

TH 102 / TH 102-Ex

Rail mounted
temperature transmitter,
HART programmable,
Pt 100 (RTD), thermocouples,
electrical isolation

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10/11-8.54 EN



■ Input

- Resistance thermometer (2, 3, 4-wire circuit)
- Thermocouples
- Resistance remote signalling unit (0...5000 Ω)
- Voltages, mV (-125...1200 mV)

■ Output

- 2-wire technique
- 4...20 mA, HART signal

■ 1 or 2 independent channels

■ Electrical isolation (I/O)

■ Digital low-drift processing of measurement values

■ Customer-specific linearization

■ Continuous sensor and self-monitoring

- Parameter saved permanently in EEPROM
- Monitoring of data integrity every 10 s

■ Substitution strategy in case of error (NE43)

■ Approvals for explosion protection

- intrinsically safe Ex II 2 G EEx [ia] Ib IIC T6, mount in zone 1
- Ex II 3 G EEx n A II T6, mount in zone 2

■ Input functionality (absolute, differential, average value)

■ EMC acc. to EN 50082-2 and NE 21

■ Parameterization

- PC software application SMART VISION
- Hand held terminals STT 04, HC 275

■ 5 years warranty

Technical data

Output 

Output signal (temperature linear)	4...20 mA
Residual ripple (peak-to-peak)	< 0.2 %
Current consumption	< 3.6 mA
Max. output current	23.6 mA
Parameterizable current error signal	
Underranging	3.6 mA
Overranging	22 mA
Default value	3,6...22 mA
Damping	$t_{63} = 0...30$ s

Input 

Resistance

Resistance thermometer (IEC 751, JIS, SAMA)	n-Pt100/Ni100 to Pt1000/Ni1000; Cu (n=0.1; 0.2; 0.5; 1; 1.2; 2; 3...10)
min. span	15 K/50 K
Max. line resistance (R_w) per core 2, 3, 4-wire	7.5 Ω , 10 Ω , 50 Ω
Measuring current	300 μ A
Sensor short-circuit	< 5 Ω (for RTD)
Sensor break	> 1.5 M Ω
Input filter	50/60 Hz

Thermocouples

Types	B, E, J, K, L, N, R, S, T, U
Voltages	-125 mV...125 mV -125 mV...1200 mV
Min. span	2 mV / 50 mV
Sensor monitoring current	70 nA
Input filter	50/60 Hz
Internal reference junction	Pt 100, via software switchable (no jumper necessary)

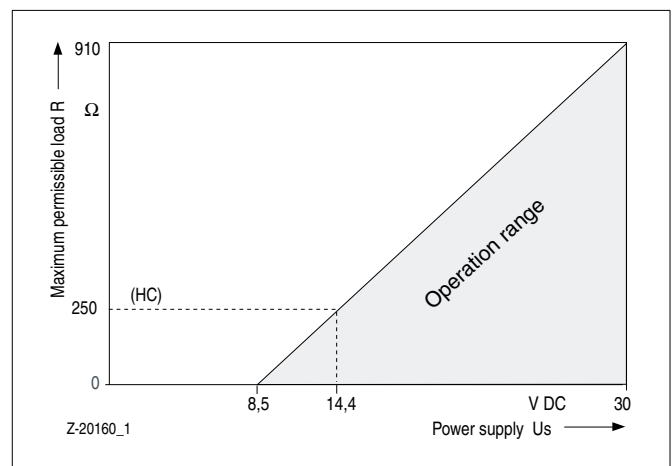
Power supply

(2-wire methode: power supply wires=signal wires)

Supply voltage, poling protected for explosion protection application, max.	$U_s = 8.5...30$ V DC $U_i = 8.5...29.4$ V DC
Influence of supply voltage	< 0.05 %/10 V
max. residual ripple	≤ 1 % U_s (< 500 Hz)

Maximale Load

$$R(k\Omega) = \frac{(U_{smax} - U_{smin})}{23,6}$$



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Standard	Input element Sensor	Measuring range	Min. measuring span
IEC 584-1	Thermocouple Type B	250...+1820 °C (+482...+3308 °F)	235 °C (423 °F)
	Thermocouple Type E	-250...+1000 °C (-418...+1832 °F)	30 °C (54 °F)
	Thermocouple Type J	-210...+1200 °C (-346...+2192 °F)	37 °C (67 °F)
	Thermocouple Type K	250...+1372 °C (-418...+2502 °F)	54 °C (98 °F)
	Thermocouple Type R	- 50...+1768 °C (- 58...+3215 °F)	171 °C (308 °F)
	Thermocouple Type S	- 50...+1768 °C (- 58...+3215 °F)	193 °C (348 °F)
	Thermocouple Type T	-200...+1350 °C (-328...+2462 °F)	50 °C (90 °F)
	Thermocouple Type N	-200...+1350 °C (-328...+2462 °F)	60 °C (108 °F)
DIN 43710	Thermocouple Type L	-200... +900 °C (-76...+ 482 °F)	36 °C (65 °F)
	Thermocouple Type U	-200... +600 °C (-328...+1112 °F)	40 °C (72 °F)
IEC 751; JIS; SAMA ¹⁾ 2, 3 and 4-wire	Resistance thermometer Pt 100	-200... +850 °C (-328...+1562 °F)	15 °C (28 °F)
	Resistance thermometer Pt 1000	-200... +850 °C (-328...+1562 °F)	50 °C (90 °F)
DIN 43760 ²⁾ 2, 3 and 4-wire	Resistance thermometer Ni 100	- 60... + 250 °C (-76...+ 482 °F)	8 °C (15 °F)
	Resistance thermometer Ni 500	- 60... + 250 °C (-76...+ 482 °F)	15 °C (28 °F)
Resistance	Ω	0...500 Ω / 0...5000 Ω	5 Ω / 50 Ω
Voltage	mV	-125 mV...+125 mV	2 mV
		-125 mV...+1200 mV	50 mV
¹⁾ IEC 751 a = 0.00385; JIS a = 0,003916; SAMA a = 0,003902			
²⁾ Edison Curve No. 7			

Technical data

General characteristics

Response time	< 0.5 s
Vibration resistance	
Vibration in operation	2 g acc. to DIN IEC 68 part 2-6
Electrical isolation (I/O)	1.5 kV AC
Long-term stability	≤ 0.1 % p.a.

Environment conditions

Ambient temperature range	(-40)-20...85 °C
Transport and storage temperature	-40...100 °C
Relative humidity	< 100 %
(100 % humidity with isolated terminals only)	
condensation	permitted

Mechanical construction

Dimensions	cf. dimensional drawing
Weight	250 g
Housing material	Polyamid
Type of protection	IP 20 (DIN 40050)
Class of protection	2 (IEC 348)
Class of combustibility	V0 acc. to UL 94
Color (Epoxy)	light grey (RAL 9002)

Electrical connection

Terminals, pluggable	2.5 mm ² , screw terminals
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Characteristics at rated conditions^{*)}

(acc. to IEC 770, related to 25 °C)

Measuring error incl. characteristic deviation	
Pt 100/resistance measurement	< 0.2 %
	min. < 0.2 K / < 80 mΩ
Thermocouple/mV	< 0.2 %, min. < 10 μV

Additional influence of the internal reference junction	Pt 100 DIN IEC 751 cl. B
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Influences

Influence effect of temperature

Pt 100/resistance measurement¹⁾

$$< (0.08 \% + \frac{ME (\Omega)}{MS (\Omega)} \times 0.008 \%) / 10K$$

Thermocouple/mV²⁾

$$< (0.08 \% + \frac{ME (mV)}{MS (mV)} \times 0.01 \% + \frac{0.014 K}{MS (K)} \times 100 \%) / 10 K$$

Percentage related to measuring span MS = ME – MA

MA = lower range value, ME = upper range value

*) Percentage related to set measuring span

1) Pt 100 (0...400 °C): Effect of temperature influence

$$< (0.08 \% + 0.013 \%) / 10 K = 0.093 \% / 10 K$$

Explosion protection

Intrinsically safe

Zone 1

⊕ II 2 G EEx [ia] ib IIC T6

EC certificate

PTB99 ATEX 2139 X

Temperature class T6/T5/T4

< 50 °C/65 °C/85 °C

Supply circuit	Output [ib]	Input [ia]
Max. voltage	U _i = 29.4 V	U _o = 5.6 V
Short-circuit current	I _i = 130 mA	I _o = 145 mA ³⁾
Max. power	P _i = 0.8 W	P _o = 20 mW
Internal inductance	L _i = 220 μH	L _o = 1 mH
Internal capacitance	C _i = 15 nF	C _o = 1.55 μF

3) Load current for connected primary element [ia] < 1.5 mA

Zone 2

⊕ II 3 G EEx n A II T6

Conformity declaration

PTB 99 ATEX 2216 X

Temperature class T6/T5/T4

< 50 °C/65 °C/85 °C

Electromagnetic compatibility (EMC)

Pt 100: measuring range 0...100 °C, span 100 K

Type of test	Degree	Influence	IEC
burst to signal/ data lines	2 kV	< 0.5 %	1000-4-4
static discharge contact discharge to: contact plate	8 kV	< 1.0 %	1000-4-2
terminals for supply	6 kV	< 1.0 %	
terminals for sensors	3.75kV	< 1.0 %	
radiated field 80 MHz...1 GHz	10 V/m	< 1.0 %	1000-4-3
coupling 150 kHz - 80 MHz	10 V	< 1.0 %	1000-4-6

Acc. to NAMUR NE 21 recommendation

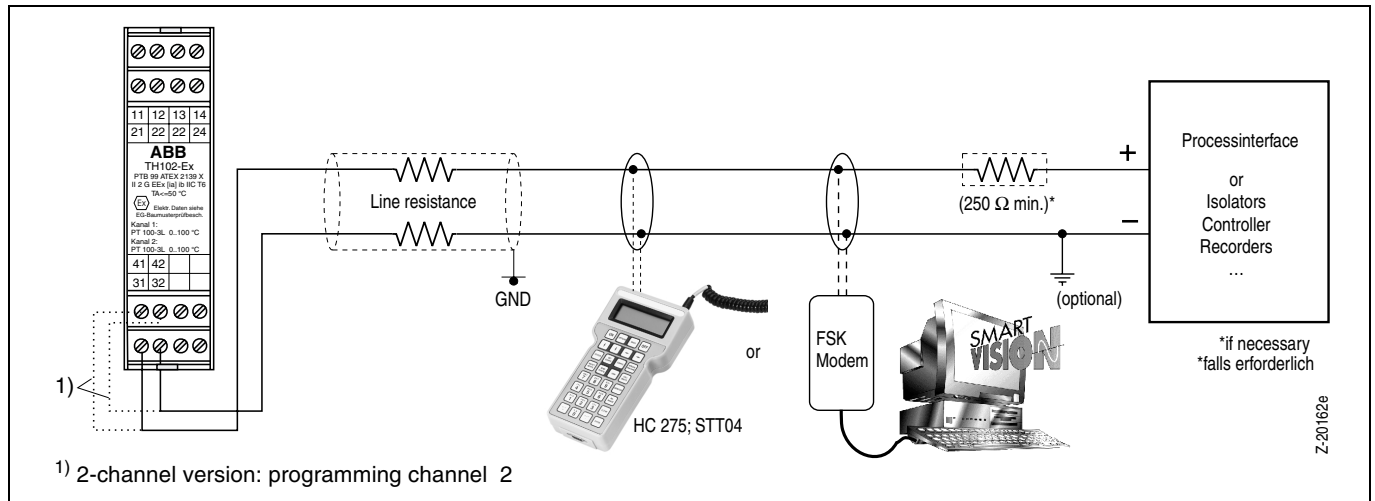
Communication/parameterization

Software-Tool
 SMART VISION

Hand held terminals
 STT 04; HC 275

Parameter
 Sensor type, error signalling, measuring range,
 general characteristics (i. e. TAG number),
 damping, signal simulation of output

Software interface AMS, Cornerstone



TH 102 / TH 102-Ex
Rail mounted temperature transmitter, HART programmable

Ordering information				
		Catalog No		
TH 102 / TH 102-Ex		V11517-		
Without Explosion protection:				
TH 102	1-channel	1		
TH 102	2-channel	3		
With Explosion protection				
Zone 1				
TH 102-Ex	1-channel	5	ATEX: II 2 G EEx [ja]ib IIC T6	
TH 102-Ex	2-channel	2	ATEX: II 2 G EEx [ja]ib IIC T6	
Zone 2 / type N				
TH 102-Ex N	1-channel	N	ATEX: II 3 G EEx n A II T6	
TH 102-Ex N	2-channel	M	ATEX: II 3 G EEx n A II T6	
Programming				
1-channel				
Factory standard parameter		0		
Pt 100, 0...100 °C, 4-wire circuit, damping off, direct action characteristic overranging at sensor or device error (≤ 23,5 mA)				
Customer-specific parameter definition, two-channel version		1		
2-channel				
Factory standard parameter		2		
Pt 100, 0...100 °C, 4-wire circuit, damping off, direct action characteristic overranging at sensor or device error (≤ 23,5 mA)				
Customer-specific parameter definition, two-channel version		3		
Calibration certificates				
without		0		
1-channel	2-point	1		
1-channel	9-point	2		
2-channel	2-point	A		
2-channel	9-point	B		
Accessories				
		Catalog No		
H&B FSK modem [EEx ib] IIC (parameter setting in the installation)		0343705		
Smart Vision ⁵ Software	on CD-ROM	7957777		
	3 1/2" Diskettes	7957778		
Smart Vision ⁵ manual	German	7957779		
	English	7957780		
TH 02 / -102 / -202 driver for AMS software 1.3.1 (Rosemount)		7957771		

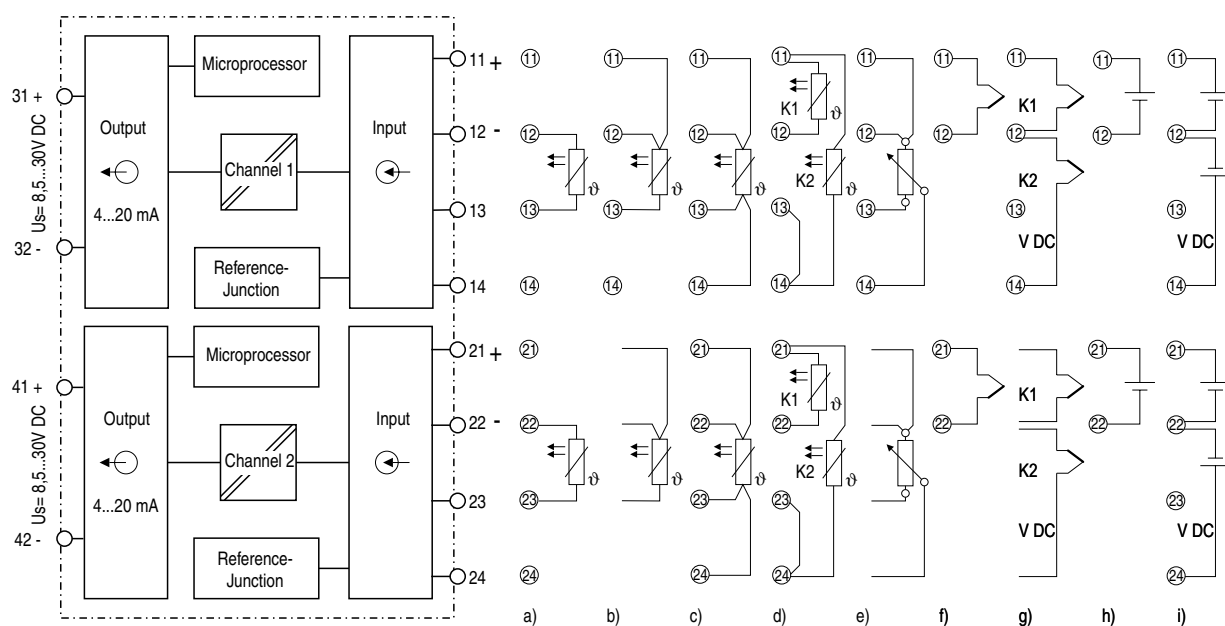
www.see Data Sheet 63-1.20

Minimum hardware requirements: Intel 80486; 66 MHz, 8MB RAM; free hard-disk capacity; Windows 3.x (95, 98, NT)

Notice:

For a lokal programming on the desk can used **as Hardware** the universal TS02-Programming-Set (without Parasoft).
 (see Data Sheet 11-8.17 ordering information accessories)

Connection diagram

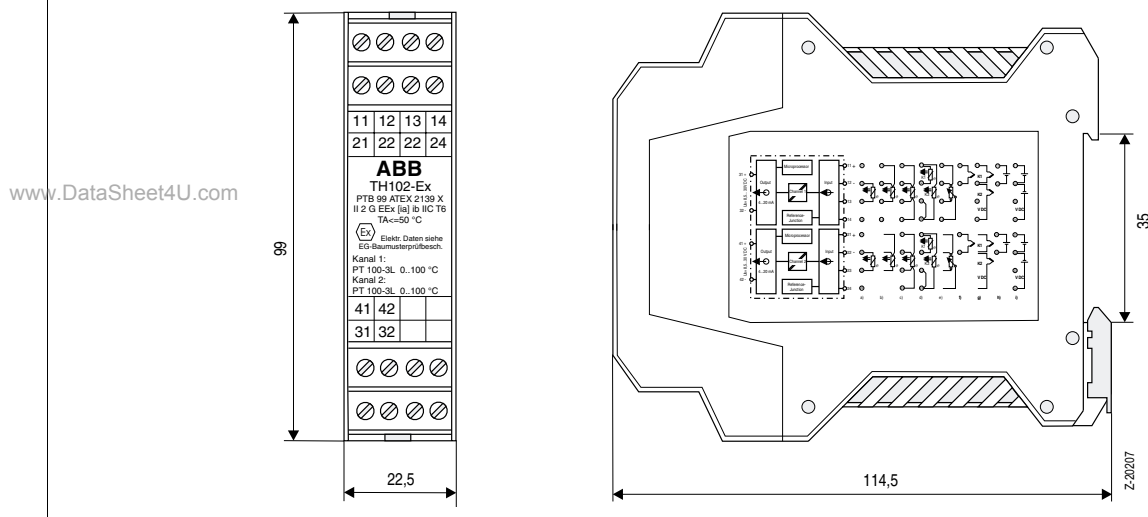


For the 1 channel version view wiring diagram of channel 1

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- a) Resistance thermometer, 2-wire circuit
- b) Resistance thermometer, 3-wire circuit
- c) Resistance thermometer, 4-wire circuit
- d) Double resistance thermometer, 2-wire circuit
- e) Potentiometer input (4-wire circuit)
- f) Thermocouple
- g) Double thermocouple
- h) Voltage measurement
- i) Double voltage measurement

Dimensional diagram (dimensions in mm)



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Z-20207



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