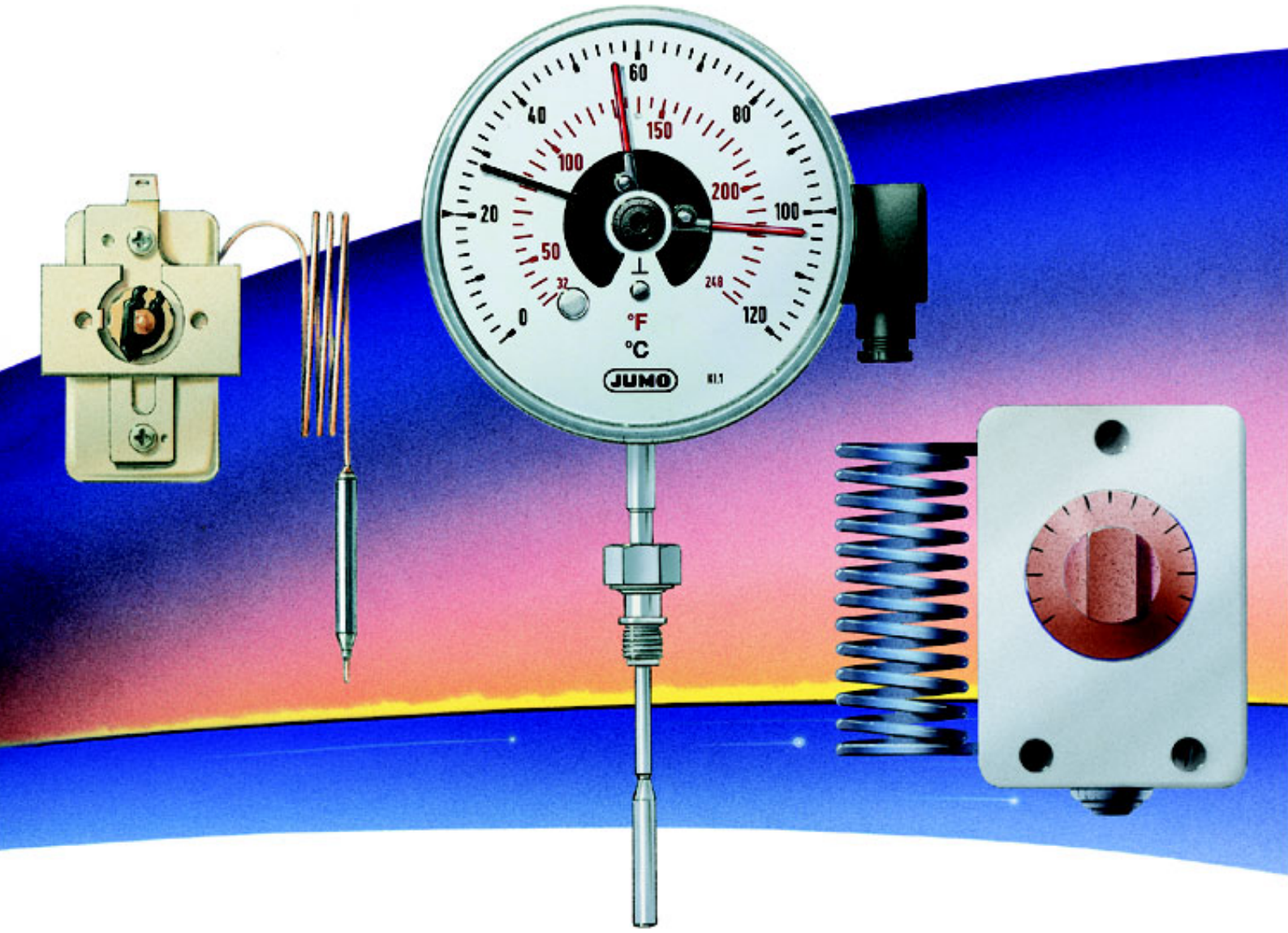
JUMO



Thermostats and Dial Thermometers

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Contents:

Thermostats

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Series	Data Sheet
Warm-air thermostats	
Series WTHc for warm-air heating systems to DIN 4794	60.4514
Ex thermostats **for application in hazardous areas**	
Series ATHf-Ex	60.5041
Series ATHf-EXx	60.5051
Electronic thermostats	
Series TE	60.5501
Resistance thermometer	60.5521
Accessories	
Temperature probes, screw fittings and and pockets for thermostats EM, ETH, ATH, AM and heatTHERM	60.6710
Setpoint adjusters (knobs, stops and scales) for panel-mounting thermostats EM and heatTHERM 602030/01	60.6715

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Rod Thermostats with microswitch STMA Series

STMA-1

Brief description

Rod thermostats with microswitch operate on the principle of rod expansion. A temperature change produces a change in the length of the stem. This change is transmitted through a low-expansion rod inside the stem to a mechanism with a microswitch in the thermostat head.

Rod thermostats in the STMA series are used, for example, in HVAC applications.

Rod thermostats have the advantage that they are largely unaffected by excess temperatures, irrespective of the range (max. +345°C), have a fast response (time constant 8 sec) and negligible ambient temperature error at the thermostat head.
The thermostats have a fail-safe action (heating switches off) if the stem is damaged or bent.


STMA-2

Switching function

Temperature controller TR and temperature monitor TW
When the temperature at the probe exceeds the selected setpoint, the microswitch is operated through the mechanism and the circuit is opened or closed. When the temperature has fallen below the selected setpoint (by the switching differential), the microswitch returns to its initial position.

Temperature limiter TB
If the temperature at the probe exceeds the set limit, the circuit is opened and the microswitch is locked out mechanically.
After the temperature has fallen below the safe temperature limit by about 10 % of span, the microswitch can be reset manually.

Temperature limiter TB with Code U
The additional make contact can be used as a signal contact.

Types

Types	Switching function
STMA-1	Temperature controller TR
STMA-2	Temperature monitor TW
STMA-7	Temperature limiter TB

for stock items see page 5

Technical data

Control ranges, switching differential and stem lengths

Ranges °C	Switching differential in °C	Stem length S	Active stem length
-10 to +100 + 5 to +160 0 to +300	4 ± 1	100 mm	100 mm
0 to + 75 +15 to +120 + 5 to +160 0 to +240	3 ± 0.7	150 mm	150 mm
0 to + 80 0 to +120 +20 to +200 +50 to +300 -80 to +100	2.5 ± 0.4	200 mm	200 mm
0 to + 50 +20 to +150 0 to +200 -15 to + 50	1.9 ± 0.4	250 mm	250 mm
0 to + 40 0 to + 80	1.6 ± 0.4	300 mm	300 mm

Electrical data

Switching device	STMA-1 / STMA-2	STMA-7	STMA-7/U
	microswitch with changeover contact	microswitch with break contact and lock-out	microswitch with break contact, lock-out and additional signal contact
max. rating	10 (2) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25A, 230 V DC +10%		

Operating data

Switching point accuracy in %	± 1.5 % of scale span, based on the switch-off point at mid-span
Permissible storage temperature	-50 to +50°C
Permissible ambient temperature in operation	-40 to +80 °C
Nominal position (NL)	to DIN 16 257, NL 0 — NL 90 (other NL on request)

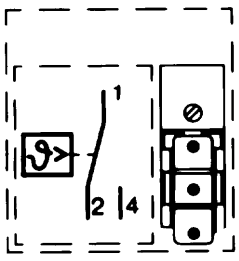
Case

Case	die-cast aluminium surface with impact-resistant textured paint; cover: RAL 7032, base: RAL 7015	
Cable entry	standard: clamping nipple M 20 x 1.5 at extra cost: cable gland M 20 x 1.5 to EN 50 262 CuZn (brass)	
Setpoint adjustment	STMA-1	STMA-2 / STMA-7
	switching point adjustable from the outside by turning the knob	switching point adjustable by screwdriver after taking off case cover
Protection	EN 60 529-IP54	
Weight	approx. 0.65 kg	

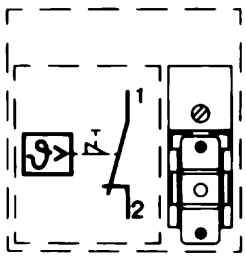
Process connection	**Version**	**Material**
A	boss 19 mm dia. between case and stem (process connections U, g, b can be retrofitted)	CuZn (brass)
U	screw-in pocket, screw-in spigot Form A to DIN 3852/2 with fixing screw, stem 12 mm dia.	up to 150°C nickel-plated brass / above 150°C St (CrNi at extra cost)
g	loose nipple M 18 x 1 with locknut	nickel-plated brass
b	mounting flange	galvanized steel
D	fixed screw thread with hexagon, 27 a/f, pipe thread $G^1/_2$	nickel-plated brass
Probe	diameter 9 mm	nickel-plated brass
Fitting (stem) length S	100, 150, 200, 250 und 300 mm	

Connection diagrams

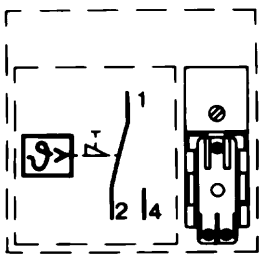
STMA-1 / STMA-2



STMA-7

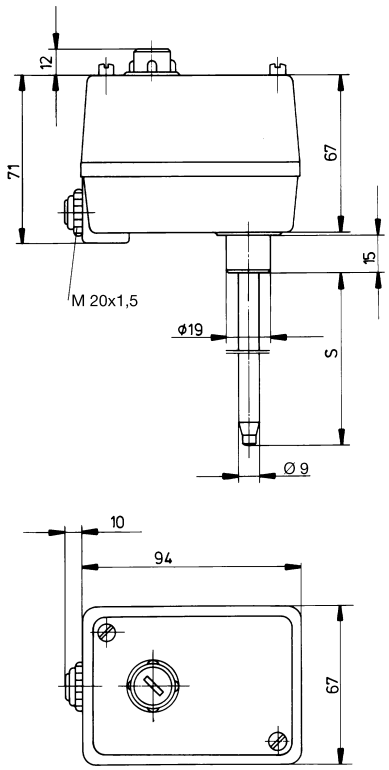


STMA-7 / U

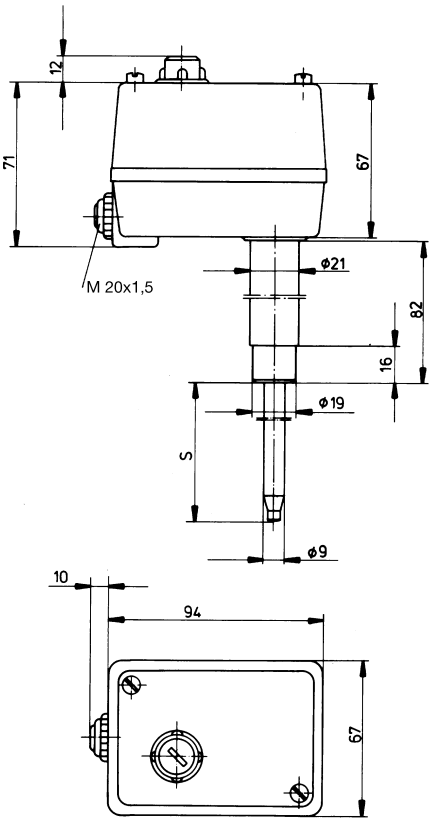


Dimensions

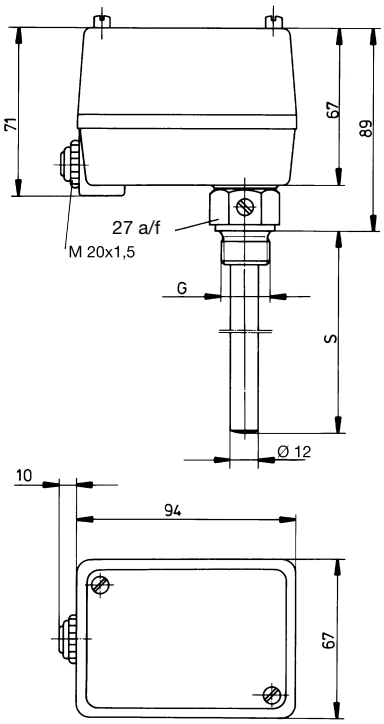
STMA-7
Process connection A, up to +200°C



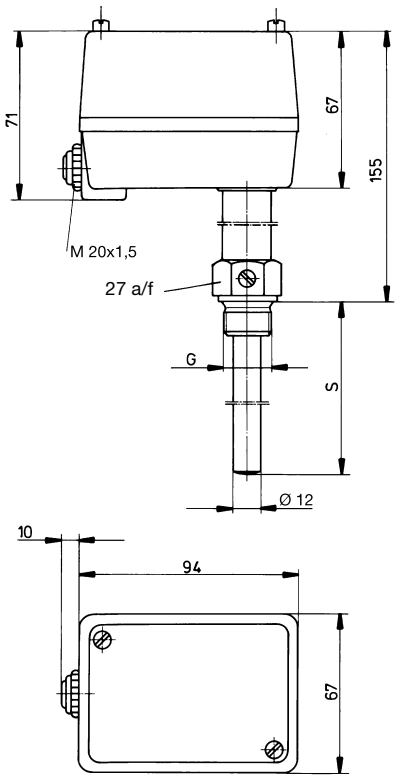
STMA-7
Process connection A, up to +300°C



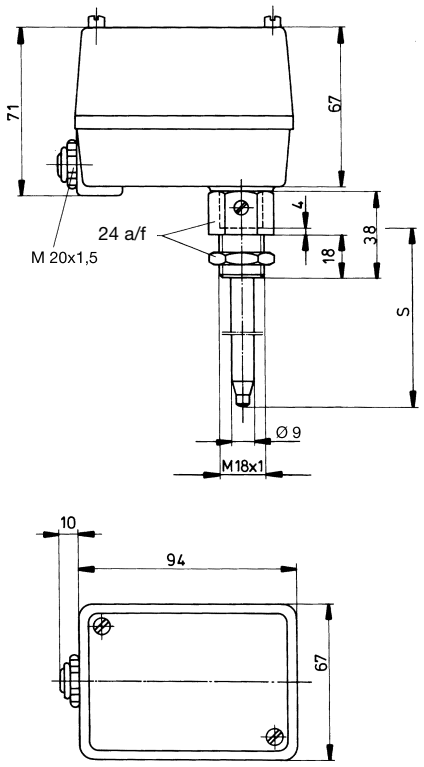
STMA-2
Process connection U, up to +200°C



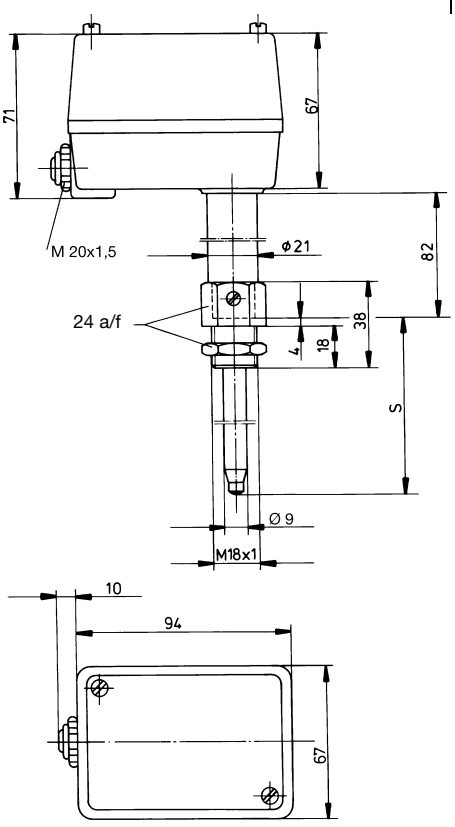
STMA-2
Process connection U, up to +300°C



STMA-2
Process connection g, up to +200°C

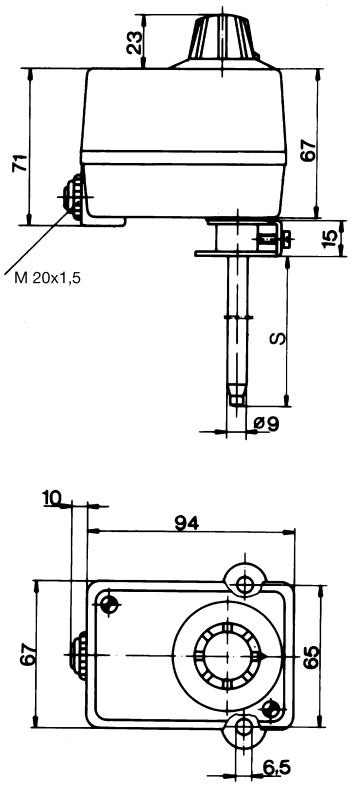


STMA-2
Process connection g, up to +300°C

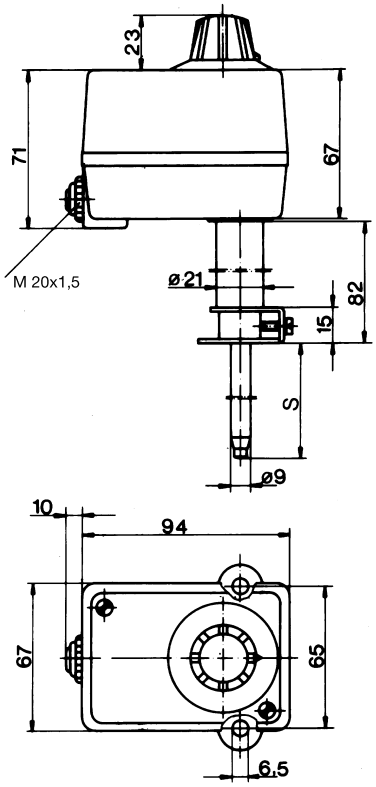


Dimensions

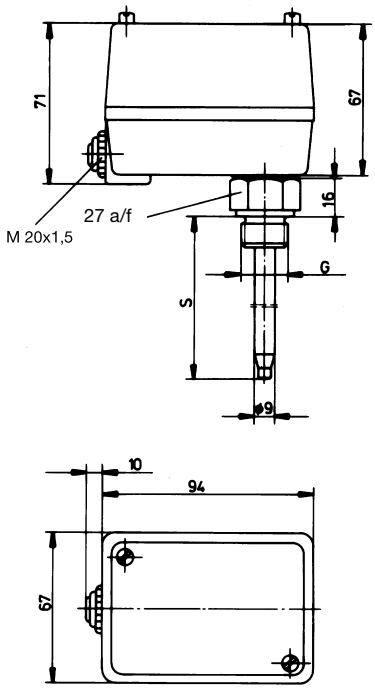
STMA-1
Process connection b, up to +200°C



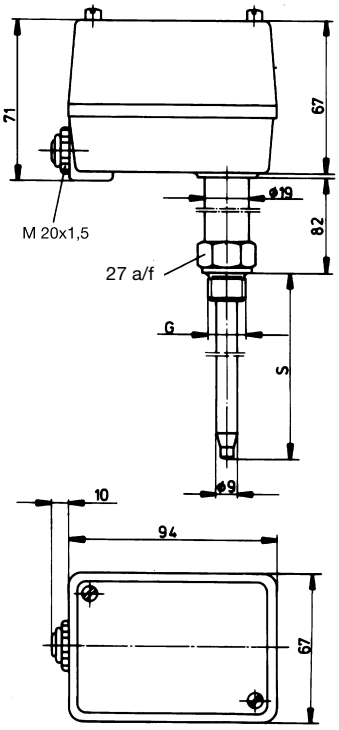
STMA-1
Process connection b, up to +300°C



STMA-2
Process connection D, up to +200°C



STMA-2
Process connection D, up to +300°C



Stock items

delivery 3 working days after receipt of order

Sales No.	Type	Control range °C	Process connection	Stem length mm
60/60000354	STMA-1	0 to + 75	U G $^1/_2$	150
60/60000355	STMA-1	0 to + 80	U G $^1/_2$	300
60/60000361	STMA-1	+ 5 to +160	U G $^1/_2$	150
60/60000362	STMA-1	0 to +200	U G $^1/_2$	250
60/60000371	STMA-2	+15 to +120	U G $^1/_2$	150
60/60000372	STMA-2	+20 to +200	U G $^1/_2$	200

Order details

STMA Series

Order code			
601530	(1)	**Basic type**	
		Rod Thermostat, STMA Series	
	(2)	**Basic type extensions**	
01		STMA-1 Temperature controller	TR with changeover contact
02		STMA-2 Temperature monitor	TW with changeover contact
07		STMA-7 Temperature limiter	TB with break contact
	(3)	**Control / limit ranges**	
		Range	**Stem length**
020		0 to + 40 °C	300 mm
021		0 to + 50 °C	250 mm
015		-15 to + 50 °C	250 mm
023		0 to + 75 °C	150 mm
024		0 to + 80 °C	200 or 300 mm
010		-80 to + 100 °C	200 mm
017		-10 to + 100 °C	100 mm
026		0 to + 120 °C	200 mm
037		+15 to + 120 °C	150 mm
043		+20 to + 150 °C	250 mm
035		+ 5 to + 160 °C	100 or 150 mm
028		0 to + 200 °C	250 mm
044		+20 to + 200 °C	200 mm
029		0 to + 240 °C	150 mm
030		0 to + 300 °C	100 mm
064		+50 to + 300 °C	200 mm
	(4)	**Process connection**	
10		A = plain cylindrical probe	
20		U = screw-in pocket 	
54		D = fixed screw thread with hexagon	
	(5)	**Thread for process connection**	
00		no thread (process connection A)	
13		external thread G 1/2	
	(6)	**Material of process connection**	
46		CuZn (brass)	with process connections A, U and D only
01		St (steel)	with process connection U only
20		CrNi (stainless steel)	with process connection U only
	(7)	**Fitting length S (stem length)***	
100		100 mm	
150		150 mm	
200		200 mm	
250		250 mm	
300		300 mm	
		* please note the relationship of control range to stem length!	
	(8)	**Extra codes****	
000		no extra code	
574		**U** TB with break contact, lock-out + additional signal contact (for basic type STMA -7 only)	
715		**g** loose nipple M 18 x 1 with locknut	
764		**b** mounting flange	

Order code

(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		
601530	/	. .	-	. . .	-	. .	-	. .	-	. .	-	. . .	/	. . .	,	. . .

Order example

601530	/	02	-	026	-	20	-	13	-	46	-	200	/	000**		

** List extra codes in sequence, separated by commas.

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Flue Gas Thermostat
Type STM-RW-2

approved to DIN 3440, DIN reg. no. ATW 86205

Brief description

The flue gas thermostat is used for monitoring flue gas temperatures in solid-fuel boilers in dual-operation with oil-heated boilers.
The flue gas thermostat operates on the principle of rod expansion. The immersion tube and the metal rod mounted inside have different expansion coefficients, so that changes in temperature produce differences in length. These act through a mechanism on a microswitch which is actuated above a set temperature limit. After the immersion tube has cooled down by approx. 10 to 30 °C, the microswitch is reset. In the event of a break in the immersion tube, the circuit is opened permanently.

Technical data

Electrical data

Switch	STM-RW-2	STM-RW-2/OS
	1-pole microswitch with changeover contact	microswitch with 2 separate circuits 1 x n.c. (break) and 1 x n.o. (make)
Max. rating	10 (2) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25A, 230 V DC +10%	

Operating data

Limit range	standard: +40°C to +120°C (factory-set to +100°C) special version: +20°C to +400°C (factory-set to +120°C)		
Switching differential	limit range	STM-RW-2	STM-RW-2/OS
	+40°C to +120°C +20°C to +400°C	10 — 18 °C 10 — 22 °C	10 — 30 °C 10 — 40 °C
Switching accuracy referred to switch-off point	limit range	scale start	scale end
	+40°C to +120°C +20°C to +400°C	+0/-10 °C +0/-15 °C	+0/-10 °C +0/-20 °C
Time constant	flue gas: ≤ 45 sec		
Mean ambient temperature error	switching point displacement referred to deviation from +22°C: ~ 0.07 °C per °C		
Permissible ambient temperature	at probe: +700°C max. at thermostat head: + 80°C max., -50°C min.		
Setpoint adjustment	against internal scale, after removal of cover		
Permissible storage temperature	+80°C max. / -50°C min.		
Nominal position	to DIN 16 257, nom. position 0 — 90 (other nom. positions on request)		

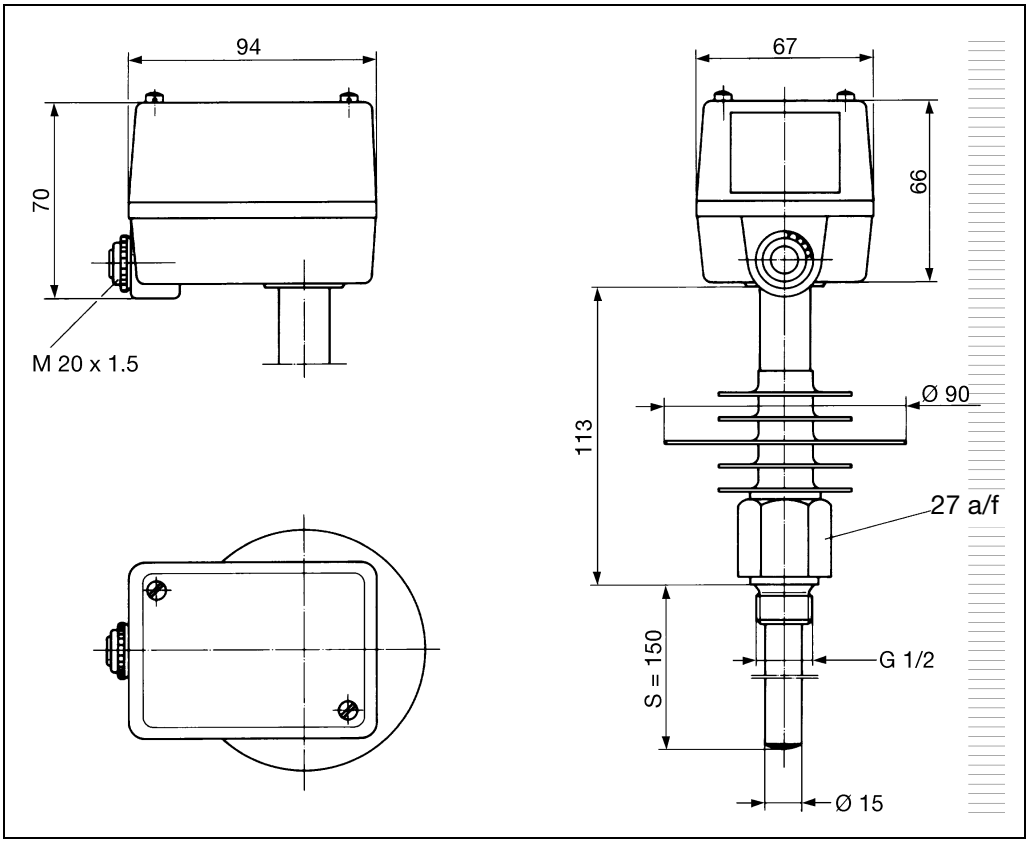
Case

Case	aluminium die-casting, screws suitable for lead sealing
Cable entry	standard: clamping gland M 20 x 1.5, for 8 to 10 mm cable diameter at extra cost: cable gland M 20 x 1.5 to EN 50 262, brass (CuZn)
Protection	EN 60 529-IP54
Weight	approx. 0.8 kg

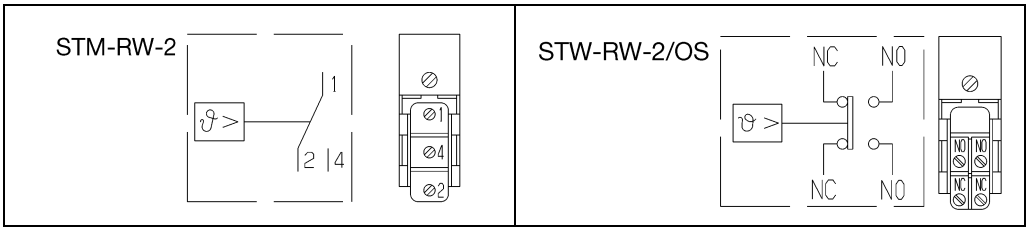
Process connection

Type of connection	Form DZ, $^1/_2$" pipe (fixed hexagon with male thread $^1/_2$" pipe), material: steel
Immersion tube	15 x 150 mm, material: steel

Dimensions



Connection diagrams



Stock items

(delivery 3 working days after receipt of order)

Sales No.	Type	Limit range °C	Switching differential °C	Connection	Immersion tube length mm
60/60000903	STM-RW-2	+40 to +120	10 — 18	DZ G 1/2 (1/2" pipe)	150
60/60001115	STM-RW-2	+20 to +400 calibration point +120			
60/60000904	STM-RW-2/OS	+40 to +120	10 — 30		

Order details

Type STM-RW-2

Order code		
	(1)	**Basic type (basic version)**
601540	STM-RW-2	Rod thermostat with microswitch as flue gas temperature monitor (ATW) with changeover contact
	(2)	**Control / limit ranges**
056		+40 to + 120 °C
045		+20 to + 400 °C
	(3)	**Extra code OS**
000		no extra code
729		microswitch with 2 separate circuits, 1 x n.c. (break) and 1 x n.o. (make)

Order code

(1)		(2)		(3)
601540	/	. . .	/	. . .

Order example

601540	/	056	/	729

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Thermostats for panel mounting ETH Series

Version approved to DIN 3440 and Pressure Equipment Directive 97/23/EC

ETHf-20

ETHf-70

Brief description

ETH panel-mounting thermostats monitor thermal processes. The instruments can be supplied as safety temperature monitors STW (STB) and protection temperature limiters STB. In the event of a fault, the STB sets the system being monitored to a safe operational state.
Panel-mounting thermostats operate on the principle of fluid expansion, with a microswitch serving as the electrical switching element.

Switching action

Safety temperature monitor STW
If the temperature at the probe exceeds the set limit, the circuit is opened by a snap-action switch. If the temperature falls below the set limit (by the switching differential), the switch returns to its initial position.

Lock-out facility on the protection temperature limiter STB
If the temperature at the probe exceeds the set limit, the circuit is opened and the microswitch is locked out mechanically.
After the temperature has fallen by about 10 % of span below the safe temperature limit (approx. 15% for limit setting > -350°C), the microswitch can be reset manually.

Use of the safety temperature monitor STW as a protection temperature limiter STB
The circuitry to which the thermostat is connected must comply with DIN 3440 and VDE 0116.

Self-monitoring on the protection temperature limiter STB and safety temperature monitor STW (STB)
Failure of the measuring system, i.e. a leakage of the expansion fluid, will cause the pressure under the diaphragm to drop, thus permanently opening the circuit. Resetting is no longer possible.
If the temperature at the probe cools down to below -20°C approx., the circuit will also be opened. As the temperature rises to above -20°C approx., the STB has to be reset manually. On the STW (STB), the reset is performed automatically.

You will find the Declarations of Conformity at:
www.jumo.net
⇨ Products
⇨ Data Sheet 60.2010
or
ask for them to be sent.

Types and approvals

Type	Switching action	DIN Reg. No.	Tests		Important note
ETH-20 ETH-70	STW (STB) STB	STW (STB) 79903S STB 80003	DIN Geprüft	Pressure Equipment Directive 97/23/ EC CE0036	The DIN Registration No. becomes invalid if pockets are used that are not listed in our Data Sheet 60.6710.

Technical data

Control ranges and temperature probes

liquid-filled					
Type	**Control/ limit setting ranges in °C**	**Max. permissible probe temperature in °C**	**Maximum capillary length in mm**	**Probe length "L" in mm** Probe dia. "d" in mm, dia. "6" = standard **6**	**8**
ETHf-20 ETHf-70	+30 to +110 +60 to +130 +20 to +150 +50 to +250 +50 to +300	135 150 175 290 345	5000	108 116 77 64 55	75 79 60 49 - - -
gas-filled					
ETHf-20 ETHf-70	+20 to +400 +20 to +500 +20 to +500	460 550 550	1000 2000 4000	176 127 202	106 81 119

Capillary and temperature probe

Type	**End of scale**	**Capillary**	**Temperature probe**	**Note**
ETHf- . .	up to 200 °C	copper (Cu) 1.5 mm dia. Mat. Ref. 2.0090	copper (Cu) Mat. Ref. 2.0090 brazed	–
	up to 350 °C	copper (Cu) 1.5 mm dia. Mat. Ref. 2.0090	stainless steel (CrNi) Mat. Ref. 1.4571 brazed	–
	up to 500 °C	stainless steel (CrNi) 1.5 mm dia. Mat. Ref. 1.4571	stainless steel (CrNi) Mat. Ref. 1.4571 welded	–
	up to 350 °C	stainless steel (CrNi) 1.5 mm dia. Mat. Ref. 1.4571	stainless steel (CrNi) Mat. Ref. 1.4571 welded	at extra cost
Capillary length	standard 1000 mm, max. 5000 mm			
Min. bending radius of capillary	5 mm			

Electrical data

Switching element	ETHf-20	ETHf-70	ETHf-70/U
	microswitch with changeover contact	microswitch with break contact and lock-out	microswitch with break contact, lock-out and additional signal contact
Max. current rating	10 (2) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25 A, 230 V DC +10%		
	with differential 2% 6 (1.2) A, 230 V AC +10%, p.f. = 1 (0.6)	–	–
	gold-plated microswitch, code /au 0.1 A, 24 V AC / DC contact resistance 2.5 — 10 mΩ		–

Operating data

Switching differential in % of control / limit setting range	Switching action	with liquid-filled measuring system		
		Nominal value	Possible actual value	
	STW (STB)	5	4 max. 6	standard
		9	8 max. 11	on request
		2	1 max. 3	at extra cost
		with gas-filled measuring system		
		7	5 max. 12	standard
		9	8 max. 16	on request
		2	1.5 max. 3	at extra cost
Switching point accuracy in % of limit setting range	in upper third of scale +0/-5 %, at start of scale +0/-10 %			
Ambient temperature error referred to control / limit setting range	A deviation of the ambient temperature at the thermostat head from the 22 °C calibration ambient temperature produces a shift of the switching point: higher ambient temperature = lower switching point lower ambient temperature = higher switching point			
	Panel-mounting thermostats with end of scale			
	< 200 °C	≥ 200 °C ≤350 °C	> 350 °C ≤500 °C	
	due to thermostat head, % per °C			
	0.17	0.13	0.12	
	due to capillary, % per °C per m length			
	0.054	0.11	0.03	
Permissible storage temperature	-50 to +50 °C			
Permissible ambient temp. in operation	+80 °C max.			
Nom. position (NL)	unrestricted			

Thermostat head

Chassis material	zinc-plated steel
Fixing	2 screws M 3, 22 mm spacing
Scale span	250° ∢
Electr. connection	screw terminals up to 2.5 mm^2 conductor cross-section
Limit setting	The limit can be adjusted at the setpoint spindle prior to mounting, by using a screwdriver.
Protection	EN 60 529-IP00
Weight	approx. 0.2 kg

Process connection

Series ETH**f**- with capillary	plain cylindrical probe A
	Please refer to Data Sheet 60.6710 for other process connections and pockets.

Note

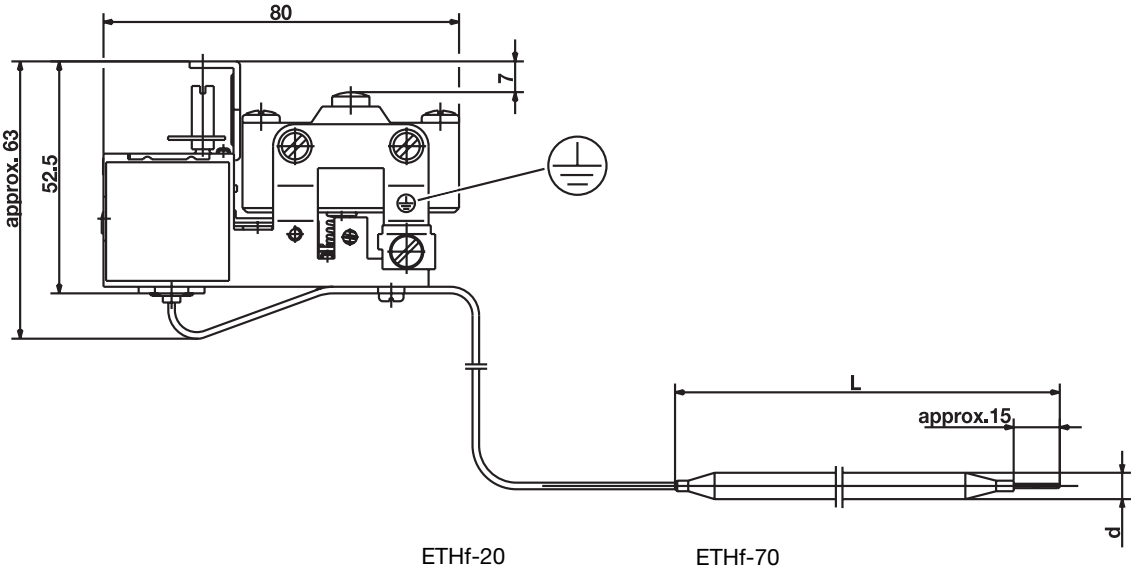
Physical and toxicological properties of the expansion fluid which may escape in the event of a system fracture.

Control range with end of scale °C	Dangerous reactions	Fire and explosion hazard		Water contamination	Toxicological data		
		Ignition temp. °C	Explosion limit % v/v		irritant	danger to health	toxic
< +200	no	+ 355	0.6 — 8	yes	yes	[1]	no
≥ 200 °C ≤+350	no	+ 490	- -	yes	yes	[1]	no
> 350 °C ≤+500	no	no	no	no	no	no	no

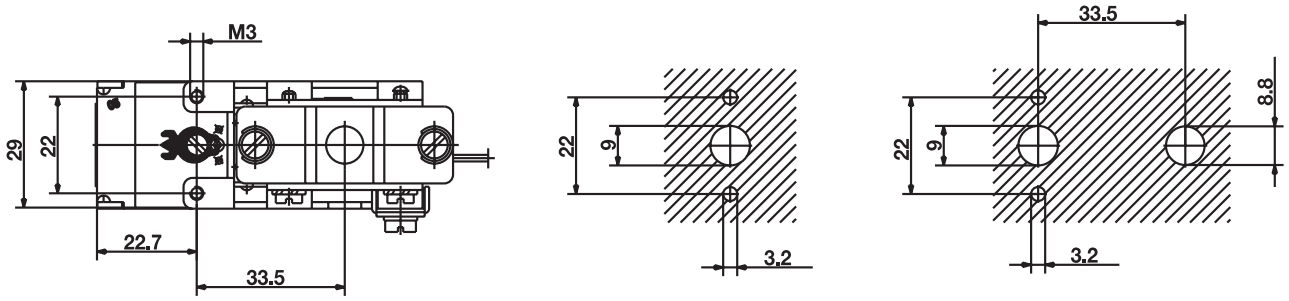
[1] At present there is no restrictive statement from the health authorities concerning any danger to health over short periods and at low concentrations, e.g. after a fracture of the measuring system.

Dimensions

ETHf-70, with plain cylindrical probe A, no pocket

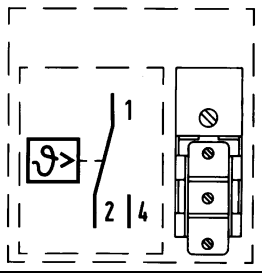


ETHf-20 ETHf-70

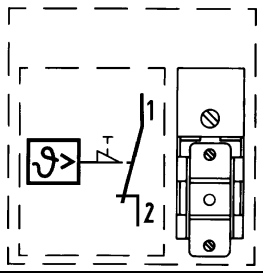


Connection diagrams

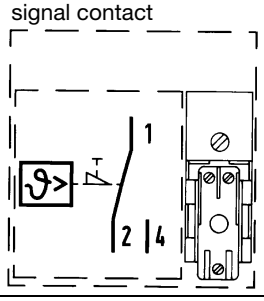
ETHf-20
with changeover contact



ETHf-70
with break contact
and lock-out



ETHf-70
with break contact,
lock-out and additional
signal contact



Order details

ETH Series

Order code		
	(1) Basic type	
602010	Panel-mounting thermostat, ETH Series	
	(2) Basic type extensions	
20	ETH-20 Safety temperature monitor	with capillary
70	ETH-70 Protection temperature limiter	with capillary
	(3) Control / limit ranges	
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	no differential (ETHf-70 STB)	
20	2% of scale span	
50	5% of scale span	
70	7% of scale span	
90	9% of scale span	
	(5) Capillary length (details in mm)	
1000	1000 mm	
2000	2000 mm	
3000	3000 mm	
4000	4000 mm	
5000	5000 mm	
. . . .	(special length, details in plain text)	
	(6) Material of capillary	
40	Cu (copper)	
20	CrNi (stainless steel 1.4571))	
	(7) Process connection*	
10	A = plain cylindrical probe 	
	* see Data Sheet 60.6710 for other process connections and pockets	
	(8) Diameter d (probe diameter)	
6	6 mm	
8	8 mm	
	(9) Extra codes	
000	no extra code	
574	**U** STB with break contact, lock-out and additional signal contact (basic type -70 STB only)	
702	**au** snap-action switch contact gold-plated	

Order code

(1)		(2)		(3)		4)		(5)		(6)		(7)		(8)		(9)
602010	/	. .	-	. . .	-	. .	-	. . . .	-	. .	-	. .	-	.	/	. . .

Order example

602010	/	70	-	043	-	00	-	1000	-	40	-	10	-	6	/	574

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Temple Bank, Riverway
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Internet: www.jumo.co.uk

JUMO Process Control, Inc.
8 Technology Boulevard
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Fax: 315-697-5867
e-mail: info@jumo.us
Internet: www.jumo.us

Panel-mounting Thermostats EM Series

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

Brief description

Thermostats control and monitor thermal processes. EM series instruments can be supplied as temperature controllers TR, temperature monitors TW, temperature limiters TB, safety temperature monitors STW (STB) and protection temperature limiters STB. In fault condition, the STB sets the system being monitored to a safe operational state.

Panel-mounting thermostats operate on the principle of liquid expansion, with a microswitch serving as the electrical switching device.

Switching action

Temperature controller TR and temperature monitor TW
When the temperature at the probe exceeds the selected setpoint, the microswitch is actuated through a mechanism and the circuit is opened or closed. When the temperature drops below the selected setpoint (by the amount of the switching differential), the microswitch returns to its initial position.

Lock-out facility
on the temperature limiter TB and protection temperature limiter STB
When the temperature at the probe exceeds the set limit, the circuit is opened and the miroswitch locked out mechanically.

After the temperature has dropped below the critical temperature by about 10 % of the scale span (approx. 15% for a limit setting above +350°C), the microswitch can be reset manually.

With limits above 120°C, the limit setting on the STB must be locked (e.g. by a seal) to prevent any shift.

Self-monitoring facility on the protection temperature limiter STB
and safety temperature monitor STW (STB)
In the case of the STB and STW (STB), any failure of the measuring system, i.e. a leakage of the expansion liquid, will cause the pressure under the diaphragm to drop, thus permanently opening the circuit. Resetting is now impossible.

When the temperature at the probe drops below -20°C (approx.), the circuit will also open, but will close again automatically when the temperature rises above -10°.

Use of the safety temperature monitor STW as a protection temperature limiter STB
The circuitry to which the thermostat is connected must comply with DIN 3440 and VDE 0116.

Approvals

DIN Geprüft	DVE	DVGW Gas Appliances Directive 90/396/EEC Type EM-50 only	Pressure Equipment Directive 97/23/EC CE0036 only Types EM-20 EM-30 EM-40 EM-50	c UL us	only Types EM-1 EM-2 EM-4 EM-50

Types and DIN registration numbers

Version	Type	Switching action of the individual contacts (see example 1)	DIN Reg. No.	Important note
1 single-pole snap-action switch	EM-1 EM-2 EM-3 * EM-4 * EM-5	TR TW TW TB TB	TR 77703 TW 77803 TW 77903 TB 78003 TB 78103	DIN approved up to +500°C max. The DIN Reg. No. becomes invalid if pockets are used that are not listed in our Data Sheet 60.6710. Type EM-50 DVGW Reg. No. CE-0085 AR 0124 *Setpoint / limit permanently set at the factory to customer requirements
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 77703 TW 77803 TW 77903 TR 77703 TW 77803 TB 78003 TB 78103	
3 single-pole snap-action switches	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 77703 TR 77703 TW 77803 TW 77803 TW 77903 TB 78003 TB 78103	
4 single-pole snap-action switches	EMF-1333 EMF-2333 EMF-3333 *	TR / TW / TW / TW TW / TW / TW / TW TW / TW / TW / TW	TR 77703 TW 77803 TW 77903	
Fail-safe version	EM-40 * EM-50 EM-20 EM-30 *	STB STB STW (STB) STW (STB)	STB 78203 STB 78303 STW (STB) 77503 S STW (STB) 77603 S	

Technical data

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

Control/limit range °C	Switching differential %	Max. probe temperature °C	Max. switch head temperature °C	Max. capillary length m	Max. contact spacing °C	Probe length "L" in mm, probe dia. "d" in mm, 6 mm dia. is standard	
						Ø 6	Ø 8
-20 to + 40	1	+ 50	+ 50	5	5	245	145
	2.5	+ 50	+ 50		8	245	145
	5	+ 95	+ 50 (80)[1)]		25	138	91
	7	+100	+ 50 (80)[1)]		50	103	73
0 to + 50	1	+ 60	+ 60	3	5	283	165
	2.5	+ 60	+ 60	3	10	283	165
	5	+105	+ 60 (80)[1)]	5	25	159	101
	7	+110	+ 60 (80)[1)]	5	50	117	80
+20 to + 90	1	+115	+ 80	1	7	210	127
	2.5	+115	+ 80	1	14	210	127
	5	+140	+100	5	35	121	82
	7	+175	+100	5	70	91	67
0 to +100	1	+125	+ 80	2	10	157	100
	2.5	+125	+ 80	2	20	157	100
	5	+165	+100	5	50	94	68
	7	+200	+100	5	100	73	58
+30 to +110	1	+135	+ 80	2	8	188	116
	2.5	+135	+ 80	2	16	188	116
	5	+170	+100	5	40	110	76
	7	+200	+100	5	80	84	63
0 to +150	1	+173	+ 80	1	15	113	78
	2.5	+173	+100		30	113	78
	5	+200	+100		75	72	57
0 to +200	1	+230	+ 80	1	20	113	78
	2.5	+230	+100		40		
+50 to +200	1	+230	+ 80	1	15	139	92
	2.5	+230	+100		30		
+50 to +250	1	+228	+ 80	1	20	105	70
	2.5	+228	+100	1	40	105	70
	5	+300	+100	5	100	64	49
+50 to +300	1	+345	+ 80	2	25	87	61
	2.5	+345	+100		50		

[1)] Values in brackets to special order only, taking into account operating conditions and capillary lengths

Technical data

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

Control/limit range °C	Switching differential %	Max. probe temperature °C	Max. switch head temperature °C	Max. capillary length m	Max. contact spacing °C	Probe length "L" in mm, probe dia. "d" in mm, 6 mm dia. is standard	
						Ø 6	Ø 8
+20 to +400	6 10	+460 +500	+100 +100	5	75 200	237 127	137 81
+20 to +500	3 / 5 6 10	+530 +575 +575	+ 80 +100 +100	1 5 5	48 95 250	278 176 95	158 106 65

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

Setting range °C	Scale span °⊀	Max. probe temperature °C	Max. switch head temperature °C	Max. capillary length m	Tolerance at limit °C	Probe length "L" in mm, probe dia. "d" in mm, 6 mm dia. is standard	
						Ø 6	Ø 8
+75 to +100	**78**	+125	+100	5	+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 span °⊀	Max. probe temperature °C	Max. switch head temperature °C	Max. capillary length m	Tolerance at limit °C	Probe length "L" in mm, probe dia. "d" in mm, 6 mm dia. is standard	
						Ø 6	Ø 8
+300 to +400	70	+460	+100	3	+0 -23	148	92
+350 to +500	72	+575			+0 -29	127	81

On thermostats with factory-set switching points, please specify the switch-off point in addition to the control range, e.g. control range +80 to +100°C, fixed at +95°C.

Capillaries and temperature probes

Type	End of scale	Capillary	Temperature probe	Notes
EM- . .	up to 200°C	copper (Cu) 1.5mm dia. Mat. Ref. Cu-DHP	copper (Cu) Mat. Ref. Cu-DHP brazed	–
	up to 350°C	copper (Cu) 1.5mm dia. Mat. Ref. Cu-DHP	stainless steel (CrNi) Mat. Ref. 1.4571 brazed	–
	up to 500°C	stainless steel (CrNi) 1.5mm dia. Mat. Ref. 1.4571	stainless steel (CrNi) Mat. Ref. 1.4571 welded	–
	up to 350°C	stainless steel (CrNi) 1.5mm dia. Mat. Ref. 1.4571	stainless steeel (CrNi) Mat. Ref. 1.4571 welded	at extra cost
Capillary length	standard: 1000 mm, max. 5000 mm			
Min. bending radius of capillary	5 mm			

Note
If the maximum permissible temperature at the probe, capillary and switch head is not fully utilized, it may be possible to increase the capillary length there where it is restricted to 1, 2 or 3 m according to the control range and probe table.
Please let us know the actual temperatures to which the thermostat is exposed.

Electrical data

Switching device: 1, 2, 3 or 4 single-pole snap-action switches	EM.-1... EM-20 EM.-2... EM-30 EM.-3...	EM.-4... EM-40 EM.-5... EM-50	EM.-4.../U EM-40/U EM.-5.../U EM-50/U
	microswitch with changeover contact	microswitch with (n.c.) break contact and lock-out	microswitch with (n.c.) break contact, lock-out and additional signal contact
Contact rating	switching action switching differential	(n.c.) break contact terminal 2	(n.o.) make contact terminal 4
	TR, TW, STW (STB) 2,5%, 5%, 6%, 7%, 10%	16 (3) A, 230 V AC +10% p.f. = 1 (0.6) 0.25 A, 230 V DC +10%	8 (1.5) A, 230 V AC +10% p.f. = 1 (0.6) 0.25 A, 230 V DC +10%
	TB, STB		2 (1) A, 230 V AC +10% p.f. = 1 (0.6) 0.25 A, 230 V DC +10%
	TR, TW 1%, 3%	6 (2) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25A, 230 V DC +10%	
	TR, TW 2.5%	microswitch, gold-plated, extra code “au” 0.1 A, 24 V AC/DC	
Contact reliability	To ensure the maximum switching reliability, we recommend a minimum load of:		
	with silver contacts: AC/DC = 20 mA, 24 V	with gold-plated contacts (code “au”): AC/DC = 10 mA, 10 V	
Rated surge voltage	1500 V (400 V via the switching contacts)		
Overvoltage category	II		
Required fusing	see Contact rating		
Electrical connection	standard	faston connectors A 6.3 x 0.8 DIN 46 244	
	extra code X	screw terminal up to 2.5 mm^2 conductor cross-section (at extra cost) — also suitable for retrofitting —	

Operating data

Switching differential in % of control/limit range	Switching action	with liquid-filled system		
		Nominal value	Possible actual value	
	TR, TW	2.5	2.5 max. 3.5	standard
		5	5 max. 6	on request
		7	7 max. 8	on request
		1	1 max. 2	at extra cost
		with gas-filled system		
		5	5 max. 11	standard
		6	6 max. 14	on request
		10	10 max. 16	on request
		3	2.5 max. 4	at extra cost
	STW (STB)	with liquid-filled system		
		5	5 max. 7	standard
		with gas-filled system		
		6	6 max. 16	standard

Contact spacing on multi-pole thermostat	with switching differential	contact spacing of scale span minimum	 maximum	switching point accuracy of contact spacing of scale span
	1% 2.5% 3%, 5% 6%, 7%, 10%	1% 1% 2% 3%	according to control range table	≤ 1% ≤ 1% < 2% < 3%
	The contact spacing is specified in °C against the setpoint of contact I. (The contact number is marked on the back of the housing.)			
	sign **-** = switching **before** the setpoint sign **+** = switching **after** the setpoint For simultaneous switching, specify contact spacing “0”.			

Operating data

Switching point accuracy in % of control /limit range	Switching action	Switching differential		in upper third of scale or at limit						
		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%	+0 / -3% +0 / -6% +0 / -8%						
	TB	—	—	+0% -5%						
	STB, STW (STB)	see table of control ranges and probes, page 3								
Mean ambient temperature effect	Deviation of the ambient temperature at the switch head and/or capillary from the +22°C calibration ambient temperature produces a switching point shift: higher ambient temperature = lower switching point lower ambient temperature = higher switching point									
	for temperatures with end of scale/limit									
	< 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 effect on switch head, % per °C									
	0.15	0.26	0.34	0.43	0.12	0.21	0.35	0.12	0.17	0.24
	ambient temperature effect on capillary, % per °C per m length									
	0.05		0.09		0.04		0.07	0.05		
Temperature compensation* **(TK)**	* for detailed information, see diagram on page 8									
Temperatures	permissible storage temperature: -50 to +50°C			permissible ambient temperature in operation: +80°C max.						
Nom. position (NL)	unrestricted									

Housing

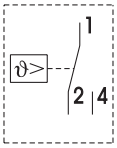
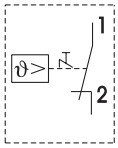
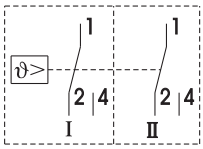
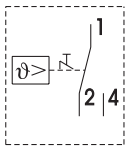
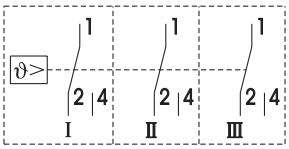
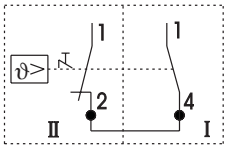
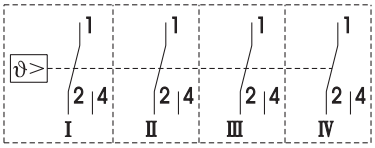
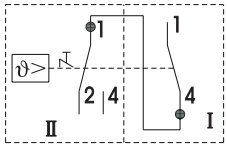
Housing in galvanized steel sheet	standard fixing	by 2 M3 screws, spaced 22 mm
	code b1	by 2 M4 screws, spaced 28 mm
	code b2	by 2 M3 screws, spaced 33 mm
	code b7	central fixing M 10 x 1 with cap nut (on TB and STB only)
Setpoint adjustment	TR: switching point externally adjustable by rotary knob	TW, TB, STB, STW (STB): switching point adjustable with screwdriver
	Types EM-3, EM-4, EM-33, EM-44, EM-444, EM-3333, EM-30, EM-40 permanently set at the factory to customer requirements	
Setpoint knob	see Data Sheet 60.6715	
Scale span	standard: 250°∢ (for STB and STW (STB), see table of control ranges and probes, page 3)	
Protection	EN 60 529-IP00	
Weight	approx. 0.3 kg	

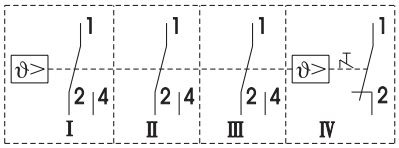
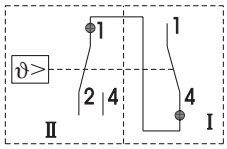
Process connection*

EM Series with capillary	**plain cylindrical probe A** (standard)	
	pocket U (on request) screw-in pocket with screw-in spigot G 1/2 Form A to DIN 3852/2 and clamping clip with fixing screw for securing the probe	
Material	**pocket U**	up to +150°C: CuZn is standard above +150°C: St is standard (CrNi on request)
Fitting length S	standard lengths: 100, 120, 150, 200 or 300 mm (other lengths on request)	
Immersion tube dia.	D = 8 mm, D = 10 mm	

*See Data Sheet 60.6710 for additional process connections and pockets.

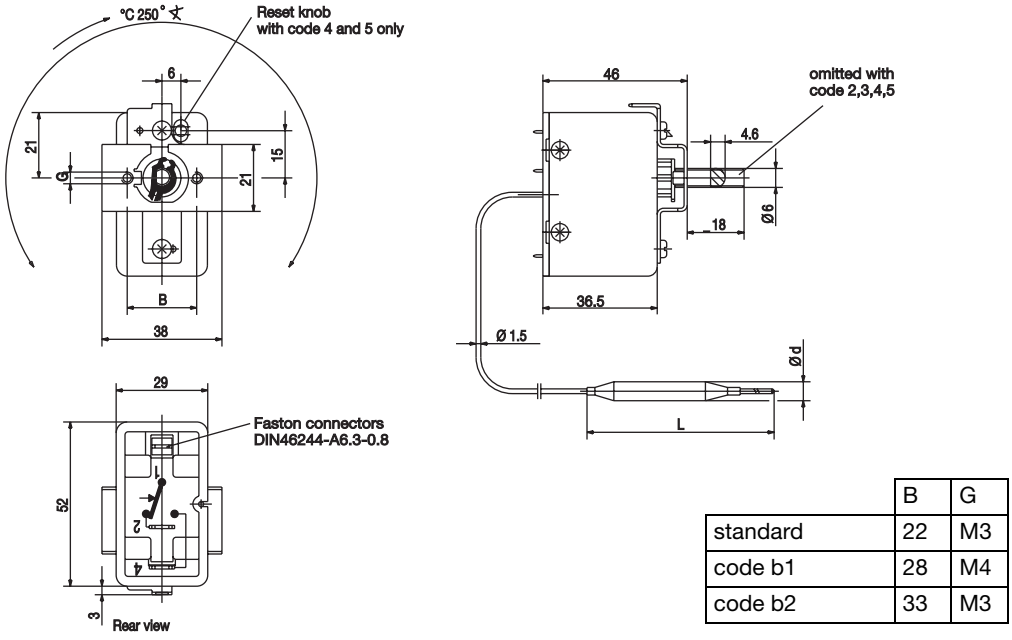
Connection diagrams

EM-1 EM-2 EM-3		EM-4 EM-5	
EMF-13 EMF-23 EMF-33 Setpoint: **I** Follow-on contact: **II**		EM-4/U EM-5/U	
EMF-133 EMF-233 EMF-333 Setpoint: **I** Follow-on contact: **II, III**		EM-40 EM-50 **I** = break contact on system fracture and T < -10°C: **I** **II** = limit: **II**	
EMF-1333 EMF-2333 EMF-3333 Setpoint: **I** Follow-on contact: **II, III, IV**		EM-40/U EM-50/U **I** = break contact on system fracture and T < -10°C: **I** **II** = limit: **II**	

Example: EMF-1334 For other type variants, the connection diagrams have to be appropriately combined.		EM-20 EM-30 **I** = break contact on system fracture and T < -10°C: **I** **II** = limit: **II**	

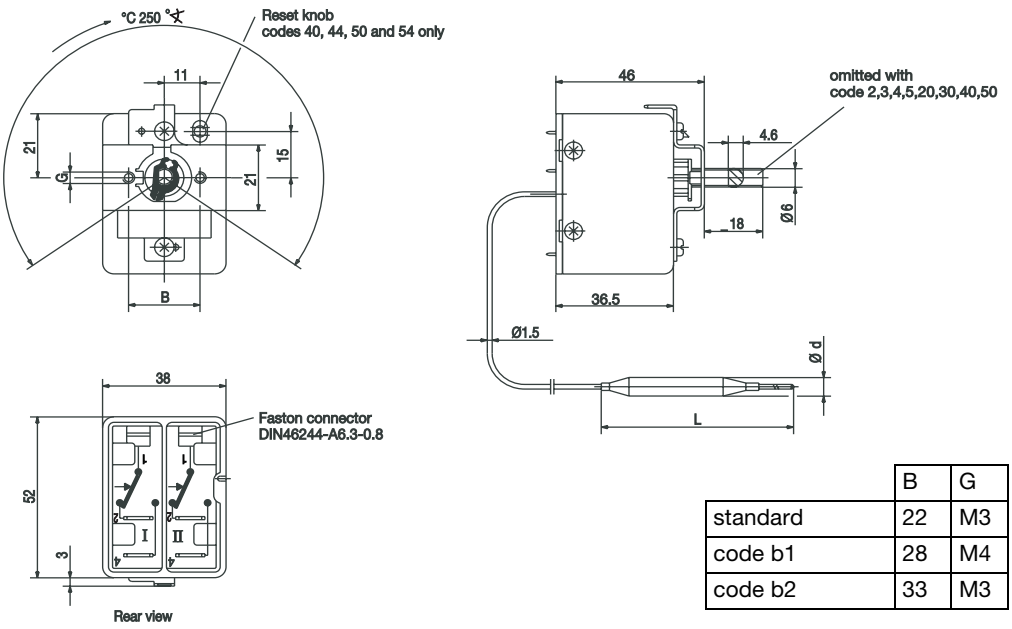
Dimensions

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



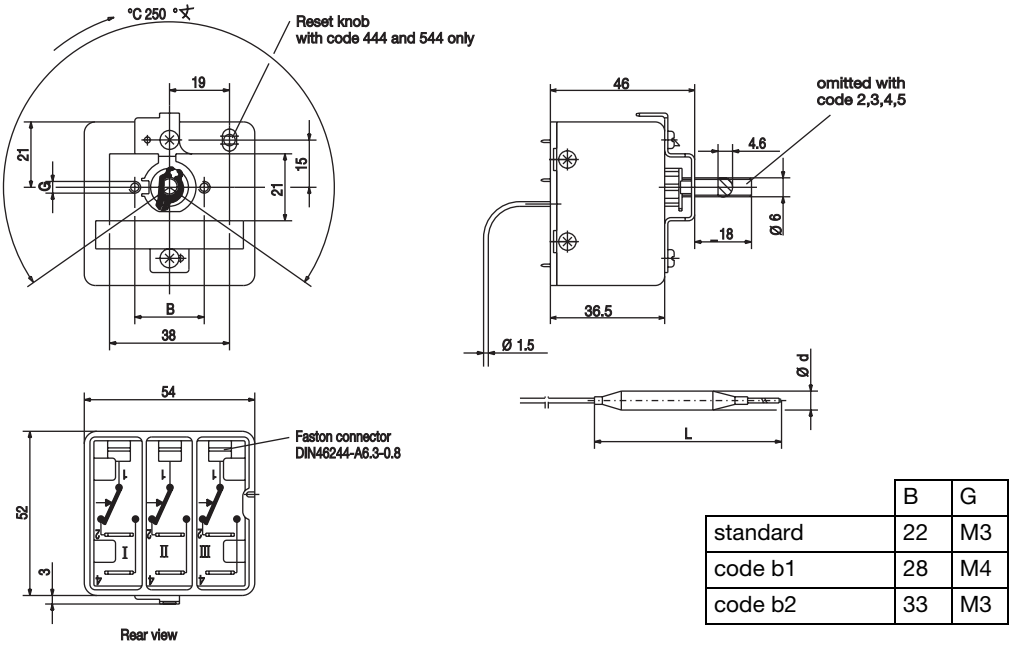
	B	G
standard	22	M3
code b1	28	M4
code b2	33	M3

EMF-13
EMF-23
EMF-33
EMF-14
EMF-24
EMF-44
EMF-54



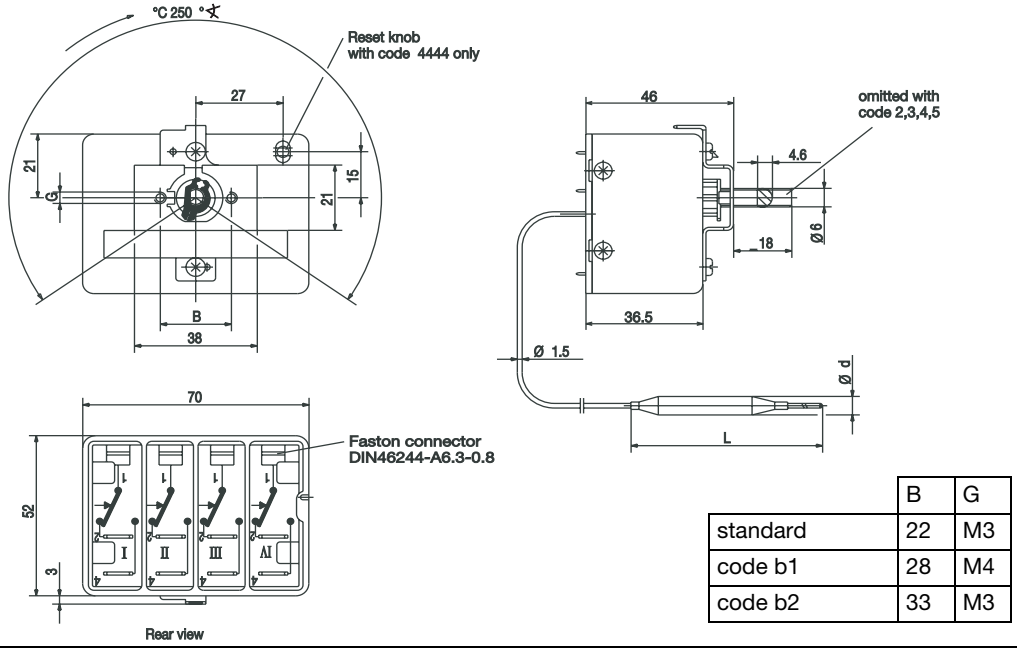
	B	G
standard	22	M3
code b1	28	M4
code b2	33	M3

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

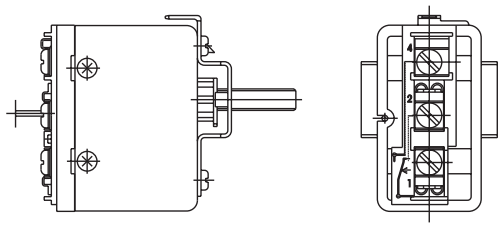


	B	G
standard	22	M3
code b1	28	M4
code b2	33	M3

EMF-1333
EMF-2333
EMF-3333



	B	G
standard	22	M3
code b1	28	M4
code b2	33	M3

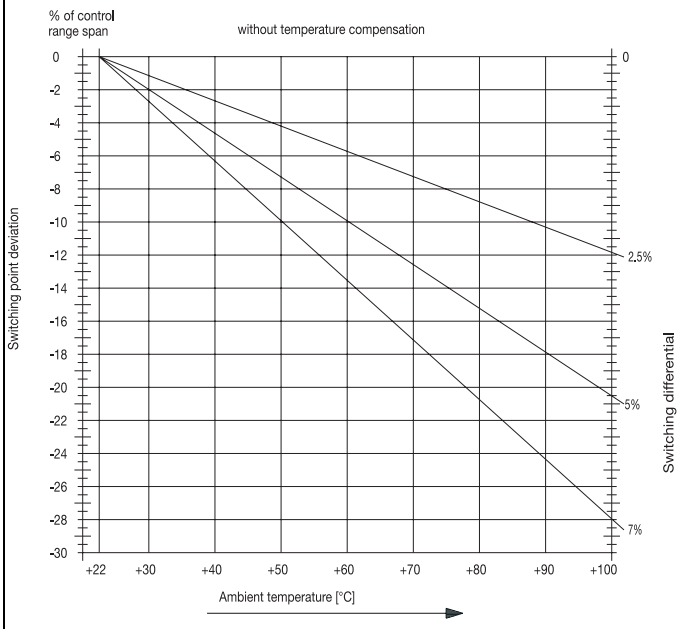
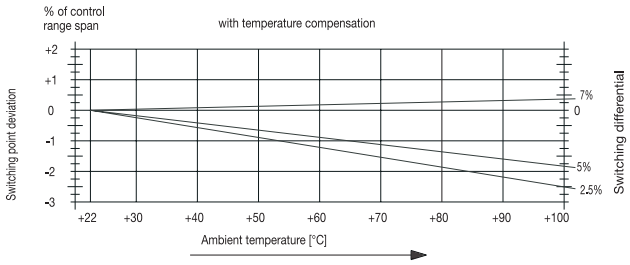
Screw connection EM-1 extra code X	

Temperature compensation (TK)

Any deviation of the temperature at the switch head from the +22°C calibration ambient temperature will produce a deviation of the switching point. With strongly fluctuating ambient temperatures it makes sense to use thermostats with temperature compensation (extra code TK).

Switching point deviation as a function of ambient temperature at the switch head, taking into account the switching differential.

The temperature effect on the capillary has not been allowed for and may introduce an additional error.

Version **without** temperature compensation	Version **with** temperature compensation
end of scale < +200°C	
EM 1-pole / EM 2-pole  	**EM 1-pole TK**  **Note:** Additional graphics of the temperature compensation TK with higher end-of-scale values and for the EM 2-pole version are available on request.

Note

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

Control range with end of scale °C	Dangerous reactions	Fire/explosion hazard		Water contamination	Toxicological data		
		Ignition temperature °C	Explosion limit % v/v		irritant	danger to health	toxic
< +200	no	+ 355	0.6 — 0.8	yes	yes	[1]	no
≥ 200 ≤+350	no	+ 490	- -	yes	yes	[1]	no
> 350 ≤+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 concentration, e.g. after a fracture of the measuring system.

Stock items

(delivery: 3 working days after receipt of order)

Sales No.	Type	Control range °C	Switching differential %	Capillary mm	Connection	Probe dia. x length mm
60/60001231	EM-1	- 20 to + 40	2.5	2000	A	6x245
60/60000492	EM-1	0 to + 50	2.5	1000	A	6x283
60/60001142	EM-1	+ 20 to + 90	2.5	1000	A	6x210
60/60000493	EM-1	+ 20 to + 90	7.0	1000	A	6x 91
60/60000215	EM-1	0 to +100	1.0	1000	A	6x157
60/60000494	EM-1	0 to +100	2.5	1000	A	6x157
60/60000219	EM-1	0 to +100	2.5	2000	A	6x157
60/60000285	EM-1	+ 30 to +110	7.0	1000	A	6x 84
60/60000921	EM-1	0 to +150	2.5	1000	A	6x113
60/60000217	EM-1	0 to +150	2.5	2000	A	6x113
60/60001141	EM-1	0 to +200	2.5	1000	A	6x114
60/60000220	EM-1	0 to +200	2.5	2000	A	6x114
60/60000216	EM-1	+ 50 to +250	2.5	2000	A	6x106
60/60000495	EM-1	+ 50 to +300	2.5	1000	A	6x 88
60/60000923	EM-1	+ 50 to +300	2.5	2000	A	6x 88
60/60002119	EM-1	+ 20 to +400	6.0	1000	A	8x137
60/60002083	EM-1	+ 20 to +500	5.0	1000	A	8x159
60/60000214	EM-2	0 to + 50	2.5	1000	A	6x286
60/60000497	EM-2	0 to +150	2.5	1000	A	6x113
60/60000213	EM-2	0 to +150	2.5	2000	A	6x113
60/60001380	EM-2	+ 50 to +300	2.5	1000	A	6x 88
60/60002120	EM-2	+ 20 to +400	6.0	1000	A	8x137
60/60002084	EM-2	+ 20 to +500	5.0	1000	A	8x159
60/60002112	EM-2	+20 to +500	6.0	2000	A	8x159
60/60000924	EM-5	0 to +150	2.5	1000	A	6x113
60/60000929	EM-5	0 to +200	2.5	1000	A	6x114
60/60000211	EM-5	+ 50 to +300	2.5	1000	A	6x 88
60/60002085	EM-5	+ 20 to +500	4.0	1000	A	8x159
60/60002244	EM-50/U,b7	+300 to +400	— —	1000	A	6x148
60/60002245	EM-50/U,b7	+350 to +500	— —	1000	A	6x127

Order details for non-stock items:
Panel-mounting thermostats EM Series

Order code	(1) Basic type			
602021	EM panel-mounting thermostat with microswitch, with capillary			
	(2) Basic type extension			
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 *	Protection temperature limiter	STB	
0050	EM-50	Protection temperature limiter	STB	
	* setpoint/limit permanently set at the factory to customer requirements			
	(3) Control/limit 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			
	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			
	(4) Limits with fixed settings			
000	for adjustable control/limit ranges			
. . .	values in °C (must be within the control/limit ranges)			

Order details for non-stock items:
Panel-mounting thermostats EM Series

Order code		
	(5)	**Switching differential**
00	no switching differential (-4 TB, -5 TB, -40 STB, -50 STB)	
10	1% * of scale span	
25	2.5% * of scale span	with liquid-filled systems
50	5% ** of scale span	
70	7% ** of scale span	
30	3% * of scale span	
50	5% ** of scale span	with gas-filled systems
60	6% * of scale span	
01	10% * of scale span	
	* on TR + TW only	
	** on TR, TW and STW only	
	(6)	**Capillary length**
1000	1000 mm	
2000	2000 mm	
3000	3000 mm	
4000	4000 mm	
5000	5000 mm	
. . . .	(special length, details in plain text)	
	(7)	**Material of capillary**
40	Cu (copper)	
20	CrNi (stainless steel 1.4571)	
	(8)	**Process connection***
10	A = plain cylindrical probe	
20	U = screw-in pocket 	
	* for other probe mountings and pockets, see Data Sheet 60.6710.	
	(9)	**Thread of process connection**
00	no thread (process connection A)	
13	male thread $G\,1/2$	
	(10)	**Material of process connection**
00	only with process connection A	
46	CuZn (brass)	
01	St (steel)	
20	CrNi (stainless steel 1.4571)	
	(11)	**Fitting length S (immersion tube length)**
000	no pocket	
100	100 mm	
150	150 mm	
200	200 mm	
300	300 mm	
400	400 mm	
. . . .	(special length, details in plain text)	

Order details for non-stock items:
Panel-mounting thermostats EM Series

Order code			
	(12)	**Diameter D (immersion tube diameter)**	
00		no pocket	
8		8 mm	
10		10 mm	
	(13)	**Diameter d (probe diameter)**	
6		6 mm	
8		8 mm	
	(14)	**Extra codes****	
574		**U**	TB/STB with (n.c.) break contact, lock-out and additional signal contact
702		**au**	snap-action switch contact, gold-plated (only on 1- and 2-pole version)
699		**X**	screw connection up to 2.5 mm^2 conductor cross-section
704		**b1**	switch head fixing by 2 M4 screws, spaced 28 mm
705		**b2**	switch head fixing by 2 M3 screws, spaced 33 mm
710		**b7**	central fixing with cap nut (on TB and STB only)
707		**TK**	temperature compensation (for 1- and 2-pole version only)

**List extra codes in sequence, separated by commas

Contact spacing for 2-, 3- and 4-pole termostats
details 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	

****** List extra codes in sequence, separated by commas.

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Panel-mounting Thermostats EM Series

- **for limiting operating temperatures**
- **limit range up to +650°C**
- **with temperature compensation**

EM panel-mounting thermostats monitor thermal processes. The thermostats are available as temperature monitors (TW), temperature limiters (TB) and protection temperature limiters (STB). If a fault occurs, the STB sets the system being monitored to a safe operational state. Panel-mounting thermostats operate on the principle of liquid expansion, with a microswitch serving as the electrical switching device.

Types	**EM-2-TK**	**EM-5-TK**	**EM-50-TK**
	Temperature monitor (TW)	Temperature limiter (TB)	Protection temperature limiter (STB)

Switching action	**TW**	**Lock-out on the TB and STB**	**Self-monitoring on the STB**
	When the temperature at the probe rises above the set limit, the circuit is opened by a snap-action switch. When the temperature has fallen below the set limit (by the amount of the switching differential), the switch returns to its initial position.	When the temperature at the probe rises above the set limit, a snap-action switch is actuated and mechanically locked out. When the temperature has fallen below the limit by about 100 °C, the snap-action switch can be manually reset.	When the temperature probe cools down to below -20°C, the snap-action switch will also be actuated. After the temperature has risen above -10°C, the circuit will be reclosed automatically. In the event of a measurement system break (leak), the snap-action switch will be permanently operated and will remain locked out mechanically.

Technical data

Limit ranges	**Control/limit range °C**	**Switching differential °C**	**Scale span °**
TW and TB	+230 to +650	50 — 80 (TB)	250
STB	+500 to +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, Mat. Ref. 1.4571

Temperature probe	**Process connection***	**Probe length x diameter**	**Material**
	plain cylindrical probe A (standard)	115 x 8 mm	high-temperature-resistant stainless steel, welded

*see Data Sheet 60.6710 for other process connections (B, C and D only).

Electrical data

Switching device: single-pole snap-action switch	**EM-2-TK**	**EM-5-TK** **EM-50-TK**	**EM-5-TK/U** **EM-50-TK/U**
	microswitch with changeover contact	microswitch with (n.c.) break contact and lockout	microswitch with (n.c.) break contact, lockout and additional signal contact
Contact rating	**Switching action**	**Break contact terminal 2**	**Make contact terminal 4**
	TW	16 (3) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25 A, 230 V DC +10%	8 (1.5) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25 A, 230 V DC +10%
	TB, STB		2 (1) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25 A, 230 V DC +10%
Contact reliability	To ensure the highest possible switching reliability, we recommend a minimum loading of: AC / DC = 24 V, 20 mA		
Rated surge voltage	1500 V (via switching contacts: 400 V)		
Overvoltage category	II		
Fusing required	see Contact rating		
Electrical connection	standard	faston connector A 6.3 x 0.6 DIN 46244	
	extra code X	screw connection up to 2.5mm^2 conductor cross-section (at extra cost) –also suitable for retrofitting –	

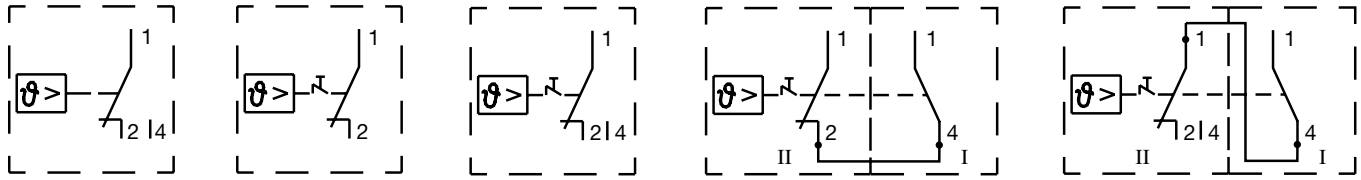
Operating data

Switching point accuracy	(in % of scale span, referred to setpoint or limit value at T_a +22°C, with rising temperature)		
	Switching action	Type	Accuracy in upper third of scale or at limit
	TW	EM-2-TK	$^{+0}_{-18}$ °C
	TB	EM-5-TK, EM-5-TK/U	$^{+0}_{-48}$ °C
	STB	EM-50-TK, EM-50-TK/U	$^{+0}_{-48}$ °C
Mean ambient temperature effect (referred to limit)	Any deviation of the ambient temperature [Δt] at the switch head and capillary from the +22°C calibration ambient temperature will result in a shift of the switching point t_V: higher ambient temperature = lower switching point lower ambient temperature = higher switching point		
	on switch head: $t_V = 0.06 \cdot \Delta t$		on capillary: $t_V = 0.33 \cdot \Delta t \cdot m$
	If the operating temperature at the switch head and capillary deviates appreciably from the +22°C calibration ambient temperature, this can, on request, be taken into account during the calibration (at extra cost).		
Permissible ambient temperature	in operation		Permissible storage temperature
	at the switch head and capillary	at the probe	
	max. +100°C / min. -40°C	max. +750°C / min. -40°C	max. +50°C / min. -50°C
Nominal position (NL)	unrestricted		

Housing

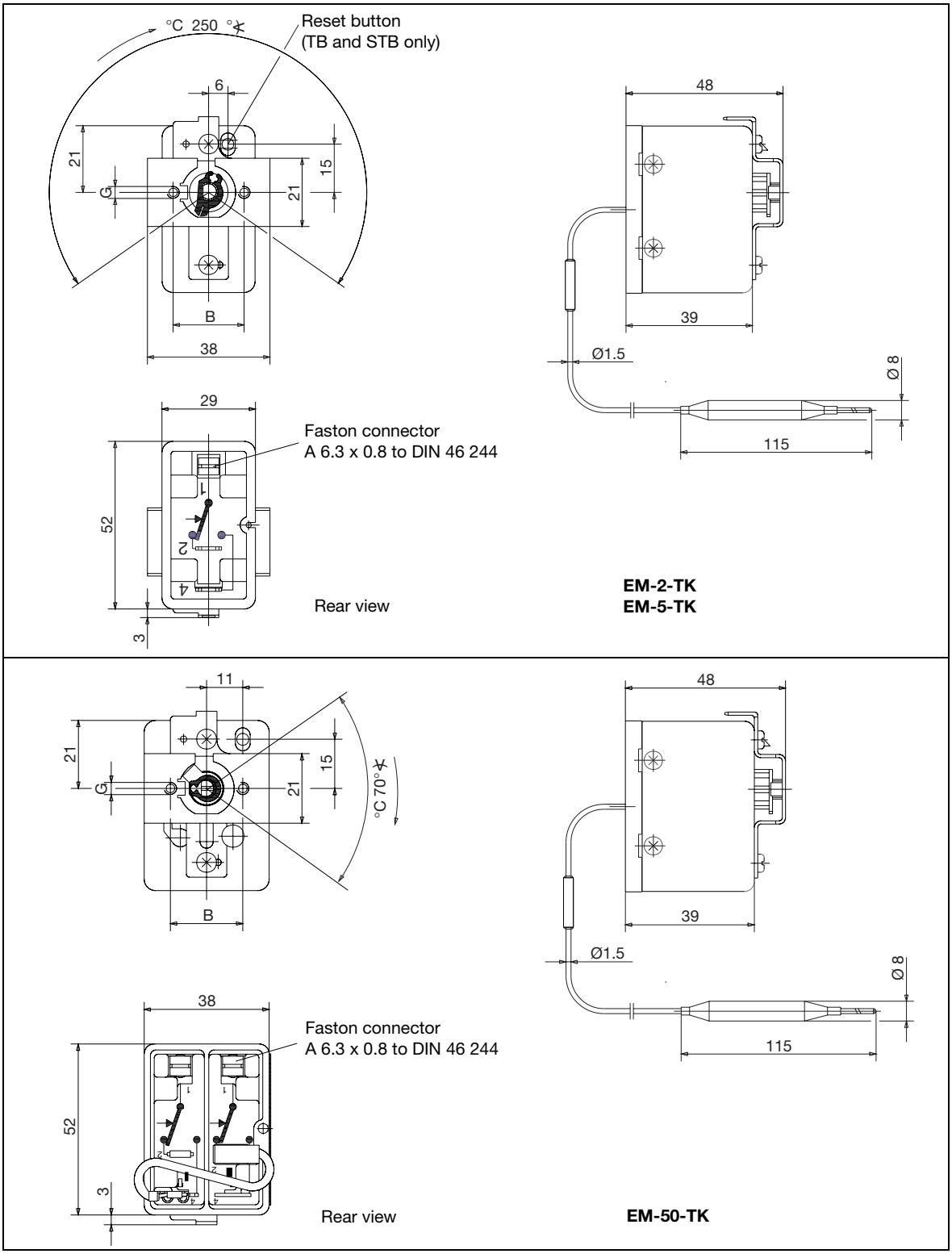
Material	galvanized steel
Fixing	standard: with two M3 screws, 22 mm spacing
	extra code b1: with two M4 screws, 28 mm spacing
	extra code b2: with two M3 screws, 33 mm spacing
	extra code b7: central fixing M10 x 1 with cap nut (TB and STB only)
Limit setting	switching point adjustable with screwdriver
Protection	EN 60 529-IP00
Weight	approx. 0.3 kg

Connection diagrams



EM-2-TK | EM-5-TK | EM-5-TK/U | EM-50-TK | EM-50-TK/U

Dimensions



Extra code	B	G
standard	22 mm	M3
b1	28 mm	M4
b2	33 mm	M3

Order details for EM Series

Stock items

delivery 3 working days after receipt of order

Sales No.	Type	Limit °C	Capillary mm	Process connection	Probe dia. x length mm
60/60003016	EM-2-TK	+230 to +650	2000	A	8 x 115

Non-stock items

Order code		
	(1)	**Basic type**
602025		Panel-mounting thermostat, EM Series up to +650°C
	(2)	**Basic type extension**
02		EM-2-TK temperature monitor
05		EM-5-TK temperature limiter
50		EM-50-TK protection temperatur limiter
	(3)	**Control / limit ranges**
093		+230 to +650°C (TW and TB only)
097		+500 to +650°C (STB only)
	(4)	**Capillary length** (details in mm)
1000		1000 mm
2000		2000 mm
3000		3000 mm
. . . .		(special length, details in plain text)
	(5)	**Process connection ***
10		A = plain cylindrical probe * see Data Sheet 60.6710 for other process connections and pockets (B, C and D only)
	(6)	**Diameter d (probe diameter)**
8		8 mm
	(7)	**Extra codes****
000		no extra code
574		U TB / STB with break contact, lock-out and additional signal contact
699		X screw connection up to 2.5 mm^2 conductor cross-section
704		b1 switch head mounting by 2 M4 screws, 28 mm spacing
705		b2 switch head mounting by 2 M3 screws, 33 mm spacing
710		b7 central fixing with cap nut (TB and STB only)

** List extra codes in sequence, separated by commas

Order code

(1)		(2)		(3)		(4)		(5)		(6)		(8)
602025	/	. .	-	. . .	-	. . . .	-	. .	-	.	/	. . .

Order example

602025	/	50	-	097	-	1000	-	10	-	8	/	710

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Internet: www.JumoUSA.com

Panel-mounting Thermostats Type EM-80

tested to DIN 3440 as STB = Safety temperature limiter, DVGW – approved to EC Gas Appliances Directive (90/396/EEC) and Pressure Equipment Directive 97/23/EC

for stock items see page 4

Brief description

Panel-mounting EM-80 thermostats monitor thermal processes. The instruments can be supplied as safety temperature limiters STB. In fault condition, the STB sets the system being monitored to a safe operational state.
Panel-mounting thermostats operate on the principle of liquid expansion, with a microswitch serving as the electrical switching device.

Switching action

Lock-out facility on the safety temperature limiter STB

When the temperature at the probe exceeds the set limit, the circuit is opened and the microswitch locked out mechanically.
After the temperature has dropped below the critical temperature by about 10 °C, the microswitch can be reset manually.

Self-monitoring on the safety temperature limiter STB

Failure of the measuring system, i.e. a leakage of the expansion liquid, causes the pressure under the diaphragm of the STB to drop, thus permanently opening the circuit. The thermostat cannot be reset now.
If the probe cools down to below about -10°C, the circuit is also opened. As the temperature rises to above -10°C (approx.), the reset is performed automatically.

You will find the Declarations of Conformity on the Internet at:
www.jumo.net
⇨ Products
⇨ Data Sheet 60.2026
or they can be sent to you on request.

Types and approvals

Type	Switching action	DIN Reg. No.	Tests/approvals			DVGW Reg. No.
EM-80 EM-80-TK	STB	STB 82604	DIN Geprüft	Pressure Equipment Directive 97/23/EC CE0036	**DVGW** Gas Appliances Directive 90/396/EEC	CE-0085 AR 0124

Technical data

Limit	+60°C to +180°C according to choice, permanently set in factory

Capillary and temperature probe

Type	Limit	Capillary	Temperature probe	Notes
EM-80	up to 180°C	copper (Cu) 1.5 mm dia. Mat. Ref. Cu-DHP	copper (Cu) Mat. Ref. Cu-DHP brazed	–
	up to 180°C	stainless steel (CrNi) 1.5 mm dia. Mat. Ref. 1.4571	stainless steel (CrNi) Mat. Ref. 1.4571 welded	at extra cost
Capillary length	standard is 1000 mm, max. 5000 mm			
Min. bending radius of capillary	5 mm			
Probe dimensions	Cu 6 mm dia., L ~ 84 mm / CrNi 6 mm dia., L ~ 76 mm			
Perm. temperature at probe	limit +15%			

Electrical data

Switching device	EM-80 (as standard)	EM-80 (extra code U)
	microswitch with break (n.c.) contact and lock-out	microswitch with break (n.c.) contact, lock-out and additional signal contact
Contact rating	10 (2) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25A, 230 V DC +10%	at break (n.c.) contact: 10 (2) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25A, 230 V DC +10%
	microswitch gold-plated, extra code /au 0.1 A, 24 V AC/DC,	at make (n.o.) contact: 2 (0.4) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25A, 230 V DC +10%
Contact reliability	To ensure maximum switching reliability, we recommend a minimum loading of: with silver contacts: AC/DC = 24 V, 20 mA	with gold-plated contacts (code “au”): AC/DC = 10 V, 10 mA
Rated surge voltage	1500 V (via switching contacts: 400 V)	
Overvoltage category	II	
Required fusing	see Contact rating	

Operating data

Switching point accuracy	at limit +0/-5 °C
Effect of ambient temperature referred to limit	A deviation of the ambient temperation at the thermostat head from the +22°C calibration ambient temperature produces a displacement of the switching point: higher ambient temperature = lower switching point lower ambient temperature = higher switching point
	effect on thermostat head: 0.35 °C per °C
	effect on capillary: 0.07 °C per °C per meter
	If the ambient temperature differs appreciably from the +22°C calibration temperature, this can, on request, be allowed for during calibration (at extra cost).
Temperature compensation	extra code TK Please refer to the diagram on page 3 for more details.
Permissible storage temperature	- 50 to +50°C
Permissible ambient temperature in operation at head and capillary	max. +80°C min. +18°C (- 40°C with extra code TK)
Nom. position (NL)	unrestricted

Thermostat head

Chassis	galvanized steel sheet
Fixing	standard: central fixing M 10 x 1 with cap nut
	extra code b1 with 2 M4 screws , 28 mm spacing extra code b2 with 2 M3 screws, 33 mm spacing extra code b3 with 2 M3 screws, 22 mm spacing
Electrical connection	standard: faston connector A 6.3 x 0.8 mm (DIN 46244), extra code X: screw connection up to 2.5 mm^2 conductor cross-section
Limit setting	The limit is permanently factory-set, according to customer requirements
Enclosure protection	EN 60 529-IP00
Weight	approx. 0.3 kg

Process connection

Type EM-80 with capillary	plain cylindrical probe A
	see Data Sheet 60.6710 for other process connections and pockets

⚠ Note

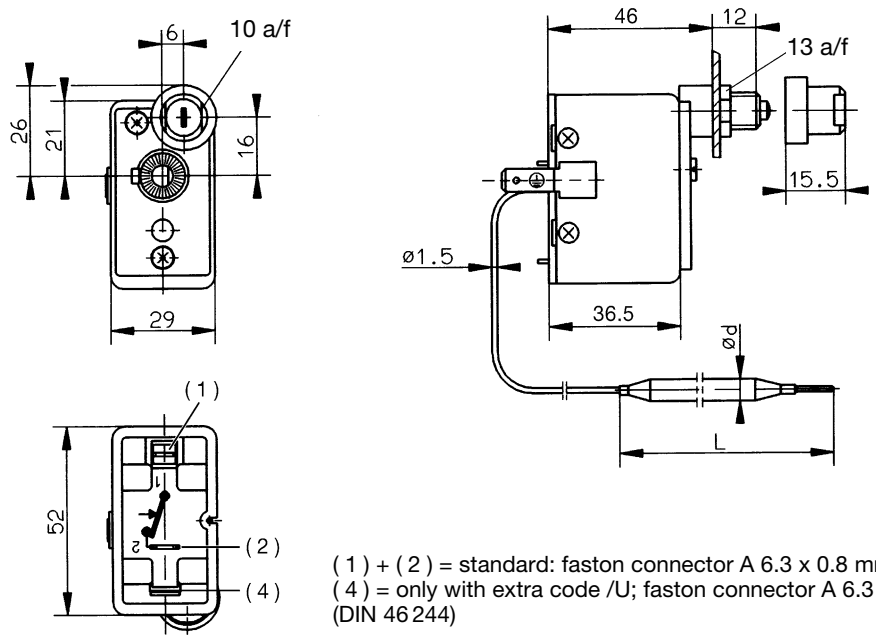
Physical and toxicological properties of the expansion media that may escape in the event of a system fracture.

Limit	Dangerous reactions	Fire/explosion hazard		Water contamination	Toxicological data		
		Ignition temperature	Explosion limit		irritant	danger to health	toxic
≤ +180°C	no	+ 355°C	0.6 - 8 % v/v	yes	yes	[1]	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.

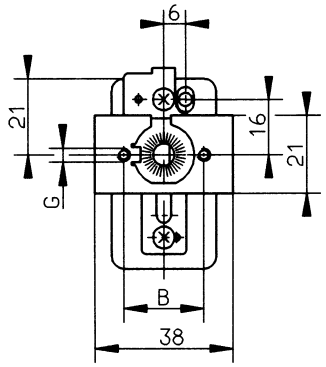
Dimensions

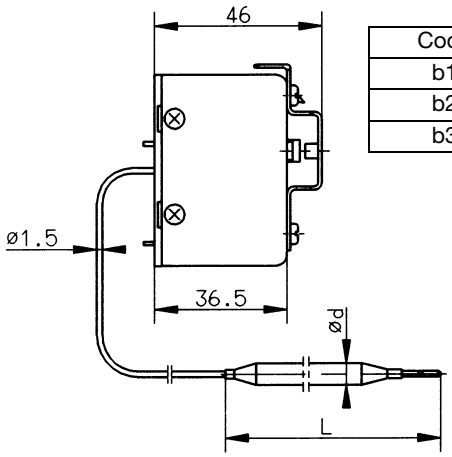
EM-80 with central fixing (standard)



(1) + (2) = standard: faston connector A 6.3 x 0.8 mm (DIN 46 244)
(4) = only with extra code /U; faston connector A 6.3 x 0.8 mm (DIN 46 244)

EM-80 with fixing bracket (extra code b1, b2, b3)





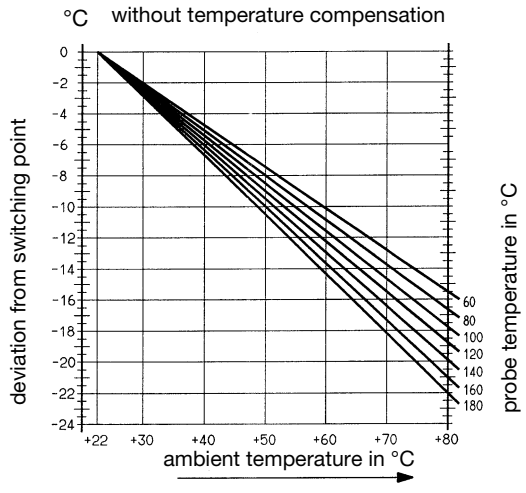
Code	B	G
b1	28	M4
b2	33	M3
b3	22	M3

Temperature compensation (TK)

If the temperature at the thermostat head deviates from the +22°C calibration ambient temperature, this will result in a displacement of the switching point. With ambient temperatures that fluctuate considerably, it is advisable to use thermostats with temperature compensation (code TK).

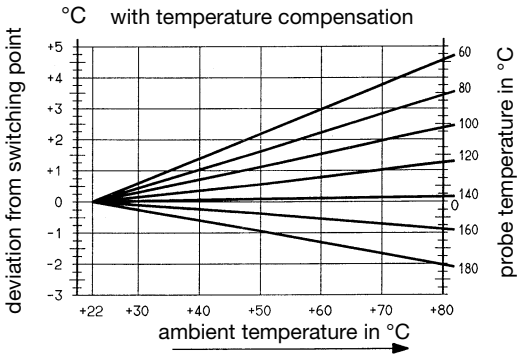
EM-80 *without* temperature compensation

Switching point deviation as a function of ambient temperature at the thermostat head, taking into account the probe temperature.



EM-80/TK *with* temperature compensation

Switching point deviation as a function of ambient temperature at the thermostat head, taking into account the probe temperature.
The temperature error at the capillary has not yet been allowed for, and may introduce an additional error of approx. 0.07°C per °C per meter.



Order details: Type EM-80

Stock items

delivery 3 working days after receipt of order

Sales No.	Type	Limit °C	Capillary mm	Process connection	Probe dia. x length mm
60/60000775	EM-80	+ 110	1000	A	6 x ~ 84
60/60000753	EM-80	+ 95			

Non-stock items

Order code		
	(1)	**Basic type**
602026		Panel-mounting thermostat, EM series
	(2)	**Basic type extension**
80		EM-80 Safety temperature limiter with break (n.c.) contact and capillary
	(3)	**Limit**
95		+ 95°C
100		+100°C
110		+110°C
120		+120°C
		Other limits, selectable between +60 and +180°C, can be permanently factory-set (details in plain text)
	(4)	**Capillary length** (in mm)
1000		1000 mm
2000		2000 mm
3000		3000 mm
4000		4000 mm
5000		5000 mm
. . . .		(special length, details in plain text)
	(5)	**Material of capillary**
40		Cu (copper)
20		CrNi (stainless steel 1.4571))
	(6)	**Process connection***
10		A = plain cylindrical probe 
99		* for other process connections and pockets, see Data Sheet 60.6710 (details in plain text)
	(7)	**Diameter d (probe diameter)**
6		6 mm
	(8)	**Extra codes**
000		no extra code
574		**U** STB with break (n.c.) contact, lock-out and additional signal contact
702		**au** snap-action switch contact gold-plated (only on STB with break (n.c.) contact)
699		**X** screw connection up to 2.5 mm^2 conductor cross-section
704		**b1** thermostat head fixing by 2 M4 screws, 28 mm spacing
705		**b2** thermostat head fixing by 2 M3 screws, 33 mm spacing
706		**b3** thermostat head fixing by 2 M3 screws, 22 mm spacing
707		**TK** temperature compensation

Order code

(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)
602026	/	. .	-	. . .	-	. . . .	-	. .	-	. .	-	.	/	. . .

Order example

602026	/	80	-	120	-	2000	-	20	-	10	-	6	/	000

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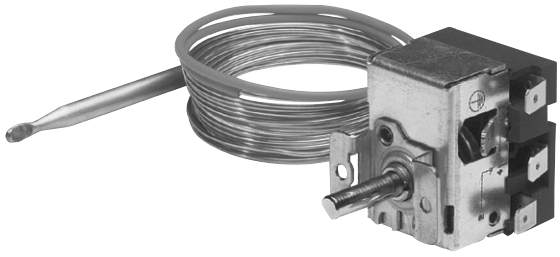
JUMO heatTHERM

Type 602030/01

- **temperature controller, as a panel-mounting thermostat**
- **compensated for ambient temperature**
- **tested to DIN 3440**



Brief description

Thermostats control and monitor thermal processes.
The JUMO heatTHERM Type 602030/01 is a temperature controller TR.

The panel-mounting thermostat operates on the principle of liquid expansion, with a snap-action switch serving as the electrical switching device.

Switching action

Temperature controller TR

When the temperature at the probe exceeds the selected setpoint, the snap-action switch is operated through a mechanism and the circuit is opened or closed. When the temperature falls below the selected setpoint (by the amount of the switching differential), the snap-action switch returns to its initial position.

Temperature compensation

A deviation of the ambient temperature at the thermostat head and capillary from the +22°C calibration ambient temperature will result in a shift of the switching point. This shift is reduced to a minimum thanks to temperature compensation.

Approvals

DIN Reg. No.	Tests			
TR 116804	VDE [3]	DIN Geprüft	ISP ESL [1 2]	You will find the Declarations of Conformity on the Internet at: www.jumo.net or they will be sent to you on request.

[1] applied for
[2] setpoint range limited to 90°
[3] mode of operation as per EN 60 730-2-9: Type 1 BL

Technical data

Control ranges and temperature probe

Control range in °C	Max. permissible probe temperature in °C	Probe length L in mm probe dia. d = 6 mm
+20 to + 90	+115	79
+30 to +110	+135	72
+20 to +120	+145	62

Capillary and temperature probe

Capillary	Temperature probe	Notes
copper (Cu) 1.25 mm dia. Mat. Ref. 2.0090	copper (Cu) 6 mm dia. Mat. Ref. 2.0090, brazed	450 mm insulated, starting from housing

Capillary length	standard is 2500 mm, minimum 500, maximum 3500 mm
Minimum bending radius of capillary	5 mm

Electrical data

Switching device	snap-action switch with single-pole changeover contact
Max. contact rating	at break contact (contacts 1-2): 16 (2.5) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25A, 230 V DC +10% at make contact (contacts 1-4): 6.3 (2.5) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25A, 230 V DC +10%

Operating data

Switching differential of setpoint range	5 to 11 %
Switching point accuracy of setpoint range	in upper third of setpoint range +2/-3 %, at start of setpoint range ±5 %
Ambient temperature effect	A deviation of the ambient temperature at thermostat head and capillary from the +22 °C calibration ambient temperature will produce a switching point shift of ±0.1 $^{°C}/_{°C}$ max.
Permissible storage/ transport temperature	-50 to +50 °C
Permissible ambient temperature in operation	+80°C max.
Nominal position (NL)	unrestricted

Thermostat head

Material	housing: sheet steel, zinc-plated base: polyester resin compound, black
Fixing	2 screws M 4, spacing 28 mm
Scale span	250° ∢
Electrical connection	faston connector A 6.3 x 0.8 (DIN 46244)
Protection	EN 60 529-IP00
Weight	approx. 0.12 kg

Process connection

Without protection tube	plain cylindrical probe A, 6 mm dia.

Accessories

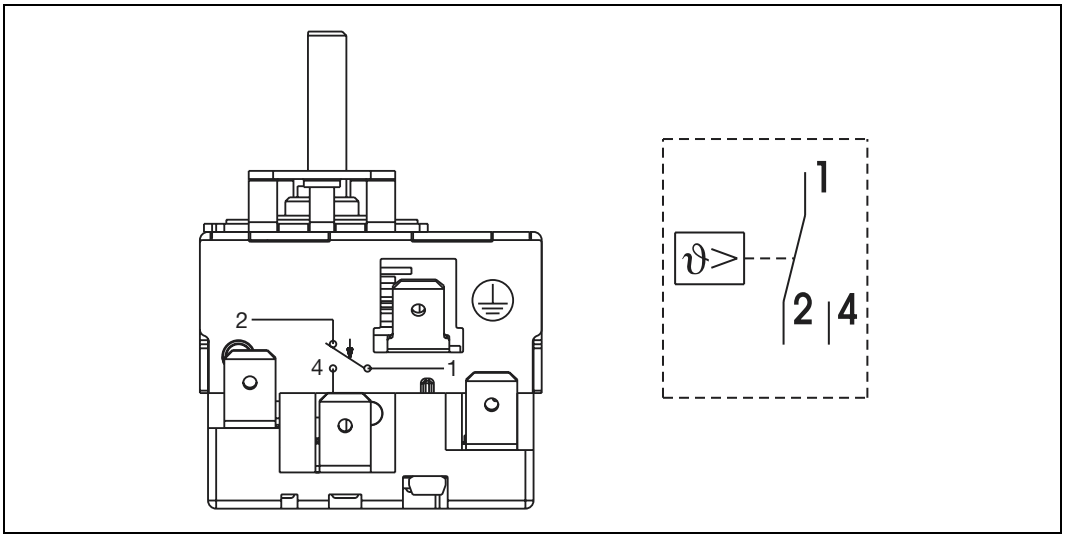
Setpoint adjuster	type W8 to Data Sheet 60.6715
Protection tube	protection tube U to Data Sheet 60.6710

Note

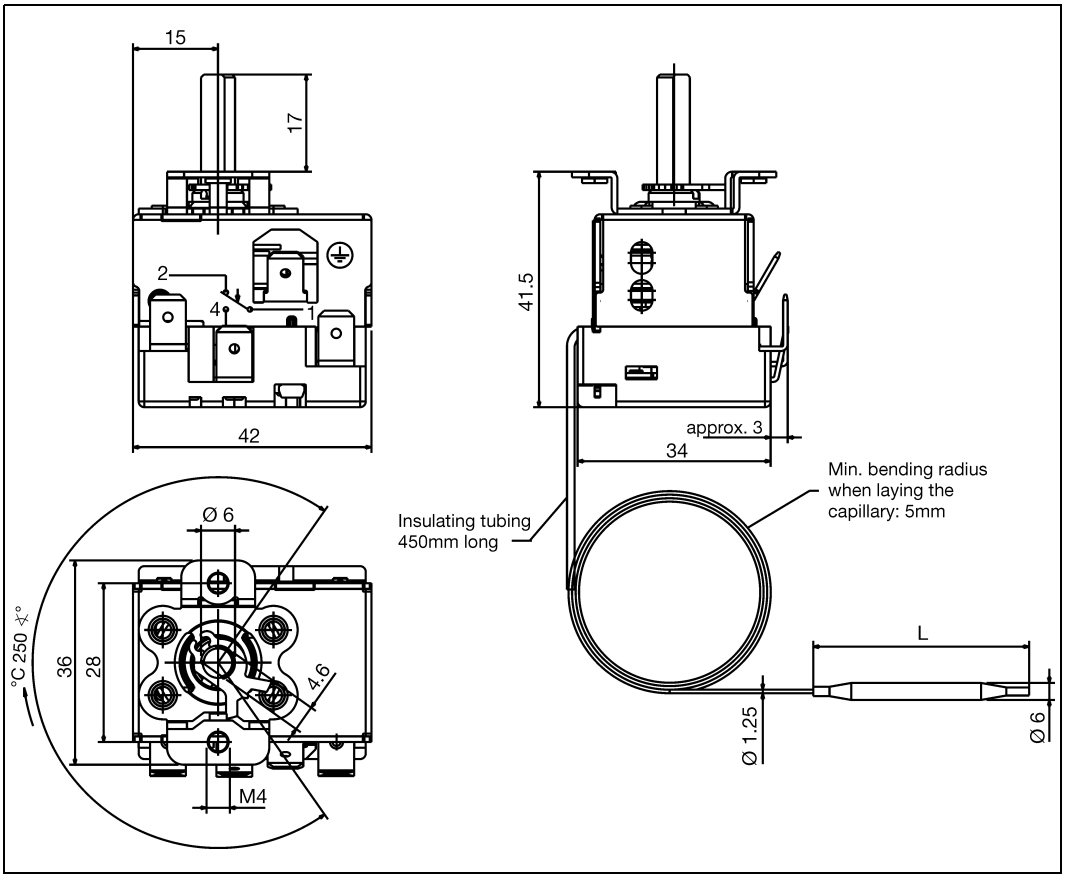
Physical and toxicological properties of the expansion media that may leak in the event of a measurement system fracture.

Dangerous reactions	Ignition temperature	Water contamination	Toxicological data		
			irritant	danger to health	toxic
no	+375 °C	Class 1 mildly contaminant	no	no	no

Connection diagram



Dimensions



Order details

Panel-mounting thermostat JUMO heatTHERM Type 602030

Order code		
	(1)	**Basic type**
602030		panel-mounting thermostat JUMO heatTHERM with single-pole snap-action switch
	(2)	**Basic type extension**
01		temperature controller (TR) with changeover contact
	(3)	**Control ranges**
041		+20 to + 90°C
052		+30 to +110°C
042		+20 to +120°C
	(4)	**Capillary length**
1000		1000 mm
2000		2000 mm
2500		2500 mm
. . . .		(special length, details in plain text, in 500 mm steps)
	(5)	**Process connection (PA)**
10		A = plain cylindrical probe 
	(6)	**Diameter d (probe diameter)**
6		6 mm
	(7)	**Extra codes**
000		no extra code
513		ISPESL approval (control range limited to 90°C)

Order code

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

Order example

602030	/	01	-	52	-	2500	-	10	-	6	/	000

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JUMO heatTHERM

Type 602031/80

- ❑ **Protection temperature limiter, as a panel-mounting thermostat**
- ❑ **compensated for ambient temperature**
- ❑ **tested to DIN 3440 and Pressure Equipment Directive 97/23/EC**

Brief description

Thermostats control and monitor thermal processes. The JUMO heatTHERM Type 602031/80 is a protection temperature limiter STB.

The panel-mounting thermostat operates on the principle of liquid expansion, with a snap-action switch serving as the electrical switching device.

Switching action

Protection temperature limiter STB
with lock-out and self-monitoring facility

When the temperature at the probe exceeds the set limit, the snap-action switch is operated through a mechanism, the circuit is opened and the snap-action switch is locked out mechanically.

After the temperature has fallen below the limit temperature by about 15°C, the snap-action switch can be reset manually.

Failure of the measuring system, i.e. a leakage of the expansion liquid, will cause the pressure under the diaphragm to drop, thus permanently opening the circuit. The thermostat can no longer be reset.

When the probe cools down to below -20°C (approx.), the same circuit will open, but will close again when the temperature rises.

Temperature compensation

A deviation of the ambient temperature at the thermostat head and capillary from the +22°C calibration ambient temperature will result in a switching point displacement. Temperature compensation will reduce this switching point displacement to a minimum.

Approvals

DIN Reg. No.	Tests				
STB 116904	VDE [3]	DIN Geprüft	PED 97/23/EC	ISP ESL [1] [2]	You will find the Declarations of Conformity at: www.jumo.net or ask for them to be sent.

[1] applied for
[2] limit restricted to 100°C
[3] mode of operation as per EN 60 730-2-9: Type 2BFHKLP

Technical data

Limits, limit setting and temperature probe

Limit setting
Using a screwdriver, set the limit on the limit adjuster to the notch position before installation.
(basic factory setting: +100°C)

Limit * in °C	Limit setting	Maximum permissible probe temperature in °C	Probe length dimension "L" at a probe dia. "d"= 6 mm in mm
+95 to +120	adjustable, notch positions at: +95, +100, +110, +120	+145	72
+ 95	permanently set		
+100			
+110			
+120			

*other limits (up to +180°C) on request!

Capillary and temperature probe

Capillary	Temperature probe	Notes
copper (Cu) 1.25 mm dia. Mat. Ref. 2.0090	copper (Cu) 6 mm dia. Mat. Ref. 2.0090, brazed	450 mm insulated, starting from housing

Capillary length	standard is 2500 mm, min. 500, max. 3500 mm
Minimum bending radius of capillary	5 mm

Electrical data

Switching device	snap-action switch with single-pole break contact, lock-out and signal contact
Contact rating	at break contact (contacts 1-2): 16 (2.5) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25A, 230 V DC +10% at signal contact (contacts 1-4): 2 (0.4) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25A, 230 V DC +10% snap-action switch gold-plated — extra code 702: 0.1A, 24 V AC/DC

Operating data

Switching point accuracy	+0/-5K
Ambient temperature effect	A deviation of the ambient temperature at the thermostat head and capillary from the +22°C calibration ambient temperature will result in a switching point displacement of -0.1 $^{K}/_{K}$ max. (measured at the +120°C fixed limit with a capillary length of 3000 mm)
Permissible storage/ transport temperature	-50 to +50°C
Permissible ambient temperature in operation	max. +80°C
Nominal position (NL)	unrestricted

Thermostat head

Material	housing: sheet steel, zinc-plated base: polyester resin compound, black
Fixing	M 10x1, with hexagon nut and protective cap
Electrical connection	faston connector A 6.3 x 0.8 (DIN 46244)
Protection	EN 60 529-IP00
Weight	approx. 0.12 kg

Process connection

Without pocket	plain cylindrical probe A 6 mm dia.

Accessory

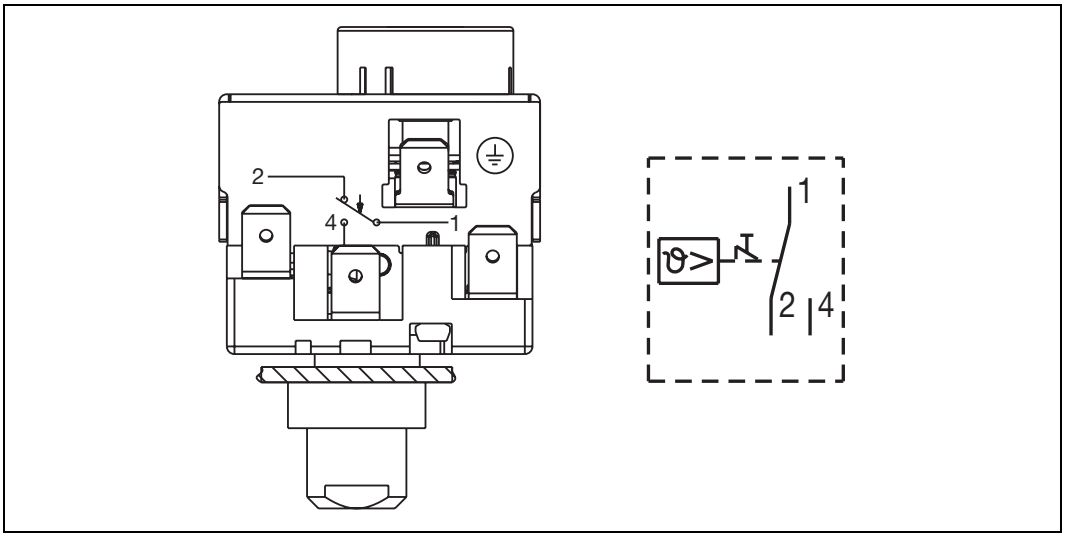
Protection tube	protection tube U to Data Sheet 60.6710

Note

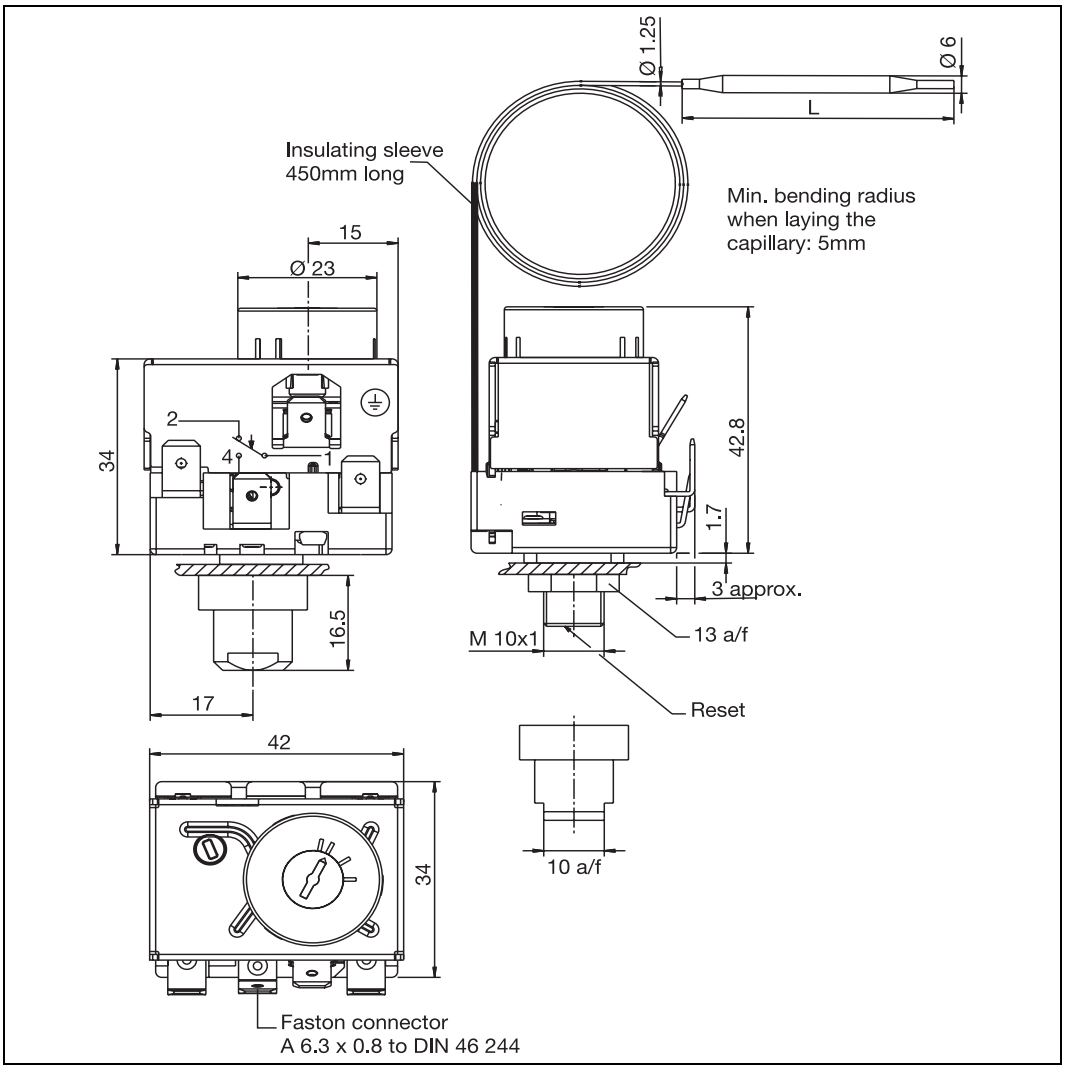
Physical and toxicological properties of the expansion medium that may escape in the event of a system fracture.

Dangerous reactions	Ignition temperature	Water contamination	Toxicological data		
			irritant	danger to health	toxic
no	+375 °C	Class 1 mildly contaminant	no	no	no

Connection diagram



Dimensions



Order details

Panel-mounting thermostat JUMO heatTHERM Type 602031

Order code			(1)	Basic type
		602031		Panel-mounting thermostat JUMO heatTHERM with single-pole snap-action switch
			(2)	**Basic type extension**
X		80		Protection temperature limiter (STB), permanently set, with n.c. (break) contact, lock-out and signal contact
	X	81		Protection temperature limiter (STB), adjustable, with n.c. (break) contact, lock-out and signal contact
			(3)	**Limit**
X		095		+ 95°C
X		100		+100°C
x		110		+110°C
X		120		+120°C
	X	666		adjustable (notch positions at 95, 100, 110 and 120°C)
			(4)	**Capillary length**
X	X	1000		1000 mm
X	X	2000		2000 mm
X	X	2500		2500 mm
X	X	3000		3000 mm
X	X	. . . .		special length (details in plain text — 500 mm steps)
			(5)	**Process connection (PA)**
X	X	10		A = plain cylindrical probe 
			(6)	**Diameter d (probe dia.)**
X	X	6		6 mm
			(8)	**Extra codes**
X	X	000		no extra code
X	X	513		ISPESL approval (limit value restricted to 100°C)
X	X	702		snap-action switch contact, gold-plated

Order code

(1)		(2)		(3)		(4)		(5)		(6)		(8)
602031	/	. .	-	. . .	-	. . . .	-	. .	-	.	/	. . .

Order example

602031	/	81	-	666	-	2500	-	10	-	6	/	000[1]

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

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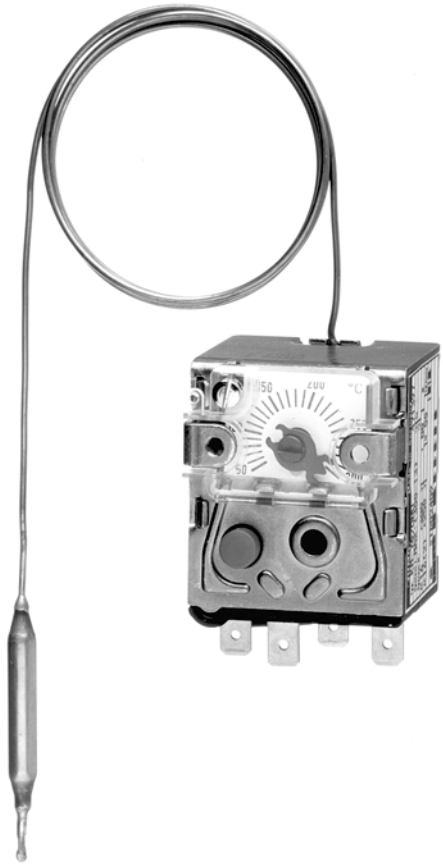
for stock items see page 5

Panel-mounting Thermostats KM-70 Series

Version to DIN 3440 and Pressure Equipment Directive 97/23/EC



Brief description

Panel-mounting thermostats monitor thermal processes. The thermostats are available as protection temperature limiters. In fault condition, the STB sets the system being monitored to a safe operational state.
Panel-mounting thermostats operate on the principle of liquid expansion, with a microswitch serving as the electrical switching device.

Switching action

Lock-out facility on the protection temperature limiter STB

When the temperature at the probe exceeds the set limit, the circuit is opened and the microswitch locked out mechanically.
After the temperature has dropped below the danger temperature by about 10 % of the span, the microswitch can be reset manually.

Self-monitoring facility on the protection temperature limiter STB

Failure of the measuring system, i.e. a leakage of the expansion liquid, causes the pressure under the diaphragm of the STB to drop, thus permanently opening the circuit. A reset is now impossible.
If the probe cools down to below -20°C (approx.), the circuit is also opened. As the temperature rises above -20°C (approx.), the STB has to be reset manually, by pressing the reset button.

Types and approvals

Type	Switching action	DIN Reg. No.	Tests /approvals			DVGW Reg. No.	The Declarations of Conformity are available on the Internet under: www.jumo.net ⇒ Products ⇒ Thermostats ⇒ Data Sheet 60.2045 **or** can be sent to you on request.
KM-70	STB	STB 82404	DIN Geprüft	Pressure Equipment Directive 97 / 23 / EC CE0036	**DVGW** Gas Appliances Directive 90/396/EEC	CE-0085 AR 0125	

Technical data

Control ranges and temperature probe

liquid-filled					
Type	**Control / limit ranges °C**	**Max. permissible probe temperature °C**	**Maximum capillary length mm**	**Probe length "L" in mm probe dia. "d" in mm, dia. 6 = standard**	
				6	**8**
KM-70	0 to + 50	60		163	104
	0 to +100	115		98	70
	+30 to +110	130		115	79
	+20 to +120	140		97	70
	+60 to +130	150	5000	125	84
	+20 to +150	175		82	62
	+50 to +200	230		83	59
	+50 to +250*	290		67	51
	+50 to +300*	345		57	- - -

* Probe material stainless steel only

Capillary and temperature probe

Type	**End of scale**	**Capillary**	**Temperature probe**	**Notes**
KM- . .	up to 200 °C	copper (Cu) 1.5 mm dia. Mat. Ref. 2.0090	copper (Cu) Mat. Ref. 2.0090 brazed	–
	up to 350 °C	copper (Cu) 1.5 mm dia. Mat Ref. 2.0090	stainless steel (CrNi) Mat. Ref. 1.4571 brazed	–
	up to 350 °C	stainless steel (CrNi) 1.5 mm dia. Mat. Ref. 1.4571	stainless steel (CrNi) Mat. Ref. 1.4571 welded	at extra cost
Capillary length	1000 mm standard, 5000 mm max.			
Min. bending radius of capillary	5 mm			

Electrical data

Switching device	KM-70	KM-70
	Code O: microswitch with break contact and lock-out	Code U: microswitch with break contact, lock-out and additional signal contact
Rating	16 A, 400 V AC +10% 16 (2) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25 A, 230 V DC +10%	on break contact: 16 A, 400 V AC +10% 16 (2) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25 A, 230 V DC +10% on make contact: 2 A, 400 V AC +10% 2 (1) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25 A, 230 V DC +10%

Operating data

Switching point accuracy in % of control / limit range	in upper third of scale +0/-5%, at start of scale +0/-10%	
Ambient temperature error referred to control / limit range	Deviation of the ambient temperature at the case from the calibration ambient temperature 22 °C produces a displacement of the switching point: higher ambient temperature = lower switching point lower ambient temperature = higher switching point	
	panel-mounting thermostats with end of scale	
	< 200 °C	≥ 200 °C ≤350 °C
	on thermostat head, % per °C	
	0.17	0.13
	on capillary, % per °C per m length	
	0.054	0.11
Permissible storage temperature	-50 to +50 °C	
Permissible ambient temperature in operation	+80 °C max.	
Nom. position (NL)	unrestricted	

Thermostat head

Case material	zinc-plated steel
Fixing	2 screws M 4, spacing 28 mm
Scale span	250° ∢
Electrical connection	standard: faston connectors A 6.3 x 0.8 mm (DIN 46244), Code X: screw terminals up to 2.5 mm^2 conductor cross-section
Limit setting	The limit can be set prior to installation, using a screwdriver on the setting spindle
Protection	EN 60 529-IP00
Weight	approx. 0.3 kg

Process connection

Series KM- with capillary	plain cylindrical probe A
	for other process connections and pockets, see Data Sheet 60.6710.

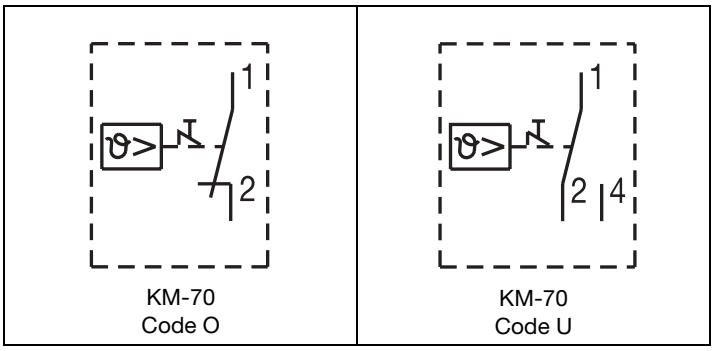
Note

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

Control range with end of scale	Dangerous reactions	Fire/explosion hazard		Water contamination	Toxicological data		
		Ignition temperature °C	Explosions limit % v/v		irritant	danger to health	toxic
< +200 °C	no	+ 355	0.6 — 8	yes	yes	[1]	no
≥ 200 °C ≤+350 °C	no	+ 490	- -	yes	yes	[1]	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.

Connection diagrams

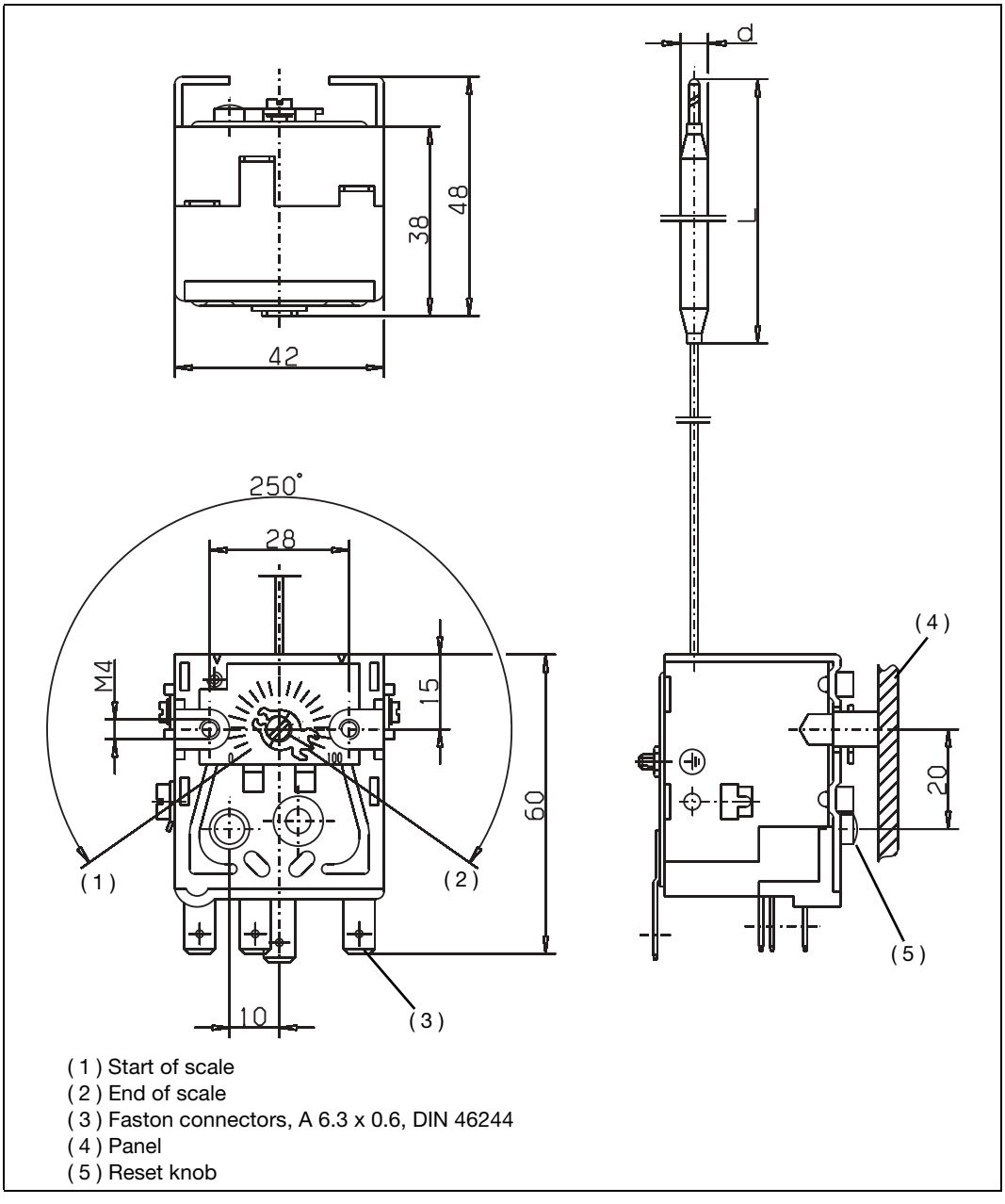


KM-70
Code O

KM-70
Code U

Dimensions

Type
KM-70



(1) Start of scale
(2) End of scale
(3) Faston connectors, A 6.3 x 0.6, DIN 46244
(4) Panel
(5) Reset knob

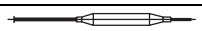
Order details: KM series

Available from stock

(delivery: 3 working days after receipt of order)

Sales No.	Type	Control / limit range	Switching differential	Capillary mm	Process connection	Probe dia. x length mm
60/60001545	KM-70/U	+20 to +150°C	—	1000	A	6 x 82
60/60001544	KM-70/U	+50 to +300°C	—	1000	A	6 x 57

Not available from stock

Order code		
	(1)	**Basic type**
602045		Panel-mounting thermostat, KM series
	(2)	**Basic type extension**
70		KM-70 Protection temperature limiter with n.c. (break) contact and capillary
	(3)	**Control / limit ranges**
021		0 to + 50°C
025		0 to +100°C
052		+30 to +110°C
042		+20 to +120°C
066		+60 to +130°C
043		+20 to +150°C
062		+50 to +200°C
063		+50 to +250°C
064		+50 to +300°C
	(4)	**Capillary length** (mm)
1000		1000 mm
2000		2000 mm
3000		3000 mm
4000		4000 mm
5000		5000 mm
. . . .		(special length, details in plain text)
	(5)	**Material of capillary**
40		Cu (copper)
20		CrNi (stainless steel 1.4571)
	(6)	**Process connection (PA) ***
10		A = plain cylindrical probe 
99		* for other types of connection and pockets, see Data Sheet 60.6710 (details in plain text).
	(7)	**Diameter D (probe dia.)**
6		6 mm
8		8 mm
	(8)	**Extra codes**
000		no extra code
574		**U** STB with break contact, lock-out and additional signal contact

Order code

(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)
602045	/	. .	-	. . .	-	. . . .	-	. .	-	. .	-	.	/	. . .

Order example

602045	/	70	/	064	-	2000	-	20	-	10	-	6	/	574

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for stock items see pages 7-9

Surface-mounting Thermostats ATH Series

Series IP54

Brief description

Thermostats control and monitor thermal processes. Thermostats in the ATH series can be supplied as temperature controllers TR, temperature monitors TW, temperature limiters TB, safety temperature monitors STW (STB) and safety temperature limiters STB. In fault condition, the STB sets the system being monitored to a safe operational state.
Surface-mounting thermostats operate on the principle of liquid expansion, with a microswitch serving as the electrical switching device.

ATHs-1

Switching function

Temperature controller TR and temperature monitor TW
When the temperature at the probe exceeds the set limit, the microswitch is operated through the mechanism and the circuit is opened or closed. When the temperature has fallen below the set limit (by the switching differential), the microswitch returns to its initial position.

Lock-out facility
on the temperature limiter TB and safety temperature limiter STB
When the temperature at the probe exceeds the set limit, the circuit is opened and the microswitch is locked out mechanically.
After the temperature has dropped below the safe temperature limit by about 10 % of span (about 15% for limit setting >+350°C), the microswitch can be reset manually.

Use of the safety temperature monitor STW as safety temperature limiter STB
The circuitry to which the thermostat is connected must comply with DIN 3440 and VDE 0116.

Self-monitoring on the safety temperature limiter STB
and safety temperature monitor STW (STB)
In the case of the STB and STW (STB), failure of the measuring system, i.e. a leakage of the expansion fluid, will cause the pressure under the diaphragm to drop, thus permanently opening the circuit. A reset is now impossible.
If the temperature at the probe cools down to below -20°C, the circuit will also be opened. As the temperature rises to above -20°C, the STB has to be reset manually, by pressing the reset button. On the STW (STB), the reset is performed automatically.

ATHf-70/g

Types and approvals

Types		Switching function	DIN Reg. No.	Tests	
with rigid stem	with capillary				You will find the Declarations of Conformity on the Internet at: www.jumo.net ⇛ Products ⇛ Thermostats ⇛ Data Sheet 60.3021 **or** they can be sent to you on request.
ATH**s**-1	ATH**f**-1	TR	TR 89 101	DIN Geprüft - DIN 3440 - Pressure Equipment Directive 97/23/EC (ATH.-20 and ATH.-70 only)	
ATH**s**-2	ATH**f**-2	TW	TW 89 201		
ATH**s**-7	ATH**f**-7	TB	TB 89 301		
ATH**s**-20	ATH**f**-20	STW (STB)	STW (STB) 89 401 S		
ATH**s**-70	ATH**f**-70	STB	STB 89 501		

Technical data

Control ranges and temperature probes

liquid-filled					
Type	**Control / limit ranges in °C**	**Max. permissible probe temperature in °C**	**Maximum capillary length in mm**	**Probe length "L" in mm probe dia. "d" in mm, dia. 6 is standard**	
				6	**8**
ATH.-1	-20 to + 50	60	5000	141	92
ATH.-2	-10 to + 40	50		185	115
ATH.-7	0 to + 50	60		185	115
	0 to + 70	80		138	91
	0 to +100	125		107	75
	+20 to + 90	115		138	91
	+30 to +110	135		125	84
	+20 to +120	140		106	75
	+60 to +130	150		135	90
	+20 to +150	175		88	65
	+50 to +200	230		101	72
	+50 to +250	290		73	54
	+50 to +300	345		63	49
	+50 to +350	405		53	- - -
ATH.-20	+30 to +110	135	5000	108	75
ATH.-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					
ATH.-1	+20 to +400	460	1000	278	158
ATH.-2	+20 to +500	550	2000	148	92
ATH.-7	+20 to +500	550	4000	202	119
ATH.-20	+20 to +400	460	1000	176	106
ATH.-70	+20 to +500	550	2000	127	81
	+20 to +500	550	4000	202	119

Capillaries and temperature probes

Type	**End of scale**	**Capillary**	**Temperature probe**	**Note**
ATH.- . .	up to 200 °C	copper (Cu) 1.5 mm dia. Mat. Ref. Cu-DHP	copper (Cu) Mat. Ref. Cu-DHP brazed	–
	up to 350 °C	copper (Cu) 1.5 mm dia. Mat. Ref. Cu-DHP	stainless steel (CrNi) Mat. Ref. 1.4571 brazed	–
	up to 500 °C	stainless steel (CrNi) 1.5 mm dia. Mat. Ref. 1.4571	stainless steel (CrNi) Mat. Ref. 1.4571 welded	–
	up to 350 °C	stainless steel (CrNi) 1.5 mm Mat. Ref. 1.4571	stainless steel (CrNi) Mat. Ref. 1.4571 welded	at extra charge
Capillary length	standard is: 1000 mm, max. 5000 mm			
Min. bending radius of capillary	5 mm			

Electrical data

Switching device	ATH.-1 ATH.-2 ATH.-20	ATH.-7 ATH.-70	ATH.-7/U ATH.-70/U
	microswitch with changeover contact	microswitch with break contact and lock-out	microswitch with break contact, lock-out and additional signal contact
Max. rating	10 (2) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25A, 230 V DC +10%		
	with differential 1.5% und 2% 6 (1.2) A, 230 V AC +10%, p.f. = 1 (0.6)	–	–
	microswitch gold-plated, code /au* (*only with switching differential 3%, 5%, 7%) 0.1 A, 24 V AC / DC +10%, contact resistance 2.5 — 10 mΩ		–

Operating data

Switching differential in % of control / limit range	Switching function	liquid-filled measuring system		
		Nominal value	Possible actual value	
	TR, TW	3	3 max. 4	standard
		6	6 max. 8	on request
		1.5	1 max. 2	at extra charge
		gas-filled measuring system		
		5	4 max. 8	standard
		9	8 max. 12	on request
		2	1.5 max. 2.5	at extra charge
		liquid-filled measuring system		
	STW (STB)	5	4 max. 6	standard
		9	8 max. 11	on request
		2	1 max. 3	at extra charge
		gas-filled measuring system		
		7	5 max. 12	standard
		9	8 max. 16	on request
		2	1.5 max. 3	at extra charge

Switching point accuracy in % of control / limit range	TR: in upper third of scale ± 1.5%, at start of scale ± 6% TW, TB, STB, STW (STB): in upper third of scale +0/-5%, at start of scale +0/-10%					
Ambient temperature error referred to control / limit range	A deviation of the ambient temperature at the housing from the 22° calibration ambient temperature produces a shift in the switching point: higher ambient temperature = lower switching point lower ambient temperature = higher switching point					
	Surface-mounting thermostats with end-of-scale value					
	< 200°C		≥ 200°C ≤350°C		> 350°C ≤500°C	
	TR / TW / TB	STB/STW (STB)	TR / TW / TB	STB/STW (STB)	TR / TW / TB	STB/STW (STB)
	due to thermostat head					
	0.08%/°C	0.17%/°C	0.06%/°C	0.13%/°C	0.14%/°C	0.12%/°C
	due to capillary per meter length					
	0.047%/°C	0.054%/°C	0.09%/°C	0.11%/°C	0.04%/°C	0.03%/°C
Permissible storage temperature	-50 to +50°C					
Permissible ambient temperature in operation	+80°C max.					
Nominal position (NL)	to DIN 16 257, NL 0 — NL 90 (other NL on request)					

Housing

Standard	cover: polycarbonate, impact-resistant base: die-cast aluminium, painted		color: pebble gray RAL 7032 color: anthracite gray RAL 7015
Code **a**	cover: die-cast aluminium, painted		color: pebble gray RAL 7032
Setpoint adjustment	ATH-1: switching point adjustable from the outside by turning the knob		ATH-2, ATH-20, ATH-7, ATH-70: switching point adjustable by screwdriver after taking off the housing cover
Protection	EN 60 529-IP54		
Cable entry	as standard: clamping gland M20 x 1.5, for 8 — 10 mm cable diameter		
Weight	approx. 0.5 kg		
Thermostat mounting, Series ATH**f**- . . with capillary	**Standard**	thread M 18 x 1 with locknut on housing spigot, capillary exit at spigot	
	Code		
	r	by 2 screws through base of housing, capillary exit on side of housing, cover and base in plastic	
	b	mounting flange in steel, capillary exit at housing spigot	
	k	wall bracket	

Process connection*

Series ATH**s**- with rigid stem	End of scale up to 150°C **Pocket U**	End of scale above 150°C **Pocket UZ**
	screw-in pocket with screw-in spigot G 1/2 Form A to DIN 3852/2	screw-in pocket with screw-in spigot G 1/2 Form A to DIN 3852/2 and extension, in order not to exceed the max. permissible ambient temperature +80°C at the housing
Series ATH**f**- with capillary	**plain cylindrical probe A** (standard)	
	pocket U (on resquet)	
	screw-in pocket with screw-in spigot G 1/2 Form A to DIN 3852/2 and clip with fixing screw for securing the probe	
Material	**Pocket U**	**Pocket UZ**
	up to +150°C CuZn (brass) as standard above +150°C St (steel) as standard (CrNi on request)	above +150°C St (steel) as standard (CrNi on request)
Fitting length S	standard lengths: 100, 120, 150, 200 or 300 mm other lengths on request	
Immersion tube dia.	D = 8 mm, D = 10 mm	

*other process connections and pockets, see Data Sheet 60.6710.

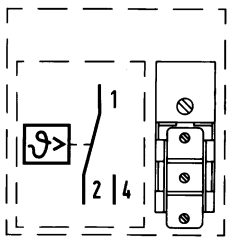
Note:

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

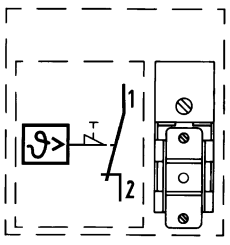
Control range with end of scale	Dangerous reactions	Fire/explosion hazard		Water contamination	Toxicological data		
		ignition temperature	explosion limit % v/v		irritant	danger to health	toxic
< +200 °C	no	+ 355 °C	0.6 — 8	yes	yes	[1]	no
≥ 200 °C ≤ +350 °C	no	+ 490 °C	- -	yes	yes	[1]	no
> 350 °C ≤ +500 °C	no	no	no	no	no	no	no

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

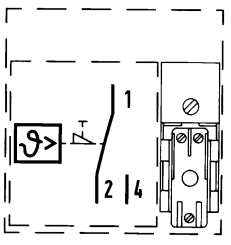
Connection diagrams



ATH.-1
ATH.-2
ATH.-20



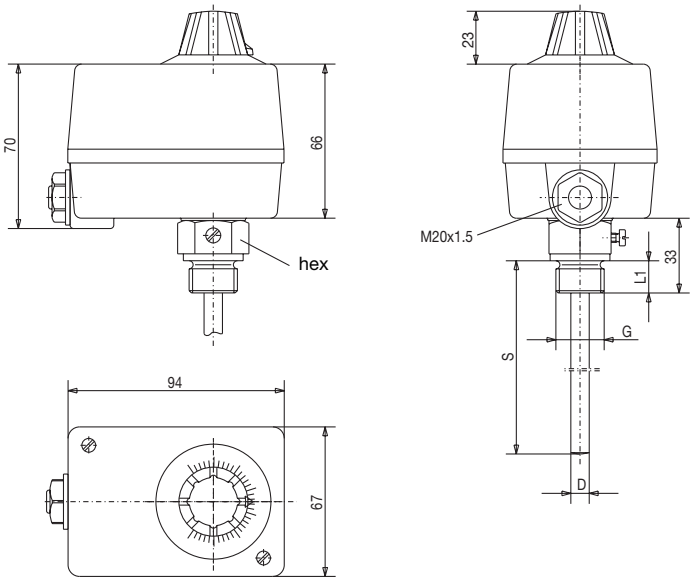
ATH.-7
ATH.-70



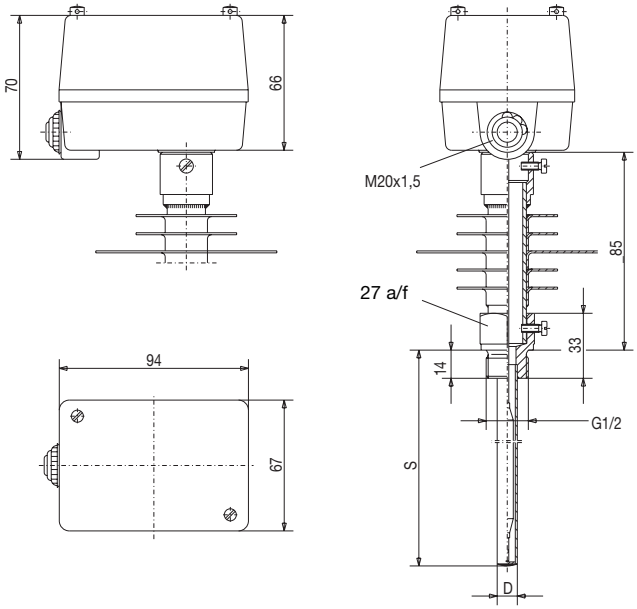
ATH.-7/U
ATH.-70/U

Dimensions

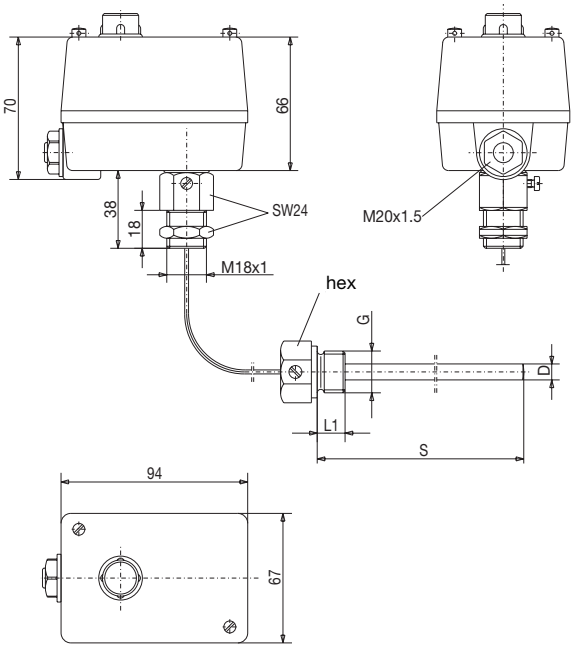
ATHs-1,
with pocket U

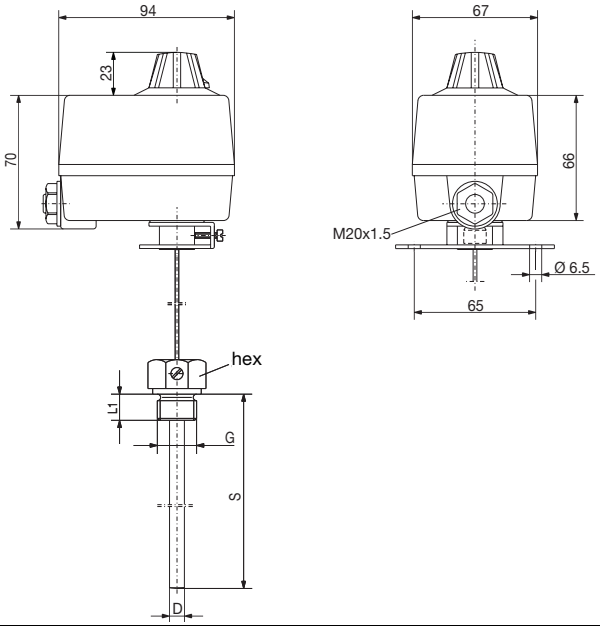
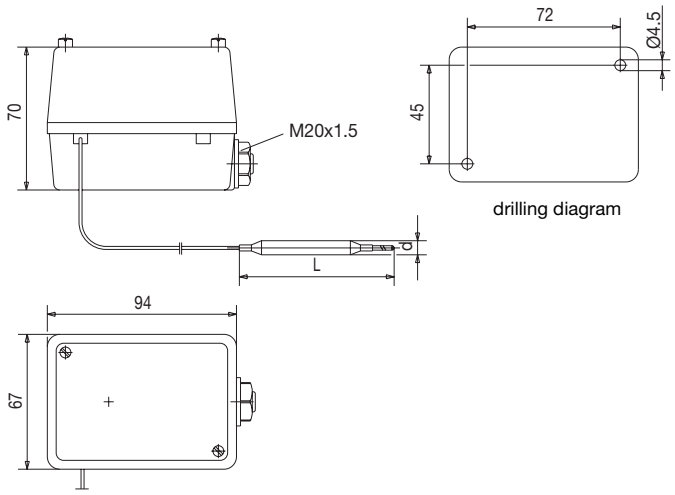
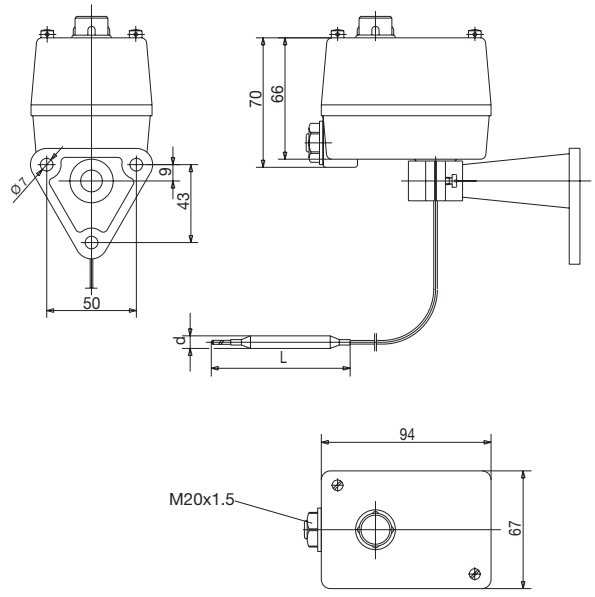


ATHs-2,
ATHs-20
with pocket UZ



ATHf-7
ATHf-70,
with pocket U



ATHf-1/b, with pocket U	
ATHf-2/r, ATHf-20/r with plain cylindrical probe A, no pocket	
ATHf-7/k ATHf-70/k, with plain cylindrical probe A, no pocket	

Stock items with rigid stem

Temperature controller (TR)

(delivery 3 working days after receipt of order)

Sales No.	Type	Control/limit range °C	Differential %	Process connection	Immersion tube dia. x length mm
60/60001517	ATHs-1	–10 to + 40	3-4	U G1/2	8x200
60/60000139	ATHs-1	0 to + 50	1.5	U G1/2	15x100
60/60000634	ATHs-1	0 to + 50	1.5	U G1/2	15x100 CrNi
60/60000479	ATHs-1	0 to + 50	3-4	U G1/2	8x200
60/60000170*	ATHs-1	0 to + 50	3-4	U G1/2	8x300
60/60000141	ATHs-1	+20 to + 90	6-8	U G1/2	15x100
60/60000171	ATHs-1	+20 to + 90	3-4	U G1/2	8x150
60/60000172*	ATHs-1	+20 to + 90	3-4	U G1/2	8x300
60/60000173	ATHs-1	0 to +100	1.5	U G1/2	8x120
60/60000332	ATHs-1	0 to +100	3-4	U G1/2	8x120
60/60001548	ATHs-1	0 to +100	3-4	U G1/2	8x120 CrNi
60/60001125	ATHs-1	0 to +100	3-4	U G1/2	8x150
60/60000174	ATHs-1	0 to +100	1.5	U G1/2	8x200
60/60001126	ATHs-1	0 to +100	3-4	U G1/2	8x200
60/60000175	ATHs-1	0 to +100	3-4	U G1/2	8x300
60/60001034	ATHs-1	+20 to +120	3-4	U G1/2	8x150
60/60000481	ATHs-1	+20 to +150	3-4	U G1/2	8x100
60/60001547	ATHs-1	+20 to +150	3-4	U G1/2	8x100 CrNi
60/60001035	ATHs-1	+20 to +150	3-4	U G1/2	8x200
60/60001127	ATHs-1	+20 to +150	3-4	U G1/2	8x300
60/60001037	ATHs-1	+50 to +200	3-4	UZ G1/2	8x200
60/60001036	ATHs-1	+50 to +300	3-4	UZ G1/2	8x150
60/60002123	ATHs-1	+20 to +500	5	UZ G1/2	8x200

*model is being phased out

Temperature monitor (TW)

(delivery 3 working days after receipt of order)

Sales No.	Type	Control/limit range °C	Differential %	Process connection	Immersion tube dia. x length mm
60/60001135	ATHs-2	–10 to + 40	3-4	U G1/2	8x200
60/60000960	ATHs-2	0 to + 50	1.5	U G1/2	15x100
60/60001549	ATHs-2	0 to + 50	1.5	U G1/2	15x100 CrNi
60/60001128	ATHs-2	0 to + 50	3-4	U G1/2	8x200
60/60000176*	ATHs-2	0 to + 50	3-4	U G1/2	8x300
60/60000177	ATHs-2	+20 to + 90	1.5	U G1/2	15x100
60/60000959	ATHs-2	+20 to + 90	6-8	U G1/2	15x100
60/60001129	ATHs-2	+20 to + 90	3-4	U G1/2	8x150
60/60000178	ATHs-2	+20 to + 90	3-4	U G1/2	8x200
60/60000331	ATHs-2	0 to +100	3-4	U G1/2	8x120
60/60001552	ATHs-2	0 to +100	3-4	U G1/2	8x120 CrNi
60/60000179	ATHs-2	0 to +100	3-4	U G1/2	8x150
60/60001039	ATHs-2	0 to +100	3-4	U G1/2	8x200
60/60001130	ATHs-2	0 to +100	3-4	U G1/2	8x300
60/60001124	ATHs-2	+20 to +150	1.5	U G1/2	8x100
60/60000483	ATHs-2	+20 to +150	3-4	U G1/2	8x100
60/60001551	ATHs-2	+20 to +150	3-4	U G1/2	8x100 CrNi
60/60000485	ATHs-2	+20 to +150	3-4	U G1/2	8x200
60/60001554	ATHs-2	+20 to +150	3-4	U G1/2	8x200 CrNi
60/60000182	ATHs-2	+20 to +150	3-4	U G1/2	8x300
60/60000186	ATHs-2	+50 to +200	3-4	UZ G1/2	8x120
60/60001131	ATHs-2	+50 to +200	3-4	UZ G1/2	8x200
60/60000185*	ATHs-2	+50 to +200	3-4	UZ G1/2	8x300
60/60001105	ATHs-2	+50 to +300	3-4	UZ G1/2	8x150
60/60001556	ATHs-2	+50 to +300	3-4	UZ G1/2	8x150 CrNi
60/60002124	ATHs-2	+20 to +500	5	UZ G1/2	8x200

*model is being phased out

Stock items with rigid stem

Safety temperature monitor STW (STB)

(delivery 3 working days after receipt of order)

Sales No.	Type	Control/limit range °C	Differential %	Process connection	Immersion tube dia. x length mm
60/60001478	ATHs-20	+20 to +150	4-6	U G 1/2	8x150
60/60000188	ATHs-20	+50 to +300	4-6	UZ G 1/2	8x200
60/60002217	ATHs-20	+50 to +350	4-6	EZS G 3/4	170
60/60000885	ATHs-20	+20 to +500	7	UZO G 1/2	200

Safety temperature limiter (STB)

(delivery 3 working days after receipt of order)

Sales No.	Type	Control/limit range °C	Differential %	Process connection	Immersion tube dia. x length mm
60/60000982	ATHs-70	+ 30 to +110	— —	U G 1/2	8x150
60/60001043	ATHs-70	+ 30 to +110	— —	U G 1/2	8x200
60/60000189	ATHs-70	+ 30 to +110	— —	U G 1/2	8x300
60/60001044	ATHs-70	+ 60 to +130	— —	U G 1/2	8x150
60/60000190	ATHs-70	+ 60 to +130	— —	U G 1/2	8x200
60/60001020	ATHs-70	+ 20 to +150	— —	U G 1/2	8x200
60/60000120	ATHs-70	+130 to +200	— —	UZ G 1/2	8x150
60/60001042	ATHs-70	+130 to +200	— —	UZ G 1/2	8x300
60/60001132	ATHs-70	+ 50 to +300	— —	UZ G 1/2	8x200
60/60001524	ATHs-70/U	+ 30 to +110	— —	U G 1/2	8x150
60/60001522	ATHs-70/U	+ 20 to +150	— —	U G 1/2	8x200
60/60001523	ATHs-70/U	+ 50 to +300	— —	UZ G 1/2	8x200
60/60002218	ATHs-70/U	+ 50 to +350	— —	EZS G 3/4	170
60/60000884	ATHs-70/U	+ 20 to +500	— —	UZO G 1/2	200
60/60002121	ATHs-70/U	+ 20 to +500	— —	UZ G 1/2	8x200

Stock items with capillary

Temperature controller (TR)

(delivery 3 working days after receipt of order)

Sales No.	Type	Control/limit range °C	Differential %	Capillary mm	Process connection	Probe dia. x length mm
60/60001134	ATHf-1	–10 to + 40	3-4	1000	A	6x185
60/60000477	ATHf-1	0 to + 50	3-4	1000	A	6x185
60/60001193	ATHf-1	+20 to + 90	3-4	1000	A	6x138
60/60001004	ATHf-1	0 to +100	3-4	1000	A	6x107
60/60000955	ATHf-1	+20 to +150	3-4	1000	A	6x 88
60/60001133	ATHf-1	+50 to +300	3-4	1000	A	6x 63
60/60002113	ATHf-1	+20 to +500	5	1000	A	6x148

Temperature monitor (TW)

(delivery 3 working days after receipt of order)

Sales No.	Type	Control/limit range °C	Differential %	Capillary mm	Process connection	Probe dia. x length mm
60/60000482	ATHf-2	0 to + 50	3-4	1000	A	6x185
60/60001192	ATHf-2	0 to + 50	3-4	2000	A	6x185
60/60000965	ATHf-2	+20 to + 90	3-4	1000	A	6x138
60/60001211*	ATHf-2	+20 to + 90	3-4	2000	A	6x138
60/60000962	ATHf-2	0 to +100	3-4	1000	A	6x107
60/60001212	ATHf-2	0 to +100	3-4	2000	A	6x107
60/60000963	ATHf-2	+20 to +150	3-4	1000	A	6x 88
60/60001210	ATHf-2	+20 to +150	3-4	2000	A	6x 88
60/60000187	ATHf-2	+50 to +200	3-4	1000	A	6x101
60/60001209	ATHf-2	+50 to +200	3-4	2000	A	6x101
60/60001038	ATHf-2	+50 to +300	3-4	1000	A	6x 63
60/60001208	ATHf-2	+50 to +300	3-4	2000	A	6x 63
60/60002122	ATHf-2	+20 to +500	5	1000	A	6x148
60/60002114	ATHf-2	+20 to +500	5	2000	A	6x148

*model is being phased out

Stock items with capillary

Safety temperature limiter (STB)

(delivery 3 working days after receipt of order)

Sales No.	Type	Control/limit range °C	Differential %	Capillary mm	Process connection	Probe dia. x length mm
60/60002261	ATHf-20/r	+ 20 to +500	7	4000	ES G 3/4	200
60/60001136	ATHf-70	+ 30 to +110	— —	1000	A	6x108
60/60001206	ATHf-70	+ 30 to +110	— —	2000	A	6x108
60/60001097	ATHf-70	+ 60 to +130	— —	1000	A	6x116
60/60001041	ATHf-70	+ 20 to +150	— —	1000	A	6x 77
60/60001205	ATHf-70	+ 20 to +150	— —	2000	A	6x 77
60/60001525	ATHf-70/U	+ 20 to +150	— —	1000	A	6x 77
60/60001204	ATHf-70	+ 50 to +200	— —	2000	A	6x 85
60/60001290	ATHf-70/U	+ 50 to +200	— —	1000	A	6x 85
60/60001002	ATHf-70	+130 to +200	— —	1000	A	6x114
60/60001040	ATHf-70	+ 50 to +300	— —	1000	A	6x 55
60/60001191	ATHf-70	+ 50 to +300	— —	2000	A	6x 55
60/60001528	ATHf-70/U	+ 50 to +300	— —	1000	A	6x 55
60/60002086	ATHf-70	+ 20 to +500	— —	1000	A	6x127
60/60002088	ATHf-70/U	+ 20 to +500	— —	1000	A	6x127
60/60002099	ATHf-70/U	+ 20 to +500	— —	2000	A	6x127
60/60002262	ATHf-70/U/r	+ 20 to +500	— —	4000	ES G 3/4	200

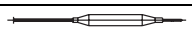
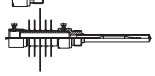
Order details

Surface-mounting thermostat, ATH series

Order code			
	(1)	**Basic type**	
603021		Surface-mounting thermostat, ATH series	
	(2)	**Basic type extension**	
01		ATH-1 Temperature controller TR	
02		ATH-2 Temperature monitor TW	
07		ATH-7 Temperature limiter TB	
20		ATH-20 Safety temperature monitor STW (STB)	
70		ATH-70 Safety temperature limiter STB	
	(3)	**Style**	
1		ATH**s** with rigid stem	
2		ATH**f** with capillary	
	(4)	**Control / limit ranges °C**	
014		-20 to + 50 *	
016		-10 to + 40 *	
021		0 to + 50	
022		0 to + 70	
025		0 to +100	
041		+20 to + 90	
052		+30 to +110	
042		+20 to +120	
066		+60 to +130	
043		+20 to +150	
062		+50 to +200	
063		+50 to +250	
064		+50 to +300	
045		+20 to +400	
046		+20 to +500	
		* on TR and TW only	
	(5)	**Switching differential**	
00		no differential (-7 TB / -70 STB)	
15		1.5 % of scale span	(on TR + TW only)
20		2 % of scale span	(on STW (STB) only)
30		3 % of scale span	(on TR + TW only)
50		5 % of scale span	(on TR + TW + STW (STB) only)
60		6 % of scale span	(on TR + TW only)
70		7 % of scale span	(on STW (STB) only)
90		9 % of scale span	(on STW (STB) only)

Order details

Surface-mounting thermostat, ATH series

Order details		
	(6)	**Capillary length**
0	ATH**s** no capillary	
1000	1000 mm	
2000	2000 mm	
3000	3000 mm	
4000	4000 mm	
5000	5000 mm	
. . . .	(special length, details in plain text)	
	(7)	**Material of capillary**
00	ATH**s** no capillary	
40	Cu	(copper)
20	CrNi	(stainless steel 1.4571)
	(8)	**Process connection (PA) ***
10	A = plain cylindrical probe (on ATH**f** only)	
20	U = screw-in pocket	
30	UZ = screw-in pocket with extension	
	(9)	**Thread for process connection***
00	no thread (process connection 10)	
13	external thread G 1/2	
	(10)	**Material of process connection**
00	with process connection 10 only	
46	CuZn	(brass)
01	St	(steel)
20	CrNi	(stainless steel 1.4571)
	(11)	**Fitting length S (immersion tube length)**
000	ATH**f** no pocket	
100	100 mm	
120	120 mm	
150	150 mm	
200	200 mm	
300	300 mm	
400	400 mm	
. . . .	. . . . special length, details in plain text	
	(12)	**Diameter D (immersion tube diameter)**
00	ATH**f** no pocket	
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**	TB / STB with break contact, lock-out and additional signal contact (-7 TB / -70 STB)
702	**au**	snap-action switch contact gold-plated (only with switching differential 3%, 5%, and 7% and TB/STB with break contact)
701	**a**	housing cover in die-cast aluminium (not with extra code r)
711	**r**	thermostat head mounting by 2 screws through base of housing, capillary exit on side of housing, cover and base in plastic
764	**b**	mounting flange in sheet steel, capillary exit at housing spigot
248	**k**	wall bracket

* for other connections and pockets, see Data Sheet 60.6710.

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**

** List extra codes in sequence, separated by commas.

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for stock items see page 7

Surface-mounting Thermostats ATH Series

Protection IP54

ATHs-12

Brief description

Thermostats control and monitor thermal processes. Surface-mounting twin thermostats, ATH series, consist of two separate measuring and switching systems.
The instruments 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 fault, the STB sets the system being monitored to a safe operational state.
Surface-mounting twin thermostats operate on the principle of liquid expansion, with a microswitch serving as the electrical switching device.

ATHf-170

Switching action

Temperature controller TR and temperature monitor TW
When the temperature at the probe exceeds the selected setpoint, the microswitch is operated through a mechanism and the circuit is opened or closed. When the temperature falls below the setpoint (by the switching differential), the microswitch returns to its initial position.

Lock-out facility
on the temperature limiter TB and safety temperature limiter STB
When the temperature at the probe exceeds the set limit, the circuit is opened and the microswitch locked out mechanically.
After the temperature has dropped by about 10 % of span below the danger temperature (about 15% with limit setting > +350°C), the microswitch can be reset manually.

Use of the safety temperature monitor STW as safety temperature limiter STB
The circuitry to which the thermostat is connected must comply with DIN 3440 and VDE 0116.

Self-monitoring on the safety temperature limiter STB
and safety temperature monitor STW (STB)
Failure of the measuring system on the STB and STW (STB) i.e. a leakage of the expansion fluid, will cause the pressure under the diaphragm to drop, thus permanently opening the circuit. A reset is now impossible.
When the temperature at the probe cools down to below about -20°C, the circuit will also be opened. As the temperature rises to above -20°C (approx.), the STB has to be reset manually, by pressing the reset button. On the STW (STB), the reset is performed automatically.

You will find the Declarations of Conformity on the Internet at:
www.jumo.net
⇛ Products
or they can be sent to you on request.

Types and approvals

Type		Switching action	DIN Reg. No.	Test
with rigid stem	with capillary			
ATH**s**-11	ATH**f**-11	TR / TR	TR / TR 89601	- DIN 3440
ATH**s**-12	ATH**f**-12	TR / TW	TR / TW 89701	
ATH**s**-17	ATH**f**-17	TR / TB	TR / TB 89801	
ATH**s**-22	ATH**f**-22	TW / TW	TW / TW 90101	
ATH**s**-27	ATH**f**-27	TW / TB	TW / TB 90201	
ATH**s**-120	ATH**f**-120	TR / STW (STB)	TR / STW (STB) 89901 S	- DIN 3440 - Pressure Equipment Directive 97/23/EC
ATH**s**-220	ATH**f**-220	TW / STW (STB)	TW / STW (STB) 90301 S	
ATH**s**-170	ATH**f**-170	TR / STB	TR / STB 90001	
ATH**s**-270	ATH**f**-270	TW / STB	TW / STB 90401	
ATH**s**-2020	ATH**f**-2020	STW (STB) / STW (STB)	2 x STW (STB) 90501 S	
ATH**s**-2070	ATH**f**-2070	STW (STB) / STB	STW (STB) / STB 90601 S	
ATH**s**-7070	ATH**f**-7070	STB / STB	STB / STB 90701	

Technical data

Control ranges and temperature probes

liquid-filled				
Switching action	**Control/ limit ranges °C**	**Max. permissible probe temperature °C**	**Maximum capillary length mm**	**Probe length L in mm probe dia. d = 6 mm is standard**
TR, TW and TB	-20 to + 50	60	5000	141
	-10 to + 40	50		185
	0 to + 50	60		185
	0 to + 70	80		138
	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 and TB	+20 to +400	460	1000	278
	+20 to +500	550	2000	148
	+20 to +500	550	4000	202
STW and STB	+20 to +400	460	1000	176
	+20 to +500	550	2000	127
	+20 to +500	550	4000	202

Capillary and temperature probe

Type	**End of scale**	**Capillary**	**Temperature probe**	**Notes**
ATH.-. .	up to 200 °C	copper (Cu) 1.5 mm dia. Mat. Ref. Cu-DHP	copper (Cu) Mat. Ref. Cu-DHP brazed	–
	up to 350 °C	copper (Cu) 1.5 mm dia. Mat. Ref. Cu-DHP	stainless steel (CrNi) Mat. Ref. 1.4571 brazed	–
	up to 500 °C	stainless steel (CrNi) 1.5 mm dia. Mat. Ref. 1.4571	stainless steel (CrNi) Mat. Ref. 1.4571 welded	–
	up to 350 °C	stainless steel (CrNi) 1.5 mm dia. Mat. Ref. 1.4571	stainless steel (CrNi) Mat. Ref. 1.4571 welded	at extra cost
Capillary length	standard: 1000 mm, maximum: 5000 mm			
Min. bending radius of capillary	5 mm			

Electrical data

Switching device	TR, TW, STW (STB)	TB (-7), STB (-70)	TB (-7/U), STB (-70/U)
	microswitch with changeover contact	microswitch with break contact and lock-out	microswitch with break contact, lock-out and additional signal contact
Rating	10 (2) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25 A, 230 V DC +10%		
	with switching differential 1.5% and 2% 6 (1.2) A, 230 V AC +10%, p.f. = 1 (0.6)	–	–
	microswitch gold-plated, extra code /au* (*only with switching differential 3%, 5%, 7%) 0.1 A, 24 V AC/DC contact resistance 2.5 — 10 mΩ		–

Operating data

Switching differential in % of control / limit range	Switching action	with liquid-filled measuring system		
		Nominal value	**Possible actual value**	
	TR, TW	3	3 max. 4	standard
		6	6 max. 8	on request
		1.5	1 max. 2	at extra cost
		with gas-filled measuring system		
		5	4 max. 8	standard
		9	8 max. 12	on request
		2	1.5 max. 2.5	at extra cost
		with liquid-filled measuring system		
	STW (STB)	5	4 max. 6	standard
		9	8 max. 11	on request
		2	1 max. 3	at extra cost
		with gas-filled measuring system		
		7	5 max. 12	standard
		9	8 max. 16	on request
		2	1.5 max. 3	at extra cost

Switching point accuracy in % of control / limit range	TR: in upper third of scale ± 1.5 %, at start of scale ± 6 % TW, TB, STB, STW (STB): in upper third of scale +0/-5 %, at start of scale +0/-10 %					
Ambient temperature error referred to control / limit range	A deviation of the ambient temperature at the case from the calibration ambient temperature of 22 °C produces a shift of the switching point: higher ambient temperature = lower switching point lower ambient temperature = higher switching point					
	Surface-mounting thermostats with end of scale					
	< 200 °C		≥ 200 °C ≤ 350 °C		> 350 °C ≤ 500 °C	
	TR / TW / TB	STB/STW (STB)	TR / TW / TB	STB/STW (STB)	TR / TW / TB	STB/STW (STB)
	due to thermostat head, % per °C					
	0.08	0.17	0.06	0.13	0.14	0.12
	due to capillary, % per °C per m length					
	0.047	0.054	0.09	0.11	0.04	0.03
Permissible storage temperature	-50 to +50 °C					
Permissible ambient temperature in operation	max. +80 °C					
Nominal position (NL)	to DIN 16 257, NL 0 — NL 90 (other NL on request)					

Case

Standard	case cover: polycarbonate, impact resistant case base: die-cast aluminium, painted		color: pebble gray RAL 7032 color: anthracite RAL 7015
Code **a**	cover: die-cast aluminium, painted		color: pebble gray RAL 7032
Setpoint adjustment	TR: switching point adjustable from the outside by turning the knob		TW, TB, STB, STW (STB): switching point adjustable with screwdriver, after removing case cover
Protection	EN 60 529-IP54		
Cable entry	standard: clamping nipple M 20 x 1.5, for 8 — 10 mm cable diameter		
Weight	approx. 0.8 kg		
Thermostat mounting on type ATH**f**- . . with capillary	**standard**	thread M 18 x 1 with locknut at case spigot, capillary exit at spigot	
	Code		
	r	by 2 screws through base of case, capillary exit on side of case, cover and base in plastic	
	b	mounting flange in sheet steel, capillary exit at case spigot	
	k	wall bracket	

Process connection*

Series ATH**s**- with rigid stem	End of scale up to 150°C **pocket U**	End of scale above 150°C **pocket UZ**
	screw-in pocket with screw-in spigot G 1/2 Form A to DIN 3852/2	screw-in pocket with screw-in spigot G 1/2 Form A to DIN 3852/2 and extension, in order not to exceed the max. permissible ambient temperature of +80°C at the case
Series ATH**f**- with capillary	**plain cylindrical probe A** (standard)	
	pocket U (on request)	
	screw-in pocket with screw-in spigot G 1/2 Form A to DIN 3852/2 and clip with fixing screw for securing the probe	
Material	**pocket U**	**pocket UZ**
	up to +150°C CuZn (brass) is standard above +150°C St (steel) is standard (CrNi on request)	above +150°C St (steel) is standard (CrNi on request)
Fitting length S	standard lengths: 100, 120, 150, 200 or 300 mm other lengths on request	
Immersion tube dia.	D = 15 mm	

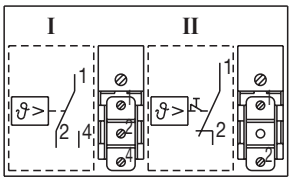
* For other process connections and pockets, see Data Sheet 60.6710.

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

Control range with end of scale °C	Dangerous reactions	Fire / explosion hazard		Water contamination	Toxicological data		
		Ignition temperature °C	Explosion limit % v/v		irritant	danger to health	toxic
< +200	no	+ 355	0.6 — 8	yes	yes	1)	no
≥ 200°C ≤+ 350	no	+ 490	- -	yes	yes	1)	no
> 350°C ≤+ 500	no	no	no	no	no	no	no

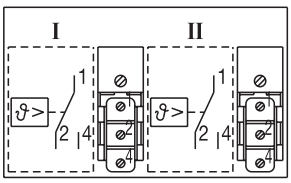
1) At present there is no restrictive statement from the health authorities concerning any danger to health over short periods and at low concentrations, e.g. after a fracture of the measuring system.

Connection diagrams

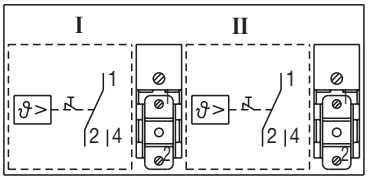


System **I**: with changeover contact
Switching action: TR, TW, STW

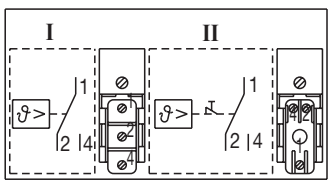
System **II**: with break contact and lock-out
Switching action: TB, STB



System **I** and **II**: with changeover contact
Switching action: TR, TW, STW

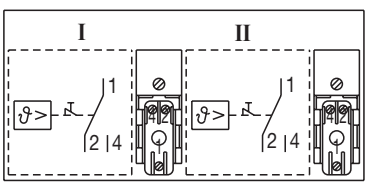


System **I** and **II**: with break contact and lock-out
Switching action: TB, STB



System **I**: with changeover contact
Switching action: TR, TW, STW

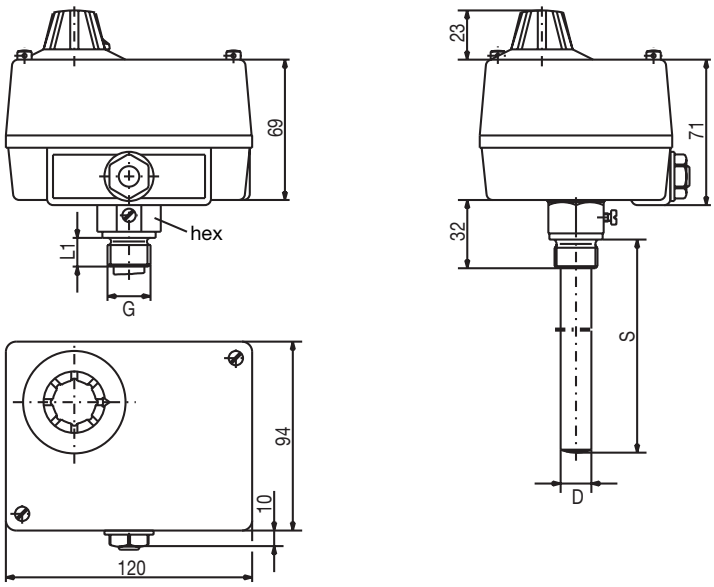
System **II**: with break contact, lock-out and additional signal contact



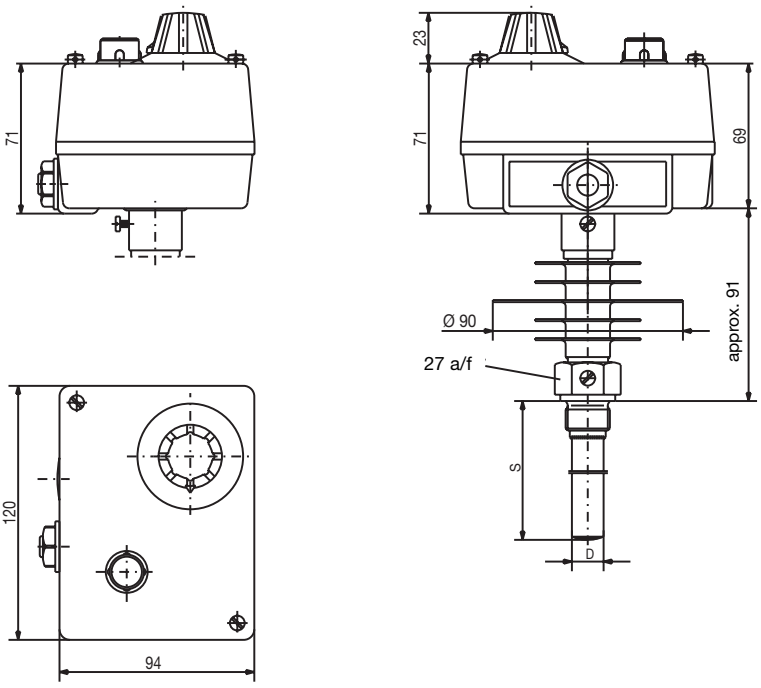
System **I** and **II**: with break contact, lock-out and additional signal contact
Switching action: TB, STB

Dimensions

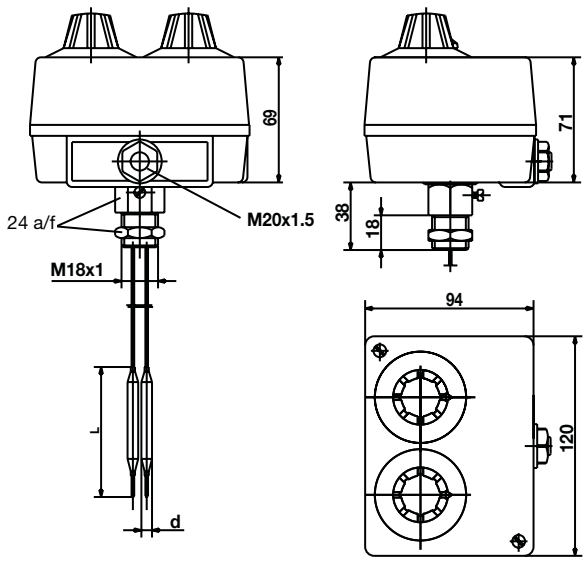
ATHs-12,
ATHs-120
with pocket U



ATHs-17,
ATHs-170
with pocket UZ

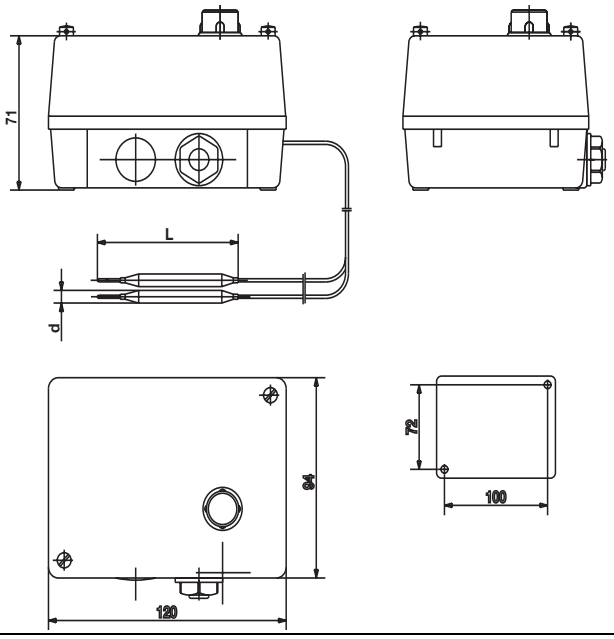


ATHf-11
Thermostat mounting
as standard
with plain cylindrical
probe A, no pocket



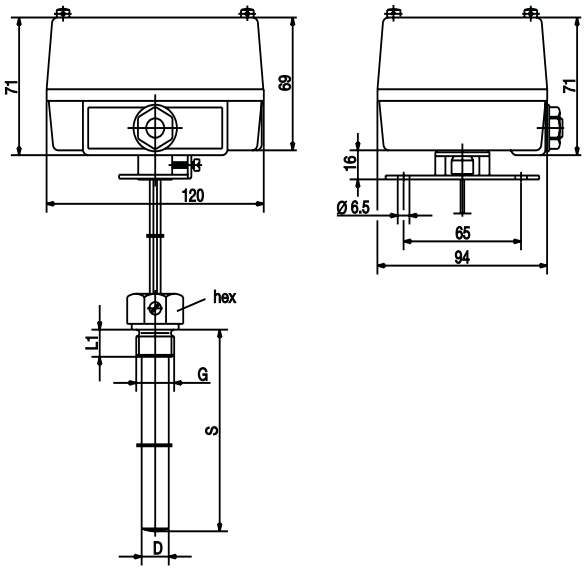
ATHf-27/r,
ATHf-270/r,
ATHf-2070/r

with plain cylindrical probe A, **no** pocket



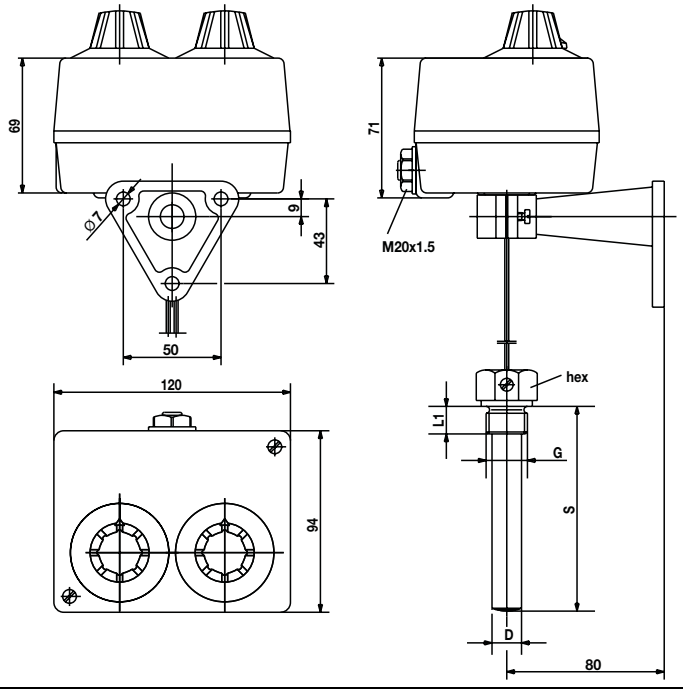
ATHf-22/b,
ATHf-220/b,
ATHf-2020/b

with pocket U



ATHf-11/k

with pocket U



Order details

Stock items with rigid stem

(delivery 3 working days after receipt of order)

Sales No.	Type	Control / limit range °C	Switching differential %	Process connection	Immersion tube dia. x length mm
60/60000210 *	ATHs-11	0 to + 50	3-4	U G$^1/_2$	15 x 200
60/60001137 *	ATHs-11	+20 to + 90	3-4	U G$^1/_2$	15 x 150
60/60000486	ATHs-11	0 to +100	3-4	U G$^1/_2$	15 x 120
60/60000209 *	ATHs-11	0 to +100	3-4	U G$^1/_2$	15 x 300
60/60000208	ATHs-12	0 to +100	3-4	U G$^1/_2$	15 x 120
60/60001045	ATHs-12	+20 to +120	3-4	U G$^1/_2$	15 x 150
60/60000491	ATHs-22	0 to + 50	3-4	U G$^1/_2$	15 x 200
60/60000490	ATHs-22	+20 to + 90	3-4	U G$^1/_2$	15 x 150
60/60000206	ATHs-22	0 to +100	1,5	U G$^1/_2$	15 x 120
60/60001047	ATHs-22	0 to +100	3-4	U G$^1/_2$	15 x 120
60/60001555	ATHs-22	0 to +100	1,5	U G$^1/_2$	15 x 120 CrNi
60/60000205	ATHs-22	0 to +100	3-4	U G$^1/_2$	15 x 150
60/60000988	ATHs-22	0 to +100	3-4	U G$^1/_2$	15 x 200
60/60000204	ATHs-22	0 to +100	3-4	U G$^1/_2$	15 x 300
60/60000489	ATHs-22	+20 to +150	3-4	U G$^1/_2$	15 x 100
60/60000203	ATHs-22	+20 to +150	3-4	U G$^1/_2$	15 x 200
60/60000198	ATHs-22	+50 to +300	3-4	UZG$^1/_2$	15 x 150
60/60002125	ATHs-22	+20 to +500	5	UZG$^1/_2$	15 x 200
60/60001479	ATHs-120	+20 to +150	3-4	U G$^1/_2$	15 x 150
60/60001932	ATHs-120	+20 to +120	3-4	U G$^1/_2$	15 x 150
60/60002009	ATHs-120	+60 to +130	3-4	U G$^1/_2$	15 x 150
60/60002008	ATHs-120	+30 to +110	3-4	U G$^1/_2$	15 x 150
60/60000195	ATHs-170	+30 to +110	3-4	U G$^1/_2$	15 x 150
60/60000196	ATHs-170	+30 to +110	3-4	U G$^1/_2$	15 x 200
60/60001048	ATHs-170	+20 to +120	3-4	U G$^1/_2$	15 x 150
60/60000989	ATHs-170	+20 to +150	3-4	U G$^1/_2$	15 x 150
60/60000194	ATHs-270	+20 to +150	3-4	U G$^1/_2$	15 x 200

***** model is being phased out

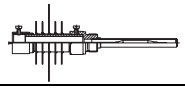
Stock items with capillary

(delivery 3 working days after receipt of order)

Sales No.	Type	Control / limit range °C	Switching differential %	Capillary	Process connection	Probe dia. x length mm
60/60000986	ATHf-11	0 to +100	3-4	1000 mm	A	6 x 107
60/60001046	ATHf-22	0 to +100				6 x 107
60/60000987	ATHf-22	+20 to +150				6 x 88
60/60001876	ATHf-170	+30 to +110				6 x 125

Order details for non-stock items
ATH Series

Order code		(1) Basic type	
603026		Surface-mounting twin thermostat, ATH series	
	(2)	**Basic type extension**	
0101		ATH.-11	TR/TR
0102		ATH.-12	TR/TW
0107		ATH.-17	TR/TB
0202		ATH.-22	TW/TW
0207		ATH.-27	TW/TB
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)	**Style**	
1		ATH**s**	with rigid stem
2		ATH**f**	with capillary
	(4)	**Control / limit ranges °C**	
014		-20 to + 50*	
016		-10 to + 40*	
021		0 to + 50	
022		0 to + 70	
025		0 to +100	
041		+20 to + 90	
052		+30 to +110	
042		+20 to +120	
066		+60 to +130	
043		+20 to +150	
062		+50 to +200	
063		+50 to +250	
064		+50 to +300	
045		+20 to +400	
046		+20 to +500	
		* TR and TW only	
	(5)	**Switching differential**	
00		without switching differential (-7 TB / -70 STB)	
15		1.5 % of scale span	(TR + TW only)
20		2 % of scale span	(STW (STB) only)
30		3 % of scale span	(TR + TW only)
50		5 % of scale span	(TR + TW + STW (STB) only)
60		6 % of scale span	(TR + TW only)
70		7 % of scale span	(STW (STB) only)
90		9 % of scale span	(STW (STB) only)
	(6)	**Capillary length** (details in mm)	
0		ATH**s** without capillary	
1000		1000 mm	
2000		2000 mm	
3000		3000 mm	
4000		4000 mm	
5000		5000 mm	
. . . .		(special length, details in plain text)	
	(7)	**Material of capillary**	
00		ATH**s** without capillary	
40		Cu (copper)	
20		CrNi (stainless steel 1.4571)	

	(8)	Process connection *	
10		A = plain cylindrical probe	
20		U = screw-in pocket	
30		UZ = screw-in pocket with extension	
	(9)	**Thread for process connection ***	
00		no thread (process connection A)	
13		male thread G 1/2	
	(10)	**Material of process connection**	
00		only with process connection A	
46		CuZn (brass)	
01		St (steel)	
20		CrNi (stainless steel 1.4571)	
	(11)	**Fitting length S (immersion tube length)**	
000		ATH**f** without pocket	
100		100 mm	
120		120 mm	
150		150 mm	
200		200 mm	
300		300 mm	
400		400 mm	
. . .		(special length, details in plain text)	
	(12)	**Diameter D (immersion tube diameter)**	
00		ATH**f**- without pocket	
15		15 mm	
	(13)	**Diameter d (probe diameter)**	
6		6 mm	
	(14)	**Extra codes****	
000		no extra code	
702		**au** snap-action switch contact, gold-plated (only with differentials 3%, 5%, and 7% and TB/STB with break contact)	
574		**U** TB / STB with break contact, lock-out and additional signal contact (basic types -7 TB and -70 STB only)	
701		**a** housing cover in die-cast aluminium (not with extra code “r”)	
711		**r** switch head mounting by 2 screws through base of housing, capillary exit at housing side, cover and base in plastic	
764		**b** mounting flange in steel sheet, capillary exit on housing spigot	
248		**k** wall bracket	

* See Data Sheet 60.6710 for additional probe mountings and pockets.

****** List extra codes in sequence, separated by commas.

Order code

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

Order example

603026 / 0202 - 2 - 043 - 30 - 2000 - 20 - 10 - 00 - 00 - 000 - 00 / 6 / 248**

****** List extra codes in sequence, separated by commas.

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Fax: +49 661 6003-607
e-mail: mail@jumo.net
Internet: www.jumo.net

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Fax: +44 1279 635262
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Internet: www.jumo.co.uk

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1-800-554-JUMO
Fax: 315-697-5867
e-mail: info@jumo.us
Internet: www.jumo.us

Surface-mounting Thermostats ATH.-SE Series

for monitoring installations on seagoing ships

ATHs-SE-70

ATHf-SE-..

Brief description

Thermostats control and monitor thermal processes. ATH.-SE series instruments are available as temperature monitors TW, safety temperature monitors STW (STB) and safety temperature limiters STB. In the event of a fault, the STB sets the installation being monitored to a safe operational state.
Surface-mounting thermostats operate on the principle of fluid expansion, with a microswitch serving as the electrical switching element.

Switching action

Temperature monitor TW and safety temperature monitor STW
When the temperature at the probe exceeds the set limit, the circuit is opened by a snap-action switch. After the temperature has fallen below the set limit (by the switching differential), the switch returns to its initial position.

Lock-out facility on the safety temperature limiter STB
When the temperature at the probe exceeds the set limit, the circuit is opened and locked out mechanically.
After the temperature has dropped below the set limit by about 10% of the span, the switch can be reset mechanically.

Use of the safety temperature monitor STW as a safety temperature limiter STB
The circuitry to which the thermostat is connected must comply with DIN 3440 and VDE 0116.

Self-monitoring on the safety temperature limiter STB and the safety temperature monitor STW (STB)
Failure of the measuring system on an STB or STW (STB), i.e. a leakage of the expansion liquid, will cause the pressure under the diaphragm to drop, thus permanently opening the circuit. A reset is now impossible.
If the temperature of the probe cools down to below -20°C, the circuit will also be opened. As the temperature rises to above -20°C, the STB has to be reset manually, by pressing the reset button. On the STW (STB), the reset is performed automatically.

You will find the Declarations of Conformity on the Internet at:
www.jumo.net
⇨ Products
⇨ Data Sheet 60.3031
or ask for them to be sent.

Types and approvals

Type	Switching action	Switching differential	Type No.	Test/approval
ATHs-SE-2 ATHf-SE-2	TW	3%	68.262-F03-S1 68.262-F04-S1	Det Norske Veritas Germanische Lloyd Seeberufsgenossenschaft DIN 3440 (not for the ATH.-SE-70) Bureau Veritas. Pressure Equipment Directive 97/23/EC CE0036 (ATH.-SE-20 and ATH.-SE-70 only)
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	

Technical data

Control ranges and temperature probes

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

Capillary and temperature probe

Type	End of scale	Capillary	Temperature probe	Notes
ATH.-SE-2 ATH.-SE-20 ATH.-SE-70	≤200 °C	copper (Cu) 1.5 mm dia. Mat. Ref. 2.0090	copper (Cu) Mat. Ref. 2.0090 brazed	–
	>200 °C	copper (Cu) 1.5 mm dia. Mat. Ref. 2.0090	stainless steel (CrNi) Mat. Ref. 1.4571 brazed	–
	all ranges	stainless steel (CrNi) 1.5 mm dia. Mat. Ref. 1.4571	stainless steel (CrNi) Mat. Ref. 1.4571 welded	at extra cost
Capillary length	normally 1000 mm, 2000 mm max.			
Min. bending radius of capillary	5 mm			

Electrical data

Switching element	ATH.-SE-2 ATH.-SE-20	ATH.-SE-70	ATH.-SE-70/U
	microswitch with changeover contact	microswitch with break (n.c.) contact and lock-out	microswitch with break (n.c.) contact, lock-out and additional signal contact
Max. contact rating	10(2) A, 230 V AC +10%, p.f. = 1(0,6) 0.25 A, 230 V DC +10%		
	with switching differential 1.5 %: 6(1,2) A, 230 V AC +10%, p.f. = 1(0,6)		

Operating data

Switching differential in % of control / limit setting range	Nominal value	Possible actual value	Designation
	3	3-4	S1
	6	6-8	S2
	1.5	1-2	S3
Switching point accuracy in % of control / limit setting range	TW: in upper third of scale ± 1.5 % STB, STW (STB): in upper third of scale +0/-5 %		
Ambient temperature error referred to control / limit setting range	A deviation of the ambient temperature at the case from the calibration ambient temperature of +22 °C produces a shift of the switching point. higher ambient temperature = lower switching point lower ambient temperature = higher switching point		
	for instruments with end-of-scale value		
	< 200 °C		≥ 200 °C
	ATH.-SE-2	ATH.-SE-20 ATH.-SE-70	ATH.-SE-2	ATH.-SE-20 ATH.-SE-70
	due to the case			
	0.08 %/°C	0.17 %/°C	0.06 %/°C	0.13 %/°C
	due to the capillary per m			
	0.047 %/°C	0.054 %/°C	0.09 %/°C	0.11 %/°C
Permissible storage temperature	-50 to 50 °C			
Permissible ambient temperature in use	+80 °C max.			
Nominal position (NL)	to DIN 16 257, nom. position 0 — 90° (other nom. positions on request)			

Case

Case	aluminium die-casting surface in impact-resistant textured paint: cover: RAL 7032, base: RAL7015
Setpoint adjustment	switching point adjustable using a screwdriver, after removing case cover
Protection	EN 60 529-IP 54
Weight	ATHf-SE-... approx. 0.70 kg ATHs-SE-... approx. 0.65 kg with pocket U ATHs-SE-... approx. 0.85 kg with pocket UZ

Process connection

Series ATHs-SE-.. with rigid stem	end-of-scale value up to 150°C **Pocket U**	end-of-scale value above 150°C **Pocket UZ**
	screw-in pocket with screw-in spigot 1/2" pipe Form A to DIN 3852/2	screw-in pocket with screw-in spigot 1/2" pipe Form A to DIN 3852/2 with extension, in order not to exceed the max. permissible ambient temperature of +80°C at the case
Series ATHf-SE-.. with capillary	**plain cylindrical probe A** (standard)	
	pocket U (on request)	
	screw-in pocket with screw-in spigot 1/2" pipe Form A to DIN 3852/2 and clip with fixing screw for securing the probe	
Material	**Pocket U**	**Pocket UZ**
	up to +150°C brass as standard above +150°C steel as standard (CrNi on request)	above +150°C steel as standard (CrNi on request)
Fitting length S (max. 200 mm)	standard lengths: 100, 120, 150 (material: brass, steel, CrNi) with 200 mm, only in brass or steel	
Immersion tube dia.	D = 8 mm, D = 10 mm	

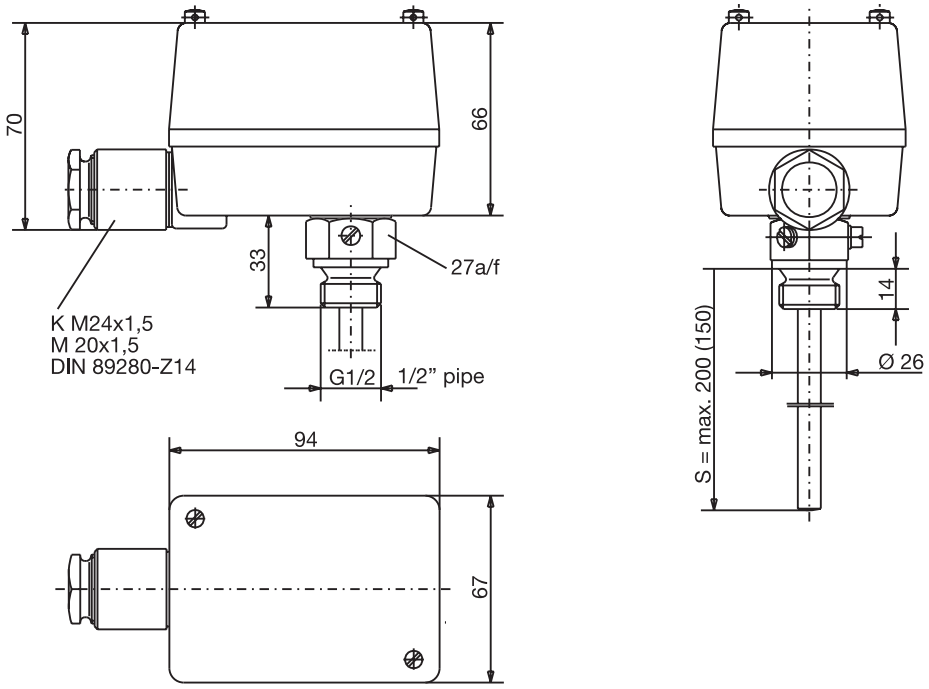
Note:
Physical and toxicological properties of the expansion media which may escape in the event of a system fracture.

Control range with end-of-scale value °C	Dangerous reactions	Fire / explosion hazard		Water contamination	Toxicological data		
		Ignition temp. °C	Explosion limit % v/v		irritant	danger to health	toxic
< +200	no	+ 355	0.6 — 8	yes	yes	[1]	no
≥ 200 °C ≤+300	no	+ 490	- -	yes	yes	[1]	no

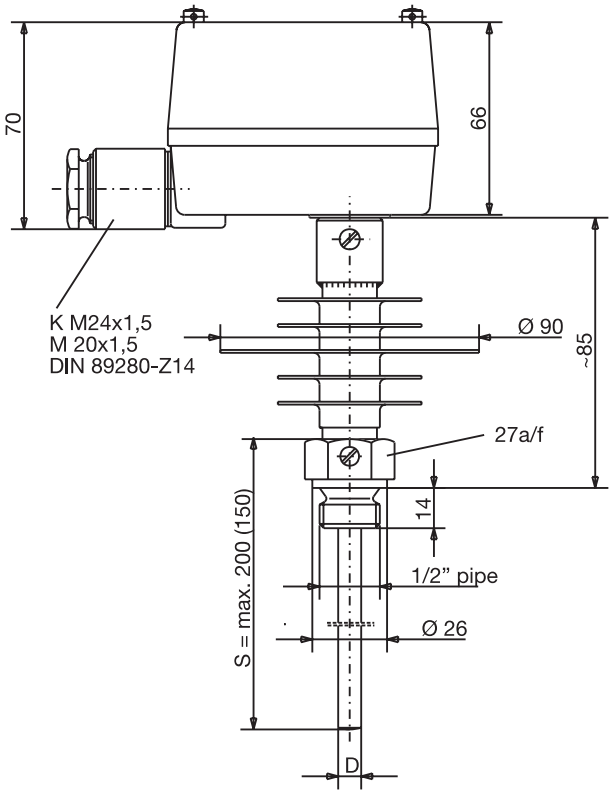
[1] At present there is no restrictive statement from the health authorities concerning any danger to health over short periods and at low concentrations, for example after a fracture of the measuring system.

Dimensions

ATHs-SE-... 2 and 20
with pocket U
up to 150°C

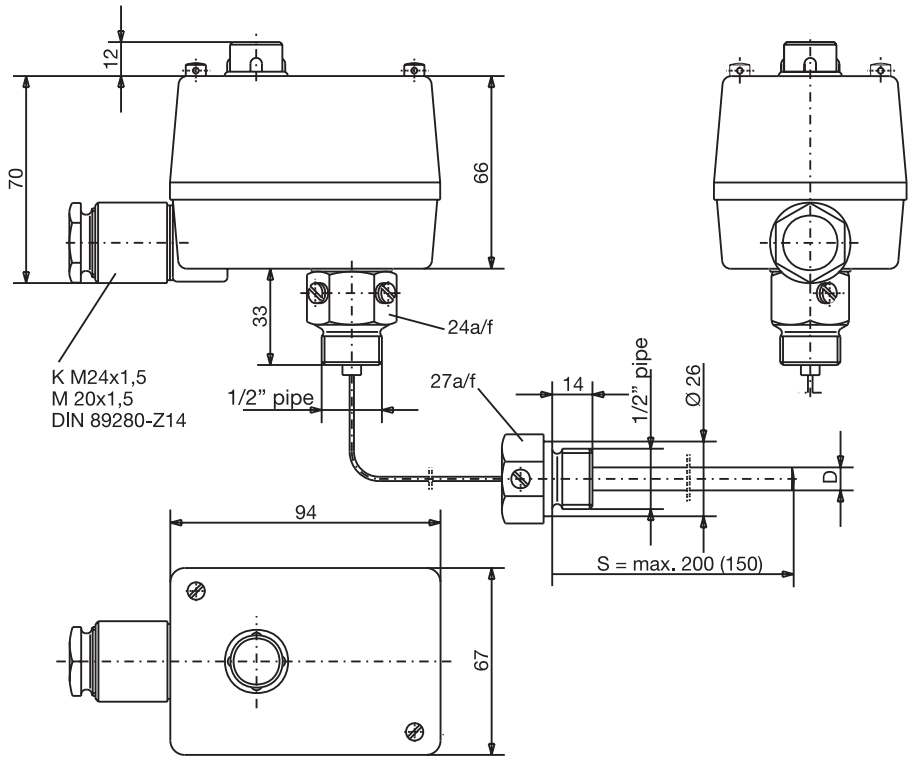


ATHs-SE-... 70
with pocket UZ
up to 300°C

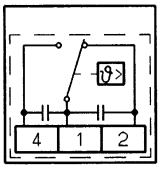


Dimensions

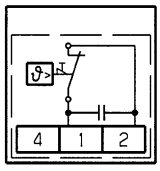
ATHs-SE-... 7
with pocket U
up to 300°C



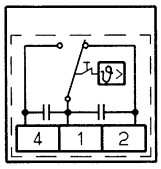
Connection diagrams



ATH.SE-2 / ATH.SE-20



ATH.SE-70



ATH.SE-70/U

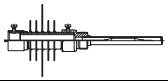
Order details

ATH.-SE Series for application on seagoing ships

Order code			
	(1)	**Basic type**	
603031		Surface-mounting thermostat, ATH.-SE series	
	(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)	**Style**	
1		ATH**s**-SE-..	with rigid stem
2		ATH**f**-SE-..	with capillary
	(4)	**Control / limit 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 to 200°C	
063		50 to 250°C	
064		50 to 300°C	

Order details

ATH.-SE Series for application on seagoing ships

Order code		
	(5)	**Switching differential**
00		no switching differential (-70 STB)
30		3 % of scale span S1
60		6 % of scale span S2
15		1.5 % of scale span S3
	(6)	**Capillary length**
0		ATH**s**-SE without capillary
1000		1000 mm
2000		2000 mm
. . . .		(special length, details in plain text)
	(7)	**Material of capillary**
00		ATH**s**-SE without capillary
40		Cu (copper)
20		CrNi (stainless steel 1.4571)
	(8)	**Process connection**
10		A = plain cylindrical probe (for ATH**f**-SE only)
20		U = screw-in pocket 
30		UZ = screw-in pocket with extension 
	(9)	**Thread for process connection**
00		no thread (process connection A)
13		external thread G 1/2
	(10)	**Material of process connection**
00		for process connection A only
46		CuZn (brass)
01		St (steel)
20		CrNi (stainless steel 1.4571)
	(11)	**Fitting length S (immersion tube length)**
000		ATH**f**-SE without pocket
100		100 mm
120		120 mm
150		150 mm
200		200 mm (not CrNi)
	(12)	**Diameter D (immersion tube diameter)**
00		ATH**f**-SE without pocket
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**= STB with break contact, lock-out + additional signal contact (-70 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 Thermostats Series ATH-SW

Protection IP65
Single or twin thermostat

Brief description

Thermostats control and monitor thermal processes. Surface-mounting thermostats in the ATH-SW series consist of one or two separate measuring and switching systems.
The instruments can be supplied as temperature monitors TW, safety temperature monitors STW (STB) and safety temperature limiters STB. In fault condition, the STB sets the system being monitored to a safe operational state.
Surface-mounting thermostats operate on the principle of liquid expansion, with a microswitch serving as the electrical switching device.

Switching action

Temperature monitor TW
When the temperature at the probe exceeds the setpoint, the microswitch is operated via the transmission mechanism and the circuit is opened or closed. When the temperature drops below the setpoint (by the amount of the switching differential), the microswitch returns to its initial position.

Lock-out facility on the safety temperature limiter STB
When the temperature at the probe exceeds the set limit, the circuit is opened and the microswitch is locked out mechanically.
After the temperature has dropped below the critical temperature by about 10 % of the scale span (approx. 15% for limit setting > +350°C), the microswitch can be reset manually.

Use of the safety temperature monitor STW as safety temperature limiter STB
The circuitry to which the thermostat is connected must comply with DIN 3440 and VDE 0116.

Self-monitoring on the safety temperature limiter STB and the safety temperature monitor STW (STB)
Failure of the measuring system, i.e. a leakage of the expansion fluid, will cause the pressure under the diaphragm to drop (STB and STW (STB)), thus permanently opening the circuit. A reset is now no longer possible.
When the temperature at the probe cools down to below approx. -20°C, the circuit will also open. As the temperature rises to above approx. -20°C, the STB has to be reset manually. On the STW (STB), the reset is perfomed automatically.

The Declarations of Conformity can be found on the Internet at: www.jumo.net ⇒ Products **or** can be sent to you on request.

Types and approvals

Single thermostats		Switching action	DIN Reg. No.	Test/approval
with rigid stem	with capillary			
ATH**s**-SW-2 *	ATH**f**-SW-2 *	TW	TW 89201	
ATH**s**-SW-20	ATH**f**-SW-20	STW (STB)	STW (STB) 89401 S	
ATH**s**-SW-70	ATH**f**-SW-70	STB	STB 89501	
Twin thermostats		**Switching action**	**DIN Reg. No.**	
with rigid stem	with capillary			
ATH**s**-SW-22 *	ATH**f**-SW-22 *	TW / TW	TW / TW 90101	- DIN 3440 - Pressure Equipment Directive 97/23/EC
ATH**s**-SW-220	ATH**f**-SW-220	TW / STW (STB)	TW / STW (STB) 90301 S	
ATH**s**-SW-270	ATH**f**-SW-270	TW / STB	TW / STB 90401	
ATH**s**-SW-2020	ATH**f**-SW-2020	STW (STB) / STW (STB)	2 x STW (STB) 90501 S	
ATH**s**-SW-2070	ATH**f**-SW-2070	STW (STB) / STB	STW (STB) / STB 90601 S	* tested to DIN only
ATH**s**-SW-7070	ATH**f**-SW-7070	STB / STB	STB / STB 90701	

Technical data

Control ranges and temperature probes

liquid-filled				
Switching action	**Control /limit ranges °C**	**Max. permissible probe temperature °C**	**Maximum capillary length mm**	**Probe length L in mm for probe dia. d = 6 mm (standard)**
TW	-20 to + 50	60	5000	141
	-10 to + 40	50		185
	0 to + 50	60		185
	0 to + 70	80		138
	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				
TW	+20 to +400	460	1000	278
	+20 to +500	550	2000	148
	+20 to +500	550	4000	202
STW and STB	+20 to +400	460	1000	176
	+20 to +500	550	2000	127
	+20 to +500	550	4000	202

Capillary and temperature probe

Type	End of scale	Capillary	Temperature probe	Notes
ATH.-SW- . .	up to 200 °C	copper (Cu) 1.5 mm dia. Mat. Ref. 2.0090	copper (Cu) Mat. Ref. 2.0090 brazed	–
	up to 350 °C	copper (Cu) 1.5 mm dia. Mat. Ref. 2.0090	stainless steel (CrNi) Mat. Ref. 1.4571 brazed	–
	up to 500 °C	stainless steel (CrNi) 1.5 mm dia. Mat. Ref. 1.4571	stainless steel (CrNi) Mat. Ref. 1.4571 welded	–
	up to 350 °C	stainless steel (CrNi) 1.5 mm dia. Mat. Ref. 1.4571	stainless steel (CrNi) Mat. Ref. 1.4571 welded	at extra cost
Capillary length	1000 mm is standard, up to 5000 mm			
Min. bending radius of capillary	5 mm			

Electrical data

Switching device	TW, STW (STB)	STB
	microswitch with changeover contact	microswitch with break (n.c.) contact and lock-out
Contact rating	10 (2) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25 A, 230 V DC +10%	
	with switching differentials 1.5% and 2% 6 (1.2) A, 230 V AC +10%, p.f. = 1 (0.6)	–
	microswitch gold-plated, extra code /au 0.1 A, 24 V AC/DC contact resistance 2.5 — 10 mΩ	

Operating data

Switching differential in % of control /limit range	Switching action	with liquid-filled measuring system		
		Nominal value	**Possible actual value**	
	TW	3	3 max. 4	standard
		6	6 max. 8	on request
		1.5	1 max. 2	at extra cost
		with gas-filled measuring system		
		5	4 max. 8	standard
		9	8 max. 12	on request
		2	1.5 max. 2.5	at extra cost
		with liquid-filled measuring system		
	STW (STB)	5	4 max. 6	standard
		9	8 max. 11	on request
		2	1 max. 3	at extra cost
		with gas-filled measuring system		
		7	5 max. 12	standard
		9	8 max. 16	on request
		2	1.5 max. 3	at extra cost

Switching point accuracy in % of control / limit range	in upper third of scale +0/-5 %, at scale start +0/-10 %					
Ambient temperature error referred to control /limit range	A deviation of the ambient temperature at the housing from the 22 °C calibration ambient temperature produces a shift in the switching point: higher ambient temperature = lower switching point lower ambient temperature = higher switching point					
	Surface-mounting thermostats with end of scale					
	< 200 °C		≥ 200 °C ≤ 350 °C		> 350 °C ≤ 500 °C	
	TW	STB/STW (STB)	TW	STB/STW (STB)	TW	STB/STW (STB)
	due to thermostat head, % per °C					
	0.08	0.17	0.06	0.13	0.14	0.12
	due to capillary, % per °C per meter length					
	0.047	0.054	0.09	0.11	0.04	0.03
Permissible storage temperature	-50 to +50 °C					
Permissible ambient temperature in operation	max. +80 °C					
Nom. position (NL)	unrestricted					

Housing

as standard	die-cast aluminium, painted
Setpoint adjustment	switching point adjustable with screwdriver, after removal of housing cover
Enclosure protection	EN 60 529-IP65
Cable entry	cable gland M 20 x 1.5, for 6 — 12 mm cable diameter
Weight	approx. 1.0 kg
Thermostat mounting Series ATH**f**-SW with capillary	by 2 screws through base of housing (wall mounting), capillary exit at side of housing

Process connection*

Series ATH**s**-SW with rigid stem	end of scale up to 150°C **pocket U**	end of scale above 150°C **pocket UZ**
	screw-in pocket with screw-in spigot G 1/2 Form A to DIN 3852/2	screw-in pocket with screw-in spigot G 1/2 Form A to DIN 3852/2 and extension, in order not to exceed the maximum permissible ambient temperature of +80°C at the housing
Series ATH**f**-SW with capillary	**plain cylindrical probe A** (standard)	
	pocket U (on request)	
	screw-in pocket with screw-in spigot G 1/2 Form A to DIN 3852/2 and clip with fixing screw for securing the probe	
Material	**pocket U**	**pocket UZ**
	up to +150°C: CuZn as standard above +150°C: St as standard (CrNi on request)	above +150°C: St as standard (CrNi on request)
Fitting length S	standard lengths: 100, 120, 150, 200 or 300 mm other lengths on request	
Immersion tube dia.	single thermostat D = 8 mm	twin thermostat D = 15 mm

*see Data Sheet 60.6710 for other process connections and pockets.

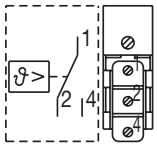
Note
Physical and toxicological properties of the expansion fluid which may escape in the event of a system fracture.

Control range with end of scale °C	Dangerous reactions	Fire /explosion hazard		Water contamination	Toxicological data		
		Ignition temp. °C	Explosion limit % v/v		irritant	danger to health	toxic
< +200	no	+ 355	0.6 — 8	yes	yes	[1]	no
≥ 200 ≤ +350	no	+ 490	- -	yes	yes	[1]	no
> 350 ≤ +500	no	no	no	no	no	no	no

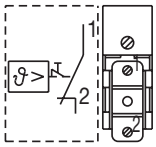
[1] At present there is no restrictive statement from the health authorities concerning any danger to health over short periods and at low concentrations, e.g. after a fracture of the measuring system.

Connection diagrams

Single thermostats

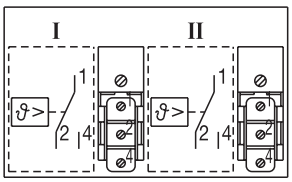


Switching action: TW, STW

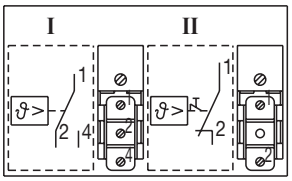


Switching action: STB

Twin thermostats

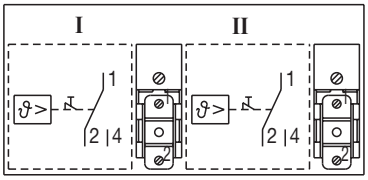


System I and II: with changeover contact
switching action: TW, STW



System I: with changeover contact
switching action: TW, STW

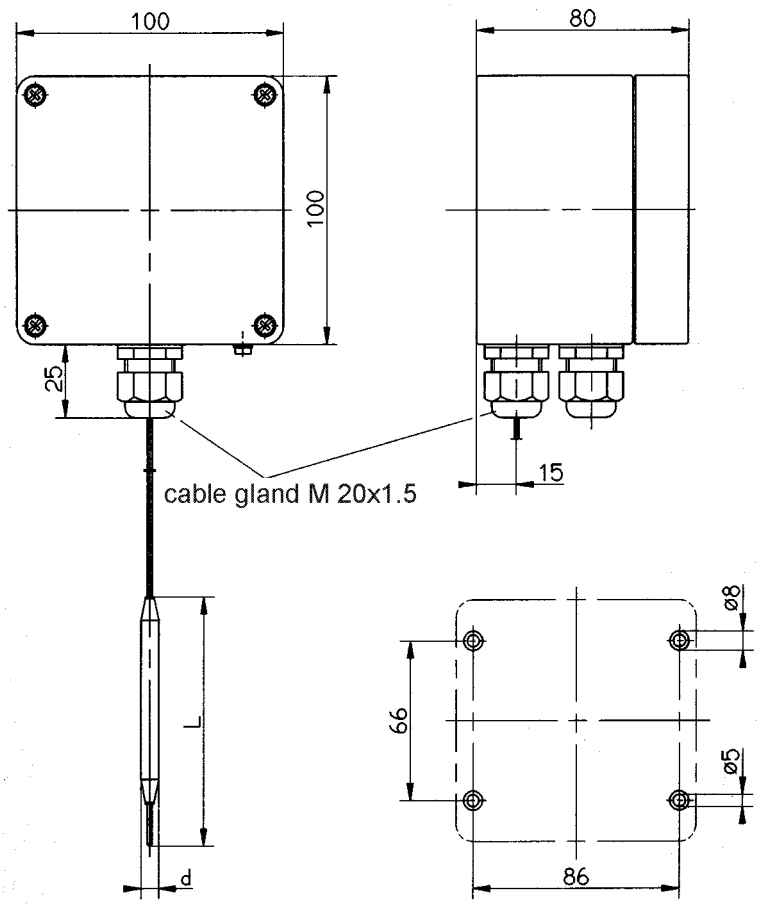
System II: with break contact
and lock-out
switching action: STB



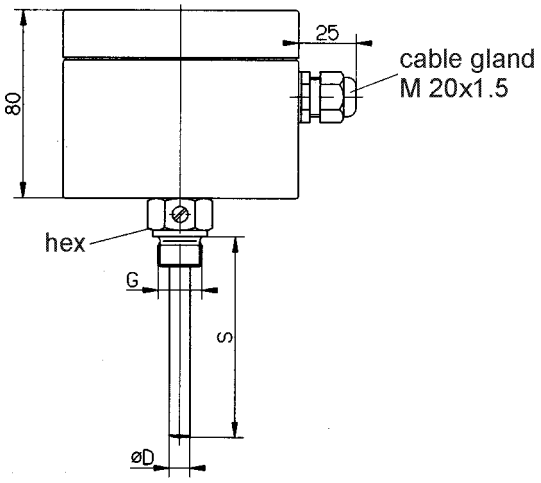
System I and II: with break contact
and lock-out
switching action: STB

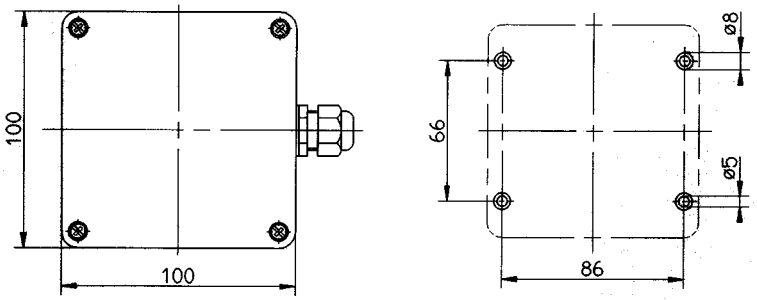
Dimensions

ATHf-SW-..
with capillary



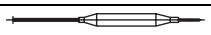
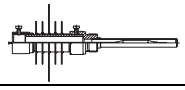
ATHs-SW-..
with rigid stem





Order details for non-stock items
ATH Series

Order code				
603035	(1)	**Basic type**		
		Surface-mounting thermostat, ATH.-SW Series		
	(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	twin thermostats
2020		ATH.-SW-2020	STW (STB)/STW (STB)	
2070		ATH.-SW-2070	STW (STB) / STB	
7070		ATH.-SW-7070	STB/STB	
	(3)	**Style**		
1		ATH**s**-SW-....	with rigid stem	
2		ATH**f**-SW-....	with capillary	
	(4)	**Control / limit ranges °C**		
014		-20 to + 50 *		
016		-10 to + 40 *		
021		0 to + 50		
022		0 to + 70		
025		0 to +100		
041		+20 to + 90		
052		+30 to +110		
042		+20 to +120		
066		+60 to +130		
043		+20 to +150		
062		+50 to +200		
063		+50 to +250		
064		+50 to +300		
045		+20 to +400		
046		+20 to +500		
		* TW only		
	(5)	**Switching differential**		
00		without switching differential (-70 STB)		
15		1.5 % of scale span		(TW only)
20		2 % of scale span		(STW (STB) only)
30		3 % of scale span		(TW only)
50		5 % of scale span		(TW + STW (STB) only)
60		6 % of scale span		(TW only)
70		7 % of scale span		(STW (STB) only)
90		9 % of scale span		(STW (STB) only)
	(6)	**Capillary length**		
0		ATH**s-**SW without capillary		
1000		1000 mm		
2000		2000 mm		
3000		3000 mm		
4000		4000 mm		
5000		5000 mm		
....		(special length, details in plain text)		
	(7)	**Material of capillary**		
00		ATH**s**-SW without capillary		
40		Cu (copper)		
20		CrNi (stainless steel 1.4571)		

	(8)	**Process connection ***
10		A = plain cylindrical probe 
20		U = screw-in pocket 
30		UZ = screw-in pocket with extension 
	(9)	**Thread for process connection ***
00		no thread (process connection A)
13		male thread G 1/2
	(10)	**Material of process connection**
00		only with process connection A
46		CuZn (brass)
01		St (steel)
20		CrNi (stainless steel 1.4571)
	(11)	**Fitting length S (immersion tube length)**
000		ATH**f**-SW without pocket
100		100 mm
120		120 mm
150		150 mm
200		200 mm
300		300 mm
400		400 mm
. . .		(special length, details in plain text)
	(12)	**Diameter D (immersion tube diameter)**
00		ATH**f**-SW without pocket
8		8 mm with single thermostats
15		15 mm with twin thermostats
	(13)	**Diameter d (probe diameter)**
6		6 mm
	(14)	**Extra codes**
000		no extra code
702		**au** snap-action switch contact, gold-plated

* see Data Sheet 60.6710 for additional probe mountings and pockets

Order code

(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)		(11)		(12)		(13)		(14)
603035	/	. . . .	-	.	-	. . .	-	. .	-	. . . .	-	. .	-	00	-	. .	-	. .	-	. . .	-	. .	-	.	/	. . .

Order example

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

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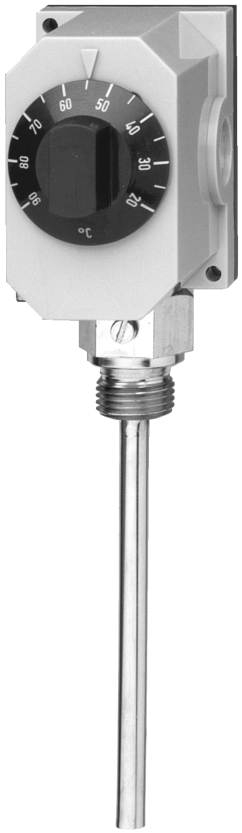
Surface-mounting Thermostats AM Series



- **with 1 or 2 single-pole snap-action switches**
- **IP40 protection**

Brief description

Surface-mounting thermostats control and monitor thermal processes. Thermostats in the AM series are available with 1 or 2 single-pole snap-action switches as temperature controllers (TR) and temperature monitors (TW). On thermostats with 2 single-pole snap-action switches, the contact spacing (in °C) is factory-set according to customer requirements. Surface-mounting thermostats operate on the principle of liquid expansion, with a microswitch serving as the electrical switching device.

Switching action

Temperature controller TR and temperature monitor TW
When the temperature at the probe exceeds the selected setpoint, the microswitch is actuated via a transmission mechanism and the circuit is opened or closed. When the temperature drops below the selected setpoint (by the amount of the switching differential), the microswitch returns to its initial position.

Types and approvals

Type		Switching action	Contact
with rigid stem	with capillary		
AM**s**-1	AM**f**-1	TR	1
AM**s**-2	AM**f**-2	TW	
AMF**s**-13	AMF**f**-13	TR	2
AMF**s**-23	AMF**f**-23	TW	

Technical data

Control ranges and probe table

Control range °C	Switching differential %	Max. probe temperature °C	Capillary lengths up to [m]	Max. switch head temperature °C	Max. contact spacing °C	Probe length in mm with 6 mm probe diameter
-20 to + 40	2.5	+ 50	2	+ 50	8	245
0 to + 50	2.5	+ 60	2	+ 60	10	283
+20 to + 90	2.5 7	+115 +175	1 2	+ 80	14 70	210 91
0 to +100	2.5	+125	2		20	157
+30 to +110	2.5 7	+135 +200	2		16 80	188 84
0 to +150	2.5	+173	1		30	113
+50 to +200*	2.5	+230	1			139

***** Type AM**s** is supplied with probe mounting UZ to Data Sheet 60.6710, and not as shown in the outline drawing.

Capillary and temperature probe

Capillary length	End of scale	Capillary	Temperature probe	Note
1000 mm or 2000 mm	up to 200°C	copper (Cu) 1.5mm dia. Mat. Ref. 2.0090	copper (Cu) Mat. Ref. 2.0090 brazed	min. bending radius of capillary 5 mm

Electrical data

Switching device	AM . -1 / AM . -2	AMF . -13 / AMF . -23	
	1 single-pole microswitch with changeover contact	2 single-pole microswitches with changeover contact	
Contact rating	Switching action	(n.c.) break contact, terminal 2	(n.o.) make contact, terminal 4
	TR, TW	16 (3) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25 A, 230 V DC +10%	8 (1.5) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25 A, 230 V DC +10%
Contact reliability	To ensure the highest possible switching reliability, we recommend a minimum loading of: AC / DC = 24V, 20mA		
Rated surge voltage	1500 V (via switching contacts 400 V)		
Overvoltage category	II		
Fusing required	see Contact rating		
Electrical connection	standard	faston connector A 6.3 x 0.8 DIN 46244	
	extra code X	screw connection up to 2.5 mm^2 conductor cross-section (at extra cost) - also suitable for retrofitting -	

Operating data

Switching differential in % of control/limit range	Switching action	Nominal value	Possible actual value	
	TR, TW	2.5	2.5 max. 3.5	standard
		7	7 max. 8	on request
Contact spacing on multi-pole version	with switching differential	Contact spacing of scale span		Switching point accuracy of contact spacing, % of span
		minimum	maximum	
	2.5 % 7 %	1 % 3 %	according to control range table	≤ 1 % < 3 %
	The contact spacing is specified in °C against the setpoint of contact **I**. (the contact no. is marked on the back of the housing)			
	sign **-** = switching **before** setpoint sign **+** = switching **after** setpoint For simultaneous switching, specify contact spacing "0".			
Switching point accuracy in % of control/limit range	Switching action	Switching differential	in upper third of scale or at limit	
	TR	2.5 % 7 %	± 1.5 % ± 4 %	
	TW	2.5 % 7 %	+0 / -3 % +0 / -8 %	
Ambient temperature effect referred to control/limit range	Any deviation of the ambient temperature at the switch head and/or the capillary from the 22°C calibration ambient temperature will result in a shift of the switching point: higher ambient temperature = lower switching point lower ambient temperature = higher switching point			
	for temperatures with end of scale / limit value			
	< 200°C		≥ 200°C	
	switching differential in %			
	2.5	7	2.5	7
	ambient temperature effect on switch head, % per °C			
	0.15	0.34	0.12	0.27
	ambient temperature effect on capillary, % per °C per m			
	0.05	0.09	0.04	0.07
Permissible storage temperature	-50 to +50°C			
Permissible ambient temp. in operation	+80°C max.			
Nominal position (NL)	to DIN 16 257, NL 0 — NL 90 (other NL on request)			

Housing

as standard	material: polycarbonate, impact-resistant, color: similar to RAL 9002		
Setpoint adjustment	AM . -1, AMF . -13 switching point adjustable from outside by rotary knob		AM . -2, AMF . -23 switching point adjustable with setpoint scale after removing a cover
Protection	EN 60 529-IP40		
Cable entry	push-in gland		
Weight	approx. 0.4 kg		
Switch head mounting Series AM**f**- . .	**standard**	by 2 screws through back of housing	
	extra code		
	b	steel mounting flange, capillary exit on housing spigot	
	k	wall bracket	
	g	M 18x1 thread with locknut on housing spigot, capillary exit on housing spigot	

Process connection*

Series AM**s**- with rigid stem	end of scale up to 150°C **pocket U**	end of scale above 150°C **pocket UZ**
	screw-in pocket with screw-in spigot G 1/2 Form A to DIN 3852/2	screw-in pocket with screw-in spigot G 1/2 Form A to DIN 3852/2 and extension, so that the max. permissible ambient temperature +80°C at the housing is not exceeded
Series AM**f**- with capillary	**plain cylindrical probe A** (standard)	
	pocket U (on request)	
	screw-in pocket with screw-in spigot G 1/2 Form A to DIN 3852/2 and clamping clip with fixing screw for securing the probe	
Material	**pocket U**	**pocket UZ**
	up to +150°C: CuZn is standard above +150°C: St is standard (CrNi on request)	above +150°C: St is standard (CrNi on request)
Fitting length S	standard lengths: 100, 120, 150, 200 or 300 mm other lengths on request	
Immersion tube dia.	D = 8 mm	

* see Data Sheet 60.6710 for other process connections and pockets

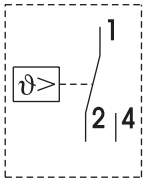
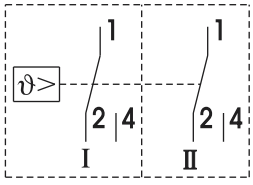
Note

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

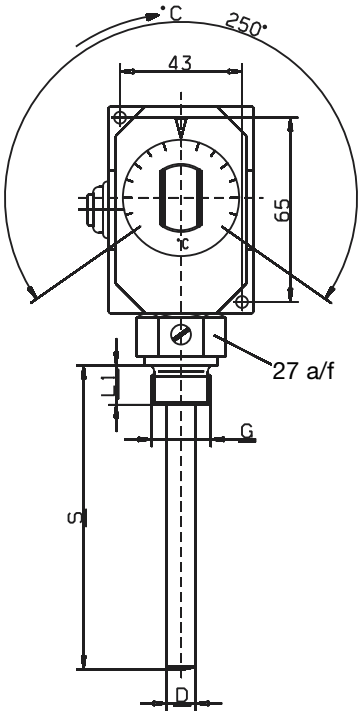
Control range with end of scale °C	Dangerous reactions	Fire/explosion hazard		Water contamination	Toxicological data		
		Ignition temp. °C	Explosion limit % v/v		irritant	danger to health	toxic
< +200	no	+ 355	0.6 — 8	yes	yes	[1]	no
≥ 200 ≤ +350	no	+ 490	- -	yes	yes	[1]	no

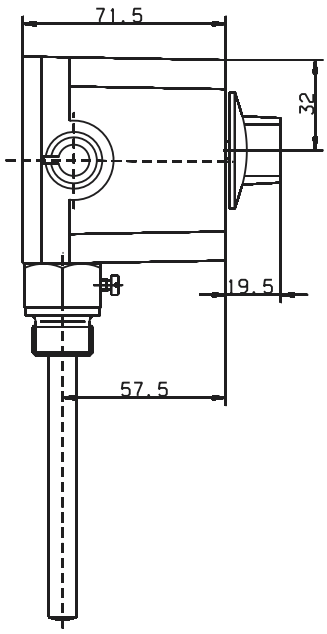
[1] At present there is no restrictive statement from the health authorities concerning any danger to health over short periods and at low concentrations, e.g. after a fracture of the measuring system.

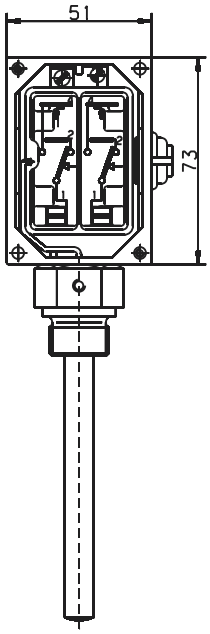
Connection diagrams

	
AM . -1 / AM . -2	AMF . -13 / AMF . -23

Dimensions

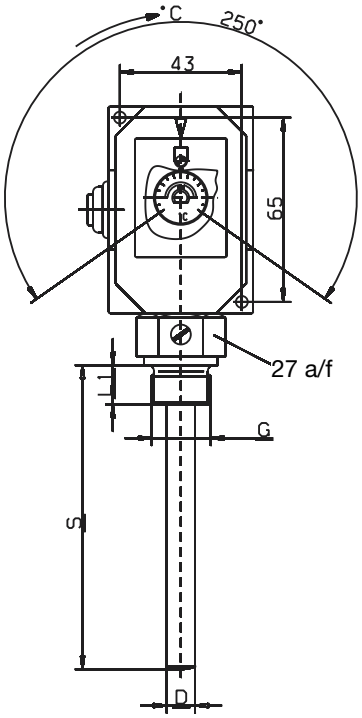




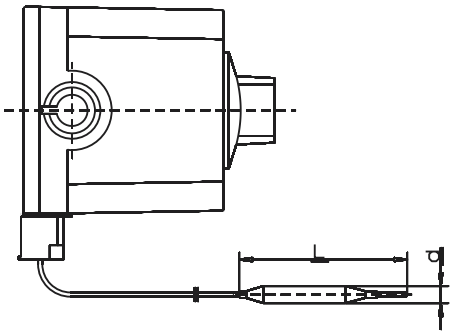


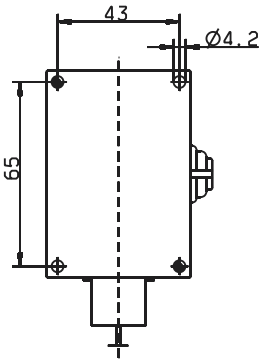
AMs-1 / AMFs-13

shown without terminal cover



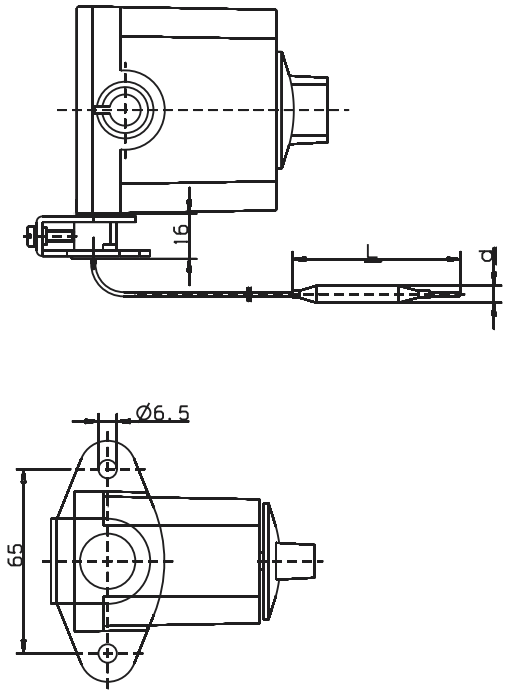
AMs-2 / AMFs-23



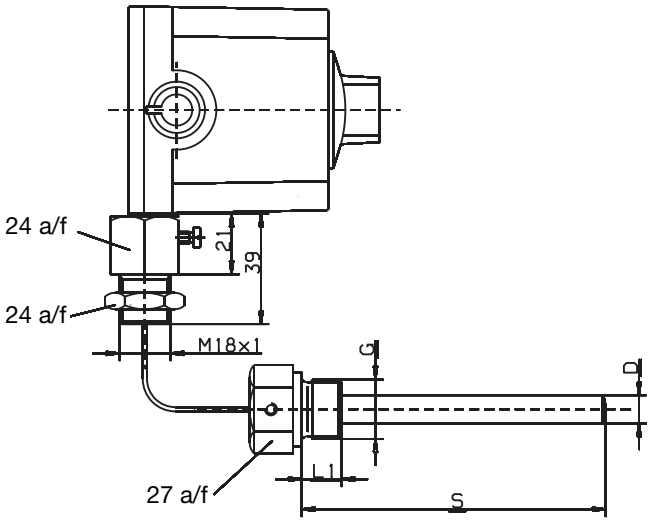


AMf-1 (standard), fixing by 2 screws
through back of housing,
with plain cylindrical probe A,
no pocket

Dimensions



AMf-1 / b
flange mounting,
with plain cylindrical probe A,
no pocket



AMf-1 / g
mounting with M 18x1 thread,
with pocket U

Order details
Stock items

(delivery 3 working days after receipt of order)

Sales No.	Type	Control range °C	Switching differential %	Process connection	Immersion tube dia. x length mm
60/60000675	AMs-1	0 to +100	2.5	U $G^1/_2$	8x200
60/60000679	AMs-1	0 to +150			8x150
60/60000703	AMs-1	+20 to + 90	7		8x120
60/60000674	AMs-1	+30 to +110			8x100

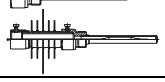
Sales No.	Type	Control range °C	Switching differential %	Capillary mm	Process connection	Probe dia. x length mm
60/60000677	AMf-1	0 to +100	2.5	2000	A	6x157
60/60000680	AMf-1	0 to +150		1000		6x113
60/60000681	AMf-1	+50 to +200				6x135

Different models on request - minimum ordering quantity: 50 units

Order details for non-stock items

AM Series

Minimum ordering quantity: 50 units

Order code		
	(1)	**Basic type**
603041		Surface-mounting thermostat, AM series
	(2)	**Basic type extension**
01		AM-1 1-pole temperature controller TR
02		AM-2 1-pole temperature monitor TW
13		AMF-13 temperature controller TR
23		AMF-23 temperature monitor TW
	(3)	**Style**
1		AM.**s** with rigid stem
2		AM.**f** with capillary
	(4)	**Control / limit ranges °C**
013		-20 to + 40
021		0 to + 50
041		+20 to + 90
025		0 to +100
052		+30 to +110
027		0 to +150
062		+50 to +200
	(5)	**Switching differential**
25		2.5 % of scale span
70		7 % of scale span
	(6)	**Capillary length**
0		AM**s** without capillary
1000		1000 mm
2000		2000 mm
	(7)	**Process connection**
10		A = plain cylindrical probe (for AM.**f** only)
20		U = screw-in pocket 
30		UZ = screw-in pocket with extension 
	(8)	**Thread for process connection**
00		no thread (process connection 10)
13		external thread G 1/2
	(9)	**Material of process connection**
00		with process connection A only
46		CuZn (brass)
01		St (steel)
20		CrNi (stainless steel 1.4571)
	(10)	**Fitting length S (immersion tube length)**
000		AM**f** without pocket
100		100 mm
120		120 mm
150		150 mm
200		200 mm
300		300 mm
	(11)	**Extra codes ***
000		no extra code
764		b steel mounting flange, capillary exit on housing spigot
715		g M 18x1 thread with locknut
248		k wall bracket
699		x screw connection up to 2.5mm^2 conductor cross-section

Order code

(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)		(11)
603041	/	. .	-	.	-	. . .	-	. .	-	. . . .	-	. .	-	. .	-	. .	-	. . .	/	. . .*

Order example

603041	/	01	-	1	-	013	-	25	-	0000	-	20	-	13	-	46	-	300	/	000*

***List extra codes in sequence, separated by commas.

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Internet: www.JumoUSA.com

Heating Thermostat AMHs-1-80 Series

Version approved to DIN 3440 and Pressure Equipment Directive 97/23/EC

Brief description

Heating thermostats with a microswitch are used to monitor and control thermal processes, mainly in heating installations. The instrument in the AMHs-1-80 series consists of two independent measurement and switching systems.
The thermostats operate on the principle of liquid expansion, with a microswitch serving as the electrical switching device.

Switching action

Temperature controller (TR)
If the temperature at the probe goes above the selected setpoint, the electrical circuit is opened by a microswitch. If the temperature falls below the setpoint (by the amount of the switching differential) the microswitch returns to its initial position.

Lock-out function for the safety temperature limiter (STB)
If the temperature at the probe goes above the selected setpoint, the electrical circuit is opened and remains mechanically locked out.
When the temperature has fallen to about 10% of the span below the set limit, the microswitch can be reset manually.

Self-monitoring function for the safety temperature limiter (STB)
If the measuring system fails, i.e. if the expansion liquid has leaked, then the pressure under the diaphragm of the STB drops and the electrical circuit is permanently open. It is no longer possible to reset the system.
If the temperature at the probe falls below approx. -20°C the circuit is also opened, but will close again if the temperature rises above -20°C (approx.).

Type and approvals

Type	Switching action	DIN Reg. No.	Tests
AMHs-1-80	TR / STB	TR / STB 97803	Pressure Equipment Directive 97/23/EC CE0036

You will find the Declarations of Conformity on our website at:
www.jumo.net
⇨ Products
⇨ Data Sheet 60.3045
or ask for them to be sent.

Technical data

Electrical data	TR	STB
Switching device	Microswitch with changeover contact	Microswitch with changeover contact and lock-out
Contact rating	10 (2) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25 A, 230 V DC +10%	

Operating data	**TR** (externally adjustable)	**STB** (fixed setting in factory)
Control range, limits	+30 to + 90°C	+100°C
	+30 to +100°C	+110°C
	+40 to +110°C	+120°C
Switching differential	approx. 6 °C	—
Switching point accuracy	± 3 °C in upper third of scale	+0/-5 °C
Permissible ambient temperature in operation	+18 to 80°C	
Permissible storage temperature	-50 to +50°C	
Max. permissible probe temperature	+140°C	
Nominal position (NL)	to DIN 16 257, NL 0 — NL 90 (other NL on request)	

Case

Housing	Plastic housing in impact-resistant polycarbonate Color: cover pebble gray RAL 7032, base anthracite gray RAL 7016
Enclosure protection	EN 60 529-IP40
Cable entry	2 clamping glands M16x1.5
Weight	approx. 0.45 kg

Process connection

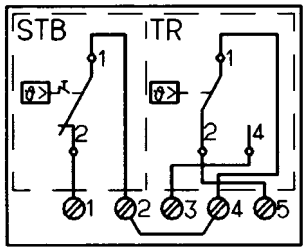
Pocket UH	Screw-in pocket with fixing screw, without shoulder for hemp sealing, material brass, thread: G½, fitting length 120 mm, support tube 15 mm diameter

Note:
Physical and toxological properties of the expansion fluid that might escape in the event of a system fracture.

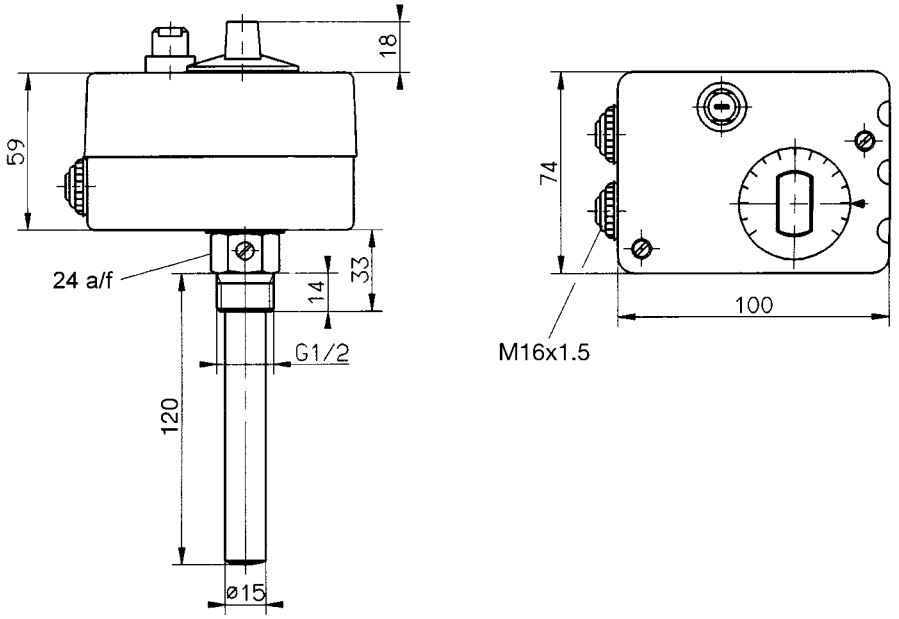
Control range with end of scale	Dangerous reactions	Fire and explosion hazard		Water contamination	Toxocological data		
		Ignition temperature	Explosion limit		irritant	danger to health	toxic
< +200°C	no	+ 355°C	0.6 - 8% v/v	yes	yes	[1]	no

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

Connection diagram



Dimensions



Order details: Type AMHs-1-80

	(1) Basic type (basic version)
603045-0180	AMHs-1-80, heating thermostat with microswitch and rigid stem screw-in pocket UH G1/2, CuZn stem 15 x 120 mm, CuZn

	(2) Control ranges / limits
050	+ 30 to + 90°C / +100°C
051	+30 to +100°C / +110°C
055	+40 to +110°C / +120°C

Order code

(1)		(2)
603045-0180	/	. . .

Order example

603045-0180 / 051 = Heating thermostat with control range/limit TR +30 to +100°C / STB +110°C

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Internet: www.JumoUSA.com

Surface-mounting Thermostats AMTHF Series

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

Type AMTHF**s**-13

Type AMTHF**f**-13

Brief description

Surface-mounting thermostats control and monitor thermal processes. The instruments in the AMTHF series are available with 2, 3 or 4 switching stages as temperature controllers (TR) and temperature monitors (TW). The contact spacing of the individual switching stages (in °C) is factory-set according to customer requirements. Surface-mounting thermostats operate on the principle of liquid expansion, with a microswitch serving as the electrical switching device.

Switching action

Temperature controller (TR) and temperature monitor (TW)

When the temperature at the probe exceeds the selected setpoint, the microswitch is actuated via a transmission mechanism and the circuit is opened or closed. When the temperature drops below the selected setpoint (by the amount of the switching differential), the microswitch returns to its initial position.

Types

Type		Switching action	Switching stage
with rigid stem	with capillary		
AMTHF**s**-13	AMTHF**f**-13	TR	2
AMTHF**s**-133	AMTHF**f**-133	TR	3
AMTHF**s**-1333	AMTHF**f**-1333	TR	4
AMTHF**s**-23	AMTHF**f**-23	TW	2
AMTHF**s**-233	AMTHF**f**-233	TW	3
AMTHF**s**-2333	AMTHF**f**-2333	TW	4

Technical data

Control range and probe table — liquid-filled

Control/limit range °C	Switching differential %	Max. probe temperature °C	Max. switch head temperature °C	Capillary length m	Max. contact spacing °C	Pobe length L in mm, probe dia. d in mm dia. 6 = standard	
						ø 6	ø 8
-20 to + 40	1	+ 50	+ 50	5	5	245	145
	2.5	+ 50	+ 50		8	245	145
	5	+ 95	+ 50 (80)[1]		25	138	91
	7	+ 100	+ 50 (80)[1]		50	103	73
0 to + 50	1	+ 60	+ 60	3	5	283	165
	2.5	+ 60	+ 60	3	10	283	165
	5	+ 105	+ 60 (80)[1]	5	25	159	101
	7	+ 110	+ 60 (80)[1]	5	50	117	80
+20 to + 90	1	+ 115	+ 80	1	7	210	127
	2.5	+ 115	+ 80	1	14	210	127
	5	+ 140	+ 80	5	35	121	82
	7	+ 175	+ 80	5	70	91	67
0 to +100	1	+ 125	+ 80	2	10	157	100
	2.5	+ 125	+ 80	2	20	157	100
	5	+ 165	+ 80	5	50	94	68
	7	+ 200	+ 80	5	100	73	58
+30 to +110	1	+ 135	+ 80	2	8	188	116
	2.5	+ 135	+ 80	2	16	188	116
	5	+ 170	+ 80	5	40	110	76
	7	+ 200	+ 80	5	80	84	63
0 to +150	1	+ 173	+ 80	1	15	113	78
	2.5	+ 173	+ 80		30	113	78
	5	+ 200	+ 80		75	72	57
0 to +200	1	+ 230	+ 80	1	20	113	78
	2.5				40		
+50 to +200	1	+ 230	+ 80	1	15	139	92
	2.5				30		
+50 to +250	1	+ 228	+ 80	1	20	105	70
	2.5	+ 228	+ 80	1	40	105	70
	5	+ 300	+ 80	5	100	64	49
+50 to +300	1	+ 345	+ 80	2	25	87	61
	2.5	+ 345	+ 80		50		

[1] Values in brackets on request only, taking into account the operating states and required capillary length !

Control range and probe table — gas-filled

Control /limit range °C	Switching differential %	Max. probe temperature °C	Max. switch head temperature °C	Capillary length m	Max. contact spacing °C	Probe length L in mm, probe dia. d in mm dia. 6 = standard	
						ø 6	ø 8
+20 to +400	6	+ 460	+ 80	5	75	237	137
	10	+ 500	+ 80		200	127	81
+20 to +500	3 / 5	+ 530	+ 80	1	48	278	158
	6	+ 575	+ 80	5	95	176	106
	10	+ 575	+ 80	5	250	95	65

Capillaries and temperature probes

Type	End of scale	Capillary	Temperature probe	Note
AMTHF	up to 200 °C	copper (Cu), 1.5 mm dia. Mat. Ref. Cu-DHP	copper (Cu), Mat. Ref. Cu-DHP brazed	–
	up to 350 °C	copper (Cu), 1.5 mm dia. Mat. Ref. Cu-DHP	st. steel (CrNi), Mat. Ref. 1.4571 brazed	–
	up to 500 °C	st. steel (CrNi), 1.5 mm dia. Mat. Ref. 1.4571	st. steel (CrNi), Mat. Ref. 1.4571 welded	–
	up to 350 °C	st. steel (CrNi), 1.5 mm dia. Mat. Ref. 1.4571	st. steel (CrNi), Mat. Ref. 1.4571 welded	at extra cost
Capillary length	standard is 1000 mm, max. 5000 mm			
Min. bending radius of capillary	5 mm			

Note: If the max. permissible temperature at the probe, capillary and switch head is not fully utilized, it may be possible to increase the capillary length where it is restricted to 1, 2 or 3 m according to the control range and probe table. Please contact us, specifying the actual temperature to which the thermostat is exposed.

Electrical data

Switching device	2, 3 or 4 single-pole snap-action switches microswitch with changeover contact		
Contact rating	Switching action Switching differential	(n.c.) break contact terminal 2	(n.o.) make contact terminal 4
	TR, TW 2,5%, 5%, 6%, 7%, 10%	16 (3) A, 230 V AC +10%, p.f. = 1(0.6) 0.25A, 230 V DC +10%	8 (1.5) A, 230 V AC +10% p.f. = 1(0.6) 0.25A, 230 V DC +10%
	TR, TW 1%, 3%	6 (2) A, 230 V AC +10%, p.f. = 1(0.6) 0.25A, 230 V DC +10%	
Contact reliability	To ensure the highest possible switching reliability, we recommend a minimum loading of: AC / DC = 24 V, 20 mA		
Rated surge voltage	1500 V (via switching contacts 400 V)		
Overvoltage category	II		
Fusing required	see Contact rating		
Electrical connection	screw terminals up to 2.5 mm^2 conductor cross-section		

Operating data

Switching differential in % of control /limit range	Switching action	with liquid-filled measuring system		
		Nominal value	Possible actual value	
	TR, TW	2.5	2.5 max. 3.5	standard
		5	5 max. 6	on request
		7	7 max. 8	on request
		1	1 max. 2	at extra cost
		with gas-filled measuring system		
		5	5 max.11	standard
		6	6 max. 14	on request
		10	10 max. 16	on request
		3	2.5 max. 4	at extra cost

Contact spacing on multi-pole thermostats	with switching differential	Contact spacing of scale span minimum	 maximum	Switching point accuracy of contact spacing, % of span
	1% 2.5% 3%, 5% 6%, 7%, 10%	1% 1% 2% 3%	according to control range table	≤ 1% ≤ 1% < 2% < 3%
	The contact spacing is specified in °C against setpoint of contact I.			
	sign **-** = switching **before** setpoint sign **+** = switching **after** setpoint For simultaneous switching, specify contact spacing “0”.			

Switching point accuracy in % of control /limit range	Switching action	Switching differential liquid-filled	 gas-filled	in upper third of scale or at limit
	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%

Mean ambient temperature effect	Deviation of the ambient temperature at the switch head and / or capillary from the +22°C calibration ambient temperature will result in a shift of the switching point: higher ambient temperature = lower switching point lower ambient temperature = higher switching point							
	for temperatures with end of scale / limit value							
	< 200°C			≥ 200°C ≤ +350°C		≥ 400°C ≤ +500°C		
	TR, TW			TR, TW		TR, TW		
	switching differential in %							
	1 / 2.5	5	7	1 / 2.5	5	3 / 5	6	10
	ambient temperature effect on switch head, % per °C							
	0.15	0.26	0.34	0.12	0.21	0.12	0.17	0.24
	ambient temperature effect on capillary, % per °C per m							
	0.05		0.09	0.04		0.05		
	If the operating temperature at the switch head deviates appreciably from the +22°C calibration ambient temperature, this can be taken into account in the calibration, at extra charge.							

Operating data

Permissible storage temp.	-50 to 50°C
Permissible ambient temperature in operation	80°C max.
Nominal position (NL)	to DIN 16257, NL 0 — NL90 (other NL on request)

Housing

as standard	housing cover: polycarbonate, impact-resistant housing base: die-cast aluminium, painted	color: pebble gray RAL 7032 color: anthracite gray RAL 7015
Setpoint adjustment	AMTHF.-1... switching point adjustable from outside by rotary knob	AMTHF.-2... switching point adjustable with screwdriver, after removing housing cover
Protection	EN 60 529-IP54	
Cable entry	standard: clamping gland M20x1.5, for 8 — 10 mm cable diameter	
Weight	approx. 0.8 kg	

Switch head fixing for AMTHF**f** Series with capillary	standard	M18x1 thread with locknut on housing spigot, capillary exit at housing spigot
	extra code	
	r	by 2 screws through housing base, capillary exit at side of housing, cover and base in plastic
	b	steel mounting flange, capillary exit at housing spigot
	k	wall bracket

Process connection*

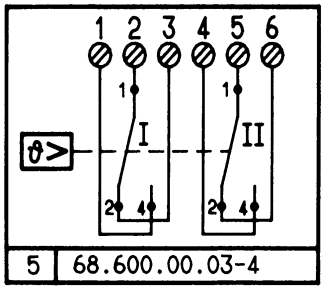
AMTHF**s** Series with rigid stem	end of scale up to 150°C **pocket U**	end of scale above 150°C **pocket UZ**
	screw-in pocket with screw-in spigot G 1/2 Form A to DIN 3852/2	screw-in pocket with screw-in spigot G 1/2 Form A to DIN 3852/2 and extension, so that the max. permissible ambient temperature +80°C at the housing is not exceeded
AMTHF**f** Series with capillary	**plain cylindrical probe A** (standard)	
	pocket U (on request)	
	screw-in pocket with screw-in spigot G 1/2 Form A to DIN 3852/2 and clamping clip with fixing screw for securing the probe	
Material	**pocket U**	**pocket UZ**
	up to +150°C: CuZn is standard above +150°C: St is standard (CrNi on request)	above +150°C: St is standard (CrNi on request)
Fitting length S	standard lengths: 100, 120, 150, 200 or 300; other lengths on request	
Immersion tube dia.	D = 8 mm, D = 10 mm	

Note:
Physical and toxicological properties of the expansion media that may escape in the event of a system fracture

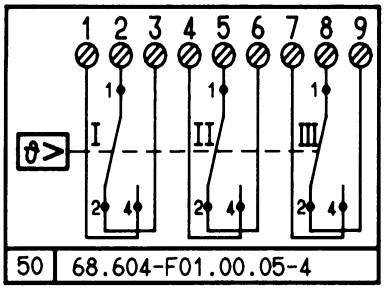
Control range with end of scale °C	Dangerous reactions	Fire/explosion hazard		Water contamination	Toxicological data		
		Ignition temp. °C	Explosion limit % v/v		irritant	danger to health	toxic
< +200	no	+ 355	0.6 — 8	yes	yes	[1]	no
≥ 200 ≤ +300	no	+ 490	- -	yes	yes	[1]	no
> 350 ≤ +500	no	no	no	no	no	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.

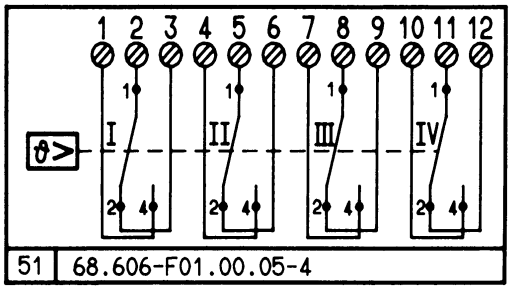
Connection diagrams



AMTHF-13
AMTHF-23

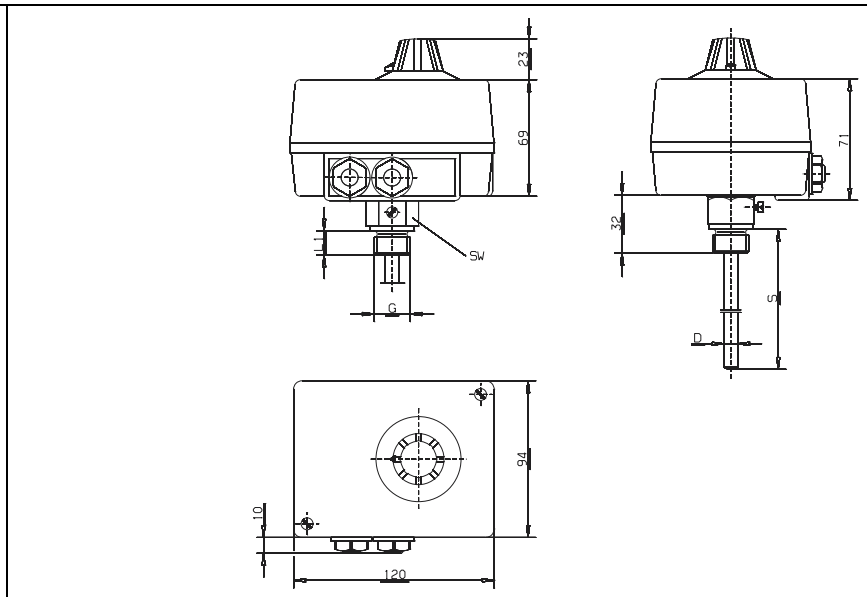
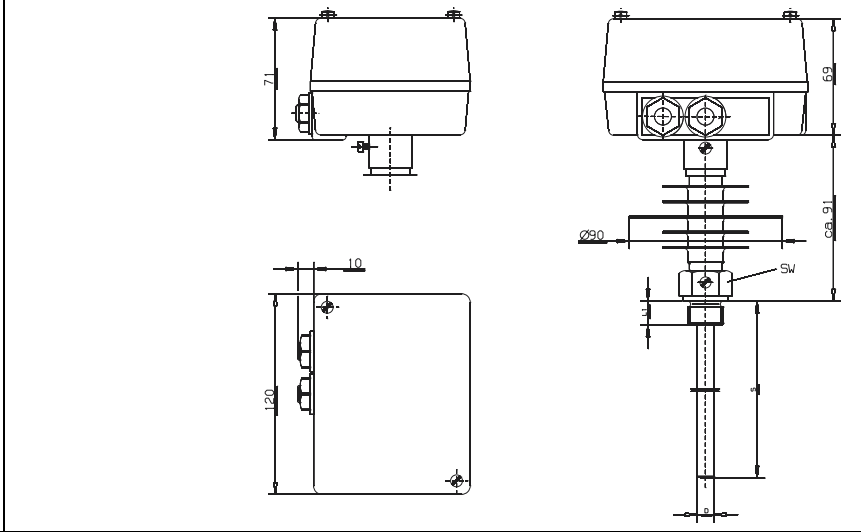
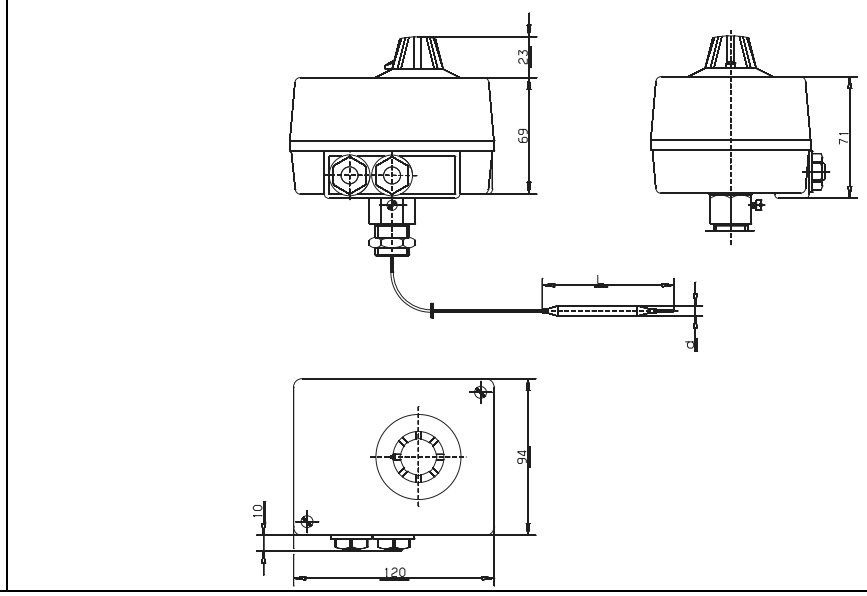


AMTHF-133
AMTHF-233



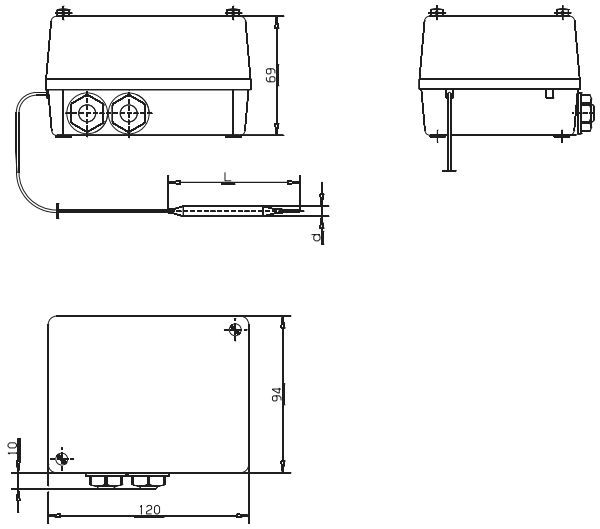
AMTHF-1333
AMTHF-2333

Dimensions

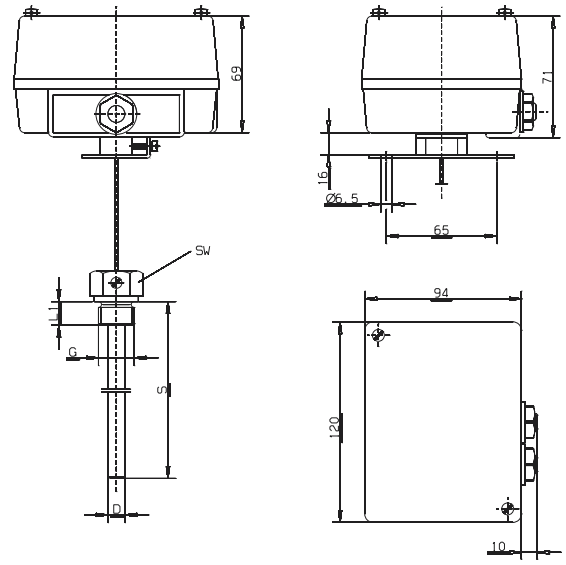
AMTHF**s**-1... with pocket U	
AMTHF**s**-2... with pocket UZ	
AMTHF**f**-1... Switch head mounting with plain cylindrical probe A as standard, no pocket	

Dimensions

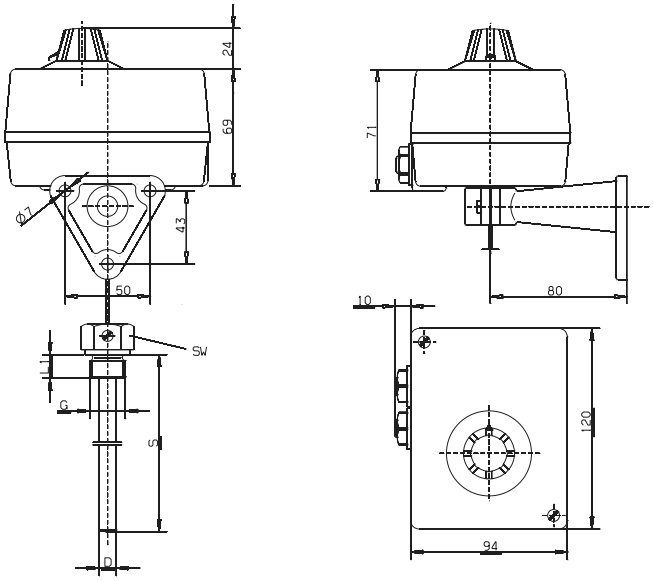
AMTHF**f**-2.../r
Capillary exit
at side of housing,
with plain cylindrical
probe A, **no** pocket



AMTHF**f**-2.../b
with mounting flange
and pocket U



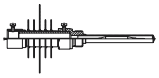
AMTHF**f**-1...
with wall bracket and
pocket U



Order details
AMTHF Series

Order code				
	(1)	**Basic type**		
603051		Surface-mounting thermostat , AMTHF series with 2, 3 or 4 single-pole snap-action switches		
	(2)	**Basic type extension (action)**		
0013		AMTHF.-13	temperature controller, 2-pole	
0023		AMTHF.-23	temperature monitor, 2-pole	
0133		AMTHF.-133	temperature controller, 3-pole	
0233		AMTHF.-233	temperature monitor, 3-pole	
1333		AMTHF.-1333	temperature controller, 4-pole	
2333		AMTHF.-2333	temperature monitor, 4-pole	
	(3)	**Style**		
1		AMTHF**s** with rigid stem		
2		AMTHF**f** with capillary		
	(4)	**Control / limit 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		+20 to +300°C		
045		+20 to +400°C		
046		+20 to +500°C		
	(5)	**Switching differential**		
10		1%		
25		2.5%	of scale span	for liquid-filled measuring systems
50		5%		
70		7%		
30		3%		
50		5%	of scale span	for gas-filled measuring systems
60		6%		
01		10%		
	(6)	**Capillary length** (in mm)		
0		AMTHF**s** without capillary		
1000		1000 mm		
2000		2000 mm		
3000		3000 mm		
4000		4000 mm		
5000		5000 mm		
. . . .		(special length, details in plain text)		
	(7)	**Material of capillary**		
00		AMTHF**s** without capillary		
40		Cu (copper)		
20		CrNi (stainless steel 1.4571)		

Order details
AMTHF Series

Order code		
	(8)	**Process connection***
10		A = plain cylindrical probe (for AM.**f** only) 
20		U = screw-in pocket 
30		UZ = screw-in pocket with extension 
	(9)	**Thread for process connection***
00		no thread (process connection 10)
13		external thread G 1/2
	(10)	**Material of process connection**
00		for process connection A only
46		CuZn (brass)
01		St (steel)
20		CrNi (stainless steel 1.4571)
	(11)	**Fitting length S (immersion tube length)**
000		AMTHF**f** without pocket
100		100 mm
120		120 mm
150		150 mm
200		200 mm
300		300 mm
400		400 mm
. . . .		(special length, details in plain text)
	(12)	**Diameter D (immersion tube diameter)**
00		AMTHF**f** without pocket
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		r switch head mounting by 2 screws through housing base, capillary exit at side of housing, cover and base in plastic
764		b steel mounting flange, capillary exit at housing spigot
248		k wall bracket

* for other connections and pockets, see Data Sheet 60.6710.

Contact spacing for 2-, 3- and 4-pole thermostats: details 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)	
603051	/	. . . .	-	.	-	. . .	-	. .	-	. . . .	-	. .	-	. .	-	. .	-	. .	-	. . .	-	. .	-	. .	/	. . .	,

Order example:

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

Contact spacing: _____

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JUMO Room thermostats Type ATHR

ATHR-1

Brief description

Type ATHR room thermostats are used in HVAC, in industrial and commercial premises, garden centers and stables for the control of heating/cooling, air-conditioning and ventilation systems.
Room thermostats in the ATHR series operate on the principle of liquid expansion. A temperature change in the liquid-filled sensing system, which consists of probe, capillary and diaphragm, produces a volume change. The resulting movement of the diaphragm operates a microswitch through a lever mechanism.

Switching action

Temperature controller TR and temperature monitor TW
If the temperature at the probe exceeds the set limit, the circuit is opened through a snap-action switch. If the temperature falls below the set limit (by the switching differential), the switch returns to its initial position.

ATHR-22

Types

Single thermostats
ATHR-1 temperature controller TR
switching point externally adjustable
ATHR-2 temperature monitor TW
switching point adjustable after removing case cover

Twin thermostats
ATHR-11 2 x temperature controller TR
ATHR-12 1 x temperature controller TR / 1 x temperature monitor TW
ATHR-22 2 x temperature monitor TW

Technical data

Electrical data

Switching element	Single thermostat	Twin thermostat
	1 microswitch with changeover contact	2 microswitches with changeover contact
Max. contact rating	10 (2) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25 A, 230 V DC +10%	

Operating data

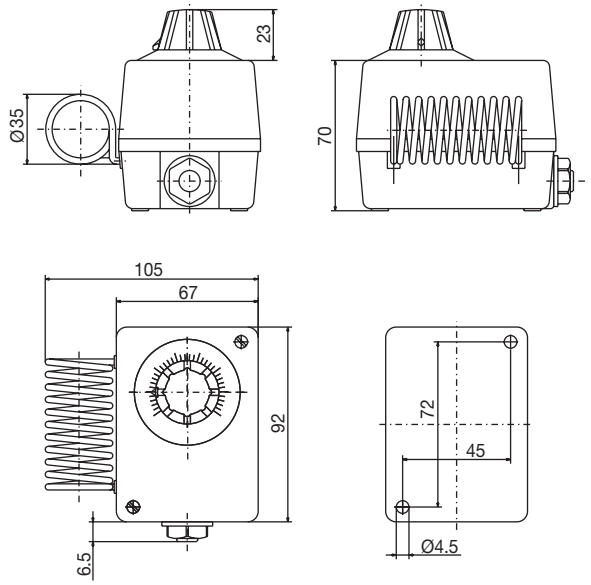
Control ranges	0 to +50°C or -10 to +40°C
Switching point accuracy	±0.5°C at 20°C
Switching differential	0.5 — 1.5°C
Permissible ambient temp.	in operation: -20 to +60°C
Permissible storage temp.	-50 to +50°C
Nominal position (NL)	to DIN 16 257, NL 0 — NL 90 (other NL on request)

Case

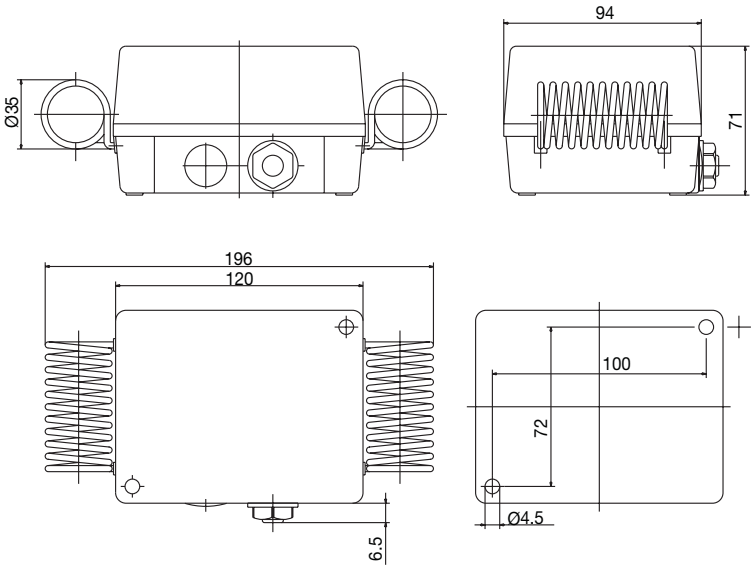
Case	plastic case in impact-resistant polycarbonate color: cover pebble gray – RAL 7032, base anthracite gray – RAL 7016	
Case fixing	by 2 screws on inside of case	
Cable entry	as standard: clamping gland M 20 x 1.5, for 8 — 10 mm cable diameter	
Enclosure protection	EN 60 529-IP54	
Temperature probe	1 or 2 coiled probe(s), tinned copper	
Weight	approx. 0.35 kg	approx. 0.65 kg

Dimensions

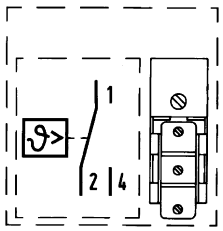
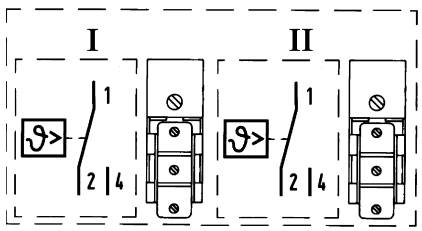
ATHR-1



ATHR-22



Connection diagrams

Single thermostat	Twin thermostat
	

Order details: ATHR series

Order code	(1)	Basic type (Basic version)
604024-01	ATHR-1	1 x temperature controller TR, switching point externally adjustable
604024-02	ATHR-2	1 x temperature monitor TW, switching point adjustable after removing case cover
604024-11	ATHR-11	2 x temperature controller TR, switching point externally adjustable
604024-12	ATHR-12	1 x temperature controller TR, switching point externally adjustable, 1 x temperature monitor TW, switching point adjustable after removing case cover
404024-22	ATHR-22	2 x temperature monitor TW, switching point adjustable after removing case cover

	(2)	Control / limit ranges
16		-10 to + 40°C
21		0 to + 50°C

Order code

(1)		**(2)**
	/	. .

Order example

604024-01 / 21 = thermostat with microswitch and changeover contact, 1 x temperature controller TR, switching point externally adjustable, 0 to + 50°C

604024-12 / 16 = thermostat with microswitch and changeover contact, 1 x temperature controller TR, switching point externally adjustable, 1 x temperature monitor TW, switching point adjustable after removing case cover, -10 to + 40°C

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JUMO Room thermostats Type AMRc

AMRc-1

Brief description

Type AMRc room thermostats are used in HVAC, in industrial and commercial premises, garden centers and stables for the control of heating /cooling, air-conditioning and ventilation systems.
Room thermostats in the AMRc series operate on the principle of liquid expansion. A temperature change in the liquid-filled sensing system, which consists of probe, capillary and diaphragm, produces a volume change. The resulting movement of the diaphragm operates a microswitch through a lever mechanism.

AMRc-2

Switching action

TR and TW
If the temperature at the probe exceeds the set limit, the circuit is opened through a snap-action switch. If the temperature falls below the set limit (by the switching differential), the switch returns to its initial position.

Types

AMRc-1 temperature controller TR
switching point externally adjustable
AMRc-2 temperature monitor TW
switching point adjustable after removing case cover

Technical data

Electrical data

Switching element	1-pole microswitch with changeover contact
Max. contact rating	10 (2) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25 A, 230 V DC +10%, max. permissible starting current: break contact: 16 A make contact: 10 A
Electrical connection	via terminal strip, after removal of case cover

Operating data

Control ranges	0 to +50°C or -10 to +40°C
Switching point accuracy	±0.75°C at +20°C
Switching differential	1 – 2°C
Permissible ambient temp.	in operation: -20 to +60°C
Permissible storage temp.	-50 to +50°C
Nominal position (NL)	to DIN 16 257, NL 0 — NL 90 (other NL on request)

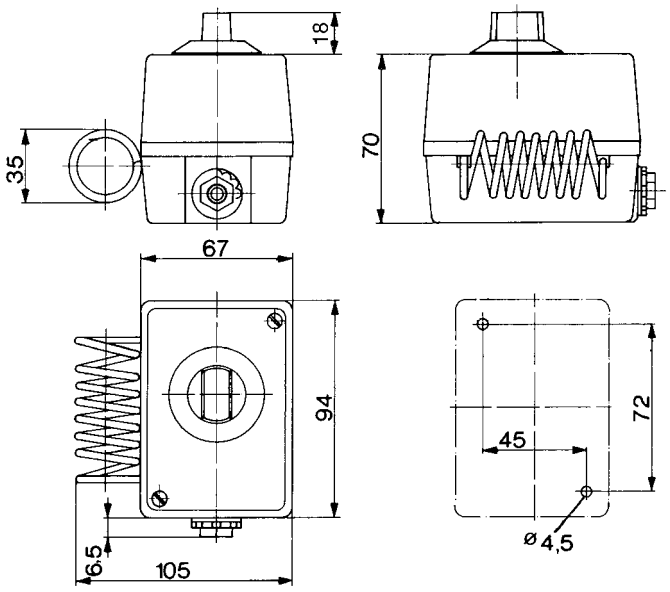
Case

Case	plastic case in impact-resistant polycarbonate color: cover pebble gray – RAL 7032, base anthracite gray – RAL 7016
Case fixing	by 2 screws on inside of case
Cable entry	as standard: clamping gland M 20 x 1.5, for 8 — 10 mm cable diameter
Protection	EN 60 529-IP54
Temperature probe	coiled probe, tinned copper
Weight	approx. 0.32 kg

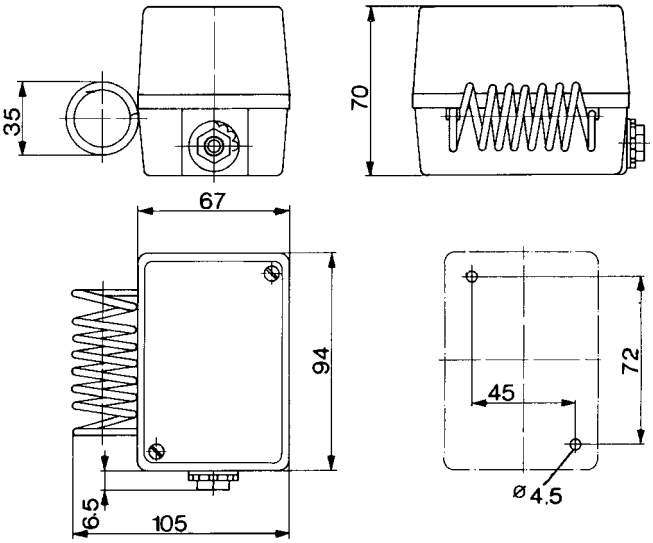
02.05/00073242

Dimensions

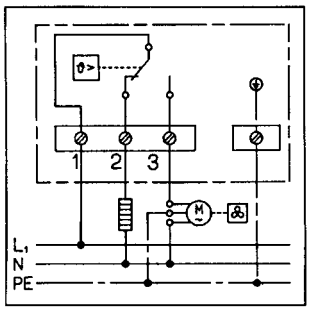
AMRc-1



AMRc-2



Connection diagram



Order details
AMRc series

Order code	(1)	Basic type
604041		room thermostat Typ AMRc
	(2)	**Basic type extension**
01		AMRc-1 temperature controller (TR), switching point externally adjustable with rotary knob
02		AMRc-2 temperature monitor (TW), switching point adjustable with screwdriver, after removing case cover
	(3)	**Control / limit setting ranges**
016		-10 to + 40°C
021		0 to + 50°C

Order code

(1)		(2)		(3)
604041	/	. .	-	. . .

Order example

604041 / 16 - 016 = Temperature monitor (TW), switching point adjustable with screwdriver, after removing case cover, -10 to +40°C

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Room Thermostat Type AMFRc-1333

- **IP54 protection**
- **4-stage room thermostat in surface-mounting housing, switching in sequence**
- **electrical wiring on pcb**
- **setpoint adjustment from outside by turning the knob**
- **contact spacing permanently set in factory to customer specification**

Brief description

The room thermostat Type AMFRc-1333 is a 4-stage temperature controller with a high response accuracy. The wiring has been laid out for fan control by different speed stages. The contact spacing of the individual switching stages in °C is permanently set in the factory to customer specification. Room thermostats operate on the principle of liquid expansion, with a microswitch serving as the electrical switching device.

Switching action

If the temperature at the temperatur probe exceeds the selected setpoint, the microswitch is operated through a mechanism and the circuit is opened or closed. When the temperature falls below the selected setpoint (by the amount of the switching differential), the microswitch returns to its initial position.

Technical data

Electrical data

Electrical connection	via terminal board, after removal of cover, temperature controller and terminal board are mounted on a pcb and electrically wired up in accordance with the connection diagram
Switching device	4 single-pole snap-action switches with changeover contact
Max. contact rating	10 (2) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25 A, 230 V DC +10%, max. permissible starting current: break contact: 16 A make contact: 10 A

Operating data

Control ranges	-10 to +40°C or 0 to +50°C	
Switching point accuracy	setpoint: ± 0.75 °C at 20°C, contact spacing: ± 0.25 °C	
Contact spacing	The contact spacing is defined in °C relative to the setpoint (contact I). 10 °C max. / 0.5 °C min.	The switching stages are assigned to be below the setpoint. The contact spacing of the 3 switching stages is specified in °C relative to the setpoint. (For example, -1°C/-2°C/-3°C, i.e. with a setpoint selection +20°C and rising temperature, the first stage switches at +17°C, the second stage at +18°C, the third stage at +19°C and the fourth stage at the setpoint +20°C).
Switching differential	approx. 1.2 °C	
Permissible ambient temp.	in operation -20 to +60°C	
Permissible storage temp.	-50 to +50°C	
Nominal position (NL)	to DIN 16 257, NL 0 — NL 90 (other NL on request)	

Housing

Housing	plastic housing in impact-resistant polycarbonate color: cover pebble gray RAL 7032, base anthracite RAL 7016
Housing fixing	by 2 screws inside housing
Cable entry	standard: clamping gland M20 x 1.5, for 8 — 10 mm cable diameter
Enclosure protection	EN 60 529-IP54
Temperature probe	coiled probe, tinned copper
Weight	approx. 0.5 kg

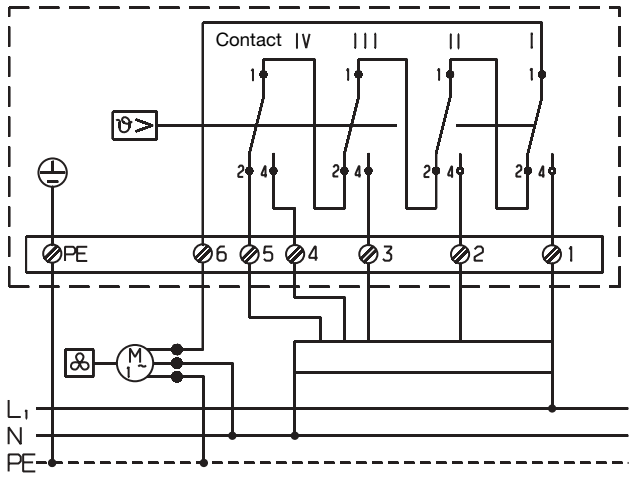
Note:

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

Dangerous reactions	Fire / explosion hazard		Water contamination	Toxicological data		
	Ignition temperature °C	Explosion limit % v/v		irritant	danger to health	toxic
no	+ 355	0.6 — 8	yes	yes	[1]	no

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

Connection diagram



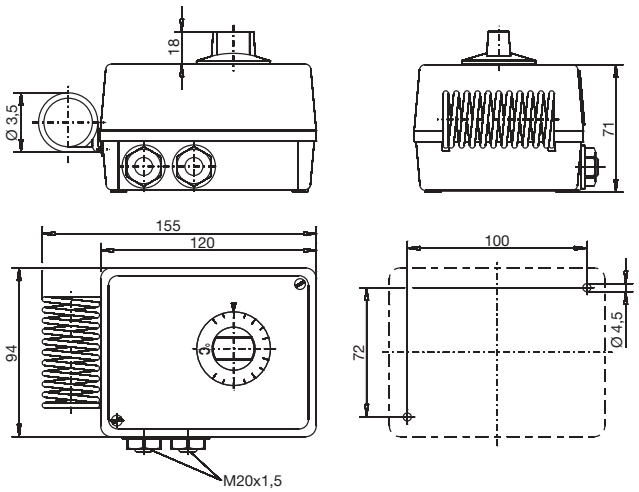
Switching action

The setpoint is at contact **I**. If this setpoint is set to +28°C, for instance, and the room temperature is below +20°C, then the fan operates with the lowest transformer voltage. This lowest transformer voltage is on terminal 5. In this case, the current flows from terminal 5 via the contacts **IV**, **III**, **II** and **I** to terminal 6, or to the fan.
If the room temperature rises to +20°C, then stage **IV** switches over and the next-higher transformer voltage, terminal 4, is switched through to the fan. On reaching +23°C, the voltage from terminal 3 is switched through, at +25°C from terminal 2 and at +28°C from terminal 1 (mains supply voltage).
With falling temperature, the switchover takes place in reverse order, but lower than the corresponding setpoint by the amount of the switching differential of the thermostats (1.2°C).

Switching sequence with rising temperature

Contact			
Follow-on contact			Setpoint
IV	**III**	**II**	**I**
e.g. ϑ-8°C	e.g. ϑ-5°C	e.g. ϑ-3°C	ϑ

Dimensions



Order details

Available from stock

Sales No.	Type	Control range °C	Switching differential °C	Contact spacing
60/60000406	AMFRc-1333	0 to +50	1.2	-1°C, -2°C, -3°C

Not available from stock

Order code	(1) Basic type
604045	AMFRc-1333 4-stage room thermostat in surface-mounting housing, factory-set to switching in sequence
	(2) Control ranges
016	-10 to + 40°C
021	0 to + 50°C
	(3) Contact spacing
. . . . .	details in plain text (e.g. -2°C, -4°C, -6°C)

Order code

(1)		(2)		(3)
604045	/			. . . . .

Order example

604045	/	021	-	-2°C, -4°C, -6°C

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JUMO Room Thermostats (1-pole) Type AMDR

AMDR-1

Brief description

Type AMDR room thermostats are used in HVAC, in industrial and commercial premises, garden centers and stables for the control of heating / cooling, air-conditioning and ventilation systems.
Room thermostats in the AMDR series operate on the principle of liquid expansion. A temperature change in the liquid-filled sensing system, which consists of probe, capillary and diaphragm, produces a volume change. The resulting movement of the diaphragm operates a microswitch through a lever mechanism.

AMDR-2

Switching action

TR and TW
If the temperature at the probe exceeds the set limit, the circuit is opened through a snap-action switch. If the temperature falls below the set limit (by the switching differential), the switch returns to its initial position.

Types

AMDR-1 Temperature controller TR,
switching point externally adjustable
AMDR-2 Temperature monitor TW,
switching point adjustable after removing the screw plug

Technical data

Electrical data

Switching element	1-pole microswitch with changeover contact
Max. rating	terminal 2: 16 (3) A, 230 V AC +10%, p.f. = 1 (0.6) terminal 4: 8 (1.5) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25 A, 230 V DC +10% max. starting current: 16 A, p.f. = 0.6
Electrical connection	after removing housing cover, at screw terminals up to 2.5mm^2 conductor cross-section

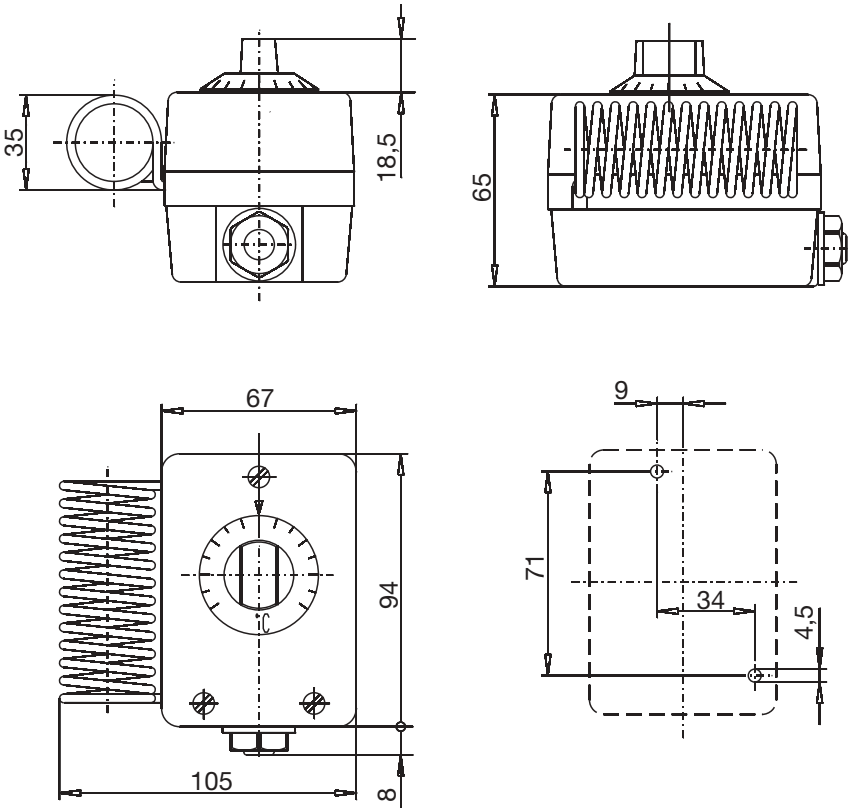
Operating data

Control ranges	0 to +50°C or -10 to +40°C
Switching point accuracy	±0.75 °C at +20°C
Switching differential	1 — 2 °C
Permissible ambient temp.	in operation: -20 to +60°C
Permissible storage temp.	-50 to +50°C
Nominal position (NL)	to DIN 16 257, NL 0 — NL 90 (other NL on request)

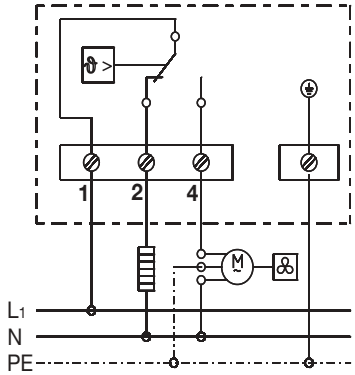
Housing

Housing	plastic housing in impact-resistant polycarbonate color: cover gray beige, RAL 1019; base/setpoint knob light brown RAL 8025
Housing fixing	by 2 screws on the inside of housing
Cable entry	as standard: clamping gland M 20 x 1.5, for 8 — 10 mm cable diameter
Enclosure protection	IP54 to EN 60 529
Temperature probe	coiled probe, tinned copper
Weight	approx. 0.35 kg

Dimensions



Connection diagram



Order details: AMDR Series

Order code	(1)	Basic type
604046		Room thermostat, AMDR series
	(2)	**Basic type extension**
01		AMDR-1 Temperature controller (TR), switching point externally adjustable by rotary knob
02		AMDR-2 Temperature monitor (TW), switching point adjustable with screwdriver after removing the screw plug
	(3)	**Control / limit ranges**
016		-10 to + 40 °C
021		0 to + 50 °C

Order code

(1)		(2)		(3)
604046	/	. .	-	. . .

Order example

604046	/	02	-	016

= Temperature monitor (TW), switching point adjustable with screwdriver after removing the screw plug, -10 to +40 °C

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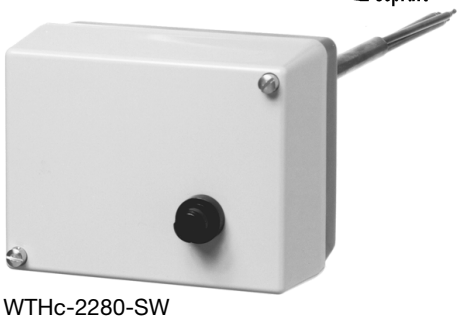
Warm-air Thermostats WTHc Series

tested to DIN 3440

for stock items see page 4

WTHc-2280



WTHc-2280-SW

Brief description

Thermostats control and monitor thermal processes. Thermostats in the WTHc series are suitable for application in warm-air heating installations to DIN 4794. They consist of 3 separate sensing and switching systems that can function as temperature controller TR, temperature monitor TW and protection temperature limiter STB.
In fault condition, the STB sets the system being monitored to a safe operational state. Warm-air thermostats operate on the principle of liquid expansion. Microswitches serve as the electrical switching devices.

Switching action

Temperature controller TR and temperature monitor TW
When the temperature at the probe exceeds the selected setpoint, the microswitch is operated via the transmission mechanism and the circuit is opened or closed. When the temperature drops below the selected setpoint (by the amount of the switching differential), the microswitch returns to its initial position.

Lock-out facility on the protection temperature limiter STB
If the temperature at the probe exceeds the set limit, the circuit is opened and the microswitch is locked out mechanically.
After the temperature has fallen below the critical temperature by about 10 °C, the microswitch can be reset manually.

Self-monitoring facility on the protection temperature limiter STB
In the event of a measuring system failure, i.e. if the expansion liquid has leaked, then the pressure on the diaphragm of the STB drops and the electrical circuit is permanently open. It is no longer possible to reset the system.
When the temperature at the probe falls below -20°C, the circuit is also opened, but will close again automatically when the temperature rises.

Types and approvals

Types	Switching action	DIN Reg. No.	Test
WTHc-2280 WTHc-2240	TR/TW/STB	TR/TW/STB 106405	DIN 3440

Extra codes	
U	**SW**
STB with break (n.c.) contact, lock-out and additional signal contact (Type WTHc-2240 only)	housing with IP54 rating, protected against dust and splashing water

Technical data

Control ranges and limit

Control range / limit	Fan controller	Burner monitor	Protection temperature limiter
	TR — System 2 +20 to +80°C	TW — System 2 +70 to +90°C	STB — System 80 or 40 limit 100°C

Capillary and temperature probe

Capillary	material:	copper (Cu), Mat. Ref. 2.0090
	diameter:	Ø 1.5 mm
	capillary length including probe:	350 mm with support tube 1250 mm without support tube [1]
	minimum bending radius:	5 mm
Temperature probe	material:	copper (Cu), Mat. Ref. 2.0090, brazed
	diameter:	3 probes Ø 4 mm

[1] probe coding on version with capillary: fan controller TR: red, burner monitor TW: blue

Electrical data

Switching device	Fan controller Burner monitor	Protection temperature limiter STB System 80	Protection temperature limiter STB System 40/U
	microswitch with changeover contact	microswitch with break (n.c.) contact and lock-out	microswitch with break (n.c.) contact, lock-out and additional signal contact
Max. contact rating	10 (2) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25A, 230 V DC +10%		
Electrical connection	via terminal strip, after removing housing cover; temperature controller and terminal strip are mounted on a printed circuit board (epoxy-resin glass fiber)		

Operating data

Switching differential	Switching action:	fan controller TR	14 ± 2°C
		burner monitor TW	6 ± 1°C
Switching point accuracy	Switching action:	in upper third of scale or at limit setting	at start of scale
	fan controller TR	± 4°C	± 6°C
	burner monitor TW	± 4°C	± 4°C
	safety temperature limiter STB	$^{+0}_{-5}$°C	- - -
Ambient temperature effect	on switch head: 0.35 °C per °C on capillary: per meter: 0.07 °C per °C		
Operating medium	air		
Time constant	in air: ≤120 sec		
Safe overtemperature	at the temperature probe: +200°C		
Permissible storage temperature	-50 to +50°		
Permissible ambient temperature in use	80°C max.		
Nominal position (NL)	to DIN 16 257, NL 0 — NL 90 (other NL on request)		

Housing

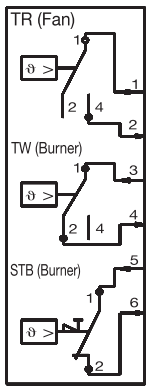
standard	housing cover: polycarbonate base: sheet steel, zinc-plated	color: pebble gray RAL 7032
Extra code SW	housing cover: polycarbonate, impact-resistant base: die-cast aluminium, painted	color: pebble gray RAL 7032 color: anthracite gray RAL 7015
Setpoint adjustment	safety temperature limiter STB: fixed factory setting	fan controller TR and burner monitor TW: switching point adjustable with screwdriver, after removing housing cover
	standard	**with extra code /SW**
Enclosure protection	EN 60 529 - IP40	EN 60 529 - IP54
Cable entry	2 push sockets	clamping nipple M 20 x 1.5, for 8 — 10 mm cable dia.
Switch head fixing	by 2 screws through housing base	by 2 screws at the flange of the support tube, then by one screw at the hexagon of the support tube
Weight	approx. 0.7 kg	

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

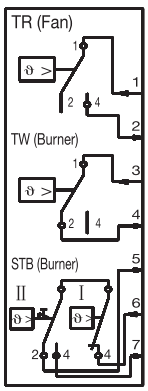
Control range with end of scale	Dangerous reactions	Fire and explosion hazard		Water contamination	Toxicological data		
		Ignition temperature	Explosion limit		irritant	danger to health	toxic
≤ +200°C	no	+ 355°C	0.6 — 8 % v/v	yes	yes	[1]	no

[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.

Connection diagrams



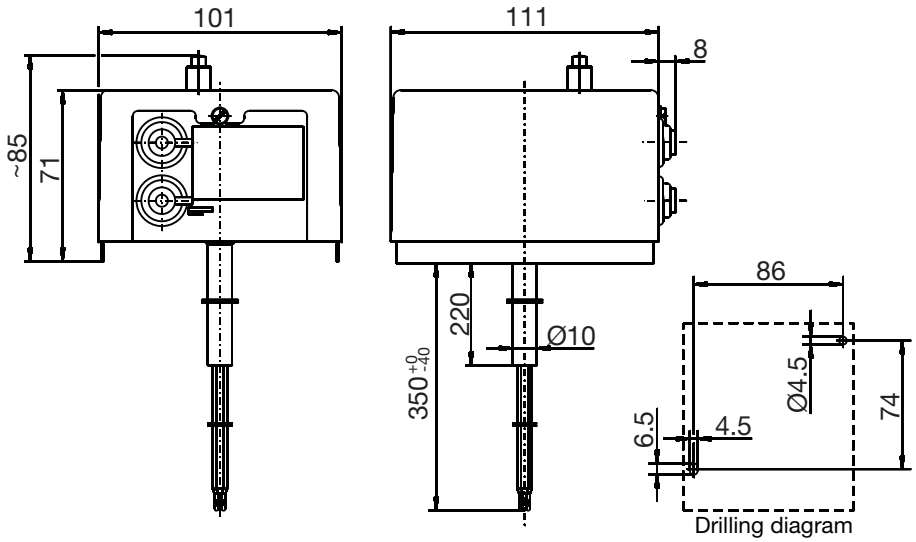
WTHc-2280
WTHc-2280-SW



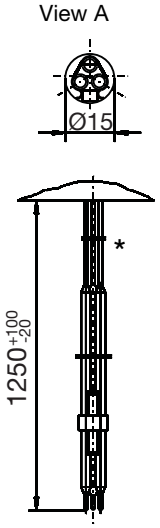
WTHc-2240/U
WTHc-2240-SW/U

Dimensions

WTHc-2280
WTHc-2240/U
IP40 protection

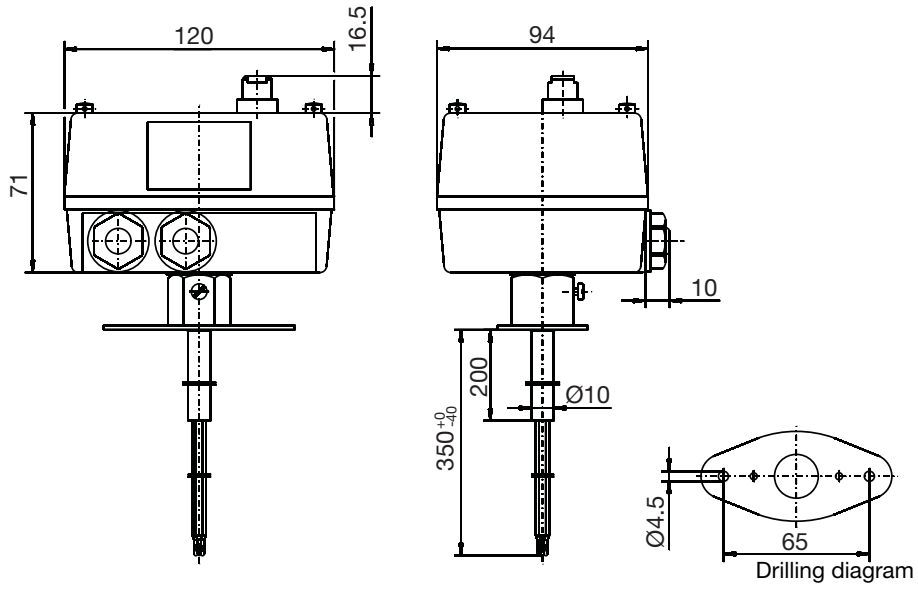


Style 1
with support tube,
switch head mounted by 2 screws through housing base,
extra code **r**

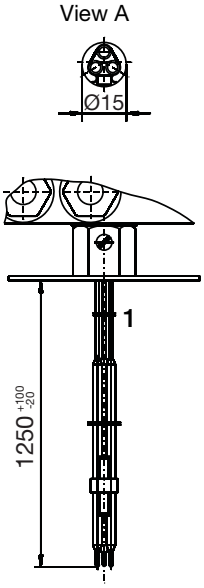


Style 2
no support tube, switch head mounted by 2 screws through housing base,
extra code **r** with capillary,
process connection **A**

WTHc-2280-SW
WTHc-2240/U/SW
IP54 protection



Style 1
with support tube,
process connection **UOF**,
mounting flange with support tube



Style 2
no support tube, switch head fixing by mounting flange in CuZn (brass), extra code **b** with capillary, process connection **A**

[1]probe coding: fan controller TR: **RED**; burner monitor TW: **BLUE**

Stock items

(delivery: 3 working days after receipt of order)

Sales No.	Type	Control range °C	Capillary incl. probe mm	Fitting length mm
60/60002161	WTHc-2280	TR = + 20 to +80 TW = + 70 to +90 STB = +100 fixed	- -	350
60/60002162	WTHc-2280		1250	- -
60/60002658	WTHc-2280-SW		- -	320

Order details

Warm-air thermostats, WTHc series

Order code			
	(1)	**Basic type**	
604514		Warm-air thermostat, WTHc series	
	(2)	**Basic type extensions**	
2280		WTHc-2280	Temperature controller TR and temperature monitor TW with changeover contact, Protection temperature limiter STB with break (n.c.) contact and lock-out
2240		WTHc-2240	Temperature controller TR and temperature monitor TW with changeover contact, Protection temperature limiter STB with break (n.c.) contact, lock-out and additional signal contact (with extra code “U” only)
	(3)	**Style**	
1		with support tube	
2		without support tube, with capillary	
	(4)	**Control / limit range for temperature controller**[1]	
040		+20 to +80°C	
	(5)	**Control / limit range for temperature monitor**[1]	
070		+70 to +90°C	
	(6)	**Limit for protection temperature limiter***	
100		+100°C	
	(7)	**Capillary length**	
0		style 01, without capillary	
1250		1250 mm	
. . . .		(special length, details in mm, max. 5000 mm)	
	(8)	**Process connection (PA)**	
00		switch head mounting **r**, Style 01	
10		A = plain cylindrical probe (on Style 02 only)	
26		UOF = mounting flange with support tube	
	(9)	**Fitting length S (immersion tube length)**	
000		Style 02, with capillary	
350		350 mm	
. . . .		(special length, details in mm)	
	(10)	**Probe diameter**	
4		4 mm	
	(11)	**Extra codes**[2]	
000		no extra code	
574		**U**	STB with break (n.c.) contact, lock-out and additional signal contact (on type WTHc-2240 only)
718		**SW**	housing with IP54 rating, protected against dust and splashing water
711		**r**	switch head mounting by 2 screws through housing base
764		**b**	mounting flange in CuZn (brass)

Order code

(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)		(11)[2]
604514	/	. . . .	-	.	-	. . .	-	. . .	-	. . .	-	.	-	. .	-	. . .	-	.	/	. . .

Order example

604514	/	2240	-	1	-	040	-	070	-	100	-	0	-	26	-	350	-	4	/	574

[1] other control / limit ranges on request
[2] List extra codes in sequence, separated by commas.

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Explosion-protected surface-mounting Thermostat ATH-Ex Series

EC type examination to ATEX Directive 94/9/EC for explosive gas atmosphere Zone 1 and explosive dust atmosphere Zone 21

TW temperature monitor
STW fail-safe temperature monitor

Brief description

Explosion-protected surface-mounting thermostats in the ATH-Ex series control and monitor thermal processes. They can be used directly in the hazardous area (zone 1 and zone 21).
The thermostats are available both as temperature monitor TW and temperature monitor STW (fail-safe).
Ex thermostats operate on the principle of liquid or gas expansion. The electrical switching device is a microswitch inside a flameproof enclosure.

Ex marking

⟨Ex⟩ **II 2G** **EEx ed IIC T6** for explosive gas atmospheres

⟨Ex⟩ **II 2D** **IP65 T80°C** for explosive dust atmospheres

Explosion protection

⟨Ex⟩ **II 2G** Equipment group II, Category 2,
Equipment for explosive gas atmospheres

⟨Ex⟩ **II 2D** Equipment group II, Category 2,
Equipment for explosive dust atmospheres

Type of explosion protection:

EEx ed IIC T6

EEx	**General requirements**	Euronorm EN 50 014 / VDE 0170 / 0171 Part 1
e	**Increased safety**	Euronorm EN 50 019 / VDE 0170 / 0171 Part 6
d	**Flameproof enclosure**	Euronorm EN 50 018 / VDE 0170 / 0171 Part 5
IIC	**Gas group**	
T6	**Temperature class**	

IP65 T80°C

Application in combustible dusts	Euronorm EN 50 281-1-1 / VDE 0170 / 0171 Part 15-1-1
IP65	**Protection to EN 60 529-IP65**
T80°C	**Max. permissible surface temperature** (use in combustible dusts)

Switching action

Temperature monitor TW and fail-safe temperature monitor STW	**Self-monitoring facility on the fail-safe temperature monitor STW**
If the temperature at the probe exceeds the selected setpoint, the microswitch is operated through a mechanism, and the circuit is opened or closed. If the temperature falls below the selected setpoint (by the amount of the switching differential), the microswitch returns to its initial position.	A failure of the measuring system, i.e. when the expansion liquid escapes, will cause the pressure under the diaphragm to drop (STW), thus permanently opening the circuit. The thermostat can no longer be reset. If the probe cools down to a temperature in accordance with the control range table, e.g. below -20°C, the circuit will also open. The STW is reset automatically.

Types and approvals

Type	Switching action	Test certificate	Test	DIN Reg. No.
ATH-Ex-2	TW	PTB 03 ATEX 1167	Pressure Equipment Directive 97/23/EC (ATH-Ex-20 only)	TW 76602
ATH-Ex-20	STW			STW (STB) 76702

Technical data

Control ranges and probe table

Control range °C	Switching point accuracy in upper third of scale * TW	Switching point accuracy in upper third of scale * STW	Maximum capillary length mm	Maximum probe temp. to DIN 3440 °C	STW opens at probe temp. below (°C):	Probe length L for d = 6 mm TW	Probe length L for d = 6 mm STW
-20 to + 50	+ 0 °C - 3 °C	+ 0 °C - 3.5°C	5000	+ 60	-30	153	132
0 to + 50	+ 0 °C - 2 °C	+ 0 °C - 2.5°C		+ 60	-10	202	172
0 to +100	+ 0 °C - 4 °C	+ 0 °C - 5 °C		+115	-10	117	102
+40 to +120	+ 0 °C - 3 °C	+ 0 °C - 4 °C		+140	-10	135	117
+50 to +200	+ 0 °C - 6 °C	+ 0 °C - 8 °C		+230	-10	107	94
+80 to +250	+ 0 °C - 7 °C	+ 0 °C - 8.5°C		+300	-20	90	78
+50 to +300	+ 0 °C - 10 °C	+ 0 °C - 12.5°C		+345	-30	67	60
+20 to +400	+ 0 °C - 15 °C	+ 0 °C - 19 °C	1000	+460	-30	- - -	202
+20 to +500	+ 0 °C - 19 °C	+ 0 °C - 24 °C	2000	+550	-30	237	149

***** The switching point accuracy can be shifted to a different part of the scale, to special order.

Capillary and temperature probe

Type	End of scale	Capillary 1.5mm dia.	Temperature probe	Notes
ATH-Ex-..	up to 200°C	copper (Cu) Mat. Ref. 2.0090 electrotinned	copper (Cu) Mat. Ref. 2.0090 brazed electrotinned	–
	up to 300°C	copper (Cu) Mat. Ref. 2.0090 electrotinned	stainless steel (CrNi) Mat. Ref. 1.4571 brazed	–
	up to 500°C	stainless steel (CrNi) Mat. Ref. 1.4571	stainless steel (CrNi) Mat. Ref. 1.4571 welded	–
	up to 300°C	stainless steel (CrNi) Mat. Ref. 1.4571	stainless steel (CrNi) Mat. Ref. 1.4571 welded	at extra cost
Capillary length	1000 mm is standard, max. 5000 mm			
Min. bending radius of capillary	5 mm			

Electrical data

Switching device	microswitch in flameproof enclosure with changeover contact
Contact rating	5 A, 230 V AC +10%, p.f. ≥ 0.9
Electrical connection	screw terminals in housing, suitable for conductor cross-section up to 2.5 mm^2

Operating data

Switching differential in % of control /limit range	Ranges with end of scale ≤ 350 °C			Ranges with end of scale > 350 °C		
	Switching action	Nominal value	Possible measured value	Switching action	Nominal value	Possible measured value
	TW	3	3-5	TW	5	5-9
	STW	5	5-7	STW	6	6-11

Ambient temperature error referred to control /limit range	A deviation of the ambient temperature at the housing from the calibrated ambient temperature 22 °C will result in a displacement of the switching point: higher ambient temperature = lower switching point lower ambient temperature = higher switching point					
	surface-mounting thermostats with end of scale					
	< 200 °C		≥ 200 °C ≤ 350 °C		> 350 °C ≤ 500 °C	
	TW	STW (STB)	TW	STW (STB)	TW	STW (STB)
	on thermostat head %/°C					
	0.08	0.17	0.06	0.13	0.14	0.12
	on capillary %/°C per meter					
	0.047	0.054	0.09	0.11	0.04	0.03

Permissible storage temperature	-50 to +50 °C			
Permissible ambient temperature in operation		Capillary	Thermostat head	with end of scale
	max.	+50°C	+50°C	
	min.	-40°C	-20°C	< 200 °C
		-20°C	-20°C	≥ 200°C ≤ 350°C
		-40°C	-20°C	> 350°C ≤ 500°C
Nom. position (NL)	to DIN 16257, NL 0 — NL 90 (other NL on request)			

Housing

Material	black polyester housing, glass-fiber reinforced, with lead-sealable screws
Limit setting	limit adjustable at setpoint spindle, after removal of housing cover
Protection	EN 60 529-IP65
Cable entry	Ex cable gland M 20 x 1.5, for cable diameters 6 — 12 mm
Weight	approx. 0.6 kg
Thermostat mounting	by 4 screws, after removal of housing cover

Process connection*

Series ATH-Ex-.. with capillary	**plain cylindrical probe A** (standard)
	pocket U (on request)
	screw-in pocket with screw-in spigot G 1/2 Form A to DIN 3852/2 and clamping clip with fixing screw for securing the probe
Material Pocket U	up to +150°C: CuZn is standard above +150°C: St is standard (CrNi on request)
Fitting length S	standard lengths: 100, 120, 150, 200 or 300 mm (other lengths on request)
Immersion tube dia.	D = 8 mm

*for other process connections and pockets, see Data Sheet 60.6710 (US, UO, Q and V only).

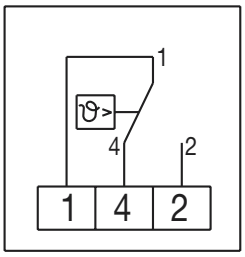
Note
Physical and toxicological properties of the expansion media that may escape in the event of a measuring system fracture.

Control range with end of scale	Dangerous reactions	Fire/explosion hazard		Water contamination	Toxicological data		
		Ignition temp. °C	Explosion limit %v/v		irritant	danger to health	toxic
< +200 °C	no	+ 355	0,6 — 8	yes	yes	[1]	no
≥ 200 °C ≤ +350 °C	no	+ 490	- -	yes	yes	[1]	no
> 350 °C ≤ +500 °C	no	no	no	no	no	no	no

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

Connection diagram

ATH-Ex-..

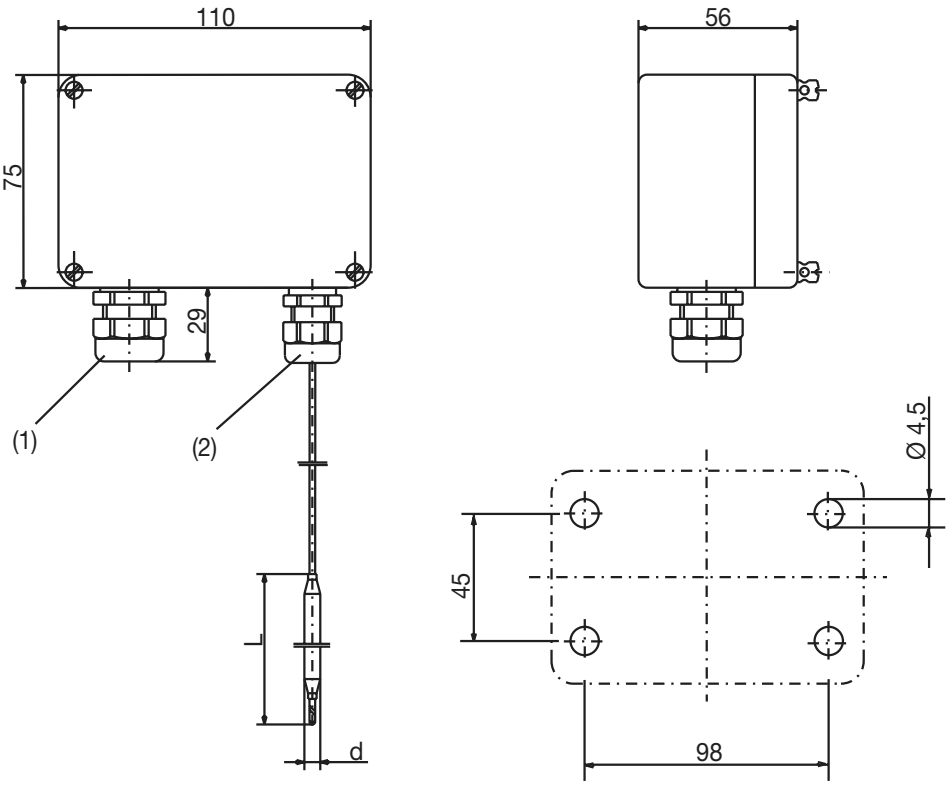


ATH-Ex-2

ATH-Ex-20

Dimensions

ATH-Ex-..



(1) = Ex cable gland, M20x1.5x6-12
(2) = Ex cable gland

For other process connections and pockets, see Data Sheet 60.6710 (U, US, UO, Q and V only).

Stock items

(delivery 3 working days after receipt of order)

Sales No.	Type	Control range °C	Material of measuring system	Capillary mm	Probe dia. x length mm
60/60001242	ATH-Ex-2	–20+ 50	CrNi	2000	6 x 153
60/60001243	ATH-Ex-2	0+ 50	CrNi	2000	6 x 202
60/60001244	ATH-Ex-2	+40+120	CrNi	2000	6 x 135
60/60001246	ATH-Ex-2	+50+300	CrNi	2000	6 x 67
60/60001247	ATH-Ex-20	+40+120	CrNi	2000	6 x 117
60/60001248	ATH-Ex-20	+50+300	CrNi	2000	6 x 60

Order details

ATH-Ex Series

Order code			
	(1)	**Basic type**	
605041		Surface-mounting thermostat for hazardous areas, ATH-Ex series	
	(2)	**Basic type extension**	
02		ATH-Ex-2	Temperature monitor TW
20		ATH-Ex-20	Fail-safe temperature monitor STW
	(3)	**Control / Limit ranges °C**	
014		-20 to + 50	
021		0 to + 50	
025		0 to +100	
056		+40 to +120	
062		+50 to +200	
080		+80 to +250	
064		+50 to +300	
045		+20 to +400	
046		+20 to +500	
	(4)	**Capillary length**	
1000		1000 mm	
2000		2000 mm	
3000		3000 mm	
4000		4000 mm	
5000		5000 mm	
. . . .		(special length, details in plain text)	
	(5)	**Material of capillary**	
40		Cu	copper, electrotinned (only up to +300°C)
20		CrNi	stainless steel 1.4571
	(6)	**Process connection (PA)**	
10		A = plain cylindrical probe (standard)	
20		U = screw-in pocket	
	(7)	**Thread for process connection**	
00		no thread (process connection A)	
13		male thread G 1/2	
	(8)	**Material of process connection**	
00		only for process connection A	
46		CuZn	(brass)
01		St	(steel)
20		CrNi	(stainless steel 1.4571)
	(9)	**Fitting length S (immersion tube length)**	
000		ATH-Ex without pocket	
100		100 mm	
120		120 mm	
150		150 mm	
200		200 mm	
300		300 mm	
400		400 mm	
	(10)	**Diameter D (immersion tube dia.)**	
00		ATH-Ex without pocket	
8		8 mm	
	(11)	**Diameter d (probe dia.)**	
6		6 mm	

Order code

(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)		(11)
605041	/	. .	-	. . .	-	. . . .	-	. .	-	. .	-	. .	-	. .	-	. . .	-	. .	-	.

Order example

605041	/	20	-	062	-	2000	-	40	-	10	-	00	-	00	-	000	-	00	-	6

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Surface-mounting Thermostat with explosion protection ATH-EXx Series

- ❏ EC-type examination as per ATEX Directive 94/9/EC
- ❏ for potentially explosive gas atmospheres, Zone 1
- ❏ and potentially explosive dust atmospheres, Zone 21

Version to DIN 3440

TW Temperature monitor
TB Temperature limiter
STW Fail-safe temperature monitor
STB Fail-safe protection temperature limiter

Brief description

ATH-EXx Series surface-mounting thermostats with explosion protection control and monitor thermal processes. They can be used directly in the hazardous area, in Zone 1 and Zone 21. The thermostats can be supplied as temperature monitors TW, temperature limiters TB, fail-safe temperature monitors STW and fail-safe protection temperature limiters STB. The thermostats operate on the principle of liquid or gas expansion. The electrical switching device is a microswitch inside a flameproof enclosure.

Ex marking

⟨Ex⟩ **II 2G EEx ed IIC T6 or T5** for potentially explosive gas atmospheres
⟨Ex⟩ **II 2D IP65 T80°C** for potentially explosive dust atmospheres

Explosion protection

⟨Ex⟩ **II 2G** Equipment group II, Category 2,
Equipment for potentially explosive gas atmospheres
⟨Ex⟩ **II 2D** Equipment group II, Category 2,
Equipment for potentially explosive dust atmospheres

Type of protection:
EEx ed IIC T6

EEx	**General requirements**	European Standard EN 50 014 / VDE 0170 / 0171 Part 1
e	**Increased Safety**	European Standard EN 50 019 / VDE 0170 / 0171 Part 6
d	**Flameproof enclosure**	European Standard EN 50 018 / VDE 0170 / 0171 Part 5
IIC	**Gas group**	
T6	**Temperature class**	

IP65 T 80°C

Application in combustible dusts	European Standard EN 50 281-1-1 / VDE 0170 / 0171 Part 15-1-1
IP65	**Enclosure protection to EN 60 529-IP65**
T 80°C	**Max. permissible surface temperature** (application in combustible dusts)

Types and approvals

Type	Switching action	Test certificate	Tests
ATH-EXx-2	TW	PTB 03 ATEX 1187	⟨Ex⟩
ATH-EXx-20	STW		
ATH-EXx-7	TB		
ATH-EXx-7-F[1]	TB		
ATH-EXx-70	STB		
ATH-EXx-70-F[1]	STB		

[1] Limit is permanently set at the factory and sealed

Switching action

Temperature monitor TW and fail-safe temperature monitor STW	**Lock-out facility on the temperature limiter TB and fail-safe protection temperature limiter STB**	**Self-monitoring on the fail-safe temperature monitor STW and fail-safe protection temperature limiter STB**
If the temperature at the probe exceeds the selected setpoint, the microswitch is operated via the transmission mechanism and the circuit is opened or closed. When the temperature drops below the selected setpoint (by the amount of the switching differential), the microswitch returns to its initial position.	If the temperature at the probe exceeds the set limit, the circuit is opened and the microswitch is locked out mechanically. After the temperature has fallen below the critical temperature by about 10 % of the scale span (about 15% for limit setting > 350°C), the microswitch can be manually reset.	In the event of a measuring system failure, i.e. if the expansion liquid has leaked, the pressure on the diaphragm of the STB and STW drops, thus permanently opening the electrical circuit. It is no longer possible to reset the system. If the probe cools down to a temperature given by the control range table, e.g. below -20°C, the circuit will also open. When the temperature rises above -20°C, the STB must be reset manually. On the STW, the reset is performed automatically.

Technical data

Control ranges and probe table

Control range	Switching point accuracy in upper third of scale [1]		Maximum capillary length	Maximum probe temperature to DIN 3440	STW + STB opens at probe temp.	Probe length L for d = 6 mm	
°C	TW, TB	STW, STB	(mm)	°C	below °C	TW TB	STW STB
-20 to + 50	+ 0 °C - 3 °C	+ 0 °C - 3.5°C	5000	+ 60	-30	142	115
0 to + 50	+ 0 °C - 2 °C	+ 0 °C - 2.5°C		+ 60	-10	185	149
0 to +100	+ 0 °C - 4 °C	+ 0 °C - 5 °C		+115	-10	107	89
+40 to +120	+ 0 °C - 3 °C	+ 0 °C - 4 °C		+140	-10	125	103
+50 to +200	+ 0 °C - 6 °C	+ 0 °C - 8 °C		+230	-10	101	83
+80 to +250	+ 0 °C - 7 °C	+ 0 °C - 8.5°C		+300	-20	82	68
+50 to +300	+ 0 °C - 10 °C	+ 0 °C - 12.5°C		+345	-30	63	53
+20 to +400	+ 0 °C - 15 °C	+ 0 °C - 19 °C	1000	+460	-30	278	176
+20 to +500	+ 0 °C - 19 °C	+ 0 °C - 24 °C	2000 4000	+550 +550	-30 -30	148 202	127 202

[1] The switching point accuracy can be shifted to another part of the scale, to special order.

Capillary and temperature probe

Type	**End of scale**	**Capillary 1.5mm dia.**	**Temperature probe**	**Notes**
ATH-EXx-..	up to 200°C	copper (Cu), Mat. Ref. 2.0090 electro-tinned	copper (Cu), Mat. Ref. 2.0090 brazed, electro-tinned	–
	up to 300°C	copper (Cu), Mat. Ref. 2.0090 electro-tinned	st. steel (CrNi), Mat. Ref. 1.4571 brazed	–
	up to 500°C	st. steel (CrNi), Mat. Ref. 1.4571	st. steel (CrNi), Mat. Ref. 1.4571 welded	–
	up to 300°C	st. steel (CrNi), Mat. Ref. 1.4571	st. steel (CrNi), Mat. Ref. 1.4571 welded	at extra cost
Capillary length	1000 mm is standard, max. 5000 mm			
Min. bending radius of capillary	5 mm			

Electrical data

Switching device	TW, STW	TB, STB
	microswitch in flameproof enclosure with changeover contact	microswitch in flameproof enclosure with (n.c.) break contact and lock-out and additional signal contact
Max. contact rating	terminals 1-4: (n.c. break) AC-1: 10 A, 230 V +10% AC-15: 2 A, 230 V +10% DC-1: 0.25A, 230 V +10%	terminals 1-4: (n.c. break) AC-1: 16 A, 230 V +10% AC-15: 2 A, 230 V +10% DC-1: 0.25A, 230 V +10%
	terminals 1-2: (n.o. make) AC-1: 5 A, 230 V +10% AC-15: 0.8 A, 230 V +10% DC-1: 0.25A, 230 V +10%	terminals 1-2: (n.o. make) AC-1: 10 A, 230 V +10% AC-15: 1.5 A, 230 V +10% DC-1: 0.25A, 230 V +10%
Electrical connection	5-pole terminal strip, suitable for conductor cross-sections up to 2.5 mm^2	

Technical data

Operating data

Switching differential in % of control / limit range	Ranges with end of scale ≤350 °C			Ranges with end of scale > 350°C		
	Switching action	Nominal value	Possible actual value	Switching action	Nominal value	Possible actual value
	TW	3	3-5	TW	5	5-9
	STW	5	5-7	STW	6	6-11

Ambient temperature effect referred to control / limit range	A deviation of the ambient temperature at the housing from the calibrated ambient temperature 22 °C will result in a shift of the switching point: higher ambient temperature = lower switching point lower ambient temperature = higher switching point					
	Surface-mounting thermostats with end of scale					
	< 200 °C		≥ 200°C ≤ 350°C		> 350°C ≤ 500°C	
	TW / TB	STB/STW	TW / TB	STB/STW	TW / TB	STB/STW
	effect due to switch head					
	0.08 %/°C	0.17 %/°C	0.06 %/°C	0.13 %/°C	0.14 %/°C	0.12 %/°C
	effect due to capillary (per meter)					
	0.047 %/°C	0.054 %/°C	0.09 %/°C	0.11 %/°C	0.04 %/°C	0.03 %/°C

Permissible storage temperature	-50 to +50 °C			
Permissible ambient temperature in operation	Temperature class	for end of scale	Capillary	Switch head
	T6 max.		+40°C	+40°C
	T5 max.		+55°C	+55°C
	min.	< 200 °C	-40°C	-20°C
		≥ 200°C ≤ 350°C	-20°C	-20°C
		> 350°C ≤ 500°C	-40°C	-20°C
Nominal position (NL)	to DIN 16257, NL 0 — NL 90 (other NL on request)			

Housing

Material	polyester housing, glass-fiber reinforced, black	
Limit setting	ATH-EXx-2 ATH-EXx-7 ATH-EXx-20	Limit adjustable at setpoint spindle, after removing housing cover.
	ATH-EXx-70	Limit adjustable at setpoint spindle, after removing housing cover. Afterwards, the setpoint spindle must be sealed by the installer in order to protect the limit that has been set.
	ATH-EXx-7-F ATH-EXx-70-F	The limit setting is fixed at the factory and sealed.
Enclosure protection	IP65 to EN 60 529	
Cable entry	Ex cable gland M 20 x 1.5, for cable diameters from 6 to 12 mm	
Weight	approx. 1.2 kg	
Switch head fixing	by 4 screws after removing housing cover	

Process connection[1]

Series ATH-EXx-.. with capillary	**plain cylindrical probe A** (standard)
	pocket U (on request)
	screw-in pocket with screw-in spigot G 1/2 Form A to DIN 3852/2 and clamping clip with fixing screw for securing the probe
Material of pocket U	up to +150°C: CuZn, nickel-plated is standard; above +150°C: St is standard (CrNi on request)
Fitting length S	standard lengths: 100, 120, 150, 200 or 300 mm (other lengths on request)
Immersion tube dia.	D = 8 mm

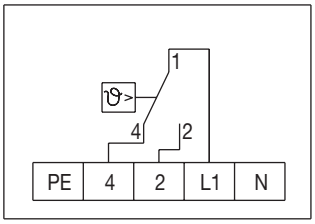
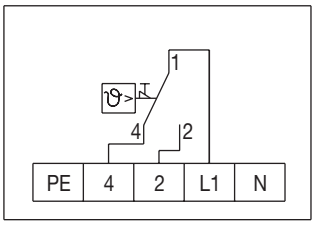
[1] For other process connections and pockets, see data sheet 60.6710 (only US, UO, Q and V).

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

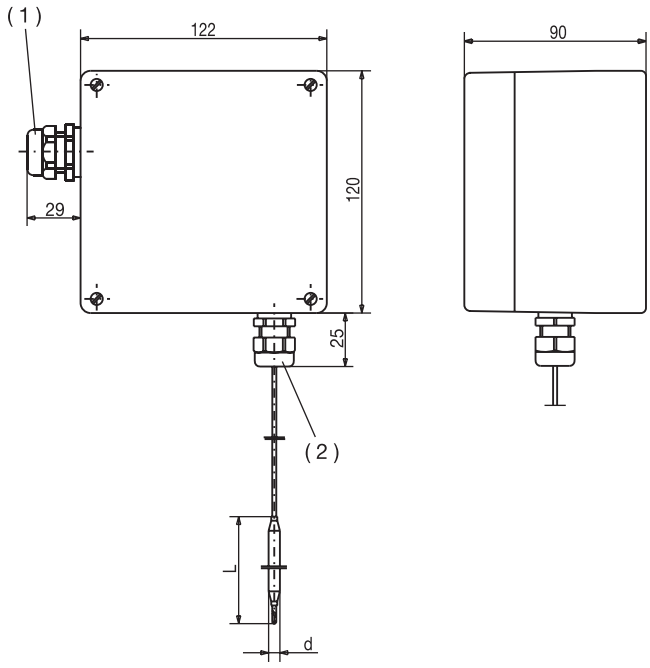
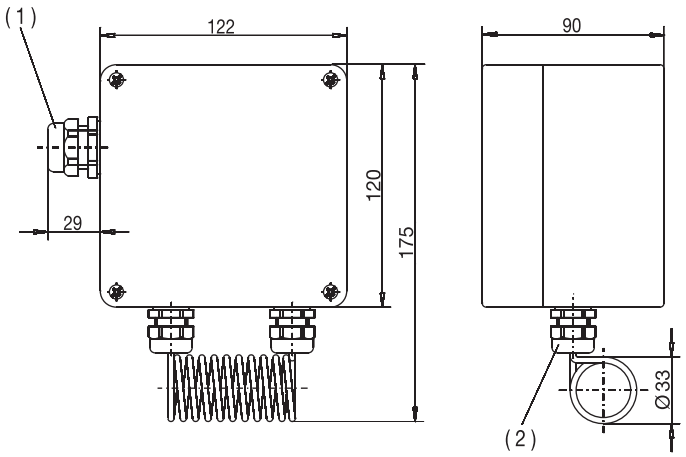
Control range with end of scale	Dangerous reactions	Fire and explosion hazard		Water contamination	Toxicological data		
		Ignition temperature	Explosion limit		irritant	danger to health	toxic
< +200°C	no	+ 355°C	0.6 — 8 % v/v	yes	yes	[1]	no
≥ 200°C ≤+350°C	no	+ 490°C	- -	yes	yes	[1]	no
> 350°C ≤+500°C	no	no	no	no	no	no	no

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

Connection diagrams

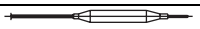
ATH-EXx-..	 ATH-EXx-2 ATH-EXx-20	 ATH-EXx-7 ATH-EXx-70

Dimensions

ATH-EXx-.. Standard version with capillary	 (1) Ex cable gland, M 20 x 1.5 x 6 -12 (2) Ex gland Other process connections and pockets as per data sheet 60.6710 (only U, US, UO, Q and V).
ATH-EXx-2 with coiled probe H (only for control ranges -20 to +40°C, -20 to +50°C and 0 to +50°C)	 (1) Ex cable gland, M 20 x 1.5 x 6 -12 (2) Ex gland, M 16 x 1.5 x 6 -12

Order details

Surface-mounting thermostat, ATH-EXx Series

Order code			
	(1)	**Basic type**	
605051		Surface-mounting thermostat for areas with an explosion hazard, ATH-EXx Series	
	(2)	**Basic type extensions**	
02		ATH-EXx-2	Temperature monitor TW
20		ATH-EXx-20	Fail-safe temperature monitor STW
07		ATH-EXx-7	Temperature limiter TB
70		ATH-EXx-70	Fail-safe protection temperature limiter STB
	(3)	**Control/limit ranges °C**	
013		-20 to + 40	
014		-20 to + 50	
021		0 to + 50	
025		0 to +100	
056		+40 to +120	
062		+50 to +200	
080		+80 to +250	
064		+50 to +300	
045		+20 to +400	
046		+20 to +500	
	(4)	**Capillary length**	
1000		1000 mm	
2000		2000 mm	
3000		3000 mm	
4000		4000 mm	
5000		5000 mm	
....		special length, details in plain text	
	(5)	**Material of capillary**	
40		Cu	copper, electro-tinned (only up to +300°C)
20		CrNi	stainless steel 1.4571
	(6)	**Process connection (PA)**	
10		A = plain cylindrical probe (standard) 	
15		H = coiled probe 	(only for -20 to +40°C, -20 to +50°C, 0 to +50°C)
20		U = screw-in pocket 	
	(7)	**Thread for process connection**	
00		no thread (process connection 10)	
13		external thread G 1/2	
	(8)	**Material of process connection**	
00		only with process connection A	
46		CuZn	(brass)
01		St	(steel)
20		CrNi	(stainless steel 1.4571)
	(9)	**Fitting length S (immersion tube length)**	
000		ATH-EXx without pocket	
100		100mm	
120		120mm	
150		150mm	
200		200mm	
300		300mm	
400		400mm	
	(10)	**Diameter D (immersion tube dia.)**	
00		ATH-EXx without pocket	
8		8 mm	
	(11)	**Diameter d (probe diameter)**	
6		6 mm	
	(12)	**Extra codes**[1]	
000		none	
520		**F** Limit is fixed at the factory and sealed (only with TB + STB).	

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)		(11)		(12)	
Order code	605051	/		-		-		-		-		-		-		-		-		-		/		, ...[1]
Order example	605051	/	70	-	062	-	2000	-	20	-	10	-	00	-	00	-	000	-	00	-	6	/	000[1]	

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

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Electronic Thermostat TE-1

Version according to EN 60 730

Brief description

The electronic thermostat TE-1 is a temperature controller with ON/OFF switching action, in a housing for DIN rail or wall mounting. The relay at the controller output switches in accordance with the temperature at the probe (process value x) and the value that has been selected as the setpoint (w).

The setpoint is selected as an analog value on a scale, by a knob on the front of the controller. The knob is fitted with an adjustable stop for restricting or limiting the range. An adjustable switching differential for the controller is a standard feature, as is zero adjustment.

Suitable probes that may be attached are platinum resistance sensors to EN 60 584 (Pt100) with a positive temperature coefficient in 2-wire or 3-wire circuit, or thermocouples (NiCr-Ni) to EN 60 584.

Types

Types	for connection to	Switching action
TE-1wO	resistance thermometer Pt100 standard: 2-wire circuit	break (n.c.) (standard) relay de-energized at x ≥ w
TE-1wS		make (n.o.) relay energized at x > w
TE-1tO	thermocouple NiCr-Ni K	break (n.c.) (standard) relay de-energized at x ≥ w
TE-1tS		make (n.o.) relay energized at x > w

Extra codes	**b3**	front-panel mounting by 2 screws
	ka	terminal cover, enclosure protection IP40
	sw	dust-tight and waterjet-proof housing, polycarbonate, enclosure protection IP65

Technical data

Electrical data

Supply	standard:	230 V AC +10/-15%, 48 — 63 Hz 115 V AC +10/-15%, 48 — 63 Hz 24 V DC +10/-15% other voltages on request
Contact rating	10 A, 250 V AC, 10 A, 24 V DC	
Power consumption	3 VA max.	
Controller output	relay with floating changeover contact: for 3-wire circuit (1 break or 1 make contact only)	
Electromagnetic compatibility	to EN 61 326	
Electrical connection	by screw terminals, max. conductor cross-section 4 mm^2	

Measurement input: Pt100 resistance thermometer

Control ranges	Control range °C	Relay is de-energized at probe temperatures below:
	-50 to + 30	- 85°C
	-20 to + 40	- 45°C
	0 to + 50	- 25°C
	0 to +100	- 40°C
	0 to +150	- 65°C
	0 to +200	- 85°C
	0 to +300	-130°C
	0 to +400	-165°C
	0 to +500	-225°C
Probe cable error	When using a 2-wire temperature probe with a cable that is different from the standard types (lead resistance RL = 165 mΩ), there will be an error of approx. 1°C per 0.39 Ω change in lead resistance. This means that if the probe cable is extended by using a 2-core copper cable, the following errors will occur:	
	Core cross-section	Temperature change per meter of cable
	0.50 mm^2	0.18 °C/m
	0.75 mm^2	0.12 °C/m
	1.00 mm^2	0.09 °C/m
	1.50 mm^2	0.06 °C/m
	For 3-wire circuit, the probe cable length is internally compensated.	
Measurement circuit monitoring	The resistance probe and the probe cable are monitored for break and short-circuit. In the event of a fault, the relay switches to the de-energized state.	

Measurement input: NiCr-Ni thermocouple

Control ranges	Control range °C	
	+200 to + 600	
	+400 to + 800	
	+600 to +1000	
	+800 to +1200	
Measurement circuit monitoring	Thermocouple and compensating cable are monitored for break.	
Temperature compensation	provided as standard	

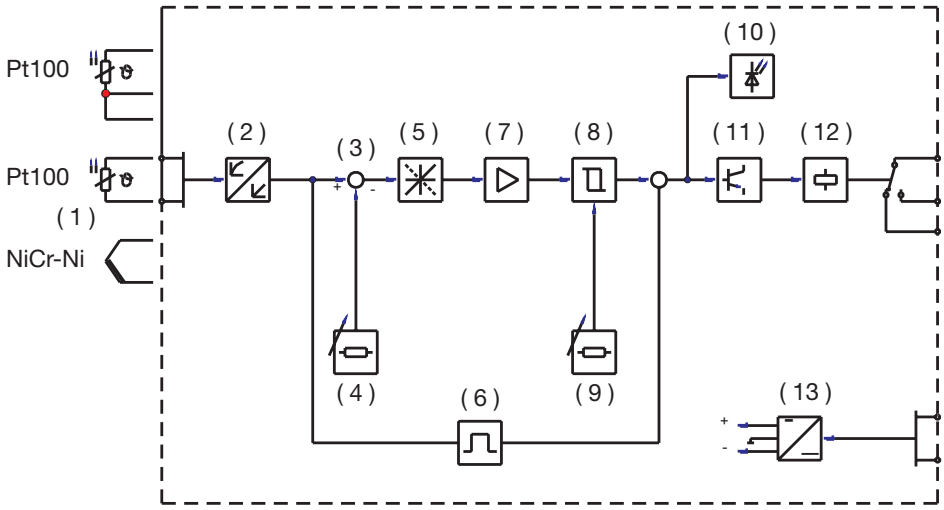
Operating data

Switching point accuracy	± 2% of control range span	
Switching differential	adjustable from 0.25 to 5%, factory-set to minimum value	
Zero point correction	enables the optimum matching of the switching point and probe accuracy to the respective working point or range	
Permissible ambient temperature	in operation -10 to +50°C	
Permissible storage temperature	-40 to +75°C	
Ambient temperature error	< 0.5% per 10°C	
Climatic conditions	relative humidity ≤ 75% annual mean, no condensation	
Permissible mechanical stress	vibration: 2 — 25 Hz; 1.6 mm 25 — 100 Hz; 40 m/sec^2	as per Guidelines of "Germanischer Lloyd", Section 5.2, Characteristic 2
	shock: 300 m/s^2 ; 11 ms	to IEC 68, Part 2-27

Housing

Enclosure protection to EN 60 529	standard: IP20
	with extra code ka: IP40
	with extra code sw: IP65
Housing	plastic housing in polycarbonate; color: light gray RAL 7035
Relay status indication	The yellow LED on the front indicates that the relay is energized.
Mounting	standard: on rail to EN 50 022 - 35 x 7.5 mm
Operating position	unrestricted
Weight	approx. 200 g

Block diagram



Operation

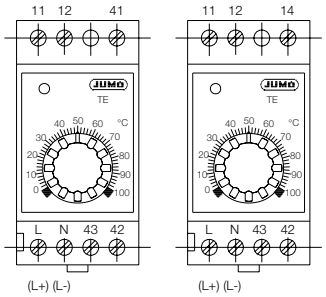
The sensor signal of the temperature probe (1) is linearized and amplified at the input stage (2) and reaches the comparator (3) as process value x. The comparator forms the difference between the process value x and the setpoint w that was set on the setpoint knob (4), resulting in the control deviation $x_w = x - w$.

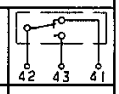
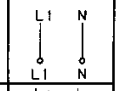
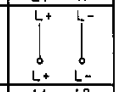
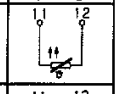
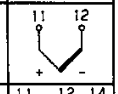
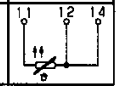
The contact action O or S is determined internally, through links (5). The difference signal produced during a control deviation acts through the integrated amplifier (7) on the subsequent trigger stage (8). The switching differential x_{sd} of the trigger stage is adjusted by means of the potentiometer (9). The trigger output signal uses the transistor (11) to operate the relay, which has a floating changeover contact (12). In the case of type TE-1w in 3-wire circuit, only one make or one break contact is available. The “relay energized” status is indicated by the LED (10).

The measurement circuit monitor (6), which comes as standard, checks the probe and the probe cable for break or short-circuit. The voltage required to operate the modules is generated and stabilized in the power supply (13).

Electrical connection

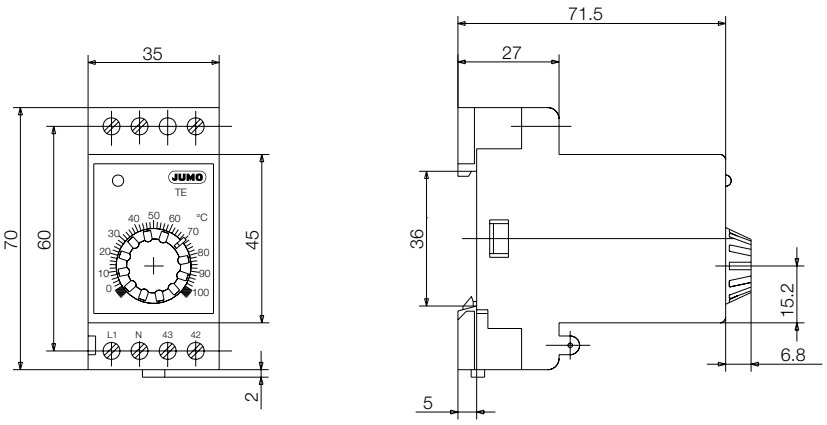
Type TE-1	Type TE-1w
as standard	3-wire circuit



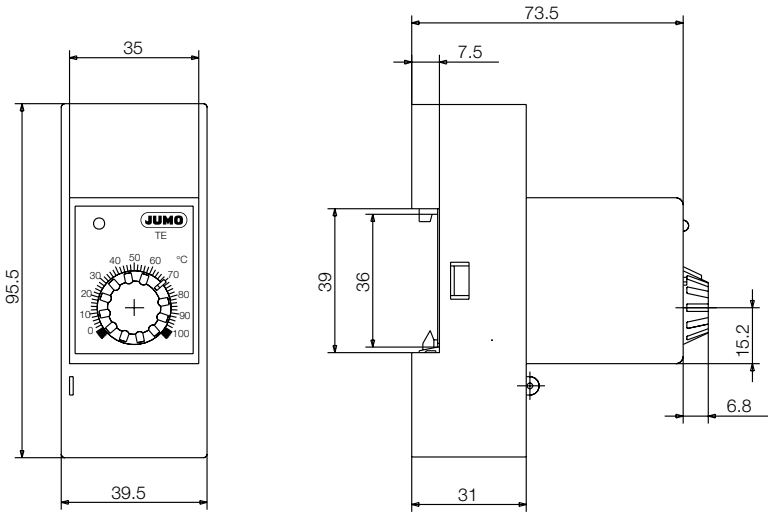
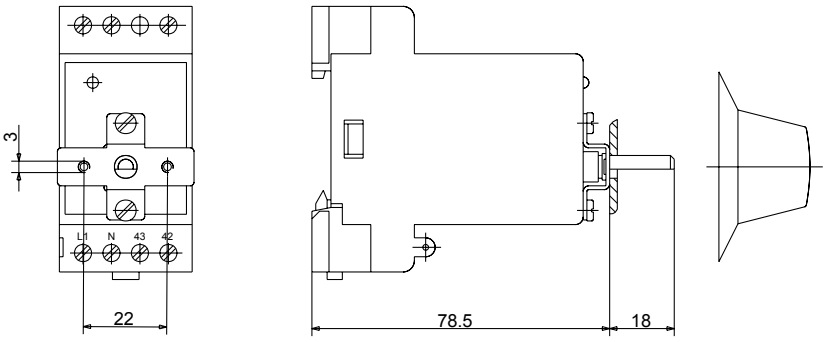
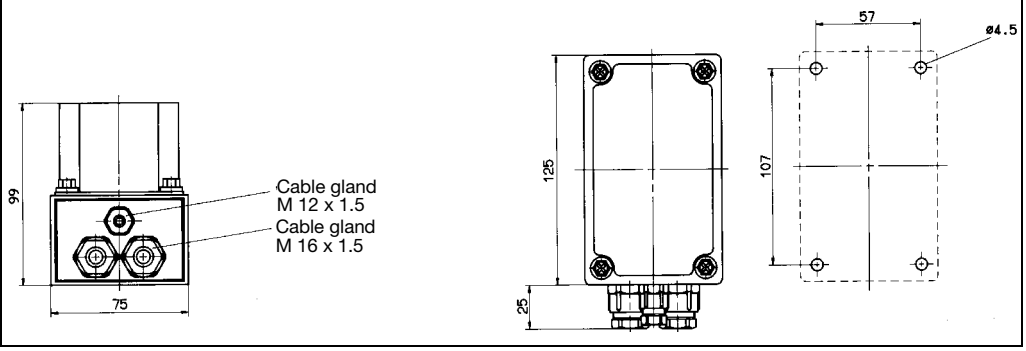
Connection for	Type	Control status	Terminals	
Relay output (41 not applicable with 3-wire circuit)	O	x ≥ w*	41 break (n.c.) 42 common 43 make (n.o)	
	S	x ≤ w		
Supply	Code			
	AC		L1 line N neutral	
	DC		L+ L-	
Resistance thermometer in 2-wire circuit (Pt100)	w		11 12	
Thermocouple (NiCr-Ni)	t		11 12	
Resistance thermometer in 3-wire circuit (Pt100)	w...-dl		11 12 14	

* x = process value, w = setpoint

Dimensions

Type TE-1 is standard	

Extra code

ka with terminal cover	
b3 for front-panel mounting	
sw housing, polycarbonate IP65 protection	

Temperature probe	see Data Sheet 60.5521; see sectional catalog 90 “Transducers” for additional temperature probes and styles

Order details for the Electronic Thermostat TE-1

Stock items:

(delivery 3 working days after receipt of order)

Supply voltage 230 V AC +10/-15%, 48 — 63 Hz

Sales No.	Type	Control range °C	Probe input
60/60001962	TE-1w O	–50+30	Pt100 in 2-wire circuit
60/60001923	TE-1w O	–20+40	
60/60001924	TE-1w O	0+50	
60/60001925	TE-1w O	0+100	
60/60001953	TE-1w O	0+150	
60/60001954	TE-1w O	0+200	
60/60001955	TE-1w O	0+300	
60/60001956	TE-1w O	0+400	
60/60001961	TE-1w O	0+500	
60/60002137	TE-1t O	+200+600	Thermocouple NiCr-Ni (Type K)
60/60002138	TE-1t O	+400+800	
60/60002139	TE-1t O	+600+1000	
60/60002140	TE-1t O	+800+1200	

Non-stock items:

Order code				
605501	**(1)**	**Basic type**		
		TE-1		
	(2)	**Basic type extension**		
11		TE-1 wO with break action	for Pt100 in 2-wire circuit	standard
12		TE-1 wS with make action	for Pt100 in 2-wire circuit	standard
21		TE-1 wO with break action	for Pt100 in 3-wire circuit	
22		TE-1 wS with make action	for Pt100 in 3-wire circuit	
31		TE-1 tO with break action	for thermocouples NiCr-Ni	
32		TE-1 tS with make action	for thermocouples NiCr-Ni	
	(3)	**Control ranges**		
011		-50 to 30°C	only with Pt100 resistance thermometer	
013		-20 to 40°C		
021		0 to 50°C		
025		0 to 100°C		
027		0 to 150°C		
028		0 to 200°C		
030		0 to 300°C		
031		0 to 400°C		
032		0 to 500°C		
086		200 to 600°C	only with NiCr-Ni thermocouple	
087		400 to 800°C		
088		600 to 1000°C		
089		800 to 1200°C		
	(4)	**Supply**		
02		230 V AC +10/-15%, 48—63 Hz		
05		115 V AC +10/-15%, 48—63 Hz		
29		24 V DC +10/-15%		
	(5)	**Extra codes**		
706		**b3** front-panel mounting by 2 screws M3		
717		**ka** terminal cover, IP40 protection		
718		**sw** dust-tight and waterjet-proof housing, IP65 protection		

Order code

(1)		(2)		(3)		(4)		(5)
605501	/	. .	-	. . .	-	. .	/	. . .

Order example

605501	/	11	-	025	-	02	/	706

TE-1 wO with break action, for Pt100 in 2-wire circuit
control range 0 to +100°C
230 V AC +10/-15%, 48 — 63 Hz
front-panel mounting by 2 screws M3

JUMO GmbH & Co. KG

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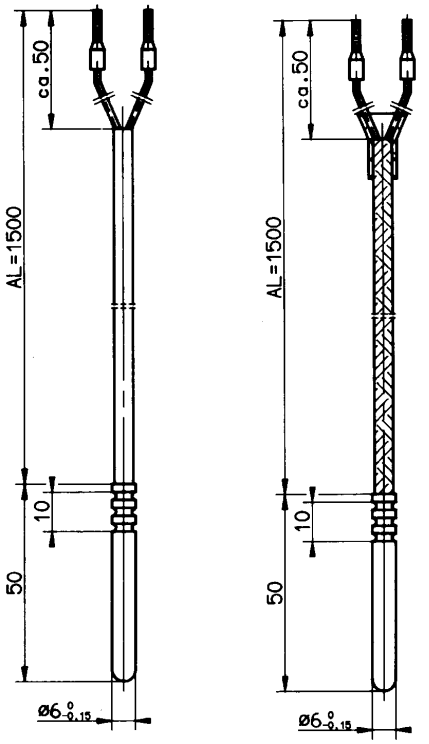
Fax: 610-380-8009
e-mail: info@JumoUSA.com
Internet: www.JumoUSA.com

Resistance Thermometer

with Pt100 resistance sensor 2DIN IEC Class B

- **for temperatures from -50 to +400°C**
- **high measurement accuracy and long-term stability**
- **short response time, 50% time in water approx. 5sec, in air approx. 60sec**



Type TW-01/02/03 Type TW-04

General application

Resistance thermometers are used for direct temperature measurement, for instance in air-conditioning and refrigeration, in heating systems, ovens and in equipment engineering.

Thanks to standardized reference values, resistance thermometers can be interchanged without the need for recalibrating indicators, controllers or recorders. The resistance values and their permissible tolerances are specified in standard tables.

Principle of operation

The resistance thermometer is based on the principle of measuring the change in resistance of metal wires with temperature. The resistance sensors are made from platinum wire, and its resistance is an indication of the particular temperature. In accordance with IEC 751, the resistance of a Pt100 at 0°C is 100Ω. At higher temperatures, the resistance is correspondingly higher, and at lower temperatures it is smaller.

Technical data / Stock items

Sales No.	Type	Temperature probe			Connecting cable: stranded wire 2 x 0.35mm²		
		Operating temperature		Material	Operating temp.	Material	Length
		min.	max.		max.		
60/00085315	TW-01	- 5°C	+ 80°C	st. steel 1.4303	+ 80°C	PVC	1.5m
60/00085316	TW-02	- 5°C	+105°C		+105°C	PUR	
60/00085313	TW-03	-50°C	+200°C		+180°C	silicone	
60/00085311	TW-04	-50°C	+400°C		+400°C	CrNi braiding	

For other resistance thermometers to DIN specification and in special versions (also for temperatures up to +500°C), see the Sectional Catalog “Transducers”.

Protection tube in brass, steel or CrNi as push-in pocket U $G^1/_2$, length 100 — 300mm as per Data Sheet 60.6710.

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JUMO PROCESS CONTROL INC.

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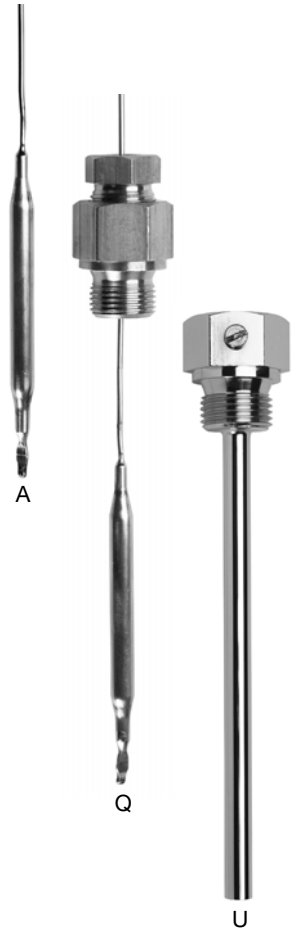
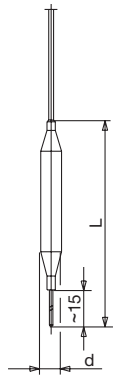
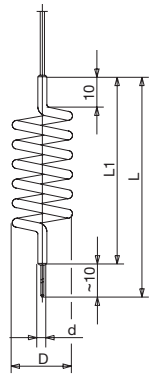
Phone: 610-380-8002
1-800-554-JUMO
Fax: 610-380-8009
E-mail: info@JumoUSA.com
Internet: www.JumoUSA.com

Process connections for thermostats

- **Temperature probes**
- **Screw fittings**
- **Pockets**

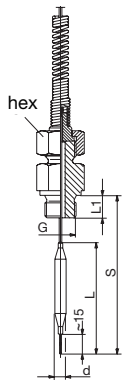
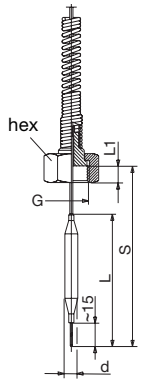
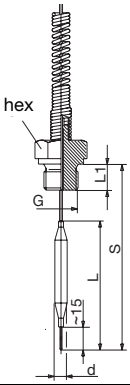


Temperature probes

Order code:	**1**	**2**		**3**				
Outline drawing	Designation	Material		Probe dia. d in mm				Notes
	plain cylindrical bulb **A**	Cu (copper)	CrNi (stainless steel)	5	6	7	8	other probe diameters on request
Order code:	606710-**10**	40	20	5	6	7	8	
	coiled bulb **H**	Cu (copper)		17		35		up to +200°C max. probe temperature
Order code:	606710-**15**	40		17		35		

	1		**2**		**3**
Order code:	606710-. .	-	. .	-	.
Order example:	606710-**10**	-	20	-	8

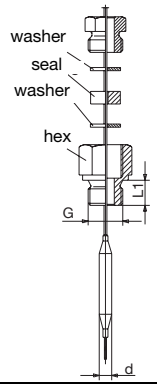
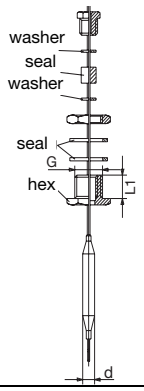
Screw fittings

Order code:	1	2			3			4	5				6	
Outline drawing	Designation	Thread G			Material of connection			Immersion tube length S in mm	Probe dia. d in mm				Material of probe	
	screw fitting **B** probe mounting C with loose nipple, threaded at both ends	G 1/2 L_1=14 27 a/f	G 3/8 L_1=12 22 a/f	G 3/4 L_1=16 32 a/f	CuZn (brass)	St (steel)	CrNi (stainless steel)	100 120 150 200 300 400 details in plain text	5	6	7	8	Cu (copper)	CrNi (stainless steel)
Order code:	606710-**50**	13	12	14	46	01	20	. . .	5	6	7	8	40	20
	screw fitting **C** plain cylindrical bulb with shoulder and union nut. Shoulder brazed or welded to capillary.	G 1/2 L_1=10 27 a/f	G 3/8 L_1=7,5 22 a/f	G 3/4 L_1=11 32 a/f	CuZn (brass)	St (steel)	CrNi (stainless steel)	100 120 150 200 300 400 details in plain text	5	6	7	8	Cu (copper)	CrNi (stainless steel)
Order code:	606710-**52**	13	12	14	46	01	20	. . .	5	6	7	8	40	20
	screw fitting **D** plain cylindrical bulb, threaded connector brazed or welded to capillary.	G 1/2 L_1=14 27 a/f	G 3/8 L_1=12 22 a/f		CuZn (brass)	St (steel)	CrNi (stainless steel)	100 120 150 200 300 400 details in plain text	5	6	7	8	Cu (copper)	CrNi (stainless steel)
Order code:	606710-**54**	13	12		46	01	20	. . .	5	6	7	8	40	20

Process connection B, C and D: max. permissible pressure with instrument function STB, STW (STB) = 2 bar / TR, TW and TB on request.

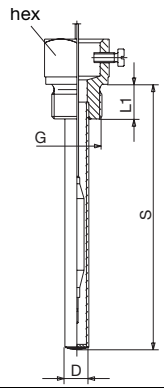
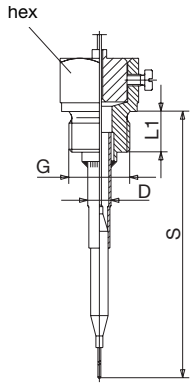
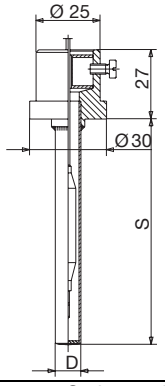
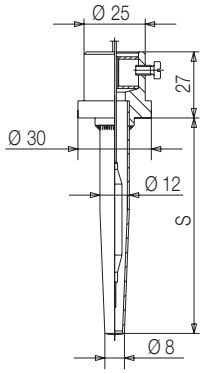
	1		2		3		4		5		6
Order code:	606710-. .	-	. .	-	. .	-	. . .	-	.	-	. .
Order example :	606710-**50**	-	13	-	20	-	200	-	6	-	20

Screw fittings

Order code:	1	2		3		
Outline drawing	Designation	Thread		Material		Notes
	screw fitting **Q** thread at both ends, for retrofitting on capillary. Max. probe temperature +200°C.	$G\ ^1/_2$ L_1=14 27 a/f	$G\ ^3/_8$ L_1=12 22 a/f	CuZn (brass)	CrNi (stainless steel)	Only suitable for probe dia. d up to 8 mm. For use in unpressurized media **only**.
Order code:	606710-**60**	13	12	46	20	
	screw fitting **V** sealing gland for retrofitting on capillary. Max. probe temperature +200°C.	M 14 x 1 19 a/f		CuZn (brass)	CrNi (stainless steel)	Only suitable for probe dia. d up to 6 mm. For use in unpressurized media **only**.
Order code:	606710-**65**	35		46	20	

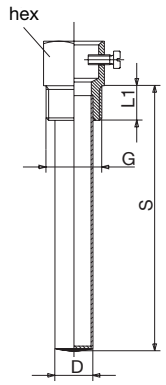
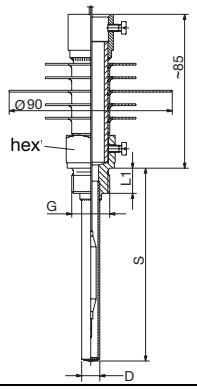
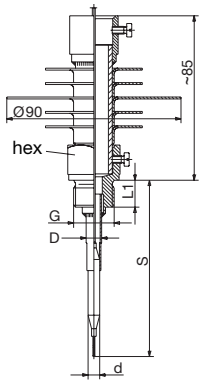
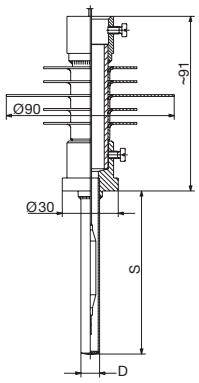
	1		2		3
Order code:	606710-**. .**	-	. .	-	. .
Order example:	606710-**60**	-	13	-	20

Pockets

Order code:	1	2		3			4	5		
Outline drawing	Designation	Thread G		Material			Immersion tube length S in mm	Immersion tube dia. D in mm		
	screw-in pocket **U** with screw-in spigot, Form A to DIN 3852/2 with fixing screw	G 1/2 L_1=14 27 a/f	G 3/8 L_1=12 24 a/f	CuZn (brass)	St (steel)	CrNi (stainless steel)	100 120 150 200 300 400 details in plain text	8 (inside dia. 6.5)	10 (inside dia. 8.5)	15 (inside dia. 13.5)
Order code:	606710-**20**	13	12	46	01	20	. . .	8	10	15
	screw-in pocket **UO** open at end, with screw-in spigot, Form A to DIN 3852/2 with fixing screw (clip for securing bulb supplied with code f)	G 1/2 L_1=14 27 a/f	G 3/8 L_1=12 24 a/f	CuZn (brass)	St (steel)	CrNi (stainless steel)	100 120 150 200 300 400 details in plain text	8 (inside dia. 6.5)		
Order code:	606710-**21**	13	12	46	01	20	. . .	8		
	weld-in pocket **US** with fixing screw	no thread			St (steel)	CrNi (stainless steel)	100 120 150 200 300 400 details in plain text		10 (inside dia. 8.5)	15 (inside dia. 13.5)
Order code:	606710-**22**	00			01	20	. . .		10	15
	weld-in pocket **US** with fixing screw, immersion tube tapered from 12 to 8 mm	no thread			St (steel)	CrNi (stainless steel)	100 120 150 200 300 400 details in plain text	immersion tube tapered from 12 to 8 mm (inside dia. 6.5)		
Order code:	606710-**23**	00			01	20	. . .	8		

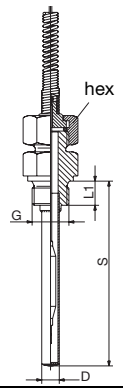
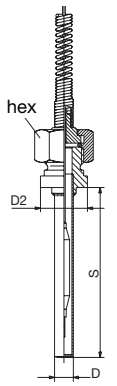
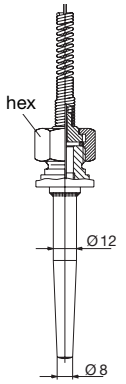
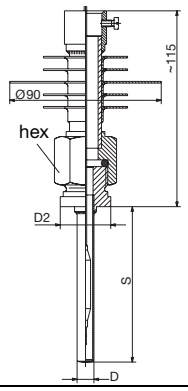
	1		2		3		4		5
Order code:	606710-. .	-	. .	-	. .	-	. . .	-	. .
Order example:	606710-**20**	-	13	-	01	-	100	-	10

Pockets

Order code:	1	2		3			4	5		
Outline drawing	Designation	Thread G		Material			Immersion tube length S in mm	Immersion tube dia. D in mm		
	screw-in pocket **UH** with fixing screw, **no** sealing shoulder, for sealing with hemp	G 1/2 L1=14 24 a/f		CuZn (brass)			120	15 mm		
Order code:	606710-**24**	13		46			120	15		
	screw-in pocket **UZ** with fixing screw and extension, for thermostat with rigid stem and probe temperature above +150°C	G 1/2 L1=14 27 a/f	G 3/8 L1=12 24 a/f		St (steel)	CrNi (stainless steel)	100 120 150 200 300 400 details in plain text	8 (inside dia. 6.5)	10 (inside dia. 8.5)	15 (inside dia. 13.5)
Order code:	606710-**30**	13	12		01	20	. . .	8	10	15
	screw-in pocket **UZO** open at end, with fixing screw and extension, for thermostat with rigid stem and probe temperature above +150°C	G 1/2 L1=14 27 a/f	G 3/8 L1=12 24 a/f		St (steel)	CrNi (stainless steel)	100 120 150 200 300 400 details in plain text	8		
Order code:	606710-**31**	13	12		01	20	. . .	8		
	weld-in pocket **UZS** with fixing screw and extension, for thermostat with rigid stem and probe temperature above +150°C	no thread			St (steel)	CrNi (stainless steel)	100 120 150 200 300 400 details in plain text		10 (inside dia. 8.5)	15 (inside dia. 13.5)
Order code:	606710-**32**	00			01	20	. . .		10	15

	1		2		3		4		5
Order code:	606710-. .	-	. .	-	. .	-	. . .	-	. .
Order example:	606710-**30**	-	13	-	20	-	200	-	8

Pockets

Order code:	1	2		3			4	5		
Outline drawing	Designation	Thread G		Material			Immersion tube length S in mm	Immersion tube dia. D in mm		
	screw-in pocket **E** with screw-in spigot*, Form A to DIN 3852/2, pocket secured with union nut, probe mounting C. (52)	$G\ ^1/_2$ L_1=14 27 a/f	$G\ ^3/_8$ L_1=12 22 a/f	CuZn (brass)	St (steel)	CrNi (stainless steel)	100 120 150 200 300 400 details in plain text	8 (inside dia. 6.5)	10 (inside dia. 8.5)	
Order code:	606710-**40**	13	12	46	01	20	. . .	8	10	15
	weld-in pocket **ES** for thermostats with capillary, with welding shoulder. Pocket secured with union nut, probe mounting C. (52)	no thread			St (steel)	CrNi (stainless steel)	100 120 150 200 300 400 details in plain text		10 (inside dia. 8.5)	
Order code:	606710-**41**	00			01	20	. . .		10	15
	weld-in pocket **ES** immersion tube tapered from 12 to 8 mm, for thermostats with capillary, with welding shoulder. Pocket secured with union nut, probe mounting C. (52)	no thread			St (steel)	CrNi (stainless steel)	100 120 150 200 300 400 details in plain text	immersion tube tapered from 12 to 8 mm (inside dia. 6.5)		
Order code:	606710-**42**	00			01	20	. . .	8		
	weld-in pocket **EZS** with thread $G^3/_4$ on instrument side and extension, for thermostats with rigid stem and probe temperature above +150°C	no thread			St (steel)	CrNi (stainless steel)	100 120 150 200 300 400 details in plain text		10 (inside dia. 8.5)	15 (inside dia. 13.5)
Order code:	606710-**45**	00			01	20	. . .		10	15

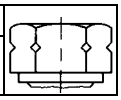
	1		2		3		4		5
Order code:	606710-. .	-	. .	-	. .	-	. . .	-	. .
Order example:	606710-**42**	-	00	-	01	-	300	-	8

Permissible loading on the pocket

Pockets U, US, UZ, UZS, E, ES and EZS

The values below refer to the maximum loading on the corresponding probe mounting.
The maximum pressure that can be sealed depends on the mounting conditions and may be lower.

Steel pocket

Material	Tube	Screw-in nipple up to 300°C	Screw-in nipple up to 450°C	Weld-in nipple	
	St 35.8 I	9 SMnPb28 K	16 Mo 3 (turned groove)	16 Mo 3 (no turned groove)	

Loading	Temperature	Tube diameter D		
		8 x 0.75 mm or taper	10 x 0.75 mm	15 x 0.75 mm
		Maximum permissible 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
	400°C	46 bar	37 bar	25 bar
	450°C	24 bar	19 bar	13 bar

Max. permissible operating temperature	Tube	Nipple	Max. permissible operating temperature*	
			static load	no load
	St 35.8 I	9 SMnPb28 K	+300°C	+530°C
		16 Mo 3	+450°C	
	* Please observe the maximum permissible probe temperature for the corresponding thermostat version. At operating temperatures above +420°C: operating time with static load is limited to 200,000 hrs. TRD 508 must be observed. Pockets UO and UZO: for use in unpressurized media only.			

Stainless steel pocket

Material	Tube and nipple: X 6 CrNiMoTI 17 122 (1.4571)

Loading	Temperature	Tube diameter D		
		8 x 0.75 mm or taper	10 x 0.75 mm	15 x 0.75 mm
		Maximum permissible 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. permissible operating temperature*	static load +400°C	no load +530°C
	* Please observe the maximum permissible probe temperature for the corresponding thermostat version.	

Brass pocket

Material	Tube and nipple: brass (CuZn)

Loading	Temperature	Tube diameter D		
		8 x 0.75 mm	10 x 0.75 mm	15 x 0.75 mm
		Maximum permissible pressure		
	100°C	50 bar	40 bar	27 bar
	150°C	48 bar	39 bar	26 bar

Max. permissible operating temperature*	+150°C
	* Please observe the maximum permissible probe temperature for the corresponding thermostat version.

Pocket UH*	Temperature	Maximum permissible pressure
	110°C	16 bar
	* Please observe the maximum permissible probe temperature for the corresponding thermostat version.	

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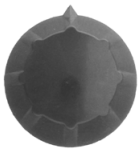
JUMO setpoint adjusters for thermostats, EM series

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

01



02

21

11

12

18

01

Spindle-fitting knobs for pushing onto 6 mm dia. shafts, with 4.6 mm flat

Part no.	**60 701 205**
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

02

Part no.	**61 079 200**

As above, but with adjustable pointer relative to spindle flat

Cap, light grey, RAL 7035

21

Setpoint dial (see Data Sheet 60.2021 for standard ranges)

Outer dia.	50.0 mm
Height	4.8 mm
Fixing	with two M3 screws
Spacing	22.0 mm
Marking	iron-grey RAL 7011
Operating temperature	+120 °C
Material	thermoplastic, flint grey RAL 7032
Dial divisions	over 250° angle

11

Stop for knobs 01 and 02

Part no.	**60 701 203**
Limiting	to limit the scale max. endpoint, right stop
Adjustment	125 to 250° angle

12

Stop for knob 01 only

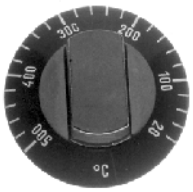
Part no.	**60 701 202**
Limiting	to limit the scale min. starting point, left stop
Adjustment	0 to 125° angle

18

Fixing screws M3 x 8 DIN 84

Part no.	**60 037 100**
Material	nickel-plated brass

07



08

23

15

16

18

19

07

Spindle-fitting knobs for pushing onto 6 mm dia. shafts, with 4.6 mm flat (see Data Sheet 60.2021 for standard ranges)

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

08

Knob

Part no. 64 336 008

As above, but with pointer as index

23

Surround

Part no.	**63 202 000**
Max. dia.	47 mm
Max. height	7.3 mm
Fixing spacing	a) 22 mm b) 28 mm
Fixing for	a) 2 screws M3 x 8 b) 2 screws M4 x 8
Operating temperature	+80 °C
Material	thermoplastic, bright chrome electroplated

15

Stop

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

16

Stop

Part no. 63 205 001

As above, but with fixing spacing 28 mm

18

Fixing screws

Part no.	**60 037 100**
M3 x 8 DIN 84 for spacing	22 mm

19

Fixing screws

Part no.	**60 046 101**
M4 x 8 DIN 84 for spacing	28 mm
Material	nickel-plated brass

Standard setpoint adjusters

Type W1 for panel-mounting thermostats EMf-1

consisting of
- knob 01
- adjustable stop 11
- setpoint dial 21
- 2 screws 18

Type W8

consisting of
- knob 07
- surround 23
- adjustable stop
- 2 screws 18

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Contents:

Dial thermometers

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Dial Thermometer
Standard Version

Type 608001/1810

- ❑ Temperature indicator with a bimetal sensing system
- ❑ Steel housing
- ❑ Class 1.5
- ❑ IP51 protection
- ❑ Housing sizes: 50 mm, 63 mm, 80 mm, 100 mm and 160 mm dia.

Brief description

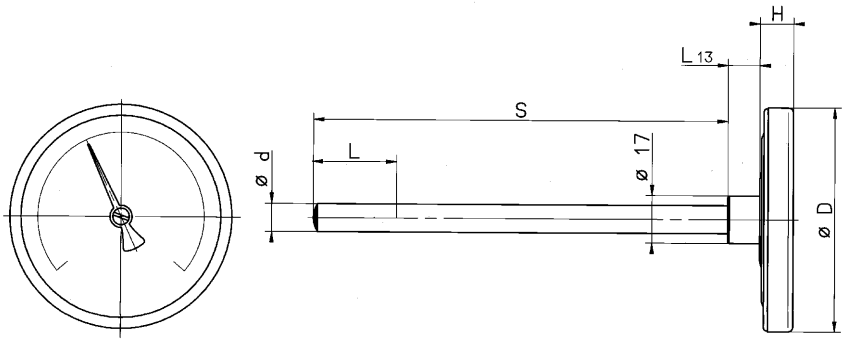
Standard version dial thermometers are instruments for universal use in on-site temperature measurement.

Technical data

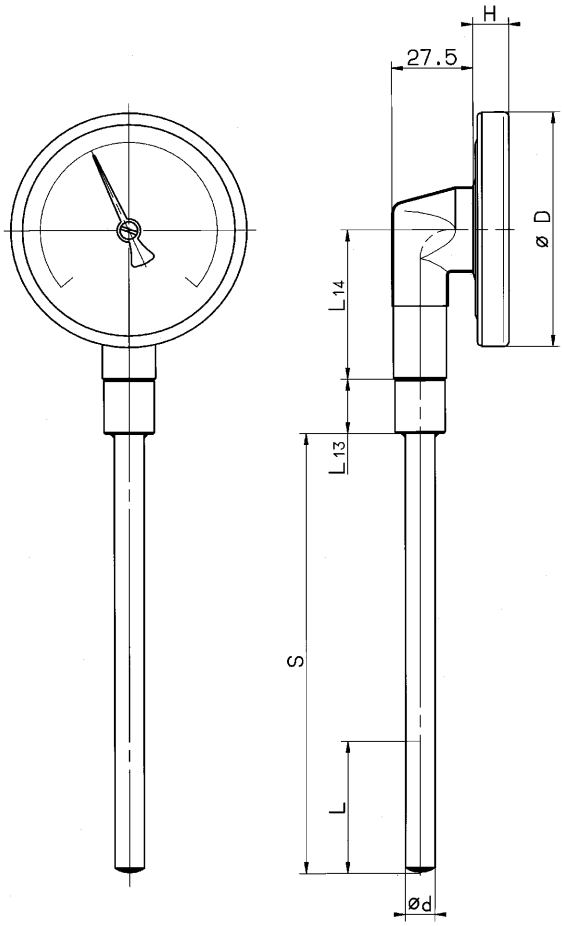
	Basic type extensions	
	0150, 0163, 0180, 0110, 1863, 1880, 1810	0116, 1816
Housing	housing and bezel in zinc-plated steel	housing and bezel in stainless steel (1.4301)
	angle block in aluminium (style 18)	
Protection	IP51 to DIN 60 529	
Window	glass, with extra code 432 in plexiglass (PMMA)	
Scale	blank aluminium, black lettering	
Indication	linear, Class 1.5 similar to EN 13190	
Response time	$t_{0.9}$ response approx 30 sec (measured in agitated water with a 10 mm dia. brass probe)	
Ambient temperature effect	no effect	
Limit temperatures	-30 to +80°C (storage and transport -30 to +80°C)	
Nominal position	unrestricted	

Dimensions

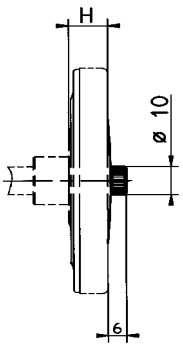
Types: **608001/0150**
608001/0163
608001/0180
608001/0110
608001/0116

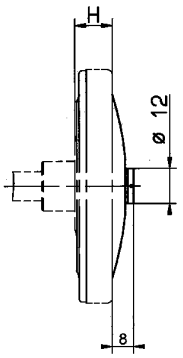


Types: **608001/1863**
608001/1880
608001/1810
608001/1816



Extra codes **430** **432**





Type	Ø D	H	L_{14}
608001/0150	50	13	- -
608001/0163	63	14	- -
608001/1863			26
608001/0180	80	13	- -
608001/1880			51
608001/0110	100	18	- -
608001/1810			51
608001/0116	160	19	- -
608001/1816			81

See Data Sheet 60.8710 for dimensions Ø d and L_{13}.

Order details

Dial thermometer, standard version, Type 608001

	(1)	Basic type
608001		Mechanical dial thermometer, standard version, Class 1.5
	(2)	**Basic type extensions**
0150		Style 01; housing size: 50 mm dia.
0163		Style 01; housing size: 63 mm dia.
0180		Style 01; housing size: 80 mm dia.
0110		Style 01; housing size: 100 mm dia.
0116		Style 01; housing size: 160 mm dia.
1863		Style 18; housing size: 63 mm dia.
1880		Style 18; housing size: 80 mm dia.
1810		Style 18; housing size: 100 mm dia.
1816		Style 18; housing size: 160 mm dia.
	(3)	**Indication range (AB)**
628		-20 to + 40°C; measuring range -10 to + 30°C, accuracy 1.5°C
632		-20 to + 60°C; measuring range -10 to + 60°C, accuracy 1.5°C
635		-20 to + 80°C; measuring range -10 to + 70°C, accuracy 1.5°C
639		-20 to +100°C; measuring range 0 to + 80°C, accuracy 3.0°C
643		-20 to +120°C; measuring range 0 to +100°C, accuracy 3.0°C
564		-30 to + 30°C; measuring range -20 to + 20°C, accuracy 1.5°C
566		-30 to + 50°C; measuring range -20 to + 40°C, accuracy 1.5°C
570		-30 to + 70°C; measuring range -20 to + 60°C, accuracy 1.5°C
585		-30 to +170°C; measuring range -10 to +150°C, accuracy 3.0°C
469		-40 to + 40°C; measuring range -30 to + 30°C, accuracy 1.5°C
472		-40 to + 60°C; measuring range -30 to + 50°C, accuracy 1.5°C
357		-50 to + 50°C; measuring range -40 to + 40°C, accuracy 1.5°C
807		0 to + 60°C; measuring range +10 to + 50°C, accuracy 1.5°C
810		0 to + 80°C; measuring range +10 to + 70°C, accuracy 1.5°C
814		0 to +100°C; measuring range +10 to + 90°C, accuracy 1.5°C
818		0 to +120°C; measuring range +20 to +100°C, accuracy 3.0°C
826		0 to +160°C; measuring range +20 to +140°C, accuracy 3.0°C
832		0 to +200°C; measuring range +20 to +180°C, accuracy 3.0°C
834		0 to +250°C; measuring range +30 to +220°C, accuracy 4.0°C
840		0 to +300°C; measuring range +30 to +270°C, accuracy 8.0°C
843		0 to +350°C; measuring range +50 to +300°C, accuracy 8.0°C
848		0 to +400°C; measuring range +50 to +350°C, accuracy 8.0°C
854		0 to +500°C; measuring range +50 to +450°C, accuracy 8.0°C
	(4)	**Process connection (PA)**
010		TA 01; immersion tube with shoulder
844		TA 02; immersion tube with union nut and loose nipple[2)]
845		TA 03; immersion tube with loose union nut
841		TA 04; immersion tube with fixed hexagon[2)]
847		TA 06; immersion tube with sliding clamp fitting (20 bar max.)[2)]
018		TA 08; immersion tube with sliding fixing plate in zinc-plated steel and fixing screw
858		SH04; screw-in pocket, one-piece
891		SH05; screw-in pocket, assembled
913		SH07; screw-in pocket, assembled, with fixing screw
820		SH09; weld-in pocket, assembled, with fixing screw

[1] See Data Sheet 60.8710 for description and features.
[2] Screw-in spigot to DIN 3852 Form A (not with NPT thread).
[3] List extra codes in sequence, separated by commas.

Order details

Dial thermometer, standard version, Type 608001

	(5)	Diameter of process connection (PA)[1]
6		6 mm dia.
10		10 mm dia.
12		12 mm dia. (with SH05, SH07 only)
14		14 mm dia. (with SH05, SH07, SH09 only)
17		17 mm dia. (with SH04 only)
	(6)	**Thread for process connection (PA)[1]**
000		no thread (TA01 only)
103		$G\,^3/_8$ thread
104		$G\,^1/_2$ thread
105		$G\,^3/_4$ thread
144		1/2-14NPT thread
	(7)	**Material of probe[1]**
01		steel (St)
26		stainless steel (CrNi, 1.4571)
46		brass (CuZn) (up to 200°C)
	(8)	**Material of process connection (PA)[1]**
01		steel (St)
26		stainless steel (CrNi, 1.4571)
46		brass (CuZn)
	(9)	**Fitting length of process connection (PA) (dimension S)**
50		50 mm
100		100 mm
150		150 mm
200		200 mm
. . .		special length (details in plain text, in 50 mm steps)
	(10)	**Extra codes (TZ)**
000		no extra code
430		peak-reading pointer (only with basic type extension 0163, 0180, 1010, 1863, 1880, 1810, indication range span: 100 °C min.)
432		marker (plexiglass window, only with basic type extension 0163, 0180, 1010, 1863, 1880, 1810, +70°C max. ambient temperature)
522		customized scale

Special versions on request!

Order code

(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)		
608001	/	. . . .	-	. . .	-	. . .	-	. .	-	. . .	-	. .	-	. .	-	. . .	/	. . .	,	. . .

Order example

608001	/	0180	-	818	-	845	-	10	-	104	-	96	-	46	-	100	/	000[3]	,	. . .

[1] See Data Sheet 60.8710 for description and features.
[2] Screw-in spigot to DIN 3852 Form A (not with NPT thread).
[3] List extra codes in sequence, separated by commas.

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Internet: www.jumo.us

Dial Thermometers
Industrial Version

- ❑ Temperature indicator with bimetal sensing system
- ❑ Stainless steel housing
- ❑ Class 1
- ❑ Protection IP65 max.
- ❑ Housing sizes: 50 mm, 60 mm, 80 mm, 100 mm and 160 mm dia.

Type 608002/1810

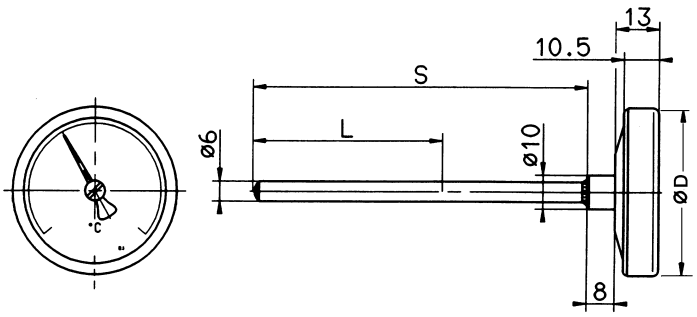
Dial thermometers, industrial version, are instruments for universal use in local temperature measurement.

Technical data

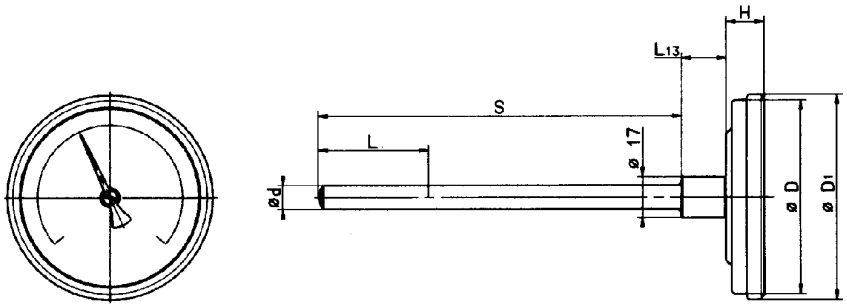
Housing	housing and bezel in stainless steel (1.4301) angle block in aluminium (Style 18)
Protection	IP54 to EN 60 529 (IP65 with extra code 404)
Window	glass, with extra code 404: plexiglass (PMMA)
Scale	blank aluminium, black lettering
Indication	linear, Class 1 to EN 13 190
Time response	$t_{0.9}$ response 30 sec approx. (measured in agitated water with a 10 mm dia. stainless steel probe)
Ambient temperature effect	no effect
Limit temperatures	-30 to +80°C (with extra code 404: -20 to +70°C) storage and transport: -30 to +80°C (with extra code 404: -20 to +70°C)
Nominal position	unrestricted

Dimensions

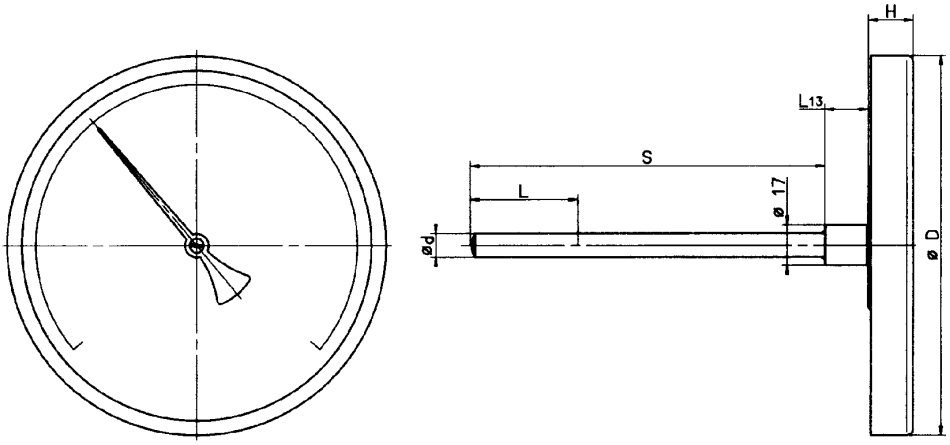
Type: 608002/0150



Types: 608002/0160
608002/0180
608002/0110



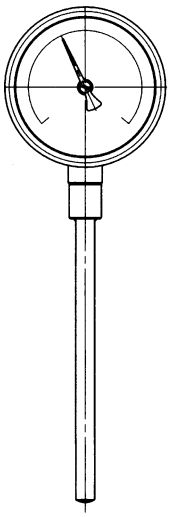
Type: 608002/0116

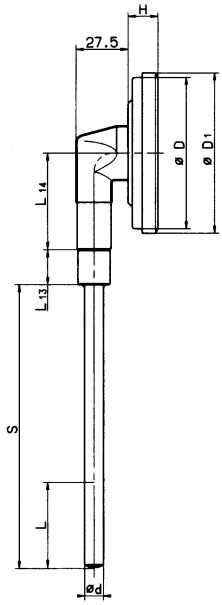


Type	Ø D	Ø D_1	H
608002/0150	50	–	–
608002/0160	60	65	17.5
608002/0180	80	85	18.5
608002/0110	100	106	18.5
608002/0116	160	–	20.0

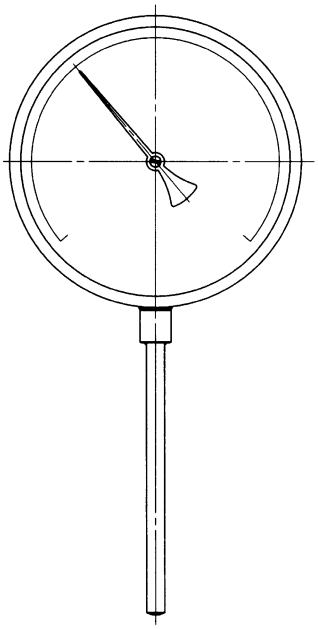
Dimensions

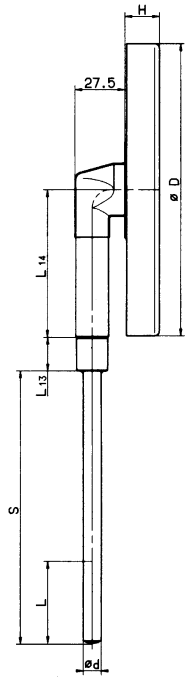
Types: 608002/1860
608002/1880
608002/1810





Type: 608002/1816



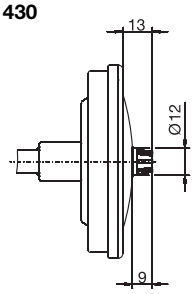


Type	Ø D	Ø D_1	H	L_{14}
608002/1860	60	65	17.5	26
608002/1880	80	85	18.5	51
608002/1810	100	106	18.5	51
608002/1816	160	—	20.0	81

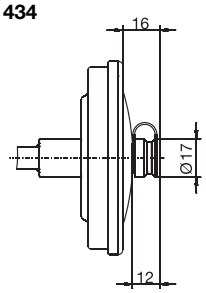
for dimensions Ø d and L_{13},
see Data Sheet 60.8710.

Extra codes

430

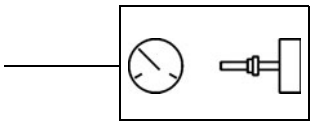


434

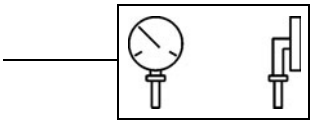


Order details

Order code	(1)	Basic type
608002		Mechanical dial thermometer, industrial version, Class 1
	(2)	**Basic type extension**
0150		Style 01; housing size: 50 mm dia.
0160		Style 01; housing size: 60 mm dia.
0180		Style 01; housing size: 80 mm dia.
0110		Style 01; housing size: 100 mm dia.
0116		Style 01; housing size: 160 mm dia.

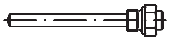
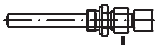
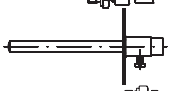
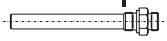
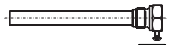
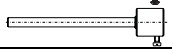


1860		Style 18; housing size: 60 mm dia.
1880		Style 18; housing size: 80 mm dia.
1810		Style 18; housing size: 100 mm dia.
1816		Style 18; housing size: 160 mm dia.



	(3)	**Indication range (AB)**
628		-20 to + 40°C; measuring range -10 to + 30°C, accuracy 1.0°C
632		-20 to + 60°C; measuring range -10 to + 60°C, accuracy 1.0°C
635		-20 to + 80°C; measuring range -10 to + 70°C, accuracy 1.0°C
639		-20 to +100°C; measuring range 0 to + 80°C, accuracy 2.0°C
643		-20 to +120°C; measuring range 0 to +100°C, accuracy 2.0°C
564		-30 to + 30°C; measuring range -20 to + 20°C, accuracy 1.0°C
566		-30 to + 50°C; measuring range -20 to + 40°C, accuracy 1.0°C
570		-30 to + 70°C; measuring range -20 to + 60°C, accuracy 1.0°C
585		-30 to +170°C; measuring range -10 to +150°C, accuracy 2.0°C
469		-40 to + 40°C; measuring range -30 to + 30°C, accuracy 1.0°C
472		-40 to + 60°C; measuring range -30 to + 50°C, accuracy 1.0°C
357		-50 to + 50°C; measuring range -40 to + 40°C, accuracy 1.0°C
807		0 to + 60°C; measuring range +10 to + 50°C, accuracy 1.0°C
810		0 to + 80°C; measuring range +10 to + 70°C, accuracy 1.0°C
814		0 to +100°C; measuring range +10 to + 90°C, accuracy 1.0°C
818		0 to +120°C; measuring range +20 to +100°C, accuracy 2.0°C
826		0 to +160°C; measuring range +20 to +140°C, accuracy 2.0°C
832		0 to +200°C; measuring range +20 to +180°C, accuracy 2.0°C
834		0 to +250°C; measuring range +30 to +220°C, accuracy 2.5°C
840		0 to +300°C; measuring range +30 to +270°C, accuracy 5.0°C
843		0 to +350°C; measuring range +50 to +300°C, accuracy 5.0°C
848		0 to +400°C; measuring range +50 to +350°C, accuracy 5.0°C
854		0 to +500°C; measuring range +50 to +450°C, accuracy 5.0°C

Order details

Order code			
	(4)	**Process connection (PA)**[1]	
010		TA 01; immersion tube with shoulder	
843		TA 02; immersion tube with union nut and loose nipple[2]	
845		TA 03; immersion tube with loose union nut	
846		TA 04; immersion tube with fixed hexagon[2]	
847		TA 06; immersion tube with sliding clamp fitting (20 bar max.)[2]	
018		TA 08; immersion tube with sliding fixing plate (zinc-plated steel) and fixing screw	
858		SH04; screw-in pocket, solid, to DIN 16 179	
891		SH05; screw-in pocket, assembled[2]	
913		SH07; screw-in pocket, assembled, with fixing screw[2]	
820		SH09; weld-in pocket, assembled, with fixing screw	
	(5)	**Diameter of process connection (PA)**[1]	
6		Ø 6 mm	
10		Ø 10 mm	
12		Ø 12 mm (with SH05, SH07 only)	
14		Ø 14 mm (with SH05, SH07, SH09 only)	
17		Ø 17 mm (with SH04 only)	
	(6)	**Type of thread for process connection (PA)**[1]	
000		no thread (TA01 only)	
102		thread $G^1/_4$ (only with basic type extension 0150)	
103		thread $G^3/_8$	
104		thread $G^1/_2$	
105		thread $G^3/_4$	
144		thread 1/2-14NPT	
	(7)	**Material of probe**[1]	
26		stainless steel (CrNi, 1.4571)	
	(8)	**Material of process connection (PA)**[1]	
26		stainless steel (CrNi, 1.4571)	
	(9)	**Fitting length of process connection (PA) (dimension S)**	
50		50 mm	
100		100 mm	
150		150 mm	
200		200 mm	
. . .		special length (details in plain text, in 50 mm steps)	
	(10)	**Extra code (TZ)**	
000		no extra code	
430		peak-reading pointer (only with basic type extension 0160, 0180, 0110, 1860, 1880, 1810 - min. indication range span: 100 °C; not with TZ 404)	
404		IP65 protection to EN 60 529 (only with basic type extension 0160, 0110, 1860, 1810; not with TZ 430, TZ 434)	
522		scale to customer specification	
434		peak-reading pointer adjustable with screwdriver, protected by screw cap (only with basic type extension 0160, 0180, 0110, 1860, 1880, 1810; not with TZ 404)	

Special versions on request!

Order code

(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)		
608002	/	. . . .	-	. . .	-	. . .	-	. .	-	. . .	-	. .	-	. .	-	. . .	/	. . .	,	. . .

Order example

608002	/	0180	-	818	-	845	-	10	-	104	-	26	-	26	-	100	/	000[3]		

[1] See Data Sheet 60.8710 for description and special features.
[2] Screw-in spigot to DIN 3852 Form A (not with NPT thread).
[3] List extra codes in sequence, separated by commas.

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Dial Thermometer
Chemical Plant Version

Type 608003/1010

- ❑ Temperature indicator with a bimetal sensing system
- ❑ Stainless steel housing with bayonet lock
- ❑ Class 1
- ❑ IP65 protection
- ❑ Housing sizes: 80 mm, 100 mm and 160 mm dia.

Brief description

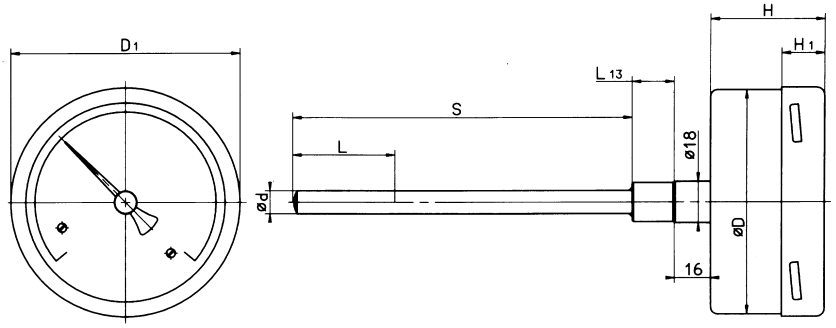
Chemical plant version dial thermometers are instruments for universal use in on-site temperature measurement.

Technical data

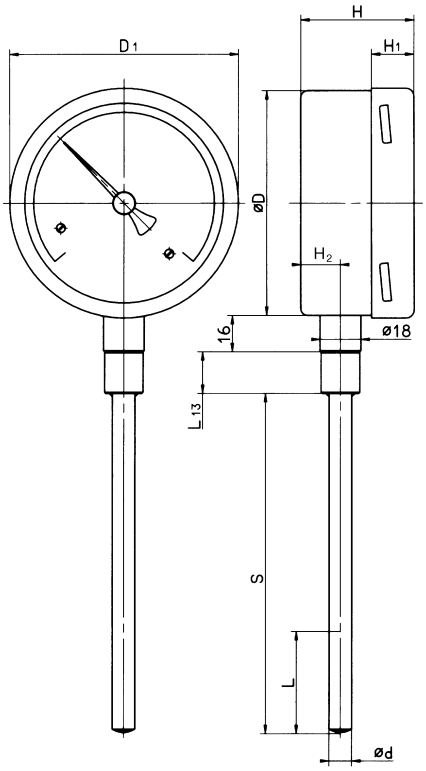
Housing	housing and bezel in stainless steel (1.4301)
Protection	IP65 to EN 60 529
Window	glass, with extra code 434 in plexiglass (PMMA)
Scale	blank aluminium, black lettering
Indication	linear, Class 1 to EN 13 190
Response time	$t_{0.9}$ response approx. 30 sec (measured in agitated water with a 10 mm dia. probe in stainless steel)
Ambient temperature effect	no effect
Limit temperatures	-30 to +80°C (storage and transport: -30 to +80°C)
Nominal position	unrestricted
Indication adjustment	The bezel can be removed and the indication corrected on the pointer.

Dimensions

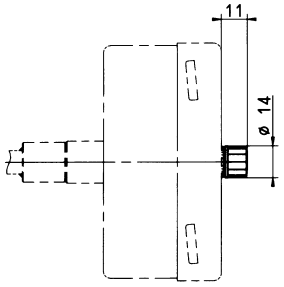
Types: 608003/0180
608003/0110
608003/0116



Types: 608003/1080
608003/1010
608003/1016



Extra code 434
(peak-reading pointer)



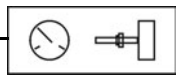
Type	Ø D	Ø D_1	H	H_1	H_2
608003/0180	79	80	55	15.5	16.8
608003/1080					
608003/0110	99	101.5	50	19	12.5
608003/0110 TZ 474			55		
608003/1010			50		
608003/0116	159	161.5	50	21	12.5
608003/1016					

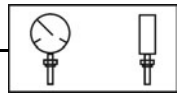
See Data Sheet 60.8710 for dimensions Ø d and L_{13}.

Order details

Dial thermometer, chemical plant version, Type 608003

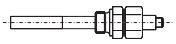
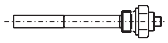
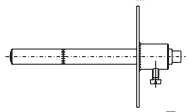
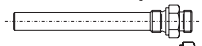
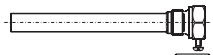
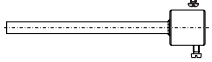
	(1)	Basic type
608003		Mechanical dial thermometer, chemical plant version, Class 1
	(2)	**Basic type extensions**
0180		Style 01; housing size: 80 mm dia.
0110		Style 01; housing size: 100 mm dia.
0116		Style 01; housing size: 160 mm dia.
1080		Style 10; housing size: 80 mm dia.
1010		Style 10; housing size: 100 mm dia.
1016		Style 10; housing size: 160 mm dia.
	(3)	**Indication range (AB)**
628		-20 to + 40°C; measuring range -10 to + 30°C, accuracy 1.0°C
632		-20 to + 60°C; measuring range -10 to + 60°C, accuracy 1.0°C
635		-20 to + 80°C; measuring range -10 to + 70°C, accuracy 1.0°C
639		-20 to +100°C; measuring range 0 to + 80°C, accuracy 2.0°C
643		-20 to +120°C; measuring range 0 to +100°C, accuracy 2.0°C
564		-30 to + 30°C; measuring range -20 to + 20°C, accuracy 1.0°C
566		-30 to + 50°C; measuring range -20 to + 40°C, accuracy 1.0°C
570		-30 to + 70°C; measuring range -20 to + 60°C, accuracy 1.0°C
585		-30 to +170°C; measuring range -10 to +150°C, accuracy 2.0°C
469		-40 to + 40°C; measuring range -30 to + 30°C, accuracy 1.0°C
472		-40 to + 60°C; measuring range -30 to + 50°C, accuracy 1.0°C
357		-50 to + 50°C; measuring range -40 to + 40°C, accuracy 1.0°C
807		0 to + 60°C; measuring range +10 to + 50°C, accuracy 1.0°C
810		0 to + 80°C; measuring range +10 to + 70°C, accuracy 1.0°C
814		0 to +100°C; measuring range +10 to + 90°C, accuracy 1.0°C
818		0 to +120°C; measuring range +20 to +100°C, accuracy 2.0°C
826		0 to +160°C; measuring range +20 to +140°C, accuracy 2.0°C
832		0 to +200°C; measuring range +20 to +180°C, accuracy 2.0°C
834		0 to +250°C; measuring range +30 to +220°C, accuracy 2.5°C
840		0 to +300°C; measuring range +30 to +270°C, accuracy 5.0°C
843		0 to +350°C; measuring range +50 to +300°C, accuracy 5.0°C
848		0 to +400°C; measuring range +50 to +350°C, accuracy 5.0°C
854		0 to +500°C; measuring range +50 to +450°C, accuracy 5.0°C





Order details

Dial thermometer, chemical plant version, Type 608003

	(4)	Process connection (PA)	
010		TA 01; immersion tube with shoulder	
843		TA 02; immersion tube with union nut and loose nipple[2]	
845		TA 03; immersion tube with loose union nut	
846		TA 04; immersion tube with fixed hexagon[2]	
847		TA 06; immersion tube with sliding clamp fitting (20 bar max.)[2]	
018		TA 08; immersion tube with sliding fixing plate in zinc-plated steel and fixing screw	
858		SH04; screw-in pocket, one-piece	
891		SH05; screw-in pocket, assembled	
913		SH07; screw-in pocket, assembled, with fixing screw	
820		SH09; weld-in pocket, assembled, with fixing screw	
	(5)	**Diameter of process connection (PA)[1]**	
6		6 mm dia.	
10		10 mm dia.	
12		12 mm dia. (with SH05, SH07 only)	
14		14 mm dia. (with SH05, SH07, SH09 only)	
17		17 mm dia. (with SH04 only)	
	(6)	**Thread for process connection (PA)[1]**	
000		no thread (TA01 only)	
103		$G\,^3/_8$ thread	
104		$G\,^1/_2$ thread	
105		$G\,^3/_4$ thread	
144		1/2-14NPT thread	
	(7)	**Material of process connection (PA)[1]**	
26		stainless steel (CrNi, 1.4571)	
	(8)	**Fitting length of process connection (PA) (dimension S)**	
50		50 mm	
100		100 mm	
150		150 mm	
200		200 mm	
. . .		special length (details in plain text, in 50 mm steps)	
	(9)	**Extra codes (TZ)**	
000		no extra code	
522		customized scale	
434		peak-reading pointer adjustable with screwdriver, protected through screw cap (plexiglass window; +70°C max. ambient temperature)	
474		silicone-filled pointer damper (only with basic type extension 0180, 0110, 0116)	

Special versions on request!

Order code

(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		
608003	/	. . . .	-	. . .	-	. . .	-	. .	-	. . .	-	. .	-	. . .	/	. . .	,	. . .

Order example

608003	/	0180	-	818	-	845	-	10	-	104	-	26	-	100	/	000[3]		

[1] See Data Sheet 60.8710 for description and features.
[2] Screw-in spigot to DIN 3852 Form A (not with NPT thread).
[3] List extra codes in sequence, separated by commas.

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Dial Thermometer Transformer Version

for stock items see price catalog

Type 608005/1080

- ❑ Temperature indicator with a bimetal sensing system
- ❑ Stainless steel housing
- ❑ Peak-reading pointer
- ❑ Class 1.5
- ❑ IP55 protection
- ❑ Housing size: 80 mm dia.

Brief description

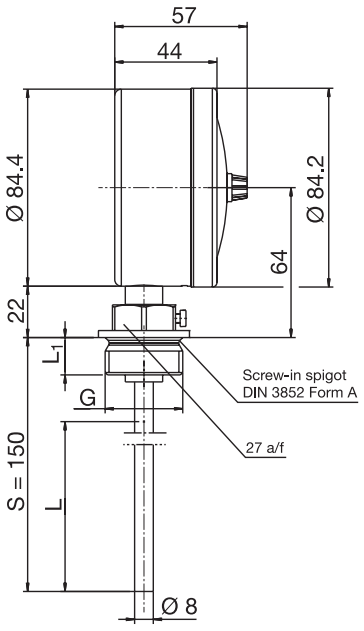
Dial thermometers for transformers are universal instruments for local temperature measurement.

Technical data

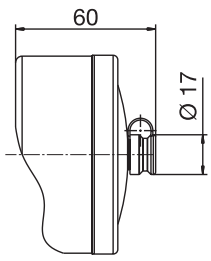
Housing	housing and bezel in stainless steel (1.4301)
Enclosure protection	IP55 to EN 60 529
Window	Plexiglas (PMMA)
Scale	white, black lettering
Accuracy class	Class 1.5 similar to EN 13 190
Time constant	$T_{0.632}$ response 18 sec approx. (measured in agitated water with an 8 mm dia. brass probe)
Ambient temperature effect	no effect
Limit temperatures	-30 to +80°C (storage and transport -30 to +80°C)
Nominal position	NL 90, symbol ⊥

Dimensions

Type: 608005/1080



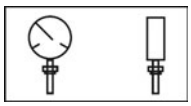
Extra code 434



Pipe thread G	L_1	L (active probe dimension)
$G^1/_2A$	14	75
$G^3/_4A$	16	
G1A	16	

Order details

Dial thermometer, transformer version, Type 608005

Order code		
	(1)	**Basic type**
608005		Mechanical dial thermometer, transformer version, Class 1.5, with peak-reading pointer
	(2)	**Basic type extension**
1080		Style 10; housing size: 80 mm dia. 
	(3)	**Indication range (AB)**
818		0 to +120°C; measuring range +20 to +100°C, accuracy 3.0°C
643		-20 to +120°C; measuring range 0 to +100°C, accuracy 3.0°C
	(4)	**Process connection (PA)**
874		TA 24; immersion tube with loose plug, O ring seal and clamping screw 
	(5)	**Diameter of process connection (PA)**
8		8 mm dia.
	(6)	**Type of thread for process connection (PA)**
104		$G^1/_2$ thread
105		$G^3/_4$ thread
106		G1 thread
	(7)	**Material of process connection (PA)**
50		brass
	(8)	**Fitting length of process connection (PA) (dimension S)**
150		150 mm
. . .		special length (on request, details in plain text)
	(9)	**Extra codes (TZ)**
000		no extra code
522		customized scale
434		peak-reading pointer adjustable with screwdriver; protected by cap

Special versions on request!

Order code

(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		
608005	/	. . . .	-	. . .	-	. . .	-	. .	-	. . .	-	. .	-	. . .	/	. . .	,	. . .

Order example

608005	/	1080	-	818	-	874	-	8	-	106	-	50	-	150	/	000[1]	,	. . .

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

Note:

For contact dial thermometers for transformers, see data sheet 60.8550.

For temperature indicators and contact dial thermometers with capillary, see data sheets 60.8201 and 60.8520.

10.05/00074773

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Dial Thermometer

- ❏ 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

Type 608201/2572

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.

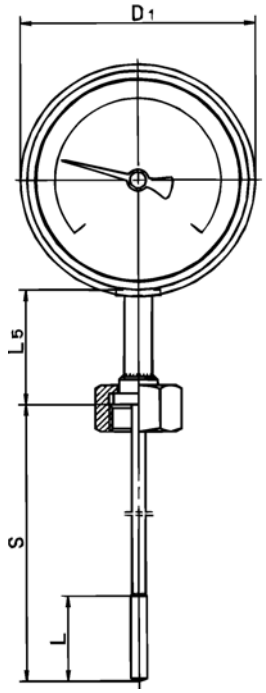
Technical data

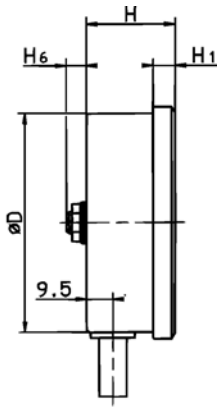
Housing or bezel	stainless steel (1.4301)
Protection	IP53 as per EN 60 529 (IP65 with extra code 404)
Window	glass, with styles 24 and 25, and with extra codes 473 and 404: PMMA (plexiglass)
Scale	white, black lettering (silver, black lettering with extra codes 473 and 404)
Indication	linear, Class 1.5 similar to EN 13 190
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
Response time $t_{0.9}$ response	approx. 20 sec, measured in agitated water bath, with a 6 mm dia. probe.	approx. 5 sec, measured in agitated oil bath, with a 8 mm dia. 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)	0.015% of indication range per °C change in ambient temperature	no effect
	at higher ambient temperature – higher temperature indication	

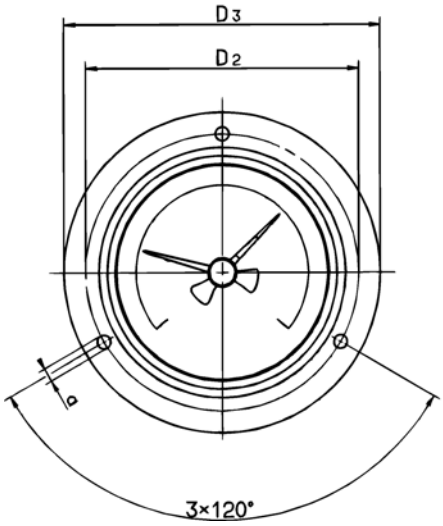
Dimensions

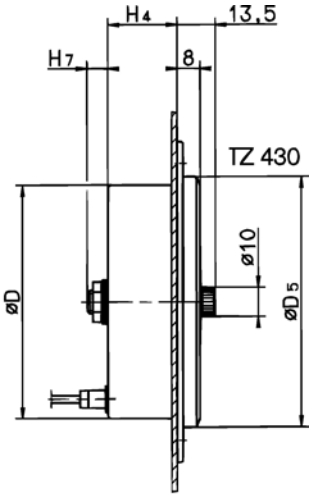
Types: 608201/1060
608201/1080
608201/1010



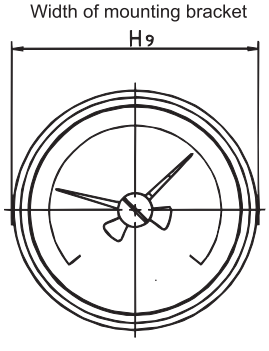


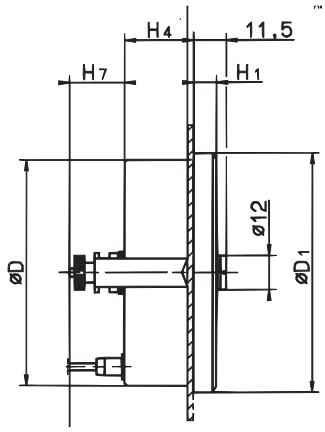
Types: 608201/2060
608201/2080
608201/2010





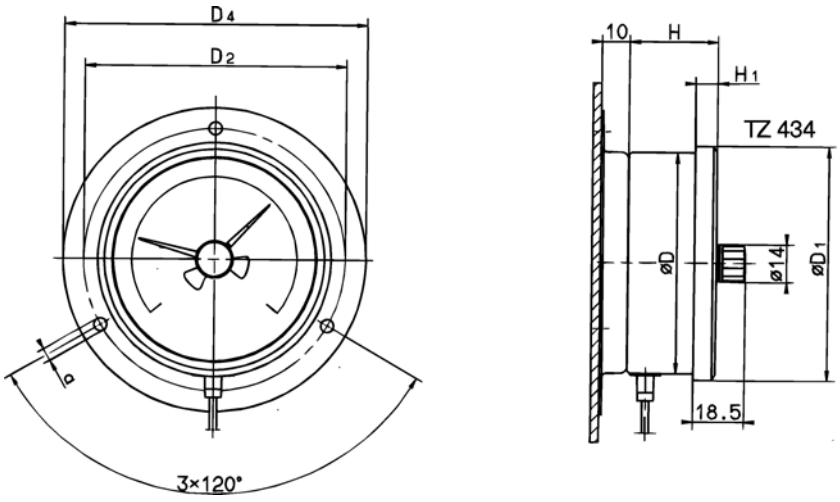
Types: 608201/2160
608201/2180
608201/2110



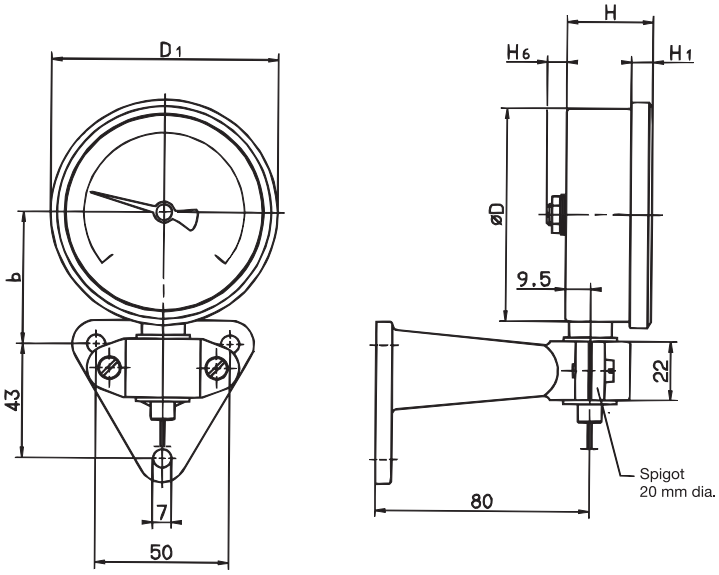


Dimensions

Types: 608201/2260
608201/2280
608201/2210



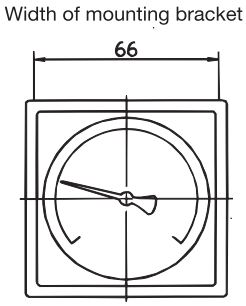
Types: 608201/2360
608201/2380
608201/2310

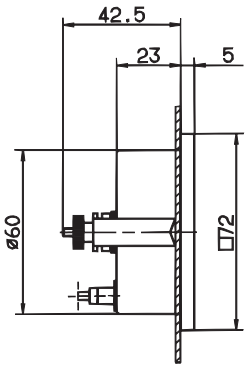


Housing dia.	Diameter of panel cut-out
60 mm	62 $^{0.5}_{0}$ mm
80 mm	82 $^{0.5}_{0}$ mm
100 mm	102 $^{0.5}_{0}$ mm

Dimensions

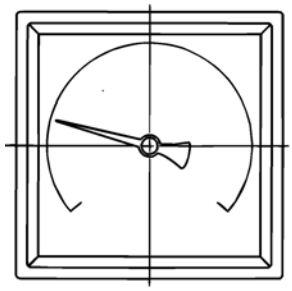
Type: 608201/2572

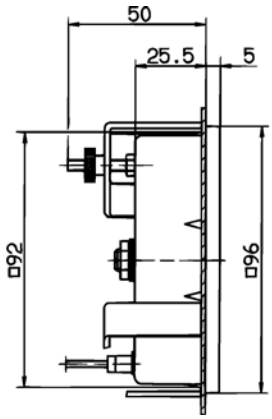




Panel cut-out: 62 $^{+0.5}_{0}$ mm dia.

Type: 608201/2496





Panel cut-out: 92 x 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	4.8	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 L_5 = ≤ 70.5 mm
on probe mountings TA 22 and TA 31 L_5 = 49.5 mm

values in brackets apply to TZ 473 or TZ 404

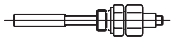
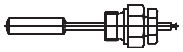
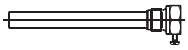
Order details

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; measuring range –30 to + 30°C, accuracy 1.5°C
566		-30 to + 50°C; measuring range –20 to + 40°C, accuracy 1.5°C
643		-20 to +120°C; measuring range 0 to +100°C, accuracy 3.0°C
807		0 to + 60°C; measuring range +10 to + 50°C, accuracy 1.5°C
810		0 to + 80°C; measuring range +10 to + 70°C, accuracy 1.5°C
814		0 to +100°C; measuring range +10 to + 90°C, accuracy 1.5°C
818		0 to +120°C; measuring range +20 to +100°C, accuracy 3.0°C
826		0 to +160°C; measuring range +20 to +140°C, accuracy 3.0°C
832		0 to +200°C; measuring range +20 to +180°C, accuracy 3.0°C
834		0 to +250°C; measuring range +30 to +220°C, accuracy 4.0°C
926		+50 to +250°C; measuring range +70 to +230°C, accuracy 3.0°C
840		0 to +300°C; measuring range +30 to +270°C, accuracy 6.0°C
927		+50 to +300°C; measuring range +80 to +270°C, accuracy 4.0°C
843		0 to +350°C; measuring range +50 to +300°C, accuracy 6.0°C
932		+50 to +350°C; measuring range +80 to +320°C, accuracy 6.0°C
848		0 to +400°C; measuring range +50 to +350°C, accuracy 6.0°C
851		0 to +450°C; measuring range +50 to +400°C, accuracy 6.0°C
854		0 to +500°C; measuring range +50 to +450°C, accuracy 8.0°C
858		0 to +600°C; measuring range +100 to +500°C, accuracy 10.0°C

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 15000 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]	
403		TA 21; immersion tube with loose plug and conical seal	
351		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 60.8730 for description and features
[2] Screw-in spigot to DIN 3852 Form A.
[3] List extra codes in sequence, separated by commas.

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 tube[1]**
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
473		housing with damping fluid (only with basic type extension: 2060, 2260, 2360, 2010, 2210, 2310)
410		metal bezel ring, bezel or flange, black
315		capillary reinforcement on housing and probe (not with FL 21 and FL 22)
404		IP65 enclosure protection to EN 60 529 (only with basic type extension: 2060, 2260, 2360, 2010, 2210, 2310)
522		customized scale
651		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)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)		(11)		(12)	
608201	/	. . . .	-	. . .	-	. .	-	. . . .	-	. . .	-	. .	-	. . .	-	. .	-	. .	-	. . .	/	. .	, . . .

Order example

608201	/	1010	-	818	-	00	-	0	-	750	-	8	-	000	-	26	-	26	-	100	/	000[3]	

[1] See Data Sheet 60.8730 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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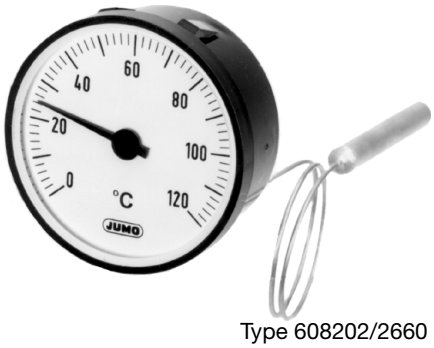
Dial Thermometer

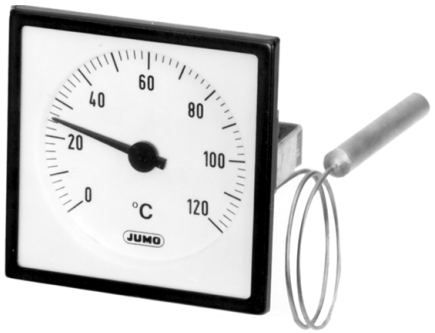


Type 608202/2660

- ❑ Temperature indicator for panel mounting
- ❑ Class 2
- ❑ IP53 front protection
- ❑ Housing sizes: 52 mm and 60 mm dia.
  Bezel: 48x48 mm, 52x52 mm and 72x72 mm

Brief description

Dial thermometers are universal temperature indicators for monitoring the temperature. The instruments feature a plastic housing with a liquid-filled measuring system.
The temperature-dependent change in volume of the liquid-filled measuring system is converted into a rotary movement of the pointer by a Bourdon tube, without any intermediate gearing.



Type 608202/2772

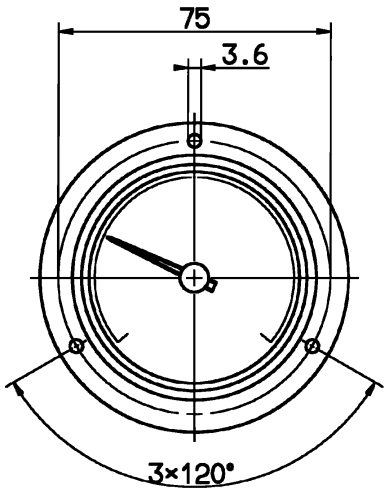
Technical data

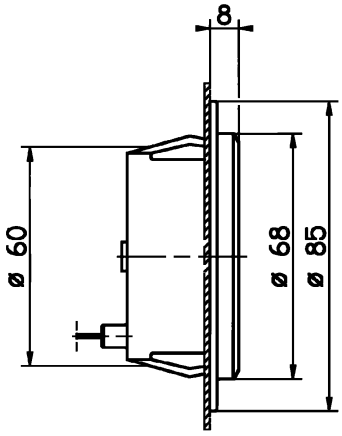
Housing or bezel	black plastic (ABS)
Protection	IP53 front protection to EN 60529
Window	polycarbonate (PC), standard size 60 in PMMA (Plexiglas)
Scale	white, black lettering
Accuracy class	Class 2 to EN 13190
Indication adjustment	at the housing rear
Limit temperatures	storage and transport -20 to +60°C (indication range -40 to +40°C: up to 50°C)
Nominal position	unrestricted

Measuring system	liquid-filled
Time constant $T_{0.632}$	approx. 12 sec, measuring in agitated water bath, with a 6 mm dia. 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
on capillary (per meter)	0.015% of indication range per °C change in ambient temperature
	at higher ambient temperature – higher temperature indication

Dimensions

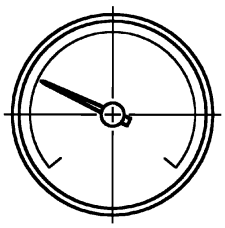
Type: 608202/2060

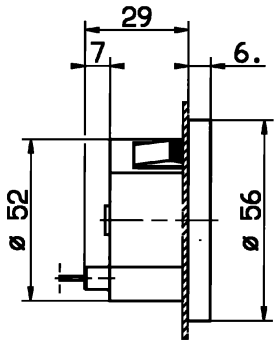




Panel cut-out: Ø 62 $^{+0.5}_{0}$ mm

Type: 608202/2652

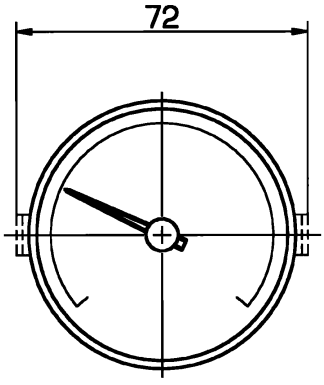


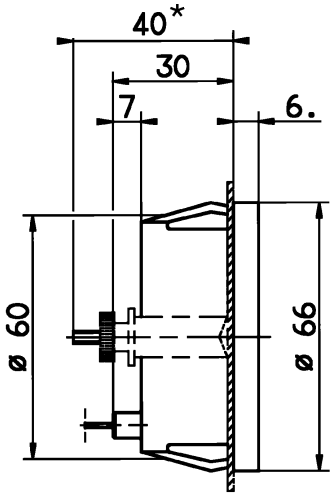


Panel cut-out: Ø 52 $^{+0.5}_{0}$ mm

Type: 608202/2660

Width of mounting bracket



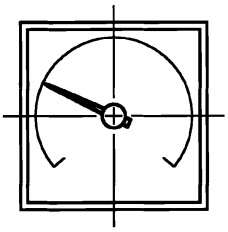


Panel cut-out: Ø 62 $^{+0.5}_{0}$ mm

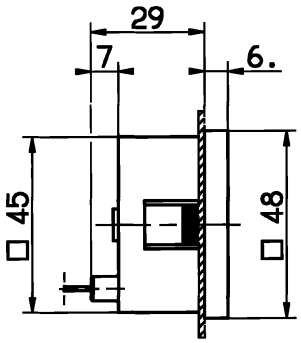
* with code TZ 455

Dimensions

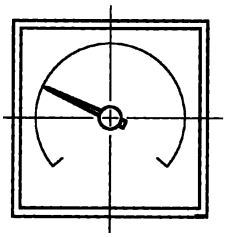
Type: 608202/2748



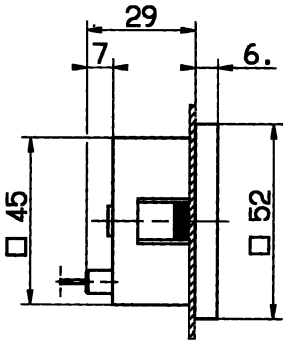
Panel cut-out: 45 x 45 $^{+0.6}_{0}$ mm



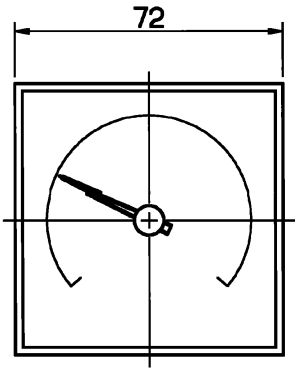
Type: 608202/2752



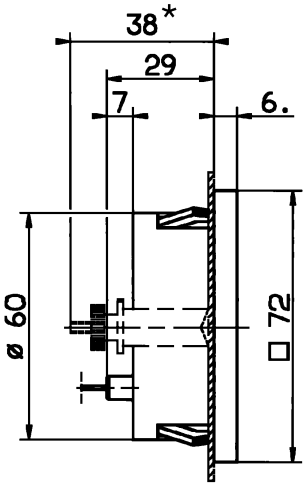
Panel cut-out: 45 x 45 $^{+0.6}_{0}$ mm



Type: 608202/2772



Panel cut-out: Ø 62 $^{+0.5}_{0}$ mm



* with code TZ 455

Order details

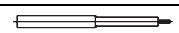
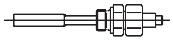
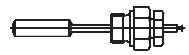
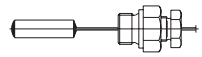
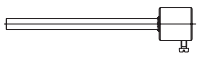
Dial thermometer, Class 2, Type 608202

Order code		Basic type
608202		Mechanical dial thermometer, Class 2
	(2)	**Basic type extensions**
2060		Style: 20; housing size: 60 mm dia.
2652		Style: 26; housing size: 52 mm dia.
2660		Style: 26; housing size: 60 mm dia.
2748		Style: 27; housing size: 48 mm dia.
2752		Style: 27; housing size: 52 mm dia.
2772		Style: 27; housing size: 72 mm dia.
	(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
	(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: in 1000 mm steps, maximum length: 15000 mm)

[1] See Data Sheet 60.8730 for description and features
[2] Screw-in spigot to DIN 3852 Form A.
[3] List extra codes in sequence, separated by commas.

Order details

Dial thermometer, Class 1.5, Type 608202

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	
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; 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.	
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)	

[1] See Data Sheet 60.8730 for description and features
[2] Screw-in spigot to DIN 3852 Form A.
[3] List extra codes in sequence, separated by commas.

Order details

Dial thermometer, Class 1.5, Type 608202

Order code

	(9)	Material of probe / support tube[1]
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
440		housing with bimetal compensation
455		mounting bracket at rear with 60 mm housing dia. and 72 x 72 mm bezel
410		metal bezel or flange, black
411		metal bezel or flange
315		capillary reinforcement on housing and probe (not with FL 21)
522		customized scale

Special versions on request!

Order code

(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)		(11)		(12)	
608202	/	. . . .	-	. . .	-	. .	-	. . . .	-	. . .	-	. .	-	. . .	-	. .	-	. .	-	. . .	/	. .	, . . .

Order example

608202	/	2660	-	832	-	11	-	2000	-	161	-	6	-	104	-	96	-	46	-	150	/	000[3]	

[1] See Data Sheet 60.8730 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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Internet: www.jumo.us

Dial Thermometer

- ❏ temperature indicator for panel mounting or self-supporting
- ❏ stainless steel housing with bayonet lock
- ❏ Class 1
- ❏ IP65 protection
- ❏ housing sizes: 100 mm and 160 mm dia.

Type 608225/1016

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.

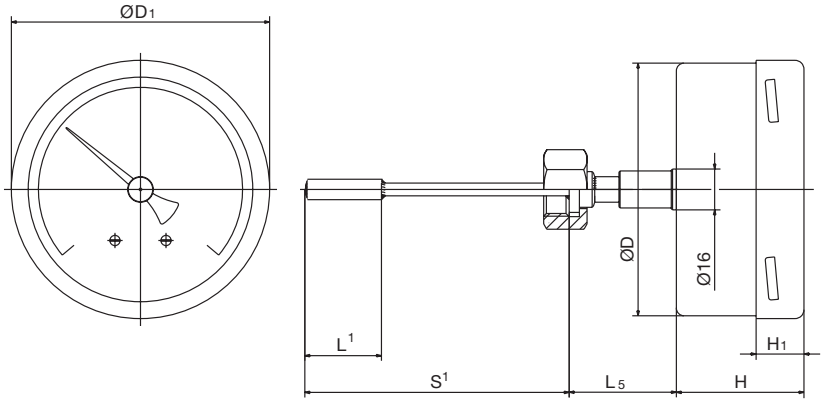
Technical data

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

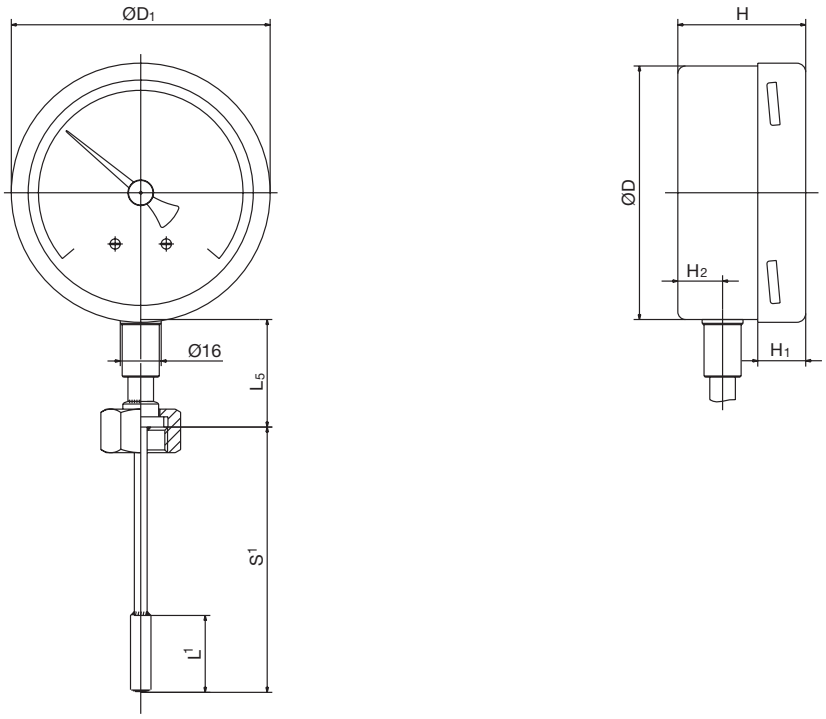
	liquid-filled	**gas-filled**
Measuring system	indication range ≤350°C	indication range ≥ 400°C
Time constant t (to DIN 3440; at 63.2%)	approx. 8 sec, measured in water bath, with a 6 mm dia. copper probe	approx. 2 sec, measured in oil bath, with a 10 mm dia. stainless steel probe
Ambient temperature 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)	0.015% of indication range per °C ambient temperature change	no effect
	higher ambient temperature – higher temperature indication – lower switching point	

Dimensions

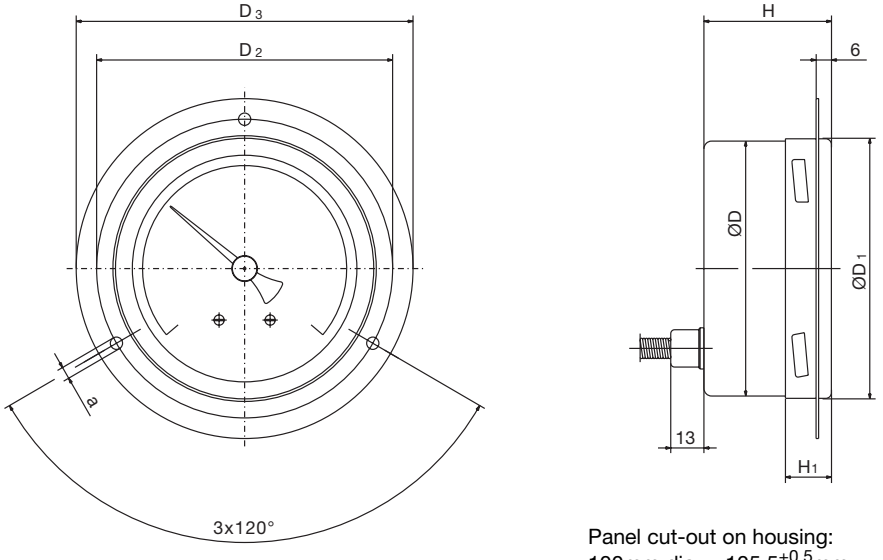
Types: 608225/0110
608225/0116



Types: 608225/1010
608225/1016



Types: 608225/2010
608225/2016

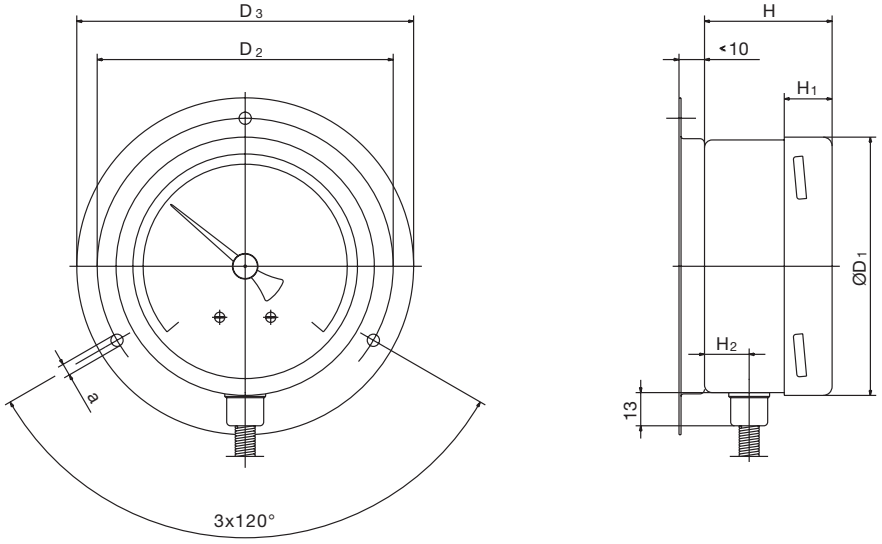


Panel cut-out on housing:
100mm dia. = $105.5^{+0.5}$mm
160mm dia. = $165.5^{+0.5}$mm

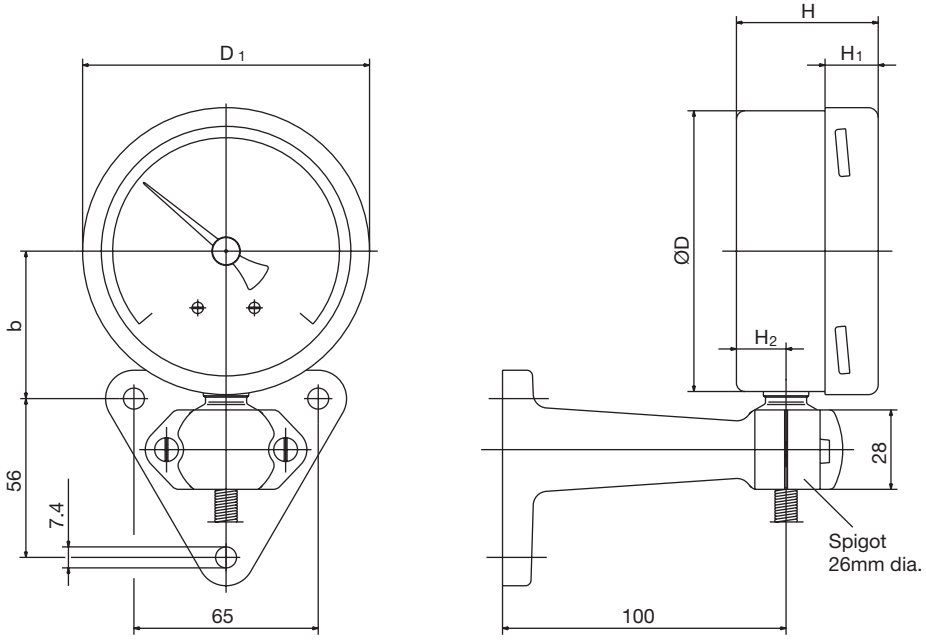
[1] see Data Sheet 60.8730 for details about lengths

Dimensions

Types: 608225/2210
608225/2216



Types: 608225/2310
608225/2316



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 L_5 is ≤69 mm

Order details: Dial thermometer Class 1, Type 608225

	(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 length[1]**	
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 15000 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] (with 14 mm dia. only)	

Order code

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

Order example

608225 / 2010 - 818 - 04 - 2000 - 750 - 8 - 000 - 26 - 100 / 000[3]

[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

	(7)	Diameter of process connection (PA)[1]
6		ø 6 mm
8		ø 8 mm
10		ø 10 mm
14		ø 14 mm (SH05 and SH07 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)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)		(11)		
608225	/	. . . .	-	. . .	-	. .	-	. . . .	-	. . .	-	. .	-	. . .	-	. .	-	. . .	/	. . .	,	. . .

Order example

608225	/	2010	-	818	-	04	-	2000	-	750	-	8	-	000	-	26	-	100	/	000[3]		

[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

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

JUMO Instrument Co. Ltd.
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Temple Bank, Riverway
Harlow, Essex CM 20 2TT, UK
Phone: +44 1279 635533
Fax: +44 1279 635262
e-mail: sales@jumo.co.uk
Internet: www.jumo.co.uk

JUMO Process Control, Inc.
8 Technology Boulevard
Canastota, NY 13032, USA
Phone: 315-697-JUMO
1-800-554-JUMO
Fax: 315-697-5867
e-mail: info@jumo.us
Internet: www.jumo.us

Bimetal Temperature Switch

- ❏ electromechanical temperature switch with a fixed switching temperature
- ❏ IP67 protection (max.)
- ❏ simple installation
- ❏ contact rating up to 2.5 kVA

Type 608301/10-...-..-01

Type 608301/10-...-..-11
Type 608301/20-...-..-11

Type 608301/10-...-..-61
Type 608301/20-...-..-61

Brief description

The bimetal temperature switch lends itself to universal use. Areas of application include temperature monitoring/control and signaling in cooling and heating systems, compressors and motors.

The temperature switch can, to a limited extent, also be used as a temperature controller.

The temperature change is transferred to a mechanism via the fitting. When the switching temperature is reached, the temperature switch is activated.

Technical data

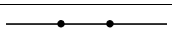
Minimum ordering quantity: 50 items

	Faston connector A 6.3-08	**Connecting cable with cable gland**	**Encapsulated connecting cable**	**Plug connector for cable connection ***
Fitting	brass or stainless steel; screw-in spigot similar to DIN 3852			
	Form A for sealing and sealing ring			sealing with sealing lip
Protection	IP52	IP65	IP67	IP65

Electrical contact Snap-action switch Connection	A 6.3-0.8 to DIN 46244	cable diameter approx. 5.5 mm; core cross-section 0.75 mm^2		cable diameter 6 — 8 mm; earth contact not connected
Contact rating	5 A, 30 V DC, +10 / -15% 10(10) A, 230 V AC +10/-15%, 48 — 63Hz, p.f. = 0.75			
	15(13.5) A, 115 V AC +10/-15%, 48 — 63Hz, p.f. = 1 (0.75)	10(10) A, 115 V AC +10/-15%, 48 — 63Hz, p.f. = 1 (0.75)		
Contact resistance	< 3 mΩ			
Breakdown strength	1500 V AC /1min			
Electrical contact Slow-action conctact Contact rating	-	-	8 A, 12 V DC +10/-15% 4 A, 24 V DC +10/-15% 6 A, 115 V AC +10/-15%, 48 — 63Hz	
	If the bimetal temperature switch is operated off a voltage above 50 V, the fitting must be provided with a protective earth according to VDE or the corresponding local regulations.			

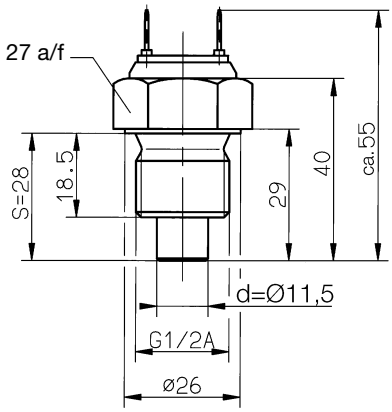
* to EN 175301-803 (DIN 43650)

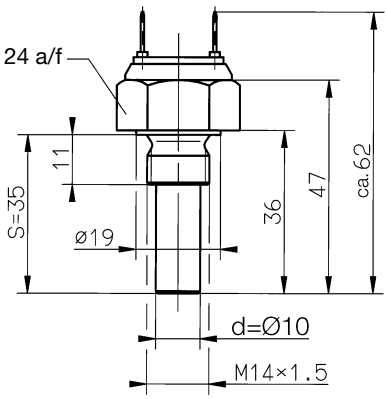
Technical data

	Snap-action switch	Slow-action contact
Switching temperature	+40°C to +140°C; 5 °C steps	
Reset temperature	15 to 30 °C below the switching temperature	approx. 1.5 °C below the switching temperature (measured in water bath, switching point 40°C)
Switching point accuracy	switching temperature: up to 130 °C ±5 °C, above 130° C ±10 °C at a rate of temperature change of 1 °C/min	
Vibration strength	13 g (vibration in direction of central axis, at a frequency of 45 Hz and an amplitude of ± 1.6 mm)	
Dynamic response	$t_{0.9}$ approx. 3.5 min, measured in agitated oil bath; brass fitting, G1/2 A	
Switching output (SA)	break (n.c.) SA01  or make (n.o.) SA02  referred to rising temperature	
Limit temperatures	for temperature and storage -5 to +80°C	
Nominal position	any	
Weight	approx. 50 g	

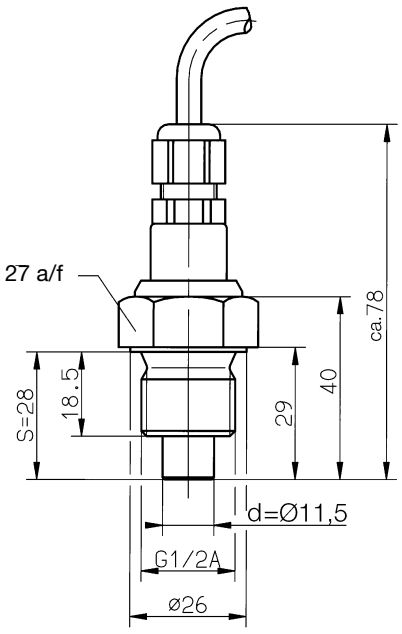
Dimensions

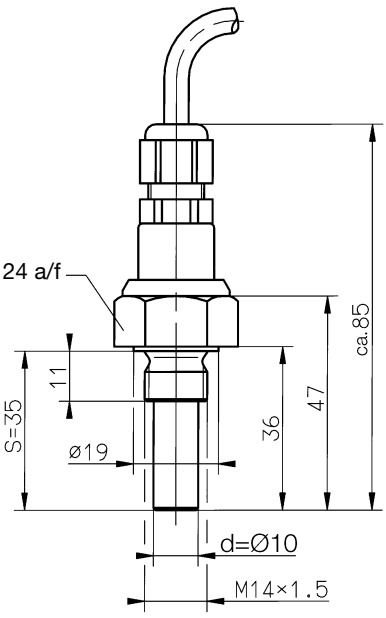
Type 608301/10-...-..-01





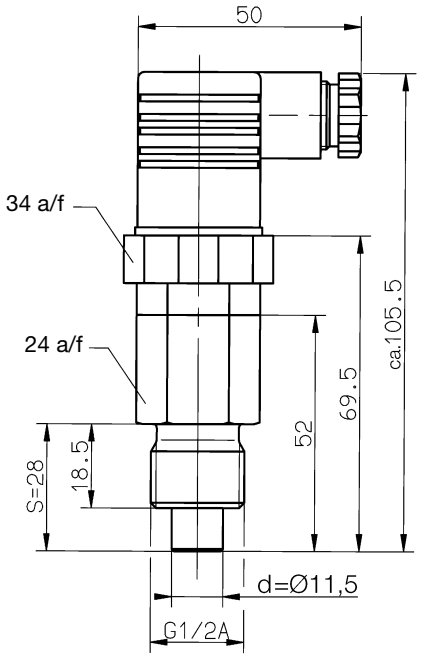
Type 608301/10-...-..-18



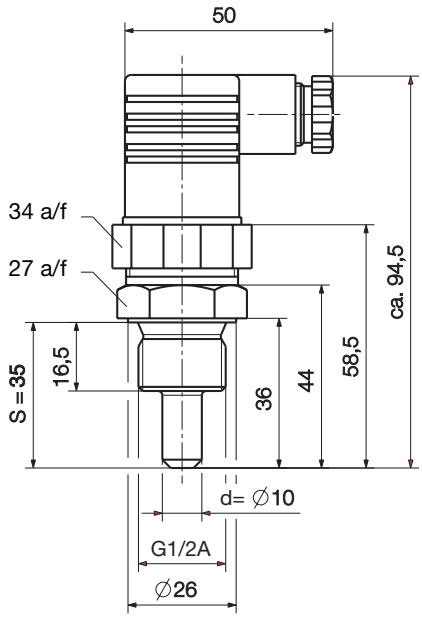


Dimensions

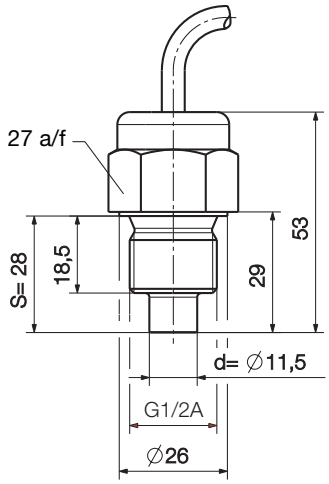
Type 608301/10-...-..-61



Type 608301/20-...-..-61



Types 608301/10-...-..-11
608301/20-...-..-11



Order details

Bimetal temperature switch Type 608301

Minimum ordering quantity: 50 items

			(1)	**Basic type**
		608301		Electromechanical temperature switch with a fixed switching temperature
			(2)	**Basic type extension**
X		10		snap-action switch
	X	20		slow-action contact
			(3)	**Switching temperature**
X	X	. . .		in degrees, within the range from +40°C to +140°C, in 5 °C increments (e.g. 85 ≙ + 85°C)
			(4)	**Switching output (SA)**
X	X	98		break (n.c.) (SA01)
X	X	99		make (n.o.) (SA02)
			(5)	**Electrical connection**
X		01		faston connector A 6.3-0.8 DIN 46244
X	X	61		plug connector for cable connection to EN 175301-803 (DIN 43650)
X		18		connecting cable with cable gland
X	X	11		encapsulated connecting cable (continuous operating temperature: 120°C max.)
			(6)	**Material of process connection**
X	X	50		brass (CuZn)
X	X	78		stainless steel (CrNi, 1.4305)
			(7)	**Diameter of process connection (PA), dimension “d”**
		10		10 mm
		11,5		11.5 mm
			(8)	**Type of thread for process connection (PA)**
		121		thread M14x1.5
		104		thread G $^1/_2$
			(9)	**Fitting length of process connection (PA), dimension “S”**
		28		28 mm
		35		35 mm
			(10)	**Cable length**
X	X	0		none
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
			(11)	**Extra codes (TZ)**
X	X	000		no extra codes

Other versions (switching temperatures, fitttings etc.) available on request.

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

JUMO GmbH & Co. KG

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36039 Fulda, Germany
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Phone: +49 661 6003-0
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Internet: www.jumo.net

JUMO Instrument Co. Ltd.

JUMO House
Temple Bank, Riverway
Harlow, Essex CM 20 2TT, UK
Phone: +44 1279 635533
Fax: +44 1279 635262
E-mail: sales@jumo.co.uk
Internet: www.jumo.co.uk

JUMO PROCESS CONTROL INC.

885 Fox Chase, Suite 103
Coatesville PA 19320, USA
Phone: 610-380-8002
1-800-554-JUMO
Fax: 610-380-8009
E-mail: info@JumoUSA.com
Internet: www.JumoUSA.com

Contact Dial Thermometers

- **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**

Type 608425/2316

Type 608425/2496

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.

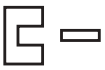
The inductive contact is an electronic limit detector operated by a contactless position sensor (proximity switch).

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	
Indication	linear, Class 1 as per EN 13 190	
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	

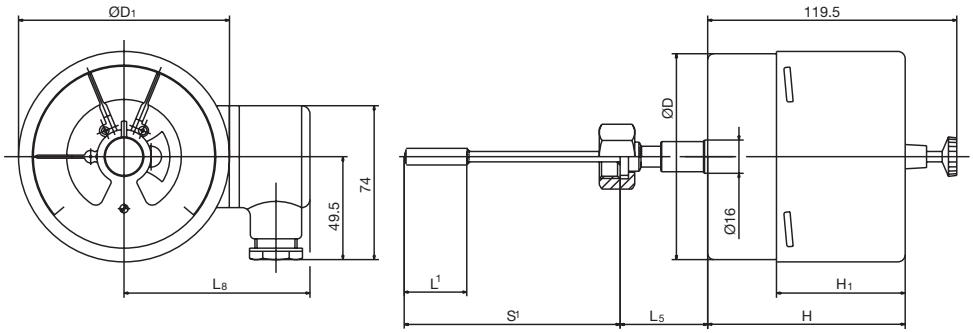
	Liquid filling	**Gas filling**
Measuring system	range (AB) ≤350°C	range (AB) ≤400°C
Time constant t (to DIN 3440; for 63.2%)	approx. 8 sec, measured in a water bath, with 6 mm probe diameter, in Cu	approx. 2 sec, measured in an oil bath, with 10 mm probe diameter, in stainless steel
Ambient temperature error	in % of indication range (referred to the deviation from the reference value at +23°C)	
at housing	0.15% of indication range per °C change of ambient temperature	0.05% of indication range per °C change of ambient temperature
on capillary (per meter)	0.015% of indication range per °C change of ambient temperature	no effect
	At higher ambient temperatures – higher temperature indication – lower switching point	

	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	

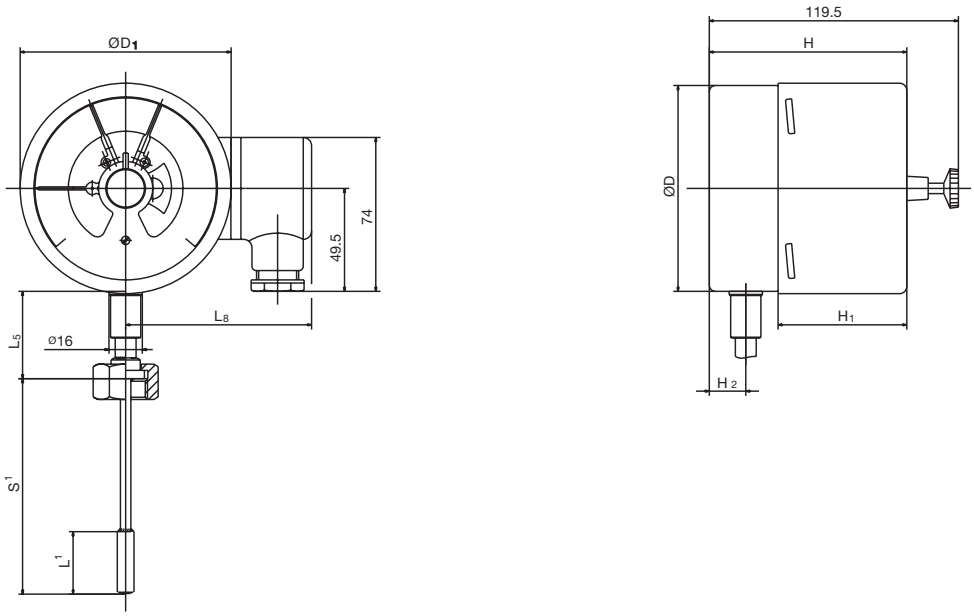
	Electromechanical limit contact	Inductive limit contact
Switching output (SA)	SA 01 to SA 11	SA 30 and SA 31 The inductive limit contact is operated by a contactless proximity switch. The sensor is a slot-type initiator attached to the setpoint indicator. The control flag is activated by the pointer. 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. Switching action according to the "active current principle". Control flag is not within the sensor air gap, relay is energized:  Current drawn ≥ 3mA (active area is clear, the oscillator is active). Control flag is within the sensor air gap, Relay is de-energized:  Current drawn ≤1mA (active area is damped, no oscillation). Inductive limit contact as per Directive 94/9 EC (ATEX), suitable for II 2 G EEx ia IIC T6
	for switching sequence and diagrams: see order details	
Secondary switched devices	For electromechanical limit detectors we recommend using Type MSR multi-function relays from: Wiebrock Mess- und Regeltechnik GmbH, www.wiebrock.de. These switching amplifiers increase the switching reliability and switching capacity of slow-break and magnetic snap-action contacts, and reduce their contact loading. Unintended switching of the limit contact (caused by vibration) can be considerably reduced by using a drop-out delay. 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.	

Dimensions

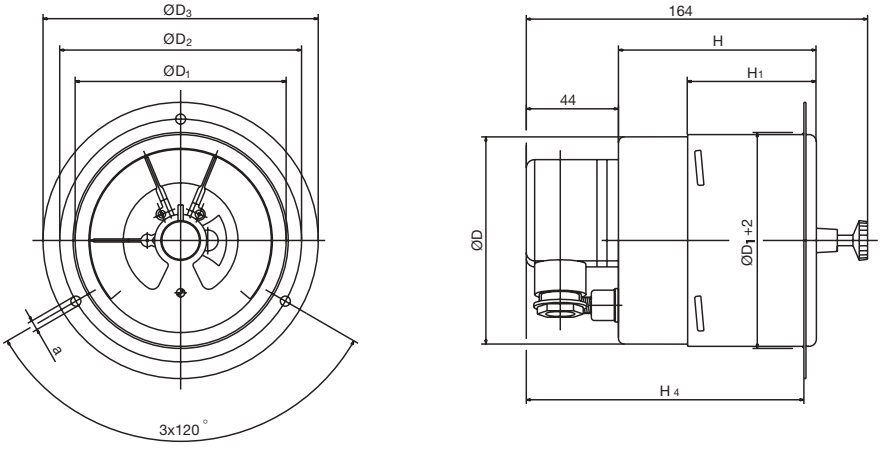
Types: 608425/0110
608425/0116



Types: 608425/1010
608425/1016



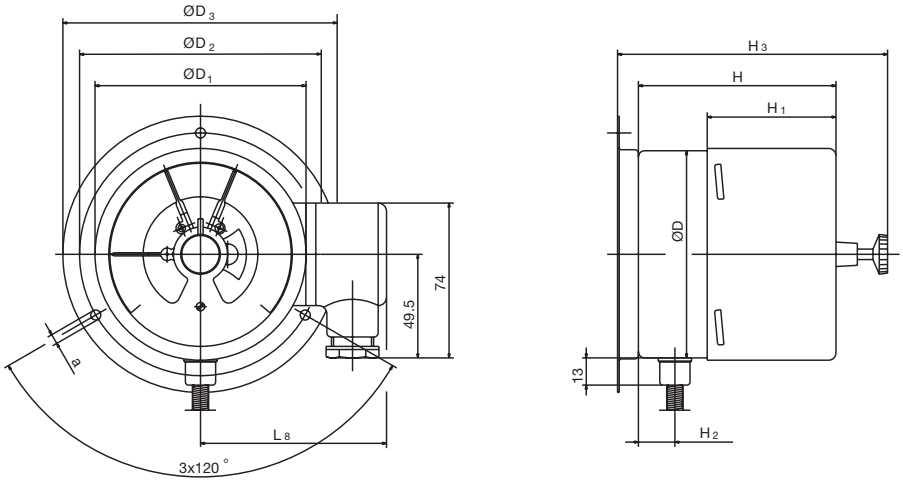
Types: 608425/2010
608425/2016



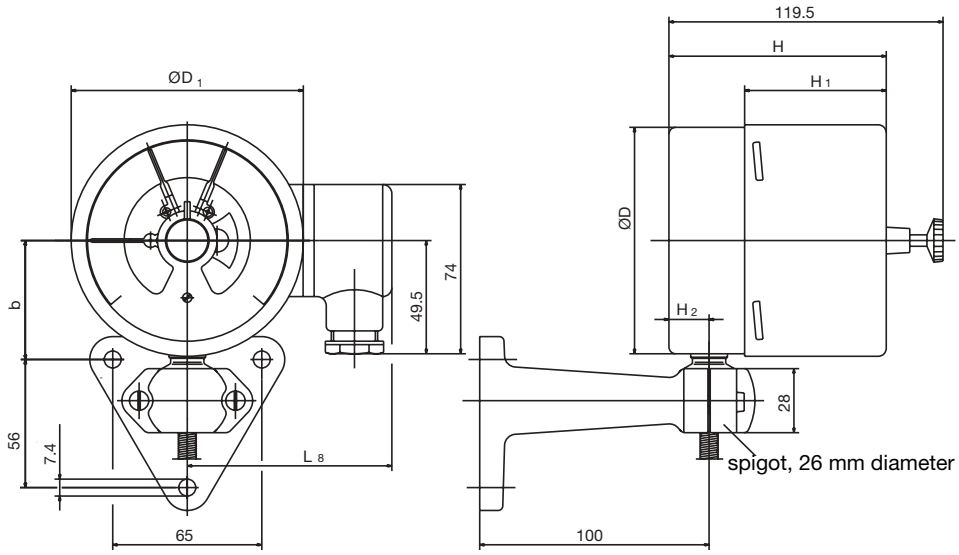
Panel cut-out for housing
diameter 100 mm = $105.5^{+0.5}$ mm
diameter 160 mm = $165.5^{+0.5}$ mm

[1] for lengths, see Data Sheet 60.8730

Types: 608425/2210
608425/2216



Types: 608425/2310
608425/2316

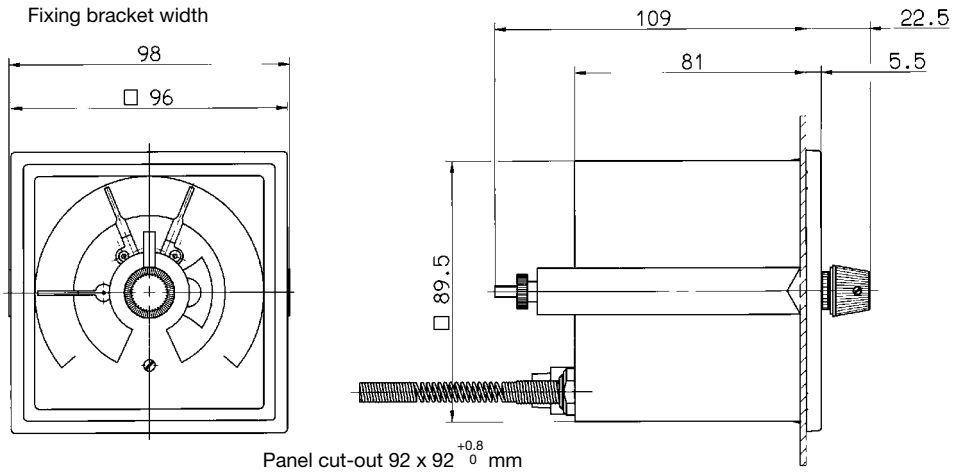


instrument mounting to DIN 16281

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, L_5 is ≤69 mm.

Type: 608425/2496



Panel cut-out 92 x 92 $^{+0.8}_{0}$ mm

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 length[1]	
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 15000 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]	

Order code

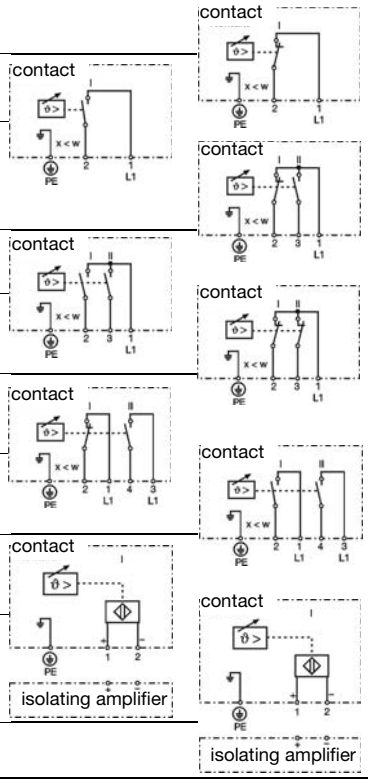
(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)		(11)		(12)		
608425	/	....	-	...	-	..	-	....	-	...	-	..	-	...	-	..	-	...	-	...	/	...	,	...

Order example

608425	/	2010	-	818	-	04	-	2000	-	750	-	8	-	000	-	26	-	100	-	01	/	000[4]	,	...

[1] for description and features, see Data Sheet 60.8730
[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 commas

			(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) material[1]**	
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		SA01 (2)[3]	With rising temperature: contact 1 opens (2)[3]
X	X	02		SA02 (1)[3]	With rising temperature: contact 1 closes (1)[3]
X	X	03		SA03 (21)[3]	With rising temperature: contact 1 opens and contact 2 closes (21)[3]
X	X	04		SA04 (11)[3]	With rising temperature: contact 1 and contact 2 close (11)[3]
X	X	05		SA05 (22)[3]	With rising temperature: contact 1 opens and contact 2 opens (22)[3]
X		10		SA10 (21)[3]	With rising temperature: contact 1 opens and contact 2 closes (with separate circuit) (21)[3]
X	X	11		SA11 (11)[3]	With rising temperature: contact 1 and contact 2 close (with separate circuits) (11)[3]
X		30		SA30 (2)[3]	With rising temperature: flag moves in, break action (2)[3]
X	X	31		SA31 (1)[3]	With rising temperature: flag moves out, make action (1)[3]



			(12)	**Extra codes (TZ)**
X	X	000		no extra code
	X	410		metal front bezel, black
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)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
608425 /	. . . .	- . . .	- . .	-	- . . .	- . .	- . . .	- . .	- . . .	- . . .	/ . . .	, . . .

Order example

608425 / 2010 - 818 - 04 - 2000 - 750 - 8 - 000 - 26 - 100 - 01 / 000[4] , . . .

[1] for description and features, see Data Sheet 60.8730
[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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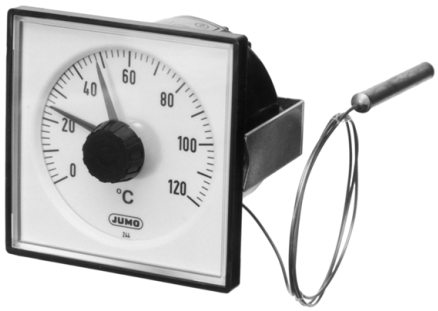
MICROSTAT-M

- ❏ Electromechanical temperature controller with indication
- ❏ Class 2 with one microswitch
- ❏ IP53 front protection
- ❏ Housing sizes: 60 mm, 80 mm and 100 mm dia.
  Bezel sizes: 72 x 72 mm and 96 x 96 mm

Type 608501/2160



Type 608501/2572

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.

Technical data

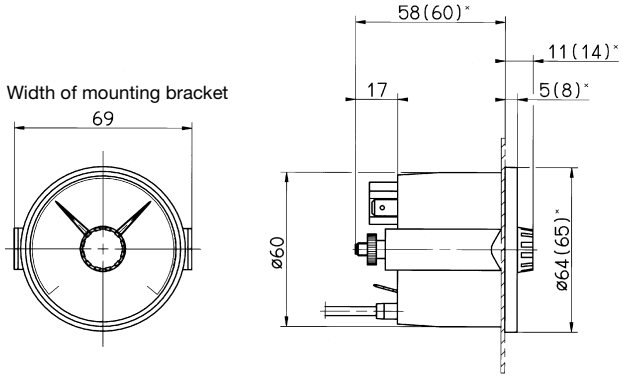
Housing or bezel	black plastic; steel housing (extra code 415)	
Protection	front: IP53 to EN 60 529 rear: IP00 to EN 60 529 (IP54 with extra code 426)	
Scale	white, black lettering	
Indication	linear, Class 2, to EN 13 190	
Measuring system	**liquid-filled**	**gas-filled**
	indication range ≤350°C	indication range ≥ 400°C
Time constant t (to DIN 3440; for 63.2%)	approx. 8 sec, measured in a water bath, with a 6 mm dia. copper probe	approx. 2 sec, measured in an oil bath, with a 10 mm dia. stainless steel probe
Ambient temperature error 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)	0.015% of indication range per °C change in ambient temperature	no effect
	higher ambient temperature – higher temperature indication – lower switching point	

	standard	extra code (TZ) 651	extra code (TZ) 650
Electrical contact **Contact type**	single-pole microswitch with a mechanically operated changeover contact		
Contact rating	230 V AC/DC +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	± 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.		

	standard	extra code (TZ) 507
Electrical connection	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	

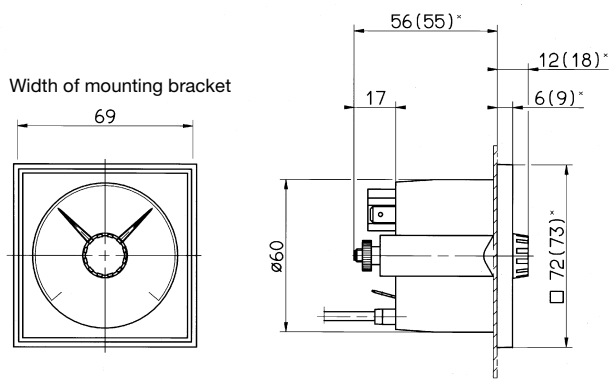
Dimensions

Types: 608501/2160
608501/2160 TZ 415



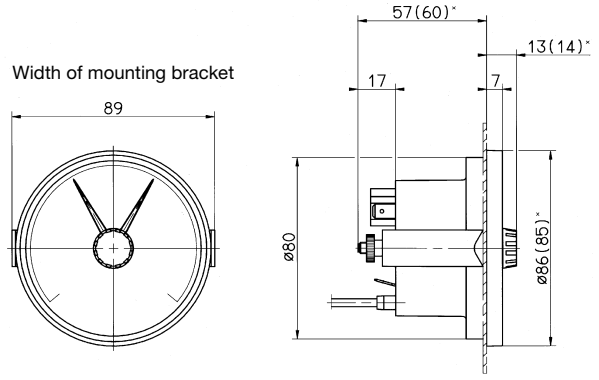
Panel cut-out Ø $62^{+0.5}_{0}$mm

Types: 608501/2572
608501/2572 TZ 415



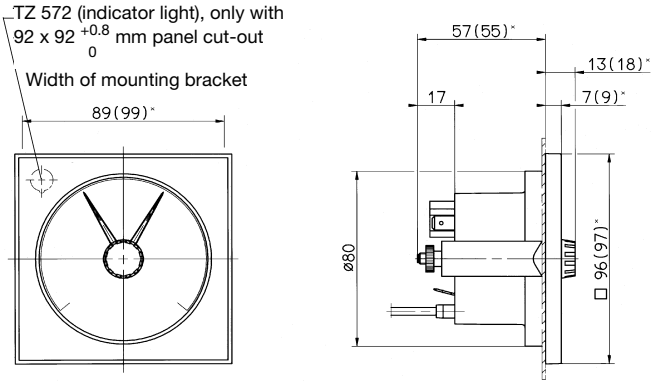
Panel cut-out Ø $62^{+0.5}_{0}$mm

Types: 608501/2180
608501/2180 TZ 415



Panel cut-out Ø $82^{+0.5}_{0}$mm

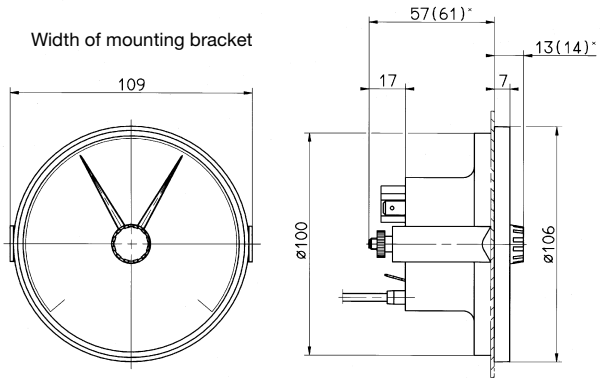
Types: 608501/2596
608501/2596 TZ 415



Panel cut-out Ø $82^{+0.5}_{0}$mm or 92 x 92 $^{+0.8}_{0}$mm (TZ 460)

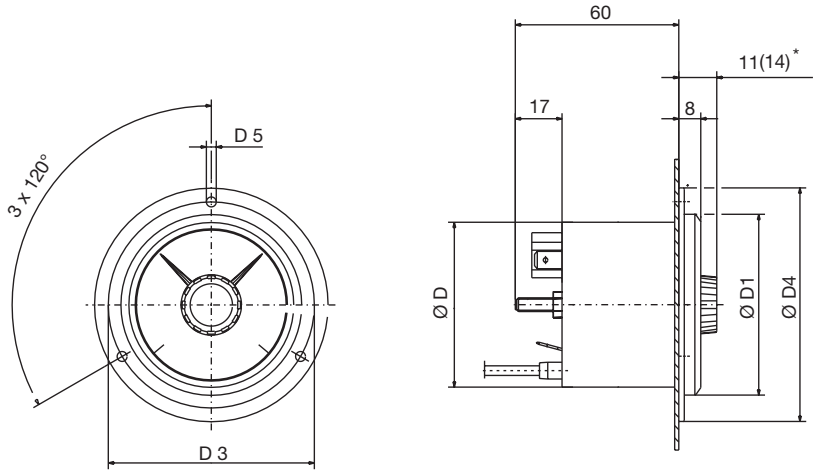
Dimensions

Types: **608501/2110**
608501/2110 TZ 415



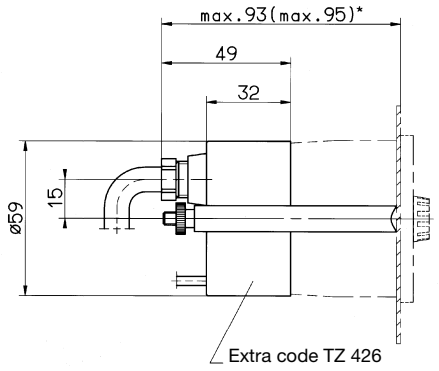
Panel cut-out Ø $102^{+0.5}_{0}$ mm

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



Type	Ø D	Ø D1	Ø D3	Ø D4	Ø D5	Panel cut-out
	(mm)					Ø $^{+0.5}_{0}$ 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)

Order details

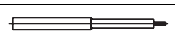
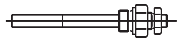
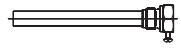
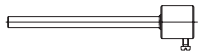
MICROSTAT-M Type 608501

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.
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 length[1]**
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: 15000 mm)

[1] See Data Sheet 60.8730 for description and features.
[2] Screw-in spigot to DIN 3852 Form A.
[3] List extra codes in sequence, separated by commas.

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]	
403		TA 21; immersion tube with loose plug and conical seal	
351		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 tube[1]**	
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)	

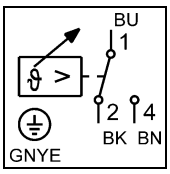
[1] See Data Sheet 60.8730 for description and features.
[2] Screw-in spigot to DIN 3852 Form A.
[3] List extra codes in sequence, separated by commas.

Order details

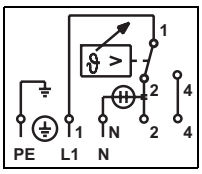
MICROSTAT-M Type 608501

Order code

	(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)	**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)
410		Metal bezel or flange, black
411		Metal bezel or flange
572		Indicator light (only with types: 608501/2572 TZ 460, 415 and 608501/2596 TZ 460, 415)
510		Stop for upper or lower limit of setpoint adjustment, factory-set
460		Housing centered for panel cut-out 68 x 68 mm and 92 x 92 mm (with basic type extensions 2572 and 2596 only)
415		Steel housing with metal bezel or flange
315		Capillary reinforcement on housing and probe (not with FL21)
477		Setpoint adjustment protected by screw cap. Adjustment with tool.
577		Protection against capillary break (not with TZ 650, 651)
520		Switching point fixed in the factory.
522		Customized scale
482		Knob 22 x 10 mm dia.
651		Microswitch 3 (1) A (230 V AC/DC +10/-15%, 48 — 63 Hz, p.f. = 1 (0.6)) (not with TZ 577)

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 60.8730 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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MICROSTAT-M

- ❏ Electromechanical temperature controller with indication
- ❏ Class 2 with two microswitches
- ❏ IP53 front protection
- ❏ Housing sizes: 60 mm, 80 mm and 100 mm dia.
  Bezel sizes: 72 x 72 mm and 96 x 96 mm

Type 608502/2160

Type 608502/2596

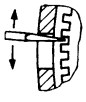
Brief description

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 microswitches through a lever system.

Technical data

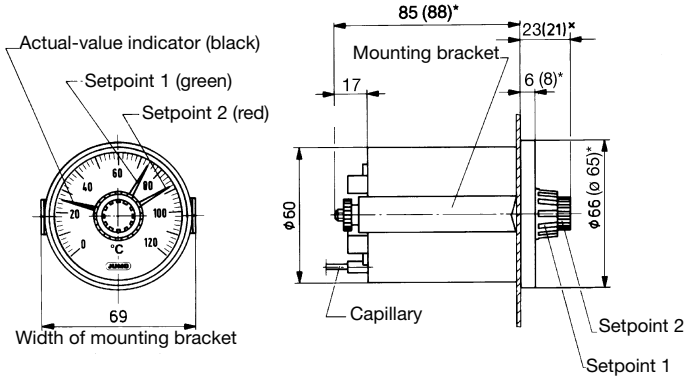
Housing or bezel	black plastic; steel housing (extra code 415)	
Enclosure protection	front: IP53 to EN 60 529 rear: IP00 to EN 60 529 (IP54 with extra code 426)	
Scale	white, black lettering	
Indication	linear, Class 2, to EN 13 190	
Measuring system	**liquid-filled**	**gas-filled**
	indication range ≤ 350°C	indication range ≥ 400°C
Time constant t (to DIN 3440; for 63.2%)	approx. 8 sec, measured in a water bath, with a 6 mm dia. copper probe	approx. 2 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°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)	0.015% of indication range per °C change in ambient temperature	no effect
	higher ambient temperature – higher temperature indication – lower switching point	

	standard	extra code (TZ) 650
Electrical contact **Contact type**	single-pole microswitch with a mechanically operated changeover contact	
Contact rating	230 V AC/DC +10/-15%, 48 — 63 Hz, p.f. = 1 (0.6)	
	5 (1.5) A	10 (3) A
Switching differential	approx. 2% of indication range	2 to 4% of indication range
Switching point accuracy	± 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.	

	standard	extra code (TZ) 507
Electrical connection	faston connectors A 6.3 x 6.8 to DIN 46 244	screw terminals: for cable up to 1.5 mm^2 conductor cross-section
Setpoint adjustment	by setting device on the window	
Indication adjustment	With ambient temperatures that deviate considerably from the reference value but are constant, the indication can be adjusted by using a screwdriver as shown (not possible on Style 25).  **shift division by max. ± 4.5% of the scale span by inserting a screwdriver in bore**	
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	

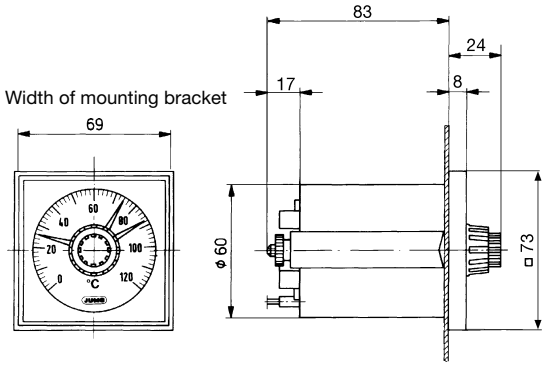
Dimensions

Types: 608502/2160
608502/2160 TZ 415



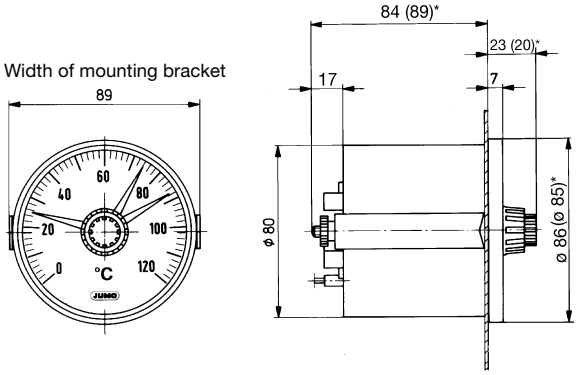
Panel cut-out Ø $62^{+0.5}_{0}$mm

Types: 608502/2572 TZ 415



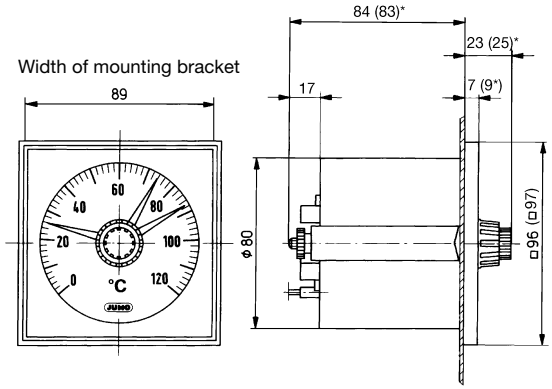
Panel cut-out Ø $62^{+0.5}_{0}$mm

Types: 608502/2180
608502/2180 TZ 415



Panel cut-out Ø $82^{+0.5}_{0}$mm

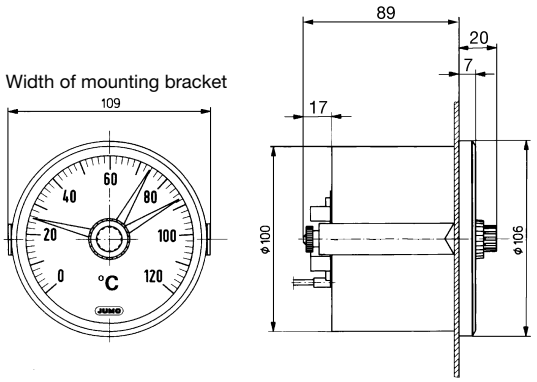
Types: 608502/2596
608502/2596 TZ 415



Panel cut-out Ø $82^{+0.5}_{0}$mm or 92 x 92 $^{+0.8}_{0}$mm (TZ 460)

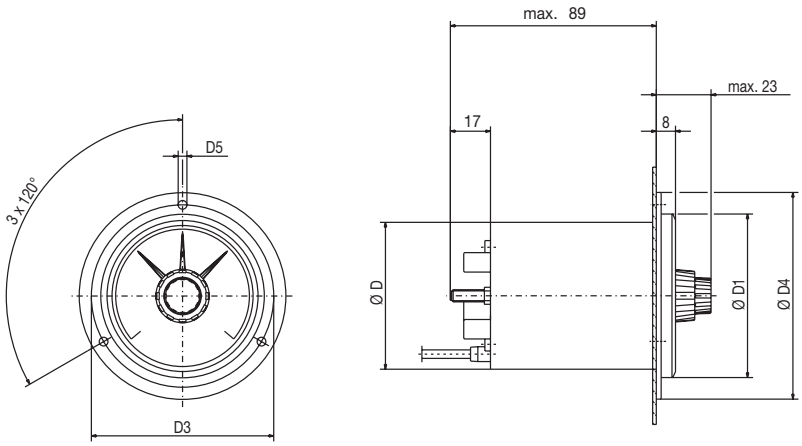
Dimensions

Types: 608502/2110 TZ 415



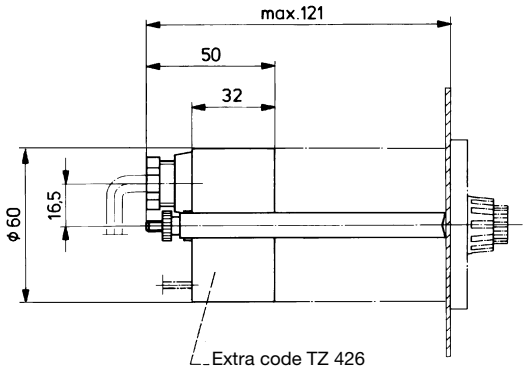
Panel cut-out Ø $102^{+0.5}_{0}$ mm

Types: 608502/2060
608502/2060 TZ 415
608502/2080 TZ 415
608502/2010 TZ 415



Type	Ø D	Ø D1	Ø D3	Ø D4	Ø D5	Panel cut-out
	(mm)					Ø $^{+0.5}_{0}$ mm
608502/2060 608502/2060 TZ 415	60	68	75	85	3.6	62
608502/2080 TZ 415	80	86	95	110	4.8	82
608502/2010 TZ 415	100	107	116	132	4.8	102

Extra code 426



Order details

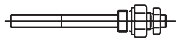
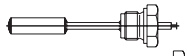
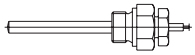
MICROSTAT-M Type 608502

Order code	(1)	Basic type
608502		Mechanical temperature controller MICROSTAT-M, Class 2, with two microswitches
	(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 (with TZ 415 only)
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 length[1]**
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: 15000 mm)

[1] See data sheet 60.8730 for description and features.
[2] Screw-in spigot to DIN 3852 Form A.
[3] List extra codes in sequence, separated by commas.

Order details

MICROSTAT-M Type 608502

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]	
403		TA 21; immersion tube with loose plug and conical seal	
351		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)	

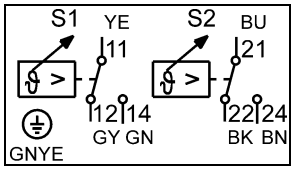
[1] See data sheet 60.8730 for description and features.
[2] Screw-in spigot to DIN 3852 Form A.
[3] List extra codes in sequence, separated by commas.

Order details

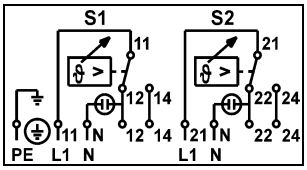
MICROSTAT-M Type 608502

Order code

	(9)	**Material of probe / support tube**[1]
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 (250°C and above)
	(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)	**Switching output (SA)**
21	SA 21	two contacts



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 faston 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))
410		metal bezel or flange, black (not on 80 mm dia. housing)
411		metal bezel or flange (not on 80 mm dia. housing)
572		indicator light (only with types: 608502/2572 TZ 460, 415 and 608502/2596 TZ 460, 415)
510		stop for upper or lower limit of setpoint adjustment, factory-set
573		two changeover contacts with a fixed spacing; minimum spacing: 2% of scale span; please state contact spacing when ordering
460		housing centered for panel cut-out 68 x 68 mm and 92 x 92 mm (with basic type extensions 2572 and 2596 only)
415		steel housing with metal bezel or flange
315		capillary reinforcement on housing and probe (not with FL21)
477		setpoint adjustment protected by screw cap, adjustment with tool.
522		customized scale

Special versions on request!

Order code

(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)		(11)		(12)		(13)	
608502	/	. . . .	-	. . .	-	. .	-	. . . .	-	. . .	-	. .	-	. . .	-	. .	-	. .	-	. .	-	. .	/	. . .	, . . .

Order example

608502	/	2160	-	818	-	21	-	2000	-	752	-	8	-	000	-	96	-	00	-	0	-	21	/	000[3]	

[1] See data sheet 60.8730 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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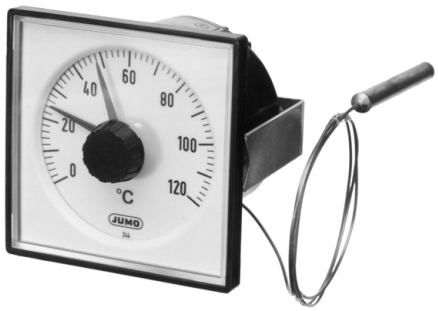
MICROSTAT-M1

- ❏ Electromechanical temperature controller with indication
- ❏ Class 2 with one microswitch
- ❏ IP53 front protection

Type 608504/2160



Type 608504/2572

Brief description

The MICROSTAT-M1 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.

Technical data

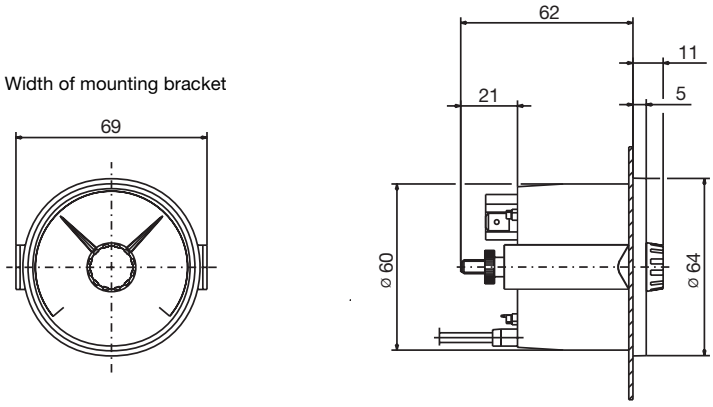
Housing or bezel	black plastic; housing fixing at rear, with bracket
Enclosure protection	front: IP53 to EN 60 529 rear: IP00 to EN 60 529 (IP54 with extra code 426)
Scale	white, black lettering
Accuracy class	Class 2 to EN 13 190
Setpoint adjustment	by setting device on the window
Limit temperatures	for transport and storage: -20 to +70°C (indication range -40 to +40°C: up to 50°C max.).
Nominal position	unrestricted

	liquid-filled	**gas-filled**
Measuring system	indication range (AB) ≤350°C	indication range (AB) ≥ 400°C
Time constant $T_{0.632}$ (to DIN 3440; for 63.2%)	approx. 8 sec, measured in a water bath, with a 6 mm dia. copper probe	approx. 2 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°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)	0.015% of indication range per °C change in ambient temperature	no effect
	higher ambient temperature – higher temperature indication – lower switching point	

Electrical contact **Contact type**	single-pole microswitch with a mechanically operated changeover contact
Contact rating	230 V AC +10/-15%, 48 — 63Hz, p.f. = 1 (0.6) 5 (1.5) A
Switching differential	< 3% of indication range
Switching point accuracy	± 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	faston connectors A 6.3 x 0.8 to DIN 46 244

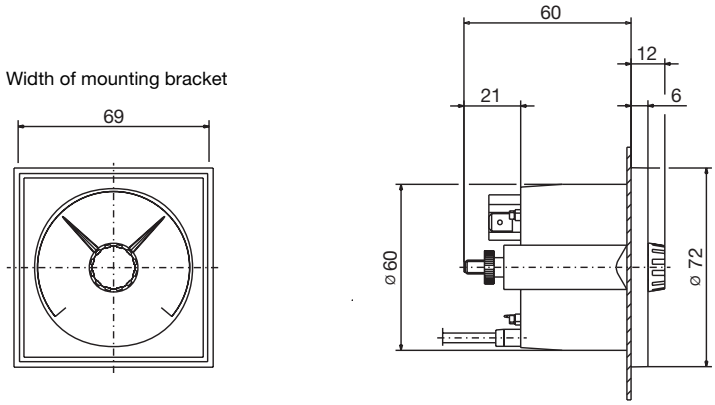
Dimensions

Type: 608504/2160



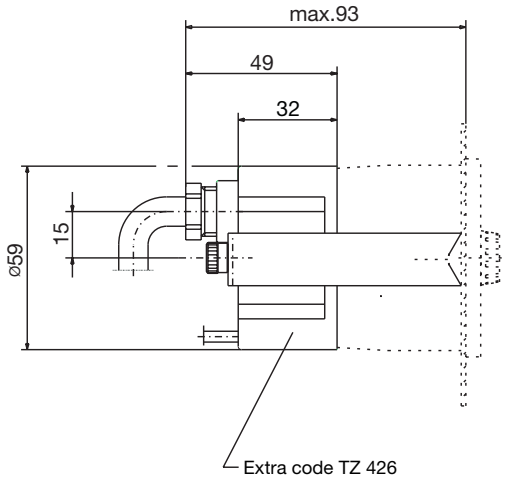
Panel cut-out Ø 62 $^{+0.5}_{0}$ mm

Type: 608504/2572



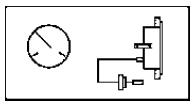
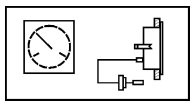
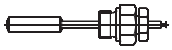
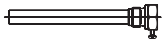
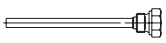
Panel cut-out Ø 62 $^{+0.5}_{0}$ mm

Extra code 426



Order details

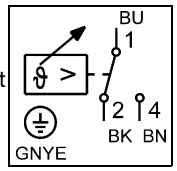
MICROSTAT-M1 Type 608504

Order code		Basic type	
608504		Mechanical temperature controller MICROSTAT-M1, Class 2, with one microswitch	
	(2)	**Basic type extensions**	
2160		Style: 21; housing size: 60 mm dia.	
2572		Style: 25; housing size: 72 x 72 mm	
	(3)	**Indication range (AB)**	
469		-40 to + 40°C; measuring range –30 to + 30°C, accuracy 2.0°C	
810		0 to + 80°C; measuring range +10 to + 70°C, accuracy 2.0°C	
818		0 to +120°C; measuring range +20 to +100°C, accuracy 4.0°C	
832		0 to +200°C; measuring range +20 to +180°C, accuracy 4.0°C	
840		0 to +300°C; measuring range +30 to +270°C, accuracy 10.0°C	
848		0 to +400°C; measuring range +50 to +350°C, accuracy 10.0°C	
854		0 to +500°C; measuring range +50 to +450°C, accuracy 10.0°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 length[1]**	
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: 15000 mm)	
	(6)	**Process connection (PA)[1]**	
750		TF 01; temperature probe with stepped support tube	
752		TF 11; temperature probe without support tube	
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]	
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.	

[1] See data sheet 60.8730 for description and features
[2] Screw-in spigot to DIN 3852 Form A
[3] List extra codes in sequence, separated by commas.

Order details

MICROSTAT-M1 Type 608504

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 tube[1]**
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 (250°C and above)
	(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)
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 
	(13)	**Extra codes (TZ)**
000		no extra code
315		capillary reinforcement on housing and probe (not with FL21)
411		metal bezel or flange
426		plastic cover to protect the faston connectors against touching and splashing water, IP54 (rear), with cable gland, suitable for 6 — 11 mm cable dia.
477		setpoint adjustment protected by cap, adjustment with screwdriver.
510		stop for upper or lower limit of setpoint adjustment, factory-set
520		switching point fixed at the factory
522		customized scale
577		capillary break protection

Special versions on request!

Order code

(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)		(11)		(12)		(13)
608504	/	. . . .	-	. . .	-	. .	-	. . . .	-	. . .	-	. .	-	. . .	-	. .	-	. .	-	. . .	-	. .	/	. . .

Order example

608504	/	2160	-	818	-	02	-	2000	-	750	-	8	-	000	-	96	-	00	-	100	-	20	/	000[3]

[1] See data sheet 60.8730 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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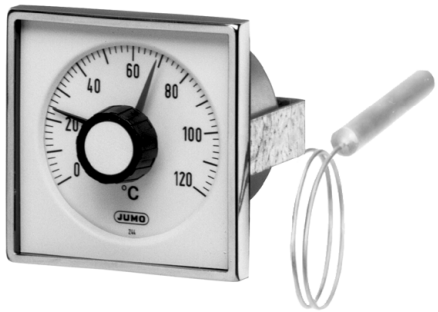
MICROSTAT-M

- ❑ Electromechanical temperature controller with indication
- ❑ Class 1.5 with one microswitch
- ❑ IP53 front protection
- ❑ Housing sizes: 60 mm, 80 mm and 100 mm dia.
  Bezel sizes: 72 x 72 mm and 96 x 96 mm

Type 608510/2160

Brief description

The MICROSTAT-M is an electromechanical temperature controller with indication for universal use. The instrument has a steel 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 608510/2572

Technical data

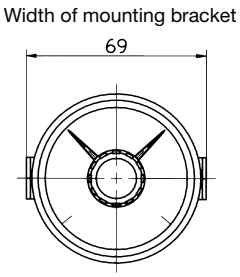
Housing or bezel	zinc-plated steel, with metal bezel; housing mounted at the rear by a bracket (not for style 20)	
Protection	front: IP53 to EN 60 529 (IP54 with extra code 489) rear: IP00 to EN 60 529 (IP54 with extra code 426)	
Scale	white, black lettering	
Indication	linear, Class 1.5 similar to EN 13190	
Measuring system	**liquid-filled**	**gas-filled**
	indication range ≤ 350°C	indication range ≥ 400°C
Time constant t (to DIN 3440; for 63.2%)	approx. 8 sec, measured in a water bath, with a 6 mm dia. copper probe	approx. 2 sec, measured in an oil bath, with a 10 mm dia. stainless steel probe.
Ambient temperature error 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)	0.015% of indication range per °C change in ambient temperature	no effect
	higher ambient temperature – higher temperature indication – lower switching point	

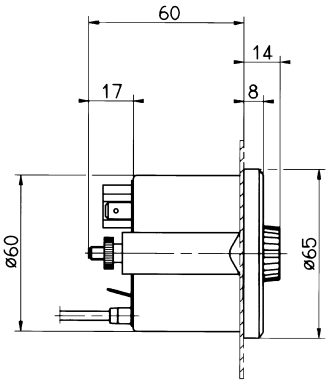
	standard	extra code (TZ) 651	extra code (TZ) 650
Electrical contact **Contact type**	single-pole microswitch with a mechanically operated changeover contact		
Contact rating	230 V AC +10/-15%, 48 — 63 Hz, p.f. = 1 (0.6)		
	5 (1.5) A	3 (1) A	10 (3) A
Switching differential	approx. 1.5% of indication range		1.5 to 3% of indication range
Switching point accuracy	± 0.5% of indication range span 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.		

	standard	extra code (TZ) 507
Electrical connection	faston connectors A 6.3 x 0.8 to DIN 46244	screw terminals: for cable up to 1.5 mm^2 conductor cross-section
Setpoint adjustment	by setting device on the 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	

Dimensions

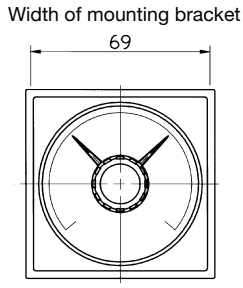
Type: 608510/2160

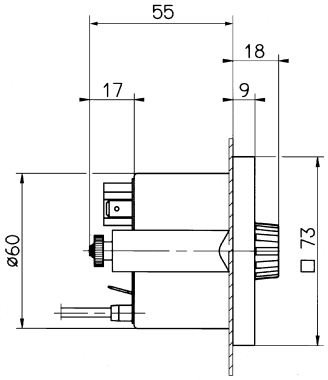




Panel cut-out Ø $62^{+0.5}_{0}$mm

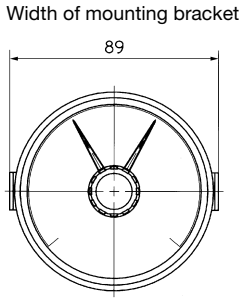
Type: 608510/2572

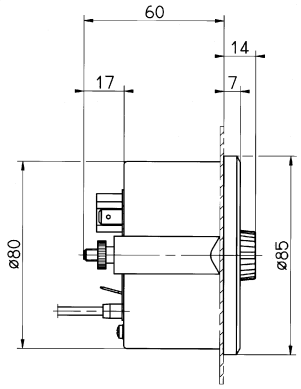




Panel cut-out Ø $62^{+0.5}_{0}$mm

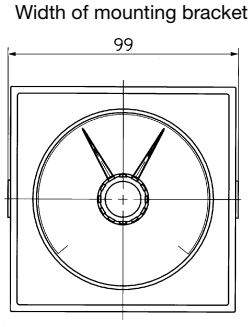
Type: 608510/2180

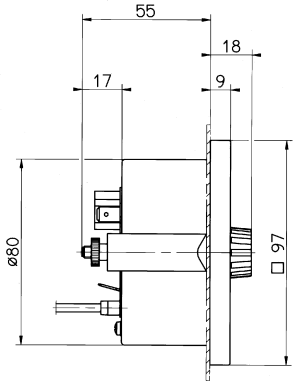




Panel cut-out Ø $82^{+0.5}_{0}$mm

Type: 608510/2596

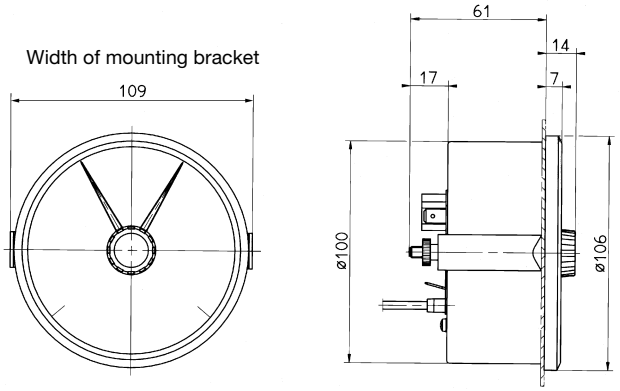




Panel cut-out Ø $82^{+0.5}_{0}$mm or 92 x 92 $^{+0.8}_{0}$mm (TZ 460)

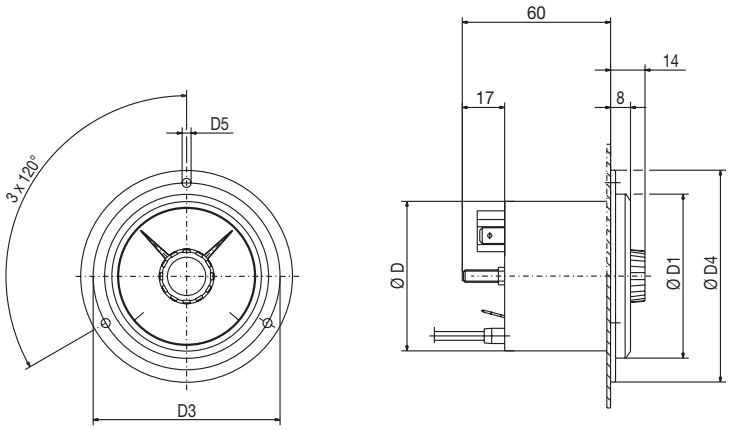
Dimensions

Type: 608510/2110



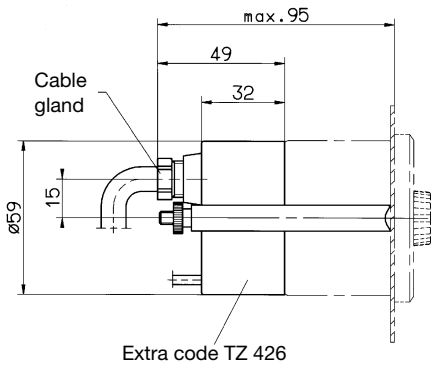
Panel cut-out Ø $102^{+0.5}_{0}$ mm

Types: 608510/2060
608510/2080
608510/2010



Type	Ø D	Ø D1	Ø D3	Ø D4	Ø D5	Panel cut-out
	(mm)					Ø $^{+0.5}_{0}$ mm
608510/2060	60	66	75	85	3.6	62
608510/2080	80	86	95	110	4.8	82
608510/2010	100	107	116	132	4.8	102

Extra code 426



Order details

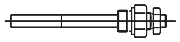
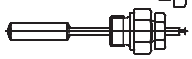
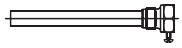
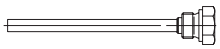
MICROSTAT-M Type 608510

Order code	(1)	Basic type
608510		Electromechanical 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.
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.
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 1.5°C
566		-30 to + 50°C; measuring range –20 to + 40°C, accuracy 1.5°C
643		-20 to +120°C; measuring range 0 to +100°C, accuracy 3.0°C
807		0 to + 60°C; measuring range +10 to + 50°C, accuracy 1.5°C
810		0 to + 80°C; measuring range +10 to + 70°C, accuracy 1.5°C
814		0 to +100°C; measuring range +10 to + 90°C, accuracy 1.5°C
818		0 to +120°C; measuring range +20 to +100°C, accuracy 3.0°C
826		0 to +160°C; measuring range +20 to +140°C, accuracy 3.0°C
832		0 to +200°C; measuring range +20 to +180°C, accuracy 3.0°C
834		0 to +250°C; measuring range +30 to +220°C, accuracy 4.0°C
926		+50 to +250°C; measuring range +70 to +230°C, accuracy 3.0°C
840		0 to +300°C; measuring range +30 to +270°C, accuracy 6.0°C
927		+50 to +300°C; measuring range +80 to +270°C, accuracy 4.0°C
843		0 to +350°C; measuring range +50 to +300°C, accuracy 6.0°C
932		+50 to +350°C; measuring range +80 to +320°C, accuracy 6.0°C
848		0 to +400°C; measuring range +50 to +350°C, accuracy 6.0°C
851		0 to +450°C; measuring range +50 to +400°C, accuracy 6.0°C
854		0 to +500°C; measuring range +50 to +450°C, accuracy 8.0°C
858		0 to +600°C; measuring range +100 to +500°C, accuracy 10.0°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 length[1]**
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: 15000 mm)

[1] See Data Sheet 60.8730 for description and features.
[2] Screw-in spigot to DIN 3852 Form A.
[3] List extra codes in sequence, separated by commas.

Order details

MICROSTAT-M Type 608510

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]	
403		TA 21; immersion tube with loose plug and conical seal	
351		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)	

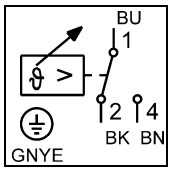
[1] See Data Sheet 60.8730 for description and features.
[2] Screw-in spigot to DIN 3852 Form A.
[3] List extra codes in sequence, separated by commas.

Order details

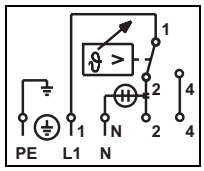
MICROSTAT-M Type 608510

Order code

	(9)	**Material of probe / support tube** [1]
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)
	(11)	**Fitting length of process connection (PA)**[1] **(dimension EL or S)**
00		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 faston connectors or screw terminals against touching and splashing water, IP54 at rear, 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)
410		Metal bezel or flange, black
572		Indicator light (only with types: 608510/2572 TZ 460 and 608510/2596 TZ 460)
510		Stop for upper or lower limit of setpoint adjustment, factory-set
460		Housing centered for panel cut-out 68 x 68 mm and 92 x 92 mm (with basic type extensions 2572 and 2596 only)
315		Capillary reinforcement on housing and probe (not with FL21)
477		Setpoint adjustment protected by screw cap. Adjustment with screwdriver.
577		Protection against capillary break (not with TZ 650 and TZ 651)
522		Customized scale
489		Setpoint adjustment by 28 mm dia. setting device, with aluminium front disk; protected to IP54 at the front
651		Microswitch 3 (1) A (230 V AC/DC +10/-15%, 48 — 63 Hz, p.f. = 1 (0.6)) (not with TZ 577)

Special versions on request!

Order code

(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)		(11)		(12)		(13)		
608510	/	. . . .	-	. . .	-	. .	-	. . . .	-	. . .	-	. .	-	. . .	-	. .	-	. .	-	. . .	-	. .	/	. . .	,	. . .

Order example

608510	/	2160	-	818	-	21	-	2000	-	752	-	8	-	000	-	96	-	00	-	000	-	20	/	000[3]		

[1] See Data Sheet 60.8730 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

Type 608520/2380

- ❏ Temperature controller with indication for panel mounting or self-supporting
- ❏ Class 1.5
- ❏ Protection IP53 max.
- ❏ Housing sizes: 60mm dia., 80mm dia. and 100mm dia.
  Bezel sizes: 72 x 72 mm and 96 x 96 mm

Brief description

Contact dial thermometers are universal instruments with indication for temperature measurement, control and monitoring.
The volume change with temperature of a liquid-filled system, or the change of pressure with temperature inside a gas-filled system, is converted by a Bourdon tube into a rotation of the pointer without transmission gearing. The movement of the pointer spindle operates a microswitch through a lever system.

Technical data

Housing or bezel	stainless steel (1.4301)
Enclosure protection	IP51 to EN 60 529 (IP53 with extra code 401)
Window	PMMA (plexiglass)
Chassis	aluminium (3.2582.05)
Scale	white, black lettering
Accuracy class	Class 1.5 similar to EN 13 190
Capillary reinforcement	for instruments with capillary: on housing and temperature probe
Setpoint adjustment	by setting knob on window
Indication correction	at the rear
Limit temperatures	for transport and storage -30°C to +70°C (for indication range -40 to +40°C up to 50°C; -30 to +50°C up to 60°C)
Nominal position (NL)	unrestricted

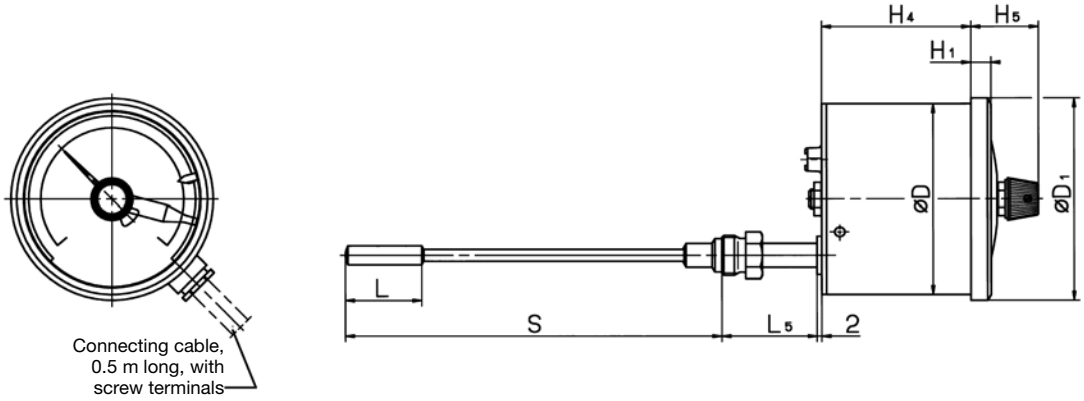
	liquid-filled	**gas-filled**
Measuring system	indication range (AB) ≤350°C	indication range (AB) ≥ 400°C
Time constant t (to DIN 3440; at 63.2%)	approx. 8 sec, measured in water bath, with a 6 mm dia. copper probe	approx. 2 sec, measured in oil bath, with a 10 mm dia. stainless steel probe
Ambient temperature 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 m)	0.015% of indication range per °C change in ambient temperature	no effect
	higher ambient temperature – higher temperature indication – lower switching point	

	standard	extra code (TZ) 651	extra code (TZ) 650
Electrical contact			
contact type	single-pole microswitch with mechanically operated changeover contact		
contact rating	230V AC/DC +10/-15%, 48 — 63Hz, p.f. = 1 (0.6)		
	5 (1.5) A	3 (1) A	10 (3) A
switching differential	approx. 1.5% of indication range		1.5 to 3% of indication range
switching point accuracy	± 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		

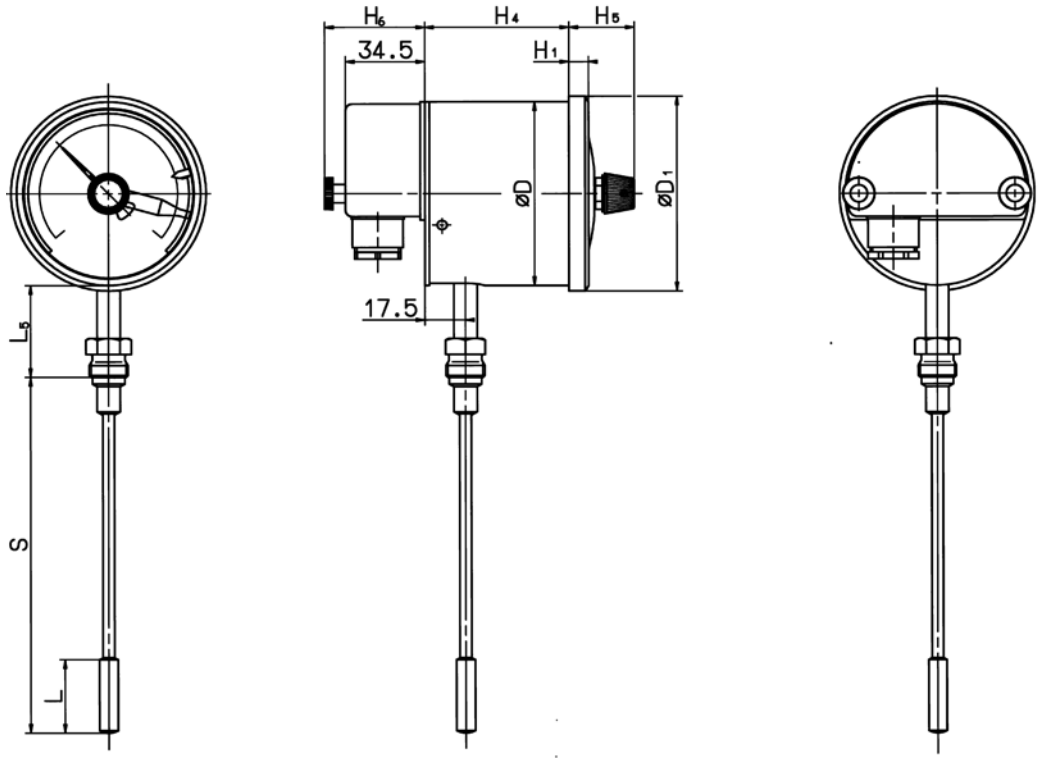
	standard	Styles 02 and 22	Styles 10, 23 and TZ 426	Housing 60mm dia.
Electrical connection	screw terminals, conductor cross-section up to 2.5 mm^2	connecting cable 0.5 m with screw terminals	cover with cable gland, suitable for cable diameters from 6.5 to 13 mm	cover with cable gland, suitable for cable diameters from 8 to 10 mm

Dimensions

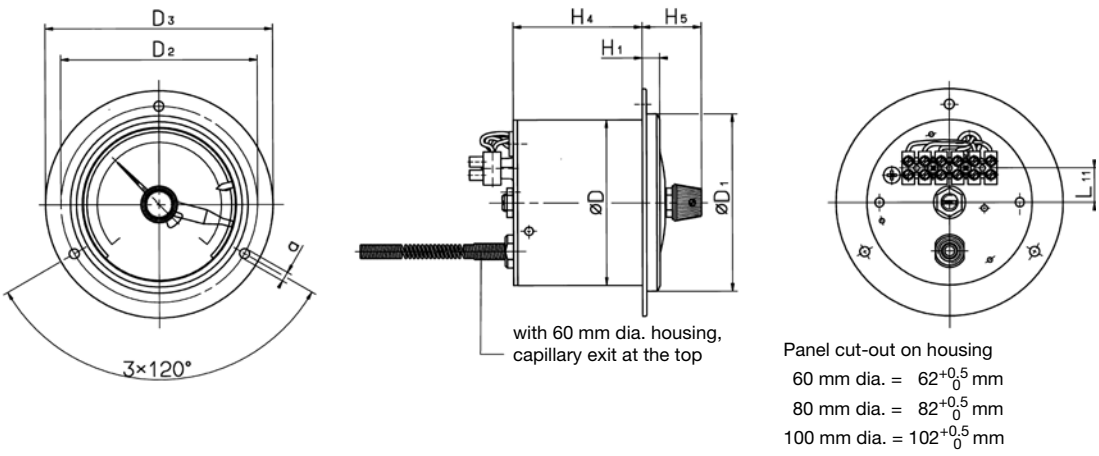
Types: 608520/0280
608520/0210



Types: 608520/1080
608520/1010

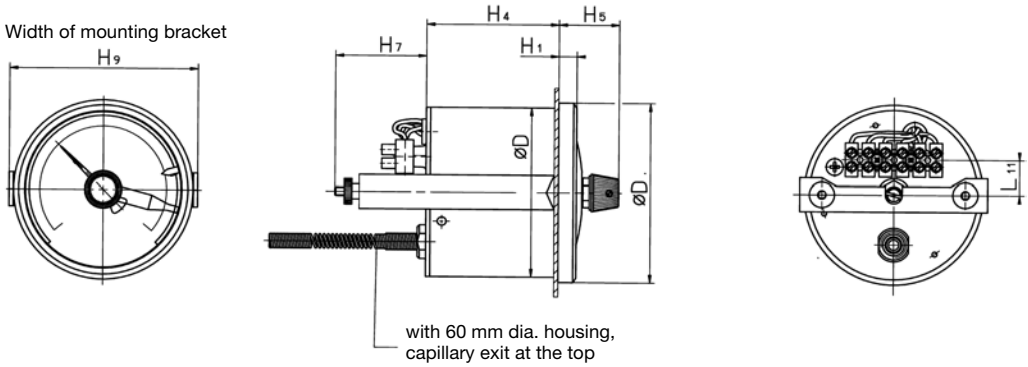


Types: 608520/2060
608520/2080
608520/2010

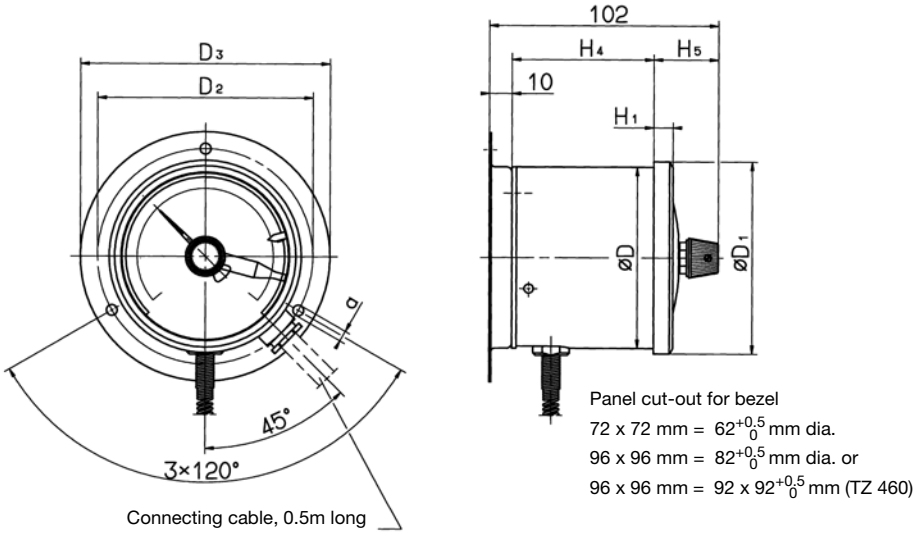


Dimensions

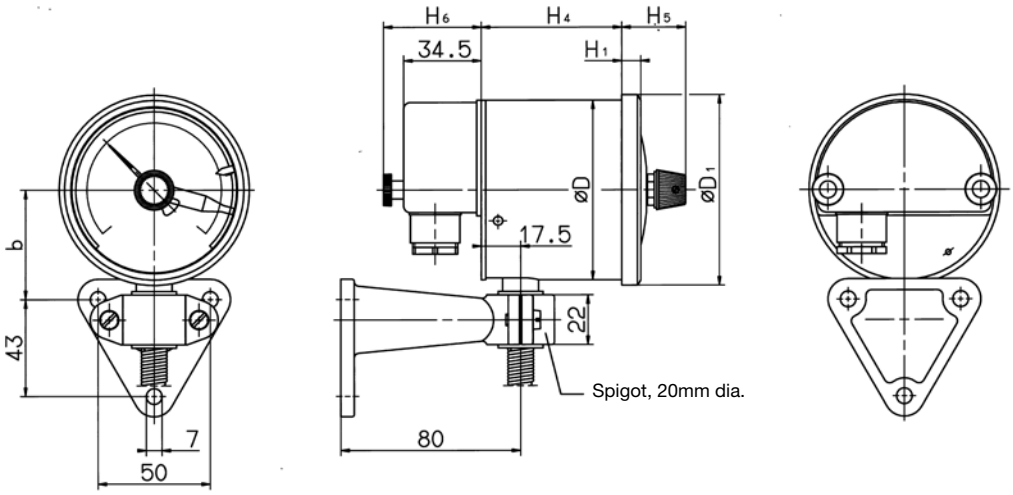
Types: 608520/2160
608520/2180
608520/2110



Types: 608520/2280
608520/2210

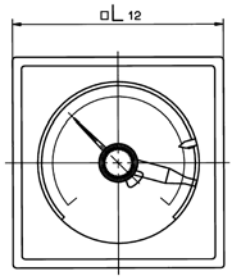


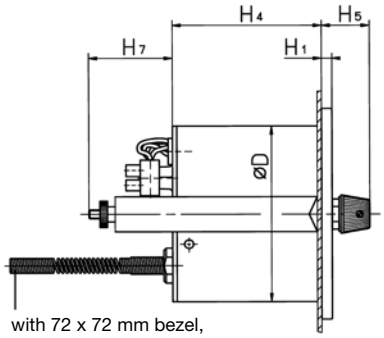
Types: 608520/2380
608520/2310



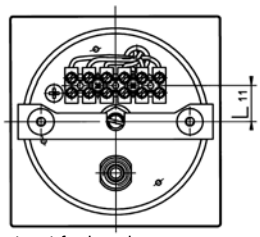
Dimensions

Types: 608520/2572
608520/2596



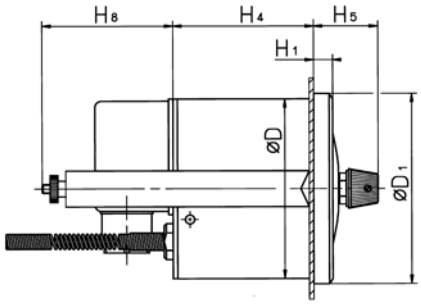


with 72 x 72 mm bezel,
capillary exit at the top



Panel cut-out for bezel
72 x 72 mm = $62^{+0.5}_{0}$ mm dia.
96 x 96 mm = $82^{+0.5}_{0}$ mm dia. or
96 x 96 mm = 92 x $92^{+0.5}_{0}$ mm (TZ 460)

Extra code 426



Housing	H_1	H_4	H_5	H_6	H_7	H_8	H_9	D	D_1	D_2	D_3	a	b	L_5	L_{11}	L_{12}
Ø 60	7.5	62.5	27.5	34	27	55	69	60	65	75	85	3.6	–	40*	–	–
Ø 80	8.5		28.5	43.5	44	59	89	80	85	95	110	4.8	49		16.5	–
Ø 100					25	59	109	100	106	116	132		59		–	–
□ 72	5	68	22	–	27	55	–	60	–	–	–	–	–	–	–	□ 72
□ 96				–	44	59	–	80	–	–	–	–	–	–	16.5	□ 96

* with probe mounting TA 02 L_5 = ≤69 mm
with probe mountings TA 22 and TA 31 L_5 = 48 mm

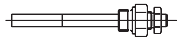
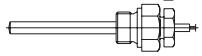
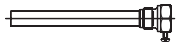
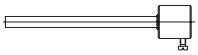
Order details

Contact dial thermometer Class 1.5, Type 608520

Order code	(1)	Basic type
608520		Mechanical contact dial thermometer Class 1.5
	(2)	**Basic type extension**
0280		Style: 02; housing size: 80 mm dia.
0210		Style: 02; housing size: 100 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.
2280		Style: 22; housing size: 80 mm dia.
2210		Style: 22; housing size: 100 mm dia.
2380		Style: 23; housing size: 80 mm dia.
2310		Style: 23; housing size: 100 mm dia.
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 1.5°C
566		-30 to + 50°C; measuring range –20 to + 40°C, accuracy 1.5°C
643		-20 to +120°C; measuring range 0 to +100°C, accuracy 3.0°C
807		0 to + 60°C; measuring range +10 to + 50°C, accuracy 1.5°C
810		0 to + 80°C; measuring range +10 to + 70°C, accuracy 1.5°C
814		0 to +100°C; measuring range +10 to + 90°C, accuracy 1.5°C
818		0 to +120°C; measuring range +20 to +100°C, accuracy 3.0°C
826		0 to +160°C; measuring range +20 to +140°C, accuracy 3.0°C
832		0 to +200°C; measuring range +20 to +180°C, accuracy 3.0°C
834		0 to +250°C; measuring range +30 to +220°C, accuracy 4.0°C
926		+50 to +250°C; measuring range +70 to +230°C, accuracy 3.0°C
840		0 to +300°C; measuring range +30 to +270°C, accuracy 6.0°C
927		+50 to +300°C; measuring range +80 to +270°C, accuracy 4.0°C
843		0 to +350°C; measuring range +50 to +300°C, accuracy 6.0°C
932		+50 to +350°C; measuring range +80 to +320°C, accuracy 6.0°C
848		0 to +400°C; measuring range +50 to +350°C, accuracy 6.0°C
851		0 to +450°C; measuring range +50 to +400°C, accuracy 6.0°C
854		0 to +500°C; measuring range +50 to +450°C, accuracy 8.0°C
858		0 to +600°C; measuring range +100 to +500°C, accuracy 10.0°C

Order details

Contact dial thermometer Class 1.5, Type 608520

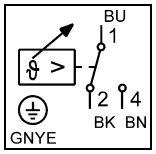
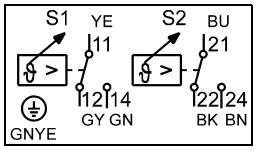
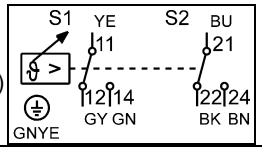
Order code			
	(4)	**Capillary type (FL)[1]**	
00		none (with rigid connection)	
02		FL02 copper capillary with copper braiding, approx. 2.5 mm dia. (up to +300°C top of indication range)	
11		FL11 copper capillary with PE sleeve, approx. 3.5 mm dia. (up to +120°C top of indication range)	
17		FL17 stainless 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 (details in plain text: in 1000 mm steps, up to 15000 mm length)	
	(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		Ø 6 mm	
8		Ø 8 mm	
10		Ø 10 mm	
11		Ø 11 mm	
12		Ø 12 mm	
	(8)	**Type of thread for process connection (PA)[1]**	
000		no thread (with TF 01 and TF 11)	
103		thread $G^3/_8$	
104		thread $G^1/_2$	
105		thread $G^3/_4$	
114		thread M 10 x 1 (only with TA 23 and SH 11)	

[1] see Data Sheet 60.8730 for description and features
[2] screw-in spigot to DIN 3852 Form A
[3] List extra codes in sequence, separated by commas.

Order details

Contact dial thermometer Class 1.5, Type 608520

Order code

	(9)	**Material of probe / support tube[1]**
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 (details in plain text — in 50 mm steps)
	(12)	**Switch output (SA)**
20	SA 20	one contact 
21	SA 21	two contacts 
22	SA 22	two contacts (sequential contacts) 
	(13)	**Extra codes (TZ)**
000		no extra code
430		peak-reading pointer
426		cover to protect the terminal against accidental contact and splashing water (standard on styles 10 and 23; not with styles 02 and 22; not in conjunction with TZ 460)
650		microswitch 10 (3) A (230 V AC/DC +10/-15%, 48 — 63 Hz, p.f. = 1 (0.6))
410		metal bezel, bezel ring or flange ring, black
518		stop for min. or max. setpoint limit, factory-set
460		housing centered for 92 x 92 mm panel cut-out (basic type extension 2596 only)
477		setpoint adjustment protected by screw cap, adjustment by screwdriver
401		IP53 protection to EN 60 529, includes TZ 426 and TZ 477 (not for housing dia. 60 mm and bezel 72 x 72 mm; not with style 02 and 22)
522		customized scale
651		microswitch 3 (1) A (230 V AC/DC +10/-15%, 48 — 63 Hz, p.f. = 1 (0.6))

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	- 750	- 8	- 000	- 26	- 00	- 100	- 000[3]	/ 000[3]

[1] see Data Sheet 60.8730 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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Internet: www.jumo.us

Contact Dial Thermometer

- ❑ Temperature controller with indication, panel mounting or self-supporting
- ❑ Class 1.5
- ❑ Protection IP65
- ❑ Housing size 100mm dia.

Type 608523/2210

Brief description

Contact dial thermometers are universal instruments with indication for temperature measurement, control and monitoring.
The volume change with temperature of a liquid-filled measuring system, or the change of pressure with temperature inside a gas-filled system, is converted by a Bourdon tube into a rotation of the pointer without transmission gearing. The movement of the pointer spindle operates a microswitch through a lever system.

Technical data

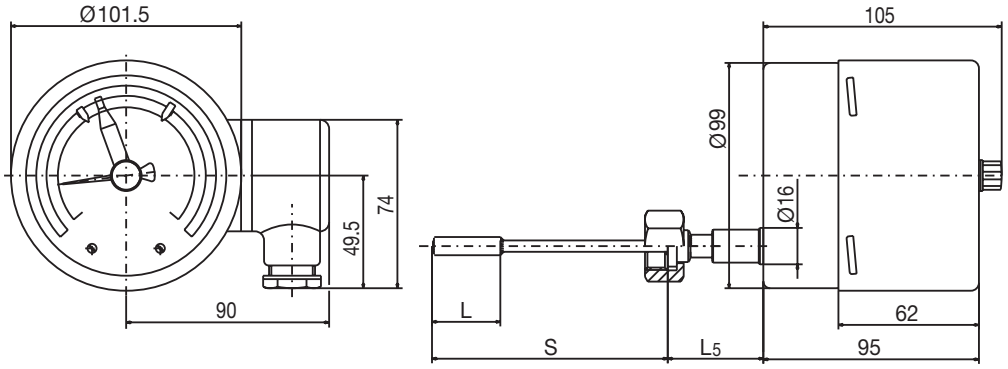
Housing	housing with bayonet lock in stainless steel (1.4301)
Enclosure protection	IP65 to EN 60 529
Window	polycarbonate
Scale	white, black lettering
Indication	linear, Class 1.5 similar to EN 13 190
Capillary reinforcement	for instruments with capillary: on housing and temperature probe
Setpoint adjustment	by setting knob on window using a screwdriver, protected by screw cap
Indication correction	at the rear, no indication correction on style 20
Limit temperatures	for transport and storage -20°C to +70°C (for indication range: 0 to +60°C up to 65°C; -40 to +40°C up to 50°C; -30 to +50°C up to 60°C)
Nominal position (NL)	unrestricted

	liquid-filled	**gas-filled**
Measuring system	indication range (AB) ≤ 350°C	indication range (AB) ≥ 400°C
Time constant t (to DIN 3440; at 63.2%)	approx. 8 sec, measured in water bath, with a 6 mm dia. copper probe	approx. 2 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 m)	0.015% of indication range per °C change in ambient temperature	no effect
	higher ambient temperature – higher temperature indication – lower switching point	

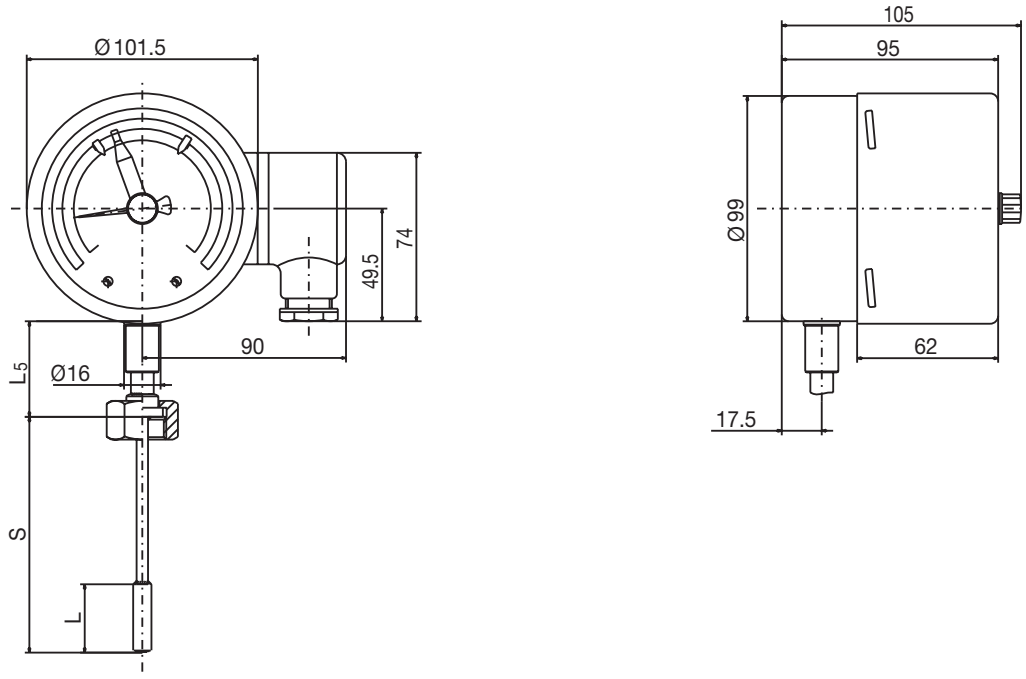
	standard	extra code (TZ) 650
Electrical contact **contact type**	single-pole microswitch with mechanically operated changeover contact	
contact rating	230V AC/DC +10/-15%, 48 — 63Hz, p.f. = 1 (0.6)	
	5 (1.5) A	10 (3) A
switching differential	approx. 1.5% of indication range	1.5 to 3% of indication range
switching point accuracy	± 0.5% of indication range span 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	terminal box: conductor cross-section up to 2.5 mm^2 suitable for cable diameters from 6.5 to 13 mm	

Dimensions

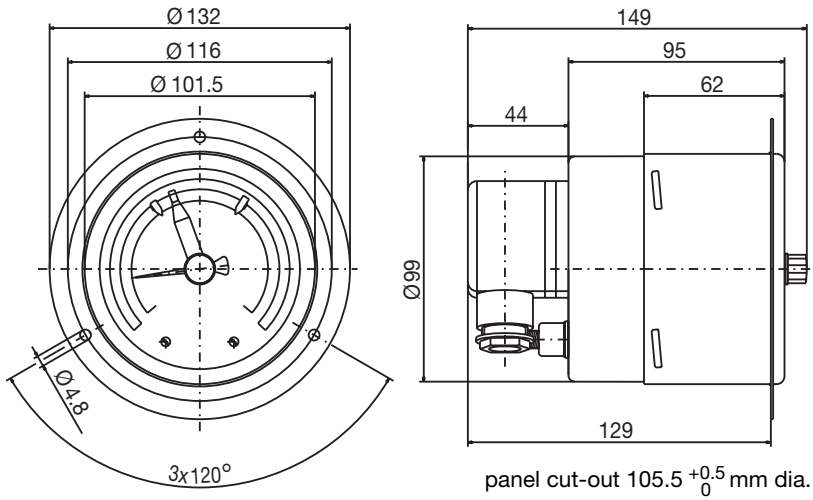
Type: 608523/0210



Type: 608523/1010



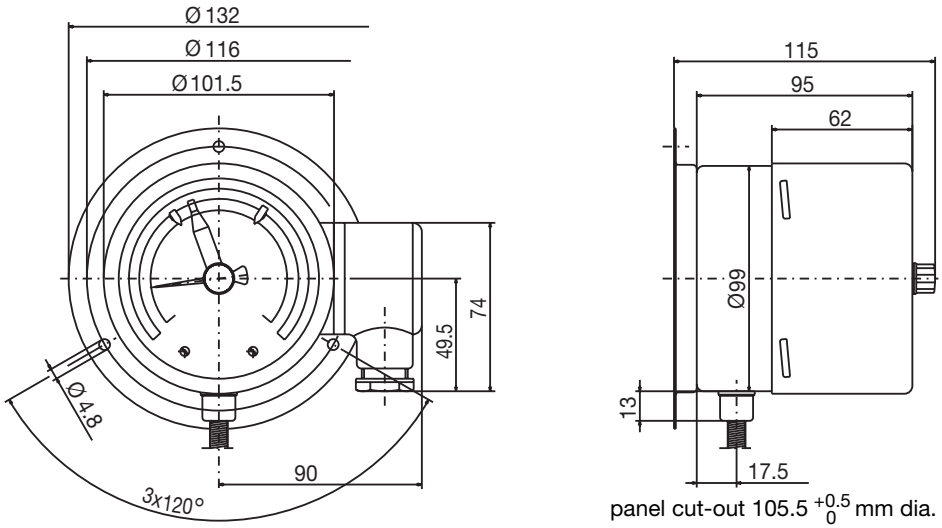
Type: 608523/2010



panel cut-out 105.5 $^{+0.5}_{0}$ mm dia.

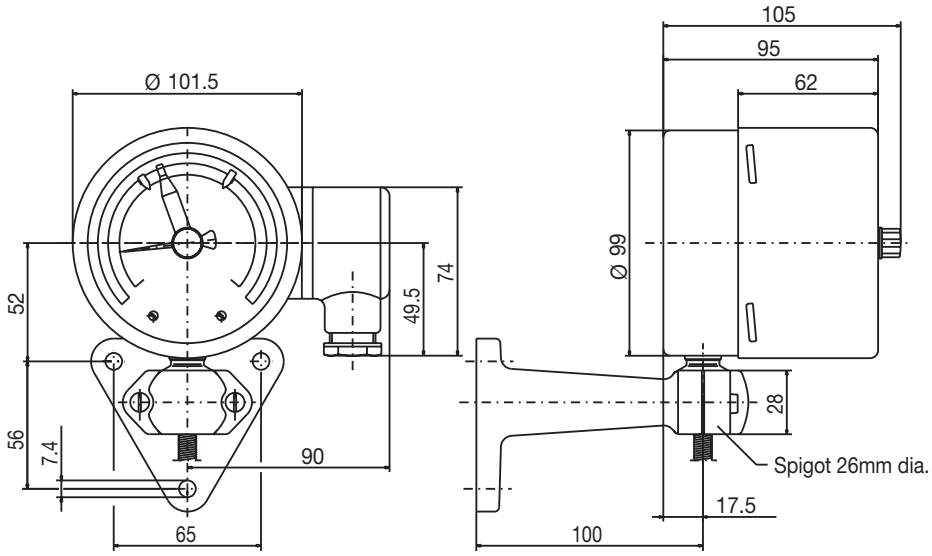
Dimensions

Type: 608523/2210



panel cut-out 105.5 $^{+0.5}_{0}$ mm dia.

Type: 608523/2310



Instrument mounting to DIN 16281

L_5	Probe mounting
40 mm	TA 03, TA 30
≤ 69 mm	TA 02
42.5 mm	TA 21
51.5 mm	TA 22, TA 31

Order details

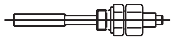
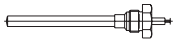
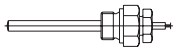
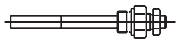
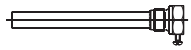
Contact dial thermometer Class 1.5, Type 608523

Order code	(1)	Basic type
608523		Mechanical contact dial thermometer Class 1.5
	(2)	**Basic type extension**
0210		Style: 02; housing size: 100 mm dia.
1010		Style: 10; housing size: 100 mm dia.
2010		Style: 20; housing size: 100 mm dia.
2210		Style: 22; housing size: 100 mm dia.
2310		Style: 23; housing size: 100 mm dia.
	(3)	**Indication range (AB)**
469		-40 to + 40°C; measuring range –30 to + 30°C, accuracy 1.5°C
566		-30 to + 50°C; measuring range –20 to + 40°C, accuracy 1.5°C
643		-20 to +120°C; measuring range 0 to +100°C, accuracy 3.0°C
807		0 to + 60°C; measuring range +10 to + 50°C, accuracy 1.5°C
810		0 to + 80°C; measuring range +10 to + 70°C, accuracy 1.5°C
814		0 to +100°C; measuring range +10 to + 90°C, accuracy 1.5°C
818		0 to +120°C; measuring range +20 to +100°C, accuracy 3.0°C
826		0 to +160°C; measuring range +20 to +140°C, accuracy 3.0°C
832		0 to +200°C; measuring range +20 to +180°C, accuracy 3.0°C
834		0 to +250°C; measuring range +30 to +220°C, accuracy 4.0°C
926		+50 to +250°C; measuring range +70 to +230°C, accuracy 3.0°C
840		0 to +300°C; measuring range +30 to +270°C, accuracy 6.0°C
927		+50 to +300°C; measuring range +80 to +270°C, accuracy 4.0°C
843		0 to +350°C; measuring range +50 to +300°C, accuracy 6.0°C
932		+50 to +350°C; measuring range +80 to +320°C, accuracy 6.0°C
848		0 to +400°C; measuring range +50 to +350°C, accuracy 6.0°C
851		0 to +450°C; measuring range +50 to +400°C, accuracy 6.0°C
854		0 to +500°C; measuring range +50 to +450°C, accuracy 8.0°C
858		0 to +600°C; measuring range +100 to +500°C, accuracy 10.0°C
	(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 range)
11		FL11 copper capillary with PE sleeve, approx. 3.5 mm dia. (up to +120°C top of range)
17		FL17 stainless steel capillary, 1.5 mm dia.
21		FL21 copper capillary, 1.0 mm dia. (up to +300°C top of 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 (details in plain text: in 1000 mm steps, up to 15000 mm length)

[1] see Data Sheet 60.8730 for description and features
[2] screw-in spigot to DIN 3852 Form A
[3] List extra codes in sequence, separated by commas.

Order details

Contact dial thermometer Class 1.5, Type 608523

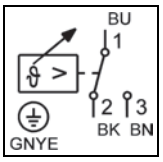
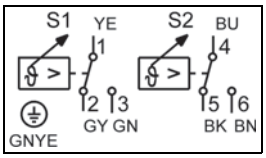
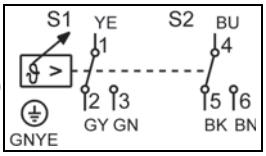
Order code			
	(6)	**Process connection (PA)[1]**	
750		TF 01; temperature probe with stepped support tube	
752		TF 11; temperature probe without support tube	
843		TA 02; immersion tube with union nut and loose nipple[2]	
161		TA 03; immersion tube with loose union nut	
311		TA 20; immersion tube with loose nipple and shoulder[2]	
403		TA 21; immersion tube with loose plug and conical seal	
351		TA 22; immersion tube with loose plug, conical seal and loose nipple[2]	
401		TA 23; immersion tube with plug and spring clip	
251		TA 25; sliding clamp fitting on support tube[2]	
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		Ø 6 mm	
8		Ø 8 mm	
10		Ø 10 mm	
11		Ø 11 mm	
12		Ø 12 mm	
	(8)	**Type of thread for process connection (PA)[1]**	
000		no thread (with TF 01 and TF 11)	
103		thread $G^3/_8$	
104		thread $G^1/_2$	
105		thread $G^3/_4$	
114		thread M 10 x 1 (TA 23 and SH 11 only)	
	(9)	**Material of probe / support tube[1]**	
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)	

[1] see Data Sheet 60.8730 for description and features
[2] screw-in spigot to DIN 3852 Form A
[3] List extra codes in sequence, separated by commas.

Order details

Contact dial thermometer Class 1.5, Type 608523

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 (details in plain text — in 50 mm steps)	
	(12)	**Switch output (SA)**	
28	SA 28	one contact	
27	SA 27	two contacts	
19	SA 19	two contacts (sequential contacts)	
	(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 min. or max. setpoint limit, 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	-	8	-	000	-	26	-	00	-	100	-	28	/	000[3]		

[1] see Data Sheet 60.8730 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 Transformer Version

for stock items see price catalog

Type 608550/1080

- ❑ Stainless steel housing
- ❑ Class 1.5
- ❑ IP54 protection
- ❑ One or two contacts; contact rating 5 or 10 A
- ❑ Housing size: 80 mm dia.

Brief description

Contact dial thermometers for transformers are universal instruments for on-site temperature measurement and monitoring.

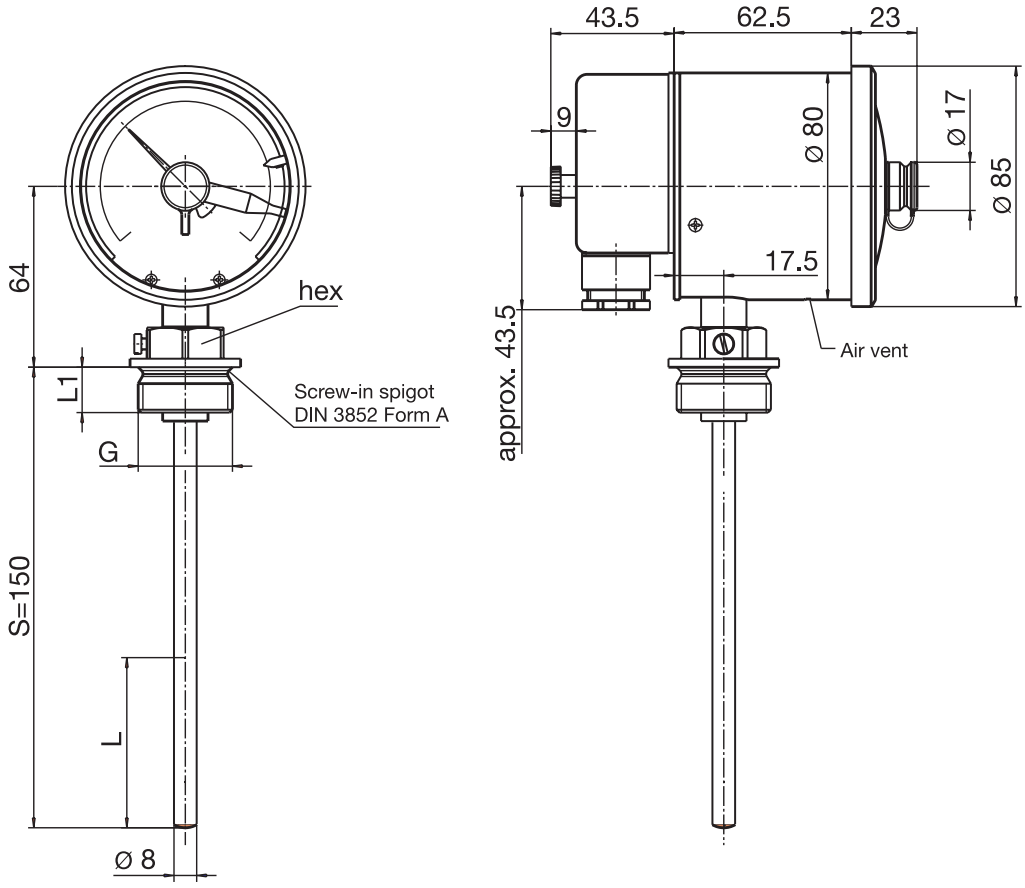
Technical data

Housing	housing, bezel and protective cap in stainless steel (1.4301)
Baseplate	aluminium (3.2582.05)
Enclosure protection	IP54 to DIN 60 529
Window	Plexiglas (PMMA)
Scale	white, black lettering
Accuracy class	Class 1.5 similar to EN 13 190
Time constant	$t_{0.632}$ response approx. 18 sec (measured in agitated water with an 8 mm dia. brass probe)
Ambient temperature effect	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
Measuring system	liquid-filled

	standard	extra code (TZ) 650
Electrical contact **Contact type**	single-pole microswitch with a mechanically operated changeover contact	
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	± 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°C (storage and transport -30 to +70°C)	
Nominal position	NL90, symbol ⊥	

Dimensions

Type 608550/1080

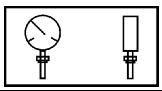
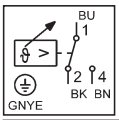
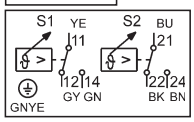


Pipe thread G	a/f	L_1
$G^1/_2A$	27	14
$G^3/_4A$	32	16
G1A	27	16

L active probe dimension	
for indication range 0 to +120°C approx. 70 mm	for indication range -20 to +120°C approx. 60 mm

Order details

Contact dial thermometer, transformer version, Type 608550

Order code		
	(1)	**Basic type**
608550		Mechanical contact dial thermometer, transformer version, Class 1.5
	(2)	**Basic type extension**
1080		Style: 10; housing size: 80 mm dia. 
	(3)	**Indication range (AB)**
818		0 to +120°C; measuring range +20 to +100°C, accuracy 3.0°C
643		-20 to +120°C; measuring range 0 to +100°C, accuracy 3.0°C
	(4)	**Process connection (PA)**
874		TA 24; immersion tube with loose plug O ring seal and clamping screw 
	(5)	**Diameter of process connection (PA)**
8		8 mm dia.
	(6)	**Type of thread for process connection (PA)**
104		$G^1/_2$ thread
105		$G^3/_4$ thread
106		G1 thread
	(7)	**Material of process connection (PA)**
50		brass
	(8)	**Fitting length of process connection (PA) (dimension S)**
150		150 mm
. . .		special length (details in plain text, in 50 mm steps)
	(9)	**Switching output (SA)**
20		one microswitch 
21		two microswitches 
	(10)	**Extra codes (TZ)**
000		no extra code
650		microswitch 10(3) A (230 V AC +10/-15%, 48 — 63 Hz, p.f. = 1 (0.6))
522		customized scale
434		peak-reading pointer adjustable with screwdriver; protected by cap

Special versions on request!

Order code

(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)		
608550	/	. . . .	-	. . .	-	. . .	-	.	-	. . .	-	. .	-	. . .	-	. .	/	. . .	,	. . .

Order example

608550	/	1080	-	818	-	874	-	8	-	106	-	50	-	150	-	20	/	000[1]		

Note: For dial thermometers for transformers, see data sheet 60.8005.
For temperature indicators and contact dial thermometers with capillary, see data sheets 60.8201 and 60.8520.

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

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JUMO dTHERM-M

Type 608624/1710

- ❑ Digital indicator for panel or surface mounting with integrated 2-wire transmitter
- ❑ Stainless steel housing with bayonet lock
- ❑ IP65 protection
- ❑ Housing size: 100mm dia.

Brief description

The JUMO dTHERM-M features a 3½-digit LC display with 13 mm digit height and an integrated 2-wire transmitter. The supply for the indicator is provided by wiring it in series into the 4 — 20 mA current loop, so that no additional cables are required.
JUMO-dTHERM-M indicators are universal instruments, either for connection to external Pt100 resistance thermometers or with an integral Pt100, and are used for temperature measurement and indication.

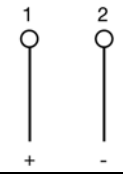
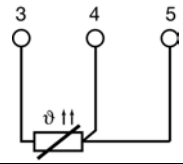
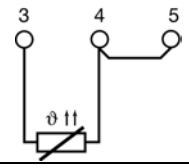
Technical data

Housing	housing and bezel or flange in stainless steel (1.4301) angle block in aluminium (Style 17)
Measurement input	Pt100 resistance thermometer in 3-wire circuit (on Styles 20 and 23). A 2-wire circuit without lead compensation can be implemented via an external link between the terminals 4 and 5.
Display	3½-digit LCD with 13 mm digit height
Transfer characteristic	linear with temperature
Linearity error	≤ 0.2% of full scale
Calibration accuracy	≤ 0.5% of full scale
Indication accuracy	≤ 0.2% of full scale ±1 digit
Display format	1 °C (0.1 °C with extra code 465)
Supply	12 — 30 V DC
Max. current drawn	approx. 30 mA
Supply voltage error	≤ 0.02% of span per volt (deviation from 24 V DC)
Output signal	4 — 20 mA
Burden (Rb)	Rb ≤ (Ub-12 V) / 20 mA
Burden error	≤ ±0.02% of span per 100 Ω burden
Probe break/short-circuit	current output < 2.5 mA, displayed value below start of range

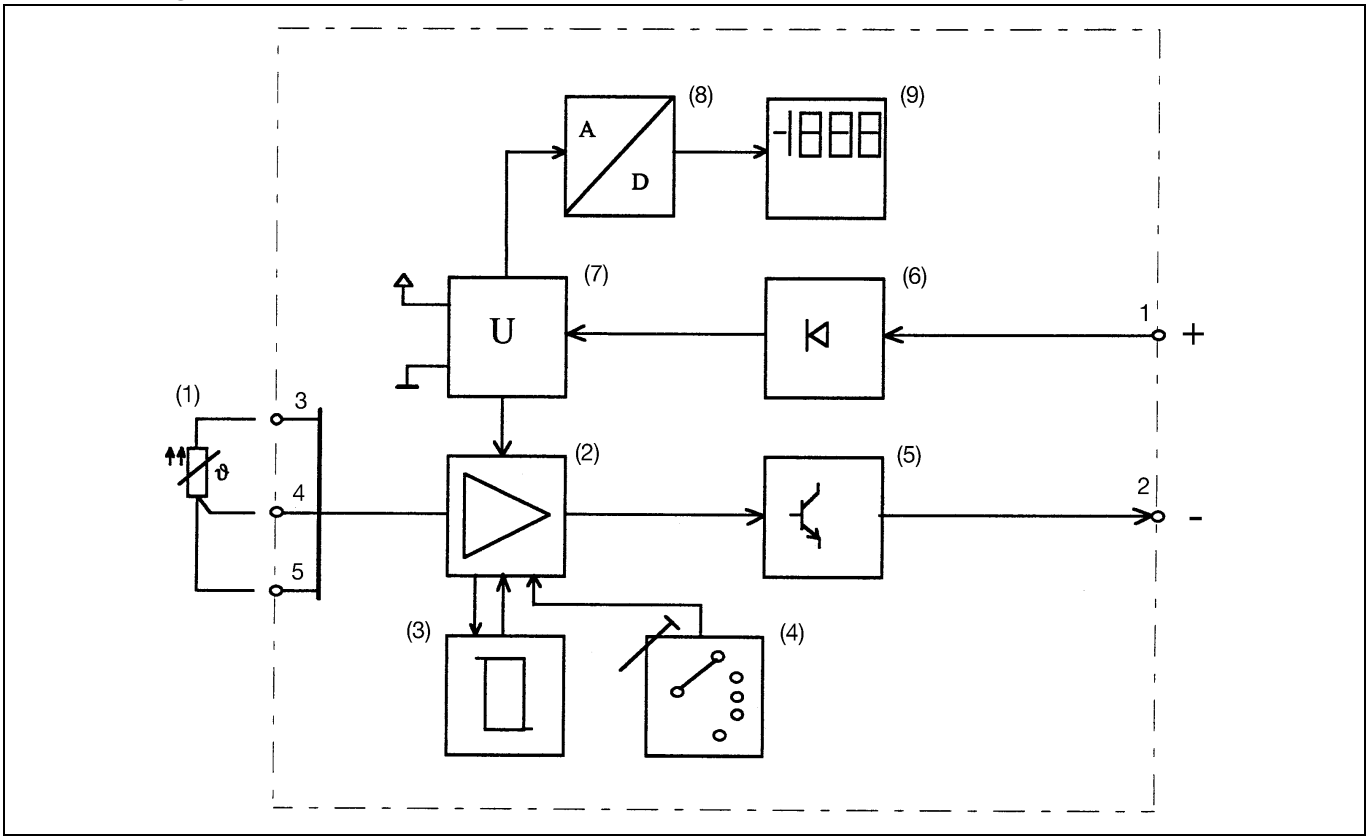
	Style 01	**Style 20, 23**	**Style 10, 17**
Electrical connection	connection for one cable	connection for two cables with 3 to 5 mm dia.	connection for one cable; terminal box to DIN 43650 (connector); gland for 6 to 8 mm cable diameter; conductor cross-section up to 1.5 mm²
	connection with earth terminal; gland for 6.5 to 13 mm cable diameter; conductor cross-section up to 2.5 mm²		
	All input and output cables without connection to the mains supply must be arranged as twisted and screened cables. Ground the screen on the instrument side to the potential earth.		

Operating temperature range	0 to +60°C (temperature at the housing)
Storage temperature range	0 to +60°C
Ambient temperature effect	referred to the deviation from the +23°C reference value
Display	≤ 0.2% / 10 °C temperature change
Current output	≤ 0.1% / 10 °C temperature change
EMC	EN 61326
Interference emission	Class B
Interference immunity	to general requirements
Protection	IP65 as per EN 60529
Time constant	$T_{0.632}$ approx. 19sec (measured in agitated water with a 10 mm dia. probe)

Connection diagram

	Supply 12 — 30 V DC Current output 4 — 20 mA
	Resistance thermometer in 3-wire circuit on Styles 20 and 23 or
	Resistance thermometer in 2-wire circuit via an external link on Styles 20 and 23 (note lead resistance)
	PE conductor

Block diagram



Function

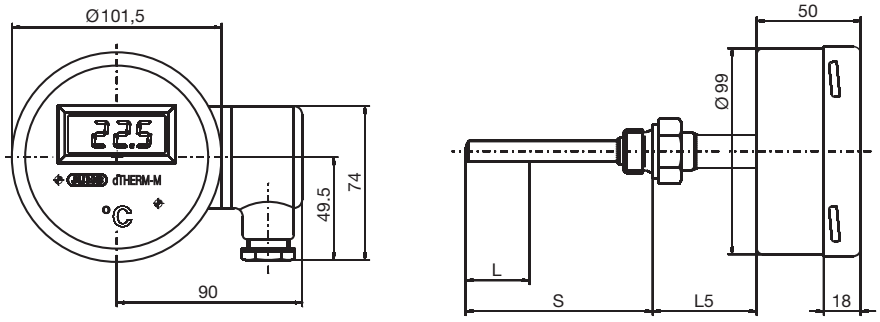
The transmitter converts the temperature-dependent change in resistance of a Pt100 resistance thermometer into a proportional DC current signal. The resistance thermometer (1) can be connected in 2- or 3-wire circuit. The amplifier stage (2) drives the output stage (5) which supplies the proportional 4 — 20mA DC current.
On probe break or short-circuit, a comparator (3) is activated, which switches the output signal over to Low level. Solder links and potentiometers (4) are used for the range settings.
The diode (6) serves as a reverse-polarity protection. The controller (7) provides the supply to the individual stages.
The 4 — 20 mA current signal is digitized in the A/D converter (8) and displayed as a temperature value on the LCD (9).

Accessories

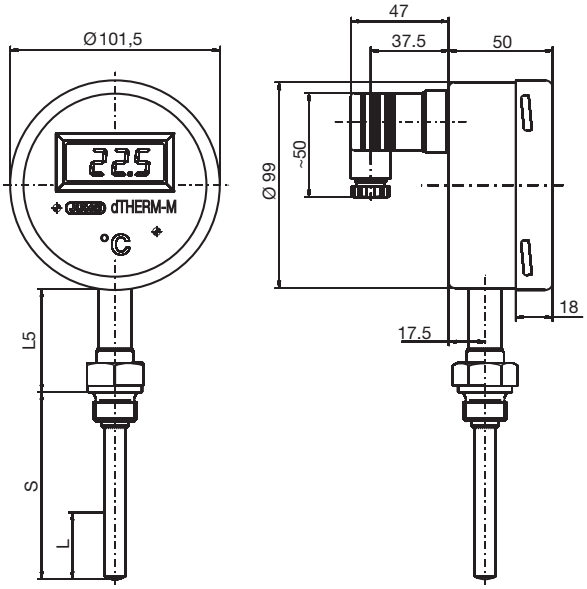
Power supply units	to data sheet 70.7500 (1- or 4-way).
Temperature probe	On instruments with an external Pt100 resistance thermometer (Styles 20 and 23), temperature probes to data sheets 90.2105 and 90.2005 can be used.

Dimensions

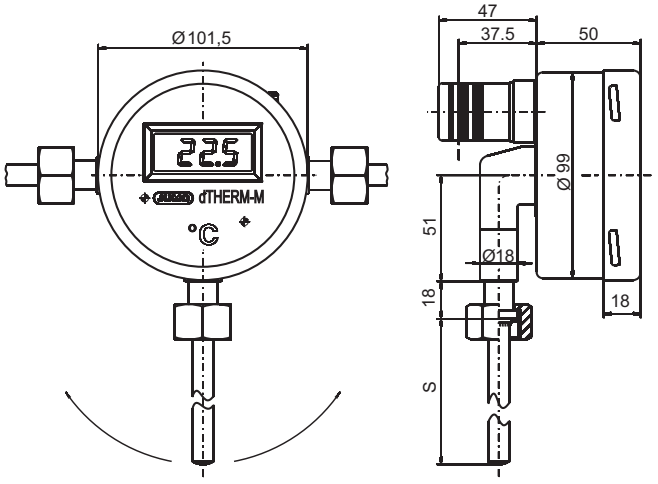
Type: 608624/0110



Type: 608624/1010



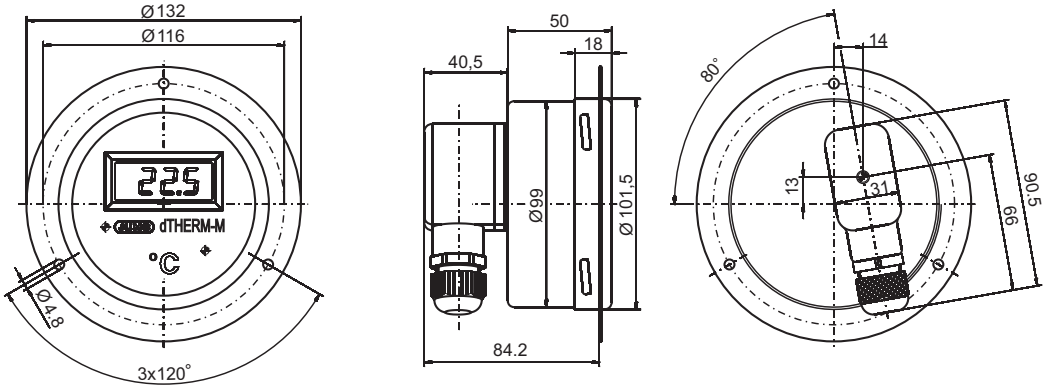
Type: 608624/1710



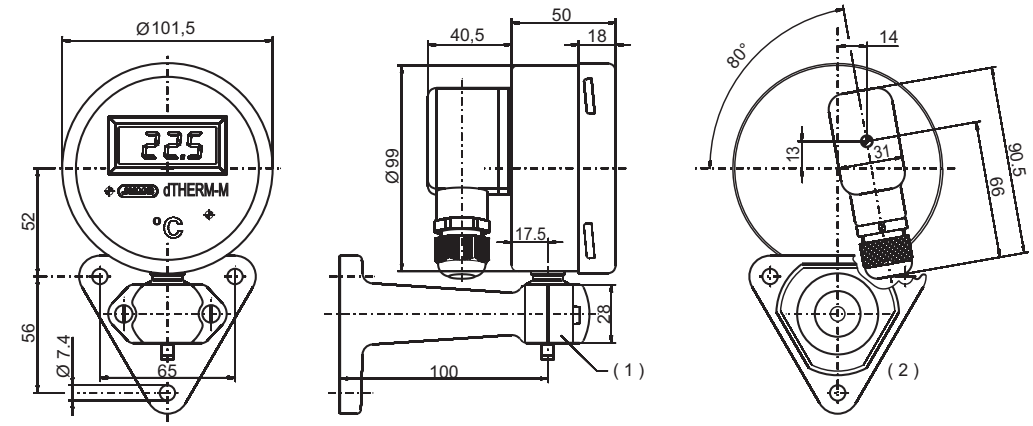
Probe mounting can be rotated through ± 90°

Dimensions

Type: 608624/2010

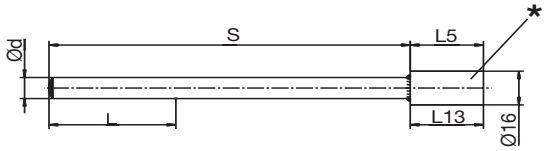
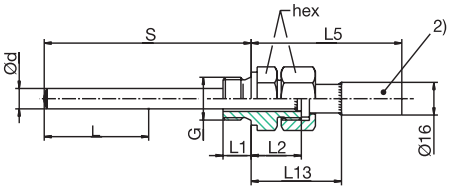
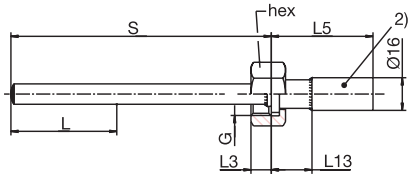
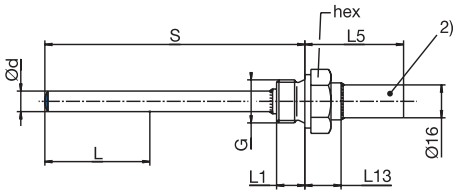
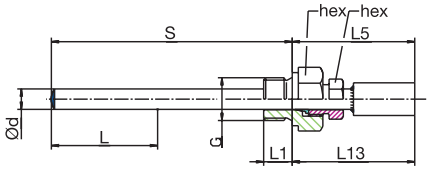
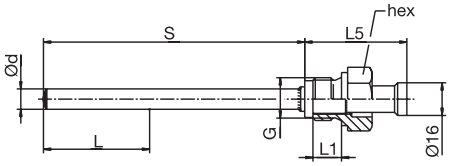


Type: 608624/2310



(1) Spigot 26 mm dia.
(2) Instrument mounting to DIN 16281

Probe mountings TA

Version	Dimensional drawing	Description
TA01		Immersion tube with shoulder * Housing connection
TA02		Immersion tube with union nut and loose nipple; screw-in spigot[1]
TA03		Immersion tube with loose union nut
TA04		Immersion tube with fixed hexagon screw-in spigot[1]
TA06		Immersion tube with sliding clamping thread; screw-in spigot[1]
TA20		Immersion tube with loose nipple and shoulder; screw-in spigot[1]

[1] Screw-in spigot to DIN 3852 Form A
[2] Housing connection not applicable on Style 17

Dimensions of process connection on Styles 01 and 10

Pipe thread G	a/f	L_1	L_2	L_3	L_5 TA01	L_5 TA02	L_5 TA03	L_5 TA04	L_5 TA06	L_5 TA20
G 1/2 A	27	14	25	10	–	67	42	40.5	50.5	50
G 3/4 A	32	16	29	11	–	71	42	40.5	50.5	50
Ø16 mm	–	–	–	–	32	–	–	–	–	–

Dimensions of process connection on Style 17

Pipe thread G	a/f	L_1	L_2	L_3	L_{13} TA01	L_{13} TA02	L_{13} TA03	L_{13} TA04	L_{13} TA06	L_{13} TA20
G 1/2 A	27	14	25	10	–	43	18	18	50	–
G 3/4 A	32	16	29	11	–	47	18	18	50	–
Ø 16 mm	–	–	–	–	18.5	–	–	–	–	–

Order details

Digital indicator, Type 608624

Order code	(1)	Basic type
608624		Digital indicator with integrated 2-wire transmitter
	(2)	**Basic type extensions**
0110		Style: 01; housing size: 100 mm dia.
1010		Style: 10; housing size: 100 mm dia.
1710		Style: 17; housing size: 100 mm dia.
2010		Style: 20; housing size: 100 mm dia.
2310		Style: 23; housing size: 100 mm dia.
	(3)	**Range (MB)**
357		-50 to + 50°C
814		0 to +100°C
818		0 to +120°C
826		0 to +160°C
832		0 to +200°C
380		-50 to +200°C
848		0 to +400°C
858		0 to +600°C
	(4)	**Process connection (PA)[1]**
000		none (Styles 20 and 23)
010		TA 01; immersion tube with shoulder
844		TA 02; immersion tube with union nut and loose nipple[1]
845		TA 03; immersion tube with loose union nut
841		TA 04; immersion tube with fixed hexagon screw-in spigot[1]
847		TA 06; immersion tube with sliding clamping thread[1]
842		TA 20; immersion tube with loose nipple and shoulder[1] (not for Style 17)
891		SH 05; screw-in pocket, assembled[1, 2]
913		SH 07; screw-in pocket, assembled, with clamping clip and fixing screw[1, 2]
	(5)	**Diameter of process connection (PA)[1]**
0		none (Styles 20 and 23)
6		6 mm dia. (only with TA 02 and TA 03)
10		10 mm dia.
14		14 mm dia. (only SH 05 and SH 07)[2]

[1] Screw-in spigot to DIN 3852 Form A.
[2] See Data Sheet 60.8730 for description and features.
[3] List extra codes in sequence, separated by commas.

Order details

Digital indicator, Type 608624

Order code		
	(6)	**Thread for process connection (PA)[1]**
000		no thread (on TA 01, Style 20 and Style 23)
104		$G^1/_2$ thread
105		$G^3/_4$ thread
	(7)	**Material of process connection (PA)[1]**
00		none (Style 20 and Style 23)
26		stainless steel (CrNi, 1.4571)
	(8)	**Fitting length of process connection (PA)[1] (dimension S)**
0		none (Style 20 and Style 23)
50		50 mm
100		100 mm
150		150 mm
200		200 mm
. . .		special length (specify in plain text, in 50 mm steps)
	(9)	**Extra codes (TZ)**
000		no extra code
465		display format 0.1 °C/digit (up to 160°C)
522		customized front panel

Special versions on request!

Order code

(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		
608624	/	. . . .	-	. . .	-	. . .	-	. .	-	. . .	-	. .	-	. . .	/	. . .	,	. . .

Order example

608624	/	1710	-	818	-	845	-	10	-	104	-	26	-	100	/	000[3]		

[1] Screw-in spigot to DIN 3852 Form A.
[2] See Data Sheet 60.8730 for description and features.
[3] List extra codes in sequence, separated by commas.

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Timers

- **with mechanical drive or synchronous motor**
- **with acoustic signal and two contacts**
- **housing size: 60 mm dia.**
  bezel sizes: 72 x 72 mm and 96 x 96 mm

Type 608901/5172

Type 608901/5272

Type 608901/5460

Brief description

Timers with mechanical drive and acoustic signal (switch function 00)

Turning the selector knob winds up the clockwork mechanism. At the end of the pre-set time, there is an acoustic signal.

Timer with mechanical drive and two changeover contacts (switch function 26)

Turning the selector knob winds up the clockwork mechanism. At the end of the pre-set time, electrical equipment and installations can be switched on/off or over. In addition, acoustic or optical signals can be operated through a contact.
After the set time has elapsed, contacts I and II change over and, at the same time, the selector knob returns to its start position.

Timer with sychronous motor and two contacts (switch function 24 and 25)

Turning the selector knob will switch on the synchronous motor of the timer and pre-select the time. During the set time, or after it has elapsed, electrical equipment and installations can be switched on/off or over. In addition, acoustic or optical signals can be operated through a contact.

Switch function 24

After the set time has elapsed, contacts I and III change over (contact II opens). Contacts I and III must be returned manually to the start position, by turning the selector knob from “0” to “Off” (contact II remains open).

Switch function 25

90 sec before the end of the pre-set time, contact II will be closed for approx. 90 sec. After the set time has elapsed, contacts I and II are opened (automatic signal switch-off for contact II).

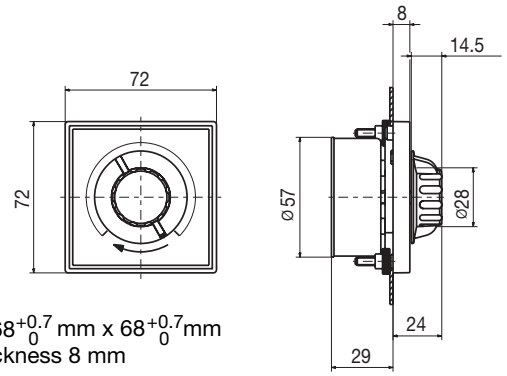
Technical data

	Basic type extension 5172 and 5196	Basic type extension 5272 and 5296	Basic type extension 5460
Housing	black plastic		- -
Housing mounting	from the back, with bracket		front
Scale	white, black lettering		
Timer setting	By selector knob on the front window. Minimum setting angle 30°. Very short times can be selected by moving the knob beyond the desired setting and then turning it back again. Timer setting by:		
	black knob with plastic flange	black knob with aluminium disc in center	
Time marking	by arrow on flange	by pointer	
Baseplate	housing size 72 x 72 mm: plastic housing size 96 x 96 mm: sheet steel, zinc-plated		sheet steel, zinc-plated
Bezel	plastic		stainless steel, electro-polished, for front mounting
Electrical contact connection	faston connector A 6.3 x 0.8 to DIN 46244		
rating	16 (4) A, 230V AC +10/-15%, 48 — 63Hz, p.f. = 1 (0.6) 10 (2) A, 380V AC +10/-15%, 48 — 63Hz, p.f. = 1 (0.6)		
operating voltage of synchronous motor	230V AC, 50 Hz		- -
Limit temperatures	Permissible ambient temperature -20 to +80°C		
Nominal position (NL)	unrestricted		

	Switch function 00	Switch function 24	Switch function 25	Switch function 26
Scale span °∢	270	300 + 30	300	276
Deviation (minutes)				
30 min	- -	- -		± 1.5
60 min	± 0.5	± 2.0		± 3.0

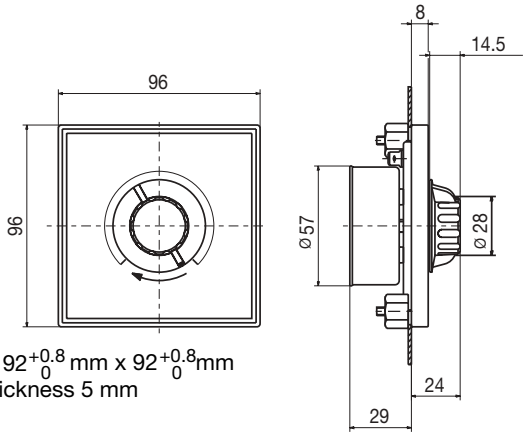
Dimensions

Type: 608901/5172-00



panel cut-out $68^{+0.7}_{0}$ mm x $68^{+0.7}_{0}$mm
max. panel thickness 8 mm

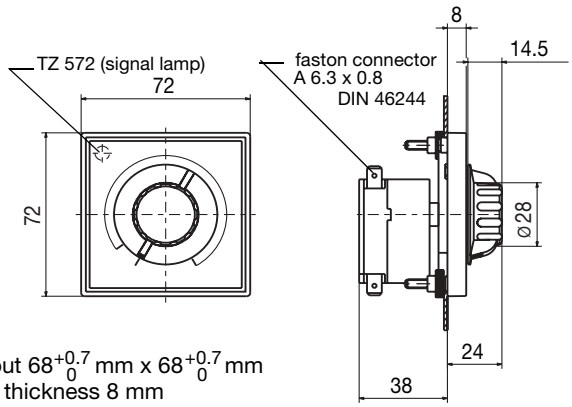
Type: 608901/5196-00



panel cut-out $92^{+0.8}_{0}$ mm x $92^{+0.8}_{0}$mm
max. panel thickness 5 mm

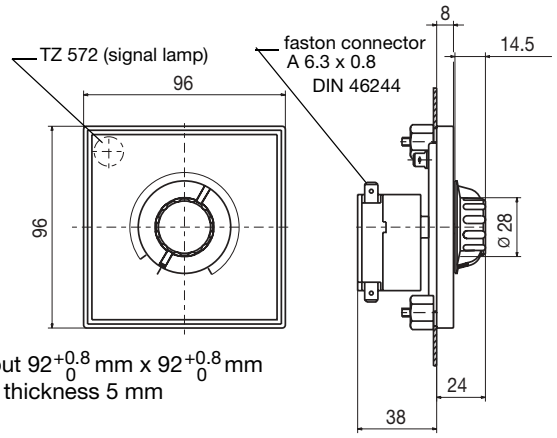
Dimensions

Type: 608901/5172-26



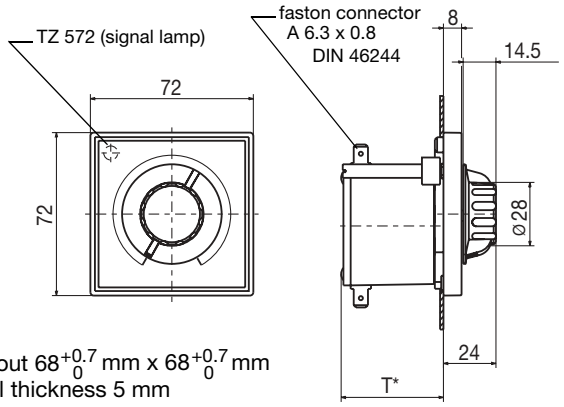
panel cut-out $68^{+0.7}_{0}$ mm x $68^{+0.7}_{0}$ mm
max. panel thickness 8 mm

Type: 608901/5196-26



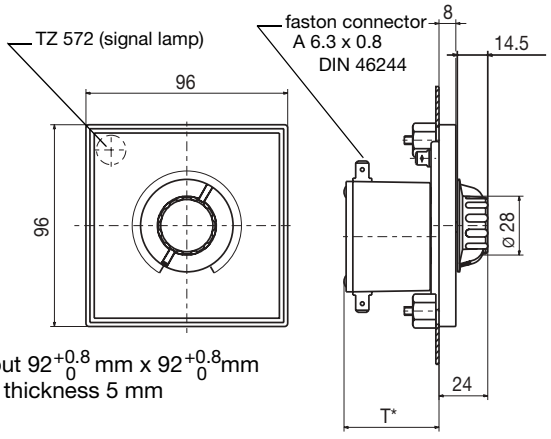
panel cut-out $92^{+0.8}_{0}$ mm x $92^{+0.8}_{0}$ mm
max. panel thickness 5 mm

Type: 608901/5172-24
608901/5172-25



panel cut-out $68^{+0.7}_{0}$ mm x $68^{+0.7}_{0}$ mm
max. panel thickness 5 mm

Type: 608901/5196-24
608901/5196-25



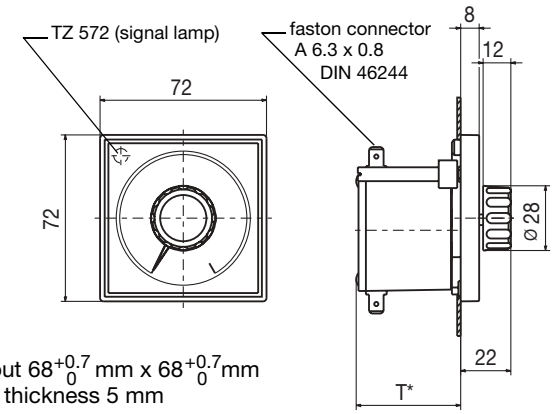
panel cut-out $92^{+0.8}_{0}$ mm x $92^{+0.8}_{0}$ mm
max. panel thickness 5 mm

*

Switch function	T (mm)
24	56
25	45

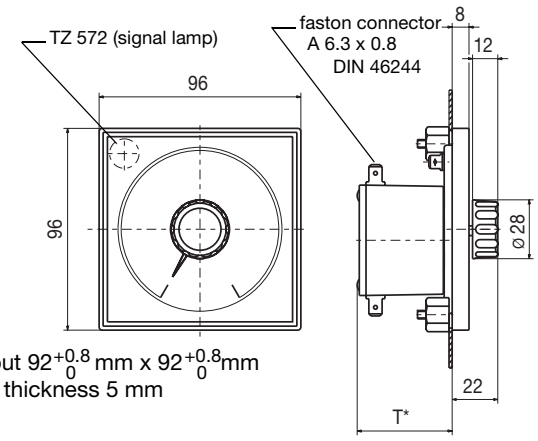
Dimensions

Type: 608901/5272-24
608901/5272-25



panel cut-out $68^{+0.7}_{0}$ mm x $68^{+0.7}_{0}$mm
max. panel thickness 5 mm

Type: 608901/5296-24
608901/5296-25

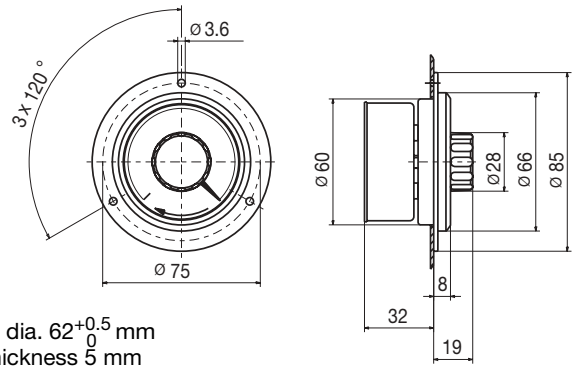


panel cut-out $92^{+0.8}_{0}$ mm x $92^{+0.8}_{0}$mm
max. panel thickness 5 mm

*

Switch function	T (mm)
24	56
25	45

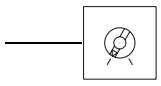
Type: 608901/5460-00

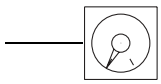


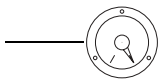
panel cut-out dia. $62^{+0.5}_{0}$ mm
max. panel thickness 5 mm

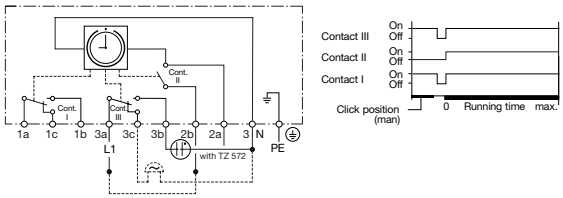
Order details
Timers Type 608901

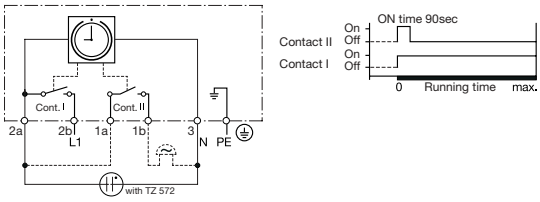
			(1)	Basic type
		608901		timer, mechanical
		608901		timer, with synchronous motor
			(2)	Basic type extension
X	X	5172		style: 51; housing size: 72 x 72 mm
X	X	5196		style: 51; housing size: 96 x 96 mm
	X	5272		style: 52; housing size: 72 x 72 mm
	X	5296		style: 52; housing size: 96 x 96 mm
X		5460		style: 54; housing size: 60 mm dia.
			(3)	Switch function
X		00		acoustic signal
	X	24		2 changeover contacts and manual signal switch-off
	X	25		2 make (n.o) contacts
X		26		2 changeover contacts (style 51 only)
			(4)	Running time
X		30		30 minutes (switch function 26 only)
X	X	60		60 minutes
			(5)	Extra codes
X	X	000		no extra code
X	X	410		metal bezel, black (not on style 54)
X	X	411		metal bezel
X	X	572		signal lamp (not on style 54; not with switch function 00)
X	X	521		black scale, white lettering
X	X	522		scale to customer specification
X	X	480		gray knob (style 51 only)

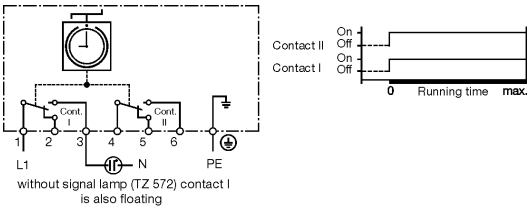












Order code

(1)		(2)		(3)		(4)		(5)		
608901	/	....	-	..	-	..	/	...	,	...

Order example

608901	/	5196	-	25	-	60	/	000[1]

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