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Panel-Mounted Thermostat

EM Series

Special features

- Safety temperature monitor STW (STB)
- Safety temperature limiter STB
- Tested according to DIN EN 14597 and the Pressure Equipment Directive 97/23/EC

Brief description

Panel-mounted thermostats are used to monitor thermal processes. The devices are available as a safety temperature monitor STW (STB) and a safety temperature limiter STB. In the event of a malfunction, the STB switches the monitored machine to a safe operating status.

Panel-mounted thermostats operate according to the fluid expansion principle — a microswitch is used as the electrical switching element.



Switching function

Safety temperature monitor STW (STB)

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

Restart lock of the safety temperature limiter STB

If the temperature on the temperature probe exceeds the set limit value, the electrical circuit is opened and the microswitch is mechanically locked. The microswitch can be manually unlocked once the temperature has dropped by approx. 10 °C.

Self-monitoring for the safety temperature limiter STB and safety temperature monitor STW (STB)

If the measuring system is destroyed (i.e. if the expansion fluid leaks), the pressure in the diaphragm of the STB drops and permanently opens the electrical circuit. Unlocking is then no longer possible. The electrical circuit 1-2 opens when cooling the probe of STW (STB) and STB down to the negative temperature range, but it then closes again if the temperature rises. The STB must be unlocked manually if the minimum probe temperature is exceeded.

Use of the safety temperature monitor STW as a safety temperature limiter STB

The activation lock required by DIN EN 14597 must be warranted by the following circuit diagram. The circuit diagram must comply with DIN EN 50156.

Approvals/approval marks (see "Technical Data")



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Technical data

General information

Limit value range, limit value range setting, and temperature probe

Type	Limit value range Limit value setting °C	Max. allowable probe temperature °C	Limit value tolerance °C	Probe length, dimension "L" for probe Ø "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
	Limit value setting done prior to mounting with a screwdriver at the limit value knob			
EM-30-E	Optional limit value +20 to +300 Permanently factory-set	Limit value +15 %		
EM-80	Optional limit value +60 to +180 Permanently factory-set	Limit value +15 %	+0/-5	84

Capillary and temperature probe

Type	Scale limit value	Capillary	Temperature probe	Notes
EM- . .	Up to 200 °C	Copper (Cu) ø 1.5 mm Material no. Cu-DHP	Copper (Cu) Material No. Cu-DHP Hard soldered	--
	Up to 300 °C	Copper (Cu) ø 1.5 mm Material no. Cu-DHP	Stainless steel (CrNi) Material No. 1.4571 Hard soldered	--
	Up to 300 °C	Stainless steel (CrNi) ø 1.5 mm	Stainless steel (CrNi) Material no. 1.4571 welded	Available at extra cost
Capillary length	Standard: 1000 mm, max. 5000 mm			
Min. bending radius of the capillary	5 mm			

Electrical data

Switching element: Single-pole snap-action switch	Type EM-20-E Type EM-30-E	Type EM-80 Standard	Type EM-80 with extra code "574"
	Microswitch with changeover contact	Microswitch with N/C contact and restart lock	Microswitch with N/C contact, restart lock, and additional signal contact
Max. switching capacity	Type	N/C contact, terminal 2	N/O contact, terminal 4
	EM-20-E EM-30-E EM-80/U	AC 230 V +10 %, 10 (2) A, cos φ = 1 (0.6) DC 230 V +10 %, 0.25A	AC 230 V +10 %, 2 (0.4) A, cos φ = 1 (0.6) DC 230 V +10 %, 0.25A
	EM-80		--
	Extra code "574"	Microswitch with gold plating, AC / DC 24 V, 0.1 A	
Contact reliability	To ensure a high switching reliability, we recommend a minimum load of: For silver contacts: AC / DC = 24 V, 20 mA		
	For gold-plated contacts (extra code "702"): AC / DC = 5 V, 5 mA		
Rating surge voltage	1500 V (via the switching contacts 400 V)		
Overtoltage category	II		
Required fuse rating	See max. switching capacity		

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Electrical connection	Standard	Tab connector A 6.3 x 0.8 DIN 46244	
	Extra code 699	Screw connection up to 2.5 mm ² conductor cross section (available at extra cost) – also suitable for retrofitting –	
Switching differential in % from the limit value range	Switching function	Rated value	Possible actual value
	STW (STB)	7	7-8

Mid ambient temperature influence	(In % from the scale range) referring to the limit value. Deviation of the ambient temperature at the switching head and/or capillary from the +22 °C calibration ambient temperature produces a switching head offset. Higher ambient temperature = lower switching point Lower ambient temperature = higher switching point		
	For temperatures with scale limit value / limit value		
STW (STB)	< +200 °C	≥ +200 °C ≤ +350 °C	
	Switching differential in %		
	7	7	
	Ambient temperature influence on the switching head in %/°C		
0.43	0.35		
Ambient temperature influence on the capillary in %/m			
0.09 · °C · m	0.07 · °C · m		
STB	Ambient temperature influence on the switching head: 0.35 °C/°C		
	Ambient temperature influence on the capillary in °C/m 0.07 °C/°C·m		

Temperature compensation	Extra code "707" For detailed information please refer to the graphical diagram on page 5.
Allowable storage temperature	-50 to +50 °C
Allowable ambient temperature when in use on the switching head and capillary	See nameplate
Rated position (NL)	Any

Switching head

Case material	Sheet steel, galvanized
Mounting	Extra code 704 with 2 M4 screws, spaced 28 mm Extra code 705 with 2 M3 screws, spaced 33 mm Extra code 706 with 2 M3 screws, spaced 22 mm (standard for EM-20-E and EM-30-E) Extra code 710, central mounting M10 x 1 with acorn nut (only for STB, standard for EM-80)
Protection type	EN 60 529-IP 00
Weight	Approx. 0.3 kg

Process connection^a

EM series with capillary	Plain cylindrical probe "10" (standard)	
	Screw-in protection tube "20" (upon request)	
	Screw-in sleeve with screw-in spigot G 1/2 form A according to DIN 3852/2 and clamping piece with fixing screw for securing the probe	
Material	Protection tube	Up to +150 °C CuZn as a standard Over +150 °C CrNi
Insertion length S	Standard lengths: 100, 120, 150, 200, or 300 mm (different lengths upon request)	
Immersion tube Ø	D = 8 mm	

^a For different process connections and thermowells refer to data sheet 606710.

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Approvals / approval marks

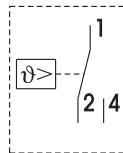
Approval marks	Testing agency	Certificates / certification number	Inspection basics	Valid for
DIN	DIN CERTCO / TÜV Süd	STB 782	DIN EN 14597	EM-80
		STW (STB) 775 S		EM-20-E, EM-30-E
DIN	TÜV Süd	B _{10d} = 250.000 ^a	DIN EN ISO 13849-1	EM-20-E, EM-30-E, EM-80
DGRL	TÜV Süd	IS-TAF-MUC 08 05 73377 020	97/23/EG	EM-20-E, EM-30-E, EM-80
DVGW	DVGW / TÜV	CE-0085AR0124	90/396/EWG	EM-20-E, EM-30-E, EM-80
UL	UL	E66358	UL 873, CSA-C22.2 No. 24	EM-80
		MH45736	UL 353, CSA-C22.2 No. 24	EM-80
EAC ^b	Gost Norm AG	TC RU C-DE.AB98.B.00348	Technical rules of the customs union Russia/Belarus/ Kazakhstan	EM-...

^a For further details see: Safety manual JUMO EM 602021, 602026.

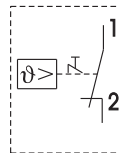
^b Russian documentation upon request.

Connection diagrams

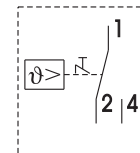
EM-20-E
EM-30-E



EM-80



EM-80/U



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Dimensions

<p>EM-80 with central mounting (standard)</p>		<p>(1) + (2) = standard: Tab connector A 6.3 x 0.8 mm (DIN 46244) (4) = only for extra code /574: Tab connector A 6.3 x 0.8 mm (DIN 46244)</p>												
<p>EM-20-E EM-30-E EM-80 with fixing brackets</p>		<table border="1"> <thead> <tr> <th>Abbreviation</th> <th>B</th> <th>G</th> </tr> </thead> <tbody> <tr> <td>704</td> <td>28</td> <td>M4</td> </tr> <tr> <td>705</td> <td>33</td> <td>M3</td> </tr> <tr> <td>706</td> <td>22</td> <td>M3</td> </tr> </tbody> </table>	Abbreviation	B	G	704	28	M4	705	33	M3	706	22	M3
Abbreviation	B	G												
704	28	M4												
705	33	M3												
706	22	M3												

<p>Temperature compensation (TK) (707) If changes occur to the switching head temperature in relation to the calibration ambient temperature (= 22 °C), a switching point deviation occurs. For highly fluctuating ambient temperatures, we recommend the use of thermostats with temperature compensation (extra code 707)</p>	<p>EM-.. "without" temperature compensation (707) Switching point deviation depends on the ambient temperature at the switching head taking the probe temperature into account.</p>	<p>EM-../TK "with" temperature compensation (707) Switching point deviation depends on the ambient temperature at the switching head taking the probe temperature into account. The temperature influence on the capillary is not yet taken into account and can result in an additional error of approx. 0.07 °C/°C·m.</p>
<p>(A) = Switching point deviation (B) = Probe temperature in °C (C) = Ambient temperature in °C</p>		

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Stock versions

Part no.	Type	Limit value °C	Capillary mm	Process connection	Probe Ø x length mm
60000775	EM-80	+110	1000	Plain cylindrical probe 10	6 x ~ 84
60000753	EM-80	+95			

(Delivery within 3 working days after receipt of order)

Order details

EM series as STW (STB) and STB

- Order code** (1) **Basic type**
 602026 Panel-mounted thermostat, EM series
- (2) **Basic type extensions**
 20 EM-20-E Safety temperature monitor (STW), limit value adjustable^a
 30 EM-30-E Safety temperature monitor (STW), limit value permanently set
 80 EM-80 Safety temperature limiter (STB), limit value permanently set
- (3) **Limit value ranges for EM-20-E STW (STB)**
 000 For permanently set limit value (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) **Permanently set limit values for EM-30-E and EM-80**
 000 For adjustable limit value range
 ... Specified in °C
- (5) **Capillary length**
 1000 1000 mm
 2000 2000 mm
 3000 3000 mm
 4000 4000 mm
 5000 5000 mm
 (Special length, specified in mm, min. 500 mm, max. 5000 mm)
- (6) **Capillary material**
 40 Cu (Copper)
 20 CrNi (Stainless steel)
- (7) **Process connection**
 10 Plain cylindrical probe 
 20 Screw-in protection tube 
- (8) **Thread of process connection**
 00 Without thread (process connection "10")
 13 External thread G 1/2

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(9) Material of process connection

- 00 Only with process connection "10"
- 46 CuZn (Brass)
- 20 CrNi (Stainless steel 1.4571)

(10) Fitting length "S" (immersion tube length)

- 000 Without protection tube
- 100 100 mm
- 120 120 mm
- 150 150 mm
- 200 200 mm
- 300 300 mm
- ... (Special length, specification in mm)

(11) Diameter "D" (immersion tube diameter)

- 00 Without protection tube
- 8 8 mm

(12) Diameter "d" (probe diameter)

- 00 Without protection tube
- 6 6 mm

(13) Extra codes

- 000 Without extra codes
- 574 Microswitch with N/C contact, restart lock, and additional signal contact (only STB)
- 702 Snap-action switch with gold plating (cannot be combined with extra code "574")
- 699 Screw-connection with 2.5 mm² conductor cross section
- 704 Switching head mounting with 2 M4 screws, spaced 28 mm
- 705 Switching head mounting with 2 M3 screws, spaced 33 mm
- 706 Switching head mounting with 2 M3 screws, spaced 22 mm
- 710 Central mounting with acorn nut (only for STB)
- 707 Temperature compensation

^a Other control ranges / limit value ranges upon request

Order code (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13)
 602026 / - - - - - - - - - - - - / , ...
Order example 602026 / 80 - 000 - 120 - 2000 - 40 - 10 - 00 - 00 - 000 - 00 - 00 / 000^a , ...

^a State extra codes one after another, separated by commas