

IN-HEAD TRANSMITTER

2-wire; PC-configurable; RTD, T/C, mV, Potentiometer input

IP2105.99

CE 06/1999

MT102

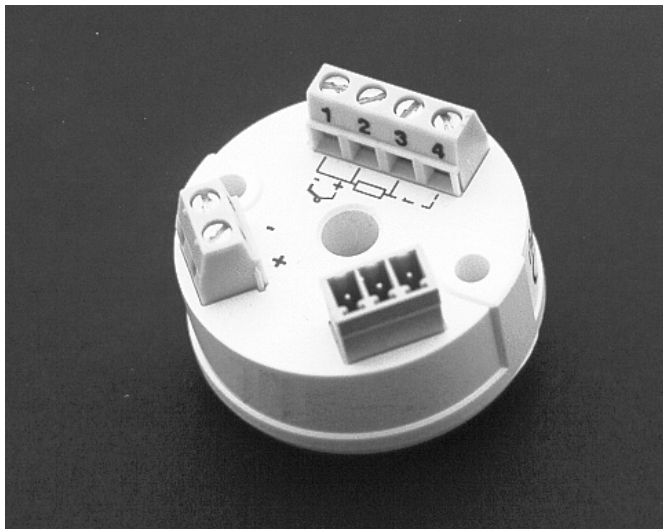
Description

The MT102 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 a personal computer and the Windows compatible SMART-2 communication software. Thermocouples which are not available in the standard configuration can be customer linearized with 8 set-points and the CJC can be adjusted with 4 set-points. A sensor/ line-break signal can be programmed to be up-scale or down-scale. The transmitter can be configured to output a calibration signal for a defined time frame during commissioning.

- ✓ RTD, T/C, POTENTIOMETER, mV INPUT
- ✓ PC CONFIGURATION
- ✓ GALVANIC ISOLATION 1,500 VAC
- ✓ FITS STANDARD DIN B-HEADS
- ✓ OPTIONAL INTRINSICALLY SAFE VERSION
- ✓ NEEDS ONLY 6.5V FOR OPERATION

Technical Characteristics

The MT102 is build around a microprocessor core with a sophisticated program. Basic calibration data and set-up is stored in EEPROM to avoid any lost of data in case of power failure. The transmitter operates from 6.5...36 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 build-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 SMART-2 program and the included serial PC-cable.



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MT102

Specification

Common specification:

Supply voltage DC
 Standard.....6.5 - 36V
 Ex-Version.....8.0 - 30V
 Isolation voltage.....1,500 VAC/ 1min.
 Warm-up time.....5min.
 Measuring time.....app. 1.5s
 Communication interface.....proprietary
 Output load..... $R_{Load} = (U-6.5)/0.02$
 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.....0.2%⁽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).....0.1%⁽¹⁾ (typ.)
 Long-term stability.....0.1%/year⁽¹⁾
 Max. wire size.....1.5 mm², AWG16
 Operating temperature.....-40...+85°
 Humidity.....0 - 95% RH
 Dimensions..... \varnothing 44 x 26 mm
 Mounting.....DIN B-head or larger
 Tightness (enclosure/terminal).....IP 50/ IP 10
 Material/ Flammability (UL).....PC + ABS/V0, Polyamide/V2
 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...+1200 °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 8 setpoints)		

Input impedance.....> 10 M Ω
 Max. cable resistance per wire.....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 $a=0.00385$	
Ni100	-60...+250 °C	min. span 10 °C
Ni1000	-60...+150 °C	min. span 10 °C
Lin.R	0...2000 Ohm	min. span 10 Ohm

Max. cable resistance per wire.....25 Ω
 Sensor current.....nom. 0.4 mA

Linear resistance input:

Measurement range.....0 - 2000 Ω
 Min. measurement range.....10 Ω
 Max. cable resistance per wire.....25 Ω
 Sensor current.....nom. 0.4 mA

Voltage input:

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

Sensor error detection (programmable):

down-scale.....3.5 mA
 up-scale.....21.6 mA

Output:

Current.....4 - 20 mA or 20 - 4 mA
 Resolution.....5 μA
 Min. signal.....3.8 mA
 Max. signal.....20.5 mA
 Instrument Calibration Signal.....4, 12, 20, 12, 4 ...mA
 (in 15 sec. intervals)

EMC-data:

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

EEx data:

$U_{max.in.}$30 VDC
 $I_{max.in.}$100 mA
 $P_{max.}$0.9 W
 $L_{eq.}$appr. 0 mH
 $C_{eq.}$appr. 0 μF
 Approvals.....EEx ia IIC T4-T6
 Applicable in zone
 Max. ambient temperature for T4.....85°C
 Max. ambient temperature for T5.....65°C
 Max. ambient temperature for T6.....50°C

(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

Subject to change without notice

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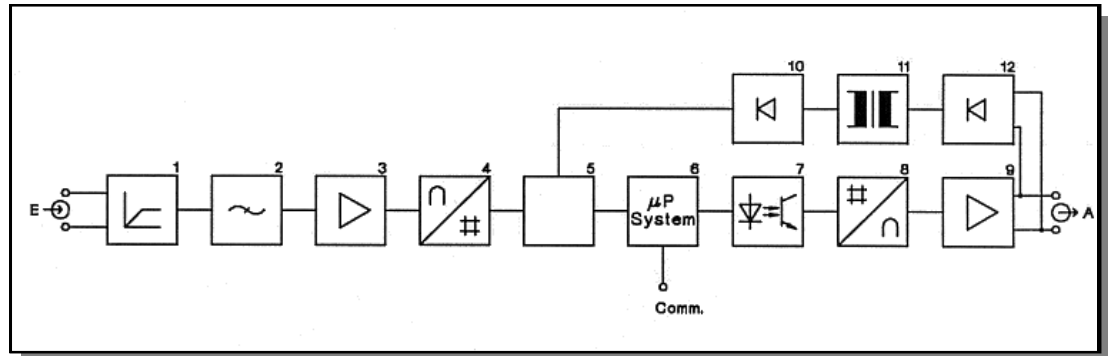
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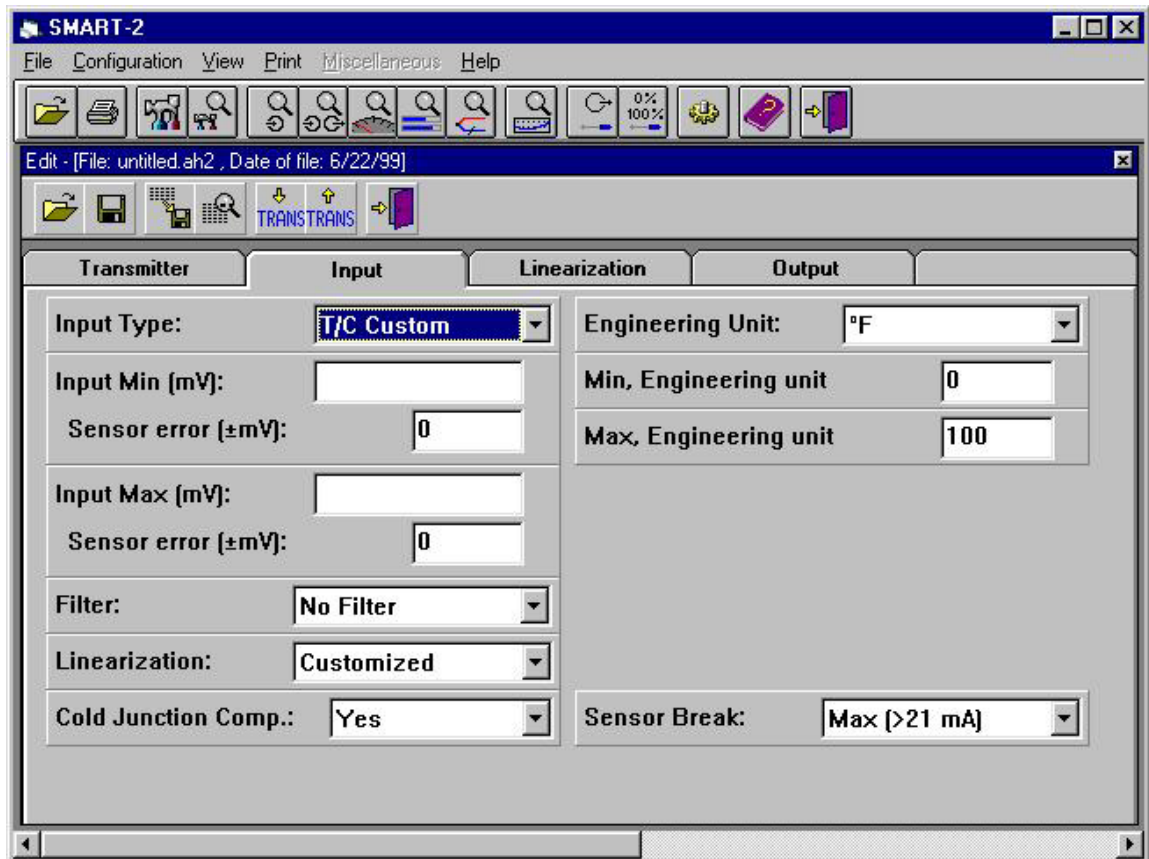
BLOCK DIAGRAM

- 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

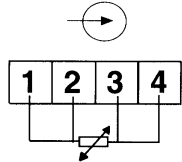
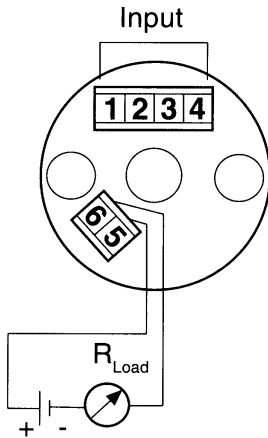


PROGRAMMING

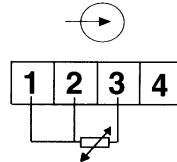
The optional SMART-2 software allows for easy programming of all parameters of the MT102 transmitter.



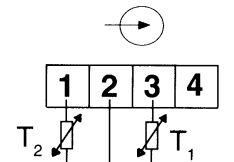
ELECTRICAL CONNECTIONS



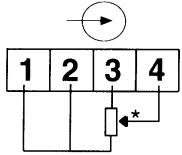
Pt100, Pt1000,
Ni100, Ni1000
4-sensor wires



Pt100, Pt1000,
Ni100, Ni1000
3-sensor wires

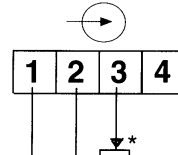


Pt100
Diff temperature
 $T_1 > T_2$



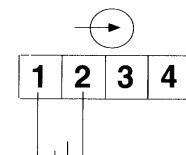
Potentiometer
4-sensor wires

*Max input



Potentiometer
3-sensor wires

*Max input



mV
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MECHANICAL DIMENSIONS

