



Product Catalogue

2017

Standard and customized **solutions**

Our Company



DR.NEUMANN Peltier-Technik is your expert for cabinet coolers. We offer refrigerant-free cooling for cabinets as well as customized cooling units that meet your application needs. The quality of our cabinet coolers has earned DR.NEUMANN Peltier-Technik an excellent reputation in the industry. Our national and international customer base values the effectiveness of our innovative cabinet coolers. Our engineers offer you a technologically optimal solution for your application case – please contact us!

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The Peltier Technologie

The DR.NEUMANN Peltier-Technik GmbH is certified to ISO 9001:2008.

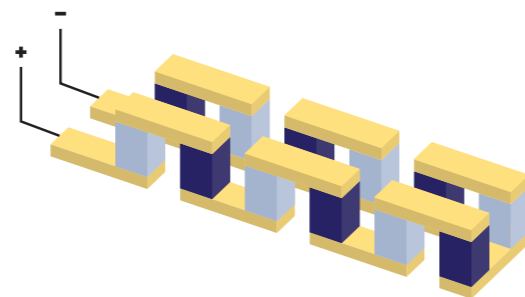


What are the advantages of cooling with Peltier cooling components? Which differences and similarities to conventional compressor systems exist?

Both cooling systems have a heat flow from a cold to a warm reservoir.

In the **compressor system**, the heat transfer is carried out by a cooling fluid which is compressed by the compressor and transported through the system.

In the **Peltier cooler**, the electric current corresponds to the coolant of the compressor and the direct current voltage source is equivalent to the compressor.



A variety of applications can only be solved with Peltier technology.

- **Control accuracy**
Peltier units can be controlled electronically. This results in control accuracies which cannot be achieved with compressor cooling.
- **Reversibility**
Peltier elements are easily reversible. Simply by reversing the polarity of the DC voltage, heat can be produced where it was cooling previously, and vice versa.
- **Robustness**
Peltier coolers can work in the most adverse environmental conditions. They are suited for working in high ambient temperatures or heavily polluted ambient air. Peltier coolers don't even have problems with vibrations or strong accelerations!
- **Miniature cooling**
Peltier coolers can provide precisely defined small cooling capacities.

The history of thermoelectric effects

The thermoelectric effects were discovered in the first half of the 19th century.

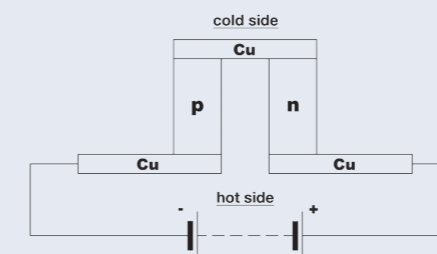
1822 Seebeck effect

It was Thomas Johan Seebeck, who observed the following phenomenon named after him in 1822: If a closed conductor loop is formed from two different metallic conductors, and a temperature difference prevails between the two contact points of the two materials, a current flows in the conductor loop.

Today's thermocouples are demonstrative examples.

1834 Peltier effect

The opposite effect was discovered 1834 by Jean Charles Athanase Peltier: Under certain conditions, an electrical current flow causes a temperature difference between two metallic conductors.



Peltier effect: A temperature difference is generated by an electric current flow

In order to make the Peltier effect economically usable, two differing metals are no longer used for the construction of a Peltier element. In this case, the resulting temperature difference is below 1 K.

Nowadays one metal is replaced with an n-type semiconductor (the electric conduction is caused by the flow of negatively charged electrons) and the other with a p-type semiconductor (the electric conduction is caused by the flow of positively charged holes). A copper bridge connects the two semiconductor legs. If direct current is passed through the Peltier element in the direction indicated, the copper bridge, which connects the two elements, cools down. The two connecting bridges, also made of copper, heat up. A steady heat transfer takes place from the upper copper bridge to the lower copper bridges.

In order to obtain suitable Peltier blocks for technical application, the individual Peltier elements are joined in a meandering manner. The Peltier elements which are combined to form a Peltier block are electrically connected in series and thermally in parallel. The Peltier blocks then again can be switched electrically in series or parallel, in case large cooling surfaces are required.

Custom Designs

We will also gladly design a custom-made device to meet your application needs.

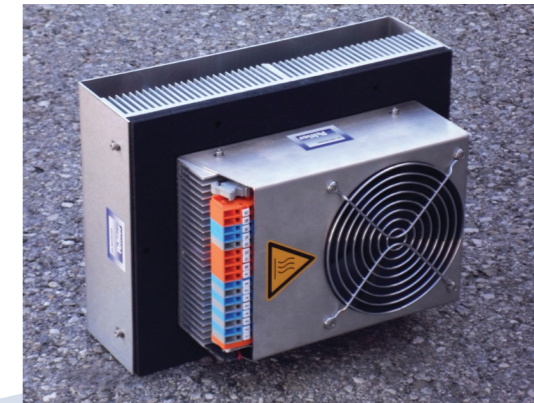


Even the temperature of liquids can be controlled and cooled using Peltier technology. The photo shows a water cooler based on our size 2 model. The media heat exchanger can be individually adapted. This means that the flow characteristics and location of the water

connections can easily be changed. The water temperature can be controlled very precisely with the integrated sensors and can be heated if needed. High-pressure applications and the temperature control of highly viscous or corrosive liquids are also possible.



This example shows a salamander terrarium with a cooled base. The heat is released to the environment using convection and therefore the device operates noise-free. The appropriate power supply and control device works using a self-regulating PID controller with an accuracy of ± 0.3 K. A Pt100 temperature probe that goes with it can be placed anywhere in the terrarium.

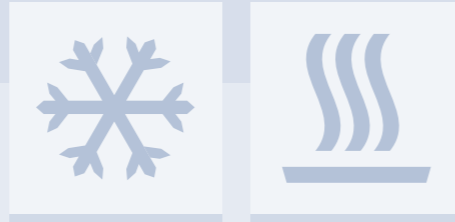


This photo shows the customization of a standard cooler size 2 for cooling pitch control systems in wind power plants. The design is resistant against salt mist and the device is equipped with sophisticated sensor technology to provide thorough monitoring.

The cold side was altered to direct the airflow to the most temperature-sensitive component in the control box.



For use in public areas, we have developed special hoods to protect against vandalism. These are fastened directly to the switch cabinet from the inside and have no screws on the outside. The hoods are available for all sizes.



Switch Cabinet Air Conditioning

The principle of Peltier cooling is similar to that of an electronic heat pump. The Peltier elements transport heat energy from the cold exchanger in the switch cabinet interior to the heat exchanger on the switch cabinet exterior. The warm air inside the switch cabinet is blown into the cold exchanger by a fan and thereby cooled. The heat exchanger on the switch cabinet exterior is then cooled by ambient air. The advantage of Peltier cooling is its functional reliability. There are no fluids and thus no danger of leakage. In addition,

our switch cabinet coolers can therefore be used in moving or accelerating systems. All DR.NEUMANN switch cabinet coolers are designed so that there is no air exchange between the switch cabinet interior and the surrounding air, even after installation. They are quickly and easily installed and interchangeable, due to identical installation dimensions for a specific size. Additionally we offer our surface coolers. They are ideal for the direct cooling of components and surfaces, e.g. for cooling mounting plates in switch cabinets.



The direct thermal contact makes the units run extremely effectively and efficiently. All of our units of the "Standard", "LRC" and "AC" series, as well as our surface coolers, are equipped with temperature protection switches and alarm relays as standard. In addition, the exterior of all of our switch cabinet

coolers is designed to comply with degree of protection IP67 / IP55, which guarantees the highest level of safety. Each of our units can be adapted to your individual operating conditions, e.g. equipping with special sensors, resizing, salt mist-resistant design, different power supply, etc. is possible.

Overview of Switch Cabinet Coolers

Our range of switch cabinet coolers consists of 30 standard types in 6 sizes:

Type	Series	Size	Weight	Nominal power	Supply voltage	Recooling	Degree of Protection (outside)	Safety systems	Function	Max A*	UL	Page
MX-004-C	Mini	0	1 kg	33 W	24 V-DC	Air	IP 55	-	Cooling/Heating	+70 °C	-	12-13
EL-104-C	Basic	1	2,5 kg	50 W	24 V-DC	Air	IP 55	-	Cooling/Heating	+70 °C	-	16
EN-104-C	Basic	1	2,5 kg	70 W	24 V-DC	Air	IP 55	-	Cooling/Heating	+70 °C	-	16
ER-104-C	Basic	1	2,5 kg	100 W	24 V-DC	Air	IP 55	-	Cooling/Heating	+70 °C	-	16
EL-208-C	Basic	2	5 kg	100 W	24 V-DC	Air	IP 55	-	Cooling/Heating	+70 °C	-	17
EN-208-C	Basic	2	5 kg	140 W	24 V-DC	Air	IP 55	-	Cooling/Heating	+70 °C	-	17
ER-208-C	Basic	2	5 kg	200 W	24 V-DC	Air	IP 55	-	Cooling/Heating	+70 °C	-	17
FL-104-C	Standard	1	2,5 kg	50 W	24 V-DC	Air	IP 67	yes	Cooling/Heating	+70 °C	yes	20
FN-104-C	Standard	1	2,5 kg	70 W	24 V-DC	Air	IP 67	yes	Cooling/Heating	+70 °C	yes	20
FR-104-C	Standard	1	2,5 kg	100 W	24 V-DC	Air	IP 67	yes	Cooling/Heating	+70 °C	yes	20
FL-208-C	Standard	2	5 kg	100 W	24 V-DC	Air	IP 67	yes	Cooling/Heating	+70 °C	yes	21
FN-208-C	Standard	2	5 kg	140 W	24 V-DC	Air	IP 67	yes	Cooling/Heating	+70 °C	yes	21
FR-208-C	Standard	2	5 kg	200 W	24 V-DC	Air	IP 67	yes	Cooling/Heating	+70 °C	yes	21
FL-316-C	Standard	3	10 kg	200 W	24 V-DC	Air	IP 67	yes	Cooling/Heating	+70 °C	yes	22-23
FN-316-C	Standard	3	10 kg	280 W	24 V-DC	Air	IP 67	yes	Cooling/Heating	+70 °C	yes	22-23
FR-316-C	Standard	3	10 kg	400 W	24 V-DC	Air	IP 67	yes	Cooling/Heating	+70 °C	yes	22-23
HL-104-C	HL	1	2,5 kg	50 W	24 V-DC	Air	IP 67	yes	Cooling/Heating	+90 °C	-	26-27
HL-208-C	HL	2	5 kg	100 W	24 V-DC	Air	IP 67	yes	Cooling/Heating	+90 °C	-	26-27
HL-316-C	HL	3	10 kg	200 W	24 V-DC	Air	IP 67	yes	Cooling/Heating	+90 °C	-	26-27
FL-208-AC	AC	2	6 kg	100 W	90..305 V-AC, 47..63 Hz	Air	IP 67	yes	Cooling	+70 °C	yes	30
FR-208-AC	AC	2	6 kg	200 W	90..305 V-AC, 47..63 Hz	Air	IP 67	yes	Cooling	+70 °C	yes	30
FL-416-AC	AC	4	12,5 kg	200 W	90..305 V-AC, 47..63 Hz	Air	IP 67	yes	Cooling	+70 °C	yes	31
FR-416-AC	AC	4	14,5 kg	400 W	90..305 V-AC, 47..63 Hz	Air	IP 67	yes	Cooling	+70 °C	yes	31
FL-536-AC	AC	5	25 kg	450 W	90..305 V-AC, 47..63 Hz	Air	IP 67	yes	Cooling	+70 °C	-	32-33
FR-536-AC	AC	5	25 kg	900 W	90..305 V-AC, 47..63 Hz	Air	IP 67	yes	Cooling	+70 °C	-	32-33
XFL-208-AC	AC	2	6 kg	100 W	90..305 V-AC, 47..63 Hz	Air	IP 67	yes	Cooling/Heating	+70 °C	-	34
XFR-208-AC	AC	2	6 kg	200 W	90..305 V-AC, 47..63 Hz	Air	IP 67	yes	Cooling/Heating	+70 °C	-	34
XFL-416-AC	AC	4	12,5 kg	200 W	90..305 V-AC, 47..63 Hz	Air	IP 67	yes	Cooling/Heating	+70 °C	-	35
XFR-416-AC	AC	4	14,5 kg	400 W	90..305 V-AC, 47..63 Hz	Air	IP 67	yes	Cooling/Heating	+70 °C	-	35
LR-208-AC	LRC	2	5 kg	200 W	24 V-DC	Water	IP 67	yes	Cooling/Heating	+90 °C	-	36-37

All of our switch cabinet coolers can be customized.

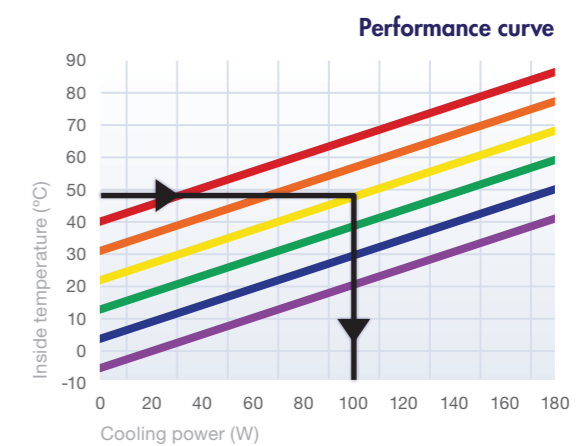
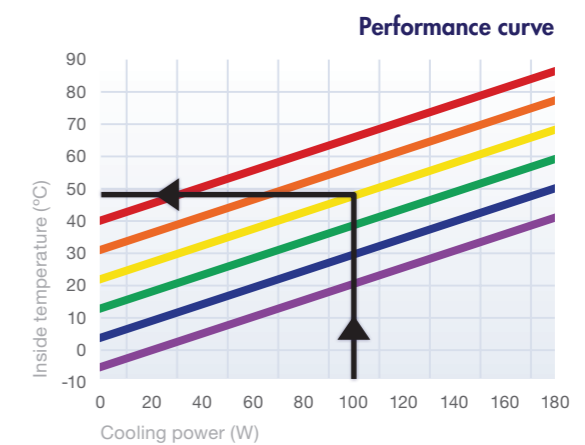
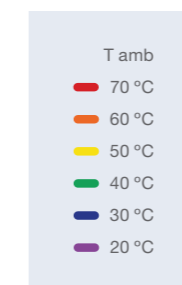
* Max. ambient temperature

Performance Curves



The performance diagrams of our coolers show the results of a long series of in-house tests for every single device type. They depict the exact performance of a cooler relative to the ambient temperature and internal temperature of the control box. For the layout design, the operating point is first assumed, which means that the cooling capacity of the Peltier device corresponds exactly with dissipation loss in the control box. That keeps the internal temperature stable. In order to determine this, the dissipation loss is first located on the X-axis of the diagram and a vertical line is drawn through it. On the Y-axis, a horizontal line is then drawn through the intersection of this vertical line

and the line for maximum ambient temperature. The adjusting internal box temperature can now be read on this horizontal line. If the temperature is too high, the next larger cooler model is tested in the same way. If the internal temperature is clearly too low, a smaller cooler type can be used. If the exact cooling capacity of a device at a given temperature needs to be determined, a horizontal line is first drawn through the corresponding internal temperature on the Y-axis. A vertical line is then drawn down to the X-axis through the intersection of the horizontal line and the colour-coded maximum ambient temperature line. This indicates the exact cooling capacity of the device.

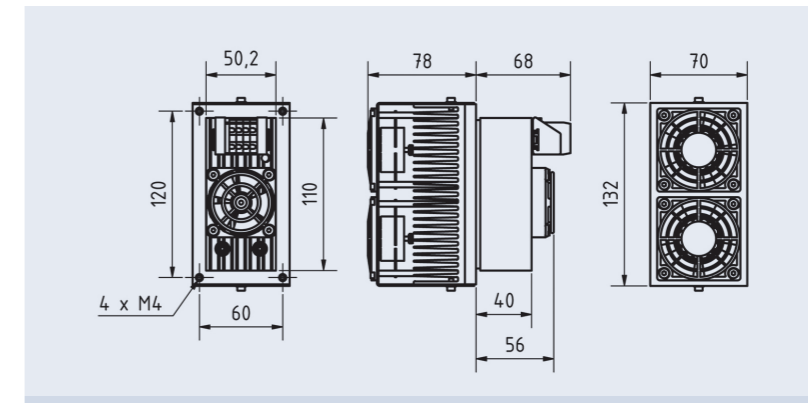




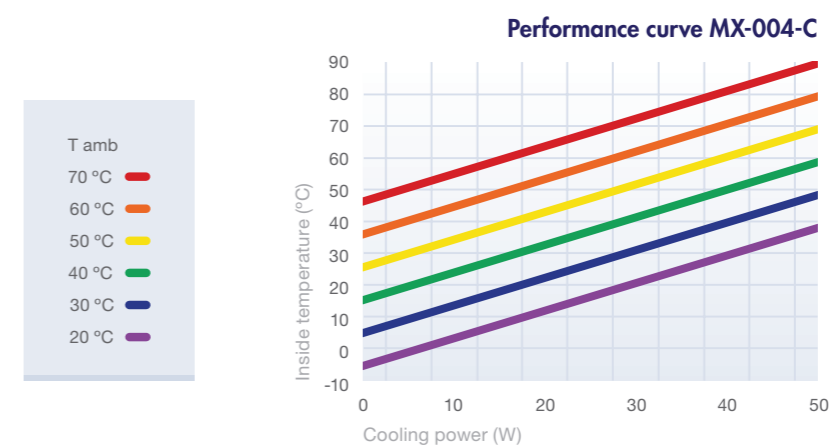
Switch Cabinet Cooler Series "Mini"

The "Mini" switch cabinet cooler series is designed specifically for use in electronics boxes and housings as well as small switch cabinets. Due to the extremely small size, even tiny switch boxes can be actively cooled below the ambient temperature. Yet the "Mini" provides

all the benefits of Peltier technology, such as position-independent installation, being able to change over to heating, or rapid start-up using a simple electrical connection. The exterior of the "Mini" switch cabinet cooler series has been designed to provide IP55 protection.



Type	Size	Nominal power	Operating temperature range	Supply voltage	Weight
MX-004-C	0	33 W	-40 .. +70 °C	+24 V-DC	1 kg





Switch Cabinet Cooler Series "Basic"

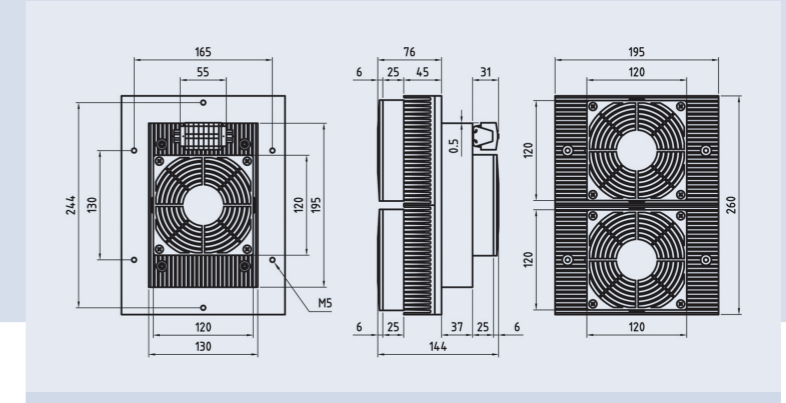
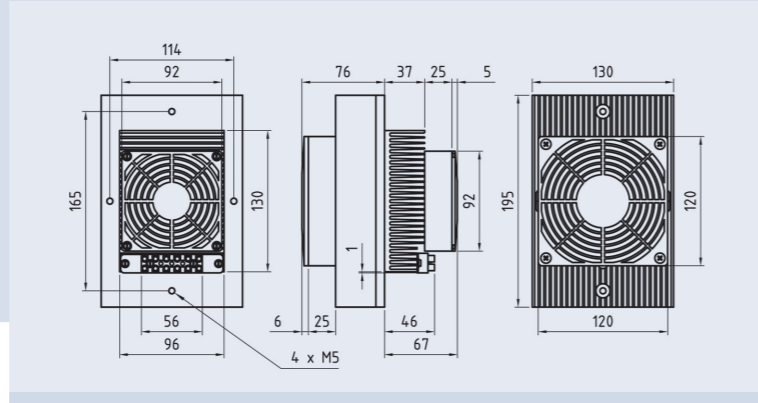
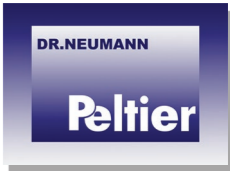
Our "Basic" series switch cabinet coolers are designed for use in small switch cabinets. But they still offer all the advantages of our larger switch cabinet coolers, for example, installation in any position, quick start-up by a simple mains connection, or interchangeability with, for example, a more powerful

switch cabinet cooler of the same size, including those of the "Standard", "AC" and "LRC" series. "Basic" series switch cabinet coolers are highly effective due to their high efficiency at an affordable price. The exterior of all of our switch cabinet coolers in the "Basic" series has been designed to provide IP55 protection.

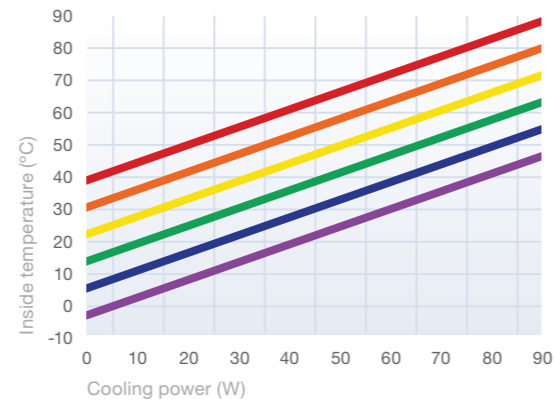
Type	Size	Nominal power	Operating temperature range	Supply voltage	Weight		
EL-104-C	1	50 W	-40 ... +70 °C	24 V-DC	2,5 kg		
EN-104-C		70 W					
ER-104-C		100 W					
EL-208-C	2	100 W			-40 ... +70 °C	24 V-DC	5 kg
EN-208-C		140 W					
ER-208-C		200 W					

Switch Cabinet Cooler Size 1 - Basic

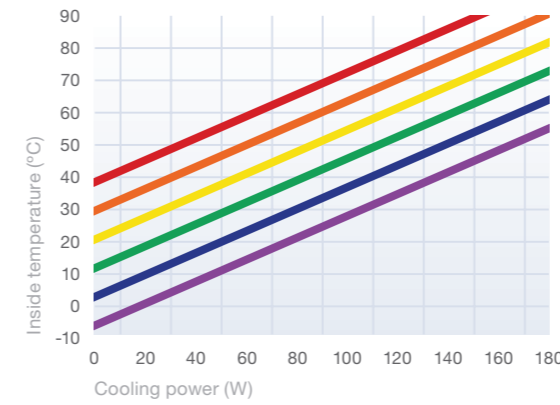
Switch Cabinet Cooler Size 2 - Basic



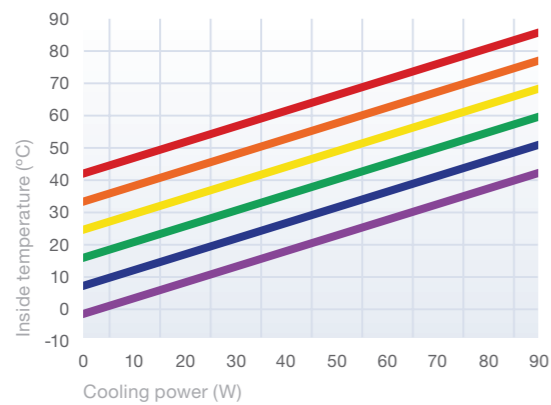
Performance curve EL-104-C



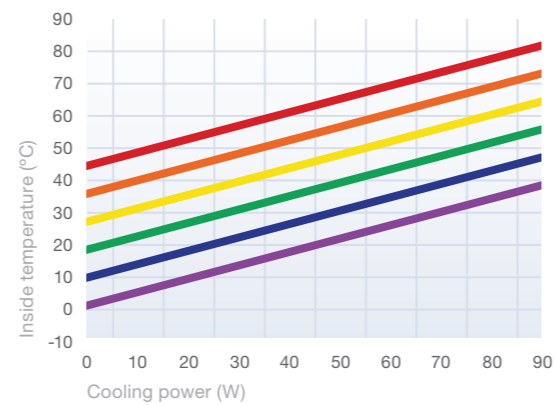
Performance curve EL-208-C



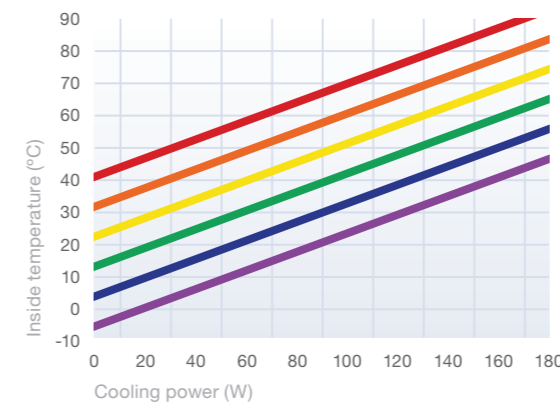
Performance curve EN-104-C



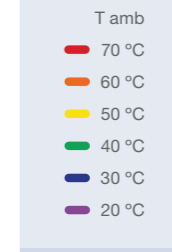
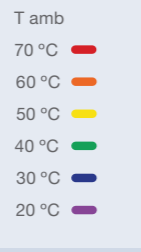
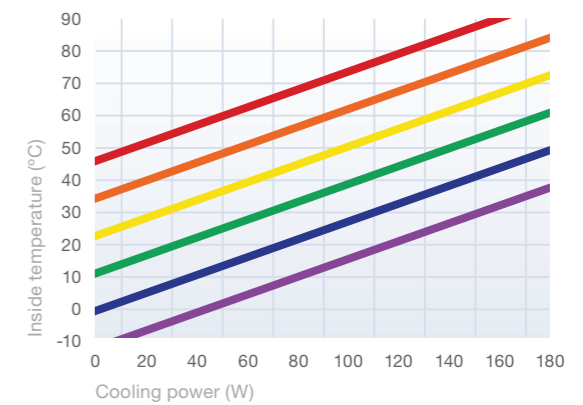
Performance curve ER-104-C



Performance curve EN-208-C



Performance curve ER-208-C



Switch Cabinet Cooler Series "Standard"



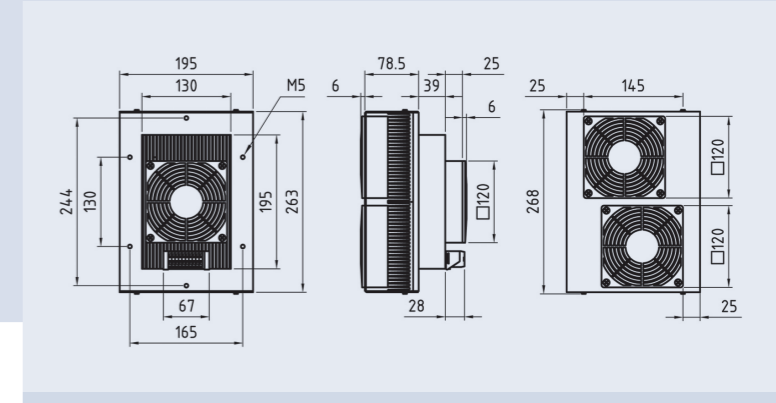
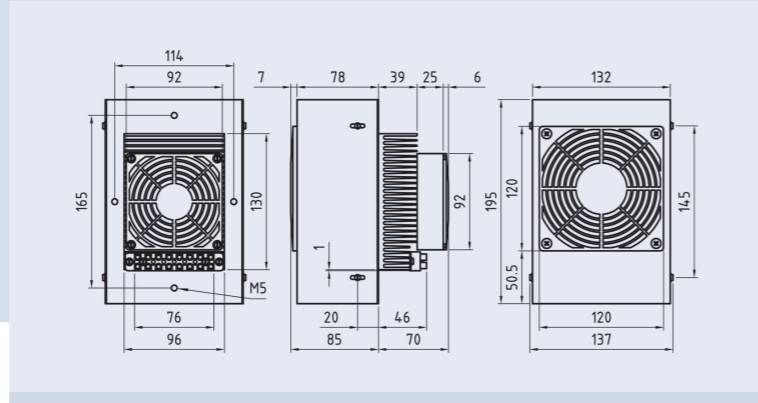
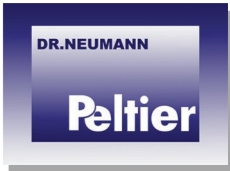
The "Standard" series switch cabinet coolers are available in three sizes with three power grades each. They distinguish themselves with their compact designs and very high efficiency, and offer superior performance despite their small size. All "Standard" series switch cabi-

net coolers are fitted with protection against overheating and alarm relays. The exterior of all "Standard" series switch cabinet coolers has been designed to provide IP67 protection. In addition to the standard model, we also offer all models as customized systems. In addition, a wide range of accessories is available.

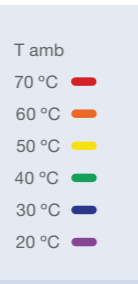
Type	Size	Nominal power	Operating temperature range	Supply voltage	Weight				
FL-104-C	1	50 W	-40 .. +70 °C	24 V-DC	2,5 kg				
FN-104-C		70 W							
FR-104-C		100 W							
FL-208-C	2	100 W			-40 .. +70 °C	24 V-DC	5 kg		
FN-208-C		140 W							
FR-208-C		200 W							
FL-316-C	3	200 W					-40 .. +70 °C	24 V-DC	10 kg
FN-316-C		280 W							
FR-316-C		400 W							

Switch Cabinet Cooler Size 1 - Standard

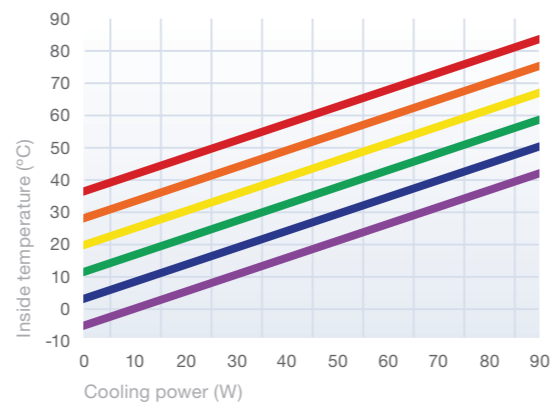
Switch Cabinet Cooler Size 2 - Standard



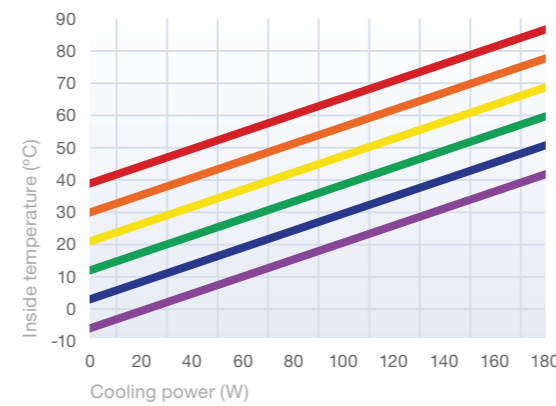
Environmental Type Rating 1, 12, 4X



Performance curve FL-104-C

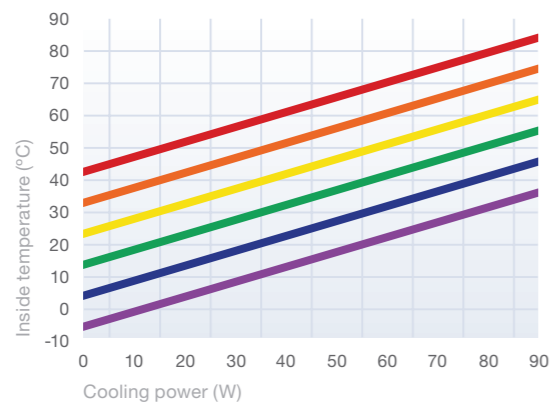


Performance curve FL-208-C

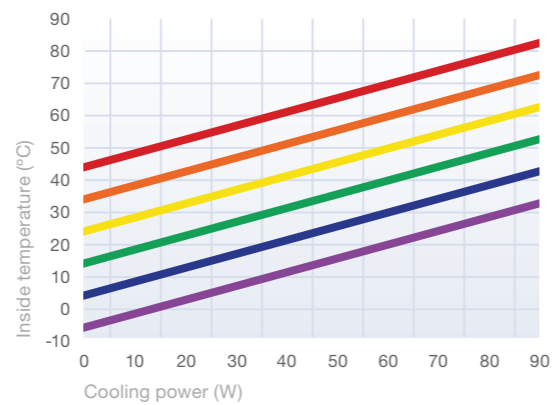


Environmental Type Rating 1, 12, 4X

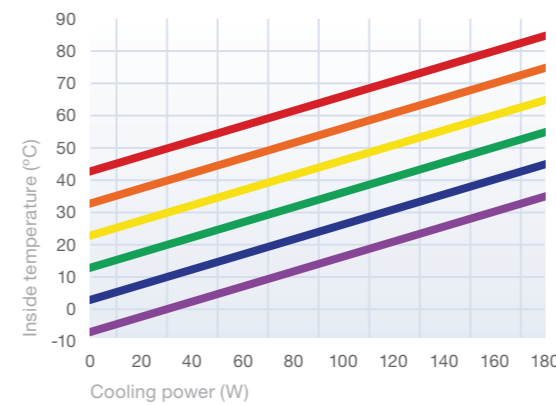
Performance curve FN-104-C



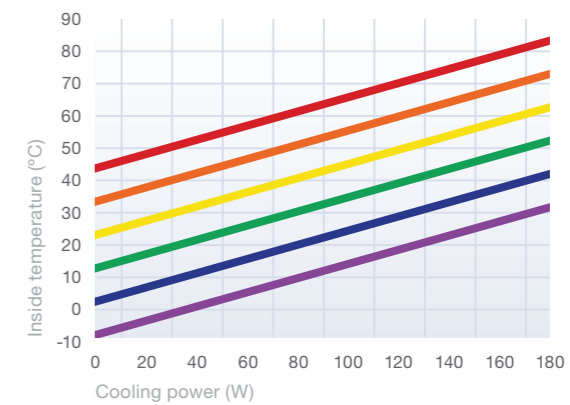
Performance curve FR-104-C



Performance curve FN-208-C

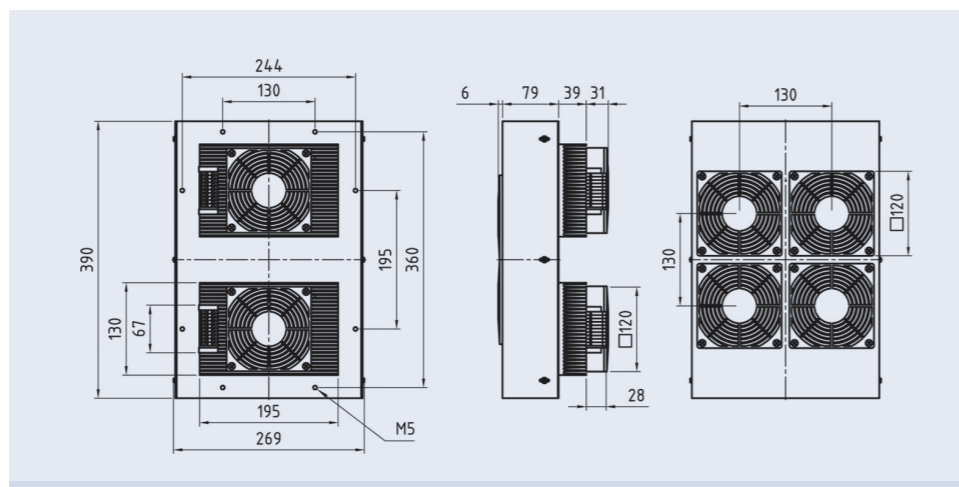
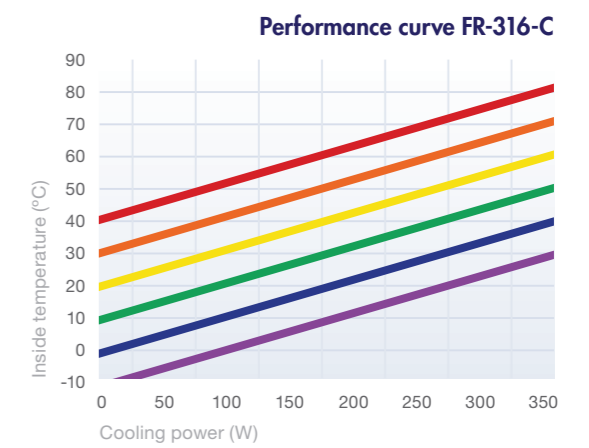
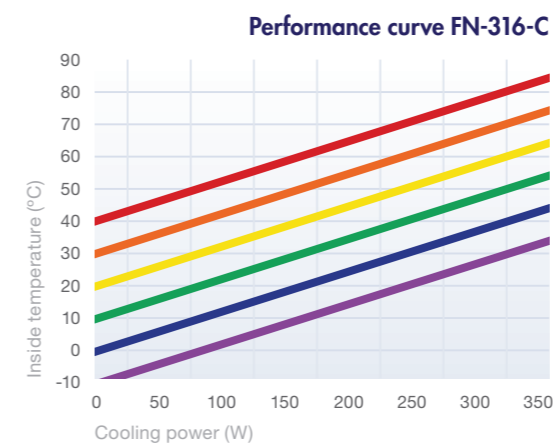
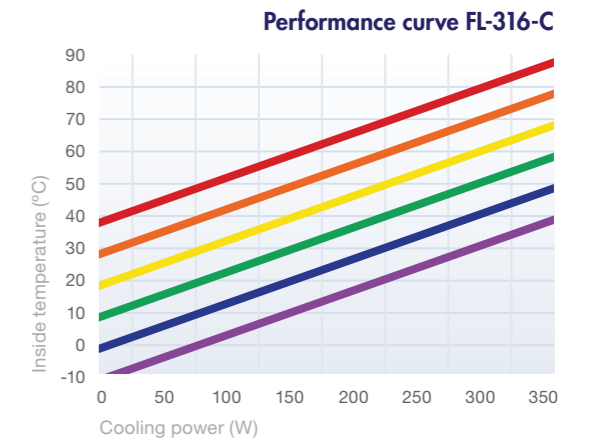


Performance curve FR-208-C





T amb
70 °C
60 °C
50 °C
40 °C
30 °C
20 °C



Switch Cabinet Cooler Series "HL"

up to 90 °C



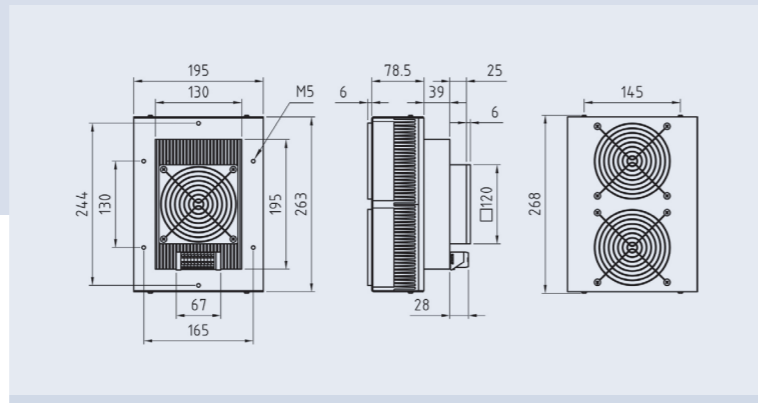
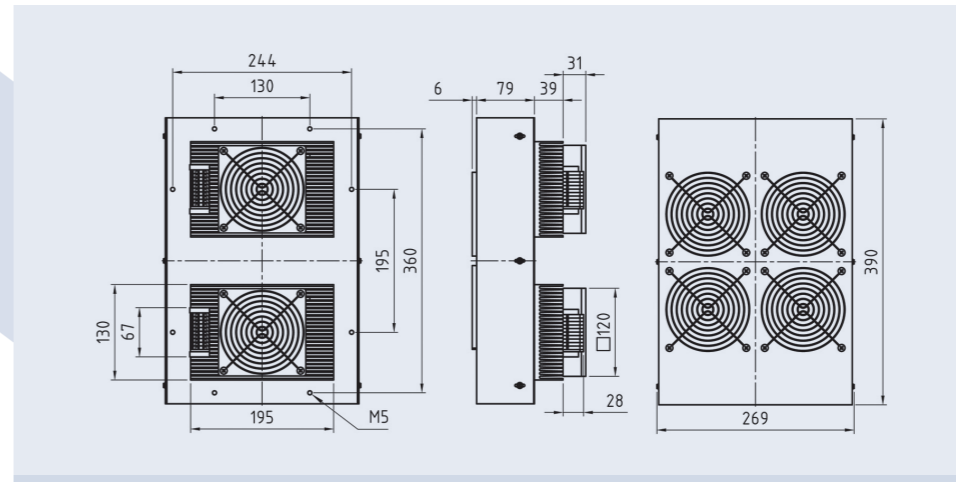
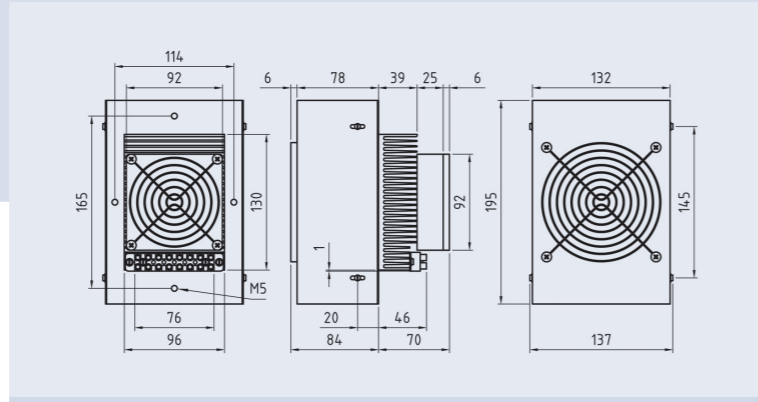
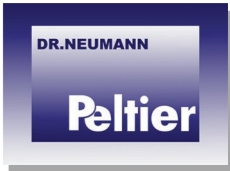
DR. Neumann Peltier-Technik GmbH's new high-temperature cabinet cooler series HL cools efficiently – even at an operating temperature up to 90 degrees Celsius (194 degrees Fahrenheit)! Three models in three different sizes with the power of 50 W, 100 W and 200 W perform demanding cooling tasks within a range of operating temperatures be-

tween -40 degrees Celsius (-40 degrees Fahrenheit) and +90 degrees Celsius (194 degrees Fahrenheit). The protection class IP67 guarantees optimum protection from the outside despite a high ambient temperature. The cabinet coolers are size equal and pin compatible to our standard series. We also have a great amount of accessories for all our units. Of course we can customize our cabinet coolers to your scope – don't hesitate to contact our engineers!

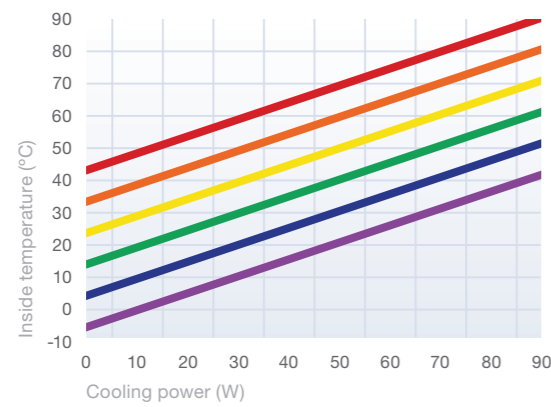
Type	Size	Nominal power	Operating temperature range	Supply voltage	Weight
HL-104-C	1	50 W	-40 .. +90 °C	24 V-DC	2,5 kg
HL-208-C	2	100 W			5 kg
HL-316-C	3	200 W			10 kg

Switch Cabinet Cooler Size 1 & 2 - HL

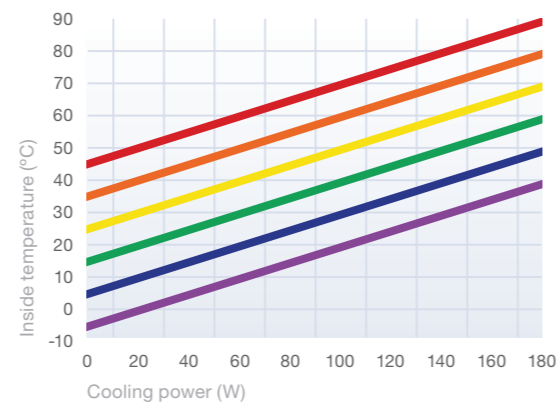
Switch Cabinet Cooler Size 3 - HL



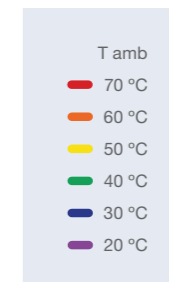
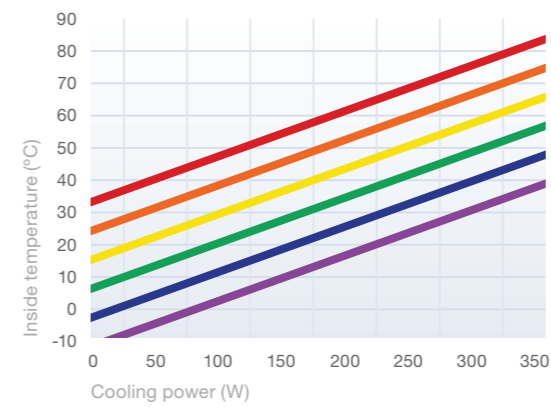
Performance curve HL-104-C



Performance curve HL-208-C



Performance curve HL-316-C





Switch Cabinet Cooler Series "AC"

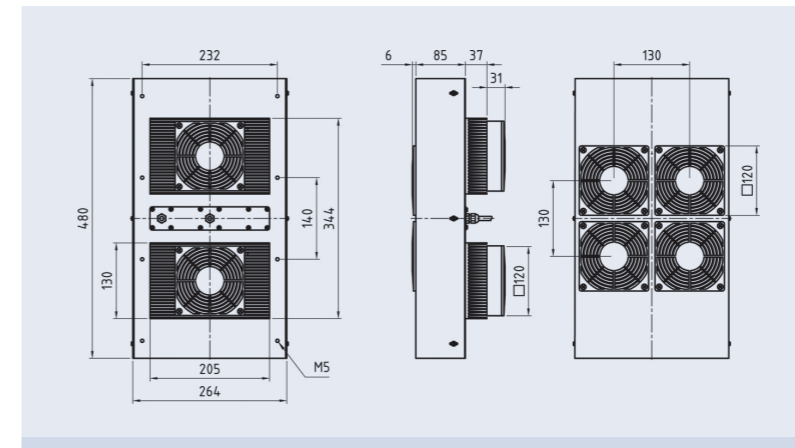
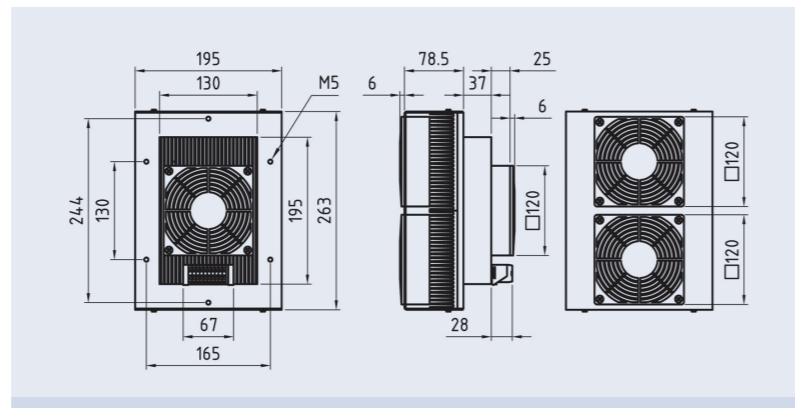
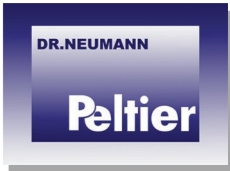
The "AC" series switch cabinet coolers are available in three sizes with two power grades each. They have built-in power supplies on the outside of the units. Thus, the devices of the "AC" series can be operated with normal mains voltage and there is no extra power loss due to a power supply inside the cabinet. All "AC" series switch

cabinet coolers are fitted with protection against overheating and alarm relays. The exterior of all "AC" series switch cabinet coolers has been designed to provide IP67 protection. The units of the "AC" series are suitable only for cooling, not for heating. However, a method for switching between cooling and heating is available on request.

Type	Size	Nominal power	Operating temperature range	Supply voltage	Weight
FL-208-AC	2	100 W	-40 .. +70 °C	90 .. 305 V-AC 47 ..63 Hz	6 kg
FR-208-AC		200 W			
FL-416-AC	4	200 W			
FR-416-AC		400 W			
FL-536-AC	5	450 W			25 kg
FR-536-AC		900 W			

Switch Cabinet Cooler Size 2 - AC

Switch Cabinet Cooler Size 4 - AC

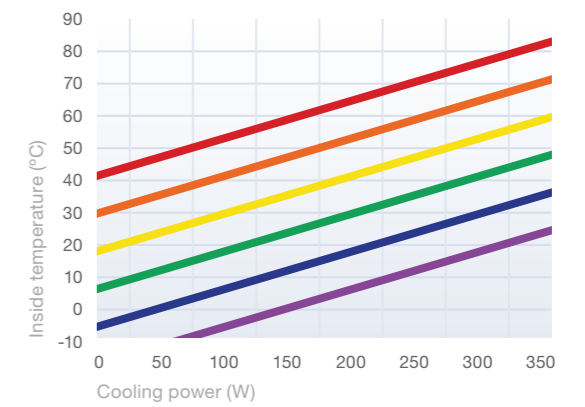
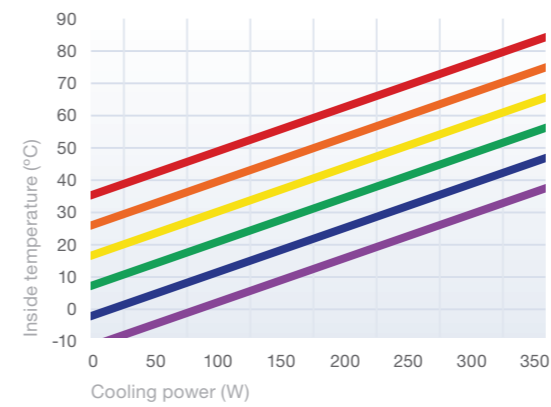
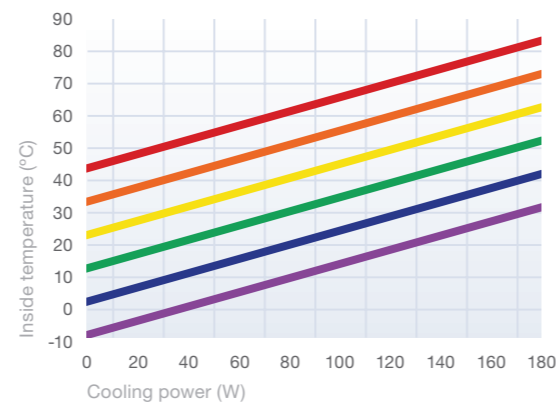
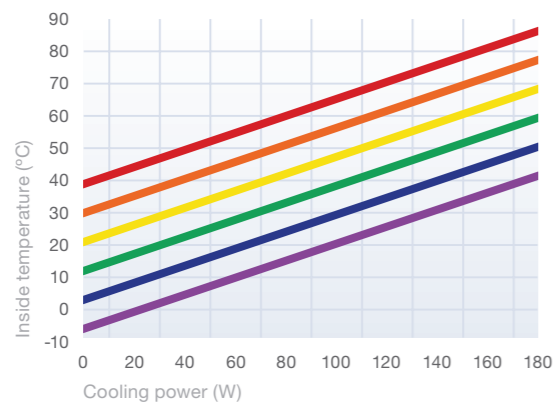
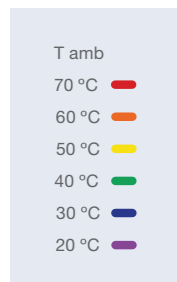


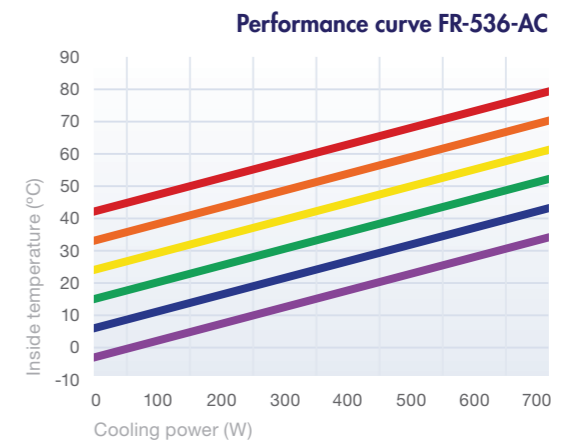
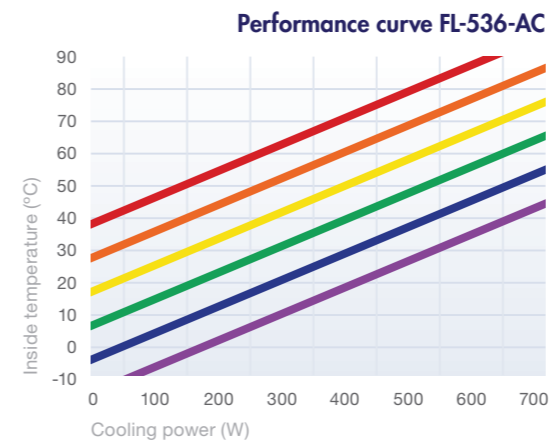
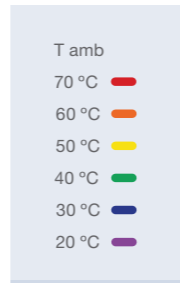
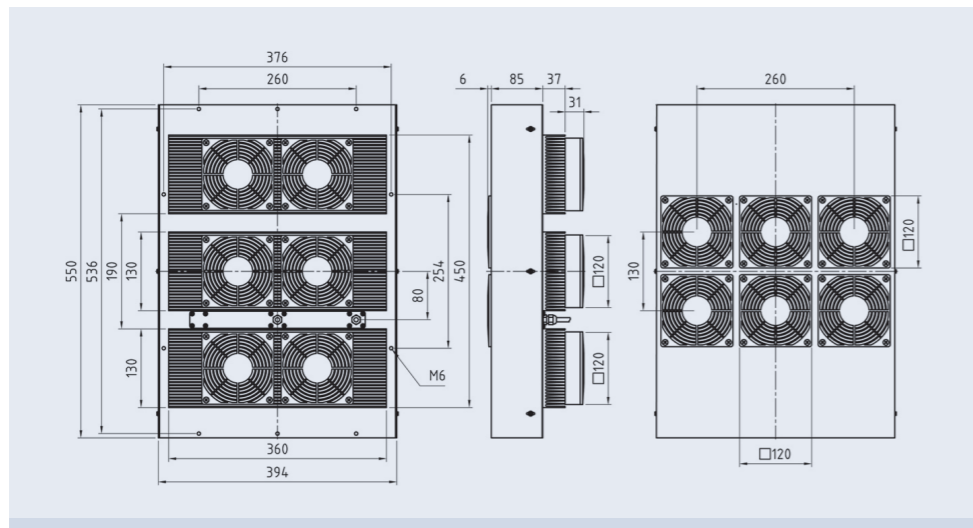
Performance curve FL-208-AC

Performance curve FR-208-AC

Performance curve FL-416-AC

Performance curve FR-416-AC







In the past the AC series switch cabinet coolers have only been able to cool. But our new version XFL and XFR of the sizes 2 and 4 offer the possibility of heating as well as cooling. They have a control output so that they can be connected

to a controller, for example with our SCC-003-A (see page 50). Of course, the new versions also offer all the advantages of the AC series: high efficiency, protection class IP67 on the outside as well as an integrated power supply.

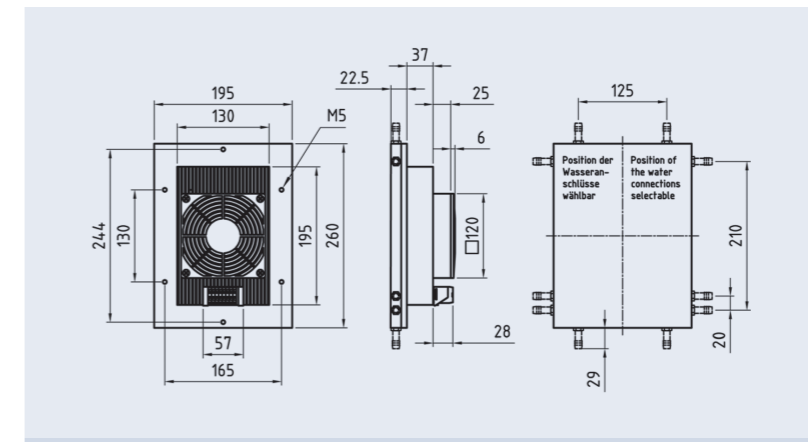
Type	Size	Rated power	Possible connection to SCC-003-A
XFL-208-AC	2	100 W	yes
XFR-208-AC	2	200 W	yes
XFL-416-AC	4	200 W	yes
XFR-416-AC	4	400 W	with additional relays



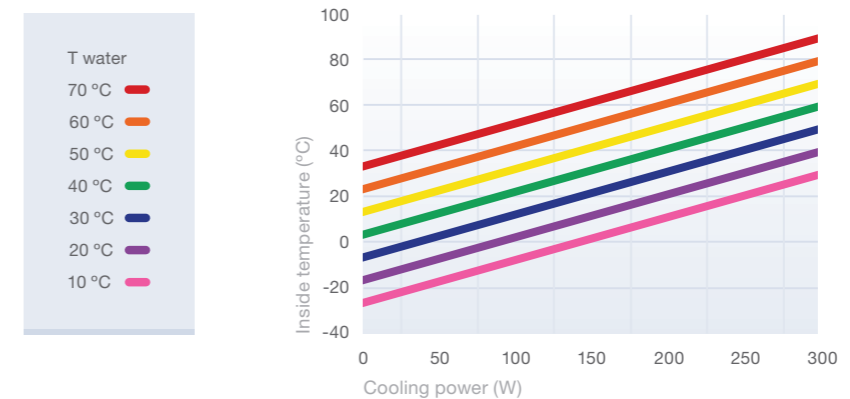
Switch Cabinet Cooler Series "LRC"

The "LRC" series switch cabinet coolers have been designed especially for use in machines. The cooling water that usually exists there can be easily used for cooling the units. The "LRC" series enables a high power output in a compact size and cooling that is largely independent

of the ambient temperature. The water path and the position of the hose connections can be selected as desired. In addition, the "LRC" series provides all the benefits of Peltier technology, such as position-independent installation and being able to change over to heating.



Performance curve LR-208-C
(Ambient temperature 20 °C - Cooling water with parallel-flow at 0,1 l/s)



Type	Size	Nominal power	Operating temperature range	Supply voltage	Weight
LR-208-C	2	200 W	+5 .. +90 °C	24 V-DC	5 kg

Surface Coolers

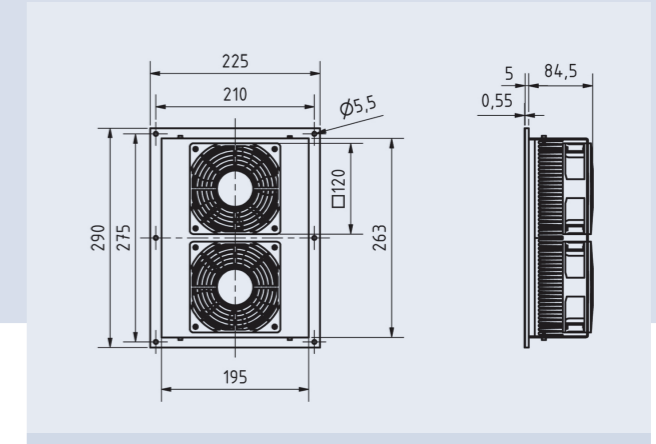
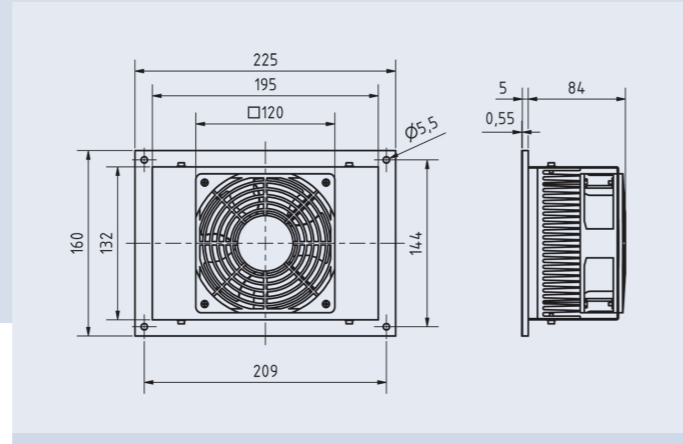
Our surface coolers are available in three sizes with three power grades each. Thanks to the direct contact cooling method, their high efficiency is impressive. The devices are equipped with a flexible heat contact film, which provides optimal thermal contact even for slightly uneven surfaces. In accordance with our high quality and safety standards, all surface coolers are equipped with overheating protection and alarm relays. All our surface coolers have been designed to provide IP67 protection.

Type	Size	Nominal power	Operating temperature range	Supply voltage	Weight
GL-104-C	1	50 W	-40 .. +70 °C	24 V-DC	2,5 kg
GN-104-C		70 W			
GR-104-C		100 W			
GL-208-C	2	100 W			
GN-208-C		140 W			
GR-208-C		200 W			
GL-316-C	3	200 W			
GN-316-C		280 W			
GR-316-C		400 W			

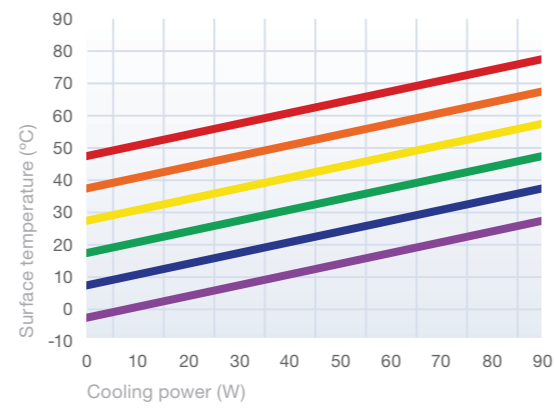


Surface Cooler Size 1

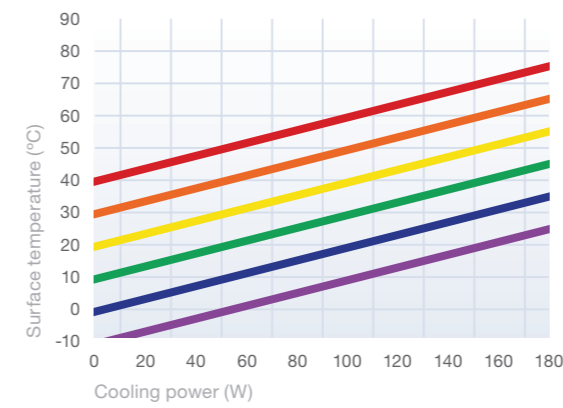
Surface Cooler Size 2



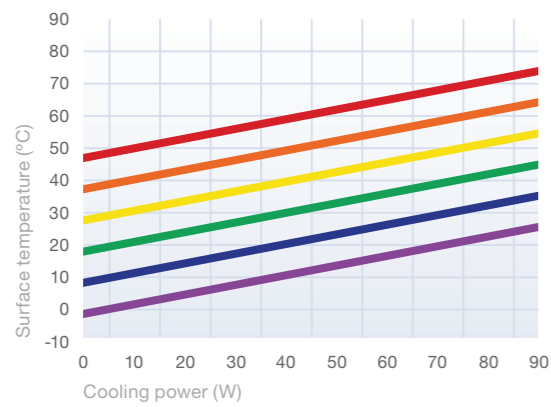
Performance curve GL-104-C



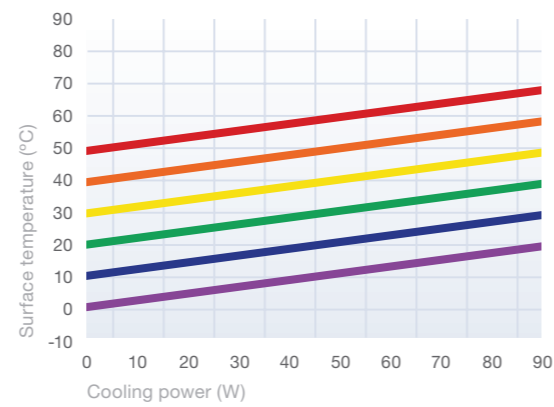
Performance curve GL-208-C



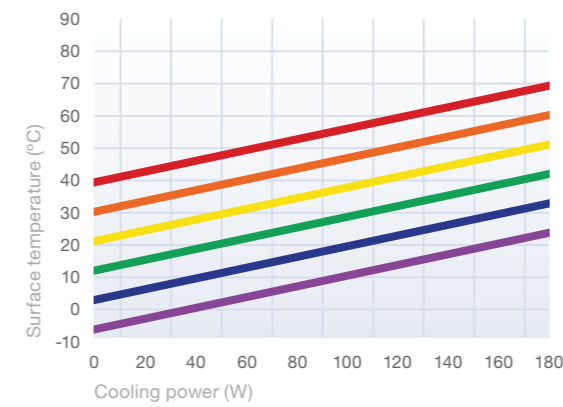
Performance curve GN-104-C



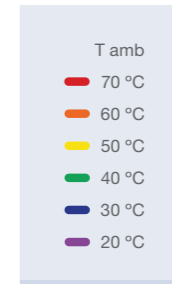
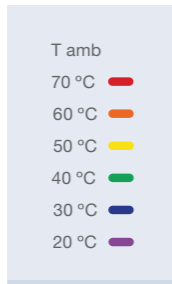
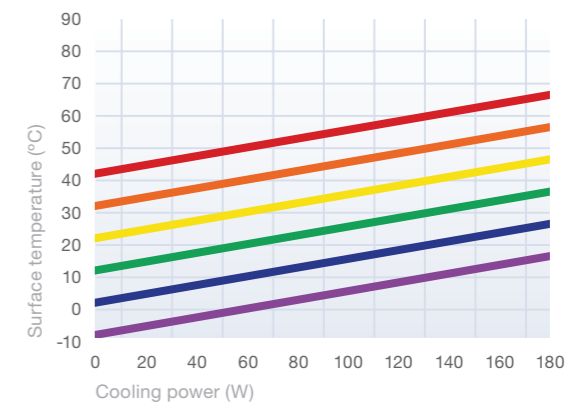
Performance curve GR-104-C



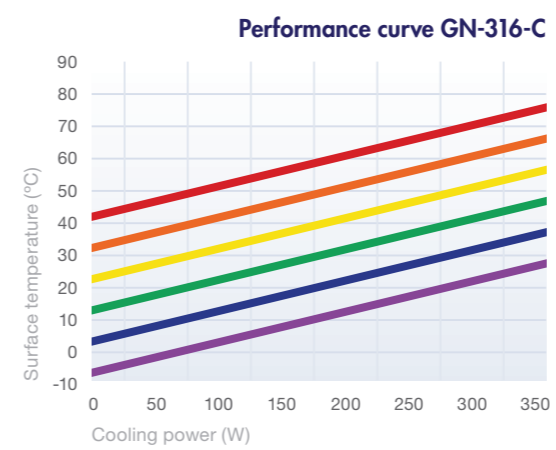
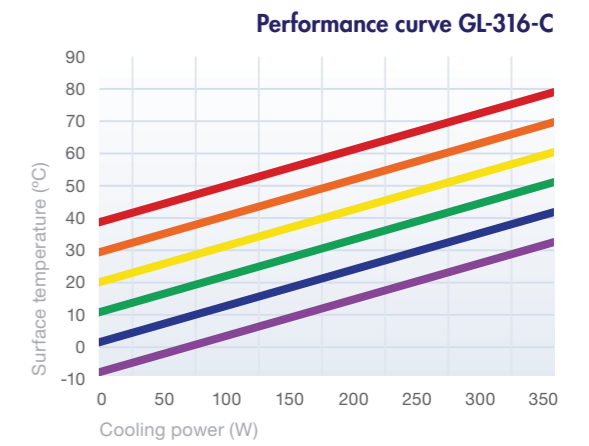
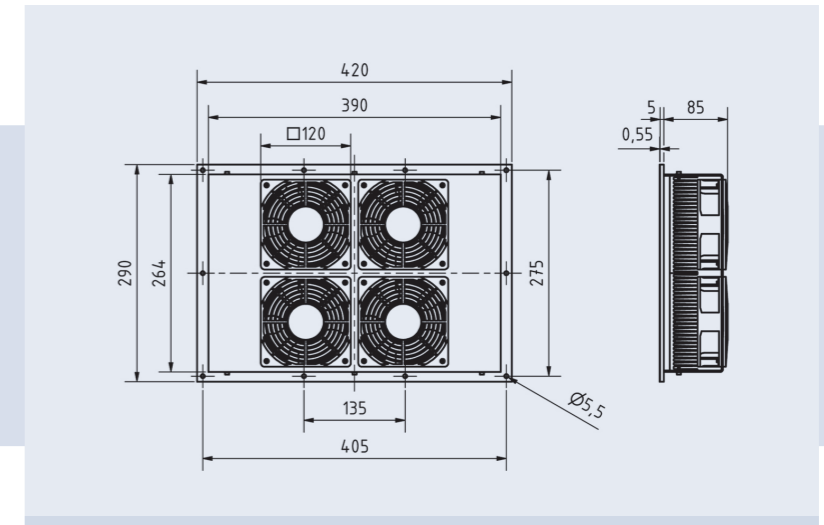
Performance curve GN-208-C

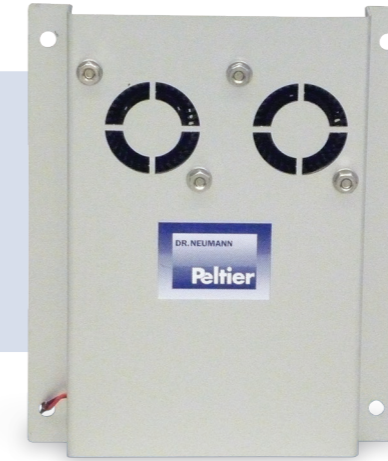
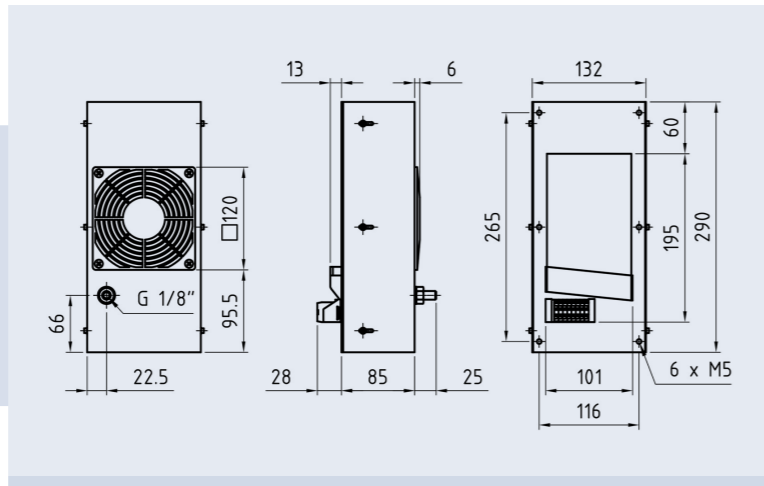


Performance curve GR-208-C



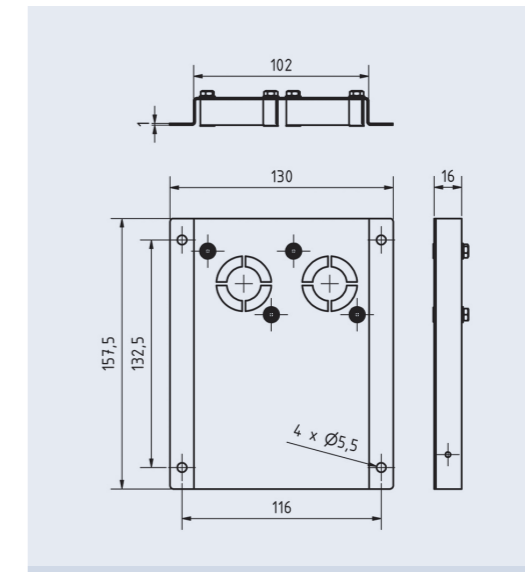
Surface Cooler Size 3





The PSE-001-B switch cabinet dehumidifier (patented) is a special form of switch cabinet cooler. In the switch cabinet interior, there is a ventilator-free cold plate on which the humidity condenses. The resulting water droplets run off the plate, are collected in a channel and drained out of the switch cabinet by a drainage tube. In order to avoid the formation of ice, the cold plate is equipped with a temperature sensor, which keeps the temperature of the cold plate in an ideal range by means of an integrated electronic regulator. In addition, the switch cabinet dehumidifier provides a control signal for direct connection of a humidistat. All of our units come equipped with temperature protection switches and alarm relays. The exterior of the unit is designed with IP67 protection, so that operation is possible in difficult environmental conditions.

The ventilation-upper part SEA 001-A for the switch cabinet dehumidifier PSE-001-B increases its performance significantly, especially in cabinets without its own air circulation in the interior. The ventilation-upper part promotes the air in a continuous flow over the condensing plate. It is simply mounted on the inside of the cabinet directly over the condensation plate of the dehumidifier. For mounting, the already existing mounting holes are used. Additional drilling is not necessary. For the electrical connection, two especially for the ventilation-upper part existing terminals on the dehumidifier are used.

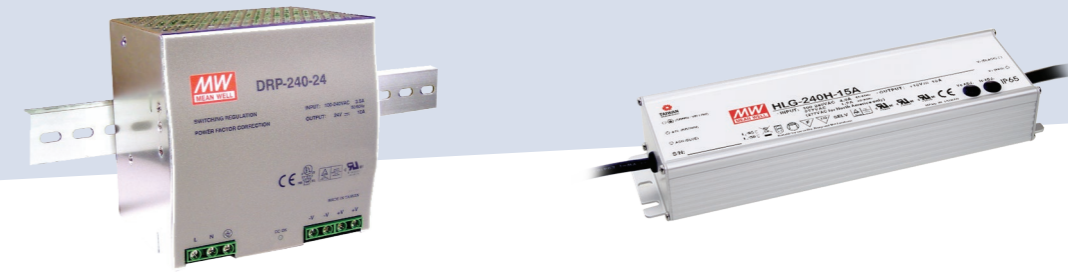


Type	Nominal power	Operating temperature range	Supply voltage	Weight
PSE-001-B	200 W	+10 .. +70 °C	24 V-DC	3,2 kg

Type	Operation temperature range	Supply voltage	Maximum input current
SEA-001-A	-40 .. +70 °C	24 V-DC	0,2 A



We modify all our devices specifically to meet your needs! In addition to our customized units we also provide special equipment, such as integrated temperature sensors, additional thermostat switches or variable-speed fans. It is also possible to adapt the devices to be salt fog resistant, for example for offshore applications, and much more - **please contact us!**

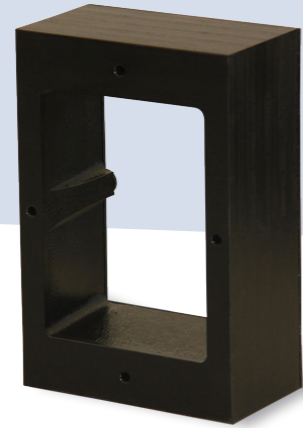


We offer a selection of switching power supplies for DIN rail and screw mounting:

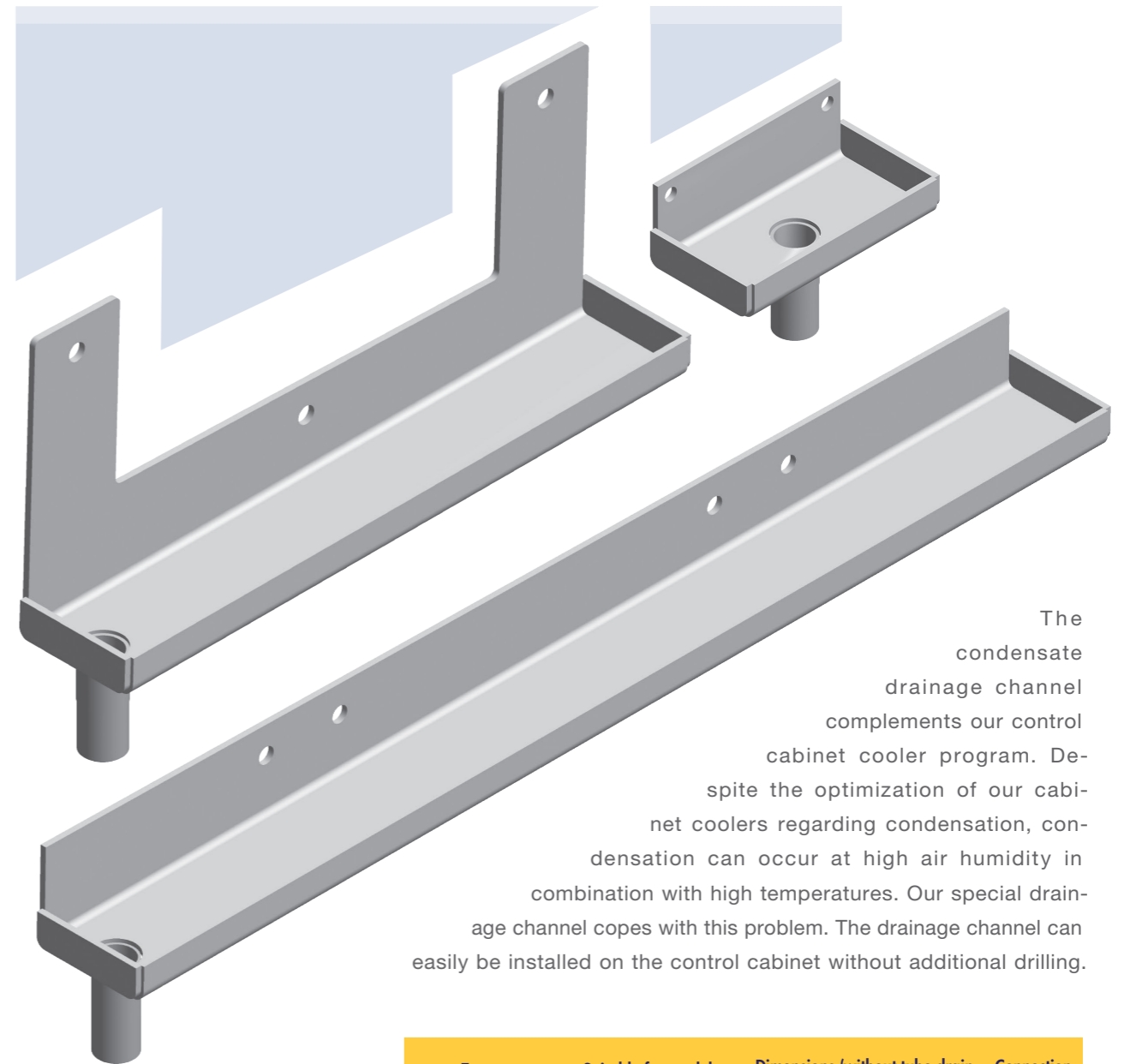
Typ	Monting	Supply voltage	Output voltage	Rated current	Rated power	Efficiency	Dimensions (W x H x D)
DR-4524	DIN-Rail	85 .. 264 V-AC, 47 .. 63 Hz - 120 .. 370 V-DC	21,6 .. 26,4 V-DC	2 A	45 W	80 %	93 x 78 x 67 mm
DR-60-24	DIN-Rail	88 .. 264 V-AC, 47 .. 63 Hz - 124 .. 370 V-DC	21,6 .. 26,4 V-DC	2,5 A	60 W	84%	78 x 93 x 56 mm
DR-75-24	DIN-Rail	85 .. 264 V-AC, 47 .. 63 Hz - 120 .. 370 V-DC	24 .. 28 V-DC	3,2 A	75 W	80 %	55 x 125,2 x 100 mm
DR-100-24	DIN-Rail	88 .. 264 V-AC, 47 .. 63 Hz - 124 .. 370 V-DC	24 .. 29 V-DC	4,2 A	100 W	89 %	100 x 93 x 56 mm
DR-120-24	DIN-Rail	88 .. 132 V-AC / 176 .. 264 V-AC (switch), 47 .. 63 Hz - 248 .. 370 V-DC	24 .. 28 V-DC	5 A	120 W	84 %	65,5 x 125,2 x 100 mm
DRP-240-24	DIN-Rail	85 .. 264 V-AC, 47 .. 63 Hz - 120 .. 370 V-DC	24 .. 28 V-DC	10 A	240 W	84 %	125,5 x 125,2 x 100 mm
DRP-480-24	DIN-Rail	180 .. 264 V-AC, 47 .. 63 Hz - 250 .. 370 V-DC	24 .. 28 V-DC	20 A	480 W	89 %	227 x 125,2 x 100 mm
HLG-40H-24	Screw mounting	90 .. 305 V-AC, 47 .. 63 Hz - 127 .. 431 V-DC	22 .. 27 V-DC	1,67 A	40 W	88 %	171 x 36,8 x 61,5mm
HLG-60H-24	Screw mounting	90 .. 305 V-AC, 47 .. 63 Hz - 127 .. 431 V-DC	22 .. 27 V-DC	2,5 A	60 W	89,5 %	171 x 36,8 x 61,5 mm
HLG-80H-24	Screw mounting	90 .. 305 V-AC, 47 .. 63 Hz - 127 .. 431 V-DC	22 .. 27 V-DC	3,4 A	80 W	90,5 %	195,6 x 38,8 x 61,5 mm
HLG-100H-24	Screw mounting	90 .. 305 V-AC, 47 .. 63 Hz - 127 .. 431 V-DC	22 .. 27 V-DC	4 A	100 W	93 %	220 x 38,8 x 68 mm
HLG-120H-24	Screw mounting	90 .. 305 V-AC, 47 .. 63 Hz - 127 .. 431 V-DC	22 .. 27 V-DC	5 A	120 W	93 %	220 x 38,8 x 68 mm
HLG-150H-24	Screw mounting	90 .. 305 V-AC, 47 .. 63 Hz - 127 .. 431 V-DC	22 .. 27 V-DC	6,3 A	150 W	93 %	228 x 38,8 x 68 mm
HLG-185H-24	Screw mounting	90 .. 305 V-AC, 47 .. 63 Hz - 127 .. 431 V-DC	22 .. 27 V-DC	7,8 A	185 W	93,5 %	228 x 38,8 x 68 mm
HLG-240H-24	Screw mounting	90 .. 305 V-AC, 47 .. 63 Hz - 127 .. 431 V-DC	22,4 .. 25,6 V-DC	10 A	240 W	92,5 %	244,2 x 38,8 x 68 mm
HLG-320H-24	Screw mounting	90 .. 305 V-AC, 47 .. 63 Hz - 127 .. 431 V-DC	21 .. 26 V-DC	13,34 A	320 W	94 %	252 x 43,8 x 90 mm
HLG-600H-24B	Screw mounting	90 .. 305 V-AC, 47 .. 63 Hz - 127 .. 431 V-DC	20,4 .. 25,2 V-DC	25 A	600 W	95 %	280 x 48,5 x 144 mm

Further types are available on request – please contact us!

Photos: Emtron electronic GmbH



We also offer a stacking frame as a standard accessory to all of our switch cabinet cooler sizes. By using this frame, the cooling unit does not have to be in the switchcabinet interior. This way, no additional space is needed inside the switch cabinet interior without a loss of cooling capacity.



The condensate drainage channel complements our control cabinet cooler program. Despite the optimization of our cabinet coolers regarding condensation, condensation can occur at high air humidity in combination with high temperatures. Our special drainage channel copes with this problem. The drainage channel can easily be installed on the control cabinet without additional drilling.

Type	Suitable for model	Dimensions (without tube drain and flange)	Connection thread
KAR-0-B	MX-004-C	74 x 12 x 39 mm (L x H x D)	G 1/4"
	EL/EN/ER-104-C		
	FL/FN/FR-104-C		
KAR-2-B	EL/EN/ER-208-C	199 x 18 x 39 mm (L x H x D)	
	FL/FN/FR-208-C		
	HL-208-C		
	FL/FR/XFL/XFR-208-AC		
KAR-4-B	LR-208-C	364 x 18 x 39 mm (L x H x D)	
	FL/FN/FR-316-C		
	HL-316-C		
KAR-5-B	FL/FR/XFL/XFR-416-AC	474 x 18 x 39 mm (L x H x D)	
	FL/FR-536-AC		

SCC-001-B



The SCC-001-B thermostat works on the basis of a bimetal making contact and does not require its own power supply. Ideally it is connected into the current feed to the power supply unit which supplies the Peltier cooler. In this way the cooler is only turned on if the temperature exceeds an adjustable switching point. Thus overcooling of the switch cabinet with switched off electrical loads can be prevented.

Hysteresis: 7 K

SCC-002-B



The SCC-002-B hydrostat also does not require its own power supply. It has a changeover relay and is the ideal extension to the PSE-001-B switch cabinet dehumidifier. With the SCC-002-B it is possible to only switch on the dehumidifier when the relative humidity in the switch cabinet is high enough to require a dehumidification.



From simple 2-point to PID control: We have a comprehensive range of controllers, relays, power supplies and sensors with control accuracies of up to +/- 0.01 Kelvin. We assess your needs and determine which controls fit your requirements. Then we manufacture your control as an individual component or as an integrated solution.

Photo: JUMO GmbH & Co. KG

SCC-003-A

The SCC-003-A controller is specially designed for controlling Peltier coolers. It has 2 setpoint temperatures and automatically switches the cooler to cooling or heating mode. Thus it is possible to keep a switch cabinet within a specific temperature range, regardless of the outside temperature. The supply-voltage is 24 V-DC, the switching-current is 16 A.

Hysteresis: 1 K

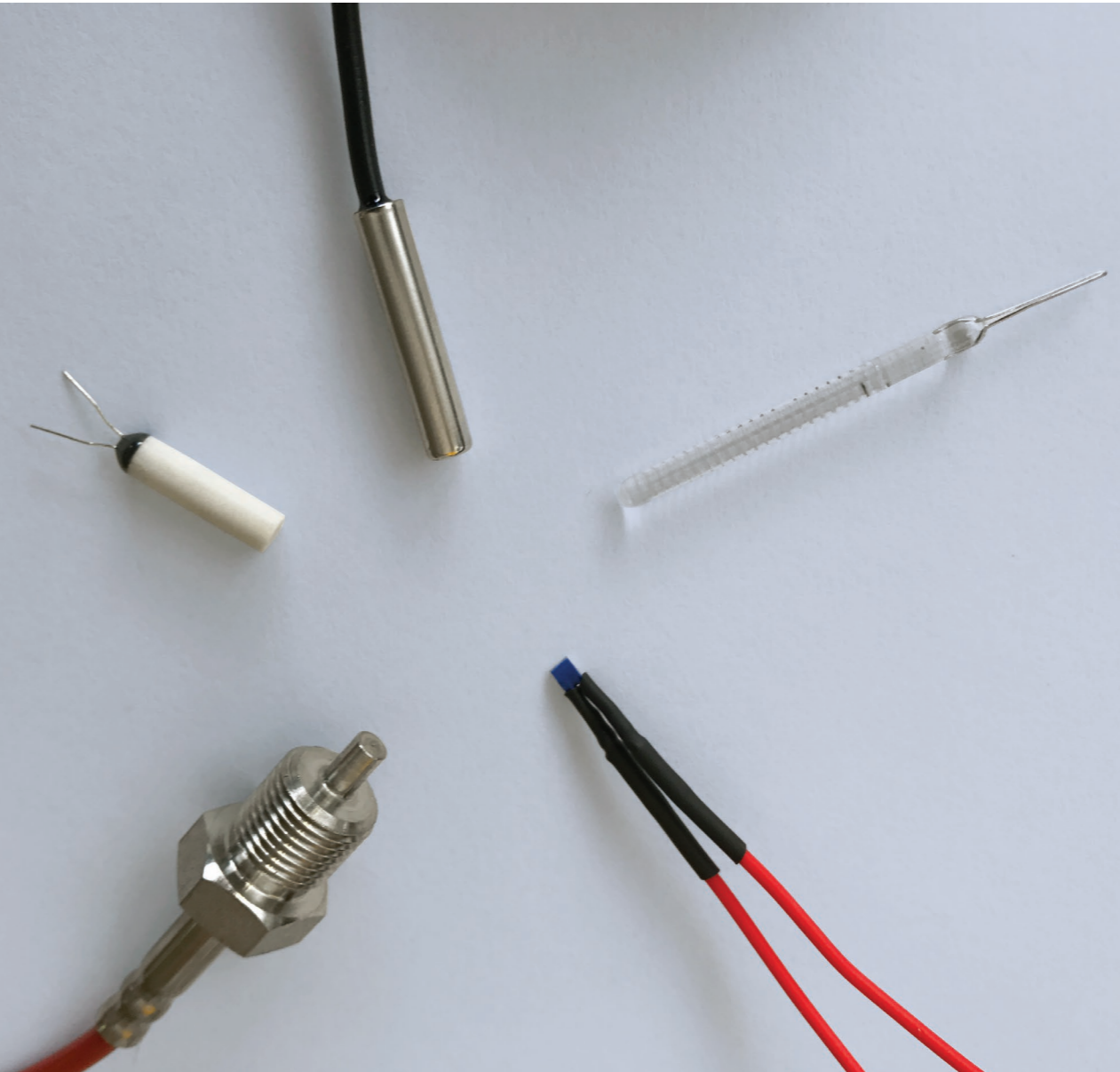


Thermal Insulation

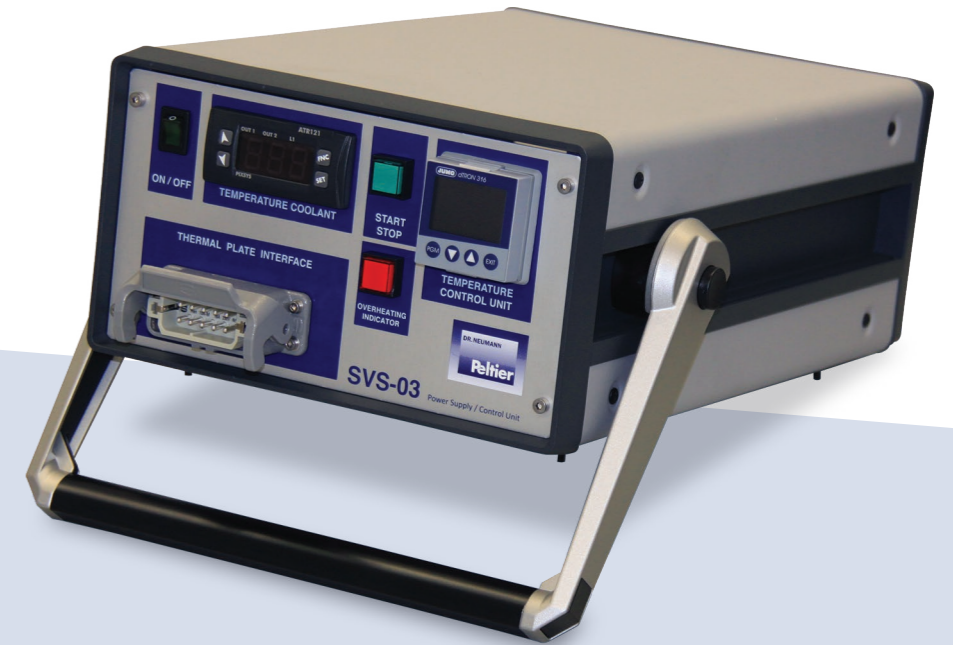
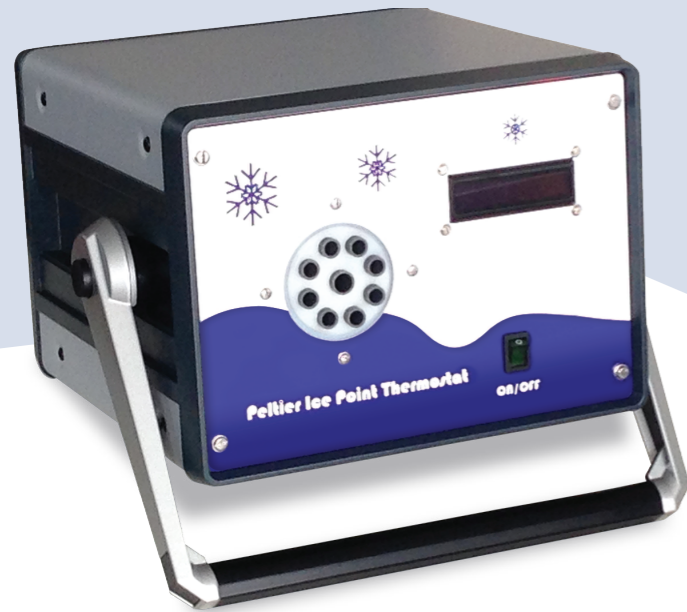


A thermal insulation of the cabinet is especially then indicated, when the internal air has to be cooled below ambient temperature. The heat insulation reduces the transmission heat, e.g. the heat flowing back through the control cabinet walls. In this case a smaller, cost-saving cooling unit often is sufficient! Our 1 cm thick insulation material made of polyethylene foam is available as a meter fabric and as a custom cut.

Temperature Sensors



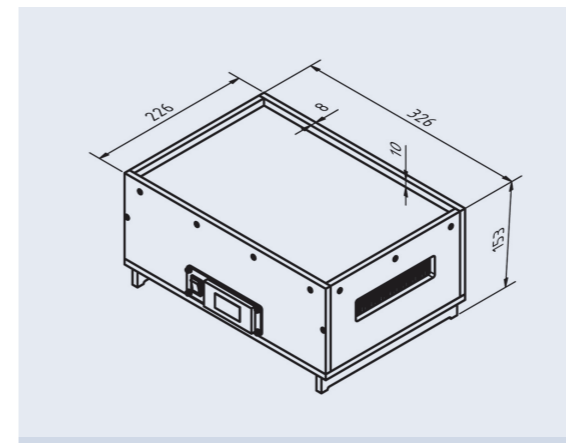
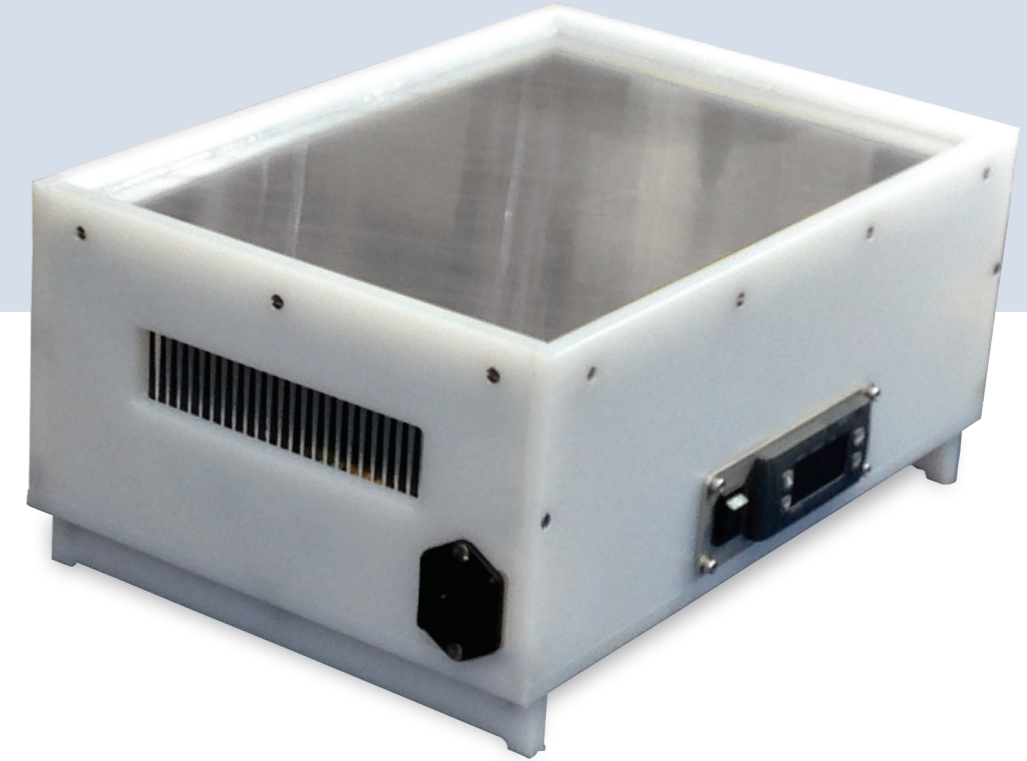
Discover our wide range of temperature sensors! Our range includes various types, such as Pt100, NTC or thermocouples in various designs, for example in stainless steel, ceramic or screw-in - always suitable for your requirements.



Laboratory Technology

In biological, chemical, medical and technical laboratories, there are often very exact temperature requirements which must often be provided as fixed points. Peltier technology has the optimal qualifications for solving these problems, as, unlike compression cooling systems, the fluid-free and purely electrically-driven Peltier systems

react significantly faster to altered operating conditions, such as to changes of the target temperature. This is why significantly more precise control can also be attained using Peltier systems. In addition, it is not only possible to cool using Peltier technology, but also to heat, which facilitates coverage of a much broader temperature range.

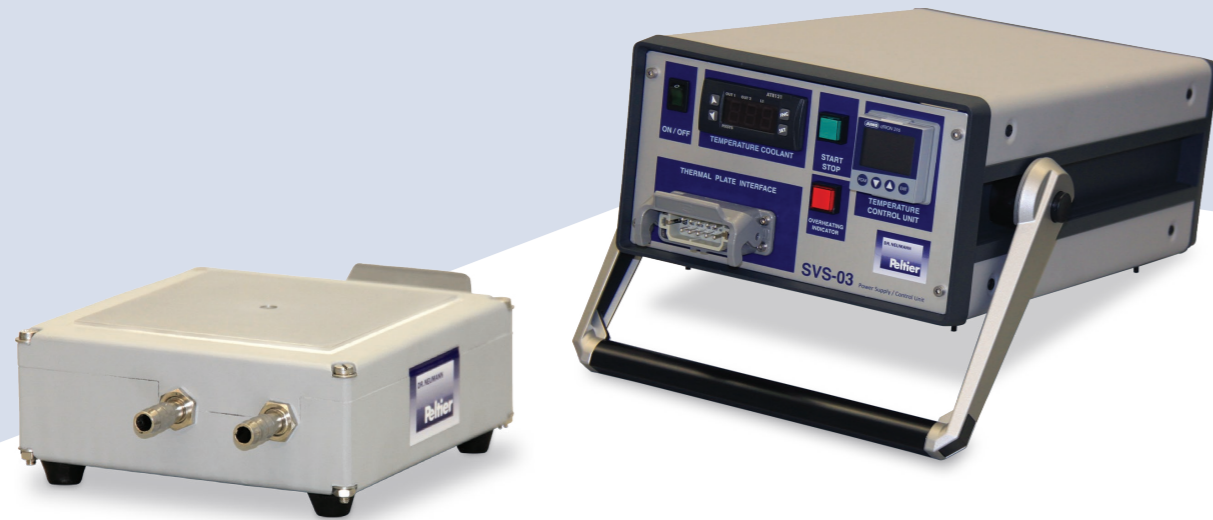


The ice point thermostat generates a temperature-constant source of precisely 0 °C. It is completely digitally controlled and has an accuracy of ± 0.01 K. The ice point thermostat has 8 receptacles with a diameter of 7.6 mm and one receptacle with a diameter of 10 mm. All receptacles are 150 mm deep. The device attains the ice point approx. 10

minutes after it is switched on. The rotational speed of the fan is temperature-controlled, so that the ice point thermostat operates with little noise. The device contains no fluids whatsoever. However, thermal oil may be used in the boreholes for better heat transfer. The device may also be operated in a vertical position for this purpose.

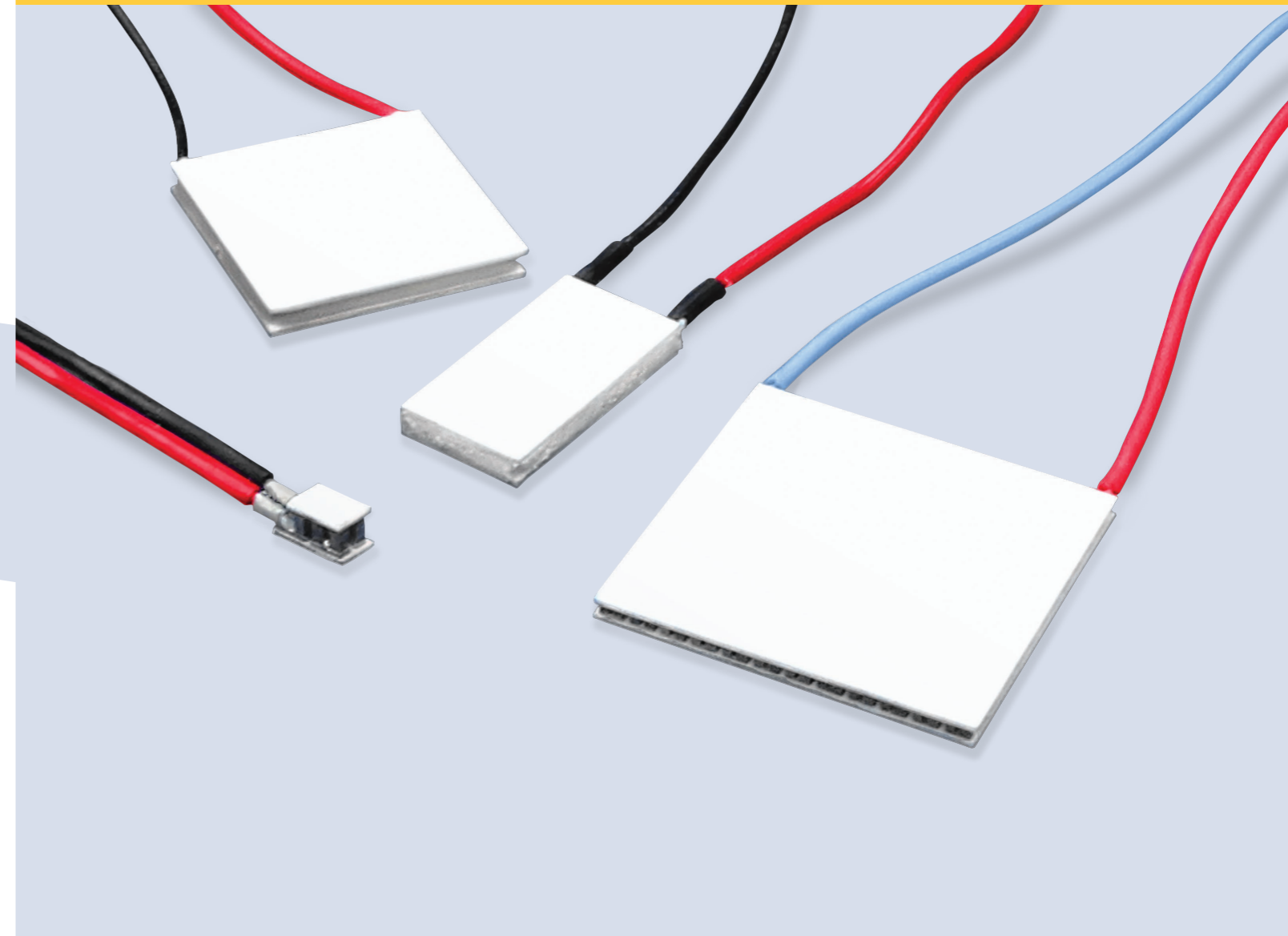
The ZTNG-310-A temperature control plate covers a range of -10 °C to +60 °C with an accuracy of ±1 K. It has an integrated controller with which the desired target temperature can be set using the arrow keys. The temperature control plate is recooled with normal ambient air and thus does not require any liquid refrigerant or coolant. Due to the integrated wide-range power supply, the unit can be used worldwide without restrictions.

Type	Operating temperature range	Working temperature range	Accuracy
ZTNG-310-A	+10 .. +30 °C	-10 .. +60 °C	+/- 1 K



The ZTNG-100-B temperature control plate cools as well as heats. Temperatures ranging from -50 °C to a maximum of +60 °C can be obtained. The temperature control plate is designed as a tabletop unit with feet and has a sturdy electrical connection. Thanks to water re-cooling, the design is compact and without exhaust fans, which enables silent operation. Two integrated Pt100 temperature sensors in the base plate and in the water heat exchanger enable external control and monitoring.

The SVS-03-A power supply and regulator, which is optionally available, can be easily connected for optimal operation. With this option, the desired temperatures can be set precisely and maintained consistently. Due to the integrated wide-range power supply, the SVS-03-A can be used worldwide without restrictions. The desired temperature of the control plate can be easily selected using the arrow keys. Everything else is accomplished by the SVS-03-A, even monitoring the cooling water temperature and switching off the temperature control plate, if necessary. The connection between the temperature control plate and the SVS-03-A can be established simply with securely lockable plug connections.



Peltier- and Seebeck-Modules

Type	Operation temperature range	Working temperature range	Accuracy	Water connection
ZTNG-100-B	+10 .. +40 °C	-50 °C .. +60 °C	+/- 0,1 K	2 connectors for hoses with inner diameter 9 mm.



We are distribution partners for Peltier modules made by Z-Max in Japan. In the following table, you will find our product selection for Peltier modules.

GL-II-Modules

Name	U max [V]	I max [A]	dT max at 27°C [K]	Q max at 27°C [W]	dT max at 50°C [K]	Q max at 50°C [W]	Length [mm]	Width [mm]	Height [mm]
FPH1-3102NC	3,8	2,0	70,0	4,4	77,0	5,0	15	15	4,7
FPH1-7102NC	8,8	2,0	70,0	10,2	77,0	11,2	20	20	4,7
FPH1-12702AC	15,7	2,0	70,0	18,2	77,0	19,5	30	30	4,75
FPH1-3103NC	3,8	3,0	70,0	7,3	77,0	8,0	15	15	3,8
FPH1-7103NC	8,8	3,0	70,0	16,6	77,0	18,0	20	20	3,8
FPH1-12703AC	15,7	3,0	70,0	29,8	77,0	32,5	30	30	3,85
FPH1-12703S7	15,4	3,5	70,0	29,0	77,0	32,0	40	40	4,65
FPH1-3104NC	3,8	3,9	70,0	8,6	77,0	9,5	15	15	3,6
FPH1-7104NC	8,8	3,9	70,0	18,7	77,0	20,9	20	20	3,6
FPH1-12704AC	15,7	3,9	70,0	35,2	77,0	39,0	30	30	3,65
FPH1-12704S7	15,4	4,0	70,0	32,0	77,0	35,2	40	40	4,6
FPH1-3106NC	3,8	6,0	70,0	13,0	77,0	14,3	15	15	3,1
FPH1-7106NC	8,8	6,0	70,0	29,7	77,0	32,7	20	20	3,1
FPH1-12706AC	15,7	6,0	70,0	53,1	77,0	59,1	30	30	3,15
FPH1-1707NC	2,1	6,0	70,0	7,4	77,0	8,2	15	15	3,9
FPH1-3107NC	3,8	6,0	70,0	13,6	77,0	14,9	20	20	3,9
FPH1-7107AC	8,8	6,0	70,0	31,1	77,0	34,2	30	30	3,95

Name	U max [V]	I max [A]	dT max at 27°C [K]	Q max at 27°C [W]	dT max at 50°C [K]	Q max at 50°C [W]	Length [mm]	Width [mm]	Height [mm]
FPH1-12707AC	15,7	6,0	70,0	55,6	77,0	61,0	40	40	3,95
FPH1-1708NC	2,1	8,5	70,0	10,3	77,0	11,3	15	15	3,4
FPH1-3108NC	3,8	8,5	70,0	18,8	77,0	20,8	20	20	3,4
FPH1-7108AC	8,8	8,5	70,0	43,1	77,0	48,0	30	30	3,45
FPH1-12708AC	15,7	8,5	70,0	77,1	77,0	85,0	40	40	3,45
FPH1-12710AC	15,4	10,5	68,0	93,0	75,0	102,0	40	40	3,3
FPH1-12712AC	15,4	12,5	68,0	110,0	75,0	121,0	40	40	3,7
FPH1-12715AC	15,4	15,0	68,0	130,0	75,0	145,0	50	50	4,15

GL-II-Modules - 2-stage

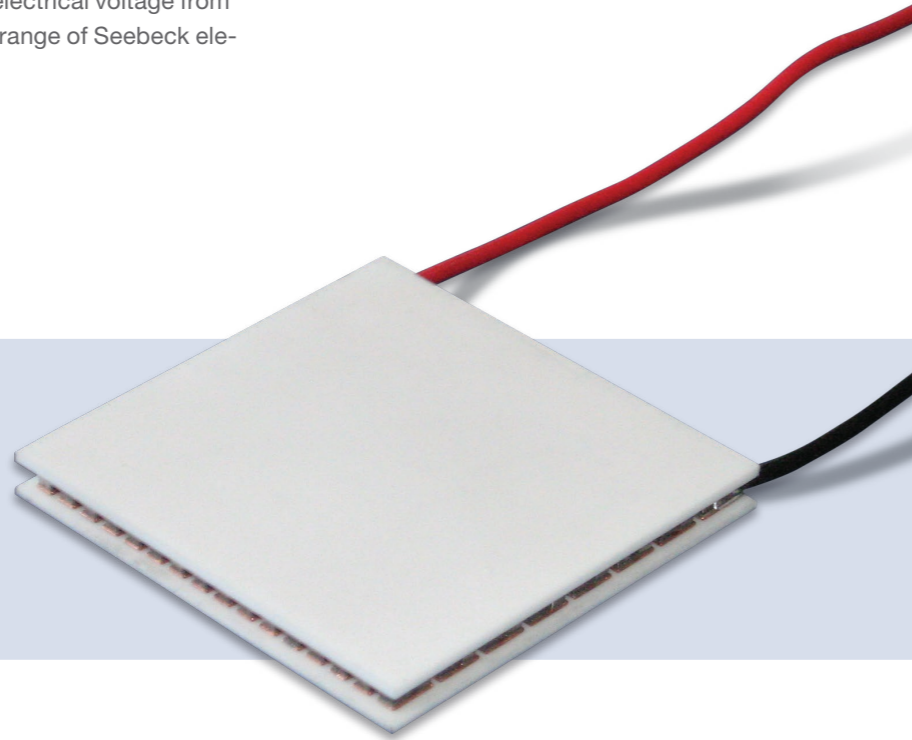
Name	U max [V]	I max [A]	dT max at 27°C [K]	Q max at 27°C [W]	dT max at 50°C [K]	Q max at 50°C [W]	Length [mm]	Width [mm]	Height [mm]
FPK2-15828	15,0	2,8	95,0	5,3	105,0	5,8	15	30	7,2
FPK2-19808NC	16,1	8,5	85,0	51,6	95,0	58,0	40	40	7,05

GL-II-Modules - Miniatur

Name	U max [V]	I max [A]	dT max at 27°C [K]	Q max at 27°C [W]	dT max at 50°C [K]	Q max at 50°C [W]	Length [mm]	Width [mm]	Height [mm]
FPM1-71008	8,6	0,8	68,0	3,7	75,0	4,2	10	10	3,0
FPM1-31008	3,6	0,8	68,0	1,6	75,0	1,8	8	8	3,0

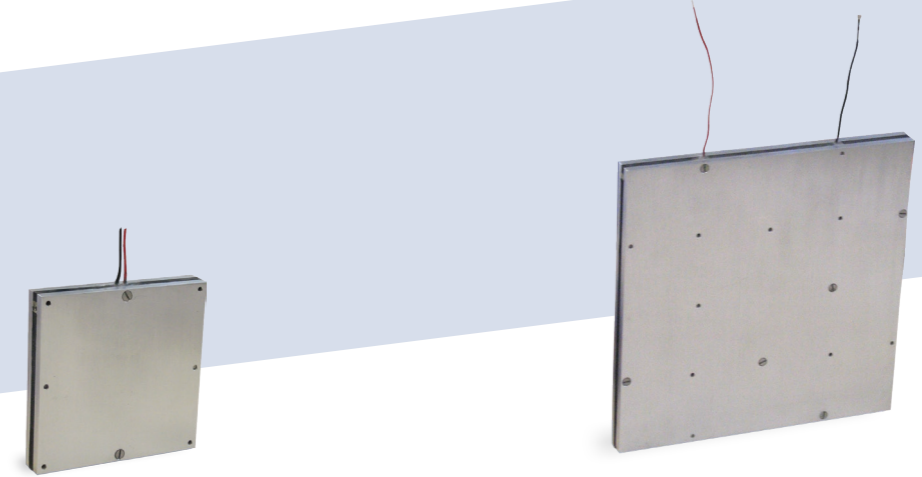
Seebeck-Modules

The Peltier effect is also applicable in the opposite direction. This so-called Seebeck effect generates electrical voltage from temperature differences. We offer a wide range of Seebeck elements of various power levels.



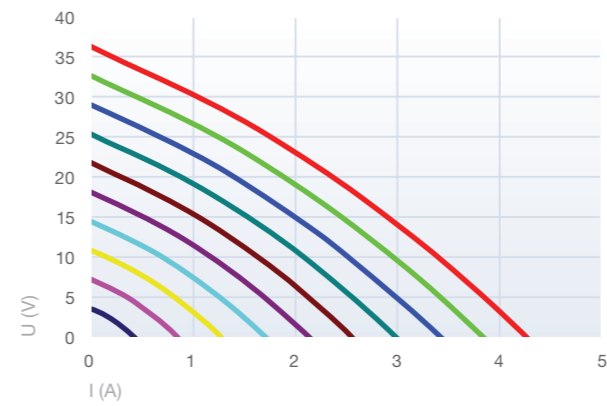
Thermal Generators

We also offer ready-made thermal generators in two sizes. They have an aluminium plate with threaded boreholes on the cold and warm sides for quick and easy mounting.

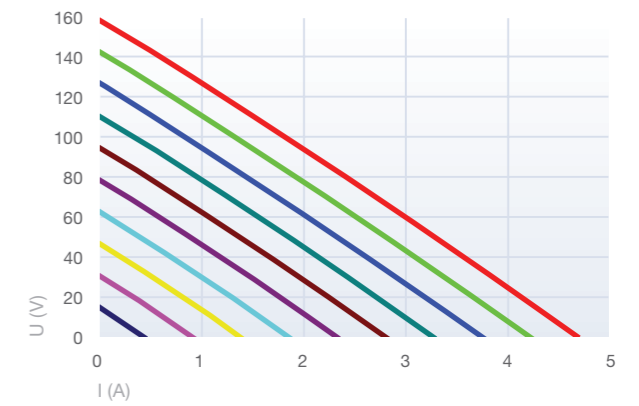


Type	P max (W)	T max (°C)	Length (mm)	Width (mm)	Height (mm)	Internal resistance (Ohm)	Thermal resistance (K/W)	Open-circuit voltage (V)	Short-circuit current (A)
GAA	2,5	200	40	40	3,6	2,95	0,675	2,62	0,89
GAB	2,39	200	40	40	3,9	3,93	0,9	2,955	0,755
GAC	2,33	200	40	40	3,6	9,03	0,99	4,42	0,49
GAD	2,23	200	40	40	3,8	10,4	1,145	4,645	0,45
GAE	1,77	200	40	40	4,8	17,35	1,905	5,355	0,305
GAF	1,38	200	30	30	3,1	2,46	1,38	1,78	0,725
GAG	1,21	200	30	30	3,6	3,995	2,24	2,125	0,535
GAH	0,86	200	30	30	4,3	7,685	4,31	2,49	0,325
GAI	2,05	200	40	40	3,9	2,51	1,41	2,19	0,87
GAJ	1,63	200	40	40	4,8	3,92	2,2	2,44	0,625
GAK	2,49	200	40	40	3,2	1,965	0,445	2,13	1,085
GCA	0,2	150	9,1	9,9	2,3	8,85	30,03	2,7	0,3
GCB	2,1	150	30	30	3,6	3,41	3,2	5,4	1,6
GCG	0,2	225	9,1	9,9	2,3	8,85	30,03	5,4	0,6
GCH	2,13	225	30	30	3,6	3,41	3,2	10,8	3,2
GCI	4,73	225	40	40	3,4	1,54	1,445	10,8	7
GCJ	19,8	250	50	50	3,4	0,673	0,526	10,3	15,3

Performance diagrams Thermal generator TG-100



Performance diagrams Thermal generator TG-200



dT = 20 K 40 K 60 K 80 K 100 K 120 K 140 K 160 K 180 K 200 K

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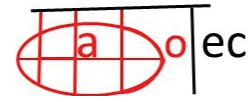
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