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JUMO Instrument Co. Ltd.

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JUMO Process Control, Inc.

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Surface-mounting thermostats, type series AMTHF with 2, 3 or 4 1-pole snap switches

Special features

- Protection rating IP 54
- tested as per DIN EN 14597 (replacement for DIN 3440)



Type AMTHFs-13



Type AMTHFf-13

Brief description

Add-on thermostats are used to control and monitor thermal processes. The devices of type series AMTHF are available with 2, 3 or 4 switching stages as temperature controllers (TR) and temperature monitors (TW). The sequential gap in Kelvin for the individual circuit stages is factory-set fixed as per customer request. Add-on thermostats operate according to the fluid expansion principle, a microswitch is used as an electrical switching element.

Switching function

Temperature controller (TR) and temperature monitor (TW)

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. The microswitch is reset to its original status once the setpoint value set is gone below (by the hysteresis).

Types

Types		Switching function	Circuit stages
with rigid shaft	with capillary		
AMTHFs-13	AMTHFf-13	TR	2
AMTHFs-133	AMTHFf-133	TR	3
AMTHFs-1333	AMTHFf-1333	TR	4
AMTHFs-23	AMTHFf-23	TW	2
AMTHFs-233	AMTHFf-233	TW	3
AMTHFs-2333	AMTHFf-2333	TW	4

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Technical data

Control range and probe table — fluid-filled

Control / limit value ranges °C	Hysteresis %	max. probe temperature °C	max. switch head temperature °C	possible capillary lengths in m	max. sequential gap K	Probe length dimension "L" in mm, Probe Ø "d" in mm Ø "6" = Standard	
						Ø 6	Ø 8
-20 to + 40	1	+ 50	+ 50	5	5	245	145
	2.5	+ 50	+ 50		8	245	145
	5	+ 95	+ 50 (80) ¹		25	138	91
	7	+ 100	+ 50 (80) ¹		50	103	73
0 to + 50	1	+ 60	+ 60	3	5	283	165
	2.5	+ 60	+ 60		10	283	165
	5	+ 105	+ 60 (80) ¹		25	159	101
	7	+ 110	+ 60 (80) ¹		50	117	80
+20 to + 90	1	+ 115	+ 80	1	7	210	127
	2.5	+ 115	+ 80		14	210	127
	5	+ 140	+ 80		35	121	82
	7	+ 175	+ 80		70	91	67
0 to +100	1	+ 125	+ 80	2	10	157	100
	2.5	+ 125	+ 80		20	157	100
	5	+ 165	+ 80		50	94	68
	7	+ 200	+ 80		100	73	58
+30 to +110	1	+ 135	+ 80	2	8	188	116
	2.5	+ 135	+ 80		16	188	116
	5	+ 170	+ 80		40	110	76
	7	+ 200	+ 80		80	84	63
0 to +150	1	+ 173	+ 80	1	15	113	78
	2.5	+ 173	+ 80		30	113	78
	5	+ 200	+ 80		75	72	57
0 to +200	1	+ 230	+ 80	1	20	113	78
	2.5	+ 230	+ 80		40	113	78
+50 to +200	1	+ 230	+ 80	1	15	139	92
	2.5	+ 230	+ 80		30	139	92
+50 to +250	1	+ 228	+ 80	1	20	105	70
	2.5	+ 228	+ 80		40	105	70
	5	+ 300	+ 80		100	64	49
+50 to +300	1	+ 345	+ 80	2	25	87	61
	2.5	+ 345	+ 80		50	87	61

¹ Values in brackets only on request taking the operating statuses and the desired capillary length into consideration

Control range and probe table — gas-filled

Control / limit value ranges °C	Hysteresis %	max. probe temperature °C	max. switch head temperature °C	possible capillary lengths in m	max. sequential gap K	Probe length dimension "L" in mm, Probe Ø "d" in mm Ø "6" = Standard	
						Ø 6	Ø 8
+20 to +400	6	+ 460	+ 80	5	75	237	137
	10	+ 500	+ 80		200	127	81
+20 to +500	3 / 5	+ 530	+ 80	1	48	278	158
	6	+ 575	+ 80		5	95	176
	10	+ 575	+ 80		5	250	95

Capillary and temperature probe

Type	Scale limit value	Capillary	Temperature probe	Remarks
AMTHF	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	against surcharge
Capillary length	1000 mm, max. 5000 mm as standard			
min. bending radius of the capillary	5 mm			

Note: If the max. admissible temperature is not reached on the probe, capillary and switching head, it is possible to increase the capillary length, where it is limited to 1, 2 or 3 m as per the control range and probe table, on request. Please specify the temperature values occurring on the thermostats.

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Electrical data

Switching element	2, 3 or 4 1-pole snap switch Microswitch with change-over contact		
max. contact rating	Hysteresis switching function	N/C contact, terminal 2	N/O contact, terminal 4
	TR, TW 2.5%, 5%, 6%, 7%, 10%	AC 230 V +10%, 16 (3) A, cos φ = 1(0.6) DC 230 V +10%, 0.25A	AC 230 V +10%, 8 (1.5) A, cos φ = 1(0.6) DC 230 V +10%, 0.25A
	TR, TW 1 %, 3 %	AC 230 V +10%, 6 (2) A, cos φ = 1(0.6) DC 230 V +10%, 0.25A	
Contact reliability	To ensure high switching reliability, we recommend a minimum load of: AC / DC = 24 V, 20 mA		
Rating surge voltage	1500 V (via the switching contacts 400 V)		
Overvoltage category	II		
Required fuse rating	see max. contact rating		
Electrical connection	Screw connection up to 2.5 mm ² cable cross section		

Operating data

Hysteresis in % of the control / limit value range	Switching function	with fluid-filled measuring system						
		Rated value	Possible process value					
	TR, TW	2.5	2.5 max. 3.5	serial				
		5	5 max. 6	on request				
		7	7 max. 8	on request				
		1	1 max. 2	Surcharge				
	with gas-filled measuring system							
		5	5 max.11	serial				
		6	6 max. 14	on request				
		10	10 max. 16	on request				
	3	2.5 max. 4	Surcharge					
Sequential gap for multi-pin version	with hysteresis	Sequential gap from the scale range		Switching point accuracy of the sequential gaps from the scale range				
		minimum	maximum					
	1% 2.5% 3%, 5% 6%, 7%, 10%	1% 1% 2% 3%	as per control range table	≤ 1% ≤ 1% < 2% < 3%				
	The sequential gap is specified in K in relation to the set point value of contact deck I.							
Prefix - = switching prior to reaching the set point value, Prefix + = switching after reaching the set point value. Enter "0" for the sequential gap for a simultaneously switching version.								
Switching point accuracy in % of the control/limit value range	Switching function	Hysteresis		in the upper third of the scale or limit value				
		fluid-filled	gas-filled					
	TR	1%, 2.5% 5% 7%	-- 3%, 5%, 6%, 10%	± 1.5% ± 3.0% ± 4.0%				
TW	1%, 2.5% 5% 7%	-- 3%, 5%, 6%, 10%	+0 / -3% +0 / -6% +0 / -8%					
medium ambient temperature influence	When the ambient temperature on the switch head and/or the capillary deviates from the calibration temperature +22 °C, a switch point offset occurs. Higher ambient temperatures = lower switching point Lower ambient temperature = higher switching point							
	For temperatures with scale limit value / limit value							
	< 200 °C	+ 200 °C ≤ +350 °C		+ 400 °C ≤ +500 °C				
	TR, TW	TR, TW		TR, TW				
	Hysteresis in %							
	1 / 2.5	5	7	1 / 2.5	5	3 / 5	6	10
	Ambient temperature influence on the switch head in %/K							
	0.15	0.26	0.34	0.12	0.21	0.12	0.17	0.24
	Ambient temperature influence on the capillary in %/m							
	0.05 · K · m	0.09 · K · m	0.04 · K · m		0.05 · K · m			
If the operating temperature on the switch head deviates essentially from the ambient calibration temperature +22 °C, this can be taken into account on request during adjustment against surcharge.								

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Operating data

Permissible storage temperature	-50 to 50 °C
admissible ambient temperature during use	max. 80 °C
Rated position	as per DIN 16257, NL 0 to NL 90 (different rated positions on request)

Case

serial	Case lid: Polycarbonate, shock resistant Case bottom section: Die-cast aluminum, lacquered	Color: pebble gray RAL 7032 Color: anthracite gray RAL 7015
Set point adjustment	AMTHF.-1... Switching point adjustable from the outside using the rotary knob	AMTHF.-2... The switching point can be adjusted by means of a screwdriver once the case lid has been removed
Protection class	EN 60 529-IP 54	
Cable inlet	serial: self-sealing grommet M 20 x 1.5, sealing range 8-10 mm	
Weight	approx. 0.8 kg	
Switch head fastening, type series AMTHFf with capillary	serial	Screw-connection by means of counter nut M 18 x 1 on the case stud, capillary outlet on the case stud
	Extra code	
	711	with 2 screws through the case bottom section, lateral capillary outlet on the case, lid and bottom part made of plastic
	764	Fastening flange made of steel sheet, capillary outlet on the case stud
	248	Wall bracket

Process connection*

Type series AMTHFs with rigid shaft	Scale limit value <u>up to</u> 150 °C Sheath "20"	Scale limit value <u>exceeding</u> 150 °C Sheath "30"
	Screw-in sleeve with screw-in spigot G 1/2 form A as per DIN 3852/	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 AMTHFf with capillary	plain cylindrical probe "10" (standard)	
	Screw-in sheath "20" (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	Sheath "20"	Sheath "30"
	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; different lengths on request	
Immersion tube Ø	D = 8 mm, D = 10 mm	

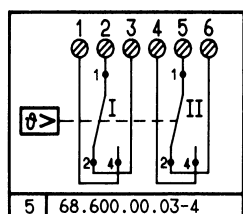
Note:

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

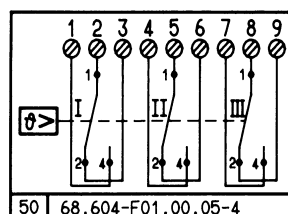
Control range with scale limit value	Hazardous reactions	Fire and explosion hazard		hazardous to waters	Information about toxicology		
		Ignition temperature	Explosion limit		irritant	dangerous to health	toxic
< +200 °C	no	+ 355 °C	0.6 - 8 V%	Yes	Yes	1	no
≥ 200 °C ≤ +300 °C	no	+ 490 °C	- -	Yes	Yes	1	no
> 350 °C ≤ +500 °C	no	no	no	no	no	no	no

¹ 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.

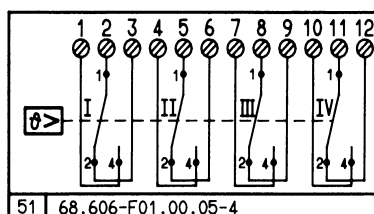
Connection diagrams



AMTHF-13
AMTHF-23



AMTHF-133
AMTHF-233



AMTHF-1333
AMTHF-2333

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Dimensions

<p>AMTHFs-1... Process connection "20" with screw-in sheath</p>	
<p>AMTHFs-2... Process connection "30" with screw-in sheath and intermediate piece for scale value exceeding +150 °C</p>	
<p>AMTHFf-1... Process connection "10" plain cylindrical probe</p>	

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Dimensions

<p>AMTHFf-2.../711 Capillary outlet lateral on the case, with plain cylindrical probe, process connec- tion "10"</p>	
<p>AMTHFf-2.../764 with "72" sheet steel flange with screw-in sheath "20"</p>	
<p>AMTHFf-1.../248 with "73" wall support with screw-in sheath "20"</p>	

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Order details

Surface-mounting thermostats, type series AMTHF

Order code**(1) Basic type**

603051 Surface-mounting thermostat, type series AMTHF with 2, 3 or 4 1-pole snap switches

(2) Basic type extension (function)

0013	AMTHF.-13	Temperature controller	2-pin
0023	AMTHF.-23	Temperature monitor	2-pin
0133	AMTHF.-133	Temperature controller	3-pin
0233	AMTHF.-233	Temperature monitor	3-pin
1333	AMTHF.-1333	Temperature controller	4-pin
2333	AMTHF.-2333	Temperature monitor	4-pin

(3) Design

1	AMTHF s	with rigid shaft
2	AMTHF f	with capillary

(4) Control / limit value ranges

013	-20 to + 40 °C
021	0 to + 50 °C
041	+20 to + 90 °C
025	0 to +100 °C
052	+30 to +110 °C
027	0 to +150 °C
028	0 to +200 °C
062	+50 to +200 °C
063	+50 to +250 °C
064	+50 to +300 °C
045	+20 to +400 °C
046	+20 to +500 °C

(5) Hysteresis

10	1%		
25	2.5%	of the scale range	with fluid-filled measuring systems
50	5%		
70	7%		
30	3%		
50	5%	of the scale range	with gas-filled measuring systems
60	6%		
01	10%		

(6) Capillary length (specifications in mm)

0	AMTHFs without capillary
1000	1000 mm
2000	2000 mm
3000	3000 mm
4000	4000 mm
5000	5000 mm
...	(Special length, specifications in plain text)

(7) Capillary material

00	AMTHFs without capillary
40	Cu (Copper)
20	CrNi (stainless steel)

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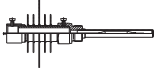
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Order details

Surface-mounting thermostats, type series AMTHF

Order code	(8) Process connection*	
10	plain cylindrical probe (only for AM.f)	
20	Screw-in sheath	
30	Screw-in sheath with intermediate piece	
	(9) Thread of process connection*	
00	without thread (process connection "10")	
13	External thread G 1/2	
	(10) Material of process connection	
00	only with process connection "10"	
46	CuZn (Brass)	
20	CrNi (Stainless steel 1.4571)	
	(11) Fitting length "S" (immersion tube length)	
000	AMTHFf 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)	
	(12) Diameter "D" (immersion tube diameter)	
00	AMTHFf without sheath	
8	8 mm	
10	10 mm	
	(13) Diameter "d" (probe diameter)	
6	6 mm	
8	8 mm	
	(14) Extra codes	
000	no extra code	
711	Switch head fastening with 2 screws through the case bottom section, lateral capillary outlet on the case, lid and bottom part made of plastic	
764	Fastening flange made of steel sheet, capillary outlet on the case stud	
248	Wall bracket	

* For different connection types and sheaths, please refer to data sheet 606710.

Sequential gap for 2-, 3- and 4-pin devices: Please specify in plain text (e.g. +2K, +5K, +8K)

Order code:

(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14)
 603051 / / - . - ... - .. - - .. - .. - .. - .. - ... - .. - ... / ... ,

Order example:

603051 / / 0133 - 2 - 025 - 25 - 2000 - 40 - 10 - 00 - 00 - 000 - 00 - 6 / 248

Sequential gap: _____