

Pyromotion, INC.



RTD Temperature Transmitters

Programmable temperature transmitters for RTDs, thermocouples and voltage inputs

Features

- ◆ **Universally PC programmable for various signals**
- ◆ **Optional HART communications**
- ◆ **2 wire technology, (4 to 20) mA analog output**
- ◆ **High accuracy in total ambient temperature range**
- ◆ **Galvanic isolation**
- ◆ **Fault signal on sensor break or short circuit**
- ◆ **RFI/EMI Protected**
- ◆ **Online configuration during measurement using SETUP connector**

Pyromotion's RTD transmitters are low cost and highly reliable devices that produce a linearized 4-20mA output current signal that is directly proportional to the RTD temperature measuring element. Units are small in size and designed to fit inside Pyromotion's terminal heads, thermostat housings, electrical boxes, or to surface mount on panel subplates. They can also be used for surface mounting by using a 35mm DIN rail mounting clip. The 440 Series programmable temperature

transmitters can measure input for resistance thermometers (RTD) in 2, 3 or 4 wire connections, thermocouples, resistance and voltage. Setting up of the transmitter is done using a RS 232 communication cable and PC software. The model 442 has HART protocol.

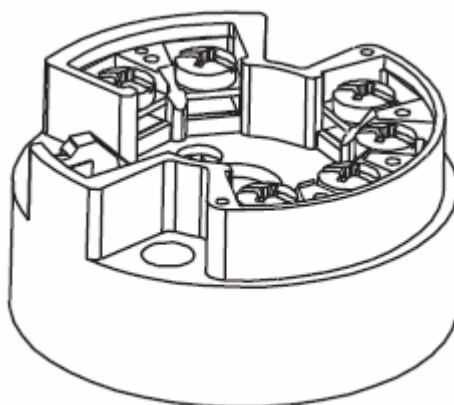
Wisner Controls stocks and will program your transmitter for same day shipment. There is also factory express service available for non stock RTD's needed in an emergency.



The **Pyromation** Series 441 programmable temperature transmitter is a two-wire transmitter with an analog output. It has measurement input for resistance thermometers (RTD) in 2, 3 or 4 wire connection, thermocouples, resistance and voltage. Setting up of the transmitter is done using the 440-CABLEKIT. These small units can be mounted in Pyromation DIN (Form B) heads or they can be used for surface mounting by using a 35 mm DIN rail mounting clip.

Temperature Head Transmitter

Universal head transmitter for resistance thermometers (RTD), thermocouples, resistance and voltage transmitters, settable using a PC, for installation in a sensor head.



Application Areas

- PC programmable temperature head transmitter for converting various input signals into an scalable (4 to 20) mA analog output signal
- Input:
 - Resistance thermometer (RTD)
 - Thermocouple (TC)
 - Resistance (Ω)
 - Voltage (mV)
- Online configuration using PC with SETUP connector

Features and Benefits

- Universally PC programmable for various signals
- Galvanic isolation
- 2 wire technology, (4 to 20) mA analog output
- High accuracy in total ambient temperature range
- Fault signal on sensor break or short circuit
- RFI/EMI Protected
- Online configuration during measurement using SETUP connector
- Output simulation



INPUT

Resistance Thermometer (RTD)

Type	Measurement Ranges	Minimum Range
Pt100	(-200 to 850) °C [-328 to 1562] °F	10° C [18 °F]
Pt500	(-200 to 250) °C [-328 to 482] °F	10° C [18 °F]
Pt1000 according to IEC 751	(-200 to 250) °C [-328 to 482] °F	10° C [18 °F]
Ni100	(-60 to 180) °C [-76 to 356] °F	10° C [18 °F]
Ni500	(-60 to 150) °C [-76 to 302] °F	10° C [18 °F]
Ni1000 according to DIN 43760	(-60 to 150) °C [-76 to 302] °F	10° C [18 °F]
Connection Type	2, 3 or 4 wire connection cable resistance compensation possible in the 2 wire system (0 to 20) Ω	
Sensor Cable Resistance	maximum 11 Ω per cable	
Sensor current	≤ 0.6 mA	

Resistance (Ω)

Type	Measurement Ranges	Minimum Range
Resistance (Ω)	(10 to 400) Ω (10 to 2000) Ω	10 Ω 100 Ω

Thermocouples (TC)

Type	Measurement Ranges	Minimum Range
B (PtRh30-PtRh6)	(0 to 1820) °C [32 to 3308] °F	500 °C [900 °F]
C (W5Re-W26Re) ^[31]	(0 to 2320) °C [32 to 4208] °F	500 °C [900 °F]
D (W3Re-W25Re) ^[31]	(0 to 2495) °C [32 to 4523] °F	500 °C [900 °F]
E (NiCr-CuNi)	(-200 to 915) °C [-328 to 1679] °F	50 °C [90 °F]
J (Fe-CuNi)	(-200 to 1200) °C [-328 to 2192] °F	50 °C [90 °F]
K (NiCr-Ni)	(-200 to 1372) °C [-328 to 2501] °F	50 °C [90 °F]
L (Fe-CuNi) ^[21]	(-200 to 900) °C [-328 to 1652] °F	50 °C [90 °F]
N (NiCrSi-NiSi)	(-270 to 1300) °C [-454 to 2372] °F	50 °C [90 °F]
R (PtRh13-Pt)	(0 to 1768) °C [32 to 3214] °F	500 °C [900 °F]
S (PtRh10-Pt)	(0 to 1768) °C [32 to 3214] °F	500 °C [900 °F]
T (Cu-CuNi)	(-200 to 400) °C [-328 to 752] °F	50 °C [90 °F]
U (Cu-CuNi) ^[21]	(-200 to 600) °C [-328 to 1112] °F	50 °C [90 °F]
MoRe5-MoRe41 ^[11] according to IEC 584 Part 1	(0 to 2000) °C [32 to 3632] °F	500 °C [900 °F]
Cold junction	internal (Pt100) or external (0 to 80) °C [32 to 176] °F	
Cold junction accuracy	± 1 °C	

Voltage (mV)

Type	Measurement Ranges	Minimum Range
Millivolt (mV)	(-10 to 100) mV	5 mV



O U T P U T

Output (Analog)

Output Signal	(4 to 20) mA, (20 to 4) mA
Transmission as	Temperature linear, resistance linear, voltage linear
Maximum load	(Vpower supply - 8 V) / 0.025 A
Digital filter 1st degree	(0 to 8) s
Input current required	≤ 3.5 mA
Current limit	≤ 25 mA
Switch on delay	4 s (during power up $I_a = 3.8$ mA)
Reply time	1 s

Failure Signal (fault monitoring)

Measurement range undercut	Linear drop to 3.8 mA
Exceeding measurement range	Linear rise to 20.5 mA
Sensor breakage; Sensor short circuit ⁽¹⁾	≤ 3.6 mA or ≥ 21.0 mA can be set up

Electrical Connection

Power supply	$U_b = (8 \text{ to } 35)$ V dc, polarity protected
Galvanic isolation (In/out)	$\hat{U} = 3.75$ kV ac
Allowable ripple	$U_{ss} \leq 5$ V at $U_b \geq 13$ V, $f_{max} = 1$ kHz

A C C U R A C Y

Reference conditions	Calibration temperature (23 ± 5) °C [73 ± 9] °F
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Resistance Thermometer (RTD)

Type	Measurement Accuracy ⁽²⁾
Pt100, Ni100	0.2 °C or 0.08%
Pt500, Ni500	0.5 °C or 0.20%
Pt1000, Ni1000	0.3 °C or 0.12%



ACCURACY (CONT)

Thermocouple (TC)

Type	Measurement Accuracy ⁽¹⁾
K, J, T, E, L, U N, C, D S, B, R MoRe5-MoRe41	0.5 °C or 0.08% 1.0 °C or 0.08% 2.0 °C or 0.08%
Influence of the internal reference junction	Pt100 DIN IEC 751 Class B

Voltage (mV)

Type	Measurement Accuracy ⁽¹⁾	Measurement Range
Millivolt (mV)	± 20 µV or 0.08%	(-10 to 100) mV

General

Influence of power supply	≤ ±0.01%/V deviation from 24 V ⁽²⁾
Load influence	≤ ±0.02%/100 Ω ⁽²⁾

Temperature drift	Resistive thermometer (RTD): $T_D = \pm (15 \text{ ppm}/^\circ\text{C max. meas. range} + 50 \text{ ppm}/^\circ\text{C preset meas. range}) * \Delta\theta$ Resistive thermometer Pt100: $T_D = \pm (15 \text{ ppm}/^\circ\text{C (range end value} + 200) + 50 \text{ ppm}/^\circ\text{C preset meas. range}) * \Delta\theta$ Thermocouple (TC): $T_D = \pm (50 \text{ ppm}/^\circ\text{C max. meas. range} + 50 \text{ ppm}/^\circ\text{C preset meas. range}) * \Delta\theta$ $\Delta\theta$ = Deviation of the ambient temperature according to the reference condition
Long term stability	≤ 0.1 °C/year ⁽³⁾ or ≤ 0.05%/Year ⁽³⁾

INSTALLATION CONDITIONS

Ambient Conditions

Ambient temperature	(-40 to 85) °C [-40 to 185] °F
Storage temperature	(-40 to 100) °C [-40 to 212] °F
Climatic class	To EN 60 654-1, Class C
Moisture condensation	Allowable
Ingress protection	IP00 / IP66 installed
Vibration protection	4g / (2 to 150) Hz according to IEC 60 068-2-6
EMC immunity	Interference immunity and interference emission according to EN 61 326-1



MECHANICAL CONSTRUCTION

Dimensions	
Weight	approximately 40 g
Materials	Housing: Polycarbonate Potting: Polyurethane
Terminals	15 AWG (maximum)

Terminal Connections

<p>Power supply and current output</p> <p>(8 to 35) V dc (4 to 20) mA</p>	<p>SETUP socket</p>			
<p>Sensor Connection</p>	<p>TC</p>	<p>2-Wire RTD Ω</p>	<p>3-Wire RTD Ω</p>	<p>4-Wire RTD Ω</p>

CERTIFICATION

Remote Operation

Configuration set	Configuration kit 440-CABLEKIT
Configuration	Using PC program TransComm
Interface	PC interface connection cable TTL +/- RS 232 with plug
Configurable parameters	Sensor type and connection type, engineering units ($^{\circ}\text{C}/^{\circ}\text{F}$), measurement range, internal/external cold junction compensation, cable resistance compensation on 2 wire connection, fault conditioning, output signal (4 to 20) mA or (20 to 4) mA, digital filter (damping), offset, measurement point identification (8 characters), output simulation
CE marked UL US	<p>Unit complies with the legal requirements laid out within the EU regulations.</p> <p>UL Recognized Component</p>

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