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# Surface-mounting Thermostats ATH Series

## Protection IP54

### Brief description

Thermostats control and monitor thermal processes. Surface-mounting twin thermostats, ATH series, consist of two separate measuring and switching systems.

The instruments are available as temperature controllers TR, temperature monitors TW, safety temperature monitors STW (STB) and safety temperature limiters STB. In the event of a fault, the STB sets the system being monitored to a safe operational state.

Surface-mounting twin thermostats operate on the principle of liquid expansion, with a micro-switch serving as the electrical switching device.

### Switching action

#### Temperature controller TR and temperature monitor TW

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

#### Lock-out facility on the safety temperature limiter STB

When the temperature at the probe exceeds the set limit, the circuit is opened and the micro-switch locked out mechanically.

After the temperature has dropped by about 10 % of span below the danger temperature (about 15% with limit setting > +350°C), the microswitch can be reset manually.

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

The circuitry to which the thermostat is connected must comply with DIN 3440 and VDE 0116.

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

Failure of the measuring system on the STB and STW (STB) i.e. a leakage of the expansion fluid, will cause the pressure under the diaphragm to drop, thus permanently opening the circuit. A reset is now impossible.

When the temperature at the probe cools down to below about -20°C, the circuit will also be opened. As the temperature rises to above -20°C (approx.), the STB has to be reset manually, by pressing the reset button. On the STW (STB), the reset is performed automatically.

for stock items  
see page 7



ATHs-12



ATHf-170

You will find the Declarations of Conformity on the Internet at:  
[www.jumo.net](http://www.jumo.net)  
 ⇒ Products  
 or they can be sent to you on request.

## Types and approvals

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

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## Technical data

### Control ranges and temperature probes

liquid-filled				
Switching action	Control/limit ranges °C	Max. permissible probe temperature °C	Maximum capillary length mm	Probe length L in mm probe dia. d = 6 mm is standard
TR and TW	-20 to + 50	60	5000	141
	-10 to + 40	50		185
	0 to + 50	60		185
	0 to + 70	80		138
	0 to +100	125		107
	+20 to + 90	115		138
	+30 to +110	135		125
	+20 to +120	140		106
	+60 to +130	150		135
	+20 to +150	175		88
	+50 to +200	230		101
	+50 to +250	290		73
	+50 to +300	345		63
	+50 to +350	405		53
STW and STB	+30 to +110	135	5000	108
	+60 to +130	150		116
	+20 to +150	175		77
	+50 to +250	290		64
	+50 to +300	345		55
gas-filled				
TR and TW	+20 to +400	460	1000	278
	+20 to +500	550	2000	148
	+20 to +500	550	4000	202
STW and STB	+20 to +400	460	1000	176
	+20 to +500	550	2000	127
	+20 to +500	550	4000	202

### Capillary and temperature probe

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

### Electrical data

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

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**Operating data**

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

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

**Case**

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

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**Process connection\***

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

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

**Note:**

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

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

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

**Connection diagrams**

<p>System I: with changeover (SPDT) contact Switching action: TR, TW, STW</p> <p>System II: with break (SPST-NC) contact and lock-out Switching action: STB</p>	<p>System I and II: with changeover (SPDT) contact Switching action: TR, TW, STW</p>	<p>System I and II: with break (SPST-NC) contact and lock-out Switching action: STB</p>
<p>System I: with changeover (SPDT) contact Switching action: TR, TW, STW</p> <p>System II: with break (SPST-NC) contact, lock-out and additional signal contact</p>		<p>System I and II: with break (SPST-NC) contact, lock-out and additional signal contact Switching action: STB</p>

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## Dimensions

<p><b>ATHs-12, ATHs-120</b> with pocket U</p>	
<p><b>ATHs-170</b> with pocket UZ</p>	
<p><b>ATHf-11</b> Thermostat mounting as standard with plain cylindrical probe A, no pocket</p>	

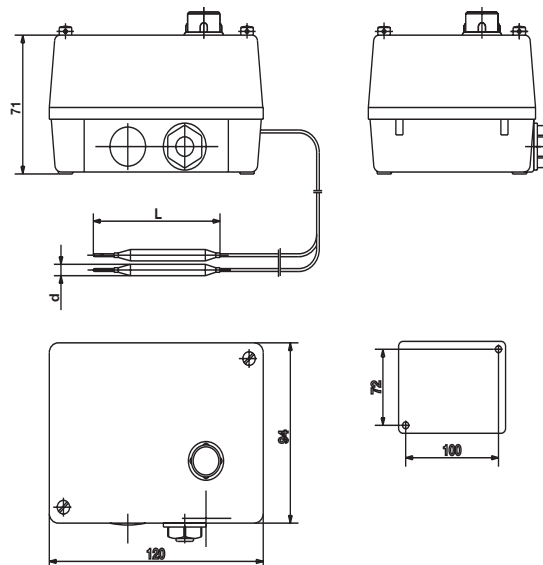
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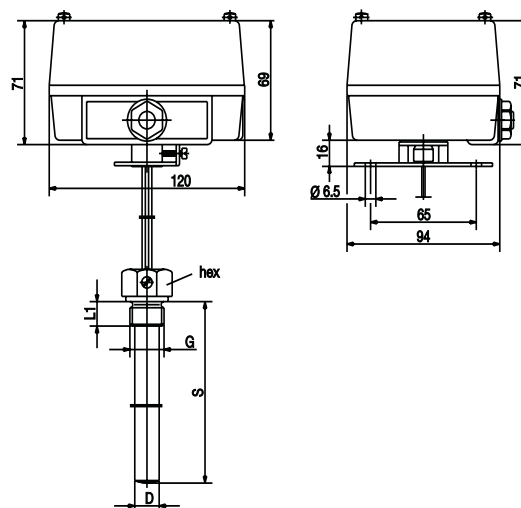
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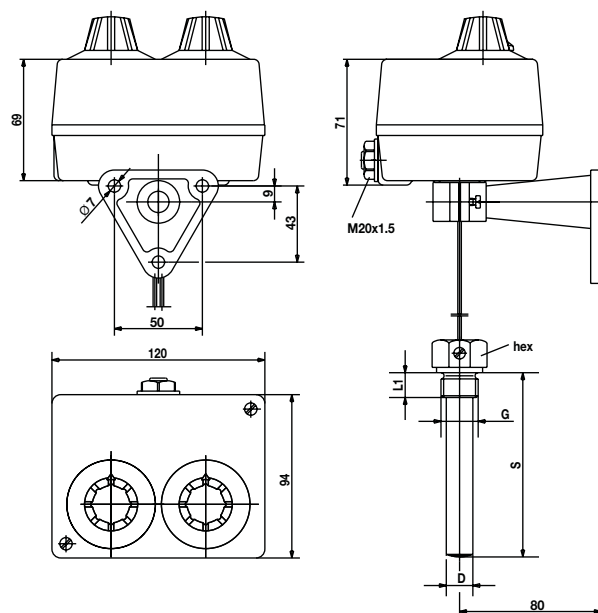
**ATHf-270/r,  
 ATHf-2070/r**  
 with plain cylindrical  
 probe A, no pocket



**ATHf-22/b,  
 ATHf-220/b,  
 ATHf-2020/b**  
 with pocket U



**ATHf-11/k**  
 with pocket U



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## Order details

### Stock items with rigid stem

(delivery 3 working days after receipt of order)

Sales No.	Type	Control / limit range °C	Switching differential %	Process connection	Immersion tube dia. x length mm
60/60000210 *	ATHs-11	0 to + 50	3-4	U G <sup>1</sup> / <sub>2</sub>	15 x 200
60/60001137 *	ATHs-11	+20 to + 90	3-4	U G <sup>1</sup> / <sub>2</sub>	15 x 150
60/60000486	ATHs-11	0 to +100	3-4	U G <sup>1</sup> / <sub>2</sub>	15 x 120
60/60000209 *	ATHs-11	0 to +100	3-4	U G <sup>1</sup> / <sub>2</sub>	15 x 300
60/60000208	ATHs-12	0 to +100	3-4	U G <sup>1</sup> / <sub>2</sub>	15 x 120
60/60001045	ATHs-12	+20 to +120	3-4	U G <sup>1</sup> / <sub>2</sub>	15 x 150
60/60000491	ATHs-22	0 to + 50	3-4	U G <sup>1</sup> / <sub>2</sub>	15 x 200
60/60000490	ATHs-22	+20 to + 90	3-4	U G <sup>1</sup> / <sub>2</sub>	15 x 150
60/60000206	ATHs-22	0 to +100	1,5	U G <sup>1</sup> / <sub>2</sub>	15 x 120
60/60001047	ATHs-22	0 to +100	3-4	U G <sup>1</sup> / <sub>2</sub>	15 x 120
60/60001555	ATHs-22	0 to +100	1,5	U G <sup>1</sup> / <sub>2</sub>	15 x 120 CrNi
60/60000205	ATHs-22	0 to +100	3-4	U G <sup>1</sup> / <sub>2</sub>	15 x 150
60/60000988	ATHs-22	0 to +100	3-4	U G <sup>1</sup> / <sub>2</sub>	15 x 200
60/60000204	ATHs-22	0 to +100	3-4	U G <sup>1</sup> / <sub>2</sub>	15 x 300
60/60000489	ATHs-22	+20 to +150	3-4	U G <sup>1</sup> / <sub>2</sub>	15 x 100
60/60000203	ATHs-22	+20 to +150	3-4	U G <sup>1</sup> / <sub>2</sub>	15 x 200
60/60000198	ATHs-22	+50 to +300	3-4	UZG <sup>1</sup> / <sub>2</sub>	15 x 150
60/60002125	ATHs-22	+20 to +500	5	UZG <sup>1</sup> / <sub>2</sub>	15 x 200
60/60001479	ATHs-120	+20 to +150	3-4	U G <sup>1</sup> / <sub>2</sub>	15 x 150
60/60001932	ATHs-120	+20 to +120	3-4	U G <sup>1</sup> / <sub>2</sub>	15 x 150
60/60002009	ATHs-120	+60 to +130	3-4	U G <sup>1</sup> / <sub>2</sub>	15 x 150
60/60002008	ATHs-120	+30 to +110	3-4	U G <sup>1</sup> / <sub>2</sub>	15 x 150
60/60000195	ATHs-170	+30 to +110	3-4	U G <sup>1</sup> / <sub>2</sub>	15 x 150
60/60000196	ATHs-170	+30 to +110	3-4	U G <sup>1</sup> / <sub>2</sub>	15 x 200
60/60001048	ATHs-170	+20 to +120	3-4	U G <sup>1</sup> / <sub>2</sub>	15 x 150
60/60000989	ATHs-170	+20 to +150	3-4	U G <sup>1</sup> / <sub>2</sub>	15 x 150
60/60000194	ATHs-270	+20 to +150	3-4	U G <sup>1</sup> / <sub>2</sub>	15 x 200

\* model is being phased out

### Stock items with capillary

(delivery 3 working days after receipt of order)

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

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## Order details for non-stock items ATH Series

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





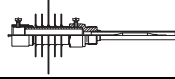
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## Order details for non-stock items ATH Series

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

<sup>1</sup> See Data Sheet 60.6710 for additional probe mountings and pockets.

<sup>2</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)  
 603026 / ... - . - .. - .. - .... - .. - .. - .. - .. - ... - .. / . / ... / ... / ...

### Order example

603026 / 0202 - 2 - 043 - 30 - 2000 - 20 - 10 - 00 - 00 - 000 - 00 / 6 / 248<sup>2</sup>

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