

**JUMO GmbH & Co. KG**

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**JUMO Instrument Co. Ltd.**

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**JUMO Process Control, Inc.**

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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  $> +350\text{ }^{\circ}\text{C}$ ).

#### 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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## Approvals

Types		Switching function	DIN registry no.	Tests	<p>You will find Declarations of Conformity on the Internet at:  <a href="http://www.jumo.net">www.jumo.net</a>            ⇒ 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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## 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)
	0.08 %/K	0.17 %/K	0.06 %/K	0.13 %/K	0.14 %/K	0.12 %/K
	Influence on the switching head				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.

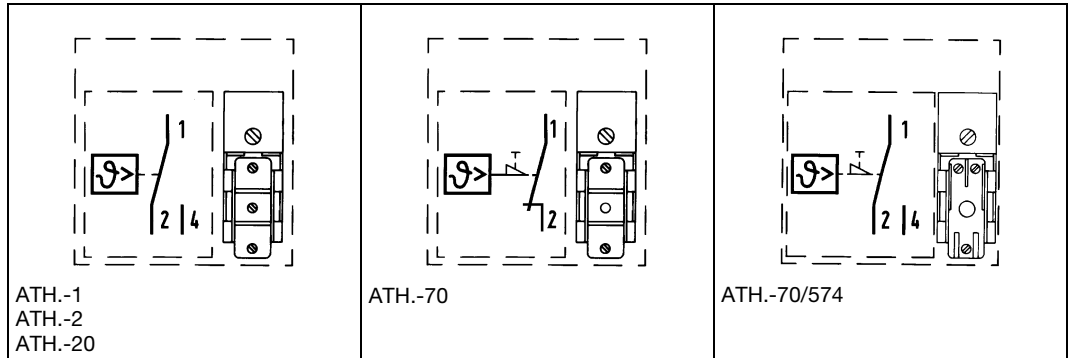
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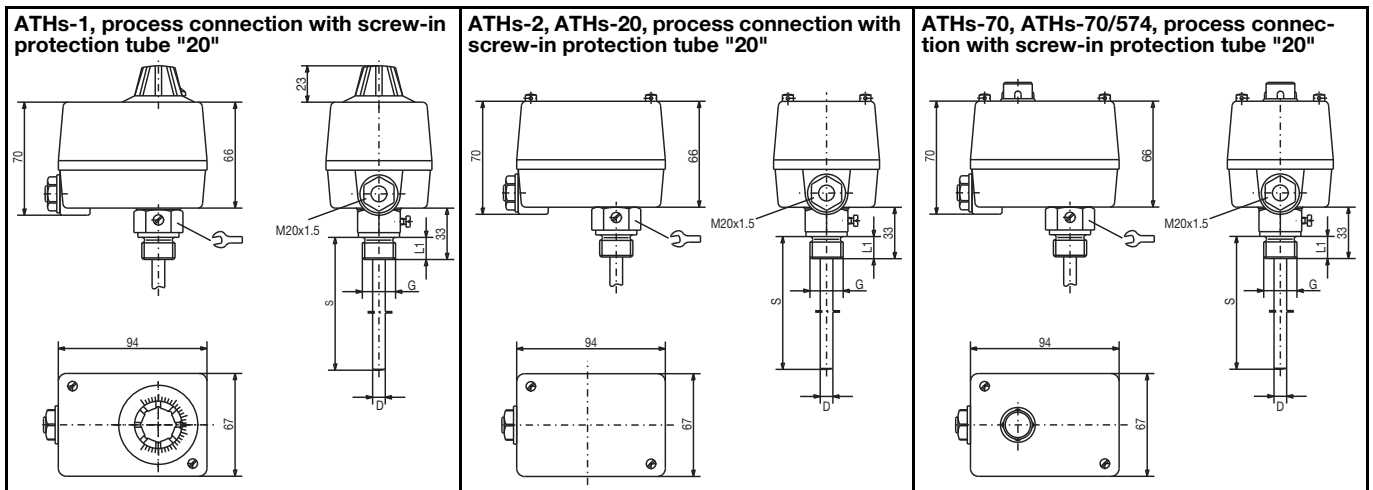
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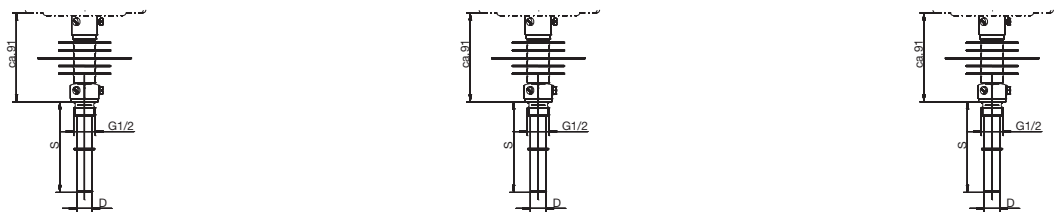
### Wiring diagrams



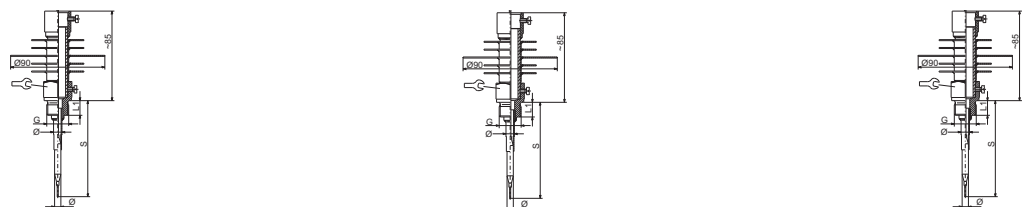
### Dimensions, versions with rigid thermowell



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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## 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

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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>



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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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**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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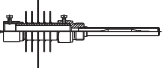


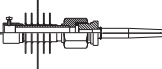
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## Order details

### 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>
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<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.