# SmartLine Temperature Probe Assemblies STT85A Quick Start Guide

## 34-TT-25-21, May 2023

This document provides descriptions and procedures for the Quick Installation of Honeywell's SmartLine Temperature Probe assemblies STT85A.	Copyrights, Notices and Trademarks Copyright 2020 by Honeywell Revision 1, November 2020	
The STT85A includes the STT850. The STT85A is an integrated probe assembly based on SmartLine Temperature Transmitter STT850	Trademarks SFC, SmartLine, STT850 are U.S. registered trademarks of Honeywell Inc.	
For full details refer to the manuals see Documentation below. The manuals will include Protocols, User Interface (HMI) Operation, Installation, Configuration, Calibration, Maintenance, Parts, Safety and Approvals	HART® and FOUNDATION™ Trademarks of FieldComm Group™	

#### Documentation

To access complete documentation, including language variants, scan the QR code below using your smart phone/device or QR code scanner.

Go to the APP store for your free Smartphone QR scanner

Or you can follow the URL to access the online SmartLine HUB page.

The HUB page will contain direct links to open SmartLine product documentation.

URL

https://hwll.co/SmartLineHUB

## QR Code



#### Installation

Evaluate the site selected for the transmitter installation with respect to the process system design specifications and Honeywell's published performance characteristics for your particular transmitter model. 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.

## Features and options

The STT85A includes the STT850. 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 1 shows the assemblies in the Electronics Housing with available options.



#### Figure 1 – Electronics Housing Components

An optional 3-button assembly is located under the nameplate and provides a user interface and operation capability without opening the transmitter to set up and make adjustments to the transmitter.

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### STT85A RIGID (NO THERMOWELL) OR THREADED THERMOWELLTYPE MOUNTING TO PROCESS CONNECTION:



Figure 2: STT85A RIGID (NO THERMOWELL) OR THREADED THERMOWELTYPE MOUNTING

- STT85A Assemblies are pre-tightened. Do not over tighten when installing.
- Clean threaded opening of any contaminants and excessive burrs. Unless prohibited at site, sealants, PTFE tape, or lubricants may be used to reduce the potential for galling.
- Insert and align the assembly into process pipe and tighten thermowell at process connection. Never back off (loosen) to achieve alignment which may corrupt the seal contribute to leakage and failure.
- General torque for ½" NPT process connection is 54 FT/LBS. Tightening torque is not usually recommended due to materials, wall thickness, operating pressures, etc. Please apply according to site conditions.
- Open housing cover to expose Terminal block
- Install a suitable conduit into the conduit connection.
- Connect the wires as per the wiring diagrams in the next section
- Close the Housing cover

## STT85A FLANGED TYPE MOUNTING TO PROCESS CONNECTION:



#### Figure 3: STT85A FLANGED TYPE MOUNTING TO PROCESS CONNECTION

- STT85A Assemblies are pre-tightened. Do not over tighten when installing.
- Consult installation instructions provided by gasket or ring manufacturer.
- Remove foreign material and debris from all seating surfaces Examine fasteners for burrs, cracks, and other defects.
   Examine flange surfaces for warping, radial scores, tool marks, or other faults which may prohibit proper gasket seating
- Insert the assembly into process pipe, align thermowell flange surface and bolt holes, ensure gasket or ring is the specified size and material. Ensure correct gasket seating.
- Do not use joint compounds or release agents unless specified by the manufacturer and approved by the site.
- Bolt torque factor and tightening sequence should comply with the ASME, ISO standards, other pressure vessel agencies, gasket or ring manufacturer, and/or local requirements.
- Open housing cover to expose Terminal block
- Install suitable conduit in to conduit connection.
- Connect the wires as per the wiring diagrams in the next section
- Close the Housing cover

## **Conduit Entry Plugs and Adapters**

#### Procedures

It is the User/Installer's responsibility to install the transmitters in accordance with national and local code requirements. Conduit entry plugs and adapters shall be suitable for the environment, shall be certified for the hazardous location when required and acceptable to the authority having jurisdiction for the plant.

#### CONDUIT ENTRY PRECAUTIONARY NOTICE

THE CONDUIT/CABLE GLAND ENTRIES OF THIS PRODUCT ARE SUPPLIED WITH PLASTIC DUST CAPS WHICH ARE NOT TO BE USED IN SERVICE.

IT IS THE USER'S RESPONSIBILITY TO REPLACE THE DUST CAPS WITH CABLE GLANDS, ADAPTORS AND/OR BLANKING PLUGS WHICH ARE SUITABLE FOR THE ENVIRONMENT INTO WHICH THIS PRODUCT WILL BE INSTALLED. THIS INCLUDES ENSURING COMPLIANCE WITH HAZARDOUS LOCATION REQUIREMENTS AND REQUIREMENTS OF OTHER GOVERNING AUTHORITIES AS APPLICABLE.

#### Notes.

- No plugs come installed in the housings. All housings come with temporary plastic dust protectors (red) installed and are not certified for use in any installation.
- The cable gland must meet or exceed connection assembly certification. Follow cable gland/Conduit manufacturer's installation instructions.

## STT85A SOCKET WELD MOUNTING TO PROCESS CONNECTION:



#### Figure 4: STT85A RIGID TYPE (NO THERMOWELL) MOUNTING TO PROCESS CONNECTION

- STT85A Assemblies are pre-tightened. Do not over tighten when installing.
- Remove probe assembly from thermowell before welding of thermowell on to the process pipe.
- Make sure filler material is appropriate with both thermowell and parent material.
- Fit Thermowell into socket and align until immersion length is correct.
- Proceed to weld in accordance with any & all applicable
- ASME, ASTM, AWS, local standards.
- Welding should be performed by a trained and experienced or certified professional.
- After welding process of thermowell, assemble probe into the thermowell once welded joint come normal temperature.
- Open housing cover to expose Terminal block.
- Install suitable conduit into conduit connection.
- Connect the wires as per the wiring diagrams in the next
- section.Close the Housing cover.

#### Wiring Connections and Power Up Summary

The transmitter is designed to operate in a two-wire power/current loop with loop resistance and power supply voltage within the HART operating range shown in Figure 5.



For DE, Rimax = 35\* (Power Supply Voltage -15) For HART, Rimax = 45.6\* (Power Supply Voltage -11.8)

#### Figure 5: HART and DE 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 6.

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

Note that the transmitter is not polarity-sensitive.



#### Figure 6: Transmitter 9-Screw Terminal Board and Grounding Screw

As shown in Figure 6, 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 provides protection against lightning and static discharge. An optional lightning terminal block can be installed in place of the nonlightning 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. Terminal #4 is for Digital Output and is not applicable for Fieldbus option.

For HART and DE, the transmitter is designed to operate in a two-wire power/current loop with loop resistance and power supply voltage within the operating range; see Figure 5 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 and maximum loop resistance. Additional consideration is required when selecting intrinsic safety barriers to ensure that they will supply at least minimum transmitter voltage, including the required 250 ohms of resistance (typically within the barriers) needed for digital communications.

#### Wiring Variations

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

Wiring must comply with local codes, regulations and ordinances. Grounding may be required to meet various approval body certification, for example CE conformity. Refer to the SmartLine Transmitter User's Manual 34-TT-25-03 (STT850) or 34-TT-25-06 (STT850) for details.

#### Input Sensor Wiring

Connect the input sensors as shown in Figures below:





#### DE Dual Input Wiring Diagram

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- 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. To minimize common noise problems in the application, a strap/jumper should be wired between terminals 6 and 8.

be wired between terminals 6 and 8. For differential T/C operation on DE Models, a second strap/jumper should be wired between terminals 6 and 7. Do not install this strap for Non-DE models. The output for differential operation is calculated as T/C 1 - T/C 2.



#### Figure 8: DE Dual Input Wiring Diagram Thermocouple and RTD Connections (not applicable to single input sensor)





#### Digital Output Wiring

Digital Output is available only on HART transmitters. The Digital Output should not use the same power supply as used to support the 4-20mA transmitter output. See Figure 10 and For Intrinsically Safe (IS) applications, the 4-20mA and the Digital Output must use separate IS Barriers



Figure 10: Digital Output Connections for mA Load (HART only)

#### 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 NOTE: Intrinsically Safe Installations require the use of separate IS Barriers for the

4-20mA output and for the Digital Output connections



Figure 11: Digital Output Connections for PLC Counting Input (HART only)

## Set the Jumpers For HART/DE

3.8mA.

digital signal.

protected).

transmitter.

position. Changed configuration

parameters can be written to the

#### ATTENTION: Electrostatic Discharge (ESD) hazards. Observe à Setting Failsafe Direction and Write Protect Jumpers The SmartLine Temperature Transmitter precautions for handling electrostatic sensitive devices (DE or HART) provides two jumpers to set the desired failsafe action and Write Protect option. See Figure 12 Step Action Turn OFF transmitter power 1 2 Loosen the end-cap lock, and The top jumper on the electronics unscrew the end cap from the module sets the Failsafe direction. The default setting is up-scale failsafe Electronics side of the transmitter housing. Up Scale drives the loop to a value If there is a Display module 3 greater than 21mA while Down Scale carefully depress the tabs on the drives the loop to a value less than sides of the Display Module and pull it off. If necessary, move the interface You can change the failsafe direction by moving the Failsafe Jumper (top jumper) to the desired position (UP or DOWN). connector from the Communication Module. Do not discard connector Set the Failsafe Jumper (top 4 If your transmitter is operating in DE jumper) to the desired action (UP mode, the upscale failsafe action will or DOWN). And the Write Protect cause the transmitter to generate a "+ infinity" digital signal, while a jumper (Bottom jumper) to the desired behavior (Protected or downscale failsafe will cause the transmitter to generate a "- infinity" Unprotected) See Figure 16 for iumper positioning. If applicable, re-install the Display 5 The bottom jumper sets the Write module as follows: Protect. The default setting is OFF (Un-Orient the display as desired. Install the Interface Connector in the Display module such that it will When set to the On (Protected) position, Changed configuration parameters mate with the socket for the display cannot be written to the transmitter in the Communication module. Carefully line up the display, When set to the OFF (Un-protected) and snap it into place. Verify that

the two tabs on the sides of the display latch. Screw on the end cap and tighten 6 the end-cap lock. Turn ON transmitter power

#### 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 Calcasified locations in accordance with ANSI/NFPA 70, the US National Electrical Code, require a LISTED explosion proof seal to be installed in the conduit, within 18 inches (457.2 mm) of the transmitter. Crouse-Hinds type EYS/EYD or EYSX/EYDX are examples of LISTED explosion proof seals that meet this requirement. Transmitters installed as explosion proof in Class I, Division 1, Group B, C or D hazardous (classified) locations do not require that explosion proof seal be installed in the conduit.

Step	Action
1	See Figure 6, 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	Connect the positive loop power lead to the positive (+) terminal and the negative loop power lead to the negative (-) terminal. <b>Note</b> that the transmitter is not polarity-sensitive. Shielded, twisted-pair cable such as Belden 9318 or equivalent must be used for all signal/power wiring. <b>Note:</b> If solid core wire is used strip insulation 1/4 in (6 mm). Once inserted under the square washer the stripped portion should be contained under the square washer. If multi-stranded wire is used, a ferrule is to be used and the stripped wire should be in the insulated portion of the ferrule. The ferrule can be also be used on the solid core wire. After wiring the transmitter as outline in the next sections, torque the screws to 1.1 Nm (10 lb-in)
5	Feed input sensor wires through the 2 <sup>nd</sup> conduit entrance and connect wire per wiring diagrams
6	Replace the end cap, and secure it in place

#### Configuration Guide

The assembly comes preconfigured from factory. Reconfiguration for your particular application can be accomplished by following instructions in the User's manual. This can be found by following the website URL or QR code on page 1 of this document.



Figure 12: Jumper Location HART/DE

Jumper Settings	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)
	Figure 13: Jumper Settings

#### Write Protect Jumper on Foundation Fieldbus (FF)

On Foundation Fieldbus transmitters there is no Failsafe jumper selection but there is a Write Protect jumper.

The bottom jumper sets the Write Protect. The default setting is OFF (Un-protected). When set to the On (Protected) position, changed configuration parameters cannot be written to the transmitter.

When set to the OFF (Un-protected) position, changed configuration parameters can be written to the transmitter.

	ATTENTION: Electrostatic I precautions for handling electron	Discharge (ESD) hazards. Observe ctrostatic sensitive devices.
	WARNING! PERSONAL IN, power before proceeding. H. 30 Vrms, 42.4 Vpeak, or 60 comply with these instruction	JURY: Risk of electrical shock. Disconnect AZARDOUS LIVE voltages greater than VDC may be accessible. Failure to ns could result in death or serious injury.
Step		Action
1	Turn OFF transmitter power	1
2	Loosen the end-cap lock, an Electronics side of the trans	nd unscrew the end cap from the mitter housing.
3	If applicable, carefully depre Module and pull it off. If nect the Communication Module preferred orientation of the o If necessary, move the inter Module to the display module the display module in the win	ss the tabs on the sides of the Display essary, move the interface connector from to the display module to provide the display module in the window. face connector from the Communication le to provide the preferred orientation of ndow.
4	Set the Write Protect jumper (Protected or Unprotected).	r (Bottom jumper) to the desired behavior See Figure 14 for jumper positioning.
5	Screw on the end cap and ti	ghten the end-cap lock.
6	Turn ON transmitter power.	
	Image	Description
		Fieldbus SIM Mode = OFF Write Protect = OFF (Not Protected)
		Fieldbus SIM Mode = OFF Write Protect = ON (Protected)
		Fieldbus SIM Mode = ON Write Protect = OFF (Not Protected)

Figure 14: Fieldbus Write Protect

### A3. European Directive Information (CE Mark)

CE Honeywell
Probes and Wells-CE Revision: A
EU 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, STT17A Series - SmartLine Temperature Probes and Wells STT70A Series - SmartLine Temperature Probes and Wells STT85A Series - SmartLine Temperature Probes and Wells
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.
O.S.S.
Owen J. Murphy
Product Safety & Approvals Engineering Issue Date: 20 October 2020 Fort Washington, PA 19034, USA

#### Appendix A. PRODUCT CERTIFICATIONS

#### A1. Safety Instrumented Systems (SIS) Installations

For Safety Certified Installations, please refer to STT850/750 Safety Manual #34-TT-25-05 for installation procedure and system requirements.

#### A2. European Directive Information (EU)

https://www.honeywellprocess.com/library/support/Public/Documents/ 50094560.pdf

 
 SIL 2/3
 IEC 61508 SIL 2 for non-redundant use and SIL 3 for redundant use according to EXIDA and TÜV Nord Sys Tec GmbH & Co. KG under the following standards: IEC61508-1: 2010; IEC 61508-2: 2010; IEC61508-3: 2010.

## Honeywe SCHEDULE Probes and Wells-CE Revision: A EMC Directive (2014/30/EU) Electrical Equipment for Measurement, Control and Laboratory Use - EMC EN 61326-1:2013 Requirements ATEX Directive (2014/34/EU) EU-Type Examination Certificate No: Baseefa18ATEX0114X (Thermo Electric Certificate) Protection : Intrinsically Safe, Flameproof and Dust Equipment Group II Category 1 G Ex ia IIC T4 Ga (-40°C ≤ Ta ≤ +70°C) Equipment Group II Category 1 G and 2 D Ex is IIC 14/17 Ga (-33<sup>5</sup>C/-40<sup>6</sup>C ± Ta ± +50<sup>6</sup>C/+60<sup>6</sup>C/+70<sup>6</sup>C) Ex is IIIC 1135<sup>6</sup>C Db (-30<sup>6</sup>C ± Ta ± +60<sup>6</sup>C/+70<sup>6</sup>C) Equipment Group II Category 1 G D Ex is IIC T4/T3/T6 Gs (-30°C/-40°C 4 Ts 4+35°C/+45°C/+55°C/+60°C/+70°C) . Ex ia IIIC T200 95°C/85°C/60°C Da (-50°C/-40°C ≤ Ta ≤ +35°C/+45°C/+55°C/+60°C/+70°C) Equipment Group II Category 2 G D Ex do eb IIC T3/T6 Gb [-30°C/-40°C 2 T8 2 +60°C/+63°C/+70°C/+73°C/+80°C/+83°C] Ex to IIIC 173°C/T30°C/T33°C/T0°C Db [-30°C/-40°C/-30°C 2 T8 2 +60°C/+63°C/+70°C/+83°C] , nent Group II Category 3 G D Ex ic IIC T6 Gc (-40°C ≤ Ta ≤ +53°C) Ex ic IIIC T85°C Dc (-40°C ≤ Ta ≤ +55°C) Equip Standards EN 60079-0: 2018 EN 60079-1: 2014 EN 60079-31: 2014 EN 60079-7: 2018 EN 60079-11: 2012 ATEX Notified Body for EC Type Certificates SGS Fimko Oy Takomotie 8 FI-00380 Helsinki, Finland otified Body for Quality Assurance SGS Fimko Oy [Notified Body Number: 0598] ATEX No Takomotie 8 FI-00380 Helsinki, Finland 2 of 3

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	SCHEDULE	-
	Probes and Wells-CE	
	Revision: A	
Pressure E	uipment Directive (PED) (2014/68/EU)	
Pressu	re Accessory, in compliance with Sound Engineering Practice according to Article 4 (3).	
Restrictio STT17	n of Hazardous Substances Directive (RoHS) (2011/ 65/ EU) A Series and STT70A Series:	
	EN30381: 2012 Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances	
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#### Sales and Service

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

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#### WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

For more information To learn more about SmartLine transmitters, visit <u>www.process.honeywell.com</u> Or contact your Honeywell Account Manager

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