DIN-RAIL MOUNTING TRANSMITTER

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

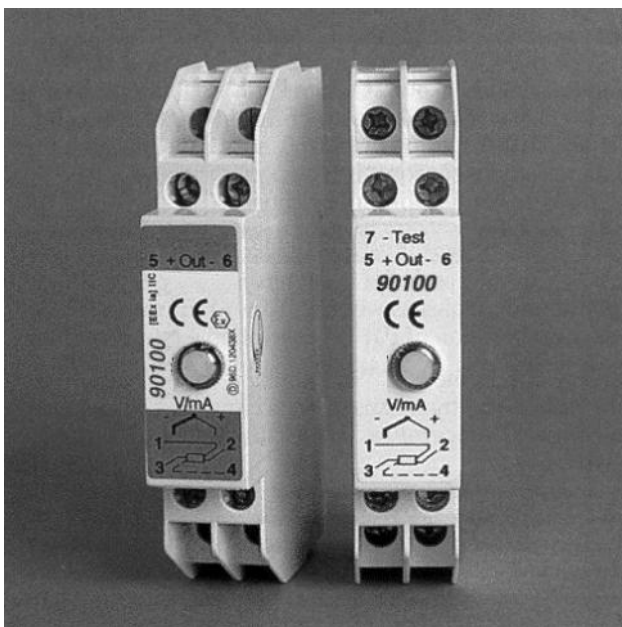IP2509.99   CE 07/2013

Description

The 90100 2-wire temperature transmitter can be equipped with a variety of different temperature sensors including RTDs, T/C, mV and Potentiometer. With its small 17.5mm wide housing it is perfect for DIN rail mounting. 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 during commissioning stage.

✓ **RTD, T/C, POTENTIOMETER, mV INPUT**

✓ **PC CONFIGURATION**

✓ **GALVANIC ISOLATION 1,500 VAC**

✓ **FITS STANDARD DIN RAIL 35MM**

✓ **ONLY 17.5MM WIDE**

✓ **NEEDS ONLY 7.5V FOR OPERATION**

✓ **OPTIONAL INTRISICALLY SAFE**

Technical Characteristics

The 90100 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 7.5...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 SMART-2 program and the included serial PC-cable.

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Specification

Supply voltage DC
    Standard...7.5 - 36V
    Ex-Version (I.S.).......................................8.0 - 30V
Isolation voltage..1,500 VAC/ 1min.
Warm-up time...5min.
Measuring time...app. 0.5 s
Communication interface..proprietary
Output load.............................R_{Load} = (U-7.5)/0.02
Temperature influence
    max. of ±0.25°C/ 25°C or ±0.25%/25°C [1][3]
    max. of ±0.5°F/ 50°F or ±0.28%/50°F [1][3]
Temperature influence CJC (T/C input)[4]
    ±0.5°C/ 25°C / ±1.0°F/ 50°F [1][3]
Linearity error
    resistance input, mV.....................................0.1%[1]
    T/C..0.2%[1]
Calibration inaccuracy
    RTD..................max. of ±0.2°C / ±0.4°F or ±0.1%[1]
    Potentiometer...................max. of ±0.1Ω or ±0.1%[1]
    mV, T/C....................max. of 2o µV or ±0.1%[1]
Cold junction compensation (CJC)....................±0.5°C/ ±0.9°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...............................1.5 mm², AWG16
Operating temperature... -20...+70°C
Humidity..0 - 95% RH
Dimensions (w x h x d)...............................17.5 x 90 x 58 mm
Tightness (enclosure/terminal)........................ IP 20
Weight...70 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 8 setpoints)		

Input impedance...> 10 MΩ
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 MΩ

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...appr. 3 mA
Max. signal...appr. 22 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
    $L_{eq.}$...not applicable
    $C_{eq.}$...not applicable
    Approvals..[EEx ia] IIC[6]

(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) separate version of 90100, only for current input
(5) reference temperature 23°C/ 73°F
(6) Transmitter must be placed outside the hazardous area
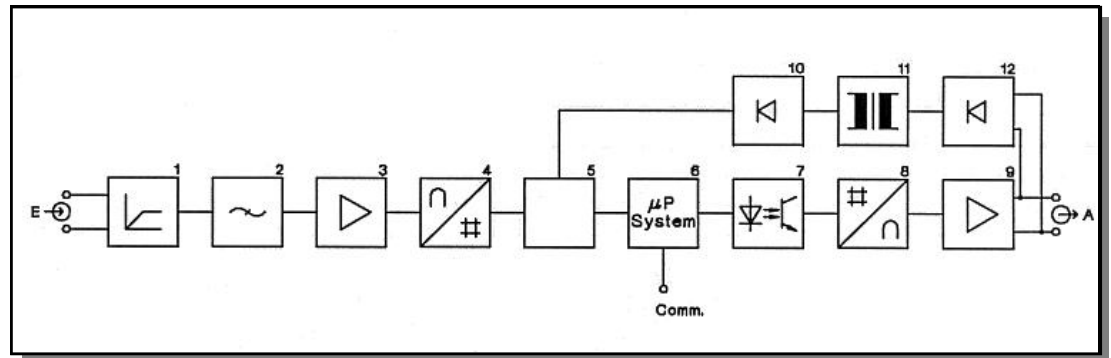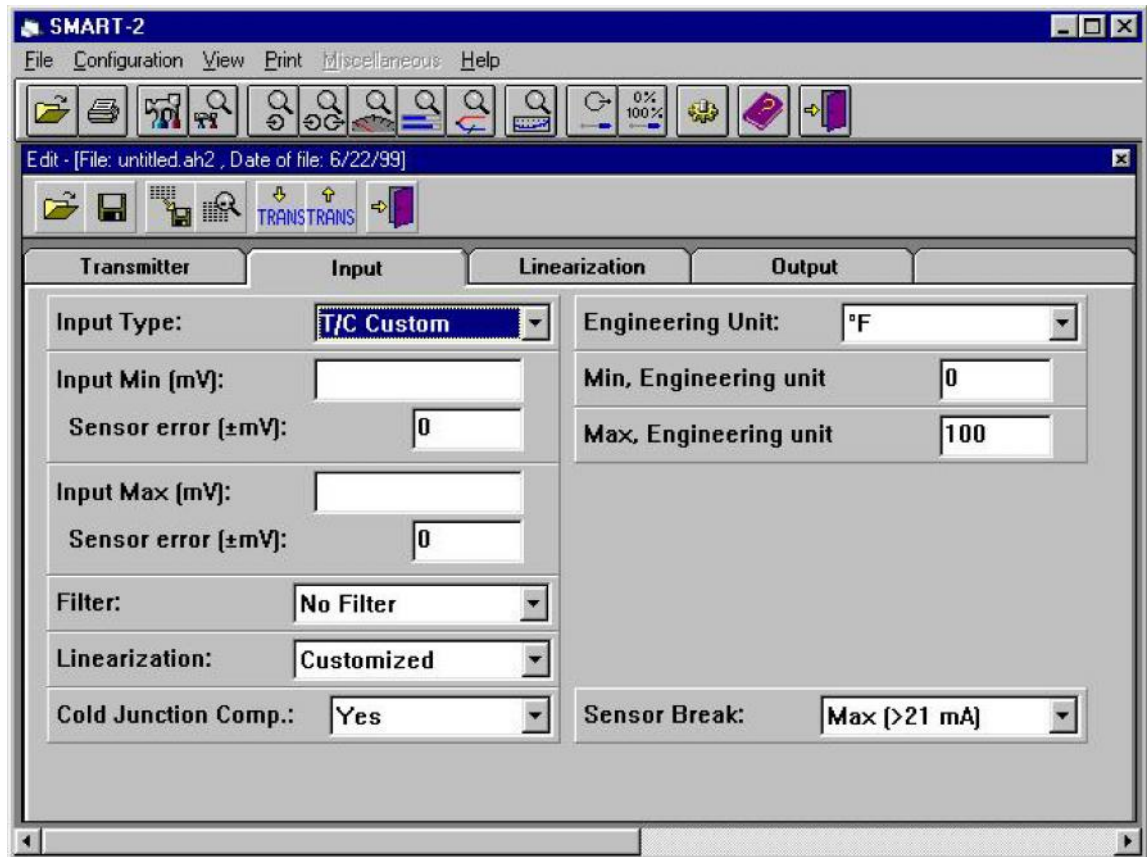**Subject to change without notice**

BLOCK DIAGRAM

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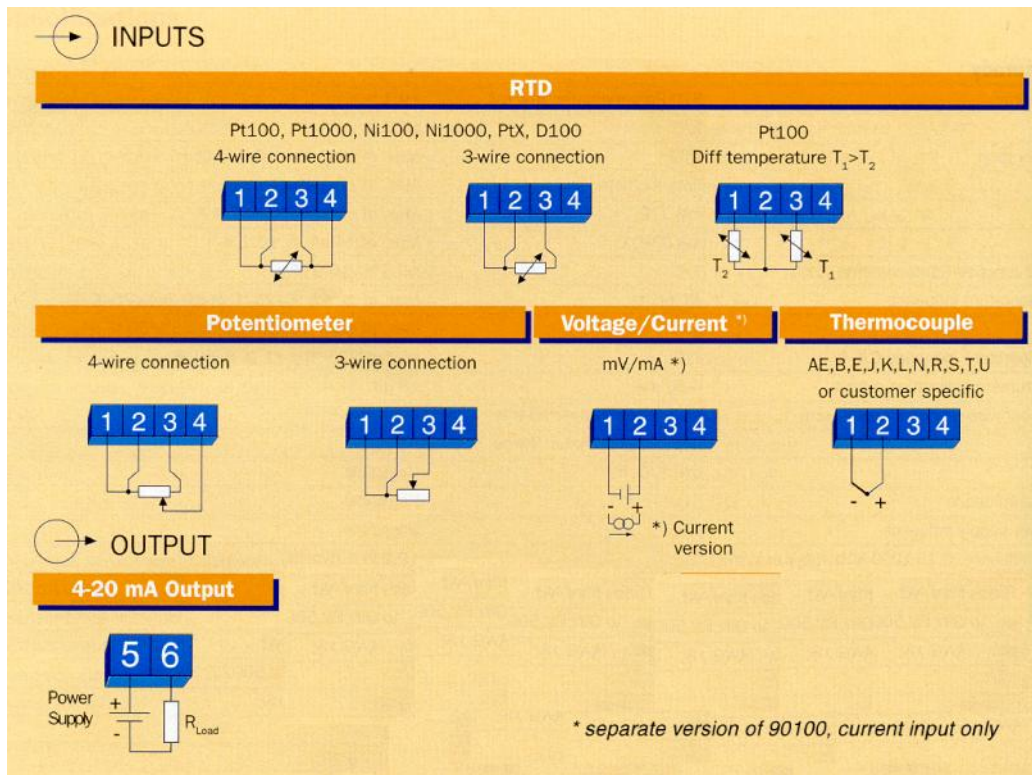12   Rectifier
E   Input
A   Output
Comm PC communication port

PROGRAMMING

The optional SMART-2 software allows for easy programming of all parameters of the 90100 transmitter.

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SENSOR CONNECTIONS

INPUTS

RTD

Pt100, Pt1000, Ni100, Ni1000, PtX, D100
4-wire connection | 3-wire connection | Pt100 Diff temperature T$_1$>T$_2$

Potentiometer | **Voltage/Current *)** | **Thermocouple**

4-wire connection | 3-wire connection | mV/mA *) | AE,B,E,J,K,L,N,R,S,T,U or customer specific

OUTPUT

4-20 mA Output

Power Supply

*) Current version

* separate version of 90100, current input only

DIMENSIONS AND CONNECTIONS

Power Supply

Test (mA)

R$_{Load}$

I$_{Out}$

7 - Test
5+ Out - 6

PC Connection

V/mA

Input

17.5/0.69   58/2.28

35/1.38   45/1.77   90/3.54

mm / inches

90100