TH 102 / TH 102-Ex

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

10/11-8.54 EN
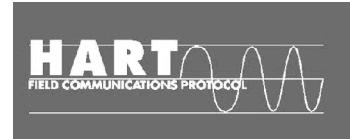
- ■ **Input**
  - – Resistance thermometer (2, 3, 4-wire circuit)
  - – Thermocouples
  - – Resistance remote signalling unit (0...5000 Ω)
  - – Voltages, mV (–125...1200 mV)
- ■ **Output**
  - – 2-wire technique
  - – 4...20 mA, HART signal
- ■ **1 or 2 independent channals**
- ■ **Electrcal isolation (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 integrety 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**
- ■ **Parameterizationg**
  - – PC software application SMART VISION
  - – Hand held terminals STT 04, HC 275
- ■ **5 years warranty**

ABB Instrumentation

ABB

Technical data

Outputn $\ominus\!\!\!\rightarrow$

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 (programmable)	t_{63} = 0...30 s

Input $\rightarrow\!\!\!\ominus$

Resistance (temperature linear)

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 µA
Sensor short-circuit	< 5 Ω (for RTD)
Sensor break	> 1.5 MΩ
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 (at transmitter terminals)
(2-wire methode: power supply wires=signal wires)

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

Maximale Load

$$R(k\Omega) = \frac{(Usmax - Usmin)}{23,6}$$

Z-20160_1
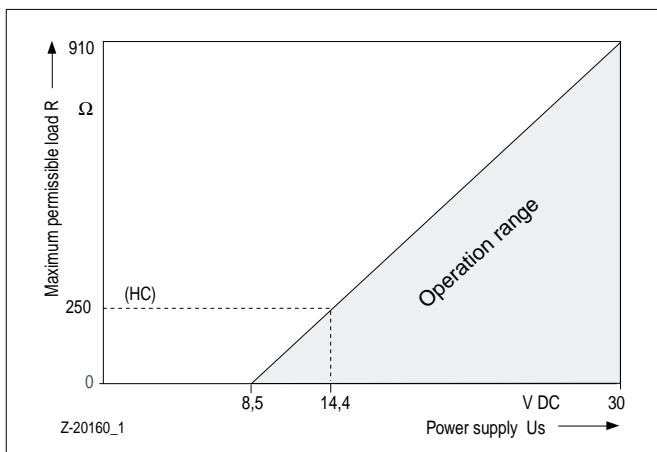
Input element		Measuring range	Min. measuring span	
Standard	**Sensor**			
IEC 584-1	Thermocouple Type B	250...+1820 °C (+482...+3308 °F)	235 °C	(423 °F)
	Thermocouple Type E	−250...+1000 °C (−418...+1832 °F)	30 °C	(54 °F)
	Thermocouple Type J	−210...+1200 °C (−346...+2192 °F)	37 °C	(67 °F)
	Thermocouple 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]	Resistance thermometer Pt 100	−200... +850 °C (−328...+1562 °F)	15 °C	(28 °F)
2, 3 and 4-wire	Resistance thermometer Pt 1000	−200... +850 °C (−328...+1562 °F)	50 °C	(90 °F)
DIN 43760[2]	Resistance thermometer Ni 100	− 60... + 250 °C (−76...+ 482 °F)	8 °C	(15 °F)
2, 3 and 4-wire	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 (optionally)	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	

Environment conditions

Ambient temperature range	–40...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

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. A

Influences

Influence effect of temperature

Pt 100/resistance measurement[1]

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

Thermocouple/mV[2]

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

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	⟨Ex⟩ 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	⟨Ex⟩ II 3 G EEx n A II T6
Conformity declaration	PTB 99 ATEX 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:			1000-4-2
contact plate	8 kV	< 1.0 %	
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-Tools

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
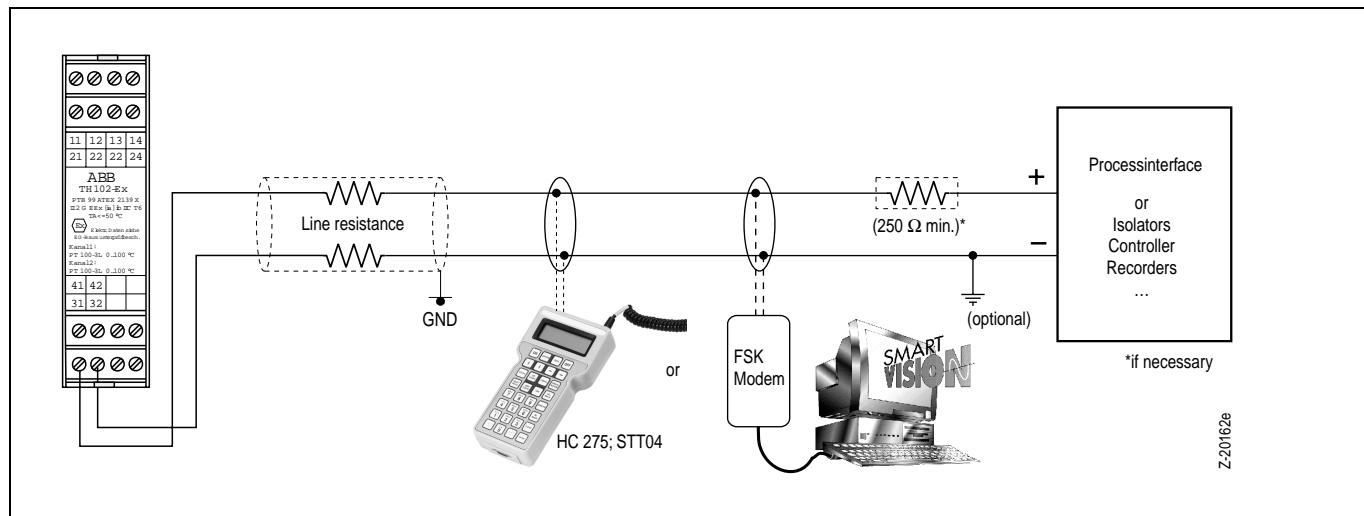
Ordering information

	Catalog No		◢		
Contrans TH 102 / TH 102-Ex	**V11517-**				
Without Explosion protection:					
Contrans TH 102 1-channel		1			
Contrans TH 102 2-channel		3			
With Explosion protection Zone 1					
Contrans TH 102-Ex 1-channel ATEX: II 2 G EEx [ia]ib IIC T6		5			
Contrans TH 102-Ex 2-channel ATEX: II 2 G EEx [ia]ib IIC T6		2			
Zone 2 / type N					
Contrans TH 102-Ex N 1-channel ATEX: II 3 G EEx n A II T6		N			
Contrans TH 102-Ex N 2-channel ATEX: II 3 G EEx n A II T6		M			
Programming					
1-channel					
Factory standard parameter			0		
Pt 100, 0...100 °C, 4-wire circut, damping off, direct action characteristic					
overranging at sensor or device error ($\leq$ 23,5 mA)					
Customer-specific parameter definition, two-channel version			1		
2-channel					
Factory standard parameter			2		
Pt 100, 0...100 °C, 4-wire circut, damping off, direct action characteristic					
overranging at sensor or device error ($\leq$ 23,5 mA)					
Customer-specific parameter definition, two-channel version			3		

Accessories

	Catalog No		◢		
H&B FSK modem [EEx ib] IIC (parameter setting in the installation)	0343705				
Smart Vision[5] Software on CD-ROM	7957777				
31/2" Diskettes	7957778				
Smart Vision[5] manual German	7957779				
English	7957780				
TH 02 / -102 / -202 driver for AMS software 1.3.1 (Rosemount)	7957771				

[5] see Data Sheet 63-1.20

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

Notice: for local programming can used the TS 02 programming set (without Parasoft) see Data Sheet 11-8.17

Connection diagram

TH02_AN
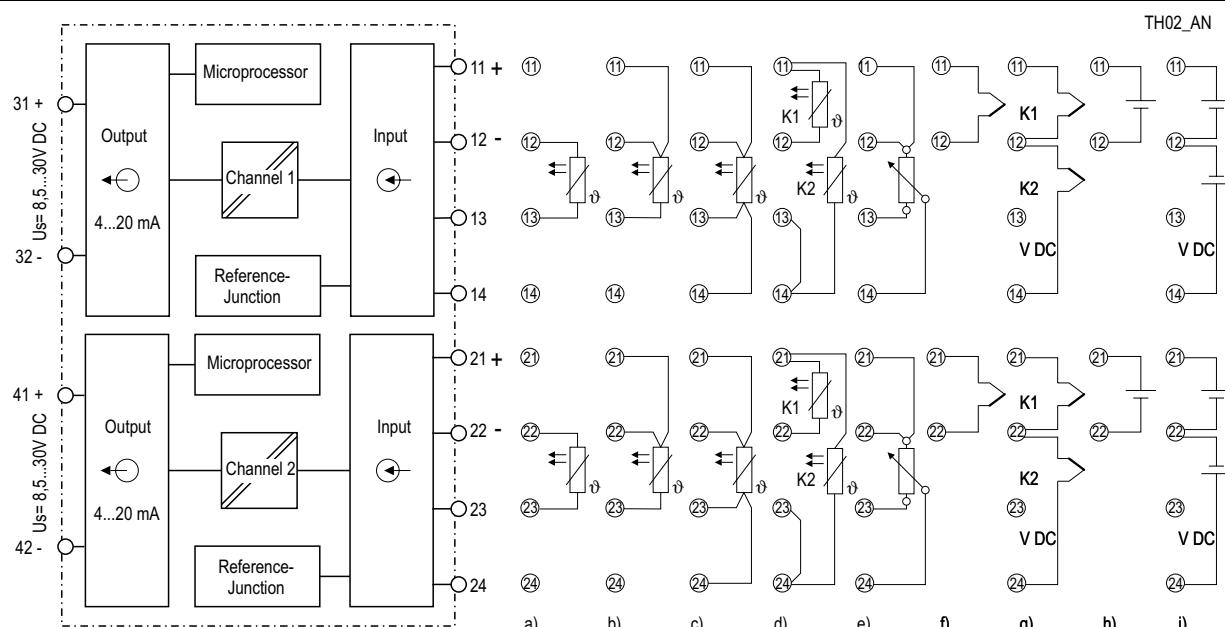
For the 1 channel version view wiring diagram of channel 1

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

Z-20208

Dimensional diagram (dimensions in mm)

z-20207

ABB