



More than sensors + automation



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# Automation

Temperature, Control, Monitoring







### Your contact person for technical consulting and offer preparation/technical sales

Name	E mail	Phone	Fax	Function/responsible for:
		+49 661 6003-		
Jörg Wingses	joerg.winges@jumo.net	2916	504	Middle (office Darmstadt), South-East (office Ingolstadt)
Jörg Seuring	joerg.seuring@jumo.net	2929	504	North (office Hanover)
Heiko Jankowski	heiko.jankowski@jumo.net	2923	504	West (office Essen), East (office Hanover)
Lothar Koch	lothar.koch@jumo.net	2926	504	South-West (office Stuttgart)

### Your contact person for order processing/operative sales

Name	E mail	Phone	Fax	Function/responsible for:
		+49 661 6003-		
Simone Kirsch	simone.kirsch@jumo.net	2924	508	West (office Essen)
Julia Weber	julia.weber@jumo.net	2915	508	North, East (office Hanover)
Xiao Dan Zhao	xiaodan.zhao@jumo.net	9658	508	Middle (office Darmstadt)
Vanessa Haas	vanessa.haas@jumo.net	2521	508	South-West (office Stuttgart)
Tobias Neidert	tobias.neidert@jumo.net	2797	508	South-East (office Ingolstadt)

### Your contact person for service: customer support, repair, technical support for applications, support for optimizing and operation

Name	E mail	Phone	Fax	Function/responsible for:
		+49 661 6003-		
Ernst Schmidt	ernst.schmidt@jumo.net	447	881 447	Head of service
Group Commercial Processing	service@jumo.net	729	503	Commercial Processing
Technical Support	service@jumo.net	9135	881 899	

### Your contact person for engineering

Name	E mail	Phone	Fax	Function/responsible for:
		+49 661 6003-		
Harald Schöppner	harald.schoeppner@jumo.net	2295	88 2295	Head of Engineering
Martin Müller	martin.mueller@jumo.net	2390	88 2390	Technical Processing
Ramona Usinger	ramona.usinger@jumo.net	2208	88 2208	Assistant/Commercial Processing





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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM 20 2DY, UK  
 Phone: +44 1279 63 55 33  
 Fax: +44 1279 62 50 29  
 Email: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: +1 315 437 5866  
 Fax: +1 315 437 5860  
 Email: info.us@jumo.net  
 Internet: www.jumousa.com



## Temperature, Control, Monitoring

<b>Rod thermostats</b>	<b>No.</b>
Series STM-RW-2 for flue gas temperature monitoring	601540

<b>Panel-mounting thermostats</b>	<b>No.</b>
Types ETHf-20(STW) and ETHf-70 (STB)	602010
Series EM, TR, TW, TB, STW, STB	602021
Series EM up to +650°C, TW, TB, STB	602025
Type EM-80 (STB), EM-20E, EM-30E, STW (STB)	602026
Type 602031 JUMO heatTHERM, TR, TW, STW, STB	602031

<b>Surface-mounting thermostats</b>	<b>No.</b>
Series ATH as single thermostats, TR, TW, STW, STB	603021
Series ATH as twin thermostats TR, TW, STW, STB	603026
Series ATH.-SE-... for monitoring installations on seagoing ships, TW, STW, STB	603031
Series ATH-SW, Protection IP65, TW, STW, STB	603035
Series AMTHF, with 2, 3 or 4 single-pole snap-action switches	603051
JUMO heatTHERM-AT as surface-mounting/room thermostat, TR, TW, STW, STB	603070
JUMO frostTHERM-AT/-DR as surface-mounting or DIN rail thermostat, STW, STB	604100
JUMO frostTHERM-ATE – electronic frost protection thermostat	604170

<b>Warm-air thermostats</b>	<b>No.</b>
Series WTHc for warm-air heating systems to DIN 4794	604514

<b>Ex thermostats for application in hazardous areas</b>	<b>No.</b>
exTHERM-AT	605055

<b>Accessories</b>	<b>No.</b>
<b>ATEX Thermowell</b>	605057
<b>Process connections for thermostats</b>	
Temperature probes, screw fittings and pockets	606710
<b>JUMO setpoint adjusters for thermostats</b>	
Spindle-fitting knobs, adjustable stops, setpoint dials, surrounds, screws for EM series and heatTHERM	606715

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
 Email: mail@jumo.net  
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**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM 20 2DY, UK  
 Phone: +44 1279 63 55 33  
 Fax: +44 1279 62 50 29  
 Email: sales@jumo.co.uk  
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 East Syracuse, NY 13057, USA  
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## Dial thermometers with bimetal measuring system

**No.**

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

## Dial thermometers with liquid- or gas-filled measuring system

**No.**

### Indicators

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

### Bimetal temperature switch

Bimetal temperature switch with a fixed switching temperature		IP52 or IP67	608301
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### Controllers with slow-break contact

Contact dial thermometer with indication for panel- or surface-mounting	1	IP 65	608425
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### Controllers with microswitch contact

MICROSTAT-M with 1 microswitch for panel-mounting	2	IP53	608501
Contact dial thermometer for panel-mounting or self-supporting	1.5	IP51 or IP53	608520
Contact dial thermometer for panel-mounting or self-supporting in stainless steel case with bayonet lock	1.5	IP65	608523
JUMO dicoTEMP 800 – Dial thermometer with microswitch	1.5	IP54	608530
Contact thermometer-TF, transformer and industrial versions	1.5	IP54	608540

## Accessories

**No.**

### Process Connections for Dial Thermometers

Temperature probes (TF), Process connections (TA), Pockets (SH) (prices on request)			608730
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**JUMO GmbH & Co. KG**

Delivery address: Mackenrodtstraße 14  
36039 Fulda, Germany  
Postal address: 36035 Fulda, Germany  
Phone: +49 661 6003-0  
Fax: +49 661 6003-607  
E-mail: mail@jumo.net  
Internet: www.jumo.net

**JUMO Instrument Co. Ltd.**

JUMO House  
Temple Bank, Riverway  
Harlow, Essex CM20 2DY, UK  
Phone: +44 1279 635533  
Fax: +44 1279 635262  
E-mail: sales@jumo.co.uk  
Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**

6733 Myers Road  
East Syracuse, NY 13057, USA  
Phone: 315-437-5866  
1-800-554-5866  
Fax: 315-437-5860  
E-mail: info.us@jumo.net  
Internet: www.jumousa.com



# Flue gas temperature monitor

## Type STM-RW-2

### Special features

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

### Brief description

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

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



### Approval / approval marks (see Technical Data)



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

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 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
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 Internet: www.jumo.co.uk

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 East Syracuse, NY 13057, USA  
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 1-800-554-5866  
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 E-mail: info.us@jumo.net  
 Internet: www.jumousa.com



## Technical data

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

### Operating data

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

### Temperatures / Position

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

### Case

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

### Process connection

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

## Approvals/Approval marks

Approval marks	Inspection authority	Certificates / Inspection number	Inspection basics	valid for
DIN EN 14597	DIN CERTCO / TÜV Süd	ATW 862	DIN EN 14597	STM-RW-2
EAC <sup>a</sup>	Gost Norm AG	TC RU C-DE.AB98.B.00348	Technical rules of the customs union Russia/Belarus/Kazakhstan	STM-RW-2

<sup>a</sup> Russian documentation upon request

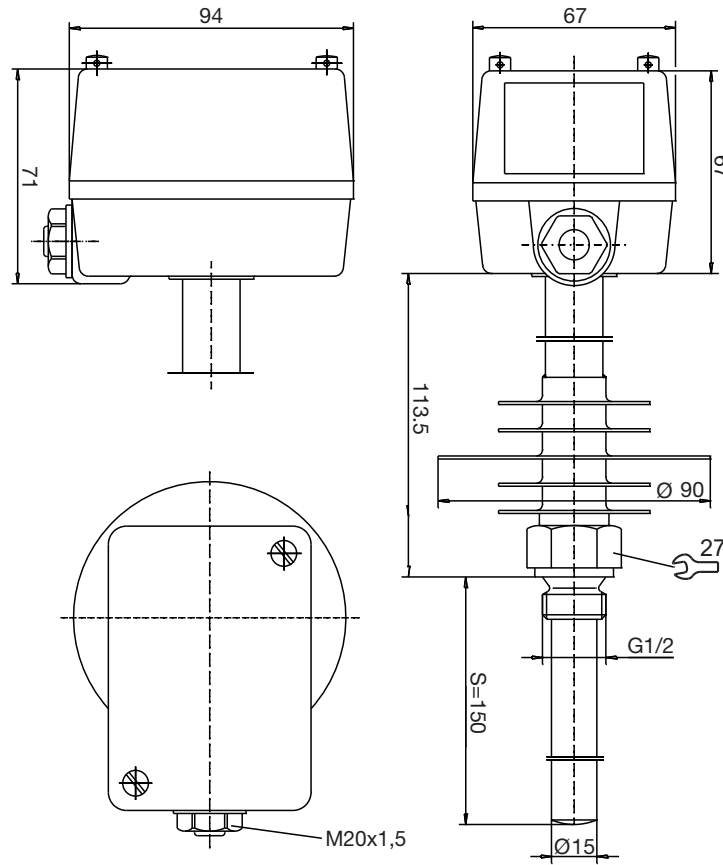
**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
 E-mail: mail@jumo.net  
 Internet: www.jumo.net

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 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

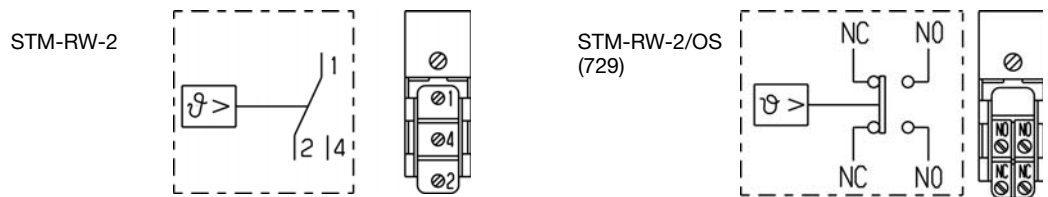
**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
 Internet: www.jumousa.com



## Dimensions



## Wiring diagram



**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
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## Stock versions

Part No.	Type	Range °C	Hysteresis K	Thread of process connection	Fitting length mm
60000903	STM-RW-2	+40 to +120	10-18	DZ G 1/2	150
60000904	STM-RW-2/OS	+40 to +120	10-30		
60001115	STM-RW-2	+20 to +400 Adjusted point +120	10-22		

## Order specifications

<b>Order code</b>	<b>( 1 ) Model</b>
601540	STM-RW-2 exhaust gas temperature monitor (ATW)
	<b>( 2 ) Range</b>
045	+40 to +400 °C
056	+40 to +120 °C
	<b>( 3 ) Switching differential</b>
00	without switching differential
	<b>( 4 ) Process connection</b>
48	DZ G 1/2 solid hexagon w. outer thread
	<b>( 5 ) Thread of process connection</b>
13	G 1/2
	<b>( 6 ) Material of process connection</b>
01	Steel
	<b>( 7 ) Fitting length</b>
150	150 mm
	<b>( 8 ) Diameter of immersion tube</b>
15	15 mm
	<b>( 9 ) Extra code</b>
729	Microswitch with 2 separate circuits

Order code **( 1 )** 601540 / **( 2 )** / **( 3 )** - **( 4 )** - **( 5 )** - **( 6 )** - **( 7 )** - **( 8 )** / **( 9 )**  
 Order example 601540 / 056 - 00 - 48 - 13 - 01 - 150 - 15 / 729

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

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JUMO House  
Temple Bank, Riverway  
Harlow, Essex CM20 2DY, UK  
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Fax: +44 1279 635262  
E-mail: sales@jumo.co.uk  
Internet: www.jumo.co.uk

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East Syracuse, NY 13057, USA  
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1-800-554-5866  
Fax: 315-437-5860  
E-mail: info.us@jumo.net  
Internet: www.jumousa.com



# Panel-mounted Thermostats

## ETH Series

### Special features

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

### Brief description

Panel-mounted thermostats ETH monitor thermal processes. The devices are available as safety-temperature monitors STW (STB) and safety temperature limiters STB. In the event of a malfunction, the STB switches the monitored machine to a safe operating status.

Panel-mounted thermostats operate according to the fluid expansion principle; a microswitch is used as an electrical switching element.



Type ETH-20



Type ETH-70

### Approvals/approval marks (see "Technical Data")



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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
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 Internet: www.jumo.co.uk

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 East Syracuse, NY 13057, USA  
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 1-800-554-5866  
 Fax: 315-437-5860  
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## Technical data

### Switching function

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

### Control ranges and temperature probes

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

### Capillary and temperature probe

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



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 36039 Fulda, Germany  
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## Technical data

### Electrical data

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

### Operating data

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

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## Technical data

### Approvals/approval marks

Type	Switching function	Certificates / Inspection number	Inspection basics		Important note !
ETH-20	STW (STB)	STW (STB) 799S		Pressure Equipment Directive 97/23/EC CE0036	The DIN registry no. will become null and void if thermowells are used that are not specified in our data sheet 606710.
ETH-70	STB	STB 800			
ETH-20 ETH-70	STW (STB) STB	TC RU C-DE.AB98.B.00348	EAC <sup>a</sup>	Gost Norm AG Technical rules of the customs union Russia/Belarus/Kazakhstan	

<sup>a</sup> Russian documentation upon request

### Switching head

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

### Process connection

ETH series with capillary	<b>Plain cylindrical probe "10"</b> (standard)
	<b>Screw-in thermowell "20"</b> (upon request)
	Screw-in sleeve with screw-in spigot G 1/2 form A according to DIN 3852/2 and clamping piece with fixing screw to lock the probe
Material	Up to +150 °C CuZn (nickel-plated) as standard, over +150 °C CrNi
Insertion length	Standard lengths: 100, 120, 150, 200, or 300 mm (different lengths upon request)
Immersion tube Ø	D = 8 mm
For different process connections and thermowells refer to data sheet 606710	

### Note:

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

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

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

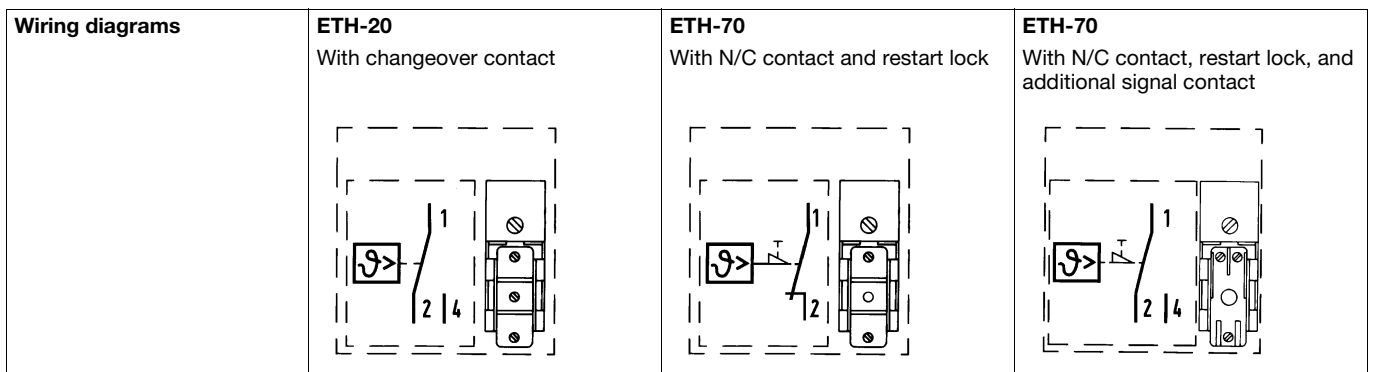
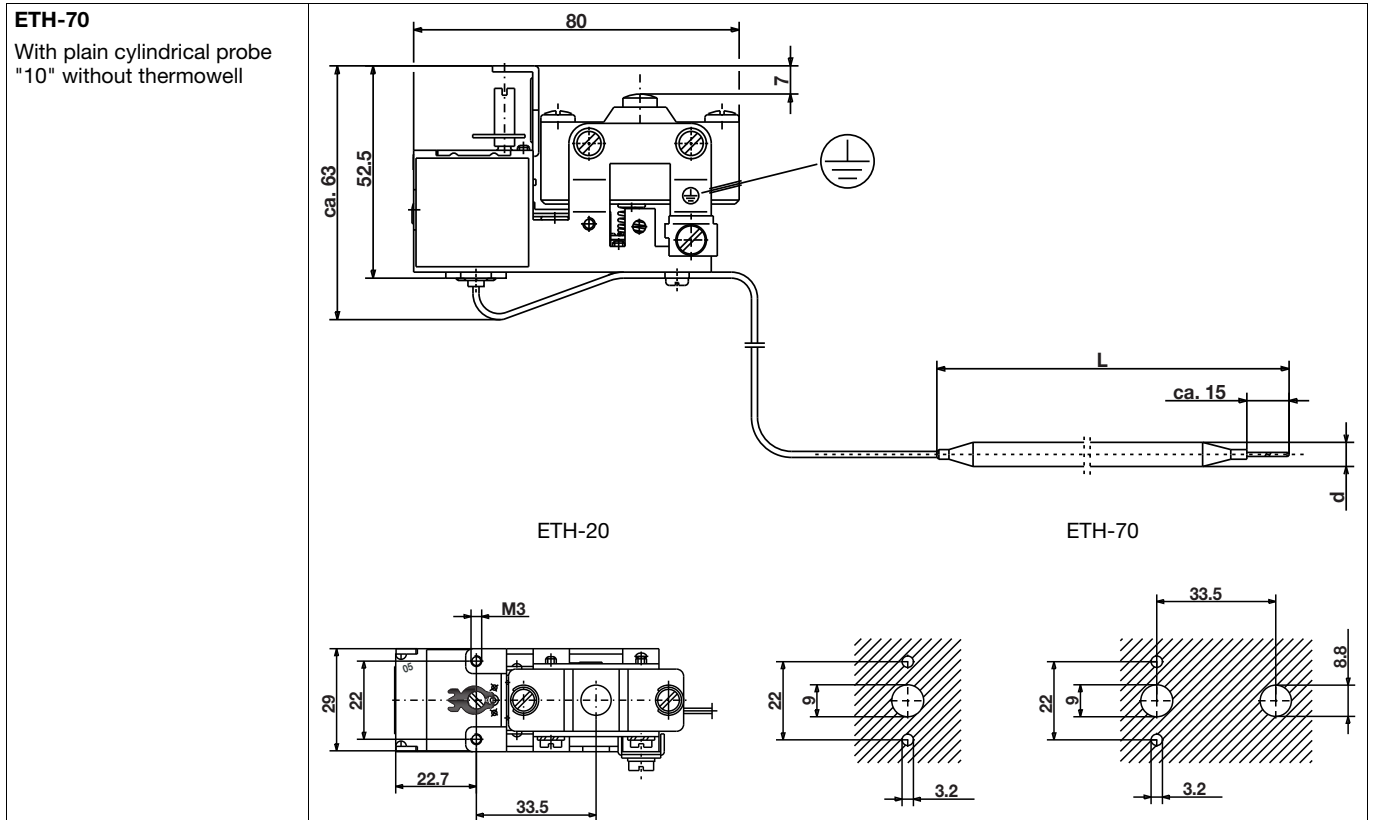
**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
 E-mail: mail@jumo.net  
 Internet: www.jumo.net

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
 Internet: www.jumousa.com



# Dimensions



**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
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## Order details

### Panel-mounted thermostats, ETH series

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

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

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 Delivery address: Mackenrodtstraße 14  
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## Panel-mounted thermostats, ETH series

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

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

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

00	Without thermowell
8	8 mm
10	10 mm

**(12) Diameter "d" (probe diameter)**

6	6 mm
8	8 mm

**(13) Extra codes<sup>a</sup>**

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

<sup>a</sup> List extra codes in sequence, separated by commas.

**Order code:**

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

**Order example:**

602010 / 70 - 052 - 00 - 1000 - 40 - 10 - 00 - 00 - 100 - 00 - 8 / 702<sup>a</sup> , ...

<sup>a</sup> List extra codes in sequence, separated by commas.



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# Panel-mounted Thermostats, EM Series

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

### Special features

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

### Brief description

Thermostats control and monitor thermal processes. The devices of the EM series are available as temperature controllers TR, temperature monitors TW, temperature limiters TB, safety temperature monitors STW (STB), and safety temperature limiters STB. In the event of a malfunction, the STB switches the monitored machine to a safe operating status.

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

### Switching function

#### Temperature controller TR and temperature monitor TW

If the temperature on the temperature probe exceeds the setpoint value, the microswitch is activated by the transmission mechanics and the electrical circuit is opened or closed. If the temperature falls below the selected setpoint (by the amount of the switching differential), the microswitch is reset to its initial position.

#### Restart lock for temperature limiter TB and safety temperature limiter STB

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

The microswitch can be manually unlocked once the temperature has dropped by approx. 10 % of the scale range (approx. 15 % with a limit value setting > +350 °C).

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

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

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

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

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

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



### Approvals/approval marks (see "Technical data")



DVGW

DGRL  
97/23/EG

c RA US

EAC

**JUMO GmbH & Co. KG**  
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 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
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 Fax: +49 661 6003-607  
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## Types and DIN registry numbers

Version	Types	Switching function	DIN register no.	Important note
1 pole snap-action switches	EM-1 EM-2 EM-3* EM-4* EM-5	TR TW TW TB TB	TR 777 TW 778 TW 778 TB 780 TB 780	DIN-tested up to max. +500 °C. The DIN registry no. will become null and void if thermowells are used that are not specified in our data sheet 606710  Type EM-50 DVGW registry no. CE-0085 AR 0124  *Setpoint value/ limit value permanently factory-set according to customer specifications
2 single-pole snap-action switches	EMF-13 EMF-23 EMF-33* EMF-14 EMF-24 EMF-44* EMF-54	TR/TW TW/TW TW/TW TR/TB TW/TB TB/TB TB/TB	TR 777 TW 778 TW 778 TR 777 TW 778 TB 780 TB 780	
3 single-pole snap-action switches  (without VDE approval)	EMF-133 EMF-134 EMF-233 EMF-234 EMF-333* EMF-444* EMF-544	TR/TW/TW TR/TW/TB TW/TW/TW TW/TW/TB TW/TW/TW TB/TB/TB TB/TB/TB	TR 777 TR 777 TW 778 TW 778 TW 778 TB 780 TB 780	
4 single-pole snap-action switches (without VDE approval)	EMF-1333 EMF-2333 EMF-3333*	TR/TW/TW/TW TW/TW/TW/TW TW/TW/TW/TW	TR 777 TW 778 TW 778	
Fail-safe version	EM-40* EM-50 EM-20 EM-30*	STB STB STW (STB) STW (STB)	STB 782 STB 782 STW (STB) 775 S STW (STB) 775 S	

## Technical data

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

Control range/ limit value range °C	Switching differential %	Max. probe temperature °C	Max. switching head temperature °C	Max. capillary length in mm	Max. sequence contact gap °C	Probe length "L" in mm, probe Ø "d" in mm, Ø "6" = Standard	
						Ø 6	Ø 8
<b>-20 to +40</b>	1	+50	+50	5000	5	245	145
	2.5	+50			8	245	145
	5	+95			25	138	91
	7	+100			50	103	73
<b>0 to 50</b>	1	+60	+60	3000 3000 5000 5000	5	283	165
	2.5	+60			10	283	165
	5	+105			25	159	101
	7	+110			50	117	80
<b>20 to 90</b>	1	+115	+80	1000 1000 5000 5000	7	210	127
	2.5	+115			14	210	127
	5	+140			35	121	82
	7	+175			70	91	67
<b>0 to 100</b>	1	+125	+80	2000 2000 5000 5000	10	157	100
	2.5	+125			20	157	100
	5	+165			50	94	68
	7	+200			100	73	58
<b>30 to 110</b>	1	+135	+80	2000 2000 5000 5000	8	188	116
	2.5	+135			16	188	116
	5	+170			40	110	76
	7	+200			80	84	63
<b>0 to 150</b>	1	+173	+80	1000	15	113	78
	2.5	+173			30	113	78
	5	+200			75	72	57
<b>0 to 200</b>	1	+230	+80	1000	20	113	78
	2.5	+230			40		
<b>50 to 200</b>	1	+230	+80	1000	15	139	92
	2.5	+230			30		
<b>50 to 250</b>	1	+288	+80	1000 1000 5000	20	105	70
	2.5	+288			40	105	70
	5	+300			100	64	49
<b>50 to 300</b>	1	+345	+80	2000	25	87	61
	2.5	+345			50		



**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
 E-mail: mail@jumo.net  
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 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
 Internet: www.jumousa.com



## Technical data

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

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

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

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

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

Setting range °C	Scale range °C	Max. probe temperature °C	Max. switching head temperature °C	Max. capillary length in mm	Limit value tolerance °C	Probe length "L" in mm, probe Ø "d" in mm, Ø "6" = Standard	
						Ø 6	Ø 8
300 to 400	70	+460	+80	3000	+0 -23	148	92
350 to 500	72	+575			+0 -29	127	81

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

### Capillary and temperature probes

Type	Scale limit value	Capillary	Temperature probe	Notes
EM- . . .	Up to 200 °C	Copper (Cu) Ø 1.5 mm Material no. Cu-DHP	Copper (Cu) Material no. Cu-DHP Hard soldered	–
	Up to 350 °C	Copper (Cu) Ø 1.5 mm Material no. Cu-DHP	Stainless steel (CrNi) Material no. 1.4571 Hard soldered	–
	Up to 500 °C	Stainless steel (CrNi) Ø 1.5 mm	Stainless steel (CrNi) Material no. 1.4571 Welded	–
	Up to 350 °C	Stainless steel (CrNi) Ø 1.5 mm	Stainless steel (CrNi) Material no. 1.4571 Welded	Available at extra cost
Capillary length	Standard: 1000 mm, max. 5000 mm			
Min. bending radius of capillary	5 mm			

#### Note:

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

**JUMO GmbH & Co. KG**

Delivery address: Mackenrodtstraße 14  
36039 Fulda, Germany  
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**Electrical data**

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

**Operating data**

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

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
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**Operating data**

Switching point accuracy in % of control range/limit value range	Switching function	Switching differential		In the upper third of the scale or limit value						
		Liquid-filled	Gas-filled							
	TR	1 %, 2.5 % 5 % 7 %	- 3 %, 5 % 6 %, 10 %	±1.5 % ±3 % ±4 %						
	TW	1 %, 2.5 % 5 % 7 %	- 3 %, 5 % 6 %, 10 %	±1.5 % ±3 % ±4 %						
	TB	-	-	+0 % -5 %						
	STB, STW (STB)	See table for control ranges and probes on page 3								
Mid ambient temperature influence	Deviation of the ambient temperature at the switching head and/or capillary from the 22 °C calibration ambient temperature produces a switching point offset. Higher ambient temperatures = lower switching point Lower ambient temperature = higher switching point									
	For temperatures with scale limit value/limit value									
	< 200 °C		≥ 200 °C ≤ 350 °C		≥ 400 °C ≤ 500 °C					
	TR, TW, TB	STW, STB	TR, TW, TB	STW, STB	TR, TW, TB, STW, STB					
	Switching differential in %									
	1/2.5	5	7	7/-	1/2.5	5	7/-	3/5	6	10
	Ambient temperature influence on the switching head in %/°C									
	0.15	0.26	0.34	0.43	0.12	0.21	0.35	0.12	0.17	0.24
Ambient temperature influence on the capillary in %/m										
0.05 × °C × m	0.09 × °C × m	0.04 × °C × m	0.07 × °C × m	0.05 × °C × m						
Temperature compensation* (TK)	* For detailed information see diagram on page 9									
Temperatures	Allowable storage temperature: -50 to +50 °C		Allowable ambient temperature for use: Max. 80 °C							
Nominal position (NL)	Any									

**Casing**

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

**Process connection\***

EM series with capillary	Plain cylindrical probe "10" (standard)	
	Screw-in thermowell "20" (upon request) Screw-in sleeve with screw-in spigot G 1/2 form A as per DIN 3852/2 and clamping piece with fixing screw for securing the probe	
Material	Thermowell	Up to 150 °C CuZn as standard Above 150 °C CrNi
Insertion length S	Standard lengths: 100, 120, 150, 200, or 300 mm (different lengths upon request)	
Immersion tube Ø	D = 8 mm, D = 10 mm	

\* See data sheet 606710 for additional process connections and thermowells

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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
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**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
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**Connection diagrams**

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

**JUMO GmbH & Co. KG**

Delivery address: Mackenrodtstraße 14  
36039 Fulda, Germany  
Postal address: 36035 Fulda, Germany  
Phone: +49 661 6003-0  
Fax: +49 661 6003-607  
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Internet: www.jumo.net

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JUMO House  
Temple Bank, Riverway  
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1-800-554-5866  
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## Approvals/approval marks

Approval marks	Inspection authority	Certificates/ inspection number	Inspection basis	Valid for
DIN	DIN CERTCO/TÜV Süd	TR777	DIN EN 14597	EM.-1
DIN	DIN CERTCO/TÜV Süd	TW778	DIN EN 14597	EM.-2, EM.-3
DIN	DIN CERTCO/TÜV Süd	TB780	DIN EN 14597	EM-4, EM-5
DIN	DIN CERTCO/TÜV Süd	STW(STB)775 S	DIN EN 14597	EM-20, EM-30
DIN	DIN CERTCO/TÜV Süd	STB782	DIN EN 14597	EM-40, EM-50
DIN	TÜV Süd	B <sub>10d</sub> = 250.000 <sup>a</sup>	DIN EN ISO 13849-1	EM-20, EM-30, EM-40, EM-50
DVGW	DVGW/TÜV Rheinland	CE-0085AR0124	90/396/EWG	EM-50
DGRL	TÜV Süd	IS-TAF-MUC 08 05 73377 020	97/23/EG	EM-20, EM-30, EM-40, EM-50
CSA	KEMA/Holland	1701699; C481302	CSA standard, C 22.2	EM-1, EM-2, EM-4, EM-50
c CSA us	KEMA/Holland	C3337-01; C3337-81	Gas directive	EM-1, EM-2, EM-3, EM-4, EM-40, EM-50
UL	UL	E66358	UL 873, CSA-22.2 No. 24	EM-...
UL	UL	MH45736	UL 353, CSA-22.2 No. 24	EM-4, EM-5, EM-40, EM-50, EM-80, EM-14, EM-24, EM-44, EM-54, EM-134, EM-234, EM-444, EM-544, EM-1334, EM-2334, EM-4444, EM-5444
EAC <sup>b</sup>	Gost Norm AG	TC RU C-DE.AB98.B.00348	Technical rules of the cus- toms union Russia/ Belarus/Kazakhstan	EM-...

<sup>a</sup> For detailed information please refer to safety manual JUMO EM: 602021, 602026.

<sup>b</sup> Russian documentation upon request.

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
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## Dimensions

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

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

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

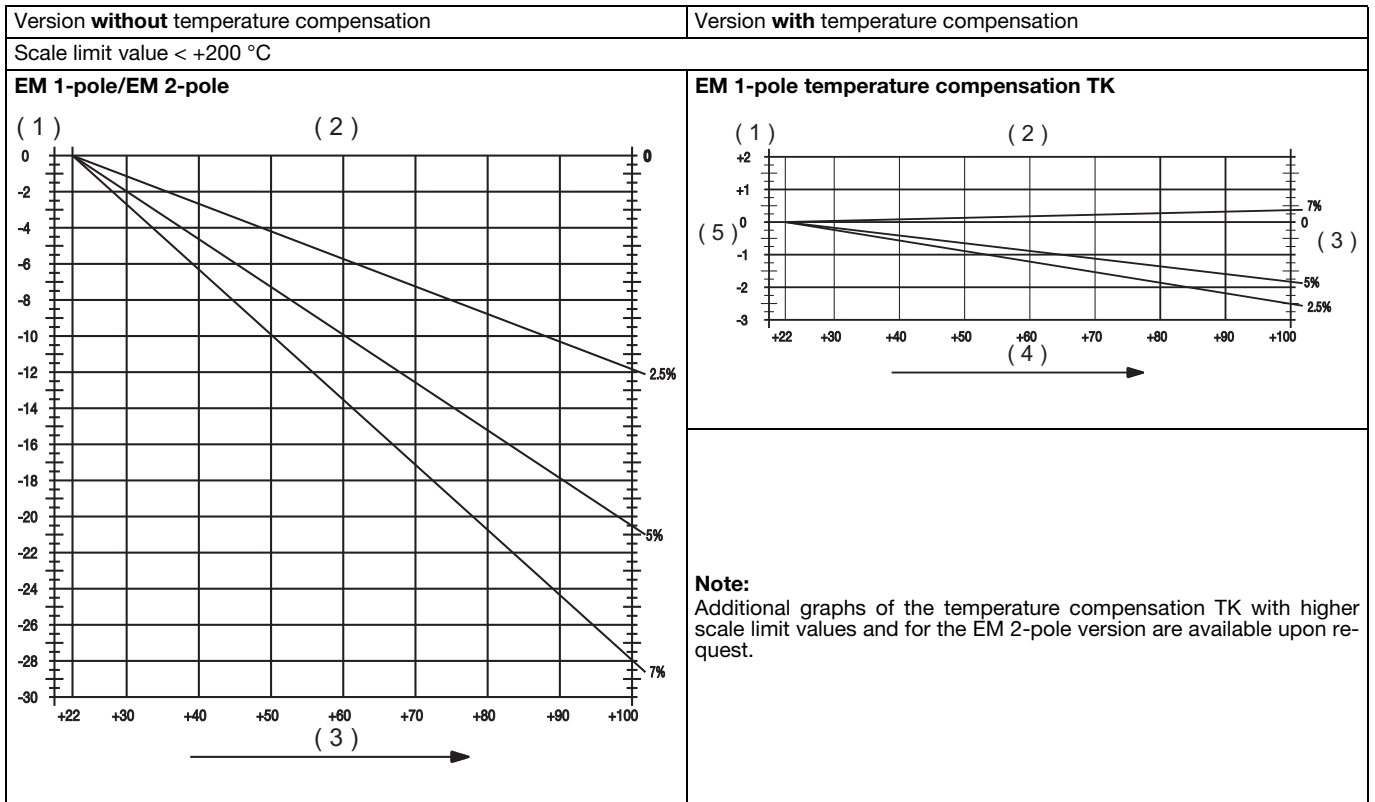
**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**  
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## Temperature compensation (TK)

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



(1) % of the control range

(2) **Without temperature compensation**

(3) Ambient temperature [°C]

(1) % of the control range scope

(2) **With temperature compensation**

(3) Switching differential

(4) Ambient temperature [°C]

(5) Switching point deviation

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

**Note:**

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

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

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



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 1-800-554-5866  
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## Stock items

(Delivery within 3 working days after receipt of order)

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

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**Order details:****Panel-mounted thermostats, EM series****Order code (1) Basic type**

602021 EM panel-mounted thermostat with microswitch, with capillary

**(2) Basic type extensions**

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

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

**(3) Control ranges/limit value ranges****For TR, TW, and TB**

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

**Adjustable for STB and STW (STB)**

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

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 Delivery address: Mackenrodtstraße 14  
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## Order details:

### Panel-mounted thermostats, EM series

#### Order code (4) Limit value with fixed settings

000 For adjustable control range/limit value range  
 ... Specification in °C (must be only within the control ranges/limit value ranges)

#### (5) Switching differential

00	Without switching differential (-40 STB, -50 STB)	
10	1 %* of the scale range	
25	2.5 %* of the scale range	
50	5 %** of the scale range	with liquid-filled measuring systems
70	7 %** of the scale range	
30	3 %* of the scale range	
50	5 %** of the scale range	
60	6 %* of the scale range	with gas-filled measuring systems
01	10 %* of the scale range	

\* Only with TR + TW  
 \*\* Only with TR, TW, and STW



#### (6) Capillary length

1000	1000 mm
2000	2000 mm
3000	3000 mm
4000	4000 mm
5000	5000 mm
....	Special length, specification in mm (for the max. allowable length see "Technical data")

#### (7) Capillary material

40	Cu (Copper)
20	CrNi (stainless steel)

#### (8) Process connection\*

10	Plain cylindrical probe	
20	Screw-in thermowell	

\* For different types of connections and thermowells refer to data sheet 606710

#### (9) Thread of process connection

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

#### (10) Material of process connection

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

#### (11) Insertion length "S" (immersion tube length)

000	Without thermowell
100	100 mm
150	150 mm
200	200 mm
300	300 mm
400	400 mm
....	Special length, specification in mm (max. 500 mm)

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## Order details:

### Panel-mounted thermostats, EM series

**Order code (12) Diameter "D" (immersion tube diameter)**

00	Without thermowells
8	8 mm
10	10 mm

**(13) Diameter "d" (probe diameter)**

6	6 mm
8	8 mm

**(14) Extra codes\***

000	Without extra codes
574	U Microswitch with N/C contact, restart lock, and additional signal contact (only for TB and STB)
702	au Snap-action switch contact, gold plated (only with 1-pole and 2-pole version)
699	X Screw connection up to 2.5 mm <sup>2</sup> conductor cross section
704	b1 Switching head mounting with 2 M4 screws, spaced 28 mm
705	b2 Switching head mounting with 2 M3 screws, spaced 33 mm
710	b7 Central mounting with acorn nut (only for TB and STB)
707	TK Temperature compensation (only with 1-pole and 2-pole version)

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

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

**Order code**

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

**Order example**

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

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

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 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
 Internet: www.jumousa.com



# Panel-mounting thermostats, type series EM

## Particularities

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



## Brief description

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

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

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

## Approvals/approval marks (see "Technical data")



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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
 Internet: www.jumousa.com



**Technical Data**

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

**Capillary and temperature probe**

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

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

**Electrical data**

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

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
 E-mail: mail@jumo.net  
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 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
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 Fax: +44 1279 635262  
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 East Syracuse, NY 13057, USA  
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 1-800-554-5866  
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**Operating data**

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

**Case**

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

**Approvals/approval marks**

Approval marks	Inspection authority	Certificates/ inspection number	Inspection basis	Valid for
EAC <sup>a</sup>	Gost Norm AG	TC RU C-DE.AB98.B.00348	Technical rules of the customs union Russia/ Belarus/Kazakhstan	EM-...

<sup>a</sup> Russian documentation upon request





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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
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 6733 Myers Road  
 East Syracuse, NY 13057, USA  
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 1-800-554-5866  
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## Stock versions

(Delivery within 3 working days after receipt of order)

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

## Order details

### EM type series:

#### Order code (1) Basic type

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

#### (2) Basic type extensions

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

#### (3) Control / limit value ranges

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

#### (4) Capillary length (specifications in mm)

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

#### (5) Process connection \*

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

#### (6) Diameter "d" (probe diameter)

8 8 mm

#### (7) Extra codes <sup>1</sup>

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

### Order code

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

### Order example

602025 / 0050 - 097 - 1000 - 10 - 8 / 710<sup>1</sup>

<sup>1</sup> List extra codes in sequence, separated by commas.



**JUMO GmbH & Co. KG**

Delivery address: Mackenrodtstraße 14  
36039 Fulda, Germany  
Postal address: 36035 Fulda, Germany  
Phone: +49 661 6003-0  
Fax: +49 661 6003-607  
E-mail: mail@jumo.net  
Internet: www.jumo.net

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Temple Bank, Riverway  
Harlow, Essex CM20 2DY, UK  
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# Panel-Mounted Thermostat

## EM Series

### Special features

- Safety temperature monitor STW (STB)
- Safety temperature limiter STB
- Tested according to DIN EN 14597 and the Pressure Equipment Directive 97/23/EC

### Brief description

Panel-mounted thermostats are used to monitor thermal processes. The devices are available as a safety temperature monitor STW (STB) and a safety temperature limiter STB. In the event of a malfunction, the STB switches the monitored machine to a safe operating status.

Panel-mounted thermostats operate according to the fluid expansion principle — a microswitch is used as the electrical switching element.



### Switching function

#### Safety temperature monitor STW (STB)

If the temperature on the temperature probe exceeds the setpoint value, the microswitch is activated by the transmission mechanics and the electrical circuit is opened or closed. If the temperature falls below the selected setpoint (by the amount of the switching differential), the microswitch is reset to its initial position.

#### Restart lock of the safety temperature limiter STB

If the temperature on the temperature probe exceeds the set limit value, the electrical circuit is opened and the microswitch is mechanically locked. The microswitch can be manually unlocked once the temperature has dropped by approx. 10 °C.

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

If the measuring system is destroyed (i.e. if the expansion fluid leaks), the pressure in the diaphragm of the STB drops and permanently opens the electrical circuit. Unlocking is then no longer possible. The electrical circuit 1-2 opens when cooling the probe of STW (STB) and STB down to the negative temperature range, but it then closes again if the temperature rises. The STB must be unlocked manually if the minimum probe temperature is exceeded.

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

The activation lock required by DIN EN 14597 must be warranted by the following circuit diagram. The circuit diagram must comply with DIN EN 50156.

### Approvals/approval marks (see "Technical Data")



**DGRL**  
97/23/EG

**DVGW** c **RA** US



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

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 JUMO House  
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 Harlow, Essex CM20 2DY, UK  
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## Technical data

### General information

#### Limit value range, limit value range setting, and temperature probe

Type	Limit value range Limit value setting °C	Max. allowable probe temperature °C	Limit value tolerance °C	Probe length, dimension "L" for probe Ø "d" = 6 mm mm
EM-20-E	+40 to +110	+135	+0/-9	72
	+100 to +150	+173	+0/-8	85
	+110 to +170	+195	+0/-9	72
	+180 to +250	+288	+0/-13	60
	+230 to +300	+345	+0/-14	60
	Limit value setting done prior to mounting with a screwdriver at the limit value knob			
EM-30-E	Optional limit value +20 to +300 Permanently factory-set	Limit value +15 %		
EM-80	Optional limit value +60 to +180 Permanently factory-set	Limit value +15 %	+0/-5	84

#### Capillary and temperature probe

Type	Scale limit value	Capillary	Temperature probe	Notes
EM- . .	Up to 200 °C	Copper (Cu) ø 1.5 mm Material no. Cu-DHP	Copper (Cu) Material No. Cu-DHP Hard soldered	--
	Up to 300 °C	Copper (Cu) ø 1.5 mm Material no. Cu-DHP	Stainless steel (CrNi) Material No. 1.4571 Hard soldered	--
	Up to 300 °C	Stainless steel (CrNi) ø 1.5 mm	Stainless steel (CrNi) Material no. 1.4571 welded	Available at extra cost
Capillary length	Standard: 1000 mm, max. 5000 mm			
Min. bending radius of the capillary	5 mm			

### Electrical data

Switching element: Single-pole snap-action switch	Type EM-20-E Type EM-30-E	Type EM-80 Standard	Type EM-80 with extra code "574"
	Microswitch with changeover contact	Microswitch with N/C contact and restart lock	Microswitch with N/C contact, restart lock, and additional signal contact
Max. switching capacity	Type	N/C contact, terminal 2	N/O contact, terminal 4
	EM-20-E EM-30-E EM-80/U	AC 230 V +10 %, 10 (2) A, cos φ = 1 (0.6) DC 230 V +10 %, 0.25A	AC 230 V +10 %, 2 (0.4) A, cos φ = 1 (0.6) DC 230 V +10 %, 0.25A
	EM-80		--
	Extra code "574"	Microswitch with gold plating, AC / DC 24 V, 0.1 A	
Contact reliability	To ensure a high switching reliability, we recommend a minimum load of: For silver contacts: AC / DC = 24 V, 20 mA		
	For gold-plated contacts (extra code "702"): AC / DC = 5 V, 5 mA		
Rating surge voltage	1500 V (via the switching contacts 400 V)		
Overtoltage category	II		
Required fuse rating	See max. switching capacity		

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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

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 East Syracuse, NY 13057, USA  
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Electrical connection	Standard	Tab connector A 6.3 x 0.8 DIN 46244	
	Extra code 699	Screw connection up to 2.5 mm <sup>2</sup> conductor cross section (available at extra cost) – also suitable for retrofitting –	
Switching differential in % from the limit value range	Switching function	Rated value	Possible actual value
	STW (STB)	7	7-8

Mid ambient temperature influence	(In % from the scale range) referring to the limit value. Deviation of the ambient temperature at the switching head and/or capillary from the +22 °C calibration ambient temperature produces a switching head offset. Higher ambient temperature = lower switching point Lower ambient temperature = higher switching point		
	For temperatures with scale limit value / limit value		
STW (STB)	< +200 °C	≥ +200 °C ≤ +350 °C	
	Switching differential in %		
	7	7	
	Ambient temperature influence on the switching head in %/°C		
0.43	0.35		
Ambient temperature influence on the capillary in %/m			
0.09 · °C · m	0.07 · °C · m		
STB	Ambient temperature influence on the switching head: 0.35 °C/°C		
	Ambient temperature influence on the capillary in °C/m 0.07 °C/°C·m		

Temperature compensation	Extra code "707" For detailed information please refer to the graphical diagram on page 5.
Allowable storage temperature	-50 to +50 °C
Allowable ambient temperature when in use on the switching head and capillary	See nameplate
Rated position (NL)	Any

**Switching head**

Case material	Sheet steel, galvanized
Mounting	Extra code 704 with 2 M4 screws, spaced 28 mm Extra code 705 with 2 M3 screws, spaced 33 mm Extra code 706 with 2 M3 screws, spaced 22 mm (standard for EM-20-E and EM-30-E) Extra code 710, central mounting M10 x 1 with acorn nut (only for STB, standard for EM-80)
Protection type	EN 60 529-IP 00
Weight	Approx. 0.3 kg

**Process connection<sup>a</sup>**

EM series with capillary	Plain cylindrical probe "10" (standard)	
	Screw-in protection tube "20" (upon request)	
	Screw-in sleeve with screw-in spigot G 1/2 form A according to DIN 3852/2 and clamping piece with fixing screw for securing the probe	
Material	Protection tube	Up to +150 °C CuZn as a standard Over +150 °C CrNi
Insertion length S	Standard lengths: 100, 120, 150, 200, or 300 mm (different lengths upon request)	
Immersion tube Ø	D = 8 mm	

<sup>a</sup> For different process connections and thermowells refer to data sheet 606710.

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
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 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
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 Internet: www.jumousa.com



## Approvals / approval marks

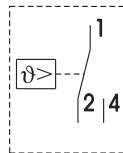
Approval marks	Testing agency	Certificates / certification number	Inspection basics	Valid for
DIN	DIN CERTCO / TÜV Süd	STB 782	DIN EN 14597	EM-80
		STW (STB) 775 S		EM-20-E, EM-30-E
DIN	TÜV Süd	B <sub>10d</sub> = 250.000 <sup>a</sup>	DIN EN ISO 13849-1	EM-20-E, EM-30-E, EM-80
DGRL	TÜV Süd	IS-TAF-MUC 08 05 73377 020	97/23/EG	EM-20-E, EM-30-E, EM-80
DVGW	DVGW / TÜV	CE-0085AR0124	90/396/EWG	EM-20-E, EM-30-E, EM-80
UL	UL	E66358	UL 873, CSA-C22.2 No. 24	EM-80
		MH45736	UL 353, CSA-C22.2 No. 24	EM-80
EAC <sup>b</sup>	Gost Norm AG	TC RU C-DE.AB98.B.00348	Technical rules of the customs union Russia/Belarus/Kazakhstan	EM-...

<sup>a</sup> For further details see: Safety manual JUMO EM 602021, 602026.

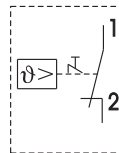
<sup>b</sup> Russian documentation upon request.

## Connection diagrams

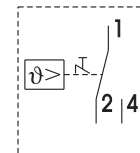
EM-20-E  
EM-30-E



EM-80



EM-80/U



**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
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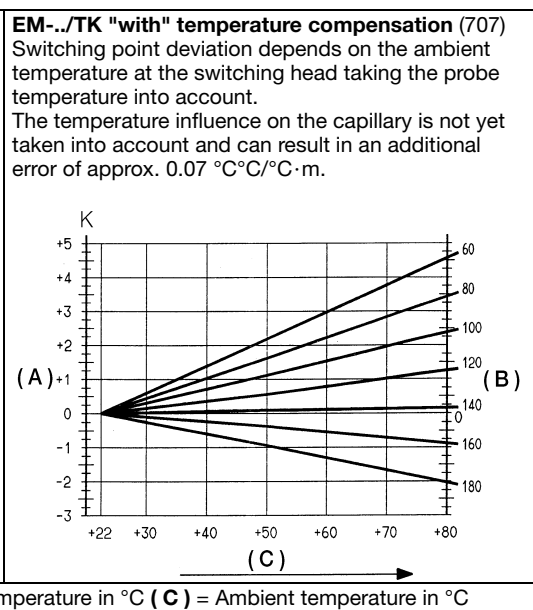
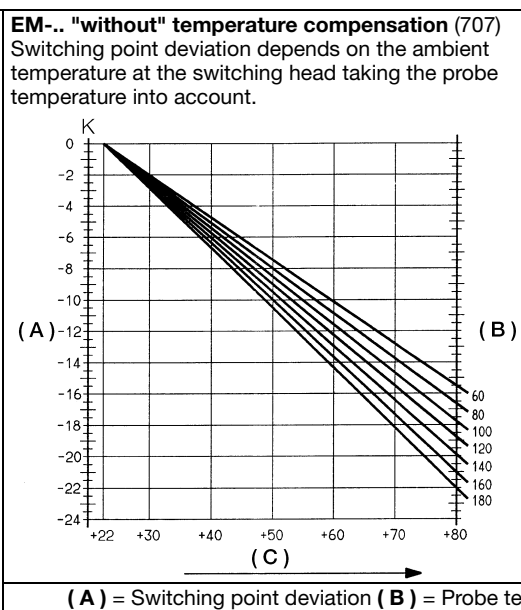
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## Dimensions

<p><b>EM-80</b> with central mounting (standard)</p>		<p>(1) + (2) = standard: Tab connector A 6.3 x 0.8 mm (DIN 46244)        (4) = only for extra code /574: Tab connector A 6.3 x 0.8 mm (DIN 46244)</p>												
<p><b>EM-20-E</b> <b>EM-30-E</b> <b>EM-80</b> with fixing brackets</p>		<table border="1"> <thead> <tr> <th>Abbreviation</th> <th>B</th> <th>G</th> </tr> </thead> <tbody> <tr> <td>704</td> <td>28</td> <td>M4</td> </tr> <tr> <td>705</td> <td>33</td> <td>M3</td> </tr> <tr> <td>706</td> <td>22</td> <td>M3</td> </tr> </tbody> </table>	Abbreviation	B	G	704	28	M4	705	33	M3	706	22	M3
Abbreviation	B	G												
704	28	M4												
705	33	M3												
706	22	M3												

**Temperature compensation (TK) (707)**  
 If changes occur to the switching head temperature in relation to the calibration ambient temperature (= 22 °C), a switching point deviation occurs. For highly fluctuating ambient temperatures, we recommend the use of thermostats with temperature compensation (extra code 707)



**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
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## Stock versions

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

(Delivery within 3 working days after receipt of order)

## Order details

### EM series as STW (STB) and STB

- Order code** (1) **Basic type**  
 602026 Panel-mounted thermostat, EM series
- (2) **Basic type extensions**  
 20 EM-20-E Safety temperature monitor (STW), limit value adjustable<sup>a</sup>  
 30 EM-30-E Safety temperature monitor (STW), limit value permanently set  
 80 EM-80 Safety temperature limiter (STB), limit value permanently set
- (3) **Limit value ranges for EM-20-E STW (STB)**  
 000 For permanently set limit value (EM-30-E and EM-80)  
 055 +40 to +110 °C  
 506 +100 to +150 °C  
 508 +110 to +170 °C  
 575 +180 to +250 °C  
 606 +230 to +300 °C
- (4) **Permanently set limit values for EM-30-E and EM-80**  
 000 For adjustable limit value range  
 ... Specified in °C
- (5) **Capillary length**  
 1000 1000 mm  
 2000 2000 mm  
 3000 3000 mm  
 4000 4000 mm  
 5000 5000 mm  
 .... (Special length, specified in mm, min. 500 mm, max. 5000 mm)
- (6) **Capillary material**  
 40 Cu (Copper)  
 20 CrNi (Stainless steel)
- (7) **Process connection**  
 10 Plain cylindrical probe   
 20 Screw-in protection tube 
- (8) **Thread of process connection**  
 00 Without thread (process connection "10")  
 13 External thread G 1/2



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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
 Internet: www.jumousa.com



**(9) Material of process connection**

- 00 Only with process connection "10"
- 46 CuZn (Brass)
- 20 CrNi (Stainless steel 1.4571)

**(10) Fitting length "S" (immersion tube length)**

- 000 Without protection tube
- 100 100 mm
- 120 120 mm
- 150 150 mm
- 200 200 mm
- 300 300 mm
- ... (Special length, specification in mm)

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

- 00 Without protection tube
- 8 8 mm

**(12) Diameter "d" (probe diameter)**

- 00 Without protection tube
- 6 6 mm

**(13) Extra codes**

- 000 Without extra codes
- 574 Microswitch with N/C contact, restart lock, and additional signal contact (only STB)
- 702 Snap-action switch with gold plating (cannot be combined with extra code "574")
- 699 Screw-connection with 2.5 mm<sup>2</sup> conductor cross section
- 704 Switching head mounting with 2 M4 screws, spaced 28 mm
- 705 Switching head mounting with 2 M3 screws, spaced 33 mm
- 706 Switching head mounting with 2 M3 screws, spaced 22 mm
- 710 Central mounting with acorn nut (only for STB)
- 707 Temperature compensation

<sup>a</sup> Other control ranges / limit value ranges upon request

**Order code**    (1)    (2)    (3)    (4)    (5)    (6)    (7)    (8)    (9)    (10)    (11)    (12)    (13)  
 602026 /  -  -  -  -  -  -  -  -  -  -  -  -  /  , ...  
**Order example**    602026 / 80 - 000 - 120 - 2000 - 40 - 10 - 00 - 00 - 000 - 00 - 00 / 000<sup>a</sup> , ...

<sup>a</sup> State extra codes one after another, separated by commas



**JUMO GmbH & Co. KG**  
Delivery address: Mackenrodtstraße 14  
36039 Fulda, Germany  
Postal address: 36035 Fulda, Germany  
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Fax: +49 661 6003-607  
Email: mail@jumo.net  
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JUMO House  
Temple Bank, Riverway  
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## Panel-Mounted Thermostats

### JUMO heatTHERM, Type 602030 and 602031

#### Special features

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

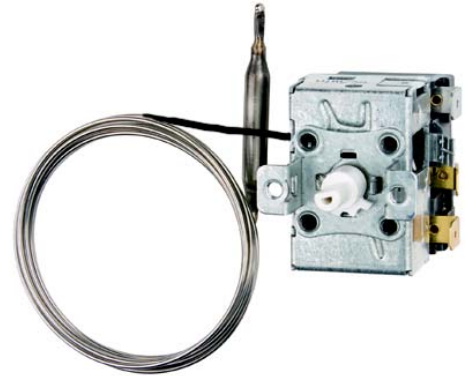
#### Brief description

Thermostats control and monitor thermal processes.

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

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

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



Type 602030 / 01



Type 602030 / 02



Type 602030 / 20  
Type 602031 / 21



Type 602030 / 80  
Type 602031 / 81

#### Approvals / approval marks



**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
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 JUMO House  
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 Harlow, Essex CM20 2DY, UK  
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## Technical data

### Switching function

<b>Temperature controller TR / temperature monitor TW</b>	If the temperature on the temperature probe exceeds the setpoint value, the microswitch is activated by the transmission mechanics and the electrical circuit is opened or closed. If the temperature falls below the selected setpoint value (by the amount of the switching differential), the microswitch is reset to its initial position.
<b>Safety temperature monitor STW (STB)</b>	If the temperature on the temperature probe exceeds the setpoint value, the snap-action switch is activated and the electrical circuit is opened or closed. If the temperature falls below the selected setpoint value (by the amount of the switching differential), the snap-action switch is reset to its initial position.  The electrical circuit 1-2 opens when the probe of STW (STB) and STB cools down to the negative temperature range, but it closes again automatically if the temperature rises.  If the measuring system is destroyed (i.e. if the expansion fluid emerges) the pressure in the diaphragm drops and permanently opens the electrical circuit.
<b>Safety temperature limiter STB with restart lock and self-monitoring</b>	If the temperature on the temperature probe exceeds the switching point, the snap-action switch is activated, the electrical circuit is opened, and the snap-action switch is mechanically locked.  The unlocking difference depends on the control range. Precise values can be attained from the respective device type. They are also available upon request.  The electrical circuit 1-2 opens when the probe of STW (STB) and STB cools down to the negative temperature range, but it closes again automatically if the temperature rises.  If the measuring system is destroyed (i.e. if the expansion fluid emerges) the pressure in the diaphragm drops and permanently opens the electrical circuit. Unlocking is no longer possible.

### Temperature compensation

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

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
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## Technical data

### Case

<b>Case</b>	Sheet steel, galvanized
<b>Protection type</b>	IP 00 according to EN 60529
<b>Switching socket</b>	Polyester resin molding compound, black
<b>Max. permissible ambient temperature</b>	For transport and storage: -50 to +50 °C In use: see nameplate
<b>Rated position (NL)</b>	Any
<b>Weight</b>	Approx. 0.12 kg
<b>Capillary</b>	2,000 mm including 460 mm protective tubing as standard, min. bending radius of the capillary 5 mm Material no. Cu-DHP

### Electrical data

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

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

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 1-800-554-5866  
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**Approvals/approval marks**

Approval marks	Testing agency	Certificates / certification number	Inspection basis	Valid for
DIN	DIN CERTCO / TÜV Süd	STB1169	DIN EN 14597	JUMO heatTHERM (STB)
DIN	DIN CERTCO / TÜV Süd	STW(STB)1190	DIN EN 14597	JUMO heatTHERM (STW(STB))
DIN	DIN CERTCO / TÜV Süd (German Technical Inspection Agency)	TR1168	DIN EN 14597	JUMO heatTHERM (TR)
DIN	DIN CERTCO / TÜV Süd (German Technical Inspection Agency)	TW1189	DIN EN 14597	JUMO heatTHERM (TW)
DIN	TÜV Süd (German Technical Inspection Agency)	B <sub>10d</sub> = 250,000 <sup>a</sup>	DIN EN ISO 13849-1	JUMO heatTHERM
c UL us	UL Germany	E66358 Vol. 1	UL 873	JUMO heatTHERM with switching capacity 230 V, 16 A
c UL us	UL Germany	MH45736 Vol. 1	UL 353	JUMO heatTHERM (STB) with switching capacity 230 V, 16 A
DGRL	TÜV Süd (German Technical Inspection Agency)	IS-TAF-MUC 07113377017	97/23/EC	JUMO heatTHERM (STW(STB)/STB)
EAC <sup>b</sup>	Gost Norm AG	TC RU C-DE.AB98.B.00348	Technical rules of the customs union Russia/ Belarus/Kazakhstan	JUMO heatTHERM

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

<sup>b</sup> Russian documentation upon request.

**Wiring diagrams**

<p>Type 602030</p>	<p>Type 602030/01</p>	<p>Type 602030/02</p>
<p>Type 602031</p>	<p>Type 602031/20 and 602031/21</p>	<p>Type 602031/80 and 602031/81</p>

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
 Email: mail@jumo.net  
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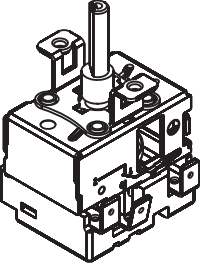
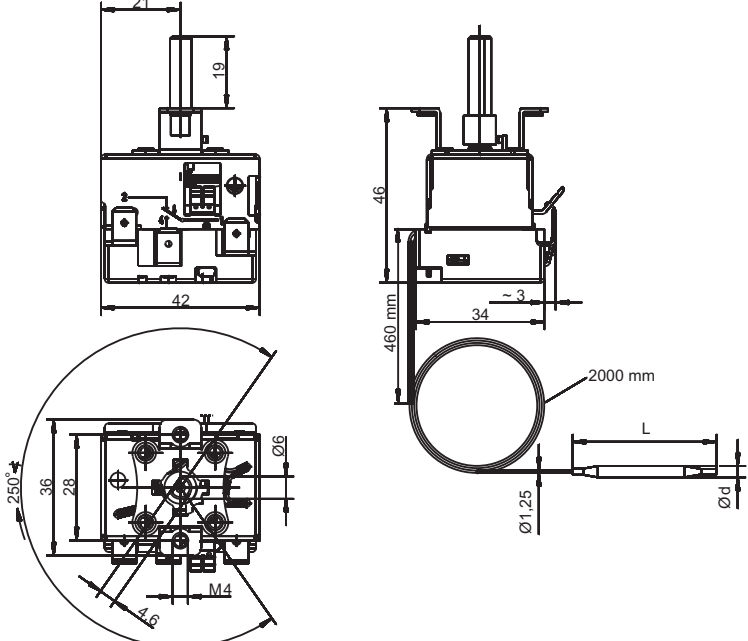
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 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
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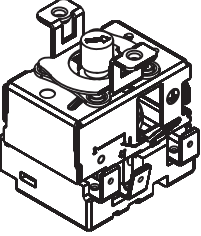
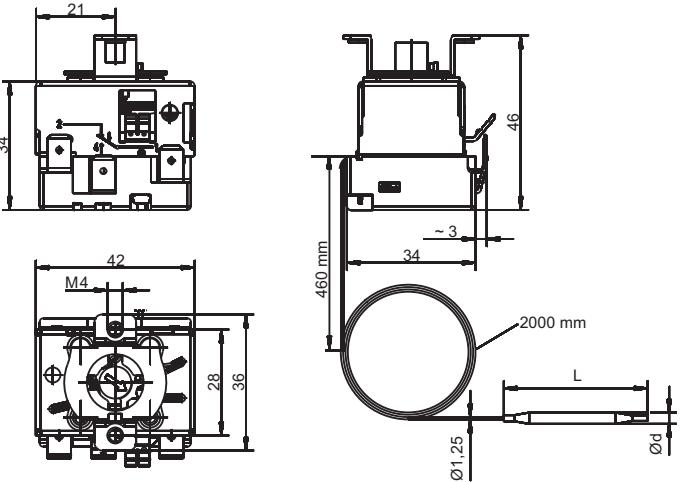
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 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
 Email: info.us@jumo.net  
 Internet: www.jumousa.com



## Devices in stock

### Dimensions

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

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

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 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
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 Fax: +49 661 6003-607  
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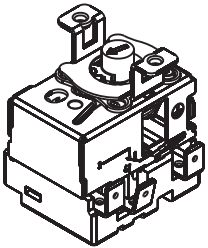
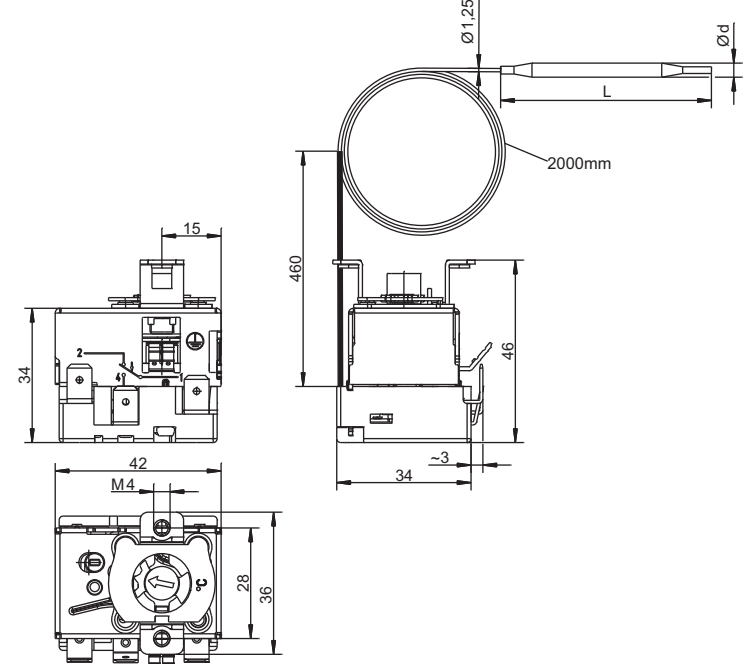
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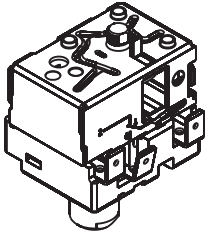
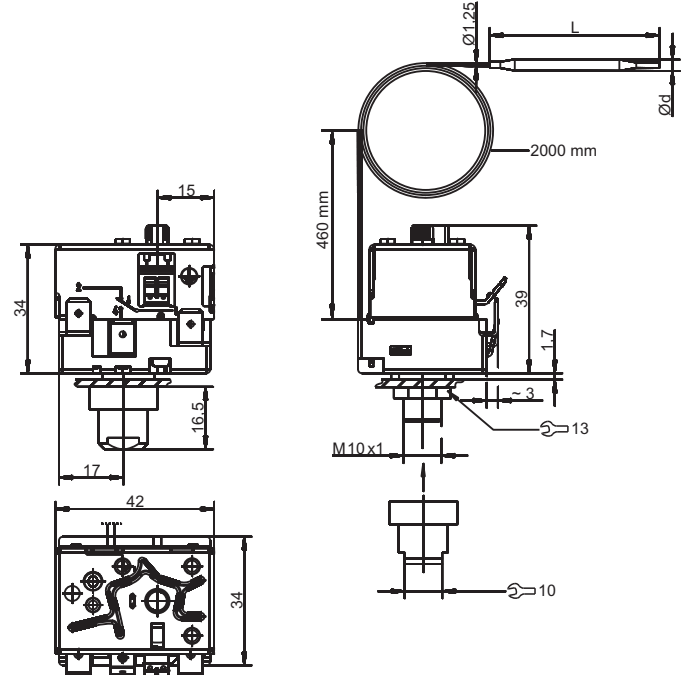
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 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
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## Devices in stock

### Dimensions

<p><b>Type 602031/21</b></p> <ul style="list-style-type: none"> <li>• Safety temperature monitor</li> <li>• Compensated ambient temperature (standard)</li> <li>• Max. switching capacity 16 A, 400 V</li> </ul> 					
<p><b>Part no.</b> 60003226</p>	<p><b>Type</b> 602031/21</p>	<p><b>Control range °C</b> +70 to 130</p>	<p><b>Capillary mm</b> 2,000</p>	<p><b>Switching differential</b> Approx. 10 K</p>	<p><b>Probe Ø d × L</b> 6 x 68 mm</p>

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



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 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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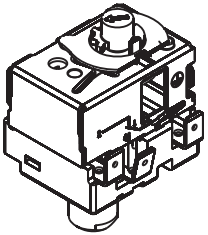
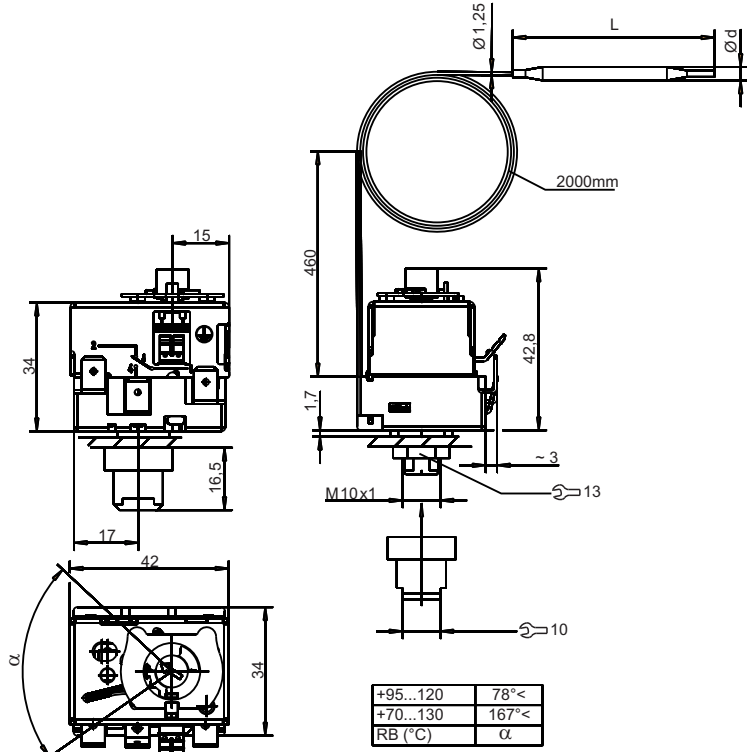
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 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
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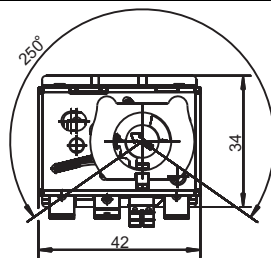
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 East Syracuse, NY 13057, USA  
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 1-800-554-5866  
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## Devices in stock

### Dimensions

<p><b>Type 602031/81</b></p> <ul style="list-style-type: none"> <li>• Safety temperature limiter</li> <li>• Compensated ambient temperature (standard)</li> <li>• Max. switching capacity 16 A, 400 V</li> </ul> 	 <table border="1" data-bbox="925 1176 1101 1243"> <tr> <td>+95...120</td> <td>78°&lt;</td> </tr> <tr> <td>+70...130</td> <td>167°&lt;</td> </tr> <tr> <td>RB (°C)</td> <td>α</td> </tr> </table>					+95...120	78°<	+70...130	167°<	RB (°C)	α
+95...120	78°<										
+70...130	167°<										
RB (°C)	α										
<p><b>Part no.</b></p>	<p>Type</p>	<p>Control range °C</p>	<p>Capillary mm</p>	<p>Unlocking difference</p>	<p>Probe Ø d × L</p>						
<p>60002995</p>	<p>602031/81</p>	<p>+95 to 120</p>	<p>2,000</p>	<p>Approx. 10 K</p>	<p>6 x 72 mm</p>						
<p>60003136</p>		<p>+70 to 130</p>			<p>6 x 68 mm</p>						

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

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 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 Email: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
 Email: info.us@jumo.net  
 Internet: www.jumousa.com



## Order details

### Panel-mounted thermostat JUMO heatTHERM type 602030 and 602031

Minimum purchase order 500 pieces

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

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
 Email: mail@jumo.net  
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**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
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## Order details

### Panel-mounted thermostat JUMO heatTHERM type 602030 and 602031

**Order code**

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

X = selection option for the basic type

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

**Order code**

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

**Order example**

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

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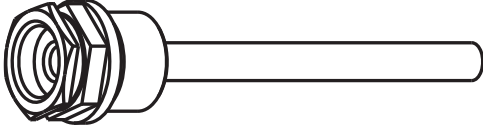
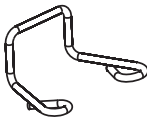
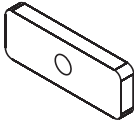

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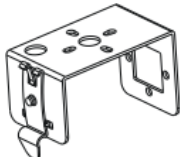


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## Accessories

(according to product group 606710 and 606715)

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

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

<b>Setpoint adjuster for type 602030/01</b> (according to product group 606715)					
<b>Part no.</b>	Type	Control range °C	W 8		
60003091	W 8	+20 to +90			
60003227		0 to +120			
60003095		0 to +200			
60003098		+50 to +300			

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# Surface-Mounted Thermostat

## ATH series

### Special features

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

### Brief description

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

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



ATHs-1



ATHf-70

### Switching function

#### Temperature controller TR and temperature monitor TW

If the temperature on the temperature probe exceeds the setpoint value, the microswitch is activated by the transmission mechanics and the electrical circuit is opened or closed. If the temperature falls below the selected setpoint value (by the amount of the switching differential), the microswitch is reset to its initial position.

#### Restart lock on the safety temperature limiter STB

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

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

#### Using the safety temperature monitor STW (STB) as a safety temperature limiter STB

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

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

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

The electrical circuit opens when cooling the probe of STW (STB) and STB down to the negative temperature range, but it then closes again if the temperature rises. The STB must be unlocked manually if the minimum probe temperature is exceeded.

The STW (STB) unlocks itself automatically

### Approvals



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Delivery address: Mackenrodtstraße 14  
36039 Fulda, Germany  
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**Approvals**

Types		Switching function	DIN registry no.	Tests	<p>You will find Declarations of Conformity on the Internet at: www.jumo.net ⇒ Products ⇒ Thermostats ⇒ Data sheet 603021 <b>or</b> they can be sent to you upon request.</p>
With rigid thermowell	With capillary				
ATHs-1	ATHf-1	TR	TR 891	 - DIN EN 14597 - Pressure Equipment Directive <b>DGRL</b> (ATH.-20 and ATH.-70 only)	
ATHs-2	ATHf-2	TW	TW 892		
ATHs-20	ATHf-20	STW (STB)	STW (STB) 894 S		
ATHs-70	ATHf-70	STB	STB 895		
ATH.-...		all	EAC-approval marks <sup>a</sup> TC RU C-DE.AB98.B.00348	Gost Norm AG 	Technical rules of the customs union Russia/Belarus/Kazakhstan

<sup>a</sup> Russian documentation upon request

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 Postal address: 36035 Fulda, Germany  
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## Technical data

### Control ranges and temperature probes

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

### Capillary and temperature probe

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

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**Electrical data**

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

**Operating data**

Switching differential in % of the control range / limit value range	Switching function	With liquid-filled measuring system				
		Nominal value	Possible actual value			
	TR, TW	3	3 max. 4	Standard		
		6	6 max. 8	Upon request		
		1.5	1 max. 2	Extra cost		
		With gas-filled measuring system				
		5	4 max. 8	Standard		
		9	8 max. 12	Upon request		
	STW (STB)	2	1.5 max. 2.5	Extra cost		
		With liquid-filled measuring system				
		5	4 max. 6	Standard		
		9	8 max. 11	Upon request		
		2	1 max. 3	Extra cost		
With gas-filled measuring system						
7	5 max. 12	Standard				
9	8 max. 16	Upon request				
2	1.5 max. 3	Extra cost				
Switching point accuracy in % of the control range / limit value range	TR, TW: In the upper third of the scale ± 1.5 %, at scale beginning ± 6 % STB, STW (STB): In the upper third of the scale +0/-5 %, at scale beginning +0/-10 %					
Ambient temperature influence based on the control range / limit value range	When the ambient temperature on the case deviates from the calibration ambient temperature of 22 °C, a switching point offset occurs. Higher ambient temperatures = lower switching point Lower ambient temperature = higher switching point					
	Surface-mounted thermostats with scale limit value					
	< 200 °C		+ 200 °C ≤ 350 °C		> 350 °C ≤ 500 °C	
	TR / TW	STB/STW (STB)	TR / TW	STB/STW (STB)	TR / TW	STB/STW (STB)
	Influence on the switching head					
	0.08 %/K	0.17 %/K	0.06 %/K	0.13 %/K	0.14 %/K	0.12 %/K
Influence on the capillary per meter						
0.047 %/K	0.054 %/K	0.09 %/K	0.11 %/K	0.04 %/K	0.03 %/K	
Admissible storage temperature	-50 to +50 °C					
Admissible ambient temperature during use	see nameplate					
Rated position (NL)	According to DIN 16 257, NL 0 to NL 90 (different rated positions (NL) upon request)					



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**Case**

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

**Process connection\***

Series ATHs- with rigid thermowell	Scale limit value <u>up to</u> 150 °C <b>protection tube "20"</b>	Scale limit value <u>exceeding</u> 150 °C <b>protection tube "30"</b>
	Screw-in sleeve with screw-in spigot G 1/2 form A according to DIN 3852/2	Screw-in sleeve with screw-in spigot G 1/2 form A according to DIN 3852/2 and intermediate piece, to ensure that the max. admissible ambient temperature of is not exceeded on the case
Type ATHf- With capillary	Plain cylindrical probe "10" (standard)	
	Screw-in protection tube "20" (upon request)	
	Screw-in sleeve with screw-in spigot G 1/2 form A acc. to DIN 3852/2 and clamping piece with fixing screw to lock the probe in place	
Material	<b>Protection tube "20"</b>	<b>Protection tube "30"</b>
	Up to +150 °C CuZn as standard over +150 °C CrNi	Above +150 °C CrNi
Insertion length S	Standard lengths: 100, 120, 150, 200, or 300 mm different lengths upon request	
Immersion tube Ø	D = 8 mm, D = 10 mm	

\* For different process connections and protection tube refer to data sheet 606710.

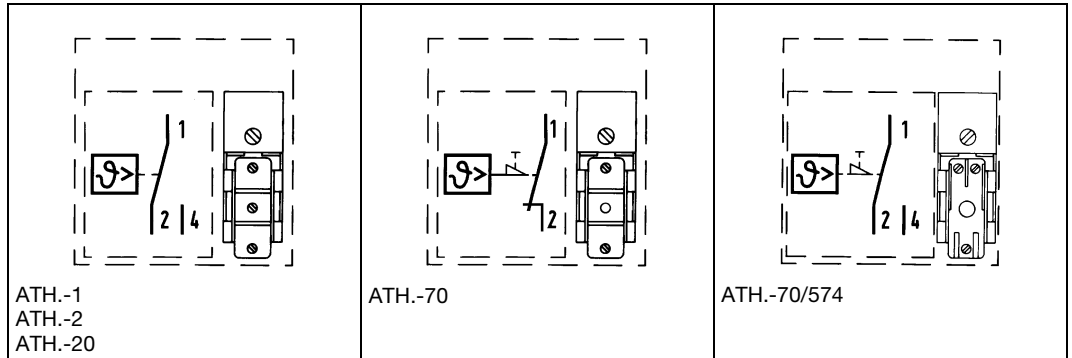
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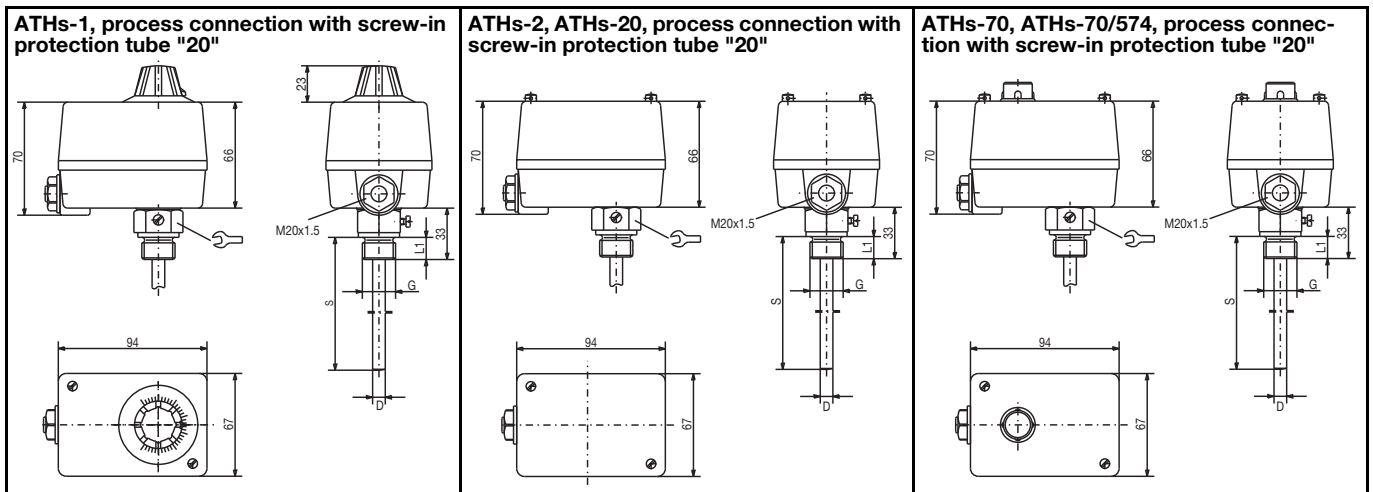
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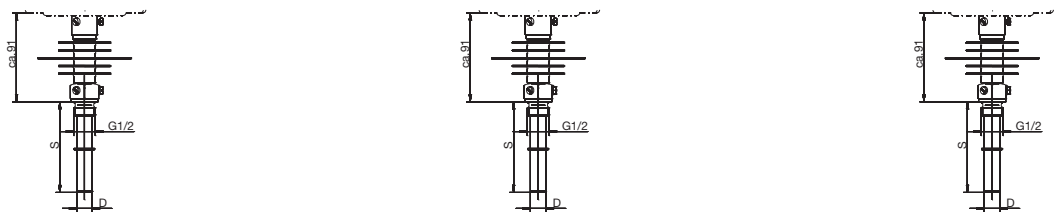
### Wiring diagrams



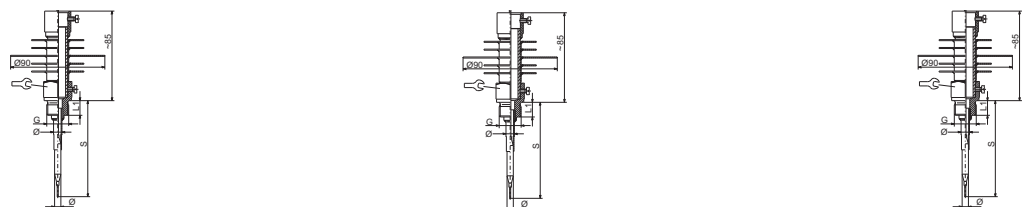
### Dimensions, versions with rigid thermowell



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



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



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**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
 Internet: www.jumousa.com



## Stock versions with rigid thermowell

### Temperature controller (TR)

(delivery within 3 working days after receipt of order)

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

## Stock versions with rigid thermowell

### Temperature monitor (TW)

(delivery within 3 working days after receipt of order)

Part no.	Type	Control range / limit value range °C	Switching differential %	Process connection screw-in tube	Immersion tube Ø x length mm	
60001135	ATHs-2	-10 to + 40	3-4	"20" G <sup>1</sup> / <sub>2</sub>	8 x 200	
60001549	ATHs-2	0 to + 50	1.5		15 x 100 CrNi	
60001128	ATHs-2	0 to + 50	3-4		8 x 200	
60000177	ATHs-2	+20 to + 90	1.5		15x100	
60000959	ATHs-2	+20 to + 90	6-8		15x100	
60001129	ATHs-2	+20 to + 90	3-4		8x150	
60000331	ATHs-2	0 to +100	3-4		8x120	
60001552	ATHs-2	0 to +100	3-4		8x120 CrNi	
60000179	ATHs-2	0 to +100	3-4		8x150	
60001039	ATHs-2	0 to +100	3-4		8 x 200	
60001130	ATHs-2	0 to +100	3-4		8x300	
60000483	ATHs-2	+20 to +150	3-4		8x100	
60001551	ATHs-2	+20 to +150	3-4		8x100 CrNi	
60000485	ATHs-2	+20 to +150	3-4		8 x 200	
60001554	ATHs-2	+20 to +150	3-4		8x200 CrNi	
60000182	ATHs-2	+20 to +150	3-4		8x300	
60003319	ATHs-2	+50 to +200	3-4		"30" G <sup>1</sup> / <sub>2</sub>	8x120 CrNi
60003320	ATHs-2	+50 to +200	3-4			8x200 CrNi
60001556	ATHs-2	+50 to +300	3-4	8x150 CrNi		
60003322	ATHs-2	+20 to +500	5	8x200 CrNi		

## Safety temperature monitor STW (STB)

(delivery within 3 working days after receipt of order)

Part no.	Type	Control range / limit value range °C	Switching differential %	Process connection screw-in tube/ weld-in tube	Immersion tube Ø x length mm
60001478	ATHs-20	+20 to +150	4-6	"20" G <sup>1</sup> / <sub>2</sub>	8x150
60003323	ATHs-20	+50 to +300	5	"30" G <sup>1</sup> / <sub>2</sub>	8x200 CrNi
60002217	ATHs-20	+50 to +350	4-6	"46" G <sup>3</sup> / <sub>4</sub>	170 steel, conical
60003324	ATHs-20	+20 to +500	7	"31" G <sup>1</sup> / <sub>2</sub>	8x200 CrNi

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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
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## Stock versions with rigid thermowell

### Safety temperature limiter (STB)

(delivery within 3 working days after receipt of order)

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

## Dimensions, versions with capillary

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

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
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## Stock versions with capillary

### Temperature controller (TR)

(delivery within 3 working days after receipt of order)

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

### Temperature monitor (TW)

(delivery within 3 working days after receipt of order)

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

## Safety temperature monitor STW (STB) and safety temperature limiter (STB)

(delivery within 3 working days after receipt of order)

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

\* Weld-in tube

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 Delivery address: Mackenrodtstraße 14  
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 Harlow, Essex CM20 2DY, UK  
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 Internet: www.jumousa.com



## Order details

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

### Surface-mounted thermostat, ATH series

#### Order code (1) Basic type

603021 Surface-mounted thermostat, ATH series

#### (2) Basic type extensions

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

#### (3) Design type

1	ATHs with rigid thermowell
2	ATHf with capillary

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

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

#### (5) Switching differential

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

#### (6) Capillary length

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

#### (7) Capillary material

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

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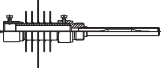


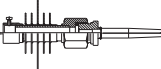
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## Order details

### Surface-mounted thermostat, ATH series

**Order code (8) Process connection (PA) <sup>1</sup>**

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

**(9) Thread of process connection <sup>1</sup>**

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

**(10) Material of process connection**

00	Only with process connection 10
46	CuZn (Brass)
20	CrNi (Stainless steel 1.4571)

**(11) Insertion length "S" (immersion tube length)**

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

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

00	ATHf without protection tube
8	8 mm
10	10 mm

**(13) Diameter "d" (probe diameter)**

6	6 mm
8	8 mm

**(14) Extra codes <sup>2</sup>**

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

**Order code**

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

**Order example**

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

<sup>1</sup> For other connection types and protection tube, see data sheet 606710.

<sup>2</sup> List extra codes in sequence, separated by commas.





**JUMO GmbH & Co. KG**  
Delivery address: Mackenrodtstraße 14  
36039 Fulda, Germany  
Postal address: 36035 Fulda, Germany  
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JUMO House  
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# Surface-mounting double thermostat

## ATH type series

### Particularities

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

### Brief description

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

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

### Switching function

#### Temperature controller TR and temperature monitor TW

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

#### Restart lock for the safety temperature limiter STB

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

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

#### Use of the safety temperature monitor STW(STB) as a safety temperature limiter STB

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

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

If the measuring system is destroyed, i.e. if the expansion fluid escapes, the pressure in the diaphragm of the STB and STW (STB) drops and permanently opens the current circuit. Unlocking is no longer possible. The electrical circuit opens when cooling the probe of STW (STB) and STB down to the negative temperature range, but it then closes again if the temperature rises. The STB must be unlocked manually if the minimum probe temperature is exceeded. The STW (STB) unlocks itself automatically.

### Approvals/approval marks (see Technical Data)



ATHs-12



ATHf-170

The declarations of conformity can be found in the internet under:  
[www.jumo.net](http://www.jumo.net)  
⇒ Products  
or they can be sent on request.

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
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## Technical Data

### Control ranges and temperature probes

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

### Capillary and temperature probe

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

### Electrical data

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

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 E-mail: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
 Internet: www.jumousa.com



**Operating data**

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

**Case**

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

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

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 E-mail: mail@jumo.net  
 Internet: www.jumo.net

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 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
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**Process connection\***

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

\* For different process connections and protection tube refer to data sheet 606710.

**Approvals/approval marks**

Types		Switching function	DIN registry No.	Test
with rigid shaft	with capillary			
ATHs-11	ATHf-11	TR / TR	TR / TR 896	DIN EN 14597
ATHs-12	ATHf-12	TR / TW	TR / TW 897	
ATHs-22	ATHf-22	TW / TW	TW / TW 901	
ATHs-120	ATHf-120	TR / STW (STB)	TR / STW (STB) 899 S	DIN EN 14597 Pressure device directive 97/23/EC
ATHs-220	ATHf-220	TW / STW (STB)	TW / STW (STB) 903 S	
ATHs-170	ATHf-170	TR / STB	TR / STB 900	
ATHs-270	ATHf-270	TW / STB	TW / STB 904	
ATHs-2020	ATHf-2020	STW (STB) / STW (STB)	2 x STW (STB) 905 S	
ATHs-2070	ATHf-2070	STW (STB) / STB	STW (STB) / STB 906 S	
ATHs-7070	ATHf-7070	STB / STB	STB / STB 907	
ATH.-....		all	EAC-approval marks <sup>a</sup> TC RU C-DE.AB98.B.00348	Gost Norm AG Technical rules of the cus- toms union Russia/ Belarus/Kazakhstan

<sup>a</sup> Russian documentation upon request

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
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 Fax: +49 661 6003-607  
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## Connection diagrams

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

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## Dimensions Versions with rigid shaft

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

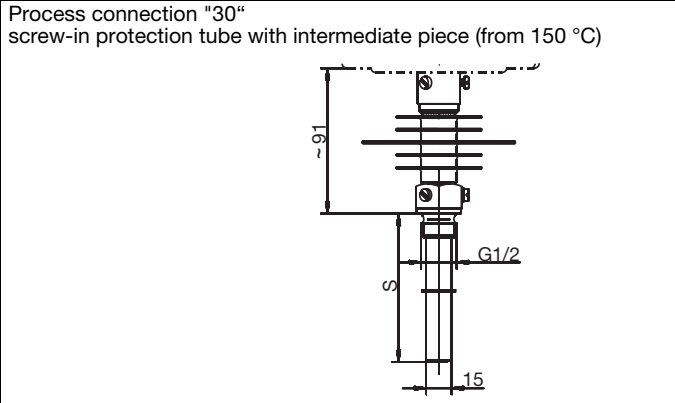
**JUMO GmbH & Co. KG**  
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 36039 Fulda, Germany  
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## Dimensions Versions with rigid shaft



## Stock versions with rigid thermowell

(Delivery within 3 working days after receipt of order)

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

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
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 1-800-554-5866  
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## Dimensions Versions with capillary

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



**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
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## Stock versions with capillary

(Delivery within 3 working days after receipt of order)

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

## Order details

### Surface-mounting double thermostat, ATH type series

#### Order code (1) Basic type

603026 Surface-mounting double thermostat, ATH type series

#### (2) Basic type extensions

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

#### (3) Design

1	ATHs	with rigid shaft
2	ATHf	with capillary

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

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

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

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

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 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
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 Fax: +49 661 6003-607  
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## Order details

### Surface-mounting double thermostat, ATH type series

#### Order code (6) Hysteresis 1

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

#### (7) Hysteresis 2

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

#### (8) Capillary length 1 (specifications in mm)

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

#### (9) Capillary length 2 (specifications in mm)

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

#### (10) Capillary material 1

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

#### (11) Capillary material 2

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

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 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
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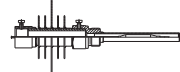
**JUMO Process Control, Inc.**  
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## Order details

### Surface-mounting thermostats, ATH type series

#### Order code (12) Process connection <sup>1</sup>

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

#### (13) Thread of process connection <sup>1</sup>

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

#### (14) Material of process connection

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

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

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

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

- |    |                               |
|----|-------------------------------|
| 00 | ATHf- without protection tube |
| 15 | 15 mm                         |

#### (17) Diameter "d" (probe diameter)

- |   |      |
|---|------|
| 6 | 6 mm |
|---|------|

#### (18) Extra codes <sup>2</sup>

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

<sup>1</sup> For different types of connections and protection tube refer to data sheet 606710.

<sup>2</sup> State extra codes one after another, separated by commas.

#### Order code:

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

#### Order example:

603026 / 0101 - 1 - 014 - 14 - 00 - 15 - 0 - 1000 - 00 - 20 - 10 - 13 - 00 - 100 - 00 - 6 / 248<sup>2</sup>

<sup>2</sup> State extra codes one after another, separated by commas.



**JUMO GmbH & Co. KG**

Delivery address: Mackenrodtstraße 14  
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Phone: 315-437-5866  
1-800-554-5866  
Fax: 315-437-5860  
E-mail: info.us@jumo.net  
Internet: www.jumousa.com



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

### Special features

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

### Brief description

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

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

### Switching function

#### Temperature monitor TW and safety temperature monitor STW

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

#### Restart lock of the safety temperature limiter STB

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

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

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

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

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

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



ATHs-SE-70



ATHf-SE-..

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

### Approvals/approval marks (see Technical Data)



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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
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## Types and approvals

Type	Switching function	Hysteresis	Type No.	Test	
ATHs-SE-2 ATHf-SE-2	TW	3%	68.262-F03-S1 68.262-F04-S1	Det Norske Veritas Germanische Lloyd DIN EN 14597 Bureau Veritas. Pressure equipment directive 97/23/EC CE0036 (only ATH.-SE-20 and ATH.-SE-70)	
ATHs-SE-2 ATHf-SE-2		6%	68.262-F03-S2 68.262-F04-S2		
ATHs-SE-2 ATHf-SE-2		1.5%	68.262-F03-S3 68.262-F04-S3		
ATHs-SE-20 ATHf-SE-20	STW (STB)	3%	68.261-F03-S1 68.261-F04-S1		
ATHs-SE-20 ATHf-SE-20		6%	68.261-F03-S2 68.261-F04-S2		
ATHs-SE-20 ATHf-SE-20		1.5%	68.261-F03-S3 68.261-F04-S3		
ATHs-SE-70 ATHf-SE-70	STB	-	68.266-F03 68.266-F04		
ATH-.....	all		TC RU C-DE.AB98.B.00000		EAC <sup>a</sup> / Gost Norm AG Technical rules of the customs union Russia/ Belarus/Kazakhstan

<sup>a</sup> Russian documentation upon request

## Technical data

### Control ranges and temperature probes

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

### Capillary and temperature probe

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

### Electrical data

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

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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
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**JUMO Process Control, Inc.**  
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 East Syracuse, NY 13057, USA  
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**Operating data**

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

**Case**

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

**Process connection**

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

**Note:**

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

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

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

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

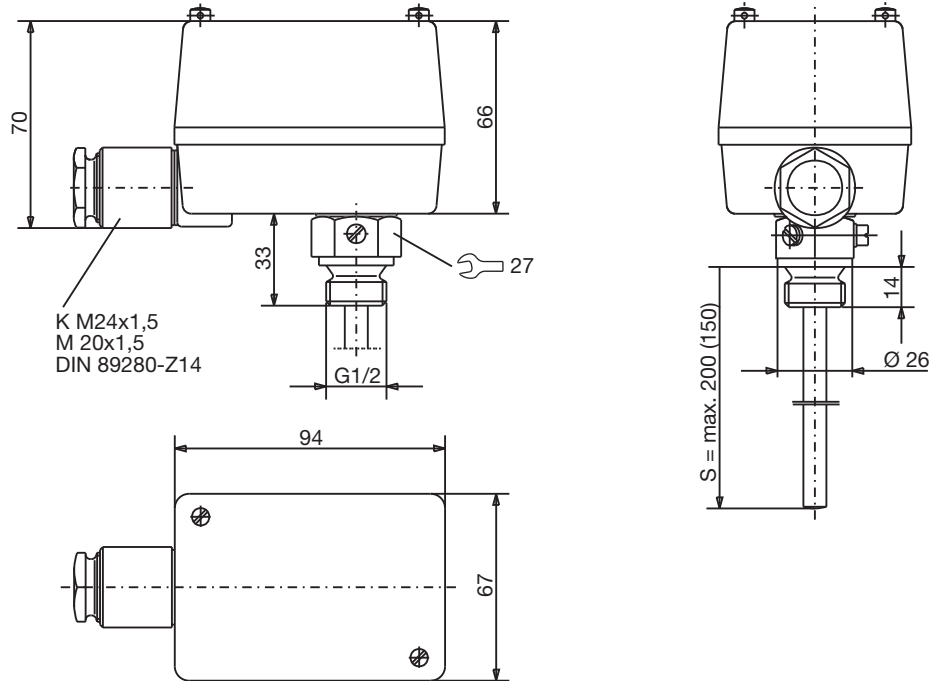
**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
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 East Syracuse, NY 13057, USA  
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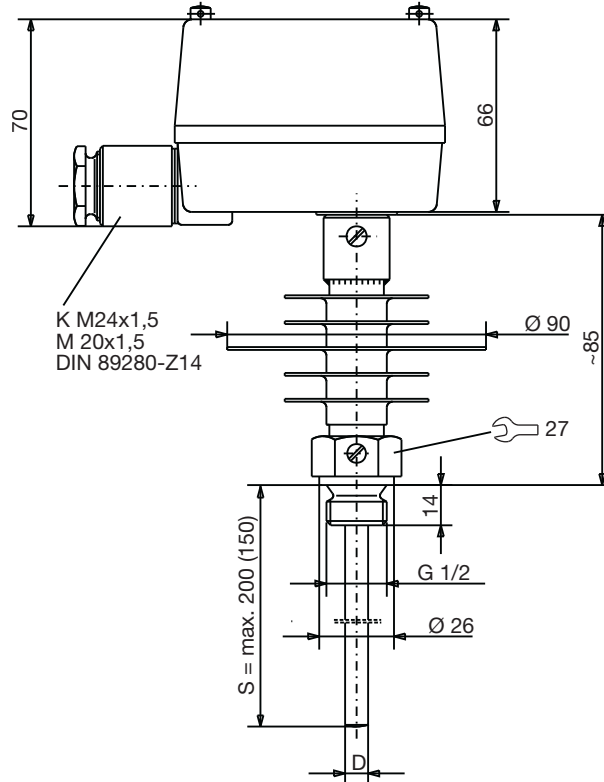


## Dimensions

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



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





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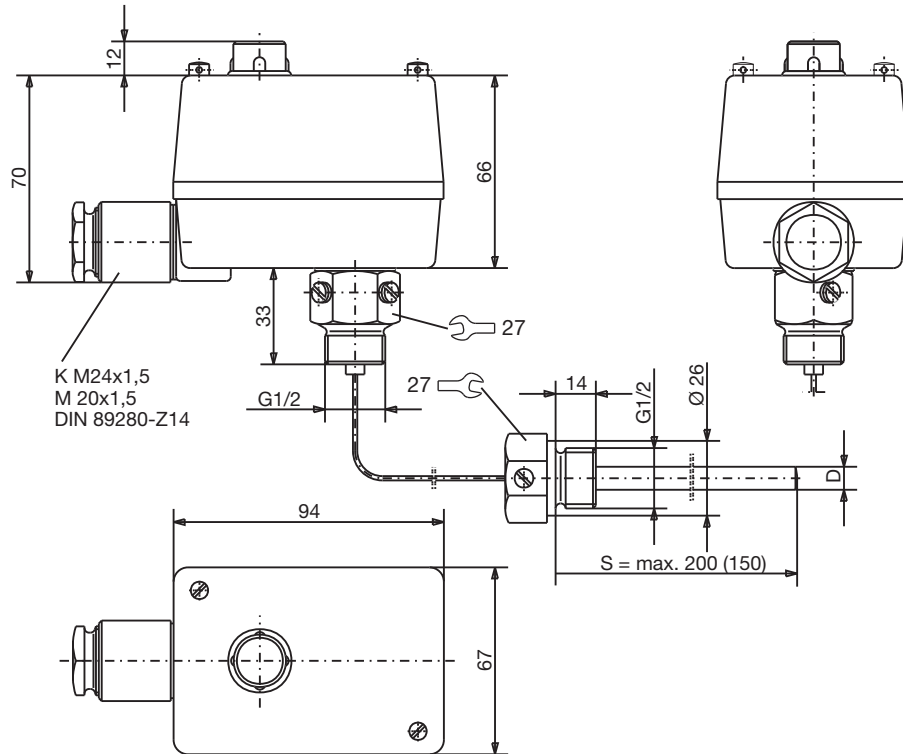
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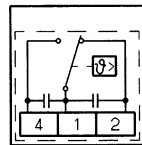


## Dimensions

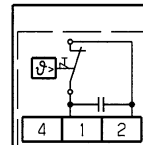
**ATHs-SE... 7**  
 with screw-in sheath "20"  
 up to 300 °C



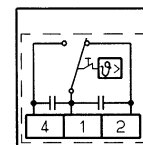
## Wiring diagrams



ATH.SE-2 / ATH.SE-20



ATH.SE-70



ATH.SE-70/574

## Order details

### Surface-mounting thermostats, type series ATH.-SE

#### Order code (1) Basic type

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

#### (2) Basic type extension

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

#### (3) Design

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

#### (4) Control / limit value ranges

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

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
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 JUMO House  
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 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
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 East Syracuse, NY 13057, USA  
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## Order details

### Surface-mounting thermostats, type series ATH.-SE

**Order code (5) Hysteresis**

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



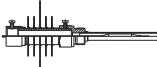
**(6) Capillary length**

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

**(7) Capillary material**

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

**(8) Process connection**

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

**(9) Process connection thread**

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

**(10) Material of process connection**

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

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

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

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

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

**(13) Diameter "d" (probe diameter)**

- 6 6 mm
- 8 8 mm

**(14) Extra codes**

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

**Order code**

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

**Order example**

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

**JUMO GmbH & Co. KG**

Delivery address: Mackenrodtstraße 14  
36039 Fulda, Germany  
Postal address: 36035 Fulda, Germany  
Phone: +49 661 6003-0  
Fax: +49 661 6003-607  
E-mail: mail@jumo.net  
Internet: www.jumo.net

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JUMO House  
Temple Bank, Riverway  
Harlow, Essex CM20 2DY, UK  
Phone: +44 1279 635533  
Fax: +44 1279 635262  
E-mail: sales@jumo.co.uk  
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East Syracuse, NY 13057, USA  
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## Surface mounting thermostat, type series ATH-SW

### Protection class IP 65, single and double thermostat

#### Special features

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

#### Brief description

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

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

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



ATHs-SW-..



ATHf-SW-..

#### Approval/approval marks (see Technical Data)



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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
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 E-mail: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

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 6733 Myers Road  
 East Syracuse, NY 13057, USA  
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## Technical Data

### Switching function

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

### Control ranges and temperature probes

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

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**Capillary and temperature probe**

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

**Electrical data**

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

**Operating data**

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

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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
 Internet: www.jumousa.com



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

**Case**

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

**Process connection<sup>a</sup>**

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

<sup>a</sup> For different process connections and sheaths, refer to data sheet 606710.


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## Approvals/approval marks

Single thermostats	with rigid shaft	with capillary	Switching function	DIN registry No.	 DIN EN 14597 Directive governing pressure systems 97/23/EC *only tested as per DIN
	ATHs-SW-2 *	ATHf-SW-2 *	TW	TW 892	
	ATHs-SW-20	ATHf-SW-20	STW (STB)	STW (STB) 894 S	
	ATHs-SW-70	ATHf-SW-70	STB	STB 895	
Double thermostats	ATHs-SW-22 *	ATHf-SW-22 *	TW / TW	TW / TW 901	
	ATHs-SW-220	ATHf-SW-220	TW / STW (STB)	TW / STW (STB) 903 S	
	ATHs-SW-270	ATHf-SW-270	TW / STB	TW / STB 904	
	ATHs-SW-2020	ATHf-SW-2020	STW (STB) / STW (STB)	2 x STW (STB) 905 S	
	ATHs-SW-2070	ATHf-SW-2070	STW (STB) / STB	STW (STB) / STB 906 S	
	ATHs-SW-7070	ATHf-SW-7070	STB / STB	STB / STB 907	
Single thermostats	ATHs-SW-...	ATHf-SW-...	TW, STW (STB), STB	EAC-approval marks <sup>a</sup> TC RU C-DE.AB98.B.00348	Gost Norm AG Technical rules of the customs union Russia/Belarus/Kazakhstan
Double thermostats	ATHs-SW-....	ATHf-SW-....	TW / TW, TW / STW (STB), TW / STB, STW (STB) / STW (STB), STW (STB) / STB, STB / STB		

<sup>a</sup> Russian documentation upon request

### Note

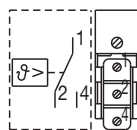
Physical and toxic features of the expansion means, which could emerge in the event of a measuring system break.

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

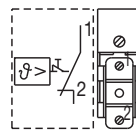
<sup>a</sup> There is currently no statement by the health authority concerning hazards to health in the event of short-term exposure and low concentration, e.g. measuring system break.

## Wiring diagrams

### Single thermostats

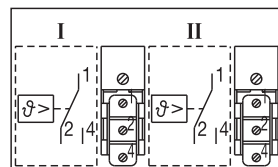


Switching function: TW, STW

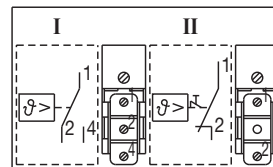


Switching function: STB

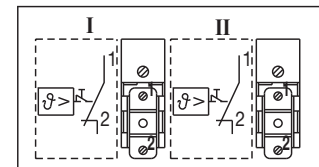
### Double thermostats



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



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



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

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 Delivery address: Mackenrodtstraße 14  
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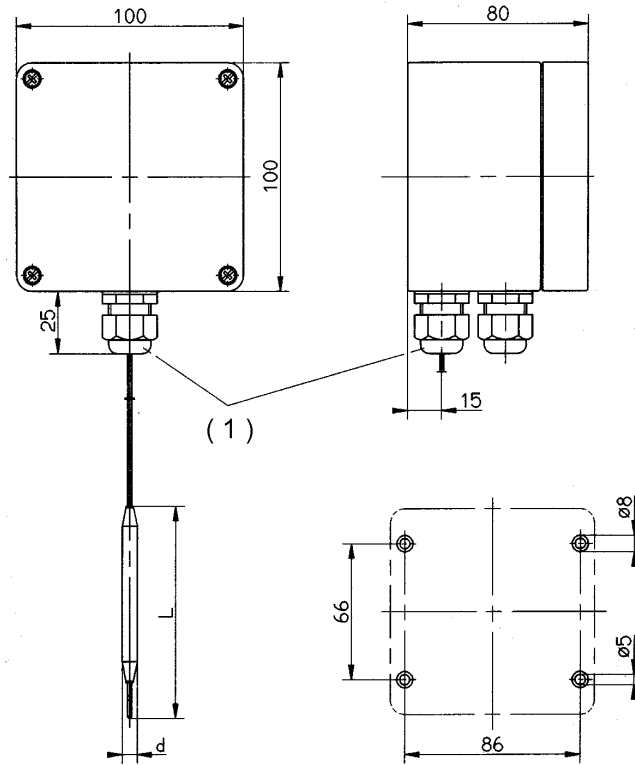
**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
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## Dimensions

### ATHf-SW-..

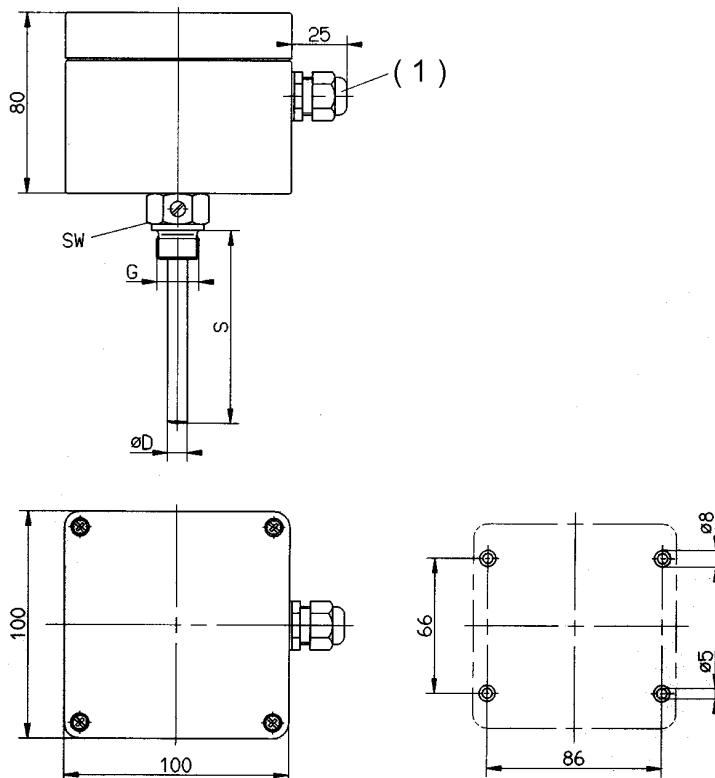
with capillary and process connection "10", plain cylindrical probe



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

### ATHs-SW-..

with screw-in sheath "20"



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



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## Order details

### Surface-mounting thermostats, type series ATH.-SW

Order code	(1) Basic type		
603035	Surface-mounting thermostat, type series ATH.-SW		
	(2) Basic type extension		
0002	ATH.-SW-2	Temperature monitor TW	
0020	ATH.-SW-20	Safety temperature monitor STW (STB)	Single thermostats
0070	ATH.-SW-70	Safety temperature limiter STB	
0202	ATH.-SW-22	TW / TW	
0220	ATH.-SW-220	TW / STW (STB)	
0270	ATH.-SW-270	TW / STB	
2020	ATH.-SW-2020	STW (STB) / STW (STB)	Double thermostats
2070	ATH.-SW-2070	STW (STB) / STB	
7070	ATH.-SW-7070	STB / STB	
	(3) Design		
1	ATHs-SW-....	with rigid shaft	
2	ATHf-SW-....	with capillary	
	(4) Control / limit value ranges °C		
014	-20...+50*		*only for TW
016	-10...+40*		
021	0...+50		
022	0...+70		
025	0...+100		
041	+20...+90		
052	+30...+110		
042	+20...+120		
066	+60...+130		
043	+20...+150		
062	+50...+200		
063	+50...+250		
064	+50...+300		
045	+20...+400		
046	+20...+500		
	(5) Hysteresis		
00	without hysteresis (-70 STB)		
15	1.5 % of the scale range	(only for TW)	
20	2 % of the scale range	(only for STW (STB))	
30	3 % of the scale range	(only for TW)	
50	5 % of the scale range	(only for TW + STW (STB))	
60	6 % of the scale range	(only for TW)	
70	7 % of the scale range	(only for STW (STB))	
90	9 % of the scale range	(only for STW (STB))	
	(6) Capillary length		
0	ATHs-SW without capillary		
1000	1000 mm		
2000	2000 mm		
3000	3000 mm		
4000	4000 mm		
5000	5000 mm		
...	(special length, specifications in plain text in mm)		



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Delivery address: Mackenrodtstraße 14  
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## Surface-mounting thermostats, type series AMTHF with 2, 3 or 4 1-pole snap switches

### Special features

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



Type AMTHFs-13



Type AMTHFf-13



### Brief description

Add-on thermostats are used to control and monitor thermal processes. The devices of type series AMTHF are available with 2, 3 or 4 switching stages as temperature controllers (TR) and temperature monitors (TW). The sequential gap in Kelvin for the individual circuit stages is factory-set fixed as per customer request. Add-on thermostats operate according to the fluid expansion principle, a microswitch is used as an electrical switching element.

### Switching function

#### Temperature controller (TR) and temperature monitor (TW)

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

### Types

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

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
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 Harlow, Essex CM20 2DY, UK  
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## Technical data

### Control range and probe table — fluid-filled

Control / limit value ranges °C	Hysteresis %	max. probe temperature °C	max. switch head temperature °C	possible capillary lengths in m	max. sequential gap K	Probe length dimension "L" in mm, Probe Ø "d" in mm Ø "6" = Standard	
						Ø 6	Ø 8
-20 to + 40	1	+ 50	+ 50	5	5	245	145
	2.5	+ 50	+ 50			245	145
	5	+ 95	+ 50 (80) <sup>1</sup>			138	91
	7	+ 100	+ 50 (80) <sup>1</sup>			103	73
0 to + 50	1	+ 60	+ 60	3	5	283	165
	2.5	+ 60	+ 60			283	165
	5	+ 105	+ 60 (80) <sup>1</sup>			159	101
	7	+ 110	+ 60 (80) <sup>1</sup>			117	80
+20 to + 90	1	+ 115	+ 80	1	7	210	127
	2.5	+ 115	+ 80			210	127
	5	+ 140	+ 80			121	82
	7	+ 175	+ 80			91	67
0 to +100	1	+ 125	+ 80	2	10	157	100
	2.5	+ 125	+ 80			157	100
	5	+ 165	+ 80			94	68
	7	+ 200	+ 80			73	58
+30 to +110	1	+ 135	+ 80	2	8	188	116
	2.5	+ 135	+ 80			188	116
	5	+ 170	+ 80			110	76
	7	+ 200	+ 80			84	63
0 to +150	1	+ 173	+ 80	1	15	113	78
	2.5	+ 173	+ 80			113	78
	5	+ 200	+ 80			72	57
0 to +200	1	+ 230	+ 80	1	20	113	78
	2.5	+ 230	+ 80			40	78
+50 to +200	1	+ 230	+ 80	1	15	139	92
	2.5	+ 230	+ 80			30	92
+50 to +250	1	+ 228	+ 80	1	20	105	70
	2.5	+ 228	+ 80			40	70
	5	+ 300	+ 80			100	64
+50 to +300	1	+ 345	+ 80	2	25	87	61
	2.5	+ 345	+ 80			50	61

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

### Control range and probe table — gas-filled

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

### Capillary and temperature probe

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

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

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
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 E-mail: mail@jumo.net  
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**Electrical data**

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

**Operating data**

Hysteresis in % of the control / limit value range	Switching function	with fluid-filled measuring system						
		Rated value	Possible process value					
	TR, TW	2.5	2.5 max. 3.5	serial				
		5	5 max. 6	on request				
		7	7 max. 8	on request				
		1	1 max. 2	Surcharge				
	with gas-filled measuring system							
		5	5 max.11	serial				
		6	6 max. 14	on request				
		10	10 max. 16	on request				
	3	2.5 max. 4	Surcharge					
Sequential gap for multi-pin version	with hysteresis	Sequential gap from the scale range		Switching point accuracy of the sequential gaps from the scale range				
		minimum	maximum					
	1% 2.5% 3%, 5% 6%, 7%, 10%	1% 1% 2% 3%	as per control range table	≤ 1% ≤ 1% < 2% < 3%				
	The sequential gap is specified in K in relation to the set point value of contact deck I.							
Prefix - = switching <b>prior to</b> reaching the set point value, Prefix + = switching <b>after</b> reaching the set point value. Enter "0" for the sequential gap for a simultaneously switching version.								
Switching point accuracy in % of the control/limit value range	Switching function	Hysteresis		in the upper third of the scale or limit value				
		fluid-filled	gas-filled					
	TR	1%, 2.5% 5% 7%	-- 3%, 5%, 6%, 10%	± 1.5% ± 3.0% ± 4.0%				
TW	1%, 2.5% 5% 7%	-- 3%, 5%, 6%, 10%	+0 / -3% +0 / -6% +0 / -8%					
medium ambient temperature influence	When the ambient temperature on the switch head and/or the capillary deviates from the calibration temperature +22 °C, a switch point offset occurs. Higher ambient temperatures = lower switching point Lower ambient temperature = higher switching point							
	For temperatures with scale limit value / limit value							
	< 200 °C	+ 200 °C ≤ +350 °C		+ 400 °C ≤ +500 °C				
	TR, TW	TR, TW		TR, TW				
	Hysteresis in %							
	1 / 2.5	5	7	1 / 2.5	5	3 / 5	6	10
	Ambient temperature influence on the switch head in %/K							
	0.15	0.26	0.34	0.12	0.21	0.12	0.17	0.24
	Ambient temperature influence on the capillary in %/m							
	0.05 · K · m		0.09 · K · m		0.04 · K · m		0.05 · K · m	
If the operating temperature on the switch head deviates essentially from the ambient calibration temperature +22 °C, this can be taken into account on request during adjustment against surcharge.								

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**Operating data**

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

**Case**

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

**Process connection\***

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

**Note:**

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

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

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

**Approvals/approval marks**

Approval marks	Inspection authority	Certificates/ inspection number	Inspection basis	Valid for
EAC	Gost Norm AG	on demand	Technical rules of the customs union Russia/Belarus/Kazakhstan	AMTHF

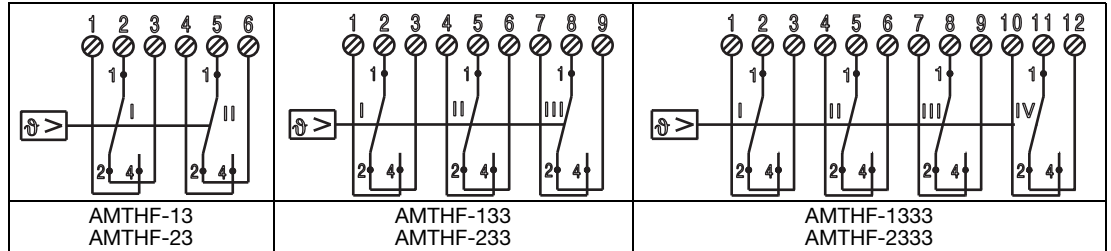
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 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
 E-mail: mail@jumo.net  
 Internet: www.jumo.net

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
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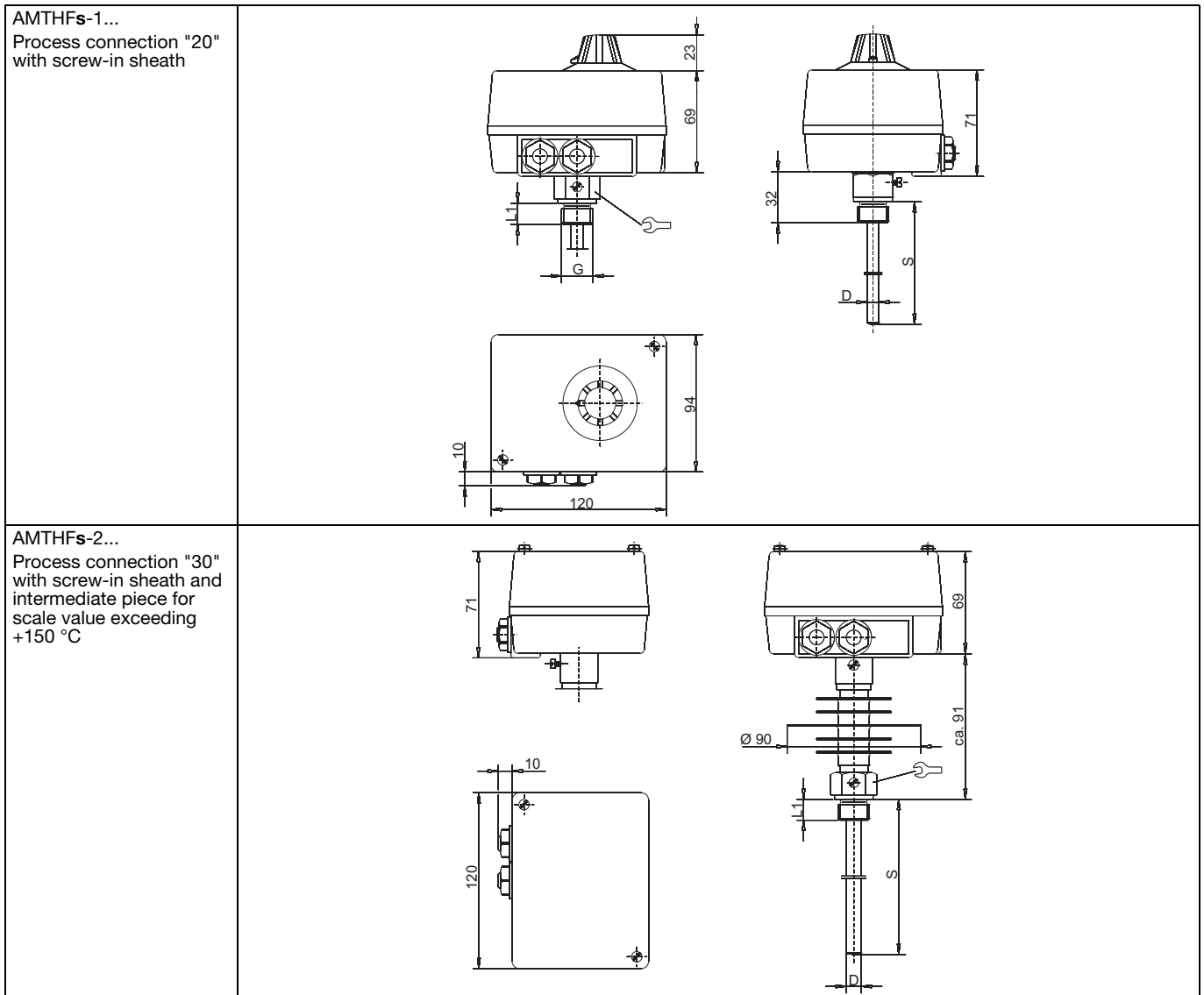
**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
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## Connection diagrams



## Dimensions



**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
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## Dimensions

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



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 Delivery address: Mackenrodtstraße 14  
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 Postal address: 36035 Fulda, Germany  
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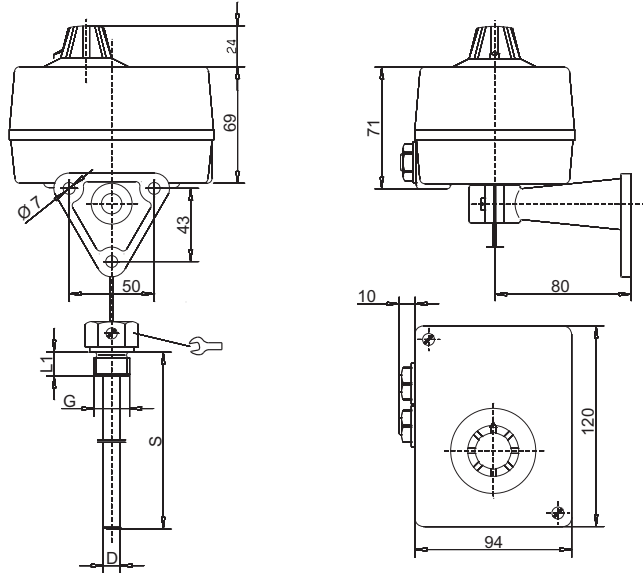
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 6733 Myers Road  
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 1-800-554-5866  
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## Dimensions

AMTHFf-1.../248  
 with "73" wall support  
 with screw-in sheath "20"



**JUMO GmbH & Co. KG**

Delivery address: Mackenrodtstraße 14  
36039 Fulda, Germany  
Postal address: 36035 Fulda, Germany  
Phone: +49 661 6003-0  
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**JUMO Instrument Co. Ltd.**

JUMO House  
Temple Bank, Riverway  
Harlow, Essex CM20 2DY, UK  
Phone: +44 1279 635533  
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East Syracuse, NY 13057, USA  
Phone: 315-437-5866  
1-800-554-5866  
Fax: 315-437-5860  
E-mail: info.us@jumo.net  
Internet: www.jumousa.com



## Order details

### Surface-mounting thermostats, type series AMTHF

**Order code****(1) Basic type**

603051 Surface-mounting thermostat, type series AMTHF with 2, 3 or 4 1-pole snap switches

**(2) Basic type extension (function)**

0013	AMTHF.-13	Temperature controller	2-pin
0023	AMTHF.-23	Temperature monitor	2-pin
0133	AMTHF.-133	Temperature controller	3-pin
0233	AMTHF.-233	Temperature monitor	3-pin
1333	AMTHF.-1333	Temperature controller	4-pin
2333	AMTHF.-2333	Temperature monitor	4-pin

**(3) Design**

1	AMTHF s	with rigid shaft
2	AMTHF f	with capillary

**(4) Control / limit value ranges**

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

**(5) Hysteresis**

10	1%		
25	2.5%		
50	5%	of the scale range	with fluid-filled measuring systems
70	7%		
30	3%		
50	5%		
60	6%	of the scale range	with gas-filled measuring systems
01	10%		

**(6) Capillary length (specifications in mm)**

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

**(7) Capillary material**

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

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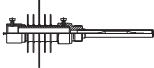
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 East Syracuse, NY 13057, USA  
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 1-800-554-5866  
 Fax: 315-437-5860  
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## Order details

### Surface-mounting thermostats, type series AMTHF

<b>Order code</b>	<b>(8) Process connection*</b>	
10	plain cylindrical probe (only for AM.f)	
20	Screw-in sheath	
30	Screw-in sheath with intermediate piece	
	<b>(9) Thread of process connection*</b>	
00	without thread (process connection "10")	
13	External thread G 1/2	
	<b>(10) Material of process connection</b>	
00	only with process connection "10"	
46	CuZn (Brass)	
20	CrNi (Stainless steel 1.4571)	
	<b>(11) Fitting length "S" (immersion tube length)</b>	
000	AMTHFf without sheath	
100	100 mm	
120	120 mm	
150	150 mm	
200	200 mm	
300	300 mm	
400	400 mm	
...	(Special length, specifications in plain text)	
	<b>(12) Diameter "D" (immersion tube diameter)</b>	
00	AMTHFf without sheath	
8	8 mm	
10	10 mm	
	<b>(13) Diameter "d" (probe diameter)</b>	
6	6 mm	
8	8 mm	
	<b>(14) Extra codes</b>	
000	no extra code	
711	Switch head fastening with 2 screws through the case bottom section, lateral capillary outlet on the case, lid and bottom part made of plastic	
764	Fastening flange made of steel sheet, capillary outlet on the case stud	
248	Wall bracket	

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

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

**Order code:**

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

**Order example:**

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

Sequential gap: \_\_\_\_\_



**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
 E-mail: mail@jumo.net  
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**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
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**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
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# JUMO heatTHERM-AT and JUMO heatTHERM-DR

## Type 603070, Surface-Mounted or Room Thermostat Versions

### Special features

- **PUSH IN**-connection technology - **reduced installation time by 50 %**
- Stable switching point position due to ambient temperature compensation (standard)
- Max. switching capacity 16 A, 230 V
- Tested according to DIN EN 14597
- Operating life at least 250,000 switching cycles for TR and TW
- Switching point deviation during the entire operating life of up to  $\pm 5 \%$
- Protection type max. IP54
- UL approval (extra code 061)

### Brief description

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

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

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

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

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

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

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



Type 603070/0170 (TR/STB)



Type 603070/0001 (TR)



Type 603070/0002 (TW)



Type 603070/0002 (TW)

### Approvals/approval marks (see "Technical Data")



**DGRL**  
97/23/EG



**CA** US



Design type 5+6\* Design type 7+8\*

\* Only with extra code 061

**JUMO GmbH & Co. KG**

Delivery address: Mackenrodtstraße 14  
36039 Fulda, Germany  
Postal address: 36035 Fulda, Germany  
Phone: +49 661 6003-0  
Fax: +49 661 6003-607  
E-mail: mail@jumo.net  
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**JUMO Instrument Co. Ltd.**

JUMO House  
Temple Bank, Riverway  
Harlow, Essex CM20 2DY, UK  
Phone: +44 1279 635533  
Fax: +44 1279 635262  
E-mail: sales@jumo.co.uk  
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**JUMO Process Control, Inc.**

6733 Myers Road  
East Syracuse, NY 13057, USA  
Phone: 315-437-5866  
1-800-554-5866  
Fax: 315-437-5860  
E-mail: info.us@jumo.net  
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## Technical data

### Switching function

<b>Temperature controller TR / temperature monitor TW</b>	<p>If the temperature on the temperature probe exceeds the setpoint value, the microswitch is activated by the transmission mechanics and the electrical circuit is opened or closed.</p> <p>If the temperature falls below the selected setpoint value (by the amount of the switching differential), the microswitch is reset to its initial position.</p>
<b>Safety temperature monitor STW</b>	<p>If the temperature on the temperature probe exceeds the setpoint value, the snap-action switch is activated and the electrical circuit is opened or closed. If the temperature falls below the selected setpoint value (by the amount of the switching differential), the snap-action switch is reset to its initial position.</p> <p>The electrical circuit 1-2 opens when the probe of STW (STB) and STB cools down to the negative temperature range, but it closes again automatically if the temperature rises.</p> <p>If the measuring system is destroyed (i.e. if the expansion fluid emerges) the pressure in the diaphragm drops and permanently opens the electrical circuit.</p>
<b>Safety temperature limiter STB</b>	<p>If the temperature on the temperature probe exceeds the switching point, the snap-action switch is activated, the electrical circuit is opened or closed, and the snap-action switch is mechanically locked.</p> <p>The unlocking difference depends on the control range. Exact values are available from the respective types. They are also available upon request. If the temperature falls below the selected setpoint value (by the amount of the unlocking difference) then the snap-action switch can be manually unlocked again.</p> <p>The electrical circuit 1-2 opens when the probe of STW (STB) and STB cools down to the negative temperature range, but it closes again automatically if the temperature rises.</p> <p>If the measuring system is destroyed (i.e. if the expansion fluid emerges) the pressure in the diaphragm drops and permanently opens the electrical circuit. Unlocking is no longer possible.</p>

### Temperature compensation

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

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
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## Technical data

### Case

	Type 5 + 6	Type 7 + 8
<b>Case</b>	Case bottom section: Color: cobalt-blue RAL 5013 (for TZ 061 light-gray, RAL 7035) Case lid: ABS with inspection glass (PMMA) Color: cobalt-blue RAL 5013 (for TZ 061 light-gray, RAL 7035)	PA (reinforced) Color: Silver-gray RAL 7001 (for TZ 061 black)
<b>Setpoint adjustment</b>	TR Switching point can be adjusted externally with the rotary knob. TW, STW, STB, ATW Switching point can be adjusted with a screwdriver once the case lid has been removed. The set switching point can be checked through the inspection glass.	- - Switching point can be adjusted with a screwdriver.
<b>Protection type</b>	IP40 or IP54 (for TZ 402) according to EN 60 529	IP20 according to EN 60 529
<b>Cable inlet</b>	Cable gland M20 x 1.5, for cable-Ø 6-12 mm	Cable connection directly on <b>PUSH IN</b> terminals
<b>Capillary</b>	Ø 1.25 mm - min. bending radius of the capillary 5 mm - material: copper (Cu) or stainless steel (CrNi, 1.4301)	
<b>Case fastening</b>	Pipe mounting with clamping belt for pipe diameter 15-100 mm, thermowell mounting, wall mounting	Wall mounting, DIN rail installation TH35 according to DIN EN 60715
<b>Weight</b>	Approx. 0.2 kg	

### Electrical data

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

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 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
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## Operating data

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

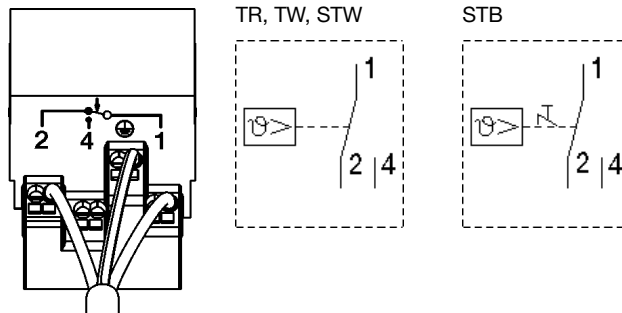
## Approvals/approval marks

Approval marks	Inspection authority	Certificates/certification number	Inspection basis	Valid for
DIN	DIN CERTCO	TR1191, TW1192, STW(STB)1193, STB1194, ATW1218	DIN EN 14597	JUMO heatTHERM-AT/-DR according to type
DIN	TÜV Süd (German Technical Inspection Agency)	DIN EN ISO 13849-1	B <sub>10d</sub> = 250,000 <sup>a</sup>	JUMO heatTHERM-AT/-DR
DGRL	TÜV Süd (German Technical Inspection Agency)	IS-TAF-MUC 07113377017	Pressure Equipment Directive 97/23/EC	STW and STB
UL	UL Germany	E 66358	UL 873	JUMO heatTHERM-AT/-DR
EAC <sup>b</sup>	Gost Norm AG	TC RU C-DE.AB98.B.00348	Technical rules of the customs union Russia/Belarus/Kazakhstan	JUMO heatTHERM-AT/-DR

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

<sup>b</sup> Russian documentation upon request

## Wiring diagrams





**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
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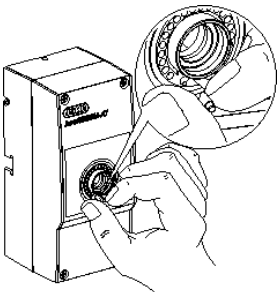
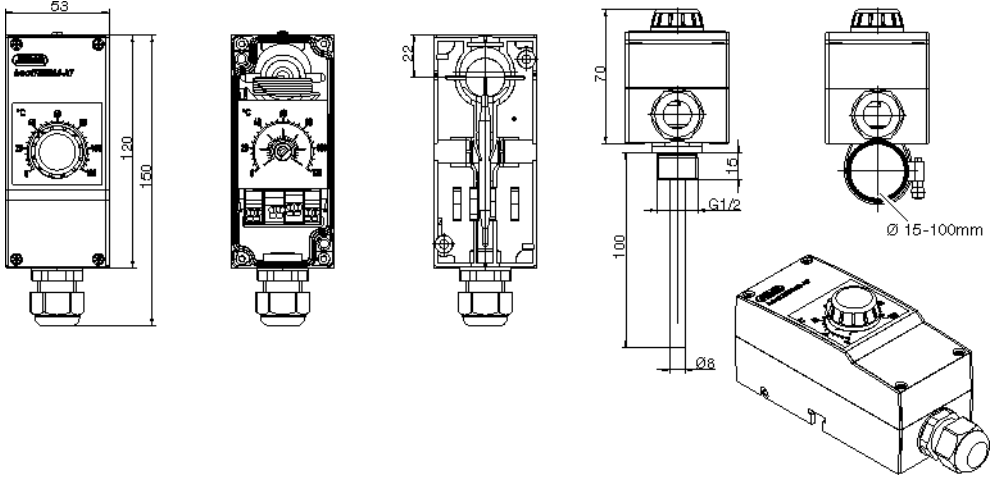
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 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
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**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
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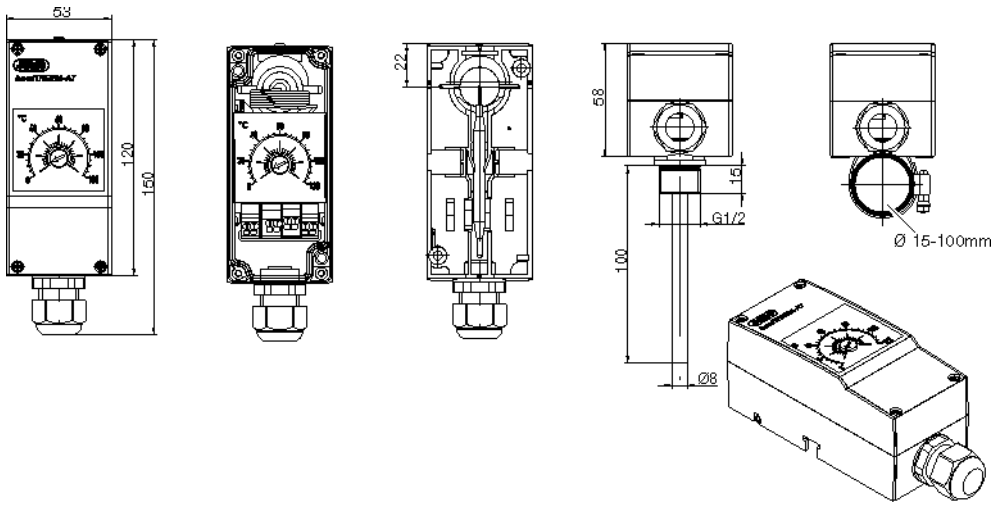
## Devices in stock: JUMO heatTHERM-AT

### Temperature controller TR, type 5

<b>Type 603070/0001<sup>a</sup></b>  <ul style="list-style-type: none"> <li>Protection type IP54</li> <li>Compensation of the ambient temperature</li> <li>Individual limitation of the control range</li> </ul> 						
Part no.	Type	Control range °C	Capillary mm	Probe-Ø (d) × L mm	Switching differential	Process connection
60003185	JUMO	0 to +120	2000	6 × 87	Approx. 3 K	With internal capillary and contact probe
60003186	heatTHERM-AT/0001					Thermowell U 4, brass nickel-plated

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

### Temperature monitor TW

<b>Type 603070/0002<sup>a</sup></b>  <ul style="list-style-type: none"> <li>Protection type IP54</li> <li>Compensation of the ambient temperature</li> <li>Switching value check through inspection window in the case lid</li> </ul>						
Part no.	Type	Control range °C	Capillary mm	Probe-Ø (d) × L mm	Switching differential	Process connection
60003187	JUMO	0 to +120	2000	6 × 87	Approx. 3 K	With internal capillary and contact probe
60003188	heatTHERM-AT/0002					Thermowell U 4, brass nickel-plated

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

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
 E-mail: mail@jumo.net  
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## Devices in stock: JUMO heatTHERM-AT

### Safety temperature monitor STW, type 5

<b>Type 603070/0020<sup>a</sup></b> <ul style="list-style-type: none"> <li>Protection type IP54</li> <li>Switching value check through inspection window in the case lid</li> <li>Compensation of the ambient temperature</li> <li>Capillary break protection</li> </ul>						
Part no.	Type	Control range °C	Capillary mm	Probe-Ø (d) × L mm	Switching differential	Process connection
60003229	JUMO	+20 to +80	2000	6 × 66	Approx. 10 K	With internal capillary and contact probe
60003189	heatTHERM-AT/0020	+70 to +130		6 × 66		Thermowell U 4, brass nickel-plated

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

### Safety temperature limiter STB, type 5

<b>Type 603070/0070<sup>a</sup></b> <ul style="list-style-type: none"> <li>Protection type IP54</li> <li>Switching value check through inspection window in the case lid</li> <li>External acknowledgement of the switching point is possible</li> <li>Compensation of the ambient temperature</li> <li>Capillary break protection</li> </ul>						
Part no.	Type	Control range °C	Capillary mm	Probe-Ø (d) × L mm	Unlocking difference	Process connection
60003230	JUMO	+70 to +130	2000	6 × 66	Approx. 10 K	With internal capillary and contact probe
60003190	heatTHERM-AT/0070					Thermowell U 4, brass nickel-plated

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

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
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## Devices in stock: JUMO heatTHERM-AT

### Room thermostat temperature controller TR, type 6

**Type 603070/0001<sup>a</sup>**

- Protection type IP54
- Wall mounting
- Individual limitation of the control range

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

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

### Room thermostat temperature limiter TW, type 6

**Type 603070/0002<sup>a</sup>**

- Protection type IP54
- Wall mounting
- Switching value check through inspection window in the case lid

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

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

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 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
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**JUMO Instrument Co. Ltd.**  
 JUMO House  
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## Devices in stock: JUMO heatTHERM-AT

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

<b>Type 603070/0120<sup>a</sup></b> <ul style="list-style-type: none"> <li>Protection type IP54</li> <li>Switching value check through inspection window in the case lid</li> <li>Compensation of the ambient temperature</li> <li>Capillary break protection for STW</li> </ul>						
Part no.	Type	Control range °C	Capillary mm	Probe-Ø (d) × L mm	Switching differential	Process connection
60003195	JUMO heatTHERM-AT/0120	TR: 0 to +120	2000	6 × 87	Approx. 3 K	With internal capillary and contact probe
		STW: 70 to +130		6 × 66	Approx. 10 K	
60003231		TR: 0 to +120		6 × 87	Approx. 3 K	Thermowell; brass nickel-plated
		STW: 70 to +130		6 × 66	Approx. 10 K	

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

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

<b>Type 603070/0170<sup>a</sup></b> <ul style="list-style-type: none"> <li>Protection type IP54</li> <li>Switching value check through inspection window in the case lid</li> <li>Compensation of the ambient temperature</li> <li>Capillary break protection for STW</li> </ul>							
Part no.	Type	Control range °C	Capillary mm	Probe-Ø (d) × L mm	Switching differential/ unlocking difference	Process connection	
60003196	JUMO heatTHERM-AT/0170	TR: 0 to +120	2000	6 × 87	Approx. 3 K	With internal capillary and contact probe	
		STB: 70 to +130		6 × 66	Approx. 10 K		
60003232				TR: 0 to +120	6 × 87	Approx. 3 K	Thermowell; brass nickel-plated
				STB: 70 to +130	6 × 66	Approx. 10 K	

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

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 36039 Fulda, Germany  
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## Devices in stock: JUMO heatTHERM-AT

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

<b>Type 603070/0202<sup>a</sup></b> <ul style="list-style-type: none"> <li>Protection type IP54</li> <li>Wall mounting</li> <li>Switching value control through inspection window in the case lid</li> </ul>						
Part no.	Type	Control range °C	Capillary mm	Probe-Ø (d) x L mm	Switching differential	Process connection
60003212	JUMO	-10 to +40	--	--	1.5 - 2 K	Spiral probe
60003213	heatTHERM-AT/0202	0 to +50				

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

### Flue gas temperature monitor with mounting sleeve, design 5

<b>Type 603070/0020<sup>a</sup></b> <ul style="list-style-type: none"> <li>Switching value check through inspection window in the case lid</li> <li>Max. allowable probe temperature +600 °C</li> <li>Approval as ATW with capillary break protection according to DIN EN 14597</li> <li>Time constant <math>t_{0.632} \leq 45</math> sec. in flue gas</li> </ul>						
Part no.	Type	Control range °C	Capillary mm	Probe-Ø (d) x L mm	Switching differential	Process connection
60003390	JUMO heatTHERM-AT/0020	+20 to +280	--	6 x 150 mm	Approx. 35 K	Intermediate piece with mounting flange

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

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
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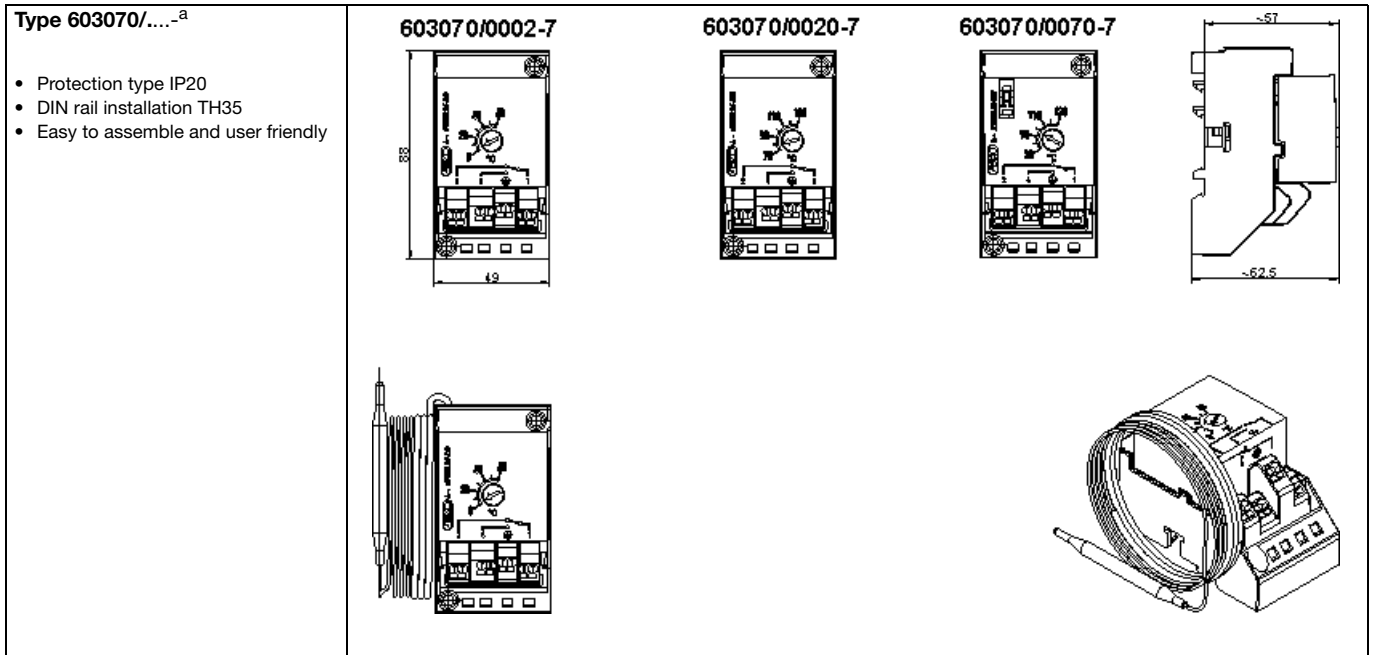
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## Devices in stock: JUMO heatTHERM-DR

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



Part no.	Type	Control range °C	Capillary mm	Probe-Ø (d) × L mm	Switching differential	Process connection
<b>Temperature monitor TW</b>						
60003283	603070/0002	0 to +120	2000	6 × 87	Approx. 3K	With capillary and contact probe
60003284	603070/0002	0 to +200		6 × 78	Approx. 5 K	
60003285	603070/0002	+50 to +300		6 × 66	Approx. 6 K	
<b>Safety temperature monitor STW</b>						
60003286	603070/0020	+70 to +130	2000	6 × 66	Approx. 10 K	With capillary and contact probe
<b>Safety temperature limiter STB</b>					Unlocking difference	
60003287	603070/0070	+70 to +130	2000	6 × 66	Approx. 10K	With capillary and contact probe
60003299	603070/0070	+20 to +150		6 × 60	In the upper third approx. 15 K At the scale beginning approx. 30 K	
60003300	603070/0070	+50 to +300		6 × 85	In the upper third approx. 25 K At the scale beginning approx. 45 K	

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

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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
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**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
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 1-800-554-5866  
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 E-mail: info.us@jumo.net  
 Internet: www.jumousa.com



# JUMO heatTHERM-DR

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

<p><b>Type 603070/0002-8<sup>a</sup></b></p> <ul style="list-style-type: none"> <li>• Protection type IP20</li> <li>• DIN rail installation TH35</li> <li>• Easy to assemble and user friendly</li> </ul> <p>Fastening hole (1) = Ø 4.5 mm</p>	<p><b>603070/0002-8</b></p>	<p><b>603070/0020-8</b></p>	<p><b>603070/0070-8</b></p>	
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<sup>a</sup> Upon request - minimum order quantity 100 pieces.

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 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
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 Harlow, Essex CM20 2DY, UK  
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## Order details

### Surface-mounted thermostat JUMO heatTHERM, type 603070

Minimum purchase order 100 pieces

Order code	(1) Basic type
603070	JUMO heatTHERM with single-pole snap-action switch
(2) Basic type extension	
0001	Temperature controller (TR)
0002	Temperature monitor (TW)
0020	Safety temperature monitor (STW) or flue gas temperature monitor (ATW)
0070	Safety temperature limiter (STB)
0120	Temperature controller / safety temperature monitor (TR/STW)
0170	Temperature controller / safety temperature limiter (TR/STB)
0202	Temperature monitor / temperature monitor (TW/TW)
(3) Type	
5	 Surface-mounted thermostat, with thermowell, flange sleeve, capillary, or as contact probe
6	 surface-mounted room thermostat, with spiral probe
7	 DIN rail thermostat, with capillary
8	 DIN-rail room thermostat, with spiral probe
(4) Control range / limit value range 1 [°C]	
016	-10 to +40 TR, TW
021	0 to +50 TR, TW
026	0 to +120 TR, TW
028	0 to +200 TR, TW, STB
040	+20 to +80 STW
043	+20 to +150 TR, TW, STB
064	+50 to +300 TR, TW, STB With thermowell, select process connection 76
671	+70 to +130 STW, STB
384	+20 to +280 ATW Only with process connection 80
Further control ranges / limit value ranges up to 350 °C upon request (up to +500 °C without approval)	
(5) Control range / limit value range 2 [°C]	
000	Single thermostat
016	-10 to +40 TR, TW Adjustable
021	0 to +50 TR, TW Adjustable
671	+70 to +130 STW, STB Adjustable
Further control ranges / limit value ranges up to 350 °C upon request (up to +500 °C without approval)	
(6) Limit value 1 STW/STB	
000	for adjustable control range
095	95 °C
100	100 °C
110	110 °C



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 Delivery address: Mackenrodtstraße 14  
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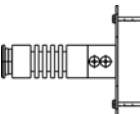

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## Order details

### Surface-mounted thermostat JUMO heatTHERM, type 603070

Order code	(7) Limit value 2 STW/STB
000	for adjustable control range
095	95 °C
100	100 °C
110	110 °C
<b>(8) Switching differential 1</b>	
00	Without switching differential (STB)
25	2.5 % of the scale range
70	7 % of the scale range
<b>(9) Switching differential 2</b>	
00	Without switching differential (STB)
25	2.5 % of the scale range
70	7 % of the scale range
<b>(10) Capillary length 1</b>	
0	0 mm only for room thermostat
2000	2000 mm Special length upon request
<b>(11) Capillary length 2</b>	
0	0 mm only for room thermostat
2000	2000 mm Special length upon request
<b>(12) Material of capillary 1</b>	
00	Without capillary
20	CrNi Stainless steel
40	Cu Copper
<b>(13) Material of capillary 2</b>	
00	Without capillary Single thermostat
20	CrNi Stainless steel
40	Cu Copper
<b>(14) Process connection</b>	
10	Plain cylindrical probe / contact probe 
15	Spiral probe 
80 <sup>a</sup>	Intermediate piece with mounting flange 
76 <sup>b</sup>	Intermediate piece 

<sup>a</sup> Only control ranges +20 to +280 °C (ATW) selectable.

<sup>b</sup> As of a control range value larger than 150 °C, select process connection 76 for mounting with thermowell. Select thermowell according to data sheet 606710, screw-in sleeve "20" with G1/2 thread made out of stainless steel (CrNi).

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
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## Order details

### Surface-mounted thermostat JUMO heatTHERM, type 603070

<b>Order code</b>	<b>(15)</b>	<b>Diameter 1</b>
6		∅ 6 mm
17		∅ 17 mm      Spiral probe for room thermostat (with process connection 15)
	<b>(16)</b>	<b>Diameter 2</b>
00		Single thermostat
6		∅ 6 mm
17		∅ 17 mm      Spiral probe for room thermostat (with process connection 15)
	<b>(17)</b>	<b>Probe material 1</b>
20	CrNi	Stainless steel
40	Cu	Copper
	<b>(18)</b>	<b>Probe material 2</b>
00		Single thermostat
20	CrNi	Stainless steel
40	Cu	Copper
	<b>(19)</b>	<b>Capillary insulation</b>
00		No protective tube
13		PVC tube, black
	<b>(20)</b>	<b>Insulation length (from case)</b>
0		No protective hose
460		460 mm
		Special length upon request
	<b>(21)</b>	<b>Extra codes<sup>a</sup></b>
000		Without extra codes
061		With UL approval
402		Case protection type IP54
702		Snap-action switch, gold-plated
749		Setting range with 250 angular degrees (only STB/STW)
758		Tightening band for contact probe

<sup>a</sup> List extra codes in sequence, separated by commas.

**Order code**

(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21)  
 603070 / [ ] - [ ] / [ ] , ...

**Order example**

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

<sup>a</sup> List extra codes in sequence, separated by commas.

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
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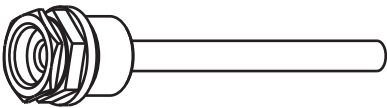

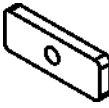

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 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

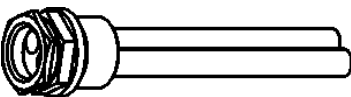

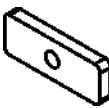

**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
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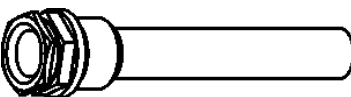


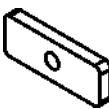




## Accessories

(according to product group 606710)

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

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

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

<b>Adapter piece for thermowell<sup>a</sup></b>					Material	
<b>Part no.</b>					Steel / nickel-plated	
00507273						

<sup>a</sup> necessary for thermowell with process connection "20" or "23".



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

**JUMO Instrument Co. Ltd.**  
JUMO House  
Temple Bank, Riverway  
Harlow, Essex CM20 2DY, UK  
Phone: +44 1279 635533  
Fax: +44 1279 635262  
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East Syracuse, NY 13057, USA  
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Fax: 315-437-5860  
E-mail: info.us@jumo.net  
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# JUMO frostTHERM-AT/-DR

## Type 604100, Surface-mounted or DIN Rail Thermostat

### Special features

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

### Brief description

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

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

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

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



JUMO frostTHERM-AT (STW)



JUMO frostTHERM-DR (STW)

### Approval/approval marks (see Technical Data)



**JUMO GmbH & Co. KG**

Delivery address: Mackenrodtstraße 14  
36039 Fulda, Germany  
Postal address: 36035 Fulda, Germany  
Phone: +49 661 6003-0  
Fax: +49 661 6003-607  
E-mail: mail@jumo.net  
Internet: www.jumo.net

**JUMO Instrument Co. Ltd.**

JUMO House  
Temple Bank, Riverway  
Harlow, Essex CM20 2DY, UK  
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**Switching function**

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

**Technical data**

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

**Approvals / approval marks**

Approval marks	Testing agency	Certificates / certification number	Inspection basics	Valid for
EAC <sup>a</sup>	Gost Norm AG	TC RU C-DE.AB98.B.00348	Technical rules of the customs union Russia/Belarus/ Kazakhstan	JUMO frostTHERM-AT/ -DR

<sup>a</sup> Russian documentation upon request

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
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 Phone: +49 661 6003-0  
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## Electrical data

<b>Electrical contact</b>	Snap-action switch with single-pole changeover contact	
<b>Switching capacity</b>	STW	STB
	On the N/C contact (contact deck 1-2): AC 230 V +10 %, 16 (2.5) A, cos φ = 1 (0.6), DC 230 V +10 %, 0.25 A On the N/O contact (contact deck 1-4): AC 230 V +10 %, 6.3 (2.5) A, cos φ = 1 (0.6), DC 230 V +10 %, 0.25 A	On the N/C contact (contact deck 1-2): AC 230 V +10 %, 16 (2.5) A, cos φ = 1 (0.6), DC 230 V +10 %, 0.25 A On the signal contact (contact deck 1-4): AC 230 V +10 %, 2 (0.4) A, cos φ = 1 (0.6), DC 230 V +10 %, 0.25 A
<b>Electrical connection</b>	<b>PUSH IN</b> contact (plug-type terminal) "Push-In <sup>®</sup> " terminal technology: Patented connection technology from Weidmüller GmbH & Co. KG, Detmold.	
<b>Connection cross section</b>	0.75 to 2.5 mm <sup>2</sup> finely stranded (single-wire, fine wired with ferrule)	
<b>Switching reliability</b>	To ensure high switching reliability, we recommend a minimum load of: AC / DC = 24 V, 100 mA with silver contacts	
<b>Switching point accuracy</b>	+/- 2 °C	
<b>Switching differential</b>	1.5 +/- 1 °C	
<b>Factory setting switching point</b>	5 °C	

## Connection diagram

		<p>STW</p>	<p>STB</p>	<p>The connection diagram included in the data sheet provides initial information about the connection options. Only use the installation instructions or the operating instructions for the electrical connection. The know-how and the correct technical implementation of the safety instructions/warnings contained in these documents are prerequisite for the installation, electrical connection, and startup as well as for safety during operation.</p>
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 Delivery address: Mackenrodtstraße 14  
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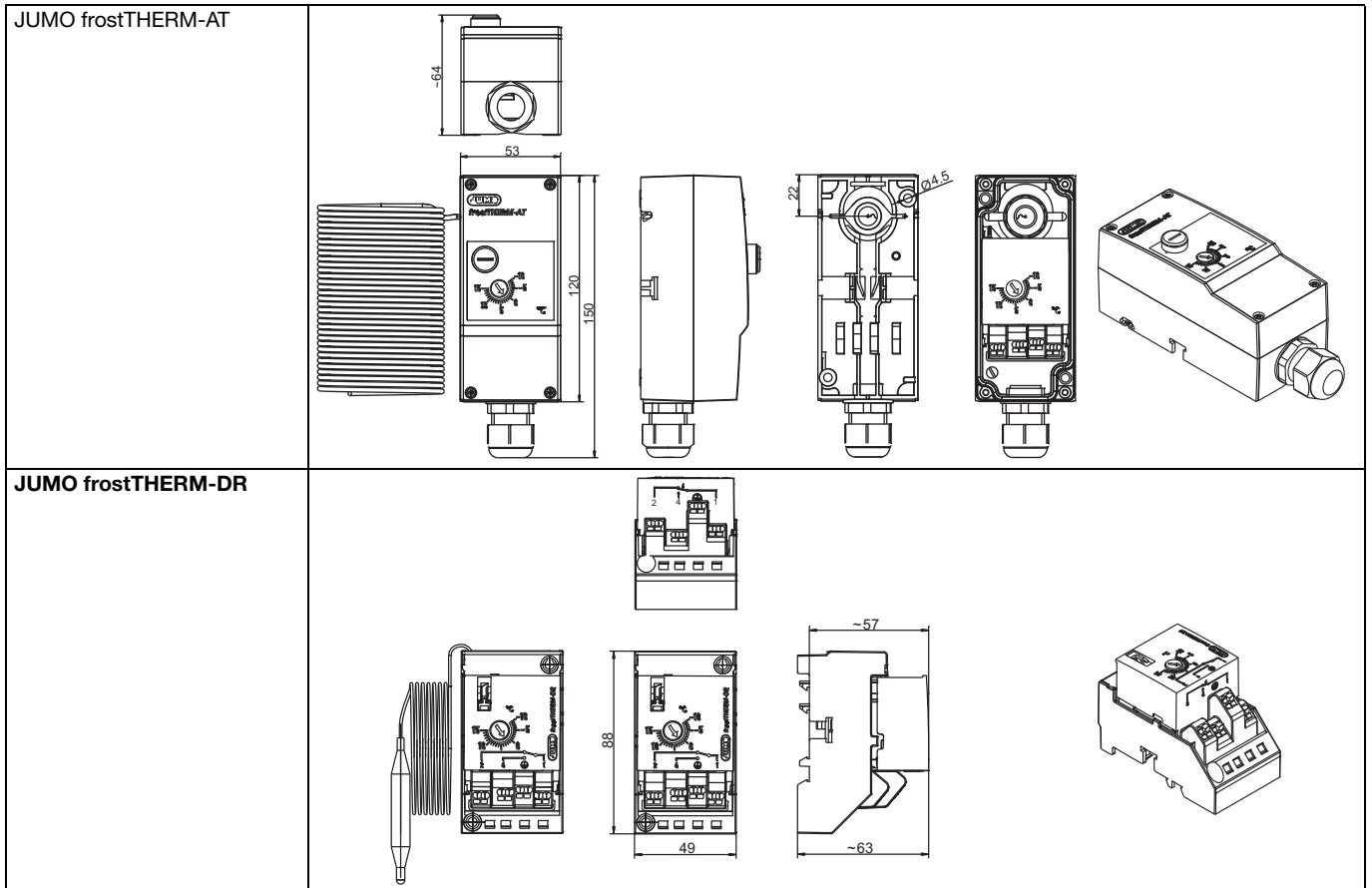
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# Dimensions

## JUMO frostTHERM type 604100



## Accessories

(Data sheet 606710)

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



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 Delivery address: Mackenrodtstraße 14  
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## Order details

### JUMO frostTHERM type 604100

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

**Order code**

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

**Order example**

604100	/	20	-	5	-	140	-	3000	-	0	-	40	/	404
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## Stock versions

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



**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
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# JUMO frostTHERM-ATE

## Electronic Frost Protection Thermostat, Type 604170

### Special features

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

### Brief description

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

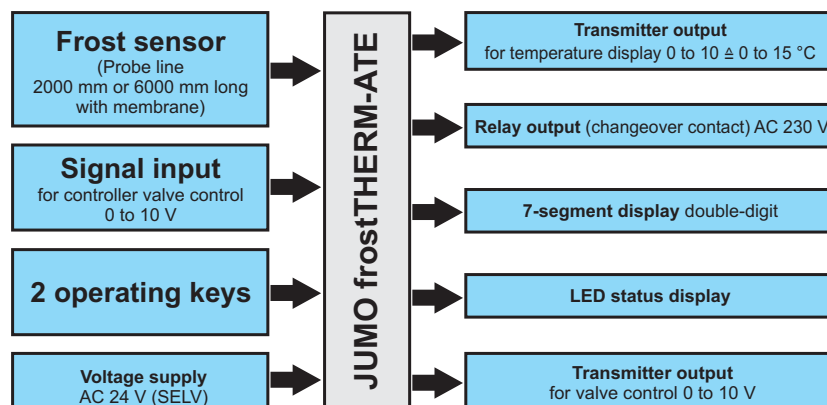
#### Applications:

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

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



### Block diagram





## Description

### Device function

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

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

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

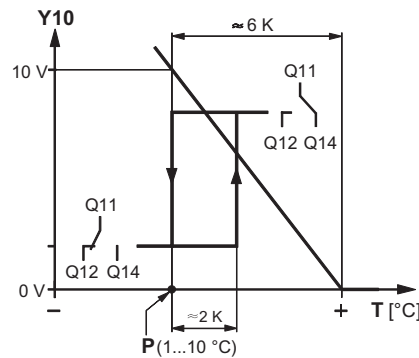
### Function

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

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

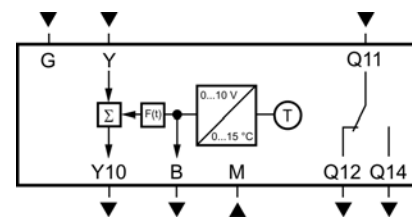
The measuring signal undergoes further processing and becomes the frost signal for the monitor function and valve control. At around 6 kelvin above the set switching point (P), the frost signal starts to increase.

### Function chart



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

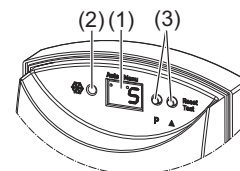
### Circuit diagram for device



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

## Display and control elements

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



## Parameters and configuration

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

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
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## Technical data

### Specifications

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

### Electrical data

according to EN 60730

Electrical connection	Terminals featuring tension springs	Max. 2 x 1.5 mm <sup>2</sup> or 1 x 2.5 mm <sup>2</sup> Min. 0.25 mm <sup>2</sup>
	Cable inlet	Cable gland M16, for cable Ø 5 to 10 mm
Voltage supply		AC 24 V +10 % / -20 %
	Frequency	48 to 63 Hz
	Power consumption	Max. 6.6 VA
	Electrical protection	Power switch max. 13 A
Analog input	Valve control (terminal Y)	DC 0 to 10 V
	Current	Max. 0.1 mA
	Admissible line length for 1.5 mm <sup>2</sup>	300 m
Analog outputs	Probe temperature (terminal B)	DC 0 to 10 V ± 0 to 15 °C
	Valve control (terminal Y10)	DC 0 to 10 V
	Current	Max. 1 mA
	Admissible line length for 1.5 mm <sup>2</sup>	300 m
Relay output (terminal Q11, -12, -14)	Output	Floating
	Min. switching capacity	AC/DC 12 V, 100 mA
	Max. switching capacity	AC 230 V, 6(2) A; DC 24 V, 6 A

### Environmental influences

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

### Case

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

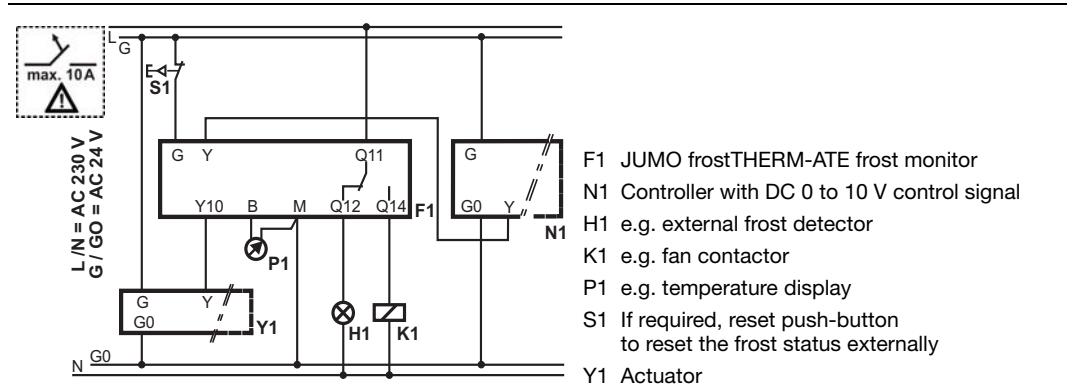
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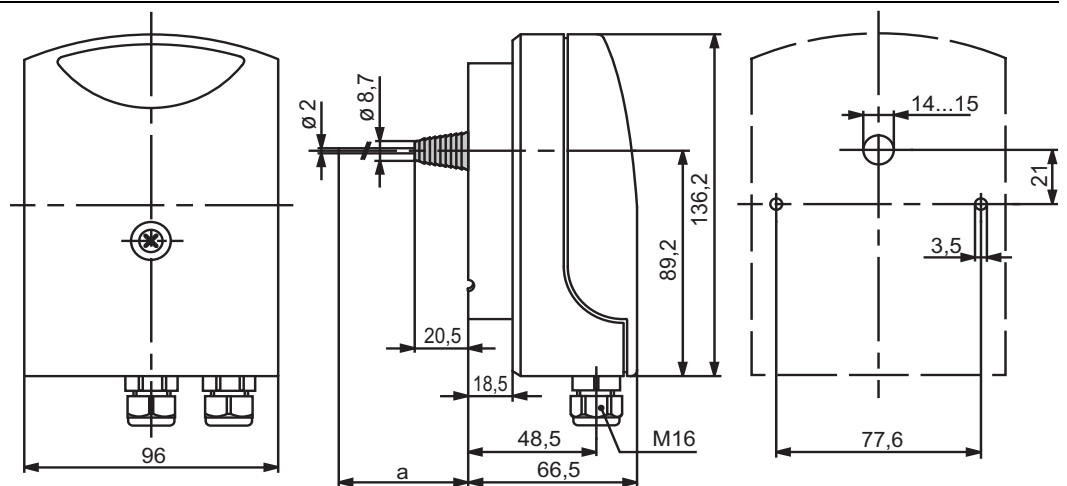


## Connection example



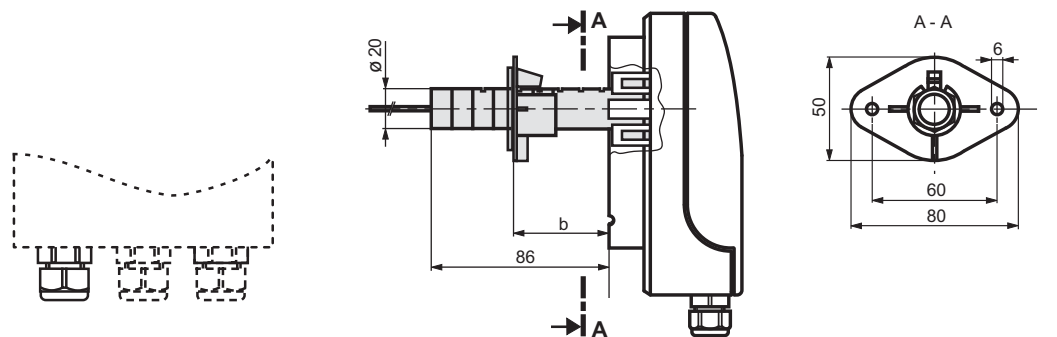
## Dimensions

Measurements in mm



Drilling diagram for direct mounting

Optional connectable accessories



Max. 1 cable gland for additional mounting

Mounting flange

b	
Max.	Min.
70	10

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 E-mail: mail@jumo.net  
 Internet: www.jumo.net

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
 Internet: www.jumousa.com



## Order details

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

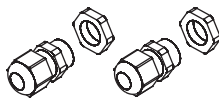


Order code      (1)      (2)      (3)      (4)      (5)      (6)      (7)  
 604170 /      -      -      -      -      -      /        
 Order example    604170 /    02    -    5    -    008    -    6000    -    40    /    000

## Stock version



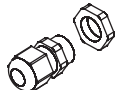
JUMO frostTHERM-ATE	Probe line length 2000 mm	TN 60003410
	Probe line length 6000 mm	TN 60003411

## Accessories

Accessories  
 integrated as standard

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

Optional  
 connectable accessories

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





**JUMO GmbH & Co. KG**

Delivery address: Mackenrodtstraße 14  
36039 Fulda, Germany  
Postal address: 36035 Fulda, Germany  
Phone: +49 661 6003-0  
Fax: +49 661 6003-607  
E-mail: mail@jumo.net  
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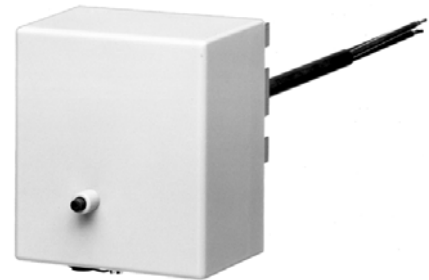


# Hot Air Thermostats

## WTHc series

### Special features

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



WTHc-2280

### Brief description

Thermostats are used to control and monitor thermal processes.

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

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

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



WTHc-2280-SW

### Switching function

#### Temperature controller TR and temperature monitor TW

If the temperature on the temperature probe exceeds the setpoint value, the microswitch is activated by the transmission mechanics and the electrical circuit is opened or closed. If the temperature falls below the selected setpoint value (by the amount of the switching differential), the microswitch is reset to its initial position.

#### Temperature monitor TW and safety temperature limiter STB

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

#### Self-monitoring for the safety temperature limiter STB

If the measuring system is destroyed (i.e. if the expansion fluid escapes) the pressure in the membrane of the STB drops and permanently opens the electrical circuit. Unlocking is then no longer possible. The electrical circuit opens when cooling the probe of STB down to the negative temperature range, but it then closes again if the temperature unlocks itself automatically.

### Approval/approval marks (see "Technical data")



**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
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## Technical data

### General information

#### Control ranges and limit values

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

#### Capillary and temperature probe

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

<sup>a</sup> Probe identification for the version with capillary: ventilator controller TR: red; burner monitor TW: blue

#### Electrical data

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

#### Operating data

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

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

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

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

**Approval/approval marks**

Approval marks	Inspection authority	Certificates / inspection number	Inspection basics	Valid for
DIN	DIN CERTCO / TÜV Süd	TR/TW/STB1064	DIN EN 14597	WTHc hot air thermo- stats
DIN	DIN CERTCO / TÜV Süd	TR/TW/STW1205	DIN EN 14597	
EAC <sup>a</sup>	Gost Norm AG	TC RU C-DE.AB98.B.00348	Technical rules of the cus- toms union Russia/ Belarus/Kazakhstan	

<sup>a</sup> Russian documentation upon request

**Note**

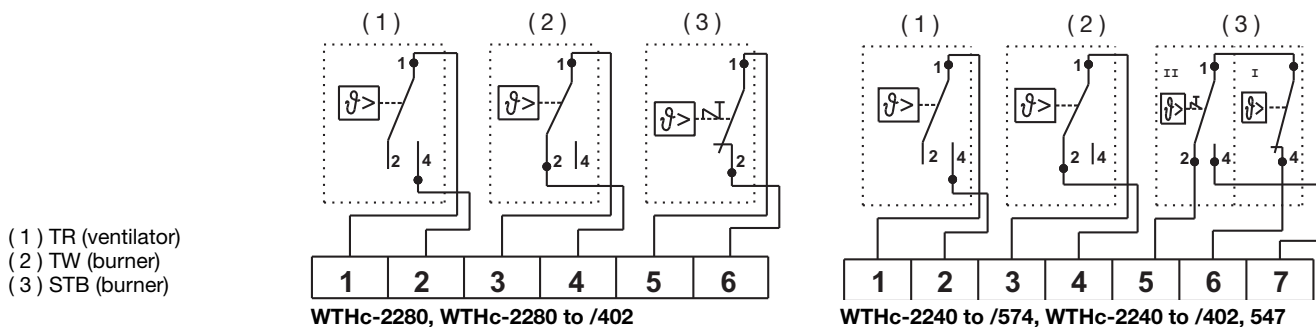
Physical and toxic features of the expansion means, which could emerge in the event of a measuring system break.

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

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

**Connection diagram**

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



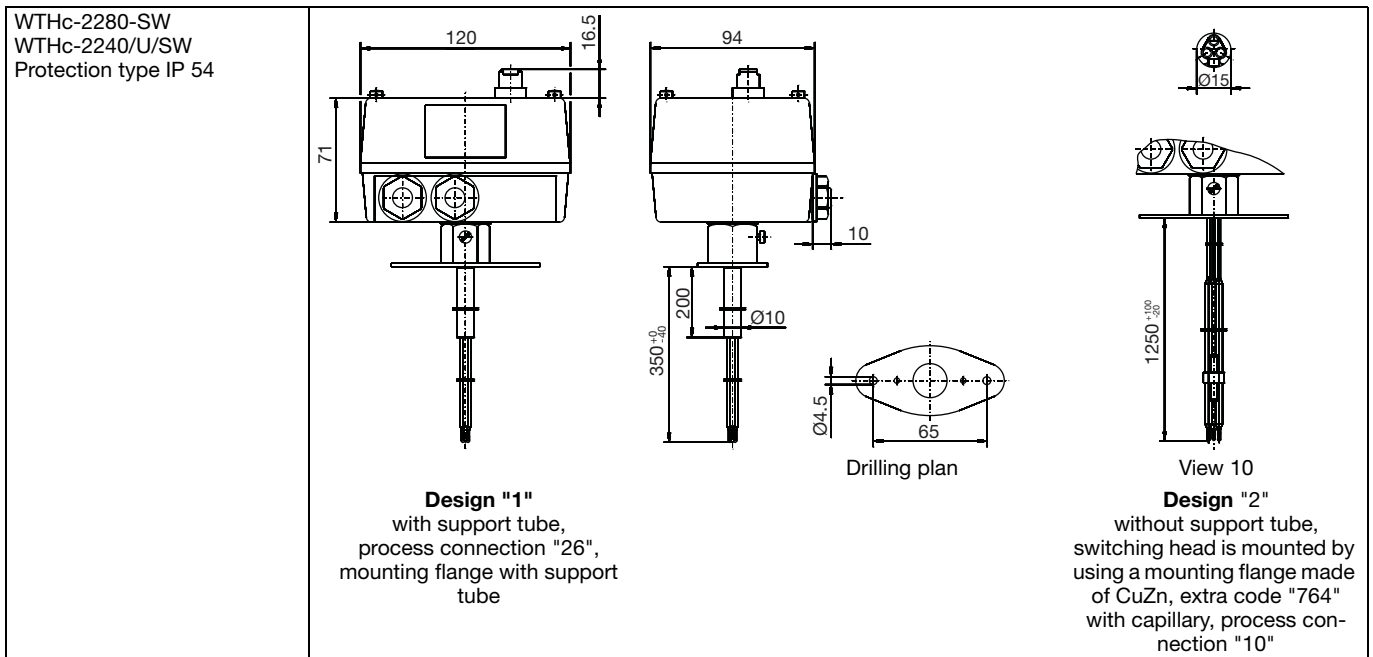
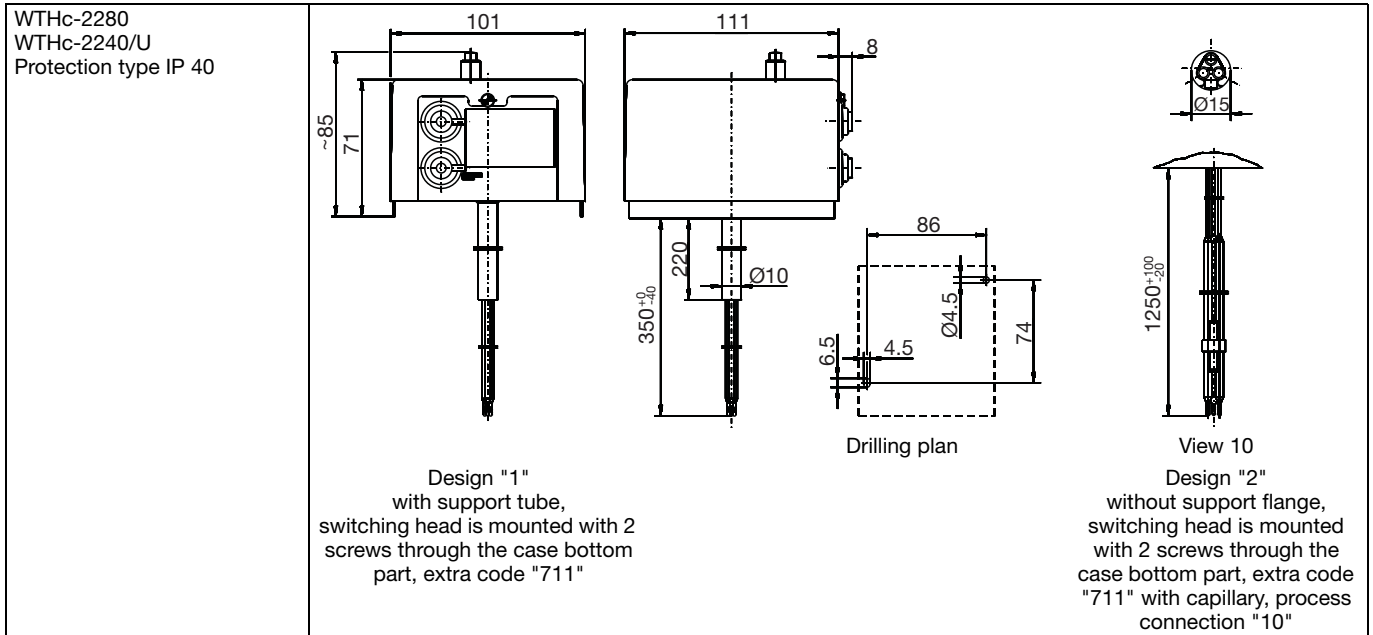
**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
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 East Syracuse, NY 13057, USA  
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## Dimensions



## Stock versions

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

(Delivery within 3 working days after receipt of order)

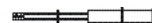
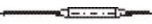
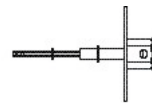
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 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
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## Order details

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

<sup>a</sup> Other control / limit ranges upon request

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

<sup>a</sup> List extra codes in sequence, separated by commas.



**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
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# JUMO exTHERM-AT

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

### Special features

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

### Brief description

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

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

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

#### Version according to DIN EN 14597:

<b>TW</b>	Temperature monitor
<b>STW</b>	Safety temperature monitor
<b>STB</b>	Safety temperature limiter



JUMO exTHERM-AT double thermostat



JUMO exTHERM-AT single thermostat

### ATEX identification

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

### ATEX confirmation

EPS 11 ATEX 1 354

### EAC-Ex confirmation

TC RU C-DE.ME92.B.00443

### IECEx identification

	<b>Ex d e IIC T4/T5/T6 Gb</b> For explosive gas atmosphere
	<b>Ex tb IIIC T85 °C/T100 °C/T130 °C Db</b> For explosive dust atmosphere

### IECEx confirmation

IECEx EPS 13.0046

### SIL-confirmation

EPS 11 ATEX 1 354 (SIL 2)

### Approvals/approval marks (see "Technical data")



\* Available with extra code (TZ 240)  
 \*\* Available with extra code (TZ 372)  
 \*\*\* Available with extra code (TZ 073)

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
 E-mail: mail@jumo.net  
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 Harlow, Essex CM20 2DY, UK  
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## Technical data

### Switching function

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

### Temperature compensation

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

### Case

Material	Polyester case, glass fiber reinforced, black (option: stainless steel)
Protection type	EN 60529 - IP65 (polyester case), pollution level 2, IP 66 with extra code 861
Setpoint value adjustment	With screwdriver (once the case lid has been removed)
Switching head fastening	Using four screws (once the case lid has been removed)
Weight	Approx. 1200 g single thermostat / approx. 2000 g double thermostat
Cable inlet	Ex cable gland M20 × 1.5, sealing area 6 to 13 mm and Ex cable gland M25 × 1.5, sealing area 7 to 17 mm

### Process connection

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

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

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



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**Electrical data**

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

\* standard

**Capillary and temperature probe**

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

**Control ranges and probe table**

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

**Switching point tolerance in the middle section of the scale**

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

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

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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
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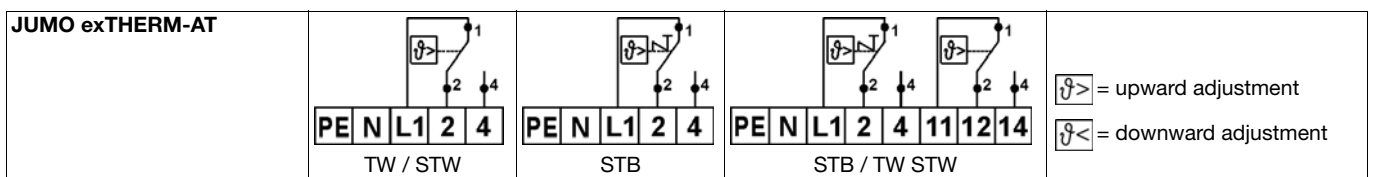


## Approvals/approval marks

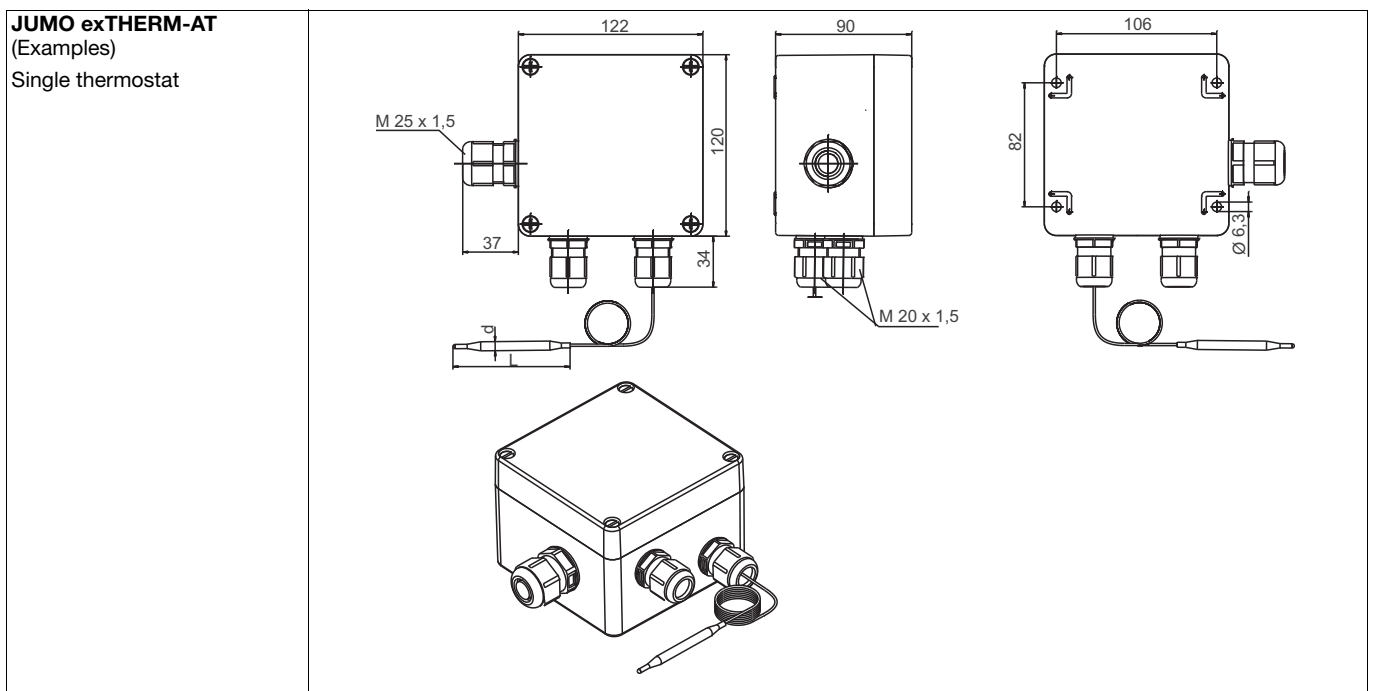
JUMO exTHERM-AT	Switching function	Certificates/test confirmations	Tests	Standard
	TW / STW / STB	EPS 11 ATEX 1 354	ATEX	DIN EN 60079
		IECEX EPS 13.0046	IECEX TZ 372	IEC 60079
		TC RU C-DE.ME92.B.00443	EAC-Ex <sup>a</sup> TZ 240	TR RC 012/2011
	STW / STB	EPS 11 ATEX 1 354	SIL 2 TZ 073	DIN EN 50495

<sup>a</sup> Russian documentation upon request

## Wiring diagrams



## Dimensions



**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
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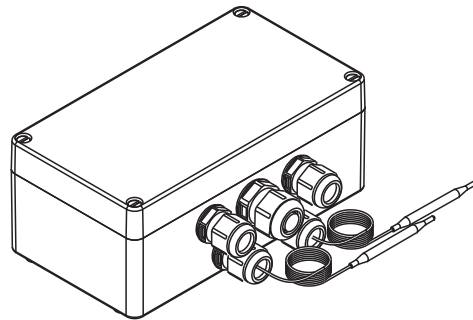
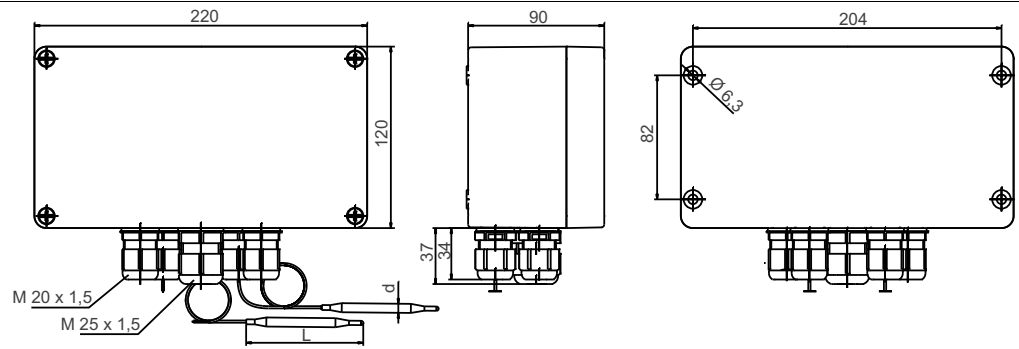
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 Harlow, Essex CM20 2DY, UK  
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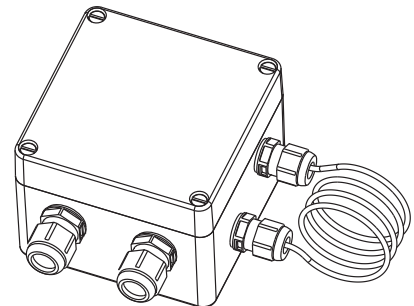
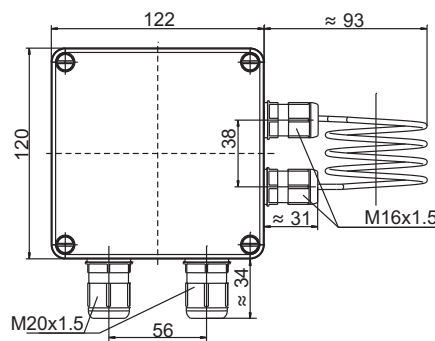
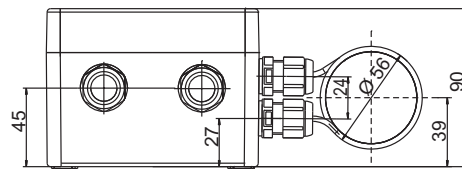


# Dimensions

**JUMO exTHERM-AT**  
 (Examples)  
 Double thermostat



Room thermostat



**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
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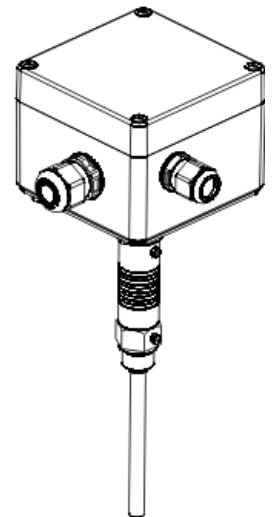
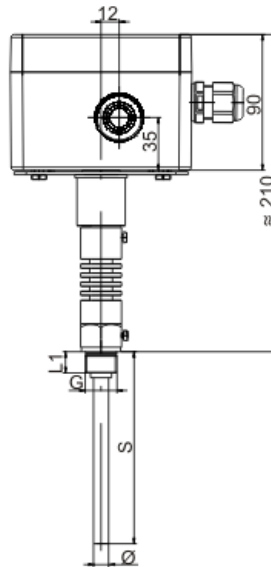
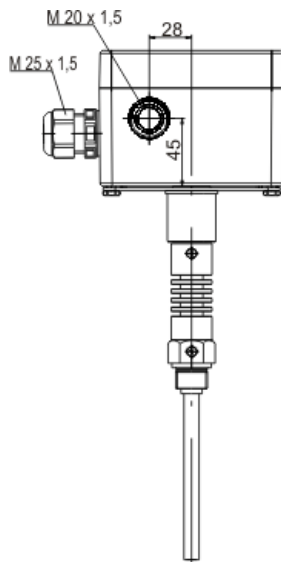
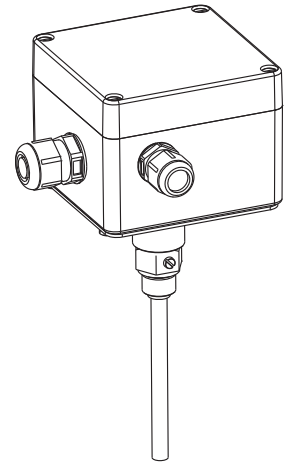
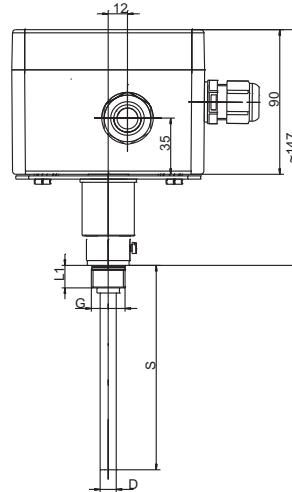
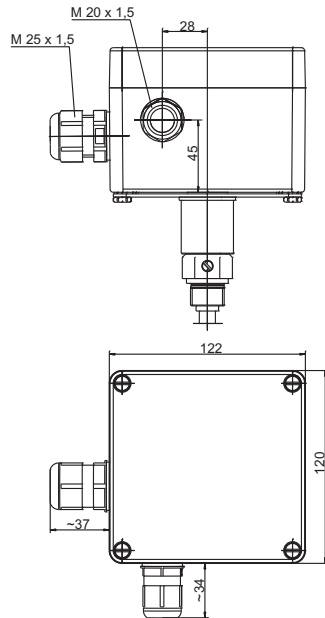
## Dimensions

### JUMO exTHERM-AT (Examples)

Thermostat with rigid thermowell (process connection 74)

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

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



**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
 E-mail: mail@jumo.net  
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**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
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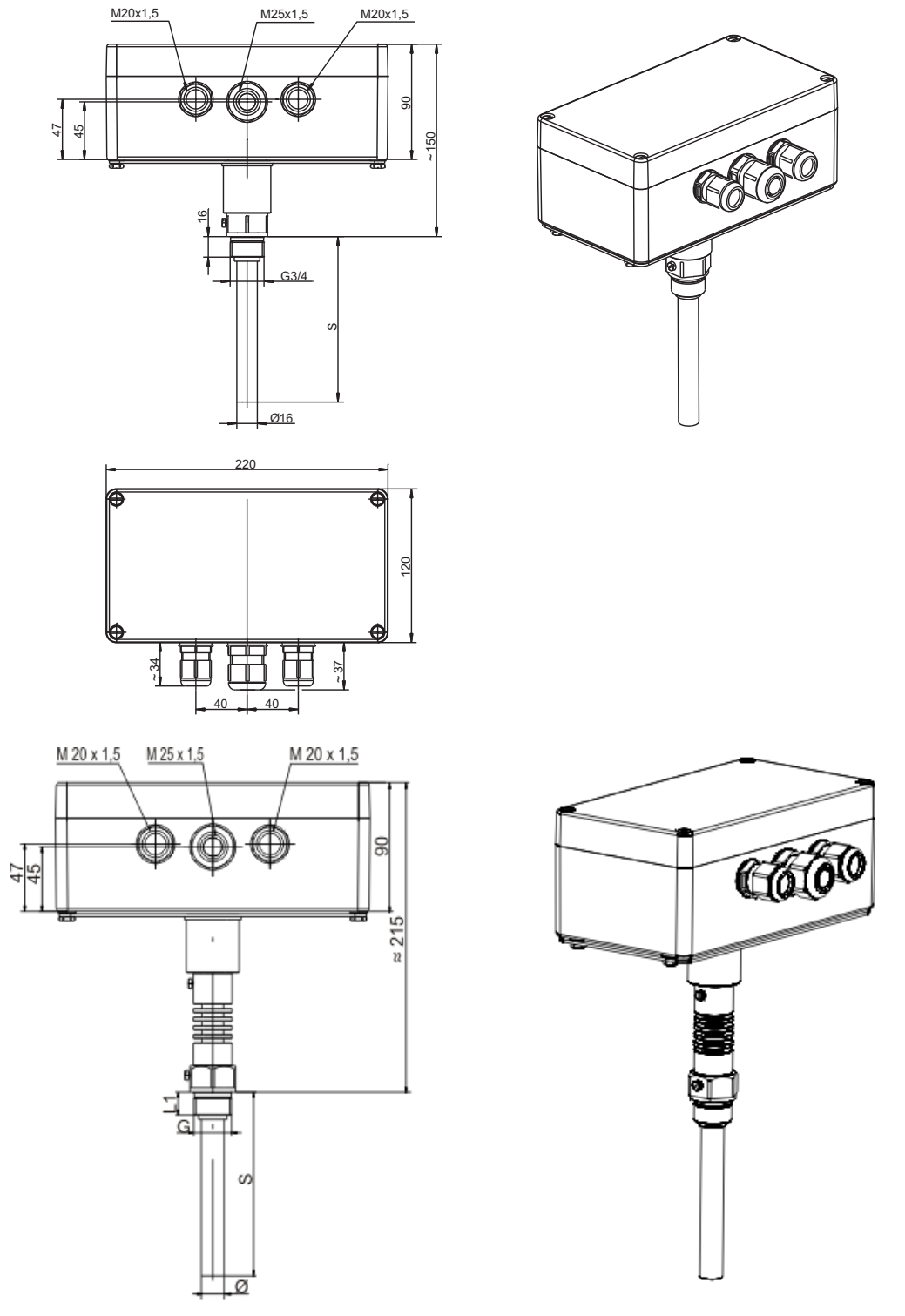
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 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
 Internet: www.jumousa.com



## Dimensions

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

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



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 36039 Fulda, Germany  
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 JUMO House  
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## Order details

### Explosion-proof panel-mounted thermostat JUMO exTHERM-AT

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

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 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
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 Harlow, Essex CM20 2DY, UK  
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<b>(11) Capillary length 1</b>	
0	0 mm design type 6, rigid thermowell
1000	1000 mm
3000	3000 mm
...	(Special length, specifications in plain text, 1000 mm increments)
<b>(12) Capillary length 2</b>	
0	0 mm (only design type 6 and for single thermostat)
1000	1000 mm
3000	3000 mm
...	(Special length, specifications in plain text, 1000 mm increments)
<b>(13) Capillary material</b>	
20	Stainless steel (CrNi)
<b>(14) Process connection (PC)</b>	
10	Plain cylindrical probe
15	Spiral probe
74	Mounting adaptor (to 300 °C) (thermowells can be ordered separately according to data sheet 605057 (with Ex-approval) or data sheet 606710 (standard))
<b>(15) Diameter 1 "d" (single thermostat)</b>	
4	Ø 4 mm
6	Ø 6 mm
56	Ø 56 mm
<b>(16) Diameter 2 "d" (double thermostat)</b>	
0	Without
4	Ø 4 mm
6	Ø 6 mm
<b>(17) Insertion length "S"</b>	
0	Without thermowell
200	200 mm
300	300 mm
<b>(18) Extra codes</b>	
000	Without extra code
073	SIL- and IPL-Approvals (only STB and STW)
240	EAC-Ex-Approvals
372	IECEX Approvals
861	IP66

**Order code:**

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

**Order example:**

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

**Stock versions**

Order code	Control range °C	Probe CrNi / mm	Capillary CrNi / mm	Part no.
605055/0002-6-4-013-000-21-467-25-00-0-0-20-15-56-0-0/000	-20 bis +40	spiral probe	--	60003366
605055/0020-5-4-014-000-21-467-70-00-1000-0-20-10-6-0-0/000	-20 bis +50	6 x 81	1000	60003365
605055/0020-5-4-026-000-21-467-70-00-1000-0-20-10-6-0-0/000	0 bis +120	6 x 58		60003367
605055/0020-5-4-064-000-21-467-70-00-1000-0-20-10-4-0-0/000	+50 bis +300	4 x 78		60003368
605055/2070-5-4-028-064-21-467-70-00-1000-1000-20-10-4-4-0/000	0 bis +200 (STW)	4 x 87 (STW)		60003369
	+50 bis +300 (STB)	4 x 78 (STB)		
605055/0020-5-4-028-000-21-467-70-00-1000-0-20-10-6-0-0/000	0 bis +200	6 x 48		60003391
605055/0070-5-4-028-000-21-467-00-00-1000-0-20-10-6-0-0/000	0 bis +200	6 x 48		60003395
605055/0002-5-4-028-000-21-467-25-00-1000-0-20-10-6-0-0/000	0 bis +200	6 x 154		60003401





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

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

### Special features

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

### Brief description

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



### Ex identification



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

### Test confirmation

EPS 12 ATEX 1 423 U

### Approvals/approval marks



**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
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## Technical data

### Thermowells made of stainless steel

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

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

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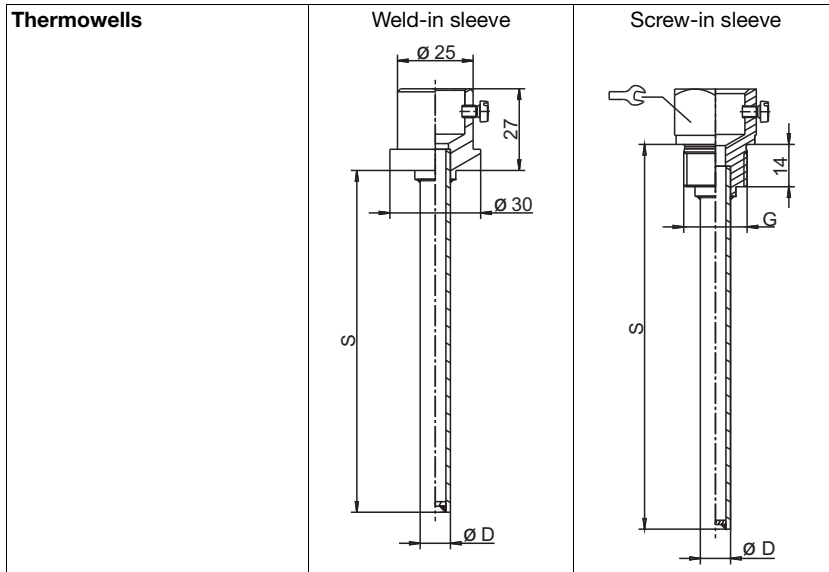
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## Approvals/approval marks

ATEX	EN 600079
Acceptance inspection certificate 3.1	DIN EN 10204

## Dimensions



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 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
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## Order details

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

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

**Order code:**

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

**Order example:**

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

## Stock versions

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

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 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

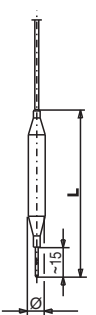
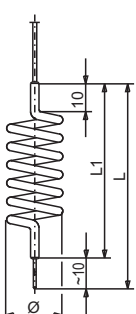
**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
 Internet: www.jumousa.com

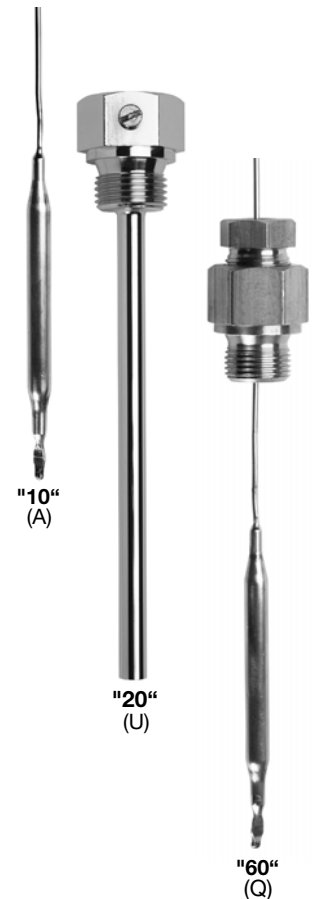


# Process connections for thermostats

- Temperature probes
- Screw fittings
- Pockets

## Temperature probe

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



<b>Order code:</b>	1	2	3
	606710-..	..	.
<b>Order example:</b>	606710-10	20	8

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
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## Screw-connections

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

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

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

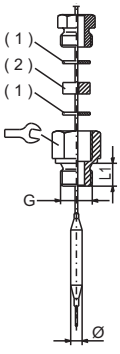


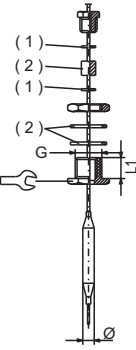

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 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
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 Internet: www.jumo.net

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 JUMO House  
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 Harlow, Essex CM20 2DY, UK  
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 E-mail: info.us@jumo.net  
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## Screw-connections

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

<b>Order code:</b>	<b>1</b>	-	<b>2</b>	-	<b>3</b>
	606710-..		..		..
Order example:	606710-60		13		20

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
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## Sheaths

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

<b>Order code:</b>	1	2	3	4	5
Order example:	606710-..	..	..	...	..
	606710-20	13	01	100	10



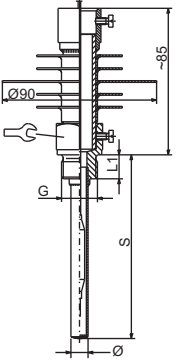
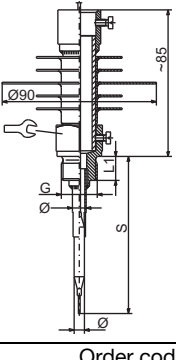
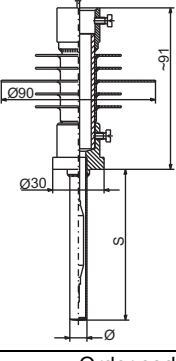
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 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
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 East Syracuse, NY 13057, USA  
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 1-800-554-5866  
 Fax: 315-437-5860  
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## Sheaths

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

<b>Order code:</b>	1	2	3	4	5
Order example:	606710-30	13	20	200	8

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 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
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## Sheaths

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

<b>Order code:</b>	606710-..	-	..	-	..	-	...	-	..
<b>Order example:</b>	606710-42	-	00	-	01	-	300	-	8

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 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
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## Sheaths

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

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

## Optional accessories

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

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## Admissible load at the sheath

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

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

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

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

### Sheath made of stainless steel

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

### Sheath made of brass (must not be used for requirements acc. to PED)

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

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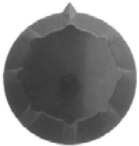




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# JUMO setpoint adjusters for thermostats, EM series

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

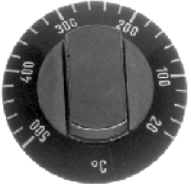






		 	
<p><b>01</b>  <b>Spindle-fitting knobs for pushing onto 6 mm dia. shafts, with 4.6 mm flat</b></p> <p><b>Part no. 60 701 205</b></p> <p>Max. dia. 30.0 mm          Height 19.0 mm          Index radius 17.5 mm          Panel hole 14.0 mm          Operating temperature +120 °C          Material thermoplastic,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

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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
 Internet: www.jumousa.com



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

**Standard setpoint adjusters for panel-mounting thermostats EMf-1**

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

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
 E-mail: mail@jumo.net  
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 Harlow, Essex CM20 2DY, UK  
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 East Syracuse, NY 13057, USA  
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 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
 Internet: www.jumousa.com



# Bimetal Dial Thermometer

## Standard version

### Special features

- Class 1.5
- Display ranges -50°C to +500°C
- Steel case zinc-plated
- Case sizes Ø: 63 mm, 80 mm and 100 mm
- Protection type IP 51

### Brief description

The locally displaying standard thermometers work according to the principle of a bimetal coil. The measuring principle is based on the fact that the bimetal coil is exposed to the medium temperature in a stainless steel or brass protection tube. The coil rotates as the temperature increases or falls. The rotation acts directly on the indicator via an axis. The indicator deflection is therefore proportional to the change of temperature.



Type 608001/1810

Type 608001/0110

### Technical data

<b>Basic type extension</b>	0163, 0180, 0110, 1863, 1880, 1810
<b>Case</b>	Case and bezel made of galvanized steel sheet; bracket made of aluminum (design type 18)
<b>Protection type</b>	IP 51 according to DIN EN 60529
<b>Front pane</b>	Glass
<b>Scale</b>	Polished aluminum, with black lettering
<b>Display</b>	Linear, class 1.5 similar to DIN EN 13190
<b>Time constant <math>t_{0.632}</math></b>	Approx. 30 s, measured in flowing water with a probe Ø of 10 mm made of stainless steel
<b>Influential effect of the ambient temperature</b>	No influence
<b>Limit value temperatures</b>	-30 to +80°C (storage and transport -30 to +80°C)
<b>Rated position</b>	Any

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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
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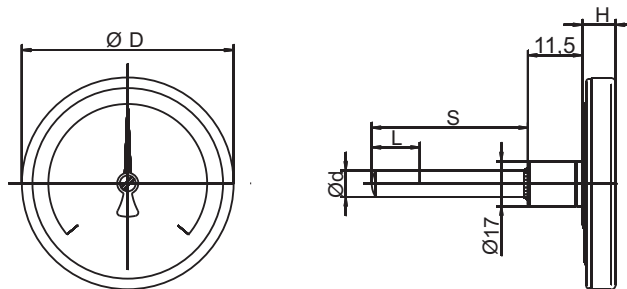


## Technical data

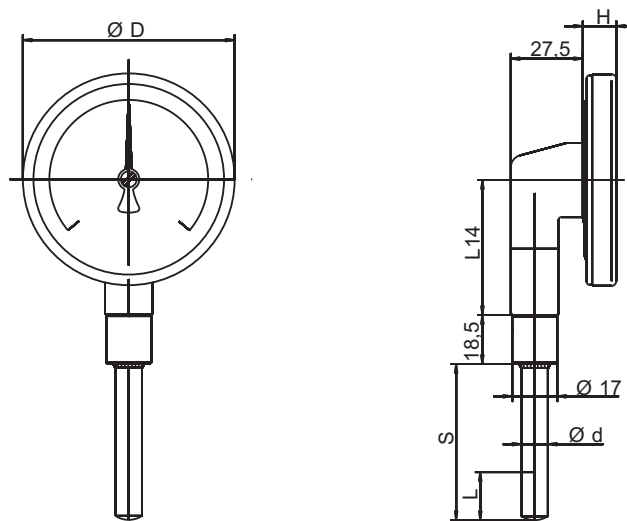
Display range (AB)	Display range in °C	Measuring range in °C	Tolerance in K (+/-)
632	-20 to +60	-10 to +60	1.5
810	0 to +80	+10 to +70	1.5
818	0 to +120	+20 to +100	3.0
826	0 to +160	+20 to +140	3.0
832	0 to +200	+20 to +180	3.0
834	0 to +250	+30 to +220	4.0
840	0 to +300	+30 to +270	8.0
854	0 to +500	+50 to +450	8.0

## Dimensions

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

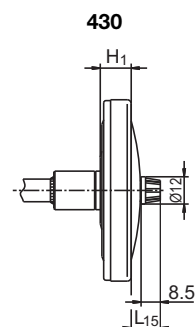


**Types:**  
 608001/1863  
 608001/1880  
 608001/1810



For dimensional specifications about Ø d, see data sheet 608730.

### Extra codes



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



**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
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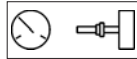
## Order details

### Order code (1) Basic type

Mechanical dial thermometer, standard version class 1.5

Design type 01 Case size Ø

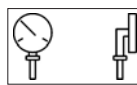
608001/0163  
 608001/0180  
 608001/0110



63 mm  
 80 mm  
 100 mm

Design type 18 Case size Ø

608001/1863  
 608001/1880  
 608001/1810



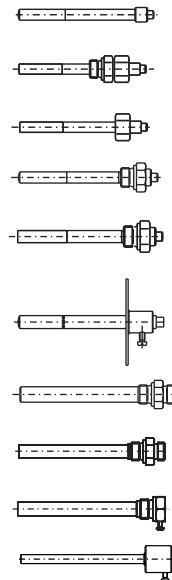
63 mm  
 80 mm  
 100 mm

### (2) Display range (AB) in °C

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

### (3) Process connection (PC)

010	TA 01	Protection tube with collar
844	TA 02	Protection tube with union nut and loose screw connection <sup>a</sup>
845	TA 03	Protection tube with loose union nut
841	TA 04	Protection tube with fixed hexagon <sup>a</sup>
847	TA 06	Protection tube with displaceable threaded fitting (max. 20 bar)
018	TA 08	Protection tube with displaceable mounting plate made of zinc-plated steel and fixing screw
858	SH 04	Single-section screw-in protection tube
891	SH 05	Multi-sectional screw-in protection tube
913	SH 07	Multi-sectional screw-in protection tube with fixing screw
820	SH 09	Multi-sectional weld-in protection tube with fixing screw



<sup>a</sup> Screw-in spigot according to DIN 3852 form A (not for NPT threads).

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
 E-mail: mail@jumo.net  
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**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
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**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
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**(4) Ø Process connection (PC) <sup>b</sup>**

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

**(5) Thread type of process connection (PC) <sup>b</sup>**

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

**(6) Probe material**

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

**(7) Material of process connection (PC) <sup>b</sup>**

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

**(8) Insertion length, process connection (PC) dimension "S"**

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

**(9) Extra code (TZ)**

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

**Special versions upon request!**

<sup>b</sup> For the description and special features, refer to data sheet 608730.

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

<sup>c</sup> List extra codes in sequence, separated by commas.

## Stock versions

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

**Delivery within 3 working days after receipt of order**

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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
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**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
 Internet: www.jumousa.com



# Bimetal Dial Thermometer

## Industry version

## Special features

- Class 1
- Display ranges from -50°C to +500°C
- Stainless steel case
- Case sizes Ø: 60 mm, 80 mm and 100 mm
- Protection type IP54, also available IP65

## Brief description

The locally displaying industrial thermometers work according to the principle of a bimetal coil. The measuring principle is based on the fact that the bimetal coil is exposed to the medium temperature in a stainless steel or brass protection tube. The coil rotates as the temperature increases or falls. The rotation acts directly on the indicator via an axis. The pointer indicator is therefore proportional to the change of temperature.

All versions of the JUMO bimetal dial thermometer 608002 comply with DIN EN 13190, class 1.



Type 608002/1810

Type 608002/0110

## Technical data

<b>Basic type extension</b>	0160, 0180, 0110, 1860, 1880, 1810
<b>Case</b>	Case and bezel made of stainless steel; bracket made of aluminum (design 18)
<b>Protection type</b>	IP 54 according to DIN EN 60529 (IP 65 in the case of extra code 404)
<b>Front pane</b>	Glass with extra code 404 made of acrylic glass (PMMA)
<b>Scale</b>	Polished aluminum, with black lettering
<b>Display</b>	Linear, class 1 similar to DIN EN 13190
<b>Time constant <sub>t<sub>0.632</sub></sub></b>	Approx. 20 s, measured in flowing water with a probe Ø of 10 mm made of stainless steel
<b>Influential effect of the ambient temperature</b>	No influence
<b>Limit value temperatures</b>	-30 to +80°C (storage and transport -30 to +80°C)
<b>Rated position</b>	Any

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
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**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
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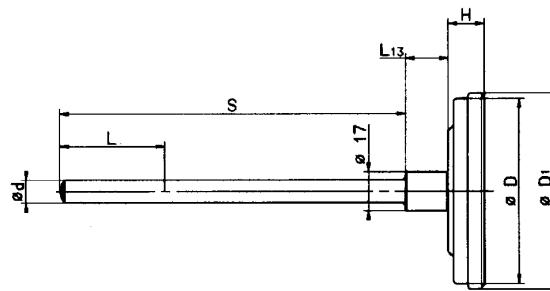
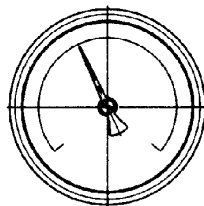
## Technical data (cont.)

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

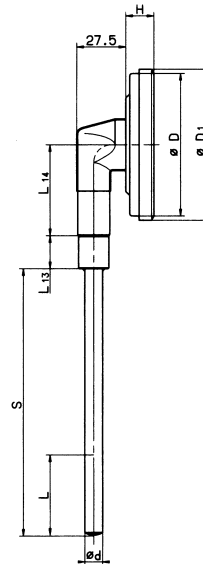
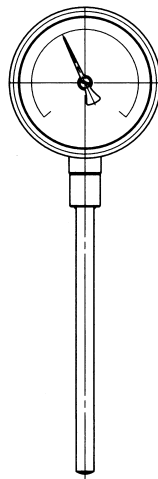
## Dimensions

**Types:**  
 608002/0160  
 608002/0180  
 608002/0110

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



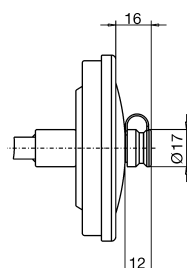
**Types:**  
 608002/1860  
 608002/1880  
 608002/1810



For dimensional specifications about Ø d and L<sub>13</sub> see data sheet 608730.

**Extra codes**

**434**



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

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
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 Harlow, Essex CM20 2DY, UK  
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## Order details






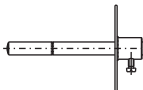




### Order code (1) Basic type

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

### (2) Display range (AB) in °C

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

### (3) Process connection (PC) <sup>b</sup>

010	TA 01	Protection tube with collar	
844	TA 02	Protection tube with union nut and loose screw connection <sup>a</sup>	
845	TA 03	Protection tube with loose union nut	
841	TA 04	Protection tube with fixed hexagon <sup>a</sup>	
847	TA 06	Protection tube with displaceable threaded fitting (max. 20 bar)	
018	TA 08	Protection tube with displaceable mounting plate made of zinc-plated steel and fixing screw	
858	SH 04	Single-section screw-in protection tube	
891	SH 05	Multi-sectional screw-in protection tube	
913	SH 07	Multi-sectional screw-in protection tube with fixing screw	
820	SH 09	Multi-sectional weld-in protection tube with fixing screw	

<sup>a</sup> Screw-in spigot according to DIN 3852 form A (not for NPT threads)

<sup>b</sup> For description and particularities refer to data sheet 608730.

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
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**(4) Ø Process connection (PA)<sup>b</sup>**

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

**(5) Thread type of process connection (PC)<sup>b</sup>**

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

**(6) Probe material**

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

**(7) Material of process connection (PC)<sup>b</sup>**

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

**(8) Insertion length, process connection (PC) dimension "S"**

100	100 mm
150	150 mm
200	200 mm
...	Special length (specifications in plain text – 50 mm increments)

**(9) Extra code (TZ)**

000	Without extra code
404	IP 65 (only with basic type extension 0160, 0110, 1860, 1810) not with TZ 430
430	Drag indicator (only with basic type extension 0160, 0180, 0110, 1860, 1880, 1810 – display range min. 100 K)
434	Drag indicator can be adjusted with a screwdriver, protected by a cover
522	Customized scale

**Special versions upon request!**

<sup>a</sup> Screw-in spigot according to DIN 3852 form A (not for NPT threads)

<sup>b</sup> For description and particularities refer to data sheet 608730.

**Order code**      (1) 608002 / . . . . - (2)  - (3)  - (4)  - (5)  - (6)  - (7)  - (8)  / (9)  , . . .  
**Order example**    608002/0180 - 818 - 845 - 10 - 104 - 26 - 26 - 100 / 000<sup>c</sup> , . . .

<sup>c</sup> List extra codes in sequence, separated by commas.

## Stock versions

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

**Delivery within 3 working days after receipt of order**

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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
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 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
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# Bimetal Dial Thermometer Chemistry version

## Special features

- Class 1
- Display ranges -50°C to +500°C
- Stainless steel case with bayonet connection
- Case sizes Ø: 100 mm and 160 mm
- Protection type IP65

## Brief description

The locally displaying bimetal thermometers (chemistry version) work according to the principle of a bimetal coil. The measuring principle is based on the fact that the bimetal coil is exposed to the medium temperature in a stainless steel protection tube. The coil rotates as the temperature increases or falls. The rotation acts directly on the indicator via an axis. The indicator deflection is therefore proportional to the change of temperature.

All versions of the JUMO bimetal dial thermometer 608003 comply with DIN EN 13190, class 1. JUMO precision bimetal dial thermometers are the proven solution for local temperature measurements of both liquids and gases. They are suitable for insertion in pipelines, containers, machines and plants and do not require any external power source. Thanks to the high protection rating (IP65) and the lack of sensitivity to fluctuations in the ambient temperature due to the measuring principle, we also recommend these versions for outdoor use.



608003/1010

## Technical data

<b>Basic type extension</b>	0110, 0116, 1010, 1016
<b>Case</b>	Stainless steel case with bayonet connection (1.4301)
<b>Protection type</b>	IP65 according to DIN EN 60529 (IP54 with extra code 434)
<b>Front pane</b>	Glass with extra code 434 made of acrylic glass (PMMA)
<b>Scale</b>	Polished aluminum, with black lettering
<b>Display</b>	Linear, class 1 according to DIN EN 13190
<b>Time constant <math>t_{0.632}</math></b>	Approx. 20 s, measured in flowing water with a probe Ø of 10 mm made of stainless steel
<b>Influential effect of the ambient temperature</b>	No influence
<b>Limit value temperatures</b>	-30 to +80°C (storage and transport)
<b>Rated position</b>	Any

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 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
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 Temple Bank, Riverway  
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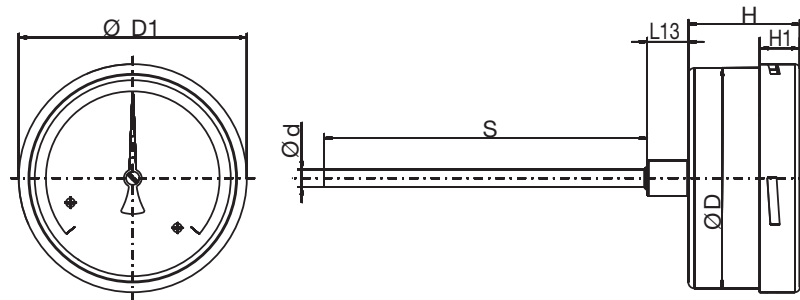
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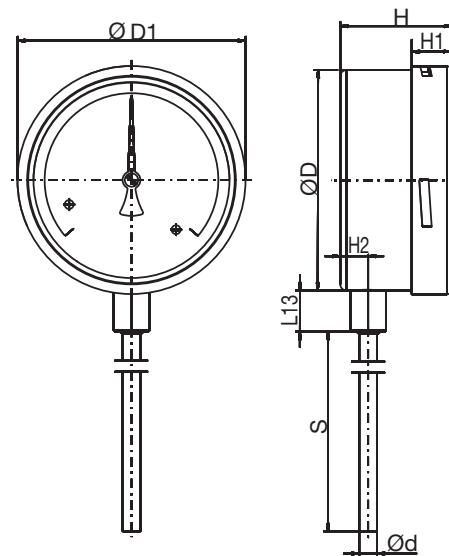
Display range (AB)	Display range in °C	Measuring range in °C	Tolerance in K (+/-)
643	-20 to +120	0 to +100	2.0
357	-50 to +50	-40 to +40	1.0
810	0 to +80	+10 to +70	1.0
814	0 to +100	+10 to +90	1.0
818	0 to +120	+20 to +100	1.0
826	0 to +160	+20 to +140	2.0
832	0 to +200	+20 to +180	2.0
834	0 to +250	+30 to +220	2.5
840	0 to +300	+30 to +270	5.0
854	0 to +500	+50 to +450	5.0

## Dimensions

**Types:**  
 608003/0110  
 608003/0116



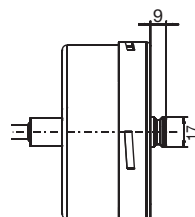
**Types:**  
 608003/1010  
 608003/1016



For dimensional specifications about Ø d and L<sub>13</sub> see data sheet 608730.

**Extra code**

**434**



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



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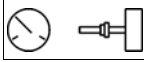
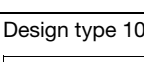

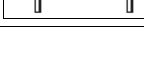
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## Order details


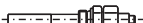








### Order code (1) Basic type

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

### (2) Display range (AB) in °C

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

### (3) Process connection (PC)<sup>b</sup>

010	TA 01	Protection tube with collar	
844	TA 02	Protection tube with union nut and loose screw connection <sup>a</sup>	
845	TA 03	Protection tube with loose union nut	
841	TA 04	Protection tube with fixed hexagon <sup>a</sup>	
847	TA 06	Protection tube with displaceable threaded fitting (max. 20 bar)	
018	TA 08	Protection tube with displaceable mounting plate made of zinc-plated steel and fixing screw	
858	SH 04	Single-section screw-in protection tube	
891	SH 05	Multi-sectional screw-in protection tube	
913	SH 07	Multi-sectional screw-in protection tube with fixing screw	
820	SH 09	Multi-sectional weld-in protection tube with fixing screw	

<sup>a</sup> Screw-in spigot according to DIN 3852 form A (not for NPT threads)

<sup>b</sup> For description and special features refer to data sheet 608730.

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 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
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 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
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**(4) Ø Process connection (PC)<sup>b</sup>**

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

**(5) Thread type of process connection (PC)<sup>b</sup>**

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

**(6) Material of process connection (PC)<sup>b</sup>**

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

**(7) Insertion length, process connection (PC) dimension "S"**

100	100 mm
150	150 mm
200	200 mm
...	Special length (specifications in plain text – 50 mm increments)

**(8) Extra code (TZ)**

000	Without extra code
362	Ex protection according to directive 2014/34/EU
434	Drag indicator can be adjusted with a screwdriver, protected by a cover, IP54 (front pane made of Plexiglas; max. ambient temperature +70°C)
474	Silicon-filled dial cushioning unit (only with basic type extension 0110, 0116, not in connection with TZ 434)
522	Customized scale

**Special versions upon request!**

<sup>b</sup> For the description and special features, refer to data sheet 608730.

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

<sup>c</sup> List extra codes in sequence, separated by commas.

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# Bimetal Dial Thermometer Transformer version

## Special features

- Class 1.5
- Display ranges -20°C to +120°C
- Stainless steel case
- Case size: Ø 80 mm
- Protection type IP 55

## Brief description

Dial thermometers in transformer version are devices which can be universally used for local temperature measurement.



Type 608005/1080

## Technical data

<b>Basic type extension</b>	1080
<b>Case</b>	Case and bezel made of stainless steel (1.4301)
<b>Protection type</b>	IP 55 according to DIN EN 60529
<b>Front pane</b>	Acrylic glass (PMMA)
<b>Scale</b>	White, with black lettering
<b>Display</b>	Class 1.5 similar to DIN EN 13190
<b>Time constant</b> <sub>t<sub>0.632</sub></sub>	Approx. 20 s, measured in flowing water with a probe Ø of 10 mm made of stainless steel
<b>Influential effect of the ambient temperature</b>	No influence
<b>Limit value temperatures</b>	-30 to +80°C (storage and transport -30 to +80°C)
<b>Rated position</b>	Any

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 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
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 E-mail: mail@jumo.net  
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**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
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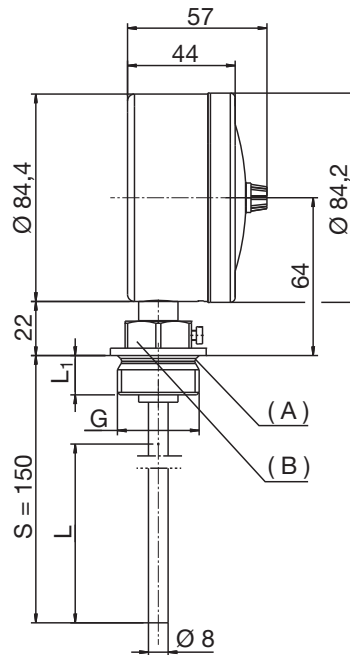
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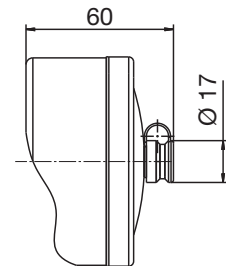
Display range (AB)	Display range in °C	Measuring range in °C	Tolerance in K (+/-)
643	-20 to +120	0 to +100	3.0
818	0 to +120	+20 to +120	3.0

## Dimensions

**Type:**  
 608005/1080



**Extra code 434**



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

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

## Devices in stock

Part no.	Type	Display range	Temperature probe, process connection, material	Protection tube Dimension "S"
00483589	608005/1080-643-874-8-106-97-150/430, 522 with drag indicator	-20 to +120 °C	TF 05, d = 8 mm TA 24, "G 1" CuZn	Stainless steel 150 mm

**Attention:** only for devices in stock – Packaging unit 3 pieces – Quantity ordered must be divisible by 3!

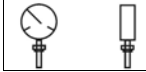
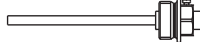
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 36039 Fulda, Germany  
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**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
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## Order details

<b>Order code</b>	<b>(1) Basic type</b>
	Mechanical dial thermometer, transformer version class 1.5 with drag indicator
608005/1080	Design type 10 Case size Ø 80 mm
	
	<b>(2) Display range (AB) in °C</b>
643	-20 to +120
818	0 to +120
	<b>(3) Process connection (PC)</b>
874	TA 24 Protection tube with screw connection, O ring seal and clamping screw
	
	<b>(4) Ø Process connection (PC)</b>
8	8 mm
	<b>(5) Thread type of process connection (PC)</b>
104	Screw connection G 1/2
105	Screw connection G 3/4
106	Screw connection G 1
	<b>(6) Probe material</b>
97	Stainless steel (1.4571) – TF / Brass – TA
	<b>(7) Insertion length, process connection (PC) dimension "S"</b>
150	150 mm
...	Special length (specifications in plain text – 50 mm increments)
	<b>(8) Extra code (TZ)</b>
000	Without extra code
434	Drag indicator can be adjusted with a screwdriver, protected by a cover
522	Customized scale

**Special versions upon request!**

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

<sup>a</sup> List extra codes in sequence, separated by commas.

**Caution:** only for devices in stock – **Packaging unit 3 pieces** – Quantity ordered must be divisible by 3!

**Note:** Contact thermometer temperature probe, refer to data sheet 608540.  
 For temperature indicator and contact dial thermometer with capillary, refer to data sheet 608201 and 608520.



**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
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**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
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 Phone: +44 1279 63 55 33  
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**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: +1 315 437 5866  
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# Dial Thermometer

## Type 608201

### Special features

- Class 1.5
- Display ranges from -40° C to +600° C
- Temperature indicator as built-in or add-on device in the stainless steel case
- Case size Ø: 60 mm, 80 mm and 100 mm  
Front panel: 72x72 mm and 96x96 mm
- Protection type IP 55, also available IP 65



608201/2060



608201/2572

### Brief description

Dial thermometers are temperature indicators for universal use. The units come in a stainless steel case with a liquid- or gas-filled measuring system.

The temperature-dependent volume change in a measuring system filled with liquid or the temperature-dependent pressure change in a measuring system filled with gas is converted to a rotational movement of the actual value indicator by a bourdon tube; no transmission gear is required.

### Technical data

<b>Case and/or front panel</b>	Stainless steel (1.4301), design type 2496 and 2572, steel zinc-plated	
<b>Protection type</b>	IP 55 according to DIN EN 60529 (IP 65 with extra code 404) Basic type extension, at front and rear: 1060, 1080, 1010, 2260, 2280, 2010, 2360, 2380, 2310 Basic type extension, at front only: 2060, 2080, 2010, 2160, 2180, 2110, 2496, 2572	
<b>Front pane</b>	Glass in design types 2496 and 2572, and with extra codes 473 and 404 made of acrylic glass (PMMA)	
<b>Scale</b>	White, with black lettering (silver, with black lettering in the case of extra code 473 and 404)	
<b>Display</b>	Class 1.5 similar to EN 13190	
<b>Display correction</b>	On the rear of the case, no display correction with extra code 473 and 404	
<b>Limit value temperatures</b>	Transport and storage -30°C to +70°C (for display range -40 to +40°C up to max. 50°C; -30 to +50°C up to max. 60°C)	
<b>Rated position</b>	Any	
	<b>Liquid filling</b>	<b>Gas filling</b>
<b>Measuring system</b>	Display range (AB) ≤ 350°C	Display range (AB) ≥ 400°C
<b>Time constant <math>\tau_{0.632}</math></b>	Approx. 12 s, measured in flowing water, with a probe Ø of 6 mm made of copper.	Approx. 4 s, measured in flowing oil, with a probe Ø of 10 mm made of stainless steel.
<b>Influential effect of the ambient temperature</b>	In % of the display range (referring to the deviation from the reference value +23°C)	
<b>On case</b>	0.15% of the display range per K ambient temperature change	0.05% of the display range per K ambient temperature change
<b>On capillary (per m)</b>	0.03% of the display range per K ambient temperature change	No influence
	At higher ambient temperature – higher temperature display	

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Postal address: 36035 Fulda, Germany  
Phone: +49 661 6003-0  
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**JUMO Instrument Co. Ltd.**

JUMO House  
Temple Bank, Riverway  
Harlow, Essex CM 20 2DY, UK  
Phone: +44 1279 63 55 33  
Fax: +44 1279 62 50 29  
Email: sales@jumo.co.uk  
Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**

6733 Myers Road  
East Syracuse, NY 13057, USA  
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Fax: +1 315 437 5860  
Email: info.us@jumo.net  
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**Technical data**

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



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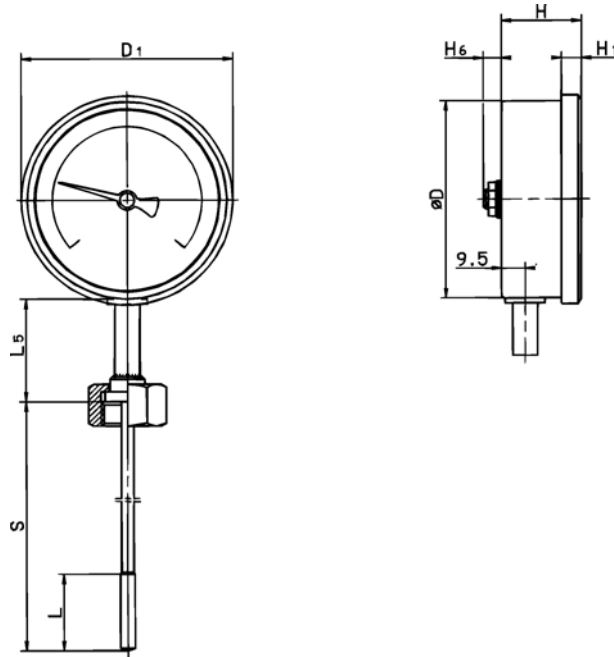
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 6733 Myers Road  
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 Fax: +1 315 437 5860  
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 Internet: www.jumousa.com

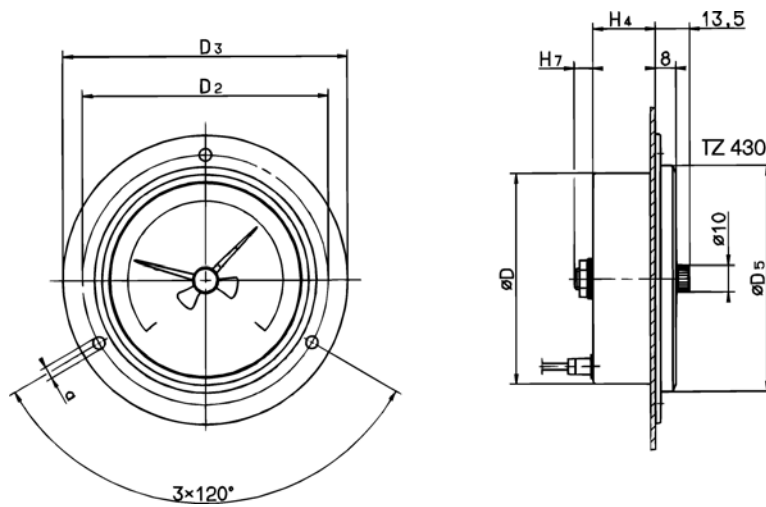


## Dimensions

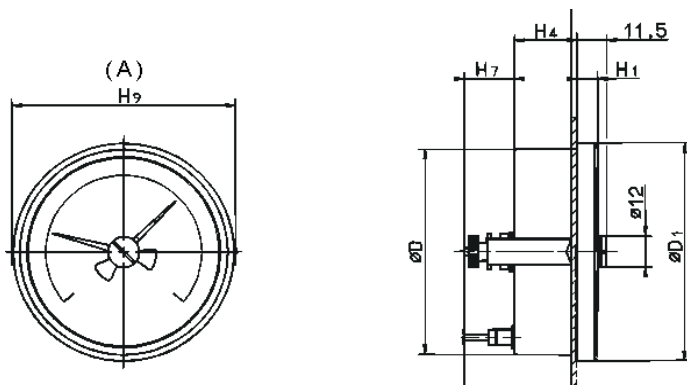
Types: 608201/1060  
 608201/1080  
 608201/1010



Types: 608201/2060  
 608201/2080  
 608201/2010



Types: 608201/2160  
 608201/2180  
 608201/2110



(A) Fastening bar width

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 Delivery address: Mackenrodtstraße 14  
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 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
 Email: mail@jumo.net  
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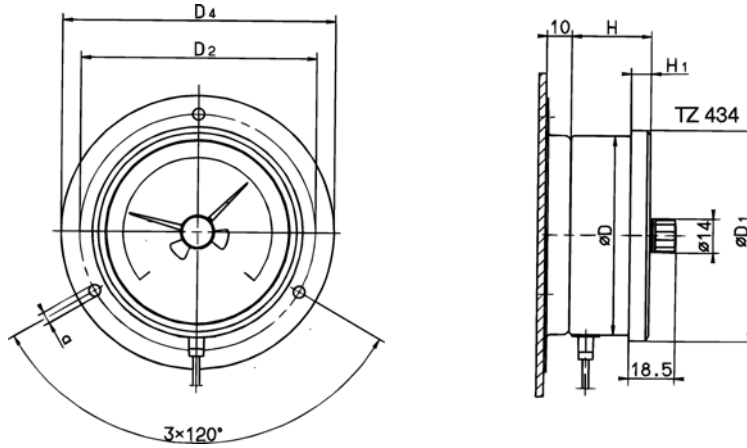
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 JUMO House  
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 Harlow, Essex CM 20 2DY, UK  
 Phone: +44 1279 63 55 33  
 Fax: +44 1279 62 50 29  
 Email: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

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 6733 Myers Road  
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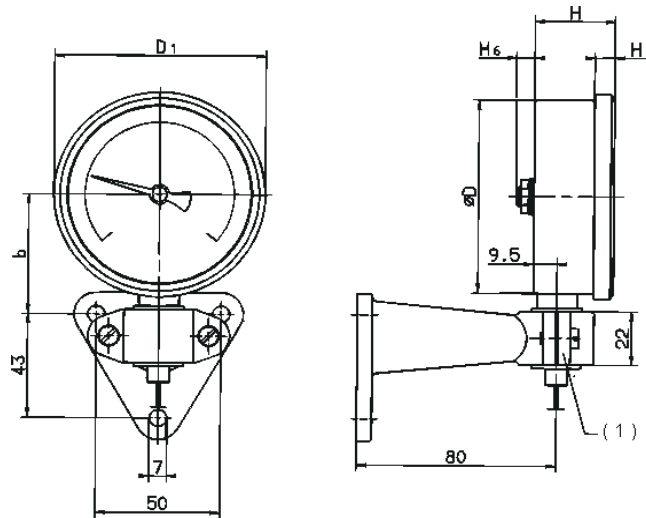


## Dimensions

Types: 608201/2260  
 608201/2280  
 608201/2210



Types: 608201/2360  
 608201/2380  
 608201/2310



(1) Spigot Ø 20 mm

Case Ø	Panel cut-out Ø
60 mm	62 <sup>0.5</sup> mm
80 mm	82 <sup>0.5</sup> mm
100 mm	102 <sup>0.5</sup> mm

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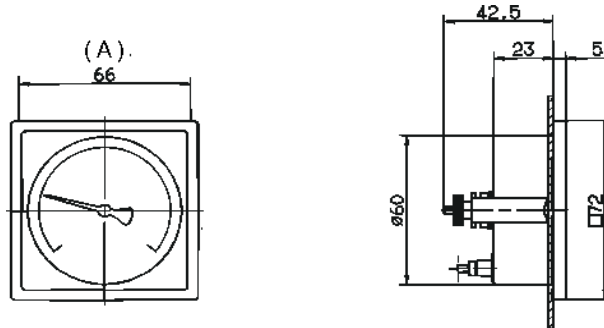
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## Dimensions

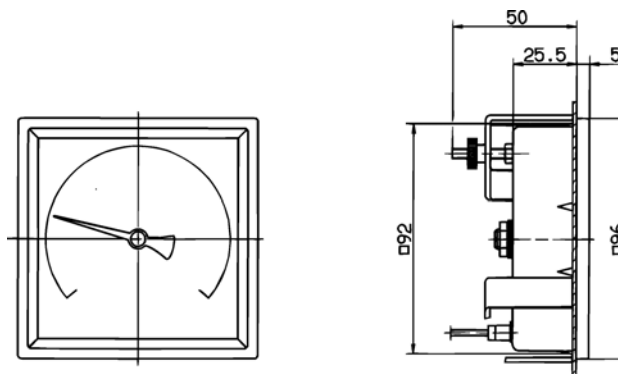
Type: 608201/2572



(A) Fastening bar width

Panel cut-out:  $\varnothing 62^{+0.5}$  mm

Type: 608201/2496



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

Case $\varnothing$	H	H <sub>1</sub>	H <sub>4</sub>	H <sub>6</sub>	H <sub>7</sub>	H <sub>9</sub>	D	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>	a	b	L <sub>5</sub>
60	30 (36)	7	23 (28)	Appro x. 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 specifications in mm

\* With protection tube connection type TA 02, L<sub>5</sub> is  $\leq 70.5$  mm  
 With protection tube connection types TA 22 and TA 31, L<sub>5</sub> is = 49.5 mm  
 () -Values apply for TZ 473 or TZ 404

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 36039 Fulda, Germany  
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## Order details

### Dial thermometer, class 1.5, type 608201

Order code:	(1) Basic type	
608201	Mechanical dial thermometer, class 1.5	
<b>(2) Basic type extension</b>		
1060	Design type: 10; case size: $\varnothing$ 60 mm	
1080	Design type: 10; case size: $\varnothing$ 80 mm	
1010	Design type: 10; case size: $\varnothing$ 100 mm	
2060	Design type: 20; case size: $\varnothing$ 60 mm	
2080	Design type: 20; case size: $\varnothing$ 80 mm	
2010	Design type: 20; case size: $\varnothing$ 100 mm	
2160	Design type: 21; case size: $\varnothing$ 60 mm	
2180	Design type: 21; case size: $\varnothing$ 80 mm	
2110	Design type: 21; case size: $\varnothing$ 100 mm	
2260	Design type: 22; case size: $\varnothing$ 60 mm	
2280	Design type: 22; case size: $\varnothing$ 80 mm	
2210	Design type: 22; case size: $\varnothing$ 100 mm	
2360	Design type: 23; case size: $\varnothing$ 60 mm	
2380	Design type: 23; case size: $\varnothing$ 80 mm	
2310	Design type: 23; case size: $\varnothing$ 100 mm	
2496	Design type: 24; case size: 96 x 96 mm	
2572	Design type: 25; case size: 72 x 72 mm	
<b>(3) Display range (AB)</b>		
469	-40 to + 40°C	
566	-30 to + 50°C	
643	-20 to +120°C	
807	0 to + 60°C	
810	0 to + 80°C	
814	0 to +100°C	
818	0 to +120°C	
826	0 to +160°C	
832	0 to +200°C	
834	0 to +250°C	
926	+50 to +250°C	
840	0 to +300°C	
927	+50 to +300°C	
843	0 to +350°C	
932	+50 to +350°C	
848	0 to +400°C	
851	0 to +450°C	
854	0 to +500°C	
858	0 to +600°C	

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 36039 Fulda, Germany  
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 East Syracuse, NY 13057, USA  
 Phone: +1 315 437 5866  
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## Order details

### Dial thermometer, class 1.5, type 608201

Order code:

	<b>(4) Capillary type (FL)<sup>1</sup></b>	
00	Without (with rigid connection)	
02	FL 02 Cu capillary with Cu textile braiding, approx. Ø 2.5 mm (up to AB end value +300°C)	
11	FL11 Cu capillary with PE coating, approx. ø 3.5 mm (up to AB end value +120°C)	
17	FL 17 Stainless steel capillary, Ø 1.5 mm	
21	FL21 Cu capillary, Ø 1.0 mm (up to AB end value +300°C)	
	<b>(5) Capillary length<sup>1</sup></b>	
0	Without (with rigid connection)	
1000	1000 mm	
2000	2000 mm	
3000	3000 mm	
4000	4000 mm	
5000	5000 mm	
....	Special length (specifications in plain text: 1,000 mm increments, maximum length 10,000 mm)	
	<b>(6) Process connection (PC)<sup>1</sup></b>	
750	TF01; Temperature probe with stepped support tube	
752	TF11; Temperature probe without support tube	
843	TA02; Protection tube with union nut and loose screw connection <sup>2</sup>	
161	TA03; Protection tube with loose union nut	
847	TA06; Displaceable threaded fitting on support tube <sup>2</sup>	
311	TA20; Protection tube with loose screw connection and connection collar <sup>2</sup>	
872	TA21; Protection tube with loose pressure screw and conical seal	
873	TA22; Protection tube with loose pressure screw, conical seal, and loose screw connection <sup>2</sup>	
401	TA23; Protection tube with pressure screw and contact pressure spring	
848	TA25; Displaceable threaded fitting on capillary <sup>2</sup> (with FL 17 and FL 21 only)	
913	SH 07; Screw-in sleeve, multi-sectional, with clamping piece and fixing screw <sup>2</sup> (with TF 01)	
820	SH 09; Weld-in sleeve, multi-sectional, with clamping piece and fixing screw (not with FL 21 – weld collar with steel 1.4515) (with TF 01)	
876	SH10; Screw-in sleeve, multi-sectional <sup>2</sup>	
871	SH11; Screw-in sleeve, multi-sectional <sup>2</sup>	
	<b>(7) Diameter of process connection (PC)<sup>1</sup></b>	
6	Ø 6 mm	
8	Ø 8 mm	
10	Ø 10 mm	
11	Ø 11 mm	
12	Ø 12 mm	

<sup>1</sup> For description and special features refer to data sheet 608730.

<sup>2</sup> Screw-in spigot according to DIN 3852 form A).

<sup>3</sup> List extra codes in sequence, separated by commas.

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
 Email: mail@jumo.net  
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**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM 20 2DY, UK  
 Phone: +44 1279 63 55 33  
 Fax: +44 1279 62 50 29  
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**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: +1 315 437 5866  
 Fax: +1 315 437 5860  
 Email: info.us@jumo.net  
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## Order details

### Dial thermometer, class 1.5, type 608201

**Order code:**

	<b>(8) Thread type of process connection (PC)<sup>1</sup></b>
000	Without thread (for TF 01 and TF 11)
103	Screw connection G <sup>3</sup> / <sub>8</sub>
104	Screw connection G <sup>1</sup> / <sub>2</sub>
105	Screw connection G <sup>3</sup> / <sub>4</sub>
114	Screw connection M 10 × 1 (only for TA 23 and SH 11)
	<b>(9) Material, probe / support tube<sup>1</sup></b>
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)
	<b>(10) Material of process connection (PC)<sup>1</sup></b>
00	Without (only TF 01 and TF 11)
26	Stainless steel (CrNi, 1.4571)
46	Brass (CuZn)
	<b>(11) Insertion length, process connection (PC)<sup>1</sup> (dimension "EL" or "S")</b>
0	Minimum insertion length TF 11 (active probe dimension)
50	50 mm
100	100 mm
150	150 mm
200	200 mm
...	Special length (specifications in plain text – 50 mm increments)
	<b>(12) Extra codes (TZ)</b>
000	Without extra code
315	Strain relief spring on case and probe (not with FL 21)
404	Protection type IP 65 according to EN 60529 (only with basic type extension: 2060, 2260, 2360, 2010, 2210, 2310)
430	Drag indicator, with case diameter 60, 80 and 100 mm (not with TZ 404)
434	Drag indicator can be adjusted with a screwdriver, protected by a cover (not possible with TZ 404)
522	Customized scale

**Special versions upon request!**

**Order code:**

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

**Order example:**

608201 / 1010 - 818 - 00 - 0 - 750 - 8 - 000 - 26 - 26 - 100 / 000<sup>3</sup>

<sup>1</sup> For description and special features refer to data sheet 608730.

<sup>2</sup> Screw-in spigot according to DIN 3852 form A.

<sup>3</sup> List extra codes in sequence, separated by commas.

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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
 Internet: www.jumousa.com



# Dial Thermometer

## Type 608225

### Special features

- Class 1
- Display ranges from -40°C to +600°C
- Temperature indicator as built-in or add-on device  
 Stainless steel case with bayonet connection
- Case size: Ø 100 mm and Ø 160 mm
- Protection type IP 65

### Brief description

Dial thermometers are universal devices used for temperature measurement and monitoring. The temperature-dependent volume change in a measuring system filled with liquid or the temperature-dependent pressure change in a measuring system filled with gas is converted to a rotational movement of the actual value indicator by a bourdon tube; no transmission gear is required.

The overall system is extremely warp resistant due to the direct connection of the indicator to the measuring system. Oscillations are transferred to the indicator only to a limited degree.



Type 608225/  
1016

### Technical data

<b>Case</b>	Stainless steel case with bayonet connection (1.4301)
<b>Protection type</b>	IP 65 according to DIN EN 60529
<b>Front pane</b>	Glass with extra code 434 made of polycarbonate
<b>Scale</b>	White, with black lettering
<b>Display</b>	Class 1 according to DIN EN 13190
<b>Strain relief spring</b>	For capillary devices on the case and the temperature probe
<b>Display correction</b>	On the rear (no display correction with design type 01)
<b>Limit value temperatures</b>	For transport and storage -20°C to +70°C (for display range 0 to +60°C up to max. 65°C)
<b>Rated position (NL)</b>	Any

	Liquid filling	Gas filling
<b>Measuring system</b>	Display range (AB) ≤ 350°C	Display range (AB) ≥ 400°C
<b>Time constant</b> τ <sub>0,632</sub>	Approx. 12 s, measured in water, with a probe Ø of 6 mm made of copper	Approx. 4 s, measured in oil, with a probe Ø of 10 mm made of stainless steel.
<b>Influential effect of the ambient temperature</b>	In % of the display range (referring to the deviation from the reference value +23°C)	
<b>On case</b>	0.15% of the display range per K ambient temperature change	0.05% of the display range per K ambient temperature change
<b>On capillary (per m)</b>	0.03% of the display range per K ambient temperature change	No influence
	At higher ambient temperature – higher temperature display – lower switching point	

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JUMO House  
Temple Bank, Riverway  
Harlow, Essex CM20 2DY, UK  
Phone: +44 1279 635533  
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Display range (AB)	Display range in °C	Measuring range in °C	Tolerance in K (+/-)
643	-20 to +120	0 to +100	2.0
357	-50 to +50	-40 to +40	1.0
810	0 to +80	+10 to +70	1.0
814	0 to +100	+10 to +90	1.0
818	0 to +120	+20 to +100	1.0
826	0 to +160	+20 to +140	2.0
832	0 to +200	+20 to +180	2.0
834	0 to +250	+30 to +220	2.5
840	0 to +300	+30 to +270	5.0
854	0 to +500	+50 to +450	5.0



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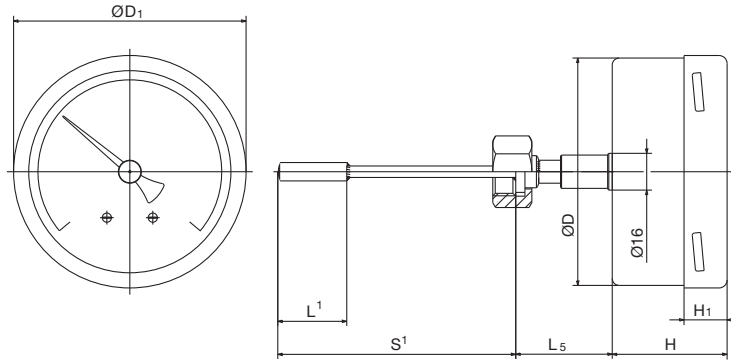
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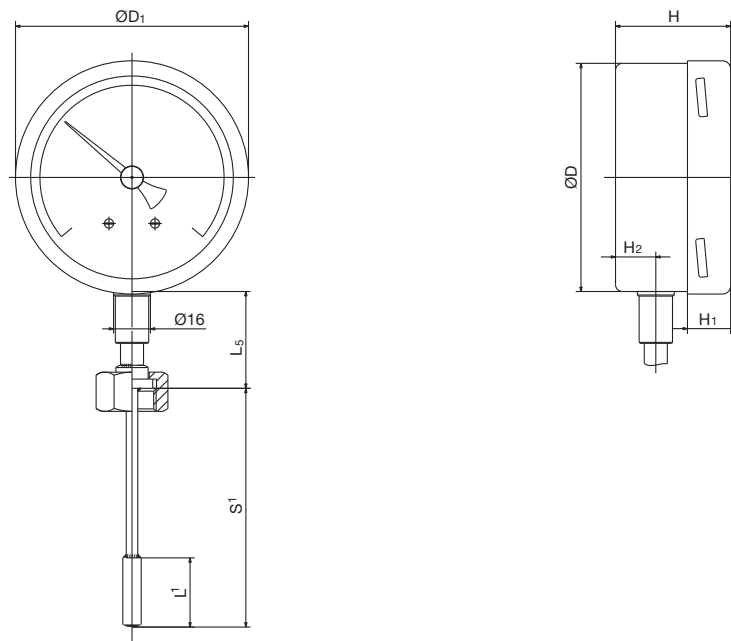


## Dimensions

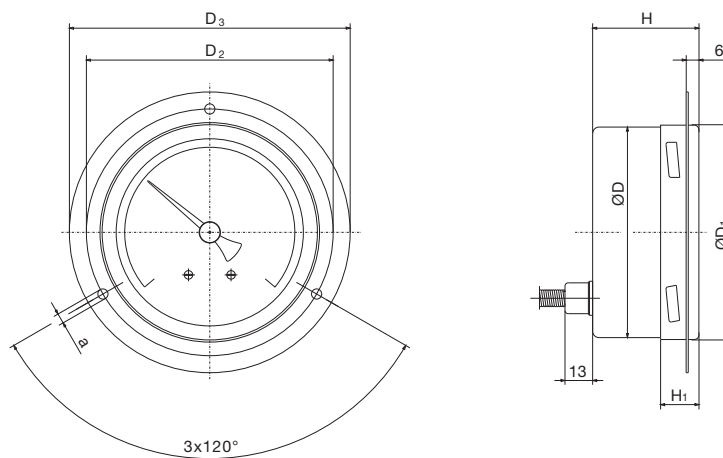
Types: 608225/0110  
 608225/0116



Types: 608225/1010  
 608225/1016



Types: 608225/2010  
 608225/2016



For length specifications, see data sheet 608730

Panel cut-out for case  
 $\varnothing 100 \text{ mm} = 105.5^{+0.5} \text{ mm}$   
 $\varnothing 160 \text{ mm} = 165.5^{+0.5} \text{ mm}$

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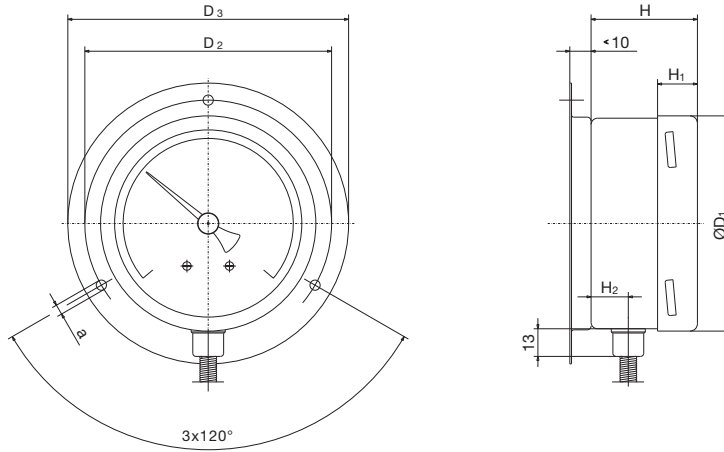
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 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
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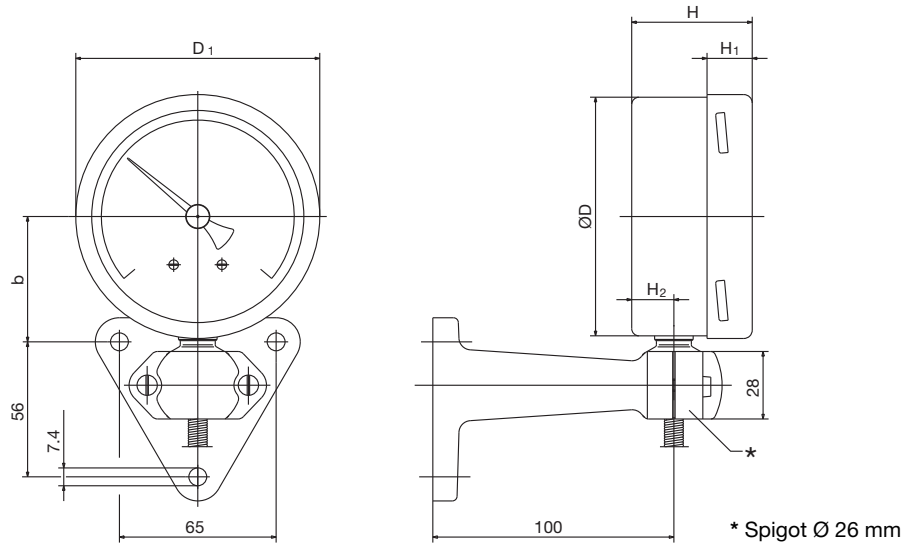


## Dimensions

Types: 608225/2210  
 608225/2216



Types: 608225/2310  
 608225/2316



Bracket for measuring device according to DIN 16281

Case Ø	H	H <sub>1</sub>	H <sub>2</sub>	D	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	a	b	L <sub>5</sub>
100	50	19	17.5	99	101.5	116	132	4.8	52	40 <sup>1</sup>
160	50	21		159	161.5	178	196	5.8	82	

<sup>1</sup> With protection tube connection type TA 02, L<sub>5</sub> is ≤ 69 mm

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## Order details

### Dial thermometer, class 1, type 608225

<b>Order code</b>	<b>(1) Basic type</b>	
608225	Mechanical dial thermometer	
	<b>(2) Basic type extension</b>	
0110	Design type: 01; case size: ø 100 mm	
0116	Design type: 01; case size: ø 160 mm	
1010	Design type: 10; case size: ø 100 mm	
1016	Design type: 10; case size: ø 160 mm	
2010	Design type: 20; case size: ø 100 mm	
2016	Design type: 20; case size: ø 160 mm	
2210	Design type: 22; case size: ø 100 mm	
2216	Design type: 22; case size: ø 160 mm	
2310	Design type: 23; case size: ø 100 mm	
2316	Design type: 23; case size: ø 160 mm	
	<b>(3) Display range (AB)</b>	
469	-40 to +40°C;	
566	-30 to +50°C;	
807	0 to +60°C;	
810	0 to +80°C;	
814	0 to +100°C;	
818	0 to +120°C;	
826	0 to +160°C;	
832	0 to +200°C;	
834	0 to +250°C;	
840	0 to +300°C;	
843	0 to +350°C;	
848	0 to +400°C;	
854	0 to +500°C;	
	<b>(4) Capillary type (FL)<sup>1</sup></b>	
00	Without (with rigid connection)	
04	FL04 Stainless steel capillary (1.4571), ø 2.2 mm	
	<b>(5) Capillary length<sup>1</sup></b>	
0	Without (with rigid connection)	
1000	1000 mm	
2000	2000 mm	
3000	3000 mm	
4000	4000 mm	
5000	5000 mm	
...	Special length (specifications in plain text: 1,000 mm increments, maximum length 10,000 mm)	
	<b>(6) Process connection (PC)<sup>1</sup></b>	
750	TF01 Temperature probe with stepped support tube	
753	TF05 Temperature probe with plane support tube	
752	TF11 Temperature probe without support tube	
843	TA02 Protection tube with union nut and loose screw connection <sup>2</sup>	
161	TA03 Protection tube with loose union nut (with TF01)	
846	TA04 Protection tube with fixed hexagon male connector <sup>2</sup>	
847	TA06 Displaceable threaded fitting on support tube <sup>2</sup>	
891	SH05 Screw-in sleeve, multi-sectional <sup>2</sup> (only with ø 14 mm)	
913	SH07 Screw-in sleeve, multi-sectional, with clamping piece and fixing screw <sup>2</sup>	

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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
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**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
 Internet: www.jumousa.com



## Order details

### Dial thermometer, class 1, type 608225

<b>Order code</b>	<b>(7) Diameter of process connection (PC)<sup>1</sup></b>
6	ø 6 mm
8	ø 8 mm
10	ø 10 mm
14	ø 14 mm (only for SH05)
	<b>(8) Thread type of process connection (PC)<sup>1</sup></b>
000	Without thread (for TF 01, TF 05 and TF 11)
103	Screw connection G 3/8
104	Screw connection G 1/2
105	Screw connection G 3/4
	<b>(9) Material of process connection (PC)<sup>1</sup></b>
26	Stainless steel (1.4571)
97	Stainless steel (1.4571) – TF / Brass – TA, SH
	<b>(10) Insertion length, process connection (PC)<sup>1</sup> (dimension "EL" or "S")</b>
0	Minimum insertion length TF 11 (active probe dimension)
50	50 mm
100	100 mm
150	150 mm
200	200 mm
...	Special length (specifications in plain text – 50 mm increments)
	<b>(11) Extra codes (TZ)</b>
000	Without extra code
362	Ex protection according to directive 2014/34/EU
434	Drag indicator can be adjusted with a screwdriver, protected by a cover
522	Customized scale

Special versions upon 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<sup>3</sup>

<sup>1</sup> For description and special features refer to data sheet 608730

<sup>2</sup> Screw-in spigot according to DIN 3852 form A

<sup>3</sup> List extra codes in sequence, separated by commas.

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# Bimetal Temperature Switch

## Special features

- Electromechanical temperature switch with a fixed switching temperature
- Protection type IP52, IP65 and IP67
- Simple installation
- Switching capacity up to 10 A



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



608301/30-...-...-36

## Brief description

Temperature switches are used in industry in general for limiting temperature. For example, they switch the machine off in the event of overheating or switch a fan on to cool the device.

### Function

The temperature measurement is carried out using a bimetal disc that switches when the rated switching temperature is reached. After cooling down to the switchback temperature, the switch returns to its original state. The switchback temperature is typically 15 to 30 K below the switching temperature.

### Contact version

The bimetal temperature switches type 608301 are supplied with two switching outputs. An N/C (normally closed) contact opens an electrical circuit and switches a machine off. An N/O (normally open) contact closes an electrical circuit when the switching temperature is reached in order, for example, to activate a fan or a signal lamp. In both cases, the contacts return to their original state after cooling back to below the switchback temperature, so that the monitored device can work again in normal mode.

The bimetal switches are RoHS-compliant and free of cadmium.



608301/10-...-...-11



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

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
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## Technical data

Minimum order quantity 50 items

<b>Snap-action switch</b> 608301/10	<b>Tab connector</b> <b>A 6.3-08</b>	<b>Connecting cable</b> <b>with</b> <b>cable fitting</b>	<b>Potted</b> <b>connecting</b> <b>cable</b> without   with protection con- ductor	<b>Plug connector</b> <b>for cable</b> <b>connection</b> Acc. to EN 175301-803 (DIN 43650)	<b>Plug connector</b> <b>M 12 x 1</b>
<b>Fitting</b>	Brass (CW614N) or stainless steel (1.4305); screw-in spigot similar to DIN 3852 Form A for sealing with sealing ring				
<b>Protection type</b>	IP52	IP65	IP67	IP65	IP67
<b>Electrical contact,</b> <b>snap-action switch</b> Connection	A 6.3-0.8 acc. to DIN 46244	Cable diameter approx. 6.5 mm connection cross-section 0.75 mm <sup>2</sup>		Cable diameter 6 to 8 mm; Connect terminals 1, 2, and protection conductor	--
Switching capacity	DC 30 V, +10/-15%, max. 5 A				--
	Max. AC 48 V, cos φ = 0.9 10 A	Max. AC 48 V, cos φ = 0.9 10 A		Max. AC 250 V, cos φ = 0.9 10 A	--
Switching capacity with TZ 702	DC 6 to 30 V, AC 6 to 48 V, 10 to 100 mA				--
Max. ampacity	--	At ambient temperature on the line/cable Up to 50 °C 10 A Up to 75 °C 7.3 A Up to 85 °C 4.2 A		--	--
Contact resistance	< 30 mΩ				
Dielectric strength	AC 1500 V/1 min				

Minimum order quantity 50 items

<b>Slow-action contact</b> 608301/20	<b>Tab connector</b> <b>A 6.3-08</b>	<b>Connecting cable</b> <b>with</b> <b>cable fitting</b>	<b>Potted</b> <b>connecting</b> <b>cable</b> without   with protection con- ductor	<b>Plug connector</b> <b>for cable</b> <b>connection</b> Acc. to EN 175301-803 (DIN 43650)	<b>Plug connector</b> <b>M 12 x 1</b>
<b>Fitting</b>	Brass (CW614N) or stainless steel (1.4305); screw-in spigot similar to DIN 3852 Form A for sealing with sealing ring				
<b>Protection type</b>	IP52	IP65	IP67	IP65	IP67
<b>Electrical contact,</b> <b>slow-action contact</b> Connection	--	Cable diameter approx. 4.5 mm connection cross-section 0.5 mm <sup>2</sup>		Cable diameter 6 to 8 mm; connect terminals 1 and 2; Protection conductor not connected	--
Switching capacity	--	DC 12 V, 8 A DC 24 V, 4 A DC 30 V, 3 A Max. AC 48 V, 6 A	--	--	DC 12 V, 8 A DC 24 V, 4 A DC 30 V, 3 A Max. AC 48 V, 6 A
Max. ampacity	--	At ambient temperature on the line/cable Up to 85 °C 8 A Up to 105 °C 3.7 A		--	--

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 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
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 Harlow, Essex CM20 2DY, UK  
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 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
 Internet: www.jumousa.com



## Technical data

Minimum order quantity 50 items

<b>Compact snap-action switch</b> 608301/30	<b>Tab connector A 6.3-08</b>	<b>Connecting cable with cable fitting</b>	<b>Potted connecting cable</b> without   with protection conductor	<b>Plug connector for cable connection</b> Acc. to EN 175301-803 (DIN 43650)	<b>Plug connector M 12 x 1</b>
<b>Fitting</b>	Brass (CW614N) or stainless steel (1.4305); screw-in spigot similar to DIN 3852 Form A for sealing with sealing ring				
<b>Protection type</b>	IP52	IP65	IP67	IP65	IP67
<b>Electrical contact, compact snap-action switch</b> Connection	--	Cable diameter approx. 6.5 mm; Connection cross-section 0.75 mm <sup>2</sup>	--	Cable diameter 6 to 8 mm; Connect terminals 1, 2, and protection conductor	Connect terminals 1 and 2
Switching capacity	--	<b>N/C contact</b> max. AC 48 V, 50/60 Hz, cos φ = 0.95 (0.6) 2.5 A (1.6 A) <b>N/O contact</b> max. AC 48 V, 50/60 Hz, cos φ = 0.95 (0.6) 2.0 A/1.6 A	--	<b>N/C contact</b> max. AC 250 V, 50/60 Hz, cos φ = 0.95 (0.6) 2.5 A (1.6 A) <b>N/O contact</b> max. AC 250 V, 50/60 Hz, cos φ = 0.95 (0.6) 2.0 A/1.6 A	<b>N/C contact</b> max. AC 48 V, 50/60 Hz, cos φ = 0.95 (0.6) 2.5 A (1.6 A) <b>N/O contact</b> max. AC 48 V, 50/60 Hz, cos φ = 0.95 (0.6) 2.0 A/1.6 A
Cable	--	Ambient temperature on the line/cable Max. 90 °C		--	--
Contact resistance	< 50 mΩ				
Dielectric strength	AC 1500 V/1 min				

	608301/10 Snap-action switch	608301/20 Slow-action contact	608301/30 Compact snap-action switch
<b>Switching temperature</b> Increments 5K	0 °C to +140 °C	+10 °C to +140 °C	+60 °C to +140 °C
<b>Switching differential</b>	Approx. 15 to 30 K below the switching temperature	Approx. 3 to 12 K below the switching temperature	Approx. 20 to 45 K below the switching temperature
<b>Switching cycles</b>	With AC 250 V, 10 A min. 100,000 AC 120 V, 15 A min. 100,000 AC 48 V, 15 A min. 100,000 DC 30 V, 5 A min. 10,000 DC 24 V, 5 A min. 10,000 DC 12 V, 5 A min. 10,000 DC 6 V, 5 A min. 10,000	With AC 48 V, 6 A min. 100,000 DC 30 V, 3 A min. 5,000 DC 24 V, 4 A min. 5,000 DC 12 V, 8 A min. 5,000	With AC 250 V, 2.5 A min. 10,000
<b>Switching point accuracy</b>	Switching temperature: Up to 130 °C ± 5 K, above 130 °C ± 10 K at a temperature change rate of 1 K/min		
<b>Vibration strength</b> According to EN 60068-2-6	10 g (with a frequency of 50 Hz and an amplitude of ± 0.75 mm)	--	10 g (with a frequency of 10 to 1,000 Hz and an amplitude of ± 0.75 mm)
<b>Response time</b>	t0.9 value time approx. 3.5 min	t0.9 value time approx. 3.0 min measured in flowing oil	t0.9 value time approx. 1.5 min,
<b>Switching output (SA)</b>	N/C contact SA01 or N/O contact SA02	 relative to the rising temperature	
<b>Rated position</b>	Any		
<b>Weight</b>	Approx. 50 g		

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

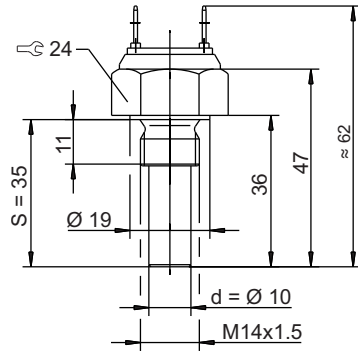
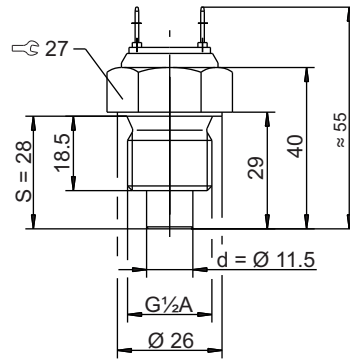
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 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
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 Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
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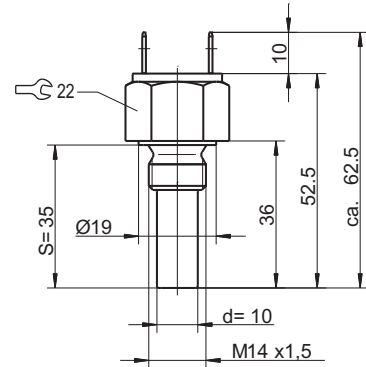
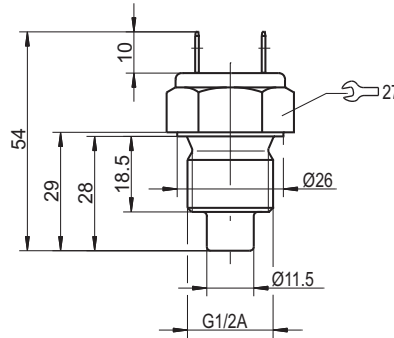


## Dimensions

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 608301/10-...-01

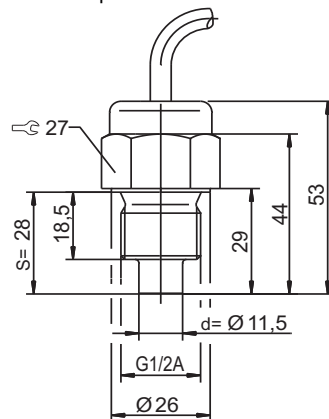


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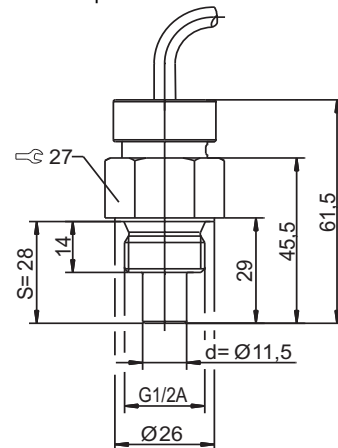


**Type:**  
 608301/10-...-11

Version without protection conductor



Version with protection conductor





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 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
 E-mail: mail@jumo.net  
 Internet: www.jumo.net

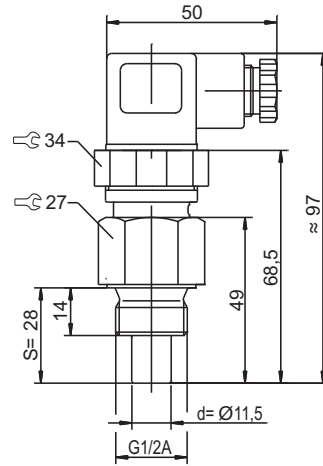
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 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
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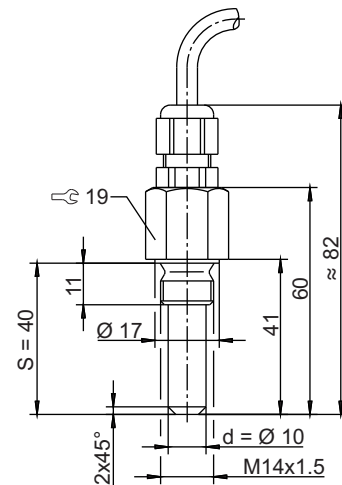
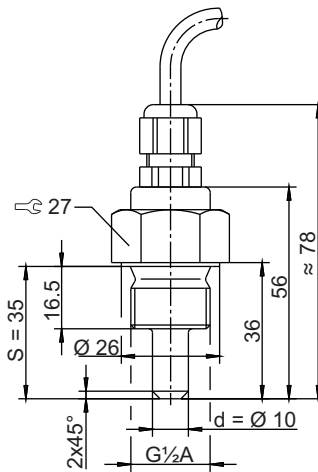


**Type:**  
 608301/10-...-61

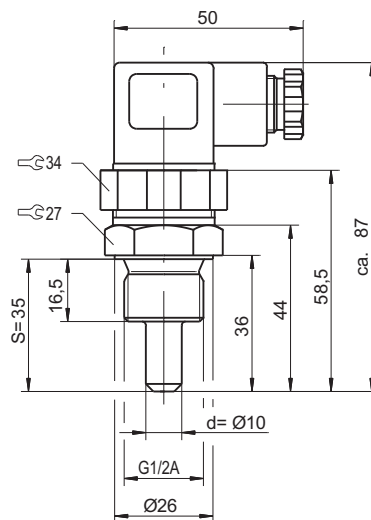
Version with protection conductor



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



**Type:**  
 608301/20-...-61



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 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
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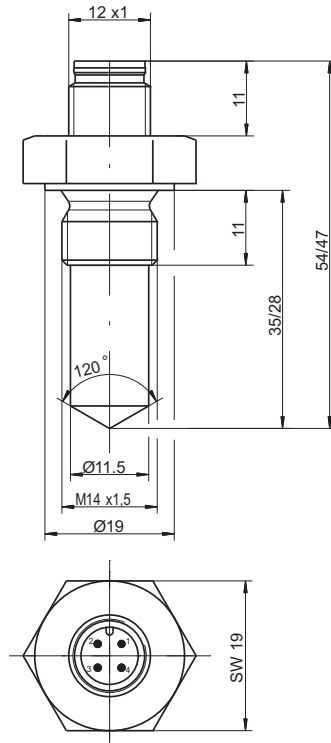
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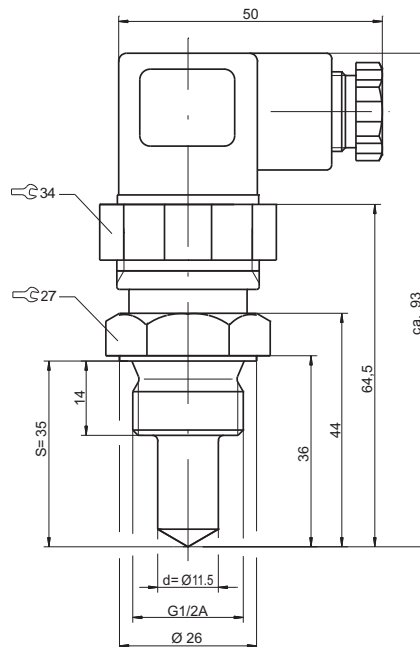


## Dimensions

**Type:**  
 608301/30-...-...-36



**Type:**  
 608301/30-...-...-61



**JUMO GmbH & Co. KG**

Delivery address: Mackenrodtstraße 14  
36039 Fulda, Germany  
Postal address: 36035 Fulda, Germany  
Phone: +49 661 6003-0  
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## Order details

### Bimetal temperature switch, type 608301

Minimum order quantity 50 items

<b>Order code</b>	<b>(1) Basic type</b>	
608301	Bimetal temperature switches	
	<b>(2) Basic type extension</b>	
10	Snap-action switch	
20	Slow-action contact	
30	Compact snap-action switch	
	<b>(3) Switching temperature</b>	(with cable version, with due consideration of the ambient temperature/ampacity on the cable!)
...	from +0 °C to +140 °C	Increments 5K (with basic type extension 608301/10)
...	from +10 °C to +140 °C	Increments 5K (with basic type extension 608301/20)
...	from +60 °C to +140 °C	Increments 5K (with basic type extension 608301/30)
		(e.g. 85 $\Delta$ + 85 °C)
	<b>(4) Switching output</b>	
98	N/C contact (SA01)	
99	N/O contact (SA02)	
	<b>(5) Rated voltage</b>	
50	AC 6 to 48 V	(with basic type extension 608301/10, /20, and /30)
51	AC 6 to 230 V	(with basic type extension 608301/10 and /30)
52	DC 6 to 30 V	(with basic type extension 608301/10 and /20)
53	AC 6 to 120 V	(with basic type extension 608301/10 with TZ 702)
	<b>(6) Electrical connection</b>	
01	Tab connector A 6.3 – 0.8 DIN 46244	not with rated voltage 51 (AC 0 to 230 V) (not with basic type extension 608301/20 and /30)
02	Tab connector A 6.3 – 0.8 DIN 46244, potted	not with rated voltage 51 (AC 0 to 230 V) (not with basic type extension 608301/20 and /30)
61	Plug connector for cable connection acc. to EN 175301-803 (DIN 43650)	
18	Connecting cable with cable fitting	not with rated voltage 51 (AC 0 to 230 V) (not with basic type extension 608301/10)
11	Potted connecting cable	(not with basic type extension 608301/20 and /30)
36	Round plug M 12 × 1	(only in connection with basic type extension 608301/30)
	<b>(7) Process connection material</b>	
50	Brass (CuZn)	
78	Stainless steel (CrNi, 1.4305)	
	<b>(8) Diameter of process connection (PC), dimension "d"</b>	
10	10 mm	
11.5	11.5 mm	
	<b>(9) Thread type of process connection (PC)</b>	
121	Screw connection M 14 × 1.5	
104	Screw connection G 1/2	

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**(10) Insertion length of process connection (PC), dimension "S"**

28	28 mm
35	35 mm
40	40 mm

**(11) Cable length**

0	None
1000	1000 mm
2000	2000 mm
3000	3000 mm
4000	4000 mm
5000	5000 mm

**(12) Extra codes (TZ)**

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

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

Possible combinations

Basic type extension (2) (5)	Diameter PC (7)	Thread type PC (8)	Insertion length (9)		Nominal voltage	
608301/10-...-01	11.5 mm	G 1/2 A	28 mm	27	50	AC 0 to 48 V
	10 mm	M 14 x 1.5	35 mm	24		
608301/10-...-61	11.5 mm	G 1/2 A	28 mm	27*	51	AC 0 to 230 V
	10 mm	M 14 x 1.5	35 mm			
608301/10-...-11	11.5 mm	G 1/2 A	28 mm	27	50	AC 0 to 48 V
				27*		
	10 mm	M 14 x 1.5	35 mm	22	50	AC 0 to 48 V
				27*		
608301/20-...-61	10 mm	G 1/2 A	35 mm	27	52	AC 0 to 30 V
		M 14 x 1.5				
608301/20-...-18	10 mm	G 1/2 A	35 mm	27		
		M 14 x 1.5	40 mm	19		
608301/30-...-61	11.5 mm	G 1/2 A	35 mm	27*	51	AC 0 to 230 V
		M 14 x 1.5	28 mm			
608301/30-...-18	11.5 mm	G 1/2 A	35 mm	27	50	AC 0 to 48 V
		M 14 x 1.5	28 mm	19		
608301/30-...-36	11.5 mm	G 1/2 A	35 mm	27	50	AC 0 to 48 V
		M 14 x 1.5	28 mm	19		

\* With protection conductor

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)											
Order code	608301	/	..	-	...	-	..	-	..	-	...	-	..	-	....	/	...						
Order example	608301	/	10	-	140	-	98	-	50	-	01	-	50	-	10	-	121	-	35	-	0	/	000*

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

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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
 Internet: www.jumousa.com



# Contact Dial Thermometers

## Type 608425

### Special features

- Class 1
- Display ranges from -40°C to +600°C
- Temperature controller with actual value display as built-in or add-on device in the stainless steel case with a bayonet connection
- Case sizes: Ø 100 mm and Ø 160 mm, front panel 96 x 96 mm
- Protection type IP 65

### Brief description

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

The temperature-dependent volume change in a measuring system filled with liquid or the temperature-dependent pressure change in a measuring system filled with gas is converted to a rotational movement of the actual value indicator by a bourdon tube; no transmission gear is required. The switching output is actuated by the rotational movement of the indicator shaft.

The overall system is extremely warp resistant due to the direct connection of the indicator to the measuring system. Oscillations are transferred to the indicator only to a limited degree.

The switching output can be designed as a slow-action contact, a magnetic snap contact, or an inductive contact. The slow-action or magnetic snap contact is an auxiliary current switch, which opens or closes an electrical circuit using a contact arm that is moved with the actual value indicator, depending on the direction of movement with the set limit values.

The inductive contact is an electronic limit contact with a contact-free displacement transducer (proximity switch).



Type 608425/2316



Type 608425/2496

### Technical data

	Round built-in and add-on case	Square built-in device
<b>Case</b>	Stainless steel case with bayonet connection (1.4301)	Zinc-plated sheet steel case, case fastening at rear with bar; front panel made of stainless steel (1.4301)
<b>Protection type</b>	IP 65 according to DIN EN 60529	On the front: IP 51 according to DIN EN 60529 On the rear: IP 00 according to DIN EN 60529
<b>Electrical connection</b>	Junction box: conductor cross-section up to 2.5 mm <sup>2</sup> Cable fitting, suitable for cable Ø from 6.5 to 13 mm	Screw terminals: conductor cross-section up to 2.5 mm <sup>2</sup>
<b>Front pane</b>	Polycarbonate	Acrylic glass (PMMA)
<b>Scale</b>	White, with black lettering	
<b>Display</b>	Class 1 according to DIN EN 13190	
<b>Strain relief spring</b>	For capillary devices on the case and the temperature probe	
<b>Setpoint value adjustment</b>	By setpoint adjuster in the front pane	
<b>Display correction</b>	On the rear, no display correction with design type 01 and design type 20 (Ø 100 mm)	
<b>Limit value temperatures</b>	For transport and storage -20°C to +70°C (for display range 0 to +60°C up to max. 65°C)	
<b>Rated position (NL)</b>	Any	
	<b>Liquid filling</b>	<b>Gas filling</b>
<b>Measuring system</b>	Display range (AB) ≤ 350°C	Display range (AB) ≥ 400°C
<b>Time constant</b> t <sub>0.632</sub>	Approx. 12 s, measured in water, with a probe Ø of 6 mm made of copper	Approx. 4 s, measured in oil, with a probe Ø of 10 mm made of stainless steel
<b>Influential effect of the ambient temperature</b>	In % of the display range (referring to the deviation from the reference value +23°C)	
<b>On case</b>	0.15% of the display range per K ambient temperature change	0.05% of the display range per K ambient temperature change
<b>On capillary (per m)</b>	0.03% of the display range per K ambient temperature change	No influence
	Higher ambient temperature – higher temperature display – lower switching point	



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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
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 6733 Myers Road  
 East Syracuse, NY 13057, USA  
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	Standard	Extra code (TZ) 442
<b>Electrical contact</b>		
<b>Contact type</b>	Electromechanical slow-action contact with single-pole touch-dependent N/O contacts	Electromechanical slow-action contact with single-pole touch-dependent N/O contacts
<b>Switching capacity</b>	AC / DC 230 V, +10/-15%, 48 to 63 Hz, $\cos \varphi = 1$ (0.6) max. 18 VA / 10 W	max. 50 VA / 30 W
<b>Switching differential</b>	$\leq 0.5\%$ of the display range	approx. 2% of the display range
<b>Switching point accuracy</b>	$\pm 0.5\%$ of the display range referring to the switch-off point with rising temperature	
<b>Switching reliability</b>	To ensure a high switching reliability, we recommend a minimum voltage of: 24 V and a minimum current of 20 mA	

	Electromechanical limit contact	Inductive limit contact
<b>Switching output</b>	01 to 11	30 and 31
		The inductive limit contact operates contact-free (proximity switch). The coil body (initiator) is fitted to the setpoint value indicator. The control lug is moved by the actual value indicator. If the control lug moves into the air gap in the coil body, the internal resistance increases (active surface attenuated, initiator has high resistance – relay drops). The resulting change in the current strength is the input signal for the switching amplifier of the control unit. Mode of operation with switching behavior according to the "open circuit principle". Control lug not in the air gap in the coil body, relay engages:
		 Current consumption $\geq 3$ mA (active surface free, oscillator oscillates).
		Control lug in the air gap in the coil body, relay drops:
		 Current consumption $\leq 1$ mA (active surface attenuated, oscillator off). Inductive limit contact according to Directive 94/9 EC (ATEX), suitable for II 2 G EEx ia IIC T6
	For switching sequence and circuit diagrams, see order details	

**Safety relays**

In the case of electromechanical limit contacts, we recommend the use of multifunctional relays in the MSR (measurement and control technology) series from: Wiebrock Mess- und Regeltechnik GmbH, www.wiebrock.de.

These switching amplifiers improve the switching reliability and the switching capacity of slow-action and magnetic snap contacts and reduce their contact load.

Unintentional switching operations in the limit contacts, caused by vibrations, are reduced considerably by an OFF delay.

In the case of inductive limit contacts, transistor relays, type KFA6-SR2-Ex up to W (II (1) G D [EEx ia] IIC) from Pepperl & Fuchs, www.pepperlfuchs.de, can be used. The intrinsic safety II 2 G EEx ia IIC T6 is guaranteed only in connection with the above-mentioned transistor relay.

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

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 Delivery address: Mackenrodtstraße 14  
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 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
 E-mail: mail@jumo.net  
 Internet: www.jumo.net

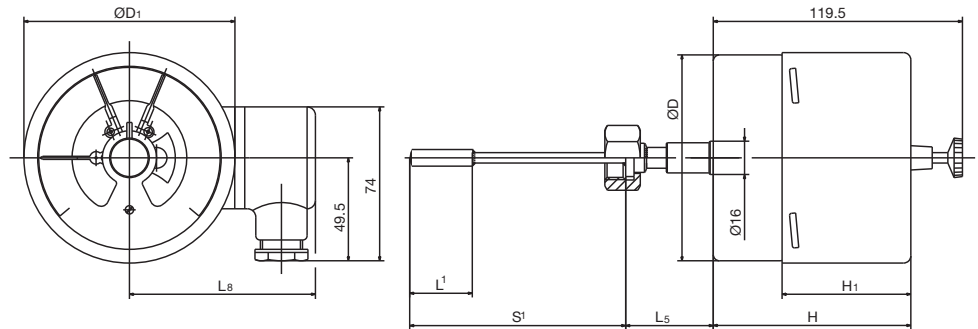
**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
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 6733 Myers Road  
 East Syracuse, NY 13057, USA  
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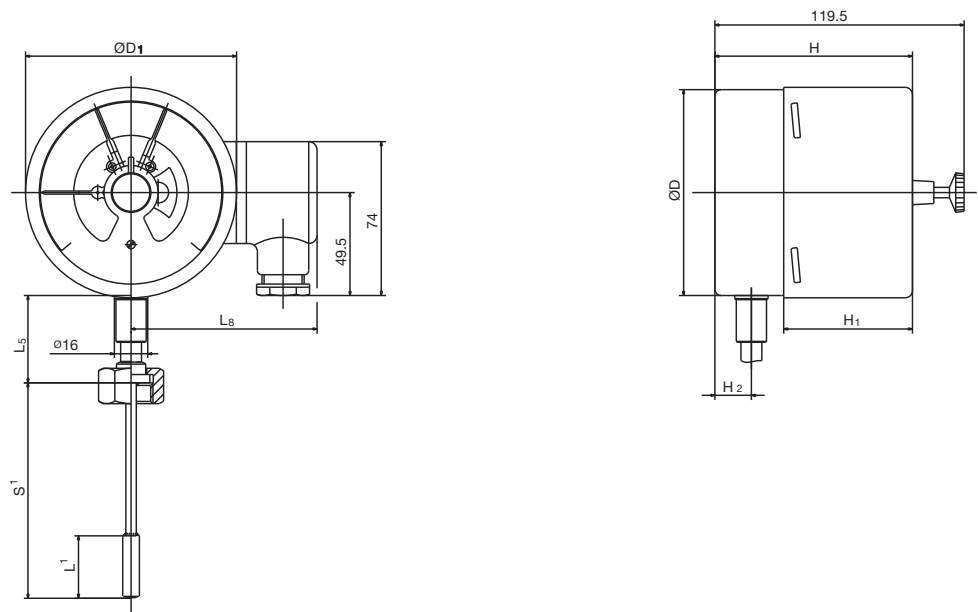


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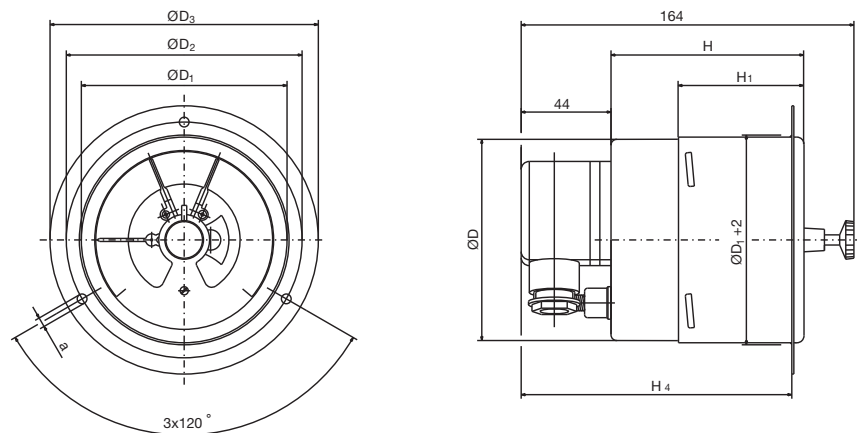
Types: 608425/0110  
 608425/0116



Types: 608425/1010  
 608425/1016



Types: 608425/2010  
 608425/2016



Panel cut-out for case  
 $\varnothing 100\text{mm} = 105.5^{+0.5}\text{mm}$   
 $\varnothing 160\text{mm} = 165.5^{+0.5}\text{mm}$

<sup>1</sup> For length specifications, see data sheet 608730

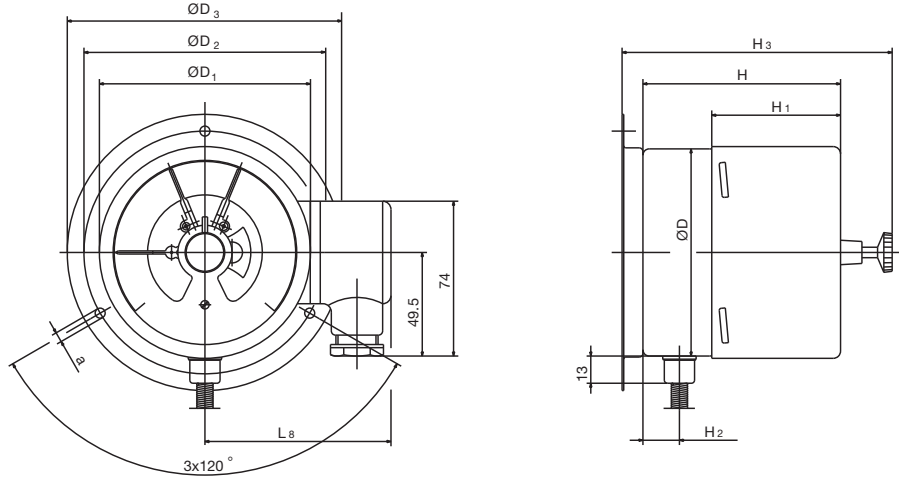
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 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
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 JUMO House  
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 Harlow, Essex CM20 2DY, UK  
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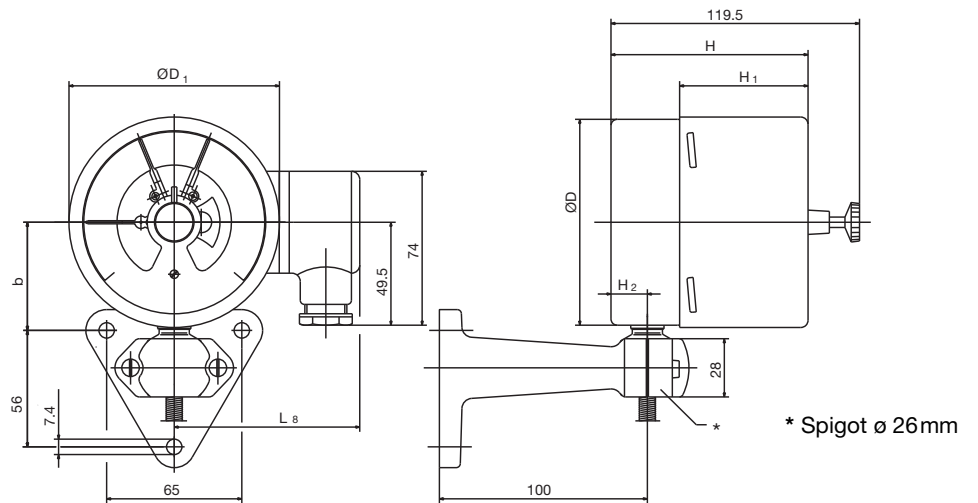
**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
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Types: 608425/2210  
 608425/2216



Types: 608425/2310  
 608425/2316

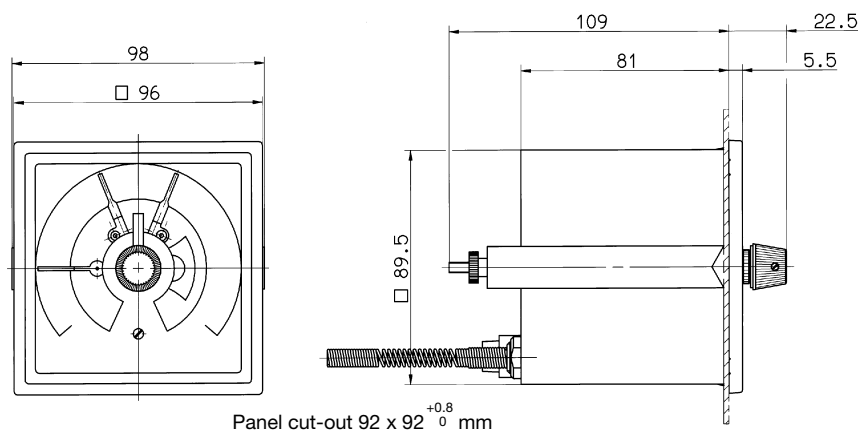


Bracket for measuring device according to DIN 16281

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

<sup>1</sup> With protection tube connection type TA 02, L<sub>5</sub> is ≤ 69 mm

Type: 608425/2496





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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

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 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
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 Internet: www.jumousa.com



## Order details

### Contact dial thermometer class 1, type 608425

Order code		(1) Basic type		
608425		Mechanical contact dial thermometer class 1 (round built-in and add-on device)		
608425		Mechanical contact dial thermometer class 1 (square built-in device)		
		<b>(2) Basic type extension</b>		
X	0110	Design type: 01; case size: ø 100 mm		
X	0116	Design type: 01; case size: ø 160 mm		
X	1010	Design type: 10; case size: ø 100 mm		
X	1016	Design type: 10; case size: ø 160 mm		
X	2010	Design type: 20; case size: ø 100 mm		
X	2016	Design type: 20; case size: ø 160 mm		
X	2210	Design type: 22; case size: ø 100 mm		
X	2216	Design type: 22; case size: ø 160 mm		
X	2310	Design type: 23; case size: ø 100 mm		
X	2316	Design type: 23; case size: ø 160 mm		
X	2496	Design type: 24; case size: 96 x 96 mm		
		<b>(3) Display range (AB)</b>		
X	X	469	-40 to +40°C;	
X	X	566	-30 to +50°C;	
X	X	807	0 to +60°C;	
X	X	810	0 to +80°C;	
X	X	814	0 to +100°C;	
X	X	818	0 to +120°C;	
X	X	826	0 to +160°C;	
X	X	832	0 to +200°C;	
X	X	834	0 to +250°C;	
X	X	840	0 to +300°C;	
X	X	843	0 to +350°C;	
X	X	848	0 to +400°C;	
X	X	854	0 to +500°C;	
		<b>(4) Capillary type (FL)<sup>1</sup></b>		
X		00	Without (with rigid shaft)	
X	X	04	FL04Stainless steel capillary (1.4571), ø 2.2 mm	
		<b>(5) Capillary length<sup>1</sup></b>		
X		0	Without (with 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 (specifications in plain text: 1,000 mm increments, maximum length 10,000 mm)	
		<b>(6) Process connection (PC)<sup>1</sup></b>		
X	X	750	TF01 Temperature probe with stepped support tube	
X	X	753	TF05 Temperature probe with plane support tube	
X	X	752	TF11 Temperature probe without support tube	
X	X	843	TA02 Protection tube with union nut and loose screw connection <sup>2</sup>	
X	X	161	TA03 Protection tube with loose union nut (with TF01)	
X	X	846	TA04 Protection tube with fixed hexagon male connector <sup>2</sup>	
X	X	847	TA06 Displaceable threaded fitting on support tube <sup>2</sup>	
X	X	891	SH05 Screw-in sleeve, multi-sectional <sup>2</sup> (only with ø 14 mm)	
X	X	913	SH07 Screw-in sleeve, multi-sectional, with clamping piece and fixing screw <sup>2</sup>	

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

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 Harlow, Essex CM20 2DY, UK  
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## Order details

### Contact dial thermometer class 1, type 608425

			<b>(7) Diameter of process connection (PC)<sup>1</sup></b>	
X	X	6	∅ 6 mm	
X	X	8	∅ 8 mm	
X	X	10	∅ 10 mm	
X	X	14	∅ 14 mm (only for SH05)	
			<b>(8) Thread type of process connection (PC)<sup>1</sup></b>	
X	X	000	Without thread (for TF 01, TF 05, and TF 11)	
X	X	103	Screw connection G 3/8	
X	X	104	Screw connection G 1/2	
X	X	105	Screw connection G 3/4	
			<b>(9) Material of process connection (PC)<sup>1</sup></b>	
X	X	26	Stainless steel (CrNi, 1.4571)	
X	X	97	Stainless steel (CrNi, 14571) – TF / Brass (CuZn) – TA, SH	
			<b>(10) Insertion length, process connection (PC)<sup>1</sup> (dimension "EL" or "S")</b>	
X	X	0	Minimum insertion 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 (specifications in plain text – 50 mm increments)	
			<b>(11) Switching output (SA)</b>	
X	X	01	With increasing temperature, contact 1 (N/C) opens (2) <sup>3</sup>	
X	X	02	With increasing temperature, contact 1 (N/O) closes (1) <sup>3</sup>	
X	X	03	With increasing temperature, contact 1 (N/C) opens and contact 2 (N/O) closes (21) <sup>3</sup>	
X	X	04	With increasing temperature, contact 1 and contact 2 (N/O) closes (11) <sup>3</sup>	
X	X	05	With increasing temperature, contact 1 and contact 2 (N/C) opens (22) <sup>3</sup>	
X		10	With increasing temperature, contact 1 (N/C) opens and contact 2 (N/O) closes (with isolated electrical circuit) (21) <sup>3</sup>	
X		11	With increasing temperature, contact 1 and contact 2 (N/O) closes (with isolated electrical circuit) (11) <sup>3</sup>	
X	X	30	Control lug moving in when the temperature rises, N/C (2) <sup>3</sup>	
X	X	31	Control lug moving out when the temperature rises, N/O contact (1) <sup>3</sup>	
			<b>(12) Extra codes (TZ)</b>	
X	X	000	Without extra code	
X	X	442	Electromechanical magnetic snap contact	
X		509	Setpoint value adjustment with key	
X	X	522	Customized scale	

Special versions upon request!

**Order code** 608425 / [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] / [ ] , ...  
**Order example** 608425 / 2010 - 818 - 04 - 2000 - 750 - 8 - 000 - 26 - 100 - 01 / 000<sup>4</sup>

<sup>1</sup> For description and special features refer to data sheet 608730

<sup>2</sup> Screw-in spigot according to DIN 3852 form A

<sup>3</sup> Bracketed values ( . . ) correspond to the key indicator specifications according to DIN 16196

<sup>4</sup> List extra codes in sequence, separated by commas

**JUMO GmbH & Co. KG**

Delivery address: Mackenrodtstraße 14  
36039 Fulda, Germany  
Postal address: 36035 Fulda, Germany  
Phone: +49 661 6003-0  
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# MICROSTAT-M

Type 608501

## Special features

- Class 2
- Display ranges from -40°C to +600°C
- Temperature controller with actual value display as built-in device in a plastic case
- With a microswitch
- Case sizes: Ø 60 mm, Ø 80 mm, and Ø 100 mm  
front panel: 72 x 72 mm and 96 x 96 mm

## Brief description

The MICROSTAT-M is a universally applicable electromechanical temperature controller with actual value display. The device comes in a plastic case with a liquid- or gas-filled measuring system.

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



Type 608501/2160



Type 608501/2572

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
 E-mail: mail@jumo.net  
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 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
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## Technical data

<b>Case and/or front panel</b>	Plastic, black; sheet steel case (extra code 415)		
<b>Protection type</b>	On the front: IP 53 according to DIN EN 60529 On the rear: IP 00 according to DIN EN 60529 (IP 54 with extra code 426)		
<b>Scale</b>	White, with black lettering		
<b>Display</b>	Class 2 according to DIN EN 13190		
<b>Measuring system</b>	<b>Liquid filling</b>		<b>Gas filling</b>
	AB ≤ 350 °C		AB ≥ 400 °C
<b>Time constant</b> $t_{0,632}$	Approx. 12 s, measured in water, with a probe Ø of 6 mm made of Cu.		Approx. 4 s, measured in oil, with a probe Ø of 10 mm made of stainless steel.
<b>Influential effect of the ambient temperature</b> <b>On case</b>	In % of the display range (referring to the deviation from the reference value +23°C)		
	0.15% of the display range per K ambient temperature change		0.05% of the display range per K ambient temperature change
<b>On capillary (per m)</b>	0.03% of the display range per K ambient temperature change		No influence
	At higher ambient temperature – higher temperature display – lower switching point		
<b>Electrical contact</b> <b>Contact type</b>	Standard	Extra code (TZ) 651	Extra code (TZ) 650
	Single-pole microswitch with mechanically actuated changeover contact		
<b>Switching capacity</b>	AC 230 V, +10/-15%, 48 to 63 Hz, cos φ = 1 (0.6)		
	5 (1.5) A	3 (1) A	10 (3) A
<b>Switching differential</b>	Approx. 2% of the display range		2 to 4% of the display range
<b>Switching point accuracy</b>	± 0.5% of the display range referring to the switch-off point with rising temperature		
<b>Switching reliability</b>	To ensure a high switching reliability, we recommend a minimum voltage of 24 V and a minimum current of 100 mA.		
<b>Electrical connection</b>	Standard	Extra code (TZ) 507	
	Tab connector A 6.3x0.8 according to DIN 46244	Screw terminals: conductor cross-section up to 1.5 mm <sup>2</sup>	
<b>Setpoint value adjustment</b>	By setpoint adjuster in the front pane		
<b>Limit value temperatures</b>	For transport and storage: -20°C to +70°C (for display range -40 to +40°C up to max. 50°C; for display range -30 to +50°C up to max. 60°C)		
<b>Rated position</b>	Any		

Display range (AB)	Display range in °C	Measuring range in °C	Tolerance in K (+/-)
469	-40 to + 40	-40 to + 40	2.0
566	-30 to + 50	-30 to + 50	2.0
643	-20 to +120	-20 to +120	4.0
807	0 to + 60	0 to + 60	2.0
810	0 to + 80	0 to + 80	2.0
814	0 to +100	0 to +100	2.0
818	0 to +120	0 to +120	4.0
826	0 to +160	0 to +160	4.0
832	0 to +200	0 to +200	4.0
834	0 to +250	0 to +250	5.0
926	+50 to +250	+50 to +250	4.0
840	0 to +300	0 to +300	10.0
927	+50 to +300	+50 to +300	5.0
843	0 to +350	0 to +350	10.0
932	+50 to +350	+50 to +350	10.0
848	0 to +400	0 to +400	10.0
851	0 to +450	0 to +450	10.0
854	0 to +500	0 to +500	10.0
858	0 to +600	0 to +600	15.0

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 Delivery address: Mackenrodtstraße 14  
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 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
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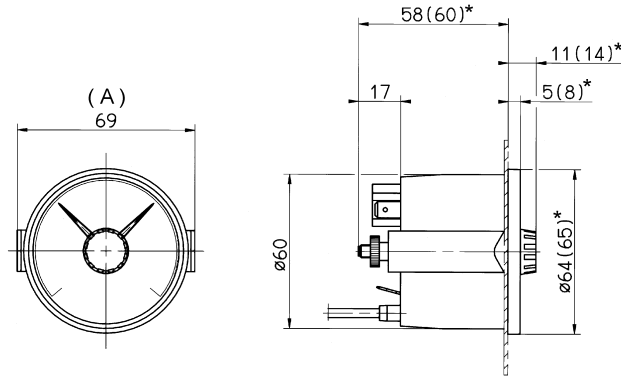
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 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
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**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
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## Dimensions

Types: 608501/2160  
 608501/2160 TZ 415

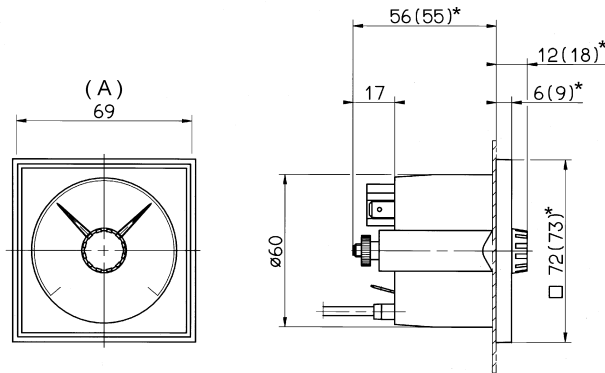


\* With sheet steel case  
 (extra code TZ 415)

(A) Fastening bar width

Panel cut-out  $\varnothing 62$   $\begin{matrix} +0.5 \\ 0 \end{matrix}$  mm

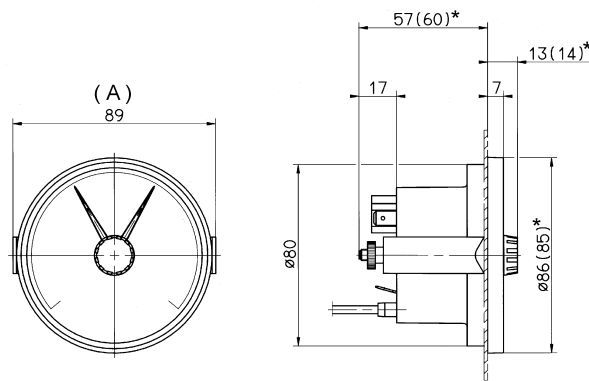
Types: 608501/2572



(A) Fastening bar width

Panel cut-out  $\varnothing 62$   $\begin{matrix} +0.5 \\ 0 \end{matrix}$  mm

Types: 608501/2180  
 608501/2180 TZ 415

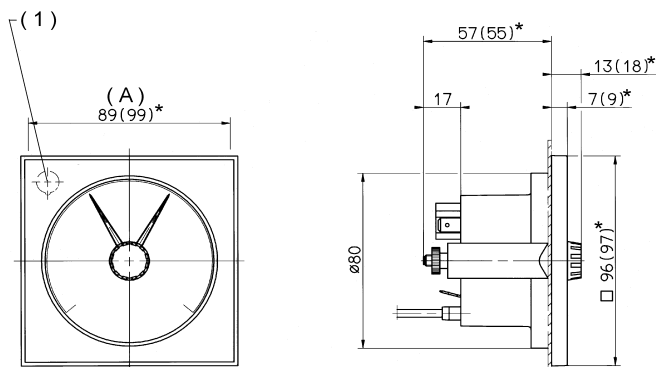


\* With sheet steel case  
 (extra code TZ 415)

(A) Fastening bar width

Panel cut-out  $\varnothing 82$   $\begin{matrix} +0.5 \\ 0 \end{matrix}$  mm

Types: 608501/2596  
 608501/2596 TZ 415



\* With sheet steel case  
 (extra code TZ 415)

(1) TZ 572 (control lamp)  
 only with panel cut-out  
 $92 \times 92^{+0.8}_0$  mm

(A) Fastening bar width

Panel cut-out  $\varnothing 82$   $\begin{matrix} +0.5 \\ 0 \end{matrix}$  mm or  $92 \times 92$   $\begin{matrix} +0.8 \\ 0 \end{matrix}$  mm (TZ 460)

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 Postal address: 36035 Fulda, Germany  
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 Internet: www.jumo.net

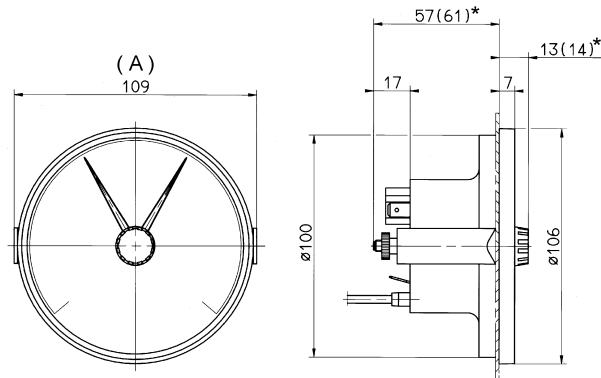
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 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
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 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
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 E-mail: info.us@jumo.net  
 Internet: www.jumousa.com



## Dimensions

Types: 608501/2110  
 608501/2110 TZ 415

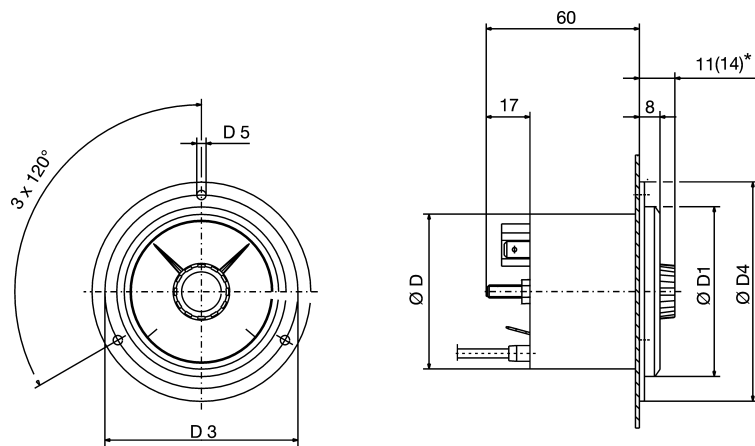


\* With sheet steel case  
 (extra code TZ 415)

(A) Fastening bar width

Panel cut-out  $\varnothing$  102  $^{+0.5}_0$  mm

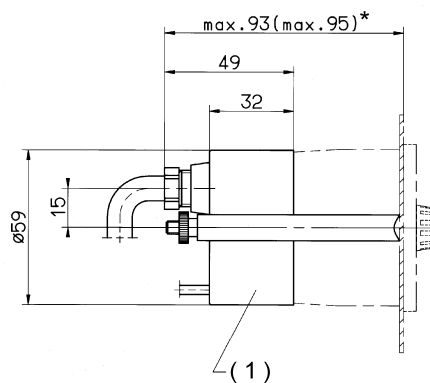
Types: 608501/2060  
 608501/2060 TZ 415  
 608501/2080 TZ 415  
 608501/2010 TZ 415



\* With sheet steel case  
 (extra code TZ 415)

Type	$\varnothing$ D	$\varnothing$ D1	$\varnothing$ D3	$\varnothing$ D4	$\varnothing$ D5	Panel cut-out $\varnothing$ $^{+0.5}_0$ mm
608501/2060 608501/2060 TZ 415	60	66	75	85	3.6	62
608501/2080 TZ 415	80	86	95	110	4.8	82
608501/2010 TZ 415	100	107	116	132	4.8	102

Extra code 426



\* With sheet steel case  
 (extra code TZ 415)

(1) Extra code TZ 426

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 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
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**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
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## Order details

### MICROSTAT-M Type 608501

#### Order code (1) Basic type

Mechanical temperature controller MICROSTAT-M class 2 with a microswitch

608501/2060	Design type: 20; case size: ø 60 mm	
608501/2080	Design type: 20; case size: ø 80 mm (only with TZ 415)	
608501/2010	Design type: 20; case size: ø 100 mm (only with TZ 415)	
608501/2160	Design type: 21; case size: ø 60 mm	
608501/2180	Design type: 21; case size: ø 80 mm	
608501/2110	Design type: 21; case size: ø 100 mm (only with TZ 415)	
608501/2572	Design type: 25; case size: 72 x 72 mm	
608501/2596	Design type: 25; case size: 96 x 96 mm	

#### (2) Display range (AB)

Display range °C

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

#### (3) Capillary type (FL)<sup>1</sup>

02	FL 02 Cu capillary with Cu textile braiding, approx. Ø 2.5 mm (up to AB end value +300°C)
11	FL11 Cu capillary with PE coating, approx. ø 3.5 mm (up to AB end value +120°C)
17	FL 17 Stainless steel capillary, Ø 1.5 mm
21	FL21 Cu capillary, Ø 1.0 mm (up to AB end value +300°C)

#### (4) Capillary length<sup>1</sup>

1000	1000 mm
2000	2000 mm
3000	3000 mm
4000	4000 mm
5000	5000 mm
...	Special length (specifications in plain text: 1,000 mm increments, maximum length 10,000 mm)

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## Order details

### MICROSTAT-M Type 608501

Order code	(5) Process connection (PC) <sup>1</sup>	
750	TF 01; Temperature probe with stepped support tube	
752	TF 11; Temperature probe without support tube	
843	TA 02; Protection tube with union nut and loose screw connection <sup>2</sup>	
161	TA 03; Protection tube with loose union nut	
847	TA 06; Displaceable threaded fitting on support tube <sup>2</sup>	
311	TA 20; Protection tube with loose screw connection and connection collar <sup>2</sup>	
872	TA 21; Protection tube with loose pressure screw and conical seal	
873	TA 22; Protection tube with loose pressure screw, conical seal and loose screw connection <sup>2</sup>	
401	TA 23; Protection tube with pressure screw and contact pressure spring	
913	SH 07; Screw-in sleeve, multi-sectional, with clamping piece and fixing screw <sup>2</sup>	
820	SH 09; Weld-in sleeve, multi-sectional, with clamping piece and fixing screw (not with FL21 – weld collar with steel 1.4515)	
876	SH 10; Screw-in sleeve, multi-sectional <sup>2</sup>	
871	SH 11; Screw-in sleeve, multi-sectional <sup>2</sup>	
<b>(6) Diameter of process connection (PC)<sup>1</sup></b>		
6	Ø 6 mm	
8	Ø 8 mm	
10	Ø 10 mm	
11	Ø 11 mm	
12	Ø 12 mm	
<b>(7) Thread type of process connection (PC)<sup>1</sup></b>		
000	Without thread (for TF 01 and TF 11)	
103	Screw connection G <sup>3</sup> / <sub>8</sub>	
104	Screw connection G <sup>1</sup> / <sub>2</sub>	
105	Screw connection G <sup>3</sup> / <sub>4</sub>	
114	Screw connection M 10 × 1 (only for TA 23 and SH 11)	
<b>(8) Material, probe / support tube<sup>1</sup></b>		
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)	







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 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
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 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
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**JUMO Process Control, Inc.**  
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 East Syracuse, NY 13057, USA  
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# Contact Dial Thermometers

## Special features

- Class 1.5
- Display range -40° C to +600° C
- Temperature controller with actual value display as built-in or add-on device in a stainless steel case
- with 1 or 2 microswitches
- Case sizes Ø: 60 mm, 80 mm, and 100 mm  
 Front panel: 72x72 mm and 96x96 mm

## Brief description

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

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

Contact dial thermometers in the series 608520 are RoHS-compliant and cadmium-free.



## Technical data

<b>Case and front panel</b>	Stainless steel (1.4301)
<b>Cover cap</b>	Plastic (PA6), gray, UV-stabilized
<b>Protection type</b>	IP 54 according to DIN EN 60529
<b>Front pane</b>	Acrylic glass (PMMA)
<b>Chassis</b>	Aluminum (3.2582.05)
<b>Scale</b>	White, with black lettering
<b>Display</b>	Class 1.5 similar to DIN EN 13190
<b>Strain relief spring</b>	For capillary devices on the case and the temperature probe
<b>Setpoint value adjustment</b>	By setpoint adjuster in the front pane
<b>Display correction</b>	On the rear
<b>Limit value temperatures</b>	For transport and storage -30°C to +70°C (for display range -40 to +40°C up to max. 50°C; -30 to +50°C up to max. 60°C)
<b>Rated position (NL)</b>	Any

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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
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 6733 Myers Road  
 East Syracuse, NY 13057, USA  
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 1-800-554-5866  
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## Technical data

Display range (AB)	Display range in °C	Measuring range in °C	Tolerance in K (+/-)
469	-40 to +40	-30 to +30	1.5
643	-20 to +120	-20 to +120	3.0
807	0 to +60	+10 to +50	1.5
814	0 to +100	+10 to +90	1.5
818	0 to +120	+20 to +100	3.0
832	0 to +200	+20 to +180	3.0
840	0 to +300	+30 to +270	6.0
848	0 to +400	+50 to +350	6.0
854	0 to +500	+50 to +450	8.0
858	0 to +600	+100 to +500	10.0

	Liquid filling	Gas filling
<b>Measuring system</b>	Display range (AB) ≤ 350°C	Display range (AB) ≥ 400°C
<b>Time constant</b> 0.632	Approx. 12 s, measured in water, with a probe Ø of 6 mm made of copper.	Approx. 4 s, measured in oil, with a probe Ø of 10 mm made of stainless steel.
<b>Ambient temperature influence effect</b>	In % of the display range (referring to the deviation from the reference value +23°C)	
<b>On case</b>	0.15% of the display range per K ambient temperature change	0.05% of the display range per K ambient temperature change
<b>On capillary (per m)</b>	0.03% of the display range per K ambient temperature change	No influence
	At higher ambient temperature – higher temperature display – lower switching point	

	Standard	Extra code (TZ) 650
<b>Electrical contact</b>	Single-pole microswitch with mechanically actuated changeover contact	
<b>Contact type</b>		
<b>Switching capacity</b>	AC 230V, +10/-15%, 48 to 63Hz, cos φ = 1 (0.6) 5 (1.5) A	10 (3) A
<b>Switching differential</b>	Approx. 1.5% of the display range	1.5 to 3% of the display range
<b>Switching point accuracy</b>	± 0.5% of the display range referring to the switch-off point with rising temperature	
<b>Switching reliability</b>	To ensure a high switching reliability, we recommend a minimum voltage of 24 V and a minimum current of 100 mA	

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

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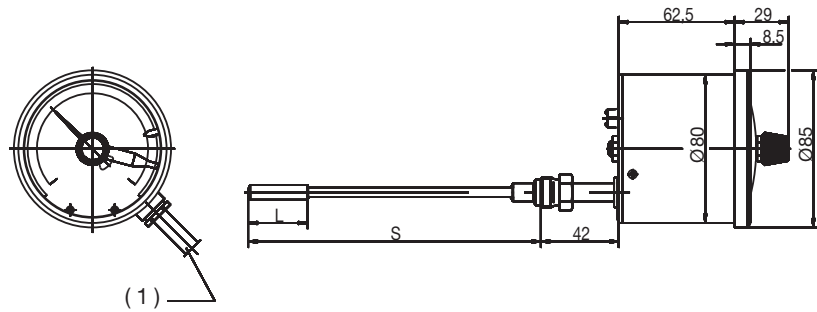
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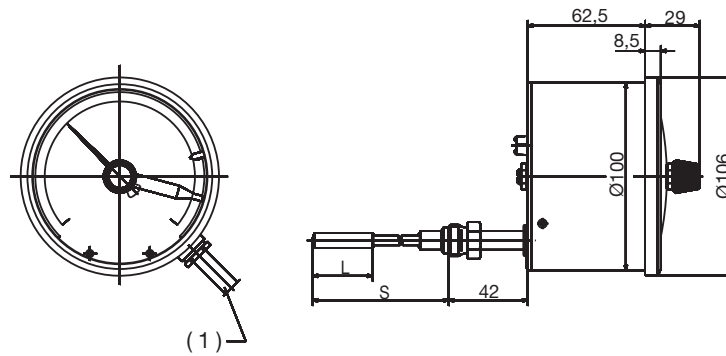
# Dimensions

**Type:**  
 608520/0280



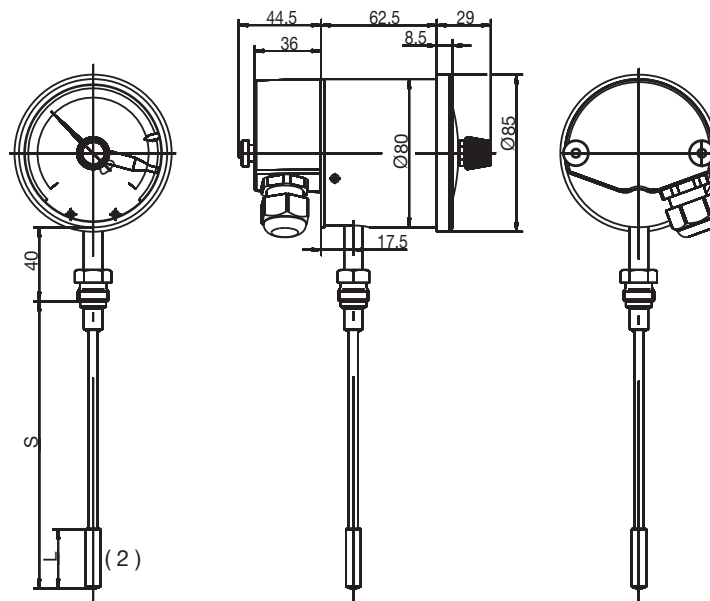
( 1 ) Connecting cable 0.6 m long with screw terminal

**Type:**  
 608520/0210



( 1 ) Connecting cable 0.6 m long with screw terminal

**Type:**  
 608520/1080



( 2 ) Active probe dimension

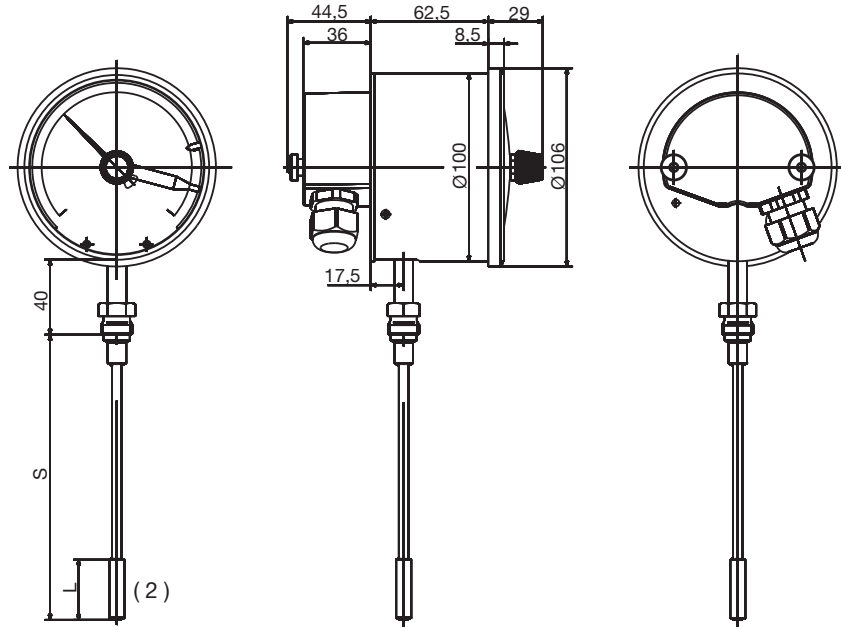
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 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
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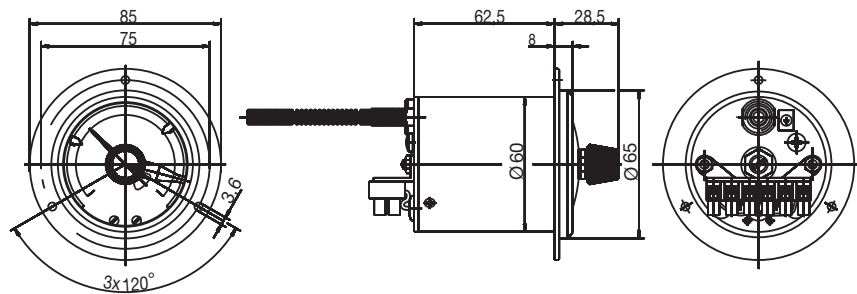


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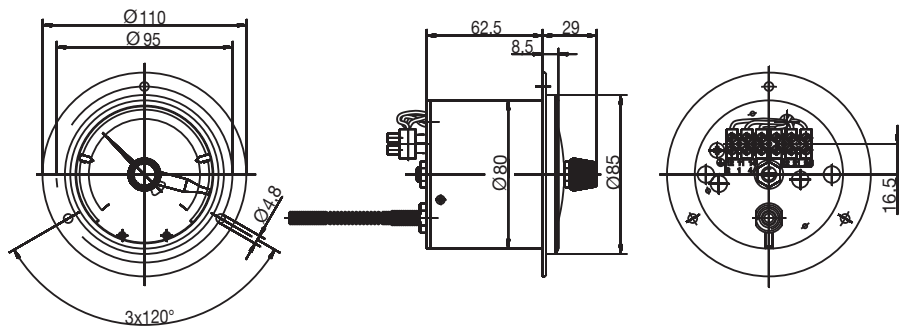
(2) Active probe dimension

**Type:**  
 608520/2060



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

**Type:**  
 608520/2080



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

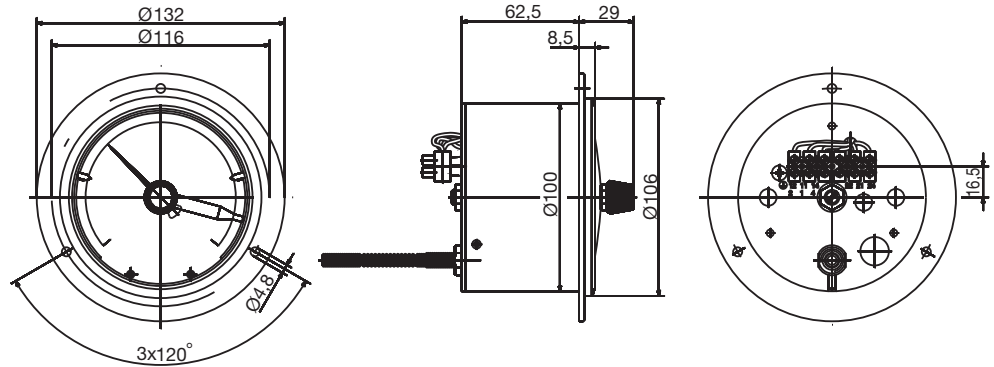
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 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
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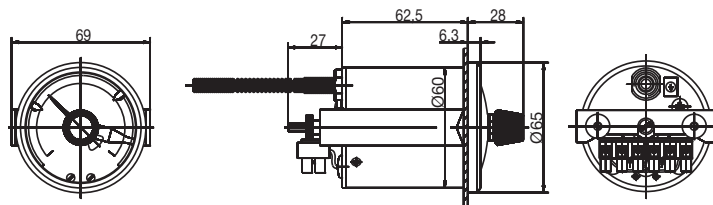


**Type:**  
 608520/2010



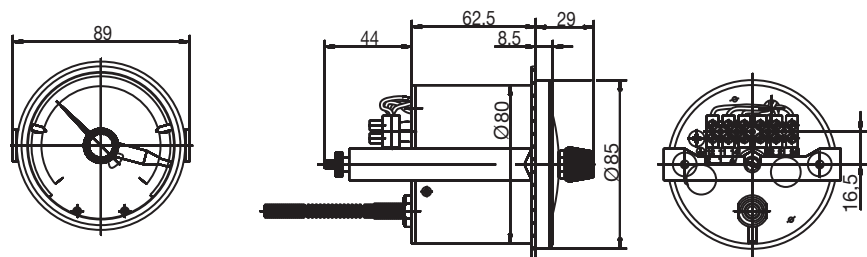
Panel cut-out for case  
 $\text{Ø } 100 \text{ mm} = 100^{+0.5} \text{ mm}$

**Type:**  
 608520/2160



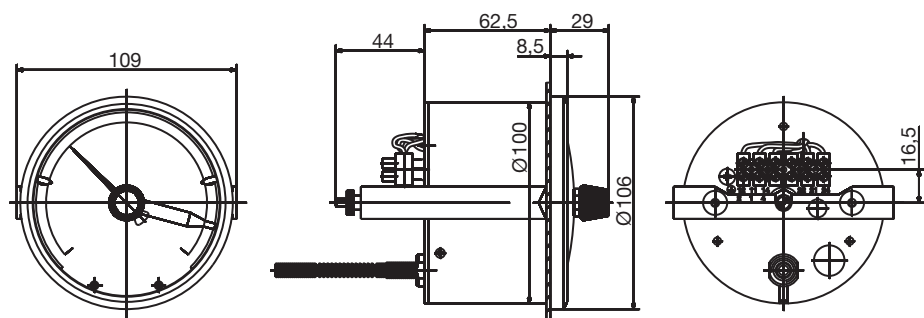
Panel cut-out for case  
 $\text{Ø } 60 \text{ mm} = 62^{+0.5} \text{ mm}$

**Type:**  
 608520/2180



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

**Type:**  
 608520/2110



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

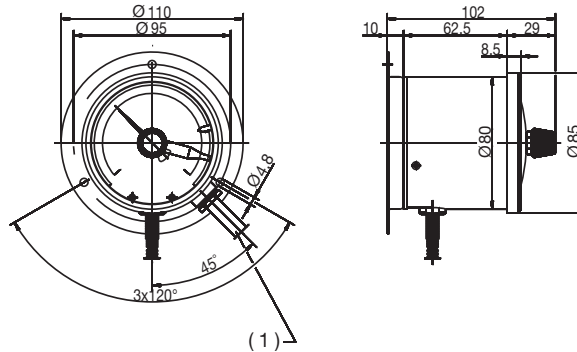
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**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
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 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
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 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
 Internet: www.jumousa.com

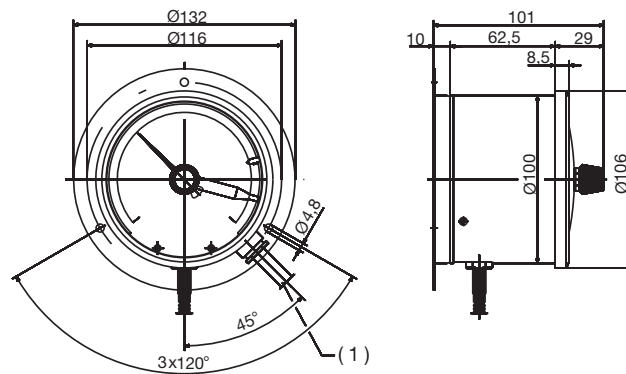


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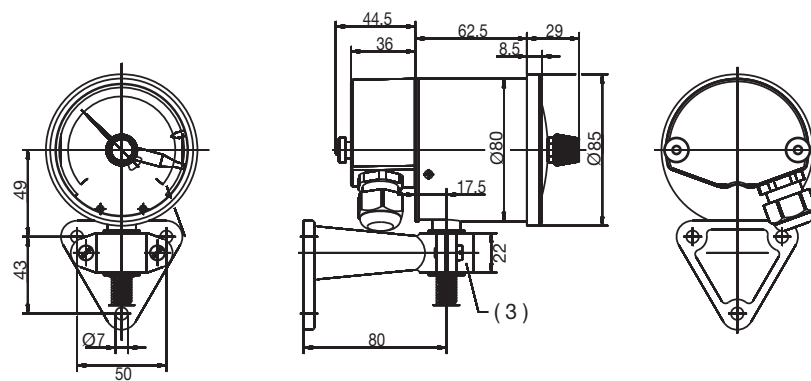
( 1 ) Connecting cable 0.6 m long with screw terminal

**Type:**  
 608520/2210



( 1 ) Connecting cable 0.6 m long with screw terminal

**Type:**  
 608520/2380



( 3 ) Spigot Ø 20 mm



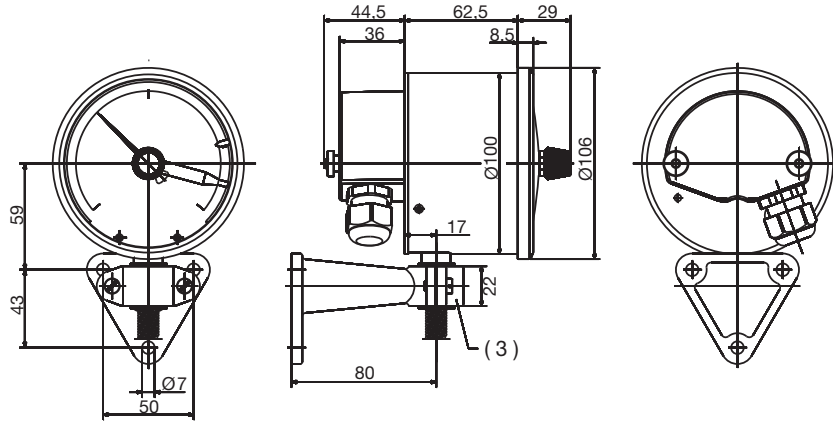
**JUMO GmbH & Co. KG**  
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 Postal address: 36035 Fulda, Germany  
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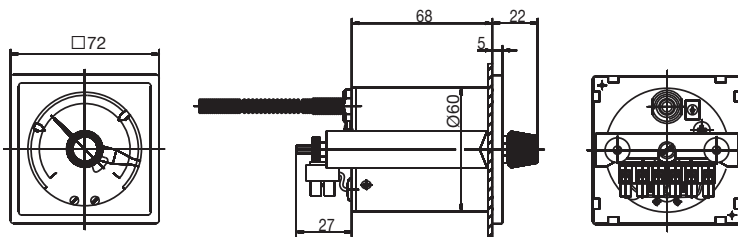


**Type:**  
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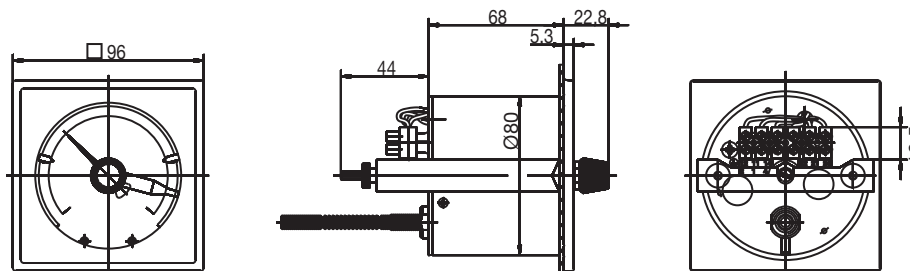
(3) Spigot Ø 20 mm

**Type:**  
 608520/2572



Panel cut-out for front panel  
 72 x 72 mm = Ø 62<sup>+0,5</sup> mm

**Type:**  
 608520/2596



Panel cut-out for front panel  
 96 x 96 mm = Ø 82<sup>+0,5</sup> mm oder  
 96 x 96 mm = 92 x 92<sup>+0,5</sup> mm (TZ 460)

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## Order details

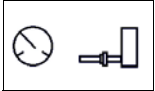
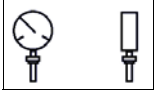
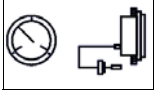
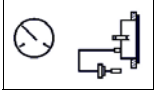
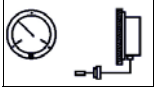

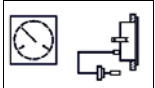
### Order code

#### (1) Basic type

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

#### (2) Basic type extension

Case size Ø

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

#### (3) Display range in °C

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

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**Order code**

**(4) Capillary type (FL)<sup>a</sup>**

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

**(5) Capillary length<sup>b</sup>**

0	Without (with rigid connection)
1000	1000 mm
2000	2000 mm
3000	3000 mm
4000	4000 mm
5000	5000 mm
...	Special length (specifications in plain text: 1,000 mm increments, maximum length 6,000 mm), additional lengths upon request

**(6) Process connection (PC)<sup>a</sup>**

750	TF 01	Temperature probe with stepped support tube	
752	TF 11	Temperature probe without support tube	
843	TA 02	Protection tube with union nut and loose screw connection <sup>b</sup>	
161	TA 03	Protection tube with loose screw connection	
847	TA 06	Protection tube with displaceable threaded fitting on support tube <sup>b</sup>	
311	TA 20	Protection tube with loose screw connection and connection collar <sup>b</sup>	
872	TA 21	Protection tube with loose pressure screw and conical seal (only G 3/8 possible)	
873	TA 22	Protection tube with loose pressure screw, conical seal, and loose screw connection <sup>b</sup>	
874	TA 24	Protection tube (CuNi) with screw connection (CuZn), O ring seal and clamping screw <sup>a b</sup>	
401	TA 23	Protection tube with pressure screw and contact pressure spring (only M 10x1 possible)	
913	SH 07	Screw-in protection tube, multi-sectional, with clamping piece and fixing screw (suitable for TF 01 and TF 11)	
820	SH 09	Weld-in protection tube, multi-sectional, with clamping piece and fixing screw <sup>b</sup> (not for FL 21 – welding collar with steel 1.4515)	
876	SH 10	Screw-in protection tube, multi-sectional <sup>b</sup> (suitable for TA 21)	
871	SH 11	Screw-in protection tube, multi-sectional <sup>b</sup> (suitable for TA 23)	

<sup>a</sup> For the description and special features refer to data sheet 608730.

<sup>b</sup> Screw-in spigot according to DIN 3852, form A.

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36039 Fulda, Germany  
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**Order code**

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

<sup>a</sup> For the description and special features refer to data sheet 608730.

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**Order code (12) Switching output**

20	1 changeover switch	
21	2 changeover switches	
22	2 changeover switches in fixed sequence	

**(13) Extra codes (TZ)**

000	Without extra code
426	Cover cap to protect the screw terminals against contact and spray water (standard for design types 10 and 23; not for design type 22; not in connection with TZ 460)
430	Drag indicator (includes TZ 477)
460	Device centering for panel cut-out 92 × 92 mm (only for basic type extension 2596)
477	Setpoint adjustment protected by the bolted cover. Adjustment with screwdriver.
518	Stop for Min. — or Max. — setpoint value limitation, default setting
522	Customized scale
650	Microswitch 10 (3) A (AC/DC 230 V, +10/-15%, 48 to 63 Hz, cos φ = 1 (0.6) )

Special versions upon request!

**Order code**

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

**Order example**

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

<sup>a</sup> List extra codes in sequence, separated by commas.

**Stock versions**

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

Delivery within 3 working days after receipt of order



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# Contact Dial Thermometer

## Special features

- Class 1.5
- Display range -40° C to +600° C
- Temperature controller with actual value display as built-in or add-on device in the stainless steel case with a bayonet connection
- Case size Ø: 100 mm
- Protection type IP 65

## Brief description

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

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



Type 608523/2210

## Technical data

<b>Basic type extension</b>	0210, 1010, 2010, 2210, 2310
<b>Case</b>	Stainless steel case with bayonet connection (1.4301)
<b>Protection type</b>	IP 65 according to DIN EN 60529
<b>Front pane</b>	Polycarbonate
<b>Scale</b>	White, with black lettering
<b>Display</b>	Class 1.5 similar to DIN EN 13190
<b>Strain relief spring</b>	For capillary devices on the case and the temperature probe
<b>Setpoint value adjustment</b>	By setpoint adjuster in the front pane; with screwdriver, protected by the bolted cover.
<b>Display correction</b>	On the rear, no display correction with design type 20
<b>Limit value temperatures</b>	For transport and storage -20°C to +70°C (for display range 0 to +60°C up to max. 65°C; -40 to +40°C up to max. 50°C; -30 to +50°C up to max. 60°C)
<b>Rated position (NL)</b>	Any

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## Technical data

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

	Liquid filling	Gas filling
<b>Measuring system</b>	Display range (AB) ≤ 350°C	Display range (AB) ≥ 400°C
<b>Time constant <math>t_{0.632}</math></b>	Approx. 12 s, measured in water, with a probe Ø of 6 mm made of Cu.	Approx. 4 s, measured in oil, with a probe Ø of 10 mm made of stainless steel.
<b>Ambient temperature influence effect</b>	In % of the display range (referring to the deviation from the reference value +23°C)	
<b>On case</b>	0.15% of the display range per K ambient temperature change	0.05% of the display range per K ambient temperature change
<b>On capillary (per m)</b>	0.03% of the display range per K ambient temperature change	No influence
	At higher ambient temperature – higher temperature display – lower switching point	

	Standard	Extra code (TZ) 650
<b>Electrical contact</b>	Single-pole microswitch with mechanically actuated changeover contact	
<b>Contact type</b>		
<b>Switching capacity</b>	AC 230V, +10/-15%, 48 to 63Hz, cos φ = 1 (0.6) 5 (1.5) A	10 (3) A
<b>Switching differential</b>	Approx. 1.5% of the display range	1.5 to 3% of the display range
<b>Switching point accuracy</b>	± 0.5% of the display range referring to the switch-off point with rising temperature	
<b>Switching reliability</b>	To ensure a high switching reliability, we recommend a minimum voltage of 24 V and a minimum current of 100 mA	
<b>Electrical connection</b>	Junction box: conductor cross-section up to 2.5 mm <sup>2</sup> , suitable for cable Ø from 6.5 to 13 mm	



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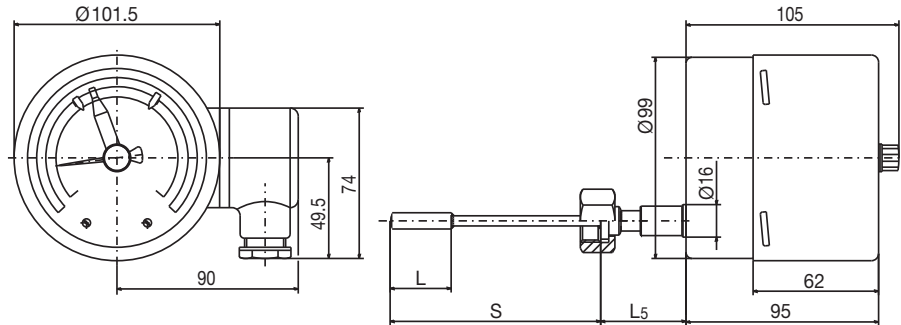
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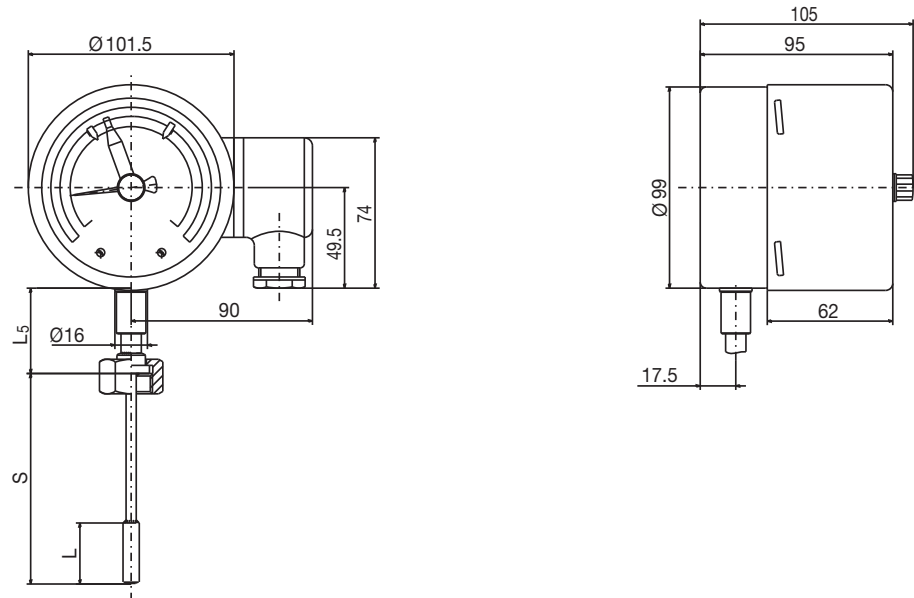


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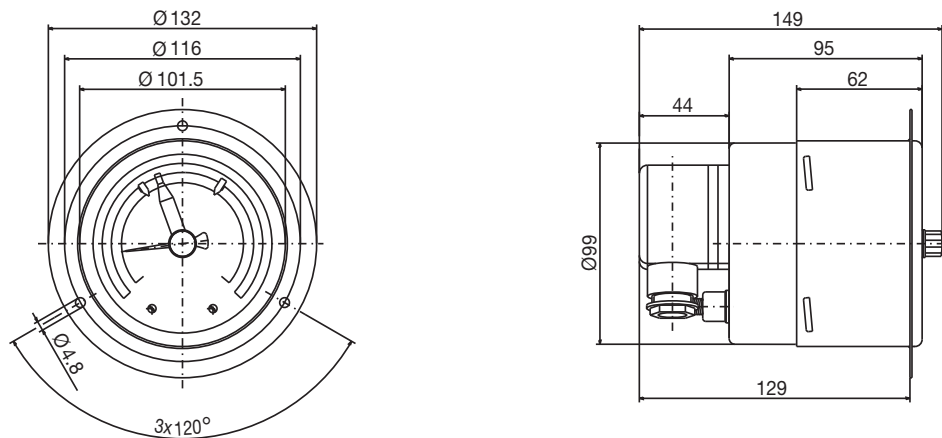
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 608523/0210



**Type:**  
 608523/1010



**Type:**  
 608523/2010



Panel cut-out Ø 105 <sup>+0.5</sup>mm

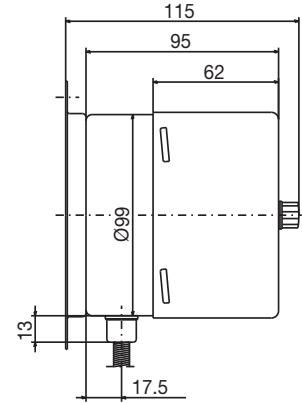
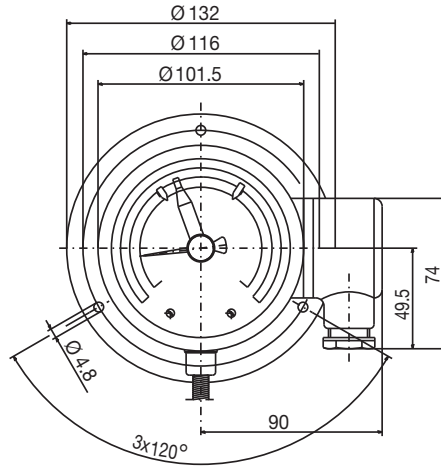
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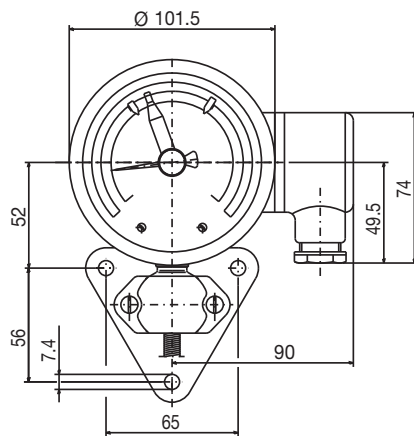


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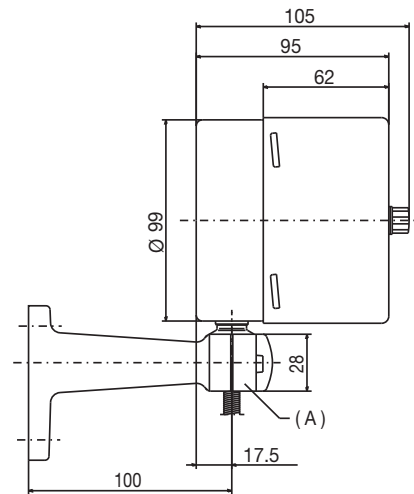


Panel cut-out  $\varnothing 105^{+0.5}$  mm

**Type:**  
 608523/2310



Bracket for measuring device according to DIN 16281



(A) Spigot  $\varnothing 26$  mm

$L_5$	Protection tube connection type
40 mm	TA 03, TA 30
$\leq 69$ mm	TA 02
42.5 mm	TA 21
51.5 mm	TA 22, TA 31

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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
 Internet: www.jumousa.com



## Order details

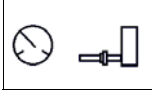

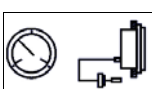


**Order code**

**(1) Basic type**

608523 Mechanical contact dial thermometer class 1.5

**(2) Basic type extension**

Case size Ø

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

**(3) Display range in °C**

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

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
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**Order code**

**(4) Capillary type (FL)<sup>a</sup>**

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

**(5) Capillary length<sup>b</sup>**

0	Without (with rigid connection)
1000	1000 mm
2000	2000 mm
3000	3000 mm
4000	4000 mm
5000	5000 mm
...	Special length (specification in plain text: 1,000 mm increments, maximum length 10,000 mm), additional lengths upon request

**(6) Process connection (PC)<sup>a</sup>**

750	TF 01	Temperature probe with stepped support tube	
752	TF 11	Temperature probe without support tube	
843	TA 02	Protection tube with union nut and loose screw connection <sup>b</sup>	
161	TA 03	Protection tube with loose screw connection	
847	TA 06	Protection tube with displaceable threaded fitting on support tube <sup>b</sup>	
311	TA 20	Protection tube with loose screw connection and connection collar <sup>b</sup>	
872	TA 21	Protection tube with loose pressure screw and conical seal (only G 3/8 possible)	
873	TA 22	Protection tube with loose pressure screw, conical seal, and loose screw connection <sup>b</sup>	
401	TA 23	Protection tube with pressure screw and contact pressure spring (only M 10x1 possible)	
913	SH 07	Screw-in protection tube, multi-sectional, with clamping piece and fixing screw (suitable for TF 01 and TF 11)	
820	SH 09	Weld-in protection tube, multi-sectional, with clamping piece and fixing screw <sup>b</sup> (not for FL 21 – welding collar with steel 1.4515)	
876	SH 10	Screw-in protection tube, multi-sectional <sup>b</sup> (suitable for TA 21)	
871	SH 11	Screw-in protection tube, multi-sectional <sup>b</sup> (suitable for TA 21)	

<sup>a</sup> For the description and special features refer to data sheet 608730.

<sup>b</sup> Screw-in spigot according to DIN 3852, form A.

**JUMO GmbH & Co. KG**

Delivery address: Mackenrodtstraße 14  
36039 Fulda, Germany  
Postal address: 36035 Fulda, Germany  
Phone: +49 661 6003-0  
Fax: +49 661 6003-607  
E-mail: mail@jumo.net  
Internet: www.jumo.net

**JUMO Instrument Co. Ltd.**

JUMO House  
Temple Bank, Riverway  
Harlow, Essex CM20 2DY, UK  
Phone: +44 1279 635533  
Fax: +44 1279 635262  
E-mail: sales@jumo.co.uk  
Internet: www.jumo.co.uk

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6733 Myers Road  
East Syracuse, NY 13057, USA  
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1-800-554-5866  
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E-mail: info.us@jumo.net  
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Order code	( 7 ) Ø Process connection (PC) <sup>a</sup>
6	6 mm
8	8 mm
10	10 mm
11	11 mm
12	12 mm
<b>( 8 ) Thread type of process connection (PC)<sup>a</sup></b>	
000	Without thread (for TA 01 and TF 11)
103	Screw connection G 3/8
104	Screw connection G 1/2
105	Screw connection G 3/4
114	Screw connection M 10 x 1 (only with TA 23 and SH 11)
<b>( 9 ) Material, probe / support tube<sup>a</sup></b>	
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
<b>( 10 ) Material of process connection (PC)<sup>a</sup></b>	
00	Without (only TF 01 and TF 11)
26	Stainless steel (CrNi, 1.4571)
46	Brass (CuZn)
<b>( 11 ) Insertion length, process connection (PC)<sup>a</sup> (dimension "EL" or "S")</b>	
0	Minimum insertion length TF 11 (active probe dimension)
50	50 mm
100	100 mm
150	150 mm
200	200 mm
...	Special length (specifications in plain text – 50 mm increments)

<sup>a</sup> For the description and special features refer to data sheet 608730.

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
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 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
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**Order code**

**( 12 ) Switching output**

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

**( 13 ) Extra codes (TZ)**

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

**Special versions upon request!**

**Order code**

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

**Order example**

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

<sup>a</sup> List extra codes in sequence, separated by commas.

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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM 20 2DY, UK  
 Phone: +44 1279 63 55 33  
 Fax: +44 1279 62 50 29  
 Email: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: +1 315 437 5866  
 Fax: +1 315 437 5860  
 Email: info.us@jumo.net  
 Internet: www.jumousa.com



# JUMO dicoTEMP 800

## Dial thermometer with microswitch

### Special features

- Low mounting depth
- Class 1.5
- Display range -50 to +500 °C
- Temperature controller with actual value display with panel mount, stainless steel case
- 1 microswitch
- Case size Ø 80 mm

### Brief description

Dial thermometers with microswitch are universal temperature controllers with actual value display for temperature measurement, control, and monitoring.

The temperature-dependent volume change in the liquid filled system or the temperature-dependent pressure change the gas filled system is converted to a rotational movement of the actual value indicator by a bourdon tube; without additional power supply. The microswitch is actuated by the rotational movement of the indicator shaft via a tap system.

Dial thermometers with microswitch in the series 608530 are RoHS-compliant and cadmium-free.



Type 608530/2180

### Technical data

Housing and front panel	Stainless steel (1.4301)
Protection type	Front IP54, rear IP00 according to DIN EN 60529
Front pane	Acrylic glass (PMMA)
Chassis	Die-cast
Scale	White, with black lettering
Display	Class 1.5 similar to DIN EN 13190
Strain relief spring	For capillary devices on the housing and temperature probe
Switching capacity	max. 5 A, 230 V / optional max. 10 A, 230 V
Setpoint value adjustment	By setpoint adjuster in the front pane
Limit value temperatures	For transport and storage -30 to +70 °C
Weight	approx. 350 g
Rated position (NL)	Any

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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM 20 2DY, UK  
 Phone: +44 1279 63 55 33  
 Fax: +44 1279 62 50 29  
 Email: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: +1 315 437 5866  
 Fax: +1 315 437 5860  
 Email: info.us@jumo.net  
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## Technical data

Display range (AB)	Display range in °C	Measuring range in °C	Tolerance in K (±)
818	0 to +120	+20 to +100	3
834	0 to +250	+30 to +220	4
926	+50 to +250	+60 to +230	4

	Liquid filling	Gas filling
Measuring system	Display range (AB) ≤ +350 °C	Display range (AB) ≥ +400 °C
Time constant $t_{0.632}$	Approx. 12 s, measured in water, with a probe Ø of 6 mm made of copper	Approx. 4 s, measured in oil, with a probe Ø of 10 mm made of stainless steel
Influential effect of the ambient temperature	In % of the display range (referring to the deviation from the reference value +23°C)	
On housing	0.15 % of display range Per K ambient temperature change	0.05 % of display range Per K ambient temperature change
On capillary (per m)	0.03 % of display range Per K ambient temperature change	No influence
	At higher ambient temperature – higher temperature display – lower switching point	

Electrical contact	Standard	Optional extra
Contact type	Single-pole microswitch with mechanically actuated changeover contact	
Switching capacity	AC 230 V, +10%, cos φ = 1 (0.6) 5 (1.5) A	10 (3) A
Switching differential	approx. 1.5 % of display range	1.5 to 3 % of display range
Switching point accuracy	± 0.5% of the display range referring to the switch-off point with rising temperature	
Switching reliability	To ensure the maximum possible switching reliability, we recommend a minimum voltage of 24 V and a minimum current of 100 mA.	

Electrical connection	Standard: screw terminals, connection cross section up to 2.5 mm <sup>2</sup>
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**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
 Email: mail@jumo.net  
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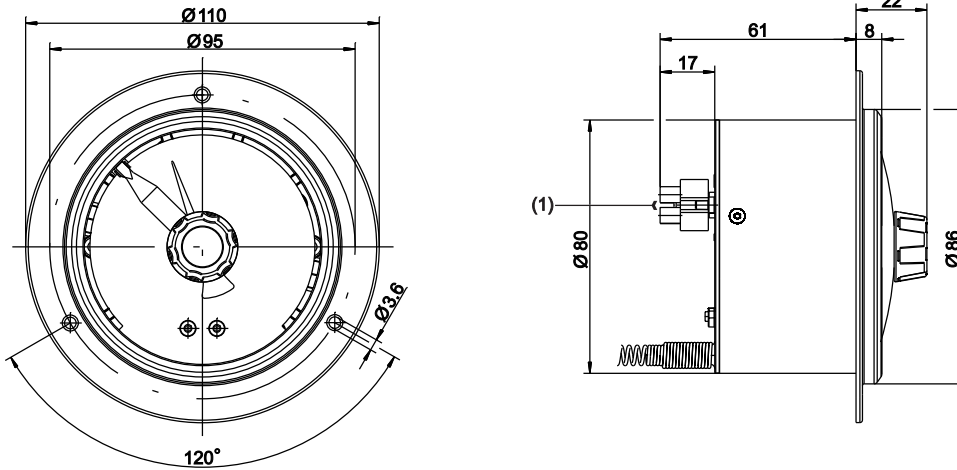
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 Harlow, Essex CM 20 2DY, UK  
 Phone: +44 1279 63 55 33  
 Fax: +44 1279 62 50 29  
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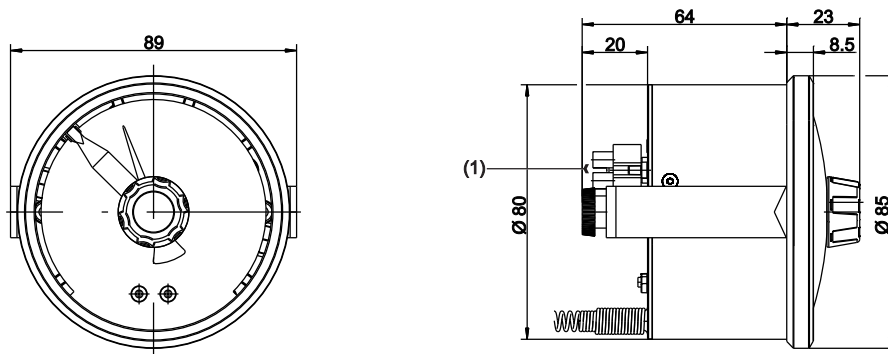
## Dimensions

Type 608530/2080



(1) Screw terminal for electrical connection

Type 608530/2180



(1) Screw terminal for electrical connection

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
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**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM 20 2DY, UK  
 Phone: +44 1279 63 55 33  
 Fax: +44 1279 62 50 29  
 Email: sales@jumo.co.uk  
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**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: +1 315 437 5866  
 Fax: +1 315 437 5860  
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## Order details

<b>Order code</b>	<b>(1) Basic type</b>		
608530	JUMO dicoTEMP 800 Dial thermometers with microswitch, class 1.5		
	<b>(2) Basic type extension</b>		Case size Ø
2080	Design type 20		80 mm
2180	Design type 21		80 mm
	<b>(3) Display range (AB) in °C</b>		
818	0 to +120		
834	0 to +250		
926	+50 to +250		
	<b>(4) Switching capacity</b>		
11	AC/DC 24V, 0.1A		
26	AC 230V, 5(1.5)A, cos = 1(0.6)		
27	AC 230V, 10(3)A, cos = 1(0.6)		
	<b>(5) Capillary type (FL)</b>		
17	FL 17 Stainless steel capillary, approx. 1.5 mm Ø		
21	FL 21 Cu capillary, approx. 1.0 mm Ø (up to AB end value +120°C)		
22	FL 22 Cu capillary, approx. 1 mm Ø		
	<b>(6) Capillary length</b>		
1000	1000 mm		
2000	2000 mm		
...	Special length (specifications in plain text: 1,000 mm increments, maximum length 6,000 mm)		
	<b>(7) Process connection (PC)</b>		
750	TF 01	Temperature probe with stepped support tube	
848	TA 25/TF11	Displaceable threaded fitting on capillary	
	<b>(8) Thread type of process connection (PC)</b>		
000	without (for TA 01 and TF 11)		
103	Screw connection G 3/8		
104	Screw connection G 1/2		
	<b>(9) Material: probe and support tube</b>		
26	Stainless steel (CrNi, 1.4571)		
96	Copper (Cu)/Brass (CuZn) (up to +200°C)		

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
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 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
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 6733 Myers Road  
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<b>(10) Material process connection</b>	
00	None
26	Stainless steel (CrNi, 1.4571)
46	Brass (CuZn)
<b>(11) Diameter "D" (immersion tube diameter)</b>	
6	6 mm
8	8 mm
<b>(12) Insertion length of process connection (PC)</b>	
0	Minimum insertion length TF 11 (active probe dimension)
50	50 mm
100	100 mm
...	Special length (specifications in plain text, 50 mm increments)
<b>(13) Extra codes (TZ)</b>	
000	None
518	Limit stop for Min. or Max. setpoint value limitation, default setting
520	Switching point is a default setting
522	Customized scale

**Special versions upon request!**

**Order code**      (1)      (2)      (3)      (4)      (5)      (6)      (7)      (8)      (9)      (10)      (11)      (12)      (13)  
 /  -  -  -  -  -  -  -  -  -  -  -  / <sup>a</sup>  
**Order example**      608530 / 2180 - 818 - 11 - 17 - 1000 - 750 - 000 - 26 - 26 - 6 - 100 / 520

<sup>a</sup> List extra codes in sequence and separate using commas.



**JUMO GmbH & Co. KG**

Delivery address: Mackenrodtstraße 14  
36039 Fulda, Germany  
Postal address: 36035 Fulda, Germany  
Phone: +49 661 6003-0  
Fax: +49 661 6003-607  
E-mail: mail@jumo.net  
Internet: www.jumo.net

**JUMO Instrument Co. Ltd.**

JUMO House  
Temple Bank, Riverway  
Harlow, Essex CM20 2DY, UK  
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6733 Myers Road  
East Syracuse, NY 13057, USA  
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# Contact Thermometer

## Transformer and industry version

### Special features

- Class 1.5
- Display ranges -40° C to +600° C
- Electromechanical temperature controller as add-on device with actual value indicator in polyamide (PAC) case
- With one or two microswitches
- Case size: Ø 80 mm

### Brief description

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

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



Type 608540/1080

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

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 JUMO House  
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## Technical data

<b>Case, bezel, and cover cap</b>	Plastic (PA 6), gray, UV-stabilized	
<b>Protection type</b>	IP 54 according to DIN EN 60529	
<b>Front pane</b>	PMMA (Plexiglas)	
<b>Scale</b>	White, with black lettering	
<b>Accuracy class</b>	Class 1.5 similar to EN 13190	
	<b>Liquid filling</b>	<b>Gas filling</b>
<b>Measuring system</b>	Display range (AB) $\leq 350^{\circ}\text{C}$	Display range (AB) $\geq 400^{\circ}\text{C}$
<b>Time constant <math>t_{0.632}</math></b>	Approx. 12 s, measured in water, with a probe $\varnothing$ of 6 mm made of Cu.	Approx. 4 s, measured in oil, with a probe $\varnothing$ of 10 mm made of stainless steel.
<b>Influential effect of the ambient temperature</b>	In % of the display range (referring to the deviation from the reference value $+23^{\circ}\text{C}$ )	
<b>On case</b>	0.15% of the display range per K ambient temperature change	0.05% of the display range per K ambient temperature change
<b>On capillary (per m)</b>	0.03% of the display range per K ambient temperature change	No influence
	At higher ambient temperature – higher temperature display – lower switching point	
	Standard	Extra code (TZ) 650
<b>Electrical contact</b>	Single-pole microswitch with mechanically actuated changeover contact	
<b>Contact type</b>		
<b>Switching capacity</b>	AC 230V, $+10/-15\%$ , 48 to 63Hz, $\cos \varphi = 1$ (0.6)	
	5 (1.5) A	10 (3) A
<b>Switching differential</b>	Approx. 1.5% of the display range	1.5 to 3 % of the display range
<b>Switching point accuracy</b>	$\pm 0.5\%$ of the display range referring to the switch-off point with rising temperature	
<b>Switching reliability</b>	To ensure a high switching reliability, we recommend a minimum voltage of 24 V and a minimum current of 20 mA	
<b>Electrical connection</b>	Screw terminals: conductor cross-section $2.5 \text{ mm}^2$ , protected by cover cap with cable fitting. Suitable for cable diameter from 6.5 to 16 mm.	
<b>Setpoint value adjustment</b>	With a screwdriver, protected by a cover.	
<b>Limit value temperatures</b>	$-30$ to $+70^{\circ}\text{C}$ (storage and transport $-30$ to $+70^{\circ}\text{C}$ )	
<b>Rated position (NL)</b>	NL90, position symbol $\perp$	

### Note:

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

Control range with scale limit value	Hazardous reactions	Fire and explosion hazard		Hazardous to waters	Toxicological specifications		
		Ignition temperature	Explosion limit		Irritant	Dangerous to health	Toxic
$< +200^{\circ}\text{C}$	No	$+ 355^{\circ}\text{C}$	0.6 to 8 V%	Yes	Yes	<sup>1)</sup>	No
$\geq 200^{\circ}\text{C} \leq +350^{\circ}\text{C}$	No	$+ 490^{\circ}\text{C}$	--	Yes	Yes	<sup>1)</sup>	No
$> 350^{\circ}\text{C} \leq +500^{\circ}\text{C}$	No	No	No	No	No	No	No

<sup>1)</sup> At present, no statement concerning health hazards in the event of short-term exposure and low concentration (e.g. measuring system rupture) has been made by the health authority

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
 E-mail: mail@jumo.net  
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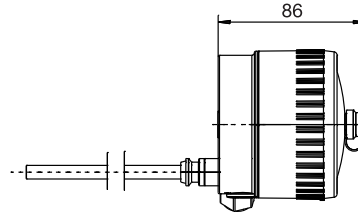
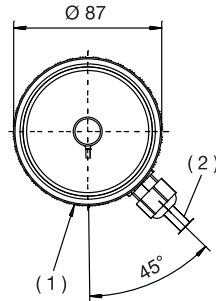
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 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
 Internet: www.jumousa.com



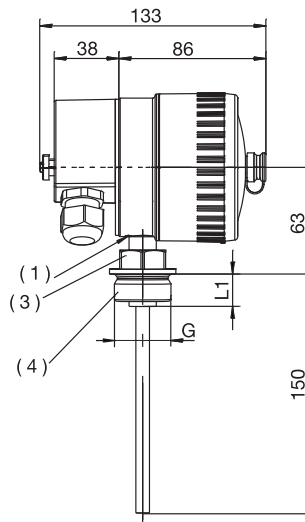
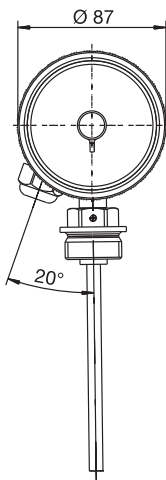
## Dimensions

Type 608540/0280



- (1) Ventilation aperture
- (2) Connecting cable, 0.5 m long

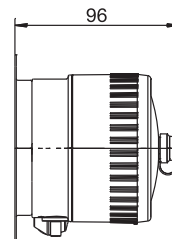
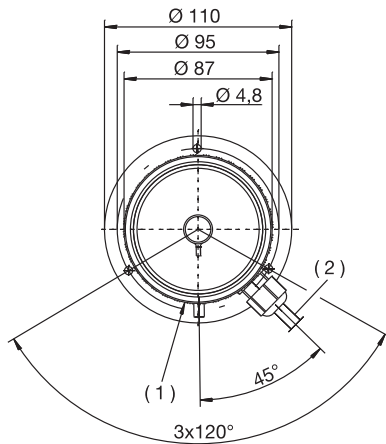
Type 608540/1080  
 (Transformer version)



G 1/2 A	27	14
G 3/4A	32	16
G 1A	27	16
G	Width across flats	L1

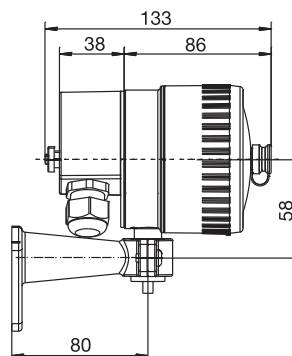
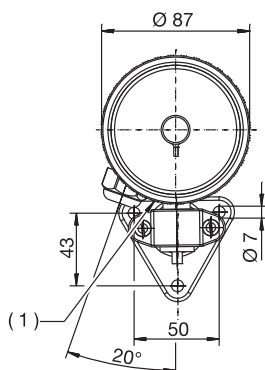
- (1) Ventilation aperture
- (3) Width across flats
- (4) Screw-in spigot DIN 3852, form A

Type 608540/2280



- (1) Ventilation aperture
- (2) Connecting cable, 0.5 m long

Type 608540/2380



- (1) Ventilation aperture

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
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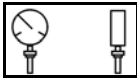

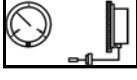

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
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 1-800-554-5866  
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## Order details:

### Contact thermometer, type 608540

<b>Order code:</b>	<b>(1) Basic type</b>
608540	Mechanical contact thermometer, industrial version
	<b>(2) Basic type extension</b>
1080	Design type: 10; case size: $\varnothing$ 80 mm 
0280	Design type: 02; case size: $\varnothing$ 80 mm 
2280	Design type: 22; case size: $\varnothing$ 80 mm 
2380	Design type: 23; case size: $\varnothing$ 80 mm 
	<b>(3) Display range (AB)</b>
469	-40 to + 40°C; measuring range -30 to + 30°C Error limit 1.5°C
566	-30 to + 50°C; measuring range -20 to + 40°C Error limit 1.5°C
643	-20 to +120°C; measuring range 0 to +100°C Error limit 3.0°C
807	0 to + 60°C; measuring range +10 to + 50°C Error limit 1.5°C
810	0 to + 80°C; measuring range +10 to + 70°C Error limit 1.5°C
814	0 to +100°C; measuring range +10 to + 90°C Error limit 1.5°C
818	0 to +120°C; measuring range +20 to +100°C Error limit 3.0°C
921	+20 to +120°C; measuring range +38 to +104°C Error limit 3.0°C
826	0 to +160°C; measuring range +20 to +140°C Error limit 3.0°C
832	0 to +200°C; measuring range +20 to +180°C Error limit 3.0°C <sup>4</sup>
834	0 to +250°C; measuring range +30 to +220°C Error limit 4.0°C <sup>4</sup>
926	+50 to +250°C; measuring range +70 to +230°C Error limit 3.0°C <sup>4</sup>
840	0 to +300°C; measuring range +30 to +270°C Error limit 6.0°C <sup>4</sup>
927	+50 to +300°C; measuring range +80 to +270°C Error limit 4.0°C <sup>4</sup>
843	0 to +350°C; measuring range +50 to +300°C Error limit 6.0°C <sup>4</sup>
932	+50 to +350°C; measuring range +80 to +320°C Error limit 6.0°C <sup>4</sup>
848	0 to +400°C; measuring range +50 to +350°C Error limit 6.0°C <sup>4</sup>
851	0 to +450°C; measuring range +50 to +400°C Error limit 6.0°C <sup>4</sup>
854	0 to +500°C; measuring range +50 to +450°C Error limit 8.0°C <sup>4</sup>
858	0 to +600°C; measuring range +100 to +500°C Error limit 10.0°C <sup>4</sup>
	<b>(4) Capillary type (FL)<sup>1</sup></b>
00	Without (with rigid connection)
02	FL 02 Cu capillary with Cu textile braiding, approx. $\varnothing$ 2.5 mm (up to AB end value +300°C)
11	FL 11 Cu capillary with PE coating, approx. $\varnothing$ 3.5 mm (up to AB end value +120°C)
17	FL 17 Stainless steel capillary, $\varnothing$ 1.5 mm
21	FL 21 Cu capillary, $\varnothing$ 1.0 mm (up to AB end value +300°C)
	<b>(5) Capillary length<sup>1</sup></b>
0	Without (with rigid connection)
1000	1000 mm
2000	2000 mm
3000	3000 mm
4000	4000 mm
5000	5000 mm
...	Special length (specifications in plain text: 1,000 mm increments, maximum length 10,000 mm)



**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
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## Order details:

Contact thermometer, type 608540.

<b>Order code:</b>	<b>(6) Process connection (PC)<sup>1</sup></b>	
750	TF 01; Temperature probe with stepped support tube	
752	TF 11; Temperature probe without support tube	
843	TA 02; Protection tube with union nut and loose screw connection <sup>2</sup>	
161	TA 03; Protection tube with loose union nut	
847	TA 06; Displaceable threaded fitting on support tube <sup>2</sup>	
311	TA 20; Protection tube with loose screw connection and connection collar <sup>2</sup>	
872	TA 21; Protection tube with loose pressure screw and conical seal	
873	TA 22; Protection tube with loose pressure screw, conical seal, and loose screw connection <sup>2</sup>	
401	TA 23; Protection tube with pressure screw and contact pressure spring	
874	TA 24; Protection tube (CuNi) with screw connection (CuZn), O ring seal and clamping screw <sup>2, 5</sup>	
913	SH 07; Screw-in sleeve, multi-sectional, with clamping piece and fixing screw <sup>2</sup> (with TF 01)	
820	SH 09; Weld-in sleeve, multi-sectional, with clamping piece and fixing screw (not with FL 21 – weld collar with steel 1.4515) (with TF 01)	
876	SH 10; Screw-in sleeve, multi-sectional <sup>2</sup>	
871	SH 11; Screw-in sleeve, multi-sectional <sup>2</sup>	
	<b>(7) Diameter of process connection (PC)<sup>1</sup></b>	
6	Ø 6 mm	
8	Ø 8 mm	
10	Ø 10 mm	
12	Ø 12 mm	
	<b>(8) Thread type of process connection (PC)<sup>1</sup></b>	
000	Without thread (for TF 01 and TF 11)	
103	Screw connection G <sup>3</sup> / <sub>8</sub>	
104	Screw connection G <sup>1</sup> / <sub>2</sub>	
105	Screw connection G <sup>3</sup> / <sub>4</sub>	
106	Screw connection G1	
114	Screw connection M 10 × 1 (only for TA 23 and SH 11)	
	<b>(9) Material, probe / support tube<sup>1</sup></b>	
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)	
	<b>(10) Material of process connection (PC)<sup>1</sup></b>	
00	Without (only TF 01 and TF 11)	
26	Stainless steel (CrNi, 1.4571)	
46	Brass (CuZn)	
	<b>(11) Insertion length, process connection (PC)<sup>1</sup> (dimension "EL" or "S")</b>	
0	Minimum insertion length TF 11 (active probe dimension)	
100	100 mm	
150	150 mm	
200	200 mm	
...	Special length (specifications in plain text – 50 mm increments)	

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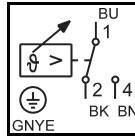


## Order details:

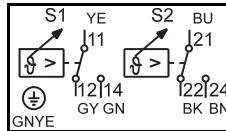
### Contact thermometer, type 608540

Order code: **(12) Switching output**

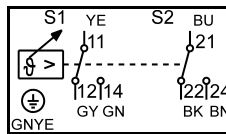
20 1 switch



21 2 switches



22 2 switches in fixed sequence



**(13) Extra codes (TZ)**

- 000 Without extra code
- 430 Drag indicator
- 650 Microswitch 10 (3) A (AC/DC 230 V, +10/-15%, 48 to 63 Hz, cos φ = 1 (0.6))
- 518 Stop for Min. — or Max. — setpoint value limitation, default setting
- 522 Customized scale

Order code:

(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13)  
 608540 / [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] / [ ] , ...

Order example:

608540 / [2280] - [818] - [02] - [2000] - [843] - [8] - [104] - [96] - [46] - [100] - [20] / [000<sup>3</sup>]

<sup>1</sup> For description and special features refer to data sheet 608730.

<sup>2</sup> Screw-in spigot according to DIN 3852 form A.

<sup>3</sup> List extra codes in sequence, separated by commas.

<sup>4</sup> Not with design types 02 and 10.

<sup>5</sup> Material, probe / support tube: design types 02 and 10: stainless steel  
 design types 22 and 23: brass

## Stock versions

(Delivery within 3 working days after receipt of order)

### Transformer version

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

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
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 JUMO House  
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 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
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 East Syracuse, NY 13057, USA  
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 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
 Internet: www.jumousa.com



# Process Connections for Dial Thermometers



## Special features

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

## Temperature probes (TF)

(S<sub>1</sub> min. 25 mm for type 6080... , S<sub>1</sub> min. 50 mm for type 6082... , 6084... , 6085...)

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

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

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
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 Fax: 315-437-5860  
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**Process connections (TA)**

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

<sup>1</sup>Screw-in spigot according to DIN 3852 Form A

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
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**Process connections (TA)**

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

<sup>1</sup>Screw-in spigot according to DIN 3852 Form A

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 36039 Fulda, Germany  
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**Process connections (TA)**

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

<sup>1</sup>Screw-in spigot according to DIN 3852 Form A

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

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM20 2DY, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
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**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
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**Thermowells (SH)**

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

<sup>1</sup>Screw-in spigot according to DIN 3852 Form A

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 Harlow, Essex CM20 2DY, UK  
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## Admissible load at the thermowell

### Thermowells 820, 876, 871, 913

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

#### Thermowell made of stainless steel

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

#### Thermowell made of brass

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



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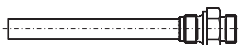

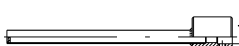


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## Order details

### Thermowells for dial thermometers, type 608730

Order code	(1) Basic type
608730	Thermowells for dial thermometers
<b>(2) Basic type extensions</b>	
858	SH 04 Single-part screw-in sleeve according to DIN 43772 T2 - form 9; screw-in spigot according to DIN 3852, form A. 
891	SH 05 Multi-part screw-in sleeve; screw-in spigot according to DIN 3852, form A. 
913	SH 07 Multi-part screw-in sleeve with fixing screw; screw-in spigot according to DIN 3852, form A. 
820	SH 09 Multi-part weld-in sleeve with fixing screw 
876	SH 10 Multi-part screw-in sleeve; screw-in spigot according to DIN 3852, form A. 
871	SH 11 Multi-part screw-in sleeve; screw-in spigot according to DIN 3852, form A. 
<b>(3) Thread "G"</b>	
000	Without (only SH 09)
103	G 3/8
105	G 3/4
104	G 1/2
144	1/2-14NPT
114	M 10 x 1 (only SH 11)
<b>(4) Material</b>	
46	Brass (CuZn)
01	Steel (St) (only TA08 and SH09)
26	Stainless steel (CrNi)
<b>(5) Insertion length "EL"</b>	
50	50 mm
63	63 mm
80	80 mm
100	100 mm
130	130 mm
150	150 mm
200	200 mm
250	250 mm
300	300 mm
...	Special length (specifications in plain text - 50 mm steps)
<b>(6) Outer diameter "D"</b>	
8	8 mm
10	10 mm
12	12 mm
14	14 mm
17	17 mm
<b>(7) Collar diameter "d<sub>15</sub>"</b>	
000	Without (only SH 04, SH 05, SH 10, SH 11)
10.3	10.3 mm
16.3	16.3 mm (for type 608001, 608002, 608003, 608624)

**Order code:**

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

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

**Order example:**

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



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## General Terms and Conditions of Delivery and Service

### 1 Area of applicability

- 1.1 The following General Terms and Conditions of Delivery and Service apply to all our deliveries and services. The General Terms and Conditions of Delivery and Service (hereinafter: "Terms and Conditions") apply exclusively; we do not acknowledge the customer's terms and conditions which are contrary or which differ from these Terms and Conditions unless we expressly agree in writing to them. These Terms and Conditions shall also apply even if we carry out deliveries or services for the customer without reservation in the knowledge of the customer's terms and conditions which are contrary or which differ from these Terms and Conditions.
- 1.2 Our employees are not authorized to conclude verbal agreements, verbal amendments to these conditions, or to make other verbal agreements.
- 1.3 Apart from these General Terms and Conditions of Delivery and Service, the "Supplementary clauses: For the industrial automation (drive, measure, switch, steer)", available at www.jumo.net, shall apply as well to the transfer of software.
- 1.4 These conditions shall only apply to enterprises as defined in Section 310 para. 1 of the German Civil Code (BGB).
- 1.5 The respective version of these General Terms and Conditions of Delivery and Service shall also apply to future contracts concerning the delivery of moveable goods with the same client, without having to refer to them again in each case; we shall immediately inform the customer of changes to these Conditions.
- 1.6 Individual agreements concluded with the client in individual cases (including side agreements, addenda and amendments) shall have priority over these General Terms and Conditions of Delivery and Service in every case. A written contract or our written confirmation shall apply to the content of these agreements.
- 1.7 Legally material declarations and notifications, which have to be submitted to us by the client after conclusion of the contract, require the written form in order to be binding.

### 2 Offer and order confirmation

- 2.1 Our offers are non-binding. The extent of our duty of performance is specified solely by our written order confirmation.
- 2.2 The details concerning the delivery item or service (hereinafter: "delivery item") (e.g. weights, dimensions, values in use, load-bearing capacity, tolerances, and technical details) as well as representations of same (e.g. illustrations and drawings) are only approximately applicable insofar as the usability for the contractually envisaged purpose does not require a precise agreement. These are not guaranteed features, but instead descriptions or designations of the delivery. Normal deviations and deviations, which are made on the basis of legal provisions or which represent technical improvements, as well as replacing components with equivalent parts, are permissible insofar as they do not affect the usability for the contractually envisaged purpose.

### 3 Copyright and retention of title to drawings, etc.

- 3.1 We reserve ownership of drawings, sketches, cost estimates, and other documents enclosed with our offers and order confirmations. The customer may only use them for the agreed purpose, and may not reproduce them or make them accessible to third parties without our consent. Upon request, these documents themselves and all reproductions shall be returned to us.
- 3.2 Insofar as these documents are copyrightable, we also reserve our copyright to these documents.

### 4 Delivery time and default

- 4.1 The binding nature of service and delivery dates and deadlines (hereinafter: "delivery deadline") requires the customer to provide us with documents and other required information promptly, and not to delay its cooperation or other material contractual duties, in particular, its payment obligations.
- 4.2 In the case of labor disputes, and in the event of unforeseen hindrances, which are outside the supplier's sphere of influence, or if there are hindrances for which another manufacturing plant is responsible, the delivery deadline shall be extended appropriately. This shall also apply if the hindrances arise during a pre-existing delay.
- 4.3 Partial deliveries and services are permissible if reasonable for the customer.
- 4.4 If an ordered delivery item cannot be delivered because we have not been supplied by our own supplier, and we are not at fault for this despite their contractual obligation, we reserve the right to withdraw from the contract. In this case, we shall immediately inform the customer that the ordered goods are not available, and we shall immediately refund any payments already made.
- 4.5 If we are in default and the customer suffers damages as a result, it is entitled to demand lump-sum compensation. This shall be 0.5% for each full week of delay, but shall not total more than 5% of the net value of the respective part of the total delivery which cannot be used on time or according to the contract because of the delay. Other claims shall be determined exclusively according to No. 9 of these Terms and Conditions.

### 5 Transfer of risk

- 5.1 Risk shall transfer to the customer with transfer of the delivery item to the haulage contractor, carrier, or collector, or if transported by us, not later than upon departing our stores or the manufacturing plant, however. Insofar as acceptance is agreed and a fixed acceptance date has not been agreed, the customer shall accept the delivery item within eight days of notification of completion.
- 5.2 If the customer has placed a call order, it must correctly call the delivery item – if ordering several delivery items, all of them – within 12 months from the date of the order, unless agreed otherwise by the contractual partners.

### 6 Prices and terms of payment

- 6.1 The prices stated by us are ex works plus sales tax at the statutory amount applicable at the time of delivery, and without packaging. The packaging shall be charged separately.
- 6.2 The purchase price is payable within 30 days of receipt of invoice.
- 6.3 For works contracts for switchgears, the remuneration amounts shall be payable as follows:
  - 1/3 14 days after date of the order confirmation,
  - 1/3 After half of the period between the date of order confirmation and the agreed delivery date,
  - 1/3 Within 14 days of delivery.
- 6.4 We reserve the right to demand submission by a customer of an irrevocable and unlimited bank surety for the amount of the contractual price upon acceptance of the order.
- 6.5 Prices apply for four months from receipt of our order confirmation. If a cost component within the total costs changes (e.g. personnel costs or hourly rates or demonstrable third-party material costs), we shall amend the price ratably, but only proportionally in respect of the corresponding costs element. The resulting new price shall apply from the first of the calendar month following receipt of the written notification.
- 6.6 If payment by instalment is agreed, the respective instalment shall be paid in advance by the 3rd working day of the respective payment period, unless a specific payment date is agreed. If the customer is in default with more than one instalment, the total outstanding amount shall become due. This shall also apply if payment by instalment is agreed after the payment date. Our right to charge default interest shall remain unaffected by an agreement to pay by instalment after the payment date.
- 6.7 Retaining payments or offsetting against customer's claims which are disputed by us, are not recognized, are not legally upheld, or are not ready for decision in pending court proceedings, are excluded. A right of retention can only be exercised if the counter claim is based on the same delivery contract.
- 6.8 In the case of non-compliance with the terms of payment, or if we become aware, after concluding the contract, that payment is at risk as a result of the customer's inability to pay, we reserve the right to carry out outstanding deliveries only for payment in advance or for provision of security deposits.
- 6.9 In the case of change requests from the customer after conclusion of the contract, we reserve the right to adjust the prices correspondingly, as well as the delivery deadlines already agreed.

### 7 Retention of title

- 7.1 We retain ownership of all delivery items until full payment of all claims to which we are entitled from the business relationship with the customer. In the case of a current account, the total goods subject to retention of title shall serve to secure the outstanding balance. If the estimated value of the goods subject to retention of title acting as security for us exceeds the outstanding claims due from the customer by more than 10%, upon request from the customer we shall release securities of our choice.
- 7.2 The customer may not pledge or otherwise transfer the delivery item as security. In the event of seizure or forfeit, or other disposal by third parties, the customer shall immediately inform us thereof.
- 7.3 In the event of conduct by the customer that is in breach of the contract, in particular in the event of default, we reserve the right to recall the goods after dunning and to require the customer to return the goods. The assertion of the retention of title, as well as the seizure of the delivery item by us, shall be deemed to be withdrawal from the contract.
- 7.4 We reserve the right to insure the delivery item at the customer's cost against fire, water, and other damage, insofar as the customer has not demonstrably purchased insurance itself.
- 7.5 The customer is entitled to resell the goods as part of ordinary business proceedings. It herewith assigns to us all claims up to the total of the invoice amount, which it accrues against a third party as a result of the resale. We accept the assignment. After assignment, the customer is authorized to collect the claim. We reserve the right to collect the claim ourselves as soon as the customer does not fulfill its payment obligations and is in default.
- 7.6 The working and processing of the goods by the customer shall always be in our name and on our behalf. If the goods are processed, we shall acquire joint ownership of the new item in relation to the value of the goods supplied by us. This shall also apply if the goods are combined or mixed with other items which do not belong to us. If the combining or mixing takes place such that the customer's item has to be seen as the main item, it is deemed to have been agreed that the customer shall transfer rateable joint ownership to us. The customer safeguards the sole ownership or joint ownership accrued to us.

### 8 Customer's right of withdrawal or reduction, and other liability for the supplier

- 8.1 The customer can withdraw from the contract if the full delivery conclusively becomes impossible for us. This shall also apply in the event of the supplier becoming insolvent. The customer can also withdraw from the contract if, when ordering equivalent items, performance of part of the delivery becomes impossible because of the quantity and it has a justified interest in rejecting the partial delivery. If this is not the case, the customer can reduce the remuneration correspondingly.
- 8.2 If the service is late as defined in No. 4 of these Terms and Conditions, and the customer grants us an appropriate period of grace and this period is not observed, the customer reserves the right of withdrawal.
- 8.3 If impossibility arises during the delayed acceptance or through the fault of the customer, the latter shall continue to be required to pay the remuneration.

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8.4 The customer also has the right of withdrawal if we allow a reasonable period of grace set for us to correct or improve a defect, for which we are responsible as defined in these Terms and Conditions, to pass without success through our own fault. The customer shall also have the right of withdrawal in other cases where we fail to correct a defect or make a replacement delivery.

8.5 Other claims for compensation for damages of any kind, including damages not sustained by the delivery item, shall only exist in the cases of No. 9 of these Terms and Conditions. Moreover, the supplier's liability for compensation is excluded.

**9 Liability**

9.1 Claims for compensation for damage of any kind – irrespective of the material and legal grounds – and even for damage which did not occur to the delivery item, shall only exist

- in the event of culpable breach of duty by us;
- in the event of grossly negligent breach of duty by us or in the event of culpable or grossly negligent breach of duty by our statutory representatives, or vicarious agents;
- in the event of injury to life, limb, or health, which is based on a negligent breach of duty by us, or based on a culpable or negligent breach of duty by one of our statutory representatives or vicarious agents;
- in the event of culpable breach of material contractual duties, insofar as the attainment of the contractual purpose is at risk; with regard to the typical contractual, foreseeable damage;
- in cases, where defects to the delivery item are liable; for personal injury or material damage; to privately used objects,
- in the event of defects, which were maliciously concealed, or whose omission we have guaranteed.

Moreover, other claims for compensation are excluded.

**10 Liability for defects**

10.1 All these deliveries/services shall be corrected or replaced free of charge at our discretion. Discovery of such defects must be reported to us immediately in writing.

10.2 No liability is assumed for damages resulting from natural wear.

10.3 No guarantee is assumed for damages caused by the following reasons:

- inappropriate or incorrect use
- defective assembly or commissioning by the customer or by third parties
- defective or negligent treatment of the delivery item, in particular in respect of the existing operating instructions
- in the event of excessive loads
- if inappropriate equipment and replacement materials are used

10.4 In order to carry out all improvements and replacements, which at our discretion appear necessary, the customer shall give us the time and opportunity required, otherwise we are released from liability for defects. The customer is only entitled to correct the defect itself or through third parties, and to demand reasonable compensation from us for its costs in urgent cases of danger to working safety, of which we must be informed immediately, or if we are in default with the correction of the defect.

10.5 We shall bear the costs to the statutory extent required of the direct costs incurred as a result of the correction or replacement, provided that the complaint is considered to be justified.

10.6 We are not liable for consequences resulting from incorrect changes or maintenance work by the customer or third parties undertaken without our prior consent.

10.7 Unless agreed otherwise, we shall make our deliveries in Germany free from property rights and third-party copyright. If there is a corresponding breach of property rights, we shall either procure a corresponding right of use from the third party or modify the delivery item such that it no longer breaches property rights. Insofar as this is not possible for us at appropriate and reasonable conditions, both the customer and we reserve the right to withdraw from the contract.

10.8 Moreover, if there are legal defects, the conditions of No. 10 and No. 9 of these Terms and Conditions shall apply correspondingly, with the customer only having claims if it has informed us immediately in writing of any claims asserted by third parties, does not acknowledge a claimed infringement either directly or indirectly, all possibilities for defense are reserved for us, the infringement is not based on the fact that the customer has changed the delivery item or otherwise used it non-contractually, or if the legal defect is due to instructions from the customer.

10.9 Other claims for compensation for damages of any kind, also damages not suffered to the delivery item, shall only exist in the cases under No. 9 of these Terms and Conditions.

**11 Expiration**

11.1 Claims due to defects – for whatever legal reason – shall expire in 12 months. This shall not apply if the defect is in a building or in items for a building, and these caused the defect, as well as in the case of entrepreneurial recourse according to Sections 478, 479 BGB. Sentence 1 notwithstanding, the statutory periods shall also apply in the event of claims under No. 9 of these Terms and Conditions.

11.2 Used delivery items are sold to the exclusion of any liability for material defects. This exclusion shall not apply in cases under No. 9 of these Terms and Conditions.

**12 Installation and services**

12.1 Unless agreed otherwise in writing, assembly work and services (repairs and maintenance) shall be remunerated. The remuneration shall include, in particular, travel costs, daily allowances, and the usual rates for working hours, and surcharges for overtime, night work, Sunday work, and work on public holidays, for work under difficult circumstances, and for planning, and monitoring.

12.2 We shall charge the costs for preparatory work, travel, waiting time, and travel time separately. If the assembly or commissioning is delayed for reasons for which we are not responsible, the customer shall bear all costs for the waiting time, and for other necessary travel.

12.3 At its own cost, the customer shall provide the necessary support staff with the tools they require in the necessary number. Furthermore, the customer shall provide sufficiently large, suitable, dry, and lockable rooms for storing the machine parts, equipment, materials, tools, etc. In order to protect our property, as well as the assembly and service staff, it shall take the measures which it would take in order to protect its own property. If the nature of the customer's business requires particular protective clothing and protective equipment for the assembly and service staff, it shall also provide this.

12.4 Our assembly staff and their vicarious agents are not authorized to carry out work, which is not performed in order to fulfill our obligation to deliver and erect or assemble the delivery item, or which is arranged by the customer or a third party without consulting us.

12.5 If assembly is performed by the customer or by a third party engaged by it, our respective operating and assembly instructions must be observed.

12.6 When carrying out service work (repair and maintenance work), we can decide at our discretion, on the basis of our experience and technical assessment, whether we carry out the service work at the customer's premises or in our own premises. If the service work is to be carried out in our premises, the customer shall send us the item. After completing the service, we shall return the item to the customer. The customer shall bear the risk of loss or damage, along with the transport costs.

12.7 Insofar as the customer does not report the fact that it has made changes, the devices shall be reset to the standard configuration after the service. If the customer has informed us of altered settings and programs, we shall configure and program the item correspondingly after completing the service. However, the customer is required to check these settings. We do not assume any guarantee for this. Furthermore, we do not assume responsibility for the function after incorporation of our product in the plant.

12.8 Our service engineer is only authorized to carry out service work to parts other than those supplied by us if a quick and easy solution is expected, and the customer expressly places a corresponding supplemental order.

12.9 Our engineer can cancel the service if it is found that he is unable to provide a remedy in the expected short time. In this case, the customer shall also pay the time-based remuneration and for the material used in carrying out the supplemental order. If, based on a technical judgment, the engineer could have completed the service work in the expected short time and did not realize this due to gross negligence or acted with wilful misconduct, the customer shall not have to pay for the canceled service.

12.10 It is incumbent upon the customer to check whether claims from delivery and maintenance agreements with third parties will be affected or lost as a result of the issue and execution of a supplemental order. We do not assume any liability for this.

- a) If devices to be serviced are delivered, and in the event of returns, the customer shall always strictly comply with the respective applicable version of the Ordinance on Hazardous Substances.
- b) In particular, the customer shall also package and label devices which are filled with hazardous substances, or which otherwise come into contact with same, taking into account the statutory conditions correspondingly. In addition, the customer must expressly refer in the service order to the devices' connection with hazardous materials as defined in the Ordinance on Hazardous Substances and, if necessary, enclose a safety data sheet in accordance with EU Directive 91/155/EC.
- c) If this does not involve such devices which are manufactured by us, for which we continue to be liable for defects, we can refuse to accept a service order for devices according to paragraph b) above at any time, which refer to the connection to hazardous substances.
- d) If the Ordinance on Hazardous Substances is not observed, we reserve the right to assert possible claims for compensation; this shall not apply if the customer is not responsible for the breach of duty.

**13 Export control regulations**

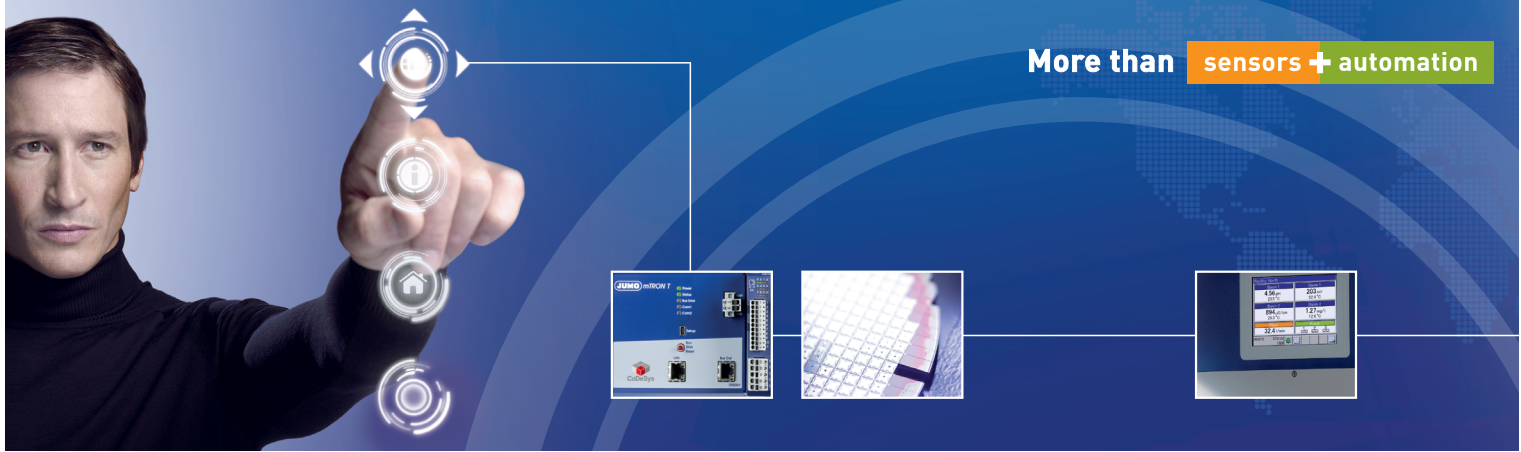
13.1 The deliveries and services (contractual performance) are provided subject to the condition that performance is not prevented by national or international provisions, in particular export control conditions and embargos, or other restrictions. The customer shall provide all information and documents, which are required for the export or import. Delays due to export audits or approval procedures shall suspend deadlines and delivery times. If required approvals are not issued or if the delivery and service cannot be approved, the contract with regard to the affected parts shall be deemed not to have been concluded.

13.2 We reserve the right to terminate the contract without notice if termination is required for us in order to comply with national or international legal provisions. In the case of such termination, the assertion of damages or other rights by the customer because of termination is excluded.

**14 Place of performance, place of jurisdiction, and concluding provisions**

14.1 For traders, legal entities under public law or special-funds under public law, the place of performance and jurisdiction is our head office or – at our discretion – the location of the branch office which concluded the contract.

14.2 The law of the Federal Republic of Germany shall apply to these Terms and Conditions and to the entire legal relationship between us and the customer to the exclusion of the UN Convention on the International Sale of Goods (CISG).

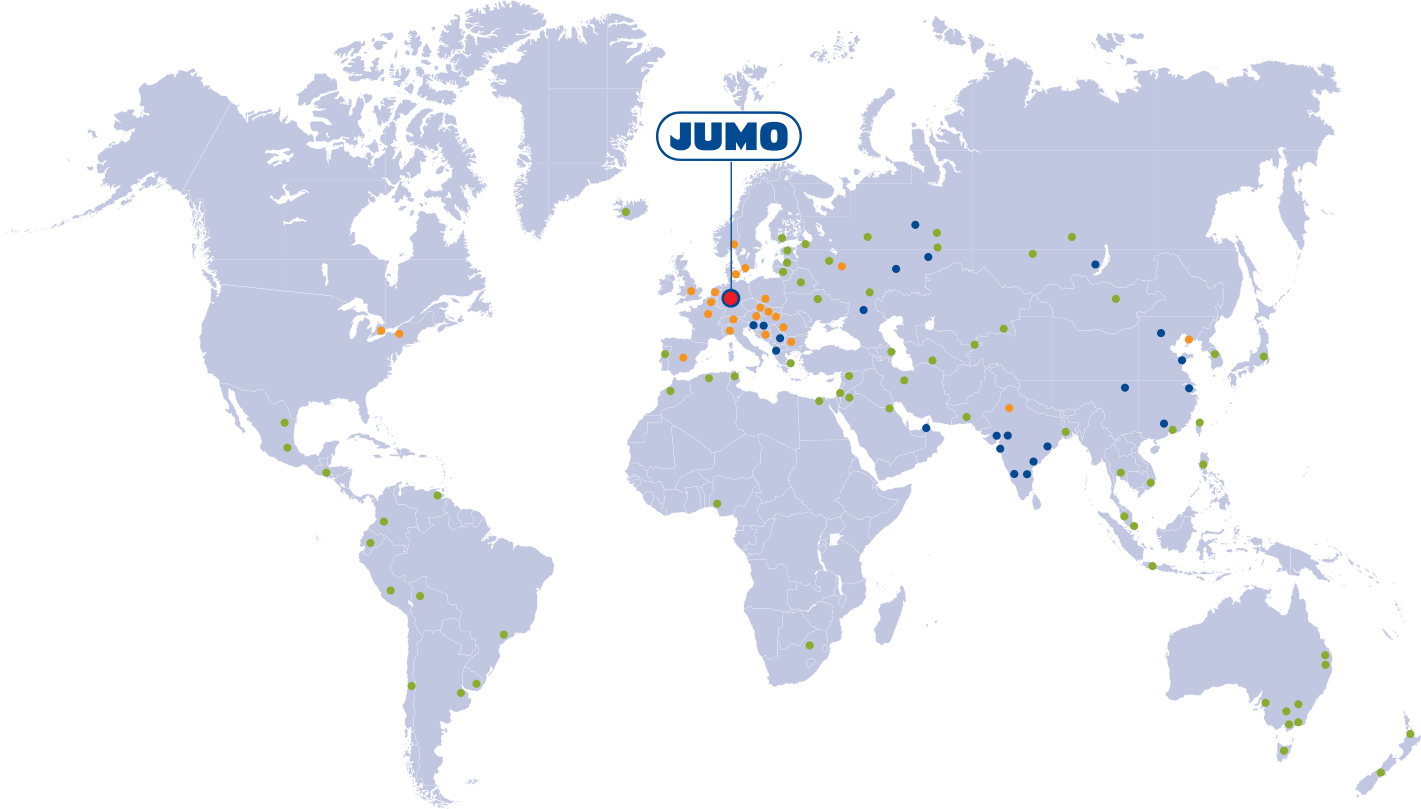


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