

*Components for  
industrial climate control*

- Heating
- Controlling
- Ventilating
- Cooling

Your  
technical  
requirements  
completely  
solved by  
innovation

*Your extended workbench for*

- Cable technology
- Assembly of
  - Components
  - Assemblies
  - Product series
- Switchgear construction

# Our profile!



## 05.06.1961

Leo Möskes established a firm in sole proprietorship for the manufacture of wastewater treatment systems in Röthenbach near Nuremberg / Germany. In control cabinets that were operated around dew point temperatures, at that time, light bulbs were installed to avoid falling below dew point temperature by means of the light bulb's waste heat.

## 1972

Mr. Möskes applied for a utility patent for the first control cabinet heating system.

## 1979

New premises were built in Altdorf near Nuremberg / Germany

## 1996

The company moves into the newly acquired premises in Arnstorf / Germany

## 01.10.2002

The Achter Elektronik AG acquires the partner's interest share of Lm-therm GmbH.

Achter Elektronik AG and Lm-therm GmbH utilize the synergy effects resulting from the amalgamation to the benefit of their customers.

Our combined efforts are to offer products and services:

We solve the technical demand of our customers complete and innovative.

## 12.08.1993

Foundation of the firm in sole proprietorship:  
Franz Achter  
Elektrohandel & Systemtechnik

## 1996

Extension of the floor space to 400 m<sup>2</sup>

## 1999

New building of a production hall with a space floor of 1200 m<sup>2</sup>

## 2001

The firm is converted into a incorporated company.

## 2005:

Consolidation of the production of Lm-therm GmbH and Achter AG in the company domicile in Aldersbach-Freundorf

## 2006:

Extension of the office accommodation and removal of the Lm-therm management

## 2007:

Extension of the production floor space for cable production

## 2008:

Opening of a new manufacturing location in Uttigkofen for the range of switchgear construction

## 2009:

Opening of a branch office in Vienna / Austria

# Fingerpost

*Components for industrial climate control*

● Heating

● Controlling

● Ventilating

● Cooling

● Accessories

*Your extended workbench for*

● Cable technology

● Assembly of

- Components
- Assemblies
- Product series

● Switchgear construction

# ZERTIFIKAT

## ISO 9001:2000



bescheinigt hiermit, dass das Unternehmen



### Bereiche:

**Achter Elektronik AG:** Entwicklung, Herstellung und Vertrieb von elektrischen und elektronischen Geräten und Kabelsystemen

**Lm-therm GmbH:** Entwicklung und Vertrieb von Schaltschrankheizgeräten

### Standorte:

Sulzbachstraße 15 \* D-94501 Aldersbach OT Freundorf  
 Eggerstdorferstraße 4 \* D-94501 Aldersbach, OT Uttigkofen

ein Qualitätsmanagementsystem entsprechend der oben genannten Norm (12/2000) eingeführt hat und dieses wirksam anwendet. Der Nachweis wurde im Rahmen des Zertifizierungs-Audits Bericht-Nr. A08031100 erbracht. Dieses Zertifikat ist nur in Verbindung mit der erfolgreichen Durchführung der Überwachungsaudits gültig.

Datum der Erstzertifizierung: 01.07.2002  
 Dieses Zertifikat ist gültig bis: 19.08.2011  
 Letzter Audittag: 08.08.2008

Datum der letzten Zertifizierung: 20.08.2008  
 Zertifikat-Registrier-Nr.: 50703720/2

*L. Jeyls*



DEKRA Certification GmbH  
 Stuttgart, den 20.08.2008



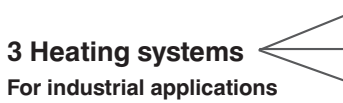
QMS-TGA-ZM-05-91-00

DEKRA Certification GmbH · Handwerkstraße 15 · D-70565 Stuttgart · www.dekra-certification.com

### ISO 14001 Environmental Certification planned for 2010

Technical modifications and further developments of our products reserved. Errors, misprints, and technical alterations do not give reason to claims for damages. For customer-specific developments, solely the customer's specifications (drawings and/or requirement specifications) do apply.

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## Why is heating respectively cooling necessary inside control cabinets?

Meanwhile – as it is known, also the subject "control cabinet cooling" has become fairly important in addition to control cabinet heating.

- **Control cabinet climatization:** heating and / or cooling!
- **Temperature/humidity** or also **temperature and humidity!**

Multifarious fields of application show that this issue is not only prevailing in the control cabinet: automation, traffic and automotive engineering, telecommunication, switchboard and control panel systems, distributor control cabinet systems, read-out displays in power plants, mining and shipbuilding industry, applications in the communal sector, in the chemical industry, in general enclosure technology, crane installations, wind generators, large weighing machines ..., so anywhere where critical, sometimes highly complicated switching circuitry needs to be protected against formation of condensation water or overheating.

The application of heating or cooling units improve the failure safety of the control system respectively enable its proper functioning at all in the first place. Due to temperature variations, falling below dew point temperature, or the temperature difference between inside and outside temperatures, condensation water can develop.

Corrosion and also creeping currents may be caused by moisture and dust formation that may result in a complete failure of the controllers and switchgear installed inside a control cabinet. Overheating of components and complete control systems can be prevented by employment of ventilators and cooling units.

### By implementation of heating / cooling systems you gain:

- Protection against formation of condensation water
- Anti-freeze protection
- Compensation of temperature variations
- A stable ambience temperature installed for the technical equipment
- Protection against formation of dew on components
- Formation of heat pockets is avoided due to continuous convection
- No undershooting / overshooting of operating temperatures caused by installed components !

Lm-therm is offering a great variety of heating and cooling techniques for control cabinet climatization. Additionally to that also a broad range of filter ventilators, ventilator inserts and recirculation fans. Control technology / sensor technology – supplementing the range of products offered.

## To what should attention be paid in control cabinet climatization?

### "When" should "which" heater be installed?

The decision for the right type of mounting and installation and of course also the proper selection of heater, cooling unit and control device is depending on several different factors.

For example:

- Ambient temperatures at the mounting place  
indoor rooms / outdoor installation
- Open or closed enclosure
- Extreme temperature gradient between day/night
- Thermal dissipation loss  
(Intrinsic heat of built-in devices)
- Humidity of air
- Is free convection of heating output assured?

We will be glad to assist you in the correct selection. Describe us your application – we select the appropriate device for you or make you a project-related proposal! For your orientation we have compiled some figure based on our experience in the following tables.

## Required heating capacity (values based on experience)

Size of enclosure volume in dm <sup>3</sup>	Installation in indoor rooms		Installation outdoors
	Indoors heated	Indoors unheated	Set up outdoors
up to 20	10 W	20 W	40 W
up to 30	20 W	33 W	55 W
up to 50	30 W	55 W	90 W
up to 75	30 W	75 W	130 W
up to 100	55 W	90 W	150 W
up to 120	55 W	90 W	150 W
up to 160	55 W	130 W	180 W
up to 240	90 W	180 W	235 W
up to 300	90 W	180 W	275 W
up to 420	90 W	180 W	310 W
up to 500	90 W	240 W	360 W
up to 600	90 W	280 W	415 W
up to 800	130 W	280 W	630 W
up to 1000	130 W	280 W	810 W
up to 1200	130 W	360 W	1300 W

Thermal dissipation losses of built-in control switching and command devices are unaccounted for in this table.

**For a more exact calculation of the required heating power, please use the master copy / fax inquiry on the next page.**

## Dew point temperatures (values based on experience)

		Ambient temperature (Ta in °C)								
		20	25	30	35	40	45	50	55	
Relative humidity r.H. in %	40	6	11	15	19	24	28	33	37	Dew point temperature (Tdew in °C)
	50	9	14	19	23	28	32	37	41	
	60	12	17	21	26	31	36	40	45	
	70	14	19	24	29	34	38	43	48	
	80	16	21	26	31	36	41	46	51	
	90	18	23	28	33	38	43	48	53	
	100	20	25	30	35	40	45	50	55	

To successfully prevent formation of condensation water, the temperature inside an enclosure must not drop below dew point temperature.

## Determination of heating/cooling power required

### 1. Surface of cabinet / enclosure according to VDE 0660, part 500

Type of placement	Calculation formula (m <sup>2</sup> )
Single cabinet, free standing	$A = 1,8 \times H \times (W + L) + 1,4 \times W \times L$
Single cabinet, at wall	$A = 1,4 \times W \times (H + L) + 1,8 \times L \times H$
Cabinet wall, left / right end free-standing	$A = 1,4 \times L \times (H + W) + 1,8 \times W \times H$
Cabinet wall, left / right end at wall	$A = 1,4 \times H \times (W + L) + 1,4 \times W \times L$
Cabinet wall, middle part, free-standing	$A = 1,8 \times W \times H + 1,4 \times W \times L + L \times H$
Cabinet wall, middle part, at wall	$A = 1,4 \times W \times (H + L) + L \times H$
Cabinet wall, middle part, at wall + top covered	$A = 1,4 \times W \times H + 0,7 \times W \times L + L \times H$

Fill in to calculate

Length L = \_\_\_\_ m )  
 Width W = \_\_\_\_ m ) Area A = \_\_\_\_ m<sup>2</sup>  
 Height H = \_\_\_\_ m )

### 2. k-value of cabinet material

Steel sheet enclosure, painted:	k = 5,5 W/m <sup>2</sup> /°C	
Polyester enclosure	k = 3,5 W/m <sup>2</sup> /°C	
Aluminium enclosure	k = 12 W/m <sup>2</sup> /°C	
Stainless steel enclosure	k = 3,7 W/m <sup>2</sup> /°C	k = ____ W/m <sup>2</sup> /°C

### 3. Environs facts

T <sub>imax</sub>	Maximum inside temperature permissible	T <sub>imax</sub> = ____ °C
T <sub>imin</sub>	Minimum inside temperature permissible	T <sub>imin</sub> = ____ °C
r.h.	Relative humidity	r.h. = ____ %
T <sub>dew</sub>	Dew point temperature see table 3	T <sub>dew</sub> = ____ °C
T <sub>amin</sub>	Minimal ambient temperature	T <sub>amin</sub> = ____ °C
T <sub>amax</sub>	Maximum ambient temperature	T <sub>amax</sub> = ____ °C
P <sub>loss</sub>	Power loss of the implemented components	P <sub>loss</sub> = ____ W

### 4. Calculation

<b>Heating power</b>	P = A x k x (T <sub>imin</sub> – T <sub>amin</sub> ) - P <sub>loss</sub>	<b>Calculated Power – P =</b> _____
<b>Calculated Power</b>	P = P <sub>loss</sub> – k x A x (T <sub>imax</sub> – T <sub>amax</sub> )	<b>Calculated Power – P =</b> _____

Fax to

**Lm-therm GmbH**  
**Project advisory service**

**Fax No. +49 (0) 8543/6 24 60-40**

Fax from

Company: \_\_\_\_\_

City: \_\_\_\_\_

Street: \_\_\_\_\_

Phone No.: \_\_\_\_\_

Fax No.: \_\_\_\_\_

Contact Person: \_\_\_\_\_

Please calculate required heating power (values as above) P = \_\_\_\_\_

Please calculate required cooling power (values as above) P = \_\_\_\_\_

which controller / sensor for the following problem: \_\_\_\_\_

Please call back: Mr. / Mrs. .... / Phone NO.: .....

Subject: .....

## General details on control cabinet climatization

### 1) Mounting

A uniform heat distribution is obtained by installing the heater in the lower third of the control cabinet – cooling units however should be installed in the upper area.

### 2) Air circulation / convection

It should be attempted not to influence the natural convection of heating by an extreme packing density of built-in components installed. By installation of air circulation fans respectively ventilator heaters, effectiveness and heat distribution can be optimized! Cooling units are equipped with ventilators as a standard.

### 3) Surface temperatures at PTC heaters

Because of high surface temperatures, no sensitive components should be installed directly above or next to the PTC heater. Our heaters with integrated thermostats (see pages 13 – 21) are a safe alternative to PTC heaters because of their lower surface temperature.

### 4) Large control cabinets

For better heat distribution, it is recommended to install always several heater units respectively air circulation fans or blower heaters with separate temperature regulation.

### 5) Tropical version

For using heaters with integrated thermostats in tropical regions and for high heating capacities, it is necessary to raise the heater's intrinsic temperature. Tropical version means: switch-on at  $< 35\text{ °C}$  / switch-off at  $65\text{ °C}$ ! Please note the options when ordering (on each catalogue page)!

### 6) Our heaters with integrated thermostat – Anti-freeze protection

In addition to point 5 please note that we also have devices available for you with temperature setting for pure frost protection operation – see under "options" on separate pages!

### 7) Mounting position – maximum efficiency

Please observe our specifications provided for each device!

### 8) Should separate control devices be installed ?

For heaters with integrated thermostat it is not necessary to install a separate controller. The size of the control cabinet, the number of built-in devices installed and other foreign influences however may be factors for the decision to install a separate control device in spite of it. In case of PTC heaters, a controller should generally be prefixed in line! Price advantage when using heaters with integrated thermostats!

### 9) Electric fuse protection for heaters

Heaters with integrated thermostat are linear and can be fused with consumer current ( $I = P/U$ ). PTC heaters need to be fused with five times consumer current (delayed-action fuse) because of the high switch-on current ( $I = P/U \times 5$ ).

### 10) Fastening and connection (page 11)

Heaters are either snapped onto 35 mm DIN top hat rails or directly screw-tightened (see specifications of devices). Electrical connection can be made via connecting leads or at a connection terminal at the device. (Notes see individual product pages – options!)

### 11) Control technology

We offer a large assortment of electromechanical and electronic control devices (temperature, humidity, sensor technology), see pages 39 – 49 !

**New!**

In case you should not find the control device needed in our delivery program, please inquire nevertheless. Our partner companies are renowned manufacturers – we will try to procure the requested control device.

## 3 Heating systems For industrial applications

### The appropriate solution for your

#### A. Heaters with integrated thermostat (catalogue pages 13 – 21)

Our heaters consist of ceramic heating elements integrated into an aluminum casing designed to thermal specifications with built-in 2-position bi-metal temperature controller. The resistors and power curves of this heating system show linear characteristics.

- 1) The built-in temperature controller provides for operational safety.
- 2) Because of the built-in temperature controller, high surface temperatures that might influence the built-in components in their functional reliability or damage them do not occur.
- 3) Default setting of the built-in temperature controller is preset to a switch-off temperature of 55 °C. This temperature setting can be factory-altered to customers' requirements, for instance for frost protection function.
- 4) Heaters with integrated thermostat can be operated without external temperature controller (price advantage!). In case of particular installation conditions and a demanded high cabinet temperature control accuracy it is of course also possible as well as reasonable to install a separate temperature controller.
- 5) This heating system is energy-saving. At a cabinet temperature of more than 25 °C, the heater does not switch on! (Other settings are possible – see point 3)
- 6) Great variation possibilities in respect of heating capacity, voltage, mounting and installation, connection and enclosure dimensions.
- 7) Operating voltages from 12 V to 750 V.
- 8) Heating capacities from 10 W to 500 W.
- 9) Devices with UL certification.

#### B. PTC heaters – self-regulating (catalogue pages 22 – 26)

Our heaters consist of specifically designed aluminum bodies with inserted PTC elements. Such elements are also called cold conductors or positive temperature coefficient thermistors.

- 1) PTC heaters are self-regulating and dynamically heating up.
- 2) This heating system can be operated within a wide voltage range (110 – 265 V).
- 3) For the case of high packing density of built-in components or existing danger of hazardous contact, we refer to the problem of high surface temperatures (up to 150 °C).
- 4) These heaters do not switch off at a definite point as it is the case with heating units with integrated thermostats. An external control device installed in line control device is recommended. (Control devices see pages 39 – 49).
- 5) Cause of the cold conductor effect, switch-on currents are very high. Please keep this in mind regarding fuse protection and interlinking of heater units.

- Heaters with integrated thermostat
- PTC heaters – self-regulating
- Ventilators and blower heaters

## climatization task!

### C. Ventilators and blower heaters

(catalogue pages 27 – 33)

For heating capacity ranges above 500 W, or also under installation conditions with difficult convection, the application of ventilators and blower heaters is recommended.

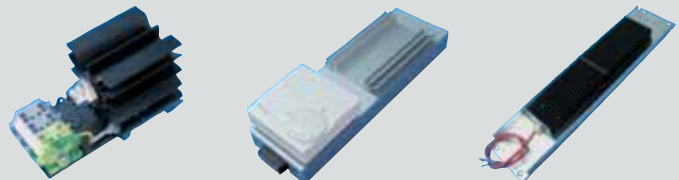
#### Advantages of our devices

- 1) Active convection and very high thermal efficiency because of built-in high-quality ventilators.
- 2) These devices can also provide sufficient heating capacity in more performance-intensive areas (e.g. in colder regions down to  $-40\text{ }^{\circ}\text{C}$ ) (heating capacities from 250 to 8000 W).
- 3) Excess temperature protection functionality by thermo switches or self-regulation respectively.
- 4) Some versions with integrated temperature respectively self-regulation.
- 5) Robust metal constructions made of stainless steel or aluminum.
- 6) Diverse variation alternatives in respect of voltage, heating capacity, fastening. The devices' technical structural concept (platforms) facilitates customer-specific versions.

With all heating systems we realize a great number of customer-specific solutions

- Heating capacities
- Mounting and installation techniques
- Connection techniques
- Enclosure dimensions
- Construction types
- Operating voltages
- Temperature ranges

We will be glad to solve your control cabinet – climatization problem also entirely – in cooperation with our parent company Achter AG (see pages 67 - 79)



Flexible in terms of mounting, installation and connection

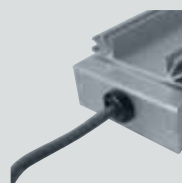
Express your wishes !



Snap fastening



Screw fastening



Connecting leads (AL)



Lead out terminal (DK)

# Industrial heater technology – index by heating capacity

- **3** Heating systems (A - C) for industrial application - look at page 10/11!
- Heaters for general applications (D)
- Ex-heaters / Ex-temperature control

## A) Heaters with integrated thermostat

10...20 W	<b>super-mini</b> .....	Page 13
10...50 W	<b>super-super-mini</b> .....	Page 14
30...90 W	<b>Lm-therm</b> .....	Page 15
33...125 W	<b>LH1502</b> .....	Page 16
130...180 W	<b>maxi</b> .....	Page 17
130...500 W	<b>LH3002</b> .....	Page 18
250...500 W	<b>super-maxi</b> .....	Page 19
180...250 W	<b>Wadi IP 65</b> .....	Page 20
250...380 W	<b>Wadi - LH IP 65</b> .....	Page 21

## B) PTC heaters

5...13 W	<b>LmE016/Lm016/LmP10</b> ..	Page 22
10...20 W	<b>Pssm</b> .....	Page 23
10...50 W	<b>P-25</b> .....	Page 24
20...50 W	<b>P-65 IP 65</b> .....	Page 25
70...300 W	<b>P-80</b> .....	Page 26

## C) Fan heaters / blower heaters

250/500 W	<b>VENTSTAR I</b> .....	Page 27
500 W	<b>VENTSTAR II</b> .....	Page 28
500 W	<b>VAERO</b> .....	Page 29
500/800 W	<b>CIREG</b> .....	Page 30
500/1000 W	<b>COREG</b> .....	Page 31
2000/4000 W	<b>GH2000/GH4000</b> .....	Page 32
4000/8000 W	<b>REVENT</b> .....	Page 33

## D) Heaters for general applications

2,0 – 9,0 KW	<b>electro-heater rod</b> .....	Page 35 (screw-in or fastening flansh) for industrial- or heater water
100 W	<b>SRK-mini</b> .....	Page 36 PTC-heater with integrated thermostat

## E) Ex-heaters / Ex-temperature control

25 – 300 W	<b>ZONE 1/21</b> .....	Page 37
	<b>ZONE 2/22</b> <b>temperature</b> <b>controllers</b> .....	Page 38

# Control cabinet heating device with integrated thermostat




Connection cable AL

Type

**super-mini**

Product group P 1

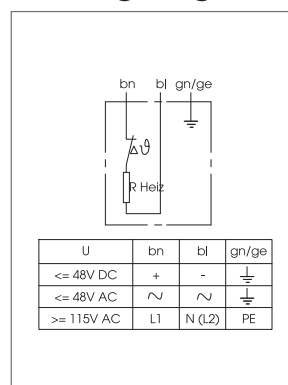
## Standard program

Power rating	Voltage	Temperature settings	Fixture	Connection	Mounting position	Protection class Protection type	Order No.
10 W	230V AC 50/60Hz	On <25°C Off 55°C	Snap-mounting for DIN-rail 35 mm	Connection cable 0,25 m 3x0,75 mm <sup>2</sup>	200g vertical	SK: I IP 54	23010AL0
20 W		(Own temperature)					23020AL0
Options					Notice to the order code		
Voltage	Temperature	Fixture	Connection	<p><b>230 20 AL 0 ***</b></p> <p>Voltage   Power rating   Connection   Art of voltage   Additional options</p> <p>alternatively put in special voltage   only AL possible   DC= 1 AC= 0   </p>			
				<p><input checked="" type="checkbox"/> Longer cable</p> <p>Order index</p> <p>-</p>			
				<p><input checked="" type="checkbox"/> Screw fastening</p> <p>Order index</p> <p>S</p>			
				<p><input checked="" type="checkbox"/> Tropic</p> <p>On&lt;35°C   Off 65°C</p> <p>Order index</p> <p>T</p>			
				<p><input checked="" type="checkbox"/> Anti-freeze</p> <p>On&lt;10°C   Off 40°C</p> <p>Order index</p> <p>F</p>			
	Special voltage		115V	12V,24V,48V DC 12,24,48V	400V		

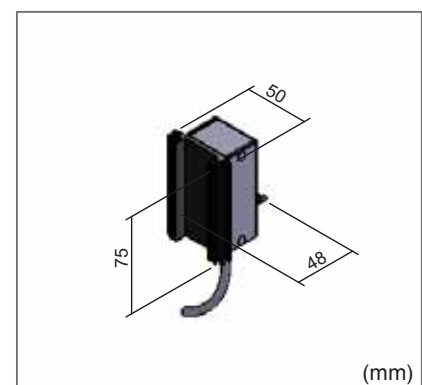
### Notice:

- Slight surface temperature by the use of a integrated thermostat
- No additional thermostat necessary
- Tamper-proof
- Special temperature settings selectable

### Wiring diagram



### Dimensioned drawing



# Control cabinet heating device with integrated thermostat



Connection cable AL

Type

**super-super-mini**

Product group P 1


## Standard program

Power rating	Voltage	Temperature settings	Fixture	Connection	Mounting position	Protection class Protection type	Order No.
10 W	110 – 265 V AC 50/60Hz	On <38°C Off 54°C (Own temperature)	Screw fastening	Connection cable 0,25 m 3x0,75 mm <sup>2</sup>	140g horizontal 51 mm	SK: I  IP 54	26510AL0
20 W					140g horizontal 51 mm		26520AL0
30 W					140g horizontal 51 mm		26530AL0
50 W					170g horizontal 71 mm		26550AL0

## Options

Voltage	Fixture	Connection
Special voltage only at 20 W Length 71 mm	24V	DC 24V

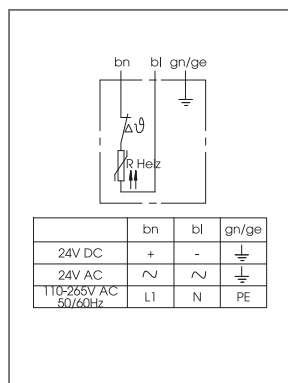
Notice to the order code 230 30 AL 0 ***				
Voltage	Power rating	Connection	Art of voltage	Additional options
alternatively put in special voltage		only AL possible	DC= 1 AC= 0	
⊗ Longer cable				
Order index				
-				

### Notice:

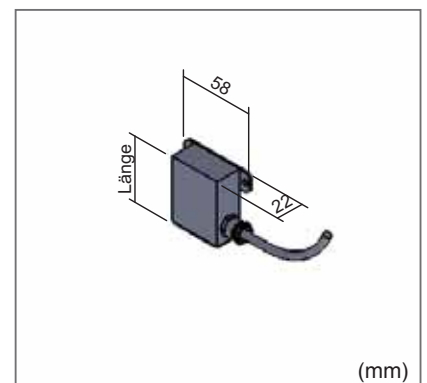
- Slight surface temperature by the use of a integrated thermostat
- No additional thermostat necessary
- Tamper-proof

**New:** Now available with  
UL - approval (E-317613)  
for 230V AC.  
Please use order index ULC

### Wiring diagram



### Dimensioned drawing

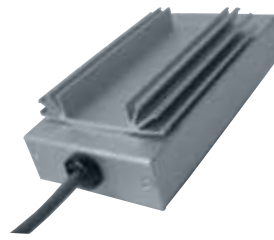


# Control cabinet heating device with integrated thermostat

Type

**Lm-therm**

Product group P 1



Connection cable AL (Standard)



Lead out terminal DK (Option)

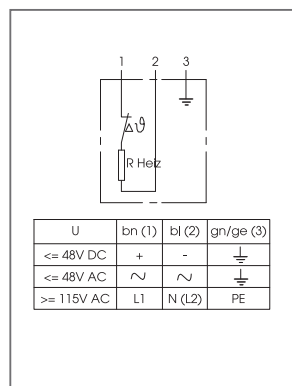
## Standard program

Power rating	Voltage	Temperature settings	Fixture	Connection	Mounting position	Protection class Protection type	Order No.	
30 W	230V 50/60Hz	On <25°C Off 55°C (Own temperature)	Snap-mounting for DIN-rail 35 mm	Connection cable 0,5 m 3x0,75 mm <sup>2</sup>	350g vertical	SK: I IP 54 (IP 20 with DK)	23033AL0	
55 W							23055AL0	
90 W							23090AL0	
Options					Notice to the order code			
Voltage	Temperature	Fixture	Connection	230 55 AL 0 ***				
				Voltage	Power rating	Connection	Art of voltage	Additional options
				alternatively put in special voltage		alternatively put in DK	DC= 1 AC= 0	<input checked="" type="checkbox"/>
						Lead out terminal DK 0,08 - 2,5 mm <sup>2</sup>	<input checked="" type="checkbox"/> Longer cable	
						Order index	Order index	
						DK	-	
				<input checked="" type="checkbox"/> Screw fastening				
				Order index				
				S				
				<input checked="" type="checkbox"/> Tropic		<input checked="" type="checkbox"/> Anti-freeze		
				On<35°C	Off 65°C	On<10°C	Off 40°C	
				Order index	Order index			
				T		F		
	Special voltage		115V	12V,24V,48V	DC 12,24,48V	400V		

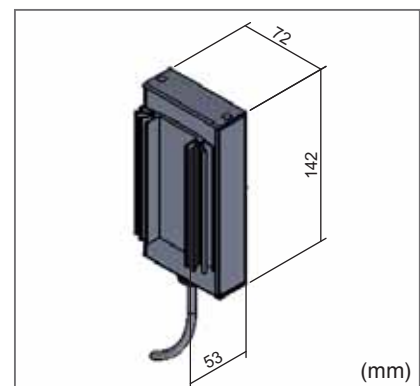
### Notice:

- Slight surface temperature by the use of a integrated thermostat
- No additional thermostat necessary
- Tamper-proof
- Special temperature settings selectable

### Wiring diagram



### Dimensioned drawing



**New:** Now available with  
UL - approval (E-317613)  
for 24V, 48V, 115V, 230V AC  
Please use order index ULC

# Control cabinet heating device with integrated thermostat



Connection cable AL

Type

**LH1502**

Product group P 1

## Standard program

Power rating	Voltage	Temperature settings	Fixture	Connection	Mounting position	Protection class Protection type	Order No.
33 W	230 V AC 50/60Hz	On <35°C Off 65°C (Own temperature)	Snap-mounting for DIN-rail 35 mm	Connection cable 0,5 m 3x0,75 mm <sup>2</sup>	600g  horizontal	SK: I  IP 54	23033LAL0
55 W							23055LAL0
90 W							230100LAL0
125 W							230125LAL0

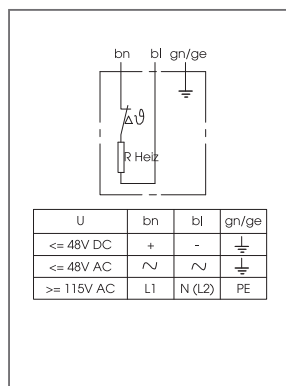
Options				Notice to the order code					
Voltage	Temperature	Fixture	Connection	<b>230 55 L AL 0 ***</b>					
				Voltage	Power rating	Connection	Art of voltage	Additional options	
				alternatively put in special voltage		only AL possible	DC= 1 AC= 0	<input checked="" type="checkbox"/>	
				<input checked="" type="checkbox"/> Longer cable					
				Order index					
				-					
				<input checked="" type="checkbox"/> Screw fastening					
				Order index					
				S					
				<input checked="" type="checkbox"/> Anti-freeze					
				On <10°C		Off 40°C			
				Order index					
				F					
Special voltage		115V	12V,24V,48V DC 12,24,48V	400V					

### Notice:

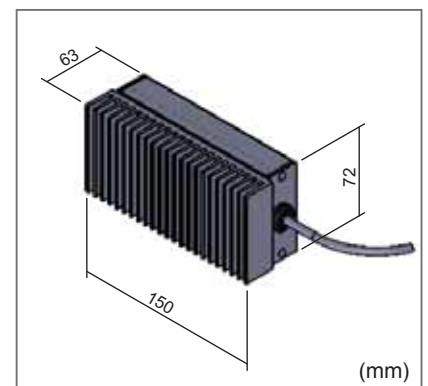
- Slight surface temperature by the use of a integrated thermostat
- No additional thermostat necessary
- Tamper-proof
- Special temperature settings selectable

**New:** Now available with  
UL - approval (E-317613)  
for 24V, 48V,115V,230V AC  
Please use order index ULC

### Wiring diagram



### Dimensioned drawing



# Control cabinet heating device with integrated thermostat

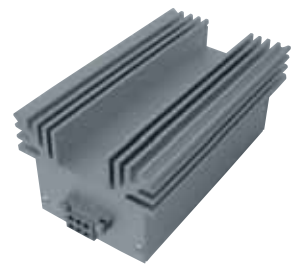
Type

**MAXI**

Product group P 1



Connection cable AL (Standard)



Lead out terminal DK (Option)

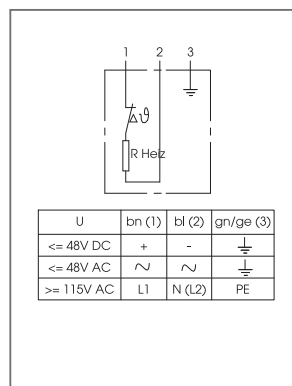
## Standard program

Power rating	Voltage	Temperature settings	Fixture	Connection	Mounting position	Protection class Protection type	Order No.	
130 W	230 V AC 50/60Hz	On <25°C Off 55°C (Own temperature)	Snap-mounting for DIN-rail 35 mm	Connection cable 0,5 m 3x0,75 mm <sup>2</sup>	800g vertical	SK: I IP 54 (IP 20 with DK)	230130AL0	
150 W							230150AL0	
180 W							230180AL0	
Options				Notice to the order code <b>230 130 AL 0 ***</b>				
Voltage	Temperature	Fixture	Connection	Voltage	Power rating	Connection	Art of voltage	Additional options
Special voltage				alternatively put in special voltage		alternatively put in DK	DC= 1 AC= 0	<input checked="" type="checkbox"/> Additional options
					Lead out terminal DK 0,08 - 2,5 mm <sup>2</sup>	<input checked="" type="checkbox"/> Longer cable		
				<input checked="" type="checkbox"/> Screw fastening				
				Order index				
				S				
				<input checked="" type="checkbox"/> Tropic			<input checked="" type="checkbox"/> Anti-freeze	
				On<35°C	Off 65°C	On<10°C	Off 40°C	
				Order index		Order index		
				T		F		
				115V	12V,24V,48V	DC 12,24,48V	400V	440V

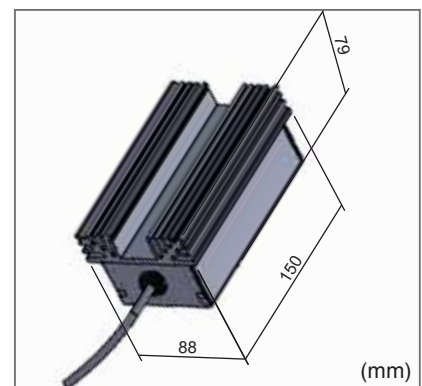
### Notice:

- Slight surface temperature by the use of a integrated thermostat
- No additional thermostat necessary
- Tamper-proof
- Special temperature settings selectable

### Wiring diagram



### Dimensioned drawing



**New:** Now available with  
UL - approval (E-317613)  
for 24V, 48V, 115V, 230V AC  
Please use order index ULC

# Control cabinet heating device with integrated thermostat

Type

**LH3002**

Product group P 1



Connection cable AL  
(Standard)



Lead out terminal DK  
(Option)

## Standard program

Power rating	Voltage	Temperature settings	Fixture	Connection	Mounting position	Protection class Protection type	Order No.
130 W	230 V AC 50/60Hz	On <35°C Off 65°C (Own temperature)	Snap- mounting for DIN-rail 35 mm	Connection cable 0,8 m 3x0,75 mm <sup>2</sup>	1400g	SK: I  IP 54 (IP 20 with DK)	230130LAL0
220 W							230220LAL0
300 W							230300LAL0
400 W							230400LAL0
500 W							230500LAL0

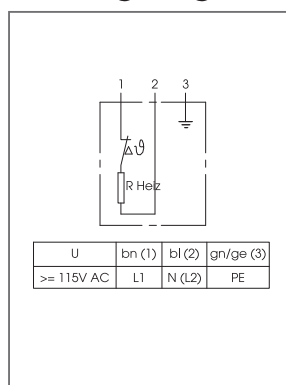
Options				Notice to the order code					
Voltage	Temperature	Fixture	Connection	230 130 L AL 0 ***					
Special voltage		115V	400V	440V	Voltage	Power rating	Connection	Art of voltage	Additional options
					alternatively put in special voltage		alternatively put in DK	DC= 1 AC= 0	<input checked="" type="checkbox"/>
					Lead out terminal DK 0,08 - 2,5 mm <sup>2</sup>		<input checked="" type="checkbox"/> Longer cable		
					Order index	Order index			
					DK	-			
					<input checked="" type="checkbox"/> Screw fastening				
					Order index				
					S				
					<input checked="" type="checkbox"/> Anti-freeze				
					On<10°C	Off 40°C			
					Order index				
					F				

### Notice:

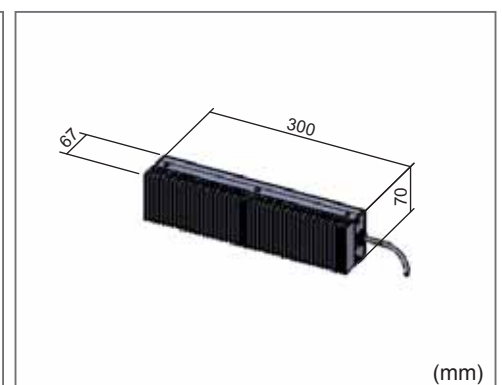
- Slight surface temperature by the use of a integrated thermostat
- No additional thermostat necessary
- Tamper-proof
- Special temperature settings selectable

**New:** Now available with  
UL - approval (E-317613)  
for 24V, 48V,115V,230V AC  
Please use order index ULC

### Wiring diagram



### Dimensioned drawing



# Control cabinet heating device with integrated thermostat

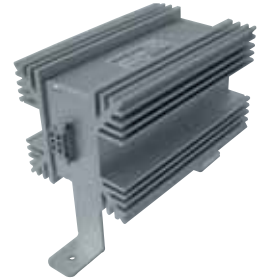
Type

**super-maxi**

Product group P 1



Connection cable AL  
(Standard)



Lead out terminal DK  
(Option)

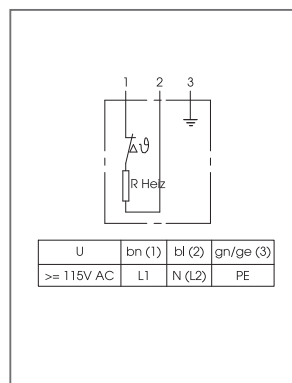
## Standard program

Power rating	Voltage	Temperature settings	Fixture	Connection	Mounting position	Protection class Protection type	Order No.										
250 W	230 V AC 50/60Hz	On <35°C Off 65°C (Own temperature)	Screw fastening	Connection cable 0,5 m 3x0,75 mm <sup>2</sup>	1400g vertical	SK: I  IP 54 (IP 20 with DK)	230250AL0										
500 W							230500AL0										
<b>Options</b>				<p style="text-align: center;">Notice to the order code</p> <p style="text-align: center;"><b>230 250 AL 0 ***</b></p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td>Voltage</td> <td>Power rating</td> <td>Connection</td> <td>Art of voltage</td> <td>Additional options</td> </tr> <tr> <td>alternatively put in special voltage</td> <td></td> <td>alternatively put in DK</td> <td>DC= 1 AC= 0</td> <td><input checked="" type="checkbox"/></td> </tr> </table>				Voltage	Power rating	Connection	Art of voltage	Additional options	alternatively put in special voltage		alternatively put in DK	DC= 1 AC= 0	<input checked="" type="checkbox"/>
Voltage	Power rating	Connection	Art of voltage					Additional options									
alternatively put in special voltage		alternatively put in DK	DC= 1 AC= 0					<input checked="" type="checkbox"/>									
								Lead out terminal DK 0,08 - 2,5 mm <sup>2</sup>		<input checked="" type="checkbox"/> Longer cable							
								Order index		Order index							
				DK		-											
				Only with screw fastening													
				<input checked="" type="checkbox"/> Anti-freeze													
				On <10°C		Off 40°C											
				Order index													
				F													
Special voltage		115V		400V		440V											

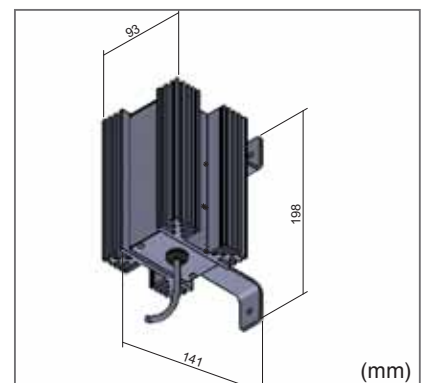
### Notice:

- Slight surface temperature by the use of a integrated thermostat
- No additional thermostat necessary
- Tamper-proof
- Special temperature settings selectable

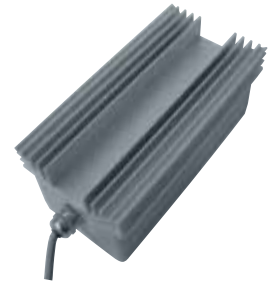
### Wiring diagram



### Dimensioned drawing



# Control cabinet heating device with integrated thermostat



Connection cable AL


Type

**WADI-IP 65**

Product group P 1

### Standard program

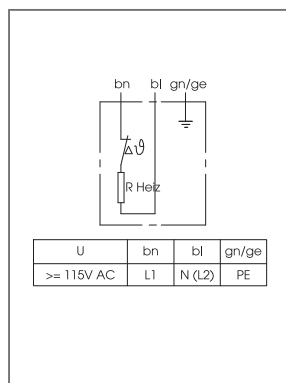
Power rating	Voltage	Temperature settings	Fixture	Connection	Mounting position	Protection class Protection type	Order No.
180 W	230 V AC 50/60Hz	On <25°C Off 55°C	Snap-mounting for DIN-rail 35 mm	Connection cable 0,5 m 3x0,75 mm <sup>2</sup>	1400g  vertical	SK: I	230180WDAL0
250 W		(Own temperature)				IP 65	230250WDAL0

Options				Notice to the order code					
Voltage	Temperature	Fixture	Connection	230 180 WD AL 0 ***					
				Voltage	Power rating	Connection	Art of voltage	Additional options	
				alternatively put in special voltage		only AL possible	DC= 1 AC= 0		
				<input checked="" type="checkbox"/> Longer cable					
				Order index					
				-					
				<input checked="" type="checkbox"/> Screw fastening					
				Order index					
				S					
				<input checked="" type="checkbox"/> Tropic			<input checked="" type="checkbox"/> Anti-freeze		
				On<35°C	Off 65°C	On<10°C	Off 40°C		
				Order index		Order index			
				T		F			
Special voltage				115V	400V	440V			

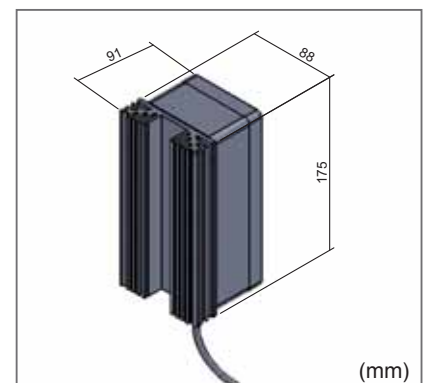
### Notice:

- Slight surface temperature by the use of a integrated thermostat
- No additional thermostat necessary
- Tamper-proof
- Special temperature settings selectable

### Wiring diagram



### Dimensioned drawing



# Control cabinet heating device with integrated thermostat



Connection cable AL

Type

**WADI-LH IP 65**

Product group P 1

### Standard program

Power rating	Voltage	Temperature settings	Fixture	Connection	Mounting position	Protection class Protection type	Order No.
250 W	230 V AC 50/60Hz	On <35°C Off 65°C	Snap-mounting for DIN-rail 35 mm	Connection cable 0,5 m 3x0,75 mm <sup>2</sup>	1600g	SK: I	230250WLAL0
380 W		(Own temperature)				IP 65	230380WLAL0

Options			
Voltage	Temperature	Fixture	Connection
Special voltage		115V	<input checked="" type="checkbox"/> Longer cable
			Order index
			-
			<input checked="" type="checkbox"/> Screw fastening
			Order index
			S
			<input checked="" type="checkbox"/> Anti-freeze
			On<10°C    Off 40°C
			Order index
			F
			Order index

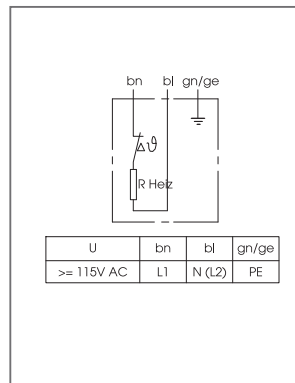
**Notice to the order code**  
**230 250 WL AL 0 \*\*\***

Voltage	Power rating	Connection	Art of voltage	Additional options
alternatively put in special voltage		only AL possible	DC= 1 AC= 0	<input checked="" type="checkbox"/>

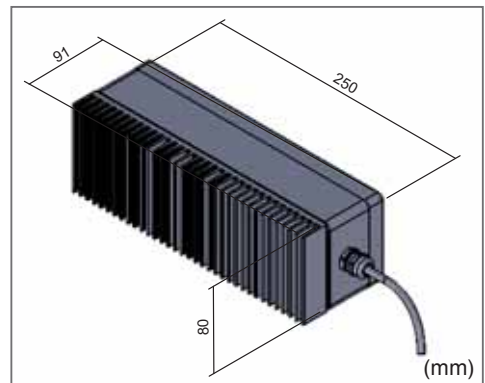
**Notice:**

- Slight surface temperature by the use of a integrated thermostat
- No additional thermostat necessary
- Tamper-proof
- Special temperature settings selectable

**Wiring diagram**

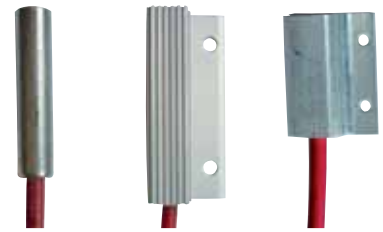


**Dimensioned drawing**



# PTC - Smallheaters

self-adjusting in addition to the ambient temperature



LmE016

Lm016

LmP10

## Type

**LmE016/Lm016/LmP10**

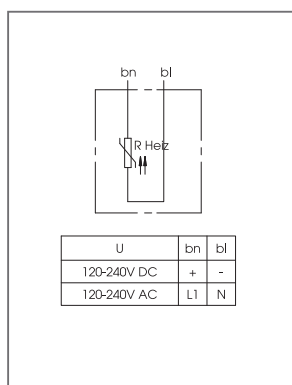
Product group P 1

### Standard program

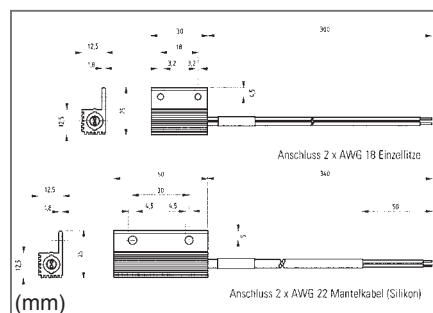
Power rating	Voltage special voltage on demand	Surface temperature (at ambient temperature: 20°C)	Fixture	Connection	Mounting position	Protection class Protection type Approbation	Order No.
5 W	120 – 240 V AC/DC	165° C	Clip	Connection cable 0,5 m	20g any	SK: II IP 32 VDE, UL	LmE016-5W
9 W	120 – 240 V AC/DC	175° C	Clip	Connection cable 0,5 m	20g any	SK: II IP 32 VDE, UL	LmE016-9W
8 W	120 – 240 V AC/DC	150° C	Screw fastening	Connection cable 0,3 m	20g any	SK: II IP 32 VDE, UL	Lm016-8W
10 W	120 – 240 V AC/DC	155° C	Screw fastening	Connection cable 0,34 m	30g any	SK: II IP 32 VDE, UL	Lm016-10W
13 W	110 – 240 V AC/DC	100° C	Screw fastening	Connection cable 0,4 m	18g any	SK: II IP 54 CE	P2651310AL2 (LmP10)

### Dimensioned drawings

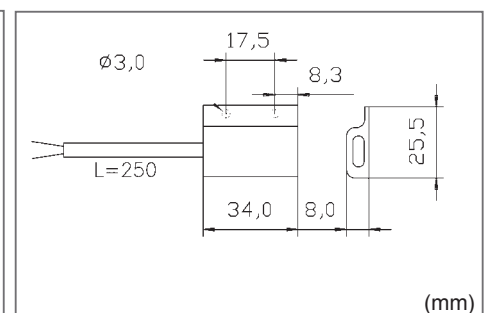
#### Wiring diagram



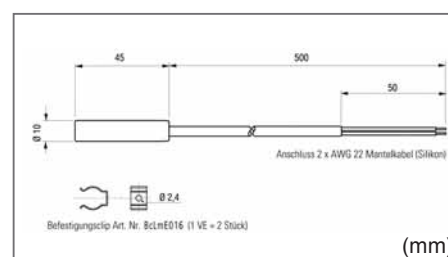
#### Lm016



#### LmP10



#### LmE016



# PTC Control cabinet heating device

self-adjusting in addition to the ambient temperature  
always prefix a controller (see below)

- ! You can find our heaters with integrated thermostat and a slight
- surface temperature on the pages 13 - 21!



Connection cable AL

**Type**  
**P-ssm**

Product group P 1

## Standard program

Power rating starting current	Voltage	Surface temperature (at ambient temperature: 20°C)	Fixture	Connection	Mounting position	Protection class Protection type	Order No.
20 W ca. 2 A	110 – 265 V AC/DC	80°C	Screw-fastening	Connection cable 0,25 m 2x0,75 mm <sup>2</sup> silicone	125g vertical	SK: II IP 54	P26520AL20
30 W ca. 2 A							P26530AL20

### Options

#### Voltage


Special voltage


24V AC/DC

#### Connection

### Notice to the order code

**P 265 20 AL 20 \*\*\***

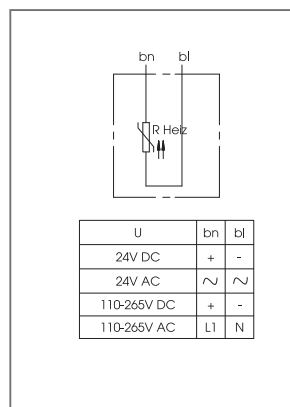
Voltage	Power rating	Connection	Art of voltage	Additional options
alternatively put in special voltage		only AL possible	suitable for AC and DC	

 Longer cable

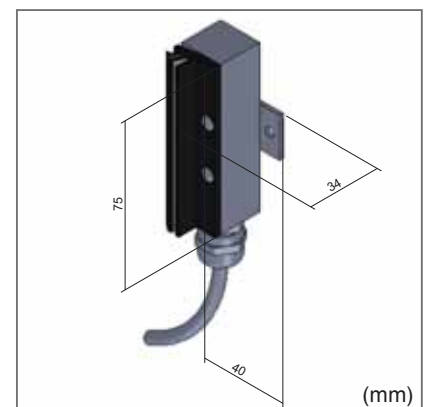
Order index

-

## Wiring diagram



## Dimensioned drawing



### Recommended controllers

- temperature or humidity

#### 2 examples:



**THÖ 1-SG**  
(Thermostat)



**HYWe1-SG**  
(Humidity switch)

Further controllers:  
pages 39 to 49

# PTC Control cabinet heating device

self-adjusting in addition to the ambient temperature  
always prefix a controller (see below)

- ! You can find our heaters with integrated thermostat and a slight
- surface temperature on the pages 13 - 21!



Connection cable AL  
(Standard)



Lead out terminal DK  
(Option)

Type

**P-25**

Product group P 1

## Standard program

Power rating starting current	Voltage	Surface temperature (at ambient temperature: 20°C)	Fixture	Connection	Mounting position	Protection class Protection type	Order No.
10 W ca. 1 A	110 – 265 V AC/DC	110°C	Snap- mounting	Connection cable 0,4 m 2x0,75 mm <sup>2</sup> silicone	300g vertical 70 mm	SK: II IP 54 (IP 20 with DK)	P2651025AL2
20 W ca. 1 A		110°C			300g vertical 70 mm		P2652025AL2
30 W ca. 2 A		115°C			330g vertical 100 mm		P2653025AL2
50 W ca. 2 A		115°C			350g vertical 120 mm		P2655025AL2

Options		Notice to the order code				
Fixture	Connection	<b>P 265 10 25 AL 2 ***</b>				
		Voltage	Power rating	Connection	Art of voltage	Additional options
				only AL possible	suitable for AC and DC	<input checked="" type="checkbox"/>
						<input checked="" type="checkbox"/> Longer cable
						<input type="checkbox"/> Lead out terminal DK 0,08 - 2,5 mm <sup>2</sup>
						Order index
						DK
						-
						<input checked="" type="checkbox"/> Screw fastening
						Order index
						S

**Recommended controllers**

- temperature or humidity

**2 examples:**



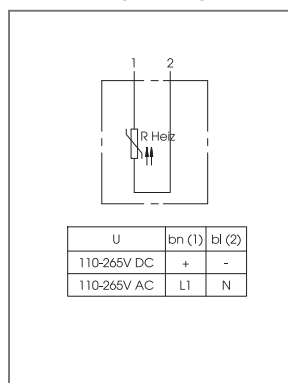
**THÖ 1-SG**  
(Thermostat)



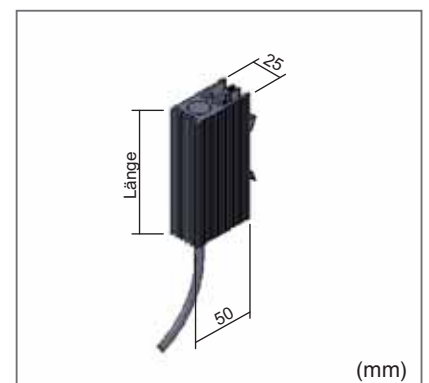
**HYWe1-SG**  
(Humidity switch)

Further controllers:  
pages 39 to 49

## Wiring diagram



## Dimensioned drawing



# PTC Control cabinet heating device

self-adjusting in addition to the ambient temperature  
always prefix a controller (see below)

- ! You can find our heaters with integrated thermostat and a slight
- surface temperature on the pages 13 - 21!



Connection cable AL

**Type**  
**P-65**

Product group P 1

## Standard program


Power rating starting current	Voltage	Surface temperature (at ambient temperature: 20°C)	Fixture	Connection	Mounting position	Protection class Protection type	Order No.
20 W ca. 1 A	110 – 265 V AC/DC	85°C	Snap-mounting	Connection cable 0,4 m 2x0,75 mm <sup>2</sup> silicone	250g vertical 60 mm	SK: II IP 65	P26520AL2
30 W ca. 2 A		80°C			350g vertical 100 mm		P26530AL2
50 W ca. 2 A		90°C			440g vertical 120 mm		P26555AL2


### Options

Voltage
Special voltage only at 20 W
12 - 48V

Fixture	Connection
Only snap-mounting possible	

Notice to the order code  
**P 265 20 AL 2 \*\*\***

Voltage	Power rating	Connection	Art of voltage	Additional options
alternatively put in special voltage		only AL possible	suitable for AC and DC	

 Longer cable

Order index

-

Only snap-mounting possible

### Recommended controllers

- temperature or humidity

#### 2 examples:



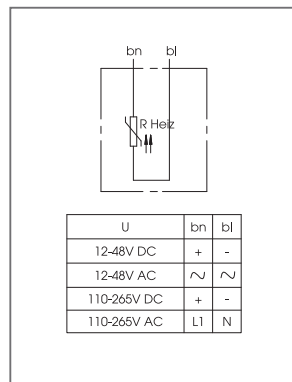
**THÖ 1-SG**  
(Thermostat)



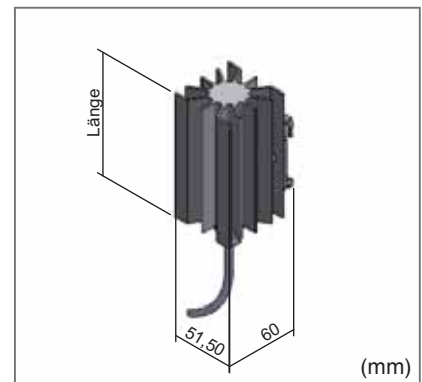
**HYWe1-SG**  
(Humidity switch)

Further controllers:  
pages 39 to 49

### Wiring diagram



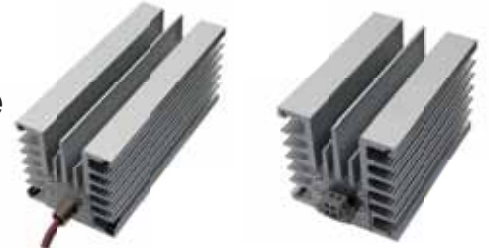
### Dimensioned drawing



# PTC Control cabinet heating device

self-adjusting in addition to the ambient temperature  
always prefix a controller (see below)

- ! You can find our heaters with integrated thermostat and a slight
- surface temperature on the pages 13 - 21!



Product group P 1  
(Standard)

Lead out terminal DK  
(Option)



Device with auxiliary fan mounted for optimum heat distribution  
(Option)

Type

**P-80**

Product group P 1

## Standard program

Power rating starting current	Voltage	Surface temperature (at ambient temperature: 20°C)	Fixture	Connection	Mounting position	Protection class Protection type	Order No.
70 W ca. 2 A	110 – 265 V AC/DC	80°C	Snap-mounting	Connection cable 0,5 m 2x0,75 mm <sup>2</sup> silicone	1000g vertical 120 mm	SK: II  IP 54 (IP 20 with DK)	P2657080AL2
100 W ca. 2 A		85°C			1000g vertical 120 mm		P26510080AL2
150 W ca. 3 A		120°C			1200g vertical 150 mm		P26515080AL2
200 W ca. 4 A		125°C			1200g vertical 150 mm		P26520080AL2
250 W ca. 5 A		120°C			1500g vertical 180 mm		P26525080AL2
300 W ca. 5 A		130°C			1500g vertical 180 mm		P26530080AL2

### Options

Fixture	Connection	Notice to the order code <b>P 265 70 80 AL 2 ***</b>				
		Voltage	Power rating	Connection	Art of voltage	Additional options
				alternatively put in DK	suitable for AC and DC	<input checked="" type="checkbox"/>
		Lead out terminal DK 0,08 - 2,5 mm <sup>2</sup>		<input checked="" type="checkbox"/> Longer cable		
		Order index		Order index		
		DK		-		
<input checked="" type="checkbox"/> Screw fastening	<input checked="" type="checkbox"/> With ventilator					
Order index	Order index					
S						

### Recommended controllers

- temperature or humidity

2 examples:



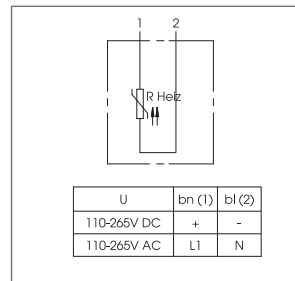
THÖ 1-SG  
(Thermostat)



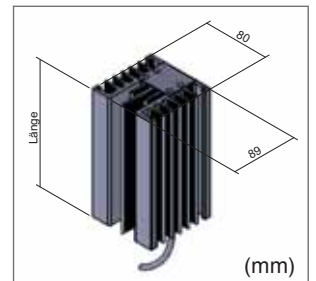
HYWe1-SG  
(Humidity switch)

Further controllers:  
pages 39 to 49

### Wiring diagram



### Dimensioned drawing



# Fan heater

**Type**  
**Ventstar I**

Product group P 1

Our "tough one" for the control cabinet!  
Very vibration-proof!



- Mechanically robust and vibration-proof
- High outblow temperature
- Powder-coated surface
- Temperature limit in case of heat accumulation

## Standard program


Power rating	Voltage	Fixture	Connection	Mounting position	Protection class Protection type	Order No.
250 W	230 V AC 50/60 Hz	Snap-mounting	Connection cable 0,5 m 3 x 0,75 mm <sup>2</sup>	1,25 kg vertical 138 mm	SK: I IP 20	230250VSAL0
500 W				2,0 kg vertical 205 mm		230500VSAL0

Options			Notice to the order code <b>230 250 VS AL 0 ***</b>				
Voltage	Fixture	Connection	Voltage	Power rating	Connection	Art of voltage	Additional options
Special voltage		Screw fastening	alternatively put in special voltage		only AL possible	only AC possible	⊗
			⊗ Longer cable				
							Order index
							-
							Order index
							S
							115V AC 50/60 HZ

**Recommended controllers**

- temperature or humidity

**2 examples:**



**THÖ 1-SG**  
(Thermostat)



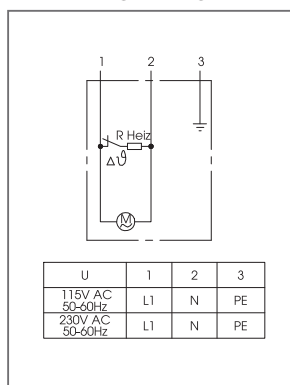
**HYWe1-SG**  
(Humidity switch)

Further controllers:  
pages 39 to 49

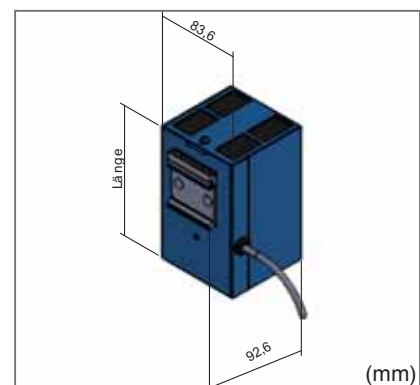
### Further technical details:

- **Fan function:**
  - permanent at operating voltage
  - optional over own supply line
- **Outblow temperature (10 cm distance):**
  - 500W-device : ca. 81°C
  - 250W-device : ca. 40°C
- **Enclosure temperature:** ca. 70° C higher at the air outlet
- **Temperature limiter:** 71° C ± 7,5 K switching differential
- **Air capacity:** 30m<sup>3</sup>/h
- **Fan durability:** 50 000 h

### Wiring diagram



### Dimensioned drawing



# Fan heater

Our "Low cost variant" for the control cabinet!



**Type**  
**Ventstar II**

Product group P 1

- Low outblow temperature - important for integrated units
- Lightweight construction (look at index)
- Temperature limit in case of heat accumulation
- Lead out terminal

## Standard program

Power rating	Voltage	Fixture	Connection	Mounting position	Protection class Protection type	Order No.
500 W	230 V AC 50/60 Hz	Snap-mounting	Lead out terminal 0,08 - 2,5 mm <sup>2</sup>	1,0 kg vertical	SK: I IP 20	230500V2DK0

**Options**


**Voltage**

Special voltage

115V AC  
50/60 Hz

Notice to the order code


**230 500 V2 DK 0 \*\*\***

Voltage	Power rating	Connection	Art of voltage	Additional options
alternatively put in special voltage		only DK possible	only AC possible	


### Recommended controllers

- temperature or humidity

**2 examples:**



**THÖ 1-SG**  
(Thermostat)



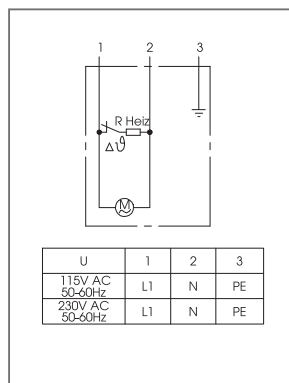
**HYWe1-SG**  
(Humidity switch)

Further controllers:  
pages 39 to 49

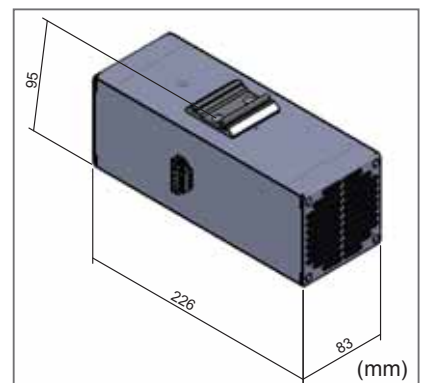
### Further technical details:

- **Fan function:**  
→ permanent at operating voltage
- **Outblow temperature (10 cm distance):**  
500W-device : ca. 60°C
- **Enclosure temperature:** ca. 50°C  
higher at the air outlet
- **Temperature limiter:** 71° C ± 7,5 K  
switching differential
- **Air capacity:** 30m<sup>3</sup>/h
- **fan durability:** 50 000 h

### Wiring diagram



### Dimensioned drawing



# Fan heater

Our "universal one" made from stainless steel! Controller integrated. Option temperature/humidity! Air outlet on the side



With air-circulation-thermostat 0-35°C adjustable from outside

**Type**  
**Vaero**

Product group P 1

- Dynamic heat output due to PTC-Register
- Optimal installation possibility on the cabinet-sidewall
- Slight surface temperature
- Ball bearing mounted fan
- High class stainless steel enclosure

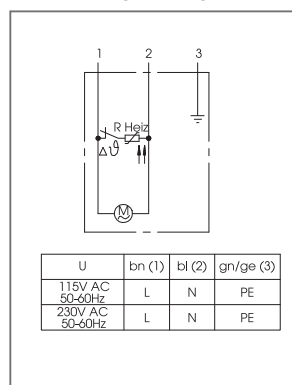
## Standard program

Power rating	Voltage	Integrated controller	Fixture	Connection	Mounting position	Protection class Protection type	Order No.
500 W	230 V AC 50/60 Hz	Air-circulation-thermostat 0 - 350 C	Snap-mounting	Cable 0,5 m 3 x 0,75 mm <sup>2</sup>	1,25 kg vertical Air output above or sideways	SK: I IP 20	230500VRAL0
<b>Options</b>					<b>Notice to the order code</b> <b>230 500 VR AL 0 ***</b>		
Voltage		Controlling		Fixture		Connection	
Special voltage		Capillary thermostat		Screw fastening stainless steel		Longer cable	
		Order index KT		Order index S		Order index DK	
		Hygrostate		Order index HY			
		115V AC 50/60 Hz					

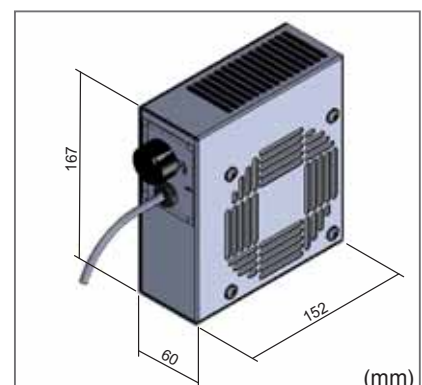
### Further technical details:

- **Fan function:**
  - > permanent at operating voltage
  - > with controller (specify GL at order)
- **Outblow temperature (10 cm distance):** ca. 82°C
- **Enclosure temperature:** ca. 30°C higher at the air outlet
- **Air capacity:** 120m<sup>3</sup>/h
- **Fan durability:** 50 000 h

### Wiring diagram



### Dimensioned drawing



# Fan heater



**Type**  
**Cireg**

Product group P 1

Stainless steel enclosure  
- up to 800W heat out-  
put, massive air-outlet-  
surface, very good heat  
distribution

- Dynamic heat output due to PTC-Register
- Very flat construction
- Slight surface temperature
- Massive air outlet surface
- Ball bearing mounted fan
- High class stainless steel enclosure
- Variable fixing possibilities


## Standard program

Power rating	Voltage	Fixture	Connection	Mounting position	Protection class Protection type	Order No.
500 W	230 V AC 50/60 Hz	Snap- mounting	Lead-out terminal 0,08 – 2,5 mm <sup>2</sup>	1,1 kg vertical Air output above or sideways	SK: I IP 20	230500CIDK0
800 W				1,1 kg vertical Air output above or sideways		2301000CIDK0
<b>Options</b>				<b>Notice to the order code</b>		
<b>Voltage</b>		<b>Fixture</b>		<b>230 500 CI DK 0 ***</b>		
Special voltage				Voltage	Power rating	Connection
				alternatively put in special voltage	only DK possible	Art of voltage
						only AC possible
						Additional options
						⊗
				⊗ Screw fastening stainless steel	⊗ Air baffle stainless steel	
				Order index	Order index	
				S	LB	
				115V AC 50/60 Hz		


**Recommended controllers**

- temperature or humidity

**2 examples:**



**TH0 1-SG**  
(Thermostat)



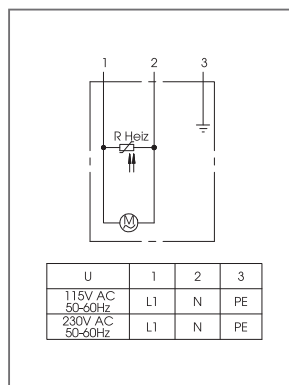
**HYWe1-SG**  
(Humidity switch)

Further controllers:  
pages 39 to 49

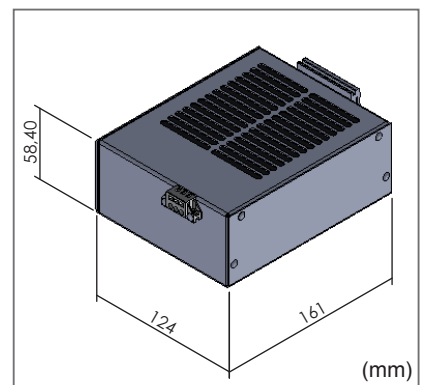
### Further technical details:

- **Fan function:**  
→ permanent at operating voltage
- **Outblow temperature (10 cm distance):** ca. 74°C
- **Enclosure temperature:** ca. 30°C  
higher at the air outlet
- **Air capacity:** 120m<sup>3</sup>/h
- **Fan durability:** 50 000 h

### Wiring diagram



### Dimensioned drawing



# Fan heater

**Type**  
**Coreg**

Product group P 1


Stainless steel enclosure  
- up to 800W heat output,  
options at the integrated  
controller  
(temperature or humidity)

With air-circulation-  
thermostat 0-35°C  
adjustable from outside



- Dynamic heat output due to PTC-Register
- Slight surface temperature
- Massive air outlet surface
- Ball bearing mounted fan
- High class stainless steel enclosure

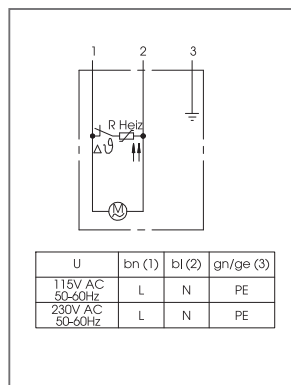
## Standard program

Power rating	Voltage	Integrated controller	Fixture	Connection	Mounting position	Protection class Protection type	Order No.
500 W	230 V AC 50/60 Hz	Air-circulation- thermostat 5 - 35°C	Snap- mounting	Cable 0,5 m 3 x 0,75 mm <sup>2</sup> Ölflex	1,2 kg vertical Air output above or sideways	SK: I IP 20	230500CRAL0
1000 W							2301000CRAL0
Options					Notice to the order code		
					<b>230 500 CR AL 0 ***</b> Voltage   Power rating   Connection   Art of voltage   Additional options <small>alternatively put in special voltage</small>     <small>alternatively put in DK</small>   <small>only AC possible</small>   		
					<input checked="" type="checkbox"/> Lead out terminal 0,08 – 2,5 mm <sup>2</sup>	<input checked="" type="checkbox"/> Longer cable	
					Order index DK	Order index -	
					<input checked="" type="checkbox"/> Screw fastening stainless steel	<input checked="" type="checkbox"/> Air baffle stainless steel	
					Order index S	Order index LB	
					<input checked="" type="checkbox"/> Capillary thermostat	<input checked="" type="checkbox"/> Hygrostate	
					Order index KT	Order index HY	
	Special voltage						115V AC 50/60 Hz

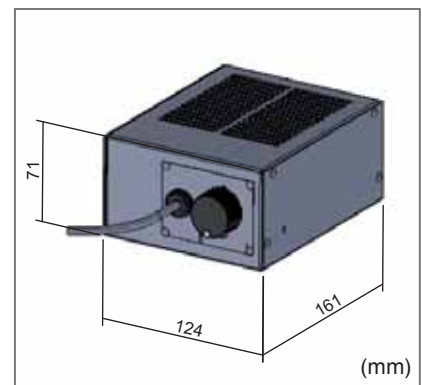
### Further technical details:

- **Fan function:**
  - > permanent at operating voltage
  - > with controller (specify GL at order)
- **Outblow temperature (10 cm distance):** ca. 84°C
- **Enclosure temperature:** ca. 30°C  
higher at the air outlet
- **Air capacity:** 120m<sup>3</sup>/h
- **Fan durability:** 50 000 h

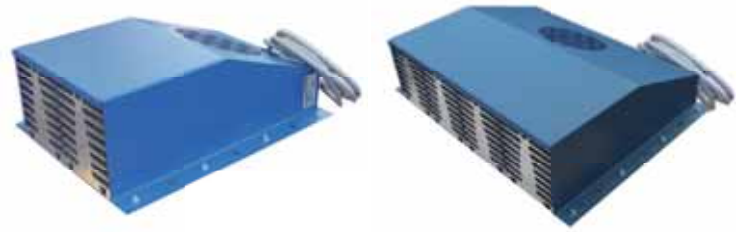
### Wiring diagram



### Dimensioned drawing



# Blower heater



Type

**GH2000 / GH4000**

Product group P 1



- High air capacity, thus optimal air-circulation operating
- Equal heat distribution due to 2/4 sep. mounted heating blocks
- Temperature limit 71°C (+/- 7,5 K Difference) at fan blackout or overheat
- Powder-coated enclosure

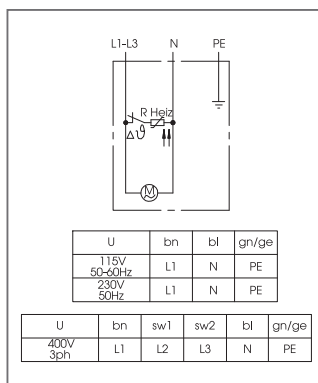
## Standard program

Power rating	Voltage AC 50/60 Hz	Fixture	Connection	Mounting position	Protection class Protection type	Order No.
<b>GH2000</b>						
2000 W	115 V	Screw fastening	Connection cable 2 m 3 x 1,5 mm <sup>2</sup>	10 kg Air output above or sideways	SK: I IP 20	1152000G2AL0
2000 W	230 V					2302000G2AL0
2000 W	400 V 3ph					4002000G2AL0
<b>GH4000</b>						
4000 W	115 V	Screw fastening	Connection cable 2 m 3 x 1,5 mm <sup>2</sup>	16,5 kg Air output above or sideways	SK: I IP 20	1154000G4AL0
4000 W	230 V					2304000G4AL0
4000 W	400 V 3ph					4004000G4AL0

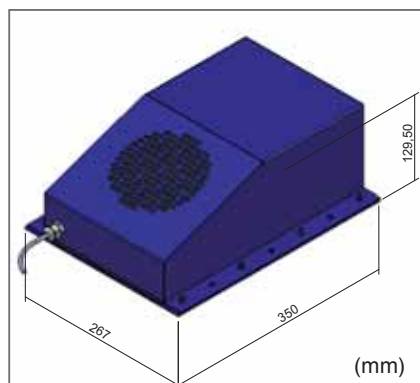
## Further technical details:

- **Fan function:**
  - > permanent at operating voltage
  - > optional over own supply line
  - for example separate regulation of the fans or other voltages
- **Air capacity:** 570m<sup>3</sup>/h
- **Fan durability:** 50 000 h
- **Outblow temperature (10 cm distance):**
  - GH2000 2kW: ca. 43°C, GH4000 4kW: ca. 53°C
- **Enclosure temperature:** ca. 35°C higher at the air outlet

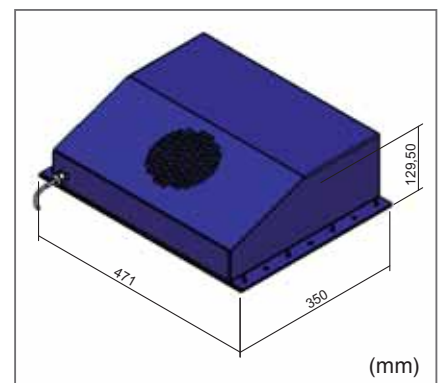
## Wiring diagram



## Dimensioned drawing



GH2000-Unit

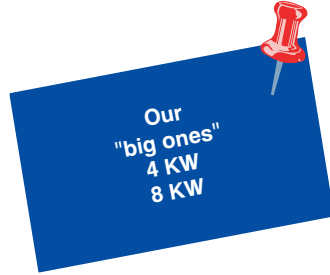


GH4000-Unit

# Kabinen-Gebläseheizung

**Type**  
**Revent**

Product group P 1



- Very high air capacity
- Air-circulation operating for cabinwarming
- Integrated hot air recirculation for heating up blower (at extremely cold areas)
- Mechanically robust for mobile using
- Dynamic heat output due to PTC-Register
- Powder-coated enclosure
- PUR-screw connection and PUR-indoor wiring
- Air intake filter optionally screw-on (on demand)

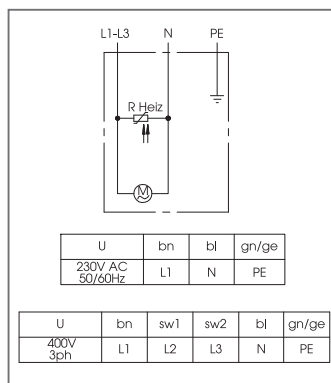
## Standard program

Power rating	Voltage AC 50/60 Hz	Fixture	Connection	Mounting position	Protection class Protection type	Order No.
4000 W	230 V	Screw fastening	Connection cable 2 m 3 x 1,5 mm <sup>2</sup>	19 kg any	SK: I IP 20	2304000RVAL0
4000 W	400 V 3 ph		Connection cable 2 m 5 x 1,5 mm <sup>2</sup>			4004000RVAL0
8000 W	230 V		Connection cable 2 m 3 x 2,5 mm <sup>2</sup>			2308000RVAL0
8000 W	400 V 3 ph		Connection cable 2 m 5 x 2,5 mm <sup>2</sup>			4008000RVAL0

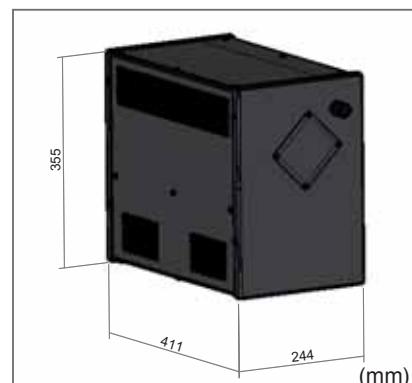
## Further technical details:

- **Fan function:**
  - permanent at operating voltage
  - optional over own supply line for example separate regulation of the fans or other voltages
- **Air capacity:** 815m<sup>3</sup>/h
- **Fan durability:** ca. 60 000 h
- **Outblow temperature (10 cm distance):** ca. 93°C
- **Enclosure temperature:** ca. 70° C higher at the air outlet

## Wiring diagram



## Dimensioned drawing



# Heaters and control systems for general operating range

– In cooperation with the head office Achter AG –

In the last years, Lm-therm has realized lots of customized heatersolutions , for example heaters for dryers in clinic range, air-dryer-devices for high-voltage-technology, cabinheaters for crane and control desks etc.!

(For accessible reasons it isn't permitted to show or describe customized products closer.)

Because of this progress the number of heaters for other industry uses and the number of special solutions, Lm-therm offers, always increases. The heaters, shown on the next pages, are our actual newcomers.

The same strategy is pursued in the area of the control systems ... not only controller for a control cabinet, but also for general industry uses!

Meanwhile we supply many costumers even with controllers for the servicerange, for example warehouses, factory building etc.

**Our request - our offer for you!**

If you have heater and controllertechnical requirements, which do not have directly to do with control cabinets or enclosure, please also apply to us.

---

## Table of contents

<b>Electronic heater rod</b> .....	page 35
<b>Smallheater with thermostat</b> .....	page 36
<b>Ex-heaters</b> .....	page 37
<b>Ex-thermostat</b> .....	page 38

# Elektro-Heating Rods fixture-nipple 1 1/2 "

(Flange-fixture Ø 180 mm on demand)

With Temperature controller and limiter

Product group P15



Auxiliary heating for industrial- or heater water in boilers, water reservoirs etc. More device-variants on demand (switches, lamps, contactor integrated, immersion-length etc.)

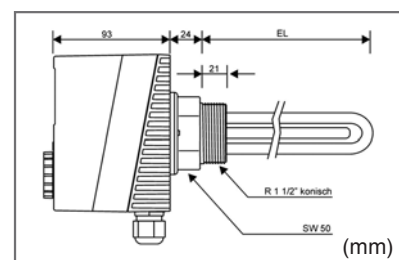
## Standard program

	Power rating	Voltage	Immersion-length (EL) Unheated zone (UB)	Order No.
<b>Industrial water</b> Cronifer 1.4529	2,0 kW	3 x 400 V	300 mm 150 mm	EHK-B2,0
	3,0 kW	3 x 400 V	400 mm 150 mm	EHK-B3,0
	3,8 kW	3 x 400 V	450 mm 150 mm	EHK-B308
	4,5 kW	3 x 400 V	500 mm 150 mm	EHK-B4,5
	6,0 kW	3 x 400 V	600 mm 150 mm	EHK-B6,0
	7,5 kW	3 x 400 V	700 mm 150 mm	EHK-B7,5
	9,0 kW	3 x 400 V	800 mm 150 mm	EHK-B9,0
<b>Heater water</b> CN18/8 1.4541	2,0 kW	3 x 400 V	300 mm 150 mm	EHK-H2,0
	3,0 kW	3 x 400 V	400 mm 150 mm	EHK-H3,0
	3,8 kW	3 x 400 V	450 mm 150 mm	EHK-H308
	4,5 kW	3 x 400 V	500 mm 150 mm	EHK-H4,5
	6,0 kW	3 x 400 V	600 mm 150 mm	EHK-H6,0
	7,5 kW	3 x 400 V	700 mm 150 mm	EHK-H7,5
	9,0 kW	3 x 400 V	800 mm 150 mm	EHK-H9,0

## Notice

- EHK** The heater consists of three U-formed pipe-heaters, which are soldered in a press-brass-nipple 1 1/2".
- TR** Electromechanic thermostat in accord to DIN 3440, not burstproof.
- STB** Electromechanic temperature limiter in accord to DIN 340, burstproof. By reaching the turn-off-temperature, the switchgear turns off and stays locked in this position. The unlock happens manually after the sensepipe has cooled down by about 10K.

## Dimensioned drawing



EL = immersion-length (look at index )

Further technical information (wiring diagrams) on demand (request data sheets)

# Smallheaters with thermostat

**Type**  
**SRK-mini-AL**

Product group P1



PTC-heater with integrated thermostat

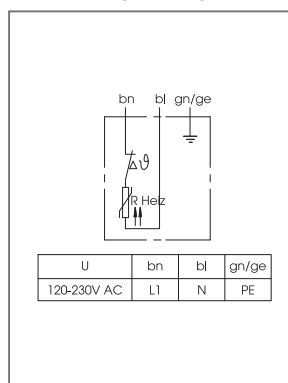
## Standard program

Power rating starting current	Voltage	Temperature settings	Fixture	Connection	Mounting position	Protection class Protection type	Order No.
100 W ca. 4 A	115 - 230 V AC 50/60Hz	On <50°C Off 75°C	Screw fastening	Connection cable 60 cm 3x0,5 mm <sup>2</sup> (UL/CSA)	220g  vertical	IP 20  SK: I	265100ULAL0

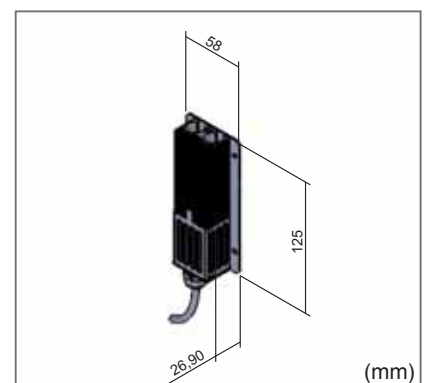
This heater was specially developed for the temperature control of protective casings in extremely cold climate regions. Through special thermal decoupling of the integrated thermostat in the heater, the complete heat output is available. After the completion of the heating-up process, the thermostat begins to control energy-efficient.

**New:** Now available with  
UL - approval (E-317613)  
Please use order index ULC

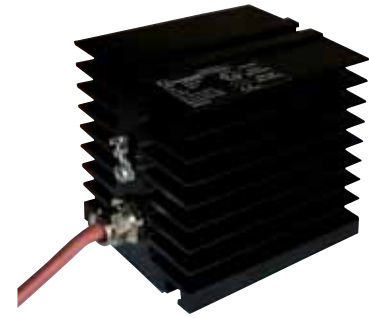
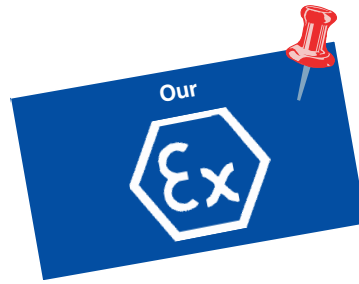
## Wiring diagram



## Dimensioned drawing



# Heater for EX-Zone 1/21 and 2/22



**Type**  
**Ex-H**

Product group P13

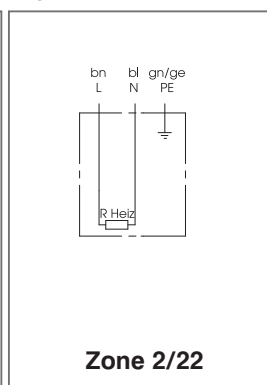
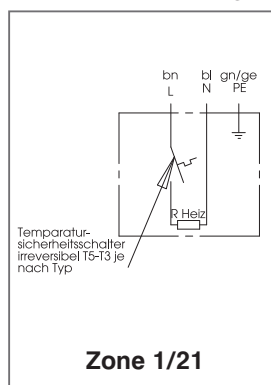
## Standard program

Power rating	Voltage	Surface temperature	Fixture	Connection	Mounting position	Length	Order No.
<b>Zone 1/21</b>							
25 W	230 V	100° C	Snap-mounting for DIN-rail 35 mm	Connection cable 1 m SIHF-JZ 3 x 1,5 mm <sup>2</sup>	1,2 kg vertical	65 mm	23025E1AL0
70 W	230 V	135° C			2,0 kg vertical	120 mm	23070E1AL0
100 W	230 V	135° C			2,5 kg vertical	150 mm	230100E1AL0
200 W	230 V	200° C			3,5 kg vertical	250 mm	230200E1AL0
300 W	230 V	200° C			5,0 kg vertical	250 mm	230300E1AL0
<b>Zone 2/22</b>							
25 W	230 V	100° C	Snap-mounting for DIN-rail 35 mm	Connection cable 1 m SIHF-JZ 3 x 1,5 mm <sup>2</sup>	1,2 kg vertical	65 mm	23025E2AL0
70 W	230 V	135° C			2,0 kg vertical	120 mm	23070E2AL0
100 W	230 V	135° C			2,5 kg vertical	150 mm	230100E2AL0
200 W	230 V	200° C			3,5 kg vertical	250 mm	230200E2AL0
300 W	230 V	200° C			5,0 kg vertical	250 mm	230300E2AL0

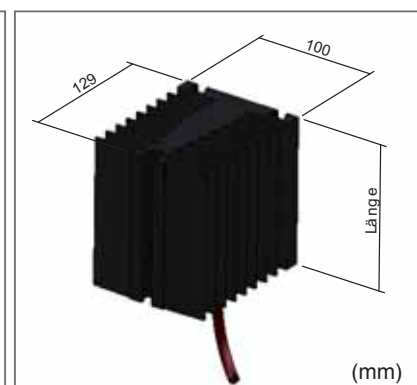
### Technical details:

- **Explosion protection in accord with Atex-directive 94/9/EG**
- **Heating element:** high performance cartridge
- **Radiator:** aluminium profile black anodized
- **Operating-/storage temperature:** -40 up to +40 °C
- **Protection class:** IP66/67
- **Protection type:** I (ground wire)

### Wiring diagram



### Dimensioned drawing



# Thermostats zones 1/21 and 2/22

## ATH-EXx

### Product group P12

EC type examination according to ATEX directive 94/9EG for explosive gas atmospheres zones I and II and explosive dust atmospheres zones 21 and 22



Thermostats without remote sensor lead upon request

### Standard program

Item No.	Type	Control range (RB) °C	Material measuring System	Remote sensor lead length mm	Sensor ø x length mm
ATH1242	•	-20 ... +50	CrNi	2000	6 x 153
ATH1243	•	0 ... +50			6 x 202
ATH1244	•	+40 ... +120			6 x 135
ATH1246	•	+50 ... +300			6 x 67
ATH1247	◦	+40 ... +120			6 x 117
ATH1248	◦	+50 ... +120			6 x 60

- Temperature monitor
- Break-proof temperature monitor

Further technical details upon request!

### Brief description

Series ATH-Ex explosion-proof built on thermostats control and monitor thermal processes and can be installed directly in potential explosive areas – zone I and zone 21.

These devices are available as temperature monitors TW and as break-proof temperature monitors STW. Ex-proof thermostats function based on the principle of liquid or gas expansion. The electric switching element is a pressure-proof enclosed microswitch.

### Ex-marking

- Ⓔ II 2GEx ed IIC T6 for explosive gas atmospheres
- Ⓔ II 2DIP65 T80°C für for explosive dust atmospheres

### Explosion protection

- Ⓔ II 2G device group II, category 2, equipment for explosive gas atmospheres
- Ⓔ II 2G device group II, category 2, equipment for explosive dust atmospheres

### Type of protection:

#### EEx ed IIC T6

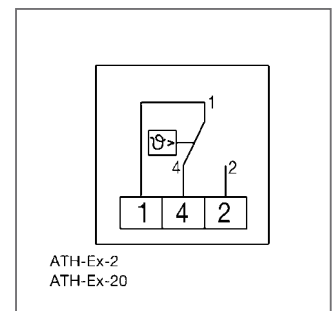
EEX	General regulation	European standard EN 50014 / VDE 0170 / 0171 part 1
e	Increased safety	European standard EN 50019 / VDE 0170 / 0171 part 6
d	Pressure-proof enclosure	European standard EN 50018 / VDE 0170 / 0171 part 5
IIC	Gas group	
T6	Temperature class	

#### IP65 T80°C

Use in flammable dusts European standard EN 50281-1-1 / VDE 0170 / 0171 part 15-1-1

IP65 T80°C Protection type according to EN 60529-IP max. permissible surface temperature (use in flammable dusts)

### Wiring diagram



### New:

Ex-thermostat:  
Fixed temperature setpoints  
(on demand)



# Control technology – Temperature/Humidity/Sensor technology for industrial applications

## → Searchindex by installation type

### Temperature controller – Thermostats

Installation: DIN-rail	(electromechanic/electrical) .....	Page 40/41
Installation: Air-duct - wall - pipe	(electromechanic/electrical) .....	Page 42/43
Installation: Front-board-mounting	(electronical) .....	Page 44/45

### Humidity control - humidity switch

Installation: DIN-rail - air duct - wall	(electromechanic/electrical) .....	Page 46/47
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### Sensor technology

Sensors	(temperature/humidity).....	Page 48
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## → Searchindex for technology

Technology	Details	Page
Thermostats - <u>electromechanic-</u>	Bimetal/capillary inner-/outerscale IP 20, 30, 54 range of temperature: 0 – 60°C 24V – 250V AC/DC further ranges (up to 230°C) on demand	40 - 43
Thermostats - <u>electrical-</u>	Internal-feeler, remote-feelerr NTC, PTC analog, digital IP 20, 40, 54 range of temperature: 0 – 60°C 24V – 250V AC/DC further ranges (up to 230°C) on demand	41 - 45
Humidity switch - <u>electromechanic/electrical</u>	Synthetic fiber inner-/outerscale IP 20, 30, 65 Internal-feeler, remote-feeler adjustment range 30 – 100% rH	46 - 47
Sensors PT 100, PT 1000, Ni 1000, Ni 1000 TK 5000, NTC 10K, NTC 20K, LM 235Z, KTY	Enclosure standard-programm costumized variants	48

# Temperature controller – For installation on DIN-rails

Product group P4

- electrical
- electromechanic (bimetal/capillary)

**Usage:**

2-point-controller, regulation of heating- and coolingdevices

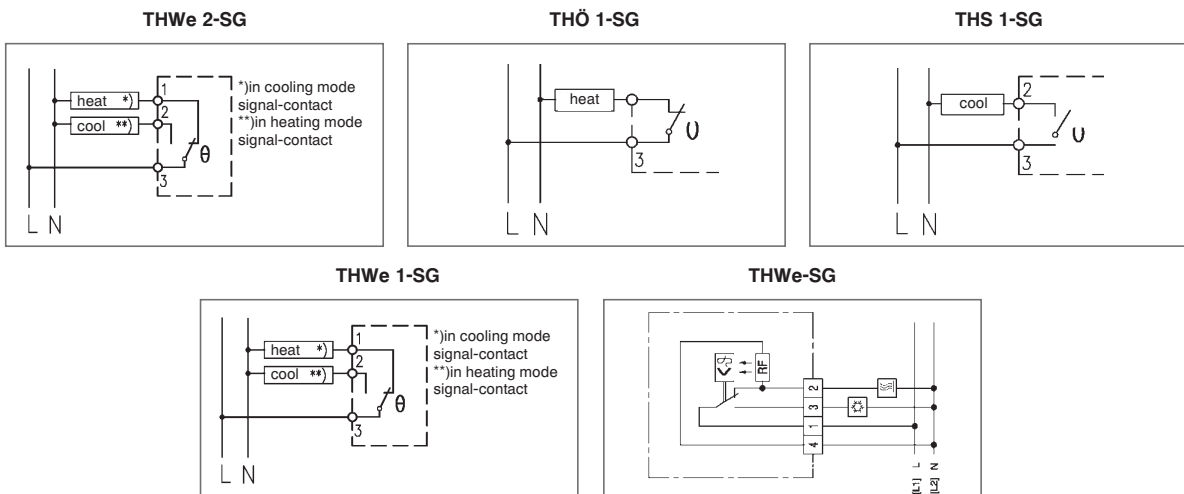
Dimensioned drawing for this controllers on page 49




Ordering data / technical data

Type / Order No.	THWe 2-SG	THÖ 1-SG	THS 1-SG	THWe 1-SG	THWe-SG
Adjustment range ⊗ further ranges on demand	0 – 60° C	⊗ 0 – 60° C	⊗ 5 – 60° C	⊗ 0 – 60° C	+10 – 60° C with range-limit
Switch difference	+/- ca. 3 K	+/- ca. 3 K	+/- ca. 3 K	+/- ca. 3 K	+/- ca. 3 K
Type of sensor	Capillary 1,5 m	Bimetal	Bimetal	Bimetal	Bimetal
Operating voltage	24 V – 250 V AC	250 V AC	250 V AC	250 V AC	250 V AC
switching current - ohmic (inductive)	10 (2) A / 5 (2) A	10 (2) A	10 (2) A	10 (2) A / 5 (2) A	10 (4) / 5 (2) A
Contact Ö = normally close NC/U = change over/ S = normally open NO	U	Ö	S	U	U
Protection type	IP 20	IP 20	IP 20	IP 20	IP 20
Approbation	UL	UL	UL	UL	–

## Wiring diagram




**Standard-sensor F 109**




further sensors on demand


**F 110**



**F 111**



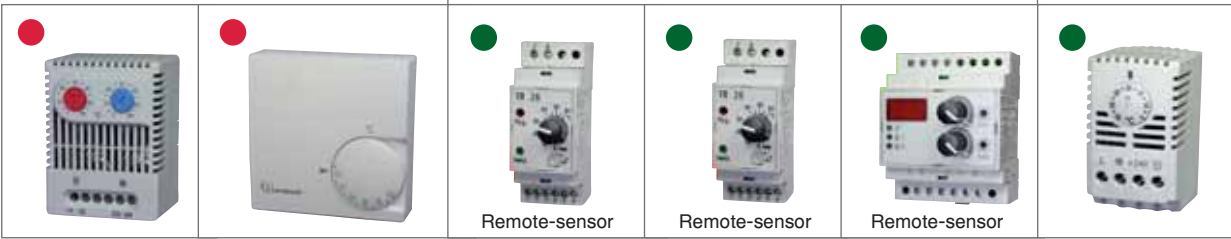
**F 112**



**Fixture**

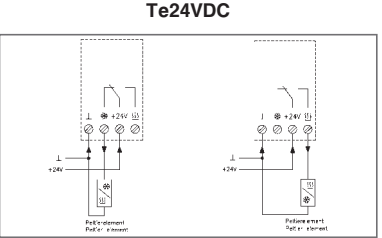
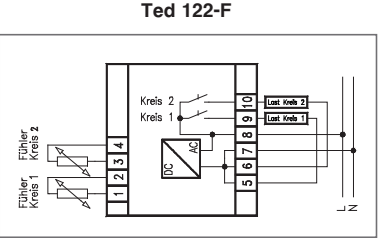
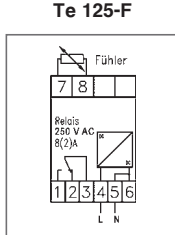
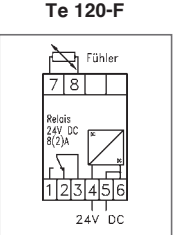
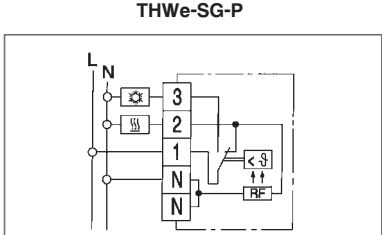
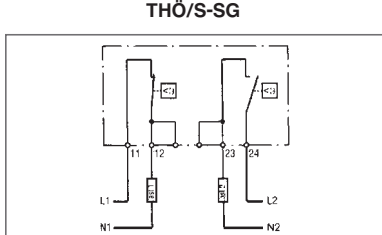


DIN-rail 35 mm



THÖ/S-SG	THWe-SG-P	Te 120-F	Te 125-F	Ted 122-F	Te24VDC
0 – 60° C	5 – 60° C with range-limit	⊗ 0 – 60° C	⊗ 0 – 60° C	⊗ 0 – 60° C	0 – 60° C
+/- ca. 4 K	ca. 1 K	0,25 – 2,5 K adjustable	0,25 – 2,5 K adjustable	0,2 K	2 – 3 K
Bimetal	Bimetal	Electrical KTY	Electrical KTY	Electrical KTY	Electrical internal
250 V AC	250 V AC	24 V <b>DC</b>	230 V AC	230 V AC	24 V <b>DC</b>
10 (2)A	10 (4) / 5 (2) A	8 (2) A	8 (2) A	8 (2) A	16 A
Ö + S	U	U	U	2 x S	U
IP 20	IP 30	IP 20	IP 20	IP 20	IP 20
–	–	–	–	–	UL

Device also available  
with terminal for  
switch clock



# Temperature controller – for various fixture-requirements

Product group P4

- Temperature controller electrical
- Temperature controller electromechanic (bimetal/capillary)

**Usage:**

Controllers with Internal-sensor, remote-sensor! 2-step-controller!  
 Regulation of heating- and coolingdevices in rooms, switchgears, cases and cabinets  
 Regulation of air and liquid or gaseous media

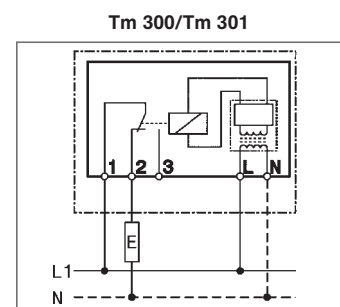
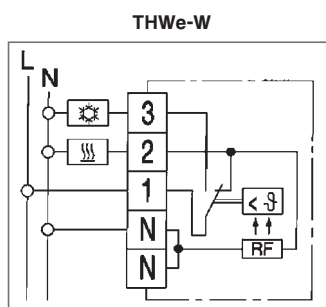
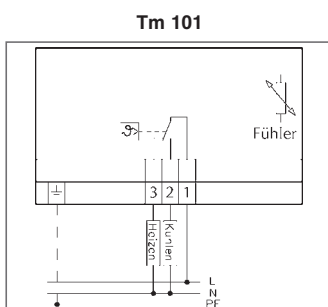
Dimensioned drawing for this controllers on page 49



Ordering data / technical data


Type / Order No.	Tm 101	THWe-W	Tm 300	Tm 301	Te 104
Adjustment range ⊗ further ranges on demand	⊗ 0 – +40° C	5 – 60° C	⊗ -10 – +50° C	⊗ -10 – +50° C	⊗ 0 – 50° C
Switch difference	±0,75 K	± ca. 1 K	± ca. 2 K	± ca. 2 K	±0,1 – ±2,5 K adjustable
Operating voltage	24 V – 250 V	250 V AC	40 V – 250 V	40 V – 250 V	250 V AC
Switching current - ohmic (inductive)	10 (4) A AC	10 (4) A	0,5 - 16 (2) A	0,5 - 16 (2) A	10 (4) A
Contact Ö = normally close NC/U = change over/ S = normally open NO	U	U	U	U	U
Fixture W = wall, DN = rail, R = pipe (contact sensor), K = duct, SCH = protective tube	W	W	R Tensioning strap in delivery contents	SCH Protective tube in delivery contents	W
Protection type	IP 54	IP 30	IP 54	IP 54	IP 20
Approbation	–	–	VDE	VDE	–

## Wiring diagram




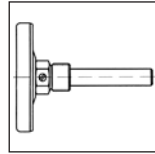
**Fixture-possibilities:**

**Standard-sensor F 109**

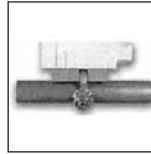


**further sensors on demand**

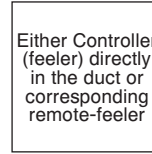
**F 110**    **F 111**    **F 112**

Sensor in protective tube

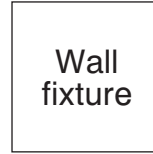


Controller/Sensor on the pipe



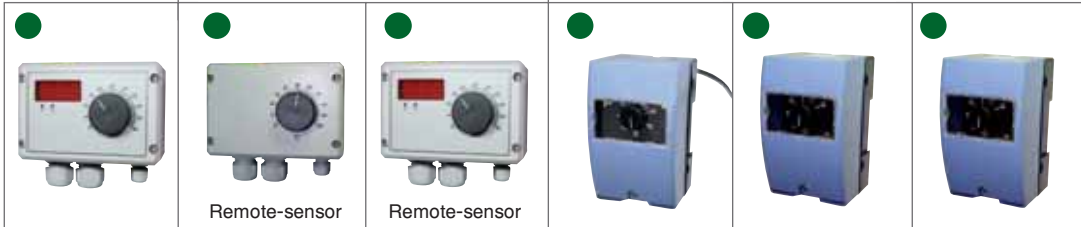
Either Controller (feeler) directly in the duct or corresponding remote-feeler

Air-duct



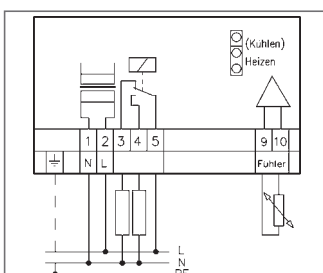
Wall fixture

Finery or on UP-jack

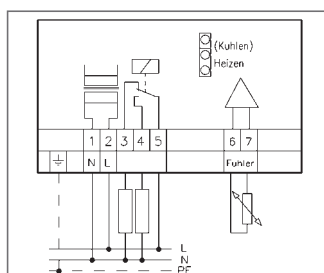


	Ted 108	Te 103-F	Ted 105-F	Te 302-F	Te 303-F	Te 304
	⊗ 0 – 50° C	⊗ 0 – 50° C	⊗ 0 – 50° C	⊗ -20 – +40° C	⊗ -20 – +40° C	⊗ -20 – +40° C
	±0,1 – ±2,5 K adjustable	±0,1 – ±2,5 K adjustable	±0,1 – ±2,5 K adjustable	0,5 – 15,5 K adjustable DIP-switch	0,5 – 15,5 K adjustable DIP-switch	0,5 – 15,5 K adjustable DIP-switch
	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC
	10 (4) A	10 (4) A	10 (4) A	8 (4) A	8 (4) A	8 (4) A
	U	U	U	U	U	U
	W	W	W	SCH 100 mm protective tube in scope of delivery	W oder K (for duct-fixture)* **Mounting bracket Order No.: SW305	R Tensioning strap in delivery contents
	IP 54	IP 20	IP 20	IP 54	IP 54	IP 54
	–	–	–	–	–	–

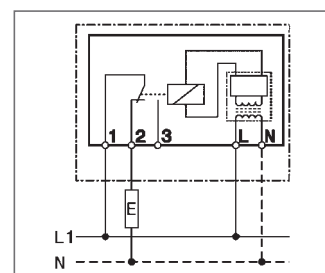
Ted 108/ Ted 105-F



Te 104/ Te 103-F



Te 302-F/ Te 303-F/ Te 304



# Temperature controller – Front-board-mounting

## ● electrical

Product group P4

### Usage:

Control of heat- and coolingprocesses  
(compressors, heating element, alarm device etc )  
Front-board-mounting! Small installation depth!

### Technical data similar for all devices:

- **Measurement range** -50 up to +150°C
- **Type of protection (enclosure front)** IP 65
- **Connection** mateable screw terminal (not mateable: Te 530-F)
- **Ambient temperature**
  - operating temperature 0 up to +50°C
  - storage temperature -20 up to +70°C
  - max. humidity 75% (no dewing)

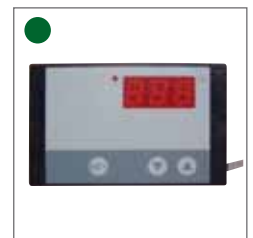
### Modular construction system:

- 1 to 6 switch levels
- 1 to 3 Sensor-inputs
- Sensor KTY81-210, PT-100 (2- or 3-conductor)
- 1, 2 or 5 digital inputs
- 0 up to 2 temperature alarms
- Buttons for target-temperature-adjustment lockable
- Alerting at feeler-split/feeler short circuit (switching status of the relay adjustable in case of an error)
- Minimumaction- and minimumpause-time separately adjustable for the output relay

### From the further delivery program:

Controllers with:

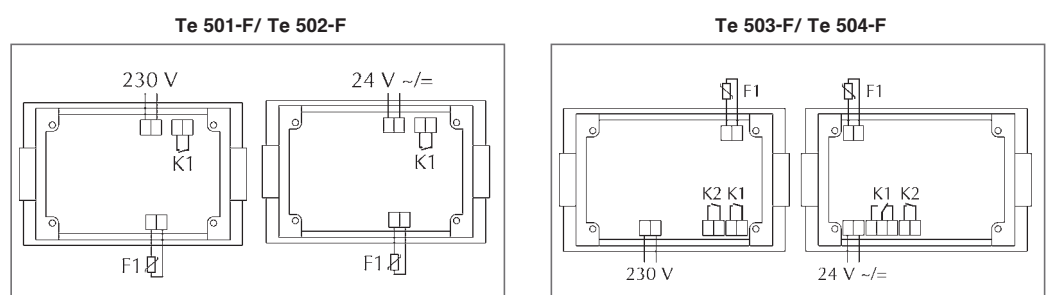
- Level control switch
- Switch clock
- Fault indicator
- **PID-Temperature controller**



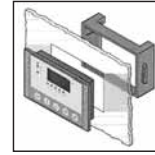
### Ordering data / technical data

Type / Order No.	Te 501-F
Operating voltage	230 V AC ±10 % 50/60 Hz
Relay contacts	1 potential-free normally open contact
Max. switching current - ohmic (inductive)	10 A (1,5 A)
Max. switching voltage	250 V~ 50/60 Hz
Display	3-digit LED-display, 13 mm
Indication range three-figure	-99 up to 999
Remote sensor 2 m	KTY 81-210 – 2 m
Control characteristics	2-step controller
Switch difference	0,1 bis 99,9 K freely adjustable
Type of operation	Heating or cooling switchable
Dimensions: -Front-dimension -Switch panel cutout -Installation depth	68 x 106 mm 56 x 87 mm 40 mm

## Wiring diagram









### Fixture



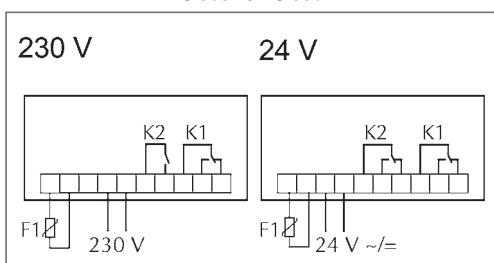
Front-board-mounting

Dimensioned drawing for this controllers on page 49

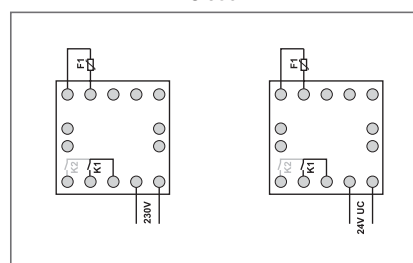
Type of protection: IP66 ( enclosure front)

	Te 502-F	Te 503-F	Te 504-F	Te 505-F	Te 506-F	Te 530-F
						
	24 V AC/DC	230 V AC ±10 % 50/60 Hz	24 V AC/DC	230 V AC ±10 % 50/60 Hz	24 V AC/DC	230 V AC ±10 % 50/60 Hz
	2 potential-free normally open contact	2 potential-free normally open contact	2 potential-free normally open contact	1 potential-free changeover 1 potential-free normally open contact	1 potential-free changeover 1 potential-free normally open contact	1 potential-free normally open contact
	10 A (1,5 A)	16 A (3,1 A)	8 A (1,0 A)	16 A / 10 A (3 / 1,5 A)	10 A / 8 A (1,5 / 1,0 A)	10 A AC 1
	24 V AC/DC	250 V~ 50/60 Hz	24 V AC/DC	250 V~ 50/60 Hz	24 V AC/DC	250 V~ 50/60 Hz
	3-digit LED-display, 13 mm	3-digit LED-display, 13 mm	3-digit LED-display, 13 mm	3-digit LED-display, 13 mm	3-digit LED-display, 13 mm	3-digit LED-display, 13 mm
	-99 up to 999	-99 up to 999	-99 up to 999	-99 up to 999	-99 up to 999	-99 up to 999
	KTY 81-210 – 2 m	KTY 81-210 – 2 m	KTY 81-210 – 2 m	KTY 81-210 – 2 m	KTY 81-210 – 2 m	KTY 81-210 – 2 m
	2-step controller	2-/3-step controller	2-/3-step controller	2-/3-step controller	2-/3-step controller	2-step controller
	0,1 bis 99,9 K freely adjustable	0,1 bis 99,9 K freely adjustable	0,1 bis 99,9 K freely adjustable	0,1 bis 99,9 K freely adjustable	0,1 bis 99,9 K freely adjustable	0,1 bis 99,9 K freely adjustable
	Heating or cooling switchable	Heating or cooling switchable	Heating or cooling switchable	Heating or cooling switchable	Heating or cooling switchable	Heating or cooling switchable
	68 x 106 mm 56 x 87 mm 40 mm	68 x 106 mm 56 x 87 mm 45 mm	68 x 106 mm 56 x 87 mm 45 mm	36 x 72 mm 33 x 68 mm 90 mm	36 x 72 mm 33 x 68 mm 90 mm	48 x 48 mm 44 x 44 mm 100 mm

Te 505-F/ Te 506-F



Te 530-F



### Notice to the sensors

**Standard:**

KTY shrunk  
(fast temperature -detection)

**Options** (on request)

- KTY stainless steel pill
- KTY with bolted sleeve
- PT100 shrunk
- PT100 stainless steel pill
- PT100 with bolted sleeve

# Humidity control - Hygrostats

● electromechanic (synthetic fiber)

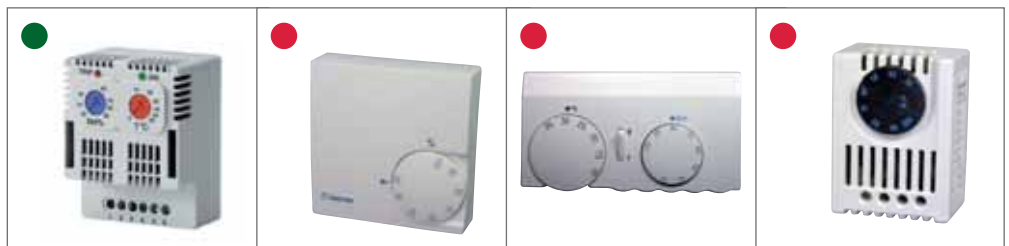
● electrical

Product group P4

## Usage:

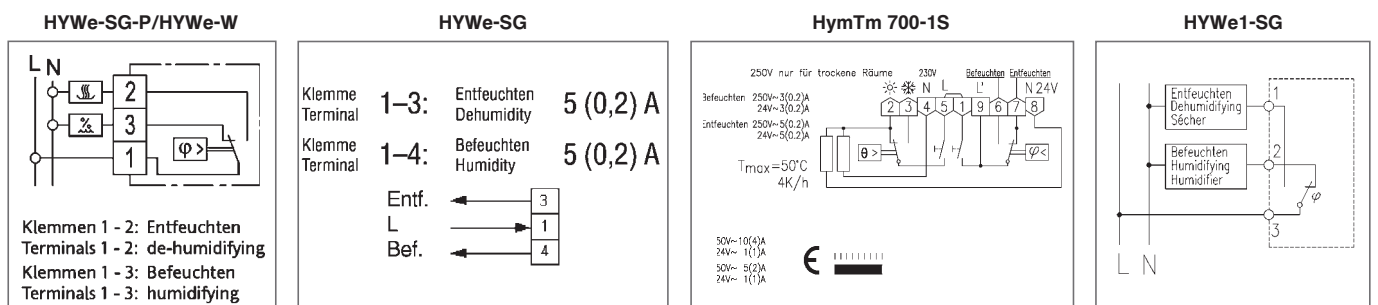
2-step-controller, regulation of heating- and coolingdevices

## Ordering data / technical data

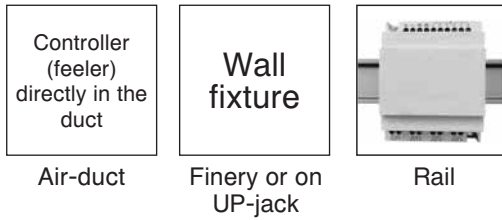


Type / Order No.	HymTm 22	HYWe-W	HymTm 700 -1S	HYWe-SG
Adjustment range	30 – 90 % rF/ 0 – 60° C	35 – 100 % rF	30 – 100 % rF/ 10 – 35° C	35 – 100 % rF
Switch difference	ca. 5 %/ ca. 2 K	ca. 4 %	ca. 4 %/ ca. 1 K	ca. 4 %
Type of sensor	Electrical	Synthetic fiber	Synthetic fiber/ bimetal	Synthetic fiber
Operating voltage	230 V AC	24 – 250 V AC	24 – 250 V AC	24 V – 250 V AC
switching current - ohmic (inductive)	5/3 A	5 (0,2) A	5 (0,2) / 3 (0,2) 10 (4) / 5 (2) A/ 1(1) A H/K 24 V A	5 (0,2) A
Contact Ö = normally close NC/U = change over/ S = normally open NO	U/U	U	U/U	U
Fixture W = wall, DN = rail, R = pipe (contact sensor), K = duct, SCH = protective tube	DN	W Also available with clip fixing Typ HYWe-SG-P	W	DN
Protection type	IP 20	IP 30	IP 30	IP 20
Approbation	CE	–	–	–

## Wiring diagram



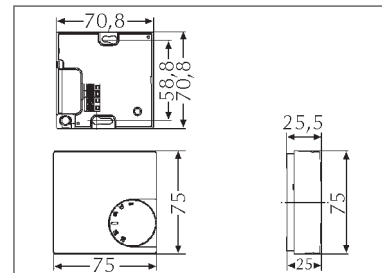
### Fixture-possibilities:



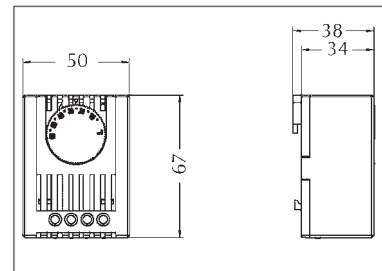
HYWe1-SG	Hym 400	Hym 401
40 – 90 % rF	35 – 100 % rH	35 – 100 % rH
ca. 4 %	ca. 4 %	ca. 4 %
Synthetic fiber	Synthetic fiber	Synthetic fiber
24 V – 250 V AC	24 – 250 V AC	24 – 250 V AC
5 (2) A	15 (2) A	15 (2) A
U	U	U
DN	K For fixture on wall order console separate Order No.: WK 402	K For fixture on wall order console separate Order No.: WK 402
IP 20	IP 54	IP 65
–	–	–

## Dimensioned drawing Humidity control

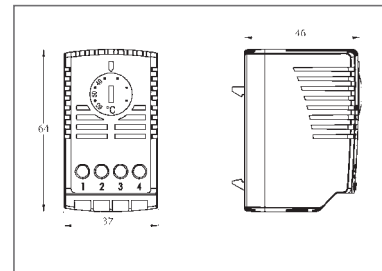
All dimensions in mm  
HYWe-SG-P/HYWe-W



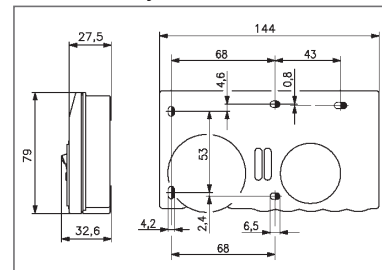
HYWe-SG



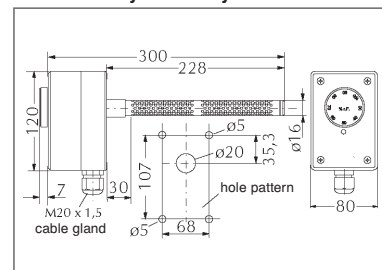
HYWe1-SG



HymTm 700-1S



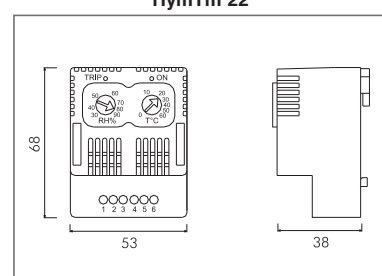
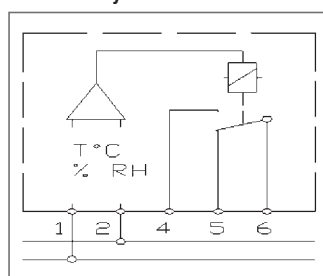
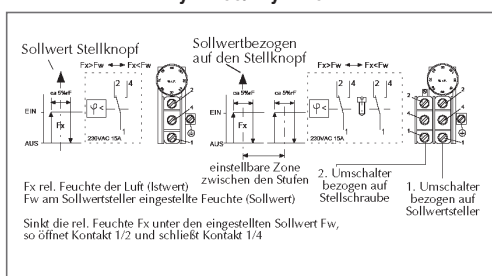
Hym 400/ Hym 401



HymTm 22

Hym 400/ Hym 401

HymTm 22

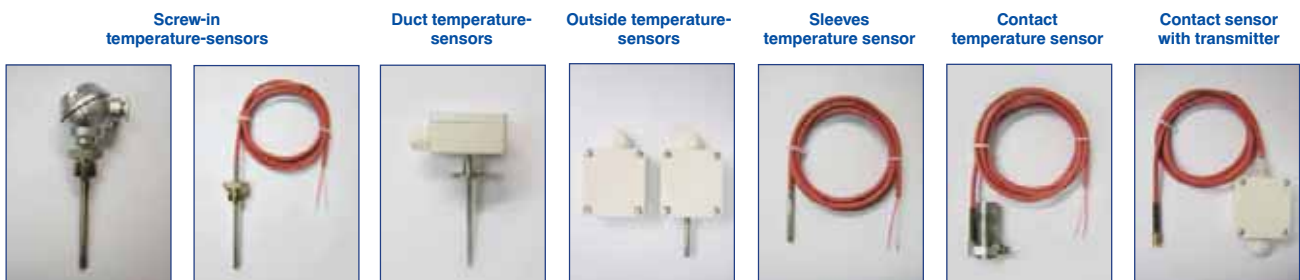


# Sensors

## Temperature / Humidity

We want to solve your technical requirements completely by innovation!  
 Several customized devices are delivered already complete with temperature-sensors out of that reason. Our strength is realisation of specially designed devices! Don't hesitate to ask us!

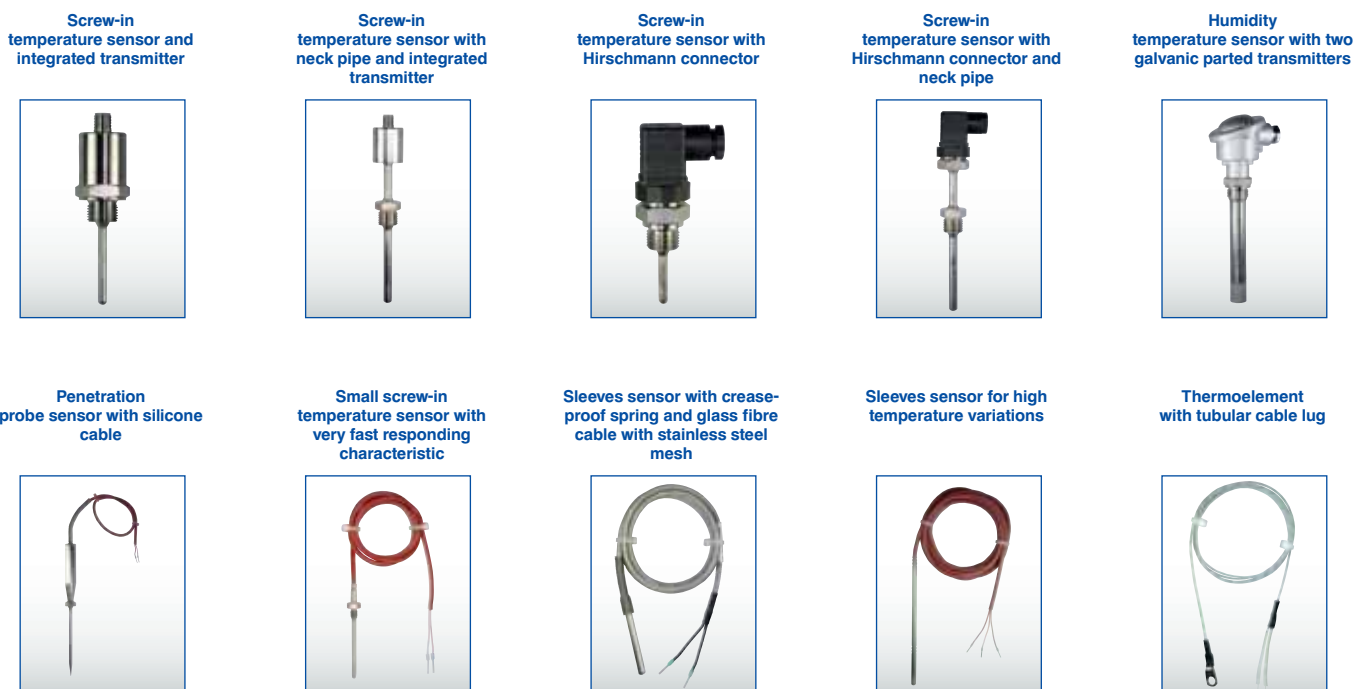
### Enclosure standard-program



### Sensors

PT 100, PT 1000, Ni 1000, Ni 1000 TK 5000, NTC 10K, NTC 20K, LM 235Z, KTY  
 Others up on request!

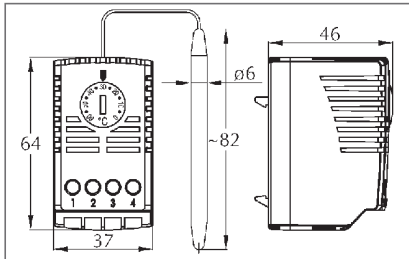
### Some specially designed sensor for example:



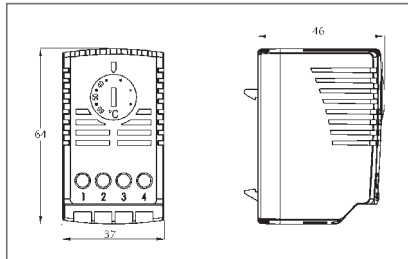
# Dimensioned drawing all dimensions in mm

## Thermostats page 40-45

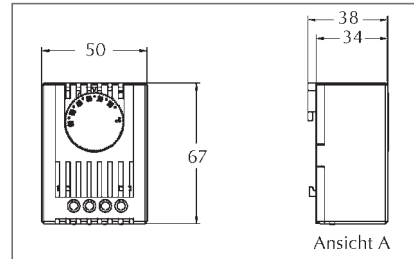
**THWe 2-SG**



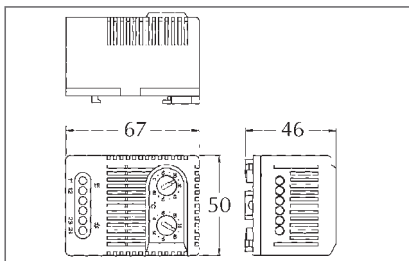
**THÖ 1-SG/ THS 1-SG/ THWe 1-SG  
HyWe1-SG/ Te24VDC**



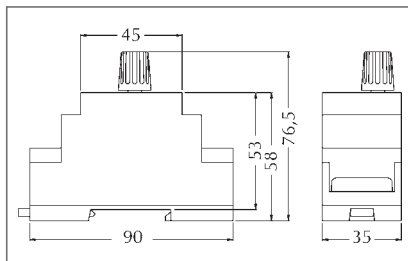
**THWe-SG**



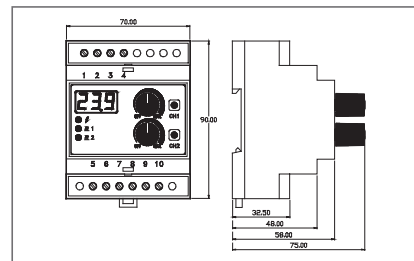
**THÖ/S-SG**



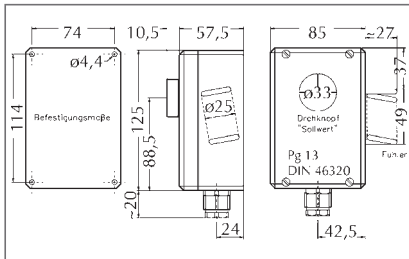
**Te 120-F/Te 125-F**



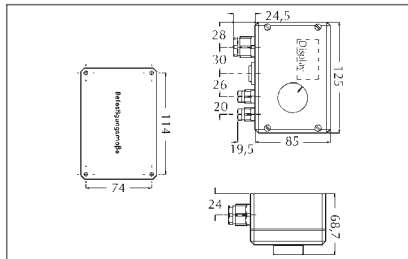
**Ted 122-F**



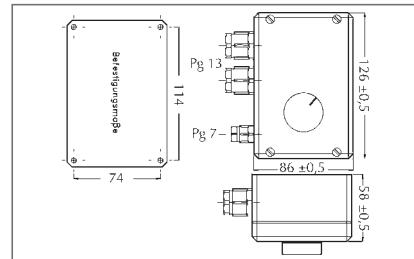
**Tm 101**



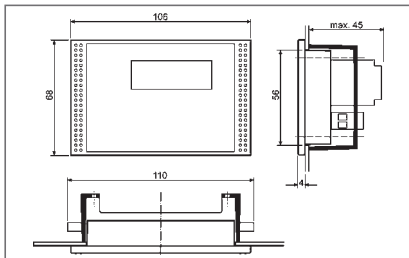
**Ted 108/ Ted 105-F**



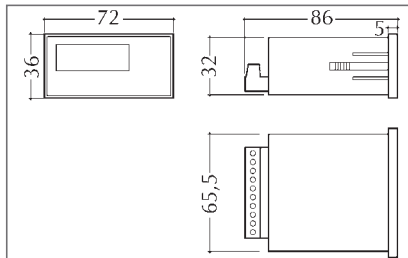
**Te 104/ Te 103-F**



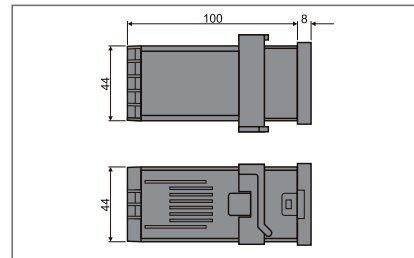
**Te 501-F/ Te 502-F/ Te 503-F/ Te 504-F/  
Te 503-F/ Te 504-F**



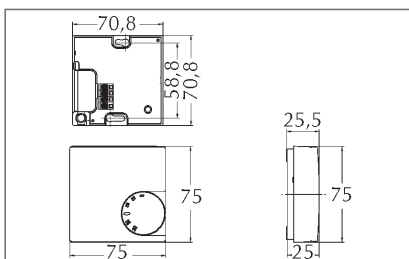
**Te 505-F/ Te 506-F**



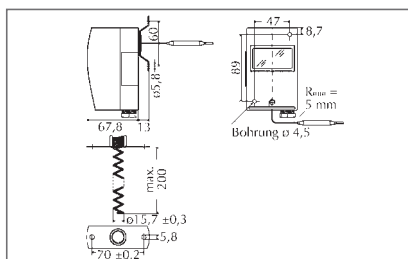
**Te 530-F**



**THWe-W/ THWe-SG-P**



**Tm 300/Tm 301/ Te 302-F/ Te 303-F/ Te 304**



# Fans

## A. Standard-programm

Hoseproof filter fans and outlet filters IP 55 / IP 53



Page 51

Filter fans outlet filters IP 54 (synthetic material)



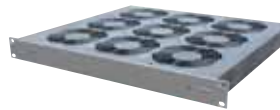
Page 52/53

Circulation fans



Page 54

19" plug-in fan module



Page 55

The Business activities of Achter began in the year 1993 with building plug-in fan modules for a well-known producer of control cabinets. For some examples of customization please look at the pictures. As a result our available know-how enables us to produce those parts according to your wishes - even in small quantities.

## B. Nonstandard program

### Cabinet roof ventilators 115 V – 230 V

Self-regulating ventilators with variable operating voltage



### Back panel ventilators for control cabinet

With 2 axial ventilators, temperature controller and connection cable



### Ventilators for data storage units

With 3 axial ventilators and ATX connection



Examples

19" ventilator insert with attached external temperature controller

19" ventilator insert with self-regulating ventilators, rotational speed monitoring and status and error message output

Back panel ventilator for control cabinets for operating voltages from 115 V to 230 V without switching

Built-in ventilator for control cabinets with 6 axial ventilators with speed control dependent on the control cabinet's internal temperature

Top attachment ventilator for control cabinets with acoustic alarm in case of excess temperature

19" ventilator inserts with up to max. 15 axial ventilators 1 HE

19" ventilator insert with max. 15 axial ventilators 3 HE with front air intake

19" ventilator insert 2 HE with cross-flow blower with front air intake and airflow monitor

Cabinet roof ventilator for control cabinets with attached external temperature controller

# Hoseproof filter fans IP55/IP53 - metal

Product group P3



Color RAL 7035  
Other colors on request

Voltage	Airflow (m <sup>3</sup> /h)		Weight	Speed	Noise level	Protection type	Order No.
	free blowing	with filter					
115 V AC	61	50	1290 g	6850 U/min	48,5 dB(A)	IP55 <sup>1)</sup> / IP53 <sup>2)</sup>	115FL80IP55
230 V AC	50	41	1290 g	6850 U/min	48,5 dB(A)	IP55 <sup>1)</sup> / IP53 <sup>2)</sup>	230FL80IP55
12 V DC	25	19	1160 g	5600 U/min	42,3 dB(A)	IP55 <sup>1)</sup> / IP53 <sup>2)</sup>	12FL80IP55
24 V DC	25	19	1160 g	5600 U/min	42,3 dB(A)	IP55 <sup>1)</sup> / IP53 <sup>2)</sup>	24FL80IP55
115 V AC	160	110	1780 g	3200 U/min	30 dB(A)	IP55 <sup>1)</sup> / IP53 <sup>2)</sup>	115FL120IP55
230 V AC	160	110	1780 g	2700 U/min	30 dB(A)	IP55 <sup>1)</sup> / IP53 <sup>2)</sup>	230FL120IP55
24 V DC	170	115	1610 g	3300 U/min	36 dB(A)	IP55 <sup>1)</sup> / IP53 <sup>2)</sup>	24FL120IP55
48 V DC	170	115	1610 g	3300 U/min	36 dB(A)	IP55 <sup>1)</sup> / IP53 <sup>2)</sup>	48FL120IP55
115 V AC	300	230	4350 g	3100 U/min	42 dB(A)	IP55 <sup>1)</sup> / IP53 <sup>2)</sup>	115FL170IP55
230 V AC	300	230	4350 g	2650 U/min	42 dB(A)	IP55 <sup>1)</sup> / IP53 <sup>2)</sup>	230FL170IP55
24 V DC	300	230	4210 g	3050 U/min	42 dB(A)	IP55 <sup>1)</sup> / IP53 <sup>2)</sup>	24FL170IP55
48 V DC	300	230	4210 g	3100 U/min	42 dB(A)	IP55 <sup>1)</sup> / IP53 <sup>2)</sup>	48FL170IP55

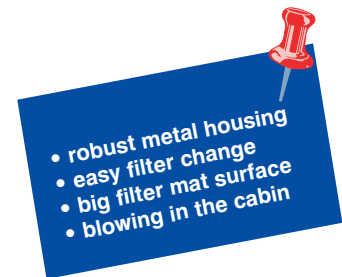
<sup>1)</sup> For installation on wall <sup>2)</sup> For installation on roof

Delivery including mounting material

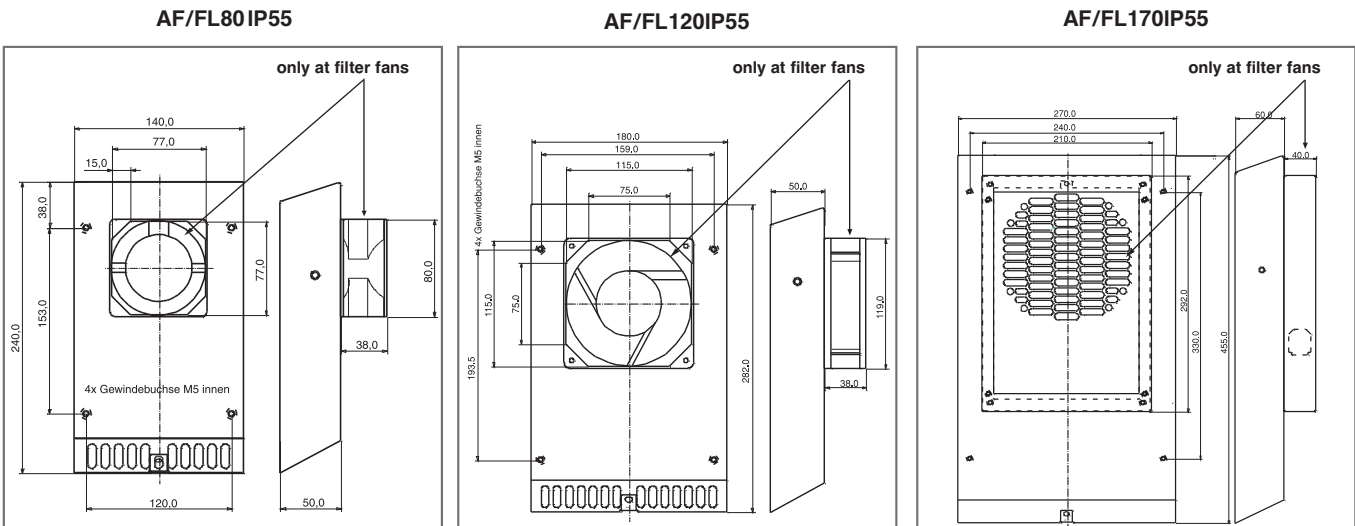
## Hoseproof outlet filters and filter mats

Outlet filters		Filter mats
Order No.	Weight	Order No.
AF80IP55	920 g	FM80IP55
AF120IP55	1220 g	FM120IP55
AF170IP55	2680 g	FM170IP55

VE = packaging unit each 5 units



### Mounting dimensions all dimensions in mm



# Filter fans - synthetic material

## Product group P3

Voltage V/Hz	Dimensions mm	Cutout mm	Power rating W	Current A	Air flow (m <sup>3</sup> /h) free blowing	Air flow (m <sup>3</sup> /h) with filter	Noise level dB (A)	Weight incl. package	Pic- ture Nr.	Standard
										Order No.
230/50-60	114x114x57	92x92	13	0,1	<b>28</b>	24	30	380	1	FL-A500BPB
115/50-60	114x114x57	92x92	13	0,14	<b>28</b>	24	30	380	1	FL-A510BPB
12 DC	114x114x45	92x92	3	0,25	<b>24</b>	24	35	180	1	FL-A512BPB
24 DC	114x114x45	92x92	4	0,16	<b>24</b>	24	35	180	1	FL-A524BPB
230/50-60	150x150x77	125x125	22	0,14	<b>55</b>	55	43	780	2	FL-1600BPB
115/50-60	150x150x77	125x125	22	0,26	<b>55</b>	55	43	780	2	FL-1610BPB
24 DC	150x150x77	125x125	9	0,37	<b>60</b>	55	45	470	2	FL-1524BPBT
48 DC	150x150x77	125x125	13	0,27	<b>60</b>	55	45	470	2	FL-1548BPBT
230/50-60	204x204x97	177x177	24	0,15	<b>110</b>	80	43	950	3	FL-B600BPB
115/50-60	204x204x97	177x177	24	0,3	<b>110</b>	80	43	950	3	FL-B610BPB
230/50-60	250x250x111	225x225	22	0,14	<b>120</b>	105	43	1200	4	FL-2300BPB
115/50-60	250x250x111	225x225	22	0,26	<b>120</b>	105	43	1200	4	FL-2310BPB
24 DC	250x250x111	225x225	9	0,37	<b>105</b>	105	45	900	4	FL-2324BPBT
48 DC	250x250x111	225x225	13	0,27	<b>105</b>	105	45	900	4	FL-2348BPBT
230/50-60	250x250x111	225x225	24	0,15	<b>130</b>	120	43	1250	5	FL-2400BPB
115/50-60	250x250x111	225x225	24	0,3	<b>130</b>	120	43	1250	5	FL-2410BPB
24 DC	250x250x111	225x225	9	0,37	<b>120</b>	120	45	950	5	FL-2424BPBT
48 DC	250x250x111	225x225	13	0,27	<b>120</b>	120	45	950	5	FL-2448BPBT
230/50-60	250x250x119	225x225	40	0,17	<b>260</b>	230	53	1600	6	FL-2500BPB
115/50-60	250x250x119	225x225	40	0,34	<b>260</b>	230	53	1600	6	FL-2510BPB
24 DC	250x250x119	225x225	26	1,08	<b>230</b>	230	61	1200	6	FL-2524BPBT
48 DC	250x250x119	225x225	33	0,68	<b>230</b>	230	61	1200	6	FL-2548BPBT
230/50-60	250x250x110	225x225	70	0,4	<b>400</b>	370	65	2500	6	FL-2600BPB
115/50-60	250x250x110	225x225	70	0,8	<b>400</b>	370	65	2500	6	FL-2610BPB
400/50-60	250x250x110	225x225	60	0,18	<b>400</b>	370	65	2500	6	FL-2640BPB
230/50-60	325x325x151	291x291	70	0,4	<b>570</b>	500	65	3000	7	FL-3500BPB
115/50-60	325x325x151	291x291	70	0,8	<b>570</b>	500	65	3000	7	FL-3510BPB
400/50-60	325x325x151	291x291	60	0,18	<b>570</b>	500	65	3000	7	FL-3540BPB
230/50-60	325x325x151	291x291	130	0,55	<b>700</b>	630	72	3650	7	FL-3600BPB
115/50-60	325x325x151	291x291	130	1,1	<b>700</b>	630	72	3650	7	FL-3610BPB

### Technical data similar for all devices:

Degree of utilization: 100%  
 Range of operating temperatures: -10°C/+70°C  
 Protection type/ class: IP54/SK 1  
 (gasket affixed)  
 blowing in  
 Compliance: CE

Bearing of the fan: Ball bearing  
 Fan durability: 50.000 hours (at 40°C)  
 Material: ABS UL94V-0 Farbe RAL7035  
 (RAL7032 specify when order)  
 1,2 mm bis 2,4 mm  
 Fixture: Selfsnapping without screws

## Outlet filters

Dimensions mm	Weight	Cutout mm	Standard	UL
			Order No.	Order No.
114x114x17	60	92x92	AF-A000BPB	AF-A000BPBU
150x150x28	160	125x125	AF-1000BPB	AF-1000BPBU
204x204x30	260	177x177	AF-B000BPB	AF-B000BPBU
250x250x30	420	225x225	AF-2000BPB	AF-2000BPBU
325x325x30	640	291x291	AF-3000BPB	AF-3000BPBU

## Filter mats (replacement)

	Order No.
for X-A000	FM-A0
for X-1000	FM-10
for X-B000	FM-B0
for X-2000	FM-20
for X-3000	FM-30

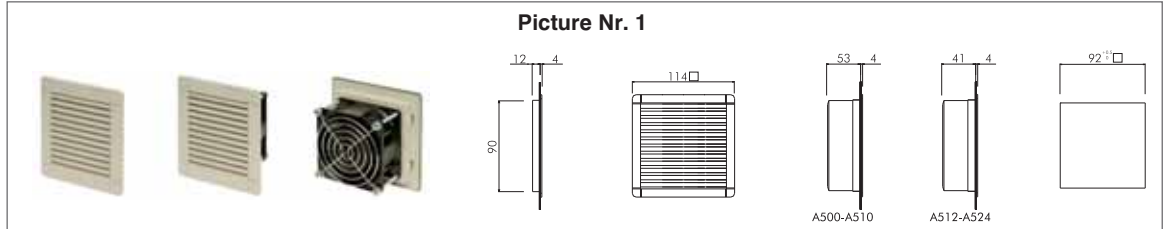
### Pictures

### Dimensioned drawing

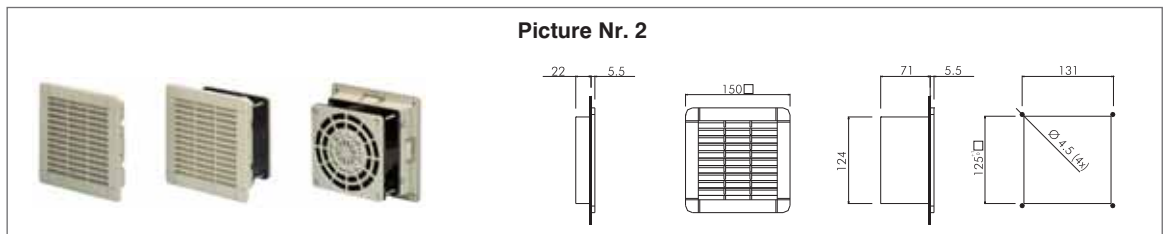
all dimensions in mm

UL-Version E3001228
Order No.
FL-A500BPBU
FL-A510BPBU
FL-A512BPBU
FL-A524BPBU
FL-1600BPBU
FL-1610BPBU
FL-1524BPBTU
FL-1548BPBTU
FL-B600BPBU
FL-B610BPBU
FL-2300BPBU
FL-2310BPBU
FL-2324BPBTU
FL-2348BPBTU
FL-2400BPBU
FL-2410BPBU
-
-
FL-2500BPBU
FL-2510BPBU
FL-2524BPBTU
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FL-2600BPBU
FL-2610BPBU
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FL-3500BPBU
FL-3510BPBU
-
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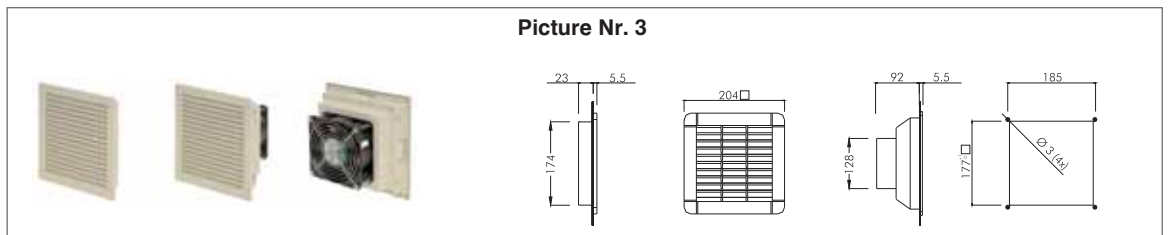
**Picture Nr. 1**



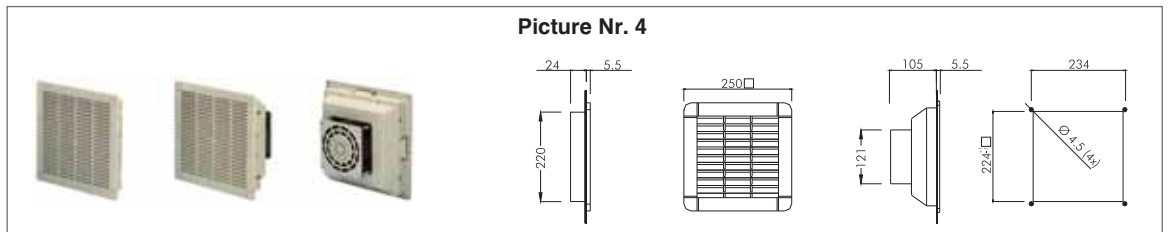
**Picture Nr. 2**



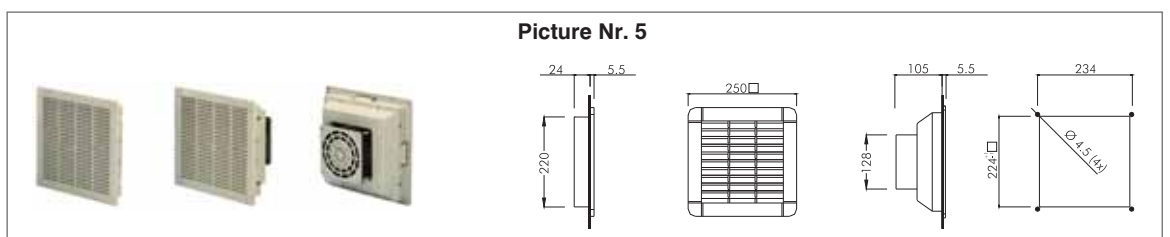
**Picture Nr. 3**



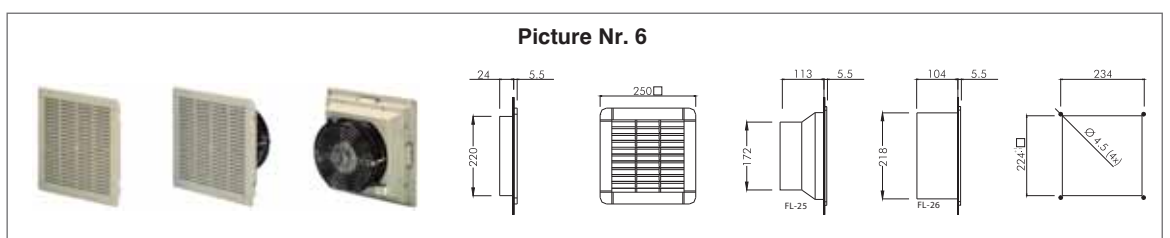
**Picture Nr. 4**



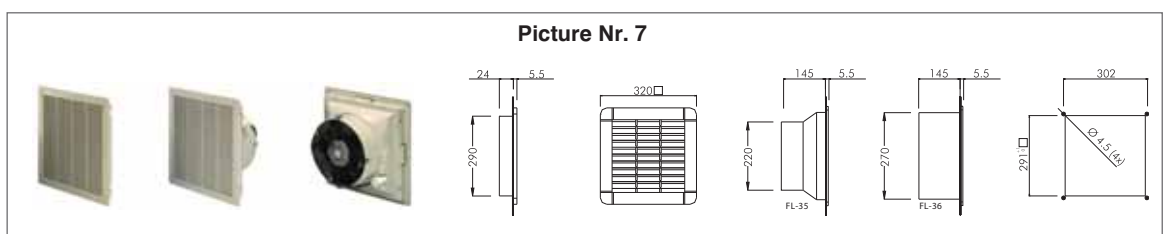
**Picture Nr. 5**



**Picture Nr. 6**



**Picture Nr. 7**



# Circulation fans

Product group P3  
Type UL 120



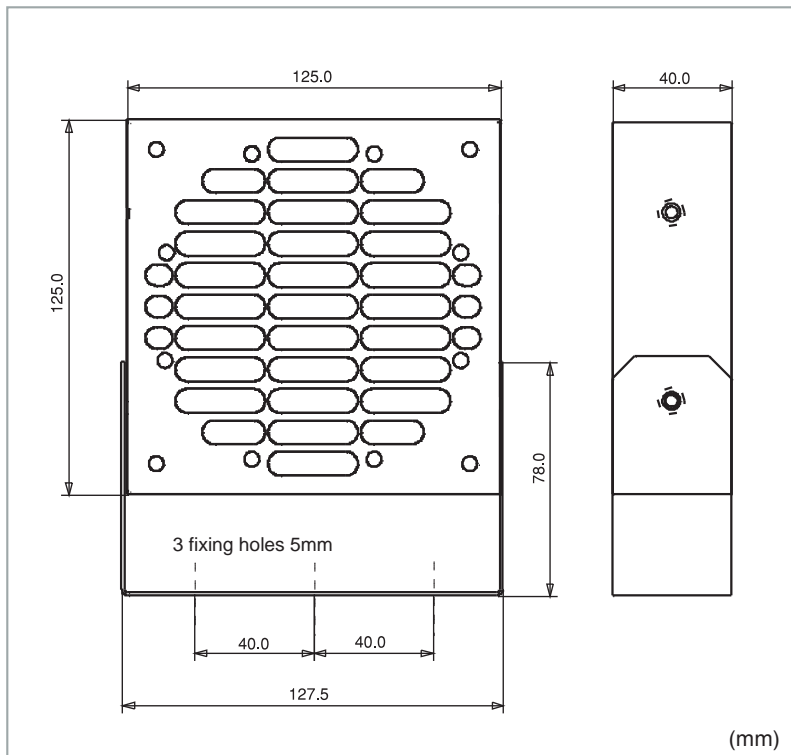
*Pivoting frame for directed ventilation*

Voltage	Air flow (m <sup>3</sup> /h) free blowing	Speed	Noise level	Order No.	Weight
12 V DC	180	5600 U/min	42,3 dB(A)	12UL120	790 g
24 V DC	180	5600 U/min	42,3 dB(A)	24UL120	790 g
115 V AC	160	3200 U/min	30 dB(A)	115UL120	910 g
230 V AC	160	2700 U/min	30 dB(A)	230UL120	910 g

Delivery including mounting material

Utilizing a circulation fan avoids heat accumulation and formation of heat pockets inside control cabinets. When heaters are installed, their efficiency is increased by circulation fans. The resulting air circulation dissipates heat through the surface of the cabinet and so, a cooling effect is achieved.

## Dimensioned drawing



### Electric data:

- Protection class 1 (ground wire)
- Protection type IP 20
- Connecting leads 0,5m 3x0,75 mm<sup>2</sup> PVC  
Other lengths upon request

# 19" plug-in fan module

Product group P3



Number of fans	Air flow Power rating			Installation depth	Order No.		
	24V DC	115V 50/60 HZ	230V 50/60 HZ		24V DC	115V 50/60 HZ	230V 50/60 HZ
3 fold	585 m <sup>3</sup> /h 21 W	324 (360) m <sup>3</sup> /h 42 (33) W		170 mm	LE3-24VDC	LE3-115VAC	LE3-230VAC
6 fold	1170 m <sup>3</sup> /h 42 W	648 (720) m <sup>3</sup> /h 84 (66) W		295 mm	LE6-24VDC	LE6-115VAC	LE6-230VAC
9 fold	1755 m <sup>3</sup> /h 63 W	972 (1080) m <sup>3</sup> /h 126 (99) W		420 mm	LE9-24VDC	LE9-115VAC	LE9-230VAC
12 fold	2340 m <sup>3</sup> /h 84 W	1296 (1440) m <sup>3</sup> /h 168 (132) W		546 mm	LE12-24VDC	LE12-115VAC	LE12-230VAC
15 fold	2925 m <sup>3</sup> /h 105 W	1620 (1800) m <sup>3</sup> /h 210 (165) W		672 mm	LE15-24VDC	LE15-115VAC	LE15-230VAC

### Further technical data:

- 2-pole connecting terminal 0,08-2,5 mm<sup>2</sup>
- Protection class 1 (ground wire)
- Protection type IP 20
- Front panel 3mm anodized

### Ask for your own customized version!

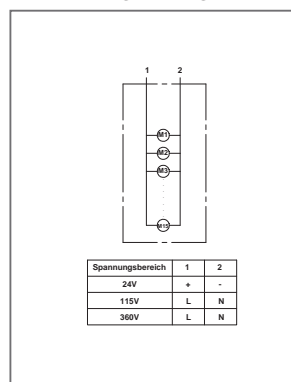
#### For example

- Display on the front panel
- Various operation voltages
- Signal outputs
- Velocity control

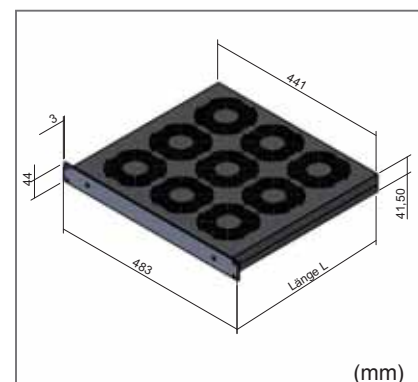
### Delivery contents:

With connection cable and fastening screws

### Wiring diagram



### Dimensioned drawing



# Industrial cooling technology

- 2 Cooling systems** → • Peltier technology  
 → • Compressor technology (air/air)

In the early days of control cabinet heating, the issue "cooling" was still of subordinate importance. High-value electronics, most diverse locations for control cabinets in indoor and outdoor areas, as well as rapid climatic changes however make more and more often also cooling of the cabinet necessary, sometimes even heating and cooling.

According to our marketing aspiration, aiming for to always offer you a complete solution, we have expanded our product range!

**Here some general comments to this:**

**1) Peltier-cooler units:**

Peltier cooler units primarily are suitable for cooling of small control cabinets, operating panel enclosures and control panels as well as for industrial PCs, CRT monitor screens and flat screen monitors.

Our Peltier cooler units operate in the medium capacity range. The advantages over compressor cooling units are the compact type of construction, independent arbitrary mounting position, no use of refrigerants. In order to obtain the optimum efficiency in Peltier cooling unit applications, it is necessary to evaluate the ambience temperature of the room. Particularly waste heat must not be dissipated into the surrounding room.

Peltier-technology is a thermoelectric process (named after the French physicist Jean Peltier). A semiconductor material is used which, while doped correspondingly by the supply of electric current, causes a change in the energy state of charge carriers and therefore, can be utilized for the transport of heat.

**2) Compressor cooler units:**

Several demands of our customers in the range of greater cooling capacities cannot be solved by Peltier-technology. Therefore, we also have compressor cooler units in our program. Now we offer you compressor cooling devices within a cooling capacity range from 380 to 4000 watt. Our partner is a renowned internationally active supplier and manufacturer of compressor cooling devices.

For choosing our partner, the issue of environmental protection was, among other things, very important to us. All compressor cooler units we offer work with the CFC-free coolant r134a. Our program includes devices for installation in the cabinet door, cabinet wall, or also on the rooftop of control cabinets. Please also query us in case you should not find your device in the current range of products offered. We will be glad to assist you.

**Table of contents**

- **Small cooler units in Peltier technology** up to 380 W .....Pages **57 - 58**
- **Control devices for Peltier technology**.....Page **59**
  
- **Compressor cooler units** – air/air up to 3850 W .....Pages **60 - 62**

# Peltier cooling unit

## Type Telku

Product group P2

### Advantages of the Peltier units:

- Montage independent of position
- ecofriendly (no coolants)
- compact construction
- robust design

### Standard program

Max. inrush cooling capacity*	Operating cooling capacity*	Voltage	Operating current	Order No.
50 W	20 W	24 V DC	2,40A	PTK50
75 W	30 W		3,65A	PTK75
100 W	40 W		4,80A	PTK100
215 W	120 W		8,90A	PTK215
380 W	185 W		14,4A	PTK380

\*all facts ±15%

Telku 50



Telku 75/100



Telku 215



Telku 380



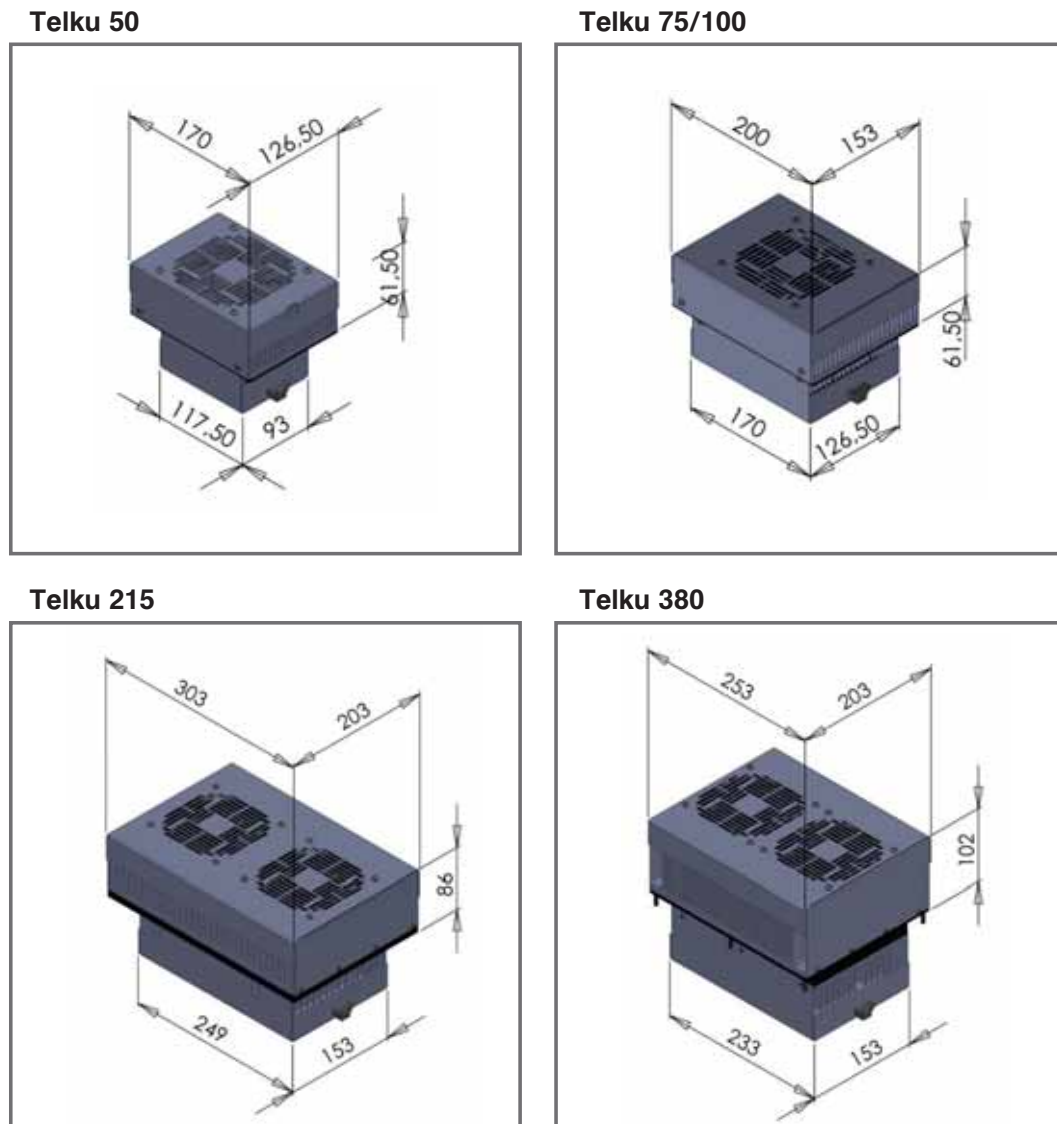
**Customized solutions upon request**

### Technical information

Type	Number of fans		Weight	Mounting cut-out	Dimensions		Operating temperature
	Inside	Outside			Inside in mm	Outside in mm	
Telku 50	1	1	1,8 kg	120 x 97 mm	117,5 x 93 x 61,5	170 x 126,5 x 63,5	-10 - +70°C
Telku 75	1	1	2,7 kg	175 x 130 mm	170 x 126,5 x 61,5	200 x 153 x 63,5	-10 - +70°C
Telku 100	1	1	2,7 kg	175 x 130 mm	170 x 126,5 x 61,5	200 x 153 x 63,5	-10 - +70°C
Telku 215	1	2	6,7 kg	253 x 157 mm	249 x 153 x 80,5	303 x 203 x 86	-10 - +70°C
Telku 380	1	2	6,8 kg	237 x 157 mm	233 x 153 x 101	253 x 203 x 102	-10 - +70°C

- Enclosure: powder-coated aluminium case in RAL 7035
- 2-pole lead-out terminal on cold side (inside)
- Grub screw (fastening material attached)

### Dimensioned drawing



Technical data sheets on request!

# Controllers for Peltier technology

## Electrical temperature controller – for Peltier cooling units Heating or cooling

Type

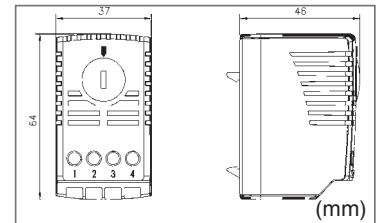
**Te24VDC**

Product group P4

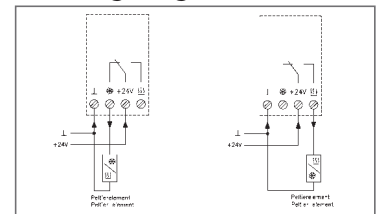
Adjustment range	0 - 60°C
Contact	Change over
Operating voltage	24 V DC
Switching current	16A
Switching differential	2-3 K
Fastening	DIN-rail 35 mm
Order No.	Te24VDC



Dimensioned drawing



Wiring diagram



## Electrical temperature controller – for Peltier cooling units Heating or cooling (with neutral zone)

Type

**Te24V-HK**

Order No.

Te24V-HK

Product group P4

### Technical details

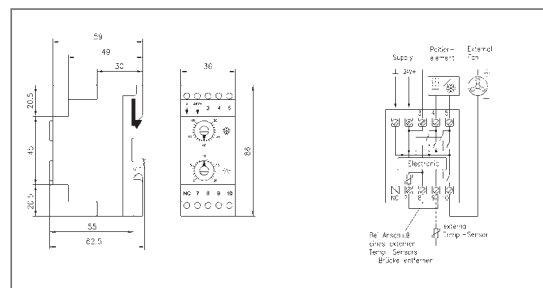
- Supply voltage: 24V DC
- Switching capacity  
Output peltierelement: 16A relay-output  
Output fan : 5A relay-output
- Power consumption: 3W
- Switching points < 10°C heating, >30°C cooling
- Switch differential (Hysteresis): ca. 1K
- Sensor: internal or extern NTC 2K • feeler tolerance: ca. 1K
- Enclosing Type: III • Type of protection: IP20
- Operation temperature: -10...50°C
- Storage temperature -20...70°C
- Max humidity: max. 95%rH, non-condensing
- Electrical connections: screw terminal 0,5...2,5m<sup>2</sup>
- Type of mounting: DIN-rail 35 mm

### Accessories (optional)

- External sensor NTC 2K at contact sensor HF-8/4-K2



Dimensioned drawing and wiring diagram



Connection Peltier element (Ground = cooling, 24 V+ = heating)	2-	Connection ventilator (ground) (switched by controller)	4-
Connection Peltier element (24 V+ = cooling, ground = heating)	1+	Remote sensor connection (sensor ground and shield connection)	F ⊥
Connection ventilator outside (24 V+)	3+	Remote sensor connection. When using internal sensor > connection bridge	F
Supply voltage (24 V+)	↑ 24V+	Connection for bridge (when using Internal sensor)	7
Supply voltage (ground)	↑ ⊥	Not connectet	NC

**Technical data similar for all devices – EGO, SKY, DEK:**

Duty cycle	100 %
Electrical connection	Connector,4-pole
Inside temperature range	20-46° C
Outside temperature range	20-50° C
Protection type inside-circulation EN60529	IP54
Protection type outside-circulation EN60529	IP34
Conformity	CE
Shade	RAL 7035 powder-coated
Temperature regulation	Electronical thermostat built-in factory setting 35°C

# Compressor – for Roof-, Door-,

Product group P16

## Door - and Wall mounting – EGO

380 W – 3850 W (35° C)

240 W – 2870 W (50° C)

### Technical data (Ordering data)

Type	ME	EG004	EG006	EG008	EG010	EG012	EG030	EG040	
Cooling power EN814 - A35A35	W	380	640	820	1000	1250	2900	3850	
Cooling power EN814 - A35A50	W	240	470	680	790	910	2250	2870	
Supply voltage	230V 1~ 50-60 V ~ Hz	Type B	EGO04BT1B	EGO06BT1B	EGO08BT1B	EGO10BT1B	EGO12BT1B	EGO30BT1B	EGO40BT1B
	115V 1~ 50-60 V ~ Hz	Type C	EGO04CT1B	EGO06CT1B	EGO08CT1B	EGO10CT1B	EGO12CT1B	-----	-----
	400/440V 2~ 50-60 V ~ Hz	Type G	-----	EGO06GT1B	EGO08GT1B	EGO10GT1B	EGO12GT1B	-----	-----
	400V 3~ 50-60 V ~ Hz	Type L	-----	-----	-----	-----	-----	EGO30LT1B	EGO40LT1B
Width	mm	285	316	348	348	405	500	500	
Height	mm	460	606	783	783	999	1270	1270	
Length B/C/G/L	mm	180/+35**/-/-	212/+42**/+58**/-	215/+42**/+58**/-	215/+42**/+58**/-	237	336	336	
Max. current B/C/G/L	A	1,6/3,2/-/-	2,1/4,4/1,2/-	2,6/5,3/1,7/-	3/6,7/2/-	3,8/7,6/2,2/-	8,2/-/-/2,6	9,5/-/-/3,6	
Starting current B/C/G/L	A	6/11/-/-	8,1/16/5/-	10,8/21,5/6,1/-	10,5/23/8/-	11/24/8,5/-	37,4/-/-/14	35,2/-/-/18	
Fuse T B/C/G/L	A	4/6/-/-	6/8/2/-	6/10/6/-	6/10/4/-	6/10/4/-	16/-/-/6	16/-/-/8	
Rated power EN814 - A35A35 B/C/G/L	W	280/290/-/-	400/410/410/-	440/450/450/-	570/590/590/-	650/660/660/-	1340/-/-/1220	1710/-/-/1780	
Rated power EN814 - A35A50 B/C/G/L	W	330/340/-/-	470/480/480/-	490/500/500/-	650/670/670/-	760/770/770/-	1560/-/-/1440	1990/-/-/2050	
Refrigerant R134a	Kg	0,11	0,2	0,21	0,23	0,38	0,84	1,14	
Max. permissible operational excess pressure	bar	26	25	25	25	25	25	25	
Air capacity outside-circulation	m³/h	280	570	570	570	860	1450	1450	
Air capacity inside-circulation	m³/h	280	330	330	330	570	860	1450	
Noise level	dB (A)	60	65	65	65	65	70	70	
Weight B/C/G/L	Kg	17/18/-/-	21/22/22/-	27/28/28/-	28/29/29/-	38/40/40/-	80/-/-/84	82/-/-/85	
<b>Accessories</b>									
Packaging unit with 5 filter mats		AAEFP04	AAEFP06	AAEFP10	AAEFP10	C15000163	C15000183	C15000183	
Packaging unit with 1 filter mat		AAEFM04	AAEFM06	AAEFM10	AAEFM10	C15000164	C15000185	C15000185	

\*\*concerning montage of the external transformer

Technical data sheets on request!



# - cooling devices or Wall mounting

### Environmental protection

- No ozone-harmful coolants  
--> R134a oder R407C
- Low noise development
- High efficiency even at highly polluted areas  
(no filter)

## Door - and Wall mounting – SKY

Addition, part installation and full installation possible  
1050 W – 2050 W (35° C)  
860 W – 1560 W (50° C)

### Technical data (Ordering data)

Type	ME	SKY10	SKY15	SKY20	
Cooling power EN814 - A35A35	W	1050	1550	2050	
Cooling power EN814 - A35A50	W	860	1200	1560	
Supply voltage	230V 1~ 50-60 V ~ Hz	Type B	SKY10BT0B	SKY15BT0B	SKY20BT0B
	115V 1~ 50-60 V ~ Hz	Type C	SKY10CT0B	SKY15CT0B	SKY20CT0B
	400/440V 2~ 50-60 V ~ Hz	Type G	SKY10GT0B	SKY15GT0B	-----
	400V 3~ 50-60 V ~ Hz	Type L	-----	-----	SKY20LT0B
Width	mm	400	400	400	
Height	mm	950	950	1265	
Length B/C/G/L	mm	233	233	236	
Max. current B/C/G/L	A	3,1/6,3/1,9/-	5,3/12,9/2,9/-	6,5/13,3/-/2,5	
Starting current B/C/G/L	A	10,5/23/8/-	18/39/11/-	24/48/-/10	
Fuse T B/C/G/L	A	6/10/4/-	10/20/6/-	10/20/-/6	
Rated power EN814 - A35A35 B/C/G/L	W	570/590/590/-	880/900/900/-	1080/1110/-/970	
Rated power EN814 - A35A50 B/C/G/L	W	650/670/670/-	980/1000/1000/-	1290/1310/-/1150	
Refrigerant R134a	Kg	0,3	0,44	0,75	
Max. permissible operational excess pressure	bar	25	25	25	
Air capacity outside-circulation	m³/h	860	1050	1050	
Air capacity inside-circulation	m³/h	570	570	860	
Noise level	dB (A)	65	65	65	
Weight B/C/G/L	Kg	37/39/39/-	38/40/40/-	60/67/-/62	
<b>Accessories</b>					
Packaging unit with 5 filter mats		C15000181	C15000181	C15000181	
Packaging unit with 1 filter mat		C15000182	C15000182	C15000182	

Technical data sheets on request!



# Compressor cooling devices

Product group P16

## Roof mounting – DEK

with condensation collecting tanks and 2 drain hose

410 W – 3850 W (35° C)

240 W – 2870 W (50° C)

### Technical data (Ordering data)

Type	ME	DEK04	DEK08	DEK12	DEK15	DEK20	DEK30	DEK40	
Cooling power EN814 - A35A35	W	410	820	1150	1550	2050	2900	3850	
Cooling power EN814 - A35A50	W	240	680	900	1200	1560	2250	2870	
Supply voltage	230V 1~ 50-60 V ~ Hz	Type B	DEK04BT0B	DEK08BT0B	DEK12BT0B	DEK15BT0B	DEK20BT0B	DEK30BT0B	DEK40BT0B
	115V 1~ 50-60 V ~ Hz	Type C	DEK04CT0B	DEK08CT0B	DEK12CT0B	DEK15CT0B	DEK20CT0B	-----	-----
	400/440V 2~ 50-60 V ~ Hz	Type G	-----	DEK08GT0B	DEK15GT0B	-----	-----	-----	-----
	400V 3~ 50-60 V ~ Hz	Type L	-----	-----	-----	-----	DEK20LT0B	DEK30LT0B	DEK40LT0B
Width	mm	259	340	401	401	401	492	492	
Height	mm	264	340	415	415	415	496	496	
Length B/C/G/L	mm	486	600	567	567	567	797	797	
Max. current B/C/G/L	A	1,5/2,9/-/-	2,9/5,7/1,7/-	3,2/6,4/2,2/-	4,5/10/2,8/-	6/13,2/-/1,9	8,2/-/-/2,5	9/-/-/3,4	
Starting current B/C/G/L	A	4/10/-/-	12/19/7/-	11/22/8/-	18/39/9,6/-	24/48/-/10	38,4/-/-/15,7	38,2/-/-/17	
Fuse T B/C/G/L	A	4/6/-/-	6/10/4/-	6/12/6/-	8/16/4/-	10/20/-/4	16/-/-/6	18/-/-/6	
Rated power EN814 - A35A35 B/C/G/L	W	270/280/-/-	510/520/520/-	550/560/560/-0	810/820/820/-	1190/1220/-/990	1350/-/-/1210	1690/-/-/1630	
Rated power EN814 - A35A50 B/C/G/L	W	315/325/-/-	560/570/570/-	660/670/670/-	930/940/940/-	1300/1320/-/1190	1610/-/-/1450	1950/-/-/1890	
Refrigerant R134a	Kg	0,17	0,31	0,63	0,8	1,05/1,05/-/0,55	1,26/-/-/1,2	1,8/-/-/1,6	
Max. permissible operational excess pressure	bar	26	25	25	25	25	25	25	
Air capacity outside-circulation	m <sup>3</sup> /h	330	860	1010	1820	1820	3410	3410	
Air capacity inside-circulation	m <sup>3</sup> /h	235	570	570	860	1050	860	1450	
Noise level	dB (A)	60	62	65	65	65	75	75	
Weight B/C/G/L	Kg	18/19/-/-	23/24/24/-	40/42/42/-	44/46/46/-	50/56/-/52	80/-/-/83	83/-/-/86	
<b>Accessories</b>									
Packaging unit with 5 filter mats		C15000171	C15000173	AADFP12	AADPF12	AADFP12	AADFP30	AADFP30	
Packaging unit with 1 filter mat		C15000172	C15000174	AADFM12	AADFM12	AADFM12	AADFM30	AADFM30	
Casing frame for partial installation		C16000140	C16000140	C16000140	C16000140	C16000140	C16000140	C16000140	

Technical data sheets on request!



# Accessories

**Power supply**.....Page 64

**Control Cabinet sockets**.....Page 65

**Shift module 24VDC/48VDC**.....Page 65  
for peltier cooling units

**Pressure compensation fitting**.....Page 66

**Airflow monitor**.....Page 66

## Your opinion to us! Copy and fax – You will get a little "thank - you"

Fax to

**Achter/Lm-therm**  
**Head of Sales**

**Fax No + 49 (0) 8543/6246040**

Fax from

Company: \_\_\_\_\_

City: \_\_\_\_\_

Street: \_\_\_\_\_

Phone No.: \_\_\_\_\_

Fax No.: \_\_\_\_\_

Contact Person: \_\_\_\_\_

*"Also recipient of the thank-you"*

**Achter/Lm-therm wants to solve your technical requirements completely by innovation!**

**Our Question:**

Which products – not only at the accessories – are you missing in our product range?

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

# Accessories

## Power supply – electrically isolated

Product group P 7

### Open version with transformer Type TO...

Ordering data

Input	Output	Power rating	Order No.	Weight
230 V AC	12 V DC	50 W	TO230-50-12	1750 g
230 V AC	12 V DC	100 W	TO230-100-12	3100 g
230 V AC	12 V DC	150 W	TO230-150-12	4900 g
230 V AC	24 V DC	50 W	TO230-50-24	1750 g
230 V AC	24 V DC	100 W	TO230-100-24	3100 g
230 V AC	24 V DC	150 W	TO230-150-24	4900 g
230 V AC	48 V DC	50 W	TO230-50-48	1750 g
230 V AC	48 V DC	100 W	TO230-100-48	3100 g
230 V AC	48 V DC	150 W	TO230-150-48	4900 g

- Protection class I (ground wire)
- Built-in fuse 2 A
- Foot bracket for fixing
- Screw terminal up to 4 mm<sup>2</sup>

Data sheet upon request



### Compound-filled version with transformer Type TC...

Ordering data

Input	Output	Power rating	Order No.	Weight
230 V AC	12 V DC	50 W	TC230-50-12	1550 g
230 V AC	12 V DC	100 W	TC230-100-12	2900 g
230 V AC	12 V DC	150 W	TC230-150-12	4200 g
230 V AC	24 V DC	50 W	TC230-50-24	1550 g
230 V AC	24 V DC	100 W	TC230-100-24	2900 g
230 V AC	24 V DC	150 W	TC230-150-24	4200 g
230 V AC	24 V DC	190 W	TC230-190-24	4200 g
230 V AC	48 V DC	50 W	TC230-50-48	1550 g
230 V AC	48 V DC	100 W	TC230-100-48	2900 g
230 V AC	48 V DC	150 W	TC230-150-48	4200 g

- Protection class II (double insulated)
- Thermo-switch 110°C
- Fixing holes in baseplate
- Screw terminal up to 4 mm<sup>2</sup>

Data sheet upon request



### Switching power supplies Type S...

Ordering data

Input	Output	Power rating	Order No.	Weight
230 V AC	12 V DC	25 W	S-25-12	400 g
230 V AC	12 V DC	60 W	S-60-12	550 g
230 V AC	12 V DC	100 W	S-100-12	650 g
230 V AC	24 V DC	25 W	S-25-24	400 g
230 V AC	24 V DC	60 W	S-60-24	550 g
230 V AC	24 V DC	100 W	S-100-24	650 g
230 V AC	48 V DC	25 W	S-25-48	400 g
230 V AC	48 V DC	60 W	S-60-48	550 g
230 V AC	48 V DC	100 W	S-100-48	605 g

- Protection class I (ground wire)
- Operating LED
- Output voltage vernier adjustable
- Screw terminal up to 4 mm<sup>2</sup>

Data sheet upon request





## Control cabinet sockets SD for installation on DIN-rails

Product group P8

Type	SD-01	SD-02	SD-03	SD-04	SD-05
Standard/Country	Germany	Italy	France	USA	Spain
Voltage	250 V	250 V	250 V	125 V	250 V
Max current	16 A	16 A	16 A	16 A	16 A
Electrical connection	3-pole terminal for 2,5 mm <sup>2</sup>				
Protection type	IP 20				
Protection class	Protection class I				
Operating temperature	-25/+60 °C				
Storage temperature	-45/+60 °C				
Fixture	Fixture for DIN-rail 35 mm EN50022				
Compliance	CE				
Dimensions H x B x T	92 x 57 x 51 mm				
Weight	105 g				

Option

With fuse 6.3 A	SD-01F	SD-02F	SD-03F	SD-04F	SD-05F
-----------------	--------	--------	--------	--------	--------

## Shift module 24VDC/48VDC solid-state for peltier cooling units



Type

**Lm-SM010**

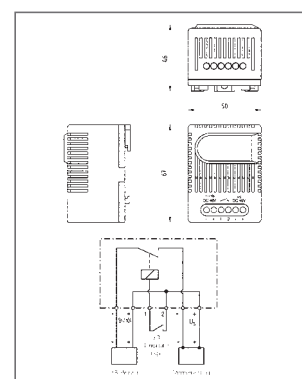
Product group P4

Order No.	Operating voltage:	Max. Breaking capacity
Lm-SM010-24	DC24V (20-28V)	16A (28V DC)
Lm-SM010-48	DC48V (38-56V)	16A (56V DC)

### Technical details

- Contact type: normally open contact (Relais/MOSFET)
- Contact transition resistance: < 10 mOhm
- Service life: >100 000 cycles
- EMV: nach EN 55014-1-2, EN 61000-3-2, EN 61000-3-3
- Connection: 2-pole terminal 2,5 mm<sup>2</sup>, tightening torque 0,8 Nm
- Fixture: clip for DIN-rail 35 mm, EN 50022
- Enclosure: plastic according to UL94 V-0, light grey
- Dimensions: 67 x 50 x 46 mm
- Weight: ca. 85 g
- Mounting position: any
- Operating-/storage temperature: -45 bis +70°C (-49 bis +158°F)
- Protection type: IP 20
- Approbation: VDE and UL intended

### Dimensioned drawing and wiring diagram



## Pressure compensation fitting

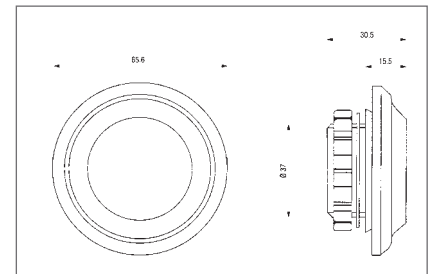
Product group P8

Fastening:	thread M40 x 1,5 including nut
Installation depth:	ca. 16 mm
Material:	polyamide 6, light gray
Sealing:	seal ring NBR
Air permeability:	1200l/h at a pressure gradient of min. 70 mbar
Dimensions:	ø 60 mm x 37 mm
Mounting position:	any
Operating-/Storage temperatures:	-45 bis +70°C (-49 bis +158°F)
Order No.:	LM-DA284



- Very high protection type
- Semipermeable membrane
- Simple installation

### Dimensioned drawing



## Airflow monitor

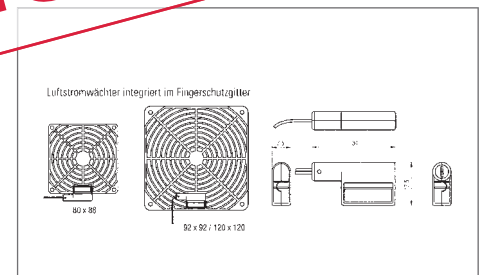
Product group P8

### Technical details

- Contact type: reed switch / magnet  
Breaker: switch contact when airflow opened  
Normally open contact: switch contact when airflow closed
- Breaking capacity: max. 10 W (ohmic load)
- Switched voltage max.: breaker: DC 240 V (UL), AC/DC 240 V (VDE) / normally open contact: DC 60 V
- Switched current max.: breaker: DC 500 mA / normally open contact: DC 170 mA
- Switching threshold of air flowrate: >2,5 m/s (Hysteresis: > 1 m/s)
- Air flow rate max.: 50 m/s
- Humidity max.: 70 % rF (non-precipitating)
- Service life: >100 000 Zyklen
- Connection: 2 x AWG 26 single strands, 100 mm long, ends stripped 5mm, tinned  
(breaker: black, NOC blue)
- Contact transition resistance: 370 mOhm (with strands)
- Mounting: optional integrated into finger protection guard (see table), fastening clamp, or fastening clip
- Enclosure: plastic according to UL94 HB, black
- Mounting position: flexible air vane perpendicular to airflow
- Protection type: IP 20 • Approvals: VDE + UL File No. E250507



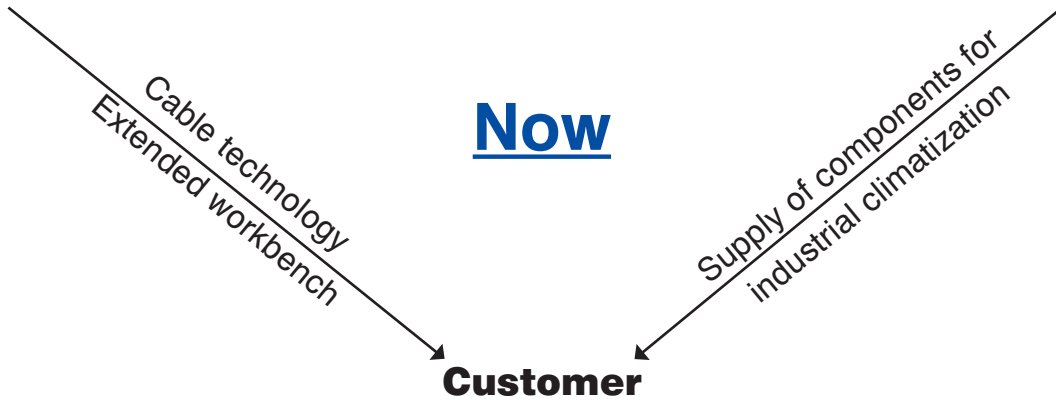
### Dimensioned drawing



Description	Order No. (breaker)	Order No. (normally open contact)	Dimensions	Weight (ca.)
Airflow monitor with fastening clamp and clip	LM-LC013-Ö	LM-LC013-S	34 x 17,5 x 7,5 mm	5 g
Airflow monitor integrated into finger protection guard (plastic)	LM-LC01380-Ö	LM-LC01380-S	88 x 80 x 10,5 mm	20 g
	LM-LC01392-Ö	LM-LC01392-S	92 x 92 x 10 mm	20 g
	LM-LC013120-Ö	LM-LC013120-S	120 x 120 x 10 mm	30 g



+



## Our vision



## Benefits for our customers

All from one source

Competent persons to contact

High-value quality

Simple logistics

Short delivery periods to schedule

Less suppliers

More cost-effective production

Assistance in design and development



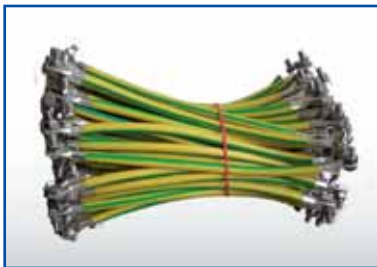
## ● Cable technology

(pages 72 – 77)

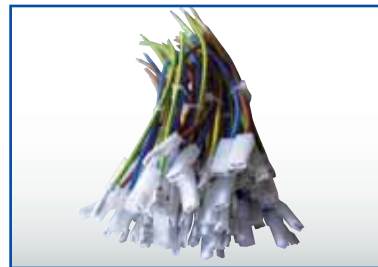
We supply many different industries (see page 70). Consequently, we process a great variety of different types of cables together with contact systems produced by all well-renowned manufacturers. To specify all details in this abstract is impossible. Please send us your inquiry including drawing, parts list, or also sample! We will be pleased to prepare a quotation for you.

The following pages show a brief overview on our customer-specific production program

### 1. Single conductor manufacture (page 72)



### 4. Manufacture of cable sets (page 75)



### 2. Manufacture of multi-conductor (page 73)



### 5. Manufacture of cable harnesses (page 76)



### 3. Manufacture of flat ribbon cables (page 74)



### 6. Manufacture of mains connection cables (page 77)



# a glance

## workbench

- **Assembly of components, modules, and product series**

(page 78)

We will be glad to assemble semi-finished products for your production or even your complete selling product.

Furthermore we offer you the warehouse and supply logistics (in country and abroad) for shipment to your customers. Your warehouse at our place.

- **Switch- and control gear production in series**

(page 79)

As your extended workbench, we realize for you switch and control gear equipment in serial production.

- Small control units
- Machinery and plant equipment control systems
- Switchgear for low and medium voltage

We also we will be glad to assist you in the development of prototypes and pilot series.



## Achter + Lm-therm together

- We achieve a consistent high-value quality standard by providing regular trainings for our employees!
- A trustful cooperation with your teams is very important to us.
- In cases where we undertake customer-specific productions, it is natural for us to make you suggestions for possible improvement potentials.
- Test procedures:  
All test procedures are performed in accordance with the pertinent standards and/or according to your specifications.
- Of course we also cooperate with partner companies. We are willing to give you the names of such companies, also in cases where you might like to get an alternative quotation for an own production!
- We design using Solidworks 3D-CAD. Also for you we will be glad to provide engineering design services (on quotation basis).
- The exchange of design data with all current CAD systems is possible.
- Integration of our supply commitments into your supply chain in line with your internal procedures, e.g. just-in-time, kanban.
- Documentation and marking of all parts to be produced according to your specifications is part of our logistics offer.
- In cases where we assume the complete procurement of production materials, we also undertake the setup of a buffer warehouse on basis of a skeleton agreement (production materials as well as finished products).

### **For us a matter of course!**

We manufacture customer-specific parts only. Our customers have decided, which parts we are allowed to make public for advertising purposes (pages 72 – 79).  
This course of procedure is self-understood to us!

### **Currently we supply the following industries:**

- **Control cabinet construction**
- **Wind power – photovoltaics**
- **Medical technology**
- **Lighting and stagecraft technology**
- **Drive technology**
- **Automotive**
- **Plant engineering and construction**
- **Transformer construction**
- **Information technology**
- **Mechanical engineering**
- **Safety features and equipment**
- **High frequency technology**

## About our company

From the following photographs you can see a number of "pictures of our production processes".

### Our advice "on own account!":

Without "loosing sight of" large-scale production, we confess to the strategy to also produce single parts, particularly however small series and medium demand.

Our machinery in operation – particularly in the cable fabrication – is arranged for short set-up times and flexible productions. That strategy enables us to realize a great variety of products and diversity of production – see following pages!



Our logistics / production is arranged for own parts + complementary supplies



Flexible manufacture by hand, or on semi and fully automatic equipment



Checking and testing according your specifications and of course in accordance with the pertinent standards



We also assist you by these activities (design engineering, project planning, etc.)

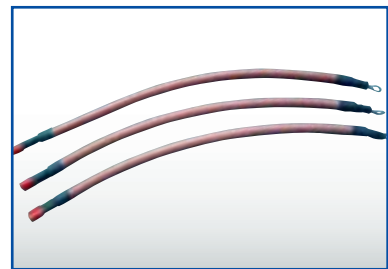
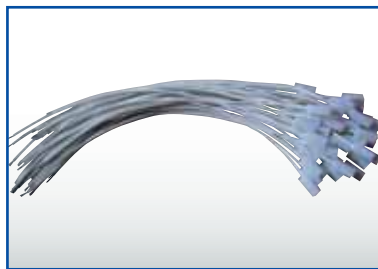
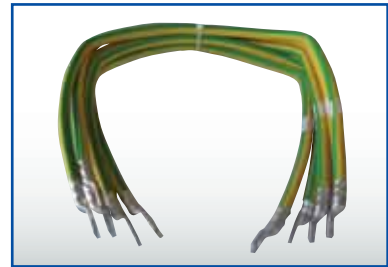
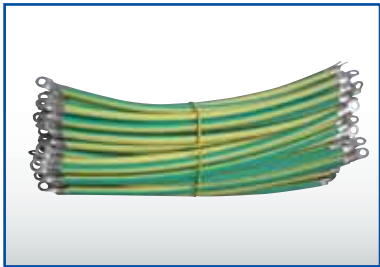
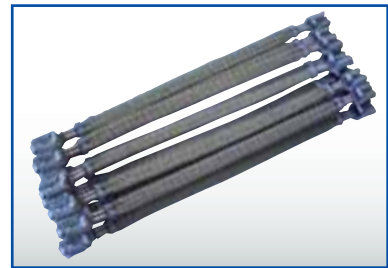
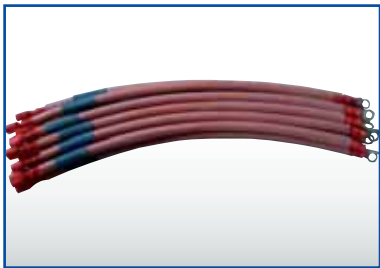


We deliver with our own trucks as well as by forwarder or parcel service. Shipment neutral or in your name to your customers (domestic / abroad).

## ● Cable technology

### 1. Single conductor manufacture

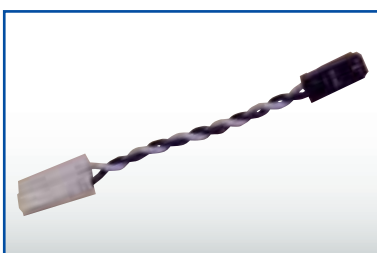
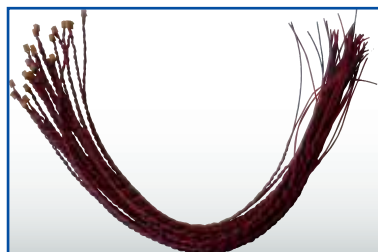
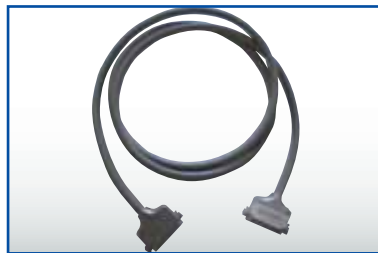
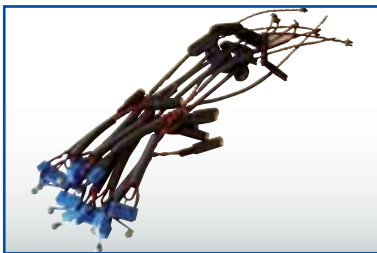
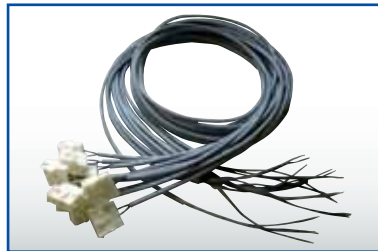
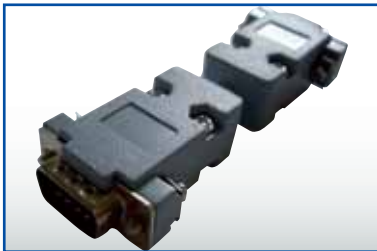
- Conductor cross sections from 0.14 mm<sup>2</sup> to 195 mm<sup>2</sup> respectively AWG26 to AWG000000
- Conductors multi-strand structure or solid wire
- Harmonized strands and UL-conform strands in a multitude of different styles as well as other standards
- Temperature ranges from -50 °C to 200 °C
- Insulation material conditional upon thermal, mechanical, chemical, and environmental requirements, made of PVC, silicone, Teflon, PE and PU
- Multi-layer insulating material structure possible
- Automatic imprinting with industrial bubble jet printers available
- Furnishing with contacts of all current contact and enclosure systems possible
- Fully automatic fabrication form von 0.14 mm<sup>2</sup> to 6 mm<sup>2</sup>
- Twisting of individual single strands



# ● Cable technology

## 2. Manufacture of multi-conductor

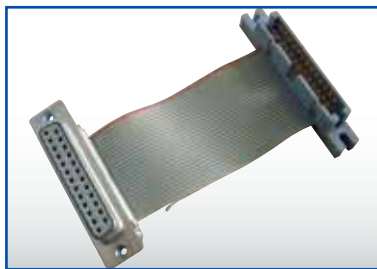
- Conductor cross sections from 0.14 mm<sup>2</sup> to 6 mm<sup>2</sup> respectively AWG26 to AWG10
- Conductors multi-strand structure or solid wire
- Harmonized strands and UL-conform strands in a multitude of different styles as well as other standards
- Temperature ranges from -50 °C to 200 °C
- Insulation material conditional upon thermal, mechanical, chemical, and environmental requirements, made of PVC, silicone, Teflon, PE and PU
- Multi-layer insulating material structure possible
- Shielded, unshielded, and coaxial structure of cables
- Automatic imprinting with industrial bubble jet printers available
- Furnishing with contacts of all current contact and enclosure systems possible



## ● Cable technology

### 3. Manufacture of flat ribbon cables

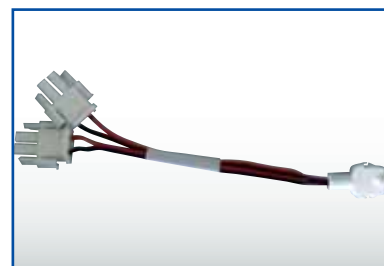
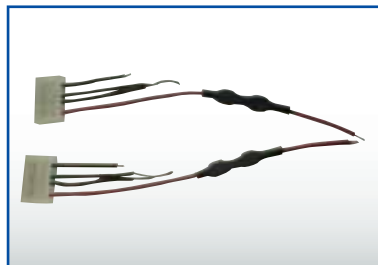
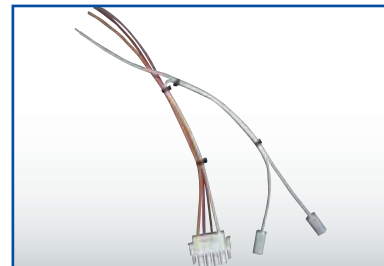
- Conductor cross sections from 0.14 mm<sup>2</sup> to 1 mm<sup>2</sup> respectively AWG26 to AWG10
- Conductors multi-strand structure or solid wire
- Contact spacing from 1.27 mm to 2.54 mm
- Harmonized strands and UL-conform strands in a multitude of different styles as well as other standards
- Temperature ranges from -50 °C to 200 °C
- Insulation material conditional upon thermal, mechanical, chemical, and environmental requirements, made of PVC, silicone, Teflon, PE and PU
- Multi-layer insulating material structure possible
- Shielded, unshielded, and round/flat cables
- Automatic imprinting with industrial bubble jet printers available
- Furnishing with contacts of all current contact and enclosure systems like insulation displacement contacts, solder contacts, and crimp contacts
- Enclosure systems such as SEB-D, socket plug connectors with /without strain relief clamp, circuit board plug connectors, and standard enclosures



# ● Cable technology

## 4. Manufacture of cable sets

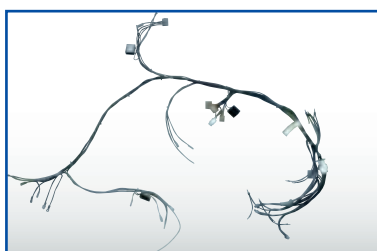
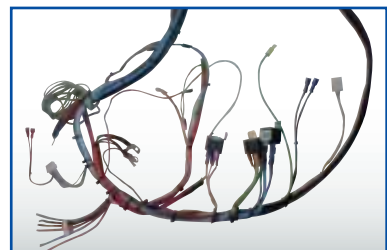
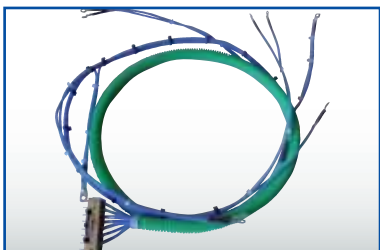
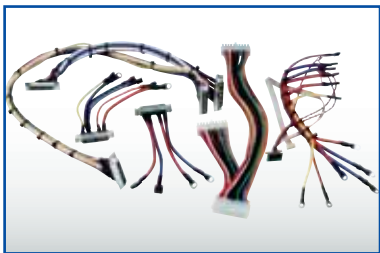
- Conductor cross sections from 0.14 mm<sup>2</sup> to 195 mm<sup>2</sup> respectively AWG26 to AWG000000
- Conductors multi-strand structure or solid wire
- Harmonized strands and UL-conform strands in a multitude of different styles as well as other standards
- Temperature ranges from -50 °C to 200 °C
- Insulation material conditional upon thermal, mechanical, chemical, and environmental requirements, made of PVC, silicone, Teflon, PE and PU
- Multi-layer insulating material structure possible
- Automatic imprinting of individual cables with industrial bubble jet printers available
- Furnishing with contacts of all current contact and enclosure systems possible
- Fully automatic fabrication from 0.14 mm<sup>2</sup> to 6 mm<sup>2</sup> possible
- Twisting of individual single strands possible



## ● Cable technology

### 5. Manufacture of cable harnesses

- Prototypes, serial production for medical technology, apparatus, plant and mechanical engineering
- Various types of sheathing possible, cable straps, corrugated pipes, insulating hose, wrapping tapes
- Open ends, various contact systems with enclosure
- Wiring materials same as described under cable fabrication
- Quality assurance: dimensional accuracy, electric continuity, short-circuit, insulation resistance measurement where required
- Labeling with serial / batch numbers
- Determination of package and lot sizes in coordination together with our customers



## ● Cable technology

### 6. Manufacture of mains connection cables

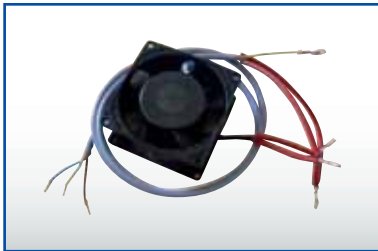
- Various international standards for plug connectors and wiring materials
- Lot size 1 up to serial production
- Connectors screwed-on or molded-on
- Compound-filled version for sealing possible
- Customization for extension cables



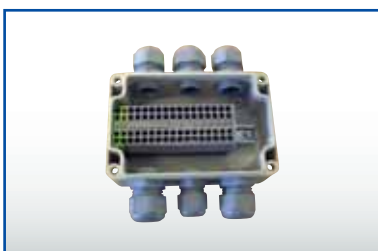
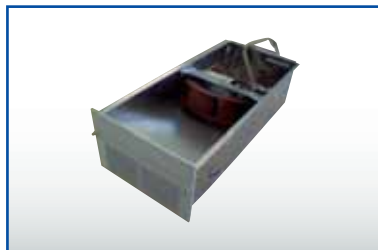
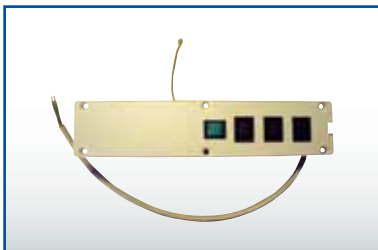
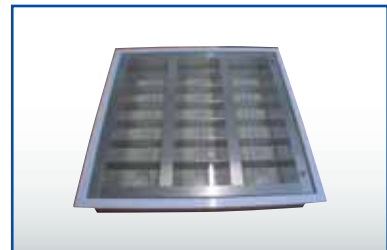
## ● Assembly of components, modules, and product series

### Our services for you:

- Assembly and testing of electronic and electromagnetic parts
- Manufacture of complete devices
- Assistance in design and development
- Retrofitting of your standard products into special variants



**We are looking forward to your inquiry**



## ● Switch- and control gear production in series

### Our services for you:

- Complete assembly including testing according to your specifications
- Integration of your complementary supplies or own procurement
- Usage of cable harnesses – prefabricated in our own cable production
- Assistance in the construction of prototypes and pilot series

Our above-described services are based upon your production and test specifications.



We like to be your partner whenever you need assistance in our serial switch and control gear production.

In this connection, we see us as your extended workbench.

You are welcome in Aldersbach!



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## Achter Elektronik AG

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