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

Surface-Mounted Thermostat
ATH series

Special features

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



ATHs-1

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.



ATHf-70

Switching function

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

Restart lock on the safety temperature limiter STB
If the temperature on the temperature probe exceeds the set limit value, the electrical circuit is opened and the microswitch is mechanically locked.
The microswitch can be manually unlocked once the dangerous temperature drops by approx. 10 % of the scale range (approx. 15 % with a limit value setting > + 350 °C).

Using the safety temperature monitor STW as a safety temperature limiter STB
The circuit following the thermostat must comply with DIN EN 14597 and VDE 0116.

Self-monitoring on the safety temperature limiter STB and the safety temperature monitor STW (STB)
If the measuring system is destroyed (i.e. if the expansion fluid escapes) the pressure in the membrane of the STB and STW (STB) drops and permanently opens the electrical circuit. Unlocking is then no longer possible.
If the probe has cooled down to a temperature below approx. -20 °C, the electrical circuit is opened; when the temperature rises above approx. -20 °C, the STB must be unlocked manually using the restart knob. The STW (STB) automatically restarts.

Approvals

DIN Geprüft

2014-01-08/00073225

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Approvals

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

Technical data

Control ranges and temperature probes

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

Capillary and temperature probe

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

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Electrical data

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

Operating data

Switching differential in % of the control range / limit value range	Switching function	With liquid-filled measuring system		
		Nominal value	**Possible actual value**	
	TR, TW	3	3 max. 4	Standard
		6	6 max. 8	Upon request
		1.5	1 max. 2	Extra cost
		With gas-filled measuring system		
		5	4 max. 8	Standard
		9	8 max. 12	Upon request
		2	1.5 max. 2.5	Extra cost
		With liquid-filled measuring system		
	STW (STB)	5	4 max. 6	Standard
		9	8 max. 11	Upon request
		2	1 max. 3	Extra cost
		With gas-filled measuring system		
		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	Max. +80 °C					
Rated position (NL)	According to DIN 16 257, NL 0 to NL 90 (different rated positions (NL) upon request)					

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Case

Standard	Case lid: polycarbonate, shock resistant Case bottom section: aluminum die casting, painted	Color: pebble gray RAL 7032 Color: anthracite gray RAL 7015
Extra code "701"	Case lid made of aluminum die casting, painted	Color: pebble gray RAL 7032
Setpoint value adjustment	ATH-1: Switching point can be adjusted externally with the rotary knob	ATH-2, ATH-20, ATH-70 Switching point can be adjusted with a screwdriver once the case lid has been removed
Protection type	Design 1 + 2: EN 60529-IP54 Design 9 (hazard detector): EN 60529-IP44	
Cable inlet	Standard: self-sealing grommet M20 × 1.5, sealing range 8 to 10 mm	
Weight	Approx. 0.5 kg	

Switching head mounting ATH**f**- . series with capillary	**Standard**	Screw connection with counter nut M18 × 1 on the case spigot, capillary exit on the case spigot
	Extra code	
	711	With 2 screws through the case bottom section, lateral capillary exit on the case, lid and bottom part made of plastic
	764	Mounting flange made of steel sheet, capillary exit on the case spigot
	248	Wall mount

Process connection*

Series ATH**s**- with rigid thermowell	Scale limit value up to 150 °C **Thermowell "20"**	Scale limit value exceeding 150 °C **Thermowell "30"**
	Screw-in sleeve with screw-in spigot G 1/2 form A according to DIN 3852/2	Screw-in sleeve with screw-in spigot G 1/2 form A according to DIN 3852/2 and intermediate piece, to ensure that the max. admissible ambient temperature of +80 °C is not exceeded on the case

Type ATH**f**- With capillary	Plain cylindrical probe "10" (standard)
	Screw-in thermowell "20" (upon request)
	Screw-in sleeve with screw-in spigot G 1/2 form A acc. to DIN 3852/2 and clamping piece with fixing screw to lock the probe in place

Material	**Thermowell "20"**	**Thermowell "30"**
	Up to +150 °C CuZn as standard over +150 °C CrNi	Above +150 °C CrNi
Insertion length S	Standard lengths: 100, 120, 150, 200, or 300 mm different lengths upon request	
Immersion tube Ø	D = 8 mm, D = 10 mm	

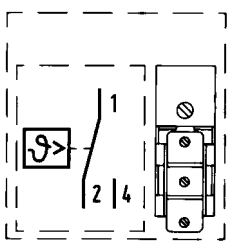
* For different process connections and thermowells refer to data sheet 606710.

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

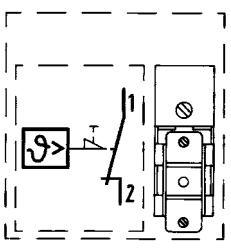
Control range with scale limit value	Hazardous reactions	Fire and explosion hazard		Hazardous to waters	Toxicological data		
		Ignition temperature	Explosion limit		Irritant	Dangerous to health	Toxic
< +200 °C	No	+ 355 °C	0.6 to 8 V%	Yes	Yes	[1]	No
≥ 200 °C ≤ +350 °C	No	+ 490 °C	- -	Yes	Yes	[1]	No
>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

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

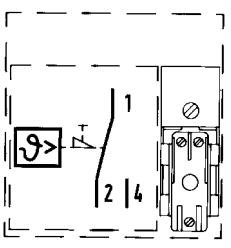
Wiring diagrams



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



ATH.-70



ATH.-70/574

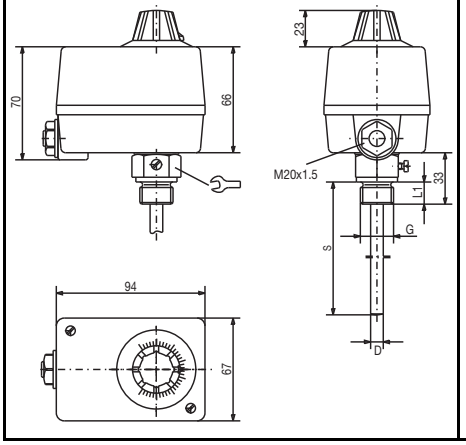
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Delivery address: Mackenrodtstraße 14
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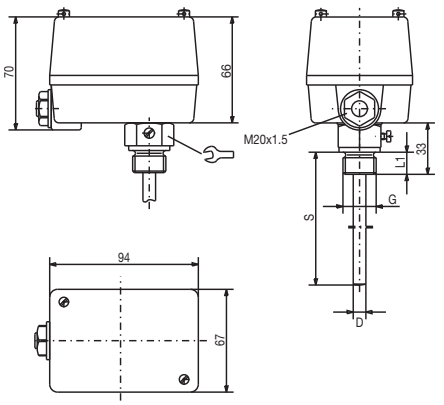
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Dimensions, versions with rigid thermowell

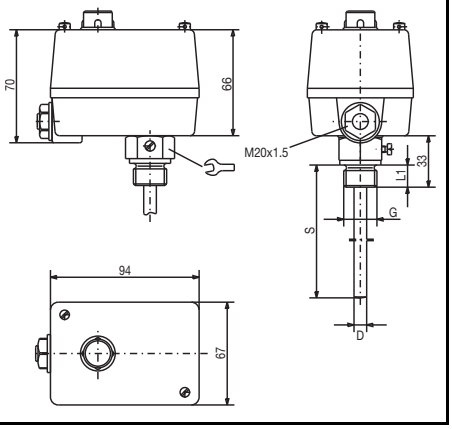
ATHs-1, process connection with screw-in thermowell "20"



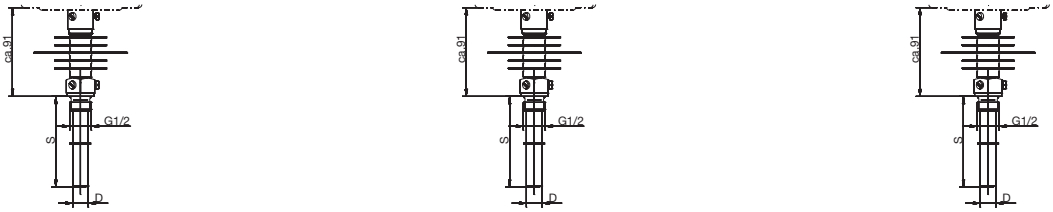
ATHs-2, ATHs-20, process connection with screw-in thermowell "20"



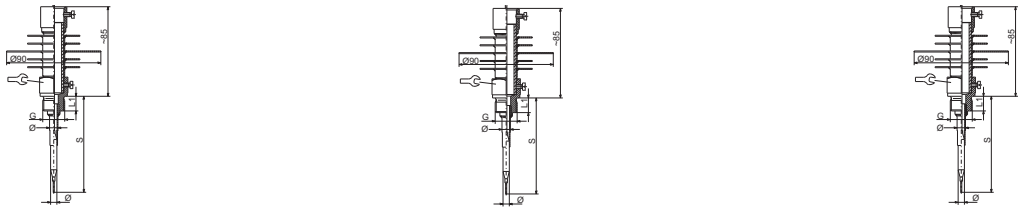
ATHs-70, ATHs-70/574, process connection with screw-in thermowell "20"



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



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



Stock versions with rigid thermowell

Temperature controller (TR)

(delivery within 3 working days after receipt of order)

Part no.	Type	Control range / limit value range °C	Switching differential %	Process connection screw-in sleeve	Immersion tube Ø × length mm
60001517	ATHs-1	–10 to + 40	3-4	"20" $G^1/_2$	8 x 200
60000634	ATHs-1	0 to + 50	1.5		15 x 100 CrNi
60000332	ATHs-1	0 to +100	3-4		8x120
60001548	ATHs-1	0 to +100	3-4		8x120 CrNi
60001125	ATHs-1	0 to +100	3-4		8x150
60000174	ATHs-1	0 to +100	1.5		8 x 200
60001126	ATHs-1	0 to +100	3-4		8 x 200
60000481	ATHs-1	+20 to +150	3-4		8x100
60001035	ATHs-1	+20 to +150	3-4		8 x 200
60001127	ATHs-1	+20 to +150	3-4		8x300
60003316	ATHs-1	+50 to +200	3-4	"30" $G^1/_2$	8x200 CrNi
60003317	ATHs-1	+50 to +300	3-4		8x150 CrNi
60003318	ATHs-1	+20 to +500	5		8x200 CrNi

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Stock versions with rigid thermowell

Temperature monitor (TW)

(delivery within 3 working days after receipt of order)

Part no.	Type	Control range / limit value range °C	Switching differential %	Process connection screw-in sleeve	Immersion tube Ø × length mm
60001135	ATHs-2	–10 to + 40	3-4	"20" $G^1/_2$	8 x 200
60001549	ATHs-2	0 to + 50	1.5		15 x 100 CrNi
60001128	ATHs-2	0 to + 50	3-4		8 x 200
60000177	ATHs-2	+20 to + 90	1.5		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" $G^1/_2$	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 sleeve/ weld-in sleeve	Immersion tube Ø × length mm
60001478	ATHs-20	+20 to +150	4-6	"20" $G^1/_2$	8x150
60003323	ATHs-20	+50 to +300	5	"30" $G^1/_2$	8x200 CrNi
60002217	ATHs-20	+50 to +350	4-6	"46" $G^3/_4$	170 steel, conical
60003324	ATHs-20	+20 to +500	7	"31" $G^1/_2$	8x200 CrNi

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Stock versions with rigid thermowell

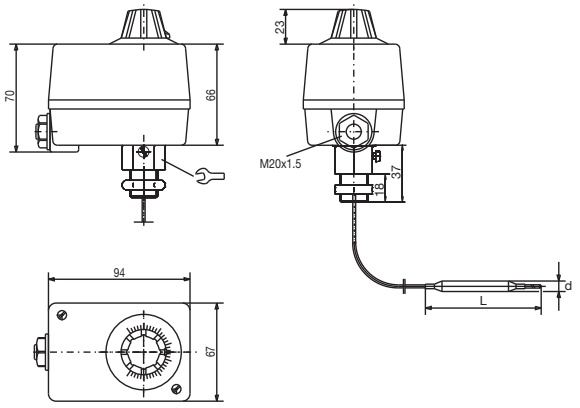
Safety temperature limiter (STB)

(delivery within 3 working days after receipt of order)

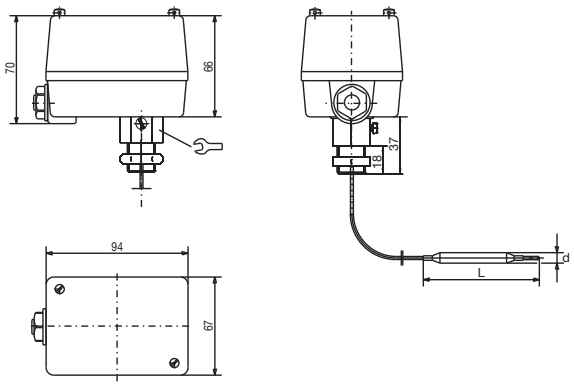
Part no.	Type	Control range / limit value range °C	Switching differential %	Process connection screw-in sleeve/ weld-in sleeve	Immersion tube Ø × length mm
60000982	ATHs-70	+ 30 to +110	— —	"20" G 1/2	8x150
60001043	ATHs-70	+ 30 to +110	— —		8 x 200
60000189	ATHs-70	+ 30 to +110	— —		8x300
60001044	ATHs-70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

Dimensions, versions with capillary

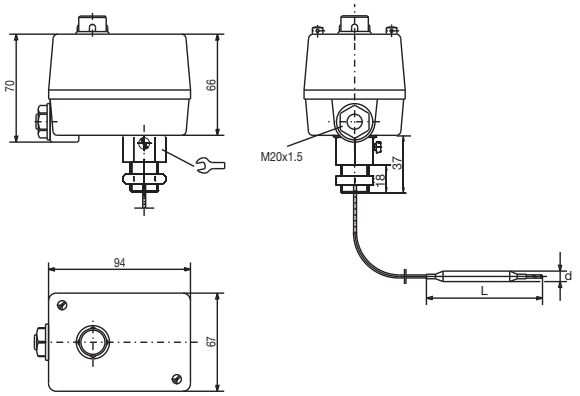
ATHf-1, process connection "10"
plain cylindrical probe



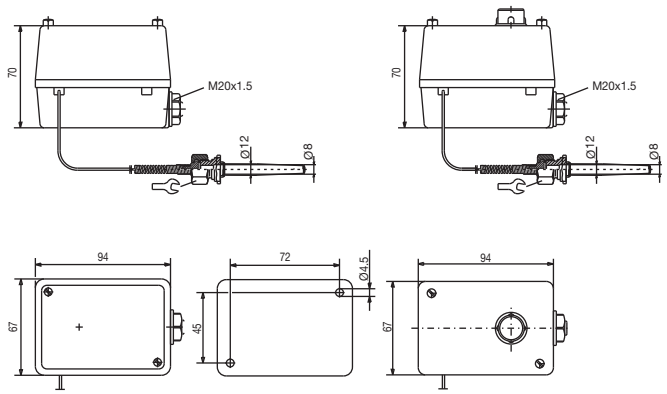
ATHf-2, ATHf-20, process connection "10"
plain cylindrical probe



ATHf-70, ATHf-70/574, process connection "10"
plain cylindrical probe



ATHf-20/r, ATHf-70/r, process connection "42"
plain cylindrical probe with weld-in sleeve G 3/4



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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E-mail: info.us@jumo.net
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Stock versions with capillary

Temperature controller (TR)

(delivery within 3 working days after receipt of order)

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

Temperature monitor (TW)

(delivery within 3 working days after receipt of order)

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

Safety temperature monitor STW and safety temperature limiter (STB)

(delivery within 3 working days after receipt of order)

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

* Weld-in sleeve

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JUMO House
Temple Bank, Riverway
Harlow, Essex CM20 2DY, UK
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Order details

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

Surface-mounted thermostat, ATH series

Order code	(1)	Basic type	
603021		Surface-mounted thermostat, ATH series	
	(2)	**Basic type extensions**	
01		ATH-1	Temperature controller (TR)
02		ATH-2	Temperature monitor (TW)
20		ATH-20	Safety temperature monitor STW (STB)
70		ATH-70	Safety temperature limiter (STB)
	(3)	**Design type**	
1		ATH**s** with rigid thermowell	
2		ATH**f** 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		ATH**s** 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		ATH**s** without capillary	
40		Cu	(Copper)
20		CrNi	(Stainless steel)

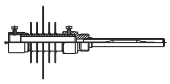
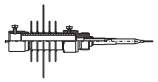
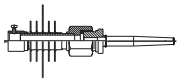
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Order details

Surface-mounted thermostat, ATH series

Order code	(8)	Process connection (PA) [1]	
10		Plain cylindrical probe (only for ATH**f**)	
20		Screw-in thermowell	
30		Screw-in thermowell with intermediate piece	
31		Screw-in thermowell with intermediate piece, open	
42		Weld-in sleeve for union nut, conical	
46		Welding sleeve for union nut with intermediate piece, conical	
	(9)	**Thread of process connection** [1]	
00		Without thread (process connection 10)	
13		External thread G 1/2	
	(10)	**Material of process connection**	
00		Only with process connection 10	
46		CuZn (Brass)	
20		CrNi (Stainless steel 1.4571)	
	(11)	**Insertion length "S" (immersion tube length)**	
000		ATH**f** without thermowell	
100		100 mm	
120		120 mm	
150		150 mm	
200		200 mm	
300		300 mm	
400		400 mm	
...		... Special length, specifications in plain text	
	(12)	**Diameter "D" (immersion tube diameter)**	
00		ATH**f** without thermowell	
8		8 mm	
10		10 mm	
	(13)	**Diameter "d" (probe diameter)**	
6		6 mm	
8		8 mm	
	(14)	**Extra codes** [2]	
000		Without extra code	
248	"k"	Wall mount	
574	"U"	Microswitch with N/C contact, restart lock, and additional signal contact (only for STB)	
701	"a"	Case lid made of aluminum diecasting (not with extra code "711")	
702	"au"	Snap-action switch contact, gold-plated (only with switching differential 3 %, 5 %, and 7 % and STB with N/C contact)	
711	"r"	Switching head mounting with 2 screws through the case bottom section, lateral capillary exit on the case, lid, and bottom section made of plastic	
764	"b"	Mounting flange made of steel sheet, capillary exit on the case spigot	

Order code

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

Order example

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

[1] For other connection types and thermowells, see data sheet 606710.
[2] List extra codes in sequence, separated by commas.