

FAHM Co. Temperature Transmitter PTT74-Ex Series



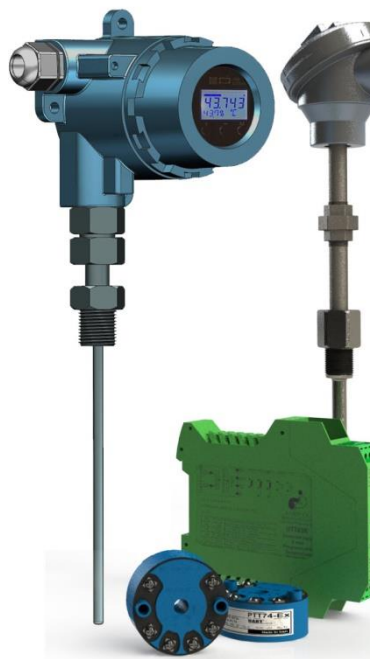
The PTT74-Ex is a versatile temperature transmitter that delivers field reliability and advanced accuracy and stability to meet demanding process needs.

PTT74-Ex Family of Transmitters

Fit your needs within one model family with a customizable transmitter design

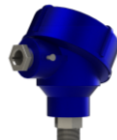
- DIN Head mount and Rail mount form factors
- 4-20 mA /HART® with Selectable Revisions
- Enhanced Display with Local Operator Interface
- LCD Display
- Integrated Transient Protection
- Enhanced Accuracy and Stability
- Variety of enclosures

PTT74-Ex HART transmitters

- **PTT74-Ex** is a smart 2-wire transmitter for temperature and other universal input measurement applications.
 - Is fully HART-compatible.
 - Provides excellent flexibility, low storage and installation costs. The high reliability ensures a safe system operation and low maintenance costs.
-
- **Input**
NTC Thermistor Sensor/Lead Type
Resistance (2.0k Ω , 10k Ω , 100k Ω)
Resistance thermometer (2,3,4 wire circuit)
Thermocouples B,C,E,J,K,L,N,R,S,T,U
Resistance remote signaling Unit(0...5000 Ohm)
Voltage, mV (-125...1150 mV)
 - **Output**
2-wire technique
4...20 mA
 - **Operating Temperature**
-40°C to 85°C
 - **Electrical isolation between input and output(I/O Isolation)**
 - **Digital low drift processing of measurement values**
 - **Customer –specific linearization**
32 tie points
 - **Continuous sensor self-monitoring**
Parameters saved permanently in EEPROM
Monitoring of ADC and DAC parameters every 1 sec
Wire break monitoring acc. With NAMUR NE 89
 - **Dual Input functionality**
Absolute, differential, average values
 - **Parameterization (Software configuration)**
Smartware Calibration Tools (SCT)
Siemens PDM Software
ABB SMART VISION Software
Hand held terminal: DHH691, 691HT, STT04, HC275, HC374, HC475 ...
 - **Approval for explosion protection**
Intrinsically safe II 2 G EEx ib IIC T6, mount in zone 1
Type n II 3 G EEx nA II T6, mount in zone 2
 - **Ingress protection (IP) ratings**
The PTT74 connection head is rated to IP66/IP68
-
- 



Ordering Information:

Model	Product Description					
PTT74-Ex	Temperature Transmitter					
Transmitter Type						
H	Head Mounted					
R	Rail Mounted					
Channel Types					Head	Rail
A	Single Channel				•	•
B	Dual Channel				-	•
Transmitter Output					Head	Rail
A	4–20 mA with Digital Signal Based on HART Protocol				•	•
Product Certifications					Head	Rail
N	No Approval				•	•
I1	ATEX Intrinsic Safety: II 2 G EEx ib IIC T6				•	•
E1	ATEX II 2G Exd IIC T6 Gb Explosion Proof				•	-
N1	ATEX Type n : II 3 G EEx nA II T6				•	•
K1	ATEX Intrinsic Safety: II 2 G EEx ib IIC T6 , ATEX Type n : II 3 G EEx nA II T6				•	•
KA	ATEX Explosion Proof; Intrinsic Safety: Type n				•	-
Head Material						
H	Aluminum					
S	Stainless steel 316					
N	No Head					
Enclosure		Entry Size	Process	Schematic	Head	Rail
0	No Additional Enclosure	-----	-----		•	•
1	Universal Enclosure /IP65	M20 x 1.5	M20 x 1.5		•	-
2	Explosion Proof Enclosure with /IP65	M20 x 1.5	M20 x 1.5		•	-
3	Explosion Proof Enclosure with Local Indicator & Glass Window /IP68	M20 x 1.5	M20 x 1.5		•	-

Options:

Electrical Entry Gland Option		Head	Rail
1	Without Gland (Plastic cover)	•	-
2	M20 Plastic Gland	•	-
3 ⁽¹⁾	M20 SS316 Gland ExdII	•	-
Mounting Bracket Option		Head	Rail
B	316 SST U-bolt Mounting Bracket, 2-in pipe mount	•	-
Z	Special Version	•	-
Display and Interface Option		Head	Rail
M4	LCD Display with Local Operator Interface	•	-
M5	LCD Display	•	-
Software Configuration Option		Head	Rail
C1	Custom Configuration of Date, Descriptor and Message (Requires CDS with order)	•	•
Alarm Level Configuration Option		Head	Rail
A1	NAMUR alarm and saturation levels, high alarm	•	•
CN	NAMUR alarm and saturation levels, low alarm	•	•
Line Filter Option		Head	Rail
F5	50 Hz Line Voltage Filter	•	•
F6	60 Hz Line Voltage Filter	•	•
5-Point Calibration Option		Head	Rail
C4	5-point calibration. Use option code Q4 to generate a calibration certificate	•	•
Calibration Certificate Option		Head	Rail
Q4	5-Point calibration with certificate.	•	•
External Label Option		Head	Rail
EL	External label for ATEX Intrinsic Safety	•	•
Assemble Sensor Option		Head	Rail
XA	Sensor Specified Separately and Assembled to Transmitter	•	•
XV	Terminal Block with extra terminal for sensor connection which used in remote type transmitter (Refer to page 9)	•	-
Typical Rail Mount Model Number: PTT74-Ex-R-A-A-K1-H0 Typical Head Mount Model Number: PTT74-Ex-H-A-A-K1-S-3-1-M4			

1. Requires Electrical Entry Gland Option code 3 if any of Product Certifications code :I1,E1,N1,K1,KA selected

Technical Overview PTT74-Ex

- **Output**

Output signal (temperature linear)

4...20 mA

Residual ripple(peak-to-peak)

< 5 uA

Nonlinearity Error

< 0.003 %

Current consumption

< 3.6 mA

Max. Output current

23.6 mA

Load resistance

< 1 K Ω

Parameterizable Current error signal

Under ranging 3.6 mA

Over ranging 22 mA

Default Value 3.6 mA ...23.6 mA

- **Input**

NTC Thermistor Sensor/Lead Type

Resistance

2K Ω , 10K Ω

Resistance thermometer

n · Pt100/Ni100/CU100 to

Pt1000/Ni1000/Cu1000

(n = 0.1, 0.2, 0.5, 1, 1.2, 2, 3...10)

Resistance

0...440 / 0...4400

Measuring current

210 μ A

Sensor short-circuit

< 5 (for RTD)

Input Filter

50/60 Hz

Thermocouples

Types

B,C,E,J,K,L,N,R,S,T,U

Voltages

-125 mV...+1150 mV

Open circuit test current

100nA

Cold junction compensator

Type

PT100, via software switchable

Resolution

0.01 °C

Accuracy

0.05 °C

- **Programming Method**

Protocol

HART

- **Programming Software**

Device Management Tool

Handheld Terminal (DHH691, 691HT, STT04,

HC275, HC374, HC475 ...)

HART Modem (FAHM Co. SMARTWARE

Calibration Tool, ABB SmartVision Software,

Siemens PDM Software)

SCT Calibration Algorithms

Linearization

SCT Parameter

Sensor type, measuring range,

Calibration Algorithm, error signaling,

Compensating switch, General characteristics

(i.e. TAG name),

Signal simulation of compensator, input and

output,

Output monitoring(Trend viewer), Device

Diagnostic

- **Mechanical construction**

Weight

65 g (Head Mounted without enclosure)

235 g (Rail Mounted)

Housing material/Color

Polyamide / Yellow

- **Electrical connection**

Terminals, pluggable

2.5 mm², screw terminals

General characteristics

Transmitter Response Time:

With sensor monitor

Single RTD 2,3-Wire : 60 ms

Single RTD 4-Wire : 240 ms

Single Thermocouple: 240 ms

Dual RTD/Thermocouple: 480 ms

Without sensor monitor

Single RTD/Thermocouple: 60 ms

Dual RTD/Thermocouple: 240 ms

Turn-On Time

Performance within specifications less than 1 second after power is applied to the transmitter.

Electrical isolation (I/O/P)

1 kV AC(60s)

Long-term stability

< 0.1 % p.a.

Environment conditions

Ambient temperature range

-40 ... +85 °C

Transport and storage temperature

-40 ... +125 °C

Relative humidity

< 100% (100% humidity with isolated terminals only)

Condensation

Permitted

Power Supply

Supply voltage

For Ex application: 11...29.4 VDC

For non Ex application 11...32 VDC

Max residual ripple

< 1 % U_s (<500Hz)

Influence of supply voltage

± 0.01 % / 10V

Accuracy

RTD ± 0.1 °C

Thermocouples ± 20 uV

Resistance 440Ω/4400Ω ± 20 mΩ/±100 mΩ

Voltage 125mV/1150mV ± 20 uV / ± 50uV

Explosion protection

Intrinsically safe

Zone 1

Marking



II 2 G EEx ib IIC T6

Temperature Class

T6/T5/T4 < 50 °C /65°C /85 °C

Supply Circuit	Output	Measuring
Max Voltage	$U_i = 29.4$ V	$U_o = 5$ V
Short-circuit current	$I_i = 130$ mA	$I_o = 3.2$ mA
Max Power	$P_i = 0.8$ W	$P_o = 16$ mW
Internal inductance	$L_i = 240$ uH	$L_o = 1$ mH
Internal capacitance	$C_i = 10$ nF	$C_o = 10$ uF

Zone 2

Marking



II 3 G EEx n A II T6

Temperature Class

T6/T5/T4 < 50 °C /65°C /85 °C

Measuring Ranges and Accuracy

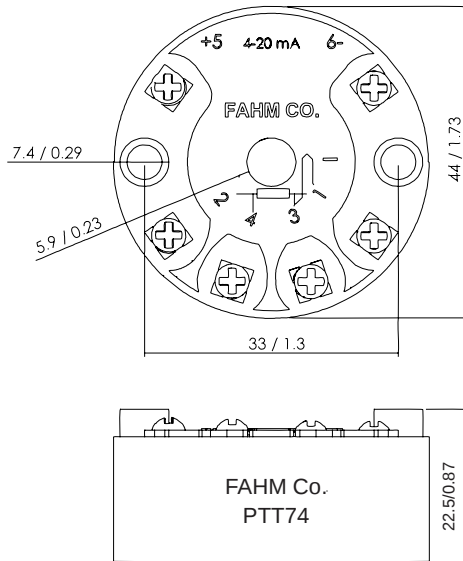
Input Element		Measuring Range	Min. Measuring span	Measuring Accuracy ³
Standard	Sensor			
IEC 584_1	Thermocouple type B	250...+1820 °C (+482...+3308 °F)	235 °C (423 °F)	±1.8...6.6 °C
	Thermocouple type E	−250...+1000 °C (−418...+1832 °F)	30 °C (54 °F)	±0.3...1.1 °C
	Thermocouple type J	−210...+1200 °C (−346...+2192 °F)	37 °C (67 °F)	±0.4...0.7 °C
	Thermocouple type K	−250...+1372 °C (−418...+2502 °F)	54 °C (98 °F)	±0.6...1.9 °C
	Thermocouple type R	− 50...+1768 °C (− 58...+3215 °F)	171 °C (308 °F)	±1.6...4.5 °C
	Thermocouple type S	− 50...+1768 °C (− 58...+3215 °F)	193 °C (348 °F)	±1.8...4.3 °C
	Thermocouple type T	−200...+ 400 °C (−328...+ 752 °F)	50 °C (90 °F)	±0.4...1.8 °C
	Thermocouple type N	−200...+1350 °C (−328...+2462 °F)	60 °C (108 °F)	±0.6...3.1 °C
DIN 43710	Thermocouple type U	−200...+ 600 °C (− 328...+ 1112 °F)	36 °C (65 °F)	±0.3...1.0 °C
	Thermocouple type L	−200...+ 900 °C (−328...+1652 °F)	40 °C (72 °F)	±0.3...0.7 °C
W3, ASTM E 998	Thermocouple type C	−18...+2315 °C (+ 0...+4200 °F)	135 °C (294 °F)	±1.3...2.1 °C
	Thermocouple type D	−18...+2315 °C (+ 0...+4200 °F)	135 °C (243 °F)	±1.8...2.0 °C
IEC 751; JIS; SAMA ¹ 2-3 and 4 wire	Resistance thermometer Pt 100	−200...+ 850 °C (−328...+1562 °F)	15 °C (28 °F)	±0.1 °C
	Resistance thermometer Pt 1000	−200...+ 850 °C (−328...+1562 °F)	15 °C (90 °F)	±0.05 °C
DIN 43760 ² 2,3 and 4 wire	Resistance thermometer Ni 100	− 60...+ 250 °C (− 76...+ 482 °F)	8 °C (15 °F)	±0.05 °C
	Resistance thermometer Ni 500	− 60...+ 250 °C (− 76...+ 482 °F)	15 °C (28 °F)	±0.1 °C
IEC 60539	negative temperature coefficient thermistors	−20...+120°C (−4...+248°F)	25 °C (77 °F)	±0.5 °C
Resistance	Ω	0...440 Ω	5Ω	±20mΩ
		0...4400 Ω	50Ω	±100mΩ
Voltage	mV	−125 mV...+ 125 mV	2 mV	±20uV
		−125 mV...+1150 mV	50 mV	±50uV

1) IEC 751 a = 0.00385, JIS a = 0.003916, SAMA a = 0.003902

2) Edison Curve No. 7

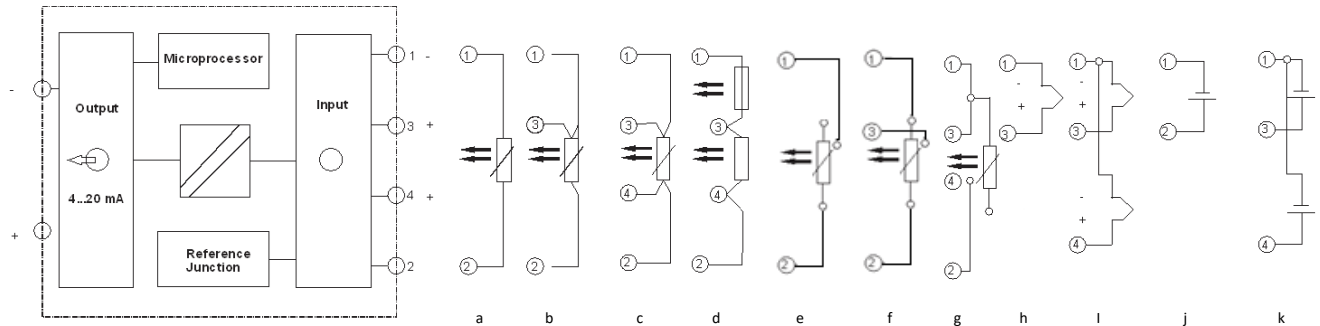
3) Due to non-linearity of thermocouples, the measuring accuracy depends on selected span of entire range.

PTT74-Ex Head Mounted Dimensional Diagram



Only used the M3 × 4.5 mm screws supplied or screws of the same type for the connecting terminals. Longer screws will damage the transmitter. In this case, the explosion-proof PTT74-Ex transmitter is no longer protected against explosions and its certification is rendered invalid.

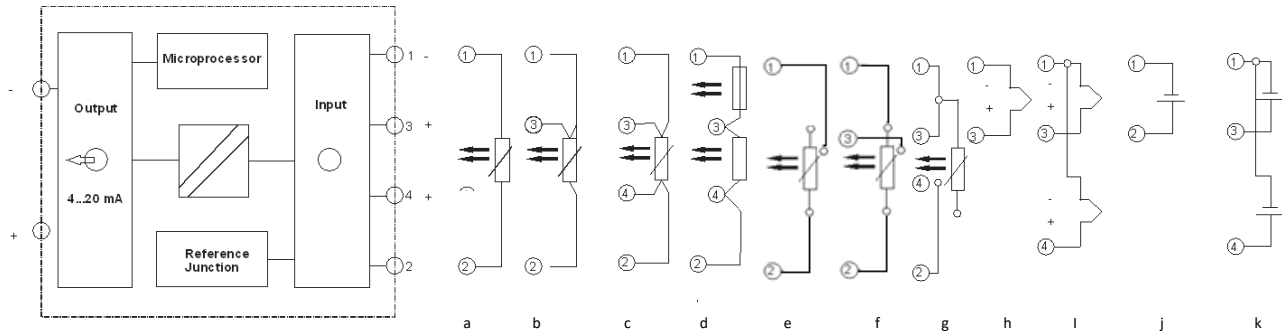
PTT74-Ex Head Mounted Connection Diagram



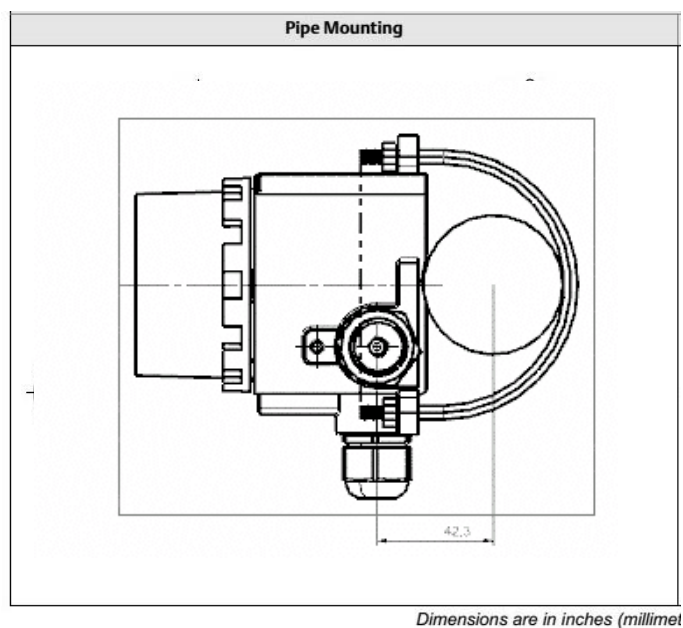
- a) Resistance thermometer, 2 wire circuit
- b) Resistance thermometer, 3 wire circuit
- c) Resistance thermometer, 4 wire circuit
- d) Double resistance thermometer, 2 wire circuit
(average, value or differential temperature measurement)
- e) Potentiometer input, 2 wire circuit
- f) Potentiometer input, 3 wire circuit
- g) Potentiometer input, 4 wire circuit
- h) Thermocouple
- i) Double Thermocouple (average value or differential temperature measurement)
- j) Voltage measurement
- k) Double voltage measurement (average value or differential temperature measurement)

PTT74-Ex with Remote Sensor

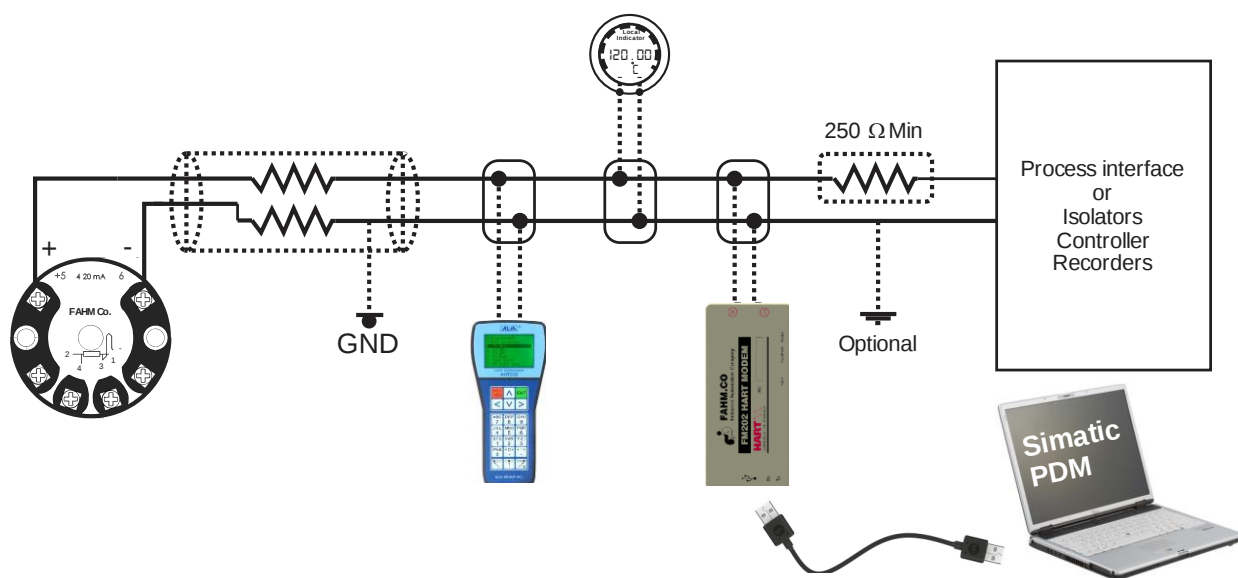
Terminal Block with extra terminal for sensor connection.



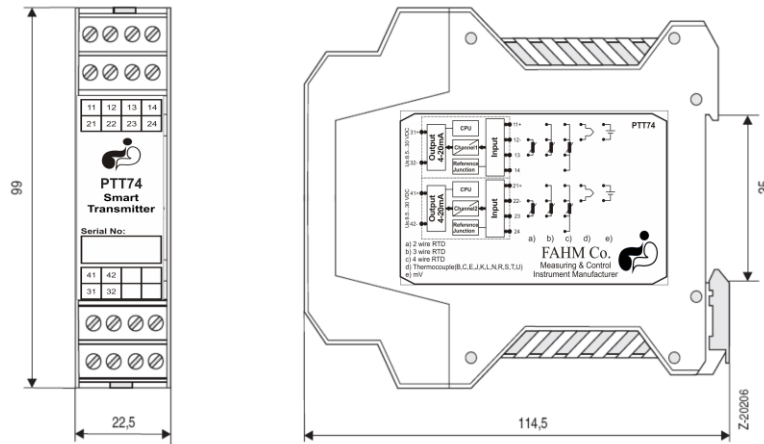
- a) Resistance thermometer, 2 wire circuit
- b) Resistance thermometer, 3 wire circuit
- c) Resistance thermometer, 4 wire circuit
- d) Double resistance thermometer, 2 wire circuit
(average, value or differential temperature measurement)
- e) Potentiometer input, 2 wire circuit
- f) Potentiometer input, 3 wire circuit
- g) Potentiometer input, 4 wire circuit
- h) Thermocouple
- i) Double Thermocouple(average value or differential temperature measurement)
- j) Voltage measurement
- k) Double voltage measurement (average value or differential temperature measurement)



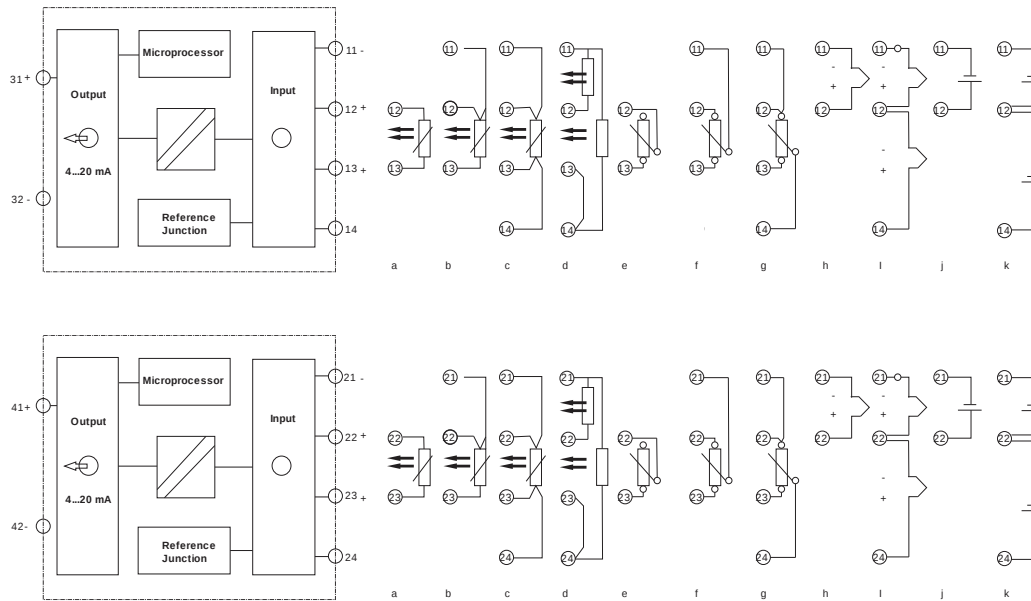
PTT74-Ex Head Mounted Hart Configuration Diagram



PTT74-Ex Rail Mounted Dimensional Diagram

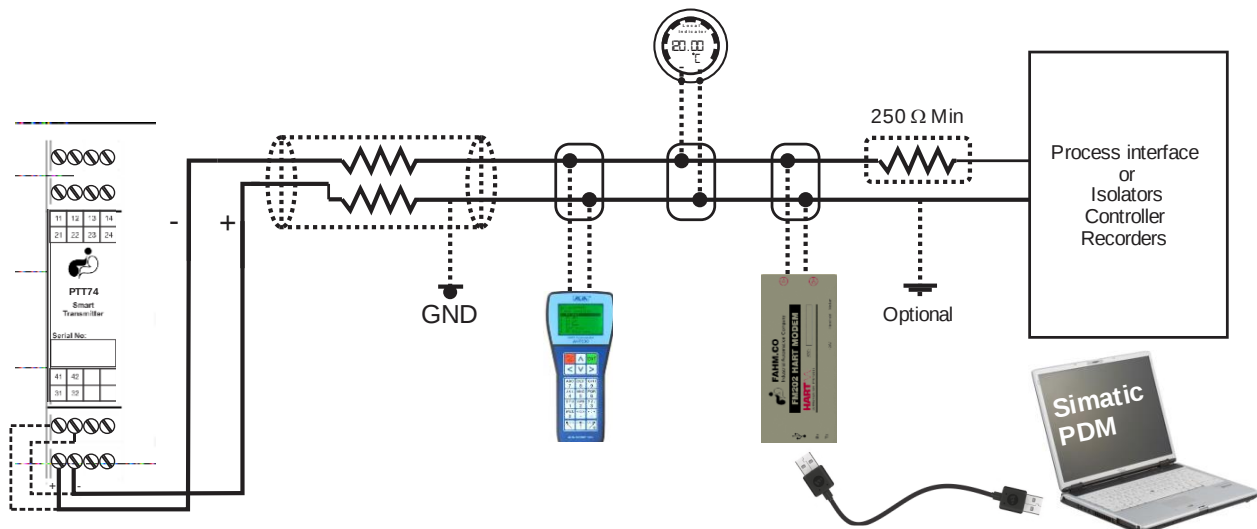


PTT74-Ex Rail Mounted Connection Diagram



- a) Resistance thermometer, 2 wire circuit
- b) Resistance thermometer, 3 wire circuit
- c) Resistance thermometer, 4 wire circuit
- d) Double resistance thermometer, 2 wire circuit
(average, value or differential temperature measurement)
- e) Potentiometer input, 2 wire circuit
- f) Potentiometer input, 3 wire circuit
- g) Potentiometer input, 4 wire circuit
- h) Thermocouple
- i) Double Thermocouple(average value or differential temperature measurement)
- j) Voltage measurement
- k) Double voltage measurement (average value or differential temperature measurement)

PTT74-Ex Rail Mounted Hart Configuration Diagram



FAHM HART Modem

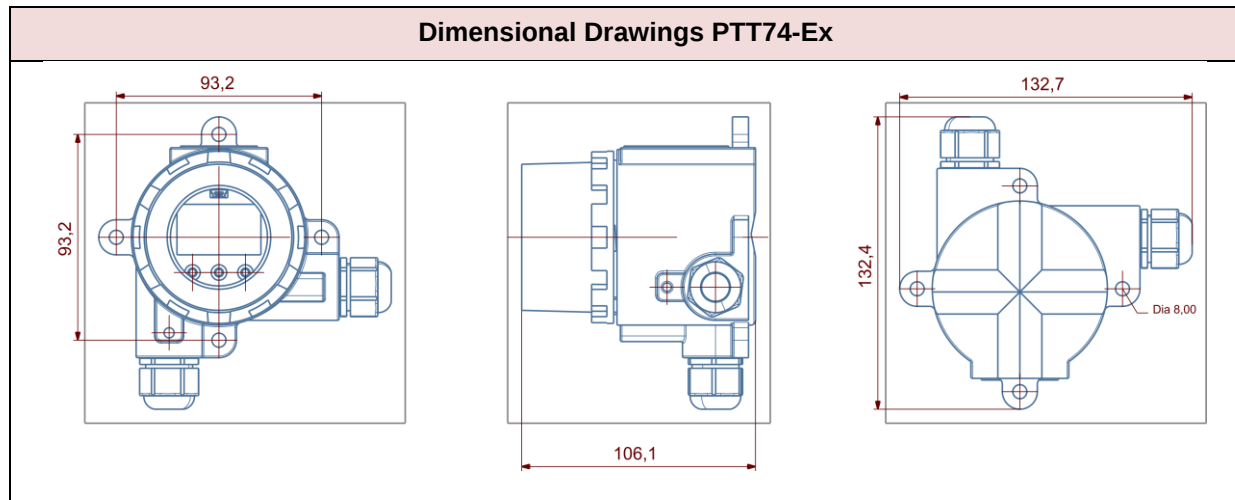
The **FM202 HART Modem** is a powerful device for connection to all 4-20mA apparatuses for Configuration and calibration via PC and PC-based software.

Features

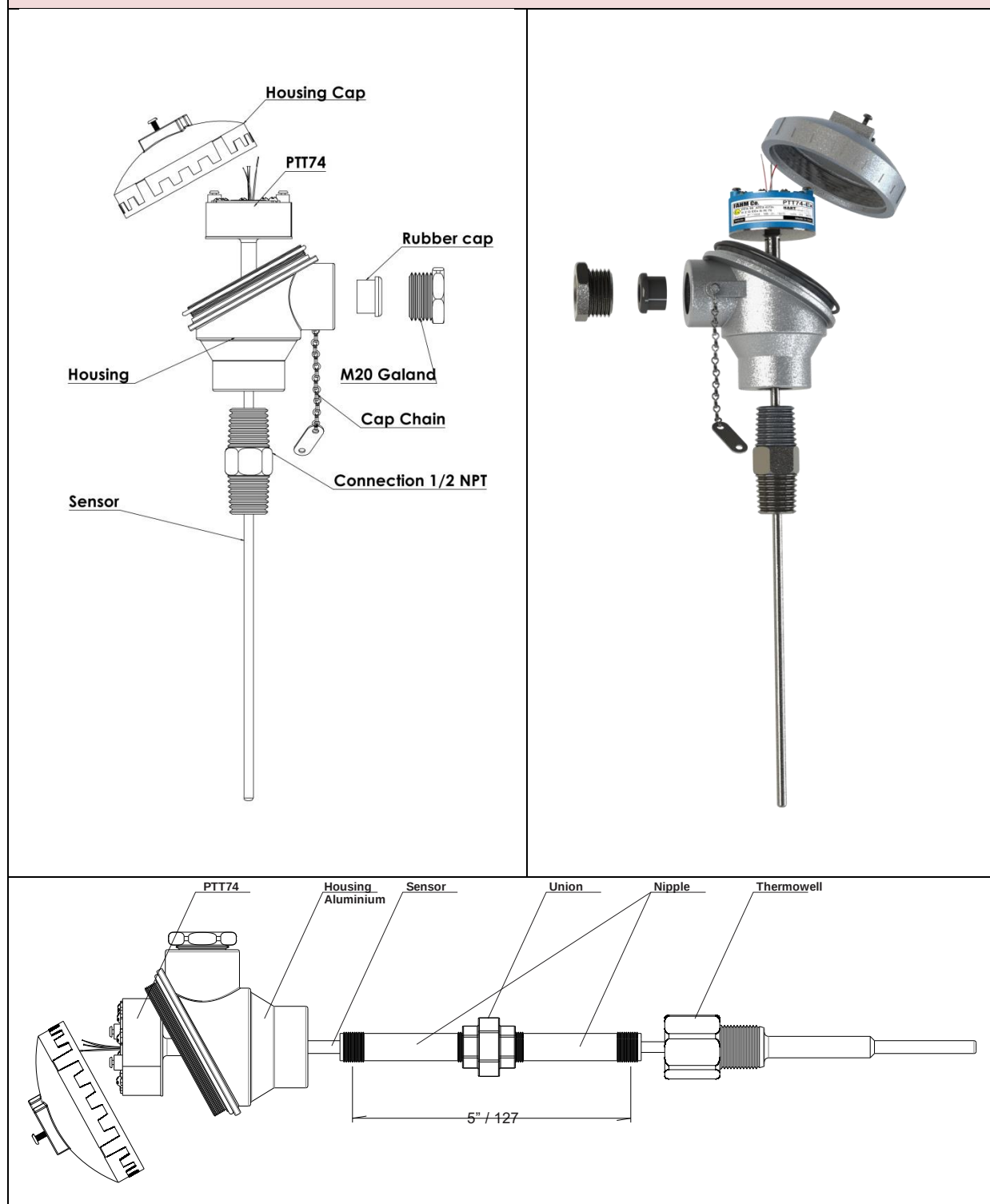
- Connect to computer through USB port
- Support USB 2.0
- Support HART Protocol (version 5.0 and 6.0)
- Hand-Held and Hart-Modem functioning modes
- No 24vDC Power Supply needed in HART-Modem mode
- Super low power design for extended portable computer battery life
- Provide instruments with max. 25mA in Hart-Modem mode
- No external 250Ohm Resistor needed in Hart-Modem mode
- LED indicator to display Power-On
- Separate LED indicator to display data transfer
- Galvanic isolation between computer and instruments to prevent Ground Loop
- Isolation Voltage: 1500 vAC
- Includes USB drivers for Windows 7, Vista, XP, and 2000



Schematic Drawings



Explosion View PTT74-Ex-H1



Temperature Sensors

Temperature sensors for particularly rough environments
Optimize plant efficiency and increase measurement reliability
Ex-certified, including Ex-d according to ATEX

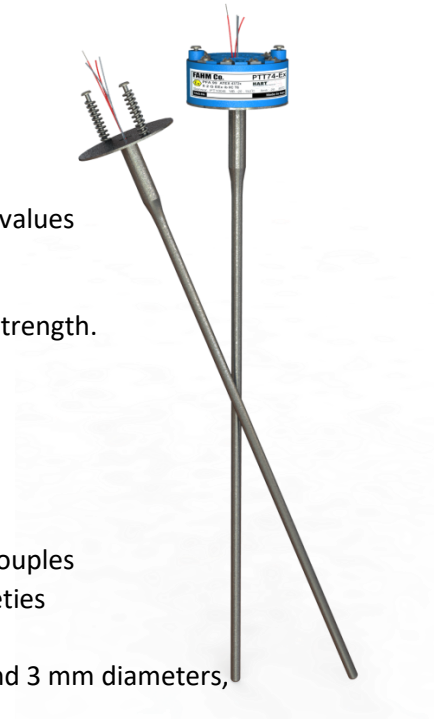
- Industry-leading calibration capabilities allow for Callendar-van Dusen values to give increased accuracy when paired with PTT74 transmitters.
- Full penetration weld standard on thermowells increases thermowell strength.
- Tapered tips on thermowells allow for a faster time response

Features:

- Available in a wide variety of sensing technologies – RTD and Thermocouples
- Industry-standard sensor types, including RTD and Thermocouple varieties
- Variety of enclosure and connection head options
- All sensor styles and lengths are available in 8 mm, 6 mm (standard) and 3 mm diameters, allowing for quicker response times.
- Global hazardous-location approvals
- Particularly durable construction for high mechanical request

Applications:

- Oil exploration and pipelines
- Petro-chemical industry
- Machinery and protective measures
- Engineering of tanks, pipes and pressure vessels
- Engineering of heating and air conditions



SENSOR Overview

A thermocouple is a junction between two dissimilar metals that produces a change in thermoelectric emf in relationship to a temperature change. The junction is laser welded to form a pure joint that maintains the integrity of the circuit and ensures accuracy. A sensor sheath protects ungrounded junctions from the environment. The ungrounded and isolated junctions provide electrical isolation from the sensor sheath.

Selecting the lagging length for a thermowell

A direct mounting configuration allows heat from the process, aside from ambient temperature variations, to transfer from the thermowell to the transmitter housing. If the expected process temperature is near or above the transmitter specification limits, consider using additional thermowell lagging length or a remote mounting configuration to isolate the transmitter. Figure 1 provides an example of the relationship between transmitter housing temperature rise and distance from the process. The following example and Figure 1 can be used as a guide to determine adequate thermowell lagging length.

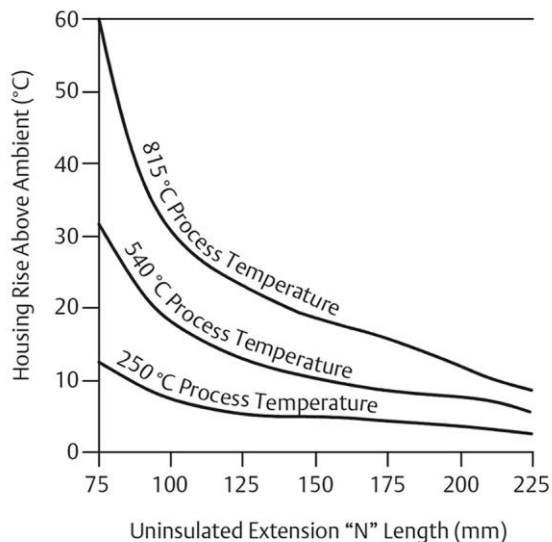


Figure 1 Transmitter Housing Temperature Rise vs. Uninsulated Distance from the Process

Example, The rated ambient temperature specification for the transmitter is 85 °C. If the maximum ambient temperature is 40 °C and the temperature to be measured is 540 °C, the maximum allowable housing temperature rise is the rated temperature specification limit minus the existing ambient temperature (85 – 40), or 45 °C.

As shown in Figure 1 Transmitter Housing Temperature Rise vs. Uninsulated Distance from the Process an uninsulated distance from the process of 90 mm will result in a housing temperature rise of 22 °C. Therefore, 100 mm would be the minimum recommended distance from the process providing a safety.

Specifications

Material selection

It is the purchaser's sole responsibility to make a careful analysis of all process parameters (such as all chemical components, temperature, pressure, flow rate, abrasives, contaminants, etc.), when specifying product, materials, options and components for the particular application. Process Management is not in a position to evaluate or guarantee the compatibility of the process fluid or other process parameters with the product, options, configuration or materials of construction selected.

Platinum RTD

100ΩRTD at 0 °C, $\alpha = 0.00385 \Omega/\Omega \times ^\circ\text{C}$

Temperature range

–196 to 600 °C (-320.8 to 1112 °F)

Insulation resistance

1,000 MΩ minimum insulation resistance when measured at 500 Vdc and at room temperature.

Sheath material

316 SST/321 SST with mineral-insulated cable construction

Lead wire

PTFE insulated, 24 AWG, silver-plated copper wire. See Wiring Diagram for wire configuration.

Ingress Protection (IP) ratings

IP65/IP68

Self-heating

0.15 K/mW when measured per method defined in DIN EN 60751:1996

Thermal response time

Tested in accordance to IEC 751 guidelines.

Table 1 Water Flowing at 0.4 m/s

	PT100	TC Grounded	TC ungrounded	Deviation
	t(0.5) [s]	t(0.5) [s]	t(0.5) [s]	
6 mm	7.7	1.8	2.8	± 10%
3 mm	2.5	1.1	1.2	± 10%

Table 2 Air Flowing at 3.0 m/s

	PT100	TC Grounded	TC ungrounded	Deviation
	t(0.5) [s]	t(0.5) [s]	t(0.5) [s]	
3 mm	18	14	14	± 10%
6 mm	35	38	42	± 10%

Thermocouple

Temperature range

Table 3 Characteristics of TW74 Thermocouples

Type	Wire alloys	Sheath material	Temperature range	Interchangeability error	Accuracy
E	Chromel/Constantan	321 SST	-40 to 800 °C (-40 to 1472 °F)	±1.5 °C (±2.7 °F) or ±0.4%	Class 1
J	Iron/Constantan	321 SST	-40 to 750 °C (-40 to 1382 °F)	±1.5 °C (±2.7 °F) or ±0.4%	Class 1
K	Chromel/Alumel	Alloy 600	-40 to 1000 °C (-40 to 1832 °F)	±1.5 °C (±2.7 °F) or ±0.4%	Class 1
N	Nicrosil/Nisil	Alloy 600	-40 to 1000 °C (-40 to 1832 °F)	±1.5 °C (±2.7 °F) or ±0.4%	Class 1
R	Platinum-13% Rhodium/Platinum	Alloy 600	0 to 1000 °C (32 to 1832 °F)	±1.0 °C (±1.8 °F) or ±(1+0.3% x [t-1100]) °C	Class 1
S	Platinum-10% Rhodium/Platinum	Alloy 600	0 to 1000 °C (32 to 1832 °F)	±1.0 °C (±1.8 °F) or ±(1+0.3% x [t-1100]) °C	Class 1
T	Copper/Constantan	321 SST	-40 to 350 °C (-40 to 662 °F)	±0.5 °C (±1.0 °F) or ±0.4%	Class 1

Insulation resistance

1,000 MΩ minimum insulation resistance when measured at 500 Vdc and at room temperature.

Sheath material

FAHM thermocouples are made of a mineral insulated cable design with a variety of sheath materials available to suit both the temperature and the environment. For temperature up to 800 °C (1472 °F) in air, the sheath is made from 321 SST. For temperatures above 800 °C (1472 °F) in air, the sheath is made from Alloy 600.

Lead wires

Thermocouple, internal – 19 AWG solid wire (max) and 21 AWG solid wire (min.). External extension leads, Type E, J, K, N, R, S, and T. PTFE insulated. 20 AWG (max.) and 24 AWG (min.) Color coded per IEC or ISA standards.

Enclosure Types:

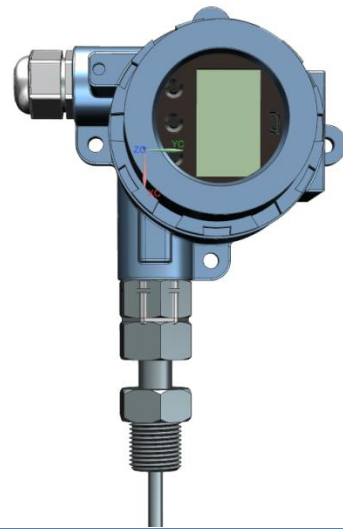
Universal Enclosure

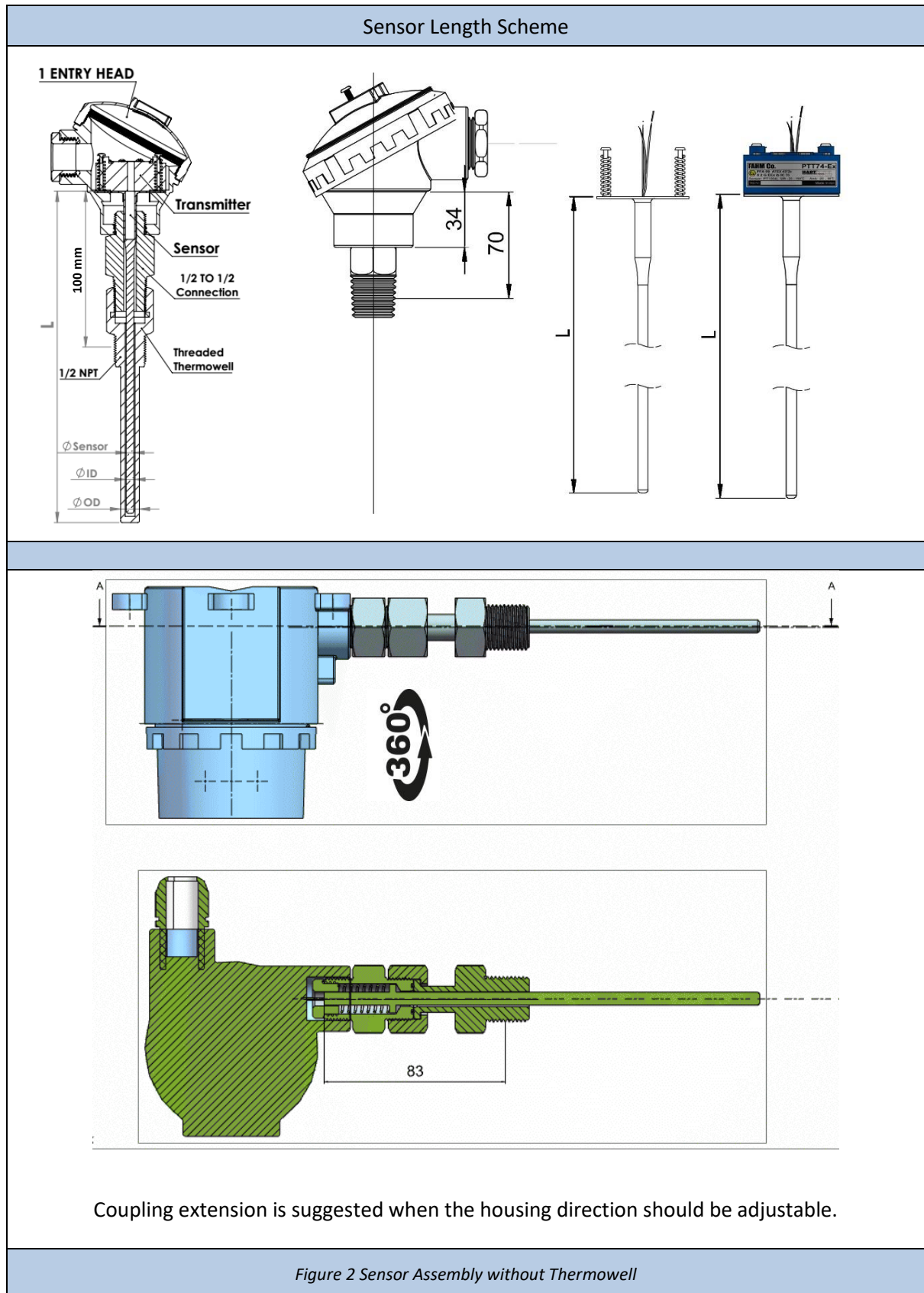


**ATEX II 2G Exd IIC T6 Gb
Flameproof Head Enclosure**



**ATEX II 2G Exd IIC T6 Gb
Flameproof Head Enclosure
with Glass window**

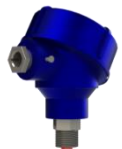
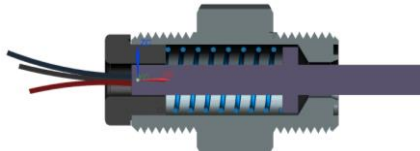




Ordering Information Temperature Sensor TS74

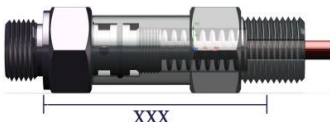
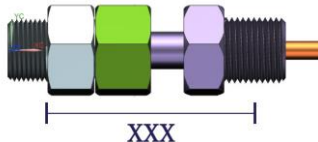
Temperature Sensor TS74 Series Ordering Information

★ The standard offering represents the most common option. The starred options (★) should be selected for best delivery lead time. The Expanded offering is subject to additional delivery lead time.

Model	Product description				
TS74	Temperature sensor				★
Head Material					
H	Aluminum				★
S	Stainless steel 316				
N	Without Head				
Connection Head		Schematic	Conduit thread	Process Thread	
0	No Additional Enclosure	-----	-----	-----	
1	Universal Connection Head with 1 Elec. Entry/IP65		M20 x 1.5	M20 x 1.5	★
2	Explosion Proof Connection Head with 1 Elec. Entries/IP65		M20 x 1.5	M20 x 1.5	★
Sensor lead wire termination			Details		
0	Flying Lead		No Springs on DIN plate		★
1	Terminal Block		With Spring on DIN 43762		★
2	Spring loaded		No Plate with spring loaded Process Connection Adaptor		★
Sensor type					
P1	RTD, PT-100, Single Element, 2 Wires				★
P2	RTD, PT-100, Single Element, 3 Wires				★
P3	RTD, PT-100, Single Element, 4 Wires				★
P4	RTD, PT-100, Dual Element, 2 Wires				
P5	RTD, PT-100, Dual Element, 3 Wires				
E1	Thermocouple , Type E Single Element, Ungrounded				★
E2	Thermocouple, Type E Dual Element, Isolated, Ungrounded				
K1	Thermocouple, Type K, Single Element, Ungrounded				★
K2	Thermocouple, Type K Dual Element, Isolated, Ungrounded				
J1	Thermocouple, Type J, Single Element, Ungrounded				★
J2	Thermocouple, Type J Dual Element, Isolated, Ungrounded				
T1	Thermocouple, Type T, Single Element, Ungrounded				
T2	Thermocouple, Type T Dual Element, Isolated, Ungrounded				
N1	Thermocouple, Type N Dual Element, Isolated, Ungrounded				

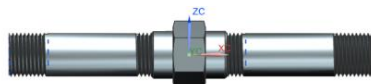
Temperature Sensor TS74 Series Ordering Information

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R1	Thermocouple, Type R, Single Element, Ungrounded		
R2	Thermocouple, Type R Dual Element, Isolated, Ungrounded		
S1	Thermocouple, Type S, Single Element, Ungrounded		
S2	Thermocouple, Type S Dual Element, Isolated, Ungrounded		
Z	Special Item		
Sensor Diameter			
3	3 mm		
6	6 mm		★
8	8 mm		★
Dimension Unit		Details	
M	Metric units (mm)	Only applies to lengths	★
E	English/U.S. units (inches)		
Sensor immersion Length		Details	
XXXX	xxxx mm, 50 to 2000 mm in 5-mm increments (when ordered with Dimension units code M)	Example of a 50 mm length: 0050	★
XXXX	xxx.x inches, 2 to 80 inches in ¼ inches increments (when ordered with Dimension units code E)	Example of a 6.25-in. length where the second decimal is dropped off: 0062	
Process Connection			
NL	No Additional Fitting (The selected connection head will determine process connection)		★
A1	½-14 NPT Male		★
A2	G ½ (BSPP) Male		
A3	¾-18 NPT Male		
A4	G ¾ (BSPP) Male		
A5	1/8-27 NPT Male		
A6	G 1/8 (BSPP) Male		
AZ	Other		
Extensions		Details	
N000-N000	No Coupling, Nipple and Union		★
Y000-Bxxx	Coupling Adaptor (It allows the HEAD to rotate freely at any direction)		xxx refers to the Length of Coupling Extension must be greater than 65mm ★
Y000-Cxxx	Coupling Nipple-Union Adaptor (It allows the HEAD to rotate freely at any direction)		xxx refers to the Length of Coupling Extension must be greater than 83mm
Y xxx-N000	One Nipple		xxx refers to the length of Nipple. e.g. Y050-N000 means one nipple with 50mm length.
Y xxx-Y000	One Nipple and one Union		xxx refers to the length of Nipple. e.g. Y050-Y000 means one nipple with 50mm length and one union.

Temperature Sensor TS74 Series Ordering Information

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Yxxx-Yxxx	Two Nipples and one Union		xxx refers to the length of Nipple. e.g. Y050-Y134 means two nipples with 0mm, 134mm length and one union.		
Other options		Details			
L	Wire color per ISA	Only available when Sensor is Thermocouple			★
M	Wire color per IEC				★
X	Assemble sensor to specific temperature transmitter				★
G	External ground screw				★
H	Cover chain				★

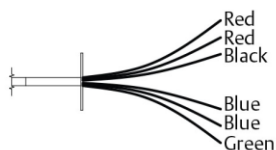
Wiring Diagram

Flying Lead Termination code 0

Single element

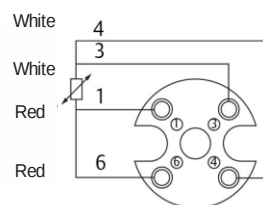


Dual element

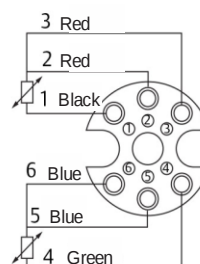


Terminal Block Termination code 1

Single element



Dual element

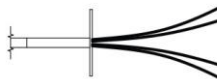


Thermocouple Flying Lead Termination code 0

Single element

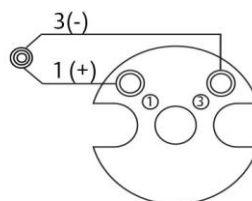


Dual element



Thermocouple Terminal Block code 1

Single element



Dual element

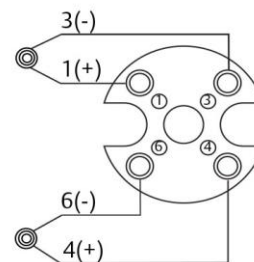
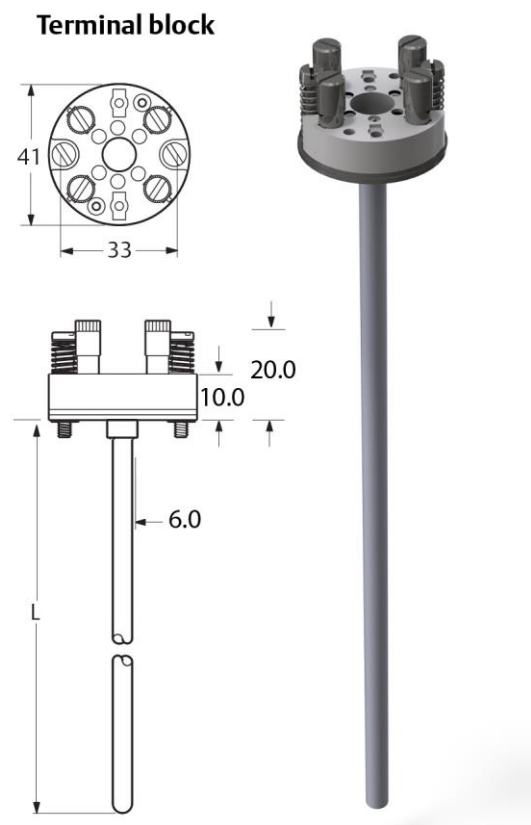


Table 4 Thermocouple Wire Color

Type	IEC wire color		ISA wire color	
	Positive (+)	Negative (-)	Positive (+)	Negative (-)
E	Violet	White	Violet	Red
J	Black	White	White	Red
K	Green	White	Yellow	Red
N	Rose	White	Orange	Red
R	Orange	White	Black	Red
S	Orange	White	Black	Red
T	Brown	White	Blue	Red



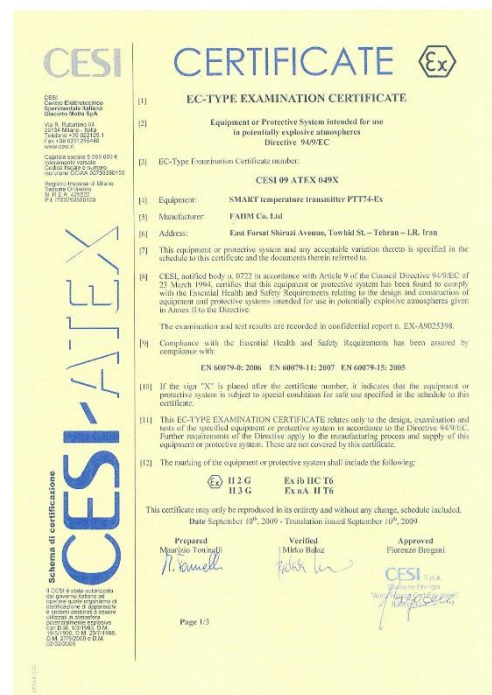
Product Certifications:

CESI is an independent center of expertise and a global provider of technical and engineering services to customers throughout the energy value chain, including business and technical consultancy, engineering and operational support.

Through our top-class modern testing facilities located in Milan, Berlin (IPH GmbH) and Mannheim (FGH GmbH), we are among the leading international organizations providing measurements and inspection, testing & certification and design review services to the global power industry.

PTT74-Ex: II 2 G Ex ib IIC T6, II 3 G, Ex nA II T6, T6 (Ta ≤ +50 °C)
Rated Voltage: 11-29.4 V
Output Signal: 4-20 mA
I1 ATEX Intrinsic Safety; Type n
Certificate: CESI 09 ATEX 049X
Standards: EN 60079-0: 2006, EN 60079-11: 2007, EN 60079-15:2005

Intrinsically safe:  II 2 G Ex ib IIC T6, mount in zone 1
II 3 G Ex nA II T6, mount in zone 2



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