

JUMO GmbH & Co. KG

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JUMO Instrument Co. Ltd.

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JUMO Process Control, Inc.

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Panel-mounted Thermostats, EM Series

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

Special features

- Temperature controller TR and temperature monitor TW
- Safety temperature limiter STB
- Tested according to DIN EN 14597
- Pressure Equipment Directive 97/23/EC

Brief description

Thermostats control and monitor thermal processes. The devices of the EM series are available as temperature controllers TR, temperature monitors TW, temperature limiters TB, safety temperature monitors STW (STB), and safety temperature limiters 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 an electrical switching element.

Switching function

Temperature controller TR and temperature monitor TW

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 for temperature limiter TB and 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 % of the scale range (approx. 15 % with a limit value setting > +350 °C).

For limit values exceeding 120 °C, the limit value set in the STB must be secured against incorrect adjustment (e.g. by a seal).

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 and STW (STB) drops and permanently opens the electrical circuit. Unlocking is then no longer possible.

When the probe has cooled down to a temperature below approx. -20 °C, the electrical circuit is also opened. However, it automatically closes again when the temperature rises above -10 °C.

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

The circuitry used with the thermostat must comply with DIN EN 14597 and VDE 0631.



Approvals/approval marks (see "Technical data")



DVGW

DGRL
97/23/EG



UL US



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Types and DIN registry numbers

Version	Types	Switching function	DIN register no.	Important note
1 pole snap-action switches	EM-1 EM-2 EM-3* EM-4* EM-5	TR TW TW TB TB	TR 77708 TW 77808 TW 77808 TB 78008 TB 78008	DIN-tested up to max. +500 °C. The DIN registry no. will become null and void if thermowells are used that are not specified in our data sheet 606710 Type EM-50 DVGW registry no. CE-0085 AR 0124 *Setpoint value/ limit value permanently factory-set according to customer specifications
2 single-pole snap-action switches	EMF-13 EMF-23 EMF-33* EMF-14 EMF-24 EMF-44* EMF-54	TR/TW TW/TW TW/TW TR/TB TW/TB TB/TB TB/TB	TR 77708 TW 77808 TW 77808 TW 77808 TR 77708 TW 77808 TB 78008 TB 78008	
3 single-pole snap-action switches (without VDE approval)	EMF-133 EMF-134 EMF-233 EMF-234 EMF-333* EMF-444* EMF-544	TR/TW/TW TR/TW/TB TW/TW/TW TW/TW/TB TW/TW/TW TB/TB/TB TB/TB/TB	TR 77708 TR 77708 TW 77808 TW 77808 TW 77808 TB 78008 TB 78008	
4 single-pole snap-action switches (without VDE approval)	EMF-1333 EMF-2333 EMF-3333*	TR/TW/TW/TW TW/TW/TW/TW TW/TW/TW/TW	TR 77708 TW 77808 TW 77808	
Fail-safe version	EM-40* EM-50 EM-20 EM-30*	STB STB STW (STB) STW (STB)	STB 78208 STB 78208 STW (STB) 77508 S STW (STB) 77508 S	

Technical data

Table of control ranges and probes for TR, TW, TB – liquid-filled

Control range/ limit value range °C	Switching differential %	Max. probe temperature °C	Max. switching head temperature °C	Max. capillary length in mm	Max. sequence contact gap °C	Probe length "L" in mm, probe Ø "d" in mm, Ø "6" = Standard			
						Ø 6	Ø 8		
-20 to +40	1	+50	+50	5000	5	245	145		
	2.5	+50	+50		8	245	145		
	5	+95	+50 (80) ^a		25	138	91		
	7	+100	+50 (80) ^a		50	103	73		
0 to 50	1	+60	+60	3000	5	283	165		
	2.5	+60	+60	3000	10	283	165		
	5	+105	+60 (80) ^a	5000	25	159	101		
	7	+110	+60 (80) ^a	5000	50	117	80		
20 to 90	1	+115	+80	1000	7	210	127		
	2.5	+115	+80	1000	14	210	127		
	5	+140	+100	5000	35	121	82		
	7	+175	+100	5000	70	91	67		
0 to 100	1	+125	+80	2000	10	157	100		
	2.5	+125	+80	2000	20	157	100		
	5	+165	+100	5000	50	94	68		
	7	+200	+100	5000	100	73	58		
30 to 110	1	+135	+80	2000	8	188	116		
	2.5	+135	+80	2000	16	188	116		
	5	+170	+100	5000	40	110	76		
	7	+200	+100	5000	80	84	63		
0 to 150	1	+173	+80	1000	15	113	78		
	2.5	+173	+100		30	113	78		
	5	+200	+100		75	72	57		
0 to 200	1	+230	+80	1000	20	113	78		
	2.5	+230	+100		40				
50 to 200	1	+230	+80	1000	15	139	92		
	2.5	+230	+100		30				
50 to 250	1	+228	+80	1000	20	105	70		
	2.5	+228	+100		40			105	70
	5	+300	+100		100				
50 to 300	1	+345	+80	2000	25	87	61		
	2.5	+345	+100		50				

a. Values in brackets only provided upon request – they take the operating conditions and the requested capillary length into consideration

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Technical data

Table of control ranges and probes for TR, TW, TB – gas-filled

Control range/ limit value range °C	Switching differential %	Max. probe temperature °C	Max. switching head temperature °C	Max. capillary length in mm	Max. sequence contact gap °C	Probe length "L" in mm, probe Ø "d" in mm, Ø "6" = Standard	
						Ø 6	Ø 8
20 to 400	6	+460	+100	5000	75	237	137
	10	+500	+100		200	127	81
20 to 500	3/5	+530	+ 80	1000	48	278	158
	6	+575	+100	5000	95	176	106
	10	+575	+100	5000	250	95	65

Control ranges and temperature probes for STB and STW (STB) – liquid-filled

Setting range °C	Scale range °C	Max. probe temperature °C	Max. switching head temperature °C	Max. capillary length in mm	Limit value tolerance °C	Probe length "L" in mm, probe Ø "d" in mm, Ø "6" = Standard	
						Ø 6	Ø 8
75 to 100	78	+125	+100	5000	+0 -7	84	63
85 to 110	78	+135			+0 -7		
120 to 150	77	+173			+0 -9	80	57
160 to 200	79	+230			+0 -12	64	49
210 to 250	71	+288			+0 -13	61	47
250 to 300	79	+345			+0 -16	55	–

Control ranges and temperature probes for STB and STW (STB) – gas-filled

Setting range °C	Scale range °C	Max. probe temperature °C	Max. switching head temperature °C	Max. capillary length in mm	Limit value tolerance °C	Probe length "L" in mm, probe Ø "d" in mm, Ø "6" = Standard	
						Ø 6	Ø 8
300 to 400	70	+460	+100	3000	+0 -23	148	92
350 to 500	72	+575			+0 -29	127	81

When the switching points are permanently factory-set, the deactivation value must be specified in addition to the control range (e.g. control range 80 to 100 °C, permanently set to 95 °C).

Capillary and temperature probes

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 350 °C	Copper (Cu) Ø 1.5 mm Material no. Cu-DHP	Stainless steel (CrNi) Material no. 1.4571 Hard soldered	–
	Up to 500 °C	Stainless steel (CrNi) Ø 1.5 mm Material no. 1.4571	Stainless steel (CrNi) Material no. 1.4571 Welded	–
	Up to 350 °C	Stainless steel (CrNi) Ø 1.5 mm Material no. 1.4571	Stainless steel (CrNi) Material no. 1.4571 Welded	Available at extra cost
Capillary length	Standard: 1000 mm, max. 5000 mm			
Min. bending radius of capillary	5 mm			

Note:

Upon request the capillary length can be increased up to a maximum of 5,000 mm if the allowable temperature on the sensor, capillary, and switching head is not reached.
 Please let us know the actual temperature values to which the thermostat is exposed.

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**Electrical data**

Switching element 1, 2, 3, or 4 single-pole snap-action switches	EM.-1... EM.-2... EM.-3...	EM-20 EM-30	EM.-4... EM.-5...	EM-40 EM-50	EM.-4.../U EM.-5.../U	EM-40/U EM-50/U
	Microswitch with changeover contact		Microswitch with N/C contact and restart lock		Microswitch with N/C contact, restart lock, and additional signal contact	
Max. contact rating	Switching function Switching differential		N/C contact, terminal 2		N/O contact, terminal 4	
	TR, TW, STW (STB) 2.5 %, 5 %, 6 %, 7 %, 10 %		AC 230 V +10 % 16 (3) A, cos φ = 1 (0.6) DC 230 V +10 %, 0.25 A		AC 230 V +10 % 8 (1.5) A, cos φ = 1 (0.6) DC 230 V +10 %, 0.25 A	
	TB, STB				AC 230 V +10 % 2 (1) A, cos φ = 1 (0.6) DC 230 V +10 %, 0.25 A	
	TR, TW 1 %, 3 %		AC 230 V +10 %, 6 (2) A, cos φ = 1 (0.6) DC 230 V +10 %, 0.25 A			
	TR, TW 2.5 %		Microswitch with gold plating, extra code "702" AC/DC 24 V, 0.1 A			
Contact reliability	To ensure the greatest possible switching reliability we recommend a minimum load of: For silver contacts: AC/DC = 24 V, 100 mA					
Rating surge voltage	2500 V (via the switching contacts 400 V)					
Overvoltage category	II					
Required fuse rating	See max. switching capacity					
Electrical connection	Standard		Tab connector A 6.3 × 0.8 DIN 46 244			
	Extra code 699		Screw connection up to 2.5 mm ² conductor cross section (available at extra cost) - also suitable for retrofitting -			

Operating data

Switching differential in % from the control range/ limit value range	Switching function	With liquid-filled measuring system		
		Rated value	Possible actual value	
	TR, TW	2.5	approx. 2.5 - 3.5	Standard
		5	approx. 5 - 6	Upon request
		7	approx. 7 - 8	Upon request
		1	approx. 1 - 2	Surcharge
		With gas-filled measuring system		
	STW (STB)	5	approx. 5 - 11	Standard
		6	approx. 6 - 14	Upon request
		10	approx. 10 - 16	Upon request
3		approx. 2.5 - 4	Surcharge	
With liquid-filled measuring system				
Sequence contact gap on multi-pole version	With switching differential	Sequence contact gap relative to scale range		Switching point accuracy of the sequence contact gaps from the scale range
		Minimum	Maximum	
1 % 2.5 % 3 %, 5 % 6 %, 7 %, 10 %		1 %	According to control range table	≤ 1 %
		1 %		≤ 1 %
		2 %		< 2 %
		3 %		< 3 %
The spacing of the additional contacts can be specified in °C in relation to the setpoint of contact 1. Prefix - = switching before reaching the setpoint value Prefix + = switching after reaching the setpoint value For the synchronized version, specify "0" as the sequence contact gap				

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Operating data

Switching point accuracy in % of control range/limit value range	Switching function	Switching differential		In the upper third of the scale or limit value						
		Liquid-filled	Gas-filled							
	TR	1 %, 2.5 % 5 % 7 %	- 3 %, 5 % 6 %, 10 %	±1.5 % ±3 % ±4 %						
	TW	1 %, 2.5 % 5 % 7 %	- 3 %, 5 % 6 %, 10 %	±1.5 % ±3 % ±4 %						
	TB	-	-	+0 % -5 %						
	STB, STW (STB)	See table for control ranges and probes on page 3								
Mid 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 temperatures = lower switching point Lower ambient temperature = higher switching point									
	For temperatures with scale limit value/limit value									
	< 200 °C		≥ 200 °C ≤ 350 °C		≥ 400 °C ≤ 500 °C					
	TR, TW, TB	STW, STB	TR, TW, TB	STW, STB	TR, TW, TB, STW, STB					
	Switching differential in %									
	1/2.5	5	7	7/-	1/2.5	5	7/-	3/5	6	10
	Ambient temperature influence on the switching head in %/°C									
0.15	0.26	0.34	0.43	0.12	0.21	0.35	0.12	0.17	0.24	
Ambient temperature influence on the capillary in %/m										
0.05 × °C × m	0.09 × °C × m	0.04 × °C × m	0.07 × °C × m	0.05 × °C × m						
Temperature compensation* (TK)	* For detailed information see diagram on page 9									
Temperatures	Allowable storage temperature: -50 to +50 °C		Allowable ambient temperature for use: Max. 80 °C							
Nominal position (NL)	Any									

Casing

Casing: galvanized sheet steel	Standard mounting	With 2 M3 screws, spaced 22 mm
	Extra code 704	With 2 M4 screws, spaced 28 mm
	Extra code 705	With 2 M3 screws, spaced 33 mm
	Extra code 710	Central mounting M10 × 1 with acorn nut (only for TB and STB)
Setpoint value setting	TR: Switching point adjustable from the outside using the rotary knob	TW, TB, STB, STW (STB): Switching point adjustable with a screwdriver
	Types EM-3, EM-4, EM-33, EM-44, EM-444, EM-3333, EM-30, EM-40 Permanently set at the factory to customer requirements	
Setpoint adjuster	See data sheet 606715	
Scale range	Standard: 250° (for STB and STW (STB) see table for control ranges and probes on page 3)	
Protection type	EN 60529-IP00	
Weight	Approx. 0.3 kg	

Process connection*

EM series with capillary	Plain cylindrical probe "10" (standard)	
	Screw-in thermowell "20" (upon request) Screw-in sleeve with screw-in spigot G 1/2 form A as per DIN 3852/2 and clamping piece with fixing screw for securing the probe	
Material	Thermowell	Up to 150 °C CuZn as standard Above 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, D = 10 mm	

* See data sheet 606710 for additional process connections and thermowells

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Connection diagrams

EM-1 EM-2 EM-3		EM-4 EM-5	
EMF-13 EMF-23 EMF-33 Setpoint value: I Sequence contact: II		EM-4/U EM-5/U	
EMF-133 EMF-233 EMF-333 Setpoint value: I Sequence contact: II, III		EM-40 EM-50 I = N/C contact with system break and T < -10°C: I II = Limit value: II	
EMF-1333 EMF-2333 EMF-3333 Setpoint value: I Sequence contact: II, III, IV		EM-40/U EM-50/U I = N/C contact with system break and T < -10°C: I II = Limit value: II	
Example: EMF-1334 For further type variants, combine the connection diagrams respectively		EM-20 EM-30 I = N/C contact with system break and T < -10°C: I II = Limit value: II	

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Approvals/approval marks

Approval marks	Inspection authority	Certificates/ inspection number	Inspection basis	Valid for
DIN	DIN CERTCO/TÜV Süd	TR77708	DIN EN 14597	EM.-1
DIN	DIN CERTCO/TÜV Süd	TW77808	DIN EN 14597	EM.-2, EM.-3
DIN	DIN CERTCO/TÜV Süd	TB78008	DIN EN 14597	EM-4, EM-5
DIN	DIN CERTCO/TÜV Süd	STW(STB)77508 S	DIN EN 14597	EM-20, EM-30
DIN	DIN CERTCO/TÜV Süd	STB78208	DIN EN 14597	EM-40, EM-50
DIN	TÜV Süd	B _{10d} = 250.000*	DIN EN ISO 13849-1	EM-20, EM-30, EM-40, EM-50
DVGW	DVGW/TÜV Rheinland	CE-0085AR0124	90/396/EWG	EM-50
DGRL	TÜV Süd	IS-TAF-MUC 08 05 73377 020	97/23/EG	EM-20, EM-30, EM-40, EM-50
CSA	KEMA/Holland	1701699; C481302	CSA standard, C 22.2	EM-1, EM-2, EM-4, EM-50
c CSA us	KEMA/Holland	C3337-01; C3337-81	Gas directive	EM-1, EM-2, EM-3, EM-4, EM-40, EM-50
GOST	Moscow	POCC DE.AI184.B00624	GOST standard, Russia	EM-...
UL	UL	E66358	UL 873, CSA-22.2 No. 24	EM-...
UL	UL	MH45736	UL 353, CSA-22.2 No. 24	EM-4, EM-5, EM-40, EM-50

* For detailed information please refer to safety manual JUMO EM: 602021, 602026.

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Dimensions

<p>EM-1 EM-2 EM-3 EM-4 EM-5</p>		<p>(1) Restart knob only with abbreviation 4 and 5 (2) Not applicable with abbreviation 2, 3, 4, and 5 (3) Tab connector DIN 46244-A6.3-0.8</p> <table border="1" data-bbox="1177 869 1465 987"> <thead> <tr> <th></th> <th>B</th> <th>G</th> </tr> </thead> <tbody> <tr> <td>Standard</td> <td>22</td> <td>M3</td> </tr> <tr> <td>Extra code 704</td> <td>28</td> <td>M4</td> </tr> <tr> <td>Extra code 705</td> <td>33</td> <td>M3</td> </tr> </tbody> </table>		B	G	Standard	22	M3	Extra code 704	28	M4	Extra code 705	33	M3
	B	G												
Standard	22	M3												
Extra code 704	28	M4												
Extra code 705	33	M3												
<p>EMF-13 EMF-20 EMF-23 EMF-30 EMF-33 EMF-14 EMF-24 EMF-40 EMF-44 EMF-50 EMF-54</p>		<p>(1) Restart knob only with abbreviation 40, 44, 50, and 5 (2) Not applicable with abbreviation 2, 3, 4, 5, 20, 30, 40, and 50 (3) Tab connector DIN 46244-A6.3-0.8</p> <table border="1" data-bbox="1177 1496 1465 1615"> <thead> <tr> <th></th> <th>B</th> <th>G</th> </tr> </thead> <tbody> <tr> <td>Standard</td> <td>22</td> <td>M3</td> </tr> <tr> <td>Extra code 704</td> <td>28</td> <td>M4</td> </tr> <tr> <td>Extra code 705</td> <td>33</td> <td>M3</td> </tr> </tbody> </table>		B	G	Standard	22	M3	Extra code 704	28	M4	Extra code 705	33	M3
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Dimensions

<p>EMF-133 EMF-134 EMF-233 EMF-234 EMF-333 EMF-444 EMF-544</p>		<p>(1) Restart knob only with abbreviation 444, 544 (2) Not applicable with abbreviation 2, 3, 4, and 5 (3) Tab connector DIN 46244-A6.3-0.8</p> <table border="1" data-bbox="1177 896 1460 1008"> <thead> <tr> <th></th> <th>B</th> <th>G</th> </tr> </thead> <tbody> <tr> <td>Standard</td> <td>22</td> <td>M3</td> </tr> <tr> <td>Extra code 704</td> <td>28</td> <td>M4</td> </tr> <tr> <td>Extra code 705</td> <td>33</td> <td>M3</td> </tr> </tbody> </table>		B	G	Standard	22	M3	Extra code 704	28	M4	Extra code 705	33	M3
	B	G												
Standard	22	M3												
Extra code 704	28	M4												
Extra code 705	33	M3												
<p>EMF-1333 EMF-2333 EMF-3333</p>		<p>(1) Restart knob only with abbreviation 4444 (2) Not applicable with abbreviation 2, 3, 4, and 5 (3) Tab connector DIN 46244-A6.3-0.8</p> <table border="1" data-bbox="1177 1489 1460 1601"> <thead> <tr> <th></th> <th>B</th> <th>G</th> </tr> </thead> <tbody> <tr> <td>Standard</td> <td>22</td> <td>M3</td> </tr> <tr> <td>Extra code 704</td> <td>28</td> <td>M4</td> </tr> <tr> <td>Extra code 705</td> <td>33</td> <td>M3</td> </tr> </tbody> </table>		B	G	Standard	22	M3	Extra code 704	28	M4	Extra code 705	33	M3
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<p>Screw connection EM-1 Extra code 699</p>														

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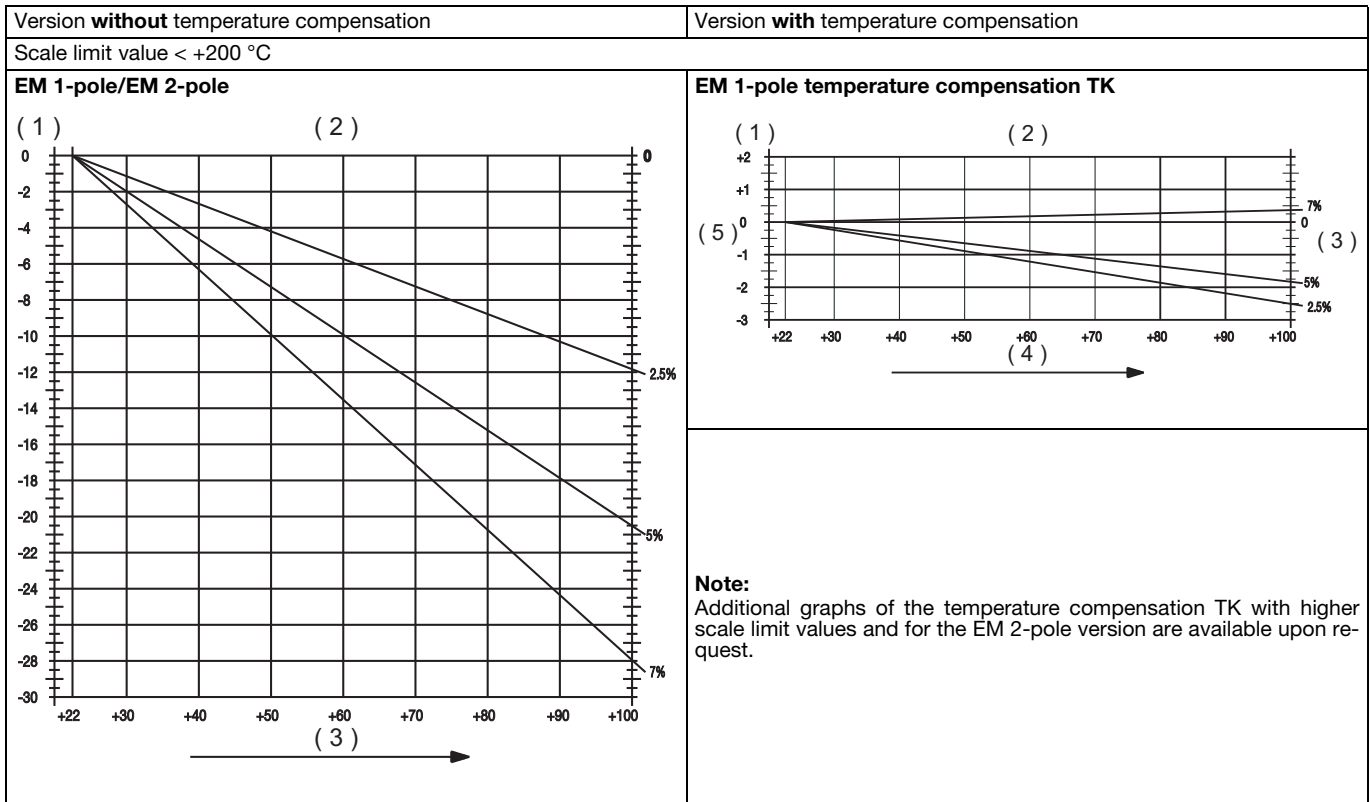
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Temperature compensation (TK)

Any change in the temperature at the switching head from the 22 °C calibration ambient temperature will produce a deviation of the switching point. For ambient temperatures that fluctuate strongly, it is advisable to use thermostats with temperature compensation (extra code "TK"). The switching point deviation depends on the ambient temperature at the switching head and takes the switching differential into consideration. **The temperature influence on the capillary is not yet taken into account and can result in an additional error.**



(1) % of the control range

(2) **Without temperature compensation**

(3) Ambient temperature [°C]

(1) % of the control range scope

(2) **With temperature compensation**

(3) Switching differential

(4) Ambient temperature [°C]

(5) Switching point deviation

Note:
 Additional graphs of the temperature compensation TK with higher scale limit values and for the EM 2-pole version are available upon request.

Note:

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

Control range with scale limit value	Hazardous reactions	Fire and explosion hazard		Hazardous to water	Information about toxicology		
		Ignition temperature	Explosion limit		Irritant	Health risks	Toxic
< 200 °C	No	355 °C	0.6 - 8 V %	Yes	Yes	^a	No
≥ 200 °C ≤ 350 °C	No	490 °C	-	Yes	Yes	^a	No
> 350 °C ≤ 500 °C	No	No	No	No	No	No	No

a. At present, no statement concerning health hazards in the event of short-term exposure and low concentration (e.g. measuring system rupture) has been made by the health authority

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Stock items

(Delivery within 3 working days after receipt of order)

Sales no.	Type	Control range °C	Switching differential %	Capillary mm	Process connection	Probe Ø × length mm
60/60001231	EM-1	-20 to +40	2.5	2000	"10" plain cylindrical probe	6×245
60/60000492	EM-1	0 to 50	2.5	1000		6×283
60/60001142	EM-1	20 to 90	2.5	1000		6×210
60/60000493	EM-1	20 to 90	7.0	1000		6×91
60/60000215 ^a	EM-1	0 to 100	1.0	1000		6×157
60/60000494	EM-1	0 to 100	2.5	1000		6×157
60/60000219	EM-1	0 to 100	2.5	2000		6×157
60/60000285	EM-1	30 to 110	7.0	1000		6×84
60/60000921	EM-1	0 to 150	2.5	1000		6×113
60/60000217 ^a	EM-1	0 to 150	2.5	2000		6×113
60/60001141	EM-1	0 to 200	2.5	1000		6×114
60/60000220	EM-1	0 to 200	2.5	2000		6×114
60/60000216 ^a	EM-1	50 to 250	2.5	2000		6×106
60/60000495	EM-1	50 to 300	2.5	1000		6×88
60/60000923	EM-1	50 to 300	2.5	2000		6×88
60/60002119	EM-1	20 to 400	6.0	1000		8×137
60/60002083	EM-1	20 to 500	5.0	1000		8×159
60/60000214	EM-2	0 to 50	2.5	1000		6×286
60/60000497	EM-2	0 to 150	2.5	1000		6×113
60/60000213	EM-2	0 to 150	2.5	2000		6×113
60/60001380	EM-2	50 to 300	2.5	1000		6×88
60/60002120	EM-2	20 to 400	6.0	1000		8×137
60/60002084	EM-2	20 to 500	5.0	1000		8×159
60/60002112	EM-2	20 to 500	6.0	2000		8×159
60/60000924	EM-5	0 to 150	2.5	1000		6×113
60/60000929	EM-5	0 to 200	2.5	1000		6×114
60/60000211	EM-5	50 to 300	2.5	1000		6×88
60/60002085	EM-5	20 to 500	5.0	1000		8×159
60/60002244	EM-50/ 574, 710	300 to 400	— —	1000		6×148
60/60002245	EM-50/ 574, 710	350 to 500	— —	1000		6×127

a. Discontinued type

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Order details:

Panel-mounted thermostats, EM series

Order code	(1) Basic type		
602021	EM panel-mounted thermostat with microswitch, with capillary		
(2) Basic type extensions			
0001	EM-1	Temperature controller	TR
0002	EM-2	Temperature monitor	TW
0003	EM-3*	Temperature monitor	TW
0004	EM-4*	Temperature limiter	TB
0005	EM-5	Temperature limiter	TB
0013	EMF-13	Temperature controller	TR/TW
0023	EMF-23	Temperature monitor	TW/TW
0033	EMF-33*	Temperature monitor	TW/TW
0014	EMF-14	Temperature controller	TR/TB
0024	EMF-24	Temperature monitor	TW/TB
0044	EMF-44*	Temperature limiter	TB/TB
0054	EMF-54	Temperature limiter	TB/TB
0133	EMF-133	Temperature controller	TR/TW/TW
0134	EMF-134	Temperature controller	TR/TW/TB
0233	EMF-233	Temperature monitor	TW/TW/TW
0234	EMF-234	Temperature monitor	TW/TW/TB
0333	EMF-333*	Temperature monitor	TW/TW/TW
0444	EMF-444*	Temperature limiter	TB/TB/TB
0544	EMF-544	Temperature limiter	TB/TB/TB
1333	EMF-1333	Temperature controller	TR/TW/TW/TW
2333	EMF-2333	Temperature monitor	TW/TW/TW/TW
3333	EMF-3333*	Temperature monitor	TW/TW/TW/TW
0020	EM-20	Safety temperature monitor	STW (STB)
0030	EM-30*	Safety temperature monitor	STW (STB)
0040	EM-40*	Safety temperature limiter	STB
0050	EM-50	Safety temperature limiter	STB

* Setpoint value/limit value permanently set at the factory to customer requirements

(3) Control ranges/limit value ranges

For TR, TW, and TB

013	-20 to +40
021	0 to 50
041	20 to 90
025	0 to 100
052	30 to 110
027	0 to 150
028	0 to 200
062	50 to 200
063	50 to 250
064	50 to 300
045	20 to 400
046	20 to 500

Adjustable for STB and STW (STB)

075	75 to 100
085	85 to 110
090	120 to 150
091	160 to 200
092	210 to 250
094	250 to 300
095	300 to 400
096	350 to 500
000	For limits with fixed settings

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Order details:

Panel-mounted thermostats, EM series

Order code	(4) Limit value with fixed settings
000	For adjustable control range/limit value range
...	Specification in °C (must be only within the control ranges/limit value ranges)
(5) Switching differential	
00	Without switching differential (-40 STB, -50 STB)
10	1 %* of the scale range
25	2.5 %* of the scale range
50	5 %** of the scale range
70	7 %** of the scale range
30	3 %* of the scale range
50	5 %** of the scale range
60	6 %* of the scale range
01	10 %* of the scale range
	* Only with TR + TW
	** Only with TR, TW, and STW
(6) Capillary length	
1000	1000 mm
2000	2000 mm
3000	3000 mm
4000	4000 mm
5000	5000 mm
...	Special length, specification in mm (for the max. allowable length see "Technical data")
(7) Capillary material	
40	Cu (Copper)
20	CrNi (stainless steel 1.4571)
(8) Process connection*	
10	Plain cylindrical probe 
20	Screw-in thermowell 
	* For different types of connections and thermowells refer to data sheet 606710
(9) Thread of process connection	
00	Without thread (process connection "10")
13	External thread G 1/2
(10) Material of process connection	
00	Only with process connection "10"
46	CuZn (brass)
20	CrNi (stainless steel 1.4571)
(11) Insertion length "S" (immersion tube length)	
000	Without thermowell
100	100 mm
150	150 mm
200	200 mm
300	300 mm
400	400 mm
...	Special length, specification in mm (max. 500 mm)

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Order details:

Panel-mounted thermostats, EM series

Order code	(12) Diameter "D" (immersion tube diameter)
00	Without thermowells
8	8 mm
10	10 mm
(13) Diameter "d" (probe diameter)	
6	6 mm
8	8 mm
(14) Extra codes*	
000	Without extra codes
574	U Microswitch with N/C contact, restart lock, and additional signal contact (only for TB and STB)
702	au Snap-action switch contact, gold plated (only with 1-pole and 2-pole version)
699	X Screw connection up to 2.5 mm ² conductor cross section
704	b1 Switching head mounting with 2 M4 screws, spaced 28 mm
705	b2 Switching head mounting with 2 M3 screws, spaced 33 mm
710	b7 Central mounting with acorn nut (only for TB and STB)
707	TK Temperature compensation (only with 1-pole and 2-pole version)

* State extra codes one after another, separated by commas

Sequence contact gap for 2-pole, 3-pole, and 4-pole devices
 Specify in plain text (e.g. +2 °C, +5 °C, +8 °C)

Order code

(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14)
 602021 / [...] - [...] - [...] - [..] - [...] - [..] - [..] - [..] - [..] - [..] - [...] - [..] - [.] / [...] , ... , ...

Order example

602021 / [0005] - [052] - [000] - [00] - [2000] - [40] - [10] - [00] - [00] - [000] - [00] - [6] / [574*] , 710

* State extra codes one after another, separated by commas.