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Surface-mounted thermostat ATH

Special features

- Version according to DIN EN 14597
- Pressure Equipment Directive 2014/68/EU
- Sturdy housing (protection type IP54)
- Microswitch
- Self-monitoring (STB/STW [STB]) in the event of a pressure drop
- Safety cut-out (STB/STW [STB])
- Control range -50[1] to +500 °C



ATH-1 (Type 603021/01-1-...)

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.

Switching functions

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

Restart lock at safety temperature limiter STB
If the temperature at the temperature sensor exceeds the set limit value, the electrical circuit is opened and the microswitch is mechanically locked. After falling below the limit value by approx. 10 % of the temperature range (approx. 15 % of the limit value setting > +350 °C), the switch can be unlocked manually.

Use of the safety temperature monitor STW as safety temperature limiter STB
In this case, the circuit following the thermostat must comply with DIN EN 14597 and VDE 0116.

Self-monitoring for safety temperature limiter STB and 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. When the STW (STB) and STB sensors cools down to the negative temperature range, the circuit opens, but must be unlocked manually by the reclosing button when the temperature rises. The STW (STB) restarts automatically.



ATH-70 (Type 603021/70-2-...)

[1] Available upon request.

Approvals and approval marks (see technical data)

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Technical data

Control ranges and temperature probes

Type	Control/limit value ranges °C	Max. admissible probe temperature °C	Max. capillary length mm	Length of the temperature probe Probe Ø "d" = 6 mm[a] mm	
				Ø 6	Ø 8
	Liquid-filled				
ATH-1, ATH-2	-20 to +50	60	5000	141	92
	-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, ATH-70	20 to 150	175	5000	77	60
	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, ATH-2	20 to 400	460	1000	278	158
	20 to 500	575	2000	148	92
	20 to 500	575	4000	202	119
ATH-20, ATH-70	20 to 400	460	1000	176	106
	20 to 500	575	2000	127	81
	20 to 500	575	4000	202	119

[a] Standard

Capillary and temperature probe

Type	Scale limit value	Capillary	Temperature probe
ATH-..	up to 200 °C	Copper (Cu), Ø 1.5 mm, material no. Cu-DHP	Copper (Cu), material no. Cu-DHP, hard soldered
	up to 350 °C	Copper (Cu), Ø 1.5 mm, material no. Cu-DHP	Stainless steel (CrNi), material no. 1.4571, hard soldered
	up to 500 °C	Stainless steel (CrNi), Ø 1.5 mm	Stainless steel (CrNi), material no. 1.4571, welded
	up to 350 °C	Stainless steel (CrNi), Ø 1.5 mm	Stainless steel (CrNi), material no. 1.4571, welded
Capillary length	1000 mm as standard, max. 5000 mm		
Min. bending radius of the capillary	5 mm		

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Electrical data

Switching function	TR, TW, STW (STB) Microswitch with change-over contact	STB (-70) Microswitch with change-over contact and restart lock	STB (-70/574) Microswitch with change-over contact, restart lock and additional signal contact
Max. switching capacity	AC 230 V +10 %, 10 (2)[a] A, cos φ = 1 (0.6)[a] DC 230 V +10 %, 0.25 A		
With switching differentials 1.5 % and 2 %	AC 230 V +10 %, 6 (1.2)[a] A, cos φ = 1 (0.6)[a]	-	-
	Microswitch, gold-plated, extra code 702 (only for switching differentials 3 %, 5 % and 7 %), AC/DC 24 V, 0.1 A, contact resistance 2.5 to 10 mΩ		

[a] Inductive loads

Contact reliability	To ensure a high switching reliability, we recommend a minimum load of:
With silver contacts	AC/DC 24 V, 100 mA
With gold-plated contacts (extra code 702)	AC/DC 10 V, 5 mA

Environmental influences

Switching differential in % from the control/limit value range	Nominal value	Possible actual value	Nominal value	Possible actual value	
	Liquid-filled		Gas-filled		
Switching function TR, TW	3	3 max. 4	5	4 max. 8	Standard
	6	6 max. 8	9	8 max. 12	Upon request
	1.5	1 max. 2	2	1.5 max. 2,5	Extra cost
	Liquid-filled		Gas-filled		
Switching function STW (STB)	5	4 max. 6	7	5 max. 12	Standard
	9	8 max. 11	9	8 max. 16	Upon request
	2	1 max. 3	2	1.5 max. 3	Extra cost

Switching point accuracy in % of the limit value range	
Switching function TR, TW	In the upper third of the scale ±1.5 %, at scale beginning ±6 %
Switching function STW (STB), STB	In the upper third of the scale +0/-5 %, at scale beginning +0/-10 %

Ambient temperature influence	Referring to the control/limit value range If the ambient temperature at the switching head and/or the capillary deviates from the calibration ambient temperature 22 °C, a switching point shift occurs. Higher ambient temperatures = lower switching point Lower ambient temperatures = higher switching point					
Surface-mounted thermostats with scale limit value	< 200 °C		≥ 200 °C ≤ 350 °C		> 350 °C ≤ 500 °C	
Switching function	TR, TW	STW (STB), STB	TR, TW	STW (STB), STB	TR, TW	STW (STB), 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	0.011 %/K	0.04 %/K	0.03 %/K
Admissible storage temperature	-50 to +80 °C or up to max. admissible ambient temperature, see nameplate					
Admissible ambient temperature when in use	See Nameplate					
Rated position (NL)	According to DIN 16257, NL 0 to NL 90 (other NL upon request)					

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Housing

Material	
Housing lid	Standard: Polycarbonate, shock resistant; color: pepple gray RAL 7032
	Extra code 701: Aluminum die casting, painted; color: pepple gray RAL 7032
Housing bottom part	Standard: Aluminum die casting, painted; color: anthracite gray RAL 7015
Setpoint value adjustment	
Switching function TR	Switching point can be adjusted externally with the rotary knob
Switching function TW, STW (STB), STB	Switching point can be adjusted with a screwdriver after removing housing lid
Protection type	IP54, according to DIN EN 60529
Cable inlet	Standard: self-sealing grommet M20 × 1.5, sealing range 8 to 10 mm
Weight	Approx. 500 g
Switching head mounting Type ATH with capillary	
Standard	Screw connection with counter nut M18 × 1 on the housing spigot, capillary exit on the housing spigot
Extra code 248	Wall mount
Extra code 711	With 2 screws through the housing bottom part, lateral capillary exit on the case, lid and bottom part made of plastic
Extra code 764	Mounting flange made of steel, capillary exit on the housing spigot

Process connection

Type ATH with rigid thermowell	
Scale limit value up to 150 °C	Process connection 20: Screw-in sleeve with screw-in spigot G 1/2″, form A, according to DIN 3852/2
Scale limit value exceeding 150 °C	Process connection 30: 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 is not exceed on the housing
Type ATH with capillary	Process connection 10: Plain cylindrical probe (standard)
	Process connection 20: Screw-in sleeve (upon request)
	Screw-in sleeve with screw-in spigot G 1/2″, form A, according to DIN 3852/2, and clamping piece with fixing screw to lock the probe in place
Material	
Process connection 20	
Up to 150 °C	CuZn, nickel-plated, standard
Above 150 °C	CrNi
Process connection 30	
Up to 150 °C	CrNi
Insertion length	Standard: 100, 120, 150, 200, or 300 mm (other lengths upon request)
Immersion tube Ø	D = 8 mm, D = 10 mm

⇨ For different process connections and thermowells refer to data sheet 606710

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Approvals and approval marks

DIN	
Testing agency	DIN CERTCO/TÜV Süd
Certificates/certification numbers	TW892
Inspection basis	DIN EN 14597
Valid for	ATH-2 (Type 603021/02 [TW])
DIN	
Testing agency	DIN CERTCO/TÜV Süd
Certificates/certification numbers	TR891
Inspection basis	DIN EN 14597
Valid for	ATH-1 (Type 603021/01 [TR])
DIN	
Testing agency	DIN CERTCO/TÜV Süd
Certificates/certification numbers	STW(STB)894S
Inspection basis	DIN EN 14597
Valid for	ATH-20 (Type 603021/20 [STW (STB)])
DIN	
Testing agency	DIN CERTCO/TÜV Süd
Certificates/certification numbers	STB895
Inspection basis	DIN EN 14597
Valid for	ATH-70 (Type 603021/70 [STB])
DGRL	
Testing agency	TÜV Süd
Certificates/certification numbers	Z-IS-TAF-MUC-17-11-2652099-021
Inspection basis	2014/68/EU, DIN EN 14597
Valid for	ATH-20 (Type 603021/20 [STW (STB)]), ATH-70 (Type 603021/70 [STB])
EAC[a]	
Testing agency	GOST Norm AG
Certificates/certification numbers	0198420
Inspection basis	TR ZU 004/2011 (LVD)
Valid for	ATH (Type 603021)

[a] Russian documentation available upon request.

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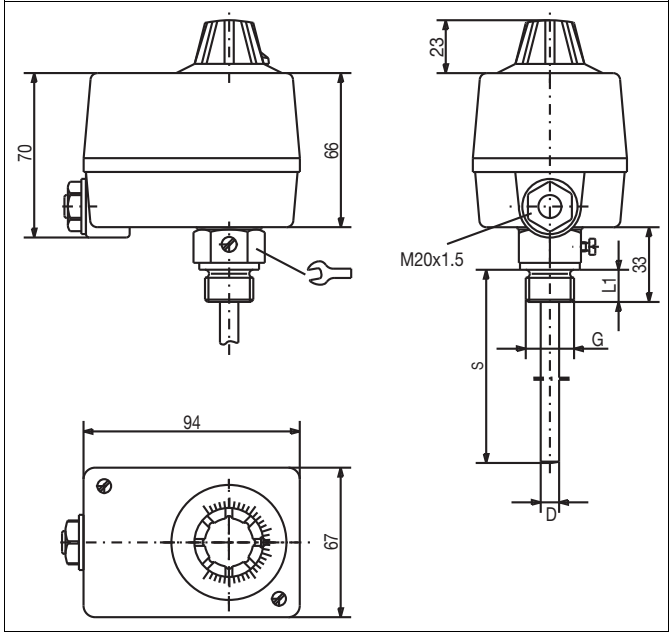
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Dimensions

Versions with rigid thermowell

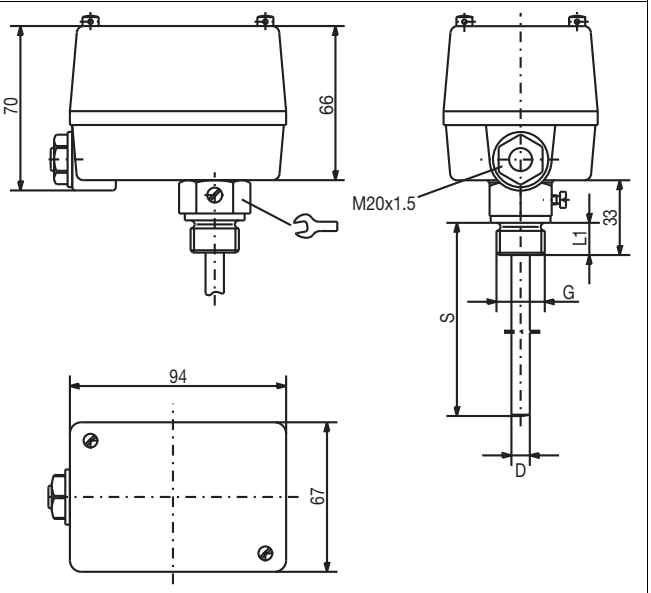
ATH-1 (Type 603021/01-1-...)

With screw-in sleeve (process connection 20)



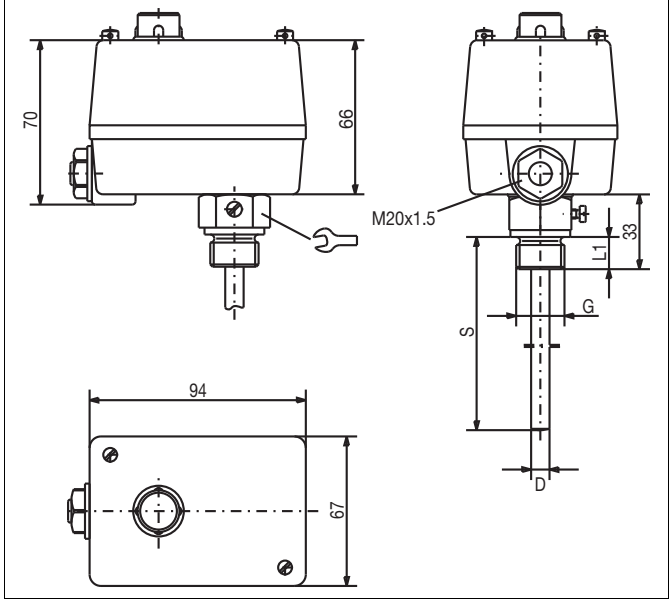
ATH-2 (Type 603021/02-1-...),
ATH-20 (Type 603021/20-1-...)

With screw-in sleeve (process connection 20)



ATH-70 (Type 603021/70-1-...),
ATH-70/574 (Type 603021/70-1-.../574)

With screw-in sleeve (process connection 20)



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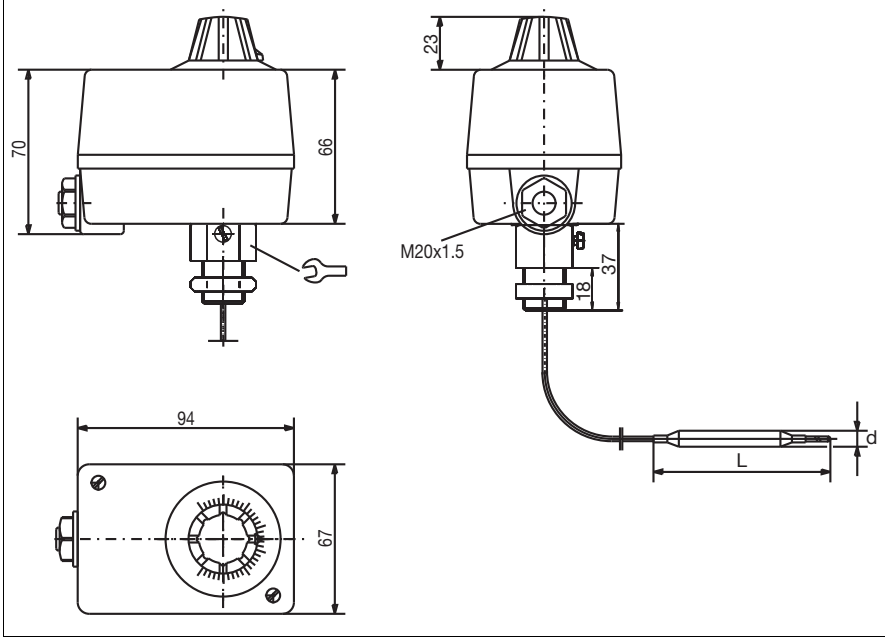
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Versions with capillary

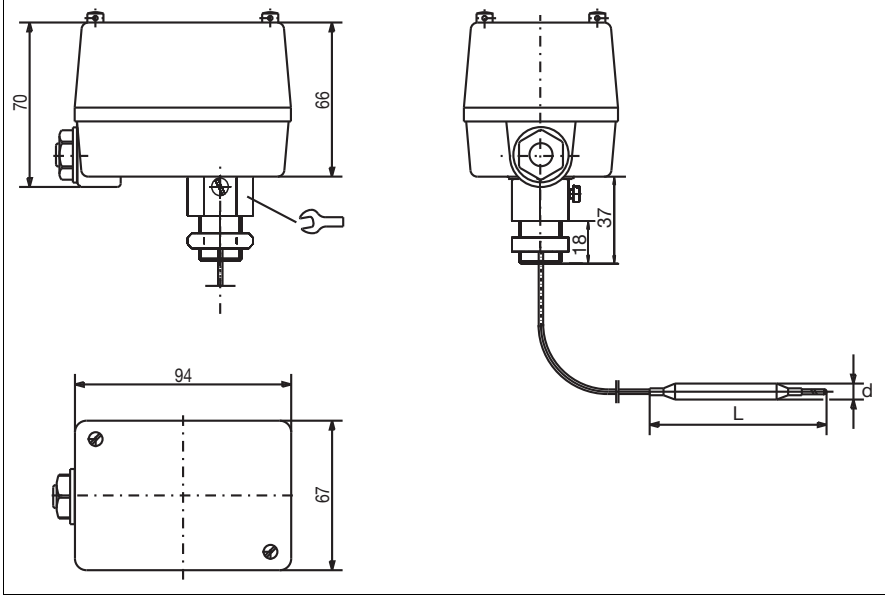
ATH-1 (Type 603021/01-2-...)

With plain cylindrical probe (process connection 10)



ATH-2 (Type 603021/02-2-...),
ATH-20 (Type 603021/20-2-...)

With plain cylindrical probe (process connection 10)



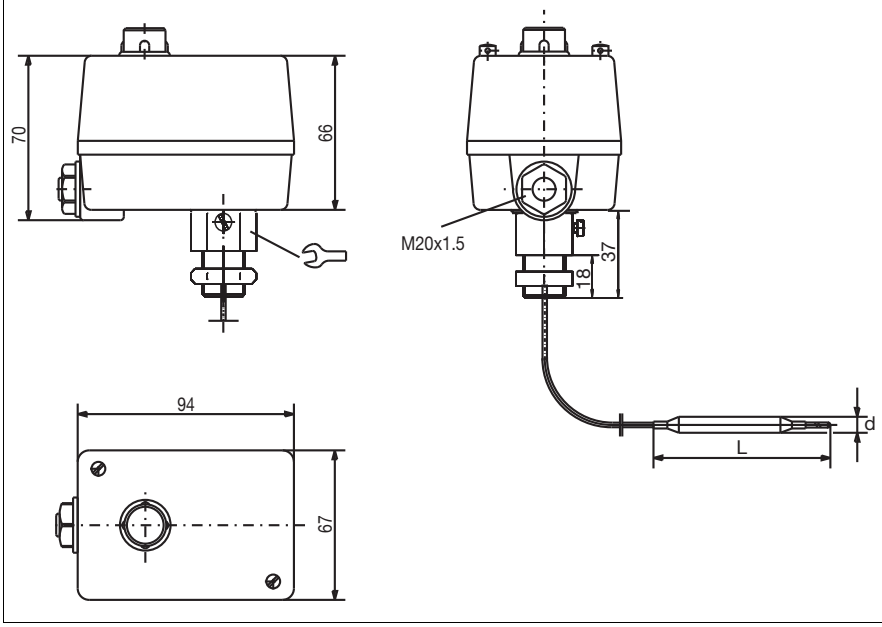
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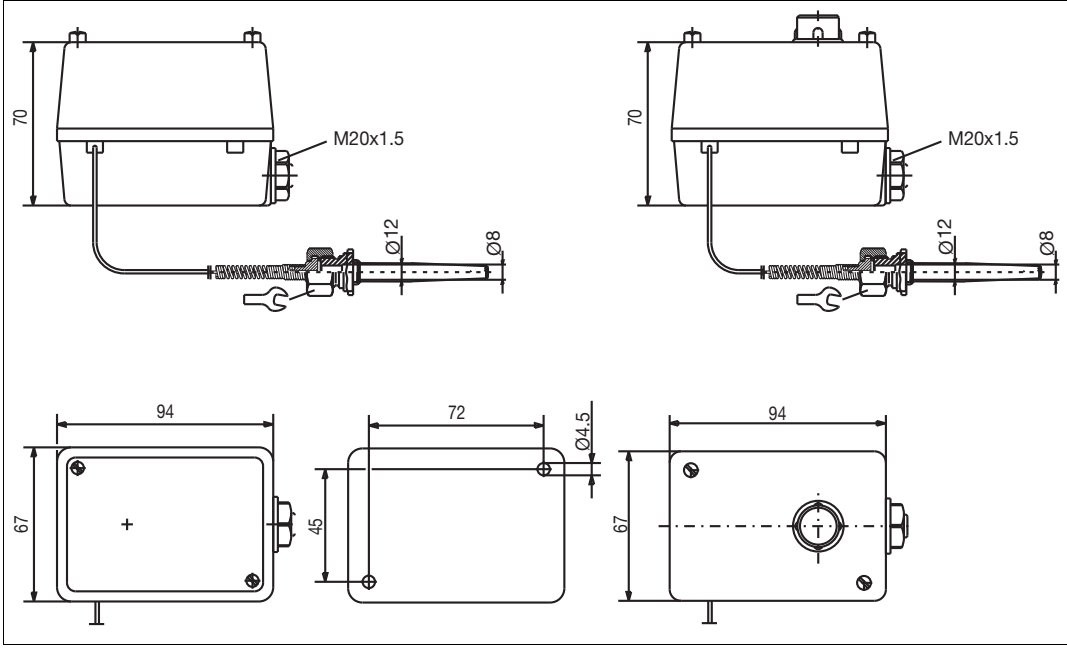
ATH-70 (Type 603021/70-2-...),
ATH-70/574 (Type 603021/70-2-.../574)

With plain cylindrical probe (process connection 10)



ATH-20/r[a] (Type 603021/20-2-.../711),
ATH-70/r[a] (Type 603021/70-2-.../711)

With Weld-in sleeve for union nut, conical (process connection 42)



[a] r = Switching head mounting (extra code 711)

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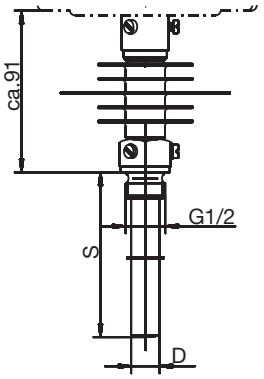
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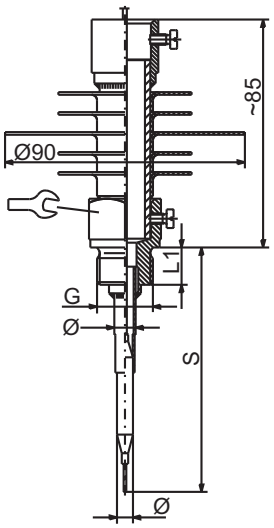
Process connection

for versions with rigid thermowell

Screw-in sleeve with intermediate piece
for scale end value above 150 °C (process connection 30)



Screw-in sleeve with intermediate piece, open (process connection 31)

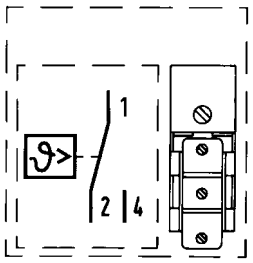


Connection diagram

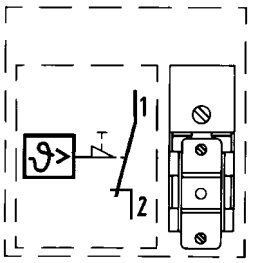
The connection diagram in the data sheet provides information on product selection.

For the electrical connection, only use the installation instructions or the operating manual.

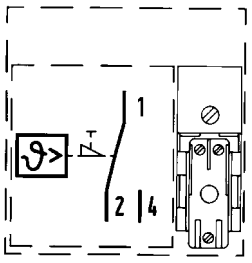
Wiring diagrams



TR (Type 603021/01-...),
TW (Type 603021/02-...),
STW (STB) (Type 603021/20-...)



STB (Type 603021/70-...)



STB (Type 603021/70-.../574)

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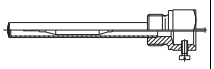
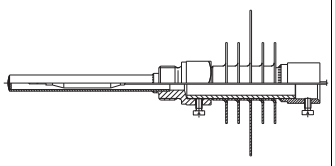
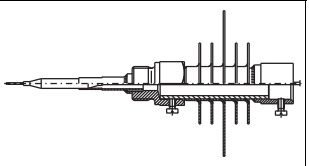
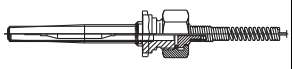
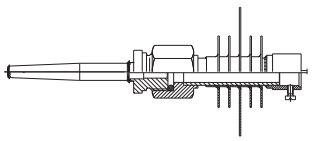
Order details

	(1)	**Basic type**
603021		Surface-mounted thermostat ATH
	(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		Rigid thermowell
2		Capillary
	(4)	**Control range**
014		-20 to +50 °C
016		-10 to +40 °C
021		0 to 50 °C
025		0 to 100 °C
041		20 to 90 °C
042		20 to 120 °C
043		20 to 150 °C
045		20 to 400 °C
046		20 to 500 °C
052		30 to 110 °C
062		50 to 200 °C
063		50 to 250 °C
064		50 to 300 °C
066		60 to 130 °C
	(5)	**Switching differential**
00		None
15		1.5 %
20		2 %
30		3 %
50		5 %
60		6 %
70		7 %
90		9 %
	(6)	**Capillary length**
0		None
1000		1,000 mm
2000		2,000 mm
3000		3,000 mm
4000		4,000 mm
5000		5,000 mm
	(7)	**Capillary material**
00		None
20		CrNi (stainless steel)
40		Cu (copper)

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	(8)	**Process connection**
10		Plain cylindrical probe 
20		Screw-in sleeve 
30		Screw-in sleeve with intermediate piece 
31		Screw-in sleeve with intermediate piece, open 
42		Weld-in sleeve for union nut, conical 
46		Weld-in sleeve for union nut with intermediate piece, conical 
	(9)	**Process connection thread**
00		None
13		G 1/2"
14		G 3/4"
	(10)	**Process connection material**
00		None
20		CrNi (stainless steel)
46		CuZn (copper)
	(11)	**Insertion length**
000		Without thermowell
100		100 mm
120		120 mm
150		150 mm
200		200 mm
300		300 mm
400		400 mm
	(12)	**Immersion tube diameter**
00		Without thermowell
8		8 mm
10		10 mm
	(13)	**Probe diameter**
6		6 mm
8		8 mm

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(14)	Extra code
000	None
248	Wall mount
574	Microswitch with changeover contact, restart lock (only for STB)
701	Housing lid made of aluminum die casting
702	Snap-action switch contact, gold-plated (only with switching differential 3 %, 5 %, and 7 %, and STB)
711	Switching head mounting with 2 screws through the housing bottom part
764	Mounting flange made of steel

⇨ For different process connections and thermowells refer to data sheet 606710

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)	
Order code		/		-		-		-		-		-		-		-
Order example	603021	/	70	-	1	-	043	-	00	-	0	-	00	-	20	-

	(9)		(10)		(11)		(12)		(13)		(14)	
Order code		-		-		-		-		/		, ...[a]
Order example	13	-	20	-	100	-	8	-	6	/	574	

[a] List extra codes in sequence, separated by commas.

Stock versions

Versions with capillary

Temperature controller (TR), Type 603021/01-2-...

Type	Control range/ limit value range °C	Switching differential %	Capillary mm	Process connection	Probe Ø × length mm	Part no.
ATHf-1	-10 to +40	3 - 4	1000	„10“ plain cylindrical probe	6 × 185	60001134
ATHf-1	0 to 100	3 - 4	1000		6 × 107	60001004
ATHf-1	20 to 150	3 - 4	1000		6 × 88	60000955
ATHf-1	50 to 300	3 - 4	1000		6 × 63	60001133
ATHf-1	20 to 500	5	1000		6 × 148	60002113

Temperature monitor (TW), Type 603021/02-2-...

Type	Control range/ limit value range °C	Switching differential %	Capillary mm	Process connection	Probe Ø × length mm	Part no.
ATHf-2	0 to 50	3 - 4	1000	„10“ plain cylindrical probe	6 × 185	60000482
ATHf-2	0 to 100	3 - 4	1000		6 × 107	60000962
ATHf-2	0 to 100	3 - 4	2000		6 × 107	60001212
ATHf-2	20 to 150	3 - 4	1000		6 × 88	60000963
ATHf-2	20 to 200	3 - 4	2000		6 × 88	60001210
ATHf-2	50 to 200	3 - 4	1000		6 × 101	60000187
ATHf-2	50 to 300	3 - 4	1000		6 × 63	60001038
ATHf-2	50 to 300	3 - 4	2000		6 × 63	60001208
ATHf-2	20 to 500	5	1000		6 × 148	60002122

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Safety temperature limiter (STB), Type 603021/70-2-...

Type	Control range/ limit value range °C	Switching differential %	Capillary mm	Process connection	Probe Ø × length mm	Part no.
ATHf-70	30 to 110	-	1000	„10“ plain cylindrical probe	6 × 108	60001136
ATHf-70	30 to 110	-	2000		6 × 108	60001206
ATHf-70	20 to 150	-	2000		6 × 77	60001205
ATHf-70/U	20 to 150	-	1000		6 × 77	60001525
ATHf-70	50 to 200	-	2000		6 × 85	60001204
ATHf-70/U	50 to 200	-	1000		6 × 85	60001290
ATHf-70	50 to 300	-	2000		6 × 55	60001191
ATHf-70/U	50 to 300	-	1000		6 × 55	60001528
ATHf-70/U	20 to 500	-	1000		6 × 127	60002088
ATHf-70/U	20 to 500	-	2000		6 × 127	60002099
ATHf-70/U/r	20 to 500	-	4000	„42“ G 3/4"	200	60002262

Versions with rigid thermowell

Temperature controller (TR), Type 603021/01-1-...

Type	Control range/ limit value range °C	Switching differential %	Process connection screw-in tube	Immersion tube Ø × length mm	Part no.
ATHs-1	-10 to +40	3 - 4	„20“ G 1/2"	8 × 200	60001517
ATHs-1	0 to 50	1.5	„20“ G 1/2"	15 × 100 CrNi	60000634
ATHs-1	0 to 100	3 - 4	„20“ G 1/2"	8 × 120 CrNi	60001548
ATHs-1	0 to 100	3 - 4	„20“ G 1/2"	8 × 150	60001125
ATHs-1	0 to 100	1.5	„20“ G 1/2"	8 × 200	60000174
ATHs-1	0 to 100	3 - 4	„20“ G 1/2"	8 × 200	60001126
ATHs-1	20 to 150	3 - 4	„20“ G 1/2"	8 × 100	60000481
ATHs-1	20 to 150	3 - 4	„20“ G 1/2"	8 × 200	60001035
ATHs-1	20 to 150	3 - 4	„20“ G 1/2"	8 × 300	60001127
ATHs-1	50 to 200	3 - 4	„30“ G 1/2"	8 × 200 CrNi	60003316
ATHs-1	50 to 300	3 - 4	„30“ G 1/2"	8 × 150 CrNi	60003317
ATHs-1	20 to 500	5	„30“ G 1/2"	8 × 200 CrNi	60003318

Temperature monitor (TW), Type 603021/02-1-...

Type	Control range/ limit value range °C	Switching differential %	Process connection screw-in tube	Immersion tube Ø × length mm	Part no.
ATHs-2	-10 to +40	3 - 4	„20“ G 1/2"	8 × 200	60001135
ATHs-2	0 to 50	1.5	„20“ G 1/2"	15 × 100 CrNi	60001549
ATHs-2	20 to 90	1.5	„20“ G 1/2"	15 × 100	60000177
ATHs-2	20 to 90	6 - 8	„20“ G 1/2"	15 × 100	60000959
ATHs-2	20 to 90	3 - 4	„20“ G 1/2"	8 × 150	60001129
ATHs-2	0 to 100	3 - 4	„20“ G 1/2"	8 × 120 CrNi	60001552
ATHs-2	0 to 100	3 - 4	„20“ G 1/2"	8 × 150	60000179
ATHs-2	0 to 100	3 - 4	„20“ G 1/2"	8 × 200	60001039
ATHs-2	0 to 100	3 - 4	„20“ G 1/2"	8 × 300	60001130
ATHs-2	20 to 150	3 - 4	„20“ G 1/2"	8 × 100 CrNi	60001551
ATHs-2	20 to 150	3 - 4	„20“ G 1/2"	8 × 200 CrNi	60001554
ATHs-2	20 to 150	3 - 4	„20“ G 1/2"	8 × 300	60000182
ATHs-2	50 to 200	3 - 4	„30“ G 1/2"	8 × 120 CrNi	60003319

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Type	Control range/ limit value range °C	Switching differential %	Process connection screw-in tube	Immersion tube Ø × length mm	Part no.
ATHs-2	50 to 300	3 - 4	„30“ G 1/2"	8 × 150 CrNi	60001556
ATHs-2	50 to 500	5	„30“ G 1/2"	8 × 200 CrNi	60003322

Safety temperature monitor (STW [STB]), Type 603021/20-1-...

Type	Control range/ limit value range °C	Switching differential %	Process connection screw-in tube/ weld-in tube	Immersion tube Ø × length mm	Part no.
ATHs-20	20 to 150	4 - 6	„20“ G 1/2"	8 × 150	60001478
ATHs-20	50 to 300	5	„30“ G 1/2"	8 × 200 CrNi	60003323
ATHs-20	50 to 300	5	„31“ G 1/2"	8 × 300 CrNi	60002585
ATHs-20	50 to 350	4 - 6	„46“ G 3/4"[a]	170 steel, conical	60002217
ATHs-20	20 to 500	7	„21“ G 1/2"	8 × 200	60003324

[a] Weld-in tube

Safety temperature limiter (STB), Type 603021/70-1-...

Type	Control range/ limit value range °C	Switching differential %	Process connection screw-in tube	Immersion tube Ø × length mm	Part no.
ATHs-70	30 to 110	-	„20“ G 1/2"	8 × 200	60001043
ATHs-70	30 to 110	-	„20“ G 1/2"	8 × 300	60000189
ATHs-70	60 to 130	-	„20“ G 1/2"	8 × 150	60001044
ATHs-70	60 to 130	-	„20“ G 1/2"	8 × 200	60000190
ATHs-70	130 to 200	-	„30“ G 1/2"	8 × 200 CrNi	60003325
ATHs-70	50 to 300	-	„30“ G 1/2"	8 × 200 CrNi	60003327
ATHs-70/U	30 to 110	-	„20“ G 1/2"	8 × 150	60001524
ATHs-70/U	20 to 150	-	„20“ G 1/2"	8 × 200	60001522
ATHs-70/U	20 to 150	-	„20“ G 1/2"	8 × 200 CrNi	00479064
ATHs-70/U	50 to 300	-	„30“ G 1/2"	8 × 200 CrNi	60003328
ATHs-70/U	50 to 350	-	„46“ G 3/4"[a]	170 steel, conical	60002218
ATHs-70/U	20 to 500	-	„31“ G 1/2"	8 × 200 CrNi	60003329
ATHs-70/U	20 to 500	-	„30“ G 1/2"	8 × 200 CrNi	60001476

[a] Weld-in tube