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Products

Temperature, Control, Monitoring



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Temperature, Control, Monitoring

Rod thermostats

No.

Series STM-RW-2 for flue gas temperature monitoring	601540
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Panel-mounting thermostats

No.

Types ETHf-20(STW) and ETHf-70 (STB)	602010
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Series EM, TR, TW, TB, STW, STB	602021
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Series EM up to +650°C, TW, TB, STB	602025
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Type EM-80 (STB), EM-20E, EM-30E, STW (STB)	602026
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Type 602031 JUMO heatTHERM, TR, TW, STW, STB	602031
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Surface-mounting thermostats

No.

Series ATH as single thermostats, TR, TW, STW, STB	603021
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Series ATH as twin thermostats TR, TW, STW, STB	603026
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Series ATH.-SE-... for monitoring installations on seagoing ships, TW, STW, STB	603031
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Series ATH-SW, Protection IP65, TW, STW, STB	603035
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Series AMTHF, with 2, 3 or 4 single-pole snap-action switches	603051
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JUMO heatTHERM-AT as surface-mounting/room thermostat, TR, TW, STW, STB	603070
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JUMO frostTHERM-AT/-DR as surface-mounting or DIN rail thermostat, STW, STB	604100
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JUMO frostTHERM-ATE - electronic frost protection thermostat	604170
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Warm-air thermostats

No.

Series WTHc for warm-air heating systems to DIN 4794	604514
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Ex thermostats for application in hazardous areas

No.

exTHERM-AT	605055
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Accessories

No.

ATEX Thermowell	605057
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Process connections for thermostats

Temperature probes, screw fittings and pockets	606710
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JUMO setpoint adjusters for thermostats

Spindle-fitting knobs, adjustable stops, setpoint dials, surrounds, screws for EM series and heatTHERM	606715
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**Dial thermometers with bimetal measuring system****No.**

Standard version	1.5	IP51	608001
Industrial version	1	IP54 or IP65	608002
Chemical plant version	1	IP65	608003
Transformer version	1.5	IP55	608005

Dial thermometers with liquid- or gas-filled measuring system**No.****Indicators**

Temperature indicator in stainless steel case	1.5	IP53 or IP65	608201
Temperature indicator in stainless steel case with bayonet lock	1	IP65	608225

Bimetal temperature switch**No.**

Bimetal temperature switch with a fixed switching temperature		IP52 or IP67	608301
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Controllers with slow-break contact**No.**

Contact dial thermometer with indication for panel- or surface-mounting	1	IP 65	608425
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Controllers with microswitch contact**No.**

MICROSTAT-M with 1 microswitch for panel-mounting	2	IP53	608501
Contact dial thermometer for panel-mounting or self-supporting	1.5	IP51 or IP53	608520
Contact dial thermometer for panel-mounting or self-supporting in stainless steel case with bayonet lock	1.5	IP65	608523
Contact thermometer-TF, transformer and industrial versions	1.5	IP54	608540

Special devices, Accessories**No.**

Process Connections for Dial Thermometers Temperature probes (TF), Process connections (TA), Pockets (SH) (prices on request)			608730
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Flue gas temperature monitor

Type STM-RW-2

Special features

- with micro switch
- Aluminum die cast case
- Protection rating IP54
- High contact reliability

Brief description

The flue gas temperature monitor is used to monitor the flue gas temperature of solid fuel boilers during bivalent operation with oil heating boilers. Furthermore it is used to block ventilation systems causing vacuum in connection with tile stoves and fireplaces.

The flue gas temperature monitor operates according to the rod expansion principle. The immersion tube and an integrated metal rod have different expansion coefficients so that a temperature-dependent length difference occurs. A micro switch, which is actuated when a set limit value temperature is exceeded, is affected due to mechanical transmission. The micro switch is reset once the immersion tube has cooled down by approx. 10-30 K. In the event of an immersion tube breakage, the current circuit will be permanently opened.



Approval / approval marks (see Technical Data)



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Technical data

Electrical data	STM-RW-2	STM-RW-2/OS (729)
Switching element	Micro switch with change-over contact	Micro switch with 2 separate current circuits 1 x N/C contact and 1 x N/O contact
maximum permissible contact rating	AC 230 V +10%, 10 (2) A, cos φ = 1 (0.6) DC 230 V +10%, 0.25A	
Contact reliability	To ensure high switching reliability, we recommend a minimum load of: AC / DC 24 V, 20 mA	
Rating surge voltage	2500 V (via the switching contacts 400 V)	
Overvoltage category II	Required fusing, see maximum switching current	

Operating data

Limit value range	+40 °C to +120 °C (factory-set to +100 °C) +20 °C to +400 °C (factory-set to +120 °C)		
Hysteresis	Limit value range	STM-RW-2	STM-RW-2/OS (729)
	+40 °C to +120 °C +20 °C to +400 °C	10 - 18 K 10 - 22 K	10 - 30 K 10 - 40 K
Switching point accuracy referring to the switch-off point	Limit value range	Scale beginning	Scale end
	+40 °C to +120 °C +20 °C to +400 °C	+0/-10 K +0/-15 K	+0/-10 K +0/-20 K
Time constant	Flue gas: ≤ 45 sec.		
Average ambient temperature influence	Switching point offset referring to the deviation of +22 °C ~ 0.07 K/K		

Temperatures / Position

	STM-RW-2
Permissible ambient temperature	on the probe: max. +700 °C on the switch head: max. +80 °C, min. -50 °C
Set point adjustment	after removal of the case lid via internal scale
Permissible storage temperature	max. +80 °C / min. -50 °C
Rated position	as per DIN 16257, NL 0 to NL 90 (different rated positions (NL) on request)

Case

Case	Aluminum die cast, surface with impact resistant textured paint; lid: RAL 7032, bottom section: RAL 7015
Cable inlet	clamping gland M 20 x 1.5
Protection class	EN 60 529-IP54
Weight	approx. 0.8 kg

Process connection

Connection type	"DZ" G 1/2 (fixed hexagon with external thread G 1/2), material: Steel
Immersion tube	15 x 150 mm, Material: Steel

Approvals/Approval marks

Approval marks	Inspection authority	Certificates / Inspection number	Inspection basics	valid for
DIN EN 14597	DIN CERTCO / TÜV Süd	ATW 862	DIN EN 14597	STM-RW-2

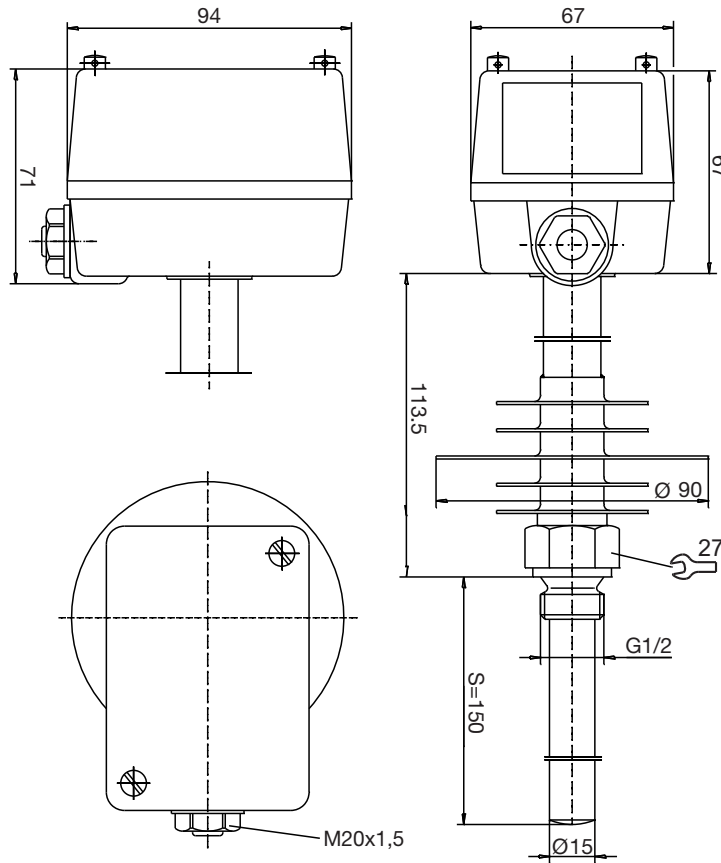
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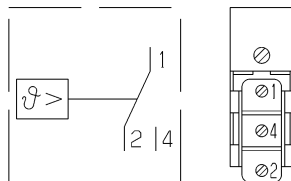


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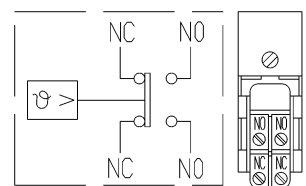


Wiring diagrams

STM-RW-2



STM-RW-2/OS
(729)



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Stock versions

Part No.	Type	Limit value range °C	Hysteresis K	Connection	Immersion tube length mm
60000903	STM-RW-2	+40 to +120	10-18	DZ G 1/2	150
60001115	STM-RW-2	+20 to +400 Adjusted point +120	10-22		
60000904	STM-RW-2/OS	+40 to +120	10-30		

Order specifications

Order code (1) Basic type

601540 STM-RW-2 Rod thermostat with micro switch as
 flue gas temperature monitor (ATW) with switch-over contact

(2) Control / limit value ranges

056 +40 to +120 °C
 045 +40 to +400 °C

(3) Extra code

000 no extra code
 729 Micro switch with 2 separate current circuits
 1 x N/C contact and 1 x N/O contact

Order code / - -
 Order example 601540 / 056 - 729

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Panel-mounted Thermostats

ETH Series

Special features

- Version according to DIN EN 14597
- Pressure Equipment Directive 97/23/EC

Brief description

Panel-mounted thermostats ETH 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 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.



Type ETH-20



Type ETH-70

Approvals/approval marks (see "Technical Data")



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Technical data

Switching function

Safety temperature monitor STW	If the temperature on the temperature probe exceeds the set limit value, the electrical circuit is opened by a snap-action switch. If the temperature falls below the selected limit value (by the amount of the switching differential), the switch 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 dangerous temperature drops by approx. 10 % of the scale range (approx. 15 % with a limit value setting > + 350 °C).
Use of the safety temperature monitor STW as a safety temperature limiter STB	The switching circuit following the thermostat must comply with DIN EN 14597 and VDE 0116.
Self-monitoring for the safety temperature limiter STB and safety temperature limiter STW (STB)	If the measuring system is destroyed (i.e. if the expansion fluid escapes) the pressure in the membrane of the STB and STW (STB) drops and permanently opens the electrical circuit. Unlocking is no longer possible. If the probe has cooled down to a temperature below approx. -20 °C, the electrical circuit is also opened; when the temperature rises above approx. -20 °C, the STB must be unlocked manually using the restart knob. The STW (STB) automatically restarts.

Control ranges and temperature probes

Type	Liquid-filled				
	Control ranges / limit value ranges in °C	Max. allowable probe temperature in °C	Maximum capillary length in mm	Probe length, dimension "L" in mm	
				Probe-Ø "d" in mm, Ø "6" = in standard	
				6	8
ETH-20	+30 to +110	135	5000	108	75
ETH-70	+60 to +130	150		116	79
	+20 to +150	175		77	60
	+50 to +250	290		64	49
	+50 to +300	345		55	--
Gas-filled					
ETH-20	+20 to +400	460	1000	176	106
ETH-70	+20 to +500	575	2000	127	81
	+20 to +500	575	4000	202	119

Capillary and temperature probe

Type	Scale limit value	Capillary	Temperature probe	Comments
ETH- ..	Up to 200 °C	Copper (Cu) ø 1.5mm Material no. 2.0090	Copper (Cu) Material no. 2.0090 Hard soldered	--
	Up to 350 °C	Copper (Cu) ø 1.5mm Material no. 2.0090	Stainless steel (CrNi) ø 1.5mm Material No. 1.4571	--
	Up to 500 °C	Stainless steel (CrNi) ø 1.5mm	Stainless steel (CrNi) ø 1.5mm Material no. 1.4571	--
	Up to 350°C	Stainless steel (CrNi) ø 1.5mm	Stainless steel (CrNi) ø 1.5mm Material no. 1.4571	Available at extra cost
Capillary length	Standard 1,000 mm, maximum 5,000 mm			
Minimum bending radius of the capillary	5 mm			

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Technical data

Electrical data

Switching element	ETH-20	ETH-70	ETH-70/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 switching capacity	AC 230 V +10 %, 10 (2) A, $\cos \varphi = 1$ (0.6), DC 230 V +10 %, 0.25 A		
	With switching differential 2% AC 230 V +10 %, 6 (1.2) A, $\cos \varphi = 1$ (0.6),	--	--
	Microswitch, gold-plated, extra code /au AC / DC 24 V, 0.1 A Contact resistance 2.5 to 10 mΩ		--
Contact reliability	To ensure a high switching reliability, we recommend a minimum load of: With silver contacts: AC / DC = 24 V, 100 mA With gold-plated contacts (abbreviation "au": AC / DC = 10 V, 5 mA		

Approvals/approval marks

Type	Switching function	DIN register no.	Tests	Important note !
ETH-20	STW (STB)	STW (STB) 799S	Pressure Equipment Directive 97/23/EC CE0036	The DIN registry no. will become null and void if thermowells are used that are not specified in our data sheet 606710.
ETH-70	STB	STB 800		

Operating data

Switching differential in % from the control range / limit value range	Switching function	With liquid-filled measuring system		
		Nominal value	Possible actual value	
	STW (STB)	5	4 max. 6	Standard
		9	8 max. 11	Upon request
		2	1 max. 3	Extra cost
	With liquid-filled measuring system			
		7	5 max. 12	Standard
		9	8 max. 16	Upon request
	2	1.5 max. 3	Extra cost	
Switching point accuracy in % of the limit value range	In the upper third of the scale +0/-5 %, at scale beginning +0/-10 %			
Ambient temperature influence referring to the control range / limit value range	When the ambient temperature on the switching head deviates from the calibration ambient temperature of +22 °C, a switching point offset occurs. Higher ambient temperatures = lower switching point Lower ambient temperature = higher switching point			
	Panel-mounted thermostats with scale limit value			
	< 200 °C	+ 200 °C ≤ 350 °C	> 350 °C ≤ 500 °C	
	Influence on the switching head			
	0.17 %/K	0.13 %/K	0.12 %/K	
	Influence on the capillary per meter			
	0.054 %/K	0.11 %/K	0.03 %/K	
Allowable storage temperature	-50 to +50 °C			
Allowable ambient temperature when in use:	Max. +80 °C			
Rated position (NL)	Any			

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Technical data

Switching head

Chassis material	Sheet steel, galvanized
Mounting	2 M3 screws, spacing 22 mm
Scale range	250 ° \nless
Electrical connection	Screw connection up to 2.5 mm ² conductor cross section
Limit value setting	Prior to installation, the limit value can be set on the adjusting spindle with a screwdriver
Protection type	EN 60 529-IP 00
Weight	Approx. 0.2 kg

Process connection

ETH 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 according to DIN 3852/2 and clamping piece with fixing screw to lock the probe
Material	Up to +150 °C CuZn (nickel-plated) as standard, over +150 °C CrNi
Insertion length	Standard lengths: 100, 120, 150, 200, or 300 mm (different lengths upon request)
Immersion tube Ø	D = 8 mm
For different process connections and thermowells refer to data sheet 606710	

Note:

Physical and toxic features of the expansion mediums that could emerge in the event of a measuring system break.

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

^a There is currently no statement by the health authority concerning hazards to health in the event of short-term exposure and low concentration, e.g. measuring system break.

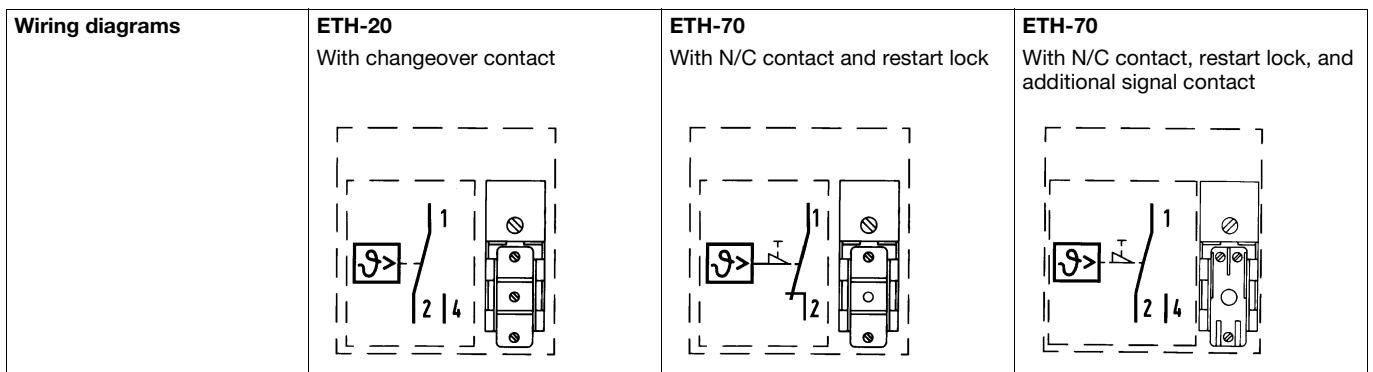
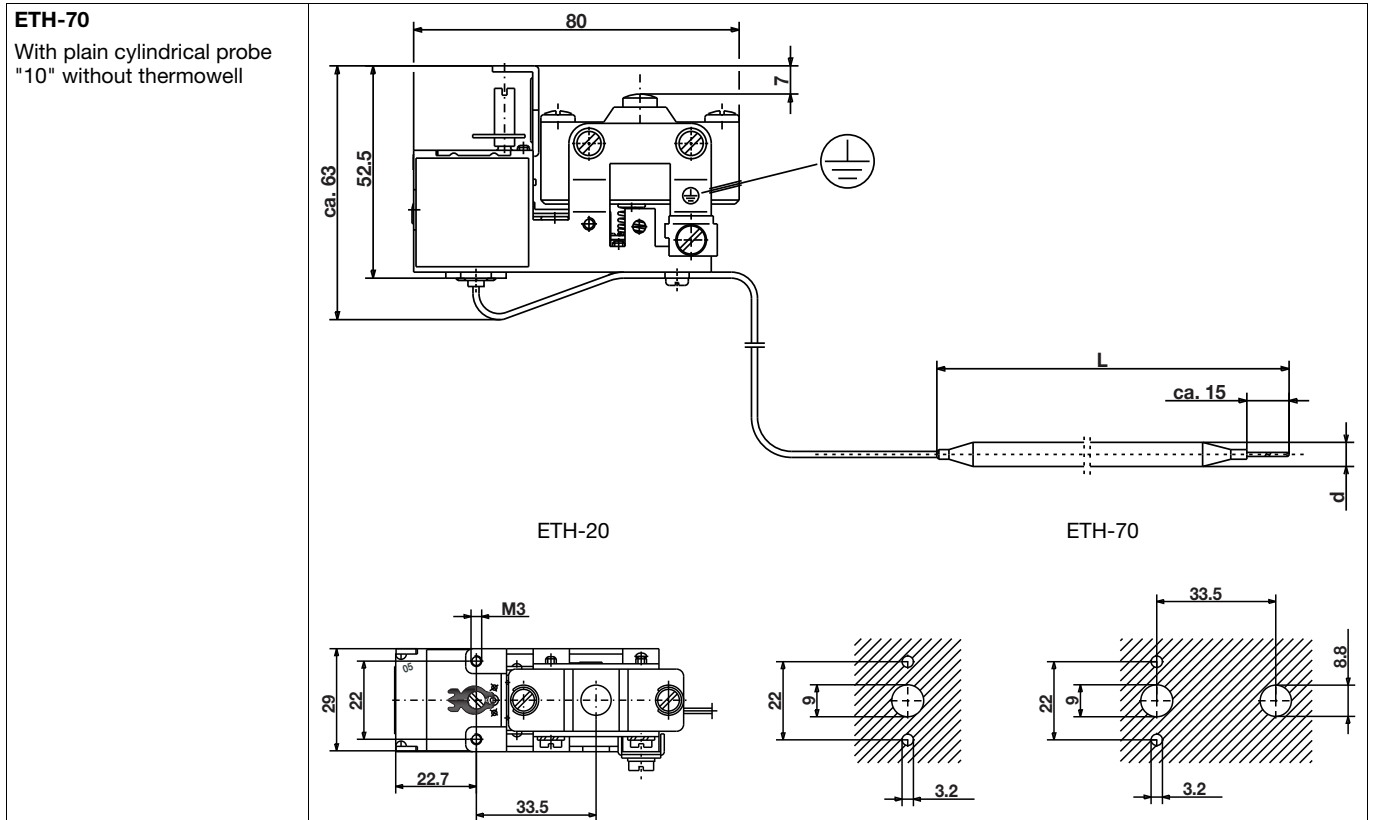
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Dimensions



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Order details

Panel-mounted thermostats, ETH series

Order code	(1) Basic type	
602010	Panel-mounted thermostat, ETH series	
	(2) Basic type extensions	
20	ETH-20 safety temperature monitor STW	With capillary
70	ETH-70 safety temperature limiter STB	With capillary
	(3) Control range / limit value range °C	
052	+30 to +110	
066	+60 to +130	
043	+20 to +150	
063	+50 to +250	
064	+50 to +300	
045	+20 to +400	
046	+20 to +500	
	(4) Switching differential	
00	Without switching differential (ETHf-70 STB)	
20	2 % of the scale range	
50	5 % of the scale range	
70	7 % of the scale range	
90	9 % of the scale range	
	(5) Capillary length	
1000	1000 mm	
2000	2000 mm	
3000	3000 mm	
4000	4000 mm	
5000	5000 mm	
....	(Special length, specifications in plain text)	
	(6) Capillary material	
40	Cu (copper)	
20	CrNi (stainless steel)	
	(7) Process connection	
10	Plain cylindrical probe	
20	Screw-in thermowell	
	(8) Thread of process connection	
00	Without thread (process connection 10)	
13	External thread G 1/2	
	(9) Material of process connection	
00	Only with process connection 10	
46	CuZn (brass)	
20	CrNi (stainless steel 1.4571)	

For different connection types and thermowells refer to data sheet 606710.

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Panel-mounted thermostats, ETH series

Order code (10) Insertion length "S" (immersion tube length)

000	Without thermowell
100	100 mm
120	120 mm
150	150 mm
200	200mm
300	300 mm
... Special length, specifications in plain text

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

00	Without thermowell
8	8 mm
10	10 mm

(12) Diameter "d" (probe diameter)

6	6 mm
8	8 mm

(13) Extra codes^a

000	Without extra code
574	"U" Microswitch with N/C contact, restart lock, and additional signal contact (only for STB)
702	"au" Snap-action switch, gold-plated

^a List extra codes in sequence, separated by commas.

Order code:

(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13)
 602010 / [..] - [...] - [..] - [....] - [..] - [..] - [..] - [..] - [..] - [...] - [..] - [.] / [...] , ...

Order example:

602010 / 70 - 052 - 00 - 1000 - 40 - 10 - 00 - 00 - 100 - 00 - 8 / 702^a , ...

^a List extra codes in sequence, separated by commas.

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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 777 TW 778 TW 778 TB 780 TB 780	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 777 TW 778 TW 778 TR 777 TW 778 TB 780 TB 780	
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 777 TR 777 TW 778 TW 778 TW 778 TB 780 TB 780	
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 777 TW 778 TW 778	
Fail-safe version	EM-40* EM-50 EM-20 EM-30*	STB STB STW (STB) STW (STB)	STB 782 STB 782 STW (STB) 775 S STW (STB) 775 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			8	245	145
	5	+95			25	138	91
	7	+100			50	103	73
0 to 50	1	+60	+60	3000 3000 5000 5000	5	283	165
	2.5	+60			10	283	165
	5	+105			25	159	101
	7	+110			50	117	80
20 to 90	1	+115	+80	1000 1000 5000 5000	7	210	127
	2.5	+115			14	210	127
	5	+140			35	121	82
	7	+175			70	91	67
0 to 100	1	+125	+80	2000 2000 5000 5000	10	157	100
	2.5	+125			20	157	100
	5	+165			50	94	68
	7	+200			100	73	58
30 to 110	1	+135	+80	2000 2000 5000 5000	8	188	116
	2.5	+135			16	188	116
	5	+170			40	110	76
	7	+200			80	84	63
0 to 150	1	+173	+80	1000	15	113	78
	2.5	+173			30	113	78
	5	+200			75	72	57
0 to 200	1	+230	+80	1000	20	113	78
	2.5	+230			40		
50 to 200	1	+230	+80	1000	15	139	92
	2.5	+230			30		
50 to 250	1	+228	+80	1000 1000 5000	20	105	70
	2.5	+228			40	105	70
	5	+300			100	64	49
50 to 300	1	+345	+80	2000	25	87	61
	2.5	+345			50		

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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 +500	+80	5000	75 200	237	137
	10					127	81
20 to 500	3/5	+575	+80	1000 5000 5000	48 95 250	278	158
	6					176	106
	10					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	+80	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	+80	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	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: 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 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 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				
STW (STB)	5	approx. 5 - 7	Standard	
	With gas-filled measuring system			
STW (STB)	6	approx. 6 - 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 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	TR777	DIN EN 14597	EM.-1
DIN	DIN CERTCO/TÜV Süd	TW778	DIN EN 14597	EM.-2, EM.-3
DIN	DIN CERTCO/TÜV Süd	TB780	DIN EN 14597	EM-4, EM-5
DIN	DIN CERTCO/TÜV Süd	STW(STB)775 S	DIN EN 14597	EM-20, EM-30
DIN	DIN CERTCO/TÜV Süd	STB782	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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 Internet: www.jumousa.com



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"> <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"> <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"> <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"> <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											
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Extra code 704	28	M4											
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<p>Screw connection EM-1 Extra code 699</p>													

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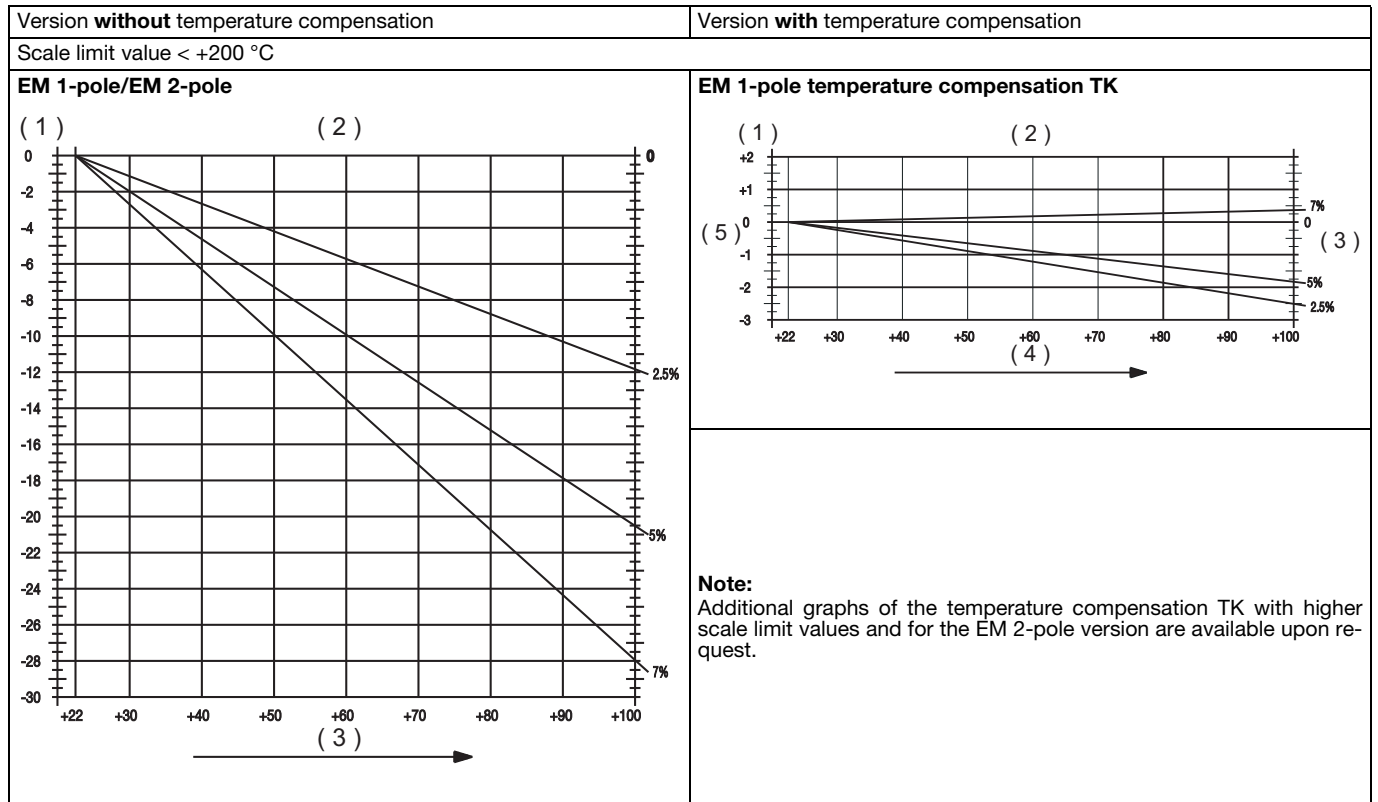
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Temperature compensation (TK)

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)

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

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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	1-pole
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	2-pole
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	3-pole
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	4-pole
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 with liquid-filled measuring systems
 70 7 %** of the scale range
 30 3 %* of the scale range
 50 5 %** of the scale range with gas-filled measuring systems
 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)

(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.

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Panel-mounting thermostats, type series EM

Particularities

- Operating temperature limiter
- Limit value range up to +650 °C
- with temperature compensation



Brief description

Panel-mounting thermostats EM are used to monitor thermal processes. The devices are available as temperature monitor (TW), limiter (TB) and safety temperature limiter (STB). In the event of a malfunction, the STB switches the monitored machine line to an operational safe status.

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

Types	EM-2/707	EM-5/707	EM-50/707
	Temperature monitor (TW)	Temperature limiter (TB)	Safety temperature limiter (STB)

Switching function	TW	Restart lock of the TB and STB	Self-monitoring of the STB
	If the temperature exceeds the limit value set on the temperature probe, the current circuit is opened via a snap switch. The switch is reset to its original status once the set limit value is gone below (by the hysteresis).	If the temperature exceeds the limit value set on the temperature probe, a snap switch is actuated and locked mechanically. Once the limit value is gone below by approx. 100 K, the snap switch can be manually unlocked.	When the temperature probe cools down below -10 °C, the snap switch is also actuated. The current circuit automatically closes again when the temperature rises. In the event of a measuring system break (leaks), the snap switch is permanently actuated and mechanically locked.

Technical Data

Limit value ranges	Control / limit value range °C	Hysteresis K	Scale range ° ±
TW and TB	+230...+650	50 - 80 (TW)	250
STB	+500...+650	-	70

Capillary and temperature probe

Capillary	Length	Diameter	min. bending radius	Material
	standard: 1 m maximum: 3 m	1.5 mm	5 mm	Stainless steel
Temperature probe	Process connection*	Probe length x Diameter	Material	
	plain cylindrical probe "10" (standard)	115 x 8 mm	high-temperature resistant stainless steel, welded	

* For different process connections and sheaths refer to data sheet 606710 (only 50, 52 and 54).

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Electrical data

Switching element 1-pole snap switch	EM-2/707	EM-5/707 EM-50/707	EM-5/707/574 EM-50/707/574
	Microswitch with change-over 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	N/C contact, terminal 2	N/O contact, terminal 4
	TW	AC 230 V +10%, 16 (3) A, cos φ = 1 (0.6) DC 230 V +10%, 0.25A	AC 230 V +10%, 8 (1.5) A, cos φ = 1 (0.6) DC 230 V +10%, 0.25A
	TB, STB		AC 230 V +10%, 2 (1) A, cos φ = 1 (0.6) DC 230 V +10%, 0.25A
Contact reliability	To ensure a high switching reliability, we recommend a minimum load of: AC/DC = 24 V, 100 mA		
Rating surge voltage	1500 V (via the switching contacts 400 V)		
Overvoltage category	II		
Required fuse rating	refer to maximum contact rating		
Electrical connection	serial	Tab connector A 6.3 x 0.6 DIN 46 244	
	Extra code 699	Screw-connection up to 2.5 mm ² cable cross section (against surcharge) – also suitable for retrofitting –	

Operating data

Switching point accuracy	(in % from the scale range; referring to the set point or limit value at T _U +22 °C, with increasing temperature)		
	Switching function	Type	accuracy in the upper third of the scale or limit value
	TW	EM-2/707	+0 -18 K
	TB	EM-5/TK, EM-5/707/574	+0 -48 K
Average ambient temperature influence (referring to the limit value)	When the ambient temperature [Δt] on the switch head and the capillary deviates from the calibration temperature +22 °C, a switch point offset t _v occurs. Higher ambient temperatures = lower switching point Lower ambient temperature = higher switching point		
	on the switch head: t _v = 0.06 · Δt		on the capillary: t _v = 0.33 · Δt · m
	If the operating temperature on the switch head and capillary deviates essentially from the calibration temperature +22 °C, it can be taken into account during adjustment on request against surcharge.		
admissible ambient temperature	during use		admissible storage temperature
	on the switch head and capillary max. +100 °C / min. -40 °C	on the probe max. +750 °C / min. -40 °C	max. +50 °C / min. -50 °C
Rated position	any		

Case

Material	Sheet steel, galvanized
Fastening	serial with 2 M 3 screws, spacing 22 mm
	Extra code 704 with 2 M 4 screws, spacing 28 mm
	Extra code 705 with 2 M 3 screws, spacing 33 mm
	Extra code 710 Central fastening M 10 x 1 with acorn nut (only for TB and STB)
Limit value setting	Switching point can adjusted by means of a screwdriver
Protection type	EN 60529-IP 00
Weight	approx. 0.3 kg

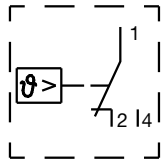
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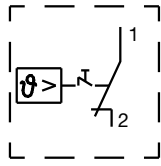
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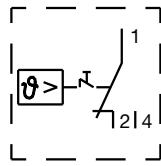
Wiring diagrams



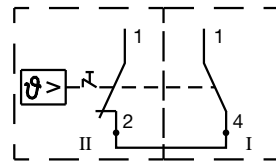
EM-2/707



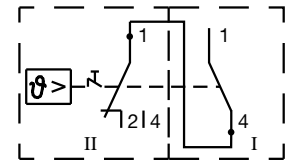
EM-5/707



EM-5/707/574

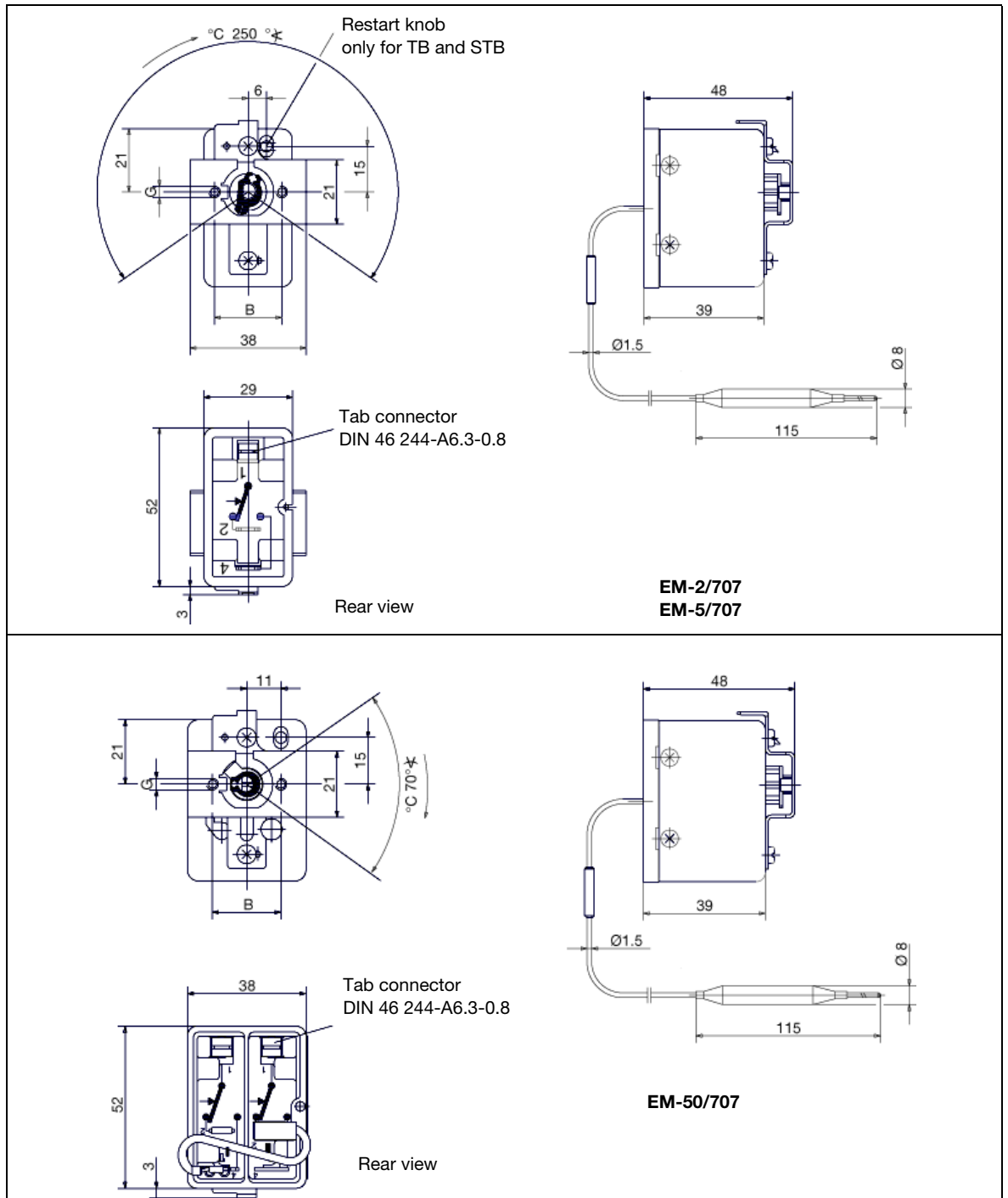


EM-50/707



EM-50/707/574

Dimensions



EM-2/707
EM-5/707

EM-50/707

Extra code	B	G
serial	22 mm	M3
704	28 mm	M4
705	33 mm	M3

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Stock versions

(Delivery within 3 working days after receipt of order)

Part no.	Type	Limit value °C	Capillary mm	Process connection	Probe Ø x length mm
60003016	EM-2/707	+230...+650	2000	„10“ plain cylindrical probe	8 x 115

Order details

EM type series:

Order code (1) Basic type

602025 Panel-mounting thermostat, type series EM up to +650 °C

(2) Basic type extensions

0002 EM-2/707 Temperature monitor
 0005 EM-5/707 Temperature limiter
 0050 EM-50/707 Safety temperature limiter

(3) Control / limit value ranges

093 +230...+650 °C (only for TW and TB)
 097 +500...+650 °C (only for STB)

(4) Capillary length (specifications in mm)

1000 1000 mm
 2000 2000 mm
 3000 3000 mm
 Special length, specification in mm (max. 3000 mm)

(5) Process connection *

10 plain cylindrical probe
 * For different process connections and sheaths see data sheet 606710 (only 50, 52 and 54)

(6) Diameter "d" (probe diameter)

8 8 mm

(7) Extra codes ¹

000 without extra codes
 574 "U" Microswitch with N/C contact,
 reactivation lock and additional signal contact (only for TB and STB)
 699 "X" Screw connection up to 2.5 mm² cable cross section
 704 "b1" Switch head fastening with 2 M4 screws, spacing 28 mm
 705 "b2" Switch head fastening with 2 M3 screws, spacing 33 mm
 707 "TK" Temperature compensation
 710 "b7" Central fastening with acorn nut (only for TB and STB)

Order code

(1) (2) (3) (4) (5) (6) (7)
 602025 / .. - ... - - .. - . / ...

Order example

602025 / 0050 - 097 - 1000 - 10 - 8 / 710¹

¹ List extra codes in sequence, separated by commas.

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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 safety temperature monitor 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 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. 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.

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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97/23/EG

DVGW



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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	
	< +200 °C	≥ +200 °C ≤ +350 °C
STW (STB)	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	Max. +80 °C Min. +18 °C (0 °C for extra code "707")
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 thermowell "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	Thermowell	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.

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

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

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

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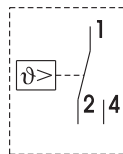
Approvals / approval marks

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
GOST	Moskau	POCC DE.A184.B00624	GOST Standard, Russland	EM-...

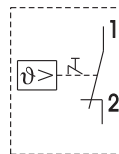
^a nähere Angaben siehe: Sicherheitshandbuch JUMO EM 602021, 602026.

Connection diagrams

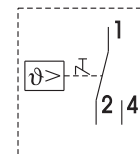
EM-20-E
EM-30-E



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

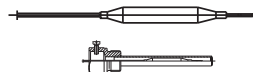
Part no.	Type	Limit value °C	Capillary mm	Process connection	Probe Ø x length mm
60000775	EM-80	+110	1000	Plain cylindrical probe 10	6 x ~ 84
60000753	EM-80	+95			

(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, limit value adjustable^a
 30 EM-30-E Safety temperature monitor, limit value permanently set
 80 EM-80 Safety temperature limiter, 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 sleeve
- (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 thermowell
- 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 thermowell
- 8 8 mm

(12) Diameter "d" (probe diameter)

- 00 Without thermowell
- 6 6 mm

(13) Extra codes

- 000 Without extra codes
- 574 "U" Microswitch with N/C contact, restart lock, and additional signal contact (only STB)
- 702 "au" Snap-action switch with gold plating (cannot be combined with extra code "574")
- 699 "X" Screw-connection with 2.5 mm² 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
- 706 "b3" Switching head mounting with 2 M3 screws, spaced 22 mm
- 710 "b7" Central mounting with acorn nut (only for STB)
- 707 "TK" Temperature compensation

^a Different control / limit 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

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Panel-mounted Thermostats

JUMO heatTHERM, type 602030 and 602031

Special features

- Stable switching point position due to ambient temperature compensation (standard)
- Max. switching capacity 16 A, 400 V
- Operating life at least 250,000 switching cycles for TR and TW
- Control ranges of up to 500 °C are possible
- STB with extensive setting range: 250 K at 250 °C
- Switching point deviation during the entire operating life of up to ± 5 %

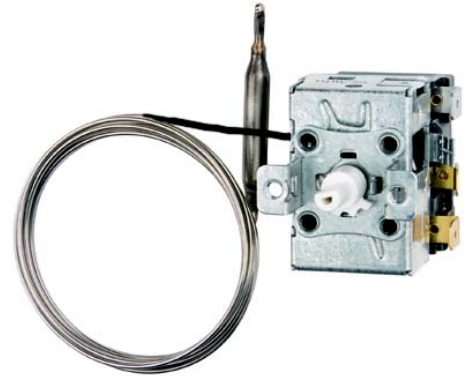
Brief description

Thermostats control and monitor thermal processes.

The JUMO heatTHERM is available as temperature controller TR, temperature monitor TW (type 602030), safety temperature monitor STW, or safety temperature limiter STB (type 602031).

The panel-mounted thermostat operates according to the fluid expansion principle. The electrical switching element is a snap-action switch.

The panel-mounted thermostat is RoHS-compliant and cadmium-free.



Type 602030 / 01



Type 602030 / 02



Type 602030 / 20
Type 602031 / 21



Type 602030 / 80
Type 602031 / 81

Approvals/approval marks (see "Technical Data")



DGRL
97/23/EG



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Internet: www.jumousa.com



Technical data

Switching function

Temperature controller TR / 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 value (by the amount of the switching differential), the microswitch is reset to its initial position.
Safety temperature monitor STW	If the temperature on the temperature probe exceeds the setpoint value, the snap-action switch is activated 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 snap-action switch is reset to its initial position. If the probe has cooled down to a temperature below approx. -20 °C the electrical circuit opens - however it closes again when the temperature rises. If the measuring system is destroyed (i.e. if the expansion fluid emerges) the pressure in the diaphragm drops and permanently opens the electrical circuit.
Safety temperature limiter STB with restart lock and self-monitoring	If the temperature on the temperature probe exceeds the switching point, the snap-action switch is activated, the electrical circuit is opened, and the snap-action switch is mechanically locked. The unlocking difference depends on the control range. Precise values can be attained from the respective device type. They are also available upon request. If the probe has cooled down to a temperature below approx. -20 °C the electrical circuit opens - however it closes again when the temperature rises. If the measuring system is destroyed (i.e. if the expansion fluid emerges) the pressure in the diaphragm drops and permanently opens the electrical circuit. Unlocking is no longer possible.

Temperature compensation

When the ambient temperature on the switching head and the capillary deviates — from the calibration ambient temperature of +22 °C — a switching point offset occurs. This switching point offset is reduced to a minimum due to the temperature compensation.

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Technical data

Case

Case	Sheet steel, galvanized
Protection type	IP 00 according to EN 60529
Switching socket	Polyester resin molding compound, black
Max. permissible ambient temperature	For transport and storage: -40 to +80 °C In use: Max. +80 °C
Rated position (NL)	Any
Weight	Approx. 0.12 kg
Capillary	2,000 mm including 460 mm protective tubing as standard, min. bending radius of the capillary 5 mm Material no. Cu-DHP

Electrical data

Electrical connection	Snap-action switch with single-pole changeover contact		
Switching capacity	TR / TW	STW	STB
	On the N/C contact (contact deck 1-2): AC 400 V +10 %, 16 A, AC 230 V +10 %, 16 (2.5) A, cos φ = 1 (0.6), DC 230 V +10 %, 0.25 A		
Switching capacity	On the N/O contact (contact deck 1-4): AC 400 V +10 %, 6.3 A, AC 230 V +10 %, 6.3 (2.5) A, cos φ = 1 (0.6), DC 230 V +10 %, 0.25 A		On the signal contact (contact deck 1-4): AC 400 V +10 %, 2 A, AC 230 V +10 %, 2 (0.4) A, cos φ = 1 (0.6), DC 230 V +10 %, 0.25 A
	Snap-action switch with gold plating - extra code 702: AC / DC 24 V, 0.1 A)		
Electrical connection	A 6.3-0.8 according to DIN 46244		
Switching reliability	To ensure the greatest possible switching reliability, we recommend a minimum load of: AC / DC = 24 V, 100 mA for silver contacts AC / DC = 10 V, 5 mA for gold-plated contacts (TZ 702)		

	Switching function	Rated value			
Switching differential in % of the control range span	TR / TW	2.5 %	Standard		
	TR / TW	7 %	Upon request		
	STW	7 %	Standard		
Ambient temperature influence	When the ambient temperature on the switching head and the capillary deviates from the calibration ambient temperature of +22 °C, a switching point offset of approx. -0.1 K/K occurs.				
Switching point accuracy	TR / TW	Switching differential	Scale beginning	Upper third	
		2.5 %	Standard	± 6 %	± 3 %
	STW / STB	7 %	Upon request	± 8 %	± 4 %
		7 %	Control range	In the "first half"	In the "second half"
			+70 to 130 °C	+0/-12 K	+0/-5 K
			+95 to 120 °C	+0/-5 K	+0/-5 K
			+20 to 150 °C	+0/-15 K	+0/-10 K
+50 to 300 °C	+0/-30 K	+0/-15 K			

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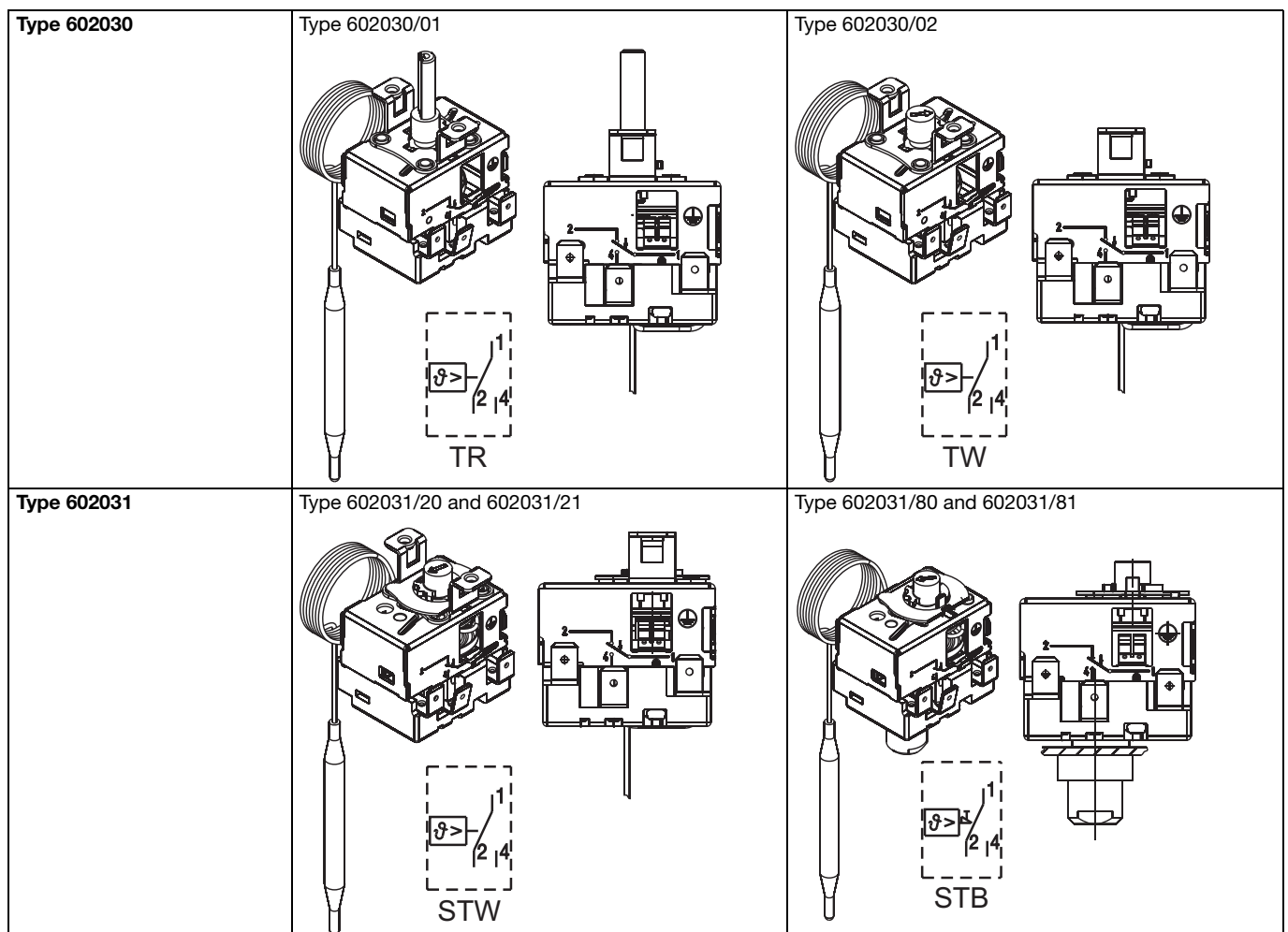


Approvals/approval marks

Approval marks	Testing agency	Certificates/certification number	Inspection basis	Valid for
DIN	DIN CERTCO / TÜV Süd	STB1169	DIN EN 14597	JUMO heatTHERM (STB)
DIN	DIN CERTCO / TÜV Süd	STW(STB)1190	DIN EN 14597	JUMO heatTHERM (STW(STB))
DIN	DIN CERTCO / TÜV Süd (German Technical Inspection Agency)	TR1168	DIN EN 14597	JUMO heatTHERM (TR)
DIN	DIN CERTCO / TÜV Süd (German Technical Inspection Agency)	TW1189	DIN EN 14597	JUMO heatTHERM (TW)
DIN	TÜV Süd (German Technical Inspection Agency)	B _{10d} = 250,000*	DIN EN ISO 13849-1	JUMO heatTHERM
c UL us	UL Germany	E66358 Vol. 1	UL 873	JUMO heatTHERM with switching capacity 230 V, 15 A
c UL us	UL Germany	MH45736 Vol. 1	UL 353	JUMO heatTHERM (STB) with switching capacity 230 V, 15 A
DGRL	TÜV Süd (German Technical Inspection Agency)	IS-TAF-MUC 07113377017	97/23/EC	JUMO heatTHERM (STW(STB)/STB)

* For further details see: Safety manual (B 602031.9) JUMO heatTHERM (-AT), (-DR) 602031, 603070.
 Switching capacity check implemented at 16 A, 230 V, ohmic load.

Wiring diagrams



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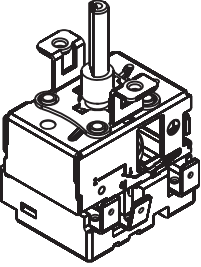
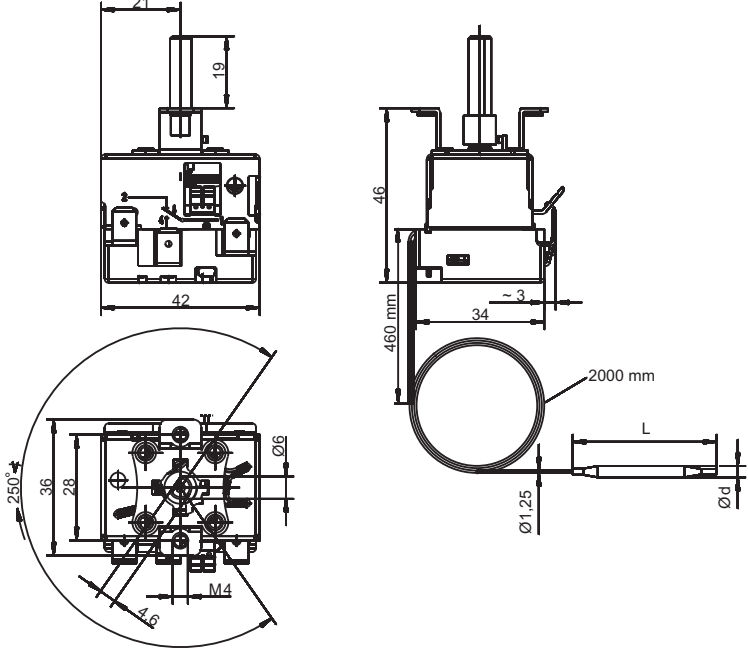
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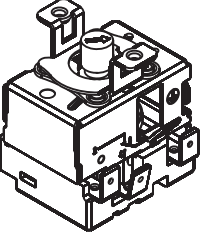
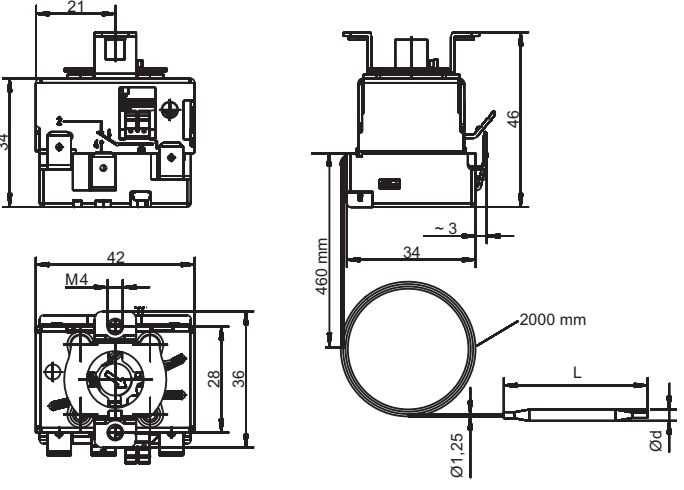
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Devices in stock

Dimensions

<p>Type 602030/01</p> <ul style="list-style-type: none"> • Temperature controller • Compensated ambient temperature (standard) • Max. switching capacity 16 A, 400 V • Operating life at least 250,000 switching cycles • Switching point deviation (drift) during the entire operating life of up to $\pm 5\%$ 					
Part no.	Type	Control range °C	Capillary mm	Switching differential	Probe Ø d × L
60003218	602030/01	+20 to 90	2,000	Approx. 2 K	6 × 132 mm
60003280		+20 to 90		Approx. 5 K	6 × 79 mm
60003219		+0 to 120		Approx. 3 K	6 × 87 mm
60003220		+0 to 200		Approx. 5 K	6 × 78 mm
60003221		+50 to 300		Approx. 6 K	6 × 66 mm

<p>Type 602030/02</p> <ul style="list-style-type: none"> • Temperature monitor • Compensated ambient temperature (standard) • Max. switching capacity 16 A, 400 V • Operating life at least 250,000 switching cycles • Switching point deviation (drift) during the entire operating life of up to $\pm 5\%$ 					
Part no.	Type	Control range °C	Capillary mm	Switching differential	Probe Ø d × L
60003222	602030/02	+20 to 90	2,000	Approx. 2 K	6 × 132 mm
60003281		+20 to 90		Approx. 5 K	6 × 79 mm
60003223		+0 to 120		Approx. 3 K	6 × 87 mm
60003224		+0 to 200		Approx. 5 K	6 × 78 mm
60003225		+50 to 300		Approx. 6 K	6 × 66 mm

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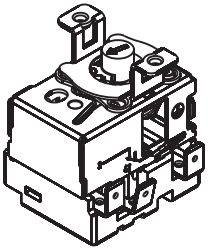
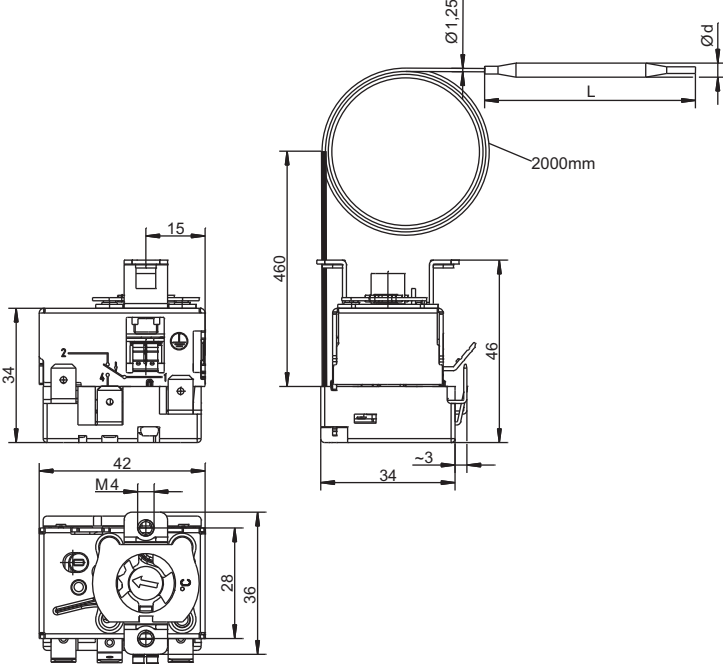
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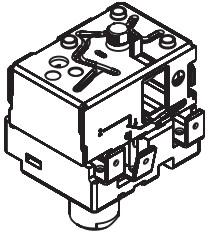
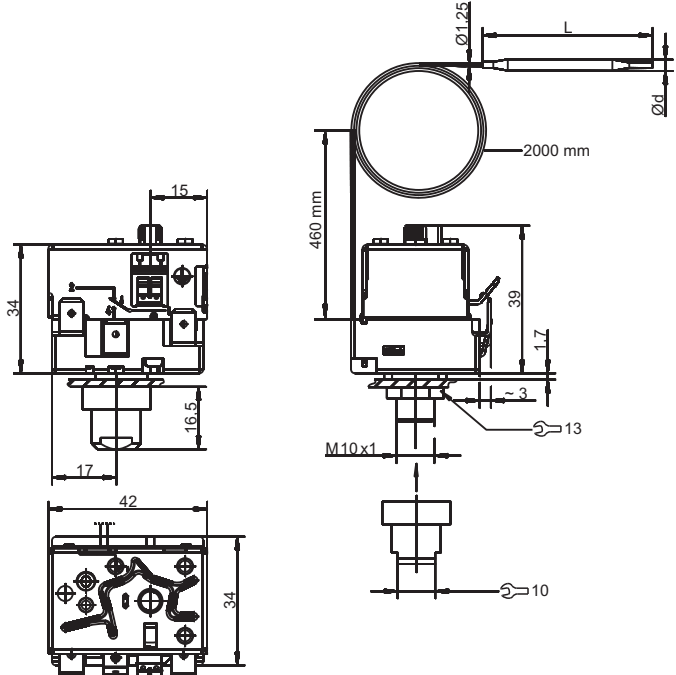
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Devices in stock

Dimensions

<p>Type 602031/21</p> <ul style="list-style-type: none"> • Safety temperature monitor • Compensated ambient temperature (standard) • Max. switching capacity 16 A, 400 V 					
<p>Part no. 60003226</p>	<p>Type 602031/21</p>	<p>Control range °C +70 to 130</p>	<p>Capillary mm 2,000</p>	<p>Switching differential Approx. 10 K</p>	<p>Probe Ø d × L 6 x 60 mm</p>

<p>Type 602031/80</p> <ul style="list-style-type: none"> • Safety temperature limiter • Compensated ambient temperature (standard) • Max. switching capacity 16 A, 400 V 					
<p>Part no. 60002994</p>	<p>Type 602031/80</p>	<p>Switching point °C +100</p>	<p>Capillary mm 2,000</p>	<p>Unlocking difference Approx. 10 K</p>	<p>Probe Ø d × L 6 x 72 mm</p>

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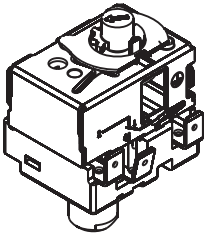
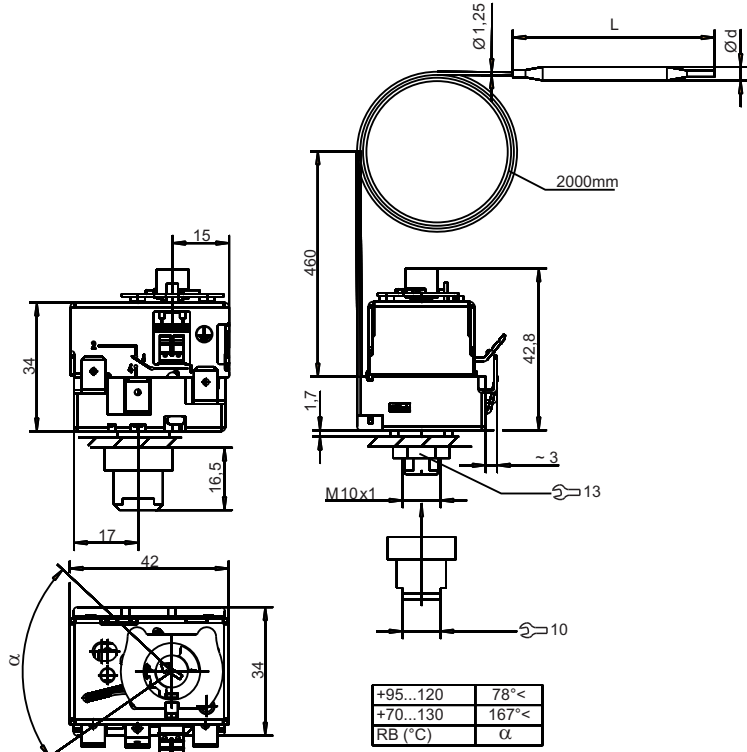
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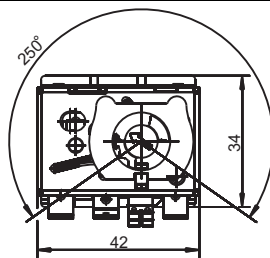
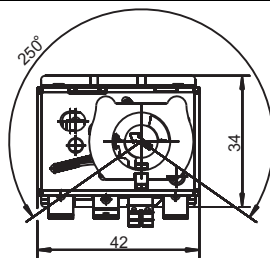
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Devices in stock

Dimensions

<p>Type 602031/81</p> <ul style="list-style-type: none"> • Safety temperature limiter • Compensated ambient temperature (standard) • Max. switching capacity 16 A, 400 V 	 <table border="1"> <tr> <td>+95...120</td> <td>78° <</td> </tr> <tr> <td>+70...130</td> <td>167° <</td> </tr> <tr> <td>RB (°C)</td> <td>α</td> </tr> </table>					+95...120	78° <	+70...130	167° <	RB (°C)	α
+95...120	78° <										
+70...130	167° <										
RB (°C)	α										
<p>Part no.</p>	<p>Type</p>	<p>Control range °C</p>	<p>Capillary mm</p>	<p>Unlocking difference</p>	<p>Probe Ø d × L</p>						
<p>60002995</p>	<p>602031/81</p>	<p>+95 to 120</p>	<p>2,000</p>	<p>Approx. 10 K</p>	<p>6 x 72 mm</p>						
<p>60003136</p>		<p>+70 to 130</p>			<p>6 x 68 mm</p>						

<p>Type 602031/81</p> <ul style="list-style-type: none"> • Safety temperature limiter • Compensated ambient temperature (standard) • Max. switching capacity 16 A, 400 V • With extra code 749: 250° .∠ 					
<p>Part no.</p>	<p>Type</p>	<p>Control range °C</p>	<p>Capillary mm</p>	<p>Unlocking difference</p>	<p>Probe Ø d × L</p>
<p>60003291</p>	<p>602031/81</p>	<p>+20 to 150</p>	<p>2,000</p>	<p>In the upper third approx. 15 K At the scale beginning approx. 30 K</p>	<p>6 x 60 mm</p>
<p>60003292</p>		<p>+50 to 300</p>		<p>In the upper third approx. 25 K At the scale beginning approx. 45 K</p>	<p>6 x 85 mm</p>

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Order details

Panel-mounted thermostat JUMO heatTHERM type 602030 and 602031

Minimum purchase order 500 pieces

Order code	(1)	Basic type		
	602030	Panel-mounted thermostat JUMO heatTHERM with single-pole snap-action switch (TR/TW)		
	602031	Panel-mounted thermostat JUMO heatTHERM with single-pole snap-action switch (STW/STB)		
		(2) Basic type extensions		
x	01	Temperature controller (TR)	With changeover contact	
x	02	Temperature monitor (TW)	With changeover contact	
x	20	Safety temperature monitor (STW)	Permanently set with changeover contact	
x	21	Safety temperature monitor (STW)	Adjustable with changeover contact	
x	80	Safety temperature limiter (STB)	Permanently set with changeover contact and restart lock	
x	81	Safety temperature limiter (STB)	Adjustable with changeover contact and restart lock	
		(3) Control range / limit value range °C	Max. allowable probe temperature °C	
x	x	000	With permanently set switching point	
x		026	0 to +120	145
x		028	0 to +200	230
x		041	+20 to +90	115
x		064	+50 to +300 (temperature probe made of CrNi)	345
x		043	+20 to +150 (only with extra code 749)	180
x		640	+50 to +300 (temperature probe made of CrNi, only with extra code 749)	345
x		666	+95 to +120	145
x		671	+70 to +130	155
			Further control ranges / limit value ranges up to 350 °C upon request (up to +500 °C without approval)	
		(4) Limit value STW/STB permanently set °C	Max. allowable probe temperature °C	Switching point tolerance
x		000	With adjustable limit value	
x		095	+95	+0/-5 K
x		100	+100	+0/-5 K
x		110	+110	+0/-5 K
			Further limit values up to 350 °C upon request (up to +500 °C without approval)	
		(5) Switching differential %		
x		00	No specifications for STB	
x		25	2.5	
x		70	7	
		(6) Capillary length mm		
x	x	2000	2,000	
x	x		Special length upon request (maximum length 5,000 mm), specifications in plain text - 1,000 mm steps	
		(7) Capillary material		
x	x	40	Cu (copper) Ø 1.25 mm	

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Order details

Panel-mounted thermostat JUMO heatTHERM type 602030 and 602031

Order code

x	x	10	(8) Process connection (PC) Plain cylindrical probe	
x	x	4	(9) Diameter "d" (probe diameter) mm 4	
x	x	6	6	
x	x	40	(10) Temperature probe material Cu (copper)	
x	x	20	CrNi (stainless steel 1.4571)	
x	x	13	(11) Capillary insulation PVC hose, black	
x	x	460	(12) Insulation length mm (from case) 460	
x	x		Special length upon request (maximum length 700 mm)	
x	x	000	(13) Extra codes Without extra code	
x	x	702	Snap-action switch, gold-plated	
x	x	742	Straight plug	
x	x	749	Setting range with 250 angular degrees (only STB)	

X = selection option for the basic type

Special versions upon request! The minimum purchase quantity for special versions is 500 pieces.

Order code

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)			
602031	/		-		-		-		-		-		/		, ...

Order example

602031	/	80	-	000	-	110	-	25	-	2000	-	40	-	10	-	6	-	40	-	13	-	460	/	000 ^a	, ...
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^a List extra codes in sequence, separated by commas.

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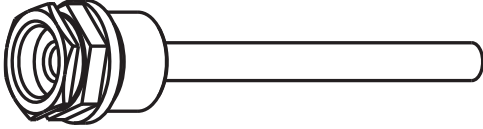
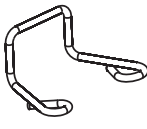
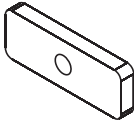

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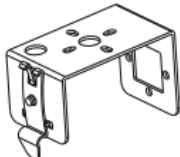


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Accessories

(according to product group 606710 and 606715)

Thermowell-set (according to product group 606710)	Thermowell with sealing collar		Clamp for strain relief	Plate for surface-mounted thermostat	Screw for surface-mounted thermostat
Suitable for type 602030 and 602031					
Part no.	Type	Abbreviation	Connection	Insertion length EL in mm	Material
60003177	Screw-in thermowell with sealing collar	28	G 1/2	100	Brass/ nickel-plated
60003203				150	
60003171				200	
60003172				100	Stainless steel / 1.4571
60003205				150	
60003173				200	

Mounting set for mounting rail DIN EN 60715 TH 35-7.5 (according to product group 606710)					
Part no.	Type				
00511794	Adapter set, mounting rail JUMO heatTHERM/ EM			2 screws M3 x 4	2 screws M4 x 5

Setpoint adjuster for type 602030/01 (according to product group 606715)						
Part no.	Type	Control range °C	W 8			
60003091	W 8	+20 to +90				
60003227		0 to +120				
60003095		0 to +200				
60003098		+50 to +300				
			Rotary knob 07	Panel 23	Adjustable stop 16	2 screws M4 x 8

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Surface-Mounted Thermostat

ATH series

Special features

- Sturdy case (protection type IP 54))
- Microswitch
- Self-monitoring (STB/STW) in the event of a pressure drop
- Safety cut-out (STB/STW)
- Tested according to DIN EN 14597

Brief description

Thermostats control and monitor thermal processes. Instruments of the ATH series are available as temperature controllers TR, temperature monitors TW, safety temperature monitors STW (STB), and safety temperature limiters STB. When malfunctions occur, the STB places the system being monitored in a safe operating status.

Surface-mounted thermostats operate according to the fluid expansion principle – a micro-switch is used as an electrical switching element.



ATHs-1



ATHf-70

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 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 unlocked once the dangerous temperature drops by approx. 10 % of the scale range (approx. 15 % with a limit value setting > +350 °C).

Using the safety temperature monitor STW as a safety temperature limiter STB

The circuit following the thermostat must comply with DIN EN 14597 and VDE 0116.

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

If the measuring system is destroyed (i.e. if the expansion fluid escapes) the pressure in the membrane of the STB and STW (STB) drops and permanently opens the electrical circuit. Unlocking is then no longer possible.

If the probe has cooled down to a temperature below approx. -20 °C, the electrical circuit is opened; when the temperature rises above approx. -20 °C, the STB must be unlocked manually using the restart knob. The STW (STB) automatically restarts.

Approvals




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Approvals

Types		Switching function	DIN registry no.	Tests	You will find Declarations of Conformity on the Internet at: www.jumo.net ⇒ Products ⇒ Thermostats ⇒ Data sheet 603021 or they can be sent to you upon request.
With rigid thermowell	With capillary				
ATHs-1	ATHf-1	TR	TR 891	 - DIN EN 14597 - Pressure Equipment Directive 97/23/EC (ATH.-20 and ATH.-70 only)	
ATHs-2	ATHf-2	TW	TW 892		
ATHs-20	ATHf-20	STW (STB)	STW (STB) 894 S		
ATHs-70	ATHf-70	STB	STB 895		

Technical data

Control ranges and temperature probes

Liquid-filled					
Type	Control range / limit value range in °C	Max. allowable probe temperature in °C	Maximum capillary length in mm	Probe length, dimension "L" in mm	
				Probe ø "d" in mm, ø "6" = standard	
				6	8
ATH.-1	-20 to + 50	60	5000	141	92
ATH.-2	-10 to + 40	50		185	115
	0 to + 50	60		185	115
	0 to +100	125		107	75
	+20 to + 90	115		138	91
	+20 to +120	140		106	75
	+20 to +150	175		88	65
	+30 to +110	135		125	84
	+50 to +200	230		101	72
	+50 to +250	290		73	54
	+50 to +300	345		63	49
	+50 to +350	405		53	---
	+60 to +130	150		135	90
ATH.-20	+20 to +150	175	5000	77	60
ATH.-70	+30 to +110	135		108	75
	+50 to +250	290		64	49
	+50 to +300	345		55	---
	+60 to +130	150		116	79
Gas-filled					
ATH.-1	+20 to +400	460	1000	278	158
ATH.-2	+20 to +500	575	2000	148	92
	+20 to +500	575	4000	202	119
ATH.-20	+20 to +400	460	1000	176	106
ATH.-70	+20 to +500	575	2000	127	81
	+20 to +500	575	4000	202	119

Capillary and temperature probe

Type	Scale limit value	Capillary	Temperature probe	Comments
ATH.- . .	Up to 200 °C	Copper (Cu) ø 1.5mm Material-no. Cu-DHP	Copper (Cu) Material-no. Cu-DHP Hard soldered	-
	Up to 350 °C	Copper (Cu) ø 1.5mm Material-no. Cu-DHP	Stainless steel (CrNi) Material no. 1.4571 Hard soldered	-
	Up to 500 °C	Stainless steel (CrNi) ø 1.5mm	Stainless steel (CrNi) Material no. 1.4571 Welded	-
	Up to 350 °C	Stainless steel (CrNi) ø 1.5mm	Stainless steel (CrNi) Material no. 1.4571 Welded	Available at extra cost
Capillary length	1000 mm, max. 5000 mm as standard			
Minimum bending radius of the capillary	5 mm			

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Electrical data

Switching element	ATH.-1 ATH.-2 ATH.-20	ATH.-70	ATH.-70/574
	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	AC 230 V +10 %, 10 (2) A, cos φ = 1 (0.6) DC 230 V +10 %, 0.25A		
	With switching differential 1.5 % and 2 % AC 230 V +10 %, 6 (1.2) A, cos φ = 1 (0.6)	-	-
	Gold-plated microswitch, extra code /702* (* for 3 %, 5 %, and 7 % switching differentials only) 24 V AC / DC, 0.1 A Contact resistance 2.5 to 10 m	-	-
Contact reliability	To ensure a high switching reliability, we recommend a minimum load of: With silver contacts: AC / DC = 24 V, 100 mA		
		For gold-plated contacts ("702" symbol): AC / DC = 10 V, 5 mA	

Operating data

Switching differential in % of the control range / limit value range	Switching function	With liquid-filled measuring system			
		Nominal value		Possible actual value	
	TR, TW	3	3 max. 4	Standard	
		6	6 max. 8	Upon request	
		1.5	1 max. 2	Extra cost	
		With gas-filled measuring system			
	STW (STB)	5	4 max. 8	Standard	
		9	8 max. 12	Upon request	
		2	1.5 max. 2.5	Extra cost	
		With liquid-filled measuring system			
	STW (STB)	5	4 max. 6	Standard	
		9	8 max. 11	Upon request	
2		1 max. 3	Extra cost		
	With gas-filled measuring system				
STW (STB)	7	5 max. 12	Standard		
	9	8 max. 16	Upon request		
	2	1.5 max. 3	Extra cost		
Switching point accuracy in % of the control range / limit value range	TR, TW: In the upper third of the scale ± 1.5 %, at scale beginning ± 6 % STB, STW (STB): In the upper third of the scale +0/-5 %, at scale beginning +0/-10 %				
Ambient temperature influence based on the control range / limit value range	When the ambient temperature on the case deviates from the calibration ambient temperature of 22 °C, a switching point offset occurs. Higher ambient temperatures = lower switching point Lower ambient temperature = higher switching point				
	Surface-mounted thermostats with scale limit value				
	< 200 °C		+ 200 °C ≤ 350 °C		> 350 °C ≤ 500 °C
	TR / TW	STB/STW (STB)	TR / TW	STB/STW (STB)	TR / TW
	0.08 %/K	0.17 %/K	0.06 %/K	0.13 %/K	0.14 %/K
	Influence on the switching head				
0.047 %/K	0.054 %/K	0.09 %/K	0.11 %/K	0.04 %/K	
Influence on the capillary per meter					
0.047 %/K	0.054 %/K	0.09 %/K	0.11 %/K	0.04 %/K	
Admissible storage temperature	-50 to +50 °C				
Admissible ambient temperature during use	Max. +80 °C				
Rated position (NL)	According to DIN 16 257, NL 0 to NL 90 (different rated positions (NL) upon request)				

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Case

Standard	Case lid: polycarbonate, shock resistant Case bottom section: aluminum die casting, painted	Color: pebble gray RAL 7032 Color: anthracite gray RAL 7015
Extra code "701"	Case lid made of aluminum die casting, painted	Color: pebble gray RAL 7032
Setpoint value adjustment	ATH-1: Switching point can be adjusted externally with the rotary knob	ATH-2, ATH-20, ATH-70 Switching point can be adjusted with a screwdriver once the case lid has been removed
Protection type	Design 1 + 2: EN 60529-IP54 Design 9 (hazard detector): EN 60529-IP44	
Cable inlet	Standard: self-sealing grommet M20 × 1.5, sealing range 8 to 10 mm	
Weight	Approx. 0.5 kg	
Switching head mounting ATHf- . series with capillary	Standard	Screw connection with counter nut M18 × 1 on the case spigot, capillary exit on the case spigot
	Extra code	
	711	With 2 screws through the case bottom section, lateral capillary exit on the case, lid and bottom part made of plastic
	764	Mounting flange made of steel sheet, capillary exit on the case spigot
248	Wall mount	

Process connection*

Series ATHs- with rigid thermowell	Scale limit value <u>up to</u> 150 °C Thermowell "20"	Scale limit value <u>exceeding</u> 150 °C Thermowell "30"
	Screw-in sleeve with screw-in spigot G 1/2 form A according to DIN 3852/2	Screw-in sleeve with screw-in spigot G 1/2 form A according to DIN 3852/2 and intermediate piece, to ensure that the max. admissible ambient temperature of +80 °C is not exceeded on the case
Type ATHf- 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 acc. to DIN 3852/2 and clamping piece with fixing screw to lock the probe in place	
Material	Thermowell "20"	Thermowell "30"
	Up to +150 °C CuZn as standard over +150 °C CrNi	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	

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

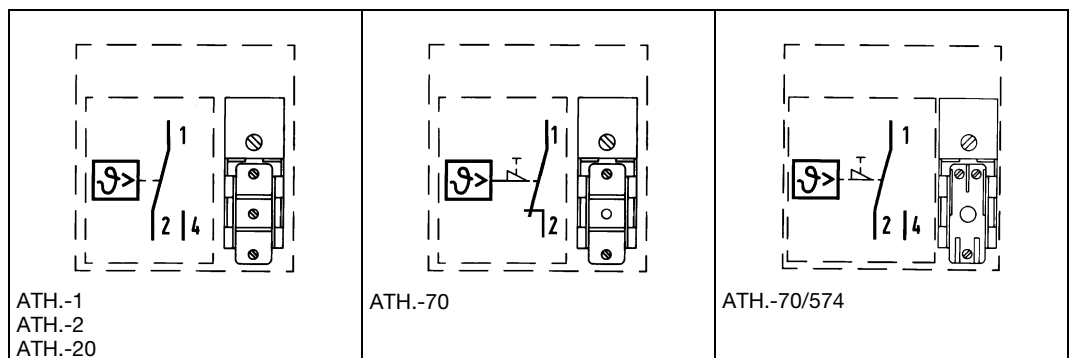
Note:

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

Control range with scale limit value	Hazardous reactions	Fire and explosion hazard		Hazardous to waters	Irritant	Toxicological data	
		Ignition temperature	Explosion limit			Dangerous to health	Toxic
< +200 °C	No	+ 355 °C	0.6 to 8 V%	Yes	Yes	1	No
≥ 200 °C ≤ +350 °C	No	+ 490 °C	--	Yes	Yes	1	No
> 350 °C ≤ +500 °C	No	No	No	No	No	No	No

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

Wiring diagrams



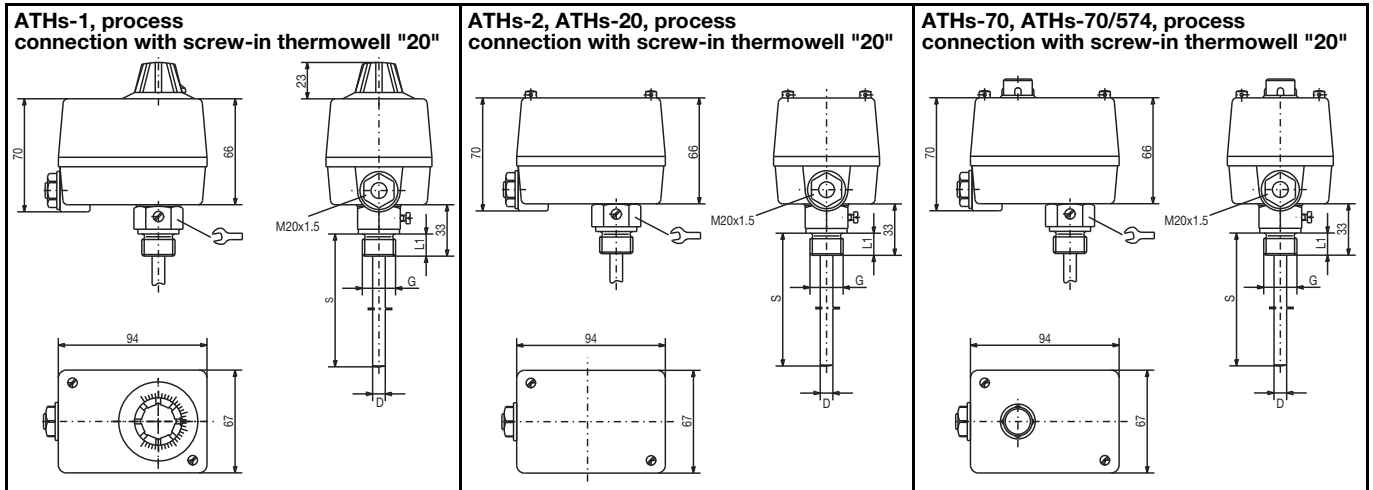
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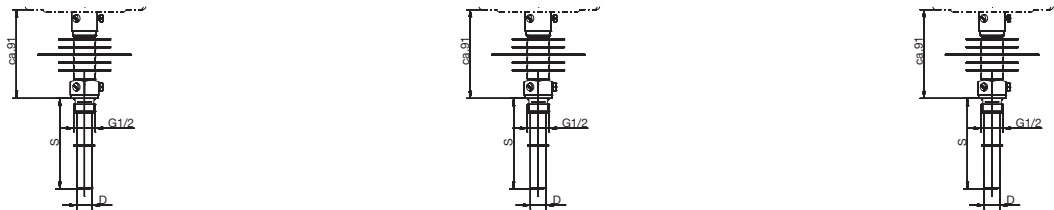
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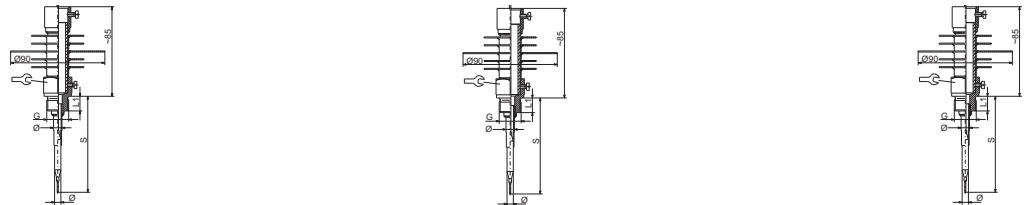
Dimensions, versions with rigid thermowell



Process connection with screw-in thermowell "30" and intermediate piece for scale limit value above +150 °C:



Process connection with thermowell "31" screw-in thermowell with intermediate piece, open:



Stock versions with rigid thermowell

Temperature controller (TR)

(delivery within 3 working days after receipt of order)

Part no.	Type	Control range / limit value range °C	Switching differential %	Process connection screw-in sleeve	Immersion tube Ø x length mm
60001517	ATHs-1	-10 to + 40	3-4	"20" G ¹ / ₂	8 x 200
60000634	ATHs-1	0 to + 50	1.5		15 x 100 CrNi
60000332	ATHs-1	0 to +100	3-4		8x120
60001548	ATHs-1	0 to +100	3-4		8x120 CrNi
60001125	ATHs-1	0 to +100	3-4		8x150
60000174	ATHs-1	0 to +100	1.5		8 x 200
60001126	ATHs-1	0 to +100	3-4		8 x 200
60000481	ATHs-1	+20 to +150	3-4		8x100
60001035	ATHs-1	+20 to +150	3-4		8 x 200
60001127	ATHs-1	+20 to +150	3-4		8x300
60003316	ATHs-1	+50 to +200	3-4	"30" G ¹ / ₂	8x200 CrNi
60003317	ATHs-1	+50 to +300	3-4		8x150 CrNi
60003318	ATHs-1	+20 to +500	5		8x200 CrNi

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**Stock versions with rigid thermowell****Temperature monitor (TW)**

(delivery within 3 working days after receipt of order)

Part no.	Type	Control range / limit value range °C	Switching differential %	Process connection screw-in sleeve	Immersion tube Ø × length mm	
60001135	ATHs-2	-10 to + 40	3-4	"20" G ¹ / ₂	8 x 200	
60001549	ATHs-2	0 to + 50	1.5		15 x 100 CrNi	
60001128	ATHs-2	0 to + 50	3-4		8 x 200	
60000177	ATHs-2	+20 to + 90	1.5		15 x 100	
60000959	ATHs-2	+20 to + 90	6-8		15 x 100	
60001129	ATHs-2	+20 to + 90	3-4		8 x 150	
60000331	ATHs-2	0 to +100	3-4		8 x 120	
60001552	ATHs-2	0 to +100	3-4		8 x 120 CrNi	
60000179	ATHs-2	0 to +100	3-4		8 x 150	
60001039	ATHs-2	0 to +100	3-4		8 x 200	
60001130	ATHs-2	0 to +100	3-4		8 x 300	
60000483	ATHs-2	+20 to +150	3-4		8 x 100	
60001551	ATHs-2	+20 to +150	3-4		8 x 100 CrNi	
60000485	ATHs-2	+20 to +150	3-4		8 x 200	
60001554	ATHs-2	+20 to +150	3-4		8 x 200 CrNi	
60000182	ATHs-2	+20 to +150	3-4		8 x 300	
60003319	ATHs-2	+50 to +200	3-4		"30" G ¹ / ₂	8 x 120 CrNi
60003320	ATHs-2	+50 to +200	3-4			8 x 200 CrNi
60001556	ATHs-2	+50 to +300	3-4			8 x 150 CrNi
60003322	ATHs-2	+20 to +500	5			8 x 200 CrNi

Safety temperature monitor STW (STB)

(delivery within 3 working days after receipt of order)

Part no.	Type	Control range / limit value range °C	Switching differential %	Process connection screw-in sleeve/ weld-in sleeve	Immersion tube Ø × length mm
60001478	ATHs-20	+20 to +150	4-6	"20" G ¹ / ₂	8 x 150
60003323	ATHs-20	+50 to +300	5	"30" G ¹ / ₂	8 x 200 CrNi
60002217	ATHs-20	+50 to +350	4-6	"46" G ³ / ₄	170 steel, conical
60003324	ATHs-20	+20 to +500	7	"31" G ¹ / ₂	8 x 200 CrNi

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Stock versions with rigid thermowell

Safety temperature limiter (STB)

(delivery within 3 working days after receipt of order)

Part no.	Type	Control range / limit value range °C	Switching differential %	Process connection screw-in sleeve/ weld-in sleeve	Immersion tube Ø x length mm
60000982	ATHs-70	+ 30 to +110	--	"20" G ¹ / ₂	8x150
60001043	ATHs-70	+ 30 to +110	--		8 x 200
60000189	ATHs-70	+ 30 to +110	--		8x300
60001044	ATHs-70	+ 60 to +130	--		8x150
60000190	ATHs-70	+ 60 to +130	--		8 x 200
60001020	ATHs-70	+ 20 to +150	--		8 x 200
60003325	ATHs-70	+130 to +200	--	"30" G ¹ / ₂	8x150 CrNi
60003326	ATHs-70	+130 to +200	--		8x300 CrNi
60003327	ATHs-70	+ 50 to +300	--		8x200 CrNi
60001524	ATHs-70/574	+ 30 to +110	--	"20" G ¹ / ₂	8x150
60001522	ATHs-70/574	+ 20 to +150	--		8 x 200
60003328	ATHs-70/574	+ 50 to +300	--	"30" G ¹ / ₂	8 x 200 CrNi
60002218	ATHs-70/574	+ 50 to +350	--	"46" G ³ / ₄	170 steel, conical
60003329	ATHs-70/574	+ 20 to +500	--	"31" G ¹ / ₂	8 x 200 CrNi
60001476	ATHs-70/574	+ 20 to +500	--	"30" G ¹ / ₂	8x200 CrNi

Dimensions, versions with capillary

<p>ATHf-1, process connection "10" plain cylindrical probe</p>	<p>ATHf-2, ATHf-20, process connection "10" plain cylindrical probe</p>
<p>ATHf-70, ATHf-70/574, process connection "10" plain cylindrical probe</p>	<p>ATHf-20/r, ATHf-70/r, process connection "42" plain cylindrical probe with weld-in sleeve G 3/4</p>

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Stock versions with capillary

Temperature controller (TR)

(delivery within 3 working days after receipt of order)

Part no.	Type	Control range / limit value range °C	Switching differential %	Capillary mm	Process connection	Probe ø × length mm
60001134	ATHf-1	-10 to + 40	3-4	1000	"10" Plain cylindrical probe	6x185
60001004	ATHf-1	0 to +100	3-4	1000		6x107
60000955	ATHf-1	+20 to +150	3-4	1000		6 x 88
60001133	ATHf-1	+50 to +300	3-4	1000		6x 63
60002113	ATHf-1	+20 to +500	5	1000		6x148

Temperature monitor (TW)

(delivery within 3 working days after receipt of order)

Part no.	Type	Control range / limit value range °C	Switching differential %	Capillary mm	Process connection	Probe ø × length mm
60000482	ATHf-2	0 to + 50	3-4	1000	"10" Plain cylindrical probe	6x185
60000962	ATHf-2	0 to +100	3-4	1000		6x107
60001212	ATHf-2	0 to +100	3-4	2000		6x107
60000963	ATHf-2	+20 to +150	3-4	1000		6 x 88
60001210	ATHf-2	+20 to +150	3-4	2000		6 x 88
60000187	ATHf-2	+50 to +200	3-4	1000		6x101
60001038	ATHf-2	+50 to +300	3-4	1000		6x 63
60001208	ATHf-2	+50 to +300	3-4	2000		6x 63
60002122	ATHf-2	+20 to +500	5	1000		6x148
60002114	ATHf-2	+20 to +500	5	2000		6x148

Safety temperature monitor STW and safety temperature limiter (STB)

(delivery within 3 working days after receipt of order)

Part no.	Type	Control range / limit value range °C	Switching differential %	Capillary mm	Process connection	Probe ø × length mm	
60002261	ATHf-20/r	+ 20 to +500	7	4000	"42" G ³ / ₄ *	200	
60001136	ATHf-70	+ 30 to +110	--	1000	"10" Plain cylindrical probe	6x108	
60001206	ATHf-70	+ 30 to +110	--	2000		6x108	
60001041	ATHf-70	+ 20 to +150	--	1000		6x 77	
60001205	ATHf-70	+ 20 to +150	--	2000		6x 77	
60001525	ATHf-70/574	+ 20 to +150	--	1000		6x 77	
60001204	ATHf-70	+ 50 to +200	--	2000		6x 85	
60001290	ATHf-70/574	+ 50 to +200	--	1000		6x 85	
60001040	ATHf-70	+ 50 to +300	--	1000		6x 55	
60001191	ATHf-70	+ 50 to +300	--	2000		6x 55	
60001528	ATHf-70/574	+ 50 to +300	--	1000		6x 55	
60002086	ATHf-70	+ 20 to +500	--	1000		6x127	
60002088	ATHf-70/574	+ 20 to +500	--	1000		6x127	
60002099	ATHf-70/574	+ 20 to +500	--	2000		6x127	
60002262	ATHf-70/574/711	+ 20 to +500	--	4000		"42" G ³ / ₄ *	200

* Weld-in sleeve

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Order details

(Please observe our stock versions and specify the parts no.)

Surface-mounted thermostat, ATH series

Order code (1) Basic type

603021 Surface-mounted thermostat, ATH series

(2) Basic type extensions

01	ATH-1	Temperature controller (TR)
02	ATH-2	Temperature monitor (TW)
20	ATH-20	Safety temperature monitor STW (STB)
70	ATH-70	Safety temperature limiter (STB)

(3) Design type

1	ATHs with rigid thermowell
2	ATHf with capillary

(4) Control ranges / limit value ranges °C

014	-20 to + 50 (only for TR and TW)
016	-10 to + 40 (only for TR and TW)
021	0 to + 50
025	0 to +100
041	+20 to + 90
042	+20 to +120
043	+20 to +150
045	+20 to +400
046	+20 to +500
052	+30 to +110
062	+50 to +200
063	+50 to +250
064	+50 to +300
066	+60 to +130

(5) Switching differential

00	Without switching differential (-70 STB)	
15	1.5 % of the scale range	(only for TR + TW)
20	2 % of the scale range	(only for STW (STB))
30	3 % of the scale range	(only for TR + TW)
50	5 % of the scale range	(only for TR + TW + STW (STB))
60	6 % of the scale range	(only for TR + TW)
70	7 % of the scale range	(only for STW (STB))
90	9 % of the scale range	(only for STW (STB))

(6) Capillary length

0	ATHs without capillary
1000	1000 mm
2000	2000 mm
3000	3000 mm
4000	4000 mm
5000	5000 mm
....	(Special length, specifications in plain text)

(7) Capillary material

00	ATHs without capillary
40	Cu (Copper)
20	CrNi (Stainless steel)

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Order details

Surface-mounted thermostat, ATH series

Order code (8) Process connection (PA) ¹

10	Plain cylindrical probe (only for ATHf)	
20	Screw-in thermowell	
30	Screw-in thermowell with intermediate piece	
31	Screw-in thermowell with intermediate piece, open	
42	Weld-in sleeve for union nut, conical	
46	Welding sleeve for union nut with intermediate piece, conical	

(9) Thread of process connection ¹

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	ATHf without thermowell
100	100 mm
120	120 mm
150	150 mm
200	200 mm
300	300 mm
400	400 mm
...	... Special length, specifications in plain text

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

00	ATHf without thermowell
8	8 mm
10	10 mm

(13) Diameter "d" (probe diameter)

6	6 mm
8	8 mm

(14) Extra codes ²

000	Without extra code
248	"k" Wall mount
574	"U" Microswitch with N/C contact, restart lock, and additional signal contact (only for STB)
701	"a" Case lid made of aluminum diecasting (not with extra code "711")
702	"au" Snap-action switch contact, gold-plated (only with switching differential 3 %, 5 %, and 7 % and STB with N/C contact)
711	"r" Switching head mounting with 2 screws through the case bottom section, lateral capillary exit on the case, lid, and bottom section made of plastic
764	"b" Mounting flange made of steel sheet, capillary exit on the case spigot

Order code

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)																
603021	/	..	-	.	-	...	-	..	-	-	..	-	..	-	..	-	..	-	...	-	..	-	..	-	..	-	...	, ... , ...

Order example

603021	/	70	-	1	-	043	-	00	-	0	-	00	-	20	-	13	-	20	-	100	-	8	-	6	/	574 ²
--------	---	----	---	---	---	-----	---	----	---	---	---	----	---	----	---	----	---	----	---	-----	---	---	---	---	---	------------------

¹ For other connection types and thermowells, see data sheet 606710.

² List extra codes in sequence, separated by commas.

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Surface-mounting double thermostat

ATH type series

Particularities

- Fluid expansion
- Microswitch
- Self-monitoring (STB/STW)
- Safety cut-out (STB/STW)
- 2 separate measuring and switching systems

Brief description

Thermostats are used to control and monitor thermal processes. Surface-mounting double thermostats of the ATH type series consist of two separate measuring and switching systems. The devices are available as temperature controllers TR, temperature monitors TW, safety temperature monitors STW (STB) and safety temperature limiters STB. In the event of a malfunction, the STB switches the monitored machine line to an operationally safe status.

Surface-mounting double thermostats operate according to the fluid expansion principle, a microswitch serves as an electrical switching element.

Switching function

Temperature controller TR and temperature monitor TW

If the temperature exceeds the set point value set on the temperature probe, the microswitch will be tripped by the transmission mechanics and the current circuit opened or closed. The microswitch is reset to its original status once the set point value set is gone below (by the hysteresis).

Restart lock for the safety temperature limiter STB

If the temperature exceeds the limit value set on the temperature probe, the current circuit is opened and the microswitch mechanically locked.

The microswitch can be manually unlocked, once the dangerous temperature drops by approx. 10 % of the scale range (approx. 15% with a limit value setting $> +350\text{ }^{\circ}\text{C}$).

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

Ensure that the switching circuit downstream of the thermostat complies to DIN EN 14597 and VDE 0116.

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 escapes, the pressure in the diaphragm of the STB and STW (STB) drops and permanently opens the current circuit. Unlocking is no longer possible. If the probe has cooled down to a temperature below approx. $-20\text{ }^{\circ}\text{C}$, the current circuit is opened, when the temperature rises above approx. $-20\text{ }^{\circ}\text{C}$, the STB must be unlocked manually first using the re-starting button. The STW (STB) automatically restarts.



ATHs-12



ATHf-170

Approvals/approval marks (see Technical Data)



The declarations of conformity can be found in the internet under:
www.jumo.net
⇒ Products
or they can be sent on request.

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Technical Data

Control ranges and temperature probes

fluid-filled				
Switching function	Control / limit value ranges in °C	max. admissible probe temperature in °C	maximum capillary length in mm	Probe length, dimension "L" in mm Probe ø "d" = 6 mm (Standard)
TR, TW	-20 to + 50	60	5000	141
	-10 to + 40	50		185
	0 to + 50	60		185
	0 to +100	125		107
	+20 to + 90	115		138
	+30 to +110	135		125
	+20 to +120	140		106
	+60 to +130	150		135
	+20 to +150	175		88
	+50 to +200	230		101
	+50 to +250	290		73
	+50 to +300	345		63
	+50 to +350	405		53
STW and STB	+30 to +110	135	5000	108
	+60 to +130	150		116
	+20 to +150	175		77
	+50 to +250	290		64
	+50 to +300	345		55
gas-filled				
TR, TW	+20 to +400	460	1000	278
	+20 to +500	575	2000	148
	+20 to +500	575	4000	202
STW and STB	+20 to +400	460	1000	176
	+20 to +500	575	2000	127
	+20 to +500	575	4000	202

Capillary and temperature probe

Type	Scale limit value	Capillary	Temperature probe	Remarks
ATH.-. .	up to 200 °C	Copper (Cu) ø 1.5mm Material No. Cu-DHP	Copper (Cu) Material No. Cu-DHP hard soldered	-
	up to 350 °C	Copper (Cu) ø 1.5mm Material No. Cu-DHP	Stainless steel (CrNi) Material No. 1.4571 hard soldered	-
	up to 500 °C	Stainless steel (CrNi) ø 1.5mm	Stainless steel (CrNi) Material No. 1.4571 welded	-
	up to 350 °C	Stainless steel (CrNi) ø 1.5mm	Stainless steel (CrNi) Material No. 1.4571 welded	against surcharge
Capillary length	1000 mm, max. 5000 mm as standard			
minimum bending radius of the capillary	5 mm			

Electrical data

Switching element	TR, TW, STW (STB)	STB (-70)	STB (-70/574)
	Microswitch with change-over contact	Microswitch with N/C contact and restart lock	Microswitch with N/C contact, restart lock and additional signal contact
max. contact rating	AC 230 V +10%, 10 (2) A, cos φ = 1 (0.6), DC 230 V +10%, 0.25A		
	with hysteresis 1.5% and 2% AC 230 V +10%, 6 (1.2) A, cos φ = 1 (0.6)	-	-
	Microswitch gold-plated, extra code /702* (*only with hysteresis 3%, 5%, and 7%) AC / DC 24 V, 0.1 A, contact resistance 2.5 to 10 mΩ		-
Contact reliability	To ensure high switching reliability, we recommend a minimum load of:		
	with silver contacts: AC / DC = 24 V, 100 mA	with gold-plated contacts (briefly "702": AC / DC = 10 V, 5 mA	

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Operating data

Hysteresis in % of the control / limit value range	Switching function		with fluid-filled measuring system			
			Rated value		Possible actual value	
	TR, TW		3		3 max. 4	
			6		6 max. 8	
			1.5		1 max. 2	
			with gas-filled measuring system			
	TR, TW		5		4 max. 8	
			9		8 max. 12	
			2		1.5 max. 2.5	
			with fluid-filled measuring system			
	STW (STB)		5		4 max. 6	
			9		8 max. 11	
			2		1 max. 3	
			with gas-filled measuring system			
STW (STB)		7		5 max. 12		
		9		8 max. 16		
		2		1.5 max. 3		
Switching point accuracy in % of the control/limit value range	TR, TW: in the upper third of the scale $\pm 1.5\%$, at scale beginning $\pm 6\%$ STB, STW (STB): in the upper third of the scale $+0/-5\%$, at scale beginning $+0/-10\%$					
Ambient temperature influence based on the control/limit value range	When the ambient temperature on the case deviates from the calibration ambient temperature $22\text{ }^\circ\text{C}$, a switch point offset occurs. Higher ambient temperatures = lower switching point Lower ambient temperature = higher switching point Surface-mounting thermostats with scale limit value					
	$< 200\text{ }^\circ\text{C}$		$+ 200\text{ }^\circ\text{C} \leq 350\text{ }^\circ\text{C}$		$> 350\text{ }^\circ\text{C} \leq 500\text{ }^\circ\text{C}$	
	TR / TW	STB/STW (STB)	TR / TW	STB/STW (STB)	TR / TW	
	Influence on the switch head					
	0.08%/K	0.17%/K	0.06%/K	0.13%/K	0.14%/K	0.12%/K
	Influence on the capillary per metre					
0.047%/K	0.054%/K	0.09%/K	0.11%/K	0.04%/K	0.03%/K	
admissible storage temperature	-50 to $+50\text{ }^\circ\text{C}$					
admissible ambient temperature during use	max. $+80\text{ }^\circ\text{C}$					
Rated position	as per DIN 16 257, NL 0 to NL 90 (different rated positions (NL) on request)					

Case

serial	Case lid: Polycarbonate, shock resistant Case bottom part: Aluminum die casting, painted	Color: pebble gray RAL 7032 Color: anthracite gray RAL 7015
Extra code "701"	Case lid made of aluminum die casting, painted	Color: pebble gray RAL 7032
Set point value setting	TR: Switching point adjustable from the outside using the rotary knob	TW, TB, STB, STW (STB): The switching point can be adjusted by means of a screw-driver once the case lid has been removed
Protection type	EN 60 529-IP 54	
Cable inlet	As a standard: self-sealing grommet M 20 x 1.5, sealing range 8-10 mm	
Weight	approx. 0.8 kg	

Switch head fastening ATHf- type series . . . with capillary	serial	Screw-connection by means of counter nut M 18 x 1 on the case stud, capillary outlet on the case stud
	Extra code	
	711	with 2 screws through the case bottom part, lateral capillary outlet on the case, lid and bottom part made of plastic
	764	Fastening flange made of steel sheet, capillary outlet on the case stud
	248	Wall stands

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Process connection*

Type series ATHs- with rigid shaft	Scale limit value <u>up to</u> 150 °C Sheath "20"	Scale limit value <u>exceeding</u> 150 °C Sheath "30"
	Screw-in sleeve with screw-in spigot G 1/2 form A as per DIN 3852/2	Screw-in sleeve with screw-in journal G 1/2 form A as per DIN 3852/2 and intermediate piece, to ensure that the max. admissible ambient temperature of +80 °C is not exceeded on the case
ATHf- type series with capillary	plain cylindrical probe "10" (standard)	
	Screw-in sheath "20" (on request)	
	Screw-in sleeve with screw-in spigot G 1/2 form A as per DIN 3852/2 and clamping piece with locking screw to lock the probe	
Material	Sheath "20"	Sheath "30"
	up to +150 °C CuZn as a standard over +150 °C CrNi	over +150 °C CrNi as a standard
Fitting length S	Standard lengths: 100, 120, 150, 200 or 300 mm (different lengths on request)	
Immersion tube Ø	D = 15 mm	

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

Note:

Physical and toxic features of the expansion agents, which could escape in the event of a measuring system break.

Control range with scale limit value	Hazardous reactions	Fire and explosion hazard		hazardous to waters	Information about toxicology		
		Ignition temperature	Explosion limit		irritant	dangerous to health	toxic
< +200 °C	no	+ 355 °C	0.6 - 8 V%	yes	yes	1	no
≥ 200 °C ≤ + 350 °C	no	+ 490 °C	- -	yes	yes	1	no
> 350 °C ≤ + 500 °C	no	no	no	no	no	no	no

There is currently no statement by the health authority concerning hazards to health in the event of short-term exposure and low concentration, e.g. measuring system break.

Approvals/approval marks

Types		Switching function	DIN registry No.	Test
with rigid shaft	with capillary			
ATHs-11	ATHf-11	TR / TR	TR / TR 896	DIN EN 14597
ATHs-12	ATHf-12	TR / TW	TR / TW 897	
ATHs-22	ATHf-22	TW / TW	TW / TW 901	
ATHs-120	ATHf-120	TR / STW (STB)	TR / STW (STB) 899 S	DIN EN 14597 Pressure device directive 97/23/EC
ATHs-220	ATHf-220	TW / STW (STB)	TW / STW (STB) 903 S	
ATHs-170	ATHf-170	TR / STB	TR / STB 900	
ATHs-270	ATHf-270	TW / STB	TW / STB 904	
ATHs-2020	ATHf-2020	STW (STB) / STW (STB)	2 x STW (STB) 905 S	
ATHs-2070	ATHf-2070	STW (STB) / STB	STW (STB) / STB 906 S	
ATHs-7070	ATHf-7070	STB / STB	STB / STB 907	

Connection diagrams

<p>ATH-11, -12, -120 ATH-22, -220, -2020</p> <p>System I and II: with change-over contact Switching function: TR, TW, STW</p>	<p>ATH-7070</p> <p>System I and II: with N/C contact and restart lock Switching function: STB</p>
<p>ATH-170/574, -270/574, -2070/574</p> <p>System I: with change-over contact Switching function: TR, TW, STW</p> <p>System II: with N/C contact, restart lock and additional signal contact</p>	<p>ATH-7070/574</p> <p>System I and II: with N/C contact, restart lock and additional signal contact Switching function: STB</p>
<p>ATH-170</p> <p>System I: with change-over contact Switching function: TR, TW, STW</p> <p>System II: with N/C contact and restart lock Switching function: STB</p>	

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Dimensions Versions with rigid shaft

<p>ATHs-11; Process connection "20" with screw-in sheath</p>	<p>ATHs-12, ATHs-120; Process connection "20" with screw-in sheath</p>
<p>ATHs-22, ATHs-2020; Process connection "20" with screw-in sheath</p>	<p>ATHs-170, ATHs-170/574; Process connection "20" with screw-in sheath</p>
<p>ATHs-270, ATHs-270/574, ATHs-2070, ATHs-2070/574; Process connection "20" with screw-in sheath</p>	<p>ATHs-7070, ATHs-7070/574; Process connection "20" with screw-in sheath</p>

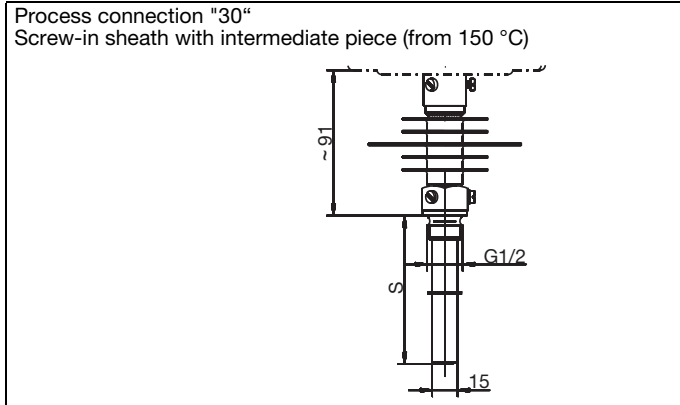
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Dimensions Versions with rigid shaft



Stock versions with rigid thermowell

(Delivery within 3 working days after receipt of order)

Part no.	Type	Control / limit value range °C	Hysteresis %	Process connection Screw-in sleeve	Immersion tube Ø x length mm	
60000486	ATHs-11	0 to +100	3-4	„20“ G ¹ / ₂	15 x 120	
60000491	ATHs-22	0 to + 50	3-4		15 x 200	
60000206	ATHs-22	0 to +100	1.5		15 x 120	
60001047	ATHs-22	0 to +100	3-4		15 x 120	
60001555	ATHs-22	0 to +100	1.5		15 x 120 CrNi	
60000205	ATHs-22	0 to +100	3-4		15 x 150	
60000988	ATHs-22	0 to +100	3-4		15 x 200	
60000204	ATHs-22	0 to +100	3-4		15 x 300	
60000489	ATHs-22	+20 to +150	3-4		15 x 100	
60000203	ATHs-22	+20 to +150	3-4		15 x 200	
60003331	ATHs-22	+50 to +300	3-4		„30“ G ¹ / ₂	15 x 150 CrNi
60003332	ATHs-22	+20 to +500	5			15 x 200 CrNi
60001479	ATHs-120	+20 to +150	3-4		„20“ G ¹ / ₂	15 x 150
60001932	ATHs-120	+20 to +120	3-4	15 x 150		
60002009	ATHs-120	+60 to +130	3-4	15 x 150		
60002008	ATHs-120	+30 to +110	3-4	15 x 150		
60000195	ATHs-170	+30 to +110	3-4	15 x 150		
60000196	ATHs-170	+30 to +110	3-4	15 x 200		
60001048	ATHs-170	+20 to +120	3-4	15 x 150		
60000989	ATHs-170	+20 to +150	3-4	15 x 150		
60000194	ATHs-270	+20 to +150	3-4	15 x 200		

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Dimensions Versions with capillary

<p>ATHf-11 Process connection "10" plain cylindrical probe</p>	<p>ATHf-12, ATHf-120 Process connection "10" plain cylindrical probe</p>
<p>ATHf-22, ATHf-2020 Process connection "10" plain cylindrical probe</p>	<p>ATHf-170, ATHf-170/574 Process connection "10" plain cylindrical probe</p>
<p>ATHf-270, ATHf-270/574, ATHf-2070, ATHf2070/574 Process connection "10" plain cylindrical probe</p>	<p>ATHf-7070, ATHf-7070/574 Process connection "10" plain cylindrical probe</p>

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Stock versions with capillary

(Delivery within 3 working days after receipt of order)

Part no.	Type	Control / limit value range °C	Hysteresis %	Capillary	Process connection	Probe ø x length mm
60000986	ATHf-11	0 to +100	3-4	1000 mm	"10" plain cylindrical probe	6 x 107
60001046	ATHf-22	0 to +100				6 x 107
60001876	ATHf-170	+30 to +110				6 x 125

Order details

Surface-mounting double thermostat, ATH type series

Order code (1) Basic type

603026 Surface-mounting double thermostat, ATH type series

(2) Basic type extensions

0101	ATH.-11	TR/TR
0102	ATH.-12	TR/TW
0202	ATH.-22	TW/TW
0120	ATH.-120	TR/STW (STB)
0220	ATH.-220	TW/STW (STB)
0170	ATH.-170	TR/STB
0270	ATH.-270	TW/STB
2020	ATH.-2020	STW (STB)/STW (STB)
2070	ATH.-2070	STW (STB)/STB
7070	ATH.-7070	STB/STB

(3) Design

1	ATHs	with rigid shaft
2	ATHf	with capillary

(4) Control / limit value ranges 1 (°C)

014	-20 to + 50	(only possible with TR and TW)
016	-10 to + 40	(only possible with TR and TW)
021	0 to + 50	
025	0 to +100	
041	+20 to + 90	
042	+20 to +120	
043	+20 to +150	
045	+20 to +400	
046	+20 to +500	
052	+30 to +110	
062	+50 to +200	
063	+50 to +250	
064	+50 to +300	
066	+60 to +130	

(5) Control / limit value ranges 2 (°C)

014	-20 to + 50	(only possible with TR and TW)
016	-10 to + 40	(only possible with TR and TW)
021	0 to + 50	
025	0 to +100	
041	+20 to + 90	
042	+20 to +120	
043	+20 to +150	
045	+20 to +400	
046	+20 to +500	
052	+30 to +110	
062	+50 to +200	
063	+50 to +250	
064	+50 to +300	
066	+60 to +130	

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Order details

Surface-mounting double thermostat, ATH type series

Order code (6) Hysteresis 1

00	without hysteresis	(STB)
15	1.5 % of the scale range	(only for TR + TW)
20	2 % of the scale range	(only for STW (STB))
30	3 % of the scale range	(only for TR + TW)
50	5 % of the scale range	(only for TR + TW + STW (STB))
60	6 % of the scale range	(only for TR + TW)
70	7 % of the scale range	(only for STW (STB))
90	9 % of the scale range	(only for STW (STB))

(7) Hysteresis 2

00	without hysteresis	(STB)
15	1.5 % of the scale range	(only for TR + TW)
20	2 % of the scale range	(only for STW (STB))
30	3 % of the scale range	(only for TR + TW)
50	5 % of the scale range	(only for TR + TW + STW (STB))
60	6 % of the scale range	(only for TR + TW)
70	7 % of the scale range	(only for STW (STB))
90	9 % of the scale range	(only for STW (STB))

(8) Capillary length 1 (specifications in mm)

0	without capillary
1000	1000 mm
2000	2000 mm
3000	3000 mm
4000	4000 mm
5000	5000 mm
...	(Special length, specifications in plain text)

(9) Capillary length 2 (specifications in mm)

0	ATHs without capillary
1000	1000 mm
2000	2000 mm
3000	3000 mm
4000	4000 mm
5000	5000 mm
...	(Special length, specifications in plain text)

(10) Capillary material 1

00	ATHs without capillary
40	Cu (Copper)
20	CrNi (stainless steel)

(11) Capillary material 2

00	ATHs without capillary
40	Cu (Copper)
20	CrNi (stainless steel)

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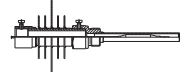
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Order details

Surface-mounting thermostats, ATH type series

Order code (12) Process connection ¹

- 10 plain cylindrical probe (only for ATH...) 
- 20 Screw-in sheath 
- 30 Screw-in sheath with intermediate piece 

(13) Thread of process connection ¹

- 00 without thread (process connection "10")
- 13 External thread G 1/2

(14) Material of process connection

- 00 only with process connection "10"
- 46 CuZn (brass)
- 20 CrNi (stainless steel 1.4571)

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

- 000 ATHf without sheath
- 100 100 mm
- 120 120 mm
- 150 150 mm
- 200 200 mm
- 300 300 mm
- 400 400 mm
- ... (Special length, specifications in plain text)

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

- 00 ATHf- without sheath
- 15 15 mm

(17) Diameter "d" (probe diameter)

- 6 6 mm

(18) Extra codes ²

- 000 without extra codes
- 248 „k“ Wall stands
- 574 „U“ Microswitch with N/C contact, restart lock and additional signal contact (only for STB)
- 701 „a“ case lid made of aluminum die casting (not with extra code "r")
- 702 „au“ Snap switch contact, gold-plated (only with hysteresis 3%, 5%, and 7% and STB with N/C contact)
- 711 „r“ Switch head fastening with 2 screws through the case bottom part, lateral capillary outlet on the case, lid and bottom part made of plastic
- 764 „b“ Fastening flange made of steel sheet, capillary outlet on the case stud

¹ For different types of connections and thermowells refer to data sheet 606710.

² State extra codes one after another, separated by commas.

Order code:

(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18)
 603026 / ... - . - .. - .. - .. - .. - .. - . - ... - .. - .. - .. - .. - .. - ... - ... - . / ... / ...

Order example:

603026 / 0101 - 1 - 014 - 14 - 00 - 15 - 0 - 1000 - 00 - 20 - 10 - 13 - 00 - 100 - 00 - 6 / 248²

² State extra codes one after another, separated by commas.

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Surface-mounting thermostat, type series ATH.-SE to monitor seagoing vessel equipment

Special features

- Control and monitoring of thermal processes
- Temperature monitor TW
- Safety temperature monitor STW (STB)
- and safety temperature limiter STB

Brief description

Thermostats are used to control and monitor thermal processes. The devices of the ATH.-SE type series are available as temperature monitors TW, safety temperature monitors STW (STB) and safety temperature limiters STB. In the event of a malfunction, the STB switches the monitored machine line to an operational safe status.

Surface-mounting thermostats operate according to the fluid expansion principle, a microswitch is used as an electrical switching element.

Switching function

Temperature monitor TW and safety temperature monitor STW

If the temperature exceeds the limit value set on the temperature probe, the current circuit is opened via a snap switch. The switch is reset to its original status once the set limit value is gone below (by the hysteresis).

Restart lock of the safety temperature limiter STB

If the temperature exceeds the limit value set on the temperature probe, the current circuit is opened and mechanically locked.

Once the limit value is gone below by approx. ~ 10% of the temperature range, the switch can be manually unlocked.

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

Ensure that the switching circuit downstream of the thermostat complies to DIN EN 14597 and VDE 0116.

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 escapes, the pressure in the diaphragm of the STB and STW (STB) drops and permanently opens the current circuit. Unlocking is no longer possible. If the probe has cooled down to a temperature below approx. -20 °C, the current circuit is opened, when the temperature rises above approx. -20 °C, the STB must be unlocked manually first using the re-starting button. The STW (STB) automatically restarts.



ATHs-SE-70



ATHf-SE-..

The declaration of conformity can be found in the internet under:
 www.jumo.net
 ⇨ Products
 ⇨ Data sheet 603031
 or
 it can be sent on request.

Types and approvals

Type	Switching function	Hysteresis	Type No.	Test
ATHs-SE-2 ATHf-SE-2	TW	3%	68.262-F03-S1 68.262-F04-S1	Det Norske Veritas Germanische Lloyd DIN EN 14597 Bureau Veritas. Pressure equipment directive 97/23/EC CE0036 (only ATH.-SE-20 and ATH.-SE-70)
ATHs-SE-2 ATHf-SE-2		6%	68.262-F03-S2 68.262-F04-S2	
ATHs-SE-2 ATHf-SE-2		1.5%	68.262-F03-S3 68.262-F04-S3	
ATHs-SE-20 ATHf-SE-20	STW (STB)	3%	68.261-F03-S1 68.261-F04-S1	
ATHs-SE-20 ATHf-SE-20		6%	68.261-F03-S2 68.261-F04-S2	
ATHs-SE-20 ATHf-SE-20		1.5%	68.261-F03-S3 68.261-F04-S3	
ATHs-SE-70 ATHf-SE-70	STB	-	68.266-F03 68.266-F04	

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Technical data

Control ranges and temperature probes

Type	Control / limit value ranges in °C	max. admissible excessive probe temperature in °C	Length of the temperature probe in mm			
			Copper (Cu)		Stainless steel (CrNi)	
			ø 6	ø 8	ø 6	ø 8
ATH.-SE-2	0 to 100	125	107	75	99	67
	20 to 90	125	138	91	130	83
	30 to 110	135	125	84	117	76
	20 to 120	140	107	75	99	67
	60 to 140	165	123	83	117	76
	20 to 150	175	88	65	80	57
	50 to 200	230	101	72	93	64
	50 to 250	290	-	-	73	54
	50 to 300	345	-	-	63	49
	ATH.-SE-20	30 to 110	135	112	78	104
ATH.-SE-70	60 to 140	165	110	77	102	68
	20 to 150	175	80	61	72	53
	50 to 250	290	-	-	66	50
	50 to 300	345	-	-	58	-

Capillary and temperature probe

Type	Scale limit value	Capillary	Temperature sensor	Remarks
ATH.-SE-2 ATH.-SE-20 ATH.-SE-70	≤ 200 °C	Copper (Cu) ø 1.5mm Material No. 2.0090	Copper (Cu) Material No. 2.0090 hard soldered	-
	> 200 °C	Copper (Cu) ø 1.5mm Material No. 2.0090	Stainless steel (CrNi) Material No. 1.4571 hard soldered	-
	all areas	Stainless steel (CrNi) ø 1.5mm	Stainless steel (CrNi) Material No. 1.4571 welded	against surcharge
Capillary length	1000 mm, max. 2000 mm as standard			
min. bending radius of the capillary	5 mm			

Electrical data

Switching element	ATH.-SE-2 ATH.-SE-20	ATH.-SE-70	ATH.-SE-70/574
	Microswitch with change-over contact	Microswitch with N/C contact and restart lock	Microswitch with N/C contact, re-start lock and additional signal contact
max. contact rating	AC 230 V +10%, 10(2) A, cos φ = 1(0.6) DC 230 V +10 %, 0.25 A		
	with a hysteresis of 1.5 %: AC 230 V +10%, 6(1.2) A, cos φ = 1(0.6)		

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Operating data

Hysteresis in % of the control / limit value range	Rated value		Possible process value		Designation	
	3		3-4		S1	
	6		6-8		S2	
	1.5		1-2		S3	
Switching point accuracy in % of the control/limit value range	TW: in the upper third of the scale $\pm 1.5\%$ STB, STW (STB): in the upper third of the scale $+0/-5\%$					
Ambient temperature influence referring to the control / limit value range	When the ambient temperature on the case deviates from the calibration ambient temperature 22 °C, a switch point offset occurs. Higher ambient temperatures = lower switching point Lower ambient temperature = higher switching point					
	For devices with scale limit value					
	< 200 °C			+ 200 °C		
	ATH.-SE-2	ATH.-SE-20 ATH.-SE-70	ATH.-SE-2	ATH.-SE-20 ATH.-SE-70	on case	
	0.08%/K	0.17%/K	0.06%/K	0.13%/K	on capillary per m	
	0.047%/K	0.054%/K	0.09%/K	0.11%/K		
	admissible storage temperature	-50 to 50 °C				
admissible ambient temperature during use	max. +80 °C					
Rated position	as per DIN 16 257, NL 0 to NL 90 (different rated positions (NL) on request)					

Case

Case	Aluminum die cast case Surface with impact resistant textured paint: Lid: RAL 7032, bottom section: RAL7015
Set point adjustment	The switching point can be adjusted by means of a screwdriver once the case lid has been removed
Protection class	EN 60 529-IP 54
Weight	ATHf-SE-... approx. 0.70 kg ATHs-SE-... approx. 0.65 kg with screw-in sheath "20" ATHs-SE-... approx. 0.85 kg with screw-in sheath and intermediate piece "30"

Process connection

Type series ATHs-SE-... with rigid shaft	Scale limit value <u>up to</u> 150 °C	Scale limit value <u>exceeding</u> 150 °C
	Sheath "20"	Sheath "30"
	Screw-in sleeve with screw-in spigot G 1/2 form A as per DIN 3852/2	Screw-in sleeve with screw-in journal G 1/2 form A as per DIN 3852/2 and intermediate piece to ensure that the max. admissible ambient temperature of +80 °C is not exceeded on the case
Type series ATHf-SE-... with capillary	plain cylindrical probe "10" (standard)	
	Screw-in sheath "20" (on request)	
	Screw-in sleeve with screw-in spigot G 1/2 form A as per DIN 3852/2 and clamping piece with locking screw to lock the probe	
Material	Sheath "20"	Sheath "30"
	up to +150 °C CuZn as standard over +150 °C CrNi as standard	over +150 °C CrNi as standard
Fitting length S (max. 200 mm)	Standard lengths: 100, 120, 150 (material CuZn, CrNi) with 200 mm CuZn only	
Immersion tube Ø	D = 8 mm, D = 10 mm	

Note:

Physical and toxic features of the expansion means, which could occur in the event of a measuring system break.

Control range with scale limit value	Hazardous reactions	Fire and explosion hazard		hazardous to waters	Information about toxicology		
		Ignition temperature	Explosion limit		irritant	dangerous to health	toxic
< +200 °C	no	+ 355 °C	0.6 -8 V%	Yes	Yes	†	no
≥ 200 °C ≤ +300 °C	no	+ 490 °C	--	Yes	Yes	†	no

There is currently no statement by the health authority concerning hazards to health in the event of short-term exposure and low concentration, e.g. measuring system break.

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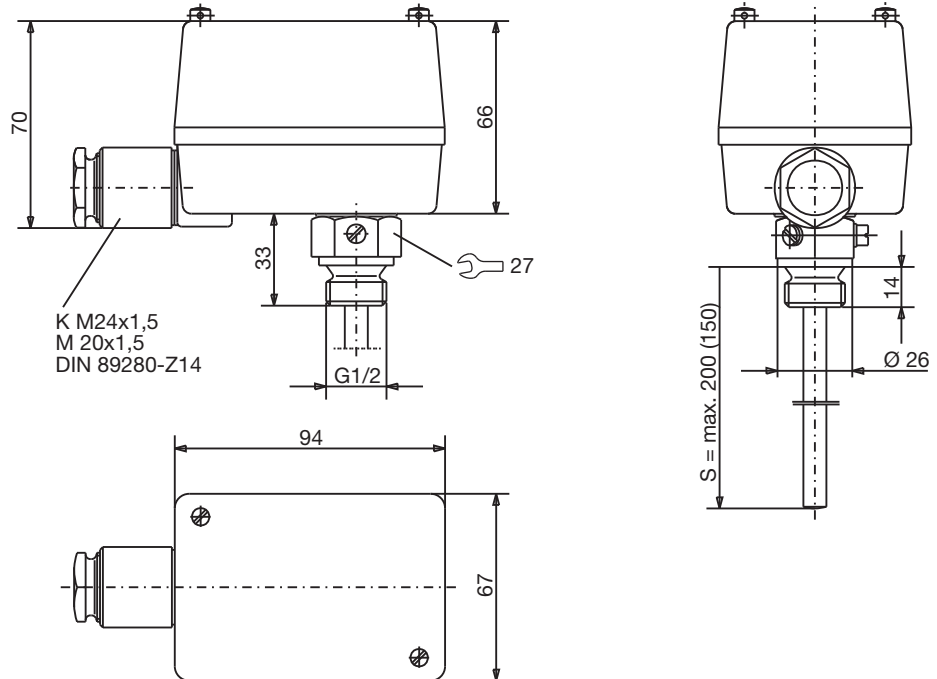
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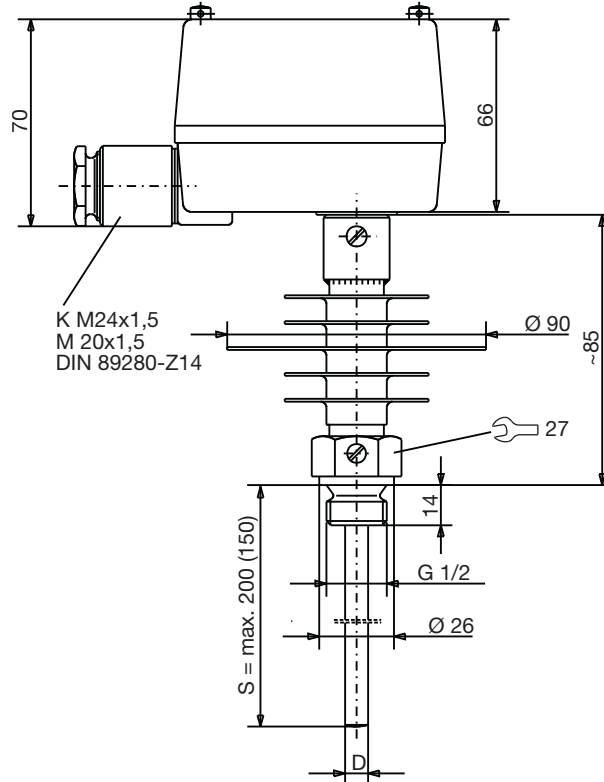


Dimensions

ATHs-SE-... 2 and 20
 with screw-in sheath "20"
 up to 150 °C



ATHs-SE-... 70
 with screw-in sheath
 and intermediate piece
 "30"
 from 150 °C to 300 °C



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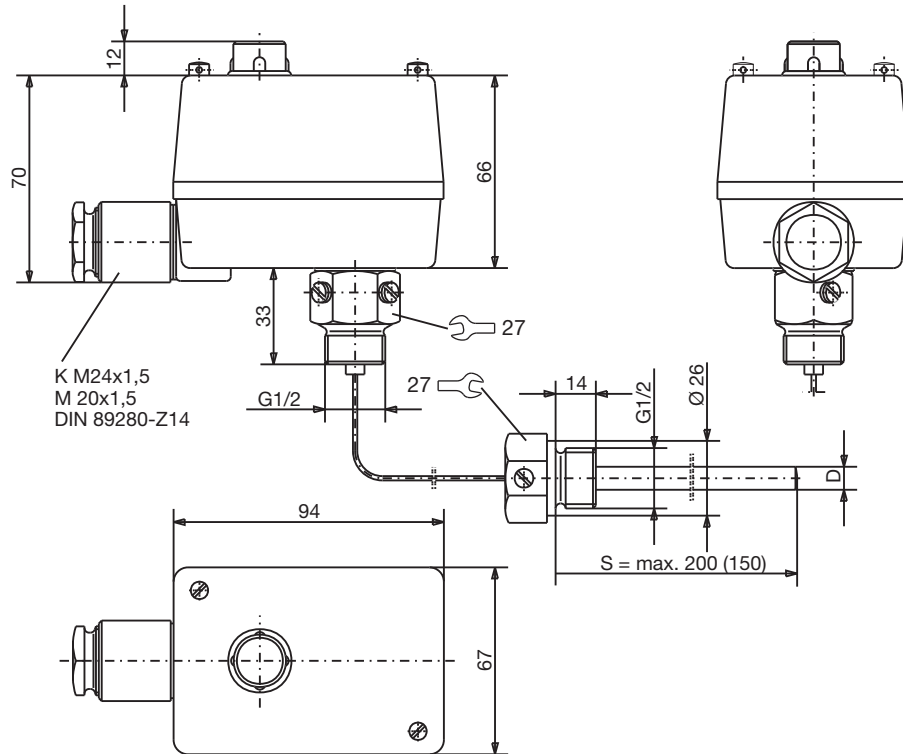
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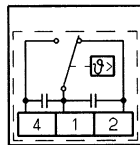


Dimensions

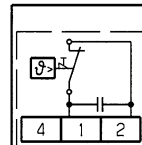
ATHs-SE... 7
 with screw-in sheath "20"
 up to 300 °C



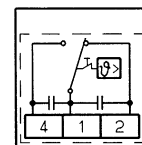
Wiring diagrams



ATH.SE-2 / ATH.SE-20



ATH.SE-70



ATH.SE-70/574

Order details

Surface-mounting thermostats, type series ATH.-SE

Order code (1) Basic type

603031 Surface-mounting thermostat, type series ATH.-SE

(2) Basic type extension

02	ATH.-SE-2	Temperature monitor TW
20	ATH.-SE-20	Safety temperature monitor STW (STB)
70	ATH.-SE-70	Safety temperature limiter STB

(3) Design

1	ATHs-SE-..	with rigid shaft
2	ATHf-SE-..	with capillary

(4) Control / limit value ranges

041	20 to 90 °C
025	0 to 100 °C
052	30 to 110 °C
042	20 to 120 °C
067	60 to 140 °C
043	20 to 150 °C
062	50 ... 200 °C
063	50 to 250 °C
064	50 to 300 °C

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Order details

Surface-mounting thermostats, type series ATH.-SE

Order code (5) Hysteresis

- 00 without hysteresis (-70 STB)
- 30 3% of the scale range S1
- 60 6% of the scale range S2
- 15 1.5% of the scale range S3



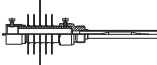
(6) Capillary length

- 0 ATHs-SE without capillary
- 1000 1000 mm
- 2000 2000 mm
- ... (Special length, specifications in plain text)

(7) Capillary material

- 00 ATHs-SE without capillary
- 40 Cu (Copper)
- 20 CrNi (Stainless steel)

(8) Process connection

- 10 plain cylindrical probe (only for ATHf-SE) 
- 20 Screw-in sheath 
- 30 Screw-in sheath with intermediate piece 

(9) Process connection thread

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

- 000 ATHf-SE without sheath
- 100 100 mm
- 120 120 mm
- 150 150 mm
- 200 200 mm (not CrNi)

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

- 00 ATHf-SE without sheath
- 8 8 mm
- 10 10 mm

(13) Diameter "d" (probe diameter)

- 6 6 mm
- 8 8 mm

(14) Extra codes

- 000 no extra code
- 574 "U"= Microswitch with N/C contact, restart lock + additional signal contact (only STB)

Order code

(1) / (2) - (3) - (4) - (5) - (6) - (7) - (8) - (9) - (10) - (11) - (12) - (13) / (14)
 603031 / .. - . - ... - .. - - .. - .. - .. - .. - ... - .. - . / ...

Order example

603031 / 20 - 1 - 025 - 15 - 0 - 00 - 20 - 13 - 46 - 150 - 8 - 6 / 000

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Surface mounting thermostat, type series ATH-SW

Protection class IP 65, single and double thermostat

Special features

- Control and monitoring of thermal processes
- Temperature monitor TW
- Safety temperature monitor STW (STB)
- and safety temperature limiter STB

Brief description

Thermostats are used to control and monitor thermal processes. Surface-mounting thermostats of the ATH-SW type series consist of one or two separate measuring and switching systems.

The devices are available as temperature monitors TW, safety temperature monitors STW (STB) and safety temperature limiters STB. In the event of a malfunction, the STB switches the monitored machine line to an operational safe status.

Surface-mounting thermostats operate according to the fluid expansion principle. The electrical switching element is a microswitch.



ATHs-SW-..



ATHf-SW-..

Approval/approval marks (see Technical Data)



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Technical Data

Switching function

Temperature monitor TW	Restart lock for the safety manual reset temperature limiter STB	Use of the safety temperature monitor STW as safety temperature limiter STB	Self-monitoring for the safety temperature limiter STB and safety temperature monitor STW (STB)
<p>If the temperature exceeds the setpoint value set on the temperature probe, the microswitch will be tripped by the transmission mechanics and the current circuit opened or closed.</p> <p>The microswitch is reset to its original status once the set point value set is gone below (by the hysteresis).</p>	<p>If the temperature exceeds the limit value set on the temperature probe, the current circuit is opened and the microswitch mechanically locked.</p> <p>The microswitch can be manually unlocked, once the dangerous temperature is gone below by approx. 10 % of the scale range (approx. 15 % with a limit value setting > 350 °C).</p>	<p>Ensure that the switching circuit downstream of the thermostat complies to DIN EN 14597 and VDE 0116.</p>	<p>If the measuring system is destroyed, i.e. if the expansion fluid escapes, the pressure in the diaphragm of the STB and STW drops and permanently opens the current circuit. Unlocking is no longer possible.</p> <p>If the probe has cooled down to a temperature within the control range table, e.g. below -20 °C, the current circuit is also opened. If the temperature rises above -20 °C, the STB must be unlocked manually. The STW automatically restarts.</p>

Control ranges and temperature probes

Switching function	fluid-filled			
	Control and limit value ranges in °C	maximum admissible probe temperature in °C	maximum capillary length mm	Probe length, dimension "L" in mm Probe Ø "d" = 6 mm (standard)
TW	-20 ... +50	060	5000	141
	-10 ... +40	050		185
	0 ... +50	060		185
	0 ... +70	080		138
	+0 ... +100	125		107
	+20 ... +090	115		138
	+30 ... +110	135		125
	+20 ... +120	140		106
	+60 ... +130	150		135
	+20 ... +150	175		88
	+50 ... +200	230		101
	+50 ... +250	290		73
	+50 ... +300	345		63
STW and STB	+30 ... +110	135	5000	108
	+60 ... +130	150		116
	+20 ... +150	175		077
	+50 ... +250	290		064
	+50 ... +300	345		055
gas-filled				
TW	+20 ... +400	460	1000	278
	+20 ... +500	575	2000	148
	+20 ... +500	575	4000	202
STW and STB	+20 ... +400	460	1000	176
	+20 ... +500	575	2000	127
	+20 ... +500	575	4000	202

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Capillary and temperature probe

Type	Scale limit value	Capillary Ø 1.5 mm	Temperature sensor	Remarks
ATH.-SW-..	up to 200 °C	Copper (Cu) Material No. Cu-DHP	Copper (Cu) Material No. Cu-DHP hard soldered	--
	up to 350 °C	Copper (Cu) Material No. Cu-DHP	Stainless steel (CrNi) hard soldered	--
	up to 350 °C	Stainless steel (CrNi)	Stainless steel (CrNi) Material No. 1.4571 welded	against surcharge
	up to 500 °C	Stainless steel (CrNi)	Stainless steel (CrNi) Material No. 1.4571 welded	--
Capillary length	standard 1000 mm, maximum 5000 mm			
min. bending radius of capillary	5 mm			

Electrical data

Switching element	TW, STW (STB)	STB
	Microswitch with change-over contact	Microswitch with N/C contact and restart lock
maximum contact rating	AC 230 V +10%, 10 (2), cos φ = 1 (0.6) DC 230 V +10%, 0.25A	
	with hysteresis 1.5% and 2% AC 230 V +10%, 6 (1.2) A, cos φ = 1 (0.6)	
	Microswitch, gold-plated, extra code /702* (*only with hysteresis 3%, 5%, and 7%) AC / DC 24 V, 0.1 A contact resistance 2.5...10 mΩ	
Contact reliability	To ensure high switching reliability, we recommend a minimum load of: with silver contacts: AC / DC = 24 V, 100 mA	for gold-plated contacts (extra code "702"): AC / DC = 10 V, 5 mA

Operating data

Hysteresis in % of the control / limit value range	Switching function	with fluid-filled measuring system		
		Rated value	Possible process value	Remarks
	TW	3	3 max. 5	serial
		6	6 max. 8	on request
		1.5	1 max. 2	Surcharge
		with gas-filled measuring system		
		5	4 max. 8	serial
		9	8 max. 12	on request
	STW (STB)	2	1.5 max. 2.5	Surcharge
		with fluid-filled measuring system		
		5	4 max. 6	serial
		9	8 max. 11	on request
		with gas-filled measuring system		
		2	1 max. 3	Surcharge
		7	5 max. 12	serial
		9	8 max. 16	on request
		2	1.5 max. 3	Surcharge
Switching point accuracy in % of the control / limit value range	TW: in the upper third of the scale ± 1.5 %, at scale beginning ± 6 % STB, STW (STB): in the upper third of the scale +0/-5 %, at scale beginning +0/-10 %			

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Ambient temperature influence referring to the control / limit value range	When the ambient temperature on the case deviates from the calibration ambient temperature 22 °C, a switch point offset occurs. Higher ambient temperatures = lower switching point Lower ambient temperature = higher switching point					
	Add-on thermostats with scale limit value					
	< 200 °C		≥ 200 °C ≤ 350 °C		> 350 °C ≤ 500 °C	
	TW	STB/STW (STB)	TW	STB/STW (STB)	TW	STB/STW (STB)
	Influence on the switch head					
	0.08 %/K	0.17 %/K	0.06 %/K	0.13 %/K	0.14 %/K	0.12 %/K
	Influence on the capillary per metre					
0.047 %/K	0.054 %/K	0.09 %/K	0.11 %/K	0.04 %/K	0.03 %/K	
admissible ambient temperature for use	max. +80 °C					
admissible storage temperature	-50 to +50 °C					
Rated position	any					

Case

standard	Aluminum die casting, painted
Set point adjustment	The switching point can be adjusted by means of a screwdriver once the case lid has been removed
Protection class	EN 60 529-IP 65
Cable inlet	Cable screw connection M 20 x 1.5, sealing area 6-12 mm
Switch head is fastened Type series ATHf-SW with capillary	with 2 screws through the case bottom part (wall mounting), lateral capillary outlet in the case.
Weight	approx. 1.2 kg

Process connection^a

Type series ATHs-SW with rigid shaft	Scale limit value up to 150 °C sheath "20"	Scale limit value over 150 °C sheath "30"
	Screw-in sleeve with screw-in spigot G 1/2 form A as per DIN 3852/2	Screw-in sleeve with screw-in journal G 1/2 form A as per DIN 3852/2 and intermediate piece, to ensure that the max. admissible ambient temperature of +80 °C is not exceeded on the case
Type series ATHf-SW with capillary	plain cylindrical probe "10" as standard	
	Screw-in sheath "20" on request	
	Screw-in sleeve with screw-in spigot G 1/2 form A as per DIN 3852/2 and clamping piece with locking screw to lock the probe	
Material	Sheath "20" up to +150 °C CuZn as a standard over +150 °C CrNi	Sheath "30" over +150 °C CrNi
Fitting length S	Standard lengths: 100, 120, 150, 200 or 300 mm different lengths on request	
Immersion tube Ø	Single thermostat D = 8 mm	Double thermostat D = 15 mm

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

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Approvals/approval marks

Single thermostats	with rigid shaft	with capillary	Switching function	DIN registry No.	Inspections
	ATHs-SW-2 *	ATHf-SW-2 *	TW	TW 892	
	ATHs-SW-20	ATHf-SW-20	STW (STB)	STW (STB) 894 S	
	ATHs-SW-70	ATHf-SW-70	STB	STB 895	
Double thermostats	ATHs-SW-22 *	ATHf-SW-22 *	TW / TW	TW / TW 901	
	ATHs-SW-220	ATHf-SW-220	TW / STW (STB)	TW / STW (STB) 903 S	
	ATHs-SW-270	ATHf-SW-270	TW / STB	TW / STB 904	
	ATHs-SW-2020	ATHf-SW-2020	STW (STB) / STW (STB)	2 x STW (STB) 905 S	
	ATHs-SW-2070	ATHf-SW-2070	STW (STB) / STB	STW (STB) / STB 906 S	
	ATHs-SW-7070	ATHf-SW-7070	STB / STB	STB / STB 907	


 DIN EN 14597
 Directive governing pressure systems
 97/23/EC
 *only tested as per DIN

Note

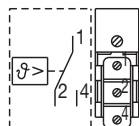
Physical and toxic features of the expansion means, which could emerge in the event of a measuring system break.

Control range with scale limit value	Hazardous reactions	Fire and explosion hazard		hazardous to waters	Information about toxicology		
		Ignition temperature	Explosion limit		irritant	dangerous to health	toxic
≤ +200 °C	no	+355 °C	0.6 - 8 V%	Yes	Yes	a	no
≤ +200 °C		+490 °C	--				
≤ +200 °C		no	0.6 - 8 V%	no	no	no	

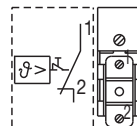
^a There is currently no statement by the health authority concerning hazards to health in the event of short-term exposure and low concentration, e.g. measuring system break.

Wiring diagrams

Single thermostats

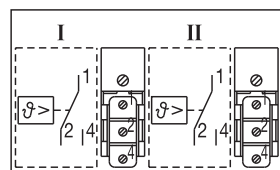


Switching function: TW, STW

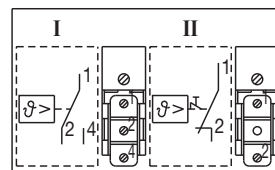


Switching function: STB

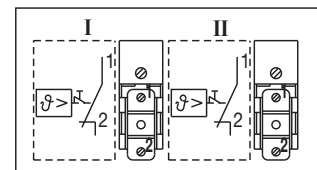
Double thermostats



System I and II:
with change-over contact
Switching function: TW, STW



System I: with change-over contact
Switching function: TW, STW
System II: with N/C contact and restart lock
Switching function: STB



System I and II:
with N/C contact and restart lock
Switching function: STB

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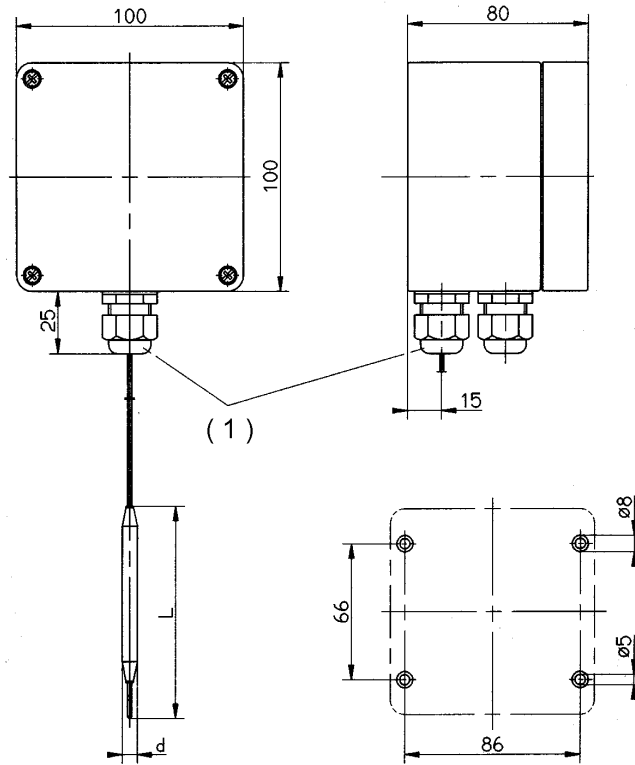
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Dimensions

ATHf-SW-..

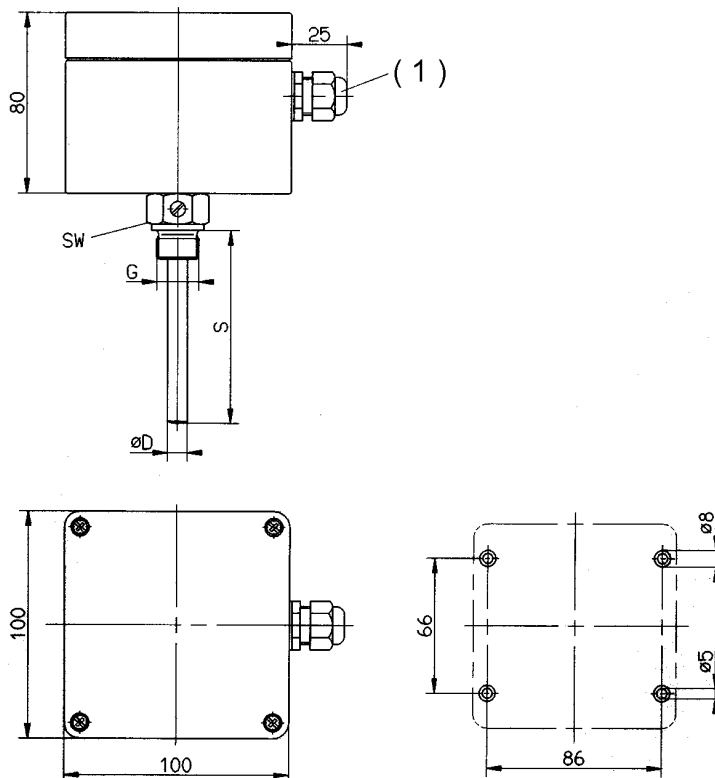
with capillary and process connection "10", plain cylindrical probe



(1) = Screw-connection M 20x1.5

ATHs-SW-..

with screw-in sheath "20"



(1) = Screw-connection M 20x1.5

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Order details

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(2) Basic type extension			
0002	ATH.-SW-2	Temperature monitor TW	
0020	ATH.-SW-20	Safety temperature monitor STW (STB)	Single thermostats
0070	ATH.-SW-70	Safety temperature limiter STB	
0202	ATH.-SW-22	TW / TW	
0220	ATH.-SW-220	TW / STW (STB)	
0270	ATH.-SW-270	TW / STB	
2020	ATH.-SW-2020	STW (STB) / STW (STB)	Double thermostats
2070	ATH.-SW-2070	STW (STB) / STB	
7070	ATH.-SW-7070	STB / STB	
(3) Design			
1	ATHs-SW-....	with rigid shaft	
2	ATHf-SW-....	with capillary	
(4) Control / limit value ranges °C			
014	-20...+50*	*only for TW	
016	-10...+40*		
021	0...+50		
022	0...+70		
025	0...+100		
041	+20...+90		
052	+30...+110		
042	+20...+120		
066	+60...+130		
043	+20...+150		
062	+50...+200		
063	+50...+250		
064	+50...+300		
045	+20...+400		
046	+20...+500		
(5) Hysteresis			
00	without hysteresis (-70 STB)		
15	1.5 % of the scale range	(only for TW)	
20	2 % of the scale range	(only for STW (STB))	
30	3 % of the scale range	(only for TW)	
50	5 % of the scale range	(only for TW + STW (STB))	
60	6 % of the scale range	(only for TW)	
70	7 % of the scale range	(only for STW (STB))	
90	9 % of the scale range	(only for STW (STB))	

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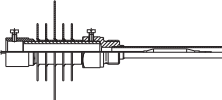
(6) Capillary length

0	ATHs-SW without capillary
1000	1000 mm
2000	2000 mm
3000	3000 mm
4000	4000 mm
5000	5000 mm
...	(special length, specifications in plain text in mm)

(7) Capillary material

00	ATHs-SW without capillary
20	CrNi stainless steel
40	Cu Copper

(8) Process connection

10	plain cylindrical probe	
20	Screw-in sheath	
30	Screw-in sheath with intermediate piece	

(9) Process connection thread ^a

00	without thread (process connection "10")
13	External thread G 1/2

(10) Material of process connection ^a

00	only with process connection "10"
20	CrNi stainless steel 1.4571
46	CuZn Brass

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

000	ATHf-SW without sheath
100	100 mm
120	120 mm
150	150 mm
200	200 mm
300	300 mm
400	400 mm
...	(special length, specifications in plain text in mm)

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

00	ATHf-SW without sheath
8	8 mm for single thermostats
15	15 mm for double thermostats

(13) Diameter "d" (probe diameter)

6	6 mm
---	------

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(14) Extra codes

000	no extra code
702	au Snap switch, gold-plated
746	Case ventilation / pressure compensation element

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

Order code

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)													
603035	/	-	.	-	...	-	..	-	-	..	-	..	-	..	-	...	-	..	-	..	-	.	/	...

Order example

603035	/	0202	-	2	-	043	-	30	-	2000	-	20	-	10	-	00	-	00	-	000	-	00	-	6	/	000
--------	---	------	---	---	---	-----	---	----	---	------	---	----	---	----	---	----	---	----	---	-----	---	----	---	---	---	-----

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Surface-mounting thermostats, type series AMTHF with 2, 3 or 4 1-pole snap switches

Special features

- Protection rating IP 54
- tested as per DIN EN 14597 (replacement for DIN 3440)



Type AMTHFs-13



Type AMTHFf-13

Brief description

Add-on thermostats are used to control and monitor thermal processes. The devices of type series AMTHF are available with 2, 3 or 4 switching stages as temperature controllers (TR) and temperature monitors (TW). The sequential gap in Kelvin for the individual circuit stages is factory-set fixed as per customer request. Add-on 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 exceeds the setpoint value set on the temperature probe, the microswitch will be tripped by the transmission mechanics and the current circuit opened or closed. The microswitch is reset to its original status once the setpoint value set is gone below (by the hysteresis).

Types

Types		Switching function	Circuit stages
with rigid shaft	with capillary		
AMTHFs-13	AMTHFf-13	TR	2
AMTHFs-133	AMTHFf-133	TR	3
AMTHFs-1333	AMTHFf-1333	TR	4
AMTHFs-23	AMTHFf-23	TW	2
AMTHFs-233	AMTHFf-233	TW	3
AMTHFs-2333	AMTHFf-2333	TW	4

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Technical data

Control range and probe table – fluid-filled

Control / limit value ranges °C	Hysteresis %	max. probe temperature °C	max. switch head temperature °C	possible capillary lengths in m	max. sequential gap K	Probe length dimension "L" in mm, Probe Ø "d" in mm Ø "6" = Standard	
						Ø 6	Ø 8
-20 to + 40	1	+ 50	+ 50	5	5	245	145
	2.5	+ 50	+ 50			245	145
	5	+ 95	+ 50 (80) ¹			138	91
	7	+ 100	+ 50 (80) ¹			103	73
0 to + 50	1	+ 60	+ 60	3	5	283	165
	2.5	+ 60	+ 60			283	165
	5	+ 105	+ 60 (80) ¹			159	101
	7	+ 110	+ 60 (80) ¹			117	80
+20 to + 90	1	+ 115	+ 80	1	7	210	127
	2.5	+ 115	+ 80			210	127
	5	+ 140	+ 80			121	82
	7	+ 175	+ 80			91	67
0 to +100	1	+ 125	+ 80	2	10	157	100
	2.5	+ 125	+ 80			157	100
	5	+ 165	+ 80			94	68
	7	+ 200	+ 80			73	58
+30 to +110	1	+ 135	+ 80	2	8	188	116
	2.5	+ 135	+ 80			188	116
	5	+ 170	+ 80			110	76
	7	+ 200	+ 80			84	63
0 to +150	1	+ 173	+ 80	1	15	113	78
	2.5	+ 173	+ 80			113	78
	5	+ 200	+ 80			72	57
0 to +200	1	+ 230	+ 80	1	20	113	78
	2.5						
+50 to +200	1	+ 230	+ 80	1	15	139	92
	2.5						
+50 to +250	1	+ 228	+ 80	1	20	105	70
	2.5	+ 228	+ 80				
	5	+ 300	+ 80				
+50 to +300	1	+ 345	+ 80	2	25	87	61
	2.5	+ 345	+ 80				

¹ Values in brackets only on request taking the operating statuses and the desired capillary length into consideration

Control range and probe table – gas-filled

Control / limit value ranges °C	Hysteresis %	max. probe temperature °C	max. switch head temperature °C	possible capillary lengths in m	max. sequential gap K	Probe length dimension "L" in mm, Probe Ø "d" in mm Ø "6" = Standard	
						Ø 6	Ø 8
+20 to +400	6	+ 460	+ 80	5	75	237	137
	10	+ 500	+ 80			127	81
+20 to +500	3 / 5	+ 530	+ 80	1	48	278	158
	6	+ 575	+ 80			95	106
	10	+ 575	+ 80			250	95

Capillary and temperature probe

Type	Scale limit value	Capillary	Temperature probe	Remarks
AMTHF	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	against surcharge
Capillary length	1000 mm, max. 5000 mm as standard			
min. bending radius of the capillary	5 mm			

Note: If the max. admissible temperature is not reached on the probe, capillary and switching head, it is possible to increase the capillary length, where it is limited to 1, 2 or 3 m as per the control range and probe table, on request. Please specify the temperature values occurring on the thermostats.

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Electrical data

Switching element	2, 3 or 4 1-pole snap switch Microswitch with change-over contact		
max. contact rating	Hysteresis switching function	N/C contact, terminal 2	N/O contact, terminal 4
	TR, TW 2.5%, 5%, 6%, 7%, 10%	AC 230 V +10%, 16 (3) A, cos φ = 1(0.6) DC 230 V +10%, 0.25A	AC 230 V +10%, 8 (1.5) A, cos φ = 1(0.6) DC 230 V +10%, 0.25A
	TR, TW 1 %, 3 %	AC 230 V +10%, 6 (2) A, cos φ = 1(0.6) DC 230 V +10%, 0.25A	
Contact reliability	To ensure high switching reliability, we recommend a minimum load of: AC / DC = 24 V, 20 mA		
Rating surge voltage	1500 V (via the switching contacts 400 V)		
Overvoltage category	II		
Required fuse rating	see max. contact rating		
Electrical connection	Screw connection up to 2.5 mm ² cable cross section		

Operating data

Hysteresis in % of the control / limit value range	Switching function	with fluid-filled measuring system						
		Rated value	Possible process value					
	TR, TW	2.5	2.5 max. 3.5	serial				
		5	5 max. 6	on request				
		7	7 max. 8	on request				
		1	1 max. 2	Surcharge				
	with gas-filled measuring system							
		5	5 max.11	serial				
		6	6 max. 14	on request				
		10	10 max. 16	on request				
	3	2.5 max. 4	Surcharge					
Sequential gap for multi-pin version	with hysteresis	Sequential gap from the scale range		Switching point accuracy of the sequential gaps from the scale range				
		minimum	maximum					
	1% 2.5% 3%, 5% 6%, 7%, 10%	1% 1% 2% 3%	as per control range table	≤ 1% ≤ 1% < 2% < 3%				
	The sequential gap is specified in K in relation to the set point value of contact deck I.							
Prefix - = switching prior to reaching the set point value, Prefix + = switching after reaching the set point value. Enter "0" for the sequential gap for a simultaneously switching version.								
Switching point accuracy in % of the control/limit value range	Switching function	Hysteresis		in the upper third of the scale or limit value				
		fluid-filled	gas-filled					
	TR	1%, 2.5% 5% 7%	-- 3%, 5%, 6%, 10%	± 1.5% ± 3.0% ± 4.0%				
TW	1%, 2.5% 5% 7%	-- 3%, 5%, 6%, 10%	+0 / -3% +0 / -6% +0 / -8%					
medium ambient temperature influence	When the ambient temperature on the switch head and/or the capillary deviates from the calibration temperature +22 °C, a switch point offset occurs. 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	TR, TW		TR, TW				
	Hysteresis in %							
	1 / 2.5	5	7	1 / 2.5	5	3 / 5	6	10
	Ambient temperature influence on the switch head in %/K							
	0.15	0.26	0.34	0.12	0.21	0.12	0.17	0.24
	Ambient temperature influence on the capillary in %/m							
	0.05 · K · m		0.09 · K · m		0.04 · K · m		0.05 · K · m	
If the operating temperature on the switch head deviates essentially from the ambient calibration temperature +22 °C, this can be taken into account on request during adjustment against surcharge.								

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Operating data

Permissible storage temperature	-50 to 50 °C
admissible ambient temperature during use	max. 80 °C
Rated position	as per DIN 16257, NL 0 to NL 90 (different rated positions on request)

Case

serial	Case lid: Polycarbonate, shock resistant Case bottom section: Die-cast aluminum, lacquered	Color: pebble gray RAL 7032 Color: anthracite gray RAL 7015
Set point adjustment	AMTHF.-1... Switching point adjustable from the outside using the rotary knob	AMTHF.-2... The switching point can be adjusted by means of a screwdriver once the case lid has been removed
Protection class	EN 60 529-IP 54	
Cable inlet	serial: self-sealing grommet M 20 × 1.5, sealing range 8-10 mm	
Weight	approx. 0.8 kg	
Switch head fastening, type series AMTHFf with capillary	serial	Screw-connection by means of counter nut M 18 × 1 on the case stud, capillary outlet on the case stud
	Extra code	
	711	with 2 screws through the case bottom section, lateral capillary outlet on the case, lid and bottom part made of plastic
	764	Fastening flange made of steel sheet, capillary outlet on the case stud
	248	Wall bracket

Process connection*

Type series AMTHFs with rigid shaft	Scale limit value <u>up to</u> 150 °C Sheath "20"	Scale limit value <u>exceeding</u> 150 °C Sheath "30"
	Screw-in sleeve with screw-in spigot G 1/2 form A as per DIN 3852/	Screw-in sleeve with screw-in journal G 1/2 form A as per DIN 3852/2 and intermediate piece, to ensure that the max. admissible ambient temperature of +80 °C is not exceeded on the case
Type series AMTHFf with capillary	plain cylindrical probe "10" (standard)	
	Screw-in sheath "20" (on request)	
	Screw-in sleeve with screw-in spigot G 1/2 form A as per DIN 3852/2 and clamping piece with locking screw to lock the probe	
Material	Sheath "20"	Sheath "30"
	up to +150 °C CuZn as a standard over +150°C CrNi	over +150 °C CrNi
Fitting length S	Standard lengths: 100, 120, 150, 200 or 300; different lengths on request	
Immersion tube Ø	D = 8 mm, D = 10 mm	

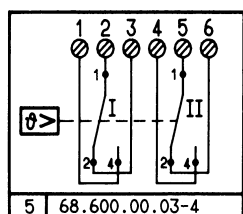
Note:

Physical and toxic features of the expansion means, which could occur in the event of a measuring system break.

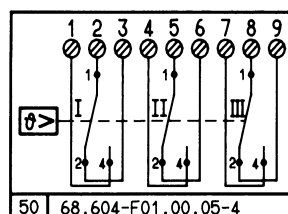
Control range with scale limit value	Hazardous reactions	Fire and explosion hazard		hazardous to waters	Information about toxicology		
		Ignition temperature	Explosion limit		irritant	dangerous to health	toxic
< +200 °C	no	+ 355 °C	0.6 - 8 V%	Yes	Yes	1	no
≥ 200 °C ≤ +300 °C	no	+ 490 °C	- -	Yes	Yes	1	no
> 350 °C ≤ +500 °C	no	no	no	no	no	no	no

¹ There is currently no statement by the health authority concerning hazards to health in the event of short-term exposure and low concentration, e.g. measuring system break.

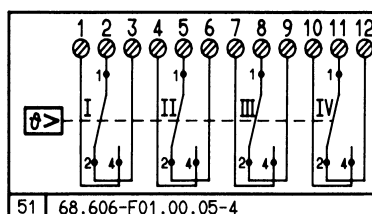
Connection diagrams



AMTHF-13
AMTHF-23



AMTHF-133
AMTHF-233



AMTHF-1333
AMTHF-2333

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Dimensions

<p>AMTHFs-1... Process connection "20" with screw-in sheath</p>	
<p>AMTHFs-2... Process connection "30" with screw-in sheath and intermediate piece for scale value exceeding +150 °C</p>	
<p>AMTHFf-1... Process connection "10" plain cylindrical probe</p>	

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Dimensions

<p>AMTHFf-2.../711 Capillary outlet lateral on the case, with plain cylindrical probe, process connection "10"</p>	
<p>AMTHFf-2.../764 with "72" sheet steel flange with screw-in sheath "20"</p>	
<p>AMTHFf-1.../248 with "73" wall support with screw-in sheath "20"</p>	

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Order details

Surface-mounting thermostats, type series AMTHF

Order code	(1) Basic type
603051	Surface-mounting thermostat, type series AMTHF with 2, 3 or 4 1-pole snap switches
(2) Basic type extension (function)	
0013	AMTHF.-13 Temperature controller 2-pin
0023	AMTHF.-23 Temperature monitor 2-pin
0133	AMTHF.-133 Temperature controller 3-pin
0233	AMTHF.-233 Temperature monitor 3-pin
1333	AMTHF.-1333 Temperature controller 4-pin
2333	AMTHF.-2333 Temperature monitor 4-pin
(3) Design	
1	AMTHF s with rigid shaft
2	AMTHF f with capillary
(4) Control / limit value ranges	
013	-20 to + 40 °C
021	0 to + 50 °C
041	+20 to + 90 °C
025	0 to +100 °C
052	+30 to +110 °C
027	0 to +150 °C
028	0 to +200 °C
062	+50 to +200 °C
063	+50 to +250 °C
064	+50 to +300 °C
045	+20 to +400 °C
046	+20 to +500 °C
(5) Hysteresis	
10	1%
25	2.5%
50	5%
70	7%
30	3%
50	5%
60	6%
01	10%
	of the scale range with fluid-filled measuring systems
	of the scale range with gas-filled measuring systems
(6) Capillary length (specifications in mm)	
0	AMTHFs without capillary
1000	1000 mm
2000	2000 mm
3000	3000 mm
4000	4000 mm
5000	5000 mm
...	(Special length, specifications in plain text)
(7) Capillary material	
00	AMTHFs without capillary
40	Cu (Copper)
20	CrNi (stainless steel)

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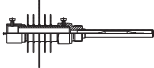
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Order details

Surface-mounting thermostats, type series AMTHF

Order code	(8) Process connection*	
10	plain cylindrical probe (only for AM.f)	
20	Screw-in sheath	
30	Screw-in sheath with intermediate piece	
	(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) Fitting length "S" (immersion tube length)	
000	AMTHFf without sheath	
100	100 mm	
120	120 mm	
150	150 mm	
200	200 mm	
300	300 mm	
400	400 mm	
...	(Special length, specifications in plain text)	
	(12) Diameter "D" (immersion tube diameter)	
00	AMTHFf without sheath	
8	8 mm	
10	10 mm	
	(13) Diameter "d" (probe diameter)	
6	6 mm	
8	8 mm	
	(14) Extra codes	
000	no extra code	
711	Switch head fastening with 2 screws through the case bottom section, lateral capillary outlet on the case, lid and bottom part made of plastic	
764	Fastening flange made of steel sheet, capillary outlet on the case stud	
248	Wall bracket	

* For different connection types and sheaths, please refer to data sheet 606710.

Sequential gap for 2-, 3- and 4-pin devices: Please specify in plain text (e.g. +2K, +5K, +8K)

Order code:

(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14)
 603051 / / - . - ... - .. - - .. - .. - .. - .. - ... - .. - ... / ... ,

Order example:

603051 / / 0133 - 2 - 025 - 25 - 2000 - 40 - 10 - 00 - 00 - 000 - 00 - 6 / 248

Sequential gap: _____

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JUMO heatTHERM-AT and JUMO heatTHERM-DR

Type 603070, Surface-Mounted or Room Thermostat Versions

Special features

- **PUSH IN**-connection technology - **reduced installation time by 50 %**
- Stable switching point position due to ambient temperature compensation (standard)
- Max. switching capacity 16 A, 230 V
- Tested according to DIN EN 14597
- Operating life at least 250,000 switching cycles for TR and TW
- Switching point deviation during the entire operating life of up to $\pm 5 \%$
- Protection type max. IP 54
- UL approval (extra code 061)

Brief description

High application flexibility and the latest connection technology are the essential equipment features of this new thermostat series.

The thermostat case is suitable for all common installation types such as wall mounting, immersion sleeve, and contact fastening. It can be used universally and reduces the variant range because different mounting types must no longer be taken into account.

The JUMO heatTHERM-DR (type 7+8) type is a specific variation with a special housing bottom section for DIN rail or wall mounting. As a result, easy mounting on mounting rails TH35 according to DIN EN 60715 (e.g. in control cabinets) is possible. This variant considerably reduces the mounting time. The flue gas automatic reset temperature limiter JUMO heatTHERM-AT locks the gas/oil vessel that is connected in parallel with the wood vessel to a chimney.

For these international innovative surface-mounted thermostats with "Push-In[®]" terminal technology, the connection wires are only inserted into the terminal point up to the stop - that's it! No tool is required for connecting the wire or strand with a ferrule and the wiring becomes safer. In this manner, the costs and time required for connection are considerably reduced compared to the conventional screw terminal.

The "Push-In[®]" terminal technology allows direct switching of loads up to 16 A at 230 V AC. The installation costs can be reduced further because a load contactor is no longer required.

Available are temperature controllers (TR), temperature monitors (TW), safety temperature monitors (STW), safety temperature limiters (STB) as single or double thermostats, and flue gas temperature monitors (ATW).

Approvals according to DIN EN 14597, DGRL, and UL indicate the high quality standards for this product series.



Type 603070/0170 (TR/STB)



Type 603070/0001 (TR)



Type 603070/0002 (TW)



Type 603070/0002 (TW)

Approvals/approval marks (see "Technical Data")



DGRL
97/23/EG



Design type 5+6*



Design type 7+8*

* Only with extra code 061

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Technical data

Switching function

Temperature controller TR / temperature monitor TW	<p>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.</p> <p>If the temperature falls below the selected setpoint value (by the amount of the switching differential), the microswitch is reset to its initial position.</p>
Safety temperature monitor STW	<p>If the temperature on the temperature probe exceeds the setpoint value, the snap-action switch is activated 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 snap-action switch is reset to its initial position.</p> <p>If the probe has cooled down to a temperature below approx. -20 °C the same electrical circuit opens - however it closes again when the temperature rises.</p> <p>If the measuring system is destroyed (i.e. if the expansion fluid emerges) the pressure in the diaphragm drops and permanently opens the electrical circuit.</p>
Safety temperature limiter STB	<p>If the temperature on the temperature probe exceeds the switching point, the snap-action switch is activated, the electrical circuit is opened or closed, and the snap-action switch is mechanically locked.</p> <p>The unlocking difference depends on the control range. Exact values are available from the respective types. They are also available upon request. If the temperature falls below the selected setpoint value (by the amount of the unlocking difference) then the snap-action switch can be manually unlocked again.</p> <p>If the probe has cooled down to a temperature below approx. -20 °C the electrical circuit opens - however it closes again when the temperature rises.</p> <p>If the measuring system is destroyed (i.e. if the expansion fluid emerges) the pressure in the diaphragm drops and permanently opens the electrical circuit. Unlocking is no longer possible.</p>

Temperature compensation

When the ambient temperature on the switching head and the capillary deviates — from the calibration ambient temperature of +22 °C — a switching point offset occurs. This switching point offset is reduced to a minimum due to the temperature compensation.

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Technical data

Case

	Type 5 + 6	Type 7 + 8
Case	Case bottom section: Color: cobalt-blue RAL 5013 (for TZ 061 light-gray, RAL 7035) Case lid: ABS with inspection glass (PMMA) Color: cobalt-blue RAL 5013 (for TZ 061 light-gray, RAL 7035)	PA (reinforced) Color: Silver-gray RAL 7001 (for TZ 061 black)
Setpoint adjustment	TR Switching point can be adjusted externally with the rotary knob. TW, STW, STB, ATW Switching point can be adjusted with a screwdriver once the case lid has been removed. The set switching point can be checked through the inspection glass.	- - Switching point can be adjusted with a screwdriver.
Protection type	IP 54 according to EN 60 529	IP 20 according to EN 60 529
Cable inlet	Cable gland M20 x 1.5, for cable-Ø 6-12 mm	Cable connection directly on PUSH IN terminals
Capillary	Ø 1.5 mm - min. bending radius of the capillary 5 mm - material: copper (Cu) or stainless steel (CrNi, 1.4301)	
Case fastening	Pipe mounting with clamping belt for pipe diameter 15-100 mm, thermowell mounting, wall mounting	Wall mounting, DIN rail installation TH35 according to DIN EN 60715
Weight	Approx. 0.2 kg	

Electrical data

Electric contact	Snap-action switch with single-pole changeover contact	
Switching capacity	TR / TW / STW / ATW On the N/C contact (contact deck 1-2): AC 230 V +10 %, 16 (2.5) A, cos φ = 1 (0.6), DC 230 V +10 %, 0.25 A On the N/O contact (contact deck 1-4): AC 230 V +10 %, 6.3 (2.5) A, cos φ = 1 (0.6), DC 230 V +10 %, 0.25 A	STB On the N/C contact (contact deck 1-2): AC 230 V +10 %, 16 (2.5) A, cos φ = 1 (0.6), DC 230 V +10 %, 0.25 A On the signal contact (contact deck 1-4): AC 230 V +10 %, 2 (0.4) A, cos φ = 1 (0.6), DC 230 V +10 %, 0.25 A
Electrical connection	PUSH IN contact (plug-type terminal) "Push-In [®] " terminal technology: patented connection technology by Weidmüller GmbH & Co. KG, Detmold, Germany	
Connection cross section	0.75 to 2.5 mm ² fine wired (single-wire, fine wired with ferrule)	
Switching reliability	To ensure the greatest possible switching reliability, we recommend a minimum load of: AC / DC = 24 V, 100 mA for silver contacts AC / DC = 10 V, 5 mA for gold-plated contacts (TZ 702)	

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Operating data

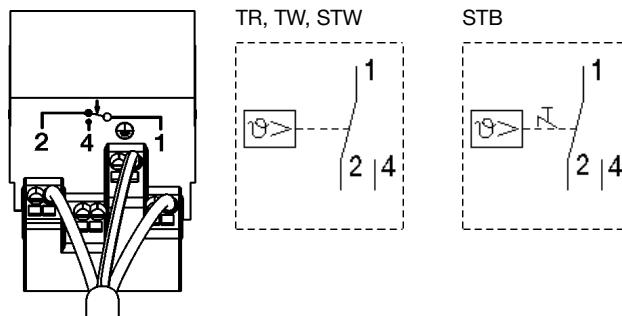
Switching point accuracy	TR, TW	STW, STB with a setting range of:			
		+20 °C to +80 °C		+70 °C to +130 °C	
	Switching differential 2.5%	In the "first half" (+20 °C to +50 °C)	In the "second half" (+50 °C to +80 °C)	In the "first half" (+70 °C to +100 °C)	In the "second half" (+100 °C to +130 °C)
	In the upper third of the scale $\pm 3\%$, at scale beginning $\pm 6\%$	+0/-8 K	+0/-5 K	+0/-12 K	+0/-5 K
Temperature compensation	When the ambient temperature on the switching head and the capillary deviates — from the calibration ambient temperature of +22 °C — a switching point offset of approx. -0.1 K/K occurs (switching point change referring to the ambient temperature change, measured at limit value +120 °C permanently set and capillary length 2,000 mm). This switching point offset is reduced to a minimum due to the standard temperature compensation.				
Limit value temperatures	For transport and storage: -30 °C to +50 °C				
	During use: max. +80 °C, for TZ 061 UL approval max. +65 °C (type 7 max. 55 °C; type 6+8 max. +50 °C)				
	For pipe mounting: max. pipe temperature +120 °C				
Rated position	According to DIN 16257, rated position 0 to rated position 90 (different rated positions upon request)				

Approvals/approval marks

Approval marks	Inspection authority	Certificates/certification number	Inspection basis	Valid for
DIN	DIN CERTCO	TR1191, TW1192, STW(STB)1193, STB1194, ATW1218	DIN EN 14597	JUMO heatTHERM-AT/-DR according to type
DIN	TÜV Süd (German Technical Inspection Agency)	DIN EN ISO 13849-1	B _{10d} = 250,000*	JUMO heatTHERM-AT/-DR
DGRL	TÜV Süd (German Technical Inspection Agency)	IS-TAF-MUC 07113377017	Pressure Equipment Directive 97/23/EC	STW and STB
UL	UL Germany	E 66358	UL 873	JUMO heatTHERM-DR

* For further details see: Safety manual JUMO heatTHERM (-AT), (-DR) 602031, 603070.
 Contact rating check conducted at 16 A, 230 V, resistive load.

Wiring diagrams



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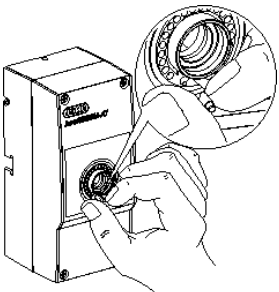
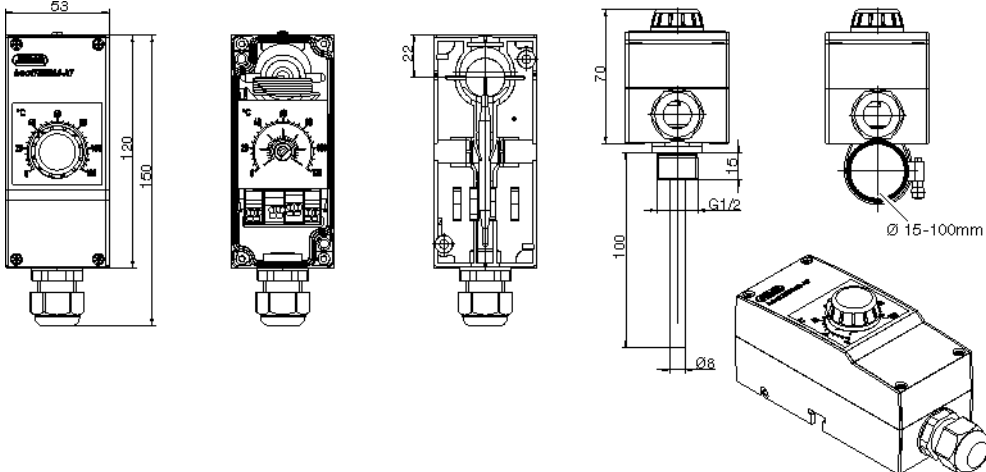
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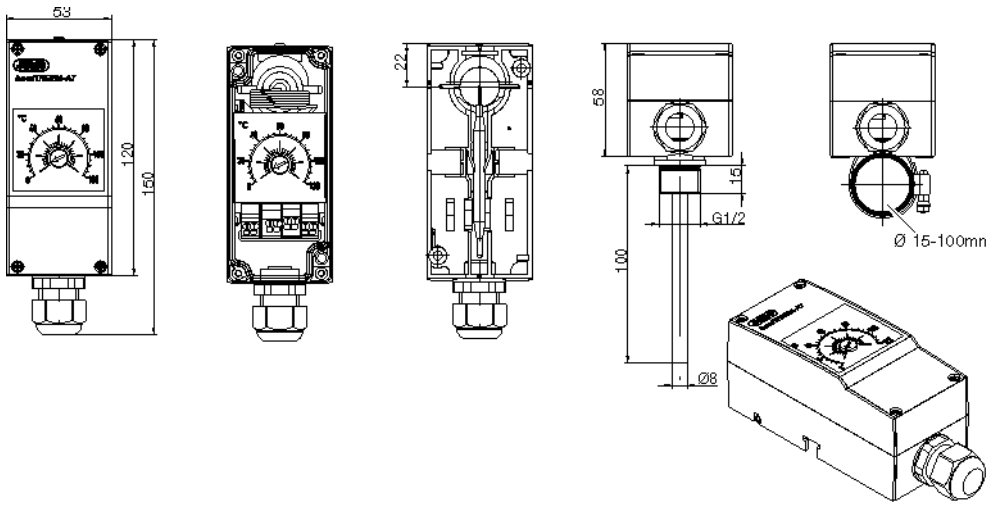
Devices in stock: JUMO heatTHERM-AT

Temperature controller TR, type 5

Type 603070/0001^a <ul style="list-style-type: none"> Protection type IP 54 Compensation of the ambient temperature Individual limitation of the control range 						
Part no.	Type	Control range °C	Capillary mm	Probe-Ø (d) × L mm	Switching differential	Process connection
60003185	JUMO	0 to +120	2000	6 × 87	Approx. 3 K	With internal capillary and contact probe
60003186	heatTHERM-AT/0001					Thermowell U 4, brass nickel-plated

^a Further design versions (control range, switching differential, process connection) upon request - minimum order quantity 100 pieces. Thermowells page 15.

Temperature monitor TW

Type 603070/0002^a <ul style="list-style-type: none"> Protection type IP 54 Compensation of the ambient temperature Switching value check through inspection window in the case lid 						
Part no.	Type	Control range °C	Capillary mm	Probe-Ø (d) × L mm	Switching differential	Process connection
60003187	JUMO	0 to +120	2000	6 × 87	Approx. 3 K	With internal capillary and contact probe
60003188	heatTHERM-AT/0002					Thermowell U 4, brass nickel-plated

^a Further design versions (control range, switching differential, process connection) upon request - minimum order quantity 100 pieces. Thermowells page 15.

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Devices in stock: JUMO heatTHERM-AT

Safety temperature monitor STW, type 5

Type 603070/0020^a <ul style="list-style-type: none"> Protection type IP 54 Switching value check through inspection window in the case lid Compensation of the ambient temperature Subsequent sealing of the case lid is possible Capillary break protection 						
Part no.	Type	Control range °C	Capillary mm	Probe-∅ (d) × L mm	Switching differential	Process connection
60003229	JUMO	+20 to +80	2000	6 x 60	Approx. 10 K	With internal capillary and contact probe
60003189	heatTHERM-AT/0020	+70 to +130				Thermowell U 4, brass nickel-plated

^a Further design versions (control range, switching differential, process connection) upon request - minimum order quantity 100 pieces. Thermowells page 15.

Safety temperature limiter STB, type 5

Type 603070/0070^a <ul style="list-style-type: none"> Protection type IP 54 Switching value check through inspection window in the case lid External acknowledgement of the switching point is possible Compensation of the ambient temperature Subsequent sealing of the case lid is possible Capillary break protection 						
Part no.	Type	Control range °C	Capillary mm	Probe-∅ (d) × L mm	Unlocking difference	Process connection
60003230	JUMO	+70 to +130	2000	6 x 60	Approx. 10 K	With internal capillary and contact probe
60003190	heatTHERM-AT/0070					Thermowell U 4, brass nickel-plated

^a Further design versions (control range, switching differential, process connection) upon request - minimum order quantity 100 pieces. Thermowells page 15.

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Devices in stock: JUMO heatTHERM-AT

Room thermostat temperature controller TR, type 6

Type 603070/0001^a

- Protection type IP 54
- Wall mounting
- Individual limitation of the control range

Part no.	Type	Control range °C	Capillary mm	Probe-Ø (d) x L mm	Switching differential	Process connection
60003191	JUMO	-10 to +40	--	--	1.5 - 2 K	Spiral probe
60003192	heatTHERM-AT/0001	0 to +50				

^a Further design versions (control range, switching differential, process connection) upon request - minimum order quantity 100 pieces. Thermowells page 15.

Room thermostat temperature limiter TW, type 6

Type 603070/0002^a

- Protection type IP 54
- Wall mounting
- Switching value check through inspection window in the case lid

Part no.	Type	Control range °C	Capillary mm	Probe-Ø (d) x L mm	Switching differential	Process connection
60003193	JUMO	-10 to +40	--	--	1.5 - 2 K	Spiral probe
60003194	heatTHERM-AT/0002	0 to +50				

^a Further design versions (control range, switching differential, process connection) upon request - minimum order quantity 100 pieces. Thermowells page 15.

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Devices in stock: JUMO heatTHERM-AT

Temperature controller / safety temperature monitor TR/STW, type 5

Type 603070/0120^a <ul style="list-style-type: none"> Protection type IP 54 Switching value check through inspection window in the case lid Compensation of the ambient temperature Capillary break protection for STW 						
Part no.	Type	Control range °C	Capillary mm	Probe-Ø (d) × L mm	Switching differential	Process connection
60003195	JUMO heatTHERM-AT/0120	TR: 0 to +120	2000	6 × 87	Approx. 3 K	With internal capillary and contact probe
		STW: 70 to +130		6 × 60	Approx. 10 K	
60003231		TR: 0 to +120		6 × 87	Approx. 3 K	Thermowell; brass nickel-plated
		STW: 70 to +130		6 × 60	Approx. 10 K	

^a Further design versions (control range, switching differential, process connection) upon request - minimum order quantity 100 pieces. Thermowells page 15.

Temperature controller / safety temperature limiter TR/STB, type 5

Type 603070/0170^a <ul style="list-style-type: none"> Protection type IP 54 Switching value check through inspection window in the case lid Compensation of the ambient temperature Capillary break protection for STW 							
Part no.	Type	Control range °C	Capillary mm	Probe-Ø (d) × L mm	Switching differential/ unlocking difference	Process connection	
60003196	JUMO heatTHERM-AT/0170	TR: 0 to +120	2000	6 × 87	Approx. 3 K	With internal capillary and contact probe	
		STB: 70 to +130		6 × 60	Approx. 10 K		
60003232				TR: 0 to +120	6 × 87	Approx. 3 K	Thermowell; brass nickel-plated
				STB: 70 to +130	6 × 60	Approx. 10 K	

^a Further design versions (control range, switching differential, process connection) upon request - minimum order quantity 100 pieces. Thermowells page 15.

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Devices in stock: JUMO heatTHERM-AT

Room thermostat temperature monitor / temperature monitor TW/TW, type 6

Type 603070/0202^a <ul style="list-style-type: none"> Protection type IP 54 Wall mounting Switching value control through inspection window in the case lid 						
Part no.	Type	Control range °C	Capillary mm	Probe-Ø (d) × L mm	Switching differential	Process connection
60003212	JUMO	-10 to +40	--	--	1.5 - 2 K	Spiral probe
60003213	heatTHERM-AT/0202	0 to +50	--	--		

^a Further design versions (control range, switching differential, process connection) upon request - minimum order quantity 100 pieces. Thermowells page 15.

Flue gas temperature monitor with mounting sleeve, design 5

Type 603070/0020^a <ul style="list-style-type: none"> Switching value check through inspection window in the case lid Max. allowable probe temperature +600 °C Approval as ATW with capillary break protection according to DIN EN 14597 Time constant $t_{0.632} \leq 45$ sec. in flue gas 						
Part no.	Type	Control range °C	Capillary mm	Probe-Ø (d) × L mm	Switching differential	Process connection
60003390	JUMO heatTHERM-AT/0020	+20 to +280	--	6 mm	Approx. 18 K	Intermediate piece with mounting flange

^a Further design versions (control range, switching differential, process connection) upon request - minimum order quantity 100 pieces. Thermowells page 15.

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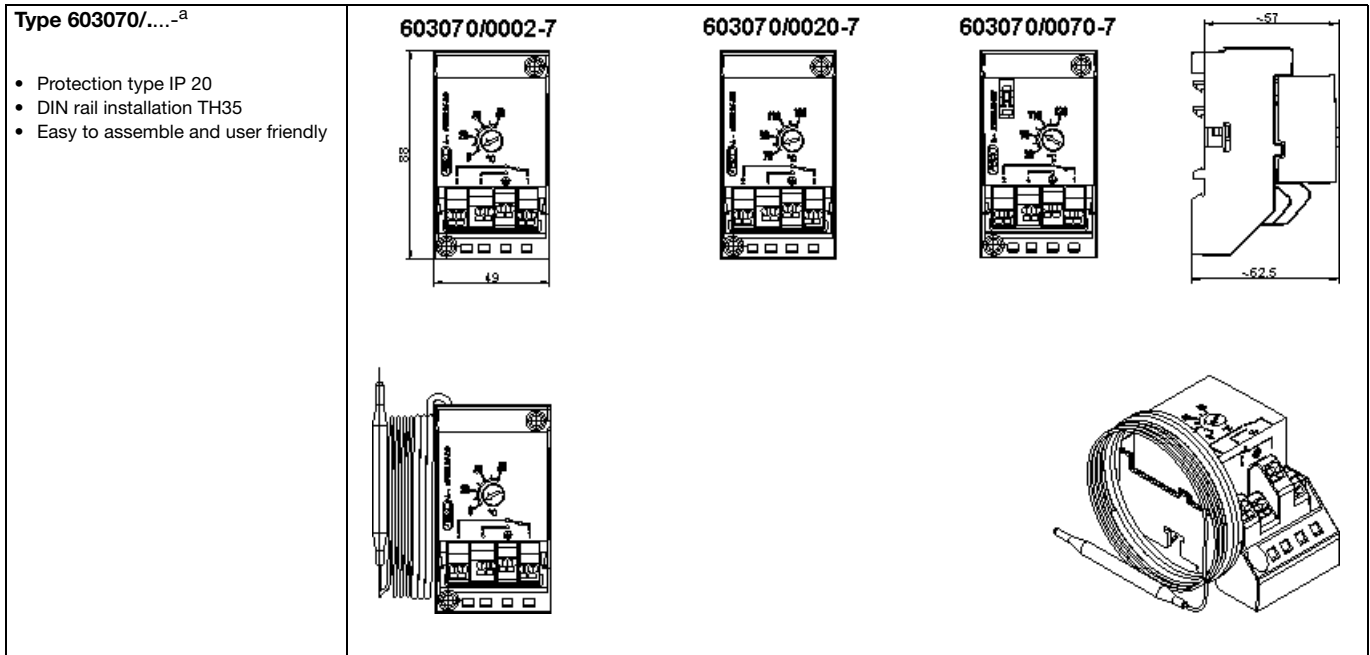
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Devices in stock: JUMO heatTHERM-DR

Thermostat for DIN rail installation TH35, according to DIN EN 60715, type 7



- Type 603070/....^a
- Protection type IP 20
 - DIN rail installation TH35
 - Easy to assemble and user friendly

Part no.	Type	Control range °C	Capillary mm	Probe-∅ (d) × L mm	Switching differential	Process connection
Temperature monitor TW						
60003283	603070/0002	0 to +120	2000	6 × 87	Approx. 3K	With capillary and contact probe
60003284	603070/0002	0 to +200		6 × 78	Approx. 5 K	
60003285	603070/0002	+50 to +300		6 × 66	Approx. 6 K	
Safety temperature monitor STW						
60003286	603070/0020	+70 to +130	2000	6 × 60	Approx. 10 K	With capillary and contact probe
Safety temperature limiter STB					Unlocking difference	
60003287	603070/0070	+70 to +130	2000	6 × 60	Approx. 10K	With capillary and contact probe
60003299	603070/0070	+20 to +150		6 × 63	In the upper third approx. 15 K At the scale beginning approx. 30 K	
60003300	603070/0070	+50 to +300		6 × 63	In the upper third approx. 25 K At the scale beginning approx. 45 K	

^a Further design versions (control range, switching differential, process connection) upon request - minimum order quantity 100 pieces. Thermowells page 15.

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JUMO heatTHERM-DR

Thermostat for DIN rail installation TH35, according to DIN EN 60715, type 8

<p>Type 603070/0002-8^a</p> <ul style="list-style-type: none"> • Protection type IP 20 • DIN rail installation TH35 • Easy to assemble and user friendly <p>Fastening hole (1) = Ø 4.5 mm</p>	<p>603070/0002-8</p>	<p>603070/0020-8</p>	<p>603070/0070-8</p>	
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^a Upon request - minimum order quantity 100 pieces.

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 1-800-554-5866
 Fax: 315-437-5860
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Order details

Surface-mounted thermostat JUMO heatTHERM, type 603070

Minimum purchase order 100 pieces

Order code	(1) Basic type
603070	JUMO heatTHERM with single-pole snap-action switch
(2) Basic type extension	
0001	Temperature controller (TR)
0002	Temperature monitor (TW)
0020	Safety temperature monitor (STW) or flue gas temperature monitor (ATW)
0070	Safety temperature limiter (STB)
0120	Temperature controller / safety temperature monitor (TR/STW)
0170	Temperature controller / safety temperature limiter (TR/STB)
0202	Temperature monitor / temperature monitor (TW/TW)
(3) Type	
5	 Surface-mounted thermostat, with thermowell, flange sleeve, capillary, or as contact probe
6	 Room thermostat with spiral probe
7	 DIN rail thermostat, with capillary
8	 DIN rail thermostat, with spiral probe
(4) Control range / limit value range 1 [°C]	
016	-10 to +40 TR, TW
021	0 to +50 TR, TW
026	0 to +120 TR, TW
028	0 to +200 TR, TW, STB
040	+20 to +80 STW
043	+20 to +150 TR, TW, STB
064	+50 to +300 TR, TW, STB With thermowell, select process connection 76
671	+70 to +130 STW, STB
384	+20 to +280 ATW Only with process connection 80
Further control ranges / limit value ranges up to 350 °C upon request (up to +500 °C without approval)	
(5) Control range / limit value range 2 [°C]	
000	Single thermostat
016	-10 to +40 TR, TW Adjustable
021	0 to +50 TR, TW Adjustable
671	+70 to +130 STW, STB Adjustable
Further control ranges / limit value ranges up to 350 °C upon request (up to +500 °C without approval)	

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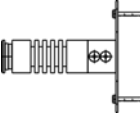

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Order details

Surface-mounted thermostat JUMO heatTHERM, type 603070

Order code	(6)	Switching differential 1
00		Without switching differential (STB)
25	2.5 %	of the scale range
70	7 %	of the scale range
	(7)	Switching differential 2
00		Without switching differential (STB)
25	2.5 %	of the scale range
70	7 %	of the scale range
	(8)	Capillary length 1
0		0 mm only for room thermostat
2000		2000 mm Special length upon request
	(9)	Capillary length 2
0		0 mm only for room thermostat
2000		2000 mm Special length upon request
	(10)	Material of capillary 1
00		Without capillary
20	CrNi	Stainless steel
40	Cu	Copper
	(11)	Material of capillary 2
00		Without capillary Single thermostat
20	CrNi	Stainless steel
40	Cu	Copper
	(12)	Process connection
10		Plain cylindrical probe / contact probe 
15		Spiral probe 
80 ^a		Intermediate piece with mounting flange 
76 ^b		Intermediate piece 

^a Only control ranges +20 to +280 °C (ATW) selectable.

^b For process connection 76, select sheath according to data sheet 606710, screw-in sheath "20" U with thread G1/2 made of stainless steel (CrNi).

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Order details

Surface-mounted thermostat JUMO heatTHERM, type 603070

Order code	(13)	Diameter 1
6		∅ 6 mm
17		∅ 17 mm Spiral probe for room thermostat (with process connection 15)
(14) Diameter 2		
00		Single thermostat
6		∅ 6 mm
17		∅ 17 mm Spiral probe for room thermostat (with process connection 15)
(15) Probe material 1		
20	CrNi	Stainless steel
40	Cu	Copper
(16) Probe material 2		
00		Single thermostat
20	CrNi	Stainless steel
40	Cu	Copper
(17) Capillary insulation		
00		No protective tube
13		PVC tube, black
(18) Insulation length (from case)		
0		No protective hose
460		460 mm
		Special length upon request
(19) Extra codes^a		
000		Without extra codes
061		With UL approval
402		Case protection type IP54
702		Snap-action switch, gold-plated
749		Setting range with 250 angular degrees (only STB/STW)
758		Tightening band for contact probe

^a List extra codes in sequence, separated by commas.

Order code

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)			
6073070	/																		/		, ...

Order example

603070	/	0001	-	5	-	021	-	671	-	70	-	00	-	2000	-	00	-	40	-	00	-	10	-	6	-	00	-	20	-	20	-	00	-	0	/	000 ^a	, ...
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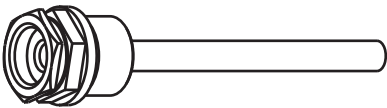

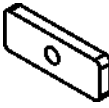

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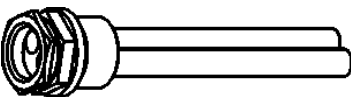

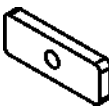

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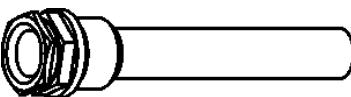


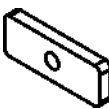




Accessories

(according to product group 606710)

Thermowell set		Thermowell with sealing collar		Clamp for strain relief	Plate for surface-mounted thermostat	Screw for surface-mounted thermostat
Suitable for 1 probe						
Part no.	Type	Abbreviation	Connection	∅ sleeve × fitting length EL	Material	Pressure loading capacity at +150 °C
60003177	Thermowell for JUMO heatTHERM, 1 probe	28	G 1/2	8 × 100 mm	Brass/nickel-plated	48 bar
60003203				8 × 150 mm		
60003171				8 × 200 mm		
60003172	Thermowell for JUMO heatTHERM, 2 probes	29	G 1/2	8 × 100 mm	Stainless steel / 1.4571	88 bar
60003205				8 × 150 mm		
60003173				8 × 200 mm		

Thermowell set		Thermowell with sealing collar		Clamp for strain relief	Plate for surface-mounted thermostat	Screw for surface-mounted thermostat
Suitable for 2 probes						
Part no.	Type	Abbreviation	Connection	∅ sleeve × fitting length EL	Material	Pressure loading capacity at +150 °C
60003178	Thermowell for JUMO heatTHERM, 2 probes	29	G 1/2	2 × 8 × 100 mm	Brass / nickel-plated	48 bar
60003204				2 × 8 × 150 mm		
60003174				2 × 8 × 200 mm		

Thermowell set		Thermowell with sealing collar		Pressure spring	Clamp for strain relief	Plate for surface-mounted thermostat	Screw for surface-mounted thermostat
Suitable for 2 probes							
Part no.	Type	Abbreviation	Connection	∅ sleeve × fitting length EL	Material	Pressure loading capacity at +150 °C	
60003175	Thermowell for JUMO heatTHERM, 2 probes	49	G 1/2	15 × 100 mm	Stainless steel / 1.4571	48 bar	
60003206				15 × 150 mm			
60003176				15 × 200 mm			

Adapter piece for thermowell		Material
Part no.		Steel / nickel-plated
00507273		

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JUMO frostTHERM-AT/-DR

Type 604100, Surface-mounted or DIN Rail Thermostat

Special features

- **PUSH IN** connection technology • **reduced installation time by 50 %**
- Maximum switching capacity 16 A, 230 V
- Protection type (AT) IP40 - IP65
(DR) IP20

Brief description

The frost protection thermostat is used for temperature monitoring in ventilation and air conditioning systems to prevent damage caused by frost. It has a low switching differential and a high reproducibility. Reset occurs automatically (STW) or manually (STB).

High application flexibility and the latest connection technology are the essential equipment features of this thermostat series. The thermostat case is suitable for all common installation types such as wall, pipe, and DIN rail mounting. The JUMO frostTHERM-DR type is a specific variation with a special case bottom section for DIN rail or wall mounting. This allows easy mounting on mounting rails TH35 according to DIN EN 60715 (e.g. in control cabinets). This version considerably reduces the mounting time.

The "Push-In[®]" terminal technology allows the connection wires to be only inserted into the contact point up to the stop. No tool is required for connecting the wire or braid with the ferrule, thereby increasing safety during wiring. As a result, the costs and time required for connection is considerably reduced compared that of the conventional screw terminal.

The "Push-In[®]" terminal technology allows direct switching of loads up to 16 A at 230 V AC. The installation costs can be reduced further because a contactor is not required.



JUMO frostTHERM-AT (STW)



JUMO frostTHERM-DR (STW)

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Switching function

Safety temperature monitor STW	If the probe line falls below the entered setpoint value over a length of 15 cm with 3 m, 30 cm with 6 m, and 40 cm with 12 m, then electrical circuit 1-2 is opened while electrical circuit 1-4 is closed due to the change-over function. When the temperature rises, the microswitch is automatically switched back to its original position. If the measuring system is destroyed (i.e. if the expansion fluid escapes) the pressure in the diaphragm drops and permanently opens electrical circuit 1-2 and closes electrical circuit 1-4.
Safety temperature limiter STB	In the event of a temperature drop, the safety temperature limiter automatically locks and can only be unlocked manually once the temperature has risen again. If the measuring system is destroyed (i.e. if the expansion fluid escapes), the pressure in the diaphragm drops and permanently opens electrical circuit 1-2 and closes electrical circuit 1-4.

Technical data

	Type 5	Type 7
Case	Case bottom section: Color: Cobalt blue RAL 5013 Case lid: ABS with inspection window (PMMA) Color: Cobalt blue RAL 5013	PA (reinforced) Color: Silver gray RAL 7001
Setpoint value adjustment STW, STB	The switching point can be adjusted with a screwdriver once the case lid has been removed. The set switching point can be checked through the inspection glass.	Switching point can adjusted with a screwdriver.
Protection class	IP 40 according to EN 60529 IP 65 according to EN 60529 (TZ 404)	IP 20 according to EN 60529
Electrical connection	Cable gland M 20 x 1.5, for cable Ø 6-12 mm	Cable connection directly on PUSH IN terminals
Probe line-Ø	Approx. 2.4 mm (or 9.5 mm with 1.8 m capillary)	
Case mounting	Wall mounting / pipe mounting	Wall mounting, DIN rail installation TH35 according to DIN EN 60715
Weight	Approx. 0.2 kg	
Allowable storage temperature	-30 °C to +80 °C	
Allowable ambient conditions on the switching head	-20 °C to +80 °C The ambient temperature must exceed the switching point by +2 °C.	
Maximum allowable probe line temperature	120 °C	
Allowable minimum bending radius of the probe line	20 mm	

Electrical data

Electrical contact	Snap-action switch with single-pole changeover contact	
Switching capacity	STW	STB
	On the N/C contact (contact deck 1-2): AC 230 V +10 %, 16 (2.5) A, cos φ = 1 (0.6), DC 230 V +10 %, 0.25 A On the N/O contact (contact deck 1-4): AC 230 V +10 %, 6.3 (2.5) A, cos φ = 1 (0.6), DC 230 V +10 %, 0.25 A	On the N/C contact (contact deck 1-2): AC 230 V +10 %, 16 (2.5) A, cos φ = 1 (0.6), DC 230 V +10 %, 0.25 A On the signal contact (contact deck 1-4): AC 230 V +10 %, 2 (0.4) A, cos φ = 1 (0.6), DC 230 V +10 %, 0.25 A
Electrical connection	PUSH IN contact (plug-type terminal) "Push-In" terminal technology: Patented connection technology from Weidmüller GmbH & Co. KG, Detmold.	
Connection cross section	0.75 to 2.5 mm ² finely stranded (single-wire, fine wired with ferrule)	
Switching reliability	To ensure high switching reliability, we recommend a minimum load of: AC / DC = 24 V, 100 mA with silver contacts	
Switching point accuracy	+/- 2 °C	
Switching differential	1.5 +/- 1 °C	

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Factory setting switching point	5 °C
---------------------------------	------

Connection diagram

		<p>STW</p>	<p>STB</p>	<p>The connection diagram included in the data sheet provides initial information about the connection options. Only use the installation instructions or the operating instructions for the electrical connection. The know-how and the correct technical implementation of the safety instructions/warnings contained in these documents are prerequisite for the installation, electrical connection, and startup as well as for safety during operation.</p>
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Dimensions

JUMO frostTHERM type 604100

JUMO frostTHERM-AT					
JUMO frostTHERM-DR					

Accessories

(Data sheet 606710)

Sales no.	Type	Material	
60/00558731	Holder	Polyamide, reinforced	
3 pieces			
60/00558730			
6 pieces			

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Order details

JUMO frostTHERM type 604100

Order code	(1) Basic type
604100	JUMO frostTHERM with single-pole snap-action switch
	(2) Basic type extension
20	Safety temperature monitor (STW)
70	Safety temperature limiter (STB)
	(3) Type
5	 Surface-mounted thermostat
7	 DIN rail thermostat
	(4) Control / limit value range
140	-10 to +15 STW, STB
	(5) Probe line length
1800	1800 mm Capillary with bulb probe
3000	3000 mm
6000	6000 mm
12000	12000 mm
	(6) Probe diameter
0	Without (for probe line)
9	∅ 9.5 mm (for 1800 mm capillary with cartridge probe)
	(7) Probe material
40	Cu Copper
	(8) Extra code
000	Without extra code
404	Case protection class IP65

Order code

(1) (2) (3) (4) (5) (6) (7) (8)
 604100 / [] - [] - [] - [] - [] - [] / []

Order example

604100 / [20] - [5] - [140] - [3000] - [0] - [40] / [404]

Stock versions

Sales no.	Type	Control Range °C	Probe lead length	Protection class
60003347	JUMO frostTHERM-AT /20	-10 to +15	3000 mm	IP 40
60003348			6000 mm	
60003349			3000 mm	IP 65
60003350			6000 mm	

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JUMO frostTHERM-ATE

Electronic Frost Protection Thermostat, Type 604170

Special features

- Active probe line, setting range 1 to 10°C
- Operating mode with choice of manual or automatic reset
- Regulated membrane heating
- Self-monitoring of the probe line
- Signal input/output for valve control DC 0 to 10 V
- Probe line length 2000 mm or 6000 mm
- Protection type EN 60529, IP42
- Operating voltage (SELV) AC 24 V

Brief description

The frost protection thermostat is used for air-side temperature monitoring in ventilation and air conditioning systems to prevent damage caused by freezing.

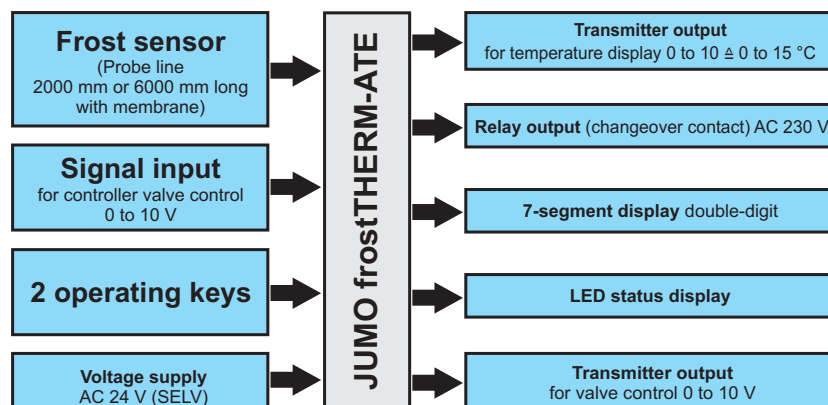
Applications:

- Switching off ventilators
- Opening heating valves
- Closing air flaps
- Or other measures to prevent freezing

Thanks to the freely selectable switching point between 1 and 10 °C and the choice of a monitoring (automatic reset) or limiting function (manual reset), the JUMO frostTHERM-ATE can always be adjusted to suit the requirements of any particular application. The self-monitoring feature for the probe line ensures that the thermostat switches to frost function and the monitored plant remains protected at all times if a capillary tube breaks.



Block diagram





Description

Device function

The frost monitor uses a steam-filled probe line and a membrane system to record the lowest temperature that occurs anywhere along at least 250 mm of the probe line. Assuming the probe line is correctly aligned at the air outlet for the air heater, it will also record the lowest temperature in the event of varying air temperature layers.

The steam pressure in the probe line displaces the membrane. With the help of an inductive measuring system, this movement is converted into an electrical signal and electronically amplified, and in turn generates a DC 0 to 10 V measuring signal.

In order to ensure it is always the lowest temperature measured at the probe line, the membrane temperature in the inner part of the case must always be higher than the probe line temperature. The heating facility installed in the case as standard achieves this by keeping the membrane temperature over 15 °C at ambient temperatures down to -15 °C.

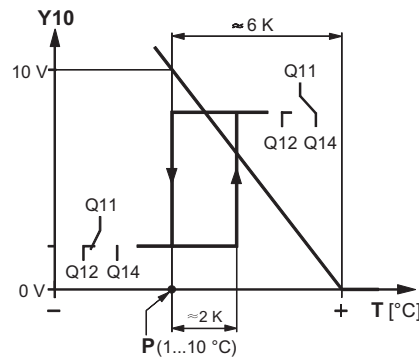
Function

The frost monitor uses three independent functions to help it perform its task:

1. It keeps the heating valve constantly open within a proportional control range.
2. It switches off the ventilators via its relay contact and closes the flaps.
3. It makes the measured temperature available for further processing.

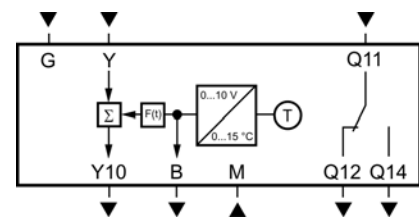
The measuring signal undergoes further processing and becomes the frost signal for the monitor function and valve control. At around 6 kelvin above the set switching point (P), the frost signal starts to increase.

Function chart



P = Switching point can be adjusted
 T = Capillary temperature
 Y10 = Valve control signal (Y = DC 0 V)
 Q11/12/14 = Relay output (changeover contact) AC 230 V

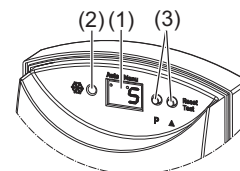
Circuit diagram for device



G = Voltage supply (SELV) AC 24 V
 M = System zero point, measurement zero point
 B = Transducer output
 DC 0 to 10 V ± 0 to 15 °C
 Y = Signal input for valve controller
 DC 0 to 10 V
 Y10 = Transducer output for valve control
 DC 0 to 10 V
 Q11/12/14 = Relay output AC/DC 12 to 230 V
 Q12 = Closed if risk of frost

Display and control elements

(1) Display	7-segment 2-digit display, red
(2) Relay status indication	1 LED for relay output
(3) Keys	To operate and program the device in order to perform a reset in manual operating mode



Parameters and configuration

Description	Display	Default setting	Value range
Switching point	Sp	5 °C	1 to 10 °C
Operating mode	St	Automatic	Automatic (At) Manual (Hd)

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 Internet: www.jumousa.com



Technical data

Specifications

Measuring range	Measuring range	0 to 15 °C
	Setting range	1 to 10 °C
Adjustment point		5 °C
	Accuracy at adjustment point	+/- 1 K
Switching differential		Approx. 2 K
Time constant	In still air	Approx. 90 s
	In moving air	< 40 s
Probe line	Minimum response length	250 mm
	Admissible temperature	Max. 110 °C
Weight	Frost monitor, 2 m probe line	Approx. 0.34 kg
	Frost monitor, 6 m probe line	Approx. 0.41 kg

Electrical data

according to EN 60730

Electrical connection	Terminals featuring tension springs	Max. 2 x 1.5 mm ² or 1 x 2.5 mm ² Min. 0.25 mm ²
	Cable inlet	Cable gland M16, for cable Ø 5 to 10 mm
Voltage supply		AC 24 V +10 % / -20 %
	Frequency	48 to 63 Hz
	Power consumption	Max. 6.6 VA
Analog input	Valve control (terminal Y)	DC 0 to 10 V
	Current	Max. 0.1 mA
	Admissible line length for 1.5 mm ²	300 m
Analog outputs	Probe temperature (terminal B)	DC 0 to 10 V ± 0 to 15 °C
	Valve control (terminal Y10)	DC 0 to 10 V
	Current	Max. 1 mA
	Admissible line length for 1.5 mm ²	300 m
Relay output (terminal Q11, -12, -14)	Output	Floating
	Min. switching capacity	AC/DC 12 V, 100 mA
	Max. switching capacity	AC 230 V, 6(2) A; DC 24 V, 6 A

Environmental influences

Operating temperature range	Operation according to	IEC 721-3-3
	Climatic conditions	Class 3K5
	Temperature	-15 to +55 °C
	Humidity	< 85 % r. H.
Storage/Transport	Operation according to	IEC 721-3-2
	Climatic conditions	Class 2K3
	Temperature	-25 to +65 °C
	Humidity	< 95 % r. H.
Electromagnetic compatibility	Interference emission	Class B according to EN 61 326-1
	Interference immunity	Industrial requirements according to EN 61 326-1
	CE conformity according to the EMC Directive	2004/108/EC
	Low Voltage Directive	2006/95/EC
Vibration strength	DIN EN 60 721-3-3	Class 3M2

Case

Materials/Colors	Case lid	PC, transparent
	Case bottom section	PA, silver gray (RAL 7001)
	Cover cap	ABS, light gray (RAL 7035)
	Probe line	Copper
	Packaging	Corrugated cardboard

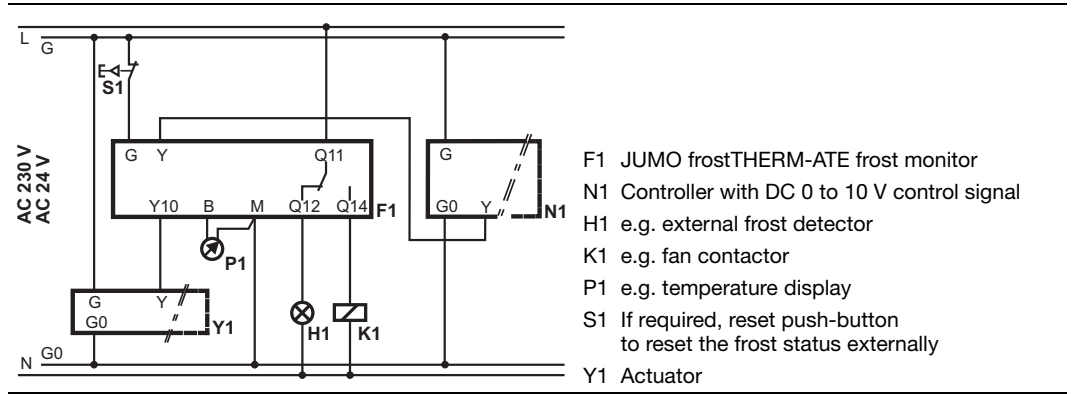
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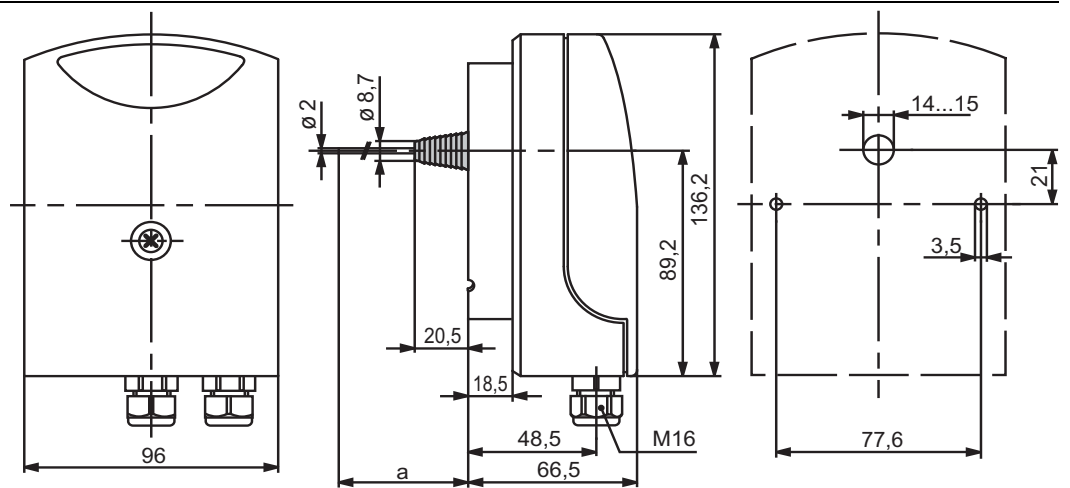


Connection example

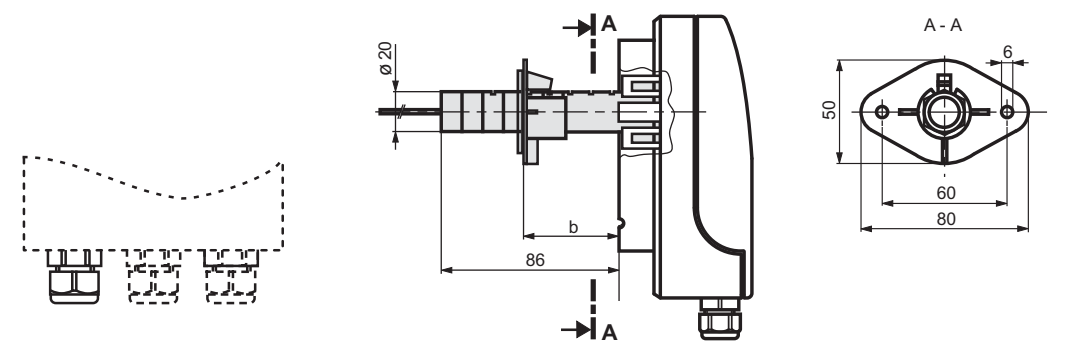


Dimensions

Measurements in mm



Optional connectable accessories



b	
Max.	Min.
70	10

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Order details

Order code	(1)	Basic type
604170		JUMO frostTHERM-ATE
	(2)	Basic type extension
02		Frost monitor with relay contact
	(3)	Design type
5		Surface-mounted thermostat (standard)
	(4)	Control range
008		1 to 10°C
	(5)	Probe line length
2000		2000 mm
6000		6000 mm
	(6)	Probe material
40		Cu (copper)
	(7)	Extra code
000		Without extra code
102		Neutral version

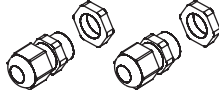


Order code (1) (2) (3) (4) (5) (6) (7)
 604170 / - - - - - /
 Order example 604170 / 02 - 5 - 008 - 6000 - 40 / 000

Stock version



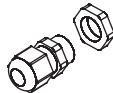
JUMO frostTHERM-ATE	Probe line length 2000 mm	TN 60003410
	Probe line length 6000 mm	TN 60003411

Accessories

Accessories
 integrated as standard

2 x cable glands M 16 x 1.5	
2 x screws for direct mounting	
1 x rubber plug for routing the probe line	

Optional
 connectable accessories

Mounting flange	Reinforced polyamide		1 piece	TN 00604453
Holder	Reinforced polyamide		3 pieces	TN 00558731
			6 pieces	TN 00558730
Cable gland M 16 x 1.5			1 piece	TN 00495887

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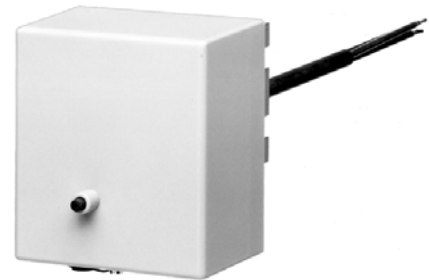


Hot Air Thermostats

WTHc series

Special features

- With microswitch
- Device combination consisting of 3 individual devices
- Protection class IP 40 or IP 54
- Tested according to DIN EN 14597



WTHc-2280

Brief description

Thermostats are used to control and monitor thermal processes.

The thermostats of the WTHc series are suitable for the use in hot air systems acc. to DIN 4794 and consist of 3 separate measuring and switching systems with the following functions: temperature controller TR, temperature monitor TW, and safety temperature limiter STB.

In the event of a malfunction, the STB switches the monitored machine line to an operational safe status.

Hot air thermostats operate according to the fluid expansion principle. The electrical switching elements are microswitches.



WTHc-2280-SW

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

Temperature monitor TW and safety temperature limiter STB

The microswitch can be manually unlocked once the dangerous temperature drops by approx. 10 K. The microswitch can be manually unlocked once the dangerous temperature drops by approx. 10 K.

Self-monitoring for the safety temperature limiter STB

If the measuring system is destroyed (i.e. if the expansion fluid escapes) the pressure in the membrane of the STB drops and permanently opens the electrical circuit. Unlocking is then no longer possible. If the probe has cooled down to a temperature below approx. -20 °C the electrical circuit opens – however it automatically closes again when the temperature rises.

Approval/approval marks (see "Technical data")



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Technical data

General information

Control ranges and limit values

Control range / limit value	Ventilator controller	Burner monitor	Protection temperature limiter S
	TR - system 2 +20 to +80 °C	TW - system 2 +70 to +90 °C	STB - system 80 or 40 limit value 100 °C

Capillary and temperature probe

Capillary	Material: copper (Cu), material No. 2.0090
	Diameter: Ø 1.5 mm
	Capillary length including probe: 350 mm with support tube, 1250 mm without support tube ^a
	Minimum bending radius: 5 mm
Temperature probe	Material: copper (Cu), material No. 2.0090, hard soldered
	Diameter: 3 probes Ø 4 mm

^a Probe identification for the version with capillary: ventilator controller TR: red; burner monitor TW: blue

Electrical data

Switching element	Ventilator controller burner monitor	Safety temperature limiter STB System 80	Safety temperature limiter STB System 40/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	AC 230 V +10 %, 10 (2) A, cos φ = 1 (0.6) DC 230 V +10 %, 0.25 A		
Electrical connection	Via terminal rail, after removing the case lid, temperature controller and terminal rail are mounted to a PCB (epoxy resin glass fabrics) with printed diagram		

Operating data

Switching differential	Switching function: Ventilator controller TR	14 ± 2 K
	Burner monitor TW	6 ± 1 K
Switching point accuracy	Switching function: In the upper third of the scale or limit value	At the scale beginning
	Ventilator controller TR: ± 4 K	± 6 K
	Burner monitor TW: ± 4 K	± 4 K
	Safety temperature limiter STB: +0/-5 K	---
Ambient temperature influence	On the switching head: 0.35 K/K	
	On the capillary: per meter: 0.07K/K	
Operating medium	Air	
Time constant	In air: ≤ 120 s	
Over-temperature security	At the temperature probe +200 °C	
Admissible storage temperature	-50 to +50 °C	
Admissible ambient temperature for use	Max. +80 °C	
Rated position	Acc. to DIN 16 257, rated position 0 to rated position 90 (different rated position on request)	

Comment	To achieve the full response accuracy, only use the device without the probe thermowells. The temperature probes of the device must be completely submerged into the operating medium to be monitored.
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Case

Standard	Case lid: polycarbonate Case bottom part: sheet steel, painted	Color: pebble gray RAL 7032
Extra code "SW"	Case lid: polycarbonate Case bottom part: aluminum die casting, painted	Color: pebble gray RAL 7032 Colour: anthracite gray RAL 7015
Setpoint value setting	Safety temperature limiter STB: permanently factory-set	Ventilator controller TR and burner monitor TW: The switching point can be adjusted by using a screwdriver once the case lid has been removed

	Standard	For extra code /SW
Protection type	EN 60 529-IP 40	EN 60 529-IP 54
Cable inlet	2 plug-type sockets	EN 60 529-IP 54
Mounting of switching head	With 2 screws through the case bottom part	With 2 screws on the support tube flange, then with one screw on the hexagonal part of the support tube
Weight	Approx. 0.7 kg	

Approval/approval marks

Approval marks	Inspection authority	Certificates / inspection number	Inspection basics	Valid for
DIN	DIN CERTCO / TÜV Süd	TR/TW/STB1064	DIN EN 14597	WTHc hot air thermostats
DIN	DIN CERTCO / TÜV Süd	TR/TW/STW1205	DIN EN 14597	

Note

Physical and toxic features of the expansion means, which could emerge in the event of a measuring system break.

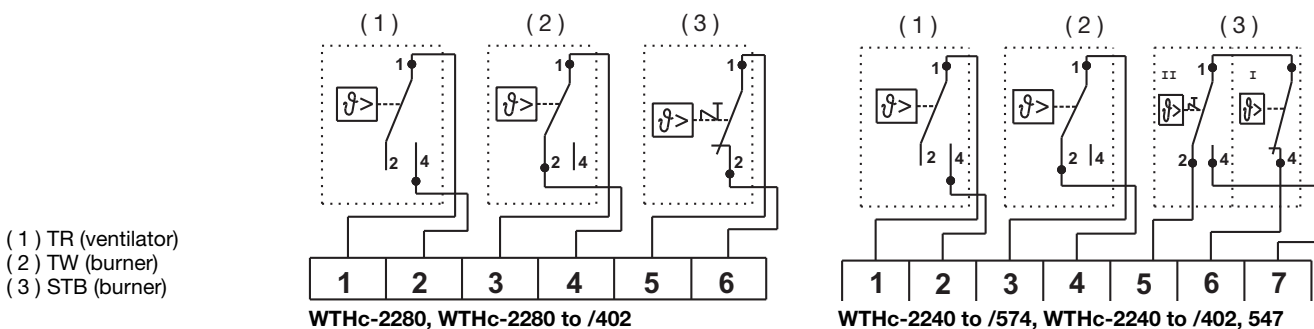
Control range with scale limit value	Hazardous reactions	Fire and explosion hazard		Hazardous to waters	Information about toxicology		
		Ignition temperature	Explosion limit		Irritant	Dangerous to health	Toxic
≤ +200 °C	No	+355 °C	0.6 - 8 V%	Yes	Yes	^a	No

^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

Connection diagram

The connection diagram in the data sheet provides preliminary information about the connection possibilities. For the electrical connection only use the operating manual. The knowledge and the correct technical execution of the safety information/instructions contained in these documents are mandatory for installation, electrical connection, and startup as well as for safety during operation.

Wiring diagrams



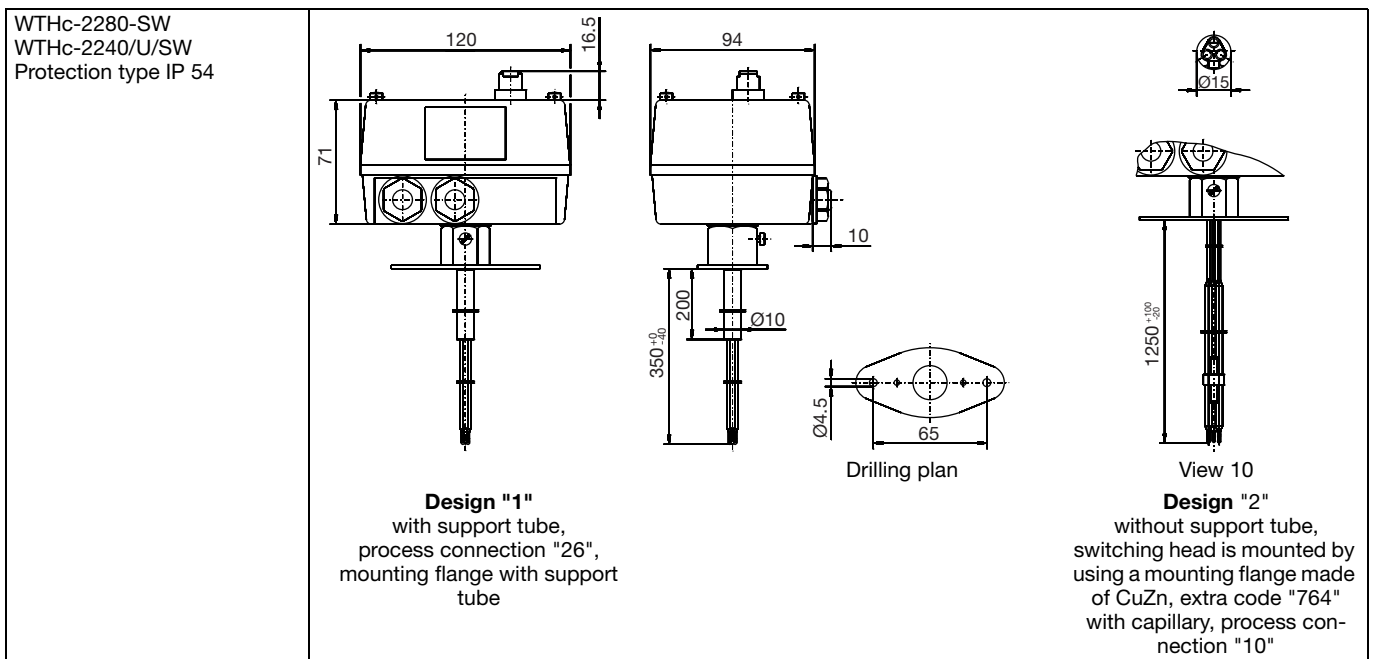
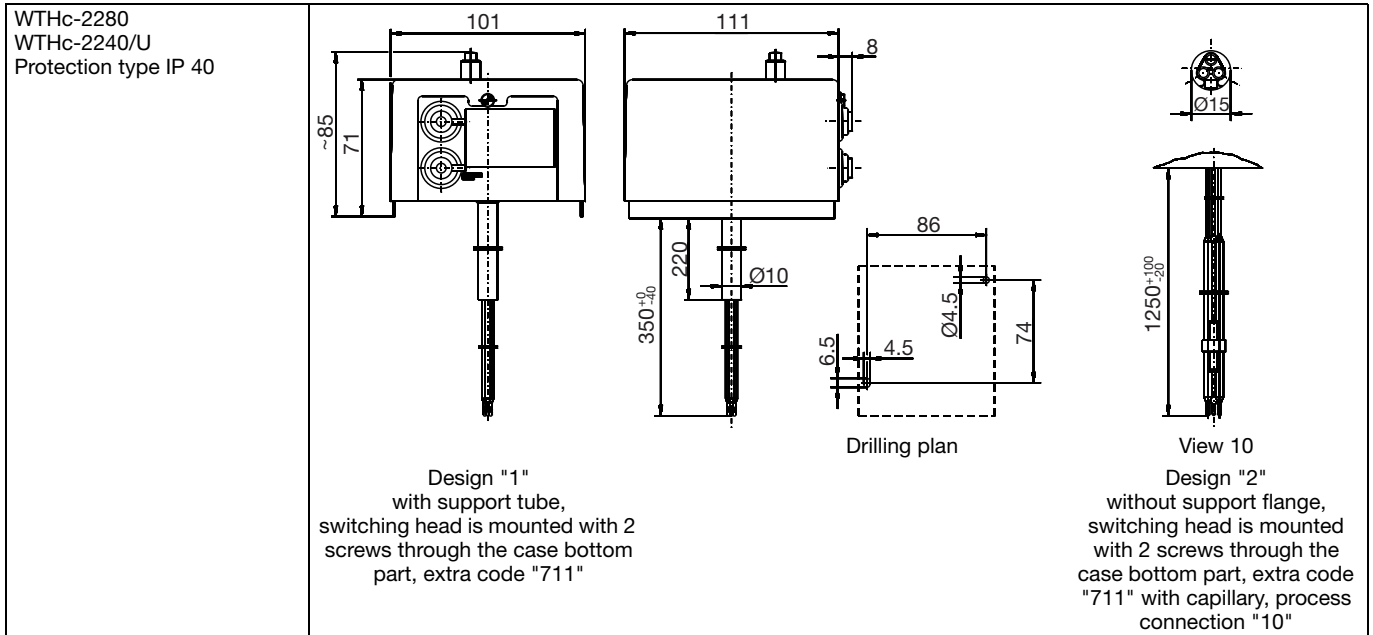
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Dimensions



Stock versions

Part no.	Type	Control range °C	Capillary including probe mm	Installation length mm
60002161	WTHc-2280	TR = +20 to +80	- -	350
60002162	WTHc-2280	TW = +70 to +90	1250	- -
60002658	WTHc-2280-SW	STB = +100 fix	- -	320

(Delivery within 3 working days after receipt of order)

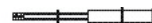
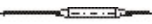
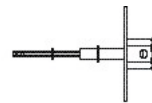
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Order details

Order code	(1) Basic type	
604514	Hot air thermostat, WTHc series	
	(2) Basic type extensions	
2280	WTHc-2280	Temperature controller TR and temperature monitor TW with changeover contact, safety temperature limiter STB with N/C contact, and restart lock
2240	WTHc-2240	Temperature controller TR and temperature monitor TW with changeover contact, safety temperature limiter STB with N/C contact, restart lock, and additional signal contact (only with extra code "574")
	(3) Design type	
1	With support tube (with capillary)	
2	Without support tube (with capillary)	
	(4) Control / limit value range, temperature controller^a	
040	+20 to +80 °C	
	(5) Control / limit value range, temperature controller^a	
070	+70 to +90 °C	
	(6) Limit value, safety temperature limiter^a	
10	+100 °C	
	(7) Capillary length	
0	Design type 01 (with capillary)	
1250	1250 mm (only capillary without support tube)	
....	(Special length, specification in mm, max. 5000 mm)	
	(8) Process connection (PA)	
00	Switching head mounting "711", design type 01	
10	Plain cylindrical probe (only for design type 02)	
26	Protection tube with flange, open	
	(9) Fitting length	
000	With capillary	
350	350 mm (support tube with capillary)	
	(10) Probe diameter Ø	
4	4 mm	
	(11) Extra codes	
000	Without extra codes	
574	Microswitch with N/C contact, restart lock, and additional signal contacts (only for STB)	
402	Protection type IP 54: dust and splash-water-proof case	
711	Switching head is mounted by 2 screws through the bottom section of the case	
764	Mounting flange made of CUZn	

^a Other control / limit ranges upon request

Order code	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)											
	605414	/		-		-		-		-		/		, ...								
Order example	604514	/	2240	-	1	-	040	-	070	-	100	-	0	-	26	-	350	-	4	/	000 ^a	, ...

^a List extra codes in sequence, separated by commas.

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JUMO exTHERM-AT

Type 605055, Explosion-proof surface-mounted thermostat for zones 1, 2, 21, and 22

Special features

- Single thermostat and double thermostat with capillary or rigid thermowell
- Switching capacity up to 25 A
- Admissible ambient temperatures -55 °C to +70 °C
- Thermowell for use in zone 0 available as an accessory
- Quick and safer electrical connection through Push-In® terminal technology
- Stable switching points through standard ambient temperature compensation

Brief description

The explosion-proof surface-mounted thermostats of the JUMO exTHERM series are built to monitor and control temperatures in potentially explosive areas. The use in environments with gas and steam is permitted (zones 1 and 2); use in environments with conductive dust (zones 21 and 22) is also permitted.

The JUMO exTHERM-AT is available as temperature monitor TW, safety temperature monitor (STW), and safety temperature limiter (STB). The thermostats work according to the liquid expansion or gas expansion principle. The electrical switching element is a pressure-resistant encapsulated thermostat with a snap-action switch. Stable switching points when ambient temperatures fluctuate are made possible by the standard ambient temperature compensation.

The thermostats of the JUMO exTHERM-AT series are RoHS conform and cadmium free.

Version according to DIN EN 14597:

TW	Temperature monitor
STW	Safety temperature monitor
STB	Safety temperature limiter

ATEX identification

	II 2G Ex d e IIC T4/T5/T6 Gb For explosive gas atmosphere
	II 2D Ex tb IIIC T85 °C/T100 °C/T130 °C Db For explosive dust atmosphere

ATEX confirmation

EPS 11 ATEX 1 354

IECEx identification

	2G Ex d e IIC T4/T5/T6 Gb For explosive gas atmosphere
	2D Ex tb IIIC T85 °C/T100 °C/T130 °C Db For explosive dust atmosphere

IECEx confirmation

IECEx EPS 13.0046



JUMO exTHERM-AT double thermostat



JUMO exTHERM-AT single thermostat

Approvals/approval marks (see "Technical data")



* Available with extra code (TZ 372)

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Technical data

Switching function

Temperature monitor TW and safety temperature monitor STW	Restart lock for the safety temperature limiter STB	Self-monitoring for the safety temperature monitor STW and safety temperature limiter STB
<p>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.</p> <p>If the temperature falls below the selected setpoint value (by the amount of the switching differential), the microswitch is reset to its initial position.</p>	<p>If the temperature on the temperature probe exceeds the set limit value, the electrical circuit is opened and the microswitch is mechanically locked.</p> <p>The microswitch can be manually unlocked once the dangerous temperature of the setpoint value drops by approx. 20 % of the scale range.</p>	<p>If the measuring system is destroyed (i.e. if the expansion fluid escapes) the pressure in the membrane of the STB and STW drops and permanently opens the electrical circuit. Unlocking is then no longer possible.</p> <p>If the probe has cooled down to a temperature below approx. 40 °C the electrical circuit also opens – however it automatically closes again when the temperature rises.</p>

Temperature compensation

When the ambient temperature on the switching head and the capillary deviates – from the calibration ambient temperature of +22 °C – a switching point offset occurs. This switching point offset is reduced to a minimum due to the temperature compensation.
--

Case

Material	Polyester case, glass fiber reinforced, black (option: stainless steel)
Protection type	EN 60529 - IP66 (polyester case), pollution level 2, IP 66 with extra code 861
Setpoint value adjustment	With screwdriver (once the case lid has been removed)
Switching head fastening	Using four screws (once the case lid has been removed)
Weight	Approx. 1200 g single thermostat / approx. 2000 g double thermostat
Cable inlet	Ex cable gland M20 × 1.5, sealing area 6 to 13 mm and Ex cable gland M25 × 1.5, sealing area 7 to 17 mm

Process connection

JUMO exTHERM-AT with capillary	Plain cylindrical probe (standard), rigid thermowell, spiral probe for room thermostat version
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Accessories

JUMO exTHERM-AT	Multi-section standard thermowells made out of CrNi for use in zones 1, 2, 21, 22 (see data sheet 606710) Multi-section thermowells made out of CrNi for use in zone separation 0/1, 20/21 (see new data sheet 605057)
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Operating data

Medium ambient temperature influence	<p>When the ambient temperature on the switching head and/or the capillary deviates from the calibration ambient temperature of +22 °C, a switching point offset occurs.</p> <p>Higher ambient temperature = lower switching point Lower ambient temperature = higher switching point</p>
Admissible storage temperature / admissible ambient temperature when in use	-40 °C, optionally -55 °C to +70 °C (referring to T4)
Max. probe temperature	+15 % of the limit value / max. adjustment value or 25 K
Rated position (NL)	According to DIN 16257, NL 0 to NL 90

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Electrical data

Max. switching capacity	Selectable on the N/C contact (contact deck 1-2):	
	AC 400 V +10 %, 16 A AC 230 V +10 %, 16 (2.5) A, cos φ = 1 (0.6)* AC 230 V +10 %, 25 (4) A, cos φ = 1 (0.6) DC 230 V +10 %, 0.25 A	
	Selectable on the N/O contact (contact deck 1-4):	
	TW, STW	STB
	AC 400 V +10 %, 6.3 A AC 230 V +10 %, 6.3 (2.5) A, cos φ = 1 (0.6)* AC 230 V +10 %, 2 (0.4) A, cos φ = 1 (0.6) DC 230 V +10 %, 0.25 A	AC 400 V +10 %, 2 A AC 230 V +10 %, 2 (0.4) A, cos φ = 1 (0.6)* AC 230 V +10 %, 2 (0.4) A, cos φ = 1 (0.6) AC 230 V +10 %, 0.25 A
	Snap-action switch, gold-plated AC / DC = 24 V, 0.1 mA	
Min. switching capacity	To ensure the greatest possible switching reliability we recommend a minimum load of: AC / DC = 24 V, 100 mA for silver contacts AC / DC = 10 V, 5 mA for gold-plated contacts	

* standard

Capillary and temperature probe

Type	Capillary Ø 1.5 mm	Temperature probe
JUMO exTHERM-AT	Stainless steel (CrNi) 1.4571	Stainless steel (CrNi) 1.4571, welded
Capillary length	Max. 5000 mm	
Capillary bending radius	≥ 5 mm	

Control ranges and probe table

Control range In °C	Max. capillary length In mm	Probe length "L"			
		For "d" = 4 mm		For "d" = 6 mm	
		TW	STW, STB	TW	STW, STB
		Hysteresis			
		Approx. 2.5 %	Approx. 7 %	Approx. 2.5 %	Approx. 7 %
-20 to +50	5000	--	--	138	81
0 to +120		203	113	90	58
0 to +200		154	87	72	48
+130 to +190		--	--	115	70
+50 to +300		135	78	65	--
+20 to +500		--	--	278	--
+140 to +500		--	--	--	126

Switching point tolerance in the middle section of the scale

Control range in °C	TW in K	STW upward adjustment in K	STW downward adjustment in K	STB in K
-20 to +40	+2/-2	--	--	--
-20 to +50	+3/-3	+0/-5	+5/-0	+0/-5
0 to +100	+5/-5	+0/-10	+10/-0	+0/-10
0 to +120	+5/-5	+0/-10	+10/-0	+0/-10
+130 to +190	+8/-8	+0/-16	+16/-0	+0/-16
0 to +200	+8/-8	+0/-16	+16/-0	+0/-16
+50 to +300	+12/-12	+0/-24	+24/-0	+0/-24
+20 to +500	+22/-22	--	--	--
+140 to +500	+22/-22	+0/-44	+44/-0	+0/-44

Temperature monitors (TW) and safety temperature monitors (STW) are adjusted ascendingly in the middle section of the scale as standard procedure. Safety temperature limiters (STB) are adjusted in the upper section of the scale. Special adjustments are possible upon request.

Approvals/approval marks

JUMO exTHERM-AT	Switching function	Certificates/test confirmations	Tests
	TW	EPS 11 ATEX 1 354	ATEX
	STW	IECEX EPS 13.0046	IECEX TZ 372
	STB	POCC DE.ME92.B02680	GOST

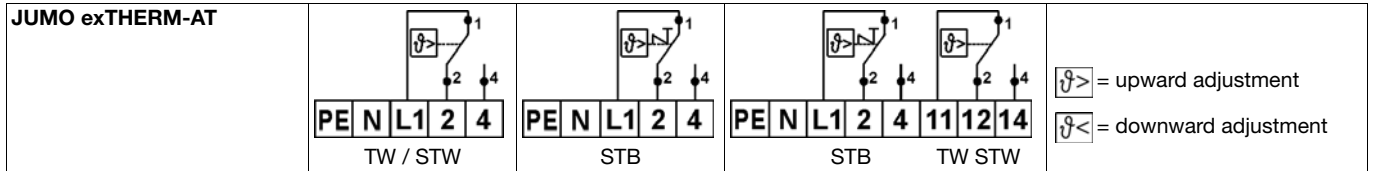
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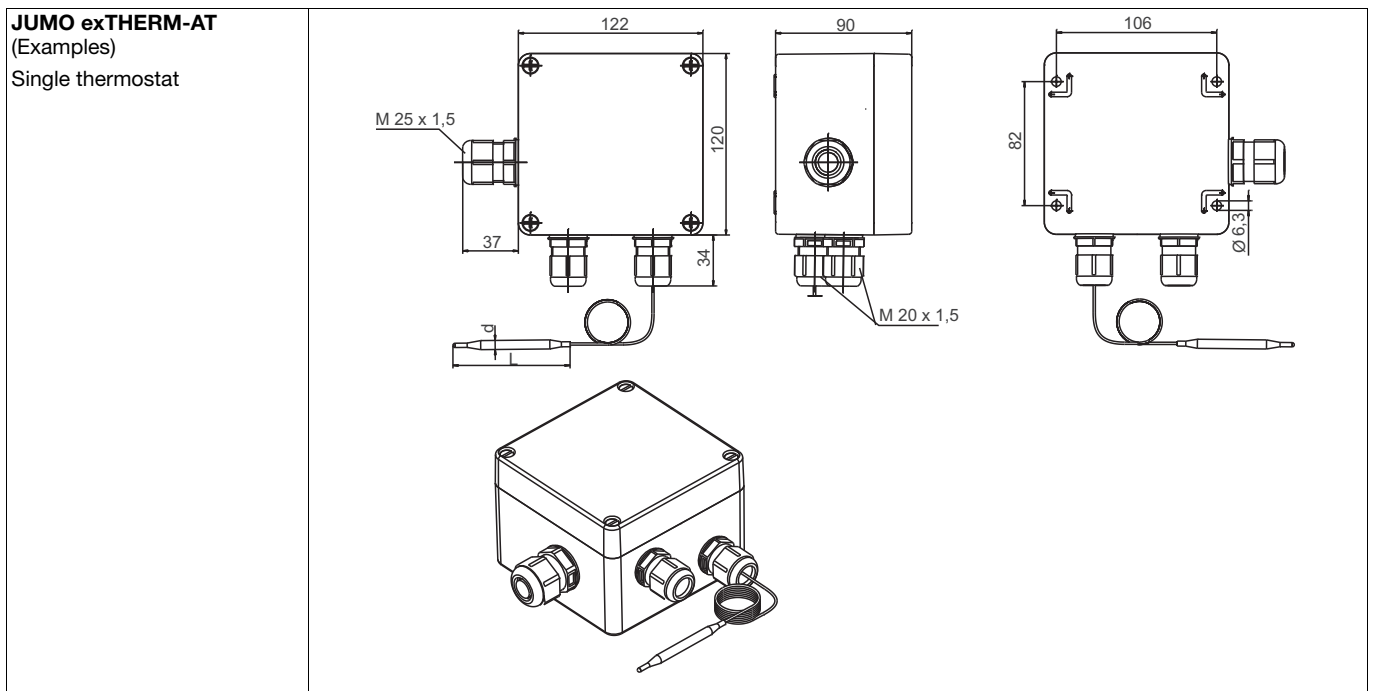
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Wiring diagrams



Dimensions



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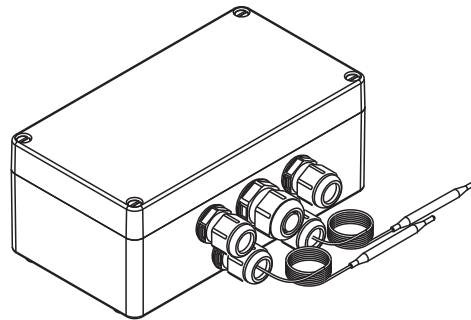
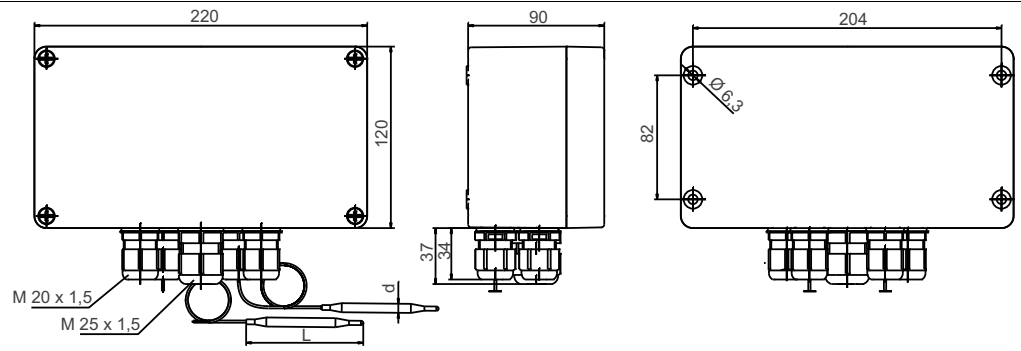
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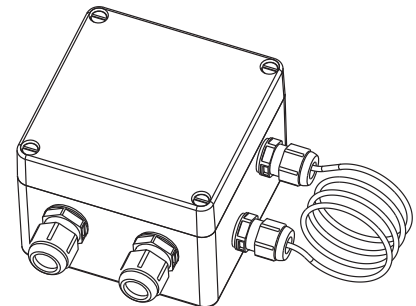
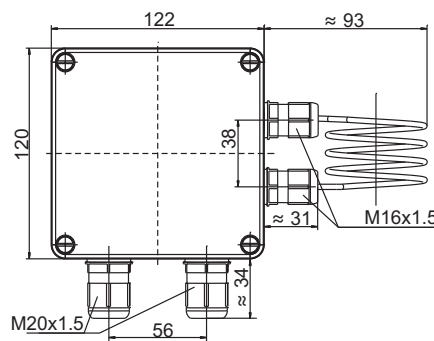
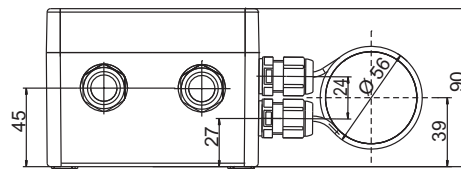


Dimensions

JUMO exTHERM-AT
 (Examples)
 Double thermostat



Room thermostat



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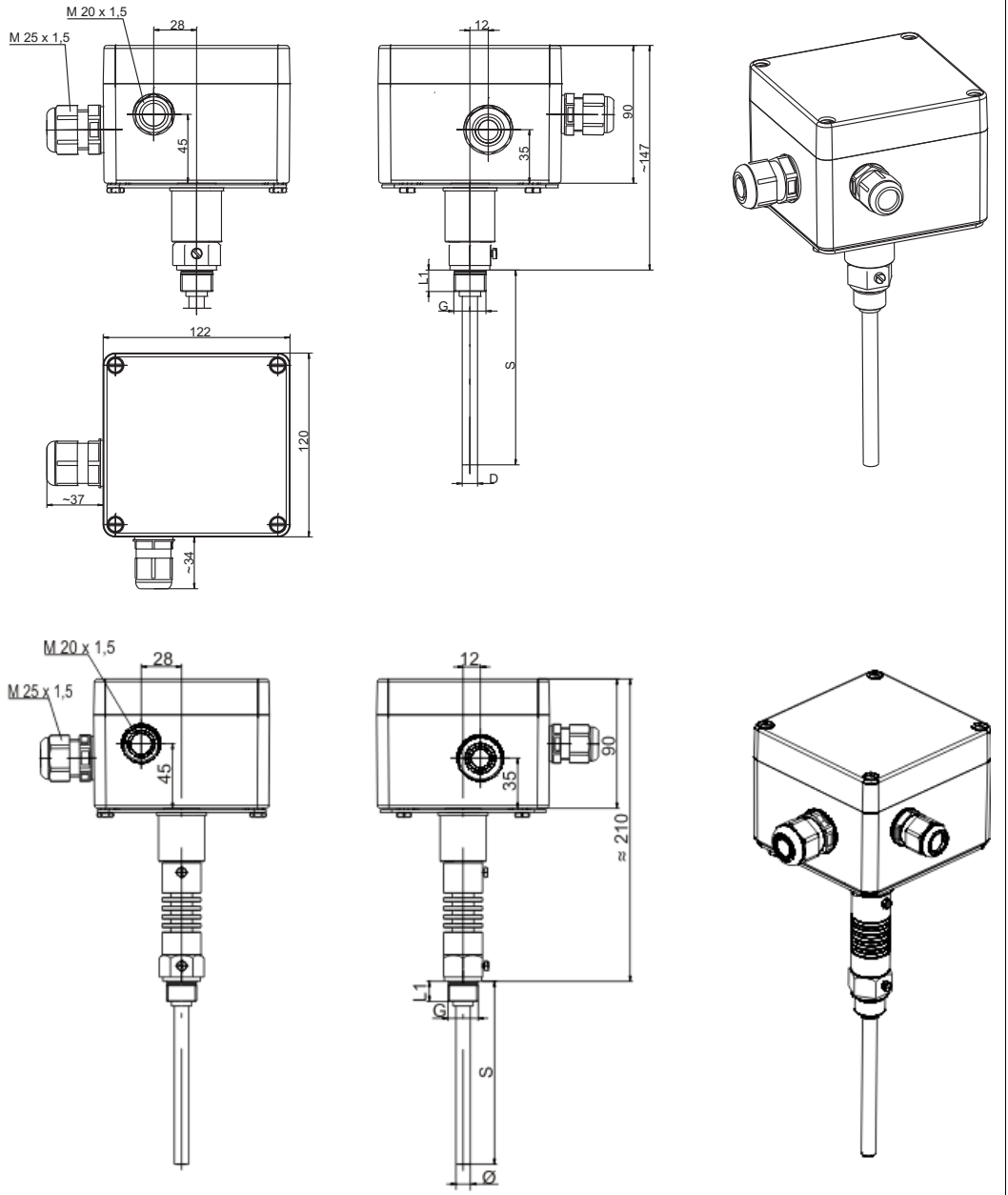
Dimensions

JUMO exTHERM-AT (Examples)

Thermostat with rigid thermowell (process connection 74)

Thermowells can be ordered separately according to data sheet 605057 (with Ex-approval) or data sheet 606710 (standard)

Thermostat with sleeve and heat sink, limit value > 150 °C



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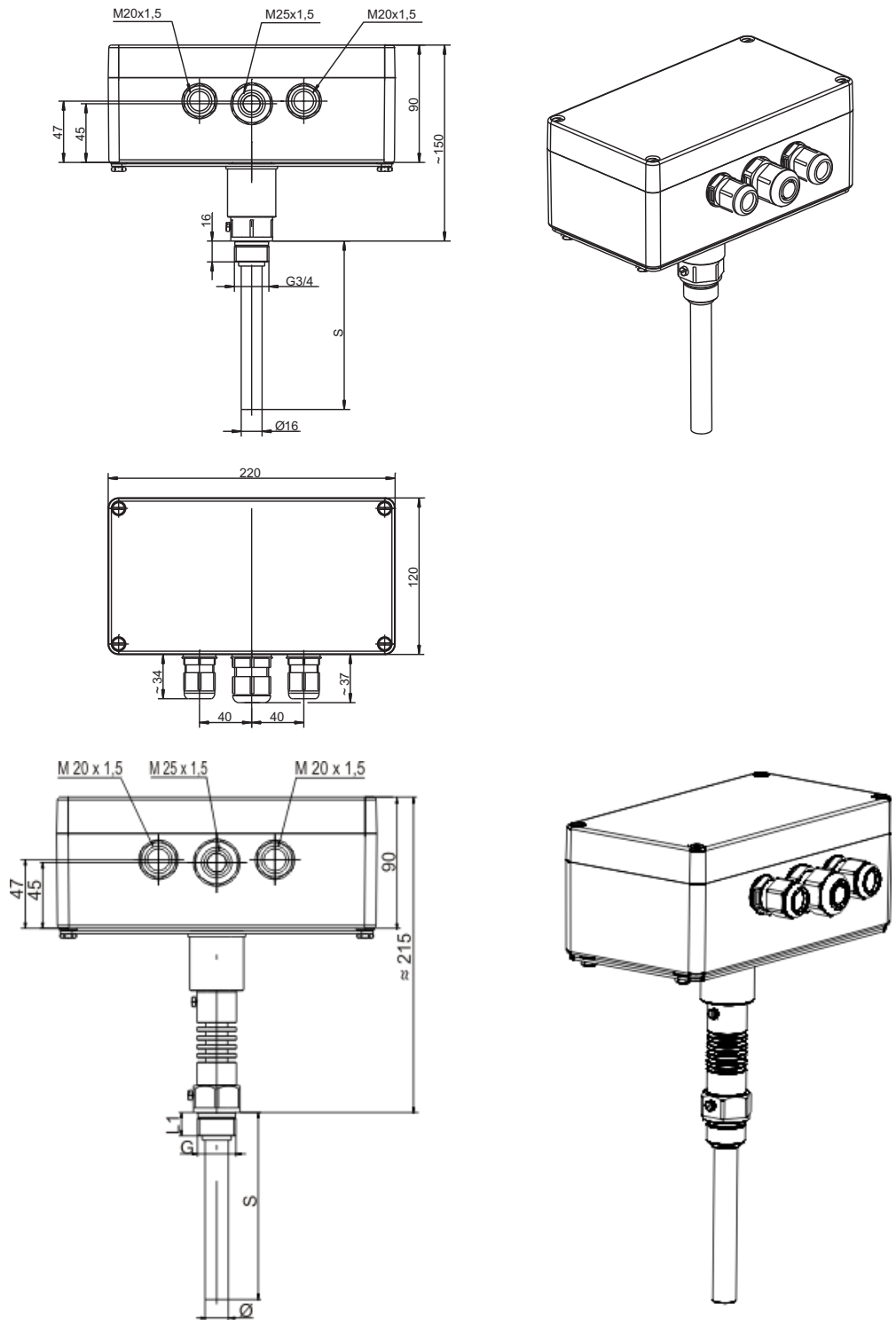
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Dimensions

JUMO exTHERM-AT
 (Examples)
 Double thermostat with sleeve
 (process connection 74)
 Thermowells can be ordered
 separately according to data
 sheet 605057 (with Ex approval)
 or data sheet 606710
 (standard)

Double thermostat
 with sleeve and heat sink, limit
 value > 150 to 300 °C



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Order details

Explosion-proof panel-mounted thermostat JUMO exTHERM-AT

Order code	(1) Basic type
605055	Surface-mounted thermostat JUMO exTHERM-AT for potentially explosive areas
	(2) Basic type extensions
0002	Temperature monitor (TW)
0020	Safety temperature monitor (STW)
0070	Safety temperature limiter (STB)
0270	Temperature monitor (TW) / safety temperature limiter (STB)
2070	Safety temperature monitor (STW) / safety temperature limiter (STB)
	(3) Design type
5	Surface-mounted thermostat
6	Room thermostat
	(4) Case
4	Polyester case black (standard)
6	Stainless steel case
	(5) Control ranges / limit value ranges 1 in °C
013	-20 to +40 (only room thermostat)
014	-20 to +50
026	0 to +120
028	0 to +200
046	+20 to +500 (only TW)
064	+50 to +300
539	+140 to +500 (only STW and STB)
532	+130 to +190
	(6) Control ranges / limit value ranges 2 in °C
000	(only single thermostat)
013	-20 to +40 (only room thermostat)
014	-20 to +50
026	0 to +120
028	0 to +200
046	+20 to +500 (only TW)
064	+50 to +300
539	+140 to +500 (only STW and STB)
532	+130 to +190
	(7) Switching capacity
11	AC / DC = 24 V, 100 mA (gold-plated snap-action switch)
21	AC 230 V +10 %, 16 (2.5) A, cos φ = 1 (0.6) (standard)
41	AC 400 V +10 %, 16 A
25	AC 230 V +10 %, 25 (4) A, cos φ = 1 (0.6)
	(8) Operating temperatures in °C
340	-55 to +40 T6 (+70 °C T4) (+50 °C T4 at 25 A)
467	-40 to +40 T6 (standard) (+70 °C T4) (+50 °C T4 at 25 A)
	(9) Switching differential 1
00	Without switching differential (STB)
25	Approx. 2.5 % (TW)
70	Approx. 7 % (TW, STW)
	(10) Switching differential 2
00	Without switching differential (STB) and for single thermostat
25	Approx. 2.5 % (TW)
70	Approx. 7 % (TW, STW)

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(11) Capillary length 1	
0	0 mm design type 6, rigid thermowell
1000	1000 mm
3000	3000 mm
...	(Special length, specifications in plain text, 1000 mm increments)
(12) Capillary length 2	
0	0 mm (only design type 6 and for single thermostat)
1000	1000 mm
3000	3000 mm
...	(Special length, specifications in plain text, 1000 mm increments)
(13) Capillary material	
20	Stainless steel (CrNi)
(14) Process connection (PC)	
10	Plain cylindrical probe
15	Spiral probe
74	Mounting adaptor (thermowells can be ordered separately according to data sheet 605057 (with Ex-approval) or data sheet 606710 (standard))
(15) Diameter 1 "d" (single thermostat)	
4	Ø 4 mm
6	Ø 6 mm
56	Ø 56 mm
(16) Diameter 2 "d" (double thermostat)	
0	Without
4	Ø 4 mm
6	Ø 6 mm
(17) Insertion length "S"	
0	Without thermowell
200	200 mm
300	300 mm
(18) Extra codes	
000	Without extra code
372	IECEx Approvals (extra code 861 not available)
861	IP66 (extra code 861 not available)

Order code:

(1) 605055 / (2) / (3) - (4) - (5) - (6) - (7) - (8) - (9) - (10) - (11) - (12) - (13) - (14) - (15) - (16) - (17) - (18) / ... , ...

Order example:

605055 / 2070 - 5 - 4 - 028 - 064 - 21 - 467 - 25 - 00 - 1000 - 1000 - 20 - 10 - 4 - 4 - 200 / 000 , ...

Stock versions

Part no.	Type	Control range °C	Measuring system material	Capillary length	Probes
60003365	605055/20 (STW)	-20 to +50	CrNi	1000 mm	6 x 81 mm
60003366	605055/02 (TW)	-20 to +40		- -	Spiral probe
60003367	605055/20 (STW)	0 to +120		1000 mm	6 x 58 mm
60003368	605055/20 (STW)	+50 to +300		1000 mm	4 x 78 mm
60003369	605055/2070 (STW/STB)	0 to +200 (STW)		1000 mm	4 x 87 mm (STW)
		+50 to +300 (STB)			4 x 78 mm (STB)
60003391	605055/20 (STW)	0 to +200		1000 mm	6 x 48 mm
60003395	605055/0070 (STB)	0 to +200		1000 mm	6 x 48 mm
60003401	605055/0002 (TW)	0 to +200		1000 mm	6 x 154 mm

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ATEX Thermowell for Zone Separation 0/1 or 20/21

with Standard Acceptance Inspection Certificate 3.1 Acc. to DIN EN 10204

Special features

- Zone separation 0/1 or 20/21
- As screw-in sleeve or weld-in sleeve
- Insertion lengths 100, 150, 200, and 300 mm available directly from the factory
- Special lengths are available upon request

Brief description

ATEX thermowells made of stainless steel are used for the separation of zones 0 and 1 or 20 and 21. Screw-in sleeves or weld-in sleeves are available from the factory in insertion lengths 100 mm, 150 mm, 200 mm, and 300 mm. Special lengths up to 500 mm can be manufactured specifically for an application.



Ex identification



II 1/2 G Ex Ga/Gb
II 1/2 D Ex Da/Db

Test confirmation

EPS 12 ATEX 1 423 U

Approvals/approval marks



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Technical data

Thermowells made of stainless steel

Material	Thermowell and nipple (pipe connector): stainless steel (1.4571)		
Max. admissible operating temperature *	Temperature °C	Thermowell-Ø	
		10 x 1.5 mm	16 x 1.5 mm
	Maximum admissible pressure in bar		
	100	74	50
	150	71	48
	200	67	45
	300	58	39
400	54	36	
Without load capacity	530	0	0

*observe maximum admissible probe temperature of the respective thermostat version!

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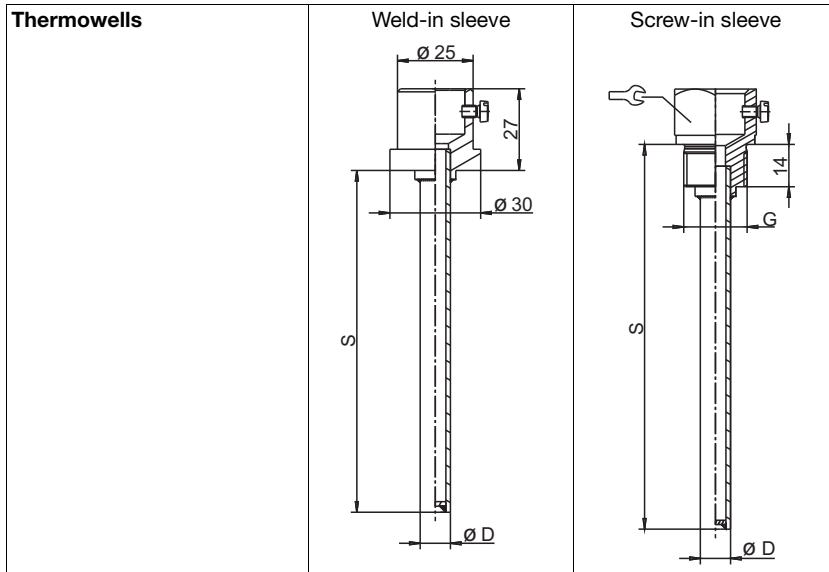
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Approvals/approval marks

ATEX	EN 600079
Acceptance inspection certificate 3.1	DIN EN 10204

Dimensions



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Order details

ATEX thermowell for zone separation 0/1 or 20/21
 with standard acceptance certificate 3.1 acc. to DIN EN 10204

Order code	(1) Basic type
605057	ATEX thermowell for zone separation 0/1 or 20/21
	(2) Basic type extension process connection
20	Screw-in thermowell
22	Weld-in thermowell
	(3) Thread type G
00	Without thread (weld-in sleeve)
13	G 1/2
	(4) Material
20	CrNi Stainless steel
	(5) Insertion length S in mm
100	100
150	150
200	200
300	300
...	Special length (specifications in plain text - 50 mm steps)
	(6) Thermowell-Ø D
10	10 mm (for the installation of a temperature probe)
16	16 mm (for the installation of 2 temperature probes, including pressure spring)

Order code:

(1)	(2)	(3)	(4)	(5)	(6)					
605057	/	..	-	..	-	..	-	...	-	..

Order example:

605057	/	20	-	13	-	20	-	200	-	10
--------	---	----	---	----	---	----	---	-----	---	----

Stock versions

Part no.	Type	Process connection	Thread	Material	Insertion length S mm	Thermowell-Ø
60003376	605057/20-13-20-100-10	Screw-in thermowell	G 1/2	CrNi	100	10 mm (for the installation of a temperature probe)
60003396	605057/20-13-20-150-10				150	
60003377	605057/20-13-20-200-10				200	
60003378	605057/20-13-20-300-10				300	
60003379	605057/22-00-20-100-10	Weld-in thermowell	Without thread		100	
60003397	605057/22-00-20-150-10				150	
60003380	605057/22-00-20-200-10				200	
60003381	605057/22-00-20-300-10				300	

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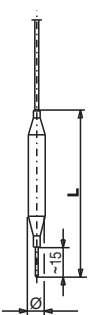
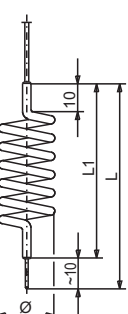
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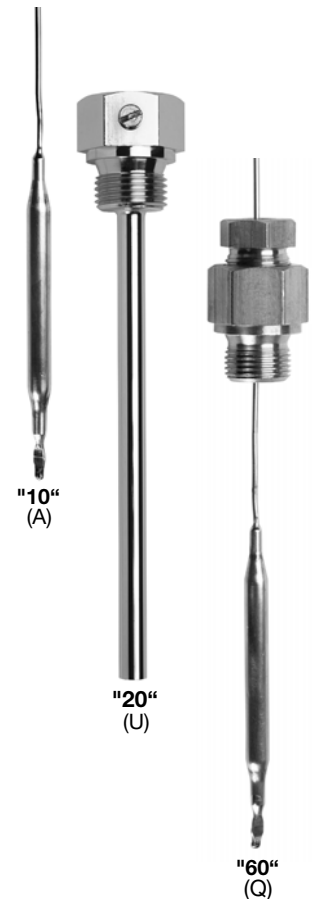


Process connections for thermostats

- Temperature probes
- Screw fittings
- Pockets

Temperature probe

Order code:	1	2	3				
Process connection	Material	Probe Ø in mm				Remark	
 <p>Plain cylindrical probe "10" (A)</p>	Cu (Copper) CrNi (stainless steel)	5	6	7	8	different probe diameters on request	
		Order code:	606710-10	40	20		5
 <p>Spiral probe "15" (H)</p>	Cu (Copper)	17	35			up to max. +200°C probe temperature	
		Order code:	606710-15	40	17		35



Order code:	606710-..	-	..	-	.
Order example:	606710-10	-	20	-	8

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Screw-connections

Order code:	1	2			3		4	5				6	
	Process connection	Thread G			Connection material		Immersion tube length "S" in mm	Probe Ø in mm				Probe material	
	Double screw-connection for union nut "50" (B)	G 1/2 L ₁ =14	G 3/8 L ₁ =12	G 3/4 L ₁ =16	CuZn (brass)	CrNi (stainless steel)	100 120 150 200 300 400 Specifications in plain text	5	6	7	8	Cu (Copper)	CrNi (stainless steel)
Order code:	606710-50	13	12	14	46	20	...	5	6	7	8	40	20
	Union nut "52" (C) Plain cylindrical probe, with collar and union nut. Collar soldered or welded to capillary.	G 1/2 L ₁ =10	G 3/8 L ₁ =7.5	G 3/4 L ₁ =11	CuZn (brass)	CrNi (stainless steel)	100 120 150 200 300 400 Specifications in plain text	5	6	7	8	Cu (Copper)	CrNi (stainless steel)
Order code:	606710-52	13	12	14	46	20	...	5	6	7	8	40	20
	fixed screw-connection with hexagon "54" (D) Plain cylindrical probe, thread piece soldered or welded to capillary.	G 1/2 L ₁ =14	G 3/8 L ₁ =12		CuZn (brass)	CrNi (stainless steel)	100 120 150 200 300 400 Specifications in plain text	5	6	7	8	Cu (Copper)	CrNi (stainless steel)
Order code:	606710-54	13	12		46	20	...	5	6	7	8	40	20

Process connections "50" (B), "52" (C) and "54" (D): max. admissible pressure for device functions STB, STW (STB) = 2 bar / TR, TW and TB on request.

Order code:	1	2	3	4	5	6
	606710-..
Order example:	606710-50	13	20	200	6	20

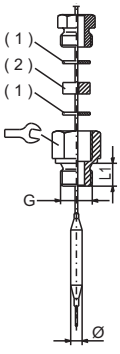




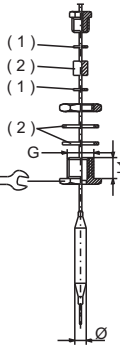



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Screw-connections

Order code:	1	2		3		Remarks
Process connection		Thread G		Material		
 <p>Double screw-connection "60" (Q)</p> <p>for retrofitting to the capillary. Probe temperature max. +200°C.</p> <p>(1) Washer (2) Seal</p>		G 1/2 L ₁ =14 	G 3/8 L ₁ =12 	CuZn (brass) 	CrNi (stainless steel) 	Suitable for probe Ø up to 8 mm. Use only in pressureless medium.
Order code:	606710-60	13	12	46	20	
 <p>Stuffing box screw-connection "65" (V)</p> <p>for retrofitting to the capillary. Probe temperature max. +200°C.</p> <p>(1) Washer (2) Seal</p>		M 14 x 1 		CuZn (brass) 	CrNi (stainless steel) 	Suitable for probe Ø up to 6 mm. Use only in pressureless medium.
Order code:	606710-65	35		46	20	

Order code:	1	-	2	-	3
	606710-..	
Order example:	606710-60		13		20

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Sheaths

Order code:	1	2		3		4	5		
Process connection	Thread G		Material		Immersion tube length "S" in mm		Immersion tube Ø in mm		
	Screw-in sheath "20" (U) with screw-in spigot, form A as per DIN 3852/2 with locking screw. (Clamping piece to fasten the probe for extra code "f")	G 1/2	G 3/8	CuZn (brass)	CrNi (stainless steel)	100	8 (Internal Ø 6.5)	10 (Internal Ø 8.5)	15 (Internal Ø 13.5)
		L ₁ =14	L ₁ =12			120			
						Specifications in plain text			
Order code:	606710-20	13	12	46	20	...	8	10	15
	Screw-in sheath, open "21" (UO) without immersion tube base, with screw-in spigot, form A as per DIN 3852/2 with locking screw. (Clamping piece to fasten the probe for extra code "f")	G 1/2	G 3/8	CuZn (brass)	CrNi (stainless steel)	100	8 (Internal Ø 6.5)		
		L ₁ =14	L ₁ =12			120		150	200
						Specifications in plain text			
Order code:	606710-21	13	12	46	20	...	8		
	Sheath with welded collar "22" (US) straight, with locking screw. (Clamping piece to fasten the probe for extra code "f")	without thread		St (Steel)	CrNi (stainless steel)	100	10 (Internal Ø 8.5)	15 (Internal Ø 13.5)	
						120			150
						Specifications in plain text			
Order code:	606710-22	00		01	20	...		10	15
	Sheath with welded collar "23" (US) conical from 12 to 8 mm, with locking screw. (Clamping piece to fasten the probe for extra code "f")	without thread		St (Steel)	CrNi (stainless steel)	100	Immersion tube conical from 12 to 8 mm (Internal Ø 6.5)		
						120		150	200
						Specifications in plain text			
Order code:	606710-23	00		01	20	...	8		

Order code:	606710-..	-	..	-	..	-	...	-	..
Order example:	606710-20	-	13	-	01	-	100	-	10

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Sheaths

Order code:	1	2		3		4	5		
Process connection	Thread G		Material		Immersion tube length "S" in mm	Immersion tube Ø in mm			
<p>Screw-in sheath with intermediate piece "30" (UZ) and locking screw for thermostat with rigid shaft and probe temperature exceeding +150°C.</p>	G 1/2	G 3/8	CrNi (stainless steel)	100 120 150 200 300 400 Specifications in plain text	8 (Internal Ø 6.5)	10 (Internal Ø 8.5)	15 (Internal Ø 13.5)		
	L ₁ =14	L ₁ =12						27	24
Order code:	606710-30	13	12	20	...	8	10	15	
<p>Sheath with screw-in piece with intermediate piece, open "31" (UZO) and locking screw for thermostat with rigid shaft and probe temperature exceeding +150°C.</p>	G 1/2	G 3/8	CrNi (stainless steel)	100 120 150 200 300 400 Specifications in plain text	8 (Internal Ø 6.5)				
	L ₁ =14	L ₁ =12				27	24		
Order code:	606710-31	13	12	20	...	8			
<p>Sheath with welded collar and intermediate piece, straight "32" (UZS) and locking screw for thermostats with rigid shaft and probe temperature exceeding +150°C.</p>	without thread		St (Steel)	100 120 150 200 300 400 Specifications in plain text		10 (Internal Ø 8.5)	15 (Internal Ø 13.5)		
			CrNi (stainless steel)						
Order code:	606710-32	00	01	20	...		10	15	

Order code:	606710-..	-	..	-	..	-	...	-	..
Order example:	606710-30	-	13	-	20	-	200	-	8

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Sheaths

Order code:	1	2		3		4	5	
Process connection		Thread G		Material		Immersion tube length "S" in mm	Immersion tube Ø in mm	
<p>Screw-in sleeve for union nut (52) "40" (E) Screw-in spigot*, form A as per DIN 3852/2.</p>		G 1/2 L ₁ =14	G 3/8 L ₁ =12	CuZn (brass)	CrNi (stainless steel)	100 120 150 200 300 400 Specifications in plain text	8 (Internal Ø 6.5)	10 (Internal Ø 8.5)
Order code:	606710-40	13	12	46	20	...	8	10
<p>Welding sleeve for union nut (52) straight "41" (ES)</p>		without thread			St (Steel) CrNi (stainless steel)	100 120 150 200 300 400 Specifications in plain text	10 (Internal Ø 8.5)	
Order code:	606710-41	00			01 20	...	10	
<p>Welding sleeve for union nut (52) conical "42" (ES)</p>		without thread			St (Steel) CrNi (stainless steel)	100 120 150 200 300 400 Specifications in plain text	Immersion tube conical from 12 to 8 mm (Internal Ø 6.5)	
Order code:	606710-42	00			01 20	...	8	
<p>Welding sleeve for union nut (52) with intermediate piece, straight "45" (Ezs)</p>		without thread			St (Steel) CrNi (stainless steel)	100 120 150 200 300 400 Specifications in plain text	10 (Internal Ø 8.5)	15 (Internal Ø 13.5)
Order code:	606710-45	00			01 20	...	10	15

Order code:	1	2	3	4	5
	606710-..
Order example:	606710-42	00	01	300	8

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Sheaths

Order code:	1	2	3		4	5
Process connection		Thread G	Material		Immersion tube length "S" in mm	Immersion tube Ø in mm
<p>Welding sleeve for union nut (52) with intermediate piece, conical "46" (EZS)</p>		without thread	St (Steel)	CrNi (stainless steel)	100	Immersion tube conical from 12 to 8 mm (Internal Ø 6.5)
					120	
150						
200						
300						
400						
Specifications in plain text			01	20	...	8

Order code:	1	2	3	4	5
Order example:	606710-...

Optional accessories

		Abbreviation for process connections	Part No.
	Sheet steel flange	72	60/60677200
	Wall support	73	60/60171300
	Holder	78	60/00558731 3 pieces
		79	60/00558730 6 pieces

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Admissible load at the sheath

Sheaths 20 (U), 22 (US), 30 (UZ), 32 (UZS), 40 (E), 41 (ES), 45 (EZS) and 46 (EZS)

The following values describe the maximum capacity of the corresponding connection type.
 The maximum pressure sealable depends on the fitting conditions and may be lower.

Sheath made of steel 22, 23, 32, 41, 42, 45 and 46 (Discontinued types: 20, 30, 32 and 40)

Material	Tube	Screw-in nipples	Welding nipples	
	St 35.8 I	Steel 1.0038	Steel 1.5415	
Capacity	Temperature	Pipe diameter		
		8 x 0.75 mm or conical	10 x 0.75 mm	15 x 0.75 mm
	Maximum admissible pressure			
	100°C	89 bar	72 bar	48 bar
	150°C	83 bar	67 bar	45 bar
	200°C	78 bar	63 bar	42 bar
300°C	59 bar	47 bar	32 bar	
350°C	50 bar	40 bar	27 bar	
max. admissible operating temperature	Tube	Nipple	max. admissible operating temperature*	
	St 35.8 I	Screw-in nipples	+300°C	without load +530°C
		Welding nipples	+450°C	
* observe the max. admissible probe temperature of the respective thermostat version. For operating temperatures > +420°C: observe the operating life of 200,000 h at a static load TRD508. Sheath "21" (UO) and "31" (UZO): Use only in pressureless medium.				

Sheath made of stainless steel

Material	Pipe and nipple: Stainless steel (1.4571)			
Capacity	Temperature	Pipe diameter		
		8 x 0.75 mm or conical	10 x 0.75 mm	15 x 0.75 mm
	Maximum admissible pressure			
	100°C	92 bar	74 bar	50 bar
	150°C	88 bar	71 bar	48 bar
	200°C	83 bar	67 bar	45 bar
300°C	72 bar	58 bar	39 bar	
400°C	67 bar	54 bar	36 bar	
max. admissible operating temperature*	static load +400°C		without load +530°C	
	* observe the max. admissible probe temperature of the respective thermostat version.			

Sheath made of brass

Material	Pipe and nipple: CuZn, nickel plated			
Capacity	Temperature	Pipe diameter		
		8 x 0.75 mm	10 x 0.75 mm	15 x 0.75 mm
	Maximum admissible pressure			
	100°C	50 bar	40 bar	27 bar
150°C	48 bar	39 bar	26 bar	
max. admissible operating temperature*	+150°C			
	* observe the max. admissible probe temperature of the respective thermostat version.			

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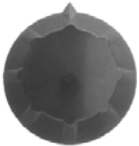




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JUMO setpoint adjusters for thermostats, EM series

**Individual components:
spindle-fitting knobs, adjustable stops, setpoint dials, surrounds, screws**

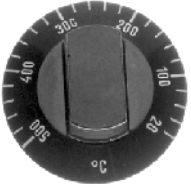






		 	
<p>01 Spindle-fitting knobs for pushing onto 6 mm dia. shafts, with 4.6 mm flat</p> <p>Part no. 60 701 205</p> <p>Max. dia. 30.0 mm Height 19.0 mm Index radius 17.5 mm Panel hole 14.0 mm Operating temperature +120 °C Material thermoplastic, slate grey RAL 7015</p>	<p>21 Setpoint dial (see Data Sheet 602021 for standard ranges)</p> <p>Outer dia. 50.0 mm Height 4.8 mm Fixing with two M3 screws Spacing 22.0 mm Marking iron-grey RAL 7011</p> <p>Operating temperature +120 °C Material thermoplastic, flint grey RAL 7032</p> <p>Dial divisions over 250° angle</p>	<p>11 Stop for knobs 01 and 02</p> <p>Part no. 60 701 203</p> <p>Limiting to limit the scale max. endpoint, right stop Adjustment 125 to 250° angle</p> <p>12 Stop for knob 01 only</p> <p>Part no. 60 701 202</p> <p>Limiting to limit the scale min. starting point, left stop Adjustment 0 to 125° angle</p>	<p>18 Fixing screws M3 x 8 DIN 84</p> <p>Part no. 60 037 100</p> <p>Material nickel-plated brass</p>

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<p>07 Spindle-fitting knobs for pushing onto 6 mm dia. shafts, with 4.6 mm flat (see Data Sheet 602021 for standard ranges)</p> <p>Max. dia. 41.0 mm Height 18.0 mm Panel hole 16.0 mm Operating temperature +80 °C Material thermoplastic, slate grey RAL 7015 Marking white</p> <p>08 Knob Part no. 64 336 008 As above, but with pointer as index</p>	<p>23 Surround</p> <p>Part no. 63 202 000 Max. dia. 47 mm Max. height 7.3 mm Fixing spacing a) 22 mm b) 28 mm</p> <p>Fixing for a) 2 screws M3 x 8 b) 2 screws M4 x 8</p> <p>Operating temperature +80 °C Material bright chrome electroplated</p>	<p>15 Stop</p> <p>Part no. 63 205 002 Limiting to limit the max. and min. of the scale starting point or end point Adjustment -125° or +125° angle Fixing spacing 22 mm</p> <p>16 Stop Part no. 63 205 001 As above, but with fixing spacing 28 mm</p>	<p>18 Fixing screws</p> <p>Part no. 60 037 105 M3 x 8 DIN 84 for spacing 22 mm</p> <p>19 Fixing screws</p> <p>Part no. 60 046 100 M4 x 8 DIN 84 for spacing 28 mm Material brass tenned</p>

Standard setpoint adjusters for panel-mounting thermostats EMf-1

<p>Type W1 consisting of knob 01 adjustable stop 11 setpoint dial 21 2 screws 18</p>	<p>Type W8 consisting of knob 07 surround 23 adjustable stop 15 2 screws 18</p>	<p>Type W8 (heatTHERM) consisting of knob 07 surround 23 adjustable stop 16 2 screws M4 x 8</p>
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Bimetal thermometer

Particularities

- Class 1.5
- Display range -50°C ... +500°C
- Case dimensions Ø: 63 mm, 80 mm and 100 mm

Brief description

Indicator thermometers in standard version are devices which can be universally used for temperature measurement.



Type 608001/1810

Technical Data

Case	Case and front ring made of galvanized sheet steel; bracket made of aluminum (design 18)
Protection type	IP 51 as per DIN 60529
Front pane	Glass
Scale	Polished aluminum, labeled in black
Display	linear, class 1.5 similar to DIN EN 13190
Time behavior	t 0.9 evaluation time approx. 30 s (measured in moving water with a probe Ø of 10 mm made of brass)
Influential effect of the ambient temperature	no influence
Limit value temperatures	-30...+80°C (storage and transport -30...+80°C)
Rated position	any

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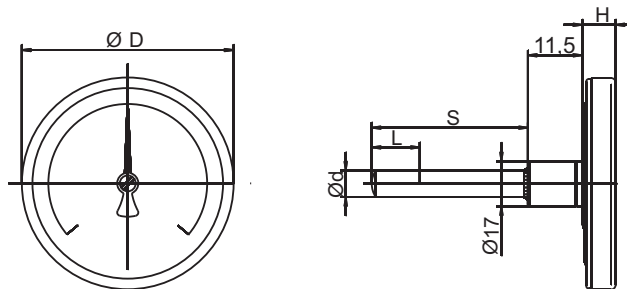


Technical Data

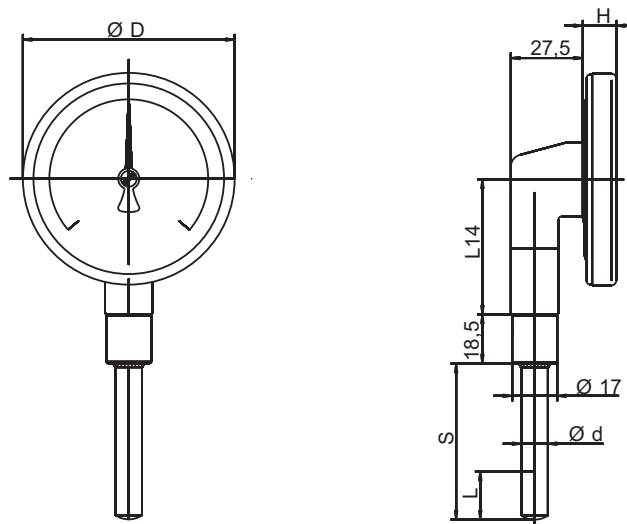
Display range (AB)	Display range in °C	Measuring range in °C	Tolerance in °C
632	-20...+60	-10...+60	1,5
810	0...+80	+10...+70	1,5
818	0...+120	+20...+100	3,0
826	0...+160	+20...+140	3,0
832	0...+200	+20...+180	3,0
834	0...+250	+30...+220	4,0
840	0...+300	+30...+270	8,0
854	0...+500	+50...+450	8,0

Dimensions

Types:
 608001/0163
 608001/0180
 608001/0110

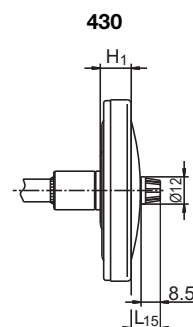


Types:
 608001/1863
 608001/1880
 608001/1810



Dimensional specifications about Ø d see data sheet 608730.

Extra codes



Type	Ø D	H	H ₁	L ₁₄	L ₁₅
608001/0163	63	13	14	--	12
608001/1863				26	
608001/0180	83	13	14	--	13
608001/1880				51	
608001/0110	100	16	16	--	13
608001/1810				51	

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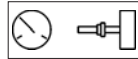
Order details

Order code (1) Basic type

Mechanical indicator thermometer, standard version class 1.5

Design 01 Case size Ø

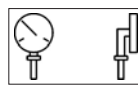
608001/0163
 608001/0180
 608001/0110



63 mm
 80 mm
 100 mm

Design 18 Case size Ø

608001/1863
 608001/1880
 608001/1810



63 mm
 80 mm
 100 mm

(2) Display range in °C

632 -20...+60
 810 0...+80
 818 0...+120
 826 0...+160
 832 0...+200
 834 0...+250
 840 0...+300
 854 0...+500

(3) Process connection (PC)

010	TA 01	Immersion tube with collar	
844	TA 02	Immersion tube with union nut and loose screw-connection ^a	
845	TA 03	Immersion tube with loose union nut	
841	TA 04	Immersion tube with fixed hexagon ^a	
847	TA 06	Immersion tube with displaceable clamping screw-connection (max. 20 bar)	
018	TA 08	Immersion tube with displaceable mounting plate made of galvanized steel and locking screw	
858	SH 04	Single-section screw-in thermowell	
891	SH 05	Multi-sectional screw-in thermowell	
913	SH 07	Multi-sectional screw-in thermowell with locking screw	
820	SH 09	Multi-sectional weld-in thermowell with locking screw	

^a Screw spigot as per DIN 3852 form A (not for NPT threads).

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(4) Ø Process connection (PC) ^b

- 6 6 mm
- 10 10 mm
- 12 12 mm (only with SH 05, SH 07)
- 14 14 mm (only with SH 05, SH 07, SH 09)
- 17 17 mm (only with SH 04)

(5) Thread type of process connection (PC) ^b

- 000 Without thread (only TA 01)
- 103 Screw connection G 3/8
- 104 Screw-connection G 1/2
- 105 Screw-connection G 3/4
- 144 Screw-connection 1/2-14NPT

(6) Probe material

- 26 Stainless steel (CrNi, 1.4571)
- 46 Brass (CuZn)

(7) Material of process connection (PC) ^b

- 26 Stainless steel (CrNi, 1.4571)
- 46 Brass (CuZn)

(8) Fitting length, process connection (PC) dimension "S"

- 100 100 mm
- 150 150 mm
- 200 200 mm
- ... Special length (specifications in plain text - 50 mm steps)

(9) Extra code (EC)

- 000 Without extra codes
- 430 Fly back
(only with basic type extension 0163, 0180, 0110, 1863, 1880, 1810 - display range min. 100 K)
- 522 Customized scale

Special versions on request !

^b For the description and particularities refer to data sheet 608730.

Order code (1) (2) (3) (4) (5) (6) (7) (8) (9)
 608001/ - - - - - - - - / , ...
 Order example 608001/0163 - 818 - 845 - 10 - 104 - 96 - 46 - 100 / 000^c , ...

^c State extra codes in sequence, separated by commas.

Stock versions

Part No.	Type	Display range °C	ø / dimension „S“ or „EL“
80000580	608001/0163-818-913-12-104-46-46-50/000	0...+120	12 x 50
80000581	608001/0163-818-913-12-104-46-46-63/000	0...+120	12 x 63
80000582	608001/0180-818-913-12-104-46-46-50/000	0...+120	12 x 50
80000583	608001/0110-818-913-12-104-46-46-100/000	0...+120	12 x 100
80000101	608001/0110-834-841-10-104-01-01-200/000	0...+250	10 x 200
80000103	608001/1810-818-841-10-104-46-01-100/000	0...+120	10 x 100

Delivery within 3 working days after receipt of order

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Bimetal indicator thermometer

industrial version

Particularities

- Stainless steel case
- Class 1
- Display range from -50°C to +500°C
- Protection class max. IP 65
- Case dimensions Ø: 60 mm, 80 mm and 100 mm
- insensitive to ambient temperature

Brief description

Indicator thermometers in industrial version are devices which can be universally used for temperature measurement.



Type 608002/1810

Technical Data

Basic type extensions	0160, 0180, 0110, 1860, 1880, 1810
Case	Case and front ring made of stainless steel, bracket made of aluminum (design 18)
Protection type	IP 54 as per DIN 60529 (IP 65 for extra code 404)
Front pane	Glass (with extra code 404 made of PMMA)
Scale	Polished aluminum, labeled in black
Display	linear, class 1 as per DIN EN 13190
Time behavior	t 0.632 evaluation time approx. 20 s (measured in moving water with a probe Ø of 10 mm made of CrNi)
Influential effect of the ambient temperature	no influence
Limit value temperatures	-30 to +80°C (storage and transport -30 to +80°C)
Rated position	any

Approval / approval marks



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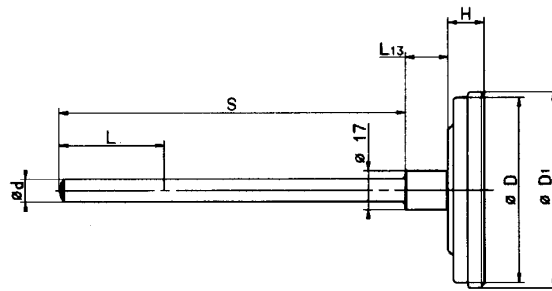
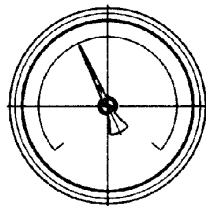
Technical Data

Display range (AB)	Display range in °C	Measuring range in °C	Tolerance in °C
632	-20 to +60	-10 to +60	1.0
643	-20 to +120	0 to to +100	2.0
469	-40 to +40	-30 to +30	1.0
357	-50 to +50	-40 to +40	1,0
810	0 to +80	+10 to +70	1.0
814	0 to +100	+10 to +90	1.0
818	0 to +120	+20 to +100	1.0
832	0 to +200	+20 to +180	2.0
834	0 to +250	+30 to +220	2.5
840	0 to +300	+30 to +270	5.0
848	0 to +400	+50 to +350	5.0
854	0 to +500	+50 to +450	5.0

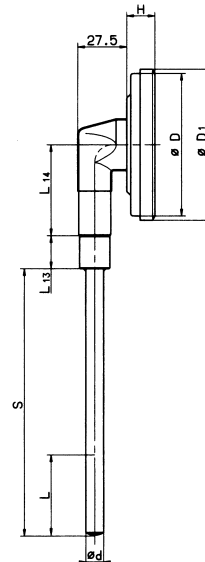
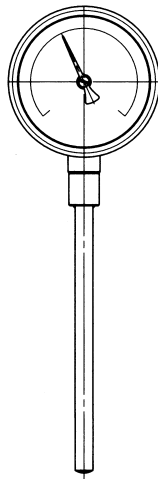
Dimensions

Types:
 608002/0160
 608002/0180
 608002/0110

Type	Ø D	Ø D ₁	H
608002/0160	60	65	17.5
608002/0180	80	85	18.5
608002/0110	100	106	18.5



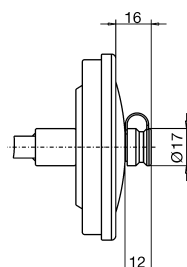
Types:
 608002/1860
 608002/1880
 608002/1810



Dimensional specifications about Ø d and L₁₃ see data sheet 608730

Extra codes

434



Type	Ø D	Ø D ₁	H	L ₁₄
608002/1860	60	65	17.5	26
608002/1880	80	85	18.5	51
608002/1810	100	106	18.5	51

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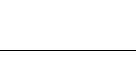
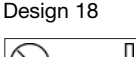


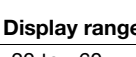
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Order details






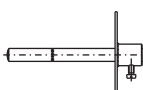


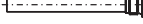
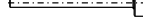
Order code (1) Basic type

Order code	Basic type	Case size Ø
	Mechanical indicator thermometer, industrial version class 1	
	Design 01	Case size Ø
608002/0160		60 mm
608002/0180		80 mm
608002/0110		100 mm
	Design 18	Case size Ø
608002/1860		60 mm
608002/1880		80 mm
608002/1810		100 mm

(2) Display range in °C

632	-20 to +60
643	-20 to +120
469	-40 to +40
357	-50 to +50
810	0 to +80
814	0 to +100
818	0 to +120
832	0 to +200
834	0 to +250
840	0 to +300
848	0 to +400
854	0 to +500

(3) Process connection (PC)^b

010	TA 01	Immersion tube with collar	
844	TA 02	Immersion tube with union nut and loose screw-connection ^a	
845	TA 03	Immersion tube with loose union nut	
841	TA 04	Immersion tube with fixed hexagon ^a	
847	TA 06	Immersion tube with displaceable clamping screw-connection (max. 20 bar)	
018	TA 08	Immersion tube with displaceable mounting plate made of galvanized steel and locking screw	
858	SH 04	Single-section screw-in thermowell	
891	SH 05	Multi-sectional screw-in thermowell	
913	SH 07	Multi-sectional screw-in thermowell with locking screw	
820	SH 09	Multi-sectional weld-in thermowell with locking screw	

^a Screw spigot as per DIN 3852 form A (not for NPT threads).

^b For description and particularities refer to data sheet 608730.

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(4) Ø Process connection (PC)^b

6	6 mm	(not with display ranges 628, 564, 807)
10	10 mm	
12	12 mm	(only with SH 05, SH 07)
14	14 mm	(only with SH 05, SH 07, SH 09)
17	17 mm	(only with SH 04)

(5) Thread type of process connection (PC)^b

000	Without thread (only TA 01)
103	Screw connection G 3/8
104	Screw-connection G 1/2
105	Screw-connection G 3/4
144	Screw-connection 1/2-14NPT

(6) Probe material

26	Stainless steel (CrNi, 1.4571)
----	--------------------------------

(7) Material of process connection (PC)^b

26	Stainless steel (CrNi, 1.4571)
----	--------------------------------

(8) Fitting length, process connection (PC) dimension "S"

100	100 mm
150	150 mm
200	200 mm
...	Special length (specifications in plain text - 50 mm steps)

(9) Extra code (EC)

000	Without extra codes
404	IP 65 (only for basic type extension 0160, 0110, 1860, 1810) not with TZ 430
430	Fly back (only with basic type extension 0160, 0180, 0110, 1860, 1880, 1810 - display range min. 100 K)
522	Customized scale

Special versions on request !

^a Screw spigot as per DIN 3852 form A (not for NPT threads).
^b For description and particularities refer to data sheet 608730.

Order code (1) 608002/ - (3) - (4) - (5) - (6) - (7) - (8) - (9) / (10) , ...
Order example 608002/0180 - 818 - 845 - 10 - 104 - 26 - 26 - 100 / 000^c , ...

^c State extra codes in sequence, separated by commas.

Stock versions

Part No.	Type	Display range °C	ø / dimension „S“ or „EL“
80001185	608002/0180-818-847-6-104-26-26-200/000	0 to +120	6 x 200
80001186	608002/0180-834-847-6-104-26-26-200/000	0 to +250	6 x 200

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Dial thermometer, chemistry version

Special features

- Temperature display with bi-metal measuring system
- Stainless steel case with bayonet lock
- Class 1
- Protection class IP 65
- Case sizes Ø: 100 mm and 160 mm

Brief description

Dial thermometer in chemistry design are devices, which can be universally used for local temperature measurement.



Type 608003/1010

Technical Data

Basic type extensions	0110, 0116, 1010, 1016
Case	Case and front ring made of stainless steel (1.4301)
Protection type	IP 65 as per DIN 60529
Front pane	Glass, for device with extra code 434 made of Plexiglas (PMMA)
Scale	Polished aluminum, labeled in black
Display	Class 1 as per DIN EN 13190
Time behavior	approx. 20 s (measured in moving water with a probe Ø of 10 mm made of stainless steel)
Influential effect of the ambient temperature	no influence
Limit value temperatures	-30...+80°C (storage and transport -30...+80°C)
Rated position	any

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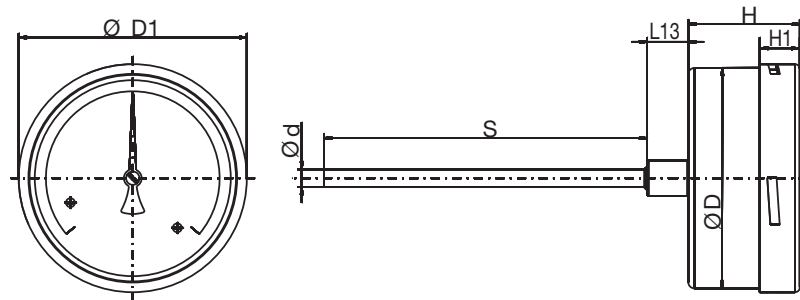
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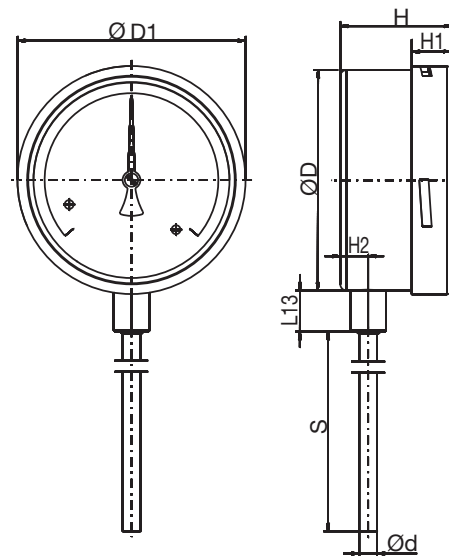
Display range (AB)	Display range in °C	Measuring range in °C	Tolerance in °C
643	-20...+120	0...+100	2.0
357	-50...+50	-40...+40	1.0
810	0...+80	+10...+70	1.0
814	0...+100	+10...+90	1.0
818	0...+120	+20...+100	1.0
826	0...+160	+20...+140	2.0
832	0...+200	+20...+180	2.0
834	0...+250	+30...+220	2.5
840	0...+300	+30...+270	5.0
854	0...+500	+50...+450	5.0

Dimensions

Types:
 608003/0110
 608003/0116



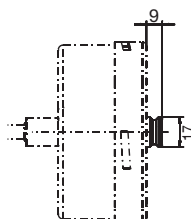
Types:
 608003/1010
 608003/1016



Dimensional specifications about Ø d and L13 see data sheet 608730.

Extra code

434



Type	Ø D	Ø D1	H	H ₁	H ₂
608003/0110	99	101.5	50	18	12.5
608003/1010				21	
608003/0116	159	161.5		18	
608003/1016				21	

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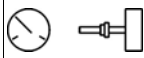
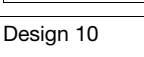

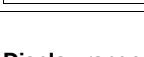
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Order details










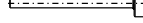
Order code (1) Basic type

Order code	Basic type
	Mechanical dial thermometer, chemistry version, class 1
	Design 01 Case size Ø
608003/0110	 100 mm
608003/0116	 160 mm
	Design 10 Case size Ø
608003/1010	 100 mm
608003/1016	 160 mm

(2) Display range in °C

357	-50...+50
643	-20...+120
810	0...+80
814	0...+100
818	0...+120
826	0...+160
832	0...+200
834	0...+250
840	0...+300
854	0...+500

(3) Process connection (PC)^b

010	TA 01	Immersion tube with collar	
844	TA 02	Immersion tube with union nut and loose screw-connection ^a	
845	TA 03	Immersion tube with loose union nut	
841	TA 04	Immersion tube with fixed hexagon ^a	
847	TA 06	Immersion tube with displaceable clamping screw-connection (max. 20 bar)	
018	TA 08	Immersion tube with displaceable mounting plate made of galvanized steel and locking screw	
858	SH 04	Single-section screw-in sheath	
891	SH 05	Multi-sectional screw-in sheath	
913	SH 07	Multi-sectional screw-in sheath with locking screw	
820	SH 09	Multi-sectional weld-in sheath with locking screw	

^a Screw spigot as per DIN 3852 form A (not for NPT threads).
^b For description and special features refer to data sheet 608730.

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(4) Ø Process connection (PC)^b

6	6 mm	(not with display ranges 628, 564, 807)
10	10 mm	
12	12 mm	(only with SH 05, SH 07)
14	14 mm	(only with SH 05, SH 07, SH 09)
17	17 mm	(only with SH 04)

(5) Thread type of process connection (PC)^b

000	Without thread (only TA 01)
103	Screw connection G 3/8
104	Screw-connection G 1/2
105	Screw-connection G 3/4
144	Screw-connection 1/2-14NPT

(6) Material of process connection (PC)^b

26	Stainless steel (CrNi, 1.4571)
----	--------------------------------

(7) Fitting length, process connection (PC) dimension "S"

100	100 mm
150	150 mm
200	200 mm
...	Special length (specifications in plain text - 50 mm steps)

(8) Extra code (EC)

000	Without extra codes
434	Fly back can be adjusted with a screwdriver, protected by a cover (front pane made of Plexiglas; max. ambient temperature +70°C)
474	Fly back damping unit filled with silicone (only with basic type extension 0110, 0116, not in connection with TZ 434)
522	Customized scale

Special versions on request !

^b For the description and special features refer to data sheet 608730.

Order code (1) (2) (3) (4) (5) (6) (7) (8)
 608003/..... - [] - [] - [] - [] - [] - [] / [] , ...
Order example 608003/0110 - 810 - 010 - 10 - 104 - 26 - 100 / 000^c , ...

^c State extra codes in sequence, separated by commas.

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Dial Thermometer Transformer version

Special features

- Temperature indicator with bimetal sensing system
- Stainless steel housing
- Peak-reading pointer
- Class 1.5
- Protection IP 55
- Housing size Ø: 80 mm

Brief description

Dial thermometers for transformers are universal instruments for local temperature measurement.



Type 608005/1080

Technical data

Basic type extension	1080
Housing	Housing and bezel in stainless steel (1.4301)
Protection type	IP 55 to DIN 60529
Window	Plexiglas (PMMA)
Scale	white, black lettering
Accuracy class	Class 1.5 similar to DIN EN 13190
Time constant	ca. 20 s (measured in agitated water with a 10 mm Ø stainless steel probe)
Ambient temperature effect	no effect
Limit temperatures	-30...+80°C (storage and transport -30...+80°C)
Nominal position	any

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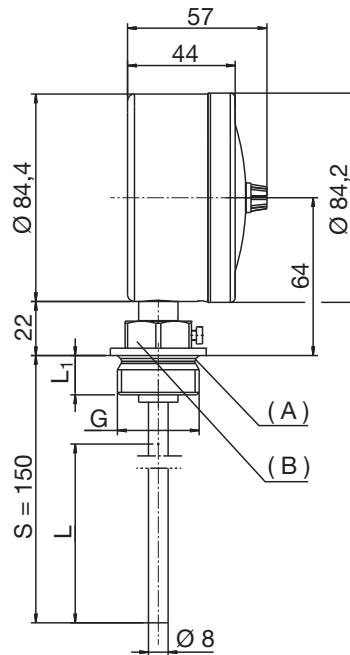
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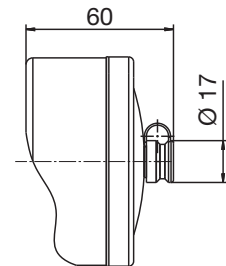
Indication range (AB)	Indication range in °C	Measuring range in °C	Tolerance in °C
643	-20...+120	0...+100	3.0
818	0...+120	+20...+120	3.0

Dimensions

Type:
608005/1080



Extra code 434



G	L1	L (active probe dimension)
G1/2A	14	75
G3/4A	16	
G1A	16	

(A) = Screw-in spigot, DIN 3852, form A
 (B) = SW

Stock items

Part No.	Type	Indication range	Temperature probe, Process connection, Material	Immersion tube Dimension „S“
00483589	608005/1080-643-874-8-106-97-150/430, 522 with peak-reading pointer	-20...+120°C/°F	TF 05, d = 8 mm TA 24, „G 1“ CuZn	Stainless steel 150 mm

Attention: for stock items only - Pack of 3 - Quantity ordered must be a multiple of 3!

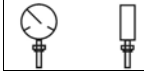
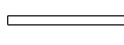
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Order details

Order code	(1) Basic type	
	Mechanical dial thermometer, transformer version, Classe 1.5 with peak-reading pointer	
	Style 10 Housing size Ø	
608005/1080	 80 mm	
	(2) Indication range (AB) in °C	
643	-20...+120	
818	0...+120	
	(3) Process connection (PA)	
874	TA 24 Immersion tube with screw connection, O ring seal and clamping screw	
	(4) Ø Process connection (PA)	
8	8 mm	
	(5) Type of thread for process connection (PA)	
104	G 1/2 thread	
105	G 3/4 thread	
106	G 1 thread	
	(6) Material of probe	
97	Stainless steel (1.4571) for temperature probe (TF) / brass for probe mounting (TA)	
	(7) Fitting length of process connection (PA) dimension „S“	
150	150 mm	
...	Special length (details in plain text - 50 mm steps)	
	(8) Extra codes(TZ)	
000	No extra codes	
434	Peak-reading pointer adjustable with screwdriver, protected by cap	
522	Customized scale	

Special versions on request!

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)									
Order code	608005/....	-	...	-	...	-	.	-	...	-	..	-	...	/	...	,	...
Order code	608005/1080	-	818	-	874	-	8	-	106	-	97	-	150	/	000 ^a	,	...

^a List extra codes in sequence, separated by commas.

Caution: for stock items only - **Pack of 3** - Quantity ordered must be a multiple of 3!

Note: For contact dial thermometers for transformers, see data sheet 608540.
 For temperature indicators and contact dial thermometers with capillary, see data sheet 608201 and 608520.

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Dial Thermometer

Particularities

- Temperature indicator for panel or surface mounting
- Class 1.5
- IP65 protection max.
- Housing sizes: 60 mm dia., 80 mm dia. and 100 mm dia.
 Bezel: 72 x 72 mm and 96 x 96 mm



Type 608201/2160

Brief description

Dial thermometers are temperature indicators for universal use. The instruments feature a stainless steel housing with a liquid-filled or gas-filled measuring system.

The temperature-dependent change in volume of a liquid-filled measuring system (or the temperature-dependent change of pressure in a gas-filled system) is converted into a rotary movement of the pointer by a Bourdon tube, without any intermediate gearing.



Type 608201/2572

Technical data

Housing or bezel	stainless steel (1.4301)	
Protection	IP55 as per EN 60 529 (IP65 with extra code 404)	
Window	glass, with styles 24 and 25, and with extra codes 473 and 404: PMMA (plexiglass)	
Scale	white, black lettering (silver, black lettering with extra codes 473 and 404)	
Accuracy class	Class 1,5 to EN 13190	
Indication adjustment	at the housing rear, no indication adjustment with extra codes 473 and 404	
Limit temperatures	storage and transport -30 to +70°C (for indication range -40 to +40°C: up to 50°C; -30 to +50°C: up to 60°C)	
Nominal position	unrestricted	

	liquid-filled	gas-filled
Measuring system	indication range (AB) ≤ 350°C	indication range (AB) ≥ 400°C
Time constant τ _{0,632}	approx. 12 sec, measured in water bath, with a 6 mm dia. copper probe	approx. 4 sec, measured in oil bath, with a 10 mm dia. stainless steel probe
Ambient temperature effect	in % of indication range (referred to the deviation from the reference value +23°C)	
on housing	0.15% of indication range per °C change in ambient temperature	0.05% of indication range per °C change in ambient temperature
on capillary (per meter)	0.03% of indication range per °C change in ambient temperature	no effect
	at higher ambient temperature – higher temperature indication	

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Technical Data

Display range (AB)	Display range in °C	Measuring range in °C	Tolerance in °
469	-40...+40	-30...+30	1,5
566	-30...+50	-20...+40	1,5
643	-20...+120	0...+100	3,0
807	0...+60	+10...+50	1,5
814	0...+100	+10...+90	1,5
818	0...+120	+20...+100	3,0
826	0...+160	+20...+140	3,0
832	0...+200	+20...+180	3,0
834	0...+250	+30...+220	4,0
926	+50...+250	+70...+230	3,0
840	0...+300	+30...+270	6,0
927	+50...+300	+80...+270	4,0
843	0...+350	+50...+300	6,0
932	+50...+350	+80...+320	6,0
848	0...+400	+50...+350	6,0
851	0...+450	+50...+400	6,0
854	0...+500	+50...+450	8,0
858	0...+600	+100...+500	10,0

Note:

Physical and toxic features of the expansion means, which could emerge in the event of a measuring system break.

Control range with scale limit value	Hazardous reactions	Fire and explosion hazard		hazardous to waters	Information about toxicology		
		Ignition temperature	Explosion limit		irritant	dangerous to health	toxic
< +200°C	no	+ 355°C	0,6 - 8 V%	yes	yes	¹⁾	no
≥ 200°C ≤ +350°C		+ 490°C	--	yes	yes	¹⁾	
> 350°C ≤ +500°C		no	no	no	no	no	

¹⁾ There is currently no statement by the health authority concerning hazards to health in the event of short-term exposure and low concentration, e.g. measuring

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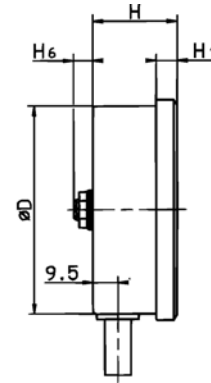
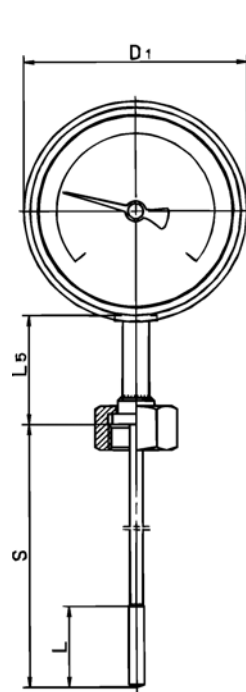
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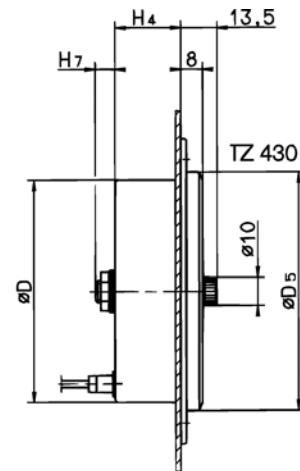
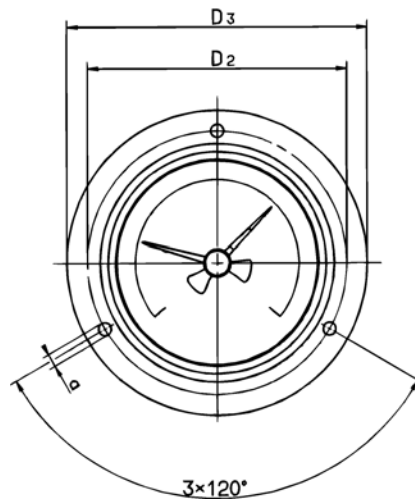


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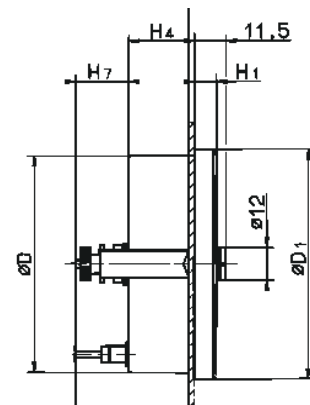
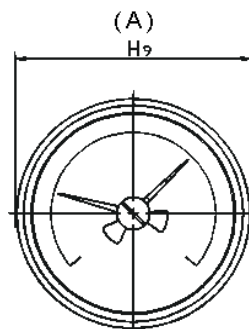
Types: 608201/1060
 608201/1080
 608201/1010



Types: 608201/2060
 608201/2080
 608201/2010



Types: 608201/2160
 608201/2180
 608201/2110



(A) Width of mounting bracket

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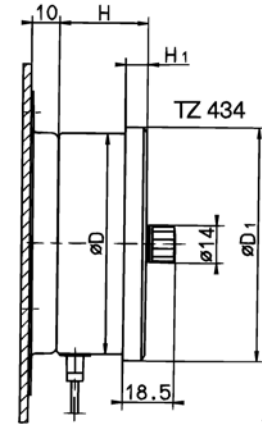
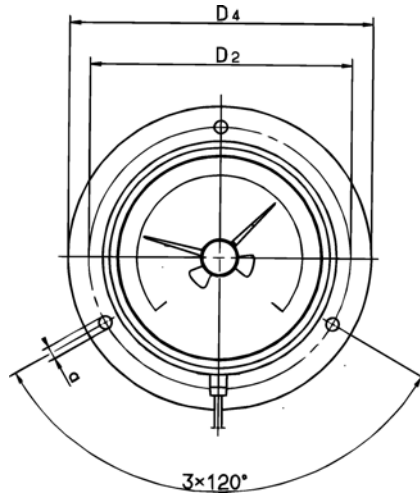
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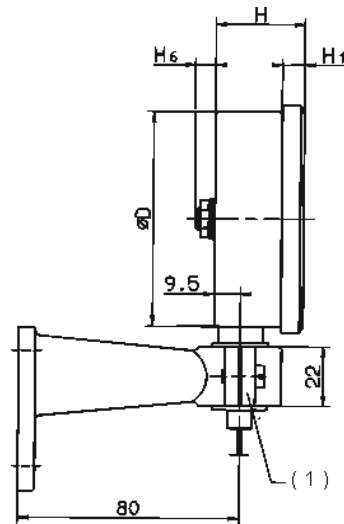
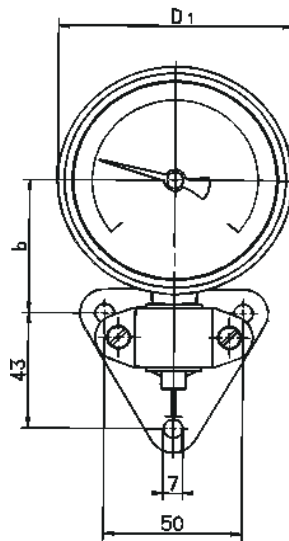


Dimensions

Types: 608201/2260
 608201/2280
 608201/2210



Types: 608201/2360
 608201/2380
 608201/2310



(1) Spigot 20 mm dia.

Housing dia.	Diameter of panel cut-out
60 mm	62 ^{0.5} mm
80 mm	82 ^{0.5} mm
100 mm	102 ^{0.5} mm

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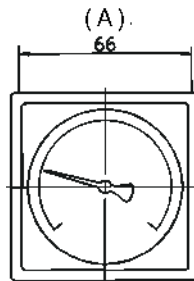
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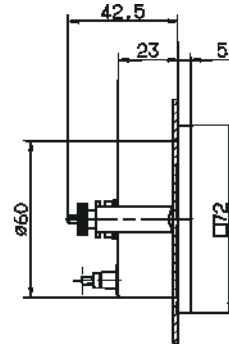


Dimensions

Type: 608201/2572

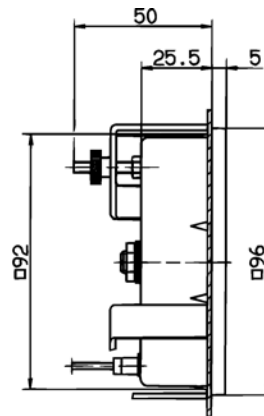
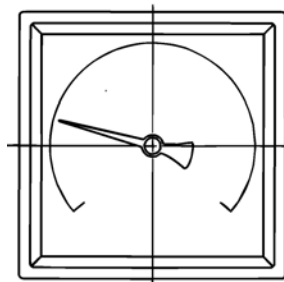


(A) Width of mounting bracket



Panel cut-out: $62^{+0.5}_0$ mm dia.

Type: 608201/2496



Panel cut-out: $92 \times 92^{+0.8}_0$ mm

Housing dia.	H	H ₁	H ₄	H ₆	H ₇	H ₉	D	D ₁	D ₂	D ₃	D ₄	D ₅	a	b	L ₅
60	30 (36)	7	23 (28)	approx. 7.5	19.5	66	60	65	75	85	86	66	3.6	39.5 (50)	41.5*
80	32.5	8	24.5			86	80	85	95	110	110	86		49.5	
100	33 (36)		25 (28)			106	100	106	116	132	132	107.5		59.5 (70)	

All dimensions in mm

* on probe mounting TA 02 L₅ = ≤ 70.5 mm
 on probe mountings TA 22 and TA 31 L₅ = 49.5 mm
 values in brackets apply to TZ 473 or TZ 404

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Order details

Dial thermometer Class 1.5, Type 608201

Order code (1) Basic type

608201 Mechanical dial thermometer Class 1.5

(2) Basic type extensions

1060	Style: 10; housing size: 60 mm dia.	
1080	Style: 10; housing size: 80 mm dia.	
1010	Style: 10; housing size: 100 mm dia.	
2060	Style: 20; housing size: 60 mm dia.	
2080	Style: 20; housing size: 80 mm dia.	
2010	Style: 20; housing size: 100 mm dia.	
2160	Style: 21; housing size: 60 mm dia.	
2180	Style: 21; housing size: 80 mm dia.	
2110	Style: 21; housing size: 100 mm dia.	
2260	Style: 22; housing size: 60 mm dia.	
2280	Style: 22; housing size: 80 mm dia.	
2210	Style: 22; housing size: 100 mm dia.	
2360	Style: 23; housing size: 60 mm dia.	
2380	Style: 23; housing size: 80 mm dia.	
2310	Style: 23; housing size: 100 mm dia.	
2496	Style: 24; housing size: 96 x 96 mm	
2572	Style: 25; housing size: 72 x 72 mm	

(3) Indication range (AB)

469	-40 to + 40°C
566	-30 to + 50°C
643	-20 to +120°C
807	0 to + 60°C
810	0 to + 80°C
814	0 to +100°C
818	0 to +120°C
826	0 to +160°C
832	0 to +200°C
834	0 to +250°C
926	+50 to +250°C
840	0 to +300°C
927	+50 to +300°C
843	0 to +350°C
932	+50 to +350°C
848	0 to +400°C
851	0 to +450°C
854	0 to +500°C
858	0 to +600°C

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Order details

Dial thermometer Class 1.5, Type 608201

Order code

(4) Capillary type (FL) ¹	
00	none (with rigid connection)
02	FL02 copper capillary with copper braiding, approx. 2.5 mm dia. (up to +300°C top of indication range)
11	FL11 copper capillary with PE sleeve, approx. 3.5 mm dia. (up to +120°C top of indication range)
17	FL17 stainless steel capillary, 1.5 mm dia.
21	FL21 copper capillary, 1.0 mm dia. (up to +300°C top of indication range)

(5) Capillary length ¹	
0	none (with rigid connection)
1000	1000 mm
2000	2000 mm
3000	3000 mm
4000	4000 mm
5000	5000 mm
...	special length (specify in plain text: 1000 mm steps, maximum length 10000 mm)

(6) Process connection (PA) ¹		
750	TF 01; temperature probe with stepped support tube	
752	TF 11; temperature probe without support tube	
843	TA 02; immersion tube with union nut and loose nipple ²	
161	TA 03; immersion tube with loose union nut	
847	TA 06; sliding clamp fitting on support tube ²	
311	TA 20; immersion tube with loose nipple and shoulder ²	
872	TA 21; immersion tube with loose plug and conical seal	
873	TA 22; immersion tube with loose plug, conical seal and loose nipple ²	
401	TA 23; immersion tube with plug and spring clip	
848	TA 25; sliding clamp fitting on capillary ² (with FL 17 and FL 21 only)	
913	SH 07; screw-in pocket, assembled, with clamping clip and fixing screw ² (with TF 01)	
820	SH 09; screw-in pocket, assembled, with clamping clip and fixing screw (not with FL21 - welding shoulder with steel 1.4515) (with TF 01)	
876	SH10; screw-in pocket, assembled ²	
871	SH11; screw-in pocket, assembled ²	

(7) Diameter of process connection (PA) ¹	
6	6 mm dia.
8	8 mm dia.
10	10 mm dia.
11	11 mm dia.
12	12 mm dia.

¹ See Data Sheet 608730 for description and features

² Screw-in spigot to DIN 3852 Form A.

³ List extra codes in sequence, separated by commas.

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Order details

Dial thermometer Class 1.5, Type 608201

Order code

(8) Thread for process connection (PA)¹	
000	no thread (with TF 01 and TF 11)
103	G ³ / ₈ thread
104	G ¹ / ₂ thread
105	G ³ / ₄ thread
114	M 10 x 1 thread (with TA 23 and SH 11 only)
(9) Material of probe / support tube¹	
26	stainless steel (CrNi, 1.4571)
96	copper (Cu) / brass (CuZn) (up to 200°C)
95	stainless steel (CrNi, 1.4571) – probe / brass (CuZn) – support tube (above 250°C)
(10) Material of process connection (PA)¹	
00	none (TF01 and TF11 only)
01	steel (St)
26	stainless steel (CrNi, 1.4571)
46	brass (CuZn)
(11) Fitting length of process connection (PA)¹ (dimension EL or S)	
0	minimum fitting length TF 11 (active probe dimension)
50	50 mm
100	100 mm
150	150 mm
200	200 mm
...	special length (specify in plain text, in 50 mm steps)
(12) Extra codes (TZ)	
000	no extra code
430	peak-reading pointer, with housing diameters 60, 80 and 100 mm (not with TZ 473 or TZ 404)
440	housing with bimetal compensation
315	capillary reinforcement on housing and probe (not with FL 21)
404	IP65 enclosure protection to EN 60 529 (only with basic type extension: 2060, 2260, 2360, 2010, 2210, 2310)
522	customized scale
434	peak-reading pointer adjustable with screwdriver; protected by screw-on cap (not available with TZ 473 or TZ 404)

Special versions on request!

Order code

(1) 608201 / (2) - (3) ... - (4) .. - (5) - (6) ... - (7) .. - (8) ... - (9) .. - (10) .. - (11) ... / (12) .. , ...

Order example

608201 / 1010 - 818 - 00 - 0 - 750 - 8 - 000 - 26 - 26 - 100 / 000³

¹ See Data Sheet 608730 for description and features

² Screw-in spigot to DIN 3852 Form A.

³ List extra codes in sequence, separated by commas.

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Dial Thermometer

Type 608225

Particularities

- temperature indicator for panel mounting or self-supporting stainless steel housing with bayonet lock
- Class 1
- IP 65 protection
- housing sizes: 100 mm and 160 mm dia.

Brief description

Dial thermometers are universal instruments for temperature measurement and monitoring. The volume change in a liquid-filled measuring system as an effect of temperature, or the change of pressure with temperature inside a gas-filled system, is converted into a rotation of the pointer by means of a Bourdon tube, without any intermediate gearing.

The pointer is directly linked to the measuring system, which makes the overall system extremely torsionally rigid. Vibrations are transmitted to the pointer only to a minor extent.



Type 608225/1016

Technical data

Housing	housing with bayonet lock in stainless steel (1.4301)
Enclosure protection	IP65 to EN 60 529
Window	glass, with extra code 434: polycarbonate
Scale	white, black lettering
Accuracy class	Class 1 to EN 13190
Reinforcement spring	instruments with capillary: on housing and temperature probe
Indication adjustment	at the back (no indication adjustment on Style 01)
Limit temperatures	for transport and storage -20°C to +70°C (for the 0 to +60°C range: up to 65°C)
Nominal position (NL)	unrestricted

	liquid-filled	gas-filled
Measuring system	indication range ≤ 350°C	indication range ≥ 400°C
Time constant $t_{0.632}$	approx. 12 sec, measured in water bath, with a 6 mm dia. copper probe	approx. 4 sec, measured in oil bath, with a 10 mm dia. stainless steel probe
Ambient temperature effect	in % of indication range (referred to the deviation from the +23°C reference value)	
on housing	0.15% of indication range per °C ambient temperature change	0.05% of indication range per °C ambient temperature change
on capillary (per m)	0.03% of indication range per °C ambient temperature change	no effect
	higher ambient temperature – higher temperature indication – lower switching point	

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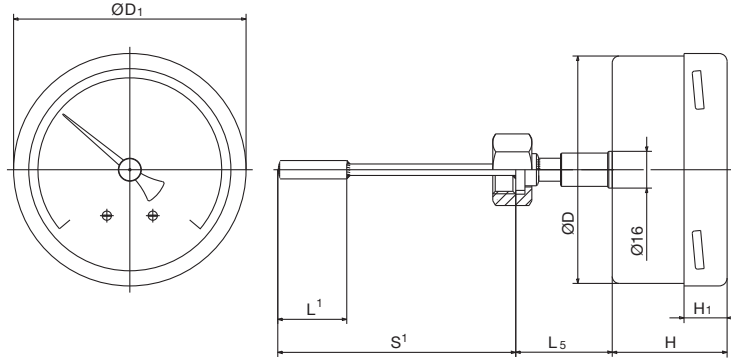
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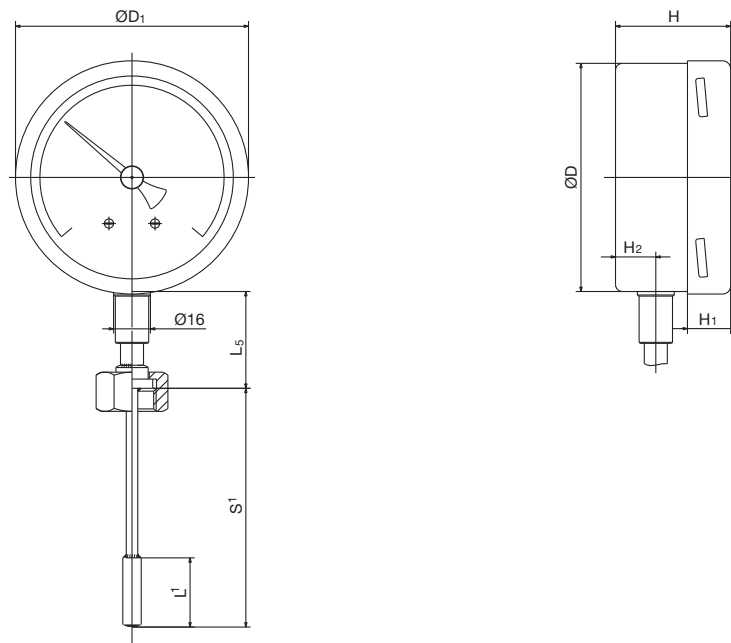


Dimensions

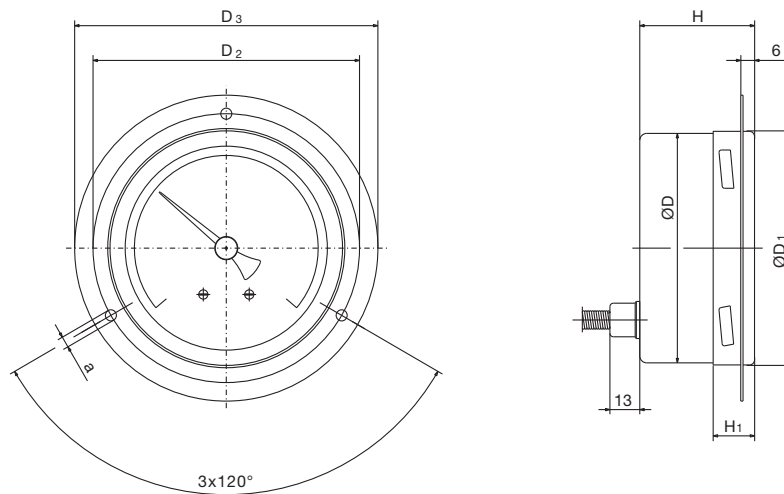
Types: 608225/0110
 608225/0116



Types: 608225/1010
 608225/1016



Types: 608225/2010
 608225/2016



Panel cut-out on housing:
 100mm dia. = $105.5^{+0.5}$ mm
 160mm dia. = $165.5^{+0.5}$ mm

¹ see Data Sheet 608730 for details about lengths

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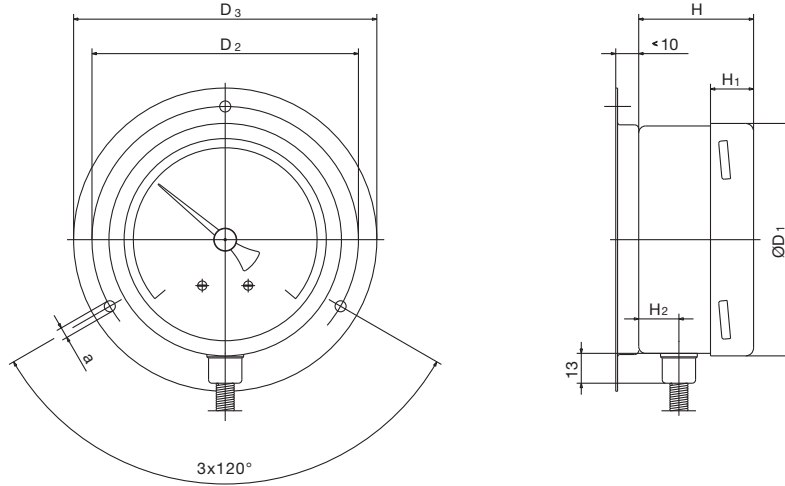
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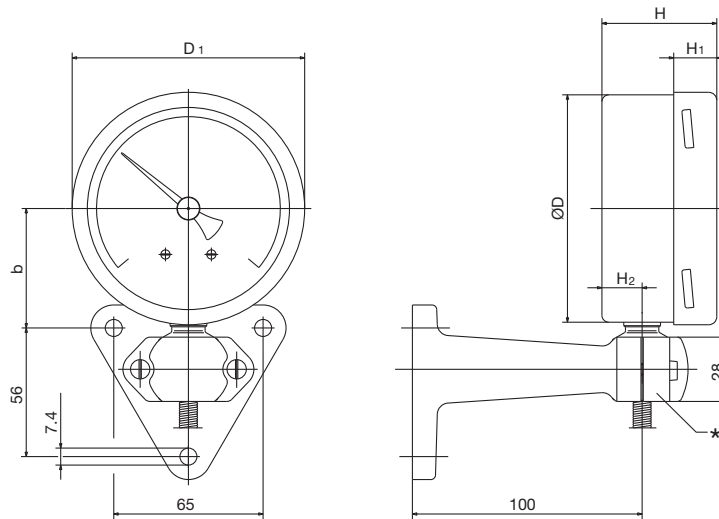


Dimensions

Types: 608225/2210
 608225/2216



Types: 608225/2310
 608225/2316



* Spigot 26 mm dia.

Mounting bracket to DIN 16 281

Housing dia.	H	H ₁	H ₂	D	D ₁	D ₂	D ₃	a	b	L ₅
100	50	19	17,5	99	101,5	116	132	4,8	52	40 ¹
160	50	21		159	161,5	178	196	5,8	82	

¹ for probe mounting TA 02 L₅ is ≤ 69 mm

Note:

Physical and toxic features of the expansion means, which could emerge in the event of a measuring system break.

Control range with scale limit value	Hazardous re- actions	Fire and explosion hazard		hazardous to waters	Information about toxicology		
		Ignition tem- perature	Explosion limit		irritant	dangerous to health	toxic
< +200°C	no	+ 355°C	0,6 - 8 V%	yes	yes	¹⁾	no
≥ 200°C ≤ +350°C		+ 490°C	--	yes	yes	¹⁾	
> 350°C ≤ +500°C		no	no	no	no	no	

¹⁾ There is currently no statement by the health authority concerning hazards to health in the event of short-term exposure and low concentration, e.g. measuring system break.

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Order details

Dial thermometer Class 1, Type 608225

Order code	(1) Basic type		
608225	Mechanical dial thermometer		
	(2) Basic type extension		
0110	Style: 01; housing size: 100 mm dia.		
0116	Style: 01; housing size: 160 mm dia.		
1010	Style: 10; housing size: 100 mm dia.		
1016	Style: 10; housing size: 160 mm dia.		
2010	Style: 20; housing size: 100 mm dia.		
2016	Style: 20; housing size: 160 mm dia.		
2210	Style: 22; housing size: 100 mm dia.		
2216	Style: 22; housing size: 160 mm dia.		
2310	Style: 23; housing size: 100 mm dia.		
2316	Style: 23; housing size: 160 mm dia.		
	(3) Indication range (AB)		
469	-40 to +40°C; range -30 to + 30°C		Accuracy 1.0°C
566	-30 to +50°C; range -20 to + 40°C	Accuracy 1.0°C	
807	0 to +60°C; range +10 to + 50°C	Accuracy 1.0°C	
810	0 to +80°C; range +10 to + 70°C	Accuracy 1.0°C	
814	0 to +100°C; range +10 to + 90°C	Accuracy 1.0°C	
818	0 to +120°C; range +20 to +100°C	Accuracy 2.0°C	
826	0 to +160°C; range +20 to +140°C	Accuracy 2.0°C	
832	0 to +200°C; range +20 to +180°C	Accuracy 2.0°C	
834	0 to +250°C; range +30 to +220°C	Accuracy 2.5°C	
840	0 to +300°C; range +30 to +270°C	Accuracy 5.0°C	
843	0 to +350°C; range +50 to +300°C	Accuracy 5.0°C	
848	0 to +400°C; range +50 to +350°C	Accuracy 5.0°C	
854	0 to +500°C; range +50 to +450°C	Accuracy 5.0°C	
	(4) Capillary type (FL)¹		
00	none (for rigid stem mounting)		
04	FL04 stainless steel capillary (1.4571), 2.2 mm dia.		
	(5) Capillary length¹		
0	none (for rigid stem mounting)		
1000	1000 mm		
2000	2000 mm		
3000	3000 mm		
4000	4000 mm		
5000	5000 mm		
...	special length (details in plain text: in 1000 mm steps, maximum length 10000 mm)		
	(6) Process connection (PA)¹		
750	TF01 temperature probe with shouldered support tube		
753	TF05 temperature probe with plain support tube		
752	TF11 temperature probe without support tube		
843	TA02 stem with union nut and loose nipple ²		
161	TA03 stem with loose union nut (on TF01)		
846	TA04 stem with fixed hexagon screw-in spigot ²		
847	TA06 sliding clamp fitting on support tube ²		
891	SH05 screw-in pocket, assembled ² (with 14 mm dia. only)		
913	SH07 screw-in pocket, assembled, with clamping clip and fixing screw ²		

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Order details

Dial thermometer Class 1, Type 608225

Order code	(7) Diameter of process connection (PA)¹
6	ø 6 mm
8	ø 8 mm
10	ø 10 mm
14	ø 14 mm (SH05 only)
	(8) Thread for process connection (PA)¹
000	no thread (TF01, TF05 and TF11)
103	thread G 3/8
104	thread G 1/2
105	thread G 3/4
	(9) Material of process connection (PA)¹
26	stainless steel (1.4571)
97	stainless steel (1.4571)-TF / brass -TA, SH
	(10) Fitting length of process connection (PA)¹ (dimension "EL" or "S")
0	minimum fitting length TF 11 (active probe dimension)
50	50 mm
100	100 mm
150	150 mm
200	200 mm
...	special length (details in plain text, in 50 mm steps)
	(11) Extra codes (TZ)
000	no extra code
434	peak-reading pointer adjustable with screwdriver, protected by cover
522	scale to customer specification

Special versions on request !

Order code

(1) 608225 / (2) ... - (3) ... - (4) .. - (5) - (6) ... - (7) .. - (8) ... - (9) .. - (10) ... / (11) ... , ...

Order example

608225 / 2010 - 818 - 04 - 2000 - 750 - 8 - 000 - 26 - 100 / 000³

¹ For description and special features see Data Sheet 60.8730

² Screw-in spigot to DIN 3852 Form A

³ List extra codes in sequence, separated by commas

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Bimetal Temperature Switch

Special features

- Electromechanical temperature switch with a fixed switching temperature
- Max. protection type: IP67
- Simple mounting
- Switching capacity up to 2.5 kVA

Brief description

The bimetal temperature switch is universally applicable. Areas of application include temperature monitoring, temperature control, and temperature indication in cooling and heating circuits as well as compressors and motors.

To a limited extent, the temperature switch can also be used as a temperature controller.

The temperature change is transmitted to a bimetal kinematics via the fitting. When the switching temperature is reached, the temperature switch is activated.



Type 608301/10-...-01

**ATEX version
upon request!**



Type 608301/30-...-36



Type 608301/10-...-11

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Technical data

Minimum order quantity 50 items

	Tab connector A 6.3-08	Connecting cable with cable gland	Encapsulated connecting cable	Connector for cable connection *	Connector M 12 x 1
Fitting	Brass or stainless steel; screw-in spigot similar to DIN 3852 Form A for sealing and sealing ring.				Form A for sealing and sealing ring
Protection type	IP 52	IP 65	IP 67	IP 65	IP 67
Electrical contact snap-action switch Connection	A 6.3-0,8 acc. to DIN 46244	Cable diameter approx. 6.5 mm; connection cross-section 0.75 mm ²		Cable diameter 6 to 8 mm; connect terminals 1 and 2; ground terminal not connected	Connect terminals 1 and 2
Switching capacity	DC 30 V, +10 / -15 %, 5 A AC 230 V, +10/-15 %, 48 to 63Hz, 10(10) A, cos φ = 0.75				AC 250 V, 50/60 Hz (cos φ 0.95/0,6) 2.5 A/1.6 A (depending on version, max. 4 A)
	AC 115 V, +10/- 15 %, 48 to 63 Hz, 15(13.5) A, cos φ = 1 (0.75)	AC 115 V, +10/-15 %, 48 to 63 Hz, 10(10) A, cos φ = 1 (0.75)			--
Contact resistance	< 30 mΩ				< 50 mΩ
Dielectric strength	AC 1500 V/1 min				
Electrical contact slow-action contact Connection	-	Cable diameter approx. 4.5 mm; connection cross-section 0.5 mm ²		Cable diameter 6 to 8 mm; connect terminals 1 and 2; ground terminal not connected	--
Switching capacity	-	DC 12 V, +10/-15 %, 8 A DC 24 V, +10/-15 %, 4 A DC 30 V, +10/-15 %, 3 A AC 48 V, +10/-15 %, 48 to 63 Hz, 6 A	-	DC 12 V, +10/-15 %, 8 A DC 24 V, +10/-15 %, 4 A DC 30 V, +10/-15 %, 3 A AC 48 V, +10/-15 %, 48 to 63Hz, 6 A	--
	If the bimetal temperature switch is operated at a voltage of 50 V, the fitting must be equipped with protective grounding according to VDE or the corresponding national regulations.				

* Acc. to EN 175301-803 (DIN 43650)

	Snap-action switch	Slow-action contact	Compact snap-action switch
Switching temperature	+0 °C to +140 °C; 5 K increments	+10 °C to +140 °C; 5 K increments	+60 °C to +140 °C
Switching differential	15 to 30 K below the switching temperature	Approx. 1.5 K below the switching temperature (measured in a water bath, switching point 40 °C)	30 K to 45 K below the switching temperature
Switching point accuracy	Switching temperature: Up to 130 °C ± 5 K, above 130 °C ± 10 K at a temperature change rate of 1 K/min		
Vibration strength	13 g (vibration in the central axis direction at a frequency of 45 Hz and an amplitude of ± 1.6 mm)	--	400 m/s ² half-sine / 100 m/s ² 5 Hz to 2,000 Hz sine
Response time	t _{0,9} value time approx. 3.5 min, measured in an agitated oil bath; brass fitting, G1/2 A	--	--
Switching output (SA)	Normally closed SA01 or normally open SA02	 relative to the rising temperature	
Rated position	Any		
Weight	Approx. 50 g		

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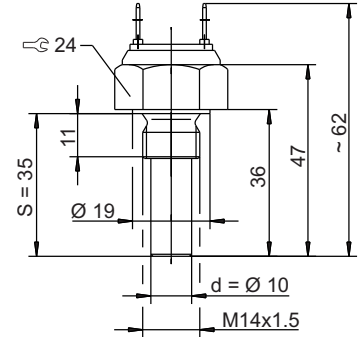
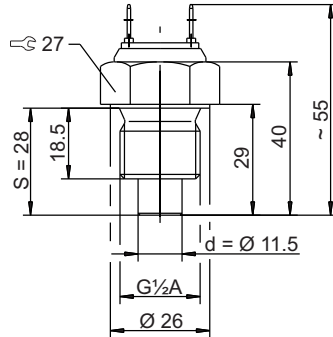
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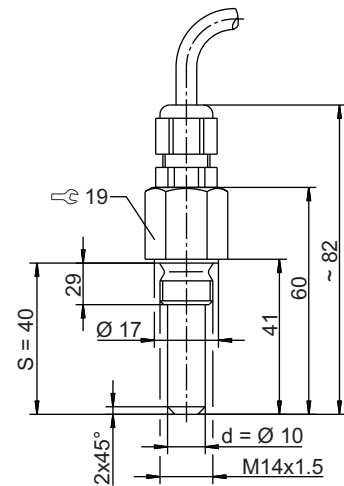
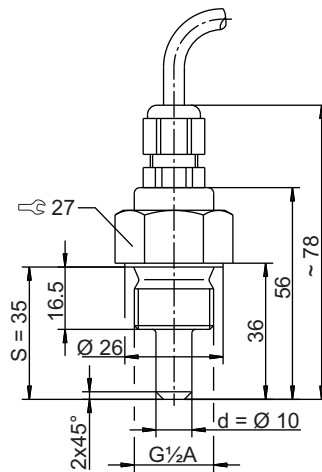


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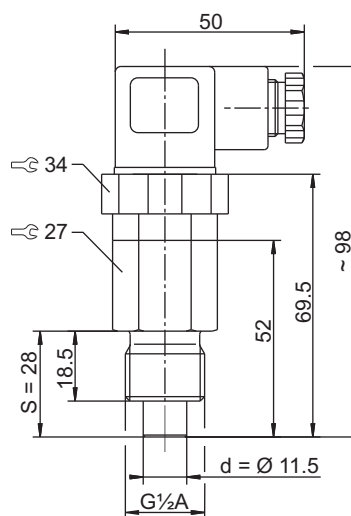
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Type: 608301/20-...-...-18



Type: 608301/10-...-...-61



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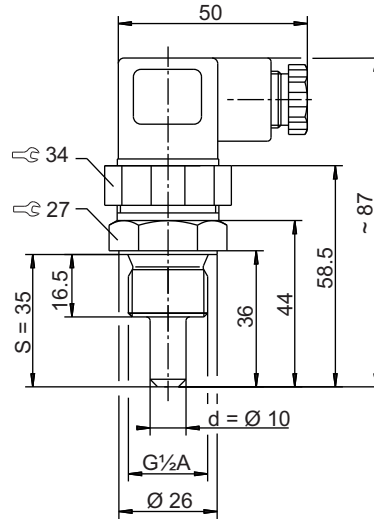
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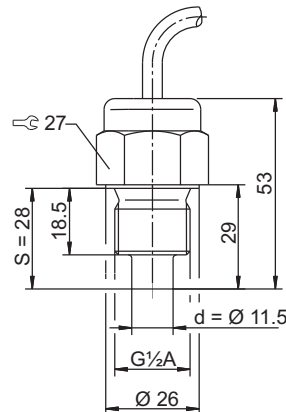


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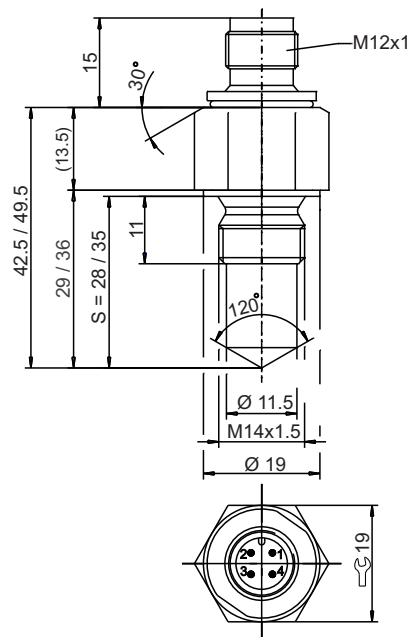
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Types: 608301/10-...-...-11



Types: 608301/30-...-...-36



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Order details

Bimetal temperature switch type 608301

Minimum order quantity 50 items

Order code			(1) Basic type
			608301 Electromechanical temperature switch with a fixed switching temperature setting
			(2) Basic type extensions
x	10		Snap-action switch
	x	20	Slow-action contact
		x	30 Compact snap-action switch
			(3) Switching temperature
x	...		Degree specification in the +0 °C to +140 °C range, 5 K increments
	x	...	Degree specification in the +10 °C to +140 °C range, 5 K increments
		x	for basic type extension 608301/30, from +60 °C to +140 °C, 5 K increments (e.g. 85 = + 85 °C)
			(4) Switching output (SA)
x	x	x	98 Normally closed (SA01)
x	x	x	99 Normally open (SA02)
			(5) Electrical connection
x	01		Tab connector A 6.3-0.8 DIN 46244 (not for basic type extensions and 608301/20 and 608301/30)
x	x	x	61 Connector for cable connection acc. to EN 175301-803 (DIN 43650)
	x	x	18 Connecting cable with cable gland (not for basic type extension 608301/10)
x	11		Encapsulated connecting cable (not for basic type extensions 608301/20 and 608301/30)
		x	36 Round plug M 12 x 1 (only in conjunction with basic type extension 608301/30)
			(6) Material of process connection
x	x	x	50 Brass (CuZn)
x	x	x	78 Stainless steel (CrNi, 1.4305)
			(7) Diameter of process connection (PA), dimension "d"
x	x	10	10 mm
x		x	11.5 11.5 mm
			(8) Thread type of process connection (PA)
x	x	x	121 M14 x 1.5 screw connection
x	x	x	104 G 1/2 screw connection
			(9) Insertion length of process connection (PA), dimension "S"
x	x	x	28 28 mm
x	x	x	35 35 mm
		x	40 40 mm
			(10) Cable length
x	x	x	0 None
x	x	x	1000 1000 mm
x	x	x	2000 2000 mm
x	x	x	3000 3000 mm
x	x	x	4000 4000 mm
x	x	x	5000 5000 mm

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Order details

Bimetal temperature switch type 608301

Minimum order quantity 50 items

				(11) Extra codes (TZ)
x	x	x	000	Without extra code
x			702	Gold-plated snap-action switch (for basic type extension 608301/10) for currents from 10 to 100 mA and 6 to 30 V DC / 6 to 120 V AC
		x	840	With integrated Pt100 (for basic type extension 608301/30 only)
		x	841	With integrated Pt1000 (for basic type extension 608301/30 only)

Other versions (switching temperatures, fittings, etc.) available upon request.

Possible combinations

Basic type extensions (2) (5)	Diameter PA (7)	Thread type PA (8)	Insertion length (9)		Switching element position:
608301/10-...-01	11.5 mm	G 1/2 A	28 mm	27*	Above the thread
608301/10-...-61	10 mm	M 14 x 1.5	35 mm	24	
608301/10-...-11	11.5 mm	G 1/2 A	28 mm	27	
	10 mm	M 14 x 1.5	35 mm	22	
608301/20-...-61	10 mm	G 1/2 A	35 mm	27	Below in the probe
608301/20-...-18		M 14 x 1.5			
	608301/30-...-36	11.5 mm	G 1/2 A	35 mm	
M 14 x 1.5			40 mm	19	
M 14 x 1.5	28 mm		19		
G 3/8 A	35 mm		24		
G 1/2 A		27			

* Screw-in spigot DIN 3852, form B with 24

Order code

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)												
608301	/	...	-	...	-	..	-	..	-	...	-	...	-	...	-	...	-	...	-	...	/	...

Order example

608301	/	10	-	85	-	98	-	01	-	50	-	10	-	121	-	35	-	0	/	000
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Contact Dial Thermometers

Type 608425

Particularities

- temperature controller with indication for panel or surface mounting
- Class 1
- protection up to IP65
- housing sizes: 100 mm and 160 mm diameter, bezel 96 x 96 mm

Brief description

Contact dial thermometers are universally applicable instruments with indication of the actual value, for temperature measurement, control and monitoring.

The temperature-dependent change in volume of a liquid-filled measuring system (or the temperature-dependent change of pressure in a gas-filled measuring system) is converted into a rotary movement of the pointer by a Bourdon tube, without any intermediate gearing. The rotary movement of the pointer shaft is used to operate the switched output.

The pointer is directly linked to the measuring system, which makes the overall system extremely torsionally rigid. Vibrations are transmitted to the pointer only to a minor extent.

The switched output can be implemented as a slow-break, magnetic snap-action or inductive contact. The slow-break or magnetic snap-action contact is an auxiliary circuit switch that, depending on the direction of movement, opens or closes an electrical circuit at the set limits, by means of a contact arm that is attached to the moving pointer.

The inductive contact is an electronic limit detector operated by a contactless position sensor (proximity switch).



Type 608425/2316



Type 608425/2496

Technical data



	Type 608425 round panel- or surface-mounting housing	Typ 608425 square panel-mounting instrument
Housing	housing with bayonet lock in stainless steel (1.4301)	galvanized sheet steel housing, fixed at back by a bracket; front bezel in stainless steel (1.4301)
Enclosure protection	IP65 as per EN 60 529	front: IP51 as per EN 60 529 back: IP00 as per EN 60 529
Electrical connection	terminal box: conductor cross-section up to 2.5mm ² cable gland suitable for cable dia. 6.5 – 13 mm	screw terminals: conductor cross-section up to 2.5mm ²
Glass window	polycarbonate	plexiglas (PMMA)
Scale	white, black lettering	
Accuracy class	Class 1 to EN 13190	
Anti-kink spring	for capillary instruments, at the housing and probe	
Setpoint adjustment	through setpoint adjuster on the glass window	
Indication correction	at the back, no indication correction for styles 01 and 20 (100 mm dia.)	
Temperature limits	for transport and storage -20°C to +70°C (with a 0 to +60°C range: max. 65°C)	
Operating position (NL)	unrestricted	
Measuring system	Liquid filling range (AB) ≤ 350°C	Gas filling range (AB) ≤ 400°C
Time constant t _{0.632}	approx. 12 sec, measured in water bath, with a 6 mm dia. copper probe	approx. 4 sec, measured in oil bath, with a 10 mm dia. stainless steel probe
Ambient temperature error at housing	in % of indication range (referred to the deviation from the reference value at +23°C)	
on capillary (per meter)	0.15% of indication range per °C change of ambient temperature	0.05% of indication range per °C change of ambient temperature
	0.03% of indication range per °C change of ambient temperature	no effect
	At higher ambient temperatures – higher temperature indication – lower switching point	

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	Standard	Extra code (TZ) 442
Electrical contact		
Contact type	electromechanical slow-break contact with single-pole make contacts	electromechanical magnetic snap-action contact with single-pole make contacts
Contact rating	230 V AC/DC, +10/-15%, 48 – 63Hz, p.f = 1 (0.6)	
	max. 18 VA / 10 W	max. 50 VA / 30 W
Switching differential	≤ 0.5% of indication range	approx.2% of indication range
Switching point accuracy	±0.5% of indication range (referred to the switching point for rising temperature)	
Switching reliability	To ensure maximum switching reliability, we recommend a minimum voltage of 24 V and a minimum current of 20 mA	
	Electromechanical limit contact	Inductive limit contact
Switching output	01 to 11	30 and 31
		<p>The inductive limit contact is operated by a contactless proximity switch. The sensor is a slot-type initiator attached to the setpoint indicator. The control flag is activated by the pointer.</p> <p>If the control flag moves into the sensor gap, the internal resistance increases (active area is damped: initiator is high-resistance, relay is de-energized). The switching amplifier of the control device responds to the resulting change in current.</p> <p>Switching action according to the "active current principle".</p> <p>Control flag is not within the sensor air gap, relay is energized:</p> <div style="text-align: center;">  <p>Current drawn ≥ 3mA (active area is clear, the oscillator is active).</p> </div> <p>Control flag is within the sensor air gap, Relay is de-energized:</p> <div style="text-align: center;">  <p>Current drawn ≤ 1mA (active area is damped, no oscillation).</p> <p>Inductive limit contact as per Directive 94/9 EC (ATEX), suitable for II 2 G EEx ia IIC T6</p> </div>
	for switching sequence and diagrams: see order details	
Secondary switched devices	<p>For electromechanical limit detectors we recommend using Type MSR multi-function relays from:Wiebrock Mess- und Regeltechnik GmbH, www.wiebrock.de.</p> <p>These switching amplifiers increase the switching reliability and switching capacity of slow-break and magnetic snap-action contacts, and reduce their contact loading.</p> <p>Unintended switching of the limit contact (caused by vibration) can be considerably reduced by using a drop-out delay.</p> <p>With inductive limit detectors, you can use the transistor relay: Type KFA6-SR2-Ex...W (II (1) G D [EEx ia] IIC) from Pepperl & Fuchs (www.pepperlfuchs.de). Intrinsic safety II 2 G EEx ia IIC T6 can only be ensured if this transistor relay is used.</p>	

Note:

Physical and toxic features of the expansion means, which could emerge in the event of a measuring system break.

Control range with scale limit value	Hazardous re- actions	Fire and explosion hazard		hazardous to waters	Information about toxicology		
		Ignition tem- perature	Explosion limit		irritant	dangerous to health	toxic
< +200°C	no	+ 355°C	0,6 - 8 V%	yes	yes	1)	no
≥ 200°C ≤ +350°C		+ 490°C	- -	yes	yes	1)	
> 350°C ≤ +500°C		no	no	no	no	no	

1) There is currently no statement by the health authority concerning hazards to health in the event of short-term exposure and low concentration, e.g. measuring system break.

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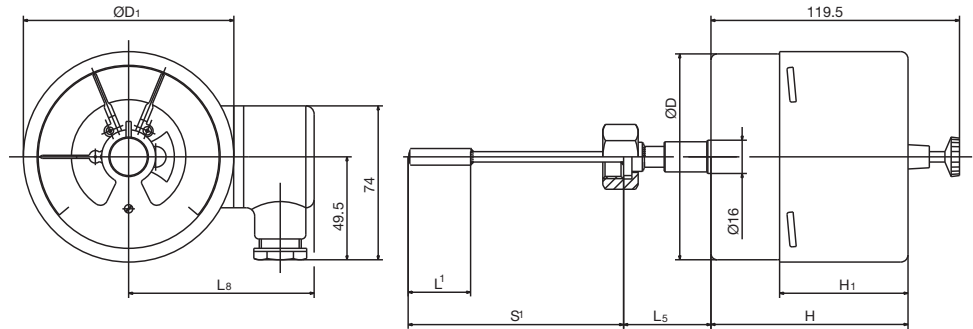
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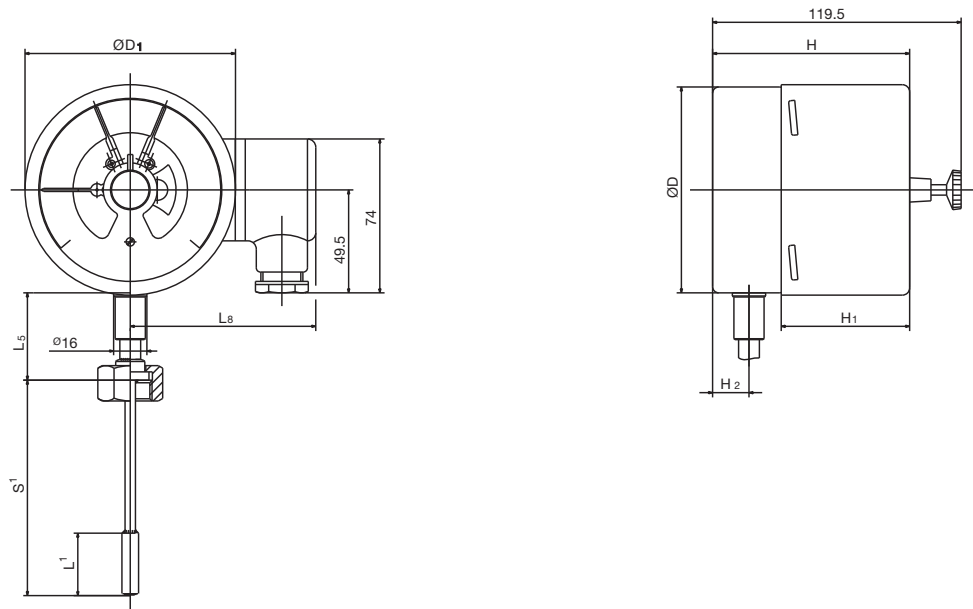


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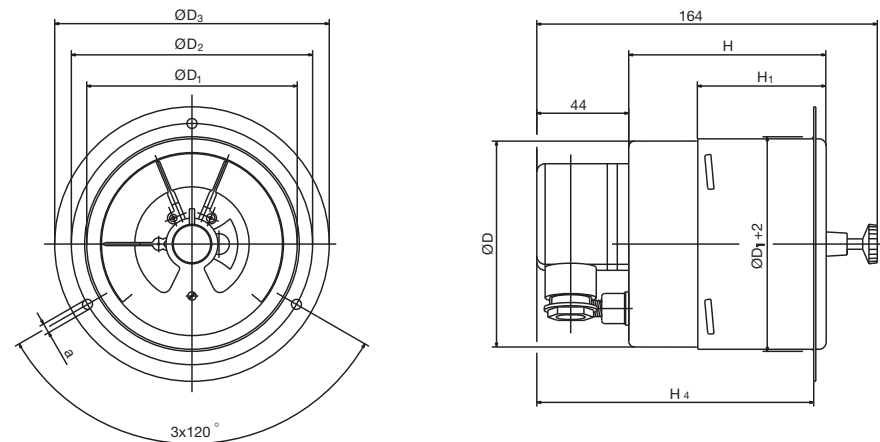
Types: 608425/0110
 608425/0116



Types: 608425/1010
 608425/1016



Types: 608425/2010
 608425/2016



Panel cut-out for housing
 diameter 100 mm = $105.5^{+0.5}$ mm
 diameter 160 mm = $165.5^{+0.5}$ mm

¹ for lengths, see Data Sheet 608730

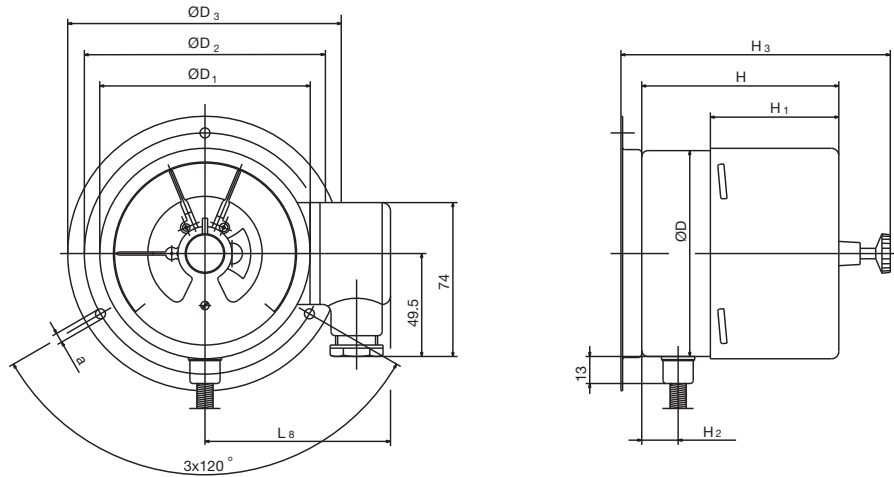
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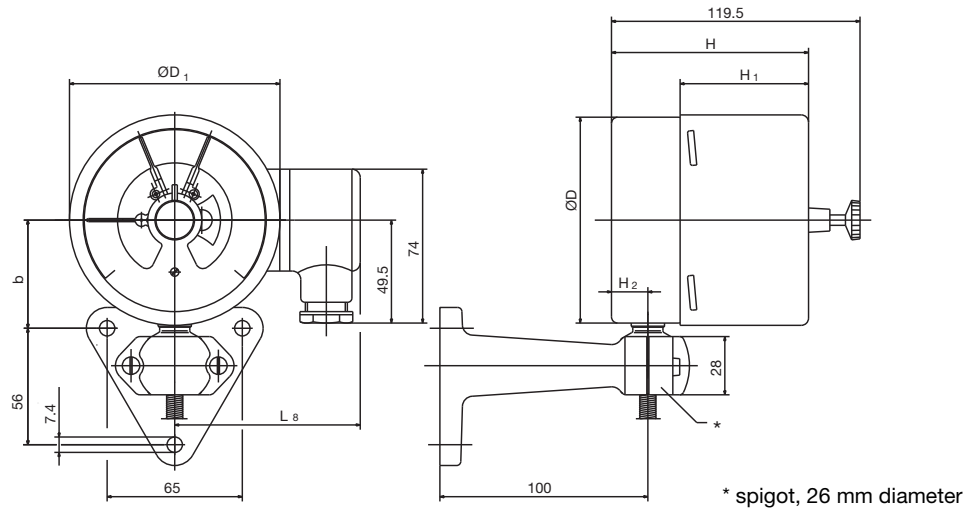
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Types: 608425/2210
 608425/2216



Types: 608425/2310
 608425/2316

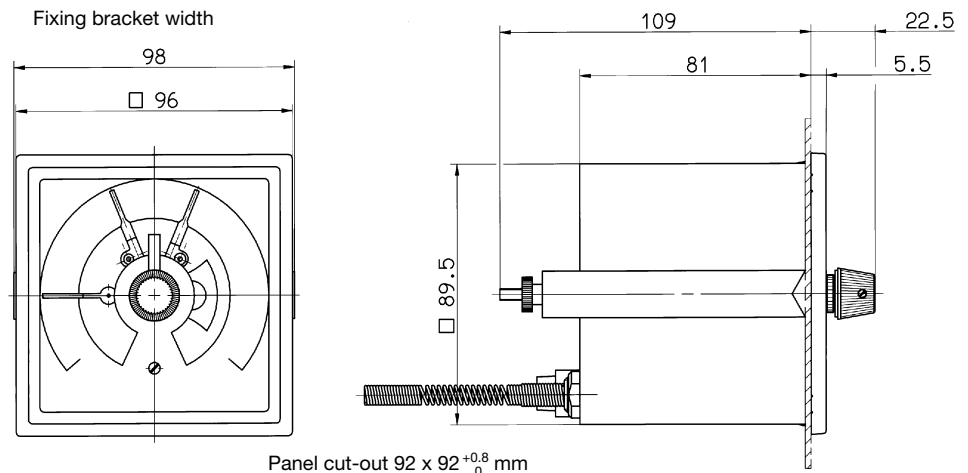


instrument mounting to DIN 16281

Housing diameter	H	H ₁	H ₂	H ₃	H ₄	D	D ₁	D ₂	D ₃	a	b	L ₅	L ₈
100	95	62	17.5	129.5	129	99	101.5	116	132	4.8	52	40 ¹	90
160	96	63		121	130	159	161.5	178	196	5.8	82		120

¹ for probe mounting TA 02, L₅ is ≤ 69 mm.

Type: 608425/2496



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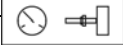
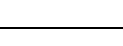

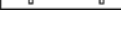

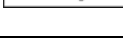

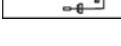

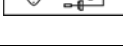

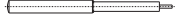







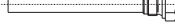
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Order details

Contact dial thermometers, Class 1, Type 608425

		(1) Basic type			
		608425	Mechanical contact dial thermometer, Class 1 (round, panel- or surface-mounting instrument)		
		608425	Mechanical contact dial thermometer, Class 1 (square, panel-mounting instrument)		
		(2) Basic type extensions			
X		0110	Style: 01; housing size: diameter 100 mm 		
X		0116	Style: 01; housing size: diameter 160 mm 		
X		1010	Style: 10; housing size: diameter 100 mm 		
X		1016	Style: 10; housing size: diameter 160 mm 		
X		2010	Style: 20; housing size: diameter 100 mm 		
X		2016	Style: 20; housing size: diameter 160 mm 		
X		2210	Style: 22; housing size: diameter 100 mm 		
X		2216	Style: 22; housing size: diameter 160 mm 		
X		2310	Style: 23; housing size: diameter 100 mm 		
X		2316	Style: 23; housing size: diameter 160 mm 		
X		2496	Style: 24; housing size: 96 x 96 mm 		
		(3) Indication range (AB)			
X	X	469	-40 to +40°C; range -30 to + 30°C	Error limit	1.0°C
X	X	566	-30 to +50°C; range -20 to + 40°C	Error limit	1.0°C
X	X	807	0 to +60°C; range +10 to + 50°C	Error limit	1.0°C
X	X	810	0 to +80°C; range +10 to + 70°C	Error limit	1.0°C
X	X	814	0 to +100°C; range +10 to + 90°C	Error limit	1.0°C
X	X	818	0 to +120°C; range +20 to +100°C	Error limit	2.0°C
X	X	826	0 to +160°C; range +20 to +140°C	Error limit	2.0°C
X	X	832	0 to +200°C; range +20 to +180°C	Error limit	2.0°C
X	X	834	0 to +250°C; range +30 to +220°C	Error limit	2.5°C
X	X	840	0 to +300°C; range +30 to +270°C	Error limit	5.0°C
X	X	843	0 to +350°C; range +50 to +300°C	Error limit	5.0°C
X	X	848	0 to +400°C; range +50 to +350°C	Error limit	5.0°C
X	X	854	0 to +500°C; range +50 to +450°C	Error limit	5.0°C
		(4) Capillary type (FL)¹			
X		00	none (with rigid stem)		
X	X	04	FL04 capillary, stainless steel (1.4571), diameter 2.2 mm		
		(5) Capillary length¹			
X	X	0000	none (rigid connection)		
X	X	1000	1000 mm		
X	X	2000	2000 mm		
X	X	3000	3000 mm		
X	X	4000	4000 mm		
X	X	5000	5000 mm		
X	X	...	special length (specify in plain text: 1000 mm steps, maximum length 10000 mm)		
		(6) Process connection (PA)¹			
X	X	750	TF01	temperature probe with shoulder on support tube	
X	X	753	TF05	temperature probe with plain support tube	
X	X	752	TF11	temperature probe without support tube	
X	X	843	TA02	stem with union nut and loose nipple (only TF01) ²	
X	X	161	TA03/01	stem with loose union nut (with TF01)	
X	X	846	TA04	stem with fixed hexagon screw-in spigot (only TF01) ²	
X	X	847	TA06	sliding clamp fitting on support tube ²	
X	X	891	SH05	screw-in pocket, assembled ² (with 14 mm dia. only)	
X	X	913	SH07	screw-in pocket, assembled, with clamping clip and fixing screw ²	

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Order details

Contact dial thermometers, Class 1, Type 608425

			(7) Diameter of process connection (PA)¹	
X	X	6	diameter 6 mm	
X	X	8	diameter 8 mm	
X	X	100	diameter 10 mm	
X	X	140	diameter 14 mm (only SH05)	
			(8) Thread for process connection (PA)¹	
X	X	000	no thread (with TF01, TF05 and TF11)	
X	X	103	thread G 3/8	
X	X	104	thread G 1/2	
X	X	105	thread G 3/4	
			(9) Process connection (PA) material¹	
X	X	26	stainless steel (CrNi, 1.4571)	
X	X	97	stainless steel (CrNi, 1.4571)-TF / brass (CuZn)-TA, SH	
			(10) Fitting length of process connection (PA)¹ (dimension "EL" or "S")	
X	X	0	minimum fitting length TF 11 (active probe dimension)	
X	X	50	50 mm	
X	X	100	100 mm	
X	X	150	150 mm	
X	X	200	200 mm	
X	X	...	special length (specify in plain text, steps of 50 mm)	
			(11) Switching output (SA)	
X	X	01	With rising temperature: contact 1 opens (2) ³	
X	X	02	With rising temperature: contact 1 closes (1) ³	
X	X	03	With rising temperature: contact 1 opens and contact 2 closes (21) ³	
X	X	04	With rising temperature: contact 1 and contact 2 close (11) ³	
X	X	05	With rising temperature: contact 1 opens and contact 2 opens (22) ³	
X		10	With rising temperature: contact 1 opens and contact 2 closes (with separate circuit) (21) ³	
X		11	With rising temperature: contact 1 and contact 2 close (with separate circuits) (11) ³	
X	X	30	With rising temperature: flag moves in, break action (2) ³	
X	X	31	With rising temperature: flag moves out, make action (1) ³	
			(12) Extra codes (TZ)	
X	X	000	no extra code	
X	X	442	electromechanical magnetic snap-action contact	
X		509	setpoint adjustment with key	
X	X	522	customized scale	

Special versions on request !

Order code

(1) 608425 / (2) - (3) ... - (4) .. - (5) - (6) ... - (7) .. - (8) ... - (9) .. - (10) ... - (11) ... / (12) ... , ...

Order example

608425 / 2010 - 818 - 04 - 2000 - 750 - 8 - 000 - 26 - 100 - 01 / 000⁴ , ...

¹ for description and features, see Data Sheet 608730

² screw-in spigot to DIN 3852 Form A

³ figures in brackets (..) correspond to the designation of the switching function code as per DIN 16196

⁴ list extra codes in sequence, separated by a comma

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MICROSTAT-M

Particularities

- Electromechanical temperature controller with indication
- with one microswitch
- Housing sizes: 60 mm, 80 mm and 100 mm dia.
Bezel sizes: 72 x 72 mm and 96 x 96 mm

Brief description

The MICROSTAT-M is an electromechanical temperature controller with indication for universal use. The instrument has a plastic housing and a liquid-filled or gas-filled measuring system. The temperature-dependent change in volume of a liquid-filled measuring system, or the temperature-dependent change in pressure of a gas-filled system, is converted by a Bourdon tube into a rotary movement of the pointer, without any transmission gearing. The rotary movement of the pointer spindle operates the microswitch through a lever system.



Type 608501/2160



Type 608501/2572

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Technical data

Housing or bezel	black plastic; steel housing (extra code 415)		
Protection	front: IP53 to EN 60 529 rear: IP00 to EN 60 529 (IP54 with extra code 426)		
Scale	white, black lettering		
Accuracy class	Class 2 to EN 13190		
Measuring system	liquid-filled		gas-filled
	indication range ≤ 350 °C		indication range ≥ 400 °C
Time constant $t_{0.632}$	approx. 12 sec, measured in water bath, with a 6 mm dia. copper probe		approx. 4 sec, measured in oil bath, with a 10 mm dia. stainless steel probe
Ambient temperature error effect on housing on capillary (per meter)	in % of indication range (referred to the deviation from the reference value +23 °C)		
	0.15% of indication range per °C change in ambient temperature		0.05% of indication range per °C change in ambient temperature
	0.03% of indication range per °C change in ambient temperature		no effect
	higher ambient temperature – higher temperature indication – lower switching point		
Electrical contact Contact type	standard	extra code (TZ) 651	extra code (TZ) 650
	single-pole microswitch with a mechanically operated changeover contact		
Contact rating	230 V AC +10/-15%, 48 – 63 Hz, p.f. = 1 (0.6)		
	5 (1.5) A	3 (1) A	10 (3) A
Switching differential	approx. 2% of indication range		2 to 4% of indication range
Switching point accuracy	$\pm 0.5\%$ of indication range referred to the switch-off point with rising temperature		
Switching reliability	To ensure maximum switching reliability, we recommend a minimum voltage of 24 V and a minimum current of 100 mA.		
Electrical connection	standard	extra code (TZ) 507	
	faston connectors A 6.3 x 0.8 to DIN 46 244	screw terminals: for up to 1.5 mm ² conductor cross-section	
Setpoint adjustment	by setting device on window		
Limit temperatures	for transport and storage: -20 to +70 °C (for indication range -40 to +40 °C: up to 50 °C; for indication range -30 to +50 °C: up to 60 °C)		
Nominal position	unrestricted		

Note:

Physical and toxic features of the expansion means, which could emerge in the event of a measuring system break.

Control range with scale limit value	Hazardous re- actions	Fire and explosion hazard		hazardous to waters	Information about toxicology		
		Ignition tem- perature	Explosion limit		irritant	dangerous to health	toxic
< +200 °C	no	+ 355 °C	0,6 - 8 V%	yes	yes	¹⁾	no
≥ 200 °C \leq +350 °C		+ 490 °C	--	yes	yes	¹⁾	
> 350 °C \leq +500 °C		no	no	no	no	no	

¹⁾ There is currently no statement by the health authority concerning hazards to health in the event of short-term exposure and low concentration, e.g. measuring system break.

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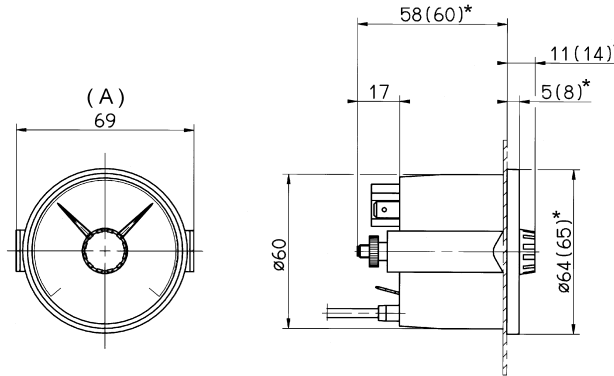
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Dimensions

Types: 608501/2160
 608501/2160 TZ 415

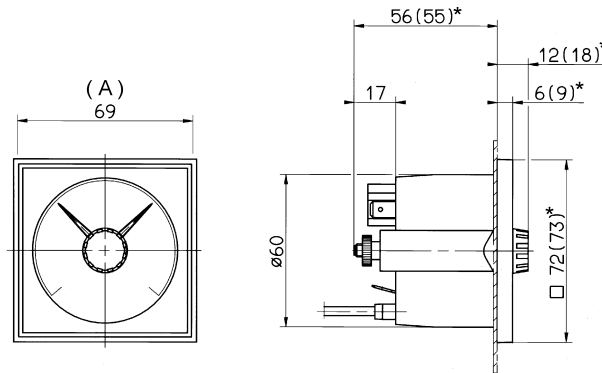


* for steel housing
 (extra code TZ 415)

(A) Width of mounting bracket

Panel cut-out $\varnothing 62$ $^{+0,5}_0$ mm

Types: 608501/2572
 608501/2572 TZ 415

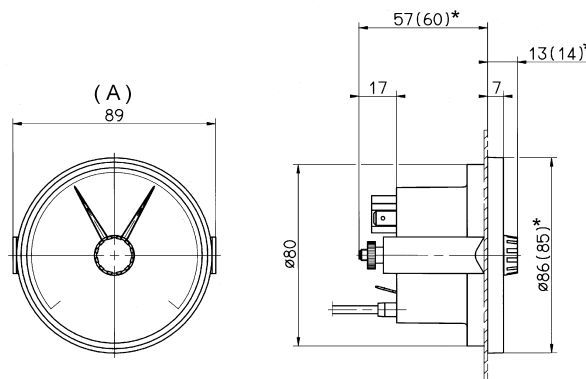


* for steel housing
 (extra code TZ 415)

(A) Width of mounting bracket

Panel cut-out $\varnothing 62$ $^{+0,5}_0$ mm

Types: 608501/2180
 608501/2180 TZ 415

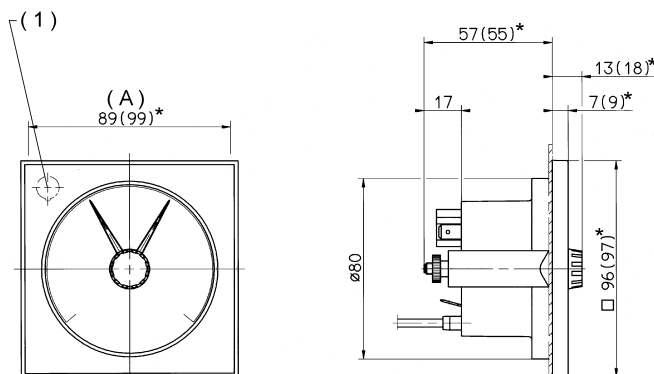


* for steel housing
 (extra code TZ 415)

(A) Width of mounting bracket

Panel cut-out $\varnothing 82$ $^{+0,5}_0$ mm

Types: 608501/2596
 608501/2596 TZ 415



* for steel housing
 (extra code TZ 415)

(1) TZ 572 (indicator light)
 only with $92 \times 92^{+0,8}_0$ mm
 panel cut-out

(A) Width of mounting bracket

Panel cut-out $\varnothing 82$ $^{+0,5}_0$ mm or 92×92 $^{+0,8}_0$ mm (TZ 460)

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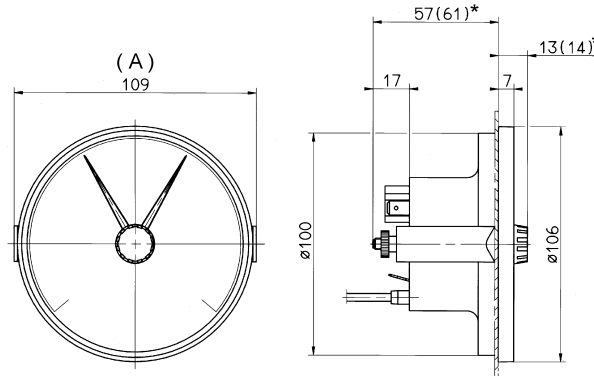
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Dimensions

Types: 608501/2110
 608501/2110 TZ 415

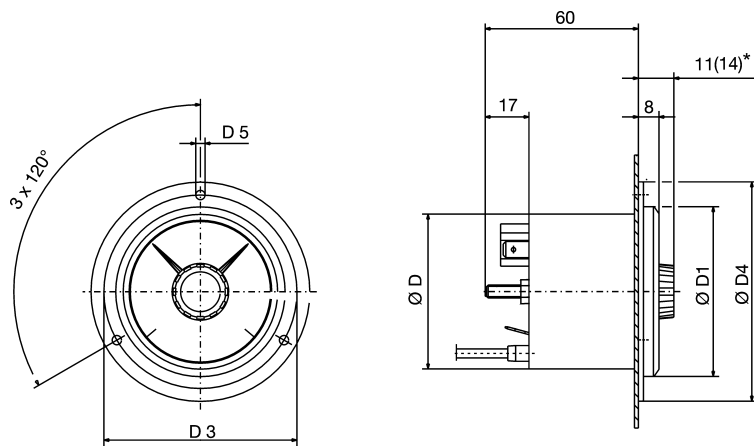


* for steel housing
 (extra code TZ 415)

(A) Width of mounting bracket

Panel cut-out $\varnothing 102^{+0,5}_0$ mm

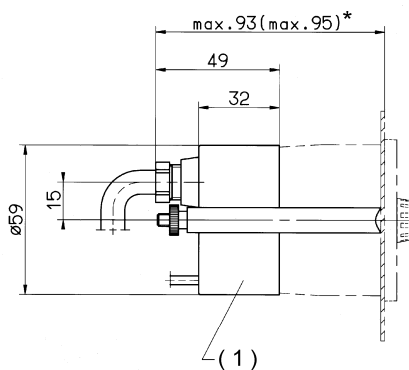
Types: 608501/2060
 608501/2060 TZ 415
 608501/2080 TZ 415
 608501/2010 TZ 415



* for steel housing
 (extra code TZ 415)

Type	$\varnothing D$	$\varnothing D1$	$\varnothing D3$	$\varnothing D4$	$\varnothing D5$	Panel cut-out $\varnothing^{+0,5}_0$ mm
608501/2060 608501/2060 TZ 415	60	66	75	85	3,6	62
608501/2080 TZ 415	80	86	95	110	4,8	82
608501/2010 TZ 415	100	107	116	132	4,8	102

Extra code 426



* for steel housing
 (extra code TZ 415)

(1) Extra code TZ 426

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Order details

MICROSTAT-M Type 608501

Order code (1) Basic type

608501 Mechanical temperature controller MICROSTAT-M Class 2, with one microswitch

(2) Basic type extensions

2060	Style: 20; housing size: 60 mm dia.		
2080	Style: 20; housing size: 80 mm dia.	(with TZ 415 only)	
2010	Style: 20; housing size: 100 mm dia.	(with TZ 415 only)	
2160	Style: 21; housing size: 60 mm dia.		
2180	Style: 21; housing size: 80 mm dia.		
2110	Style: 21; housing size: 100 mm dia.	(with TZ 415 only)	
2572	Style: 25; housing size: 72 x 72 mm		
2596	Style: 25; housing size: 96 x 96 mm		

(3) Indication range (AB)

469	-40 to + 40 °C; measuring range -30 to + 30 °C, accuracy 2.0 °C
566	-30 to + 50 °C; measuring range -20 to + 40 °C, accuracy 2.0 °C
643	-20 to +120 °C; measuring range 0 to +100 °C, accuracy 4.0 °C
807	0 to + 60 °C; measuring range +10 to + 50 °C, accuracy 2.0 °C
810	0 to + 80 °C; measuring range +10 to + 70 °C, accuracy 2.0 °C
814	0 to +100 °C; measuring range +10 to + 90 °C, accuracy 2.0 °C
818	0 to +120 °C; measuring range +20 to +100 °C, accuracy 4.0 °C
826	0 to +160 °C; measuring range +20 to +140 °C, accuracy 4.0 °C
832	0 to +200 °C; measuring range +20 to +180 °C, accuracy 4.0 °C
834	0 to +250 °C; measuring range +30 to +220 °C, accuracy 5.0 °C
926	+50 to +250 °C; measuring range +70 to +230 °C, accuracy 4.0 °C
840	0 to +300 °C; measuring range +30 to +270 °C, accuracy 10.0 °C
927	+50 to +300 °C; measuring range +80 to +270 °C, accuracy 5.0 °C
843	0 to +350 °C; measuring range +50 to +300 °C, accuracy 10.0 °C
932	+50 to +350 °C; measuring range +80 to +320 °C, accuracy 10.0 °C
848	0 to +400 °C; measuring range +50 to +350 °C, accuracy 10.0 °C
851	0 to +450 °C; measuring range +50 to +400 °C, accuracy 10.0 °C
854	0 to +500 °C; measuring range +50 to +450 °C, accuracy 10.0 °C
858	0 to +600 °C; measuring range +100 to +500 °C, accuracy 15.0 °C

(4) Capillary type (FL)¹

02	FL02 copper capillary with copper braiding, approx. 2.5 mm dia. (up to +300 °C top of indication range)
11	FL11 copper capillary with PE sleeve, approx. 3.5 mm dia. (up to +120 °C top of indication range)
17	FL17 stainless steel capillary, 1.5 mm dia.
21	FL21 copper capillary, 1.0 mm dia. (up to +300 °C top of indication range)

(5) Capillary length¹

1000	1000 mm
2000	2000 mm
3000	3000 mm
4000	4000 mm
5000	5000 mm
...	special length (specify in plain text: in 1000 mm steps, maximum length: 10000 mm)

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Order details
MICROSTAT-M Type 608501

Order code

(6) Process connection (PA)¹		
750	TF 01; temperature probe with stepped support tube	
752	TF 11; temperature probe without support tube	
843	TA 02; immersion tube with union nut and loose nipple ²	
161	TA 03; immersion tube with loose union nut	
847	TA 06; sliding clamp fitting on support tube ²	
311	TA 20; immersion tube with loose nipple and shoulder ²	
872	TA 21; immersion tube with loose plug and conical seal	
873	TA 22; immersion tube with loose plug, conical seal and loose nipple ²	
401	TA 23; immersion tube with plug and spring clip	
913	SH 07; screw-in pocket, assembled, with clamping clip and fixing screw ²	
820	SH 09; weld-in pocket, assembled, with clamping clip and fixing screw (not with FL21 - welding shoulder with steel 1.4515)	
876	SH10; screw-in pocket, assembled ²	
871	SH11; screw-in pocket, assembled ²	
(7) Diameter of process connection (PA)¹		
6	6 mm dia.	
8	8 mm dia.	
10	10 mm dia.	
11	11 mm dia.	
12	12 mm dia.	
(8) Thread for process connection (PA)¹		
000	no thread (with TF 01 and TF 11)	
103	G ³ / ₈ thread	
104	G ¹ / ₂ thread	
105	G ³ / ₄ thread	
114	M 10 x 1 thread (with TA 23 and SH 11 only)	
(9) Material of probe / support tube¹		
26	stainless steel (CrNi, 1.4571)	
96	copper (Cu) / brass (CuZn) (up to 200 °C)	
95	stainless steel (CrNi, 1.4571) - probe / brass (CuZn) - support tube (from 250 °C)	
(10) Material of process connection (PA)¹		
00	none (TF01 and TF11 only)	
01	steel (St)	
26	stainless steel (CrNi, 1.4571)	
46	brass (CuZn)	

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Order details
MICROSTAT-M Type 608501

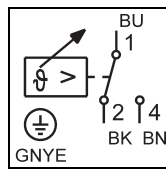
Order code

(11) Fitting length of process connection (PA)¹ (dimension EL or S)

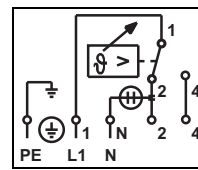
0	minimum fitting length TF 11 (active probe dimension)
50	50 mm
100	100 mm
150	150 mm
200	200 mm
...	special length (specify in plain text, in 50 mm steps)

(12) Switching output (SA)

,20 SA 20 one contact



Connection diagram, standard



Connection diagram, with indicator light (TZ 572)

(13) Extra codes (TZ)

000	no extra code
507	Electrical connection by screw terminals for cable up to 1.5 mm ² conductor cross-section
426	Plastic cover to protect the tab connectors or screw terminals against touching and splashing water, IP54, with cable gland, suitable for 6 – 8 mm cable dia.
650	Microswitch 10 (3) A (230 V AC/DC +10/-15%, 48 – 63 Hz, p.f. = 1 (0.6)) (not with TZ 577)
518	Stop for upper or lower limit of setpoint adjustment, factory-set
315	Capillary reinforcement on housing and probe (not with FL21)
477	Setpoint adjustment protected by screw cap. Adjustment with tool (only in case size 60 mm diameter in plastic housing).
520	Switching point fixed in the factory.
522	Customized scale
743	Class 1.5

Special versions on request!

Order code

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)									
608501	/	-	...	-	..	-	-	...	-	..	-	...	-	..	-	-	...	, ...

Order example

608501	/	2160	-	818	-	21	-	2000	-	750	-	8	-	000	-	96	-	00	-	100	-	20	/	000 ³
--------	---	------	---	-----	---	----	---	------	---	-----	---	---	---	-----	---	----	---	----	---	-----	---	----	---	------------------

¹ See Data Sheet 608730 for description and features.

² Screw-in spigot to DIN 3852 Form A.

³ List extra codes in sequence, separated by commas.

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Contact dial thermometer

Particularities

- Temperature controller with actual value display as panel-mounting or add-on device
- Stainless steel case with bayonet lock
- Class 1.5
- Protection class IP 53
- Case sizes Ø: 60 mm, 80 mm and 100 mm
 Front frame: 72x72 mm and 96x96 mm

Brief description

Contact dial thermometer are devices with actual value display for temperature measurement, control and monitoring and can be used universally.

The temperature depending volume change in a measuring system filled with liquid or the temperature depending pressure change in a measuring system filled with gas is converted to a rotational movement of the actual value indicator by a bourdon tube, no transmission gear is required. The microswitch is actuated by the rotational movement of the indicator shaft via a tap system.



Technical Data

Case and front frame	Stainless steel (1.4301)
Cover cap	Plastic (PA6), gray, UV stabilized
Protection type	IP 51 as per DIN EN 60529 (IP 53 with extra code 401)
Front pane	Acryl glass (PMMA)
Chassis	Aluminum (3.2582.05)
Scale	white, labeled in black
Display	Class 1.5 similar to DIN EN 13190
Anti-kink spring	for devices with capillary on the case and the temperature probe
Set point value setting	by set point controller in the front window
Display correction	on the rear
Limit value temperatures	for transport and storage -30°C...+70°C (for display range -40...+40°C up to max. 50°C; -30...+50°C up to max. 60°C)
Rated position	any

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Technical Data

Display range (AB)	Display range in °C	Measuring range in °C	Tolerance in °C
469	-40...+40	-30...+30	1.5
643	-20...+120	-20...+120	3.0
807	0...+60	+10...+50	1.5
814	0...+100	+10...+90	1.5
818	0...+120	+20...+100	3.0
832	0...+200	+20...+180	3.0
840	0...+300	+30...+270	6.0
848	0...+400	+50...+350	6.0
854	0...+500	+50...+450	8.0
848	0...+600	+100...+500	10.0

	Liquid filling	Gas filling
Measuring system	Display range (AB) ≤ 350°C	Display range (AB) ÷ 400°C
Time behavior	approx. 12 s, measured in water, with a probe Ø of 6 mm made of Cu.	approx. 4 s, measured in oil, with a probe Ø of 10 mm made of stainless steel.
Ambient temperature influence effect	In % of the display range (referring to the deviation from the reference value +23°C)	
on case	0.15% of the display range per K ambient temperature change	0.05% of the display range per K ambient temperature change
on capillary (per m)	0.03% of the display range per K ambient temperature change	no influence
	Higher ambient temperature – higher temperature display – lower switching point	
Anti-kink spring	for devices with capillary on the case and the temperature probe	
Set point value setting	by set point controller in the front window	
Display correction	on the rear	
Limit value temperatures	for transport and storage -30°C...+70°C (for display range -40...+40°C up to max. 50°C; -30...+50°C up to max. 60°C)	
Rated position	any	

	standard	Extra code (TZ) 650
Electric contact	Single-pole microswitch with mechanically actuate change-over contact	
Type of contact		
Contact rating	AC 230V, +10/-15%, 48...63Hz, cos φ = 1 (0.6)	
	5 (1.5) A	10 (3) A
Hysteresis	approx. 1.5% of the display range	1.5 to 3% of the display range
Switching point accuracy	± 0.5% of the display range referring to the switch-off point with rising temperature	
Switching reliability	To ensure a high switching reliability, we recommend a minimum voltage of 24 V and a minimum current of 100 mA	

	standard	Design 02 and 22	Design 10, 23 and TZ 426	Case Ø 60 mm
Electrical connection	Screw-type terminals, connection cross section up to 2.5 mm ²	Connection cable 0.5 m with screw-type terminals	Cover cap with cable screw-connection, suitable for cable Ø from 6.5 to 13 mm	Cover cap with cable screw-connection, suitable for cable Ø from 8 to 10 mm

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Note:

Physical and toxic features of the expansion means, which could emerge in the event of a measuring system break.

Control range with scale limit value	Hazardous reactions	Fire and explosion hazard		hazardous to waters	Information about toxicology		
		Ignition temperature	Explosion limit		irritant	dangerous to health	toxic
< +200°C	no	+ 355°C	0.6 - 8 V%	yes	yes	^a	no
≥ 200°C ≤ +350°C		+ 490°C	- -	yes	yes	^a	
> 350°C ≤ +500°C		no	no	no	no	no	

^a There is currently no statement by the health authority concerning hazards to health in the event of short-term exposure and low concentration, e.g. measuring system break.

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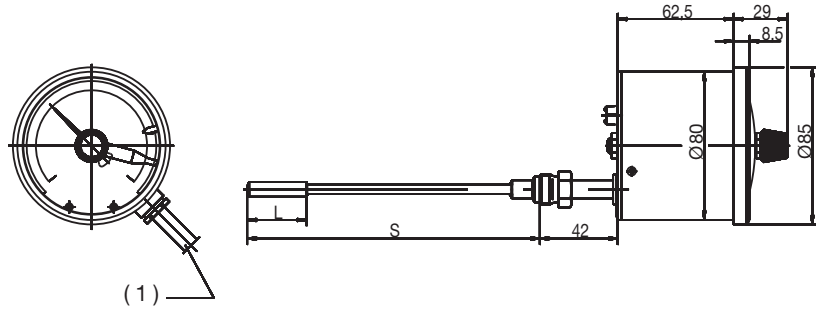
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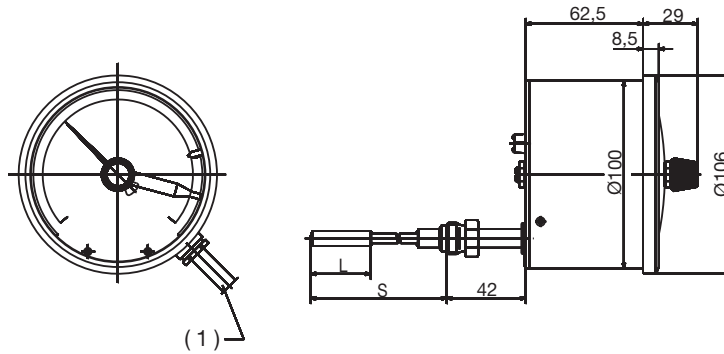
Dimensions

Type:
 608520/0280



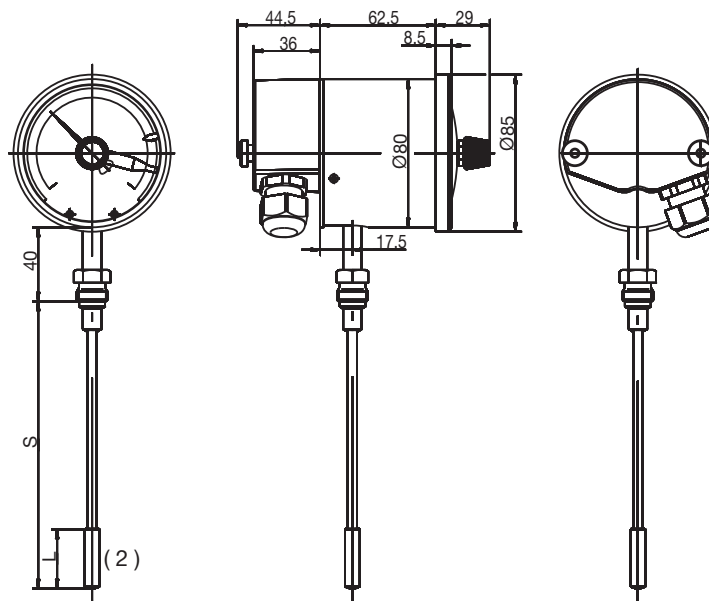
(1) Connection line 0.6 m long with screw terminal

Type:
 608520/0210



(1) Connection line 0.6 m long with screw terminal

Type:
 608520/1080



(2) active probe dimension

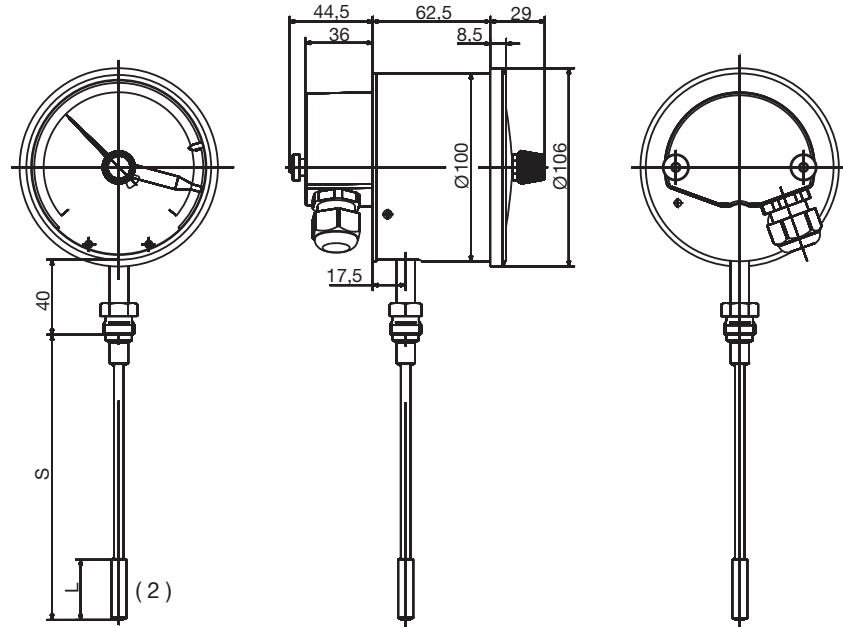
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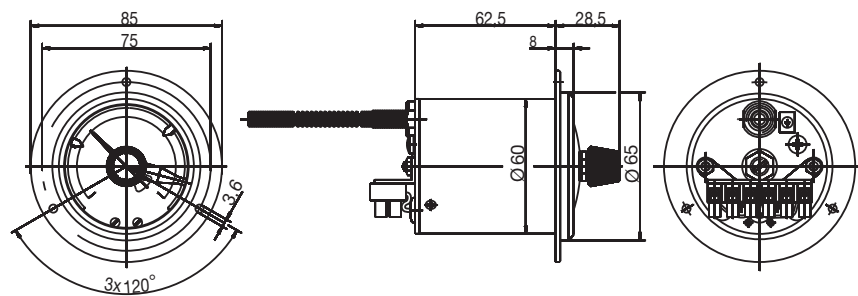


Type:
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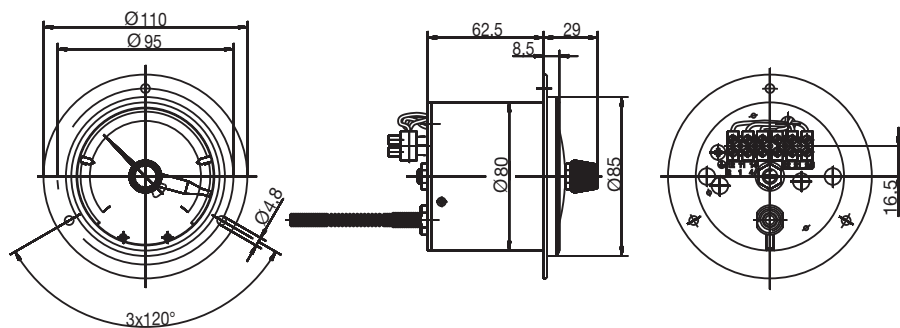
(2) active probe dimension

Type:
 608520/2060



Panel cut-out for case
 $\varnothing 60 \text{ mm} = 62^{+0.5} \text{ mm}$

Type:
 608520/2080



Panel cut-out for case
 $\varnothing 80 \text{ mm} = 62^{+0.5} \text{ mm}$

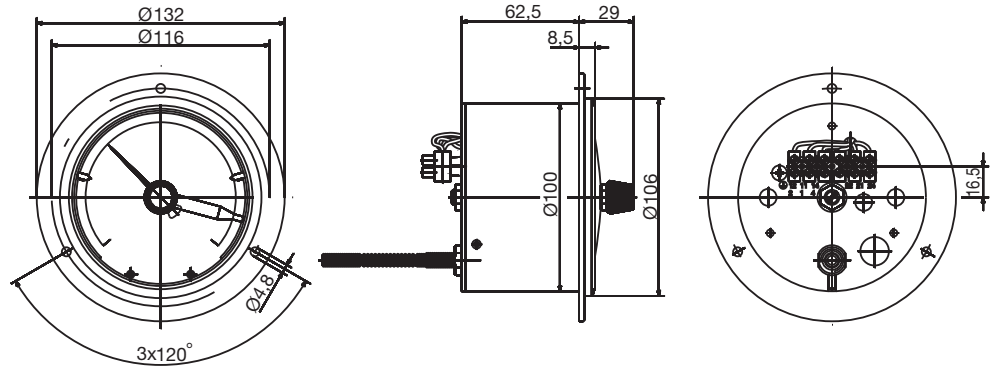
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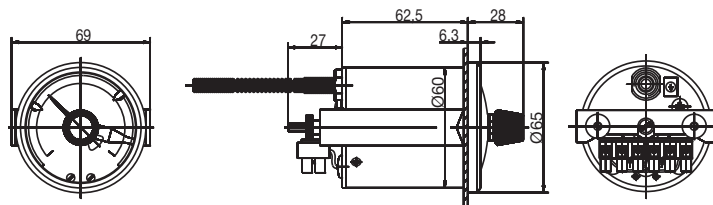


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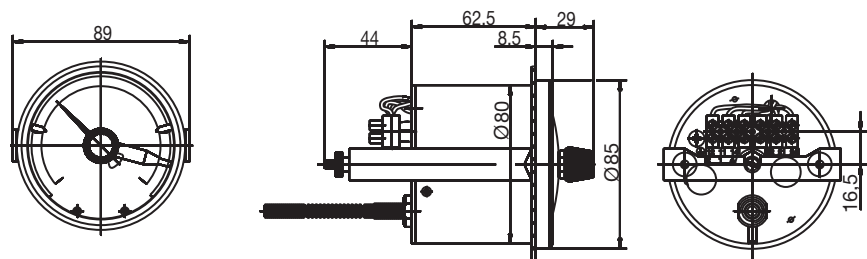
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Type:
 608520/2160



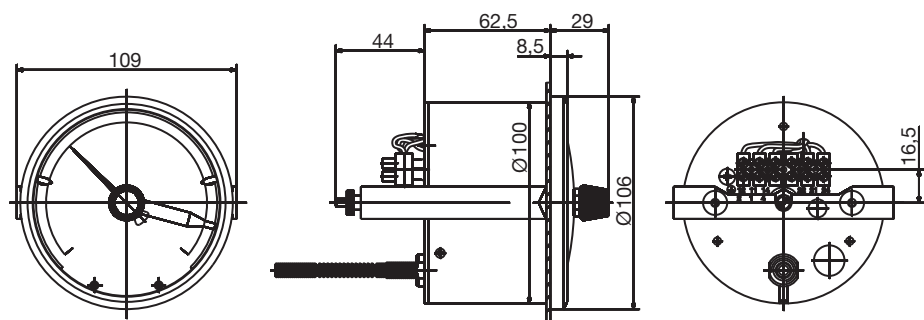
Panel cut-out for case
 $\text{Ø } 60 \text{ mm} = 62^{+0.5} \text{ mm}$

Type:
 608520/2180



Panel cut-out for case
 $\text{Ø } 80 \text{ mm} = 82^{+0.5} \text{ mm}$

Type:
 608520/2110



Panel cut-out for case
 $\text{Ø } 100 \text{ mm} = 100^{+0.5} \text{ mm}$

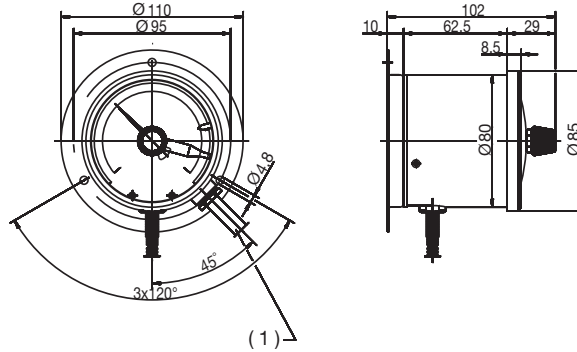
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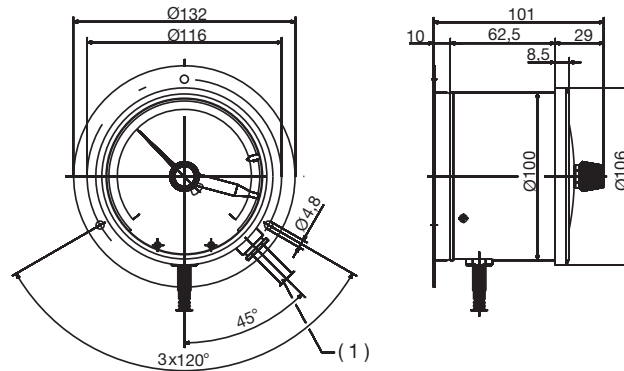


Type:
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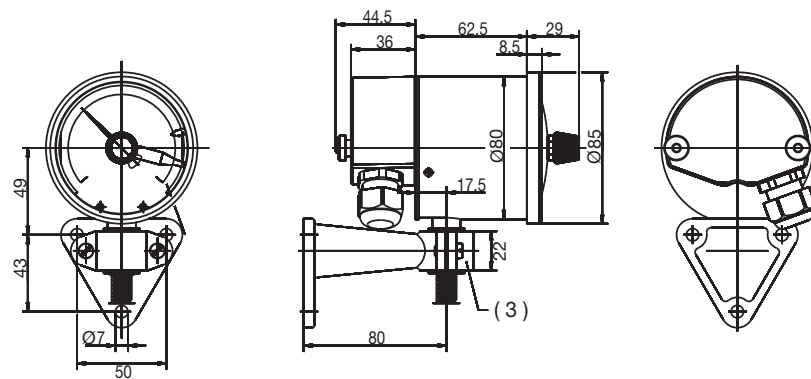
(1) Connection line 0.6 m long with screw terminal

Type:
 608520/2210



(1) Connection line 0.6 m long with screw terminal

Type:
 608520/2380



(3) Spigot Ø 20 mm

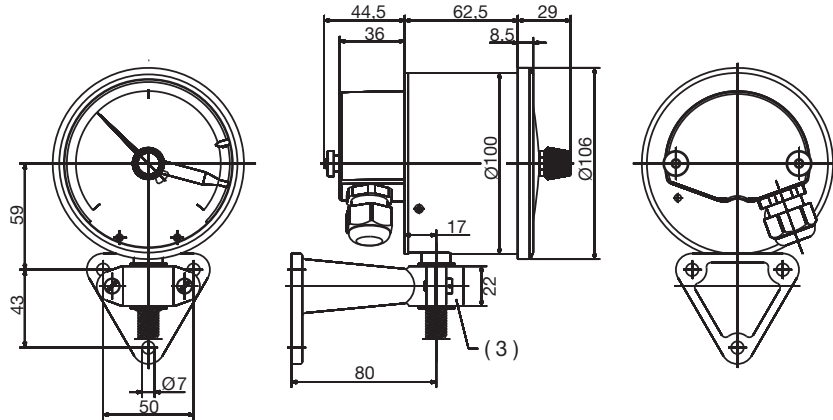
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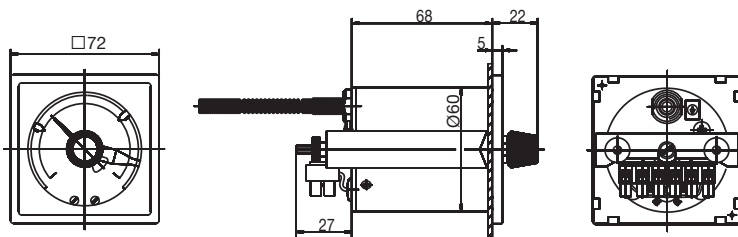


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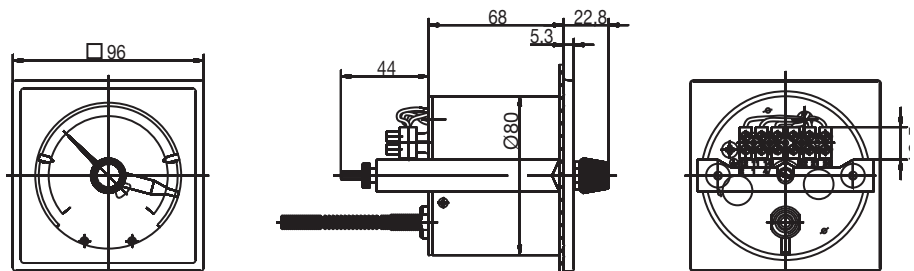
(3) Spigot Ø 20 mm

Type:
 608520/2572



Panel cut-out for front frame
 72 x 72 mm = Ø 62^{+0,5} mm

Type:
 608520/2596



Panel cut-out for front frame
 96 x 96 mm = Ø 82^{+0,5} mm oder
 96 x 96 mm = 92 x 92^{+0,5} mm (TZ 460)

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Order details

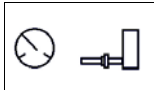

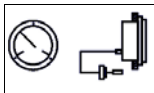
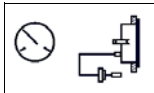
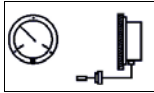
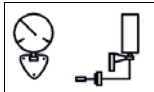
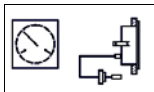
Order code

(1) Basic type

608520	Mechanical Contact dial thermometer, class 1.5
608550	Mechanical Contact dial thermometer, class 1.5, Transformer version (only basic type extension 1080)

(2) Basic type extensions

Case size Ø

0280	Design 02		80 mm
0210			100 mm
1080	Design 10		80 mm
1010			100 mm
2060	Design 20		60 mm
2080			80 mm
2010			100 mm
2160	Design 21		60 mm
2180			80 mm
2110			100 mm
2280	Design 22		80 mm
2210			100 mm
2380	Design 23		80 mm
2310			100 mm
2572	Design 25		Case size □
2596			72 x 72 mm 96 x 96 mm

(3) Display range in °C

469	-40...+40
643	-20...+120
807	0...+60
814	0...+100
818	0...+120
832	0...+200
840	0...+300
848	0...+400
854	0...+500
858	0...+600

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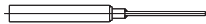
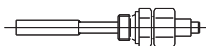





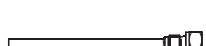





(4) Capillary type (FL) ^a

- 00 Without (with rigid connection)
- 02 FL 02 Cu capillary with Cu textile braiding, approx. Ø 2.5 mm (up to AB limit value +300°C)
- 11 FL 11 Cu capillary with PE jacketing, approx. Ø 3.5 mm (up to AB limit value +120°C)
- 17 FL 17 Stainless steel capillary, approx. Ø 1.5 mm
- 21 FL 21 Cu capillary, approx. Ø 1.0 mm (up to AB limit value +300°C)

(5) Capillary ^b

- 0 Without (with rigid connection)
- 1000 1000 mm
- 2000 2000 mm
- 3000 3000 mm
- 4000 4000 mm
- 5000 5000 mm
- ... Special length (specifications in plain text: 1000 mm steps, maximum length 6000 mm), further lengths on request

(6) Process connection (PA) ^a

- | | | | |
|-----|-------|---|---|
| 750 | TF 01 | Temperature probe with stepped support tube |  |
| 752 | TF 11 | Temperature probe without support tube |  |
| 843 | TA 02 | Immersion tube with union nut and loose screw-connection ^b |  |
| 161 | TA 03 | Immersion tube with loose screw-connection |  |
| 847 | TA 06 | Immersion tube with displaceable clamping screw-connection on support tube ^b |  |
| 311 | TA 20 | Immersion tube with loose screw-connection and connection collar ^b |  |
| 872 | TA 21 | Immersion tube with loose screw-connection and sealing cone (only G 3/8 possible) |  |
| 873 | TA 22 | Immersion tube with loose pressure screw, sealing cone and loose screw-connection ^b |  |
| 874 | TA 24 | immersion tube with screw fitting, O ring seal and clamping screw ^{a b} |  |
| 401 | TA 23 | Immersion tube with pressure screw and contact pressure spring (only M 10x1 possible) |  |
| 913 | SH 07 | Screw-in sheath, multi-part, with clamping piece and locking screw (suitable for TF 01 and TF 11) |  |
| 820 | SH 09 | Weld-in sheath, multi-part, with clamping piece and locking screw ^b (not for FL 21 - welding collar with steel 1.4515) |  |
| 876 | SH 10 | Screw-in sheath, multi-part ^b (suitable for TA 21) |  |
| 871 | SH 11 | Screw-in sheath, multi-part ^b (suitable for TA 23) |  |

^a For the description and particularities refer to data sheet 608730.

^b Screw-in spigot as per DIN 3852, form A.

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Order code	(7)	Ø Process connection (PC) ^a
6		6 mm
8		8 mm
10		10 mm
11		11 mm
12		12 mm
	(8)	Thread type of process connection (PA) ^a
000		Without thread (for TA 01 and TF 11)
103		Screw connection G 3/8
104		Screw-connection G 1/2
105		Screw-connection G 3/4
114		Screw-connection M 10 x 1 (only for TA 23)
	(9)	Material, probe / support tube ^a
26		Stainless steel (CrNi, 1.4571)
96		Copper (Cu) / Brass (CuZn) (up to 200°C)
95		Stainless steel (CrNi, 1.4571) - probe / Brass (CuZn) - support tube from 250°C)
	(10)	Material of process connection (PA) ^a
00		Without (only TF 01 and TF 11)
26		Stainless steel (CrNi, 1.4571)
46		Brass (CuZn)
	(11)	Fitting length, process connection (PA) ^a (dimension "EL" or "S")
0		Minimum fitting length TF 11 (active probe dimension)
50		50 mm
100		100 mm
150		150 mm
200		200 mm
...		Special length (specifications in plain text - 50 mm steps)

^a For the description and particularities refer to data sheet 608730.

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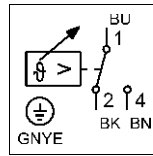
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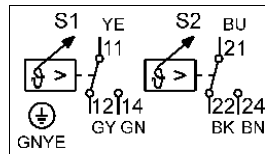
Order code

(12) Switching output (SA)

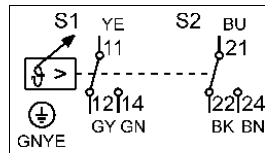
20 SA 20 One contact



21 SA 21 Two contacts



22 SA 22 Two contacts - Sequence switch



(13) Extra codes (TZ)

- 000 Without extra codes
- 430 Fly back (includes TZ 477)
- 426 Cover cap to protect the screw terminals against access and splashing water (standard for design 10 and 23; not for design 22; not in connection with TZ 460)
- 650 Microswitch 10 (3) A (AC/DC 230 V, +10/-15%, 48...63 Hz, cos φ = 1 (0.6))
- 518 Stop for Min. — or Max. — set point value limitation, factory set
- 460 Device centering for panel cut-out 92 x 92 mm (only for basic type extension 2596)
- 477 Set point adjustment protected by the bolted cover. Adjustment with screwdriver.
- 401 Protection class IP 53 as per EN 60529, includes TZ 426 and TZ 477 (not for case Ø = 60 mm and front frame 72 x 72 mm; not for design 02 and 22)
- 522 Customized scale

Special versions on request !

Order code

(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13)
 608520 / [....] - [...] - [...] - [...] - [...] - [...] - [...] - [...] - [...] - [...] - [...] - [...] / [...], ...

Order example

608520 / 2010 - 818 - 21 - 2000 - 104 - 10 - 000 - 26 - 00 - 100 - 20 / 650^a, ...

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

Stock versions

Part no.	Type	Display range °C	Switching output	Temperature probe, process connection	Immersion tube mm
00455918	608550/0180-643-874-8-106-50-150-20/434-522 with fly back	-20...+120	20 (1 contact)	TF 05 d = 8 mm TA 24, G 1", CuZn	150
00455919	608550/0180-643-874-8-106-50-150-21/434-522 with fly back		21 (2 contacts)		

Delivery within 3 working days after receipt of order

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Contact dial thermometer

Special features

- Temperature controller with process value display as panel-mounting or add-on device
- Class 1.5
- Protection rating IP 65
- Case sizes Ø: 100 mm

Brief description

Contact dial thermometer are devices with process value display for temperature measurement, control and monitoring and can be used universally.

The temperature depending volume change in a measuring system filled with liquid or the temperature depending pressure change in a measuring system filled with gas is converted to a rotational movement of the process value indicator by a bourdon tube, no transmission gear is required. The microswitch is actuated by the rotational movement of the indicator shaft via a tap system.



Type 608523/2210

Technical data

Case	Case with bayonet lock made of stainless steel (1.4301)
Protection class	IP 65 as per DIN EN 60529
Front pane	Polycarbonate
Scale	white, labeled in black
Display	Class 1.5 similar to DIN EN 13190
Anti-kink spring	for devices with capillary on the case and the temperature probe
Set point adjustment	by set point value setter in the front pane; with screwdriver, protected by screw-fitted cover
Display correction	on the rear, no display correction with design 20
Limit value temperatures	for transport and storage -20°C to +70°C (for display range 0 to +60°C up to max. 65°C; -40 to +40°C up to max. 50°C; -30 to +50°C up to max. 60°C)
Rated position	any

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Technical data

Display range (AB)	Display range in °C	Measuring range in °C	Tolerance in °C
469	-40...+40	-30...+30	1.5
566	-30...+50	-20...+40	1.5
643	-20...+120	-20...+100	3.0
807	0...+60	+10...+50	1.5
810	0...+80	+10...+70	1.5
814	0...+100	+10...+90	1.5
818	0...+120	+20...+100	3.0
826	0...+160	+20...+140	3.0
832	0...+200	+20...+180	3.0
834	0...+250	+30...+220	4.0
926	+50...+250	+70...+230	3.0
840	0...+300	+30...+270	6.0
927	+50...+300	+80...+270	4.0
843	0...+350	+50...+300	6.0
932	+50...+350	+80...+320	6.0
848	0...+400	+50...+350	6.0
851	0...+450	+50...+400	6.0
854	0...+500	+50...+450	8.0
858	0...+600	+100...+500	10.0

Measuring system	Liquid filling	Gas filling
	Display range (AB) ≤ 350°C	Display range (AB) ÷ 400°C
Time behavior	approx. 12 s, measured in water, with a probe Ø of 6 mm made of Cu.	approx. 4 s, measured in oil, with a probe Ø of 10 mm made of stainless steel.
Ambient temperature influence effect	In % of the display range (referring to the deviation from the reference value +23°C)	
on case	0.15% of the display range per K ambient temperature change	0.05% of the display range per K ambient temperature change
on capillary (per m)	0.03% of the display range per K ambient temperature change	no influence
	Higher ambient temperature – higher temperature display – lower switching point	

Electric contact	standard	Extra code (TZ) 650
	Type of contact	Single-pole microswitch with mechanically actuate change-over contact
Contact rating	AC 230 V, +10/-15 %, 48 to 63 Hz, cos φ = 1 (0.6)	
	5 (1.5) A	10 (3) A
Hysteresis	approx. 1.5% of the display range	1.5 to 3 % of the display range
Switching point accuracy	± 0.5% of the display range referring to the switch-off point with rising temperature	
Switching reliability	To ensure a high switching reliability, we recommend a minimum voltage of 24 V and a minimum current of 100 mA	

Electrical connection	Connection inlet: Cable cross section up to 2.5 mm ² , suitable for cable-Ø from 6.5 to 13 mm
------------------------------	--

Note

Physical and toxic features of the expansion means, which could emerge in the event of a measuring system break.

Control range with scale limit value	Hazardous reactions	Fire and explosion hazard		hazardous to waters	Information about toxicology		
		Ignition temperature	Explosion limit		irritant	dangerous to health	toxic
≤ +200°C	no	+355°C	0.6 - 8V%	Yes	Yes	a	no
≥ +200°C ≤ +350°C		+490°C	- -				
> +350°C ≤ +500°C		no	0.6 - 8V%	no	no	no	

^a There is currently no statement by the health authority concerning hazards to health in the event of short-term exposure and low concentration, e.g. measuring system break.

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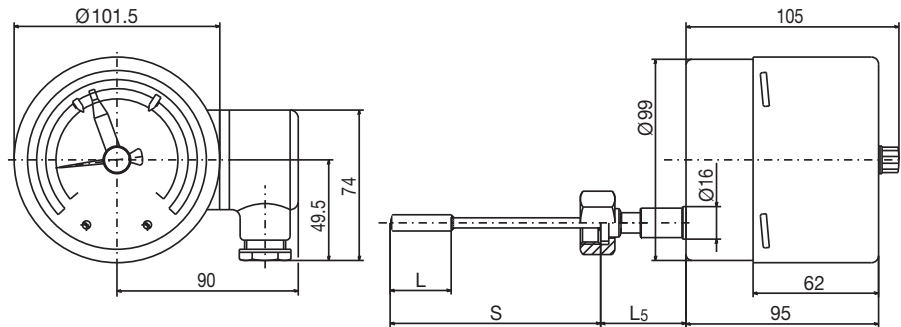
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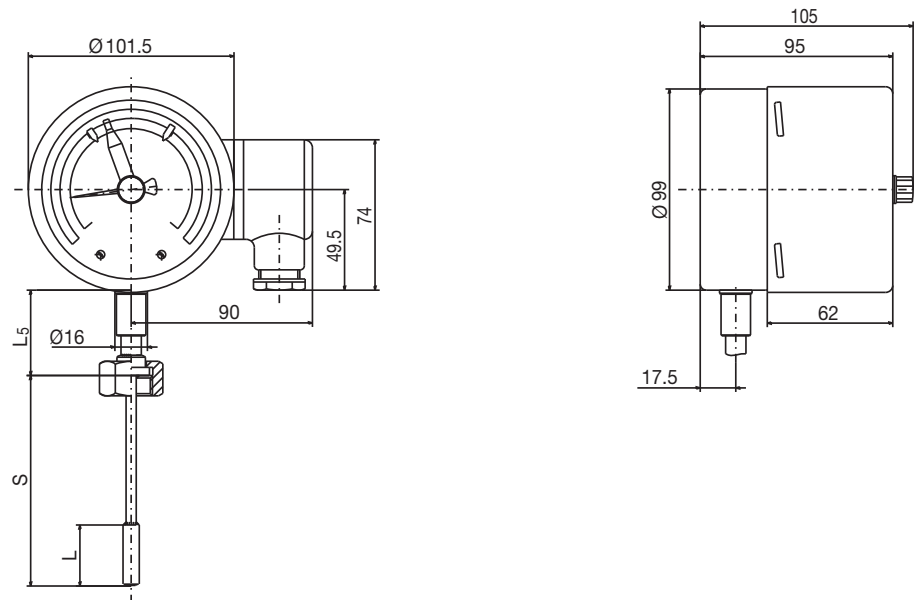


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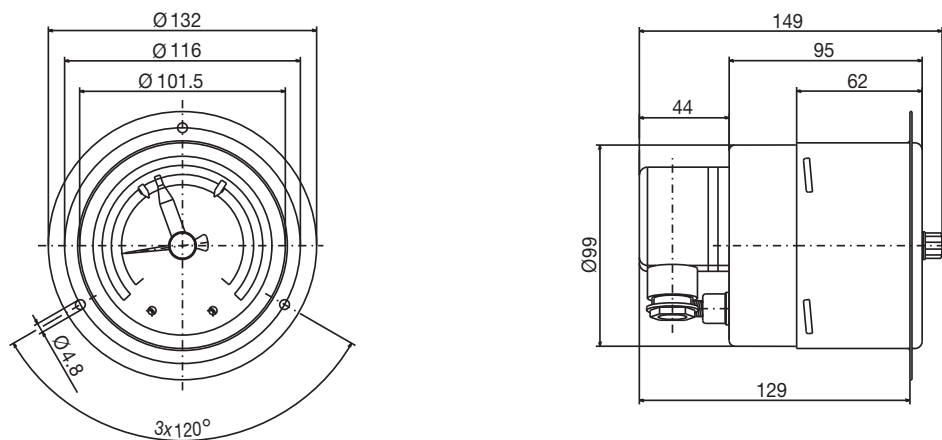
Type:
608523/0210



Type:
608523/1010



Type:
608523/2010



Panel cut-out Ø 105 ^{+0.5}mm

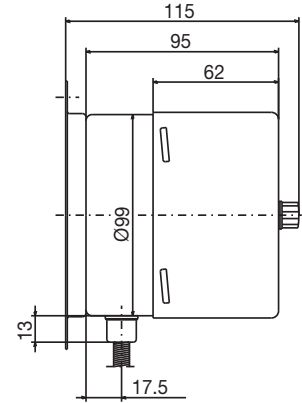
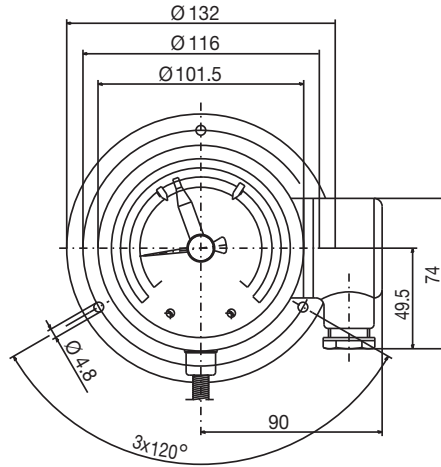
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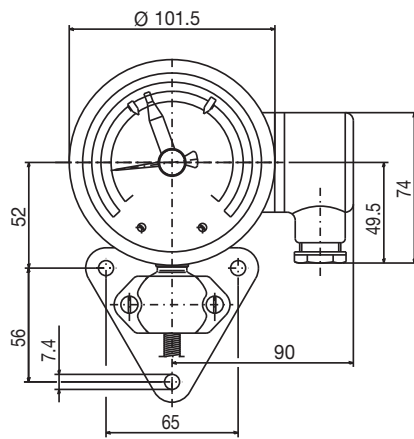


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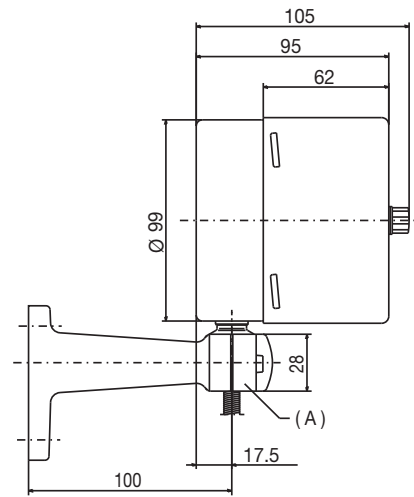


Panel cut-out Ø 105 ^{+0,5} mm

Type:
 608523/2310



Holder for measuring device as per DIN 16281



(A) Spigot-Ø 26 mm

L₅	Immersion tube connection type
40 mm	TA 03, TA 30
≤ 69 mm	TA 02
42.5 mm	TA 21
51.5 mm	TA 22, TA 31

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Order details

Order code

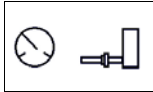
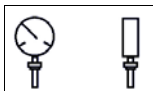
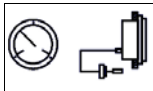

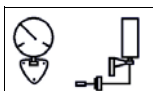
608523

(1) Basic type

Mechanical contact dial thermometer, class 1.5

(2) Basic type extension

Case size Ø

0210	Design 02		100 mm
1010	Design 10		100 mm
2010	Design 20		100 mm
2210	Design 22		100 mm
2310	Design 23		100 mm

(3) Display range in °C

469	-40...+40
566	-30...+50
643	-20...+120
807	0...+60
810	0...+80
814	0...+100
818	0...+120
826	0...+160
832	0...+200
834	0...+250
926	+50...+250
840	0...+300
927	+50...+300
843	0...+350
932	+50...+350
848	0...+400
851	0...+450
854	0...+500
858	0...+600

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Order code

(4) Capillary type (FL) ^a

00	Without (with rigid connection)
02	FL 02 Cu capillary with Cu textile braiding, approx. Ø 2.5 mm (up to AB limit value +300°C)
11	FL 11 Cu capillary with PE jacketing, approx. Ø 3.5 mm (up to AB limit value +120°C)
17	FL 17 Stainless steel capillary, approx. Ø 1.5 mm
21	FL 21 Cu capillary, approx. Ø 1.0 mm (up to AB limit value +300°C)

(5) Capillary ^b

0	Without (with rigid connection)
1000	1000 mm
2000	2000 mm
3000	3000 mm
4000	4000 mm
5000	5000 mm
...	Special length (specifications in plain text: 1000 mm steps, maximum length 10000 mm), further lengths on request

(6) Process connection (PA) ^a

750	TF 01	Temperature probe with stepped support tube	
752	TF 11	Temperature probe without support tube	
843	TA 02	Immersion tube with union nut and loose screw-connection ^b	
161	TA 03	Immersion tube with loose screw-connection	
847	TA 06	Immersion tube with displaceable crimp screw-connection on support tube ^b	
311	TA 20	Immersion tube with loose screw-connection and connection collar ^b	
872	TA 21	Immersion tube with loose screw-connection and sealing cone (only G 3/8 possible)	
873	TA 22	Immersion tube with loose pressure screw, sealing cone and loose screw-connection ^b	
401	TA 23	Immersion tube with pressure screw and contact pressure spring (only M 10x1 possible)	
913	SH 07	Screw-in sheath, multi-part, with clamping piece and locking screw (suitable for TF 01 and TF 11)	
820	SH 09	Weld-in sheath, multi-part, with clamping piece and locking screw ^b (not for FL 21 - welding collar with steel 1.4515)	
876	SH 10	Screw-in sheath, multi-part ^b (suitable for TA 21)	
871	SH 11	Screw-in sheath, multi-part ^b (suitable for TA 21)	

^a For the description and particularities, refer to data sheet 608730.

^b Screw-in spigot as per DIN 3852, form A.

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Order code	(7) Ø Process connection (PA) ^a
6	6 mm
8	8 mm
10	10 mm
11	11 mm
12	12 mm
<hr/>	
(8) Thread type of process connection (PA) ^a	
000	Without thread (for TA 01 and TF 11)
103	Screw connection G 3/8
104	Screw-connection G 1/2
105	Screw-connection G 3/4
114	Screw-connection M 10 x 1 (only for TA 23 and SH 11)
<hr/>	
(9) Material, probe / support tube ^a	
26	Stainless steel (CrNi, 1.4571)
96	Copper (Cu) / Brass (CuZn) (up to 200°C)
95	Stainless steel (CrNi, 1.4571) - probe / Brass (CuZn) - support tube from 250°C)
<hr/>	
(10) Material of process connection (PA) ^a	
00	Without (only TF 01 and TF 11)
26	Stainless steel (CrNi, 1.4571)
46	Brass (CuZn)
<hr/>	
(11) Fitting length, process connection (PA) ^a (dimension "EL" or "S")	
0	Minimum fitting length TF 11 (active probe dimension)
50	50 mm
100	100 mm
150	150 mm
200	200 mm
...	Special length (specifications in plain text - 50 mm steps)

^a For the description and particularities, refer to data sheet 608730.

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Order code

(12) Switching output

28	1 switch	
27	2 switches	
19	2 switches in fixed sequence	

(13) Extra codes (TZ)

000	Without extra codes
434	Fly back can be adjusted with a screwdriver, protected by a cover
650	Microswitch 10 (3) A (AC/DC 230 V, +10/-15 %, 48 to 63 Hz, cos φ = 1 (0.6))
518	Stop for Min. — or Max. — setpoint value limitation, factory set
522	Customized scale

Special versions on request !

Order code

(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13)
 608523 / [...] - [...] - [..] - [....] - [...] - [..] - [...] - [..] - [...] - [..] - [...] - [..] / [...] , ...

Order example

608523 / 2010 - 818 - 21 - 2000 - 750 - 10 - 000 - 26 - 00 - 100 - 28 / 000^a , ...

^a List extra codes in sequence, separated by commas.

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Contact Thermometer Transformer and industrial versions

Particularities

- Electromechanical temperature controller, with indication of actual value
- Class 1.5
- One or two switches; Performance of 5 or 10 A
- Case size: Ø 80 mm
- high-quality ochwertiges polyamide (PA6) case

Brief description

The contact thermometer is a universally applicable instrument with indication of the actual value, for temperature measurement, control and monitoring.

The temperature-dependent change in volume of a liquid-filled measuring system (or the temperature-dependent change of pressure in a gas-filled system) is converted into a rotary movement of the pointer by a Bourdon tube, without any intermediate gearing. The rotary movement of the pointer spindle operates the microswitch through a lever system.



Type 608540/1080

Stock versions

(delivery within 3 working days after receipt of order)

Transformer version

Sales No.	Type	Display range °C / °F	Switching output (SA)	Temperature probe Process connection	Immersion tube "S"
60/00491256	608540/1080-643-00-0-874-8-106-26-46-150-21/430, 522, 477 with fly back	-20...+120°C	21 2 switches	TA 24, G1" CuZn	150 mm
60/00512083	608540/1080-643-00-0-874-8-106-26-46-150-20/430, 522, 477 with fly back		20 1 switch		

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Technical data

Housing, bezel and protective cap	plastic (PA 6), gray UV-stabilized	
Enclosure protection	IP54 to EN 60 529	
Window	PMMA (Plexiglas)	
Scale	white, black lettering	
Accuracy class	Class 1.5 similar to EN 13 190	
	liquid-filled	gas-filled
Measuring system	indication range (AB) $\leq 350^{\circ}\text{C}$	indication range (AB) $\geq 400^{\circ}\text{C}$
Time constant $t_{0.632}$	approx. 12 sec, measured in a water bath, with a 6 mm dia. copper probe	approx. 4 sec, measured in an oil bath, with a 10 mm dia. stainless steel probe
Ambient temperature effect	in % of indication range (referred to the deviation from the reference value $+23^{\circ}\text{C}$)	
on housing	0.15% of indication range per $^{\circ}\text{C}$ change in ambient temperature	0.05% of indication range per $^{\circ}\text{C}$ change in ambient temperature
on capillary (per meter)	0.03% of indication range per $^{\circ}\text{C}$ change in ambient temperature	no effect
	higher ambient temperature – higher temperature indication – lower switching point	
	standard	extra code (TZ) 650
Electrical contact	single-pole microswitch with a mechanically operated changeover contact	
Contact type		
Contact rating	230V AC $+10/-15\%$, 48 – 63Hz, p.f = 1 (0.6)	
	5 (1.5) A	10 (3) A
Switching differential	approx. 1.5% of indication range	1.5 to 3% of indication range
Switching point accuracy	$\pm 0.5\%$ of indication range referred to the switch-off point with rising temperature	
Switching reliability	To ensure maximum switching reliability, we recommend a minimum voltage of 24 V and a minimum current of 20 mA.	
Electrical connection	screw terminals: for conductor cross-section up to 2.5 mm ² , protected by cap with cable gland Suitable for cable diameters from 6.5 to 16 mm.	
Setpoint adjustment	with screwdriver, protected by cap.	
Limit temperatures	-30 to $+70^{\circ}\text{C}$ (storage and transport -30 to $+70^{\circ}\text{C}$)	
Nominal position (NL)	NL90, symbol \perp	

Note

Physical and toxicological properties of the expansion fluid which may escape in the event of a system fracture.

Control range with end of scale $^{\circ}\text{C}$	Dangerous reactions	Fire and explosion hazard		Water contamination	irritant	Toxicological data	
		Ignition temp. $^{\circ}\text{C}$	Explosion limit % v/v			danger to health	toxic
$< +200$	no	+ 355	0.6 – 8	yes	yes	1	no
$\geq 200^{\circ}\text{C} \leq +350$	no	+ 490	--	yes	yes	1	no
$> 350^{\circ}\text{C} \leq +500$	no	no	no	no	no	no	no

¹ At present there is no restrictive statement from the health authorities concerning any danger to health over short periods and at low concentrations, e.g. after a fracture of the measuring system.

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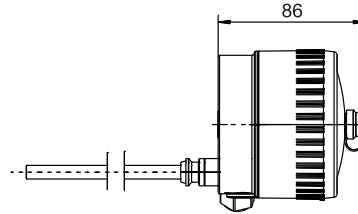
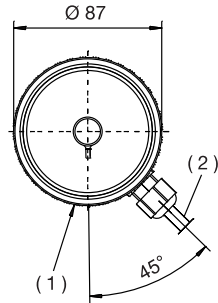
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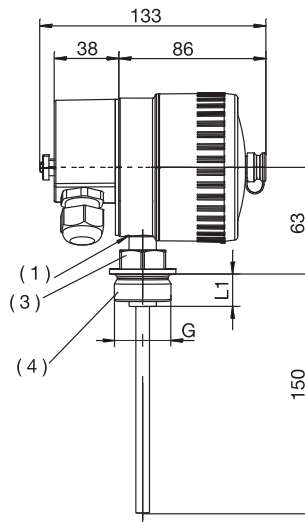
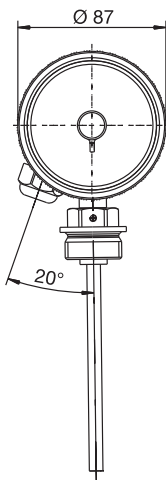
Dimensions

Type 608540/0280



- (1) Vent opening
- (2) Connecting cable, 0.5 m long

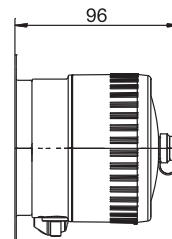
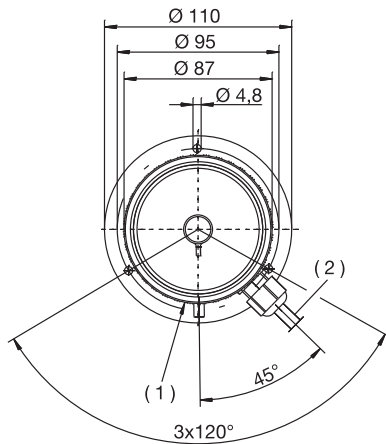
Type 608540/1080
 (transformer version)



G 1/2A	27	14
G 3/4A	32	16
G 1A	27	16
G	a/f	L1

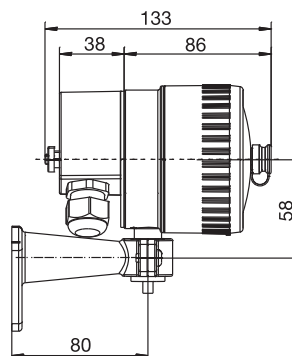
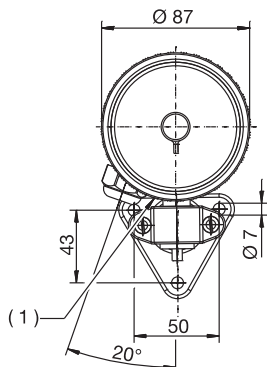
- (1) Vent opening
- (3) a/f
- (4) Screw-in spigot DIN 3852 Form A

Type 608540/2280



- (1) Vent opening
- (2) Connecting cable, 0.5 m long

Type 608540/2380



- (1) Vent opening

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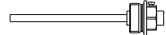
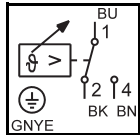
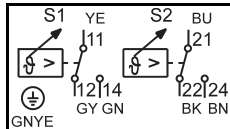
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Order details: Transformer version

Contact thermometer, type 608540

Order code	(1) Basic type	
608540	Mechanical contact thermometer, transformer version	
	(2) Basic type extensions	
1080	Style: 10; housing size: Ø 80 mm dia.	
	(3) Indication range (AB)	
643	-20 to +120°C; range 0 to +100°C	accuracy 3.0°C
818	0 to +120°C; range +20 to +100°C	accuracy 3.0°C
921	+20 to +120°C; range +38 to +104°C	accuracy 3.0°C
	(4) Capillary type (FL)¹	
00	none (with rigid connection)	
	(5) Capillary length¹	
0	none (with rigid connection)	
	(6) Process connection (PA)¹	
874	TA 24; Immersion tube (CrNi) with screw connection (CuZn), O ring sealing and clamping screw	
	(7) Diameter of process connection (PA)¹	
8	8 mm dia.	
	(8) Thread for process connection (PA)¹	
104	G ¹ / ₂ (1/2" pipe) thread	
105	G ³ / ₄ (3/4" pipe) thread	
106	G 1 (1" pipe) thread	
	(9) Material of probe / support tube¹	
26	stainless steel (CrNi 1.4571)	
	(10) Material of process connection (PA)¹	
46	brass (CuZn)	
	(11) Fitting length of process connection (PA)¹ (dimension S)	
150	150 mm	
	(12) Switching output (SA)	
20	one switch	
21	two switches	
	(13) Extra codes	
000	no extra code	
430	peak-reading pointer	
522	customized scale	

Order code	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)			
608540	/	-	...	-	..	-	.	-	...	-	..	-	..	/	..

Order example

608540	/	1080	-	921	-	00	-	0	-	874	-	8	-	106	-	26	-	46	-	150	-	20	/	000 ³
--------	---	------	---	-----	---	----	---	---	---	-----	---	---	---	-----	---	----	---	----	---	-----	---	----	---	------------------

¹ See data sheet 608730 for description and features.

³ List extra codes in sequence, separated by commas.

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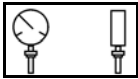



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Order details: Industrial version

Contact thermometer, type 608540

Order code	(1) Basic type	
608540	Mechanical contact thermometer, industrial version	
(2) Basic type extensions		
1080	Style: 10; housing size: Ø 80 mm dia.	
0280	Style: 02; housing size: Ø 80 mm dia.	
2280	Style: 22; housing size: Ø 80 mm dia.	
2380	Style: 23; housing size: Ø 80 mm dia.	
(3) Indication range (AB)		
469	-40 to + 40°C; range -30 to + 30°C	accuracy 1.5°C
566	-30 to + 50°C; range -20 to + 40°C	accuracy 1.5°C
643	-20 to +120°C; range 0 to +100°C	accuracy 3.0°C
807	0 to + 60°C; range +10 to + 50°C	accuracy 1.5°C
810	0 to + 80°C; range +10 to + 70°C	accuracy 1.5°C
814	0 to +100°C; range +10 to + 90°C	accuracy 1.5°C
818	0 to +120°C; range +20 to +100°C	accuracy 3.0°C
921	+20 to +120°C; range +38 to +104°C	accuracy 3.0°C
826	0 to +160°C; range +20 to +140°C	accuracy 3.0°C
832	0 to +200°C; range +20 to +180°C	accuracy 3.0°C ⁴
834	0 to +250°C; range +30 to +220°C	accuracy 4.0°C ⁴
926	+50 to +250°C; range +70 to +230°C	accuracy 3.0°C ⁴
840	0 to +300°C; range +30 to +270°C	accuracy 6.0°C ⁴
927	+50 to +300°C; range +80 to +270°C	accuracy 4.0°C ⁴
843	0 to +350°C; range +50 to +300°C	accuracy 6.0°C ⁴
932	+50 to +350°C; range +80 to +320°C	accuracy 6.0°C ⁴
848	0 to +400°C; range +50 to +350°C	accuracy 6.0°C ⁴
851	0 to +450°C; range +50 to +400°C	accuracy 6.0°C ⁴
854	0 to +500°C; range +50 to +450°C	accuracy 8.0°C ⁴
858	0 to +600°C; range +100 to +500°C	accuracy 10.0°C ⁴
(4) Capillary type (FL)¹		
00	none (with rigid connection)	
02	FL02 copper capillary with copper braiding, approx. 2.5 mm dia. (up to +300°C top of indication range)	
11	FL11 copper capillary with PE sleeve, approx. 3.5 mm dia. (up to +120°C top of indication range)	
17	FL17 stainless steel capillary, 1.5 mm dia.	
21	FL21 copper capillary, 1.0 mm dia. (up to +300°C top of indication range)	
(5) Capillary length¹		
0	none (with rigid connection)	
1000	1000 mm	
2000	2000 mm	
3000	3000 mm	
4000	4000 mm	
5000	5000 mm	
...	special length (specify in plain text: in 1000 mm steps, maximum length: 10000 mm)	

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Order details: Industrial version

Contact thermometer, type 608540

Order code	(6) Process connection (PA) ¹	
750	TF 01; temperature probe with stepped support tube	
752	TF 11; temperature probe without support tube	
843	TA 02; immersion tube with union nut and loose nipple ²	
161	TA 03; immersion tube with loose union nut	
847	TA 06; sliding clamp fitting on support tube ²	
311	TA 20; immersion tube with loose nipple and shoulder ²	
872	TA 21; immersion tube with loose plug and conical seal	
873	TA 22; immersion tube with loose plug, conical seal and loose nipple ²	
401	TA 23; immersion tube with plug and spring clip	
874	TA 24; Immersion tube (CrNi) with screw connection (CuZn), O ring sealing and clamping screw ^{2,5}	
913	SH 07; screw-in pocket, assembled, with clamping clip and fixing screw ² (with TF 01)	
820	SH 09; weld-in pocket, assembled, with clamping clip and fixing screw (not with FL21 - welding shoulder with steel 1.4515) (with TF 01)	
876	SH10; screw-in pocket, assembled ²	
871	SH11; screw-in pocket, assembled ²	
(7) Diameter of process connection (PA)¹		
6	6 mm dia.	
8	8 mm dia.	
10	10 mm dia.	
12	12 mm dia.	
(8) Thread for process connection (PA)¹		
000	no thread (with TF 01 and TF 11)	
103	G ³ / ₈ (3/8" pipe) thread	
104	G ¹ / ₂ (1/2" pipe) thread	
105	G ³ / ₄ (3/4" pipe) thread	
106	G1 (1" pipe) thread	
114	M 10 x 1 thread (with TA 23 and SH 11 only)	

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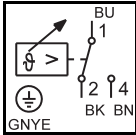
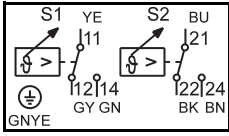
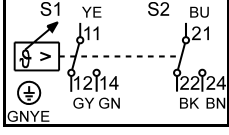
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Order details: Industrial version

Contact thermometer, type 608540

Order code	(9) Material of probe / support tube¹
26	stainless steel (CrNi, 1.4571)
96	copper (Cu) / brass (CuZn) (up to 200°C)
95	stainless steel (CrNi, 1.4571) – probe / brass (CuZn) – support tube (above 250°C)
	(10) Material of process connection (PA)¹
00	none (TF01 and TF11 only)
26	stainless steel (CrNi, 1.4571)
46	brass (CuZn)
	(11) Fitting length of process connection (PA)¹ (dimension EL or S)
0	minimum fitting length TF 11 (active probe dimension)
100	100 mm
150	150 mm
200	200 mm
...	special length (specify in plain text, in 50 mm steps)
	(12) Switching output (SA)
20	one switch 
21	two switches 
22	two switches - sequential switch 
	(13) Extra codes (TZ)
000	no extra code
430	peak-reading pointer
650	microswitch 10 (3) A (230 V AC/DC +10/-15%, 48 – 63 Hz, p.f. = 1 (0.6))
518	stop for upper or lower limit of setpoint adjustment, factory-set
522	customized scale
426	Plastic cap for protecting the flat plugs or terminal screws from human contact and from splashed water IP 54, with screwed cable glands, suitable for cable-Ø from 6-8 mm

Order code	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	608540	/	...	-	...	-	...	-	...	-	...	-	...
Order example	608540	/	2280	-	818	-	02	-	2000	-	843	-	8
		/	104	-	96	-	46	-	100	-	20	/	000 ³

¹ See data sheet 608730 for description and features.
² Screw-in spigot to DIN 3852 Form A.
³ List extra codes in sequence, separated by commas.
⁴ Not on styles 02 and 10.
⁵ Material of probe / support tube: styles 02 and 10: stainless steel
 styles 22 and 23: brass

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Process Connections for Dial Thermometers



Special features

- Temperature probes (TF)
- Process connections (TA)
- Thermowell (SH)

Temperature probes (TF)

(S₁ min. 25 mm for type 6080... , S₁ min. 50 mm for type 6082... , 6084... , 6085...)

Type	Dimensional drawing	Description	Material	Probe dia. Ø d (mm)	For use with type	Active probe length L (mm)														
						Scale range in °C														
						60	80	100	120	140	160	200	250	300	350	400	500	600		
750 TF 01		Temperature sensor with stepped support tube	Cu (copper)	6	6082 ..	98	74	59	48	42	37	29	-	-	-	-	-	-		
				8	6084 .. 6085 ..	51	39	31	26	23	20	16	-	-	-	-	-	-	-	
			CrNi (st. steel)	6		100	76	61	50	44	39	31	31	27	24	-	-	-	-	-
				8		53	41	33	28	25	22	18	18	16	14	130	180	180	-	-
				10		-	-	-	-	-	-	-	-	-	-	100	100	100	-	-
752 TF 11		Temperature probe without support tube	Cu (copper)	6	6082 ..	98	74	59	48	42	37	29	-	-	-	-	-	-		
				8	6084 .. 6085 ..	51	39	31	26	23	20	16	-	-	-	-	-	-	-	
			CuZn (brass)	6		100	76	61	50	44	39	31	31	27	24	-	-	-	-	-
				8		53	41	33	28	25	22	18	18	16	14	130	180	180	-	-
				10		-	-	-	-	-	-	-	-	-	-	100	100	100	-	-
753 TF 05		Temperature probe with plain support tube	CrNi (st. steel)	6	6082 ..	140	105	85	70	60	55	45	40	35	30	-	-	-		
				8	6084 ..	75	55	45	40	35	30	25	25	20	20	130	180	180	-	
				10	6085 ..	-	-	-	-	-	-	-	-	-	-	-	100	100	100	-
			CrNi (st. steel) CuZn up to 200 °C	6	608002/01-... * 608003/01-... *	60	85	70	60	55	50	45	100	75	65	65	55	-	-	-
					608002/18-... 608003/10-... *	120	90	80	70	55	50	45	110	75	70	70	55	-	-	-
				10	608001/01-... * 608002/01-... * 608003/01-... *	65	60	45	40	65	50	45	70	55	55	45	40	-	-	-
					608001/18-... 608002/18-... 608003/10-... *	120	95	85	70	70	55	50	70	55	55	50	40	-	-	-

* At TZ 430 and TZ 434, L = design 18 or 10

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Process connections (TA)

Type	Description	Dimensional drawing	For use with type	Note	Screw connection						Suitable for TF
					Material		Pipe thread G				
					CuZn (brass)	CrNi (st. steel)	G 3/8	G 1/2	G 3/4	1/2-14NPT	
010 TA 01	Immersion tube with collar		608001/0150-...	Up to 200 °C	●						TF 05
			608001/0163-...		●						
			608001/0180-...		●						
			608001/0110-...		●						
			608001/0116-...	Up to 200 °C	●						
			608001/18...	As of 250 °C	●						
			608001/...		●						
			608002/...			●					
			608003/...				●				
			608624/...					●			
843 (844) TA 02	Immersion tube with union nut and loose screw connection ¹		608001/...		●	●	●	●		TF 05	
			608001/...		●	●	●	●			
			608002/...		●	●	●	●			
			608003/...		●	●	●	●			
			608624/...		●	●	●				
			6082...		●	●	●		TF 01		
			6084...		●	●	●				
			6085..		●	●	●				
161 (845) TA 03	Immersion tube with loose union nut		608001/...		●	●	●	●		TF 05	
			608002/...		●	●	●	●			
			608003/...		●	●	●	●			
			608624/...		●	●	●	●			
			6082...		●	●	●		TF 01		
			6084...		●	●	●				
			6085..		●	●	●				

¹Screw-in spigot according to DIN 3852 Form A

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Process connections (TA)

Type	Description	Dimensional drawing	For use with type	Note	Screw connection							Suitable for TF
					Material			Pipe thread G				
					CuZn (brass)	St (steel)	CrNi (st. steel)	G 3/8	G 1/2	G 3/4	1/2-14NPT	
846 (841) TA 04	Immersion tube with fixed hexagon screw-in spigot ¹		608001/...				●	●	●	●	TF 05	
			608002/...			●	●	●	●			
			608003/...			●	●	●	●			
			608624/...			●	●	●	●			
			608225/...			●	●	●	●	TF 01		
			608425/...			●	●	●	●			
847 TA 06	Immersion tube with sliding clamping screw connection on support tube		608001/...	20 bar max.			●	●	●		TF 05	
			608002/...				●	●	●			
			608003/...				●	●	●			
		608624/...				●	●	●				
		608225/...				●	●	●		TF 01		
		608425/...				●	●	●		TF 05		
018 TA 08	Immersion tube with sliding mounting plate in zinc-plated steel and fixing screw		608001/...								TF 05	
			608002/...									
			608003/...									
						●						
311 (842) TA 20	Immersion tube with loose screw connection and connection collar ¹		608201/...				●	●	●		TF 01	
			608202/...		●		●	●	●			
			6085...				●	●	●			
			608624/...				●	●	●		TF 05	

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Process connections (TA)

Type	Description	Dimensional drawing	For use with type	Note	Screw connection						Suitable for TF
					Material		Pipe thread G				
					CuZn (brass)	CrNi (st. steel)	G 3/8	G 1/2	G 3/4	M 10x1	
872 (403) TA 21	Immersion tube with loose pressure screw and conical seal		608201/... 608202/... 6085...	With rigid imm. tube connection CuZn only	●	●	●				TF 01
873 (351) TA 22	Immersion tube with loose pressure screw, conical seal, and loose screw connection ¹		608201/... 608202/... 6085...	With rigid imm. tube connection CuZn only	●	●	● L ₁ =12 a/f=22	● L ₁ =14 a/f=27	● L ₁ =16 a/f=32		TF 01
401 TA 23	Immersion tube with pressure screw and spring clip		608201/... 608202/... 6085...		●					●	TF 01
874 TA 24	Immersion tube with screw connection, O ring seal, and clamping screw ¹		608005/... 608540/1080 608540/0280		●			● L ₁ =14 a/f=27	● L ₁ =16 a/f=27		TF 05
			608540/2280 608540/2380								
848 TA 25	Sliding clamping screw connection on capillary ¹		608201/... 608202/...	Only with FL 17 and FL 21 Up to 250 °C	●	●		● L ₁ =12 a/f=22	● L ₁ =14 a/f=27		TF 11

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Thermowells (SH)

Type	Description	Dimensional drawing	dia. Ø D (SH)	dia. Ø d (TF)	Screw connection								Suitable for		
					Material			Pipe thread G							
					CuZn (brass)	St (steel)	CrNi (st. steel)	G 3/8	G 1/2	G 3/4	1/2-14NPT				
858 SH 04	Single-part screw-in sleeve according to DIN 43772 T2-Form 9 ¹ . Steel: Mat. no. 1.5415		17	10		●	●			● L ₁ =14 L ₂ =25 a/f=27	● L ₁ =16 L ₂ =29 a/f=32			TA 03	
891 SH 05	Screw-in sleeve, multi-part ¹		12	10	●					● L ₁ =14 L ₂ =25 a/f=27	● L ₁ =16 L ₂ =29 a/f=32			TA 03	
			14	10			●				● L ₁ =14 L ₂ =25 a/f=27	● L ₁ =16 L ₂ =29 a/f=32	● L ₁ =20 L ₂ =25 a/f=27		
913 SH 07	Screw-in sleeve multi-part, with fixing screw		8	6	●		●			● L ₁ =12 a/f=22	● L ₁ =14 a/f=27	● L ₁ =16 a/f=32			TA 01 TF 01 TF 11
			10	8	●		●			● L ₁ =12 a/f=22	● L ₁ =14 a/f=27	● L ₁ =16 a/f=32			
			12	10	●					● L ₁ =12 a/f=22	● L ₁ =14 a/f=27	● L ₁ =16 a/f=32			
			14	10			●				● L ₁ =14 a/f=27	● L ₁ =16 a/f=32	● L ₁ =20 a/f=27		
820 SH 09	Weld-in sleeve, multi-part, with fixing screw. Welding collar for steel, mat. no. 1.5415.		8	6		●	●								TA 01 TF 01 TF 11
			10	8		●	●								
			14	10		●	●								
876 SH 10	Screw-in sleeve, multi-part ¹		8	6	●		●			● L ₁ =12 a/f=22	● L ₁ =14 a/f=27	● L ₁ =16 a/f=32			TA 21
			10	8	●		●			● L ₁ =12 a/f=22	● L ₁ =14 a/f=27	● L ₁ =16 a/f=32			
871 SH 11	Screw-in sleeve, multi-part ¹		10	8	●		●			● L ₁ =12 a/f=22	● L ₁ =14 a/f=27			TA 23	

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Admissible load at the thermowell

Thermowells 820, 876, 871, 913

The following values describe the maximum capacity of the corresponding connection type.
 The maximum sealable pressure depends on the fitting conditions and may be lower.

Thermowell made of stainless steel

Material	Pipe and nipple: Stainless steel (1.4571)		
Capacity	Temperature	Pipe diameter	
		8 x 0.75 mm or conical	10 x 0.75 mm
		Max. allowable pressure	
	100 °C	92 bar	74 bar
	150 °C	88 bar	71 bar
	200 °C	83 bar	67 bar
	300 °C	72 bar	58 bar
400 °C	67 bar	54 bar	
Max. allowable operating temperature*	Static load +400 °C		Without load +530 °C
	Observe max. allowable probe temperature of the respective thermometer version.		

Thermowell made of brass

Material	Pipe and nipple: CuZn		
Capacity	Temperature	Pipe diameter	
		8 x 0.75 mm	10 x 0.75 mm
		Max. allowable pressure	
	100 °C	50 bar	40 bar
	150 °C	48 bar	39 bar
Max. allowable operating temperature*	+150 °C		
	Observe max. allowable probe temperature of the respective thermometer version.		

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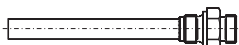

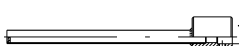


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Order details

Thermowells for dial thermometers, type 608730

Order code	(1) Basic type
608730	Thermowells for dial thermometers
(2) Basic type extensions	
858	SH 04 Single-part screw-in sleeve according to DIN 43772 T2 - form 9; screw-in spigot according to DIN 3852, form A. 
891	SH 05 Multi-part screw-in sleeve; screw-in spigot according to DIN 3852, form A. 
913	SH 07 Multi-part screw-in sleeve with fixing screw; screw-in spigot according to DIN 3852, form A. 
820	SH 09 Multi-part weld-in sleeve with fixing screw 
876	SH 10 Multi-part screw-in sleeve; screw-in spigot according to DIN 3852, form A. 
871	SH 11 Multi-part screw-in sleeve; screw-in spigot according to DIN 3852, form A. 
(3) Thread "G"	
000	Without (only SH 09)
103	G 3/8
105	G 3/4
104	G 1/2
144	1/2-14NPT
114	M 10 x 1 (only SH 11)
(4) Material	
46	Brass (CuZn)
01	Steel (St) (only TA08 and SH09)
26	Stainless steel (CrNi)
(5) Insertion length "EL"	
50	50 mm
63	63 mm
80	80 mm
100	100 mm
130	130 mm
150	150 mm
200	200 mm
250	250 mm
300	300 mm
...	Special length (specifications in plain text - 50 mm steps)
(6) Outer diameter "D"	
8	8 mm
10	10 mm
12	12 mm
14	14 mm
17	17 mm
(7) Collar diameter "d₁₅"	
000	Without (only SH 04, SH 05, SH 10, SH 11)
10.3	10.3 mm
16.3	16.3 mm (for type 608001, 608002, 608003, 608624)

Order code:

(1) / (2) - (3) - (4) - (5) - (6) - (7)

608730 / ... - ... - .. - ... - .. - ...

Order example:

608730 / 891 - 105 - 26 - 100 - 10 - 000