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Surface-mounting Thermostats ATH Series

Series IP54

Brief description

Thermostats control and monitor thermal processes. Thermostats in the ATH series can be supplied as temperature controllers TR, operating temperature monitors TW, protection temperature monitors STW (STB) and protection temperature limiters STB. In the event of a fault, the STB sets the system being monitored to a safe operational state.

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

Switching function

Temperature controller TR and operating temperature monitor TW

When the temperature at the probe exceeds the set limit, the microswitch is operated through the mechanism and the circuit is opened or closed. When the temperature has fallen below the set limit (by the switching differential), the microswitch returns to its initial position.

Lock-out facility on the protection temperature limiter STB

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

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

Use of the protection temperature monitor STW as protection temperature limiter STB

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

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

In the case of the STB and STW (STB), failure of the measuring system, 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.

If the temperature at the probe cools down to below -20°C, the circuit will also be opened. As the temperature rises to above -20°C, 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 pages 7-9



ATHs-1



ATHf-70/g

Types and approvals

Types		Switching function	DIN Reg. No.	Tests	
with rigid stem	with capillary				
ATHs-1	ATHf-1	TR	TR 89 101	 - DIN 3440 - Pressure Equipment Directive 97/23/EC (ATH.-20 and ATH.-70 only)	You will find the 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 89 201		
ATHs-20	ATHf-20	STW (STB)	STW (STB) 89 401 S		
ATHs-70	ATHf-70	STB	STB 89 501		

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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 "L" in mm	
				probe dia. "d" in mm, dia. 6 is 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 + 70	80		138	91
	0 to +100	125		107	75
	+20 to + 90	115		138	91
	+30 to +110	135		125	84
	+20 to +120	140		106	75
	+60 to +130	150		135	90
	+20 to +150	175		88	65
	+50 to +200	230		101	72
	+50 to +250	290		73	54
	+50 to +300	345		63	49
	+50 to +350	405		53	- - -
ATH.-20	+30 to +110	135	5000	108	75
ATH.-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					
ATH.-1	+20 to +400	460	1000	278	158
ATH.-2	+20 to +500	550	2000	148	92
	+20 to +500	550	4000	202	119
ATH.-20	+20 to +400	460	1000	176	106
ATH.-70	+20 to +500	550	2000	127	81
	+20 to +500	550	4000	202	119

Capillaries and temperature probes

Type	End of scale	Capillary	Temperature probe	Note
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 Mat. Ref. 1.4571	stainless steel (CrNi) Mat. Ref. 1.4571 welded	at extra charge
Capillary length	standard is: 1000 mm, max. 5000 mm			
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 break contact and lock-out	microswitch with break contact, lock-out and additional signal contact
Max. rating	10 (2) A, 230 V AC +10%, p.f. = 1 (0.6) 0.25A, 230 V DC +10%		
	with differential 1.5% und 2% 6 (1.2) A, 230 V AC +10%, p.f. = 1 (0.6)	-	-
	microswitch gold-plated, code /au* (*only with switching differential 3%, 5%, 7%) 0.1 A, 24 V AC / DC +10%, contact resistance 2.5 – 10 mΩ	-	-

Operating data

Switching differential in % of control / limit range	Switching function	liquid-filled measuring system		
		Nominal value	Possible actual value	
	TR, TW	3	3 max. 4	standard
		6	6 max. 8	on request
		1.5	1 max. 2	at extra charge
	gas-filled measuring system			
	5	4 max. 8	standard	
	9	8 max. 12	on request	
	2	1.5 max. 2.5	at extra charge	
	liquid-filled measuring system			
	STW (STB)	5	4 max. 6	standard
		9	8 max. 11	on request
		2	1 max. 3	at extra charge
	gas-filled measuring system			
7	5 max. 12	standard		
9	8 max. 16	on request		
2	1.5 max. 3	at extra charge		
Switching point accuracy in % of control / limit range	TR: in upper third of scale ± 1.5%, at start of scale ± 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 housing from the 22° calibration ambient temperature produces 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 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)
	due to thermostat head					
	0.08%/°C	0.17%/°C	0.06%/°C	0.13%/°C	0.14%/°C	0.12%/°C
	due to capillary per meter length					
0.047%/°C	0.054%/°C	0.09%/°C	0.11%/°C	0.04%/°C	0.03%/°C	
Permissible storage temperature	-50 to +50°C					

Permissible ambient temperature in operation	+80°C max.
Nominal position (NL)	to DIN 16 257, NL 0 – NL 90 (other NL on request)

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Housing

Standard	cover: polycarbonate, impact-resistant base: die-cast aluminium, painted	color: pebble gray RAL 7032 color: anthracite gray RAL 7015
Code a	cover: die-cast aluminium, painted	color: pebble gray RAL 7032
Setpoint adjustment	ATH-1: switching point adjustable from the outside by turning the knob	ATH-2, ATH-20, ATH-7, ATH-70: switching point adjustable by screwdriver after taking off the housing cover
Protection	EN 60 529-IP54	
Cable entry	as standard: clamping gland M20 x 1.5, for 8 – 10 mm cable diameter	
Weight	approx. 0.5 kg	

Thermostat mounting, Series ATHf- . . with capillary	Standard	thread M 18 x 1 with locknut on housing spigot, capillary exit at spigot
	Code	
	r	by 2 screws through base of housing, capillary exit on side of housing, cover and base in plastic
	b	mounting flange in steel, capillary exit at housing spigot
	k	wall bracket

Process connection*

Series ATHs- with rigid stem	End of scale up to 150°C Pocket U	End of scale above 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 extension, in order not to exceed the max. permissible ambient temperature +80°C at the housing
Series ATHf- with capillary	plain cylindrical probe A (standard)	
	pocket U (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	Pocket U up to +150°C CuZn (brass) as standard above +150°C St (steel) as standard (CrNi on request)	Pocket UZ above +150°C St (steel) as standard (CrNi on request)
	Fitting length S standard lengths: 100, 120, 150, 200 or 300 mm other lengths on request	
Immersion tube dia.	D = 8 mm, D = 10 mm	

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

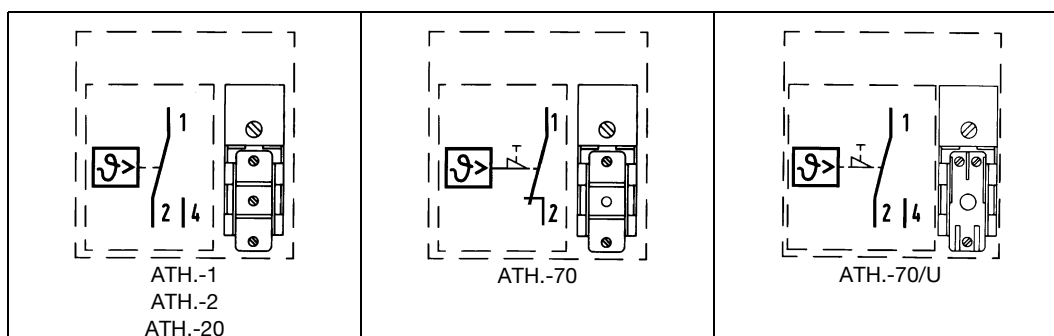
Note:

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

Control range with end of scale	Dangerous reactions	Fire/explosion hazard		Water contamination	irritant	Toxicological data	
		ignition temperature	explosion limit % v/v			danger to health	toxic
< +200°C	no	+ 355°C	0.6 – 8	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 there is no restrictive statement from the health authorities concerning any danger to health over short periods and at low concentrations, for example after a fracture of the measuring system.

Connection diagrams



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Dimensions

<p>ATHs-1, with pocket U</p>	
<p>ATHs-2, ATHs-20 with pocket UZ</p>	
<p>ATHf-70, with pocket U</p>	

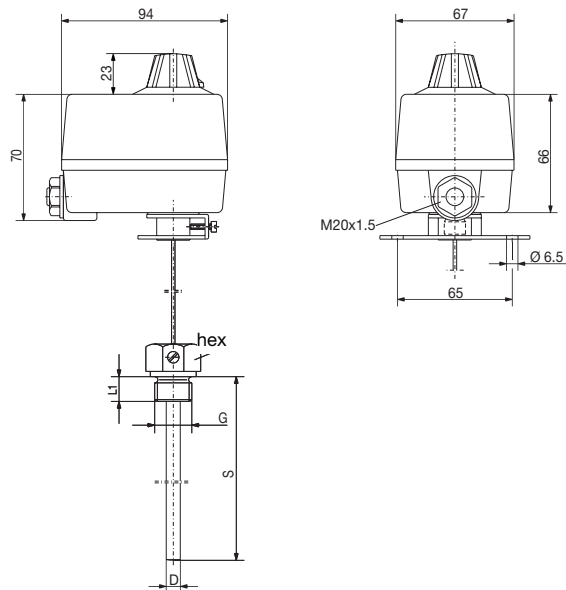
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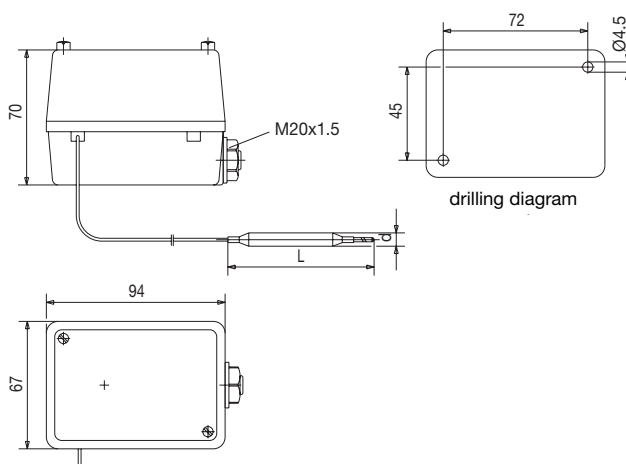
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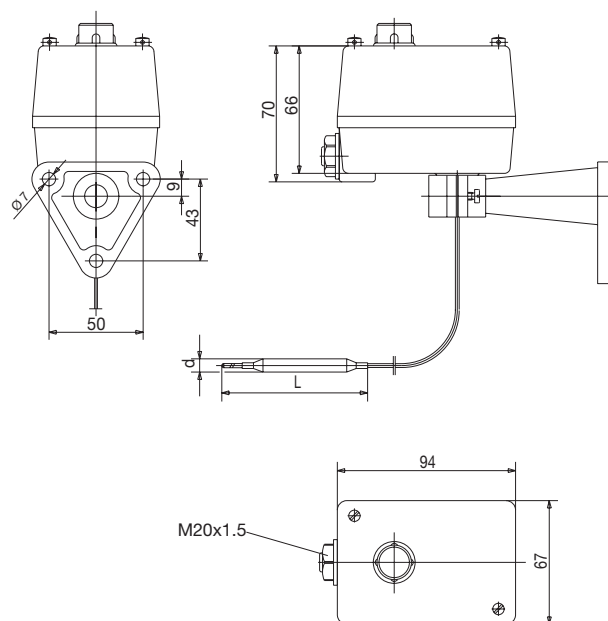
**ATHf-1/b,
 with pocket U**



**ATHf-2/r,
 ATHf-20/r with
 plain cylindrical probe A,
 no pocket**



**ATHf-70/k, with
 plain cylindrical probe A,
 no pocket**



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Stock items with rigid stem

Temperature controller (TR)

(delivery 3 working days after receipt of order)

Sales No.	Type	Control/limit range °C	Differential %	Process connection	Immersion tube dia. 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

Operating temperature monitor (TW)

(delivery 3 working days after receipt of order)

Sales No.	Type	Control/limit range °C	Differential %	Process connection	Immersion tube dia. 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

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Stock items with rigid stem

Protection temperature monitor STW (STB)

(delivery 3 working days after receipt of order)

Sales No.	Type	Control/limit range °C	Differential %	Process connection	Immersion tube dia. 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

Protection temperature limiter (STB)

(delivery 3 working days after receipt of order)

Sales No.	Type	Control/limit range °C	Differential %	Process connection	Immersion tube dia. 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

Stock items with capillary

Temperature controller (TR)

(delivery 3 working days after receipt of order)

Sales No.	Type	Control/limit range °C	Differential %	Capillary mm	Process connection	Probe dia. 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

Operating temperature monitor (TW)

(delivery 3 working days after receipt of order)

Sales No.	Type	Control/limit range °C	Differential %	Capillary mm	Process connection	Probe dia. 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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Stock items with capillary Protection temperature limiter (STB)

(delivery 3 working days after receipt of order)

Sales No.	Type	Control/limit range °C	Differential %	Capillary mm	Process connection	Probe dia. 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

Surface-mounting thermostat, ATH series

Order code	(1) Basic type	
603021	Surface-mounting thermostat, ATH series	
	(2) Basic type extension	
01	ATH-1	Temperature controller TR
02	ATH-2	Operating temperature monitor TW
20	ATH-20	Protection temperature monitor STW (STB)
70	ATH-70	Protection temperature limiter 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	
	* on TR and TW only	
	(5) Switching differential	
00	no differential (-70 STB)	
15	1.5% of scale span	(on TR + TW only)
20	2% of scale span	(on STW (STB) only)
30	3% of scale span	(on TR + TW only)
50	5% of scale span	(on TR + TW + STW (STB) only)
60	6% of scale span	(on TR + TW only)
70	7% of scale span	(on STW (STB) only)
90	9% of scale span	(on STW (STB) only)

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Order details

Surface-mounting thermostat, ATH series

Order details	(6) Capillary length
0	ATHs no 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 no capillary
40	Cu (copper)
20	CrNi (stainless steel 1.4571)
(8) Process connection (PA) ¹	
10	A = plain cylindrical probe (on ATHf only) 
20	U = screw-in pocket 
30	UZ = screw-in pocket with extension 
(9) Thread for process connection ¹	
00	no thread (process connection A)
13	external thread G 1/2
(10) Material of process connection	
00	with 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 no 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 no 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 break (SPST-NC) contact, lock-out and additional signal contact (-70 STB)
702	au gold-plated switch contacts (only with 3%, 5%, and 7% switching differential and STB with break (SPST-NC) contact)
701	a housing cover in die-cast aluminium (not with extra code r)
711	r thermostat head mounting by 2 screws through base of housing, capillary exit on side of housing, cover and base in plastic
764	b mounting flange in sheet steel, 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 See data sheet 60.6710 for additional probe mountings and pockets.

² List extra codes in sequence, separated by commas.