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## Surface-mounting Thermostats AMTHF Series with 2, 3 or 4 single-pole snap-action switches



Type AMTHFs-13

### Brief description

Surface-mounting thermostats control and monitor thermal processes. The instruments in the AMTHF series are available with 2, 3 or 4 switching stages as temperature controllers (TR) and temperature monitors (TW). The contact spacing of the individual switching stages (in °C) is factory-set according to customer requirements. Surface-mounting thermostats operate on the principle of liquid expansion, with a microswitch serving as the electrical switching device.

### Switching action

#### Temperature controller (TR) and temperature monitor (TW)

When the temperature at the probe exceeds the selected setpoint, the microswitch is actuated via a transmission mechanism and the circuit is opened or closed. When the temperature drops below the selected setpoint (by the amount of the switching differential), the microswitch returns to its initial position.



Type AMTHFf-13



### Types

Type		Switching action	Switching stage
with rigid stem	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 — liquid-filled

Control/limit range °C	Switching differential %	Max. probe temperature °C	Max. switch head temperature °C	Capillary length m	Max. contact spacing °C	Probe length L in mm, probe dia. d in mm dia. 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) <sup>1</sup>		25	138	91
	7	+ 100	+ 50 (80) <sup>1</sup>		50	103	73
0 to + 50	1	+ 60	+ 60	3	5	283	165
	2,5	+ 60	+ 60		10	283	165
	5	+ 105	+ 60 (80) <sup>1</sup>		25	159	101
	7	+ 110	+ 60 (80) <sup>1</sup>		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				40		
+50 to +200	1	+ 230	+ 80	1	15	139	92
	2,5				30		
+50 to +250	1	+ 228	+ 80	1	20	105	70
	2,5	+ 228	+ 80	1	40	105	70
	5	+ 300	+ 80	5	100	64	49
+50 to +300	1	+ 345	+ 80	2	25	87	61
	2,5	+ 345	+ 80		50		

<sup>1</sup> Values in brackets on request only, taking into account the operating states and required capillary length !

### Control range and probe table — gas-filled

Control /limit range °C	Switching differential %	Max. probe temperature °C	Max. switch head temperature °C	Capillary length m	Max. contact spacing °C	Probe length L in mm, probe dia. d in mm dia. 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	106
	10	+ 575	+ 80	5	250	95	65

### Capillaries and temperature probes

Type	End of scale	Capillary	Temperature probe	Note
AMTHF	up to 200 °C	copper (Cu), 1.5mm dia. Mat. Ref. Cu-DHP	copper (Cu), Mat. Ref. Cu-DHP brazed	-
	up to 350 °C	copper (Cu), 1.5mm dia. Mat. Ref. Cu-DHP	st. steel (CrNi), Mat. Ref. 1.4571 brazed	-
	up to 500 °C	st. steel (CrNi), 1.5mm dia. Mat. Ref. 1.4571	st. steel (CrNi), Mat. Ref. 1.4571 welded	-
	up to 350 °C	st. steel (CrNi), 1.5mm dia. Mat. Ref. 1.4571	st. steel (CrNi), Mat. Ref. 1.4571 welded	at extra cost
Capillary length	standard is 1000 mm, max. 5000 mm			
Min. bending radius of capillary	5 mm			

**Note:** If the max. permissible temperature at the probe, capillary and switch head is not fully utilized, it may be possible to increase the capillary length where it is restricted to 1, 2 or 3 m according to the control range and probe table.  
 Please contact us, specifying the actual temperature to which the thermostat is exposed.

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**Electrical data**

Switching device	2, 3 or 4 single-pole snap-action switches microswitch with changeover contact		
Contact rating	Switching action Switching differential	(n.c.) break contact terminal 2	(n.o.) make contact terminal 4
	TR, TW 2,5%, 5%, 6%, 7%, 10%	16 (3) A, 230 V AC +10%, p.f. = 1(0.6) 0.25A, 230 V DC +10%	8 (1.5) A, 230 V AC +10% p.f. = 1(0.6) 0.25A, 230 V DC +10%
	TR, TW 1%, 3%	6 (2) A, 230 V AC +10%, p.f. = 1(0.6) 0.25A, 230 V DC +10%	
Contact reliability	To ensure the highest possible switching reliability, we recommend a minimum loading of: AC / DC = 24 V, 20 mA		
Rated surge voltage	1500 V (via switching contacts 400 V)		
Overvoltage category	II		
Fusing required	see Contact rating		
Electrical connection	screw terminals up to 2.5 mm <sup>2</sup> conductor cross-section		

**Operating data**

Switching differential in % of control /limit range	Switching action	with liquid-filled measuring system						
		Nominal value	Possible actual value					
	TR, TW	2.5	2.5 max. 3.5	standard				
		5	5 max. 6	on request				
		7	7 max. 8	on request				
		1	1 max. 2	at extra cost				
	with gas-filled measuring system							
	5	5 max. 11	standard					
	6	6 max. 14	on request					
	10	10 max. 16	on request					
3	2.5 max. 4	at extra cost						
Contact spacing on multi-pole thermostats	with switching differential	Contact spacing of scale span		Switching point accuracy of contact spacing, % of span				
		minimum	maximum					
	1% 2.5% 3%, 5% 6%, 7%, 10%	1% 1% 2% 3%	according to control range table	≤1% ≤1% < 2% < 3%				
	The contact spacing is specified in °C against setpoint of contact I.							
	sign - = switching <b>before</b> setpoint sign + = switching <b>after</b> setpoint For simultaneous switching, specify contact spacing "0".							
Switching point accuracy in % of control /limit range	Switching action	Switching differential		in upper third of scale or at limit				
		liquid-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%					
Mean ambient temperature effect	Deviation of the ambient temperature at the switch head and / or capillary from the +22°C calibration ambient temperature will result in a shift of the switching point: higher ambient temperature = lower switching point lower ambient temperature = higher switching point							
	for temperatures with end of scale / limit value							
	< 200 °C		≥ 200 °C ≤ +350 °C			≥ 400 °C ≤ +500 °C		
	TR, TW		TR, TW			TR, TW		
	switching differential in %							
	1 / 2.5	5	7	1 / 2.5	5	3 / 5	6	10
	ambient temperature effect on switch head, % per °C							
	0.15	0.26	0.34	0.12	0.21	0.12	0.17	0.24
	ambient temperature effect on capillary, % per °C per m							
	0.05		0.09		0.04		0.05	
If the operating temperature at the switch head deviates appreciably from the +22°C calibration ambient temperature, this can be taken into account in the calibration, at extra charge.								

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**Operating data**

Permissible storage temp.	-50 to 50 °C
Permissible ambient temperature in operation	80 °C max.
Nominal position (NL)	to DIN 16257, NL 0 – NL90 (other NL on request)

**Housing**

as standard	housing cover: polycarbonate, impact-resistant housing base: die-cast aluminium, painted	color: pebble gray RAL 7032 color: anthracite gray RAL 7015
Setpoint adjustment	AMTHF.-1... switching point adjustable from outside by rotary knob	AMTHF.-2... switching point adjustable with screwdriver, after removing housing cover
Protection	EN 60 529-IP54	
Cable entry	standard: clamping gland M20x1.5, for 8 – 10 mm cable diameter	
Weight	approx. 0.8 kg	
Switch head fixing for AMTHF Series with capillary	standard	M18x1 thread with locknut on housing spigot, capillary exit at housing spigot
	extra code	
	r	by 2 screws through housing base, capillary exit at side of housing, cover and base in plastic
	b	steel mounting flange, capillary exit at housing spigot
	k	wall bracket

**Process connection\***

AMTHFs Series with rigid stem	end of scale <u>up to</u> 150 °C <b>pocket U</b>	end of scale <u>above</u> 150 °C <b>pocket UZ</b>
	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, so that the max. permissible ambient temperature +80 °C at the housing is not exceeded
AMTHFf Series with capillary	<b>plain cylindrical probe A</b> (standard)	
	<b>pocket U</b> (on request)	
	screw-in pocket with screw-in spigot G 1/2 Form A to DIN 3852/2 and clamping clip with fixing screw for securing the probe	
Material	<b>pocket U</b>	<b>pocket UZ</b>
	up to +150 °C: CuZn is standard above +150 °C: St is standard (CrNi on request)	above +150 °C: St is standard (CrNi on request)
Fitting length S	standard lengths: 100, 120, 150, 200 or 300; other lengths on request	
Immersion tube dia.	D = 8 mm, D = 10 mm	

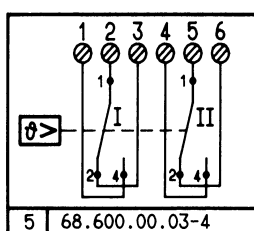
**Note:**

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

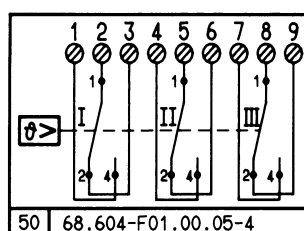
Control range with end of scale °C	Dangerous reactions	Fire/explosion hazard		Water contamination	irritant	Toxicological data	
		Ignition temp. °C	Explosion limit % v/v			danger to health	toxic
< +200	no	+ 355	0.6 – 8	yes	yes	1	no
≥ 200 ≤ +300	no	+ 490	- -	yes	yes	1	no
> 350 ≤ +500	no	no	no	no	no	no	no

<sup>1</sup> At present there is no restrictive statement from the health authorities concerning any danger to health over short periods and at low concentrations, e.g. after a fracture of the measuring system.

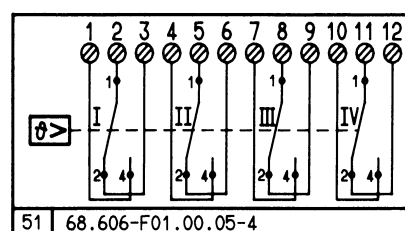
**Connection diagrams**



AMTHF-13  
AMTHF-23



AMTHF-133  
AMTHF-233



AMTHF-1333  
AMTHF-2333

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## Dimensions

<p>AMTHFs-1... with pocket U</p>	
<p>AMTHFs-2... with pocket UZ</p>	
<p>AMTHFf-1... Switch head mounting with plain cylindrical probe A as standard, no pocket</p>	

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## Dimensions

<p>AMTHFf-2.../r          Capillary exit          at side of housing,          with plain cylindrical          probe A, no pocket</p>	
<p>AMTHFf-2.../b          with mounting flange          and pocket U</p>	
<p>AMTHFf-1...          with wall bracket          and pocket U</p>	

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## Order details

### AMTHF Series

Order code	(1) Basic type	
603051	Surface-mounting thermostat , AMTHF series with 2, 3 or 4 single-pole snap-action switches	
(2) Basic type extension (action)		
0013	AMTHF.-13 temperature controller, 2-pole	
0023	AMTHF.-23 temperature monitor, 2-pole	
0133	AMTHF.-133 temperature controller, 3-pole	
0233	AMTHF.-233 temperature monitor, 3-pole	
1333	AMTHF.-1333 temperature controller, 4-pole	
2333	AMTHF.-2333 temperature monitor, 4-pole	
(3) Style		
1	AMTHFswith rigid stem	
2	AMTHFfwith capillary	
(4) Control / limit 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) Switching differential		
10	1%	
25	2.5%	
50	5% of scale span	for liquid-filled measuring systems
70	7%	
30	3%	
50	5%	
60	6% of scale span	for gas-filled measuring systems
01	10%	
(6) Capillary length (in mm)		
0	AMTHFs without 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	AMTHFs without capillary	
40	Cu (copper)	
20	CrNi (stainless steel 1.4571)	

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## Order details

### AMTHF Series

<b>Order code</b>	<b>(8) Process connection*</b>	
10	A = plain cylindrical probe (for AM.f only)	
20	U = screw-in pocket	
30	UZ = screw-in pocket with extension	
	<b>(9) Thread for process connection*</b>	
00	no thread (process connection A)	
13	external thread G 1/2	
	<b>(10) Material of process connection</b>	
00	for process connection A only	
46	CuZn (brass)	
01	St (steel)	
20	CrNi (stainless steel 1.4571)	
	<b>(11) Fitting length S (immersion tube length)</b>	
000	AMTHFf without pocket	
100	100mm	
120	120mm	
150	150mm	
200	200mm	
300	300mm	
400	400mm	
...	(special length, details in plain text)	
	<b>(12) Diameter D (immersion tube diameter)</b>	
00	AMTHFf without pocket	
8	8 mm	
10	10 mm	
	<b>(13) Diameter d (probe diameter)</b>	
6	6 mm	
8	8 mm	
	<b>(14) Extra codes</b>	
000	no extra code	
711	r switch head mounting by 2 screws through housing base, capillary exit at side of housing, cover and base in plastic	
764	b steel mounting flange, capillary exit at housing spigot	
248	k wall bracket	

\* for other connections and pockets, see Data Sheet 60.6710.

**Contact spacing for 2-, 3- and 4-pole thermostats:** details in plain text (e.g. +2°C, +5°C, +8°C)

<b>Order code</b>	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>	<b>(6)</b>	<b>(7)</b>	<b>(8)</b>	<b>(9)</b>	<b>(10)</b>	<b>(11)</b>	<b>(12)</b>	<b>(13)</b>	<b>(14)</b>													
	603051	/	....	-	.	-	...	-	..	-	....	-	..	-	..	-	..	-	..	-	...	-	..	-	..	/	...
<b>Order example:</b>	603051	/	0133	-	2	-	025	-	25	-	2000	-	40	-	10	-	00	-	00	-	000	-	00	-	6	/	248

Contact spacing: \_\_\_\_\_