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Panel-mounting Thermostats

EM Series as:

- Protection temperature monitor STW (STB)
- Protection temperature limiter STB
- tested to DIN 3440 and Pressure Equipment Directive 97/23/EC

Brief description

Panel-mounting thermostats monitor thermal processes. The thermostats are available as protection temperature monitors STW (STB) and protection temperature limiters STB. In fault condition, the STB sets the system being monitored to a safe operational state.

Panel-mounting thermostats operate on the principle of liquid expansion. The electrical switching device is a microswitch.

Switching action

Protection temperature monitor STW (STB)

If the temperature at the probe exceeds the selected setpoint, the microswitch is operated via the transmission mechanism and the circuit is opened or closed. If the temperature drops below the selected setpoint (by the amount of the switching differential), the microswitch returns to its initial position.

Lock-out facility on the protection temperature limiter STB

If the temperature at the probe exceeds the set limit, the circuit is opened and the microswitch is locked out mechanically.

After the temperature has fallen below the critical temperature by about 10 °C, the microswitch can be reset manually.

Self-monitoring facility on the protection temperature limiter STB and protection temperature monitor STW (STB)

If the measuring system fails, i.e. if the expansion liquid has leaked, then the pressure under the diaphragm drops and the circuit is permanently open. The thermostat can no longer be reset. If the probe cools down to a temperature below -20°C (approx.), the circuit will also open. When the temperature rises above -10°C (approx.), the reset is performed automatically.

Use of the protection temperature monitor STW as protection temperature limiter STB

The lock-out required by EN 14597 must be ensured by the subsequent circuit. This circuit must comply with EN 50156.



You will find the Declarations of Conformity on the Internet at:
www.jumo.net
 ⇒ Products
 ⇒ Data Sheet 60.2026
 or ask for them to be sent.

Types and approvals

Type	Switching action	DIN Reg. No.	Tests			
EM-80	STB	STB 82604		Pressure Equipment Directive 97/23/EC CE0036	DVGW Gas Appliances Directive 90/396/EEC only EM-80	
EM-20-E	STW (STB)	STW (STB) 77 503 S				
EM-30-E		STW (STB) 77 603 S				

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Technical data

Limit range, limit setting and temperature probe

Type	Limit range Limit setting °C	Max. permissible probe temperature °C	Tolerance at limit °C	Probe length L for probe dia. d= 6 mm mm
EM-20-E	+ 40 to +110	+135	+0/-9	72
	+100 to +150	+173	+0/-8	85
	+110 to +170	+195	+0/-9	72
	+180 to +250	+288	+0/-13	60
	+230 to +300	+345	+0/-14	60
	Using a screwdriver, set the limit on the limit adjuster before installation.			
EM-30-E	limit selectable between +20 and +300 fixed factory setting	limit +15%		
EM-80	limit selectable between +60 and +180 fixed factory setting	limit +15%	+0/-5	84

Capillary and temperature probe

Type	End of scale	Capillary	Temperature probe	Notes
EM- . .	up to 200°C	copper (Cu) 1.5 mm dia. Mat. Ref. Cu-DHP	copper (Cu) Mat. Ref. Cu-DHP brazed	-
	up to 300°C	copper (Cu) 1.5 mm dia. Mat. Ref. Cu-DHP	stainless steel (CrNi) Mat. Ref. 1.4571 brazed	-
	up to 300°C	stainless steel (CrNi) 1.5 mm dia. Mat. Ref. 1.4571	stainless steel (CrNi) Mat. Ref. 1.4571 welded	at extra cost
Capillary length	standard is 1000 mm, maximum 5000 mm			
Min. bending radius of capillary	5 mm			

Electrical data

Switching device: single-pole snap-action switch	Type EM-20-E Type EM-30-E	Type EM-80 standard	Type EM-80 with extra code U
	microswitch with changeover contact	microswitch with (n.c.) break contact and lock-out	microswitch with (n.c.) break contact, lock-out and additional signal contact
Contact rating	Type	(n.c.) break contact terminal 2	(n.o.) make contact terminal 4
	EM-20-E EM-30-E EM-80/U	230 V AC +10% 10 (2) A, p.f. = 1 (0.6) 0.25 A, 230 V DC +10%	230 V AC +10% 2 (0.4) A, p.f. = 1 (0.6) 0.25 A, 230 V DC +10%
	EM-80		- - -
	extra code au	gold-plated microswitch, 0.1 A, 24 V AC/DC	
Contact reliability	To ensure maximum switching reliability, we recommend a minimum loading of: with silver contacts: AC/DC = 24 V, 20 mA		
	with gold-plated contacts (extra code au): AC/DC = 5 V, 5 mA		
Rated surge voltage	1500 V (via the switching contacts: 400 V)		
Overtoltage category	II		
Required fusing	see contact rating		
Electrical connection	standard	faston connectors A 6.3 x 0.8 DIN 46 244	
	extra code X	screw connection up to 2.5 mm ² conductor cross-section (at extra cost) - also suitable for retrofitting -	

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Operating data

Switching differential in % of limit range	Switching action	Nominal value	Possible actual value
	STW (STB)	7	7-8
Mean ambient temperature effect	in % of scale span, referred to the limit value. A deviation of the ambient temperature at the switch head and/or the capillary from the +22°C calibration ambient temperature will result in a shift of the switching point: higher ambient temperature = lower switching point lower ambient temperature = higher switching point for temperatures with end of scale / limit value < +200°C ≥ +200°C ≤ +350°C		
STW(STB)	switching differential in %		
	7		7
	ambient temperature effect due to the switch head, % per °C		
	0.43		0.35
	ambient temperature effect due to the capillary, % per °C per meter		
	0.09		0.07
STB	ambient temperature effect due to the switch head: 0.35 °C per °C		
	ambient temperature effect due to the capillary: 0.07 °C per °C per meter		
Temperature compensation	extra code TK Please see the diagram on page 4 for details.		
Permissible storage temperature	-50 to +50 °C		
Permissible ambient temperature in operation at switch head and capillary	+80°C max. +18°C min. (0°C with extra code TK)		
Nominal position (NL)	unrestricted		

Switch head

Housing material	sheet steel, zinc-plated
Fixing	extra code b1 with 2 M4 screws, 28 mm spacing extra code b2 with 2 M3 screws, 33 mm spacing extra code b3 with 2 M3 screws, 22 mm spacing (standard for EM-20-E and EM-30-E) extra code b7, central fixing M 10 x 1 with cap nut (STB only, standard for EM-80)
Enclosure protection	EN 60 529 - IP00
Weight	approx. 0.3 kg

Process connection*

EM series with capillary	plain cylindrical probe A (standard)	
	pocket U (on request) screw-in pocket with screw-in spigot G 1/2 Form A to DIN 3852/2 and clamping clip with fixing screw for securing the probe	
Material	pocket U	up to +150°C CuZn is standard above +150°C St is standard (CrNi on request)
Fitting length S	standard lengths: 100, 120, 150, 200 or 300 mm (other lengths on request)	
Immersion tube dia.	D = 8 mm	

*See data sheet 60.6710 for additional process connections and pockets.

Note:

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 - 8 % v/v	yes	yes	1	no
≥ 200°C ≤ +350°C	no	+ 490°C	- -	yes	yes	1	no

¹ 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.

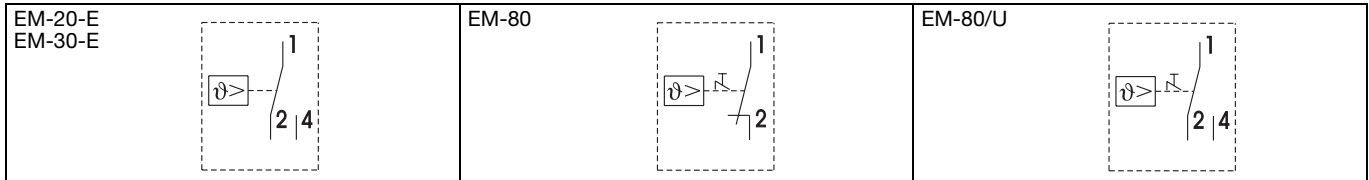
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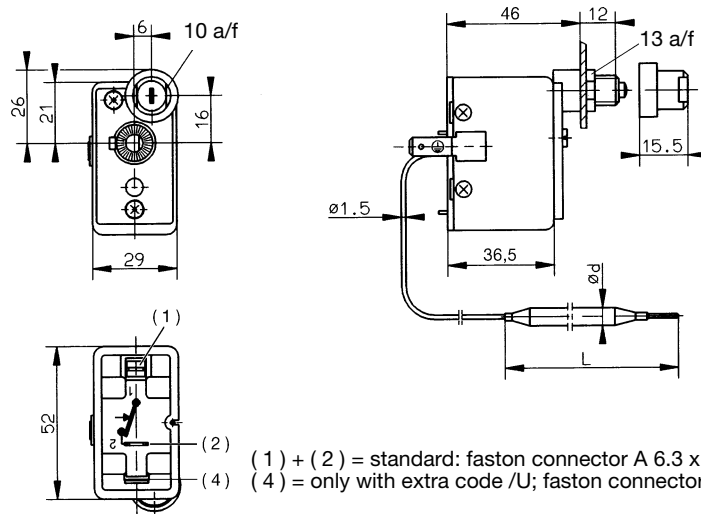


Connection diagrams

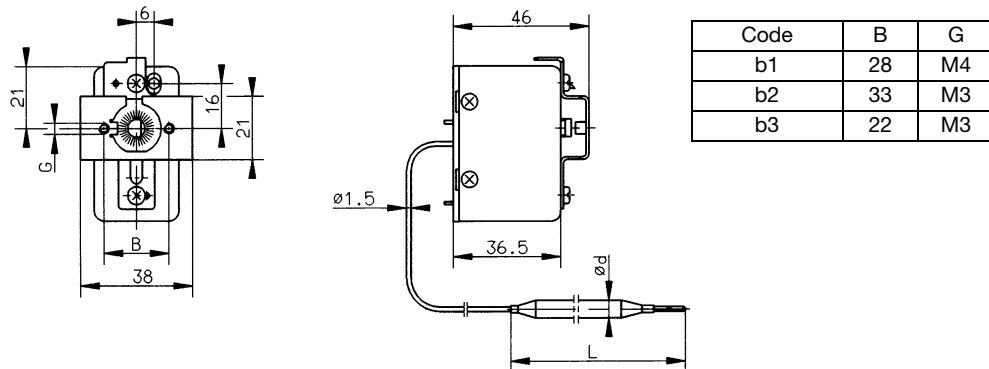


Dimensions

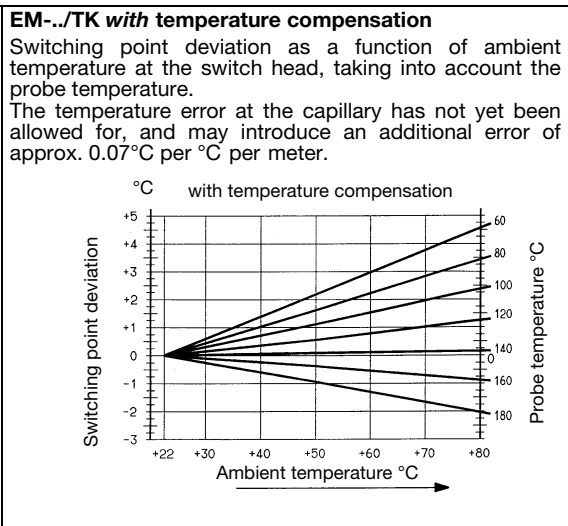
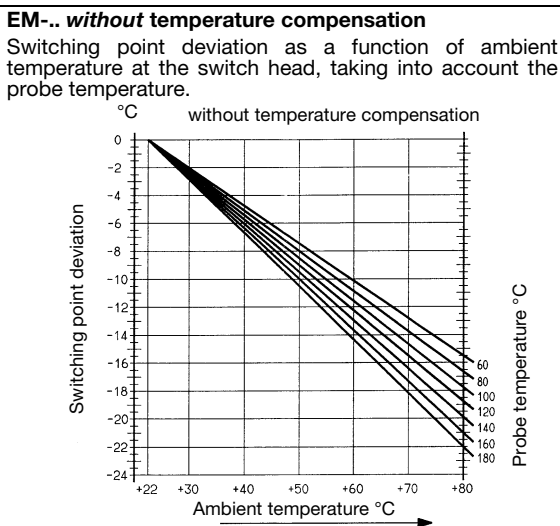
EM-80 with central fixing (standard)



EM-20-E, EM-30-E, EM-80 with fixing bracket



Temperature compensation (TK)
 If the temperature at the switch head deviates from the +22°C ambient temperature, this will result in a displacement of the switching point.
 With ambient temperatures that fluctuate considerably, it is advisable to use thermostats with temperature compensation (code TK).



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Stock items

shipment: 3 working days after receipt of order

Sales No.	Type	Limit °C	Capillary mm	Process connection	Probe dia. x length mm
60/60000775	EM-80	+ 110	1000	A	6 x ~ 84
60/60000753	EM-80	+ 95			

Order details

EM Series as STW (STB) and STB

Order code	(1) Basic type
602026	Panel-mounting thermostat, EM series
	(2) Basic type extensions
20	EM-20-E Protection temperature monitor, adjustable limit ³
30	EM-30-E Protection temperature monitor, fixed limit
80	EM-80 Protection temperature limiter, fixed limit
	(3) Limit ranges for EM-20-E STW (STB)
000	with fixed limit (EM-30-E and EM-80)
055	+ 40 to +110°C
506	+100 to +150°C
508	+110 to +170°C
575	+180 to +250°C
606	+230 to +300°C
	(4) Fixed limits for EM-30-E and EM-80
000	with adjustable limit range
...	details in °C
	(5) Capillary length
1000	1000 mm
2000	2000 mm
3000	3000 mm ³
4000	4000 mm ³
5000	5000 mm ³
...	(special length, details in mm, 500 mm min., 5000 mm max.)
	(6) Material of capillary
40	Cu(copper)
20	CrNi(stainless steel 1.4571) ³
	(7) Process connection¹
10	A = plain cylindrical probe 
20	U = screw-in pocket 
	(8) Thread for process connection
00	no thread (process connection A)
13	external thread G1/2
	(9) Material of process connection
00	only with process connection A
46	CuZn(brass)
01	St(steel)
20	CrNi(stainless steel 1.4571)
	(10) Fitting length S (immersion tube length)
000	no pocket
100	100 mm
120	120 mm
150	150 mm
200	200 mm
300	300 mm
...	(special length, details in mm)

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Order details

EM Series as STW (STB) and STB

Order code	(11) Diameter D (immersion tube dia.)
00	no pocket
8	8 mm
(12) Diameter d (probe diameter)	
6	6 mm
(13) Extra codes ²	
000	no extra code
574	U STB with (n.c.) break contact, lock-out and additional signal contact
702	au snap-action switch, gold-plated (cannot be combined with code U)
699	X screw connection with 2.5 mm ² conductor cross-section
704	b1 switch head fixing with 2 M4 screws, 28 mm spacing
705	b2 switch head fixing with 2 M3 screws, 33 mm spacing
706	b3 switch head fixing with 2 M3 screws, 22 mm spacing
710	b7 central fixing with cap nut (STB only)
707	TK temperature compensation

Order code

(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13)²
 602026 / .. - ... - ... - - .. - .. - .. - .. - ... - .. - . / ...

Order example

602026 / 80 - 000 - 120 - 2000 - 40 - 10 - 00 - 00 - 000 - 00 - 6 / 710

¹ See data sheet 60.6710 for additional process connections and pockets.

² List extra codes in sequence, separated by commas.

³ Special instrument → Delivery time.