

**JUMO GmbH & Co. KG**

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**JUMO Instrument Co. Ltd.**

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**JUMO Process Control, Inc.**

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## Surface mounting thermostat, type series ATH-SW

### Protection class IP 65, single and double thermostat

#### Special features

- Control and monitoring of thermal processes
- Temperature monitor TW
- Safety temperature monitor STW (STB)
- and safety temperature limiter STB

#### Brief description

Thermostats are used to control and monitor thermal processes. Surface-mounting thermostats of the ATH-SW type series 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 switches the monitored machine line to an operational safe status.

Surface-mounting thermostats operate according to the fluid expansion principle. The electrical switching element is a microswitch.



ATHs-SW-....



ATHf-SW-....

#### Approval/approval marks (see Technical Data)



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## Technical Data

### Switching function

Temperature monitor TW	Restart lock for the safety manual reset temperature limiter STB	Use of the safety temperature monitor STW as safety temperature limiter STB	Self-monitoring for the safety temperature limiter STB and safety temperature monitor STW (STB)
<p>If the temperature exceeds the setpoint value set on the temperature probe, the microswitch will be tripped by the transmission mechanics and the current circuit opened or closed.</p> <p>The microswitch is reset to its original status once the set point value set is gone below (by the hysteresis).</p>	<p>If the temperature exceeds the limit value set on the temperature probe, the current circuit is opened and the microswitch mechanically locked.</p> <p>The microswitch can be manually unlocked, once the dangerous temperature is gone below by approx. 10 % of the scale range (approx. 15 % with a limit value setting &gt; 350 °C).</p>	<p>Ensure that the switching circuit downstream of the thermostat complies to DIN EN 14597 and VDE 0116.</p>	<p>If the measuring system is destroyed, i.e. if the expansion fluid escapes, the pressure in the diaphragm of the STB and STW drops and permanently opens the current circuit. Unlocking is no longer possible.</p> <p>If the probe has cooled down to a temperature within the control range table, e.g. below -20 °C, the current circuit is also opened. If the temperature rises above -20 °C, the STB must be unlocked manually. The STW automatically restarts.</p>

### Control ranges and temperature probes

Switching function	fluid-filled			
	Control and limit value ranges in °C	maximum admissible probe temperature in °C	maximum capillary length mm	Probe length, dimension "L" in mm Probe Ø "d" = 6 mm (standard)
TW	-20 to +50	060	5000	141
	-10 to +40	050		185
	0 to +50	060		185
	0 to +70	080		138
	+0 to +100	125		107
	+20 to +090	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
STW and STB	+50 to +300	345	5000	63
	+30 to +110	135		108
	+60 to +130	150		116
	+20 to +150	175		077
	+50 to +250	290		064
TW	+50 to +300	345	4000	055
	+20 to +400	460		278
	+20 to +500	575		148
STW and STB	+20 to +500	575	2000	202
	+20 to +400	460		176
	+20 to +500	575		127
TW	+20 to +500	575	1000	202
	+20 to +400	460		176
	+20 to +500	575		127
STW and STB	+20 to +500	575	4000	202
	+20 to +400	460		176
	+20 to +500	575		127

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**Capillary and temperature probe**

Type	Scale limit value	Capillary Ø 1.5 mm	Temperature sensor	Remarks
ATH.-SW-....	up to 200 °C	Copper (Cu) Material No. Cu-DHP	Copper (Cu) Material No. Cu-DHP hard soldered	--
	up to 350 °C	Copper (Cu) Material No. Cu-DHP	Stainless steel (CrNi) hard soldered	--
	up to 350 °C	Stainless steel (CrNi)	Stainless steel (CrNi) Material No. 1.4571 welded	against surcharge
	up to 500 °C	Stainless steel (CrNi)	Stainless steel (CrNi) Material No. 1.4571 welded	--
Capillary length	standard 1000 mm, maximum 5000 mm			
min. bending radius of capillary	5 mm			

**Electrical data**

Switching element	TW, STW (STB)	STB
	Microswitch with change-over contact	Microswitch with N/C contact and restart lock
maximum contact rating	AC 230 V +10%, 10 (2), cos φ = 1 (0.6) DC 230 V +10%, 0.25A	
	with hysteresis 1.5% and 2% AC 230 V +10%, 6 (1.2) A, cos φ = 1 (0.6)	
	Microswitch, gold-plated, extra code /702* (*only with hysteresis 3%, 5%, and 7%) AC / DC 24 V, 0.1 A contact resistance 2.5 to 10 mΩ	
Contact reliability	To ensure high switching reliability, we recommend a minimum load of: with silver contacts: AC / DC = 24 V, 100 mA	for gold-plated contacts (extra code "702"): AC / DC = 10 V, 5 mA

**Operating data**

Hysteresis in % of the control / limit value range	Switching function	with fluid-filled measuring system		
		Rated value	Possible process value	Remarks
	<b>TW</b>	3	3 max. 5	serial
		6	6 max. 8	on request
		1.5	1 max. 2	Surcharge
		with gas-filled measuring system		
		5	4 max. 8	serial
		9	8 max. 12	on request
	<b>STW (STB)</b>	2	1.5 max. 2.5	Surcharge
		with fluid-filled measuring system		
		5	4 max. 6	serial
		9	8 max. 11	on request
		with gas-filled measuring system		
		2	1 max. 3	Surcharge
		7	5 max. 12	serial
		9	8 max. 16	on request
Switching point accuracy in % of the control / limit value range		TW: in the upper third of the scale ± 1.5 %, at scale beginning ± 6 % STB, STW (STB): in the upper third of the scale +0/-5 %, at scale beginning +0/-10 %		

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Ambient temperature influence referring to 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					
	Add-on thermostats with scale limit value					
	< 200 °C		≥ 200 °C ≤ 350 °C		> 350 °C ≤ 500 °C	
	TW	STB/STW (STB)	TW	STB/STW (STB)	TW	STB/STW (STB)
	Influence on the switch head					
	0.08 %/K	0.17 %/K	0.06 %/K	0.13 %/K	0.14 %/K	0.12 %/K
	Influence on the capillary per metre					
0.047 %/K	0.054 %/K	0.09 %/K	0.11 %/K	0.04 %/K	0.03 %/K	
admissible ambient temperature for use	max. +80 °C					
admissible storage temperature	-50 to +50 °C					
Rated position	any					

**Case**

<b>standard</b>	Aluminum die casting, painted
Set point adjustment	The switching point can be adjusted by means of a screwdriver once the case lid has been removed
Protection class	EN 60 529-IP 65
Cable inlet	Cable screw connection M 20 x 1.5, sealing area 6-12 mm
Switch head is fastened Type series ATHf-SW with capillary	with 2 screws through the case bottom part (wall mounting), lateral capillary outlet in the case.
Weight	approx. 1.2 kg

**Process connection<sup>a</sup>**

Type series ATHs-SW with rigid shaft	Scale limit value <b>up to 150 °C</b> <b>sheath "20"</b>	Scale limit value <b>over 150 °C</b> <b>sheath "30"</b>
	Screw-in sleeve with screw-in spigot G 1/2 form A as per DIN 3852/2	Screw-in sleeve with screw-in journal G 1/2 form A as per DIN 3852/2 and intermediate piece, to ensure that the max. admissible ambient temperature of +80 °C is not exceeded on the case
Type series ATHf-SW with capillary	<b>plain cylindrical probe "10"</b> as standard	
	<b>Screw-in sheath "20"</b> on request	
	Screw-in sleeve with screw-in spigot G 1/2 form A as per DIN 3852/2 and clamping piece with locking screw to lock the probe	
Material	<b>Sheath "20"</b>	<b>Sheath "30"</b>
	up to +150 °C CuZn as a standard over +150 °C CrNi	over +150 °C CrNi
Fitting length S	Standard lengths: 100, 120, 150, 200 or 300 mm different lengths on request	
Immersion tube Ø	Single thermostat D = 8 mm	Double thermostat D = 15 mm

<sup>a</sup> For different process connections and sheaths, refer to data sheet 606710.


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## Approvals/approval marks

Single thermostats	with rigid shaft	with capillary	Switching function	DIN registry No.	Inspections
	ATHs-SW-2 *	ATHf-SW-2 *	TW	TW 892	
	ATHs-SW-20	ATHf-SW-20	STW (STB)	STW (STB) 894 S	
	ATHs-SW-70	ATHf-SW-70	STB	STB 895	
Double thermostats	ATHs-SW-22 *	ATHf-SW-22 *	TW / TW	TW / TW 901	 DIN EN 14597 Directive governing pressure systems 2014/68/EC *only tested as per DIN
	ATHs-SW-220	ATHf-SW-220	TW / STW (STB)	TW / STW (STB) 903 S	
	ATHs-SW-270	ATHf-SW-270	TW / STB	TW / STB 904	
	ATHs-SW-2020	ATHf-SW-2020	STW (STB) / STW (STB)	2 x STW (STB) 905 S	
	ATHs-SW-2070	ATHf-SW-2070	STW (STB) / STB	STW (STB) / STB 906 S	
	ATHs-SW-7070	ATHf-SW-7070	STB / STB	STB / STB 907	
Single thermostats	ATHs-SW-....	ATHf-SW-....	TW, STW (STB), STB	EAC-approval marks <sup>a</sup> TC RU C-DE.AB98.B.00348	Gost Norm AG Technical rules of the customs union Russia/Belarus/ Kazakhstan
Double thermostats	ATHs-SW-....	ATHf-SW-....	TW / TW, TW / STW (STB), TW / STB, STW (STB) / STW (STB), STW (STB) / STB, STB / STB		

You will find Declarations of Conformity on the Internet at: [www.jumo.net](http://www.jumo.net)

<sup>a</sup> Russian documentation upon request

### Note

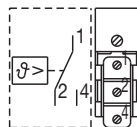
Physical and toxic features of the expansion means, which could emerge in the event of a measuring system break.

Control range with scale limit value	Hazardous reactions	Fire and explosion hazard		hazardous to waters	Information about toxicology		
		Ignition temperature	Explosion limit		irritant	dangerous to health	toxic
≤ +200 °C	no	+355 °C	0.6 - 8 V%	Yes	Yes	a	no
≤ +200 °C		+490 °C	- -				
≤ +200 °C		no	0.6 - 8 V%	no	no	no	

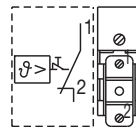
<sup>a</sup> There is currently no statement by the health authority concerning hazards to health in the event of short-term exposure and low concentration, e.g. measuring system break.

## Wiring diagrams

### Single thermostats

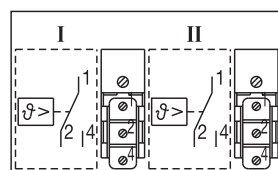


Switching function: TW, STW

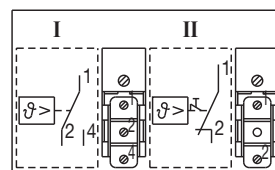


Switching function: STB

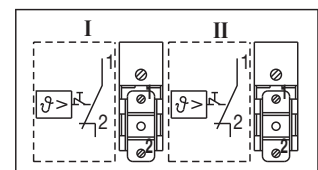
### Double thermostats



System I and II:  
with change-over contact  
Switching function: TW, STW



System I: with change-over contact  
Switching function: TW, STW  
System II: with N/C contact and restart lock  
Switching function: STB



System I and II:  
with N/C contact and restart lock  
Switching function: STB

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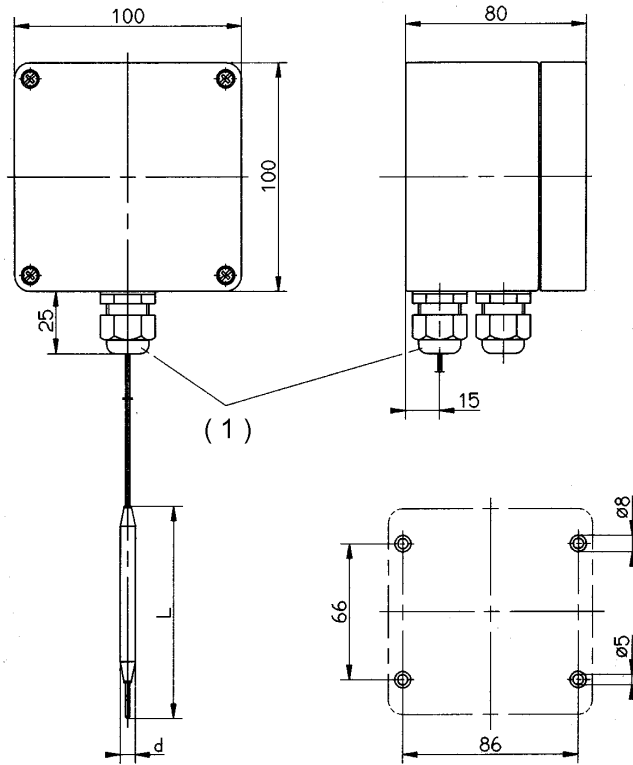
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## Dimensions

### ATHf-SW-....

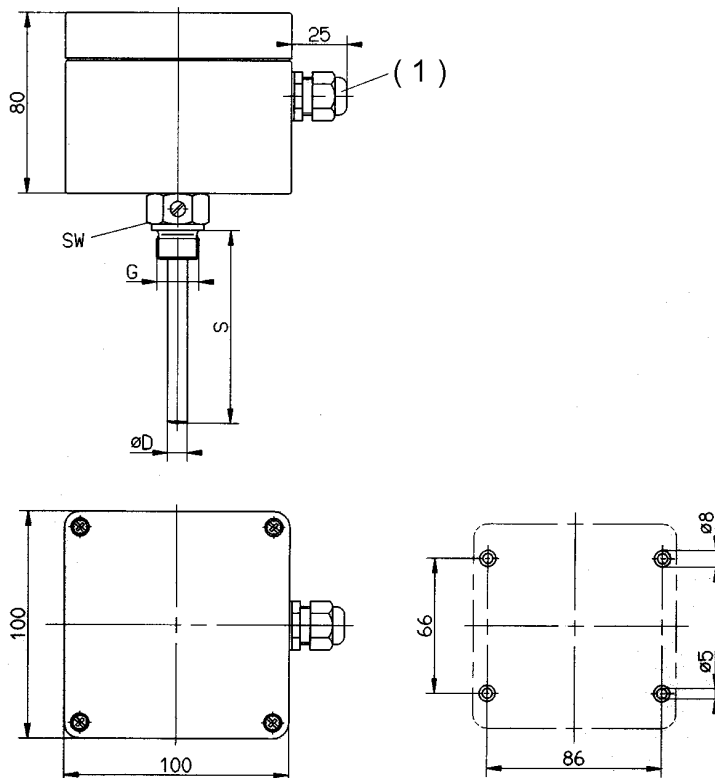
with capillary and process connection "10", plain cylindrical probe



(1) = Screw-connection M 20x1.5

### ATHs-SW-....

with screw-in sheath "20"



(1) = Screw-connection M 20x1.5

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## Order details

### Surface-mounting thermostats, type series ATH.-SW



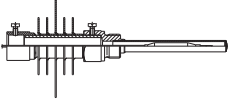
Order code	(1) Basic type		
603035	Surface-mounting thermostat, type series ATH.-SW		
	(2) Basic type extension		
0002	ATH.-SW-2	Temperature monitor TW	
0020	ATH.-SW-20	Safety temperature monitor STW (STB)	Single thermostats
0070	ATH.-SW-70	Safety temperature limiter STB	
0202	ATH.-SW-22	TW / TW	
0220	ATH.-SW-220	TW / STW (STB)	
0270	ATH.-SW-270	TW / STB	
2020	ATH.-SW-2020	STW (STB) / STW (STB)	Double thermostats
2070	ATH.-SW-2070	STW (STB) / STB	
7070	ATH.-SW-7070	STB / STB	
	(3) Design		
1	ATHs-SW-....	with rigid shaft	
2	ATHf-SW-....	with capillary	
	(4) Control / limit value ranges °C		
014	-20 to +50*	*only for TW	
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		
	(5) Hysteresis		
00	without hysteresis (-70 STB)		
15	1.5 % of the scale range	(only for TW)	
20	2 % of the scale range	(only for STW (STB))	
30	3 % of the scale range	(only for TW)	
50	5 % of the scale range	(only for TW + STW (STB))	
60	6 % of the scale range	(only for TW)	
70	7 % of the scale range	(only for STW (STB))	
90	9 % of the scale range	(only for STW (STB))	
	(6) Capillary length		
0	ATHs-SW without capillary		
1000	1000 mm		
2000	2000 mm		
3000	3000 mm		
4000	4000 mm		
5000	5000 mm		
...	(special length, specifications in plain text in mm)		

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<b>(7) Capillary material</b>	
00	ATHs-SW without capillary
20	CrNi stainless steel
40	Cu Copper
<b>(8) Process connection</b>	
10	plain cylindrical probe 
20	Screw-in sheath 
30	Screw-in sheath with intermediate piece 
<b>(9) Process connection thread <sup>a</sup></b>	
00	without thread (process connection "10")
13	External thread G 1/2
<b>(10) Material of process connection <sup>a</sup></b>	
00	only with process connection "10"
20	CrNi stainless steel 1.4571
46	CuZn Brass
<b>(11) Fitting length "S" (immersion tube length)</b>	
000	ATHf-SW without sheath
100	100 mm
120	120 mm
150	150 mm
200	200 mm
300	300 mm
400	400 mm
...	(special length, specifications in plain text in mm)
<b>(12) Diameter "D" (immersion tube diameter)</b>	
00	ATHf-SW without sheath
8	8 mm for single thermostats
15	15 mm for double thermostats
<b>(13) Diameter "d" (probe diameter)</b>	
6	6 mm
<b>(14) Extra codes</b>	
000	no extra code
702	au Snap switch, gold-plated
746	Case ventilation / pressure compensation element

<sup>a</sup> For different process connections and thermowells refer to data sheet 606710.

**Order code**

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)													
603035	/	....	-	.	-	...	-	..	-	...	-	..	-	..	-	...	-	..	-	...	-	..	-	...	/	...

**Order example**

603035	/	0202	-	2	-	043	-	30	-	2000	-	20	-	10	-	00	-	00	-	000	-	00	-	6	/	000
--------	---	------	---	---	---	-----	---	----	---	------	---	----	---	----	---	----	---	----	---	-----	---	----	---	---	---	-----