

IN-HEAD TRANSMITTER

2-wire; HART® programmable; RTD, T/C, mV, Potentiometer input

IP2605.99

CE 06/1999

MT 105

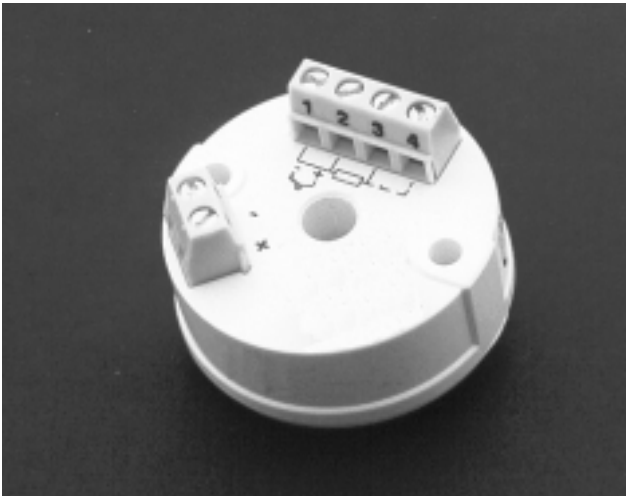
Description

The MT105 2-wire temperature transmitter can be equipped with a variety of different temperature sensors including RTDs, T/C, mV and Potentiometer. Its small mechanical dimension allows mounting in B-size DIN heads. The transmitter can be configured using the standard HART® universal commands. In addition there are specific commands implemented to take full advantage of the temperature transmitter. A PC/Laptop and a HART® modem is required to run the SMARTAH-3 communication software.

- ✓ RTD, T/C, POTENTIOMETER, mV INPUT
- ✓ HART® CONFIGURATION
- ✓ GALVANIC ISOLATION 1,500 VAC
- ✓ FITS STANDARD DIN B-HEADS
- ✓ OPTIONAL INTRINSICALLY SAFE VERSION
- ✓ NEEDS ONLY 10V FOR OPERATION

Technical Characteristics

The MT105 is built around a microprocessor core with a sophisticated program. Basic calibration data and set-up is stored in EEPROM to avoid any loss of data in case of power failure. The transmitter operates from 10...42 VDC and is protected against polarity reversal. The transmitter is equipped with a galvanic isolation of 1,500 VAC between input and output. Sensor error detection is programmable for different output values (down-scale or up-scale). The output signal of 4...20 mA can be reversed or specified for any window within the 4...20 mA range. For thermocouple operation a built-in cold junction compensation (CJC) can be activated or an external Pt100 sensor or thermostat can be attached. The transmitter can be configured with the optional SMARTAH-3 program and a HART® modem. A 250 Ω resistance must be in the current loop to communicate with the transmitter. Load and cable resistance as well as cable capacitance must be considered.



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MT 105

Specification

Supply voltage DC
 Standard.....10 - 42 V ⁽⁵⁾
 Ex-Version.....12 - 30 V ⁽⁵⁾

Isolation voltage.....1500 VAC/ 1 min.
 Warm-up time.....5 min.
 Measuring time.....app. 0.8 s
 Communication interface.....HART®
 Output load
 Standard..... $R_{Load} = (U-10)/0.023$
 Ex-Version..... $R_{Load} = (U-12)/0.023$

Temperature influence
 max. of $\pm 0.25^{\circ}\text{C}/25^{\circ}\text{C}$ or $\pm 0.25\%/25^{\circ}\text{C}$ ⁽¹⁾⁽³⁾
 max. of $\pm 0.5^{\circ}\text{F}/50^{\circ}\text{F}$ or $\pm 0.28\%/50^{\circ}\text{F}$ ⁽¹⁾⁽³⁾

Temperature influence CJC (T/C input)⁽⁴⁾
 $\pm 0.5^{\circ}\text{C}/25^{\circ}\text{C} / \pm 1.0^{\circ}\text{F}/50^{\circ}\text{F}$ ⁽¹⁾⁽³⁾

Linearity error
 resistance input, mV.....0.1%⁽¹⁾
 T/C.....0.1%⁽¹⁾

Calibration inaccuracy
 RTD.....max. of $\pm 0.2^{\circ}\text{C} / \pm 0.4^{\circ}\text{F}$ or $\pm 0.1\%$ ⁽¹⁾
 Potentiometer.....max. of $\pm 0.1\Omega$ or $\pm 0.1\%$ ⁽¹⁾
 mV, T/C.....max. of 20 μV or $\pm 0.1\%$ ⁽¹⁾

Cold junction compensation (CJC)..... $\pm 0.5^{\circ}\text{C}/\pm 0.9^{\circ}\text{F}$
 Sensor wire resistance effect.....negligible⁽²⁾
 Output load effect.....negligible
 Supply voltage effect.....negligible
 RFI influence (0.15 to 1,000MHz, 10V or V/m).....0.2%⁽¹⁾ (typ.)
 Long-term stability.....0.1%/year⁽¹⁾
 Max. wire size.....1 x 1.5 mm²
 Operating temperature.....-40...+85°C
 Humidity.....0 - 95% RH
 Dimensions..... $\varnothing 44 \times 26$ mm
 Tightness (enclosure/terminal).....IP 50/ IP 10
 Weight.....50 g

T/C input:			
Type	Range	Min. span	Norm
AE	-10...+1000 °C	100 °C	JIS C1604 1981
B	0...+1800 °C	200 °C	IEC 584
E	-200...+1000 °C	50 °C	IEC 584
J	-200...+1000 °C	50 °C	IEC 584
K	-200...+1350 °C	50 °C	IEC 584
L	-200...+900 °C	50 °C	DIN 43710
N	0...+1300 °C	50 °C	IEC 584
R	-50...+1750 °C	50 °C	IEC 584
S	-50...+1750 °C	50 °C	IEC 584
T	-200...+400 °C	50 °C	IEC 584
U	-200...+600 °C	50 °C	DIN 43710
custom	customer specific linearization (up to 50 setpoints)		

Input impedance.....> 10 M Ω
 Max. cable resistance.....500 Ω

RTD Input:		
Pt100	-200...+1000 °C	min. span 10 °C
Pt1000	-200...+200 °C	min. span 10 °C
Pt custom	Pt10 - Pt1000 with $a=0.00385$	
Hi100	-60...+250 °C	min. span 10 °C
Hi1000	-60...+150 °C	min. span 10 °C
D100	-200...+1000°C	min. span 10 °C
Lin.R	0...2000 Ω hm	min. span 10 Ω hm

Max. cable resistance per wire.....25 Ω
 Sensor current.....nom. 0.3 mA

Linear resistance input:

Measurement range.....0 - 2000 Ω
 Min. measurement range.....10 Ω
 Max. cable resistance per wire.....25 Ω
 Sensor current.....nom. 0.3 mA

Voltage input:

Measurement range.....-10 - +500 mV
 Min. measurement range.....2 mV
 Input resistance.....> 10 M Ω

Sensor error detection (programmable):

down-scale.....3.6 mA
 up-scale.....23 mA

EMC-data:

Emission.....EN 50 081
 Immunity.....EN 50 082

Output:

Current.....4 - 20 mA or 20 - 4 mA
 Resolution.....5 μA
 Min. signal.....3.6 mA
 Max. signal.....23 mA

EEx data:

$U_{max.in}$30 VDC
 $I_{max.in}$100 mA
 P_{max}0.9 W
 L_r1 mH
 C_r1 nF
 Approvals.....EEx ia IIC T4-T6

Max. ambient temperature for T4.....85°C
 Max. ambient temperature for T5.....65°C
 Max. ambient temperature for T6.....50°C

HART® is a registered trademark of the
 HART Communication Foundation

- (1) of input span
 (2) with equal wire resistance (3-wire connection)
 (3) If zero-deflection > 100% of input span:
 add 0.125% of input span/25°C or 0.14% of input span/
 50°F per 100% zero-deflection
 (4) reference temperature 23°C/ 73°F

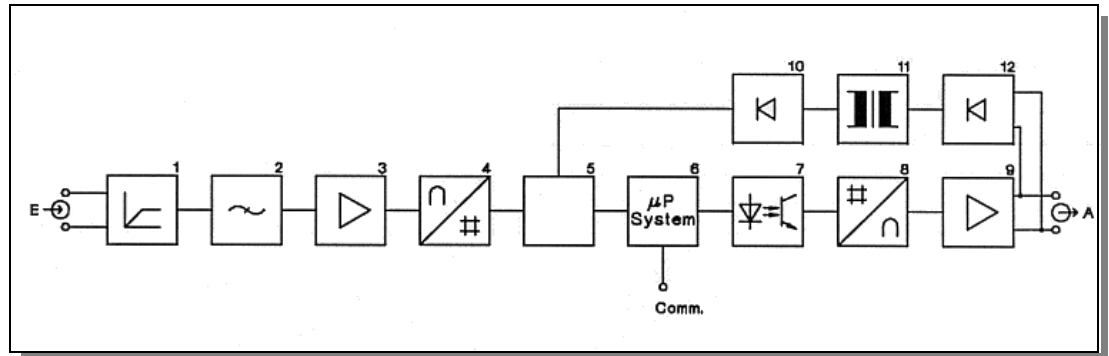
(5) With 250 Ohm in loop, a minimum of 15.75V (Ex 17.75V) is required

Subject to change without notice

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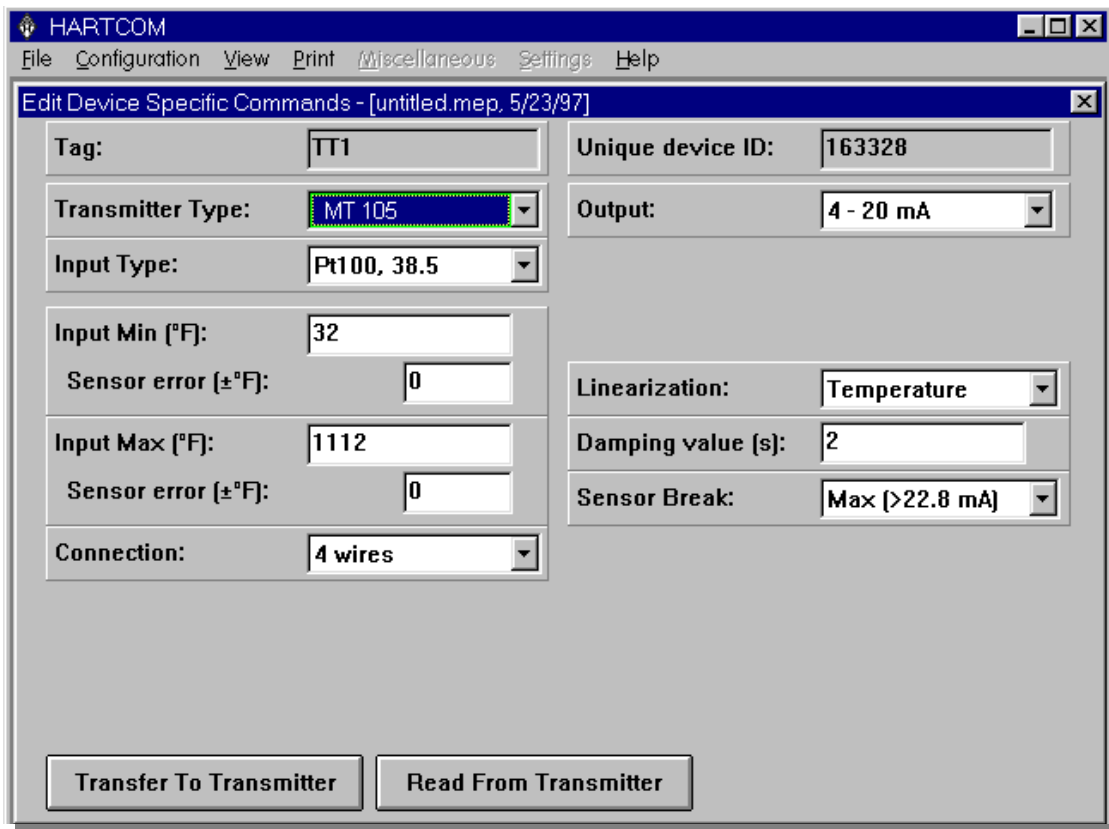
BLOCK DIAGRAM

- 1 Input conditioning
 - 2 Filter
 - 3 Pre-amplifier
 - 4 A/D-converter
 - 5 Logic control
 - 6 μ P-system
 - 7 Optocoupler
 - 8 D/A-converter
 - 9 Output amplifier
 - 10 Rectifier
 - 11 Electric isolation
 - 12 Rectifier
 - E Input
 - A Output
- Comm PC communication port

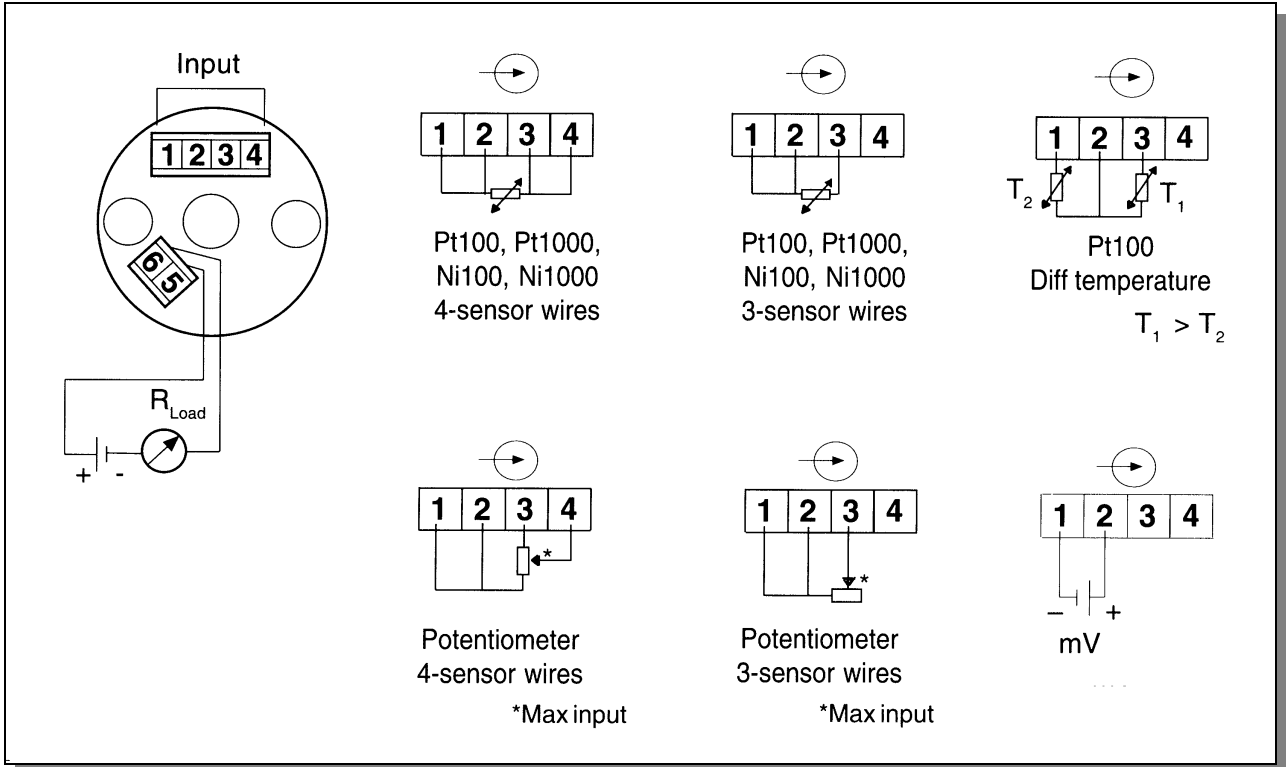


PROGRAMMING

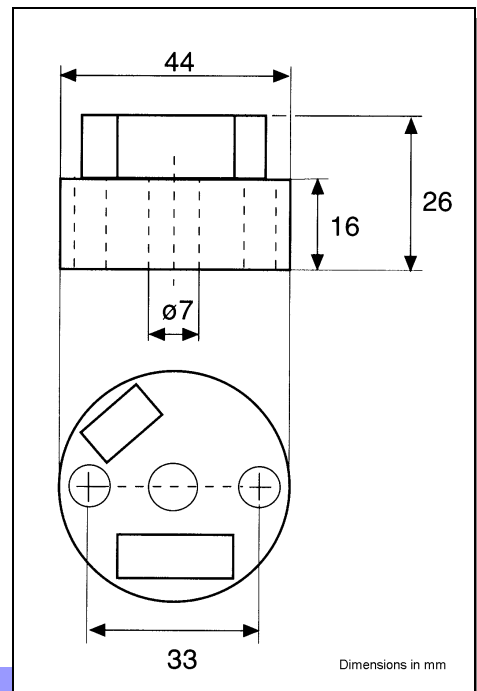
The optional SMARTAH-3 software allows for easy programming of all parameters of the MT105 transmitter.



ELECTRICAL CONNECTIONS



MECHANICAL DIMENSIONS



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