

UNIVERSAL SMART TRANSMITTER

USE-2

- HIGH ACCURACY
- 3 1/2 DIGITS LED DISPLAY
- INPUTS: T/C, RTD, Ohm and mV
- GALVANIC ISOLATION
- DRY CONFIGURATION™
- LOW COST
- 3 YEAR WARRANTY



The USE-2 is a digital, PC programmable, galvanically isolated two-wire smart transmitter.

The USE-2 converts 13 types of thermocouple sensors; 12 types of RTD sensors, configured as 2, 3 and 4 wires; potentiometer, resistor and millivolt inputs, single or differential - into process current loop.

A 3 ½ digits LED display is integrated forming transmitter / field monitor unit which is visible in dark installations.

A 24 bit A/D converter is the heart of the outstanding performance.

The transmitter can be set and wired to perform differential measurement conversions of temperature sensors as well as mV sources.

The output current is temperature linearized and can be set to be 4 to 20 / 20 to 4mA - or any range within these limits. The current is limited to 3.6 and 22mA.

The USE-2 samples and updates the output current in a rate of 2 - 4 samples per second depends on the sensor type.

The transmitter is fully configurable in Dry-Configuration™ mode by which the connection to PC is performed with no voltage needed. The configuration parameters are stored in a non-volatile memory.

Exceptional digital accuracy of typical $\pm 0.1^{\circ}\text{C}$ (typical) is provided for most sensors regardless of the calibrated span. Extremely accurate cold -junction temperature measurement provides precise compensation throughout the entire ambient range.

Detection of sensor breakage or disconnection of input leads, forces the output to a pre-defined up/down scale value. The unit continuously monitors the sensor and automatically returns to normal operation mode when the sensor is recovered.

The USE-2 is housed in Aluminum or Stainless Steel enclosures. The front panel is special red filter for optimal view.

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Input

Input Impedance	> 10 ⁷ Ω
Maximum Input Voltage	1V

Thermocouple and Millivolts

Type	Standard	Input range °C	Input range °F	Minimum Span	Digital Accuracy ²	D/A Accuracy ¹
B Pt30Rh-Pt6Rh	IEC 584-1 ITS-90	100 to 1820	212 to 3308	200°C / 360°F	±0.5°C	±0.1%
E NiCr-Con	IEC 584-1 ITS-90	-200 to 1000	-328 to 1832	50°C / 90°F	±0.1°C	
J Fe-Con	IEC 584-1 ITS-90	-200 to 1200	-328 to 2192	50°C / 90°F	±0.1°C	
K NiCr-Ni	IEC 584-1 ITS-90	-200 to 1370	-328 to 2498	50°C / 90°F	±0.1°C	
L Fe-Con	IEC 584-1 ITS-90	-190 to 890	-310 to 1634	25°C / 45°F	±0.1°C	
N NiCrSi-NiSi	IEC 584-1 ITS-90	-200 to 1300	-328 to 2372	25°C / 45°F	±0.1°C	
R Pt3Rh-Pt	IEC 584-1 ITS-90	0 to 1760	32 to 3200	200°C / 360°F	±0.5°C	
S Pt10Rh-Pt	IEC 584-1 ITS-90	0 to 1760	32 to 3200	200°C / 360°F	±0.5°C	
T Cu-Con	IEC 584-1 ITS-90	-200 to 400	-328 to 752	50°C / 90°F	±0.1°C	
U Cu-Con	IEC 584-1 ITS-90	-190 to 590	-310 to 1094	25°C / 45°F	±0.1°C	
D W3Re-W25Re	ASTM E988-90	0 to 2230	32 to 4046	25°C / 45°F	±0.5°C	
G W-W26Re	ASTM E988-90	0 to 2160	32 to 3920	25°C / 45°F	±0.5°C	
C W5Re-W26Re	ASTM E988-90 ITS-90	-15 to 2320	5 to 4208	25°C / 45°F	±0.5°C	
Millivolt Input		-145 to 145		2 mV	±5μV	
Mode	T/C: single or differential sensor			Voltage: ordinary or differential		
Cold Junction	Internal Pt-100 sensor					
C.J Accuracy	±0.5°C (±0.9°F)					
Sampling Rate	T/C: single: 4, differential: 2 (S/sec)			Voltage: 4, differential: 2 (S/sec)		

Total probable accuracy for T/C measurement equals to: $\sqrt{C.J.E^2 + DA^2 + (span * 2 * 10^{-4})^2}$ where C.J.E is the cold-junction error and DA is the digital accuracy value for the specific T/C.

Resistor Temperature Detector (RTD)

Type	Standard	Input range °C	Input range °F	Minimum Span	Digital Accuracy ²	D/A Accuracy ¹
Pt-50	α=0.00385 Ω/Ω/°C ITS-90	-200 to 850	-328 to 1562	10°C / 18°F	±0.15°C	±0.1%
Pt-100		-200 to 850	-328 to 1562	10°C / 18°F	±0.1°C	
Pt-500		-200 to 690	-328 to 1274	10°C / 18°F	±0.1°C	
Pt-1000		-200 to 690	-328 to 1274	10°C / 18°F	±0.1°C	
Pt-50	α=0.00392 Ω/Ω/°C	-100 to 455	-148 to 851	10°C / 18°F	±0.15°C	
Pt-100		-100 to 455	-148 to 851	10°C / 18°F	±0.1°C	
Pt-500		-100 to 455	-148 to 851	10°C / 18°F	±0.1°C	
Pt-1000		-100 to 455	-148 to 851	10°C / 18°F	±0.1°C	
Ni-Fe		-200 to 260	-328 to 500	10°C / 18°F	±0.1°C	
Ni-120		-80 to 260	-112 to 500	10°C / 18°F	±0.1°C	
Ni-1000		-50 to 160	-58 to 320	10°C / 18°F	±0.1°C	
Cu-10		-120 to 260	-184 to 500	10°C / 18°F	±0.1°C	
Resistor	Potentiometer	0 to 10 KΩ		4 ohm	±0.1% ¹	
Connection Type	2, 3 or 4-wire					
Mode	Single Sensor Mode			Dual Sensor –Differential Mode		
Sensor Current	< 0.2 mA for Pt-100					
Sampling Rate	Single Sensor: 3, Differential: 2 S/sec			Potentiometer: 2 S/sec		

Example: Pt-100 sensor input, configured to 0-50°C: The digital accuracy would be ±0.1°C, the D/A accuracy would be ±50 x 0.1 / 100= ±0.05°C, Total maximum accuracy = ±0.15°C.

Output

Output Signal	Proportional dc current 4-20mA or 20-4mA (user configurable)
Under Range/ Over Range	Linear to 3.97mA/ 20.8mA
Burnout	~ 3.6mA or ~22.5mA (user configurable)
Isolation	>1500V between input and output
Output Linearity	For temperature sensors - linear with temperature
	For potentiometer - linear with potentiometer ratio
	For millivolt input - linear with the measured voltage
Long Term Stability	< ± 0.1% of span for 12 months
Maximum Loop Resistance	According to: $R_{max}(\Omega) = (V_{supply}-13)/0.02$
Calibration Accuracy	At 24V supply, at room temperature : 0.05% ¹
Damping Factor	1 - 60 seconds
Analog Step-Response	200-500mS (depends on the sensor and the mode of operation)
Set-Up Time	10 seconds after power on

Display

Display	3 1/2 digits LED (-1999 to 1999) + one decimal point
Display Size	0.32" digit height
Display Color	Red
Intensity	Varies as a function of the output current

Supply

Supply Voltage	13 to 36 Vdc
Supply Variation Effect	Negligible (<1 μA/V)
Polarity Protection	Yes
CMR	> 110 db

Environmental Influence

Operating Temperature Range	-40 to +80°C / -40 to 185°F
Storage Temperature Range	-50 to +90°C / -45 to 185°F
Temperature Stability	< ±0.004%/1°C ¹
Humidity	10 to 90 % RH, non condensing

Housing³

Material	Aluminum
Probe Thread	3/4" NPT
Weight	900 gr.

Programming

Software Package	CONCAL
Modem Cord	CON-USB . Length: 1.5m
Configured Parameters	Tag information, Sensor type, Input range, Display range, Selection of connection type, Output offset, Output curve correction, Damping factor, Burnout type, Output current mode, Sensor calibration

¹. Of span (typical)

². Typical. The digital readout can be accessed via the programming communication port.

³. This enclosure *is not* an Ex proof enclosure.

Transmitter Configuration

The CONCAL configuration and calibration software is a PC-based software package.

The PC is connected to the transmitter via CON-USB, communication cable for USB port. This communication cables contains the electronic interface circuitry for DRY CONFIGURATION™.

The DRY CONFIGURATION™ feature makes the configuration process very easy, as it does not require the transmitter to be wired to an external power supply.

The Windows based software conducts the user to the configuration steps in a friendly and simple interactive way.

The PC requirements are:

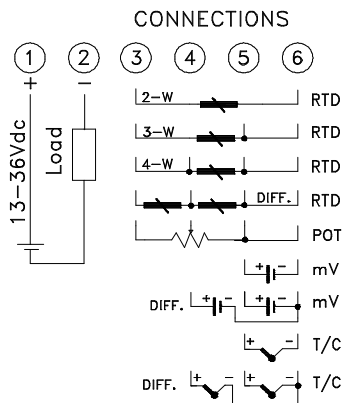
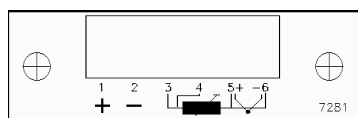
PC Operating System:

Microsoft Windows 98®, Windows XP®, Windows NT®, Windows Vista®.

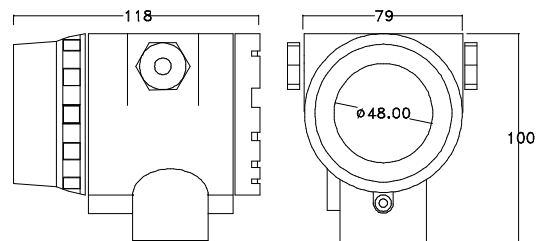
Display: Color display with screen resolution of 1024x768. Lower resolution will require scrolling for accommodation of the configuration window.

Free Disk Space: 15 MB

Connection Diagram



Dimensions



data subject to change without notice

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