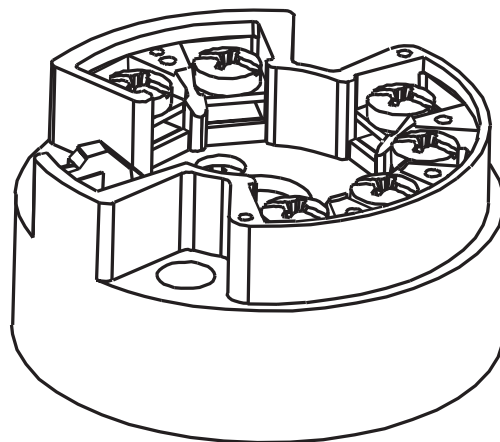


The Series 442 programmable HART® temperature transmitter is a two-wire transmitter with an analog output. It has measurement input for resistance thermometers (RTD) in 2, 3 or 4 wire connection, thermocouples, resistance and voltage. Setting up of the transmitter is done using the 442-MODEMKIT or HART® hand operating module (275). 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 HART® protocol, for installation in a sensor head (Form B).



Application Areas

- Temperature head transmitter with HART® protocol 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)
- HART® protocol for front end unit or panel unit operation using the hand operating module (275) or PC.

Features and Benefits

- Universal settings with HART® protocol 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, **CE** marked
- **UL** US UL Recognized Component
- **IS** Intrinsically safe for hazardous locations
- Output simulation

ORDER CODES

Unconfigured Order Number: **442 – 00**

Configured Order Number: **4 4 2** – **1 J U** – **S (50-300) F**

Table 1 – Connection Type

Code	Description
1	Thermocouple (TC)
2	RTD (2-wire)
3	RTD (3-wire)
4	RTD (4-wire)

Table 2 – Sensor

Code	Description
J	Type J thermocouple
K	Type K thermocouple
T	Type T thermocouple
N	Type N thermocouple
E	Type E thermocouple
R	Type R thermocouple
S	Type S thermocouple
B	Type B thermocouple
85	100 ohm platinum 0.003 85
55	500 ohm platinum 0.003 85
95	1000 ohm platinum 0.003 85
MV	Millivolts
W	Resistance

Table 3 – Fault Signal

Code	Description
U	Upscale Burnout ≈ 20.5 mA
D	Downscale Burnout ≈ 3.8 mA

Table 4 – Range

Range
S (lower limit – upper limit)

Table 5 – Scale

Code	Description
C	Celsius
F	Fahrenheit

Accessories

Code	Description
442-MODEMKIT	HART® Communication MODEM and Software
441-DIN35	35 mm DIN rail mounting clip

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 250) °C	[-76 to 482] °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 30) Ω		
Sensor Cable Resistance	maximum 11 Ω per cable		
Sensor current	≤ 0.2 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) ^[3]	(0 to 2320) °C	[32 to 4208] °F	500 °C [900 °F]
D (W3Re-W25Re) ^[3]	(0 to 2495) °C	[32 to 4523] °F	500 °C [900 °F]
E (NiCr-CuNi)	(-270 to 1000) °C	[-454 to 1832] °F	50 °C [90 °F]
J (Fe-CuNi)	(-210 to 1200) °C	[-346 to 2192] °F	50 °C [90 °F]
K (NiCr-Ni)	(-270 to 1372) °C	[-454 to 2501] °F	50 °C [90 °F]
L (Fe-CuNi) ^[2]	(-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)	(-50 to 1768) °C	[-58 to 3214] °F	500 °C [900 °F]
S (PtRh10-Pt)	(-50 to 1768) °C	[-58 to 3214] °F	500 °C [900 °F]
T (Cu-CuNi)	(-270 to 400) °C	[-454 to 752] °F	50 °C [90 °F]
U (Cu-CuNi) ^[2]	(-200 to 600) °C	[-328 to 1112] °F	50 °C [90 °F]
MoRe5-MoRe41 ^[1] 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 75) mV	5 mV

[1] no reference

[2] according to DIN 43710

[3] according to ASTM E988

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	(V _{power supply} - 10 V) / 0.022 A
Digital filter 1st degree	(0 to 60) s
Input current required	≤ 3.5 mA
Current limit	≤ 23 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 = (10 to 35) V dc, polarity protected
Galvanic isolation (In/out)	Û = 2 kV ac
Allowable ripple	U _{SS} ≤ 3 V at U _b ≥ 13 V, f _{max} = 1 kHz

A C C U R A C Y

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

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%

Resistance (Ω)

Type	Measurement Accuracy ^[2]	Measurement Range
Resistance	± 0.1 Ω or 0.08%	(10 to 400) Ω
	± 1.5 Ω or 0.12%	(10 to 2000) Ω

[1] Not for thermocouple

[2] % is related to the adjusted measurement range
(the value to be applied is the greater)

ACCURACY (CONT)

Thermocouple (TC)

Type	Measurement Accuracy ^[1]
K, J, T, E, L, U	0.5 °C or 0.08%
N, C, D	1.0 °C or 0.08%
S, B, R MoRe5-MoRe41	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 75) 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): $T_d = \pm (15 \text{ ppm}/^\circ\text{C max. meas. range} + 50 \text{ ppm}/^\circ\text{C preset meas. range}) * \Delta\vartheta$ Resistive thermometer Pt100: $T_d = \pm (15 \text{ ppm}/^\circ\text{C (range end value} + 200) + 50 \text{ ppm}/^\circ\text{C preset meas. range}) * \Delta\vartheta$ Thermocouple (TC): $T_d = \pm (50 \text{ ppm}/^\circ\text{C max. meas. range} + 50 \text{ ppm}/^\circ\text{C preset meas. range}) * \Delta\vartheta$ $\Delta\vartheta =$ Deviation of the ambient temperature according to the reference condition
Long term stability	≤ 0.1 °C/year ^[3] or ≤ 0.05%/Year ^{[1][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

[1] % is related to the adjusted measurement range (the value to be applied is the greater)

[2] All data is related to a measurement end value (FSD) of 20 mA

[3] Under reference conditions

M E C H A N I C A L C O N S T R U C T I O N

Dimensions	<p style="text-align: right;">Dimensions in inches [mm]</p>
Weight	approximately 40 g
Materials	Housing: Polycarbonate Potting: Polyurethane
Terminals	15 AWG (maximum)

Terminal Connections

<p>Power supply and current output</p> <p>(10 to 35) V dc (10 to 30) V dc Ex (4 to 20) mA</p>	<p>HART® Communication on (4 to 20) mA</p>			
<p>Sensor Connection</p>	<p>TC</p>	<p>2-Wire</p>	<p>3-Wire</p>	<p>4-Wire</p>

Remote Operation

Configuration set	Configuration kit 442-MODEMKIT
Configuration	Using PC program TransComm
Interface	PC interface connection cable TTL -/- RS 232 with plug
Configurable parameters	Sensor type and connection type, engineering units (°C/°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

Certification

 	<p>Unit complies with the legal requirements laid out within the EU regulations.</p> <p>UL Recognized Component</p> <p>Intrinsically Safe - For Hazardous Locations Class I, Div 1, Groups A, B, C and D</p>
----------	--