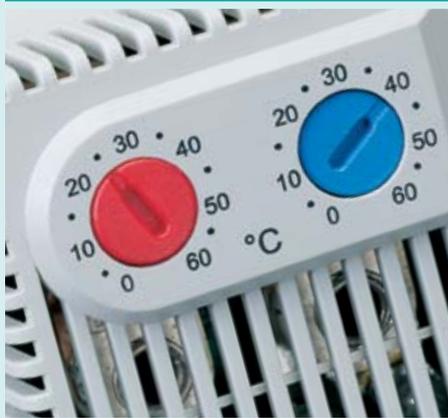


# Product Catalogue



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Indication of measurements in mm. Errors and omissions excepted. Specifications are subject to change without notice. Suitability of the products for their intended use and any associated risks must be determined by the end customer/buyer in their final application. Up-to-date versions of all technical data sheets in pdf-format can be found in the Internet at [www.stego.de](http://www.stego.de), [www.stego.co.uk](http://www.stego.co.uk) or [www.stegonorden.se](http://www.stegonorden.se) for download.



- **Temperature limiting**
- **Wide voltage range**
- **Dynamic heating up**
- **Energy saving**
- **Compact**

Small heaters designed to prevent condensation and to ensure a minimum operating temperature in small enclosures.

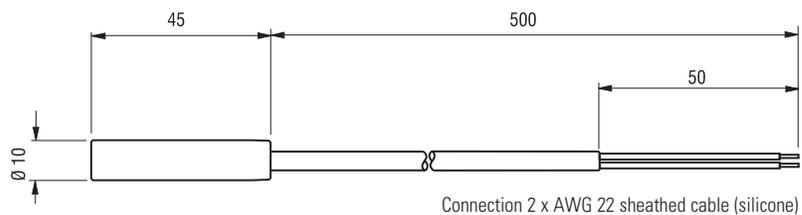
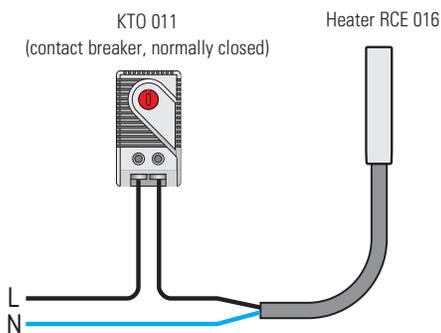


### Technical Data

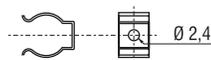
<b>Operating voltage</b>	120-250V AC/DC*
<b>Heating element</b>	PTC resistor, self regulating and temperature limiting
<b>Heater body</b>	aluminium
<b>Mounting</b>	see Accessories
<b>Fitting position</b>	variable
<b>Operating/Storage temperature</b>	-45 to +70°C (-49 to +158°F)
<b>Dimensions</b>	length 45mm, Ø 10mm
<b>Protection type / Protection class</b>	IP32 / II (double insulated)
<b>Approvals</b>	VDE, UL File No. E150057
<b>Accessories</b>	mounting clips (see illustration)
<b>Note</b>	other voltages on request

\*Operating with voltages below 140V AC/DC reduces heating performance by approx. 10%.

Example of connection



Connection 2 x AWG 22 sheathed cable (silicone)



Mounting clips Art. No. 09008.0-01 (1 packing unit = 2 pieces)

Art. No.	Heating capacity*	Inrush current max.	Surface temperature (approx.)	Connection	Weight (approx.)
01622.0-00	5W	2.0A	165°C	2 x AWG 22 sheathed cable (silicone)	20g
01623.0-00	9W	2.5A	175°C	2 x AWG 22 sheathed cable (silicone)	20g

\*at 20°C (68°F) ambient temperature



- **Temperature limiting**
- **Wide voltage range**
- **Dynamic heating up**
- **Energy saving**
- **Compact**

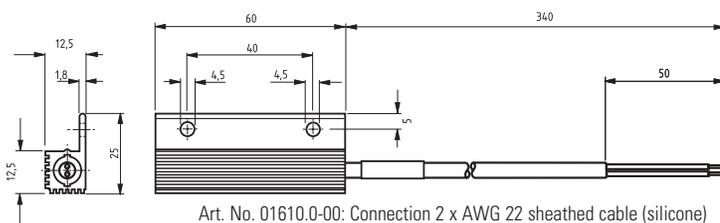
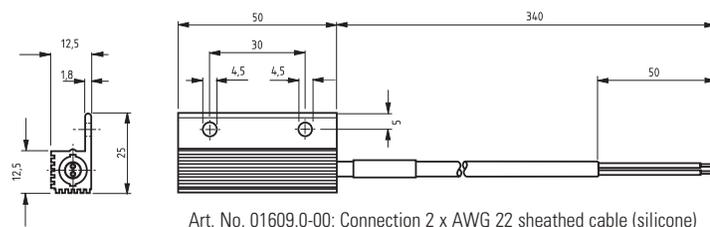
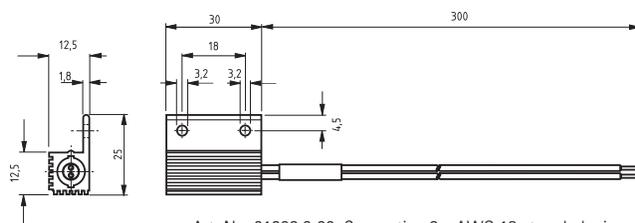
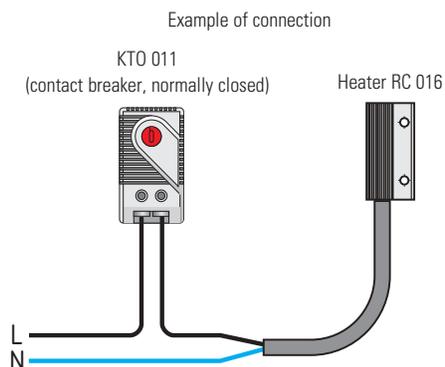
These small heaters are designed to prevent condensation and to ensure a minimum operating temperature in small enclosures.



### Technical Data

<b>Operating voltage</b>	120-250V AC/DC*
<b>Heating element</b>	PTC resistor, self regulating and temperature limiting
<b>Heater body</b>	aluminium, anodised
<b>Mounting</b>	screw fixing
<b>Fitting position</b>	variable
<b>Operating/Storage temperature</b>	-45 to +70°C (-49 to +158°F)
<b>Protection type / Protection class</b>	IP32 / II (double insulated)
<b>Approvals</b>	VDE, UL File No. E150057
<b>Note</b>	other voltages on request

\*Operating with voltages below 140V AC/DC reduces heating performance by approx. 10%.



Art. No.	Heating capacity*	Inrush current max.	Surface temperature (approx.)	Connection	Weight (approx.)
01602.0-00	8W	2.0A	150°C	2 x AWG 18 stranded wire	20g
01609.0-00	10W	2.5A	155°C	2 x AWG 22 sheathed cable (silicone)	30g
01610.0-00	13W	3.0A	170°C	2 x AWG 22 sheathed cable (silicone)	40g

\*at 20°C (68°F) ambient temperature



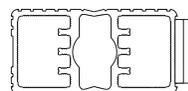
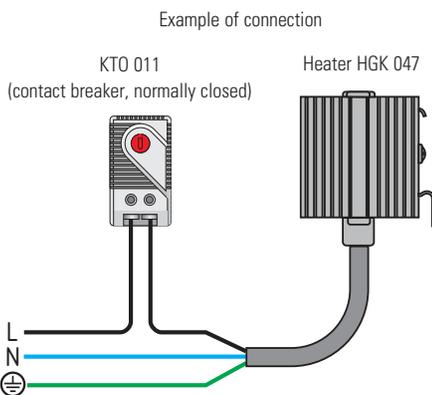
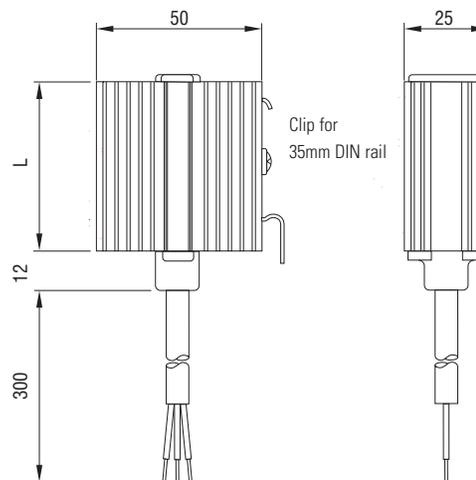
- **Dynamic heating up**
- **Energy saving**
- **Wide voltage range**
- **Temperature limiting**
- **Clip fixing**

The heaters are used in enclosures where condensation is to be prevented or the temperature may not fall below a minimum value. In this way corrosion is avoided and an even temperature is ensured.



### Technical Data

<b>Heating element</b>	PTC resistor, self regulating and temperature limiting
<b>Heater body</b>	extruded aluminium profile, anodised
<b>Mounting</b>	clip for 35mm DIN rail, EN 50022
<b>Fitting position</b>	vertical
<b>Operating/Storage temperature</b>	-45 to +70°C (-49 to +158°F)
<b>Protection type / Protection class</b>	IP54 / I (earthed)
<b>Accessories</b>	screw fixing, Art. No. 09024.0-00 (1 packing unit = 2 pieces)



Art. No.	Operating voltage	Heating capacity <sup>1)</sup>	Inrush current max.	Length (L)	Weight (approx.)	Connection	Approvals
04700.0-00	120-250V AC/DC <sup>2)</sup>	10W	1.0A	50mm	0.10kg	3 x 0.5mm <sup>2</sup> x 300mm sheathed cable (silicone)	VDE
04701.0-00	120-250V AC/DC <sup>2)</sup>	20W	2.5A	60mm	0.20kg	3 x 0.5mm <sup>2</sup> x 300mm sheathed cable (silicone)	VDE
04702.0-00	120-250V AC/DC <sup>2)</sup>	30W	3.0A	70mm	0.20kg	3 x 0.5mm <sup>2</sup> x 300mm sheathed cable (silicone)	VDE
04700.9-00	110-120V AC/DC	10W	1.0A	50mm	0.10kg	3 x AWG 20 x 300mm sheathed cable	UL File No. E150057
04701.9-00	110-120V AC/DC	20W	1.5A	60mm	0.20kg	3 x AWG 20 x 300mm sheathed cable	UL File No. E150057
04702.9-00	110-120V AC/DC	30W	1.5A	70mm	0.20kg	3 x AWG 20 x 300mm sheathed cable	UL File No. E150057

<sup>1)</sup>at 20°C (68°F) ambient temperature

<sup>2)</sup>Operating with voltages below 140V AC/DC reduces heating performance by approx. 10%.



- **Pressure clamp connectors**
- **Dynamic heating up**
- **Wide voltage range**
- **Temperature limiting**
- **Energy saving**
- **Clip fixing**
- **Quick installation**

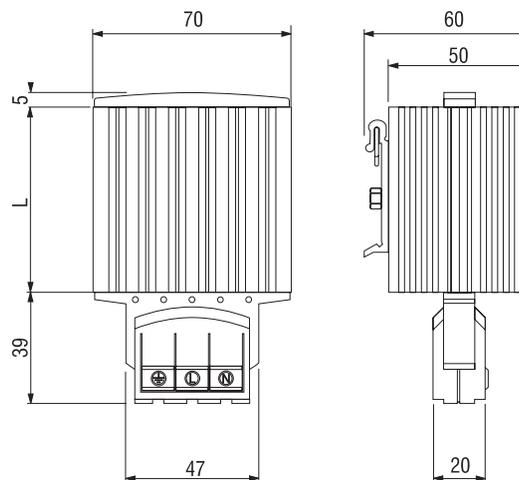
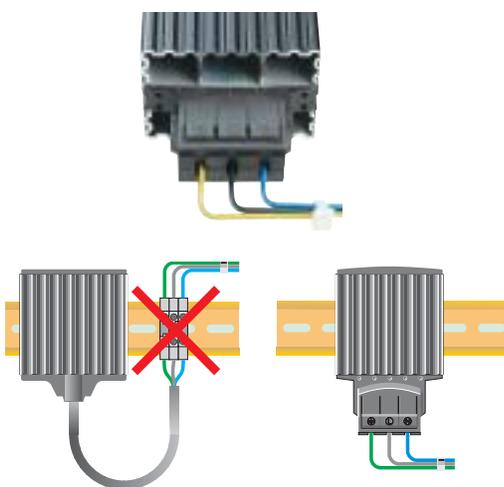
These heaters are used in enclosures where damage from condensation must be prevented, or where the temperature may not fall below a minimum value. The aluminium profile heater body design has a chimney effect and distributes the heat evenly. The pressure clamp connectors save time and simplify installation.



### Technical Data

<b>Operating voltage</b>	120-250V AC/DC*
<b>Heating element</b>	PTC resistor, self regulating and temperature limiting
<b>Heater body</b>	extruded aluminium profile, anodised
<b>Connection</b>	3 pressure clamps for stranded wire 0.5-1.5mm <sup>2</sup> (with wire end ferrule) and rigid wire 0.5-2.5mm <sup>2</sup>
<b>Connection casing</b>	plastic according to UL94 V-0, black
<b>Mounting</b>	clip for 35mm DIN rail, EN 50022
<b>Fitting position</b>	vertical
<b>Operating/Storage temperature</b>	-45 to +70°C (-49 to +158°F)
<b>Protection type / Protection class</b>	IP20 / I (earthed)
<b>Approvals</b>	VDE, UL File No. E150057
<b>Accessories</b>	screw fixing, Art. No. 09024.0-00 (1 packing unit = 2 pieces)

\*Operating with voltages below 140V AC/DC reduces heating performance by approx. 10%.



Art. No.	Heating capacity*	Inrush current max.	Length (L)	Weight (approx.)
14000.0-00	15W	1.5A	65mm	0.30kg
14001.0-00	30W	3.0A	65mm	0.30kg
14003.0-00	45W	3.5A	65mm	0.30kg
14005.0-00	60W	2.5A	140mm	0.40kg
14006.0-00	75W	4.0A	140mm	0.50kg
14007.0-00	100W	4.5A	140mm	0.50kg
14008.0-00	150W	9.0A	220mm	0.70kg

\*at 20°C (68°F) ambient temperature

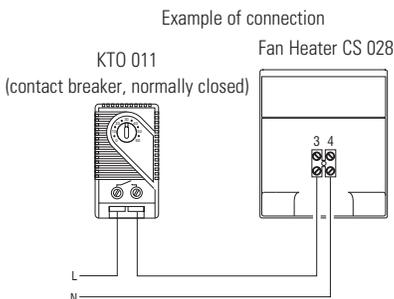
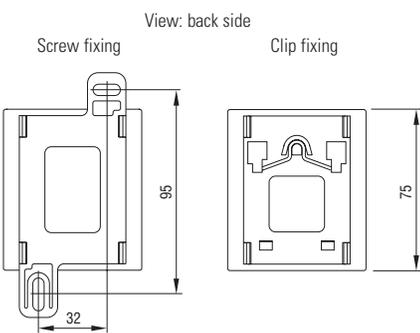
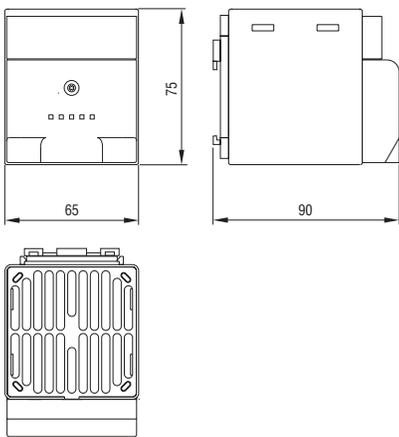


- Small, compact design**
- Quiet in operation**
- Dynamic heating up**
- Clip or screw fixing**

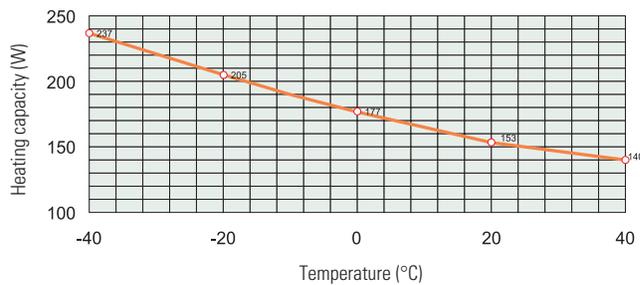
Fan heater prevents formation of condensation and provides an evenly distributed interior air temperature in enclosures with electric/electronic components. The heater is connected using the internal terminal connectors. The CS 028's small size make it ideal for use in enclosures where space is at a premium.



Technical Data	
<b>Heating element</b>	PTC heating element
<b>Current at make</b>	max. 2A at 230VAC, max. 5A at 120VAC
<b>Surface temperature</b>	max. 50°C at casing; 100°C at upper protective grille at 20°C (68°F) ambient temperature
<b>Axial fan, ball bearing</b>	air flow 13.8 m³/h, free flow (service life 40,000h at 40°C)
<b>Connection</b>	2-pole clamp max. 2.5mm², clamping screw max. torque 0.8Nm
<b>Mounting</b>	clip for 35 mm DIN rail, EN 50022 or screw fixing (Ø 5.3 mm)
<b>Casing</b>	plastic according to UL94-0, black
<b>Weight</b>	approx. 0.30kg
<b>Fitting position</b>	vertical
<b>Operating/storage temperature</b>	-45 to +70°C (-49 to +158°F)
<b>Prot. type/prot. class</b>	IP20 / II (double insulated)
<b>Note</b>	other voltages on request



Heating capacity / Ambient temperature diagram  
CS 028 (150W)



Art. No.	Operating voltage	Heating capacity*	Dimensions	Mounting	Approvals
02800.0-00	230VAC, 50/60Hz	150W	87 x 65 x 75mm	Clip fixing	VDE intended
02800.0-01	230VAC, 50/60Hz	150W	87 x 65 x 114mm	Screw fixing	VDE intended
02800.9-00	120VAC, 50/60Hz	150W	87 x 65 x 75mm	Clip fixing	-
02800.9-01	120VAC, 50/60Hz	150W	87 x 65 x 114mm	Screw fixing	-

\*at 20°C (68°F) ambient temperature

# Space-saving Fan Heater HV 031 / HVL 031 Series 100W to 400W



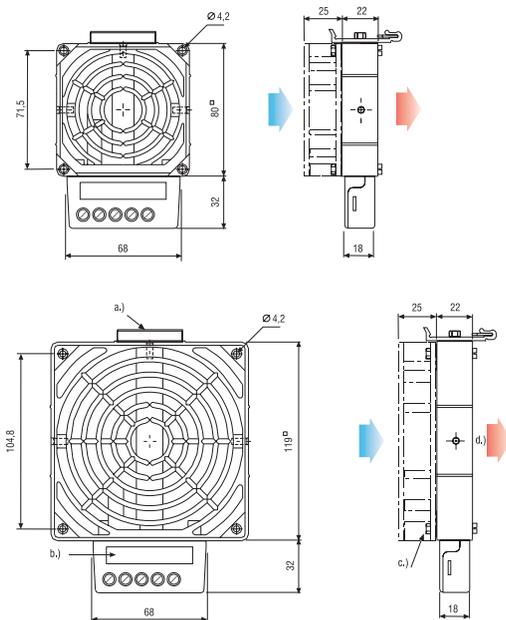
- **Compact**
- **Flat design**
- **High air through-flow**
- **Temperature safety cut-out**
- **Clip fixing**

The compact high-performance fan heater prevents formation of condensation in control or switch systems and provides an evenly distributed interior air temperature in enclosures. This fan heater is available without fan (HV 031) as well as with fan (HVL 031).



### Technical Data

<b>HV 031</b>	Heater without fan (fan mounting kit included)
<b>HVL 031</b>	Heater with fan
<b>Heating element</b>	high performance cartridge
<b>Temperature safety cut-out</b>	to protect against overheating in case of fan failure
<b>Heater body</b>	die-cast aluminium (glass bead blasted)
<b>Connection</b>	3-pole screw connector 2.5mm <sup>2</sup> , clamping torque 0.8Nm
<b>Connection casing</b>	plastic according to UL94 V-0, black
<b>Mounting</b>	clip for 35mm DIN rail, EN 50022
<b>Fitting position</b>	horizontal
<b>Operating/Storage temperature</b>	-45 to +70°C (-49 to +158°F)
<b>Protection type / Protection class</b>	IP20 / I (earthed)
<b>*Axial fan, ball bearing</b>	airflow see table service life 50,000h at 25°C (77°F)
<b>*Connection (axial fan)</b>	2-pole screw connector 2.5mm <sup>2</sup> (L2/N2)
<b>(*HVL 031 only)</b>	
<b>Approvals</b>	UL File No. E187294 (only 230VAC: VDE)



- a.) Clip
- b.) Type plate
- c.) Axial fan
- d.) Air direction



**Important!** Heater may only be operated together with fan. Danger of overheating!

Art. No. HV 031 230VAC, 50/60Hz	Art. No. HV 031 120VAC, 50/60Hz	Heating capacity	Dimensions	Weight (approx.)
03100.0-00	03100.9-00	100W	80 x 112 x 22mm	0.40kg
03101.0-00	03101.9-00	150W	80 x 112 x 22mm	0.40kg
03110.0-00	03110.9-00	200W	119 x 151 x 22mm	0.50kg
03111.0-00	03111.9-00	300W	119 x 151 x 22mm	0.50kg
03112.0-00	03112.9-00	400W	119 x 151 x 22mm	0.50kg

Art. No. HVL 031 230VAC, 50/60Hz	Art. No. HVL 031 120VAC, 50/60Hz	Heating capacity	Airflow min., free flow	Dimensions	Weight (approx.)
03102.0-00	03102.9-00	100W	35m <sup>3</sup> /h	80 x 112 x 47mm	0.60kg
03103.0-00	03103.9-00	150W	35m <sup>3</sup> /h	80 x 112 x 47mm	0.60kg
03113.0-00	03113.9-00	200W	108m <sup>3</sup> /h	119 x 151 x 47mm	0.90kg
03114.0-00	03114.9-00	300W	108m <sup>3</sup> /h	119 x 151 x 47mm	0.90kg
03115.0-00	03115.9-00	400W	108m <sup>3</sup> /h	119 x 151 x 47mm	0.90kg



- Compact Design**
- Clip fixing**
- Long service life**
- Maintenance free**
- Temperature safety cut-out**

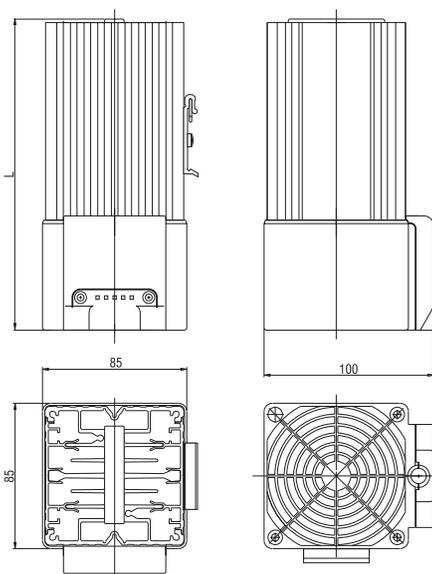
Compact fan heater prevents formation of condensation. The integrated high performance axial fan provides forced air circulation and so guarantees an even temperature in enclosures. With internal terminal connector.



### Technical Data

<b>Heating element</b>	resistance heater
<b>Temperature safety cut-out</b>	to protect against overheating in case of fan failure
<b>Heater body</b>	anodised extruded aluminium profile
<b>Surface temperature</b>	max. 75°C (400W)
<b>Axial fan, ball bearing</b>	Airflow, free flow AC: 45m³/h (50Hz) or 54m³/h (60Hz) DC: 54m³/h service life 50,000h at 25°C (77°F)
<b>Connection</b>	internal connection terminal 1.5mm² with cable clamp, clamping torque 0.8Nm
<b>Connection casing</b>	plastic according to UL94 V-0, black
<b>Mounting</b>	clip for 35mm DIN rail, EN 50022
<b>Fitting position</b>	vertical
<b>Operating/Storage temperature</b>	-45 to +70°C (-49 to +158°F)
<b>Protection type / Protection class</b>	IP20 / I (earthed)

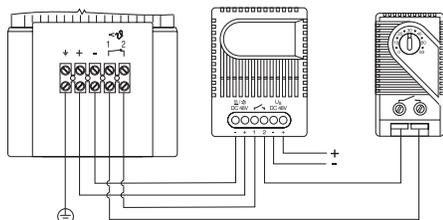
**Note:** In the case of 24VDC and 48VDC the fan heater has to be switched via a relay. For this purpose we recommend our electronic relay SM 010 (Art. No. 01000.0-00 and 01001.0-00).



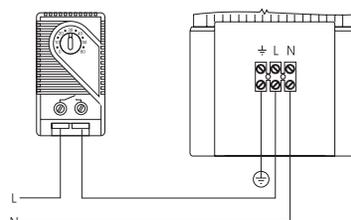
View from below

**Electronic relay SM 010**    **Control contact** e.g. Temperature regulator KTO 011    **Control contact** e.g. Temperature regulator KTO 011

**Heater**  
Fan Heater HGL 046 (DC 48V) with temperature safety cut-out



**Heater**  
Fan Heater HGL 046 (AC 230V and 120V) with temperature safety cut-out



Art. No.	Operating voltage	Heating capacity	Length (L)	Weight (approx.)	Approvals
04640.0-00	230VAC, 50/60Hz	250W	182mm	1.10kg	VDE + UL File No. E150057
04641.0-00	230VAC, 50/60Hz	400W	222mm	1.40kg	VDE + UL File No. E150057
04640.9-00	120VAC, 50/60Hz	250W	182mm	1.10kg	VDE + UL File No. E150057
04641.9-00	120VAC, 50/60Hz	400W	222mm	1.40kg	VDE + UL File No. E150057
04640.1-00	24VDC	250W	182mm	1.10kg	-
04640.2-00	48VDC	250W	182mm	1.10kg	-
04641.2-00	48VDC	400W	222mm	1.40kg	-



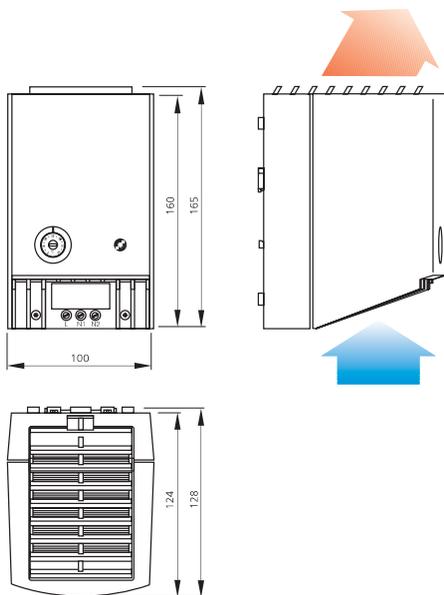
- Compact heater**
- Heating capacity adjusts to ambient temperature**
- Adjustable temperature range**
- Clip fixing**
- Optical indicator**
- Temperature safety cut-out**

Semiconductor fan heaters prevent the formation of condensation and ensure an even temperature in switch and control equipment. The built-in regulator is used to set the desired temperature.

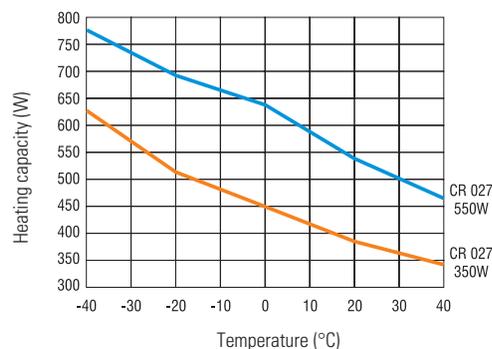


### Technical Data

<b>Heating element</b>	PTC resistor, self regulating and temperature limiting
<b>Temperature safety cut-out</b>	to protect against overheating in case of fan failure
<b>Axial fan, ball bearing</b>	airflow see table service life 50,000h at 25°C (77°F)
<b>Casing</b>	plastic according to UL94 V-0, light grey
<b>Optical indicator</b>	thermostat control lamp
<b>Connection</b>	2-pole clamp 2.5mm <sup>2</sup> , clamping torque 0.8Nm
<b>Mounting</b>	clip for 35mm DIN rail, EN 50022
<b>Fitting position</b>	vertical
<b>Operating/Storage temperature</b>	0 to +60 °C (+32 to +140 °F) / -45 to +70 °C (-49 to +158 °F)
<b>Dimensions</b>	100 x 128 x 165mm
<b>Protection type / Protection class</b>	IP20 / II (double insulated)
<b>Approvals</b>	UL File No. E204590



Heating capacity / Ambient temperature diagram CR 027



Art. No.	Operating voltage	Heating capacity*	Performance rating on type plate	Inrush current max.	Airflow, free flow	Setting range Temp. regulator	Weight (approx.)
02700.0-00	220-240VAC, 50Hz	350W	400W/50Hz, 550W/60Hz	11.0A	35m <sup>3</sup> /h	0 to 60°C	0.90kg
02701.0-00	220-240VAC, 50Hz	550W	550W/50Hz, 650W/60Hz	13.0A	45m <sup>3</sup> /h	0 to 60°C	1.10kg
02700.9-00	100-120VAC, 60Hz	350W	400W/50Hz, 550W/60Hz	14.0A	35m <sup>3</sup> /h	32 to 140°F	0.90kg
02701.9-00	100-120VAC, 60Hz	550W	550W/50Hz, 650W/60Hz	15.0A	45m <sup>3</sup> /h	32 to 140°F	1.10kg

\*at 20°C (68°F) ambient temperature



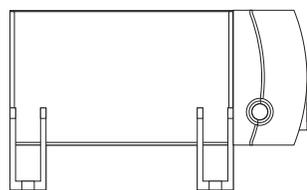
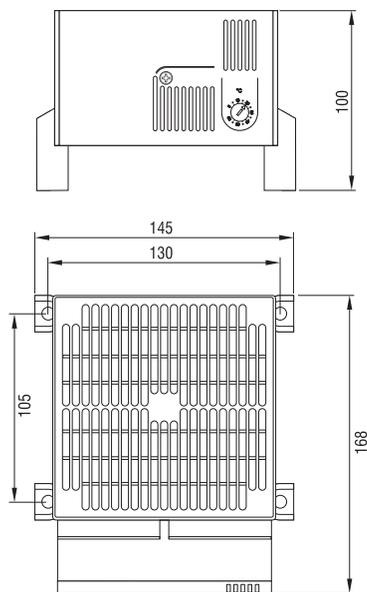
- Compact design**
- Double insulated**
- Integrated thermostat or hygrostat**

The compact high performance fan heater prevents formation of condensation and provides an evenly distributed interior air temperature in enclosures with electric/electronic components. The plastic enclosure provides double insulation and acts as protection against contact. The fan heater is available with integrated thermostat or pre-set hygrostat for temperature or humidity control. The CR 030 was designed as a stationary unit for the bottom of the enclosure. For wall fixing the fan heater CR 130 is recommended.

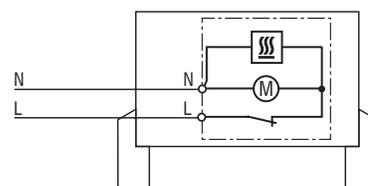


### Technical Data

<b>Heating element</b>	high performance cartridge
<b>Temperature safety cut-out</b>	to protect against overheating in case of fan failure
<b>Heater body</b>	extruded aluminium profile
<b>Axial fan, ball bearing</b>	airflow 160m <sup>3</sup> /h, free flow
	service life 50,000h at 25°C (77°F)
<b>Casing</b>	plastic according to UL94 V-0, black
<b>Connection</b>	2-pole max. 2.5mm <sup>2</sup> , clamping screw with strain relief, max. torque 0.8Nm
<b>Mounting</b>	screw fixing (M5)
<b>Fitting position</b>	horizontal
<b>Operating /Storage temperature</b>	0 to +60 °C (+32 to +140 °F) / -45 to +70 °C (-49 to +158 °F)
<b>Dimensions</b>	168 x 145 x 100mm
<b>Weight</b>	approx. 1.40kg
<b>Protection type / Protection class</b>	IP20 / II (earthed)
<b>Note</b>	other heating capacities from 200W up available on request



Connection diagram



Art. No.	Model	Operating voltage	Heating capacity	Setting range	Approvals
03051.0-00	Fan Heater with thermostat	230VAC, 50/60Hz	950W	0 to 60°C	VDE + UL File No. E234324
03051.0-02	Fan Heater with hygrostat	230VAC, 50/60Hz	950W	65% RH, factory-set	VDE + UL File No. E234324
03051.9-00	Fan Heater with thermostat	120VAC, 50/60Hz	700W	0 to 60°C	UL File No. E234324
03051.9-02	Fan Heater with hygrostat	120VAC, 50/60Hz	700W	65% RH, factory-set	UL File No. E234324



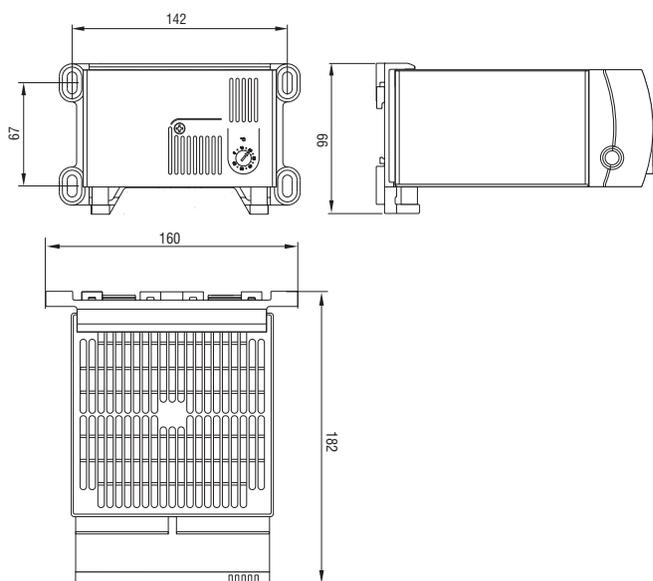
- **Compact design**
- **Double insulated**
- **Integrated thermostat or hygrostat**
- **Optional clip or screw fixing**

The compact high performance fan heater prevents formation of condensation and provides an evenly distributed interior air temperature in enclosures with electric/electronic components. The plastic enclosure provides double insulation and acts as protection against contact. The fan heater is available with integrated thermostat or pre-set hygrostat for temperature or humidity control. The CR 130 was designed as a stationary unit for wall fixing. For fixing on the bottom of the enclosure the fan heater CR 030 is recommended.

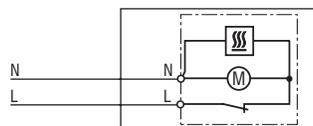


### Technical Data

<b>Heating element</b>	high performance cartridge
<b>Temperature safety cut-out</b>	to protect against overheating in case of fan failure
<b>Heater body</b>	extruded aluminium profile
<b>Axial fan, ball bearing</b>	airflow 160m <sup>3</sup> /h, free flow service life 50,000h at 25°C (77°F)
<b>Casing</b>	plastic according to UL94 V-0, black
<b>Connection</b>	2-pole max. 2.5mm <sup>2</sup> , clamping screw with strain relief, max. torque 0.8Nm
<b>Mounting</b>	clip for 35mm DIN rail, EN 50022 or screw fixing (M6)
<b>Fitting position</b>	horizontal
<b>Operating /Storage temperature</b>	0 to +60 °C (+32 to +140 °F) / -45 to +70 °C (-49 to +158 °F)
<b>Dimensions</b>	182 x 160 x 99mm
<b>Weight</b>	approx. 1.45kg
<b>Protection type / Protection class</b>	IP20 / II (earthed)
<b>Note</b>	other heating capacities from 200W up available on request



Connection diagram



Art. No.	Model	Operating voltage	Heating capacity	Setting range	Approvals
13051.0-00	Fan Heater with thermostat	230VAC, 50/60Hz	950W	0 to 60°C	VDE + UL File No. E234324
13051.0-02	Fan Heater with hygrostat	230VAC, 50/60Hz	950W	65% RH, factory-set	VDE + UL File No. E234324
13051.9-00	Fan Heater with thermostat	120VAC, 50/60Hz	700W	0 to 60°C	UL File No. E234324
13051.9-02	Fan Heater with hygrostat	120VAC, 50/60Hz	700W	65% RH, factory-set	UL File No. E234324



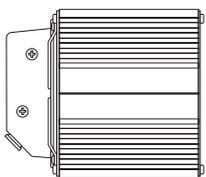
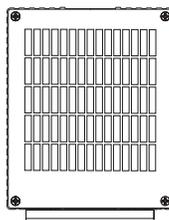
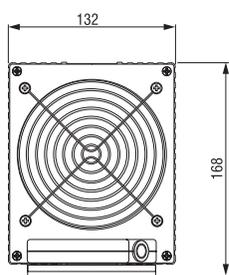
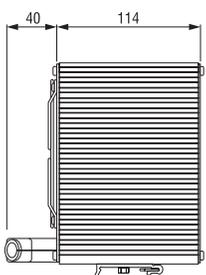
- Compact fan heater**
- High heating performance**
- Self-adjusting heating performance according to ambient temperature**
- Sturdy all-metal housing**
- Clip fixing**

Compact fan heater prevents formation of condensation. The integrated axial fan provides forced air circulation and so guarantees an even temperature in enclosures. A built-in temperature safety cut-out switches the heater off in the event of fan failure.

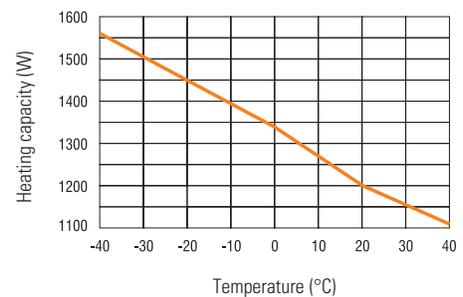


### Technical Data

<b>Heating element</b>	PTC resistor, self regulating and temperature limiting
<b>Inrush current</b>	max. 15A
<b>Axial fan, ball bearing</b>	airflow 165m³/h, free flow service life 50 000h at 25°C (77°F)
<b>Casing</b>	extruded aluminium profile, anodised
<b>Connection</b>	3-pole terminal for 2.5mm², clamping torque 0.8Nm
<b>Connection casing</b>	plastic according to UL94 V-0
<b>Mounting</b>	clip for 35mm DIN rail, EN50022
<b>Fitting position</b>	horizontal
<b>Operating/Storage temperature</b>	-45 to +60 °C (-49 to +140 °F)
<b>Dimensions</b>	154 x 132 x 168mm
<b>Weight</b>	approx. 1.60kg
<b>Protection type / Protection class</b>	IP20 / I (earthed)
<b>Approvals</b>	-



Heating capacity diagram / Ambient temperature CR 027



Art. No.	Operating voltage	Heating capacity*
03220.0-00	230-240VAC, 50/60Hz	1200W

\*at 20°C (68°F) ambient temperature



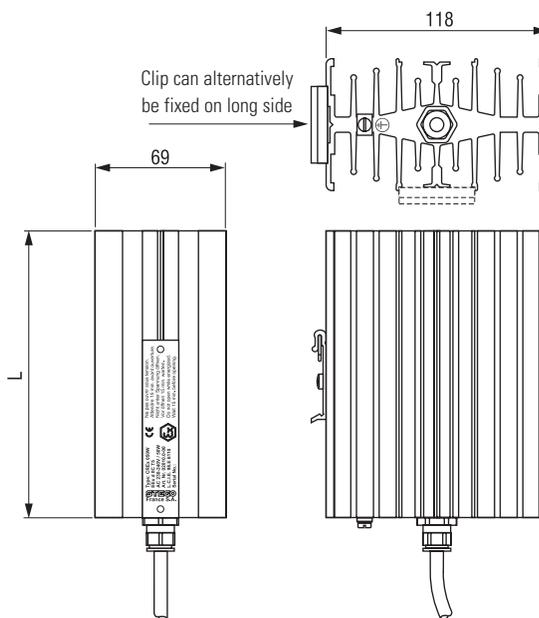
- Large convection surface**
- Clip fixing**
- Ready for use**
- Maintenance free**

Compact convection heater for use in areas with explosion hazard for prevention of formation of condensation, temperature fluctuations and for protection against frost in transmitter housings, switch cabinets and measuring equipment.



### Technical Data

<b>Explosion protection according to EN</b>	LCIE (Laboratoire Central des Industries Electriques)
<b>Conformity certificate</b>	LCIE 01 ATEX 6073
<b>Heating element</b>	high performance cartridge
<b>Heater body</b>	aluminium profile, black anodised
<b>Connection</b>	Si HF-JZ 3 x 0.75mm <sup>2</sup> cable, length 1m
<b>Connection PE</b>	4mm <sup>2</sup>
<b>Mounting</b>	clip for 35mm DIN rail, EN 50022
<b>Fitting position</b>	vertical
<b>Operating/Storage temperature</b>	-45 to +70°C (-49 to +158°F)
<b>Protection type / Protection class</b>	IP65 / I (earthed)



Art. No.	Operating voltage	Heating capacity	Ex protection type	Surface temperature	Length (L)	Weight (approx)
02010.0-00	230-240VAC	50W	II 2 GD, IP6x T100°C	100°C	150mm	1.30kg
02011.0-00	230-240VAC	100W	II 2 GD, IP6x T135°C	135°C	180mm	1.50kg
02010.0-01	110-120VAC	50W	II 2 GD, IP6x T100°C	100°C	150mm	1.30kg
02011.0-01	110-120VAC	100W	II 2 GD, IP6x T135°C	135°C	180mm	1.50kg



**Compact design**

**Set temperature**

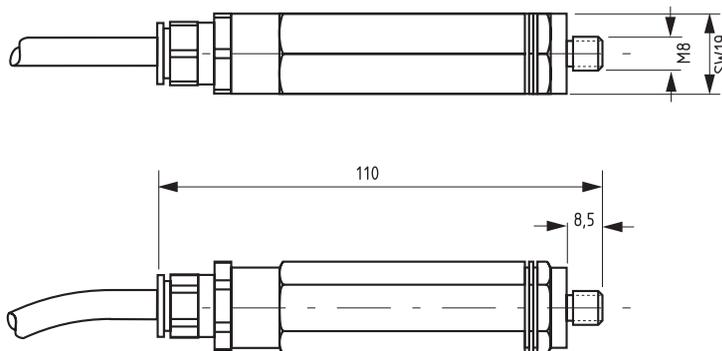
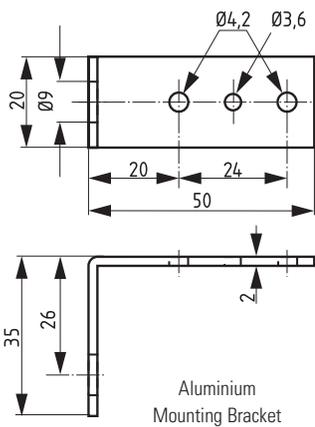
**High switching capacity**

Compact small mechanical thermostat for temperature regulation and monitoring of heaters, for example in transmitter cabinets, control panels and measuring equipment which are deployed in areas with explosion hazard. The special switch construction enables high response accuracy, small switch temperature difference and a very long service life. High switching performance allows direct control of the heaters.



### Technical Data

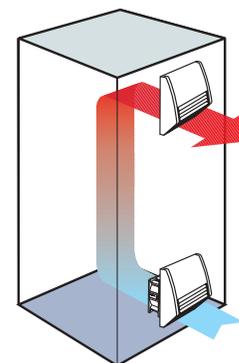
<b>Explosion proof according to EN</b>	LCIE (Laboratoire Central des Industries Electriques)
<b>Conformity certificate</b>	LCIE 01 ATEX 6074
<b>Sensor element</b>	thermostatic bimetal
<b>Contact type (1-pole)</b>	opens with rising temperature
<b>Service life</b>	> 100,000 cycles
<b>Max. Switching capacity</b>	250VAC, 4 (1) A
<b>Connection</b>	Si HF - JZ 3 x 0.75mm <sup>2</sup> , length 1m
<b>Mounting</b>	mounting bracket with nut M8 (see illustration)
<b>Casing</b>	aluminium, black anodised
<b>Dimensions</b>	length 110mm
<b>Weight</b>	approx. 0.20kg
<b>Fitting position</b>	variable
<b>Operating/Storage temperature</b>	-45 to +70°C (-49 to +158°F)
<b>Protection type / Protection class</b>	IP65 / I (earthed)



Art. No.	Ex protection type	Switch-off temperature	Switch temperature difference
01180.0-00	II 2 GD, IP6x T85°C	15°C (± 4K tolerance)	4K (± 1K tolerance)
01181.0-00	II 2 GD, IP6x T85°C	25°C (± 4K tolerance)	4K (± 1K tolerance)



- **Very low noise**
- **Minimal depth in enclosure**
- **Functional design**
- **Time-saving installation**



Enclosure air-conditioning using a filter fan and exit filter

Filter fans are used to provide an optimum climate in enclosures. The interior temperature of an enclosure can be reduced by channelling cooler filtered outside air into the enclosure thus expelling heated internal air. The resulting air flow prevents formation of localised hot pockets and protects the electronic components from overheating.



### Technical Data

<b>Axial fan, ball bearing</b>	service life min. 50,000h at 25°C/77°F (65% RH) fan body aluminium, rotor plastic
<b>Connection</b>	2 wires with pressure clamps 2.5mm², length 100mm
<b>Filter fan and exit filter casing</b>	Plastic according to UL94 V-0, light grey
<b>Mounting frame</b>	with double industrial adhesive band for fixing to the outside of enclosure; certain operating circumstances can make the additional use of screws necessary (see drilling template); included in the delivery of the filter fans is a template for the enclosure cut-out
<b>Filter mat</b>	G4 acc. to DIN EN 779, filtering degree 94%
<b>Filter material</b>	synthetic fibre with progressive construction, temperature resistant to 100°C, self-extinguishing class F1; moisture resistant to 100% RH, reusable – cleaning by washing or vacuuming
<b>Operating/Storage temperature</b>	-45 to +70°C (-49 to +158°F)
<b>Prot. Type / Protection class</b>	IP54* / I (earthed)

\*Using fine filter mats type F5 increases the protection type to IP55, but reduces the air volume.

### Special features

The **self-adhesive seal** of the mounting frame prevents dust and water from entering the cabinet.

**Functional design** of the intake and exit fan hoods very effectively prevents direct intrusion of falling water and dust. The advantage is that the filter mat does not get so quickly contaminated with dirt and thus does not need to be exchanged so often.

The **air channelling** makes the filter fan particularly quiet in operation.

Functional and **modern design** enables time-saving assembly and maintenance.

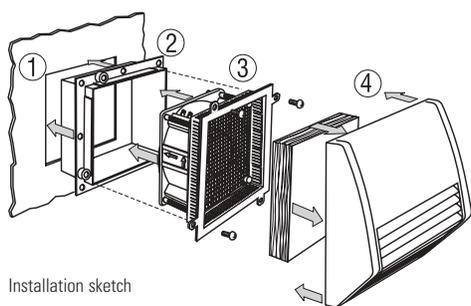
All filter fan models are also available with **integrated airflow monitor**.

### Time-saving assembly and maintenance

STEGO's filter fans are easily connected and installed **from outside** the cabinet.

- 1.) Make cut-out in the cabinet wall. The cut edge of the cabinet opening should be free of dirt, filings and grease. A template for the enclosure cut-out is included in the delivery of the filter fan.
- 2.) Remove protective film from the sealing strips on the mounting frame. Press mounting frame into the cabinet opening. The frame stays permanently in the cabinet.
- 3.) Electrically connect the axial fan using the clip connectors. Push the unit into the mounting frame. Fix using screws.
- 4.) Insert the filter mat in the hood. Clip on. Finished.

Cleaning and changing the filter mat is quickly done. To change the filter mat simply remove the filter hood, insert the new mat and snap the hood back again. No tools required. Assembly and maintenance can easily be carried out by one person from outside.



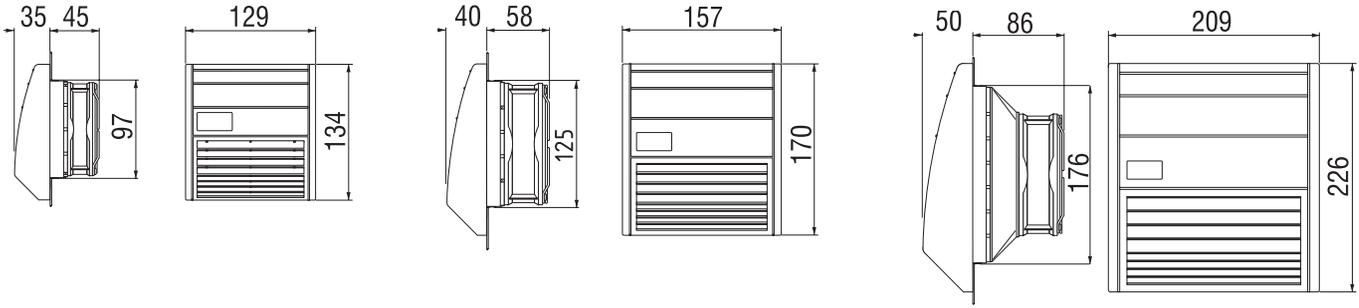
Installation sketch

### Filter Fan FF 018 Series

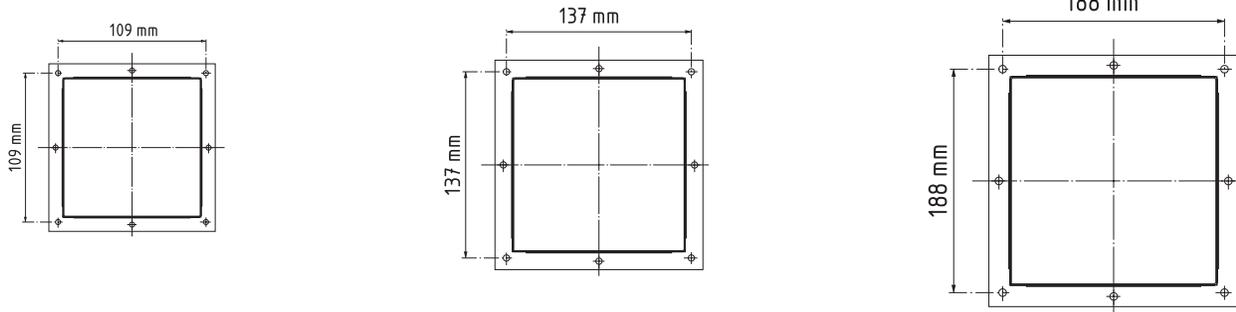
Art. No.	Operating voltage	Air volume, free flow	Air volume with exit filter	Current consumption	Power consumption	Average noise level (DIN EN ISO 4871)	Depth in enclosure	Enclosure cut-out	Weight (approx.)	Approvals
01800.0-00	230VAC, 50Hz	21m³/h	16m³/h	80mA	13W	31dB (A)	45mm	97 x 97mm + 0.4	0.60kg	VDE + UL File No. E234324
01801.0-00	230VAC, 50Hz	55m³/h	42m³/h	100mA	15W	40dB (A)	58mm	125 x 125mm + 0.4	1.00kg	VDE + UL File No. E234324
01802.0-00	230VAC, 50Hz	102m³/h	68m³/h	100mA	15W	39dB (A)	86mm	176 x 176mm + 0.4	1.30kg	VDE + UL File No. E234324
01800.0-01	120VAC, 50Hz	24m³/h	18m³/h	160mA	13W	31dB (A)	45mm	97 x 97mm + 0.4	0.60kg	UL File No. E234324
01801.0-01	120VAC, 50Hz	63m³/h	48m³/h	180mA	15W	40dB (A)	58mm	125 x 125mm + 0.4	1.00kg	UL File No. E234324
01802.0-01	120VAC, 50Hz	117m³/h	78m³/h	180mA	15W	39dB (A)	86mm	176 x 176mm + 0.4	1.30kg	UL File No. E234324

# Filter Fan FF 018 Series

## Dimensional Drawing



## Drilling template for mounting frame



## Exit Filter EF 118 Series

Art. No.	Depth in enclosure	Enclosure cut-out	Weight (approx.)	Filter mat	Protection type
11800.0-00	16mm	97 x 97mm + 0.4	0.30kg	G4 acc. to DIN EN 779, filtering degree 94%	IP54*
11801.0-00	16mm	125 x 125mm + 0.4	0.40kg	G4 acc. to DIN EN 779, filtering degree 94%	IP54*
11802.0-00	16mm	176 x 176mm + 0.4	0.60kg	G4 acc. to DIN EN 779, filtering degree 94%	IP54*

\*Using fine filter mats type F5 increases the protection type to IP55, but reduces the air volume.

## Filter Mats FM 086 / FFM 086

Filter mat	89 x 89mm	118 x 118mm	168 x 168mm
G4 (1 packing unit = 3 pcs.)	Art. No. 08600.0-00	Art. No. 08601.0-00	Art. No. 08602.0-00
F5 (1 packing unit = 3 pcs.)	Art. No. 08603.0-00	Art. No. 08604.0-00	Art. No. 08605.0-00

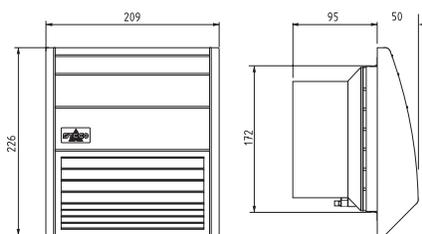
## Filter Fan with Airflow Monitor FFLC 218 (Normally Closed)



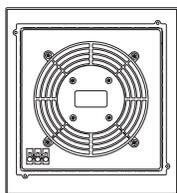
Airflow monitor integrated in protective grille of filter fan, e.g. Art. No. 21800.0-00

Art. No.	Operating voltage	Air volume, free flow	Air volume with exit filter	Current consumption	Power consumption	Average noise level (DIN EN ISO 4871)	Depth in enclosure	Enclosure cut-out	Weight (approx.)
21800.0-00	230VAC, 50Hz	21m³/h	16m³/h	80mA	13W	31dB (A)	45mm	97 x 97mm + 0.4	0.60kg
21801.0-00	230VAC, 50Hz	55m³/h	42m³/h	100mA	15W	40dB (A)	58mm	125 x 125mm + 0.4	1.00kg
21802.0-00	230VAC, 50Hz	102m³/h	68m³/h	100mA	15W	39dB (A)	86mm	176 x 176mm + 0.4	1.30kg
21800.0-01	120VAC, 50Hz	24m³/h	18m³/h	160mA	13W	31dB (A)	45mm	97 x 97mm + 0.4	0.60kg
21801.0-01	120VAC, 50Hz	63m³/h	48m³/h	180mA	15W	40dB (A)	58mm	125 x 125mm + 0.4	1.00kg
21802.0-01	120VAC, 50Hz	117m³/h	78m³/h	180mA	15W	39dB (A)	86mm	176 x 176mm + 0.4	1.30kg

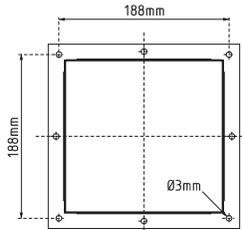
For technical data see Airflow Monitor LC 013/LCF 013 (Normally Closed, Normally Open)



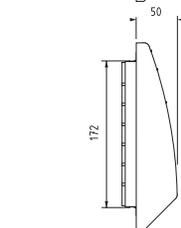
Filter Fan



View from rear



Drilling template for mounting frame



Exit filter



Airflow monitor integrated in protective grille of filter fan, e.g. Art. No. 21804.0-00

- **Low maintenance**
- **High through-flow air volume**
- **Functional design**
- **Time-saving installation**

Filter fans are used to provide an optimum climate in enclosures. The interior temperature of an enclosure can be reduced by channelling cooler filtered outside air into the enclosure thus expelling heated internal air. The resulting air flow prevents formation of localised hot pocket and protects the electronic components from overheating.



### Technical Data

<b>Axial fan, ball bearing</b>	service life min. 50,000h at 25°C/77°F (65% RH) fan body aluminium, rotor metal
<b>Connection</b>	3-pole clamp for 2.5mm <sup>2</sup> , clamping torque 0.8Nm
<b>Filter fan and exit filter casing</b>	plastic according to UL94 V-0, light grey
<b>Mounting frame</b>	with double industrial adhesive band for fixing to the outside of enclosure; certain operating circumstances can make the additional use of screws necessary (see drilling template); included in the delivery of the filter fans is a template for the enclosure cut-out
<b>Filter mat</b>	G4 acc. to DIN EN 779, filtering degree 94%
<b>Filter material</b>	synthetic fibre with progressive construction, temperature resistant to 100°C, self-extinguishing class F1; moisture resistant to 100% RH, reusable – cleaning by washing or vacuuming
<b>Operating/Storage temperature</b>	-45 to +70°C (-49 to +158°F)
<b>Prot. Type / Protection class</b>	IP54* / I (earthed)

\*Using fine filter mats type F5 increases the protection type to IP55, but reduces the air volume.

### Filter Fan FF 018 Series

Art. No.	Operating voltage	Air volume, free flow	Air volume with exit filter	Current consumption	Power consumption	Average noise level (DIN EN ISO 4871)	Depth in enclosure	Enclosure cut-out	Weight (approx.)	Approvals
01804.0-00	230VAC, 50Hz	200m <sup>3</sup> /h	125m <sup>3</sup> /h	320mA	45W	52dB (A)	95mm	176 x 176mm + 0.4	1.70kg	UL File No. E234324
01804.0-01	120VAC, 50Hz	230m <sup>3</sup> /h	143m <sup>3</sup> /h	470mA	39W	52dB (A)	95mm	176 x 176mm + 0.4	1.70kg	UL File No. E234324

### Exit Filter EF 118 Series

Art. No.	Depth in enclosure	Enclosure cut-out	Weight (approx.)	Filter mat	Protection type
11802.0-00	16mm	176 x 176mm + 0.4	0.60kg	G4 acc. to DIN EN 779, filtering degree 94%	IP54*

\*Using fine filter mats type F5 increases the protection type to IP55, but reduces the air volume.

### Filter Mats FM 086 / FFM 086

Filter mat	168 x 168mm
G4 (1 packing unit = 3 pcs.)	Art. No. 08602.0-00
F5 (1 packing unit = 3 pcs.)	Art. No. 08605.0-00

### Filter Fan with Airflow Monitor FFLC 218 (Normally Closed)

Art. No.	Operating voltage	Air volume, free flow	Air volume with exit filter	Current consumption	Power consumption	Average noise level (DIN EN ISO 4871)	Depth in enclosure	Enclosure cut-out	Weight (approx.)
21804.0-00	230VAC, 50Hz	200m <sup>3</sup> /h	125m <sup>3</sup> /h	320mA	45W	52dB (A)	95mm	176 x 176mm + 0.4	1.70kg
21804.0-01	120VAC, 50Hz	230m <sup>3</sup> /h	143m <sup>3</sup> /h	470mA	39W	52dB (A)	95mm	176 x 176mm + 0.4	1.70kg

For technical data see Airflow Monitor LC 013/LCF 013 (Normally Closed, Normally Open)



- Very low noise**
- Minimal depth in enclosure**
- High through-flow air volume**
- Uniform air circulation**
- High reliability**

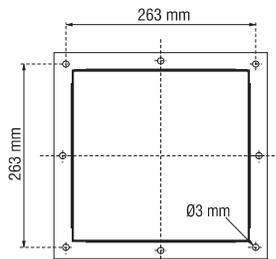
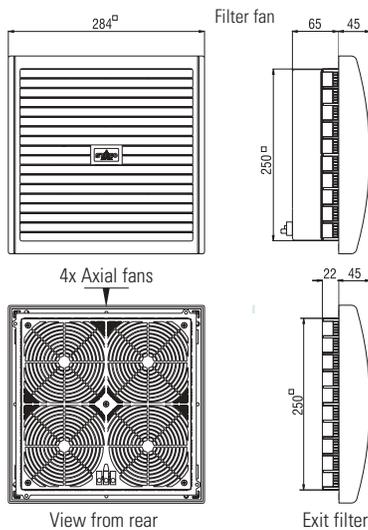
Filter fans are used to provide an optimum climate in enclosures. The interior temperature of an enclosure can be reduced by channelling cooler filtered outside air into the enclosure thus expelling heated internal air. The resulting air flow prevents formation of localised hot pocket and protects the electronic components from overheating. **Four integrated axial fans** provide a particularly high and uniform air circulation thus contributing to higher reliability.



### Technical Data

<b>Axial fan, ball bearing</b>	service life min. 50,000h at 25°C/77°F (65% RH) fan body aluminium, rotor plastic
<b>Connection</b>	3-pole clamp for 2.5mm <sup>2</sup> , clamping torque 0.8Nm
<b>Filter fan and exit filter casing</b>	plastic according to UL94 V-0, light grey
<b>Mounting frame</b>	with double industrial adhesive band for fixing to the outside of enclosure; certain operating circumstances can make the additional use of screws necessary (see drilling template); included in the delivery of the filter fans is a template for the enclosure cut-out
<b>Filter mat</b>	G4 acc. to DIN EN 779, filtering degree 94%
<b>Filter material</b>	synthetic fibre with progressive construction, temperature resistant to 100°C, self-extinguishing class F1; moisture resistant to 100% RH, reusable – cleaning by washing or vacuuming
<b>Operating/Storage temperature</b>	-45 to +70°C (-49 to +158°F)
<b>Prot. Type / Protection class</b>	IP54* / I (earthed)

\*Using fine filter mats type F5 increases the protection type to IP55, but reduces the air volume.



Drilling template for mounting frame

### Filter Fan FF 018 Series

Art. No.	Operating voltage	Air volume, free flow	Air volume with exit filter	Current consumption	Power consumption	Average noise level (DIN EN ISO 4871)	Depth in enclosure	Enclosure cut-out	Weight (approx.)	Approvals
01803.0-00	230VAC, 50Hz	300m <sup>3</sup> /h	230 m <sup>3</sup> /h	400 mA	60W	53dB (A)	65mm	250 x 250mm + 0.4	3.30kg	UL File No. E234324
01803.0-01	120VAC, 50Hz	345m <sup>3</sup> /h	264 m <sup>3</sup> /h	700 mA	60W	53dB (A)	65mm	250 x 250mm + 0.4	3.30kg	UL File No. E234324

### Exit Filter EF 118 Series

Art. No.	Depth in enclosure	Enclosure cut-out	Weight (approx.)	Filter mat	Protection type
11803.0-00	22mm	250 x 250mm + 0.4	1.00kg	G4 acc. to DIN EN 779, filtering degree 94%	IP54*

\*Using fine filter mats type F5 increases the protection type to IP55, but reduces the air volume.

### Filter Mats FM 086 / FFM 086

Filter mat	247 x 247mm
G4 (1 packing unit = 3 pcs.)	Art. No. 08608.0-00
F5 (1 packing unit = 3 pcs.)	Art. No. 08609.0-00



### High through-flow air volume

### Functional design

### Time-saving installation

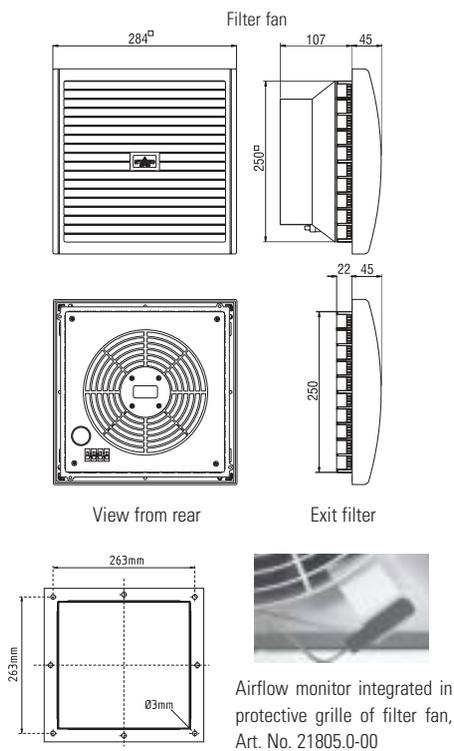
Filter fans are used to provide an optimum climate in enclosures. The interior temperature of an enclosure can be reduced by channelling cooler filtered outside air into the enclosure thus expelling heated internal air. The resulting air flow prevents formation of localised hot pocket and protects the electronic components from overheating. The high-performance axial fan provides high air circulation.



### Technical Data

<b>Axial fan, ball bearing</b>	service life min. 50,000h at 25°C/77°F (65% RH) fan body aluminium, rotor metal
<b>Connection</b>	3-pole clamp for 2.5mm <sup>2</sup> , clamping torque 0.8Nm
<b>Filter fan and exit filter casing</b>	plastic according to UL94 V-0, light grey
<b>Mounting frame</b>	with double industrial adhesive band for fixing to the outside of enclosure; certain operating circumstances can make the additional use of screws necessary (see drilling template); included in the delivery of the filter fans is a template for the enclosure cut-out
<b>Filter mat</b>	G4 acc. to DIN EN 779, filtering degree 94%
<b>Filter material</b>	synthetic fibre with progressive construction, temperature resistant to 100°C, self-extinguishing class F1; moisture resistant to 100% RH, reusable – cleaning by washing or vacuuming
<b>Operating/Storage temperature</b>	-45 to +70°C (-49 to +158°F)
<b>Prot. Type / Protection class</b>	IP54* / I (earthed)

\*Using fine filter mats type F5 increases the protection type to IP55, but reduces the air volume.



Drilling template for mounting frame

### Filter Fan FF 018 Series

Art. No.	Operating voltage	Air volume, free flow	Air volume with exit filter	Current consumption	Power consumption	Average noise level (DIN EN ISO 4871)	Depth in enclosure	Enclosure cut-out	Weight (approx.)	Approvals
01805.0-00	230VAC, 50Hz	550m <sup>3</sup> /h	300m <sup>3</sup> /h	300mA	64W	65dB (A)	107mm	250 x 250mm + 0.4	2.70kg	UL File No. E234324
01805.0-01	120VAC, 50Hz	632m <sup>3</sup> /h	345m <sup>3</sup> /h	780mA	85W	65dB (A)	107mm	250 x 250mm + 0.4	2.70kg	UL File No. E234324

### Exit Filter EF 118 Series

Art. No.	Depth in enclosure	Enclosure cut-out	Weight (approx.)	Filter mat	Protection type
11803.0-00	22mm	250 x 250mm + 0.4	1.00kg	G4 acc. to DIN EN 779, filtering degree 94%	IP54*

\*Using fine filter mats type F5 increases the protection type to IP55, but reduces the air volume.

### Filter Mats FM 086 / FFM 086

Filter mat	247 x 247mm
G4 (1 packing unit = 3 pcs.)	Art. No. 08608.0-00
F5 (1 packing unit = 3 pcs.)	Art. No. 08609.0-00

### Filter Fan with Airflow Monitor FFLC 218 (Normally Closed)

Art. No.	Operating voltage	Air volume, free flow	Air volume with exit filter	Current consumption	Power consumption	Average noise level (DIN EN ISO 4871)	Depth in enclosure	Enclosure cut-out	Weight (approx.)
21805.0-00	230VAC, 50Hz	550m <sup>3</sup> /h	300m <sup>3</sup> /h	300mA	64W	65dB (A)	107mm	250 x 250mm + 0.4	2.70kg
21805.0-01	120VAC, 50Hz	632m <sup>3</sup> /h	345m <sup>3</sup> /h	780mA	85W	65dB (A)	107mm	250 x 250mm + 0.4	2.70kg

For technical data see Airflow Monitor LC 013/LCF 013 (Normally Closed, Normally Open)

# Outdoor Filter Fan FF 018 Series



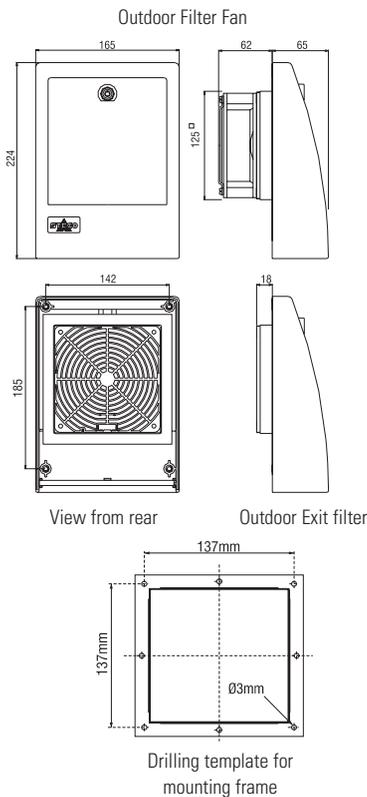
- Filter changeable from outside**
- Safe, lockable**
- Impact resistant**
- Weather proof**

The outdoor filter fan can be used in outdoor enclosures where warm air has to be dissipated on account of increased thermic development. To clean and exchange the filter mat, it is only necessary to open the lockable door of the outdoor hood. A protection type of IP55 is achieved due to the special design of the hood and the use of fine filter mats. The plastic casing is impact resistant, highly weather proof and resistant to UV light.



## Technical Data

<b>Axial fan, ball bearing</b>	service life min. 50,000h at 25°C/77°F (65% RH) fan body aluminium, rotor plastic
<b>Connection</b>	2 wires with pressure clamps 2.5mm <sup>2</sup> , length 100mm
<b>Filter fan and exit filter casing</b>	casing material high impact plastic ASA, light grey burning behaviour according to UL94 H-B; high resistance to weather and UV
<b>Mounting frame</b>	with double industrial adhesive band for fixing to the outside of enclosure; certain operating circumstances can make the additional use of screws necessary (see drilling template); included in the delivery of the filter fans is a template for the enclosure cut-out.
<b>Filter mat</b>	F5 acc. to DIN EN 779, filtering degree 98%
<b>Filter material</b>	synthetic fibre with progressive construction, temperature resistant to 100°C, self-extinguishing class F1; moisture resistant to 100% RH
<b>Operating/Storage temperature</b>	-45 to +70°C (-49 to +158°F)
<b>Protection type</b>	IP55
<b>Protection class</b>	I (earthed)
<b>Approvals</b>	UL File No. E234324



The hood is fixed permanently to the enclosure from the inside using screws. Filter mats can be easily changed from outside the enclosure through the lockable door in the hood.

## Outdoor Filter Fan FF 018 Series

Art. No.	Operating voltage	Air volume, free flow	Current consumption	Power consumption	Average noise level (DIN EN ISO 4871)	Depth in enclosure	Enclosure cut-out	Weight (approx.)
01821.0-00	230VAC, 50Hz	20m <sup>3</sup> /h	100mA	15W	40dB (A)	62mm	125 x 125mm + 0.4	1.20kg
01821.0-02	120VAC, 60Hz	23m <sup>3</sup> /h	180mA	15W	40dB (A)	62mm	125 x 125mm + 0.4	1.20kg

## Exit Filter EF 118 Series

Art. No.	Depth in enclosure	Enclosure cut-out	Weight (approx.)	Filter mat	Protection type
11821.0-00	16mm	125 x 125mm + 0.4	0.60kg	F5 acc. to DIN EN 779, filtering degree 98%	IP55

## Filter Mats FFM 086

Filter mat	122 x 122mm
F5 (1 packing unit =3 pcs.)	Art. No. 08607.0-00



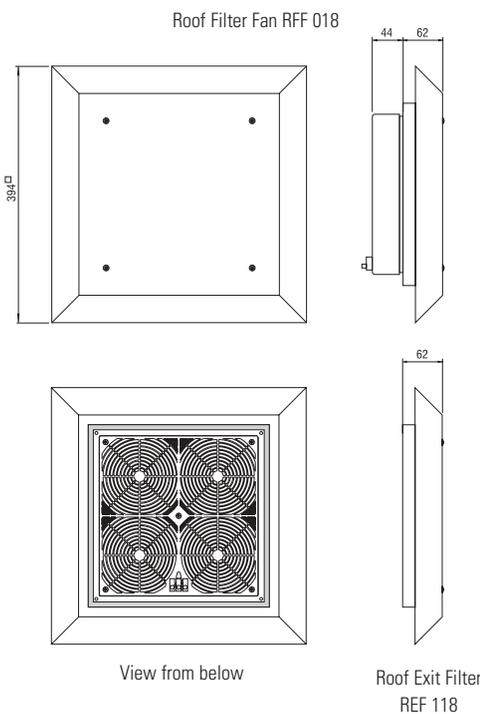
- Very low noise**
- Minimal depth in enclosure**
- High through-flow air volume**
- Uniform air circulation**
- High reliability**
- Time-saving installation**

Roof filter fans and roof exit filters find use in enclosures, from which warm air has to be diverted due to increased heat development. The ready-to-connect and low-noise roof filter fan, which houses **four axial fans**, is used to expel warm air from within the enclosure which has been generated by the stray power of the components. The roof exit filter provides passive ventilation.

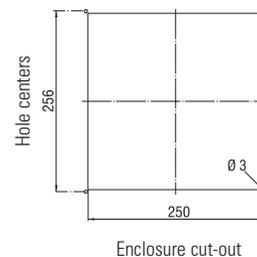


### Technical Data

<b>Axial fans, ball bearing</b>	service life 50,000h at 25°C/77°F (65% RH) fan body aluminium, rotor plastic
<b>Connection</b>	3-pole clamp for 2.5mm <sup>2</sup>
<b>Casing</b>	plastic acc. to UL94 V-0/lacquered steel sheet, light grey
<b>Filter mat</b>	G3 acc. to DIN EN 779, filtering degree 85%
<b>Filter material</b>	synthetic fibre with progressive construction, temperature resistant to 100°C, self-extinguishing class F1; moisture resistant to 100% RH, reusable – cleaning by washing or vacuuming
<b>Operating/Storage temperature</b>	-45 to +70°C (-49 to +158°F)
<b>Protection type</b>	IP54 (with filter mat) / IP33 (without filter mat)
<b>Protection class</b>	I (earthed)
<b>Approvals</b>	UL File No. E234324



**Important note:** For reasons of pressure compensation the roof filter fan must always be operated in combination with another filter fan (e.g. Art. No. 01803.0-00) or a passive intake filter (e.g. Art. No. 11803.0-00).



### Roof Filter Fan RFF 018 Series

Art. No.	Operating voltage	Air volume, free flow	Air volume, free flow	Current consumption	Power consumption	Average noise level (DIN EN ISO 4871)	Depth in enclosure	Enclosure cut-out	Weight (approx.)
01850.0-00	230VAC, 50Hz	350m <sup>3</sup> /h (w/ filter mat G3)	500m <sup>3</sup> /h (w/o filter mat)	400mA	60W	55db (A)	44mm	250 x 250mm + 0.4	4.40kg
01850.0-01	120VAC, 60Hz	402m <sup>3</sup> /h (w/ filter mat G3)	575m <sup>3</sup> /h (w/o filter mat)	700mA	60W	55db (A)	44mm	250 x 250mm + 0.4	4.40kg

### Roof Exit Filter REF 118 Series

Art. No.	Depth in enclosure	Enclosure cut-out	Weight (approx.)	Filter mat	Protection type
11850.0-00	none	250 x 250mm + 0.4	2.00kg	G3 acc. to DIN EN 779, filtering degree 85%	IP54 (w/ filter mat)

### Filter Mats FM 086

Filter mat	282 x 282 mm
(1 packing unit = 3 pcs.)	Art. No. 08613.0-00

# High-performance 19" Fan Tray LE 019 Series

- **High air output**
- **Long service life**
- **Ball bearing fans**
- **Ready for connection**
- **Optical function indicator**



Compact high performance fan tray for enforced circulation of air in switch and server enclosures and for concerted cooling of 19" component groups. Natural convection is improved and the formation of localised hot pockets is avoided. Also available with integrated thermostat (see photo).



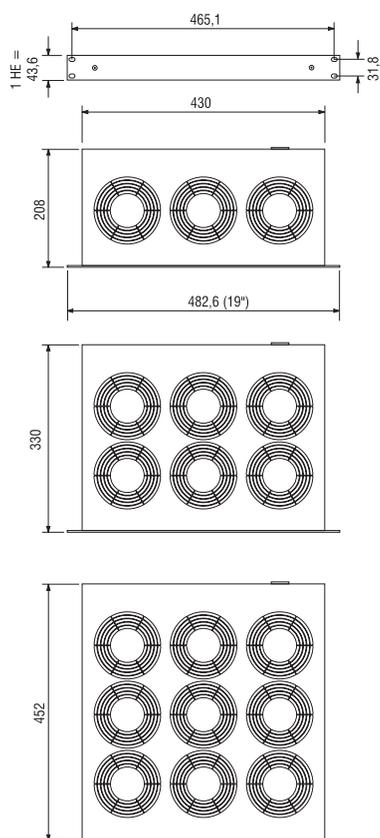
## Technical Data

<b>Axial fans, ball bearing</b>	service life 50,000h at 25°C (65% RH) fan body aluminium, rotor plastic
<b>Material</b>	front panel aluminium, bright anodised casing steel sheet, electrogalvanized
<b>Optical indicator</b>	integrated in front panel
<b>Connection</b>	appliance power inlet on rear of casing, plug included
<b>Fitting position</b>	horizontal (direction of air upwards)
<b>Operating/Storage temperature</b>	-45 to +70°C (-49 to +158°F)
<b>Protection type</b>	IP20
<b>Protection class</b>	I (earthed)
<b>Approvals</b>	UL File No. E234324

### Note

We recommend using the fan tray without integrated thermostat in combination with our dual thermostat (ZR 011 Art. No. 01176.0-00) for regulating temperature in electronic enclosures and for protection against overheating due to possible fan failure. The dual thermostat regulates the operation of the fan tray and – when connected to a signal device – also triggers an early warning if the enclosure interior temperature rises above a set limit.

When using a fan tray with integrated thermostat, the use of an additional thermostat (KTS 011 Art. No. 01141.0-00) provides the extra safety of activating a signal device.



Art. No.	Model	No. of fans	Operating voltage	Air flow, free flow	Current consumption	Average noise level (DIN EN ISO 4871)	Speed (rpm <sup>-1</sup> )	Impact pressure	Weight (approx.)
01930.0-00	without thermostat	3	230VAC, 50Hz	486m <sup>3</sup> /h	45W	55 db (A)	2600 min <sup>-1</sup> (50Hz)	74Pa	3.00kg
01930.1-00	with thermostat 0 to 60°C	3	230VAC, 50Hz	486m <sup>3</sup> /h	45W	55 db (A)	2600 min <sup>-1</sup> (50Hz)	74Pa	3.40kg
01940.0-00	without thermostat	6	230VAC, 50Hz	972m <sup>3</sup> /h	90W	57 db (A)	2600 min <sup>-1</sup> (50Hz)	74Pa	5.30kg
01940.1-00	with thermostat 0 to 60°C	6	230VAC, 50Hz	972m <sup>3</sup> /h	90W	57 db (A)	2600 min <sup>-1</sup> (50Hz)	74Pa	5.70kg
01950.0-00	without thermostat	9	230VAC, 50Hz	1458m <sup>3</sup> /h	135W	58 db (A)	2600 min <sup>-1</sup> (50Hz)	74Pa	7.80kg
01950.1-00	with thermostat 0 to 60°C	9	230VAC, 50Hz	1458m <sup>3</sup> /h	135W	58 db (A)	2600 min <sup>-1</sup> (50Hz)	74Pa	7.90kg
01931.0-00	without thermostat	3	120VAC, 60Hz	576m <sup>3</sup> /h	45W	55 db (A)	2900 min <sup>-1</sup> (60Hz)	88Pa	3.00kg
01931.1-00	with thermostat 0 to 60°C	3	120VAC, 60Hz	576m <sup>3</sup> /h	45W	55 db (A)	2900 min <sup>-1</sup> (60Hz)	88Pa	3.40kg
01941.0-00	without thermostat	6	120VAC, 60Hz	1152m <sup>3</sup> /h	90W	57 db (A)	2900 min <sup>-1</sup> (60Hz)	88Pa	5.30kg
01941.1-00	with thermostat 0 to 60°C	6	120VAC, 60Hz	1152m <sup>3</sup> /h	90W	57 db (A)	2900 min <sup>-1</sup> (60Hz)	88Pa	5.70kg
01951.0-00	without thermostat	9	120VAC, 60Hz	1728m <sup>3</sup> /h	135W	58 db (A)	2900 min <sup>-1</sup> (60Hz)	88Pa	7.80kg
01951.1-00	with thermostat 0 to 60°C	9	120VAC, 60Hz	1728m <sup>3</sup> /h	135W	58 db (A)	2900 min <sup>-1</sup> (60Hz)	88Pa	7.90kg

# Airflow Monitor LC 013 / LCF 013 for higher reliability

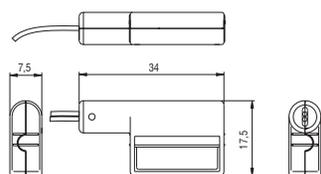
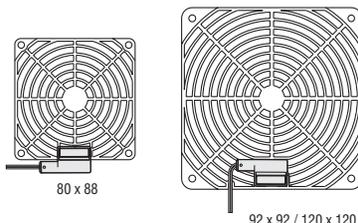


Photo enlarged

## Application:

The LC 013 is used as a signal contact to monitor fans or filter fans in stationary, self-contained Protection Class I enclosures. It can be connected to monitoring systems with remote control or can directly switch alarm devices, such as LED's or signal lamps. Loads with capacities exceeding the indicated switching capacity must be switched via a relay, e.g. our electronic relay SM 010. The airflow monitor with NC contact closes upon loss of air movement, i.e. it indicates fan failure (e.g. red signal lamp). The NO contact closes when fan is in operation and serves as optical function display (e.g. green signal lamp).

Airflow monitor integrated in protective grille



## Mechanical switch contact

## Versatile fields of application

## Small size

## Easy to connect

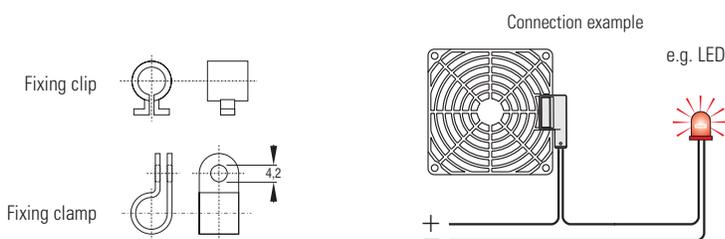
The airflow monitor (NC/NO) is designed to indicate the loss of air movement of a fan or filter fan. The contact detects the loss of air movement caused by fan failure or blocked filter media regardless of direction of air. Its simple mechanical operation makes it a viable alternative to electronic monitoring systems.



## Technical Data

<b>Contact type</b>	reed / magnet contact
<b>Normally Closed (NC)</b>	switch contact open when air is flowing
<b>Normally Open (NO)</b>	switch contact closed when air is flowing
<b>Max. switching capacity</b>	10W (resistive load)
<b>Max. switching voltage</b>	NC: 240VDC (UL), 240V AC/DC (VDE) / NO: 60VDC
<b>Max. switching current</b>	NC: DC 500mA / NO: DC 170mA
<b>Switching threshold of airflow velocity</b>	> 2.5m/s (hysteresis: > 1m/s)
<b>Max. airflow velocity</b>	50m/s
<b>Contact resistance</b>	< 370mOhm (with wire)
<b>Max. air humidity</b>	70% RH (not precipitating)
<b>Service life</b>	> 100,000 cycles
<b>Connection</b>	2 x single strand AWG 26, length 500 mm, tip of stranded wire 5mm stripped and tinned (NC: black, NO: blue)
<b>Mounting</b>	alternatively integrated in protective grille (see table), mounting clamp or mounting clip
<b>Casing</b>	plastic according to UL94-HB, black
<b>Fitting position</b>	bidirectional tab perpendicular to airflow
<b>Operating/Storage temperature</b>	-20 to +50 °C (-4 to +122 °F) / -20 to +80°C (-4 to +176°F)
<b>Protection type</b>	IP20
<b>Approvals</b>	VDE + UL File No. E250507

Note: The product of switching voltage and switching current must not exceed 10W. The max. voltage and max. current must not be exceeded, not even short-term (voltage/current peaks). The resulting voltage and current peaks of inductive or capacitive loads must be restricted by a contact protection circuit.



## Installation notes:

1. The airflow monitor must not be installed in the impact range of permanent magnets or ferrous metals as the built-in permanent magnet will move unintentionally and consequently can not move in dependence with the air flow.
2. A suitable distance from electromagnetic fields, e.g. generated by transformers, motors, etc., must be maintained as otherwise the contact may switch incorrectly with the frequency of the power supply. Interferences must be checked with an oscillograph and the mounting position of the airflow monitor should be adjusted if necessary.
3. Avoid installing the airflow monitors in areas where air pockets or turbulence can be expected.
4. Ambient air with a high dust content should be avoided.

As there are many different conditions of use, suitability of this product must be assessed by the end user in its final application.

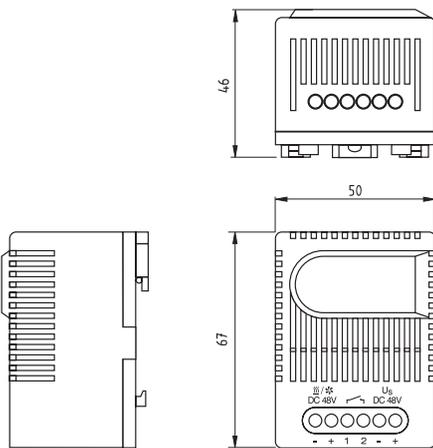
Description	Art. No. (NC)	Art. No. (NO)	Dimensions	Weight (approx.)
Airflow monitor with mounting clamp and mounting clip LC 013	01300.0-00	01300.1-00	34 x 17.5 x 7.5mm	5g
Airflow monitor integrated in protective grille (plastic) LCF 013	01301.0-00	01301.1-00	80 x 88 x 10.5mm	20g
	01302.0-00	01302.1-00	92 x 92 x 10mm	20g
	01303.0-00	01303.1-00	120 x 120 x 10mm	30g

# Electronic Relay SM 010 (24VDC + 48VDC)



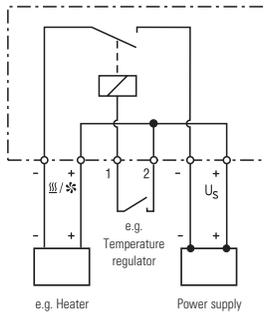
- High DC switching capacity**
- Variety of applications**
- Compact design**
- Simple connection**
- Clip fixing**

Electronic relay for switching DC appliances with high switching capacity. A separate conventional switch contact is used as controller (e.g. temperature regulator, humidity regulator). The electronic relay is available in 24VDC and 48VDC versions.



## Technical Data

<b>Contact type</b>	contact maker, normally open (Relay/MOSFET)
<b>Contact resistance</b>	< 10mOhm
<b>Service life</b>	> 100,000 cycles
<b>EMC</b>	acc. to EN 55014-1-2, EN 61000-3-2, EN 61000-3-3
<b>Connection</b>	6-pole terminal for 2.5mm <sup>2</sup> , clamping torque 0.8Nm
<b>Mounting</b>	clip for 35mm DIN rail, EN50022
<b>Casing</b>	plastic according to UL94 V-0, light grey
<b>Dimensions</b>	67 x 50 x 46mm
<b>Weight</b>	approx. 85g
<b>Fitting position</b>	variable
<b>Operating/Storage temperature</b>	-45 to +70°C (-49 to +158°F)
<b>Protection type</b>	IP20
<b>Approvals</b>	VDE and UL intended



**Load**, e.g. heater, cooling device with temperature cut-out

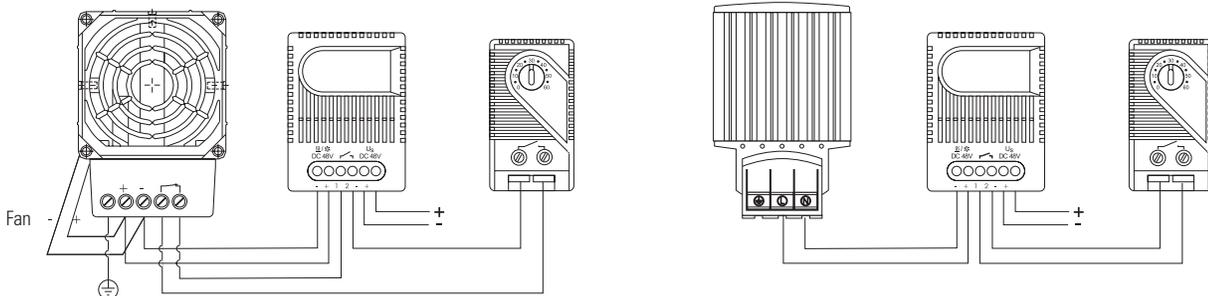
**SM 010 Electronic relay**

**Control contact**, e.g. temperature, humidity or pressure regulator

**Load**, e.g. heater, cooling device without temperature cut-out

**SM 010 Electronic relay**

**Control contact**, e.g. temperature, humidity or pressure regulator



Art. No.	Operating voltage	Max. Switching capacity
01001.0-00	24VDC (20-28VDC)	28VDC 16A
01000.0-00	48VDC (38-56VDC)	56VDC 16A

# Small, compact Thermostat KTO 011 / KTS 011



- **Large setting range**
- **Small size**
- **Simple to mount**
- **High switching performance**

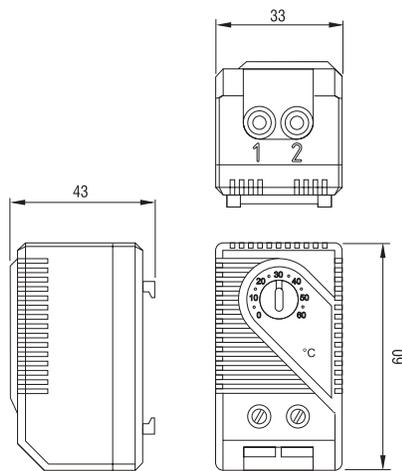
KTO 011: Thermostat (normally closed); contact breaker for regulating heaters.

KTS 011: Thermostat (normally open); contact maker for regulating of filter fans and heat exchangers or for switching signal devised when temperature limit has been exceeded.



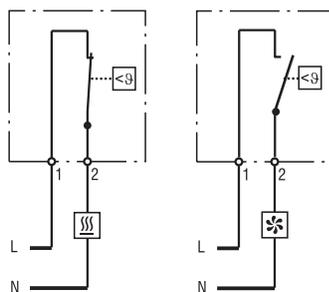
### Technical Data

<b>Switch temperature difference</b>	7K (± 4K tolerance)
<b>Sensor element</b>	thermostatic bimetal
<b>Contact type</b>	snap-action contact
<b>Contact resistance</b>	< 10mOhm
<b>Service life</b>	> 100,000 cycles
<b>Max. Switching capacity</b>	250VAC, 10 (2) A 120VAC, 15 (2) A DC 30W
<b>EMC</b>	acc. to EN 55014-1-2, EN 61000-3-2, EN 61000-3-3
<b>Connection</b>	2-pole terminal for 2.5mm <sup>2</sup> , clamping torque 0.8Nm
<b>Mounting</b>	clip for 35mm DIN rail, EN50022 (or for exit filter EF 118 Series)
<b>Casing</b>	plastic according to UL94 V-0, light grey
<b>Dimensions</b>	60 x 33 x 43mm
<b>Weight</b>	approx. 40g
<b>Fitting position</b>	variable
<b>Operating/Storage temperature</b>	-20 to +80 °C (-4 to +176 °F) / -45 to +80 °C (-49 to +176 °F)
<b>Protection type</b>	IP20

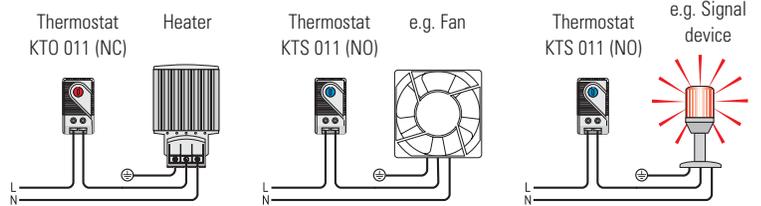


Thermostat KTO 011 (NC)

Thermostat KTS 011 (NO)



Example of connection



Example of connection

Setting range	Art. No. Contact Breaker (NC)	Art. No. Contact Maker (NO)	Approvals
0 to +60°C	01140.0-00	01141.0-00	VDE
-10 to +50°C	01142.0-00	01143.0-00	VDE
+20 to +80°C	01159.0-00	01158.0-00	VDE
+32 to +140°F	01140.9-00	01141.9-00	UL File No. E164102
+14 to +122°F	01142.9-00	01143.9-00	UL File No. E164102
0 to +60°C	01146.9-00	01147.9-00	UL File No. E164102



- NO and NC in one casing**
- Separate adjustable temperatures**
- High switching capacity**
- Terminals easily accessible**
- Clip fixing**

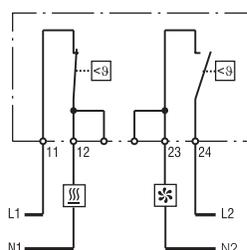
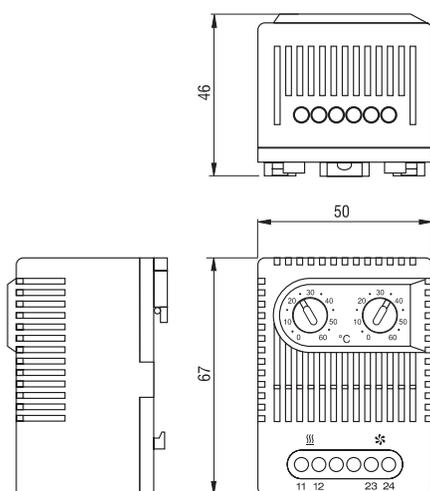
Two thermostats in one casing:  
 Thermostat (contact breaker, normally closed) for regulating heaters.  
 Thermostat (contact maker, normally open) for regulating filter fans and heat exchangers or switching signal devices when temperature limit has been exceeded.

Heaters and cooling equipment can be switched independently from each other with a temperature offset as opposed to the usual change-over contacts.



### Technical Data

<b>Switch temperature difference</b>	7K (± 4K tolerance)
<b>Sensor element</b>	thermostatic bimetal
<b>Contact type</b>	snap-action contact
<b>Contact resistance</b>	< 10mOhm
<b>Service life</b>	> 100,000 cycles
<b>Max. Switching capacity</b>	250VAC, 10 (2) A 120VAC, 15 (2) A DC 30W
<b>EMC</b>	acc. to EN 55014-1-2, EN 61000-3-2, EN 61000-3-3
<b>Connection</b>	4-pole terminal for 2.5mm <sup>2</sup> , clamping torque 0.8Nm
<b>Mounting</b>	clip for 35mm DIN rail, EN50022
<b>Casing</b>	plastic according to UL94 V-0, light grey
<b>Dimensions</b>	67 x 50 x 46mm
<b>Weight</b>	approx. 90g
<b>Fitting position</b>	variable
<b>Operating/Storage temperature</b>	-20 to +80 °C (-4 to +176 °F) / -45 to +80 °C (-49 to +176 °F)
<b>Protection type</b>	IP20
<b>Approvals</b>	UL File No. E164102



Load 1: Heater  
 Load 2: Filter fan, Cooling equipment, Signal device

Art. No.	Setting Range		Setting Range	
	Setting	Range	Setting	Range
01172.0-00	contact breaker, normally closed	0 to +60°C	contact maker, normally open	0 to +60°C
01172.0-01	contact breaker, normally closed	+32 to +140°F	contact maker, normally open	+32 to +140°F
01175.0-00	contact breaker, normally closed	-10 to +50°C	contact maker, normally open	+20 to +80°C
01175.0-01	contact breaker, normally closed	+14 to +122°F	contact maker, normally open	+68 to +176°F
01176.0-00*	contact maker, normally open	0 to +60°C	contact maker, normally open	0 to +60°C
01176.0-01*	contact maker, normally open	+32 to +140°F	contact maker, normally open	+32 to +140°F

\*For regulating heat exchangers and fans (e.g. LE 019) and as an alarm contact for monitoring the interior temperature of electronic enclosures.

# Mechanical Thermostat FZK 011



- **Adjustable temperature**
- **High switching capacity**
- **Small hysteresis**
- **Terminals easily accessible**
- **Clip fixing**
- **Change-over contact**

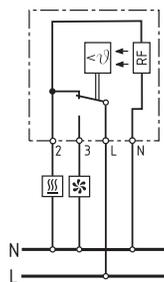
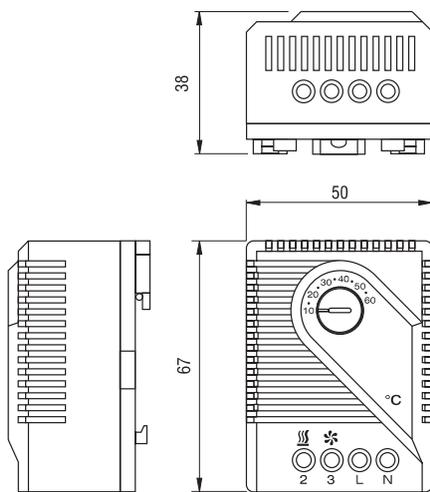
The mechanical thermostat is used for controlling heating and cooling equipment, filter fans or signal devices. The thermostat registers the surrounding air and can switch both inductive and resistive loads via snap-action contact.



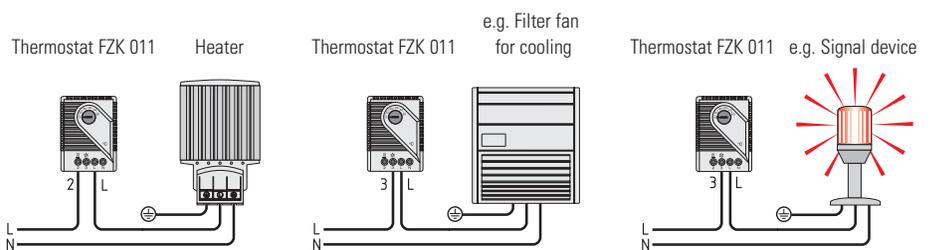
## Technical Data

<b>Switch temperature difference</b>	4K ( $\pm 1.5K$ tolerance)*
<b>Sensor element</b>	thermostatic bimetal
<b>Contact type</b>	change-over snap-action contact
<b>Contact resistance</b>	< 10mOhm
<b>Service life</b>	> 100,000 cycles
<b>Max. Switching capacity, NC</b>	250VAC, 10 (4) A
	DC 30W
<b>Max. Switching capacity, NO</b>	250VAC, 5 (2) A
	DC 30W
<b>EMC</b>	acc. to EN 55014-1-2, EN 61000-3-2, EN 61000-3-3
<b>Connection</b>	4-pole terminal for 2.5mm <sup>2</sup> , clamping torque 0.8Nm
<b>Mounting</b>	clip for 35mm DIN rail, EN50022
<b>Casing</b>	plastic according to UL94 V-0, light grey
<b>Dimensions</b>	67 x 50 x 38mm
<b>Weight</b>	approx. 0.10kg
<b>Fitting position</b>	variable
<b>Operating/Storage temperature</b>	-20 to +80 °C (-4 to +176 °F) / -45 to +80 °C (-49 to +176 °F)
<b>Protection type</b>	IP20
<b>Approvals</b>	-

\*Connecting terminal "N" (RF heating resistor) causes the thermal feedback to work and so reduces the switch temperature difference to approx. 0.5K.



Load 1 = Enclosure heater  
Load 2 = Filter fan, Cooling equipment, Signal device



Examples of connection

Art. No.	Operating voltage*	Setting range
01170.0-00	230VAC	+ 5 to +60°C
01170.0-02	230VAC	-20 to +30°C

\*operating voltage 120VAC with setting range in °F upon request

# Electronic Thermostat ET 011 (24VDC)



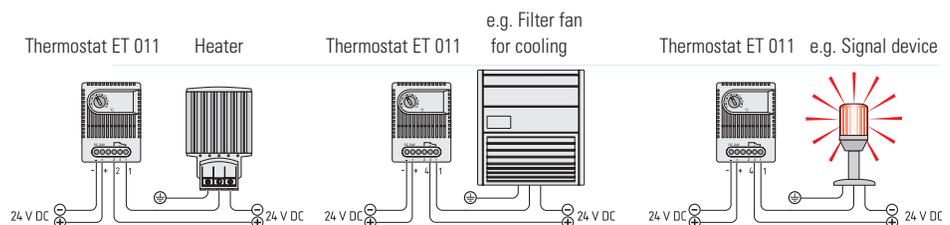
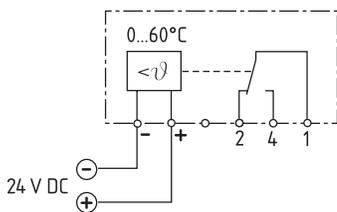
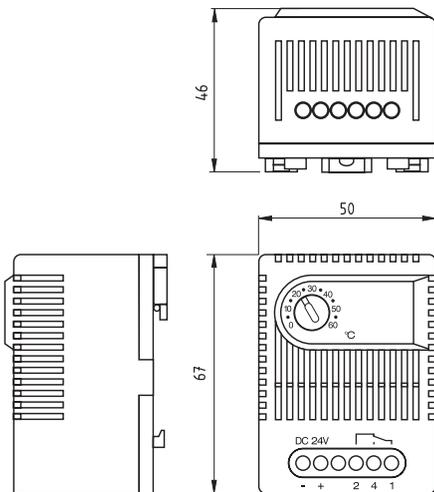
- **High DC breaking capacity**
- **Low hysteresis**
- **Adjustable temperature**
- **Change-over contact**
- **Clip fixing**

Electronic thermostat for regulating high performance DC 24V equipment. Heating or cooling appliances as well as signal devices can be switched via the potential free change-over contact. In comparison to mechanical thermostats, the ET 011 has a low hysteresis making the switching point and setting accuracy more precise.



## Technical Data

<b>Switch temperature difference</b>	approx. 3K
<b>Sensor element</b>	PTC
<b>Contact type</b>	change-over
<b>Contact resistance</b>	< 10mOhm
<b>Service life</b>	> 100,000 cycles
<b>Max. switching capacity</b>	28VDC, 16A
<b>EMC</b>	acc. to EN 55014-1-2, EN 61000-3-2, EN 61000-3-3
<b>Connection</b>	5-pole terminal for 2.5mm <sup>2</sup> , clamping torque 0.8Nm
<b>Mounting</b>	clip for 35mm DIN rail, EN 50022
<b>Casing</b>	plastic according to UL94 V-0, light grey
<b>Dimensions</b>	67 x 50 x 46mm
<b>Weight</b>	approx. 80g
<b>Fitting position</b>	vertical
<b>Operating/Storage temperature</b>	0 to +60 °C (32 to +140 °F) / -45 to +80 °C (-49 to +176 °F)
<b>Protection type</b>	IP20
<b>Approvals</b>	VDE and UL intended



Examples of connection

Art. No.	Operating voltage	Setting range
01190.0-00	24VDC (20-28VDC)	0 to +60°C

# Mechanical Hygrostat KFR 012 (65% or 50%)



## Default relative humidity settings

### Small size

### High switching capacity

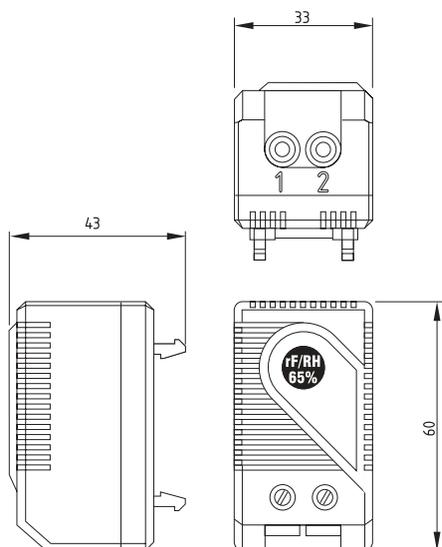
### Clip fixing

The mechanical hygrostat senses the relative humidity in an enclosure with electric/electronic components, and turns on a heater at the fixed factory-set relative humidity setting, helping prevent the formation of condensation in the enclosure.

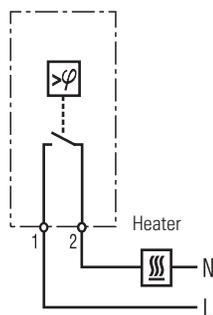


## Technical Data

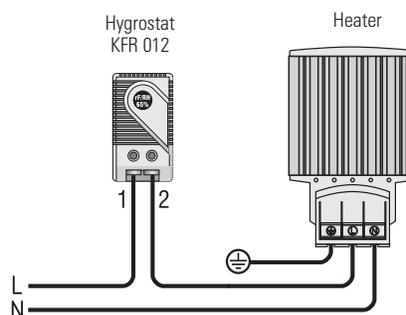
<b>Switch tolerance</b>	± 5% RH
<b>Switch difference (humidity)</b>	4% RH (± 3% tolerance)
<b>Permissible air velocity</b>	15m/s
<b>Contact type</b>	contact maker (NO)
<b>Contact resistance</b>	< 10mOhm
<b>Service life</b>	50,000 cycles
<b>Min. Switching capacity</b>	20V AC/DC 100mA
<b>Max. Switching capacity</b>	250VAC, 5 (0.2) A
	DC 20W
<b>EMC</b>	acc. to EN 55014-1-2, EN 61000-3-2, EN 61000-3-3
<b>Connection</b>	2-pole terminal 2.5 mm <sup>2</sup> , clamping torque 0.8Nm
<b>Mounting</b>	clip for 35mm DIN rail, EN 50022
<b>Casing</b>	plastic according to UL94 V-0, light grey
<b>Dimensions</b>	60 x 43 x 33mm
<b>Weight</b>	approx. 40g
<b>Fitting position</b>	variable
<b>Operating/Storage temperature</b>	0 to +60°C (+32 to +140°F) / -20 to +80°C (-4 to +176°F)
<b>Prot. type</b>	IP20
<b>Approvals</b>	VDE and UL submitted



Connection diagram



Example of connection



Art. No.	Setting
01240.0-00	65% RH factory-set
01241.0-00	50% RH factory-set

# Mechanical Hygrostat MFR 012



- Adjustable relative humidity
- Change-over contact
- High switching capacity
- Easily accessible terminals
- Clip fixing

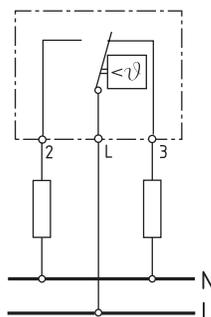
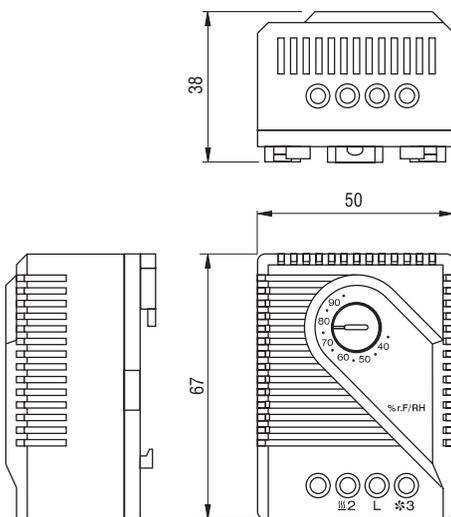
The electromechanical thermostat MRF 012 is designed to control enclosure heaters so that the dew point is raised when a critical relative humidity of 65% is exceeded. In this way condensation and corrosion is effectively prevented.



## Technical Data

<b>Switch difference*</b>	4% RH ( $\pm 3\%$ tolerance)
<b>permissible air velocity</b>	15m/sec
<b>Contact type</b>	change-over contact
<b>Contact resistance</b>	< 10mOhm
<b>Service life</b>	50,000 cycles
<b>Min. Switching capacity</b>	20V AC/DC 100mA
<b>Max. Switching capacity</b>	250VAC, 5 (0.2) A DC 20W
<b>EMC</b>	acc. to EN 55014-1-2, EN 61000-3-2, EN 61000-3-3
<b>Connection</b>	3-pole terminal for 2.5mm <sup>2</sup> , clamping torque 0.8Nm
<b>Mounting</b>	clip for 35mm DIN rail, EN50022
<b>Casing</b>	plastic according to UL94 V-0, light grey
<b>Dimensions</b>	67 x 50 x 38mm
<b>Weight</b>	approx. 60g
<b>Fitting position</b>	variable
<b>Operating/Storage temperature</b>	0 to +60°C (+32 to +140°F) / -20 to +80°C (-4 to +176°F)
<b>Protection type</b>	IP20
<b>Approvals</b>	VDE and UL submitted

\*at 50% RH



Load 1 = Enclosure heater  
Load 2 = Air humidifier

Art. No.	Setting range
01220.0-00	35 to 95% RH

# Electronic Hygrotherm ETF 012



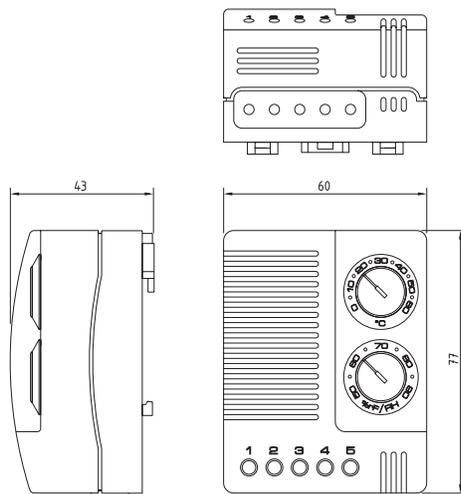
- **Temperature and humidity adjustable**
- **Optical operating display (LED)**
- **High switching capacity**
- **Clip fixing**

The electronic hygrotherm senses the ambient temperature and relative humidity in an enclosure with electric/electronic components, and turns on a heater (or alternatively, a fan) at either set point, helping prevent the formation of condensation in the enclosure. The LED integrated in the adjustment knob on the active controller is lit when the connected device is in operation.

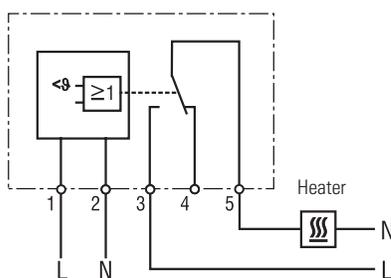


## Technical Data

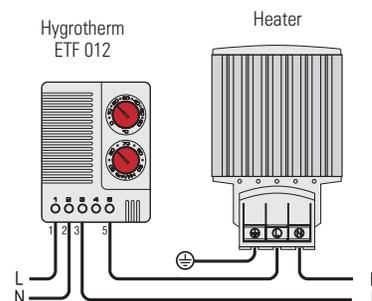
<b>Switch difference (temperature)</b>	2K (± 1K tolerance)
<b>Switch difference (humidity)</b>	4% RH (± 1% tolerance)
<b>Reaction time (humidity)</b>	approx. 160 sec.
<b>Contact type</b>	change-over contact (relay)
<b>Contact resistance</b>	< 10mOhm
<b>Service life</b>	NC: 50,000 cycles NO: 100,000 cycles
<b>Max. Switching capacity (Relay output)</b>	NC: 240VAC, 6 (1) A NO: 240VAC, 8 (1.6) A NC: 120VAC, 6 (1) A NO: 120VAC, 8 (1.6) A 24VDC, 4A
<b>EMC</b>	acc. to EN 55014-1-2, EN 61000-3-2, EN 61000-3-3
<b>Betriebsanzeige</b>	LED
<b>Connection</b>	5-pole terminal 2.5mm <sup>2</sup> , clamping torque 0.8Nm
<b>Mounting</b>	clip for 35mm DIN rail, EN50022
<b>Casing</b>	plastic according to UL94 V-0, light grey
<b>Dimensions</b>	77 x 60 x 43mm
<b>Weight</b>	approx. 0.20kg
<b>Fitting position</b>	vertical
<b>Operating/Storage temperature</b>	0 to +60°C (+32 to +140°F) / -20 to +80°C (-4 to +176°F)
<b>Protection type</b>	IP20



Connection diagram



Example of connection



Art. No.	Operating voltage	Setting range temperature	Setting range humidity	Approval
01230.0-00	230VAC, 50/60Hz	0 to 60°C	50 to 90% RH	VDE + UL File No. E164102
01230.9-00	120VAC, 50/60Hz	32 to 140°F	50 to 90% RH	UL File No. E164102
01230.9-01	120VAC, 50/60Hz	0 to 60°C	50 to 90% RH	UL File No. E164102

Lamp shown with protective plastic cover (see Accessories)



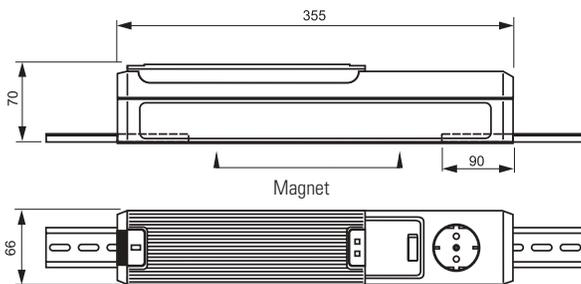
- **Magnetic or optional DIN rail mounting**
- **Energy-saving lamp**
- **Lamp without/with electrical socket**  
(choice of sockets)
- **On/Off switch**

The compact lamp KL 025 was especially designed for use in enclosures. A powerful magnet enables the lamp to be mounted freely in any desired position in metal enclosures saving time and installation problems. The integrated electrical socket allows the use of additional appliances.



### Technical Data

<b>Luminosity</b>	900 Lm
<b>Lamp type</b>	compact fluorescent lamp with integral starter
<b>Service life</b>	5,000 h
<b>Switch</b>	on/off switch for lamp
<b>Connection</b>	3-pole terminal 2.5mm <sup>2</sup> with cable clamp, torque 0.8Nm
<b>Mounting</b>	magnet fixing
<b>Casing</b>	plastic, light grey
<b>Dimensions</b>	355 x 65 x 70mm
<b>Weight</b>	approx. 1.0kg
<b>Fitting position</b>	variable
<b>Operating/Storage temperature</b>	-20 to +50°C (-4 to +122°F) / -45 to +70 °C (-49 to +158 °F)
<b>Protection type</b>	IP20
<b>Accessories</b>	lamp cover, Art. No. 09520.0-00 (see photo)



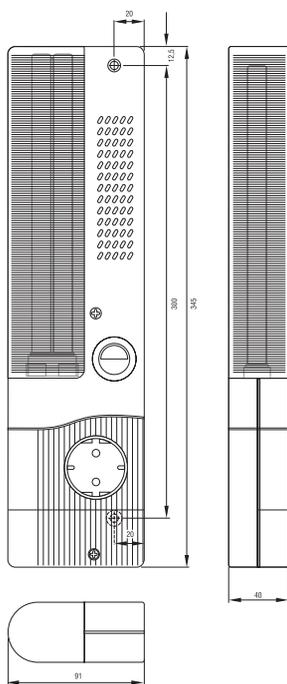
In plastic, aluminium or stainless steel cabinets the lamp can be fixed using screws together with inserted 35mm DIN rail sections.



Art. No.	Operating Voltage	Socket	Power consumption	Nominal Current	Protection class	Approvals
02500.0-00	230VAC, 50Hz	Germany (1)	11W (equals 75W light bulb)	16.0A	I (earthed)	VDE
02500.0-07	230VAC, 50Hz	none	11W (equals 75W light bulb)	-	II (double insulated)	-
02501.0-00	230VAC, 50Hz	France/Poland (2)	11W (equals 75W light bulb)	16.0A	I (earthed)	-
02502.0-00	230VAC, 50Hz	Switzerland (3)	11W (equals 75W light bulb)	10.0A	I (earthed)	-
02510.0-00	230VAC, 50Hz	UK/Ireland (4)	11W (equals 75W light bulb)	13.0A	I (earthed)	-
02512.0-00	230VAC, 50Hz	Italy (6)	11W (equals 75W light bulb)	16.0A	I (earthed)	-
02505.9-00	120VAC, 60Hz	USA/Canada (5)	9W (equals 60W light bulb)	15.0A	I (earthed)	-
02505.9-01	120VAC, 60Hz	none	9W (equals 60W light bulb)	-	II (double insulated)	-

# Slimline Lamp SL 025 Series with On/Off switch

Photo: Slimline lamp with on/off switch, with integrated electric socket (Germany), Art. No. 02520.0-00



- Slim casing
- Electronic ballast
- Lamp without/with electrical socket (choice of sockets)
- Magnet fixing (option)
- Energy saving lamp
- On/Off switch

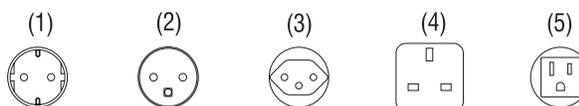
The flat slimline lamp SL 025 is suitable for all types of panels and enclosures, especially where space is at a premium. The lamp can be mounted on its narrow or broad surface using screws. It is also available with a magnet which allows it to be fitted quickly in any position in a steel enclosure. Both versions are available with an integrated electrical socket enabling the use of additional appliances.



## Technical Data

<b>Power consumption</b>	11W (equals 75W light bulb)
<b>Luminosity</b>	900Lm
<b>Lamp type</b>	energy saving lamp, 2G7 socket
<b>Service life</b>	10,000h
<b>Switch</b>	on/off switch for lamp
<b>Connection</b>	terminal 2.5mm <sup>2</sup> with cable clamp, clamping torque 0.8Nm
<b>Mounting</b>	screw fixing, M5, 300mm centers magnet fixing (optional)
<b>Casing</b>	plastic according to UL94 V-0, light grey
<b>Dimensions</b>	345 x 91 x 40mm
<b>Fitting position</b>	narrow surface/broad surface
<b>Operating/Storage temperature</b>	-20 to +50°C (-4 to +122°F) / -45 to +70 °C (-49 to +158 °F)
<b>Protection type</b>	IP20
<b>Note</b>	24VDC to 48VDC on request

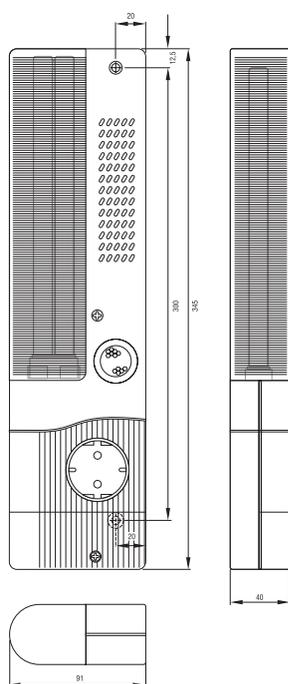
The slimline lamp SL 025 is also available with a 19" front panel.



Art. No.	Model	Operating Voltage	Socket	Nominal Current	Weight (approx.)	Protection class	Approvals
02520.0-00	without magnet	230VAC, 50/60Hz	Germany (1)	16.0A	0.40kg	I (earthed)	VDE
02520.1-00	with magnet	230VAC, 50/60Hz	Germany (1)	16.0A	0.60kg	I (earthed)	VDE
02521.0-00	without magnet	230VAC, 50/60Hz	France/Poland (2)	16.0A	0.40kg	I (earthed)	VDE
02521.1-00	with magnet	230VAC, 50/60Hz	France/Poland (2)	16.0A	0.60kg	I (earthed)	VDE
02522.0-00	without magnet	230VAC, 50/60Hz	Switzerland (3)	10.0A	0.40kg	I (earthed)	VDE
02522.1-00	with magnet	230VAC, 50/60Hz	Switzerland (3)	10.0A	0.60kg	I (earthed)	VDE
02523.0-00	without magnet	230VAC, 50/60Hz	UK/Ireland (4)	13.0A	0.40kg	I (earthed)	VDE
02523.1-00	with magnet	230VAC, 50/60Hz	UK/Ireland (4)	13.0A	0.60kg	I (earthed)	VDE
02524.0-01	without magnet	120VAC, 50/60Hz	USA/Canada (5)	15.0A	0.40kg	I (earthed)	UL submitted
02524.1-01	with magnet	120VAC, 50/60Hz	USA/Canada (5)	15.0A	0.60kg	I (earthed)	UL submitted
02527.0-00	without magnet	230VAC, 50/60Hz	none	-	0.40kg	II (double insulated)	VDE; UL submitted
02527.1-00	with magnet	230VAC, 50/60Hz	none	-	0.60kg	II (double insulated)	VDE; UL submitted
02527.0-10	without magnet	120VAC, 50/60Hz	none	-	0.40kg	II (double insulated)	UL submitted
02527.1-10	with magnet	120VAC, 50/60Hz	none	-	0.60kg	II (double insulated)	UL submitted

# Slimline Lamp SL 025 Series with movement sensor

Photo: Slimline lamp with movement sensor and with integrated electric socket (Germany), Art. No. 02520.0-03



The PIR movement sensor switches the lighting on when the enclosure door is opened. The switch-on time is reset with every further registered movement. The movement sensor does not react to movement on the other side of glass and so can be used in enclosures with glass doors.

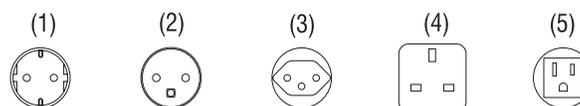
- **Slim casing**
- **Electronic ballast**
- **Lamp without/with electrical socket**  
(choice of sockets)
- **Magnet fixing (option)**
- **Energy saving lamp**
- **Automatic switching**

The flat slimline lamp SL 025 with movement sensor is suitable for all types of panels and enclosures, especially where space is at a premium. The lamp can be mounted on its narrow or broad surface using screws. It is also available with a magnet which allows it to be fitted quickly in any position in a steel enclosure. Both versions are available with an integrated electrical socket enabling the use of additional appliances. The movement sensor substitutes a door contact switch.



Technical Data	
<b>Power consumption</b>	11W (equals 75W light bulb)
<b>Luminosity</b>	900lm
<b>Lamp type</b>	energy saving lamp, 2G7 socket
<b>Service life</b>	10,000h
<b>Switch</b>	PIR movement sensor, approx. 6min. fixed switch-on duration
<b>Connection</b>	terminal 2.5mm <sup>2</sup> with cable clamp, clamping torque 0.8Nm
<b>Mounting</b>	screw fixing, M5, 300mm centers magnet fixing (optional)
<b>Casing</b>	plastic according to UL94 V-0, light grey
<b>Dimensions</b>	345 x 91 x 40mm
<b>Fitting position</b>	narrow surface/broad surface
<b>Operating/Storage temperature</b>	-20 to +50°C (-4 to +122°F) / -45 to +70 °C (-49 to +158 °F)
<b>Protection type</b>	IP20
<b>Note</b>	24VDC to 48VDC on request

The slimline lamp SL 025 is also available with a 19" front panel.



Art. No.	Model	Operating Voltage	Socket	Nominal Current	Weight (approx.)	Protection class	Approvals
02520.0-03	without magnet	230VAC, 50/60Hz	Germany (1)	16.0A	0.40kg	I (earthed)	VDE
02520.1-03	with magnet	230VAC, 50/60Hz	Germany (1)	16.0A	0.60kg	I (earthed)	VDE
02521.0-03	without magnet	230VAC, 50/60Hz	France/Poland (2)	16.0A	0.40kg	I (earthed)	VDE
02521.1-03	with magnet	230VAC, 50/60Hz	France/Poland (2)	16.0A	0.60kg	I (earthed)	VDE
02522.0-03	without magnet	230VAC, 50/60Hz	Switzerland (3)	10.0A	0.40kg	I (earthed)	VDE
02522.1-03	with magnet	230VAC, 50/60Hz	Switzerland (3)	10.0A	0.60kg	I (earthed)	VDE
02523.0-03	without magnet	230VAC, 50/60Hz	UK/Ireland (4)	13.0A	0.40kg	I (earthed)	VDE
02523.1-03	with magnet	230VAC, 50/60Hz	UK/Ireland (4)	13.0A	0.60kg	I (earthed)	VDE
02524.0-04	without magnet	120VAC, 50/60Hz	USA/Canada (5)	15.0A	0.40kg	I (earthed)	UL submitted
02524.1-04	with magnet	120VAC, 50/60Hz	USA/Canada (5)	15.0A	0.60kg	I (earthed)	UL submitted
02527.0-04	without magnet	230VAC, 50/60Hz	none	-	0.40kg	II (double insulated)	VDE; UL submitted
02527.1-04	with magnet	230VAC, 50/60Hz	none	-	0.60kg	II (double insulated)	VDE; UL submitted
02527.0-12	without magnet	120VAC, 50/60Hz	none	-	0.40kg	II (double insulated)	UL submitted
02527.1-12	with magnet	120VAC, 50/60Hz	none	-	0.60kg	II (double insulated)	UL submitted

# Dual Lamp DL 026 Series with on/off switch



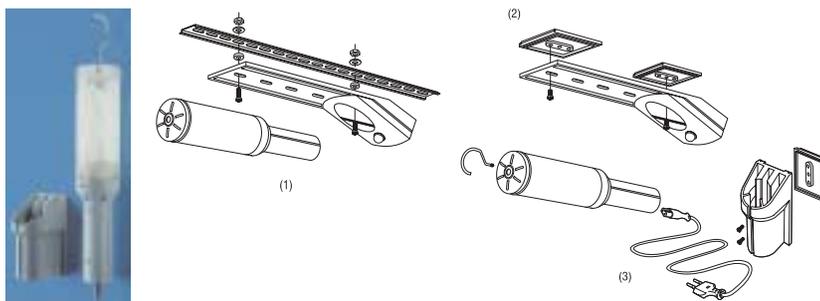
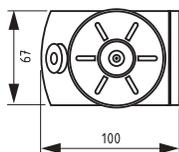
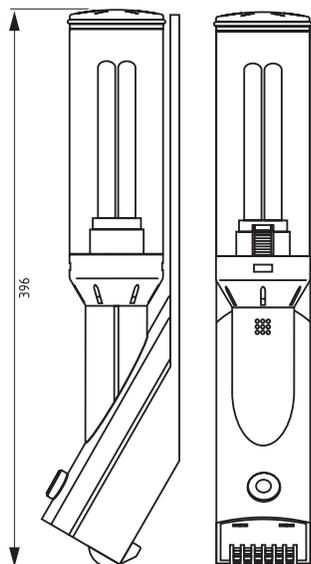
- **Versatile – base lamp or hand lamp**
- **Long-life energy saving lamp**
- **Connections for further lamps**

Dual lamp with on/off switch (incl. base station)



### Technical Data

<b>Luminosity</b>	1000Lm
<b>Lamp type</b>	energy saving lamp, E27 socket
<b>Service life</b>	10,000h
<b>Switch</b>	on/off push switch
<b>Connection</b>	6-pole screw connector 2.5mm <sup>2</sup> (torque 0.8Nm) for power connection, further lamps and external door contact switch
<b>Mounting</b>	screw fixing (e.g. 35mm DIN rail)
<b>Casing</b>	plastic according to UL94 V-0, light grey
<b>Weight</b>	approx. 0.60kg
<b>Fitting position</b>	variable
<b>Operating/Storage temperature</b>	-20 to +50°C (-4 to +122°F) / -45 to +70 °C (-49 to +158 °F)
<b>Protection type / Protection class</b>	IP20 / II (double insulated)
<b>Approvals</b>	-
<b>Accessories</b>	wall holder with connection cable (2m) incl. fixing plate, Art. No. 03410.0-00 2 fixing plates (self-adhesive), Art. No. 09515.0-00
<b>Note</b>	120VAC and DC voltages on request



- (1) Standard screw fixing to DIN rail
  - (2) 2 self-adhesive fixing plates, Art. No. 09515.0-00
  - (3) Wall holder with connection cable (2m) and self-adhesive fixing plate, Art. No. 03410.0-00.
- By using an additional wall holder the lamp can be used as a hand lamp.

Art. No.	Operating voltage	Power consumption
02600.0-00	230VAC, 50Hz	20W (equals 100W light bulb)

# Dual Lamp DL 026 Series with movement sensor



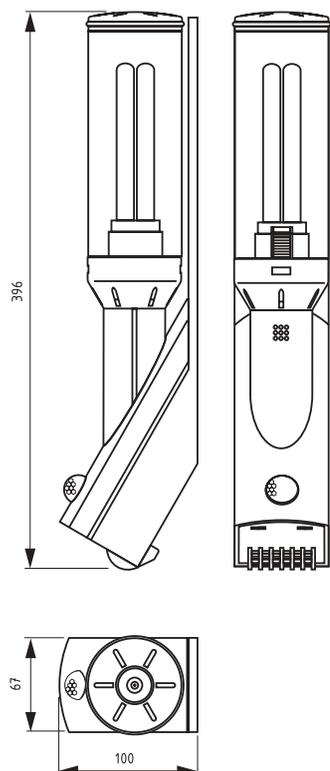
- **Versatile – base lamp or hand lamp**
- **Long-life energy saving lamp**
- **Automatic switching**
- **Alternative solution for door switch**
- **Connections for further lamps**

Dual lamp with movement sensor (incl. base station)

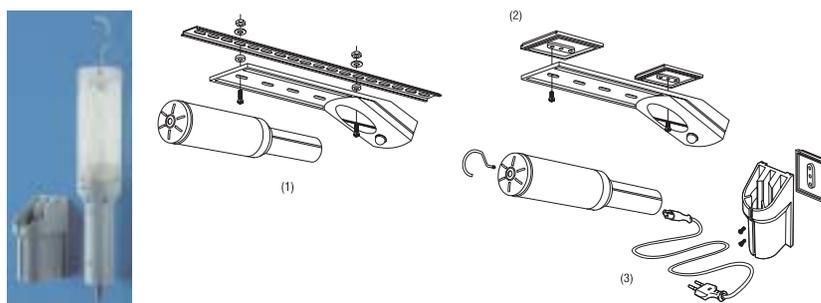


## Technical Data

<b>Luminosity</b>	1000Lm
<b>Lamp type</b>	energy saving lamp, E27 socket
<b>Service life</b>	10,000h
<b>Switch</b>	PIR movement sensor, approx. 3min. fixed switch-on duration
<b>Connection</b>	4-pole screw connector 2.5mm <sup>2</sup> (torque 0.8Nm) for power connection and further lamps
<b>Mounting</b>	screw fixing (e.g. 35mm DIN rail)
<b>Casing</b>	plastic according to UL94 V-0, light grey
<b>Weight</b>	approx. 0.60kg
<b>Fitting position</b>	variable
<b>Operating/Storage temperature</b>	-20 to +50°C (-4 to +122°F) / -45 to +70 °C (-49 to +158 °F)
<b>Protection type / Protection class</b>	IP20 / II (double insulated)
<b>Approvals</b>	-
<b>Accessories</b>	wall holder with connection cable (2m) incl. fixing plate, Art. No. 03410.0-00 2 fixing plates (self-adhesive), Art. No. 09515.0-00
<b>Note</b>	120VAC and DC voltages on request



The PIR movement sensor switches the lamp on when the enclosure door is opened. The switch-on time is reset with every further registered movement. The movement sensor does not react to movement on the other side of glass and so can be used in enclosures with glass doors.



- (1) Standard screw fixing to DIN rail
  - (2) 2 self-adhesive fixing plates, Art. No. 09515.0-00
  - (3) Wall holder with connection cable (2m) and self-adhesive fixing plate, Art. No. 03410.0-00.
- By using an additional wall holder the lamp can be used as a hand lamp.

Art. No.	Operating voltage	Power consumption
02601.0-00	230VAC, 50Hz	20W (equals 100W light bulb)

# Hand Lamp DL 026 Series with lamp holder

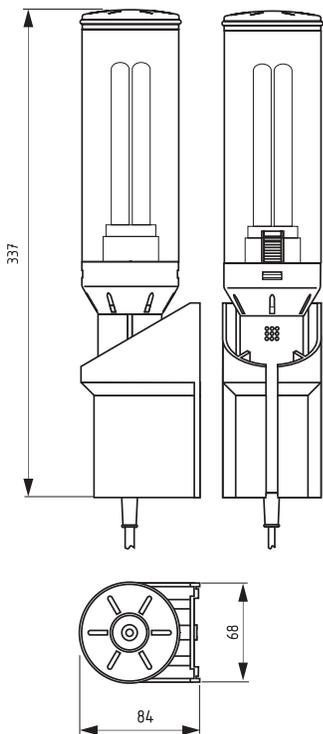
Long-life energy saving lamp

Versatile



## Technical Data

<b>Luminosity</b>	1000Lm
<b>Lamp type</b>	energy saving lamp, E27 socket
<b>Service life</b>	10,000h
<b>Connection</b>	power cable (2m) with Euro plug
<b>Mounting</b>	screws or fixing plate (self-adhesive)
<b>Casing</b>	plastic according to UL94 V-0, light grey
<b>Weight</b>	approx. 0.60kg
<b>Fitting position</b>	variable
<b>Operating/Storage temperature</b>	-20 to +50°C (-4 to +122°F) / -45 to +70 °C (-49 to +158 °F)
<b>Protection type / Protection class</b>	IP20 / II (double insulated)
<b>Approvals</b>	-
<b>Included in delivery</b>	lamp holder, hook and fixing plate
<b>Note</b>	120VAC and DC voltages on request



Art. No.	Operating voltage	Power consumption
02610.0-00	230VAC, 50Hz	20W (equals 100W light bulb)

# Electrical Socket SD 035 Series

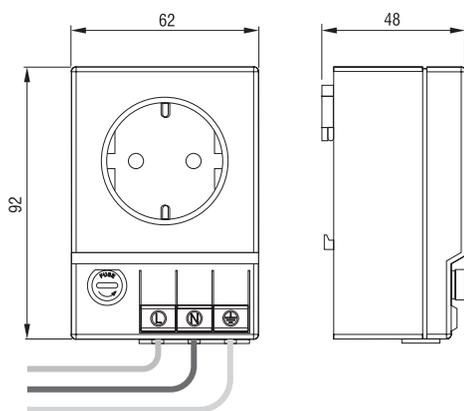


- **Quickly connected**
- **Available with or without fuse**
- **Clip fixing**

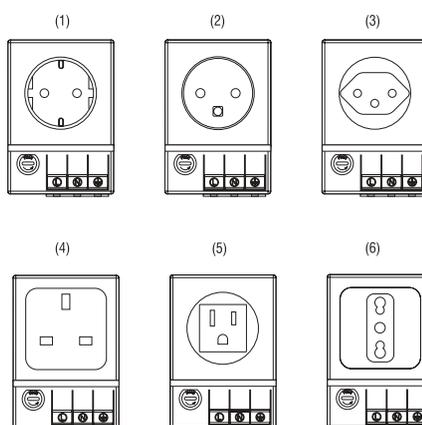
The DIN rail mounted electrical socket can be quickly fitted and connected in enclosures allowing the use of auxiliary products such as hand lamps, measuring devices, soldering irons etc. The unit is available with and without fuse and in many world socket standards.



Technical Data	
<b>Connection</b>	3 x pressure clamps for stranded and rigid wire 0.5 - 2.5mm <sup>2</sup>
<b>Mounting</b>	clip for 35mm DIN rail, EN50022
<b>Casing</b>	plastic according to UL94 V-0, light grey
<b>Dimensions</b>	92 x 62 x 48mm
<b>Weight</b>	approx. 0.20kg
<b>Fitting position</b>	variable
<b>Operating/Storage temperature</b>	-45 to +70°C (-49 to +158°F)
<b>Protection type/Protection class</b>	IP20 / I (earthed)



Connections from mains



Art. No.	Operating Voltage max.	Socket	Model	Nominal Current	Approvals
03500.0-00	250VAC	Germany (1)	with fuse*	6.3A	-
03500.0-01	250VAC	Germany (1)	without fuse	16.0A	-
03501.0-00	250VAC	France/Poland (2)	with fuse*	6.3A	-
03501.0-01	250VAC	France/Poland (2)	without fuse	16.0A	-
03502.0-00	250VAC	Switzerland (3)	with fuse*	6.3A	-
03502.0-01	250VAC	Switzerland (3)	without fuse	10.0A	-
03503.0-00	250VAC	UK/Ireland (4)	with fuse*	6.3A	-
03503.0-01	250VAC	UK/Ireland (4)	without fuse	13.0A	-
03504.0-00	125VAC	USA/Canada (5)	with fuse*	6.3A	UL File No. E222026
03504.0-01	125VAC	USA/Canada (5)	without fuse	15.0A	UL File No. E222026
03505.0-00	250VAC	Italy (6)	with fuse*	6.3A	-
03505.0-01	250VAC	Italy (6)	without fuse	16.0A	-

\*fuse Ø 5 x 20mm



Photo: Inside view

**Simple to mount**

**High degree of protection**

It has become more and more important to provide a protected enclosure environment for valuable and crucial electrical and electronic components. In a tightly closed enclosure, pressure differentials can occur during extreme temperature variations, such as day/night operation. When this occurs, the risk of dust and humidity being absorbed into the control panel increases dramatically. The specially designed pressure compensation plug DA 084 permits a controlled change in pressure. It can be installed easily in any enclosure. Because of the pressure compensation plug's high degree of protection (IP45), the protection type of the enclosure will not be affected.

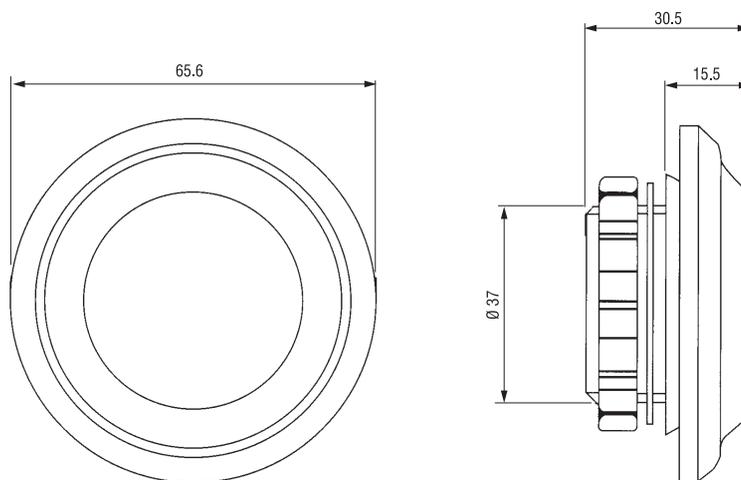


**Technical Data**

<b>Mounting</b>	PG 29 thread with union nut
<b>Material</b>	plastic according to UL94 V-0
<b>Air interface</b>	approx. 7cm <sup>2</sup>
<b>Dimensions</b>	Ø 65.5mm x 30.5mm
<b>Fitting position</b>	variable
<b>Operating/Storage temperature</b>	-45 to +70°C (-49 to +158°F)

**Installation**

For mounting, a hole with a diameter of Ø 37<sup>+1mm</sup> is required. For optimal pressure compensation, it is recommended that two plugs are installed diagonal to each other.



Art. No.	Model	Protection type	1 packing unit	Weight (approx.)
08400.0-00	without gasket	IP45	2 pieces	62g (31g/piece)
08400.0-04	with gasket	IP55	2 pieces	62g (31g/piece)



Photo: Inside view

- High degree of protection**
- Semipermeable membrane**
- Easy to install**

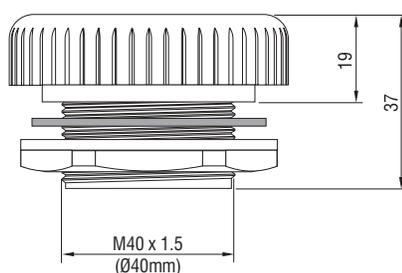
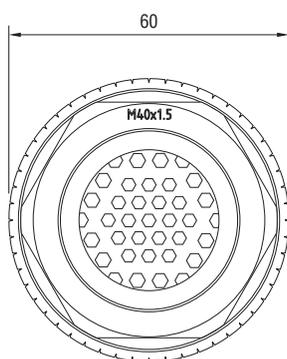
Pressure differentials in enclosures with a high degree of protection with respect to humidity and dust are a result of inside and outside temperature fluctuations. In case of negative pressure or vacuum, dust and humidity can be absorbed through the door seal and can enter the enclosure. As the humidity cannot exit the enclosure condensation may occur. The easy to install pressure compensation device DA 284 provides the compensation of pressure at a protection degree of **IP66**. A semipermeable membrane inside the plug allows air and humidity to leave the enclosure. In the opposite direction, it only allows dry air into the enclosure while humidity and dust from the outside are blocked by the membrane.



Technical Data	
Mounting	thread M40 x 1.5 with nut
Depth in enclosure	approx. 16mm
Material	plastic, light grey
Sealing	sealing gasket NBR
Filter	semipermeable membrane
Air permeability	1200l/h at a pressure difference of min. 70mbar
Dimensions	Ø 60 x 37mm
Fitting position	variable
Operating/Storage temperature	-45 to +70°C (-49 to +158°F)

### Installation

Make cut-out Ø 40.5<sup>+0.5</sup> mm in enclosure wall and mount pressure compensation device with nut. Please make sure that the sealing gasket is put in place on the outer side panel of the enclosure. For large enclosures and enclosures with a high component density, two or more devices should be used on opposite sides of the enclosure towards the top.



Art. No.	Protection type	1 packing unit	Weight (approx.)
28400.0-00	IP66 (EN 60529) / IPX9K (EN 40050-9)	2 pieces	90g (45g/piece)
28400.0-01	IP66 (EN 60529) / IPX9K (EN 40050-9)	1 piece	45g

# Self-adhesive Appliance Holder STEGOFIX



STEGOFIX is an appliance holder for direct fixing of small appliances and perforated 35mm DIN rails.

With STEGOFIX small appliances can be mounted in switch cabinets significantly quicker, easier and more economically than before, without drilling holes. Mounting DIN rails is a simple matter with STEGOFIX. Longer rails are mounted on several STEGOFIX units and joining two rails is also not a problem. Subsequent changes and the mounting of additional appliances can be carried out with ease – even in confined spaces.

STEGOFIX is a self-adhesive plastic unit with an adhesion power which will bear a continuous load of 500g. The high-performance industrial adhesive band is also non-ageing and designed with safety tolerances.



## Technical Data

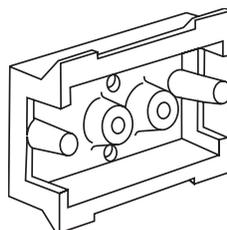
<b>Load</b>	500g after a 24h waiting period*
<b>Mounting</b>	self-adhesive (non-ageing, high-performance adhesive band)
<b>Material</b>	plastic according to UL94 V-0
<b>Dimensions</b>	43 x 38 x 14mm
<b>Screw pitch</b>	12.8mm; Ø 3.6mm, for perforated 35mm DIN rails
<b>Operating/Storage temperature</b>	-45 to +70°C (-49 to +158°F)

\*depending on the conditions of use (e.g. surface condition, size of the device to be mounted, etc.) higher loads were achieved.

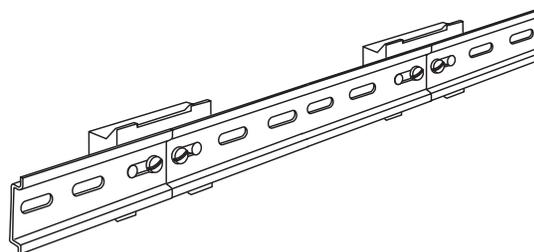
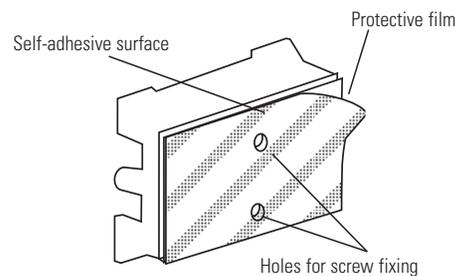
## Installation

STEGOFIX can only be mounted on smooth surfaces, e.g. metals, lacquered surfaces and plastics (except polyethylene, polypropylene and rubber). The surfaces must be dry, free from dust, oil, separating agents and other contamination.

### Application examples



STEGOFIX



Art. No.	1 packing unit	Weight (approx.)
09510.0-01	5 pieces	60g (12g/piece)

# Calculation of temperature control in enclosures.

## What's needed:

1. The dimensions of the enclosure (Height, Width, Depth) [m]
2. The enclosure position (eg. single enclosure, enclosure in row) according to calculation formula, enclosure surface area A [m<sup>2</sup>]
3. The enclosure material (metal, plastic) heat transfer coefficient from table, k [W/m<sup>2</sup> K]
4. The temperature difference between desired enclosure interior temperature Ti [°C] and the expected ambient temperature Tu [°C] (eg. day - night, summer - winter, climate zones)  $\Delta T$  [K=Kelvin]
5. The stray power (self-warming) of all installed components during operation (eg. transformers, relays, semiconductors) P<sub>v</sub> [W]

## Calculation and selection of parameters: enclosure surface area - heat transfer coefficient - temperature difference

### 1. Enclosure surface area from dimensions

### 2. Enclosure position (plan view) accord. to VDE 0660 part 500

	Single enclosure free on all sides
	Single enclosure, wall mounted
	First or last enclosure in free standing row
	First or last enclosure in wall mounted row
	Middle enclosure in free standing row
	Middle enclosure in wall mounted row
	Middle enclosure in wall mounted row with covered top

### Formula for cabinet surface area A [m<sup>2</sup>]

H = Height W = Width D = Depth

$$A = 1.8 \times H \times (W + D) + 1.4 \times W \times D$$

$$A = 1.4 \times W \times (H + D) + 1.8 \times D \times H$$

$$A = 1.4 \times D \times (H + W) + 1.8 \times W \times H$$

$$A = 1.4 \times H \times (W + D) + 1.4 \times W \times D$$

$$A = 1.8 \times W \times H + 1.4 \times W \times D + D \times H$$

$$A = 1.4 \times W \times (H + D) + D \times H$$

$$A = 1.4 \times W \times H + 0.7 \times W \times D + D \times H$$

Example: enclosure free on all sides, 2000mm high / 800mm wide / 600mm deep.  $A = 1.8 \times 2.0 \times (0.8 + 0.6) + 1.4 \times 0.8 \times 0.6 = 5.712\text{m}^2$

### 3. Enclosure material and its heat transfer coefficient k [W/m<sup>2</sup> K]

Steel sheet, painted	k~5.5W/m <sup>2</sup> K
Steel sheet, stainless	k~4.5W/m <sup>2</sup> K
Aluminium	k~12W/m <sup>2</sup> K
Aluminium, double-walled	k~4.5W/m <sup>2</sup> K
Polyester	k~3.5W/m <sup>2</sup> K

### 4. Temperature difference $\Delta T$ [K=Kelvin]

$$\Delta T = T_i - T_u$$

i.e. the temperature difference between the interior and exterior temperatures

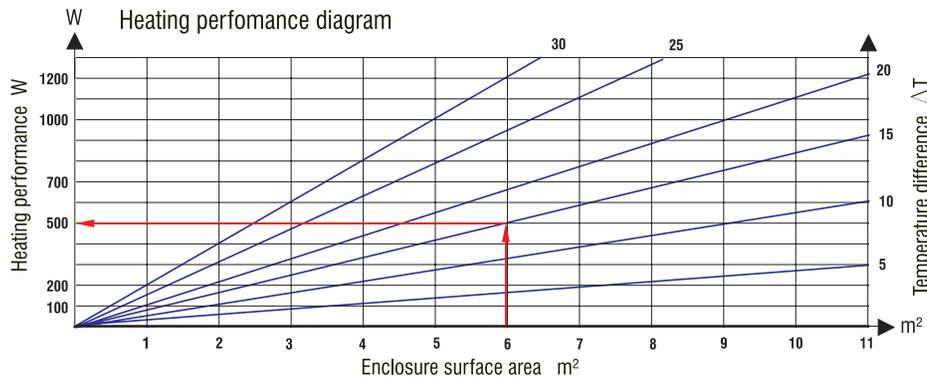
## CALCULATION FORMULA FOR REQUIRED HEATING PERFORMANCE (HEATER):

Required heating performance P<sub>h</sub> [W] = enclosure surface area A [m<sup>2</sup>] x heat transfer coefficient k [W/m<sup>2</sup> K] x temperature difference  $\Delta T$  [K]

**Example:**  $W = 5.712\text{m}^2 \times 5.5\text{W/m}^2\text{K} \times 15\text{K} = 471.24\text{W}$

Result: Heater with **500W** heating performance is required. If enclosure is situated outdoors the calculated heating performance must be doubled!

## OR CHOOSE REQUIRED HEATING PERFORMANCE FROM DIAGRAM:



5. In the case of continuous stray power P<sub>v</sub> [W] (self-warming) this must be deducted from the calculated heating performance.

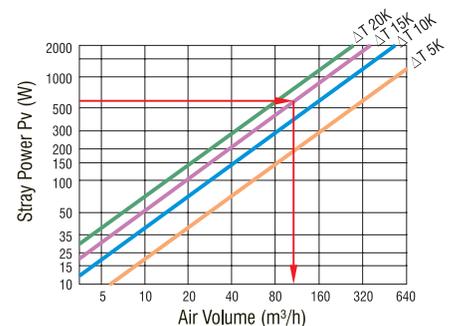
## CHOOSE REQUIRED COOLING PERFORMANCE FROM DIAGRAM:

## OR CALCULATE USING FORMULA FOR REQUIRED COOLING PERFORMANCE (FILTER FAN):

$$\text{Required air volume } V \text{ [m}^3\text{/h]} = \frac{\text{installed stray power } P_v \text{ [W]}}{\text{temperature difference } \Delta T \text{ [K]}} \times \text{air constant } f^* \text{ [3.3m}^3 \text{ K/Wh]}$$

Example:  $V = \frac{600\text{W}}{15\text{K}} \times 3.3\text{m}^3 \text{ K/Wh} = 132\text{m}^3\text{/h}$

\*f(0-100)=3.1m<sup>3</sup> K/Wh, f(100-250)=3.2m<sup>3</sup> K/Wh, f(250-500)=3.3m<sup>3</sup> K/Wh, f(500-750)=3.4m<sup>3</sup> K/Wh, f(750-1000)=3.5m<sup>3</sup> K/Wh





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