

STT700 SmartLine Temperature Transmitter Quick Start Installation Guide

34-TT-25-19, Revision 1, July 2017

This document provides descriptions and procedures for the Quick Installation of Honeywell's family of SmartLine Temperature Transmitters.

The STT700 is available in a variety of models for measuring Thermocouples, RTD, Millivolts and Ohm sensor types.

For full details refer to the manuals listed below for Operation, Installation, Protocol, Configuration, Calibration, Maintenance, Parts, Safety and Approvals etc. including options.

Various other documents are available on the CD supplied with your shipment.

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| Revision history |
| Rev.1, July 2017 – 1 st release |

References

The following list identifies all documents that may be sources of reference for material discussed in this publication.

| Document Title | Document # |
|---|-------------|
| STT700 SmartLine Transmitter User's Manual | 34-TT-25-17 |
| STT700 SmartLine Transmitter HART User Manual | 34-TT-25-18 |
| SmartLine Temperature Safety Manual | 34-TT-25-20 |
| STT700 Specification | 34-TT-03-19 |
| STT700 Surge Protection spec | 34-TT-03-20 |
| STT700 Field Device Specification (HART) | 34-TT-00-05 |
| MC Toolkit User Manual (MCT404) | 34-ST-25-50 |

For start-up, operation (including configuration), maintenance and calibration refer to the STT700 Transmitter User's manual, #34-TT-25-17

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INSTALLATION

Evaluate the site selected for the Transmitter installation with respect to the process system design specifications and Honeywell's published performance characteristics for your particular model. Conditions to be considered include:

Table 1: Installation considerations

| Environmental Conditions: | Process Parameters |
|--------------------------------------|--|
| - Ambient temperature | - Temperature |
| - Relative Humidity | - Maximum Sensor Input Ratings |
| Potential Noise Sources: | Vibration Sources |
| - Radio Frequency Interference (RFI) | - Pumps |
| - Electromagnetic Interference (EMI) | - Motorized System Devices (e.g., pumps) |
| | - Valve Cavitation |

In preparation for post-installation processes, refer to the *MC Toolkit User Manual*, Document # #34-ST-25-50 (MCT404), for battery conditioning and device operation and maintenance information.

FEATURES AND OPTIONS

As shown in [Figure 1](#), the STT700 is packaged in a single module. The elements in this module are connected to the process sensors, measure the process variables, respond to setup commands and execute the software and protocol for the different temperature measurement types.



Figure 1 – STT700 Temperature Transmitter (HART left, DE right)

The transmitter measures process temperature and outputs a signal proportional to the measured process variable (PV). Available output communication protocols include 4 to 20mA, Honeywell Digitally Enhanced (DE) and HART protocols.

MOUNTING THE TRANSMITTER

DIN Rail Mounting

If the STT700 is to be installed on DIN Rail then the main considerations are electrical connections and mechanical fixing. Electrical connections are identical to the bench test instructions except that thermocouple wire is likely to be used with thermocouples. Mechanical fixing of the module is by means of the snap-in DIN Rail Clips which are screwed to the bottom lugs of the module.

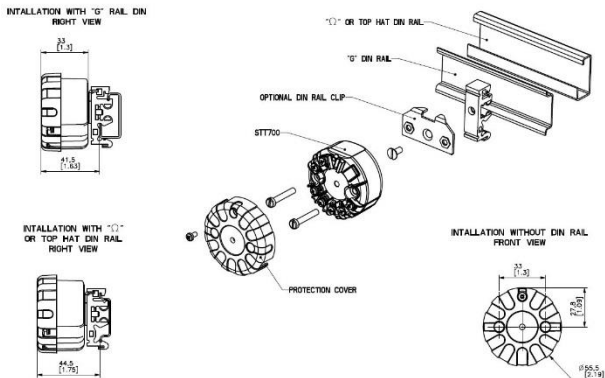


Figure 2: DIN Rail Mounting

The DIN Rail needs to be connected to Earth Ground, refer to STT700 SmartLine transmitter user's manual, #34-TT-25-17.

Uninstalling/Installing EU Meter from Housing

EU Meter:

1. Remove the EU METER from the mounting bracket.
2. Unfasten the 2 mounting screws.
3. Remove the bracket.

To put the EU meter back follow the above sequence in the reverse order.

Housing Cover and O Ring:

1. Review O-ring condition & replace, if damaged. New O-ring can be ordered from spare parts list.
2. Apply O-ring lubricant to the end cap O-ring. Relax O-ring twists, if any.
3. Assemble housing cover with sufficient torque for securing against IP.

Mounting Module in Housing

The STT700 module can be installed in a variety of housings suitable for direct head mounting, 2" (50mm) pipe mounting or wall mounting.

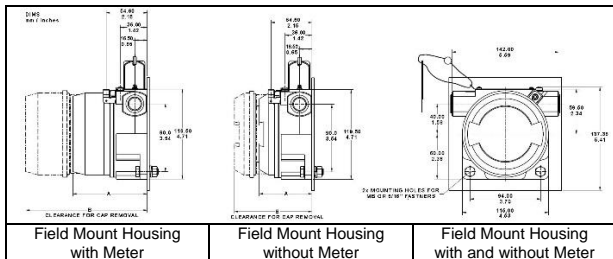


Figure 3: Wall Mounting Dimensions

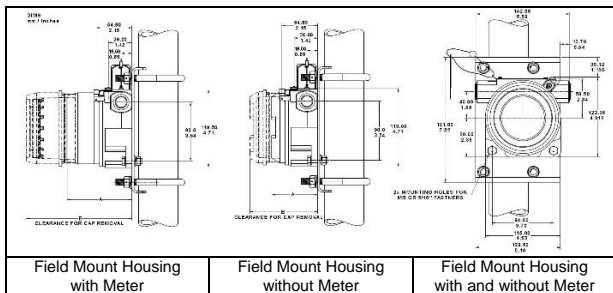


Figure 4: Pipe Mounting Dimensions

Table 2: Mounting Dimensions

| Dimensions | Aluminum (field mount housing) | |
|------------------------|--------------------------------|----------------------|
| | A | B |
| Without integral meter | 70 mm [2.76 inch] | 120,8 mm [4.76 inch] |
| With integral meter | 127 mm [5.00 inch] | 210,8 mm [8.30 inch] |

Spring Loading

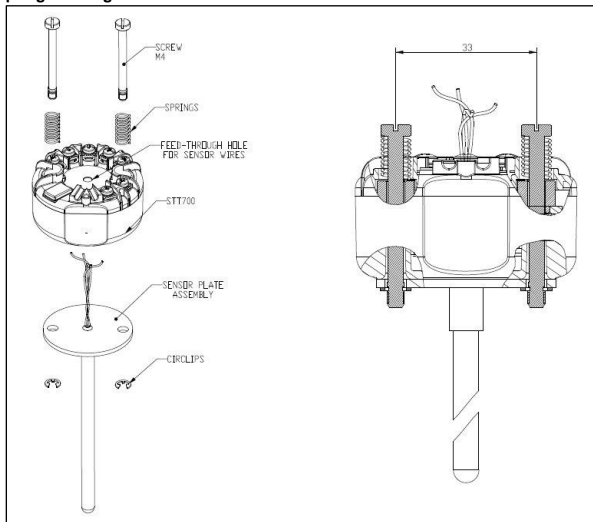


Figure 5: Spring Loading and Sensor Assembly

Spring loading is available worldwide with direct head mounting. In North America, the spring loading is typically included in the sensor/thermowell assembly and is available with all housings. For non-North American spring loading as shown in Figure 5, simply include the springs under the 33 mm pitch mounting screws, pass the screws through the module and sensor mounting plate and snap in the retaining circlip to the screws to hold the assembly together. Guide the sensor assembly through the housing sensor entry and screw down the 33 mm screws until the limit is reached as the sensor presses against the bottom of thermowell.

For wall or 2" pipe mounting, the temperature sensor can be remote from the STT700 field mount housing or integral to the housing. For remote installations, the sensor wiring should be run in shielded, twisted pair wiring and connected via one of the housing wiring entries. For explosionproof/flameproof installations, ensure that the cable entries are fitted with flameproof adaptors and that the wiring grade complies with local standards.

For more details on wiring and dimensions for Aluminum Direct head and Cast iron Direct head refer to STT700 SmartLine transmitter user's manual, #34-TT-25-17.

WIRING CONNECTIONS AND POWER UP

Summary

The transmitter is designed to operate in a two-wire power/current loop with loop resistance and power supply voltage within the HART and DE operating ranges shown in [Figure 6](#).

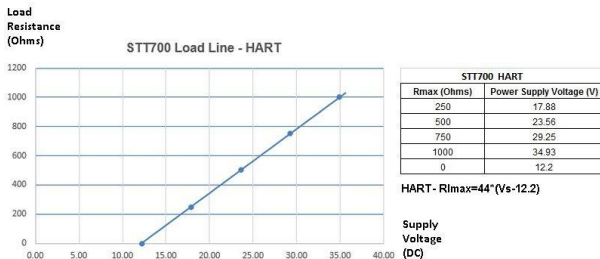


Figure 6: STT700 HART Transmitter Operating Ranges

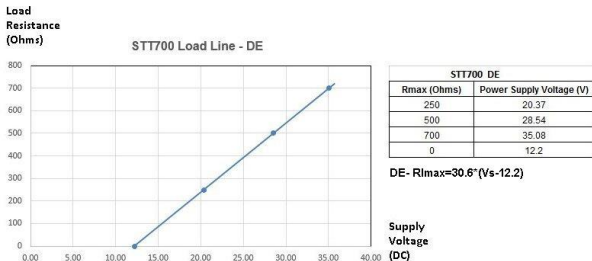


Figure 7: STT700 DE Transmitter Operating Ranges

Loop wiring is connected to the transmitter by simply attaching the positive (+) and negative (-) loop wires to the positive (+) and negative (-) terminals on the transmitter terminal block in the electronics housing shown in [Figure 8](#). Route the wires through the pre-molded channels on the connector cap. Connect the loop power wiring shield to earth ground only at the power supply end.

Note that loop-power for this transmitter is not polarity-sensitive.

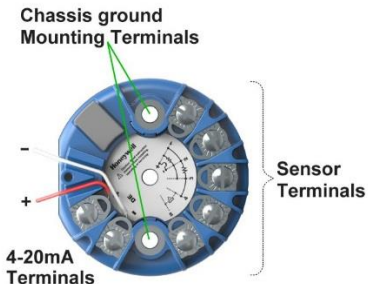


Figure 8: STT 700 Terminal connections

This transmitter uses the two mounting screws to connect it to earth ground. Grounding the transmitter for proper operation is required, as doing so tends to minimize the possible effects of noise on the output signal and affords protection against lightning and static discharge. An optional lightning protection module is available for use in areas that are highly susceptible to lightning strikes. As noted above, the loop power wiring shield should only be connected to earth ground at the power supply end.



Wiring must comply with local codes, regulations and ordinances. Grounding may be required to meet various approval body certification, for example CE conformity. Refer to the [STT700 SmartLine Transmitter User's Manual 34-TT-25-17](#) for details

For HART and DE the transmitter is designed to operate in a two-wire power/current loop with loop resistance and power supply voltage within the operating range; see [Figure 9](#). With an optional remote meter, the voltage drop for this must be added to the basic power supply voltage requirements to determine the required transmitter voltage (VXMTR) and maximum loop resistance (RLOOP MAX). Additional consideration is required when selecting intrinsic safety barriers to ensure that they will supply at least minimum transmitter voltage (VXMTR MIN), including the required 250 ohms of resistance (typically within the barriers) needed for digital communications.

Wiring Variations

The above procedures are used to connect power to a transmitter. For loop wiring and external wiring, detailed drawings are provided for transmitter installation in non-intrinsically safe areas and for intrinsically safe loops in hazardous area locations. This procedure shows the steps for connecting power to the transmitter.

Grounding and Lightning Protection

Connect a wire from the mounting screws to earth ground to make the protection effective. Use a size 8 AWG or (8.37mm²) bare or green covered wire for this connection. For ungrounded thermocouple, mV, RTD or ohm inputs, connect the input wiring shield(s) to the same earth ground connection. For grounded thermocouple inputs, connect the internal ground connection shown in [Figure 8](#) to the same earth ground as used by the thermocouple. As noted above, the loop power wiring shield should only be connected to earth ground at the power supply end.

For DE, the burnout direction needs to be selected in the hardware and this will be detected at power on time.

Input Sensor Wiring

Connect the input sensors as shown in [Figure 9](#) below: RTD Thermocouple, mV, Ohm and Millivolt connections.

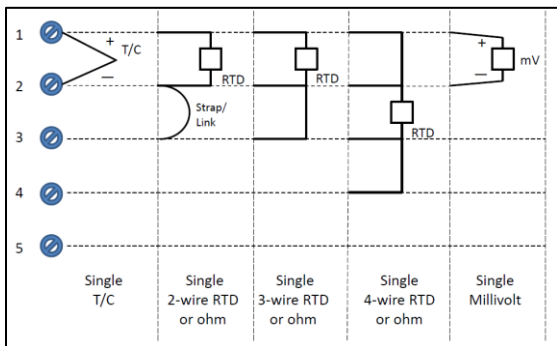


Figure 9: HART/DE Input Wiring Diagram for single sensor connection

The single sensor connections can also be used on a dual input transmitter when a second input is not required. In this case, it is recommended that the second input be configured to none in software.

In case of RTD type being configured to 4-wire, this is automatically done.

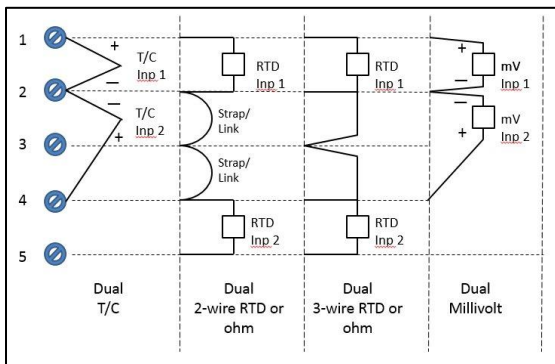


Figure 10: Wiring Diagram for HART Dual Sensor Connections

EXPLOSION-PROOF CONDUIT SEAL



When installed as explosion proof in a Division 1 Hazardous Location, keep covers tight while the Transmitter is energized. Disconnect power to the Transmitter in the non-hazardous area prior to removing end caps for service.

When installed as non-incendive equipment in a Division 2 hazardous location, disconnect power to the Transmitter in the non-hazardous area, or determine that the location is non-hazardous before disconnecting or connecting the Transmitter wires.

Transmitters installed as explosion proof in Class I, Division 1, Group A Hazardous (classified) locations in accordance with ANSI/NFPA 70, the US National Electrical Code, require a LISTED explosion proof seal to be installed in the conduit, within 18 inches (457.2 mm) of the transmitter.

LIGHTNING PROTECTOR

This device is designed to give the SmartLine temperature transmitter maximum protection against surges such as those generated by lightning strikes. The lightning protector mounts right on the top of the STT700 terminal block, providing easy field wiring and also protection for the EU meter if used. For more details refer to STT700 SmartLine temperature transmitter user's manual, #34-TT-25-17.

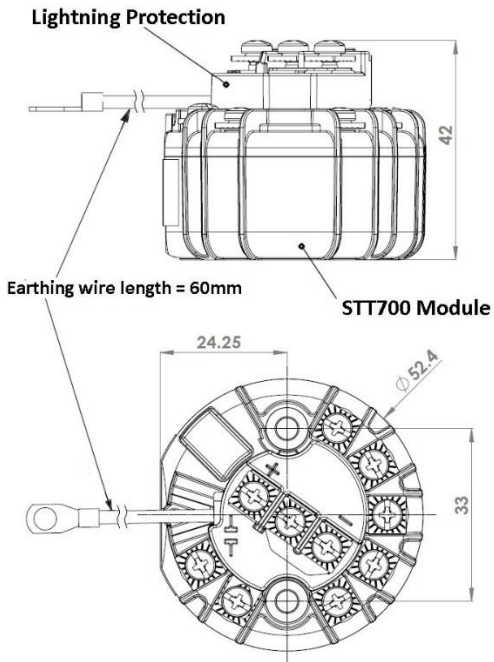


Figure 11: Lightning Protector Dimensions

Installation

- If an EU meter is used, remove the shunt on the Lightning Protector. In all other cases, the shunt must be present.
- Remove the cover/cap of the housing (if applicable). The device fits on the top of the transmitter module terminal block and the transmitter output screws (+ and -) fix mechanically the device.
- Attach the grounding wire to the ground screw in the housing. Connect a wire from the transmitter enclosure to local earth ground. Use size 14 AWG or 2.0mm² bare or green covered wire.
- If an EU meter is used, wire according to [Figure 13](#).
- Connect the 4 – 20mA loop to the + and – terminal screws of the surge protection and close the cap of the housing.

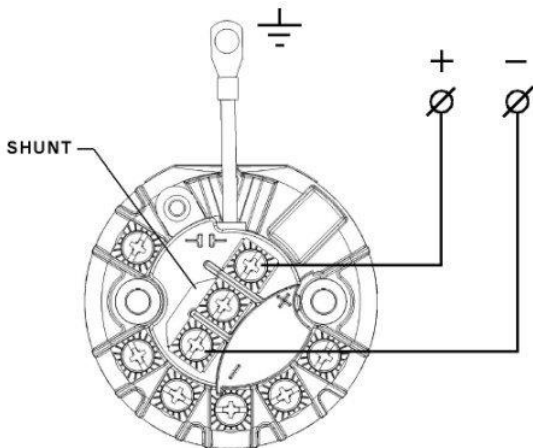


Figure 12: Installation without EU Meter

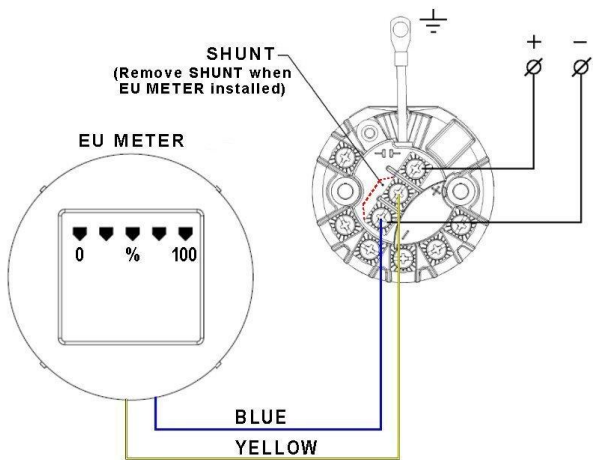


Figure 13: Installation with EU Meter

For start-up, operation (including configuration), maintenance and calibration refer to the STT700 Transmitter User's manual, #34-TT-25-17

