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Surface-mounting Thermostats

ATH Type Series

- enclosure protection IP 54
- tested to DIN EN 14597 (replacing DIN 3440)

Brief description

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

Surface-mounting thermostats work on the principle of liquid expansion, with a microswitch acting as the electrical switching device.

Switching function

Temperature controllers TR and temperature monitors TW

When the temperature present at the temperature probe exceeds the specified setpoint, the microswitch mechanism operates and the circuit is opened or closed. If the value falls below the specified setpoint (by the switching differential) the microswitch returns to its initial condition.

Restart lockout on the safety temperature limiter STB

Should the temperature present at the temperature probe exceed the specified limit, the circuit opens and the microswitch is mechanically locked.

Once the temperature falls below the alarm temperature by about 10 % of the scale range (about 15% for a limit setting > + 350°C), the microswitch lockout can be manually deactivated.

Using the safety temperature monitor STW as a safety temperature limiter STB

The circuit subsequent to the thermostat must comply with EN 14597 and VDE 0116.

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

With the STB and the STW (STB), if the measuring system is destroyed, that is, should the expansion fluid escape, the pressure in the diaphragm will fall and the circuit will be permanently open. It is then no longer possible to deactivate the lockout.

The circuit will also open if the temperature at the probe cools to below about -20°C. If the temperature rises above about -20°C, STB lockout must first be manually deactivated by pressing the reset button. Reset is automatic for the STW (STB).



ATHs-1



ATHf-70

Approvals




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Approvals

Types		Switching function	DIN reg. no.	Tests	
with rigid stem	with capillary				
ATHs-1	ATHf-1	TR	TR 89107	 - 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 60.3021 or they can be sent to you on request.
ATHs-2	ATHf-2	TW	TW 89207		
ATHs-20	ATHf-20	STW (STB)	STW (STB) 89407 S		
ATHs-70	ATHf-70	STB	STB 89507		

Technical data

Control ranges and temperature probes

liquid-filled					
Type	Control limit ranges in °C	Max. permissible probe temperature in °C	Maximum capillary length in mm	Probe length dim. "L" in mm	
				probe ø "d" in mm, ø "6" = standard	8
ATH.-1 ATH.-2	-20 to + 50 -10 to + 40 0 to + 50 0 to +100 +20 to + 90 +30 to +110 +20 to +120 +60 to +130 +20 to +150 +50 to +200 +50 to +250 +50 to +300 +50 to +350	60 50 60 125 115 135 140 150 175 230 290 345 405	5000	141 185 185 107 138 125 106 135 88 101 73 63 53	92 115 115 75 91 84 75 90 65 72 54 49 ---
ATH.-20 ATH.-70	+30 to +110 +60 to +130 +20 to +150 +50 to +250 +50 to +300	135 150 175 290 345	5000	108 116 77 64 55	75 79 60 49 ---
gas-filled					
ATH.-1 ATH.-2	+20 to +400 +20 to +500 +20 to +500	460 550 550	1000 2000 4000	278 148 202	158 92 119
ATH.-20 ATH.-70	+20 to +400 +20 to +500 +20 to +500	460 550 550	1000 2000 4000	176 127 202	106 81 119

Capillaries and temperature probes

Type	End of scale	Capillary	Temperature sensor	Comments
ATH.- . .	up to 200 °C	copper (Cu) ø 1.5mm material ref. Cu-DHP	copper (Cu) material ref. Cu-DHP brazed	-
	up to 350 °C	copper (Cu) ø 1.5mm material ref. Cu-DHP	stainless steel (CrNi) material no. 1.4571 brazed	-
	up to 500 °C	stainless steel (CrNi) ø 1.5mm material no. 1.4571	stainless steel (CrNi) material no. 1.4571 welded	-
	up to 350 °C	stainless steel (CrNi) ø 1.5mm material no. 1.4571	stainless steel (CrNi) material no. 1.4571 welded	for extra charge
Capillary length	1000 mm, max. 5000 mm as standard			
min. bending radius of capillary	5 mm			

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Electrical data

Switching device	ATH.-1 ATH.-2 ATH.-20	ATH.-70	ATH.-70/U
	microswitch with changeover contact	microswitch with normally-closed contact and restart lockout	microswitch with normally-closed contact, restart lockout and additional signal contact
Max. contact rating	230 V AC +10%, 10 (2) A, cos φ = 1 (0.6) 230 V DC +10%, 0.25A		
	at switching differential 1.5% and 2% 230 V AC +10%, 6 (1.2) A, cos φ = 1 (0.6)	-	-
	gold-plated microswitch, extra code /au* (*for 3%, 5%, and 7% switching differentials only) 24 V AC / DC, 0.1 A contact resistance 2.5 - 10 mΩ		-
Contact reliability	To ensure that switching is as reliable as possible, we recommend a minimum loading of: for silver contacts: AC / DC = 24 V, 100 mA		
	for gold-plated contacts ("au" symbol): AC / DC = 10 V, 5 mA		

Operating data

Switching differential as % of the control / limit range	Switching function	for a liquid-filled measuring system				
		Nominal value	potential actual value			
	TR, TW	3	3 max. 4	as standard		
		6	6 max. 8	on request		
		1,5	1 max. 2	extra charge		
		for a gas-filled measuring system				
		5	4 max. 8	as standard		
		9	8 max. 12	on request		
	STW (STB)	2	1.5 max. 2.5	extra charge		
		for a liquid-filled measuring system				
		5	4 max. 6	as standard		
		9	8 max. 11	on request		
		2	1 max. 3	extra charge		
		for a gas-filled measuring system				
7	5 max. 12	as standard				
9	8 max. 16	on request				
2	1.5 max. 3	extra charge				
Switching point accuracy as % of control / limit range	TR, TW: in upper third of scale ± 1.5%, at start of scale ± 6% STB, STW (STB): in upper third of scale +0/-5%, at start of scale +0/-10%					
Ambient temperature error related to control / limit range	Should the ambient temperature at the housing deviate from the calibration ambient temperature of 22°C, there is a shift in the switching point. Higher ambient temperature = lower switching point Lower ambient temperature = higher switching point					
	Surface-mounting thermostats with end of scale					
	< 200°C		≥ 200°C ≤ 350°C		> 350°C ≤ 500°C	
	TR / TW	STB/STW (STB)	TR / TW	STB/STW (STB)	TR / TW	STB/STW (STB)
	effect on thermostat head					
	0.08%/°C	0.17%/°C	0.06%/°C	0.13%/°C	0.14%/°C	0.12%/°C
	effect on capillary per meter					
	0.047%/°C	0.054%/°C	0.09%/°C	0.11%/°C	0.04%/°C	0.03%/°C
Permissible storage temperature	-50...+50°C					
Permissible ambient temperature in use	+80°C max.					
Nominal position (NL)	to DIN 16 257, NL 0 - NL 90 (other NL on request)					

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Housing

as standard	Cover: polycarbonate, impact-resistant Base: die-cast aluminum, painted	Color: pebble gray RAL 7032 Color: anthracite gray RAL 7015
Code "a"	cover is painted, die-cast aluminum	Color: pebble gray RAL 7032
Setpoint adjustment	ATH-1: switching point adjustable from outside by turning knob	ATH-2, ATH-20, ATH-70: switching point adjustable by screwdriver, once the cover is removed from the housing
Protection	EN 60 529-IP 54	
Cable entry	as standard: clamping gland M 20 x 1.5, sealing area 8-10 mm	
Weight	approx. 0.5 kg	
Thermostat head mounting ATHf- . . type series with capillary	as standard	Screw connection with locknut M 18 x 1 on housing spigot, capillary exit at spigot
	Extra codes	
	r	with 2 screws through base of housing, capillary exit at side of housing, plastic cover and base
	b	sheet-steel mounting flange, capillary exit at housing spigot
	k	wall bracket

Process connection*

Type series ATHs- with rigid stem	End of scale <u>up to</u> 150°C pocket U	End of scale <u>over</u> 150°C pocket UZ
	Screw-in pocket with screw-in spigot G 1/2 Form A to DIN 3852/2	Screw-in pocket with screw-in spigot G 1/2 Form A to DIN 3852/2 and spacer, so that the ambient temperature at the housing does not exceed the permissible maximum of +80°C
Type series ATHf- with capillary	plain cylindrical probe A (as standard)	
	pocket U (on request)	
	Screw-in pocket with screw-in spigot G 1/2 Form A to DIN 3852/2 and clamp with locking screw for holding the probe in position	
Material	pocket U	pocket UZ
	up to +150°C CuZn as standard above +150°C St as standard (CrNi on request)	above +150°C St as standard (CrNi on request)
Fitting length S	Standard lengths: 100, 120, 150, 200 or 300 mm other lengths on request	
Immersion tube Ø	D = 8 mm, D = 10 mm	

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

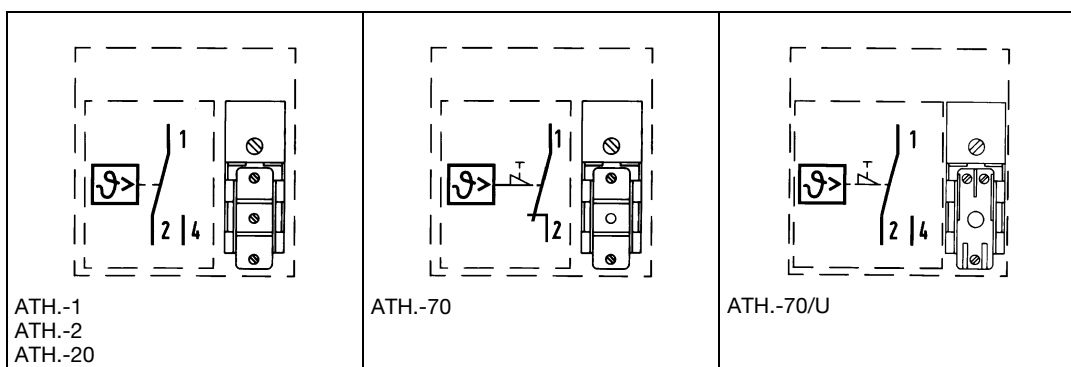
Note:

Physical and toxicological properties of the expansion media which might escape should the measuring system fracture.

Control range with end of scale	Dangerous reactions	Fire and explosion hazard		Risk to water	Toxicological data		
		ignition temperature	explosion limit		irritant	danger to health	toxic
< +200°C	no	+ 355°C	0.6 - 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

¹The health authorities have yet to comment on possible risks to health from short-term exposure at low concentration, such as might occur should a measuring system fracture.

Connection diagrams



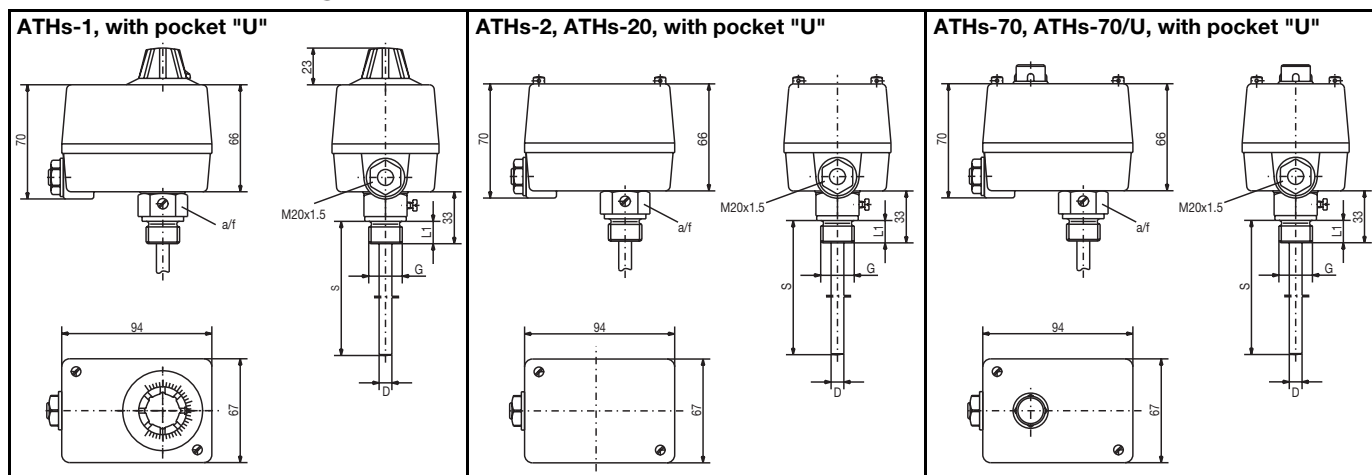
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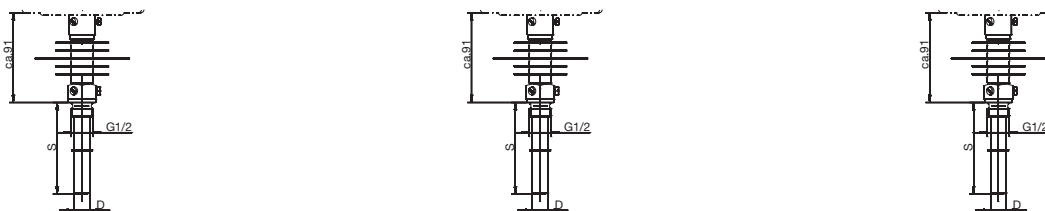
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Dimensions for rigid stem versions



with pocket "UZ"



Instruments with rigid stem held in stock

Temperature controllers (TR)

(delivery 3 working days after receipt of order)

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

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Instruments with rigid stem held in stock

Temperature monitors (TW)

(delivery 3 working days after receipt of order)

Sales no.	Type	Control/limit range °C	Switching differential %	Process connection	Immersion tube ø x length mm
60/60001135	ATHs-2	-10 to + 40	3-4	U G ¹ / ₂	8x200
60/60000960	ATHs-2	0 to + 50	1.5	U G ¹ / ₂	15x100
60/60001549	ATHs-2	0 to + 50	1.5	U G ¹ / ₂	15x100 CrNi
60/60001128	ATHs-2	0 to + 50	3-4	U G ¹ / ₂	8x200
60/60000177	ATHs-2	+20 to + 90	1.5	U G ¹ / ₂	15x100
60/60000959	ATHs-2	+20 to + 90	6-8	U G ¹ / ₂	15x100
60/60001129	ATHs-2	+20 to + 90	3-4	U G ¹ / ₂	8x150
60/60000178	ATHs-2	+20 to + 90	3-4	U G ¹ / ₂	8x200
60/60000331	ATHs-2	0 to +100	3-4	U G ¹ / ₂	8x120
60/60001552	ATHs-2	0 to +100	3-4	U G ¹ / ₂	8x120 CrNi
60/60000179	ATHs-2	0 to +100	3-4	U G ¹ / ₂	8x150
60/60001039	ATHs-2	0 to +100	3-4	U G ¹ / ₂	8x200
60/60001130	ATHs-2	0 to +100	3-4	U G ¹ / ₂	8x300
60/60001124	ATHs-2	+20 to +150	1.5	U G ¹ / ₂	8x100
60/60000483	ATHs-2	+20 to +150	3-4	U G ¹ / ₂	8x100
60/60001551	ATHs-2	+20 to +150	3-4	U G ¹ / ₂	8x100 CrNi
60/60000485	ATHs-2	+20 to +150	3-4	U G ¹ / ₂	8x200
60/60001554	ATHs-2	+20 to +150	3-4	U G ¹ / ₂	8x200 CrNi
60/60000182	ATHs-2	+20 to +150	3-4	U G ¹ / ₂	8x300
60/60000186	ATHs-2	+50 to +200	3-4	UZ G ¹ / ₂	8x120
60/60001131	ATHs-2	+50 to +200	3-4	UZ G ¹ / ₂	8x200
60/60001105	ATHs-2	+50 to +300	3-4	UZ G ¹ / ₂	8x150
60/60001556	ATHs-2	+50 to +300	3-4	UZ G ¹ / ₂	8x150 CrNi
60/60002124	ATHs-2	+20 to +500	5	UZ G ¹ / ₂	8x200

Safety temperature monitors (STW) (STB)

(delivery 3 working days after receipt of order)

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

Safety temperature limiters (STB)

(delivery 3 working days after receipt of order)

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

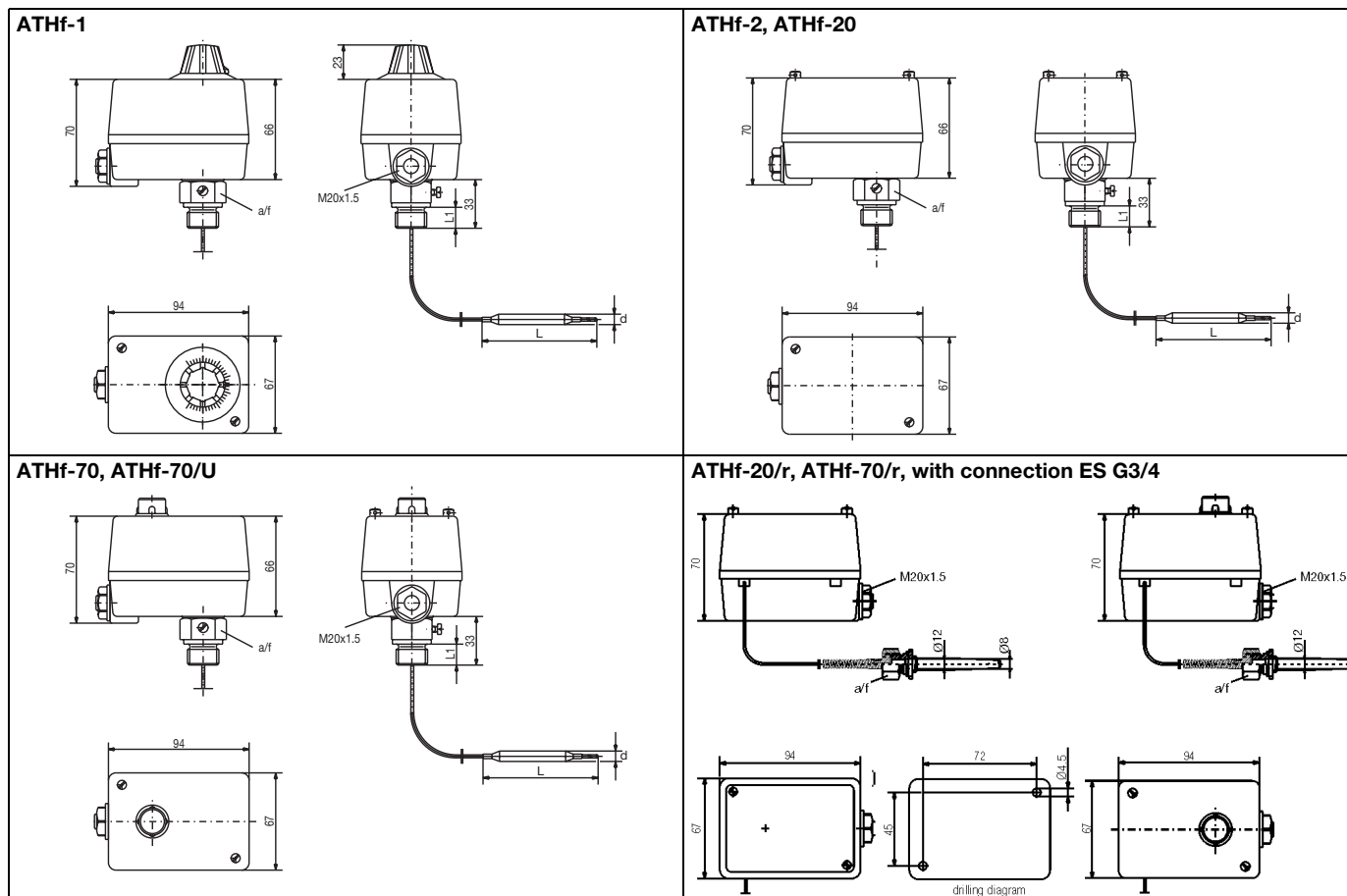
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Dimensions for capillary versions



Instruments with capillary held in stock

Temperature controllers (TR)

(delivery 3 working days after receipt of order)

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

Temperature monitors (TW)

(delivery 3 working days after receipt of order)

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

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Instruments with capillary held in stock

Safety temperature monitors (STW) and limiters (STB)

(delivery 3 working days after receipt of order)

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

Order details

(please take account of our stock versions and specify the sales number)

Surface-mounting thermostats, ATH type series

Order code	(1) Basic type
603021	Surface-mounting thermostat, ATH type 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	
1	ATHs with rigid stem
2	ATHf with capillary
(4) Control / limit ranges °C	
014	-20 to + 50 (TR and TW only)
016	-10 to + 40 (TR and TW only)
021	0 to + 50
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
065	+50 to +350
045	+20 to +400
046	+20 to +500
(5) Switching differential	
00	without switching differential (-70 STB)
15	1.5% of scale range (TR + TW only)
20	2% of scale range (STW (STB) only)
30	3% of scale range (TR + TW only)
50	5% of scale range (TR + TW + STW (STB) only)
60	6% of scale range (TR + TW only)
70	7% of scale range (STW (STB) only)
90	9% of scale range (STW (STB) only)

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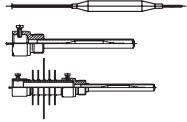
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Order details

Surface-mounting thermostat, ATH type series

Order code	(6) Capillary length
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) Capillary material	
00	ATHs without capillary
40	Cu (copper)
20	CrNi (stainless steel 1.4571)
(8) Process connection (PA) ¹	
10	A = plain cylindrical probe (ATHf only)
20	U = screw-in pocket
30	UZ = screw-in pocket with spacer
	
(9) Process connection thread ¹	
00	no thread (process connection A)
13	external thread G 1/2
(10) Process connection material	
00	process connection A only
46	CuZn (brass)
01	St (steel)
20	CrNi (stainless steel 1.4571)
(11) Fitting length "S" (immersion tube length)	
000	ATHf without pocket
100	100mm
120	120mm
150	150mm
200	200mm
300	300mm
400	400mm
...	... special length, details in plain text
(12) Diameter "D" (immersion tube diameter)	
00	ATHf without pocket
8	8 mm
10	10 mm
(13) Diameter "d" (probe diameter)	
6	6 mm
8	8 mm
(14) Extra codes ²	
000	no extra code
574	"U" STB with normally-closed contact, restart lockout and additional signal contact (-70 STB)
702	"au" gold-plated snap-action switch contact (switching differentials 3%, 5%, and 7% and STB with normally-closed contact only)
701	"a" die-cast aluminum housing cover (not extra code "r")
711	"r" thermostat head mounting with 2 screws through base of housing, capillary exit at side of housing, plastic cover and base
764	"b" sheet-steel mounting flange, capillary exit at housing spigot
248	"k" wall bracket

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] / [574²]

¹ for other connection types and pockets, see Data Sheet 60.6710.

² List extra codes one after the other, separated by commas.