Panel-Mounted Thermostats, EM Series

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

Special features

- Available with 1-, 2-, 3- or 4-pole jump-switches
- Approved according to the latest standards

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 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 an electrical switching element.

Switching function

Temperature controller TR and safety temperature monitos STW

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.

The electrical circuit 1-2 opens when the probe of STW (STB) and STB cools down to the negative temperature range, but it closes again automatically if the temperature rises.

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 and approval marks (see Technical data)

Types and DIN registry numbers

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.

Version	Types	Switching function	DIN registry numbers
1 pole snap-action switches	EM-1 EM-2 EM-3[a] EM-4[a] EM-5	TR TW TW TB TB	TR 777 TW 778 TW 778 TB 780 TB 780
2 single-pole snap-action switches	EMF-13 EMF-23 EMF-33[a] EMF-14 EMF-24 EMF-44[a] EMF-54	TR/TW TW/TW TW/TW TR/TB TW/TB TB/TB TB/TB	TR 777 TW 778 TW 778 TR 777 TW 778 TB 780 TB 780
3 single-pole snap-action switches	EMF-133 EMF-134 EMF-233 EMF-234 EMF-333[a] EMF-444[a] EMF-544	TR/TW/TW TR/TW/TB TW/TW/TW TW/TW/TB TW/TW/TW TB/TB/TB TB/TB/TB	TR 777 TR 777 TW 778 TW 778 TW 778 TB 780 TB 780
4 single-pole snap-action switches	EMF-1333 EMF-2333 EMF-3333[a]	TR/TW/TW/TW TW/TW/TW/TW TW/TW/TW/TW	TR 777 TW 778 TW 778
Fail-safe version	EM-40[a] EM-50 EM-20 EM-30[a]	STB STB STW (STB) STW (STB)	STB 782 STB 782 STW (STB) 775 S STW (STB) 775 S

[a] Setpoint value/limit value permanently factory-set according to customer specifications.

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 K	Probe length "L", probe Ø "d" in mm Ø 6 (Standard)	Ø 8
-20 to 40	1 2.5 5 7	50 50 95 100	50	5,000	5 8 25 50	245 245 138 103	145 145 91 73
0 to 50	1 2.5 5 7	60 60 105 110	60		5 10 25 50	283 283 159 117	165 165 101 80
20 to 90	1 2.5 5 7	115 115 140 175	80		7 14 35 70	210 210 121 91	127 127 82 67
0 to 100	1 2.5 5 7	125 125 165 200	80		10 20 50 100	157 157 94 73	100 100 68 58
30 to 110	1 2.5 5 7	135 135 170 200	80		8 16 40 80	188 188 110 84	116 116 76 63
0 to 150	1 2.5 5	173 173 200	80		15 30 75	113 113 72	78 78 57
0 to 200	1 2.5	230 230	80		20 40	113	78
50 to 200	1 2.5	230 230	80		15 30	139	92
50 to 250	1 2.5 5	288 288 300	80		20 40 100	105 105 64	70 70 49
50 to 300	1 2.5	345 345	80		25 50	87	61

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 K	Probe length "L", probe Ø "d" in mm Ø 6 (Standard)	Ø 8
20 to 400	6 10	460 500	80	5,000	75 200	237 127	137 81
20 to 500	3/5 6 10	575	80	1,000 5,000 5,000	48 95 250	278 176 95	158 106 65

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

Setting range °C	Scale range °⧋	Max. probe temperature °C	Max. switching head temperature °C	Max. capillary length in mm	Limit value tolerance K	Probe length "L", probe Ø „d“ in mm Ø 6 (Standard)	Ø 8
75 to 100	**78**	125	80	5,000	+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 °⧋	Max. probe temperature °C	Max. switching head temperature °C	Max. capillary length in mm	Limit value tolerance K	Probe length "L", probe Ø „d“ in mm Ø 6 (Standard)	Ø 8
300 to 400	70	460	80	3,000	+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	Stainless steel (CrNi) Material no. 1.4571 Welded	–
	Up to 350 °C	Stainless steel (CrNi) Ø 1.5 mm	Stainless steel (CrNi) Material no. 1.4571 Welded	Available at extra cost
Capillary length	Standard: 1,000 mm, max. 5,000 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.

Electrical data

Switching element 1, 2, 3, or 4 single-pole snap-action switches	EM.-1... EM-20 EM.-2... EM-30 EM.-3...	EM.-4... EM-40 EM.-5... EM-50	EM.-4.../U EM-40/U EM.-5.../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
Maximum 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 %, 0.25A	
	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	For gold-plated contacts (abbreviation "702"): AC/DC = 10 V, 5 mA	
Rating surge voltage	2500 V (via the switching contacts 400 V)		
Overvoltage category	II		
Required fuse rating	See 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} 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 to 3.5	Standard
		5	Approx. 5 to 6	Upon request
		7	Approx. 7 to 8	Upon request
		1	Approx. 1 to 2	Extra cost
		With gas-filled measuring system		
		5	Approx. 5 to 11	Standard
		6	Approx. 6 to 14	Upon request
		10	Approx. 10 to 16	Upon request
		3	Approx. 2.5 to 4	Extra cost
	STW (STB)	With liquid-filled measuring system		
		5	Approx. 5 to 7	Standard
		With gas-filled measuring system		
		6	Approx. 6 to 16	Standard
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 % 1 % 2 % 3 %	According to control range table	≤ 1 % ≤ 1 % < 2 % < 3 %
	The spacing of the additional contacts can be specified in °C in relation to the setpoint of contact I. (The contact track no. is stamped on the back of the housing par.)			
	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.			

Switching point accuracy in % of control rang/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									
	TR, TW, TB			STW, STB	TR, TW, TB		STW, STB	TR, TW, TB, STW, STB		
For temperatures with scale limit value/ limit value	< 200 °C				≥ 200 °C ≤ 350 °C			≥ 400 °C ≤ 500 °C		
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: Maximum 80 °C			
Nominal position (NL)	Any									

Housing

Housing: 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 outside with rotary knob	TW, TB, STB, STW (STB): Switching point adjustable with 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	IP00 according to EN 60529	
Weight	Approx. 0.3 kg	

Process connection

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 as per DIN 3852/2 and clamping piece with fixing screw for securing the probe	
Material	**Protection tube**	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)	
Protection tube Ø	D = 8 mm, D = 10 mm	

For further process connections and protection tubes see data sheet 606710.

Approvals and approval marks

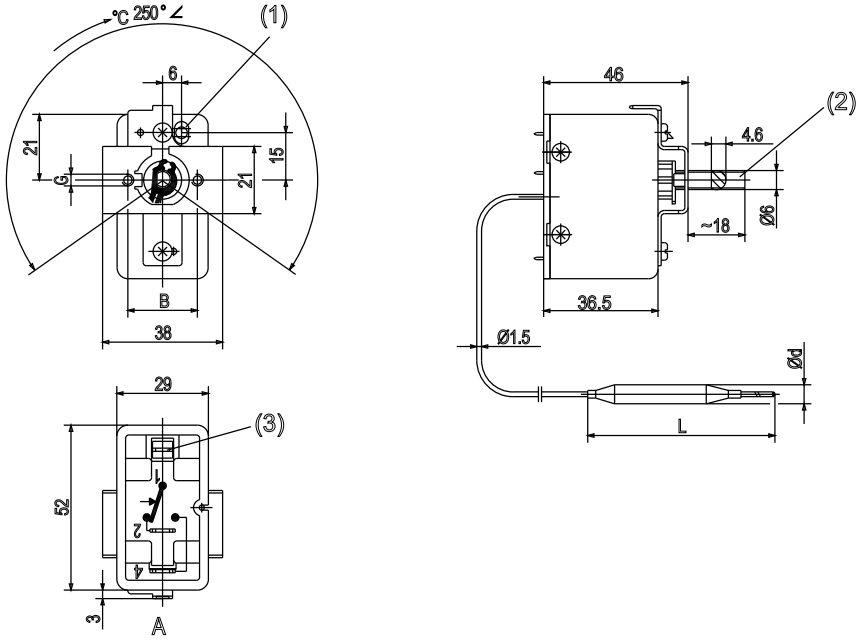
DIN	
Testing agency	DIN CERTCO/TÜV Süd
Certificates/certification numbers	TR777
Inspection basis	DIN EN 14597
Valid for	EM-1
DIN	
Testing agency	DIN CERTCO/TÜV Süd
Certificates/certification numbers	TW778
Inspection basis	DIN EN 14597
Valid for	EM-2, EM-3
DIN	
Testing agency	DIN CERTCO/TÜV Süd
Certificates/certification numbers	TB780
Inspection basis	DIN EN 14597
Valid for	EM-4, EM-5
DIN	
Testing agency	DIN CERTCO/TÜV Süd
Certificates/certification numbers	STW(STB)775 S
Inspection basis	DIN EN 14597
Valid for	EM-20, EM-30
DIN	
Testing agency	DIN CERTCO/TÜV Süd
Certificates/certification numbers	STB782
Inspection basis	DIN EN 14597
Valid for	EM-40, EM-50
DIN	
Testing agency	TÜV Süd
Certificates/certification numbers	B_{10d} = 250.000[a]
Inspection basis	DIN EN ISO 13849-1
Valid for	EM-20, EM-30, EM-40, EM-50
PED	
Testing agency	TÜV Süd
Certificates/certification numbers	Z-IS-TAF-MUC-18-06-2652099-07102504
Inspection basis	2014/68/EU
Valid for	EM-20, EM-30, EM-40, EM-50
UL	
Testing agency	UL
Certificates/certification numbers	E66358
Inspection basis	UL 873, CSA-22.2 No. 24
Valid for	EM-...
UL	
Testing agency	UL
Certificates/certification numbers	MH45736
Inspection basis	UL 353, CSA-22.2 No. 24
Valid for	EM-4, EM-5, EM-40, EM-50, EM-80, EM-14, EM-24, EM-44, EM-54, EM-134, EM-234, EM-444, EM-544, EM-1334, EM-2334, EM-4444, EM-5444

EAC[b]	
Testing agency	Gost Norm AG
Certificates/certification numbers	TC RU C-DE.AB98.B.00348
Inspection basis	Technical rules of the customs union Russia/Belarus/Kazakhstan
Valid for	EM-...
Railway application	
Testing agency	JUMO
Certificates/certification numbers	-
Inspection basis	EN 50155
Valid for	EM-... with extra code 950

[a] For detailed information please refer to safety manual JUMO EM 602021, 602026
[b] Russian documentation upon request.

Dimensions

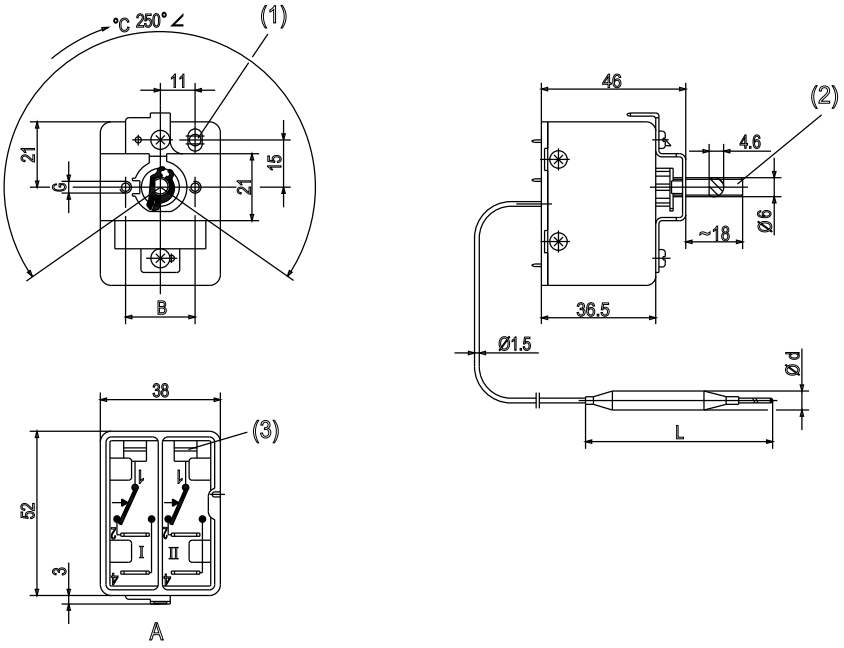
EM-1, EM-2, EM-3, EM-4, EM-5



(1) Restart knob only with abbreviation 4 and 5
(2) Not applicable with abbreviation 2, 3, 4, 5
(3) Tab connector DIN 46244-A6,3-0,8

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

EMF-13, EMF-20, EMF-23, EMF-30, EMF-33, EMF-14, EMF-24, EMF-40, EMF-44, EMF-50, EMF-54



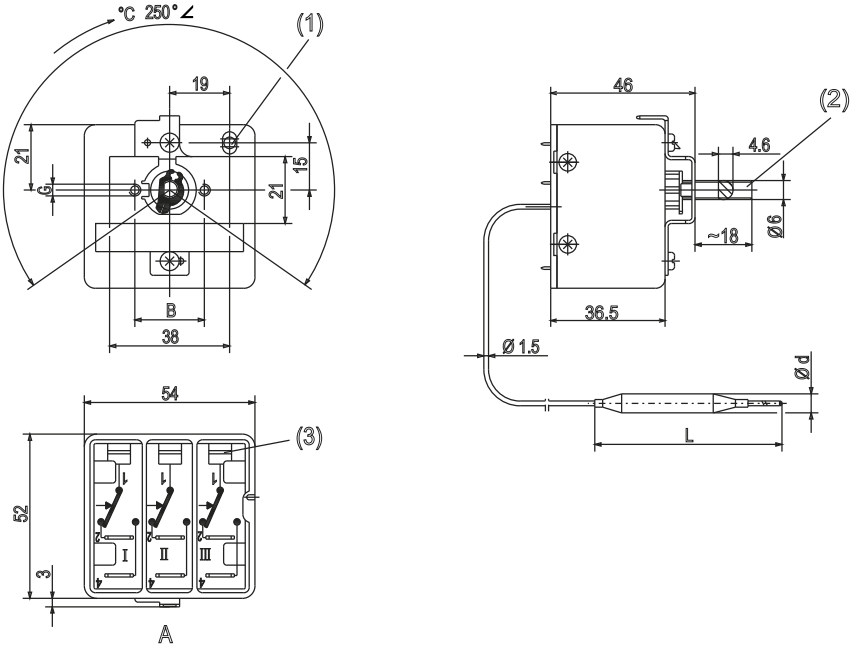
(1) Restart knob only with abbreviation 40, 44, 50 and 5

(2) Not applicable with abbreviation 2, 3, 4, 5, 20, 30, 40 and 50

(3) Tab connector DIN 46244-A6,3-0,8

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

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



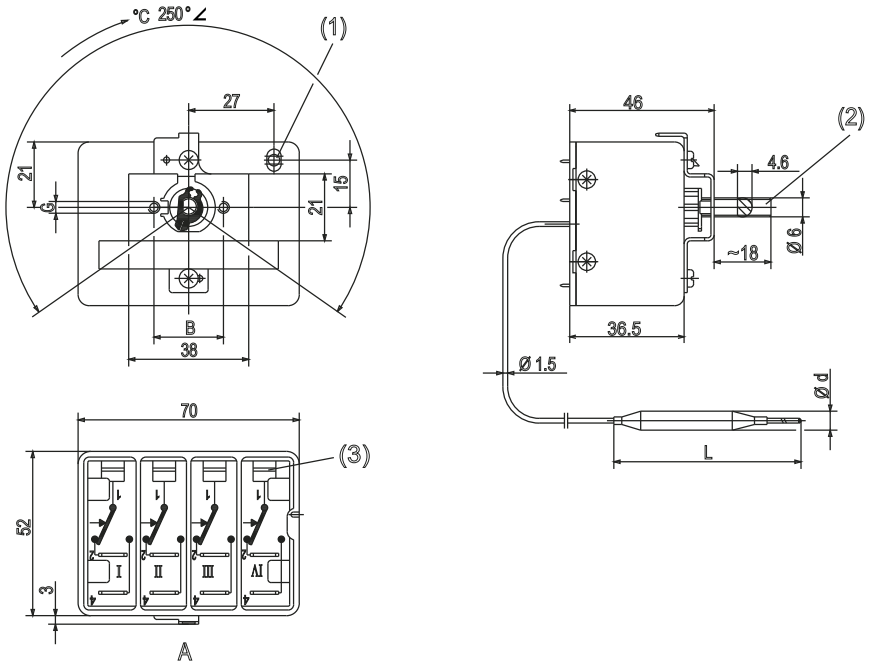
(1) Restart knob only with abbreviation 444, 544

(2) Not applicable with abbreviation 2, 3, 4, 5

(3) Tab connector DIN 46244-A6,3-0,8

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

EMF-1333, EMF-2333, EMF-3333



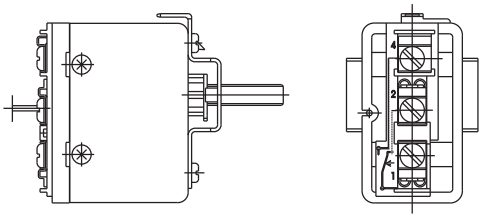
(1) Restart knob only with abbreviation 4444

(2) Not applicable with abbreviation 2, 3, 4, 5

(3) Tab connector DIN 46244-A6,3-0,8

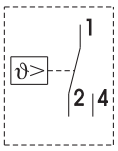
	B	G
Standard	22	M3
Extra code 704	28	M4
Extra code 705	33	M3

Schraubanschluss EM-1, extra code 699

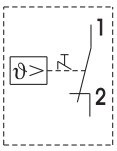


Connection diagrams

EM-1
EM-2
EM-3

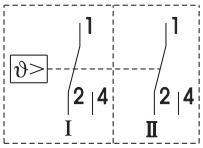


EM-4
EM-5

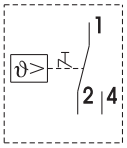


EMF-13
EMF-23
EMF-33

Setpoint value: I
Sequence contact: II

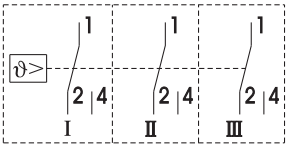


EM-4/U
EM-5/U



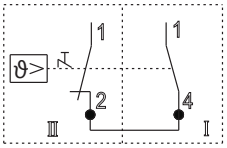
EMF-133
EMF-233
EMF-333

Setpoint value: I
Sequence contact: II, III



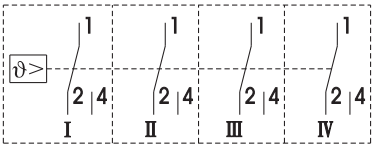
EM-40
EM-50

I = N/C contact with system break and T < -10 °C: I
II = Limit value: II



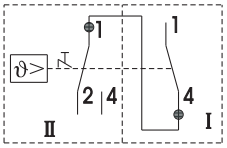
EMF-1333
EMF-2333
EMF-3333

Setpoint value: I
Sequence contact: II, III, IV



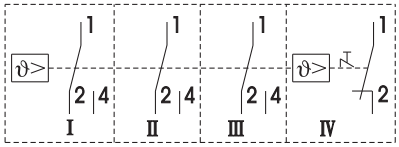
EM-40/U
EM-50/U

I = N/C contact with system break and T < -10 °C: I
II = Limit value: II



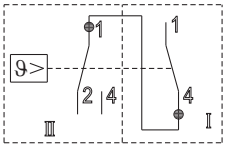
Example: EMF-1334

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



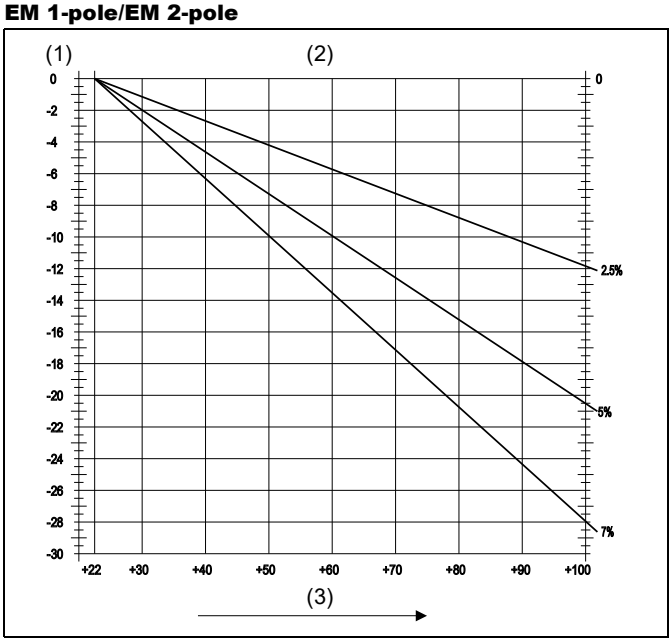
Temperature compensation (TK)

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.

Version **without** temperature compensation

Scale limit value < 200 °C

EM 1-pole/EM 2-pole

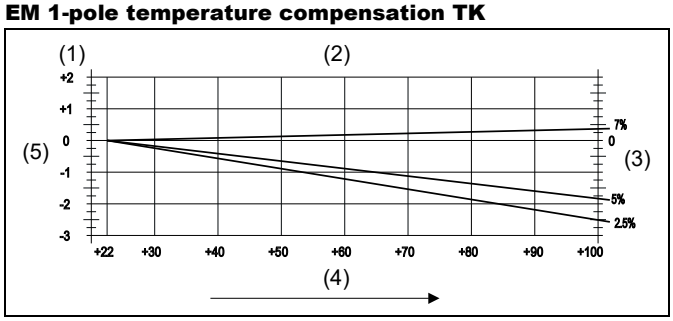


(1) % % of the control range scope
(2) Without temperature compensation
(3) Ambient temperature [°C]

Version **with** temperature compensation

Scale limit value < 200 °C

EM 1-pole temperature compensation TK



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

(1) % % of the control range scope
(2) With temperature compensation
(3) Switching differential
(4) Ambient temperature [°C]
(5) Switching point deviation

Bestellangaben

	(1)	**Basic type**	
602021		Panel-Mounted Thermostats, EM Series	
	(2)	**Basic type extensions**	
0001		EM-1	Temperature controller (TR), 1-pole
0002		EM-2	Temperature monitor (TW), 1-pole
0003		EM-3	Temperature monitor (TW), permanently set, 1-pole
0004		EM-4	Temperature limiter (TB), permanently set, 1-pole
0005		EM-5	Temperature limiter (TB, 1-pole
0013		EM-13	Temperature controller (TR/TW), 2-pole
0014		EM-14	Temperature controller (TR/TB), 2-pole
0020		EM-20	Safety temperature monitor (STW (STB))
0023		EM-23	Temperature monitor (TR/TB), 2-pole
0024		EM-24	Temperature monitor (TW/TB), 2-pole
0030		EM-30	Safety temperature monitor (STW(STB)), permanently set
0033		EM-33	Temperature monitor (TW/TW), 2-pole
0040		EM-40	Safety temperature limiter (STB), permanently set
0044		EM-44	Temperature limiter (TB/TB), 2-pole
0050		EM-50	Safety temperature limiter (STB)
0054		EMF-54	Temperature limiter (TB/TB), 2-pole
0133		EMF-133	Temperature controller (TR/TW/TW), 3-pole
0134		EMF-134	Temperature controller (TR/TW/TB), 3-pole
0233		EMF-233	Temperature monitor (TW/TW/TW), 3-pole
0333		EMF-333	Temperature monitor (TW/TW/TW), 3-pole
0444		EMF-444	Temperature limiter (TB/TB/TB), 3-pole
0544		EMF-544	Temperature limiter (TB/TB/TB), 3-pole
1333		EMF-1333	Temperature controller (TR/TW/TW/TW), 4-pole
2333		EMF-2333	Temperature monitor (TW/TW/TW/TW), 4-pole
3333		EMF-3333	Temperature monitor (TW/TW/TW/TW), 4-pole
	(3)	**Control range (TW)**	
000		For permanently set limit value	
013		-20 to +40 °C	
021		0 to 50 °C	
025		0 to 100 °C	
027		0 to 150 °C	
028		0 to 200 °C	
041		20 to 90 °C	
045		20 to 400 °C	
046		20 to 500 °C	
052		30 to 110 °C	
062		50 to 200 °C	
063		50 to 250 °C	
064		50 to 300 °C	
075		75 to 100 °C	
085		85 to 110 °C	
090		120 to 150 °C	
091		160 to 200 °C	
092		210 to 300 °C	
094		250 to 300 °C	
095		300 to 400 °C	
096		350 to 500 °C	

	(4)	**Limit value (STW/STB)**	
000		For adjustable control range	
100		100 °C	
95		95 °C	
	(5)	**Switching differential**	
00		None	
		With liquid-filled measuring system	
10		1 %	Only with TR and TW
25		2,5 %	Only with TR and TW
50		5 %	Only with TR, TW and STW
70		7 %	Only with TR, TW and STW
		With gas-filled measuring system	
30		3 %	Only with TR and TW
50		5 %	Only with TR, TW and STW
60		6 %	Only with TR and TW
01		10 %	Only with TR and TW
	(6)	**Capillary length**	
0		None	
1000		1,000 mm	
2000		2,000 mm	
3000		3,000 mm	
4000		4,000 mm	
5000		5,000 mm	
	(7)	**Capillary material**	
20		CrNi (stainless steel)	
40		Cu (copper)	
	(8)	**Process connection**	
10		Plain cylindrical probe	
20		Screw-in protection tube	
	(9)	**Thread of process connection**	
00		None	
13		G 1/2	
	(10)	**Process connection material**	
00		None	
20		CrNi (stainless steel)	
40		CuZn (brass)	
	(11)	**Insertion length**	
000		None	
100		100 mm	
120		120 mm	
150		150 mm	
200		200 mm	
300		300 mm	
	(12)	**Proctection tube diameter**	
00		None	
10		10 mm	
8		8 mm	
	(13)	**Probe diameter**	
6		6 mm	
8		8 mm	

(14)	Extra codes
000	None
025	Central mounting M10 × 1, metall
574	Microswitch with N/C contact, restart lock, and additional signal contact (only for TB and STB)
699	Screw connection up to 2.5 mm ^{2}
702	Snap-action contact, gold-plated
704	Switching head mounting with 2 M4 screws, spaced 28 mm
705	Switching head mounting with 2 M3 screws, spaced 33 mm
707	Temperature compensation
710	Central mounting M10 ×1, standard
950	Railway application

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)	
Order code		/		-		-		-		-		-		-		-
Order example	602021	/	0005	-	052	-	000	-	00	-	2,000	-	40	-	10	-

	(9)		(10)		(11)		(12)		(13)		(14)	
		-		-		-		-		/		, ...[a]
	00	-	00	-	000	-	00	-	6	/	571	

[a] List extra codes in sequence, separated by commas.

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

For further process connections and protection tubes see data sheet 606710.

Lagerausführungen

Order code	Control range (TW)	Capillary length	Probe Ø	Part no.
602021/0001-013-000-25-2000-40-10-00-00-000-00-6/000	-20 to +40 °C	2,000 mm	6 mm	60001231
602021/0001-021-000-25-1000-40-10-00-00-000-00-6/000	0 to 50 °C	1,000 mm	6 mm	60000492
602021/0001-041-000-70-1000-40-10-00-00-000-00-6/000	20 to 90 °C	1,000 mm	6 mm	60000493
602021/0001-025-000-25-1000-40-10-00-00-000-00-6/000	0 to 100 °C	1,000 mm	6 mm	60000494
602021/0001-028-000-25-2000-40-10-00-00-000-00-6/000	0 to 200 °C	2,000 mm	6 mm	60000220
602021/0001-046-000-50-1000-20-10-00-00-000-00-6/000	20 to 500 °C	1,000 mm	8 mm	60002083
602021/0002-027-000-25-2000-40-10-00-00-000-00-6/000	0 to 150 °C	2,000 mm	6 mm	60000213
602021/0002-064-000-25-1000-40-10-00-00-000-00-6/000	50 to 300 °C	1,000 mm	6 mm	60001380
602021/0002-046-000-25-1000-20-10-00-00-000-00-6/000	20 to 500 °C	1,000 mm	8 mm	60002084
602021/0002-046-000-25-2000-20-10-00-00-000-00-6/000	20 to 500 °C	2,000 mm	8 mm	60002112
602021/0005-027-000-25-1000-40-10-00-00-000-00-6/000	0 to 150 °C	1,000 mm	6 mm	60000924
602021/0005-028-000-25-1000-40-10-00-00-000-00-6/000	0 to 200 °C	1,000 mm	6 mm	60000929
602021/0005-064-000-25-1000-40-10-00-00-000-00-6/000	50 to 300 °C	1,000 mm	6 mm	60000211
602021/0005-046-000-25-1000-20-10-00-00-000-00-6/000	20 to 500 °C	1,000 mm	8 mm	60002085