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Surface-mounting Thermostat with explosion protection ATH-EXx Series

- EC-type examination as per ATEX Directive 94/9/EC
- for potentially explosive gas atmospheres, Zone 1
- and potentially explosive dust atmospheres, Zone 21

Version to DIN 3440

TW Temperature monitor
 TB Temperature limiter
 STW Fail-safe temperature monitor
 STB Fail-safe protection temperature limiter

Brief description

ATH-EXx Series surface-mounting thermostats with explosion protection control and monitor thermal processes. They can be used directly in the hazardous area, in Zone 1 and Zone 21. The thermostats can be supplied as temperature monitors TW, temperature limiters TB, fail-safe temperature monitors STW and fail-safe protection temperature limiters STB. The thermostats operate on the principle of liquid or gas expansion. The electrical switching device is a microswitch inside a flameproof enclosure.

Ex marking

- Ex II 2G EEx ed IIC T6 or T5 for potentially explosive gas atmospheres
- Ex II 2D IP65 T80°C for potentially explosive dust atmospheres

Explosion protection

- Ex II 2G Equipment group II, Category 2, Equipment for potentially explosive gas atmospheres
- Ex II 2D Equipment group II, Category 2, Equipment for potentially explosive dust atmospheres

Type of protection:

EEx ed IIC T6

EEx	General requirements	European Standard EN 50 014 / VDE 0170 / 0171 Part 1
e	Increased Safety	European Standard EN 50 019 / VDE 0170 / 0171 Part 6
d	Flameproof enclosure	European Standard EN 50 018 / VDE 0170 / 0171 Part 5
IIC	Gas group	
T6	Temperature class	

IP65 T 80°C

Application in combustible dusts European Standard EN 50 281-1-1 / VDE 0170 / 0171 Part 15-1-1

IP65 Enclosure protection to EN 60 529-IP65
T 80°C Max. permissible surface temperature (application in combustible dusts)

Types and approvals

Type	Switching action	Test certificate	Tests
ATH-EXx-2	TW	PTB 03 ATEX 1187	
ATH-EXx-20	STW		
ATH-EXx-7	TB		
ATH-EXx-7-F ¹	TB		
ATH-EXx-70	STB		
ATH-EXx-70-F ¹	STB		

¹ Limit is permanently set at the factory and sealed



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Switching action

<p>Temperature monitor TW and fail-safe temperature monitor STW If the temperature at the probe exceeds the selected setpoint, the microswitch is operated via the 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.</p>	<p>Lock-out facility on the temperature limiter TB and fail-safe protection temperature limiter STB If the temperature at the probe exceeds the set limit, the circuit is opened and the microswitch is locked out mechanically. After the temperature has fallen below the critical temperature by about 10 % of the scale span (about 15% for limit setting > 350°C), the microswitch can be manually reset.</p>	<p>Self-monitoring on the fail-safe temperature monitor STW and fail-safe protection temperature limiter STB In the event of a measuring system failure, i.e. if the expansion liquid has leaked, the pressure on the diaphragm of the STB and STW drops, thus permanently opening the electrical circuit. It is no longer possible to reset the system. If the probe cools down to a temperature given by the control range table, e.g. below -20°C, the circuit will also open. When the temperature rises above -20°C, the STB must be reset manually. On the STW, the reset is performed automatically.</p>
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Technical data

Control ranges and probe table

Control range °C	Switching point accuracy in upper third of scale ¹		Maximum capillary length (mm)	Maximum probe temperature to DIN 3440 °C	STW + STB opens at probe temp. below °C	Probe length L for d = 6 mm	
	TW, TB	STW, STB				TW TB	STW STB
-20 to + 50	+ 0 °C - 3 °C	+ 0 °C - 3.5°C	5000	+ 60	-30	142	115
0 to + 50	+ 0 °C - 2 °C	+ 0 °C - 2.5°C		+ 60	-10	185	149
0 to +100	+ 0 °C - 4 °C	+ 0 °C - 5 °C		+115	-10	107	89
+40 to +120	+ 0 °C - 3 °C	+ 0 °C - 4 °C		+140	-10	125	103
+50 to +200	+ 0 °C - 6 °C	+ 0 °C - 8 °C		+230	-10	101	83
+80 to +250	+ 0 °C - 7 °C	+ 0 °C - 8.5°C		+300	-20	82	68
+50 to +300	+ 0 °C - 10 °C	+ 0 °C - 12.5°C	1000	+345	-30	63	53
+20 to +400	+ 0 °C - 15 °C	+ 0 °C - 19 °C		+460	-30	278	176
+20 to +500	+ 0 °C - 19 °C	+ 0 °C - 24 °C		2000 4000	+550 +550	-30 -30	148 202

¹ The switching point accuracy can be shifted to another part of the scale, to special order.

Capillary and temperature probe

Type	End of scale	Capillary 1.5mm dia.	Temperature probe	Notes
ATH-EXx-..	up to 200°C	copper (Cu), Mat. Ref. 2.0090 electro-tinned	copper (Cu), Mat. Ref. 2.0090 brazed, electro-tinned	-
	up to 300°C	copper (Cu), Mat. Ref. 2.0090 electro-tinned	st. steel (CrNi), Mat. Ref. 1.4571 brazed	-
	up to 500°C	st. steel (CrNi), Mat. Ref. 1.4571	st. steel (CrNi), Mat. Ref. 1.4571 welded	-
	up to 300°C	st. steel (CrNi), Mat. Ref. 1.4571	st. steel (CrNi), Mat. Ref. 1.4571 welded	at extra cost
Capillary length	1000 mm is standard, max. 5000 mm			
Min. bending radius of capillary	5 mm			

Electrical data

Switching device	TW, STW	TB, STB
	microswitch in flameproof enclosure with changeover contact	microswitch in flameproof enclosure with (n.c.) break contact and lock-out and additional signal contact
Max. contact rating	terminals 1-4: (n.c. break) AC-1: 10 A, 230 V +10% AC-15: 2 A, 230 V +10% DC-1: 0.25A, 230 V +10%	terminals 1-4: (n.c. break) AC-1: 16 A, 230 V +10% AC-15: 2 A, 230 V +10% DC-1: 0.25A, 230 V +10%
	terminals 1-2: (n.o. make) AC-1: 5 A, 230 V +10% AC-15: 0.8 A, 230 V +10% DC-1: 0.25A, 230 V +10%	terminals 1-2: (n.o. make) AC-1: 10 A, 230 V +10% AC-15: 1.5 A, 230 V +10% DC-1: 0.25A, 230 V +10%
Electrical connection	5-pole terminal strip, suitable for conductor cross-sections up to 2.5 mm ²	

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Technical data

Operating data

Switching differential in % of control / limit range	Ranges with end of scale $\leq 350^{\circ}\text{C}$			Ranges with end of scale $> 350^{\circ}\text{C}$		
	Switching action	Nominal value	Possible actual value	Switching action	Nominal value	Possible actual value
	TW	3	3-5	TW	5	5-9
STW	5	5-7	STW	6	6-11	
Ambient temperature effect referred to control / limit range	A deviation of the ambient temperature at the housing from the calibrated ambient temperature 22°C will result in a shift of the switching point: higher ambient temperature = lower switching point lower ambient temperature = higher switching point					
	Surface-mounting thermostats with end of scale					
	$< 200^{\circ}\text{C}$		$\geq 200^{\circ}\text{C} \leq 350^{\circ}\text{C}$		$> 350^{\circ}\text{C} \leq 500^{\circ}\text{C}$	
	TW / TB	STB/STW	TW / TB	STB/STW	TW / TB	STB/STW
	effect due to switch head					
	0.08 %/ $^{\circ}\text{C}$	0.17 %/ $^{\circ}\text{C}$	0.06 %/ $^{\circ}\text{C}$	0.13 %/ $^{\circ}\text{C}$	0.14 %/ $^{\circ}\text{C}$	0.12 %/ $^{\circ}\text{C}$
effect due to capillary (per meter)						
0.047 %/ $^{\circ}\text{C}$	0.054 %/ $^{\circ}\text{C}$	0.09 %/ $^{\circ}\text{C}$	0.11 %/ $^{\circ}\text{C}$	0.04 %/ $^{\circ}\text{C}$	0.03 %/ $^{\circ}\text{C}$	
Permissible storage temperature	-50 to $+50^{\circ}\text{C}$					
Permissible ambient temperature in operation	Temperature class	for end of scale		Capillary		Switch head
	T6 max.			$+40^{\circ}\text{C}$		$+40^{\circ}\text{C}$
	T5 max.			$+55^{\circ}\text{C}$		$+55^{\circ}\text{C}$
	min.	$< 200^{\circ}\text{C}$		-40°C		-20°C
		$\geq 200^{\circ}\text{C} \leq 350^{\circ}\text{C}$		-20°C		-20°C
	$> 350^{\circ}\text{C} \leq 500^{\circ}\text{C}$		-40°C		-20°C	
Nominal position (NL)	to DIN 16257, NL 0 – NL 90 (other NL on request)					

Housing

Material	polyester housing, glass-fiber reinforced, black	
Limit setting	ATH-EXx-2 ATH-EXx-7 ATH-EXx-20	Limit adjustable at setpoint spindle, after removing housing cover.
	ATH-EXx-70	Limit adjustable at setpoint spindle, after removing housing cover. Afterwards, the setpoint spindle must be sealed by the installer in order to protect the limit that has been set.
	ATH-EXx-7-F ATH-EXx-70-F	The limit setting is fixed at the factory and sealed.
Enclosure protection	IP65 to EN 60 529	
Cable entry	Ex cable gland M 20 x 1.5, for cable diameters from 6 to 12 mm	
Weight	approx. 1.2 kg	
Switch head fixing	by 4 screws after removing housing cover	

Process connection¹

Series ATH-EXx-... with capillary	plain cylindrical probe A (standard)	
	pocket U (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 of pocket U	up to $+150^{\circ}\text{C}$: CuZn, nickel-plated is standard; above $+150^{\circ}\text{C}$: St is standard (CrNi on request)	
Fitting length S	standard lengths: 100, 120, 150, 200 or 300 mm (other lengths on request)	
Immersion tube dia.	D = 8 mm	

¹ For other process connections and pockets, see data sheet 60.6710 (only US, UO, Q and V).

Note:

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

Control range with end of scale	Dangerous reactions	Fire and explosion hazard		Water contamination	irritant	Toxicological data	
		Ignition temperature	Explosion limit			danger to health	toxic
$< +200^{\circ}\text{C}$	no	$+ 355^{\circ}\text{C}$	0.6 – 8 % v/v	yes	yes	1	no
$\geq 200^{\circ}\text{C} \leq 350^{\circ}\text{C}$	no	$+ 490^{\circ}\text{C}$	--	yes	yes	1	no
$> 350^{\circ}\text{C} \leq 500^{\circ}\text{C}$	no	no	no	no	no	no	no

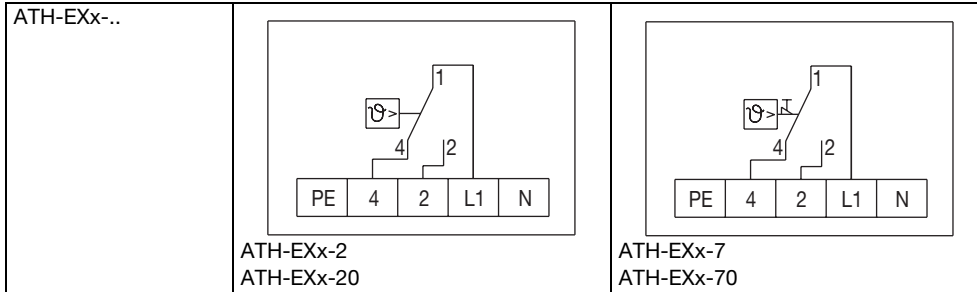
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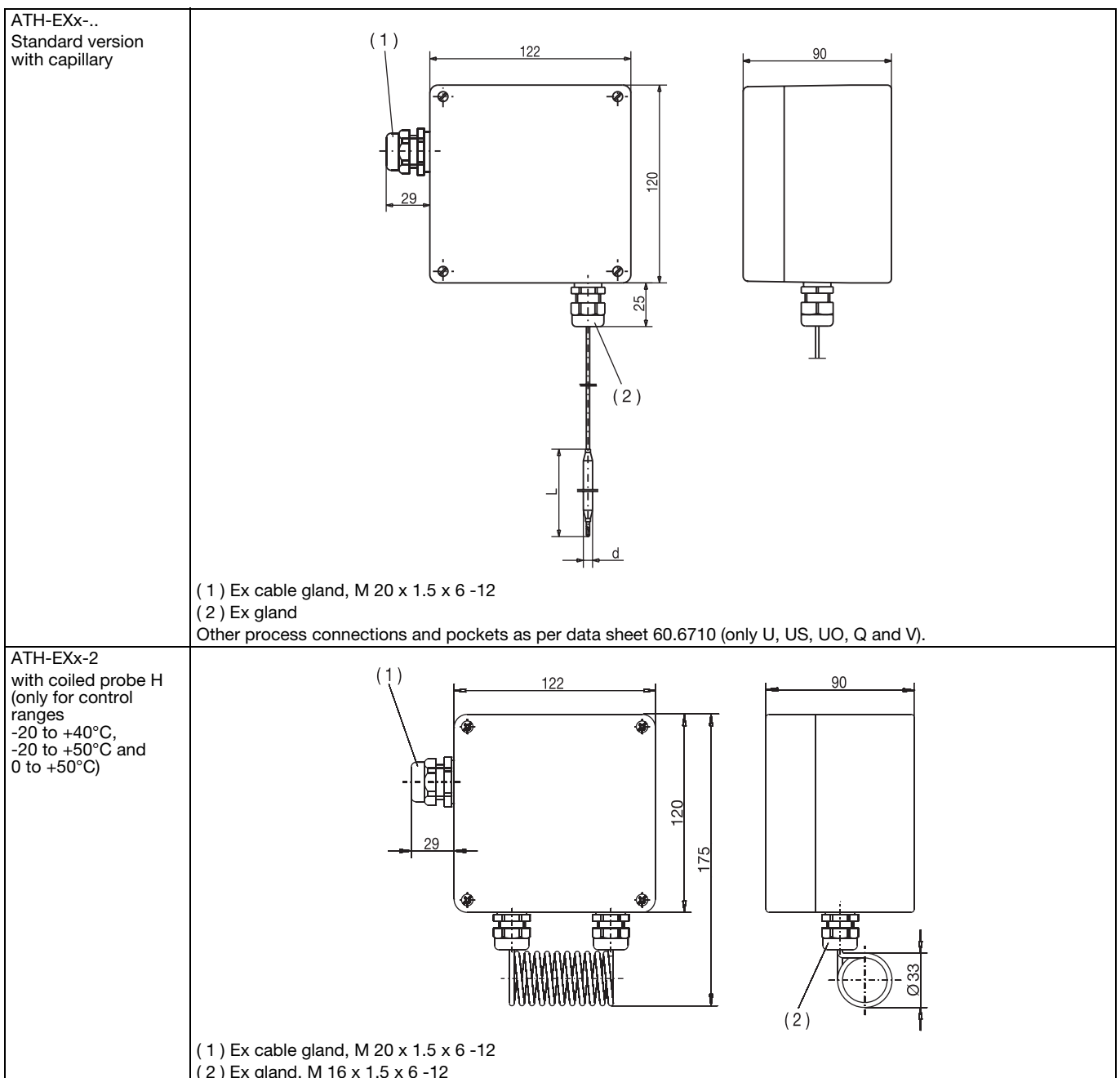
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Connection diagrams



Dimensions



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Order details

Surface-mounting thermostat, ATH-EXx Series

Order code	(1) Basic type
605051	Surface-mounting thermostat for areas with an explosion hazard, ATH-EXx Series
	(2) Basic type extensions
02	ATH-EXx-2 Temperature monitor TW
20	ATH-EXx-20 Fail-safe temperature monitor STW
07	ATH-EXx-7 Temperature limiter TB
70	ATH-EXx-70 Fail-safe protection temperature limiter STB
	(3) Control/limit ranges °C
013	-20 to + 40
014	-20 to + 50
021	0 to + 50
025	0 to +100
056	+40 to +120
062	+50 to +200
080	+80 to +250
064	+50 to +300
045	+20 to +400
046	+20 to +500
	(4) Capillary length
1000	1000 mm
2000	2000 mm
3000	3000 mm
4000	4000 mm
5000	5000 mm
....	special length, details in plain text
	(5) Material of capillary
40	Cu copper, electro-tinned (only up to +300°C)
20	CrNi stainless steel 1.4571
	(6) Process connection (PA)
10	A = plain cylindrical probe (standard) 
15	H = coiled probe  (only for -20 to +40°C, -20 to +50°C, 0 to +50°C)
20	U = screw-in pocket 
	(7) Thread for process connection
00	no thread (process connection 10)
13	external thread G 1/2
	(8) Material of process connection
00	only with process connection A
46	CuZn (brass)
01	St (steel)
20	CrNi (stainless steel 1.4571)
	(9) Fitting length S (immersion tube length)
000	ATH-EXx without pocket
100	100mm
120	120mm
150	150mm
200	200mm
300	300mm
400	400mm
	(10) Diameter D (immersion tube dia.)
00	ATH-EXx without pocket
8	8 mm
	(11) Diameter d (probe diameter)
6	6 mm
	(12) Extra codes¹
000	none
520	F Limit is fixed at the factory and sealed (only with TB + STB).

Order code

(1)	605051	/	(2)		-	(3)		-	(4)		-	(5)		-	(6)		-	(7)		-	(8)		-	(9)		-	(10)		-	(11)		-	(12)		/		, ... ¹
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Order example 605051 / 70 - 062 - 2000 - 20 - 10 - 00 - 00 - 000 - 00 - 6 / 000¹

¹ List extra codes in sequence, separated by commas.