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Surface-mounted thermostat ATH.-SW

Single and double thermostat

Special features

- Temperature monitor TW
- Safety temperature monitor STW (STB)
- Safety temperature limiter STB
- Protection type IP65
- Control range -50¹ to +500 °C

Brief description

Thermostats control and monitor thermal processes. ATH.-SW surface-mounted thermostats consist of one or two separate measuring and switching systems.

The devices are available as temperature monitors TW, safety temperature monitors STW (STB), and safety temperature limiters STB. In the event of a malfunction, the STB puts the monitored system into a safe operating state.

Surface-mounted thermostats operate on the principle of liquid expansion; a microswitch serves as the electrical switching element.

Switching function

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 cool down to the negative temperature range, the circuit opens, but must be manually unlocked by the reclosing button when the temperature rises. The STW (STB) automatically restarts.



ATHs-SW (Type 603035/...-1-...)



ATHf-SW (Type 603035/...-2-...)

¹ upon request

Approvals and approval marks (see Technical data)



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Technical data

Control ranges and temperature probes

Switching function	Liquid-filled			
	Control/limit value ranges °C	Max. admissible probe temperature °C	Max. capillary length mm	Probe length, dimension „L“ Probe Ø „d“ = 6 mm ^a mm
TW	-20 to +50	60	5,000	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		
STW (STB) and STB	30 to 110	135	5,000	108
	60 to 130	150		116
	20 to 150	175		077
	50 to 250	290		064
	50 to 300	345		055

Switching function	Gas-filled			
	Control/limit value ranges °C	Max. admissible probe temperature °C	Max. capillary length mm	Probe length, dimension „L“ Probe Ø „d“ = 6 mm ^a mm
TW	20 to 400	460	1,000	278
	20 to 500	575	2,000	148
	20 to 500	575	4,000	202
STW (STB) and STB	20 to 400	460	1,000	176
	20 to 500	575	2,000	127
	20 to 500	575	4,000	202

^a Standard

Capillary and temperature probe

Type	Scale limit value	Capillary	Temperature probe
ATH.-SW	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 350 °C	Stainless steel (CrNi), Ø 1.5mm	Stainless steel (CrNi), material no. 1.4571, welded (extra cost)
	Up to 500 °C	Stainless steel (CrNi), Ø 1.5mm	Stainless steel (CrNi), material no. 1.4571, welded
Capillary length	1,000 mm, max. 5,000 mm as standard		
Minimum bending radius of capillary	5 mm		

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Electrical data

Switching function	TW, STW (STB) Microswitch with changeover contact	STB Microswitch with NC contact and restart lock
Max. contact rating with switching differential 1.5 % and 2 %	AC 230 V +10 %, 10 (2) ^a A, cos φ = 1 (0.6) ^a , DC 230 V +10 %, 0.25 A AC 230 V +10 %, 6 (1.2) ^a A, cos φ = 1 (0.6) ^a - Microswitch with gold-plated contacts, extra code 702 (only with switching differential 3 %, 5 %, and 7 %), AC/DC 24 V, 0.1 A, contact resistance 2.5 to 10 mΩ	
Contact reliability with silver contacts with gold-plated contacts (extra code 702)	To ensure high switching reliability, we recommend a minimum load of: AC/DC = 24 V, 100 mA AC/DC = 10 V, 5 mA	

^a Inductive loads

Environmental influences

Switching difference in % of the control/limit value range	Liquid-filled		Gas-filled		
	Rated value	Poss. actual value	Rated value	Poss. actual value	
Switching function TW	3	3 max. 5	5	4 max. 8	Standard
	6	6 max. 8	9	8 max. 12	Upon request
Switching function STW (STB)	1,5	1 max. 2	2	1.5 max. 2.5	Extra cost
	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 control/limit value range					
Switching function TW	In the upper third of the scale ± 1.5 %, at scale beginning ± 6 %				
Switching function STB, STW (STB)	In the upper third of the scale +0/-5 %, at scale beginning +0/-10 %				

Ambient temperature influence	based on the control/limit value range When the ambient temperature on the case deviates from the calibration ambient temperature 22 °C, a switch point offset occurs. Higher ambient temperatures = lower switching point Lower ambient temperature = higher switching point					
Surface-mounted thermostat with scale limit value Switching function Influence on the switch head Influence on the capillary per metre	< 200 °C		≥ 200 °C ≤ 350 °C		> 350 °C ≤ 500 °C	
	TW	STB/STW (STB)	TW	STB/STW (STB)	TW	STB/STW (STB)
	0.08 %/K	0.17 %/K	0.06 %/K	0.13 %/K	0.14 %/K	0.12 %/K
	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 or up to max. permissible ambient temperature (see nameplate)					
Admissible ambient temperature during use	See nameplate					
Rated position (NL)	Any					

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Housing

Material	Aluminium die casting, painted (standard)
Set point value setting	Switching point can be adjusted with a screwdriver once the case lid has been removed.
Protection type	IP65 according to DIN EN 60529
Cable inlet	Cable screw connection M20 × 1.5, sealing range 6 to 12 mm (standard)
Weight	Approx. 1.2 kg
Switch head fastening Type ATHf-SW with capillary	With 2 screws through the case bottom section (wall mounting), lateral capillary outlet in the case.

Process connection

Type ATHs-SW with rigid shaft Scale limit value up to 150 °C Scale limit value exceeding 150 °C	Process connection 20: Screw-in sleeve with screw-in spigot G 1/2", form A, as per DIN 3852/2 Process connection 30: Screw-in sleeve with screw-in spigot G 1/2", form A, as per DIN 3852/2, and intermediate piece, to ensure that the max. admissible ambient temperature is not exceeded on the case
Type ATHf-SW with capillary	Process connection 10: Plain cylindrical probe (standard) Process connection 20: Screw-in thermowell (upon request) Screw-in sleeve with screw-in spigot G 1/2", form A, as per DIN 3852/2, and clamping piece with fixing screw to lock the probe
Material Process connection 20 Up to 150 °C Exceeding 150 °C Process connection 30 Exceeding 150 °C	CuZn (standard) CrNi CrNi
Fitting length	Standard lengths: 100, 120, 150, 200 or 300 mm (different lengths upon request)
Immersion tube Ø	Single thermostat D = 8 mm, Double thermostat D = 15 mm

⇒ For different process connections and thermowells refer to data sheet 606710.

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Approvals and approval marks

DIN Testing agency Certificates/certification number Inspection basis Valid for	DIN CERTCO/TÜV Süd TW892 DIN EN 14597 ATH.-SW-2 (Type 603035/0002 [TW])
DIN Testing agency Certificates/certification number Inspection basis Valid for	DIN CERTCO/TÜV Süd STW(STB)894S DIN EN 14597 ATH.-SW-20 (Typ 603035/0020 [STW (STB)])
DIN Testing agency Certificates/certification number Inspection basis Valid for	DIN CERTCO/TÜV Süd TW/TW901 DIN EN 14597 ATH.-SW-22 (Type 603035/0202 [TW/TW])
DIN Testing agency Certificates/certification number Inspection basis Valid for	DIN CERTCO/TÜV Süd STB895 DIN EN 14597 ATH.-SW-70 (Type 603035/0070 [STB])
DIN Testing agency Certificates/certification number Inspection basis Valid for	DIN CERTCO/TÜV Süd TW/STW(STB)903S DIN EN 14597 ATH.-SW-220 (Type 603035/0220 [TW/STW (STB)])
DIN Testing agency Certificates/certification number Inspection basis Valid for	DIN CERTCO/TÜV Süd TW/STB904 DIN EN 14597 ATH.-SW-270 (Type 603035/0270 [TW/STB])
DIN Testing agency Certificates/certification number Inspection basis Valid for	DIN CERTCO/TÜV Süd 2xSTW(STB)905S DIN EN 14597 ATH.-SW-2020 (Type 603035/2020 [STW (STB)/STW (STB)])
DIN Testing agency Certificates/certification number Inspection basis Valid for	DIN CERTCO/TÜV Süd STW(STB)/STB906S DIN EN 14597 ATH.-SW-2070 (Type 603035/2070 [STW (STB)/STB])
DIN Testing agency Certificates/certification number Inspection basis Valid for	DIN CERTCO/TÜV Süd STB/STB907 DIN EN 14597 ATH.-SW-7070 (Type 603035/7070 [STB/STB])

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DGRL Testing agency Certificates/certification number Inspection basis Valid for	TÜV Süd Z-IS-TAF-MUC-17-11-2652099-021 2014/68/EU, DIN EN 14597 ATH.-SW-20 (Type 603035/0020 [STW (STB)]), ATH.-SW-70 (Type 603035/0070 [STB]), ATH.-SW-220 (Type 603035/0220 [TW/STW (STB)]), ATH.-SW-270 (Type 603035/0270 [TW/STB]), ATH.-SW-2020 (Type 603035/2020 [STW (STB)/STW (STB)]), ATH.-SW-2070 (Type 603035/2070 [STW (STB)/STB]), ATH.-SW-7070 (Type 603035/7070 [STB/STB])
EAC^a Testing agency Certificates/certification number Inspection basis Valid for	GOST Norm AG EAC TR ZU TR ZU 004/2011 (LVD) ATH.-SW (Type 603035)

^a Russian documentation upon request

Note

Physical and toxic features of the expansion means, which could emerge in the event of a measuring system break.

Control range with scale limit value	Hazardous reactions	Fire and explosion hazard		Information about toxicology			
		Ignition temperature	Explosion limit	Hazardous to waters	Irritant	Dangerous to health	Toxic
Liquid-filled							
≤ 200 °C	No	355 °C	0.6 to 8 V%	Yes	Yes	^a	No
≥ 200 ≤ 350 °C	No	490 °C	-	Yes	Yes	^a	No
Gas-filled							
≥ 400 ≤ 500 °C	No	No	No	No	No	No	No

^a There is currently no limited statement by the health authority concerning hazards to health in the event of short-term exposure and low concentration, e.g. measuring system break.

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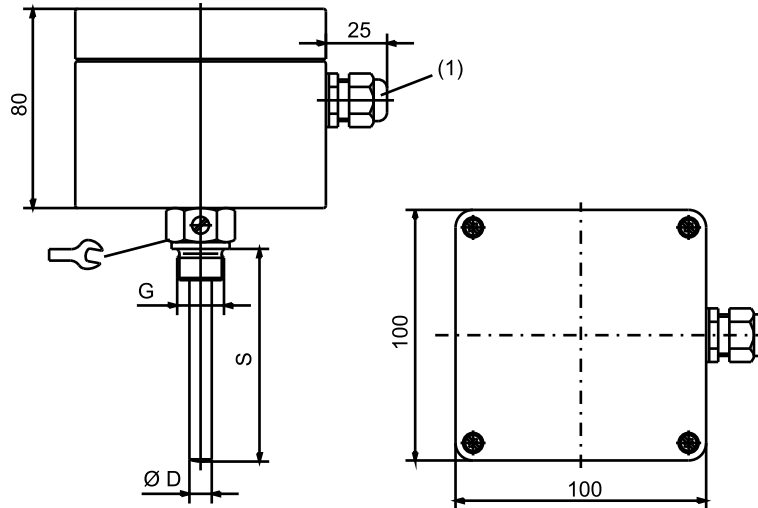
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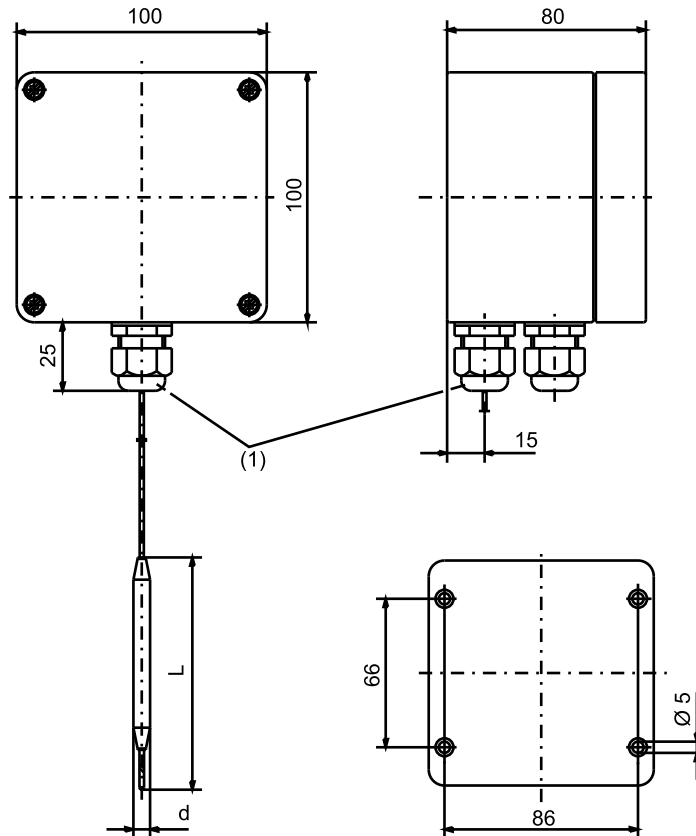
Dimensions

ATHs-SW (Type 603035/...-1-...) with process connection screw-in thermowell



(1) Screw connection M20 × 1.5

ATHf-SW (Type 603035/...-2-...) with capillary and process connection plain cylindrical probe



(1) Screw connection M20 × 1.5

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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..

Type	System	Switching function	
Single thermostat	-	TW, STW	
	-	STB	

Type	System	Switching function	
Double thermostat	System I and System II: with changeover contact	TW, STW	
	System I: with changeover contact	TW, STW	
	System II: with NC contact and restart lock	STB	
	System I and System II: with NC contact and restart lock	STB	

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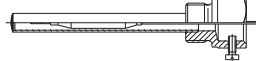
(1) Basic type	
603035	Aufbauthermostat ATH.-SW
(2) Basic type extension	
0002	ATH.-SW-2 Temperature monitor (TW)
0020	ATH.-SW-20 Safety temperature monitor (STW)
0070	ATH.-SW-70 Safety temperature limiter (STB)
0202	ATH.-SW-22 Temperature monitor/Temperature monitor (TW/TW)
0220	ATH.-SW-220 Temperature monitor/safety temperature monitor (TW/STW (STB))
0270	ATH.-SW-270 Temperature monitor/safety temperature limiter (TW/STB)
2020	ATH.-SW-2020 Safety temperature monitor/safety temperature monitor (STW (STB)/STW (STB))
2070	ATH.-SW-2070 Safety temperature monitor/safety temperature limiter (STW (STB)/STB)
7070	ATH.-SW-7070 Safety temperature limiter/safety temperature limiter (STB/STB)
(3) Design	
1	Rigid shaft (ATHs-SW)
2	Capillary (ATHf-SW)
(4) Control range (TW)	
014	-20 to +50 °C
016	-10 to +40 °C
021	0 to 50 °C
022	0 to 70 °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) Limit value range (STB)	
000	With permanently set limit value
014	-20 to +50 °C
016	-10 to +40 °C
021	0 to 50 °C
022	0 to 70 °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

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(6) Switching differential 1		
00	None	
15	1.5 %	
20	2 %	
30	3 %	
50	5 %	
60	6 %	
70	7 %	
90	9 %	
(7) Switching differential 2		
00	None	
15	1.5 %	
20	2 %	
30	3 %	
50	5 %	
60	6 %	
70	7 %	
90	9 %	
(8) Capillary length 1		
0	None	
1000	1,000 mm	
2000	2,000 mm	
3000	3,000 mm	
4000	4,000 mm	
5000	5,000 mm	
(9) Capillary length 2		
0	None	
1000	1,000 mm	
2000	2,000 mm	
3000	3,000 mm	
4000	4,000 mm	
5000	5,000 mm	
(10) Capillary material 1		
00	None	
20	CrNi (stainless steel)	
40	Cu (copper)	
(11) Capillary material 2		
00	None	
20	CrNi (stainless steel)	
40	Cu (copper)	
(12) Process connection		
10	Plain cylindrical probe	
20	Screw-in thermowell	
30	Screw-in thermowell with intermediate piece	