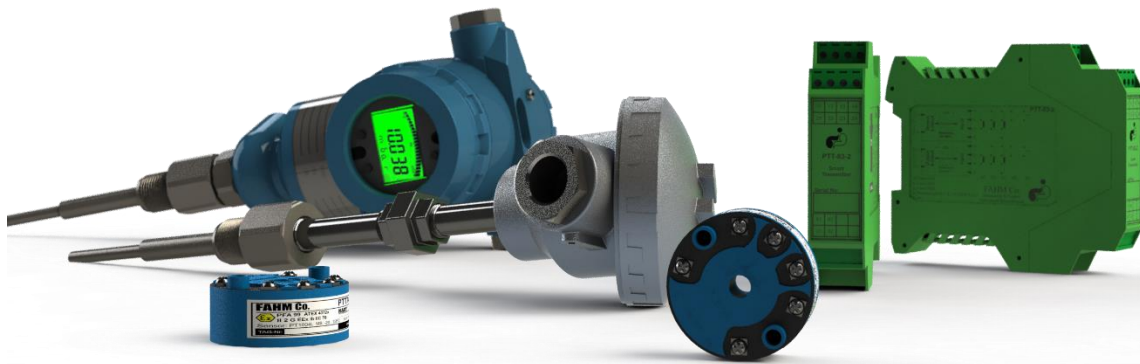


FAHM Co. Temperature Transmitter

PTT74-Ex Series



Contents

PTT74-Ex Series	1
1.Introduction	3
1.1 Preface.....	3
1.2 Transmitter overview	3
1.3 PTT74-Ex features.....	3
2. Hardware Installation	4
2.1 General considerations.....	4
2.2 Installation Process.....	5
2.2.1 Head mount Transmitter	5
2.2.2 Head mount Transmitter with local indicator.....	5
2.2.3 Rail mount transmitter	6
2.3 Electrical considerations.....	7
2.3.1 Wiring Head Mount Transmitter.....	7
2.3.2 Wiring Rail Mount Transmitter	8
2.3.3 Powering	10
2.3.4 Grounding	10
3. Configuration	11
3.1 Lcd display	11
3.2 Basic setup.....	12
Appendix	15
Schematic Drawings	15
PTT74-Ex-H1.....	15
PTT74-Ex-H2.....	16
PTT74-Ex-H3.....	17
PTT74-Ex-R.....	18

1. Introduction

1.1 Preface

This manual is designed to assist in the installation, operation, and maintenance of Fahm Co temperature transmitter. Please Read this manual before working with the product. For personal and system safety, and for optimum product performance, make sure you thoroughly understand the contents before installing, using, or maintaining this product.

1.2 Transmitter overview

Electrical temperature sensors such as RTDs and thermocouples produce low-level signals proportional to their sensed temperature. The temperature transmitter converts the low-level sensor signal to a standard 4–20 mA DC or digital HART signal that is relatively insensitive to lead length and electrical noise. This signal is then transmitted to the control room via two wires. PTT74-Ex is a smart 2-wire transmitter for temperature and other universal input measurement applications. This HART-compatible transmitter Provides excellent flexibility, low storage and installation costs. The high reliability ensures a safe system operation and low maintenance costs. In fact, The PTT74-Ex is a versatile temperature transmitter that delivers field reliability and advanced accuracy and stability to meet demanding process needs. Head mounted and Rail mounted transmitters are two different kinds of the PTT74-Ex supporting numerous features.

1.3 PTT74-Ex features

- ◆ DIN Head mount and Rail mount form factors.
- ◆ 4-20 mA /HART® with Selectable Revisions prepares your plant for the latest HART capabilities while ensuring seamless integration with today's systems.
- ◆ Enhanced Display with Local Operator Interface offers easy to use configuration capabilities at the transmitter.

- ◆ Electrical isolation between input and output (I/O Isolation) in this transmitter provides safety for plants.
- ◆ Wide range operating temperature (-40 °C to 85 °C).
- ◆ Digital low drift processing of measurement values.
- ◆ Approval for explosion protection (II 2 G EEx ib IIC T6 for mounting in zone 1 and II 3 G EEx nA II T6 for mounting in zone 2).
- ◆ Compatible with Smartware Calibration Tools (SCT), Siemens PDM Software, ABB SMART VISION Software and Hand held terminals such as DHH691, 691HT, STT04, HC275, HC374, HC475 for parametrization.
- ◆ Completely encapsulated electronics to ensure long term transmitter reliability.

2. Hardware Installation

The information in this section covers electrical and mechanical installation considerations for the PTT74-Ex temperature transmitter.

2.1 General considerations

The transmitter can be commissioned before or after installation. It may be useful to commission it on the bench, before installation, to ensure proper operation and to become familiar with its functionality. Make sure the instruments in the loop are installed in accordance with intrinsically safe, or non-incendive field wiring practices. When choosing an installation location and position, take into account the need for access to the transmitter. Proper electrical installation is necessary to prevent errors due to sensor lead resistance and electrical noise. For best results, shielded cable should be used in electrically noisy environments. Make wiring connections through the cable entry in the side of the housing. Be sure to provide adequate clearance for cover removal. The transmitter electronics module is permanently sealed within a plastic enclosure, resisting moisture and corrosive damage. Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications. The transmitter will operate within specifications for ambient temperatures between -40 and 185 °F (-40 °C and 85 °C). Heat from the process is transferred from the thermowell to the transmitter housing. If the expected process temperature is near or beyond specification limits, consider the use of additional thermowell lagging, an extension nipple, or a remote mounting configuration to isolate the transmitter from the process. Measurement accuracy depends upon proper installation of the transmitter. Mount the transmitter close to the process and use minimum wiring to achieve best

accuracy. Keep in mind the need for easy access, personnel safety, practical field calibration, and a suitable transmitter environment. Install the transmitter to minimize vibration, shock, and temperature fluctuation.

2.2 Installation Process

2.2.1 Head mount Transmitter

- ◆ Attach the thermowell to the pipe or process container wall. Install and tighten the thermowell before applying process pressure.
- ◆ Assemble the transmitter to the sensor. Push the transmitter mounting screws through the sensor mounting plate.
- ◆ Wire the sensor to the transmitter.
- ◆ Insert the transmitter-sensor assembly into the connection head. Thread the transmitter mounting screw into the connection head mounting holes. Assemble the extension to the connection head by tightening the threaded connections of the extension to the housing. Insert the assembly into the thermowell and tighten the threaded connections.
- ◆ if using a cable gland for power wiring, properly attach the cable gland to a housing conduit entry.
- ◆ Insert the shielded cable leads into the connection head through the conduit entry.
- ◆ Connect the shielded power cable leads to the transmitter power terminals. Avoid contact with sensor leads and sensor connections. Connect and tighten the cable gland.
- ◆ Install and tighten the connection head cover. Enclosure covers must be fully engaged to meet explosion-proof requirements.

2.2.2 Head mount Transmitter with local indicator

- ◆ Attach the thermowell to the pipe or process container wall. Install and tighten the thermowell before applying process pressure.
- ◆ Assemble the transmitter to the sensor. Push the transmitter mounting screws through the sensor mounting plate.

- ◆ Wire the sensor to the transmitter.
- ◆ Insert the transmitter-sensor assembly into the connection head. Thread the transmitter mounting screw into the sensor interface holes.
- ◆ connect the transmitter flat cable to CPU board.
- ◆ Assemble the thermowell to the sensor interface by tightening their threaded connections. Also, assemble the housing to the sensor interface by tightening their threaded connections
- ◆ if using a cable gland for power wiring, properly attach the cable gland to a housing conduit entry.
- ◆ Insert the shielded cable leads into the connection head through the conduit entry.
- ◆ Connect the shielded power cable leads to the transmitter power terminals. Avoid contact with sensor leads and sensor connections. Connect and tighten the cable gland.
- ◆ Install and tighten the connection head cover. Enclosure covers must be fully engaged to meet explosion-proof requirements.

2.2.3 Rail mount transmitter

- ◆ Attach the transmitter to a suitable rail or panel. The necessary power for transmitter is provided by connectors which characterized by D1, D2, D3 and, D4.
- ◆ Attach the sensor wires to the transmitter by proper connector. This transmitter has two separate channels for sensor connection.

2.3 Electrical considerations

Make sure all electrical installation is in accordance with national and local code requirements. All power to the transmitter is supplied over the signal wiring. Use ordinary copper wire of sufficient size to ensure the voltage across the transmitter power terminals does not drop below 11 Vdc. If the sensor is installed in a high-voltage environment and a fault condition or installation error occurs, the sensor leads and transmitter terminals could carry lethal voltages. Use extreme caution when making contact with the leads and terminals.

2.3.1 Wiring Head Mount Transmitter

See Figure 2-1 and Figure 2-2 for where to find and how to correctly wire all sensor types to the head mount transmitter. The PTT74 is compatible with a number of RTD and thermocouple sensor types. Figure 2-2 shows the correct input connections to the sensor terminals on the transmitter. The pin 5 and 6 are applied for powering the transmitter and user can utilize other pins for sensor connection. To ensure a proper sensor connection, anchor the sensor lead wires into the appropriate captive terminals and tighten the screws. Figure 2-3 shows how to correctly configure head mount transmitter for Hart connection.

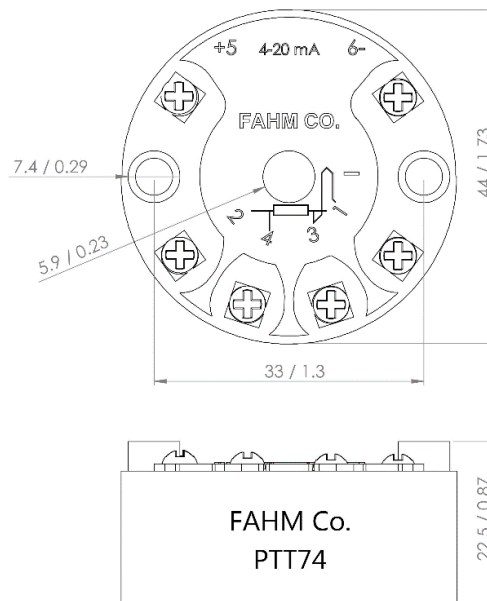
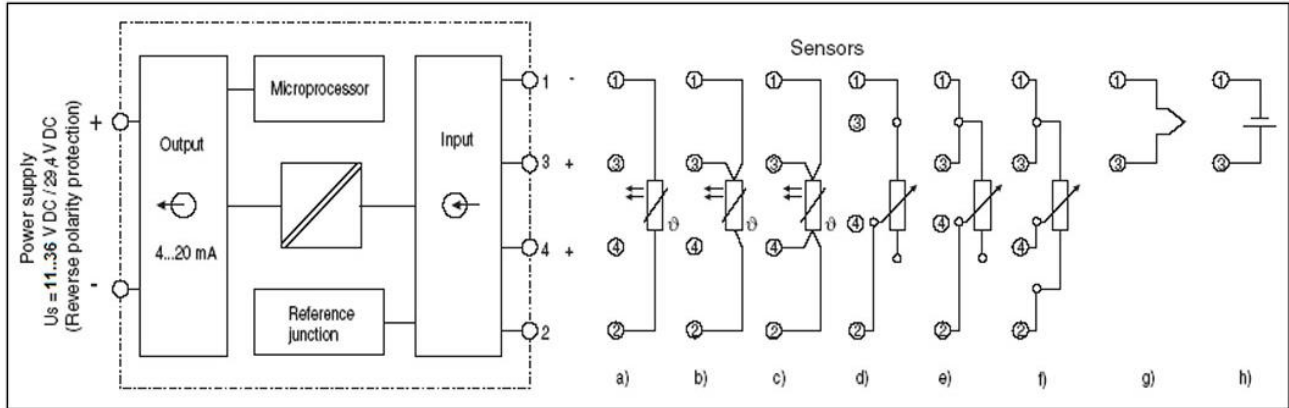


Fig2-1 PTT74 Head Mount Transmitter



- a) Resistance thermometer, 2-wire circuit
- b) Resistance thermometer, 3-wire circuit
- c) Resistance thermometer, 4-wire circuit
- d) Potentiometer input (2-wire circuit)
- e) Potentiometer input (3-wire circuit)
- f) Potentiometer input (4-wire circuit)
- g) Thermocouple
- h) Voltage meter

Fig2-2 PTT74-Ex Head Mounted Connection Diagram

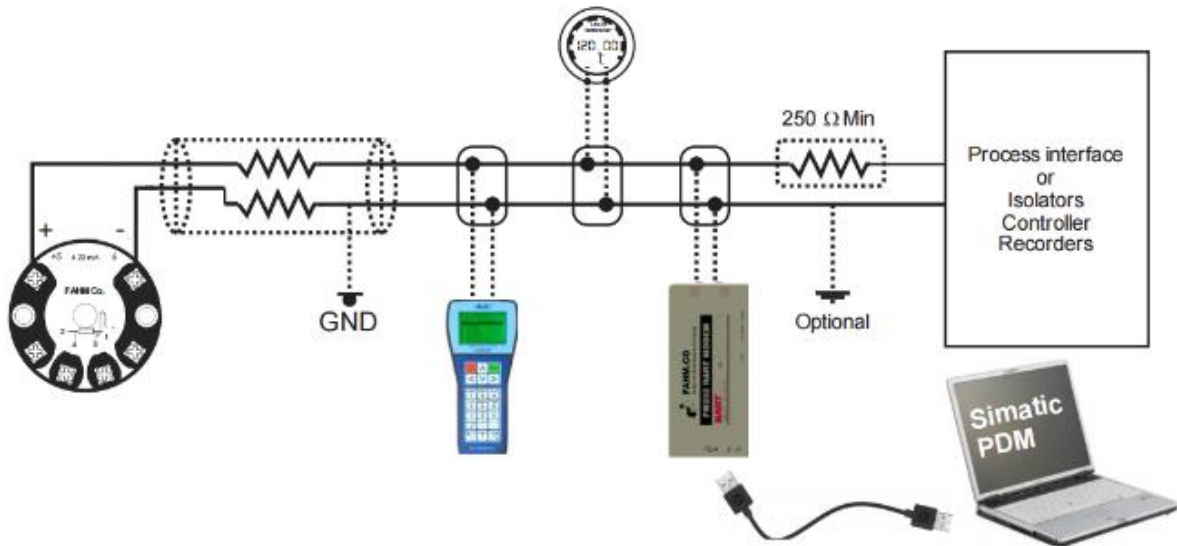


Fig2-3 PTT74 Head Mounted Hart Configuration Diagram

2.3.2 Wiring Rail Mount Transmitter

See Figure 2-4 and Figure 2-5 for where to find and how to correctly wire all sensor types to the rail mount transmitter. The PTT74 is compatible with a number of RTD and thermocouple sensor types. Figure 2-6 shows the correct input connections to the sensor terminals on the transmitter.

To ensure a proper sensor connection, anchor the sensor lead wires into the appropriate captive terminals and tighten the screws. Figure 2-6 shows how to correctly configure head mount transmitter for Hart connection.

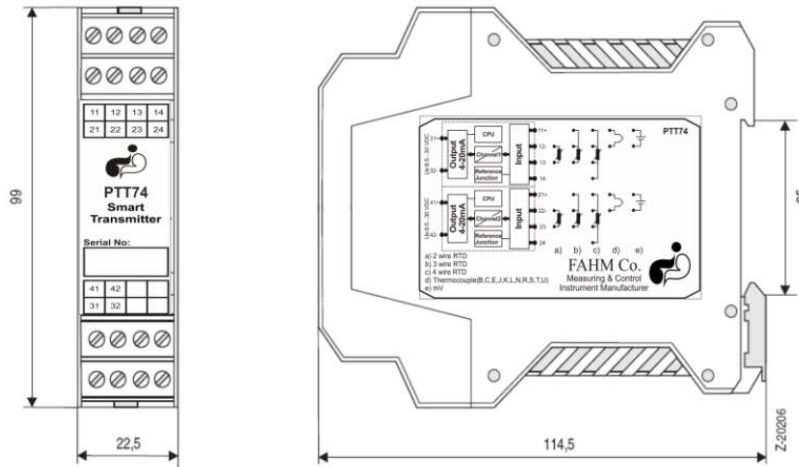


Fig2-4 PTT74 Rail Mount Transmitter

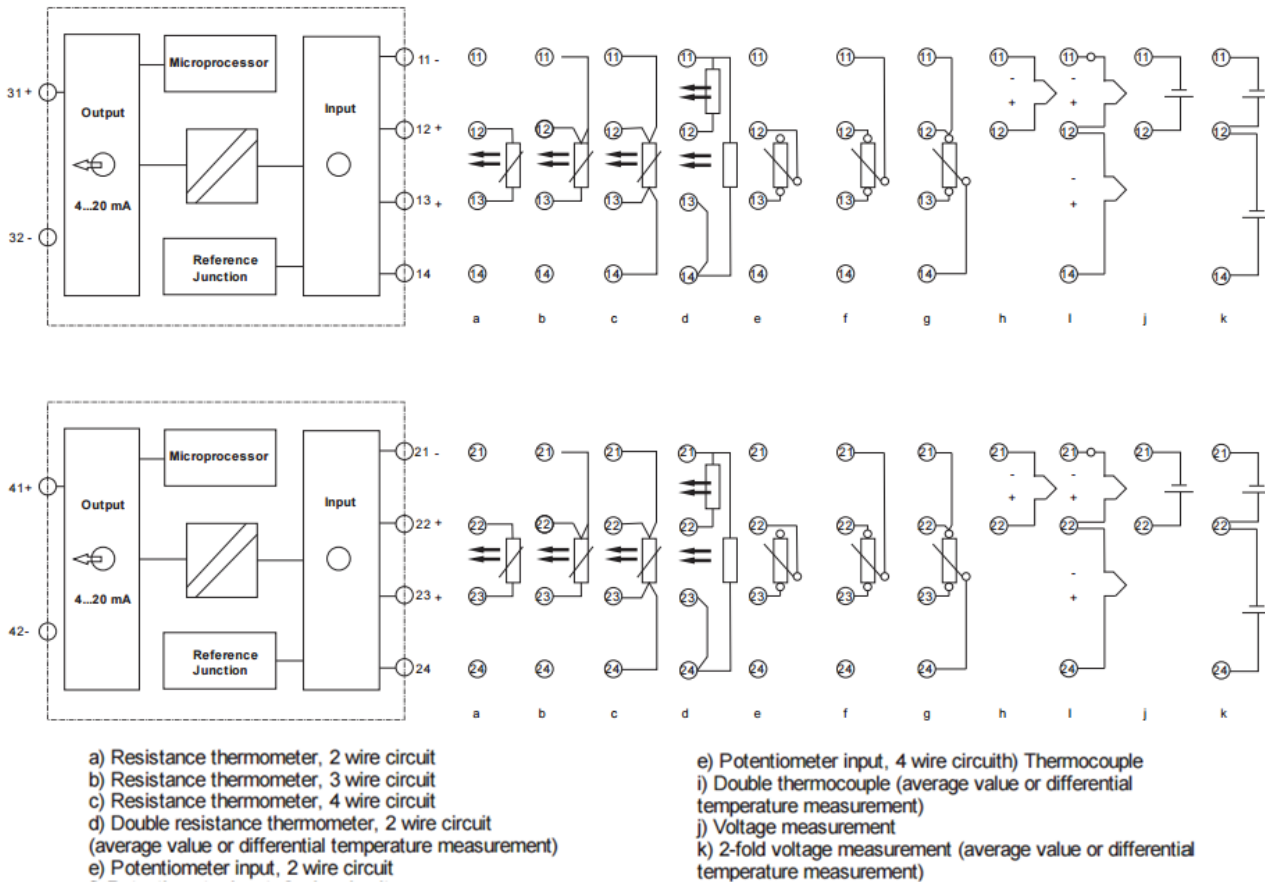


Fig2-5 PTT74 Rail Mounted Connection Diagram

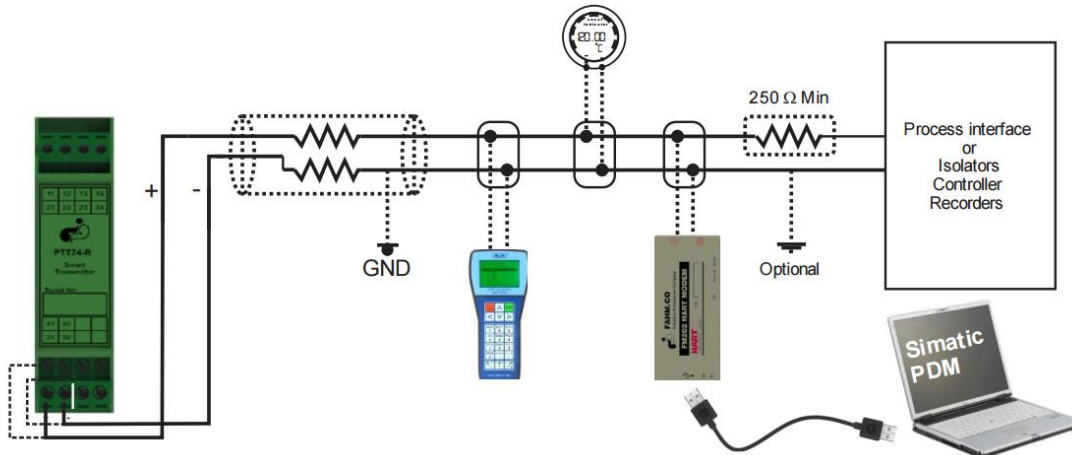


Fig2-6 PTT74 Rail Mounted Hart Configuration Diagram

2.3.3 Powering

Do not connect the power signal wiring to the test terminals. Voltage may burn out the reverse-polarity protection diode in the test connection. Perform the following steps to make wiring connections:

1. Remove the housing cover on terminal compartment side. Do not remove the cover in explosive atmospheres when the circuit is live. Signal wiring supplies all power to the transmitter.
2. For 4-20 mA HART output, connect the positive lead to the terminal marked (+) and the negative lead to the terminal marked (-). Do not connect powered signal wiring to the test terminals. Power could damage the test diode.
3. Plug and seal unused conduit connection on the transmitter housing to avoid moisture accumulation in the terminal side. Install wiring with a drip loop. Arrange the drip loop so the bottom is lower than the conduit connections and the transmitter housing. Transmitter operates on 11 - 36 Vdc (11-29.4 Vdc for satisfaction of EX). The dc power supply should provide power with less than two percent ripple.

2.3.4 Grounding

Use the following techniques to properly ground the transmitter signal wiring and case. Do not run signal wiring in conduit or open trays with power wiring or near heavy electrical equipment. It is important that the instrument cable shield be:

- ◆ trimmed close and insulated from touching the transmitter housing
- ◆ Connected to the next shield if cable is routed through a junction box.
- ◆ Connected to a good earth ground at the power supply end.

For 4-20 mA HART output, the signal wiring may be grounded at any one point on the signal loop or may be left ungrounded. The negative terminal of the power supply is a recommended grounding point. Always ground the transmitter case in accordance with national and local electrical codes. The most effective transmitter case grounding method is a direct connection to earth ground with minimal impedance. Methods for grounding the transmitter case include:

- ◆ **Internal Ground Connection:** The Internal Ground Connection screw is inside the FIELD TERMINALS side of the electronics housing. This screw is identified by a ground symbol.
- ◆ **External Ground Connection:** Grounding the transmitter case via threaded conduit connection may not provide sufficient ground continuity.

3. Configuration

3.1 Lcd display

The LCD indicator connects directly to the interface board which maintains direct access to the signal terminals. It can display the digital pressure, temperature, current three kinds of physicals, 0-100% analog indication and abbreviated diagnostic messages. A display cover is provided to accommodate the display. The LCD display features a three-line display. The first line displays three characters related to measured parameter. The first character of the first line is <P> related to programming mode. The second character of first line is <SP> and the last character is <FIX>. This character is on when the measured temperature is stable and same for different times. The second line displays the actual measured value of temperature and its sign. The third line displays the engineering unit for the temperature. A speed meter located in above section of the first line displayed the percentage of measured temperature. The lcd display is shown in Fig3-1.



Fig3-1 the indicator

3.2 Basic setup






For configuration and tuning the parameters, three key buttons exist on the indicator. The key button characterized by <M> is located in above of ICD display and by pressing this button, menu for tuning the parameters is available for users and they can use this button to save new parameters when all characters in display are in blinking mode. Also, two key buttons located in the bottom of lcd which characterized by <Z> and <S> signs. The key button characterized by <Z> is responsible for horizontal sweeping of parameters and switching between programming mode and operation mode. Also, the key button characterized by <S> is responsible for vertical sweeping of parameters. Operation of this key button is mentioned in summery in table 3-1.








Table3-1 keys operation

Key button	operation
M	Accessing to menu list - saving new parameters
Z	Horizontal sweeping of parameters - switching between programming mode and operation mode
S	Vertical sweeping of parameters

Users can use the following instruction to perform the configuration of the different parameters (see table 3-2).

Table3-2 basic configuration

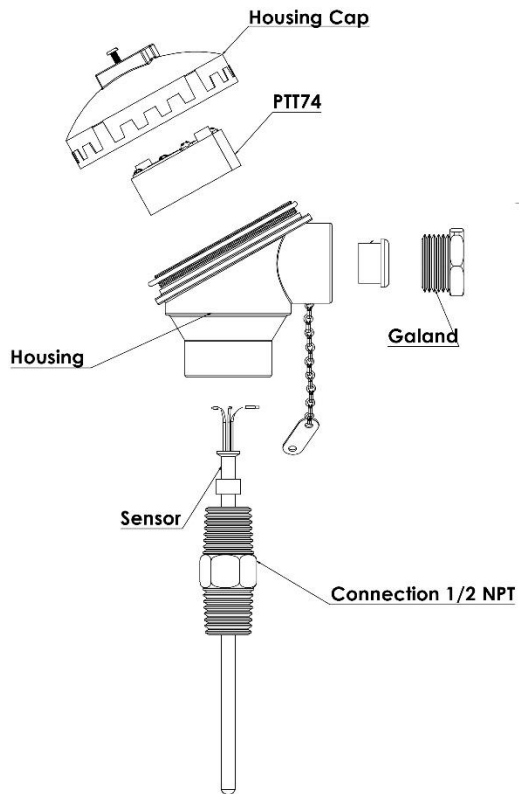
parameter	display	Parameter tuning structure
Ambient temperature		Press <M> until this page is appeared on lcd. Then ambient temperature is displayed on the indicator.
Max-temperature (The temperature mapped to 20 mA)		Press <M> until this page is appeared on lcd. The initial value of maximum temperature is displayed on the indicator. Then press <Z> to access the amount of maximum temperature. You can change the amount of digits by <S> and change the point and position of digits by <Z>. After tuning this parameter, press the <Z> until all characters blink (programing mode). Then press <M> for the saving new parameter and switching from programing mode to operation mode.
Min-temperature (The temperature mapped to 4 mA)		Press <M> until this page is appeared on lcd. The initial value of minimum temperature is displayed on the indicator. Then press <Z> to access the amount of minimum temperature. You can change the amount of digits by <S> and change the point and position of digits by <Z>. After tuning this parameter, press the <Z> until all characters blink (programing mode). Then press <M> for the saving new parameter and switching from programing mode to operation mode.
Trim-High (For offset removing and local calibration of maximum temperature)		Press <M> until this page is appeared on lcd. The amount of temperature is displayed on the indicator. Then press <Z> to access the amount of offset. You can change the amount of digits by <S> and change the point and position of digits by <Z>. After tuning this parameter, press the <Z> until all characters blink (programing mode). Then press <M> for the saving new parameter and switching from programing mode to operation mode.
Trim-low (For offset removing and local calibration of minimum temperature)		Press <M> until this page is appeared on lcd. The amount of temperature is displayed on the indicator. Then press <Z> to access the amount of temperature. You can change the amount of digits by <S> and change the point and position of digits by <Z>. After tuning this parameter, press the <Z> until all characters blink (programing mode). Then press <M> for the saving new parameter and switching from programing mode to operation mode.

<p>Damping (for smoothing the noisy output (based on sec))</p>		<p>Press <M> until this page is appeared on lcd. The amount of damping time is displayed on the indicator. Then press <Z> to access the amount of time based on second. You can change the amount of digits by <S> and change the point and position of digits by <Z>. After tuning this parameter, press the <Z> until all characters blink (programing mode). Then press <M> for the saving new parameter.</p>
<p>Sensor type</p>		<p>Press <M> until this page is appeared on lcd. The default sensor type is displayed on the indicator. Then press <Z> to change the type of sensor. You can scroll by pressing <S>. After tuning this parameter, press the <Z> until all characters blink (programing mode). Then press <M> for the saving new parameter and switching from programing mode to operation mode.</p>
<p>Number of wire</p>		<p>Press <M> until this page is appeared on lcd. The default number of sensor wire is displayed on the indicator. Then press <Z> to change the type of sensor. You can scroll by pressing <S>. After tuning this parameter, press the <Z> until all characters blink (programing mode). Then press <M> for the saving new parameter.</p>
<p>Alarm (setting alarm for over range and under range)</p>		<p>Press <M> until this page is appeared on lcd. Then press <Z> to access the Alarm parameters. You can set the alarm for over range (high) and under range (low) by pressing <S>. After that, press <Z> until all characters blink (programing mode). Then press <M> for the saving new parameter and switching from programing mode to operation mode. Also, user can see the last amount of temperature in last section when the last alarm is occurred.</p>
<p>Unit (set the unit of temperature)</p>		<p>Press <M> until this page is appeared on lcd. Then press <Z> to access the units. You can select the unit by pressing <S>. After that, press <Z> until all characters blink (programing mode). Then press <M> for the saving new parameter.</p>
<p>Mapping mode (linear or sqrt mode)</p>		<p>Press <M> until this page is appeared on lcd. Then press <Z> to access the mapping mode. You can select linear or sqrt mode by pressing <S>. After that, press <Z> until all characters blink (programing mode). Then press <M> for the saving new parameter and switching from programing mode to operation mode</p>
<p>Version of firmware</p>		<p>Press <M> until this page is appeared on lcd. Then version of firmware is displayed on the indicator.</p>

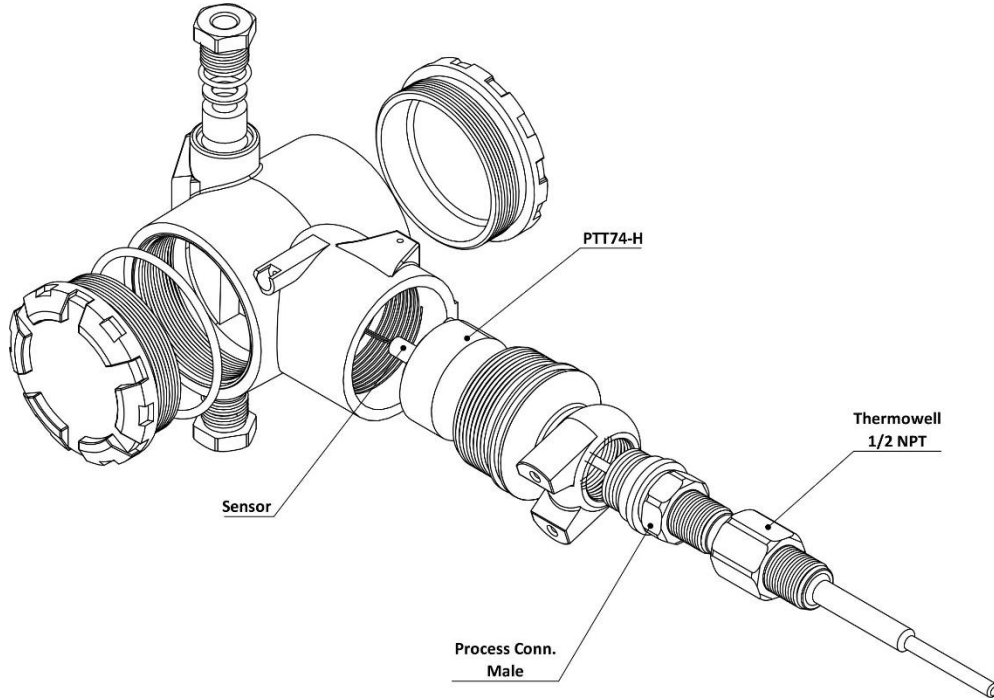
Appendix

Schematic Drawings

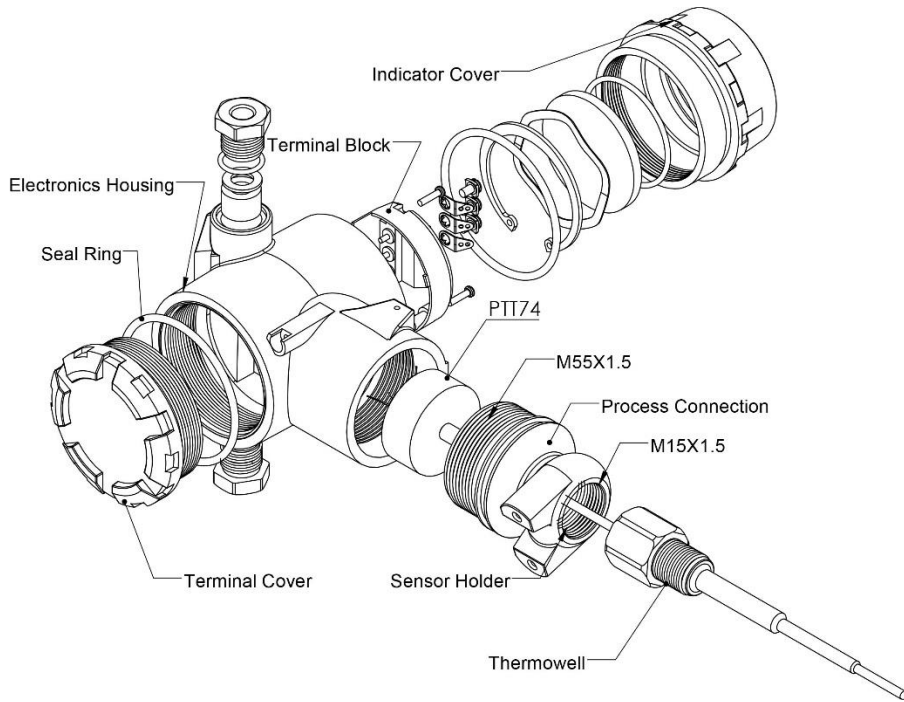
PTT74-Ex-H1




PTT74-Ex-H2



PTT74-Ex-H3



PTT74-Ex-R

11	12	13	14
21	22	23	24
 PTT74-R Smart Transmitter			
Serial No:			
41	42		
31	32		



FAHM Co.

FARABOARD HOUSHMAND MIHAN
 Main Office: Unit 8, 4th Floor, No.37, Tohid St., Tehran, Iran
 Tel: +98 21 66123710-13 Fax: +98 21 66123714
 Factory: Garmsar Industrial Zone, Sanat 2 St.
 E-Mail: sales@faraboard.com