Honeywell

STT850 SMARTLINE Temperature Transmitter User's Manual

34-TT-25-03
Revision 1
March 2014

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Revision 1, March 2014

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About This Manual

This manual is a detailed *how to* reference for installing, piping, wiring, configuring, starting up, operating, maintaining, calibrating, and servicing Honeywell's family of STT850 Temperature Transmitters. Users who have a Honeywell STT850 SmartLine Temperature Transmitter configured for HART protocol or Honeywell's Digitally Enhanced (DE) are referred to the *STT850 SmartLine Series HART/DE Option User's Manual*, document number 34-TT-25-06. Users who have a Honeywell STT850 SmartLine Temperature Transmitter configured for Fieldbus operation are referred to the *STT850 SmartLine Series Fieldbus Option User's Manual*, document number (34-TT-25-07).

The configuration of your Transmitter depends on the mode of operation and the options selected for it with respect to operating controls, displays and mechanical installation. This manual provides detailed procedures to assist first-time users, and it further includes keystroke summaries, where appropriate, as quick reference or refreshers for experienced personnel.

To digitally integrate a Transmitter with one of the following systems:

- For the Experion PKS, you will need to supplement the information in this document with the data and procedures in the *Experion Knowledge Builder*.
- For Honeywell's TotalPlant Solutions (TPS), you will need to supplement the information in this document with the data in the *PM/APM SmartLine Transmitter Integration Manual*, which is supplied with the TDC 3000 book set. (TPS is the evolution of the TDC 3000).

Release Information:

STT850 SmartLine Temperature Transmitter User Manual, Document # 34-TT-25-03,

Rev 1, March 2014 1st Release

References

The following list identifies publications that may contain information relevant to the information in this document.

STT850 SmartLine Temperature Transmitter Quick Start Installation Guide, Document # 34-TT-25-04

STT850 SmartLine Temperature Transmitter with HART Communications Options Safety Manual, # 34-TT-25-05

STT850 SmartLine Temperature Transmitter HART/DE Option User's Manual, Document # 34-TT-25-06

STT850 FF Transmitter with FOUNDATION Fieldbus Option Installation & Device Reference Guide, Document # 34-TT-25-07

MC Toolkit User Manual, for 400 or later, Document # 34-ST-25-20

PM/APM SmartLine Transmitter Integration Manual, Document # PM 12-410

*STT850 Series Temperature, Transmitter, Agency IS Control Drawing*50091227

Smart Field Communicator Model STS 103 Operating Guide, Document # 34-ST-11-14

Patent Notice

The Honeywell STT850 SmartLine Temperature Transmitter family is covered by one or more of the following U. S. Patents: 5,485,753; 5,811,690; 6,041,659; 6,055,633; 7,786,878; 8,073,098; and other patents pending.

Support and Contact Information

For Europe, Asia Pacific, North and South America contact details, refer to the back page of this manual or the appropriate Honeywell Solution Support web site:

Honeywell Corporate	www.honeywellprocess.com
Honeywell Process Solutions	https://www.honeywellprocess.com/smartline-temperature/
Training Classes	http://www.automationccollege.com

Telephone and Email Contacts

Area	Organization	Phone Number
United States and Canada	Honeywell Inc.	1-800-343-0228 Customer Service 1-800-423-9883 Global Technical Support
Global Email Support	Honeywell Process Solutions	ask-ssc@honeywell.com

Symbol Descriptions and Definitions

The symbols identified and defined in the following table may appear in this document.

Symbol	Definition
	**ATTENTION: Identifies information that requires special consideration.**
	**TIP: Identifies advice or hints for the user, often in terms of performing a task.**
CAUTION	**Indicates a situation which, if not avoided, may result in equipment or work (data) on the system being damaged or lost, or may result in the inability to properly operate the process.**
	**CAUTION: Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.** **CAUTION symbol on the equipment refers the user to the product manual for additional information. The symbol appears next to required information in the manual.**
	**WARNING: Indicates a potentially hazardous situation, which, if not avoided, could result in serious injury or death.** **WARNING symbol on the equipment refers the user to the product manual for additional information. The symbol appears next to required information in the manual.**
	**WARNING, Risk of electrical shock: Potential shock hazard where HAZARDOUS LIVE voltages greater than 30 Vrms, 42.4 Vpeak, or 60 VDC may be accessible.**
	**ESD HAZARD: Danger of an electro-static discharge to which equipment may be sensitive. Observe precautions for handling electrostatic sensitive devices.**
	**Protective Earth (PE) terminal: Provided for connection of the protective earth (green or green/yellow) supply system conductor.**
	**Functional earth terminal: Used for non-safety purposes such as noise immunity improvement. NOTE: This connection shall be bonded to Protective Earth at the source of supply in accordance with national local electrical code requirements.**
	**Earth Ground: Functional earth connection. NOTE: This connection shall be bonded to Protective Earth at the source of supply in accordance with national and local electrical code requirements.**
	**Chassis Ground: Identifies a connection to the chassis or frame of the equipment shall be bonded to Protective Earth at the source of supply in accordance with national and local electrical code requirements.**
continued	

Symbol	Description
	The Factory Mutual® Approval mark means the equipment has been rigorously tested and certified to be reliable.
	The Canadian Standards mark means the equipment has been tested and meets applicable standards for safety and/or performance.
	The Ex mark means the equipment complies with the requirements of the European standards that are harmonized with the 94/9/EC Directive (ATEX Directive, named after the French "ATmosphere EXplosible").

Contents

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1 Introduction

1.1 Overview

This section is an introduction to the physical and functional characteristics Honeywell's family of STT850 SmartLine Temperature Transmitters.

1.2 Features and Options

The STT850 SmartLine Temperature Transmitter is available in a variety of models for measuring Thermocouples, RTD, Millivolts, and Volt or ohm sensor types. Table 1 lists the protocols, human interface (HMI), materials, approvals, and mounting bracket options for the STT850.

Table 1 – Features and Options

Feature/Option	Standard/Available Options
Communication Protocols	HART version 7, Digitally Enhanced (DE), Fieldbus
Human-Machine Interface (HMI) Options (Basic and Advanced Display)	Basic and Advanced Digital Display
	Three-button programming (optional)
	Basic display language: English only
	Advanced display languages: English, German, French, Spanish, Turkish, Italian, Chinese, Japanese and Russian
Calibration	Single
Approvals (See Appendix C for details.)	ATEX, CSA, FM, IECx, NEPSI
Mounting Brackets	Pipe mounting and wall mounting brackets in carbon steel and 316 stainless steel.
Integration Tools	Experion

1.2.1 Physical Characteristics

As shown in Figure 1, the STT850 is packaged in one major assembly: the Electronics Housing. The elements in the Electronic Housing 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 2 shows the assemblies in the Electronics Housing with available options.

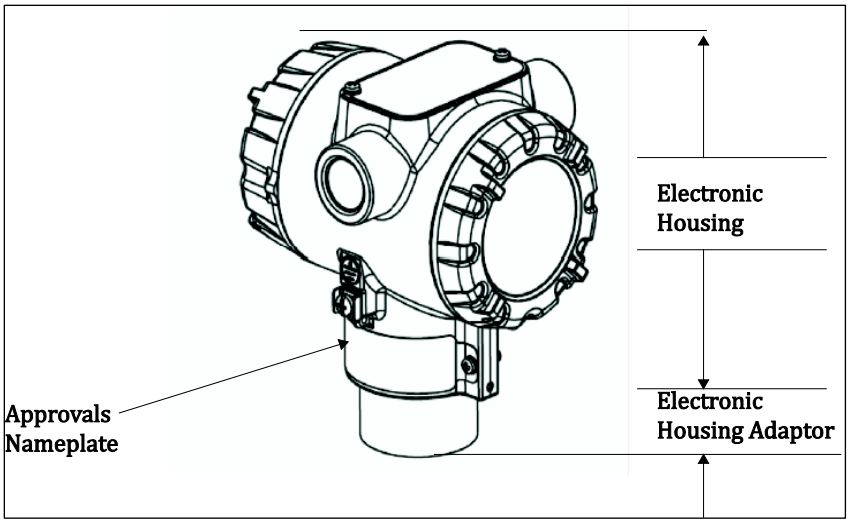


Figure 1 – STT850 Major Assemblies

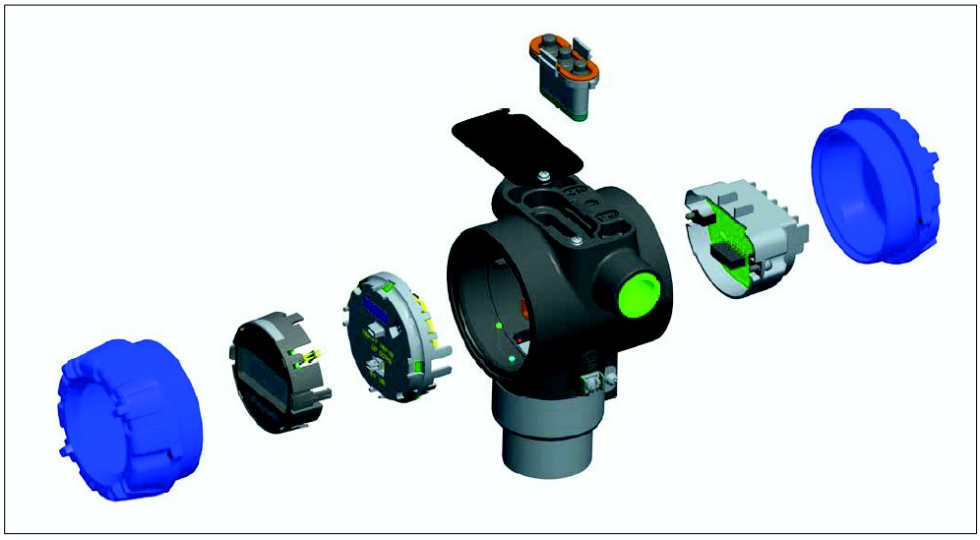


Figure 2 – Electronics Housing Components

1.2.2 Functional Characteristics

Functionally, the Transmitter can measure process sensors and provides a proportional analog 4 to 20 mA output to the measured process variable (PV). Available output communication protocols include Honeywell Digitally Enhanced (DE), HART, and FOUNDATION Fieldbus.

An optional 3-button assembly is available to set up and make adjustments to the Transmitter. In addition, a Honeywell Multi-Communication (MC) Toolkit (not supplied with the Transmitter) can facilitate setup and adjustment procedures. Certain adjustments can be made through an Experion Station or a Universal Station if the Transmitter is digitally integrated with Honeywell's Experion or TPS/TDC 3000 control system.

1.3 STT850 SmartLine Transmitter Name Plate

The Transmitter nameplate mounted on the bottom of the electronics housing (see Figure 1) lists its model number, physical configuration, electronics options, accessories, certifications, and manufacturing specialties. Figure 3 is an example of a typical Temperature Transmitter name plate. The model number format consists of a Key Number with several table selections.

Key		I		II		III		IV		V		VI		VII		VIII		IX
STT850	-	_	-	_	-	_	-	_ _ _	-	_ _ _	-	_	-	_ _ _ _	-	_ _, _ _, _ _	-	XXXX

Figure 3 –Typical STT850 Name Plate

You can readily identify the series and basic Transmitter type from the key number. The letter in the third digit represents one of these basic transmitter types:

- T = Temperature

For a complete selection breakdown, refer to the appropriate Specification and Model Selection Guide provided as a separate document.

1.4 Safety Certification Information

An “approvals” name plate is located on the bottom of the Electronics Assembly; see Figure 1for exact location. The approvals name plate contains information and service marks that disclose the Transmitter compliance information. Refer to Appendix C of this document for safety certification requirements and details.

1.5 Transmitter Adjustments

Zero and Span adjustments are possible in STT850 SmartLine Temperature Transmitters with the optional three-button assembly located at the top of the Electronic Housing (see Figure 2).

You can also use the Honeywell MC Toolkit or other third-party hand-held zero to make any adjustments to an STT850 SmartLine Temperature Transmitter. Alternately, certain adjustments can be made through the Experion or Universal Station, if the Transmitter is digitally integrated with a Honeywell Experion or TPS system.

1.6 Display Options

The STT850 SmartLine Temperature Transmitter has two display options: Basic and Advanced; see Table 2.

Table 2 – Available Display Characteristics

Basic Display	• Suitable for basic process needs • 360° rotation in 90° increments • 2 lines,16 characters • Standard units of measurement: °F, °C, °R, °K, Ω, mV & % • Diagnostic messaging

Advanced Display	• Suitable for custom and complex process needs
	• 360° rotation in 90° increments
	• Three (3) configurable screen formats with configurable rotation timing
	  ○ Large process variable (PV)
	  ○ PV with bar graph
	  ○ PV with trend (1-960 hours (allows 30 days), configurable)
	• Eight (8) screens with 3-30 seconds rotation timing
	• Standard engineering units
	• Diagnostic alerts and diagnostic messaging
	• Multiple language support:
	  ○ EN, FR, GE, SP, RU, IT, TK
	  ○ EN, CH (Kanji), JP
	• Supports 3-button configuration and calibration
	• Supports transmitter messaging, and maintenance mode indications

1.7 Optional 3-Button Assembly

The optional 3-Button Assembly provides the following features and capabilities:

- Increment, decrement, and enter key functions.
- With the menu-driven display:
  - Comprehensive on-screen menu for navigation.
  - Transmitter configuration.
  - Transmitter calibration
  - Display configuration.
  - Set zero and span parameters.

2 Application Design

2.1 Overview

This section discusses the considerations involved with deploying a Honeywell STT850 SmartLine Temperature Transmitter in a process system. The following areas are covered:

- Safety
- Input and output data
- Reliability
- Environmental limits
- Installation considerations
- Operation and maintenance\
- Repair and replacement

2.2 Safety

2.2.1 Accuracy

The STT850 SmartLine Temperature Transmitter (Transmitter) measures the temperature of a process and reports the measurement to a receiving device.

2.2.2 Diagnostic Messages

Transmitter standard diagnostics are reported in the two basic categories listed in Table 3. Problems detected as critical diagnostics drive the analog output to the programmed burnout level. Problems detected as non-critical diagnostics may affect performance without driving the analog output to the programmed burnout level. Informational messages (not listed in Table 3) report various Transmitter status or setting conditions. The messages listed in Table 3 are specific to the Transmitter, exclusive of those associated with HART and DE protocols. HART and DE diagnostic messages are listed and described in the *STT850 SmartLine Temperature Transmitter HART/DE Option User Manual*, document number 34-TT-25-06.

Table 3 – STT850 Standard Diagnostics Messages

Critical Diagnostics (Failure Conditions)	Non-Critical Diagnostics (Warning Conditions)	
Sensor Comm Timeout	No DAC Compensation	No DAC Calibration
Temperature Sensor Critical Failure	No Factory Calibration	Tamper Alarm
Sensor Burnout Detection	PV Out of Range	Loop Current Noise
Comm Module Diag Failure	Fixed Current Mode	AO Out of Range
Config Data Corrupt	Ambient temperature out of range	URV Set Error – Span Config Button
Temperature Sensor NVM Corrupt	Sensor resistance high	LRV Set Error – Span Config Button
Comm Module DAC Failure	No DAC Compensation	
Sensor open/short	No Factory Calibration	
	Local Display	
	Low Supply Voltage	

2.2.3 Safety Integrity Level (SIL)

The STT850 is intended to achieve sufficient integrity against systematic errors by the manufacturer's design. A Safety Instrumented Function (SIF) designed with this product must not be used at a SIL level higher than the statement, without "prior use" justification by the end user or diverse technology redundancy in the design. Refer to the *STT850 Safety Manual*, 34-TT-25-05, for additional information.

3 Installation and Startup

3.1 Installation Site Evaluation

Evaluate the site selected for the STT850 SmartLine Transmitter installation with respect to the process system design specifications and Honeywell's published performance characteristics for your particular model. Some parameters that you may want to include in your site evaluation are:

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

3.2 Honeywell MC Toolkit

In preparation for post-installation processes, refer to the *MC Toolkit User Manual,* Document # 34-ST-25-20, for battery conditioning and device operation and maintenance information.

3.3 Display Installation Precautions

Temperature extremes can affect display quality. The display can become unreadable at temperature extremes; however, this is only a temporary condition. The display will again be readable when temperatures return to within operable limits.

The display update rate may increase at cold temperature extremes, but as with readability, normal updating resumes when temperatures are within limits for full operability.

3.4 Mounting STT850 SmartLine Temperature Transmitters

3.4.1 Summary

Transmitter models can be attached to a two-inch (50 millimeter) vertical or horizontal pipe using Honeywell's optional angle.
Honeywell's optional wall mounting bracket is also shown below:

Figure 4 shows typical bracket-mounted installations.

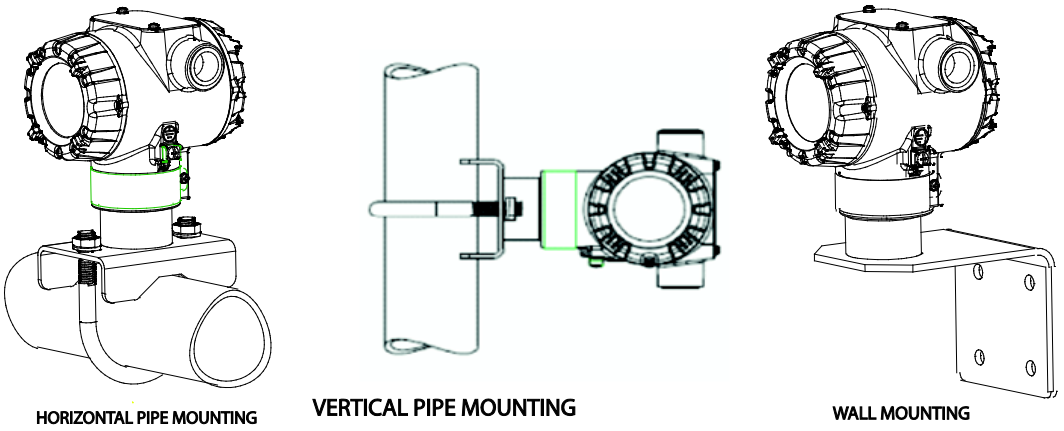


Figure 4 – Typical Bracket Mounted Installations

3.4.2 Mounting Dimensions

Refer to Honeywell drawing number 50094836 for detailed dimensions of the transmitter assembly. Abbreviated overall dimensions are also shown on the Specification Sheets for the transmitter models. This section assumes that the mounting dimensions have already been taken into account and the mounting area can accommodate the Transmitter.
Refer to Honeywell drawing numbers 50095917 (Pipe Mount) and 50095918 (Wall Mount) for detailed mounting specifications.

3.4.3 Bracket Mounting Procedure

1. Align the two mounting holes in the transmitter with the two slots in the mounting bracket and assemble the (2) M8 hex cap screws, (2) lockwashers and (2) flat washers provided. Rotate transmitter assembly to the desired position and torque the M8 hex cap screws to 27,0 Nm/20,0 Lb-ft maximum.
2. Pipe Mount Option: Refer to Figure 5. Position the bracket on a 2-inch (50.8 mm) horizontal or vertical pipe, and install a "U" bolt around the pipe and through the holes in the bracket. Secure the bracket with the nuts, flat washers and lock washers provided.
3. Wall Mount Option: Position the bracket on the mounting surface at the desired location and secure the bracket to the mounting surface using the appropriate hardware (Wall mounting hardware requirements to be determined and supplied by the end user).

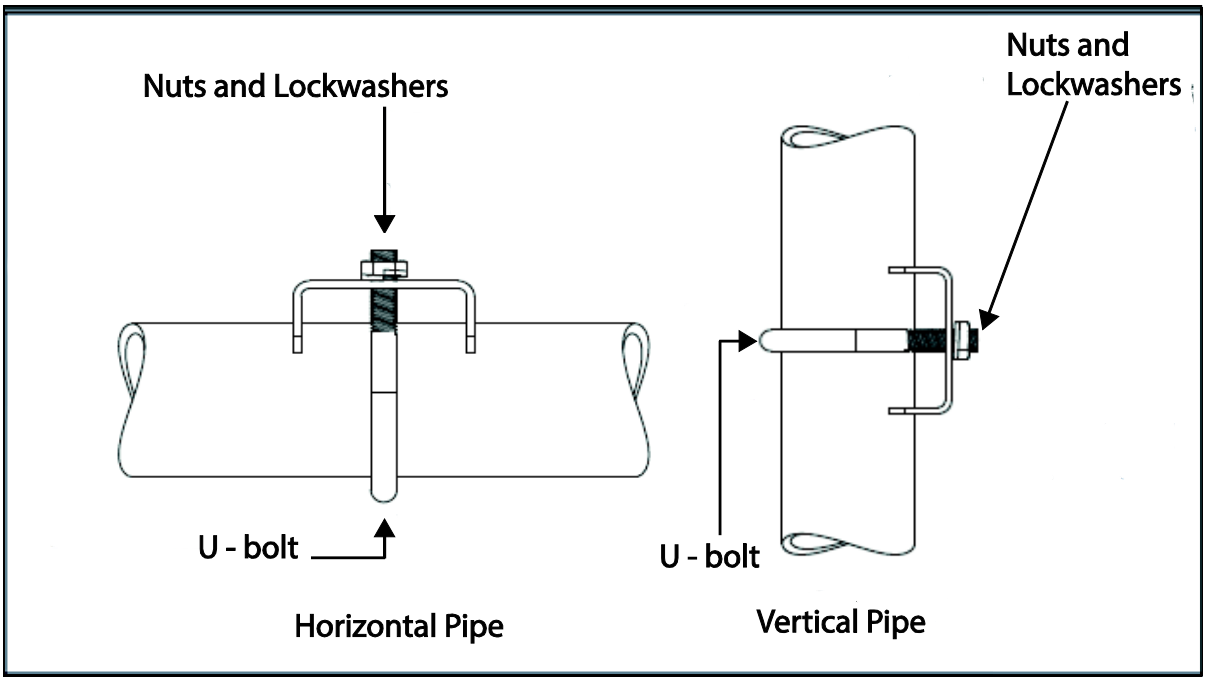


Figure 5 – Pipe Mounting Bracket Secured to a Horizontal or Vertical Pipe

3.5 Wiring a Transmitter

3.5.1 Loop Power Overview

The transmitter is designed to operate in a two-wire power/current loop with loop resistance and power supply voltage within the HART operating range shown in Figure 6.

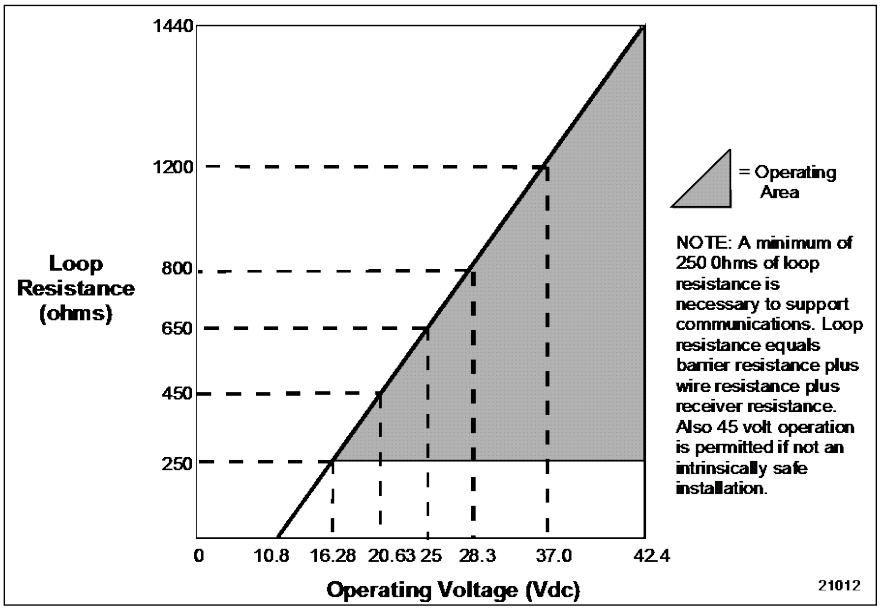


Figure 6 – HART Transmitter Operating Ranges

For DE operation, add 3.0V to these values.

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 7. Connect the Loop Power wiring shield to earth ground only at the power supply end.

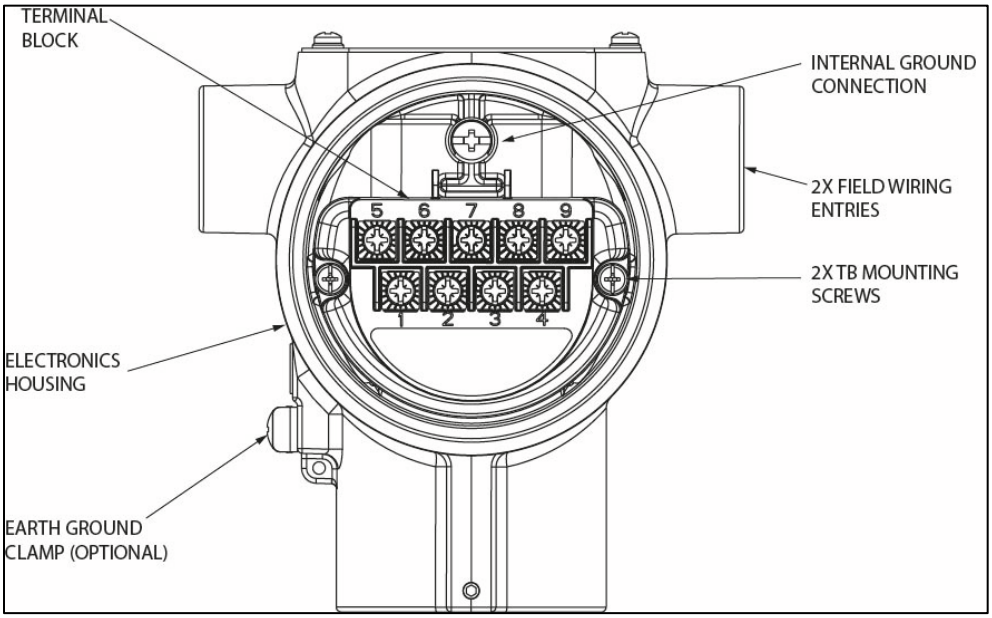


Figure 7 – Transmitter 9-Screw Terminal Board and Grounding Screw

As shown in Figure 7, each Transmitter has an internal terminal to connect it to earth ground. Optionally, a ground terminal can be added to the outside of the Electronics Housing. 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 terminal block can be installed in place of the non-lightning terminal block for Transmitters that will be installed 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 Appendix A of this document for details.

Note: Terminal #3 is for loop test and is not applicable for Fieldbus option.

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 6. 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 (V_{XMTR}) and maximum loop resistance ($R_{LOOP\ MAX}$). Additional consideration is required when selecting intrinsic safety barriers to ensure that they will supply at least minimum Transmitter voltage ($V_{XMTR\ MIN}$), including the required 250 ohms of resistance (typically within the barriers) needed for digital communications.

Transmitter loop parameters are as follows:
$R_{LOOP\ MAX}$ = maximum loop resistance (barriers plus wiring) that will allow proper Transmitter operation and is calculated as $R_{LOOP\ MAX} = (V_{SUPPLY\ MIN} - V_{XMTR\ MIN} - V_{SM}) \div 21.8$ mA.

In this calculation:

$V_{XMTR\ MIN}$ = 10.8 V (HART) or 13.8V (DE) V_{SM} = 2.3 V, remote meter

Note that V_{SM} should only be considered if a remote meter will be connected to the transmitter.

The positive and negative loop wires are connected to the positive (+) and negative (–) terminals on the terminal block in the Transmitter Electronics Housing.

Barriers can be installed per Honeywell's instructions for Transmitters to be used in intrinsically safe applications.

3.5.2 Digital System Integration Information

Transmitters that are to be digitally integrated to Honeywell's Total Plant Solution (TPS) system will be connected to the Temperature Transmitter Interface Module in the Process Manager, Advanced Process Manager or High Performance Process Manager through a Field Termination Assembly. Details about the TPS system connections are given in the *PM/APM SmartLine Transmitter Integration Manual*, PM12-410, which is part of the TDC 3000^X system bookset.

If you are digitally integrating a Transmitter in an Allen Bradley Programmable Logic Controller (PLC) process system, the same Field Terminal Assembly (FTA) and wiring procedures used with Honeywell's TPS system are also used with the Allen-Bradley 1771 and 1746 platforms.

3.5.3 Wiring Variations

The above procedures are used to connect power to a Transmitter. For loop wiring, sensor 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.
If you are using the Transmitter with Honeywell's TPS system, see *PM/APM Smartline Transmitter Integration Manual*, PM12-410, which is part of the TDC 3000^X system bookset.

3.5.4 Loop Wiring Procedure

1. See Figure 7, above, for parts locations. Loosen the end cap lock using a 1.5 mm Allen wrench.
2. Remove the end cap cover from the terminal block end of the Electronics Housing.
3. Feed loop power leads through one end of the conduit entrances on either side of the Electronics Housing. The Transmitter accepts up to 16 AWG wire.
4. Plug the unused conduit entrance with a conduit plug appropriate for the environment.
5. Connect the positive loop power lead to the positive (+) terminal #1 and the negative loop power lead to the negative (-) terminal #2. Note that the Transmitter is not polarity-sensitive.
6. Replace the end cap, and secure it in place.

3.5.5 Grounding and Lightning Protection

Connect a wire from the Earth Ground Clamp or to the Internal Ground Connection (see Figure 7) to Earth Ground to make the protection effective. Use a size 8 AWG or (8.37mm^2) bare or green covered wire for this connection.
For ungrounded Thermocouple, mV, RTD or ohm inputs connect the input wiring shield(s) to the Internal Ground Connection shown in Figure 7.

For grounded Thermocouple inputs, connect the Internal Ground Connection shown in Figure 7 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.

3.5.6 Supply Voltage Limiting Requirements

If your Transmitter complies with the ATEX 4 directive for self-declared approval per 94/9EC, the power supply has to include a voltage-limiting device. Voltage must be limited such that it does not exceed 42 V DC. Consult the process design system documentation for specifics.

3.5.7 Process Sealing

The STT850 SmartLine Temperature Transmitter is CSA-certified as a Dual Seal device in accordance with ANSI/ISA–12.27.01–2003, "Requirements for Process Sealing Between Electrical Systems and Flammable, or Combustible Process Fluids."

3.5.8 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, with 1/2 inch conduit do not require an explosion-proof seal for installation. If 3/4 inch conduit is used, a LISTED explosion proof seal to be installed in the conduit, within 18 inches (457.2 mm) of the transmitter.

3.5.9 Input Sensor Wiring

Connect the input sensors as shown in Figures below:

Figure 8 – Thermocouple, mV and Volt Connections

- To minimize common noise problems in the application, a strap/jumper should be wired between terminals 6 and 8.
- For differential T/C operation, a second strap/jumper should be wired between terminals 6 and 7. The output for differential operation is calculated as T/C 1 - T/C 2.

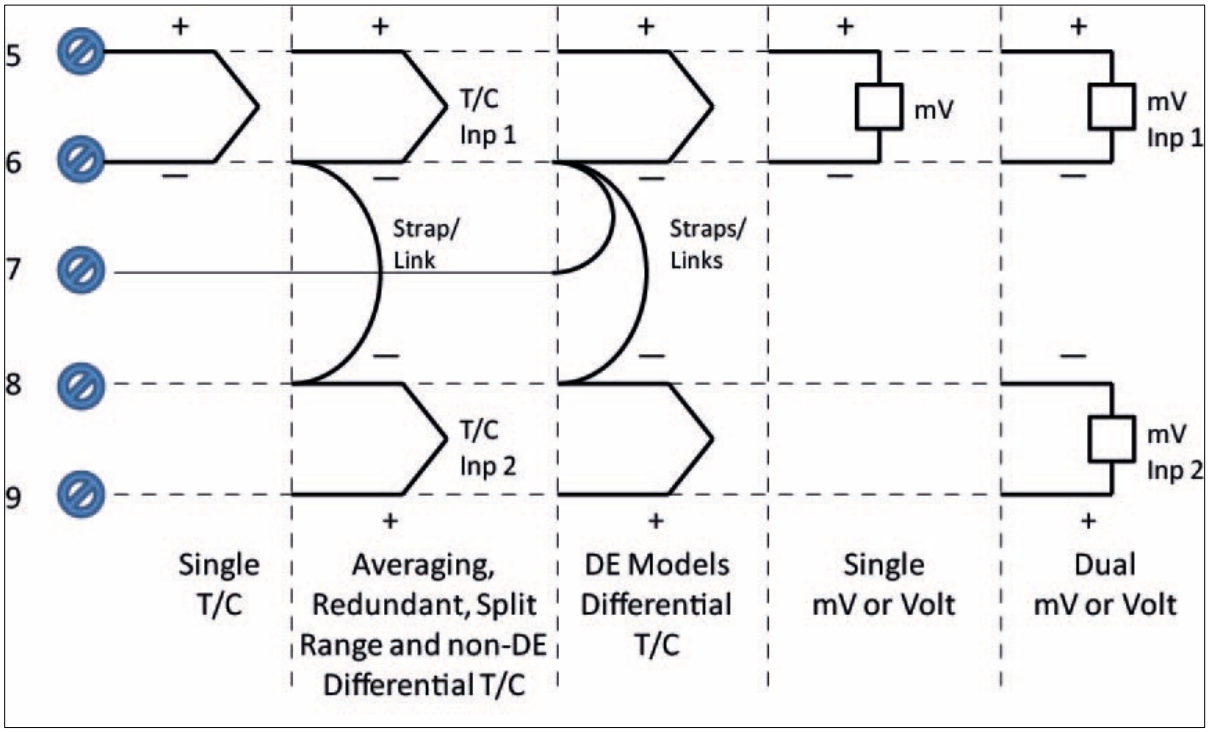


Figure 8 – Thermocouple, mV and Volt Connections

Figure 9 – RTD and Ohm Connections

- Resistance temperature detector (RTD) measurements use the 3 or 4 wire approach.
- Dual-input units wired for a 4-wire RTD will automatically disable Input 2.

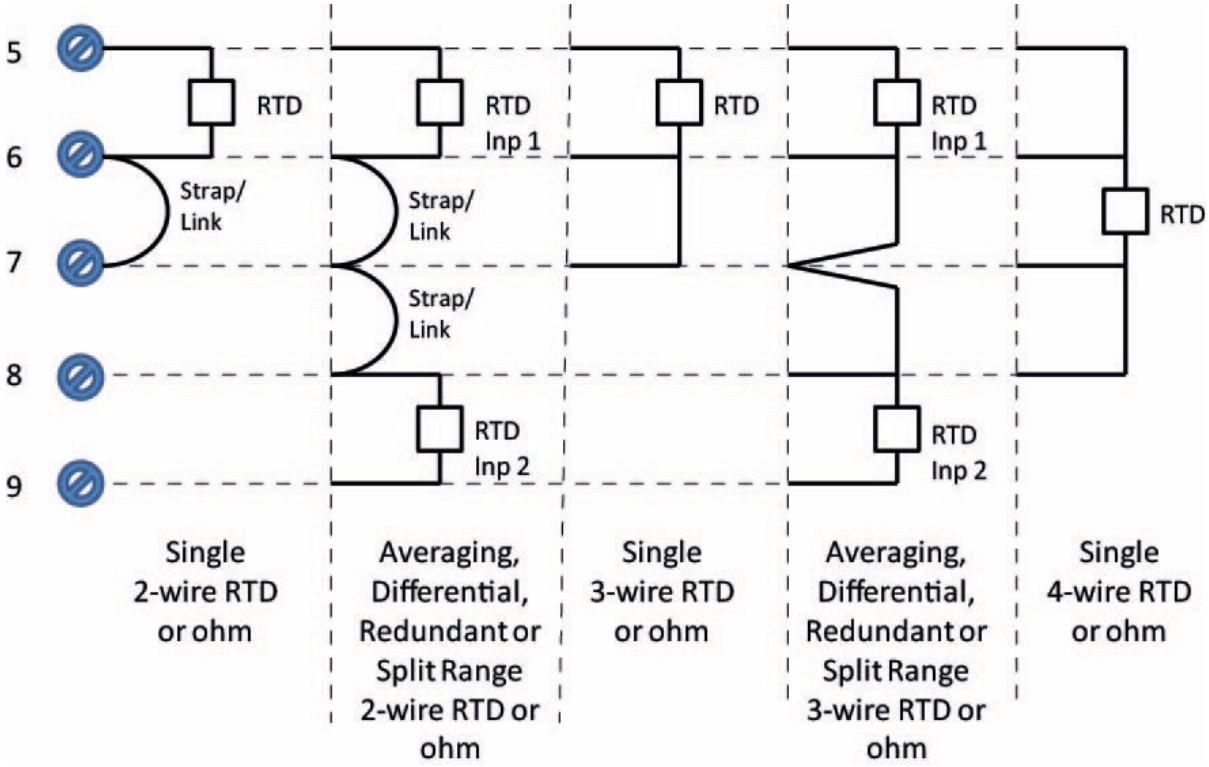


Figure 9 – RTD and Ohm Connections

Figure 10- Remote C/J and Mixed Sensors Connections (Not available on DE Models)

- For Remote C/J compensation, the first input is a thermocouple type and the second input is a 3-wire PT100 ohm RTD
- The STT850 can have different sensor types on its inputs for split range or averaging applications

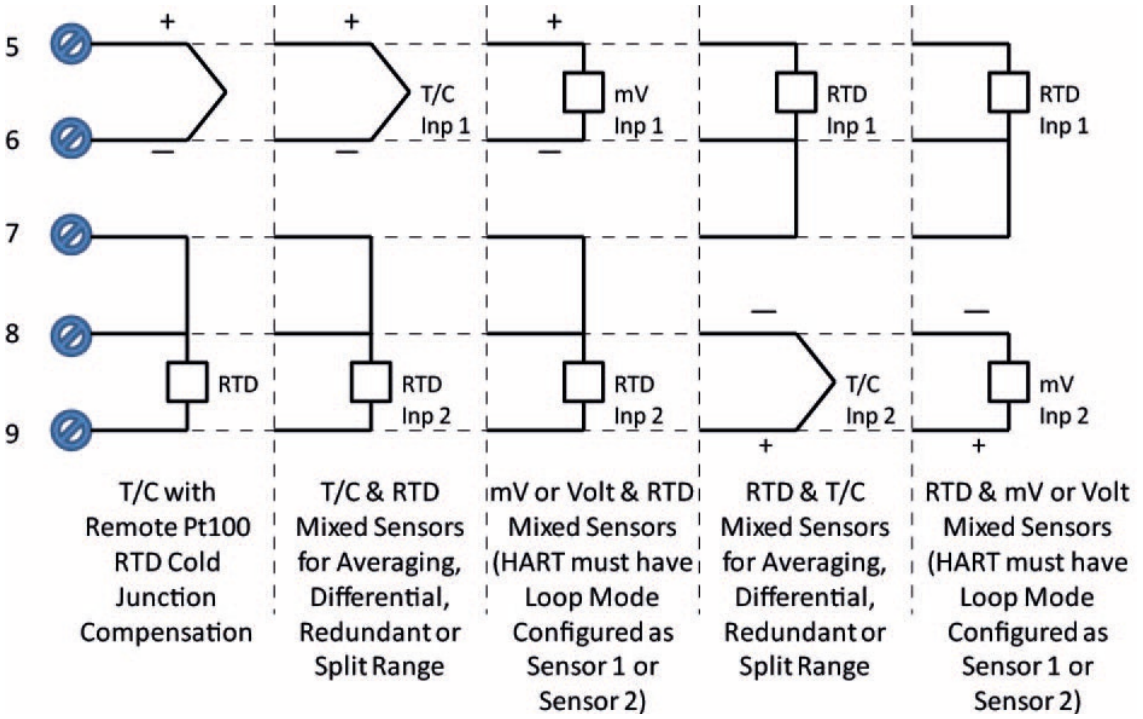


Figure 10– Remote C/J and Mixed Sensors Connections (Not available on DE Models)

3.5.10 Digital Output Wiring

The Digital Output is rated at a maximum load of 40 milliamps and 30 Volts. The Digital Output is mutually exclusive with the Second Sensor Input.

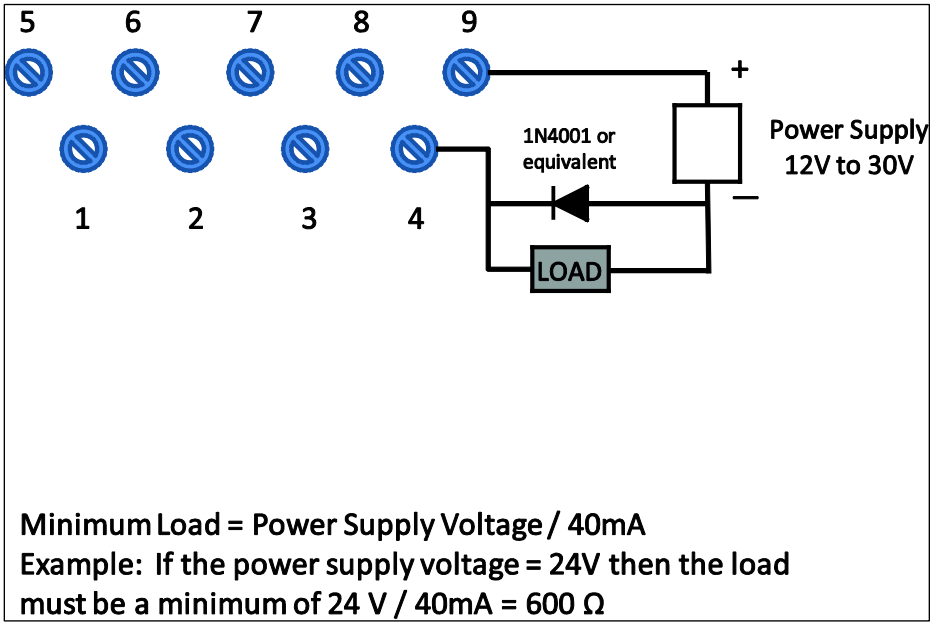


Figure 11– Digital Output Connections for mA Load

For best performance, it is recommended that:

- Digital Output wires should be in a separate shielded twisted pair cable, do not use the same cable as used for the Loop or the Sensor wires
- If using the same power supply to operate both the 4-20mA Loop and the Digital Output, then make the interconnections to the power supply terminals directly at the power supply

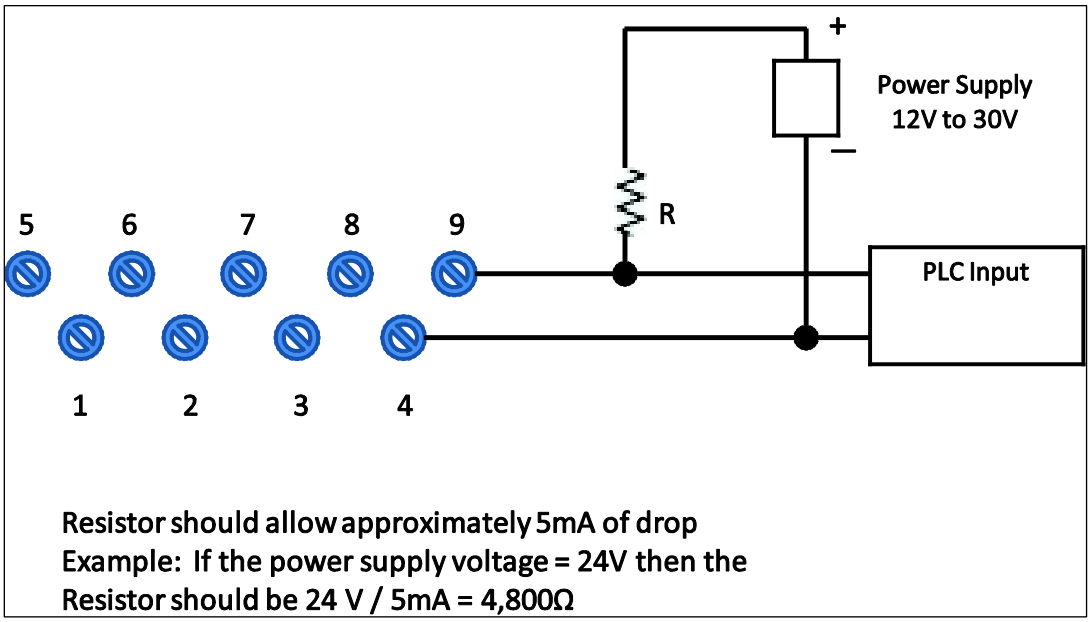


Figure 12– Digital Output Connections for PLC Counting Input

3.6 Startup

3.6.1 Overview

This section identifies typical start up tasks associated with several generic temperature measurement applications. It also includes the procedure for running an optional analog output check.

3.6.2 Startup Tasks

After completing the installation and configuration tasks for a Transmitter, you are ready to start up the process loop. Startup usually includes:

- Setting initial resistance (T/C sensor types only)
- Reading inputs and outputs
- Applying process inputs to the transmitter.

You can also run an optional output check to *wring out* an analog loop and check out individual Process Variable (PV) outputs in Digitally Enhanced (DE) mode before startup.

The actual steps in a startup procedure vary based on the type of Transmitter and the measurement application. In general, the procedures in this section are based on using Honeywell MC Toolkit to check the Transmitter input and output under static process conditions, and make adjustments as required initiating full operation with the running process.
Note: Checks can be made using the optional three-button assembly, if your Transmitter is so equipped. Operation with the three-button assembly is discussed in the "Operation" section of this manual.

3.6.3 Output Check Procedures

The Output Check comprises the following procedures:

- The Loop Test procedure checks for continuity and the condition of components in the output current loop.
- The Trim DAC Current procedure calibrates the output of the Digital-to-Analog converter for minimum (0%) and maximum (100%) values of 4 mA and 20 mA, respectively. This procedure is used for Transmitters operating online in analog mode to ensure proper operation with associated circuit components (for example, wiring, power supply, control equipment). Precision test equipment (an ammeter or a voltmeter in parallel with precision resistor) is required for the Trim DAC Current procedure.
- The Apply Values procedure uses actual Process Variable (PV) input levels for calibrating the range of a Transmitter. The PV is carefully adjusted to stable minimum and maximum levels, and the Lower Range Limit Value (LRV) and Upper Range Limit Value (URV) are then set by commands from the MC Toolkit.

The Transmitter does not measure the given PV input or update the PV output while it operates in the Output mode.

3.6.4 Constant Current Source Mode Procedure

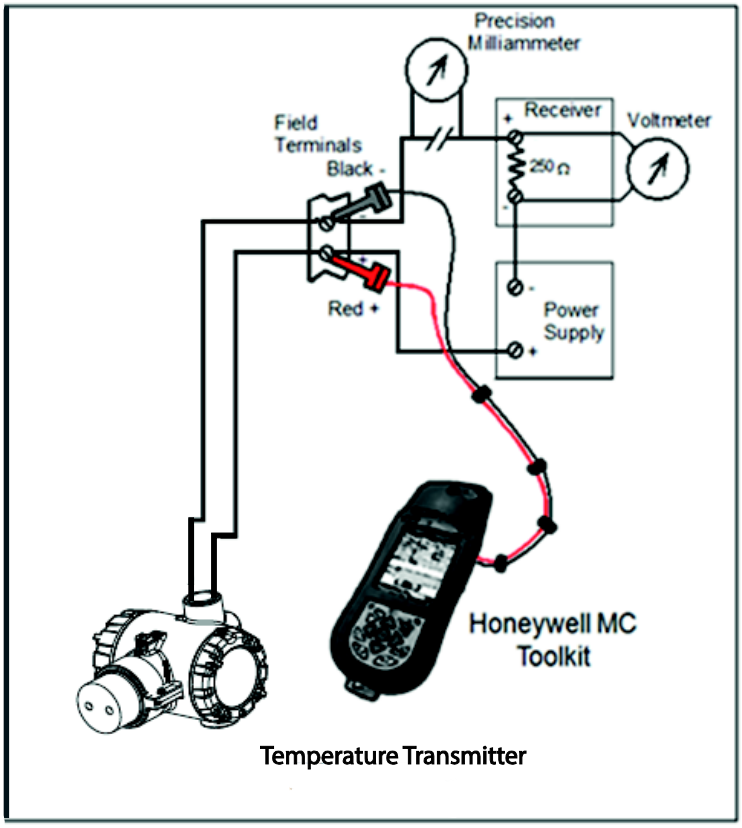


Figure 13 – Current Loop Test Connections

1. Refer to Figure 12 for test connections. Verify the integrity of electrical components in the output current loop.
2. Establish communication with the Transmitter. For these procedures, the values of components in the current loop are not critical if they support reliable communication between the Transmitter and the Toolkit.
3. On the Toolkit, display the **Output Calibration** box.
4. In the Output Calibration box, select the **Loop Test** button; the **LOOP TEST** box will be displayed.
5. Select the desired constant-level Output: 0 %, 100 %, or Other (any between 0 % - 100 %).
6. Select the Set button. A box will be displayed asking **Are you sure you want to place the transmitter in output mode?**

   With the Transmitter in Analog mode, you can observe the output on an externally-connected meter or on a local meter. In DE mode, you can observe the output on the local meter or on the Toolkit Monitor display.

7. Select the **Yes** button. Observe the output current at the percentage you selected in Step 5.
8. To view the monitor display, navigate back from the **LOOP TEST** display, and select the **MONITOR** display. A **Confirm** popup will be displayed.
9. Select **Yes** to continue. This concludes the Startup procedure.

4 Operation

4.1 Overview

This section provides the information and processes involved for both Digitally Enhanced (DE) and HART operation using the 3-button option.

4.2 Three-Button Operation

The STT850 optional three-button interface provides a user interface and operation capability without opening the transmitter.
Figure 13 shows the location of the three-button option and the labels for each button.

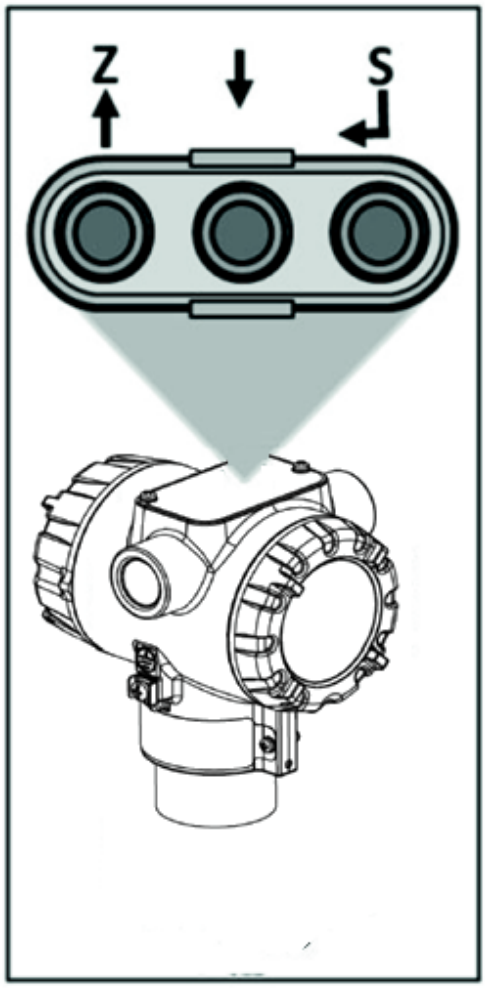


Figure 14 – Three-Button Option

Table 4 – Three-Button Option Functions

Physical Button	Basic Display	Advanced Display	Action
Left ↑	Increment Previous Menu Item	Increment Move cursor Up	Scroll to previous menu item in an active list. Scroll through alphanumeric list to desired character (ex. for entering Tag names or numeric values)
Center ↓	Decrement Next Menu Item	Decrement Move cursor Down	Scroll to next menu item in an active list. Scroll through alphanumeric list to desired character (ex. for entering Tag names or numeric values)
Right ↵	Select displayed menu item for activation or editing	Enter	Call up the Main Menu. Call up a lower-level menu. Select an item for data entry. Confirm a data entry operation Activate the service associated with a selected menu item.

4.2.1 Menu Navigation

The behavior of the buttons is the same for both the Basic and Advanced Displays. The user must press ↵ button to call up the Main Menu. To exit the Main Menu and return to the PV display screen, select **<EXIT>**.

When on a lower level menu, return to the menu above by selecting <Return>. Alternately, the (up symbol) and (down symbol) buttons can be pressed simultaneously to return to the menu above. When on the highest level menu, or when using the basic display menu, pressing the (up symbol) and (down symbol) buttons simultaneously will exit the menu and return to the PV display. Use the ↑ and ↓ buttons to scroll through the list of menu items. Press the ↵ button to select an item for data entry or activation. When an item is selected for data entry or activation, the cursor will jump to the lower line of the LCD (Basic Display) or call up a pop-up window (Advanced Display) to allow editing of the value. No action is taken against a menu item until the ↵ button is pressed.

If a user presses the ↵ button to begin a data entry operation, they must press another button within 10 seconds or the transmitter firmware will assume that the user wants to abort the operation or has walked away from the transmitter. After 10 seconds with no action, the data entry will time out and the original value of the parameter will be preserved.

If no button presses occur within 60 seconds, menu access will time out and the transmitter will exit the menu and return to the PV display.

4.2.2 Data Entry

Data entry is performed from left to right. Select a character / digit by pressing ↑ or ↓ buttons, and then press ↵ to advance to the next character position to the right. Select the cross-hatch character ▒ to terminate the entry or if the final character is already a space character, just press ↵ again.

All numeric entries are clamped at the low or high limit if needed. You can determine the low and high limit for a parameter by selecting either the ▲ or ▼ character while the cursor is positioned over the left-most digit and press ↵ button. The Display will show the selected limit.

Table 5 – Three-Button Data Entry

Screen Symbol	Numeric data entry	Text entry
▲	Display the high limit for this parameter. This symbol only appears in the left-most position of the data entry field.	Not Available
▼	Display the low limit for this parameter. This symbol only appears in the left-most position of the data entry field.	Not Available
▒	Terminate the numeric entry	Terminate the text entry
0 thru 9, Minus, Decimal	These characters are used to enter numeric values. The minus sign only appears in the left-most digit.	These characters can be used to create custom tags and unit labels
A thru Z, 0 thru 9 special symbols	Not Available	These characters can be used to create custom tags and unit labels

4.2.3 Editing a Numeric Value

Editing a Numeric Value
Editing of a numeric value is a digit-by-digit process, starting with the left-most digit.

1. Press ↵ to begin the edit process.
2. The Basic Display will show the current value of the item on the lower line, left justified. The Advanced Display will show the current value of the item in a pop-up window in the middle of the screen
3. Press the ↑ or ↓ buttons to select the desired digit, and then press ↵ to advance to the next digit to the right.
4. After the last digit has been entered, press ↵ one more time to write the new value to the transmitter.

4.2.4 Selecting a new setting from a list of choices

Use the procedure described below to select a new setting for parameters that present a list of choices (e.g., Screen Format, Display Units, etc.).

1. Press ↵ to begin the edit process.
    a. The Basic Display will show the current setting of the item on the lower line, left justified.
    b. The Advanced Display will show the current setting of the item in a pop-up window.
2. Press the ↑ or ↓ buttons to scroll through the list of choices.
3. Press ↵ to make your selection. The new selection will be stored in the transmitter and will be displayed on the lower line, right justified.

4.2.5 The Advanced Display Menus

The Advanced Display menus are organized into three levels, as shown by Table 6. There is a **<Return>** menu item at each level that allows the user to return to the previous level.

Table 6 – Advanced Display Main Menu Structure

Level 1	Level 2	Level 3
<Exit>	n/a	n/a
Diagnostics	Critical Non-Critical	For details go to the Diagnostics Menu table
Display Setup	LCD Contrast Common Setup Screen 1 Screen 2 … Screen 8	For details go to the Display Setup Menu table. Note that the Advanced Display supports the configuration of up to 8 different screens.
Calibration	Cal Points Set Time Stamp DAC Trim Loop Test	For details go to the Calibration Menu table.
Transmtr Setup	Device Setup HART Setup HART Date Sensor Setup Enter LRV Enter URV Enter MRV Set LRV Enter MRV Set URV Dev Install Date S1 Install Date S2 Install Date	For details go to the Transmitter Setup Menu table.
Information	Display Comm Module Sensor Module	For details go to the Information Menu table.

Table 7 –Diagnostics Menu

All Diagnostics menu items are Read Only.

<Return> Return to the Level 1 menu			
Critical	<Return>		
	Active Diags	# #	Description
	Sensor	OK FAULT	FAULT: There is a problem with the Sensor Module
	Comm Module	OK FAULT	FAULT: There is a problem with the Electronics Module (HART, DE, or FF)
	Sensor Comm	OK FAULT	FAULT: There is a problem with the interface between the Sensor Module and the Electronics Module.
	Critical Diags	# #	Description
	Input 1	OK FAULT	FAULT: There is a problem with the Input 1 sensor
	Input 2	OK FAULT	FAULT: There is a problem with the Input 2 sensor
Non Critical	<Return>		
	Active Diags	# #	Shows the number of Non-Critical Diagnostics that are currently active
	Analog Out mode	Normal FIXED OUTPUT	Normal indicates that the Loop Output reflects the current value of the PV. FIXED OUTPUT indicates that the Loop Output of the transmitter is manually set a fixed value, probably due to a DAC Trim or Loop Test operation that is currently in progress.
	Input 1 Range	OK OUT OF RANGE	OUT OF RANGE: Cold Junction temperature is greater than 85C or less than -40C.
	Input 2 Range	OK OUT OF RANGE	OUT OF RANGE: Cold Junction temperature is greater than 85C or less than -40C.
	CJ Range	OK OUT OF RANGE	OUT OF RANGE: Cold Junction temperature is greater than 85Cor less than -40C.
	Input 1	OK OPEN	OPEN: Input 1 is open.
	Input 2	OK OPEN	OPEN: Input 2 is open.
	Input 1 TB6	OK OPEN	OPEN: Input 1 Terminal TB6 is open.
	Input 2 TB8	OK OPEN	OPEN: Input 2 Terminal TB8 is open.

	Supply Voltage	OK LOW HIGH	LOW: Supply voltage is below the low specification limit. HIGH: Supply voltage is above the high specification limit.
	Sensor Module Temp	OK OVER TEMP	OVERTEMP: Temperature Sensor Module temperature is greater than 85C or less than -40C.
	Comm Module Temp	OK OVER TEMP	OVERTEMP: Electronics temperature is greater than 85C or less than -40C.
	Sensor Comm	OK SUSPECT	SUSPECT: The interface between the Temperature Sensor Module and the Electronics Module is experiencing intermittent communication failures.
	Factory Cal	OK NO FACTORY CAL	The transmitter has not been calibrated by the factory.
	DAC Temp Comp	OK NO COMPENSATION	The DAC has not been compensated for temperature effects. This is a factory operation.
	Display Setup	OK NVM Corrupt	NVM Corrupt: The Display memory is corrupt

Table 8 –Display Setup Menus

<Return> Return to the Level 1 menu				
LCD Contrast	<Return>			
	Set Contrast	# #	Adjust the LCD contrast level. Range from 0 to 9. Default: 5	Press ↵ to enter menu selection ↑ and ↓ to select number. ↵ to enter and shift to next digit
Common Setup	<Return>			
	Language	English, French, German, Spanish, Italian, Turkish, Russian	Select the language for the Display. Default: English	Press ↵ to enter menu selection ↑ and ↓ to select from list. ↵ to enter
	Rotation Time	# #	Time duration, in seconds, that each configured screen is shown before moving to the next screen. Range: 3 to 30 seconds Default: 10 seconds	Press ↵ to enter menu selection ↑ and ↓ to select number. ↵ to enter and shift to next digit
	Screen Rotate	Enabled Disabled	Select to enable or disable the automatic rotation of Screens	
	Units	°C, °F, °R, K	Select the ranging and calibration temperature units	
Screens 1 thru 8	<Return>			
	Screen Format	None PV PV & Bar Graph PV & Trend	Select the Screen format from the list.	Press ↵ to enter menu selection ↑ and ↓ to select from list. ↵ to enter
	Trend Duration	##	Select the amount of historic data visible on the Trend screen. Range: 1 to 999 hours (allows 31 days). Applies to the “PV & Trend” format only	Press ↵ to enter menu selection ↑ and ↓ to select number. ↵ to enter and shift to next digit
	PV Selection	Loop PV Sensor 1 Sensor 2 CJ Temperature Sensor 1 Resistance Sensor 2 Resistance Loop Output Percent Output	Select the Process Variable (PV) that will be shown on the screen. Sensor Resistance is only available for RTDs and will read 0 for thermocouples.	Press ↵ to enter menu selection ↑ and ↓ to select from list. ↵ to enter

	Display Units	°R, K °C, °F,	Select the Display Units for the selected PV.	Press ↵ to enter menu selection ↑ and ↓ to select from list. ↵ to enter
	Decimal	None X.X X.XX X.XXX	Select the decimal resolution for the PV.	Press ↵ to enter menu selection ↑ and ↓ to select from list. ↵ to enter
	Disp Low Limit	#########	Enter the lower limit shown on the Bar Graph or Trend screen	Press ↵ to enter menu selection ↑ and ↓ to select number. ↵ to enter and shift to next digit
	Disp High Limit	#########	Enter the upper limit shown on the Bar Graph or Trend screen.	
	Custom Tag	□□□□□□□□□□□□□□	Enter Custom Tag using any alphanumeric value up to 14 characters long.	Press ↵ to enter menu selection ↑ and ↓ to select Alphanumeric ↵ to enter and shift to next char.

Table 9 –Calibration Menus

<Return> Return to the Level 1 menu				
Cal Points	**<Return>**			
	S1 Cal Lo Pt	Calibration low point for Sensor 1		
	S1 Cal Hi Pt	Calibration high point for Sensor 1		
	S 2 Cal Lo Pt	Calibration low point for Sensor 2		
	S2 Cal Hi Pt	Calibration high point for Sensor 2		
Set Time Stamp	**<Return>**			
	Hour	# #	These selections allow the user to enter a time stamp for the Zero Correct, LRV Correct, URV Correct, and Reset Corrects. This time stamp can be read via HART and FF communications.	Press ↵ to enter menu selection ↑ and ↓ to select number.
	Minute	# #		
	Year	# # # #		
	Month	January thru December		↑ and ↓ to select from list. ↵ to enter
	Day	# #		
S1 Cal Lo Corr	**<Return>**			
	Do S1 Cal Lo	Executing this selection corrects the Input 1 Calibration Low Point based on the input measurement. The current live value of the Input 1 Sensor is shown on this display so the user can easily see the effect of the correction.		Press ↵ to enter menu selection Scroll to Do Cal Press ↵ to initiate
S1 Cal Hi Corr	**<Return>**			
	Do S1 Cal Hi	Executing this selection corrects the Input 1 Calibration High Point based on the input measurement. The current live value of the Input 1 Sensor is shown on this display so the user can easily see the effect of the correction.		Press ↵ to enter menu selection Scroll to Do Cal Press ↵ to initiate
S2 Cal Lo Corr	**<Return>**			
	Do S2 Cal Lo	Executing this selection corrects the Input 2 Calibration Low Point based on the input measurement. The current live value of the Input 2 sensor is shown on this display so the user can easily see the effect of the correction.		Press ↵ to enter menu selection Scroll to Do Cal Press ↵ to initiate
S2 Cal Hi Corr	**<Return>**			
	Do S2 Cal Hi	Executing this selection corrects the Input 2 Calibration High Point based on the input measurement. The current live value of the Input 2 sensor is shown on this display so the user can easily see the effect of the correction.		Press ↵ to enter menu selection Scroll to Do Cal Press ↵ to initiate
Reset Cal	**<Return>**			

1 Corr	Reset Cals	Executing this selection resets the Sensor 1 and calibrations back to Factory values.	Press ↵ to enter menu selection Scroll to Reset Cals Press ↵ to initiate
Reset Cal 2 Corr	**<Return>**		
	Reset Cals	Executing this selection resets the Sensor 1 calibrations back to Factory values.	
DAC Trim Note: Loop must be removed from Automatic Control	**<Return>**		
	Trim Zero	This selection will calibrate the loop zero output to 4.000 mA Connect a current meter to the transmitter to monitor the loop output. When you press Enter, the transmitter will set the loop output to 4 mA. When the prompt "Enter reading" appears, enter the value shown on the current meter (in milliamps) and press Enter again. The transmitter will adjust the DAC output to 4mA.	Press ↵ to enter menu selection Scroll to Trim Zero or Trim Span Press ↵ to initiate ↑ and ↓ to select number. ↵ to enter and shift to next digit
	Trim Span	This selection will calibrate the loop span output to 20.000 mA Connect a current meter to the transmitter to monitor the loop output. When you press Enter, the transmitter will set the loop output to 20 mA. When the prompt "Enter reading" appears, enter the value shown on the current meter (in milliamps) and press Enter again. The transmitter will adjust the DAC output to 20 mA.	
	Set DAC Normal	This selection allows the loop to be returned to its Normal mode (Automatic Control) after performing the Trim operation.	Press ↵ to enter menu selection Scroll to Set DAC Normal Press ↵ to initiate
Loop Test Note: Loop must be removed from Automatic Control	**<Return>**		
	Set DAC Output	This selection allows the user to force the DAC output to any value between 3.8 and 20.8 mA. Note: This selection will put the DAC into Fixed Output Mode.	Press ↵ to enter menu selection Scroll to Set DAC Output Press ↵ to initiate ↑ and ↓ to select number. ↵ to enter and shift to next digit
	Set DAC Normal	This selection allows the loop to be returned to its Normal mode (Automatic Control) after performing the Set DAC Output operation	Press ↵ to enter menu selection Scroll to Set DAC Normal Press ↵ to initiate

Table 10 –Transmitter Setup Menus

<Return> Return to the Level 1 menu				
Device Setup	**<Return>**			
	Tag ID	□□□□□□□□	Enter Tag ID name up to 8 characters long. □ = any Alphanumeric value	Press ↵ to enter menu selection ↑ and ↓ to select Alphanumeric ↵ to enter and shift to next character to the right.
	Units	°C	This selection determines the units of the values shown on the following menu items: • Enter LRV • Enter URV • Set LRV • Set URV • Sensor 1 and Sensor 2 Cal Hi (Calib. menu) • Sensor 1 and Sensor 2 Cal Low (Calib. menu) • LRL (Input Info. menu) • URL (Input Info. menu) For calibration, this parameter allows the user to match the value displayed on the menus to the units supported by the user's calibration equipment.	Press ↵ to enter menu selection ↑ and ↓ to select from list ↵ to enter
		°F		
		°R		
		°K		
	Damping (sec)	##. #	Selection applies digital filtering to suppress noise effects on the PV. The limits for this value are 0.0 to 32.0 seconds	
	NAMUR Output	Disabled	Disabling sets the loop output and burnout levels to the Honeywell levels	Press ↵ to enter menu selection ↑ and ↓ to select from list ↵ to enter
		Enabled	Enabling sets the loop output and burnout levels to the NAMUR levels	
	Loop Ctrl Mode	Average, Differential, Sensor 1, Sensor 2, Split-Range, Redundant	Mode of Loop control	
	Loop Ctrl Src	Input sensor currently controlling		

		the Loop		
	Excess Delta	Enable, Disable	Enable or disable Critical Diagnostic when Sensor Delta (difference between Sensor 1 and Sensor 2) exceeds Delta Limit. A Non-Critical Diagnostic occurs if Disabled.	
	Delta Limit	Value that will produce a Diagnostic if exceeded by Sensor Delta.		
	Bumpless Damping	Damping value for the transition of Loop Control between Sensors when Loop Ctrl Mode is Split-Range or Redundant		
	Hysteresis	Hysteresis value relative to the MRV for the transition of Loop Control between Sensors when Loop Ctrl Mode is Split-Range		
	Break Detect	Enable, Disable	When enabled, adds a constant bias value to the Sensor 2 measured value to equate it to the Sensor 1 measured value at the moment selected.	
	Latching	When enabled, causes all Critical Diagnostics to latch to the Fault state, and will not be released until a power cycle occurs.		
	CJ Source	Internal, External, Fixed	Determines the source of the Cold Junction compensation for thermocouple Sensor types.	
	Fixed CJ Value	When CJ Source is Fixed, specifies the Cold Junction temperature value for thermocouple Sensor types.		

Enter LRV	**<Return>**			
	Enter LRV	###. ##	The limit for the Lower Range Value is the Lower Range Limit (LRL) of the selected Sensor ID.	
Enter URV	**<Return>**			
	Enter URV	###. ##	The limit for the Upper Range Value is the Upper Range Limit (URL) of the selected Sensor ID.	
Enter MRV	**<Return>**			
	Enter MRV	###.##	Limits are the minimum URL and maximum LRL of the selected Sensor 1 and Sensor 2 IDs. Determines the point of transition of Loop Control between Sensor 1 and Sensor 2 for Split-Range Loop Control Mode.	
Set LRV	**<Return>**			
	Set LRV	ATTENTION: Executing this service will set the Lower Range Value (LRV) equal to the Input 1 measurement		Press ↵ to enter menu selection ↵ to execute
Set URV	**<Return>**			
	Set URV	ATTENTION: Executing this service will set the Upper Range Value (URV) equal to the Input 1 measurement		Press ↵ to enter menu selection ↵ to execute

HART Setup	**<Return>**			
	Device ID	Unique for each device Read Only		
	Universal Rev	HART Revision Read Only		
	Field Device Rev	For DD/DTM compatibility Read Only		
	Final Assy Num	Asset tracking number		
	Loop mA	Disabled for Multidrop		
	Poll Address	0 (default) to 63		
	PV Units	Units of transmitted PV		
	SV Units	Units of transmitted SV		
HART Date	**<Return>**			
	Year # # # #	Enter the current year		
	Month	January through December	Select the current month	
	Day # #	Enter the day of the month		
	Write Date	Press ENTER to write the HART Date to the Transmitter		

Sensor Setup	**<Return>**			
	Sensor 1 Type	mV, TC, RTD, Ohm		
	Sensor 1 ID	Sensor ID for Input 1		
	Sensor 2 Type	mV, TC, RTD, Ohm		
	Sensor 2 ID	Sensor ID for Input 2		
	RTD 1 Type	2-Wire, 3-Wire, 4-Wire		
	RTD 1 Lead Wire	Resistance of Input 1 RTD lead wires	User entered value for the resistance of each leg. Used only for 2-wire RTD or 2-wire ohm input types.	
	Sensor 1 Bias	Bias value which is applied to the Input 1 measured value	Per the Engineering Units selected for this input.	
	RTD 2 Type	2-Wire, 3-Wire		
	RTD 2 Lead Wire	Resistance of Input 2 RTD lead wires	User entered value for the resistance of each leg. Used only for 2-wire RTD or 2-wire ohm input types.	
	Sensor 2 Bias	Bias value which is applied to the Input 2 measured value	Per the Engineering Units selected for this input.	

Dev Install Date	**<Return>**			
	Year	# # # #	Enter the current year. This item will only be visible if no Install Date has been written to the transmitter.	
	Month	January thru December	Select the current month. This item will only be visible if no Install Date has been written to the transmitter.	
	Day	# #	Enter the day of the month. This item will only be visible if no Install Date has been written to the transmitter.	
	Install Date	dd-mm-yyyy	If no Install Date has been set in the transmitter, this value is a preview of the Year, Month, and Day entered above. Otherwise, this is the Install Date that was previously written to the transmitter.	
	Write Date	Press ENTER to write the Install Date to the transmitter. **CAUTION**: The Install Date can only be written once in the life of the transmitter. You cannot erase or overwrite the Install Date once it has been written.		

S1 Install Date	**<Return>**			
	Year	# # # #	Enter the current year. This item will only be visible if no Install Date has been written to the transmitter.	
	Month	January thru December	Select the current month. This item will only be visible if no Install Date has been written to the transmitter.	
	Day	# #	Enter the day of the month. This item will only be visible if no Install Date has been written to the transmitter.	
	Write Date	Press ENTER to write the Install Date to the transmitter.		

S2 Install Date	**<Return>**			
	Year	# # # #	Enter the current year. This item will only be visible if no Install Date has been written to the transmitter.	
	Month	January thru December	Select the current month. This item will only be visible if no Install Date has been written to the transmitter.	
	Day	# #	Enter the day of the month. This item will only be visible if no Install Date has been written to the transmitter.	
	Write Date	Press ENTER to write the Install Date to the transmitter.		

Table 11 –Information Menus

<Return> Return to the Level 1 menu			
Display	**<Return>**		
	Firmware Version	The firmware version of the Display Module	Read Only
Comm Module	**<Return>**		
	Firmware Version	The firmware version of the Electronics Module	Read Only
	HART/DE Version	The firmware version number of the Electronics Module as displayed via the HART and DE protocols	Read Only
	Protocol	The communications protocol of the transmitter: • HART: HART protocol • DE: Honeywell DE protocol • FF: Foundation Fieldbus	Read Only
Sensor Module	**<Return>**		
	Firmware Version	The firmware version of the Sensor Module	Read Only
	Model Key	Identifies the type and range of the transmitter	Read Only
	Units	The Engineering Units for the LRL and URL. Note that you can change these Units from the Transmitter Setup menu, if desired (Transmtr	Read Only

		Setup\Parameters\Units)	
	LRL1	The Lower Range Limit of the Input 1 Sensor	Read Only
	URL1	The Upper Range Limit of the Input 1 Sensor	Read Only
	LRL2	The Lower Range Limit of the Input 2 Sensor	Read Only
	URL2	The Upper Range Limit of the Input 2 Sensor	Read Only

4.2.6 The Basic Display Menu

The Basic Display Menu is implemented as one long single-level menu and will "wrap around" when it reaches the start or end of the menu. Operation is as follows:

Press the ↵ button to call up the Menu.

1. Select **<Exit Menu>** and press ↵ to exit the Menu.
2. Use the ↑ and ↓ buttons to scroll through the list of menu items.
3. Press the ↵ button to select an item for data entry or activation. When an item is selected for data entry or activation, the cursor will jump to the lower line of the LCD to allow editing of the value. No action is taken against a menu item until the user presses the ↵ button.
4. If you want to abort a data entry operation, simply refrain from pushing any buttons for 10 seconds; the data entry operation will time out and the original value of the selected item will be preserved.

Table 12 – The Basic Display Menus

LCD Contrast	»»»»»»	Adjust the LCD contrast level. Range from » (1) to »»»»»»»»»» (9) Default: »»»»»»»» (7)	Press ↵ to enter menu selection ↑ and ↓ to select level. ↵ to enter
Screen Decimals	None X.X X.XX X.XXX	Select the PV decimal resolution to be shown on selected screen from list.	Press ↵ to enter menu selection ↑ and ↓ to select entry. ↵ to enter
Screen Units	°C, °F,°R, °K	Choose appropriate engineering units from list	
Range/Cal Units	°C, °F, °R, °K	Select the ranging and calibration temperature units	

Select Input	1 - 8	Select Input number to configure, referred to as "n" in subsequent menu items	Press ↵ to enter menu selection ↑ and ↓ to select entry. ↵ to enter
Sensor n Type	mV, TC, RTD, Ohm	Select Sensor Type	
Sensor n ID	Sensor Identifier	Select Sensor ID for Input n for selected Sensor Type	
RTD n Type	2-Wire, 3-Wire, 4-Wire	Select the RTD Type according to the number of lead wires	
RTD n Lead Wire	Resistance of Input n RTD lead wires	Select the lead wire resistance for 2-Wire RTD Types	
Sensor n Bias	####.##	Bias value which is applied to the Input n measured value	
Sens n Cal Lo Pt	####.##	Calibration low point for Sensor n	
Sens n Cal Hi Pt	####.##	Calibration high point for Sensor n	
Reset Cal n Corr		Executing this selection resets the Sensor 1 calibrations back to Factory values	
Screen Rotate	Enabled Disabled	Select to enable or disable the automatic rotation of Screens	
Select Screen	1 through 8	Select Screen to configure.	
Screen	Enabled/Disabled	Select to enable or disable the screen for display and configuration	
Screen PV	Loop PV Sensor 1 Sensor 2 CJ Temperature Sensor 1 Resistance Sensor 2 Resistance Loop Output Percent Output	Select the Process Variable (PV) that will be shown on the screen. Sensor Resistance is only available for RTDs and will read 0 for thermocouples	
Screen Decimal	None X.X X.XX X.XXX	Select the decimal resolution for the PV	

Do Sens n Cal Lo	Confirm	Executing this selection corrects the Cal Low Point based on the input measurement	
Do Sens n Cal Hi	Confirm	Executing this selection corrects the Cal High Point based on the input measurement	
Reset Sens n Cal	Confirm	Executing this selection Resets the LRV, and URV Corrects back to Factory values	
DAC Zero Trim Note: Loop must be removed from Automatic Control	DAC Zero Trim	This selection allows the loop zero output 4mA value to be trimmed. Note: You must connect a current meter to the transmitter to monitor the loop output.	Press ↵ to enter menu selection ↑ and ↓ to select number. ↵ to enter
DAC Span Trim Note: Loop must be removed from Automatic Control	DAC Span Trim	This selection allows the loop span output 20mA value to be trimmed. Note: You must connect a current meter to the transmitter to monitor the loop output.	
Loop Test Note: Loop must be removed from Automatic Control	Loop Test 12.000	This selection allows the user to force the DAC output to any value between 3.8 and 20.8 mA. Note: This selection will put the DAC into Fixed Output Mode, as indicated by the flashing output value. Navigation away from this menu item will return the loop to Normal (Automatic) Mode.	Press ↵ to enter and shift to next digit ↑ and ↓ to select digit. ↵ to enter
Loop Ctrl Mode	Average, Difference, Sensor 1, Sensor 2, Split-Range, Redundant	Mode of Loop control	Press ↵ to enter menu selection ↑ and ↓ to select entry. ↵ to enter
Loop Ctrl Src	Sensor 1, Sensor 2	Input sensor currently controlling the Loop	Read Only Parameter
Excess Delta	Enable, Disable	Enable or disable Critical Diagnostic when Sensor Delta (difference between Sensor 1 and Sensor 2) exceeds Delta Limit. A Non-Critical Diagnostic occurs if Disabled	
Delta Limit	####.##	Value that will produce a Diagnostic if exceeded by Sensor Delta.	
Bumpless Damping	##.#	Damping value for the transition of Loop Control between Sensors when Loop Ctrl Mode is Split-Range or Redundant	Press ↵ to enter and shift to next digit

Hysteresis	###.##	Hysteresis value relative to the MRV for the transition of Loop Control between Sensors when Loop Ctrl Mode is Split-Range	↑ and ↓ to select digit. ↵ to enter
Break Detect	Enable, Disable	Enable or disable detection of Input wire break	Press ↵ to enter menu selection ↑ and ↓ to select entry. ↵ to enter
Match PVs	Enable, Disable	For Redundant Loop Control Mode. When enabled, adds a constant bias value to the Sensor 2 measured value to equate it to the Sensor 1 measured value at the moment selected.	
Latching	Enabled, Disabled	When enabled, causes all Critical Diagnostics to latch to the Fault state, and will not be released until a power cycle occurs.	Press ↵ to enter menu selection ↑ and ↓ to select entry. ↵ to enter
CJ Source	Internal, External, Fixed	Determines the source of the Cold Junction compensation for thermocouple Sensor types.	
Fixed CJ Value	####.##	When CJ Source is Fixed, specifies the Cold Junction temperature value for thermocouple Sensor types.	
HART Device ID	Unique for each device		Read Only Parameter
HART PV Units	Units of transmitted PV		Press ↵ to enter menu selection ↑ and ↓ to select entry. ↵ to enter
HART SV Units	Units of transmitted SV		
HART Date	**<Return>**		
	Year	# # # #	Enter the current year
	Month	January through December	Select the current month
	Day	# #	Enter the day of the month
	Write Date	Press ENTER to write the HART Date to the transmitter	

	Install Date	DD MM YYYY. This selection allows the user to enter the date a transmitter is installed. The Install Date is entered in sequence of Day, Month, and Year, followed by the new date and the prompt Write Date to confirm the entry. CAUTION: The Install Date can only be written once in the life of the Transmitter. You cannot erase or overwrite the Install Date once it has been written.	Press ↵ ↑ and ↓ to select number ↵ to enter and shift to next digit to the right.
LRV URV	#. ## #. ##	The limits are: the Lower Range Limit (LRL) and the Upper Range Limit (URL) of the selected Sensor 1 ID	Press ↵ to enter menu selection ↑ and ↓ to select number. ↵ to enter and shift to the next digit to the right
MRV		Limits are the minimum URL and maximum LRL of the selected Sensor 1 and Sensor 2 IDs. Determines the point of transition of Loop Control between Sensor 1 and Sensor 2 for Split-Range Loop Control Mode.	
Damping	#. ##	Selection applies digital filtering to suppress noise effects on the PV. The limits for this value are 0.0 to 32.0 seconds	
NAMUR Output	Enabled Disabled	Disabling sets the loop output and burnout levels to the Honeywell levels	Press ↵ to enter menu selection ↑ and ↓ to select from list ↵ to enter
Tag ID	□□□□□□□□	Enter Tag ID name up to 8 characters long. □ = any Alphanumeric value	Press ↵ to enter menu selection ↑ and ↓ to select Alphanumeric ↵ to enter and shift to next character to the right.

Install Date	DD MM YYYY	This selection allows the user to enter the date a transmitter is installed. The Install Date is entered in sequence of Day, Month, and Year, followed by the new date and the prompt Write Date to confirm the entry. **CAUTION**: The Install Date can only be written once in the life of the Transmitter. You cannot erase or overwrite the Install Date once it has been written.	Press ↵ to enter menu selection ↑ and ↓ to select number ↵ to enter and shift to next digit to the right. Read Only after entered
Firmware	Display Electronics Sensor	Menu item shows the current Firmware versions of the Display, Electronics Module and the Sensor Module	Read Only Parameter
Protocol	HART DE	Menu item shows the communications protocol	
Model Key		Identifies the type and range of the transmitter	Read Only Parameter
<Exit Menu>			

4.2.7 Selecting a new setting from a list of choices

Use the procedure described below to select a new setting for parameters that present a list of choices (e.g., PV Display, Temperature Units, etc.)

1. Press ↵ to begin the edit process. The Basic Display will show the current setting of the item on the lower line, left justified.
2. Press the ↑ or ↓ buttons to scroll through the list of choices.
3. Press ↵ to make your selection. The new selection will be stored in the transmitter and displayed on the lower line, right justified.

4.3 Three Button Operation with no Display Installed

When there is no Display installed, the buttons can be used to perform a Zero or Span adjustment of the Transmitter. Caution should be taken to insure these adjustments are only made when the correct input values are applied.

4.3.1 Zero Adjustment

This adjustment is the same as performing a Set LRV using the Display.

1. Connect a current meter or voltmeter as shown in Figure 12 to monitor the PV output of the Transmitter.
2. Using an accurate input source, apply a signal equivalent to the Transmitter LRV.
3. Press the Down (↓) and Zero (↑) buttons together to set the Zero.
4. Verify that the output is now 4 mA.

4.3.2 Span Adjustment

This adjustment is the same as performing a Set URV using the Display.

1. Connect a current meter or voltmeter as shown in Figure 12 to monitor the PV output of the Transmitter.
2. Using an accurate input source, apply a signal equivalent to the desired Upper Range Value of the transmitter.
3. Press the **Down (↓)** and **Span (↵**) buttons together to set the span.
4. Verify that the PV output is now 20 mA.


You can also use the MCT 202 Toolkit to make any adjustments to an STT850 SmartLine Temperature Transmitter. Alternately, certain adjustments are possible through an Experion Station or Universal Station, if the STT850 is digitally integrated with either of these stations.

4.4 Changing the Default Failsafe Direction

Transmitters are shipped with a default failsafe direction of upscale. This means that the Transmitter output will set the current output to upscale failsafe (maximum output) upon detection of a critical status. You can change the direction from upscale failsafe to downscale failsafe (minimum output) by moving the top jumper located in the Electronics module.

4.4.1 DE and Analog Differences

Failsafe operation is somewhat different between DE and analog operation:

- **Analog operation** – Upscale failsafe drives the Transmitter output to 21.8 mA. Downscale failsafe drives the Transmitter output to 3.6 mA.
- **DE operation** – Upscale failsafe causes the Transmitter to generate a **+ infinity** digital signal. Downscale failsafe causes the Transmitter to generate a **– infinity** digital signal.

The Transmitter electronics module interprets either signal as *not-a-number* and initiates its own configured failsafe action for the control system.

4.4.2 Procedure to Establish Failsafe Operation

The failsafe direction display accessible via the Toolkit shows only the state of the jumper as it correlates to analog Transmitter operation. Failsafe action for the DE control system may be configured to operate in a manner different from analog, as indicated by the state of the Transmitter jumper.

The integrated circuits in the Transmitter PWA are vunerable to damage by stray static discharges when removed from the Electronics Housing. Minimize the possibility of static discharge damage when handling the PWA as follows:

Do not touch terminals, connectors, component leads, or circuits when handling the PWA.

When removing or installing the PWA, handle it by its edges or bracket section only. If you need to touch the PWA circuits, be sure you are grounded by staying in contact with a grounded surface or by wearing a grounded wrist strap.

When the PWA is removed from the Transmitter, put it in an electrically conductive bag, or wrap it in aluminum foil to protect it.

The following procedure outlines the steps for positioning the write protect and failsafe jumpers on the electronics module. See Figure 14 for the locations of the failsafe and write protect jumpers.

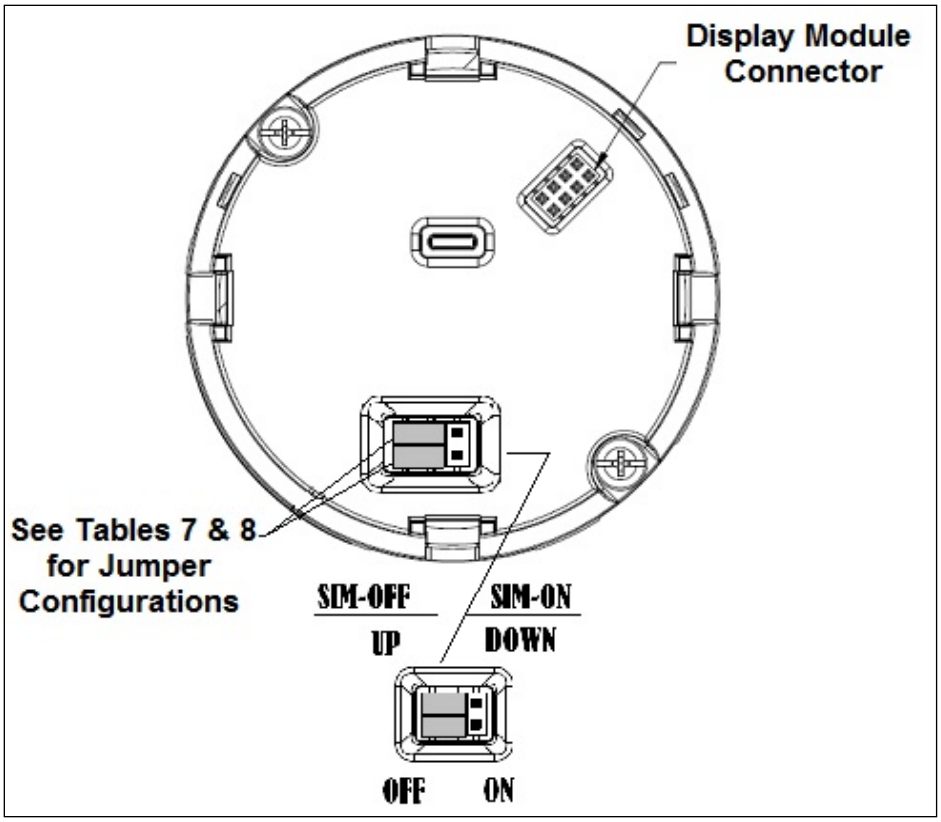


Figure 15 – Locating the Failsafe and Write Protect Jumpers

Table 13 – Hart and DE Failsafe and Write Protect Jumpers

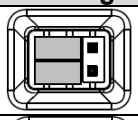
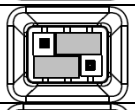
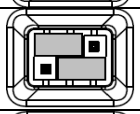
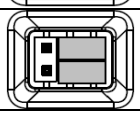
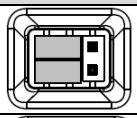
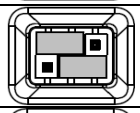
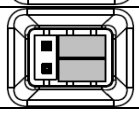
Jumper Arrangements	Description
	Failsafe = UP (High) Write Protect = OFF (Not Protected)
	Failsafe = DOWN (Low) Write Protect = OFF (Not Protected)
	Failsafe = UP (High) Write Protect = ON (Protected)
	Failsafe = Down (Low) Write Protect = On (Protected)

Table 14 – Fieldbus Simulation and Write Protect Jumpers

Image	Description
	Fieldbus Simulation Mode = OFF Write Protect = OFF (Not Protected)
	Fieldbus Simulation Mode = OFF Write Protect = ON (Protected)
	Fieldbus SIM Mode = ON Write Protect = OFF (Not Protected)

1. Turn OFF Transmitter power (Power removal is only required in accordance with area safety approvals. Power removal is only required in Class 1 Div 1 Explosionproof and Class 1 Div 2 environments).
2. Loosen the end cap lock, and unscrew the end cap from the electronics side of the Transmitter housing.
3. If equipped with a Display module, carefully depress the two tabs on the sides of the Display Module, and pull it off.
4. If necessary, unplug the interface connector from the Communication module. Do not discard the connector.
5. Set the Failsafe Jumper (top jumper) to the desired position (UP or DOWN). See Table 16 and Table 14 for jumper positioning.
6. Table 13If applicable, re-install the Display module as follows:
    - Orient the display as desired.
    - Install the Interface Connector in the Display module such that it will mate with the socket for the display in the Communication module.
    - Carefully line up the display, and snap it into place. Verify that the two tabs on the sides of the display latch.

NOTE: Installing a Display Module into a powered transmitter may cause a temporary upset to the loop output value.

Orient the Display for proper viewing through the end cap window. You can rotate the meter mounting orientation in 90 ^{o} increments.

7. Restore transmitter power if removed.

\

4.5 Monitoring the Basic and Advanced Displays

This section describes the information shown on the operator screens of the Advanced and Basic Displays.

4.5.1 Basic Display

Figure 15 illustrates the Basic Display format with Process Variable (PV).

- The PV value is user-configurable. This field has 7 characters. The maximum allowable numeric value is 9999999 or -999999. If fractional decimals are configured, the fractional positions will be dropped, as required. If the PV value exceeds the above limits, it is divided by 1000 and "K" is appended to the result, allowing a maximum value with multiplier of 999999K or -99999K.
- Process Variable Tag is user-configurable from a HART Host. This field has 14 characters.
- Engineering Units. This field is user-configurable when measuring temperature. This field has 8 characters.

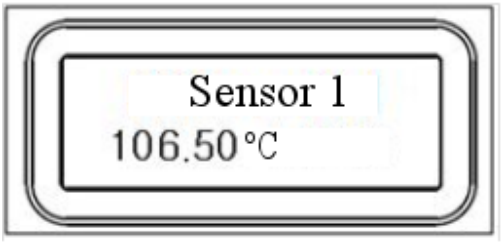


Figure 16 – Basic Display with Process Variable Format

4.5.2 Advanced Displays

As shown in Figure 16 , the Advanced Display provides three formats. Table 15 lists and describes the fields in each of the three Advanced Display formats. Essentially, all three formats provide the same information, but with the following differences:

- Bar Graph. User Configurable 126 segment Bar Graph with range settings. The Bar Graph displays the current value of the configured PV.
- PV Trend. User-configurable display period from one hour to 999 hours (allowing 31 days). The chart displays minimum, maximum, and average of the configured PV over the selected trend period.

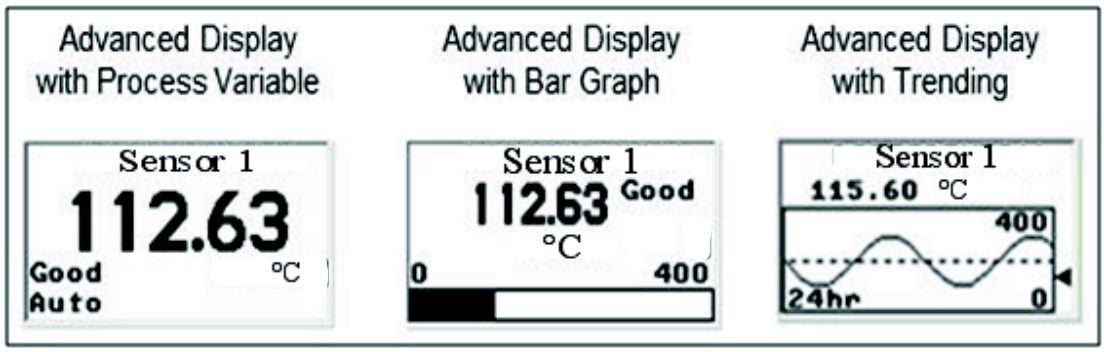


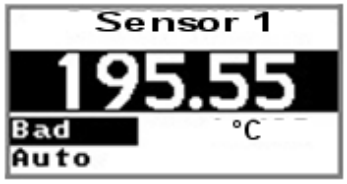
Figure 17 – Advanced Display Formats with the Process Variable

Table 15 – Advanced Displays with PV Format Display Indications

Display Indicator	What It Means
Diagnostic / Maintenance These indicators are displayed in the upper left corner of the screen when the associated conditions are present in the transmitter.	D Diagnostic condition present This indicator is displayed any time a diagnostic is present in the transmitter, either Critical or Non-Critical. If a Critical Diagnostic is present, the message "Critical Diag" will flash at the top of the screen and the appropriate Diagnostic screen will be inserted into the normal screen rotation.  To determine which Non-Critical diagnostics are active, use the local buttons to call up the Non-Critical diagnostics menu (Main Menu\Diagnostics\Non-Critical. Refer to Table 10 for details concerning the Non-Critical diagnostics. M Maintenance Mode is active This indicator is set by the Experion DCS. When this Mode is active, a screen with the text "Available for Maintenance" will be inserted into the normal screen rotation to make it easy to identify transmitters that are available for maintenance.
PV Value	User Configurable. This field has 7 characters. Maximum allowable numeric value of 9999999 or -999999. If fractional decimals are configured, the fractional positions will be dropped as required. If the PV exceeds the values above limits, the PV is divided by 1000 and "K" is appended to the result, allowing a maximum value with multiplier of 999999K or -99999K

<table>
<tr><td>PV Status:</td><td>Good The transmitter is operating normally

Bad The transmitter has detected a fault condition.
The PV Status field will flash when this condition is present and the PV Value will be displayed on a black background as shown below:

Unc Uncertain (this status is only available for FF transmitters)
The PV Value is outside of normal limits.</td></tr>
<tr><td rowspan="2">PV Function Block Mode</td><td colspan="2">The Function Block Mode is only displayed for Foundation Fieldbus transmitters. The eight possible Modes are shown below.</td></tr>
<tr><td>OOS Out Of Service
Auto Automatic
Man Manual
Cas Cascade</td><td>RCas Remote Cascade
Rout Remote Output
IMan Initialization Manual
LO Local Override</td></tr>
<tr><td>Process Variable Tag</td><td colspan="2">User Configurable. This field has 14 characters</td></tr>
<tr><td rowspan="2">Engineering Units</td><td colspan="2">User Configurable. This field has 2 characters</td></tr>
<tr><td>Temperature
°C
°F
°R
K (Kelvin)</td><td>Other:
(%) percent
(mV) millivolt
mA (milliampere)</td></tr>
<tr><td>Bar Graph</td><td colspan="2">The limits of the bar graph are user-configurable for each screen.</td></tr>
<tr><td>Trend graph</td><td colspan="2">The limits of the trend graph are user-configurable for each screen.
The amount of time visible on the Trend graph is also configurable.</td></tr>
</table>

4.5.3 Button operation during monitoring

When the operator screens are active on the Advanced Display, the Increment and Decrement buttons (↑ and ↓) can be used to move to the next or previous operator screen without waiting for the rotation time to expire. Pressing the Enter button (↵) will call up the Main Menu.

5 Maintenance

5.1 Overview

This section provides information about preventive maintenance and replacing damaged parts. The topics covered in this section are:

- Replacement of damaged parts such as the Electronics Modules.

5.2 Preventive Maintenance Practices and Schedules

The STT850 SmartLine Transmitter does not require any specific maintenance at regularly scheduled intervals.
Maintenance of the STT850 is limited to ensuring that connections, seals and mounting are tight and secure. There are no moving parts or adjustments and hence no reason to open the field housing except to inspect for corrosion or conductive dust entry which could later affect reliable operation. The transmitter modules themselves should never be opened.

5.3 Replacing the Communication Module

The Communication module includes a connector to the optional Display module. This section includes the procedure to replace the Communication module.

The transmitter does not have to be removed from service to replace the Comm Module

Please take appropriate steps to avoid ESD damage when handling the Communication and Display Module assemblies

Refer to Figure 18for parts locations.

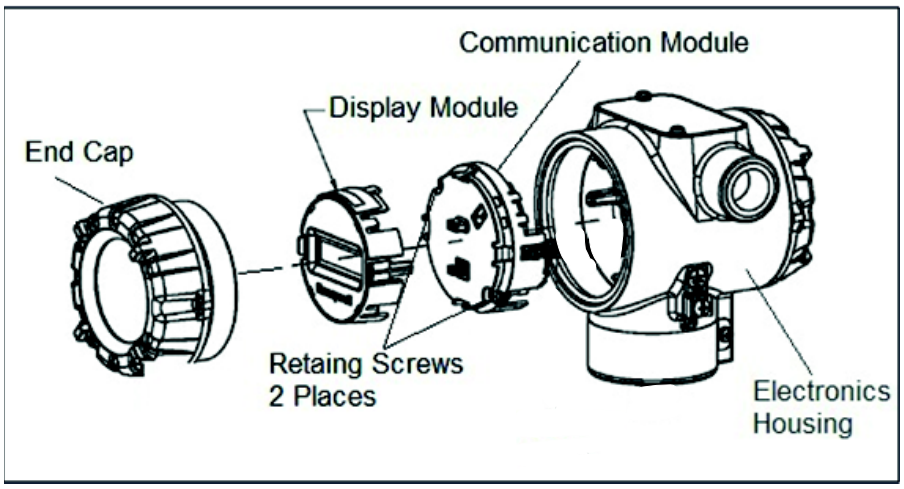


Figure 18 – PWA Replacement

1. Turn OFF Transmitter power (Power removal is only required in accordance with area safety approvals. Power removal is only required in Class 1 Div 1 Explosionproof and Class 1 Div 2 environments).

    - When removing the Communications Module with power applied, the loop will go to 0V. Likewise, installing a Communications Module into a transmitter with power applied will cause the loop output value to go to 12 ma for several seconds then the loop output value will go to the configured value based on the PV input.
    - Installing a Display Module into a powered transmitter may cause a temporary upset to the loop output value.

2. Loosen the end cap lock, and unscrew the end cap from the electronics side of the Transmitter housing.
3. If equipped with a Display module, carefully depress the two tabs on the sides of the Display Module, and pull it off.
4. If necessary, unplug the Display interface connector from the Communication module. **Do not discard the connector**.
5. Loosen the two retaining screws, and carefully pull the Communication module from the Electronics compartment.
6. Carefully, insert the Communication module into the Electronics compartment.
7. Tighten the two Communication module retaining screws.
8. Refer to the SmartLine User's Manual to change the FAILSAFE, READ/WRITE, and SIM-OFF/SIM-ON (Fieldbus Only) configuration settings.
9. If applicable, re-install the Display module as follows:

a) Orient the display as desired.

b) Install the Interface Connector in the Display module such that it will mate with the socket for the display in the Communication module.

c) Carefully line up the display, and snap it into place. Verify that the two tabs on the sides of the display latch.

10.  Orient the Display for proper viewing through the end cap window.
You can rotate the meter mounting orientation in 90 ° increments.

11. Apply Parker Super O-ring Lubricant or equivalent to the end cap O-ring before installing the end cap. Reinstall the End Cap and tighten the End Cap locking screw.
12. Installing Optional External Configuration Button Assembly.

a) Loosen (Do Not Remove) both top nameplate screws and pivot nameplate 90°.

b) Align the protrusion on the button assembly with the matching opening in the housing and snap the button assembly into the housing.

c) Rotate the nameplate back to the original position, and tighten the nameplate screws.

(Steps 13 - 16 required for Field Upgrades Only)

13. Loosen the End Cap locking screw and unscrew the End Cap from the Field Wiring side of the transmitter housing.
14. Select the proper Communication/External Configuration upgrade kit label from the label strip provided and adhere to the inside of the Field Wiring compartment End Cap.
15. Apply Parker Super O-ring Lubricant or equivalent to the end cap o-ring before installing the end cap. Reinstall the End Cap and tighten the end cap locking screw
16. Install external upgrade label (i.e. DEVICE MODIFIED…..) provided on outside of housing as shown in Figure 17.
17. Restore power if removed.
18. Check the settings of the Transmitter Setup and Display Setup parameters to make sure that the transmitter is configured correctly for your application. Refer to the STT850 HART/DE manual (34-TT-25-06) for details on HART and DE transmitters. Refer to STT850 Fieldbus manual (34-TT-25-07) for additional information about Fieldbus transmitters.
19. If applicable, verify External Button Configuration operation.

    Ready to go.

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6 Calibration

6.1 Recommendations for Transmitter Calibration

The STT850 SmartLine Temperature Transmitter does not require periodic calibration to maintain accuracy. Typically, calibration of a process-connected Transmitter will degrade, rather than augment the capability of a smart Transmitter. For this reason, it is recommended that a Transmitter be removed from service before calibration. Moreover, calibration will be accomplished in a controlled, laboratory-type environment, using certified precision equipment.

6.2 Calibration Procedures

For a Transmitter operating in analog mode, you must calibrate its output signal measurement range using any compatible hand-held communicator or a local display.

One calibration option is to use the Honeywell Smart Field Communicator (SFC). Refer to the *Smart Field Communicator Operating Guide,* 34-ST-11-14 for calibration procedures.

Calibration information and procedures for a Transmitter operating in the HART/DE mode are provided in the *STT850 Series HART/DE Option User's Manual*, document number 34-TT-25-06, Section on "Calibration."

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7 Troubleshooting

7.1 Overview

Troubleshooting involves responding to error messages, primarily displayed by the MC Toolkit. Error messages that may occur on the Transmitter's local display are fairly self-explanatory and intuitive. However, this section covers the diagnostic messages that indicate critical conditions. Other than the critical conditions, additional detail is not provided. If you require assistance, contact your distributor or Honeywell Technical Support. All other messages are covered by the MC Toolkit Users' Manual.

7.2 Critical Diagnostics Screens

When a Critical Diagnostic is present in the Transmitter, the Advanced Display will show one or more of the screens pictured in Figure 18. These screens will be inserted into the normal screen rotation and displayed between the user-defined operator screens. A description of the diagnostic conditions is given Table 16, along with suggested actions for resolving the problem.

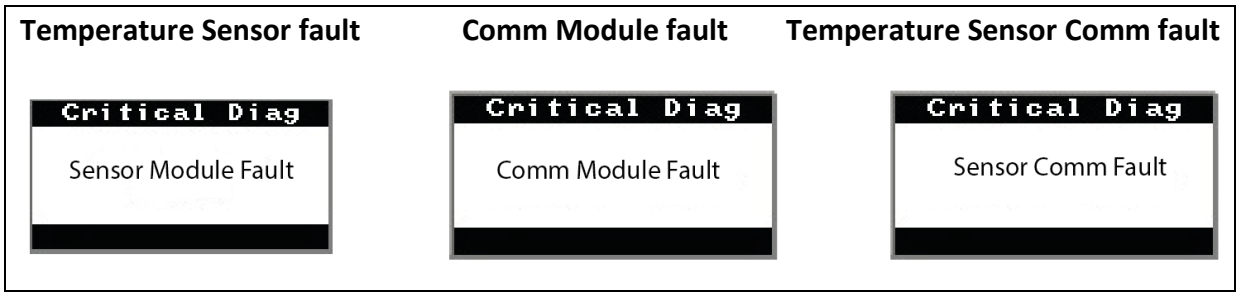


Figure 19 – Local Display Fault Diagnostic Conditions

The Basic Display will display the message CRITICAL FAULT on the top line of the LCD and the appropriate diagnostic text on the lower line.

7.2.1 Fault Conditions and Recommended Corrective Actions

Table 16 – Fault Conditions and Recommended Corrective Actions.

Condtion	Analysis	Recommended Corrective Action
Electronics Module Fault. A critical failure has been detected on the HART, DE, or FF Electronics Module.	Use a HART, DE, or FF communicator to read the detailed status information from the transmitter. Refer to the appropriate communicator manual for more information about the possible failure causes.	Cycle power to the transmitter. If the problem continues to occur replace the Electronics Module.
Temperature Sensor Module Fault. A critical failure has been detected on the Temperature Sensor Module.	Use a HART, DE, or FF communicator to read the detailed status information from the transmitter. Refer to the appropriate communicator manual for more information about the possible failure causes.	If the diagnostic status indicates an input problem (burnout, out of range, etc.), correct the root error and then cycle power to the transmitter. If the problem continues to occur replace the Temperature Sensor Module.
Temperature Sensor Comm Fault. Cannot communicate with the Temperature Sensor Module.	Use a HART, DE, or FF communicator to read the detailed status information from the transmitter. Refer to the appropriate communicator manual for more information about the possible failure causes.	Cycle power to the transmitter. If the problem continues to occur replace the Temperature Sensor Module

Figure 22	3	1	1	1-2

8 Parts List

8.1 Overview

Individually saleable parts for the various Transmitter models are listed in this section. Some parts are illustrated for identification. Parts are identified and listed in the corresponding tables as follows:

- Individually saleable parts are indicated in each figure by key number callout.
- Parts that are supplied in kits are indicated in each illustration by key number callout with the letter K prefix.

Table 17 is a summarized list of recommended spare parts.

Table 17 – Summary List of Recommended Spare Parts

Part Number	Description	Figure No.	Key No.	1-10 Units	10-100 Units	100-1000 Units
Electronics Housing Assembly						
50086423-501 50086423-502 50086423-503 50086423-504 50086423-505 50086423-506	HART Electronics Module Without REED Sensor PWA HART Electronics Module With REED Sensor PWA DE Electronics Module Without REED Sensor PWA DE Electronics Module With REED Sensor PWA FieldBus Electronics Module Without REED Sensor PWA FieldBus Electronics Module With REED Sensor PWA	Figure 21	5	1	1-2	2-4
50049911-502 50049846-503	Basic Display Module Advanced Display Module	Figure 21	4	1	1-2	2-4
50086421-501 50086421-502 50086421-503 50086421-504 50086421-505 50086421-506	HART/DE Temperature/Terminal Block Assy Without Lightning Protection, Single Input HART/DE Temperature/Terminal Block Assy Without Lightning Protection, Dual Input HART/DE Temperature/Terminal Block Assy With Lightning Protection, Single Input HART/DE Temperature/Terminal Block Assy With Lightning Protection, Dual Input HART/DE Temperature/Terminal Block Assy Without Lightning Protection, Single Input w/Digital Output HART/DE Temperature/Terminal Block Assy With Lightning Protection, Single Input,w/Digital Output	Figure 22	3	1	1	1-2

Part Number	Description	Figure No.	Key No.	1-10 Units	10-100 Units	100-1000 Units
50086421-507 50086421-508 50086421-509 50086421-510	FieldBus Temperature/Terminal Block Assy Without Lightning Protection, Single Input FieldBus Temperature/Terminal Block Assy Without Lightning Protection, Dual InputFieldBus Temperature/Terminal Block Assy With Lightning Protection,Single Input FieldBus Temperature/Terminal Block Assy With Lightning Protection, Dual Input	Figure 22	3	1	1	1-2

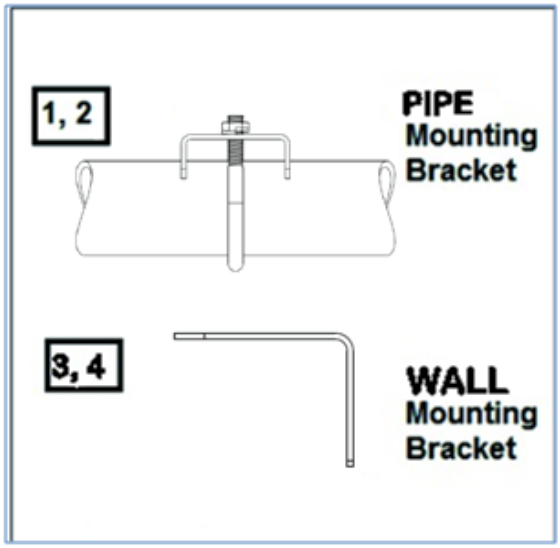


Figure 20 – Pipe and Wall Bracket Parts

Pipe Mounting Bracket	Carbon Steel
Pipe Mounting Bracket	316 SS
Marine Approved Mounting Bracket	316 SS
Wall Mounting Bracket	Carbon Steel
Wall Mounting Bracket	316 SS

Table 18 – Pipe and Wall Bracket Parts

(Refer to Figure 20)

Key No.	Part Number	Description	Quantity Per Unit
1	50090524-501	Carbon Steel Pipe Bracket Mounting kit for all models	1
2	50090524-503	316 Stainless Steel Pipe Bracket Mounting kit for all models	1
3	50092363-501	Carbon Steel Wall Bracket Mounting kit for all models	1
4	50092363-503	316 Stainless Steel Wall Bracket Mounting kit for all models	1

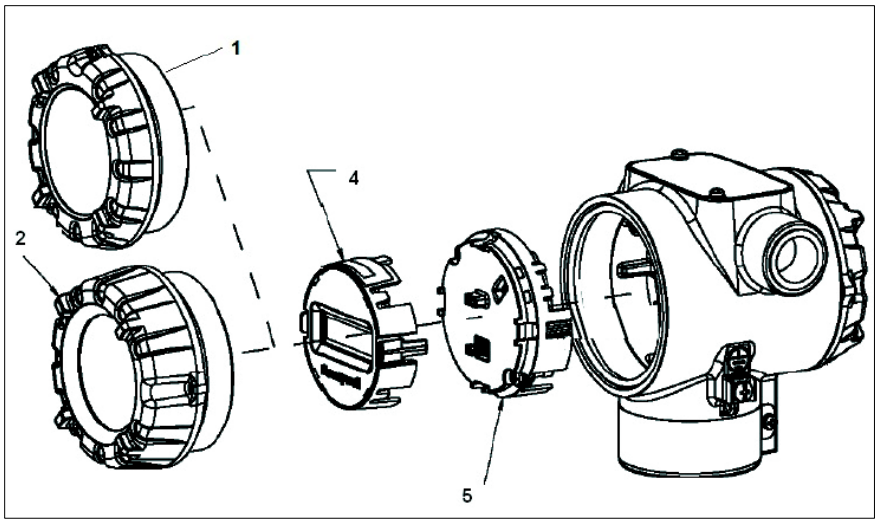


Figure 21 – Electronic Housing, Display End

Table 19 – Transmitter Major Assemblies

(Refer to Figure 21, Figure 22)

Key No.	Part Number	Description	Quantity Per Unit
1	50049858-501 50049858-521	End Cap (Aluminum) End Cap (Stainless Steel)	1
2	50049832-501 50049832-521	End Cap, Display (Aluminum) End Cap, Display (Stainless Steel)	1
3	50086421-501 50086421-502 50086421-503 50086421-504 50086421-505 50086421-506 50086421-507 50086421-508 50086421-509 50086421-510	HART/DE Temperature/Terminal Block Assy Without Lightning Protection, Single Input HART/DE Temperature/Terminal Block Assy Without Lightning Protection, Dual Input HART/DE Temperature/Terminal Block Assy With Lightning Protection, Single Input HART/DE Temperature/Terminal Block Assy With Lightning Protection, Dual Input HART/DE Temperature/Terminal Block Assy Without Lightning Protection, Single Input w/Digital Output HART/DE Temperature/Terminal Block Assy With Lightning Protection, Single Input,w/Digital Output FieldBus Temperature/Terminal Block Assy Without Lightning Protection, Single Input FieldBus Temperature/Terminal Block Assy Without Lightning Protection, Dual InputFieldBus Temperature/Terminal Block Assy With Lightning Protection,Single Input FieldBus Temperature/Terminal Block Assy With Lightning Protection,Dual Input	1
4	50049911-502 50049846-503	Basic Display for Temperature Advanced Display for Temperature	1

5	50086423--501 50086423--502 50086423--503 50086423--504 50086423--507 50086423--508	HART Electronics Module Assembly (PWA) without Reed sensor HART Electronics Module Assembly (PWA) with Reed sensor DE Electronics Module Assembly (PWA) without Reed sensor DE Electronics Module Assembly (PWA) with Reed sensor FF Electronics Module Assembly (PWA) without Reed sensor FF Electronics Module Assembly (PWA) with Reed sensor	1
6	50049915-501	External Zero, Span & Config Buttons	1
K1	30757503-005	Electronics housing seals kit (includes O-rings)	

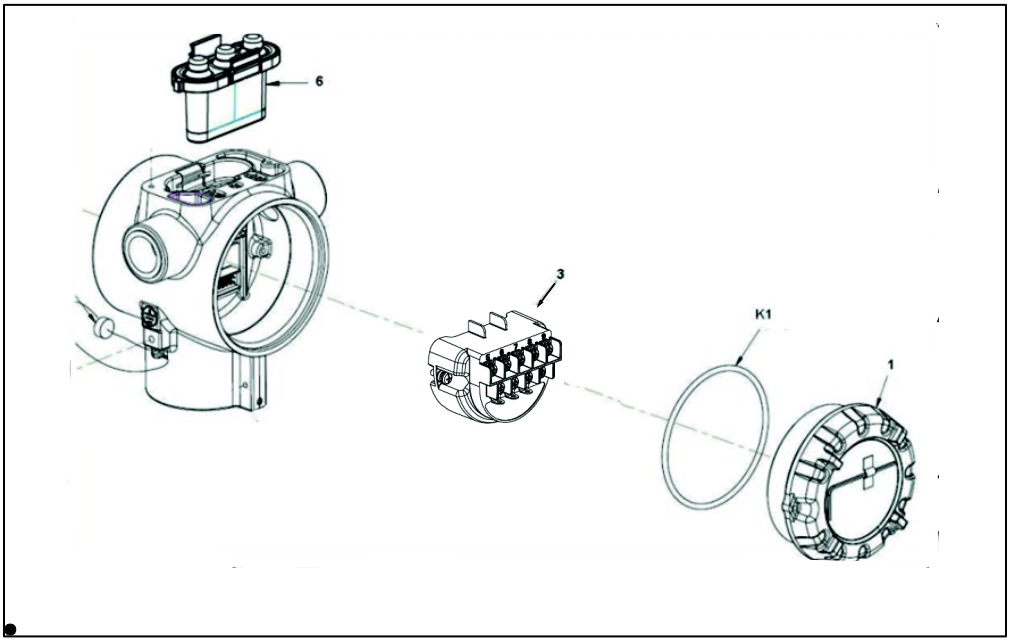


Figure 22 – Electronic Housing, Terminal Block End

Appendix A. PRODUCT CERTIFICATIONS

A1. Safety Instrumented Systems (SIS) Installations

For Safety Certified Installations, please refer to STT850 Safety Manual 34-TT-25-05 for installation procedure and system requirements.

A2. European Directive Information (CE Mark)

CE Honeywell

50094560 Revision: A

EC DECLARATION OF CONFORMITY

We,

Honeywell International Inc.
Honeywell Field Solutions
512 Virginia Drive
Fort Washington, PA 19034 USA

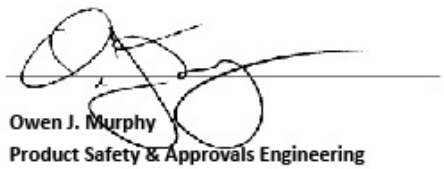
declare under our sole responsibility that the following products,

ST 850 – Smart Series Temperature Transmitter

to which this declaration relates, is in conformity with the provisions of the European Community Directives, including the latest amendments, as shown in the attached schedule.

Assumption of conformity is based on the application of the harmonized standards and when applicable or required, a European Community notified body certification, as shown in the attached schedule.

The authorized signatory to this declaration, on behalf of the manufacturer, and the Responsible Person is identified below.



Owen J. Murphy
Product Safety & Approvals Engineering
Issue Date: 26 December 2013

Honeywell

SCHEDULE
50094560 Revision: A

EMC Directive (2004/108/EC)

IEC 61326-1:2005 Electrical Equipment for Measurement, Control and Laboratory Use – EMC Requirements.

IEC 61326-3-1:2008 Electrical Equipment for Measurement, Control and Laboratory Use- Part 3-1: Immunity Requirements for safety related systems and equipment intended to perform safety-related functions.

Overview of EMC Testing

Equipment Tested (EUT): ST 850 TRANSMITTER
Reference Document(s): EMI-EMC Test Plan- STT850 Dated Oct 2013

Summary of Tests Performed:

PORT	TEST	STANDARD	CRITERIA (IEC 61326-1)	CRITERIA (IEC 61326-3-1)	RESULTS
Enclosure	Radiated Emission	CISPR 11	Group1, Class A 30 – 230 MHz: 40 dB 230 – 1000 MHz: 47 dB	Group1, Class A 30 – 230 MHz: 40 dB 230 – 1000 MHz: 47 dB	PASS
	ESD Immunity	IEC61000-4-2	+/- 4KV Contact +/- 8KV Air	+/- 6KV Contact +/- 8KV Air	PASS
	EM Field- RF Radiated Susceptibility	IEC61000-4-3	10 V/m- 80 MHz to 1GHz 3 V/m - 1.4 GHz to 2.0 GHz 1 V/m- 2.0 GHz to 2.7 GHz	20 V/m- 80MHz to 1GHz 10 V/m - 1.4GHz to 2.0 GHz 3 V/m- 2.0GHz to 2.7GHz	PASS PASS PASS
	50Hz/60Hz Magnetic Field Immunity	IEC 6100-4-8	30 A/m	30 A/m	N/A 1
DC Power	EFT(B) Immunity	IEC61000-4-4	+/- 1KV	+/- 2KV	PASS
	Surge Immunity	IEC61000-4-5	+/- 1KV	+/- 2KV	PASS
	RF Conducted Susceptibility	IEC61000-4-6	3V	3 V Except the following: 10 V 3.39 to 3.410MHz 10 V 6.765 to 6.795MHz 10 V 13.553 to 13.567MHz 10 V 26.957 to 27.283MHz 10 V 40.66 to 40.70MHz	PASS
I/O Signal/	EFT(Burst) Immunity	IEC61000-4-4	+/- 1KV	+/- 2KV	2

Honeywell

SCHEDULE
50094560 Revision: A

PORT	TEST	STANDARD	CRITERIA (IEC 61326-1)	CRITERIA (IEC 61326-3-1)	RESULTS
Control (Including Earth Lines)	Surge Immunity	IEC61000-4-5	+/- 1KV	+/- 2KV	2
	RF Conducted Susceptibility	IEC61000-4-6	3V	3 V Except the following: 10 V 3.39 to 3.410MHz 10 V 6.765 to 6.795MHz 10 V 13.553 to 13.567MHz 10 V 26.957 to 27.283MHz 10 V 40.66 to 40.70MHz	2
AC Power	Voltage Dip	IEC61000-4-11	0% during 1 Cycle 40% during 10-12 Cycles 70% during 25-30 Cycles		N/A[3]
	Short Interruptions	IEC61000-4-11	0% during 250-300 Cycles		N/A[3]
	EFT(Burst) Immunity	IEC61000-4-4	2KV		N/A[3]
	Surge Immunity	IEC61000-4-5	1KV/ 2KV		N/A[3]
	RF Conducted Susceptibility	IEC61000-4-6	3V		N/A[3]

1. There is no magnetic sensitive circuitry.
2. Done as part of the DC Power Testing.
3. Product is DC Powered.

Testing performed at:

Retlif Testing Labatories
3131 Detwiler Road
Harleysville, PA 19438
USA

ATEX Directive (94/9/EC)

EC-Type Examination Certificate No: FM13ATEX0107X- Flameproof "d" Certificate
IEC 60079-0: 2011 EN 60079-1: 2007
EN 60079-31: 2009 EN 60529: 1991 + A1:2000

EC-Type Examination Certificate No: FM13ATEX0107X - Intrinsically Safe "ia" Certificate
IEC 60079-0: 2011 IEC 60079-11: 2011 EN 60079-26: 2006

Honeywell

SCHEDULE
50094560 Revision: A

Type Examination Certificate No: FM13ATEX0108X **Non Sparking "n" Certificate**
IEC 60079-0: 2011 EN 60079-15: 2010

ATEX Notified Body for EC Type Certificates
FM Approvals Ltd. [Notified Body Number: 1725]
1 Windsor Dials,
Windsor, Berkshire, SL4 1RS
England

ATEX Notified Body for Quality Assurance
DEKRA Certification B.V. [Notified Body Number: 0344]
Utrechtseweg 310
6802 ED Arnhem
The Netherlands

4 of 4

A3. Hazardous Locations Certifications

AGENCY	TYPE OF PROTECTION	COMM. OPTION	FIELD PARAMETERS	AMBIENT TEMP (Ta)
FM Approvals™ USA	**Explosion proof:** Class I, Division 1, Groups A, B, C, D; **Dust Ignition Proof:** Class II, III, Division 1, Groups E, F, G; T4 Class 1, Zone 1/2, AEx d IIC T4 Class 2, Zone 21, AEx tb IIIC T 95°C IP 66	4-20 mA / DE/ HART	Note 1	-50ºC to 85ºC
	Standards: FM 3600:2011; ANSI/ ISA 60079-0: 2009 FM 3615:2006; ANSI/ ISA 60079-1 : 2009 FM 3616 : 2011 ; ANSI/ ISA 60079-31 : 2009 FM 3810 : 2005 ; ANSI/ ISA 60079-26 : 2008 NEMA 250 : 2003 ; ANSI/ IEC 60529 : 2004			
	Intrinsically Safe: Class I, II, III, Division 1, Groups A, B, C, D, E, F, G; T4 Class I Zone 0 AEx ia IIC T4 Ex ia IIC T4	4-20 mA / DE/ HART	Note 2	-50 ºC to 70ºC
	Standards: FM 3600:2011; ANSI/ ISA 60079-0: 2009 FM 3610:2010; ANSI/ ISA 60079-11 : 2011 FM 3810 : 2005 ; ANSI/ ISA 60079-26 : 2008 NEMA 250 : 2003 ; ANSI/ IEC 60529 : 2004			
	Class I, Division 2, Groups A, B, C, D; T4 Class I Zone 2 AEx nA IIC T4 Ex nA IIC T4	4-20 mA / DE/ HART	Note 1	-50 ºC to 85ºC
	Standards: FM 3600:2011; ANSI/ ISA 60079-0: 2009 FM 3611:2004; ANSI/ ISA 60079-15 : 2009 ; FM 3810 : 2005 ; NEMA 250 : 2003 ; ANSI/ IEC 60529 : 2004			
	Enclosure: Type 4X/ IP66/ IP67	All	All	All
CSA US and Canada	**Intrinsically Safe:** Class I, II, III, Division 1, Groups A, B, C, D, E, F, G; T4 Class I Zone 0 AEx ia IIC T4 Ex ia IIC T4	4-20 mA / DE/ HART	Note 2	-50 ºC to 70ºC
	Class I, Division 2, Groups A, B, C, D; T4 Class I Zone 2 AEx nA IIC T4 Ex nA IIC T4	4-20 mA / DE/ HART	Note 1	-50 ºC to 85ºC
	Enclosure: Type 4X/ IP66/ IP67	All	All	All
	Standards: ANSI/ ISA 60079-0: 2009 ; CAN/ CSA-C22.2 No. 0-M91:2006; CAN/ CSA-E60079-0:2002 ; ANSI/ UL 913 : 2010 ; ANSI/ ISA 60079-11 : 2009 ; CAN/ CSA-C22.2 No.157-92: 1992; CAN/CSA-E 60079-11: 2002; ANSI/ ISA 60079-26 : 2008 ANSI/ ISA 12.12.01 : 2007 ; ANSI/ ISA 60079-15 : 2009 ; C22.2 No. 213-M1987; CAN/CSA-E60079-15: 2002 ANSI/ UL 50 : 2007 ; ANSI/ IEC 60529 : 2004			

ATEX- FM	**FM12ATEX0029X** **Flameproof:** II 1/2 G Ex d IIC T4 II 2 D Ex tb IIIC T 85°C IP 66	All	Note 1	-50 ºC to 85ºC
	Enclosure: IP66/ IP67	All	All	All
	Standards: EN 60079-0: 2011 EN 60079-1 : 2007 EN 60079-31 : 2009 EN 60079-26 : 2007 EN 60529 : 2000 + A1			
ATEX- SIRA	**Sira12ATEX2233X** **Intrinsically Safe:** II 1 G Ex ia IIC T4	4-20 mA / DE/ HART/ FF	Note 2	-50 ºC to 70ºC
	Sira12ATEX4234X **Nonincendive:** II 3 G Ex nA IIC T4	4-20 mA / DE/ HART/	Note 1	-50 ºC to 85ºC
	Enclosure: IP66/ IP67	All	All	All
	Standards: EN 60079-0: 2011 EN 60079-11 : 2011 EN 60079-26 : 2006 EN 60079-15 : 2007 IEC 60529 : 2009 with Corr 3			
IECEx- FM	**Flameproof :** Ga/Gb Ex d IIC T4 Ex tb IIIC T 85°C IP 66	All	Note 1	-50 ºC to 85ºC
	Enclosure: IP66/ IP67	All	All	All
	Standards: IEC 60079-0: 2011 IEC 60079-1 : 2007 IEC 60079-31 : 2008 IEC 60079-26 : 2006 IEC 60529 : 2009 with Corr 3			
IECEx- CSA	**Intrinsically Safe:** Ex ia IIC T4 Ex ta IIIC T 85°C IP 66	4-20 mA / DE/ HART/ FF	Note 2	-50 ºC to 70ºC
	Nonincendive: Ex nA IIC T4	4-20 mA / DE/ HART/	Note 1	-50 ºC to 85ºC
	Enclosure: IP66/ IP67	All	All	All
	Standards: IEC 60079-0: 2011 IEC 60079-11 : 2011 IEC 60079-26 : 2006 IEC 60079-15 : 2011 IEC 60529 : 2009 with Corr 3			

INMETRO (Brazil)	**Flameproof**: Ex d IIC Ga/Gb T4 Ex tb IIIC Db T 85oC IP 66	All	Note 1	T5 Ta = –50 ºC to 85ºC
	Intrinsically Safe: Ex ia IIC Ga T4	4-20 mA / DE/ HART/ FF	Note 2	T4 Ta = –50 ºC to 70ºC
	Nonincendive: Ex nA IIC Gc T4	4-20 mA / DE/ HART/ FF	Note 1	-50 ºC to 85ºC
	Enclosure: IP66/ IP67	All	All	All
SAEx (South Africa)	**Flameproof**: Ex d IIC Ga/Gb T4 Ex tb IIIC Db T 85°C IP 66	All	Note 1	-50 ºC to 85ºC
	Intrinsically Safe: Ex ia IIC Ga T4	4-20 mA / DE/ HART/ FF	Note 2	-50 ºC to 70ºC
	Nonincendive: Ex nA IIC Gc T4	4-20 mA / DE/ HART/ FF	Note 1	-50 ºC to 85ºC
	Enclosure: IP66/ IP67	All	All	All
NEPSI (China)	**Flameproof**: Ex d IIC Ga/Gb T4 Ex tb IIIC Db T 85°C IP 66	All	Note 1	-50 ºC to 85ºC
	Intrinsically Safe: Ex ia IIC Ga T4	4-20 mA / DE/ HART/ FF	Note 2	-50 ºC to 70ºC
	Nonincendive: Ex nA IIC Gc T4	4-20 mA / DE/ HART/ FF	Note 1	-50 ºC to 85ºC
	Enclosure : IP 66/67	All	All	All

Notes

1. Operating Parameters:

(Loop Terminal)

Voltage= 11 to 42 V Current= 4-20 mA Normal (3.8 – 23 mA Faults)

2. Intrinsically Safe Entity Parameters

For details see Control Drawing on page 68.

A4. Marking ATEX Directive

General:

The following information is provided as part of the labeling of the transmitter:

- Name and Address of the manufacturer
- Notified Body identification: DEKRA Quality B.V., Arnhem, the Netherlands

- For complete model number, see the Model Selection Guide for the particular model of Temperature Transmitter.
- The serial number of the transmitter is located on the Housing data-plate. The first two digits of the serial number identify the year (02) and the second two digits identify the week of the year (23); for example, 0223xxxxxxxx indicates that the product was manufactured in 2002, in the 23 rd week.

Apparatus Marked with Multiple Types of Protection

The user must determine the type of protection required for installation the equipment. The user shall then check the box [☐] adjacent to the type of protection used on the equipment certification nameplate. Once a type of protection has been checked on the nameplate, the equipment shall not then be reinstalled using any of the other certification types.

WARNINGS and Cautions:

Intrinsically Safe and Non-Incendive Equipment:

WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR USE IN HAZARDOUS LOCATIONS.

Explosion-Proof/ Flameproof:

WARNING: DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE MAY BE PRESENT

Non-Incendive Equipment:

WARNING: DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE MAYBE PRESENT

All Protective Measures:

WARNING: FOR CONNECTION IN AMBIENTS ABOVE 60^{o}C USE WIRE RATED 105^{o}C

A.5 Conditions of Use" for Ex Equipment", Hazardous Location Equipment or "Schedule of Limitations"

Consult the manufacturer for dimensional information on the flameproof joints for repair.

Painted surface of the STT850 may store electrostatic charge and become a source of ignition in applications with a low relative humidity less than approximately30% relative humidity where the painted surface is relatively free of surface contamination such as dirt, dust or oil. Cleaning of the painted surface should only be done with a damp cloth.

Flame-proof Installations: The Transmitter can installed in the boundary wall between an area of EPL Ga/ Class I Zone 0/ Category 1 and the less hazardous area, EPL Gb/ Class I Zone 1/ Category 2. In this configuration, the process connection is installed in EPL Ga/ Class I Zone 0/ Category 1, while the transmitter housing is located in EPL Gb/ Class I Zone 1/ Category 2.
Intrinsically Safe: Must be Installed per drawing 50049892
Division 2: This equipment is suitable for use in a Class I, Division 2, Groups A, B, C, D; T4 or Non-Hazardous Locations Only.

The enclosure is manufactured from low copper aluminium alloy. In rare cases, ignition sources due to impact and friction sparks could occur. This shall be considered during Installation, particularly if equipment is installed a Zone 0 location.

If a charge-generating mechanism is present, the exposed metallic part on the enclosure is capable of storing a level of electrostatic that could become incendive for IIC gases. Therefore, the user/ installer shall implement precautions to prevent the build up of electrostatic charge, e.g. earthing the metallic part. This is particularly important if equipment is installed a Zone 0 location.

A.6 Control Drawing

PRE REL		
ISS	REVISION & DATE	APPD
A	12/10/13 ECO-0094776	OJM

STT 850 Series Temperature Transmitter
ANALOG, HART/DE and FF/ PA Communications

1. Intrinsically safe installation shall be in accordance with
   a. FM (USA): ANSI/NFPA 70, NEC® Articles 504 and 505.
   b. CSA (Canada): Canadian Electrical Code (CEC), part I, section 18.
   c. ATEX: Requirements of EN 60079-14, 12.3 (See also 5.2.4).
   d. IECEx: Requirements of IEC 60079-14, 12.3 (See also 5.2.4).
2. ENTITY approved equipment shall be installed in accordance with the manufacturer's Intrinsic Safety Control Drawing.
3. The Intrinsic Safety ENTITY concept allows the interconnection of two ENTITY Approved Intrinsically safe devices with ENTITY parameters not specifically examined in combination as a system when:

   Uo, Voc, or Vt ≤ Ui or Vmax; Io, Isc, or It ≤ Ii or Imax; Ca or Co ≥ Ci + Ccable, La or Lo ≥ Li + Lcable, Po ≤ Pi. Where two separate barrier channels are required, one dual-channel or two single-channel barriers may be used, where in either case, both channels have been Certified for use together with combined entity parameters that meet the above equations.
4. System Entity Parameters:

   ST 800/ ST 700 Transmitter: Vmax Voc or Uo, Imax Isc or Io;
   ST 800/ ST 700 Transmitter: Ci + Ccable ≤ Control Apparatus Ca,
   ST 800/ ST 700 Transmitter: Li + Lcable ≤ Control Apparatus La.
5. When the electrical parameters of the cable are unknown, the following values may be used:

   Capacitance: 197pF/m (60 pF/ft)
   Inductance: 0.66µH/m (0.020µH/ft).
6. Control equipment that is connected to Associated Equipment must not use or generate more than 250 V.
7. Associated equipment must be FM, CSA ATEX or IECEx (depending on location) listed. Associated equipment may be installed in a Class I, Division 2 or Zone 2 Hazardous (Classified) location if so approved.
8. Non-Galvanically isolated equipment (grounded Zener Barriers) must be connected to a suitable ground electrode per:
   a. FM (USA): NFPA 70, Article 504 and 505. The resistance of the ground path must be less than 1.0 ohm.
   b. CSA (Canada): Canadian Electrical Code (CEC), part I, section 10.
   c. ATEX: Requirements of EN 60079-14, 12.2.4.
   d. IECEx: Requirements of IEC 60079-14, 12.2.4.
9. Intrinsically Safe DIVISION 1/ Zone 0 WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR USE IN HAZARDOUS LOCATIONS.
10. Division 2/ Zone 2: WARNING: DO NOT OPEN WHEN AN EXPLOSIVE GAS ATMOSPHERE IS PRESENT.
11. NO REVISION OF THIS CONTROL DRAWING IS PERMITTED WITHOUT AUTHORIZATION FROM THE AGENCIES listed.
12. For release approvals see ECO # 0094464.

	DRAWN		
	CHECKED		
	DEV ENG		
	MFG ENG		
	QA ENG		
	TOLERANCE UNLESS NOTED		
MASTER FILE TYPE: MS WORD	ANGULAR DIMENSION		

Honeywell

CONTROL DRAWING
ST 850 SERIES TEMPERATURE TRANSMITTER
DIVISIONS 1 & 2 / ZONE 0 & 2

A/A4	50091227	
SCALE: None	USED ON	SH. 1 OF 3

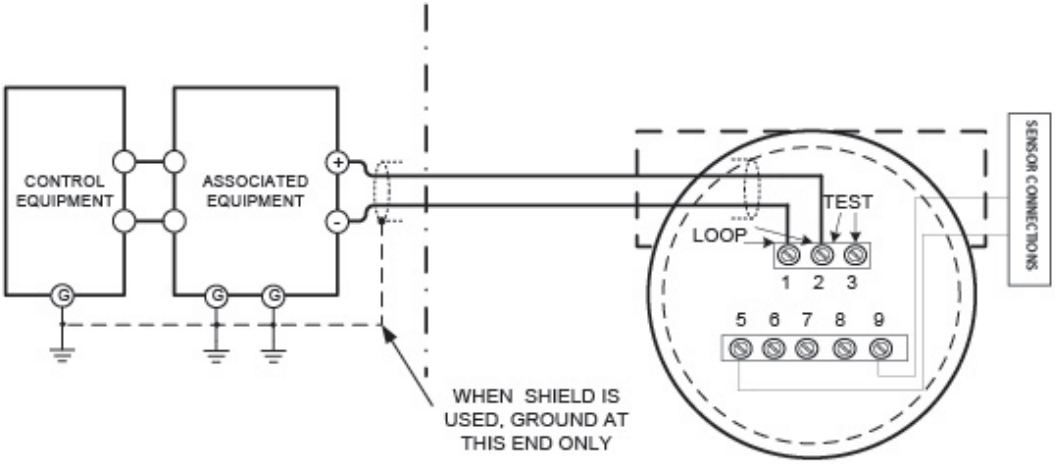
HART/DE

ENTITY PARAMETERS	Associated Apparatus	SENSOR Parameters
Ui or Vmax ≤ 30V	Uo, Voc or Vt ≤ 30V	Uo= 6 V
Ii or Imax ≤ 225 mA	Io (Isc or It) ≤ 225 mA	Io= 85 mA
Pi or Pmax = 0.9W	Po ≤ 0.9 W	Po= 0.51 W
Ci= 4 nF	Ca or Co ≥ C_{cable} + $C_{ST\ 800/\ ST\ 700}$	Co= 39 uF
Li= 0 µH	La or Lo ≥ L_{cable} + $L_{ST\ 800/\ ST\ 700}$	Lo= 9 mH

NON-HAZARDOUS LOCATION

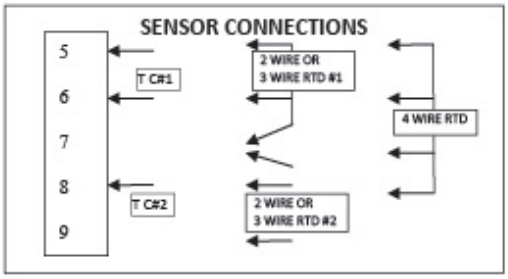
HAZARDOUS (CLASSIFIED) LOCATION

CLASS I, DIVISION 1, GROUPS A, B, C, D, E, F & G;
ZONE 0 IIC & ZONE 2 IIC,
CLASS I DIVISION 2, GROUPS A, B, C, D;



ASSOCIATED EQUIPMENT NOT REQUIRED FOR DIV 2 / ZONE 2 INSTALLATIONS

CONTROL EQUIPMENT PARAMETERS WHEN NO ASSOCIATED EQUIPMENT
Umax = Ui = 42V, 4-20 mA, Po ≤ 1 W



Honeywell	A/A4	50091227	
	SCALE: None	REV A DATE 10 December 2013	SH. 2 of 3

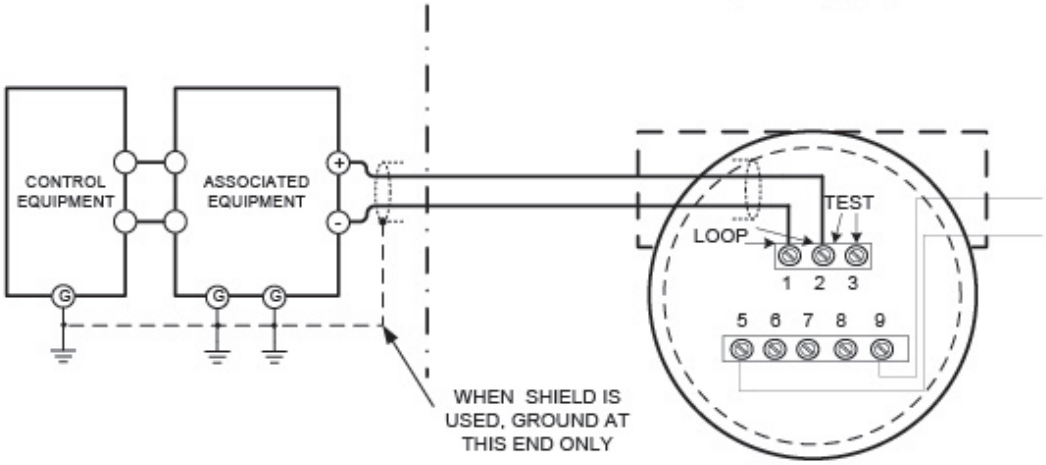
FOUNDATION FIELDBUS/ PROFIBUS

NON FISCO		FISCO		BOTH
ENTITY PARAMETERS	Associated Apparatus	ENTITY PARAMETERS	Associated Apparatus	SENSOR Parameters
Ui or Vmax ≤ 30V	Uo, Voc or Vt ≤ 30V	Ui or Vmax ≤ 17.5	Uo, Voc or Vt ≤ 18V	Uo= 6 V
Ii or Imax ≤ 225 mA	Io (Isc or It) ≤ 225 mA	Ii or Imax ≤ 380 mA	Io (Isc or It) ≤ 380 mA	Io= 85 mA
Pi or Pmax = 1W	Po ≤ 1 W	Pi or Pmax = 5.32W	Po ≤ 5.32 W	Po= 0.51 W
Ci= 0 nF	Ca or Co ≥ C_{cable} + $C_{ST\ 800/\ ST\ 700}$	Ci= 0 nF	Ca or Co ≥ C_{cable} + $C_{ST\ 800/\ ST\ 700}$	Co= 39 uF
Li= 0 µH	La or Lo ≥ L_{cable} + $L_{ST\ 800/\ ST\ 700}$	Li= 0 µH	La or Lo ≥ L_{cable} + $L_{ST\ 800/\ ST\ 700}$	Lo= 9 mH

NON-HAZARDOUS LOCATION

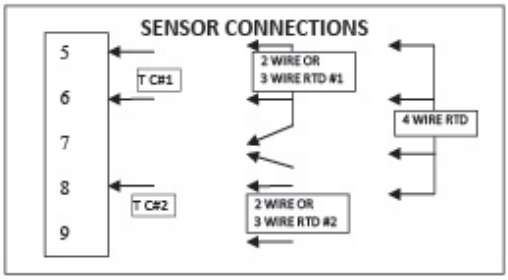
HAZARDOUS (CLASSIFIED) LOCATION

CLASS I, CLASS II, DIVISION 1, GROUPS A, B, C, D, E, F & G;
ZONE 0 IIC & ZONE 2 IIC,
CLASS I DIVISION 2, GROUPS A, B, C, D;



ASSOCIATED EQUIPMENT NOT REQUIRED FOR DIV 2 / ZONE 2 INSTALLATIONS

CONTROL EQUIPMENT PARAMETERS WHEN NO ASSOCIATED EQUIPMENT
Umax=Ui= 32V, 25 mA, Po ≤ 1 W



Honeywell	A/A4	50091227	
	SCALE: None	REV A DATE 10 December 2013	SH. 3 of 3

Glossary

AWG	American Wire Gauge
DE	Digital Enhanced Communications Mode
EMI	Electromagnetic Interference
FTA	Field Termination Assembly
Hz	Hertz
LRL	Lower Range Limit
LRV	Lower Range Value
mAdc	Milliamperes Direct Current
mV	Millivolts
Nm	Newton meters
NVM	Non-Volatile Memory
PM	Process Manger
PV	Process Variable
PWA	Printed Wiring Assembly
RFI	Radio Frequency Interference
RTD	Resistance Temperature Detector
SFC	Smart Field Communicator
STIM	Temperature Transmitter Interface Module
STIMV IOP	Temperature Transmitter Interface Multivariable Input/Output Processor
T/C	Thermocouple
URL	Upper Range Limit
URV	Upper Range Value
US	Universal Station
Vac	Volts Alternating Current
Vdc	Volts Direct Current

Index

T

W

Sales and Service

For application assistance, current specifications, pricing, or name of the nearest Authorized Distributor, contact one of the offices below.

ASIA PACIFIC

Honeywell Process Solutions,
(TAC) hfs-tac-support@honeywell.com

Australia
Honeywell Limited
Phone: +(61) 7-3846 1255
FAX: +(61) 7-3840 6481
Toll Free 1300-36-39-36
Toll Free Fax:
1300-36-04-70

China – PRC - Shanghai
Honeywell China Inc.
Phone: (86-21) 5257-4568
Fax: (86-21) 6237-2826

Singapore
Honeywell Pte Ltd.
Phone: +(65) 6580 3278
Fax: +(65) 6445-3033

South Korea
Honeywell Korea Co Ltd
Phone: +(822) 799 6114
Fax: +(822) 792 9015

EMEA

Honeywell Process Solutions,
Phone: + 80012026455 or
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