

Panel-mounted thermostats EM

with 1, 2, 3, or 4 single-pole snap-action switches

PED Pressure
Equipment
Directive



C **RU** **US**



Operating Manual



60202100T90Z003K000

V6.00/EN/00073772/2025-06-04

Further information and downloads



qr-602021-en.jumo.info

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1 About this documentation

1.1 Purpose

This documentation is part of the device and includes all information to ensure that it is used safely and as intended across all phases of the product lifecycle.

If you do not follow the documentation and safety information, this may result in risk to life and damage to property due to improper use.

- Read and follow the documentation and the safety information and warnings.
- Store the document in its entirety, in an easily accessible location, and so that it can be read in full at all times.
- Contact the manufacturer if you have any questions about the device and documentation.

1.2 Trademark information

All trademarks and trade and company names used are the property of their rightful owners or authors.

1.3 Symbols



WARNING!

The signal word "WARNING" indicates an imminent danger.

Non-observance can lead to death or serious injury.

- ▶ The instructions in the warning notice must be observed and followed!
-

NOTICE!

The signal word "NOTICE" indicates possible damage to property.

Non-observance can lead to damage to devices, systems or the environment.

- ▶ Observe the instructions in the note for avoiding damage!
-

2.1 Intended use

The panel-mounted thermostat monitors and controls the exceeding or falling below of limit values in process systems. The device can be used in the following areas:

- Heating and air-conditioning industry
- Heating cabinets
- Plastics industry
- General mechanical engineering
- In the event of a break in the measuring system, liquid may escape

Physical and toxicological properties of the expansion fluid that may escape in the event of a system fracture.

Control range with end of scale	Dangerous reactions	Fire and explosion hazard		Water contamination	Toxicological data		
		Ignition temperature	Explosion limit		Irritant	Danger to health	Toxic
< 200 °C	No	355 °C	0.6 to 8 % v/v	Yes	Yes	See note	No
≥ 200 °C ≤ 350 °C	No	490 °C	-	Yes	Yes	See note	No
> 350 °C ≤ 650 °C	No	No	No	No	No	No	No

At present, there is no restrictive statement from the health authorities concerning any danger to health over short periods and at low concentration, e.g. after a fracture of the measuring system.

3 Description

Switching functions

Temperature controller TR and temperature monitor TW

If the temperature on the temperature probe exceeds the setpoint value, the electrical circuit is opened or closed by a microswitch. If the temperature falls below the selected setpoint value (by the switching differential), the microswitch is reset to its initial position.

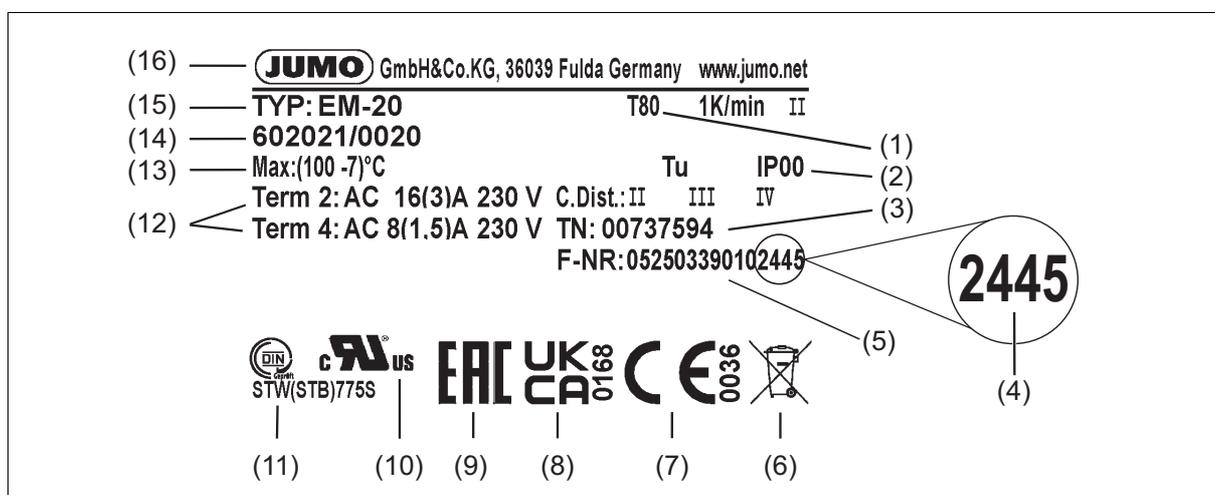
Temperature limiter TB

If the temperature at the temperature sensor exceeds the set limit value, the electrical circuit is opened or closed by a microswitch.

After the temperature has fallen below the limit value by approx. 10 % of the scale range (approx. 15 % with setpoint setting >350 °C), the microswitch can be unlocked manually.

3.1 Nameplate

Example:



- | | | | |
|---|--|----|------------------------------------|
| 1 | Manufacturer and address | 8 | EAC conformity marking |
| 2 | Device designation | 9 | UK conformity marking |
| 3 | Order code | 10 | EU conformity marking |
| 4 | Control range or limit value range/
ambient temperature at which this
thermostat was calibrated (option) | 11 | Fabrication number (F-NR) |
| 5 | Switching capacity | 12 | Date of manufacture: year and week |
| 6 | DIN marking | 13 | Part number (TN) |
| 7 | UL marking | 14 | Protection type |
| | | 15 | Permissible ambient temperature |

4.1 Electrical data

Switching element	Snap-action switch with single-pole changeover contact
Max. switching capacity On the NC contact (contact deck 1 to 2) TR, TW, STW (STB), STB, TB On the NO contact (contact deck 1 to 2) TR, TW, STW (STB) STB, TB With switching differential TR, TW 1 %, 3 % TR, TW, 2,5 % TB, STB with microswitches with gold-plating (type suffix 702)	AC 24...400 V +10 %, 0,1...10 A, AC 24...230 V +10 %, 0,1...16 (3)a A, $\cos \varphi = 1$ (0,6) DC 24...230 V +10 %, 0,25 A AC 24...400 V +10 %, 0,1...2 A, AC 24...230 V +10 %, 0,1...8 (1,5) A, $\cos \varphi = 1$ (0,6) DC 24...230 V +10 %, 0,25 A AC 24...230 V +10 %, 0,1...2 (1) A, $\cos \varphi = 1$ (0,6) DC 24...230 V +10 %, 0,25 A, (only with extra code 574) AC 24...230 V +10 %, 0,1...6 (2) A, $\cos \varphi = 1$ (0,6) DC 24...230 V +10 %, 0,25 A AC/DC 10...24 V, 0,005...0,1 A
Rated surge voltage	2500 V (via the switching contacts 400 V)
Overvoltage category	II
Required fuse protection	Refer to maximum switching capacity
Electrical connection	
Standard	Tab connector A 6.3 – 0.8 DIN 46244
Extra code 699	Screw connection up to 2.5 mm ² cable cross-section (can be retrofitted)

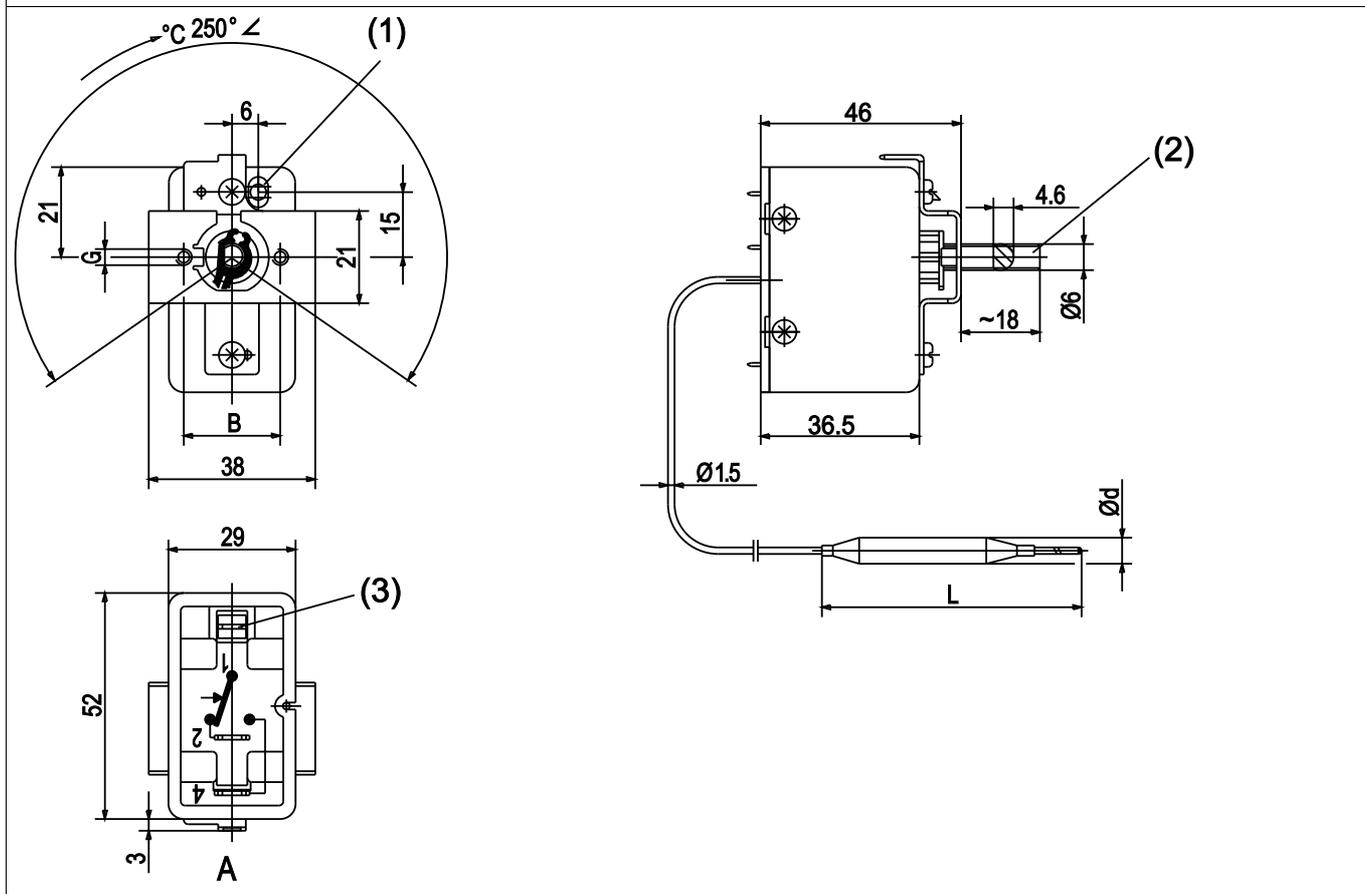
4 Technical data

4.2 Operating data

Medium ambient temperature influence	Deviation of the ambient temperature at the switching head and/or capillary from the 22 °C calibration ambient temperature produces a switching point offset. Higher ambient temperature = low switching point Lower ambient temperature = higher switching point											
For temperatures with scale limit value/limit value Switching differential in % Ambient temperature influence on the switching head in %/K Ambient temperature influence on the capillary in %/m	TR, TW, TB				STW, STB		TR, TW, TB		STW, STB		TR, TW, TB, STW, STB	
	< 200 °C					≥ 200 °C ≤ 350 °C					≥ 400 °C ≤ 500 °C	
	1/2,5	5	7	7/-		1/2,5	5	7/-		3/5	6	10
	0,15	0,26	0,34	0,43		0,12	0,21	0,35		0,12	0,17	0,24
	0,05 · K · m			0,09 · K · m			0,09 · K · m		0,07 · K · m		0,05 · K · m	
Temperatures Admissible storage temperature Admissible ambient temperature for use	-50 bis +50 °C Max. 80 °C											
Nominal position (NL)	Any											
Operating medium	Water, oil, air, superheated steam											
Time constant $t_{0,632}$ In water In oil In air or superheated steam	≤ 45 s ≤ 60 s ≤ 120 s											
Mode of operation TR, TW TB STW (STB) STB	According to EN 60730-1, DIN EN 60730-2-9, DIN EN 14597 2 BL 2 BFHLPV 2 BKLNP 2 BFHKLNPV											

4.3 Dimensions

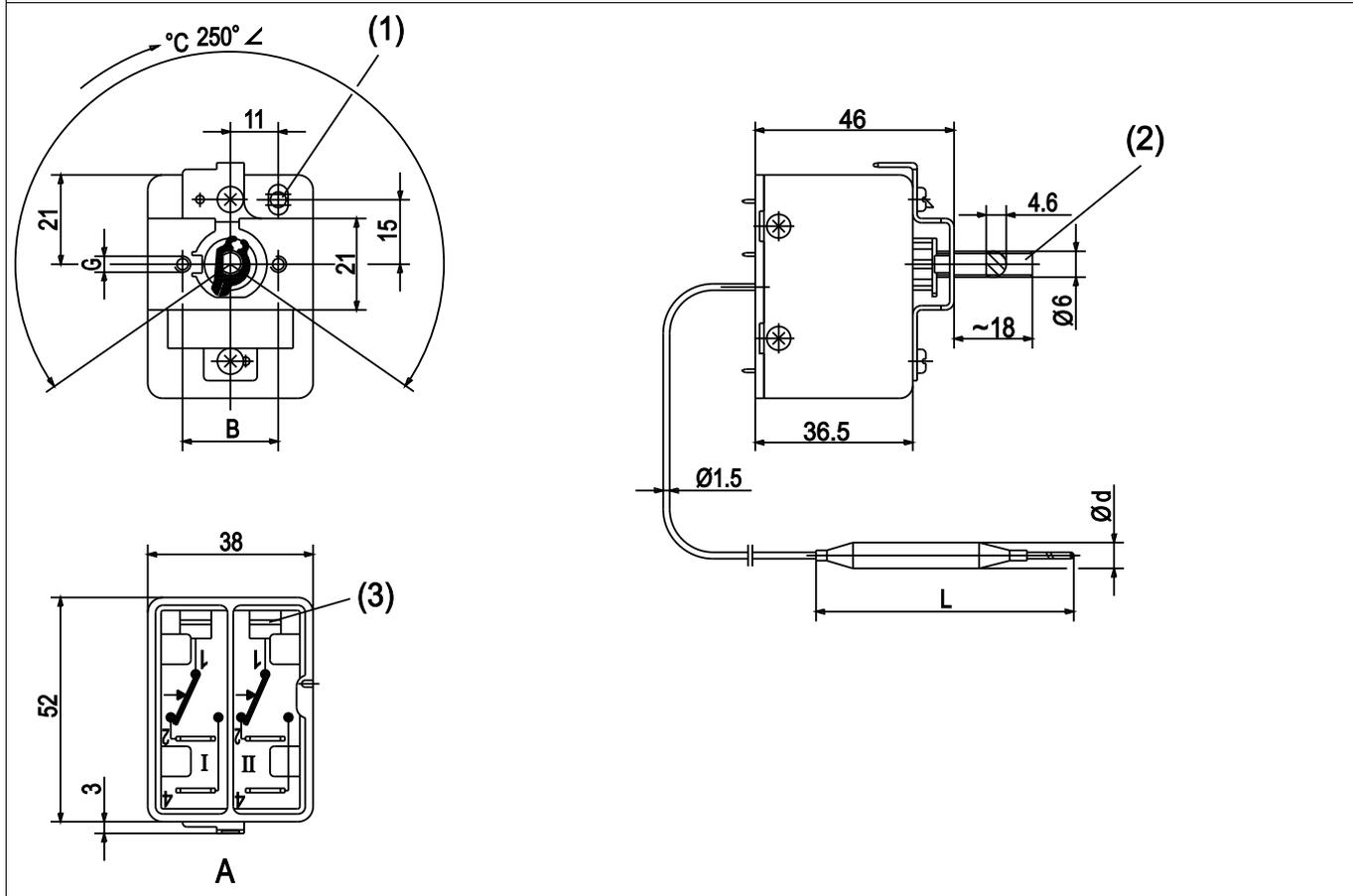
EM-1, EM-2, EM-3, EM-4, EM-5



- 1 Restart knob only for EM-4 and EM-5
- 2 Not applicable for EM-2, EM-3, EM-4, EM-5
- 3 Tab connector DIN 46244-A6,3-0,8
- A Rear view

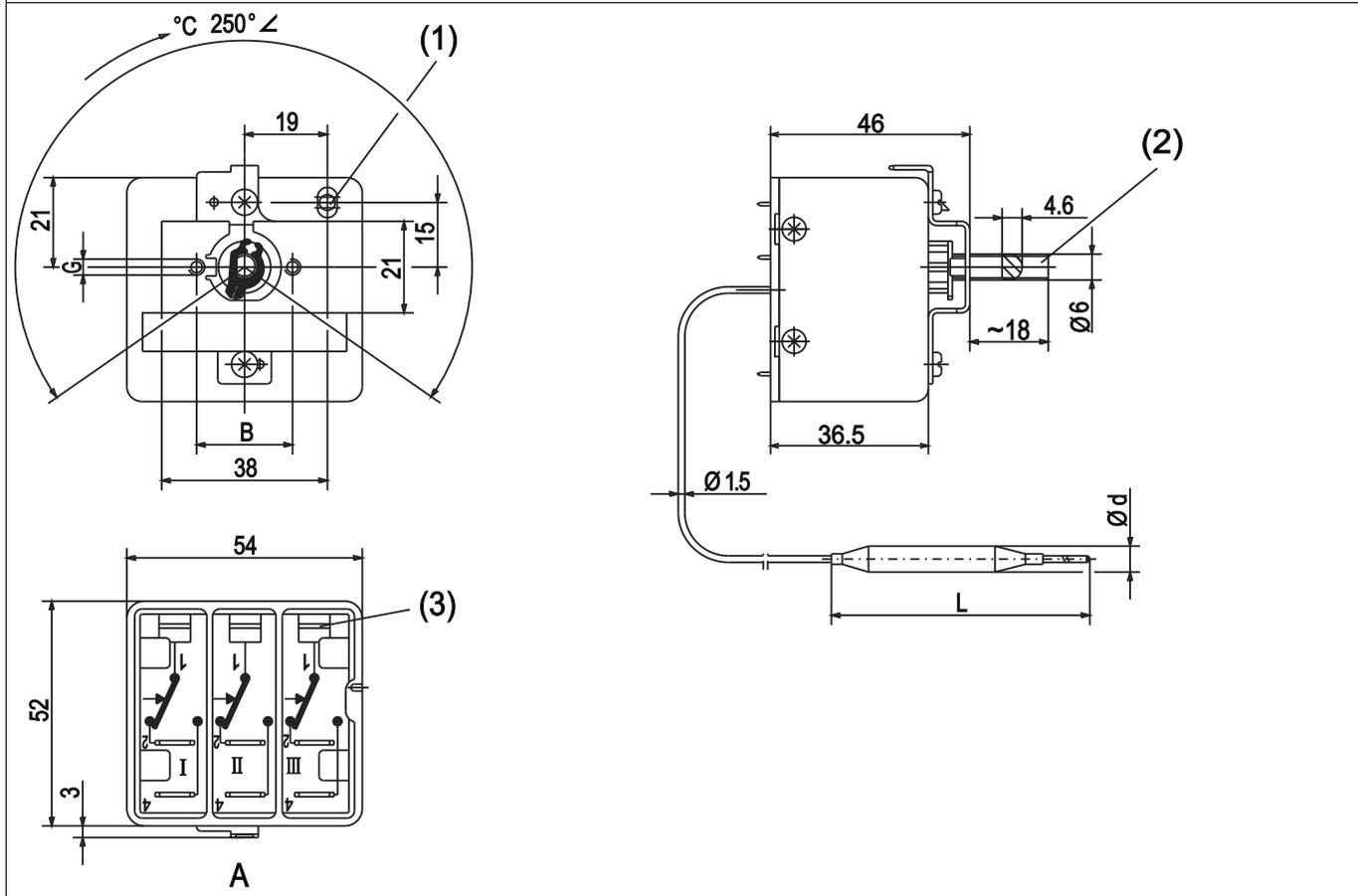
4 Technical data

EM-13, EM-14, EM-23, EM-24, EM-33, EM-44, EM-54



- 1 Restart knob only for EM-14, EM-24, EM-44, EM-50 and EM-54
- 2 Not applicable for EM-23, EM-24, EM-33, EM-44 and EM-54
- 3 Tab connector DIN 46244-A6,3-0,8
- A Rear view

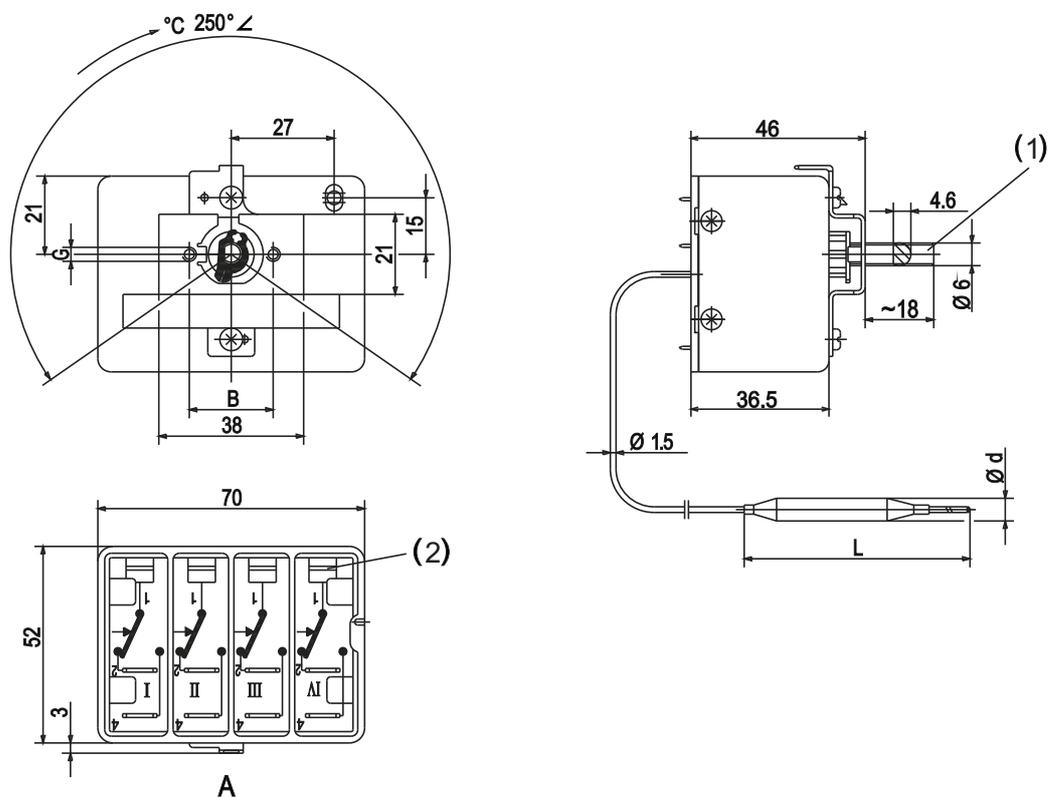
EM-133, EM-134, EM-233, EM-234, EM-333, EM-444, EM-544



- 1 Restart knob only for EM-134, EM-234, EM-444, EM-544
- 2 Not applicable for EM-233, EM-234, EM-333, EM-444, EM-544
- 3 Tab connector DIN 46244-A6,3-0,8
- A Rear view

4 Technical data

EM-1333, EM-2333, EM-3333



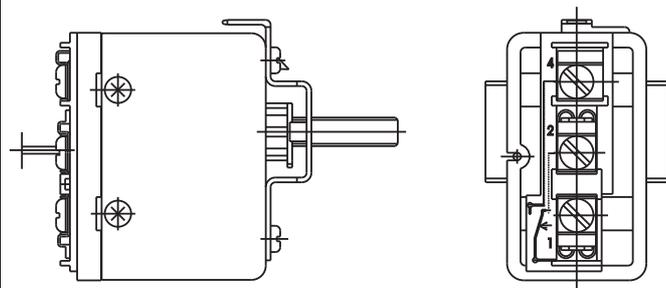
1 Not applicable for EM-2333, EM-3333

2 Tab connector DIN 46244-A6,3-0,8

A Rear view

	B	G
Standard	22	M3
Extra code 704	28	M4
Extra code 705	33	M3

Screw connection EM-1, extra code 699



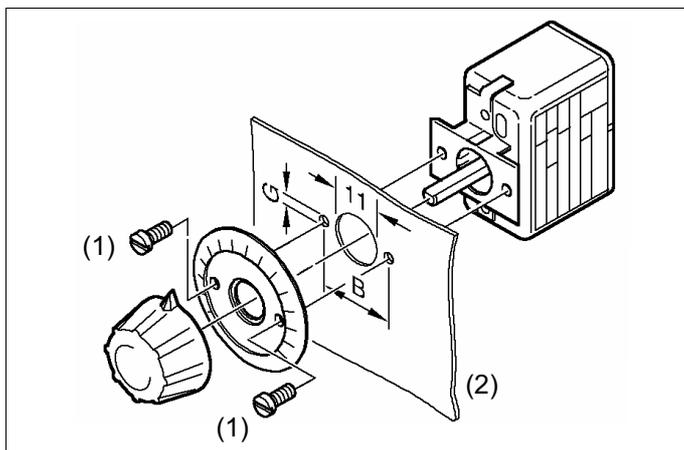
5.1 Fixing the panel-mounted thermostat

Operating position	Any
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5.1.1 Mounting the switching head

EM-1

Mounting the switching head with 2 screws M3 on chassis (M4 with extra code 704).

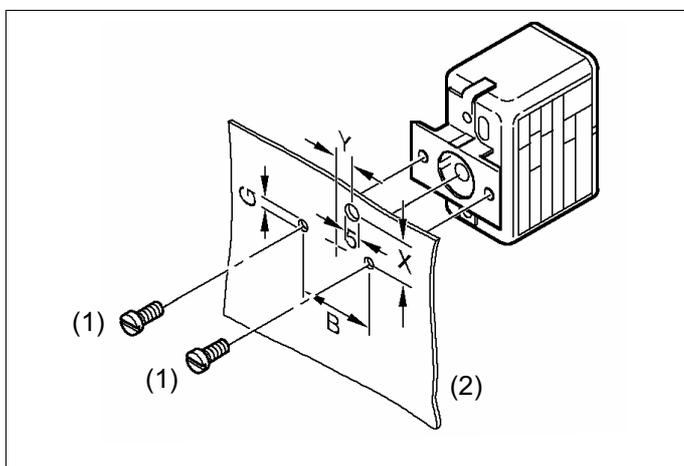


- 1 Screw
- 2 Panel

	Dim. (mm)	
	G	B
Standard	3,5	22
Extra code 704	4,5	28
Extra code 705	3,5	33

EM-2, EM-3, EM-4, EM-5, EM-20, EM-30, EM-30, EM-40, EM-44, EM-50, EM-54, EM-444, EM-544

Mounting the switching head with 2 screws M3 on chassis (M4 with extra code 704).



- 1 Screw
- 2 Panel

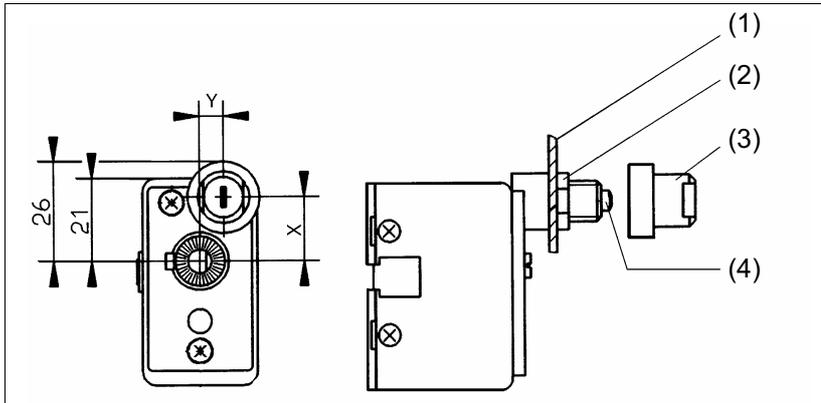
	Dim. (mm)	
	X	Y
EM-2, EM-3, EM-20, EM-30	-	-
EM-4, EM-5	15	6
EM-40, EM-50	15	11
EM-44, EM-54	15	11
EM-444, EM-544	15	19

	G	B
	Standard	3,5
Extra code 704	4,5	28
Extra code 705	3,5	33

5 Mounting

EM-4, EM-5, EM-40, EM-50 with central mounting

Extra code 710



	Dim. (mm)	
	X	Y
EM-4, EM-5	16	6
EM-40, EM-50	16	11

- 1 Panel
- 2 Fixing nut M10 × 1 (13 a/f)
- 3 Acorn nut M10 × 1 (10 a/f)
- 4 Restart knob

5.2 Capillary, temperature probe and thermowell

NOTICE!

Device failure due to a defective remote line

Cutting or kinking of the capillary leads to permanent failure of the functions.
The minimum permissible bending radius of the capillary is 5 mm.

If the temperature sensor is installed in a protective tube, suitable protective tubes must be used.

Fitting several probes into a common thermowell is permissible with 2 or 3 cylindrical probes with diameter $D = 6$ mm and thermowells 15×0.75 mm. When fitting 2 probes in a common thermowell, the default-supplied pressure spring must be fitted in the thermowell. For operation in air, process connection 10 (without thermowell) must be chosen.

5.2.1 Approved process connections

For detailed information, refer to data sheet 606710.

If you determine an external defect, also at mechanical way, the differential pressure transmitter has to be sent for repair to the manufacturer.

6.1 Installation notes



CAUTION!

The electrical connection must only be made by qualified personnel.

The choice of cable, the installation and the electrical connection must conform to the requirements of VDE 0100 „Regulations for the installation of power circuits with nominal voltages below 1000 V“, or the appropriate local regulations..

If contact with live parts is possible while working on the unit, it must be completely disconnected from the supply.

Earth the instrument at the PE terminal to the protective conductor. This cable must have a cross-section that is at least as large as the supply cables. Earth cables must be run in a star configuration to a common earth point which is connected to the protective earth of the supply. Do not loop earth cables, i.e. do not run them from one instrument to another.

Apart from faulty installation, incorrect settings on the thermostat can affect the proper functioning of the following process or lead to damage. Setting up must therefore be restricted to qualified personnel. Please observe the appropriate safety regulations.

6.2 Electrical connection



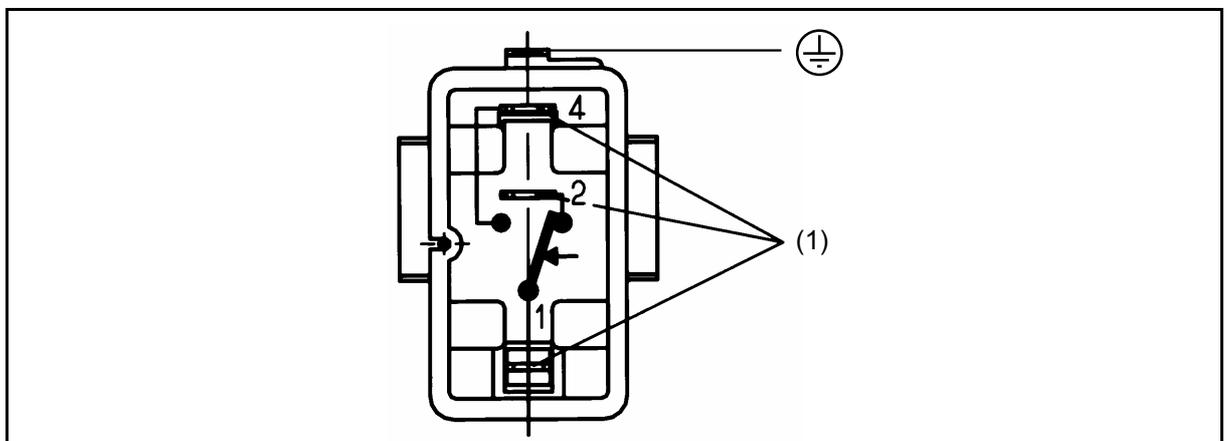
WARNING!

Electric shock due to the lack of protective conductor function of the capillary tube

Terminals and connections are suitable for internal conductors.

- Terminals and connections are suitable for internal conductors.
- The connection is suitable for permanently installed wiring.
- The cable routing is carried out without strain relief.
- Protection class I includes:
 - Switch head including 4000-mm Cu capillary (including sensor length)
 - Only the switch head for CrNi capillaries

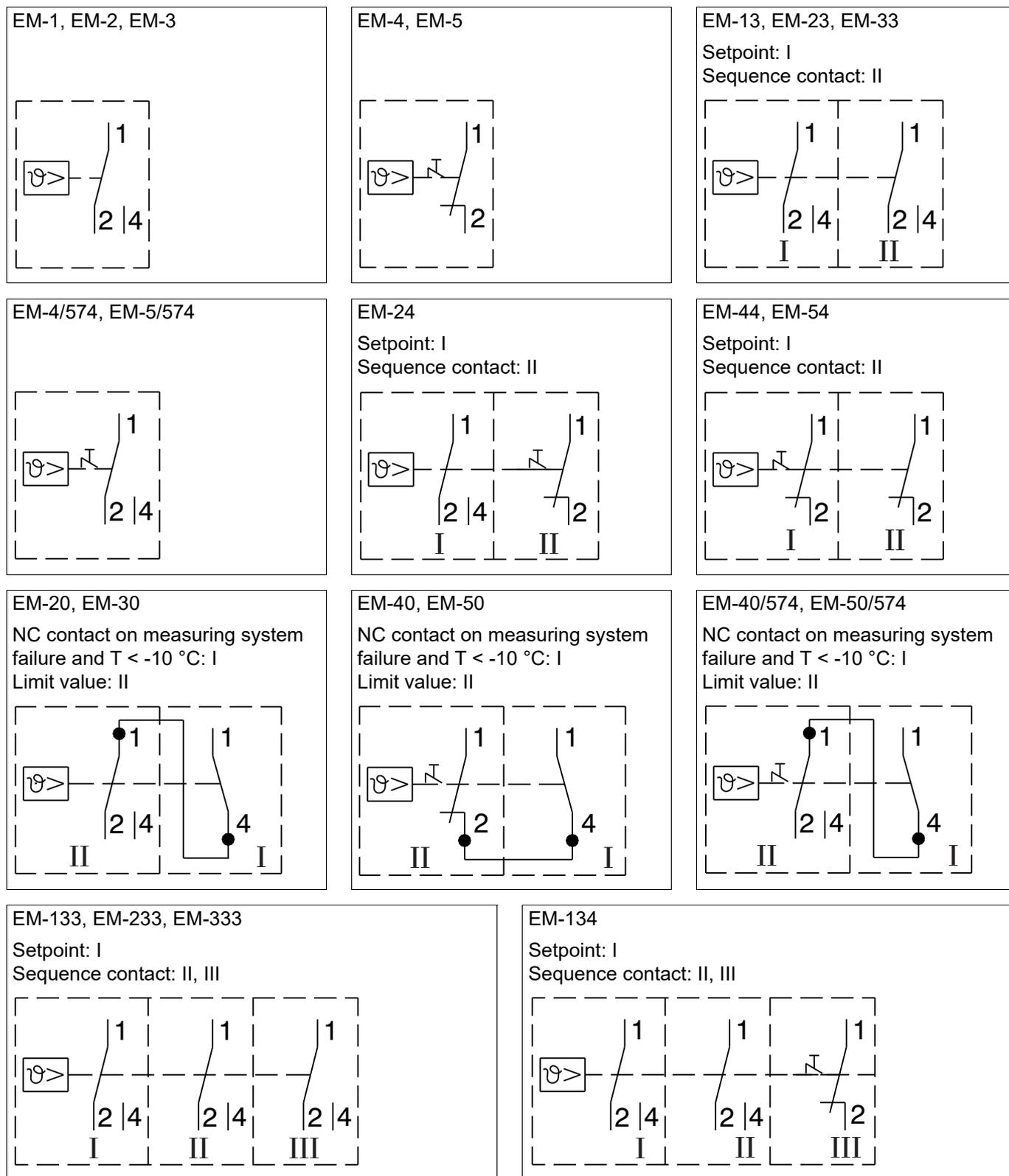
Plug connection



1 Tab connector DIN 46244-A, 6,3 × 0,8

6 Installation

6.3 Connection diagram

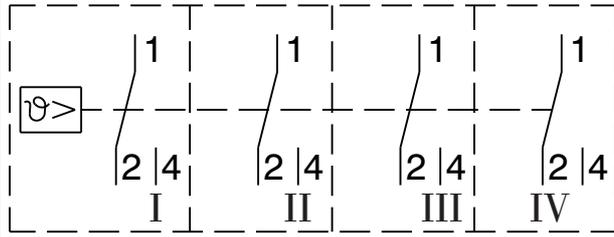


6 Installation

EM-1333, EM-2333, EM-3333

Setpoint: I

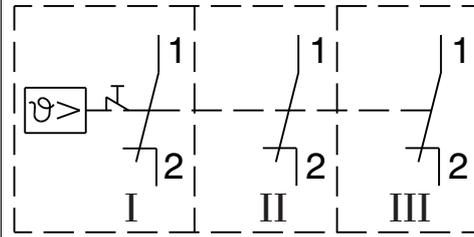
Sequence contact: II, III, IV



EM-444, EM-544

Setpoint: I

Sequence contact: II, III



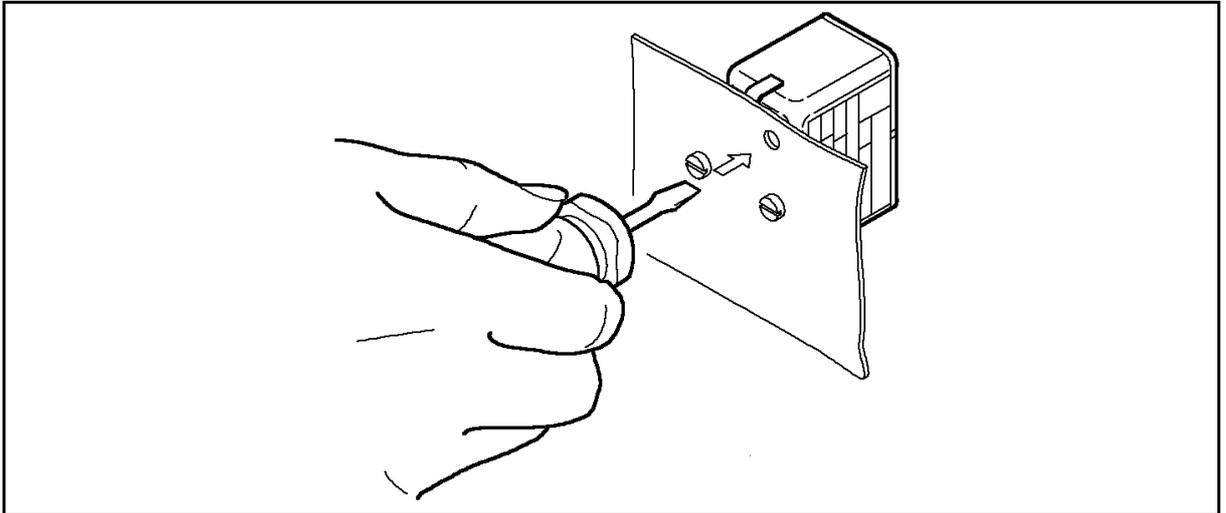
7 Settings

7.1 Unlocking the TB or STB

EM-4, EM-40, EM-44, EM-444, EM-5, EM-50, EM-54, EM-544 with switching head mounting

Extra code 704, 705

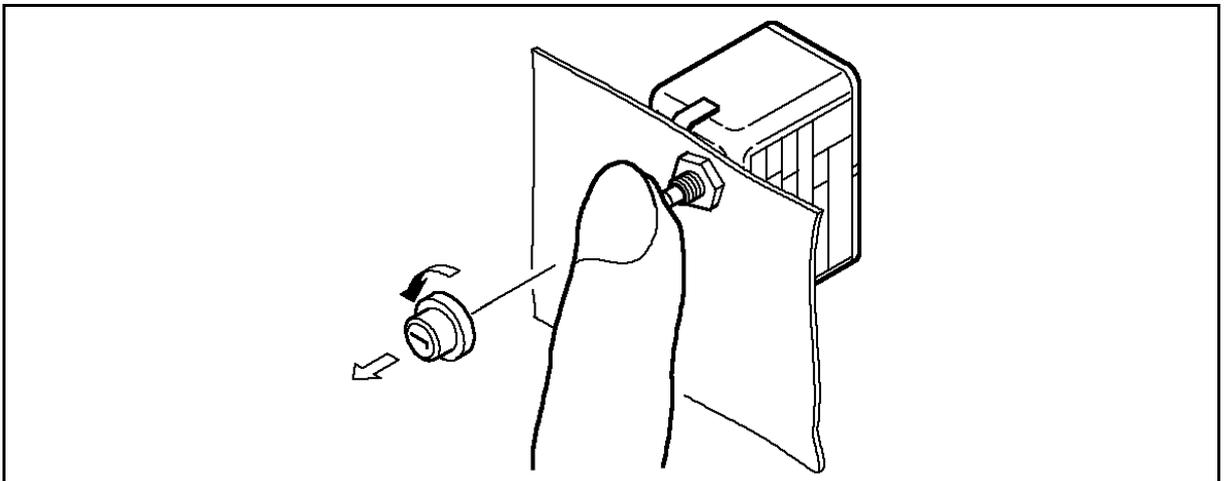
After the temperature has dropped by about 10 % of span below the set limit(critical temperature), the microswitch can be reset.



1. Push the reset button using a small screwdriver.

EM-4, EM-40, EM-44, EM-444, EM-5, EM-50, EM-54, EM-544 with central mounting

Extra code 710

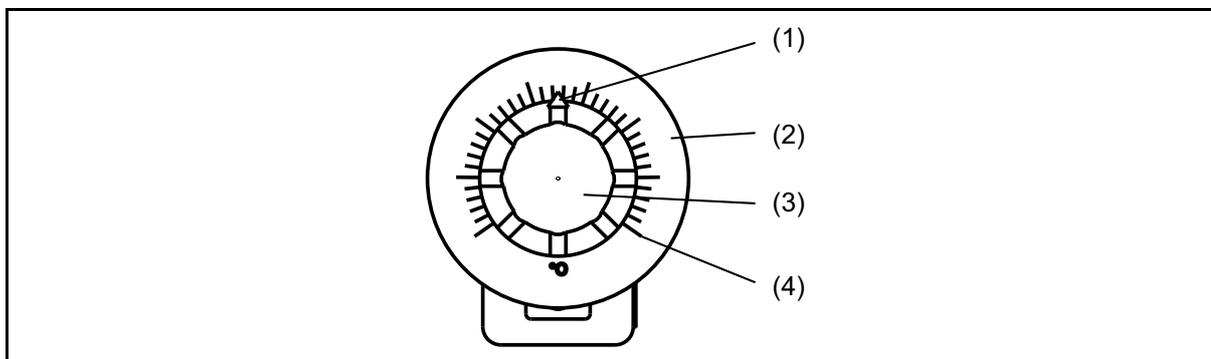


1. Unscrew cap.
2. Press reset button.
3. Screw cap back into position.

7.2 Setpoint adjustment

EM-1, EM-13, EM-133, EM-1333

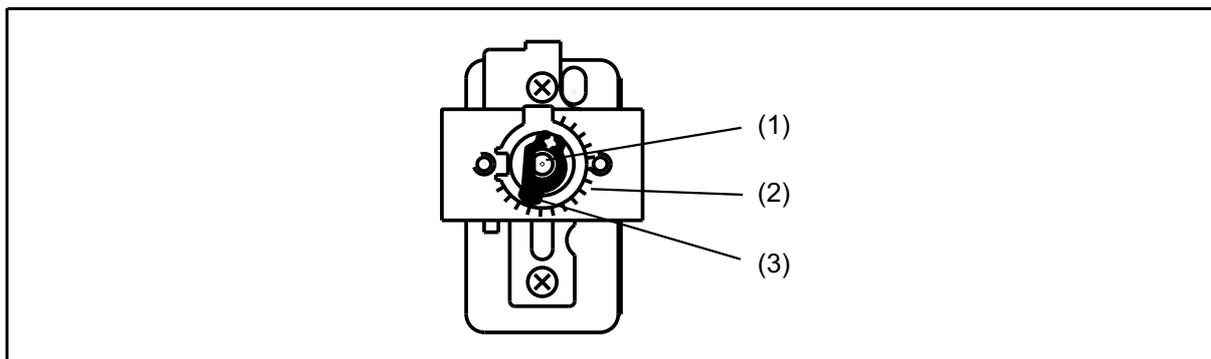
1. Rotate the setpoint knob by hand over the external scale.



- 1 Setpoint marker
- 2 External scale
- 3 Setpoint knob
- 4 Scale graduation

EM-2, EM-20, EM-23, EM-233, EM-2333, EM-5, EM-50, EM-54, EM-544

1. Rotate the setpoint spindle over the internal scale using a screwdriver.



- 1 Setpoint spindle
- 2 Scale graduation
- 3 Setpoint marker

EM-3, EM-30, EM-33, EM-333, EM-3333, EM-4, EM-40, EM-44, EM-444

The limit value setting is fixed at the factory and sealed. It must subsequently **not** be adjusted.

8 Shutdown

8.1 Maintenance

The device is maintenance-free.

8.2 Cleaning

Do not damage the device, especially the parts in contact with the medium.

The cleaning agent must not damage the surface.

8.3 Dismounting

Requirements:

- The system has been de-energized and secured against being switched on again.

8.4 Returns

Procedure:

1. The [supplementary sheet for product returns](#) must first be completed correctly and signed. Then enclose it with the shipping documents and attach it to the packaging, ideally on the outside.
2. Use the original packaging or a suitably secure container for sending the device.

8.5 Disposal



- Do not dispose of the device or replaced parts in the trash after use.
- Dispose of the device and the packaging material in a responsible and environmentally friendly manner.
- Observe the country-specific laws and regulations for waste treatment and disposal.

In accordance with Directive 2012/19/EU on Waste from Electrical and Electronic Equipment, manufacturers are obliged to offer the option of returning waste equipment. Request the return from the manufacturer.

	 More than sensors + automation					
产品组别 Product group: 602021	产品中有害物质的名称及含量 China EEP Hazardous Substances Information					
部件名称 Component Name						
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
外壳 Housing (Gehäuse)	X	○	○	○	○	○
过程连接 Process connection (Prozessanschluss)	○	○	○	○	○	○
螺母 Nuts (Mutter)	○	○	○	○	○	○
螺栓 Screw (Schraube)	○	○	○	○	○	○
<p>本表格依据SJ/T 11364的规定编制。 This table is prepared in accordance with the provisions SJ/T 11364. ○ : 表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572规定的限量要求以下。 Indicate the hazardous substances in all homogeneous materials' for the part is below the limit of the GB/T 26572. × : 表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572规定的限量要求。 Indicate the hazardous substances in at least one homogeneous materials' of the part is exceeded the limit of the GB/T 26572.</p>						



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