Air Conditioning Components and Equipments for Enclosures

Cooling Units · Chillers · Heat Exchangers · Filterfans
Heaters · Thermostats · Hygrostats · Lamp Systems · Components for Enclosures

Your Air Conditioning Experts

Enclosure Air Conditioning

Pfannenberg

Safety for man, machine and the environment!©

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ELECTRO-TECHNOLOGY FOR INDUSTRY

Safety for man, machine and the environment!©

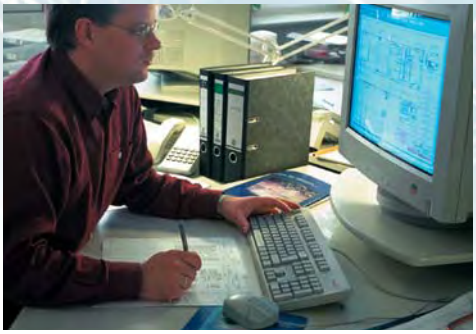
Filterfan

If you are looking for competence, performance and flexibility, Pfannenberg is the right partner. After all it was Pfannenberg who invented the filterfan* almost fifty years ago and so was born enclosure air conditioning. A pioneering achievement if you consider the fact that cool, clean air ensures that electronics last longer, thus protecting against the prohibitive cost of machine failure.

In this catalogue, Pfannberg introduces a brand-new, 4th Generation of filterfans. Prepare to be amazed and excited by its new features! Enjoy the benefits of our experience and core competence!

You will find the ideal solution for every application among Pfannenberg's diverse range of high-quality air-conditioning components, from spindle cooling to enclosure air conditioning. Our product portfolio includes everything from our new patented 4th Generation filterfans, to chillers, slimline compact cooling units for side, internal and top-mounting, peltier cooling units and air/water heat exchangers for central cooling systems, the corresponding controls and of course, heaters for electronic enclosures.

* European-Patent No. 0439667



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NEW!

Pfannenberg – Your Partner for Service and Product Validation

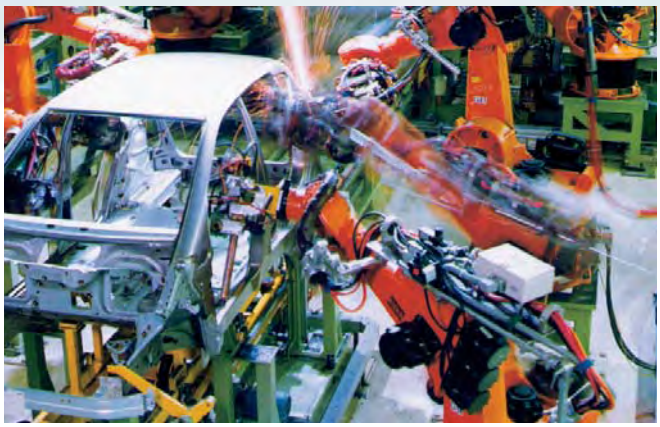
... more information on the pages 136-138!

Quick-Finder

www.pfannenberg.com

Convincing Arguments!
Partnership for Success!

A number of leading companies – for example in the car industry or in industrial engineering – rely on Pfannenberg for spindle cooling or for air conditioning enclosures. Not only because efficiency and utility are the core of our philosophy, but also because we adopt an individual approach on the basis of partnership when working together with our customers. This catalogue merely provides you with a summary of our products and services. We therefore ask you to contact us if you're looking for something out of the ordinary or need a custom design. Your problems and needs are a challenge for us.
Just give us a call!



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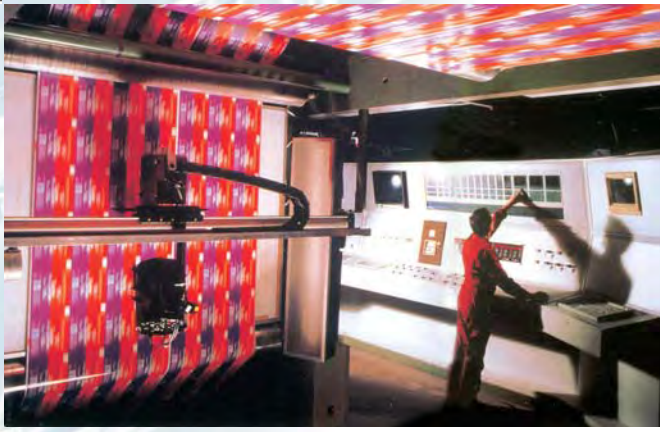

Functionality ensures the ultimate in availabi economic reliability & efficiency!

You would like to achieve your goal with as little effort as possible: A maximum guarantee against production failure, by air conditioning your electronic control systems.
We do everything to help you in your endeavour: With energy-saving equipment, rapid planning, simple installation and efficient service.

Enhanced performance!

At Pfannenberg, economic efficiency goes without saying. With pin-pointed improvements in detail, we can enhance the performance of our equipment considerably. The benefit to you is more value for your money.

Availability

Equipment designed using the ultimate in modern methods and the choice of proven components in cooling units provide you with a high degree of availability and security when air conditioning your enclosures.

Functionality

The sturdy control equipment inside the units ensures you of the highest degree of security against electromagnetic influences, and also against high-inductive stray fields.

Prompt planning and easy installation

We have made it as easy as possible for you: One single template accommodates all of the cooling units in a particular range, in this example four models. You can cut out the panel on your enclosure before your know the capacity you have to install. For installing our patented Filterfans, simply press into place, “Click and Fit!” There’s nothing faster than that!

One installation cutout for five levels of capacity

with patented method of rapid installation

Pfannenberg head warehouse in Hamburg

patented mounting of filter fans

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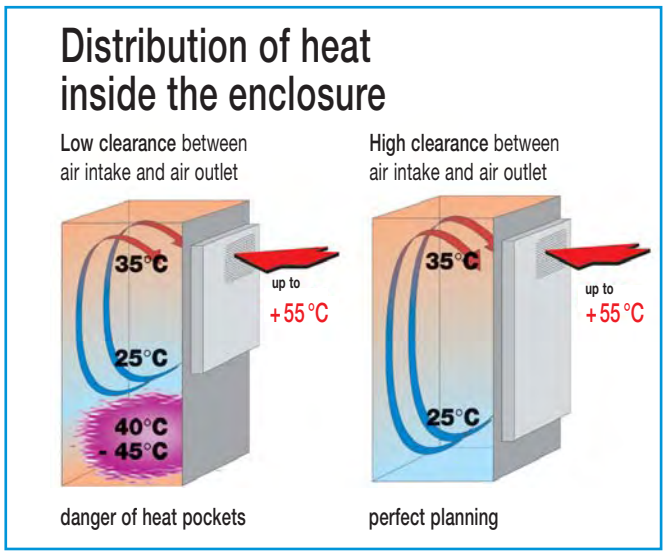

Optimum air passage

Using and encouraging natural convection to the fullest – that means optimum air flow. Hot air is drawn off from the upper reaches of the enclosure and cool air blown in at the bottom. This prevents hot spots in a reliable manner. High clearance between air intake and air outlet means: Optimum distribution of heat inside the enclosure.

The complete programme (see page 119 to 126) for your enclosure equipment. Heaters, thermostats, hygrostats or lamp systems – useful supplementings and additional control of filter fans, heat exchangers and cooling units.

No matter what RAL colour you decide on ...
... our design allows you to adapt the unit to the enclosure colour scheme. There is no need for you to do any expensive painting yourself.

You only need to ask us to send you your personal computer programme **PSS (Pfannenberg Software Service)** - or you can download the programme for free om www. pfannenberg.com - and you can find out yourself, using a few keystrokes, what are the best components for your air conditioning problem. Of course, we'll be glad to help you, with training programmes and seminars – even at your premises.
Just give us a call!

Decision made easy: High efficiency cooling units

Please observe the following points during planning and / or installation:

- When designing, make sure that the cold air is not deflected onto open electronic pcbs. The cold air can lead to condensation on the pcb.
- Take care to ensure that the cold air has unimpeded passage on its way out the cooling unit into the enclosure, as otherwise the cold air cannot circulate throughout the enclosure.
- Provide your enclosure with a door contact switch to prevent the cooling unit from trying to dehumidify the production bay when the door is left open. This would lead to extreme levels of condensation inside the enclosure.
- Whenever the cooling unit is in operation, make sure the cover is fitted correctly. The condenser in the cold air circuit would otherwise not be provided with sufficient air and thus be unable to release energy. This would cause the pressure safety cut out to operate.
- The standard scope of supply for Pfannenberg cooling units includes two all-resistant connecting cables or ready-to-connect plugs for mains voltage and fault contact. Use the connector to detect faults at an early stage. In accordance with car industry specifications, the cable cross section measures 1.5 mm^2.

... especially for side-mounted units

- On three-phase versions of the cooling unit, make sure the rotary field turns in the proper direction.
  In general, the rotary field turns clockwise.
  The DTS 7301 cooling unit, for example, is only available in a three-phase version, which is equipped with a rotary piston compressor.
  This must be connected to a right rotary field!
- In very humid ambient conditions, large amounts of condensation may accumulate; this drain off through a 12 mm overflow pipe. A length of hose can be attached to enable the disposal of the water.

... especially for top-mounted units

- On three-phase versions of the cooling unit, make sure the rotary field turns in the proper direction.
  In general, the rotary field turns clockwise.
  Although during intermittent operation none of the components is adversely affected, the blade on the fans are of aerodynamic design and thus only attain a fraction of their nominal air performance. For this reason, the pressure safety cut out is activated after only a short period of operation.
- In very humid ambient conditions, large amounts of condensation may accumulate; they drain off through a 12 mm overflow pipe, to which you can attach a length of hose to prevent water from accumulating on the top of the enclosure.
  When attaching the hose, please make sure that there are no kinks and the flow is unimpeded (vertical).

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Invest in safety, reliability, economic efficiency and profitability!

- Perfectly designed air conditioning equipment for enclosures guarantees a high degree of safe operation and long service life to ensure that your switch gear runs at its optimum efficiency. Our line of products ranges from thermostats to Filterfans® and water-cooling systems. This range provides the complete solution for all your applications.
- During the product development and manufacturing stages, it goes without saying that we apply the current standards and regulations, such as directives on machinery, electromagnetic compatibility and low voltage equipment.
- For technical data, there are not always distinct standards to use as a yardstick for product comparison. We have taken it upon ourselves to provide data tailored to everyday use that can be reproduced.
- Our UL-approved products have been specially designed for the North American market. This means that our customers find it much easier to gain access to this interesting market.
  An UL-approval is an absolute must for the American car industry. You can find an overview on the pages 12/13.
- Most of Pfannenberg's products do already conform to RoHS, even if the Pfannenberg products are not affected by the legislation.
  If you do need detailed informations, please use the following e-mail address: qm@.pfannenberg.com.

And talking of the environment!

Environmental protection is important. That is why ozone-friendly refrigerant (R 134a), together with the return and proper disposal of out-of-service units are a matter of fact at Pfannenberg.

ISO 14001
TÜV SÜD
ISO 9001
No. 12 100/104 19658 TMS

A Passion for Innovatio new Filte

Dear business partners,

with the invention of the filterfan by Otto Pfannenberg in 1958, the company Pfannenberg had set a milestone in industrial climatisation.

In cooperation with switchgear cabinet and machinery manufacturers operating in different market segments, we have created the 4th Generation of the Pfannenberg filterfan and thus made an important step towards a new world standard.

This newly developed filterfan is even more servicefriendly due to its modular structure. The air-flow optimised design with its patented louvre, 4-corner fastening system and patented filter mat has an air flow figure increased by more than 100 % for the protection type IP 55, compared to the filterfans of the previous generation.

At the same time it provides a longer service life for the filter mat and therefore lengthened service intervals. By this, it is possible to save time, money and increase at the same time the performance and availability of your plant. Our IP 54 versions have also been subject to a technical upgrading. Whilst the filter mat of the series 150g had the filtration efficiency G2, the new filter mats sizes 11,000 to 43,000 now achieve G3 and those of 65,000 to 67,000 even achieve G4.

Pfannenberg is one of the few companies in the world which develops and manufactures the whole range of industrial climatisation products such as thermostats, heaters, filterfans, cooling units and chillers. Thus, we supply everything "**from one hand**". Together with our distributors and subsidiaries we are your qualified, competent and flexible partners.

Andreas Pfannenberg
Managing Director

P.S. We are specialists in thinking ahead. This is demonstrated by 47 product patents applied for in the past 3 years. This is made possible by the fact 8% of the annual turnover is invested in research and development and 49% of the products which contribute to the worldwide turnover are younger than 5 years old.

n ...
rfans - 4th Generation

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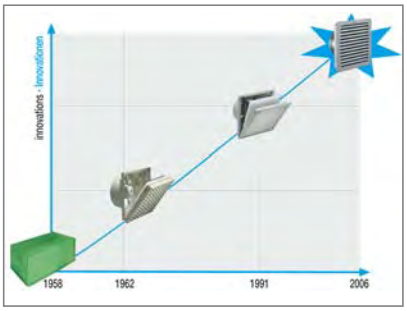
THE innovation on the filterfan market

With the innovative 4th Generation of filterfans, Pfannenberg offers you real competitive advantages. The development of the new generation includes of course all national and international norms and standards e.g. TÜV, NEMA, UL and GOST. In addition, there are the classical attributes of the Pfannenberg filterfans such as flat modern industrial design and easy assembly without the need for tools due to the patented 4-corner fastening system ("Click and fit!"). Easy maintenance is also achieved. Ten applied for patent innovations and registered designs assure that the new 4th Generation filterfans are unique.

5 sizes, 8 performance classes IP 54 and 7 performance classes IP 55

Modern test laboratory

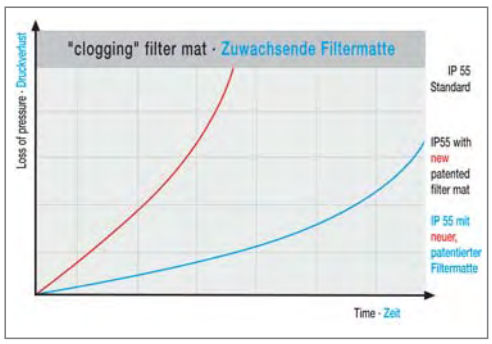
More than 1,000 tests in our modern test laboratory led to the air-flow optimised design with an increased air performance.

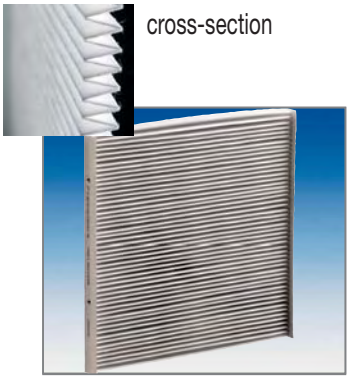


The 4th filterfan generation of Pfannenberg

An increase of airflow by more than 100% at the protection rating IP 55 is made possible by using the newly developed filter mat, designed especially for the most demanding ambient conditions such as dust, paper and cardboard fibres, oil mist, etc.

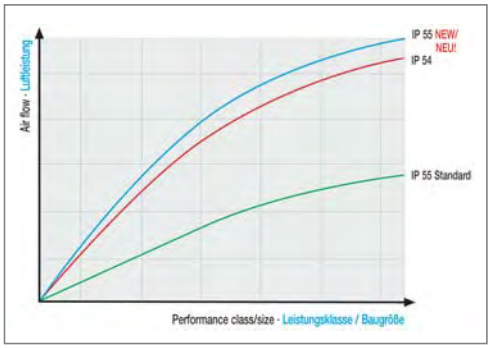
The filter mat used (patent) assures a longer service life and thus increased service intervals. It saves both time and money





cross-section

For climatisation, a minimum airflow volume is required. The airflow volume is decreasing when the dust contamination of the filter increases.



Contrary to the existing filterfan systems, the new Pfannenberg solution does not provide any reduction of the air flow but by means of a new patented filterfan technology a significant increase in the IP 55 protection.

Detailed product informations starting from page 76.

All you need to know at a glance...

Cooling units for side- and door-mounting

Partially recessed

Cooling capacity (A35 / A35)*	Model	Rated voltage	Height	Width	Depth (inside + outside)	UL version	Page
4000 Watt	DTI 9841	400 V	1539 mm	485 mm	360 mm	yes	16–17
2500 Watt	DTI 9541	400 V	1536 mm	485 mm	240 mm	yes	16–17
2000 Watt	DTI 9441	400 V	1536 mm	485 mm	240 mm	yes	16–17
1500 Watt	DTI 9341	230 V / 400 V	1536 mm	485 mm	180 mm	yes	16–17
1000 Watt	DTI 9241	230 V / 400 V	1536 mm	485 mm	180 mm	yes	16–17

Cooling capacity (A35 / A35)*	Model	Rated voltage	Height	Width	Depth (inside + outside)	UL version	Page
1500 Watt	DTI 9341C	230 V	958 mm	410 mm	248 mm	yes	20–21
950 Watt	DTI 9141	115 V / 230 V / 400 V	958 mm	410 mm	248 mm	yes	20–21
870 Watt	DTI 9041	115 V / 230 V / 400 V	599 mm	380 mm	231 mm / 231 mm / 363 mm	yes	22–23
510 Watt	DTI 9031	115 V / 230 V / 400 V	562 mm	310 mm	212 mm / 212 mm / 353 mm	yes	22–23

Cooling capacity (A35 / A35)*	Model	Rated voltage	Height	Width	Depth (inside + outside)	UL version	Page
320 Watt	DTFI 9021	115 V / 230 V / 400 V**	326 mm	385 mm	252 mm	yes	24–25
320 Watt	DTI 9021	115 V / 230 V / 400 V**	329 mm	385 mm	252 mm	yes	24–25

External mounting

Cooling capacity (A35 / A35)*	Model	Rated voltage	Height	Width	Depth	UL version	Page
4000 Watt	DTS 9841	400 V	1549 mm	485 mm	360 mm	yes	18–19
2500 Watt	DTS 9541	400 V	1543 mm	485 mm	240 mm	yes	18–19
2000 Watt	DTS 9441	400 V	1543 mm	485 mm	240 mm	yes	18–19
1500 Watt	DTS 9341	230 V / 400 V	1539 mm	485 mm	180 mm	yes	18–19
1000 Watt	DTS 9241	230 V / 400 V	1539 mm	485 mm	180 mm	yes	18–19

Cooling capacity (A35 / A35)*	Model	Rated voltage	Height	Width	Depth	UL version	Page
1500 Watt	DTS 9341C	230 V	964 mm	410 mm	248 mm	yes	20–21
950 Watt	DTS 9141	115 V / 230 V / 400 V	964 mm	410 mm	248 mm	yes	20–21
870 Watt	DTS 9041	115 V / 230 V / 400 V	604 mm	380 mm	231 mm / 231 mm / 363 mm	yes	22–23
510 Watt	DTS 9031	115 V / 230 V / 400 V	565 mm	310 mm	212 mm / 212 mm / 353 mm	yes	22–23

All units of the 9000-series (except DTx 9031) are available with integrated condensate evaporation (CM)

Cooling units for side- and door-mounting

Cooling capacity (A35 / A35)*	Model	Rated voltage	Height	Width	Depth	UL version	Page
2500 Watt	DTS 7541	400 V	1350 mm	397 mm	270 mm	yes	38–39
2000 Watt	DTS 7441	400 V	1350 mm	397 mm	270 mm	yes	38–39
1500 Watt	DTS 7341	400 V	1350 mm	390 mm	200 mm	———	38–39
1400 Watt	DTS 7341	115 V / 230 V	1350 mm	390 mm	200 mm	yes	38–39
1100 Watt	DTS 7241	115 V / 230 V	1350 mm	390 mm	200 mm	yes	38–39
800 Watt	DTS 7141	230 V	1390 mm	390 mm	200 mm	———	38–39
1400 Watt	DTS 7301	230 V / 400 V	1350 mm	390 mm	140 mm	———	40–41
1100 Watt	DTS 7201	230 V	1350 mm	390 mm	140 mm	———	40–41
820 Watt	DTS 7101	115 V / 230 V	915 mm	390 mm	200 mm	yes	42–43
470 Watt	DTS 7001	230 V	580 mm	340 mm	210 mm	———	42–43
	DTS 7001	115 V	580 mm	340 mm	210 mm	yes	42–43
320 Watt	DTS 7061	115 V / 230 V	445 mm	315 mm	255 mm	yes	44–45
220 Watt	DTS 7041	115 V / 230 V	330 mm	375 mm	190 mm	yes	44–45

Cooling units for potentially explosive environments (Ex)

Cooling capacity (A35 / A35)*	Model	Rated voltage	Height	Width	Depth	Approval	Page
3500 Watt	NEW! DTS-Ex 7741	400 V	1804 mm	474,5 mm	452 mm	TÜV 04 ATEX 2484U	46–47
3000 Watt	NEW! DTS-Ex 7641	400 V	1804 mm	474,5 mm	452 mm	TÜV 04 ATEX 2484U	46–47
2500 Watt	DTS-Ex 7541	230 V / 400 V	1804 mm	474,5 mm	452 mm	TÜV 04 ATEX 2484U	46–47
1400 Watt	DTS-Ex 7341	230 V / 400 V	1804 mm	474,5 mm	452 mm	TÜV 04 ATEX 2484U	46-47

*in accordance with EN 814: at 35 °C ambient temperature and 35 °C temperature inside enclosure, ** dimension differing

Outdoor series

Cooling capacity (A35 / A35)*	Model	Rated voltage	Height	Width	Depth	UL version	Page
5500 Watt NEW!	DTS 3661, 3681	400 V / 460 V	1667 mm	483 mm	623 mm	yes	26–27
4000 Watt NEW!	DTS 3561, 3581	400 V / 460 V	1502 mm	483 mm	534 mm	yes	28–29
2800 Watt NEW!	DTS 3361, 3381	400 V / 460 V	1502 mm	403 mm	468 mm	yes	30–31
2000 Watt	DTS 3261, 3281	115 V / 230 V / 400 V	1209 mm	395 mm	326 mm	yes	32–33
1100 Watt	DTS 3161, 3181	115 V / 230 V / 400 V	748 mm	395 mm	294 mm	yes	34–35

Enclosure cooling units for top-mounting

Cooling capacity (A35 / A35)*	Model	Rated voltage	Height	Width	Depth	UL version	Page
3000 Watt	DTD 5501	400 V / 440 V	465 mm	720 mm	465 mm	yes	48–49
1700 Watt	DTD 5301	400 V / 440 V	400 mm	600 mm	390 mm	yes	50–51
1600 Watt	DTD 5301	230 V	400 mm	600 mm	390 mm	yes	50–51
1400 Watt	DTD 5301	115 V	400 mm	600 mm	390 mm	yes	50–51
1150 Watt	DTD 5201	230 V	400 mm	600 mm	390 mm	——	50–51
	DTD 5201	115 V	400 mm	600 mm	390 mm	yes	50–51
810 Watt	DTD 5101	230 V	400 mm	600 mm	390 mm	yes	50–51
	DTD 5101	115 V	400 mm	600 mm	390 mm	yes	50–51

* in accordance with EN 814: at 35 °C ambient temperature and 35 °C temperature inside enclosure

Accessories for Cooling units

External condensate evaporation KV DTX *	52
Condensate bottle KF DTX	53
Filter mats, attachment and aluminium filters, protective edging	53

* all units of the 9000-series (except DTx 9031) are available with integrated condensate evaporation (CM)

Peltier cooling units

PTM	100 - 500 Watt	55–56

Chiller

60-61

Air / Water heat exchangers for side-mounting

Cooling capacity (W10 / A35)*	Model	Rated voltage	Height	Width	Depth	UL version	Housing stainless steel [1]	Page
This standard series includes the following features • integrated solenoid valve • integrated thermostat • plug-in connection on attached connector • fault contact for 10 K overtemperature								
10000 Watt	PWS 71002	400 V	1800 mm	600 mm	450 mm	——	——	62-63
7000 Watt	PWS 7702	400 V	1800 mm	450 mm	300 mm	——	——	62-63
5000 Watt**	PWS 7502	115 V / 230 V	1400 mm	460 mm	235 mm	yes	yes	64–65
3000 Watt**	PWS 7332	115 V / 230 V	950 mm	400 mm	190 mm	yes	yes	66-67
3000 Watt	PWS 7332 L	115 V / 230 V	1350 mm	400 mm	190 mm	——	——	66-67
1500 Watt	PWS 7152	115 V / 230 V	950 mm	400 mm	115 mm	yes	yes	66-67
1000 Watt	PWS 7102	115 V / 230 V	500 mm	200 mm	150 mm	yes	yes	68-69
650 Watt	PWS 7062	115 V / 230 V	500 mm	200 mm	100 mm	yes	yes	68-69
This standard series includes the following features: • extremely long air passage • cable connection • designed as a circulating cooler								
3550 Watt	PWS 7602	230 V	860 mm	560 mm	140 mm	——	——	72-73
3400 Watt	PWS 7402	230 V / 400-480 V	1350 mm	390 mm	180 mm	- / yes	yes	72-73
2100 Watt	PWS 7302	230 V	1350 mm	390 mm	140 mm	——	——	72-73
1250 Watt	PWS 7002	230 V	587 mm	390 mm	114 mm	——	——	72-73
These specially adapted versions include the following features: • integrated solenoid valve • integrated thermostat • connection by means of an IEC connector								
3400 Watt	PWS 7412	230 V	1350 mm	390 mm	180 mm	——	——	75
3550 Watt	PWS 7612	230 V	860 mm	560 mm	140 mm	——	——	75
2100 Watt	PWS 7312	230 V	1350 mm	390 mm	140 mm	——	yes	75
1250 Watt	PWS 7012	230 V	587 mm	390 mm	114 mm	——	——	75

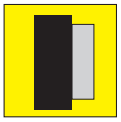
Air / Water heat exchangers for top-mounting

3400 Watt	PWD 5402	230 V / 400-480 V	190 mm	720 mm	465 mm	- / yes	——	70–71
2150 Watt	PWD 5302	230 V	140 mm	600 mm	390 mm	——	yes	70–71
3400 Watt***	PWD 5412	230 V	285 mm	720 mm	465 mm	——	——	75
2150 Watt***	PWD 5312	230 V	140 mm	600 mm	390 mm	——	——	75

** W = °C water supply temperature, A = °C temperature inside enclosure ** pipework stainless steel (optional) *** pipework 1.4571 complete [1]) optional extra

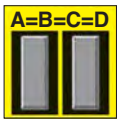
The exceptional range of products for enclosure air conditioning. Cooling units for partially recessed installation and external mounting.


Partially recessed
DTI


External mounting
DTS

Flexibility for any enclosure

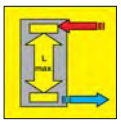
Regardless of whether the partially recessed model is for internal installation or external mounting, we provide the cooling capacity you need for any size of enclosure.



Easy to plan

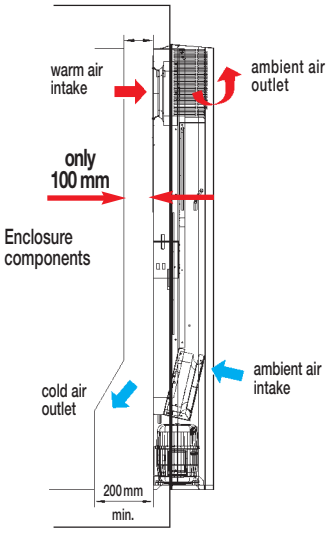
You choose the type of installation:

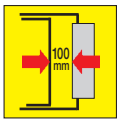
- DTI or DTS (partially recessed or external mounting) cooling units
- cost savings due to standardised mechanisms
- subsequent change of capacity level possible
- suitable for multiple voltages
- one installation cutout for five levels of capacity (DTI/DTS 9241 to 9841)



Optimum cooling effect

- effective, extremely long air passage
- no hot spots (due to extremely long clearance between air intake and outlet)
- high-capacity air volume
- the cool air flows downwards
- high degree of availability





Optimum use of enclosure space

The optimum passage of cold air in a downward flow makes it possible for a mere 100 mm clearance between electronic components and cooling unit.

Safety and service

The new cooling unit electronics maximise the requirement of your machine and systems, ensuring ultimate reliability, even under the most extreme conditions, as the electronics are located inside the passage of cool air. This design enables you to service your equipment both simply and quickly (see page 37).

Optional extras for enhanced safety and convenience

The Pfannenberg Comfort Controller combines the benefits of the standard controller (SC) with the added advantages of features such as a multimaster interface (see page 37). Basis for integration into bus systems for telemonitoring and remote diagnosis from control room.

The Pfannenberg Multi-Controller features a control unit equipped with temperature display, a second, separate temperature probe, and an optical interface. More information available on page 37.

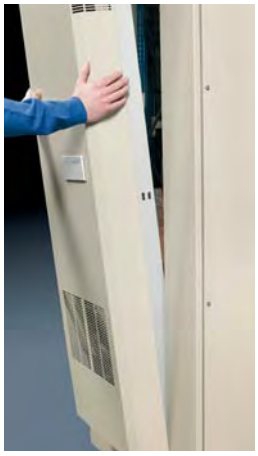
All cooling units are available in stainless steel, especially designed for applications in which hygiene and corrosion protection are of paramount importance (see page 36).

Integrated Cooling System©:
The new ICS line of cooling units with the DTI 9x41 range set new industrial standards.

single handed installation = 2 minutes

The efficient, technical solution:

The partially recessed DTI 9x41 cooling units for smart and efficient installation.
The patented method of rapid fixing – without tools.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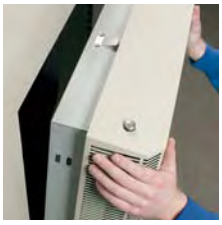
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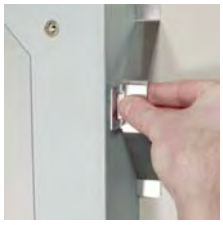
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6

Time-saving

Integrated seals and plug-in connectors are just two of the features to help you install quickly, saving time and money.

Don't just take our word for it! See our video demonstration on the web.
Follow the „Single-handed installation = 2 minutes" at http://www.pfannenberg.com to see how you can save time and money.

CM

Integrated, self-adjusting condensate evaporation

For years now, all Pfannenberg cooling devices that are used in telecommunications or in the USA have been fitted with an integrated evaporation device. Experience shows that integrated an evaporation device ensures maximum safety, as no condensation can drip onto the floor. Furthermore, the use of an integrating evaporation system rather than a conventional tank saves time, and therefore costs. From now on, all cooling devices from the DTx 9000 series (with the exception of the DTx 9031, due to its compact construction) are available with the new integrated, self-adjusting evaporation device.

DTc

The complete design integration

The design of the Pfannenberg cooling units is consciously designed in such a way that the machine and/or plant is in the center of attention and not the cooling unit.
To help you determine 100% the appearance of your machine and/or plant Pfannenberg allows you to use your own cover by offering you the series DTI 9000 (DTI 9241, 9341, 9441, 9541 and 9841) without the cover and display unit. The only condition is the spatial requirement within the machine and/or plant for the cooling unit to achieve its full capacity.


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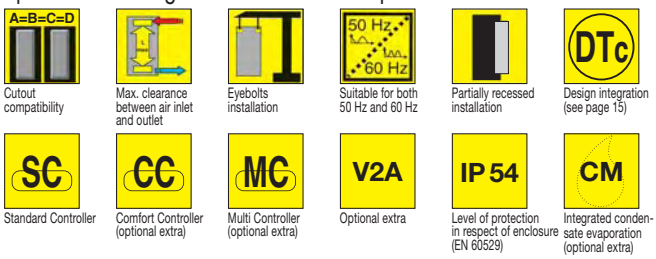
DTI 9x41 cooling units for partially recessed door- or side-mounting: 4000, 2500, 2000, 1500 or 1000 W

No tools required for installing the exceptional DTI range: see page 15

Economic, state-of-the-art cooling units

- five levels of capacity in one single installation cutout
- extremely variable to suit required capacity
- all components reliably cooled using extremely long air passage
- no tools required, single-handed installation in 2 minutes
- no need to drill, enclosure seal installed at the factory
- fault and door contacts as standard electronics
- design integration possible by using of a DTc variant
- DTI 9441/9541/9841 are available with special voltage: 380 V / 400 V / 440 V / 460 V / 480 V
- optional with integrated condensate evaporation



Refrigeration data	DTI 9841	DTI 9541	DTI 9441	DTI 9341	DTI 9241
Cooling capacity at A35/A35[1])	4000 W	2500 W	2000 W	1500 W	1000 W
Cooling capacity at A50/A35[1])	3050 W	1800 W	1440 W	1200 W	780 W
Type of refrigerant	R134a				
Amount of refrigerant	2100 g	1000 g	1000 g	500 g	500 g
Thermostat setting	adjustable within a range of + 25 °C (+ 77 °F) to 45 °C (+ 113 °F), factory-set at 35 °C (+ 95 °F)				
Ambient air temperature	+ 15 °C (+ 59 °F) ... + 55 °C (+ 131 °F)				
Air volume [2]), external circuit	1400 m³/h	1200 m³/h	1200 m³/h	890 m³/h	890 m³/h
Air volume [2]), internal circuit	1670 m³/h	890 m³/h	830 m³/h	890 m³/h	890 m³/h
Condensate discharge	condensate drain				

[1]) Refrigeration capacity according to EN 814 [2]) free-flow

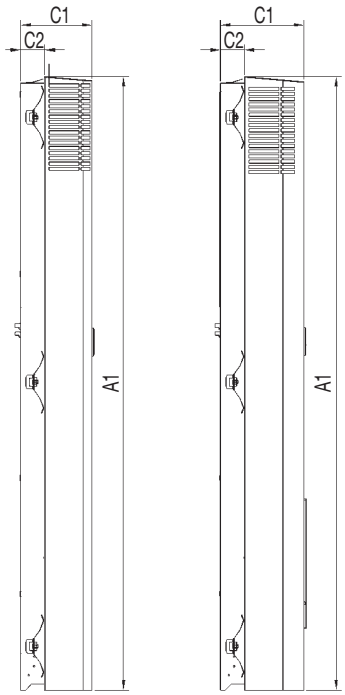
Electrical data	DTI 9841		DTI 9541		DTI 9441		DTI 9341				DTI 9241			
Rated voltage	400 V 3~*		400 V 3~*		400 V 3~*		230 V		400 V 2~**		230 V		400 V 2~**	
Rated frequency	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
Voltage range	380 V ... 480 V		380 V ... 480 V		380 V ... 480 V		DIN IEC 60038				DIN IEC 60038			
Power consumption at A35/A35	1891 W	2336 W	1140 W	1450 W	880 W	1250 W	800 W	1040 W	840 W	1080 W	740 W	910 W	780 W	960 W
Current consumption at A35/A35	4,2 A	3,6 A	3,5 A	3,9 A	3,2 A	3,7 A	5,1 A	6,1 A	3,0 A	3,6 A	3,7 A	4,4 A	2,2 A	2,6 A
Starting current at A35/A35	28,3 A	25,2 A	10,9 A	11,8 A	10,5 A	11,2 A	21,4 A	19,9 A	12,9 A	12,0 A	11,5 A	18,5 A	6,9 A	11,1 A
Type of connection	plug-in connector													

* Rated voltage can be adjusted on the device within a range of 380–420 V (50 Hz) and 440–480 V (60 Hz)
** Rated voltage can be set on the device at 400, 440 and 460 V

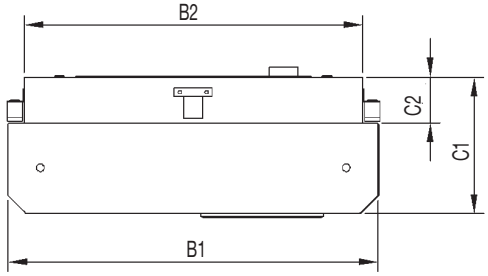
Supplementary data	DTI 9841	DTI 9541	DTI 9441	DTI 9341		DTI 9241	
Weight (without packaging)	86 kg	67 kg	67 kg	50 kg	55 kg	50 kg	55kg
Orientation	vertical, for door- or side-mounting						
Unit construction (chassis)	galvanized steel						
Corrosion protection (cover)	galvanized / electrostatically powder-coated (200 °C); on request: stainless steel cover						
Colour	RAL 7032 (european grey) + RAL 7035 (light grey), other colours available on request						
Insulation	according to EN 60529						
Climatic data	max. ambient temperature + 55 °C max. relative humidity 80%, A35 / A 35 (EN 814)						
System of protection	IP 54 against the enclosure (EN 60529), when used as recommended IP 34 against the ambience (EN 60529), when used as recommended						
Standard scope of supply	operating instructions, technical datasheet, installation kit incl. plug-in connector, eyebolts at DTI 9841						
Approvals	see overview cooling units / approvals						

Mechanical data:

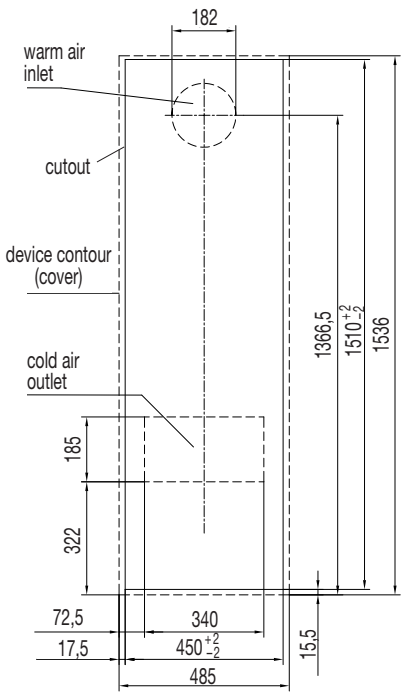
DTI **DTI PFA**



DTI / DTI PFA

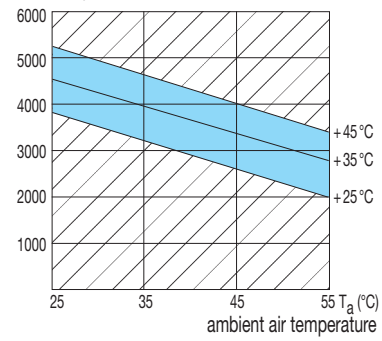


Installation cutout:

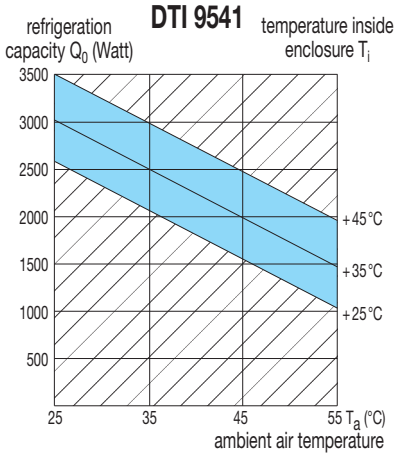


Characteristic curves: DTI 9841, DTI 9541, DTI 9441, DTI 9341, DTI 9241 – Effective refrigeration capacity

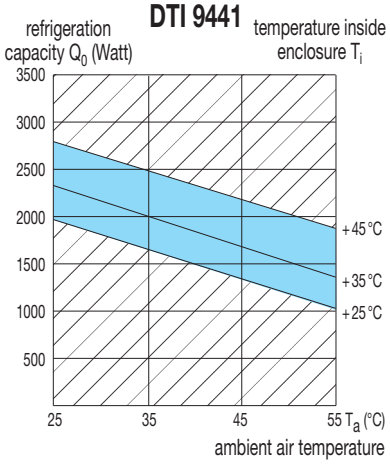
DTI 9841



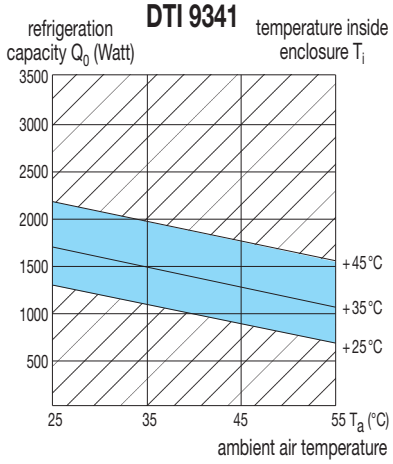
DTI 9541



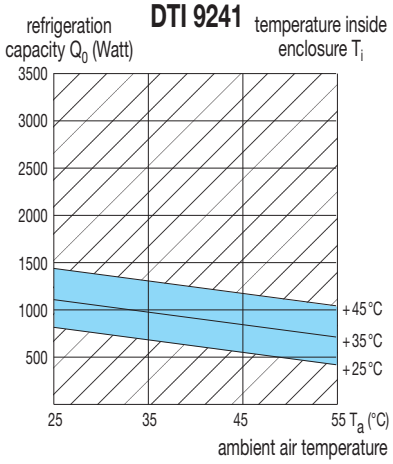
DTI 9441



DTI 9341



DTI 9241



	DTI 9241 / 9341		DTI 9441 / 9541		DTI 9841
	DTI	DTI PFA	DTI	DTI PFA	
A1	1536		1536		1539
B1	485		485		485
B2	444		444		443
C1	180	210	240	270	360
C2	60		120		120

* PFA – standard filter in Pfannenberg PFA range

DTS 9x41 cooling units for external door- or side-mounting: 4000, 2500, 2000, 1500 or 1000 W

Cutout compatible to Air/Water Heat Exchanger PWS 7332-L see page 66

Economic, state-of-the-art cooling units

- five levels of capacity in one single installation cutout
- extremely variable to suit required cooling capacity
- all components reliably cooled using extremely long air passage
- fault and door contacts as standard electronics
- DTS 9441/9541/9841 are available with special voltage: 380 V / 400 V / 440 V / 460 V / 480 V
- optional with integrated condensate evaporation

Cutout compatibility


Max. clearance between air inlet and outlet


Eyebolts installation

Suitable for both 50 Hz and 60 Hz


Side-mounted installation

Integrated condensate evaporation (optional extra)

Standard Controller

Comfort Controller (optional extra)

Multi Controller (optional extra)

Optional extra

Level of protection in respect of enclosure (EN 60529)

Refrigeration data	DTS 9841	DTS 9541	DTS 9441	DTS 9341	DTS 9241
Cooling capacity at A35/A35[1)]	4000 W	2500 W	2000 W	1500 W	1000 W
Cooling capacity at A50/A35[1)]	3050 W	1800 W	1440 W	1200 W	780 W
Type of refrigerant	R134a				
Amount of refrigerant	2100 g	1000 g	1000 g	500 g	500 g
Thermostat setting	adjustable within a range of + 25 °C (+ 77 °F) to 45 °C (+ 113 °F), factory-set at 35 °C (+ 95 °F)				
Ambient air temperature	+ 15 °C (+ 59 °F) ... + 55 °C (+ 131 °F)				
Air volume [2)], external circuit	1400 m³/h	1200 m³/h	1200 m³/h	890 m³/h	890 m³/h
Air volume [2)], internal circuit	1670 m³/h	890 m³/h	830 m³/h	890 m³/h	890 m³/h
Condensate discharge	condensate drain				

[1)] Refrigeration capacity according to EN 814 [2)] free-flow

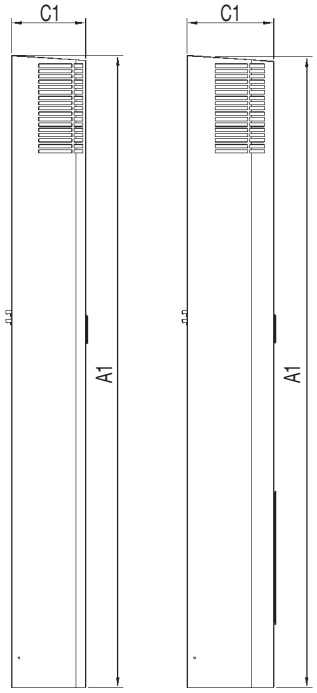
Electrical data	DTS 9841		DTS 9541		DTS 9441		DTS 9341				DTS 9241			
Rated voltage	400 V 3~*		400 V 3~*		400 V 3~*		230 V		400 V 2~**		230 V		400 V 2~**	
Rated frequency	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
Voltage range	380 V ... 480 V		380 V ... 480 V		380 V ... 480 V		DIN IEC 60038				DIN IEC 60038			
Power consumption at A35/A35	1891 W	2336 W	1140 W	1450 W	880 W	1250 W	800 W	1040 W	840 W	1080 W	740 W	910 W	780 W	960 W
Current consumption at A35/A35	4,2 A	3,6 A	3,5 A	3,9 A	3,2 A	3,7 A	5,1 A	6,1 A	3,0 A	3,6 A	3,7 A	4,4 A	2,2 A	2,6 A
Starting current at A35/A35	28,3 A	25,2 A	10,9 A	11,8 A	10,5 A	11,2 A	21,4 A	19,9 A	12,9 A	12,0 A	11,5 A	18,5 A	6,9 A	11,1 A
Type of connection	plug-in connector													

* Rated voltage can be adjusted on the device within a range of 380–420 V (50 Hz) and 440–480 V (60 Hz)
** Rated voltage can be set on the device at 400, 440 and 460 V

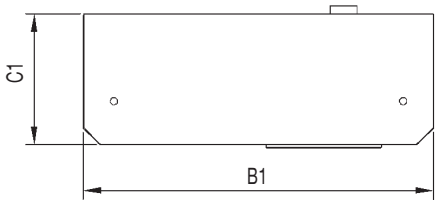
Supplementary data	DTS 9841	DTS 9541	DTS 9441	DTS 9341		DTS 9241	
Weight (without packaging)	86 kg	71 kg	71 kg	51 kg	56 kg	51 kg	56 kg
Orientation	vertical, for door- or side-mounting						
Unit construction (chassis)	galvanized steel						
Corrosion protection (cover)	galvanized / electrostatically powder-coated (200 °C); on request: stainless steel cover						
Colour	RAL 7032 (european grey) + RAL 7035 (light grey), other colours available on request						
Insulation	according to EN 60529						
Climatic data	max. ambient temperature + 55 °C max. relative humidity 80%, A35 / A 35 (EN 814)						
System of protection	IP 54 against the enclosure (EN 60529), when used as recommended IP 34 against the ambience (EN 60529), when used as recommended						
Standard scope of supply	operating instructions, technical datasheet, installation kit incl. plug-in connector, eyebolts at DTS 9841						
Approvals	see overview cooling units / approvals						

Mechanical data:

DTS **DTS PFA**



DTS / DTS PFA



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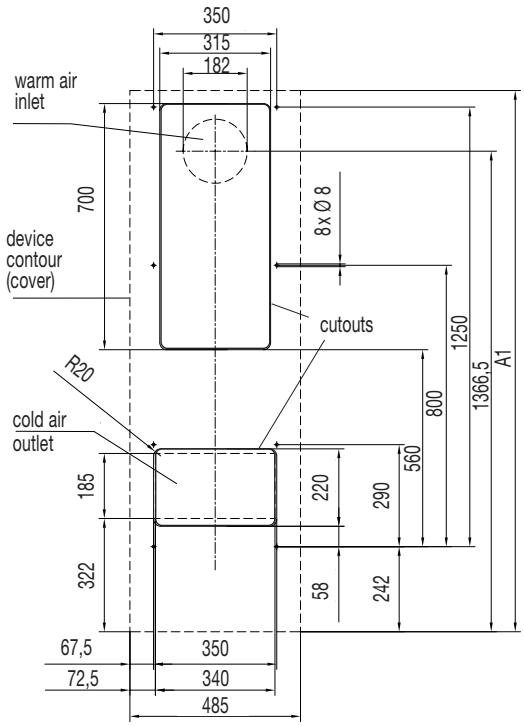
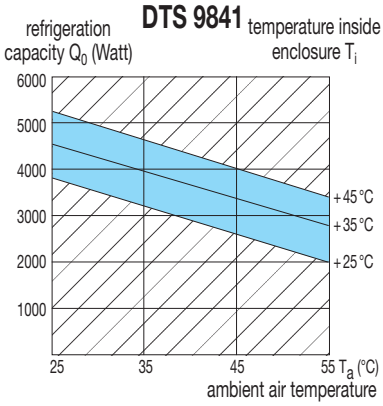
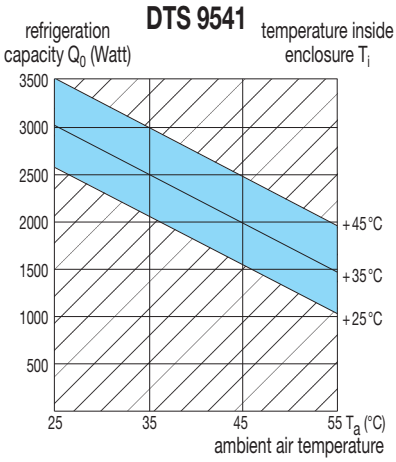
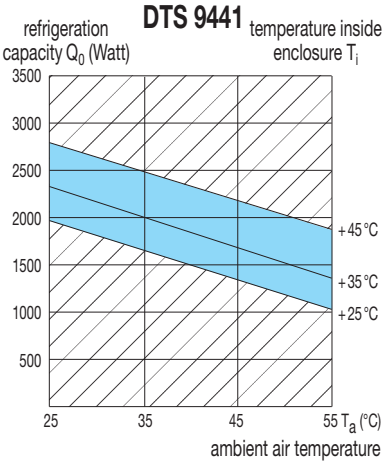
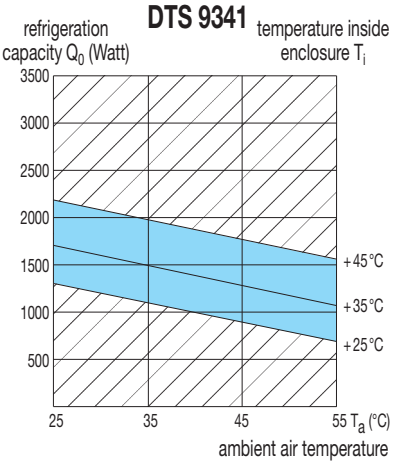


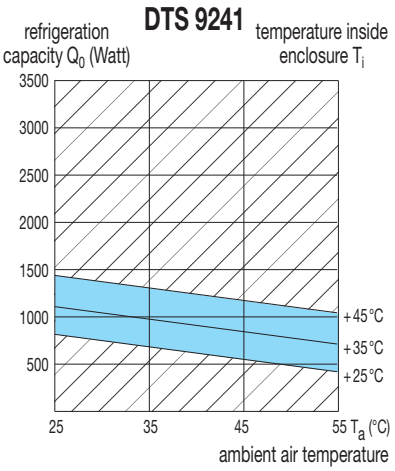
Characteristic curves: DTS 9841, DTS 9541, DTS 9441, DTS 9341, DTS 9241 – Effective refrigeration capacity











	DTS 9241 / 9341		DTS 9441 / 9541		DTS 9841
	DTS	DTS PFA	DTS	DTS PFA	
A1	1539		1543		1549
B1	485		485		485
C1	180	210	240	270	360

* PFA – standard filter in Pfannenberg PFA range

Cooling units for door- and side-mounting DTI / DTS 9141 and DTI / DTS 9341C for partially recessed or external mounting: 950 and 1500 W

No tools required for installing the exceptional DTI range *see page 15*

- easy to install: no drilling (DTI range) or fitting enclosure seal
- suitable for door widths of 500 mm or more
- optimum long air passage in internal circuit
- fault and door contacts as standard electronics
- extremely good air circulation inside enclosure
- rapid fixing
- cutout compatible
- optional with integrated condensate evaporation


Max. clearance between air inlet and outlet


Eyebolts installation

Suitable for both 50 Hz and 60 Hz


Partially recessed installation (DTI 9141)


Side-mounted installation (DTS 9141)

Integrated condensate evaporation (optional extra)

Optional extra

Standard Controller

Comfort Controller (optional extra)

Multi Controller (optional extra)

Level of protection in respect of enclosure (EN 60529)

Refrigeration data	DTI / DTS 9141		DTI / DTS 9341C	
Cooling capacity at A35 / A35[1])	950 W	950 W	1500 W	1550 W
Cooling capacity at A50 / A35[1])	520 W	473 W	754 W	758 W
Type of refrigerant	R134a			
Amount of refrigerant	400 g			
Thermostat setting	adjustable within a range of + 25 °C (+ 77 °F) to 45 °C (+ 113 °F), factory-set at 35 °C (+ 95 °F)			
Fault display: temperature inside enclosure (factory-set)	> + 50 °C (+ 122 °F)			
Ambient air temperature	+ 15 °C (+ 59 °F) ... + 55 °C (+ 131 °F)			
Air volume [2]), external circuit	570 m³/h		885 m³/h	
Air volume [2]), internal circuit	570 m³/h		885 m³/h	
Condensate discharge	condensate drain			

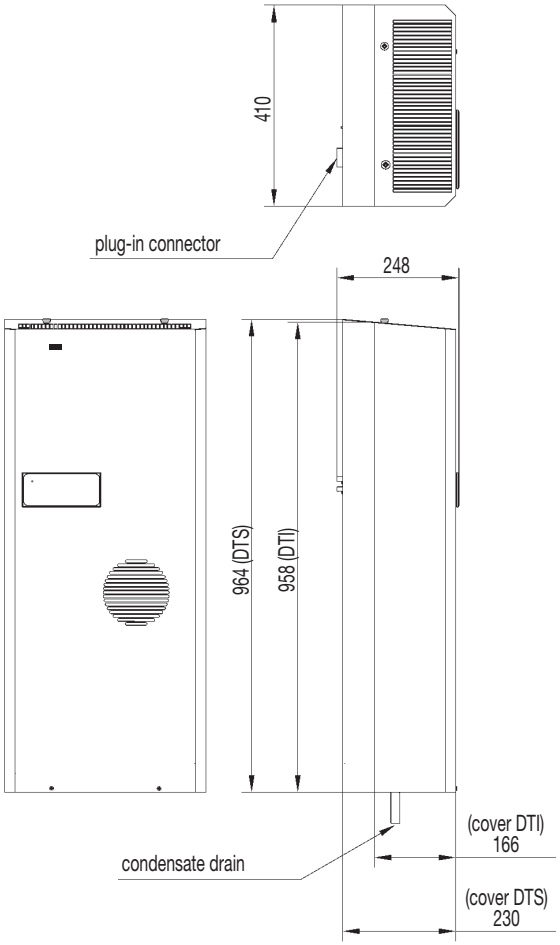
[1]) Refrigeration capacity according to EN 814 [2]) free-flow

Electrical data	DTI / DTS 9141					DTI / DTS 9341C	
Rated voltage	230 V		400 V 2 ~*		115 V	230 V	
Rated frequency	50 Hz	60 Hz	50 Hz	60 Hz	60 Hz	50 Hz	60 Hz
Voltage range	DIN IEC 60038						
Power consumption at A 35 / A 35	515 W	623 W	576 W	697 W	842 W	907 W	1047 W
Current consumption	2,98 A	3,25 A	2,73 A	2,98 A	9,1 A	5,4 A	6 A
Starting current	23,3 A	25,40 A	13,94 A	15,19 A	33,2 A	33,2 A	27,6 A

* Rated voltage can be set on the device at 400, 440 and 460 V

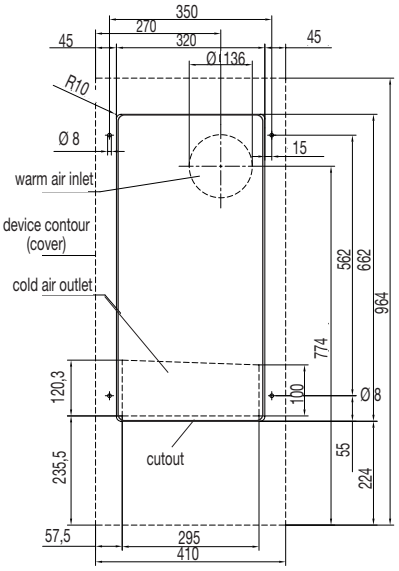
Supplementary data	DTI 9141	DTS 9141		DTI 9341C	DTS 9341C
Height	958 mm	964 mm		958 mm	964 mm
Width	410 mm				
Depth	248 mm				
Weight (without packaging)	36 kg	43 kg	36 kg	39 kg	41 kg
Orientation	vertical				
Unit construction	standard: sheet steel / optional extra: stainless steel				
Corrosion protection	standard: galvanized / electrostatically powder-coated (200 °C) RAL 7035, RAL 7032 / optional extra: stainless steel				
System of protection	IP 54 against the enclosure (EN 60529), when used as recommended IP 34 against the ambience (EN 60529), when used as recommended				
Standard scope of supply	operating instructions, technical datasheet, installation kit incl. plug-in connector				
Zulassung	see overview cooling units / approvals				

Mechanical data:

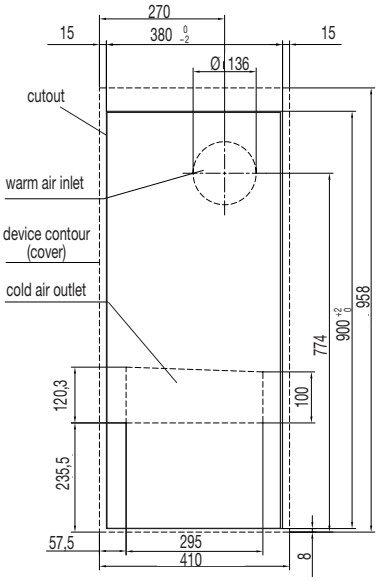


Installation cutout:

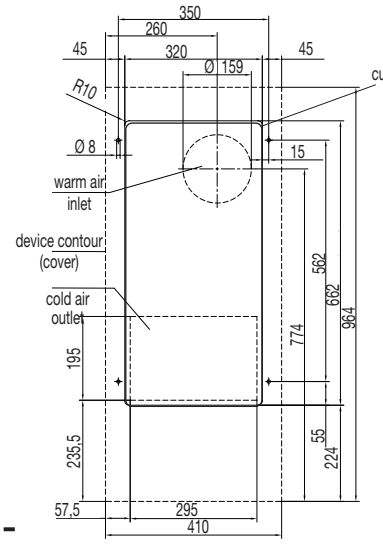
DTS 9141



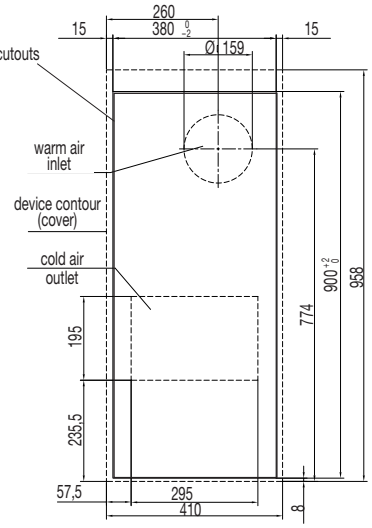
DTI 9141



DTS 9341C

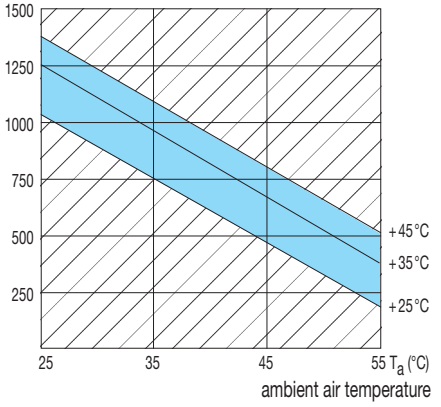


DTI 9341C

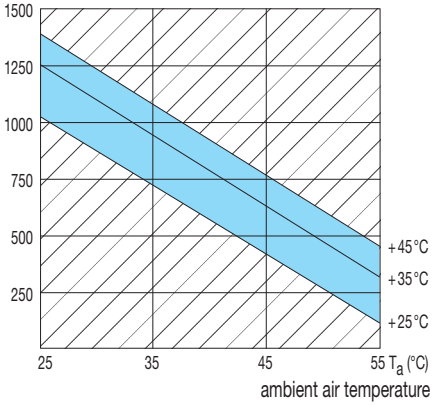


Characteristic curves: DTI / DTS 9141, DTI / DTS 9341C – Effective refrigeration capacity

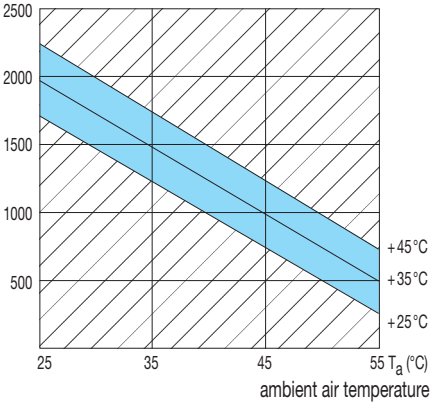
DTI/DTS 9141 230V/400V 2~



DTI/DTS 9141 115V



DTI/DTS 9341C



Cooling units for door- and side-mounting DTI / DTS 9031 and DTI / DTS 9041 for partially recessed or external mounting: 410 to 870 W

No tools required for installing the exceptional DTI range see page 15

- easy to install: no drilling (DTI range) or fitting enclosure seal
- suitable for door widths of 500 mm or more
- optimum long air passage in internal circuit
- fault and door contacts as standard electronics
- extremely good air circulation inside enclosure
- rapid fixing
- optional with integrated condensate evaporation (DTI/DTS 9041)


Max. clearance between air inlet and outlet


Eyebolts installation

Suitable for both 50 Hz and 60 Hz


Partially recessed installation (DTI 9041)


Side-mounted installation (DTS 9041)

Integrated condensate evaporation (optional extra) (DTI/DTS 9041)

Optional extra

Standard Controller

Comfort Controller (optional extra)

Multi Controller (optional extra)

Level of protection in respect of enclosure (EN 60529)

Refrigeration data	DTI / DTS 9041			DTI / DTS 9031				
Cooling capacity at A35/A35[1)]	870 W	810 W	790 W	510 W	560 W	410 W	540 W	585 W
Cooling capacity at A50/A35[1)]	580 W	483 W	590 W	365 W	395 W	305 W	360 W	545 W
Type of refrigerant	R134a							
Amount of refrigerant	400 g			250 g				
Thermostat setting	adjustable within a range of + 25 °C (+ 77 °F) to 45 °C (+ 113 °F), factory-set at 35 °C (+ 95 °F)							
Fault display: temperature inside enclosure (factory-set)	> + 50 °C (+ 122 °F)							
Ambient air temperature	+ 15 °C (+ 59 °F) ... + 55 °C (+ 131 °F)							
Air volume [2)], external circuit	570 m³/h			345 m³/h				
Air volume [2)], internal circuit	570 m³/h			280 m³/h				
Condensate discharge	condensate drain							

[1)] Refrigeration capacity according to EN 814 [2)] free-flow

Electrical data	DTI / DTS 9041					DTI / DTS 9031				
Rated voltage	230 V		400 V 2 ~ *		115 V	230V		400V 2 ~ *		115 V
Rated frequency	50 Hz	60 Hz	50 Hz	60 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	60 Hz
Voltage range	DIN IEC 60038									
Power consumption at A 35 / A 35	524 W	634 W	580 W	702 W	783 W	283 W	337 W	297 W	354 W	322 W
Current consumption	3,06 A	3,34 A	3,2 A	3,49 A	7,6 A	1,58 A	1,64 A	1,59 A	1,53 A	3,29 A
Starting current	22,16 A	24,15 A	20,2 A	22,02 A	40,1 A	14,31 A	13,8 A	8,63 A	7,86 A	26,15 A

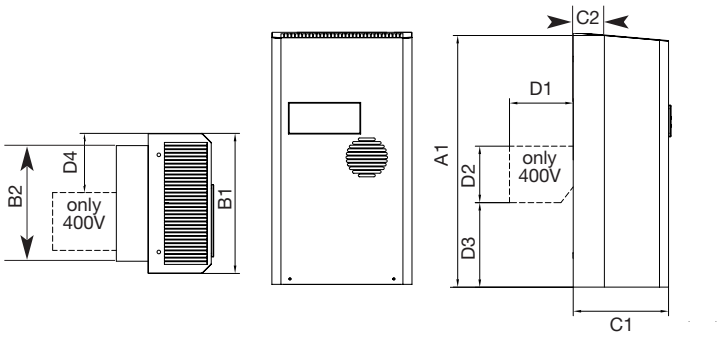
* Rated voltage can be set on the device at 400, 440 and 460 V

Supplementary data	DTI / DTS 9041			DTI / DTS 9031		
Weight (without packaging) DTI	29,5 kg	37 kg	29,5 kg	21 kg	26 kg	21 kg
Weight (without packaging) DTS	29,5 kg	29,5 kg	29,5 kg	22 kg	27 kg	22 kg
Orientation	vertical					
Unit construction	standard: sheet steel / optional extra: stainless steel					
Corrosion protection	standard: galvanized / electrostatically powder-coated (200 °C) RAL 7035, RAL 7032 / optional extra: stainless steel					
Colour	RAL 7032 (european grey) and RAL 7035 (light grey), other colours available on request					
Insulation	according to DIN 31001					
System of protection	IP 54 against the enclosure (EN 60529), when used as recommended IP 34 against the ambience (EN 60529), when used as recommended					
Standard scope of supply	operating instructions, technical datasheet, installation kit incl. plug-in connector					
Approvals	see overview cooling units / approvals					

Mechanical data:

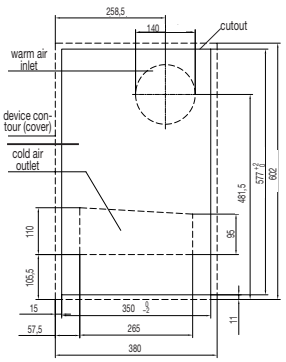
	DTI 9031 115/230 V	DTS 9031 115/230 V	DTI 9041 115/230 V	DTS 9041 115/230 V
A1	562	565	599	604
B1	310	310	380	380
B2	256		344	
C1	212	212	231	231
C2	67		60	
	only 400 V	only 400 V	only 400 V	only 400 V
D1	141	141	132	132
D2	125	125	152	152
D3	187	187	244	244
D4	131	131	171	171

DTI / DTS 9031 and DTI / DTS 9041

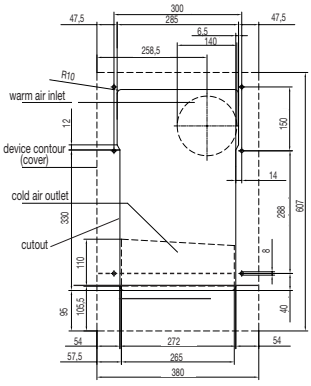


Installation cutout:

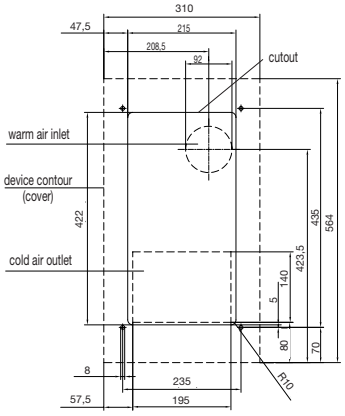
DTI 9041



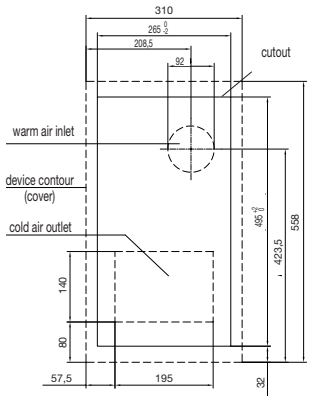
DTS 9041



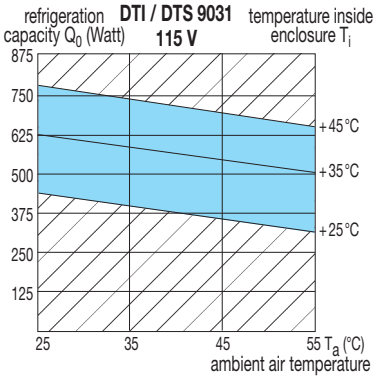
DTS 9031

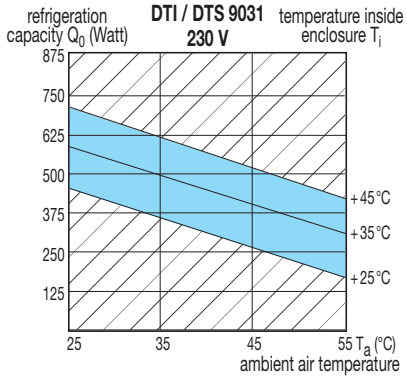


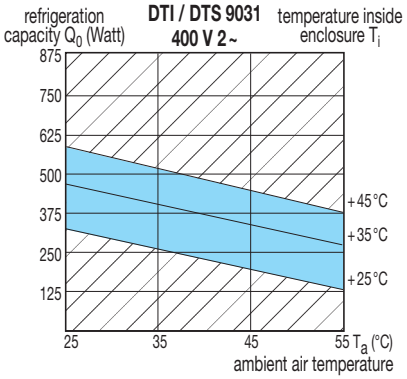
DTI 9031

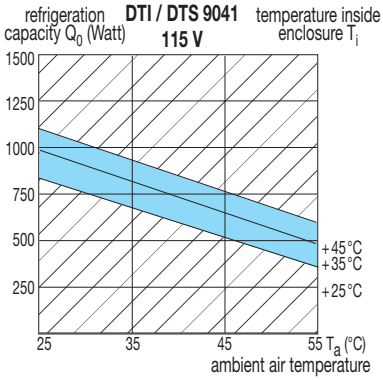


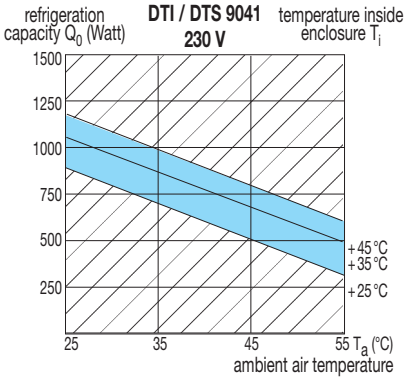
Characteristic curves: DTI / DTS 9031 and DTI / DTS 9041 - Effective refrigeration capacity

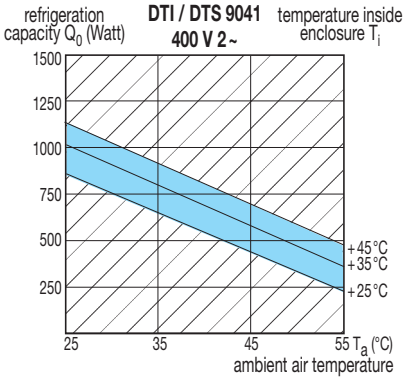












Compact cooling units: DTFI / DTI 9021, 320 W

The optimum for space-saving, efficient air-conditioning

DTFI 9021 cutout compatible with filterfans PF 65.000 - PF 67.000
see page 90

- easy and quick to install, without any drilling (DTFI 9021)
- high-capacity performance in compact design
- ideal for small enclosures and control panels
- diagnosis report for status monitoring system
- low-profile design for integration into machine enclosures (DTFI 9021)
- DTFI 9021 cutout compatible with filterfans PF 65.000 - 67.000, PF 5.000, PF 6.000, PF 7.000, PF 6.500SL1 and PF 6.000SL2
- shallow installation depth when partially recessed (DTI 9021)
- optimum reliability with standard electronics (e.g. fault and door contacts)
- optional with integrated condensate evaporation

Cutout compatibility

Suitable for both 50 Hz and 60 Hz


Recessed installation (DTFI 9021)


Partially recessed installation (DTI 9021)

Level of protection in respect of enclosure (EN 60529)

Integrated condensate evaporation (optional extra)

Standard Controller

Refrigeration data	DTFI 9021					DTI 9021		
Cooling capacity at A 35 / A 35 [1]	320 W	320 W	340 W	230 W	290 W	320 W	320 W	340 W
Cooling capacity at A 45 / A 35 [1]	250 W	300 W	330 W	220 W	280 W	250 W	300 W	330 W
Type of refrigerant	R134a							
Amount of refrigerant	350 g							
Thermostat setting	adjustable within a range of + 25 °C (+ 77 °F) to 45 °C (+ 113 °F), factory-set at 35 °C (+ 95 °F)							
Fault display: temperature inside enclosure	> + 50 °C (+ 122 °F) (factory-set)							
Ambient air temperature	+ 15 °C (+ 59 °F) ... + 45 °C (+ 113 °F)							
Air volume [2], external circuit	282 m³/h							
Air volume [2], internal circuit	282 m³/h							
Condensate discharge	condensate drain							

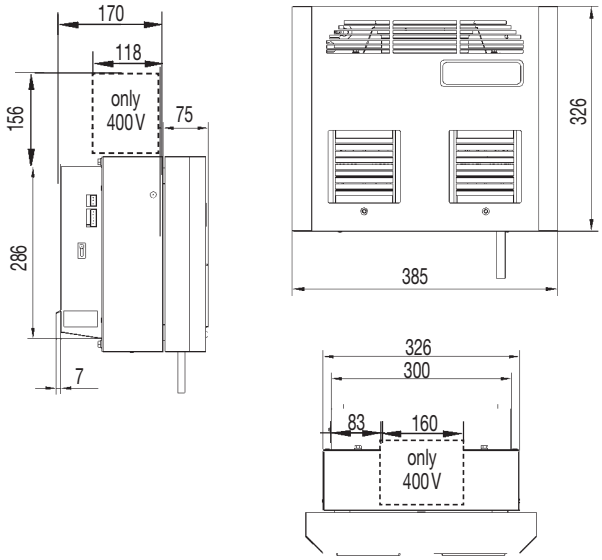
[1] Refrigeration capacity according to EN 814 [2] free-flow

Electrical data	DTFI 9021					DTI 9021		
Rated voltage	115 V	230 V		400 V		115 V	230 V	
Rated frequency	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	60 Hz	50 Hz	60 Hz
Voltage range	DIN IEC 60038							
Power consumption at A 35 / A 35 A 45 / A 35	240 W 230 W	230 W 260 W	240 W 290 W	200 W 230 W	200 W 230 W	240 W 230 W	230 W 189 W	240 W 268 W
Current consumption	2,7 A	1,6 A	1,6 A	1 A	0,9 A	2,7 A	1,6 A	1,6 A
Starting current	11,4 A	11,7 A	10,9 A	6,6 A	5,9 A	11,4 A	11,7 A	10,9 A

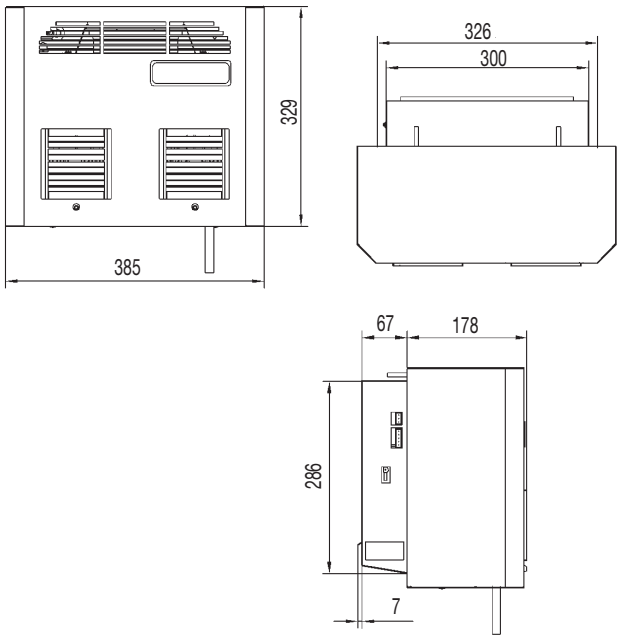
Supplementary data	DTFI 9021		DTI 9021
Height	326 mm	464 mm	329 mm
Width	385 mm		
Depth	252 mm		252 mm
Weight (without packaging)	16 kg	22 kg	17 kg
Orientation	vertical		
Unit construction	sheet steel		
Corrosion protection	standard: galvanized / electrostatically powder-coated (200 °C) RAL 7035, RAL 7032		
System of protection	IP 54 against the enclosure (EN 60529), when used as recommended IP 34 against the ambience (EN 60529), when used as recommended		
Standard scope of supply	operating instructions, technical datasheet, installation kit incl. plug-in connector		
Approvals	see overview cooling units / approvals		

Mechanical data:

DTFI 9021

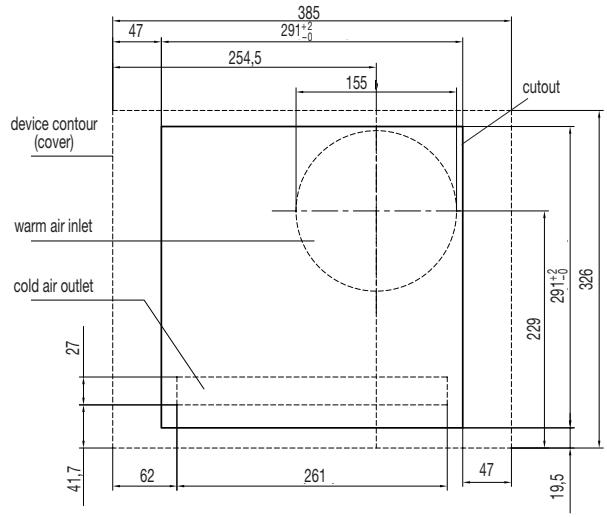


DTI 9021

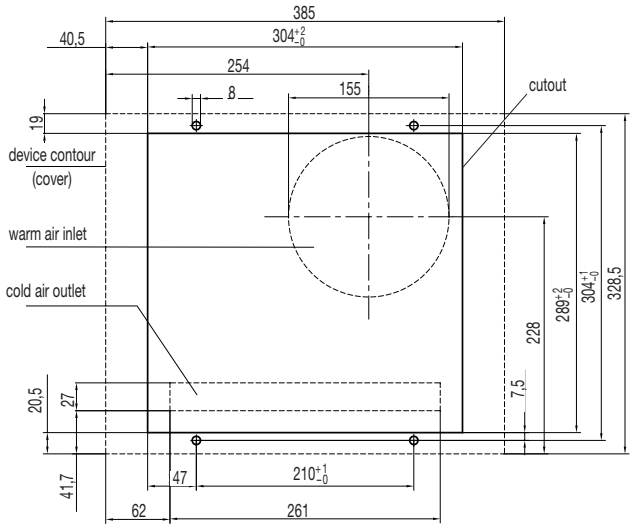


Installation cutout:

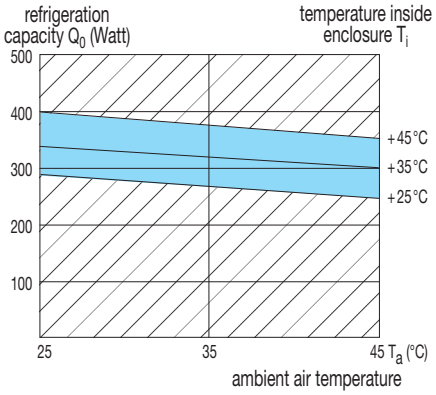
DTFI 9021



DTI 9021



Characteristic curves: DTFI / DTI 9021 – Effective refrigeration capacity



Outdoor cooling units
DTS 3661 / DTS 3681, 5500 W
NEMA 3R/4, NEMA 4/4X version

- high degree of protection IP 56
- condenser protected against aggressive operating conditions
- high-capacity performance in compact design
- available in stainless steel
- maintenance-free
- suitable for food industry and outdoor applications
- integrated condensate evaporation


Side-mounted installation

System of protection

NEMA System of protection

DTS 3681

Standard Controller

Integrated condensate evaporation

Refrigeration data	DTS 3661 (NEMA 3R/4)		DTS 3681 (NEMA 4/4X)	
Cooling capacity at A35/A35[1])	5500 W	6100 W	5500 W	6100 W
Cooling capacity at A50/A35[1])	4430 W	4900 W	4430 W	4900 W
Type of refrigerant	R134a			
Amount of refrigerant	1300 g			
Thermostat setting	adjustable within a range of + 25 °C (+ 77 °F) to 45 °C (+ 113 °F), factory-set at 35 °C (+ 95 °F)			
Hysteresis	4K			
Air volume [2]), external circuit	2365 m³/h	2740 m³/h	2365 m³/h	2740 m³/h
Air volume [2]), internal circuit	2365 m³/h	2740 m³/h	2365 m³/h	2740 m³/h
Noise level	73 dB (A)			
Duty cycle	100%			
Condensate discharge	integrated condensate management			

[1]) Refrigeration capacity according to EN 814 [2]) free-flow

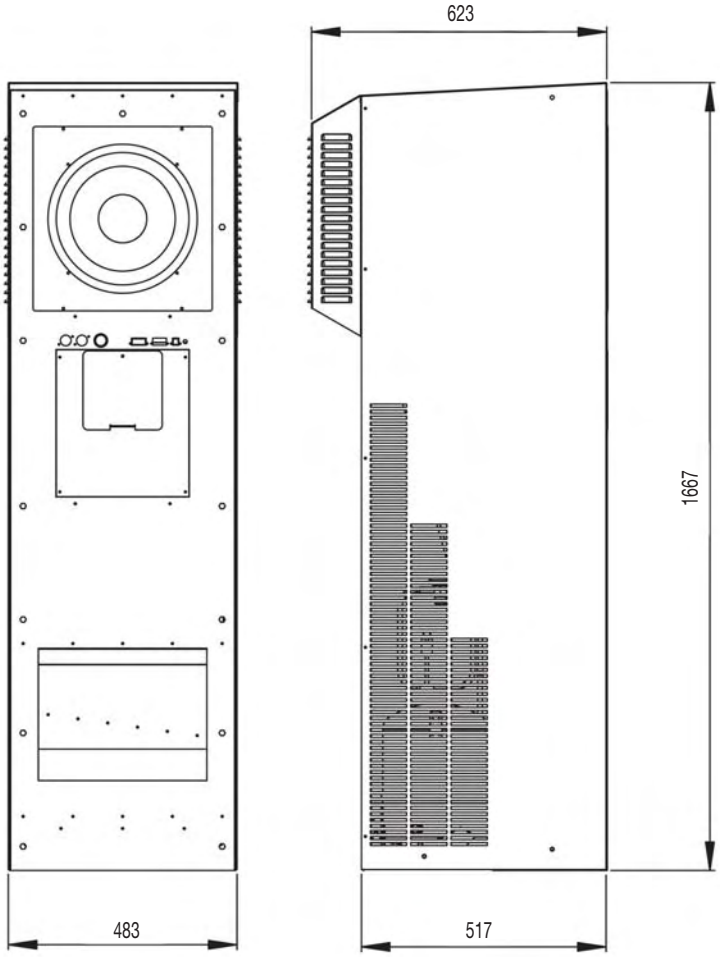
Electrical data	DTS 3661 (NEMA 3R/4)		DTS 3681 (NEMA 4/4X)	
Rated voltage [3])	400 V	460 V	400 V	460 V
Rated frequency	50 Hz	60 Hz	50 Hz	60 Hz
Voltage range	360 V...440 V	416V...506 V	360 V...440 V	416V...506 V
Power consumption	2275 W	2920 W	2275 W	2920 W
Current consumption	6,3 A		6,3 A	
Starting current	25 A		25 A	
Type of connection	terminal			

[3]) other voltages on request

Supplementary data	DTS 3661 (NEMA 3R/4)	DTS 3681 (NEMA 4/4X)
Height	1667 mm	
Width	483 mm	
Depth	623 mm	
Weight (without packaging)	108 kg	109 kg
Orientation	side or vertical	
Unit construction	sheet steel	304 stainless steel
Corrosion protection	galvanized / electrostatically powder-coated (200 °C)	304 stainless steel
System of protection	NEMA 3R/4 against the enclosure, NEMA 1 for external circuit, when used as recommended	NEMA 4/4X against the enclosure, NEMA 1 for external circuit, when used as recommended
Standard scope of supply	ready for connection to mains with power cable with fault and door contact line, operating instructions, sealing material, technical datasheet, installation kit with plug-in connector, PVC-tube for condensate drain	
Approvals	see overview cooling units / approvals	

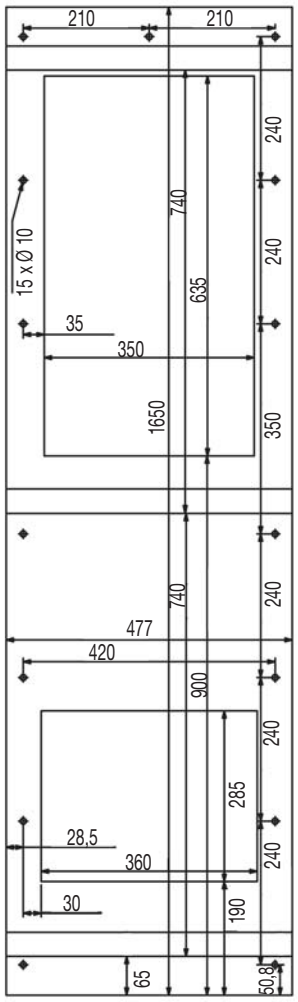
Mechanical data:

DTS 36xx NEMA 3R/4X

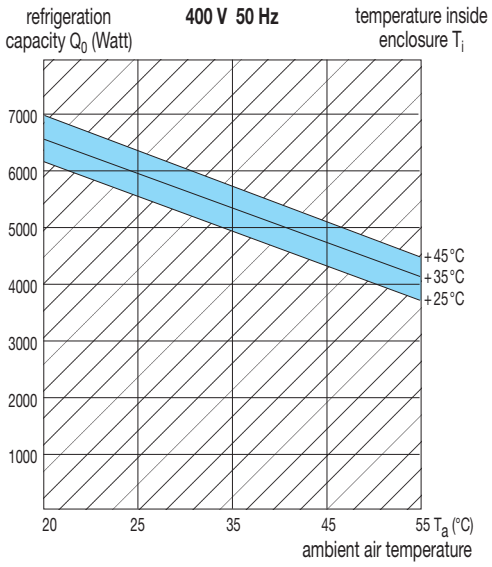


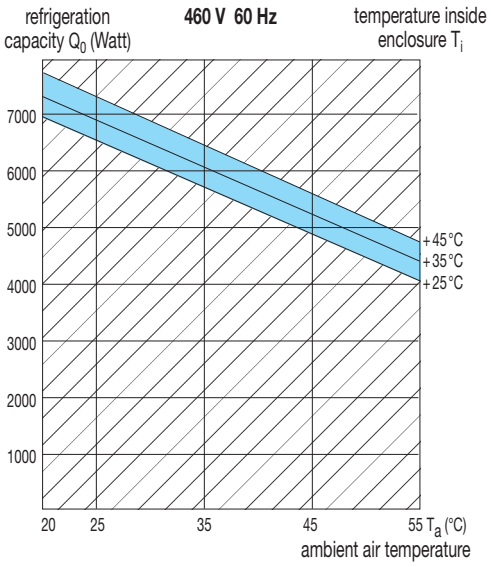
Installation cutout

DTS 36xx NEMA 3R/4X



Characteristic curves: DTS 3661 and DTS 3681 – Effective refrigeration capacity





Outdoor cooling units
DTS 3561 / DTS 3581, 4000 W
NEMA 3R/4, NEMA 4/4X version

- high degree of protection IP 56
- condenser protected against aggressive operating conditions
- high-capacity performance in compact design
- available in stainless steel
- maintenance-free
- suitable for food industry and outdoor applications
- integrated condensate evaporation


Side-mounted installation

System of protection

NEMA System of protection

DTS 3581

Standard Controller

Integrated condensate evaporation

Refrigeration data	DTS 3561 (NEMA 3R/4)		DTS 3581 (NEMA 4/4X)	
Cooling capacity at A35/A35[1])	4000 W	4400 W	4000 W	4400 W
Cooling capacity at A50/A35[1])	3100 W	3500 W	3100 W	3500 W
Type of refrigerant	R134a			
Amount of refrigerant	1200 g			
Thermostat setting	adjustable within a range of + 25 °C (+ 77 °F) to 45 °C (+ 113 °F), factory-set at 35 °C (+ 95 °F)			
Hysteresis	4K			
Air volume [2]), external circuit	2130 m³/h	2380 m³/h	2130 m³/h	2380 m³/h
Air volume [2]), internal circuit	1200 m³/h	1340 m³/h	1200 m³/h	1340 m³/h
Noise level	72 dB (A)			
Duty cycle	100%			
Condensate discharge	integrated condensate management			

[1]) Refrigeration capacity according to EN 814 [2]) free-flow

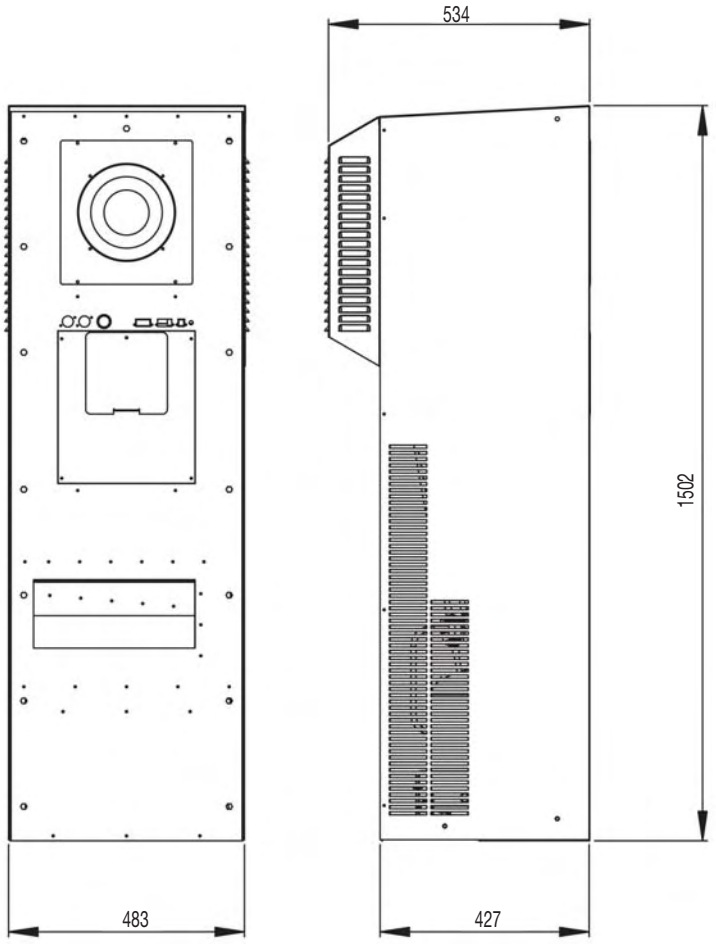
Electrical data	DTS 3561 (NEMA 3R/4)		DTS 3581 (NEMA 4/4X)	
Rated voltage [3])	400 V	460 V	400 V	460 V
Rated frequency	50 Hz	60 Hz	50 Hz	60 Hz
Voltage range	360 V...440 V	416 V...506 V	360 V...440 V	416 V...506 V
Power consumption	1365 W	1815 W	1365 W	1815 W
Current consumption	4,4 A		4,4 A	
Starting current	16 A		16 A	
Type of connection	terminal			

[3]) other voltages on request

Supplementary data	DTS 3561 (NEMA 3R/4)	DTS 3581 (NEMA 4/4X)
Height	1502 mm	
Width	483 mm	
Depth	534 mm	
Weight (without packaging)	104 kg	105 kg
Orientation	side or vertical	
Unit construction	sheet steel	304 stainless steel
Corrosion protection	galvanized / electrostatically powder-coated (200 °C)	304 stainless steel
System of protection	NEMA 3R/4 against the enclosure, NEMA 1 for external circuit, when used as recommended	NEMA 4/4X against the enclosure, NEMA 1 for external circuit, when used as recommended
Standard scope of supply	ready for connection to mains with power cable with fault and door contact line, operating instructions, sealing material, technical datasheet, installation kit with plug-in connector, PVC-tube for condensate drain	
Approvals	see overview cooling units / approvals	

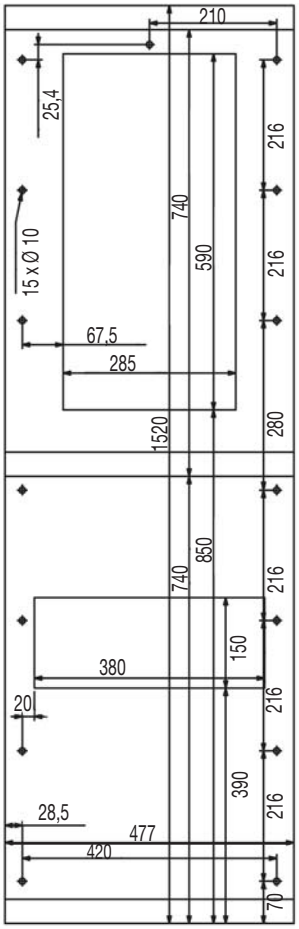
Mechanical data:

DTS 35xx NEMA 3R/4X

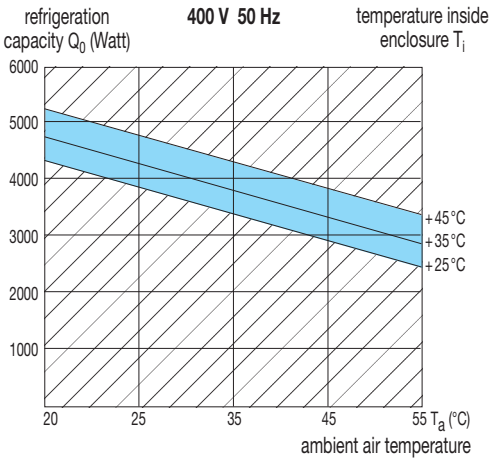


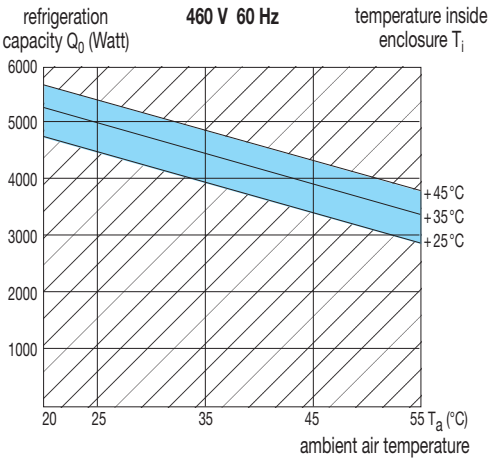
Installation cutout

DTS 35xx NEMA 3R/4X



Characteristic curves: DTS 3561 and DTS 3581 – Effective refrigeration capacity





Outdoor cooling units
DTS 3361 / DTS 3381, 2800 W
NEMA 3R/4, NEMA 4/4X version

- high degree of protection IP 56
- condenser protected against aggressive operating conditions
- high-capacity performance in compact design
- available in stainless steel
- maintenance-free
- suitable for food industry and outdoor applications
- integrated condensate evaporation


Side-mounted installation

System of protection

NEMA System of protection

DTS 3381

Standard Controller

Integrated condensate evaporation

Refrigeration data	DTS 3361 (NEMA 3R/4)		DTS 3381 (NEMA 4/4X)	
Cooling capacity at A35/A35[1])	2800 W	3000 W	2800 W	3000 W
Cooling capacity at A50/A35[1])	1900 W	2100 W	1900 W	2100 W
Type of refrigerant	R134a			
Amount of refrigerant	1000 g			
Thermostat setting	adjustable within a range of + 25 °C (+ 77 °F) to 45 °C (+ 113 °F), factory-set at 35 °C (+ 95 °F)			
Hysteresis	4K			
Air volume [2]), external circuit	1435 m³/h	1685 m³/h	1435 m³/h	1685 m³/h
Air volume [2]), internal circuit	1200 m³/h	1340 m³/h	1200 m³/h	1340 m³/h
Noise level	73 dB (A)			
Duty cycle	100%			
Condensate discharge	integrated condensate management			

[1]) Refrigeration capacity according to EN 814 [2]) free-flow

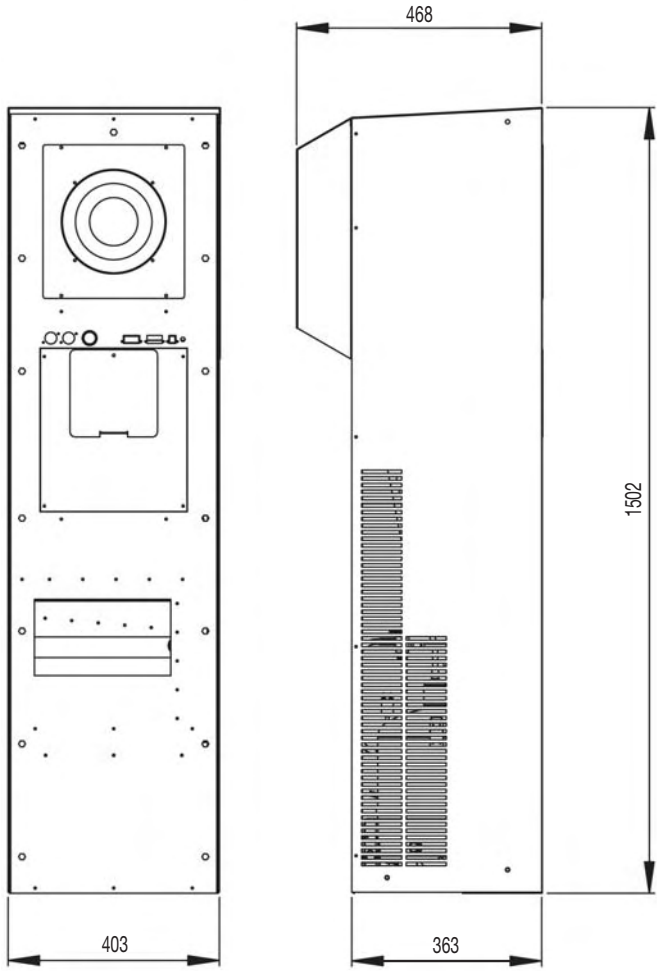
Electrical data	DTS 3361 (NEMA 3R/4)		DTS 3381 (NEMA 4/4X)	
Rated voltage [3])	400 V	460 V	400 V	460 V
Rated frequency	50 Hz	60 Hz	50 Hz	60 Hz
Voltage range	360 V...440 V	416 V...506 V	360 V...440 V	416 V...506 V
Power consumption	1400 W	1800 W	1400 W	1800 W
Current consumption	3,6 A		3,6 A	
Starting current	16 A		16 A	
Type of connection	terminal			

[3]) other voltages on request

Supplementary data	DTS 3361 (NEMA 3R/4)	DTS 3381 (NEMA 4/4X)
Height	1502 mm	
Width	403 mm	
Depth	468 mm	
Weight (without packaging)	100 kg	101 kg
Orientation	side or vertical	
Unit construction	sheet steel	304 stainless steel
Corrosion protection	galvanized / electrostatically powder-coated (200 °C)	304 stainless steel
System of protection	NEMA 3R/4 against the enclosure, NEMA 1 for external circuit, when used as recommended	NEMA 4/4X against the enclosure, NEMA 1 for external circuit, when used as recommended
Standard scope of supply	ready for connection to mains with power cable with fault and door contact line, operating instructions, sealing material, technical datasheet, installation kit with plug-in connector, PVC-tube for condensate drain	
Approvals	see overview cooling units / approvals	

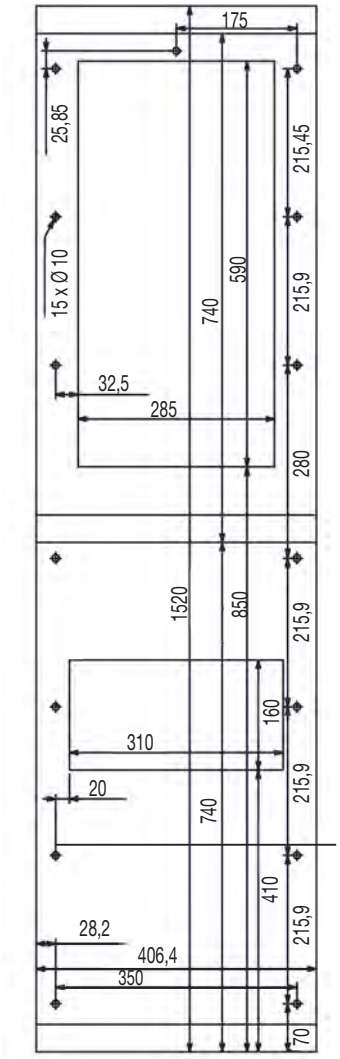
Mechanical data:

DTS 33xx NEMA 3R/4X

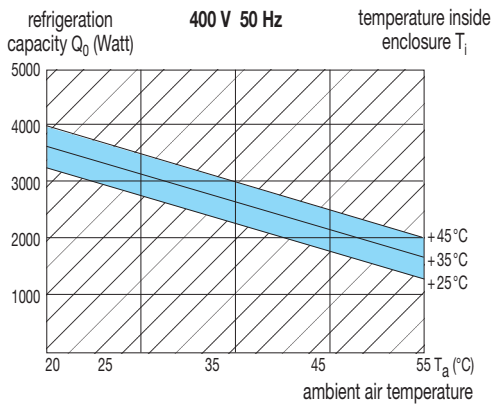


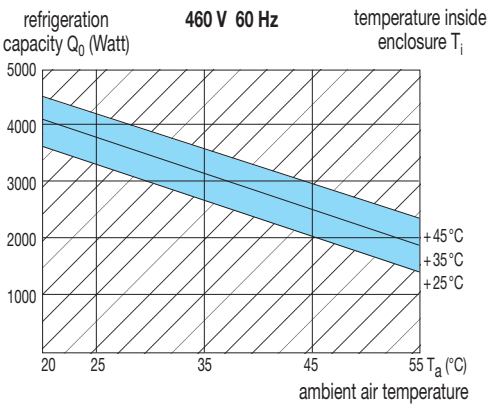
Installation cutout

DTS 33xx NEMA 3R/4X



Characteristic curves: DTS 3361 and DTS 3381 – Effective refrigeration capacity





Outdoor cooling units
DTS 3261 / DTS 3281, 2000 W
NEMA 3R/4, NEMA 4/4X version

- high degree of protection IP 56
- condenser protected against aggressive operating conditions
- high-capacity performance in compact design
- available in stainless steel
- maintenance-free
- suitable for food industry and outdoor applications
- integrated condensate evaporation


Side-mounted installation

System of protection

NEMA System of protection

DTS 3281

Standard Controller

Integrated condensate evaporation

Refrigeration data	DTS 3261 (NEMA 3R/4) / DTS 3281 (NEMA 4/4X)
Cooling capacity at A35/A35[1])	2000 W
Cooling capacity at A50/A35[1])	1850 W
Type of refrigerant	R134a
Amount of refrigerant	700 g
Thermostat setting	adjustable within a range of + 25 °C (+ 77 °F) to 45 °C (+ 113 °F), factory-set at 35 °C (+ 95 °F)
Hysteresis	4K
Air volume [2]), external circuit	765 m³/h
Air volume [2]), internal circuit	765 m³/h
Duty cycle	100%
Condensate discharge	integrated condensate management

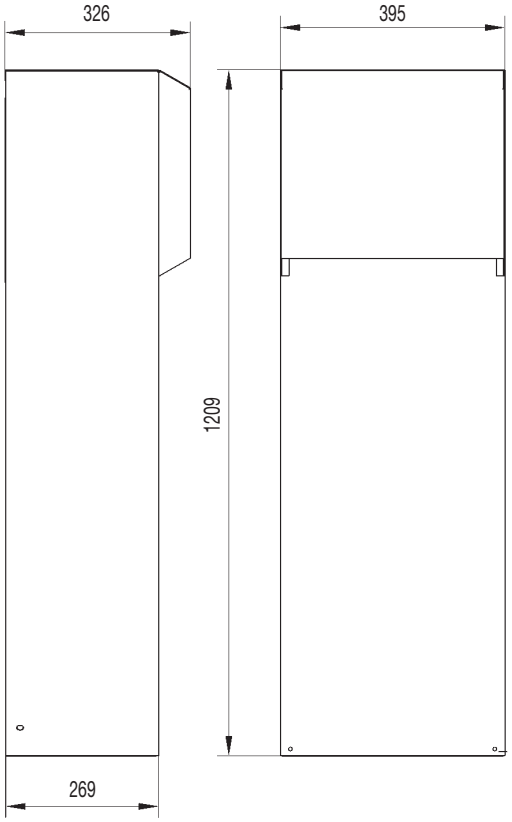
[1]) Refrigeration capacity according to EN 814 [2]) free-flow

Electrical data	DTS 3261 (NEMA 3R/4)			DTS 3281 (NEMA 4/4X)		
Rated voltage	115 V	230 V	400 V / 460 V	115 V	230 V	400 V / 460 V
Rated frequency	60 Hz	50/60 Hz	50/60 Hz	60 Hz	50/60 Hz	50/60 Hz
Voltage range	103 V...127 V	198 V...252 V	360 V...440 V / 404 V...506 V	103 V...127 V	198 V...252 V	360 V...440 V / 404 V...506 V
Power consumption	1680 W	1425 W	1400 W	1680 W	1425 W	1400 W
Current consumption	14,6 A	6,3 A	3,5 A	14,6 A	6,3 A	3,5 A
Starting current	53 A	21,8 A	10,0 A	53 A	21,8 A	10,0 A
Type of connection	terminal					

Supplementary data	DTS 3261 (NEMA 3R/4)		DTS 3281 (NEMA 4/4X)	
Height	1209 mm			
Width	395 mm			
Depth	326 mm			
Weight (without packaging)	56 kg	63 kg	60 kg	67 kg
Orientation	side or vertical			
Unit construction	sheet steel		304 stainless steel	
Corrosion protection	galvanized / electrostatically powder-coated (200 °C)		304 stainless steel	
System of protection	NEMA 3R/4 + NEMA 4/4X against the enclosure, when used as recommended			
Standard scope of supply	operating instructions, technical datasheet, installation kit incl. plug-in connector			
Approvals	see overview cooling units / approvals			

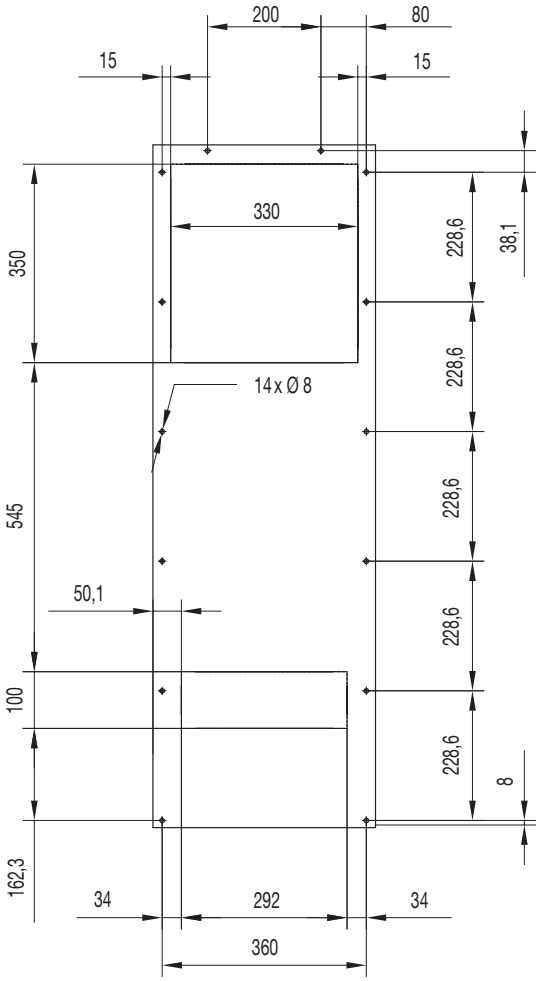
Mechanical data:

DTS 32xx NEMA 3R/4X

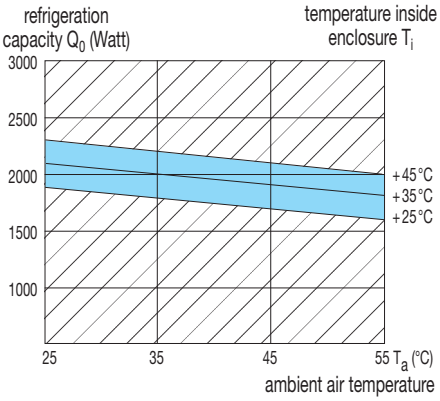


Installation cutout

DTS 32xx NEMA 3R/4X



Characteristic curves: DTS 3261 and DTS 3281 – Effective refrigeration capacity



Compact outdoor cooling units DTS 3161 / DTS 3181, 1100 W

NEMA 3R/4, NEMA 4/4X version

- high degree of protection IP 56
- condenser protected against aggressive operating conditions
- high-capacity performance in compact design
- available in stainless steel
- maintenance-free
- suitable for food industry and outdoor applications
- integrated condensate evaporation


Side-mounted installation

System of protection

NEMA System of protection

DTS 3181

Standard Controller

Integrated condensate evaporation

Refrigeration data	DTS 3161 (NEMA 3R/4)	DTS 3181 (NEMA 4/4X)
Cooling capacity at A35 / A35[1])	1100 W	
Cooling capacity at A50 / A35[1])	950 W	
Type of refrigerant	R134a	
Amount of refrigerant	400 g	
Thermostat setting	adjustable within a range of + 25 °C (+ 77 °F) to 45 °C (+ 113 °F), factory-set at 35 °C (+ 95 °F)	
Hysteresis	4K	
Air volume [2]), external circuit	595 m³/h	
Air volume [2]), internal circuit	595 m³/h	
Condensate discharge	integrated condensate management	

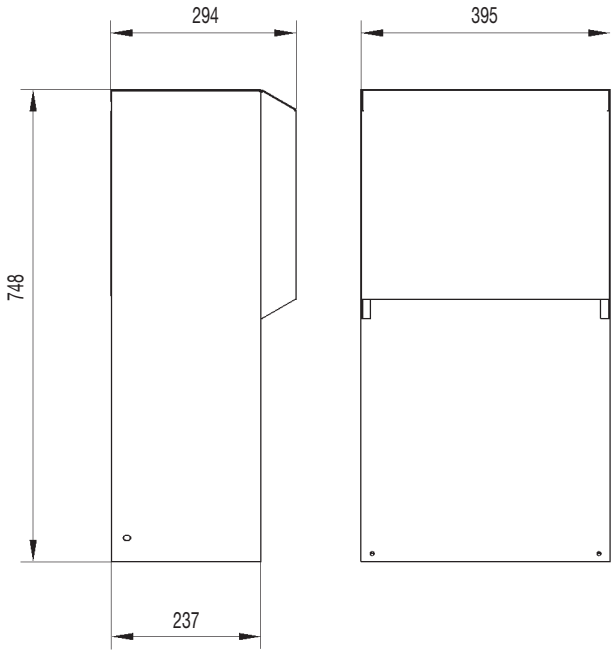
[1]) Refrigeration capacity according to EN 814 [2]) free-flow

Electrical data	DTS 3161 (NEMA 3R/4)			DTS 3181 (NEMA 4/4X)		
Rated voltage	115 V	230 V	400 V / 460 V	115 V	230 V	400 V / 460 V
Rated frequency	60 Hz	50/60 Hz	50/60 Hz	60 Hz	50/60 Hz	50/60 Hz
Voltage range	103 V... 127 V	198 V...252 V	360 V...440 V / 404 V...506 V	103 V... 127 V	198 V... 252 V	360 V...440 V / 404 V...506 V
Power consumption	712 W	712 W	760 W	712 W	712 W	760 W
Current consumption	7,9 A	3,9 A	1,9 A	7,9 A	3,9 A	1,9 A
Starting current	29,9 A	14,9 A	8,0 A	29,9 A	14,9 A	8,0 A
Type of connection	terminal					

Supplementary data	DTS 3161 (NEMA 3R/4)		DTS 3181 (NEMA 4/4X)	
Weight (without packaging)	40 kg	44 kg	42 kg	46 kg
Height x Width x Depth	748 x 395 x 294 mm			
Colour	RAL 7032 (european grey), other colours available on request			
Insulation	according to EN 60529			
Climatic data	max. ambient temperature + 55 °C			
Orientation	side or vertical			
Unit construction	sheet steel		304 stainless steel	
Corrosion protection	galvanized / electrostatically powder-coated (200 °C)		304 stainless steel	
System of protection	NEMA 3R / NEMA 4/4X against the enclosure, when used as recommended			
Standard scope of supply	operating instructions, technical datasheet, installation kit incl. plug-in connector			
Approvals	see overview cooling units / approvals			

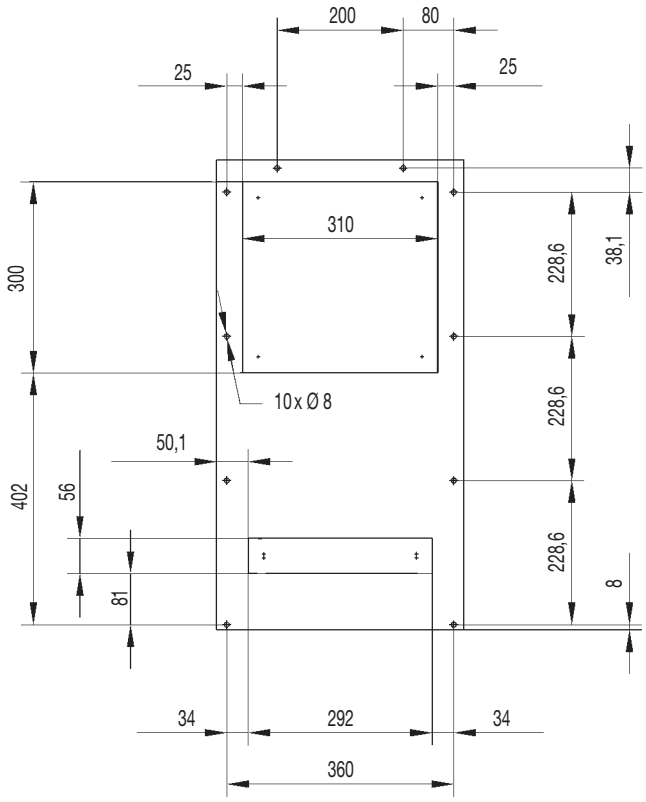
Mechanical data:

DTS 31xx NEMA 3R/4X

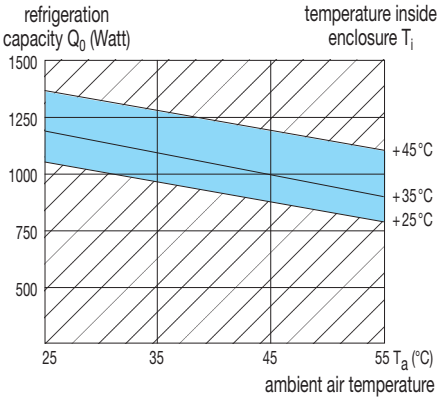


Installation cutout

DTS 31xx NEMA 3R/4X



Characteristic curves: DTS 3161 and DTS 3181 – Effective refrigeration capacity



Stainless Steel Cooling Units

- for applications where hygienic conditions and corrosion protection are essential. Our stainless steel cooling units have all your requirements
- our cooling units are particularly designed for
  – food industry
  – the hygienic packing industry and antiseptic processing
- available for nearly all units of the series 9000 and 3000

Electronic control system for cooling units

Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY

Beginning with the DT(F)I 9021, DTI / DTS 9031, DTI / DTS 9x41, DTS 7101 and DTS 7441/7541, ranges, all Pfannenberg cooling units are equipped with the new smart standard electronics. This means that you can now take advantage not only of the extremely long air passage, but also of the new standard featuring cooling unit electronics.

Take advantage of the cooling unit electronics!

More power for your machines and systems
- optimises the cooling system for your machines

Enhanced availability for your machines and systems
- e.g. early warning of excessive temperatures and automatic monitoring

More convenience
- additional functions such as test mode and start-up time lag

More safety for man and machine
- e.g. door contact feature

SC Smart *Standard-Controller* in detail

Test mode
- conducts a function test on your cooling unit function at any time

Fault diagnosis
- fault analysis indicated by LED pilot light

Temperature limits
- adjustable, supplementary alarm for maximum temperature limit

Start-up time lag
- delays restart of cooling unit, e.g. after enclosure door opened

Pfannenberg display panel

Informative LED
- differentiates between normal operation, test mode, hardware fault and application fault (e.g. shortened air supply)

Door contact feature
- deactivates the cooling unit if the enclosure door is opened

CC Optional extra: Pfannenberg *Comfort-Controller*

All standard electronic functions

Multi-Master interface
- easy to wire with two wiring connectors
- common circuit for up to 20 cooling units
- effective, rapid cooling for large-size enclosures

Coming soon

Basics for integration into bus link
- existing bus system in your facility
- expansion of service functions in your system
- telemonitoring and remote diagnosis from control room
- clarification with user in order to define both the interface (e.g. RS 232) and the protocol

MC Optional extra: Pfannenberg *Multi-Controller* – Make use of the extra benefits the Pfannenberg *Multi-Controller* has to offer:

All functions available with the Standard and Comfort-Controllers

Control panel with temperature display
- simple layout with easy-to-use controls
- inside temperature and error message displayed in event of a fault

Optical interface (optional extra)

Separate temperature probe with 3 m cable
- for monitoring temperatures in potential hotspots; also possible to optimise consumer layout if necessary

Unit parameter settings
- optimises cooling efficiency for your application

Pfannenberg control panel

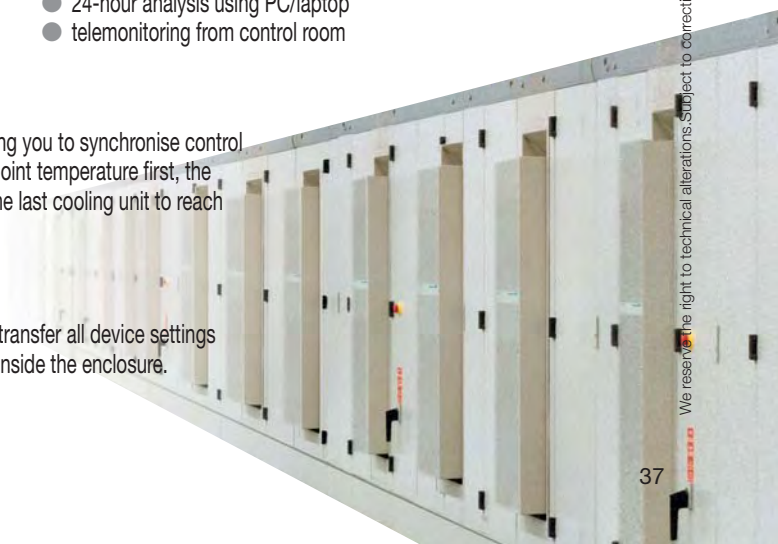
Options using optical interface
- 24-hour analysis using PC/laptop
- telemonitoring from control room

Pfannenberg Multi-Master function

Both the Comfort and Multi-Controllers each provide a Multi-Master function enabling you to synchronise control of up to 20 cooling units. Depending on which of the cooling units reaches the set point temperature first, the Multi-Master function ensures that all the other cooling units automatically cut in. The last cooling unit to reach the set point temperature ends the cooling cycle for all units.

Optical interface for Multi-Controller:

With additional software (on request) and an optical interface, you can store and/or transfer all device settings and status values. When in online mode, you can log the curve for the temperature inside the enclosure.
The optical interface is attached to the display magnetically.



Cooling units for door- and side-mounting: 2500 W, 2000 W, 1500 W, 1400 W, 1100 W and 800 W

Read about our partially recessed mounted DTI units (page 16)

- powerful radial fans ensure optimum air circulation inside the enclosure
- sealed with protective edging, no extensive work on the installation cutout necessary!
- DTS 7141, 7241 and 7341: temperature regulated by integrated thermostat
- new standard electronics for DTS 7541/7441
- DTS 7541/7441 are available as standard with special voltage 380V/400V/440V/460V/480V

Cutout compatibility


Max. clearance between air inlet and outlet


Eyebolts installation

Suitable for both 50 Hz and 60 Hz


Recessed installation

Level of protection in respect of enclosure (EN 60529)

Standard Controller for DTS 7541/7441

Optional extra

Refrigeration data	DTS 7541	DTS 7441	DTS 7341	DTS 7341 (400 V/440 V)	DTS 7241	DTS 7141
Cooling capacity (A35/A35)* Cooling capacity (A50/A35)*	2500 Watt 1800 Watt	2000 Watt 1500 Watt	1400 Watt 1200 Watt	1500 Watt 1280 Watt	1100 Watt 820 Watt	800 Watt 500 Watt
Type of refrigerant	R134a					
Amount of refrigerant	850 g	850 g	530 g	530 g	480 g / 430 g	480 g
Thermostat setting	adjustable within a range of 25 °C (+ 77 °F) to 50 °C (+ 122 °F), factory-set at 35 °C (+ 95 °F)					
Overlap	4 K					
Flow volume (actual) – Condenser airflow – Evaporator airflow	1000 m³/h 900 m³/h	1000 m³/h 850 m³/h	450 m³/h 270 m³/h	760 m³/h 560 m³/h	450 m³/h 270 m³/h	450 m³/h 270 m³/h
Duty cycle	100 %					

* Refrigeration capacity according to EN 814

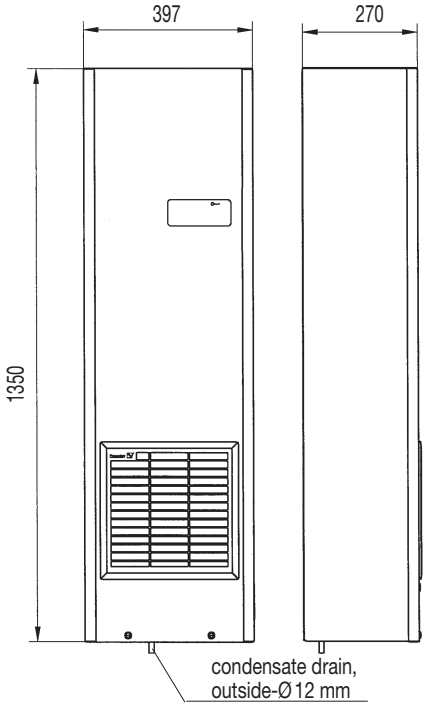
Electrical data	DTS 7541	DTS 7441	DTS 7341		DTS 7341 (400 V/440 V)	DTS 7241		DTS 7141
Rated voltage	400 V**	400 V**	230 V	115 V	400/440 V	230 V	115 V	230 V
Rated frequency	50 Hz/60 Hz	50 Hz/60 Hz	50 Hz/60 Hz	60 Hz	50/60 Hz/60 Hz	50 Hz/60 Hz	60 Hz	50 Hz/60 Hz
Voltage range	380 V... 480 V	380 V... 480 V	198 V...252 V	103 V...127 V	360 V...440 V/396 V...484 V	198 V...252 V	103 V...127 V	198 V...252 V
Power consumption (A35/A35)	1400 W	1200 W	810 W	1100 W	920 W	670 W	780 W	443 W
Current consumption (A35/A35)	3,2 A	2,8 A	4,3 A	13,4 A	2,3 A	3,0 A	7,4 A	3,66 A
Starting current	11,5 A	10,4 A	16,5 A	26,8 A	9,3 A	14,7 A	24,9 A	12,4 A
Interne Steuerspannung					230 V			

** Rated voltage can be adjusted on the device within a range of 380–420 V (50 Hz) and 440–480 V (60 Hz)

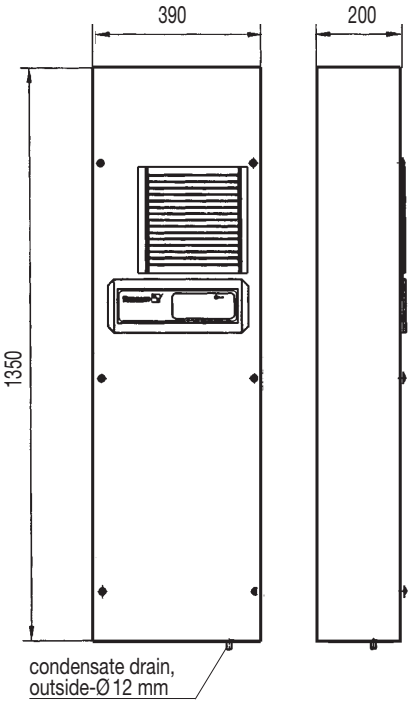
Supplementary data	DTS 7541	DTS 7441	DTS 7341	DTS 7341 (400 V/440 V)	DTS 7241	DTS 7141
Weight (without packaging)	75 kg	75 kg	58 kg	58 kg	53 kg	50 kg
Orientation	vertical, for door- or side-mounting					
Unit construction	sheet steel					
Corrosion protection	galvanized/electrostatically powder-coated (200 °C); on request: stainless steel cover					
Colour	RAL 7035, RAL 7032; other colours available on request					
Insulation	according to EN 60529					
Climatic data	max. ambient temperature + 55 °C max. relative humidity 80 %, A35/A35 (EN 814)					
System of protection	IP 54 against the enclosure (EN 60529), when used as recommended IP 34 against the ambience (EN 60529), when used as recommended					
Type of connection	spring terminal with connection for mains voltage, door contact and fault contact		2 m power cord for mains voltage and fault contact			
Standard scope of supply	sealing material, fixing material, 1 m PVC-tube for condensate drain, technical datasheet and operating instructions					
Accessories	aluminium filter PFA 3000 for DTS 7241/7341/7141, PFA 6000 for DTS 7441/7541					
Approvals	see overview cooling units / approvals					

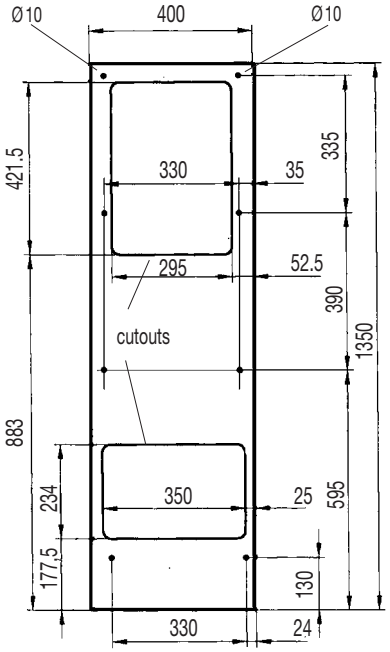
Mechanical data:

DTS 7541 + DTS 7441



DTS 7341 + DTS 7241 + DTS 7141

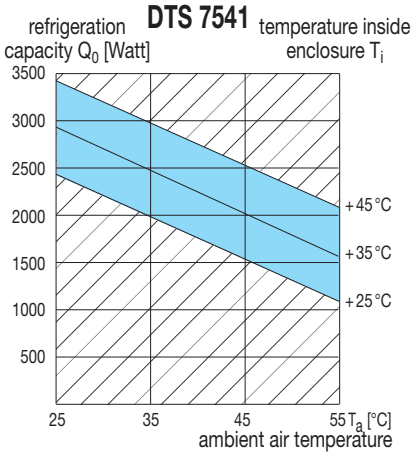


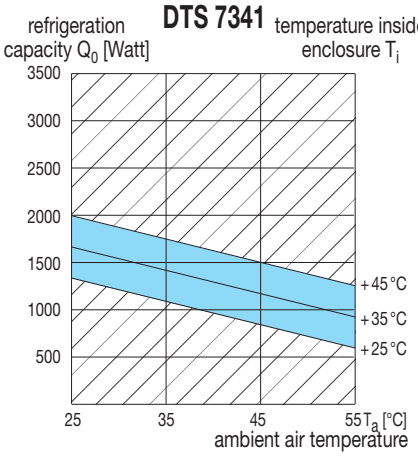


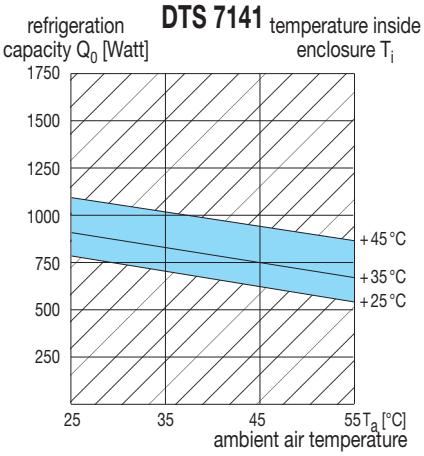
Installation cutout for all 5 units

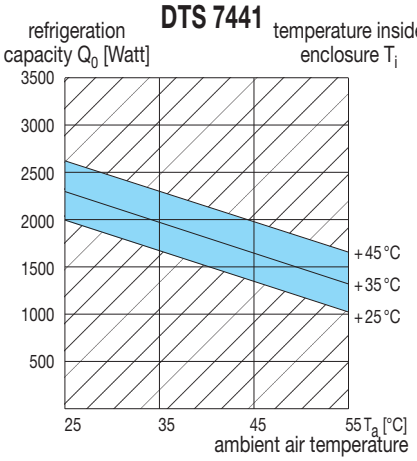
drill holes without dimension Ø8 mm

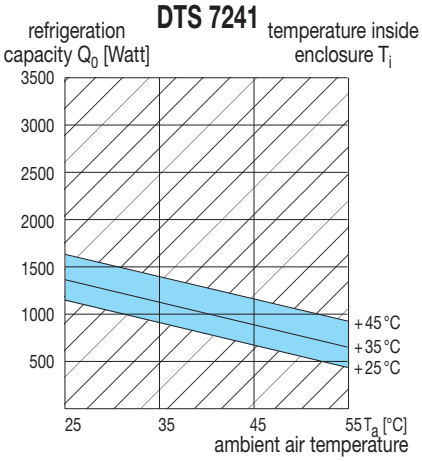
Characteristic curves: DTS 7541, DTS 7441, DTS 7341, DTS 7241 and DTS 7141 – Effective refrigeration capacity







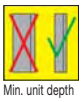




Slimline enclosure cooling units for side-mounting: 1400 W and 1100 W

- very slim design, low-profile construction; 140 mm for 1100 W and 1400 W capacity
- fitted with protective seal, no extra work on the installation cutout necessary!
- temperature regulated by integrated thermostat

Cutout compatibility


Min. unit depth


Eyebolts installation

Suitable for both 50 Hz and 60 Hz


Recessed mounting with built-in frame DTZ xxx possible

Level of protection in respect of enclosure (EN 60529)

Optional extra

Refrigeration data	DTS 7301	DTS 7201
Cooling capacity (A35/A35)*	1400 Watt	1100 Watt
Cooling capacity (A50/A35)*	1200 Watt	820 Watt
Type of refrigerant	R134a	
Amount of refrigerant	400 V: 650 g / 230 V: 580 g	480 g
Thermostat setting	adjustable within a range of + 25 °C (+ 77 °F) to 45 °C (+ 113 °F), factory-set at 35 °C (+ 95 °F)	
Overlap	4 K	
Flow volume (actual) – Condenser airflow – Evaporator airflow	 450 m³/h 270 m³/h	
Duty cycle	100 %	

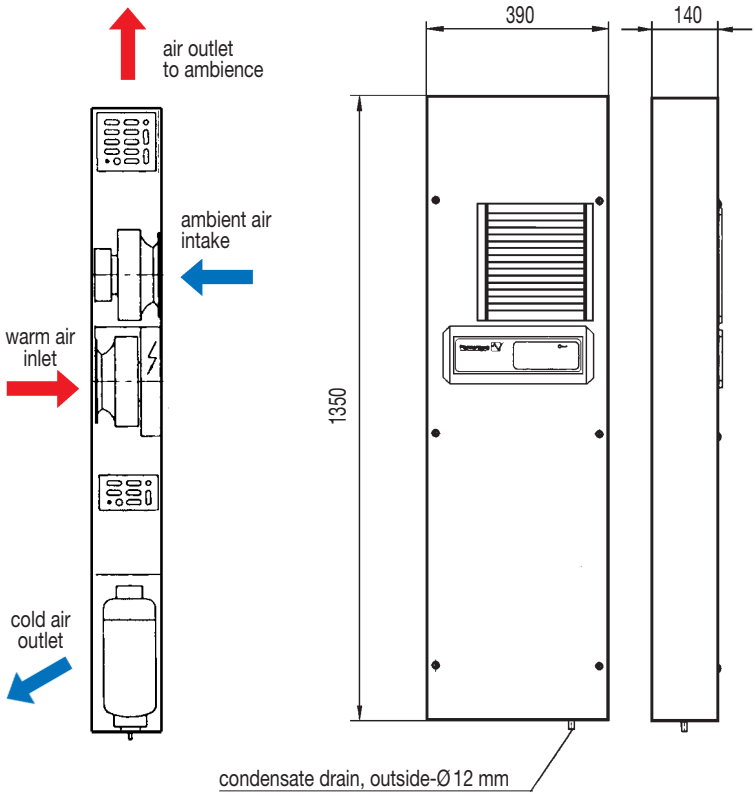
* Refrigeration capacity according to EN 814

Electrical data	DTS 7301			DTS 7201	
Rated voltage	400 V	230 V		230 V	
Rated frequency	50 Hz	50 Hz	60 Hz	50 Hz	60 Hz
Voltage range	360 V ... 440 V	198 V ... 252 V		198 V ... 252 V	
Power consumption (A35/A35)	1020 Watt	700 Watt	800 Watt	570 Watt	650 Watt
Current consumption (A35/A35)	1,5 A	3,4 A	4,3 A	2,9 A	2,7 A
Starting current	8,5 A	14,4 A	16 A	13,5 A	14,4 A
Internal control voltage	230 V				

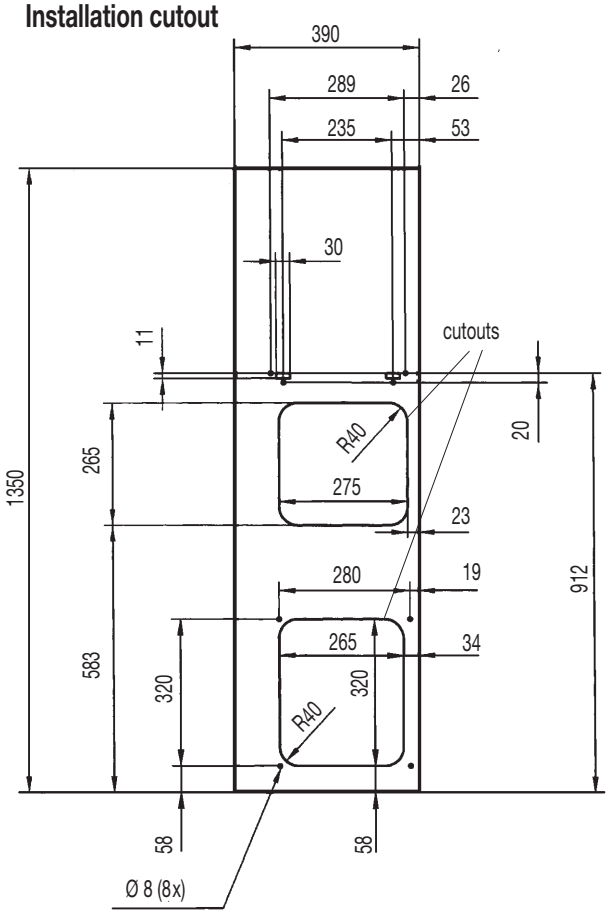
Supplementary data	DTS 7301	DTS 7201
Weight (without packaging)	43 kg	41 kg
Orientation	vertical	
Unit construction	sheet steel	
Corrosion protection	galvanized/electrostatically powder-coated (200 °C); on request: stainless steel cover	
Colour	RAL 7035, RAL 7032; other colours available on request	
Insulation	according to EN 60529	
Climatic data	max. ambient temperature + 55 °C max. relative humidity 80 %, A35/A35 (EN 814)	
System of protection	IP 54 against the enclosure (EN 60529), when used as recommended IP 34 against the ambience (EN 60529), when used as recommended	
Standard scope of supply	ready for connection to mains with 2 m power cable with fault contact line, sealing material, fixing material, 1 m PVC-tube for condensate drain, technical datasheet and operating instructions	
Accessories	built-in frame DTZ 080 up to DTZ 140 aluminium filter PFA 3000 for DTS 7201, 7301	
Approvals	see overview cooling units / approvals	

Mechanical data:

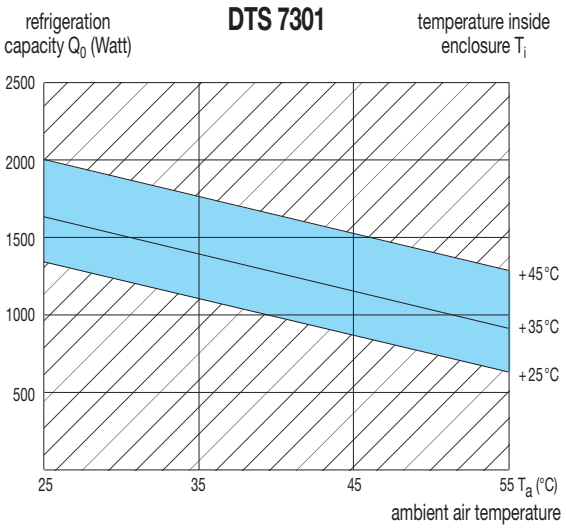
DTS 7301 and DTS 7201

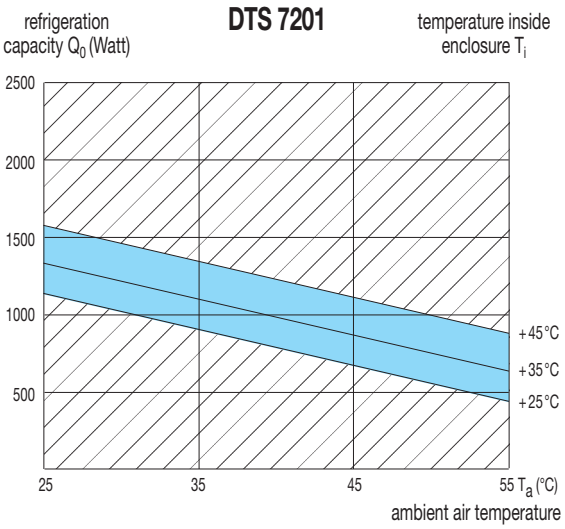


Installation cutout



Characteristic curves: DTS 7301 and DTS 7201 – Effective refrigeration capacity





Enclosure cooling units for side-mounting: 820 W and 470 W

- sealed with protective edging, no extensive work on the installation cutout necessary!
- recessed installation possible for DTS 7001 using our DTZ210 built-in frame
- temperature regulated by integrated thermostat
- new standard electronics for DTS 7101 (see page 37)


Max. clearance between air inlet and outlet


Eyebolts installation

Suitable for both 50 Hz and 60 Hz


Recessed mounting with built-in frame DTZ 210 possible (DTS 7001)

Level of protection in respect of enclosure (EN 60529)

Optional extra: DTS 7101

Optional extra

Refrigeration data	DTS 7101	DTS 7001
Cooling capacity (A35/A35)*	820 Watt	470 Watt
Cooling capacity (A50/A35)*	635 Watt	270 Watt / 260 Watt
Type of refrigerant	R134a	
Amount of refrigerant	480 g	280 g
Thermostat setting	adjustable within a range of 25 °C (+ 77 °F) to 50 °C (+ 122 °F), factory-set at 35 °C (+ 95 °F)	
Overlap	4 K	
Flow volume (actual) – Condenser airflow – Evaporator airflow	 370 m³/h / 580 m³/h 270 m³/h / 450 m³/h	 270 m³/h 150 m³/h
Duty cycle	100 %	

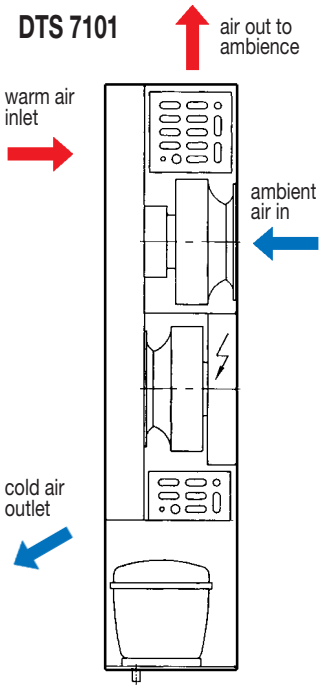
* Refrigeration capacity according to EN 814

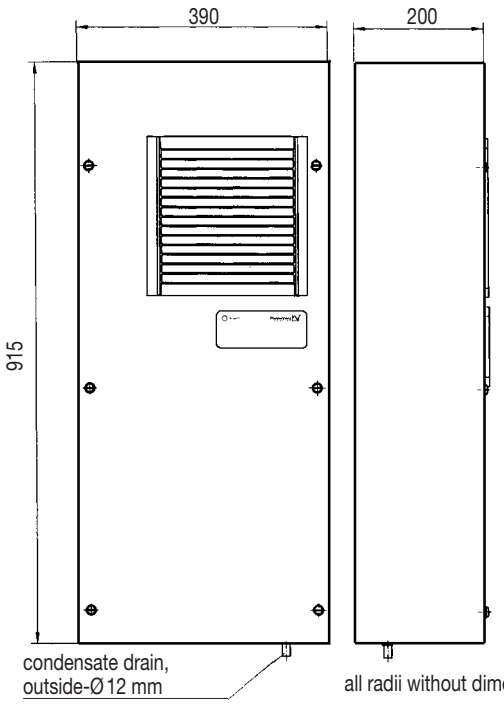
Electrical data	DTS 7101		DTS 7001	
Rated voltage	230 V	115 V	230 V	115 V
Rated frequency	50 Hz/60 Hz	60 Hz	50 Hz/60 Hz	60 Hz
Voltage range	198 V... 252 V	103 V... 127 V	198 V... 252 V	103 V... 127 V
Power consumption (A35/A35)	520 Watt/610 Watt	590 Watt	350 Watt/430 Watt	295 Watt
Current consumption (A35/A35)	2,9 A/2,5 A	6,7 A	2,2 A/2,1 A	4,2 A
Starting current	8,2 A/9,8 A	17,5 A	6,9 A/7,7 A	13,8 A
Internal control voltage	230 V	115 V	230 V	115 V

Supplementary data	DTS 7101	DTS 7001
Weight (without packaging)	43 kg	26 kg
Orientation	vertical	
Unit construction	sheet steel	
Corrosion protection	galvanized/electrostatically powder-coated (200 °C); on request: stainless steel cover	
Colour	RAL 7035, RAL 7032; other colours available on request	
Insulation	according to EN 60529	
Climatic data	max. ambient temperature +55 °C max. relative humidity 80 %, A35/A35 (EN 814)	
System of protection	IP 54 against the enclosure (EN 60529), when used as recommended IP 34 against the ambience (EN 60529), when used as recommended	
Standard scope of supply	ready for connection to mains with 2 m power cable with fault contact line, sealing material, fixing material, 1 m PVC-tube for condensate drain, technical datasheet and operating instructions	
Accessories	optional extra: Multi Controller for DTS 7101 aluminium filter PFA 3000 for DTS 7101	
Approvals	see overview cooling units / approvals	

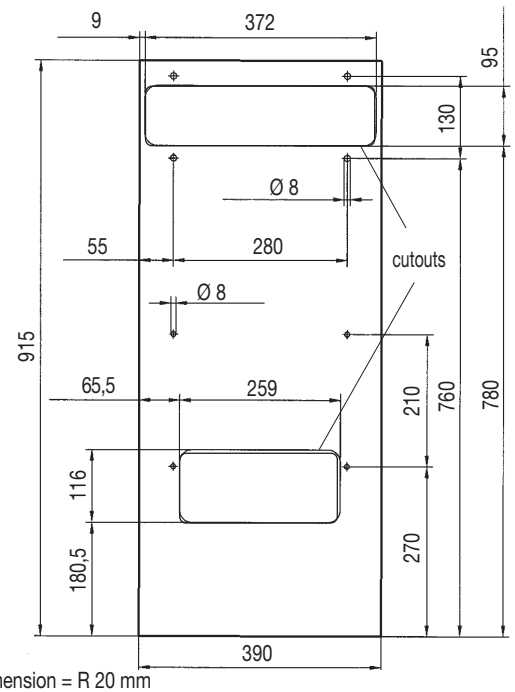
Mechanical data:

DTS 7101



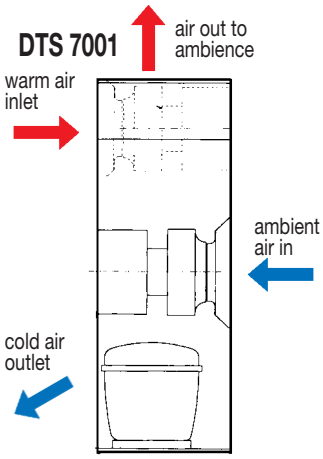


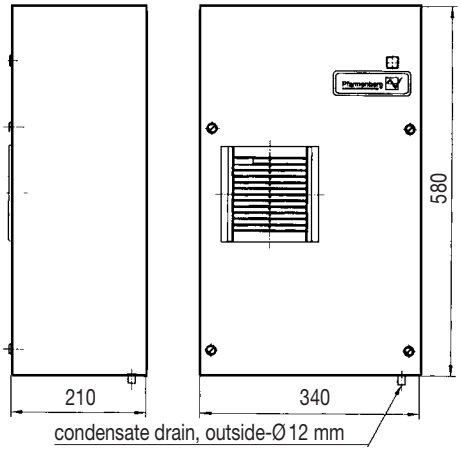
Installation cutout

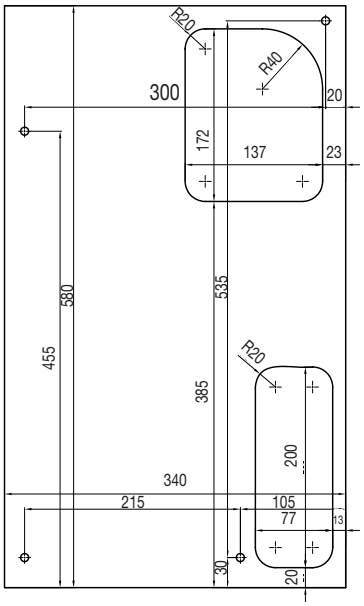


all radii without dimension = R 20 mm

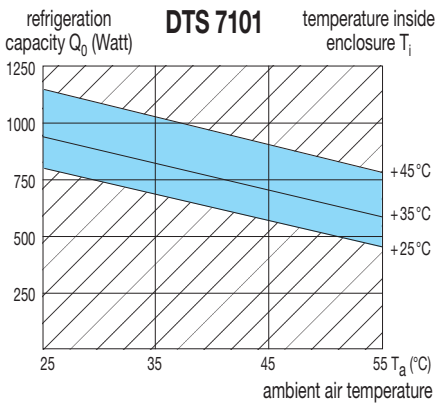
DTS 7001

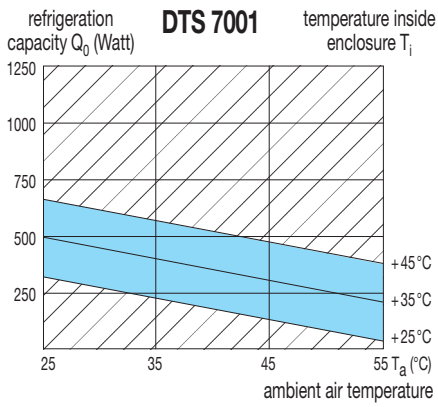






Characteristic curves: DTS 7101 and DTS 7001 – Effective refrigeration capacity





Enclosure cooling units for side- or wall-mounting: 320 W and 220 W

- compact design
- ideal for snall systems with requency converters or desk cabinets
- the installation height of the DTS 7061 model is a mere 445 mm
- temperature regulated by integrated thermostat

Max. clearance between air inlet and outlet

Suitable for both 50 Hz and 60 Hz

Level of protection in respect of enclosure (EN 60529)

Refrigeration data	DTS 7061	DTS 7041
Cooling capacity (A35/A35)*	320 Watt	220 Watt
Cooling capacity (A50/A35)*	130 Watt	95 Watt
Type of refrigerant	R134a	
Amount of refrigerant	300 g	280 g
Thermostat setting	adjustable within a range of + 25 °C (+ 77 °F) to 45 °C (+ 113 °F), factory-set at 35 °C (+ 95 °F)	
Overlap	4 K	
Flow volume (actual) – Condenser airflow – Evaporator airflow	 390 m³/h 390 m³/h	 390 m³/h 180 m³/h
Duty cycle	100 %	

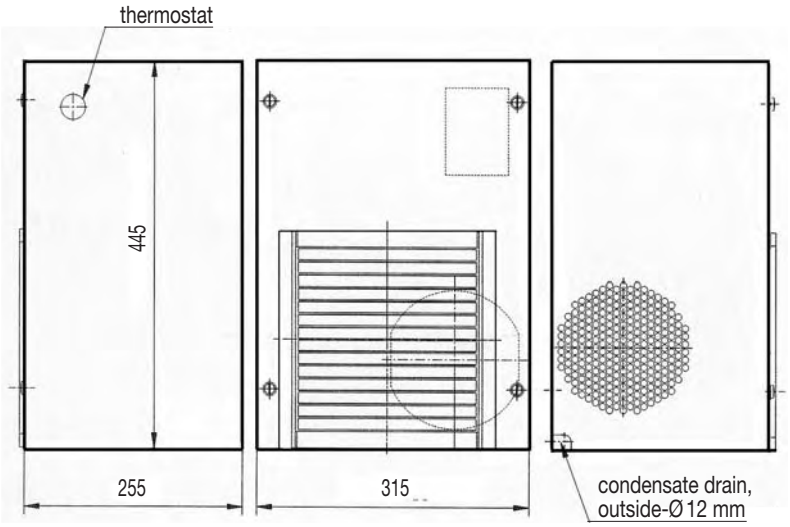
* Refrigeration capacity according to EN 814

Electrical data	DTS 7061		DTS 7041	
Rated voltage	230 V	115 V	230 V	115 V
Rated frequency	50 Hz/60 Hz	60 Hz	50 Hz/60 Hz	60 Hz
Voltage range	198 V... 252 V	103 V... 127 V	198 V... 252 V	103 V... 127 V
Power consumption (A35/A35)	230 Watt	270 Watt	200 Watt	200 Watt
Current consumption (A35/A35)	1,3 A	2,9 A	1,3 A	2,2 A
Starting current	7,4 A	13,8 A	9,5 A	15,7 A

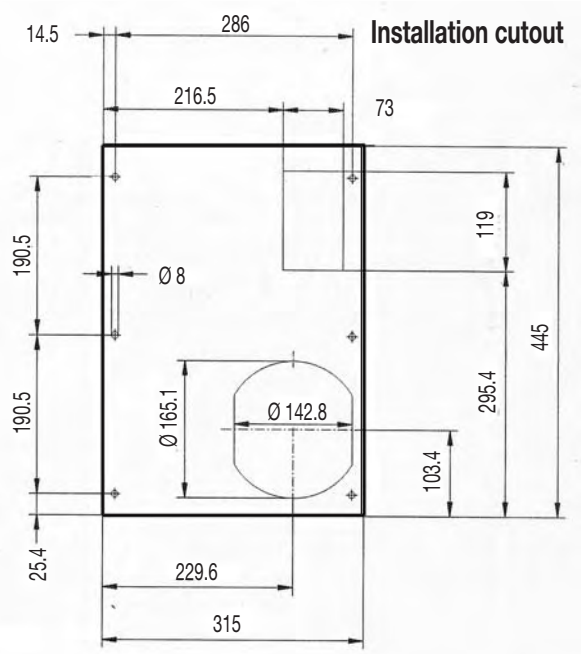
Supplementary data	DTS 7061	DTS 7041
Weight (without packaging)	23 kg	18 kg
Orientation	vertical	
Unit construction	sheet steel	
Corrosion protection	galvanized/electrostatically powder-coated (200 °C)	
Colour	RAL 7035, RAL 7032; other colours available on request	
Insulation	according to EN 60529	
Climatic data	max. ambient temperature + 55 °C max. relative humidity 80 %, A35 / A35 (EN 814)	
System of protection	IP 54 against the enclosure (EN 60529), when used as recommended IP 34 against the ambience (EN 60529), when used as recommended	
Standard scope of supply	ready for connection to mains with 2 m power cable with fault contact line, sealing material, fixing material, 1 m PVC-tube for condensate drain, technical datasheet and operating instructions	
Approvals	see overview cooling units / approvals	

Mechanical data:

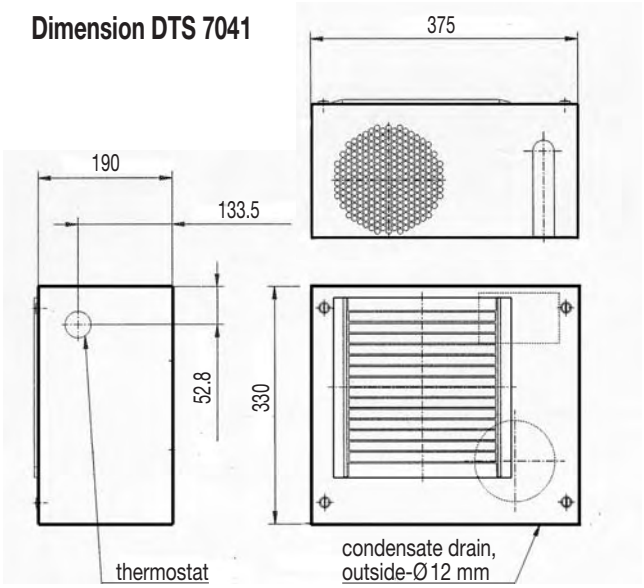
Dimension DTS 7061

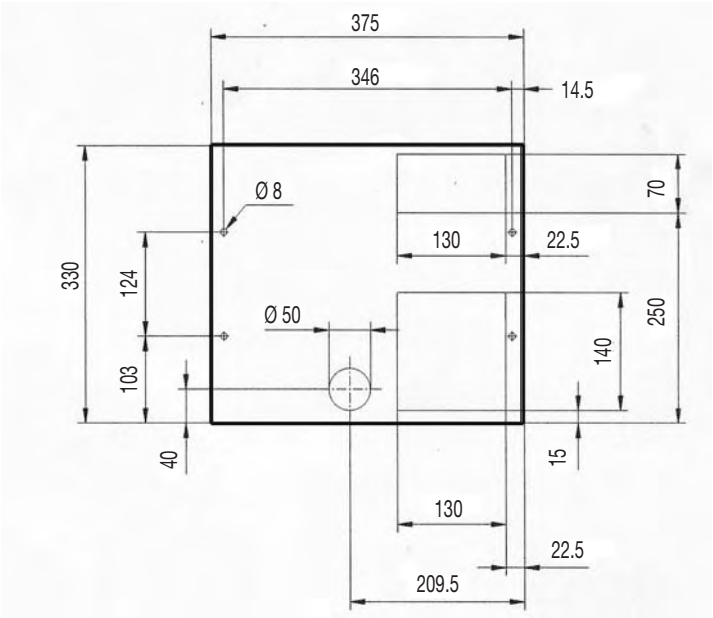


Installation cutout

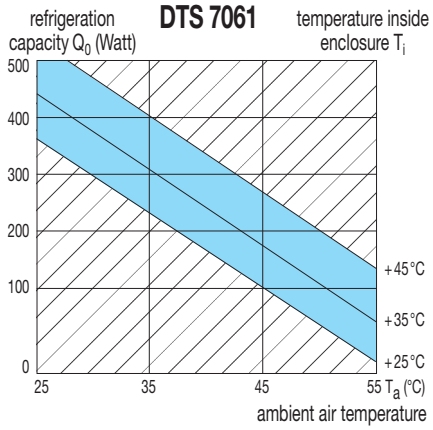


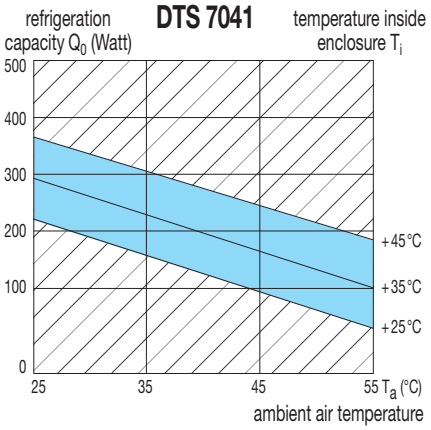
Dimension DTS 7041





Characteristic curves: DTS 7061, DTS 7041 – Effective refrigeration capacity





Cooling units for potentially explosive environments (Ex)
DTS-Ex 7x41 1400 W up to 3500 W

- cooling units for environments susceptible to gas or dust explosions as classified by categories 2G and 3G (formerly designated as zones 1 and 2)
- high degree of protection; cooling units suitable for outdoor applications
- EExP pressurised encapsulation (over pressure test- or supply devices not included)
- four levels of capacity in one single installation cutout
- stainless steel enclosure
- approval no.: TÜV 04 ATEX 2484U
- for use with overpressure encapsulated enclosures

Cutout compatibility


Side-mounted installation

System of protection

Standard Controller

Refrigeration data	DTS-Ex 7341		DTS-Ex 7541	DTS-Ex 7641	DTS-Ex 7741
Cooling capacity at A35 / A35[1])	approx. 1400 W	1500 W	approx. 2500 W	approx. 3000 W	approx. 3500 W
Cooling capacity at A50 / A35[1])	approx. 1200 W	1280 W	approx. 1800 W	approx. 2400 W	approx. 2830 W
Type of refrigerant	R134a				
Amount of refrigerant	1300 g		2000 g	2000 g	2000 g
Thermostat setting	adjustable within a range of + 25 °C (+ 77 °F) to 45 °C (+ 113 °F), factory-set at 35 °C (+ 95 °F)				
Fault display: temperature inside enclosure	> + 50 °C (+ 122 °F), factory-set				
Ambient air temperature	- 30 °C (+ 22 °F) ... + 40 °C (+ 104 °F)				
Temperature inside enclosure	+ 25 °C (+ 77 °F) ... + 45 °C (+ 113 °F)				
Air volume, external circuit	1806 m³/h				
Air volume, internal circuit	560 m³/h				
Condensate discharge	integrated condensate pump				
Noise level (1 m)	< 84 dB (A)				

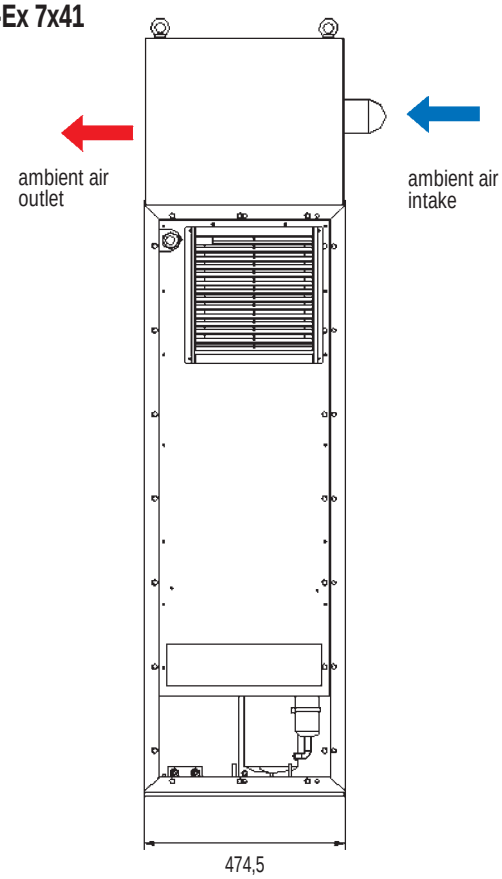
[1]) Refrigeration capacity according to EN 814

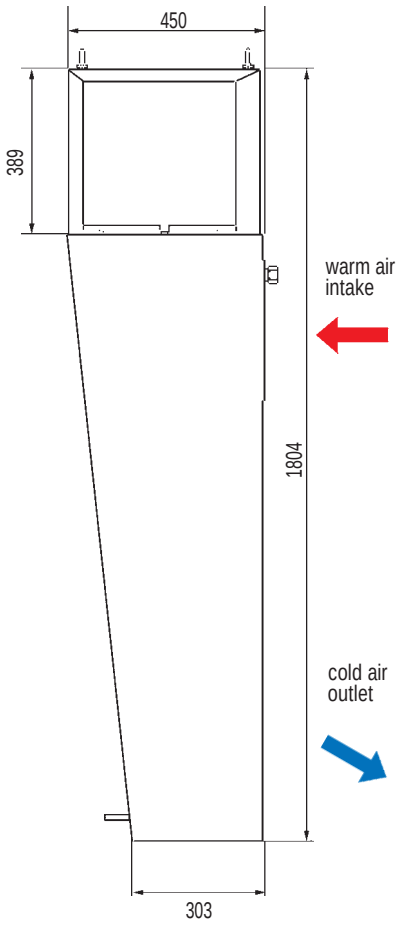
Electrical data	DTS-Ex 7341		DTS-Ex 7541		DTS-Ex 7641	DTS-Ex 7741
Rated voltage	230 V	400 V	230 V	400 V	400 V	400 V
Rated frequency	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz
Voltage range	DIN IEC 60038					
Power consumption at A35 / A35	810 W	920 W	1140 W	1410 W	1900 W	2170 W
Current consumption	4,3 A	1,75 A	5,5 A	3,2 A	4,5 A	5,2 A
Starting current	16,5 A	9,3 A	40 A	11,5 A	15 A	18,7 A

Supplementary data	DTS-Ex 7341		DTS-Ex 7541		DTS-Ex 7641	DTS-Ex 7741
Height	1804 mm					
Width	474,5 mm					
Depth	450 mm					
Weight (without packaging)	approx. 79 kg	approx. 85 kg	approx. 79 kg	approx. 89 kg	approx. 89 kg	approx. 89 kg
Orientation	vertical					
Unit construction	stainless steel, aluminium					
Connection for scavenging air	screw connection with cutting-ring for pipe Ø 22 mm with BSPP inside thread of pipe 1/2“					
System of protection	IP 65 against the enclosure (EN 60529), when used as recommended IP 55 against the ambience (EN 60529), when used as recommended					
Standard scope of supply	operating instructions, technical datasheet, installation kit incl. plug-in connector					

Mechanical data:

DTS-Ex 7x41





Explosions are a potential danger wherever flammable gases, vapours, liquids or powders can mix with oxygen or any other reactive gas. This kind of risk is present in locations, e.g. in the petrochemical and chemical industries, at tank storage facilities or on offshore oil platforms. But even facilities such as grain silos and paint workshops are susceptible to the dangers of explosions.

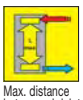
Explosions are a hazard for both man and his environment, that is why measures were implemented on an international scale. Measures designed to help in preventing explosions or minimising their impact. With the introduction of the newly developed DTS-Ex7x41 range of EExp cooling units, for the first time system solutions are now available for applications inside EEX p enclosures with pressurised encapsulation in potentially explosive areas designated as categories 2G and 3G.

It is now possible to safely use switchgear and control system components without explosion proof protection in potentially explosive environments.

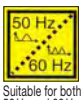
The EEX p models provide a high degree of reliability and availability for machines and systems used for complex applications in potentially explosive environments.

Enclosure cooling units for top-mounting: 3000 W

- temperature regulated by integrated thermostat
- high air volume in internal and external circulation
- sealing gasket protection against water leakage


Max. distance between air inlet and -outlet


Eyebolts installation



Suitable for both 50 Hz and 60 Hz

Level of protection in respect of enclosure (EN 60529)

Optional extra

Refrigeration data	DTD 5501
Cooling capacity (A35/A35)*	3000 Watt
Cooling capacity (A50/A35)*	2400 Watt
Type of refrigerant	R134a
Amount of refrigerant	1650 g
Thermostat setting	adjustable within a range of 25 °C to 45 °C (factory-set at 35 °C)
Overlap	4 K
Flow volume (actual) – Condenser airflow – Evaporator airflow	 1300 m³/h 720 m³/h
Noise level (3 m distance)	75 dB (A)
Duty cycle	100 %

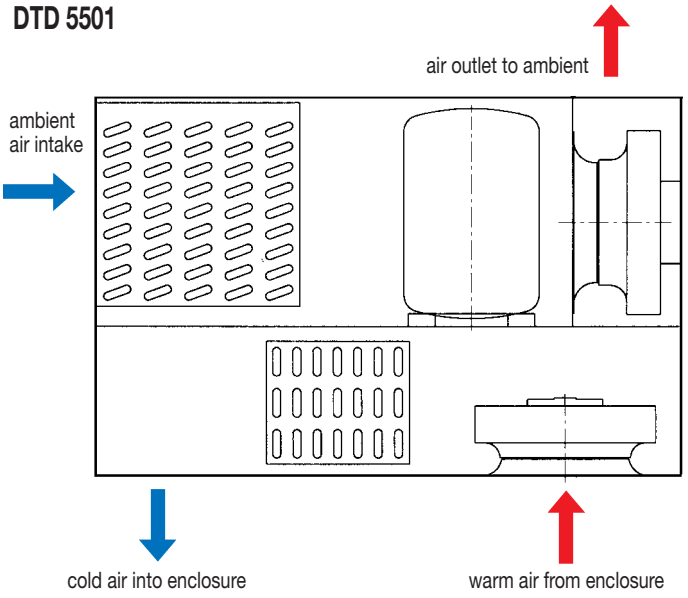
* Refrigeration capacity according to EN 814

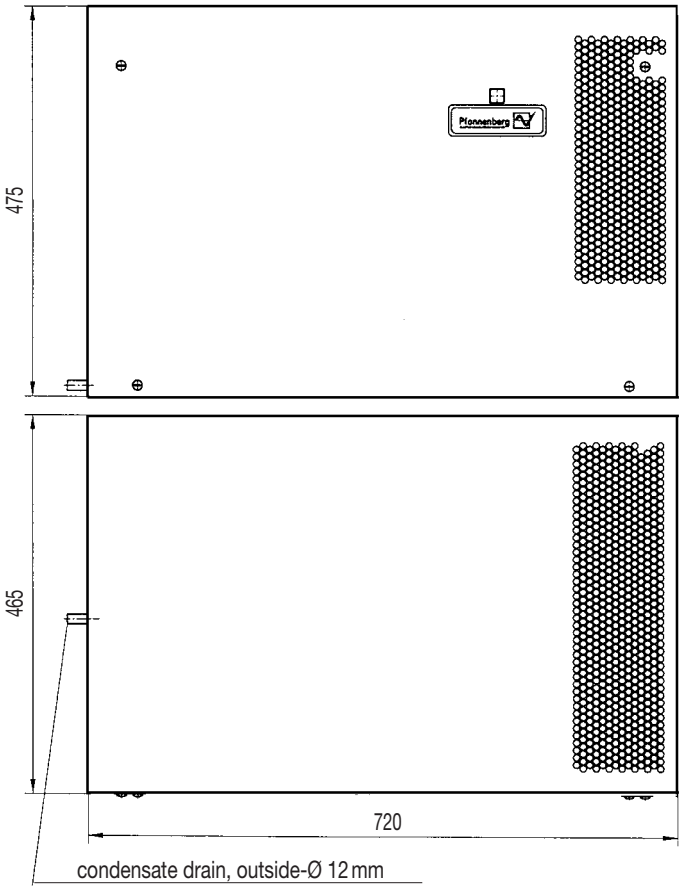
Electrical data	DTD 5501
Rated voltage	400 V / 440 V
Rated frequency	50 / 60 Hz / 60 Hz
Voltage range	360 V ... 440 V / 396 V ... 484 V
Power consumption (A35/A35)	1900 Watt
Current consumption (A35/A35)	4,5 A
Starting current	15 A
Internal control voltage	230 V

Supplementary data	DTD 5501
Weight (without packaging)	73 kg
Orientation	horizontal
Unit construction	sheet steel
Corrosion protection	galvanized / electrostatically powder-coated (200 °C)
Colour	RAL 7035, RAL 7032; other colours available on request
Insulation	according to EN 60529
Climatic data	max. ambient temperature + 55 °C max. relative humidity 80 %, A35/A35 (EN 814)
System of protection	IP 54 against the enclosure (EN 60529), when used as recommended IP 34 against the ambience (EN 60529), when used as recommended
Standard scope of supply	ready for connection to mains with 2 m power cable, sealing material, fixing material, 1 m PVC-tube for condensate drain, technical datasheet and operating instructions
Approvals	see overview cooling units / approvals

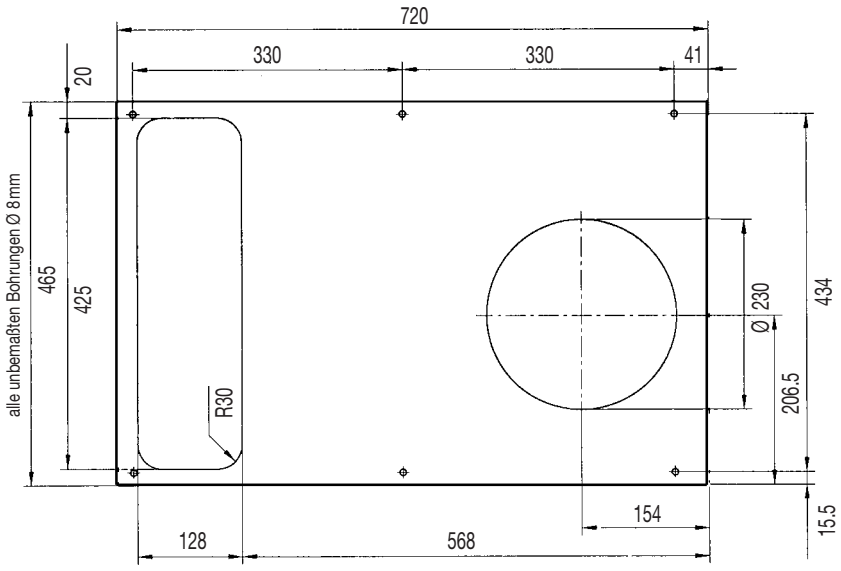
Mechanical data:

DTD 5501

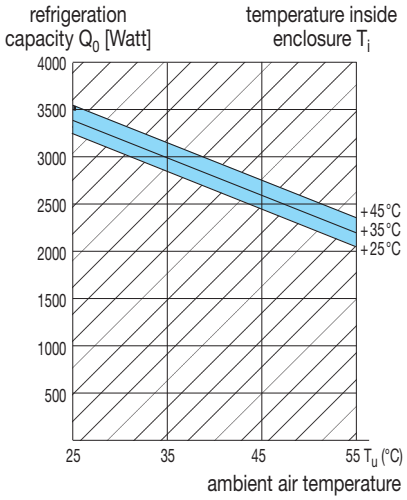




Installation cutout



Characteristic curves: DTD 5501 – Effective refrigeration capacity



Enclosure cooling units for top-mounting: 1700 W, 1150 W and 810 W

- temperature regulated by integrated thermostat
- high air volume in internal and external circulation
- sealing gasket protection against water leakage

Coutout compatibility


Max. distance between air inlet and -outlet


Eyebolts installation

Suitable for both 50 Hz and 60 Hz (not for DTD 5301/230 V)

Level of protection in respect of enclosure (EN 60529)

Optional extra

Refrigeration data	DTD 5301	DTD 5201	DTD 5101
Cooling capacity (A35/A35)* Cooling capacity (A50/A35)*	1700 Watt (1600 W/230 V; 1400 W/115 V) 1250 Watt (1200 W/230 V; 1150 W/115 V)	1150 Watt (1100 W/115 V) 850 Watt	810 Watt 650 Watt
Type of refrigerant	R134a		
Amount of refrigerant	580 g	580 g	530 g
Thermostat setting	adjustable within a range of 25 °C to 45 °C (factory-set at 35 °C)		
Overlap	4 K		
Flow volume (actual) – Condenser airflow – Evaporator airflow	 760 m³/h 500 m³/h	 760 m³/h 500 m³/h	 450 m³/h 270 m³/h
Noise level (3 m distance)	72 dB (A)	72 dB (A)	63 dB (A)
Duty cycle	100 %		

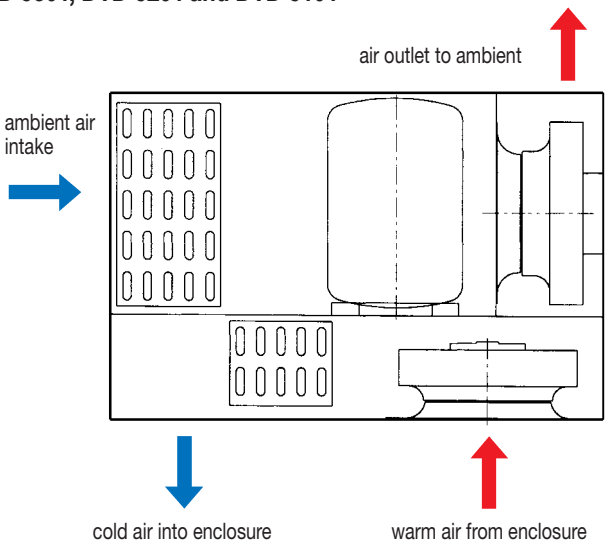
* Refrigeration capacity according to EN 814

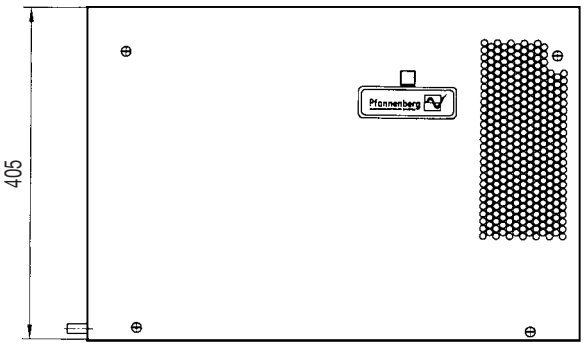
Electrical data	DTD 5301			DTD 5201			DTD 5101	
Rated voltage	400 V/440 V	230 V	115 V	230 V		115 V	230 V	115 V
Rated frequency	50/60 Hz / 60 Hz	50 Hz / 60 Hz	60 Hz	50 Hz	60 Hz	60 Hz	50 Hz/60 Hz	60 Hz
Voltage range	360 V... 440 V/ 386 V... 484 V	198 V... 252 V	104 V... 127 V	198 V... 252 V		104 V... 127 V	198 V... 252 V	104 V... 127 V
Power consumption (A35/A35)	1200 Watt	900 Watt	1200 Watt	900 Watt	840 Watt	780 Watt	560/610 Watt	610 Watt
Current consumption (A35/A35)	1,5 A	6,5 A	14,6 A	4,0 A	5,2 A	7,7 A	3,0 A	6,8 A
Starting current	9 A	19,5 A	28 A	13,7 A	18,5 A	24,9 A	9,2 A / 9,8 A	22,0 A
Internal control voltage	230 V							

Supplementary data	DTD 5301	DTD 5201	DTD 5101
Weight (without packaging)	50 kg	45 kg	40 kg
Orientation	horizontal		
Unit construction	sheet steel, stainless steel cover on request		
Corrosion protection	galvanized/electrostatically powder-coated (200 °C); on request: stainless steel cover (DTD 5301)		
Colour	RAL 7035, RAL 7032; other colours available on request		
Insulation	according to EN 60529		
Climatic data	max. ambient temperature +55 °C max. relative humidity 80 %, A35/A35 (EN 814)		
System of protection	IP 54 against the enclosure (EN 60529), when used as recommended IP 34 against the ambience (EN 60529), when used as recommended		
Standard scope of supply	ready for connection to mains with 2 m power cable, sealing material, fixing material, 1 m PVC-tube for condensate drain, technical datasheet and operating instructions		
Approvals	see overview cooling units / approvals		

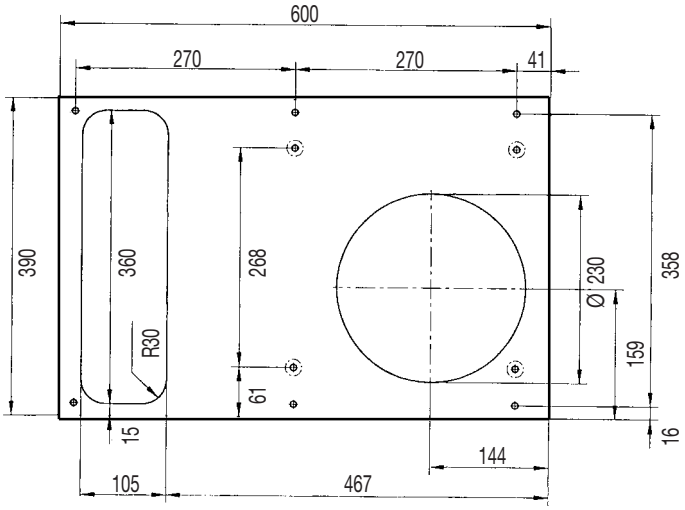
Mechanical data:

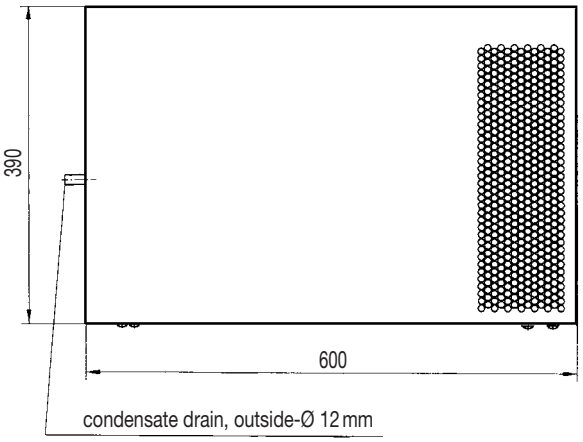
DTD 5301, DTD 5201 and DTD 5101



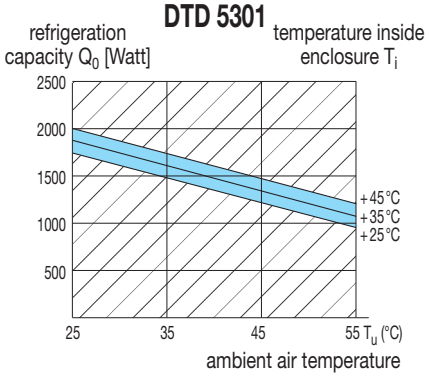


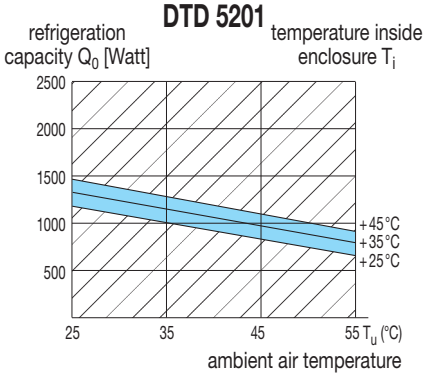
Installation cutout

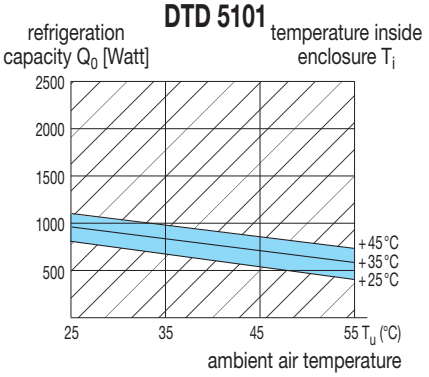




Characteristic curves: DTD 5301, DTD 5201 and DTD 5101 – Effective refrigeration capacity







Accessories for cooling units: Condensate Evaporation KV DTX

- high performance evaporation with self regulation
- easy to retrofit on any cooling unit
- **quality:** stainless steel enclosure corrosion-resistant
- **fail-safe:** without mechanical components
- **energy-saving:** automatic power adjustment
- **universal:** voltage range between 230 V – 115 V and 50/60 Hz

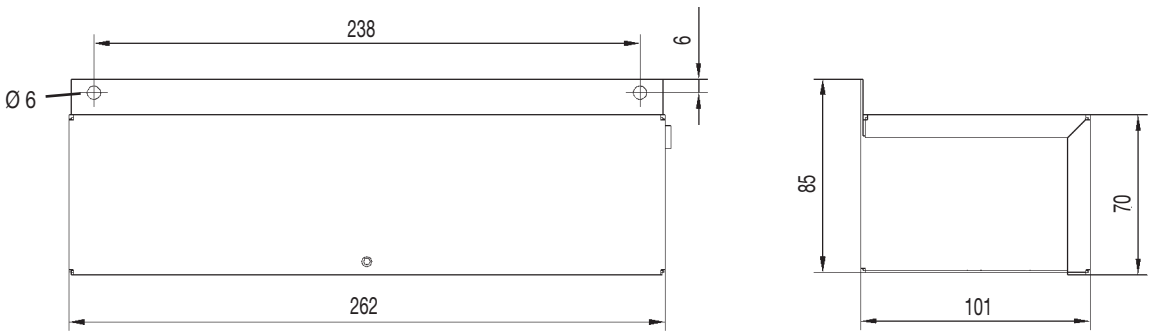
Please note that the DTx 9000 series devices (with the exception of DTx 9031) can be delivered with an integrated evaporation device already fitted.

Technical data	KV DTX
Max. condensation absorption volume	400 ml
Heating source	self adjusting heating element

Electrical data	KV DTX
Rated voltage	230 V / 115 V
Rated frequency	50/60 Hz
Voltage range	100 V ... 240 V
Power consumption	20 – 115 W
Current consumption	0,8 A (115 V) / 0,5 A (230 V)
Starting current	1,3 A

Supplementary data	KV DTX
Height	85 mm
Width	263 mm
Depth	102 mm
Weight	1,2 kg
Orientation	horizontal
Construction material	bowl stainless steel, enclosure brushed stainless steel
Assembling instruction	The condensate evaporation is installed horizontally underneath the cooling unit (minimum distance 60 mm). The condensate hose should reach minimum 20 mm into the opening of the condensate evaporation. The plastic plug to seal the mains connection must be pressed in a 20 mm in diameter drilling in the sheet metal. A drilling template is attached to the condensate evaporation. The power supply cord is provided by the customer.

Mechanical data:



Accessories for Cooling Units:

Filter mats for cooling units

Pfannenberg cooling units require a minimum of service. All our cooling units are delivered without filter mats.
If the cooling unit is intended for applications in harsh conditions you can insert filter mats into the air intake grill. Because we make use of our PFA exhaust filters, inserting, changing and cleaning filter mats is implicity itself.

Filter attachment for DTD

Special versions with filter attachment are available for our DTD 5501/5301 top-mounted cooling units.

Aluminium filter for DTS/DTI

Aluminium filters for applications in oily environments are available for our door- and side-mounted units.
Simply open the air intake grill and insert the filter. The filter is washable.
Available for

- **all standard models except DTS 7041, DTS 7061 and DTS 7001**
- **DTI 9x41 PFA**

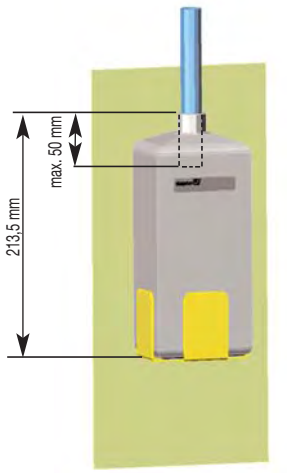
Protective edging for DTS

We use a protective edging to seal the gap between the cooling unit and the enclosure. This ensures that the edge of the cutout is not only sealed but also mechanically protected. The cutout is covered and requires no further work. We also supply the protective edging by the metre for use on cutouts for other cooling units.

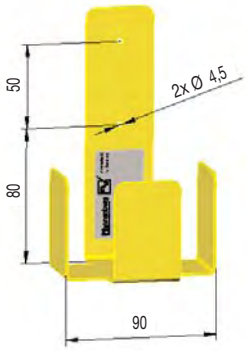
Condensate bottle KF DTX

For collecting condensate to be obtained.

- support of stainless steel
- easy installation at enclosure below the cooling unit
- max. collecting volume 1000 mll

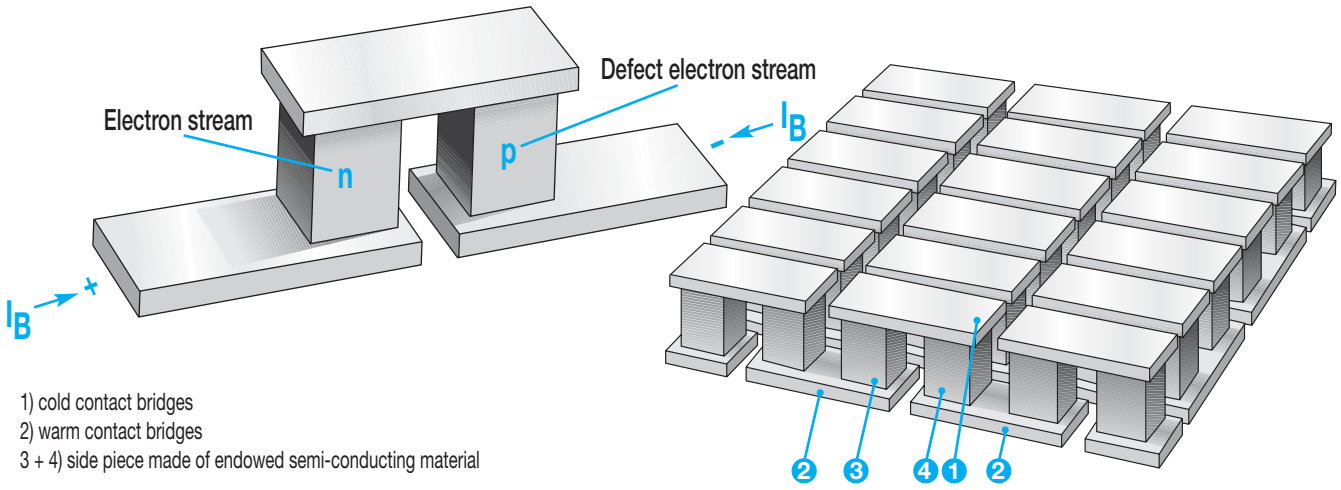


Support :



Innovative cooling concept
Peltier cooling units from Pfannenberg

Diagram representation of a Peltier unit
In order to achieve useful cooling capacity, several elements must be brought together in one Peltier cool block.



1) cold contact bridges
2) warm contact bridges
3 + 4) side piece made of endowed semi-conducting material

The Peltier effect is one of three thermo electrical effects, and describes the creation of a temperature difference by an electrical current. It occurs when two different metals (or semi-conductors) are connected with one another at two points and an electrical current flows through them. The current causes heat transfer from one junction to another, depending on the current's strength and direction. In the Peltier device this effect has a technical use.

This discovery was published by Jean Peltier already in 1834. In the 60s and 70s intensive research was made on materials with good thermo-electric characteristics. In particular the ban on coolants containing CFCs gave increased impetus to the development because, as opposed to traditional cooling, no liquids/gases are used but endowed semi-conductors.

Cooling devices which are based on Peltier technology are, as far as possible, maintenance free and have no moving parts in the actual cooling circuit which makes this very reliable and long lasting. Not forgetting the low noise level by the removal of the otherwise needed compressors.

The advantages at a glance:

- compact design, which plays a decisive roll in particular for the panel cooling area
- by pole reversal the heat current is converted, from cooling to heating
- assembly in any desired location is possible whether on the side or on the roof, there are no limitations
- use in moving units, e.g. crane systems, transportation, vehicles, or even in wind power units is possible
- no vibration due to compressor
- low noise emissions
- environmentally safe due to removal of refrigerant
- as far as possible maintenance free

Peltier cooling units are particularly suitable for the following applications:

- air conditioning of small switch cabinets, control panels or operator enclosure
- cooling moveable, mobile enclosures
- use on traffic and environment measuring technology
- cooling of vibration sensitive devices because there is no compressor to kick in

Peltier cooling units PTM: 100 W, 150 W and 500 W

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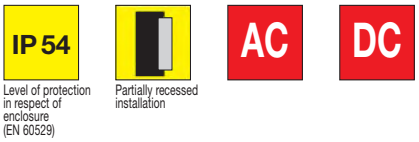
- high-capacity performance in compact design
- especially suitabe for small enclosures, like e.g. panel- and table enclosures
- suitable for any fitting position
- integrated electronic, free positioning of the temperature sensor
- temperature display
- setting of requested temperature by push button
- in each case, 3 different variants are available:
  H = horizontal installation
  T = top-mounting
  V = vertical installation
  the variants differ in the alignment of the temperature display as well as in the internal condensate pan



Level of protection in respect of enclosure (EN 60529)

Partially recessed installation

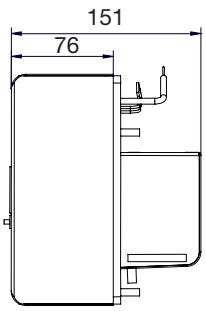
Refrigeration data:	PTM 100-H / PTM 100-V / PTM 100-T	PTM 150-H / PTM 150-V / PTM 150-T	PTM 500-H / PTM 500-V / PTM 500-T
Refrigeration capacity	100 W	150 W	500 W
Ambient air temperature	- 40 °C (- 40 °F) ... + 50 °C (+ 122 °F)	- 40 °C (- 40 °F) ... + 50 °C (+ 122 °F)	data on request
Temperature inside enclosure	0 °C (+ 32 °F) ... + 50 °C (+ 122 °F)	0 °C (+ 32 °F) ... + 50 °C (+ 122 °F)	data on request
Air volume, external circuit	156 m^3/h	234 m^3/h	data on request
Air volume, internal circuit	76 m^3/h	114 m^3/h	data on request
Condensate discharge	condensate drain		

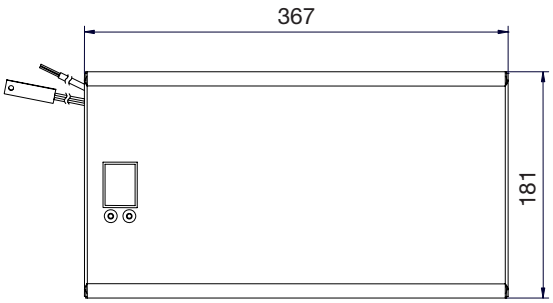
Electrical data:	PTM 100-H / PTM 100-V / PTM 100-T	PTM 150-H / PTM 150-V / PTM 150-T	PTM 500-H / PTM 500-V / PTM 500-T	
Rated voltage	24 V	24 V	220 V	24 V
Rated frequency	DC	DC	50 / 60 Hz	DC
Voltage range (according to DIN IEC 38)	21,6 V – 26,4 V	21,6 V – 26,4 V	198 V - 242 V	21,6 V – 26,4 V
Power consumption	102 W	240 W	data on request	
Current consumption	6 A	16 A	data on request	
Starting current	5,15 A	12,4 A	data on request	
Power supply cable	terminal block, max. 2,5 mm^2 / AWG 16			
Sensor cable	1200 mm (length outside of device)			

Supplementary data:	PTM 100-H	PTM 100-V	PTM 100-T	PTM 150-H	PTM 150-V	PTM 150-T	PTM 500-H / PTM 500-V / PTM 500-T
Height	181 mm	367 mm	181 mm	181 mm	495 mm	181 mm	data on request
Width	367 mm	181 mm	367 mm	495 mm	181 mm	495 mm	data on request
Depth with cover	151 mm	151 mm	151 mm	151 mm	151 mm	151 mm	data on request
Installation depth	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	data on request
Weight	6,7 kg			9,16 kg			data on request
Construction material	sheet steel						
Corrosion protection	galvanized / electrostatically powder-coated (200 °C)						
System of protection	IP 54 (EN 60529) against the enclosure, when used as recommended IP 24 (EN 60529) against the ambience, when used as recommended						

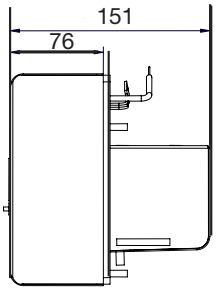
Mechanical data:

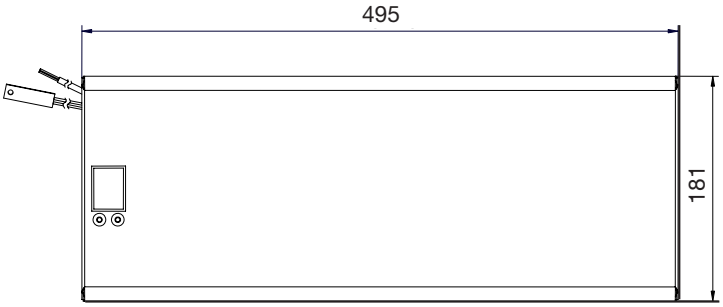
PTM 100





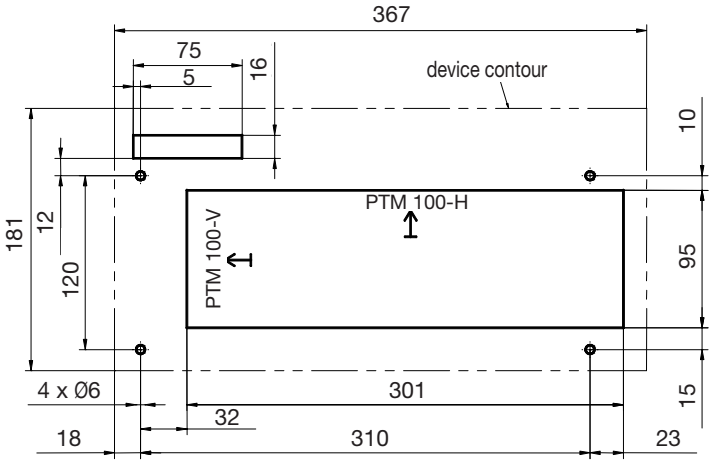
PTM 150



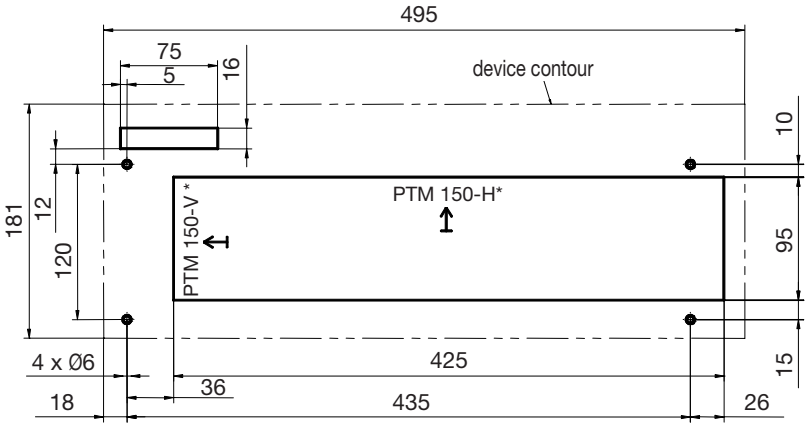


Installation cutout

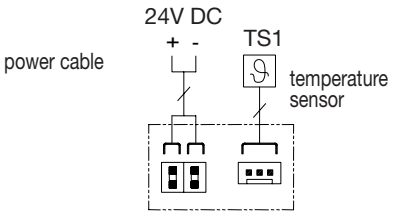
PTM 100



PTM 150



Wiring



* orientation: this side up

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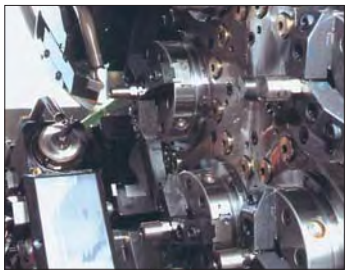
State-of-the-art, environmental measurement and testing centre

As a sign of their commitment to customer quality, Pfannenberg have one of Europe's most modern, state-of-the-art, environmental, measurement and testing centres.
With an area of some 60 m², they have at their disposal the latest test equipment available to meet customer demands in the field of climate control.
For Pfannenberg, it is merely a small matter to progress from an arctic temperature of –45 °C to the desert heat of +70 °C. In this way, they can test all devices ranging from prototypes to series-manufactured products under extreme climatic conditions and ensure compliance with qualification standards. The entire environmental chamber is divided into two environmental cells of equal proportions, allowing simultaneous measurement of low-powered devices.
High-powered equipment, i. e. 15 kW, is mounted on a partition wall between the two environmental cells, whereby one side of the chamber represents the customer's installation room and the other simulates environmental conditions.
The environmental chamber is conditioned by means of a two-stage, indirect cooling agent, with a salt water content of 3.5 m³ in each stage. It is possible to measure and test any item of equipment in terms of performance and technical operation at a temperature ranging from –45 °C up to +70 °C in a simulated relative humidity of up to 99%.
High-quality precision instruments for a range of capacities are available to record measurement data, with a PC-based EDP system for test and measurement documentation.

Cooling solutions for all branches of the industry

The demands placed on industrial products require a high level of system integration. The functions of the individual system components must be finely-tuned to ensure the safe overall function of the device.
For these reasons, Pfannenberg already began to broaden the spectrum in the area of cooling technology several years ago, in order to provide our customers with solutions for varying demands.

With several factories, Pfannenberg is a manufacturer that offers a complete range of products for its customers. This is combined with our continuous quality, function and reliability with regard the necessary manufacturing processes. In line with today's standards, the concept behind this system is not simply limited to the product, but rather includes the technical and performance environment. We approach our customers with this perspective, advise them, and work on joint concepts for solutions to the tasks at hand.



Several new areas have developed since the machine tool building market first came into being.
In addition to tool spindles and linear motors, cooling units are increasingly being used alongside other central components, to name but a few

- laser sources
- x-ray systems
- frequency converters
- brakes, hydraulic
- various kinds of motors

For further information, please request the catalogue for this product group.

In addition, the harsh environmental and temperature conditions that dominate many parts of the world must be taken into account. This is worth bearing in mind, as excess heat causes malfunctions, reduces the lifespan and eventually results in the complete failure of production machines. Pfannenberg's chillers are the best way to meet these challenges, capable of fulfilling all these requirements with ease.
Designed on demand, based on varying platforms (housing concepts), our products succeed in cooling the central production parts to a constant temperature, regardless of the environmental conditions and ambient temperature. Various liquids are used to remove the heat safely from the affected areas. Generally, these consist of water + additive, which may be various oils, emulsions from water/oil or de-salted/de-ionised water.

System Cooling from Pfannenberg

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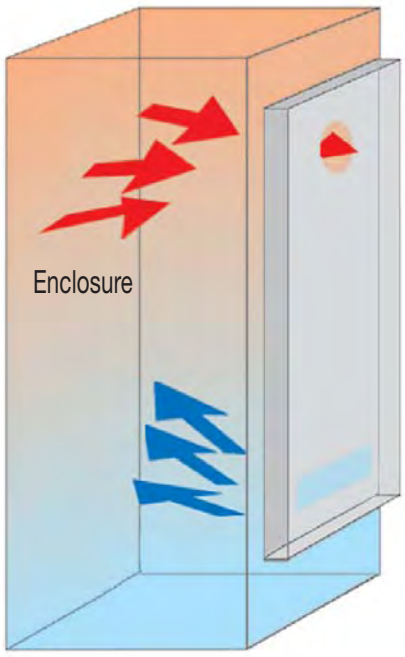
The chiller is the core component in the following discussions on system cooling.
The air/water heat exchanger is also an important cooling component in complex environments.

The air/water heat exchanger is used in areas dominated by high ambient temperatures, and oily or destructive atmospheres.

An additional advantage of this heat exchanger over other systems is its maintenance-free operation and low noise pollution.

Air/water heat exchangers are essentially quite simply constructed. The heat transmission occurs by means of a lamellar heat exchanger, consisting of copper pipes and aluminium lamellae. Air circulation occurs by means of a powerful radial fan.
The fan sucks the warm air from the electronic enclosures and transfers it using the heat exchanger. This cools the air, which is then returned to the enclosure. The cooling fluid fed in from outside is pumped through the heat exchanger.
The heat energy is removed from the electronic enclosure and absorbed by the cooling fluid. The thus heated cooling fluid transports the heat energy to a chiller unit, where the cooling fluid is cooled down and the cycle begins once more.



Maximum clearance between the inflow and outflow provides optimum distribution of temperature inside the enclosure.

Pfannenberg's air/water heat exchanger has several options on offer:

- various positions for connecting cooling fluids
- various connection systems for cooling fluids
- available with or without controls, with or without fault display
- various RAL/NCS colours (on request)
- various connection voltages/currents
- stainless steel pipes

Water and oil chillers - a wide variety of performance is available, from 1,1 up to 150 kW, in this high quality series

Customer benefits:

- UL version is available for various series
- extensive choice of options available to suit your individual requirements
- each and every unit is suitable for stand-alone chilling. Simply plug in and chill!

Technical features:

- perfect protection using separate installation of electronic components and the cooling circuit – optimum protection in inclement conditions
- for further information please order our catalogue: "Chillers for industrial use"
- standard colour RAL 7035, other colours on request

Chiller - line up to 2,4 kW - refrigerant water

Optionals:

- pump with different capacities
- high and low water temperature alarm
- connecting plug
- electrical thermostat with digital display
- hydraulik by pass with manometer
- wheels
- water flow switch
- UL conformity

Serie – Rack	1100	1700	2400
Capacity*	1100 W	1700 W	2400 W
Voltage	230 V 50/60 Hz	230 V 50/60 Hz	230 V 50/60 Hz
Dimensions	D 450 x W 480 x H 395		D 580 x W 580 x H 495
Weight	42 kg		48 kg

Chiller - line up to 9 kW - refrigerant water + additive

Optionals:

- pump with different capacities
- viton gasket
- electrical water level
- diagnostic module
- hydraulik by pass
- wheels
- water flow switch
- UL conformity
- differential thermostat
- high and low water temperature alarm
- electric water heater
- hot gas by pass valve
- connecting plug
- aluminium filter
- other colours available
- time delay switch

Serie – EB	30	43	60	75	90	130
Capacity*	3000 W	4300 W	6000 W	7500 W	9000 W	13000 W
Voltage	230 V 50 Hz 230 V 60 Hz 3x400V 50Hz - 3x460V 60Hz	230 V 50 Hz 230 V 60 Hz 3x400V 50Hz - 3x460V 60Hz	3x400V 50Hz - 3x460V 60Hz	3x400V 50Hz - 3x460V 60Hz		
Dimensions	D 600 x W 550 x H 1000			D 750 x W 700 x H 1345		
Weight	95 kg	120 kg	150 kg	160 kg	180 kg	180 kg

Temperature range +5°C to +43°C, * range of operation +10 °C to +35 °C capacity values are based on a water temperature T_w = 18 °C and an ambient temperature T_a = 32 °C

Chiller - line up to 15 kW - refrigerant oil

Optionals:

- pump with different capacities
- version without pump
- version with tank
- oil flow switch
- oil filter
- maximum pressure valve
- differential thermostat
- high and low oil temperature alarm
- electric oil heater
- connecting plug in various versions
- hot gas by pass valve
- other colours available
- special power supply
- 60 Hz on request
- time delay switch

Serie – GDV	35	40	43	45	50	60	65	90	150
Capacity	1500 W	2200 W	3000 W	4200 W	6000 W	7500 W	9000 W	13000 W	15000 W
Voltage	400 V 50 Hz	400 V 50 Hz	400 V 50 Hz	400 V 50 Hz	400 V 50 Hz	400 V 50 Hz	400 V 50 Hz	400 V 50 Hz	400 V 50 Hz
Dimensions	D 530 x W 650 x H 925			D 530 x W 830 x H 925		D 630 x W 930 x H 1125		D 700 W 1200 H 1190	D 700 W 1200 H 1370
Weight	85 kg	100 kg	105 kg	140 kg	145 kg	180 kg	185 kg	240 kg	260 kg

Indoor / Outdoor Chiller - line 12 kW up to 150 kW

Optionals:

- oil version on customer specification
- oil filter
- maximum pressure valve
- differential thermostat with sensor
- heater
- connectors for electrical connections
- other colours (RAL) available
- time delay switch

Serie – HK	12	15	20	25	33	40	55	62	70
Capacity	12 kW	15 kW	20 kW	25 kW	33 kW	40 kW	55 kW	62 kW	70 kW
Voltage	3x400V 50Hz - 3x460V 60Hz	3x400V 50Hz - 3x460V 60Hz	3x400V 50Hz - 3x460V 60Hz	3x400V 50Hz - 3x460V 60Hz	3x400V 50Hz - 3x460V 60Hz	3x400V 50Hz - 3x460V 60Hz	3x400V 50Hz - 3x460V 60Hz	3x400V 50Hz - 3x460V 60Hz	3x400V 50Hz - 3x460V 60Hz
Dimensions	D 800 x W 1500 x H 1753,5				D 900 x W 2150 x H 1565,5		D 1100 x W 2500 x H 1781		
Weight	484 kg	484 kg	484 kg	484 kg	734 kg	734 kg	1081 kg	1081 kg	1081 kg

Chiller for recessed installation - line up to 18 kW

Optionals:

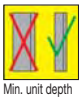
- pump with different capacities
- viton gaskets
- electrical fluid level
- hot gas by pass valve
- hydraulik by pass
- differential thermostat
- fluid flow switch
- high and low fluid temperature alarm
- electric fluid heater
- other colours available
- special power supply
- aluminium filter
- time delay switch
- connecting plug

Serie – AR	10	12	15	18
Capacity	10000 W	12000 W	15000 W	20000 W
Voltage	3x400V 50Hz - 3x460V 60Hz	3x400V 50Hz - 3x460V 60Hz	3x400V 50Hz - 3x460V 60Hz	3x400V 50Hz - 3x460V 60Hz
Dimensions	D 600 x W 1000 x H 2000		D 800 x W 1000 x H 2000	
Weight	250 kg	265 kg	280 kg	510 kg

Air/Water Heat Exchanger:
10.000 W and 7.000 W for side-mounting

- high air flow rate
- compact design
- suitable for external installation
- thermostat and solenoid valve for temperature control
- integrated temperature monitoring system with alarm contact
- sealed: no extra work on the installation cutout necessary
- maintenance free


Max. distance between air inlet and -outlet


Min. unit depth

Suitable for both 50 Hz and 60 Hz

System of protection

Refrigeration data	PWS 71002	PWS 7702
Cooling capacity at W10/A35 – nominal conditions*	10.000 W	7.000 W
Air volume (free-flow)	4600 m³/h	4050 m³/h
Water volume	500 l/h	
Water intake temperature	10 °C (> +1 °C – +35 °C)	
Air intake temperature	+35 °C	
Noise level (3 m distance)	≦66 dB (A)	≦63 dB (A)
Thermostat setting	adjustable within a range of +8 °C – + 50 °C, factory-set + 35 °C	
Condensate discharge	drip pan with safety overflow	
Duty cycle	100%	
Admissable operating pressure	1 – 10 bar	

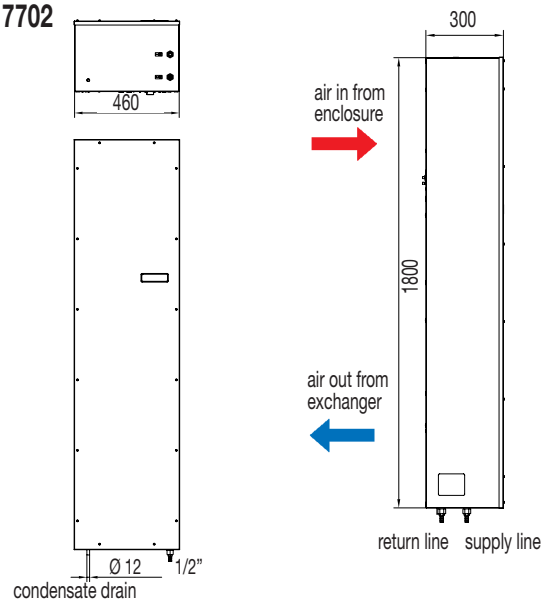
* water intake temperature +10 °C (W10), sir intake temperature +35 °C, water volume= 500 l/h / ** free-flow

Electrical data	PWS 71002	PWS 7702
Rated voltage	400 V	
Rated frequency	50 Hz	50 Hz/60 Hz
Voltage range (according to DIN IEC 38)	360V ... 440 V	
Power consumption	705 W	555 / 790 W
Current consumption	1,83 A	1,61 / 1,64 A
Starting current	7,3 A	6,4 / 6,6 A
Type of connection	plug-in connector	
Primary fuse T	10 A	

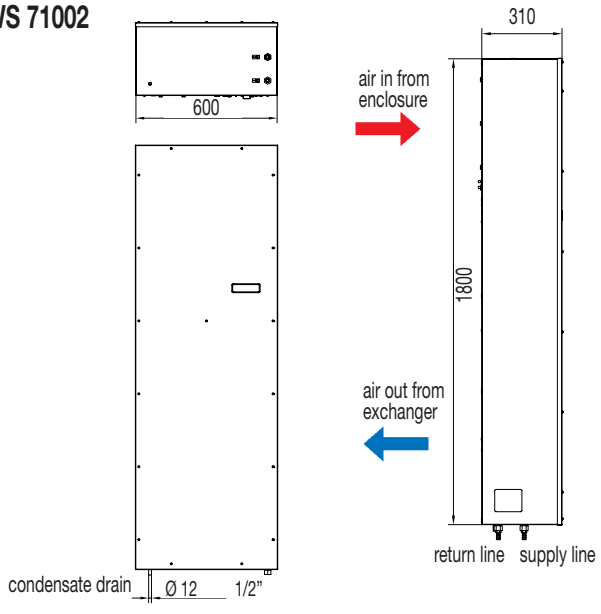
Supplementary data	PWS 71002	PWS 7702
Weight (without packaging)	98 kg	75 kg
Connection to water supply	13 mm hose nipple, special connections available on request	
Orientation	vertical	
Construction material	sheet steel	
Colour	RAL 7035, RAL 7032, other colours available on request	
Electric shock protection	according to EN 60529	
Climatic data	max. ambient temperature +70 °C / max. relative humidity 90%	
System of protection	IP 55 (EN 60529) against the enclosure, when used as recommended, IP 65 on request	
Standard scope of supply	incl. sealing material, fixing material, operating instructions. Connection to water supply with inside taper	
Temperature monitoring	integrated thermostat with changing contact, capacity 16 A, adjustable range +8 °C – +50 °C	
Alarm contact	10 K using setpoint	
Approvals	see overview cooling units / approvals	

Mechanical data:

PWS 7702

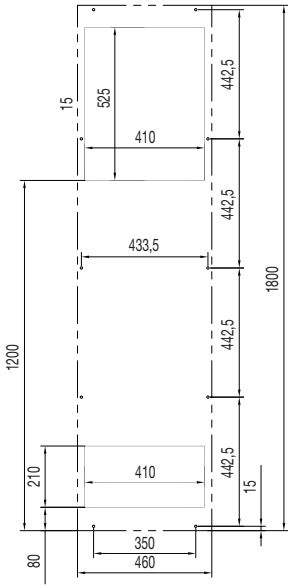


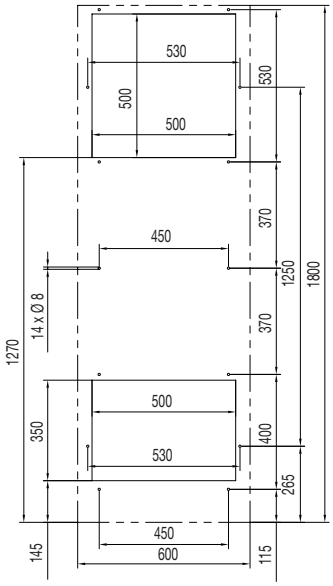
PWS 71002



Installation cutout

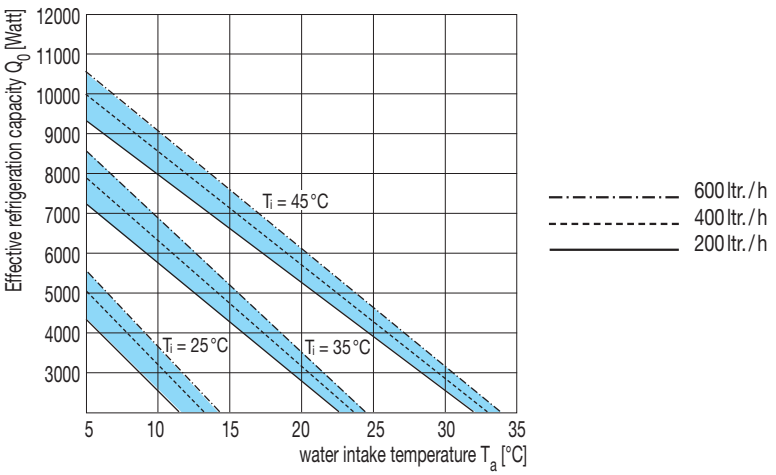
outside mounting



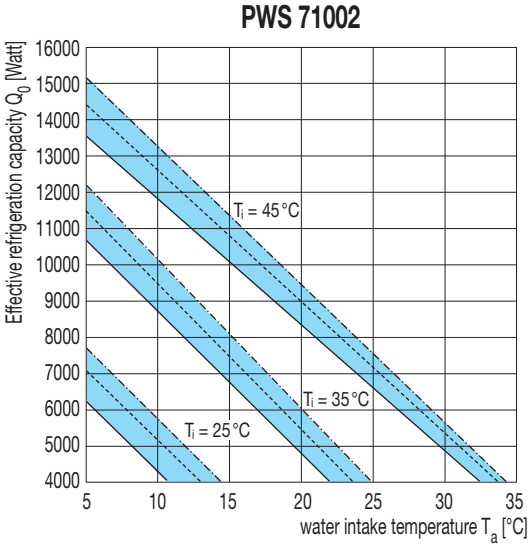


Characteristic curves: PWS 7702 and PWS 71002 - Effective refrigeration capacity

PWS 7702



PWS 71002



Air/Water Heat Exchanger: 5000 W for side-mounting

- high air flow rate
- compact design
- suitable for external installation
- thermostat and solenoid valve for temperature control
- integrated temperature monitoring system with alarm contact
- sealed: no extra work on the installation cutout necessary
- maintenance free

Cutout compatibility


Max. distance between air inlet and -outlet


Min. unit depth

Suitable for both 50 Hz and 60 Hz

System of protection


Outside installation

Refrigeration data	PWS 7502
Cooling capacity at W10/A35 – nominal conditions*	5200 W
Air volume (free-flow)	1670 m³/h
Water volume	400 l/h
Water intake temperature	+10 °C (> +1 °C – +35 °C)
Air intake temperature	+35 °C
Thermostat setting	adjustable within a range of +8 °C – +50 °C, factory-set +35 °C
Noise level (3 m distance)	57 dB (A)
Condensate discharge	drip pan with safety overflow
Duty cycle	100%
Admissable operating pressure	1 – 10 bar

* water intake temperature +10 °C (W10), air intake temperature +35 °C, water volume= 400 l/h

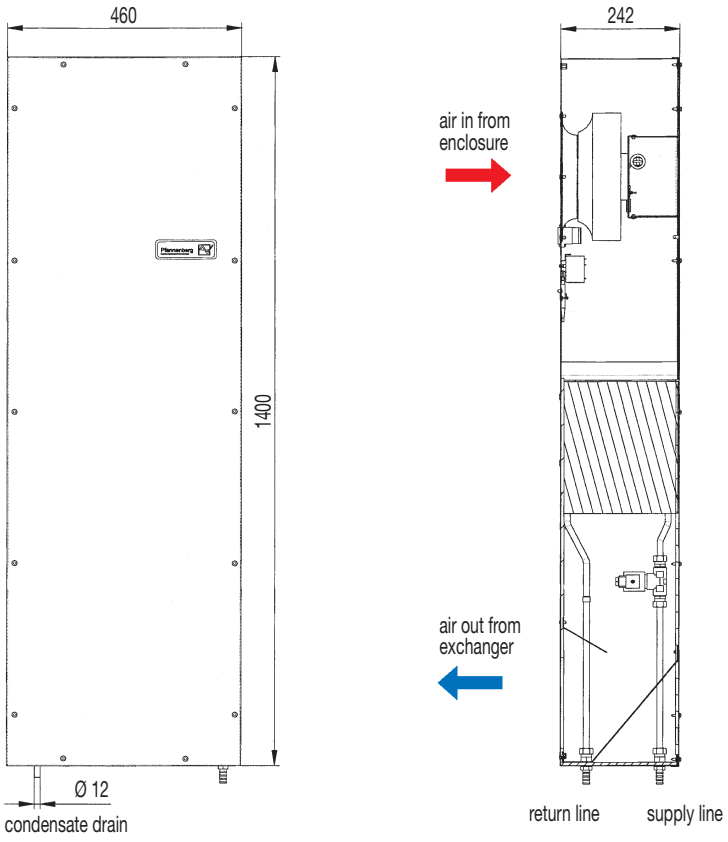
Electrical data	PWS 7502	
Rated voltage**	230 V	115 V
Rated frequency	50 Hz/60 Hz	60 Hz
Voltage range according to DIN IEC 38	198 V ... 252 V	104 V ... 127 V
Power consumption	295/385 W	384 W
Current consumption	1,3/1,7 A	3,45 A
Starting current	5,8/6,6 A	8,33 A
Type of connection	plug-in connector	
Primary fuse T	6 A	

** other voltages available on request

Supplementary data	PWS 7502
Weight (without packaging)	39 kg
Connection to water supply	13 mm hose nipple, special connections available on request
Orientation	vertical
Construction material	sheet steel, enclosure stainless steel 1.4301 (240 corundum) available on request
Colour	RAL 7035, RAL 7032, other colours available on request
Electric shock protection	according to EN 60529
Climatic data	max. ambient temperature +70 °C / max. relative humidity 90%
System of protection	IP 55 (EN 60529) against the enclosure, when used as recommended, IP 65 on request
Standard scope of supply	incl. sealing material, fixing material, operating instructions. Connection to water supply with inside taper
Temperature monitoring	integrated thermostat with changing contact, capacity 16 A, adjustable range +8 °C – +50 °C
Alarm contact	10 K using setpoint
Approvals	see overview cooling units / approvals

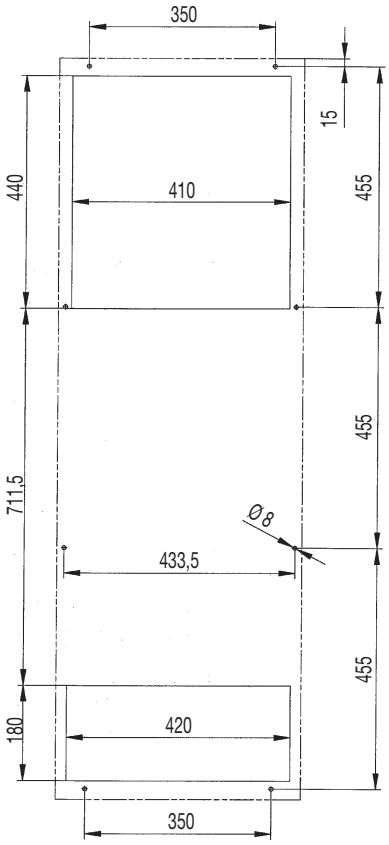
Mechanical data:

PWS 7502

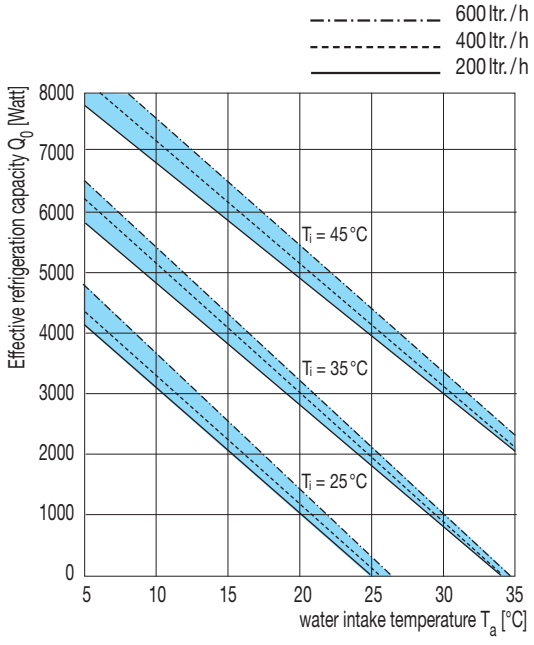


Installation cutout

outside mounting



Characteristic curves: PWS 7502 - Effective refrigeration capacity



Air/Water Heat Exchanger: 3000 W and 1500 W for side-mounting

PWS 7332-L cutout compatible with DTS 9x41 range see page 18

- high air flow rate
- compact design
- suitable for external installation
- thermostat and solenoid valve for temperature control
- integrated temperature monitoring system with alarm contact
- sealed: no extra work on the installation cutout necessary
- maintenance free
- long air passage (PWS 7332 L)
- cutout compatible with DTS 9x41 range (PWS 7332 L)
- heat exchanger tubes are available in stainless steel (PWS 7332)

Cutout compatibility


Max. distance between air inlet and -outlet


Min. unit depth

Suitable for both 50 Hz and 60 Hz

System of protection


Outside and inside installation

Refrigeration data	PWS 7332	PWS 7332 L	PWS 7152
Cooling capacity at W10/A35 *	3150 W	3150 W	1500 W
Air volume (free-flow)	1670 m³/h	1670 m³/h	850 m³/h
Water volume	200 l/h		
Water intake temperature	10 °C (> +1 °C – +35 °C)		
Air intake temperature	+35 °C		
Thermostat setting	adjustable within a range of +8 °C – +50 °C, factory-set +35 °C		
Noise level (3 m distance)	54 dB (A)	54 dB (A)	53 dB (A)
Condensate discharge	drip pan with safety overflow		
Duty cycle	100%		
Admissable operating pressure	1 – 10 bar		

* nominal conditions: water intake temperature +10 °C (W10), air intake temperature +35 °C, water volume= 200 l/h

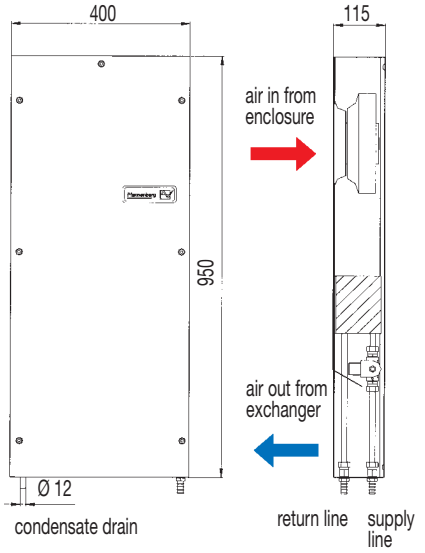
Electrical data	PWS 7332		PWS 7332 L		PWS 7152	
Rated voltage**	230 V	115 V	230 V	115 V	230 V	115 V
Rated frequency	50 Hz/60 Hz	60 Hz	50 Hz/60 Hz	60 Hz	50 Hz/60 Hz	60 Hz
Voltage range according to DIN IEC 38	198 V ... 252 V	104 V ... 127 V	198 V ... 252 V	104 V ... 127 V	198 V ... 252 V	104 V ... 127 V
Power consumption	295 / 385 W	453 W	295 / 385 W	453 W	125 / 185 W	186 W
Current consumption	1,3 / 1,7 A	4,1 A	1,3 / 1,7 A	4,1 A	0,55 / 0,75 A	1,5 A
Starting current	5,8 / 6,6 A	8,62 A	5,8 / 6,6 A	8,62 A	2 A	3,9 A
Type of connection	plug-in connection at attached connector					
Primary fuse T	6 A	16 A	6 A	16 A	4 A	6 A

** other voltages available on request

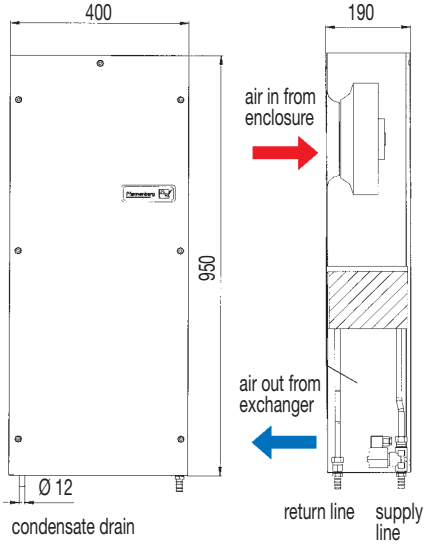
Supplementary data	PWS 7332	PWS 7332 L	PWS 7152
Weight (without packaging)	23 kg	35 kg	21 kg
Connection to water supply	13 mm hose nipple, special connections available on request		
Orientation	vertical		
Construction material	sheet steel, PWS 7332 and PWS 7152 with enclosure stainless steel 1.4301 (240 corundum) available on request		
Colour	RAL 7035, RAL 7032, other colours available on request		
Electric shock protection	according to EN 60529		
Climatic data	max. ambient temperature +70 °C / max. relative humidity 90%		
System of protection	IP 55 (EN 60529) against the enclosure, when used as recommended, IP 65 on request		
Standard scope of supply	incl. sealing material, fixing material, operating instructions. Connection to water supply with inside taper		
Temperature monitoring	integrated thermostat with changing contact, capacity 16 A, adjustable range +20°C – +60°C		
Alarm contact	10 K using setpoint		
Approvals	see overview cooling units / approvals		

Mechanical data:

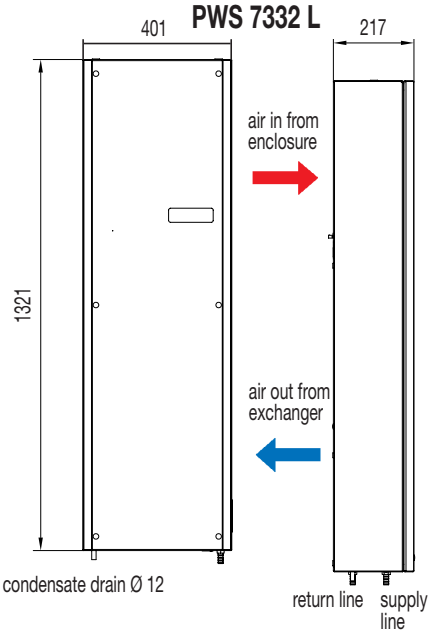
PWS 7152



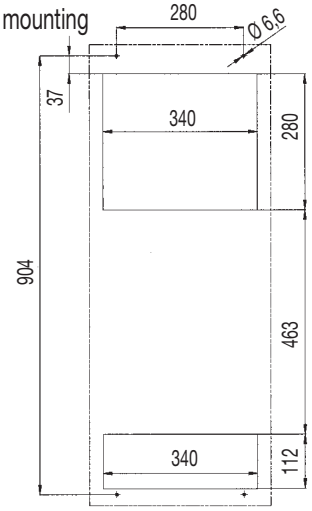
PWS 7332



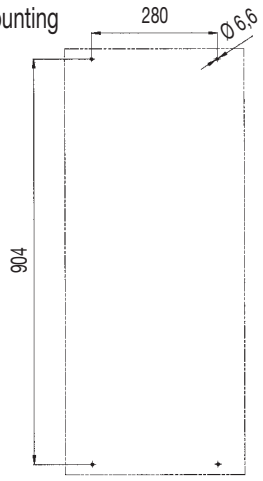
PWS 7332 L



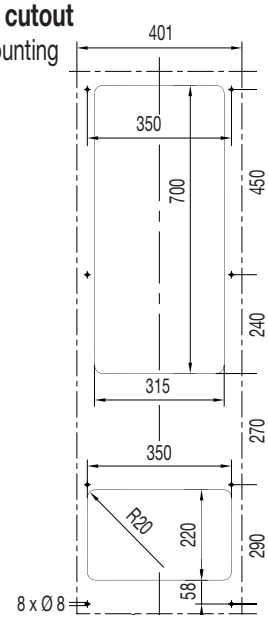
Installation cutout
outside mounting



Installation cutout
inside mounting

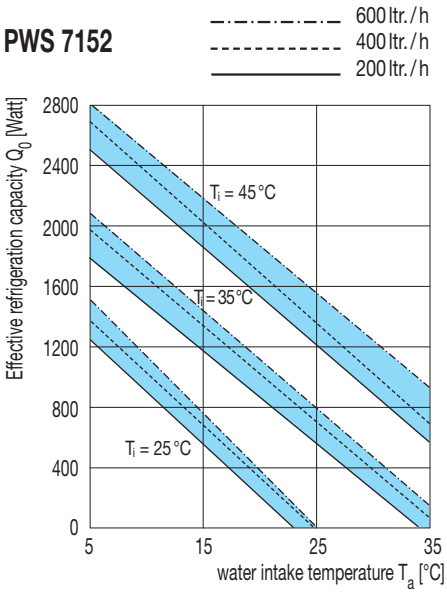


Installation cutout
outside mounting

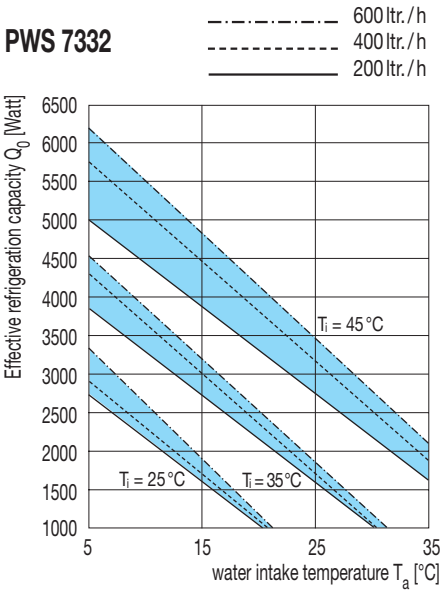


Characteristic curves: PWS 7152, PWS 7332 und PWS 7332 L - Effective refrigeration capacity

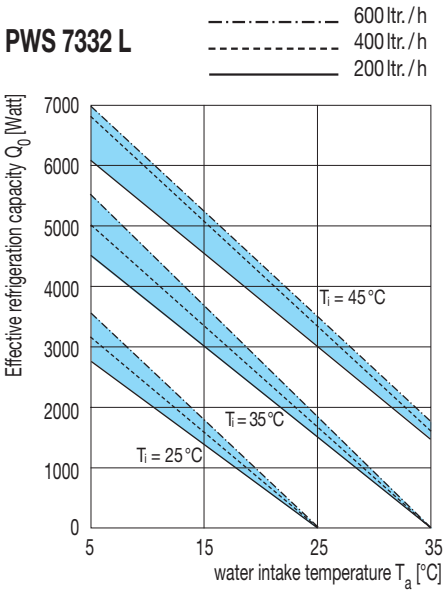
PWS 7152



PWS 7332



PWS 7332 L



Air/Water Heat Exchanger:
1000 W and 600 W for side-mounting

- high air flow rate
- compact design
- suitable for external installation
- thermostat and solenoid valve for temperature control
- integrated temperature monitoring system with alarm contact
- sealed: no extra work on the installation cutout necessary
- maintenance free

Cutout compatibility


Max. distance between air inlet and -outlet


Min. unit depth

Suitable for both 50 Hz and 60 Hz

System of protection


Outside and inside installation

Refrigeration data	PWS 7102	PWS 7062
Cooling capacity at W10/A35 – nominal conditions*	950 W	600 W
Air volume (free-flow)	570 m³/h	440 m³/h
Water volume	200 l/h	
Water intake temperature	10 °C (> +1 °C – +35 °C)	
Air intake temperature	+35 °C	
Noise level (3 m distance)	≤48 dB (A)	
Thermostat setting	adjustable within a range of +8 °C – + 50 °C, factory-set + 35 °C	
Condensate discharge	drip pan with safety overflow	
Duty cycle	100%	
Admissable operating pressure	1 – 10 bar	

* water intake trremperature +10 °C (W10), air intake temperature +35 °C, water volume= 200 l/h

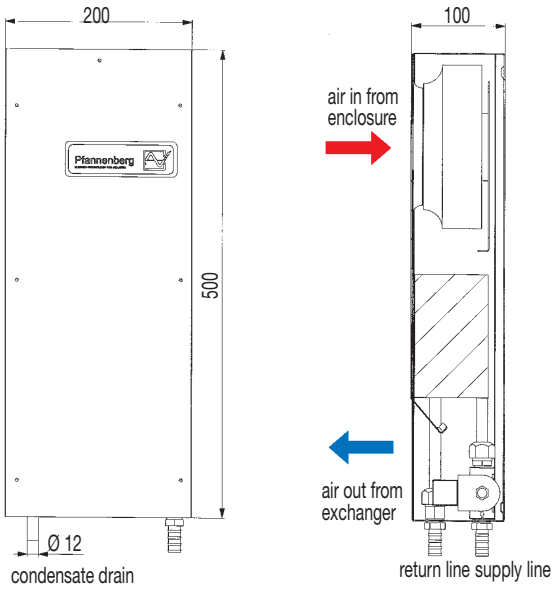
Electrical data	PWS 7102		PWS 7062	
Rated voltage**	230 V	115 V	230 V	115 V
Rated frequency	50 Hz/60 Hz	60 Hz	50 Hz/60 Hz	60 Hz
Voltage range (according to DIN IEC 38)	198 V...252 V	104 V...127 V	198 V...252 V	104 V...127 V
Power consumption	82/84 W	82 W	68/70 W	60 W
Current consumption	0,35/0,4 A	0,69 A	0,35/0,38 A	0,65 A
Starting current	1,7/1,95 A	1,4 A	1,5/1,8 A	1,3 A
Type of connection	plug-in connection at attached connector			
Primary fuse T	4 A			

** other voltages available on request

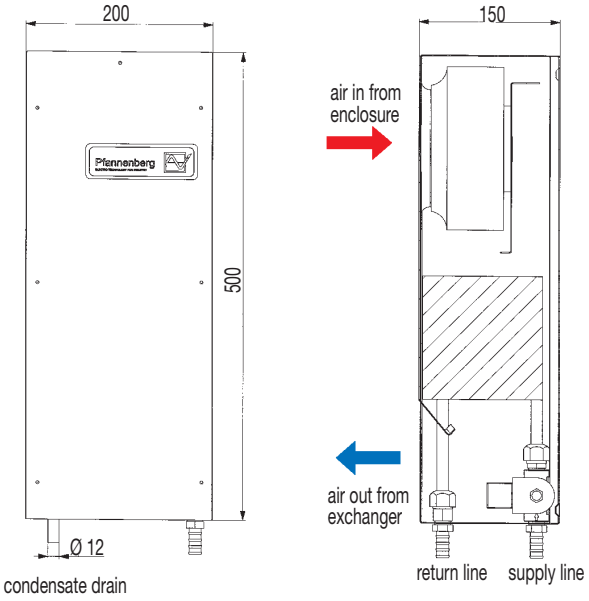
Supplementary data	PWS 7102	PWS 7062
Weight (without packaging)	7,5 kg	6 kg
Connection to water supply	13 mm hose nipple, special connections available on request	
Orientation	vertical	
Construction material	sheet steel, enclosure stainless steel 1.4301 (200 corundum) available on request	
Colour	RAL 7035, RAL 7032, other colours available on request	
Electric shock protection	according to EN 60529	
Climatic data	max. ambient temperature +70 °C / max. relative humidity 90%	
System of protection	IP 55 (EN 60529) against the enclosure, when used as recommended, IP 65 on request	
Standard scope of supply	incl. sealing material, fixing material, operating instructions. Connection to water supply with inside taper	
Temperature monitoring	integrated thermostat with changing contact, capacity 16 A, adjustable range +8 °C – +50 °C	
Alarm contact	10 K using setpoint	
Approvals	see overview cooling units / approvals	

Mechanical data:

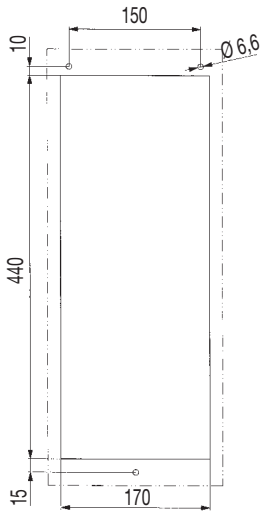
PWS 7062



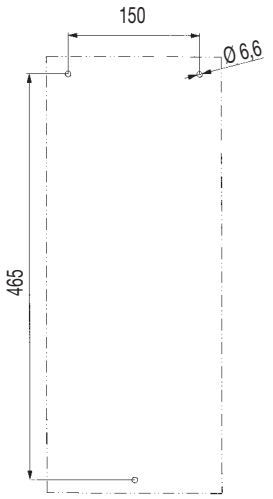
PWS 7102



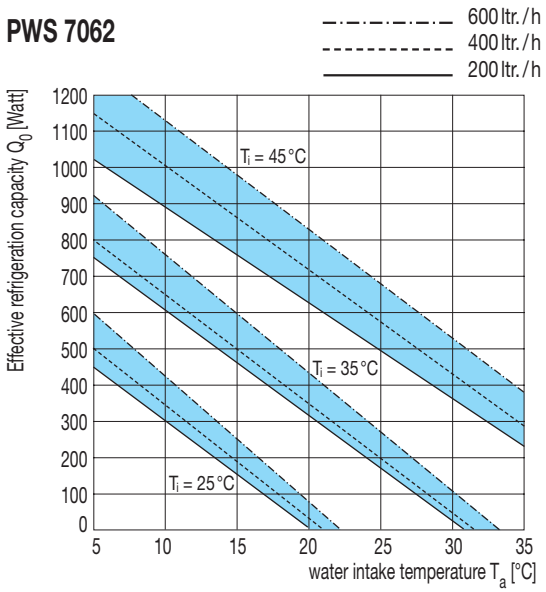
Installation cutout
outside mounting



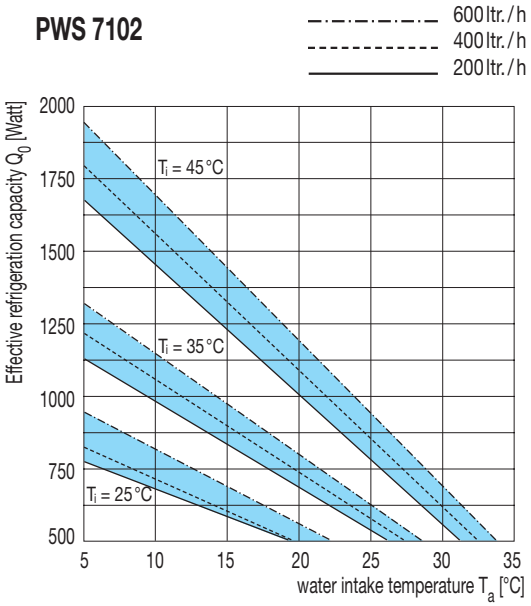
Installation cutout
inside mounting



PWS 7062



PWS 7102



Air/Water Heat Exchanger:
2100 W and 1450 W for top-mounting

- flat gasket to protect against water penetratian via top of the enclosure
- water circuit tested for 30 bar pressure
- temperature regulated by integrated thermostat and solenoid valve
- 10 bar operating pressure
- tubes and heat exchanger are available in stainless steel


Max. distance between air inlet and -outlet

Suitable for both 50 Hz and 60 Hz

Level of protection in respect of enclosure (EN 60529)

Optional extra

Refrigeration data	PWD 5402	PWD 5302
Cooling capacity at W20/A35 – nominal conditions*	2100 Watt	1450 Watt
Cooling capacity at W10/A35 – nominal conditions*	3400 Watt	2150 Watt
Air volume	720 m³/h	500 m³/h
Water volume	400 l/h	
Water intake temperature	+20 °C	
Air intake temperature	+35 °C	
Noise level (1 m distance)	64 dB (A)	54 dB (A)
Duty cycle	100 %	

* water intake temperature +20 °C (W20) / +10 °C (W10), air intake temperature +35 °C, water volume= 400 l/h

Electrical data	PWD 5402		PWD 5302
Rated voltage**	230 V	400 V - 480 V ***	230 V
Rated frequency	50 Hz/60 Hz	50 Hz/60 Hz	50 Hz/60 Hz
Voltage range	198 V ... 252 V	400 V - 480 V ± 10%	198 V ... 252 V
Power consumption	200 Watt	200 - 290 Watt	55 Watt
Current consumption	0,84 A	0,5 - 0,9 A	0,38 A
Starting current	4 A	4 A	3 A

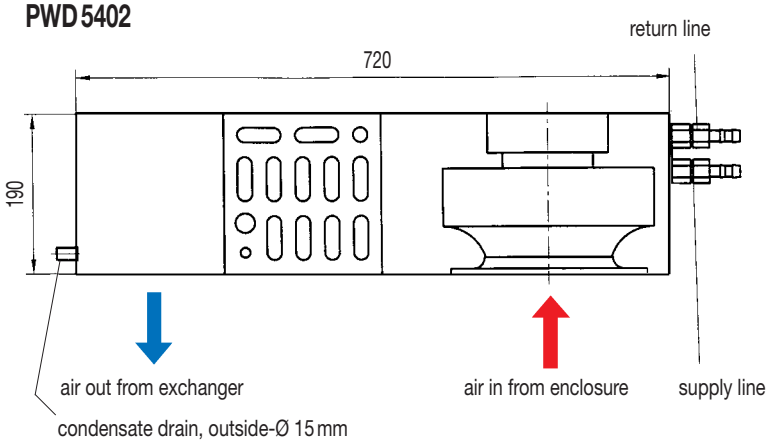
** other voltages available on request

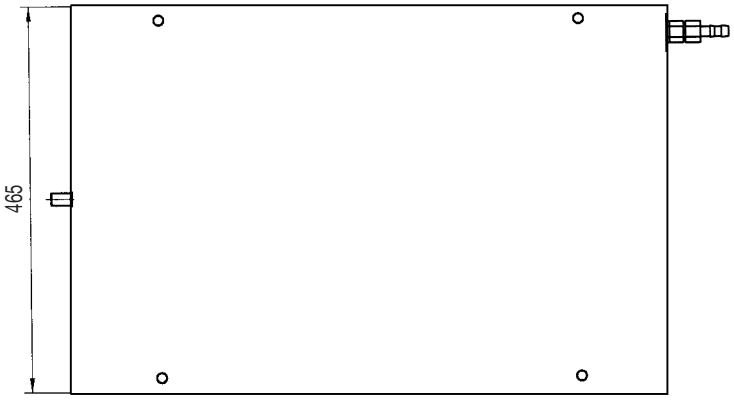
*** rated voltage can be adjusted on the device within a range of 380-420 V (50 Hz) and 440-480 V (60Hz)

Supplementary data	PWD 5402	PWD 5302
Weight (without packaging)	30 kg	21 kg
Connection to water supply	13 mm hose nipple, special connections available on request	
Orientation	horizontal	
Construction material	sheet steel (stainless steel available on request)	
Corrosion protection	galvanized / electrostatically powder-coated (200 °C)	
Colour	RAL 7035, RAL 7032 (european grey), other colours available on request	
Electric shock protection	according to EN 60529	
Climatic data	max. ambient temperature +60 °C max. relative humidity 90 %	
System of protection	IP 54 against the enclosure (EN 60529), when used as recommended	
Standard scope of supply	connection to water supply with inside taper, sealing material, fixing material, operating instructions	
Approvals	see overview cooling units / approvals	

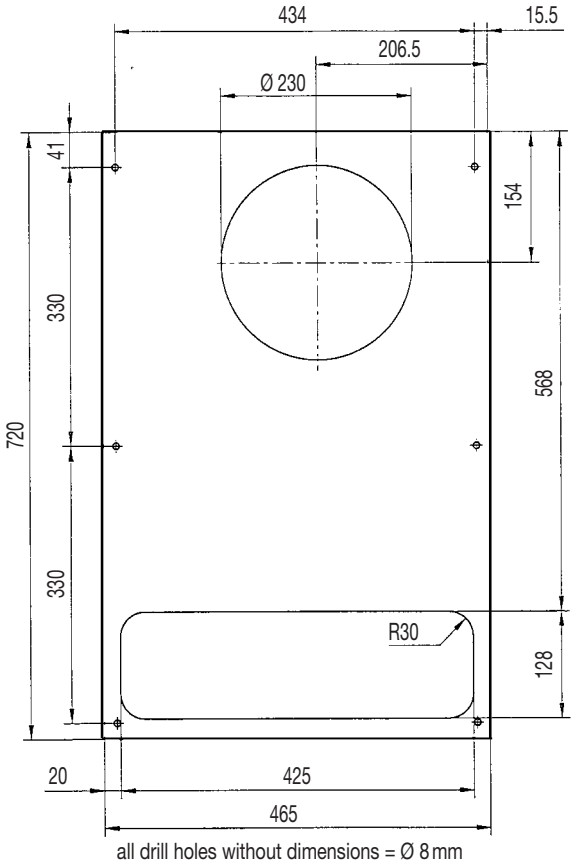
Mechanical data:

PWD 5402

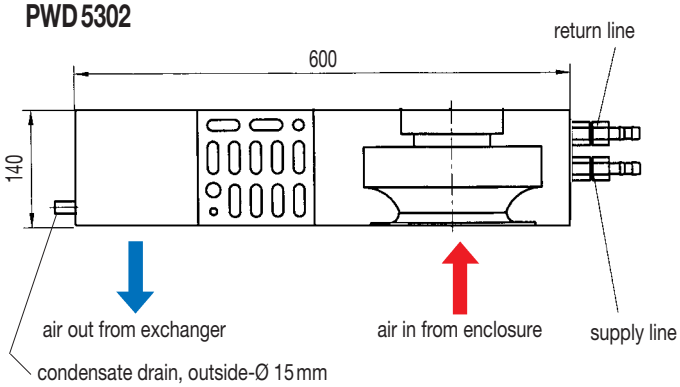


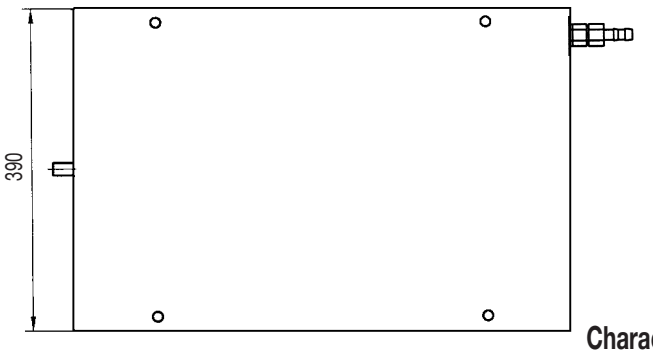


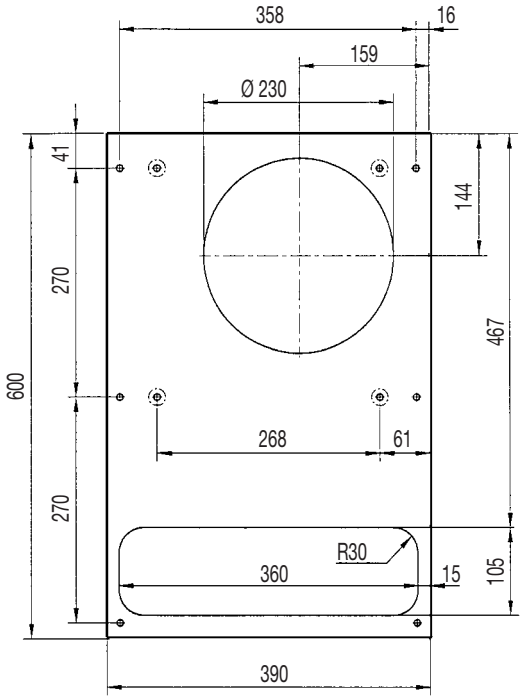
Installation cutout



PWD 5302







Characteristic curves see page 74

○ only drill if enclosure depth 400 mm
all drill holes without dimensions = Ø 8 mm

Air/Water Heat Exchanger:
2450 W, 2060 W, 1450 W and 760 W for side-mounting

- sealed with protective edging, no extra work on the installation cutout necessary
- water circuit tested for 30 bar pressure
- temperature regulated by integrated thermostat and solenoid valve (available as optional extra)
- 10 bar operating pressure
- long air passage

Cutout compatibility


Max. distance between air inlet and -outlet


Min. unit depth

Suitable for both 50 Hz and 60 Hz

Level of protection in respect of enclosure (EN 60529)

Refrigeration data	PWS 7602	PWS 7402	PWS 7302	PWS 7002
Cooling capacity at W20/A35 – nominal conditions*	2060 Watt	2450 Watt	1450 Watt	760 Watt
Cooling capacity at W10/A35 – nominal conditions*	3550 Watt	3400 Watt	2100 Watt	1250 Watt
Air volume	900 m³/h	800 m³/h	450 m³/h	180 m³/h
Water volume	400 l/h			
Water intake temperature	+20 °C			
Air intake temperature	+35 °C			
Noise level (1 m distance)	64 dB (A)	64 dB (A)	54 dB (A)	50 dB (A)
Condensate discharge	drip pan with safety overflow			
Duty cycle	100 %			

* water intake temperature +20 °C (W20) / +10 °C (W10), air intake temperature +35 °C, water volume= 400 l/h

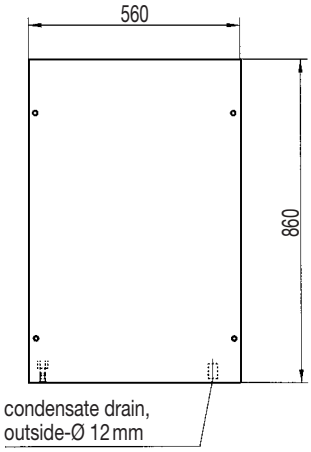
Electrical data	PWS 7602	PWS 7402	PWS 7302	PWS 7002
Rated voltage**)	230 V	230 V	230 V	230 V
Rated frequency	50 Hz/60 Hz	50 Hz/60 Hz	50 Hz/60 Hz	50 Hz/60 Hz
Voltage range	198 V ... 252 V	198 V ... 252 V	198 V ... 252 V	198 V ... 252 V
Power consumption	200 Watt	220 Watt	85 Watt	55 Watt
Current consumption	0,84 A	1,25 A	0,4 A	0,25 A
Starting current	4 A	4 A	3 A	2 A

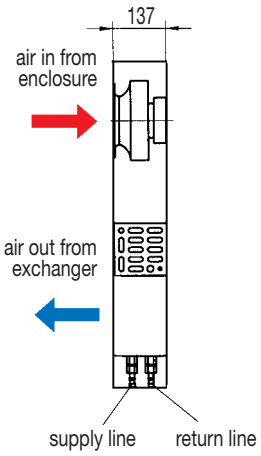
** other voltages available on request

Supplementary data	PWS 7602	PWS 7402	PWS 7302	PWS 7002
Weight (without packaging)	31 kg	31 kg	28 kg	13 kg
Connection to water supply	13 mm hose nipple, special connections available on request			
Orientation	vertical			
Construction material	sheet steel (stainless steel available on request)			
Colour	RAL 7035, RAL 7032 (european grey), other colours available on request			
Electric shock protection	according to EN 60529			
Climatic data	max. ambient temperature +70 °C / max. relative humidity 90 %			
System of protection	IP 55 (EN 60529) against the enclosure, when used as recommended			
Standard scope of supply	incl. sealing material, fixing material, operating instructions. Connection to water supply with inside taper			
Accessories	thermostat and solenoid valve			
Approvals	see overview cooling units / approvals			

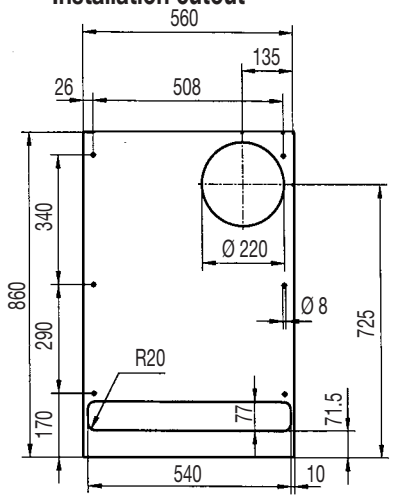
Mechanical data:

PWS 7602

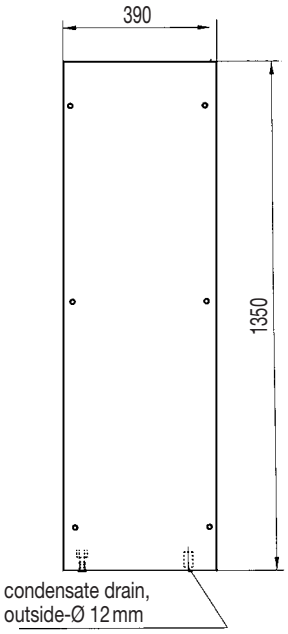


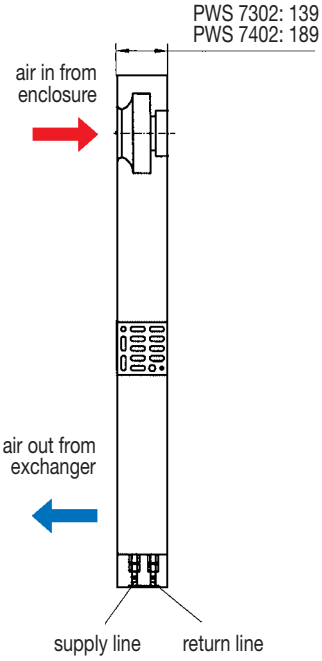


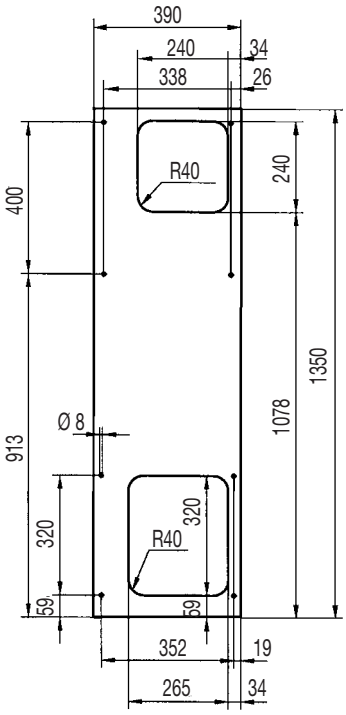
Installation cutout



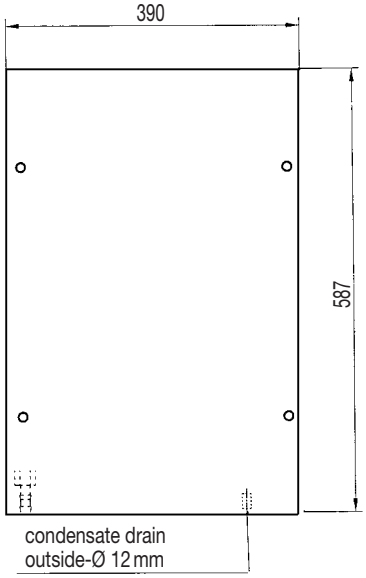
PWS 7402 / PWS 7302

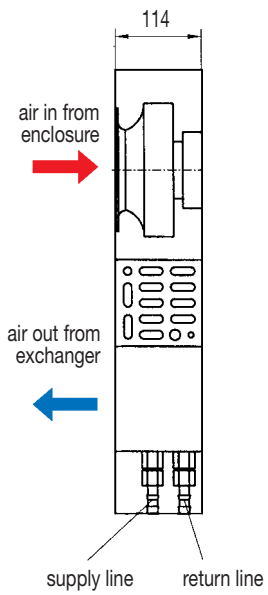


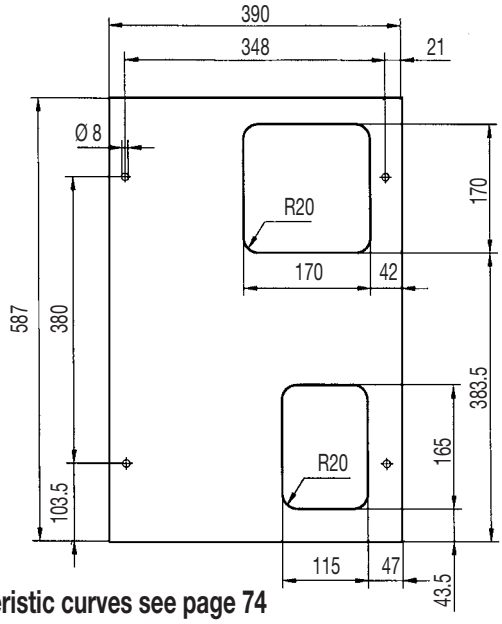




PWS 7002



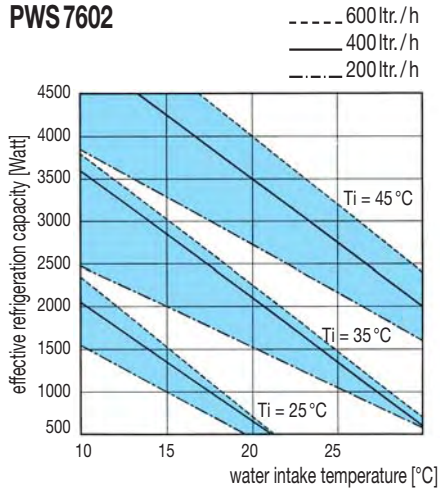




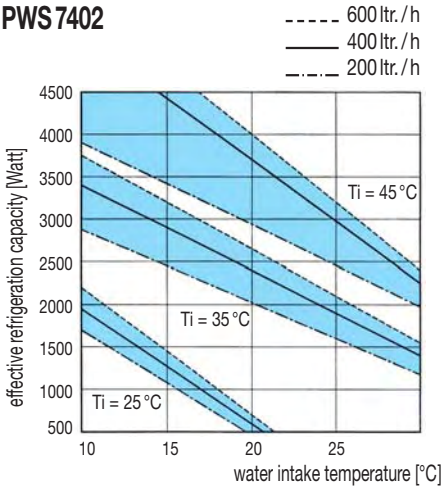
Characteristic curves see page 74

Characteristic curves - Effective refrigeration capacity

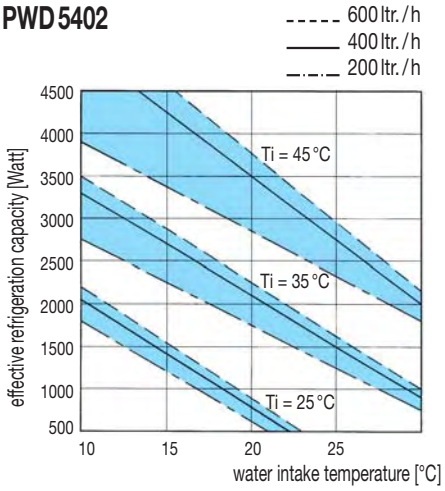
PWS 7602



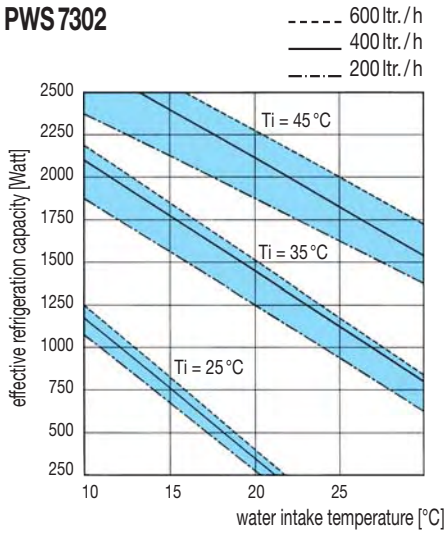
PWS 7402



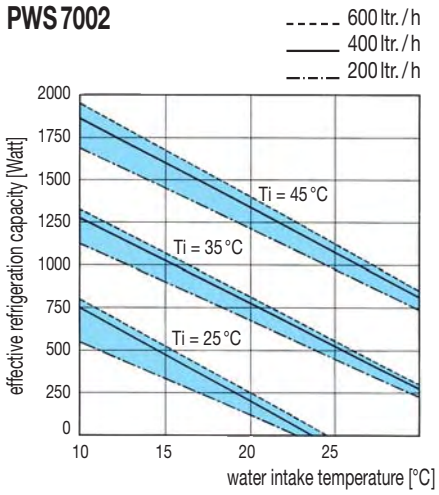
PWD 5402



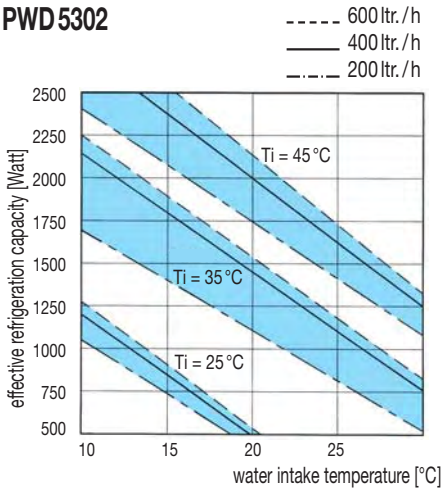
PWS 7302



PWS 7002

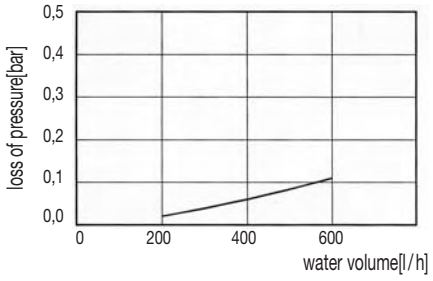


PWD 5302

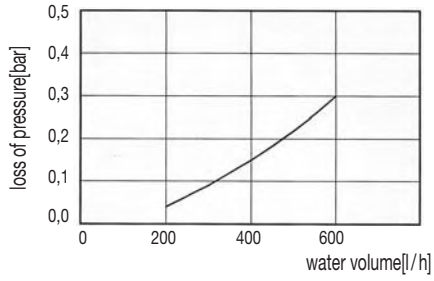


Drop in pressure

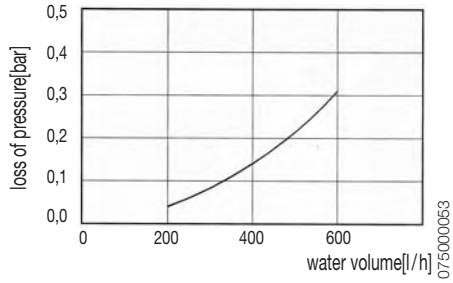
PWS 7602



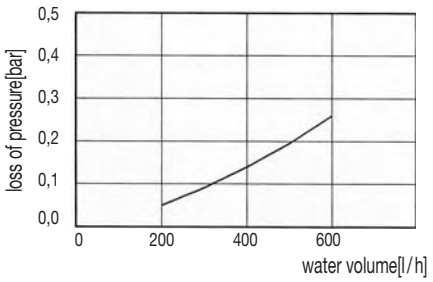
PWS 7402



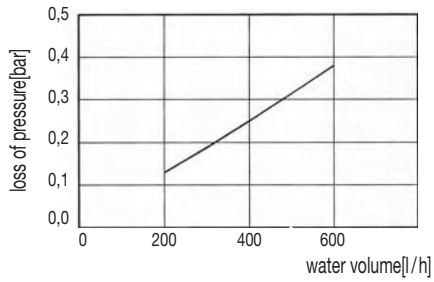
PWD 5402



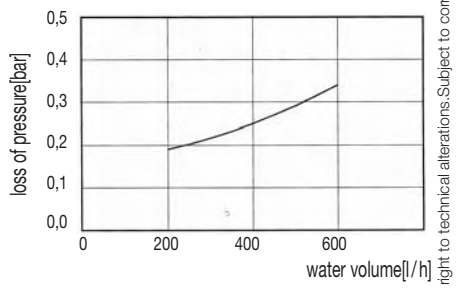
PWS 7302



PWS 7002



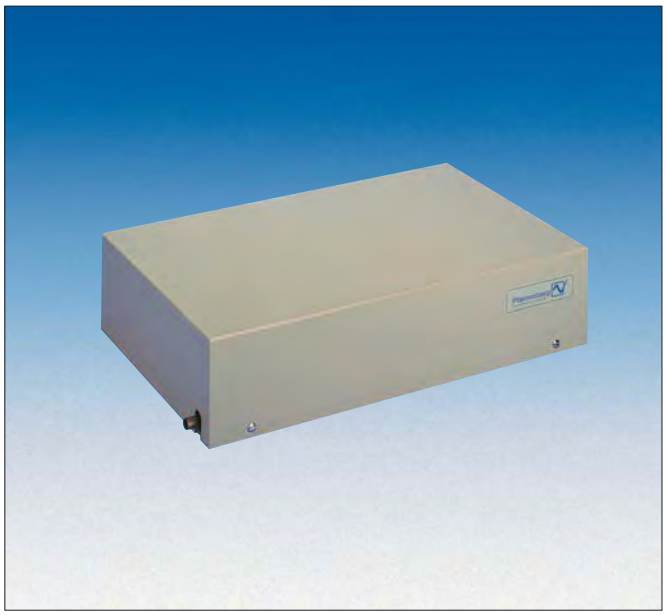
PWD 5302



- this curve demonstrates the relationship between the drop in pressure and the water volume
- the details of pressure loss are important for designing the piping and the circulation pump
- a low drop in pressure also indicates a lower operating pressure for the heat exchangers. This allows you to keep the cost of investment for the pump down to a minimum

Air/Water Heat Exchangers: Special Versions

The air/water heat exchangers listed on this page were developed especially for applications in the car industry. Pfannenberg adapted the products to comply with the special requirements dictated by the harsh conditions sometimes encountered there.



PWD 5412 and PWD 5312

These top-mounted units were designed to cope with special conditions arising from the addition of substances to the cooling water.

- All components that get in contact with the cooling water, such as heat exchanger and pipes are made of stainless steel (V_4A). This allows these two models to be used in conjunction with strongly polluted or extremely salty water. This situation may arise if river water is mixed with the cooling water. Saltwater has the chemical property of extracting the copper from normal pipes, causing leaks in the water system sometimes after only a few months of operation.
- These units are fitted with an integrated thermostat connected directly to the exterior by means of a plug. This allows you to set up an electrically controlled valve.
  We suggest to use ball valves to minimize the contamination hazard.
- The installation cutout is almost identical with the cutout for standard models the PWD 5402 and PWD 5302. However, the installation height of model PWD 5412 is 86 mm higher than the standard units, and model PWD 5312 is 64 mm higher.

PWS 7612, PWS 7412, PWS 7312 and PWS 7012

These air/water heat exchangers were developed for standard applications in the car industry.

- With integrated thermostat, set at +35 °C
  (adjustable from +25 °C to +45 °C).
- With integrated solenoid valve.
  This helps to maintain the temperature inside the enclosure at the preset level. The cooling water only flows through the heat exchanger if the temperature inside the enclosure rises above the preset value.
- The unit is connected to the mains using a rubber connector.
  The relevant socket is located at the bottom adjacent to the water connection point.
  The plug and 3 m power cord are included in the scope of supply.
- The units are fitted in place using 6 mm threaded bolts in 8 mm Ø predrilled holes located on the rear panel.
  Simply detach the front panel to mount the units from the outside.

The extra servicefriendly Filterfan
... IP 55 with outstanding

IP 54
IP 55 | UV | Type 12 | cULus | RAL 7035 7032 | EAC | EMC

Bound to lead by inventing modern innovative products!
This is Pfannenberg's mission!

Filterfan

No tools required for assembly!

The assembly does not require tools – mounting of the filterfans is completed without the need for screws!

4-corner fastening system "click and fit!"

This extremely safe mounting system is patented!

Safe assembly and disassembly

of the screw less mounting system – simply listen to the "click"!

Quick change of the filter mat –

the front cover can be opened and this enables the easiest access during the change of the filter mat!

AC DC

Bound to lead by our patented innovations for higher performance and availability. Quality "Made in Germany" at an excellent price-performance ratio.

If you want to learn more navigate to:

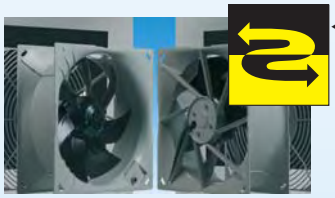
www.filterfan.com

Option: Intelligent filterfan

airflow capacity

An easier connection to power by clamps –

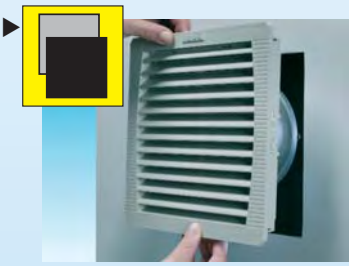
it cannot be easier!



An easier change of airflow direction!

Fitting is compatible

Change to new 4th Generation filterfan easily as all the cutouts are compatible with the previous generation!

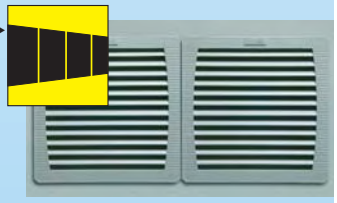


A variable connection position by 90° step turns

The fan can be rotated in steps of 90°. Optimised adaptation for electrical connection!

Filterfan array (In-Line mounting)

According to the specification of the customer!



Everything from one hand!

We manufacture a very comprehensive range of standard cooling products and related accessories to enable precise control of the internal environment of your enclosure. Contact us today to discuss the requirements of your specific project or visit us at **www.pfannenberg.com**

Select the components for your climatisation project yourself

How? Very easily by using the software PSS (Pfannenberg-Software-Service), which you can order free of charge or download yourself from **www.pfannenberg.com**.

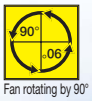
All filterfans of the 4th Generation at a glance...


Simple click and fit! Without tools

System of protection


Installation without tools


Change of air flow direction



Fan rotating by 90°

Filterfans - Model PF

4-corner fastening system „click and fit“ –
patented quick-action snap-fit system for rapid, extremly safe installation of filterfans

Model	Rated voltage	Power	Airflow / Capacity free-flow	Airflow / Capacity in combination PF + PFA	Installation cutout at wall thickness ≤2mm	Installation cutout at wall thickness >2mm ≤3mm	UL version	page
PF 11.000	230V / 115V AC	12W / 12W	25 m³/h / 8 W/K	16 m³/h / 5 W/K (PF 11.000 + PFA 10.000)	92 x 92 mm	93 x 93 mm	yes	82
	12V / 24V / 48V DC	2,4 W/2,4W/2,6W						
PF 22.000	230V / 115V AC	19W / 20W	IP 54: 61 m³/h / 20 W/K IP 55: 56 m³/h / 19 W/K	IP 54: 44 m³/h / 13 W/K IP 55: 40 m³/h / 15 W/K (PF 22.000 + PFA 20.000)	125 x 125 mm	126 x 126 mm	yes	84
	12V / 24V / 48V DC	5W / 5W / 5W						
PF 32.000	230V / 115V AC	19W / 20W	IP 54: 110 m³/h / 37 W/K IP 55: 100 m³/h / 33 W/K	IP 54: 82 m³/h / 27 W/K IP 55: 55 m³/h / 18 W/K (PF 32.000 + PFA 30.000)	177 x 177 mm	178 x 178 mm	yes	86
	12V / 24V / 48V DC	5W / 5W / 5W						
PF 42.500	230V / 115V AC	18W / 18W	IP 54: 156 m³/h / 52 W/K IP 55: 145 m³/h / 48 W/K	IP 54: 116 m³/h / 39 W/K IP 55: 109 m³/h / 37 W/K (PF 42.500 + PFA 40.000)	223 x 223 mm	224 x 224 mm	yes	88
	12V / 24V / 48V DC	5W / 4,7W / 4,6W						
PF 43.000	230V / 115V AC	45W / 40W	IP 54: 256 m³/h / 85 W/K IP 55: 233 m³/h / 78 W/K	IP 54: 231 m³/h / 77 W/K IP 55: 180 m³/h / 60 W/K (PF 43.000 + PFA 40.000)	223 x 223 mm	224 x 224 mm	yes	88
	400V 2 ~	41W						
	12V / 24V / 48V DC	12W / 12W / 12W						
PF 65.000	230V / 115V AC	65W / 75W	IP 54: 480 m³/h / 160 W/K IP 55: 505 m³/h / 168 W/K	IP 54: 370 m³/h / 123 W/K IP 55: 380 m³/h / 127 W/K (PF 65.000 + PFA 60.000)	291 x 291 mm	292 x 292 mm	yes	90
PF 66.000	400V / 460 V 3 ~	120 W	IP 54: 640 m³/h / 213 W/K IP 55: 770 m³/h / 257 W/K	IP 54: 445 m³/h / 148 W/K IP 55: 490 m³/h / 163 W/K (PF 66.000 + PFA 60.000)	291 x 291 mm	292 x 292 mm	yes	90
	230V / 115V AC	115W / 110W						
PF 67.000	400V / 460 V 3 ~	on request	IP 54: 845 m³/h / 282 W/K IP 55: 925 m³/h / 308 W/K	IP 54: 560 m³/h / 187 W/K IP 55: 570 m³/h / 190 W/K (PF 67.000 + PFA 60.000)	291 x 291 mm	292 x 292 mm	yes	90
	230V / 115V AC	135W / 140 W						

Exhaust Filters - Model PFA

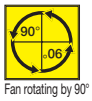
Model	Installation cutout at wall thickness ≤2mm	Installation cutout at wall thickness >2mm ≤3mm	UL version	page
PFA 10.000	92 x 92 mm	93 x 93 mm	yes	82
PFA 20.000	125 x 125 mm	126 x 126 mm	yes	84
PFA 30.000	177 x 177 mm	178 x 178 mm	yes	86

Model	Installation cutout at wall thickness ≤2mm	Installation cutout at wall thickness >2mm ≤3mm	UL version	page
PFA 40.000	223 x 223 mm	224 x 224 mm	yes	88
PFA 60.000	291 x 291 mm	292 x 292 mm	yes	90


Simple click and fit! Without tools

System of protection


Installation without tools



Fan rotating by 90°

EMC Filterfans - Model PF

4-corner fastening system „click and fit“ –
patented quick-action snap-fit system for rapid, extremly safe installation of filterfans

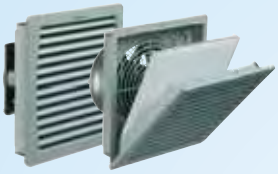
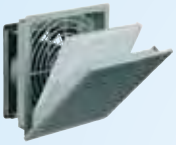
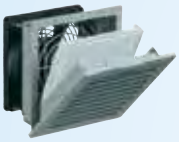
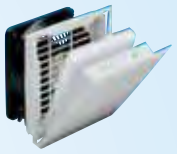
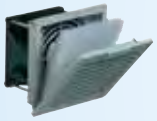
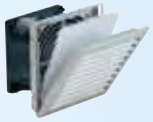
Model	Rated voltage	Power	Airflow / Capacity free-flow	Airflow / Capacity in combination PF + PFA	Installation cutout	UL version	page
PF 11.000 EMC*	230V / 115V AC	12W / 12W	25 m³/h / 8 W/K	16 m³/h / 5 W/K (PF 11.000 + PFA 10.000)	93 x 93 mm ± 0,5 mm	yes	93
	12V / 24V / 48V DC	2,4 W/2,4W/2,6W					
PF 22.000 EMC	230V / 115V AC	19W / 20W	IP 54: 61 m³/h / 20 W/K IP 55: 56 m³/h / 19 W/K	IP 54: 44 m³/h / 13 W/K IP 55: 40 m³/h / 15 W/K (PF 22.000 + PFA 20.000)	126,5 x 126,5 mm ± 0,5 mm	yes	93
	12V / 24V / 48V DC	5W / 5W / 5W					
PF 32.000 EMC	230V / 115V AC	19W / 20W	IP 54: 110 m³/h / 37 W/K IP 55: 100 m³/h / 33 W/K	IP 54: 82 m³/h / 27 W/K IP 55: 55 m³/h / 18 W/K (PF 32.000 + PFA 30.000)	178 x 178 mm ± 0,5 mm	yes	93
	12V / 24V / 48V DC	5W / 5W / 5W					
PF 42.500 EMC	230V / 115V AC	18W / 18W	IP 54: 156 m³/h / 52 W/K IP 55: 145 m³/h / 48 W/K	IP 54: 116 m³/h / 39 W/K IP 55: 109 m³/h / 37 W/K (PF 42.500 + PFA 40.000)	224 x 234 mm ± 0,5 mm	yes	93
	12V / 24V / 48V DC	5W / 4,7W / 4,6W					
PF 43.000 EMC	230V / 115V AC	45W / 40W	IP 54: 256 m³/h / 85 W/K IP 55: 233 m³/h / 78 W/K	IP 54: 231 m³/h / 77 W/K IP 55: 180 m³/h / 60 W/K (PF 43.000 + PFA 40.000)	224 x 224 mm ± 0,5 mm	yes	93
	400V 2 ~	41W					
	12V / 24V / 48V DC	12W / 12W / 12W					
PF 65.000 EMC	230V / 115V AC	65W / 75W	IP 54: 480 m³/h / 160 W/K IP 55: 505 m³/h / 168 W/K	IP 54: 370 m³/h / 123 W/K IP 55: 380 m³/h / 127 W/K (PF 65.000 + PFA 60.000)	292 x 292 mm ± 0,5 mm	yes	93
PF 66.000 EMC	400V / 460 V 3 ~	120 W	IP 54: 640 m³/h / 213 W/K IP 55: 770 m³/h / 257 W/K	IP 54: 445 m³/h / 148 W/K IP 55: 490 m³/h / 163 W/K (PF 66.000 + PFA 60.000)	292 x 292 mm ± 0,5 mm	yes	93
	230V / 115V AC	115W / 110W					
PF 67.000 EMC	400V / 460 V 3 ~	on request	IP 54: 845 m³/h / 282 W/K IP 55: 925 m³/h / 308 W/K	IP 54: 560 m³/h / 187 W/K IP 55: 570 m³/h / 190 W/K (PF 67.000 + PFA 60.000)	292 x 292 mm ± 0,5 mm	yes	93
	230V / 115V AC	135W / 140 W					

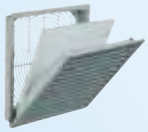
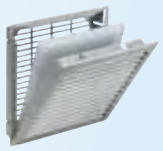
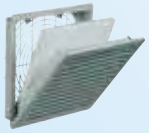
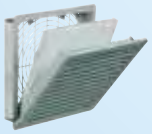
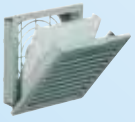
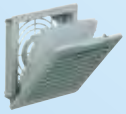
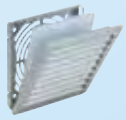
* PF 11.000 EMC IP 54

Pfannenberg Filterfans of the 4th Generation - Installation size comparison

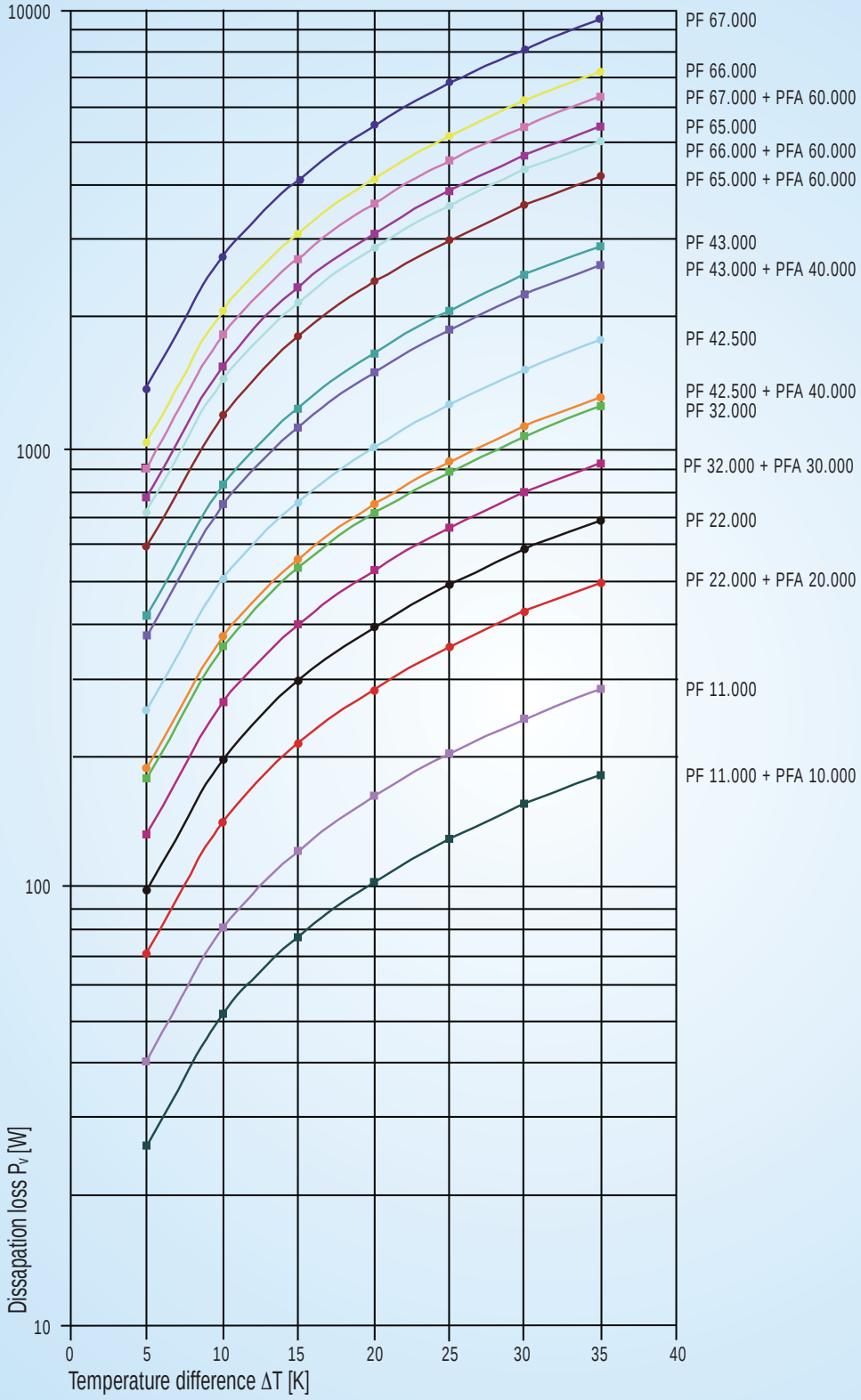
Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY

NEW!

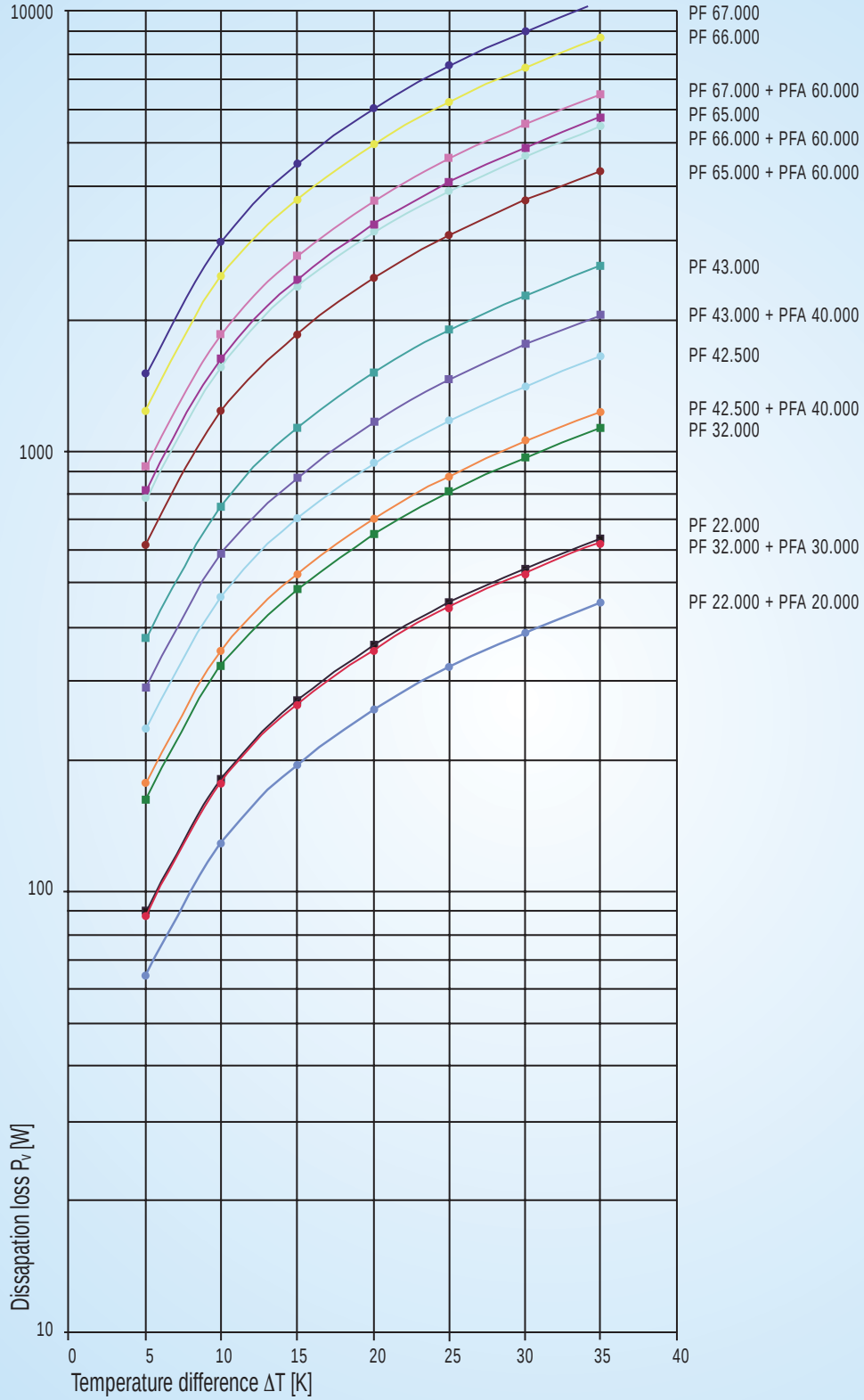
	Filterans 4th Generation	Size	Cutout (mm)	Filterfans 3rd Generation	
	PF 67.000	6	291 x 291	PF 7.000	
	PF 66.000	6	291 x 291	PF 6.000	
	PF 65.000	6	291 x 291	PF 5.000	
	PF 43.000	4	223 x 223	PF 3.000	
	PF 42.500	4	223 x 223	PF 2.500	
	PF 32.000	3	177 x 177		
	PF 22.000	2	125 x 125	PF 2.000	
	PF 11.000	1	92 x 92	PF 1.000	

	Exhaust filter 4th Generation	Size	Cutout (mm)	Exhaust filter 3rd Generation	
	PFA 60.000	6	291 x 291 291 x 291 291 x 291	PFA 7.000 PFA 6.000 PFA 5.000	
	PFA 40.000	4	223 x 223 223 x 223	PFA 2.500 / PFA 3.000	
	PFA 30.000	3	177 x 177		
	PFA 20.000	2	125 x 125	PFA 2.000	
	PFA 10.000	1	92 x 92	PFA 1.000	

Performance selection diagram for filterfans IP 54 according to temperature difference



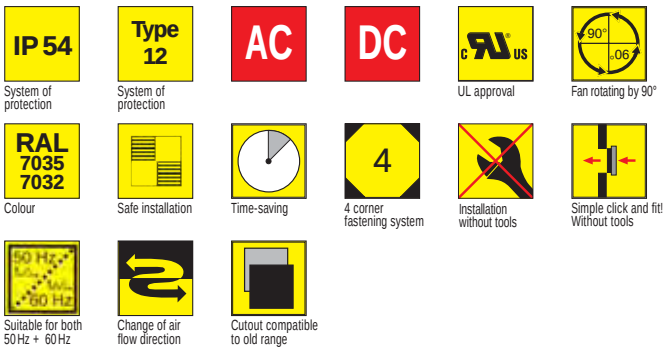
Performance selection diagram for filterfans IP 55 according to temperature difference



Filterfan PF 11.000
Exhaust Filter PFA 10.000

PF 11.000

Versatile incorporation into equipment. Examples are in the medical industry, in EDV/IT equipment, warning and control enclosures and also for low power applications.



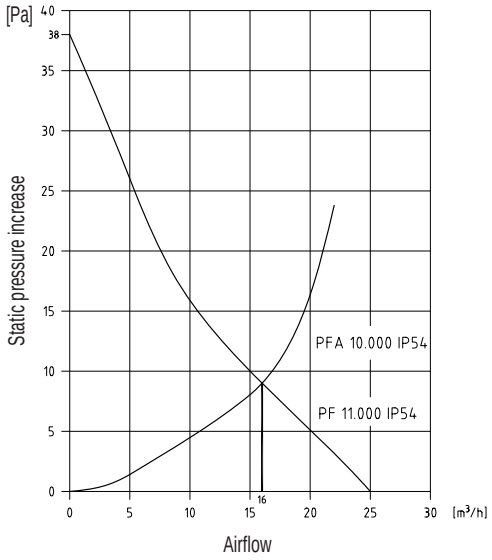
Airflow data	PF 11.000	PFA 10.000
Filter mat (standard grade)	IP 54-filter mat	
Air delivery free-flow	25 m³/h; 50 Hz / 29 m³/h; 60 Hz	-
Capacity free-flow	8 W/K / 10 W/K	-
Airflow in combination (filterfan + exhaust filter)	16 m³/h; 50 Hz / 18 m³/h; 60 Hz (PF 11.000 + PFA 10.000)	-
Capacity in combination (filterfan + exhaust filter)	5 W/K / 6 W/K (PF 11.000 + PFA 10.000)	-
Max. static pressure (Airflow = 0 m³/h)	38 Pa	-
Filtration efficiency	88%	88%
Filter material grade	G 3 (DIN EN 779)	G 3 (DIN EN 779)
Duty cycle	100%	-

Technical data	PF 11.000		PFA 10.000
	AC	DC	
Outside dimensions in mm (Height x Width x Installation depth)	109 x 109 x 62	109 x 109 x 49	109 x 109 x 19
Bearing type	sleeve bearings	ball bearings	-
Fitting position	vertical	any	any
Construction	housing and guard of sprayed thermoplastic, self-extinguishing, UL 94 VO		
Weight	0,55 kg	0,16 kg	0,06 kg
Safety protection	according to EN 60529		-
Colour	RAL 7035, RAL 7032 or black, other colours available on request		
Type of connection	2 wires, 310 mm long		-

Electrical data	PF 11.000				
	AC 50 Hz / 60 Hz		DC		
Rated voltage +/- 10%	230 V	115 V	12 V	24 V	48 V
Power consumption	12 W / 11 W	12 W / 11 W	2,4 W	2,4 W	2,6 W

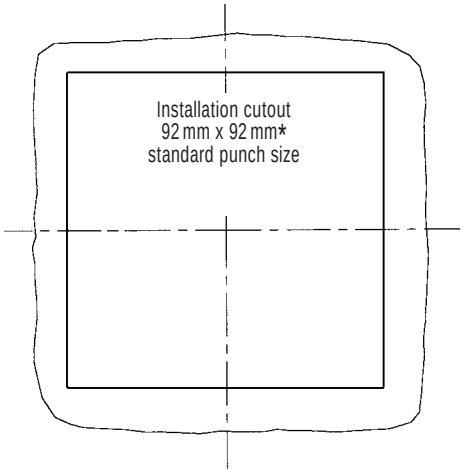
Airflow data:

PF 11.000



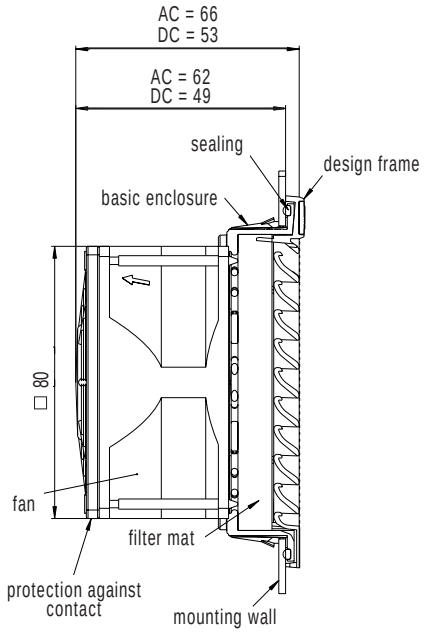
Installation cutout:

PF 11.000 + PFA 10.000

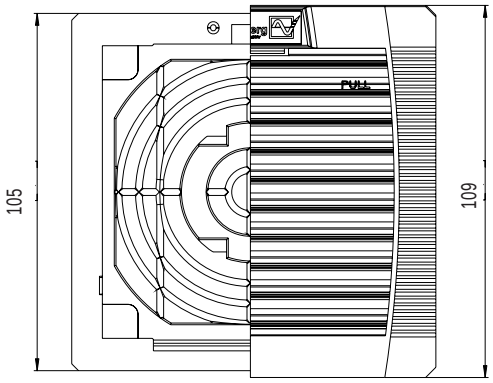


Mechanical data:

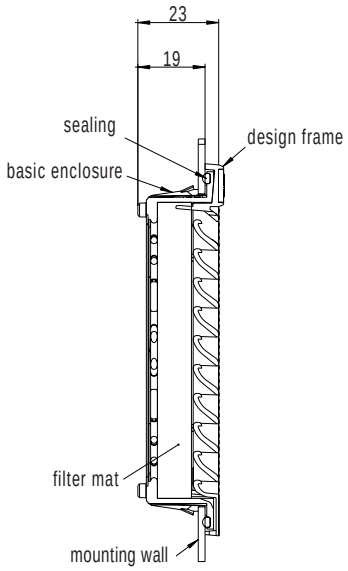
PF 11.000



PF 11.000 + PFA 10.000



PFA 10.000

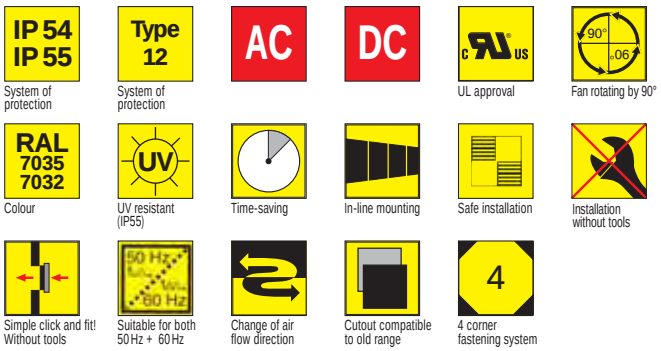


Supplementary data	PF 11.000 AC	PF 11.000 DC	PFA 10.000
Climatic data			
Operating temperature	−15 °C (+ 5 °F) to + 55 °C (+ 131 °F)		
Storage temperature	- 20 °C (- 4 °F) to + 70 °C (+ 158 °F)		
Max. relative humidity	90%		
System of protection	IP 54 (EN 60 529), when used as recommended, not for outdoor-application		
Basic parts kit	filter mat, user manual		
Accessories	radiant heater, fan heater, thermostat, hygrostat		
Approvals	UL approval		
* Tolerance installation cutout	92 $^{+1}_{-0}$ thickness of material to 2 mm 93 $^{+1}_{-0}$ thickness of material > 2 mm ≤ 3 mm		

Filterfan PF 22.000
Exhaust Filter PFA 20.000

PF 22.000

For a broad range of applications in electronics as well as conventional switchgear installations; a wide range of operating voltages ensures universal use.
Now available as IP 55 version with significantly higher airflow capacity and extended service life.



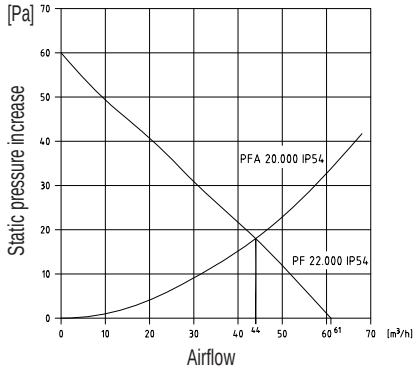
Airflow data	PF 22.000	PFA 20.000
Filter mat	IP 54: IP 54-filter mat - IP 55: fluted filter	
Airflow free-flow	IP 54: 61 m³/h; 50 Hz / 70 m³/h; 60 Hz - IP 55: 56 m³/h; 50 Hz / 64 m³/h; 60 Hz	-
Capacity free-flow	IP 54: 20 W/K / 23 W/K - IP 55: 19 W/K / 21 W/K	-
Airflow in combination (filterfan + exhaust filter)	IP 54: 44 m³/h; 50 Hz / 52 m³/h; 60 Hz - IP 55: 40 m³/h; 50 Hz / 46 m³/h; 60 Hz (PF 22.000 + PFA 20.000)	-
Capacity in combination (filterfan + exhaust filter)	IP 54: 15 W/K / 17 W/K - IP 55: 13 W/K / 15 W/K (PF 22.000 + PFA 20.000)	-
Max. static pressure (Airflow = 0 m³/h)	IP 54: 60 Pa - IP 55: 57 Pa	-
Filtration efficiency	IP 54: 88% - IP 55: 91%	
Filter material grade	IP 54: G 3 - IP 55: G 4 (DIN EN 779)	
Duty cycle	100%	-

Technical data	PF 22.000		PFA 20.000
	AC	DC	
Outside dimensions in mm (Height x Width x Installation depth)	145 x 145 x 70	145 x 145 x 64	145 x 145 x 26
Bearing type	sleeve bearings	ball bearings	-
Fitting position	vertical	any	any
Construction	housing and guard of sprayed thermoplastic, self-extinguishing UL 94 V0, IP55: UV resistant		
Weight	0,7 kg	0,44 kg	0,12kg
Safety protection	according to EN 60529		-
Colour	RAL 7035, RAL 7032 or black, other colours available on request		
Type of connection	terminal strip	2 wires, 310 mm long	-

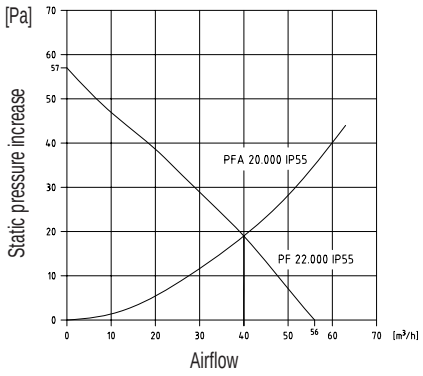
Electrical data	PF 22.000				
	AC 50 Hz / 60 Hz		DC		
Rated voltage +/- 10%	230 V	115 V	12 V	24 V	48 V
Power consumption	19 W / 18 W	20 W / 20 W	5 W	5 W	5 W

Airflow data:

PF 22.000 IP 54

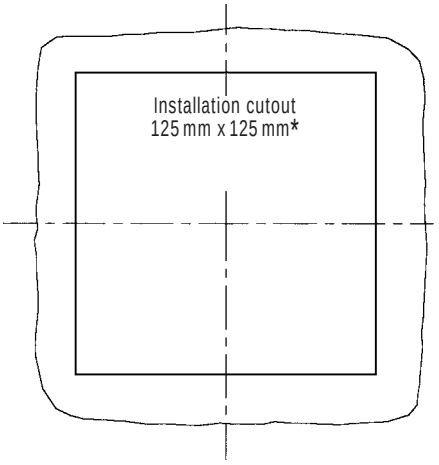


PF 22.000 IP 55



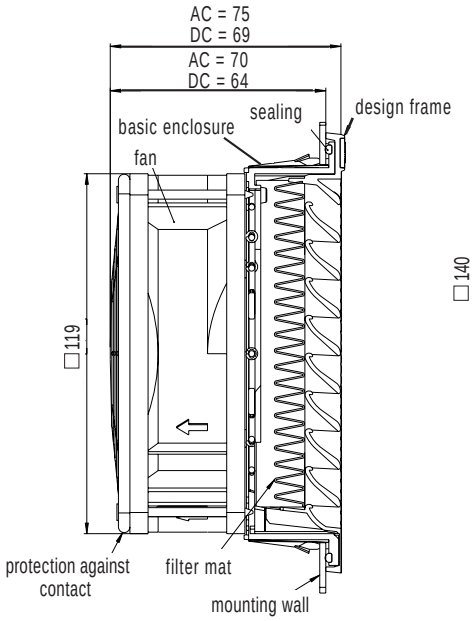
Installation cutout

PF 22.000 + PFA 20.000

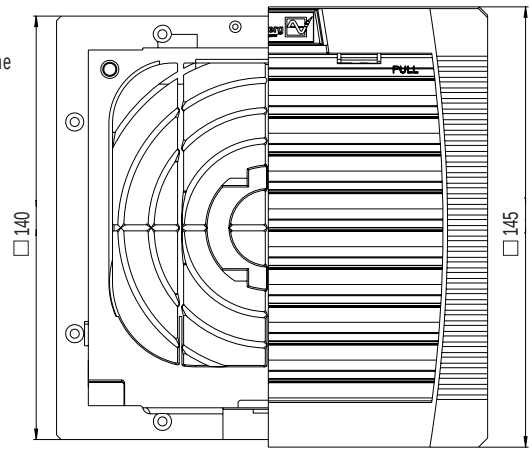


Mechanical data:

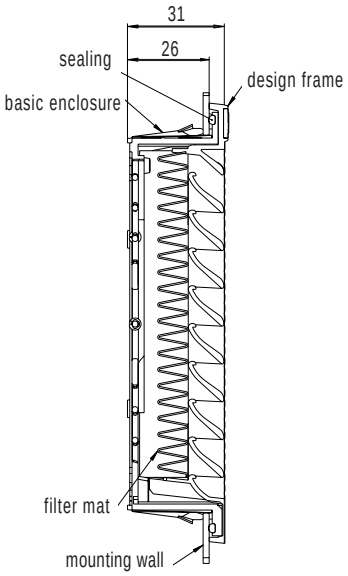
PF 22.000



PF 22.000 + PFA 20.000



PFA 20.000

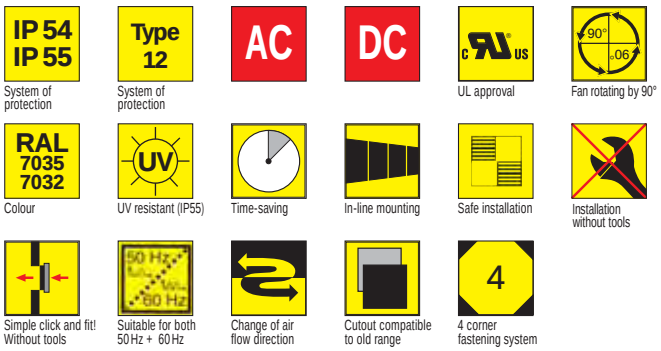


Supplementary data	PF 22.000 AC	PF 22.000 DC	PFA 20.000
Climatic data			
Operating temperature	−15 °C (- 5 °F) to + 55 °C (+ 131 °F)		
Storage temperature	−20 °C (- 4 °F) to + 70 °C (+ 158 °F)		
Max. relative humidity	90%		
System of protection	IP 54 or IP 55 (EN 60529), when used as recommended		
Basic parts kit	filter mat, user manual		
Accessories	radiant heater, fan heater, thermostat, hygrostat		
Approvals	UL approval		
* Tolerance installation cutout	125 $^{+1}_{-0}$ thickness of material to 2 mm 126 $^{+1}_{-0}$ thickness of material > 2 mm ≤ 3 mm		

Filterfan PF 32.000
Exhaust Filter PFA 30.000

PF 32.000

For a broad range of applications in electronics as well as conventional switchgear installations; a wide range of operating voltages ensures universal use.
Now available as IP 55 version with significantly higher airflow capacity and extended service life.



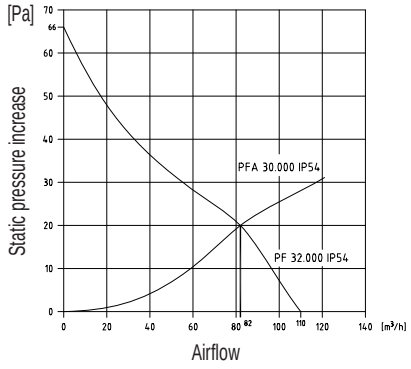
Airflow data	PF 32.000	PFA 30.000
Filter mat	IP 54: IP 54-filter mat - IP 55: fluted filter	
Airflow free-flow	IP 54: 110 m³/h; 50 Hz / 125 m³/h; 60 Hz - IP 55: 100 m³/h; 50 Hz / 110 m³/h; 60 Hz	-
Capacity free-flow	IP 54: 37 W/K / 42 W/K - IP 55: 33 W/K / 37 W/K	-
Airflow in combination (filterfan + exhaust filter)	IP 54: 82 m³/h; 50 Hz / 93 m³/h; 60 Hz - IP 55: 55 m³/h; 50 Hz / 64 m³/h; 60 Hz (PF 32.000 + PFA 30.000)	-
Capacity in combination (filterfan + exhaust filter)	IP 54: 27 W/K / 31 W/K - IP 55: 18 W/K / 21 W/K (PF 32.000 + PFA 30.000)	-
Max. static pressure (Airflow = 0 m³/h)	IP 54: 66 Pa - IP 55: 61 Pa	-
Filtration efficiency	IP 54: 88% - IP 55: 91%	
Filter material grade	IP 54: G 3 - IP 55: G 4 (DIN EN 779)	
Duty cycle	100%	-

Technical data	PF 32.000		PFA 30.000
	AC	DC	
Outside dimensions in mm (Height x Width x Installation depth)	202 x 202 x 87	202 x 202 x 81	202 x 202 x 34
Bearing type	sleeve bearings	ball bearings	-
Fitting position	vertical	any	any
Construction	housing and guard of sprayed thermoplastic, self-extinguishing UL 94 V0, IP55: UV resistant		
Weight	0,87 kg	0,61 kg	0,26 kg
Safety protection	according to EN 60529		-
Colour	RAL 7035, RAL 7032 or black, other colours available on request		
Type of connection	terminal strip	cage clamp	-

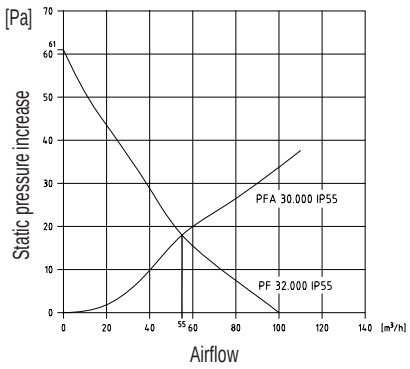
Electrical data	PF 32.000				
	AC 50 Hz / 60 Hz		DC		
Rated voltage +/- 10%	230 V	115 V	12 V	24 V	48 V
Power consumption	19 W / 18 W	20 W / 20 W	5 W	5 W	5 W

Airflow data:

PF 32.000 IP 54

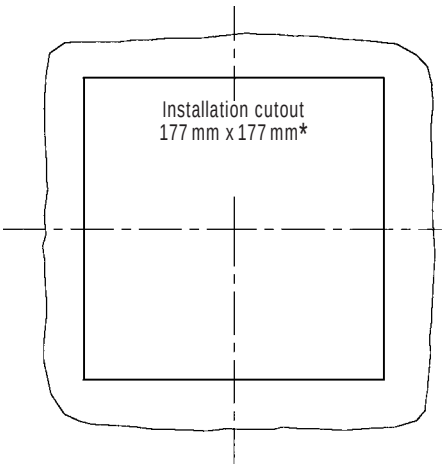


PF 32.000 IP 55



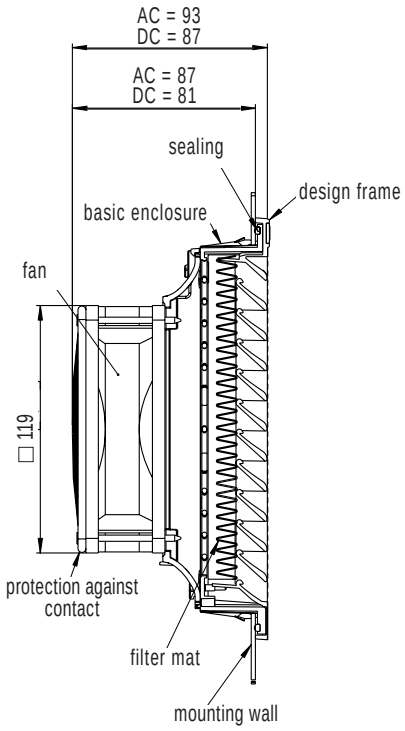
Installation cutout:

PF 32.000 + PFA 30.000

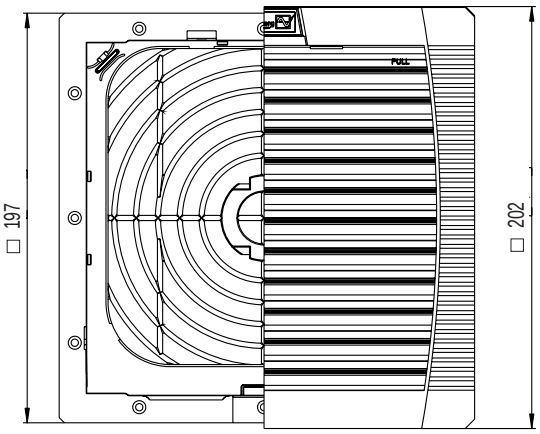


Mechanical data:

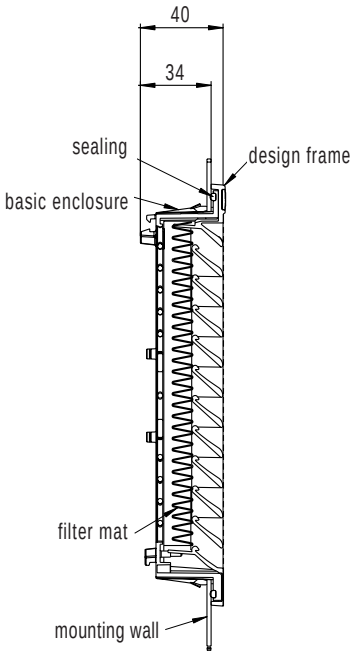
PF 32.000



PF 32.000 + PFA 30.000



PFA 30.000

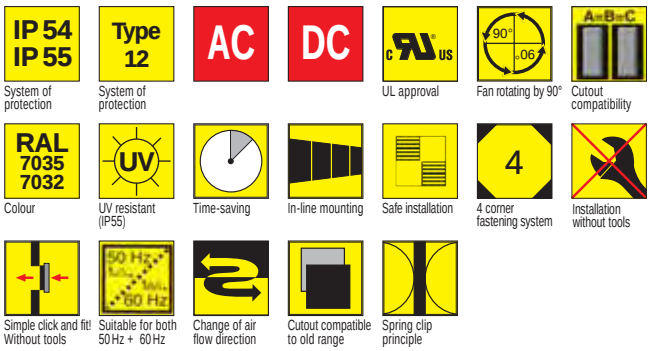


Supplementary data	PF 32.000 AC	PF 32.000 DC	PFA 30.000
Climatic data			
Operating temperature	−15 °C (- 5 °F) to +55 °C (+ 131 °F)		
Storage temperature	−20 °C (- 4 °F) to +70 °C (+ 158 °F)		
Max. relative humidity	90%		
System of protection	IP 54 or IP 55 (EN 60529), when used as recommended		
Basic parts kit	filter mat, user manual		
Accessories	radiant heater, fan heater, thermostat, hygrostat		
Approvals	UL approval		
* Tolerance installation cutout	177 $^{+1}_{-0}$ thickness of material to 2 mm 178 $^{+1}_{-0}$ thickness of material > 2 mm ≤ 3 mm		

Filterfan PF 42.500, PF 43.000
Exhaust Filter PFA 40.000

PF 42.500 / PF 43.000

For optimum flexibility to suit medium range applications in plant and machine equipment. Two levels of capacity in one single installation cutout.
Now available as IP 55 version with significantly higher airflow capacity and extended service life.



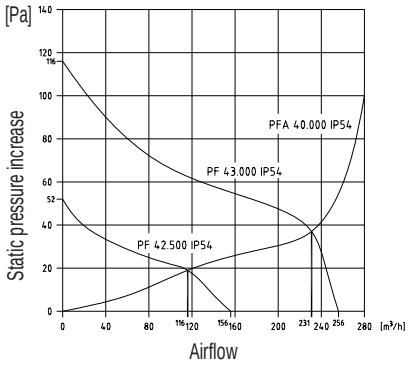
Airflow data	PF 42.500	PF 43.000	PFA 40.000
Filter mat	IP 54: IP 54-filter mat - IP 55: fluted filter		
Airflow free-flow	IP 54: 156 m³/h; 50 Hz / 171 m³/h; 60 Hz IP 55: 145 m³/h; 50 Hz / 160 m³/h; 60 Hz	IP 54: 256 m³/h; 50 Hz / 292 m³/h; 60 Hz IP 55: 233 m³/h; 50 Hz / 265 m³/h; 60 Hz	-
Capacity free-flow	IP 54: 52 W/K / 57 W/K - IP 55: 48 W/K / 53 W/K	IP 54: 85 W/K / 97 W/K - IP 55: 78 W/K / 88 W/K	-
Airflow in combination (filterfan + exhaust filter)	IP 54: 116 m³/h; 50 Hz / 127 m³/h; 60 Hz IP 55: 109 m³/h; 50 Hz / 113 m³/h; 60 Hz (PF 42.500 + PFA 40.000)	IP 54: 231 m³/h; 50 Hz / 265 m³/h; 60 Hz IP 55: 180 m³/h; 50 Hz / 207 m³/h; 60 Hz (PF 43.000 + PFA 40.000)	-
Capacity in combination (filterfan + exhaust filter)	IP 54: 39 W/K / 36 W/K - IP 55: 37 W/K / 38 W/K (PF 43.000 + PFA 40.000)	IP 54: 77 W/K / 88 W/K - IP 55: 60 W/K / 69 W/K (PF 43.000 + PFA 40.000)	-
Max. static pressure (Airflow = 0 m³/h)	IP 54: 52 Pa - IP 55: 49 Pa	IP 54: 116 Pa - IP 55: 112 Pa	-
Filtration efficiency	IP 54: 88% - IP 55: 91%		
Filter material grade	IP 54: G 3 - IP 55: G 4 (DIN EN 779)		
Duty cycle	100%		-

Technical data	PF 42.500		PF 43.000		PFA 40.000
	AC	DC	AC	DC	
Outside dimensions in mm (Height x Width x Installation depth)	252 x 252 x 97		252 x 252 x 113	252 x 252 x 97	252 x 252 x 38
Bearing type	ball bearings				-
Fitting position	any, horizontal airflow preferred				any
Construction	housing and guard of sprayed thermoplastic, self-extinguishing UL 94 V0, IP 55: UV resistant				
Weight	1,18 kg	0,92 kg	1,67 kg	1,51 kg	0,46 kg
Safety protection	according to EN 60529				-
Colour	RAL 7035, RAL 7032 or black, other colours available on request				
Type of connection	cage clamp				-

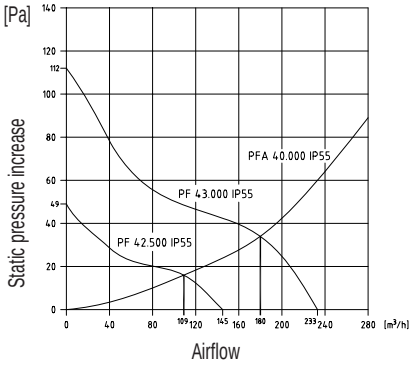
Electrical data	PF 42.500					
	AC 50 Hz / 60 Hz			DC		
Rated voltage +/- 10%	230 V		115 V	12 V	24 V	48 V
Power consumption	18 W / 17 W		18 W / 17 W	5 W	4,7 W	4,6 W
	PF 43.000					
	AC 50 Hz / 60 Hz			DC		
Rated voltage +/- 10%	400 V 2~	230 V	115 V	12 V	24 V	48 V
Power consumption	41 W / 38 W	45 W / 39 W	40 W / 40 W	12 W	12 W	12 W

Airflow data:

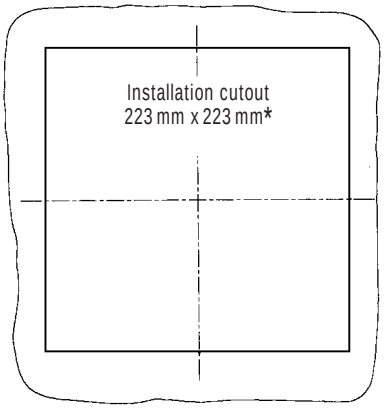
PF 42.500 / PF 43.000 IP 54



PF 42.500 / PF 43.000 IP 55

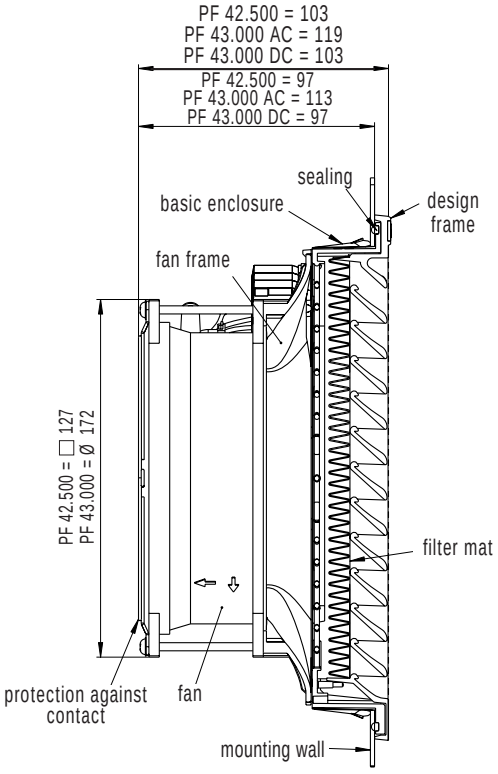


Installation cutout:
PF 42.500, PF 43.000 + PFA 40.000

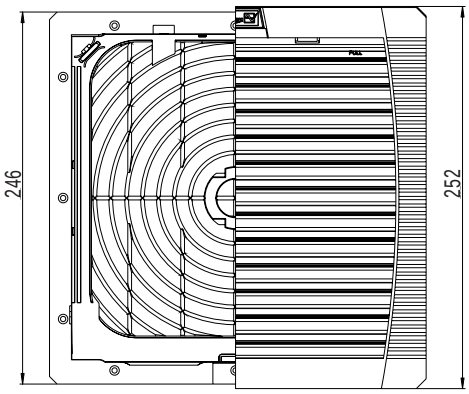


Mechanical data:

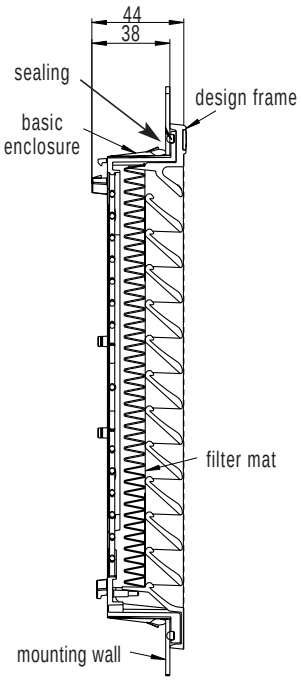
PF 42.500 + PF 43.000



PF 42.500. PF 43.000 + PFA 40.000



PFA 40.000



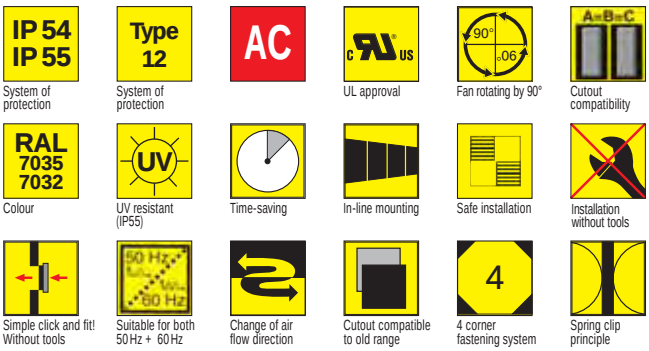
Supplementary data	PF 42.500 / PF 43.000 AC	PF 42.500 / PF 43.000 DC	PFA 40.000
Climatic data			
Operating temperature	– 15 °C (- 5 °F) to + 55 °C (+ 131 °F)		
Storage temperature	– 20 °C (- 4 °F) to + 70 °C (+ 158 °F)		
Max. relative humidity	90%		
System of protection	IP 54 or IP 55 (EN 60 529), when used as recommended		
Basic parts kit	filter mat, user manual		
Accessories	radiant heater, fan heater, thermostat, hygrostat		
Approvals	UL approval		
* Tolerance installation cutout	223^{+1}_{0} thickness of material to 2 mm 224^{+1}_{0} thickness of material > 2 mm ≤ 3 mm		

Filterfan PF 65.000, PF 66.000, PF 67.000
Exhaust Filter PFA 60.000

Cutout compatible with cooling unit DTFI 9021 see page 24

PF 65.000 / PF 66.000 / PF 67.000

For optimum flexibility to suit large switchgear installations where extreme heat extraction is needed whilst maintaining the required IP rating. Three levels of capacity in one single installation cutout.
Now available as IP 55 version with significantly higher airflow capacity and extended service life.



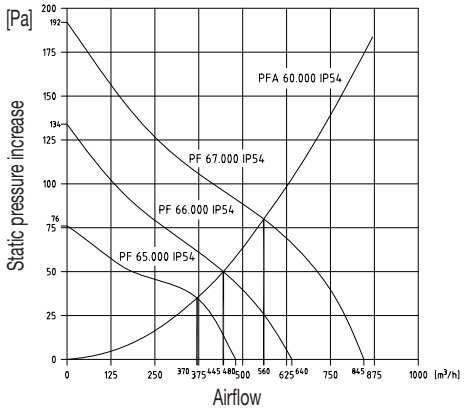
Airflow data	PF 65.000	PF 66.000	PF 67.000	PFA 60.000
Filter mat	IP 54: IP 54-filter mat - IP 55: fluted filter			
Airflow free-flow	IP54: 480m³/h; 50Hz / 480m³/h; 60Hz IP55: 505m³/h; 50Hz / 505m³/h; 60Hz	IP54: 640m³/h; 50Hz / 653m³/h; 60Hz IP55: 770m³/h; 50Hz / 785m³/h; 60Hz	IP54: 845m³/h; 50Hz / 875m³/h; 60Hz IP55: 925m³/h; 50Hz / 950m³/h; 60Hz	-
Capacity free-flow	IP 54: 160 W/K / 160 W/K IP 55: 168 W/K / 168 W/K	IP 54: 213 W/K / 218 W/K IP 55: 257 W/K / 262 W/K	IP 54: 282 W/K / 292 W/K IP 55: 308 W/K / 317 W/K	-
Airflow in combination (filterfan + exhaust filter)	IP54: 370m³/h; 50Hz / 370m³/h; 60Hz IP55: 380m³/h; 50Hz / 380m³/h; 60Hz (PF 65.000 + PFA 60.000)	IP54: 445m³/h; 50Hz / 445m³/h; 60Hz IP55: 490m³/h; 50Hz / 501m³/h; 60Hz (PF 66.000 + PFA 60.000)	IP54: 560m³/h; 50Hz / 625m³/h; 60Hz IP55: 570m³/h; 50Hz / 625m³/h; 60Hz (PF 67.000 + PFA 60.000)	-
Capacity in combination (filterfan + exhaust filter)	IP 54: 123 W/K / 123 W/K IP 55: 127 W/K / 127 W/K (PF 65.000 + PFA 60.000)	IP 54: 148 W/K / 148 W/K IP 55: 163 W/K / 167 W/K (PF 66.000 + PFA 60.000)	IP 54: 187 W/K / 208 W/K IP 55: 190 W/K / 208 W/K (PF 67.000 + PFA 60.000)	-
Max. static pressure (Airflow = 0 m³/h)	IP 54: 76 Pa - IP 55: 74 Pa	IP 54: 134 Pa - IP 55: 134 Pa	IP 54: 192 Pa - IP 55: 187 Pa	-
Filtration efficiency	91 %			91 %
Filter material grade	G 4 (DIN EN 779)			G 4 (DIN EN 779)
Duty cycle	100%			-

Technical data	PF 65.000	PF 66.000	PF 67.000	PFA 60.000
Outside dimensions in mm (Height x Width x Installation depth)	320 x 320 x 150	320 x 320 x 150	320 x 320 x 150	320 x 320 x 39
Bearing type	ball bearings			-
Fitting position	any, horizontal airflow preferred			any
Construction	housing and guard of sprayed thermoplastic, self-extinguishing, UL 94 V0, IP 55: UV resistant			
Weight	3,2 kg	3,2 kg	3,7 kg	0,7 kg
Safety protection	according to EN 60529			-
Colour	RAL 7035, RAL 7032, other colours available on request			
Type of connection	cage clamp			-

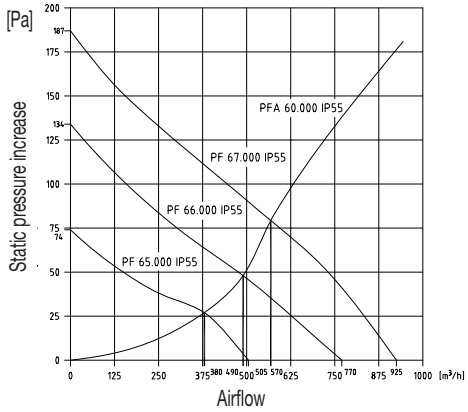
Electrical data	AC 50 Hz / 60 Hz							
	PF 65.000		PF 66.000			PF 67.000		
Rated voltage +/- 10%	230 V	115 V	400 V / 460 V 3~	230 V	115 V	400 V / 460 V 3~	230 V	115 V
Power consumption	65 W / 80 W	75 W / 90 W	120 W / 155 W	115 W / 150 W	110 W / 160 W	on request	135 W / 215 W	140 W / 195 W

Airflow data:

PF 65.000 / PF 66.000 / PF 67.000 IP 54

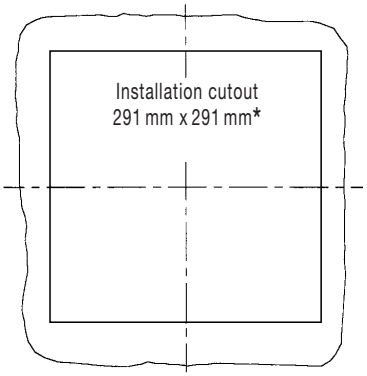


PF 65.000 / PF 66.000 / PF 67.000 IP 55



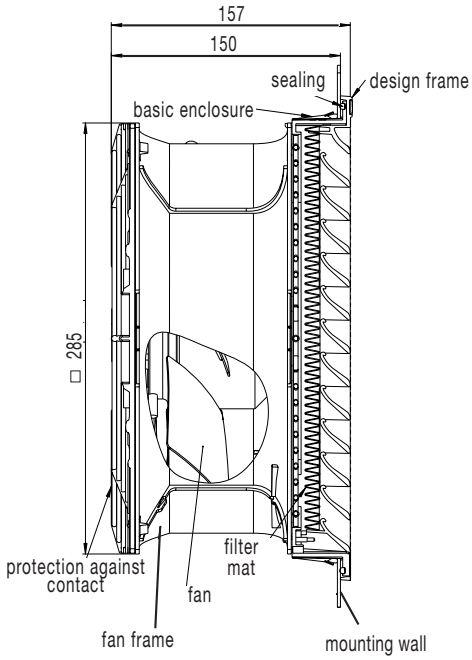
Installation cutout:

PF 65.000, PF 66.000, PF 67.000 + PFA 60.000

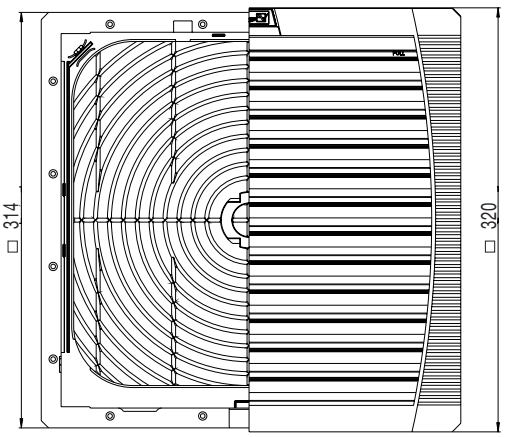


Mechanical data:

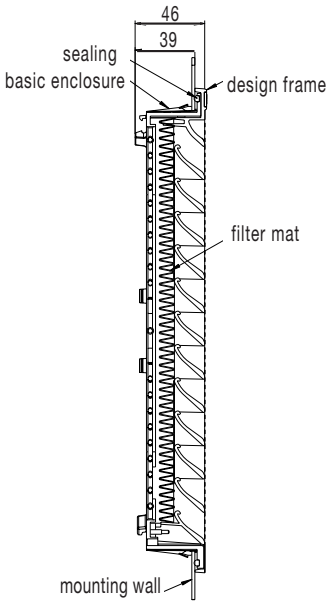
PF 65.000. PF 66.000, PF 67.000



PF 65.000, PF 66.000, PF 67.000 + PFA 60.000



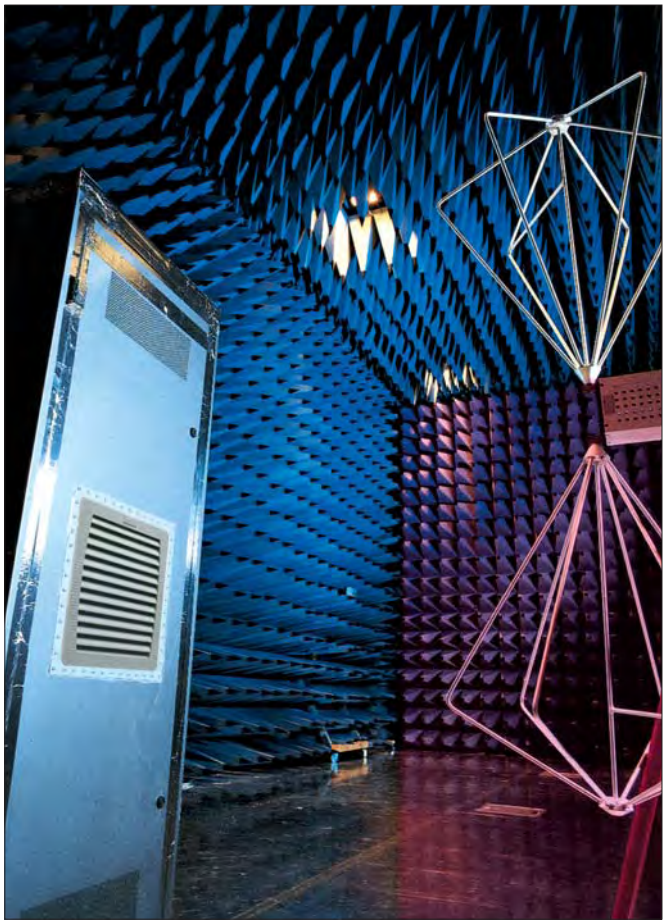
PFA 60.000



Supplementary data	PF 65.000	PF 66.000	PF 67.000	PFA 60.000
Climatic data				
Operating temperature	−15 °C (+ 5 °F) to + 55 °C (+ 131 °F)			
Storage temperature	− 20 °C (- 4 °F) to + 70 °C (+ 158 °F)			
Max. relative humidity	90%			
System of protection	IP 54 or IP 55 (EN 60 529), when used as recommended			
Basic parts kit	filter mat, user manual			
Accessories	radiant heater, fan heater, thermostat, hygrostat			
* Tolerance installation cutout	$291\,^{+1}_{0}$ thickness of material to 2 mm $292\,^{+1}_{0}$ thickness of material > 2 mm ≤ 3 mm			
Approvals	UL approval			

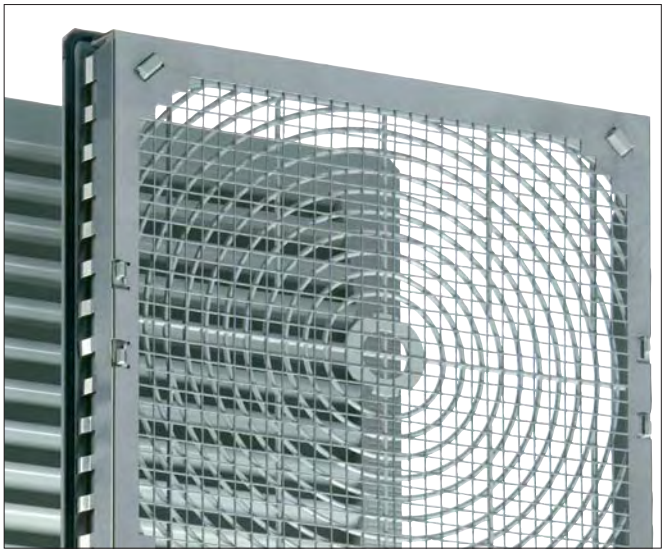
EMC-shielded Filterfans

Series PF 11.000 EMC – PF 67.000 EMC
PFA 10.000 EMC – PFA 60.000 EMC



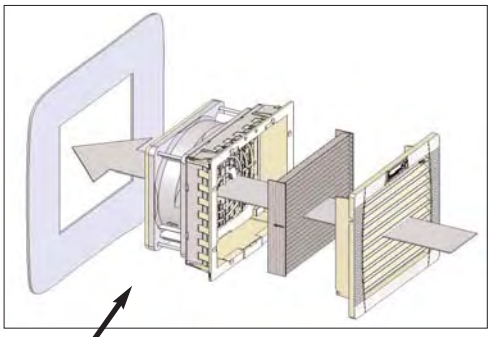
When filterfans are used for cooling, it is necessary to include openings in the enclosure that allow the electromagnetic waves to pass in and out unimpeded. Pfannenberg has the solution: the widest range of EMC-shielded filterfans.

At an air volume flow of 25 m^3/h to 845 m^3/h you will also find the most suitable combination of EMC-shielded filterfans / exhaust filters for your needs. In accordance with our company policy we have dispensed with metallised plastics as these are difficult to recycle.



New surface-to-surface contact:

- unmatched, worldwide: contact surface without copper seal!!!



No extensive extra work on the installation cutout

- no copper band or similar auxiliary materials to glue in place
- no need to scratch away layers of material to ensure surface-to-surface contact

- surface-to-surface contact made via edge of the cutout for the filterfan or exhaust filter

EMC – Electromagnetic compatibility

Standards define electromagnetic compatibility abbreviated to "EMC" roughly as the ability of a component, device or system to function satisfactorily under the influence of surrounding electromagnetic fields without inadmissibly affecting the ambience and any other electrical equipment therein.

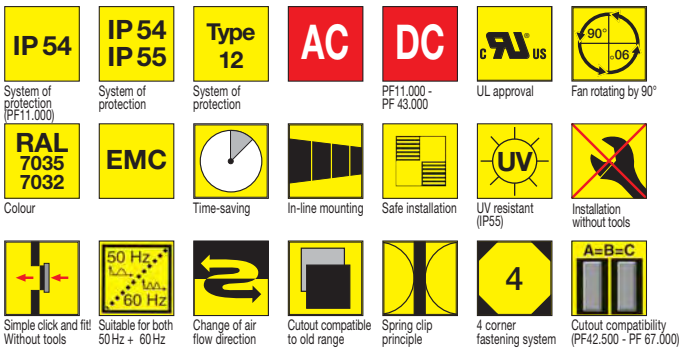
Our EMC-shielded filterfans affect the EMC shielding of your enclosure as follows:

Damping at 30 MHz approx. 71 dB
Damping at 400 MHz approx. 57 dB
Measured according to EN 50 147 – 1 (1996)

EMC-shielded Filterfans IP 54 / IP 55
EMC-shielded Exhaust Filters IP 54 / IP 55

Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY

- **innovative surface-to-surface contact** along the edge of the cutout makes mounting a simple task
- **reliable surface-to-surface contact** by means of specially shaped contact springs on screen grid
- now available as IP 55 version with significantly higher airflow capacity and extended service life (PF 22.000 - PF 67.000)



EMC-shielded Filterfans IP 54

Model	PF 11.000 EMC	PF 22.000 EMC	PF 32.000 EMC	PF 42.500 EMC	PF 43.000 EMC	PF 65.000 EMC	PF 66.000 EMC	PF 67.000 EMC
Airflow volume (free-flow) *	25 m³/h	61 m³/h	110 m³/h	156 m³/h	256 m³/h	480 m³/h	640 m³/h	845 m³/h
Cooling capacity (free-flow)	8 W/K	20 W/K	37 W/K	52 W/K	85 W/K	160 W/K	213 W/K	282 W/K
Airflow volume (in combination)*	16 m³/h (with PFA 10.000)	44 m³/h (with PFA 20.000)	82 m³/h (with PFA 30.000)	116 m³/h (with PFA 40.000)	231 m³/h (with PFA 40.000)	370 m³/h (with PFA 60.000)	445 m³/h (with PFA 60.000)	560 m³/h (with PFA 60.000)
Cooling capacity (in combination)	5 W/K (with PFA 10.000)	15 W/K (with PFA 20.000)	27 W/K (with PFA 30.000)	39 W/K (with PFA 40.000)	77 W/K (with PFA 40.000)	123 W/K (with PFA 60.000)	148 W/K (with PFA 60.000)	187 W/K (with PFA 60.000)
Type of filter mat	IP 54-filter mat G 3					IP 54-filter mat G 4		
Max. static pressure	38 Pa	60 Pa	66 Pa	52 Pa	116 Pa	76 Pa	134 Pa	192 Pa

* at 50 Hz

EMC-shielded Filterfans IP 55

Model	PF 22.000 EMC	PF 32.000 EMC	PF 42.500 EMC	PF 43.000 EMC	PF 65.000 EMC	PF 66.000 EMC	PF 67.000 EMC
Airflow volume (free-flow) *	56 m³/h	100 m³/h	145 m³/h	233 m³/h	505 m³/h	770 m³/h	925 m³/h
Cooling capacity (free-flow)	19 W/K	33 W/K	48 W/K	78 W/K	168 W/K	257 W/K	308 W/K
Airflow volume (in combination)*	40 m³/h (with PFA 20.000)	55 m³/h (with PFA 30.000)	109 m³/h (with PFA 40.000)	180 m³/h (with PFA 40.000)	380 m³/h (with PFA 60.000)	490 m³/h (with PFA 60.000)	570 m³/h (with PFA 60.000)
Cooling capacity (in combination)	13 W/K (with PFA 20.000)	18 W/K (with PFA 30.000)	37 W/K (with PFA 40.000)	60 W/K (with PFA 40.000)	113 W/K (with PFA 60.000)	147 W/K (with PFA 60.000)	190 W/K (with PFA 60.000)
Type of filter mat	fluted filter G 4						
Max. static pressure	57 Pa	61 Pa	49 Pa	112 Pa	74 Pa	134 Pa	187 Pa

* at 50 Hz

EMC-shielded Filterfans IP 54 / IP 55

Model		PF 11.000 EMC	PF 22.000 EMC	PF 32.000 EMC	PF 42.500 EMC	PF 43.000 EMC	PF 65.000 EMC	PF 66.000 EMC	PF 67.000 EMC
Rated voltages available	AC	230 V, 115 V	230 V, 115 V	230 V, 115 V	230 V, 115 V	230 V, 115 V, 400 V 2~	230V, 115V	230V, 115V, 3x400V	230V, 115V, 3x400V
	DC	12 V, 24 V, 48 V	12 V, 24 V, 48 V	12 V, 24 V, 48 V	12 V, 24 V, 48 V	12 V, 24 V, 48 V			
Height x Width Installation depth		109 x 109 mm AC 62 / DC 49 mm	145 x 145 mm AC 70 / DC 64 mm	202 x 202 mm AC 87 / DC 81 mm	252 x 252 mm 97 mm	252 x 252 mm AC 113 / DC 97 mm	320 x 320 mm 150 mm	320 x 320 mm 150 mm	320 x 320 mm 150 mm
Cutout dimensions		93 mm ± 0,5 mm	126,5 mm ± 0,5 mm	178 mm ± 0,5 mm	224 mm ± 0,5 mm	224 mm ± 0,5 mm	292 mm ± 0,5 mm	292 mm ± 0,5 mm	292 mm ± 0,5 mm
Operating temperature		−15 °C (+ 5 °F) to + 55 °C (+ 131 °F)							
Storage temperature		−20 °C (− 4 °F) to + 70 °C (+ 58 °F)							
Material		thermoplastic, self-extinguishing, UL 94 V0, IP 55: UV resistant							
EMC shielding		**stainless steel**							
Approvals		UL approval							

EMC-shielded Exhaust Filters IP 54 / IP 55

Model	PFA 10.000 EMC (IP 54)	PFA 20.000 EMC	PFA 30.000 EMC	PFA 40.000 EMC	PFA 60.000 EMC
H x W x ID	109 x 109 x 19 mm	145 x 145 x 26 mm	202 x 202 x 34 mm	252 x 252 x 38 mm	320 x 320 x 39 mm
Cutout dimensions	93 mm ± 0,5 mm	126,5 mm ± 0,5 mm	178 mm ± 0,5 mm	224 mm ± 0,5 mm	292 mm ± 0,5 mm
Material	thermoplastic, self-extinguishing, UL 94 V0, IP 55: UV resistant				
EMC shielding	**stainless steel**				

Filterfans 3rd Generation - Overview

Filterfan - Model PF


Click and fit!

System of protection


Installation without tools

only for PF 2000 – PF 6000

... "click and fit" –
the patented quick-action snap-fit system for rapid installation of filterfans without screws or bolts
(PF 2000 EMC – PF 6000 EMC filterfans see page 107)

Model	Rated voltage	Power	Airflow / Cooling capacity free-flow	Airflow / Cooling capacity in combination PF + PFA	Installation cutout at wall thickness ≤2mm	Installation cutout at wall thickness >2mm ≤3mm	UL version	page
PF 1.000*	230 V / 115 V AC	12 W / 12 W	24 m³/h / 8 W/K	15 m³/h / 5 W/K (PF 1.000 + PFA 1.000)	92 x 92 mm	92 x 92 mm	yes	96
	12 V / 24 V / 48 V DC	2,4 W / 2,4 W / 2,6 W					-	
PF 2.000	230 V / 115 V AC	19 W / 20 W	58 m³/h / 19 W/K	43 m³/h / 14 W/K (PF 2.000 + PFA 2.000)	125 x 125 mm	126 x 126 mm	yes	98
	12 V / 24 V / 48 V DC	5,0 W						
PF 2.500	230 V / 115 V AC	18 W / 18 W	155 m³/h / 52 W/K	108 m³/h / 36 W/K (PF 2.500 + PFA 3.000)	223 x 223 mm	224 x 224 mm	yes	100
	12 V / 24 V / 48 V DC	5 W / 4,7 W / 4,6 W						
PF 3.000	230 V / 115 V AC	45 W / 40 W	255 m³/h / 85 W/K	231 m³/h / 77 W/K (PF 3.000 + PFA 3.000)	223 x 223 mm	224 x 224 mm	yes	100
	~ 400 V / 50 / 60 Hz	41 W					-	
	12 V / 24 V / 48 V DC	12 W / 18 W / 17 W					yes	
PF 5.000	230 V / 115 V AC	74 W / 82 W	478 m³/h / 159 W/K	368 m³/h / 122 W/K (PF 5.000 + PFA 6.000)	291 x 291 mm	292 x 292 mm	yes	102
PF 6.000	~ 400 V / 3 phases 50 / 60 Hz	110 W / 160 W	606 m³/h / 201 W/K	437 m³/h / 145 W/K (PF 6.000 + PFA 6.000)	291 x 291 mm	292 x 292 mm	yes	102
	230 V / 115 V AC	165 W / 155 W						
PF 7.000	230 V / 115 V AC	195W / 165 W	755 m³/h / 245 W/K	545 m³/h / 175 W/K PF 7.000 + PFA 6.000	291 x 291 mm	292 x 292 mm	yes	102
	400 V / 3 phases 50 / 60 Hz	106 W / 145 W						

Exhaust Filters - Model PFA

Model	Installation cutout at wall thickness ≤2mm	Installation cutout at wall thickness >2mm ≤3mm	UL version	page
PFA 1.000	92 x 92 mm	92 x 92 mm	yes	104
PFA 2.000	125 x 125 mm	126 x 126 mm	yes	104

Model	Installation cutout at wall thickness ≤2mm	Installation cutout at wall thickness >2mm ≤3mm	UL version	page
PFA 3.000	223 x 223 mm	224 x 224 mm	yes	104
PFA 6.000	291 x 291 mm	292 x 292 mm	yes	104

* PF 1.000 IP 43

Filterfans - Model PF IP 55


Click and fit!

System of protection


Installation without tools

UV resistant

only for PF 2000 – PF 6000

... "click and fit" –
the patented quick-action snap-fit system for rapid installation of filterfans without screws or bolts

Model	Rated voltage	Power	Airflow free-flow	Airflow in combination PF + PFA	Installation cutout at wall thickness ≤2mm	Installation cutout at wall thickness >2mm ≤3mm	UL version	page
PF 2.000	230 V / 115 V	19 W / 20 W	28 m³/h; 50 Hz / 32 m³/h; 60 Hz	20 m³/h; 50 Hz / 23 m³/h; 60 Hz (PF 2.000 und PFA 2.000)	125 x 125 mm	126 x 126 mm	yes	108
PF 2.500	230 V / 115 V	19 W / 18 W	87 m³/h; 50 Hz / 103 m³/h; 60 Hz	55 m³/h; 50 Hz / 64 m³/h; 60 Hz (PF 2.500 und PFA 3.000)	223 x 223 mm	224 x 224 mm	yes	108
PF 3.000	230 V / 115 V	45 W / 40 W	134 m³/h; 50 Hz / 161 m³/h; 60 Hz	114 m³/h; 50 Hz / 134 m³/h; 60 Hz (PF 3.000 und PFA 3.000)	223 x 223 mm	224 x 224 mm	yes	108
PF 5.000	230 V / 115 V	74 W / 82 W	319 m³/h; 50 Hz / 374 m³/h; 60 Hz	255 m³/h; 50 Hz / 299 m³/h; 60 Hz (PF 5.000 und PFA 6.000)	291 x 291 mm	292 x 292 mm	yes	108
PF 6.000	230 V / 115 V	165 W / 155 W	379 m³/h; 50 Hz / 404 m³/h; 60 Hz	281 m³/h; 50 Hz / 312 m³/h; 60 Hz (PF 6.000 und PFA 6.000)	291 x 291 mm	292 x 292 mm	yes	108
PF 7.000	230 V / 115 V	185 W / 165 W	415 m³/h; 50 Hz / 477 m³/h; 60 Hz	327 m³/h; 50 Hz / 376 m³/h; 60 Hz (PF 7.000 und PFA 6.000)	291 x 291 mm	292 x 292 mm	yes	108

Exhaust Filters - Model PFA IP 55

Model	Installation cutout at wall thickness ≤2mm	Installation cutout at wall thickness >2mm ≤3mm	UL version	page
PFA 2.000	125 x 125 mm	126 x 126 mm	yes	110
PFA 3.000	223 x 223 mm	224 x 224 mm	yes	110
PFA 6.000	291 x 291 mm	292 x 292 mm	yes	110

Exhaust Filters - Model PF EMC IP 55

Model	Installation cutout bei Wandstärke ≤3mm	UL version	page
PFA 2.000	126,5 x 126,5 mm ±0,5	yes	107
PFA 3.000	224 x 224 mm ±0,5	yes	107
PFA 6.000	292 x 292 mm ±0,5	yes	107

Other voltages are available on request for all filterfans

PF-Series **S**lim **L**ine – Filterlüfter with geringer Installation depth

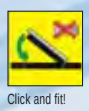

Click and fit!

System of protection


Installation without tools

... "click and fit" –
the patented quick-action snap-fit system for rapid installation of filterfans without screws or bolts

Model	Rated voltage	Power	Airflow free-flow	Airflow in combination PF + PFA	Installation cutout at wall thickness ≤2 mm	Installation cutout at wall thickness >2 mm ≤3 mm	UL version	page
PF 3000 SL	207…244 V / 103…122 V	46 / 44 W / 48 / 48 W	140 m³/h	114 m³/h (PF 3000 SL + PFA 3000)	223 x 223 mm	224 x 224 mm	yes	112
PF 6000 SL 2	207…244 V / 103…122 V	92 / 88 W / 96 / 92 W	260 m³/h	205 m³/h (PF 6000 SL 2 + PFA 6000)	291 x 291 mm	292 x 292 mm	yes	113
PF6500 SL 1	207…244 V / 103…122 V	64 / 80W / 64 / 80 W	545 m³/h	410 m³/h (PF 6500 SL 1 + PFA 6000)	291 x 291 mm	292 x 292 mm	yes	114


Click and fit!

System of protection

System of protection


Installation without tools

Top Fans Series PTF - Filterfans for roof mounting

NEW!

Model	Rated voltage	Power 50 Hz	Power 60 Hz	Airflow free-flow [m³/h]	Airflow in combination PTF + PFA [m³/h]	Installation cutout	UL version	page
PTF 60.500	230 V / 115 V	4x28 / 4x29 W	4x24 / 4x24 W	500 (IP 33); 350 (IP 54)	260 (IP 33); 230 (IP 54) (PTF 60.500 + PFA 6000)	291 x 291 mm*	yes	116
PTF 60.700	230 V / 115 V	65 / 75 W	80 / 90 W	700 (IP 33); 550 (IP 54)	400 (IP 33); 350 (IP 54) (PTF 60.7000 + PFA 6000)	291 x 291 mm*	yes	116
PTF 61.000	230 V / 115 V	115 / 110 W	150 / 170 W	1000 (IP 33); 750 (IP 54)	550 (IP 33); 470 (IP 54) (PTF 61.0000 + PFA 6000)	291 x 291 mm*	yes	116

* depending on wall thickness

Top Exhaust Filters for roof mounting - Model PTFA

Model	Installation cutout at wall thickness ≤2 mm	Installation cutout at wall thickness >2 mm ≤3 mm	UL version	page
PTFA 60.000	291 x 291 mm	292 x 292 mm	yes	117


Screw mounting

System of protection (FLF 02 IP 43)

Filterfans for Enclosures - Model FLF

Model	Rated voltage	Power	Airflow free-flow	Airflow in combination FLF + AFF	Installation cutout	UL version	page
FLF 02	230 V / 115 V AC	19 W	63 m³/h	38 m³/h (FLF 02 + AFF 02)	Ø 116 mm	——	115
	12 V / 24 V / 48 V DC	5 W					
FLF 01	230 V / 115 V AC	19 W	59 m³/h	37 m³/h (FLF 01 + AFF 01)	Ø 116 mm	——	115
	12 V / 24 V DC	5 W					
FLF 0-E	230 V / 115 V AC	19 W	58 m³/h (integrated)		200 x 200 mm	——	115
	12 V / 24 V / 48 V DC	5 W					
FLF 0	230 V / 115 V AC	19 W	73 m³/h	63 m³/h (FLF 0 + AFF 0)	200 x 200 mm	——	115
	12 V / 24 V / 48 V DC	5 W					
FLF I	230 V / 115 V AC	19 W	71 m³/h	65 m³/h (FLF I + AFF I)	300 x 200 mm	——	115
FLF II	230 V / 115 V AC	41 W	184 m³/h	151 m³/h (FLF II + AFF I)	300 x 200 mm	——	115
FLF III	230 V / 115 V AC	165 W / 155 W	756 m³/h	591 m³/h (FLF III + AFF III)	300 x 300 mm	——	115
	3 x 400 V AC	110 W / 160 W					

Exhaust Filters for Enclosures - Model AFF

Model	Installation cutout	UL version	page
AFF 02	Ø 116	——	115
AFF 01	Ø 116	——	115
AFF 0	200 x 200 mm	——	115
AFF I	300 x 200 mm	——	115
AFF III	300 x 300 mm	——	115

Other voltages are available on request for all filterfans

Filterfan PF 1.000

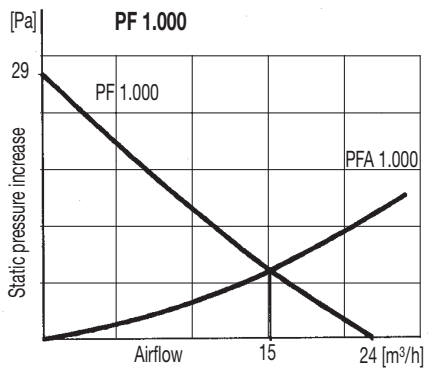
PF 1.000
For versatile incorporation into equipment. Examples are in the medical industry, in EDP equipment, warning and control enclosures and also for low power applications.

Airflow data	PF 1.000
Filter material (standard grade)	150 g/m²
Unimpeded airflow	24 m³/h; 50 Hz / 28 m³/h; 60 Hz
Capacity free-flow	8 W/K / 9 W/K
Airflow in combination (filterfan + exhaust filter)	15 m³/h; 50 Hz / 17 m³/h; 60 Hz (PF 1.000 + PFA 1.000)
Capacity in combination (filterfan + exhaust filter)	5 W/K / 6 W/K (PF 1.000 + PFA 1.000)
Max. static pressure (Airflow = 0 m³/h)	29 Pa
Filtration efficiency	73%
Filter material grade (DIN EN 779)	G 2
Noise level (DIN 45 635)	39 dB(A)
Duty cycle	100%

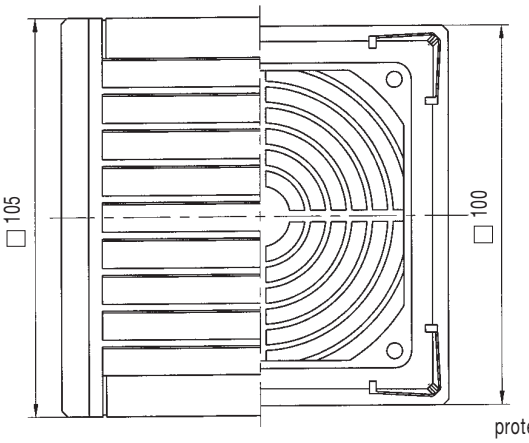
Technical data	PF 1.000	
	AC	DC
Outside dimensions in mm (Height x Width x Installation depth)	105 x 105 x 52	105 x 105 x 44
Bearing type	sleeve bearings	ball bearings
Fitting position	horizontal – vertical	any
Construction	housing and guard of sprayed thermoplastic (PC-FR) self-extinguishing, UL 94 VO	
Weight	0,60 kg	0,45 kg
Safety protection	according to EN 60529	
Colour	RAL 7035, RAL 7032 or black, other colours available on request	
Type of connection	2 wires, 310 mm long	

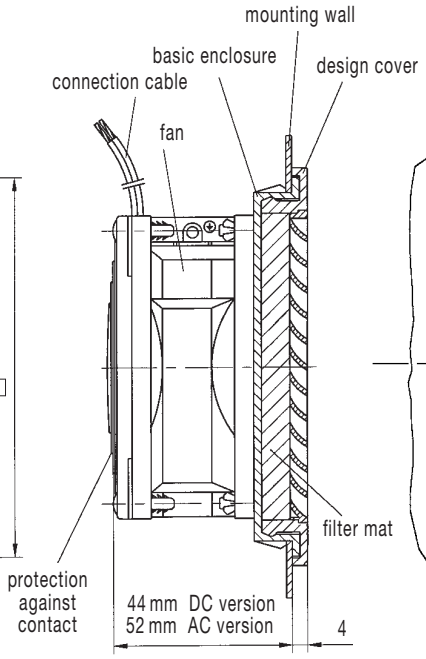
Electrical data	PF 1.000				
	AC 50 Hz / 60 Hz		DC		
Rated voltage	230 V	115 V	12 V	24 V	48 V
Voltage range	187 V ... 253 V	97 V ... 127 V	7 V ... 15 V	14 V ... 28 V	36 V ... 56 V
Power consumption	12 W / 11 W	12 W / 11 W	2,4 W	2,4 W	2,6 W

Airflow data:

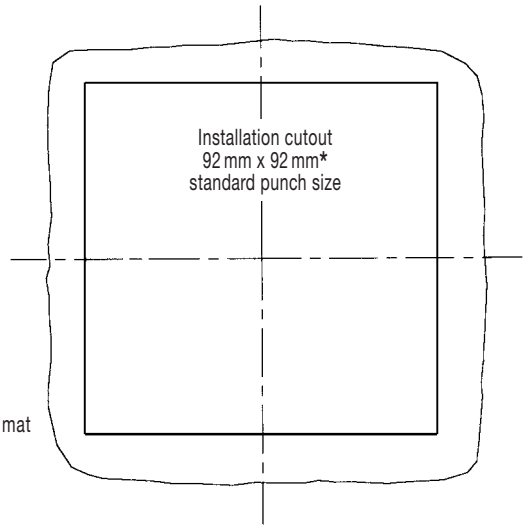


Mechanical data:





Installation cutout



Supplementary data	AC	DC
Climatic data		
Operating temperature	–10 °C to +60 °C	–20 °C to +60 °C
Storage temperature	–20 °C to +70 °C	
Max. relative humidity	90%	
System of protection	IP 43 (EN 60 529), when used as recommended, not for outdoor-application	
Basic parts kit	standard filter, mounting- and user manual	
Accessories	radiant heater, fan heater, thermostat, see Thermal Management	
Approvals	UL approval see overview filterfans	
* Tolerance installation cutout	92^{+1}_{-0}	

Filterfan PF 2.000

PF 2.000

For a broad range of applications in electronics as well as conventional switchgear installations; a wide range of operating voltages ensures universal usability.

- with integrated foamed on seal

IP 54 — System of protection

IP 55 — System of protection (see page 108)

AC

DC

Click and fit!

Installation without tools

RAL — Colour

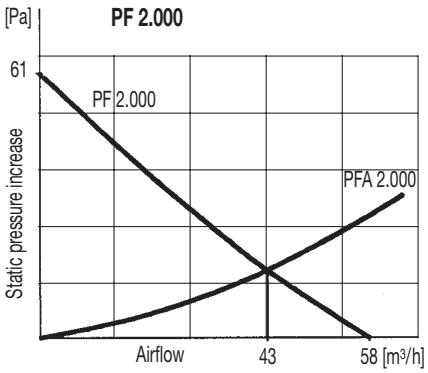
Airflow data	PF 2.000
Filter material*	150 g/m²
Unimpeded airflow	58 m³/h; 50 Hz / 65 m³/h; 60 Hz
Capacity free-flow	19 W/K / 22 W/K
Airflow in combination (filterfan + exhaust filter)	43 m³/h; 50 Hz / 49 m³/h; 60 Hz (PF 2.000 + PFA 2.000)
Capacity in combination (filterfan + exhaust filter)	14 W/K / 16 W/K (PF 2.000 + PFA 2.000)
Max. static pressure (Airflow = 0 m³/h)	61 Pa
Filtration efficiency	73%
Filter material grade (DIN EN 779)	G 2
Noise level (DIN 45 635)	49 dB(A)
Duty cycle	100%

* standard filter mat 150 g/m² (alternative filter mat in 350 g/m², 500 g/m²)

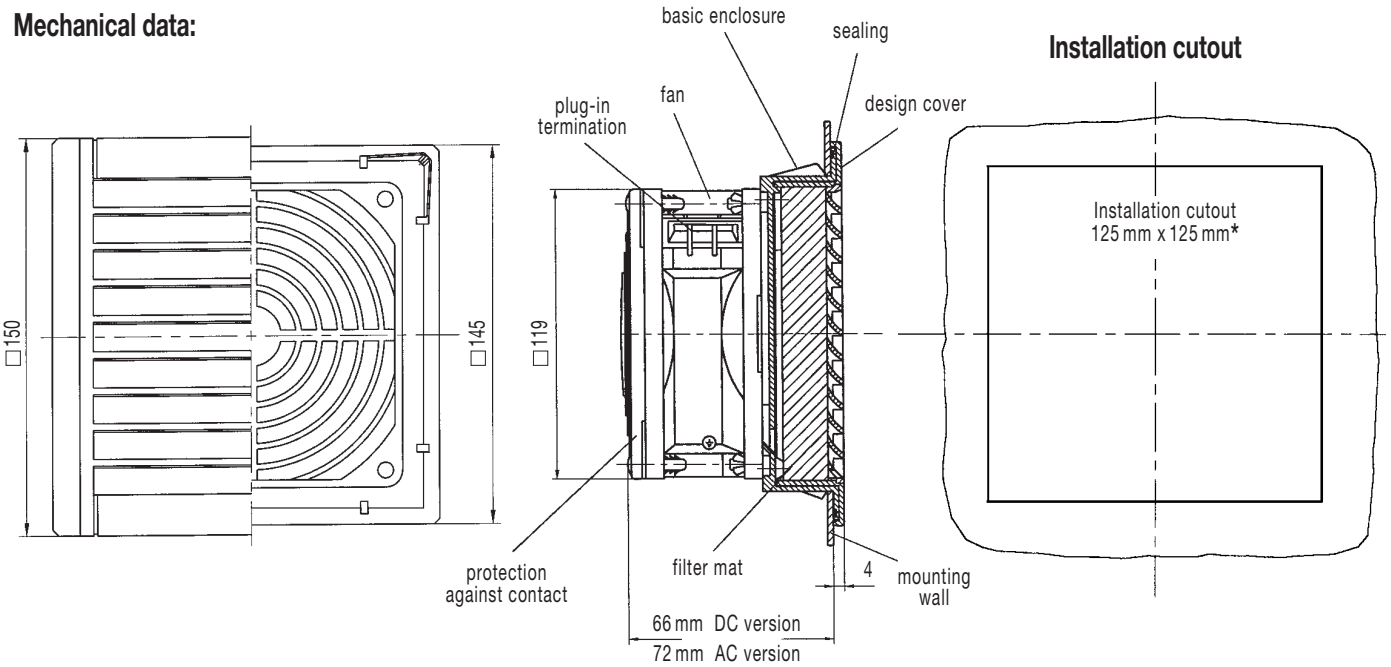
Technical data	PF 2.000	
	AC	DC
Outside dimensions in mm (Height x Width x Installation depth)	150 x 150 x 72	150 x 150 x 66
Bearing type	sleeve bearings	ball bearings
Fitting position	horizontal – vertical	any
Construction	housing and guard of sprayed thermoplastic (ABS-FR) self-extinguishing, UL 94 VO	
Weight	0,735 kg	0,385 kg
Safety protection	according to EN 60529	
Colour	RAL 7035, RAL 7032 oder schwarz, other colours available on request	
Type of connection	terminal strip	2 wires, 310 mm long

Electrical data	PF 2.000				
	AC 50 Hz / 60 Hz		DC		
Rated voltage	230 V	115 V	12 V	24 V	48 V
Voltage range	187 V ... 253 V	97 V ... 127 V	6 V ... 14 V	18 V ... 30 V	36 V ... 56 V
Power consumption	19 W / 18 W	20 W	5 W	5 W	5 W

Airflow data:



Mechanical data:



Installation cutout

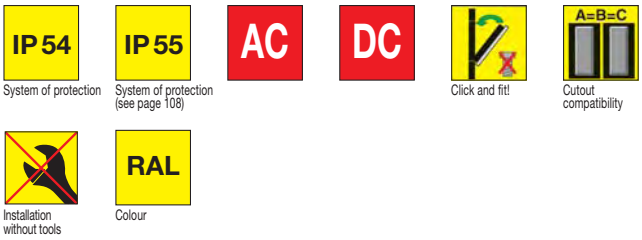
Supplementary data	AC	DC
Climatic data		
Operating temperature	–10 °C to +55 °C	–20 °C to +55 °C
Storage temperature	–20 °C to +70 °C	
Max. relative humidity	90%	
System of protection	IP 54 (EN 60529), when used as recommended, not for outdoor-application	
Basic parts kit	standard filter, mounting- and user manual	
Accessories	radiant heater, fan heater, thermostat, see Thermal Management	
* Tolerance installation cutout	125^{+1}_{-0} thickness of material to 2 mm 126^{+1}_{-0} thickness of material > 2 mm ≤ 3 mm	
Approvals	UL approval see overview filterfans	

Filterfan PF 2.500, PF 3.000

PF 2.500
For medium range applications in plant and machine equipment.

PF 3.000
The same size PF 2.500 but with a more powerful fan.

- with integrated foamed on seal (PF 2.500, PF 3.000)



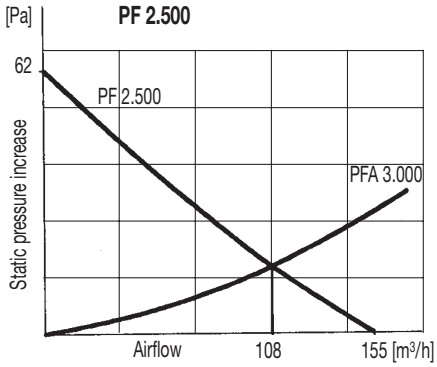
Airflow data	PF 2.500	PF 3.000
Filter marerial*	150 g/m²	150 g/m²
Unimpeded airflow	155 m³/h; 50 Hz / 170 m³/h; 60 Hz	255 m³/h; 50 Hz / 292 m³/h; 60 Hz
Capacity free-flow	52 W/K / 57 W/K	85 W/K / 97 W/K
Airflow in combination (filterfan + exhaust filter)	108 m³/h; 50 Hz / 118 m³/h; 60 Hz (PF 2.500 + PFA 3.000)	231 m³/h; 50 Hz / 265 m³/h; 60 Hz (PF 3.000 + PFA 3.000)
Capacity in combination (filterfan + exhaust filter)	36 W/K / 39 W/K (PF 3.000 + PFA 3.000)	77 W/K / 88 W/K (PF 3.000 + PFA 3.000)
Max. static pressure (Airflow = 0 m³/h)	62 Pa	115 Pa
Filtration efficiency	73%	
Filter material grade (DIN EN 779)	G 2	
Noise level (DIN 45 635)	53 dB (A)	55 dB (A)
Duty cycle	100%	

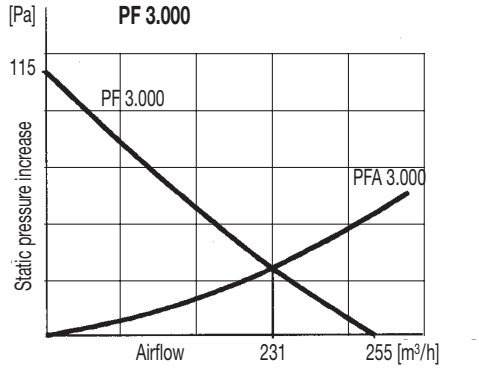
* standard filter mat 150 g/m² (alternative filter mat in 350 g/m², 500 g/m²)

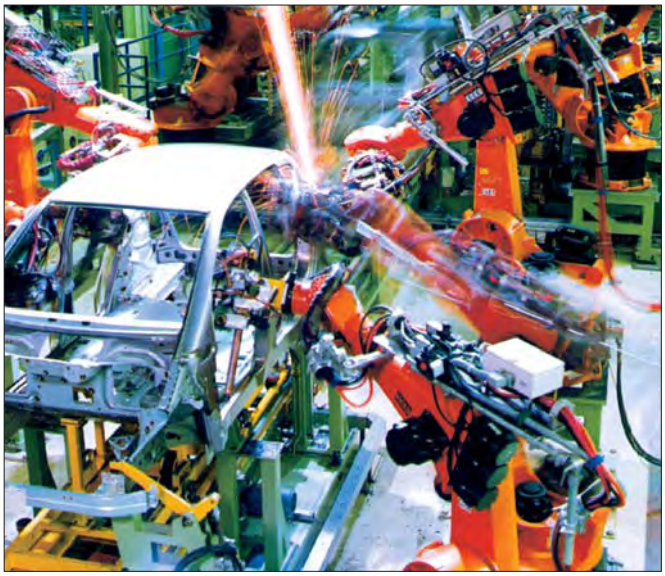
Technical data	PF 2.500 AC / DC	PF 3.000 AC	PF 3.000 DC
Outside dimensions in mm (Height x Width x Installation depth)	250 x 250 x 111	250 x 250 x 121	
Bearing type	ball bearings		
Fitting position	any, horizontal airflow preferred		
Construction	housing and guard of sprayed thermoplastic (ABS-FR) self-extinguishing, UL 94 VO		
Weight	1,75 kg	1,75 kg	1,50 kg
Safety protection	according to EN 60529		
Colour	RAL 7035, RAL 7032 or black, other colours available on request		
Type of connection	terminal strip		

Electrical data	PF 2.500 AC 50 Hz / 60 Hz			PF 2.500 DC		
Rated voltage	230 V		115 V	12 V	24 V	48 V
Voltage range	187 V ... 253 V		97 V ... 127 V	8 V ... 14 V	18 V ... 30 V	36 V ... 56 V
Power consumption	18 W / 17 W		18 W / 17 W	4,5 W	4,7 W	4,6 W
	PF 3.000 AC 50 Hz / 60 Hz			**PF 3.000 DC**		
Rated voltage	400 V	230 V	115 V	12 V	24 V	48 V
Voltage range	360 V ... 440 V	187 V ... 253 V	97 V ... 127 V	8 V ... 15 V	18 V ... 30 V	36 V ... 56 V
Power consumption	41 W / 38 W	45 W / 39 W	40 W	12 W	18 W	17 W

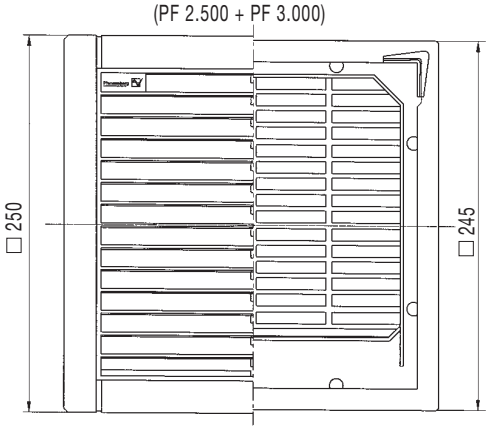
Airflow data:

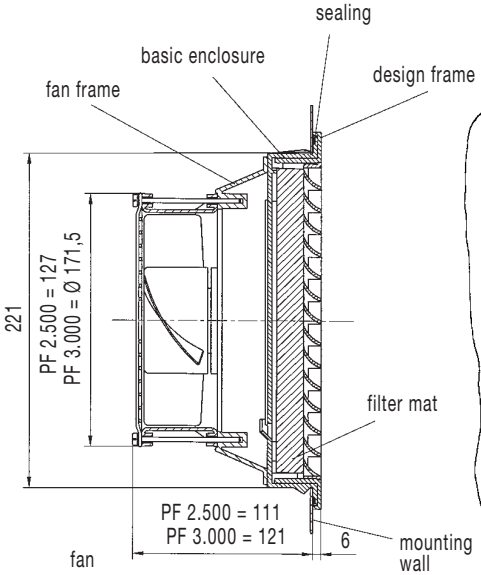




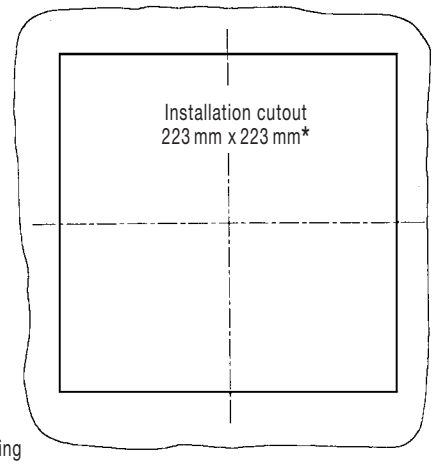


Mechanical data:





Installation cutout



Supplementary data	AC	DC
Climatic data		
Operating temperature	−10 °C to +55 °C	−20 °C to +55 °C
Storage temperature	−20 °C to +70 °C	
Max. relative humidity	90%	
System of protection	IP 54 (EN 60 529), when used as recommended, not for outdoor-application	
Basic parts kit	standard filter, mounting- and user manual	
Accessories	radiant heater, fan heater, thermostat, see Thermal Management	
Approvals	UL approval see overview filterfans	
* Tolerance installation cutout	223^{+1}_{0} thickness of material to 2 mm 224^{+1}_{0} thickness of material > 2 mm ≤ 3 mm	

Filterfan PF 5.000, PF 6.000, PF 7.000

Cutout compatible with DTFI cooling unit (see page 24)

PF 5.000
For larger switchgear installations with higher demands for heat extraction.

PF 6.000 / PF 7.000
For large switchgear installations where extreme heat extraction is needed whilst maintaining the required I.P. protection rating.

- with integrated foamed on seal

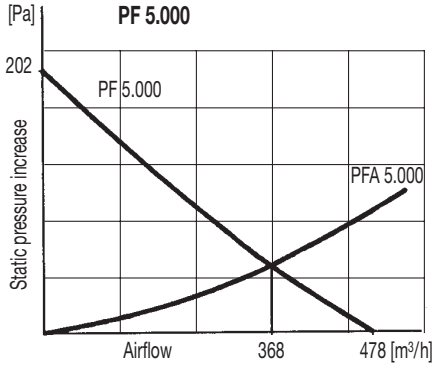
Airflow data	PF 5.000	PF 6.000	PF 7.000
Filter material*	150 g/m²	150 g/m²	150 g/m²
Unimpeded airflow	478 m³/h; 50 Hz / 550 m³/h; 60 Hz	606 m³/h; 50 Hz / 647 m³/h; 60 Hz	755 m³/h; 50 Hz / 830 m³/h; 60 Hz
Capacity free-flow	159 W/K / 183 W/K	201 W/K / 215 W/K	245 W/K / 277 W/K
Airflow in combination (filterfan + exhaust filter)	368 m³/h; 50 Hz / 423 m³/h; 60 Hz (PF 5.000 + PFA 6.000)	437 m³/h; 50 Hz / 476 m³/h; 60 Hz (PF 6.000 + PFA 6.000)	545 m³/h; 50 Hz / 626 m³/h; 60 Hz (PF 7.000 + PFA 6.000)
Capacity in combination (filterfan + exhaust filter)	122 W/K / 141 W/K (PF 5.000 + PFA 6.000)	145 W/K / 155 W/K (PF 6.000 + PFA 6.000)	175 W/K / 202 W/K (PF 7.000 + PFA 6.000)
Max. static pressure (Airflow = 0 m³/h)	202 Pa	243 Pa	158 Pa
Filtration efficiency	73%		
Filter material grade (DIN EN 779)	G 2		
Noise level (DIN 45 635)	69 dB(A)	71 dB(A)	72 dB(A)
Duty cycle	100%		

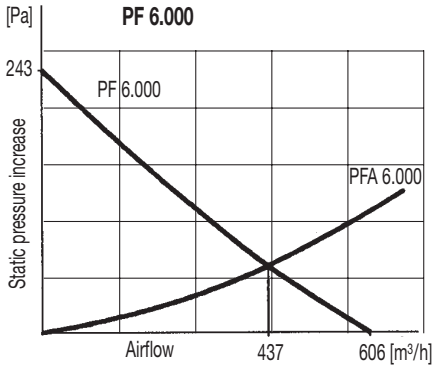
* standard filter mat 150 g/m² (alternative filter mat in 350 g/m², 500 g/m²)

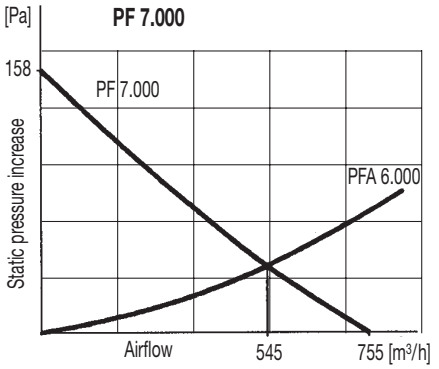
Technical data	PF 5.000	PF 6.000	PF 7.000
Outside dimensions in mm (Height x Width x Installation depth)	325 x 325 x 157	325 x 325 x 158	325 x 325 x 117
Bearing type	ball bearings		
Fitting position	any, horizontal airflow preferred		
Construction	housing and guard of sprayed thermoplastic (ABS-FR) self-extinguishing, UL 94 VO		
Weight	3,0 kg	3,5 kg	3,55 kg
Safety protection	according to EN 60529		
Colour	RAL 7035, RAL 7032, other colours available on request		
Type of connection	terminal strip		

Electrical data	AC 50 Hz / 60 Hz							
	PF 5.000		PF 6.000			PF 7.000		
Rated voltage	230 V	115 V	400 V / 3 phases	230 V	115 V	230 V	115 V	400 V / 3 phases
Voltage range	190 V ... 253 V	103 V ... 127 V	360 V ... 440 V	190 V ... 253 V	97 V ... 127 V	190 V ... 253 V	97 V ... 127 V	360 V ... 440 V
Power consumption	74 W	82 W	110 W / 160 W	165 W	110 W / 155 W	135 W / 195 W	120 W / 165 W	106 W / 145 W

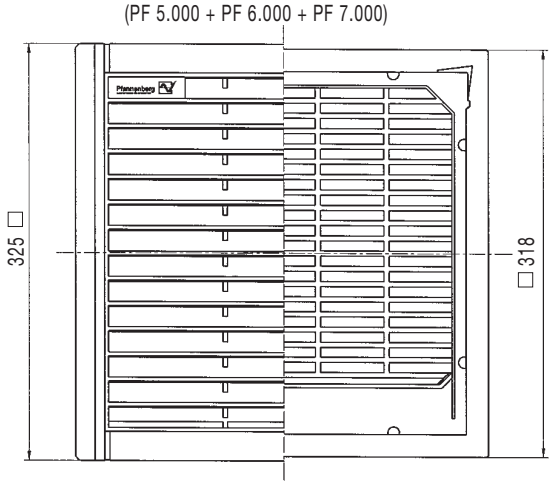
Airflow data:

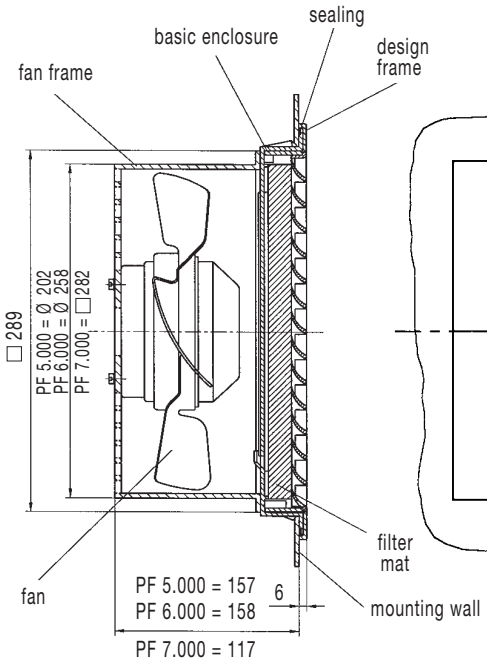




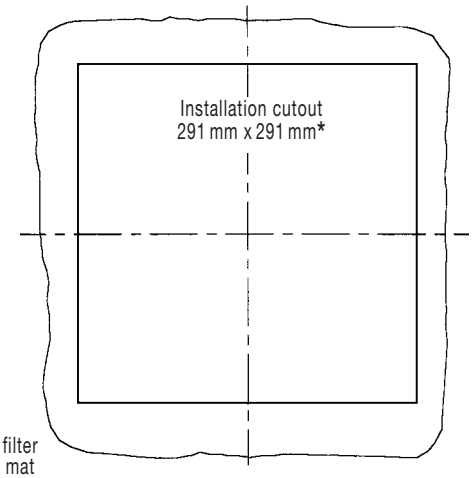


Mechanical data:





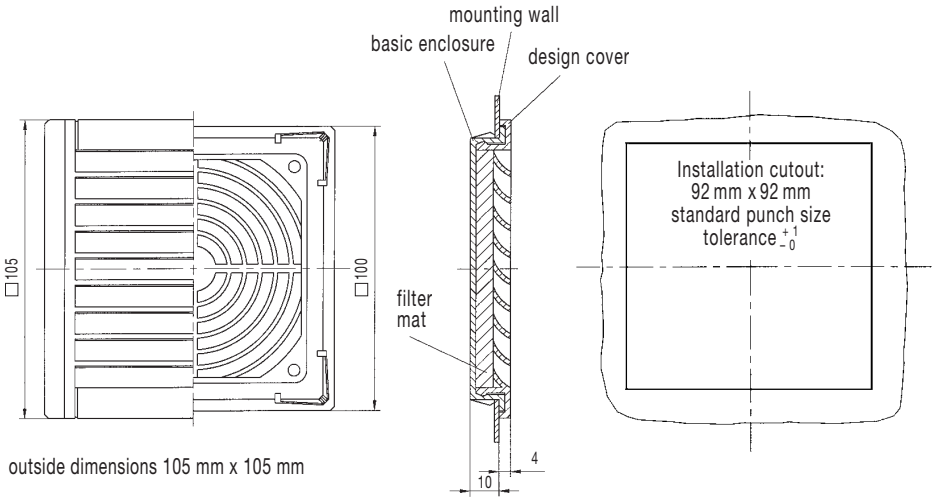
Installation cutout



Supplementary data	PF 5.000	PF 6.000	PF 7.000
Climatic data			
Operating temperature	−10 °C to +55 °C		
Storage temperature	−20 °C to +70 °C		
Max. relative humidity	90%		
System of protection	IP 54 (EN 60 529), when used as recommended, not for outdoor-application		
Basic parts kit	standard filter, mounting- and user manual		
Accessories	radiant heater, fan heater, thermostat, see Thermal Management		
* Tolerance installation cutout	$291\,^{+1}_{-0}$ thickness of material to 2 mm $292\,^{+1}_{-0}$ thickness of material > 2 mm ≤ 3 mm		
Approvals	UL approval see overview filterfans		

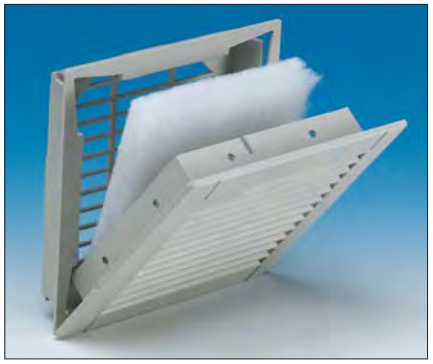
Exhaust Filters - Model PFA

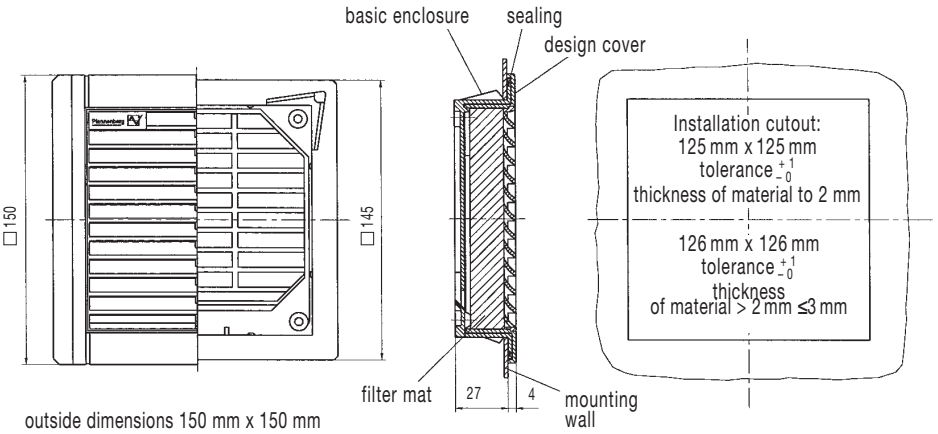
PFA 1.000



outside dimensions 105 mm x 105 mm

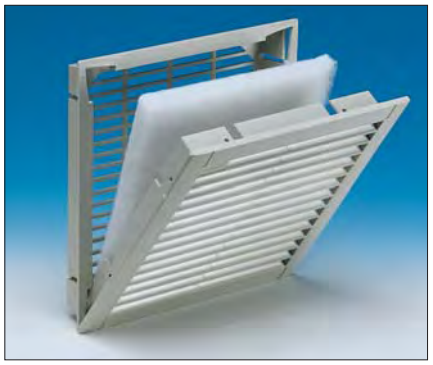
PFA 2.000

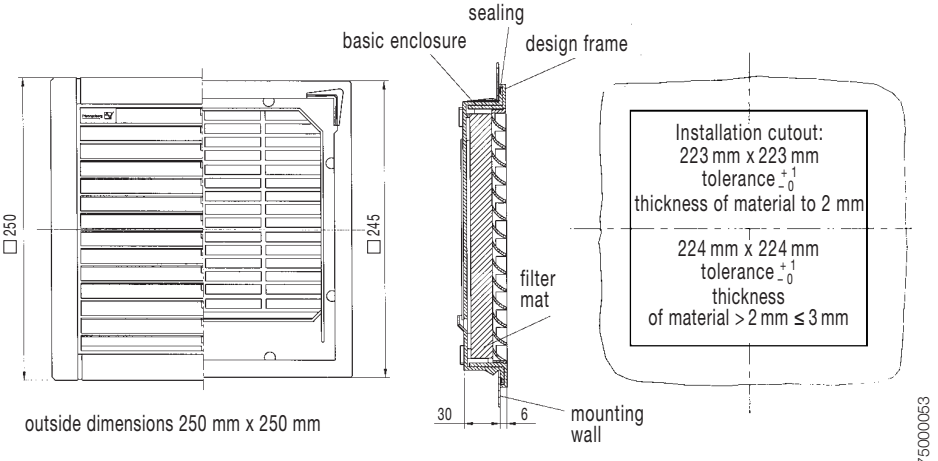




outside dimensions 150 mm x 150 mm

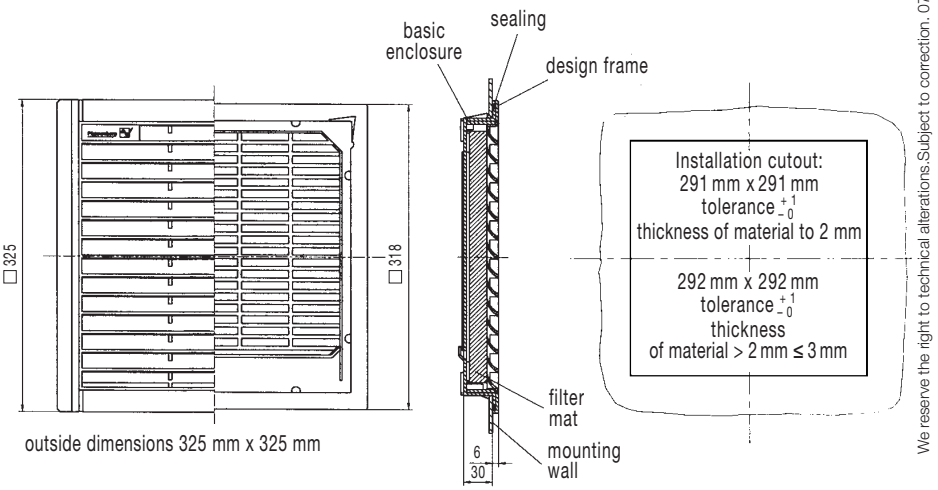
PFA 2.500/3.000





outside dimensions 250 mm x 250 mm

PFA 5.000/6.000/7.000

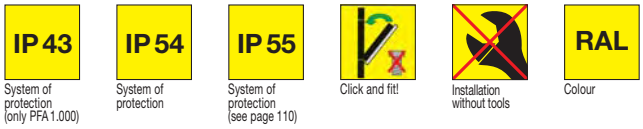


outside dimensions 325 mm x 325 mm

„ ... click and fit!“

Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY

- same design as the filterfans PF-series
- Pfannenberg developed and patented snap-fastening **„ ... click and fit“**
- for door mounting in accordance with VDE 0113 (EN 60204) without screws
- easy filter exchange during use
- with integrated foamed seal to enclosure (from size PF 2.000)



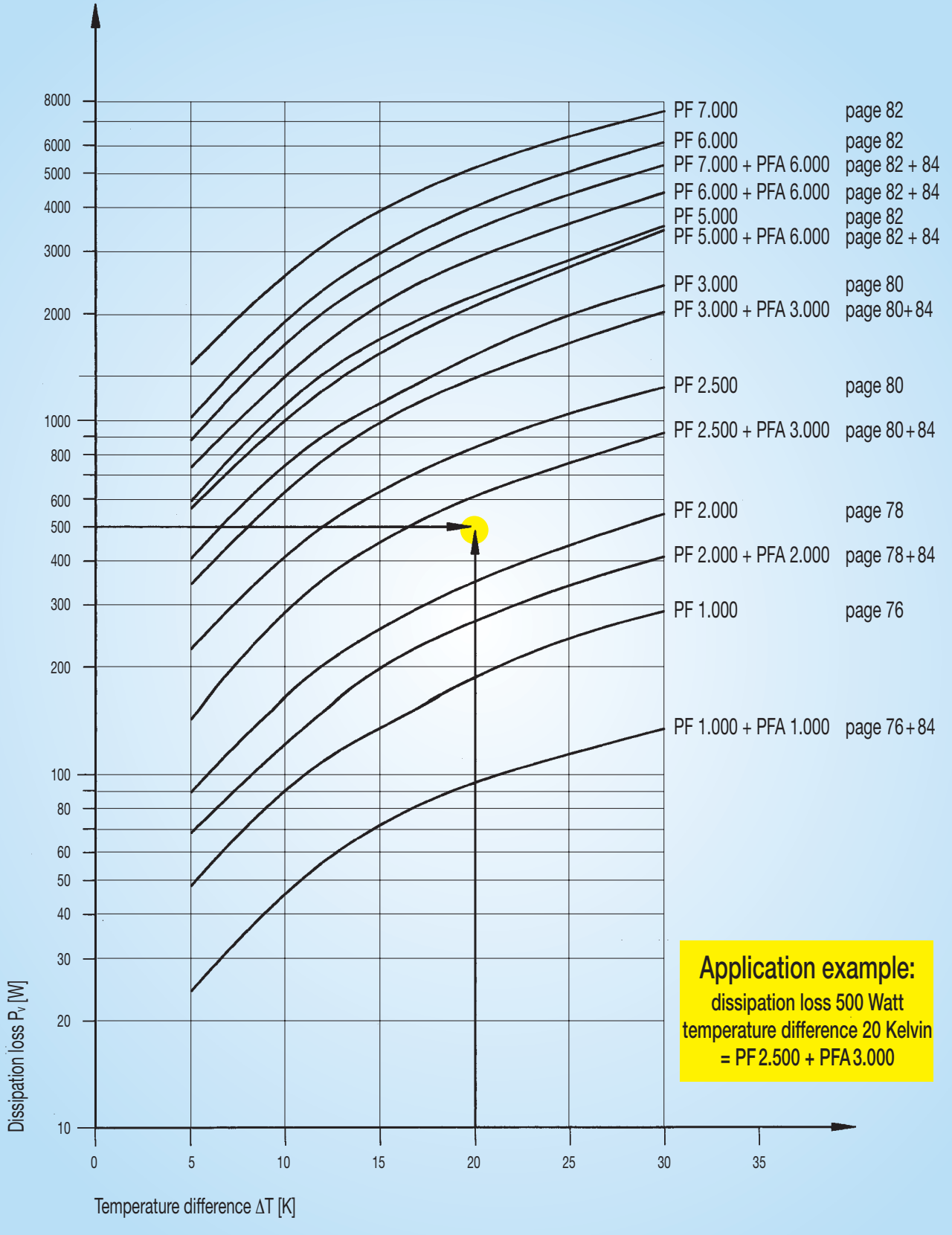
Airflow data	PFA 1.000	PFA 2.000	PFA 3.000	PFA 6.000
Filter mat	150 g/m²*)	150 g/m²*)		
Filtration efficiency	73%	73%		
Filter material grade (DIN EN 779)	G 2	G 2		

*) standard filter mat 150 g/m² (alternative filter mat in 350 g/m², 500 g/m²)

Technical data	PFA 1.000	PFA 2.000	PFA 3.000	PFA 6.000
Outside dimensions in mm (Height x Width x Installation depth)	105 x 105 x 10	150 x 150 x 27	250 x 250 x 30	325 x 325 x 30
Material	sprayed thermoplastic, self-extinguishing, UL 94 V0			
	(PC-FR)		(ABS-FR)	
Weight	0,050 kg	0,126 kg	0,460 kg	0,755 kg
Colour	RAL 7035, RAL 7032 or black, other colours available on request			

Supplementary data	PFA 1.000	PFA 2.000	PFA 3.000	PFA 6.000
Climatic data				
Operating temperature	–20 °C to +70 °C			
Storage temperature	–20 °C to +70 °C			
Max. relative humidity	90%			
System of protection	IP 43	IP 54		
Basic parts kit	standard filter, mounting- and user manual			
Accessories	radiant heater, fan heater, thermostat, see Thermal Management			
Approvals	UL approval see overview filterfans			

Performance selection diagram
for filterfans according to temperature difference - Series PF/PFA IP 54

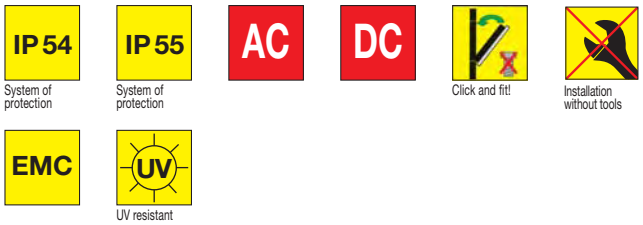


EMC-shielded Filterfans IP 54 / IP 55

Series PF 2000 EMC – PF 6000 EMC
PFA 2000 EMC – PFA 6000 EMC

Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY

- **innovative surface-to-surface contact** along the edge of the cutout makes mounting a simple task
- **reliable surface-to-surface contact** by means of specially shaped contact springs on screen grid
- **low environmental impact** due to use of separate screen grids made of stainless steel (1.4301)
- **low environmental impact** because grid plates and contact surfaces are in one piece; beryllium copper band is not necessary to provide contact



EMC-shielded Filterfans IP 54

Filterfan/Model	PF 2000 EMC	PF 2500 EMC	PF 3000 EMC	PF 5000 EMC	PF 6000 EMC
Airflow volume (free-flow)	56 m³/h	131 m³/h	249 m³/h	461 m³/h	590 m³/h
Cooling capacity (free-flow)	18,6 W/K	44 W/K	83 W/K	153 W/K	196 W/K
Airflow volume (with exhaust filter)	42 m³/h (with PFA 2000 EMC)	95 m³/h (with PFA 3000 EMC)	210 m³/h (with PFA 3000 EMC)	350 m³/h (with PFA 6000 EMC)	450 m³/h (with PFA 6000 EMC)
Cooling capacity (with exhaust filter)	14 W/K (with PFA 2000 EMC)	32 W/K (with PFA 3000 EMC)	70 W/K (with PFA 3000 EMC)	116 W/K (with PFA 6000 EMC)	149 W/K (with PFA 6000 EMC)
Type of filter mat	150 g/m² G 2				
Max. static pressure	55 Pa	60 Pa	103 Pa	195 Pa	210 Pa

EMC-shielded Filterfans IP 55

Filterfan/Model	PF 2000 EMC	PF 2500 EMC	PF 3000 EMC	PF 5000 EMC	PF 6000 EMC
Airflow volume (free-flow)	26 m³/h	80 m³/h	130 m³/h	310 m³/h	371 m³/h
Cooling capacity (free-flow)	8,4 W/K	25 W/K	42 W/K	100 W/K	119 W/K
Airflow volume (with exhaust filter)	19 m³/h (with PFA 2000 EMC)	52 m³/h (with PFA 3000 EMC)	104 m³/h (with PFA 3000 EMC)	248 m³/h (with PFA 6000 EMC)	325 m³/h (with PFA 6000 EMC)
Cooling capacity (with exhaust filter)	6,5 W/K (with PFA 2000 EMC)	17 W/K (with PFA 3000 EMC)	34 W/K (with PFA 3000 EMC)	80 W/K (with PFA 6000 EMC)	105 W/K (with PFA 6000 EMC)
Type of filter mat	150 g/m² und 350 g/m² G 4				
Max. static pressure	46 Pa	52 Pa	91 Pa	156 Pa	172 Pa

Filterfan/Model	PF 2000 EMC (IP 54 / IP 55)	PF 2500 EMC (IP 54 / IP 55)	PF 3000 EMC (IP 54 / IP 55)	PF 5000 EMC (IP 54 / IP 55)	PF 6000 EMC (IP 54 / IP 55)
Noise level	48 dB (A)	49 dB (A)	52 dB (A)	68 dB (A)	70 dB (A)
Rated voltages available	230 V AC, 115 V AC 12 V, 24 V, 48 V DC	230 V AC, 115 V AC 12 V DC, 24 V DC	230 V AC, 115 V AC 12 V, 24 V, 48 V DC	230 V AC, 115 V AC	230 V AC, 115 V AC 3 x 400 V AC
Height x Width x Depth	150 x 150 x 69 mm	250 x 250 x 111 mm	250 x 250 x 121 mm	325 x 325 x 157 mm	325 x 325 x 158 mm
Cutout dimensions	126,5 ± 0,5 mm	224 ± 0,5 mm	224 ± 0,5 mm	292 ± 0,5 mm	292 ± 0,5 mm
Operating temperature	–10 °C to +55 °C				–25 °C to +55 °C
Storage temperature	–20 °C to +70 °C				
Material	ABS plastic material, UL 94-VO				
EMC shielding	**stainless steel**				
Approvals	UL approval see overview filterfans				

Exhaust filter/Model	PFA 2000 EMC	PFA 3000 EMC	PFA 6000 EMC
Height x Width x Depth	150 x 150 x 28 mm	250 x 250 x 36 mm	325 x 325 x 36 mm
Cutout dimensions	126,5 ± 0,5 mm	224 ± 0,5	292 ± 0,5
Material	ABS plastic material, UL 94-VO		
EMC shielding	**stainless steel**		

Filterfans - Model PF IP 55

Filterfans in the PF range set the pace in terms of technology and power. TÜV-tested with distinction. So they provide values you can count on. Designed for a wide, universal range of applications in electronic and traditional switchgear engineering.

- for outdoor applications
- with integrated foamed seal to enclosure

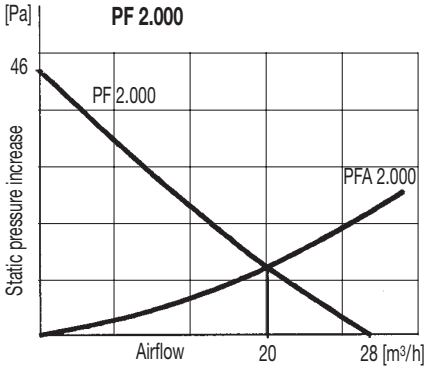
Airflow data	PF 2.000	PF 2.500	PF 3.000	PF 5.000	PF 6.000	PF 7.000
Filter mat	350 g/m² und 150 g/m²					
Unimpeded airflow	28 m³/h; 50 Hz / 32 m³/h; 60 Hz	87 m³/h; 50 Hz / 103 m³/h; 60 Hz	134 m³/h; 50 Hz / 161 m³/h; 60 Hz	319 m³/h; 50 Hz / 374 m³/h; 60 Hz	379 m³/h; 50 Hz / 404 m³/h; 60 Hz	415 m³/h; 50 Hz / 477 m³/h; 60 Hz
Capacity free-flow	9 W/K / 11 W/K	29 W/K / 34 W/K	45 W/K / 54 W/K	106 W/K / 124 W/K	122 W/K / 130 W/K	134 W/K / 154 W/K
Airflow in combination (filterfan + exhaust filter)	20 m³/h; 50 Hz / 23 m³/h; 60 Hz (PF 2.000 + PFA 2.000)	55 m³/h; 50 Hz / 64 m³/h; 60 Hz (PF 2.500 + PFA 3.000)	114 m³/h; 50 Hz / 134 m³/h; 60 Hz / (PF 3.000 + PFA 3.000)	255 m³/h; 50 Hz / 299 m³/h; 60 Hz / (PF 5.000 + PFA 6.000)	281 m³/h; 50 Hz / 312 m³/h; 60 Hz / (PF 6.000 + PFA 6.000)	327 m³/h; 50 Hz / 376 m³/h; 60 Hz / (PF 7.000 + PFA 6.000)
Capacity in combination (filterfan + exhaust filter)	7 W/K / 8 W/K (PF 2.000 + PFA 2.000)	18 W/K / 21 W/K (PF 2.500 + PFA 3.000)	38 W/K / 45 W/K (PF 3.000 + PFA 3.000)	85 W/K / 100 W/K (PF 5.000 + PFA 6.000)	91 W/K / 100 W/K (PF 6.000 + PFA 6.000)	106 W/K / 122 W/K (PF 7.000 + PFA 6.000)
Max. static pressure (Airflow = 0 m³/h)	46 Pa	42 Pa	91 Pa	156 Pa	172 Pa	122 Pa
Filtration efficiency	91%					
Filter material grade (DIN EN 779)	G 4					
Noise level (DIN 45 635)	48 dB(A)	49 dB(A)	52 dB(A)	68 dB(A)	70 dB(A)	71 dB(A)
Duty cycle	100%					

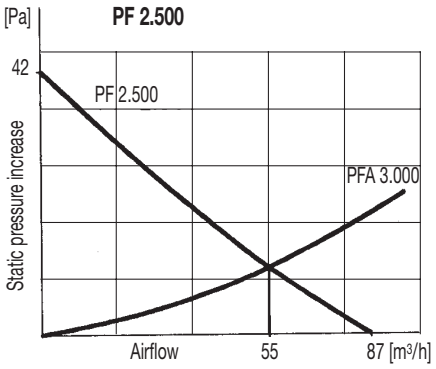
Technical data	PF 2.000	PF 2.500	PF 3.000	PF 5.000	PF 6.000	PF 7.000
Outside dimensions in mm (Height x Width x Installation depth)	150 x 150 x 72	250 x 250 x 111	250 x 250 x 121	325 x 325 x 157	325 x 325 x 158	325 x 325 x 117
Weight	0,736 kg	1,75 kg		3,0 kg	3,5 kg	3,8 kg

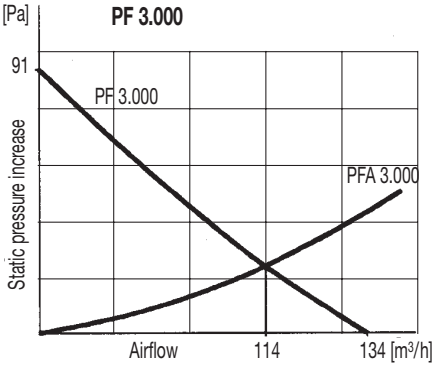
Electrical data		PF 2.000	PF 2.500	PF 3.000	PF 5.000	PF 6.000	PF 7.000
Rated voltage 230 V	Voltage range		187 V ... 253 V		190 V ... 253 V		
	Power consumption	19 W	19 W	45 W	74 W	165 W	185 W
Rated voltage 115 V	Voltage range		97 V ... 127 V		103 V ... 127 V	97 V ... 127 V	
	Power consumption	20 W	18 W	40 W	82 W	155 W	165 W

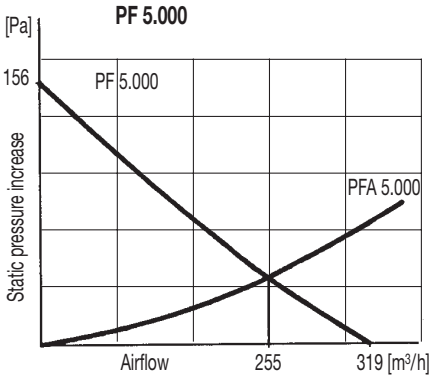
Supplementary data	PF 2.000	PF 2.500	PF 3.000	PF 5.000	PF 6.000	PF 7.000
Climatic data						
Operating temperature	−10 °C to +55 °C					
Storage temperature	−20 °C to +70 °C					
Max. relative humidity	90%					
System of protection	IP 55 when used as recommended					
Approvals	UL approval see overview filterfans					

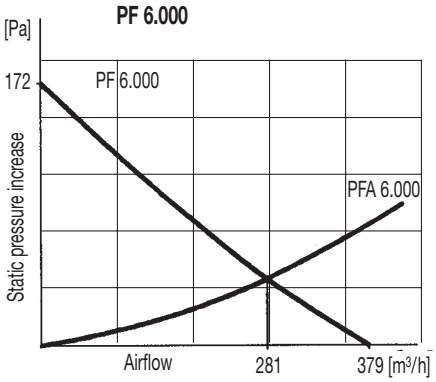
Airflow data:

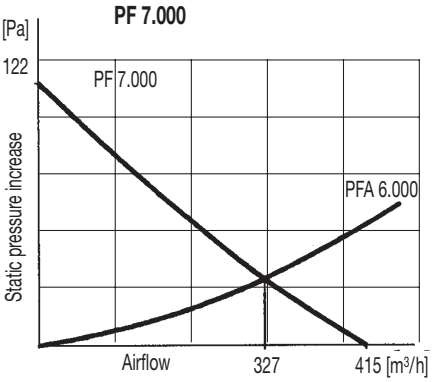




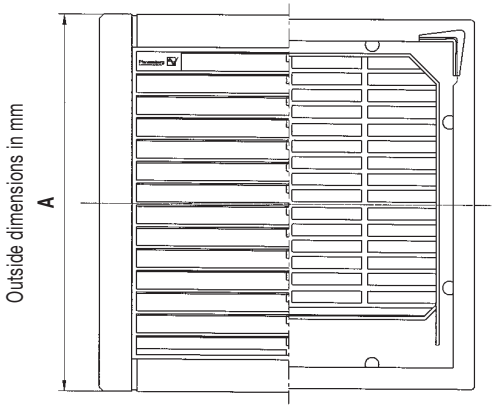


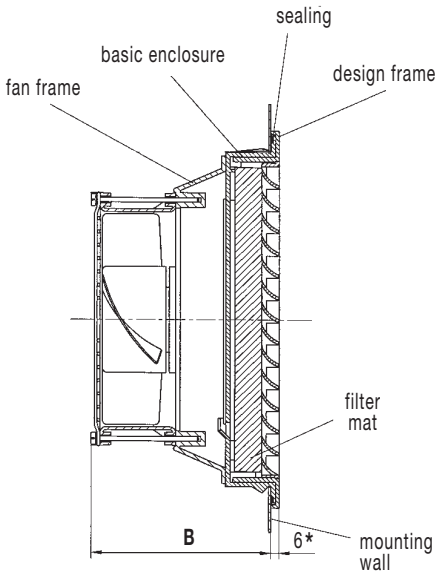






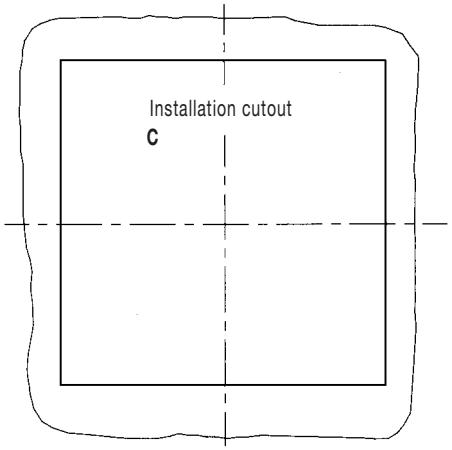
Mechanical data:





* 4 at PF 2.000

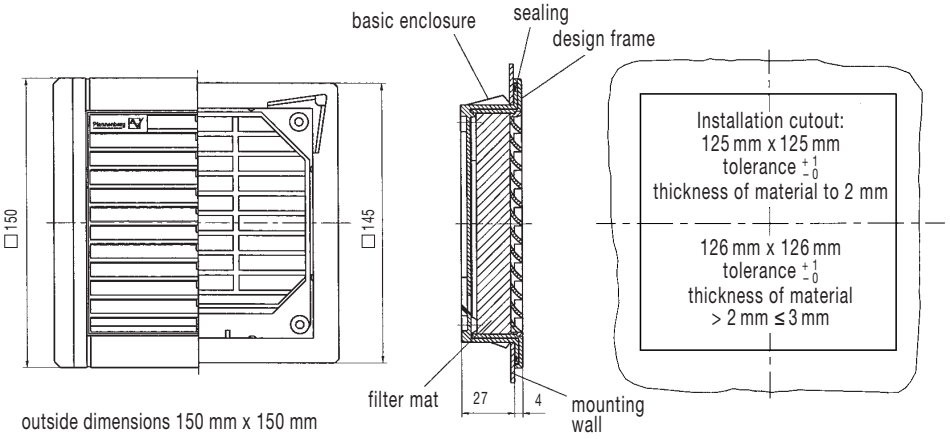
Installation cutout



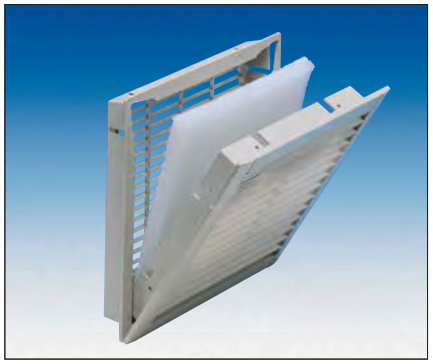
Dimensions	A	B	C
PF 2.000	150	72	125 $^{+1}_{0}$ thickness of material to 2 mm; 126 $^{+1}_{0}$ thickness of material > 2 mm ≤ 3 mm
PF 2.500	250	111	223 $^{+1}_{0}$ thickness of material to 2 mm; 224 $^{+1}_{0}$ thickness of material > 2 mm ≤ 3 mm
PF 3.000	250	121	223 $^{+1}_{0}$ thickness of material to 2 mm; 224 $^{+1}_{0}$ thickness of material > 2 mm ≤ 3 mm
PF 5.000	325	157	291 $^{+1}_{0}$ thickness of material to 2 mm; 292 $^{+1}_{0}$ thickness of material > 2 mm ≤ 3 mm
PF 6.000	325	158	291 $^{+1}_{0}$ thickness of material to 2 mm; 292 $^{+1}_{0}$ thickness of material > 2 mm ≤ 3 mm
PF 7.000	325	117	291 $^{+1}_{0}$ thickness of material to 2 mm; 292 $^{+1}_{0}$ thickness of material > 2 mm ≤ 3 mm

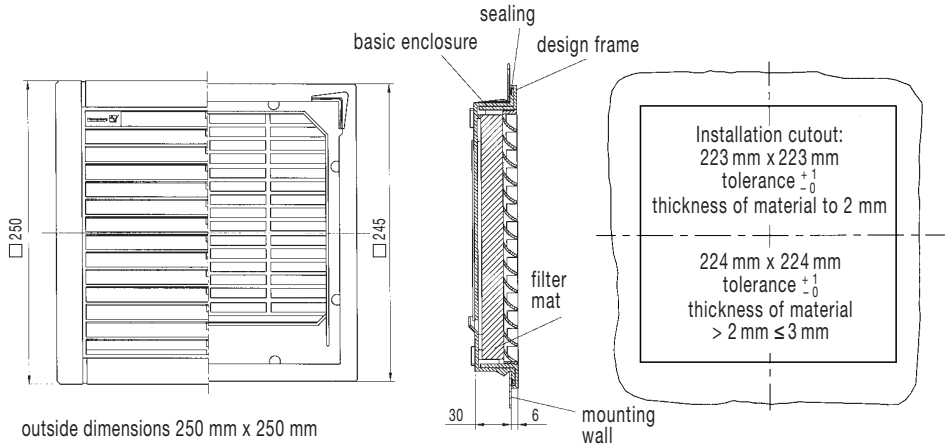
Exhaust Filters - Model PFA IP 55

PFA 2.000

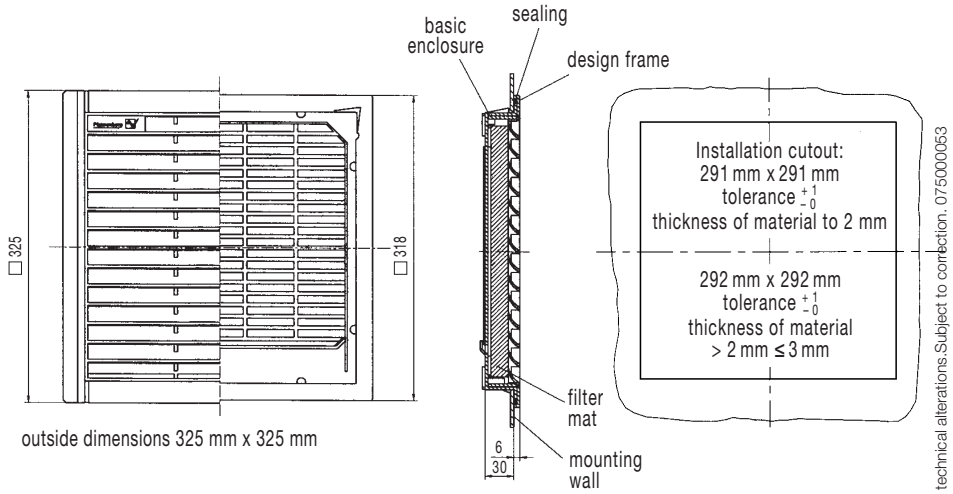


PFA 2.500 / 3.000





PFA 5.000 / 6.000 / 7.000



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„ ... click and fit!“

- same design as the filterfan PF-series
- Pfannenberg developed and patented snap-fastening **„ ... click and fit“**
- for door mounting in accordance with VDE 0113 (EN 60204) without screws
- easy filter exchange during use
- with integrated foamed on seal to enclosure

Airflow data	PFA 2.000	PFA 2.500 / 3.000	PFA 5.00 / 6.000 / 7.000
Filter mat	350 g/m² and 150 g/m²		
Filtration efficiency	91%		
Filter material grade (DIN EN 779)	G 4		

Technical data	PFA 2.000	PFA 2.500 / 3.000	PFA 5.00 / 6.000 / 7.000
Outside dimensions in mm (Height x Width x Installation depth)	150 x 150 x 27	250 x 250 x 30	325 x 325 x 30
Material	sprayed thermoplastic, self-extinguishing, UL 94 VO		
Weight	0,126 kg	0,460 kg	0,755 kg
Colour	RAL 7035, RAL 7032 or black, other colours available on request		

Supplementary data	PFA 2.000	PFA 2.500 / 3.000	PFA 5.00 / 6.000 / 7.000
Climatic data			
Operating temperature	–20 °C to +70 °C		
Storage temperature	–20 °C to +70 °C		
Max. relative humidity	90%		
System of protection	IP 55 when used as recommended		
Basic parts kit	IP 55 filter mat, mounting- and user manual		
Accessories	radiant heater, fan heater, thermostat, see Thermal Management		

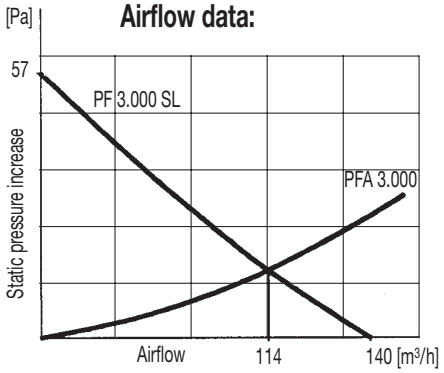
PF-Series **S**lim **L**ine
Filterfan PF 3000 SL

PF 3000 SL
Low profile filterfans depth
Built-in depth: 92,5 mm

IP 54 — System of protection
AC
DC
Click and fit!
Min. unit depth
Installation without tools
RAL — Colour

Airflow data	PF 3000 SL
Unimpeded airflow (free-flow)	140 m³/h
Capacity (free-flow)	47 W/K
Airflow in combination (filterfan + exhaust filter PFA 3000)	114 m³/h
Capacity in combination (filterfan + exhaust filter PFA 3000)	38 W/K
Noise level	55 dB(A)
Filter mat	150 g/m²

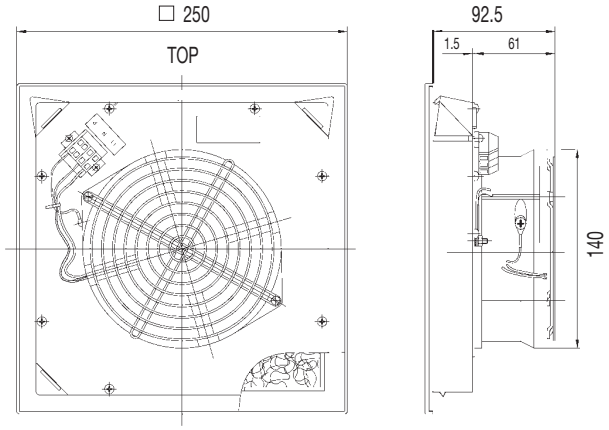
Airflow data:



Electrical data	PF 3000 SL	
Rated voltage[1])	230 V	115 V
Voltage range	207 V ... 244 V	103 V ... 122 V
Mains frequency	50 / 60 Hz	
Power consumption	46 / 44 Watt	48 / 46 Watt
Nominal current	0,25 A	0,45 A
Duty cycle	100%	
Type of connection	cage clamp	

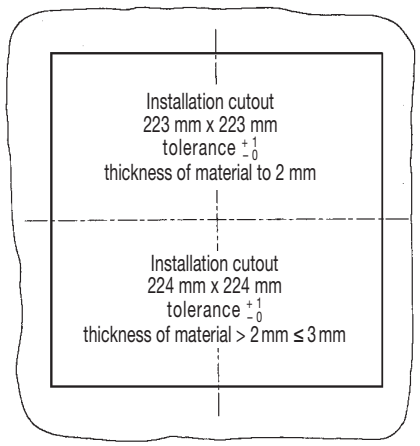
[1]) 24 V DC version on request

Mechanical data:



Supplementary data	PF 3000 SL
Dimensions	250 x 250 x 92,5 mm (Height x Width x Installation depth)
Construction	sprayed thermoplastic (ABS-FR), self-extinguishing, UL 94 VO
Safety protection	according to DIN 31001
Colour	RAL 7035, RAL 7032
System of protection	IP 54 (EN 60529), when used as recommended
Weight	1,85 / 1,75 kg (230 / 115 V)
Approvals	UL approval see overview filterfans

Installation cutout



PF-Series **S**lim **L**ine
Filterfan PF 6000 SL 2

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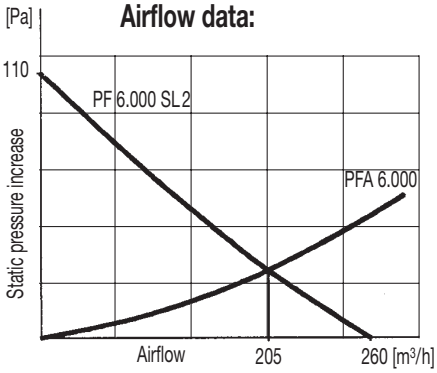
PF 6000 SL 2
Low profile filterfans depth
Built-in depth: 92,5 mm

IP 54 — System of protection
AC
DC
Click and fit!
Min. unit depth
A=B=C — Cutout compatibility
Installation without tools

Airflow data	PF 6000 SL 2
Unimpeded airflow (free-flow)	260 m³/h
Capacity (free-flow)	86 W/K
Airflow in combination (filterfan + exhaust filter PFA 6000)	205 m³/h
Capacity in combination (filterfan + exhaust filter PFA 6000)	68 W/K
Noise level	58 dB(A)
Filter mat	350 g/m²

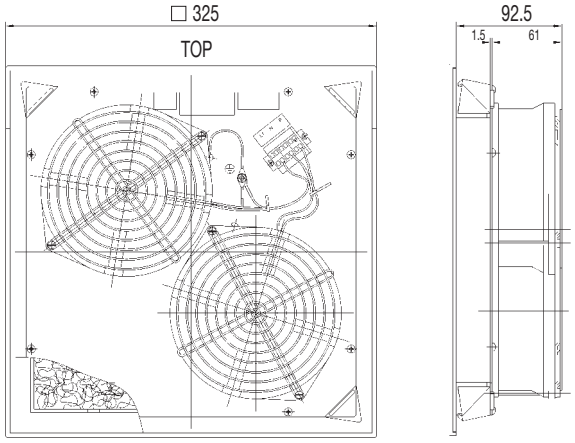
Airflow data:



Electrical data	PF 6000 SL 2	
Rated voltage[1])	230 V	115 V
Voltage range	207 V ... 244 V	103 V ... 122 V
Mains frequency	50 / 60 Hz	
Power consumption	92 / 88 Watt	96 / 92 Watt
Nominal current	0,5 A	0,9 A
Duty cycle	100%	
Type of connection	cage clamp	

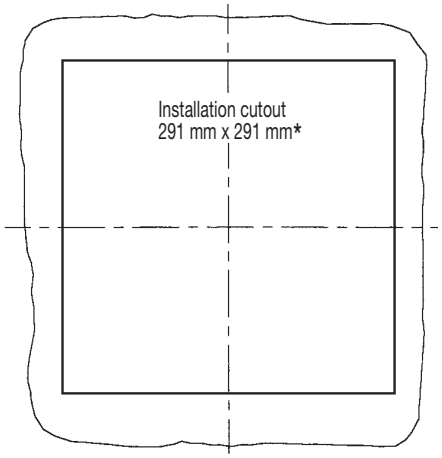
[1]) 24 V DC version on request

Mechanical data:



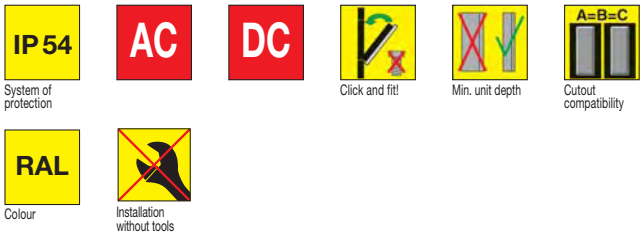
Supplementary data	PF 6000 SL 2
Dimensions	325 x 325 x 92,5 mm (Height x Width x Installation depth)
Construction	sprayed thermoplastic (ABS-FR), self-extinguishing, UL 94 VO
Safety protection	according to DIN 31001
Colour	RAL 7035, RAL 7032
System of protection	IP 54 (EN 60529), when used as recommended
Weight	3,55 / 3,45 kg (230 / 115 V)
* Tolerance installation cutout	291 $^{+1}_{-0}$
Approvals	UL approval see overview filterfans

Installation cutout



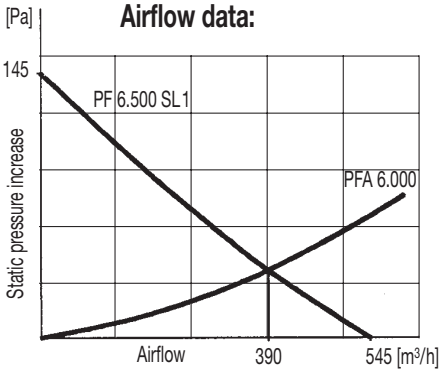
PF-Series **S**lim **L**ine
Filterfan PF 6500 SL 1

PF 6500 SL 1
Low profile filterfans depth
Built-in depth: 125 mm



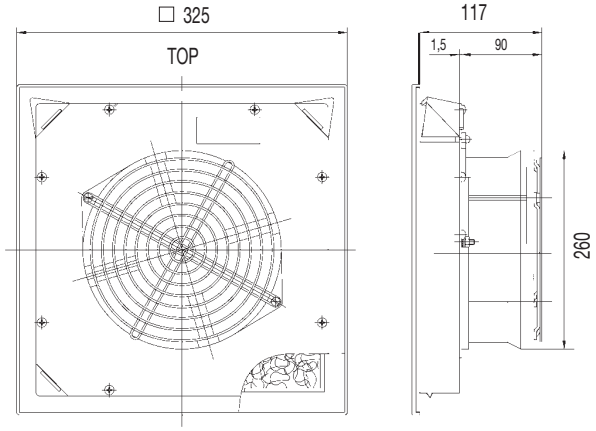
Airflow data	PF 6500 SL 1
Unimpeded airflow (free-flow)	545 m³/h
Capacity (free-flow)	165 W/K
Airflow in combination (filterfan + exhaust filter PFA 6000)	390 m³/h
Capacity in combination (filterfan + exhaust filter PFA 6000)	126 W/K
Noise level	59 dB(A)
Filter mat	150 g/m²

Airflow data:



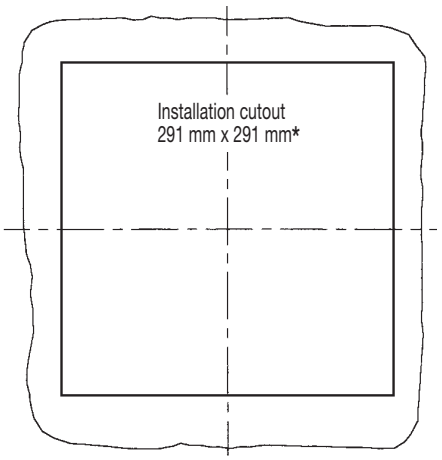
Electrical data	PF 6500 SL 1	
Rated voltage	230 V	115 V
Voltage range	207 V ... 244 V	103 V ... 122 V
Mains frequency	50 / 60 Hz	
Power consumption	64 / 80 Watt	
Nominal current	0,29 A	0,58 A
Duty cycle	100%	
Type of connection	terminal strip	

Mechanical data:



Supplementary data	PF 6500 SL 1
Dimensions	325 x 325 x 117 mm (Height x Width x Installation depth)
Construction	sprayed thermoplastic (ABS-FR), self-extinguishing, UL 94 VO
Safety protection	according to DIN 31001
Colour	RAL 7035, RAL 7032
System of protection	IP 54 (EN 60529), when used as recommended
Weight	3,75 kg (230 / 115 V)
* Tolerance installation cutout	291 $^{+1}_{-0}$
Approvals	UL approval see overview filterfans

Installation cutout



Filterfans - Model FLF

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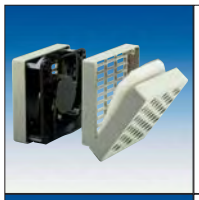
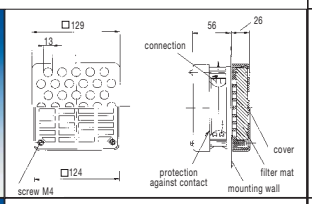
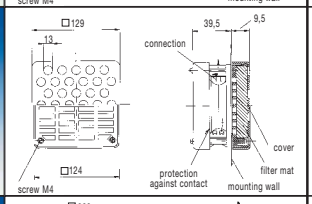
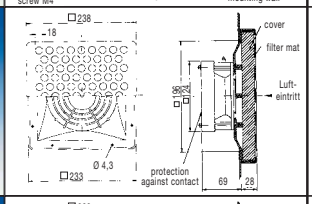
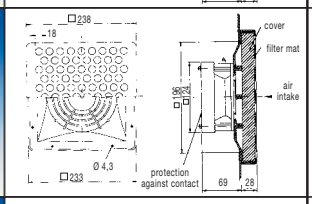
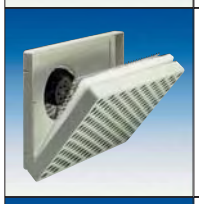
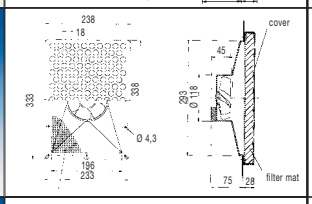
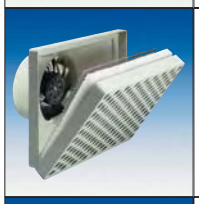
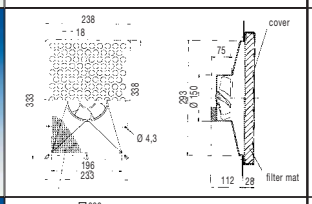
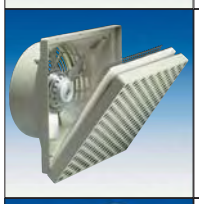
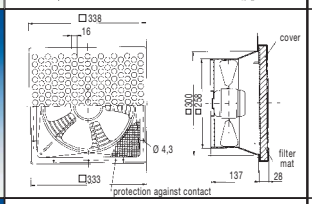
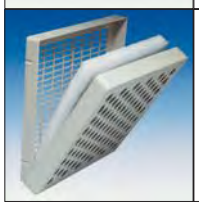
		Filterfan/ Model	Air volume free-flow	Air volume with exhaust filter	Rated voltages available	Height x Width (mm)	Installation cutout (mm)
		**FLF 01**	59 m³/h	37 m³/h (with AFF 01)	230 V AC, 115 V AC 24 V, 12 V DC	129 x 129	Ø 116
		**FLF 02**	63 m³/h	38 m³/h (with AFF 02)	230 V AC, 115 V AC 48 V, 24 V, 12 V DC	129 x 129	Ø 116
		**FLF 0-E**	58 m³/h	44 m³/h integrated	230 V AC, 115 V AC 48 V, 24 V, 12 V DC	238 x 238	200 x 200
		**FLF 0**	73 m³/h	63 m³/h (with AFF 0)	230 V AC, 115 V AC 48 V, 24 V, 12 V DC	238 x 238	200 x 200
		**FLF I**	71 m³/h	65 m³/h (with AFF I)	230 V AC, 115 V AC	338 x 238	300 x 200
		**FLF II**	184 m³/h	151 m³/h (with AFF I)	230 V AC, 115 V AC	338 x 238	300 x 200
		**FLF III**	756 m³/h	591 m³/h (with AFF III)	230 V AC, 115 V AC 3 x 400 V AC	338 x 338	300 x 300



Exchaust Filters - Model AFF

Model	Dimensions	Installation-cutout (mm)
AFF 02	129 mm x 129 mm x 12 mm	Ø 116
AFF 01	129 mm x 129 mm x 26 mm	Ø 116
AFF 0	238 mm x 238 mm x 28 mm	200 x 200
AFF I	338 mm x 238 mm x 28 mm	300 x 200
AFF III	338 mm x 338 mm x 28 mm	300 x 300

General technical information

Filtration efficiency of standard filter: 88%
Filter material grade: G3 (FLF 02 G2) according to DIN EN 779
Safety protection according to EN 60529
Duty cycle 100%
Mains frequency: suitable for both: 50 Hz and 60 Hz

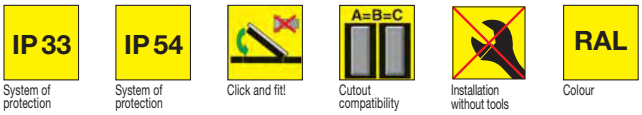
Operating temperature: -10 °C to + 50 °C
Storage temperature: - 20 °C to + 70 °C
Colour: similar RAL 7032 (european grey), other colours on request
Material: ABS-FR, FLF 0-E (PC-FR)
System of protection: IP 54 with a rubber seal at horizontal airflow

Accessories: rubber seal, fan heater, radiant heater, thermostat: see Thermal Management. The screws required for mounting the unit, as well as mounting and operating instructions are included with every filterfan/exhaust filter.

Top Fan PTF 60.500 / PTF 60.700 / PTF 61.000
Top Exhaust Filter PTFA 60.000

PTF 60.500 / PTF 60.700 / PTF 61.000 / PTFA 60.000

- ideal to use when there is little space within the enclosure compartment
- available in IP 33 and IP 54
- all types in only one cut-out make uprades easy
- simple click&fit installation, no tool necessary
- best way to ventilate (AC) the enclosure, bottom-up ventilation of entire enclosure



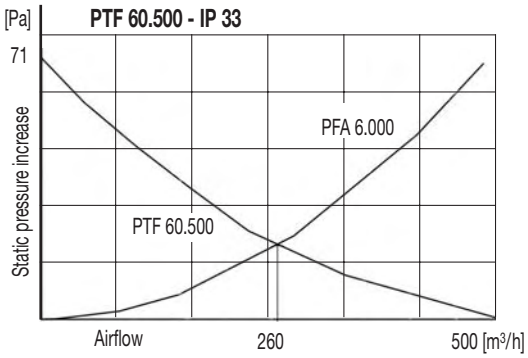
Airflow data	PTF 60.500		PTF 60.700		PTF 61.000	
	IP 33	IP 54	IP 33	IP 54	IP 33	IP 54
Filter mat		IP 54-filter mat		IP 54-filter mat		IP 54-filter mat
Airflow free-flow	500 m³/h	350 m³/h	700 m³/h	550 m³/h	1000 m³/h	750 m³/h
Capacity free-flow	161 W/K	113 W/K	226 W/K	177 W/K	323 W/K	242 W/K
Airflow in combination (filterfan + exhaust filter)	260 m³/h (PTF 60.500 + PFA 6.000)	230 m³/h	400 m³/h (PTF 60.700 + PFA 6.000)	350 m³/h	550 m³/h (PTF 61.000 + PFA 6.000)	470 m³/h
Capacity in combination (filterfan + exhaust filter)	84 W/K (PTF 60.500 + PFA 6.000)	74 W/K	129 W/K (PTF 60.700 + PFA 6.000)	113 W/K	177 W/K (PTF 61.000 + PFA 6.000)	152 W/K
Max. static pressure (Airflow = 0 m³/h)	71 Pa		88 Pa		158 Pa	
Filtration efficiency	-	81%	-	81%	-	81%
Filter material grade (DIN EN 779)	-	G 3	-	G 3	-	G 3
Noise level (DIN 45 635)	67 dB (A)		69 dB (A)		77 dB (A)	
Duty cycle	100%					

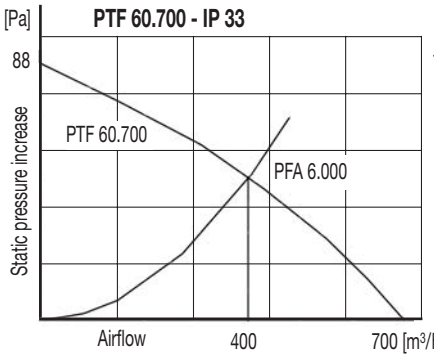
Technical data	PTF 60.500	PTF 60.700	PTF 61.000
Outside dimensions in mm (Height x Width x Depth x Installation depth)	125 x 430 x 430 x 50	140 x 470 x 470 x 50	140 x 470 x 470 x 50
Construction material	metal chassis, cover powder-coated; snap-in body of sprayed thermoplastic (ABS-FR) self-extinguishing, UL 94 V0		
Weight	5,5 kg	5,8 kg	6,0 kg
Safety protection	according to EN 60529		
Colour	RAL 7035, RAL 7032, other colours available on request		
Type of connection	terminal strip		

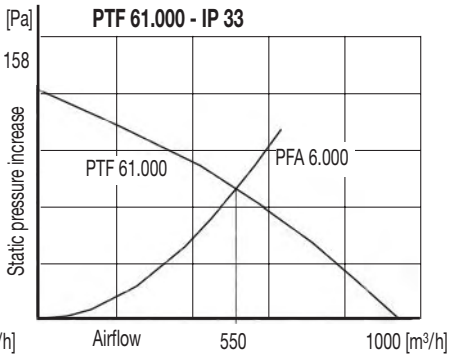
Electrical data	PTF 60.500	PTF 60.700	PTF 61.000
Rated voltage	230 V 50/60 Hz +/- 10% 115 V 50/60 Hz +/- 10%	230 V 50/60 Hz +/- 10% 115 V 50/60 Hz +/- 10%	230 V 50/60 Hz +/- 10% 115 V 50/60 Hz +/- 10%
Power consumption 230 V 115 V	4 x 28 / 24 W 4 x 29 / 24 W	65 / 80 W 75 / 90 W	115 / 150 W 110 / 170 W

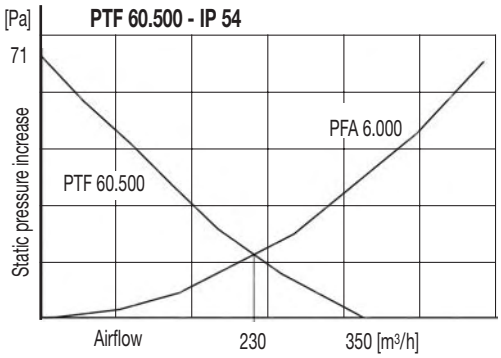
Supplementary data	PTF 60.500	PTF 60.700	PTF 61.000
Operating temperature	−10 °C to +55 °C		
Storage temperature	−20 °C to +70 °C		
Max. relative humidity	90%		
System of protection	IP 33, IP 54 (EN 60 529), when used as recommended		
Accessories	radiant heater, fan heater, thermostat, see Thermal Management		
Tolerance installation cutout	$291\,^{+1}_{0}$ thickness of material to 2 mm $292\,^{+1}_{0}$ thickness of material > 2 mm ≤ 3 mm		
Approvals	UL approval see overview filterfans		

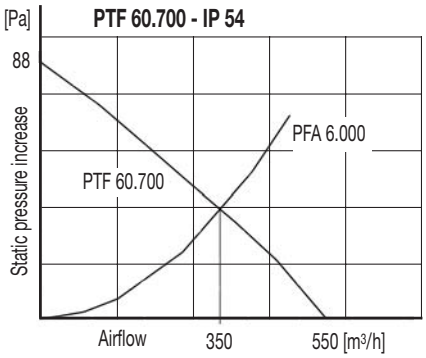
Airflow data:

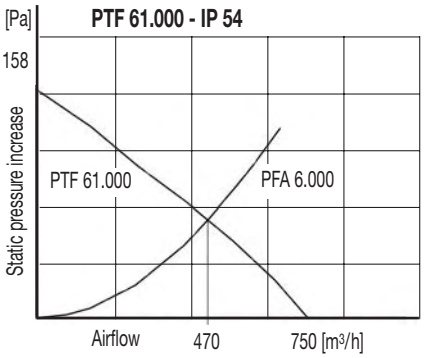




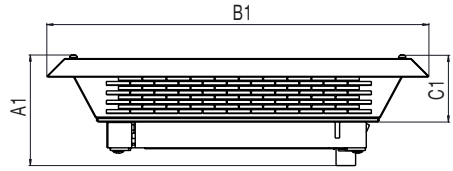


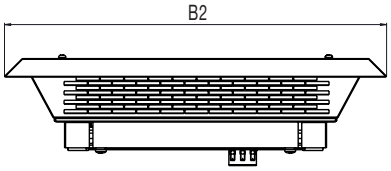






Mechanical data:

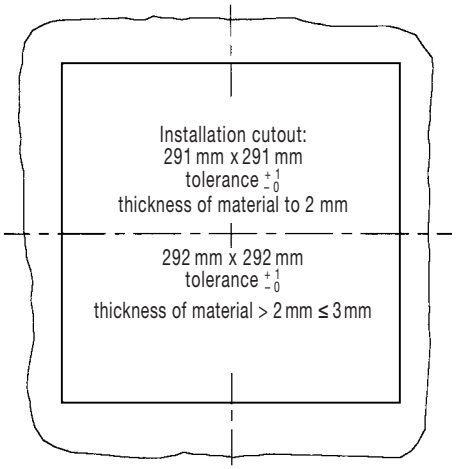




	PTF 60.500	PTF 60.700	PTF 61.000	PTFA 60.000
A1	125	140	140	110*
B1/B2	430	470	470	430
C1	75	90	90	75

* no terminal strip

Installation cutout



Airflow data	PTFA 60.000 IP 54
Filter mat	IP 54-filter mat
Filtration efficiency	81%
Filter material grade (DIN EN 779)	G 3

Technical data	PTFA 60.000
Outside dimensions in mm (Height x Width x Depth x Installation depth)	110 x 430 x 430 x 35
Construction	metal chassis, cover powder-coated; snap-in body of sprayed thermoplastic (ABS-FR) self-extinguishing, UL 94 V0
Weight	3,1 kg
Safety protection	according to EN 60529
Colour	RAL 7035, RAL 7032, other colours available on request

Supplementary data	PTFA 60.000
Operating temperature	–10 °C to +55 °C
Storage temperature	–20 °C to +70 °C
Max. relative humidity	90%
System of protection	IP 33, IP 54 (EN 60 529), when used as recommended
Accessories	radiant heater, fan heater, thermostat, see Thermal Management
Tolerance installation cutout	291 +1 -0 thickness of material to 2 mm; 292 +1 -0 thickness of material > 2 mm ≤ 3 mm
Approvals	UL approval see overview filterfans

Customised solutions for air-conditioned telecommunication equipment

- For more than 15 years, Pfannenberg have cooperated with the most successful system providers and enclosure manufacturers in the international telecommunications market.
- Our customers and partners rely on us - starting from the analysis to development, system integration and to production and logistics at various production facilities.
- The Pfannenberg product range includes a large variety of air-/air-heat exchangers, cooling units or combi units for indoor- and outdoor-applications with surrounding temperatures from –40 °C to +55 °C.

Thermal Management

Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY

The devices of the Thermal Management for Pfannenberg's air-conditioning equipment are useful supplementary items and provide additional control for Pfannenberg filterfans, heat exchangers and cooling units.

Thermostat

Temperature control devices are mainly used to regulate filterfans or enclosure heaters. They are available with NCC, NOC and change-over function. Especially when used in combination with heating systems, they are not only suitable for temperature control in, for example, outdoor applications, but can also "artificially" dehumidify enclosures. This means that the temperature is maintained at a level over and above the dewpoint, preventing precipitation of water from the air and potential short-circuiting that can result from accumulated condensation. A new combined thermostat range combines two thermostats in all combinations for complex trigger operations!

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Hygrostat / Hygrostat-Thermostat Combination

The hygrostat regulates heaters or fans whenever they exceed a preset level of relative humidity. This means that the relative humidity is maintained over and above the dewpoint to prevent precipitation of water on the electrical components and corrosion on unprotected metal.

A new electronic device combines a thermostat and a hygrostat in one.

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Radiant heating systems

Radiant heaters are very compact devices, designed to cover a wide range of operating voltages. They are primarily used in conjunction with a thermostat or hygrostat to prevent low temperatures or high levels of humidity in enclosures, thus forestalling the production of corrosion.

Pfannenberg's new mini-heaters are particularly suitable for use in small enclosures or for selective heating of sensitive areas.

page 124-126

Fan Heaters

These heaters are the optimum solution for large-sized enclosures. They have an integrated fan to enhance natural convection and provide rapid, uniform distribution of heat inside the enclosure.
Fan heaters are primarily used in conjunction with a thermostat or hygrostat to prevent low temperatures or high levels of humidity in enclosures, thus forestalling the production of corrosion.

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Thermostat
FLZ 510, FLZ 520, FLZ 530 und FLZ 550 AS-i

Mechanical bi-metallic thermostat for temperature in enclosures. Suitable for Pfannenberg filterfans and heaters and also for monitoring temperature.
Different models available fitted with either change-over contact with neutral position, NCC or NOC.
Function at increasing temperature (e.g. NCC for triggering heaters, NOC for triggering fans). AS-i slave module also available.

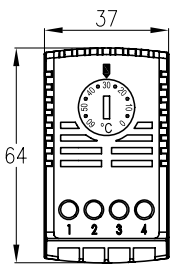
- all models can be delivered in convenient packaging units

IP 20 — System of protection
50 Hz / 60 Hz — suitable for both 50 Hz and 60 Hz
AC — Load
DC — Load

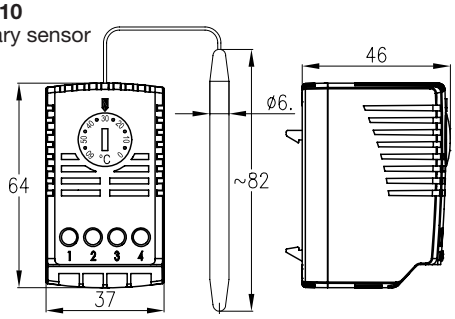
Technical data	FLZ 510	FLZ 520	FLZ 530	FLZ 550 AS-i
Type of contact	change over with spring contact	NCC with spring contact	NOC with spring contact	integrated AS-i bus Slave
Available setting ranges	- 20 °C (- 4 °F) ... + 40 °C (+ 104 °F) 0 °C (+ 32 °F) ... + 60 °C (+ 140 °F) + 20 °C (+ 68 °F) ... + 80 °C (+ 176 °F)			- 10°C (+ 14°F) ... + 60°C(+ 140°F)
Max. breaking capacity, value in brackets inductive Load at cos(phi) = 0,6	NCC: 100-250V AC/10(2)A NOC: 100-250V AC/5(2)A DC: max. 30W	240V AC / 10(2) A 120V AC / 15(2) A DC: max. 30W		< 20 mA 26,5 V ... 31,6 V AS-i profile: S-BA
Breaking temperature difference	1K: thermal return * 3K: without thermal return 7K: capillary sensor	< 7K		1 - 4K (adjustable)
Tolerance for switching point	+/- 3K	+/- 4K		+/- 2K
Sensor	bimetal or capillary sensor (1,5 m)	bimetal		NTC
Connection	0,5 - 2,5 mm² screw clamps			
Programming				1,3 mm DC Jack programming
Colour	RAL 7035 - light grey			
Weight	75 g	50 g	50 g	55 g
System of protection	IP 20			
Working /storage temperature range	- 20 °C (- 4 °F) ... + 80 °C (+ 176 °F)			- 25°C (- 13°F) ... + 80°C (+ 176°F)
Mounting method	snap fastening for 35mm profile bars according to EN 60715 (FLZ 520/530: for Pfannenberg exhaust filter PFA 3000 too) FLZ 550 AS-i not for headfirst mounting			
Approvals	1K, 3K: UL approval (not for 7K)	UL approval		AS-i

* suitable for 230V connection

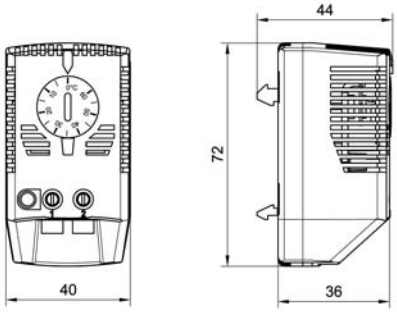
FLZ 510



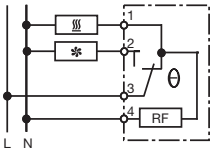
FLZ 510
capillary sensor



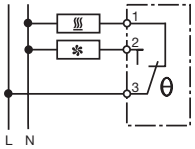
FLZ 520 / FLZ 530 / FLZ 550-AS-i



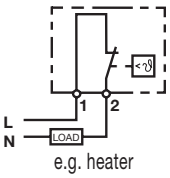
FLZ 510 1K



FLZ 510 3K / 7K

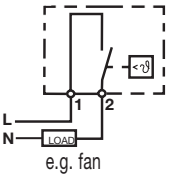


FLZ 520
NCC



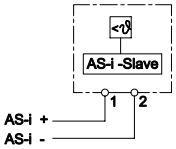
e.g. heater

FLZ 530
NOC



e.g. fan

FLZ 550 AS-i

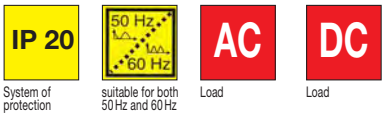


Twin Thermostat
FLZ 541, FLZ 542, FLZ 543

Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY

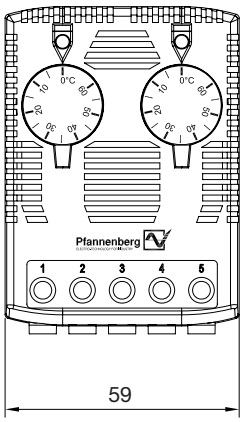
The twin thermostats of the FLZ series stand out for their integration of independently triggering mechanical thermostats. In contrast to thermostats with changeover contact, connected devices can be operated in varying temperature ranges. The availability of differing combinations ensures that a great number of applications can be catered for ideally.

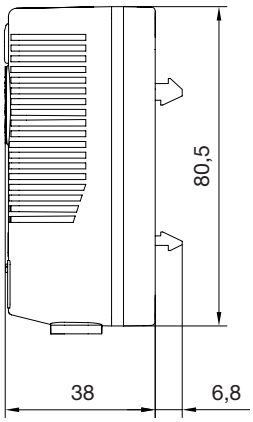
- FLZ 541 (NCC/NOC) for triggering, heaters and fans for example
- FLZ 542 (NCC/NCC) for triggering heaters, for example, heaters and additional heaters or early warning system and heater
- FLZ 543 (NOC/NOC) for triggering fans, for example: filterfans and additional filterfans to reduce volume/energy or early warning systems and filterfans
- all models can be delivered in convenient packaging units

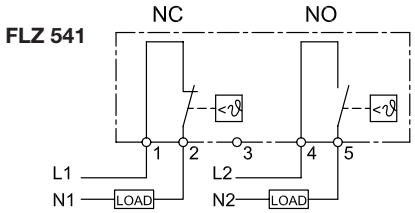


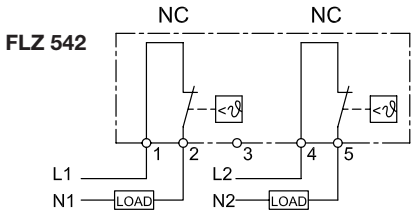
System of protection | suitable for both 50 Hz and 60 Hz | Load | Load

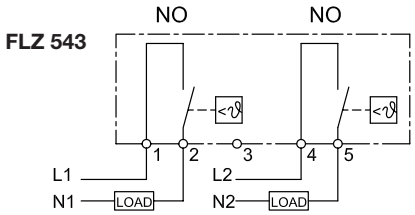
Technical data	FLZ 541	FLZ 542	FLZ 543
Type of contact	**NCC / NOC with spring contact**	**NCC / NCC with spring contact**	**NOC / NOC with spring contact**
Temperature ranges (adjustable)	0 °C (30 °F) ... + 60 °C (+ 140 °F)		
Max. breaking capacity, value in brackets: inductive Load at cos(phi) = 0,6	240 V AC, 10 (2)A / 120 V AC, 15(2) A DC: max. 30W		
Breaking temperature difference	< 7K		
Tolerance for switching point	± 4K		
Sensor	bimetal		
Connection	0,5 - 2,5 mm² screw clamps		
Colour	RAL 7035 - light grey		
System of protection	IP20		
Working /storage temperature range	- 20 °C (- 4 °F) ... + 80 °C (+ 180 °F)		
Mounting method	snap fastening for 35mm profile bars according to EN 60715, for Pfannenberg exhaust filter PFA 3000 too		
Weight	95 g		
Approvals	UL- and cUL approval in preparation		











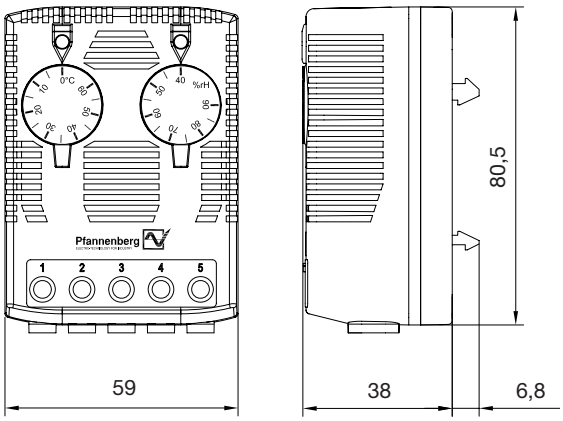
Electronic combined unit
Hygrostat/Thermostat FLZ 610

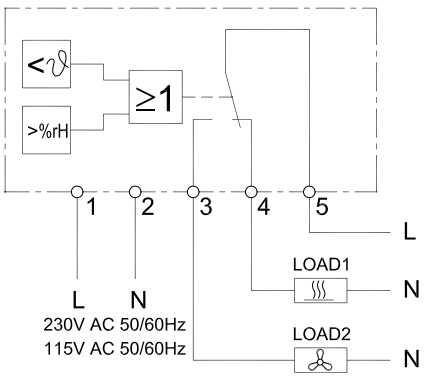
The electronic combined unit monitors the relative moisture and the temperature simultaneously, but independently of one another. If the set relative humidity level is exceeded, or if the temperature is lower than set, the connected unit, for example, a heater is triggered. This is ideal for avoiding condensation forming on electronic components in the electrical enclosure.
It is instantly clear whether the hygrostat and/or the thermostat have triggered the attached units (LOAD 1) by means of the integrated LEDs. If no LED is lit, LOAD 2 is active.

- also available in a convenient packaging unit

System of protection | suitable for both 50 Hz and 60 Hz | Load | Load

Technical data	FLZ 610
Type of contact	**change-over switch (relay)**
Control range (adustable)	40 - 90% r. H.
Temperature range (adustable)	0 °C (30 °F) ... + 60 °C (+ 140 °F)
Rated voltage	230 V or 115 V AC 50/60 Hz
Max. breaking capacity, value in brackets: inductive Load at cos(phi) = 0,6	240 V AC, 8(3) A or 120 V AC, 8(3) A 24 V DC, 4 A
Differential gap	approx. 2K ± 1K / approx. 4% r.H. ± 1%
Contact transition resistance	< 10m Ω
Connection	0,5- 2,5 mm² screw clamps
Colour	RAL 7035 - light grey
Operating mode display	LED
System of protection	IP 20
Working temperature range	- 20 °C (- 4 °F) ... + 60 °C (+ 140 °F)
Storage temperature range	- 20 °C (- 4 °F) ... + 80 °C (+ 176 °F)
Number of switching cycles	≥ 100.000
Mounting method	snap fastening for 35mm profile bars according to EN 60715, for Pfannenberg exhaust filter PFA 3000 too)
Weight	85 g
Approvals	UL- and cUL approval in preparation





Mechanichal Hygrostat
FLZ 600

Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY

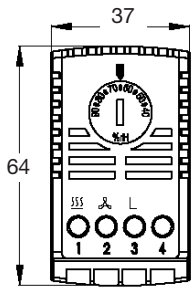
Mechanical hygrostat with change-over contact for triggering heating and / or filterfan at a preset level of relative humidity.

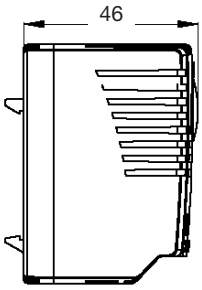
This maintains the relative humidity above the dew point to prevent condensation and corrosion.

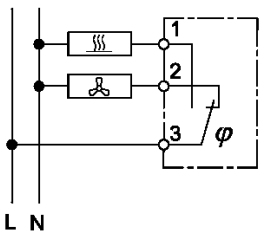
- also available in a convenient packaging unit

IP 20 — System of protection
AC — Load
DC — Load

Technical data	FLZ 600
Type of contact	**Change-over switch**
Control range	40 - 90% r.H.
Max. breaking capacity, value in brackets: inductive Load at cos(phi) = 0,6	NCC: 24V - 250V AC / 5(0,2) A - min. 100 mA NOC: 24V - 250V AC / 2(0,2) A min. 100 mA DC: max. 30W
Differential gap	approx. 5%
Tolerance for switching point	+/- 4% based on 50% r.H.
Sensor	polyamide band
Connection	0,5 - 2,5 mm² screw clamps
Colour	RAL 7035 - light grey
Weight	55 g
System of protection	IP 20
Operating temperature	0 °C (30 °F) ... + 60 °C (+ 140 °F)
Storage temperature	- 20 °C (- 4 °F) ... + 80 °C (+ 176 °F)
Mounting method	snap fastening for 35mm profile bars according to EN 60715
Approvals	UL approval







Radiant Heater and Fan Heater
FLH 010 - FLH 400

Heat generated by electrical equipment operating under load will prevent the accumulation of condensation. After the equipment has been switched off however it cools down and gradually adapts to the ambient temperature, thus dropping below the dew point.
This is the signal that triggers the heater! These sources of heat prevent the formation of condensation by raising the internal temperature a few degrees above the ambient temperature.
In the interest of evenly distributing the heat, we recommend that the requirement of heating capacity is divided among several small heaters.

System of protection

suitable for both 50 Hz and 60 Hz

115 V ... 230 V (FLH 010-150)

Thermal data	Radiant Heater								Fan Heater	
	FLH 010	FLH 015	FLH 030	FLH 045	FLH 060	FLH 075	FLH100	FLH 150	FLH 250	FLH 400
Heater power (T_U = +20 °C)	10 Watt	15 Watt	30 Watt	45 Watt	60 Watt	75 Watt	100 Watt	150 Watt	250 Watt	400 Watt
Max. surface temperature approx.	55 °C	65 °C	90 °C	105 °C	105 °C	120 °C	130 °C	150 °C	70 °C	85 °C
Airflow									50 m³/h (50 Hz) 61 m³/h (60 Hz)	
Duty cycle	100 %									
Heating element	PTC (positive temperature coefficient), temperature regulating								resistance type with temperature monitor	

Electrical data

Rated voltage[1])	230 V (50 / 60 Hz) [2])								115 V or 230 V	
Voltage range	110 - 250 V								104 - 126 V or 207 - 258 V	
Power consumption	10 Watt	15 Watt	30 Watt	45 Watt	60 Watt	75 Watt	100 Watt	150 Watt	260 Watt	410 Watt
Starting current approx.	1,0A	1,1A	1,2A	1,8A	2,5A	4,5A	5,0A	7,5A	2,2A / 1,1A	3,6A / 1,8A

[1]) **other voltages (24 V DC, 48V DC) on request**
[2]) **selected models available in 400V**

Mechanical data

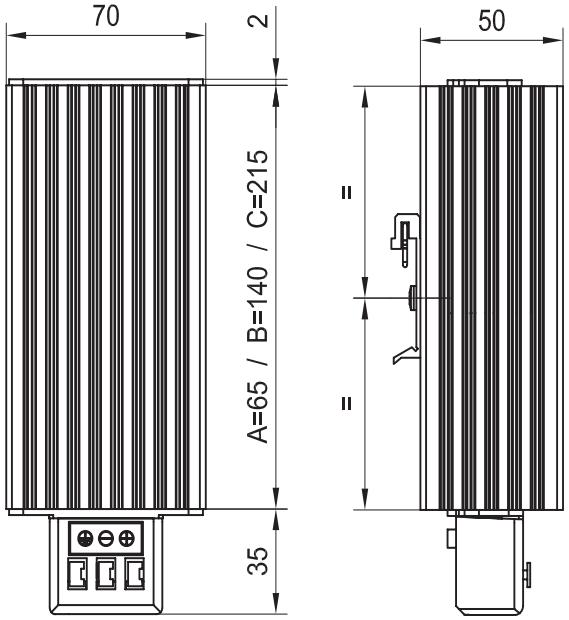
Fitting position	any, vertical position preferred								airflow vertical, exit at top	
Construction	aluminium section, anodised (light-coloured)									
Weight	250 g	250 g	250 g	250 g	450 g	510 g	510 g	770 g	1.035 g	1.200 g
Dimensions	A	A	A	A	B	B	B	C	D	E
Protection class	I								I	
Connection	cable end or plug-in terminal								plug-in terminal	
Binding post clambing area	single filament: 2 x 0,5 - 2,5 mm², fine multi-filament: (soldered, wire and sleeve, pin terminal) 2 x 0,5 - 1,5 mm²									
Mounting method	snap fastening for 35mm profile bars according to EN 60715									

Supplementary data

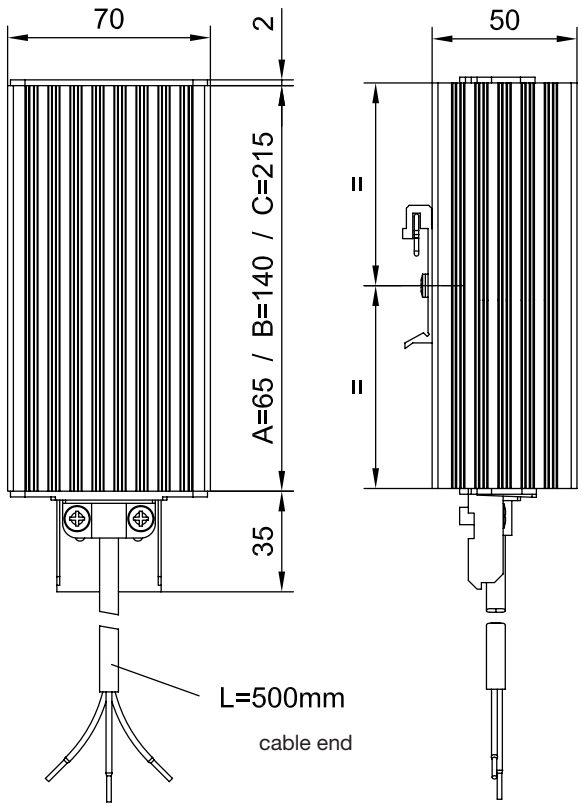
Operating temperature	- 40 °C (- 40 °F) ... + 70 °C (+ 158 °F)	- 20 °C (- 4 °F) ... + 70 °C (+ 158 °F)
Storage temperature	- 40 °C (- 40 °F) ... + 70 °C (+ 158 °F)	- 40 °C (- 40 °F) ... + 70 °C (+ 158 °F)
System of protection	IP 44 (cable end), IP 20 (plug-in terminal), when installed as recommended	IP 20, when installed as recommended
Accessories	thermostats, hygrostats	
Approvals	UL approval	
Optional extra		2nd protective guard

Mechanical data:

FLH 010 - FLH 150

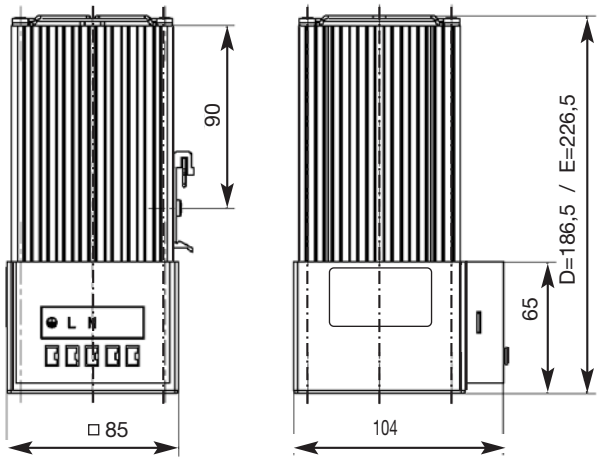


plug-in terminal

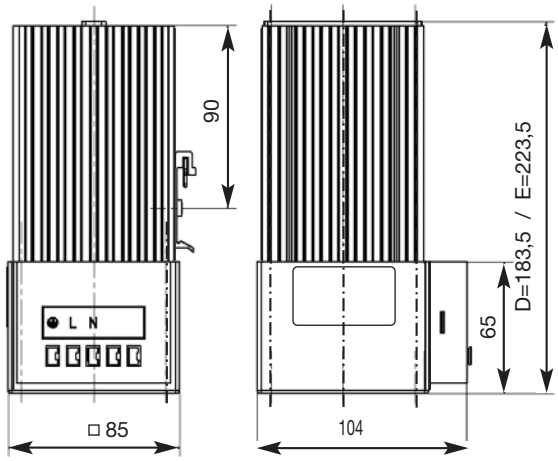


cable end

FLH 250 / FLH 400



with guard



without guard

Mini Radiant Heaters
FLH 010-M, FLH 020-M and FLH 030-M

Mini Radiant Heaters

The new mini radiant heaters are particularly suitable for use in small enclosures or for selective heating of sensitive areas.
Heat generated by electrical equipment operating under load will prevent the accumulation of condensation. After the equipment has been switched off however it cools down and gradually adapts to the ambient temperature, thus dropping below the dew point.
This is the signal that triggers the radiant heater! These sources of heat prevent the formation of condensation by raising the internal temperature a few degrees above the ambient temperature.

System of protection

suitable for both 50 Hz and 60 Hz

115 V ... 230 V

Thermal data	FLH 010-M	FLH 020-M	FLH 030-M
Heater power (T_U = +20 °C)	10 Watt	20 Watt	30 Watt
Max. surface temperature approx.	95 °C	115 °C	140 °C
Duty cycle	100 %		
Heating element	PTC (positive temperature coefficient), temperature regulating		

Electrical data

Rated voltage	230 V (50 / 60 Hz)		
Voltage range	110 - 250 V		
Power consumption	10 Watt	20 Watt	30 Watt
Starting current approx.	1,0A	1,1A	1,2A

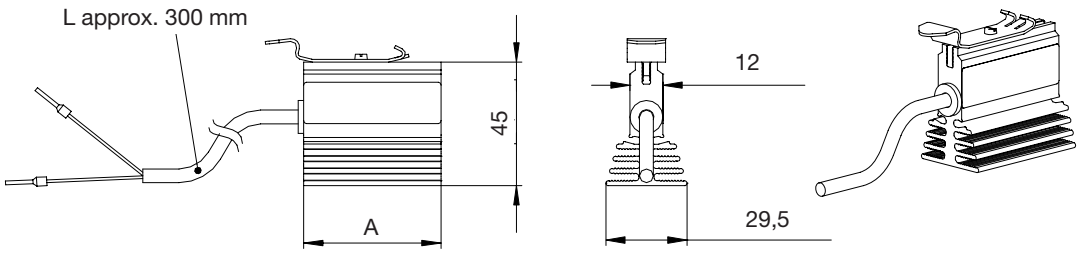
Mechanical data

Fitting position	any, vertical position preferred		
Construction	aluminium section, anodised (black)		
Weight	85 g	120 g	120 g
Dimensions	A = 50 mm	A = 75 mm	A = 75 mm
Protection class	II		
Connection	cable end (300 mm)		
Mounting method	snap fastening for 35mm profile bars according to EN 60715		

Supplementary data

Operating temperature	- 40 °C (- 40 °F) ... + 70 °C (+ 158 °F)
Storage temperature	- 40 °C (- 40 °F) ... + 70 °C (+ 158 °F)
System of protection	IP 54 (vertical installation), when used as recommended
Accessories	thermostats, hygrostats
Approvals	UL approval

Mechanical data:



Lamp Systems, Plugs, Power Sockets, Pressure Compensation Device and Machine Identification Lights

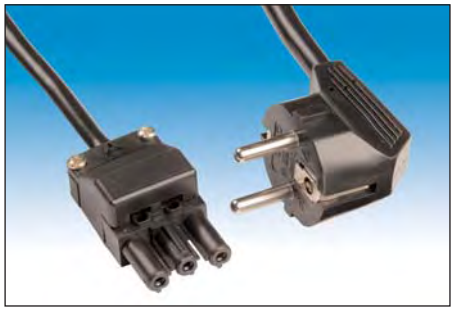
Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY

Apart from the air conditioning of industrial applications with its comprehensively expanded product range Pfannenberg now also offers systems and components for switch cabinet suppliers.

Pfannenberg Lamp System PLS

For illuminating your switch cabinets there is a large selection of different options available. Whether with plugs, connections for door contacts, integrated door end switches or for simple series connection of several lights – everything is possible. Light coverings are also available.

page **128**



Mains / Connection Plug PLS-C

In order to simply and effectively integrate the Pfannenberg lamp system into the switch cabinet we offer you a range of prefabricated connection possibilities of different lengths.

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Power Sockets PPS

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

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Pressure Compensation Device PPC

Due to temperature fluctuations in a housing in relation to the environment, created by installed heat creating fluctuations of the ambient temperature, changing pressures arise. These pressure changes can lead to a build up of dust and humidity in the enclosure. To compensate for these pressure fluctuations it is recommended to install a pressure-balancing device keeping the highest protection types (up to IP 69K, high pressure/steam jet cleaning).

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Maschine Identification Lights BR

To supplement their air-conditioning equipment, Pfannenberg also manufacture machine identification lights for control equipment and automation systems. The slimline, elegant shape and the intrinsic values of BR signal towers ensure that they are placed more and more frequently on machines in the electrical industry, in medicine technology and in laboratories.

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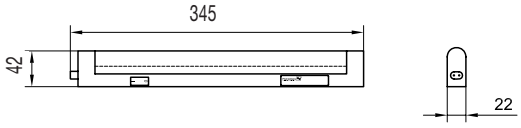
Standard Lamp System Series PLS

PLS 008 MINI

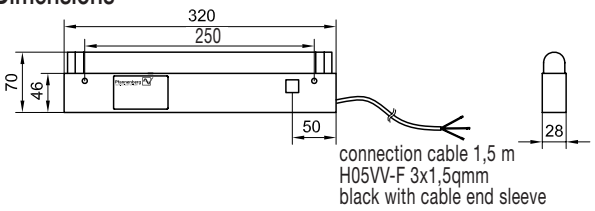
Dimensions



Technical data	PLS 008 MINI
Rated voltage	230 V 50/60 Hz
Current consumption	0,07 A
Fluorescent tube	8 W
Tube type	T5
Light intensity	450 Lm
Duty cycle	8000 h
Operating temperature	– 10 °C (+ 14 °F) ... + 45 °C (+ 113 °F)
Storage temperature	– 10 °C (+ 14 °F) ... + 45 °C (+ 113 °F)
System of protection	IP 20
Protection class	II
Colour of housing	white
Fitting position	any
Basic parts kit	magnetic fixing enclosed
Certification	GS (ITS)
Weight	0,17 kg
Connection	mains connector with plug enclosed

PLS 008 SL

Dimensions

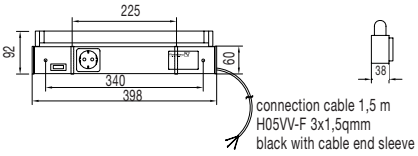


Technical data	PLS 008 SL
Rated voltage	230 V 50 Hz
Current consumption	0,16 A
Fluorescent tube	8 W
Tube type	T5
Light intensity	450 Lm
Duty cycle	8000 h
Operating temperature	– 10 °C (+ 14 °F) ... + 45 °C (+ 113 °F)
Storage temperature	– 10 °C (+ 14 °F) ... + 45 °C (+ 113 °F)
System of protection	IP 20
Protection class	I
Colour of housing	RAL 7035
Fitting position	any
Certification	ENEC (KEMA)
Weight	0,89 kg
Connection	cable (1,5 m)

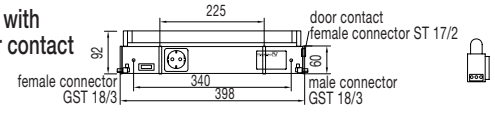
PLS 014

Dimensions

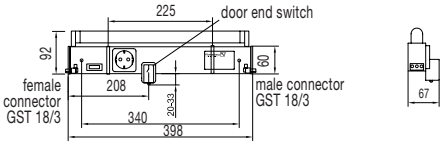
PLS 014 cable



PLS 014
2 x GST 18/3 with
external door contact



PLS 014
2 x GST 18/3 with
door end switch



Technical data	PLS 014		
Rated voltage	230 V 50 Hz		
Current consumption	0,39 A		
Fluorescent tube	14 W		
Tube type	T8		
Light intensity	700 Lm		
Power socket	D (other versions on request)		
Duty cycle	8000 h		
Operating temperature	– 10 °C (+ 14 °F) ... + 45 °C (+ 113 °F)		
Storage temperature	– 10 °C (+ 14 °F) ... + 45 °C (+ 113 °F)		
System of protection	IP 20		
Protection class	I		
Colour of housing	RAL 7035		
Fitting position	any		
Certification	ENEC (KEMA)		
Weight	1,31 kg	1,22 kg	1,22 kg
Connection	cable (1,5 m)	GST 18/3 plug	GST 18/3 plug
Additional connections	——	GST 18/3 socket	GST 18/3 socket
	——	door contact	integrated door end switch

Lamp System Series PLS: Special versions

Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY




Technical data	PLS 015				PLS 015 SL					PLS 008 SL				PLS 013 MINI
Rated voltage	230 V 50 Hz (US: 120 V 60 Hz)													230 V 50/60 Hz
Current consumption	0,29 A (US: 0,38 A)				0,29 A (US: 0,38 A)					0,16 A (US: 0,25 A)				0,11 A
Fluorescent tube	15 W				15 W					8 W				13 W
Tube type	T8									T5				T5
Light intensity	720 Lm									450 Lm				640 Lm
Power sockets	D, F, CH, GB, US/CDN				———					———				———
Duty cycle	8000 h													
Operating temperature	– 10 °C (+ 14 °F) ... + 45 °C (+ 113 °F)													
Storage temperature	– 10 °C (+ 14 °F) ... + 45 °C (+ 113 °F)													
System of protection	IP 20													
Protection class	I													II
Colour of housing	RAL 7035													white
Fitting position	any													
Certification	ENEC (KEMA)													GS (ITS)
Weight (kg)	1,36	1,25	1.29	1,29	1,43	1,28	1.30	1,32	1,35	0,75	0,75	0,78	0,82	0,26
Connection														mains connector plug enclosed
Cable (1,5 m)	X				X	X				X				
GST 18/3 plug		X	X	X			X	X	X		X	X	X	
Additional connections														
GST 18/3 socket *	X	X	X	X		X	X	X	X	X	X	X	X	
Door contact			X					X				X		
Integrated door end switch				X					X				X	
Measure drawing	1	———	2	3	4	5	———	6	7	8	———	9	10	11

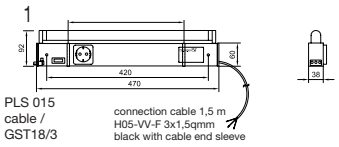
* for series connection of several lights

Accessories cable see page 130

Light cover

	PU (piece)
PLS light cover for PLS 008 SL	1
PLS light cover for PLS 014	1
PLS light cover for PLS 015 and PLS 015 SL	1

PLS 015

1


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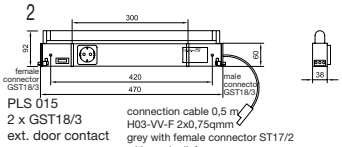

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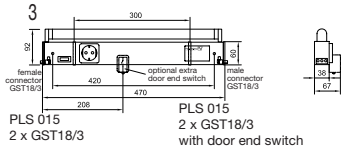

PLS 015 SL

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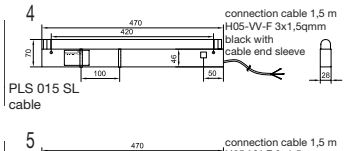

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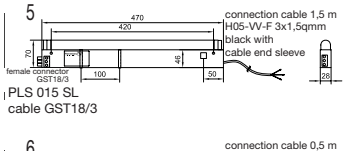

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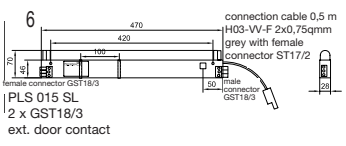

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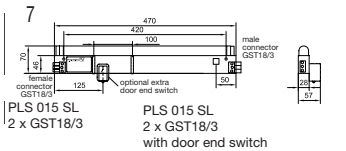

PLS 008 SL

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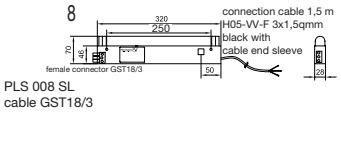

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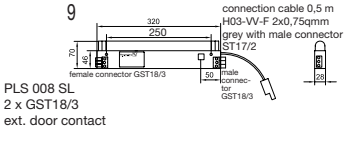

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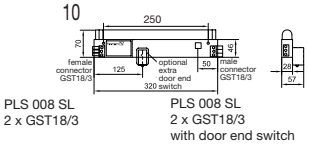

PLS 013 MINI

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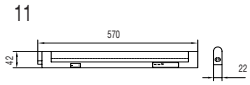


Plugs, Connecting Cable, Power Socket and Pressure Compensation Device

Plugs / connecting cables PLS-C (for PLS 008 SL / PLS 014 / PLS 015 / PLS 015 SL)

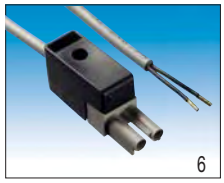

1


2


3


4

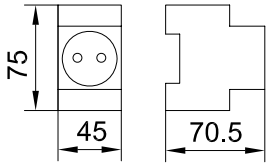

5


6

	length	PU (piece)	picture
PLS-C mains connection cable with saftey plug and GST 18/3 socket	1,0 or 3,0 m	1 or 5	1
PLS-C mains connection cable with GST 18/3 plug	1,0 or 3,0 m	1 or 5	2
PLS-C mains connection cable with GST 18/3 socket	1,0 or 3,0 m	1 or 5	3
PLS-C connecting cable withGST 18/3 plug und socket	0,5 or 1,0 or 2,0 m	1 or 5	4
Socket GST 18/3		5	5
Plug GST 18/3		5	5
Door contact cable ST 17/2	1,0 m	1 or 5	6

Power sockets series PPS

Dimensions:




PPS D


PPS F


PPS USA

Technical data	PPS D	PPS F	PPS USA
Rated voltage	250 V AC	250 V AC	125 V AC
Nominal current	10 A DC / 16 A AC	10 A DC / 16 A AC	15 A AC
Contact material	CuZn37		
Insulating material	PA		
Colour	grau		
Operating temperature	– 20 °C (- 4 °F) ... + 60 °C (+ 140 °F)		
Mounting method	snap fastening for 35mm profile bars according to EN 60715		
Conductor cross-section	single filament: 0,2 - 4 mm² / fine multi-filament: 0,2 - 2,5 mm² / AWG 24 - AWG 12		
Bare length	8 mm		
Standards / Approvals	IEC 83, DIN 49440-1		UL

Pressure compensation device PPC

Technical data	
Thread	M12 x 1,5 - 10 mm
Material	polyamide 6, O ring: perbunan
Operating temperature	- 40 °C (- 40 °F) ... + 120 °C (+ 248 °F)
Colour	RAL 7035
System of protection	IP 66, 68 + 69K
PU (piece)	5

Mounting support PDR

Technical data	
Fastening	self-adhesive
Material	sheet steel, galvanized
Operating/Storage temperature	- 30 °C (- 22 °F) ... + 70 °C (+ 158 °F)
Dimensions	H 35 x W 70 x D 7 mm
Weight	approx. 25 g
Load *	500 g after 24h waiting period

* The smooth surface have to be free of dust, oil and separate means for mounting

PDR is a mounting support, for installation of e.g. thermostats or hygrostats in small enclosures without drilling or screwing.
At the backside of the PDR is a self-adhesive foam strip, first developed for space travel and aviation.

Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY

The BR 35 and BR 50 Signal Towers

Choose safety, wherever equipment is required to display machine status and provide warning signals!

To supplement their air-conditioning equipment, Pfannenberg also manufacture machine identification lights for control equipment and automation systems. The slimline, elegant shape and the intrinsic values of BR 35 signal towers ensure that they are placed more and more frequently on machines in the electrical industry, in medicine technology and in laboratories. With an IP 54 protection system, they are an excellent choice for all indoor applications.

Available with sounder!

- modular design with six different coloured elements – red, yellow, amber, green, clear, blue – and six different mounting methods for an infinite number of combinations
- high level of protection against electric shock
- the light is intensified by the prismatic arrangement inside the impact- and heat-resistant, dustproof polycarbonate globes and is clearly visible from all sides
- sophisticated design with a mere 35 mm in cross-section
- the BR 35 is the crowning glory on machinery and production lines
- under both technological and economical aspects, the ideal solution for any application
- design patent No. 9706583.8, utility model registration No. 29716867.3

IP 54 System of protection | +55 °C / –35 °C | CE | UL* | * 24V DC

The sturdy stacklight BR 50: for all in- and outdoor applications – for industrial use with IP 54 or IP 55.

LED-Generation-Multi LED BA 15d

Energy- and cost-saving high-performance SMD LED replace light bulbs

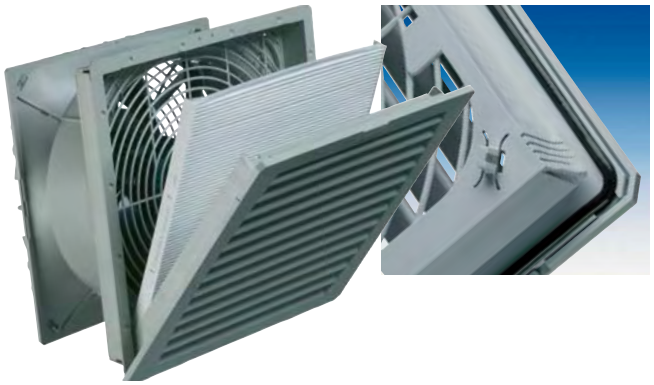
- extremely long service life (>50.000 hours)
- selection of colours: white, yellow, red, blue and green

Please ask for your copy of our signal tower brochure.

- wherever equipment is required to display machine status and provide warning signals
- a flexible modular system guarantees easy operation. Up to as many as five modules with a choice of six globe colours can be simply plugged together in any permutation, even at a later point in time
- the mechanical and electronic systems are decoupled to produce a stable construction insensitive to vibration
- you have the choice between four different modules:
  - module with continuous beam max. 7 W
  - blinking-light module max. 7 W
  - flashing-light module max. 1 joules
  - acoustic module 85 dB (A)
- versatility in installation: Also the mounting methods we offer leave nothing to be desired. Stand, tube or direct mounting.
- the environmentally friendly materials used in manufacture comply with the DIN ISO 14000
- tool for lamp replacement
- BR 50-LED for Ex applications available

IP 54	IP 65	+45 °C / –25 °C	+60 °C / –30 °C	90%	CE	UL
System of protection	System of protection (optional extra)	Operating temperature	Storage temperature (with LED)	Relative humidity		(Listed)

How to select the right components for air your enclosures!



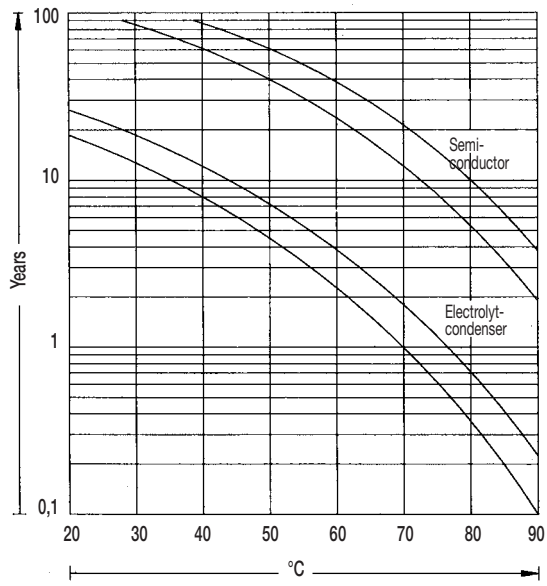
Excellent in capacity – unique in design!

Ever since components have been made to control electrotechnical tasks, heat loss has been a subject to take into consideration.

Major problems with heat caused excessive dust accumulation in switchgear equipment because the doors were left open during the summer to allow the equipment to cool down. This can result in fluctuations in temperature. This leads to stress situations that can considerably reduce the service life of electronic components (see diagram).

We are at your disposal, 24 hours a day.

www.pfannenberg.com



The diagram demonstrates the relationship between temperature and service life.

The demand for cool and filtered air led to the **first filterfan** being developed by Pfannenberg nearly **50 years ago**.

In 1989 Pfannenberg introduced a completely new range of filterfans to meet the requirements of a changing market. With a considerable reduction in installation time in mind we created the snap-fitting mechanism. The specifications for a non-bolted filterfan system are demanding. Extremely fluctuating temperatures and the mechanical strain due to transport or slamming enclosure doors must not be allowed to cause failure. The shock and vibration tests conducted by "Germanischer Lloyd" certify the excellence of our snap-fitting system (European-Patent No. 0439667).

In the course of development absolute priority was given to the use of high-quality components (plastic material, fan, filter mat) and comprehensive transparent technical data.
For this purpose we measured every filterfan and exhaust filter in a test laboratory. All the relevant data for our cooling units and air-/water heat exchangers result from tests in our own climatic chamber.

Resulting from many years of experience and close cooperation with customers and numerous laboratory measuring systems we are proud to present the extra servicefriendly 4th Generation of filterfans.
Please find additional information starting from page 76 as well as under the internet domain **www. filterfan.com.**

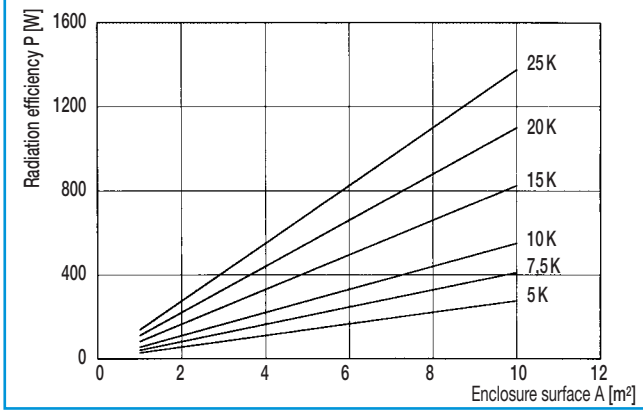
The following pages are designed to provide support on the selection of the required cooling components.

Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY

Heat dissipation by natural convection

If the ambient temperature is lower than the temperature inside the enclosure the dissipated heat escapes into the atmosphere through the surface of the enclosure. The following simple equation is used to calculate nearly the level of heat radiated from an enclosuret:

$$P_R[W] = c \times A \times \Delta T$$



Heat dissipation with a cooling unit

Pfannenberg air/refrigerant 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 dissipated from the enclosure (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 is 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 rife with conductive dust.

Selecting cooling units:

- Ascertain the total dissipation loss from the components installed in the enclosure. Take into account the simultaneity factor. Only rarely are all components in operation at the same time.
- Also take the heat radiation from the enclosure into account. If $T_i < T_a$, this must also be added to the dissipation loss value.
- Now select the necessary cooling unit in accordance with the required refrigeration capacity, ensuring that the cooling capacity of the cooling unit is at least equal to the dissipation loss value. Preferable is a figure 10% in excess of that value.

Using the characteristic curves for the cooling units properly.

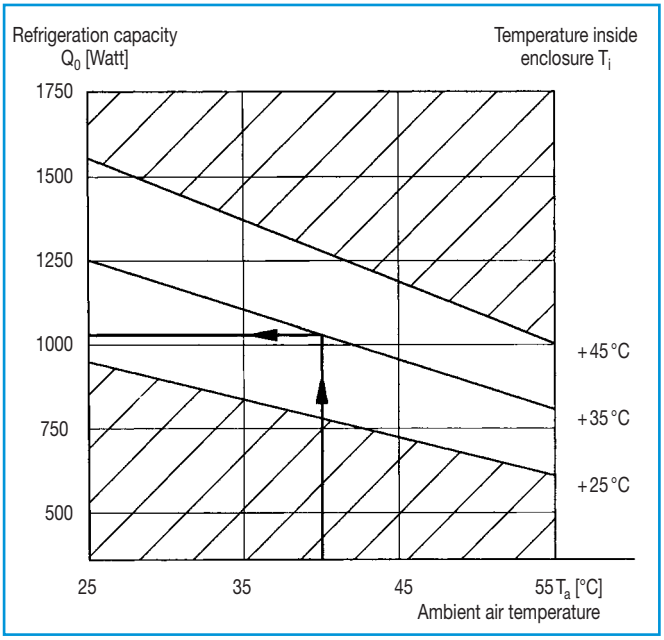
In this catalogue you will find a diagram for every Pfannenberg cooling unit showing the relevant characteristic curves. This diagram allows you to ascertain the corresponding effective (useful) refrigeration capacity for any temperature.

Example:

T_a = 40 °C; T_i = 35 °C.

Go to the known ambient temperature (T_a = 40 °C) and trace a vertical line up to the intersection with the +35 °C line. Now, trace a horizontal line left of that intersection until it meets with the ordinate (vertical axis). This point shows the refrigeration capacity required. In our example the value is 1040 W.

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



How to select the right components for air your enclosures!

Important information on the utilization of cooling units:

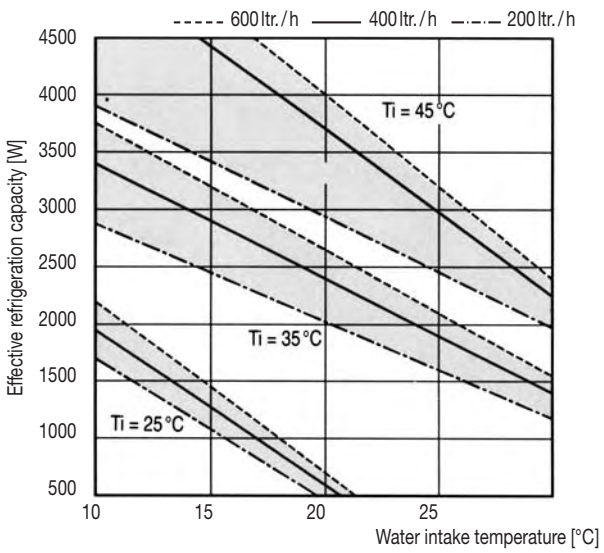
- The refrigeration capacity should exceed the dissipation loss from the installed components by approx. 10 %.
- The enclosure must be adequately sealed to prevent the inflow of ambient air.
- Use the door contact switch to impede operation with open doors and consequent excessive accumulation of condensation.
- Use cooling units with a generous clearance between air inflow and air outflow to prevent poor circulation.
- Attach the condensate overflow hose included in the package of accessories supplied with the unit.
- Make sure that the air inflow and air outflow in the external circuit of the cooling unit circulates satisfactorily to ensure that the thermal energy is released into the ambience.
- 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. This counteraction between the two airflows would otherwise substantially reduce the refrigeration capacity and could cause heat pockets.
- Make sure that the enclosure stands up straight.
  Otherwise the condensation cannot drain properly from the top-mounted unit.
- The lowest temperature inside the enclosure is not the best. The value we have preset (35 °C) is a sound compromise between service life and accumulation of condensation.

Heat dissipation with air/water heat exchangers

With their elementary compact design, air/water heat exchangers allow you to cool an enclosure particularly effectively.

- Since the capacity data for air/water heat exchangers are not governed by any standards (such as DIN 3168 / pr EN 814 T5) Pfannenberg has drawn on data gathered from experience:
  Water intake temperature: T_w = 10 resp. 20 °C
  Temperature inside enclosure: T_i = 35 °C
  Water flow volume: v_w = 400 l/h
- Pfannenberg offers a wide range of air/water heat exchangers: with top- and side-mounted units with a refrigeration capacity from 650 W to 5000 W.
- The ideal application is in harsh ambient conditions such as oily air.
- If a cooling water system with sufficient capacity is already in place you should seriously consider the use of air/water heat exchangers.
- Avoid excessive flow velocity in the piping system.
  Cavitation can cause leaks. The max. flow velocity should not exceed 3 m/s.
- Make sure that the water intake temperature is not too low. Temperatures below 15 °C lead to excessive accumulation of condensation. This means that part of the capacity is used to cope with the condensation and is therefore no longer available for cooling the air inside the enclosure.

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



Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY

Heat dissipation with filterfans

Simple equation for calculating the required air flow volume:

$$v = \frac{3{,}1 \cdot P_v}{\Delta T} \; [m^3/h]$$

Please take the following into account when considering the use of filterfans:

- Always use the filterfan to propel the cool ambient air into the enclosure. This ensures that slight positive pressure builds up inside the enclosure in comparison to the ambience and that only air filtered by the filterfan flows into the enclosure. The air propelled into the enclosure displaces the warm air which exits through the exhaust filter. If however the air is drawn out of the enclosure by suction power, unfiltered air can also enter through gaps and components.
- If you install a combination of filterfan / exhaust filter, fit the filterfan into the lower third of the enclosure if possible. The exhaust filter must be installed as near to the top as possible to prevent hot spots in the upper part of the enclosure.
- In enclosures consisting of several compartments, the cool air capacity required should be divided among two or more filterfans / exhaust filters. This measure helps to ensure a more acceptable distribution of temperature throughout the enclosure.
- If you combine a filterfan with two exhaust filters, the cool air divides into a Y-shape. In this way, with just one additional exhaust filter you can considerably improve the circulation inside the enclosure.
- Install a thermostat that only trips the filterfan when the temperature is too high. This can quite substantially increase the service life of your filter mat.

EMC-shielded filterfans

On the first pages have we already informed you about our new filterfans. The PF 11.000 to PF 67.000 range and the corresponding exhaust filters are available in EMC-shielded versions. Back in 1991, Pfannenberg was the first in the industry who introduced two EMC-shielded filterfans to the market. With the new system, Pfannenberg has once again set a sign. Especially in terms of the environmentally friendly and discriminate use of material. A particular point to emphasize is that with this version you can also do without the dreary task of screw fixing the equipment.

Heat supply with heating

In certain applications it may be necessary to fit switch cabinets with heating devices to maintain and reach minimal temperatures or to avoid condensation. Also for these requirements Pfannenberg offers a simple tool. Please download the PSS heating program for free at http//www.pfannenberg.com.

Formula expressions:

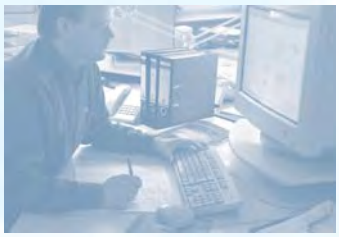
A [m²]:	Surface area of enclosure: Effective surface area of a enclosure measured according to the specifications of VDE 0660, Part 507
c [W / m² K]:	Coefficient of heat transmission: Radiation power per 1 m² surface area and 1K difference in temperature. This constant is determined by the material: Sheet steel – 5.5 W / m² K Stainless steel – 4.5 W / m² K Aluminium – 12.0 W / m² K Plastic/Polyester – 3.5 W / m² K
P_T [W]:	Thermal power of a radiant heater
Q_0 [W]:	Refrigeration capacity of a cooling unit: Only the effective or useful cooling capacity is shown
P_R [W]:	Radiation power: Thermal power radiated from the surface area of the enclosure into the ambience or radiated from the ambience into the enclosure. The surface area of the enclosure is measured according to the specifications of VDE 0660, Part 507
P_d [W]:	Dissipation loss: Thermal power generated inside an enclosure by dissipation loss from components
T_i [°C]:	Maximum admissible temperature inside the enclosure: This value reflects the maximum operating temperature of components installed in the enclosure. This usually ranges from approx. 35 °C to 45 °C
T_a [°C]:	Maximum ambient temperature: Temperature at which the enclosure is installed
T_w [°C]:	Water intake temperature
v [m³/h]:	Flow volume for a filterfan
v_w [l/h]:	Water volume: Volume of water pumped through an air / water heat exchanger
ΔT [K]:	Difference in temperature between the ambience and inside of the enclosure

NEW!

Pfannenberg – Your Partner for Service and Product Validation

Do you have a ground-breaking idea for a product, but don't have the necessary resources or know-how to develop it? Do you have a product, but don't have the necessary resources or know-how to validate the features and applications for it?
If you can answer 'Yes' to either of the above, then why not avail of the extensive knowledge and more than 50 years worth of experience of the Pfannenberg company, as well as our highly-qualified technical personnel and our extensive and modern laboratory facilities to support you in your endeavour?

As a manufacturer of product ranges for industrial electronic enclosure cooling as well as products for optical and acoustic warning and emergency signals, we are happy to offer you qualified support to realise your products, from the idea, through validation and cost-optimised production on your assembly line.



Product Development

We offer the following services when realising and assembling your product idea:

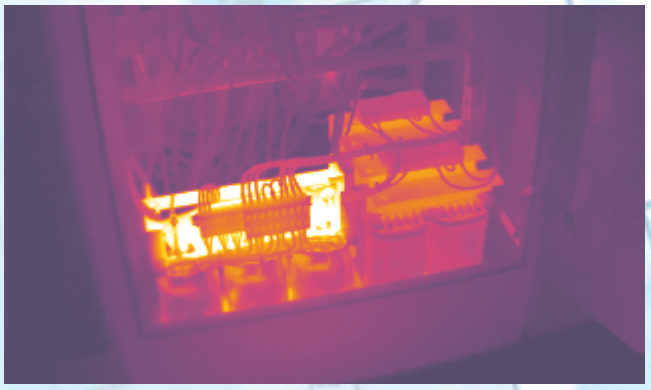
- developing the concept, taking into account the technical demands, costs, deadline, national and international regulations and policies
- testing whether or not the product is patentable
- design using the most diverse testing tools
- construction using modern 3-D construction software
- construction of a prototype in our well-equipped prototype workshop
- product validation
- creating the product specification and equipment (list of parts, diagrams, assembly instructions, test instructions and equipment and so on)
- delivery to customers and supervision of the beginning of production

Product Validation

When validating your product, or benchmarking, we can offer the following services:

Environmental conditioning

Our well-equipped double climatic chamber can reach temperatures of between -40% to +70% °C with relative humidity of 0-99%. Test pieces can be connected up to 500V 50/60Hz.
Each chamber has a self-contained data logging system, with sensors of all types connected, which allow the operating parameters of your test piece, as set by you, to be measured and be documented on our modern computer-aided data logging system.

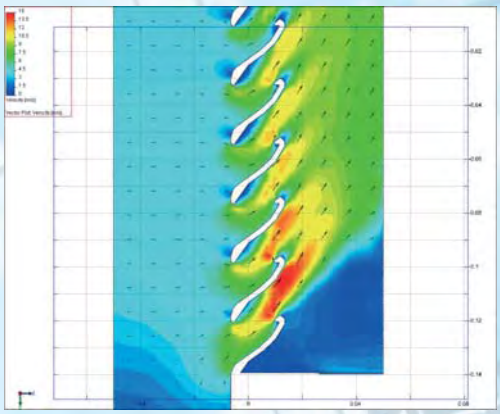


Infra-red measurement

To visualise the temperature distribution of your test piece under varying environments or environmental conditions, and to be able to identify possible thermic problem areas quickly, we offer thermographic records, in which different temperature zones are displayed in colour.

Flow simulation

Our state of the art CFD-Software (Computational Fluid Dynamics) permits to conduct flow simulation on your products based on your input. The resulting temperature and pressure distribution can be graphically displayed. Furthermore, this allows conducting parametric studies of your system without having to build expensive prototypes.



Transport and vibration checks

If the behaviour of your test piece is tested under transport conditions (drop, shock and vibration) or under seismic loads (earthquake), we will advise and support you with many years of experience in developing concepts, preparation and carrying out these tests.

Airflow checks

To generate the airflow required by your test piece, we offer you corresponding readings from our air flow checks with a DIN EN ISO 5167-2 measurement process (air volume currents of 3-2000 m^3/h can be measured on 6 measurement sections here).

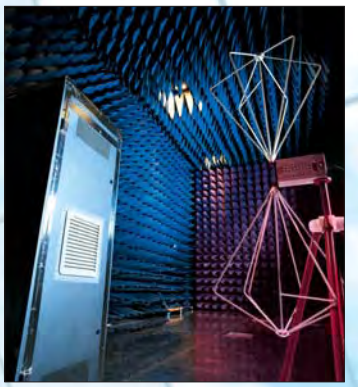
Checks on system of protection (IP, UL)

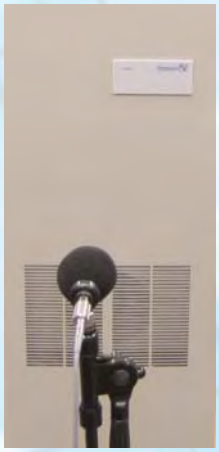
Smaller test pieces can be tested in our dust chamber with regard to protection from the entry of dust (IP 5x).
Using our standardised spraying device, test pieces can be tested for protection from the entry of spray (IP x4).

Our spraying device (in accordance with UL 50) enables your test piece to be tested against the entry of spray (Atomised Water Test UL 50).

EMC Checks

Your test piece will be examined for connection-related interference.
In addition, we are happy to support and advise you with regard to further tests on electromagnetic compatibility.



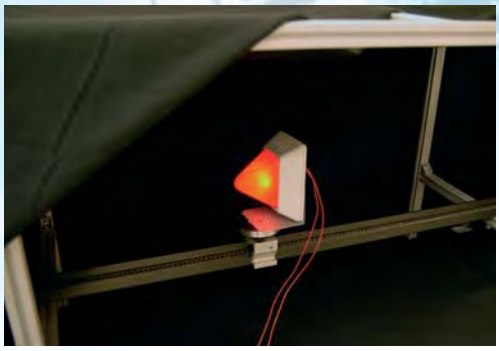


Noise emission

For benchmark measurements, we can check the acoustic pressure or the acoustic power of your test piece (depending on the procedure used for coating the surface) in our facilities using our noise measurement devices, or we can design, prepare and supervise readings in a soundproof room with a reflective floor (free field) for example, in accordance with ISO 3744.

Photometry

To determine the luminosity and other optical characteristic values of your light-emitting test piece, we offer experiments in our own light measurement canal.



Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY

Pictogram legend ...

... for cooling units

IP 54 — Unit with IP 54 protection system vis-à-vis enclosure

Several capacities share the same installation cutout for the enclosure


Long air passage in the enclosure provides optimum in air circulation


A minimum in installation depth for space-saving fitting

Units run on both 50 Hz and 60 Hz mains frequency


Recessed installation possible with installation frame


Partially recessed installation


External mounting


Eyebolts installation

RAL — Colour

GOST approval

V2A — Unit in 1.4301 stainless steel

SC — Standard-Controller

CC — Comfort-Controller

MC — Multi-Controller

Lowest clearance

115 V to 230 V operating range

DTc — Design integration

CM — Integrated, self regulated condensate evaporation

... for Filterfans

IP 55 — IP protection system provided used for design purposes only

EMC — The standards define electromagnetic compatibility


Change of air flow direction

AC — Alternating current

DC — Direct current


A minimum in installation depth for space-saving fitting


Installation with bolts

UV-resistant


Safe installation


Click and fit!

4 corner fastening system


Installation without tools


Simple click and fit! without tools

Fan rotating by 90°

GOST approval


Spring clip orinciple


In-line mounting


Shipping register

Sample order ...

... for cooling units

Model	Cooling capacity	Rated voltage	Special functions
DTI 9441	2000 W	400 V	CC, MM, RAL 7035, V2A

DTI – partially recessed door- or side-mounted
DTS – door- or side-mounted
DTD – top-mounted

CC = Comfort-Controller
MM = Multi-Master
RAL = RAL code for special colour finish – on request
V2A = cover made of 1.4301 stainless steel

... for Filterfans series 4th Generation

PF | 32.000 | 24 V DC | EMC | RAL 9011 | IP 55

PF = Filterfan
PFA = Exhaust filter

Model size:
11.000
22.000
32.000
42.500
43.000
65.000
66.000
67.000

Connection voltage
12 V DC
400 V AC

Protection system:
IP 54
IP 55

Special functions:
EMC = Electromagnetic compatibility
„A“ = Direction of air delivery*

Cover in special colour: on request
e.g. RAL 7035

You will understand that, for technical reasons, some theoretical combinations would be senseless in practice.

Please give us a call!

* Standard direction is air blown into the enclosure.
Direction “A” is air sucked out from the enclosure.

Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY

At Pfannenberg, air conditioning experts versed in industrial applications are at your disposal – from consulting and planning services up to installation and after-sales service. Irrespective of whether your concerns involve a small piece of equipment or a major plant, a standard solution or a custom-built design – at Pfannenberg your problems and your orders are in the very best of hands.

Our PC application PSS (Pfannenberg Software Service), which is easily available free of charge on request and allows you to run it yourself at your own leisure, will help you to find the ideal components for your air conditioning application. The PSS medium is available in 8 different languages.

Hotline 040 / 73 412-106 • Fax 040 / 734 12-101

Or simply log onto our Internet webpage (www.pfannenberg.com) and download PSS – fast and conveniently. We will also be happy to provide you with support at your premises with training courses and seminars.

Headquarter:

Pfannenberg GmbH
Werner-Witt-Strasse 1 – D-21035 Hamburg
P.O. Box 80 07 47 – D-21007 Hamburg
Phone: ++ 49 40 / 7 34 12-0
Fax: ++ 49 40 / 7 34 12-101
sales.support@pfannenberg.com
http://www.pfannenberg.com
http://www.filterfan.com

A number of leading companies – for example in the car industry or in engineering – rely on Pfannenberg for air-conditioning enclosures. Pfannenberg's philosophy is to develop an ongoing partnership with a view to meeting the criteria of their customers by offering reliable quality products in the form of standard and customised units.

This catalogue is merely able to provide you with a summary of our products and services. We therefore ask you to contact us if you're looking for something out of the ordinary or need a custom design. Your problems and needs are a challenge for us. Just give us a call.

Local agency:

Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY

International Support Organisations

- **Asia Pacific regional office**
  Pfannenberg Asia Pacific Pte Ltd.
  371 Beach Road
  # 02-07, Keypoint
  Singapore 199597
  phone: 0065 6293 9040
  telefax: 0065 6299 3184
  e-mail:
  info@pfannenberg.com.sg
- **Australia**
  HSC Pfannenberg
  10 Remillies Way
  Beaumont Hills
  2155 NSW Sydney
  phone/telefax: 02 / 8824 3213
  e-mail:
  claushaug@bigpond.com
- **Austria**
  Pfannenberg GmbH
  Austria Branch Office
  Köstlergasse 11/14
  1060 Wien
  phone: 1 / 581 11 66
  telefax: 1 / 591 11 45
  e-mail: heinrich.zeman
  @pfannenberg.com
  Joachim Hoitsch
  Am Sonnengrund 41
  8152 Graz/Stallhofen
  phone: 03142 / 203 86
  telefax: 03142 / 203 96
  e-mail: joachim.hoitsch@
  pfannenberg.com
- **Belgium**
  Electro-Flandria n.v.-s.a.
  Begoniastraat 6
  9810 Nazareth-Eke
  phone: 09 / 385 51 11
  telefax: 09 / 385 64 30
  e-mail: ef@online.be
- **Brazil**
  TASCO LTDA.
  1) Av. Veread. José Angelo
  Biagioni, 850
  18550-000 Boituva – SP
  phone: 015 / 263 - 14 93
  telefax: 015 / 263 - 26 66
  2) R. Américo Brasiliense
  2171-Cj. 709
  Chácara Santo Antonio
  04715-005 Sao Paulo – SP
  phone: 011 / 5183-59 95
  telefax: 011 / 5183-40 86
  e-mail: tasco@tascoltda.com.br
- **Bulgaria**
  Eurotrade Ltd.
  Hristo Botev bul. 92/B
  Rilon Center sector A
  Plodiv 4000
  phone/telefax: 32 / 655 021
  e-mail: eurotradex@migton.net
- **Canada**
  Pfannenberg Inc.
  68 Ward Road
  Lancaster, N.Y. 14086
  phone: 716 / 685-68 66
  telefax: 716 / 681-15 21
  e-mail: blaine.witt
  @pfannenbergusa.com
- **China**
  Pfannenberg China c/o GPS
  Procurement (Shanghai) Co. Ltd
  Shanghai Stock Exchange
  Building
  No. 528, Pudong Road South
  North Tower, Unit 2402
  Shanghai 200120
  phone: 86-21 / 688 247 55
  telefax: 86-21 / 688 247 58
  e-mail: sales@pfannenberg.cn
- **Croatia**
  Elektro Partner d.o.o.
  Radnicka cesta 22 / II
  10000 Zagreb
  phone: 01 / 618 47 93
  telefax: 01 / 618 47 95
  e-mail:
  elektropartner@zg.htnet.hr
- **Czech Republic**
  Weidmüller, s.r.o.
  Videnská 340 · 252 42 Vestec
  phone: 02 / 44 00 14 00
  telefax: 02 / 44 00 14 99
  e-mail:
  odvarko@weidmueller.cz
- **Denmark**
  CARLO GAVAZZI HANDEL A/S
  Over Hadstenvej 42
  8370 Hadsten
  phone: 89 60 61 00
  telefax: 86 98 15 30
  e-mail: handel@gavazzi.dk
- **Estonia**
  Klinkmann Eesti AS
  Mehaanika 2 B · 10602 Tallinn
  phone: 06 / 564 069
  telefax: 06 / 543 503
  e-mail:
  klinkmann.est@klinkmann.ee
- **Finland**
  Oy Klinkmann AB
  Fonseenintie 3 · 00371 Helsinki
  phone: 09 / 540 49 40
  telefax: 09 / 541 35 41
  e-mail: automation@klinkmann.fi
- **France**
  Pfannenberg France S.A.
  44, Rue Armand Carrel
  93108 Montreuil Cedex
  phone: + 33 (0) 1 48 57 07 72
  telefax: + 33 (0) 1 48 57 82 24
  e-mail:
  info.france@pfannenberg.com
- **Great Britain**
  Pfannenberg (UK) Ltd.
  Unit 6C · Aspen Court · Aspen Way
  Centurion Business Park
  Rotherham S60 1FB
  phone: 01709 / 36 48 44
  telefax: 01709 / 36 42 11
  e-mail: mark.rosten-edwards
  @pfannenberg.co.uk
- **Greece**
  KALAMARAKIS-SAPOUNAS S.A.
  Ionias & Neromilou Str.
  13671 Chamomilos
  Achames/Athen
  phone: 030 / 210 240 6006
  telefax: 030 / 210 240 6007
  e-mail: nikal@ksa.gr
- **Hungary**
  Trendelektro Kft.
  Dombóvári u. 5–7 ·1117 Budapest
  phone: 01 / 464 31 18
  telefax: 01 / 464 31 19
  e-mail:laszlo.varga@trendelektro.hu
- **Indonesia**
  PT Guna Elektro GAE
  Electrical & Mechanical Products
  Jl. Arjuna Utara 50
  Jakarta Barat 1510
  phone: 021 / 565 50 10
  telefax: 021 / 568 90 07
  e-mail: irwanwibisono@gae.co.id
- **Ireland**
  Pfannenberg (UK) Ltd.
  Unit 6C · Aspen Court · Aspen Way
  Centurion Business Park
  Rotherham S60 1FB
  phone: 0044 1709 / 36 48 44
  telefax: 0044 1709 / 36 42 11
  e-mail: mark.rosten-edwards
  @pfannenberg.co.uk
- **Israel**
  ATEKA LTD.
  23, Hayetzira St., Kiryat Aryeh
  Petach-Tikva 49512
  phone: 03 939 23 03
  telefax: 03 924 32 73
  e-mail: marketing@ateka.co.il
- **Italy**
  Pfannenberg Italia s.r.l.
  Via La Bionda, 13
  43036 Fidenza (PR)
  phone: 0524 / 51 67 11
  telefax: 0524 / 51 67 90
  e-mail: mail@pfannenberg.it
- **Japan**
  Naigai Energering Inc.
  4 - 1 - 1 Takaida hon-dori
  577-8551 Higasi-Osaka
  City Osaka
  phone: 06 / 67 82 05 70
  telefax: 06 / 67 82 05 11
  e-mail: overseas@naigai-e.co.jp
- **Kazakhstan**
  Electric Light
  Auezova str. 84, office 310
  050008 Almaty
  phone: 3272 / 421 709
  telefax: 3271 / 423 518
  e-mail: wgm@nursat.kz
- **Korea**
  SungWon Hitech Inc.
  Rm.404, Yooyoung-town, Lot3,
  Block 12 · Dangjeong-dong.
  Gunpo-si, Gyenggi-do
  phone: 031 / 427 65 54
  telefax: 031 / 427 65 55
  e-mail:
  minsu@sungwonhitech.com
- **Latvia**
  Klinkmann Villa
  STABU IELA 19-3B · 1011 Riga
  phone: 0750 / 63 07
  telefax: 0750 / 63 08
  e-mail: klinkmann@klinkmann.lv
- **Lithuania**
  Klinkmann Lit
  Mindaugo 42 · 2006 Vilnius
  phone: 02 / 251 646, 262 572
  telefax: 02 / 262 641
  e-mail: post@klinkmann.lt
- **Malaysia**
  EITA Electric SDN. BHD.
  Subang Jaya Industrial Estate
  Block A, Lot 4, Jalan SS 13/7
  47500 Petaling Jaya
  phone: 603 563 780 88
  telefax: 603 563 547 19
- **Mexico**
  Sistemas de Gestión Climàtica
  PFA de México S.A. de C.V.
  Insurgentes Sur · 1548 Edificio Anexo
  Piso 1 Col. Crédito Constructor
  C.P. 03940 · México D.F.
  phone: 52(55) 566 344 47/76
  telefax: 52(55) 566 344 47/76
  e-mail: info@pfannenberg.com.mx
- **Netherlands**
  Eldon N.V.
  Tussendiepen 64-66 · 9200 AA Drachten
  phone: 0512 / 58 01 232
  telefax: 0512 / 51 71 17
  e-mail: eldon.nl@eldon.com
- **Norway**
  Hydro Aluminium
  Hydal AS · 4265 Havik
  phone: 52 84 81 00
  telefax: 52 84 81 60
- **Poland**
  Automatech Sp.z o.o.
  ul. Ryzowa 84 · 05-815 Opacz-Kolonia
  phone: 022-723 06 06
  telefax: 022-723 06 62
  e-mail: biuro.warszawa@automatech.pl
- **Portugal**
  Olaer Oiltech Ibérica S.A.U.
  Travesia Industrial, 29
  08907 L'Hospitalet de Ll. (BCN)
  phone: 933 / 368 900
  telefax: 933 / 357 186
  e-mail: olaer@olaer.es
- **Romania**
  R.T.S. Electro
  39 Velintei Str. · 022964 Bucharest 2
  phone: 21 / 241 46 26 / 46 77
  telefax: 21 / 241 47 73
  e-mail:rtselectro@easynet.ro
- **Russia**
  Pfannenberg GmbH c/o
  Weidmueller Representative Office
  Shabolovka 2 · 119049 Moscow
  phone: 495 786 68 67
  telefax: 495 786 68 69
  e-mail:denis.alexandrov@pfannenberg.ru
- **Slovakia**
  Elektris s.r.o.
  Racianska 188 · 83153 Bratislava
  phone: 02 / 4920 0113
  telefax: 02 / 4468 03 28
  e-mail: weidmueller@computel.sk
- **Slovenia**
  Elektrospoji d.o.o.
  Stegne 25 · 1000 Ljubljana
  phone: 01 / 511 38 10
  telefax: 01 / 511 16 04
  e-mail: elektrospoji@spiol.net
- **South Africa**
  Phambili Interface (Pty) Ltd
  5 Bundo Road, Sebenza
  P.O. Box 193 · 1610 Edenvale
  phone: 011 / 452 19 30
  telefax: 011 / 452 64 55
  e-mail: alockyer@radinterface.co.za
- **Spain**
  Olaer Oiltech Ibérica S.A.U.
  Travesia Industrial, 29
  08907 L'Hospitalet de Ll. (BCN)
  phone: 933 / 368 900
  telefax: 933 / 357 186
  e-mail: olaer@olaer.es
- **Sweden**
  Weidmüller AB
  1) Skebokvarnsvägen 370
  12450 Bandhagen
  phone: 08 / 727 23 00
  telefax: 08 / 727 24 80
  2) Axel Danielssons v. 271
  Box 31025 · 20049 Malmö
  phone: 040 / 37 48 00
  telefax: 040 / 37 48 60
  e-mail: info@weidmuller.se
- **Switzerland**
  Carl Geisser AG
  Industriestraße 7 · 8117 Fällanden ZH
  phone: 044 / 806 65 00
  telefax: 044 / 806 65 01
  e-mail: info@carlgeisser.ch
- **Turkey**
  Endaks Endustryel Aksesuarlar LTD. STI
  Perpa Ticaret Merkezi
  A Blok Kat 5 No. 292
  80270 Okmeydani – Istanbul
  phone: 90 / 212 222 22 75
  telefax: 90 / 212 220 10 47
  e-mail: info@endaks.com
- **United Arab Emirates**
  Golden Sand Trading Est.
  202, Bin Ham Building · Dubai
  phone: 4 / 359 56 11
  telefax: 4 / 359 54 73
  e-mail: vasu2000@emirates.net.ae
- **United States of America**
  Pfannenberg Inc.
  68 Ward Road · Lancaster, N.Y. 14086
  phone: 716 / 685-68 66
  telefax: 716 / 681-15 21
  e-mail:blaine.witt@pfannenbergusa.com