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# Panel-mounting Thermostats

## EM Series

- for limiting operating temperatures
- limit range up to +650°C
- with temperature compensation

EM panel-mounting thermostats monitor thermal processes. The thermostats are available as temperature monitors (TW), temperature limiters (TB) and protection temperature limiters (STB). If a fault occurs, the STB sets the system being monitored to a safe operational state.

Panel-mounting thermostats operate on the principle of liquid expansion, with a microswitch serving as the electrical switching device.



Types	EM-2/TK	EM-5/TK	EM-50/TK
	Temperature monitor (TW)	Temperature limiter (TB)	Protection temperature limiter (STB)

Switching action	TW	Lock-out on the TB and STB	Self-monitoring on the STB
	When the temperature at the probe rises above the set limit, the circuit is opened by a snap-action switch. When the temperature has fallen below the set limit (by the amount of the switching differential), the switch returns to its initial position.	When the temperature at the probe rises above the set limit, a snap-action switch is actuated and mechanically locked out. When the temperature has fallen below the limit by about 100 °C, the snap-action switch can be manually reset.	When the temperature probe cools down to below -10°C, the snap-action switch will also be actuated. After the temperature has risen, the circuit will be reclosed automatically. In the event of a measurement system break (leak), the snap-action switch will be permanently operated and will remain locked out mechanically.

### Technical data

Limit ranges	Control/limit range °C	Switching differential °C	Scale span ° $\frac{1}{4}$
TW and TB	+230 to +650	50 – 80 (TW)	250
STB	+500 to +650	-	70

### Capillary and temperature probe

Capillary	Length	Diameter	Min. bending radius	Material
	standard: 1 m maximum: 3 m	1.5 mm	5 mm	stainless steel, Mat. Ref. 1.4571
Temperature probe	Process connection*	Probe length x diameter	Material	
	plain cylindrical probe A (standard)	115 x 8 mm	high-temperature-resistant stainless steel, welded	

\*see Data Sheet 60.6710 for other process connections (B, C and D only).

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## Electrical data

<b>Switching device:</b> single-pole snap-action switch	<b>EM-2/TK</b>	<b>EM-5/TK</b> <b>EM-50/TK</b>	<b>EM-5/TK/U</b> <b>EM-50-TK/U</b>
	microswitch with changeover contact	microswitch with (n.c.) break contact and lockout	microswitch with (n.c.) break contact, lockout and additional signal contact
<b>Contact rating</b>	<b>Switching action</b>	<b>Break contact terminal 2</b>	<b>Make contact terminal 4</b>
	TW	16 (3) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25A, 230 V DC +10%	8 (1.5) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25A, 230 V DC +10%
	TB, STB		2 (1) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25A, 230 V DC +10%
<b>Contact reliability</b>	To ensure the highest possible switching reliability, we recommend a minimum loading of: AC / DC = 24 V, 20 mA		
<b>Rated surge voltage</b>	1500 V (via switching contacts: 400 V)		
<b>Overvoltage category</b>	II		
<b>Fusing required</b>	see Contact rating		
<b>Electrical connection</b>	standard	faston connector A 6.3 x 0.6 DIN 46244	
	extra code X	screw connection up to 2.5mm <sup>2</sup> conductor cross-section (at extra cost) –also suitable for retrofitting –	

## Operating data

<b>Switching point accuracy</b>	(in % of scale span, referred to setpoint or limit value at T <sub>a</sub> +22°C, with rising temperature)		
	Switching action	Type	Accuracy in upper third of scale or at limit
	TW	EM-2/TK	+0 °C -18 °C
	TB	EM-5/TK, EM-5/TK/U	+0 °C -48 °C
<b>Mean ambient temperature effect</b> (referred to limit)	Any deviation of the ambient temperature [Δt] at the switch head and capillary from the +22°C calibration ambient temperature will result in a shift of the switching point t <sub>v</sub> : higher ambient temperature = lower switching point lower ambient temperature = higher switching point		
	on switch head: t <sub>v</sub> = 0.06 · Δt		on capillary: t <sub>v</sub> = 0.33 · Δt · m
	If the operating temperature at the switch head and capillary deviates appreciably from the +22°C calibration ambient temperature, this can, on request, be taken into account during the calibration (at extra cost).		
<b>Permissible ambient temperature</b>	in operation		Permissible storage temperature
	at the switch head and capillary max. +100°C / min. -40°C	at the probe max. +750°C / min. -40°C	max. +50°C / min. -50°C
<b>Nominal position (NL)</b>	unrestricted		

## Housing

<b>Material</b>	galvanized steel
<b>Fixing</b>	standard: with two M3 screws, 22 mm spacing
	extra code b1: with two M4 screws, 28 mm spacing
	extra code b2: with two M3 screws, 33 mm spacing
	extra code b7: central fixing M10 x 1 with cap nut (TB and STB only)
<b>Limit setting</b>	switching point adjustable with screwdriver
<b>Protection</b>	EN 60 529-IP00
<b>Weight</b>	approx. 0.3 kg

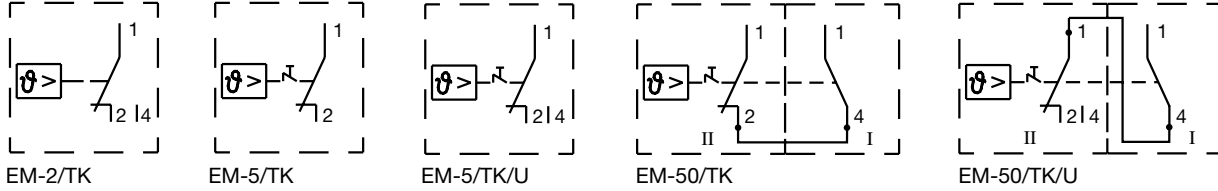
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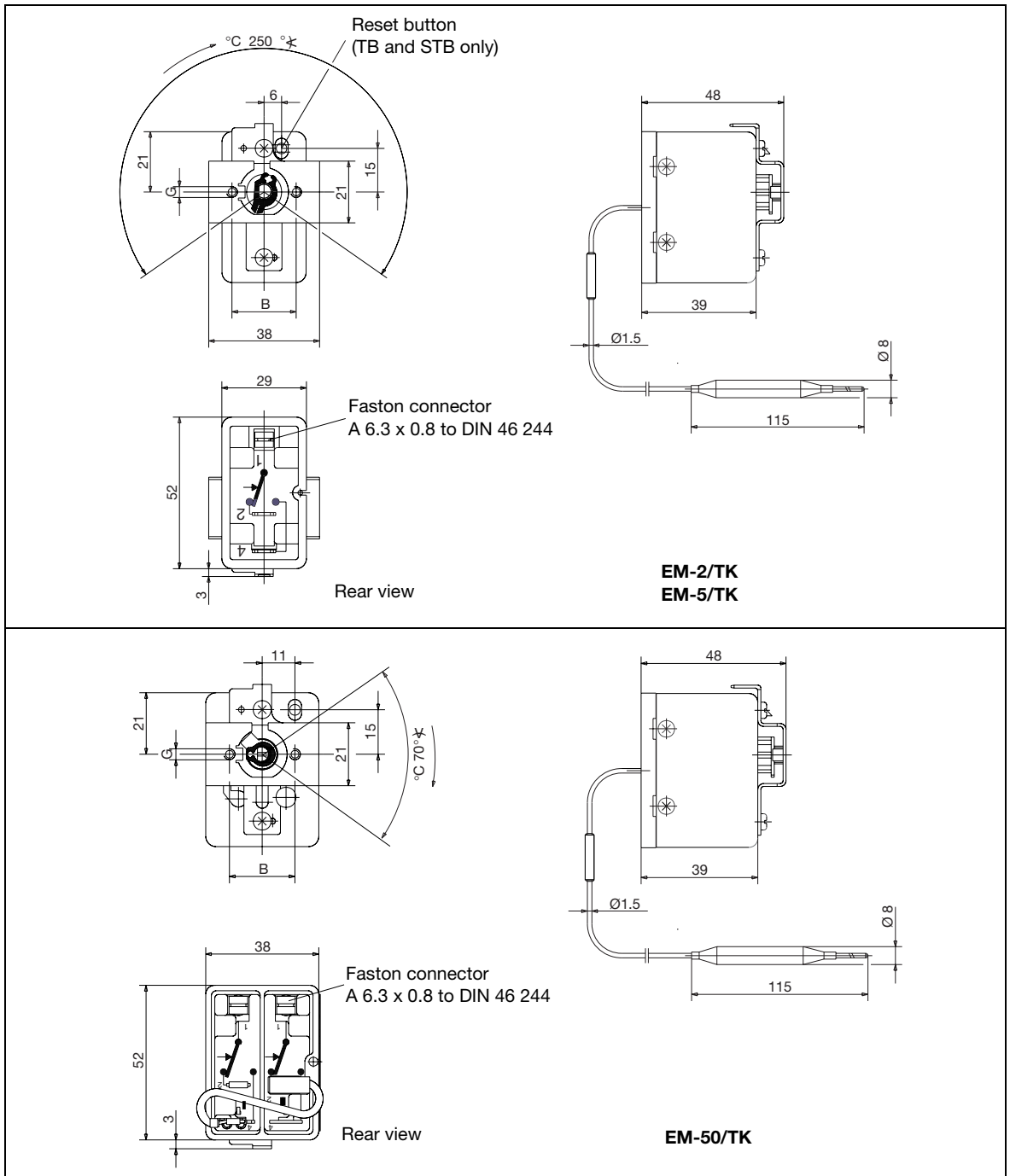
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**Connection diagrams**



**Dimensions**



Extra code	B	G
standard	22 mm	M3
b1	28 mm	M4
b2	33 mm	M3

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## Order details for EM Series

### Stock items

delivery 3 working days after receipt of order

Sales No.	Type	Limit °C	Capillary mm	Process connection	Probe dia. x length mm
60/60003016	EM-2/TK	+230 to +650	2000	A	8 x 115

### Non-stock items

Order code

**(1) Basic type**

602025 Panel-mounting thermostat, EM Series up to +650°C

**(2) Basic type extension**

0002 EM-2/TK temperature monitor  
 0005 EM-5/TK temperature limiter  
 0050 EM-50/TK protection temperatur limiter

**(3) Control / limit ranges**

093 +230 to +650°C (TW and TB only)  
 097 +500 to +650°C (STB only)

**(4) Capillary length (details in mm)**

1000 1000 mm  
 2000 2000 mm  
 3000 3000 mm  
 . . . . special length, details in mm (3000 mm max.)

**(5) Process connection \***

10 A = plain cylindrical probe  
 \* see Data Sheet 60.6710 for other process connections and pockets (B, C and D only)

**(6) Diameter d (probe diameter)**

8 8 mm

**(7) Extra codes<sup>1</sup>**

000 no extra code  
 574 **U** TB / STB with break contact, lock-out and additional signal contact  
 699 **X** screw connection up to 2.5 mm<sup>2</sup> conductor cross-section  
 704 **b1** switch head mounting by 2 M4 screws, 28 mm spacing  
 705 **b2** switch head mounting by 2 M3 screws, 33 mm spacing  
 707 **TK** temperature compensation  
 710 **b7** central fixing with cap nut (TB and STB only)

**Order code**

(1) (2) (3) (4) (5) (6) (7)  
 602025 / .. - ... - .... - .. - . / ...

**Order example**

602025 / 0050 - 097 - 1000 - 10 - 8 / 710<sup>1</sup>

<sup>1</sup> List extra codes in sequence, separated by commas