JUMO GmbH & Co. KG
Delivery address: Mackenrodtstraße 14
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
Email: mail@jumo.net
Internet: www.jumo.net

JUMO UK LTD
JUMO House
Temple Bank, Riverway
Harlow, Essex, CM20 2DY, UK
Phone: +44 1279 63 55 33
Fax: +44 1279 62 50 29
Email: sales@jumo.co.uk
Internet: www.jumo.co.uk

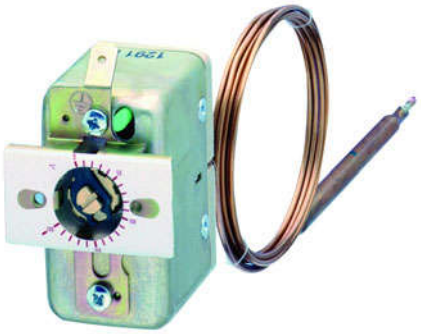
JUMO Process Control, Inc.
6724 Joy Road
East Syracuse, NY 13057, USA
Phone: +1 315 437 5866
Fax: +1 315 437 5860
Email: info.us@jumo.net
Internet: www.jumousa.com

JUMO Panel-mounted thermostats

EM series

Special features

- Safety temperature monitor STW (STB)
- Safety temperature limiter STB
- Tested according to DIN EN 14597 and PED 2014/68/EU



Description

Panel-mounted thermostats are used to monitor thermal processes. The devices are available as safety temperature monitors STW (STB) and safety temperature limiters STB. In the event of a malfunction the STB places the system being monitored in a safe operating status.

Panel-mounted thermostats operate according to the liquid expansion principle. The electrical switching element is a microswitch.



Switching functions

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 value (by the amount of the switching differential), the microswitch is reset to its initial position.

Restart lock on 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 un locked once the temperature has dropped by approx. 10 K.

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

If the measuring system is destroyed, that is, if the expansion fluid emerges, the pressure in the membrane drops and permanently opens the electrical circuit of the STB. 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.

Using 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 switching diagram must comply with DIN EN 50156.

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Approval marks and certificates

	Designation	DIN
	Test facility	DIN CERTCO/TÜV Süd
	Certificate no.	STB782
	Inspection basis	DIN EN 14597
	Valid for	Type 602026/80 (EM-80)
	Designation	DIN
	Test facility	DIN CERTCO/TÜV Süd
	Certificate no.	STW(STB)775S
	Inspection basis	DIN EN 14597
	Valid for	Type 602026/20 (EM-20-E), Type 602026/30 (EM-30-E)
	Designation	DIN
	Test facility	TÜV Süd
	Certificate no.	C-T 1370-01/11, B_{10d} = 250.000[a]
	Inspection basis	DIN EN 14597, DIN EN ISO 13849-1, draft DIN EN 13611 A2
	Valid for	Type 602026/...
PED	Designation	PED
	Test facility	TÜV Süd
	Certificate no.	Z-IS-TAF-MUC-18-06-2652099-07102504
	Inspection basis	Directive 2014/68/EU, DIN EN 14597
	Valid for	Type 602026/...
c UL us	Designation	UL
	Test facility	Underwriter Laboratories
	Certificate no.	E66358
	Inspection basis	UL 873, CSA-C22.2 No. 24
	Valid for	Type 602026/80 (EM-80)
	Designation	UL
	Test facility	Underwriter Laboratories
	Certificate no.	MH45736
	Inspection basis	UL 353, CSA-C22.2 No. 24
	Valid for	Type 602026/80 (EM-80)

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

Russian documentation upon request.

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Technical data

Limit value range, limit value range setting and temperature probe

	Limit value range, Limit value setting[a] **°C**	**Max. admissible probe temperature °C**	**Limit value tolerance K**	**Probe length "L", for probe Ø "d" = 6 mm**
Type EM-20-E	40 to 110 100 to 150 110 to 170 180 to 250 230 to 300	135 173 195 288 345	0/-9 0/-8 0/-9 0/-13 0/-14	72 85 72 60 60
Type EM-30-E	Optional limit value 20 to 300 permanently factory-set	limit value 15 %	-	-
Type EM-80	Optional limit value 60 to 180 permanently factory-set	limit value 15 %	0/-5	84

[a] Set the limit value with a screwdriver on the limit value adjuster before installation.

Capillary and temperature probe

	Scale limit value	**Capillary**	**Temperature probe**
Type 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
Capillary length	Standard 1000 mm, max. 5000 mm		
Min. bending radius of the capillary	5 mm		

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Electrical data

Switching element	Snap-action switch with single-pole changeover contact
Max. switching capactiy	
On the NC contact (contact deck 1 to 2)	
STW (STB), STB	AC 400 V +10 %, 10 A, AC 230 V +10 %, 16 (2.5)[a] A, cos φ = 1 (0.6), DC 230 V +10 %, 0,25 A
On the NO contact (contact deck 1 to 4	
STW (STB)	AC 400 V +10 %, 6.3 A, AC 230 V +10 %, 6.3 (2.5)b A, cos φ = 1 (0.6), DC 230 V +10 %, 0.25 A
STB	AC 230 V +10 %, 2 (0.4) A, cos φ = 1 (0.6), DC 230 V +10 %, 0.25 A, (only with extra code 574)
STW (STB), STB for microswitches with gold-plating	AC/DC 24 V, 0.1 A
Switching reliability	Minimum load for maximum switching reliability
For silver contacts	AC/DC 24 V, 100 mA
With gold-plating	AC/DC = 10 V, 5 mA
Rated surge voltage	2500 V (via the switching contacts 400 V)
Overvoltage category	II
Electrical connection	
Standard	Tab connector A 6.3 – 0.8 DIN 46244
Extra code 699	Screw connection up to 2.5 mm^2 cable cross-section (can be retrofitted)

[a] Inductive loads

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Operating data

Switching differential in % from the control range/limit value range	Nominal value	Possible actual value
Switching function		
STW (STB)	7	7-8
Medium ambient temperature influence	When the ambient temperature on the switching head and/or the capillary eviates from the calibration ambient temperature of +22 °C, a switching point offset occurs. Higher ambient temperature = lower switching point Lower ambient temperature = higher switching point	
	STW (STB)	STB
For temperatures with scale limit value/ limit value	< 200 °C	≥ 200 °C ≤ 350 °C
Switching differential in %	7	7
Ambient temperature influence on the switching head in %/K	0.43	0.35
Ambient temperature influence on the capillary in %/m	0.09 · K · m	0.07 · K · m
Temperature compensation **(TK)**	For detailed information see diagram.	
Temperatures		
Admissible storage temperature	-50 to 50 °C	
Admissible ambient temperature for use	T80	
Nominal position **(NL)**	Any	
Operating medium	Water, oil, air, superheated steam	
Time constant $t_{0.632}$		
In water	≤ 45 s	
In oil	≤ 60 s	
In air or superheated steam	≤ 120 s	
Mode of operation	EN 60730, DIN EN 60730-2-9, DIN EN 14597	
STW (STB)	2 BKLNP	
STB	2 BFHKLNPV	

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Mechanical features

Housing

Material	Galvanized sheet steel
Fastening	
Extra code 704	With 2 M4 screws, spacing 28 mm
Extra code 705	With 2 M3 screws, spacing 33 mm
Extra code 706	With 2 M3 screws, spacing 22 mm
Extra code 710	Central mounting M10 × 1 with acorn nut (for STB only)
Protection type	IP00, according to EN 60 529, pollution degree 2
Weight	Approx. 200 g

Process connection

Material	
Protection tube up to 150 °C	CuZn (standard)
Protection tube above 150 °C	CrNi
Capillary	Plain cylindrical probe (standard) Screw-in protection tube (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
Insertion length S	
Standard	100, 120, 150, 200, or 300 mm (other lengths upon request)
Protection tube Ø	D = 8 mm

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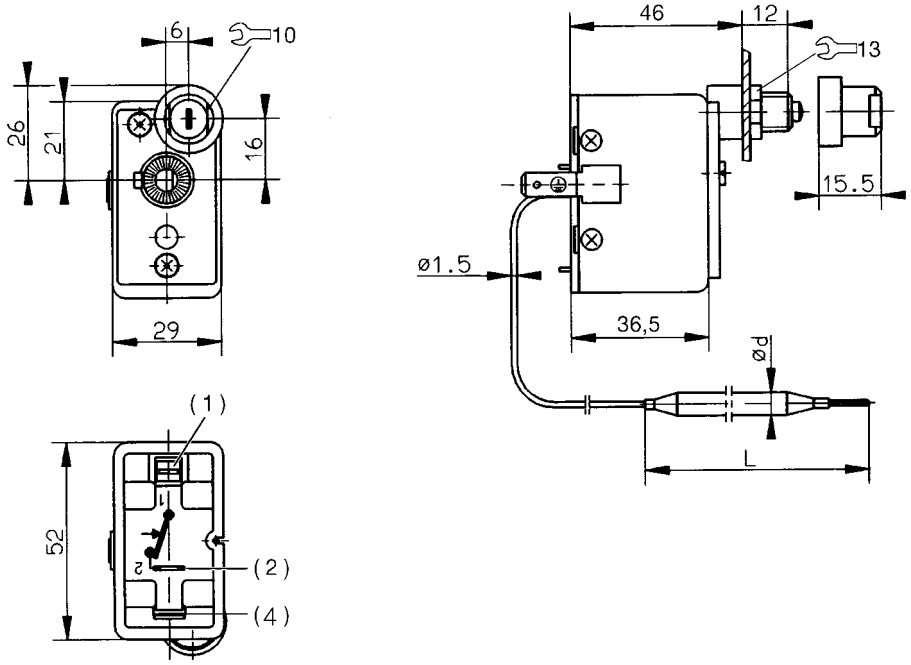
Dimensions

EM-80

with central mounting (standard)

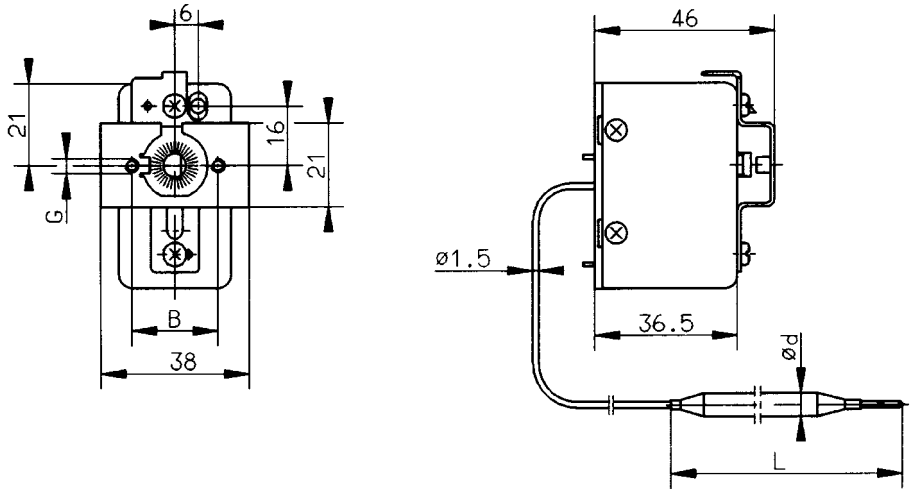


(1)/(2) Standard: Tab connector A 6.3 x 0.8 mm (DIN 46244)

(4) Only for extra code /574: Tab connector A 6.3 x 0.8 mm (DIN 46244)

EM-20-E, EM-30-E, EM-80

with fixing brackets



Abbreviation	B	G
704	28	M4
705	33	M3
706	22	M3

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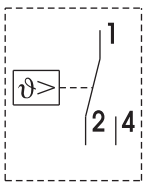
Connection diagram

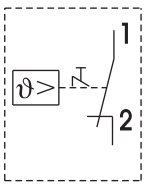
The connection diagram in the data sheet provides information on product selection.

For the electrical connection, only use the installation instructions or the operating manual.

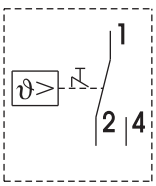
EM-20-E, EM-30-E



EM-80



EM-80/U



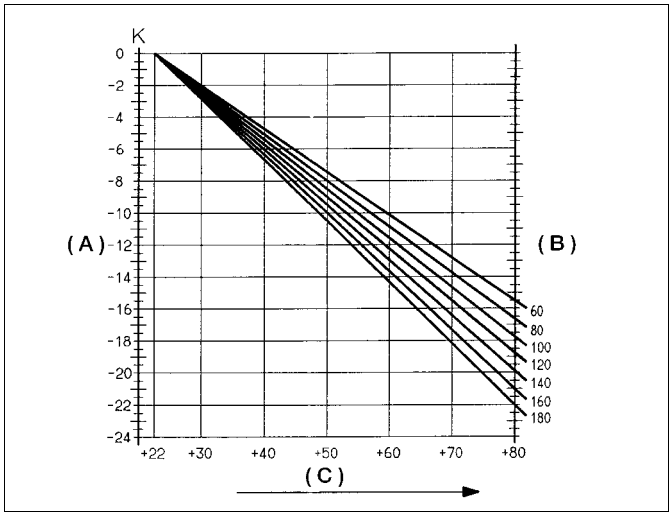
Temperature compensation

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 highly fluctuating ambient temperatures, we recommend to use thermostats with temperature compensation (extra code 707).

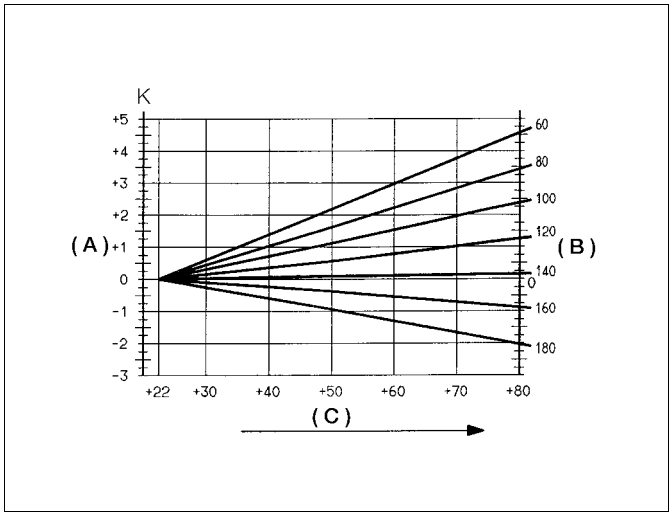
Switching point deviation depends on the ambient temperature at the switching head taking the probe temperature into account.

The temperature influence on the capillary is not yet taken into account and can result in an additional error of approx. 0.07 K/K·m.

Version **without** temperature compensation



Version **with** temperature compensation



A Switching point deviation
B Probe temperature in °C
C Ambient temperature in °C

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Delivery address: Mackenrodtstraße 14
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Order details

	(1)	**Basic type**
602026		JUMO Panel-mounted thermostat, EM series
	(2)	**Basic type extension**
20		EM-20-E Safety temperature monitor STW
30		EM-30-E Safety temperature monitor STW, limit value permanently set
80		EM-80 Safety temperature limiter STB, limit value permanently set
	(3)	**Control range (TW)**
000		With permanently set limit value
040		20 to 80 °C
055		40 to 110 °C
061		50 to 150 °C
063		50 to 250 °C
081		80 to 200 °C
095		300 to 400 °C
096		300 to 500 °C
374		45 to 70 °C
461		95 to 120 °C
506		100 to 150 °C
508		110 to 170 °C
540		145 to 170 °C
551		150 to 190 °C
552		150 to 250 °C
554		150 to 350 °C
575		180 to 250 °C
591		190 to 230 °C
606		230 to 300 °C
	(4)	**Limit value (STW/STB)**
000		With adjustable control range
95		95 °C
100		100 °C
	(5)	**Capillary length**
1000		1000 mm
2000		2000 mm
3000		3000 mm
4000		4000 mm
5000		5000 mm
	(6)	**Capillary material**
20		CrNi (stainless steel 1.4571)
40		Copper (Cu)
	(7)	**Process connection**
10		Plain cylindrical probe
20		Screw-in thermowell
	(8)	**Process connection**
00		None
13		G 1/2
	(9)	**Process connection material**
00		None
20		CrNi (stainless steel)
46		CuZn (brass)

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	(10)	Insertion length
000		None
100		100 mm
120		120 mm
150		150 mm
200		200 mm
300		300 mm
	(11)	**Immersion tube diameter**
00		None
8		8 mm
	(12)	**Probe diameter**
6		6 mm
	(13)	**Extra codes**
000		None
025		Central mounting M10 × 1, metall
574		Microswitch with N/C contact, restart lock, and additional signal contact (only for STB)
699		Screw connection up to 2.5 mm²
702		Snap action contact with gold-plating
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
707		Temperature compensation
710		Central mounting M10 × 1

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)		(11)		(12)		(13)	
Order code		/		-		-		-		-		-		-		-		-		-		-		/		, ...[a]
Order example	602026	/	80	-	000	-	000	-	1000	-	40	-	10	-	00	-	00	-	000	-	00	-	00	/	000	

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

Stock versions

Order code	limit value	Probe diameter	Part no.
602026/80-000-95-1000-40-10-00-00-000-00-6/710	95 °C	6 mm	60000753
602026/80-000-110-1000-40-10-00-00-000-00-6/710	110 °C		60000775