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
- **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 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**

ABB Instrumentation

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	0...500 Ω / 0...5000 Ω
min. span	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 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.....

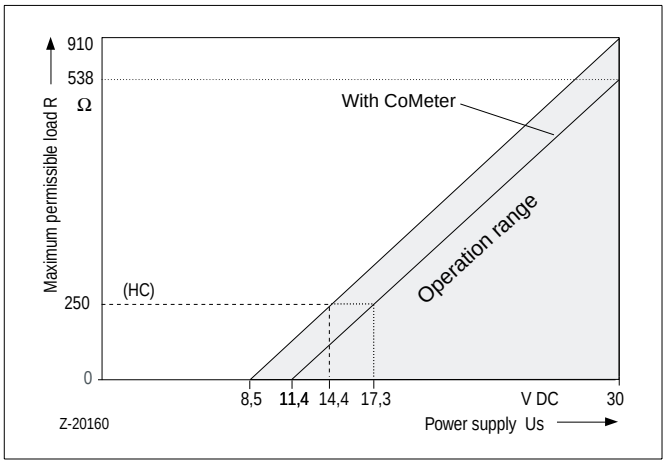
Power demand of indicators

(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

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



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)] 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 ×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 conditions*)

(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 measurement[1)]

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

Thermocouple/mV[2)]

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

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

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
Pressure-proof enclosure	⟨Ex⟩ 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 Mutual [4)]

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

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

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

Class

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

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

Digital display

CoMeter
(HART Configurator)

Display	Digital	Configurator
Response time	0,5 s	1,3 s
Measuring error	± 0,1 %	± 0,15 %
Overvoltage	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

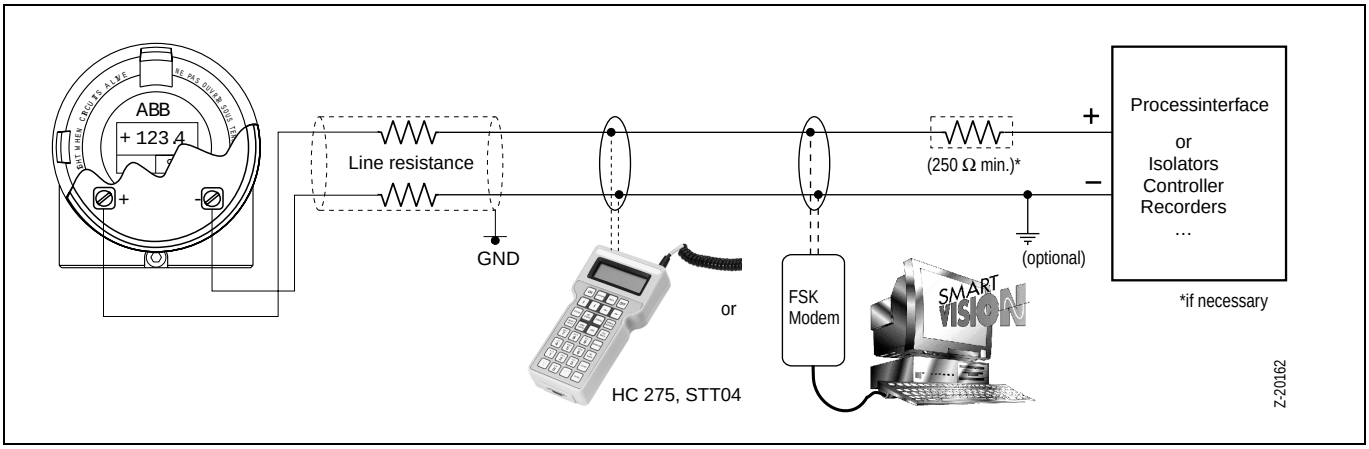
Hand held terminal HHT

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 (stainlees 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

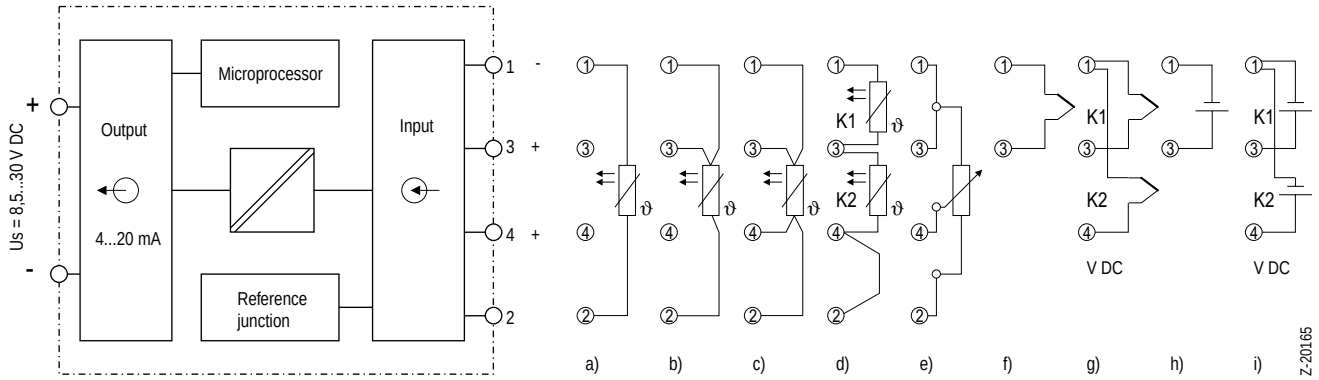
Minimum hardware reuqirements: Intel 80486; 66 MHz, 8MB RAM; free hard-disk capacity; Windows 3.x (95, 98, NT)

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

TH 202 / TH 202-Ex
Field mounted temperature transmitter, HART programmable

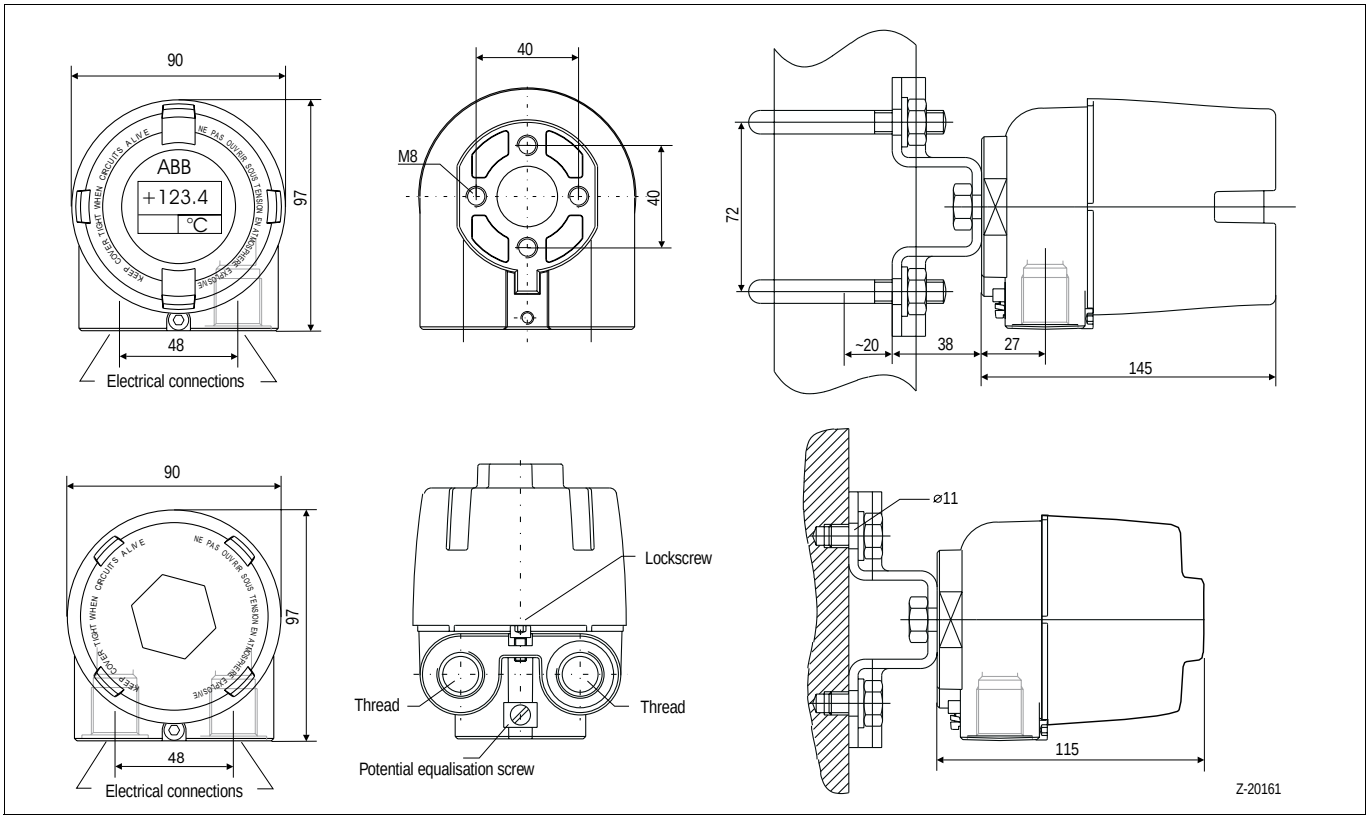
10/11-8.64 EN

Connection diagram



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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Subject to technical changes.
Printed in the Fed. Rep. of Germany
Data Sheet 10/11-8.64 EN 01.2000