

TH 202 / TH 202-Ex

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

10/11-8.64 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

■ 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  II 2 G EEx [ia] ib IIC T6, mount in zone 1
-  II 3 G EEx n A II T6, mount in zone 2
- pressure-proof  II 2 G EEx d IIC T6, mount in zone 1

■ 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
- CoMeter (HART-Configurator/LC-Display)

■ 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 (programmable)	$t_{63} = 0...30$ 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
Resistance min. span	0...500 Ω / 0...5000 Ω 5 Ω / 50 Ω
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 (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....

Power demand of indicators

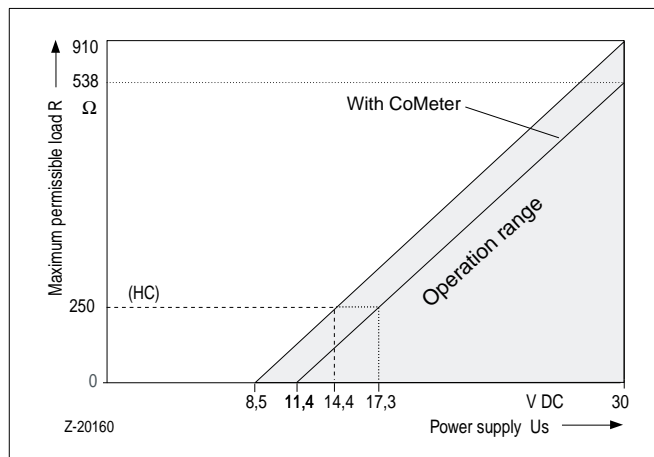
(Power demand of transmitter and indicator have to be added.)

Digital indicator $U_{sd} = 2$ V DC

CoMeter
(HART Configurator/LC-Display) $U_{sd} = 2,9$ V DC

Maximale Load

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



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 (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	1.25 kg (without accessories)
Housing material	Aluminium/stainless steel
Type of protection	IP 67
Color (Epoxy)	light grey (RAL 9002)

Electrical connection

Thread	M20 x 1.5, 1/2" GK 1/2" NPT, 3/4" NPT
Screwings	M20 x 1,5
Ground screw ext./int.	6 mm ² M5 / 2.5 mm ² M4
Terminals, pluggable	2.5 mm ² , screw terminals

Characteristics at rated conditions³⁾

(acc. to IEC 770, related to 25 °C)

Measuring error incl. characteristic deviation	
Pt 100/resistance measurement	< 0.2 % or < 0.2 K / < 80 mΩ whichever value is greater
Thermocouple/mV	< 0.2 % or < 10 μV whichever value is greater

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

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

³⁾ Percentage related to set measuring span

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

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

²⁾ Type K (0...1000 °C): Effect of temperature influence

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 X
Temperature class T6/T5/T4	< 50 °C/65 °C/85 °C
Pressure-proof enclosure	⊕ II 2 G EEx d IIC T6
EC certificate	PTB 99 ATEX X
Temperature class T6/T5/T4	< 50 °C/65 °C/85 °C

Canadian Standards Association and Factory Mutual⁴⁾

4) in preparation

Intrinsically Safe

FM/CSA	Class I, Div.1/Div.2, Group A, B, C, D Class II, Div.1/Div.2, Group E, F, G Class III
FM	Class I, Zone 1, AEx [ia] ib IIC T6
CSA	Class I, Zone 1, Ex [ia] ib IIC T6

Nonincendive

FM/CSA	Class I, Div.2, Group A, B, C, D, T6 Class II, Div.1/Div. 2, Group E, F, G, T6 Class T6
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Explosionsproof

FM/CSA	Class I, Div.1/Div.1, Group A, B, C, D, T6 Class II, Div.1/Div. 2, Group E, F, G, T6 Class III T6
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Flameproof

FM	Class I, Zone 1, AEx d IIC T6
CSA	Class I, Zone 1, Ex d IIC T6

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

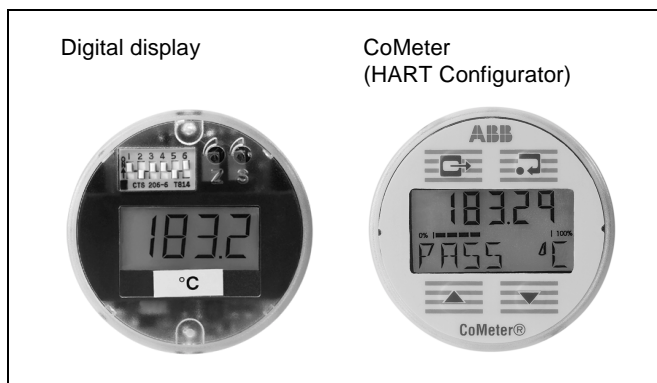
Displays (Option)

Digital indicator

- LC display
 3½ digits (± 1999), digit height 10 mm, 7 segments
- Standard scaling 0...100 %
 Linear scaling for measuring ranges and units possible
 Description of the physical unit (labels)

CoMeter (HART-Configurator/LC-Display)

- 4 function keys for request and programming
 (Code protection)
- LC display:
 5 digits (± 1999), digit height 7,6 mm, 7 segments
- Sign and floating point
- 10 segment bargraph (heading of measuring range)
- 7 digits alphanumeric characters 6 mm, 14 segments



Request function

Process variable, analog and display value, description of measuring point, serial number, error behaviour, lower/upper measuring range limit

Change function

Display mode (linear, average), physical unit, measuring range limits, damping, pass word, mains frequency filter

Special function

Zero point adjustment, simulation of output signal, adjustment of output signal, wet calibration

Display	Digital	Configurator
Response time	0,5 s	1,3 s
Measuring error	± 0,1 %	± 0,15 %
Overtolerance	150 % of input range	215 mA
EMC	EN 50082-2	
Temperature	-20...+70 °C	
Humidity	0...100 %, condensation permitted	

Mind limits of application.

Communication/parameterization

Software-Tools

SMART Vision

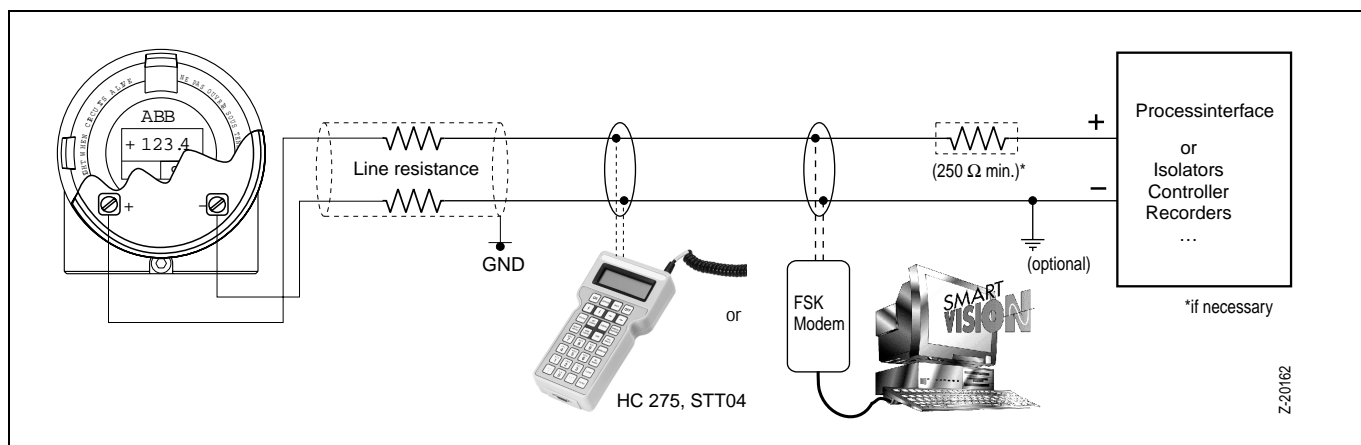
Hand held terminal HHT

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					
TH 202 / TH 202-Ex					V11523-					
TH 202 (without expolsion protection)					1					
With explosion protection:										
Type of protection: intrinsically safe										
TH 202-Ex	PTB / ATEX	II 2 G EEx [ia] ib IIC T6	(Zone 1)	5						
TH 202-Ex	FM / CSA	Class I, Div. 1 / Div 2., Group A,B,C,D		7						
		Class II, Div. 1 / Div. 2, Group E,F,G								
		Class III								
		Class I, Zone 1, AEx [ia] ib IIC T6								
		Class I, Zone 1, Ex [ia] ib IIC T6								
TH 202-Ex N	PTB / ATEX	II 3 G EEx n A II T6	(Zone 2)	N						
	FM / CSA	Class I, Div. 2, Group A,B,C,D, T6 nonincendive								
		Class II, Div. 2, Group E,F,G, T6								
		Class III T6								
Type of protection: pressure-proof enclosure / explosion-proof										
TH 202-Ex d	PTB / ATEX	II 2 G EEx d IIC T6		D						
TH 202-Ex d	FM / CSA	Class I, Div. 1 / Div. 2, Group A,B,C,D, T6		E						
		Class II, Div. 1/ Div. 2, Group E,F,G, T6								
		Class III T6								
Type of protection: flameproof										
TH 202-Ex d	FM	Class 1, Zone 1, AEx d IIC T6		F						
	CSA	Class 1, Zone 1, Ex d IIC T6								
Display / construction										
AGLF housing without display					N					
AGLFD housing with digital indicator					D					
AGLFD housing with Cometer					C					
Material										
Aluminium					A					
Stainless steel					E					
Connections										
with cable-screw-connection		M 20 x 1.5 ¹			M					
		pressure-proof ¹			D					
Thread (without screw connection)		M 20 x 1.5			1					
		1/2" NPT			2					
		3/4" NPT			3					
		1/2" GK			4					
Mounting field housing										
without							1			
Wall mounting (STT 37)							2			
Wall mounting (stainless steel)							3			
Pipe mounting (STT 37)							4			
Pipe mounting (stainless steel)							5			
Programming										
Factory standard parameter:								S		
Pt 100, 4-wire circuit, damping off, direct action characteristic										
overranging at sensor or device error (22 mA)										
Customer-specified parameter definition								K		
Certificates										
Two-point calibration certificate								1		
9-point calibration certificate								2		
customer-specified certificate								3		

¹ metal-screw-connection EEx e bzw. EEx d (cable-diameter 3.5 ... 8.7mm)

Accessories									
					Catalog No				
H&B FSKMmdem [EEx ib] IIC (parameter setting in the installation)					0343705				
SMART-Vision ⁵ Software		on CD-ROM (German/English)			7957777				
		on 3 1/2" diskettes (German/English)			7957778				
SMART-VISION 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 requirements: Intel 80486; 66 MHz; 8MB RAM; free hard-disk capacity; Windows 3.x (95, 98, NT)

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

