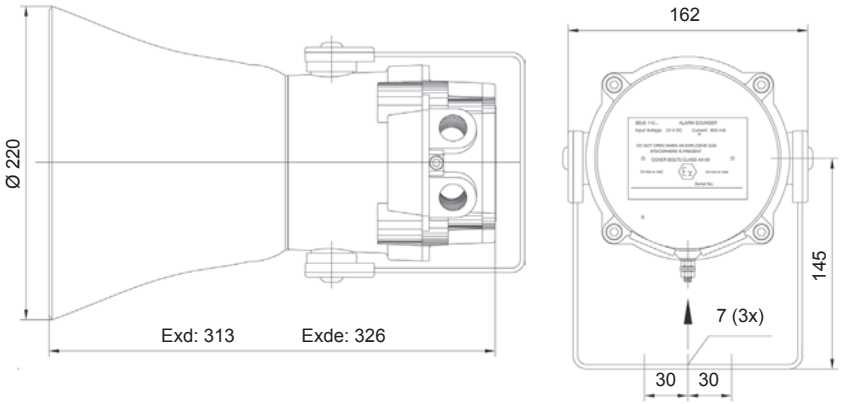
+ 70 °C
- 50 °C

Operating temperature

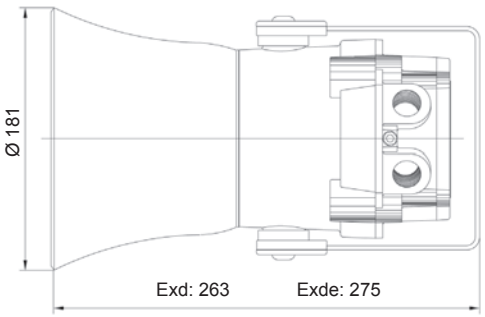
Mechanical data		BExL 25 d/e	BExL 15 d/e
Protection system		"d" = IP 67; or "e" = IP 66	
Explosion protection		II 2G Ex d IIC T4 / II 2G EEx de IIC T4 II 2G Ex d IIB T4 / II 2G EEx de IIB T4	
Category (area of use)		2G (Zone 1) 3G (Zone 2)	
Certificate of conformity		KEMA 99 ATEX 7906	
Testing body		KEMA	
Sound pressure level		117 dB (A) ± 3 dB (A) @ 25 W	113 dB (A) ± 3 dB (A) @ 15 W
Rated power	sine wave	25 W	15 W
Transformer	type	100 V power – 25 W / 12.5 W / 6 W / 2 W taps (Z = 400 Ω / 800 Ω / 1.67 kΩ / 5 kΩ)	100 V power – 15 W / 7.5 W / 3 W / 1 W taps (Z = 666.87 Ω / 1.34 kΩ / 3.34 kΩ / 10 kΩ)
Impedance	type	8 Ω or 16 Ω	
Dispersion		130° @ 1 kHz / 32° @ 4 kHz	120° @ 1 kHz / 32°@ 4 kHz
Frequency range		300 Hz – 8 000 Hz	400 Hz – 8 000 Hz
Temperature class T		IIC T4 @ - 50 °C ... + 55 °C Ta IIB T4 @ - 50 °C ... + 70 °C Ta	
Storage temperature		- 50 °C … + 70 °C	
Relative humidity		90%	
Duty cycle		100%	
Material	housing	die-cast aluminium LM6, similar to RAL 3000 (flame red)	
	horn	ABS self-extinguishing, similar UL 94 VO & 5VA FR ABS, Ex II 2GD anti-static ABS, black	
Connecting terminals		1 x 4 mm^2 or 2 x 2.5 mm^2	
Cable entry		2 / 1 x closed, 1 x open (M20), optionally PG13.5 or 1/2" NPT	
Weight	transformer	"d": 3.95 kg / "e": 4.21 kg	"d": 3.45 kg / "e": 3.10 kg
	impedance	"d": 3.56 kg / "e": 3.82 kg	"d": 3.71 kg / "e": 3.36 kg

Dimensions

BExL 25 d/e

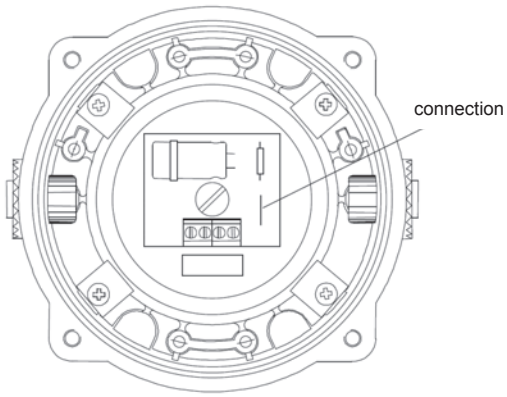


BExL 15 d/e

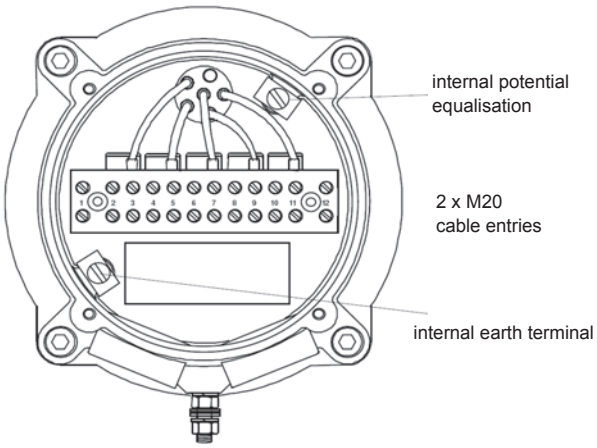


Connection diagram

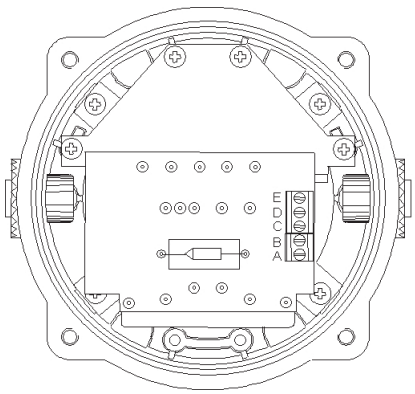
EEx d, 8 Ω and 16 Ω



EEx e, 8 Ω and 16 Ω



100 V



Connections	BExL 25 d (25 W)	BExL 15 d (15 W)
A–B	25 W	15 W
A–C	12.5 W	7.5 W
A–D	6 W	3 W
A–E	2 W	1 W

Ordering details

Article numbers	BExL 25 d	BExL 25 e	BExL 15 d	BExL 15 e
8 Ω	320 93 00 0 910	320 95 00 0 910	320 97 00 0 910	320 99 00 0 910
16 Ω	320 93 00 0 911	320 95 00 0 911	320 97 00 0 911	320 99 00 0 911
100 V transformer	320 93 00 0 912	320 95 00 0 912	320 97 00 0 912	320 99 00 0 912

Options / Accessories

GOST

Sounder/Flashing Light Combination BExCS 110-05D, BExDCS 110-05D



Combination devices for visual and acoustic alarms
- stainless steel protective cage and stainless steel mounting bracket for 360° positioning
- extremely intensive light reflection due to 5 Joule xenon flash
- 32 different tones incl. DIN tone, UKOOA/PFEER conformant, 2 externally controllable tones (via plus or minus in DC version) (see page 219 for tone table)
- flashing light and sounder can be controlled separately
- synchronised flash frequency (1 Hz) or alternating flash mode in system operation
- highly resistant to corrosion and suitable for the toughest environments
- adjustable volume (except 12 V DC version)
- flashing light is insensitive to vibration, impact and shock



max. signal reception range



Protection system

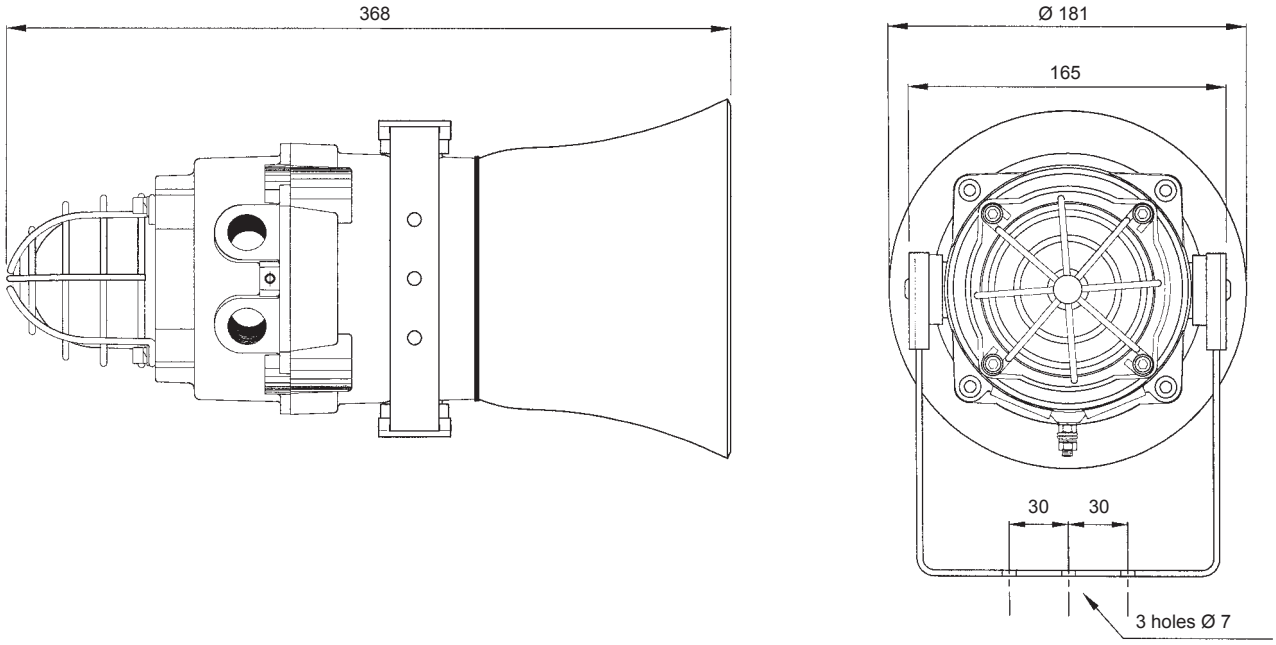


Operating temperature

Electrical data	BEx(D)CS 110-05D sounder				
Rated voltage	230 V AC	115 V AC	48 V DC	24 V DC	12 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz			
Operating range	± 10%	± 10%	± 25%	± 25%	± 25%
Nominal current consumption	56 mA	110 mA	130 mA	250 mA	195 mA
Electrical data	**BEx(D)CS 110-05D flashing light**				
Rated voltage	230 V AC	115 V AC	48 V DC	24 V DC	12 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz			
Operating range	± 10%	± 10%	42 – 54 V	20 – 28 V	10 – 14 V
Nominal current consumption	55 mA	140 mA	180 mA	270 mA	750 mA

Mechanical data		BExCS 110-05D	BExDCS 110-05D
Explosion protection		II 2G Ex d IIB T4 - 50 °C ... + 70 °C Ta	II 2GD Ex d IIB T4 T100°C
Category (area of use)		2G (Zone 1) 3G (Zone 2)	2G (Zone 1) / 2D (Zone 21) 3G (Zone 2) / 3D (Zone 22)
Certificate of conformity		KEMA 03 ATEX 2545 X	KEMA 01 ATEX 2223 X
Testing body		KEMA	KEMA
Sound pressure level		110 dB (A)	
Volume control		- 9 dB	
Flash energy		5 J	
Flash rate		approx. 1 Hz = 60 flashes/min.	
Lens colours		clear, yellow, amber, red, green, blue	
Storage temperature		- 50 °C … + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 67	
Duty cycle		100%	
Service life of the flash tube		light emission still 70% after 8 000 000 flashes	
Material	lens	glass	
	housing	die-cast aluminium LM6, similar to RAL 3000 (flame red)	
	horn	ABS self-extinguishing, similar UL 94 VO & 5VA FR ABS, Ex II 2D anti-static ABS, black	
Connecting terminals		0.5 ... 4.0 mm²	
Cable entry		2 / 1 x closed, 1 x open (M20), optionally PG13.5 or 1/2“ NPT	
Weight	AC	5.0 kg	
	DC	4.8 kg	

Dimensions



Ordering details

Article numbers		BExCS 110-05D		
Lens colour	**Rated voltage**	230 V AC	115 V AC	24 V DC
red		320 74 10 5 000	320 74 15 5 000	320 74 80 5 000

Article numbers for other colours and voltages on request

Options / Accessories

GOST

Manufacturer's declaration

We hereby declare that the explosion-protected flashing light with the type designation **BExCS 110-05 D, BExDCS 110-05D** has been developed and manufactured in accordance with section 5.1.2 of EN 50014.

This declaration is based on compliance with the following regulations and standards:

94/9/EG	CE conformity
EN 50014	Electrical equipment for areas at risk of explosions – General requirements
EN 50018	Pressure-resistant encapsulation 'd'
EN 50281-1-1	Electrical equipment for use in areas with combustible dust

Loudspeaker/Flash Light Combination BExCL 15-05D



Combination device for visual and acoustic alarms
- extremely intensive light reflection due to 5 Joule xenon flash
- synchronised flash frequency or alternating flash mode in system operation
- acoustic and visual signal can be controlled separately
- highly resistant to corrosion and suitable for the toughest environments
- adjustable volume
- stainless steel protective cage and stainless steel mounting bracket for 360° positioning



max. signal reception range



Protection system

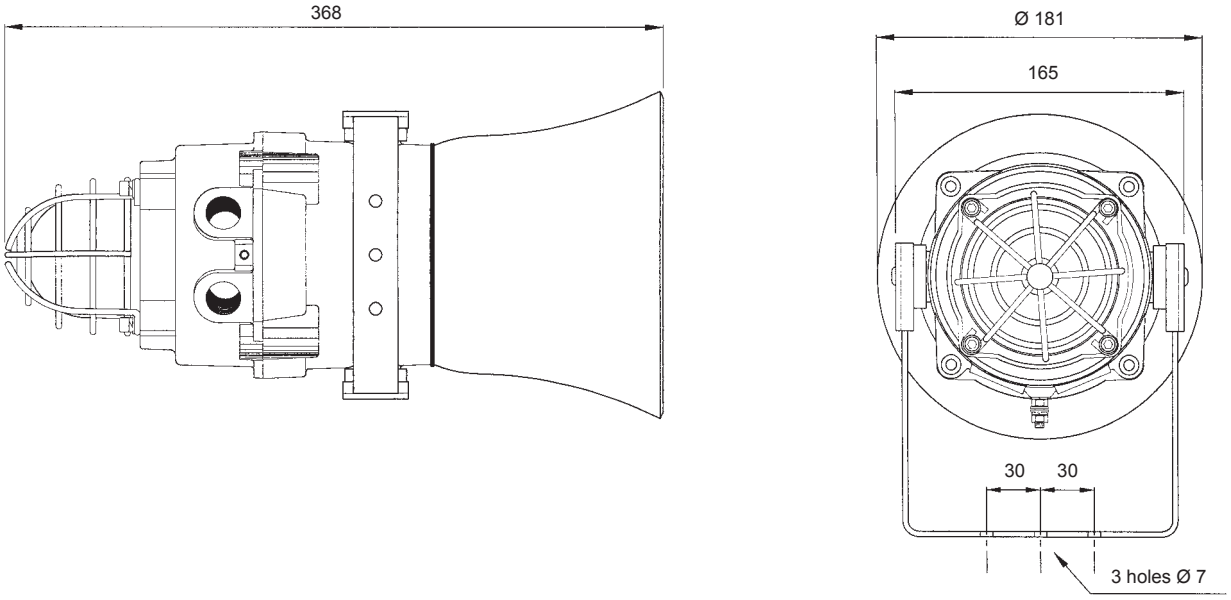


Operating temperature

Electrical data	BExCL 15-05D				
Rated voltage	230 V AC	115 V AC	48 V DC	24 V DC	12 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz			
Operating range	± 10%	± 10%	42 – 54 V	20 – 28 V	10 – 14 V
Nominal current consumption	55 mA	140 mA	180 mA	270 mA	750 mA

Mechanical data		BExCL 15-05D
Explosion protection		II 2G Ex d IIB T4
Category (area of use)		2G (Zone 1) / 3G (Zone 2)
Certificate of conformity		KEMA 03 ATEX 2545
Testing body		KEMA
Sound pressure level		113 dB (A) ± 3 dB (A) @ 15 W
Rated power	sine wave	15 W
Transformer	type	100 V power – 15 W / 7.5 W / 3 W / 1 W taps (Z = 666.87 Ω / 1.34 kΩ / 3.34 kΩ / 10 kΩ)
Impedance	type	8 Ω or 16 Ω
Dispersion		120° @ 1 kHz / 32° @ 4 kHz
Frequency range		400 Hz – 8 000 Hz
Flash energy		5 J
Flash rate		approx. 1 Hz
Lens colours		clear, yellow, amber, red, green, blue
Temperature class T		IIB: T4 @ - 50 °C ... + 70 °C Ta
Storage temperature		- 50 °C … + 70 °C
Protection system according to EN 60529		IP 67
Duty cycle		100%
Service life of the flash tube		light emission still 70% after 8 000 000 flashes
Material	lens	glass
	housing	die-cast aluminium LM6, RAL 3000 (flame red)
	horn	ABS self-extinguishing, similar UL 94 VO & 5VA FR ABS, Ex II 2D anti-static ABS
Connecting terminals		0.5 ... 4.0 mm²
Cable entry		2 / 1 x closed, 1 x open (M20), optional PG13.5 or 1/2“ NPT
Weight		5 kg

Dimensions



Ordering details

Article numbers		BExCL 15-05D	
Lens colour	**Version**	230 V AC	24 V DC
red	**8 Ω**	320 91 10 5 910	320 91 80 5 910
red	**16 Ω**	320 91 10 5 911	320 91 80 5 911
red	**100 V transformer**	320 91 10 5 912	320 91 80 5 912

Article numbers for other colours and voltages on request

Options / Accessories

GOST

Manufacturer's declaration

We hereby declare that the explosion-protected means of alarm with the type designation **BExCL 150-05 D** has been developed and manufactured in accordance with section 5.1.2 of EN 50014.

This declaration is based on compliance with the following regulations and standards:

94/9/EG	CE conformity
EN 50014	Electrical equipment for areas at risk of explosions – General requirements
EN 50018	Pressure-resistant encapsulation 'd'
EN 50281-1-1	Electrical equipment for use in areas with combustible dust

LED Blinking Light/Sounder Combination IS-Mini Serie IS-mC1



Very economical visual and acoustic alarm
- certified for use in Ex-Zones 0, 1 and 2!
- compact design with a diameter of just 88 m
- alarm operated via certified zener barriers or galvanic isolators
- 49 loud tones at 100 dB (A); super-bright LEDs in red, green, blue and yellow/amber for all applications
- volume control
- can be operated as combination unit or separately
- very well suited for fire alarm systems and direct control due to low power consumption
- self-synchronising sounder for clear tone perception
- 2 different externally controllable tones

See pages 234 and 235 for suitable zener barriers



max. signal reception range



Protection system



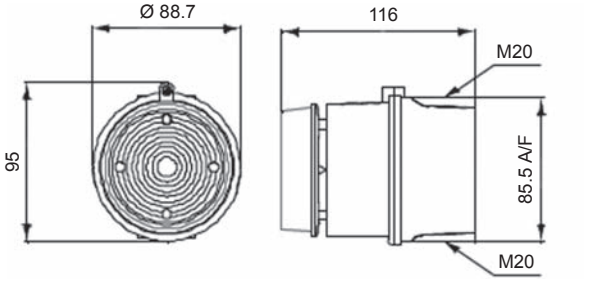
Operating temperature

Electrical data	IS-mC1
Rated voltage	24 V DC
Operating range	16 – 28 V
Nominal current consumption	48 mA (typical for connection to 24 V DC via 28 V / 300 Ω zener barrier)

Power must be connected via a zener barrier (max. 28 V DC, 93 mA DC, 0.66 W) or a galvanic isolator, specified by the system certificate (see page 235)

Mechanical data		IS-mC1
Type of protection		"ia" inherently safe
Explosion protection		II 1G Ex ia IIC T4 - 40 °C ... + 60 °C Ta
Category (area of use)		1G (Zone 0) / 2G (Zone 1) / 3G (Zone 2)
Certificate / Testing body		SIRA 05 ATEX2084 X / SIRA
Sound pressure level		100 dB (A)
Sound level reduction		by - 20 dB
Flash rate		can be set to 2 Hz or 1 Hz
Lens colour		clear, with red, yellow/amber, blue or green LEDs
Storage temperature		- 40 °C … + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 65
Duty cycle		100%
Material	housing	ABS, self-extinguishing UL94VO & 5VA, similar to RAL 3000 (flame red)
	lens	polycarbonate (PC)
Connecting terminals		0.5 – 2.5 mm²
Cable entry		2 x M20 (knock-outs prepared)
Weight		280 g

Dimensions



Tone table

Tone	Description - Frequency	Stage 2	Stage 3
1	Continuous tone	2	5
2	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	17	5
3	Slow whoop, evacuation alarm Netherlands NEN 2575	2	5
4	Sweeping (fast)	6	5
5	Continuous tone	3	20
6	Sweeping	7	5
7	Sweeping (fast)	10	5
8	Sweeping	2	5
9	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	15	2
10	Alternating tone	7	5
11	Interrupted tone	2	5
12	Alternating tone	4	5
13	Interrupted tone	15	5
14	Interrupted tone	4	5
15	Continuous tone	2	5
16	Interrupted tone	18	5
17	Alternating tone, France NFS 32-001 (fire alarm)	2	27
18	Interrupted tone, Sweden SS031711 (air raid warning)	2	5
19	Sweeping, France NFC48-265	2	5
20	Continuous tone, Sweden SS031711 (all-clear signal)	2	5
21	Alternating tone	2	5
22	Interrupted tone	2	5
23	Interrupted tone	6	5
24	Sweeping (medium), UK BS5839-1	29	5
25	Sweeping	29	5
26	Simulated bell	2	15
27	Continuous tone	26	5
28	Continuous tone	2	5
29	Sweeping (fast), UK BS5839-1	7	5
30	Continuous tone	2	5
31	Sweeping	26	5
32	2-tone bell sound	26	15
33	Interrupted tone	2	5
34	Alternating tone, Singapore	38	45
35	Interrupted tone – Australian alert	36	5
36	Sweeping, IMO 3d, Germany KTA3901 evacuation alarm	35	5
37	Continuous tone	9	45
38	Continuous tone	34	45
39	Interrupted tone	23	17
40	Alternating tone, France NFS 32-001 (fire alarm)	31	27
41	Motor siren	2	5
42	Motor siren	2	5
43	Continuous tone, PFEER gasalarm	2	5
44	Motor siren	2	5
45	Interrupted tone, PFEER (general alarm)	38	34
46	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	47	37
47	Interrupted tone, PFEER (general alarm)	46	37
48	Interrupted tone, Australia AS2220, AS1610, AS1670	49	5
49	Sweeping, IMO 3d, Germany KTA3901 evacuation alarm	26	37

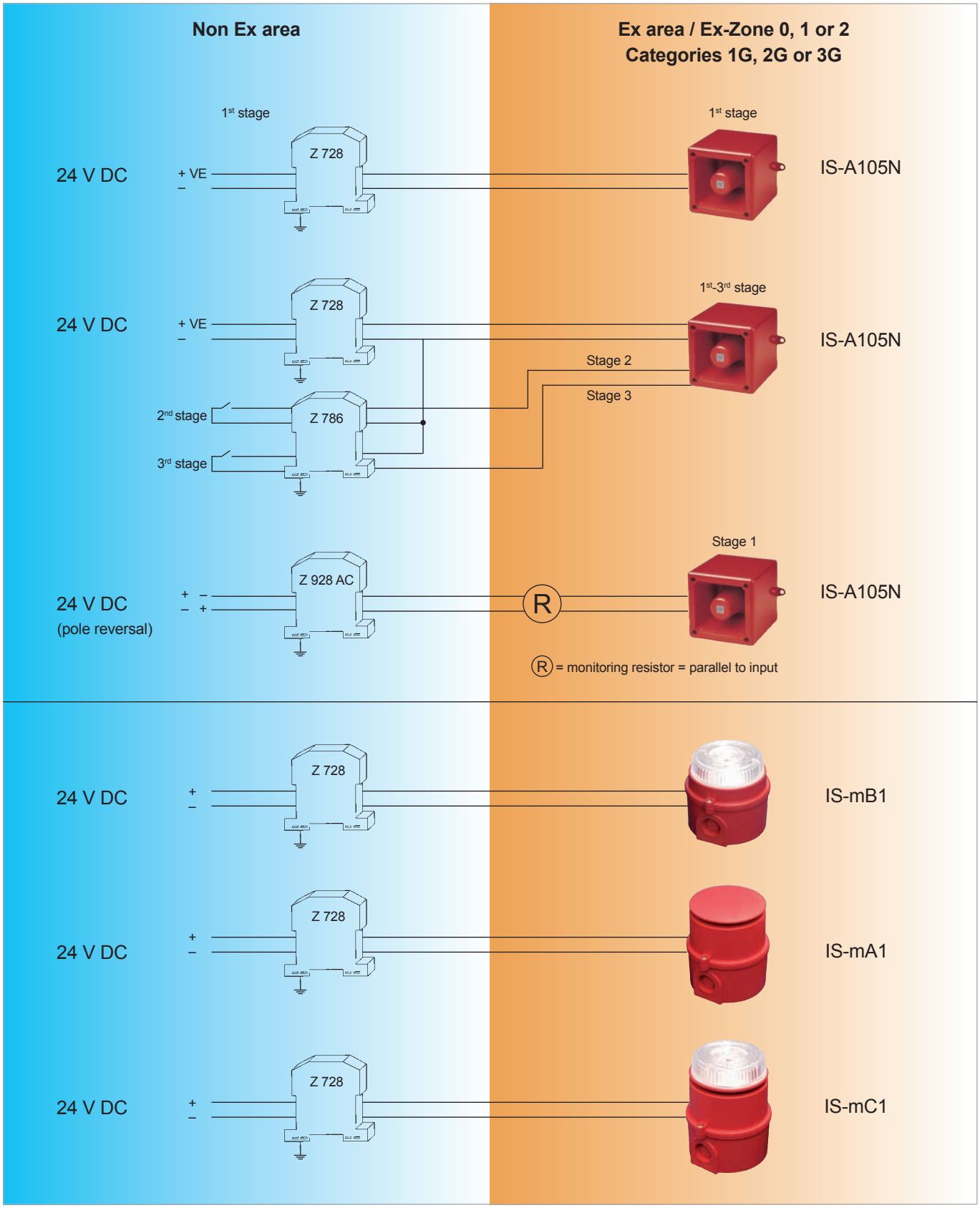
Ordering details

Article numbers		IS-mC1
Colour LED	Rated voltage	24 V DC
yellow/amber		320 35 80 4 000
red		320 35 80 5 000
green		320 35 80 6 000
blue		320 35 80 7 000

Accessories

Zener barriers

Combination possibilities: Zener barrier, IS-A105N sounder and IS-Mini series alarm



Technical data for Zener barriers

Type	Version	Rated data		Ex characteristic values for (Eex ia) IIC							Technical data			
		V	Ω	U_z (V)	R_{min} (Ω)	I_k (I_0) (mA)	P_{max} (W)	C_{max} (µF)	L_{max} (mH)	L/R Ratio	max. longitudinal resistance (Ω)	U in at 10 µA (V)	U in max. (V)	rated safety current (mA)
Z 728	Zener barrier + Ve BAS 01 ATEX 7005	28	300	28	301	93	0.65	0.083	3.05	56	327	26.5	28.0	50
Z 928	Zener barrier AC BAS 01 ATEX 7005	28	300	28	301	93	0.65	0.083	3.05	56	327	26.0	27.6	50
Z 786	Diode barrier BAS 01 ATEX 7005	28	Diode A1 A2 B	28 28 28	– – –	– – –	– – –	0.083 0.083 0.083	– – –	– – –	36 + 0.9 V 36 + 0.9 V –	26.5 26.5 –	28.0 28.0 –	50 50 –

Note: A1 and A2 - separate channels, B - two channels connected in parallel with ground connection

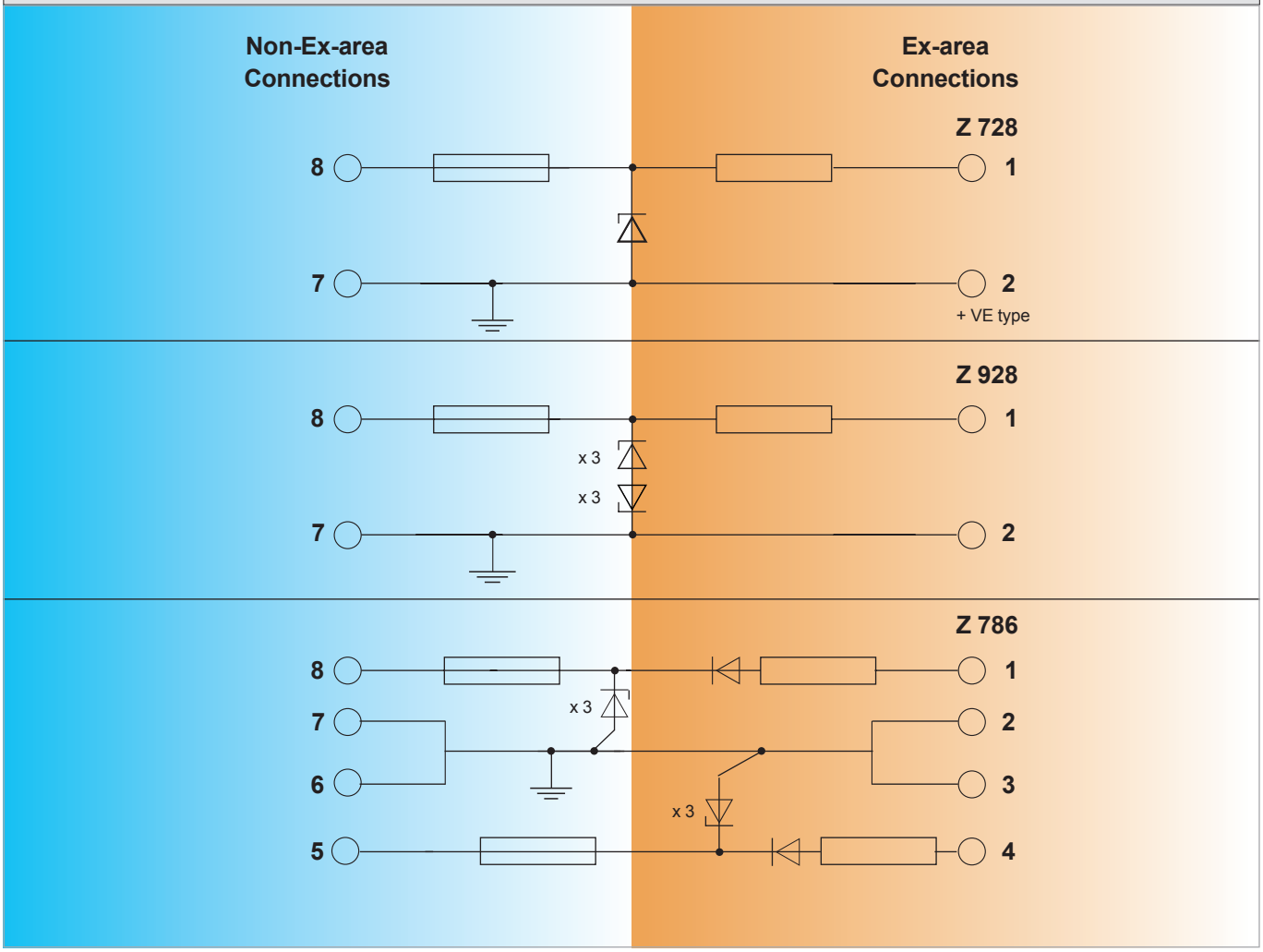
Mechanical data

Design		terminal housing made of makrolon, flammability class UL 94 V-0
Height x Width x Depth	mm	110 x 12.5 x 115
Mounting		snap fitting to 35 mm DIN rail conforming to DIN EN 50022
Connection		self-opening apparatus terminals; max. wire cross-section 2 x 2.5mm²
Ambient temperature		- 20 °C … + 60 °C

Ordering details

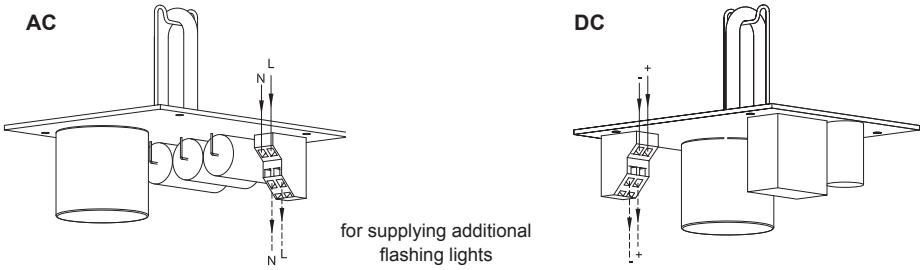
Article numbers	Z 728	Z 928	Z 786
	381 09 80 0 000	381 09 30 0 000	381 09 80 0 001

Block circuit diagrams

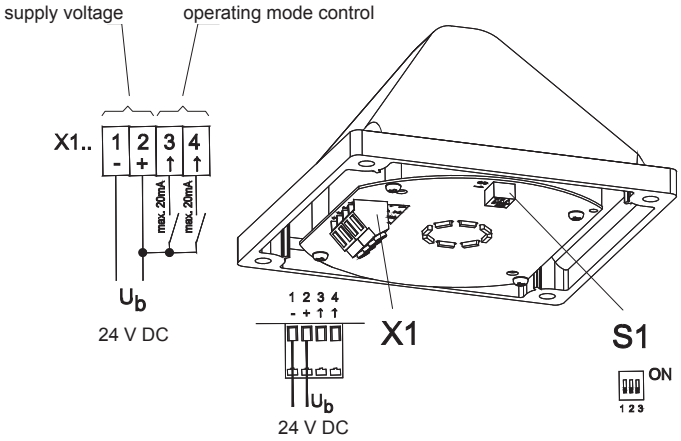


Connection diagrams

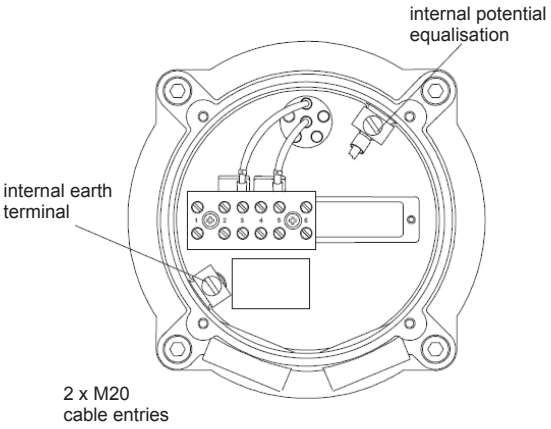
Quadro F12-3G/3D ATEX



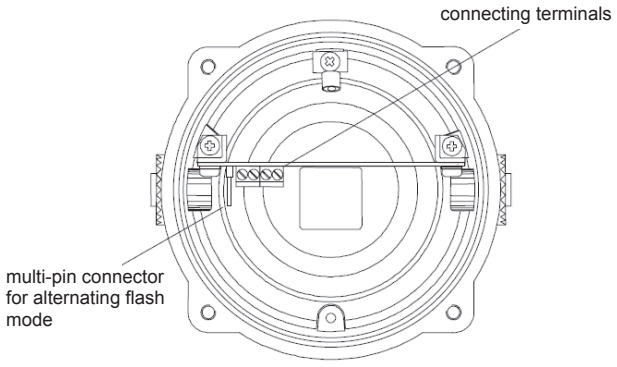
Quadro-LED Flex-3G/3D



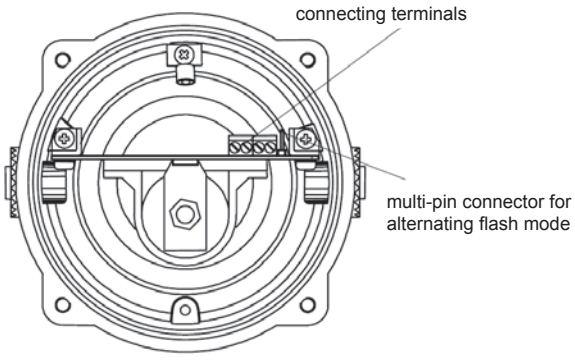
BExBG 15 / BExBG 10 / BExBG 05 – EEx e



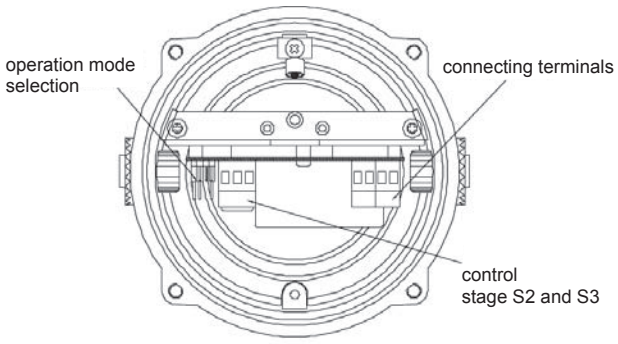
BExBG 05 – EEx d



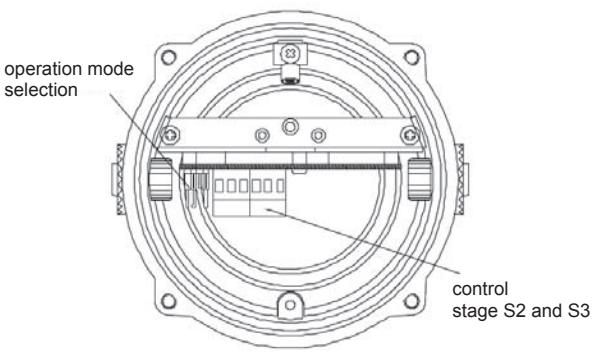
BExBG15 / BExBG 10 – EEx d



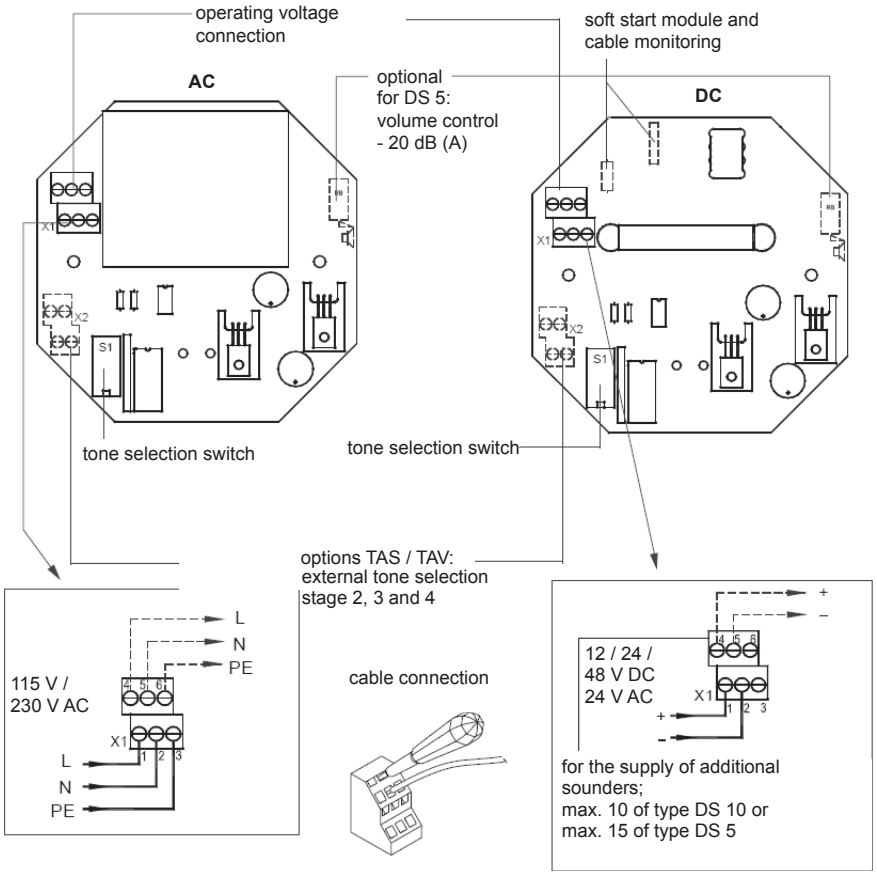
BExBG L1D – AC



BExBG L1D – DC

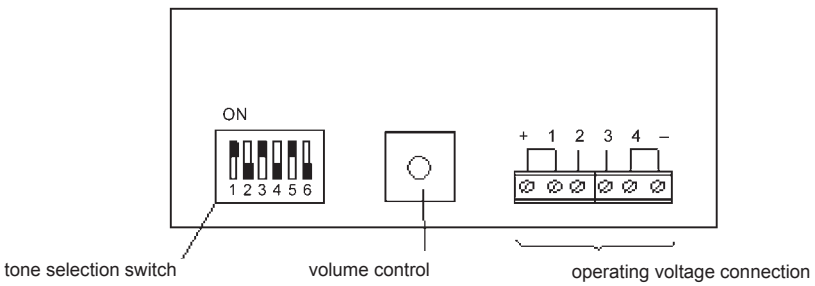


DS 5 3G/3D / DS 10 3G/3D – AC

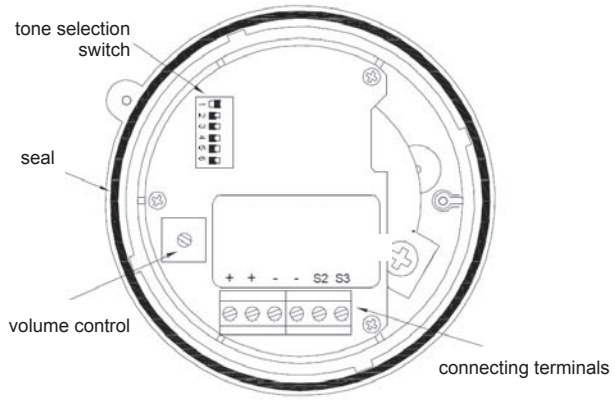


DS 5 3G/3D / DS 10 3G/3D – DC

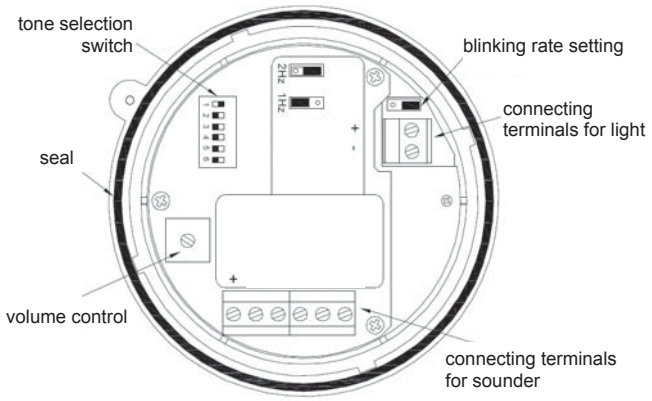
IS-A105N



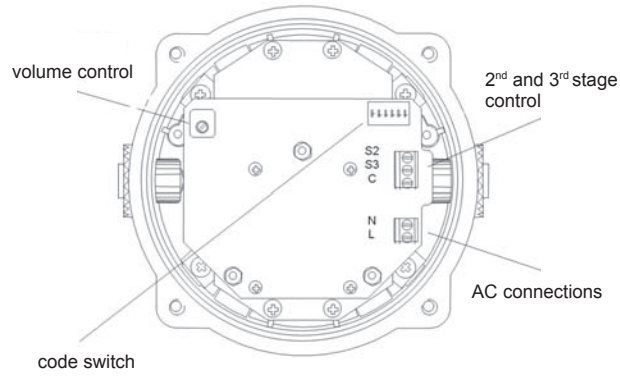
IS-mA1



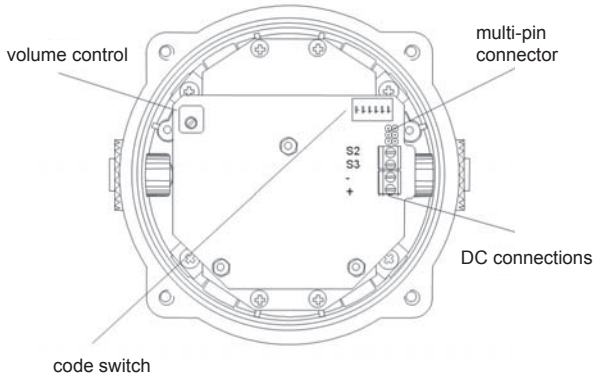
IS-mC1



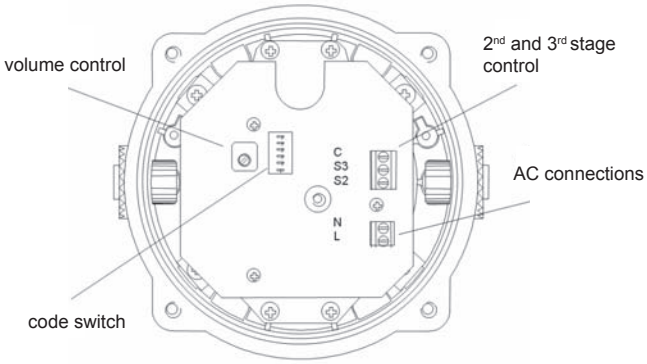
BExS 110d – AC



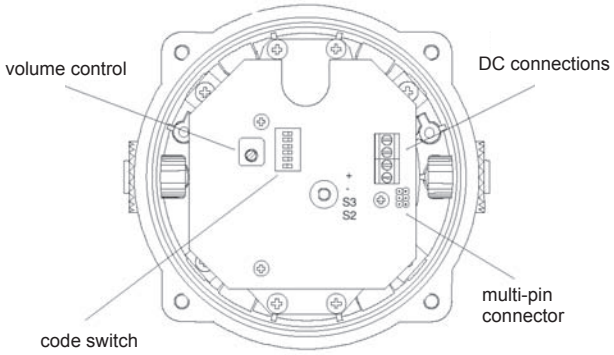
BExS 110d – DC



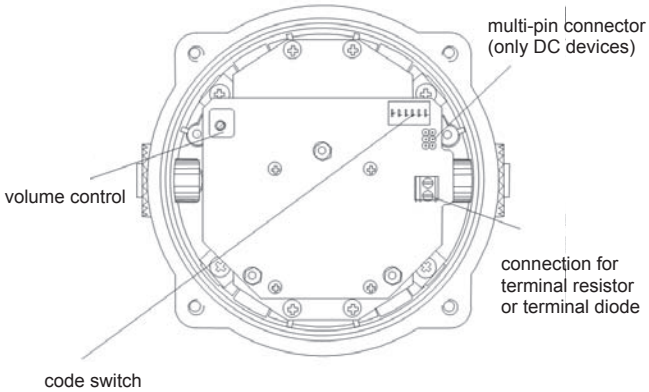
BExS 120d – AC



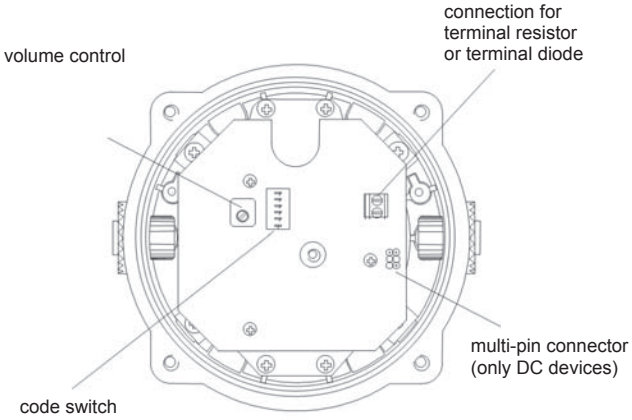
BExS 120d – DC



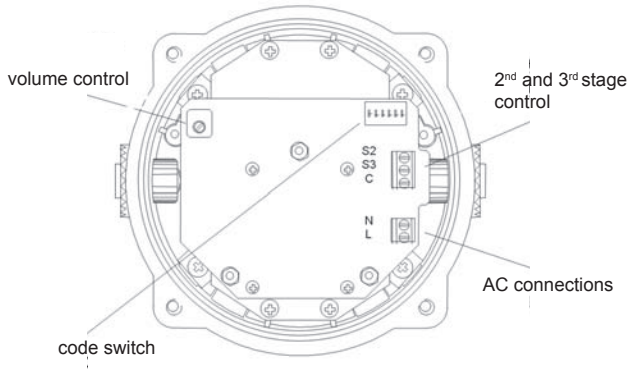
BExS 110e – DC



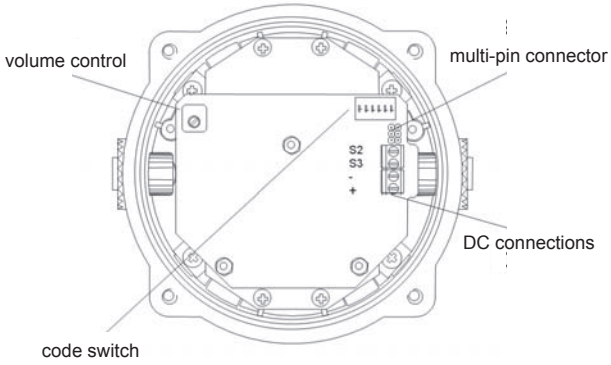
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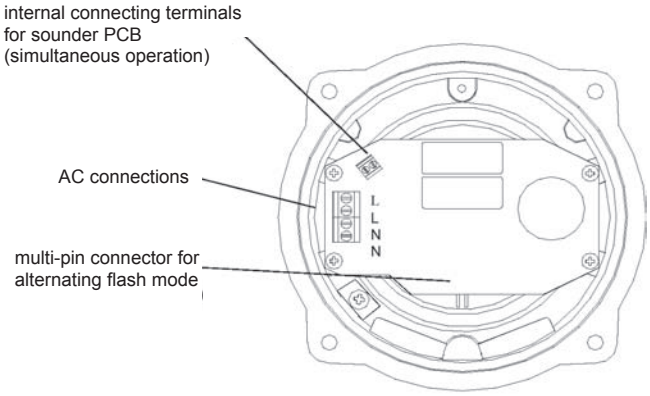
BExCS 110-05D sounder – AC



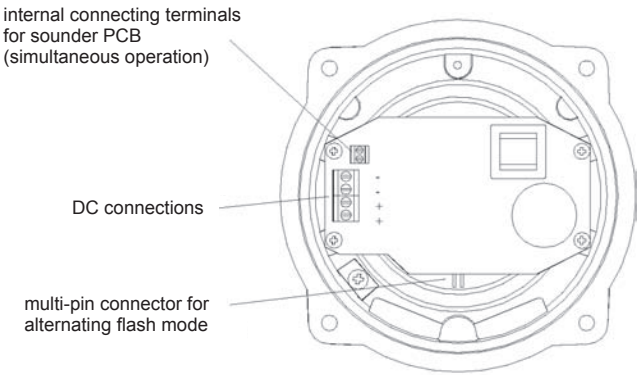
BExCS 110-05D sounder – DC



BExCS 110-05D flashing light – AC

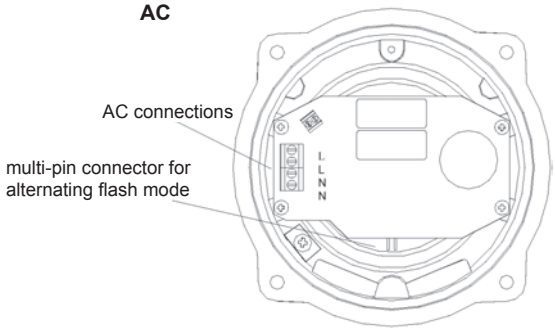


BExCS 110-05D flashing light – DC

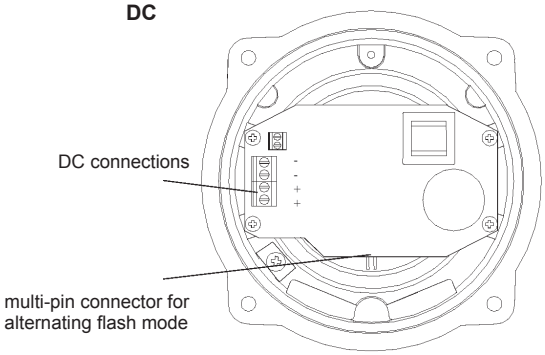


BExCL 15-05D flashing light

AC

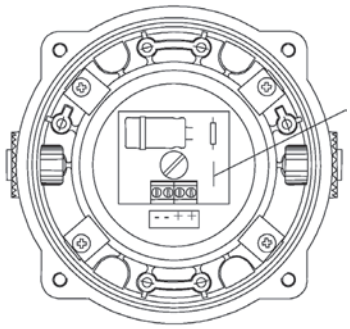


DC

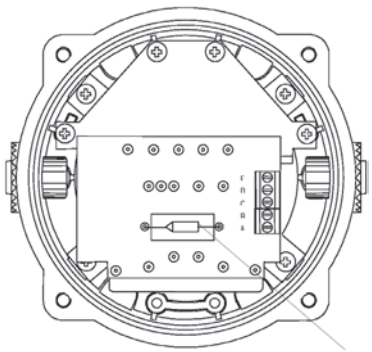


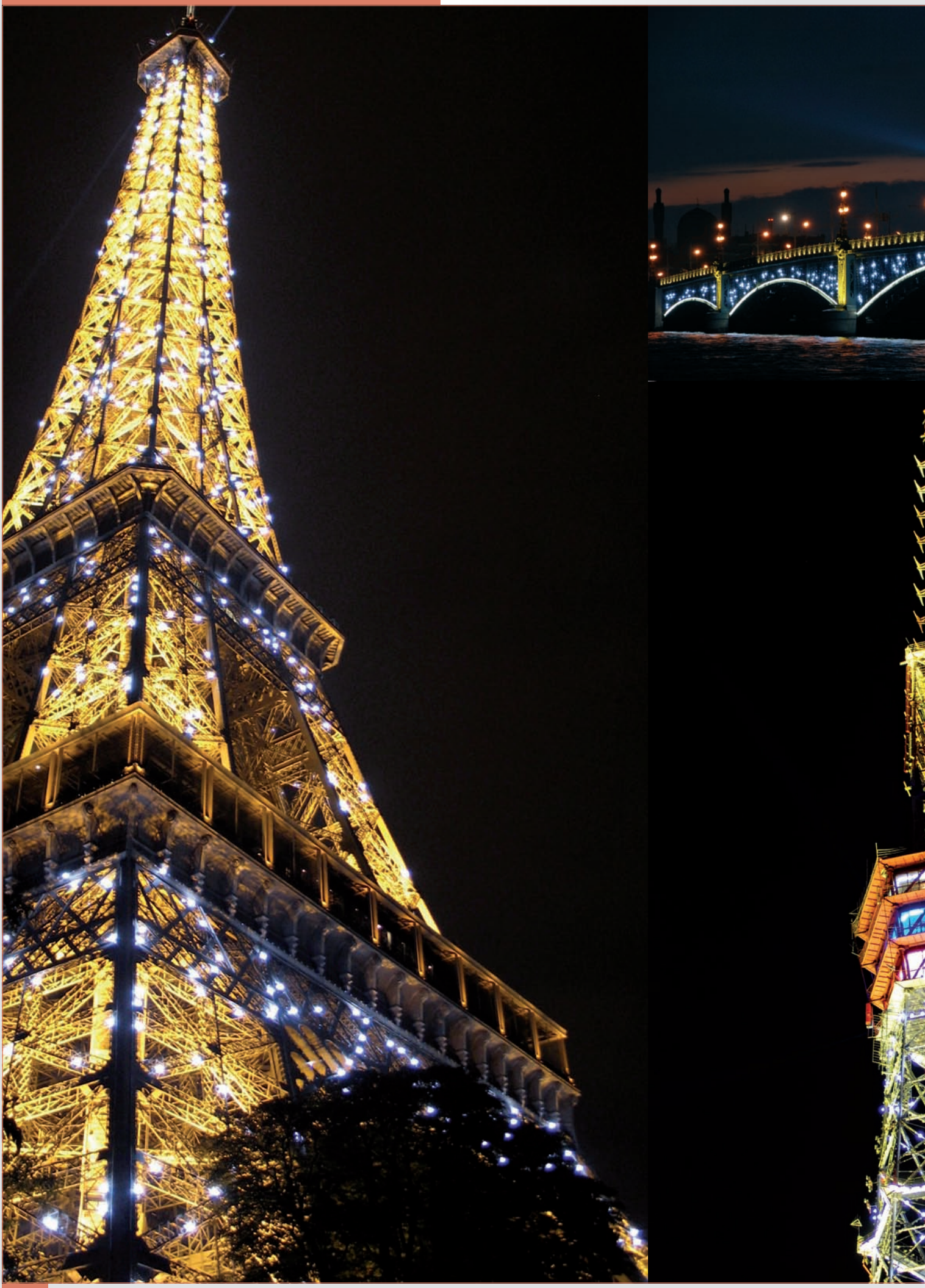
BExCL 15-05D loudspeaker

8 Ω / 16 Ω

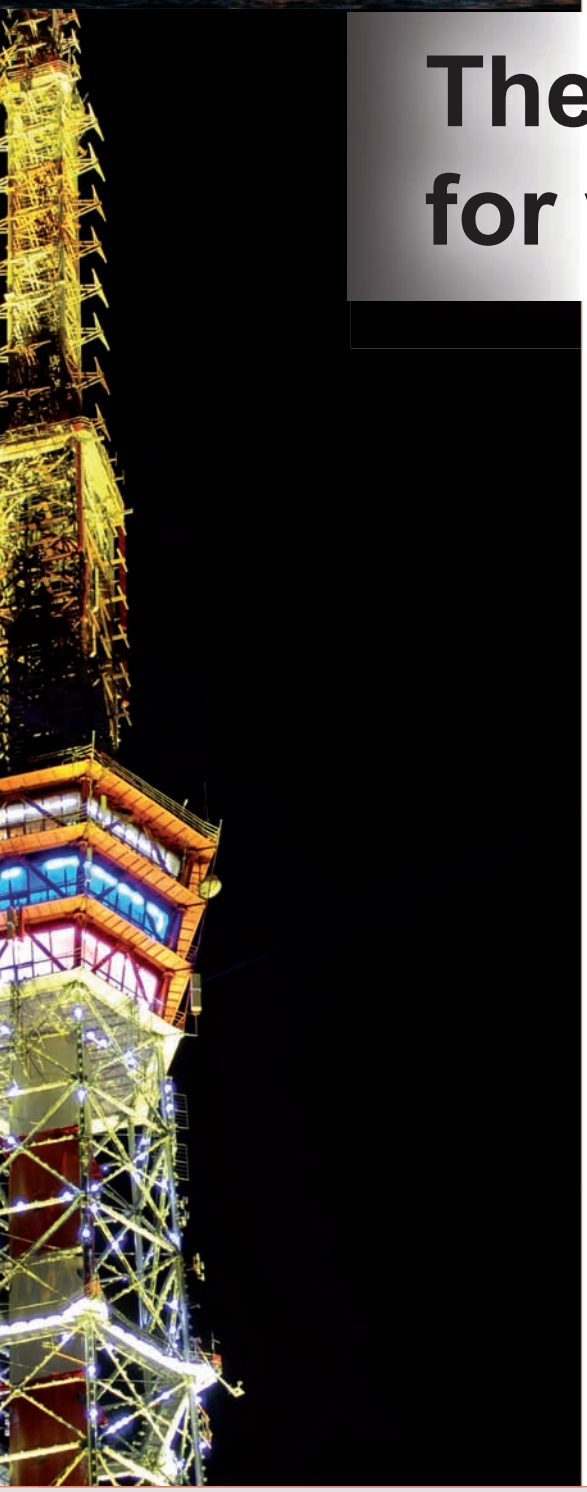


100 V









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Benefit from our know-how in the field of light architecture

Illumination is naturally also technology. In its purest form, however, it is much more. Namely art. Or, to put it better: a real philosophy, because with light, you can take your building into a completely new dimension.

That is what makes perfect illumination an ideal image tool. Present your building or structure in the right light. You can see for yourself how that looks in Paris, for example, where we illuminated a famous tower by a certain Gustave Eiffel, or in St. Petersburg, where the TV Tower and Trinity Bridge (Troitskiy-Most) are lit up by 9,500 Pfannenberg flashing lights.

ART ILLUMINATION

A completely different side of Pfannenberg: art illumination.

The beauty of the application and the durability and sturdiness of Pfannenberg flashing lights are the driving forces here. Let yourself be captivated by a few selected examples of Pfannenberg's artistic side.

Quadro R-ST

In June 2008, St. Petersburg became the scene of a fantastic art illumination installation. The TV Tower and the Trinity Bridge were illuminated as part of the International Economic Forum.

The project, which was based on the unique illumination of the Eiffel Tower in Paris, was carried out by a local company under the auspices of the city authorities. 9,500 Pfannenberg Quadro R-ST flashing lights were used for the project, selected because of their sturdy design that guarantees a long service life under adverse conditions.



St. Petersburg, Russia
TV Tower and Trinity Bridge





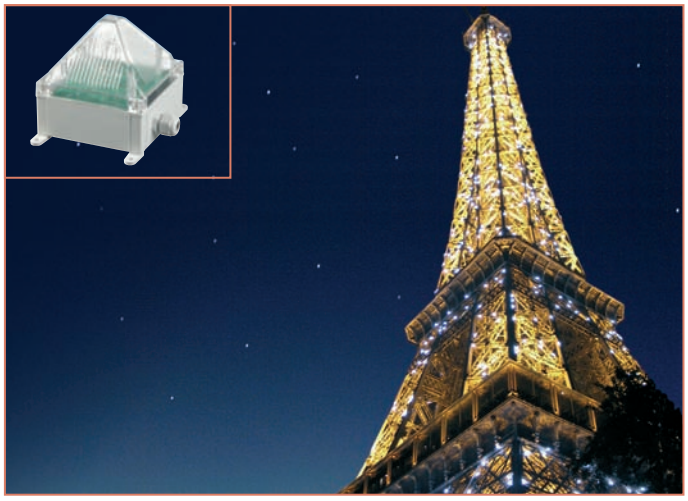


Quadro R

Pfannenberg put the Eiffel Tower back in the spotlight on 21 June 2003. Millions of people all over the world have admired the flashing lights that illuminate one of the most famous landmarks in the world.

20,000 flashing lights, specially manufactured by Pfannenberg GmbH, were installed by experienced mountaineers in order to light up the Eiffel Tower.

Each light has a service life of at least 10 years and can light up over 10 million times during that time. Thanks to their special design, they withstand summer and winter, storm and hail and illuminate the Eiffel Tower daily between 7 pm and midnight every hour on the hour for 10 minutes, as well as on special occasions.



Paris, France
Eiffel Tower

Do you require further information?

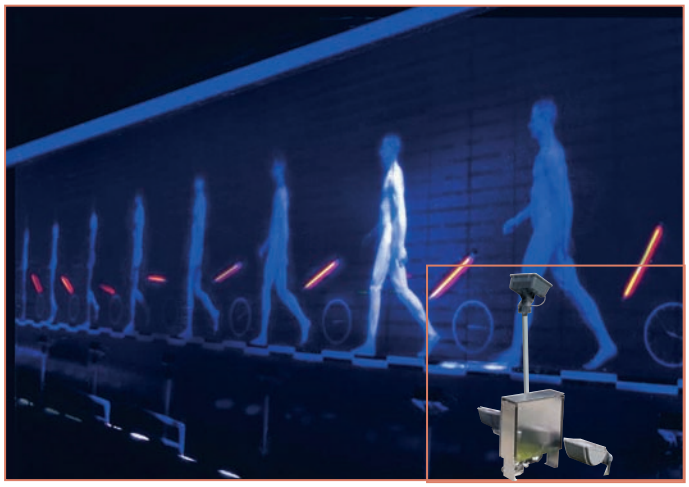
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PSL 060

At the Expo 2000, the façade of the French Pavilion was turned into a spectacular eye-catcher. Etienne Jules Meray's photo 'The Walking Man', taken in 1880, was recreated as a large, moving light construction in keeping with the exhibition's slogan: 'Transport, Mobility and Movement'.

The 26 steps of the movement were illuminated in quick succession by Pfannenberg flashing lights. Like in a film, the lights ran along the 100 metre long walkway in 2 seconds and brought the man to life, day and night.



Hanover, Germany
Expo 2000

AB-PN

Pfannenberg's extremely bright and extremely strong flashing lights were used to illuminate the Pont de Normandie.

The frequencies of the flashing lights can be programmed in various stages and the light sequences adjust themselves to the level of traffic on the bridge: a lot of traffic – fast sequences, little traffic – slow sequences.

Due to the varying light sequences, the light installation has become a real attraction that draws in and captivates tourists.



Le Havre - Honfleur, France
Pont de Normandie

Quadro R-ST

In honour of the Sino-European Economic Conference in Hamburg in 2004, the organisers wanted to create a special accent and had the Council House lit up in blue. As the icing on the cake, the tower was lit by Pfannenberg Eiffel Tower flashing lights, thus captivating the observers with the famous Champagne sparkle.

Many citizens and visitors described the project, which could be seen from afar, as innovative and, as the light artist Michael Batz, who arranged the lights, said: "on a par with large cities such as Paris or New York".



Hamburg, Germany
Council House

Flashing Lights 10 Joule
Quadro R / Quadro R-ST / Quadro A-DMX



Quadro R
- art illumination inside and outside buildings, even under the toughest of conditions
- with instant sparkling effect

Quadro R-ST (additional)
- equipped with industrial plug connectors for simple mounting
- one plug connector each for input and output, thus the devices can be connected in a row

Quadro A-DMX
- DMX-Controller for the individual controlling of each individual light in the system by means of a DMX-Bus system
- can be directly controlled by means of the standard DMX-Master
- rugged plug connectors for power supply and DMX-Bus (inlet and outlet)

IP 66	IP 67	IK 08	+ 55 °C / - 40 °C	+ 60 °C / - 30 °C	I lim t
Protection system	Protection system	Impact-proof housing	Operating temperature	Operating temperature (Quadro A-DMX)	Quadro A-DMX

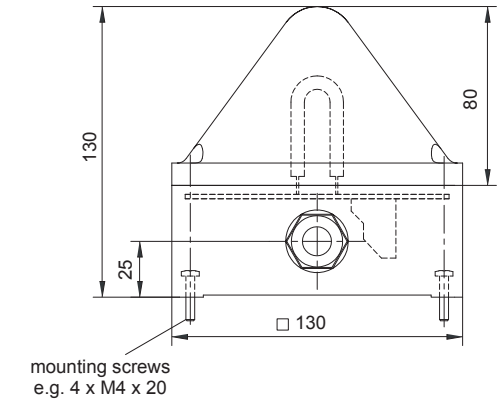
Electrical data	Quadro R	Quadro R-ST	Quadro A-DMX
Rated voltage	230 V AC	230 V AC	230 V AC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz
Operating range	195 V – 253 V	195 V – 253 V	195 V – 253 V
Nominal current consumption	85 mA	85 mA	280 mA @ 1 Hz
Initial current limited to			< 1 A

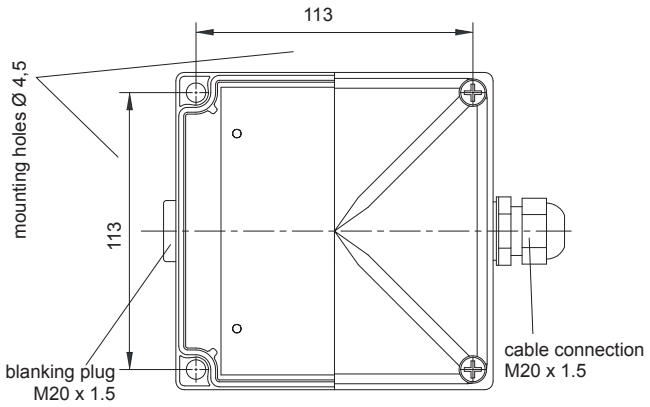
Mechanical data		Quadro R	Quadro R-ST	Quadro A-DMX
Flash rate		22 – 28 flashes/min.		≤ 2 Hz
Flash energy		10 J		
Light intensity (DIN 5037) [1]		124 cd		
Lens colours		clear, white, yellow, amber, red, green, blue		
Operating temperature		- 40 °C ... + 55 °C		- 30 °C ... + 60 °C
Storage temperature		- 40 °C ... + 70 °C		
Relative humidity		100%		
Protection system according to EN 60529		IP 66, IP 67, mounting arbitrary		
Impact resistance as per EN 50102		IK 08		
Protection class		II		
Duty cycle		100%		
Service life of the flash tube		light emission still 70% after 10 000 000 flashes		
Material	lens	polycarbonate (PC)		
	housing	polycarbonate (PC), RAL 7035		
Type of connection		screw clamps 2.5 mm²	2 x plug connectors (input/output)	2 x plug connectors for operation voltage 2 x plug connectors for Bus-connection
Cable entry		2 x M20		
Mounting	external lugs	113 x 153 mm – M5 or 127.1 x 127.1 mm – M5		
	internal holes	113 x 113 mm		
Weight		600 g		

[1] with a clear lens

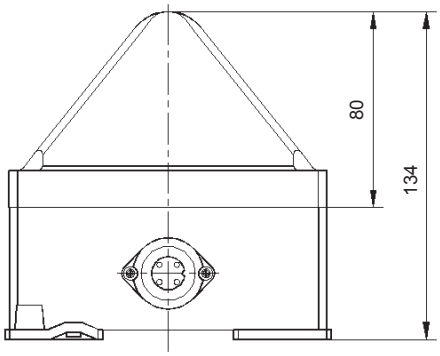
Dimensions

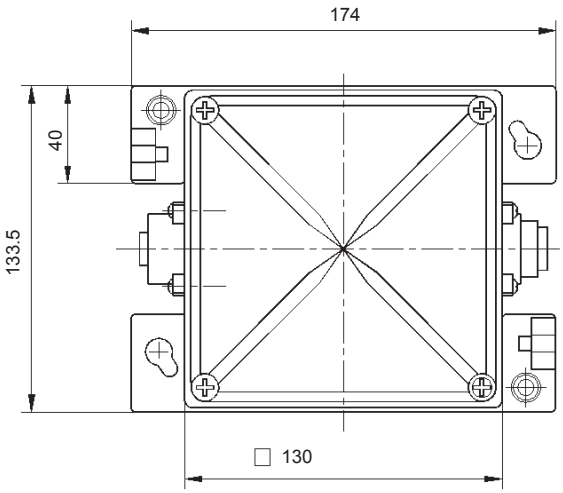
Quadro R



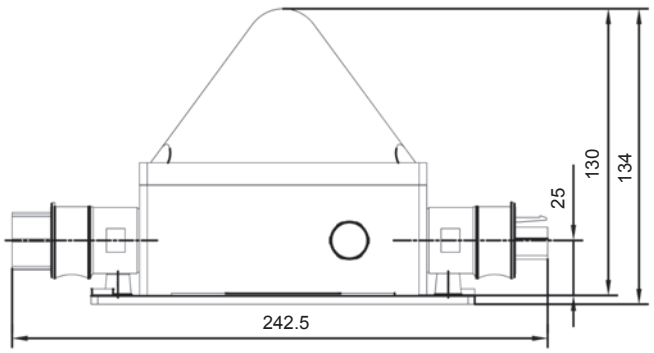


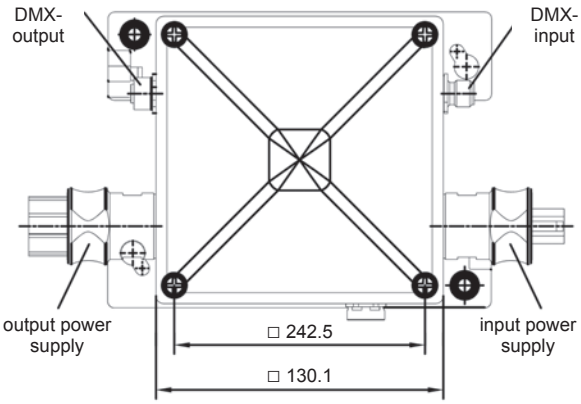
Quadro R-ST





Quadro A-DMX





Ordering details

Article numbers		Quadro R	Quadro R-ST	Quadro A-DMX
Haubenfarbe	**Rated voltage**	230 V AC	230 V AC	230 V AC
clear		291 23 10 1 005	291 24 10 1 000	291 25 10 1 000

Article numbers for other colours on request

Options / Accessories

GOST

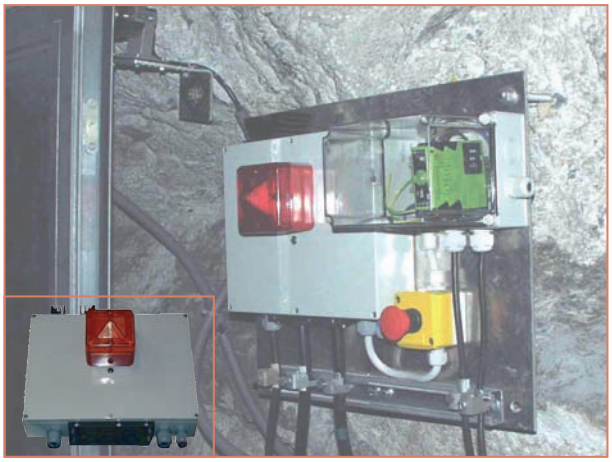
Custom solutions

Customer-specific solutions are another of Pfannenberg's specialties.



WBQ-SG

Integrated sounder/flashing light combinations is a sturdy aluminium housing to protect against extreme mechanical stress, developed for the German navy.



PL 105 Accu

Fire signal in the safety tunnel alongside the Kitzsteinhorn railway; integrated 60 minute battery buffer.



LWL M-AS-i

Laser function display as per IEC 60825-1 with integrated function monitoring, redundant LED equipment and AS-i control in machine-specific design.



BR 35 Silver

Special high-gloss surface coating in customer-specific machine design.

Do you require further information?

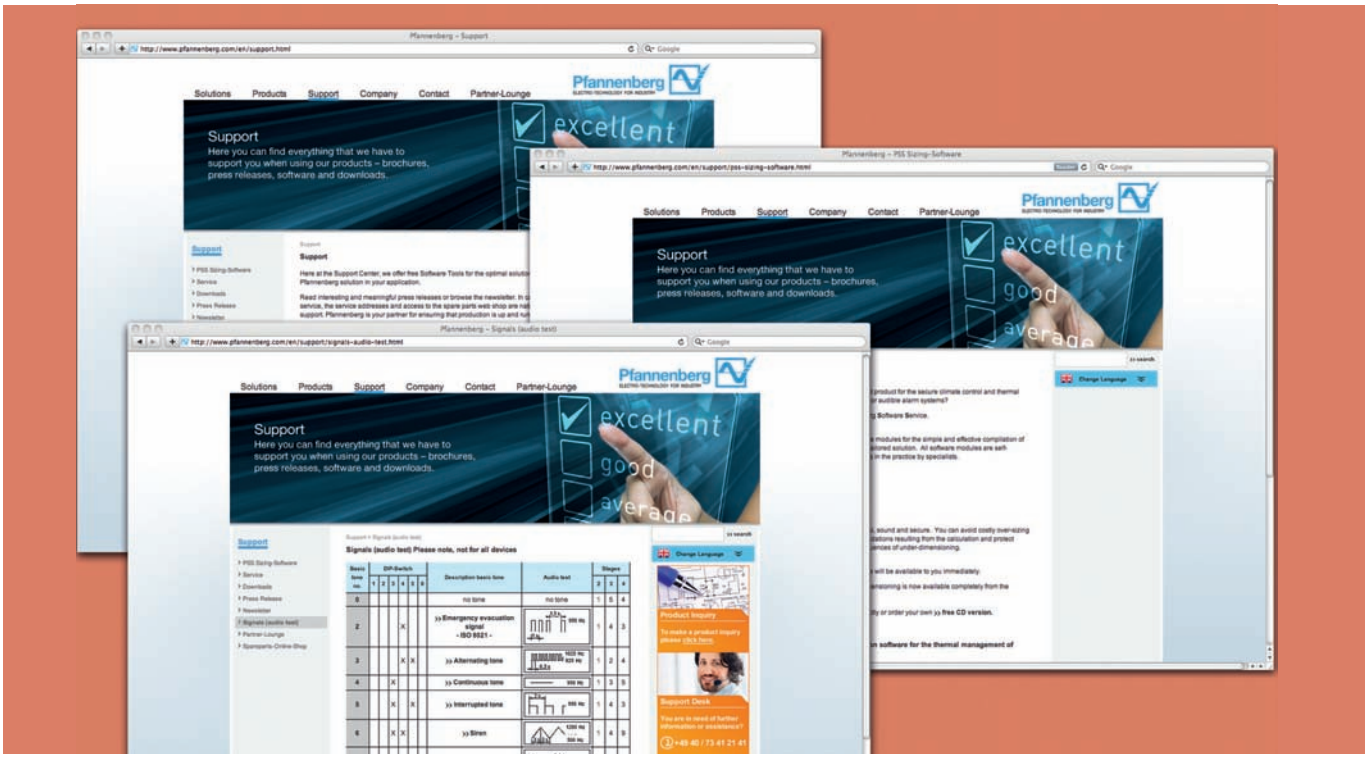
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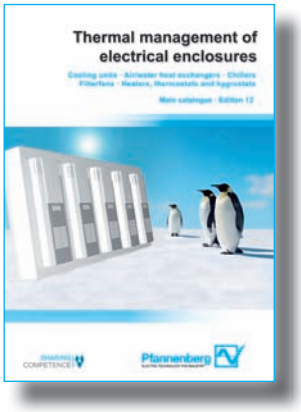


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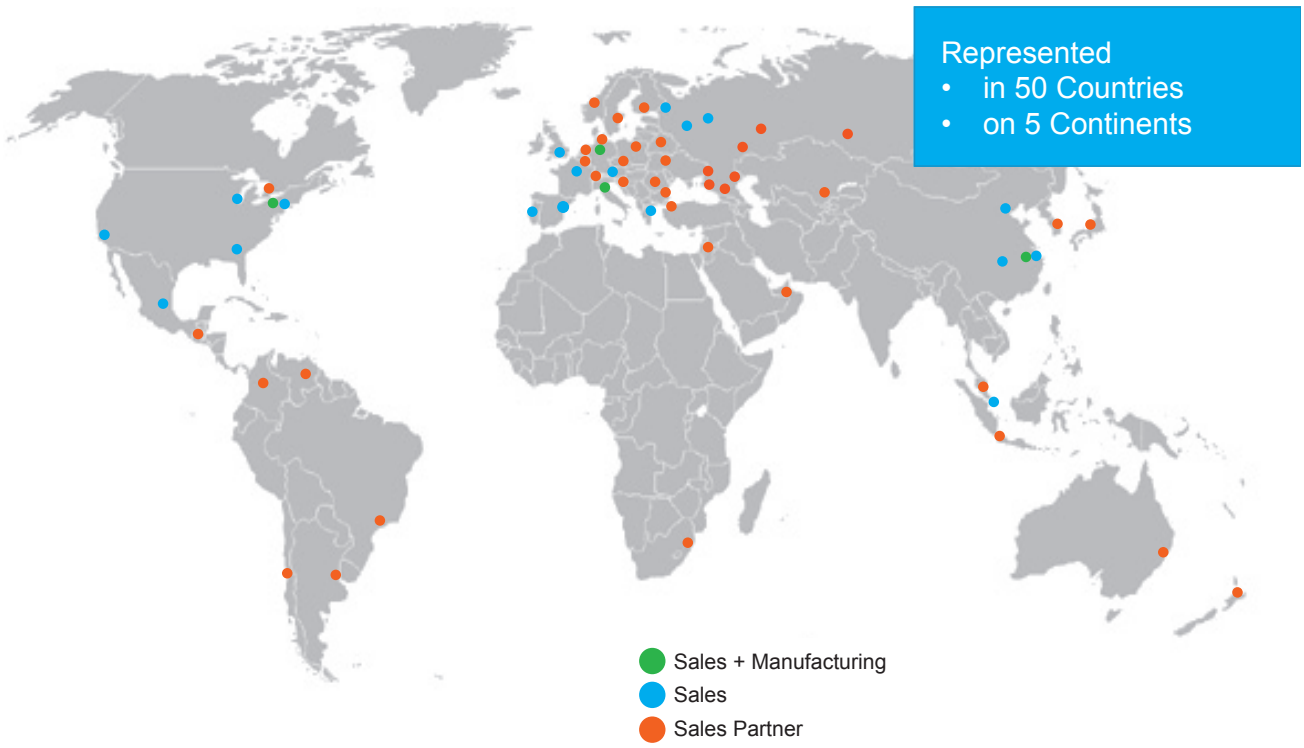
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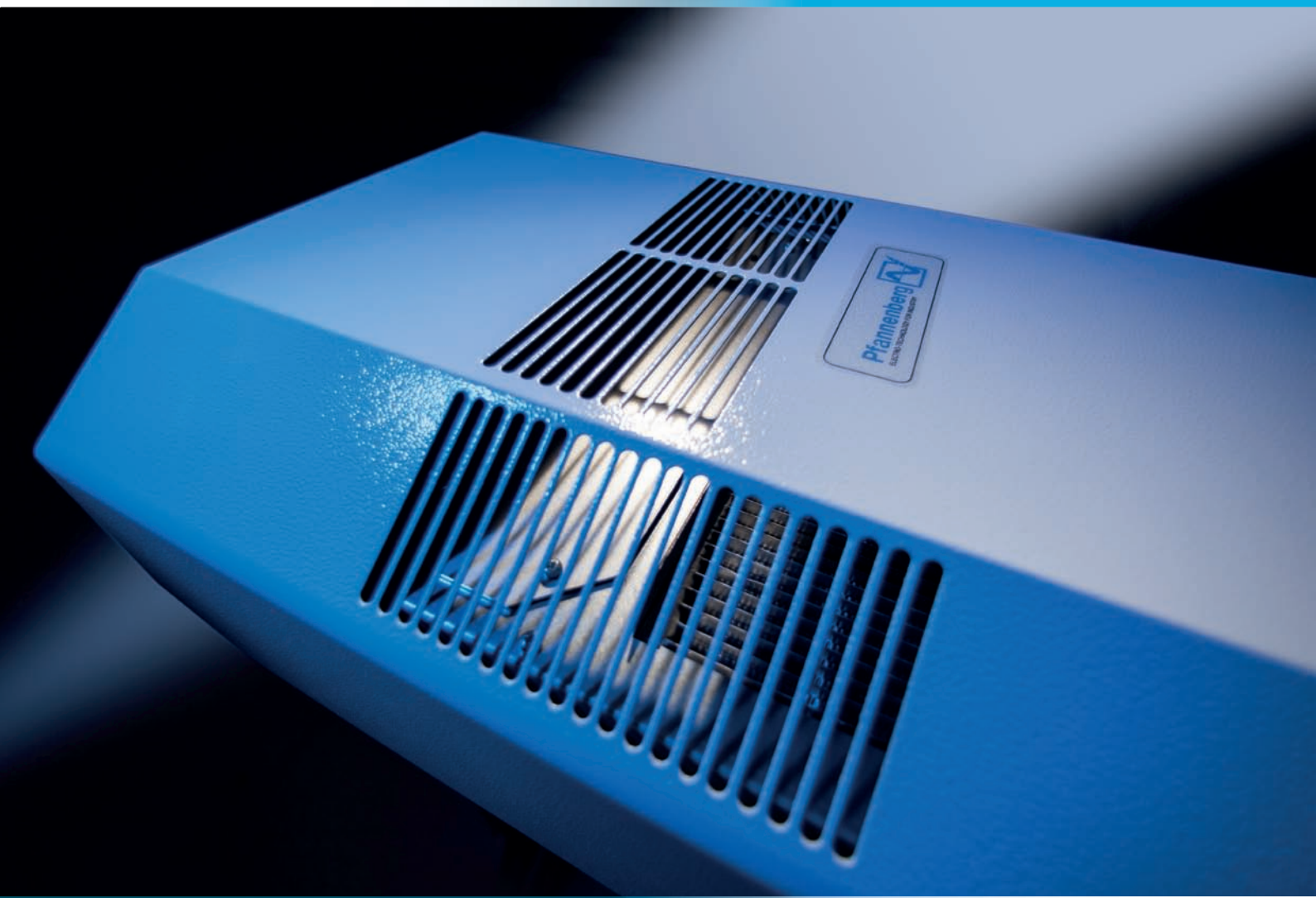
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Thermal management of electrical enclosures

Cooling units · Air/water heat exchangers · Chillers
Air/air heat exchangers · Filterfans · Heaters, thermostats and hygrostats

Main catalogue · Edition 13



SHARING COMPETENCE

Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY



Safety for man, machine and the environment



Thermal management and process cooling of electrical enclosures

Pfannenberg is one of the few companies in the world which develops and manufactures the whole range of industrial thermal management products. Thus, we supply everything “from one hand”. Together with our sales associates and subsidiary companies we are your qualified, competent and flexible partners.

Your ideas are constantly used for product development and we define milestones over and over again for user-friendly products. We have development departments in Germany, Italy, and the USA and since the beginning of 2010, also in China, which makes us one of the leading companies in the area of implementation of market demands.

The efficient use of resources, i.e. energy consumption is a topic our end-users are focusing on more and more. We make our contribution by means of energy-efficient equipment.
Utilize or competencies and contact us. By means of our Global Services we are not only in a position to help you with your customer-specific development, but we are also in the position to accompany you with our products on a global level.

Thank you for your trust!

Yours,

Andreas Pfannenberg
CEO



SHARING COMPETENCE

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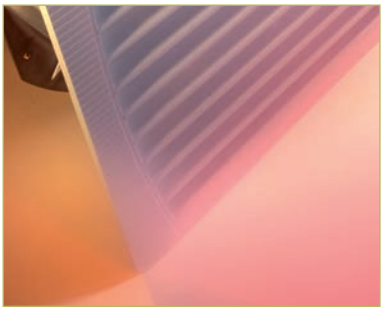
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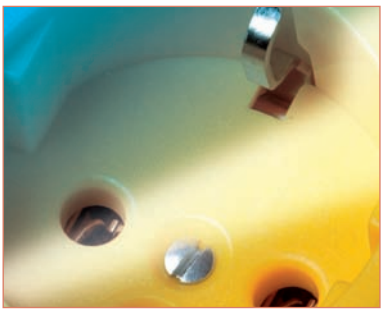
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Why reliable cooling units are so important for your electrical enclosure

A Pfannenberg cooling unit for your electrical enclosure is much more than just an accessory. In fact, it is basically the backbone of your entire production process because trouble-free production is only guaranteed if the sensitive climate inside your electrical enclosures is maintained.

Even the slightest overheating of the electronic controller units can result in serious consequences such as long standstills, delivery problems or total breakdown. Therefore, we not only take into account the demands placed on your equipment, but on the cooling unit as well.

As an example, how large are the fluctuations in the ambient temperature? Is the control cabinet placement in an environment where the air is full of dust or oil? Is the equipment to be cooled exposed to the weather, i.e. moisture and sunshine? How large are the designated dimensions of the required cooling units?

Once these questions have been clarified completely, Pfannenberg supplies you with highly efficient air conditioning solutions that guarantee the highest degree of safety and energy efficiency.

Air/water heat exchanger
from the Pfannenberg PWS series



Cooling unit
from the Pfannenberg DTI series



Why you should choose air conditioning products from Pfannenberg

Whereas as most of our competitors offer only ‘off the shelf’ products, we additionally offer customised solutions.

This means that our units or unit combinations are precisely tailored to your needs, i.e. neither over nor under-dimensioned and, therefore, always particularly energy-efficient. This is an aspect that is playing an ever larger part in climate control considerations.

In choosing Pfannenberg products, you additionally benefit from high quality, robustness and precision, as well as simple mounting and service friendliness. Many of our products, such as our patented filterfan, can even be mounted and serviced without tools.

As you can see, many reasons speak in favour of Pfannenberg. Let us know your requirements; we will then supply you with an individual solution at a fair price without delay.

Side mounted cooling units
from the Pfannenberg DTS series



Determine the correct air conditioning products

When can Filterfans be used?

If the ambient temperature is always lower than the temperature required in the electrical enclosure, then filterfans represent an economical solution for thermal management of electrical enclosures.



Important for the use of Filterfans:

Use filterfans to force the surrounding air into the electrical enclosure, so that a slight overpressure builds up inside the enclosure. The surrounding air enters the electrical cabinet exclusively via the filterfan, which ensures that it is filtered.
Install the filterfan in the lower third of the electrical enclosure and the exhaust filter as close to the top as possible. This assists the natural convection of the air and avoids hot spots within the enclosure.

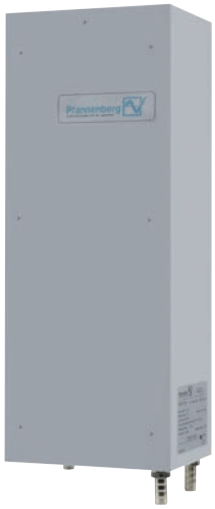


When are cooling units necessary?

- if cooling cannot be accomplished by the outside air
- if the temperature required inside the electrical cabinet should be equal to or lower than the ambient temperature
- if the ambient air is strongly contaminated with oil or conductive dusts

Important for the use of cooling units:

- ensure a good supply of air intake and outtake from the external circuit of the cooling unit, so that thermal energy can be transferred to the surroundings
- the lowest temperature inside the enclosure may not necessarily be the best. The 35 °C preset by Pfannenberg represents a good compromise between service life and the accumulation of condensation.



When must air/water heat exchangers be used?

- if the thermal energy may not be dispersed to the surroundings
- if aggressive ambient air restricts the use of conventional cooling units
- if a very high IP class is required (up to IP 65)
- if a maintenance-free cooling unit is required

PSS Climatisation – Pfannenberg Sizing Software for the thermal management of electronic enclosures

PSS Climatisation, a new JAVA based software package will help you size filterfans, cooling units, air/water heat exchangers and heaters for your electronic enclosures. The software accounts for both indoor and outdoor applications and can assist you in calculating the heat dissipation within your enclosure, component by component.

Please go to http://pss.pfannenberg.com to download the software.



Combined use as a system solution

Air/water heat exchangers and Chillers

The combination of air/water heat exchangers and chillers offers an ideal system solution for the cooling of your processes, machines and controllers. All cooling tasks in a system or machine and also on a control cabinet can be taken care of simply and economically via a closed pipeline system.



- through the highly economical supply of water as the cooling medium for the air conditioning of control cabinets with air/water heat exchangers
- and 100% independence from the ambient temperature at the installation location

Filterfans and Thermostats

With a combination of filterfans and thermostats you can additionally achieve energy savings, material and time plus a significantly longer service life. This results in an optimised environmental balance as well as greater reliability of your production process:



- through reduced energy consumption and improvement of the filterfan efficiency
- through the reduction of the time required for cleaning the filter mats and
- through a reduction in the consumption of filter mats

Thermostats, Hygrostats and Heaters

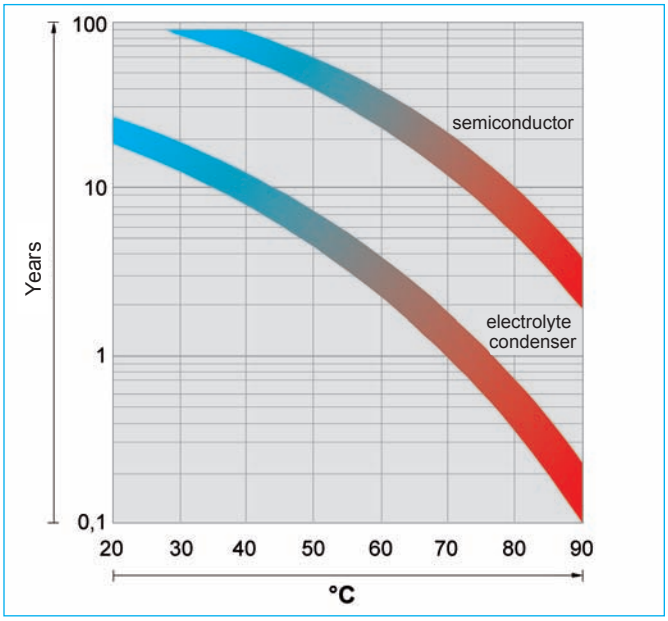
Electrical enclosure heaters in combination with thermostats and hygrostats ensure that the correct temperature is always available. In addition to savings on energy and, therefore, a better environmental balance, the combination of heaters with thermostats and hygrostats offers greater reliability of the production process:



- through pinpoint distribution and constant temperatures in the electrical enclosure
- through reduced energy consumption and improvement of the heater efficiency

The Technology of Cooling

Due to the increasing automation of processes, electro-technical components are used more and more. Therefore, the development of warmth inside the cabinet increases.
The diagram below shows the effects of the increased heat load on random components' service life. The process reliability and keeping service intervals within an economic framework are special challenges thermal management of control cabinets is faced with special challenges such as process reliability and keeping service intervals within an economic framework. Therefore, the choice of the cooling method can be pivotal with regards to it's advantages.





Three basic cooling methods

When selecting a cooling method there are three types to consider:

Natural Convection

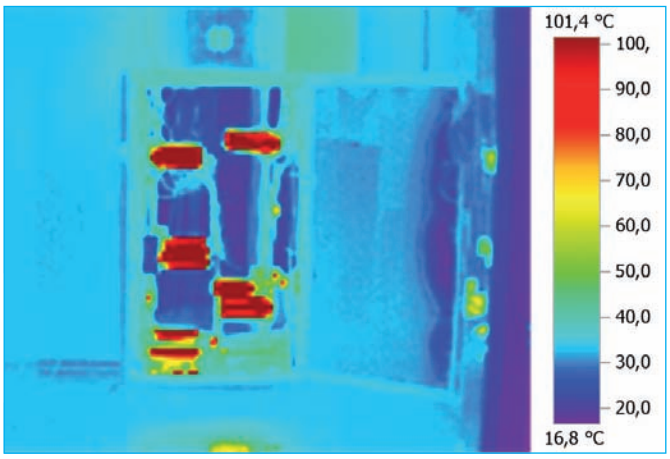
If there is only a minimal heat loss in your application, use of louvers or grills with filters can be effective. This method, however, usually provides less cooling effect than is necessary with today's components.

Forced convection

If the installation will be in a clean, non-hazardous environment with an acceptable ambient (outside the enclosure) temperature range, a simple forced-air cooling system utilizing outside air is usually adequate. Combined with an air filter, such devices generally meet the heat removal needs of typical electronic equipment and many electrical applications. An example of forced convection air cooling is filterfans.

Closed-loop cooling

In harsh environments involving high temperatures, wash-down requirements, heavy particulate matter or the presence of chemicals capable of damaging components (NEMA 4 or 12 environments), ambient air must be kept out of the enclosure. Closed-loop cooling consists of two separate circulation systems. One system seals out the ambient air, cooling and re-circulating clean, cool air throughout the enclosure. The second system uses ambient air or water to remove and discharge the heat. Example of closed-loop cooling equipment employed with electronics and process controls are cooling units and heat exchangers.



Cooling by natural convection

Rules of thumb:

- **limited to roughly + 25 Kelvin rise above ambient -** in general, the temperature rise inside the enclosure would be roughly + 25 Kelvin utilizing natural convection
- **no moving parts -** by eliminating external fans, you create a zero maintenance application
- **no dirt -** utilizing exhaust filters prevents dirt from entering cabinet, dirt can damage electronics as fast as heat!

If the ambient temperature is lower than the temperature inside the electronic cabinet, the dissipated heat escapes into the atmosphere throughout the surface of the electronic cabinet. The following simple equation is used to calculate the level of heat radiated from the electronic cabinet:

$$P_R(W) = C \times A \times \Delta T$$

- **P_R[Watt]: Radiation Power**: Thermal power radiated from the surface area of the electronic cabinet into the ambience into the electronic cabinet
- **C[W/m²K]: Coefficient of heat transmission**: Radiation power per 1 m² surface area and is difference in temperature. This constant is determined by the material:
  sheet steel - 5.5 W/m²K
  stainless steel - 5.5 W/m²K
  aluminium - 12.0 W/m²K
  plastic - 3.5 W/m²K
- **A[m²]: Surface area of electronic cabinet**: Effective surface area of a electronic cabinet measured according to the specifications of VDE 0660, part 500
- **ΔT[K]:** Difference between ambient air temperature and inside air temperature

Cooling with filterfans

Rules of thumb:

- **limited to roughly + 10 Kelvin rise above ambient -** in general, the temperature rise inside the enclosure would be roughly + 10 Kelvin
- **multiple configurations possible -** filterfans can be located in a number of locations within complex enclosure configurations
- **size fans to include static pressure -** understanding how static pressure effects the performance of a fan is very important when sizing filterfans, see chart below!

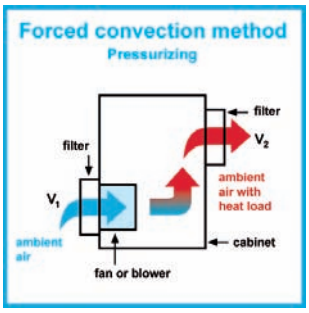
Follow this simple equation for calculating the required airflow:

$$V = \frac{3.1\ (P_D)}{\Delta T}\ [m^3/h]$$

- **V[m³/h]:** Airflow volume of filterfans
- **P_D[Watt]: Dissipation loss**: Thermal power generated inside a cabinet by the dissipation loss of components
- **ΔT:** Difference in temperature between the ambience and inside the electronic cabinet

V_1 - Fan with filter and louver rating (free flow)

V_2 - System rating with exhaust
(includes static pressure drop)



Model	V_1 [m³/h]	V_2 [m³/h]
PF 11.000	25	16
PF 22.000	61	44
PF 32.000	110	82
PF 42.500	156	116
PF 43.000	256	231
PF 65.000	480	370
PF 66.000	640	445
PF 67.000	845	560

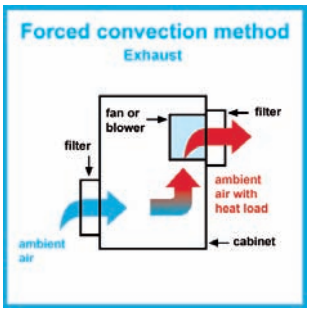
NOTE:
Always calculate cooling capacity of filterfans with the V_2 value.

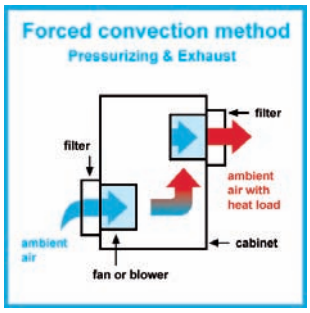
When utilizing filterfans

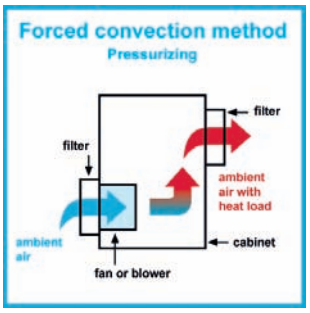
Always use the filterfan to propel the cool ambient air into enclosure. This ensures that slight positive pressure builds up inside the electronic cabinet in comparison to the ambience and that only air filtered by the filterfans flows into the enclosure. The air propelled into the cabinet displaces the warm air which exits through the exhaust filter. If, however, the air is drawn out of the electronic cabinet by suction power, unfiltered air can also enter through poor seals and cable entries.

If you install a combination of filterfan/exhaust filter, fit the filterfan in the lower third of the electronic cabinet if possible. The exhaust filter must be installed as near to the top as possible to prevent heat pockets in the upper part of the cabinet.

Install a FLZ 530 thermostat to control your filterfan. This will increase the life of the fan and decrease the amount of maintenance required to clean the filters.







Cooling with closed loop cooling units

Rules of thumb:

- **only method for reducing cabinet temperature below ambient -** if the ambient temperature is greater than the target internal temperature of the enclosure, active cooling is required
- **applications from NEMA type 12 to 4x -** closed loop systems can maintain the NEMA type rating of the cabinet
- **designer must size per ambient temperatures -** by utilizing performance charts, be sure to correctly size your system!

Pfannenberg cooling units operate on the principle of the Carnot cycle. This means that the cooling unit functions as a heat pump that “pumps” the thermal energy transferred from the electronic cabinet (heat dissipated from the components) up to a higher level of temperature (the ambient temperature can reach levels as high as + 55 °C). The air inside the enclosure is cooled down by the evaporator and at the same time dehumidified.

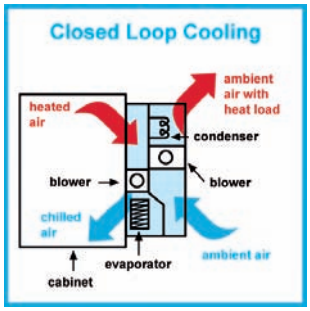
Cooling units are used if:

- the outside air cannot be used for cooling
- the required temperature inside the enclosure should be equal-to or lower-than the required ambient temperature
- the ambient air is extremely oily or dirty

Steps for sizing a cooling unit

Proper selection of a cooling unit is determined by the following criteria:

- required cooling capacity in Watt
- mounting requirements
  (side, integrated or top mount)
- dimensions of cooling unit and enclosure



Follow this simple equation for calculating the required cooling capacity:

$$P_C = P_D - P_R$$

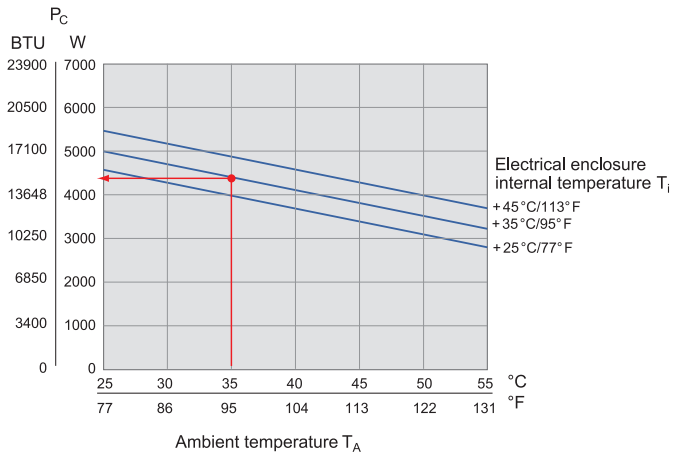
$$P_R = C \times A \times \Delta T$$

- **P_C[Watt]:** Refrigeration capacity of a cooling unit
- **P_D[Watt]: Dissipation loss**: Thermal power generated inside a cabinet by the dissipation loss of components
- **P_R[Watt]: Radiant heat gain/loss**: Heat transfer through the skin of the enclosure (insulation factor not included)

- **C[W/m²K]: Coefficient of heat transmission**
- **A[m²]: Surface area of electronic cabinet**
- **ΔT[K]:** Difference in temperature between the ambience and inside the electronic cabinet

Utilizing performance curves to properly size cooling units:

Pfannenberg utilizes the DIN standard 35/35 °C when rating our cooling units. Many other companies use 50/50 °C, which provides a higher, non-usable value. Customers should use their own application temperatures to determine the proper cooling capacity of the system.



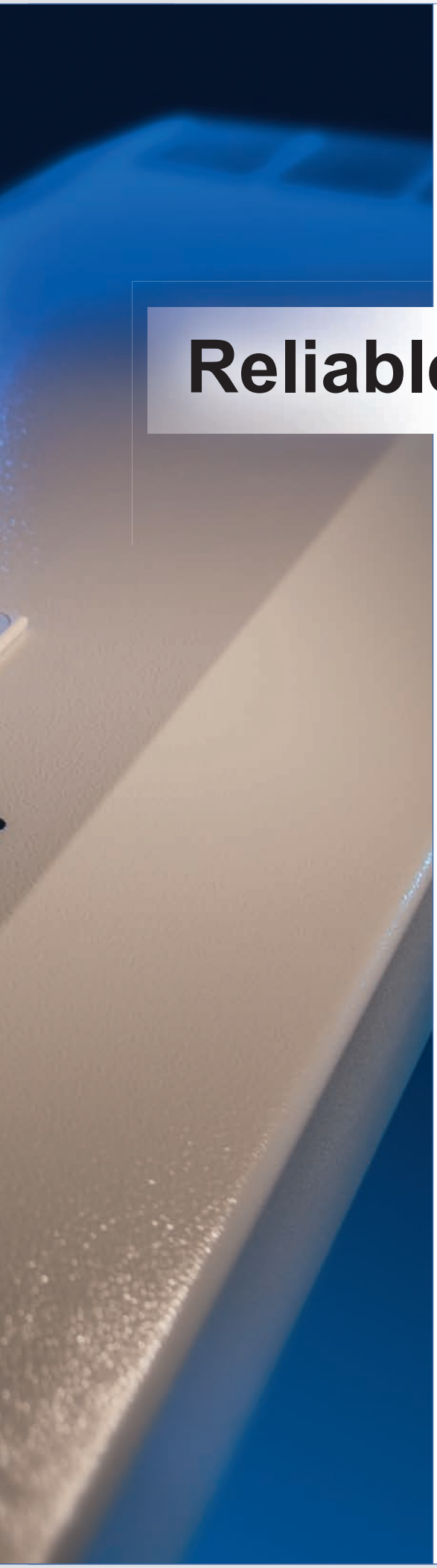
Important information when utilizing cooling units:

- the refrigeration capacity should exceed the dissipation loss from the installed components by approximately 10%
- the enclosure should be sealed to prevent the inflow of ambient air
- use the door contact switch to impede operation with open doors and consequent excessive accumulation of condensation
- use cooling units with maximum clearance between air inflow and air outflow to prevent poor circulation
- make sure that the air inflow and air outflow in the external circuit is not hindered, preventing proper heat exchanging at the condenser
- when using top-mounted cooling units, make sure that components with their own fans do not expel the air directly into the cooling unit's cool air outflow. Make sure unit is level.
- setting the temperature to the lowest setting is not the optimal solution due to the condensation issues. The value we have preset on the cooling unit is a sound compromise between cooling the inside of the enclosure and the accumulation of condensation.



Use the Pfannenberg Sizing Software, PSS considers self-convection for calculation and demonstrates it. You can download a free version on www.pfannenberg.com


M 2



Reliable to the farthest corner

DTS, DTI and DTT Cooling unit series

In addition to quality, function and performance, we have also taken into account the subject of ‘service-friendliness’ while developing our cooling units.

The trouble-free running of your process controller is always at the centre of attention in the realisation phase of our products, as well as optimised energy consumption and usage of materials and time.

The DTI and DTS series are two extraordinary cooling unit product lines available to you. These satisfy all requirements for partially recessed (DTI) and side mounted (DTS) installation for every size of enclosure.

Furthermore, an absolute world innovation: DTT. The top mounted cooling units offer unique security through the innovative, patented condensate management system and it is installable in the most limited of spaces.

The ℰCOOL Family from Pfannenberg

Everywhere you see the new ℰCOOL logo it stands for a Pfannenberg product that distinguishes itself by:
- energy-efficiency
- environment
- easy-handling

ℰCOOL – the standard of the future

With its new product range Pfannenberg is responding to the users' increasing demands and to the growing climate awareness. The aim in developing the **ℰCOOL** series is the largest possible cost efficiency with the best possible performance.

Optimum in energy-efficiency

The **ℰCOOL** series has made an enormous leap in development compared with the tried and tested DTI/DTS units, in particular in energy efficiency.
Especially developed components combined with intelligent electronics of the newest generation reduce the energy consumption by up to 43%; in stand-by mode by a further 10%.



ℰCOOL DTI/DTS und DTT

The time-tested, high-quality industrial standard of the DTI/DTS completely covers the needs for side-mounting and door-mounting, as well as for the partially sunk-in mounting (DTI) of every cabinet size.
Additionally Pfannenberg's DTT series provides, thanks to its innovative, patented condensate management a safety standard for roof-mounted cooling units that has never been attained before.
The **ℰCOOL** series is a role model for a new generation of cooling units.

ℰfficiency

ℰCOOL means cutting-edge technology which provides the users with enormous cost benefits over the entire running term. Records for the energy efficiency and the service factors MTTR and MTBF guarantee a high Return On Investment.

ℰCOOL

The distinctly increased EER (Energy Efficiency Ratio) of the ℰCOOL series is globally market-leading!

$$\varepsilon = \frac{\dot{Q}_K}{P_{el}}$$

The **Energy Efficiency Ratio (EER)** is defined as the quotient of the actual cooling capacity of the cooling unit and its nominal power consumption. The cooling capacity factor **ℰ** corresponds therefore to the efficiency ratio. The higher the value, the less energy consumption is needed in order to provide the cooling performance.

Up to 10% less energy consumption in stand-by mode

Up to 43% less energy consumption

Up to 48% less CO_2 emissions

Up to 80% shorter service / repair times

... in comparison to conventional cooling units

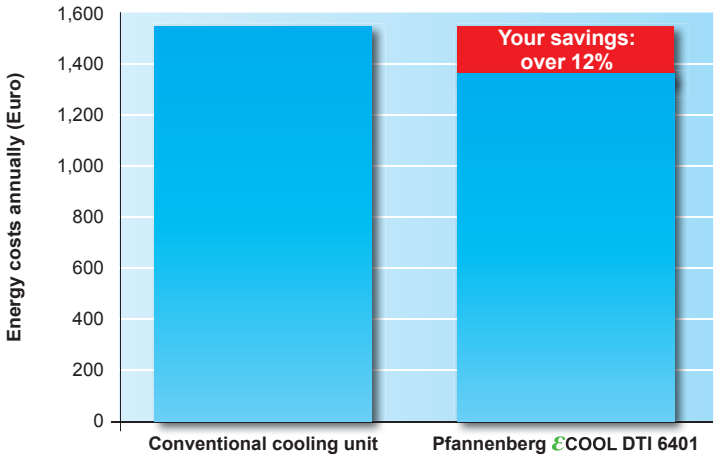
Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY

Effective Cost Savings with Pfannenberg ECOOL Cooling Units



Take a small business with 5 cooling units, which works in two shifts as an example. In comparison to the **ECOOL** DTI 6401 with a 2000 W cooling capacity and a comparable unit available on the market.

Energy savings comparison:
Savings of over 12%



The ECOOL DTI 6401 saves 12% in energy costs in comparison to conventional cooling units.

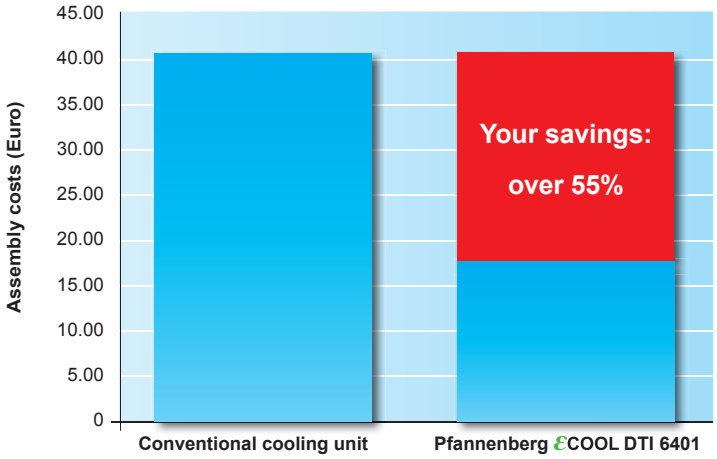
Basic parameter for energy comparison

Uptime at full performance	70%
Uptime at partial performance	30%
Total uptime per day	16 hes
Total uptime per year	240 days
Electricity price in Germany*	0.1233 €/kWh*
Number of units	5 pieces
Cooling capacity	2000 W

*Ø electricity price 2012 according to BDEW

Energy costs	
Conventional cooling units	1554.64 € annually
ECOOL DTI 6401	1359.61 € annually
Your savings	**195.02 € annually**

Assembly cost comparison:
Savings of over 55%



Another large potential for savings is the reduction of service and assembly time (MTTR).

Assembly and service times (MTTR) [min]

	Conventional cooling units	**ECOOL** *cooling units*
Assembly	25	3
External fan change	6	6
Internal fan change	6	6
Fuse replacement	8	1
Filter change	2	1
Control board change	15	10
Total	**62**	**27**

Calculated hourly wage of technician	40 €
Number of units	5

Assembly costs	
Conventional cooling units	206.67 €
ECOOL DTI 6401	90.00 €
Your savings	**116.67 €**

The ECOOL product family unites total savings potential in one unit.

New advantages of the ECOOL Cooling Unit Series

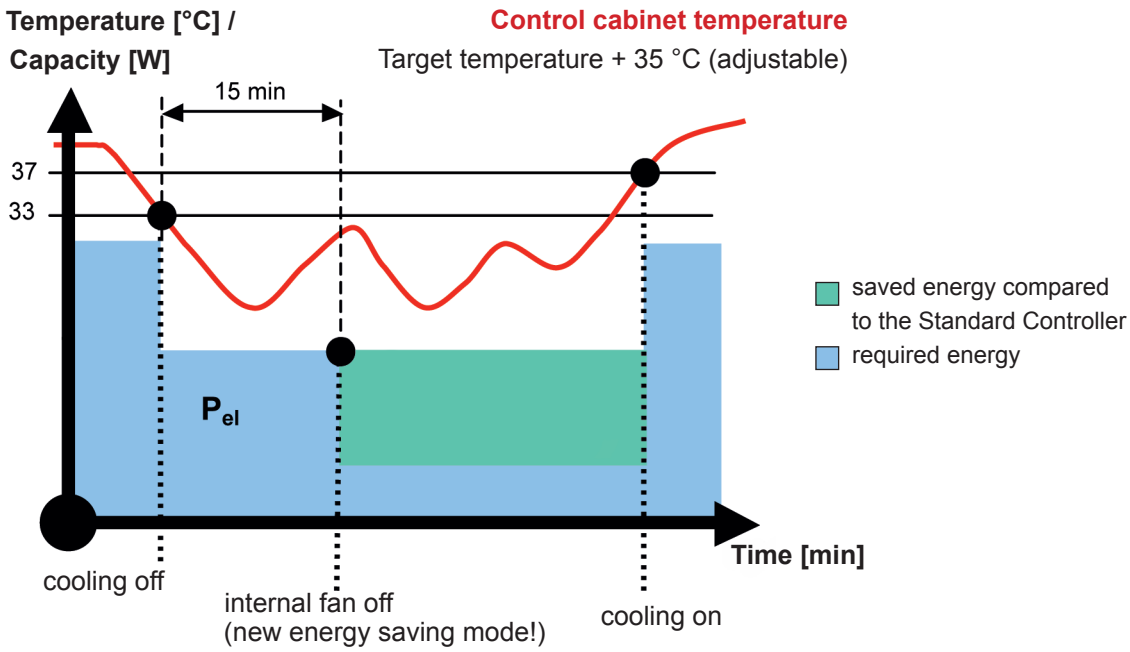
New Filter Adapter

- Optionally available adapter for multiple use and all filter inserts
- Optional filter inserts (aluminum, fleece or fluted filter inserts) depending on the environmental conditions / application
- Patented fluted filter mats extend the service intervals by 300%
- Tool-less installation and tool-less filter replacement
- Filter replacement in less than one minute
- Filter adapter available in several colors

Filter Adapter

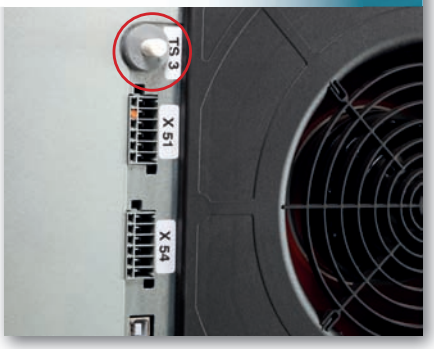


New Energy Saving Mode with additional temperature probe



- Pfannenberg „MultiController“ (MC) has now been upgraded with the energy savings mode (ESM) as a standard feature (DTI/DTS 6000 series)
- Internal fan switches off when no temperature increase is registered, condensate evaporator will be deactivated too
- Cooling mode starts automatically upon exceeding the required cabinet temperature
- Additional temperature probe for precise measurement of the internal cabinet temperature and to ensure correct operation of the energy savings mode
- No intermediate start-up of the internal fan necessary for temperature monitoring of the cabinet
- Fan’s length of life is significantly longer

Multi Controller



Easy Handling: perfect service-friendliness decreases routine costs

Thought-out solutions for installation and service

From the cut-out compatibility to the flexible software solutions:

Pfannenberg' **ECOOL** series takes excellent accessibility and simple maintenance into consideration.

- Large condenser fin spacing allow for longer maintenance periods, even without an additional Nano coating
- One mounting cut-out for 5 different performances, 1000 W – 4000 W
- Mounting possible by 1 man in a few minutes
- Simple accessibility to all the relevant components
- Plug & Play: fast component replacement
- Integration in established net-work possible
- Versatile voltage supply of 380 – 460 V via built-in transformer
- Integrated condensate evaporation system

Time-saving

Efficient assembly; the tool-less, quick and patented mounting method reduces process costs considerably. Don't just take our word for it! See our video demonstration on the web. Follow the „single-handed installation" at **www.pfannenberg.com** to see how you can save time and money.

Easy mounting

Pfannenberg offers cooling units with the largest possible cut-out compatibility in order to be able to provide a unit replacement with the least possible installation work. Intelligent mounting systems minimize work during unit installation and replacement.

Pfannenberg Sizing Software (PSS)

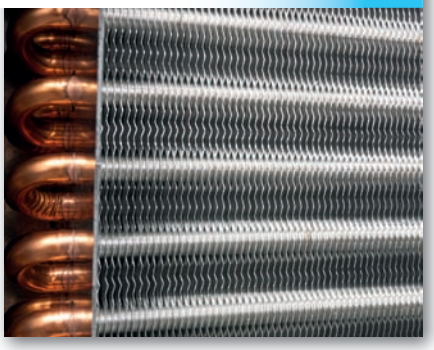
Pfannenberg's Sizing Software determines your cooling requirements, calculates the necessary cooling capacity and recommends the appropriate equipment components. Thus, you receive a tailor-made solution which gives you the security of a perfect dimensioning and prevents costly over-dimensioning. Download the PSS free of charge or calculate directly online on www.pfannenberg.com/en/support/pss-sizing-software.html.

Available as an APP:

PSS-APP and

Online PSS

Large fin spacing



Simple installation



Condensate evaporation system



PSS



DTT provides 100% protection against condensation for top-mounted devices

All the hazards of the past in standard systems have been effectively eliminated by Pfannenberg by means of the new DTT series.

1st hazard: Condensation build up on the outer area (bottom) of the top-mount cooling units, in which a particular amount ends up within the electrical enclosure.

Pfannenberg solution: In the DTT concept, the condensation build up is in the upper portion of the cooling unit. In contrast to the earlier norm, the „cold“ side is now at the top. Condensate build up is routed safely into the integrated condensate evaporator.

2nd hazard: When the warm and moist air from the enclosure cools down condensation builds up on the vapourizer. A certain amount of condensate droplets can be collected and routed into the flow of cold air and end up in the electrical enclosure.

Pfannenberg solution: The new design of the DTT series leads to an extensive separation of the routing of the air and vapourizer. The air speed at the vapourizer is therefore reduced significantly. This ensures the prevention of condensate turbulence.

3rd hazard: In the cold side of the cooling unit, condensation can form on the ceiling within the electrical enclosure and drip into enclosure. Traditionally, this is located at the bottom portion of the cooling unit and borders with the warm top portion of the electrical enclosure.

Pfannenberg solution: The innovative DTT concept puts the internal air circuits in the reverse order. As a result, a large temperature difference between the surface of the DTT and the electrical enclosure is avoided and the possibility of condensation build up is eliminated.

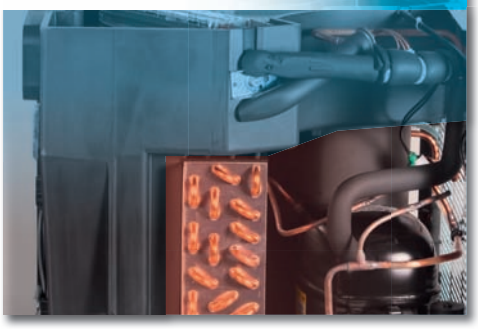
4th hazard: On the outer surfaces of the air routing duct, the cold air leaving the duct and warm air within the enclosure collide with one another and due to a “shock effect” condensation can occur within the electrical enclosure.

Pfannenberg solution: The DTT top mount cooling unit has eliminated the need for an air routing duct. Instead, the DTT uses high performance fans and therefore, due to special air channels, an increase of air speed is achieved and as a result, the cold air routing to the bottom section of the electrical enclosure is guaranteed.

DTT – Safety with 4X condensate protection!

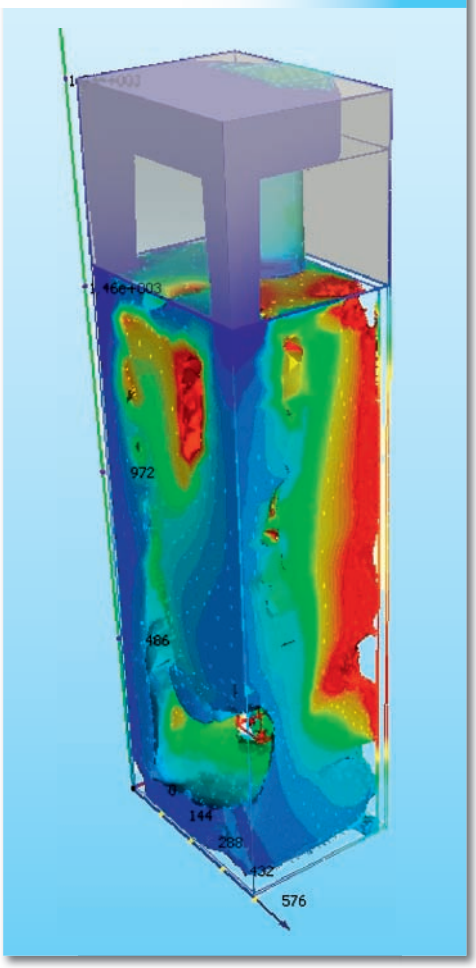
1. **No penetration of condensate into the electrical enclosure**
2. **No condensate turbulence in the air flow**
3. **No condensate build up on the bottom area of the cooling unit**
4. **No condensate-prone air routing duct (hoses)**

DTT Concept



The innovative order of the cold area above the warm parts of the cooling unit ensures the prevention of condensate build up in the enclosure’s interior

Optimised air conduction



A high airflow speed and optimised cold air passage into the electrical enclosure ensures 100% efficient cooling of the enclosure without any additional air routing

Easy andling: Cut costs with the DTT service and maintenance friendliness

An easy assembly, operation and maintenance of the cooling units are an advantage especially in places where there is limited space. The DTT series gives you several beneficial product features at once.

Very long service intervals

The condenser's large fin spacing extends the service intervals significantly, also without an additional nano-coating. Thus, in many application areas no pre-filter is needed at all.

Filter change in seconds

The front cover can be opened with one movement and the pre-filter can be changed in seconds. There is an aluminum filter available for filter operation.

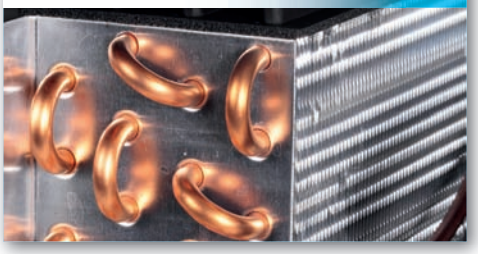
Perfect access to electronics and fan motor

The most important components can be easily accessed using the service panel on the front of the unit. The whole cover can be removed by pulling forward for easy access without disassembling.

Intelligent mounting via Twist & Fit

Mounting without screws using turnbuckle makes a tool-free assembly and exact adjustment by hand possible.

Large fin spacing



Perfect accessibility



Twist & Fit mounting





Environment: Responsibility for the environment and resources

In light of the growing climate and environment problems, Pfannenberg is dedicated more than ever to the safety of man, machine and the environment. That is why environment-friendly production process and careful use of available resources define our actions. Decreasing your thermal management costs through first-class energy efficiency and exemplary Life Cycle Advantage is our foremost goal with the **ECOOL** series.



All cooling units at a glance

Type	Cooling capacity	Rated voltage	Dimensions (HxWxD)	Approvals					Page
				UR	UL	cUL	GOST	CE	
Cooling units from the DTI and DTS series – cooling units in installation and surface mounting variants for side and door mounting									
DTI 6801	4000 W	400 V 3~	1539 x 485 x 372 mm	●		○	●	●	24
DTS 6801			1549 x 485 x 372 mm						
DTI 6501	2500 W	400 V 3~	1536 x 485 x 278 mm	●		○	●	●	25
DTS 6501			1543 x 485 x 278 mm						
DTI 6401	2000 W	230 V / 400 V 3~	1536 x 485 x 278 mm	●		○	●	●	28
DTS 6401			1543 x 485 x 278 mm						
DTI 6301	1500 W	115 V / 230 V / 400 V 2~	1536 x 485 x 218 mm	●		○	●	●	30
DTS 6301			1539 x 485 x 218 mm						
DTI 6201	1000 W	115 V / 230 V / 400 V 2~	1536 x 485 x 218 mm	●		○	●	●	32
DTS 6201			1539 x 485 x 218 mm						
DTI 9141	950 W	115 V / 230 V / 400 V 2~	958 x 410 x 248 mm	●		●	●	●	34
DTS 9141			964x 410 x 248 mm						
DTI 9341C	1500 W	115 V / 230 V / 400 V 2~	958 x 410 x 248 mm	●		●	●	●	34
DTS 9341C			964 x 410 x 248 mm						
DTI 9041	870 W	115 V / 230 V / 400 V 2~	599 x 380 x 231/231/363 mm	●		●	●	●	36
DTS 9041			604 x 380 x 231/231/363 mm						
DTI 9031	510 W	115 V / 230 V / 400 V 2~	562 x 310 x 212/212/353 mm	●		●	●	●	38
DTS 9031			565 x 310 x 212/212/353 mm						
DTFI 9021	320 W	115 V / 230 V / 400 V 2~	326/326/464 x 385 x 252 mm	●		●	●	●	40
DTI 9021	320 W	115 V / 230 V	329 x 385 x 252 mm	●		●	●	●	40
DTS 9011H	300 W	230 V	300 x 495 x 140 mm	●		●		●	42
DTS 7541	2500 W	400 V 3~[2]	1350 x 397 x 270 mm	●		●	●	●	44
DTS 7441	2000 W	400 V 3~ [2]	1350 x 397 x 270 mm	●		●	●	●	44
DTS 7341	1500 W	115 V / 230 V / 400 V 2~[1]	1350 x 390 x 200 mm	●		●	●	●	46
DTS 7241	1000 W	115 V / 230 V	1350 x 390 x 200 mm	●		●	●	●	46
Cooling units from the DTS series – cooling units for side mounting in outdoor areas									
DTS 3661/3681	5500 W	400 V 3~	1667 x 483 x 623 mm		●	●	●	●	48
DTS 3561/3581	4000 W	400 V 3~	1502 x 483 x 534 mm		●	●	●	●	50
DTS 3361/3381	2800 W	400 V 3~	1502 x 403 x 468 mm		●	●	●	●	52
DTS 3265/3285	2900 W	230 V / 400 V 3~	1347 x 411 x 301 mm		●	●	●	●	54
DTS 3261/3281	2000 W	115 V / 230 V / 400 V 3~	1209 x 395 x 326 mm		●	●	●	●	56
DTS 3165/3185	1600 W	230 V / 400 V 3~	914 x 305 x 302 mm		●	●	●	●	58
DTS 3161/3181	1100 W	115 V / 230 V / 400 V 2~	748 x 395 x 294 mm		●	●	●	●	60
DTS 3061/3081	680 W	115 V / 230 V	512 x 256 x 274 mm		●	●	●	●	62

[1] variant without UR
[2] MC variant without UR

● available
○ pending

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All cooling units at a glance

Type	Cooling capacity	Rated voltage	Dimensions (HxWxD)	Approvals					Page
				UR	UL	cUL	GOST	CE	
High temperature cooling units from the DTS series – cooling units for side mounting in outdoor areas									
DTS 3265 HT	2800 W	230 V	1209 x 395 x 326 mm		●	●		●	64
DTS 3165 HT	1600 W		914 x 305 x 302 mm		●	●		●	64
DTS 3061 HT	600 W		512 x 256 x 274 mm		●	●		●	64
Roof-mounted cooling units from the DTT series – cooling units for top mounting									
DTT 6801	4000 W	400 V 3~	485 x 795 x 575 mm	●		●	○	●	66
DTT 6601	3000 W	400 V 3~	485 x 795 x 575 mm	●		●	○	●	66
DTT 6401	2000 W	115 V / 230 V / 400 V 3~	435 x 595 x 495 mm	●		●	○	●	68
DTT 6301	1500 W	115 V / 230 V / 400 V 2~	435 x 595 x 495 mm	●		●	○	●	68
DTT 6201	1000 W	115 V / 230 V / 400 V 2~	435 x 595 x 395 mm	●		●	○	●	70
DTT 6101	500 W	115 V / 230 V	435 x 595 x 395 mm	●		●	○	●	70
Peltier Cooling units									
PTM 100	100 W	24 V DC	367 x 181 x 151 mm					●	72
PTM 150	150 W	24 V DC	495 x 181 x 151 mm					●	72
Accessories									
Pre-filter, aluminium									75
ECOOL filter									75
Filter kits for DTS 3xxx series									74
External condensate evaporation system		230 V							74
Condensate bottle									74
Transport eye bolts									74
Cooling unit controller									74
ECOOL-Plant Software									74
Quick installation frame									75
Internal enclosure fan PEF 180		24 V DC / 115 V AC / 230 V AC							75
Air diverter internal									75
Air baffle internal									75

[1] variant without UL

● available
○ pending



Further information can be found on the Internet:
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newsletter.pfannenberg.com

ECOOL Cooling units 4000 W
DTI/DTS 6801



DTI: for partially recessed mounting of the cooling unit in the door or side
DTS: for outer mounting of the cooling unit on the door or side

- top EER (energy efficiency ratio)
- energy efficient: reduced CO_2 emissions = environment-friendly
- condenser with large fin spacing for highly effective protection in strongly contaminated ambient air
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- exceptional serviceability
- new USB port for easy retrieval of parameter settings/history (Pfannenberg **ECOOL-**Plant software necessary)
- optional filter (easy to retrofit)
- energy-saving mode by default integrated into the Multi Controller

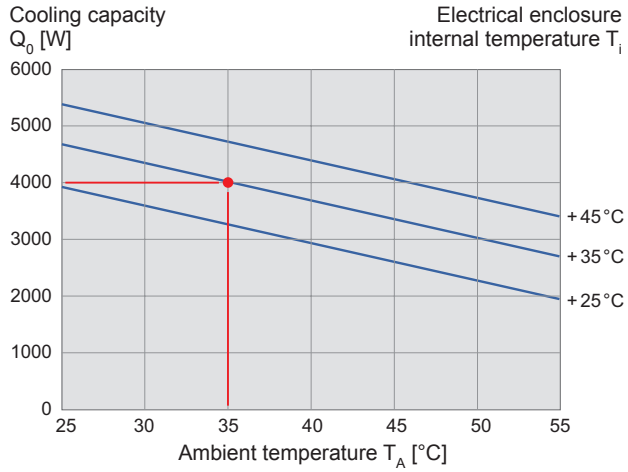
Data		DTI 6801	DTS 6801	Unit
Article number	Standard Controller	13896812055	13886812055	
	Multi Controller	13896822055	13886822055	
	V2A, Standard Controller	13896812015	13886812015	
	V2A, Multi Controller	13896822015	13886822015	
Rated voltage [1] ± 10%		AC 50 / 60		Hz
		400 / 460 3~		V
Cooling performance according to EN 14511	L35/L35	4000		W
	L35/L50	3050		
Power consumption	L35/L35	1918 / 2369		
Current consumption	L35/L35	4.5 / 4.6		A
Starting current	L35/L35	28.3		
Energy efficiency ratio $\varepsilon_{ke} = \frac{Q_0}{P}$ ➛COP		2.09		
Unimpeded airflow (free flow)	internal	1450		m^3/h
	external	1450		
Pre fuse T		16		A
Type of connection		spring-type terminal included with plug		
Noise level according to EN ISO 3741		< 70		dB (A)
Weight (without packaging)		91	95	kg
Ambient temperature range		+ 15 … + 55 / + 59 … + 131		°C / °F
Control range (adjustable)	SC	+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95		
	MC	+ 25 … + 50 / + 77 … + 122; factory setting + 35 / + 95		
Refrigerant	R134a	2000		g
Condensate management		integrated condensate evaporation system with safety overflow		
Protection system according to EN 60529	IP54	towards the electrical enclosure if used as intended by the manufacturer		
	IP34	towards the surroundings if used as intended by the manufacturer		
Design	housing	galvanised sheet steel		
	cover	electrostatically powder coated (200 °C), or stainless steel		
Colour		RAL 7035 (different colours available on request) or stainless steel		

Accessories	Piece	Article number	Information on page
Filter adapter	1	18310000151	75
Aluminium filter	1	18300000149	75
Vlies filter	5	18300000147	75
Fluted filter	5	18300000148	75

[1] Suitable for various supply voltages (see technical data sheet).
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

DTI/DTS 6801



Dimensions

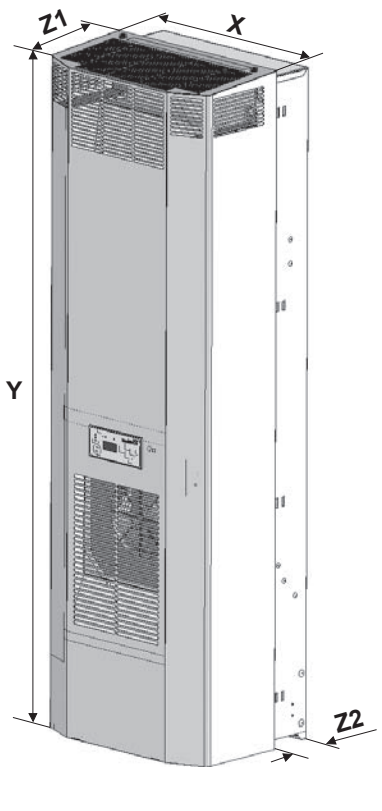
DTI	X	Y	Z1	Z2	K	L
mm	485	1539	252	120	1510	450

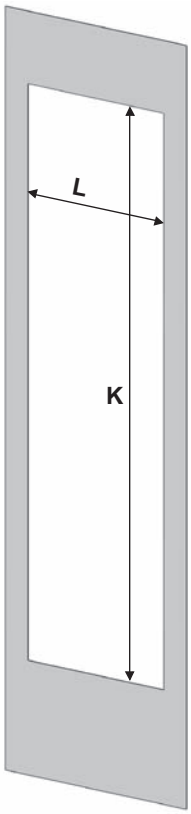
DTI variants partially recessed by 120 mm after installation

DTS	X	Y	Z	A	B	C	D	E	F	G	H	I
mm	485	1549	372	700	282	220	10	450	510	290	315	350

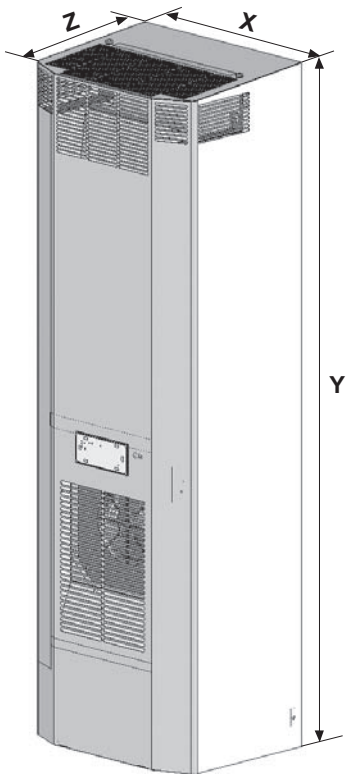
Mounting holes Ø 8 mm and cut-out radii R20

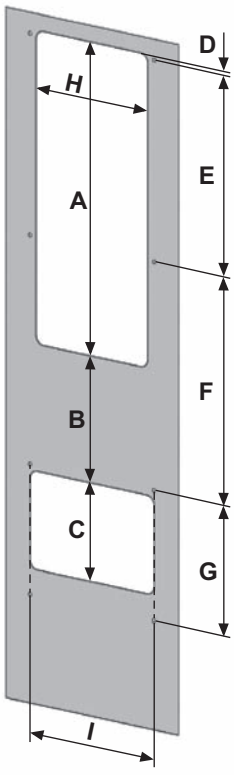
DTI 6801





DTS 6801





ECOOL Cooling units 2500 W
DTI/DTS 6501



DTI: for partially recessed mounting of the cooling unit in the door or side
DTS: for outer mounting of the cooling unit on the door or side

- top EER (energy efficiency ratio)
- energy efficient: reduced CO_2 emissions = environment-friendly
- condenser with large fin spacing for highly effective protection in strongly contaminated ambient air
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- exceptional serviceability
- new USB port for easy retrieval of parameter settings/history (Pfannenberg **ECOOL-**Plant software necessary)
- optional filter (easy to retrofit)
- energy-saving mode by default integrated into the Multi Controller

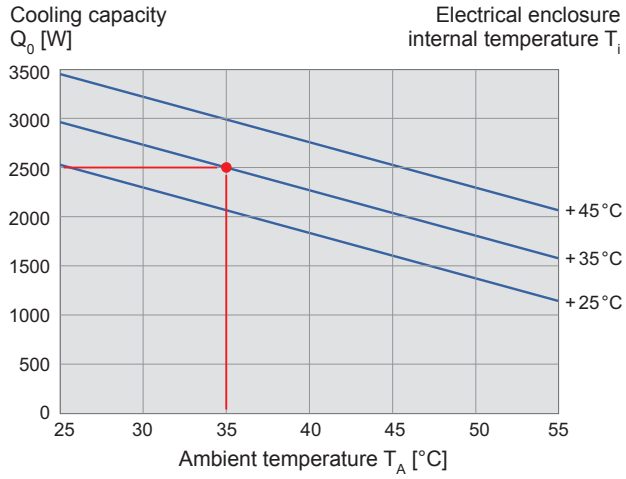
Data		DTI 6501	DTS 6501	Unit
Article number	Standard Controller	13896512055	13886512055	
	Multi Controller	13896522055	13886522055	
	V2A, Standard Controller	13896512015	13886512015	
	V2A, Multi Controller	13896522015	13886522015	
Rated voltage [1] ± 10%		AC 50 / 60		Hz
		400 / 460 3~		V
Cooling performance according to EN 14511	L35/L35	2500		W
	L35/L50	1800		
Power consumption	L35/L35	1048 / 1247		
Current consumption	L35/L35	3.27 / 3.1		A
Starting current	L35/L35	16		
Energy efficiency ratio $\varepsilon_{ke} = \frac{Q_0}{P} \rightarrow$ COP		2.39		
Unimpeded airflow (free flow)	internal	935		m^3/h
	external	1260		
Pre fuse T		16		A
Type of connection		spring-type terminal included with plug		
Noise level according to EN ISO 3741		< 65		dB (A)
Weight (without packaging)		67	71	kg
Ambient temperature range		+ 15 … + 55 / + 59 … + 131		°C / °F
Control range (adjustable)	SC	+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95		
	MC	+ 25 … + 50 / + 77 … + 122; factory setting + 35 / + 95		
Refrigerant	R134a	1400		g
Condensate management		integrated condensate evaporation system with safety overflow		
Protection system according to EN 60529	IP54	towards the electrical enclosure if used as intended by the manufacturer		
	IP34	towards the surroundings if used as intended by the manufacturer		
Design	housing	galvanised sheet steel		
	cover	electrostatically powder coated (200 °C), or stainless steel		
Colour		RAL 7035 (different colours available on request) or stainless steel		

Accessories	Piece	Article number	Information on page
Filter adapter	1	18310000151	75
Aluminium filter	1	18300000149	75
Vlies filter	5	18300000147	75
Fluted filter	5	18300000148	75

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Cooling capacity performance curves

DTI/DTS 6501



Dimensions

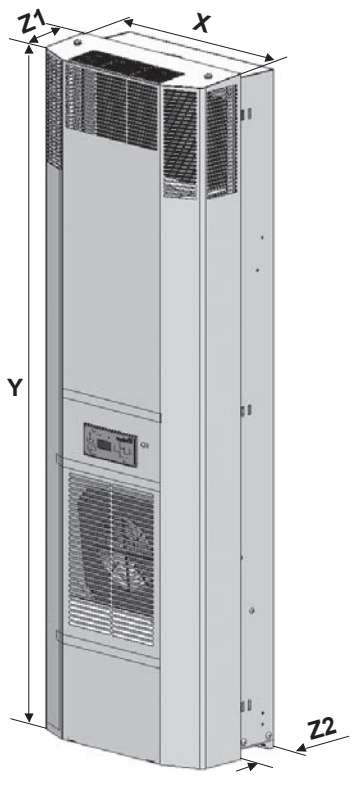
DTI	X	Y	Z1	Z2	K	L
mm	485	1536	158	120	1510	450

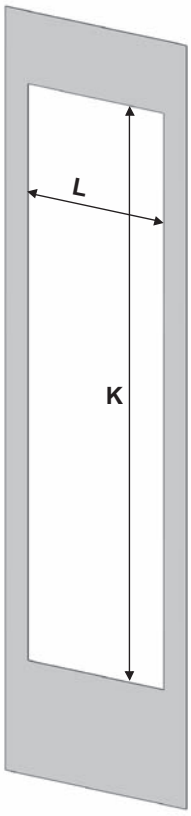
DTI variants partially recessed by 120 mm after installation

DTS	X	Y	Z	A	B	C	D	E	F	G	H	I
mm	485	1543	278	700	282	220	10	450	510	290	315	350

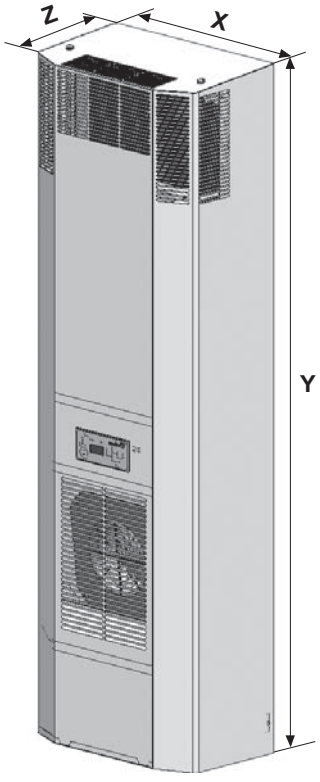
Mounting holes Ø 8 mm and cut-out radii R20

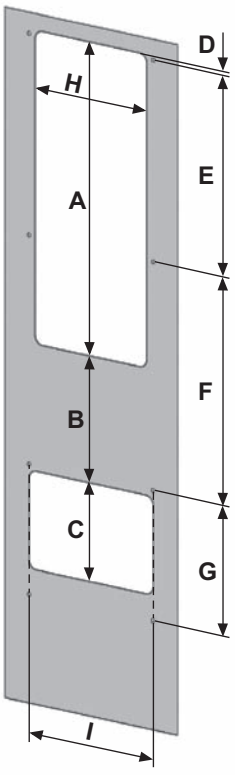
DTI 6501





DTS 6501





ECOOL Cooling units 2000 W
DTI/DTS 6401



DTI: for partially recessed mounting of the cooling unit in the door or side
DTS: for outer mounting of the cooling unit on the door or side

- top EER (energy efficiency ratio)
- energy efficient: reduced CO_2 emissions = environment-friendly
- condenser with large fin spacing for highly effective protection in strongly contaminated ambient air
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- exceptional serviceability
- new USB port for easy retrieval of parameter settings/history (Pfannenberg **ECOOL-**Plant software necessary)
- optional filter (easy to retrofit)
- energy-saving mode by default integrated into the Multi Controller

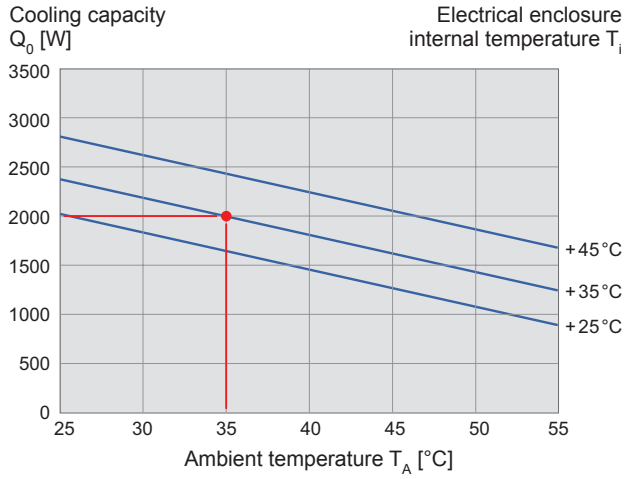
Data		DTI 6401		DTS 6401		Unit
Article number	Standard Controller	13896412055	13896411055	13886412055	13886411055	
	Multi Controller	13896422055	13896421055	13886422055	13886421055	
	V2A, Standard Controller	13896412015	13896411015	13886412015	13886411015	
	V2A, Multi Controller	13896422015	13896421015	13886422015	13886421015	
Rated voltage [1] ± 10%		AC 50 / 60				Hz
		400 / 460 3~	230	400 / 460 3~	230	V
Cooling performance according to EN 14511	L35/L35	2000				W
	L35/L50	1440				
Power consumption	L35/L35	753 / 908	1047 / 1273	753 / 908	1047 / 1273	
Current consumption	L35/L35	2.71 / 2.59	5.45 / 6	2.71 / 2.59	5.45 / 6	A
Starting current	L35/L35	12.0	21.4	12.0	21.4	
Energy efficiency ratio $\varepsilon_{ke} = \frac{Q_0}{P}$ ➛ COP		2.66	1.91	2.66	1.91	
Unimpeded airflow (free flow)	internal	935				m^3/h
	external	1260				
Pre fuse T		16				A
Type of connection		spring-type terminal included with plug				
Noise level according to EN ISO 3741		< 65				dB (A)
Weight (without packaging)		67		71		kg
Ambient temperature range		+ 15 … + 55 / + 59 … + 131				°C / °F
Control range (adjustable)	SC	+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95				
	MC	+ 25 … + 50 / + 77 … + 122; factory setting + 35 / + 95				
Refrigerant	R134a	1400	1200	1400	1200	g
Condensate management		integrated condensate evaporation system with safety overflow				
Protection system according to EN 60529	IP54	towards the electrical enclosure if used as intended by the manufacturer				
	IP34	towards the surroundings if used as intended by the manufacturer				
Design	housing	galvanised sheet steel				
	cover	electrostatically powder coated (200 °C), or stainless steel				
Colour		RAL 7035 (different colours available on request) or stainless steel				

Accessories	Piece	Article number	Information on page
Filter adapter	1	18310000151	75
Aluminium filter	1	18300000149	75
Vlies filter	5	18300000147	75
Fluted filter	5	18300000148	75

[1] Suitable for various supply voltages (see technical data sheet).
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

DTI/DTS 6401



Dimensions

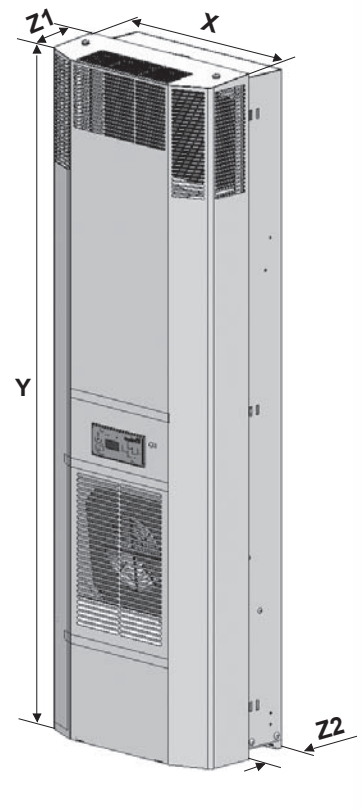
DTI	X	Y	Z1	Z2	K	L
mm	485	1536	158	120	1510	450

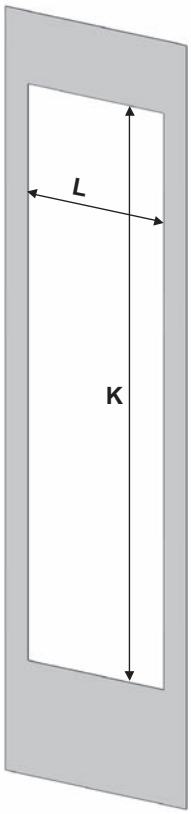
DTI variants partially recessed by 120 mm after installation

DTS	X	Y	Z	A	B	C	D	E	F	G	H	I
mm	485	1543	278	700	282	220	10	450	510	290	315	350

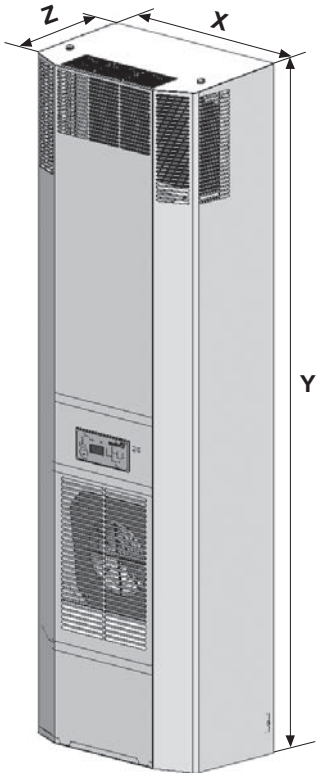
Mounting holes Ø 8 mm and cut-out radii R20

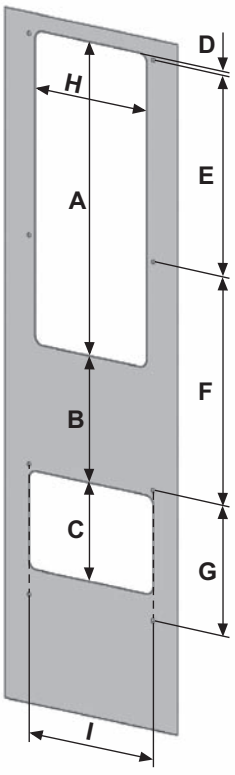
DTI 6401





DTS 6401





ECOOL Cooling units 1500 W
DTI/DTS 6301



DTI: for partially recessed mounting of the cooling unit in the door or side
DTS: for outer mounting of the cooling unit on the door or side

- top EER (energy efficiency ratio)
- energy efficient: reduced CO_2 emissions = environment-friendly
- condenser with large fin spacing for highly effective protection in strongly contaminated ambient air
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- exceptional serviceability
- new USB port for easy retrieval of parameter settings/history (Pfannenberg **ECOOL-**Plant software necessary)
- optional filter (easy to retrofit)
- energy-saving mode by default integrated into the Multi Controller

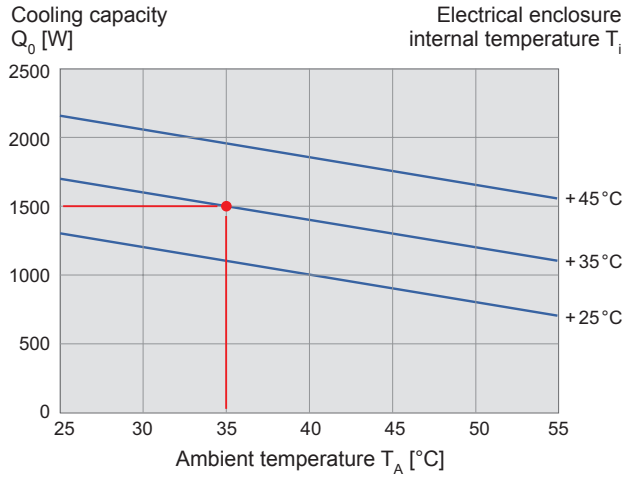
Data		DTI 6301		DTS 6301		Unit
Article number	Standard Controller	13896319055	13896311055	13886319055	13886311055	
	Multi Controller	13896329055	13896321055	13886329055	13886321055	
	V2A, Standard Controller	13896319015	13896311015	13886319015	13886311015	
	V2A, Multi Controller	13896329015	13896321015	13886329015	13886321015	
Rated voltage [1] ± 10%		AC 50 / 60				Hz
		400 / 460 3~	230	400 / 460 3~	230	V
Cooling performance according to EN 14511	L35/L35	1500				W
	L35/L50	1200				
Power consumption	L35/L35	786 / 863	727 / 868	786 / 863	727 / 868	
Current consumption	L35/L35	3.65 / 3.35	5.08 / 5.17	3.65 / 3.35	5.08 / 5.17	A
Starting current	L35/L35	19.7				
Energy efficiency ratio $\varepsilon_{ke} = \frac{Q_0}{P} \frac{\rightarrow}{COP}$		1.91	2.06	1.91	2.06	
Unimpeded airflow (free flow)	internal	935				m³/h
	external	938				
Pre fuse T		6	16	6	16	A
Type of connection		spring-type terminal included with plug				
Noise level according to EN ISO 3741		< 62				dB (A)
Weight (without packaging)		55	50	56	51	kg
Ambient temperature range		+ 15 … + 55 / + 59 … + 131				°C / °F
Control range (adjustable)	SC	+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95				
	MC	+ 25 … + 50 / + 77 … + 122; factory setting + 35 / + 95				
Refrigerant	R134a	600				g
Condensate management		integrated condensate evaporation system with safety overflow				
Protection system according to EN 60529	IP54	towards the electrical enclosure if used as intended by the manufacturer				
	IP34	towards the surroundings if used as intended by the manufacturer				
Design	housing	galvanised sheet steel				
	cover	electrostatically powder coated (200 °C), or stainless steel				
Colour		RAL 7035 (different colours available on request) or stainless steel				

Accessories	Piece	Article number	Information on page
Filter adapter	1	18310000151	75
Aluminium filter	1	18300000149	75
Vlies filter	5	18300000147	75
Fluted filter	5	18300000148	75

[1] 115 V on request, suitable for various supply voltages (see technical data sheet).
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet.
This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

DTI/DTS 6301



Dimensions

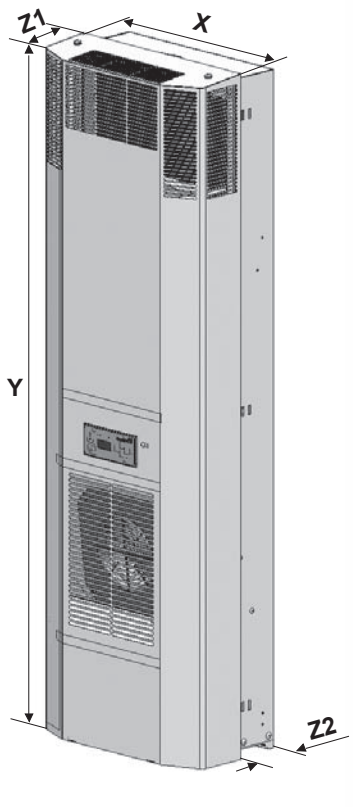
DTI	X	Y	Z1	Z2	K	L
mm	485	1536	158	60	1510	450

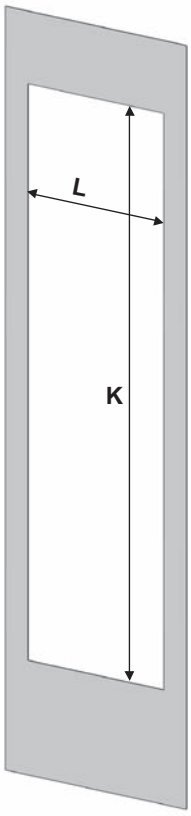
DTI variants partially recessed by 60 mm after installation

DTS	X	Y	Z	A	B	C	D	E	F	G	H	I
mm	485	1539	218	700	282	220	10	450	510	290	315	350

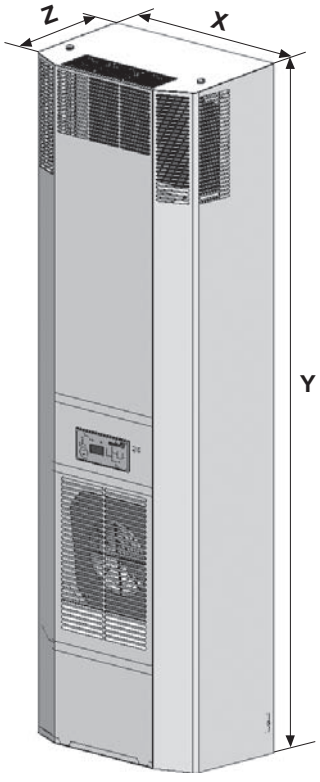
Mounting holes Ø 8 mm and cut-out radii R20

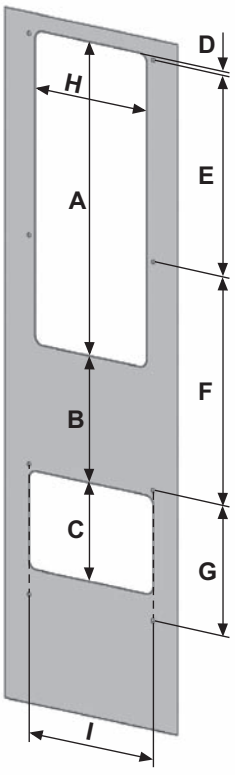
DTI 6301





DTS 6301





ECOOL Cooling units 1000 W
DTI/DTS 6201



DTI: for partially recessed mounting of the cooling unit in the door or side
DTS: for outer mounting of the cooling unit on the door or side

- top EER (energy efficiency ratio)
- energy efficient: reduced CO_2 emissions = environment-friendly
- condenser with large fin spacing for highly effective protection in strongly contaminated ambient air
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- exceptional serviceability
- new USB port for easy retrieval of parameter settings/history (Pfannenberg **ECOOL-**Plant software necessary)
- optional filter (easy to retrofit)
- energy-saving mode by default integrated into the Multi Controller

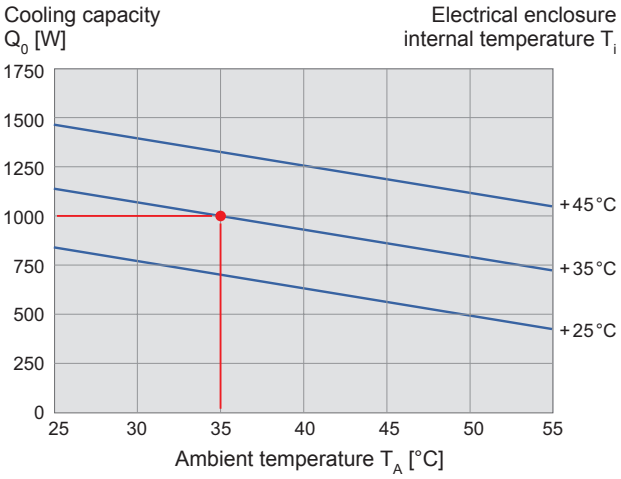
Data		DTI 6201		DTS 6201		Unit
Article number	Standard Controller	13896219055	13896211055	13886219055	13886211055	
	Multi Controller	13896229055	13896221055	13886229055	13886221055	
	V2A, Standard Controller	13896219015	13896211015	13886219015	13886211015	
	V2A, Multi Controller	13896229015	13896221015	13886229015	13886221015	
Rated voltage [1] ± 10%		AC 50 / 60				Hz
		400/460 2~	230	400/460 2~	230	V
Cooling performance according to EN 14511	L35/L35	1000				W
	L35/L50	780				
Power consumption	L35/L35	490 / 570	454 / 567	490 / 570	454 / 567	
Current consumption	L35/L35	2.33 / 2.54	3.08 / 3.65	2.33 / 2.54	3.08 / 3.65	A
Starting current	L35/L35	9.1				
Energy efficiency ratio $\varepsilon_{ke} = \frac{Q_0}{P} \nearrow$ COP		2.04	2.2	2.04	2.2	
Unimpeded airflow (free flow)	internal	935				m³/h
	external	938				
Pre fuse T		4	16	4	16	A
Type of connection		spring-type terminal included with plug				
Noise level according to EN ISO 3741		< 62				dB (A)
Weight (without packaging)		55	50	56	51	kg
Ambient temperature range		+ 15 … + 55 / + 59 … + 131				°C / °F
Control range (adjustable)	SC	+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95				
	MC	+ 25 … + 50 / + 77 … + 122; factory setting + 35 / + 95				
Refrigerant	R134a	600				g
Condensate management		integrated condensate evaporation system with safety overflow				
Protection system according to EN 60529	IP54	towards the electrical enclosure if used as intended by the manufacturer				
	IP34	towards the surroundings if used as intended by the manufacturer				
Design	housing	galvanised sheet steel				
	cover	electrostatically powder coated (200 °C), or stainless steel				
Colour		RAL 7035 (different colours available on request) or stainless steel				

Accessories	Piece	Article number	Information on page
Filter adapter	1	18310000151	75
Aluminium filter	1	18300000149	75
Vlies filter	5	18300000147	75
Fluted filter	5	18300000148	75

[1] 115 V on request, suitable for various supply voltages (see technical data sheet).
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet.
This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

DTI/DTS 6201



Dimensions

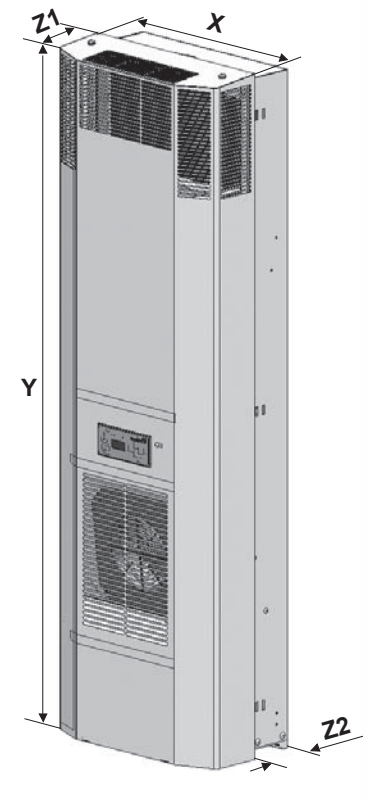
DTI	X	Y	Z1	Z2	K	L
mm	485	1536	158	60	1510	450

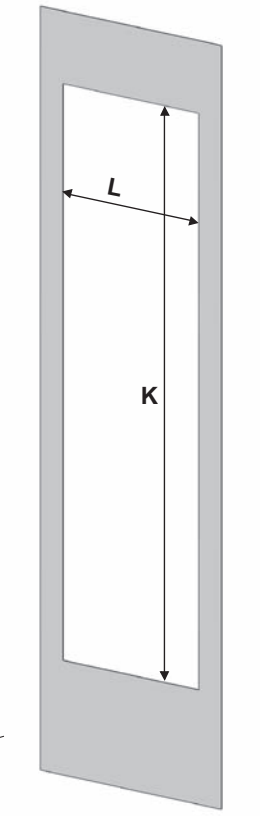
DTI variants partially recessed by 60 mm after installation

DTS	X	Y	Z	A	B	C	D	E	F	G	H	I
mm	485	1539	218	700	282	220	10	450	510	290	315	350

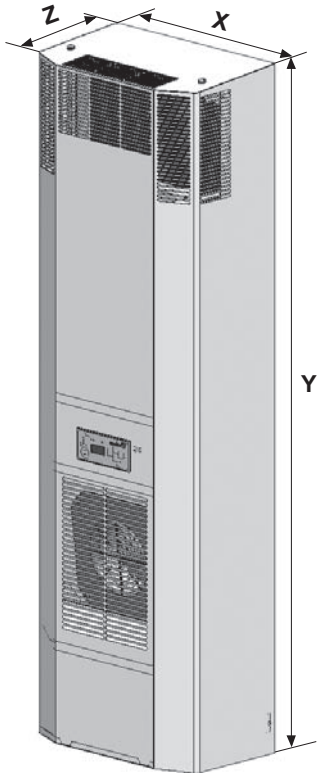
Mounting holes Ø 8 mm and cut-out radii R20

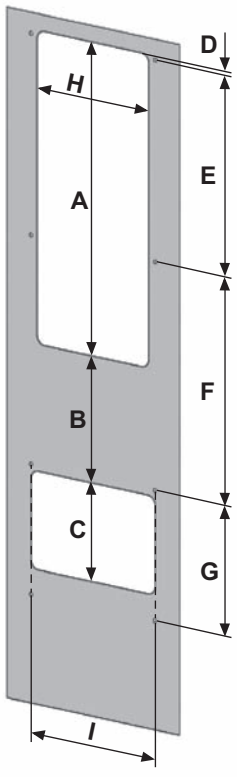
DTI 6201





DTS 6201





Cooling units 950 / 1500 W
DTI/DTS 9141
DTI/DTS 9341C



DTI: for partially recessed mounting of the cooling unit in the door or side
DTS: for outer mounting of the cooling unit on the door or side

- suitable for use with a door width of 500 mm
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- integrated fault and door contact
- optionally available with integrated condensate evaporation system
- DTI variants: fast mounting without drilling and adhering the electrical enclosure seal

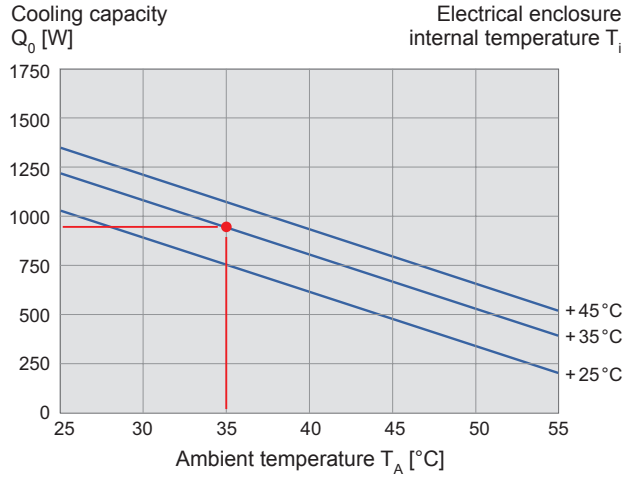
Data		DTI/DTS 9141			DTI/DTS 9341C			Unit
Article number	DTI Standard Controller	13299149055	13299141055	13299144055	13291549055	13291541055	13291544055	
	DTI Multi Controller	13299179055	13299171055	13299174055	13291579055	13291571055	13291574055	
	DTS Standard Controller	13249149055	13249141055	13249144055	13241549055	13241541055	13241544055	
	DTS Multi Controller	13249179055	13249171055	13249174055	13241579055	13241571055	13241574055	
Rated voltage ± 10%		AC 50 / 60		AC 60	AC 50 / 60		AC 60	Hz
		400 2~[1]	230	115	400 2~[1]	230	115	V
Cooling performance according to EN 14511	L35/L35	950			1500			W
	L35/L50	520			750			
Power consumption	L35/L35	576 / 697	515 / 623	842	950	907 / 1047	1220	
Current consumption	L35/L35	2.73 / 2.98	2.98 / 3.25	9.1	3.2	5.4 / 6	13.5	A
Starting current	L35/L35	13.94 / 15.19	23.3 / 25.4	33.2	20	33.2 / 27.6	31.7	
Unimpeded airflow (free flow)	internal	570			885			m^3/h
	external	570			885			
Pre fuse T		4	10	16	6	10	16	A
Type of connection		spring-type terminal included with plug						
Noise level according to EN ISO 3741		< 62						dB (A)
Weight (without packaging)	DTI	43	36		46	39		kg
	DTS	45	38		48	41		
Ambient temperature range		+15 … +55 / +59 … +131						°C / °F
Control range (adjustable)	SC	+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95						
	MC	+ 25 … + 50 / + 77 … + 122; factory setting + 35 / + 95						
Refrigerant	R134a	400						g
Duty cycle		100						%
Condensate management		condensate drain; integrated condensate evaporation system optional						
Protection system according to EN 60529	IP 54	towards the electrical enclosure if used as intended by the manufacturer						
	IP 34	towards the surroundings if used as intended by the manufacturer						
Design	housing	galvanised sheet steel						
	cover	galvanised/electrostatically powder coated (200 °C); stainless steel on request						
Colour (cover)		RAL 7035, different colours available on request						

Accessories	Piece	Article number	Information on page
External condensate evaporation system	1	18314000001	74
Condensate bottle	1	18314000100	74

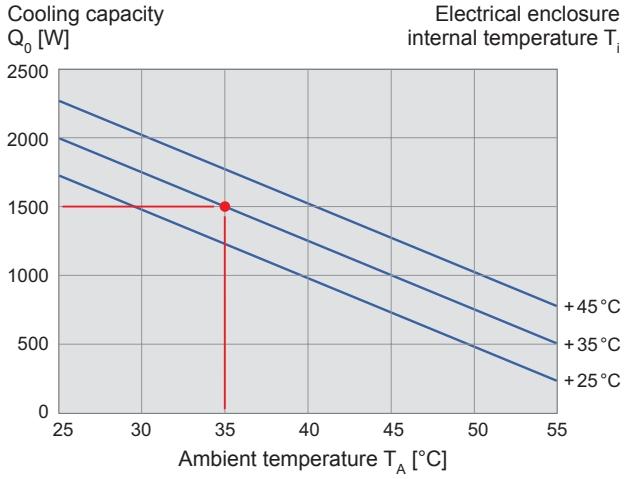
[1] suitable for various supply voltages (see technical specific data sheet)
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

DTI/DTS 9141



DTI/DTS 9341C

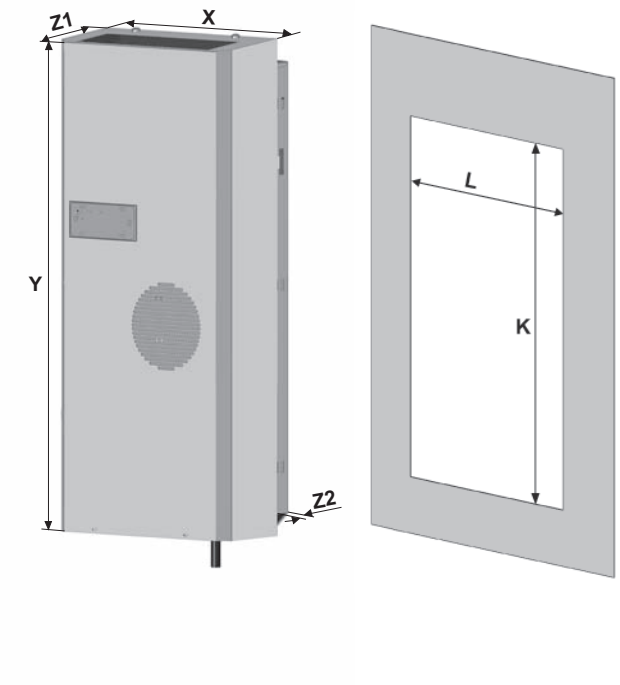


Dimensions

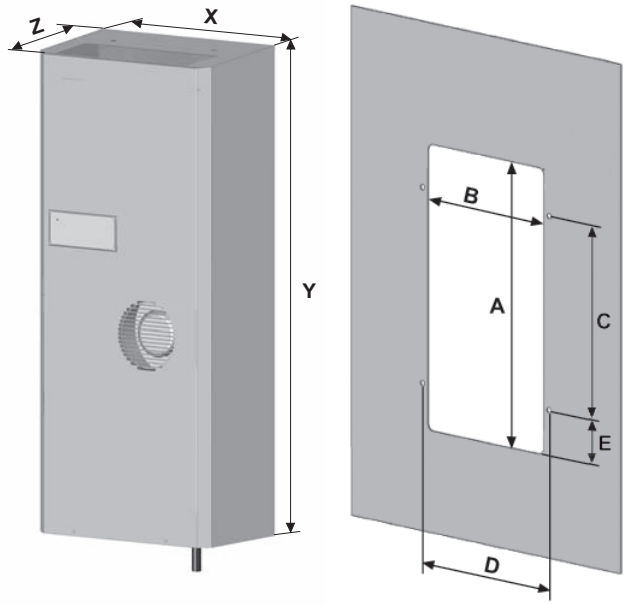
DTI	X	Y	Z1	Z2	K	L
mm	410	958	188	60	900	380
DTI variants partially recessed by 60 mm after installation						

DTS	X	Y	Z	A	B	C	D	E
mm	410	964	248	662	320	562	350	55
Mounting holes Ø 8 mm and cut-out radii R20								

DTI 9141/DTI 9341C



DTS 9141/DTS 9341C



Cooling unit 870 W
DTI/DTS 9041



DTI: for partially recessed mounting of the cooling unit in the door or side
DTS: for outer mounting of the cooling unit on the door or side

- suitable for use with a door width of 400 mm
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- integrated fault and door contact
- optionally available with integrated condensate evaporation system
- DTI variants: fast mounting without drilling and adhering the electrical enclosure seal

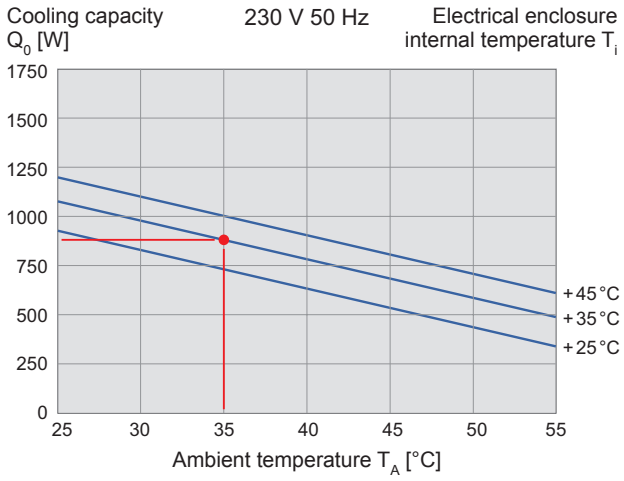
Data		DTI/DTS 9041			Unit
Article number	DTI Standard Controller	13299049055	13299041055	13299044055	
	DTI Multi Controller	13299079055	13299071055	13299074055	
	DTS Standard Controller	13249049055	13249041055	13249044055	
	DTS Multi Controller	13249079055	13249071055	13249074055	
Rated voltage ± 10%		AC 50 / 60		AC 60	Hz
		400 2~[1]	230	115	V
Cooling performance according to EN 14511	L35/L35	810	870	790	W
	L35/L50	483	580	590	
Power consumption	L35/L35	580 / 702	524 / 634	783	
Current consumption	L35/L35	3.2 / 3.49	3.06 / 3.34	7.6	A
Starting current	L35/L35	20.2 / 22.02	22.16 / 24.15	40.1	
Unimpeded airflow (free flow)	internal	570			m^3/h
	external	570			
Pre fuse T		4	10	16	A
Type of connection		spring-type terminal included with plug			
Noise level according to EN ISO 3741		< 63		< 64	dB (A)
Weight (without packaging)	DTI	37	29.5		kg
	DTS	37	29.5		
Ambient temperature range		+ 15 … + 55 / + 59 … + 131			°C / °F
Control range (adjustable)	SC	+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95			
	MC	+ 25 … + 50 / + 77 … + 122; factory setting + 35 / + 95			
Refrigerant	R134a	400			g
Duty cycle		100			%
Condensate management		condensate drain; integrated condensate evaporation system optional			
Protection system according to EN 60529	IP 54	towards the electrical enclosure if used as intended by the manufacturer			
	IP 34	towards the surroundings if used as intended by the manufacturer			
Design	housing	galvanised sheet steel			
	cover	galvanised/electrostatically powder coated (200 °C); stainless steel on request			
Colour (cover)		RAL 7035, different colours available on request			

Accessories	Piece	Article number	Information on page
External condensate evaporation system	1	18314000001	74
Condensate bottle	1	18314000100	74

[1] suitable for various supply voltages (see technical specific data sheet)
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

DTI/DTS 9041

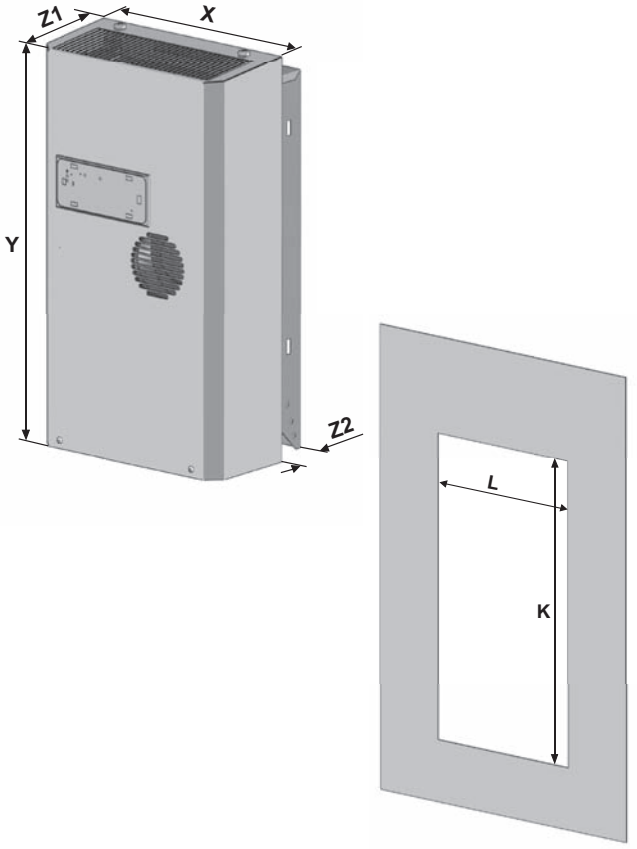


Dimensions

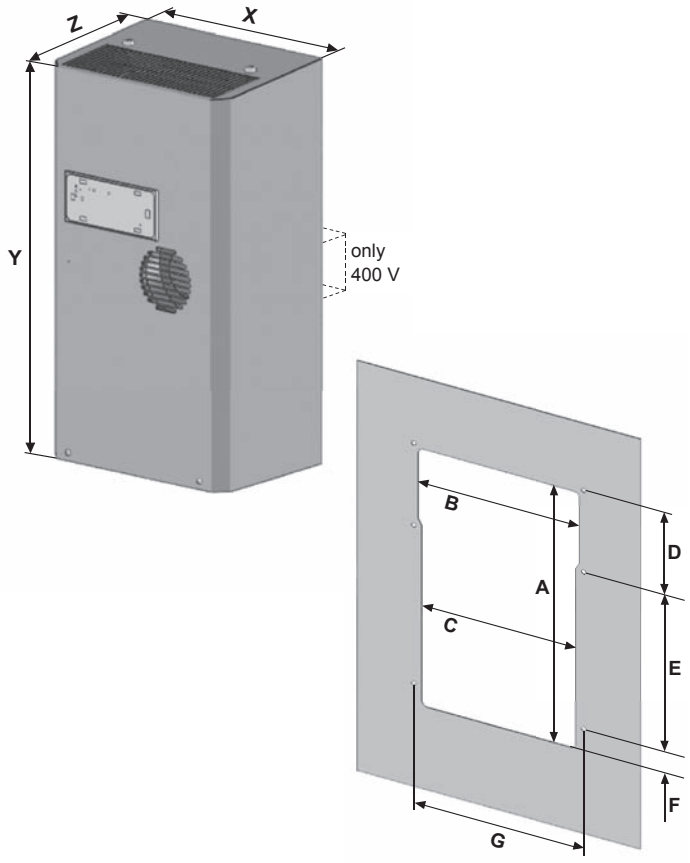
DTI	X	Y	Z1	Z2 115V / 230V	Z2 400V	K	L
mm	380	599	171	60	192	577	350
DTI variants partially recessed by 60 mm after installation							

DTS	X	Y	Z 115V / 230V	Z 400V	A	B	C	D	E	F	G
mm	380	604	231	363	472	285	272	150	288	40	300
Mounting holes Ø 8 mm and cut-out radii R20											

DTI 9041



DTS 9041



Cooling unit 510 W
DTI/DTS 9031



DTI: for partially recessed mounting of the cooling unit in the door or side
DTS: for outer mounting of the cooling unit on the door or side

- suitable for use with a door width of 400 mm
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- integrated fault and door contact
- DTI variants: fast mounting without drilling and adhering the electrical enclosure seal

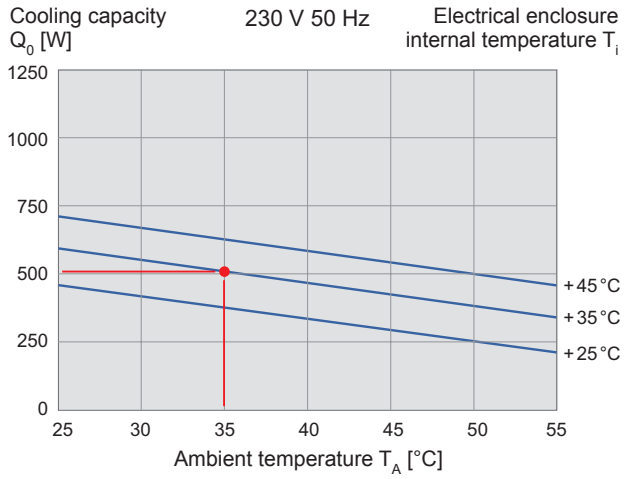
Data		DTI/DTS 9031			Unit
Article number	DTI Standard Controller	13295049055	13295041055	13295044055	
	DTI Multi Controller	13295079055	13295071055	13295074055	
	DTS Standard Controller	13245049055	13245041055	13245044055	
	DTS Multi Controller	13245079055	13245071055	13245074055	
Rated voltage ± 10%		AC 50 / 60		AC 60	Hz
		400 2~[1]	230	115	V
Cooling performance according to EN 14511	L35/L35	410 / 540	510 / 580	585	W
	L35/L50	305 / 360	365 / 395	545	
Power consumption	L35/L35	297 / 354	283 / 337	322	
Current consumption	L35/L35	1.59 / 1.53	1.58 / 1,64	3.29	A
Starting current	L35/L35	8.63 / 7.86	14.31 / 13.8	26.15	
Unimpeded airflow (free flow)	internal	280			m^3/h
	external	345			
Pre fuse T		4	6	10	A
Type of connection		spring-type terminal included with plug			
Noise level according to EN ISO 3741		63			dB (A)
Weight (without packaging)	DTI	26	21		kg
	DTS	27	22		
Ambient temperature range		+ 15 … + 55 / + 59 … + 131			°C / °F
Control range (adjustable)	SC	+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95			
	MC	+ 25 … + 50 / + 77 … + 122; factory setting + 35 / + 95			
Refrigerant	R134a	250			g
Duty cycle		100			%
Condensate management		condensate drain			
Protection system according to EN 60529	IP 54	towards the electrical enclosure if used as intended by the manufacturer			
	IP 34	towards the surroundings if used as intended by the manufacturer			
Design	housing	galvanised sheet steel			
	cover	galvanised/electrostatically powder coated (200 °C); stainless steel on request			
Colour (cover)		RAL 7035, different colours available on request			

Accessories	Piece	Article number	Information on page
External condensate evaporation system	1	18314000001	74
Condensate bottle	1	18314000100	74

[1] suitable for various supply voltages (see technical specific data sheet)
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

DTI/DTS 9031

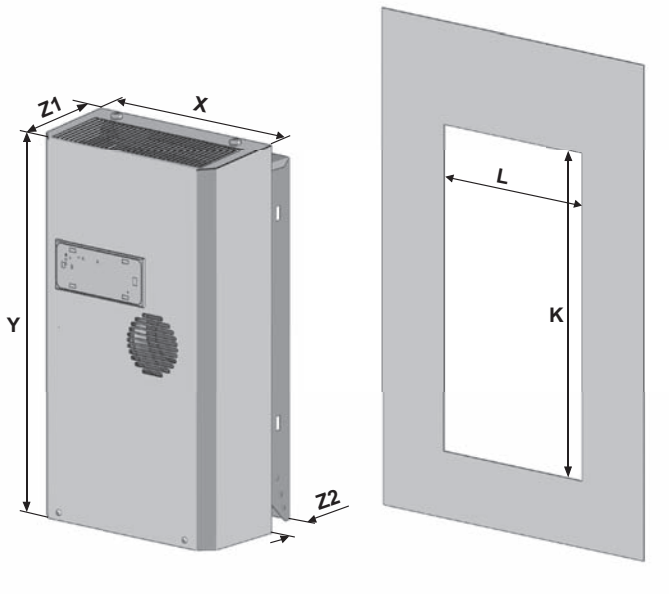


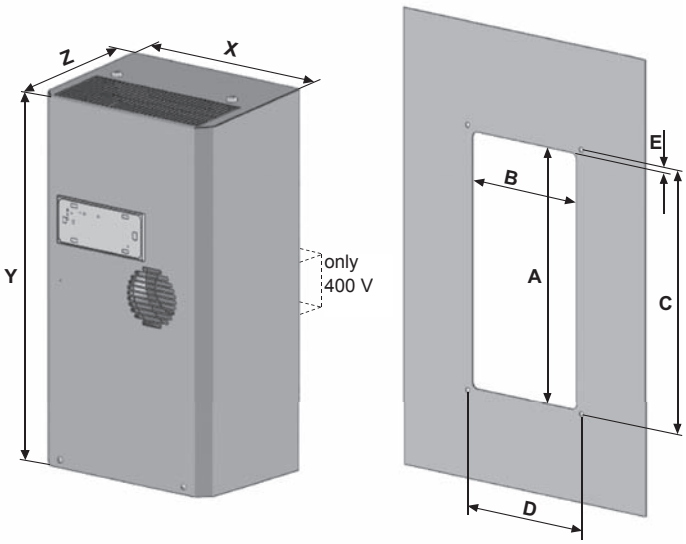
Dimensions

DTI	X	Y	Z1	Z2 115V / 230V	Z2 400V	K	L
mm	310	562	145	67	208	495	265
DTI variants partially recessed by 67 mm after installation							

DTS	X	Y	Z 115V / 230V	Z 400V	A	B	C	D	E
mm	310	565	212	353	422	215	435	235	8
Mounting holes Ø 8 mm and cut-out radii R20									

DTI 9031 | **DTS 9031**





Cooling units 320 W
DTFI 9021
DTI 9021



- compact design, ideal for flat control cabinets, control consoles and operating units
- diagnostic message via operating display
- integrated fault and door contact
- optionally available with integrated condensate evaporation system

DTFI variants:

- simple and fast mounting without drilling
- small structural height for integration in machine control cabinets
- cut-out compatible with 3rd and 4th Generation Filterfans, installation size 6

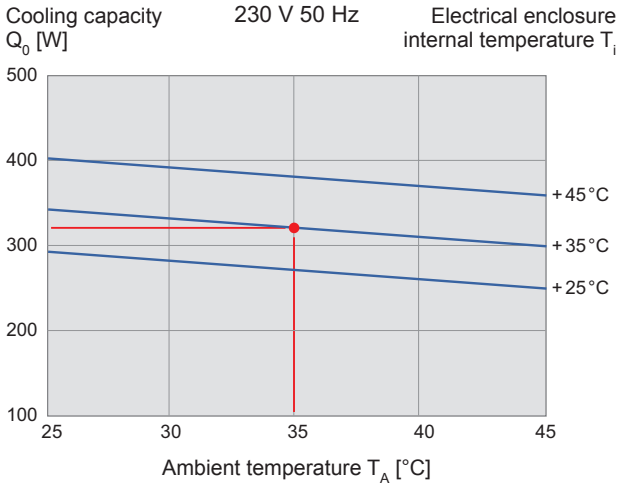
Data		DTFI 9021			DTI 9021		Unit
Article number	Standard Controller	13293149055	13293141055	13293144055	13293041055	13293044055	
Rated voltage ± 10%		AC 50 / 60		AC 60	AC 50 / 60	AC 60	Hz
		400 2~[1]	230	115	230	115	V
Cooling performance according to EN 14511	L35/L35	230 / 290	320 / 340	320	320 / 340	320	W
	L35/L45	220 / 280	300 / 330	250	300 / 330	250	
Power consumption	L35/L35	200 / 200	230 / 240	240	230 / 240	240	
Current consumption	L35/L35	1 / 0.9	1.6	2.7	1.6	2.7	A
Starting current	L35/L35	6.6 / 5.9	11.7 / 10.9	11.4	11.7 / 10.9	11.4	
Unimpeded airflow (free flow)	internal	282					m^3/h
	external	282					
Pre fuse T		4	6	6	6	6	A
Type of connection		spring-type terminal included with plug					
Noise level according to EN ISO 3741		< 62					dB (A)
Weight (without packaging)		22	16		17		kg
Ambient temperature range		+ 15 … + 45 / + 59 … + 113					°C / °F
Control range (adjustable)		+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95					
Refrigerant	R134a	350					g
Duty cycle		100					%
Condensate management		condensate drain; integrated condensate evaporation system optional					
Protection system according to EN 60529	IP 54	towards the electrical enclosure if used as intended by the manufacturer					
	IP 34	towards the surroundings if used as intended by the manufacturer					
Design	housing	galvanised sheet steel					
	cover	galvanised/electrostatically powder coated (200 °C); stainless steel on request					
Colour (cover)		RAL 7035, different colours available on request					

Accessories	Piece	Article number	Information on page
External condensate evaporation system	1	18314000001	74
Condensate bottle	1	18314000100	74

[1] suitable for various supply voltages (see technical specific data sheet)
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

DTFI 9021 / DTI 9021



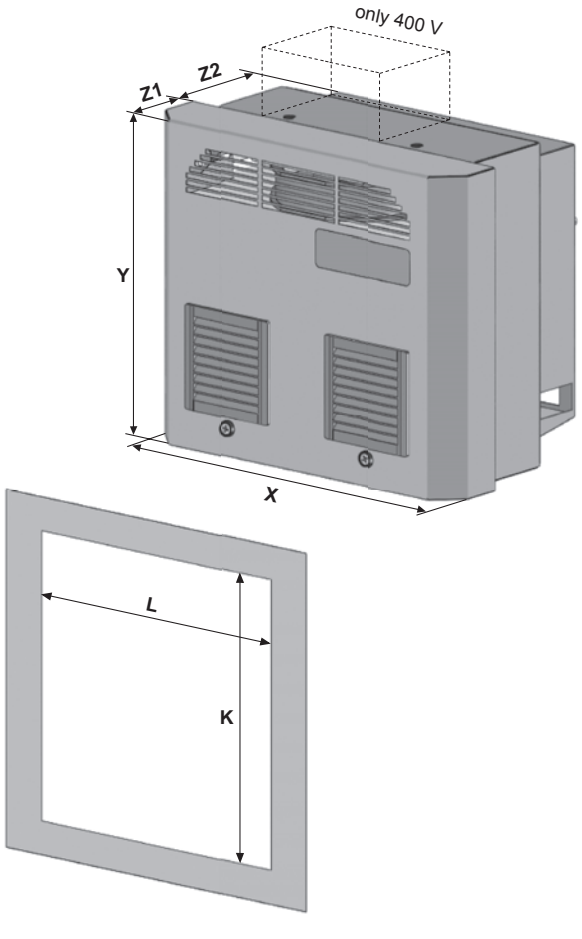
Dimensions

DTFI	X	Y 115V / 230V	Y 400V	Z1	Z2	K	L
mm	385	326	464	75	170	291	291

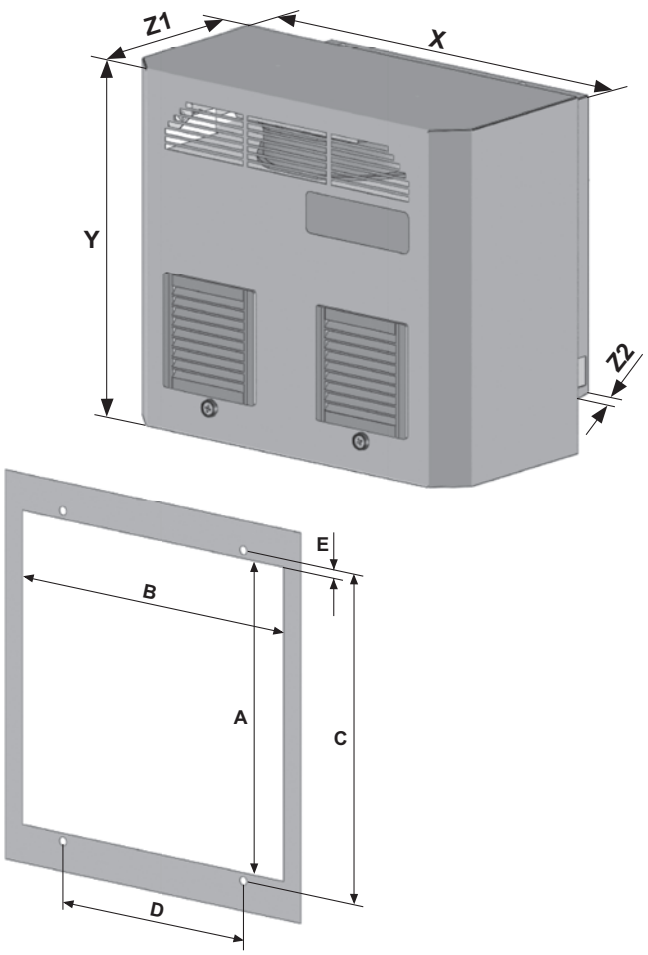
DTI	X	Y 115V / 230V	Z1	Z2	A	B	C	D	E
mm	385	329	178	67	289	304	304	210	7.5

Mounting holes Ø 8 mm and cut-out radii R20

DTFI 9021



DTI 9021



Cooling unit 300 W
DTS 9011H



- service-friendly, compact design
- small mounting area, ideal for small electrical enclosures and larger electrical enclosures for the cooling of hot spots
- simple and fast mounting with brackets for door or side mounting
- powerful radial fans ensure optimum air circulation inside the enclosure
- integrated collective fault and door contact (potential-free)
- 100% reliability with controllers by Pfannenberg

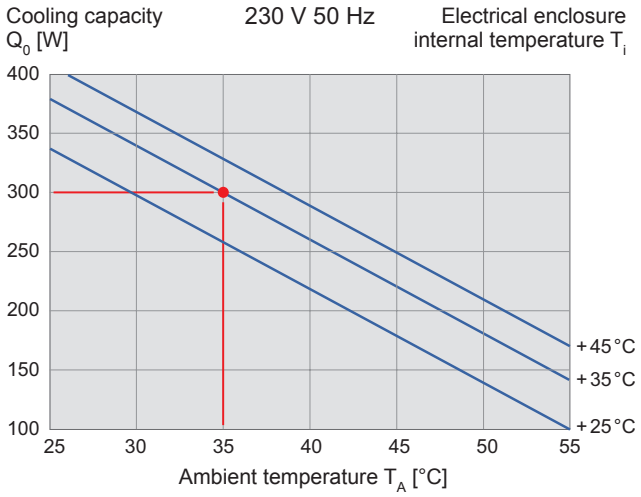
Data		DTS 9011H	Unit
Article number	Standard Controller	13242541055	
Rated voltage ± 10%		AC 50 / 60	Hz
		230	V
Cooling performance according to EN 14511	L35/L35	300	W
	L35/L45	180	
Power consumption	L35/L35	275 / 290	
Current consumption	L35/L35	1.52 / 1.56	A
Starting current	L35/L35	4.52 / 4.66	
Unimpeded airflow (free flow)	internal	160	m^3/h
	external	160	
Pre fuse T		16	A
Type of connection		spring-type terminal included with plug	
Noise level according to EN ISO 3741		< 65	dB (A)
Weight (without packaging)		15	kg
Ambient temperature range		+ 15 … + 45 / + 59 … + 113	°C / °F
Control range (adjustable)		+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95	
Refrigerant	R134a	130	g
Duty cycle		100	%
Condensate management		condensate drain	
Protection system according to EN 60529	IP 54	towards the electrical enclosure if used as intended by the manufacturer	
	IP 34	towards the surroundings if used as intended by the manufacturer	
Design	housing	galvanised sheet steel	
	cover	galvanised/electrostatically powder coated (200 °C); stainless steel on request	
Colour (cover)		RAL 7035, different colours available on request	

Accessories	Piece	Article number	Information on page
External condensate evaporation system	1	18314000001	74
Condensate bottle	1	18314000100	74

Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

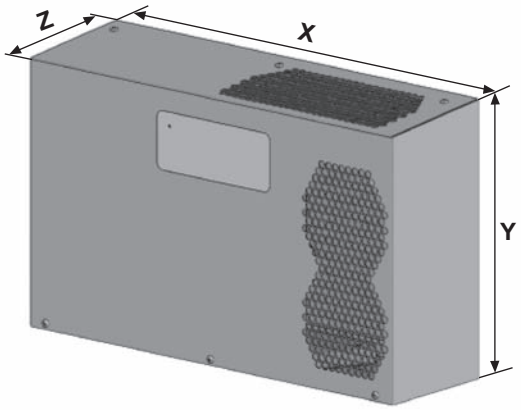
DTS 9011H

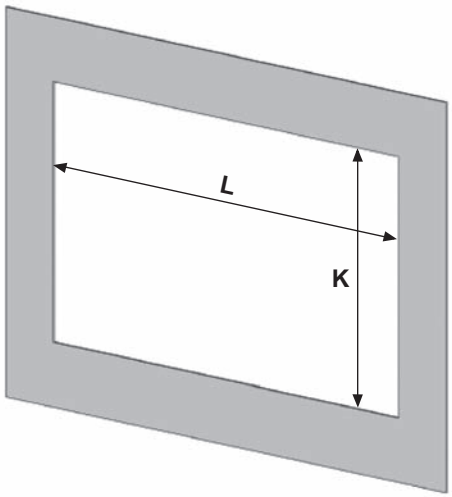


Dimensions

	X	Y	Z	K	L
mm	495	300	140	281	471

DTS 9011H





Cooling units 2500 / 2000 W
DTS 7541
DTS 7441



- powerful radial fans ensure optimum air circulation inside the enclosure
- sealed with protective edging, no extensive work on the installation cut-out necessary
- new standard electronics

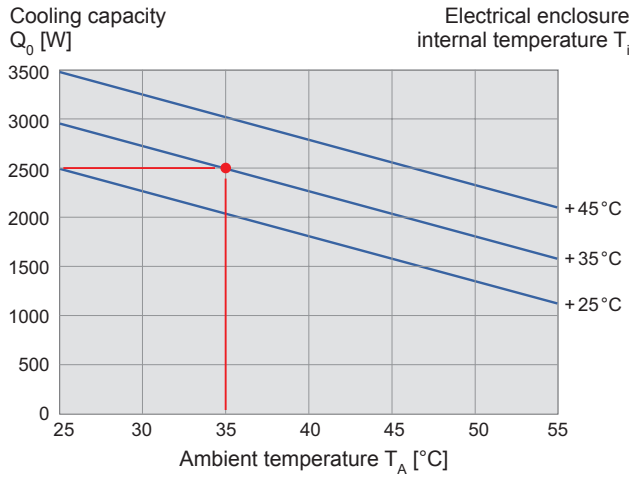
Data		DTS 7541	DTS 7441	Unit
Article number	Standard Controller	13287532055	13287432055	
	Multi Controller	13087562055	13087462055	
Rated voltage [1] ± 10%		AC 50 / 60		Hz
		400 / 460 3~		V
Cooling performance according to EN 14511	L35/L35	2500	2000	W
	L35/L50	1800	1500	
Power consumption	L35/L35	1400	1200	
Current consumption	L35/L35	3.2	2.8	A
Starting current	L35/L35	11.5	10.4	
Unimpeded airflow (free flow)	internal	900	850	m^3/h
	external	1000	1000	
Pre fuse T		10		A
Type of connection		spring-type terminal included with plug		
Noise level according to EN ISO 3741		< 65		dB (A)
Weight (without packaging)		75		kg
Ambient temperature range		+ 15 … + 55 / + 59 … + 131		°C / °F
Control range (adjustable)	SC	+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95		
	MC	+ 25 … + 50 / + 77 … + 122; factory setting + 35 / + 95		
Refrigerant	R134a	850		g
Duty cycle		100		%
Condensate management		condensate drain		
Protection system according to EN 60529	IP 54	towards the electrical enclosure if used as intended by the manufacturer		
	IP 34	towards the surroundings if used as intended by the manufacturer		
Design	housing	galvanised sheet steel		
	cover	galvanised/electrostatically powder coated (200 °C); stainless steel on request		
Colour (cover)		RAL 7035, different colours available on request		

Accessories	Piece	Article number	Information on page
External condensate evaporation system	1	18314000001	74
Condensate bottle	1	18314000100	74

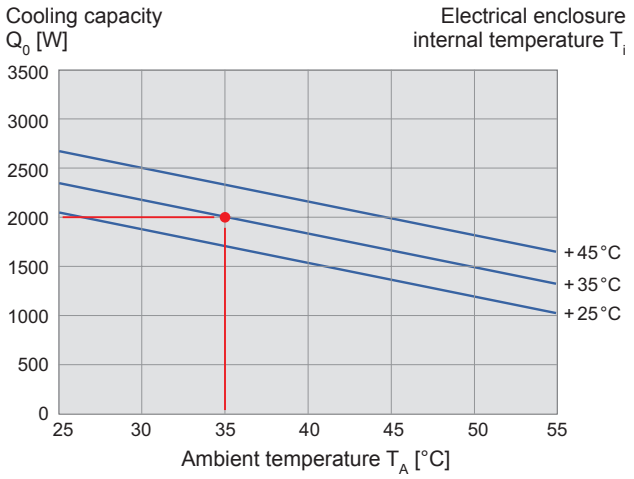
[1] suitable for various supply voltages (see technical specific data sheet)
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

DTS 7541



DTS 7441

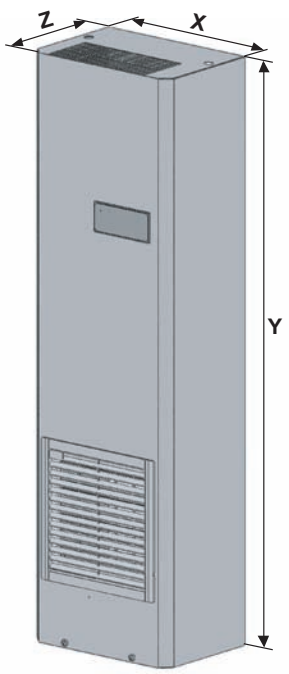


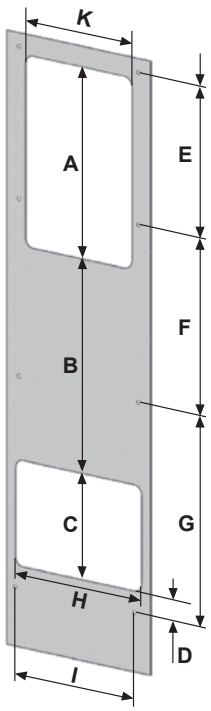
Dimensions

	X	Y	Z	A	B	C	D	E	F	G	H	I	K
mm	397	1350	270	421.5	471.5	234	47.5	335	390	465	350	330	295

Mounting holes Ø 8 mm and cut-out radii R20

DTS 7541 / DTS 7441





Cooling units 1500 / 1000 W
DTS 7341
DTS 7241



- powerful radial fans ensure optimum air circulation inside the enclosure
- sealed with protective edging, no extensive work on the installation cut-out necessary
- temperature regulated by integrated thermostat

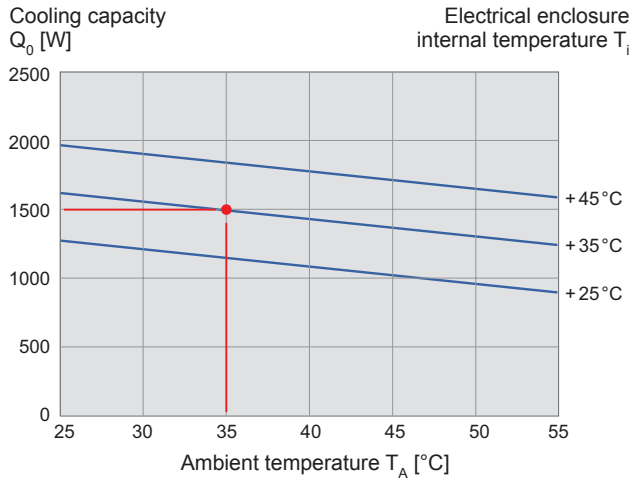
Data		DTS 7341			DTS 7241		Unit
Article number	thermostat control	13087319055	13287311055	13287314055	13287211055	13287214055	
Rated voltage ± 10%		AC 50 / 60		AC 60	AC 50 / 60	AC 60	Hz
		400 2~[1]	230	115	230	115	V
Cooling performance according to EN 14511	L35/L35	1500			1000		W
	L35/L50	1200			780		
Power consumption	L35/L35	920	810	1100	670	780	W
Current consumption	L35/L35	2.3	4.3	13.4	3.0	7.4	A
Starting current	L35/L35	9.3	16.5	26.8	14.7	24.9	A
Unimpeded airflow (free flow)	internal	560	270		270		m^3/h
	external	760	450		450		
Pre fuse T		6	16				A
Type of connection		connection cable > 2000 mm					
Noise level according to EN ISO 3741		< 62					dB (A)
Weight (without packaging)		58			53		kg
Ambient temperature range		+ 15 … + 55 / + 59 … + 131					°C / °F
Control range (adjustable)		+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95					
Refrigerant	R134a	530			480		g
Duty cycle		100					%
Condensate management		condensate drain					
Protection system according to EN 60529	IP 54	towards the electrical enclosure if used as intended by the manufacturer					
	IP 34	towards the surroundings if used as intended by the manufacturer					
Design	housing	galvanised sheet steel					
	cover	galvanised/electrostatically powder coated (200 °C); stainless steel on request					
Colour (cover)		RAL 7035, different colours available on request					

Accessories	Piece	Article number	Information on page
External condensate evaporation system	1	18314000001	74
Condensate bottle	1	18314000100	74

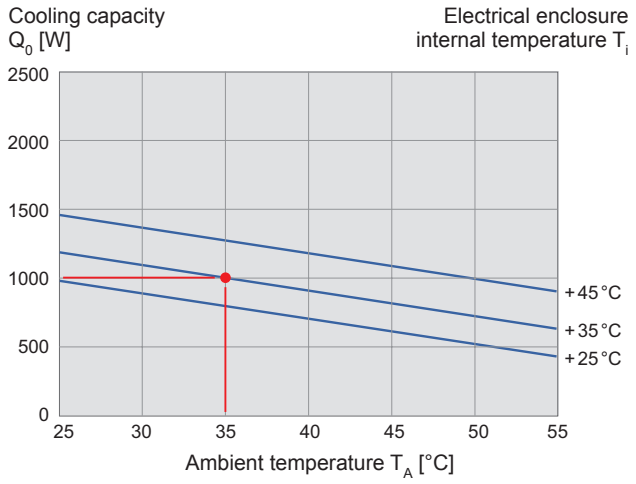
[1] suitable for various supply voltages (see technical specific data sheet)
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

DTS 7341



DTS 7241

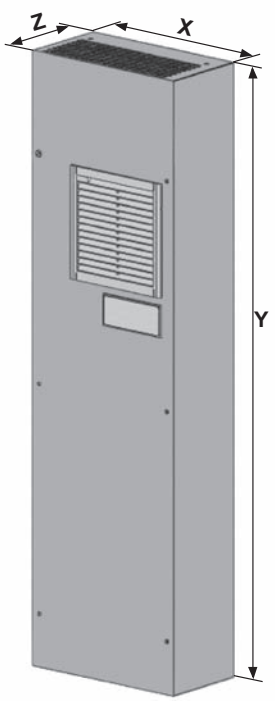


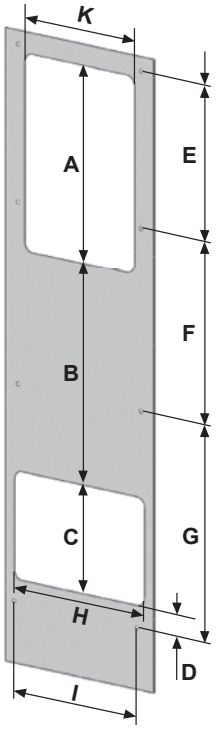
Dimensions

	X	Y	Z	A	B	C	D	E	F	G	H	I	K
mm	390	1350	200	421.5	471.5	234	47.5	335	390	465	350	330	295

Mounting holes Ø 8 mm and cut-out radii R20

DTS 7341 / DTS 7241





Cooling units 5500 W
DTS 3661 (NEMA 3R/4)
DTS 3681 (NEMA 4/4X)



- particularly suitable for the food industry and outdoor applications
- high protection system IP 56, maintenance-free
- maintains a UL tested NEMA type 3R/4 seal against the enclosure
- condenser with 3 mm fin spacing, highly effective protection against strongly contaminated ambient air
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- integrated condensate evaporation system

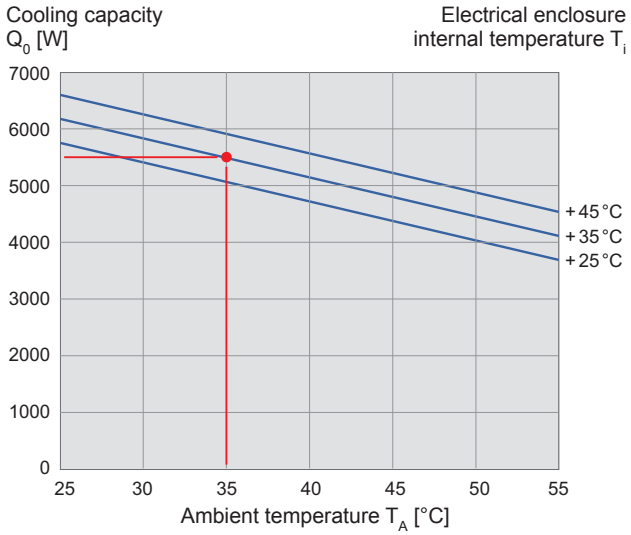
Data		DTS 3661 (NEMA 3R/4)	DTS 3681 (NEMA 4/4X)	Unit
Article number	Standard Controller	13383932355	13383932158	
	LAP [1]	13383936375	13383936178	
Rated voltage ± 10%		AC 50 / 60		Hz
		400 / 460 3~		V
Cooling performance according to EN 14511	L35/L35	5500		W
	L35/L50	4400		
Power consumption	L35/L35	2275 / 2920		
Current consumption	L35/L35	6.3		A
Starting current	L35/L35	25		
Unimpeded airflow (free flow)	internal	2740		m^3/h
	external	2740		
Pre fuse T		10		A
Type of connection		spring-type terminal included with plug		
Noise level according to EN ISO 3741		< 73		dB (A)
Weight (without packaging)		108	109	kg
Ambient temperature range	SC	+ 15 … + 55 / + 59 … + 131		°C / °F
	LAP	- 40 … + 55 / - 40 … + 131		
Control range (adjustable)		+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95		
Refrigerant	R134a	1300		g
Duty cycle		100		%
Condensate management		integrated condensate evaporation system with safety overflow		
Protection system according to NEMA type	3R/4	towards the electrical enclosure if used as intended by the manufacturer	-	
	4/4X	-	towards the electrical enclosure if used as intended by the manufacturer	
	1	towards the surroundings if used as intended by the manufacturer		
Design	housing	galvanised sheet steel		
	cover	galvanised/electrostatically powder coated (200 °C)	304 rust proof stainless steel	
Colour (cover)		RAL 7035, different colours available on request	-	

Accessories	Piece	Article number	Information on page
Condensate bottle	1	18314000100	74
Filter kit	1	18881500004	74

[1] LAP (Low Ambient Package): includes 1400 W enclosure heater and a thermostat to be placed inside the enclosure
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

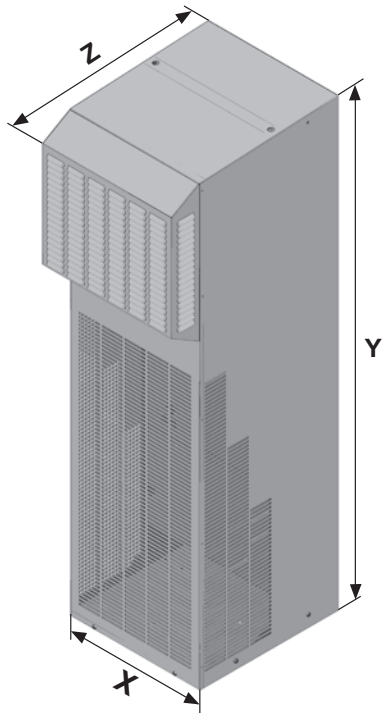
DTS 3661/3681

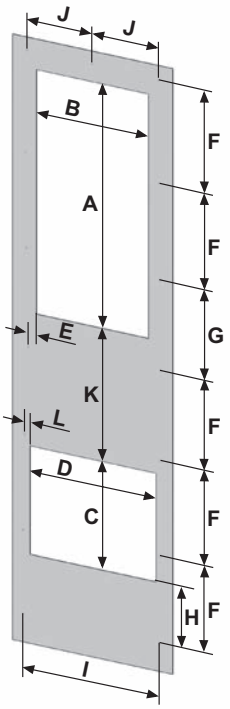


Dimensions

	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L
mm	483	1667	623	635	350	285	360	35	240	350	139	420	210	425	28.5
Mounting holes Ø 10 mm															

DTS 3661/3681





Cooling units 4000 W
DTS 3561 (NEMA 3R/4)
DTS 3581 (NEMA 4/4X)



- particularly suitable for the food industry and outdoor applications
- high protection system IP 56, maintenance-free
- maintains a UL tested NEMA type 3R/4 seal against the enclosure
- condenser with 3 mm fin spacing, highly effective protection against strongly contaminated ambient air
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- integrated condensate evaporation system

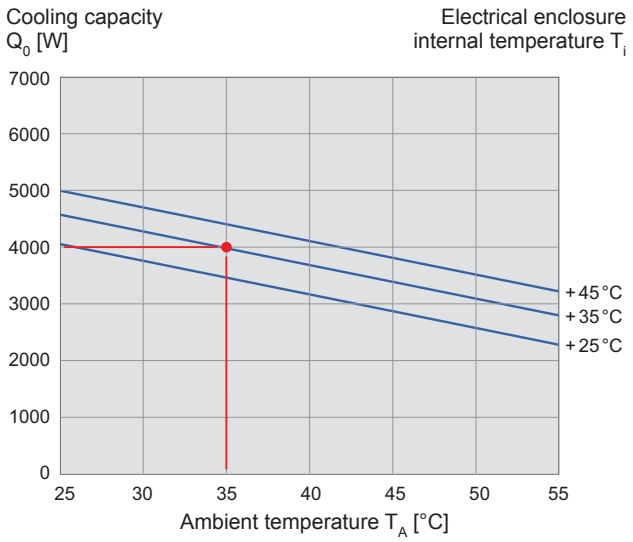
Data		DTS 3561 (NEMA 3R/4)	DTS 3581 (NEMA 4/4X)	Unit
Article number	Standard Controller	13383532355	13383532158	
	LAP [1]	13383536375	13383536178	
Rated voltage ± 10%		AC 50 / 60		Hz
		400 / 460 3~		V
Cooling performance according to EN 14511	L35/L35	4000		W
	L35/L50	3100		
Power consumption	L35/L35	1365 / 1815		
Current consumption	L35/L35	4.4		A
Starting current	L35/L35	16		
Unimpeded airflow (free flow)	internal	1340		m^3/h
	external	2380		
Pre fuse T		10		A
Type of connection		spring-type terminal included with plug		
Noise level according to EN ISO 3741		< 72		dB (A)
Weight (without packaging)		104	105	kg
Ambient temperature range	SC	+ 15 … + 55 / + 59 … + 131		°C / °F
	LAP	- 40 … + 55 / - 40 … + 131		
Control range (adjustable)		+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95		
Refrigerant	R134a	1200		g
Duty cycle		100		%
Condensate management		integrated condensate evaporation system with safety overflow		
Protection system according to NEMA type	3R/4	towards the electrical enclosure if used as intended by the manufacturer	-	
	4/4X	-	towards the electrical enclosure if used as intended by the manufacturer	
	1	towards the surroundings if used as intended by the manufacturer		
Design	housing	galvanised sheet steel		
	cover	galvanised/electrostatically powder coated (200 °C)	304 rust proof stainless steel	
Colour (cover)		RAL 7035, different colours available on request	-	

Accessories	Piece	Article number	Information on page
Condensate bottle	1	18314000100	74
Filter kit	1	18881500003	74

[1] LAP (Low Ambient Package): includes 1400 W enclosure heater and a thermostat to be placed inside the enclosure
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

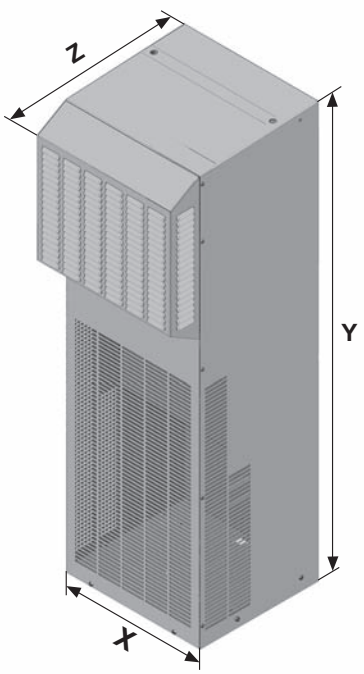
DTS 3561/3581

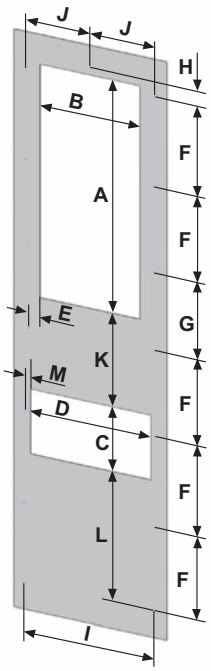


Dimensions

	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M
mm	483	1502	534	590	285	150	380	67.5	216	280	26	420	210	310	320	20
Mounting holes Ø 10 mm																

DTS 3561/3581





Cooling units 2800 W
DTS 3361 (NEMA 3R/4)
DTS 3381 (NEMA 4/4X)



- particularly suitable for the food industry and outdoor applications
- high protection system IP 56, maintenance-free
- maintains a UL tested NEMA type 3R/4 seal against the enclosure
- condenser with 3 mm fin spacing, highly effective protection against strongly contaminated ambient air
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- integrated condensate evaporation system

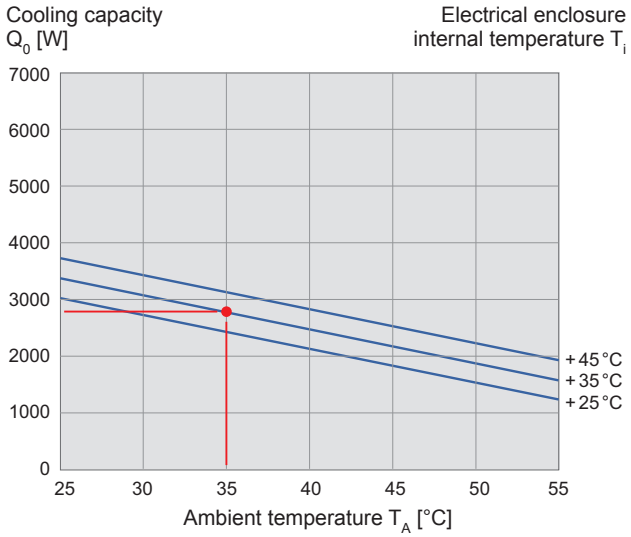
Data		DTS 3361 (NEMA 3R/4)	DTS 3381 (NEMA 4/4X)	Unit
Article number	Standard Controller	13383032355	13383032158	
	LAP [1]	13383036375	13383036178	
Rated voltage ± 10%		AC 50 / 60		Hz
		400 / 460 3~		V
Cooling performance according to EN 14511	L35/L35	2800		W
	L35/L50	1800		
Power consumption	L35/L35	1200 / 1600		
Current consumption	L35/L35	3.6		A
Starting current	L35/L35	16		
Unimpeded airflow (free flow)	internal	1400		m^3/h
	external	1685		
Pre fuse T		6		A
Type of connection		spring-type terminal included with plug		
Noise level according to EN ISO 3741		< 72		dB (A)
Weight (without packaging)		101		kg
Ambient temperature range	SC	+ 15 … + 55 / + 59 … + 131		°C / °F
	LAP	- 40 … + 55 / - 40 … + 131		
Control range (adjustable)		+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95		
Refrigerant	R134a	1000		g
Duty cycle		100		%
Condensate management		integrated condensate evaporation system with safety overflow		
Protection system according to NEMA type	3R/4	towards the electrical enclosure if used as intended by the manufacturer	-	
	4/4X	-	towards the electrical enclosure if used as intended by the manufacturer	
	1	towards the surroundings if used as intended by the manufacturer		
Design	housing	galvanised sheet steel		
	cover	galvanised/electrostatically powder coated (200 °C)	304 rust proof stainless steel	
Colour (cover)		RAL 7035, different colours available on request	-	

Accessories	Piece	Article number	Information on page
Condensate bottle	1	18314000100	74
Filter kit	1	18881500002	74

[1] LAP (Low Ambient Package): includes 1400 W enclosure heater and a thermostat to be placed inside the enclosure
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

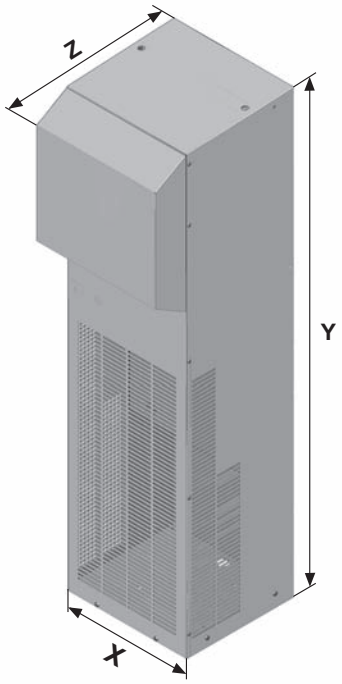
DTS 3361/3381

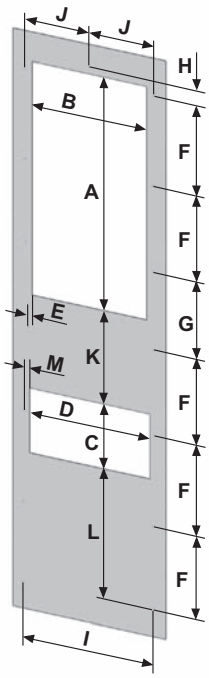


Dimensions

	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M
mm	403	1502	468	590	285	160	310	32.5	216	280	26	350	175	280	340	20
Mounting holes Ø 10 mm																

DTS 3361/3381





Cooling units 2900 W
DTS 3265 (NEMA 3R/4)
DTS 3285 (NEMA 4/4X)



- particularly suitable for the food industry and outdoor applications
- high protection system IP 56, maintenance-free
- maintains a UL tested NEMA type 3R/4 seal against the enclosure
- condenser with 3 mm fin spacing, highly effective protection against strongly contaminated ambient air
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- integrated condensate evaporation system

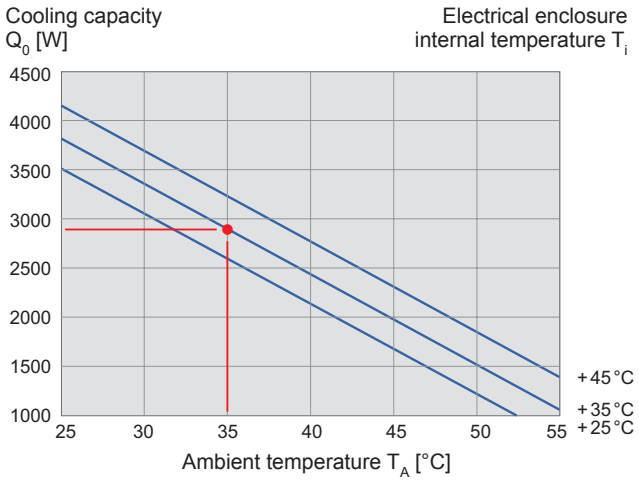
Data		DTS 3265 (NEMA 3R/4)		DTS 3285 (NEMA 4/4X)		Unit
Article number	Standard Controller	13383836355	13383839355	13383836158	13383839158	
	LAP [1]	13383836375	13383839375	13383836178	13383839178	
Rated voltage ± 10%		AC 50 / 60				Hz
		400 / 460 3~	230	400 / 460 3~	230	V
Cooling performance according to EN 14511	L35/L35	2900		2900		W
	L35/L50	1520		1520		
Power consumption	L35/L35	1700	1600	1700	1600	
Current consumption	L35/L35	2.6	7	2.6	7	A
Starting current	L35/L35	8	10	8	10	
Unimpeded airflow (free flow)	internal	1200				m^3/h
	external	1200				
Pre fuse T		5	15	5	15	A
Type of connection		spring-type terminal included with plug				
Noise level according to EN ISO 3741		< 73				dB (A)
Weight (without packaging)		68				kg
Ambient temperature range	SC	+ 15 … + 55 / + 59 … + 131				°C / °F
	LAP	- 40 … + 55 / - 40 … + 131				
Control range (adjustable)		+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95				
Refrigerant	R134a	1200				g
Duty cycle		100				%
Condensate management		integrated condensate evaporation system with safety overflow				
Protection system according to NEMA type	3R/4	towards the electrical enclosure if used as intended by the manufacturer		-		
	4/4X	-		towards the electrical enclosure if used as intended by the manufacturer		
	1	towards the surroundings if used as intended by the manufacturer				
Design	housing	galvanised sheet steel				
	cover	galvanised/electrostatically powder coated (200 °C)		304 rust proof stainless steel		
Colour (cover)		RAL 7035, different colours available on request		-		

Accessories	Piece	Article number	Information on page
Condensate bottle	1	18314000100	74
Filter kit	1	18881500007	74

[1] LAP (Low Ambient Package): includes 900 W enclosure heater and a thermostat to be placed inside the enclosure
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

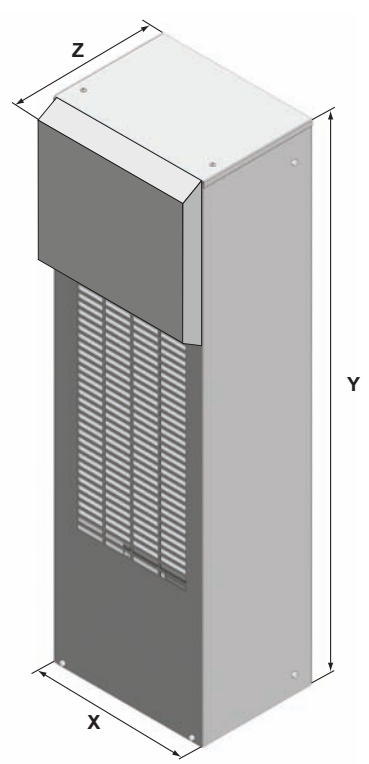
DTS 3265/3285

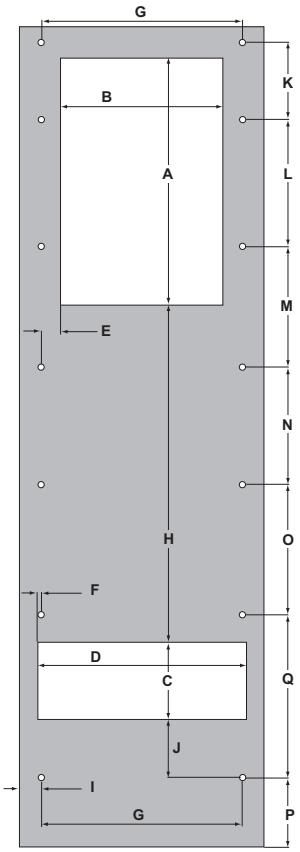


Dimensions

	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
mm	406	1347	367	427	280	135	348	25	9	330	537	35	92	126	209	198	192	214	114	267
Mounting holes Ø 8 mm																				

DTS 3265/3285





Cooling units 2000 W
DTS 3261 (NEMA 3R/4)
DTS 3281 (NEMA 4/4X)



- compact design, ideal for small control cabinets and larger control cabinets for the cooling of hot spots
- particularly suitable for the food industry and outdoor applications
- high protection system IP 56, maintenance-free
- maintains a UL tested NEMA type 3R/4 seal against the enclosure
- condenser with 3 mm fin spacing, highly effective protection against strongly contaminated ambient air
- integrated condensate evaporation system

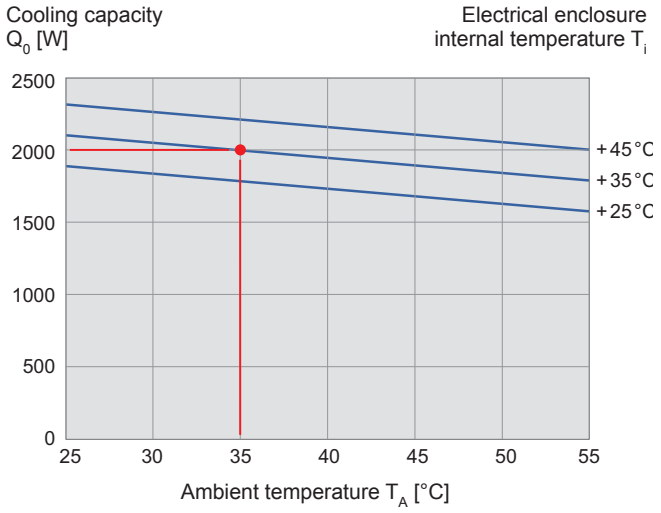
Data		DTS 3261 (NEMA 3R/4)			DTS 3281 (NEMA 4/4X)			Unit
Article number	Standard Controller	13385736355	13385741355	13385744355	13385736158	13385741158	13385744158	
	LAP [1]	13385736375	13385741375	13385744375	13385736178	13385741178	13385744178	
Rated voltage ± 10%		AC 50 / 60		AC 60	AC 50 / 60		AC 60	Hz
		400 / 460 3~	230	115	400 / 460 3~	230	115	V
Cooling performance according to EN 14511	L35/L35	2000						W
	L35/L50	1850						
Power consumption	L35/L35	1400	1425	1680	1400	1425	1680	
Current consumption	L35/L35	3.5	6.3	14.6	3.5	6.3	14.6	A
Starting current	L35/L35	10	21.8	53	10	21.8	53	
Unimpeded airflow (free flow)	internal	985						m^3/h
	external	985						
Pre fuse T		6	10	20	6	10	20	A
Type of connection		spring-type terminal included with plug						
Noise level according to EN ISO 3741		< 73						dB (A)
Weight (without packaging)		54			60			kg
Ambient temperature range	SC	+ 15 … + 55 / + 59 … + 131						°C / °F
	LAP	- 40 … + 55 / - 40 … + 131						
Control range (adjustable)		+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95						
Refrigerant	R134a	700						g
Duty cycle		100						%
Condensate management		integrated condensate evaporation system with safety overflow						
Protection system according to NEMA type	3R/4	towards the electrical enclosure if used as intended by the manufacturer			-			
	4/4X	-			towards the electrical enclosure if used as intended by the manufacturer			
	1	towards the surroundings if used as intended by the manufacturer						
Design	housing	galvanised sheet steel						
	cover	galvanised/electrostatically powder coated (200 °C)			304 rust proof stainless steel			
Colour (cover)		RAL 7035, different colours available on request			-			

Accessories	Piece	Article number	Information on page
Condensate bottle	1	18314000100	74
Filter kit	1	18881500004	74

[1] LAP (Low Ambient Package): includes 900 W enclosure heater and a thermostat to be placed inside the enclosure
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

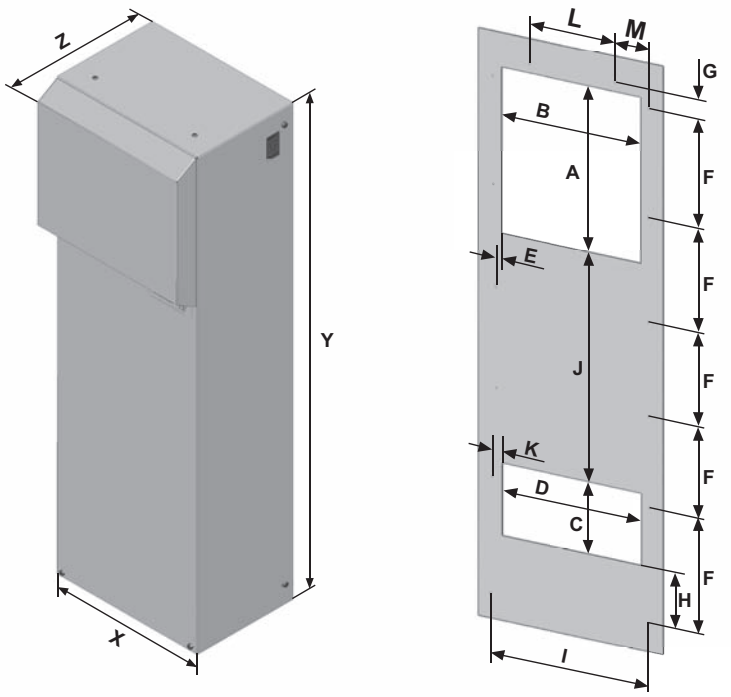
DTS 3261/3281



Dimensions

	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M
mm	395	1209	326	350	330	100	292	15	228.6	38.1	162.3	360	545	34	200	80
Mounting holes Ø 8 mm																

DTS 3261/3281



Cooling units 1600 W
DTS 3165 (NEMA 3R/4)
DTS 3185 (NEMA 4/4X)



- particularly suitable for the food industry and outdoor applications
- high protection system IP 56, maintenance-free
- maintains a UL tested NEMA type 3R/4 seal against the enclosure
- condenser with 3 mm fin spacing, highly effective protection against strongly contaminated ambient air
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- integrated condensate evaporation system

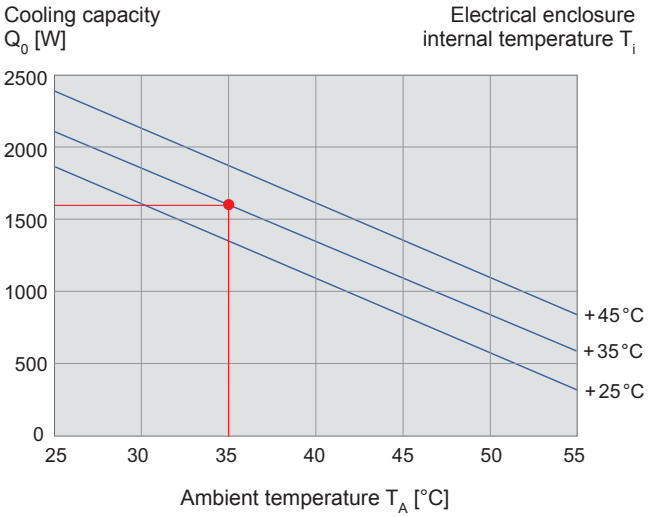
Data		DTS 3165 (NEMA 3R/4)		DTS 3185 (NEMA 4/4X)		Unit
Article number	Standard Controller	13383636355	13383639355	13383636158	13383639158	
	LAP [1]	13383636375	13383639375	13383636178	13383639178	
Rated voltage ± 10%		AC 50 / 60				Hz
		400 / 460 3~	230	400 / 460 3~	230	V
Cooling performance according to EN 14511	L35/L35	1600		1600		W
	L35/L50	832		832		
Power consumption	L35/L35	1283	1020	1283	1020	
Current consumption	L35/L35	3	4.5	3	4.5	A
Starting current	L35/L35	8	10	8	10	
Unimpeded airflow (free flow)	internal	580				m^3/h
	external	1200				
Pre fuse T		5	10	5	10	A
Type of connection		spring-type terminal included with plug				
Noise level according to EN ISO 3741		< 70				dB (A)
Weight (without packaging)		49				kg
Ambient temperature range	SC	+ 15 … + 55 / + 59 … + 131				°C / °F
	LAP	- 40 … + 55 / - 40 … + 131				
Control range (adjustable)		+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95				
Refrigerant	R134a	400		900		g
Duty cycle		100				%
Condensate management		integrated condensate evaporation system with safety overflow				
Protection system according to NEMA type	3R/4	towards the electrical enclosure if used as intended by the manufacturer		-		
	4/4X	-		towards the electrical enclosure if used as intended by the manufacturer		
	1	towards the surroundings if used as intended by the manufacturer				
Design	housing	galvanised sheet steel				
	cover	galvanised/electrostatically powder coated (200 °C)		304 rust proof stainless steel		
Colour (cover)		RAL 7035, different colours available on request		-		

Accessories	Piece	Article number	Information on page
Condensate bottle	1	18314000100	74
Filter kit	1	18881500006	74

[1] LAP (Low Ambient Package): includes 900 W enclosure heater and a thermostat to be placed inside the enclosure
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

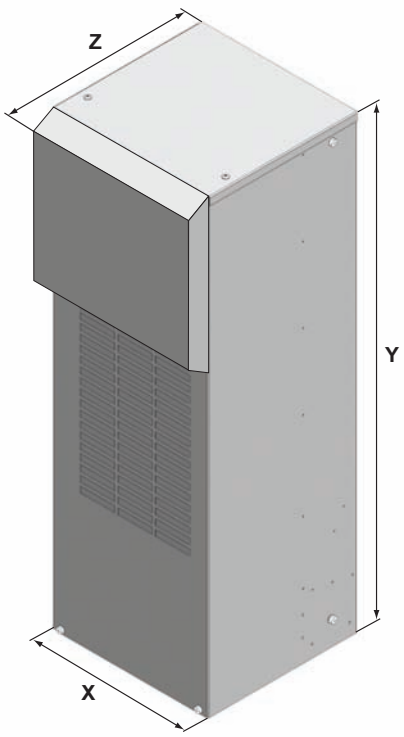
DTS 3165/3185

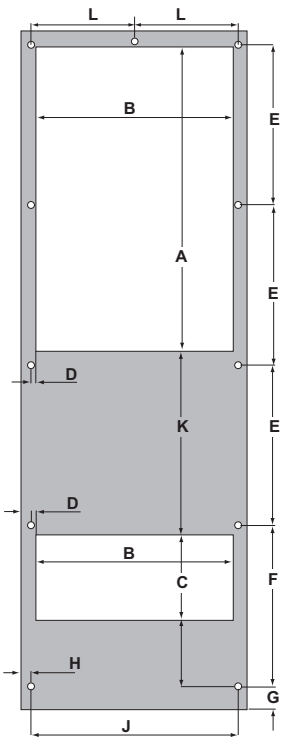


Dimensions

	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L
mm	311	914	367	430	264	118	8	216	216	32	13	80	279	228	139.5
Mounting holes Ø 10 mm															

DTS 3165/3185





Cooling units 1100 W
DTS 3161 (NEMA 3R/4)
DTS 3181 (NEMA 4/4X)



- compact design, ideal for small control cabinets and larger control cabinets for the cooling of hot spots
- particularly suitable for the food industry and outdoor applications
- maintains a UL tested NEMA type 3R/4 seal against the enclosure
- high protection system IP 56, maintenance-free
- condenser with 3 mm fin spacing, highly effective protection against strongly contaminated ambient air
- integrated condensate evaporation system

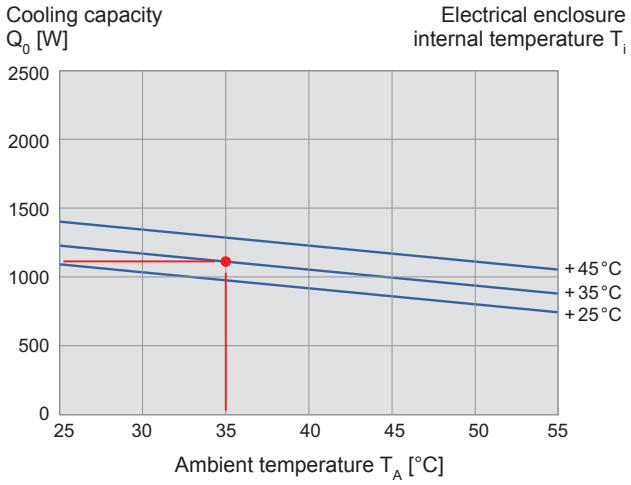
Data		DTS 3161 (NEMA 3R/4)			DTS 3181 (NEMA 4/4X)			Unit
Article number	Standard Controller	13385436355	13385441355	13385444355	13385436158	13385441158	13385444158	
	LAP [1]	13385436375	13385441375	13385444375	13385436178	13385441178	13385444178	
Rated voltage ± 10%		AC 50 / 60		AC 60	AC 50 / 60		AC 60	Hz
		400 2~	230	115	400 2~	230	115	V
Cooling performance according to EN 14511	L35/L35	1100						W
	L35/L50	950						
Power consumption	L35/L35	860	860	950	860	860	950	
Current consumption	L35/L35	1.9	3.9	7.9	1.9	3.9	7.9	A
Starting current	L35/L35	8	14.9	29.9	8	14.9	29.9	
Unimpeded airflow (free flow)	internal	595						m^3/h
	external	595						
Pre fuse T		6	6	10	6	6	10	A
Type of connection		spring-type terminal included with plug						
Noise level according to EN ISO 3741		< 70						dB (A)
Weight (without packaging)		43			45			kg
Ambient temperature range	SC	+ 15 … + 55 / + 59 … + 131						°C / °F
	LAP	- 40 … + 55 / - 40 … + 131						
Control range (adjustable)		+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95						
Refrigerant	R134a	400						g
Duty cycle		100						%
Condensate management		integrated condensate evaporation system with safety overflow						
Protection system according to NEMA type	3R/4	towards the electrical enclosure if used as intended by the manufacturer			-			
	4/4X	-			towards the electrical enclosure if used as intended by the manufacturer			
	1	towards the surroundings if used as intended by the manufacturer						
Design	housing	galvanised sheet steel						
	cover	galvanised/electrostatically powder coated (200 °C)			304 rust proof stainless steel			
Colour (cover)		RAL 7035, different colours available on request			-			

Accessories	Piece	Article number	Information on page
Condensate bottle	1	18314000100	74
Filter kit	1	18881500000	74

[1] LAP (Low Ambient Package): includes 900 W enclosure heater and a thermostat to be placed inside the enclosure
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

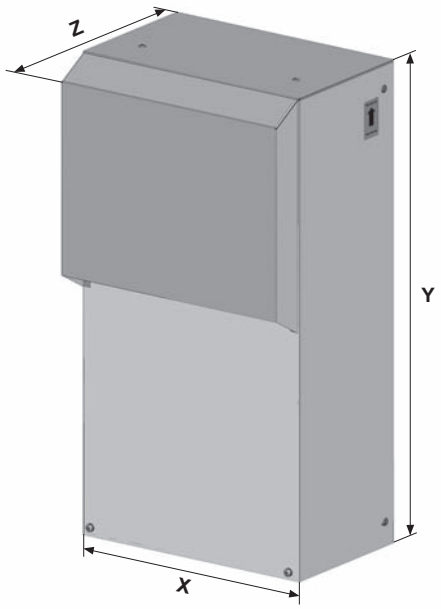
DTS 3161/3181

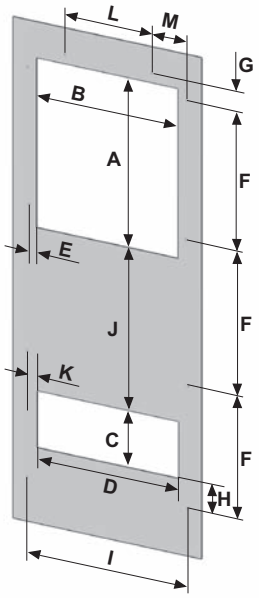


Dimensions

	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M
mm	395	748	294	300	310	56	292	25	228.6	38.1	81	360	265	34	200	80
Mounting holes Ø 8 mm																

DTS 3161/3181





Cooling units 680 W
DTS 3061 (NEMA 3R/4)
DTS 3081 (NEMA 4/4X)



- compact design, ideal for small control cabinets and larger control cabinets for the cooling of hot spots
- particularly suitable for the food industry and outdoor applications
- maintains a UL tested NEMA type 3R/4 seal against the enclosure
- high protection system IP 56, maintenance-free
- condenser with 3 mm fin spacing, highly effective protection against strongly contaminated ambient air

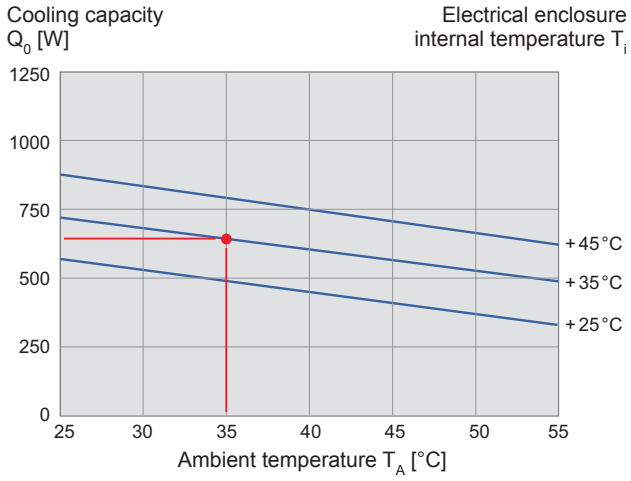
Data		DTS 3061 (NEMA 3R/4)	DTS 3081 (NEMA 4/4X)	Unit
Article number	Standard Controller	13382341355	13382341300	
	LAP [1]	13382341375	13382341178	
Rated voltage ± 10%		AC 50 / 60		Hz
		230		V
Cooling performance according to EN 14511	L35/L35	680		W
	L35/L50	475		
Power consumption	L35/L35	724		
Current consumption	L35/L35	3.3		A
Starting current	L35/L35	14.4		
Unimpeded airflow (free flow)	internal	325		m^3/h
	external	148		
Pre fuse T		16		A
Type of connection		spring-type terminal included with plug		
Noise level according to EN ISO 3741		< 64		dB (A)
Weight (without packaging)		23	25	kg
Ambient temperature range	SC	+ 15 … + 55 / + 59 … + 131		°C / °F
	LAP	- 40 … + 55 / - 40 … + 131		
Control range (adjustable)		+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95		
Refrigerant	R134a	400		g
Duty cycle		100		%
Condensate management		condensate drain		
Protection system according to NEMA type	3R/4	towards the electrical enclosure if used as intended by the manufacturer	-	
	4/4X	-	towards the electrical enclosure if used as intended by the manufacturer	
	1	towards the surroundings if used as intended by the manufacturer		
Design	housing	galvanised sheet steel		
	cover	galvanised/electrostatically powder coated (200 °C)	304 rust proof stainless steel	
Colour (cover)		RAL 7035, different colours available on request	-	

Accessories	Piece	Article number	Information on page
Condensate bottle	1	18314000100	74

[1] LAP (Low Ambient Package): includes 900 W enclosure heater and a thermostat to be placed inside the enclosure
Approvals see page 22. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

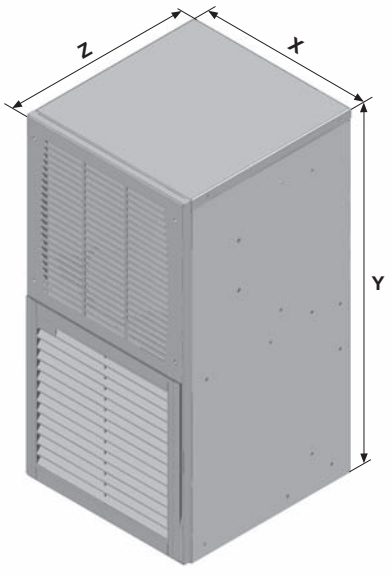
DTS 3061/3081

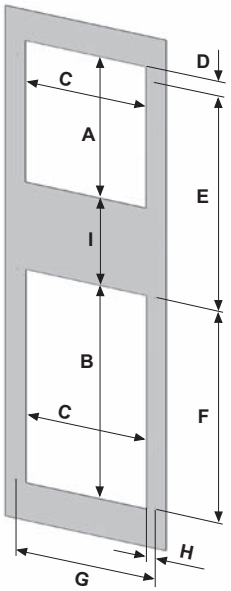


Dimensions

	X	Y	Z	A	B	C	D	E	F	G	H	I
mm	256	512	274	152.4	230.3	209.6	26.1	203.2	225.6	238.1	14.3	76.1
Mounting holes Ø 7.9 mm												

DTS 3061/3081





High temperature cooling units

DTS 3265 HT (NEMA 3R/4)
DTS 3165 HT (NEMA 3R/4)
DTS 3061 HT (NEMA 3R/4)

- suitable for outdoor applications
- operation under extreme high temperature conditions (+ 60 °C)
- maintains a UL tested NEMA type 3R/4 seal against the enclosure
- high protection system IP 56, maintenance-free
- condenser with 3 mm fin spacing, highly effective protection against strongly contaminated ambient air
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated
- integrated condensate evaporation system



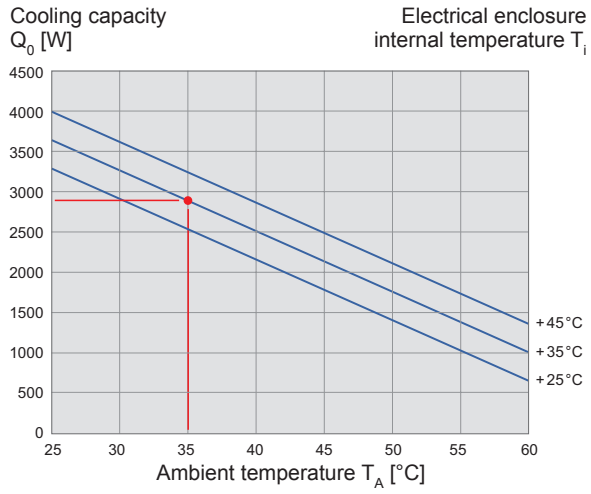
Data		DTS 3265 HT	DTS 3165 HT	DTS 3061 HT	Unit
Article number		13393841001	13393641001	13392341005	
Rated voltage ± 10%		AC 50 / 60			Hz
		230			V
Cooling performance according to EN 14511	L35/L35	2800	1600	680	W
	L40/L60	1250	750	280	
Power consumption	L35/L35	1360	860	360	
Current consumption	L35/L35	7.0	7.8	1.9	A
Starting current	L35/L35	38.0	26.0	6.5	
Unimpeded airflow (free flow)	internal	1200	1200	325	m^3/h
	external	1200	580	150	
Pre fuse T		15	10	10	A
Type of connection		spring-type terminal included with plug			
Noise level according to EN ISO 3741		< 73	< 70	< 64	dB (A)
Weight (without packaging)		68	49	23	kg
Ambient temperature range		0 … + 60 / + 52 … + 140			°C / °F
Control range (adjustable)		+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95			
Refrigerant	R134a	1200	900	400	g
Duty cycle		100			%
Condensate management		integrated condensate evaporation system with safety overflow			
Protection system according to NEMA type	3R/4	towards the electrical enclosure if used as intended by the manufacturer			
	1	towards the surroundings if used as intended by the manufacturer			
Design	housing	galvanised sheet steel			
	cover	galvanised/electrostatically powder coated (200 °C)			
Colour (cover)		RAL 7035, different colours available on request			

Accessories	Piece	Article number	Information on page
Condensate bottle	1	18314000100	74

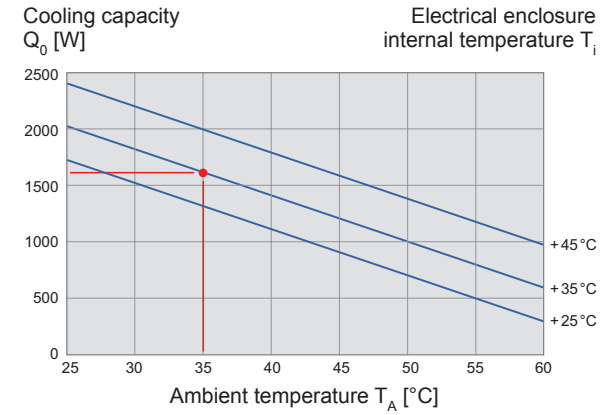
Approvals see page 23. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

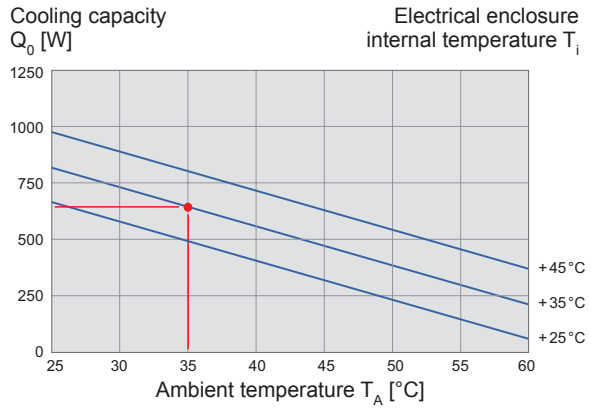
DTS 3265 HT



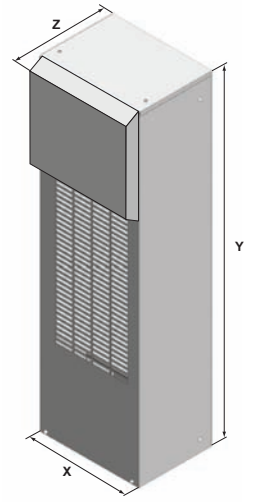
DTS 3165 HT

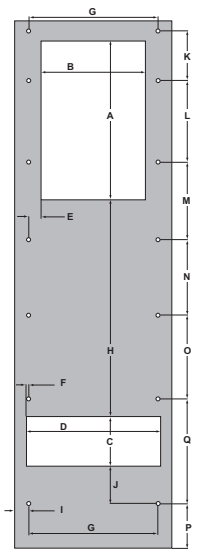


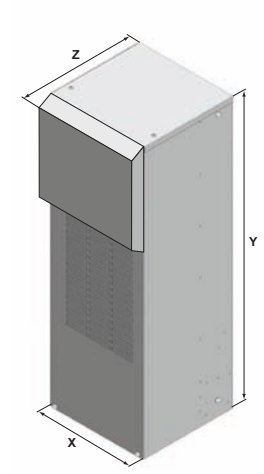
DTS 3061 HT

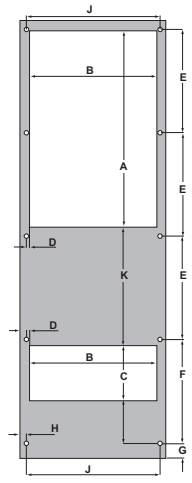


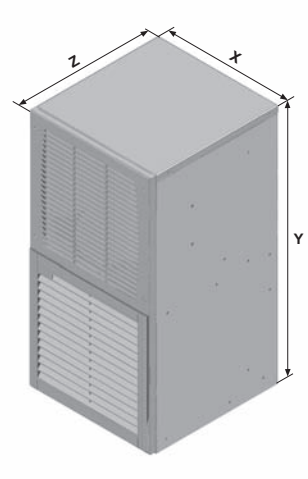
Dimensions

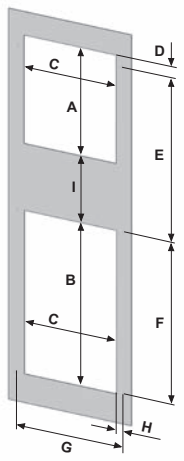












DTS 3265 HT	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
mm	406	1347	367	427	280	135	348	25	9	330	537	35	92	126	209	198	192	214	114	267
Mounting holes Ø 8 mm																				

DTS 3165 HT	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K
mm	311	914	367	430	264	118	8	216	216	32	13	80	279	228
Mounting holes Ø 10 mm														

DTS 3061 HT	X	Y	Z	A	B	C	D	E	F	G	H	I
mm	256	512	274	152.4	230.3	209.6	26.1	203.2	225.6	238.1	14.3	76.1
Mounting holes Ø 7.9 mm												

ECOOL Top mounted Cooling units 4000 / 3000 W

DTT 6801 / DTT 6601



- product variety: 3 installation sizes and 6 performances
- safety: 4-fold protection against condensate thanks to ideal, patented condensate management system
- service-friendly: toolless mounting and maintenance thanks to quick installation frame
- service-friendly: complete cover removable towards the front. Easily accessible filter mats (optional) and control elements in front area.
- energy efficiency: around 20% saving on energy thanks to the use of more effective, lighter components
- energy efficiency: optional multi-controller with energy-saving mode
- design and colour matching: perfect mixture of functionality and design
- available in stainless steel

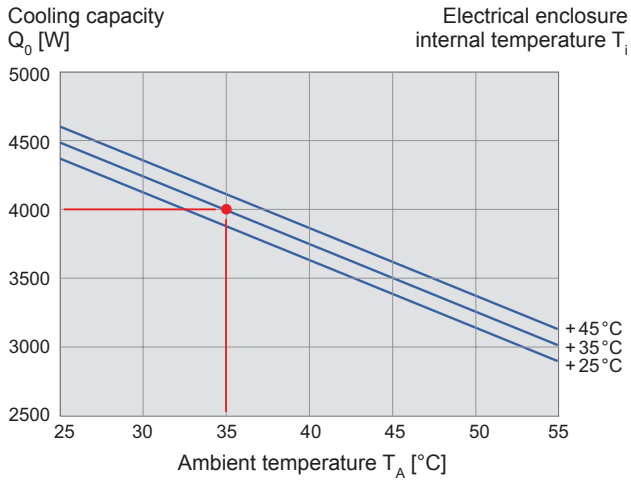
Data		DTT 6801	DTT 6601	Unit
Article number	Standard Controller	13216832055	13216632055	
	Multi Controller	13216862055	13216662055	
	V2A, Standard Controller	13216832015	13216632015	
	V2A, Multi Controller	13216862015	13216662015	
Rated voltage ± 10%		AC 50 / 60		Hz
		400 / 460 3~[1]	400 / 460 3~[1]	V
Cooling performance according to EN 14511	L35/L35	4000 / 4250	3000 / 3200	W
	L35/L50	3260 / 3495	2000 / 2250	
Power consumption	L35/L35	1618 / 2050	1700 / 2100	
Current consumption	L35/L35	7.07 / 5	3.16 / 4.5	A
Starting current	L35/L35	17.1 / 19.5	8.9 / 9.9	
Unimpeded airflow (free flow)	internal	1420 / 1530		m^3/h
	external	1970 / 2180		
Pre fuse T		10	10	A
Type of connection		spring-type terminal included with plug		
Noise level according to EN ISO 3741		< 62		dB (A)
Weight (without packaging)		77	75	kg
Ambient temperature range		+ 15 … + 55 / + 59 … + 131		°C / °F
Control range (adjustable)	SC	+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95		
	MC	+ 25 … + 50 / + 77 … + 122; factory setting + 35 / + 95		
Refrigerant	R134a	1250		g
Duty cycle		100		%
Condensate management		integrated condensate evaporation system with safety overflow		
Protection system according to EN 60529	IP54	towards the electrical enclosure if used as intended by the manufacturer		
	IP34	towards the surroundings if used as intended by the manufacturer		
Design	housing	galvanised sheet steel		
	cover	galvanised/electrostatically powder coated (200 °C), or stainless steel		
Colour (cover)		RAL 7035 (different colours available on request) or stainless steel		

Accessories	Piece	Article number	Information on page
Condensate bottle	1	18314000100	74
Pre-filter, aluminium	1	18311500000	74
Quick installation frame	1	18300000146	75

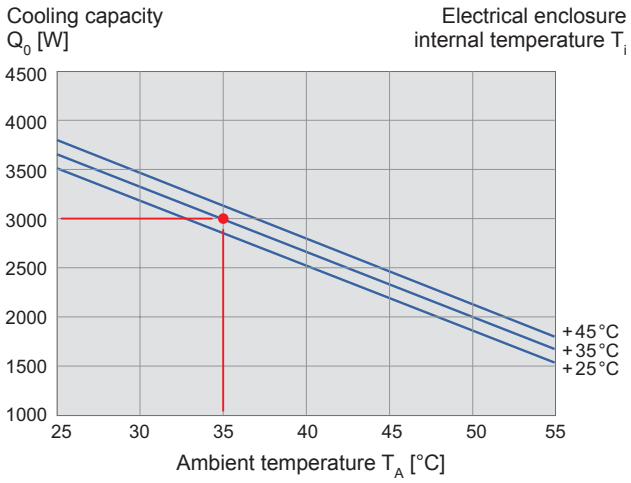
[1] suitable for various supply voltages (see technical specific data sheet)
Approvals see page 23. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

DTT 6801



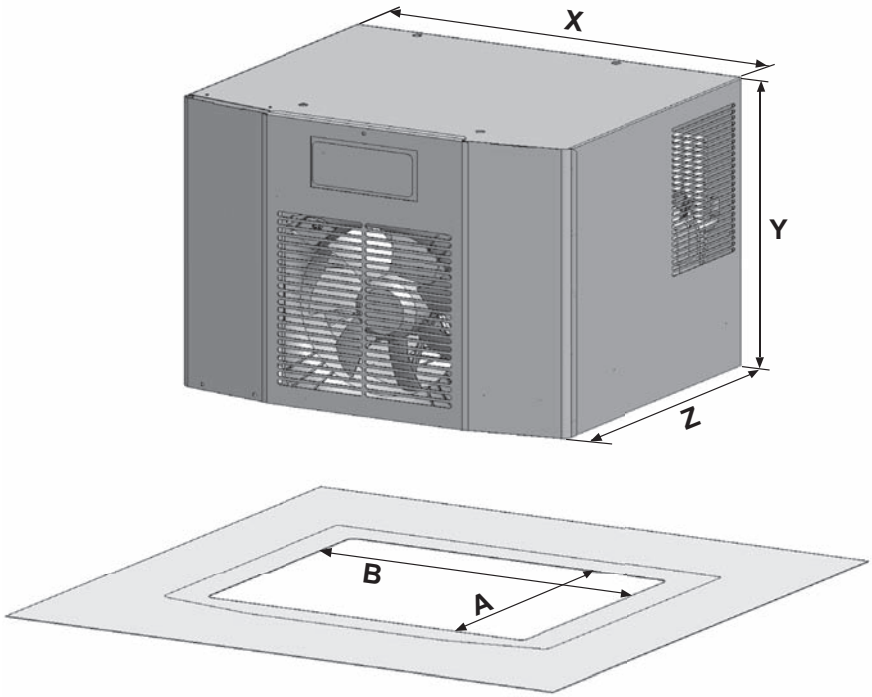
DTT 6601



Dimensions

	X	Y	Z	A	B
mm	795	485	575	392	692

DTT 6801 / DTT 6601



Top mounted Cooling units 2000 / 1500 W

DTT 6401 / DTT 6301



- product variety: 3 installation sizes and 6 performances
- safety: 4-fold protection against condensate thanks to ideal, patented condensate management system
- service-friendly: toolless mounting and maintenance thanks to quick installation frame
- service-friendly: complete cover removable towards the front. Easily accessible filter mats (optional) and control elements in front area.
- energy efficiency: around 20% saving on energy thanks to the use of more effective, lighter components
- energy efficiency: optional multi-controller with energy-saving mode
- design and colour matching: perfect mixture of functionality and design
- available in stainless steel

Data		DTT 6401			DTT 6301			Unit
Article number	Standard Controller	13216432055	13216441055	13216444055	13216349055	13216341055	13216344055	
	Multi Controller	13216462055	13216471055	13216474055	13216379055	13216371055	13216374055	
	V2A, Standard Controller	13216432015	13216441015	13216444015	13216349015	13216341015	13216344015	
	V2A, Multi Controller	13216462015	13216471015	13216474015	13216379015	13216371015	13216374015	
Rated voltage ± 10%		AC 50 / 60		AC 60	AC 50 / 60		AC 60	Hz
		400 / 460 3~[1]	230	115	400 2~[1]	230	115	V
Cooling performance according to EN 14511	L35/L35	2000 / 2100			1500 / 1620			W
	L35/L50	1540 / 1600			1000 / 1160			
Power consumption	L35/L35	1300 / 1598	1049 / 1275	1894	962 / 1150	980 / 1140	1027	
Current consumption	L35/L35	3 / 3.3	6.2 / 7	20	3.75 / 3.6	5.73 / 7	15	A
Starting current	L35/L35	10 / 12	16.8 / 20	34	9.8 / 11.6	19.7 / 23.2	32	
Unimpeded airflow (free flow)	internal	885 / 990						m^3/h
	external	1820 / 1970						
Pre fuse T		6	10	20	6	10	20	A
Type of connection		spring-type terminal included with plug						
Noise level according to EN ISO 3741		< 62						dB (A)
Weight (without packaging)		51	46	44	50.5	45	40	kg
Ambient temperature range		+ 15 … + 55 / + 59 … + 131						°C / °F
Control range (adjustable)	SC	+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95						
	MC	+ 25 … + 50 / + 77 … + 122; factory setting + 35 / + 95						
Refrigerant	R134a	750			725			g
Duty cycle		100						%
Condensate management		integrated condensate evaporation system with safety overflow						
Protection system according to EN 60529	IP54	towards the electrical enclosure if used as intended by the manufacturer						
	IP34	towards the surroundings if used as intended by the manufacturer						
Design	housing	galvanised sheet steel						
	cover	galvanised/electrostatically powder coated (200 °C), or stainless steel						
Colour (cover)		RAL 7035 (different colours available on request) or stainless steel						

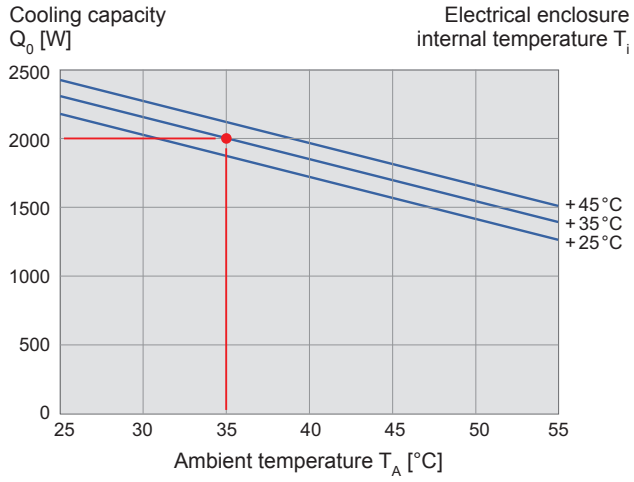
Accessories	Piece	Article number	Information on page
Condensate bottle	1	18314000100	74
Pre-filter, aluminium	1	18311500000	74
Quick installation frame	1	18300000145	75

[1] suitable for various supply voltages (see technical specific data sheet)

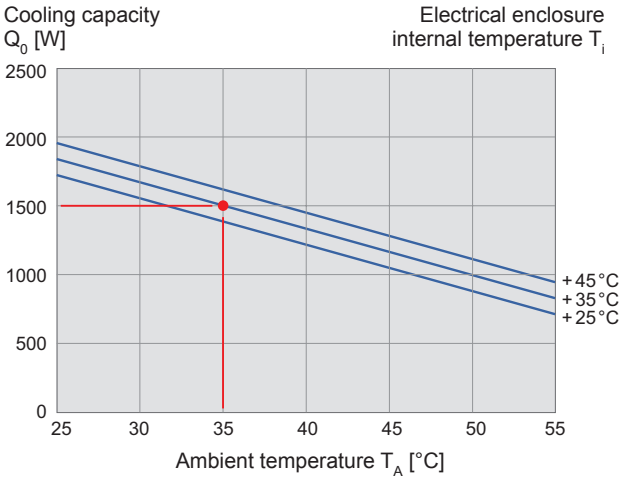
Approvals see page 23. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

DTT 6401



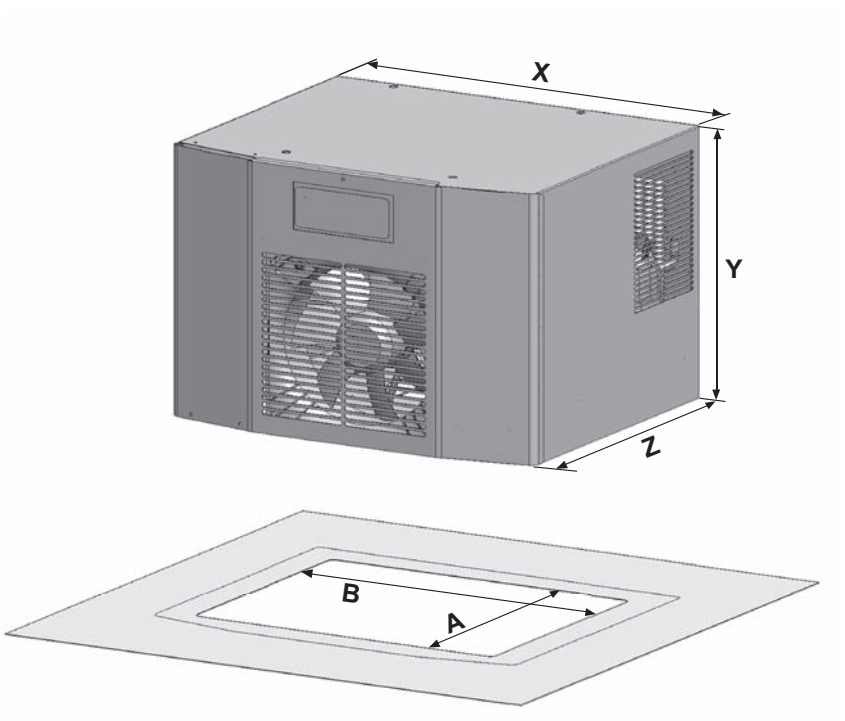
DTT 6301



Dimensions

	X	Y	Z	A	B
mm	595	435	495	390	490

DTT 6401 / DTT 6301



Top mounted Cooling units 1000 / 500 W

DTT 6201 / DTT 6101



- product variety: 3 installation sizes and 6 performances
- safety: 4-fold protection against condensate thanks to ideal, patented condensate management system
- service-friendly: toolless mounting and maintenance thanks to quick installation frame
- service-friendly: complete cover removable towards the front. Easily accessible filter mats (optional) and control elements in front area.
- energy efficiency: around 20% saving on energy thanks to the use of more effective, lighter components
- energy efficiency: optional multi-controller with energy-saving mode
- design and colour matching: perfect mixture of functionality and design
- available in stainless steel

Data		DTT 6201			DTT 6101		Unit
Article number	Standard Controller	13216249055	13216241055	13216244055	13216141055	13216144055	
	Multi Controller	13216279055	13216271055	13216274055	13216171055	13216174055	
	V2A, Standard Controller	13216249015	13216241015	13216244015	13216141015	13216144015	
	V2A, Multi Controller	13216279015	13216271015	13216274015	13216171015	13216174015	
Rated voltage ± 10%		AC 50 / 60		AC 60	AC 50 / 60	AC 60	Hz
		400 2~[1]	230	115	230	115	V
Cooling performance according to EN 14511	L35/L35	1000 / 1100			500 / 665		W
	L35/L50	600 / 640			370 / 400		
Power consumption	L35/L35	706 / 845	663 / 805	877	458 / 532	569	
Current consumption	L35/L35	2.82 / 2.5	3.98 / 4.5	10	2.36 / 3	5.6	A
Starting current	L35/L35	8.5 / 9.3	14.8 / 17.4	17.4	19.7 / 23	23	
Unimpeded airflow (free flow)	internal	570 / 582					m^3/h
	external	1820 / 1970					
Pre fuse T		6	10	20	10	20	A
Type of connection		spring-type terminal included with plug					
Noise level according to EN ISO 3741		< 62					dB (A)
Weight (without packaging)		41	35		33		kg
Ambient temperature range		+ 15 … + 55 / + 59 … + 131					°C / °F
Control range (adjustable)	SC	+ 25 … + 45 / + 77 … + 113; factory setting + 35 / + 95					
	MC	+ 25 … + 50 / + 77 … + 122; factory setting + 35 / + 95					
Refrigerant	R134a	400					g
Duty cycle		100					%
Condensate management		integrated condensate evaporation system with safety overflow					
Protection system according to EN 60529	IP54	towards the electrical enclosure if used as intended by the manufacturer					
	IP34	towards the surroundings if used as intended by the manufacturer					
Design	housing	galvanised sheet steel					
	cover	galvanised/electrostatically powder coated (200 °C), or stainless steel					
Colour (cover)		RAL 7035 (different colours available on request) or stainless steel					

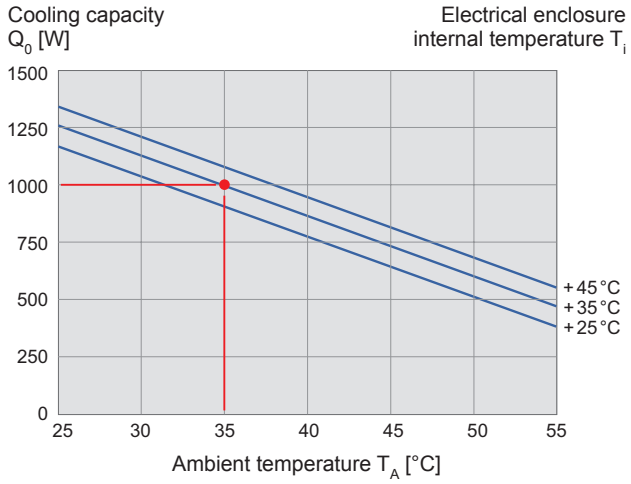
Accessories	Piece	Article number	Information on page
Condensate bottle	1	18314000100	74
Pre-filter, aluminium	1	18311500000	74
Quick installation frame	1	18300000144	75

[1] suitable for various supply voltages (see technical specific data sheet)

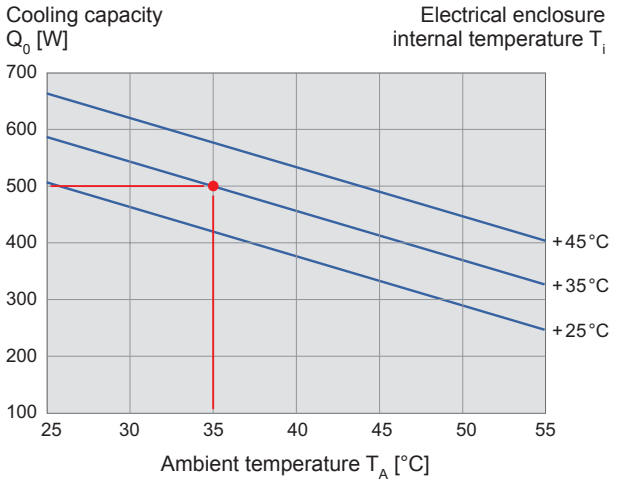
Approvals see page 23. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

DTT 6201



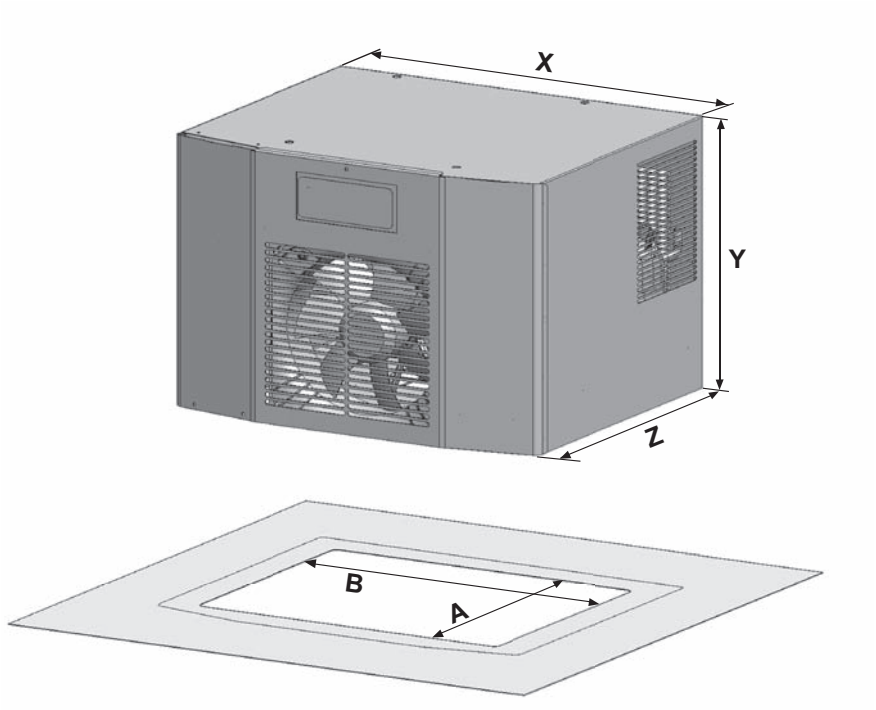
DTT 6101



Dimensions

	X	Y	Z	A	B
mm	595	435	395	260	475

DTT 6201 / DTT 6101



Peltier Cooling units 100–150 W
PTM 100 / PTM 150



Peltier cooling unit product line for use in sensitive areas, circuitry and small control cabinets.

- ideal for the cooling of operating and control elements
- particularly suitable for support arm systems
- vibration-free, also usable for precision processes
- pinpoint cooling of hotspots

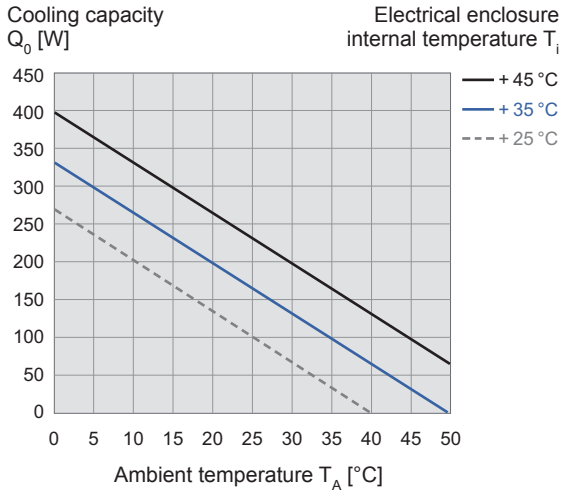
Data		PTM 100	PTM150	Unit
Article number	horizontal	15310080055	15315080055	
	vertical	15310180055	15315180055	
Rated voltage ± 10%		24 DC	24 DC	V
Cooling performance according to EN 14511	L35/L35	100	150	W
Power consumption	L35/L35	102	240	
Current consumption	L35/L35	4.25	10	A
Unimpeded airflow (free flow)	internal	76	114	m^3/h
	external	156	234	
Pre fuse T		6	16	A
Type of connection		connection via terminal strip, max. 2.5 mm² / AWG 16		
Sensor cable length		1200		mm
Noise level according to EN ISO 3741		47		dB (A)
Weight (without packaging)		6.7	9.16	kg
Ambient temperature range		- 40 … + 50 / - 40 … + 122		°C / °F
Control range (adjustable)		+ 0 … + 50 / + 32 … + 122		
Duty cycle		100		%
Condensate management		condensate drain		
Protection system according to EN 60529	IP 54	towards the electrical enclosure if used as intended by the manufacturer		
	IP 24	towards the surroundings if used as intended by the manufacturer		
Design	housing	galvanised sheet steel		
	cover	galvanised/electrostatically powder coated (200 °C)		
Installation location		H - horizontal / V - vertical		
Colour (cover)		RAL 7035, different colours available on request		

Accessories	Piece	Article number	Information on page
External condensate evaporation system	1	18314000001	74
Condensate bottle	1	18314000100	74

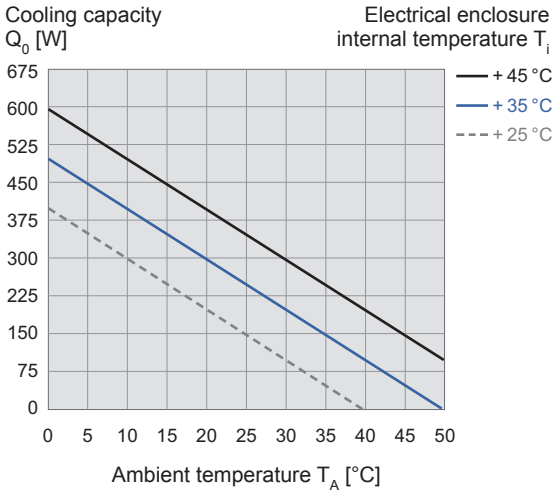
Approvals see page 23. For additional information to ensure the accurate setting of the motor protection switch, please see technical specific data sheet. This information is included with the delivery of the unit or can be found at www.pfannenberg.com.

Cooling capacity performance curves

PTM 100

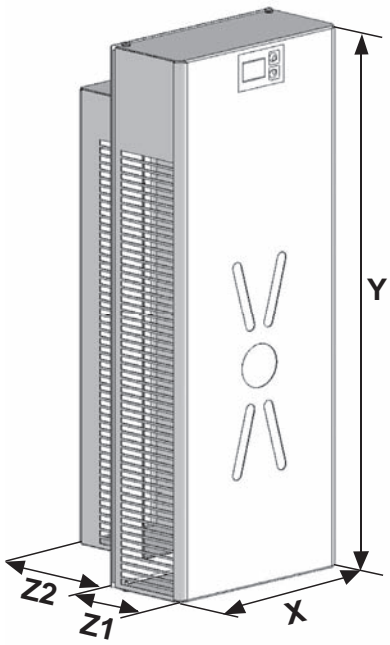


PTM 150



Dimensions

mm	PTM 100	PTM 150
X	181	181
Y	367	495
Z1	151	151
Z2	75	75



Accessories



Filter kit

Aluminium mesh.

Suitable for ...	Article number
DTS 3161/3181	18881500000
DTS 3261/3281	18881500001
DTS 3361/3381	18881500002
DTS 3561/3581	18881500003
DTS 3661/3681	18881500004
DTS 3165/3185	18881500006
DTS 3265/3285	18881500007



External condensate evaporation system 230V 50/60 Hz

External condensate evaporator for the accumulated condensed water.

Suitable for ...	Article number
all units	18314000001



Condensate bottle

External container for collecting the accumulating condensed water.

Suitable for ...	Article number
all units	18314000100



Transport eye bolts

Eye bolts to lift the cooling unit with cranes or lifters.

Suitable for ...	Article number
all unit of the 6000 series	18310000154



External temperature probe

For positioning of the ESM temperature probe inside the enclosure. Cable length 2.9 m.

Suitable for ...	Article number
DTI/DTS 6000 with Multi Controller	18310000153



Cooling unit controller with energy-saving mode

Cooling unit PCB with integrated energy-saving function.

Suitable for ...	Article number
all multi-controller capable units	note when ordering



ECOOL-Plant Software

Cooling unit software for external diagnosis and parameterisation of the cooling units (incl. USB cable).

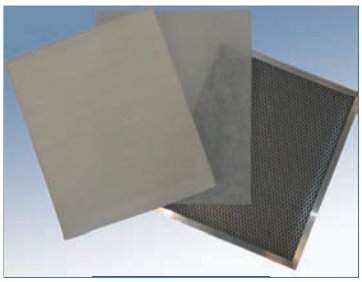
Suitable for ...	Article number
all multi-controller capable units	18310000002



Pre-filter, aluminium

Retrofittable pre-filter.

Suitable for ...	Article number
all DTT units	18311500000



ECOOL Filter

3 different type of filters for the different environmental conditions.

Product	Article number
Vlies filter for DTI/DTS 6201-6801	18300000147
Vlies filter for PAI/PAS 6043-6133	18066100001
Fluted filter for DTI/DTS 6201-6801	18300000148
Aluminium filter for DTI/DTS 6201-6801	18300000149
Filter adapter [1] for DTI/DTS 6201-6801 (RAL 7035, different colours available on request)	18310000151

[1] filter adapter only needed one time, all filters fits to the adapter



Quick installation frame

For quick and easy installation or replacement.

Suitable for ...	Article number
DTT 61/6201	18300000144
DTT 63/6401	18300000145
DTT 66/6801	18300000146



Internal enclosure fan

Distribution of cold air inside the control cabinet.

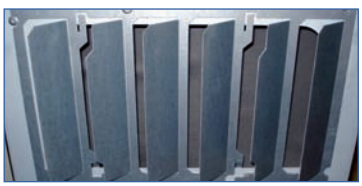
Product	Article number
PEF 180 mounting bracket 230 V AC	18110000000
PEF 180 mounting bracket 115 V AC	18110000001
PEF 180 mounting bracket 24 V DC	18110000002



Air diverter internal

For diverting the cold air downwards.

Suitable for ...	Article number
DTI/DTS 6201–6801	18300000201



Air baffle internal

For diverting the cold air optionally to the right or to the left.

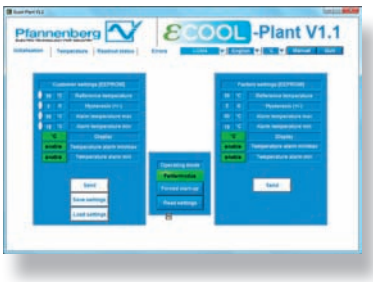
Suitable for ...	Article number
DTI/DTS 6201–6801	18300000141

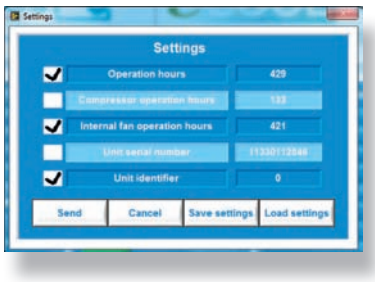
ECOOL-Plant Software

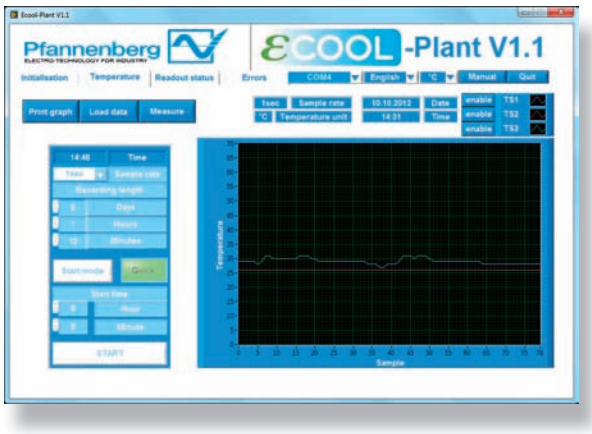
Pfannenberg cooling units with electronic control, which are designed as **Pfannenberg Multi Controller**, can be configured and interrogated by means of a remote optical interface with a scanner head with magnetic holder or by means of an integrated USB connection (DTI/DTS 6000 series) and the program **ECOOL-Plant**.

The following parameters can be set using this program:

- **Nominal value for switch cabinet interior temperature**
- **Switching hysteresis and nominal temperature of switch cabinet**
- **Upper temperature limit T_{max} above which an error message is issued**
- **Lower temperature limit T_{min} below which an error message is issued**
- **Changeover of temperature indication on display of the Pfannenberg Multi Controller between °C / °F**
- **Suppression of error message when lower temperature limit T_{min} is reached, and when upper temperature limit T_{max} is reached**
- **Suppression of error message when lower temperature limit T_{min} is reached**
- **Input of operating hours, including operating hours of compressor and internal fan, as well as appliance serial number and ID designation**

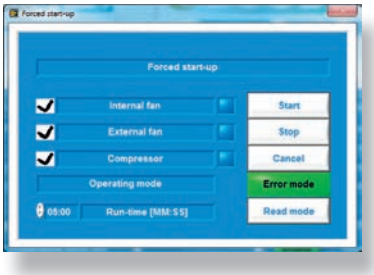


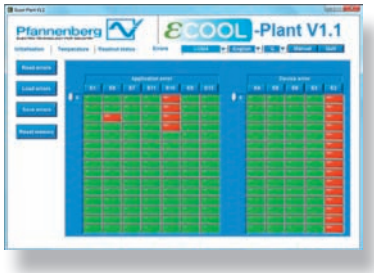


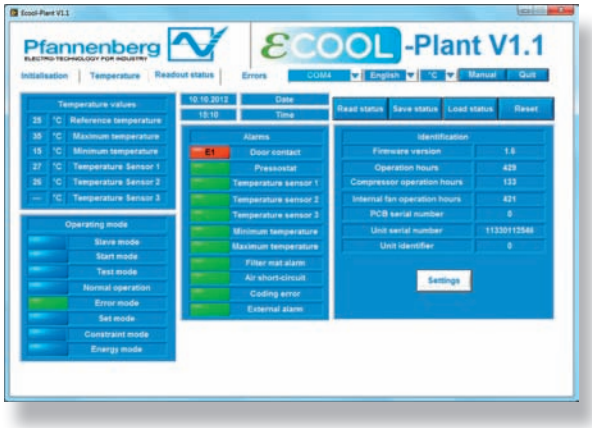


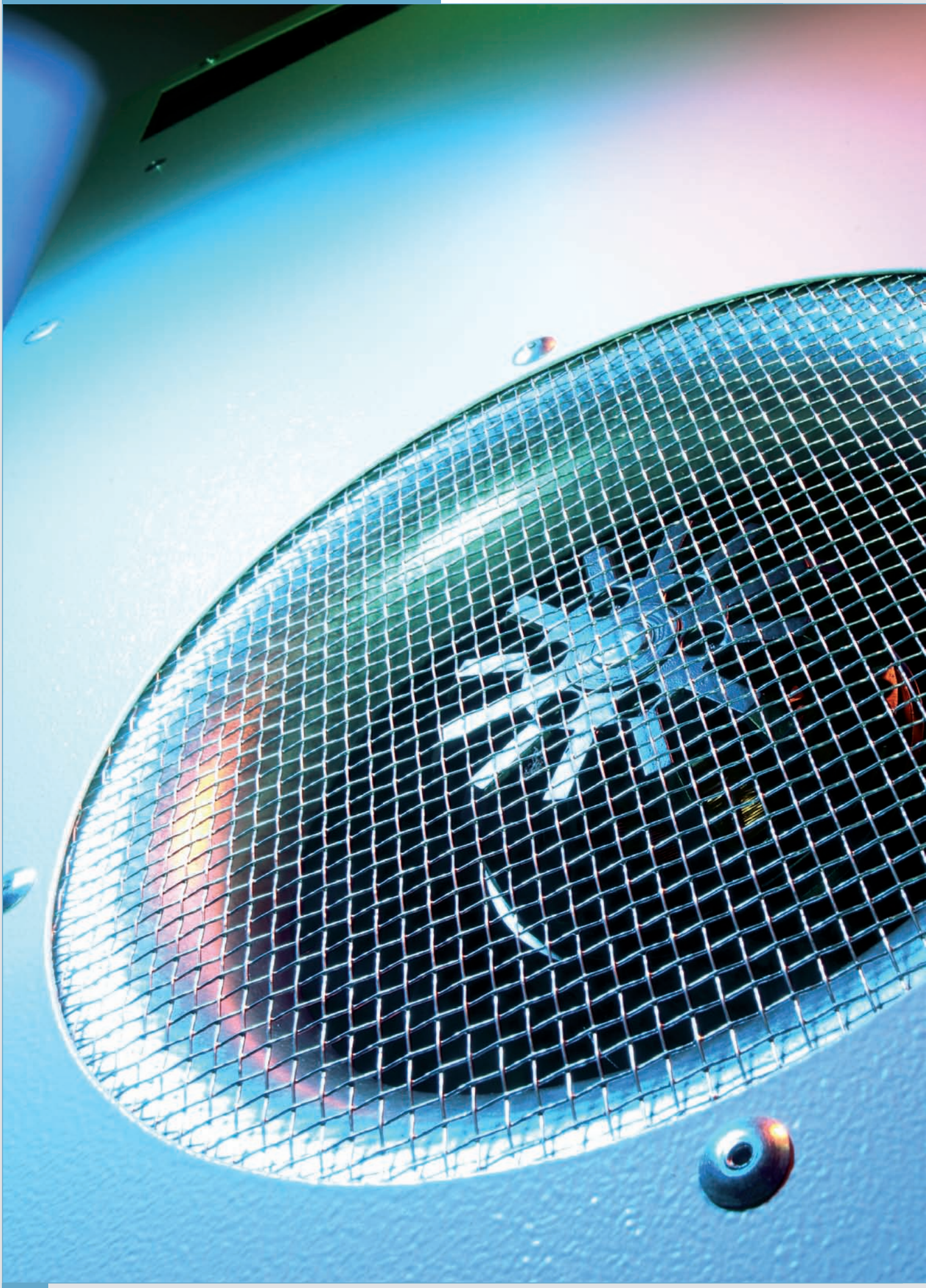
The following actions can be triggered using this program:

- Reset of electronic feedback (closed loop) controller
- Interrogating and restoring the factory setting
- Saving and loading the customer settings
- Recording, saving, loading and printing temperature profiles
- Interrogating current errors
- Interrogating the firmware version, operating hours, PCB serial number and appliance serial number
- Interrogating the current operating status
- Interrogating temperature sensor readings
- Saving the current status
- Loading a status
- Interrogating and saving the last 31 application errors
- Loading 31 application errors
- Interrogating and saving the last 31 appliance/device errors
- Loading 31 appliance/device errors
- Deleting the cyclical error memory with application and appliance/ device errors
- Saving and loading operating hours, including operating hours of compressor and internal fan, as well as appliance serial number and ID designation into and/or from a file
- Switching on the components of internal fans, external fans and compressors (forced start-up) and automatic shut-down after a specified period of time

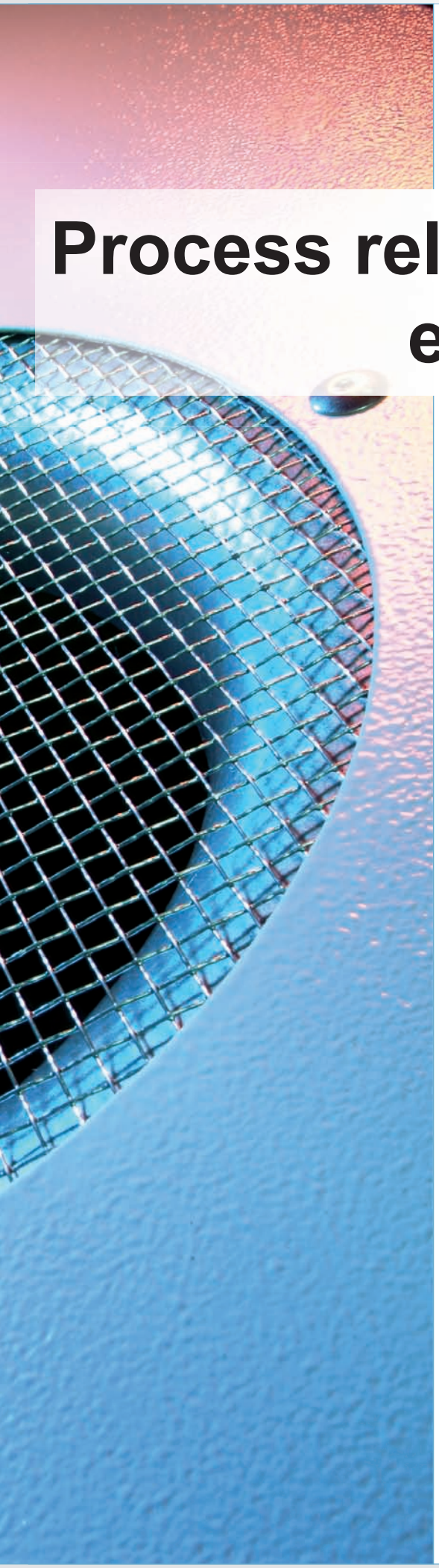








Process reliability even under extreme conditions



Air/Water Heat exchangers from the PWS and PWD series

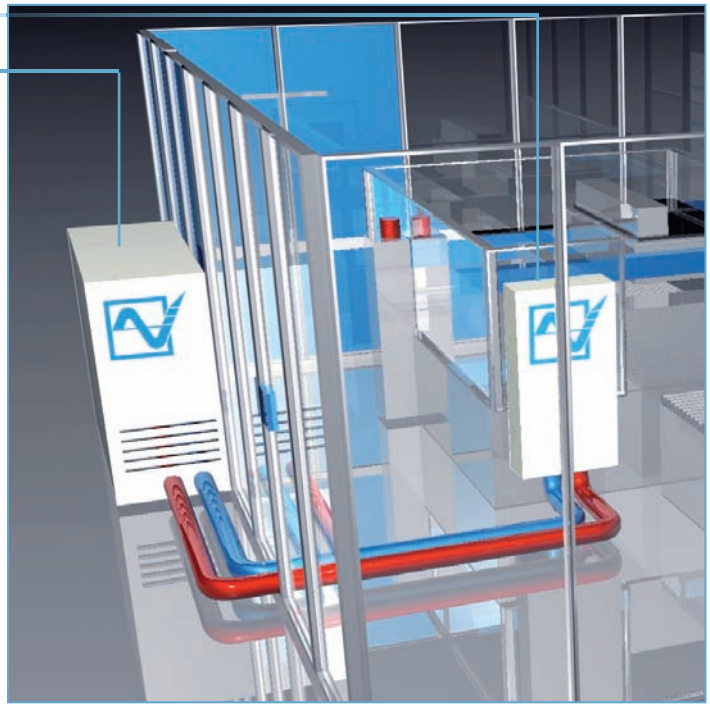
The use of Pfannenberg air/water heat exchangers is particularly suitable where ambient temperatures are high or the atmosphere proves to be particularly oily or aggressive.
Their main advantages over other air conditioner units for control cabinets are their maintenance-free operation and extremely low noise emission.

Ideal areas of use for air/water heat exchangers are wherever machines or production processes are cooled by tempered water and water is thus already provided.

The biggest advantage of water cooling is the 100% system solution

The combination of air/water heat exchangers and chillers offers an ideal system solution for the cooling of your processes, machines and controllers.

Chillers ensure central, economic cooling and provision of water as the cooling medium. All cooling tasks in a system or machine and also on a control cabinet can be accomplished simply and economically via a closed pipeline system.



The special product characteristics of the PWS series



Economy

- system-compatible with chillers
- can be integrated in existing cooling circuits
- integrated thermostat and solenoid valve for energy-efficient temperature control

Process reliability

- high airflow rate and cooling capacity
- any power losses that occur are not given off into the room
- integrated temperature monitoring with alarm contact

Resilience

- very high IP protection (up to IP 65)
- usable under aggressive environmental conditions
- independent from the ambient temperature at the place of installation

Service and mounting-friendliness

- compact design
- seal requires no elaborate reworking of the mounting cut-out
- maintenance-free

All air/water heat exchangers at a glance

Type	Cooling capacity	Rated voltage	Dimensions (HxWxD)	Approvals					Page
				UR	cUL	GOST	CSA	CE	
Heat exchangers from the PWS series – air/water heat exchangers for side and door mounting									
PWS 71002	10000 W	230 V / 400 V[1]	1800 x 600 x 315 mm	●	●	●		●	82
PWS 7702	7000 W	230 V / 400 V[1]	1800 x 460 x 310 mm	●	●	●		●	84
PWS 7702 SL	7000 W	230 V / 400 V	1800 x 460 x 255 mm	●	●	○		●	84
PWS 7502	5200 W	115 V / 230 V	1400 x 460 x 235 mm	●	●	●		●	86
PWS 7332	3150 W	115 V / 230 V	950 x 400 x 190 mm	●	●	●		●	88
PWS 7332 L	3150 W	115 V / 230 V	1350 x 400 x 190 mm	●	●	●		●	90
PWS 7152	1500 W	115 V / 230 V	950 x 400 x 115 mm	●	●	●		●	88
PWS 7102	950 W	115 V / 230 V	500 x 200 x 150 mm	●	●	●		●	92
PWS 7062	600 W	115 V / 230 V	500 x 200 x 100 mm	●	●	●		●	92
Roof-mounted heat exchangers from the PWD series – air/water heat exchangers for roof mounting									
PWD 5402	3400 W	230 V	190 x 720 x 465 mm			●		●	94
PWD 5302	2150 W	230 V	140 x 600 x 390 mm			●		●	94
Accessories									
Internal enclosure fan PEF 180		24 V DC / 115 V AC / 230 V AC							96
External condensate evaporation system		230 V							96
Condensate bottle									96
Device-side water connection with G3/8“ internal thread									96

[1] variant without UL

● available
○ pending



Further information can be found on the Internet:
www.pfannenberg.com · **www.pfannenberg-spareparts.com**
Keep up to date. Subscribe to the newsletter now:
newsletter.pfannenberg.com

Air/Water Heat Exchanger 10000 W
PWS 71002



- maintenance-free
- mounting-friendly seal, no elaborate reworking of the mounting cut-out
- integrated thermostat and solenoid valve for temperature control
- integrated temperature monitoring with alarm contact

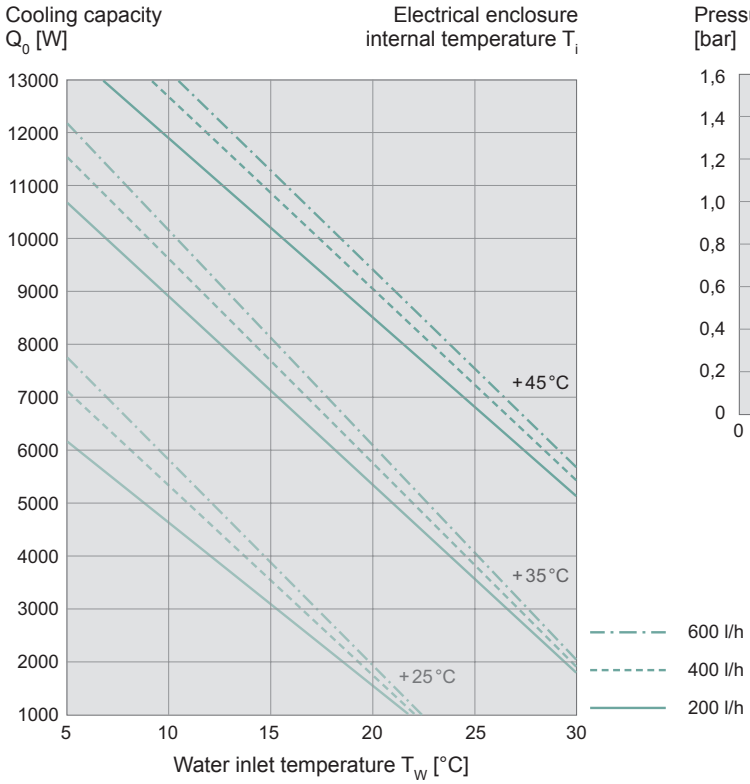
Data		PWS 71002		Unit
Article number		12057802055	12057810055	
Rated voltage ± 10 %		AC 50 Hz / 60 Hz	AC 50 Hz / 60 Hz	
		400 3~	230	V
Cooling capacity at 600 l/h	W10/L35	10000		W
Power consumption	W10/L35	1050 / 1450	820 / 1200	
Current consumption	W10/L35	1.9 / 2.2	3.8 / 5.2	A
Starting current	W10/L35	8.3 / 9.4	13.5 / 18.8	
Unimpeded airflow (free flow)	internal	5900	6250	m³/h
Pre fuse T		10		A
Type of connection	electro	spring-type terminal included with plug		
	fluid	13 mm hose nozzle; other connectors on request		
Noise level (according to EN ISO 3741)		66		dB (A)
Weight (without packaging)		73	75	kg
Ambient temperature range		> + 1 … + 70 / > + 34 … + 158		°C / °F
Control range (adjustable)		+ 8 … + 50 / + 47 … + 122; factory setting + 35 / + 95		
Water outlet temperature		> + 1 … + 35 / > + 34 … + 95		
Permissible operating pressure		max. 10		bar
Duty cycle		100%		
Condensate management		condensate drain		
System of protection according to EN 60529	IP 55	towards the electrical enclosure if used as intended by the manufacturer		
	IP 65	on request		
Design	housing	galvanised steel/electrostatically powder-coated (200 °C); on request: stainless steel		
	heat exchanger	copper pipe with aluminium fins; stainless steel piping on request		
Colour (cover)		RAL 7035, different colours available on request		

Accessories	Piece	Article number	Informationen on page
External condensate evaporation system	1	18314000001	96
Condensate bottle	1	18314000100	96

Approvals see page 81

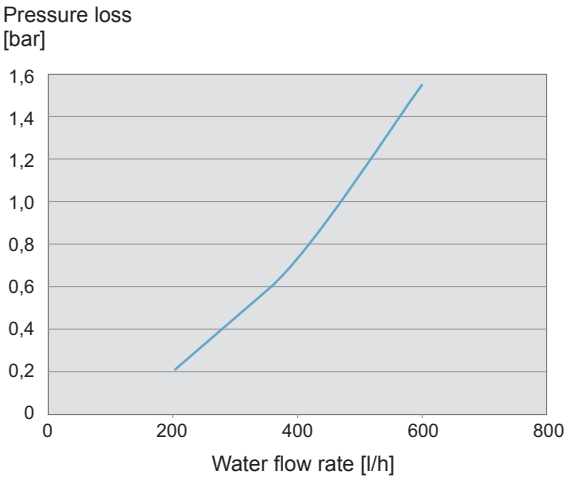
Cooling capacity performance curves

PWS 71002



Pressure loss performance curve

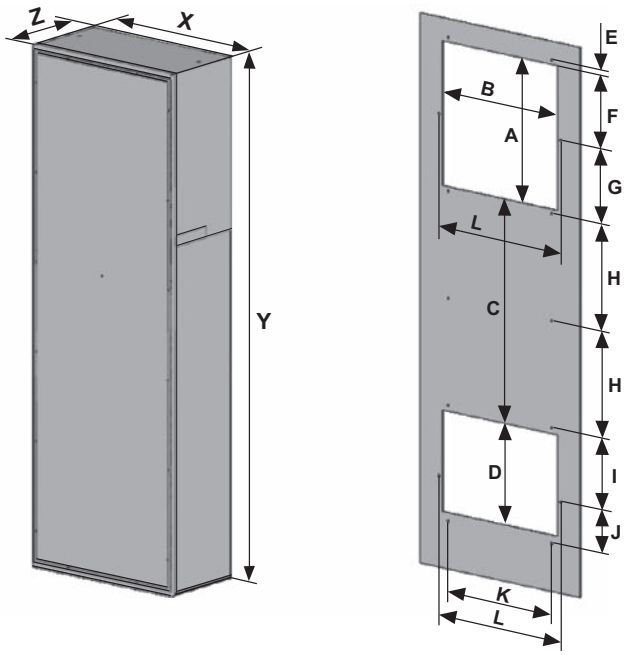
PWS 71002



Dimensions

	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L
mm	600	1800	315	500	500	775	350	15	270	260	370	250	150	450	530
Mounting holes Ø 8 mm															

PWS 71002



Air/Water Heat Exchanger 7000 W
PWS 7702
Slim Line Air/Water Heat Exchanger 7000 W
PWS 7702 SL



- maintenance-free
- mounting-friendly seal, no elaborate reworking of the mounting cut-out
- integrated thermostat and solenoid valve for temperature control
- integrated temperature monitoring with alarm contact

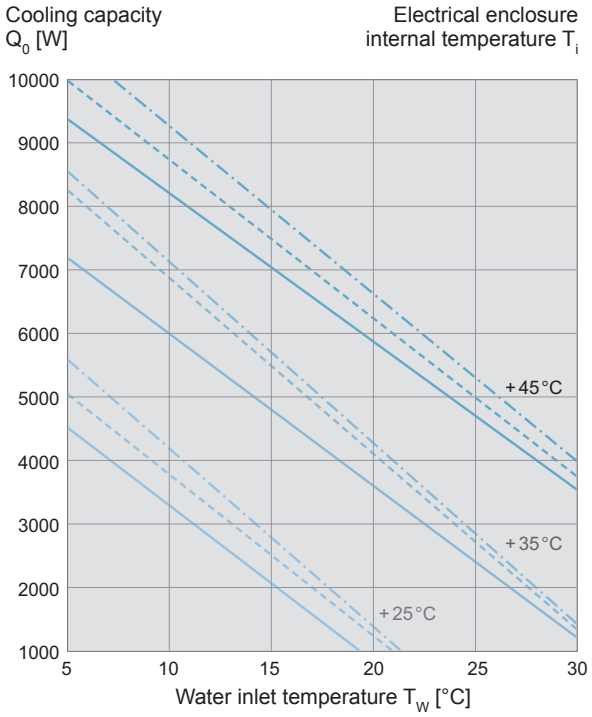
Data		PWS 7702		PWS 7702 SL		Unit
Article number		12057702055	12057710055	12057702155	12057710155	
Rated voltage ± 10 %		AC 50 Hz / 60 Hz				
		400 3~	230	400 3~	230	V
Cooling capacity at 500 l/h	W10/L35	7000				W
Power consumption	W10/L35	550 / 790	520 / 680	550 / 790	520 / 680	
Current consumption	W10/L35	0.8 / 0,95	2.4 / 3.2	0.8 / 0.95	2.4 / 3.2	A
Starting current	W10/L35	3.0 / 3.8	9.2 / 12	3.0 / 3.8	9.2 / 12	
Unimpeded airflow (free flow)	internal	3630	4600	3630	4600	m^3/h
Pre fuse T		10				A
Type of connection	electro	spring-type terminal included with plug				
	fluid	13 mm hose nozzle; other connectors on request				
Noise level (according to EN ISO 3741)		63				dB (A)
Weight (without packaging)		58		57		kg
Ambient temperature range		> + 1 … + 70 / > + 34 … + 158				°C / °F
Control range (adjustable)		+ 8 … + 50 / + 47 … + 122; factory setting + 35 / + 95				
Water outlet temperature		> + 1 … + 35 / > + 34 … + 95				
Permissible operating pressure		max. 10				bar
Duty cycle		100%				
Condensate management		condensate drain				
System of protection according to EN 60529	IP 55	towards the electrical enclosure if used as intended by the manufacturer				
	IP 65	on request				
Design	housing	galvanised steel/electrostatically powder-coated (200 °C); on request: stainless steel				
	heat exchanger	copper pipe with aluminium fins; stainless steel piping on request				
Colour (cover)		RAL 7035, different colours available on request				

Accessories	Piece	Article number	Informationen on page
External condensate evaporation system	1	18314000001	96
Condensate bottle	1	18314000100	96

Approvals see page 81

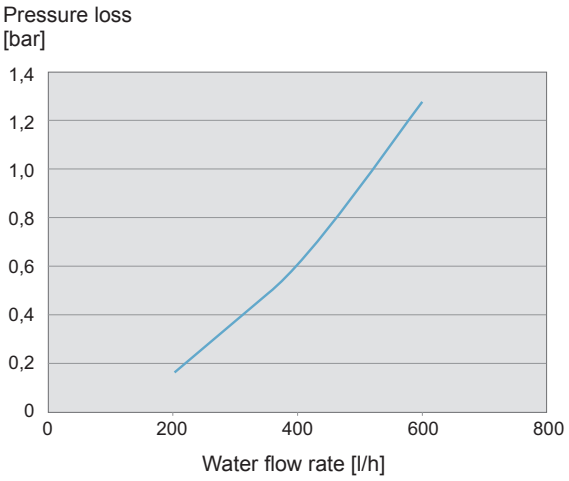
Cooling capacity performance curves

PWS 7702 / 7702 SL



Pressure loss performance curve

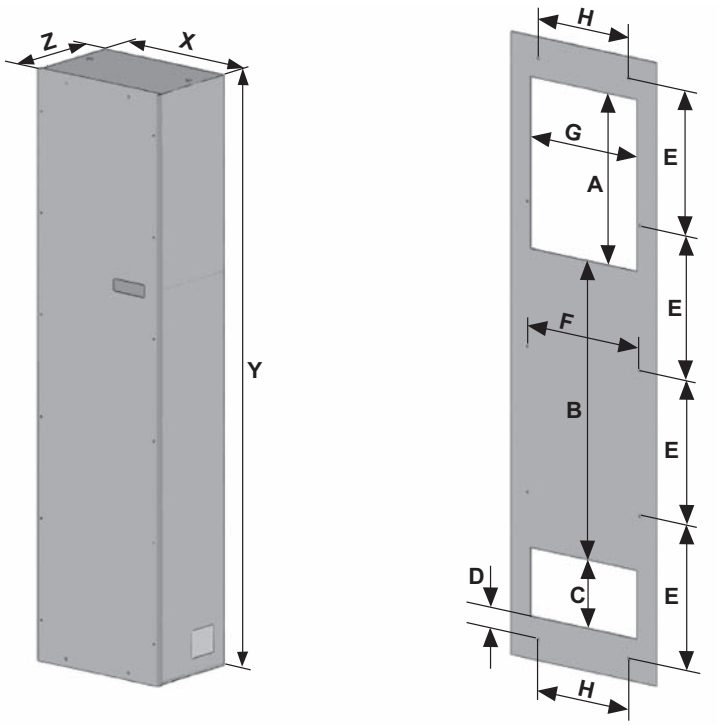
PWS 7702 / 7702 SL



Dimensions

PWS 7702	X	Y	Z	A	B	C	D	E	F	G	H
mm	460	1800	310	525	910	210	65	442.5	433.5	410	350
PWS 7702 SL	**X**	**Y**	**Z**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**
mm	460	1800	255								
Mounting holes Ø 8 mm											

PWS 7702 / 7702 SL



Air/Water Heat Exchanger 5200 W
PWS 7502



- maintenance-free
- mounting-friendly seal, no elaborate reworking of the mounting cut-out
- integrated thermostat and solenoid valve for temperature control
- integrated temperature monitoring with alarm contact

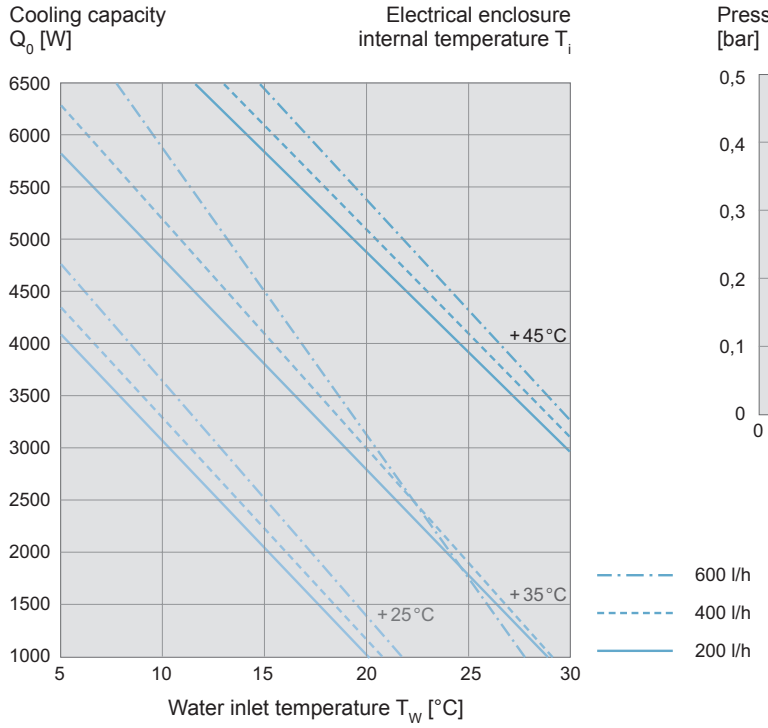
Data		PWS 7502		Unit
Article number		12055010055	12055017055	
Rated voltage ± 10 %		AC 50 Hz / 60 Hz	AC 60 Hz	
		230	115	V
Cooling capacity at 400 l/h	W10/L35	5200		W
Power consumption	W10/L35	295 / 385	384	
Current consumption	W10/L35	1.3 / 1.7	3.45	A
Starting current	W10/L35	5.8 / 6.6	8.33	
Unimpeded airflow (free flow)	internal	1670		m^3/h
Pre fuse T		6		A
Type of connection	electro	spring-type terminal included with plug		
	fluid	13 mm hose nozzle; other connectors on request		
Noise level (according to EN ISO 3741)		57		dB (A)
Weight (without packaging)		39		kg
Ambient temperature range		> + 1 … + 70 / > + 34 … + 158		°C / °F
Control range (adjustable)		+ 8 … + 50 / + 47 … + 122; factory setting + 35 / + 95		
Water outlet temperature		> + 1 … + 35 / > + 34 … + 95		
Permissible operating pressure		max. 10		bar
Duty cycle		100%		
Condensate management		condensate drain		
System of protection according to EN 60529	IP 55	towards the electrical enclosure if used as intended by the manufacturer		
	IP 65	on request		
Design	housing	galvanised steel/electrostatically powder-coated (200 °C); on request: stainless steel		
	heat exchanger	copper pipe with aluminium fins; stainless steel piping on request		
Colour (cover)		RAL 7035, different colours available on request		

Accessories	Piece	Article number	Informationen on page
External condensate evaporation system	1	18314000001	96
Condensate bottle	1	18314000100	96

Approvals see page 81

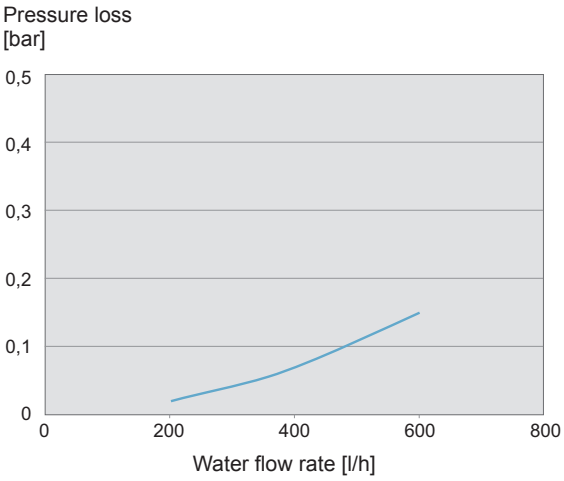
Cooling capacity performance curves

PWS 7502



Pressure loss performance curve

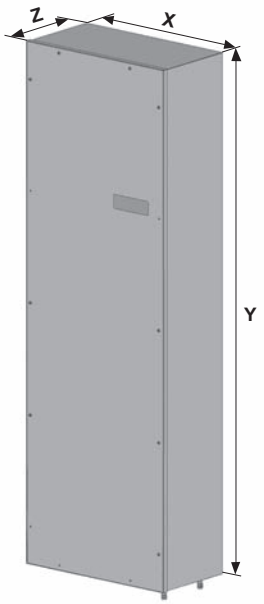
PWS 7502

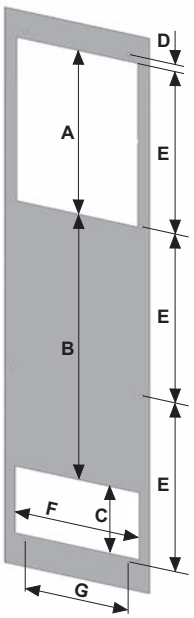


Dimensions

	X	Y	Z	A	B	C	D	E	F	G
mm	460	1400	239	440	711.5	180	20	455	420	350
Mounting holes Ø 8 mm										

PWS 7502





Air/Water Heat Exchanger 3150 W / 1500 W

PWS 7332
PWS 7152



- two performance classes, cut-out compatible
- completely installable or mountable externally and internally
- maintenance-free
- mounting-friendly seal, no elaborate reworking of the mounting cut-out
- integrated thermostat and solenoid valve for temperature control
- integrated temperature monitoring with alarm contact

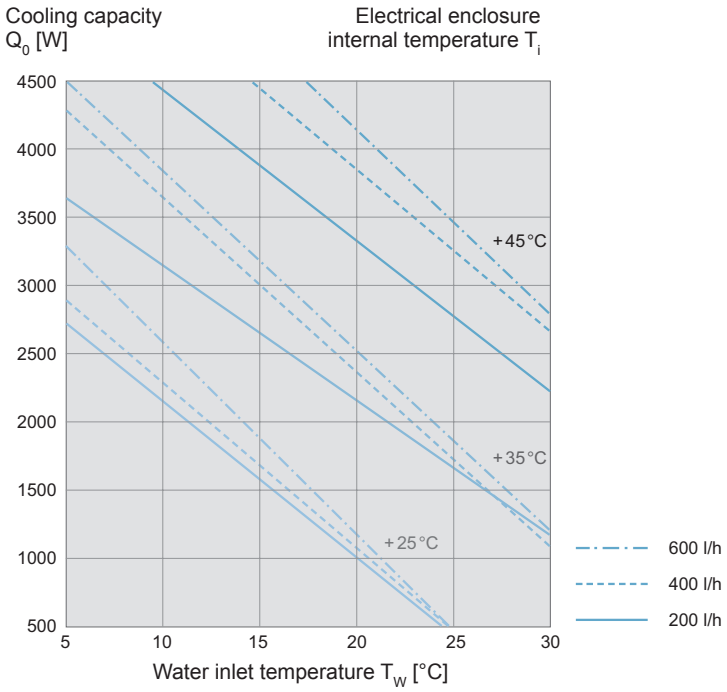
Data		PWS 7332		PWS 7152		Unit
Article number		12053010055	12053017055	12051510055	12051517055	
Rated voltage ± 10 %		AC 50 Hz / 60 Hz	AC 60 Hz	AC 50 Hz / 60 Hz	AC 60 Hz	
		230	115	230	115	V
Cooling capacity at 200 l/h	W10/L35	3150		1500		W
Power consumption	W10/L35	295 / 385	453	125 / 182	186	W
Current consumption	W10/L35	1.3 / 1.7	4.1	0.55 / 0.75	1.5	A
Starting current	W10/L35	5.8 / 6.6	8.62	2 / 2	3.9	A
Unimpeded airflow (free flow)	internal	1670		850		m³/h
Pre fuse T		6	16	4	6	A
Type of connection	electro	spring-type terminal included with plug				
	fluid	13 mm hose nozzle; other connectors on request				
Noise level (according to EN ISO 3741)		54		53		dB (A)
Weight (without packaging)		23		21		kg
Ambient temperature range		> + 1 … + 70 / > + 34 … + 158				°C / °F
Control range (adjustable)		+ 8 … + 50 / + 47 … + 122; factory setting + 35 / + 95				
Water outlet temperature		> + 1 … + 35 / > + 34 … + 95				
Permissible operating pressure		max. 10				bar
Duty cycle		100%				
Condensate management		condensate drain				
System of protection according to EN 60529	IP 55	towards the electrical enclosure if used as intended by the manufacturer				
	IP 65	on request				
Design	housing	galvanised steel/electrostatically powder-coated (200 °C); on request: stainless steel				
	heat exchanger	copper pipe with aluminium fins; stainless steel piping on request				
Colour (cover)		RAL 7035, different colours available on request				

Accessories	Piece	Article number	Informationen on page
External condensate evaporation system	1	18314000001	96
Condensate bottle	1	18314000100	96

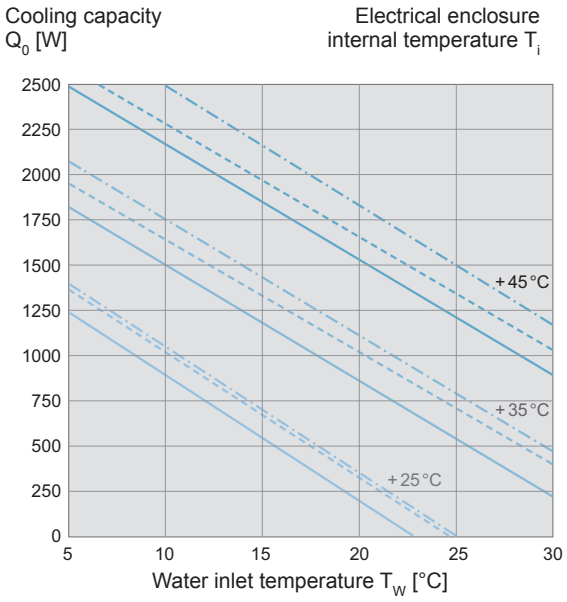
Approvals see page 81

Cooling capacity performance curves

PWS 7332

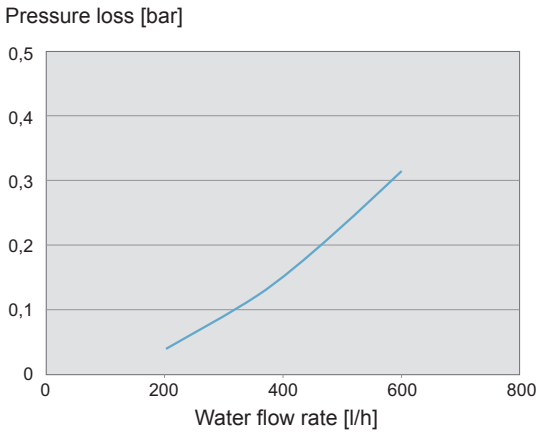


PWS 7152

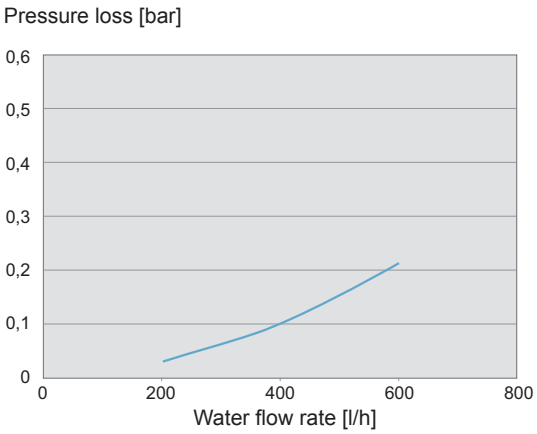


Pressure loss performance curves

PWS 7332

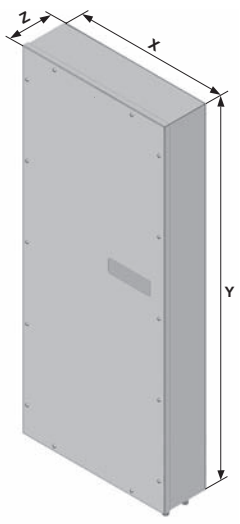


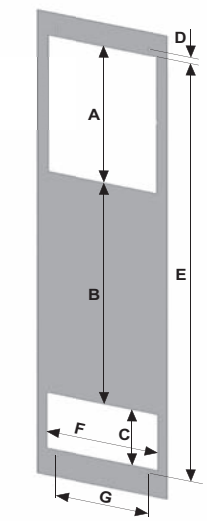
PWS 7152



Dimensions

mm	PWS 7332	PWS 7152
X	400	
Y	950	
Z	190	115
A	280	
B	463	
C	112	
D	37	
E	904	
F	340	
G	280	
Mounting holes Ø 8 mm		





Air/Water Heat Exchanger 3150 W
PWS 7332 L



- long passage of air
- compatible with DTS 9x41 cooling unit series
- maintenance-free
- mounting-friendly seal, no elaborate reworking of the mounting cut-out
- integrated thermostat and solenoid valve for temperature control
- integrated temperature monitoring with alarm contact

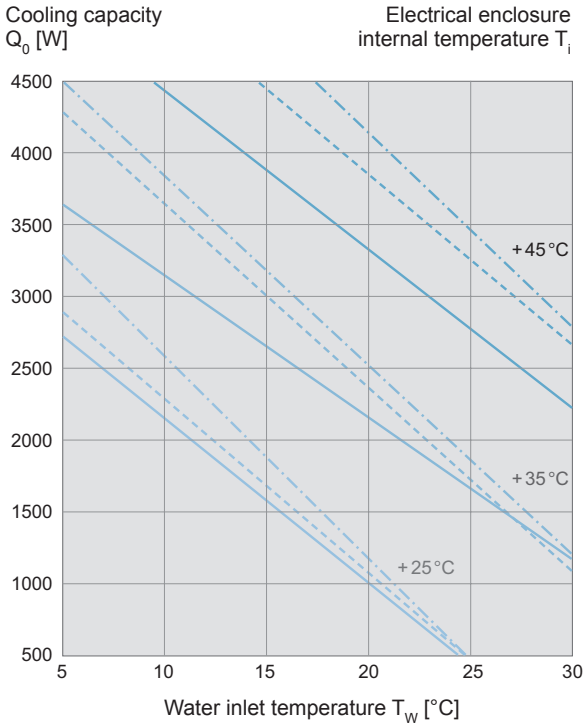
Data		PWS 7332 L		Unit
Article number		12053010063	12053017063	
Rated voltage ± 10 %		AC 50 Hz / 60 Hz	AC 60 Hz	
		230	115	V
Cooling capacity at 200 l/h	W10/L35	3150		W
Power consumption	W10/L35	161 / 226	193	
Current consumption	W10/L35	0.7 / 1	1.7	A
Starting current	W10/L35	2.6 / 2	3	
Unimpeded airflow (free flow)	internal	1200		m^3/h
Pre fuse T		6		A
Type of connection	electro	spring-type terminal included with plug		
	fluid	13 mm hose nozzle; other connectors on request		
Noise level (according to EN ISO 3741)		54		dB (A)
Weight (without packaging)		35		kg
Ambient temperature range		> + 1 … + 70 / > + 34 … + 158		°C / °F
Control range (adjustable)		+ 8 … + 50 / + 47 … + 122; factory setting + 35 / + 95		
Water outlet temperature		> + 1 … + 35 / > + 34 … + 95		
Permissible operating pressure		max. 10		bar
Duty cycle		100%		
Condensate management		condensate drain		
System of protection according to EN 60529	IP 55	towards the electrical enclosure if used as intended by the manufacturer		
	IP 65	on request		
Design	housing	galvanised steel/electrostatically powder-coated (200 °C); on request: stainless steel		
	heat exchanger	copper pipe with aluminium fins; stainless steel piping on request		
Colour (cover)		RAL 7035, different colours available on request		

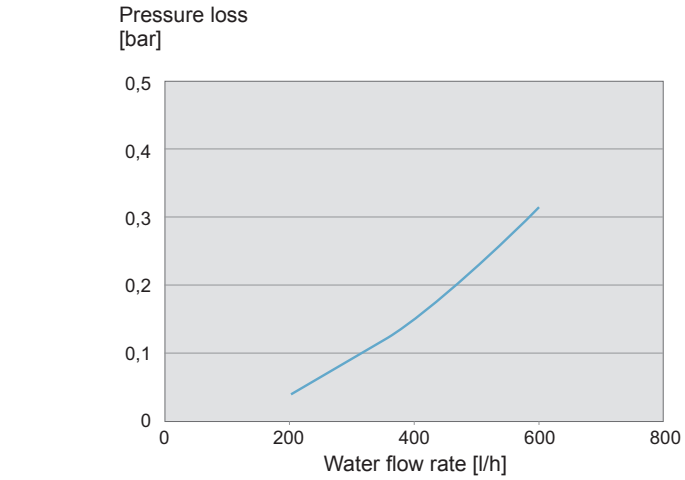
Accessories	Piece	Article number	Informationen on page
External condensate evaporation system	1	18314000001	96
Condensate bottle	1	18314000100	96

Approvals see page 81

Cooling capacity performance curves

PWS 7332 L





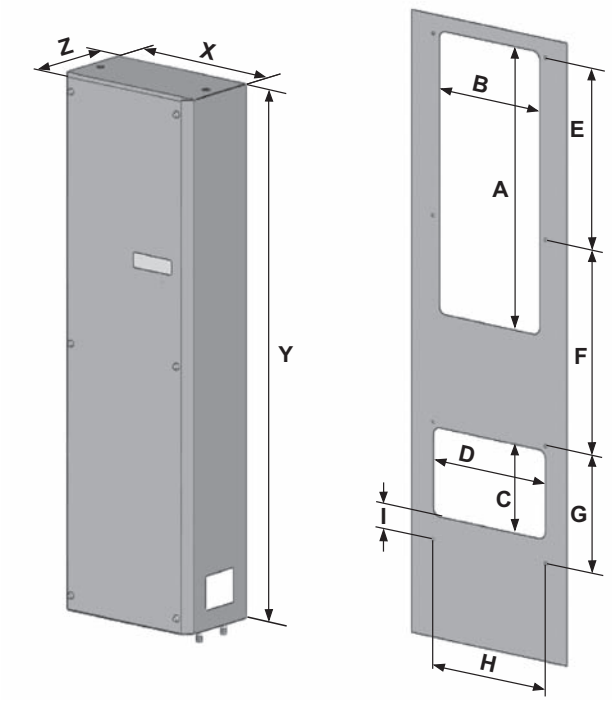
Pressure loss performance curve

PWS 7332 L

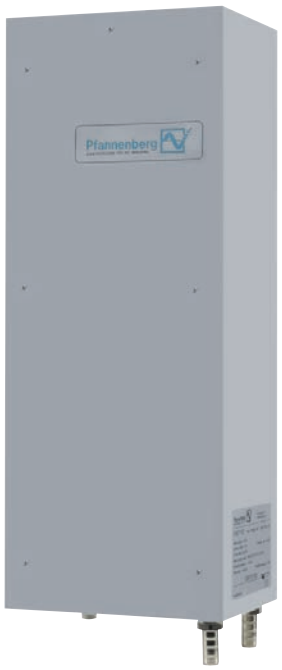
Dimensions

	X	Y	Z	A	B	C	D	E	F	G	H	I
mm	400	1350	190	700	315	220	350	450	510	290	350	58
Mounting holes Ø 8 mm and cut-out radii R20												

PWS 7332 L



Air/Water Heat Exchanger 950 W / 600 W
PWS 7102
PWS 7062



- two performance classes, cut-out compatible
- completely installable or mountable externally and internally
- maintenance-free
- mounting-friendly seal, no elaborate reworking of the mounting cut-out
- integrated thermostat and solenoid valve for temperature control
- integrated temperature monitoring with alarm contact

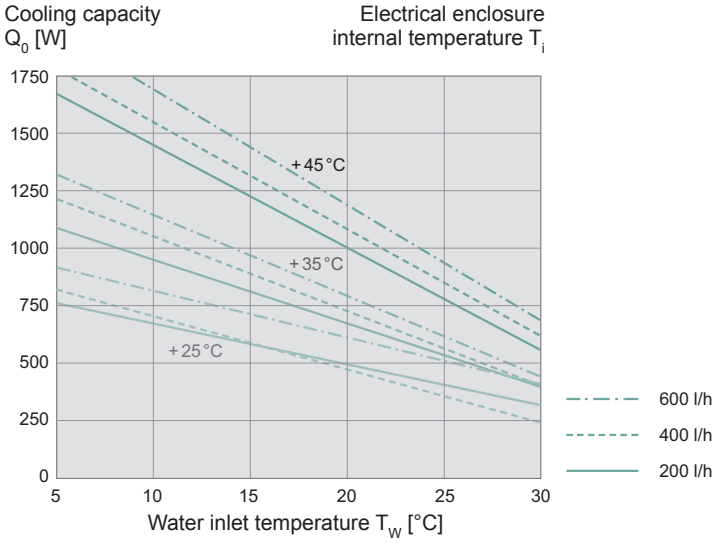
Data		PWS 7102		PWS 7062		Unit
Article number		12051010055	12051017055	12050610055	12050617055	
Rated voltage ± 10 %		AC 50 Hz / 60 Hz	AC 60 Hz	AC 50 Hz / 60 Hz	AC 60 Hz	
		230	115	230	115	V
Cooling capacity at 200 l/h	W10/L35	950		600		W
Power consumption	W10/L35	82 / 84	82	68 / 70	60	
Current consumption	W10/L35	0.35 / 0.4	0,69	0.35 / 0.38	0.65	A
Starting current	W10/L35	1.7 / 1.95	1.4	1.5 / 1.8	1.3	
Unimpeded airflow (free flow)	internal	570		440		
Pre fuse T		4				A
Type of connection	electro	spring-type terminal included with plug				
	fluid	13 mm hose nozzle; other connectors on request				
Noise level (according to EN ISO 3741)		≤ 48				dB (A)
Weight (without packaging)		7.5		6		kg
Ambient temperature range		> + 1 … + 70 / > + 34 … + 158				°C / °F
Control range (adjustable)		+ 8 … + 50 / + 47 … + 122; factory setting + 35 / + 95				
Water outlet temperature		> + 1 … + 35 / > + 34 … + 95				
Permissible operating pressure		max. 10				bar
Duty cycle		100%				
Condensate management		condensate drain				
System of protection according to EN 60529	IP 55	towards the electrical enclosure if used as intended by the manufacturer				
	IP 65	on request				
Design	housing	galvanised steel/electrostatically powder-coated (200 °C); on request: stainless steel				
	heat exchanger	copper pipe with aluminium fins				
Colour (cover)		RAL 7035, different colours available on request				

Accessories	Piece	Article number	Informationen on page
External condensate evaporation system	1	18314000001	96
Condensate bottle	1	18314000100	96

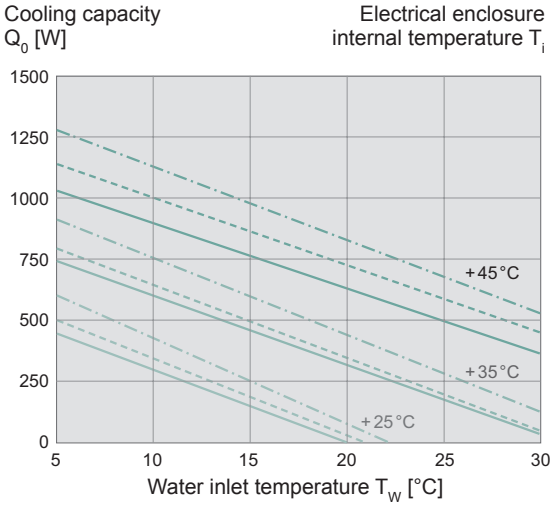
Approvals see page 81

Cooling capacity performance curves

PWS 7102

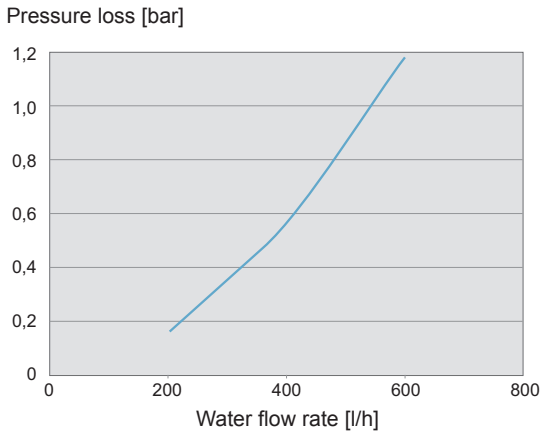


PWS 7062

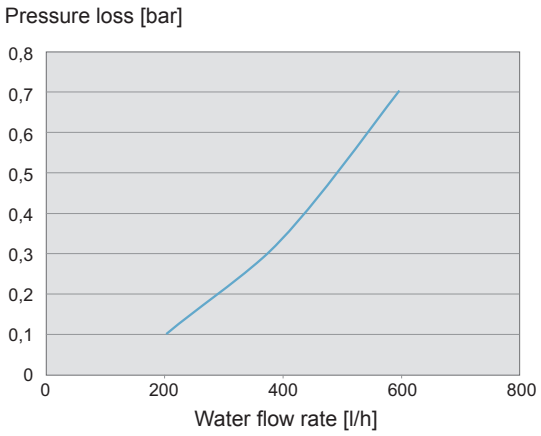


Pressure loss performance curves

PWS 7102

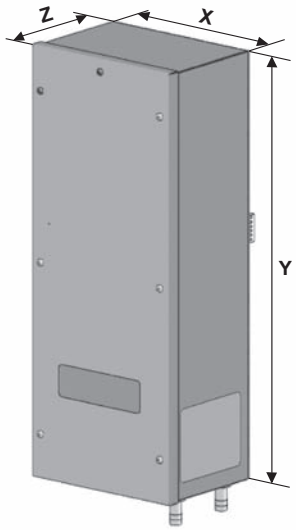


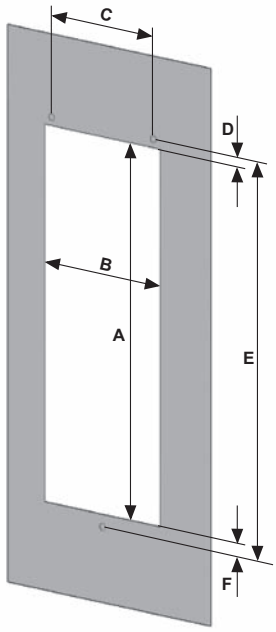
PWS 7062



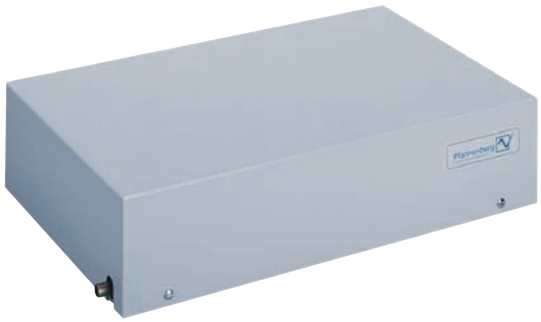
Dimensions

mm	PWS 7102	PWS 7062
X	200	
Y	500	
Z	150	100
A	440	
B	170	
C	150	
D	10	
E	465	
F	15	
Mounting holes Ø 8 mm		





Air/Water Heat Exchanger 3400 W / 2150 W
PWD 5402
PWD 5302



- water circuit pressure-tested to 30 bar
- surface seal to protect against the penetration of water via the roof surface of the control cabinet
- simple temperature control with integrated thermostat and solenoid valve
- 10 bar maximum operating pressure
- piping and heat exchanger optionally available in V4A (1.4571)

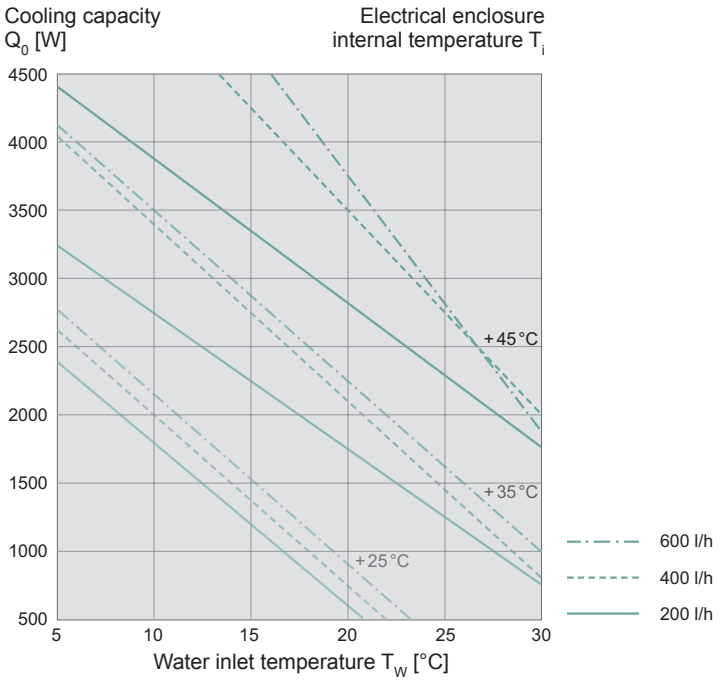
Data		PWD 5402	PWD 5302	Unit
Article number		12065410055	12065310055	
Rated voltage ± 10 %		AC 50 Hz / 60 Hz		
		230		V
Cooling capacity at 400 l/h	W10/L35	3400	2150	W
Power consumption	W10/L35	115 / 165	85 / 100	
Current consumption	W10/L35	0.84	0.4	A
Starting current	W10/L35	4	3	
Unimpeded airflow (free flow)	internal	720	500	m³/h
Pre fuse T		6		A
Type of connection	electro	3.5 metres of cable 3 x 0.75 mm²		
	fluid	13 mm hose nozzle; other connectors on request		
Noise level (according to EN ISO 3741)		64	54	dB (A)
Weight (without packaging)		30	21	kg
Ambient temperature range		> + 1 … + 70 / > + 34 … + 158		°C / °F
Control range (adjustable)		+ 8 … + 50 / + 47 … + 122; factory setting + 35 / + 95		
Water outlet temperature		> + 1 … + 35 / > + 34 … + 95		
Permissible operating pressure		max. 10		bar
Duty cycle		100%		
Condensate management		condensate drain		
System of protection according to EN 60529	IP 55	towards the electrical enclosure if used as intended by the manufacturer		
	IP 65	on request		
Design	housing	galvanised steel/electrostatically powder-coated (200 °C); on request: stainless steel		
	heat exchanger	copper pipe with aluminium fins; stainless steel piping on request		
Colour (cover)		RAL 7035, different colours available on request		

Accessories	Piece	Article number	Informationen on page
External condensate evaporation system	1	18314000001	96
Condensate bottle	1	18314000100	96

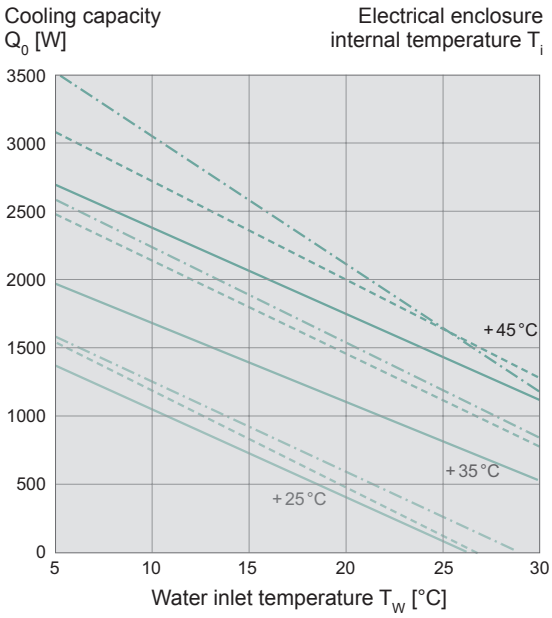
Approvals see page 81

Cooling capacity performance curves

PWD 5402

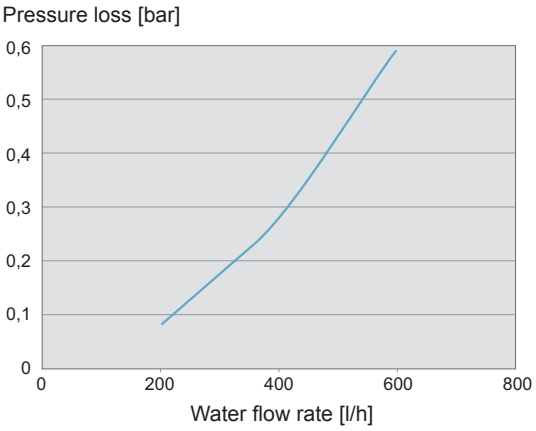


PWD 5302

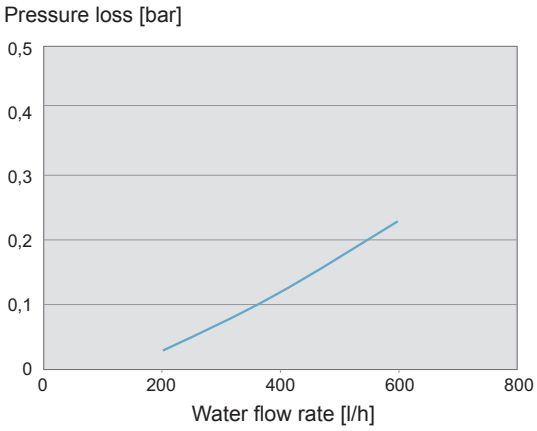


Pressure loss performance curves

PWD 5402

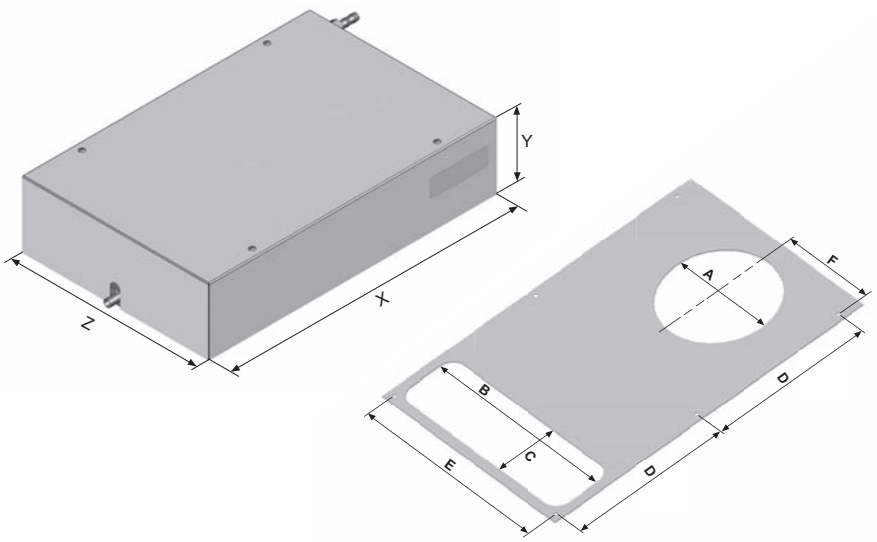


PWD 5302



Dimensions

mm	PWD 5402	PWD 5302
X	720	600
Y	190	140
Z	465	390
A	230	230
B	425	360
C	128	105
D	330	270
E	434	358
F	191	143
Cut-out radii R30		



Accessories



Internal enclosure fan

Distribution of cold air inside the control cabinet

Product	Article number
PEF 180 mounting bracket 230 V	18110000000
PEF 180 mounting bracket 115 V	18110000001
PEF 180 mounting bracket 24 V DC	18110000002



External condensate evaporation system 230 V 50/60 Hz

External condensate evaporator for the accumulated condensed water

Suitable for ...	Article number
all units	18314000001



Condensate bottle

External container for collecting the accumulating condensed water

Suitable for ...	Article number
all units	18314000100



Device-side water connection with G 3/8” internal thread

variable connection possibilities:

e.g.
- hose nozzle 3/8“ x 12 with o-ring
- double nipple 3/8“
- quick-coupling 12 mm
- quick-coupling 10 mm

etc.

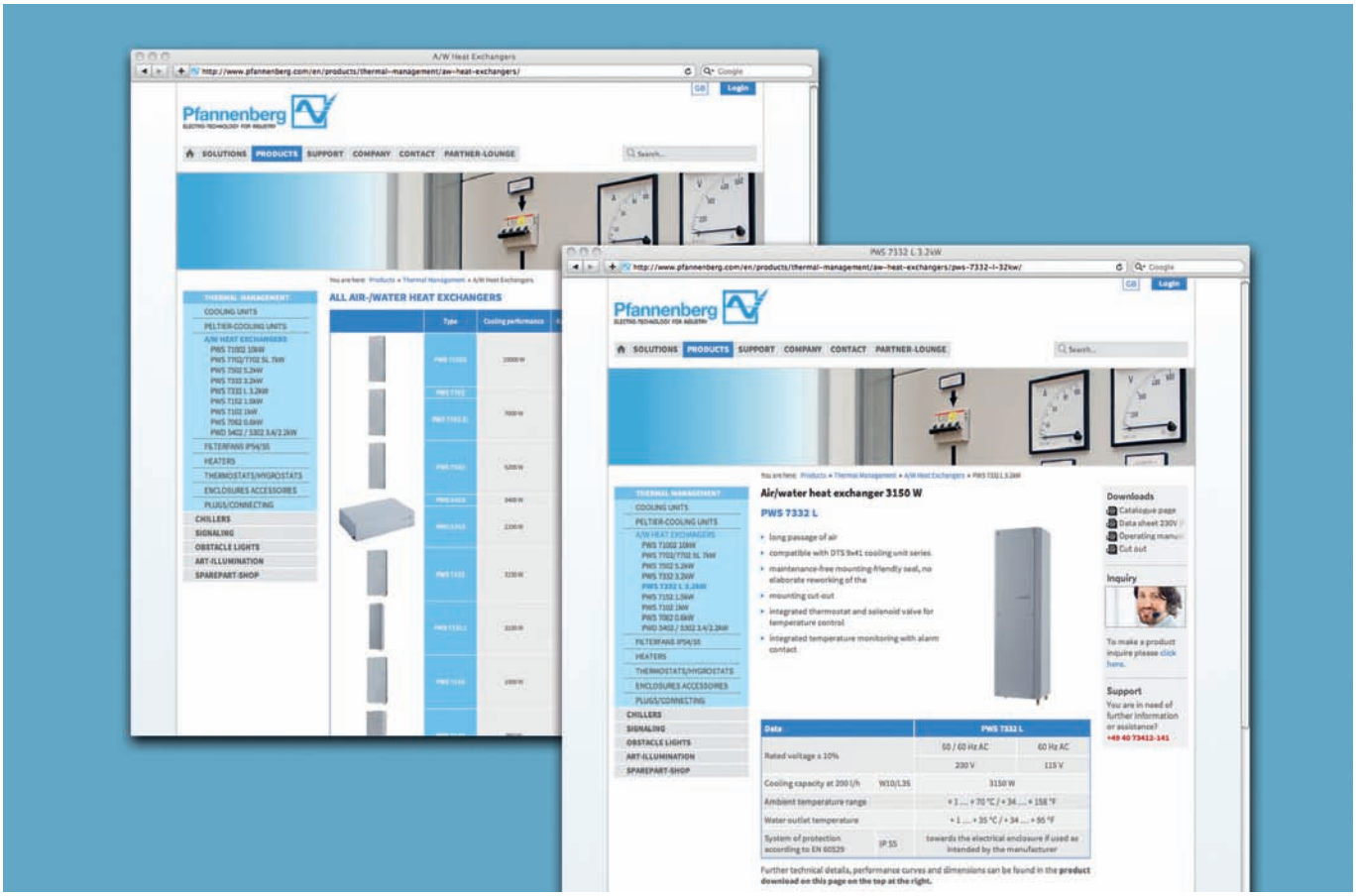
Suitable for ...	Article number
all heat exchangers	on request

Air/water heat exchangers on the Internet

As with all of our products, you can find a large amount of online information about the air/water heat exchangers. At **www.pfannenberg.com**, just click ‘Products’ in the menu bar. This will open a sub-menu on the left-hand side with all categories. With a few clicks you can find all of the important information about the individual air/water heat exchangers that you need.

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Pfannenberg



When it's about economy and long service life

Chillers from the Rack, CC, EB, HK, AR and PWW series

Pfannenberg's chillers – including the new CC chillers from the **ECOOL** series – guarantee both a central and economic provision and cooling of the media water, emulsion and oil. All the cooling tasks are realized with devices which are both compact and maintenance friendly. The areas of applications for Pfannenberg's chillers range from machine tools, lasers, plastic processing and alternative energy to the food, drinks and pharmaceutical industry.

The Pfannenberg group offers a variety of designs for your specific tasks:

- Air or water chillers
- Pressurized chillers
- Passive chillers
- Outdoor for low and high temperature conditions
- Stand-alone design
- Enclosure chillers

Expertise in process cooling!

In this day and age, if you want to be the best in process cooling, you have offer more than just superior quality. The ability to partner with customers and sharing competence, as well as offer excellent service is an absolute must - and that requires the highest level of innovation and technology.

From the idea to the product

No matter whether it is a question of air conditioners or large projects, standard solutions or individual developments, your problems and avtivities will be in good hands with us. We can guarantee you a face to face meeting on site. Using successful solutions, we would like to introduce our company as a solid, flexible and reliable partner.



Everything from a single source

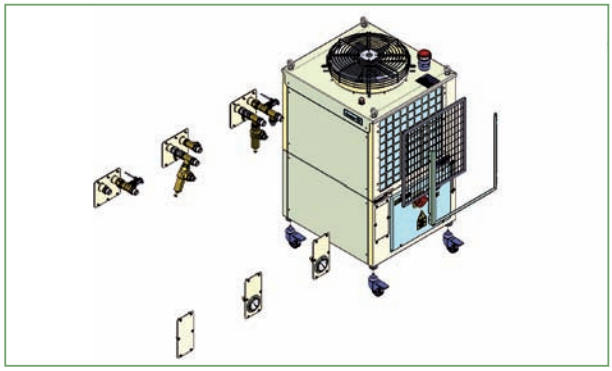
Within a prescribed period, innovative technology is developed and successfully implemented. For target markets, we not only carry out development together with our customers, but also provide consulting for installation and project management.

Process chiller design

Pfannenberg process chillers are designed based on three main areas: the refrigeration circuit, the hydraulic circuit and controls.

Refrigeration circuit

The refrigeration circuit‘s main purpose is to guarantee the heat transfer from the medium, which is passing through the evaporator and therefore, to cool the particular medium down to the desired temperature for the particular application. The heat, which is transferred from the medium to the refrigerant is then carried back to a compressor and then passes on to the different phases of the refrigeration cycle. This is an continuous cycle, which we are rejecting heat (condenser) and in wich we are absorbing heat (evaporator).



Hydraulic circuit

The hydraulic circuit is specifically designed to deliver a certain medium at a calculated flow rate, temperaure and pressure to the consumers‘s application. The flow rate, temperature and pressure varies based on the particular application.

Controls

In order to guarantee the accurate delivery of the medium to the consumer‘s application, proper controls are necessary.

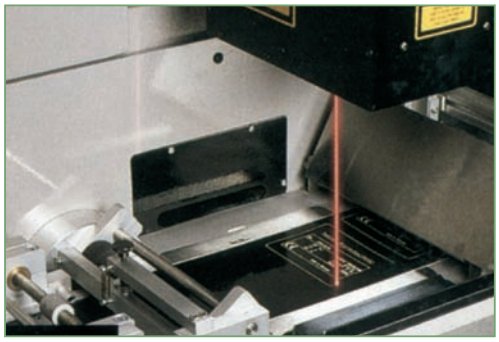
For example, a standard method of controlling a temperature is by using a digital controller with a medium sensor and based on the set-point, will control the refrigeration circuit in order to maintain the accurate temperature for the particular application.

There are many methods of providing accurate controlling of the refrigeration and hydraulic circuits and these are based on the application criteria. At Pfannenberg, we have the competence to provide consultation to determine sizing and ensure proper configuration of a process chiller in order to meet your application needs.

The perfect solution...

High-tech machines need high-tech components and systems, such as:

- spindle, linear and torque motors
- all types of motors
- laser souces
- print systems
- x-ray tubes



Heat is created wherever these items are in use, in addition to the ambient termperature which in some areas can be very high during certain seasons. This must be controlled since too much heat leads to machine failure or shutdown, in turn causing a loss of production.

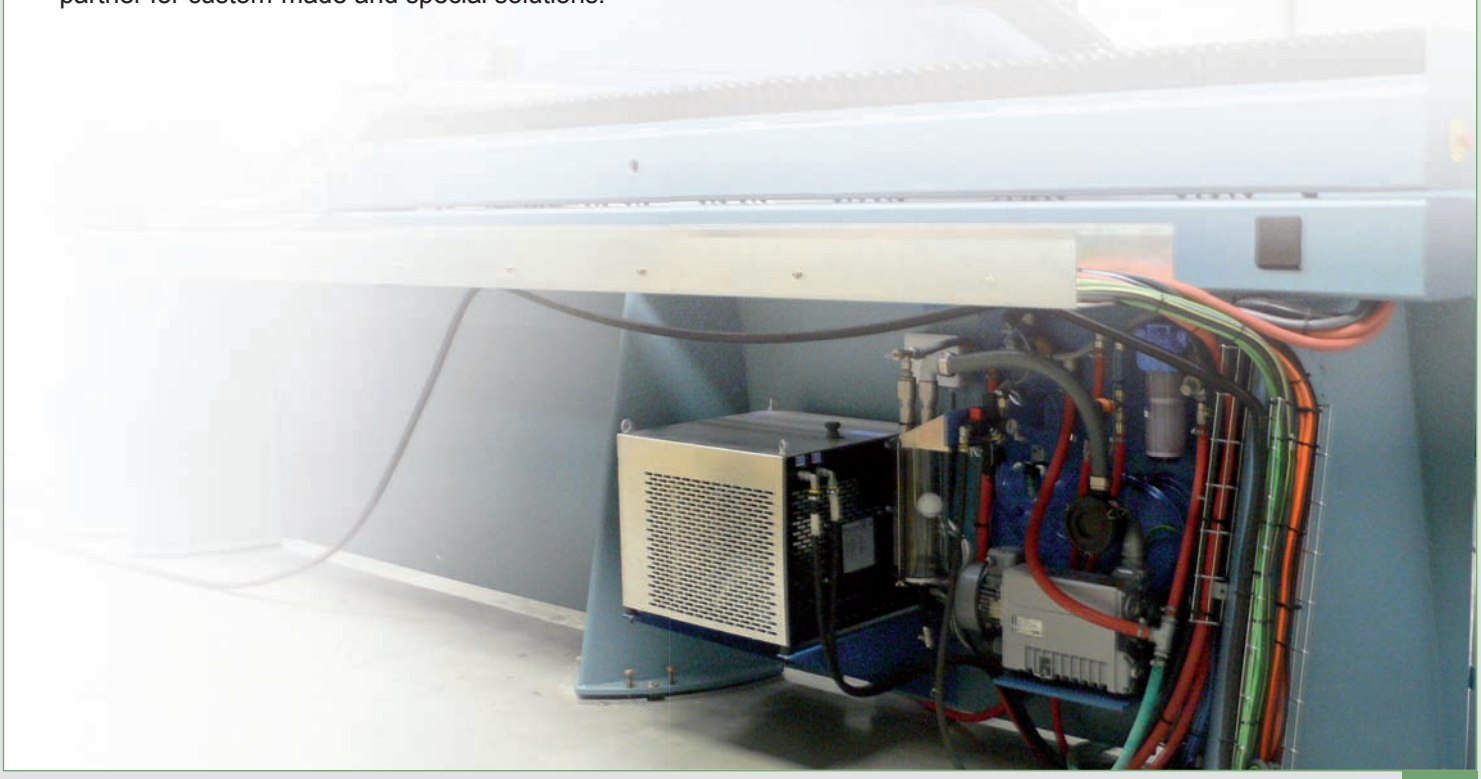
Wherever precise, exact temperatures are required, water is a proven cooling agent and it is impossible to imagine cooling whithout it. This is where chillers are used. Chillers produce cold water (10 °C – 35 °C) as a cooling agent - or bring water, oil and emulsions to the exact temperature required.



...whatever the application

Our many years of experience from across such varied industries as the cooling of complex machine tools anc machining centers, colour systems for printing presses, glue and colour cooling for wood working machines, welding systems for plastic film for packaging machines, laser sources for marking lasers, x-ray tubes for measuring systems all combine to guarantee precision and quality. Our successful engineering team is constantly developing and improving chiller technology. We are also your competent partner for custom-made and special solutions.





Cost-efficiency Master Plan

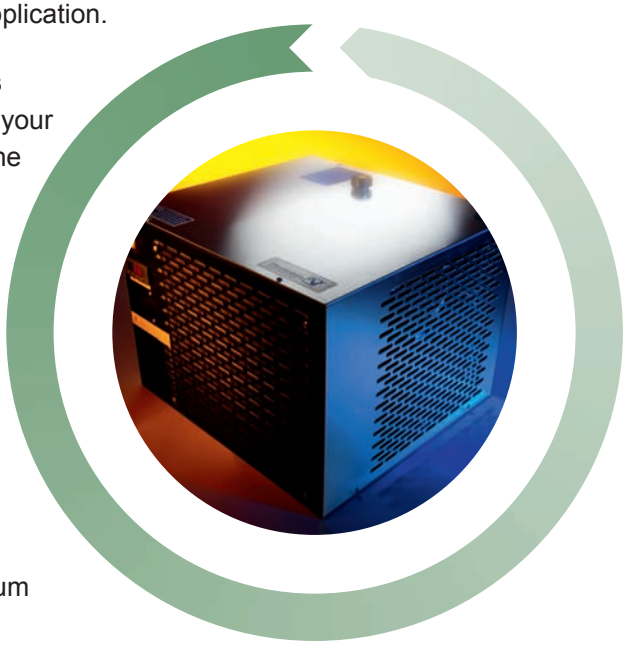
We secure your future with our modern philosophy

Pfannenberg subscribes to a corporate philosophy which focuses on the concerns and objectives of the users with respect to cost efficiency. This starts during the planning phase and extends far beyond the operation phase. Furthermore, Pfannenberg is one of the few suppliers who can supply a complete solution, i.e. a chiller solution as well as the complete handling and maintenance of your cabinet thermal management.

Pre-sales The right product at the right time – at Pfannenberg, service starts even before delivery. An analysis of the business environment, of the objectives and of the technology which the user has available is our investment in a sustainably successful cooperation.

Concept design Design that is perfectly adjusted to your application.

Installation and start-up operation Pfannenberg offers support in the installation and start-up operation of the chiller at your site. This ensures a smooth start and contributes to extending the long service life of the chiller.



Coaching and service Training courses by Pfannenberg experts, in combination with customised maintenance and repair packages, ensure that your production processes run smoothly and guarantee longer service life.

Energy efficiency Our chillers achieve top grades in energy consumption.

Reliability More than 20 years of experience in the field of recooling and the use of high-quality components ensure optimum long-term stability and top MTBF (mean time between failures).

Service friendliness Minimum MTTR (mean time to repair) and the shortest time needed to replace units thanks to perfect accessibility, standardised parts and a carefully thought-through plug-and-play concept minimise your repair costs and downtimes.

Benefits: risk minimisation and cost savings

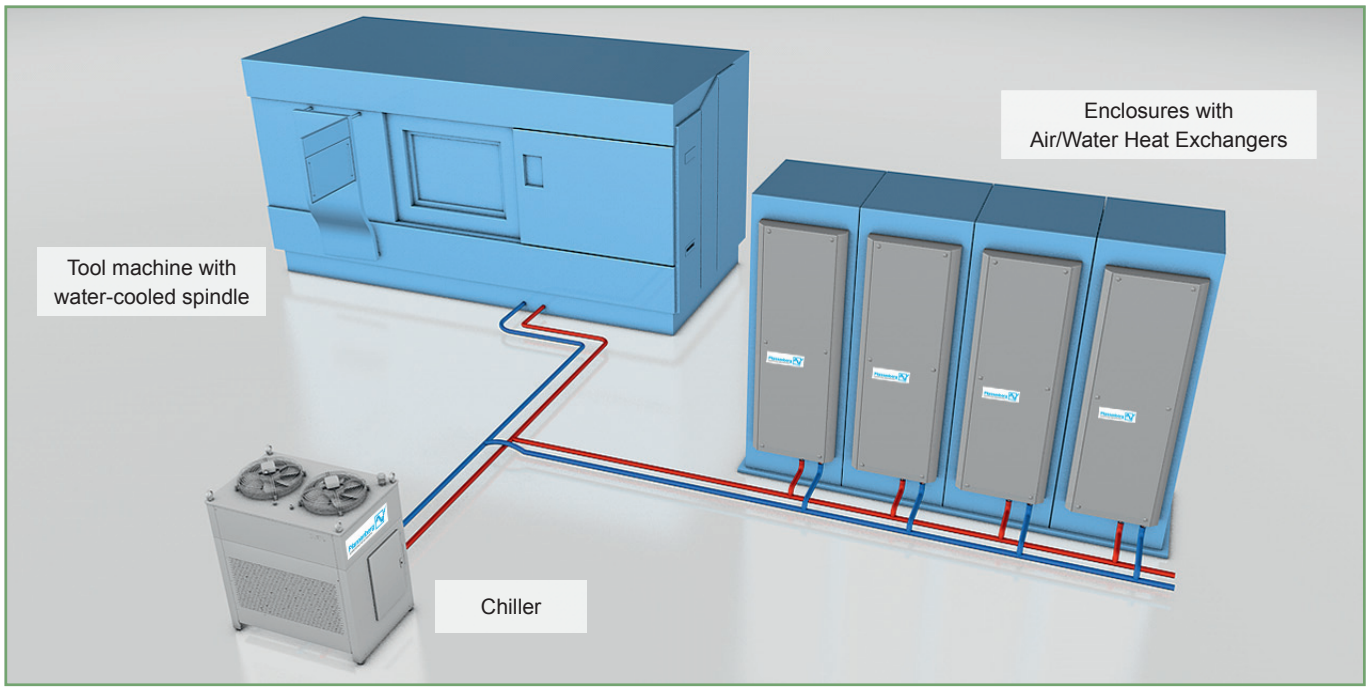
Pfannenberg's master plan as described above spells crucial benefits for manufacturers and users. After all, Pfannenberg makes sure that the total cost of ownership (TCO) of your components is considerably reduced while your return on investment (ROI) receives a powerful boost.



The 100% system solution for all branches of industry

The Pfannenberg chillers offer decisive advantages in combination with the Pfannenberg air/water heat exchangers:

- in applications where power losses must not enter the surrounding space
- if aggressive ambient air restricts the use of conventional cooling units
- if a very high IP class is required (up to IP 65)
- if maintenance-free cooling units are necessary



Planning on making new acquisitions for your production or thinking about expanding? Then you'll definitely be on the safe side with solutions for water-cooling.

Every change in production conditions involves, first and foremost, medium or long-term investments. Despite the rather high purchase price, the use of chillers normally pays off – owing to the long durability, low maintenance costs and high energy efficiency.

Pfannenberg Sizing Software (PSS):
Calculation software for your customized solution

The Pfannenberg sizing software determines your cooling requirements, calculates the necessary cooling capacity and recommends the correct device components. Thus, you get a customized solution which gives you the security of a perfect dimensioning and prevents expensive over-dimensioning. Download PSS free of charge or calculate directly online on **www.pfannenberg.com/support**.



Six series for every application

Rack
The compact design of the unit allows it to be attached to the widest variety of machine types. This unit is used in the fields of laboratory equipment, pharmaceutical and medical equipment, laser equipment, automation equipment and also in industrial automation for work spindles.

NEW

CC
The chillers of the CC-series are available in 6 power classes and their compact design makes them especially space-saving. The chillers, which can also be installed as top-mounting devices, are safe and an installation in compact plants is made easier by their design. Additionally, they reach an especially high coefficient of performance (COP). And the UL 1995 certification makes them particularly interesting for machine manufacturers who work internationally.
6 different performance classes in just 2 sizes make it possible to make a flexible and late adjustment in the device you choose. This change can be effected in the planning phase and also during the operation of the plant without you having to dimension the essential connections or floor space again. Due to the number of available options, the CC chillers can be configured flexibly, this enables them to be used in virtually all industry sectors. The high system of protection IP 54 also supports the operation of the devices in harsh ambient conditions.

EB
The EB series has been specially developed for applications that require stable temperature control. Equipped with a programmable control module, these units can be used to realise small hystereses of the fluid temperature. For monitoring the functions of the chiller, a control module is optionally available that indicates the individual function statuses via an LED display.

HK
The HK series has been designed for indoor and outdoor applications for the cooling of water, oil and emulsions. These units have a ‘stand-alone’ design for automatic operation. They can be used throughout the entire range of industries. The cooling circuit is controlled by a programmable temperature module; this ensures high temperature accuracy.

AR
The AR series arose from the requirements of the application area of the mechanical engineering sector as well as the cigarette and packaging industry. The characteristic feature of this series is the implementation of the housing, which is based on standard control cabinet sizes. This allows optimum integration of the cooler in switchgear.

PWW
The PWW series is a new generation of cooling units based on the passive cooling principle. It has been specially designed for applications where process water is already available. Process water flowing through the integrated heat exchanger on the primary side will be regulated to keep the cooling water on the secondary side at a stable temperature. Due to the smart design of the closed loop circuit the PWW can be easily adapted to the existing water supply.



All Chillers at a glance

Type	Cooling capacity [1]	Rated voltage [2]	Dimensions (HxWxD)	Approvals					Page
				UL	cUL	GOST	CSA	CE	
Rack Chillers (water)									
Rack 1100	1100 W	230 V AC	395 x 450 x 480 mm	◉	◉	◉		●	106
Rack 1700	1700 W			◉	◉	◉		●	106
Rack 2400	2400 W		500 x 580 x 580 mm	◉	◉	◉		●	106
CC Chillers									
CC 6101	1100 W	115 V / 230 V	626 x 600 x 480 mm	●	◉	◉		●	108
CC 6201	1700 W			●	◉	◉		●	108
CC 6301	2400 W			●	◉	◉		●	108
CC 6401	3500 W	400 V / 460 V 3 ~	984 x 601 x 670 mm	●	◉	◉		●	110
CC 6501	5000 W			●	◉	◉		●	110
CC 6601	6500 W			●	◉	◉		●	110
EB Chillers (water)									
EB 30 WT	3000 W	400 V / 460 V 3 ~	955 x 550 x 610 mm	◉	◉	◉		●	112
EB 43 WT	4300 W			◉	◉	◉		●	112
EB 60 WT	6000 W			◉	◉	◉		●	112
EB 75 WT	7500 W		1290 x 705 x 765 mm	◉	◉	◉		●	114
EB 90 WT	9000 W			◉	◉	◉		●	114
EB 130 WT	13000 W			◉	◉	◉		●	114
EB 150 WT	15000 W			◉	◉	◉		●	114
EB 190 WT	19000 W		1410 x 1230 x 790 mm	◉	◉	◉		●	116
EB 250 WT	25000 W			◉	◉	◉		●	116
EB 300 WT	30000 W		1410 x 1680 x 790 mm	◉	◉	◉		●	118
EB 350 WT	35000 W			◉	◉	◉		●	118
EB 400 WT	40000 W			◉	◉	◉		●	118
EB Chillers (oil)									
EB 30 (oil)	3000 W	400 V / 460 V 3 ~	955 x 550 x 610 mm	◉	◉	◉		●	120
EB 43 (oil)	4300 W			◉	◉	◉		●	120
EB 60 (oil)	6000 W			◉	◉	◉		●	120
EB 75 (oil)	7500 W		1290 x 705 x 765 mm	◉	◉	◉		●	122
EB 90 (oil)	9000 W			◉	◉	◉		●	122
EB 130 (oil)	13000 W			◉	◉	◉		●	122
EB 150 (oil)	15000 W			◉	◉	◉		●	122
EB 190 (oil)	19000 W		1410 x 1230 x 790 mm	◉	◉	◉		●	124
EB 250 (oil)	25000 W			◉	◉	◉		●	124
EB 300 (oil)	30000 W		1410 x 1680 x 790 mm	◉	◉	◉		●	126
EB 350 (oil)	35000 W			◉	◉	◉		●	126
EB 400 (oil)	40000 W			◉	◉	◉		●	126
HK Chillers (WT)									
HK 55 (WT)	55000 W	400 V / 460 V 3 ~	1800 x 2500 x 1110 mm	◉	◉	◉		●	128
HK 62 (WT)	62000 W			◉	◉	◉		●	128
HK 70 (WT)	70000 W			◉	◉	◉		●	128
AR Chillers (WT)									
AR 10 WT	10000 W	400 V / 460 V 3 ~	2000 x 1000 x 600 mm	◉	◉	◉		●	130
AR 12 WT	12000 W			◉	◉	◉		●	130
AR 15 WT	15000 W		2001 x 1000 x 800 mm	◉	◉	◉		●	130
AR 18 WT	18000 W			◉	◉	◉		●	130
PWW Chillers									
PWW 9.000	9000 W	230 V AC	500 x 580 x 580 mm	◉	◉	◉		●	132
PWW 12.000	12000 W			◉	◉	◉		●	132
PWW 18.000	18000 W			◉	◉	◉		●	132
PWW 24.000	24000 W			◉	◉	◉		●	132

[1] performance data based on 50Hz operation
[2] different voltages available on request

● available
○ pending
◉ upon request



Further information can be found on the Internet:
www.pfannenberg.com · **www.pfannenberg-spareparts.com**
Keep up to date. Subscribe to the newsletter now:
newsletter.pfannenberg.com

Chillers 1100–2400 W
Rack 1100 / Rack 1700
Rack 2400



- stand-alone chiller
- fluid cooling with water, water/glycol mixtures and low-viscosity oils*
- anodised aluminium housing cover
- basic housing made of powder-coated sheet steel
- robust laboratory and industry standard in 3 performance classes
- integration of project-specific additional components is possible on request

Further options for the Rack series chillers can be found on page 134.

* maximum viscosity 10 cSt (10 mm²/s) @ + 40 °C

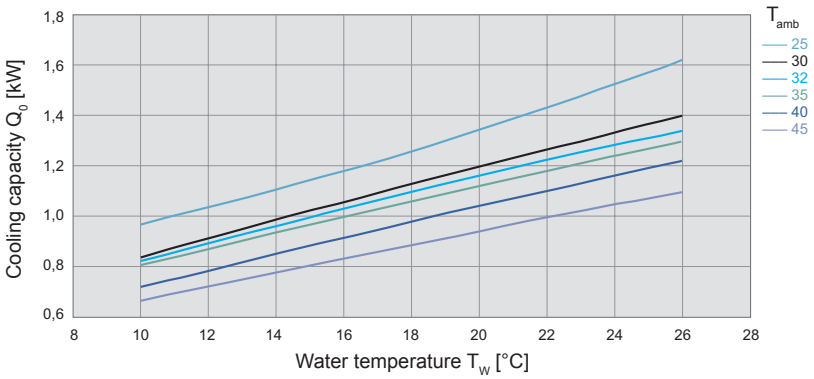
Data		Rack 1100	Rack 1700	Rack 2400	Unit
Article number		42010110003	42010170008	42010240001	
Rated voltage ± 10%		AC 50 / 60			Hz
		230 1~			V
Cooling capacity (with pump)[1]	W18/L32	1.1 / 1.35	1.7 / 2.05	2.4 / 2.7	kW
	W10/L32	0.82 / 1.01	1.28 / 1.61	1.92 / 2.14	
Flow rate (pump)[2]		12		14	l/min
Pressure (head) (pump)		2		2.5	bar
Ambient temperature range		+ 15 … + 45 / + 59 … + 113		+ 15 … + 40 / + 59 … + 104	°C / °F
Control range (refrigerant outlet temperature)		+ 10 … + 35 / + 50 … + 95; factory setting + 18 / + 64			
Target value tolerance		± 2			K
Refrigerant	type	R134a		R404A	
	quantity	700	800	1000	g
Power consumption	W18/L32	0.632 / 0.782	0.724 / 0.826	1.8 / 2.12	kW
Current consumption	W18/L32	4.16 / 3.97	3.8 / 3.94	11.22 / 11.72	A
Starting current	W18/L32	14.67 / 16.3	23.58 / 26.2	33.57 / 37.3	A
Control voltage		230			V
Pre fuse T		10	10	on request	A
Volumetric airflow	external	806	1182	1000	m³/h
Tank volume		5		10	l
Connections (medium)	IG	3/8"			BSPP
Noise level according to EN ISO 3741		< 66		68	dB (A)
Weight (without packaging)		42		61	kg
System of protection (electrical equipment)		IP 20			
Colour		RAL 9005 (different colours on request); cover: aluminium			

Accessories		Article number
Overflow valve (internal)		48000009680
Flow monitor		48000009682
Casters		45000009678
20% Propyleneglycol pre-mix	20 l	45783000123
20% Ethyleneglycol pre-mix	20 l	45783000125

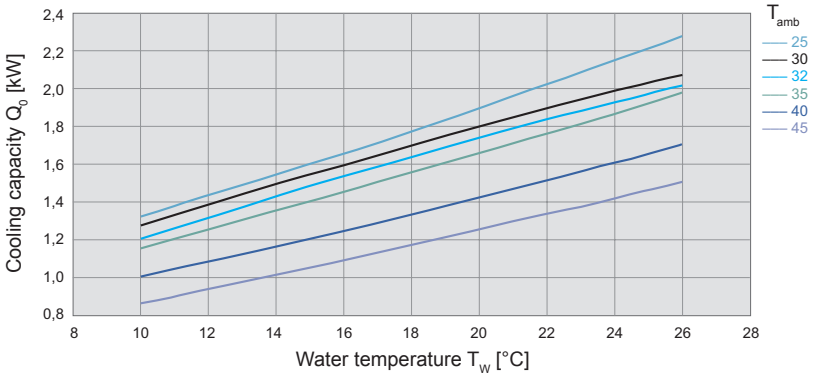
[1] cooling capacity incl. power loss in the pump, refrigerant outlet temperature + 18 °C, ambient temperature + 32 °C
[2] performance data based on 50 Hz operation
Approvals see page 105

Cooling capacity performance curves

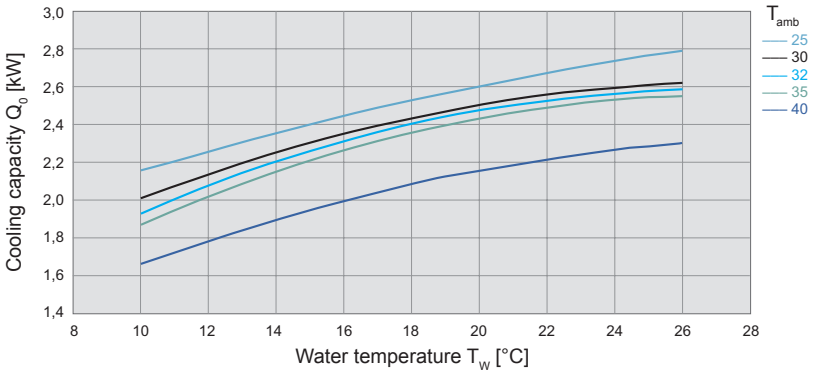
Rack 1100 (50 Hz)[1]



Rack 1700 (50 Hz)[1]

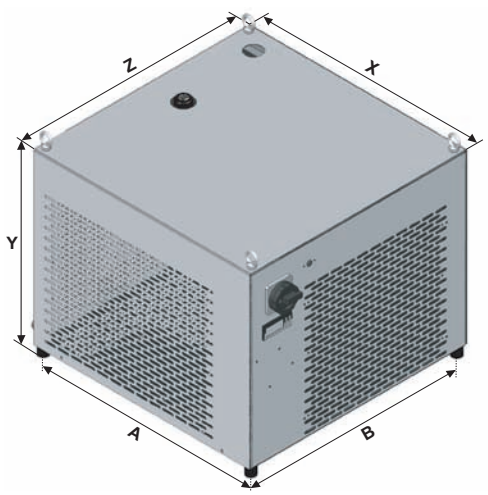


Rack 2400 (50 Hz)[1]



Dimensions

mm	Rack 1100/1700	Rack 2400
X	450	580
Y	395	500[2]
Z	480	580
A	425	555
B	450	550



[1] the performance curves for the 60 Hz version can be obtained from your Pfannenberg advisor or at www.pfannenberg.com

[2] without eye bolts

ECOOL Chillers 1100–2400 W

CC 6101 / CC 6201 / CC 6301



- stand-alone chiller
- fluid cooling with water, water/glycol mixtures and low-viscosity oils*
- steel housing with thick powder coating
- robust industry standard
- mounting on top of the enclosure is possible
- integration of project-specific additional components is possible on request
- separate cooling circuit and hydraulic circuit
- equipped with a programmable control module that allows small hystereses of the temperature of the cooling medium

Further options for the CC series chillers can be found on page 134.

* maximum viscosity 10 cSt (10 mm²/s) @ + 40 °C

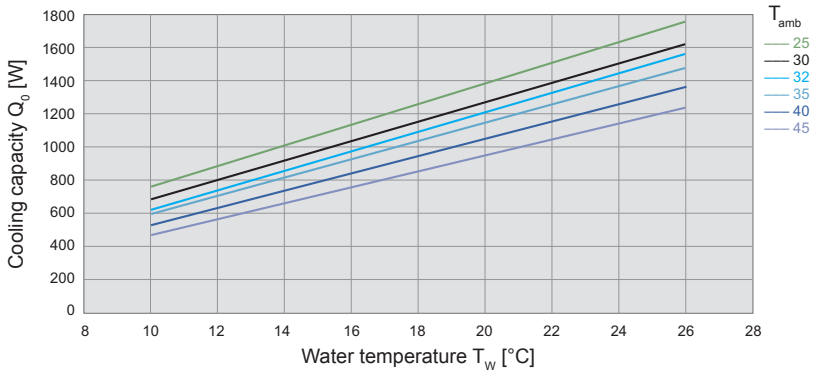
Data		CC 6101		CC 6201		CC 6301		Unit
Article number		42630115200	42630115100	42630175200	42630175100	42630245200	42630245100	
Rated voltage ± 10%		AC 50 / 60	AC 60	AC 50 / 60	AC 60	AC 50 / 60	AC 60	Hz
		230 1~	115 1~	230 1~	115 1~	230 1~	115 1~	V
Cooling capacity (with pump)[1]	W18/L32	1.1	1.3	1.7	1.92	2.4	2.68	kW
	W10/L32	0.64	0.753	0.99	1.165	1.396	1.642	
Flow rate (pump)[2]		12						l/min
Pressure (head) (pump)		3						bar
Ambient temperature range		+ 15 … + 45 / + 59 … + 113						°C / °F
Control range (refrigerant outlet temperature)		+ 10 … + 35 / + 50 … + 95; factory setting + 18 / + 64						
Target value tolerance		± 2						K
Refrigerant	R134a	650						g
Power consumption	W18/L32	1.15	1.38	1.325 / 1.59	1.59	2.926 / 3.511	3.511	kW
Current consumption	W18/L32	5 / 6.1	12.8	5.7 / 7.1	13.8	7.4 / 8.9	30.5	A
Starting current	W18/L32	17.5 / 21.35	32	20 / 24.9	34.5	25.9 / 31.15	54.9	A
Control voltage		230 AC						V
Pre fuse T		15		15	20	20	25	A
Volumetric airflow	external	1300 / 1450	1450	1300 / 1450	1450	1300 / 1450	1450	m³/h
Tank volume		10						l
Connections (medium)	IG	1/2"						BSPP
Noise level according to EN ISO 3741		< 62						dB (A)
Weight (without packaging)		67		67		72		kg
System of protection (electrical equipment)		IP 54						
Colour		RAL 7035, different colours available on request						

Accessories		Article number
Overflow valve (internal)		48700956146
Flow monitor		48700956148
Aluminium pre-filter (condenser)		45700956150
20% Propyleneglycol pre-mix	20 l	45783000123
20% Ethyleneglycol pre-mix	20 l	45783000125

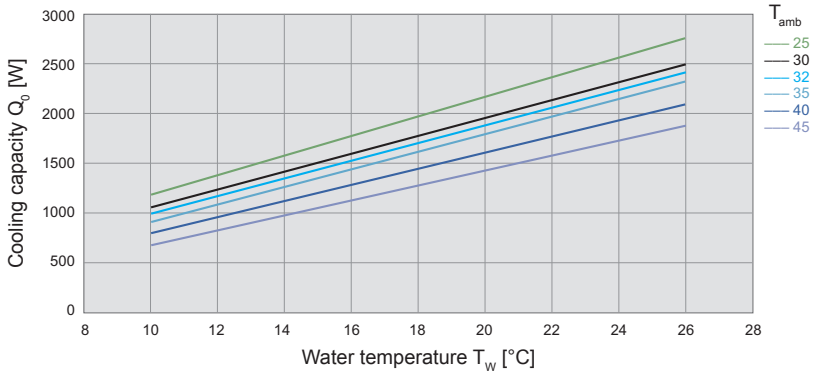
[1] cooling capacity incl. power loss in the pump, refrigerant outlet temperature + 18 °C, ambient temperature + 32 °C
[2] performance data based on 50 Hz operation
Approvals see page 105

Cooling capacity performance curves

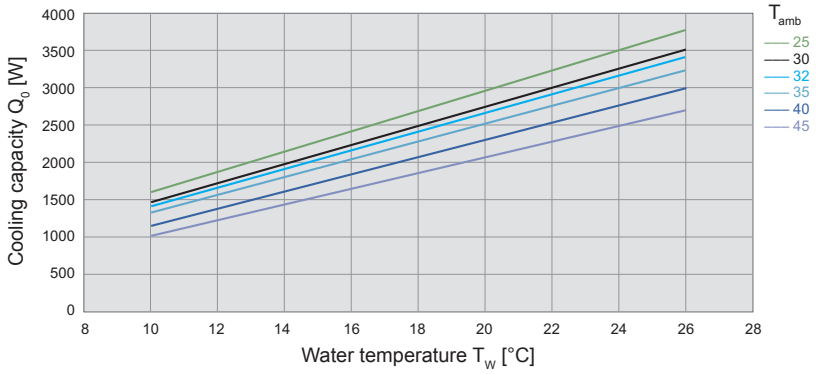
CC 6101 (50 Hz)[1]



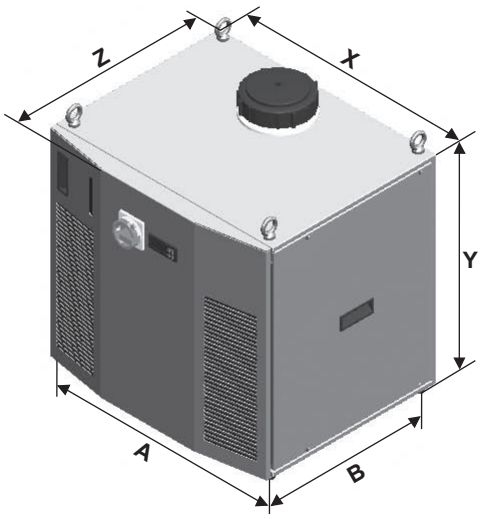
CC 6201 (50 Hz)[1]



CC 6301 (50 Hz)[1]



Dimensions	
mm	CC 6101/6201/6301
X	600
Y	626[2]
Z	480
A	540
B	412



[1] the performance curves for the 60 Hz version can be obtained from your Pfannenberg advisor or at www.pfannenberg.com

[2] without eye bolts

ECOOL Chillers 3500–6500 W

CC 6401 / CC 6501 / CC 6601



- stand-alone chiller
- fluid cooling with water, water/glycol mixtures and low-viscosity oils*
- steel housing with thick powder coating
- robust industry standard
- mounting on top of the enclosure is possible
- integration of project-specific additional components is possible on request
- separate cooling circuit and hydraulic circuit
- equipped with a programmable control module that allows small hystereses of the temperature of the cooling medium

Further options for the CC series chillers can be found on page 134.

* maximum viscosity 10 cSt (10 mm²/s) @ + 40 °C

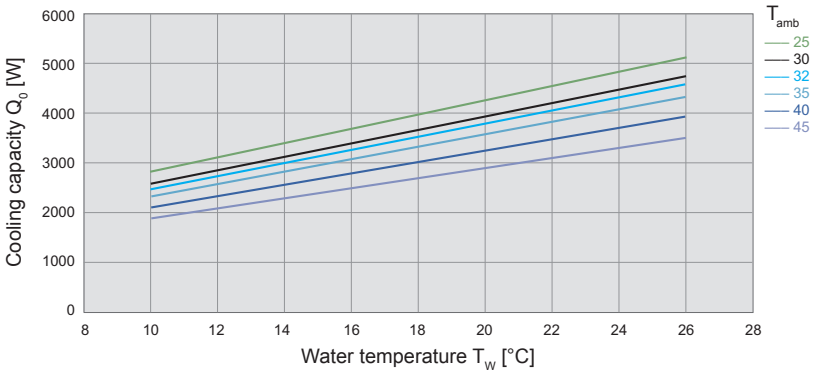
Data		CC 6401	CC 6501	CC 6601	Unit
Article number		42630355300	42630505300	42630655300	
Rated voltage ± 10%		AC 50 / 60	AC 50 / 60	AC 50 / 60	Hz
		400 / 460 3~	400 / 460 3~	400 / 460 3~	V
Cooling capacity (with pump)[1]	W18/L32	3.5	5	6.5	kW
	W10/L32	2.45	3.5	4.55	
Flow rate (pump)[2]		22			l/min
Pressure (head) (pump)		3			bar
Ambient temperature range		+ 15 … + 45 / + 59 … + 113			°C / °F
Control range (refrigerant outlet temperature)		+ 10 … + 35 / + 50 … + 95; factory setting + 18 / + 64			
Target value tolerance		± 2			K
Refrigerant	R134a	1400		1500	g
Power consumption	W18/L32	2.178	2.962	3.294	kW
Current consumption	W18/L32	3.6	4.5	5.3	A
Starting current	W18/L32	12.6	15.75	18.55	A
Control voltage		24 AC			V
Pre fuse T		9		12	A
Volumetric airflow	external	2300			m³/h
Tank volume		30			l
Connections (medium)	IG	3/4"			BSPP
Noise level according to EN ISO 3741		< 62			dB (A)
Weight (without packaging)		109	111	114	kg
System of protection (electrical equipment)		IP 54			
Colour		RAL 7035, different colours available on request			

Accessories		Article number
Overflow valve (internal)		48700956147
Flow monitor		48700956149
Aluminium pre-filter (condenser)		45700956151
20% Propyleneglycol pre-mix	20 l	45783000123
20% Ethyleneglycol pre-mix	20 l	45783000125

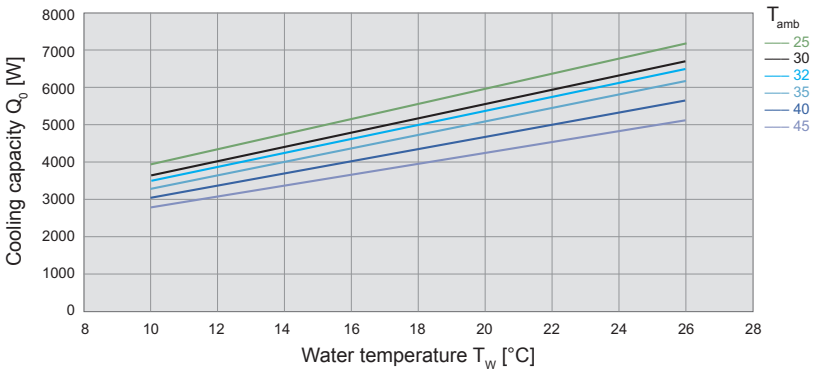
[1] cooling capacity incl. power loss in the pump, refrigerant outlet temperature + 18 °C, ambient temperature + 32 °C
[2] performance data based on 50 Hz operation
Approvals see page 105

Cooling capacity performance curves

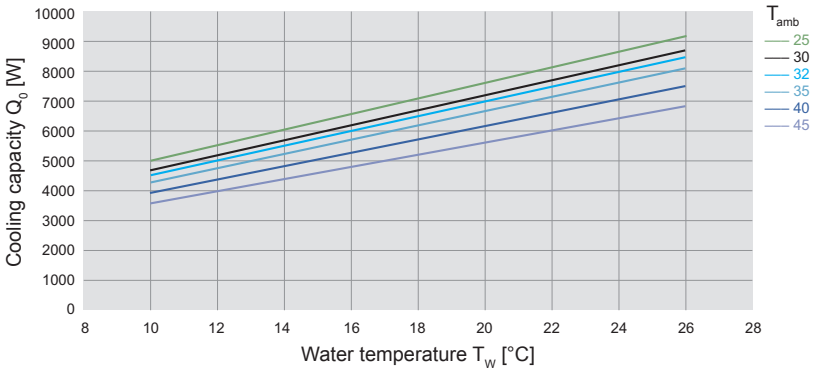
CC 6401 (50 Hz)[1]



CC 6501 (50 Hz)[1]

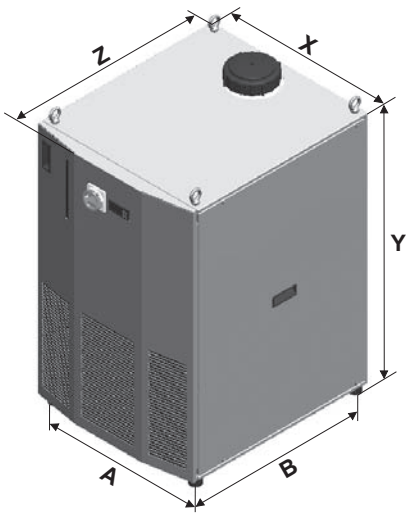


CC 6601 (50 Hz)[1]



Dimensions

mm	CC 6401/6501/6601
X	601
Y	984
Z	670
A	540
B	612



[1] the performance curves for the 60 Hz version can be obtained from your Pfannenberg advisor or at www.pfannenberg.com

[2] without eye bolts

Chillers 3000– 6000 W
EB 30 WT / EB 43 WT / EB 60 WT



- robust industry standard
- fluid cooling with water, water/glycol mixtures and low-viscosity oils*
- steel housing with thick powder coating
- identical basic housing for oil and water cooling
- separate cooling circuit and hydraulic circuit
- equipped with a programmable control module that allows small hystereses of the temperature of the cooling medium
- integration of project-specific additional components is possible on request

Further options for the EB series chillers can be found on page 135.

* maximum viscosity 10 cSt (10 mm²/s) @ + 40 °C

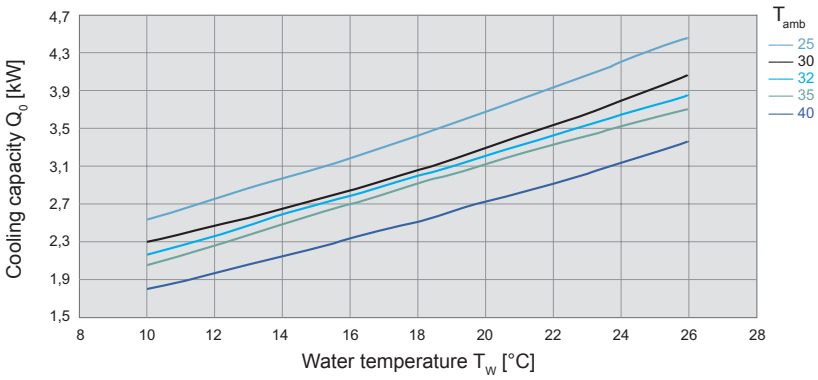
Data		EB 30 WT	EB 43 WT	EB 60 WT	Unit
Article number		42030300003	42030430003	42030600022	
Rated voltage ± 10%		AC 50 / 60			Hz
		400 / 460 3~			V
Cooling capacity (with pump) [1]	W18/L32	3 / 3.3	4.3 / 4.7	6 / 6.5	kW
	W10/L32	2.1 / 2.3	3 / 3.2	3.8 / 3.8	
Flow rate (pump)[2]		14			l/min
Pressure (head) (pump)		2.5			bar
Ambient temperature range		+ 15 … + 40 / + 59 … + 104			°C / °F
Control range (refrigerant outlet temperature)		+ 10 … + 35 / + 50 … + 95; factory setting + 18 / + 64			
Target value tolerance		± 2			K
Refrigerant	R404A	1100	1200	1600	g
Power consumption	W18/L32	2.08 / 2.43	2.78 / 3.25	3.4 / 4.1	kW
Current consumption	W18/L32	4.7 / 4.8	6.5 / 6.8	7.2 / 7.2	A
Starting current	W18/L32	18.7 / 20.8	20.4 / 22.5	28.7 / 30.2	A
Control voltage		24 V AC			V
Pre fuse T		20	20	25	A
Volumetric airflow	external	2000		3000	m³/h
Tank volume		30			l
Connections (medium)	IG	3/4"			BSPP
Noise level according to EN ISO 3741		< 66		< 70	dB (A)
Weight (without packaging)		95	120	150	kg
System of protection (enclosure electrical components)		IP 56			
Colour		RAL 7035, different colours available on request			

Accessories		Article number
Overflow valve (internal)		48000012266
Flow monitor		48000012268
Aluminium pre-filter (condenser)		45000012286
Casters		45000012284
20% Propyleneglycol pre-mix	20 l	45783000123
20% Ethyleneglycol pre-mix	20 l	45783000125

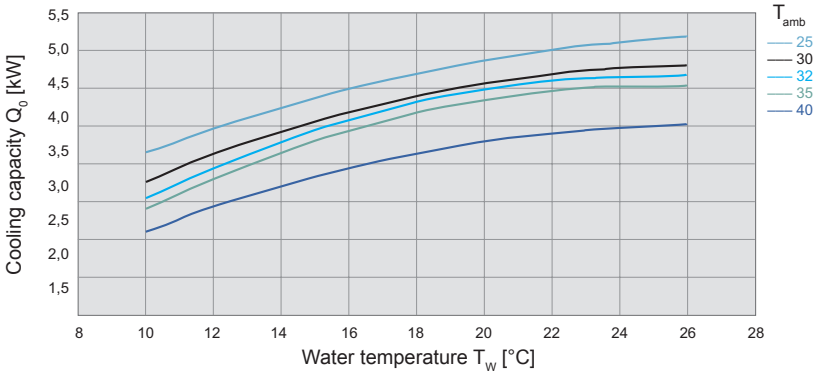
[1] cooling capacity incl. power loss in the pump, refrigerant outlet temperature + 18 °C, ambient temperature + 32 °C
[2] performance data based on 50 Hz operation
Approvals see page 105

Cooling capacity performance curves

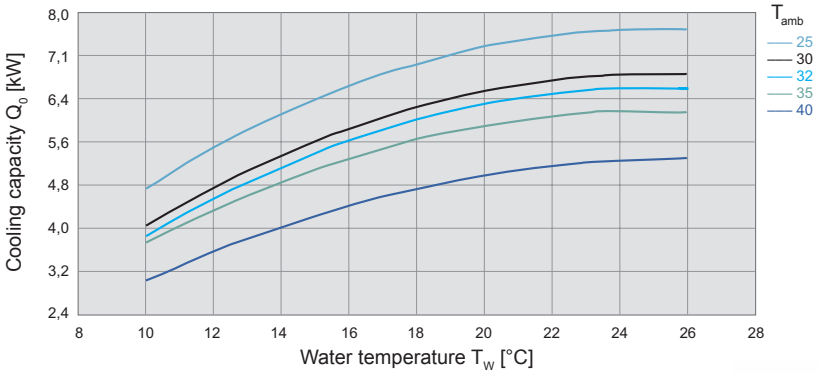
EB 30 WT (50 Hz)[1]



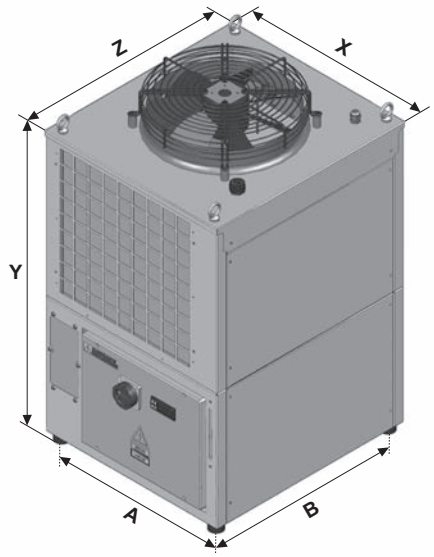
EB 43 WT (50 Hz)[1]



EB 60 WT (50 Hz)[1]



Dimensions	
mm	EB 30/43/60 WT
X	555
Y	955[2]
Z	610
A	495
B	550



[1] the performance curves for the 60 Hz version can be obtained from your Pfannenberg advisor or at www.pfannenberg.com

[2] incl. fan

Chillers 7500 – 15000 W
EB 75 WT / EB 90 WT / EB 130 WT / EB 150 WT



- robust industry standard
- fluid cooling with water, water/glycol mixtures and low-viscosity oils*
- steel housing with thick powder coating
- identical basic housing for oil and water cooling
- separate cooling circuit and hydraulic circuit
- equipped with a programmable control module that allows small hystereses of the temperature of the cooling medium
- integration of project-specific additional components is possible on request

Further options for the EB series chillers can be found on page 135.

* maximum viscosity 10 cSt (10 mm²/s) @ + 40 °C

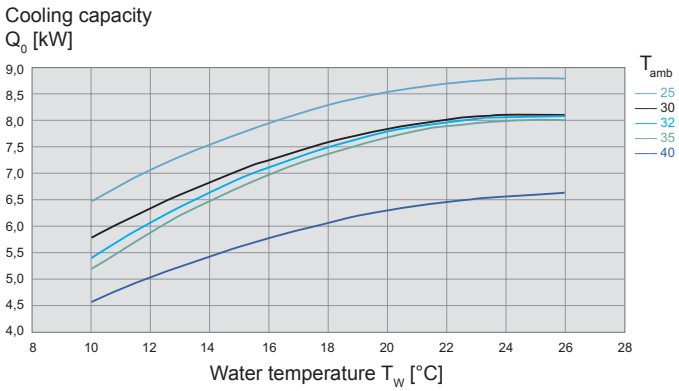
Data		EB 75 WT	EB 90 WT	EB 130 WT	EB 150 WT	Unit
Article number		42030750003	42030900009	42031300001	42031500001	
Rated voltage ± 10%		AC 50 / 60				Hz
		400 / 460 3~				V
Cooling capacity (with pump)[1]	W18/L32	7.5 / 8.3	9 / 10	13 / 14.3	15 / 16.6	kW
	W10/L32	5.4 / 5.7	6.9 / 7.5	10.5 / 11.4	11.8 / 12.8	
Flow rate (pump)[2]		35				l/min
Pressure (head) (pump)		3				bar
Ambient temperature range		+ 15 … + 40 / + 59 … + 104				°C / °F
Control range (refrigerant outlet temperature)		+ 10 … + 35 / + 50 … + 95; factory setting + 18 / + 64				
Target value tolerance		± 2				K
Refrigerant	R404A	2000	2300	3500	3400	g
Power consumption	W18/L32	4.87 / 5.76	6.48 / 7.1	8 / 10	8.86 / 11.01	kW
Current consumption	W18/L32	9.7 / 9.7	13.17 / 13	14.5 / 15.8	16.39 / 17.91	A
Starting current	W18/L32	30.6 / 31.4	42.5 / 46.6	65.4 / 68.9	72.8 / 75.9	A
Control voltage		24 V AC				V
Pre fuse T		25	25	on request	on request	A
Volumetric airflow	external	3000	5000			m³/h
Tank volume		50				l
Connections (medium)	IG	1"				BSPP
Noise level according to EN ISO 3741		< 72				dB (A)
Weight (without packaging)		160	180	205	225	kg
System of protection (enclosure electrical components)		IP 56				
Colour		RAL 7035, different colours available on request				

Accessories		Article number
Overflow valve (internal)		48000012267
Flow monitor		48000012269
Aluminium pre-filter (condenser)		45000012287
Casters		45000012285
20% Propyleneglycol pre-mix	20 l	45783000123
20% Ethyleneglycol pre-mix	20 l	45783000125

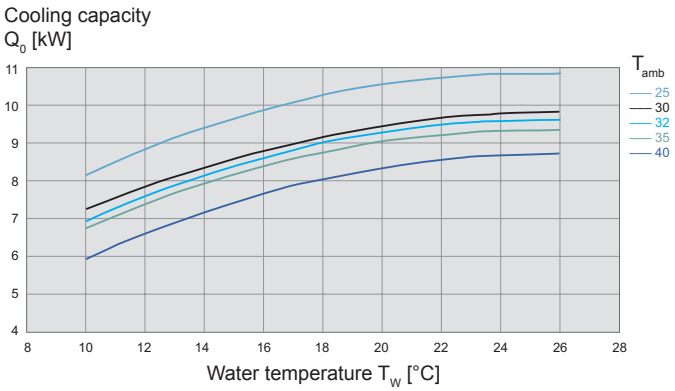
[1] cooling capacity incl. power loss in the pump, refrigerant outlet temperature + 18 °C, ambient temperature + 32 °C
[2] performance data based on 50 Hz operation
Approvals see page 105

Cooling capacity performance curves

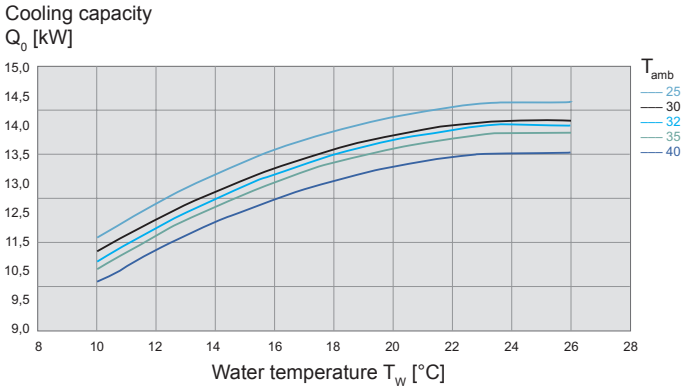
EB 75 WT (50 Hz)[1]



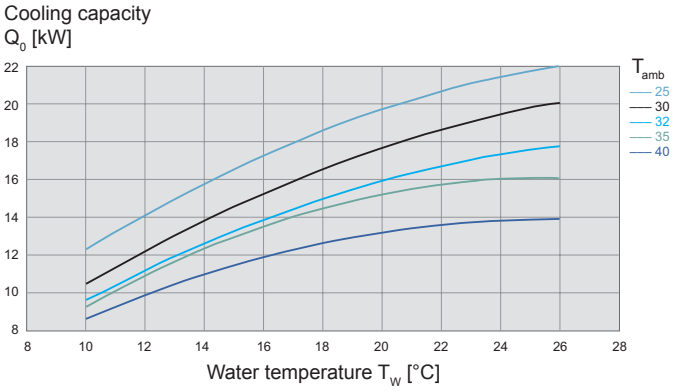
EB 90 WT (50 Hz)[1]



EB 130 WT (50 Hz)[1]

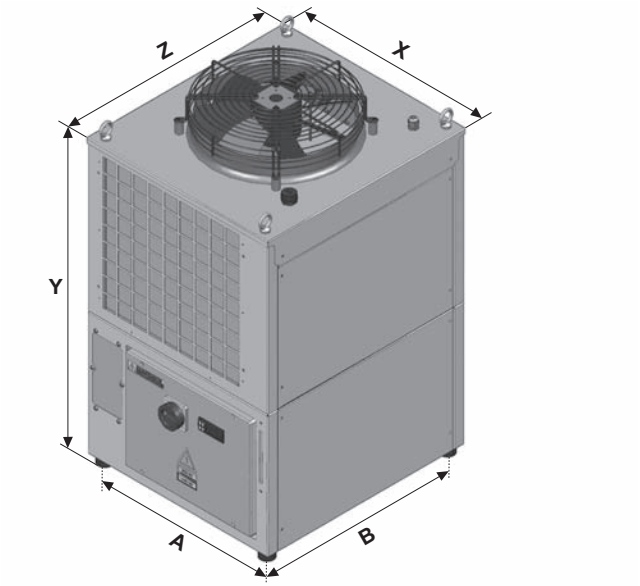


EB 150 WT (50 Hz)[1]



Dimensions

mm	EB 75/90/130/150 WT
X	705
Y	1290[2]
Z	765
A	645
B	700



[1] the performance curves for the 60 Hz version can be obtained from your Pfannenberg advisor or at www.pfannenberg.com

[2] incl. fan

Chillers 19000–25000 W
EB 190 WT
EB 250 WT



- robust industry standard
- fluid cooling with water, water/glycol mixtures and low-viscosity oils*
- steel housing with thick powder coating
- identical basic housing for oil and water cooling
- separate cooling circuit and hydraulic circuit
- equipped with a programmable control module that allows small hystereses of the temperature of the cooling medium
- integration of project-specific additional components is possible on request

Further options for the EB series chillers can be found on page 135.

* maximum viscosity 10 cSt (10 mm²/s) @ + 40 °C

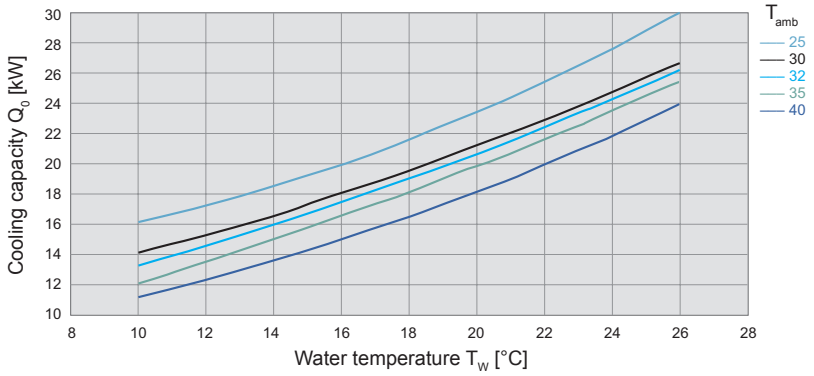
Data		EB 190 WT	EB 250 WT	Unit
Article number		42031900001	42032500001	
Rated voltage ± 10%		AC 50 / 60		Hz
		400 / 460 3~		V
Cooling capacity (with pump)[1]	W18/L32	19 / 21	25 / 27.7	kW
	W10/L32	13.3 / 14.8	17.7 / 19.7	
Flow rate (pump)[2]		50		l/min
Pressure (head) (pump)		3		bar
Ambient temperature range		+ 15 … + 40 / + 59 … + 104		°C / °F
Control range (refrigerant outlet temperature)		+ 10 … + 35 / + 50 … + 95; factory setting + 18 / + 64		
Target value tolerance		± 2		K
Refrigerant	R407C	10000		g
Power consumption	W18/L32	10.7 / 13.7	12.3 / 15.7	kW
Current consumption	W18/L32	20.2 / 21.1	22.5 / 23.1	A
Starting current	W18/L32	123.9 / 126.2	148.2 / 152.8	A
Control voltage		24 V AC		V
Pre fuse T		on request		A
Volumetric airflow	external	11800 / 12980		m³/h
Tank volume		70	70	l
Connections (medium)	IG	1"		BSPP
Noise level according to EN ISO 3741		< 73		dB (A)
Weight (without packaging)		389	403	kg
System of protection (enclosure electrical components)		IP 56		
Colour		RAL 7035, different colours available on request		

Accessories		Article number
Overflow valve (internal)		48000012865
Flow monitor		48000012866
Aluminium pre-filter (condenser)		45000012763
Casters		45000012867
20% Propyleneglycol pre-mix	20 l	45783000123
20% Ethyleneglycol pre-mix	20 l	45783000125

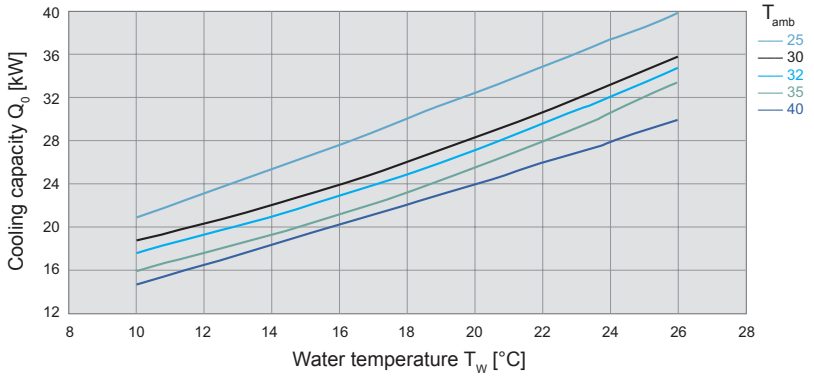
[1] cooling capacity incl. power loss in the pump, refrigerant outlet temperature + 18 °C, ambient temperature + 32 °C
[2] performance data based on 50 Hz operation
Approvals see page 105

Cooling capacity performance curves

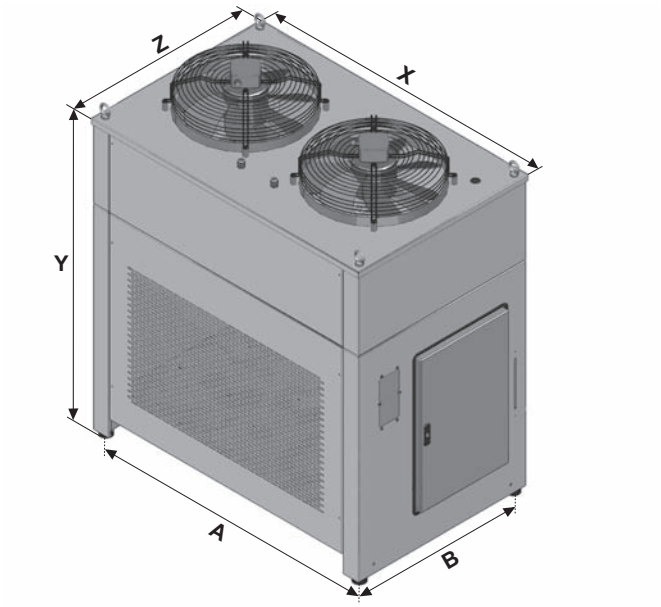
EB 190 WT (50 Hz)[1]



EB 250 WT (50 Hz)[1]



Dimensions	
mm	EB 190/250 WT
X	1230
Y	1410[2]
Z	790
A	1145
B	695



[1] the performance curves for the 60 Hz version can be obtained from your Pfannenberg advisor or at www.pfannenberg.com

[2] incl. fan

Chillers 30000–40000 W
EB 300 WT / EB 350 WT / EB 400 WT



- robust industry standard
- fluid cooling with water, water/glycol mixtures and low-viscosity oils*
- steel housing with thick powder coating
- identical basic housing for oil and water cooling
- separate cooling circuit and hydraulic circuit
- equipped with a programmable control module that allows small hystereses of the temperature of the cooling medium
- integration of project-specific additional components is possible on request

Further options for the EB series chillers can be found on page 135.

* maximum viscosity 10 cSt (10 mm²/s) @ + 40 °C

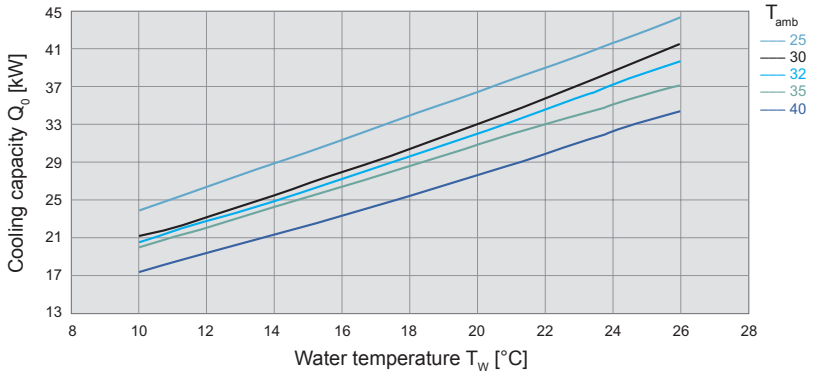
Data		EB 300 WT	EB 350 WT	EB 400 WT	Unit
Article number		42033000001	42033500001	42034000001	
Rated voltage ± 10%		AC 50 / 60			Hz
		400 / 460 3~			V
Cooling capacity (with pump)[1]	W18/L32	30 / 32.8	35 / 38.3	40 / 44.4	kW
	W10/L32	20.6 / 22.9	23.4 / 26	27.6 / 30.6	
Flow rate (pump)[2]		80			l/min
Pressure (head) (pump)		3.5			bar
Ambient temperature range		+ 15 … + 40 / + 59 … + 104			°C / °F
Control range (refrigerant outlet temperature)		+ 10 … + 35 / + 50 … + 95; factory setting + 18 / + 64			
Target value tolerance		± 2			K
Refrigerant	R407C	13000	12000	13000	g
Power consumption	W18/L32	14.8 / 18.5	17.3 / 22.0	19.5 / 24.4	kW
Current consumption	W18/L32	27.8 / 28.1	31.3 / 32.2	35.4 / 36.4	A
Starting current	W18/L32	157.8 / 161.1	182.8 / 191.1	212.9 / 216.1	A
Control voltage		24 V AC			V
Pre fuse T		on request			A
Volumetric airflow	external	14100 / 15510			m³/h
Tank volume		120			l
Connections (medium)	IG	1-1/2"			BSPP
Noise level according to EN ISO 3741		< 73			dB (A)
Weight (without packaging)		434	448	476	kg
System of protection (enclosure electrical components)		IP 56			
Colour		RAL 7035, different colours available on request			

Accessories		Article number
Overflow valve (internal)		48000012869
Flow monitor		48000012870
Aluminium pre-filter (condenser)		45000012868
Casters		45000012867
20% Propyleneglycol pre-mix	20 l	45783000123
20% Ethyleneglycol pre-mix	20 l	45783000125

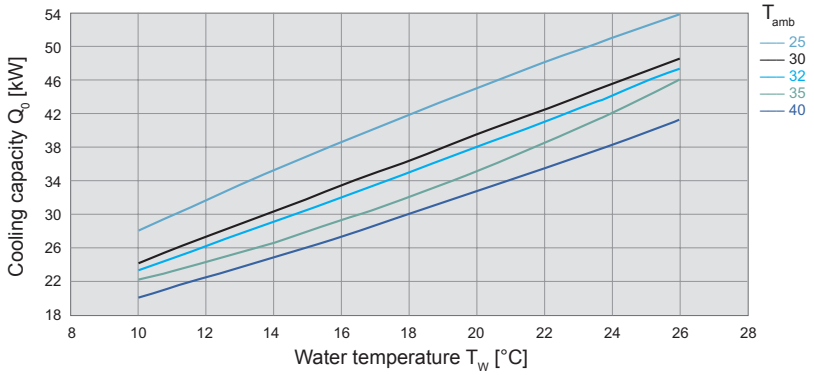
[1] cooling capacity incl. power loss in the pump, refrigerant outlet temperature + 18 °C, ambient temperature + 32 °C
[2] performance data based on 50 Hz operation
Approvals see page 105

Cooling capacity performance curves

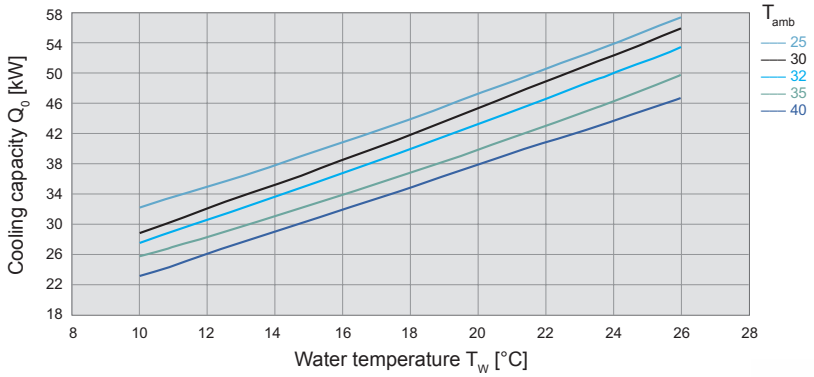
EB 300 WT (50 Hz)[1]



EB 350 WT (50 Hz)[1]

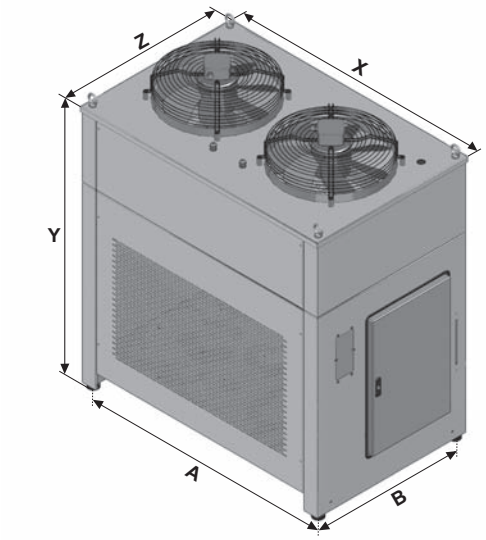


EB 400 WT (50 Hz)[1]



Dimensions

mm	EB 300/350/400 WT
X	1680
Y	1410[2]
Z	790
A	1595
B	695



[1] the performance curves for the 60 Hz version can be obtained from your Pfannenberg advisor or at www.pfannenberg.com

[2] incl. fan

Chillers 3000–6000 W
EB 30 (oil) / EB 43 (oil) / EB 60 (oil)



- robust industry standard
- fluid cooling with oil*
- steel housing with thick powder coating
- identical basic housing for oil and water cooling
- separate cooling circuit and hydraulic circuit
- equipped with a programmable control module that allows small hystereses of the temperature of the cooling medium
- integration of project-specific additional components is possible on request

Further options for the EB series chillers can be found on page 135.

* viscosity in the standard 10 cSt (10 mm²/s) to 32 cSt (32 mm²/s) @ + 40 °C

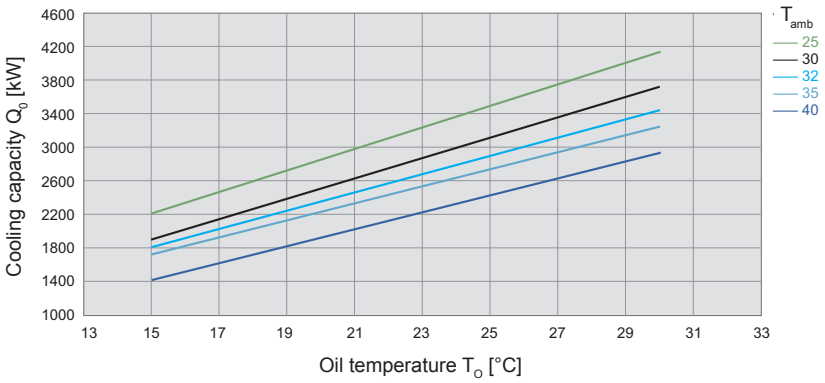
Data	EB 30 (oil)	EB 43 (oil)	EB 60 (oil)	Unit
Article number	43030300003	43030430003	43030600001	
Rated voltage ± 10%	AC 50 / 60			Hz
	400 / 460 3~			V
Cooling capacity (with pump)[1] O26/L32	3 / 3.3	4.3 / 4.7	6 / 6.5	kW
Flow rate (pump)[2]	10	25	25	l/min
Pressure (head) (pump)	10			bar
Ambient temperature range	+ 15 … + 40 / + 59 … + 104			°C / °F
Control range (refrigerant outlet temperature)	+20 … + 35 / + 68 … + 95; factory setting + 26 / + 79			
Target value tolerance	± 2			K
Refrigerant R404A	1100	1200	1600	g
Power consumption O26/L32	2.38 / 2.73	3.08 / 3.55	3.00 / 3.72	kW
Current consumption O26/L32	5.17 / 5.9	7.18 / 7.48	5.44 / 5.76	A
Starting current O26/L32	19.5 / 21.5	20.9 / 23.2	29.5 / 31.5	A
Control voltage	24 V AC			V
Pre fuse T	20	20	25	A
Volumetric airflow external	2000		3000	m³/h
Tank volume	–			l
Connections (medium) IG	3/4"			BSPP
Noise level according to EN ISO 3741	< 66		< 70	dB (A)
Weight (without packaging)	95	120	150	kg
System of protection (enclosure electrical components)	IP 56			
Colour	RAL 7035, different colours available on request			

Accessories	Article number	
Overflow valve (internal)	48700956059	48700956067
Flow monitor	48000012875	
Oil filter (90 µm)	45700956063	
Aluminium pre-filter (condenser)	45000012286	
Casters	45000012284	

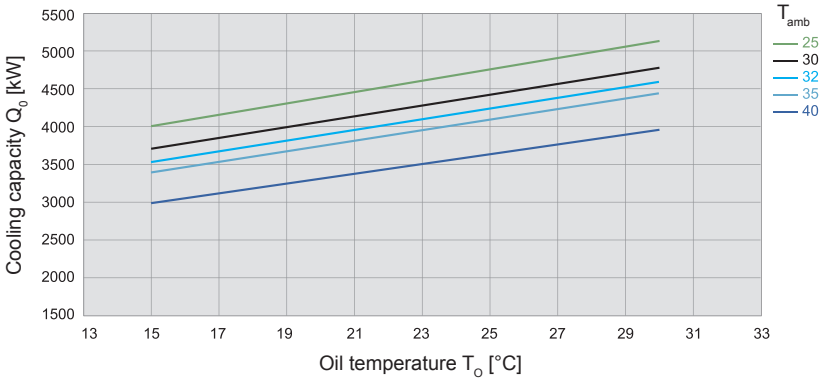
[1] cooling capacity incl. power loss in the pump, oil outlet temperature + 26 °C, ambient temperature + 32 °C, oil viscosity 22 cSt @ + 40 °C
[2] performance data based on 50 Hz operation
Approvals see page 105

Cooling capacity performance curves

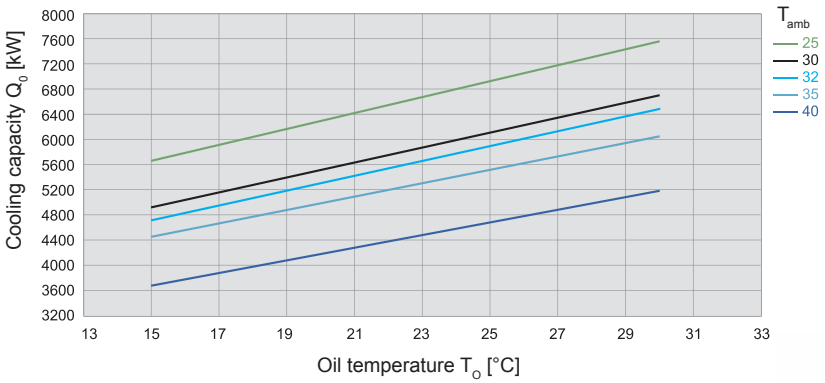
EB 30 (oil) (50 Hz)[1]



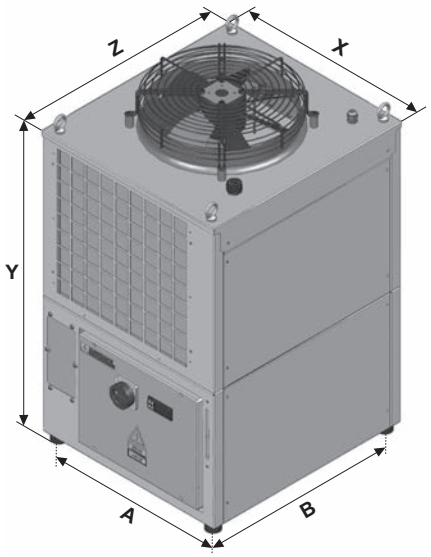
EB 43 (oil) (50 Hz)[1]



EB 60 (oil) (50 Hz)[1]



Dimensions	
mm	EB 30/43/60 (oil)
X	555
Y	955[2]
Z	610
A	495
B	550



[1] the performance curves for the 60 Hz version can be obtained from your Pfannenberg advisor or at www.pfannenberg.com

[2] incl. fan

Chillers 7500–15000 W
EB 75 (oil) / EB 90 (oil) / EB 130 (oil) / EB 150 (oil)



- robust industry standard
- fluid cooling with oil*
- steel housing with thick powder coating
- identical basic housing for oil and water cooling
- separate cooling circuit and hydraulic circuit
- equipped with a programmable control module that allows small hystereses of the temperature of the cooling medium
- integration of project-specific additional components is possible on request

Further options for the EB series chillers can be found on page 135.

* viscosity in the standard 10 cSt (10 mm²/s) to 32 cSt (32 mm²/s) @ + 40 °C

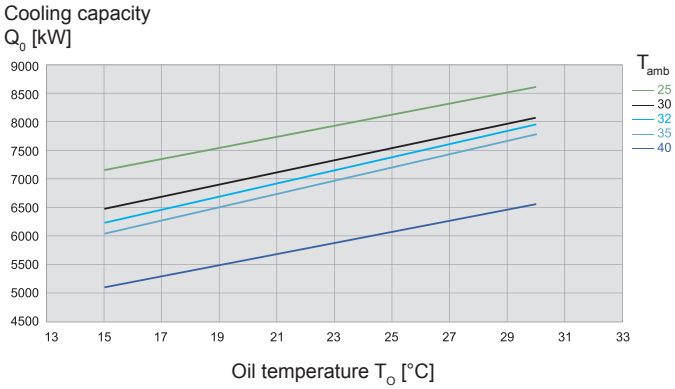
Data	EB 75 (oil)	EB 90 (oil)	EB 130 (oil)	EB 150 (oil)	Unit
Article number	43030750001	43030900001	43031300001	43031500001	
Rated voltage ± 10%	AC 50 / 60				Hz
	400 / 460 3~				V
Cooling capacity (with pump)[1] O26/L32	7.5 / 8.3	9 / 10	13 / 14.3	15 / 16.6	kW
Flow rate (pump)[2]	35	35	60	60	l/min
Pressure (head) (pump)	10				bar
Ambient temperature range	+ 15 … + 40 / + 59 … + 104				°C / °F
Control range (refrigerant outlet temperature)	+20 … + 35 / + 68 … + 95; factory setting + 26 / + 79				
Target value tolerance	± 2				K
Refrigerant R404A	2000	2300	3500	3400	g
Power consumption O26/L32	5.27 / 6.26	6.88 / 8.11	8.4 / 10.5	9.36 / 12.61	kW
Current consumption O26/L32	10.6 / 11.1	14.07 / 14.4	15.4 / 17.2	17.79 / 19.31	A
Starting current O26/L32	31.3 / 31.4	43.94 / 48.6	67.0 / 70.1	74.1 / 77.3	A
Control voltage	24 V AC				V
Pre fuse T	25	25	on request	on request	A
Volumetric airflow external	3000	5000			m³/h
Tank volume	–				l
Connections (medium) IG	1"				BSPP
Noise level according to EN ISO 3741	< 72				dB (A)
Weight (without packaging)	160	180	205	225	kg
System of protection (enclosure electrical components)	IP 56				
Colour	RAL 7035, different colours available on request				

Accessories	Article number	
Overflow valve (internal)	48700956060	48700956061
Flow monitor	48000012873	
Oil filter (90 µm)	45700956064	
Aluminium pre-filter (condenser)	45000012287	
Casters	45000012285	

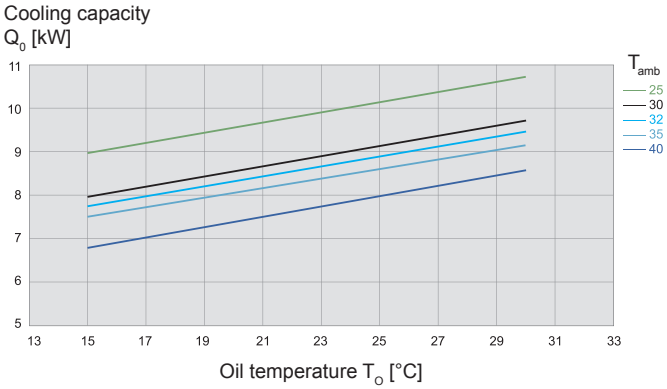
[1] cooling capacity incl. power loss in the pump, oil outlet temperature + 26 °C, ambient temperature + 32 °C, oil viscosity 22 cSt @ + 40 °C
[2] performance data based on 50 Hz operation
Approvals see page 105

Cooling capacity performance curves

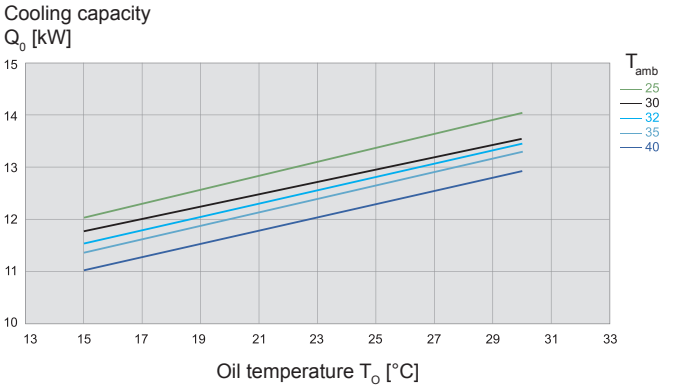
EB 75 (oil) (50 Hz)[1]



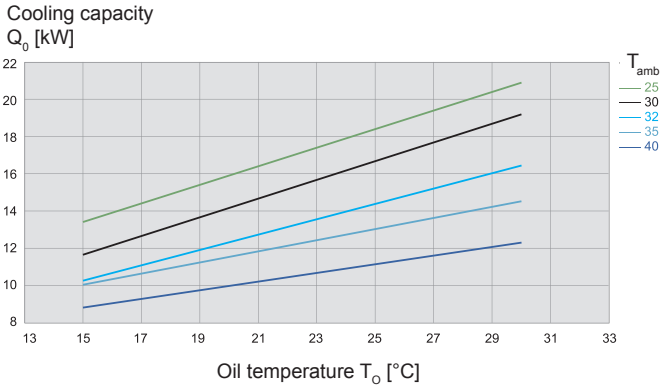
EB 90 (oil) (50 Hz)[1]



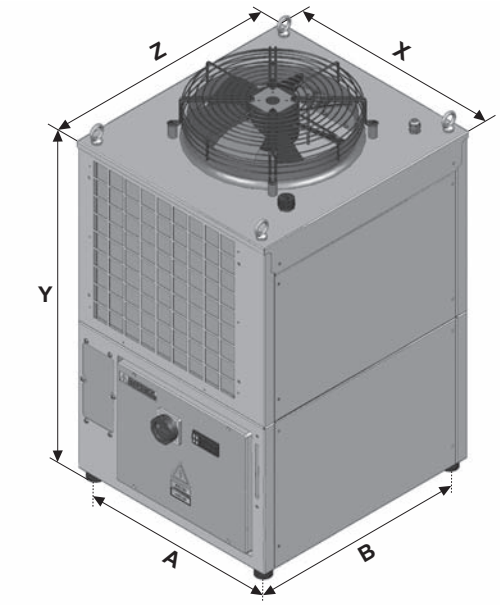
EB 130 (oil) (50 Hz)[1]



EB 150 (oil) (50 Hz)[1]



Dimensions	
mm	EB 75/90/130/150 (oil)
X	705
Y	1290[2]
Z	765
A	645
B	700



[1] the performance curves for the 60 Hz version can be obtained from your Pfannenberg advisor or at www.pfannenberg.com

[2] incl. fan

Chillers 19000–25000 W
EB 190 (oil) / EB 250 (oil)



- robust industry standard
- fluid cooling with oil*
- steel housing with thick powder coating
- identical basic housing for oil and water cooling
- separate cooling circuit and hydraulic circuit
- equipped with a programmable control module that allows small hystereses of the temperature of the cooling medium
- integration of project-specific additional components is possible on request

Further options for the EB series chillers can be found on page 135.

* viscosity in the standard 10 cSt (10 mm²/s) to 32 cSt (32 mm²/s) @ + 40 °C

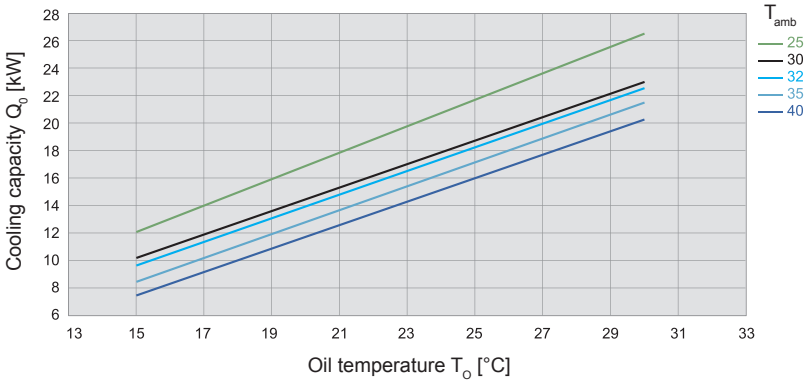
Data		EB 190 (oil)	EB 250 (oil)	Unit
Article number		43031900001	43032500001	
Rated voltage ± 10%		AC 50 / 60		Hz
		400 / 460 3~		V
Cooling capacity (with pump)[1]	O26/L32	19 / 21	25 / 27.7	kW
Flow rate (pump)[2]		60		l/min
Pressure (head) (pump)		10		bar
Ambient temperature range		+ 15 … + 40 / + 59 … + 104		°C / °F
Control range (refrigerant outlet temperature)		+20 … + 35 / + 68 … + 95; factory setting + 26 / + 79		
Target value tolerance		± 2		K
Refrigerant	R407C	10000		g
Power consumption	O26/L32	12.0 / 14.2	14.7 / 17.6	kW
Current consumption	O26/L32	20.8 / 20.8	24.7 / 25.1	A
Starting current	O26/L32	125.6 / 126.7	151.3 / 153.2	A
Control voltage		24 V AC		V
Pre fuse T		on request		A
Volumetric airflow	external	11800 / 12980		m³/h
Tank volume		–		l
Connections (medium)	IG	1"		BSPP
Noise level according to EN ISO 3741		< 73		dB (A)
Weight (without packaging)		350	390	kg
System of protection (enclosure electrical components)		IP 56		
Colour		RAL 7035, different colours available on request		

Accessories	Article number
Overflow valve (internal)	48000012873
Flow monitor	48000012871
Aluminium pre-filter (condenser)	45000012763
Casters	45000012867

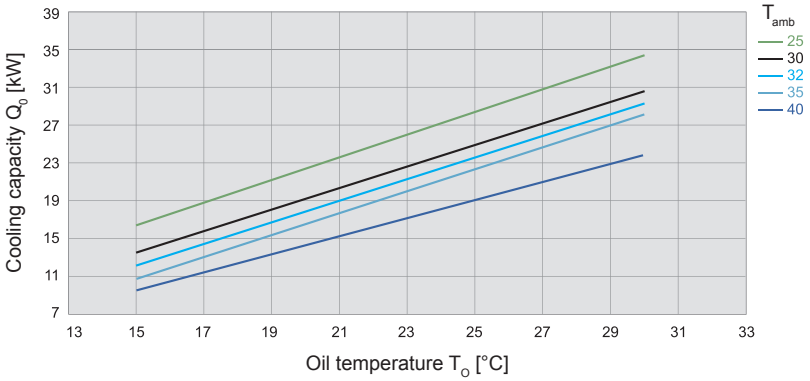
[1] cooling capacity incl. power loss in the pump, oil outlet temperature + 26 °C, ambient temperature + 32 °C, oil viscosity 22 cSt @ + 40 °C
[2] performance data based on 50 Hz operation
Approvals see page 105

Cooling capacity performance curves

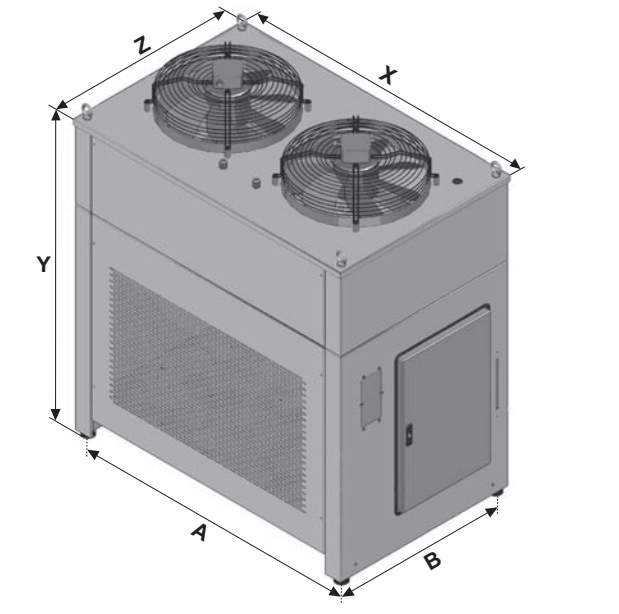
EB 190 (oil) (50 Hz)[1]



EB 250 (oil) (50 Hz)[1]



Dimensions	
mm	EB 190/250 (oil)
X	1230
Y	1410[2]
Z	790
A	1145
B	695



[1] the performance curves for the 60 Hz version can be obtained from your Pfannenberg advisor or at www.pfannenberg.com

[2] incl. fan

Chillers 30000–40000 W
EB 300 (oil) / EB 350 (oil) / EB 400 (oil)



- robust industry standard
- fluid cooling with oil*
- steel housing with thick powder coating
- identical basic housing for oil and water cooling
- separate cooling circuit and hydraulic circuit
- equipped with a programmable control module that allows small hystereses of the temperature of the cooling medium
- integration of project-specific additional components is possible on request

Further options for the EB series chillers can be found on page 135.

* viscosity in the standard 10 cSt (10 mm²/s) to 32 cSt (32 mm²/s) @ + 40 °C

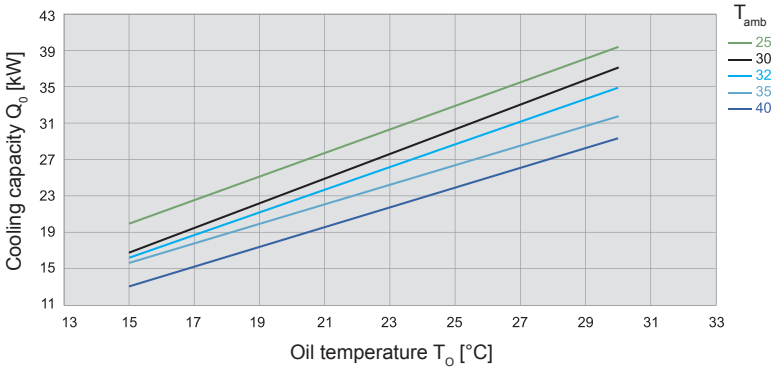
Data	EB 300 (oil)	EB 350 (oil)	EB 400 (oil)	Unit
Article number	43033000001	43033500001	43034000001	
Rated voltage ± 10%	AC 50 / 60			Hz
	400 / 460 3~			V
Cooling capacity (with pump)[1] O26/L32	30 / 32.8	35 / 38.3	40 / 44.4	kW
Flow rate (pump)[2]	80			l/min
Pressure (head) (pump)	10			bar
Ambient temperature range	+ 15 … + 40 / + 59 … + 104			°C / °F
Control range (refrigerant outlet temperature)	+20 … + 35 / + 68 … + 95; factory setting + 26 / + 79			
Target value tolerance	± 2			K
Refrigerant R407C	13000	12000	13000	g
Power consumption O26/L32	14.8 / 18.3	19.4 / 22.3	21.3 / 25.6	kW
Current consumption O26/L32	27.2 / 28.1	33.1 / 34.5	38.3 / 39.2	A
Starting current O26/L32	159.1 / 164.1	184.2 / 193.5	214.6 / 219.2	A
Control voltage	24 V AC			V
Pre fuse T	on request			A
Volumetric airflow external	14100 / 15510			m³/h
Tank volume	–			l
Connections (medium) IG	1 1/2"			BSPP
Noise level according to EN ISO 3741	< 73			dB (A)
Weight (without packaging)	424	438	466	kg
System of protection (enclosure electrical components)	IP 56			
Colour	RAL 7035, different colours available on request			

Accessories	Article number
Overflow valve (internal)	48000012874
Flow monitor	48000012872
Aluminium pre-filter (condenser)	45000012868
Casters	45000012867

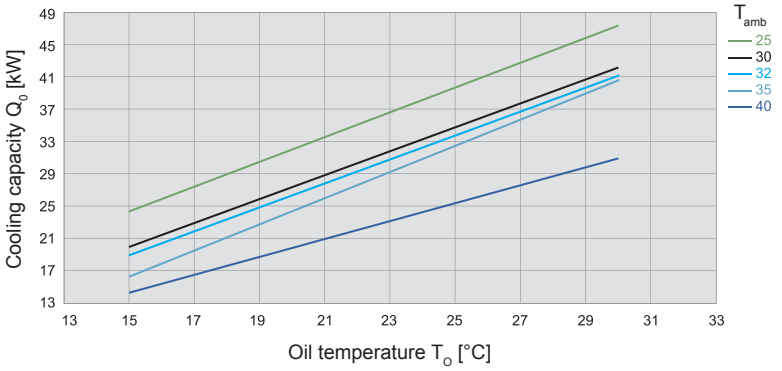
[1] cooling capacity incl. power loss in the pump, oil outlet temperature + 26 °C, ambient temperature + 32 °C, oil viscosity 22 cSt @ + 40 °C
[2] performance data based on 50 Hz operation
Approvals see page 105

Cooling capacity performance curves

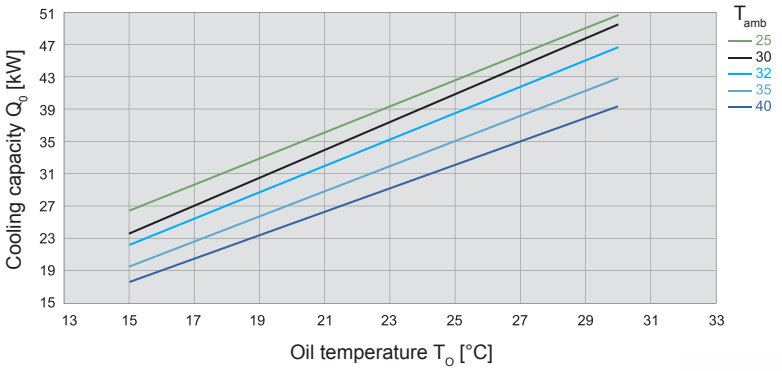
EB 300 (oil) (50 Hz)[1]



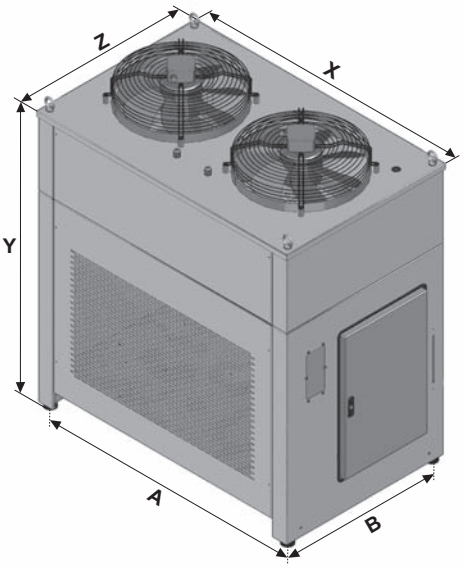
EB 350 (oil) (50 Hz)[1]



EB 400 (oil) (50 Hz)[1]



Dimensions	
mm	EB 300/350/400 (oil)
X	1680
Y	1410[2]
Z	790
A	1595
B	695



[1] the performance curves for the 60 Hz version can be obtained from your Pfannenberg advisor or at www.pfannenberg.com

[2] incl. fan

Chillers 55000–70000 W
HK 55 WT / HK 62 WT / HK 70 WT



- stand-alone chiller, automatic operation
- fluid cooling with water, water/glycol mixtures, emulsions and low-viscosity oils*
- particularly suitable for outdoors and aggressive environmental conditions
- powder-coated steel housing
- cooling circuit controlled via a programmable temperature module
- anti-freeze thermostat
- transport eye bolts on housing
- integration of project-specific additional components is possible on request
- fluid cooling with oil on request

Further options for the HK series chillers can be found on page 135.

* maximum viscosity 10 cSt (10 mm²/s) @ + 40 °C

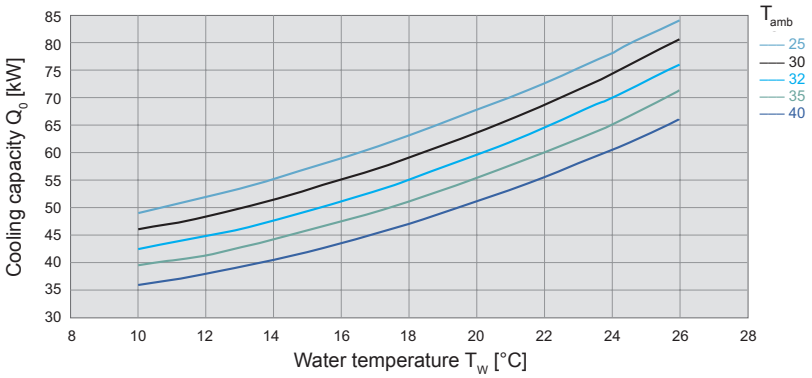
Data		HK 55 WT	HK 62 WT	HK 70 WT	Unit
Article number		42105500002	42106200001	42107000001	
Rated voltage ± 10%		AC 50 / 60			Hz
		400 / 460 3~			V
Cooling capacity (with pump)[1]	W18/L32	55 / 72.5	62 / 72.5	70 / 89	kW
	W10/L32	42.5 / 51.5	49.5 / 58	53 / 63	
Flow rate (pump)[2]		85	160	160	l/min
Pressure (head) (pump)		3			bar
Ambient temperature range		+ 15 … + 40 / + 59 … + 104			°C/°F
Control range (refrigerant outlet temperature)		+ 10 … + 35 / + 50 … + 95; factory setting + 18 / + 64			
Target value tolerance		± 2			K
Refrigerant	R407C	14500	16000	19000	g
Power consumption	W18/L32	19.7 / 25.9	23.8 / 28.0	28.5 / 33.3	kW
Current consumption	W18/L32	37.4 / 46.5	40.5 / 50.4	48.8 / 56.7	A
Starting current	W18/L32	220.8 / 266.8	232.6 / 267.5	311.7 / 334.6	A
Control voltage		24 V AC			V
Pre fuse T		on request			A
Volumetric airflow	external	14100 / 15510			m³/h
Tank volume		300			l
Connections (medium)	IG	1 1/2“			BSPP
Noise level according to EN ISO 3741		< 73			dB (A)
Weight (without packaging)		1081	1210	1315	kg
System of protection (enclosure electrical components)		IP 56			
Colour		RAL 7035, different colours available on request			

Accessories		Article number	
Overflow valve (internal)		48000012877	48000012884
Differential thermostat + 2 m sensor		48000012878	48000012885
Aluminium pre-filter (condenser)		45000012291	
20% Propyleneglycol pre-mix	20 l	45783000123	
20% Ethyleneglycol pre-mix	20 l	45783000125	

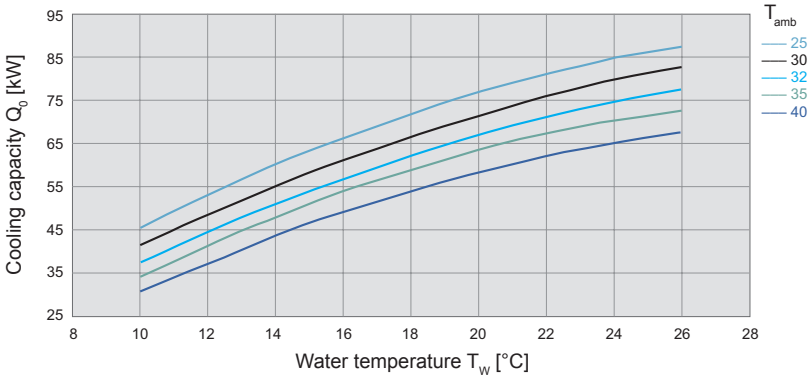
[1] cooling capacity incl. power loss in the pump, refrigerant outlet temperature + 18 °C, ambient temperature + 32 °C
[2] performance data based on 50 Hz operation
Approvals see page 105

Cooling capacity performance curves

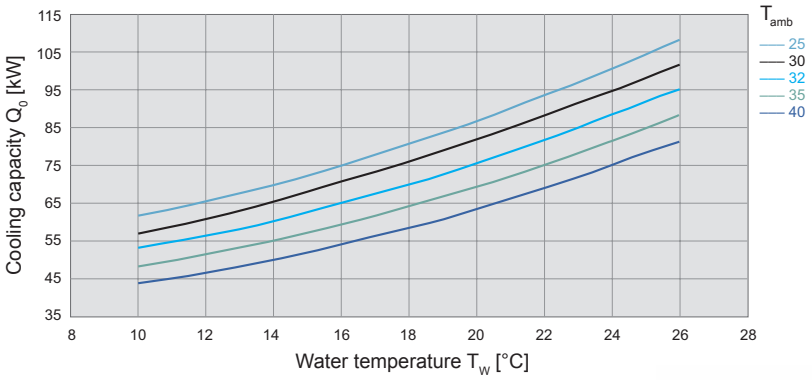
HK 55 WT (50 Hz)[1]



HK 62 WT (50 Hz)[1]

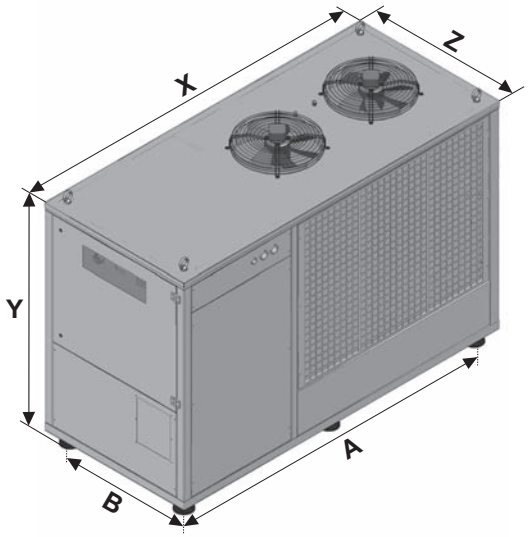


HK 70 WT (50 Hz)[1]



Dimensions

mm	HK 55/62/70 WT
X	2500
Y	1800[2]
Z	1110
A	2295
B	900



[1] the performance curves for the 60 Hz version can be obtained from your Pfannenberg advisor or at www.pfannenberg.com

[2] incl. fan

Chillers 10000–18000 W
AR 10 WT / AR 12 WT / AR 15 WT / AR 18 WT



- housing concept based on standard control cabinets
- optimum integration in switchgear
- fluid cooling with water, water/glycol mixtures, emulsions and low-viscosity oils*
- steel housing with thick powder coating
- condenser with 3 mm fin spacing, highly effective protection against strongly contaminated and aggressive ambient air
- transport eye bolts on housing
- integration of project-specific additional components is possible on request
- fluid cooling with oil on request

Further options for the AR series chillers can be found on page 135.

* maximum viscosity 10 cSt (10 mm²/s) @ + 40 °C

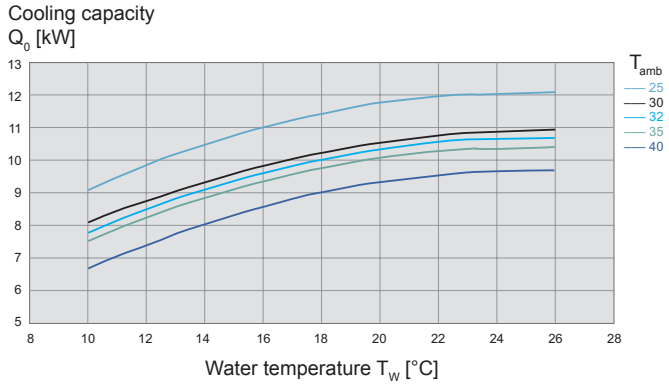
Data		AR 10 WT	AR 12WT	AR 15WT	AR 18 WT	Unit
Article number		42051000004	42051200004	42051500005	42051800003	
Rated voltage ± 10%		AC 50 / 60				Hz
		400 / 460 3~				V
Cooling capacity (with pump)[1]	W18/L32	10 / 11.1	12 / 15.7	15 / 16.6	18 / 21	kW
	W10/L32	7.7 / 8.3	9.7 / 12.5	11.8 / 12.8	16.6 / 18.8	
Flow rate (pump)[2]		35	35	50	50	l/min
Pressure (head) (pump)		3				bar
Ambient temperature range		+ 15 … + 40 / + 59 … + 104				°C/°F
Control range (refrigerant outlet temperature)		+ 10 … + 35 / + 50 … + 95; factory setting + 18 / + 64				
Target value tolerance		± 2				K
Refrigerant	R404A	2600	3300	3400	9300	g
Power consumption	W18/L32	7.1 / 7.7	7.4 / 8.0	8.3 / 10.4	10.4 / 12.3	kW
Current consumption	W18/L32	13.0 / 13.5	14.57 / 15.8	16.39 / 17.91	18.8 / 19.0	A
Starting current	W18/L32	49.3 / 51.1	63.8 / 65.1	67.2 / 71.5	71.2 / 75.4	A
Control voltage		24 V AC				V
Pre fuse T		25	32	on request	on request	A
Volumetric airflow	external	5000		5800		m³/h
Tank volume		50				l
Connections (medium)	IG	1"				BSPP
Noise level according to EN ISO 3741		< 73				dB (A)
Weight (without packaging)		250	265	285	300	kg
System of protection (enclosure electrical components)		IP 56				
Colour		RAL 7035, different colours available on request				

Accessories		Article number	
Overflow valve (internal)		48000012881	48000012886
Flow monitor		48000012882	48000012887
Aluminium pre-filter (condenser)		45000012883	45000012888
Casters			
20% Propyleneglycol pre-mix	20 l	45783000123	
20% Ethyleneglycol pre-mix	20 l	45783000125	

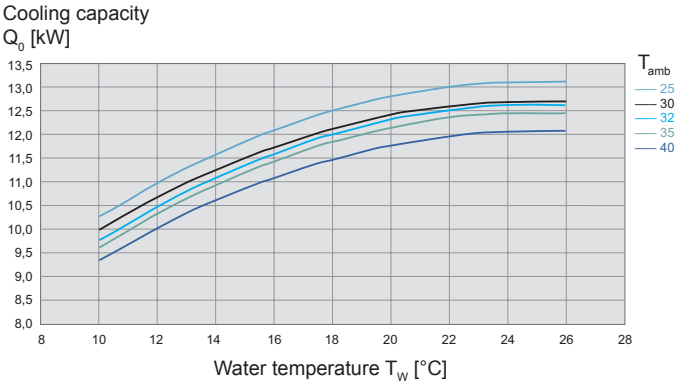
[1] cooling capacity incl. power loss in the pump, refrigerant outlet temperature + 18 °C, ambient temperature + 32 °C
[2] performance data based on 50 Hz operation
Approvals see page 105

Cooling capacity performance curves

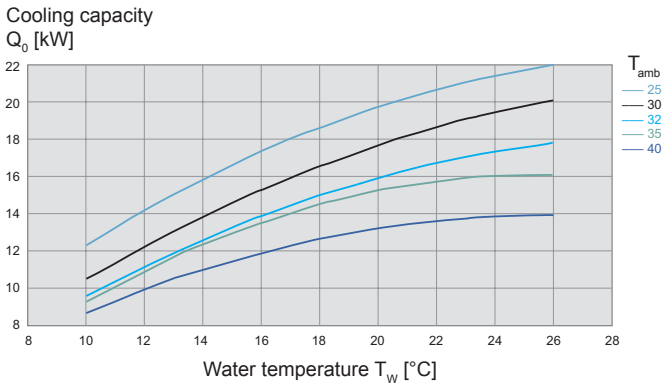
AR 10 WT (50 Hz)[1]



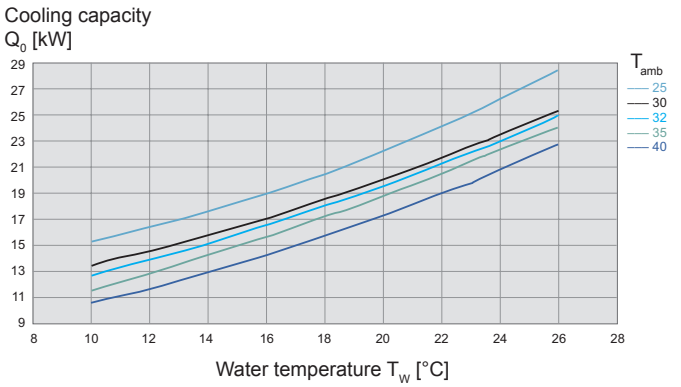
AR 12 WT (50 Hz)[1]



AR 15 WT (50 Hz)[1]

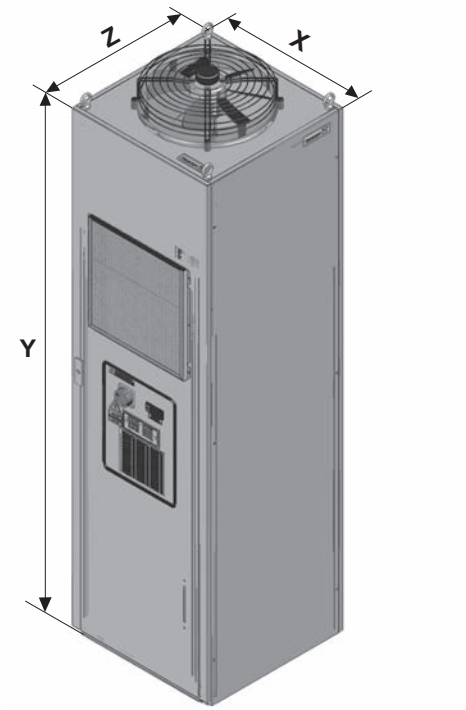


AR 18 WT (50 Hz)[1]



Dimensions

mm	AR 10/12 WT[2]	AR 15/18 WT[2]
X	1000	1000
Y	2000	2000
Z	600	800



[1] the performance curves for the 60 Hz version can be obtained from your Pfannenberg advisor or at www.pfannenberg.com

[2] housing only

Chillers 9000–24000 W
PWW 9.000 / PWW 12.000 / PWW 18.000 / PWW 24.000

- easily removable panels for easy access to interior components
- corrosion prevention with nonferrous construction
- closed loop system
- primary water regulation valve (AVTA)
- control circuit on/off switch for service convenience
- corrosion-resistant fixed piping for water circulation
- programmable controller (solid-state)
- multi stage centrifugal pump
- customer specific modification upon request



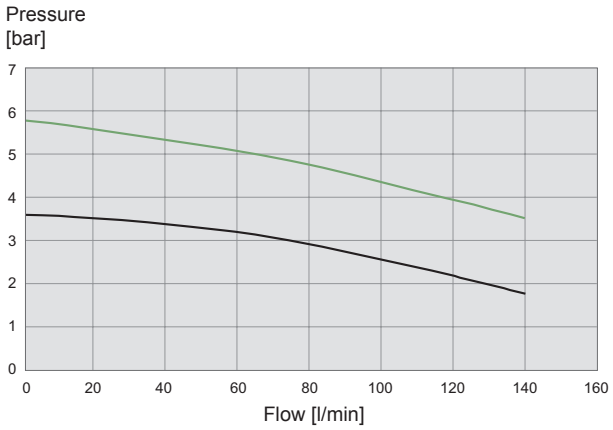
Data		PWW 9.000	PWW 12.000	PWW 18.000	PWW 24.000	Unit
Article number		42120905001	42121205001	42121805001	42122405001	
Rated voltage ± 10%		AC 50 / 60				Hz
		230 1~				V
Cooling capacity [1] (flow rate ration primary/ secondary = 1/1)	W15/W20	9	12	18	24	kW
	W15/W25	10	13.5	20	27	
Primary water inlet	temperature range	+ 10 … + 35 / + 50 … + 95; factory setting + 20 / + 68				°C/°F
	flow rate	70				l/min
	pressure	3				bar
Secondary water outlet	temperature range	+ 5 … + 15 / + 41 … + 59				°C/°F
	flow range	min. 35	min. 35	min. 70	min. 70	l/min
	pressure	1.5				bar
Ambient temperature range		> + 1 … + 70 / > + 34 … + 158				°C/°F
Target value tolerance		± 2				K
Power consumption	W15/W20	1720 / 2610				W
Current consumption	W15/W20	4.37 / 4.32				A
Starting current	W15/W20	17.48 / 17.28				A
Connections (medium)	IG	1/2"				BSPP
Noise level according to EN ISO 3741		< 62				dB (A)
Weight (without packaging)		50	53	60	65	kg
System of protection (enclosure electrical components)		IP 56				
Colour		RAL 7035, different colours available on request				

Accessories		Article number
Temperature display		48700952805
Overflow valve (internal)		48700952806
Flow monitor		48700952807
Water inlet filter	60 µ	48700952808
Casters		45700952809
20% Propyleneglycol pre-mix	20 l	45783000123
20% Ethyleneglycol pre-mix	20 l	45783000125

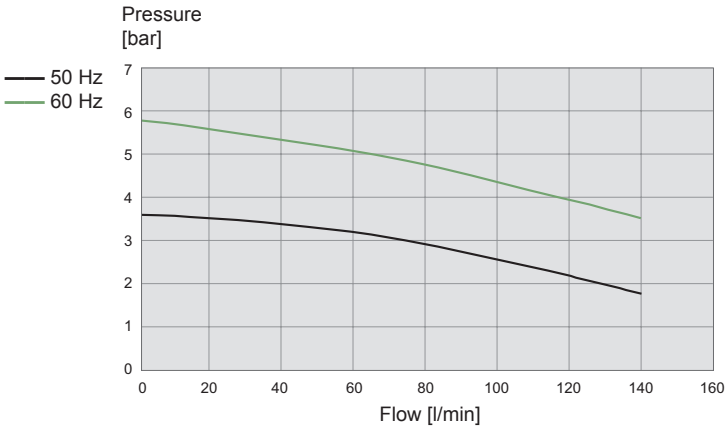
[1] cooling capacity incl. power loss in the pump, primary water inlet temperature/secondary water outlet temperature
[2] performance data based on 50 Hz operation
Approvals see page 105

Pump performance curves

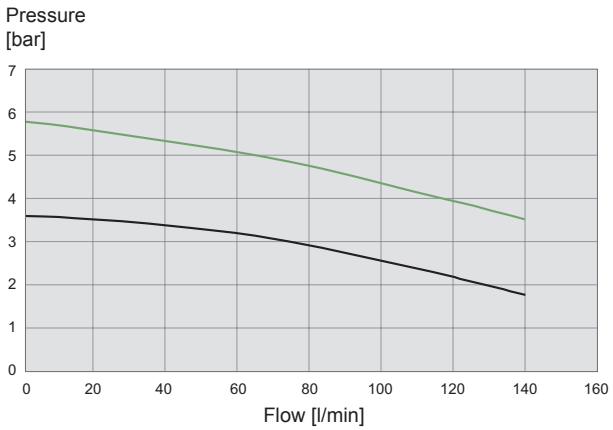
PWW 9.000



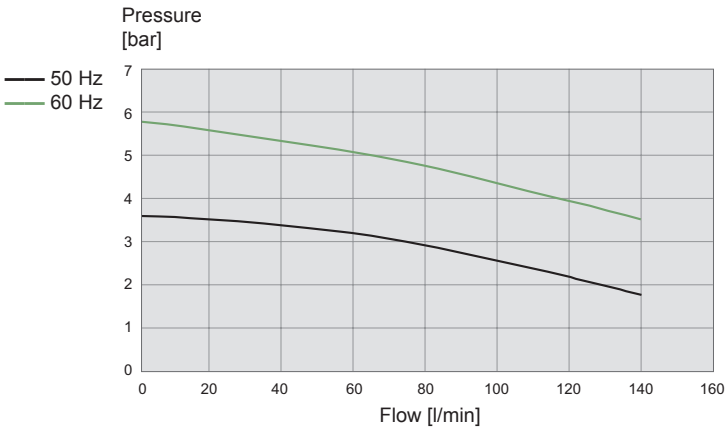
PWW 12.000



PWW 18.000

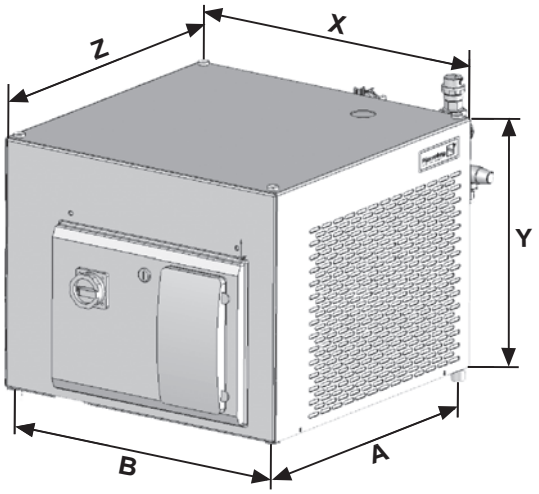


PWW 24.000



Dimensions

mm	PWW 9.000 - 24.000
X	580
Y	500 [1]
Z	580
A	555
B	550



[1] without eye bolts

Options

Start up / Service case

Service case for closed loop systems	Article number
Service case **Box incl. pump, pipes, connections, gaskets**	45700952648



Pfannenberg Protect

Water/glycol-mixture in different concentrations and for several applications.

	Glycol content	Quantity	Article number
Pfannenberg Protect 20P (PP20P)	20% Propyleneglycol	20 kg	45783000123
Pfannenberg Protect 30P (PP30P)	30% Propyleneglycol	20 kg	45783000124
Pfannenberg Protect 50P (PP50P)	54% Propyleneglycol	20 kg	45783000128
Pfannenberg Protect 20E (PP20E)	20% Ethyleneglycol	20 kg	45783000125
Pfannenberg Protect 30E (PP30E)	30% Ethyleneglycol	20 kg	45783000126
Pfannenberg Protect 50E (PP50E)	50% Ethyleneglycol	20 kg	45783000127

Rack series

- maximum temperature alarm
- bypass in hydraulic circuit with manometer and manual controller
- UL conformity
- other supply voltages
- flow monitor
- Harting plug for power supply



CC series

- castors
- different RAL colours (5002, 5010, 5015, 6011, 7037, 9002 and 9010)
- different pumps
- differential temperature control
- control circuit 24 V DC
- pre-filter, aluminium
- flow monitor
- Harting plug for power supply
- Harting plug for single alarm
- heating gas bypass
- hydraulic bypass
- minimum/maximum temperature alarm
- stainless steel housing
- water pressure gauge 0...10 bar



EB series



- electric level control
- differential temperature control
- minimum/maximum temperature alarm
- flow monitor
- heating gas bypass
- UL conformity
- heater for tempering the fluid
- pressure-sealed system
- control accuracy +/- 0.1K
- other supply voltages
- other ambient temperature ranges
- unit for outdoor installation
- refrigerant R134a
- monitoring of air intake filter
- water filter
- oil filter
- shut-off valves for feed/return
- automatic tank refilling
- water circuit in PVC for DI water
- dual-circuit system
- water-cooled condenser
- control circuit 24 V DC
- phase protection relay
- electronic speed control for condenser fan
- Harting plug for power supply
- Harting plug for single alarm
- different pumps

HK series



- differential temperature control
- minimum/maximum temperature alarm
- oil version according to customer specification
- UL conformity
- heater for tempering the fluid
- heating gas bypass
- pressure-sealed system
- other supply voltages
- other connection systems
- flow monitor
- Harting plug for power supply
- Harting plug for single alarm
- different pumps

AR series



- pump seal made from FPM (Viton)
- electric level control
- diagnostic module
- differential temperature control
- minimum/maximum temperature alarm
- heater for tempering the fluid
- heating gas bypass
- other supply voltages
- flow monitor
- Harting plug for power supply
- Harting plug for single alarm
- different pumps


Pfannenberg

New standards in efficient cooling



εCOOL Air/Air Heat Exchangers from the PAI and PAS series

Using the ambient air for the thermal management of the enclosure is the most economical and energy efficient type of cooling. In many applications the ambient air is contaminated by dust, liquid or gases, so that components which are integrated in the enclosure can be damaged when contact occurs. The use of a filter fan is therefore no longer possible.

The Pfannenberg air/air heat exchangers make the ideal solution for these application areas. Due to the integrated heat exchangers a complete separation of the internal and external air flow is possible. The interior of the enclosure is thus hermetically separated from the atmosphere. Harmful dust and fluids can't cause any damage to the integrated components any more. The **εCOOL** air/air heat exchangers are thus an alternative to filter fans.

The robust steel construction of the air/air heat exchangers makes their operation in harsh industrial routines possible. According to our **εCOOL**-motto special focus has been placed on maintenance friendliness. Assembly and maintenance has been reduced to a uniquely low amount of time. Energy efficiency and maintenance friendliness form the optimal basis for process safety, reliability and cost advantages.

Cut-out compatibility with active cooling units from the DTI/DTS series

Components in the enclosure are often updated and the requirements to thermal management change. An air/air heat exchanger which was previously the optimal solution is not suitable any more. The refitting of an active **ECOOL** cooling unit can be carried out easily and without problems, because the units have the same cut-out dimensions. Thus, the process stability is also ensured after extensive modifications.



Cooling unit *Air/air heat exchanger*

The advantages at a glance



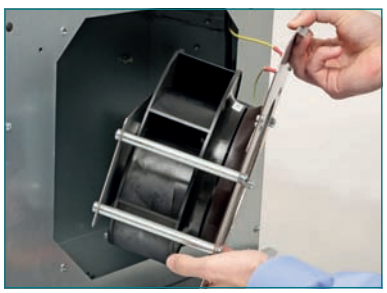
- tool-free assembly for partially recessed mounting
- tried and tested partially recessed mounting
- integrated handles makes it possible for one mechanic to assemble the device
- assembly possible in less than 3 minutes
- simple colour matching
- robust front design



- tool-free retrofit of filter adapter
- tool-free filter change
- filter change in less than one minute



- temperature adjusting occurs via the mechanical thermostat
- additional alarm thermostat makes optimal adjusting of the alarm limit possible



- high maintenance friendliness
- all fans are easily accessible from the outside
- not necessary to open the enclosure
- exchange of the fan in less than 6 minutes
- secure selection via PSS



All ECOOL air/air heat exchangers at a glance

PAI: for partially recessed mounting of the cooling unit in the door or side
PAS: or outer mounting of the cooling unit on the door or side

Type	Specific cooling capacity	Rated voltage	Dimensions (HxWxD)	Approvals					Page
				UR	cUL	GOST	CSA	CE	
Heat exchangers from the PAI and PAS series – air/air heat exchangers for side and door mounting									
PAI 6203	100 W/K	115 V / 230 V	1549 x 485 x 252 mm	○		○		●	140
PAS 6203			1555 x 485 x 252 mm	○		○		●	
PAI 6173	85 W/K	115 V / 230 V	1549 x 485 x 252 mm	○		○		●	140
PAS 6173			1555 x 485 x 252 mm	○		○		●	
PAI 6133	65 W/K	115 V / 230 V	933 x 410 x 199 mm	○		○		●	142
PAS 6133			937 x 410 x 199 mm	○		○		●	
PAI 6103	50 W/K	115 V / 230 V	933 x 410 x 199 mm	○		○		●	142
PAS 6103			937 x 410 x 199 mm	○		○		●	
PAI 6073	35 W/K	115 V / 230 V	933 x 410 x 199 mm	○		○		●	144
PAS 6073			937 x 410 x 199 mm	○		○		●	
PAI 6043	20 W/K	115 V / 230 V	612 x 380 x 212 mm	○		○		●	144
PAS 6043			618 x 380 x 212 mm	○		○		●	

● available
○ pending



Further information can be found on the Internet:
www.pfannenberg.com · **www.pfannenberg-spareparts.com**
Keep up to date. Subscribe to the newsletter now:
newsletter.pfannenberg.com

Air/Air Heat Exchanger 85 / 100 W/K

PAI/PAS 6173
PAI/PAS 6203



PAI: for partially recessed mounting of the cooling unit in the door or side
PAS: for outer mounting of the cooling unit on the door or side

- cut-out compatible with the complete DTI/DTS 6000 cooling unit series
- mounting-friendly seal, no elaborate reworking of the mounting cut-out
- integrated thermostat for temperature control
- additional thermostat for excessive temperature warning
- maintenance-free
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated

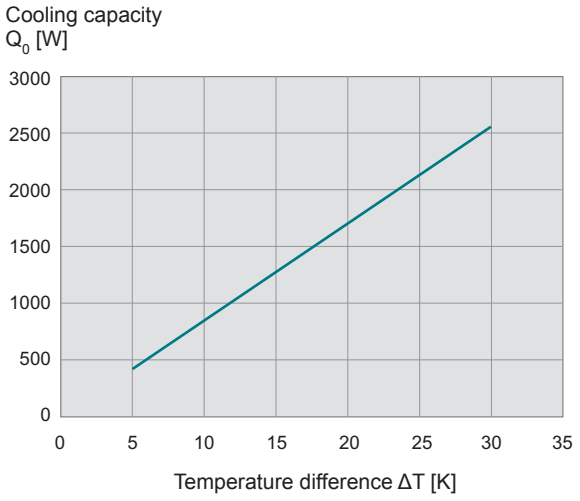
Data		PAI/PAS 6173		PAI/PAS 6203		Unit
Article number	PAI	12993511055	12993514055	12993611055	12993614055	
	PAS	12983511055	12983514055	12983611055	12983614055	
Rated voltage ± 10%		AC 50 / 60	AC 60	AC 50 / 60	AC 60	Hz
		230	115	230	115	V
Specific cooling capacity		85		100		W/K
Power consumption		310 / 420	420	310 / 420	420	W
Current consumption		1.3 / 1.7	3.4	1.3 / 1.7	3.4	A
Starting current		3.5 / 3.3	7.8	3.5 / 3.3	7.8	
Unimpeded airflow (free flow)	intern	1175 / 1300	1340	1175 / 1300	1340	m^3/h
	extern	1175 / 1300	1340	1175 / 1300	1340	
Pre use T		4	8	4	8	A
Type of connection		spring-type terminal included with plug				
Noise level according to EN ISO 3741		< 69				dB (A)
Weight (without packaging)	PAI	46		46		kg
	PAS	46.3		46.3		
Ambient temperature range		-25 … +55 / -13 … +131				°C / °F
Control range (adjustable)	control thermostat	+ 20 … + 55 / + 68 … + 131; factory setting + 35 / + 95				
	alarm thermostat	+ 30 … + 65 / + 86 … + 149; factory setting + 45 / + 113				
Duty cycle		100				%
Protection system according to EN 60529	IP 54	towards the electrical enclosure if used as intended by the manufacturer				
	IP 34	towards the surroundings if used as intended by the manufacturer				
Design	housing	galvanised sheet steel				
	cover	galvanised / electrostatically powder coated (200 °C)				
Colour (cover)		RAL 7035, different colours available on request				

Accessories	Piece	Article number
Filter adapater (RAL 7035)	1	18310000151
Vlies filter	5	18300000147

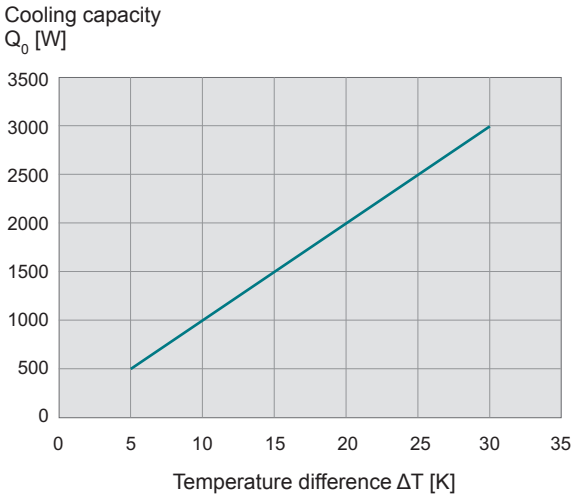
Approvals see page 139

Cooling capacity performance curves

PAI/PAS 6173



PAI/PAS 6203



Dimensions

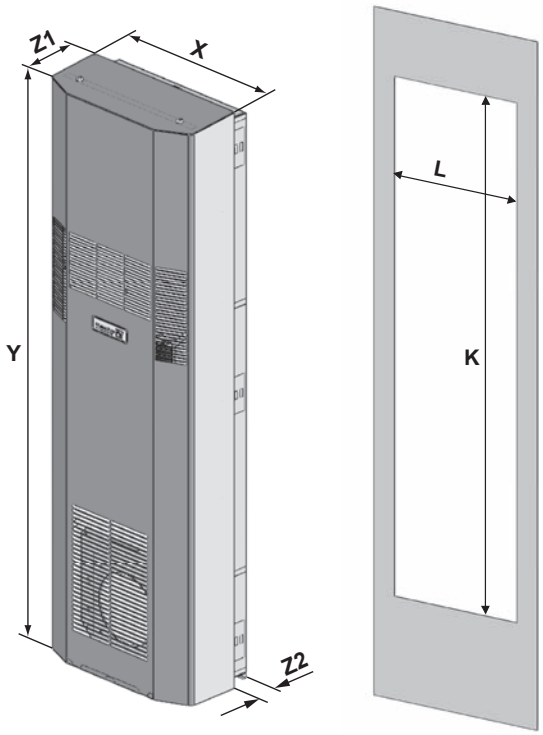
PAI	X	Y	Z1	Z2	K	L
mm	485	1549	252	120	1510	450

PAI variants partially recessed by 120 mm after installation

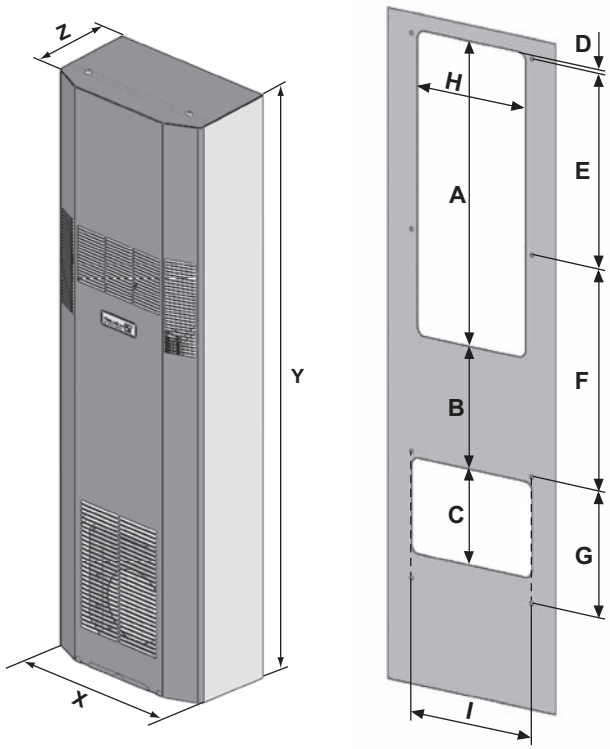
PAS	X	Y	Z	A	B	C	D	E	F	G	H	I
mm	485	1555	372	700	282	220	10	450	510	290	315	350

Mounting holes Ø 8 mm and cut-out radii R20

PAI 6173 / PAI 6203



PAS 6173 / PAS 6203



ECOOL Air/Air Heat Exchanger 35 / 50 / 65 W/K

PAI/PAS 6073
PAI/PAS 6103
PAI/PAS 6133



PAI: for partially recessed mounting of the cooling unit in the door or side
PAS: for outer mounting of the cooling unit on the door or side

- cut-out compatible with DTI/DTS 9341C and DTI/DTS 9141
- mounting-friendly seal, no elaborate reworking of the mounting cut-out
- integrated thermostat for temperature control
- additional thermostat for excessive temperature warning
- maintenance-free
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated

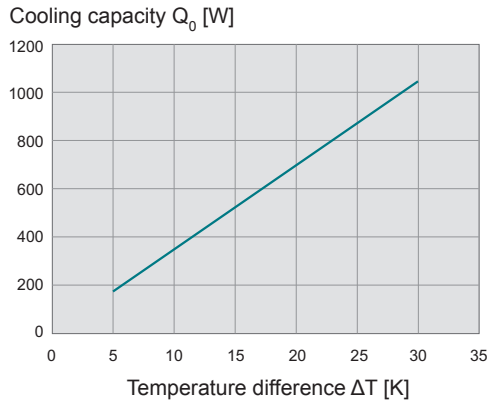
Data		PAI/PAS 6073		PAI/PAS 6103		PAI/PAS 6133		Unit
Article number	PAI	12992211055	12992214055	12992311055	12992314055	12992411055	12992414055	
	PAS	12982211055	12982214055	12982311055	12982314055	12982411055	12982414055	
Rated voltage ± 10%		AC 50 / 60	AC 60	AC 50 / 60	AC 60	AC 50 / 60	AC 60	Hz
		230	115	230	115	230	115	V
Specific cooling capacity		35		50		65		W
Power consumption		170 / 180	260	170 / 180	260	310 / 420	420	
Current consumption		0.8 / 1	2.45	0.8 / 1	2.45	1.3 / 1.8	3.6	A
Starting current		1.9 / 1.8	5.1	1.9 / 1.8	5.1	3.6 / 3.7	8.2	
Unimpeded airflow (free flow)	intern	850 / 900	1070	850 / 900	1070	1175 / 1300	1340	m^3/h
	extern	850 / 900	1070	850 / 900	1070	1175 / 1300	1340	
Pre use T		2	6	2	6	4	8	A
Type of connection		spring-type terminal included with plug						
Noise level according to EN ISO 3741		< 64	< 68	< 64	< 68	< 70	< 71	dB (A)
Weight (without packaging)	PAI	23.9		23.9		23.9		kg
	PAS	24.9		24.9		24.9		
Ambient temperature range		-25 … +55 / -13 … +131						°C / °F
Control range (adjustable)	control thermostat	+ 20 … + 55 / + 68 … + 131; factory setting + 35 / + 95						
	alarm thermostat	+ 30 … + 65 / + 86 … + 149; factory setting + 45 / + 113						
Duty cycle		100						%
Protection system according to EN 60529	IP 54	towards the electrical enclosure if used as intended by the manufacturer						
	IP 34	towards the surroundings if used as intended by the manufacturer						
Design	housing	galvanised sheet steel						
	cover	galvanised / electrostatically powder coated (200 °C)						
Colour (cover)		RAL 7035, different colours available on request						

Accessories	Piece	Article number
Filter adapater (RAL 7035)	1	18060200001
Vlies filter	5	18066100001

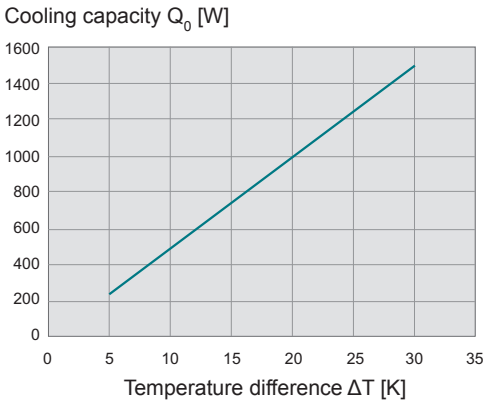
Approvals see page 139

Cooling capacity performance curves

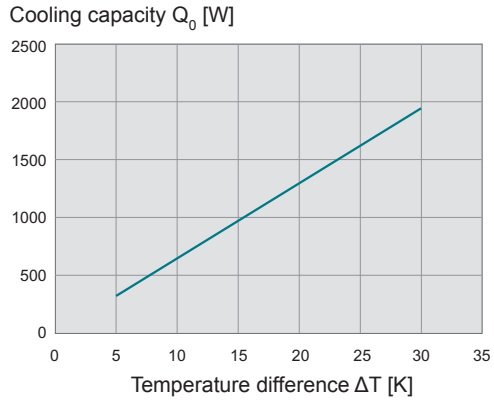
PAI/PAS 6073



PAI/PAS 6103



PAI/PAS 6133

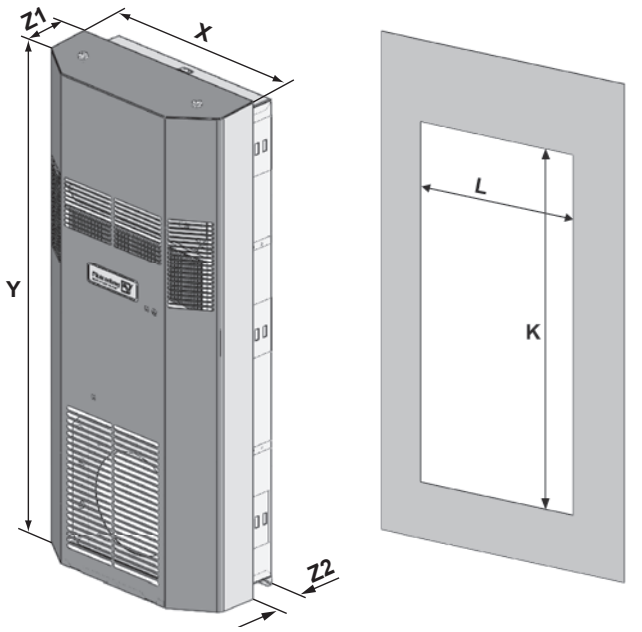


Dimensions

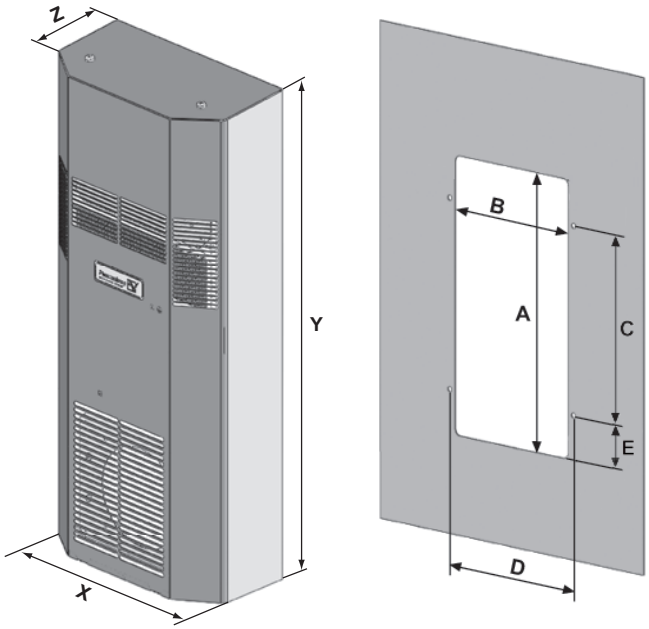
PAI	X	Y	Z1	Z2	K	L
mm	410	933	192	60	900	380
PAI variants partially recessed by 60 mm after installation						

PAS	X	Y	Z	A	B	C	D	E
mm	410	937	199	662	320	562	350	55
Mounting holes Ø 8 mm and cut-out radii R20								

PAI 6073 / PAI 6103 / PAI 6133



PAS 6073 / PAS 6103 / PAS 6133



ECOOL Air/Air Heat Exchanger 20 W/K
PAI/PAS 6043



PAI: for partially recessed mounting of the cooling unit in the door or side
PAS: for outer mounting of the cooling unit on the door or side

- cut-out compatible with DTI/DTS 9041
- mounting-friendly seal, no elaborate reworking of the mounting cut-out
- integrated thermostat for temperature control
- additional thermostat for excessive temperature warning
- maintenance-free
- large distance between intake and exhaust vents, safe circulation within the electrical enclosure due to long passage of air, therefore hot spots are eliminated

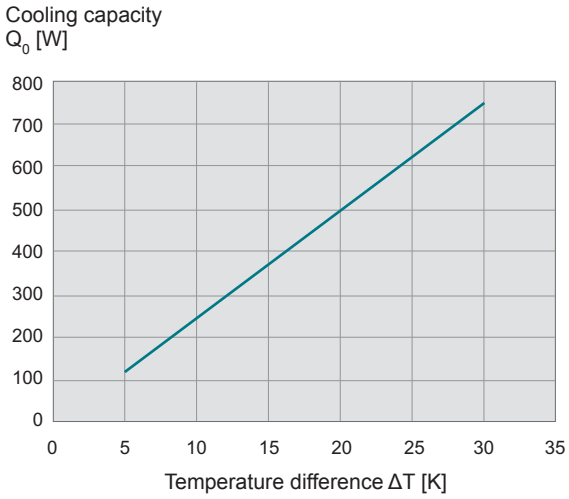
Data		PAI/PAS 6043		Unit
Article number	PAI	12991111055	12991114055	
	PAS	12981111055	12981114055	
Rated voltage ± 10%		AC 50 / 60	AC 60	Hz
		230	115	V
Specific cooling capacity		20		W/K
Power consumption		50 / 56	56	W
Current consumption		0.25 / 0.26	0.52	A
Starting current		0.7 / 0.8	1.3	
Unimpeded airflow (free flow)	intern	240 / 280	280	m^3/h
	extern	240 / 280	280	
Pre use T		1		A
Type of connection		spring-type terminal included with plug		
Noise level according to EN ISO 3741		< 61	< 63	dB (A)
Weight (without packaging)	PAI	15.2		kg
	PAS	15.5		
Ambient temperature range		- 25 … + 55 / - 13 … + 131		°C / °F
Control range (adjustable)	control thermostat	+ 20 … + 55 / + 68 … + 131; factory setting + 35 / + 95		
	alarm thermostat	+ 30 … + 65 / + 86 … + 149; factory setting + 45 / + 113		
Duty cycle		100		%
Protection system according to EN 60529	IP 54	towards the electrical enclosure if used as intended by the manufacturer		
	IP 34	towards the surroundings if used as intended by the manufacturer		
Design	housing	galvanised sheet steel		
	cover	galvanised / electrostatically powder coated (200 °C)		
Colour (cover)		RAL 7035, different colours available on request		

Accessories	Piece	Article number
Filteradpater	1	18060200000
Vlies filter	5	18061600000

Approvals see page 139

Cooling capacity performance curves

PAI/PAS 6043

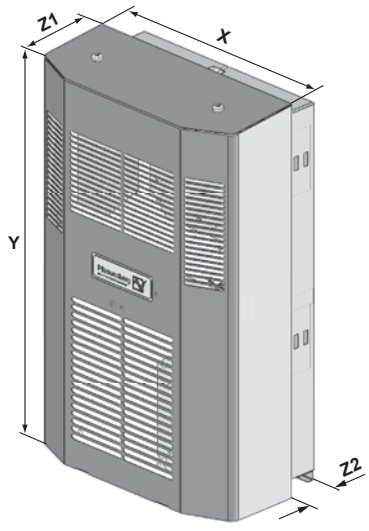


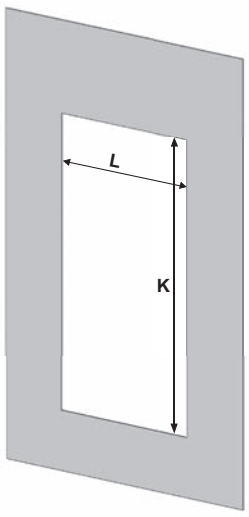
Dimensions

PAI	X	Y	Z1	Z2	K	L
mm	380	612	152	60	577	350
PAI variants partially recessed by 60 mm after installation						

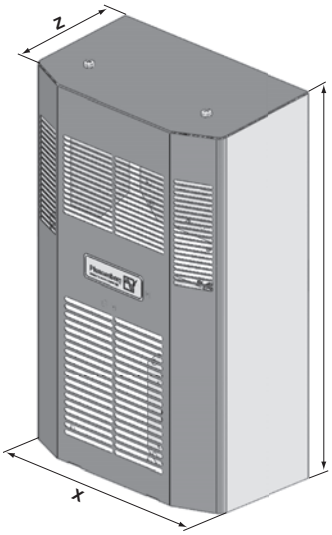
PAS	X	Y	Z	A	B	C	D	E	F	G
mm	380	618	212	472	285	272	150	288	40	300
Mounting holes Ø 8 mm and cut-out radii R20										

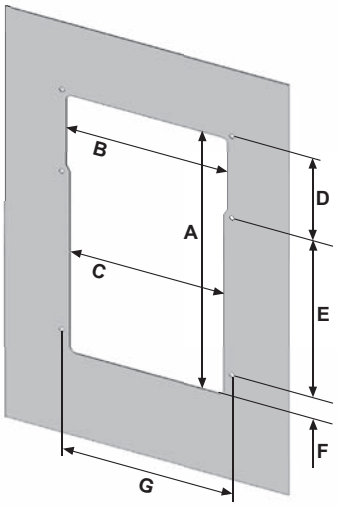
PAI 6043

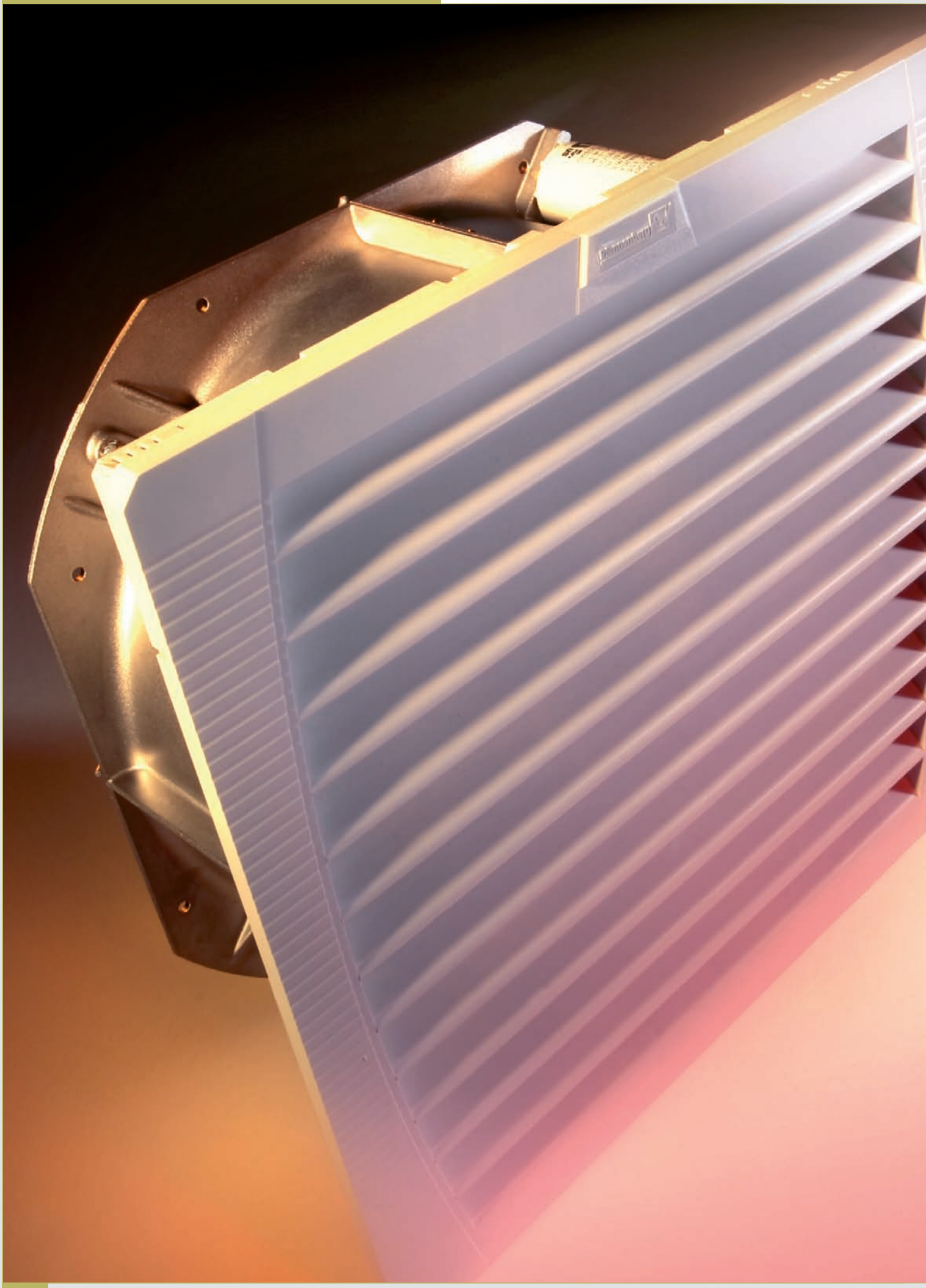


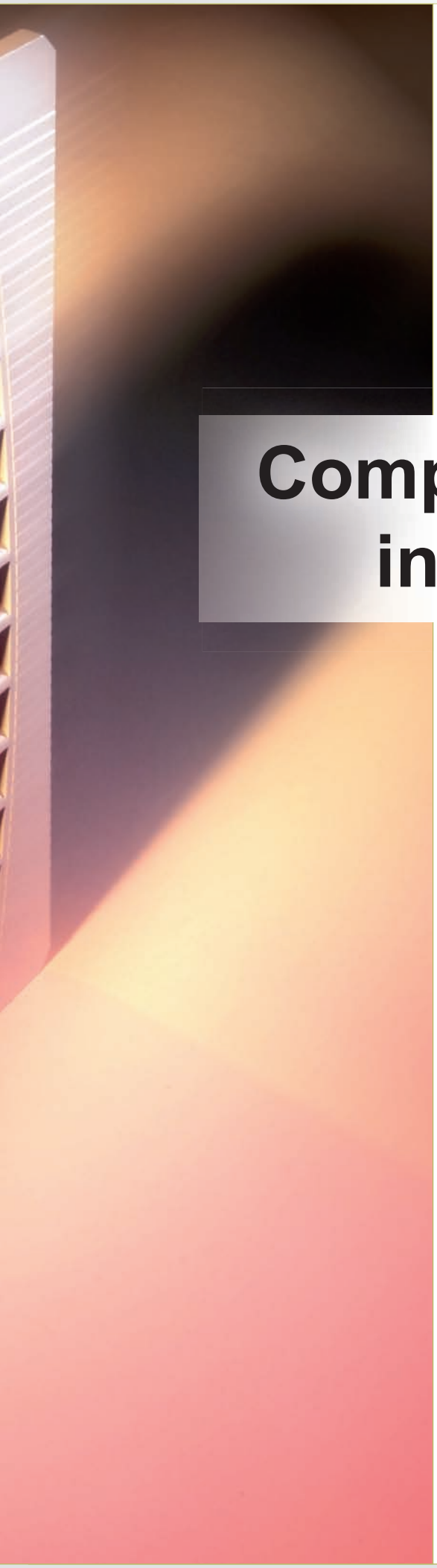


PAS 6043









Competence advantage in the 4th Generation

ECOOL Filterfans

You can save energy, resources and valuable time through the use of Pfannenberg's 4th Generation **ECOOL** Filterfans.

Over and above that, they provide for more reliability in the production process, because the innovative Filterfans and filter mats from the 4th Generation enable an increase in the air flow of over 100% (protection class IP 55), leading to expanded operating life that is several times longer and thus to longer service intervals.

Practical tests under the toughest conditions in the woodworking industry showed that service intervals were prolonged by one to two and sometimes even three weeks. In addition, the mounting and service-friendliness of the Filterfans was confirmed, also for cleaning by means of compressed air and dispensing with the bothersome cutting to size of filter mats.

Using a combination of Filterfans with thermostats and hygrostats from the FLZ series (see page 208), you can additionally achieve savings on energy, materials and time plus a significantly longer life span. This results in an optimised environmental balance as well as greater reliability of your production process.

Assembly, energy, air, maintenance - Your advantage

Well thought out details optimize your balance sheet:



Compatibility

The 4th generation Filterfans can be integrated into existing applications without any problems, because most of the enclosure cut-outs correspond to the Pfannenberg standard.



Time

The patented 4-corner snap fastener makes a tool-free installation possible in seconds and guarantees a secure fit.



Maintenance

The cover enables a filter mat change in seconds.



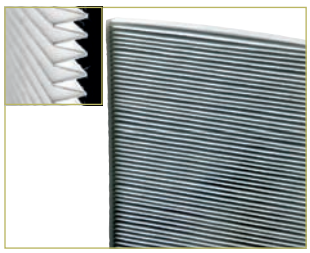
Air

Fins and rotor blades that are optimized for the current guarantee maximal airflow and a minimal energy consumption.



Efficiency

The 4th generation Filterfans can be equipped with a thermostat (optional): they operate only when cooling is really necessary.



Life span

The 4th generation Filterfans achieve the system of protection IP 55 with the patented fluted filter mats. The intervals when they need to be exchanged are 300% longer in comparison to conventional filter media.

All 4th Generation ECOOL Filterfans at a glance

Type	Airflow rate [1] IP 54 / IP 55	Rated voltage	Cut-out dimensions (HxW) [2]	Approvals UR	cUL	GOST	CSA	CE	Page
PF series Filterfans									
PF 11.000	25 / - m³/h	115 V / 230 V AC 12 V / 24 V / 48 V DC	92 x 92 mm	●	●	●		●	150
PF 22.000	61 / 56 m³/h	115 V / 230 V AC 12 V / 24 V / 48 V DC	125 x 125 mm	●	●	●		●	152
PF 32.000	110 / 100 m³/h	115 V / 230 V AC 12 V / 24 V / 48 V DC	177 x 177 mm	●	●	●		●	154
PF 42.500	156 / 145 m³/h	115 V / 230 V AC 12 V / 24 V / 48 V DC	223 x 223 mm	●	●	●		●	156
PF 43.000	256 / 233 m³/h	115 V / 230 V AC 12 V / 24 V / 48 V DC	223 x 223 mm	●	●	●		●	160
PF 65.000	480 / 505 m³/h	115 V / 230 V AC	291 x 291 mm	●	●	●		●	160
PF 66.000	640 / 770 m³/h	400 V / 460 V 3 ~ 115 V / 230 V AC	291 x 291 mm	●	●	●		●	162
PF 67.000	845 / 925 m³/h	400 V / 460 V 3 ~ 115 V / 230 V AC	291 x 291 mm	●	●	●		●	164
PFA series exhaust filters									
PFA 10.000			92 x 92 mm	●	●	●		●	190
PFA 20.000			125 x 125 mm	●	●	●		●	190
PFA 30.000			177 x 177 mm	●	●	●		●	190
PFA 40.000			223 x 223 mm	●	●	●		●	190
PFA 60.000			291 x 291 mm	●	●	●		●	190
PF Slim Line Filterfans									
PF 65.000 SL	500 m³/h	115 V / 230 V AC	291 x 291 mm	●	●	●		●	166
PF 67.000 SL	705 m³/h	400 V / 460 V 3 ~ 115 V / 230 V AC	291 x 291 mm	●	●	●		●	168
PF series EMC Filterfans									
PF 11.000 EMC	as for PF series	as for PF series	93 x 93 mm	●	●	●		●	170
PF 22.000 EMC			126 x 126 mm	●	●	●		●	172
PF 32.000 EMC			178 x 178 mm	●	●	●		●	174
PF 42.500 EMC			224 x 224 mm	●	●	●		●	176
PF 43.000 EMC			224 x 224 mm	●	●	●		●	178
PF 65.000 EMC			292 x 292 mm	●	●	●		●	180
PF 66.000 EMC			292 x 292 mm	●	●	●		●	182
PF 67.000 EMC			292 x 292 mm	●	●	●		●	184
PFA series EMC exhaust filters									
PFA 10.000 EMC			93 x 93 mm	●	●	●		●	190
PFA 20.000 EMC			126 x 126 mm	●	●	●		●	190
PFA 30.000 EMC			178 x 178 mm	●	●	●		●	190
PFA 40.000 EMC			224 x 224 mm	●	●	●		●	190
PFA 60.000 EMC			292 x 292mm	●	●	●		●	190
PTF series top-mounted Filterfans – Filterfans for top mounting									
PTF 60.500	500 / 350 m³/h	115 V / 230 V AC	291 x 291 mm	●	●	●		●	188
PTF 60.700	700 / 550 m³/h	115 V / 230 V AC	291 x 291 mm	●	●	●		●	188
PTF 61.000	1000 / 750 m³/h	115 V / 230 V AC	291 x 291 mm	●	●	●		●	188
PTFA series top exhaust filters									
PTFA 60.000			291 x 291 mm	●	●	●		●	190

[1] free-blowing
[2] for material thicknesses up to 2 mm

● available
○ pending



Further information can be found on the Internet:
www.pfannenberg.com · **www.pfannenberg-spareparts.com** · **www.filterfan.com**
Keep up to date. Subscribe to the newsletter now:
newsletter.pfannenberg.com

ECOOL Filterfan
PF 11.000
ECOOL Exhaust filter
PFA 10.000



- installation size 1, air flow rate up to 29 m³/h
- system of protection IP 54, NEMA type 12
- UL, cUL approval
- cut-out compatible with installation size 1 from the 3rd Generation

Data		PF 11.000					Unit
Article number	IP 54	11611101055	11611151055	11611851055	11611801055	11611701055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz		DC			
		230	115	12	24	48	V
Unimpeded airflow		25 / 29					m³/h
Airflow rate in combination (PF + PFA 10.000)		16 / 18					
Power consumption		12 / 11	12 / 11	2.4	2.4	2.6	W
Current consumption		0.07 / 0.06	0.15 / 0.15	0.2	0.1	0.05	A
Noise level (according to EN ISO 3741)		33 / 33		33			dB (A)
Weight		0.55		0.16			kg
Type of connection		cable, 2-core, length 310 mm					
Fuse		6					A
System of protection according to EN 60529 / UL 50		NEMA type 12 - standard filter					
Filtration efficiency		88					%
Filter mat quality class according to EN 779		G 3					
Duty cycle		100					%
Bearing type		sleeve bearing		ball bearing			
Service life L_{10} (+ 40 °C)[1]		52500	55000	70000			h
Temperature range		- 40 … + 55 / - 40 … + 131					°C / °F
Design (housing and protection against accidental contact)		made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO					
Colour		RAL 7035, different colours available on request					

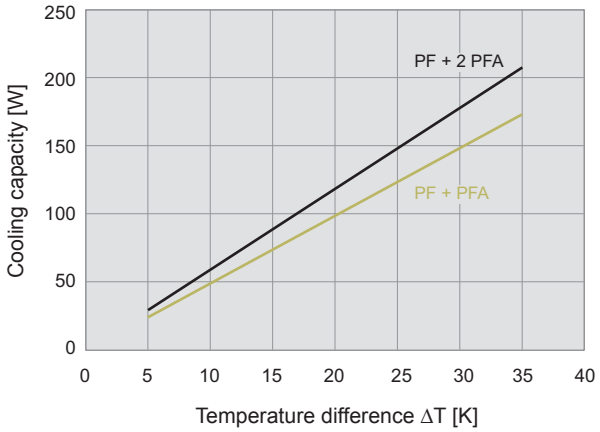
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 10.000	IP 54	1	11710001055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

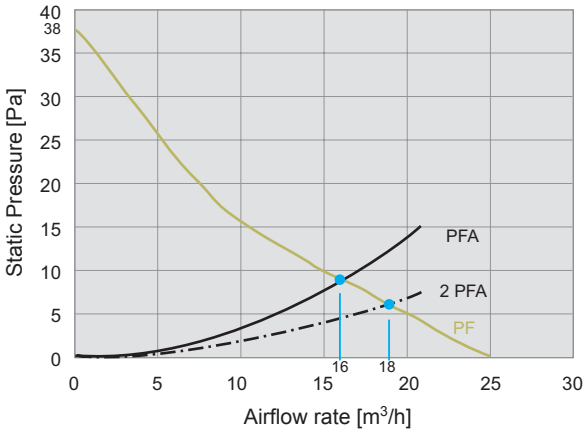
Cooling capacity performance curves

PF 11.000



Static pressure performance curves

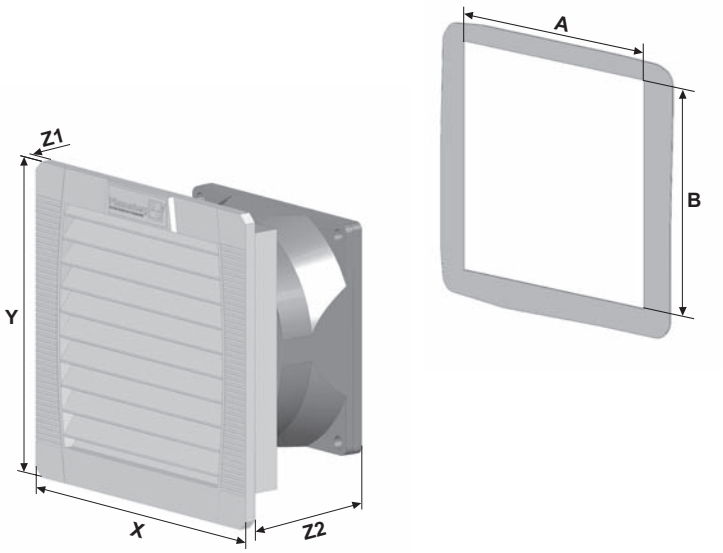
PF 11.000



Dimensions

mm	PF 11.000		PFA 10.000
	AC	DC	
X	109	109	109
Y	109	109	109
Z1	4	4	4
Z2	62	49	19
A[1]	92	92	92
B[1]	92	92	92

[1] for material thicknesses up to 2 mm
+ 1 mm for thickness of material > 2 mm ≤ 3 mm



ecool Filterfan
PF 22.000
ecool Exhaust filter
PFA 20.000



- installation size 2, air flow rate up to 70 m³/h
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)
- cut-out compatible with installation size 2 from the 3rd Generation

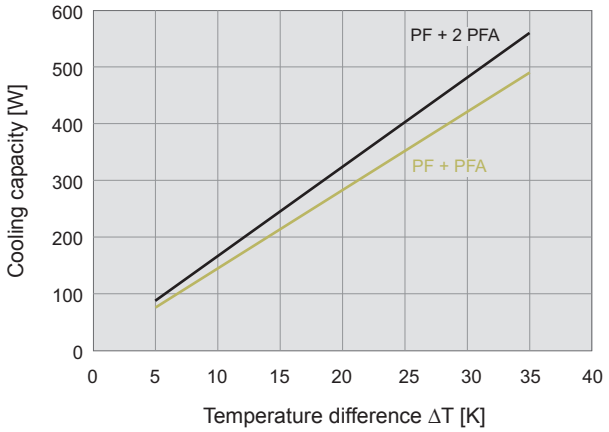
Data		PF 22.000					Unit
Article number	IP 54	11622101055	11622151055	11622851055	11622801055	11622701055	
	IP 55	11622103055	11622153055	11622853055	11622803055	11622703055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz		DC			
		230	115	12	24	48	V
Unimpeded airflow	IP 54	61 / 70					m³/h
	IP 55	56 / 64					
Airflow rate in combination (PF + PFA 20.000)	IP 54	44 / 52					
	IP 55	40 / 46					
Power consumption		19 / 18	20 / 20	5	5	5	W
Current consumption		0.12 / 0.18	0.24 / 0.23	0.42	0.21	0.1	A
Noise level (according to EN ISO 3741)	IP 54	44 / 44		44			dB (A)
	IP 55						
Weight		0.7		0.44			kg
Type of connection		terminal strip		cable, 2-core, length 310 mm			
Fuse		6					A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter					
	IP 55	NEMA type 12 - fluted filter					
Filtration efficiency	IP 54	88					%
	IP 55	91					
Filter mat quality class according to EN 779	IP 54	G 3					
	IP 55	G 4					
Duty cycle		100					%
Bearing type		sleeve bearing		ball bearing			
Service life L_{10} (+ 40 °C)[1]		37500	40000	62500			h
Temperature range		- 40 … + 55 / - 40 … + 131					°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO					
	IP 55	additional: UV-resistant					
Colour		RAL 7035, different colours available on request					

Accessories		Piece	Article number	Information on page
Exhaust filter PFA 20.000	IP 54	1	11720001055	190
	IP 55	1	11720003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary
Approvals see page 149.

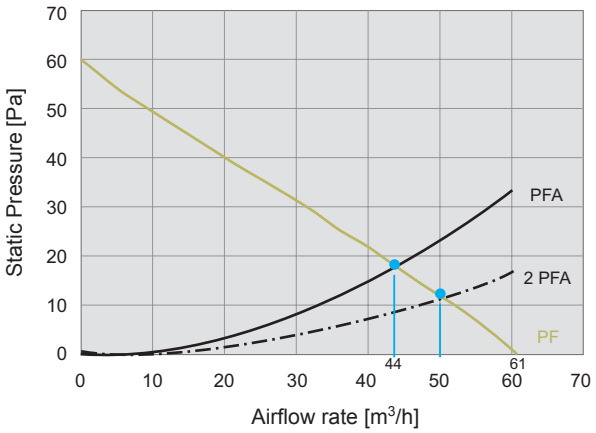
Cooling capacity performance curves

PF 22.000 IP 54

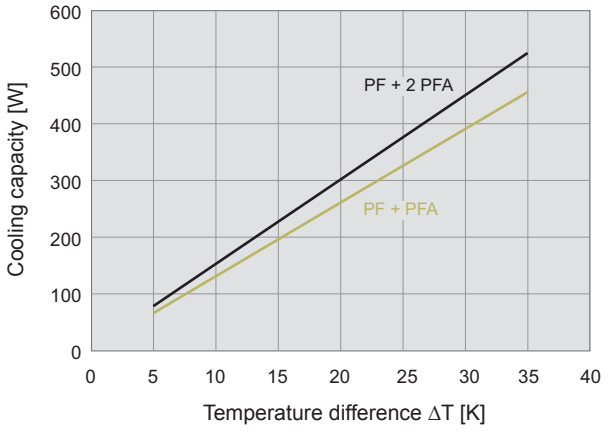


Static pressure performance curves

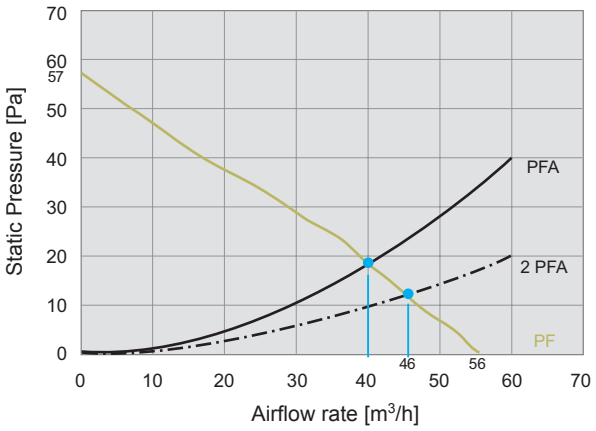
PF 22.000 IP 54



PF 22.000 IP 55



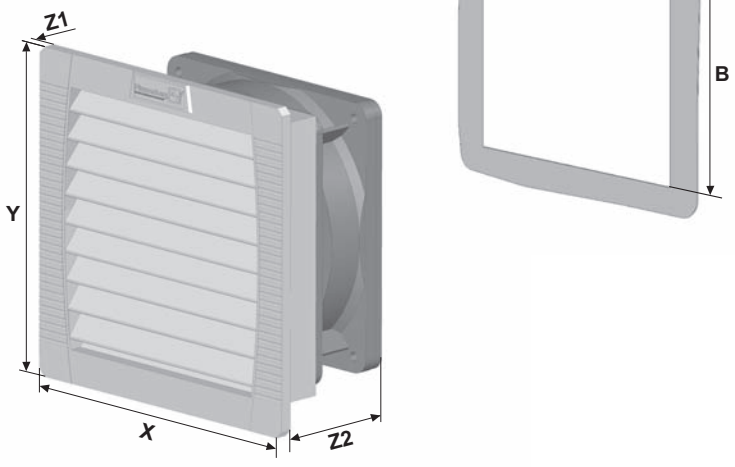
PF 22.000 IP 55



Dimensions

mm	PF 22.000		PFA 20.000
	AC	DC	
X	145	145	145
Y	145	145	145
Z1	5	5	5
Z2	70	64	26
A[1]	125	125	125
B[1]	125	125	125

[1] for material thicknesses up to 2 mm
+ 1 mm for thickness of material > 2 mm ≤ 3 mm



ECOOL Filterfan
PF 32.000
ECOOL Exhaust filter
PFA 30.000



- installation size 3, air flow rate up to 125 m³/h
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)

Data		PF 32.000					Unit
Article number	IP 54	11632101055	11632151055	11632851055	11632801055	11632701055	
	IP 55	11632103055	11632153055	11632853055	11632803055	11632703055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz		DC			
		230	115	12	24	48	V
Unimpeded airflow	IP 54	110 / 125					m³/h
	IP 55	100 / 110					
Airflow rate in combination (PF + PFA 30.000)	IP 54	82 / 93					
	IP 55	55 / 64					
Power consumption		19 / 18	20 / 20	5	5	5	W
Current consumption		0.12 / 0.18	0.24 / 0.23	0.42	0.21	0.1	A
Noise level (according to EN ISO 3741)	IP 54	40 / 40		40			dB (A)
	IP 55						
Weight		0.87		0.61			kg
Type of connection		terminal strip		cable, 2-core, length 310 mm			
Fuse		6					A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter					
	IP 55	NEMA type 12 - fluted filter					
Filtration efficiency	IP 54	88					%
	IP 55	91					
Filter mat quality class according to EN 779	IP 54	G 3					
	IP 55	G 4					
Duty cycle		100					%
Bearing type		sleeve bearing		ball bearing			
Service life L_{10} (+ 40 °C)[1]		37500	40000	62500			h
Temperature range		- 40 … + 55 / - 40 … + 131					°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO					
	IP 55	additional: UV-resistant					
Colour		RAL 7035, different colours available on request					

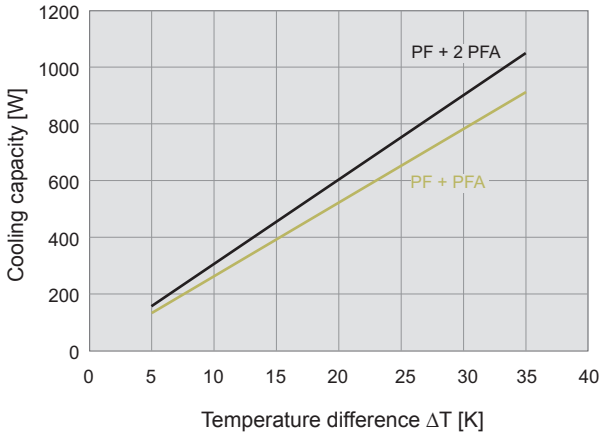
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 30.000	IP 54	1	11730001055	190
	IP 55	1	11730003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

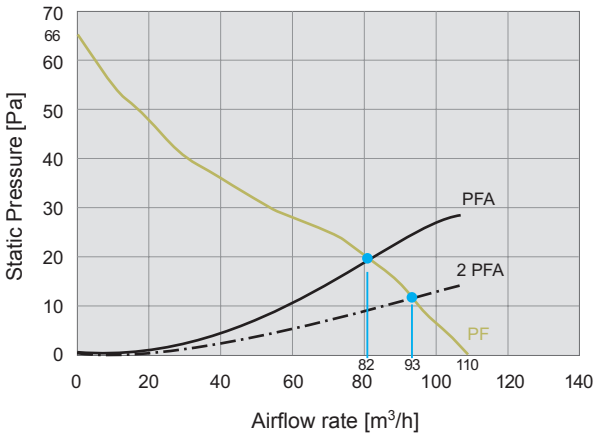
Cooling capacity performance curves

PF 32.000 IP 54

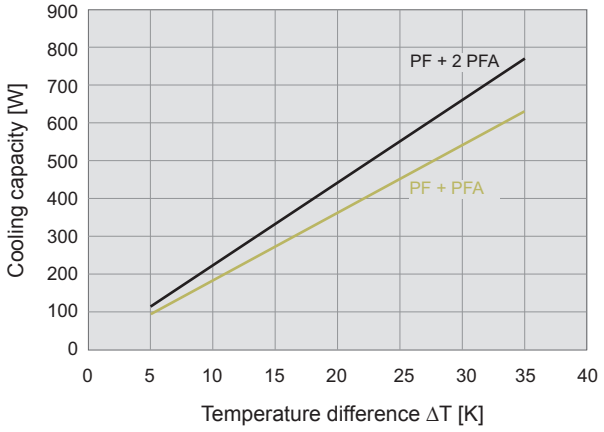


Static pressure performance curves

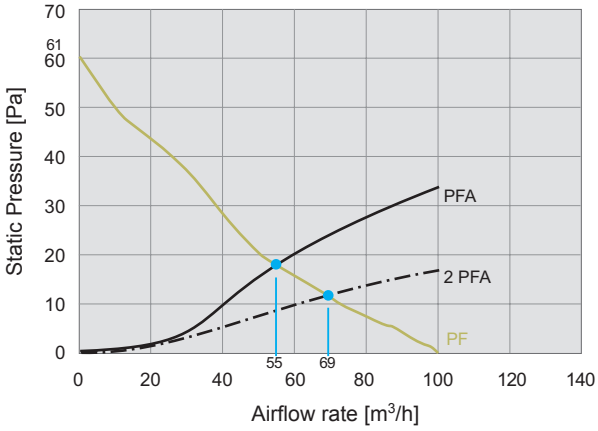
PF 32.000 IP 54



PF 32.000 IP 55



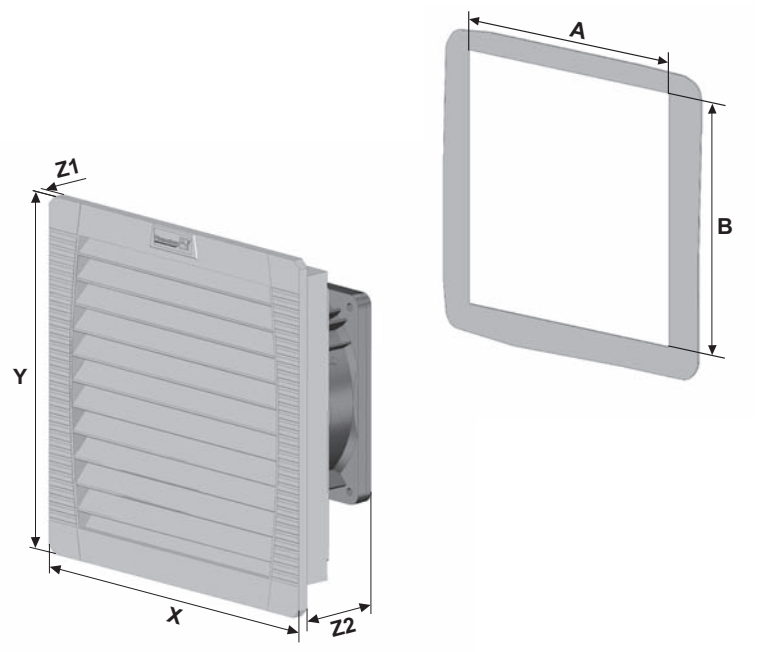
PF 32.000 IP 55



Dimensions

mm	PF 32.000		PFA 30.000
	AC	DC	
X	202	202	202
Y	202	202	202
Z1	6	6	6
Z2	87	81	34
A[1]	177	177	177
B[1]	177	177	177

[1] for material thicknesses up to 2 mm
+ 1 mm for thickness of material > 2 mm ≤ 3 mm



ecool Filterfan
PF 42.500
ecool Exhaust filter
PFA 40.000



- installation size 4, air flow rate up to 171 m³/h
- two performance classes, cut-out compatible
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)
- cut-out compatible with installation size 4 from the 3rd Generation

Data		PF 42.500					Unit
Article number	IP 54	11642101055	11642151055	11642851055	11642801055	11642701055	
	IP 55	11642103055	11642153055	11642853055	11642803055	11642703055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz		DC			
		230	115	12	24	48	V
Unimpeded airflow	IP 54	156 / 171					m³/h
	IP 55	145 / 160					
Airflow rate in combination (PF + PFA 40.000)	IP 54	116 / 127					
	IP 55	109 / 113					
Power consumption		18 / 17	18 / 17	6	4.7	4.6	W
Current consumption		0.12 / 0.1	0.25 / 0.25	0.5	0.2	0.1	A
Noise level (according to EN ISO 3741)	IP 54	40 / 43		40			dB (A)
	IP 55						
Weight		1.18		0.92			kg
Type of connection		spring-type terminal					
Fuse		6					A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter					
	IP 55	NEMA type 12 - fluted filter					
Filtration efficiency	IP 54	88					%
	IP 55	91					
Filter mat quality class according to EN 779	IP 54	G 3					
	IP 55	G 4					
Duty cycle		100					%
Bearing type		ball bearing					
Service life L_{10} (+ 40 °C)[1]		40000	42500	57500	70000		h
Temperature range		- 40 … + 55 / - 40 … + 131					°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO					
	IP 55	additional: UV-resistant					
Colour		RAL 7035, different colours available on request					

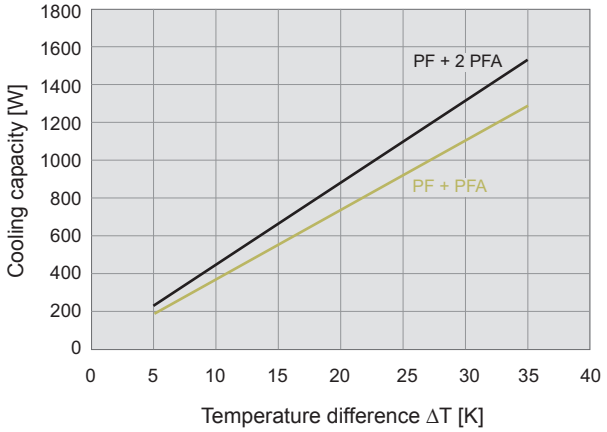
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 40.000	IP 54	1	11740001055	190
	IP 55	1	11740003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

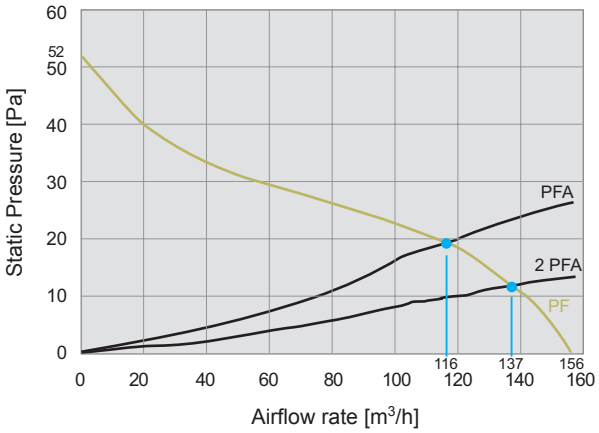
Cooling capacity performance curves

PF 42.500 IP 54

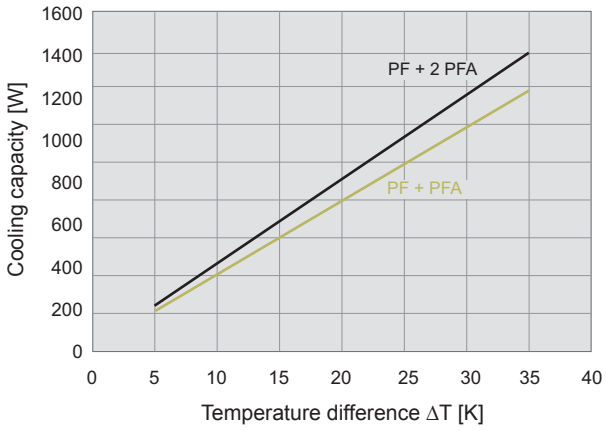


Static pressure performance curves

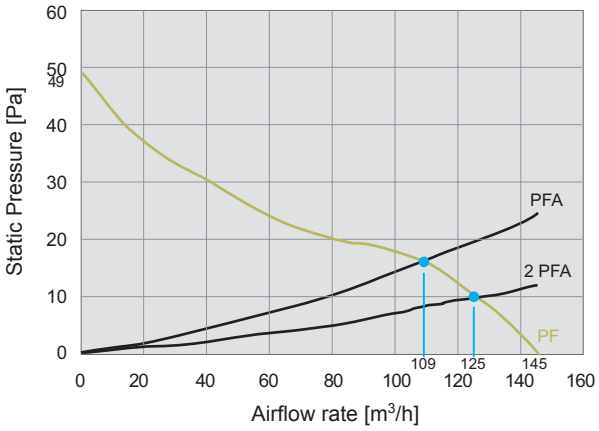
PF 42.500 IP 54



PF 42.500 IP 55



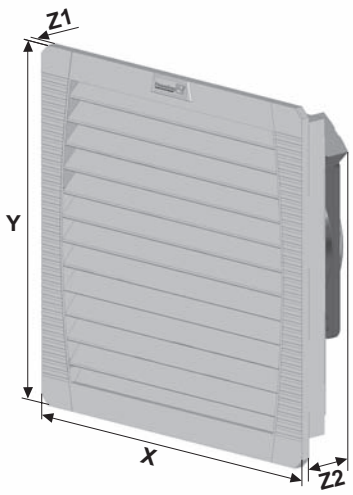
PF 42.500 IP 55

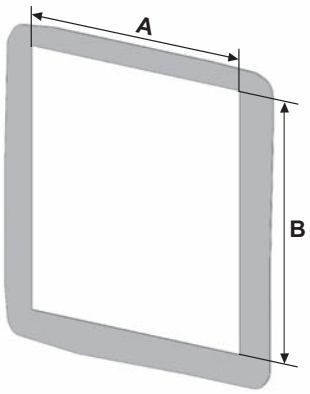


Dimensions

mm	PF 42.500	PFA 40.000
X	252	252
Y	252	252
Z1	6	6
Z2	97	38
A[1]	223	223
B[1]	223	223

[1] for material thicknesses up to 2 mm
+ 1 mm for thickness of material > 2 mm ≤ 3 mm





ecool Filterfan PF 43.000

ecool Exhaust filter PFA 40.000



- installation size 4, air flow rate up to 292 m³/h
- two performance classes, cut-out compatible
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)
- cut-out compatible with installation size 4 from the 3rd Generation

Data		PF 43.000					Unit
Article number	IP 54	11643101055	11643151055	11643851055	11643801055	11643701055	
	IP 55	11643103055	11643153055	11643853055	11643803055	11643703055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz		DC			
		230	115	12	24	48	V
Unimpeded airflow	IP 54	256 / 292					m³/h
	IP 55	233 / 265					
Airflow rate in combination (PF + PFA 40.000)	IP 54	231 / 265					
	IP 55	180 / 207					
Power consumption		45 / 39	40 / 40	12	12	12	W
Current consumption		0.32 / 0.26	0.5 / 0.5	1	0.5	0.25	A
Noise level (according to EN ISO 3741)	IP 54	42 / 46		42			dB (A)
	IP 55						
Weight		1.67		1.51			kg
Type of connection		spring-type terminal					
Fuse		6					A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter					
	IP 55	NEMA type 12 - fluted filter					
Filtration efficiency	IP 54	88					%
	IP 55	91					
Filter mat quality class according to EN 779	IP 54	G 3					
	IP 55	G 4					
Duty cycle		100					%
Bearing type		ball bearing					
Service life L_{10} (+ 40 °C)[1]		40000		80000			h
Temperature range		- 40 … + 55 / - 40 … + 131					°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO					
	IP 55	additional: UV-resistant					
Colour		RAL 7035, different colours available on request					

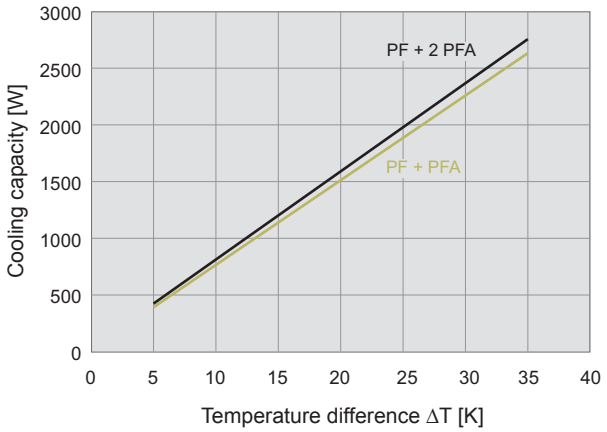
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 40.000	IP 54	1	11740001055	190
	IP 55	1	11740003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

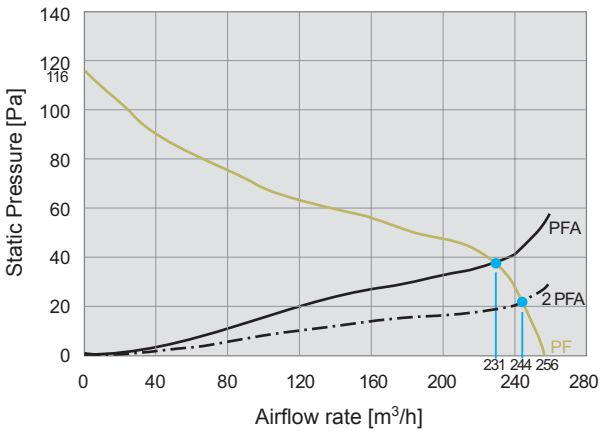
Cooling capacity performance curves

PF 43.000 IP 54

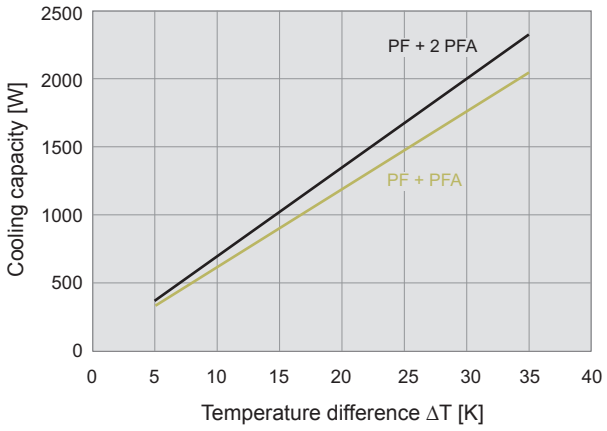


Static pressure performance curves

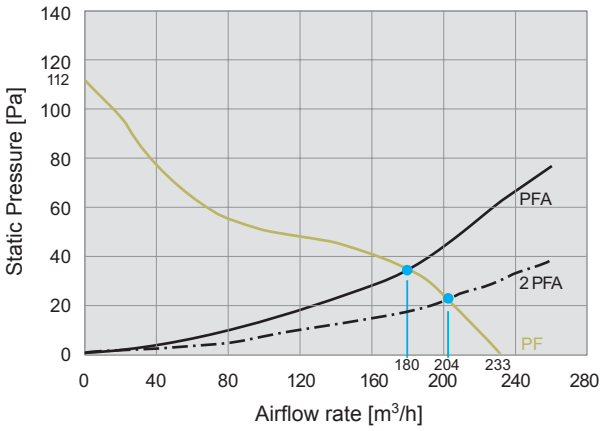
PF 43.000 IP 54



PF 43.000 IP 55



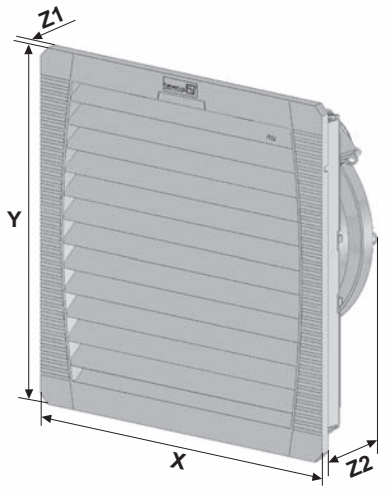
PF 43.000 IP 55

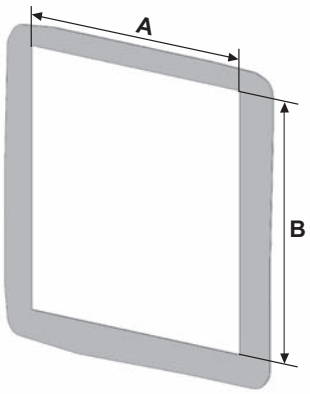


Dimensions

mm	PF 43.000		PFA 40.000
	AC	DC	
X	252	252	252
Y	252	252	252
Z1	6	6	6
Z2	113	97	38
A[1]	223	223	223
B[1]	223	223	223

[1] for material thicknesses up to 2 mm
+ 1 mm for thickness of material > 2 mm ≤ 3 mm





ECOOL Filterfan
PF 65.000
ECOOL Exhaust filter
PFA 60.000



- installation size 6, air flow rate up to 505 m³/h
- three performance classes, cut-out compatible
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)
- cut-out compatible with installation size 6 from the 3rd Generation and with cooling unit DTFI 9021 (see page 36)

Data		PF 65.000		Unit
Article number	IP 54	11665102055	11665152055	
	IP 55	11665103055	11665153055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz		
		230	115	V
Unimpeded airflow	IP 54	480 / 480		m³/h
	IP 55	505 / 505		
Airflow rate in combination (PF + PFA 60.000)	IP 54	370 / 370		
	IP 55	380 / 380		
Power consumption		65 / 80	75 / 90	W
Current consumption		0.3 / 0.36	0.66 / 0.8	A
Noise level (according to EN ISO 3741)	IP 54	54 / 52		dB (A)
	IP 55			
Weight		3.2		kg
Type of connection		spring-type terminal		
Fuse		6		A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter		
	IP 55	NEMA type 12 - fluted filter		
Filtration efficiency	IP 54	91		%
	IP 55			
Filter mat quality class according to EN 779	IP 54	G 4		
	IP 55			
Duty cycle		100		%
Bearing type		ball bearing		
Service life L_{10} (+ 40 °C)[1]		40000		h
Temperature range		- 40 … + 55 / - 40 … + 131		°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 V0		
	IP 55	additional: UV-resistant		
Colour		RAL 7035, different colours available on request		

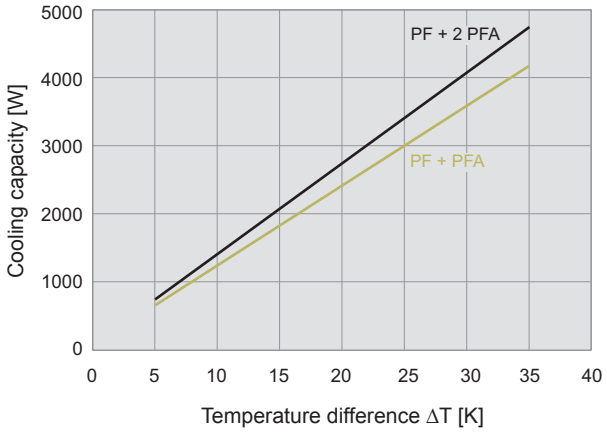
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 60.000	IP 54	1	11760002055	190
	IP 55	1	11760003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

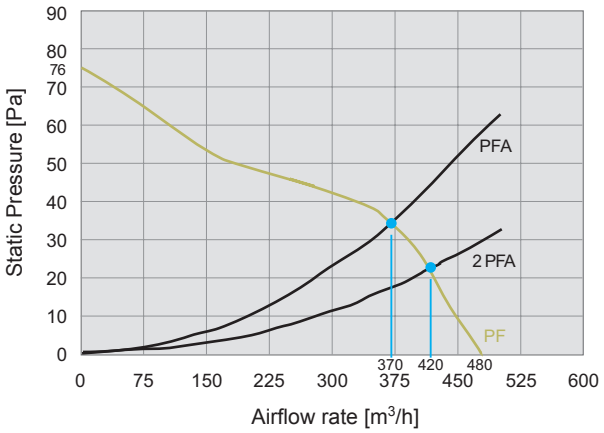
Cooling capacity performance curves

PF 65.000 IP 54

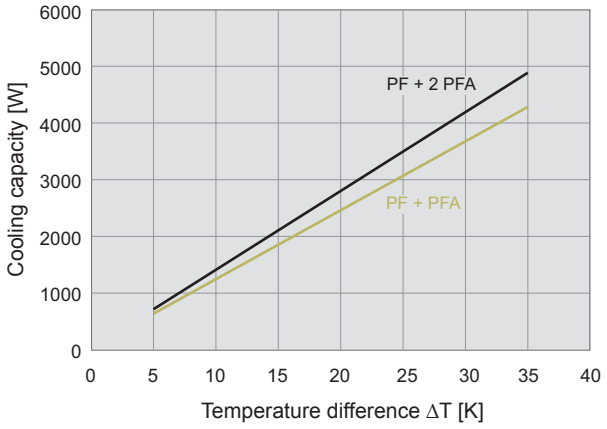


Static pressure performance curves

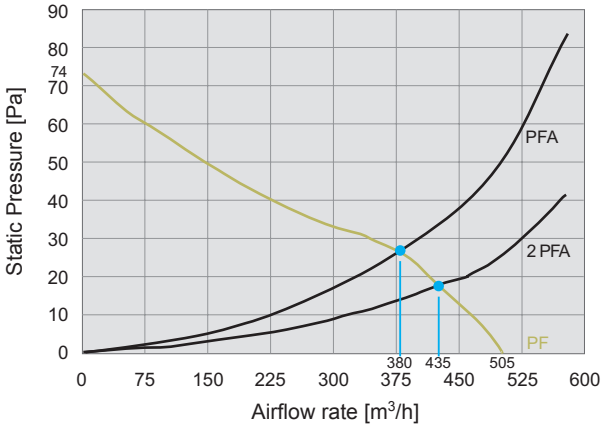
PF 65.000 IP 54



PF 65.000 IP 55



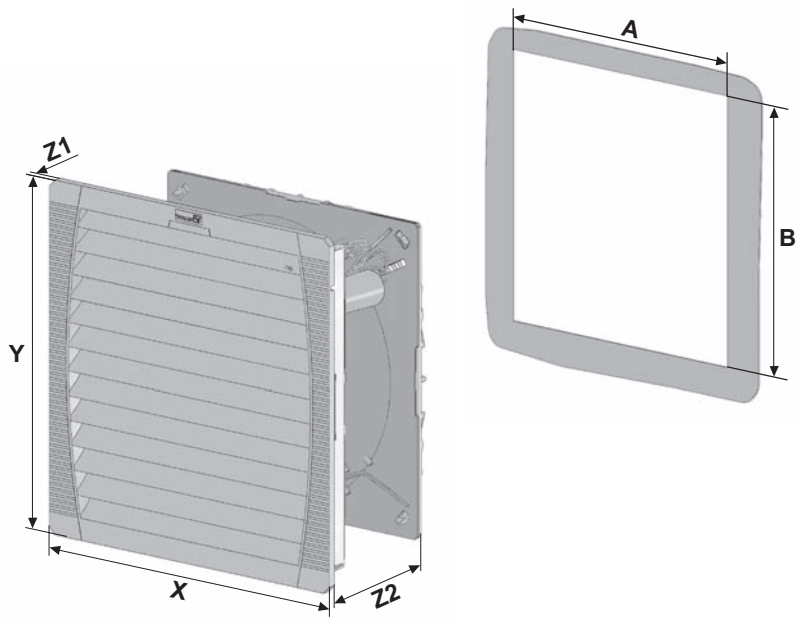
PF 65.000 IP 55



Dimensions

mm	PF 65.000	PFA 60.000
X	320	320
Y	320	320
Z1	7	7
Z2	150	39
A[1]	291	291
B[1]	291	291

[1] for material thicknesses up to 2 mm
+ 1 mm for thickness of material > 2 mm ≤ 3 mm



ECOOL Filterfan
PF 66.000
ECOOL Exhaust filter
PFA 60.000



- installation size 6, air flow rate up to 785 m³/h
- three performance classes, cut-out compatible
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)
- cut-out compatible with installation size 6 from the 3rd Generation and with cooling unit DTFI 9021 (see page 36)

Data		PF 66.000			Unit
Article number	IP 54	11666022055	11666102055	11666152055	
	IP 55	11666023055	11666103055	11666153055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz			
		400 / 460 3 ~	230	115	V
Unimpeded airflow	IP 54	640 / 653			m³/h
	IP 55	770 / 785			
Airflow rate in combination (PF + PFA 60.000)	IP 54	445 / 445			
	IP 55	490 / 501			
Power consumption		120 / 155	115 / 150	110 / 160	W
Current consumption		0.26 / 0.25	0.51 / 0.66	0.96 / 1.4	A
Noise level (according to EN ISO 3741)	IP 54	63 / 64			dB (A)
	IP 55				
Weight		3.2			kg
Type of connection		spring-type terminal			
Fuse		6			A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter			
	IP 55	NEMA type 12 - fluted filter			
Filtration efficiency	IP 54	91			%
	IP 55				
Filter mat quality class according to EN 779	IP 54	G 4			
	IP 55				
Duty cycle		100			%
Bearing type		ball bearing			
Service life L_{10} (+ 40 °C)[1]		40000			h
Temperature range		- 40 … + 55 / - 40 … + 131			°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO			
	IP 55	additional: UV-resistant			
Colour		RAL 7035, different colours available on request			

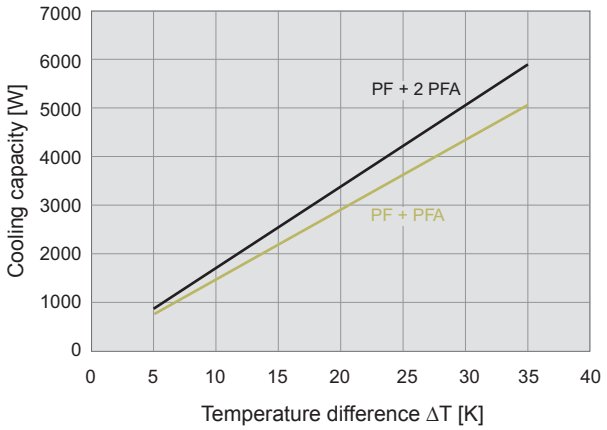
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 60.000	IP 54	1	11760002055	190
	IP 55	1	11760003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

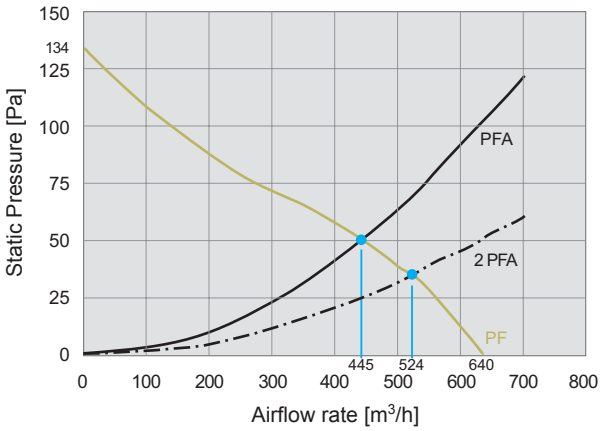
Cooling capacity performance curves

PF 66.000 IP 54

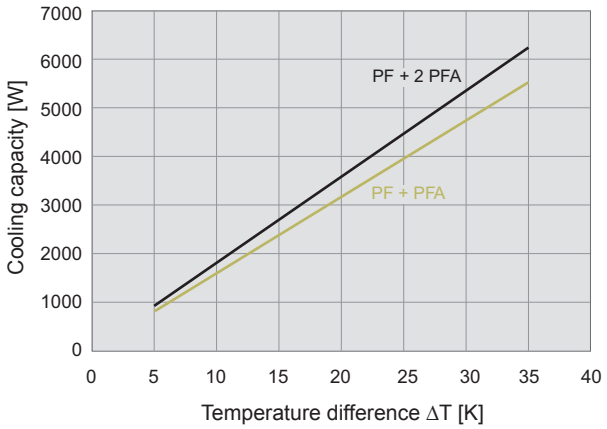


Static pressure performance curves

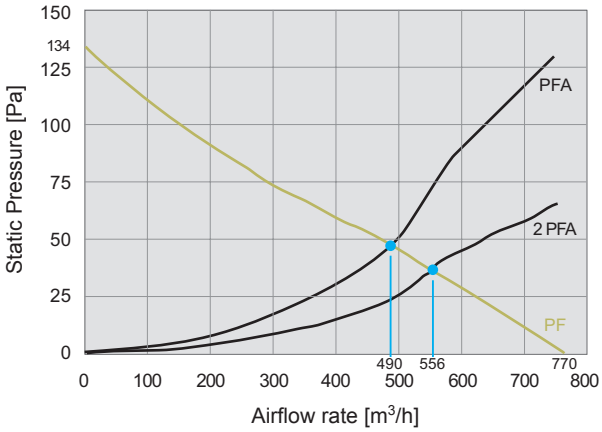
PF 66.000 IP 54



PF 66.000 IP 55



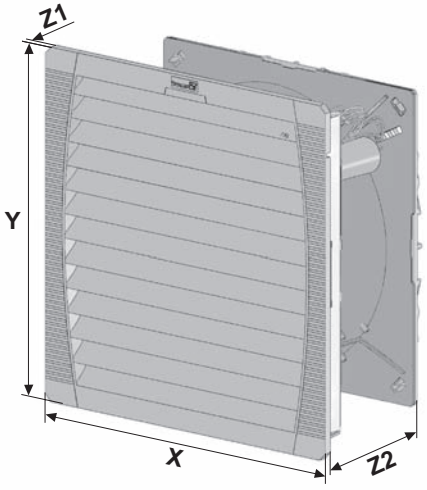
PF 66.000 IP 55

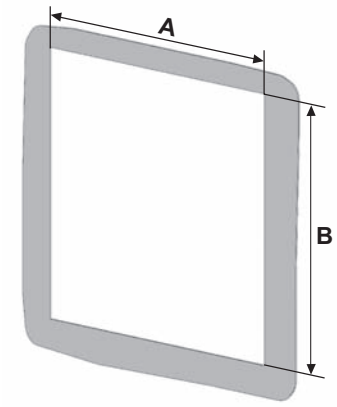


Dimensions

mm	PF 66.000	PFA 60.000
X	320	320
Y	320	320
Z1	7	7
Z2	150	39
A[1]	291	291
B[1]	291	291

[1] for material thicknesses up to 2 mm
+ 1 mm for thickness of material > 2 mm ≤ 3 mm





ecool Filterfan
PF 67.000
ecool Exhaust filter
PFA 60.000



- installation size 6, air flow rate up to 950 m³/h
- three performance classes, cut-out compatible
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)
- cut-out compatible with installation size 6 from the 3rd Generation and with cooling unit DTFI 9021 (see page 36)

Data		PF 67.000			Unit
Article number	IP 54	11667022055	11667102055	11667152055	
	IP 55	11667023055	11667103055	11667153055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz			
		400 / 460 3 ~	230	115	V
Unimpeded airflow	IP 54	845 / 875			m³/h
	IP 55	925 / 950			
Airflow rate in combination (PF + PFA 60.000)	IP 54	560 / 625			
	IP 55	570 / 625			
Power consumption		140 / 170	135 / 200	140 / 195	W
Current consumption		0.35 / 0.43	0.59 / 0.88	1.23 / 1.71	A
Noise level (according to EN ISO 3741)	IP 54	66 / 69			dB (A)
	IP 55				
Weight		3.7			kg
Type of connection		spring-type terminal			
Fuse		6			A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter			
	IP 55	NEMA type 12 - fluted filter			
Filtration efficiency	IP 54	91			%
	IP 55				
Filter mat quality class according to EN 779	IP 54	G 4			
	IP 55				
Duty cycle		100			%
Bearing type		ball bearing			
Service life L_{10} (+ 40 °C)[1]		40000			h
Temperature range		- 40 … + 55 / - 40 … + 131			°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO			
	IP 55	additional: UV-resistant			
Colour		RAL 7035, different colours available on request			

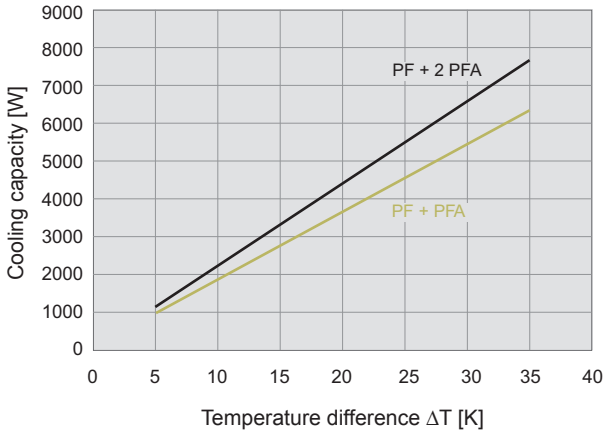
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 60.000	IP 54	1	11760002055	190
	IP 55	1	11760003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

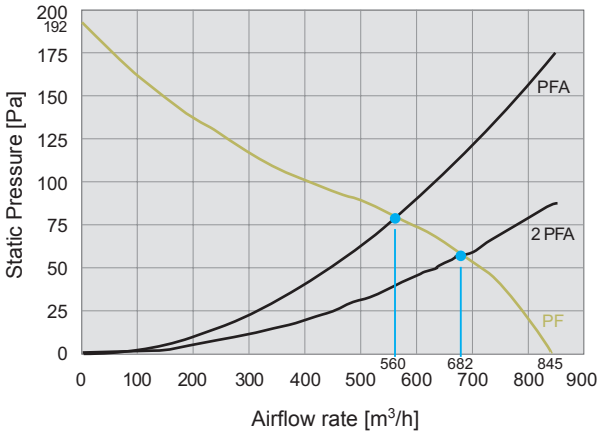
Cooling capacity performance curves

PF 67.000 IP 54

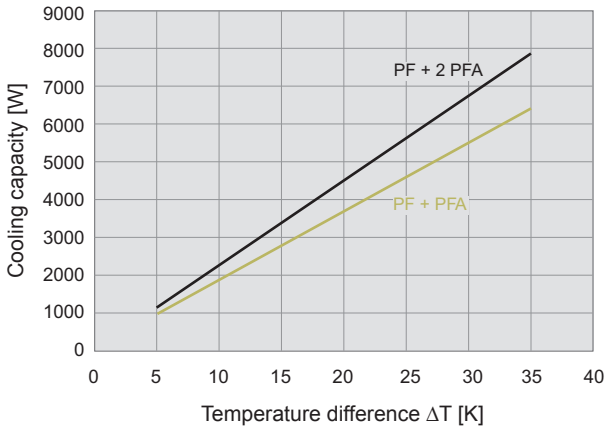


Static pressure performance curves

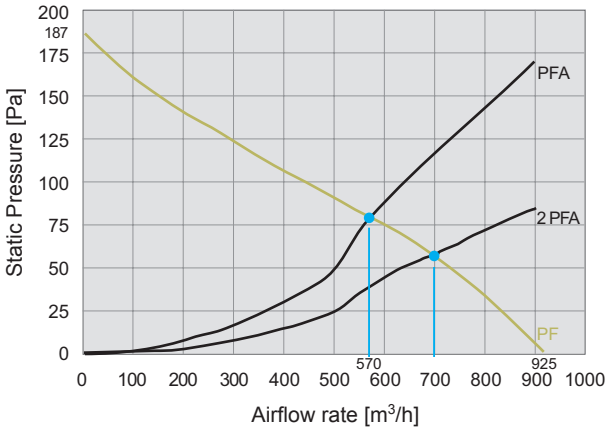
PF 67.000 IP 54



PF 67.000 IP 55



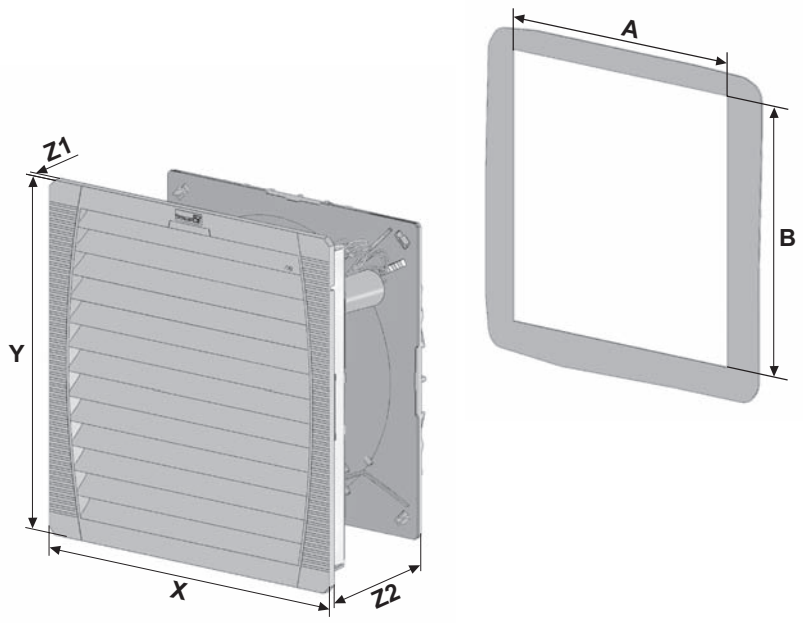
PF 67.000 IP 55



Dimensions

mm	PF 67.000	PFA 60.000
X	320	320
Y	320	320
Z1	7	7
Z2	150	39
A[1]	291	291
B[1]	291	291

[1] for material thicknesses up to 2 mm
+ 1 mm for thickness of material > 2 mm ≤ 3 mm



ecool Slim Line Filterfan
PF 65.000 SL



Pfannenberg 4th Generation filterfan with low installation depth
- installation size 6, air flow rate up to 550 m³/h
- three performance classes, cut-out compatible
- system of protection IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)

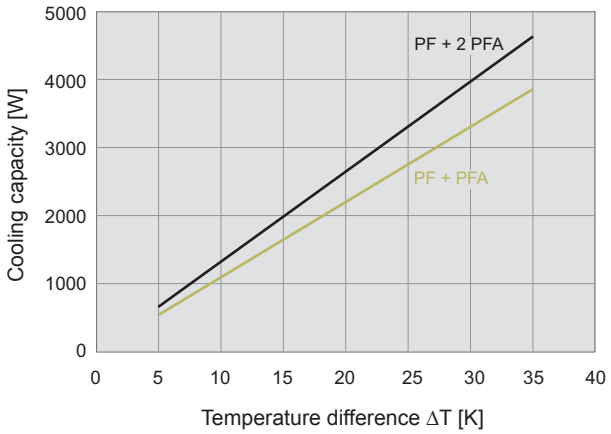
Data		PF 65.000 SL		Unit
Article number	IP 55	11675103055	11675153055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz		
		230	115	V
Unimpeded airflow		500 / 550		m³/h
Airflow rate in combination (PF + PFA 60.000)		345 / 423		
Power consumption		64 / 80		W
Current consumption		0.29 / 0.35	0.58 / 0.7	A
Noise level (according to EN ISO 3741)		54 / 52		dB (A)
Weight		3.3		kg
Type of connection		screw terminal		
Fuse		6		A
System of protection according to EN 60529 / UL 50		NEMA type 12 - fluted filter		
Filtration efficiency		91		%
Filter mat quality class according to EN 779		G 4		
Duty cycle		100		%
Bearing type		ball bearing		
Service life L_{10} (+ 40 °C)[1]		40000		h
Temperature range		- 40 … + 55 / - 40 … + 131		°C / °F
Design (housing and protection against accidental contact)		made of injection-moulded thermoplastic, self-extinguishing, UL 94 V0, UV-resistant		
Colour		RAL 7035, different colours available on request		

Accessories		Piece	Article number	Information on page
Exhaust filter PFA 60.000	IP 55	1	11760003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary
Approvals see page 149.

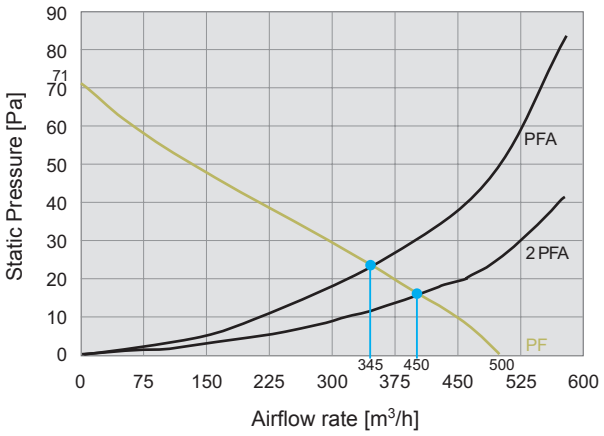
Cooling capacity performance curves

PF 65.000 SL IP 55



Static pressure performance curves

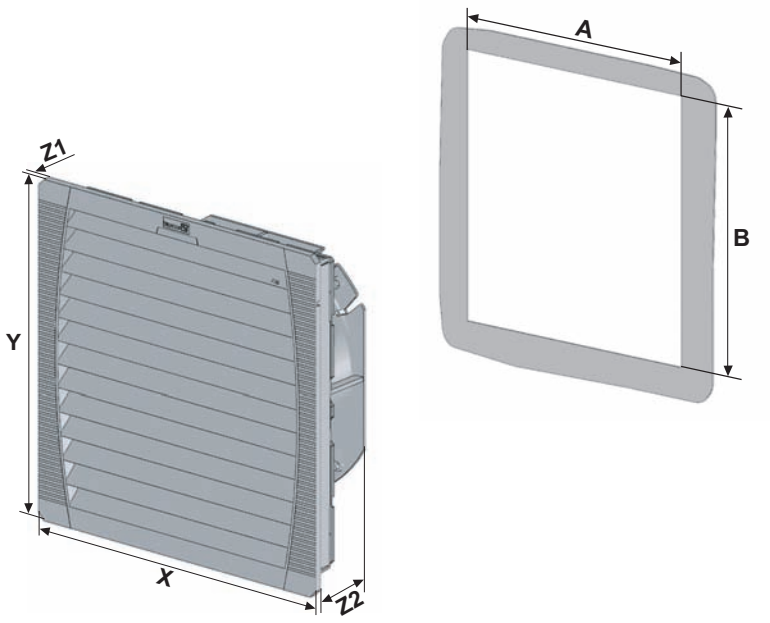
PF 65.000 SL IP 55



Dimensions

mm	PF 65.000 SL	PFA 60.000
X	320	320
Y	320	320
Z1	7	7
Z2	124	39
A[1]	291	291
B[1]	291	291

[1] for material thicknesses up to 2 mm
+ 1 mm for thickness of material > 2 mm ≤ 3 mm



ecool Slim Line Filterfan
PF 67.000 SL



Pfannenberg 4th Generation filterfan with low installation depth
- installation size 6, air flow rate up to 725 m³/h
- three performance classes, cut-out compatible
- system of protection IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)

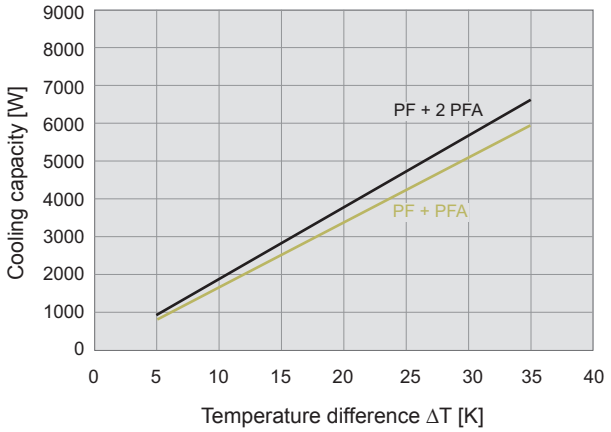
Data		PF 67.000 SL			Unit
Article number	IP 55	11677023055	11677103055	11677153055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz			
		400 / 460 3 ~	230	115	V
Unimpeded airflow		705 / 725			m³/h
Airflow rate in combination (PF + PFA 60.000)		530 / 580			
Power consumption		110 / 165	127 / 180	120 / 165	W
Current consumption		0.2 / 0.23	0.56 / 0.79	1.05 / 1.45	A
Noise level (according to EN ISO 3741)		66 / 69			dB (A)
Weight		3.85	4.05	4.00	kg
Type of connection		screw terminal			
Fuse		6			A
System of protection according to EN 60529 / UL 50		NEMA type 12 - fluted filter			
Filtration efficiency		91			%
Filter mat quality class according to EN 779		G 4			
Duty cycle		100			%
Bearing type		ball bearing			
Service life L_{10} (+ 40 °C)[1]		40000			h
Temperature range		- 40 … + 55 / - 40 … + 131			°C / °F
Design (housing and protection against accidental contact)		made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO, UV-resistant			
Colour		RAL 7035, different colours available on request			

Accessories		Piece	Article number	Information on page
Exhaust filter PFA 60.000	IP 55	1	11760003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary
Approvals see page 149.

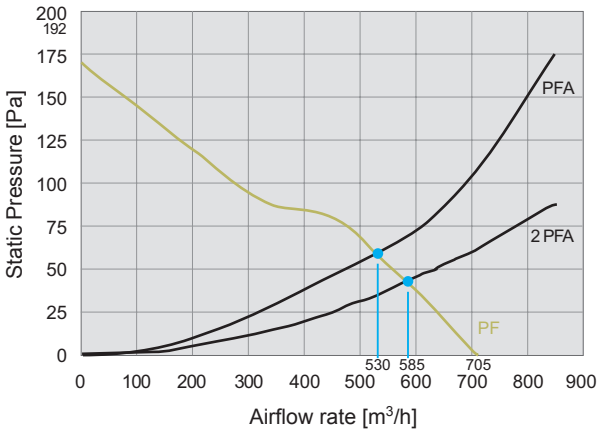
Cooling capacity performance curves

PF 67.000 SL IP 55



Static pressure performance curves

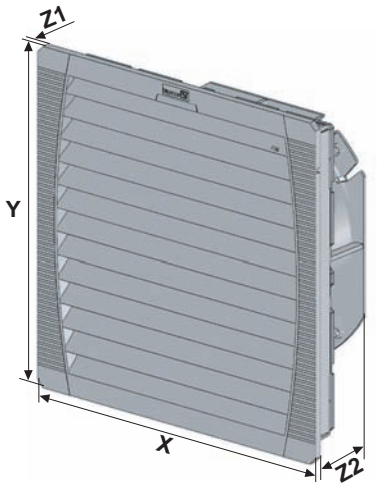
PF 67.000 SL IP 55

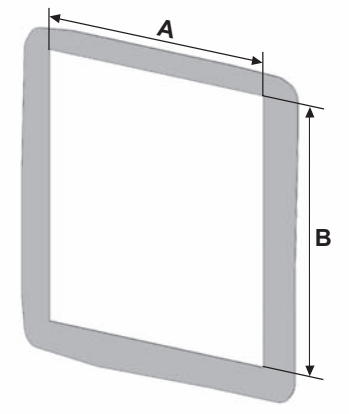


Dimensions

mm	PF 67.000 SL	PFA 60.000
X	320	320
Y	320	320
Z1	7	7
Z2	127	39
A[1]	291	291
B[1]	291	291

[1] for material thicknesses up to 2 mm
+ 1 mm for thickness of material > 2 mm ≤ 3 mm





ECOOL Filterfan
PF 11.000 EMC
ECOOL Exhaust filter
PFA 10.000 EMC



- installation size 1, air flow rate up to 29 m³/h
- secure contact due to improved contact springs on the screen grid
- system of protection IP 54, NEMA type 12
- UL, cUL approval
- cut-out compatible to installation size 1 of the 3rd and 4th Generation

Data		PF 11.000 EMC					Unit
Article number	IP 54	11811101055	11811151055	11811851055	11811801055	11811701055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz		DC			
		230	115	12	24	48	V
Unimpeded airflow		25 / 29					m³/h
Airflow rate in combination (PF + PFA 10.000 EMC)		16 / 18					
Power consumption		12 / 11	12 / 11	2.4	2.4	2.6	W
Current consumption		0.07 / 0.06	0.15 / 0.15	0.2	0.1	0.05	A
Noise level (according to EN ISO 3741)		33 / 33		33			dB (A)
Weight		0.58		0.19			kg
Type of connection		cable, 2-core, length 310 mm					
Fuse		6					A
System of protection according to EN 60529 / UL 50		NEMA type 12 – standard filter					
Filtration efficiency		88					%
Filter mat quality class according to EN 779		G 3					
Duty cycle		100					%
Bearing type		sleeve bearing		ball bearing			
Service life L_{10} (+ 40 °C)[1]		52500	55000	70000			h
Temperature range		- 40 … + 55 / - 40 … + 131					°C / °F
Design (housing and protection against accidental contact)		made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO					
EMC screen		**stainless steel**					
Colour		RAL 7035, different colours available on request					

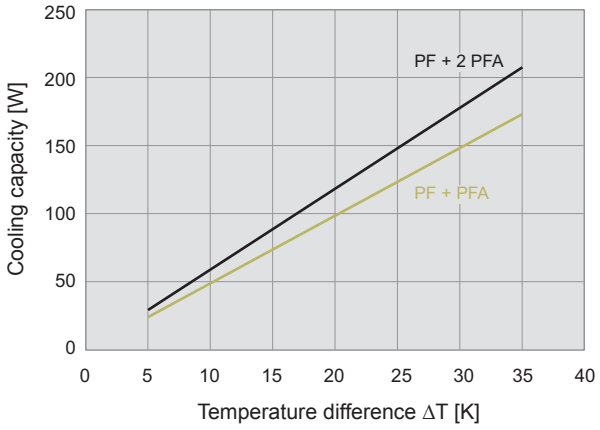
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 10.000 EMC	IP 54	1	11910001055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

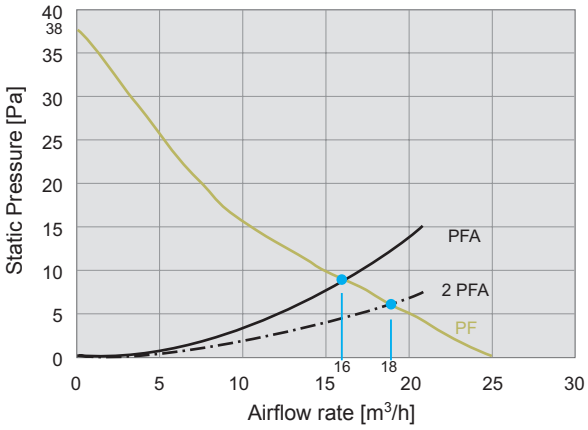
Cooling capacity performance curves

PF 11.000 EMC



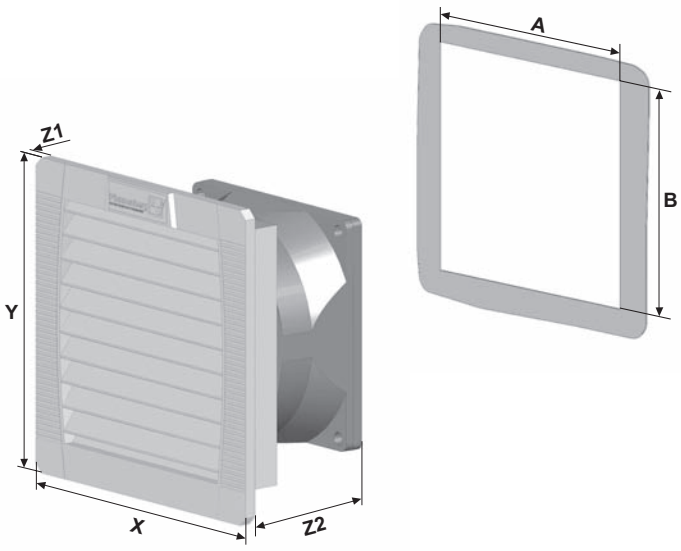
Static pressure performance curves

PF 11.000 EMC



Dimensions

mm	PF 11.000 EMC		PFA 10.000 EMC
	AC	DC	
X	109	109	109
Y	109	109	109
Z1	4	4	4
Z2	62	49	19
A	93	93	93
B	93	93	93



Further information on the EMC Filterfans (EMC series) can be found on page 186.

ECOOL Filterfan
PF 22.000 EMC
ECOOL Exhaust filter
PFA 20.000 EMC



- installation size 2, air flow rate up to 70 m³/h
- secure contact due to improved contact springs on the screen grid
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)
- cut-out compatible to installation size 2 of the 3rd and 4th Generation

Data		PF 22.000 EMC					Unit
Article number	IP 54	11822101055	11822151055	11822851055	11822801055	11822701055	
	IP 55	11822103055	11822153055	11822853055	11822803055	11822703055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz		DC			
		230	115	12	24	48	V
Unimpeded airflow	IP 54	61 / 70					m³/h
	IP 55	56 / 64					
Airflow rate in combination (PF + PFA 20.000 EMC)	IP 54	44 / 52					
	IP 55	40 / 46					
Power consumption		19 / 18	20 / 20	5	5	5	W
Current consumption		0.12 / 0.18	0.24 / 0.23	0.42	0.21	0.1	A
Noise level (according to EN ISO 3741)	IP 54	44 / 44		44			dB (A)
	IP 55						
Weight		0.78		0.49			kg
Type of connection		terminal strip		cable, 2-core, length 310 mm			
Fuse		6					A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter					
	IP 55	NEMA type 12 - fluted filter					
Filtration efficiency	IP 54	88					%
	IP 55	91					
Filter mat quality class according to EN 779	IP 54	G 3					
	IP 55	G 4					
Duty cycle		100					%
Bearing type		sleeve bearing		ball bearing			
Service life L_{10} (+ 40 °C)[1]		37500	40000	62500			h
Temperature range		- 40 … + 55 / - 40 … + 131					°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO					
	IP 55	additional: UV-resistant					
EMC screen		**stainless steel**					
Colour		RAL 7035, different colours available on request					

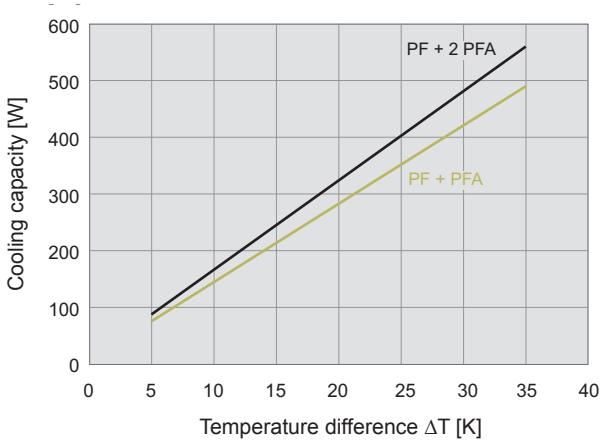
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 20.000 EMC	IP 54	1	11920001055	190
	IP 55	1	11920003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

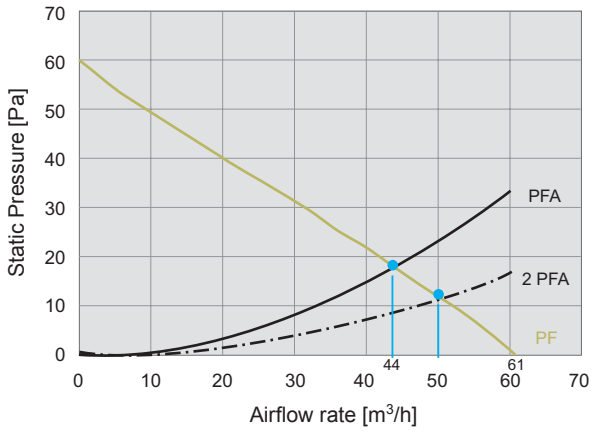
Cooling capacity performance curves

PF 22.000 EMC IP 54

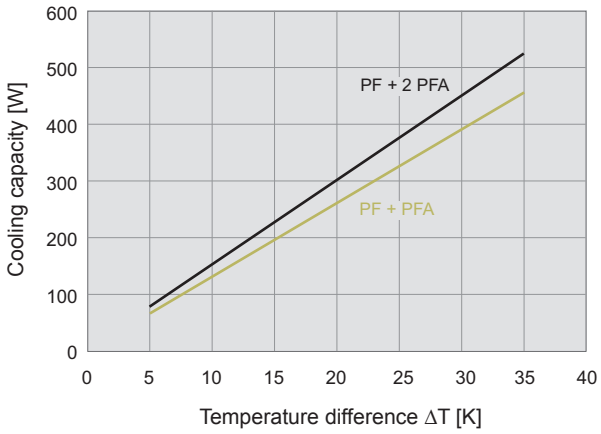


Static pressure performance curves

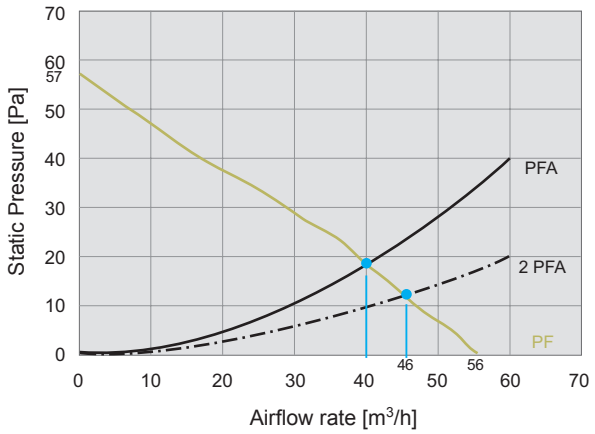
PF 22.000 EMC IP 54



PF 22.000 EMC IP 55

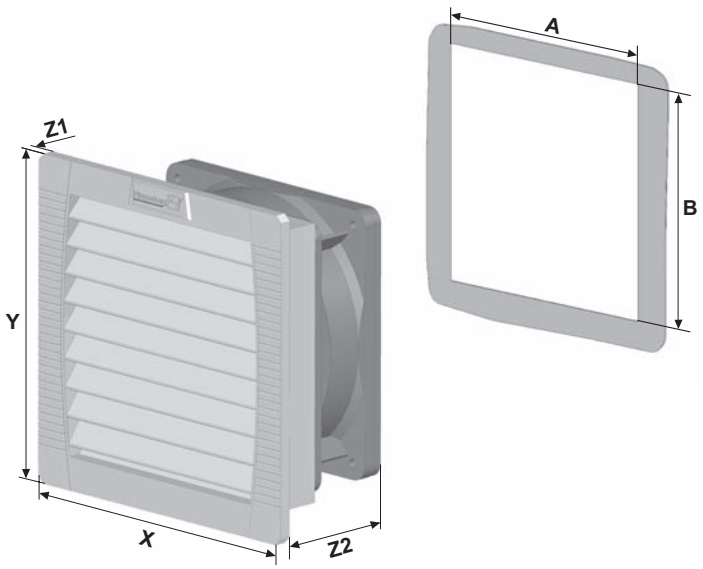


PF 22.000 EMC IP 55



Dimensions

mm	PF 22.000 EMC		PFA 20.000 EMC
	AC	DC	
X	145	145	145
Y	145	145	145
Z1	5	5	5
Z2	70	64	26
A	126	126	126
B	126	126	126



Further information on the EMC Filterfans (EMC series) can be found on page 186.

ECOOL Filterfan
PF 32.000 EMC
ECOOL Exhaust filter
PFA 30.000 EMC



- installation size 3, air flow rate up to 125 m³/h
- secure contact due to improved contact springs on the screen grid
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)

Data		PF 32.000 EMC					Unit
Article number	IP 54	11832101055	11832151055	11832851055	11832801055	11832701055	
	IP 55	11832103055	11832153055	11832853055	11832803055	11832703055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz		DC			
		230	115	12	24	48	V
Unimpeded airflow	IP 54	110 / 125					m³/h
	IP 55	100 / 110					
Airflow rate in combination (PF + PFA 30.000 EMC)	IP 54	82 / 93					
	IP 55	55 / 64					
Power consumption		19 / 18	20 / 20	5	5	5	W
Current consumption		0.12 / 0.18	0.24 / 0.23	0.42	0.21	0.1	A
Noise level (according to EN ISO 3741)	IP 54	40 / 40		40			dB (A)
	IP 55						
Weight		0.96		0.7			kg
Type of connection		terminal strip		cable, 2-core, length 310 mm			
Fuse		6					A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter					
	IP 55	NEMA type 12 - fluted filter					
Filtration efficiency	IP 54	88					%
	IP 55	91					
Filter mat quality class according to EN 779	IP 54	G 3					
	IP 55	G 4					
Duty cycle		100					%
Bearing type		sleeve bearing		ball bearing			
Service life L_{10} (+ 40 °C)[1]		37500	40000	62500			h
Temperature range		- 40 … + 55 / - 40 … + 131					°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO					
	IP 55	additional: UV-resistant					
EMC screen		**stainless steel**					
Colour		RAL 7035, different colours available on request					

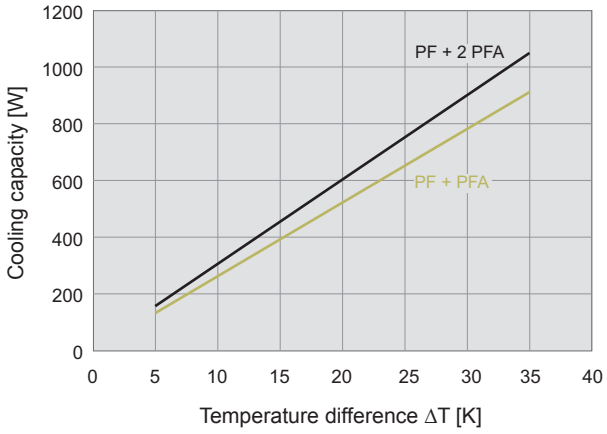
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 30.000 EMC	IP 54	1	11930001055	190
	IP 55	1	11930003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

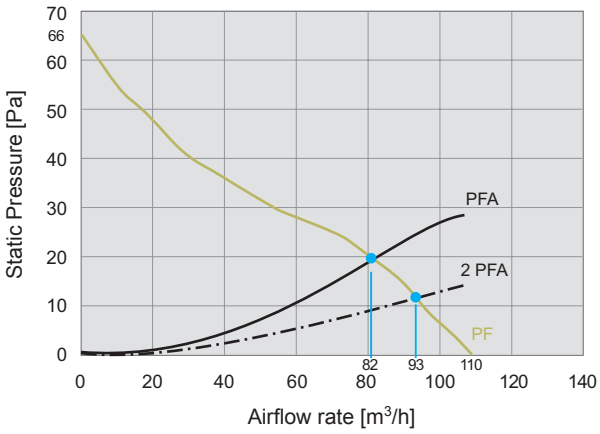
Cooling capacity performance curves

PF 32.000 EMC IP 54

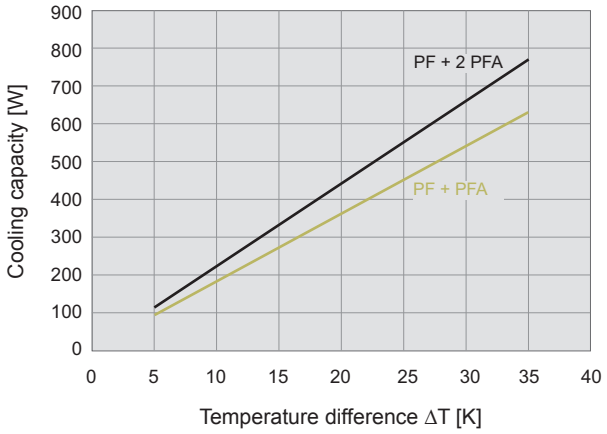


Static pressure performance curves

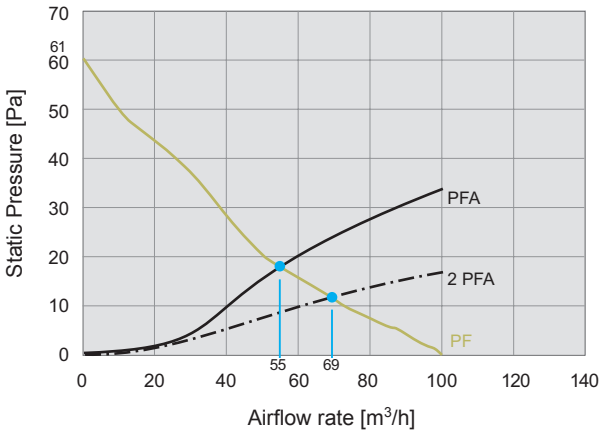
PF 32.000 EMC IP 54



PF 32.000 EMC IP 55

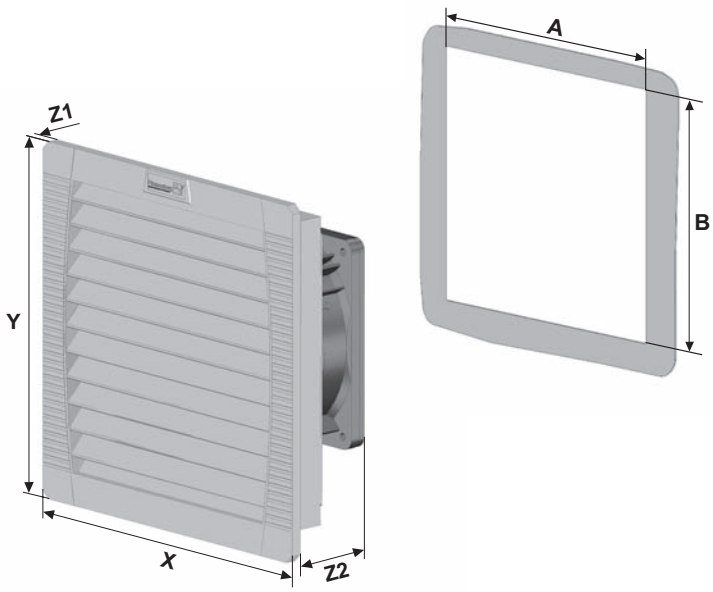


PF 32.000 EMC IP 55



Dimensions

mm	PF 32.000 EMC		PFA 30.000 EMC
	AC	DC	
X	202	202	202
Y	202	202	202
Z1	6	6	6
Z2	87	81	34
A	178	178	178
B	178	178	178



Further information on the EMC Filterfans (EMC series) can be found on page 186.

ecool Filterfan
PF 42.500 EMC
ecool Exhaust filter
PFA 40.000 EMC



- installation size 4, air flow rate up to 171 m³/h
- two performance classes, cut-out compatible
- secure contact due to improved contact springs on the screen grid
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)
- cut-out compatible to installation size 4 of the 3rd and 4th Generation

Data		PF 42.500 EMC					Unit
Article number	IP 54	11842101055	11842151055	11842851055	11842801055	11842701055	
	IP 55	11842103055	11842153055	11842853055	11842803055	11842703055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz		DC			
		230	115	12	24	48	V
Unimpeded airflow	IP 54	156 / 171					m³/h
	IP 55	145 / 160					
Airflow rate in combination (PF + PFA 40.000 EMC)	IP 54	116 / 127					
	IP 55	109 / 113					
Power consumption		18 / 17	18 / 17	6	4.7	4.6	W
Current consumption		0.12 / 0.1	0.25 / 0.25	0.5	0.2	0.1	A
Noise level (according to EN ISO 3741)	IP 54	40 / 43		40			dB (A)
	IP 55						
Weight		1.34		1.08			kg
Type of connection		spring-type terminal					
Fuse		6					A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter					
	IP 55	NEMA type 12 - fluted filter					
Filtration efficiency	IP 54	88					%
	IP 55	91					
Filter mat quality class according to EN 779	IP 54	G 3					
	IP 55	G 4					
Duty cycle		100					%
Bearing type		ball bearing					
Service life L_{10} (+ 40 °C)[1]		40000	42500	57500	70000		h
Temperature range		- 40 … + 55 / - 40 … + 131					°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO					
	IP 55	additional: UV-resistant					
EMC screen		**stainless steel**					
Colour		RAL 7035, different colours available on request					

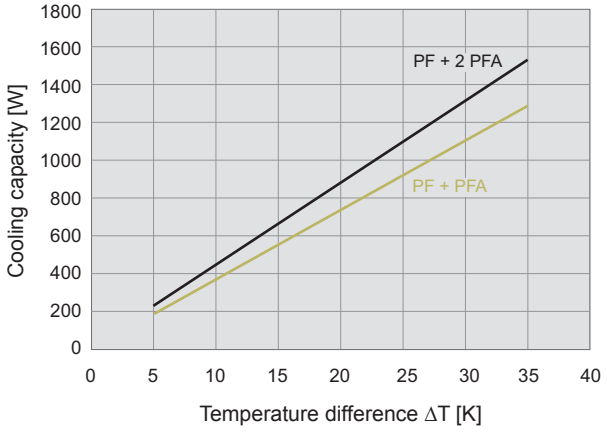
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 40.000 EMC	IP 54	1	11940001055	190
	IP 55	1	11940003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

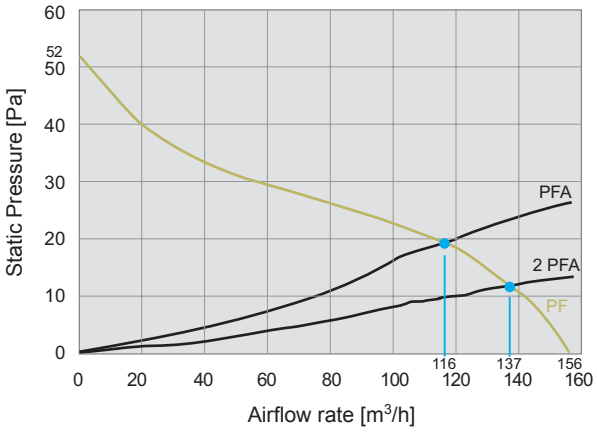
Cooling capacity performance curves

PF 42.500 EMC IP 54

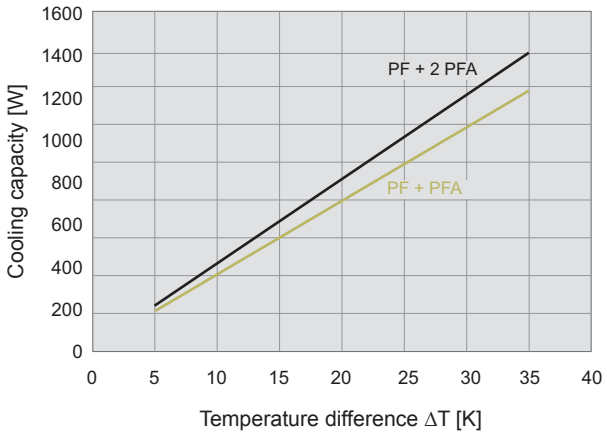


Static pressure performance curves

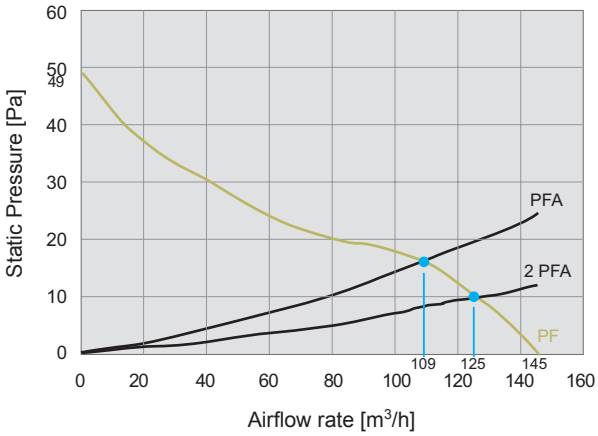
PF 42.500 EMC IP 54



PF 42.500 EMC IP 55

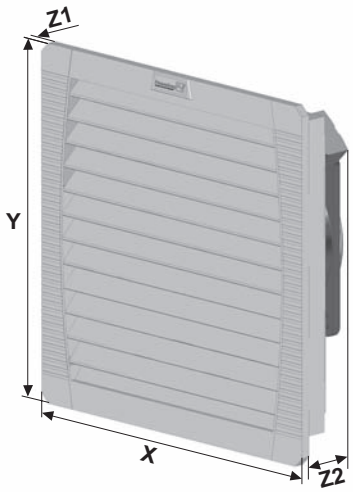


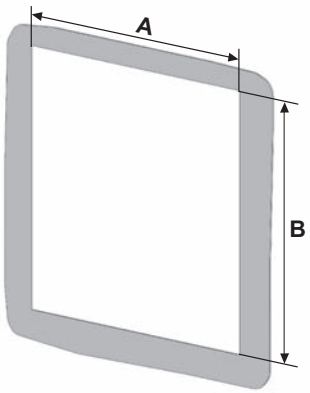
PF 42.500 EMC IP 55



Dimensions

mm	PF 42.500 EMC	PFA 40.000 EMC
X	252	252
Y	252	252
Z1	6	6
Z2	97	38
A	224	224
B	224	224





Further information on the EMC Filterfans (EMC series) can be found on page 186.

ecool Filterfan
PF 43.000 EMC
ecool Exhaust filter
PFA 40.000 EMC



- installation size 4, air flow rate up to 292 m³/h
- two performance classes, cut-out compatible
- secure contact due to improved contact springs on the screen grid
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)
- cut-out compatible to installation size 4 of the 3rd and 4th Generation

Data		PF 43.000 EMC					Unit
Article number	IP 54	11843101055	11843151055	11843851055	11843801055	11843701055	
	IP 55	11843103055	11843153055	11843853055	11843803055	11843703055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz		DC			
		230	115	12	24	48	V
Unimpeded airflow	IP 54	256 / 292					m³/h
	IP 55	233 / 265					
Airflow rate in combination (PF + PFA 40.000 EMC)	IP 54	231 / 265					
	IP 55	180 / 207					
Power consumption		45 / 39	40 / 40	12	12	12	W
Current consumption		0.32 / 0.26	0.5 / 0.5	1	0.5	0.25	A
Noise level (according to EN ISO 3741)	IP 54	42 / 46		42			dB (A)
	IP 55						
Weight		1.83		1.77			kg
Type of connection		spring-type terminal					
Fuse		6					A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter					
	IP 55	NEMA type 12 - fluted filter					
Filtration efficiency	IP 54	88					%
	IP 55	91					
Filter mat quality class according to EN 779	IP 54	G 3					
	IP 55	G 4					
Duty cycle		100					%
Bearing type		ball bearing					
Service life L_{10} (+ 40 °C)[1]		40000		80000			h
Temperature range		- 40 … + 55 / - 40 … + 131					°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO					
	IP 55	additional: UV-resistant					
EMC screen		**stainless steel**					
Colour		RAL 7035, different colours available on request					

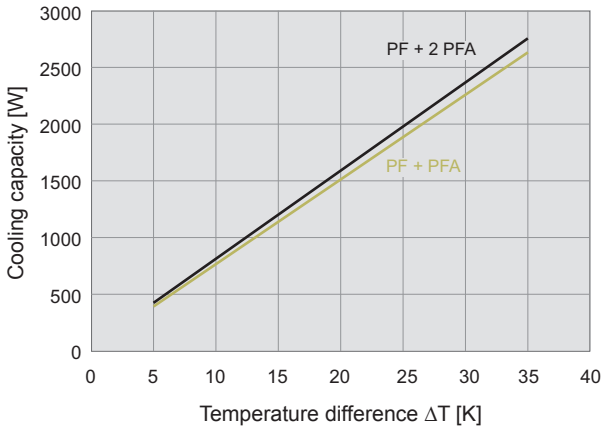
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 40.000 EMC	IP 54	1	11940001055	190
	IP 55	1	11940003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

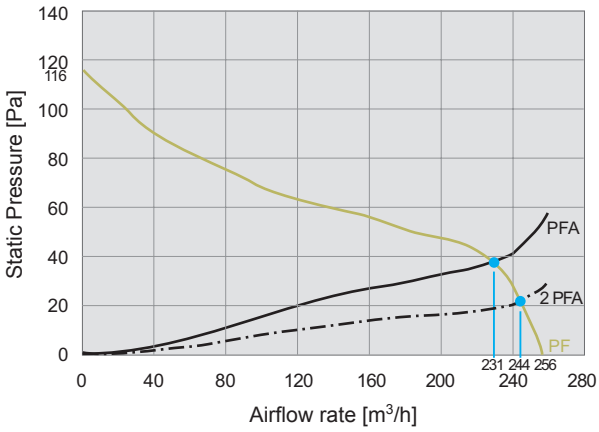
Cooling capacity performance curves

PF 43.000 EMC IP 54

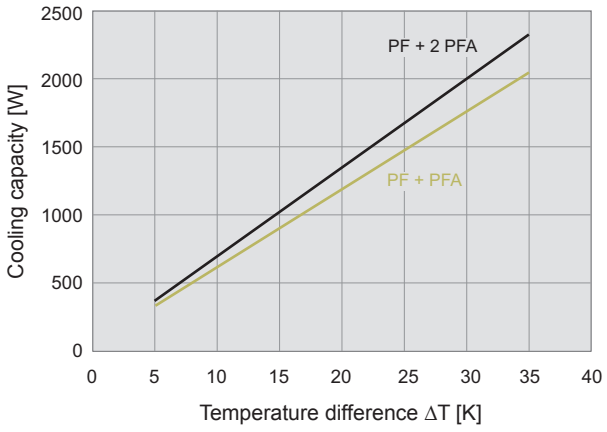


Static pressure performance curves

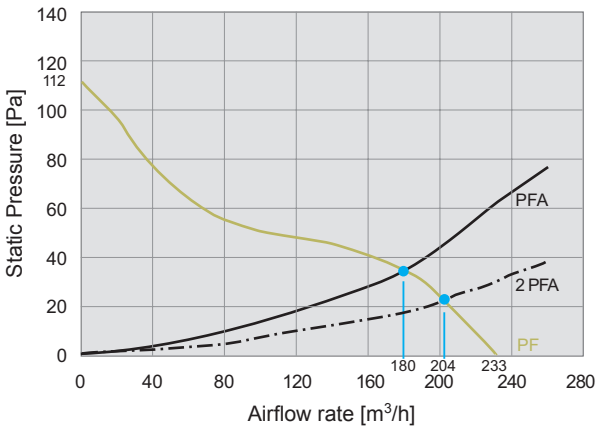
PF 43.000 EMC IP 54



PF 43.000 EMC IP 55

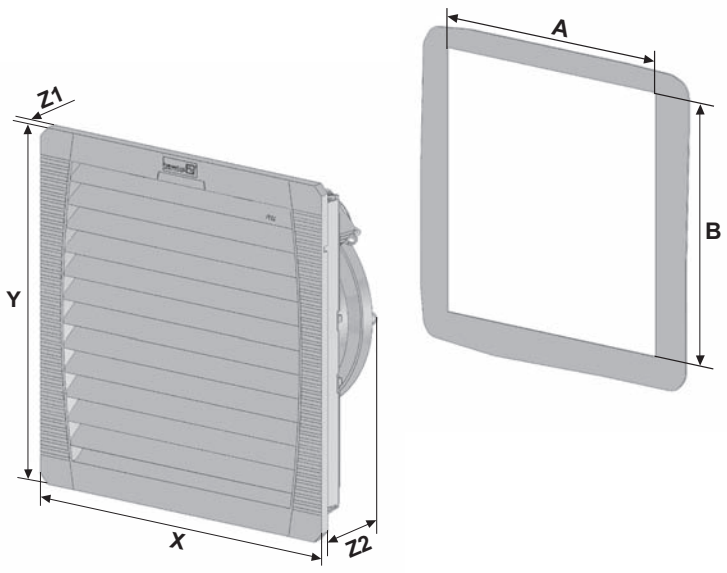


PF 43.000 EMC IP 55



Dimensions

mm	43.000 EMC		PFA 40.000 EMC
	AC	DC	
X	252	252	252
Y	252	252	252
Z1	6	6	6
Z2	113	97	38
A	224	224	224
B	224	224	224



Further information on the EMC Filterfans (EMC series) can be found on page 186.

ECOOL Filterfan
PF 65.000 EMC
ECOOL Exhaust filter
PFA 60.000 EMC



- installation size 6, air flow rate up to 505 m³/h
- three performance classes, cut-out compatible
- secure contact due to improved contact springs on the screen grid
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)
- cut-out compatible to installation size 6 of the 3rd and 4th Generation

Data		PF 65.000 EMC		Unit
Article number	IP 54	11865102055	11865152055	
	IP 55	11865103055	11865153055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz		
		230	115	V
Unimpeded airflow	IP 54	480 / 480		m³/h
	IP 55	505 / 505		
Airflow rate in combination (PF + PFA 60.000 EMC)	IP 54	370 / 370		
	IP 55	380 / 380		
Power consumption		65 / 80	75 / 90	W
Current consumption		0.3 / 0.36	0.66 / 0.8	A
Noise level (according to EN ISO 3741)	IP 54	54 / 52		dB (A)
	IP 55			
Weight		3.43		kg
Type of connection		spring-type terminal		
Fuse		6		A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter		
	IP 55	NEMA type 12 - fluted filter		
Filtration efficiency	IP 54	91		%
	IP 55			
Filter mat quality class according to EN 779	IP 54	G 4		
	IP 55			
Duty cycle		100		%
Bearing type		ball bearing		
Service life L_{10} (+ 40 °C)[1]		40000		h
Temperature range		- 40 … + 55 / - 40 … + 131		°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO		
	IP 55	additional: UV-resistant		
EMC screen		**stainless steel**		
Colour		RAL 7035, different colours available on request		

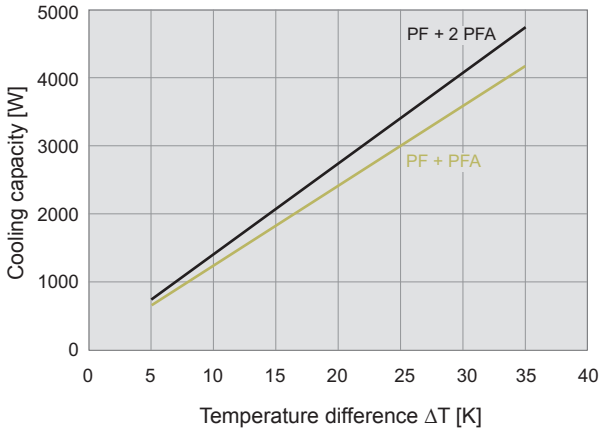
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 60.000 EMC	IP 54	1	11960002055	190
	IP 55	1	11960003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

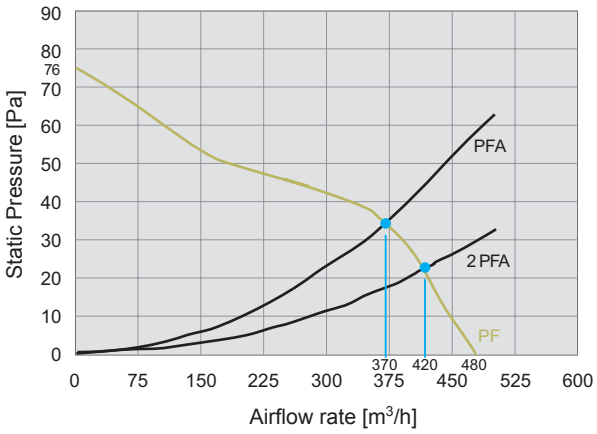
Cooling capacity performance curves

PF 65.000 EMC IP 54

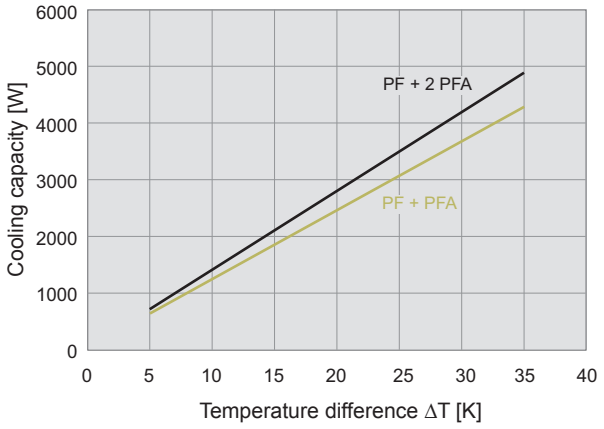


Static pressure performance curves

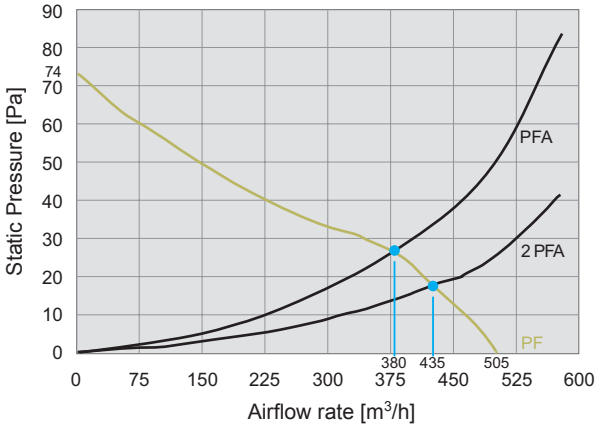
PF 65.000 EMC IP 54



PF 65.000 EMC IP 55

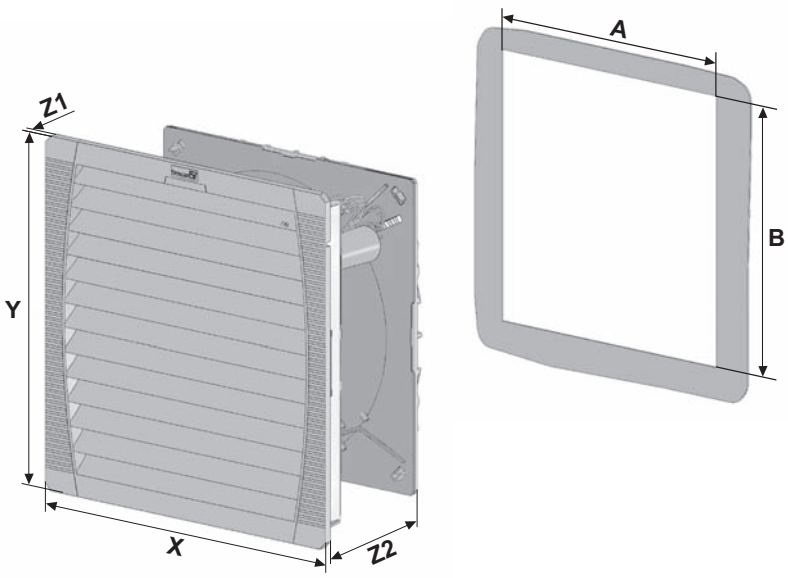


PF 65.000 EMC IP 55



Dimensions

mm	PF 65.000 EMC	PFA 60.000 EMC
X	320	320
Y	320	320
Z1	7	7
Z2	150	39
A	292	292
B	292	292



Further information on the EMC Filterfans (EMC series) can be found on page 186.

ECOOL Filterfan
PF 66.000 EMC
ECOOL Exhaust filter
PFA 60.000 EMC



- installation size 6, air flow rate up to 785 m³/h
- three performance classes, cut-out compatible
- secure contact due to improved contact springs on the screen grid
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)
- cut-out compatible to installation size 6 of the 3rd and 4th Generation

Data		PF 66.000 EMC			Unit
Article number	IP 54	11866022055	11866102055	11866152055	
	IP 55	11866023055	11866103055	11866153055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz			
		400 / 460 3 ~	230	115	V
Unimpeded airflow	IP 54	640 / 653			m³/h
	IP 55	770 / 785			
Airflow rate in combination (PF + PFA 60.000 EMC)	IP 54	445 / 445			
	IP 55	490 / 501			
Power consumption		120 / 155	115 / 150	110 / 160	W
Current consumption		0.26 / 0.25	0.51 / 0.66	0.96 / 1.4	A
Noise level (according to EN ISO 3741)	IP 54	63 / 64			dB (A)
	IP 55				
Weight		3.43			kg
Type of connection		spring-type terminal			
Fuse		6			A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter			
	IP 55	NEMA type 12 - fluted filter			
Filtration efficiency	IP 54	91			%
	IP 55				
Filter mat quality class according to EN 779	IP 54	G 4			
	IP 55				
Duty cycle		100			%
Bearing type		ball bearing			
Service life L_{10} (+ 40 °C)[1]		40000			h
Temperature range		- 40 … + 55 / - 40 … + 131			°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO			
	IP 55	additional: UV-resistant			
EMC screen		**stainless steel**			
Colour		RAL 7035, different colours available on request			

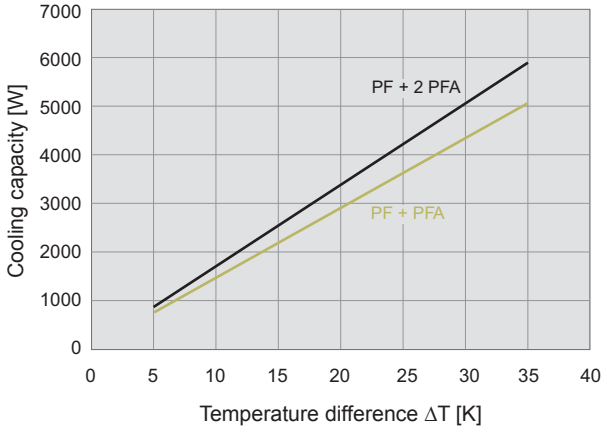
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 60.000 EMC	IP 54	1	11960002055	190
	IP 55	1	11960003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

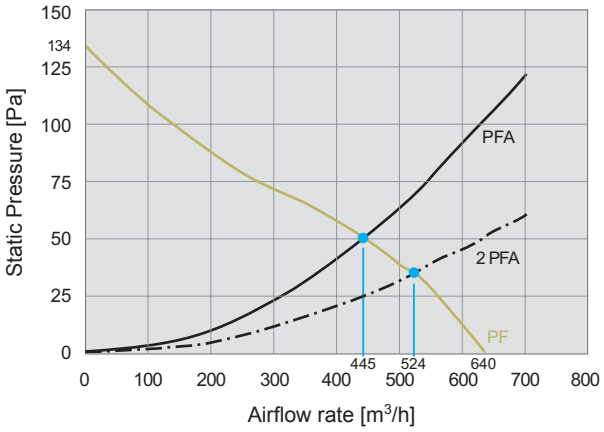
Cooling capacity performance curves

PF 66.000 EMC IP 54

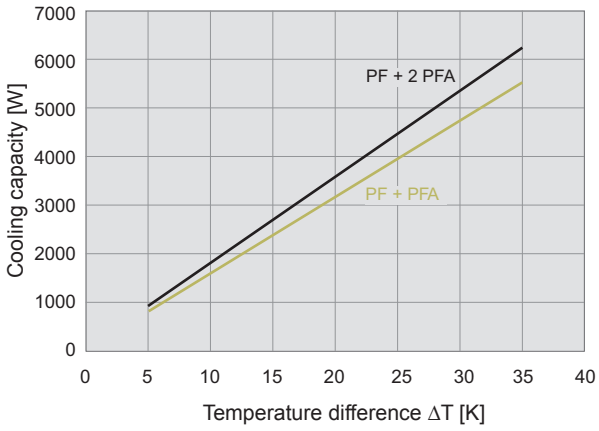


Static pressure performance curves

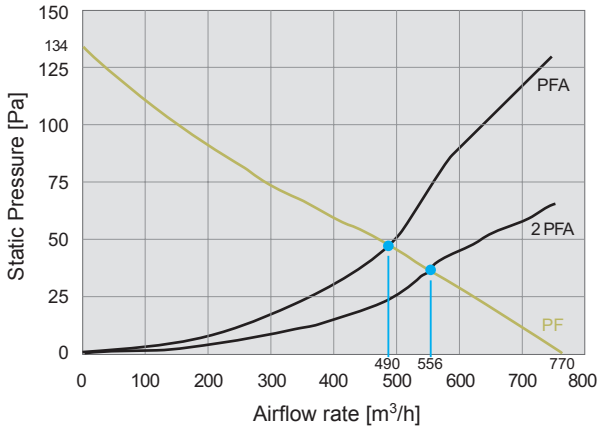
PF 66.000 EMC IP 54



PF 66.000 EMC IP 55

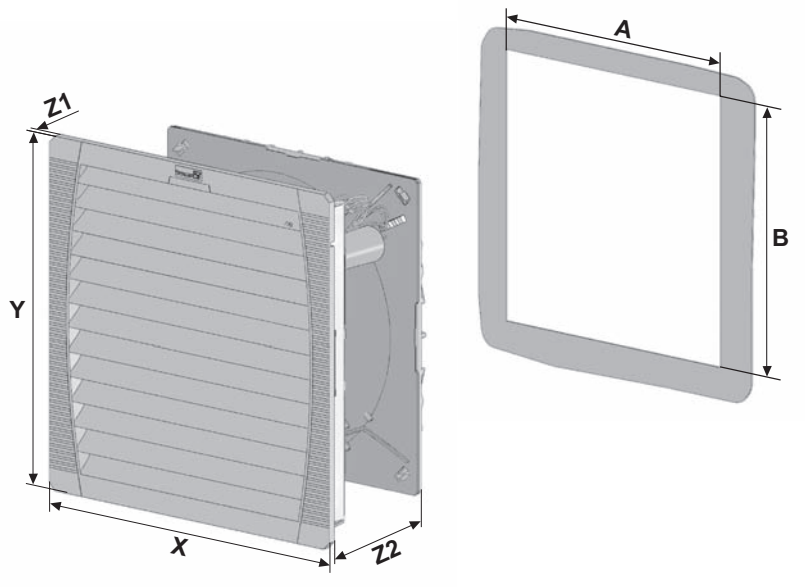


PF 66.000 EMC IP 55



Dimensions

mm	PF 66.000 EMC	PFA 60.000 EMC
X	320	320
Y	320	320
Z1	7	7
Z2	150	39
A	292	292
B	292	292



Further information on the EMC Filterfans (EMC series) can be found on page 186.

ecool Filterfan
PF 67.000 EMC
ecool Exhaust filter
PFA 60.000 EMC



- installation size 6, air flow rate up to 950 m³/h
- three performance classes, cut-out compatible
- secure contact due to improved contact springs on the screen grid
- system of protection IP 54 and IP 55, NEMA type 12
- UL, cUL approval
- UV-resistance (IP 55 version)
- cut-out compatible to installation size 6 of the 3rd and 4th Generation

Data		PF 67.000 EMC			Unit
Article number	IP 54	11867022055	11867102055	11867152055	
	IP 55	11867023055	11867103055	11867153055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz			
		400 / 460 3 ~	230	115	V
Unimpeded airflow	IP 54	845 / 875			m³/h
	IP 55	925 / 950			
Airflow rate in combination (PF + PFA 60.000 EMC)	IP 54	560 / 625			
	IP 55	570 / 625			
Power consumption		140 / 170	135 / 200	140 / 195	W
Current consumption		0.35 / 0.43	0.59 / 0.88	1.23 / 1.71	A
Noise level (according to EN ISO 3741)	IP 54	66 / 69			dB (A)
	IP 55				
Weight		3.93			kg
Type of connection		spring-type terminal			
Fuse		6			A
System of protection according to EN 60529 / UL 50	IP 54	NEMA type 12 - standard filter			
	IP 55	NEMA type 12 - fluted filter			
Filtration efficiency	IP 54	91			%
	IP 55				
Filter mat quality class according to EN 779	IP 54	G 4			
	IP 55				
Duty cycle		100			%
Bearing type		ball bearing			
Service life L_{10} (+ 40 °C)[1]		40000			h
Temperature range		- 40 … + 55 / - 40 … + 131			°C / °F
Design (housing and protection against accidental contact)	IP 54	made of injection-moulded thermoplastic, self-extinguishing, UL 94 VO			
	IP 55	additional: UV-resistant			
EMC screen		**stainless steel**			
Colour		RAL 7035, different colours available on request			

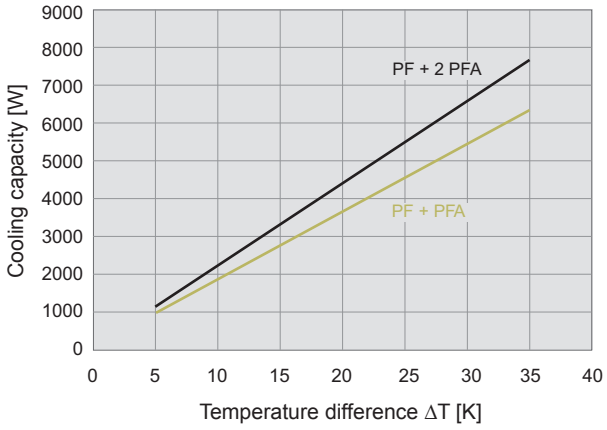
Accessories		Piece	Article number	Information on page
Exhaust filter PFA 60.000 EMC	IP 54	1	11960002055	190
	IP 55	1	11960003055	190
Thermostat		1	17121000000	208/210

[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Approvals see page 149.

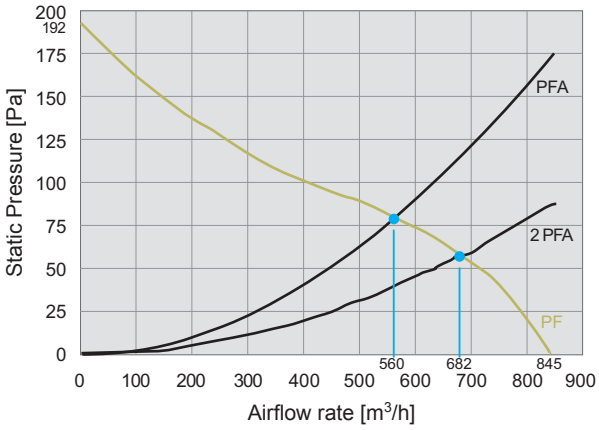
Cooling capacity performance curves

PF 67.000 EMC IP 54

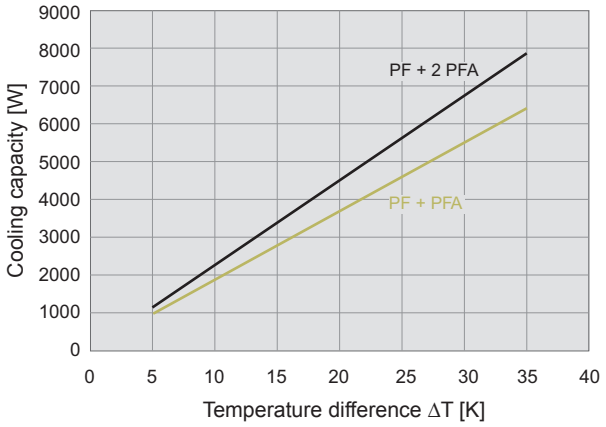


Static pressure performance curves

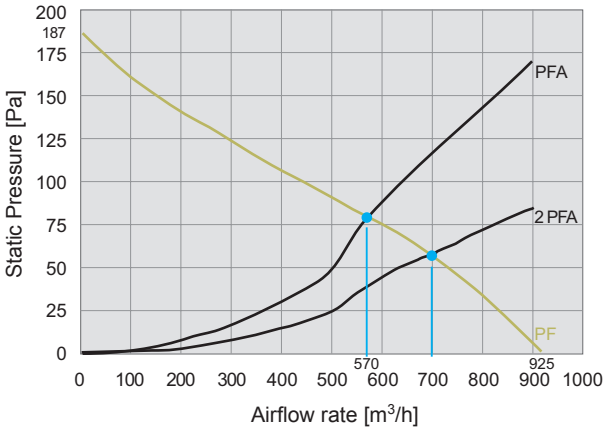
PF 67.000 EMC IP 54



PF 67.000 EMC IP 55

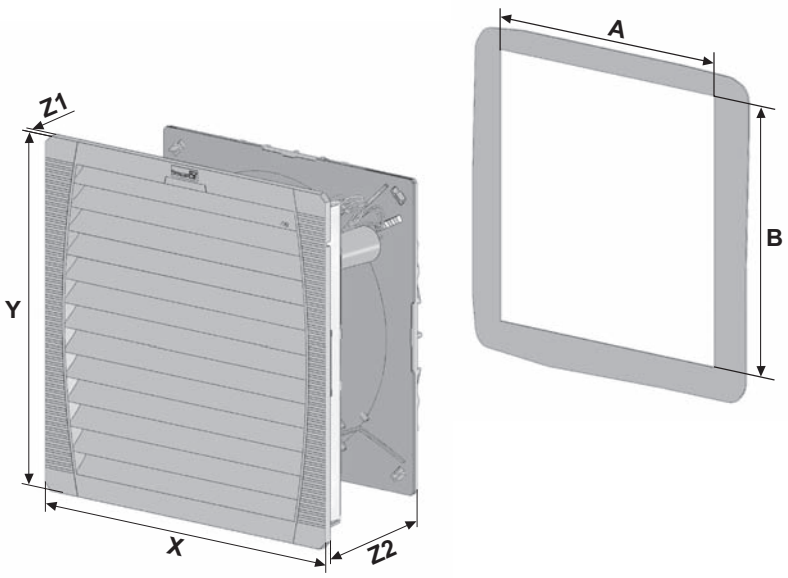


PF 67.000 EMC IP 55



Dimensions

mm	PF 67.000 EMC	PFA 60.000 EMC
X	320	320
Y	320	320
Z1	7	7
Z2	150	39
A	292	292
B	292	292

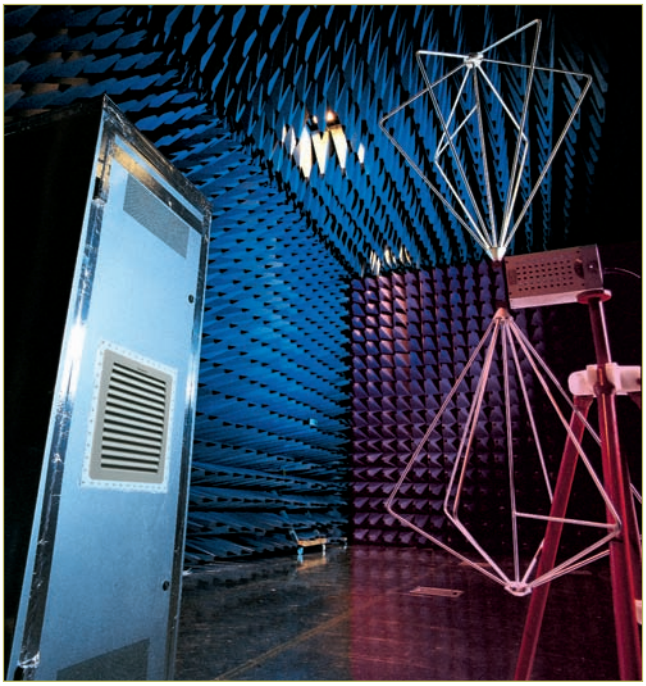


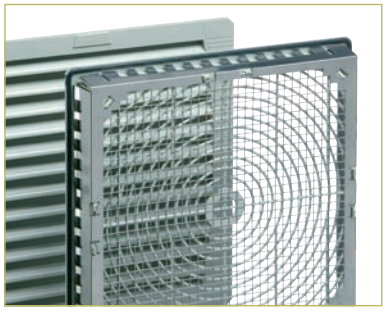
Further information on the EMC Filterfans (EMC series) can be found on page 186.

EMC Filterfans (EMC series)

If filterfans are used for thermal management, openings must exist in the cabinet. These can allow electromagnetic radiation to pass in or out unhindered. Pfannenberg offers the widest range of EMC Filterfans as solutions to this problem.

You too can find the right combination of EMC filterfan and exhaust filter for airflow rates from 25 m^3/h to 950 m^3/h.





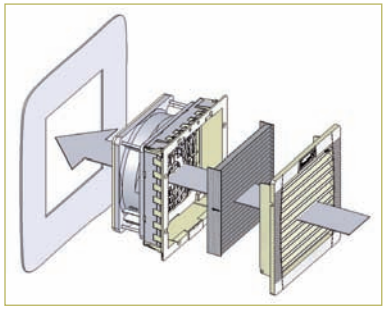
In accordance with the basic principle of our company we have dispensed with the use of metallised plastics, because these are difficult to recycle.



contact springs

New metal shielding

- unequalled worldwide: contact surfaces without beryllium-copper seal!



No elaborate reworking of the cut-out

- no adhering of copper tape or similar aids
- no time-consuming scratching off of coatings in order to ensure a good contact
- contact is made via the cut edge of the cut-out for the filterfan or exhaust filter

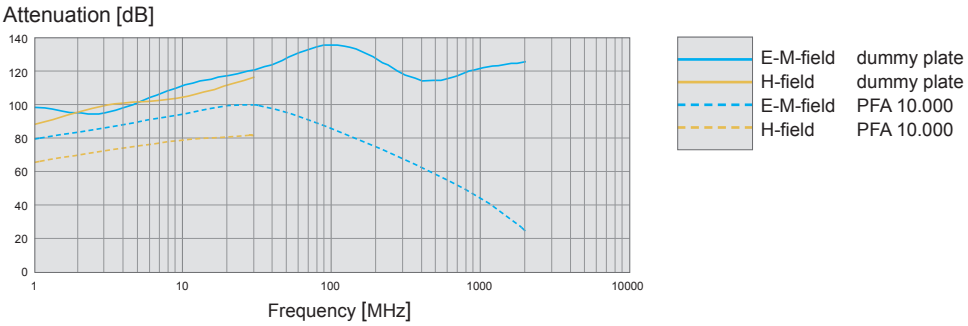
EMC – electromagnetic compatibility

In standards, electromagnetic compatibility, or 'EMC' for short, is defined as the ability of a component, device or system to function satisfactorily under the influence of electromagnetic fields in its surroundings, without influencing its surroundings, to which other electrical equipment also belongs, in an impermissible way.
We guarantee that our EMC shielded filterfans provide protection against electromagnetic interference by ensuring continuity between the shielding part of the fan and the metal structure of the cabinet based on the attenuation characteristics below:

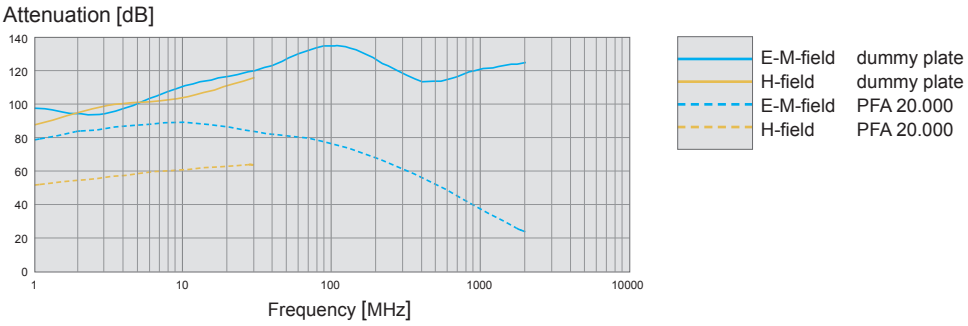
Attenuation at 30 MHz approx. 71 dB
Attenuation at 400 MHz approx. 57 dB
Measured in accordance with EN 50 147-1 (1996): absorber rooms, part 1, measurement of screening attenuation.

Shielding effectiveness

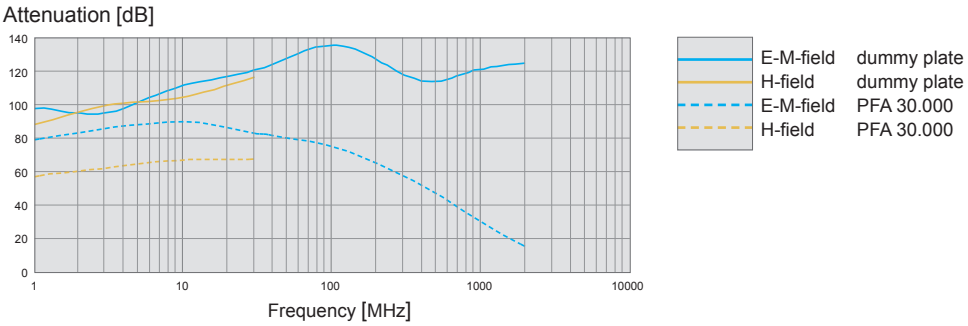
PF 11.000 EMC / PFA 10.000 EMC



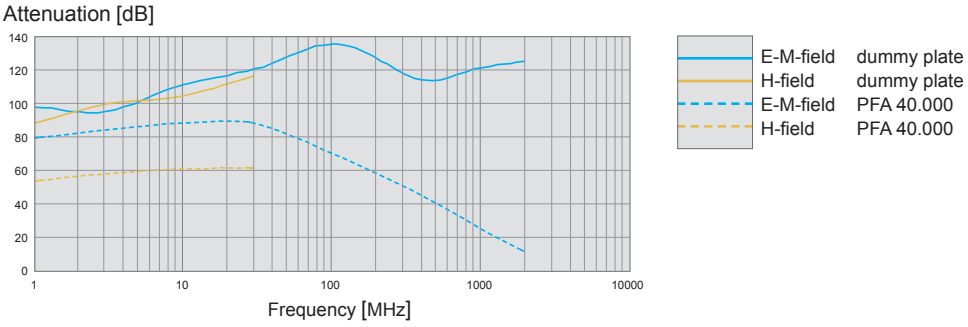
PF 22.000 EMC / PFA 20.000 EMC



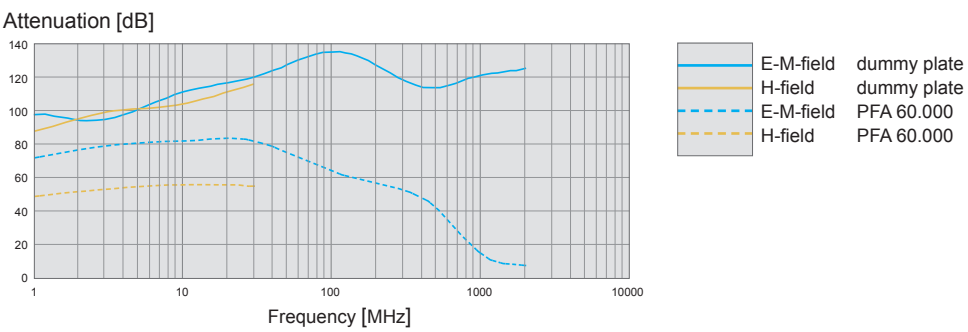
PF 32.000 EMC / PFA 30.000 EMC



PF 42.500 EMC / PF 43.000 EMC / PFA 40.000 EMC



PF 65.000 EMC / PF 66.000 EMC / PF 67.000 EMC / PFA 60.000 EMC



ECOOL Filterfans for roof mounting

PTF 60.500
PTF 60.700
PTF 61.000



ECOOL Top exhaust filter for roof mounting

PTFA 60.000

- 2 installation sizes, air flow rate up to 1000 m³/h
- three performance classes, cut-out compatible
- system of protection IP 33 and IP 54
- optimum passage of air and even temperature distribution (natural air convection is supported)
- toolless mounting, patented quick fastening system
- UL, cUL approval

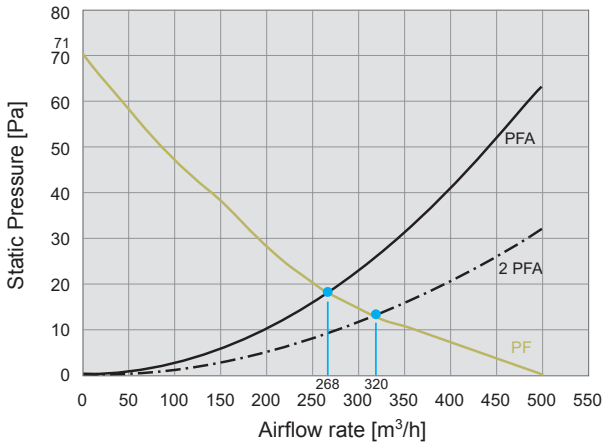
Data		PTF 60.500		PTF 60.700		PTF 61.000		Unit
Article number	IP 54	11685101055	11685151055	11687102055	11687152055	11681102055	11681152055	
	IP 33	11685100055	11685150055	11687100055	11687150055	11681100055	11681150055	
Rated voltage ± 10%		AC 50 Hz / 60 Hz						
		230	115	230	115	230	115	V
Unimpeded airflow	IP 54	350		550		750		m³/h
	IP 33	500		700		1000		
Airflow rate in combination (PTF + PFA 60.000)	IP 54	242		370		500		
	IP 33	268		427		582		
Power consumption		4 x 28 / 29	4 x 29 / 24	65 / 80	75 / 90	115 / 150	110 / 160	W
Current consumption		4 x 0.2 / 0.2	4 x 0.3 / 0.3	0.3 / 0.36	0.66 / 0.8	0.51 / 0.66	0.96 / 1.4	A
Noise level (according to EN ISO 3741)	IP 54 / IP 33	67		69		77		dB (A)
Weight		4.8		4.1		4.3		kg
Type of connection		terminal strip						
Fuse		6						A
System of protection according to EN 60529 / UL 50		IP 33, IP 54						
Filtration efficiency	IP 54	81						%
	IP 33	0 (no filter mat)						
Filter mat quality class according to EN 779	IP 54	G 3						
	IP 33	no filter mat						
Duty cycle		100						%
Bearing type		ball bearing						
Service life L_{10} (+ 40 °C)[1]		approx. 50000[2]		approx. 40000		approx. 40000		h
Temperature range		- 15 … + 55 / + 5 … + 131						°C / °F
Design (housing and protection against accidental contact)		sheet steel, cover powder-coated; snap-in housing made of injection-moulded thermoplastic (ABS-FR) self-extinguishing, UL 94 VO						
Colour		RAL 7035, different colours available on request						

Accessories		Piece	Article number	Information on page
Exhaust filter PTFA 60.000	IP 54	1	11786001055	190
	IP 33	1	11786000055	190
Thermostat		1	17121000000	208/210

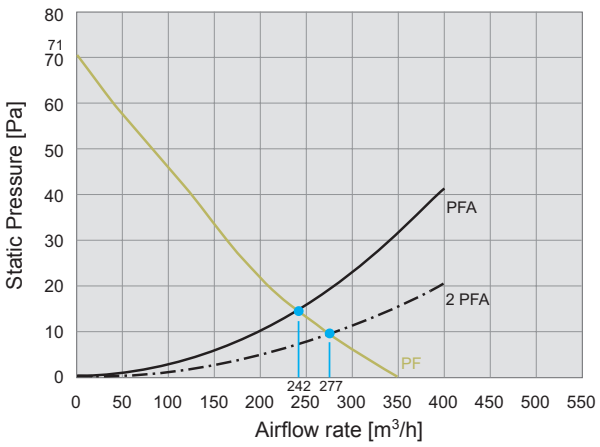
[1] fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary
[2] L_{10} (+25 °C)
Approvals see page 149.

Static pressure performance curves

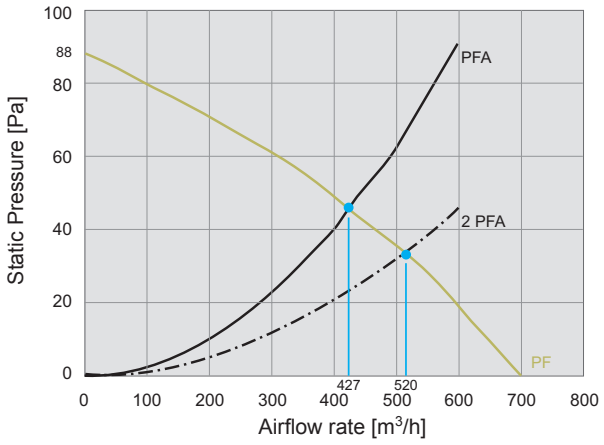
PTF 60.500 IP 33



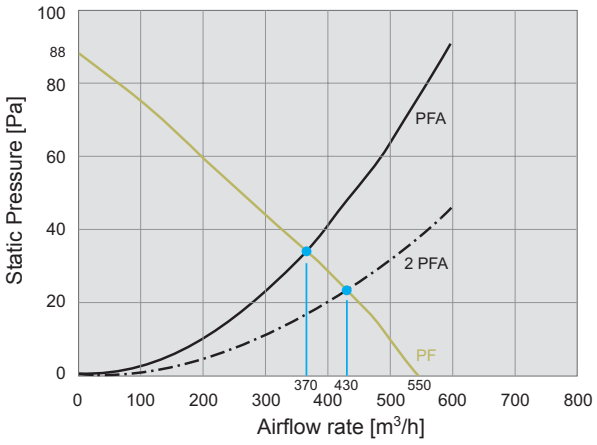
PTF 60.500 IP 54



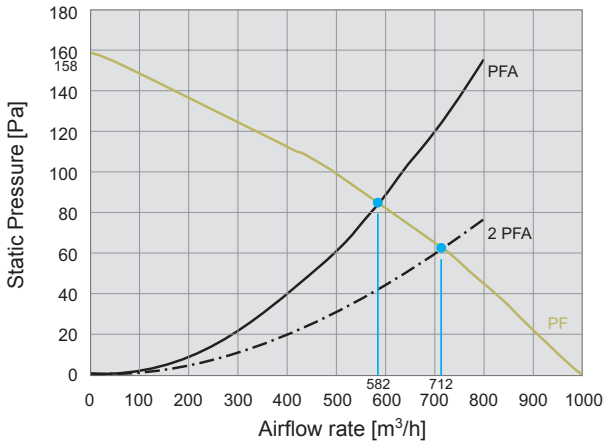
PTF 60.700 IP 33



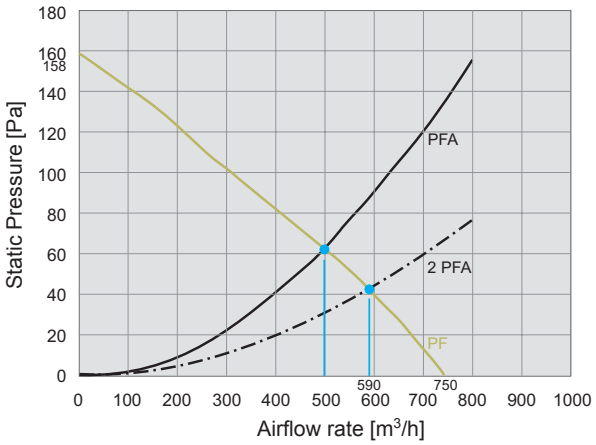
PTF 60.700 IP 54



PTF 61.000 IP 33

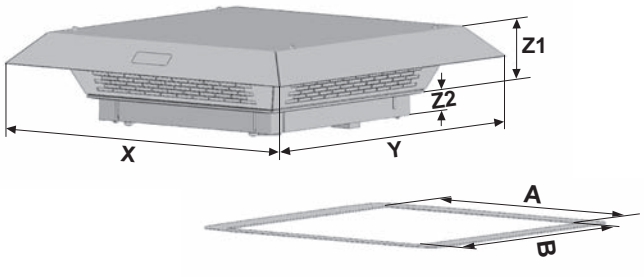


PTF 61.000 IP 54



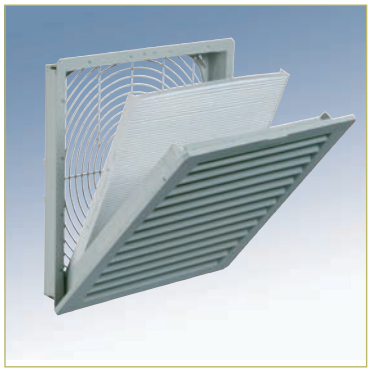
Dimensions

mm	PTF 60.500	PTF 60.700	PTF 61.000	PTFA 60.000
X	436	470	470	436
Y	436	470	470	436
Z1	72	95	95	72
Z2	34	57	57	34
A[1]	291	291	291	291
B[1]	291	291	291	291



[1] for material thicknesses up to 2 mm
+ 1 mm for thickness of material > 2 mm ≤ 3 mm

Options



Exhaust filters for all PF Filterfans

- same design as the PF series filterfans
- snap fastener developed and patented by Pfannenberg
- door mounting without screws in accordance with VDE 0113 (EN 60204)
- simple filter mat exchange during operation
- with integrated foam seal to enclosure

Product	Cut-out	Article number (IP 54)	Article number (IP 55)
PFA 10.000	92 x 92 mm	11710001055	–
PFA 20.000	125 x 125 mm	11720001055	11720003055
PFA 30.000	177 x 177 mm	11730001055	11730003055
PFA 40.000	223 x 223 mm	11740001055	11740003055
PFA 60.000	291 x 291 mm	11760002055	11760003055
PFA 10.000 EMC	93 x 93 mm	11910001055	–
PFA 20.000 EMC	126 x 126 mm	11920001055	11920003055
PFA 30.000 EMC	178 x 178 mm	11930001055	11930003055
PFA 40.000 EMC	224 x 224 mm	11940001055	11940003055
PFA 60.000 EMC	293 x 293 mm	11960002055	11960003055



Product	Cut-out	Article number (IP 54)	Article number (IP 33)
PTFA 60.000	291 x 291 mm	11786001055	11786000055



Weather protection hoods

Weather protection hood in VA or powder-coated.

Suitable for ...	Version	Article number
Installation size 1 and 2	VA	18102000014
	RAL 7035	18102000013
Installation size 3 and 4	VA	18102000017
	RAL 7035	18102000016
Installation size 6	VA	18102000020
	RAL 7035	18102000019



Thermostat and Hygrostat

In combination with thermostats and hygrostats from the FLZ series (see page 208), Pfannenberg Filterfans additionally achieve savings on energy, materials and time plus a significantly longer service life. This results in an optimised environmental balance as well as greater reliability of your production process. Suitable for all Pfannenberg Filterfans.

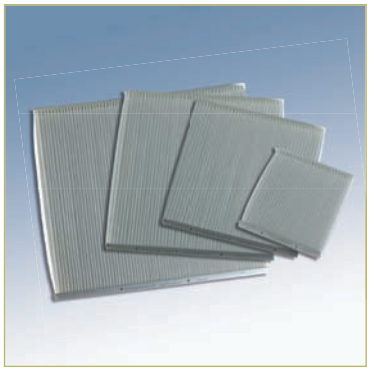
Product	Article number	Page
FLZ 530 Thermostat 0 ... 60 °C	17121000000	208
FLZ 543 Twin Thermostat 0 ... 60 °C	17143000000	210
FLZ 600 Hygrostat 40 ... 90% R.H.	17207000000	212
FLZ 610 Thermostat/Hygrostat 0 … 60 °C / 40 ... 90% R.H.	17218100000	212

Filter mats for filterfans and exhaust filters



Suitable for ...	Article number (IP 54)	Dimensions	Material
Installation size 1 [1]	18611600029	87 x 87 mm	LG3318
Installation size 2 [1]	18611600030	119 x 119 mm	LG3318
Installation size 3 [1]	18611600031	170 x 170 mm	LG3318
Installation size 4 [1]	18611600032	216 x 216 mm	LG3318
Installation size 6 [1]	18611600033	284 x 284 mm	LG3318
PTF 60.500 and PTFA 60.000 [2]	18611600124	290 x 70 mm	LG3318
PTF 60.700 and PTF 61.000 [2]	18611600143	390 x 100 mm	LG3318

[1] set with 5 pieces, [2] set with 20 pieces

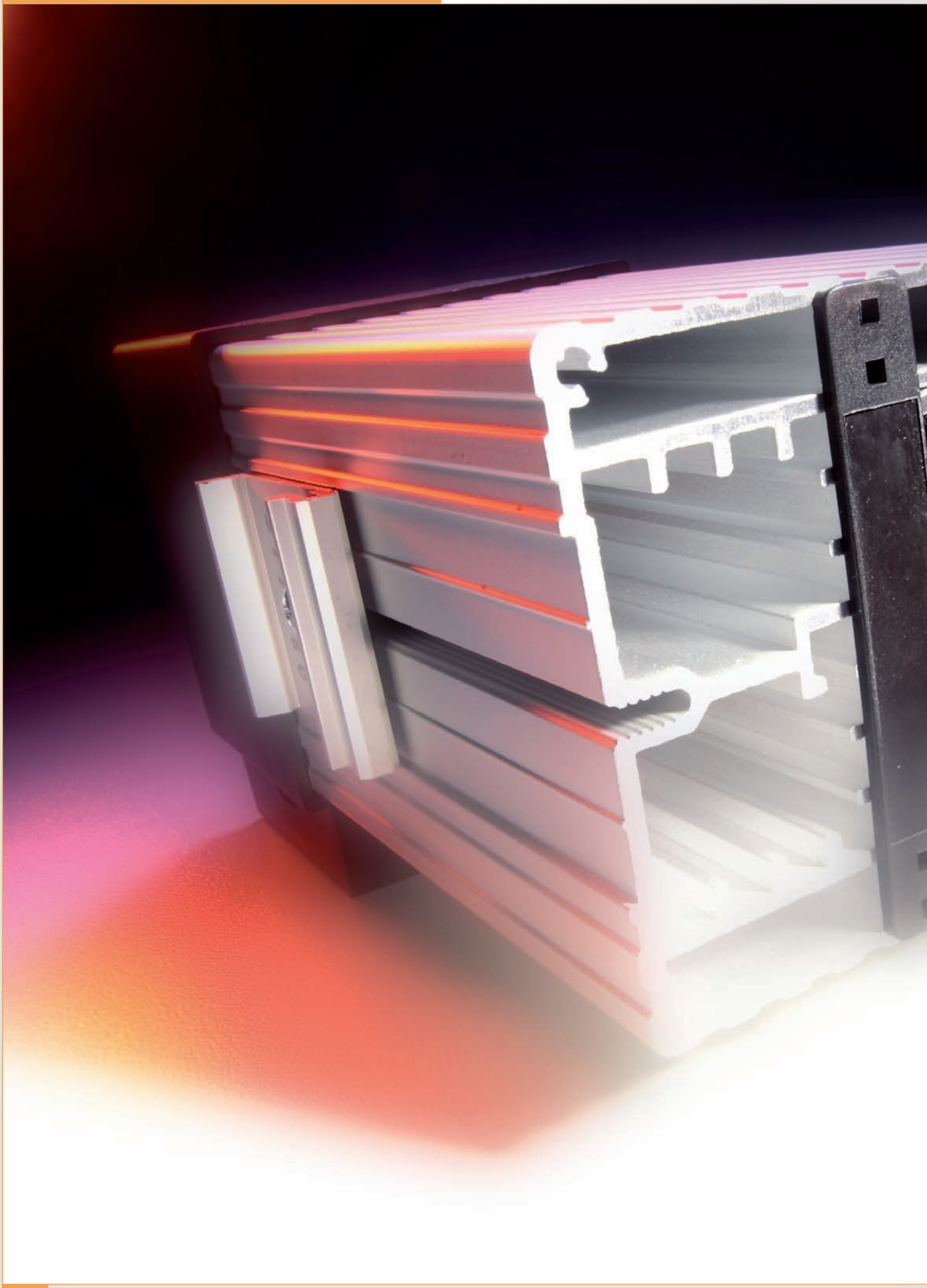


Suitable for ...	Article number (IP 55)	Dimensions	Material
Installation size 2 [1]	18611600034	116 x 108 mm	BN 2.208
Installation size 3 [1]	18611600035	166 x 156 mm	BN 2.208
Installation size 4 [1]	18611600036	212 x 200 mm	BN 2.208
Installation size 6 [1]	18611600037	279 x 264 mm	BN 2.208

[1] set with 5 pieces



Further information can be found on the Internet:
www.pfannenberg.com · **www.pfannenberg-spareparts.com** · **www.filterfan.com**
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newsletter.pfannenberg.com





The formation of condensation is one of the biggest dangers for electrical enclosures. As long as they are working under load, the heat dissipation from the components will prevent any condensation from forming within the enclosure.
When there is no longer any heat load due to system downtime, there is a potential danger that components within the cabinet will form condensation. This varies based on the dew point. And this is precisely where the function of the Pfannenberg control cabinet heaters begins (radiant heaters and fan heaters).
With the addition of the new FLH-T series, which is a new range of fan heaters with an internal thermostat for the regulation of the fan and heater, prevention of condensation in the cabinet is guaranteed.
Various performance classes of FLH control cabinet heaters are ideally complemented by thermostats and hygrostats from the FLZ series. Combined, they ensure that the temperature inside the control cabinet is always correct and that the formation of condensation is prevented.

The control of 4th generation filterfans by thermostats from the FLZ series represents an intelligent use of filterfans for control cabinet air conditioning to suit individual needs. It increases energy efficiency and reduces CO_2 emissions.

Accordingly, the combination with thermostats and hygrostats from the FLZ series offers a better environmental balance through higher energy efficiency. It also results in greater reliability of your production process. The reasons for this are:

- pinpoint distribution and constant temperature in the control cabinet
- reduced energy consumption and optimisation of the efficiency of the heaters and
- additional savings on energy, materials and time

Pfannenberg's heaters, thermostats and hygrostats perfectly complement Pfannenberg's filterfans, heat exchangers and air conditioner units.

Life insurance for your electronics

Heaters, Thermostats and Hygrostats

The Pfannenberg Thermal Management Team



FLZ Thermostats

Thermostats are used as temperature controllers and, therefore, for the control of filterfans or electrical enclosure heaters. They are available with N.C. (normally closed) / N.O. (normally open) and changeover contacts. In combination with control cabinet heaters you can ensure, besides temperature control, that the control cabinet is ‘artificially’ dehumidified, in particular in outdoor applications. That means that the temperature is kept above the dew point so that no water condenses out of the air, which could lead to short circuits due to the formation of condensation.
The combination with filterfans offers additional savings on energy, materials and time and, as well as a better environmental balance and greater reliability of the production process due to reduced energy consumption and improvement of the efficiency of the filterfans.
The twin thermostat series unites two thermostats in all combinations for multiple switching tasks!



FLZ Hygrostats/Hygrostat-Thermostat Combination

Hygrostats switch on electrical enclosure heaters or filterfans when a preset relative humidity is exceeded. The relative humidity is kept above the dew point and the condensation of water on electrical components and the corrosion of unprotected sheet metal is prevented. A new electronic combination device unites thermostat and hygrostat in one housing.



FLH Radiant Heaters

Radiant heaters are built very compactly and cover a wide operating range. They are used in combination with a thermostat or hygrostat, predominantly for the avoidance of excessively low temperatures or excessively high humidity in the control cabinet and, last but not least, help to avoid the formation of corrosion.

The mini-heaters and surface temperature-limited heaters by Pfannenberg are particularly suitable for use in small housings or for the heating of isolated spots in sensitive areas.



FLH Fan Heaters

This type of heating is ideal for use in larger electrical enclosure. They have an integrated fan that assists the natural convection and provides for fast and even distribution of the heat in the electrical enclosure.

The fan heaters are used in combination with a thermostat or hygrostat, predominantly for the avoidance of excessively low temperatures or excessively high humidity in the electrical enclosure and also help to avoid the formation of corrosion.

The new heater line FLH-T with integrated thermostat has been specifically developed for demanding environments, espacially wind turbines and for use in the telecommunications sector.

All heaters, thermostats and hygrostats at a glance

Type	Heating performance	Rated voltage	Dimensions (HxWxD)	Approvals						Page
				UR	cUL	GOST	CSA	VDE	CE	
FLH series Radiant Heaters										
FLH 010	10 W	230 V AC [1]	100 x 70 x 50 mm	●	●	●			●	196
FLH 015	15 W	230 V AC [1]	100 x 70 x 50 mm	●	●	●			●	196
FLH 030	30 W	230 V AC [1]	100 x 70 x 50 mm	●	●	●			●	196
FLH 045	45 W	230 V AC [1]	100 x 70 x 50 mm	●	●	●			●	196
FLH 060	60 W	230 V AC [1]	175 x 70 x 50 mm	●	●	●			●	196
FLH 075	75 W	230 V AC [1]	175 x 70 x 50 mm	●	●	●			●	196
FLH 100	100 W	230 V AC [1]	175 x 70 x 50 mm	●	●	●			●	196
FLH 150	150 W	230 V AC [1]	250 x 70 x 50 mm	●	●	●			●	196
Surface temperature-limited Radiant Heaters from the FLH series										
FLH-LST 020	20 W	230 V AC [1]	100 x 70 x 50 mm	●	●	●			●	198
FLH-LST 030	30 W	230 V AC [1]	100 x 70 x 50 mm	●	●	●			●	198
FLH-LST 050	50 W	230 V AC [1]	100 x 70 x 50 mm	●	●	●			●	198
FLH series Mini-Radiant Heaters										
FLH 010-M	10 W	230 V AC [1]	45 x 50 x 29.5 mm	●	●	●			●	200
FLH 020-M	20 W	230 V AC [1]	45 x 75 x 29.5 mm	●	●	●			●	200
FLH 030-M	30 W	230 V AC [1]	45 x 75 x 29.5 mm	●	●	●			●	200
FLH series Fan Heaters										
FLH 250	250 W	115 V / 230 V AC	186.5 x 85 x 104 mm	●	●	●			●	202
FLH 400	400 W	115 V / 230 V AC	226.5 x 85 x 104 mm	●	●	●			●	202
FLH 250 SL	250 W	230 V AC	170.5 x 126.5 x 103 mm	○	○				●	204
FLH 275 SLM	275 W	230 V AC	108 x 91 x 115 mm	○	○				●	204
FLH-T series Fan Heaters with integrated thermostat										
FLH-T 250	250 W	115 V / 230 V AC	100 x 150 x 164 mm	●					●	206
FLH-T 400	400 W	115 V / 230 V AC	100 x 150 x 164 mm	●					●	206
FLH-T 600	600 W	115 V / 230 V AC	100 x 150 x 164 mm	●					●	206
FLH-T 800	800 W	115 V / 230 V AC	100 x 150 x 164 mm	●					●	206
FLH-T 1000	1000 W	115 V / 230 V AC	100 x 150 x 164 mm	●					●	206
FLZ series Thermostats and Hygrostats										
FLZ 510		AC / DC	64 x 37 x 46 mm	●	●	●			●	208
FLZ 520		AC / DC	72 x 40 x 36 mm	●	●	●	●		●	208
FLZ 530		AC / DC	72 x 40 x 36 mm	●	●	●	●		●	208
FLZ 541		AC / DC	80.5 x 59 x 38 mm	●	●	●			●	210
FLZ 542		AC / DC	80.5 x 59 x 38 mm	●	●	●			●	210
FLZ 543		AC / DC	80.5 x 59 x 38 mm	●	●	●			●	210
FLZ 600		AC / DC	64 x 37 x 46 mm	●	●	●			●	212
FLZ 610		AC / DC	80.5 x 59 x 38 mm	●	●	●			●	212

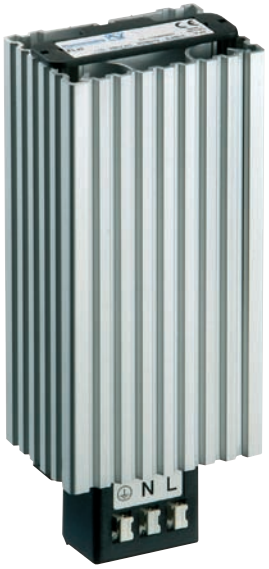
[1] voltage range 110 V - 250 V AC

● available
○ pending



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Radiant Heaters
FLH 010 – FLH 150



FLH radiant heaters are used in combination with a thermostat or hygrostat, predominantly for the avoidance of excessively low temperatures or excessively high humidity in the control cabinet. Different performance ratings from 10 to 150 Watts ensure that the correct heating power is always available.
The total required heat can be distributed in a control cabinet according to needs.
Available with either terminal or connecting cable.

Data		FLH 010	FLH 015	FLH 030	FLH 045	Unit
Article number	with terminal	17001005007	17001505007	17003005007	17004505007	
	with connecting cable	17001005017	17001505017	17003005017	17004505017	
Heating performance (Ta = +20 °C)		10	15	30	45	W
Max. surface temperature		55	65	90	105	°C
Power consumption		10	15	30	45	W
Starting current		1.0	1.1	1.2	1.8	A
Sytem of protection for intended purpose of use		IP 44 (connecting cable) and IP 20 (plug terminal connector)				
Weight		250	250	250	250	g

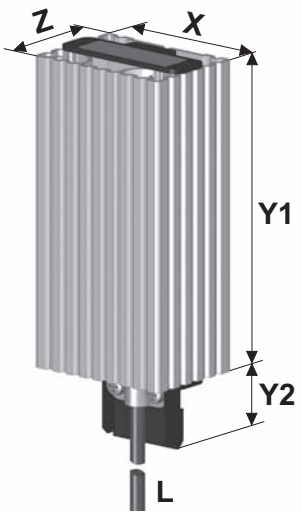
Data		FLH 060	FLH 075	FLH 100	FLH 150	Unit
Article number	with terminal	17006005007	17007505007	17010005007	17015005007	
	with connecting cable	17006005017	17007505017	17010005017	17015005017	
Heating performance (Ta = +20 °C)		60	75	100	150	W
Max. surface temperature		105	120	130	150	°C
Power consumption		60	75	100	150	W
Starting current		2.5	4.5	5.0	7.5	A
Sytem of protection for intended purpose of use		IP 44 (connecting cable) and IP 20 (plug terminal connector)				
Weight		450	510	510	770	g
Rated voltage [1]		230 V AC 50 / 60 Hz				
Functional range		110 - 250 V AC 50 / 60 Hz				
Duty cycle		100%				
Operating temperature range		- 40 … + 70 (- 40 … + 158)				°C
Storage temperature range		- 40 … + 70 (- 40 … + 158)				
Installation orientation		as desired, preferably vertical				
Device construction		aluminium profile, brightly anodised				
Type of mounting		snap fastening for 35 mm profile bars according to EN 60715				
Protection class		I				
Type of connection		connecting cable (500 mm) or plug terminal connector				
Clamping range of connecting terminal		single wire: 2 x 0.5 - 2.5 mm², fine-stranded: (tinned, with ferrule, with pin cable lug) 2 x 0.5 - 1.5 mm²				

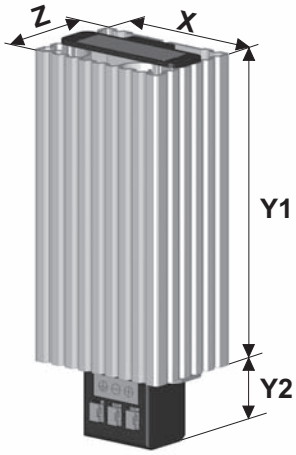
Accessories	Piece	Article number	Information on page
Thermostat	1	17111000000	208/210
Hygrostat	1	17207000000	212
Internal enclosure fan	1	18110000000	75

[1] other voltages avaibale on request
Approvals see page 195.

Dimensions

mm	FLH 010 ... 045	FLH 060 ... 100	FLH 150
X	70	70	70
Y1	65	140	215
Y2	35	35	35
Z	50	50	50
L	500	500	500





Surface temperature-limited Radiant Heaters
FLH-LST 020 – FLH-LST 050



The FLH series of radiant heaters with limitation of the radiator surface temperature consists of three versions with heating performance ratings of 20, 30 and 50 Watts.
Typical applications are to be found within building installations, where accidental contact with radiant heaters inside control cabinets is possible, where safety regulations prohibit open sources of heat, or where neighbouring structural elements are negatively influenced by the increased development of heat.

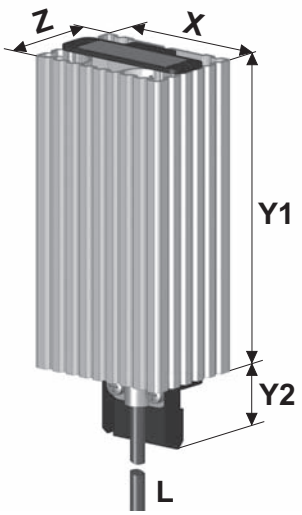
Data		FLH-LST 020	FLH-LST 030	FLH-LST 050	Unit
Article number	with terminal	17002105007	17003105007	17005105007	
	with connecting cable	17002105017	17003105017	17005105017	
Heating performance (Ta = +20 °C)		20	30	50	W
Max. surface temperature		55 [1]			°C
Power consumption		20	30	50	W
Starting current		1.1	1.2	2.3	A
Sytem of protection for intended purpose of use		IP 44 (connecting cable) and IP 20 (plug terminal connector)			
Weight		320	450	770	g
Rated voltage		230 V AC 50 / 60 Hz			
Functional range		110 - 250 V AC 50 / 60 Hz			
Duty cycle		100%			
Operating temperature range		- 40 … + 70 (- 40 … + 158)			°C (°F)
Storage temperature range		- 40 … + 70 (- 40 … + 158)			
Installation orientation		as desired, preferably vertical			
Device construction		aluminium profile, brightly anodised			
Type of mounting		snap fastening for 35 mm profile bars according to EN 60715			
Protection class		I			
Type of connection		connecting cable (500 mm) or plug terminal connector			
Clamping range of connecting terminal		single wire: 2 x 0.5 - 2.5 mm², fine-stranded: (tinned, with ferrule, with pin cable lug) 2 x 0.5 - 1.5 mm²			

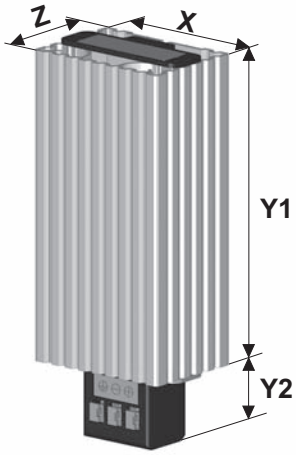
Accessories	Piece	Article number	Information on page
Thermostat	1	17111000000	208/210
Hygrostat	1	17207000000	212
Internal enclosure fan	1	18110000000	75

[1] surface temperature by a max. internal enclosure temperature of + 35 °C
Approvals see page 195.

Dimensions

mm	FLH-LST 020	FLH-LST 030	FLH-LST 050
X	70	70	70
Y1	95	140	215
Y2	37	37	37
Z	50	50	50
L	500	500	500





Mini-Radiant Heaters
FLH 010-M – FLH 030-M



The FLH Mini series of radiant heaters consists of three versions with heating performance ratings of 10, 20 and 30 Watts. The new mini-heaters by Pfannenberg are particularly suitable for use in small housings or for the heating of isolated spots in sensitive areas.

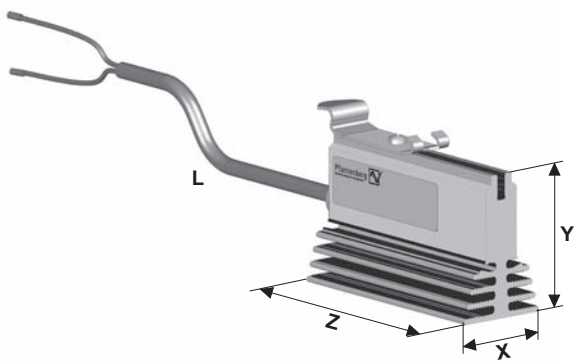
Data	FLH 010-M	FLH 020-M	FLH 030-M	Unit
Article number	17000105017	17000205017	17000305017	
Heating performance (Ta = +20 °C)	10	20	30	W
Max. surface temperature	95	115	140	°C
Power consumption	10	20	30	W
Starting current	1.0	1.1	1.2	A
Sytem of protection for intended purpose of use	IP 54			
Weight	85	120	120	g
Rated voltage	230 V AC 50 / 60 Hz			
Functional range	110 - 250 V AC 50 / 60 Hz			
Duty cycle	100%			
Operating temperature range	- 40 … + 70 (- 40 … + 158)			°C (°F)
Storage temperature range	- 40 … + 70 (- 40 … + 158)			
Installation orientation	as desired, preferably vertical			
Device construction	aluminium profile, black anodised			
Type of mounting	snap fastening for 35 mm profile bars according to EN 60715			
Protection class	II			
Type of connection	connecting cable (300 mm)			

Accessories	Piece	Article number	Information on page
Thermostat	1	17111000000	208/210
Hygrostat	1	17207000000	212
Internal enclosure fan	1	18110000000	75

Approvals see page 195.

Dimensions

mm	FLH 010-M	FLH 020-M / 030-M
X	29.5	29.5
Y	45	45
Z	50	75
L	300	300



Fan Heater
FLH 250 – FLH 400



The FLH series of fan heaters consists of two versions with heating performance ratings of 250 and 400 Watts. This type of heating is ideal for use in larger electrical enclosures. It has an integrated fan that assists the natural convection and thus provides for fast and even distribution of the heat in the control cabinet.

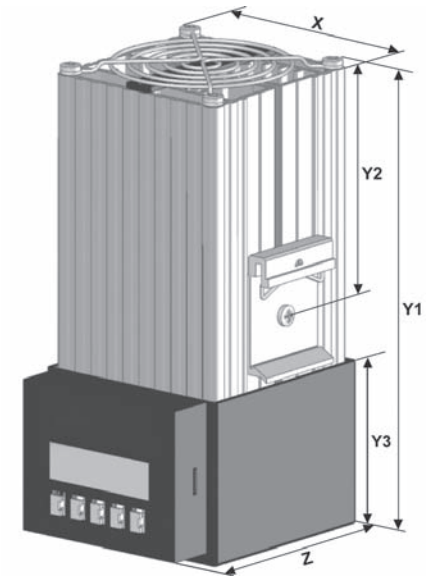
Data	FLH 250	FLH 400	Unit
Article number	17025010007	17040010007	
plus a 2nd protective grille	17025010107	17040010107	
Heating performance (Ta = +20 °C)	250	400	W
Max. surface temperature	70	85	°C
Power consumption	260	410	W
Starting current	2.2 / 1.1	3.6 / 1.8	A
Sytem of protection for intended purpose of use	IP 20		
Weight	1035	1200	g
Volumetric air flow	50 (50 Hz) / 61 (60 Hz)		m^3/h
Rated voltage [1]	230 V AC 50 / 60 Hz		
Functional range	207 - 258 V AC 50 / 60 Hz		
Duty cycle	100%		
Operating temperature range	- 40 … + 70 (- 40 … + 158)		°C (°F)
Storage temperature range	- 40 … + 70 (- 40 … + 158)		
Installation orientation	as desired, preferably vertical		
Device construction	aluminium profile, brightly anodised		
Type of mounting	snap fastening for 35 mm profile bars according to EN 60715		
Protection class	I		
Type of connection	plug terminal connector		
Clamping range of connecting terminal	single wire: 2 x 0.5 - 2.5 mm², fine-stranded: (tinned, with ferrule, with pin cable lug) 2 x 0.5 - 1.5 mm²		

Accessories	Piece	Article number	Information on page
Thermostat	1	17111000000	208/210
Hygrostat	1	17207000000	212
Internal enclosure fan	1	18110000000	75

[1] other voltages avaibale on request
Approvals see page 195.

Dimensions

mm	FLH 250	FLH 400
X	85	85
Y1	186.5	226.5
Y2	90	90
Y3	65	65
Z	104	104



Fan Heater
FLH 250 SL
FLH 275 SLM



The FLH 250 SL and FLH 275 SLM fan heater prevents formation of condensation and provides an evenly distributed interior air temperature in enclosures.

- all tests were performed according to European Norms, EN 60068-2-6 / 60068-2-27 / 60068-2-29 **Railway applications - Rolling stock equipment - Shock and vibration tests** and therefore are unique to the industry
- can be used under extreme conditions (- 40 °C…+ 70 °C)
- fan design with ball bearing: guaranteed long service life
- the heater is connected using the internal terminal connectors
- the heaters compact design make it ideal for use in enclosures where space is at a premium

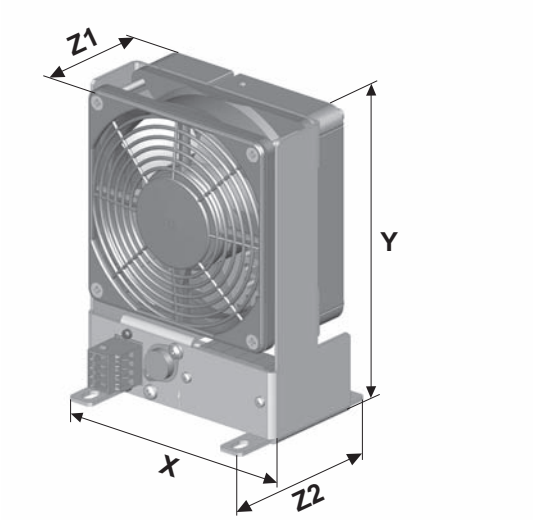
Data	FLH 250 SL	FLH 275 SLM	Unit
Article number	17025110007	17027610007	
Heating performance (Ta = +20 °C)	250	275	W
Max. surface temperature	70	70	°C
Power consumption	269	287	W
Starting current	2.4	1.5	A
Sytem of protection for intended purpose of use	IP 20		
Weight	1500	955	g
Volumetric air flow	160	50	m^3/h
Rated voltage	230 V AC 50 / 60 Hz		
Functional range	207 - 258 V AC 50 / 60 Hz		
Duty cycle	100%		
Operating temperature range	- 40 … + 70 (- 40 … + 158)		°C (°F)
Storage temperature range	- 40 … + 70 (- 40 … + 158)		
Installation orientation	as desired, preferably vertical		
Device construction	galvanised sheet steel		
Type of mounting	M6 screw fastening		
Protection class	I		
Type of connection	plug terminal connector		
Clamping range of connecting terminal	single wire: 0.08 - 4.0 mm² (AWG 28-12), fine-stranded: (tinned, with ferrule, with pin cable lug) 0.08 - 2.5 mm² (AWG 28-14)		

Accessories	Piece	Article number	Information on page
Thermostat	1	17111000000	208/210
Hygrostat	1	17207000000	212
Internal enclosure fan	1	18110000000	75

Approvals see page 195.

Dimensions

mm	FLH 250 SL	FLH 275 SLM
X	126.5	91
Y	170.5	108
Z1	75	89
Z2	103	115



Fan Heater with integrated thermostat
FLH-T



New Pfannenberg heater line with integrated thermostat. This new line has been specifically developed for demanding environments, especially wind turbines and for use in the telecommunications sector.

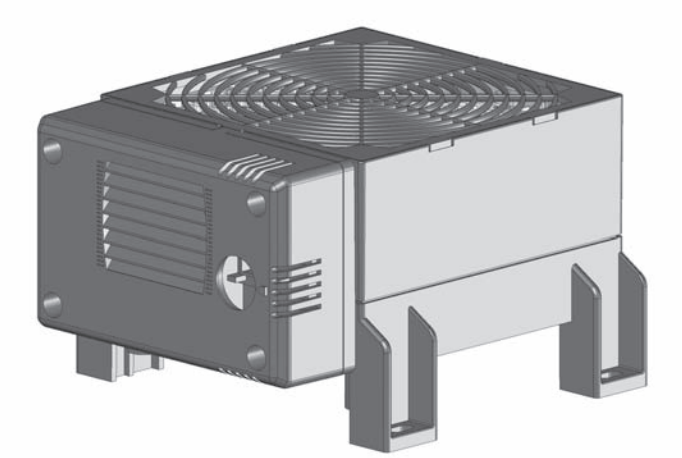
- all tests were performed according to European Norms, EN 60068-2-6 / 60068-2-27 / 60068-2-29 **Railway applications - Rolling stock equipment - Shock and vibration tests** and therefore are unique to the industry
- can be used under extreme conditions (- 40 °C…+ 70 °C)
- fan design with ball bearing: guaranteed long service life
- voltage range: 230 V / 115 V / 50/60 Hz

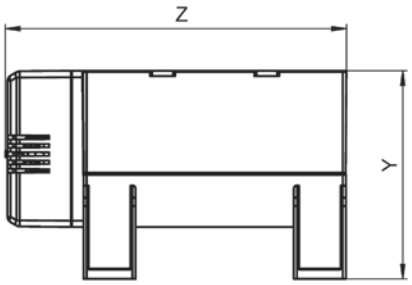
Data		FLH-T 250	FLH-T 400	FLH-T 600	FLH-T 800	FLH-T 1000	Unit
Article number	230 V	17025310007	17040310007	17060310007	17080310007	17099310007	
	115 V	17025315007	17040315007	17060315007	17080315007	17099315007	
Heating performance (Ta = +20 °C)		250	400	600	800	1000	W
Power consumption		300	450	650	850	1050	W
Starting current		0.7	2.6	3.4	4.3	5.2	A
Bearing type	fan	ball bearing					
Service life L_{10} (+ 25 °C)		52500					h
Sytem of protection according to EN 60529		IP 20					
Weight		1.0	1.1	1.2	1.4		kg
Volumetric air flow	50 Hz	160					m^3/h
	60 Hz	180					
Rated voltage		115 V or 230 V AC 50/60 Hz					
Functional range		104 - 127 V or 207 - 253 V AC 50/60 Hz					
Duty cycle		100%					
Temperature setting range		- 20 … + 40 (- 4 … + 104)					°C (°F)
Switching temperature difference		< 7					K
Switching point tolerance		± 4					
Operating temperature range		- 40 … + 70 (- 40 … + 158)					°C (°F)
Storage temperature range		- 40 … + 70 (- 40 … + 158)					
Installation orientation		as desired, preferably vertical					
Device construction		plastic UL 94V-O, black					
Type of mounting		4 x M5 screws (not included)					
Protection class		II (double insulation)					
Type of connection		2-pole terminal strip					
Clamping range of connecting terminal		2.5 mm² (AWG 14); clamping torque 0.51 Nm					

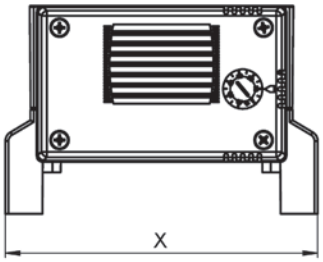
Accessories	Piece	Article number	Information on page
Hygrostat	1	17207000000	212
Internal enclosure fan	1	18110000000	75

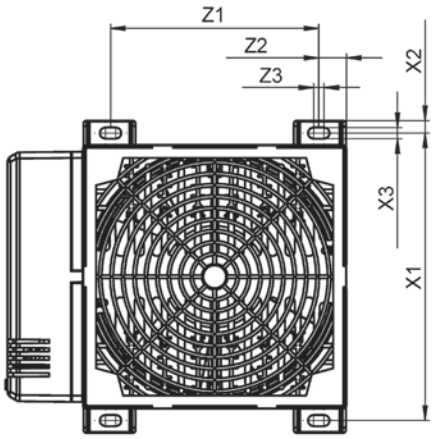
Dimensions

mm	FLH-T
X	150
X1	138
X2	6
X3	5.4
Y	100
Z	164
Z1	100
Z2	13.3
Z3	5









Thermostats
FLZ 510 – FLZ 530



The FLZ series of thermostats consists of three versions. They are available with N.C. / N.O.[1] and changeover contacts. In combination with control cabinet heaters, they serve for temperature control inside the control cabinet. In combination with filterfans, they provide for additional savings on energy, materials and time and, hence, for a better environmental balance. All in all, this results in greater reliability of the production process, reduced energy consumption due to need-based use and an improvement in the efficiency of the controlled heaters and filterfans.

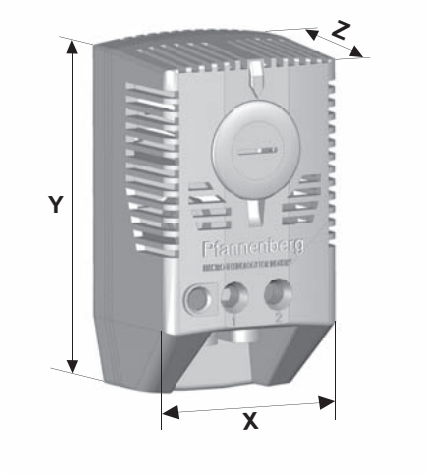
Data		FLZ 510			FLZ 520	FLZ 530	Unit
Article number	-20 °C (-4 °F) … +40 °C (+104 °F)	17103000003	17105000003	17106000003	17111000003	17121000003	
	0 °C (+32 °F) … +60 °C (+140 °F)	17103000000	17105000000	17106000000	17111000000	17121000000	
	+20 °C (+68 °F) … +80 °C (+176 °F)	17103000004	17105000004	17106000004	17111000004	17121000004	
Type of contact		changeover with spring contact			N.C. with spring contact	N.O. with spring contact	
Switching temperature difference		1[2]	3	7	< 7		K
Switching point tolerance		± 3			± 4		K
Max. switching power value in brackets: inductive load at cos φ = 0.6		N.C. 100 - 250 V AC / 10 (2)			240 V AC / 10 (2)		A
		N.O. 100 - 250 V AC / 5 (2)			120 V AC / 15 (2)		A
	DC	max. 30			max. 30		W
Operating temperature range		- 40 … + 80 (- 40 … + 176)					°C (°F)
Storage temperature range		- 40 … + 80 (- 40 … + 176)					°C (°F)
Probe type		bimetal		capillary probe (1.5 m)	bimetal		
System of protection		IP 20					
Weight		75			50		g
Type of connection		screw terminal for cable cross-section 0.5 to 2.5 mm²					
Special feature		thermal return[2]	–				
Suitable for the operation of		fan and heater			heater	fan	
Type of mounting		snap fastening for 35 mm profile bars according to EN 60715					
Colour		RAL 7035					

Accessories	Piece	Article number	Information on page
Hygrostat	1	17207000000	212
Internal enclosure fan	1	18110000000	75

[1] N.C. = normally closed / N.O. = normally open
[2] for 230 V AC operation only
Approvals see page 195.

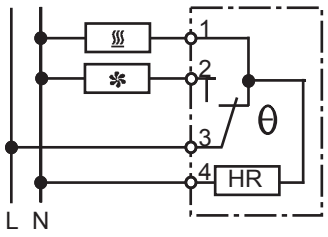
Dimensions

mm	FLZ 510	FLZ 520	FLZ 530
X	37	40	40
Y	64	72	72
Z	46	36	36

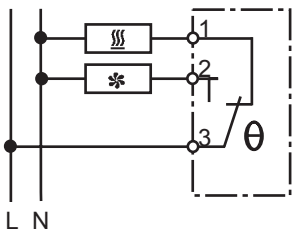


Schematics

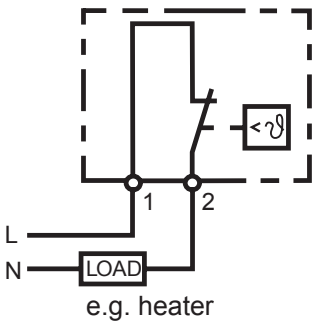
FLZ 510 1K



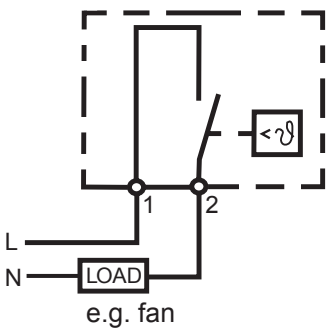
FLZ 510 3K / 7K



FLZ 520 N.C.



FLZ 530 N.O.



Twin Thermostats
FLZ 541 – FLZ 543



The FLZ series of twin thermostats integrates two independently switchable thermostats. They are available with N.C./N.O.[1], N.C./N.C. and N.O./N.O. contacts. Unlike thermostats with changeover contacts, connected devices can be switched in different temperature ranges.

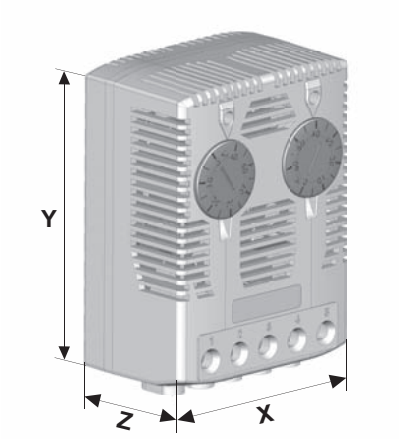
Data		FLZ 541	FLZ 542	FLZ 543	Unit
Article number		17141000000	17142000000	17143000000	
Type of contact		N.C. / N.O. with spring contact	N.C. / N.C. with spring contact	N.O. / N.O. with spring contact	
Setting range		0 °C (+32 °F) … +60 °C (+140 °F)			
Switching temperature difference		< 7			K
Switching point tolerance		± 4			
Max. switching power value in brackets: inductive load at cos φ = 0.6	N.C.	240 V AC / 10 (2)			A
	N.O.	120 V AC / 15 (2)			
	DC	max. 30			W
Operating temperature range		- 40 … + 80 (- 40 … + 176)			°C (°F)
Storage temperature range		- 40 … + 80 (- 40 … + 176)			
Probe type		bimetal			
System of protection		IP 20			
Weight		95			g
Type of connection		screw terminal for cable cross-section 0.5 to 2.5 mm²			
Suitable for the operation of		fan and heater	heaters	fans	
Type of mounting		snap fastening for 35 mm profile bars according to EN 60715			
Colour		RAL 7035			

Accessories	Piece	Article number	Information on page
Hygrostat	1	17207000000	212
Internal enclosure fan	1	18110000000	75

[1] N.C. = normally closed / N.O. = normally open
Approvals see page 195.

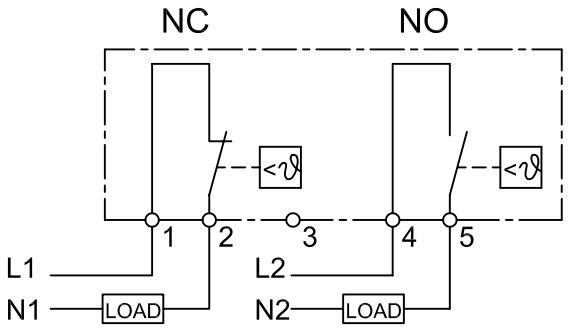
Dimensions

mm	FLZ 541	FLZ 542	FLZ 543
X	59		
Y	80.5		
Z	38		

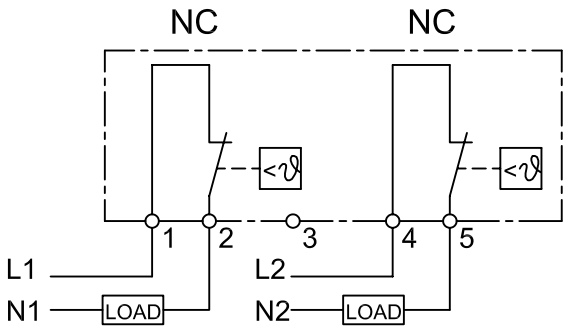


Schematics

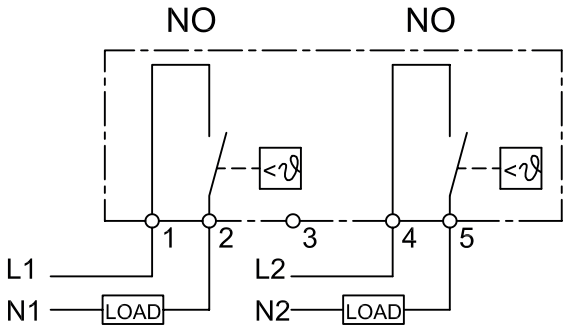
FLZ 541



FLZ 542



FLZ 543



Hygrostat
FLZ 600
Hygrostat-thermostat combination device
FLZ 610



Hygrostats from the FLZ series switch on control cabinet heaters or filterfans when a preset relative humidity is exceeded. The relative humidity is kept above the dew point and the condensation of water on electrical components and the corrosion of unprotected sheet metal is prevented. The electronic combination device unites thermostat and hygrostat in one housing and, at the same time, monitors the relative humidity and the temperature independently of each other.

Data		FLZ 600	FLZ 610	Unit
Article number		17207000000	17218100000	
Device implementation		mechanical hygrostat	electronic hygrostat-thermostat combination device	
Type of contact		changeover with spring contact	changeover/relay	
Rated voltage		–	230 V AC 50 / 60 Hz [1]	
Setting range			0 °C (+32 °F) … +60 °C (+140 °F)	
		40 - 90% R.H.	40 - 90% R.H.	
Switching temperature difference		approx. 5%	approx. 2 K ± 1 K / approx. 4% R.H. ± 1%	
Switching point tolerance		± 4[2]	–	K
Contact resistance		–	< 10	mΩ
Max. switching power value in brackets: inductive load at cos φ = 0.6	N.C.	24 - 250 V AC / 2 (0.2) A – min. 100 mA	240 V AC, 8 (3) A or 120 V AC, 8 (3) A	
	N.O.	24 - 250 V AC / 5 (0.2) A – min. 100 mA	24 V DC, 4 A	
	DC	max. 30	–	W
Operating temperature range		0 … + 60 (+ 30 … + 140)	- 20 … + 60 (- 4 … + 140)	°C (°F)
Storage temperature range		- 40 … + 80 (- 40 … + 176)		
Probe type		polyamide belt	–	
System of protection		IP 20		
Weight		55	85	g
Type of connection		screw terminal for cable cross-section 0.5 to 2.5 mm²		
Operating display		–	LED	
Suitable for the operation of		fan and heater		
Type of mounting		snap fastening for 35 mm profile bars according to EN 60715		
Colour		RAL 7035		

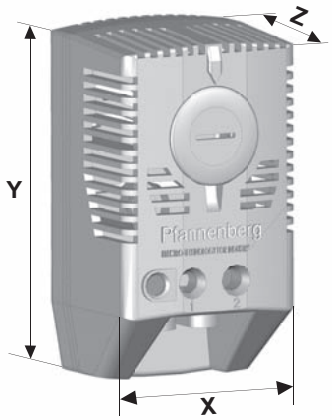
Accessories	Piece	Article number	Information on page
Thermostat	1	17207000000	208/210
Internal enclosure fan	1	18110000000	75

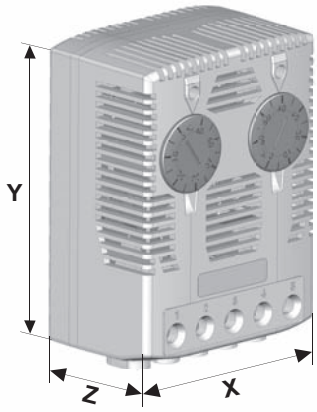
[1] alternatively available in 115 V AC (17218151000)
[2] in relation to 50% R.H.
Approvals see page 195.

Dimensions

mm	FLZ 600	FLZ 610
X	37	59
Y	64	80.5
Z	46	38

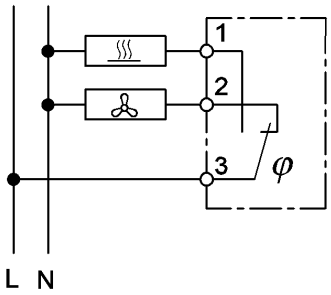
FLZ 600 | **FLZ 610**



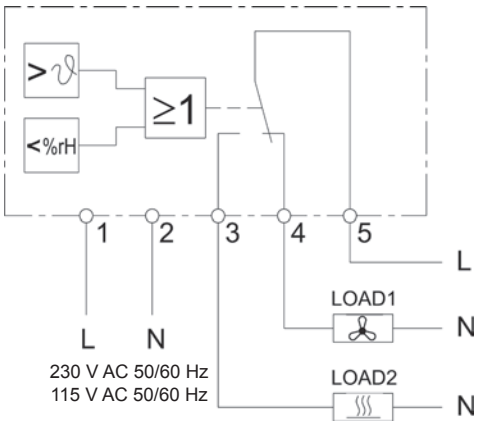


Schematics

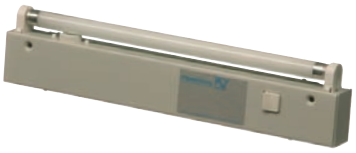
FLZ 600



FLZ 610



Pfannenberg electrical enclosure accessories



PLS Lamp Systems

A large selection of different options is available for illuminating your control cabinets. Whether with sockets, connector for door contact, integrated door limit switch or for the simple series switching of several lights - everything is possible. Light bulb covers are additionally available.



PLS-C Mains/Connection Plugs

In order to integrate the Pfannenberg lamp system simply and effectively in the switch cabinet, we offer you a series of preassembled connectors of various lengths.



PPS Sockets

For simple snap fastening to 35 mm profile bars, available in the country versions Germany, France and USA (incl. UL approval). The electrical connection is made via screw clamps up to a line cross-section of 4 mm^2 (single wire).



PPC Pressure Compensation Device

Temperature fluctuations in a housing in relation to the environment - caused by installed heat generating components and fluctuations in the ambient temperature – result in changing pressure conditions. These pressure changes can lead to the penetration of dust and humidity into the enclosure. In order to compensate for these pressure fluctuations, it is recommended to install a pressure-balancing element whilst retaining the highest protection types (up to IP 69K, high pressure/steam jet cleaning).



BR Machine Identification Lights

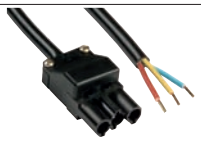
Supplementary to their air-conditioning equipment, Pfannenberg also manufactures machine identification lights for control equipment and automation systems. Irrespective of whether in the electrical industry, in medical equipment, in laboratories, in mechanical engineering or in the automation of manufacturing, Pfannenberg's signal towers are used with ever increasing frequency.
Their slim, elegant form and the quality of the components are convincing.



Internal enclosure fan

For an optimal distribution of cold air inside the control cabinet, (see page 75).

Plugs/connecting cables for PLS/PLS SL
PLS-C

	Length	Sales unit (piece)	Article number	Picture
Mains connection cable with safety plug and GST18/3 socket	1.0 m	1	17399091090	
		5	17399591090	
	3.0 m	1	17399095090	
		5	17399595090	
Mains connection cable with GST18/3 plug	1.0 m	1	17399091092	
		5	17399591092	
	3.0 m	1	17399095092	
		5	17399595092	
Mains connection cable with GST18/3 socket	1.0 m	1	17399091091	
		5	17399591091	
	3.0 m	1	17399095091	
		5	17399595091	
Connecting cable with GST18/3 plug and socket	0.5 m	1	17398089093	
		5	17398589093	
	1.0 m	1	17398091093	
		5	17398591093	
	2.0 m	1	17398093093	
		5	17398593093	

Sockets
PPS




NEMA 5-15

Data	PPS D	PPS F	PPS USA	Unit
Article number	17401000000	17402000000	17403000000	
Rated voltage	250 V AC		125 V AC	
Nominal current	10 A DC / 16 A AC		15 A AC	
Contact material	CuZn37			
Insulation material	PA			
Colour	grey			
Operating temperature	- 20 ... + 60 (- 4 ... + 140)			°C (°F)
Montage	snap fastening for 35 mm profile bars according to EN 60715			
Cable cross-section	single wire: 0.2 – 4 mm² / fine-stranded: 0.2 – 2.5 mm² / AWG 24 – AWG 12			
Insulation stripping length	8 mm			mm
Standards/approvals	IEC 83, DIN 49440-1		UL	

Pressure compensation device
PPC



Data	PPC	Unit
Article number	17410050000	
Thread	M12 x 1.5 - 10 mm	
Material	polyamide 6, O ring: perbunan	
Operating temperature	- 40 ... + 120 (- 40 ... + 248)	°C (°F)
Colour	RAL 7035	
System of protection	IP 66, 68 + 69K	
Sales unit	5	piece

Mounting support
PDR



Data	PDR	Unit
Article number	17411000000	
Fastening	self-adhesive	
Material	sheet steel, galvanised	
Operating/storage temperature	- 30 ... + 70 (- 22 ... + 158)	°C (°F)
Dimensions (HxWxD)	35 x 70 x 7	mm
Weight	approx. 25	g
Load capacity after 24h waiting period	500	

Standard Lamp Systems
PLS 008 Mini
PLS 013 Mini
PLS 014



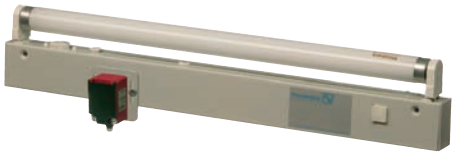
Data	PLS 008 Mini	PLS 013 Mini	PLS 014			Unit
Article number	17308210010	17313210010	17314010110	17314010102	17314010103	
Rated voltage ± 10 %	230 V 50 / 60 Hz					
Current consumption	0.07	0.11 A	0.39			A
Fluorescent tubes	8	13	14			W
Tube type	T5		T8			
Light intensity	450	640	700			Lm
Duty cycle	8000					h
Operating temperature	- 10 ... + 45 (+ 14 ... + 113)					°C (°F)
Storage temperature	- 10 ... + 45 (+ 14 ... + 113)					
Installation location	variable					
System of protection	IP 20					
Protection class	II		I			
Housing colour	white		RAL 7035			
Certification	GS (ITS)		ENEC (KEMA)			
Weight	0.17	0.26	1.31	1.22		kg
Type of connection	mains cable with plug included		cable (1.5 m)	GST 18/3 plug		
Additional connections	–			GST 18/3 socket		
				door contact	integrated door end switch	

Special Lamp Systems
PLS 015



Data	PLS 015				Unit
Article number	17315010111	17315010101	17315010102	17315010103	
Rated voltage ± 10 %	230 V 50 / 60 Hz (US: 120 V 60 Hz)				
Current consumption	0.29 (US: 0.38)				A
Fluorescent tubes	15				W
Tube type	T8				
Light intensity	720				Lm
Duty cycle	8000				h
Operating temperature	- 10 ... + 45 (+ 14 ... + 113)				°C (°F)
Storage temperature	- 10 ... + 45 (+ 14 ... + 113)				
Installation location	variable				
System of protection	IP 20				
Protection class	I				
Housing colour	RAL 7035				
Certification	ENEC (KEMA)				
Weight	1.36	1.25	1.29		kg
Socket	D				
Type of connection	cable (1.5 m)	GST 18/3 plug			
Additional connections		GST 18/3 socket			
			door contact	integrated door end switch	

Special Lamp Systems
PLS 015 SL



Data	PLS 015 SL					Unit
Article number	17315110010[1]	17315110011	17315110001	17315110002	17315110003	
Rated voltage ± 10 %	230 V 50 / 60 Hz (US: 120 V 60 Hz)					
Current consumption	0.29 (US: 0.38)					A
Fluorescent tubes	15					W
Tube type	T8					
Light intensity	720					Lm
Duty cycle	8000					h
Operating temperature	- 10 ... + 45 (+ 14 ... + 113)					°C (°F)
Storage temperature	- 10 ... + 45 (+ 14 ... + 113)					
Installation location	variable					
System of protection	IP 20					
Protection class	I					
Housing colour	RAL 7035					
Certification	ENEC (KEMA)					
Weight	1.43	1.28	1.30	1.32	1.35	kg
Type of connection	cable (1.5 m)		GST 18/3 plug			
Additional connections		GST 18/3 socket				
				door contact	integrated door end switch	

Special Lamp Systems
PLS 008 SL



Data	PLS 008 SL					Unit
Article number	17308110010[1]	17308110011	17308110001	17308110002	17308110003	
Rated voltage ± 10 %	230 V 50 / 60 Hz (US: 120 V 60 Hz)					
Current consumption	0.16 (US: 0.25)					A
Fluorescent tubes	8					W
Tube type	T5					
Light intensity	450					Lm
Duty cycle	8000					h
Operating temperature	- 10 ... + 45 (+ 14 ... + 113)					°C (°F)
Storage temperature	- 10 ... + 45 (+ 14 ... + 113)					
Installation location	variable					
System of protection	IP 20					
Protection class	I					
Housing colour	RAL 7035					
Certification	ENEC (KEMA)					
Weight	0.89	0.75		0.78	0.82	kg
Type of connection	cable (1.5 m)		GST 18/3 plug			
Additional connections		GST 18/3 socket				
				door contact	integrated door end switch	

[1] without socket GST 18/3


Spare parts
Maintenance
Pfannenberg
Global Services
Commissioning
Product
validation



Customised Services for your Thermal Management

Pfannenberg Global Services

In order to ensure the trouble-free functioning of your production process, Pfannenberg maintains a global service network of competent partners. True to the company's motto 'safety for man, machine and the environment' we offer a broad range of additional services besides pure sales, which are available worldwide, fast and individually tailored to your company's requirements.

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Our service prolongs the availability of your machines

Maintenance

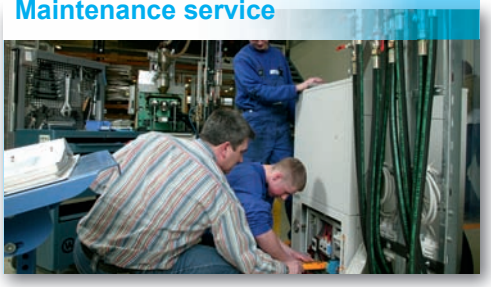
Pfannenberg's products are designed and manufactured to the highest quality standards. That pays off for you - in the form of particularly long running times, even under extreme operating and environmental conditions. In addition to that, the taking out of a service contract ensures the optimal functioning of our products and prevents expensive downtimes. Regular maintenance just once or twice per year already significantly reduces the probability of failure and contributes to a considerable improvement in machine availability.

In addition, our service supports you in the optimisation of your plants and production with equipment cleaning, inspections and further maintenance measures.

Regular service



Maintenance service



Maintenance includes:

- **checking the essential functions of the unit**
- **checking and exchanging consumable parts**
- **performance of necessary cleaning**
- **readjustment of control and regulating modules**
- **provision of tools and measuring instruments**
- **preparation of a maintenance report and a list of any parts needed for repairs**

NATURALLY EFFICIENT.

Regular maintenance ensures the high energy efficiency of Pfannenberg products. That lowers your energy costs and also benefits our environment.

Maintenance frequency

Regular maintenance is necessary even for the most reliable devices. Depending upon operating conditions, individually adapted maintenance intervals can significantly increase operational reliability and availability. You can be safe with your individual service level within the context of a service contract.

Warranty extension is your security

By taking out a service contract it is possible to extend the warranty on your Pfannenberg product up to five years. Depending on your chosen level, the warranty period amounts to ...

Level 1 ... 2 years

Level 2 ... 3 years

Level 3 ... 5 years.

Spare and consumable parts

Spare part availability

Pfannenberg ensures the short-notice, global availability of its consumable and spare parts, so that they can be delivered quickly to you if need be. No matter where in the world you need them.

Four different options are available, depending upon needs:

Standard order Level 1

Standard spare parts are always on stock in at least one of our service centres and are dispatched within 24 hours.

Manufactured spare parts are not always in stock and are in part only manufactured to order (procurement time up to 48 hours).

Custom spare parts are only special ordered.

Part stock at Pfannenberg Level 2

On request, customer-specific spare part stock can be set up in the Pfannenberg service centres. This makes particular sense in the case of non-standard spare parts. These parts are dispatched within 24 hours when needed.

Part stock at your premises Level 3

In order to guarantee the maximum availability of your production plants, defined parts can also be stocked at your own premises. This way they are always immediately available at the place of use.

Online Spare Parts Shop

www.pfannenberg-spareparts.com

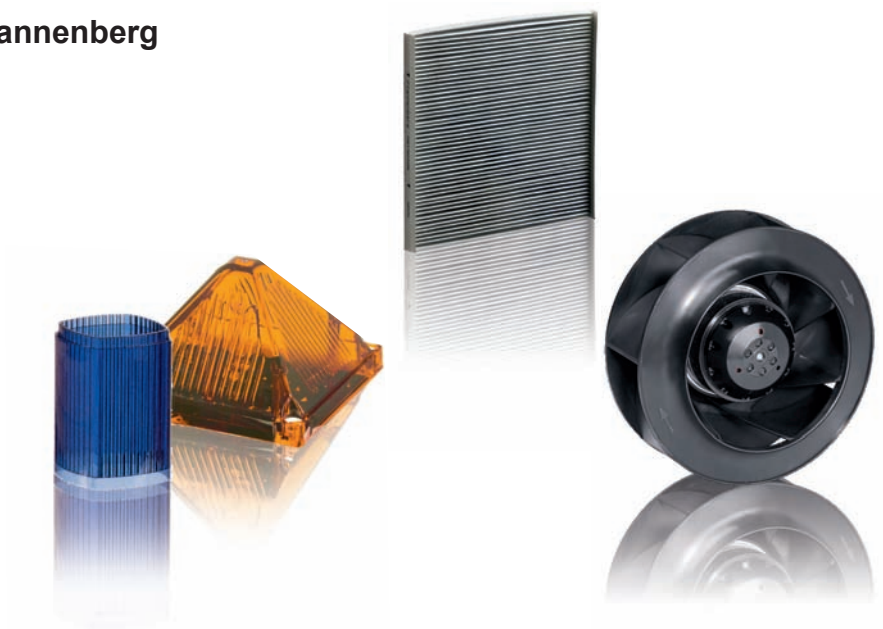
Online parts ordering by mouse click; search comfortably, find quickly, order directly - from anywhere in the world. Ordering that is handy, fast and reliable.

Simply click **www.pfannenberg-spareparts.com** and enter the desired part into the search function, or directly enter the part number of the desired part. The price and shipping costs will be displayed to you immediately. Ordering original parts from Pfannenberg is as simple as that.
From anywhere in the world, 24 hours a day, 7 days a week.

Wherever you are in the world, the Pfannenberg Online Spare Parts Shop delivers to you quickly, comfortably and reliably.

Only with original parts from Pfannenberg can you be sure that ...

... they are the correct parts
... they fit
... they are available
... they can be delivered quickly
... you won't lose valuable time
... their proper function is guaranteed
... your warranty remains intact



Before commissioning – call Pfannenberg

Pfannenberg offers you worldwide professional commissioning in order to avoid malfunctions and damage to machines right at the start of production. Incorrect installations otherwise pose the danger of causing expensive machine failures and losses of production, in particular under the complex conditions for water chillers.

We offer you the professional commissioning of your cooling systems anywhere in the world.

Our service technicians support you in:

- **the conversion, expansion or relocation of your existing cooling solution**
- **questions of technical support for your cooling applications**
- **commissioning of new devices in your manufacturing facilities**
- **organisation and completion of commissioning**

Training courses

In order for your employees to develop a better understanding of thermal management technology, we also offer training courses.

This allows your employees to recognise malfunctions faster and to make the correct decisions for the repair and resumption of production with greater reliability. The result is more economical operation of the systems with less trouble.

Pfannenberg's range of services therefore includes practical training courses, in which suitable methods of assistance are learned and fast intervention in the case of faults is practised. These training courses are held at Pfannenberg, but of course they can also take place at your company.

The standard contents of a training course are:

- **general information on refrigeration technology (circuit, components, functional sequences)**
- **the refrigeration unit - in direct relationship to the customer's application**
- **commissioning of a refrigeration unit and the customer's system**
- **fault simulation, fault recognition**
- **remedial actions in the event of faults during commissioning**
- **information about making contact in the event of a fault**
- **information about the work processes and the flow of documentation in the event of a fault**



Use our knowledge for putting your product ideas into practice

Product development

Benefit from the Pfannenberg R&D service for the testing of your own product ideas, e.g. during component development in the fields of system air conditioning, thermal management and signaling. Here, we can place the complete range of services of a well-rehearsed engineering consultancy at your disposal – to suit your needs and pocket. This way you can put your own ideas into practice, even if you have neither the resources nor the experience necessary to be able to do so.

That gives you several advantages at once. On the one hand, you can fall back on external know-how and rely on a professional team of specialists. On the other, you lower your fixed costs, since you do not tie up any of your own R&D capacities for long periods and do not need to take care of staffing issues. Instead, you can concentrate 100% on your own core competency.

Air test facility



Our R&D department offers to you the complete service of an engineering consultancy:

- **conception**
- **development of specifications and test plans (design)**
- **design**
- **flow simulation (CFD)**
- **prototype construction**
- **validation of prototypes with regard to relevant requirements**
- **production of the design and manufacturing documents**

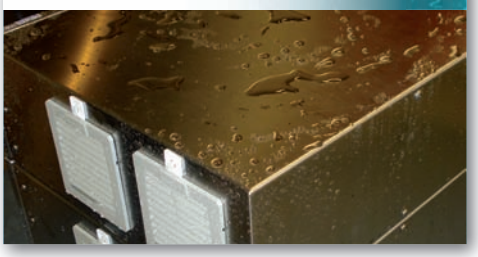
We put your products through their paces

Product validation

Many companies are very reluctant to invest in efficient test laboratories because both their acquisition and maintenance are too cost-intensive given the infrequency of their use. The inexpensive alternative is to use Pfannenberg's test laboratories. There is no need to maintain any permanent testing facilities at your company, but you still have access at all times to professional testing facilities, including expert technical staff.

In order to test the characteristics of your products in detail, we place an extensive range of services at your disposal.

IP test equipment





Further information can be found in our new Service Flyer.
Order your copy today:

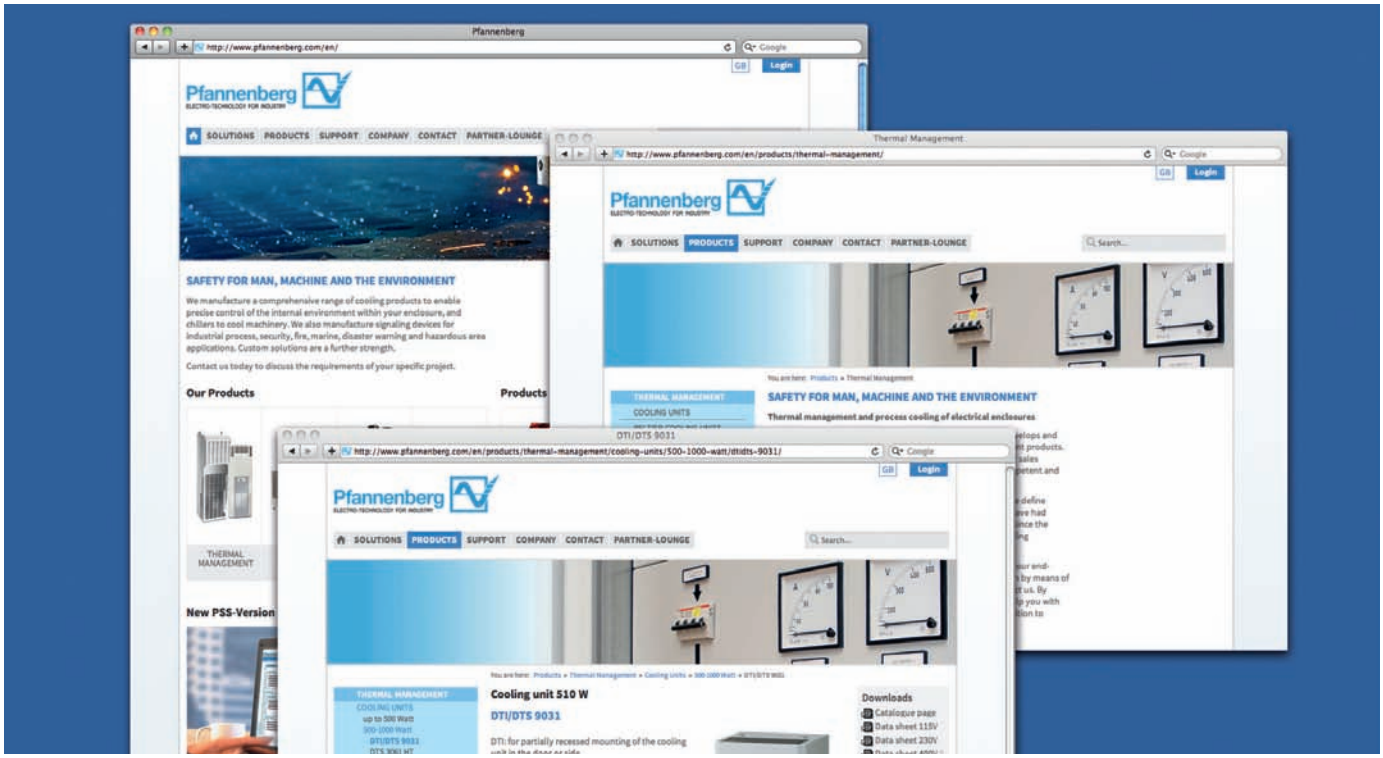
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Pfannenberg on the Internet

Make use of our large offering of online information. At **www.pfannenberg.com**, just click ‘Products’ in the menu bar. This will open a sub-menu on the left-hand side with all product categories. With just a few clicks you can find all of the important information that you require.

Our special service to you: the download area! With a mouse click here you can conveniently download data sheets, operating manuals, drilling templates and construction drawings to your PC and print them out.

www.pfannenberg.com



Pfannenberg:
Thermal Management & Signaling Technology

You can also benefit from Pfannenberg’s long-standing competence in the field of signaling technology. You too will be convinced by our economical solutions.

We look forward to your call or just send an email to: **customercare@pfannenberg.com**. Order your ‘signaling’ catalogue today.

+ 49 40 734 12-141



- **Flashing lights**
- **Sounders**
- **LED lights**
- **Signal towers**
- **Traffic lights**
- **Ex-ATEX signaling devices**
- **Obstruction lights**

Do you require further information?

Do you have any questions on our products and services? Would you like to arrange an appointment with one of our technicians? Do you require further information? Then just call us on **+ 49 40 7 34 12 - 0** or send an email to **info@pfannenberg.com**.

You can also fill in this fax form and send it to the number shown below. Whichever way you choose to contact us, we will respond promptly to your questions, requests and suggestions.



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Company	
Contact person	
Street/no.	
Post code/town	
Country	
Email	

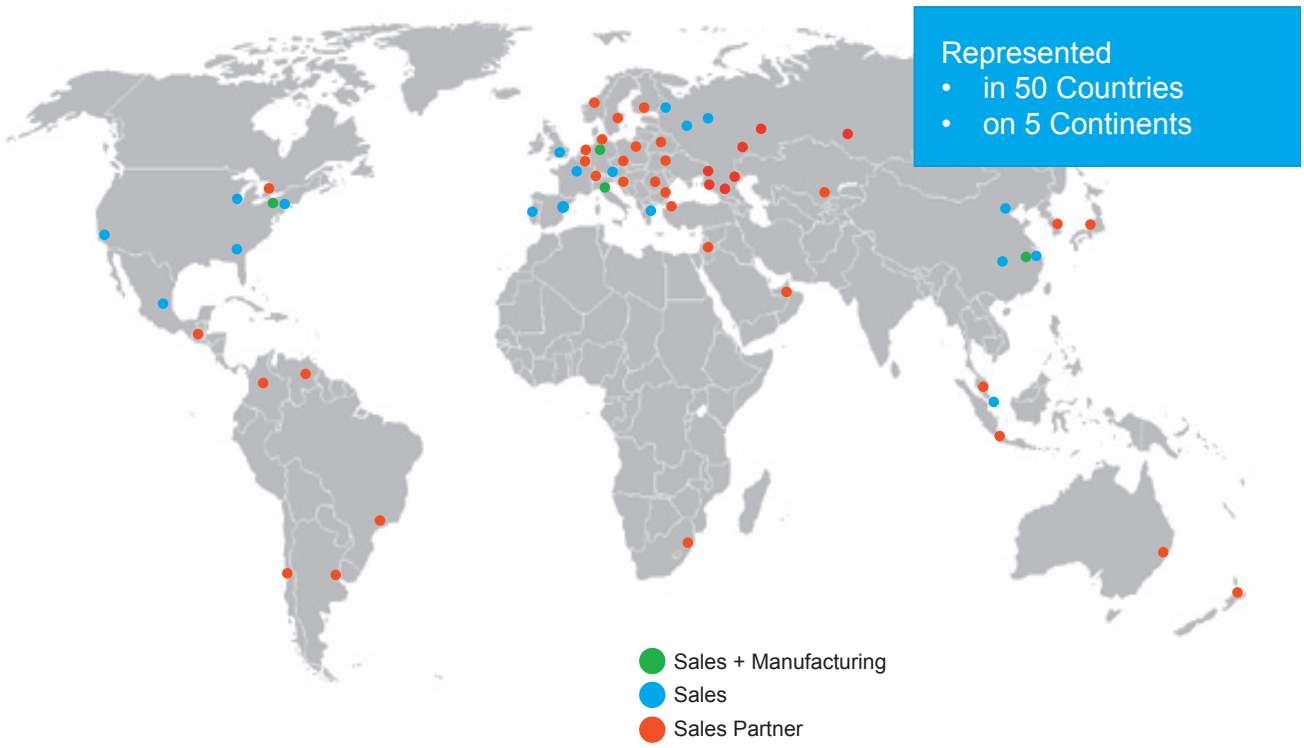
Please call me on	

I would like to arrange an appointment with a field service employee.

My suggested date:	

My concern is as follows:

Pfannenberg – worldwide expertise in thermal management and signaling technology



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