

Technical Information

STT850 SmartLine Temperature Transmitter Specification 34-TT-03-14, September 2017



Introduction

Part of the SmartLine® family of products, the SmartLine STT850 is a high-performance temperature transmitter offering high accuracy and stability over a wide range of process and ambient temperatures. The SmartLine family is also fully tested and compliant with Experion® PKS providing the highest level of compatibility assurance and integration capabilities. SmartLine easily meets the most demanding needs for temperature measurement applications.

Best in Class Features:

Industry leading performance

- Digital Accuracy up to ± 0.10 Deg C for RTD
- Stability up to $\pm 0.01\%$ of URL per year for ten years
- 125 mSec update time for single input models
- 250 mSec update time for dual input models

Reliable measurement

- Built in Galvanic Isolation
- Differential/Averaging/Redundant/Split Range measurements
- Dual Compartment Housing
- Sensor Break detection
- Comprehensive on-board diagnostic capabilities
- Full compliance to SIL 2/3 requirements.
- Available with 15 year warranty
- Supports Namur 107 Extended Diagnostics
- Supports Namur 89 Wire break
- Direct entry of Callendar-Van Dusen coefficients R_0 , α , δ and β for calibrated RTD sensors (not available on DE units)



Figure 1– Smartline STT850 Temperature transmitter

Lower Cost of Ownership

- Universal input
- Dual sensor option
- Multiple local display capabilities
- Modular construction
- External zero, span, & configuration capability
- Polarity insensitive loop wiring
- Digital Output Option (only available with HART)

Communications/Output Options:

- 4-20 mA dc
- Honeywell Digitally Enhanced (DE)
- HART® (version 7.0)
- FOUNDATION™ Fieldbus compliant to ITK 6.1.2

All transmitters are available with the above listed communications protocols.

Description

The SmartLine Temperature Transmitter is designed and manufactured to deliver very high performance across varying ambient temperature. The total accuracy of the transmitter including the ambient temperature effect in harsh industrial environments, allows the STT850 to replace virtually any competitive transmitter available today.

Unique Indication/Display Options

The STT850 modular design accommodates a basic alphanumeric LCD display or a unique advanced graphics LCD display with many unparalleled features.

Basic Alphanumeric LCD Display Features

- Modular (may be added or removed in the field)
- 0, 90, 180, & 270 degree position adjustments
- Deg C , F, R and Kelvin measurement units
- 2 Lines 16 Characters (4.13H x 1.83W mm)
- Up to 8 display screens with similar formats
- Configurable screen rotation timing (3 to 30 sec)
- Auto/Manual selection for screen rotation
- Displays up to 9 Datapoints - Loop PV, CJ Temperature, Sensor 1, Sensor 2, Sensor Delta, RTD 1 Resistance, RTD 2 Resistance, Loop output, Percent Loop.
- Out of Range Indication
- PV Status and critical fault indication

Advanced Graphics LCD Display Features

- Modular (may be added or removed in the field)
- 0, 90, 180, & 270 degree position adjustments
- Up to eight display screens with 3 formats are possible (Large PV with Bar Graph or PV with Trend Graph)
- Configurable screen rotation timing (3 to 30 sec)
- Provides instant visibility for diagnostics
- Multiple language capability. (EN, GE, FR, IT, SP, RU, TR, CN & JP)

Configuration Tools

Integral Three Button Configuration Option

Suitable for all electrical and environmental requirements, SmartLine offers the ability to configure the transmitter and display via three externally accessible buttons when either display option is selected. Zero or span capabilities are also optionally available via these buttons with or without selection of a display option.

Hand Held Configuration

SmartLine transmitters feature two-way communication and configuration capability between the operator and the transmitter. This is accomplished via Honeywell's field-rated Multiple Communication Configuration tool.

The Honeywell Handheld MC Toolkit is capable of field configuring DE and HART Devices and can also be ordered for use in intrinsically safe environments.

All Honeywell transmitters are designed and tested for compliance with the offered communication protocols and are designed to operate with any properly validated hand held configuration device.

Personal Computer Configuration

Honeywell's SCT 3000 Configuration Toolkit provides an easy way to configure Digitally Enhanced (DE) instruments using a personal computer as the configuration interface. Field Device Manager (FDM) Software and FDM Express are also available for managing HART & Fieldbus device configurations.

Diagnostics

SmartLine transmitters all offer digitally accessible diagnostics which aid in providing advanced warning of possible failure events minimizing unplanned shutdowns, providing **lower overall operational costs**

System Integration

- SmartLine communications protocols all meet the most current published standards for HART/DE/Fieldbus.
- Integration with Honeywell's Experion PKS offers the following unique advantages.
 - Transmitter messaging
 - Maintenance mode indication
 - Tamper reporting (HART only)
 - FDM Plant Area Views with Health summaries
 - All STT850 units are Experion tested to provide the highest level of compatibility assurance

Modular Design

To help contain maintenance & inventory costs, all STT850 transmitters are modular in design supporting the user's ability to replace temperature boards, add indicators or change electronic modules without affecting overall performance or approval body certifications. Each temperature board is uniquely characterized to provide in-tolerance performance over a wide range of application variations in temperature and due to the Honeywell advanced interface, electronic modules may be swapped with any electronics module without losing in-tolerance performance characteristics

Modular Features

- Replace Temperature/Terminal board/Lightning protection*
- Exchange/replace electronics/comms modules*
- Add or remove integral indicators*
- Add or remove external configuration buttons

* Field replaceable in all electrical environments (including IS) except flameproof without violating agency approvals.

With no performance effects, Honeywell's unique modularity results in **lower inventory needs and lower overall operating costs**.

Digital Output Option

An optional Digital Output (open collector type) is available on HART transmitters which can be used to activate external equipment when preset Alarm Setpoints are reached. The Digital Output can be set to monitor two independent setpoints based upon the analog value of the PV or upon device status.

The following Alarm Types are available:

- PV High
- PV Low
- Critical Diagnostic Active
- Redundant Input Active**
- PV Rate of Change Alarm *
- PV Deviation Alarm *

Alarm Blocking is also available which allows start-up without the alarm energizing until it first reaches the operating region.

Alarm Hysteresis is configurable from 0 to 100% of PV range.

The Digital Output functionality and status is also available over the HART communications link.

* These Alarm Types are available as part of the Advanced Diagnostics option. Rate of Change monitors the rate at which the PV is changing, configurable as either increasing or decreasing. Deviation monitors the PV delta from a separately configurable Setpoint value.

** Available only via Communications Status

See the [Wiring Diagrams](#)

for further information.

Alarms can be configured as latching or non-latching.

Performance Specifications^{1,3}

Reference Accuracy² (conformance to +/-3 Sigma)

Input Type	Maximum Range Limits		Digital Accuracy (+/-)	Output D/A Accuracy (% of span)	Standards
RTD (2,3,4 wire)	° C	° F	° C	%	
Pt25 ⁶	-200 to 850	-328 to 1562	0.50	0.005	IEC751:1990 ($\alpha=0.00385$)
Pt100	-200 to 850	-328 to 1562	0.10	0.005	IEC751:1990 ($\alpha=0.00385$)
Pt200	-200 to 850	-328 to 1562	0.20	0.005	IEC751:1990 ($\alpha=0.00385$)
Pt500	-200 to 850	-328 to 1562	0.12	0.005	IEC751:1990 ($\alpha=0.00385$)
Pt1000 ⁵	-200 to 500	-328 to 932	0.10	0.005	IEC751:1990 ($\alpha=0.00385$)
Ni 120	-80 to 260	-112 to 500	0.08	0.005	Edison Curve #7 ($\alpha=0.00672$)
Cu 10	-50 to 250	-58 to 482	1.00	0.005	Edison Copper Winding #15 ($\alpha=0.00427$)
Thermocouples	° C	° F	° C	%	
B	200 to 1820	392 to 3308	0.60	0.005	IEC 584-1 (ITS-90)
E	-200 to 1000	-328 to 1832	0.20	0.005	IEC 584-1 (ITS-90)
J	-200 to 1200	-328 to 2192	0.25	0.005	IEC 584-1 (ITS-90)
K	-200 to 1370	-328 to 2498	0.25	0.005	IEC 584-1 (ITS-90)
N	-200 to 1300	-328 to 2372	0.40	0.005	IEC 584-1 (ITS-90)
R	-50 to 1760	-58 to 3200	0.50	0.005	IEC 584-1 (ITS-90)
S	-50 to 1760	-58 to 3200	0.50	0.005	IEC 584-1 (ITS-90)
T	-250 to 400	-418 to 752	0.20	0.005	IEC 584-1 (ITS-90)
C (W ₅ W ₂₆)	0 to 2300	32 to 4172	0.60	0.005	ANSI/ASTM E-230 (ITS-90)

Other Input Types	Maximum Range Limits	Digital Accuracy (+/-)	Output D/A Accuracy (% of span)	Standards
Millivolts ⁵	-100 to 1200 mV	0.12 mV	0.005	
Millivolts	-20 to 125 mV	0.015 mV	0.005	
Ohms ⁵	0 to 500 Ohms	0.2 Ohms	0.005	
Ohms	0 to 2000 Ohms	0.3 Ohms	0.005	
Ohms ⁵	0 to 3000 Ohms	0.45 Ohms	0.005	

1. Digital Accuracy is accuracy of the digital value accessed by the Host system and the handheld communicator

2. Total analog accuracy is the sum of digital accuracy and output D/A Accuracy

3. Output D/A Accuracy is applicable to the 4 to 20 mA Signal output

4. For TC inputs, CJ accuracy shall be added to digital accuracy to calculate the total digital accuracy

5. These input types are not available on DE units

6. Custom Callendar-van Dusen not available for Pt25 sensors

Differential Temperature Measurement

SmartLine Temperature supports differential temperature measurements between any two types of sensors.

When the loop current mode is set to "Differential" then the input range is from A to B for sensor 1 & 2 where

A = Sensor 1 Minimum - Sensor 2 Maximum

B = Sensor 1 Maximum - Sensor 2 Minimum

Callendar - van Dusen Algorithm (CVD)

The easy to use Callendar - van Dusen (CVD) algorithm allows the use of calibrated Platinum RTD sensors to increase the overall system accuracy. Simply enable the algorithm and then enter the four CVD coefficients supplied with the calibrated RTD sensor into the transmitter.

Digital Accuracy for differential temperature measurement

If both the inputs are similar the digital accuracy equals 1.5 times the worst case accuracy of either sensor type.

For mixed input types, the digital accuracy is the sum of sensor 1 and sensor 2 digital accuracies.

Performance under Rated Conditions – All Models

Parameter	Description									
Input Span Adjustment Range	No limits to adjustments within the maximum range except minimum span limit of 1 engineering unit									
Analog Output Digital Communications:	Two-wire, 4 to 20 mA (HART & DE Transmitters only) Honeywell DE, HART 7 protocol or FOUNDATION Fieldbus ITK 6.1.2 compliant All transmitters, irrespective of protocol have polarity insensitive connections.									
Output Failure Modes (HART/DE only)	<table><tr><td></td><td>Honeywell Standard:</td><td>NAMUR NE 43 Compliance:</td></tr><tr><td>Normal Limits:</td><td>3.8 – 20.8 mA</td><td>3.8 – 20.5 mA</td></tr><tr><td>Failure Mode:</td><td>≤ 3.6 mA and ≥ 21.0 mA</td><td>≤ 3.6 mA and ≥ 21.0 mA</td></tr></table>		Honeywell Standard:	NAMUR NE 43 Compliance:	Normal Limits:	3.8 – 20.8 mA	3.8 – 20.5 mA	Failure Mode:	≤ 3.6 mA and ≥ 21.0 mA	≤ 3.6 mA and ≥ 21.0 mA
	Honeywell Standard:	NAMUR NE 43 Compliance:								
Normal Limits:	3.8 – 20.8 mA	3.8 – 20.5 mA								
Failure Mode:	≤ 3.6 mA and ≥ 21.0 mA	≤ 3.6 mA and ≥ 21.0 mA								
Output Accuracy (HART/DE only)	±0.005 % span									
Supply Voltage Effect	0.005 % span per volt.									
Transmitter Turn on Time (includes power up & test algorithms)	HART or DE: 2.5 sec. Foundation Fieldbus: Host dependant									
Analog Input	<u>Stability:</u> 0.01% of URL per Year for 10 years <u>Maximum Lead Wire Resistance:</u> <u>Thermocouples:</u> 50 ohms per leg <u>RTD (all except Pt15) and Ohms:</u> 50 ohms per leg <u>RTD Pt25:</u> 10 ohms per leg									
Response Time (delay + time constant)	<table><tr><td></td><td><u>DE/HART Analog Output</u></td><td><u>FOUNDATION Fieldbus</u></td></tr><tr><td>Single Input:</td><td>130 - 230 mSec</td><td>Host Dependant</td></tr><tr><td>Dual Input:</td><td>305 - 455 mSec</td><td>Host Dependant</td></tr></table>		<u>DE/HART Analog Output</u>	<u>FOUNDATION Fieldbus</u>	Single Input:	130 - 230 mSec	Host Dependant	Dual Input:	305 - 455 mSec	Host Dependant
	<u>DE/HART Analog Output</u>	<u>FOUNDATION Fieldbus</u>								
Single Input:	130 - 230 mSec	Host Dependant								
Dual Input:	305 - 455 mSec	Host Dependant								
Update time	125 mSec for single input units 250 mSec for dual input units									
Damping Time Constant	HART: Adjustable from 0 to 102 seconds in 0.1 increments. Default: 0.50 seconds DE: Discrete values 0.0, 0.3, 0.7, 1.5, 3.1, 6.3, 12.7, 25.5, 51.1, 102.3 seconds. Default: 0.3 seconds									
Ambient Temperature Effect	<u>Digital Accuracy</u> For RTD Inputs: 0.0015 °C/°C For T/C Inputs: 0.005 °C/°C Output D/A: 0.0005 % of span/°C									
Cold Junction Accuracy	±0.25 °C									
Total Reference Accuracy	Digital Mode Digital Accuracy + C/J Accuracy (T/C input types only) Analog Mode (HART/DE only) Digital Accuracy + Output D/A Accuracy + C/J Accuracy (T/C input types only) Example: Transmitter in Analog Mode with Pt100 sensor and 0 to 200°C range Total Reference Accuracy = 0.10°C + (200 °C / 100 %) * 0.005 % = 0.11 °C									
Sensor Burnout	Burnout detection is user selectable. Upscale or down scale with critical status message. For RTD or ohm type inputs; broken wire/wires will be indicated									
Digital Output	<u>Contact Rating</u> Voltage: +12 to +30 Vdc. Current: 40mA maximum (controlled by load resistance) Low Level: 0 to 2 Vdc									
Vibration Effect	Per IEC60770-1 field or pipeline, high vibration level (10-2000Hz: 0.21 displacement/3g max acceleration)									
Electromagnetic Compatibility	IEC 61326-3-1									
Isolation	2000 Vdc (1400Vrms) Galvanic isolation between inputs and output.									
Stray Rejection	Common Mode AC (50 or 60 Hz): 120 dB (with maximum source impedance of 100 ohms) or ± 1 LSB (least significant bit) whichever is greater with line voltage applied. DC: 120 dB (with maximum source impedance of 50 ohms) or a ±1 LSB whichever is greater with 120 Vdc applied. DC (to 1 KHz): 50 dB (with maximum source of impedance of 50 ohms) or ±1 LSB whichever is greater with 50 Vac applied. <u>Normal Mode</u> AC (50 or 60 Hz): 60 dB (with 100% span peak-to-peak maximum)									

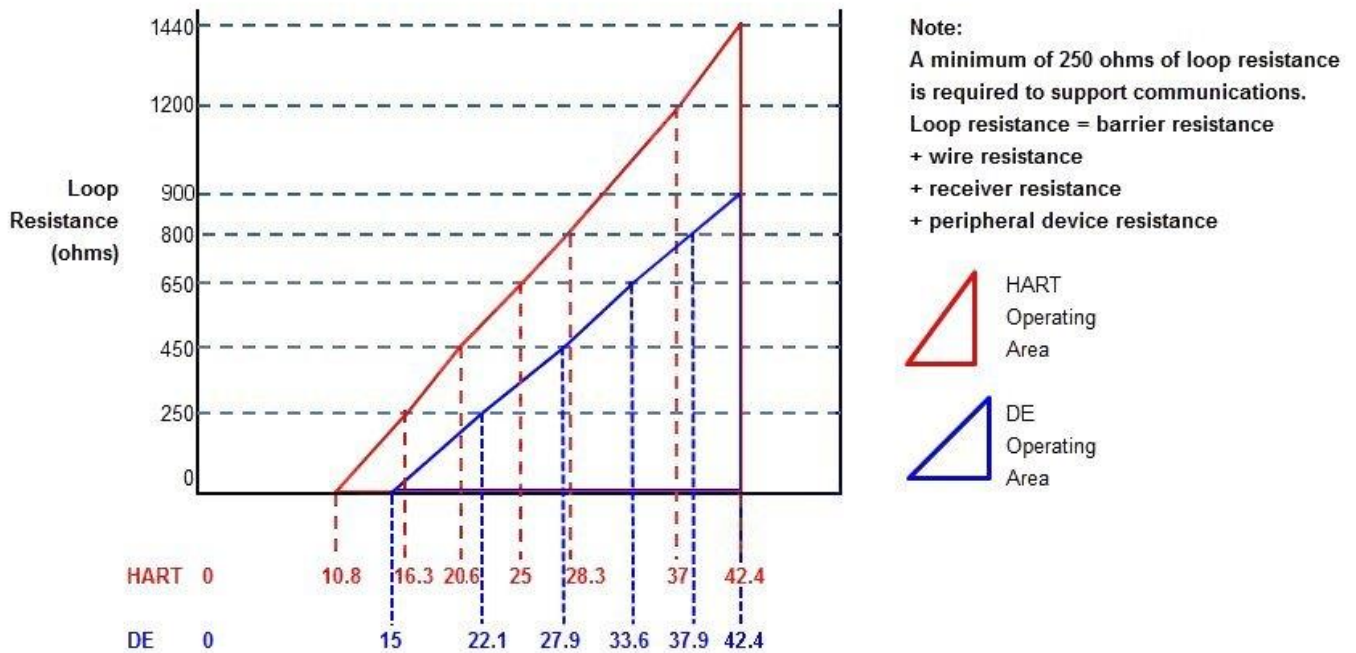
Performance under Rated Conditions – All Models (continued)

Parameter	Description
EMC Compliance	EN 61326-1 and EN 61326-3-1 (SIL)
Lightning Protection Option	Leakage Current: 10 uA max @ 42.4 VDC 85 °C Impulse rating: 8/20 uS 5000 A (>10 strikes) 10000 A (1 strike min.) 10/1000 uS 200 A (> 300 strikes)

Operating Conditions – All Models

Parameter	Reference Condition		Rated Condition		Operative Limits		Transportation and Storage	
	°C	°F	°C	°F	°C	°F	°C	°F
Ambient Temperature ¹ STT850	25±1	77±2	-40 to 85	-40 to 185	-40 to 85	-40 to 185	-55 to 120	-67 to 248
Humidity %RH	10 to 55		0 to 100		0 to 100		0 to 100	
Supply Voltage Load Resistance	HART Models: 11.8 to 42.4 Vdc at terminals (IS versions limited to 30 Vdc) 0 to 1,400 ohms (as shown in Figure 2) DE Models: 13.8 to 42.4 Vdc at terminals (IS versions limited to 30 Vdc) 0 to 1,300 ohms (as shown in Figure 2) FF Models: 9.0 to 32.0 Vdc at terminals							

¹ LCD Display operating temperature -20°C to +70°C . Storage temperature -30°C to 80°C.



For DE, $R_{lmax} = 35 * (\text{Power Supply Voltage} - 15)$

For HART, $R_{lmax} = 45.6 * (\text{Power Supply Voltage} - 10.8)$

Figure 2 - Supply voltage and loop resistance chart & calculations
 (not applicable for Fieldbus)

Materials Specifications (see model selection guide for availability/restrictions with various models)

Parameter	Description
Mounting Bracket	Wall or 2" Pipe, Carbon Steel (Zinc-plated) or 316 Stainless Steel
Electronic Housing	Pure Polyester Powder Coated Low Copper (<0.4%)-Aluminum. Meets Type 4X, IP66, & IP67. All stainless steel housing is optional. Cover O Ring Material: Silicone
Sensor/Cable Entry	1/2 NPT electrical connection or M20x1.5
Mounting	Can be mounted in virtually any position using the standard mounting bracket. Bracket is designed to mount on 2-inch (50 mm) vertical or horizontal pipe.
Wiring	Accepts up to 16 AWG (1.5 mm diameter).
Dimensions	See Figures 3 through 8
Net Weight Lbs (kg)	Aluminum housing for transmitter with Display – 2.7 lbs (1.22 kg) Aluminum housing for transmitter w/o Display – 2.6 lbs (1.18 kg) Stainless Steel housing for transmitter with Display – 4.9 lbs (2.22 kg) Stainless Steel housing for transmitter w/o Display – 4.8 lbs (2.18 kg)

Communications Protocols & Diagnostics**HART Protocol****Version:**

HART 7

Power Supply

Voltage: 11.8 to 42.4Vdc at terminals

Load: Maximum 1400 ohms See figure 2

Minimum Load: 0 ohms. (For handheld communications a minimum load of 250 ohms is required)

IEC 61508 Safety Certified SIL 2 and SIL 3

Honeywell Digitally Enhanced (DE)

DE is a Honeywell proprietary protocol which provides digital communications between Honeywell DE enabled field devices and Hosts.

Power Supply

Voltage: 13.8 to 42.4Vdc at terminals

Load: Maximum 1300 ohms See figure 2

Foundation Fieldbus (FF)**Power Supply Requirements**

Voltage: 9.0 to 32.0 Vdc at terminals

Steady State Current: 17.6 mA

Software Download Current: 27.6 mA

Available Blocks

Block Type	Qty	Execution Time
Resource	1P	n/a
Temperature Transducer	1P	n/a
Diagnostic	1P	n/a
Analog Input	1P, 4I	30 ms
PID w/Autotune	1P, 1I	45 ms
Discrete Input	1P, 2I	30 ms
Signal Characterizer	1P	30 ms

LCD Display	1P	n/a
Input Selector	1P	30 ms
Arithmetic	1P, 2I	30 ms
Output Splitter	1P	30 ms

P = Permanent

I = Instantiable

The AI function block allows the user to configure the alarms to HIGH-HIGH, HIGH, LOW, or LOW-LOW with a variety of priority levels and hysteresis settings.

All available function blocks adhere to FOUNDATION Fieldbus standards. PID blocks support ideal & robust PID algorithms with full implementation of Auto-tuning.

Link Active Scheduler

Transmitters can perform as a backup Link Active Scheduler (LAS) and take over when the host is disconnected. Acting as a LAS, the device ensures scheduled data transfers typically used for the regular, cyclic transfer of control loop data between devices on the Fieldbus.

Number of Devices/Segment

Entity IS model: 15 devices/segment

Schedule Entries

45 maximum schedule entries

50 maximum Links

Number of VCR's: 50 max**Compliance Testing:** Tested according to ITK 6.1.2**Software Download**

Utilizes Class-3 of the Common Software Download procedure as per FF-883 which allows any field devices to receive software upgrades from any host.

Standard Diagnostics

STT850 top level diagnostics are reported as either critical or non-critical as listed below. All diagnostics are readable via the DD/DTM tools. All critical diagnostics will appear on the Basic and Advanced integral displays, non-critical diagnostics will appear on the Advanced integral display.

Critical Diagnostics

- Sensor Module Fault
- Communications Module Fault
- Sensor Communications Fault
- Input 1 Fault
- Input 2 Fault

Non Critical Diagnostics (for Advanced Display only)

- Cal 1 Correct
 - Cal 2 Correct
 - Sensor Temperature
 - Sensor 1 Health
 - Sensor 2 Health
 - Input 1 Range
 - Input 2 Range
 - CJ Range
 - Input 1
 - Input 2
 - Input 1 TB5 (For RTD and Ohm types only)
 - Input 1 TB6 (for RTD and Ohm types only)
 - Input TB7 (Input 1 or 2, for RTD and Ohm types only)
 - Input 1 TB8 (for 4-Wire RTD and Ohm types only)
 - Input 2 TB8 (for RTD and Ohm types only)
 - Input 2 TB9 (for RTD and Ohm types only)
 - Factory Calibration
 - Loop Supply Voltage (not available on Fieldbus)
 - Communications Module Temperature
 - DAC Temperature Compensation (not available on Fieldbus)
 - Sensor Communications
 - Display Setup (not for Fieldbus)
 - Excess Delta Alert
-

Approval Certifications:

MSG CODE	AGENCY	TYPE OF PROTECTION	COMM OPTION	Electrical Parameters	Ambient Temperature
A	FM Approvals™ (USA)	Explosion proof , Certificate: FM16US0157X: Class I, Division 1, Groups A, B, C, D; Dust Ignition Proof: Class II, III, Division 1, Groups E, F, G; T6..T5 Class 1, Zone 1, AEx d IIC T6..T5 Gb Class 2, Zone 21, AEx tb IIIC T 95°C IP 66 Db	4-20 mA/ DE/HART/ FF/ PROFIBUS	Note 1	T5: Ta= -50°C to 85°C T6: Ta= -50°C to 65°C
		Intrinsically Safe , Certificate: FM16US0157X: Class I, II, III, Division 1, Groups A, B, C, D, E, F, G; T4 Class I Zone 0 AEx ia IIC T4 Ga FISCO Field Device (Only for FF Option) Ex ia IIC T4	4-20 mA/ DE/HART/ /FF/ PROFIBUS	Note 2	-50°C to 70°C
		Non-Incendive , Certificate: FM16US0157X: Class I, Division 2, Groups A, B, C, D; T4 Class I Zone 2 AEx nA IIC T4 Gc AEx nA IIC T4	4-20 mA/ DE/HART/ /FF/ PROFIBUS	Note 1	-50°C to 85°C
		Standards: FM 3600:2011; ANSI/ ISA 60079-0: 2013 FM 3615:2006; ANSI/ ISA 60079-1 : 2015 FM 3616 : 2011 ; ANSI/ ISA 60079-31 : 2015 FM 3610:2010; ANSI/ ISA 60079-11 : 2014 FM 3810 : 2005 ; FM 3611:2004; ANSI/ ISA 60079-15 : 2012 ; FM 3810 : 2005 ; NEMA 250 : 2003 ; ANSI/ IEC 60529 : 2004			
		Enclosure: Type 4X/ IP66/ IP67	ALL	ALL	ALL
B	CSA-Canada	Explosion proof , Certificate: 2689056: Class I, Division 1, Groups A, B, C, D; Dust Ignition Proof: Class II, III, Division 1, Groups E, F, G; T4 Zone 1 Ex d IIC T4 Gb Ex tb IIIC T 95°C IP 66 Db DIP A21 Class II, III	4-20 mA/ DE/HART/ FF	Note 1	-50°C to 85°C
		Intrinsically Safe , Certificate: 2689056: Class I, II, III, Division 1, Groups A, B, C, D, E, F, G; T4 Ex ia IIC T4 Ga FISCO Field Device (Only for FF Option) Ex ia IIC T4	4-20 mA/ DE/HART/ FF	Note 2	-50°C to 70°C
		Non-Incendive , Certificate: 2689056: Class I, Division 2, Groups A, B, C, D; T4 Class I Zone 2 Ex nA IIC T4 Gc Ex nA IIC T4 Gc	4-20 mA/ DE/HART/ FF	Note 1	-50°C to 85°C
		Enclosure: Type 4X/ IP66/ IP67	ALL	ALL	ALL

B		Standards: CSA C22.2 No. 0-10; CSA 22.2 No. 25-1966 (reaffirmed 2009); CSA C22.2 No. 30-M1986 (reaffirmed 2012); CSA C22.2 No. 94-M91; CSA C22.2 No. 142-M1987 (reaffirmed 2009); CSA-C22.2No.157-92 (reaffirmed 2012); C22.2 No. 213-M1987(reaffirmed 2012); C22.2 No. 60529-05 C22.2 No. CSA 60079-0:2011; C22.2 No. 60079-1: 2011; C22.2 No. 60079-11: 2011; C22.2 No. 60079-15: 2012; C22.2 No. 60079-31: 2012; ANSI/ ISA12.12.01-2012; ANSI/ ISA 60079-0 (12.00.01): 2009 ; ANSI/ ISA 60079-1 (12.22.01): 2009 ; ANSI/ ISA 60079-11(12.02.01) : 2012; ANSI/ ISA 60079-26 (12.00.03) : 2011; ANSI/ ISA 60079-15(12.12.02) : 2012 ; ANSI/ ISA 60079-27 (12.02.04) : 2006; ANSI/ ISA 60079-31(12.10.03) : 2009 ; FM Class 3615: Aug 2006; FM Class 3616: Dec 2011; ANSI/ IEC 60529 : Edition 2.1 ANSI/ UL 913: Edition 7; ANSI/ UL 916 : Edition 4 ;			
C	ATEX	Flameproof , Sira 14ATEX2046X: II 2 G Ex d IIC T4 Gb II 2 D Ex tb IIIC T 95°C Db IP 66/ IP67	4-20 mA/ DE/HART/ FF	Note 1	-50°C to 85°C
		Intrinsically Safe , Sira 14ATEX2046X: II 1 G Ex ia IIC T4 Ga FISCO Field Device (Only for FF Option) Ex ia IIC T4	4-20 mA/ DE/HART/ FF	Note 2	-50°C to 70°C FISCO: -50°C to 45°C
		Enclosure: IP66/ IP67	ALL	ALL	ALL
		Standards: EN 60079-0: 2012; EN 60079-1 : 2007; EN 60079-31 : 2009 EN 60079-11: 2011; EN 60079-26 : 2006; EN 60529 : 2000 + A1			
		Non Sparking , Sira 14ATEX4052X: II 3 G Ex nA IIC T4 Gc	4-20 mA/ DE/HART/ FF	Note 1	-50°C to 85°C
		Enclosure: IP66/ IP67	ALL	ALL	ALL
		Standards: EN 60079-0: 2012; EN 60079-15 : 2010; IEC 60529 : 2009 with Corr 3			
D	IECEX	Flameproof , SIR 14.0020X Ex d IIC T4 Gb Ex tb IIIC T 95°C IP 66/ IP67	4-20 mA/ DE/HART/ FF	Note 1	-50°C to 85°C
		Intrinsically Safe , SIR 14.0020X Ex ia IIC T4 Ga FISCO Field Device (Only for FF Option) Ex ia IIC T4	4-20 mA/ DE/HART/ FF	Note 2	-50°C to 70°C FISCO: -50°C to 45°C
		Non Sparking , SIR 14.0020X Ex nA IIC T4 Gc	4-20 mA/ DE/HART/ FF	Note 1	-50°C to 85°C
		Enclosure: IP66/ IP67	ALL	ALL	ALL
		Standards: IEC 60079-0: 2011, Edition 6; IEC 60079-1 : 2007-04, Edition 6; IEC 60079-11 : 2011, Edition 6; IEC 60079-15 : 2010, Edition 4 IEC 60079-26 : 2006, Edition 2; IEC 60079-31 : 2008, Edition 1 IEC 60529 : 2009 with Corr 3			
E	SAEx (South Africa)	Flameproof: Ex d IIC T4 Gb Ex tb IIIC T 85°C IP 66 Db	4-20 mA/ DE/HART/ FF	Note 1	-50°C to 85°C
		Intrinsically Safe: Ex ia IIC T4 Ga FISCO Field Device (Only for FF Option) Ex ia IIC T4	4-20 mA/ DE/HART/ FF	Note 2	-50°C to 70°C
		Non Sparking: Ex nA IIC T4 Gc	4-20 mA/ DE/HART/ FF	Note 1	-50°C to 85°C
		Enclosure: IP66/ IP67	ALL	ALL	ALL

F	INMETRO	Flameproof: Ex d IIC T4 Gb Ex tb IIIC T 95°C IP 66 Db	4-20 mA/ DE/HART/ FF	Note 1	-50°C to 85°C
		Intrinsically Safe: Ex ia IIC T4 Ga FISCO Field Device (Only for FF Option) Ex ia IIC T4	4-20 mA/ DE/HART/ FF	Note 2	-50°C to 70°C
		Non Sparking: Ex nA IIC T4 Gc	4-20 mA/ DE/HART/ FF	Note 1	-50°C to 85°C
		Enclosure: IP66/ IP67	ALL	ALL	ALL
G	NEPSI (CHINA)	Flameproof: Ex d IIC T4 Gb Ex tb IIIC T 85°C IP 66	4-20 mA/ DE/HART/ FF	Note 1	-50°C to 85°C
		Intrinsically Safe: Ex ia IIC T4 FISCO Field Device (Only for FF Option) Ex ia IIC T4	4-20 mA/ DE/HART/ FF	Note 2	-50°C to 70°C
		Non Sparking: Ex nA IIC T4	4-20 mA/ DE/HART/ FF	Note 1	-50°C to 85°C
		Enclosure: IP66/ IP67	ALL	ALL	ALL
H	KOSHA (KOREA)	Flameproof: Ex d IIC T4 Gb Ex tD A21 T 95°C IP 66/ IP67	4-20 mA/ DE/HART/ FF	Note 1	-50°C to 85°C
		Intrinsically Safe: Ex ia IIC T4 FISCO Field Device (Only for FF Option) Ex ia IIC T4	4-20 mA/ DE/HART/ FF	Note 2	-50°C to 70°C
		Enclosure: IP66/ IP67	ALL	ALL	ALL
J	EAC Ex (Russia, Belarus and Kazakhstan)	Flameproof: 1 Ex d IIC T4 Gb Ex tb IIIC T95°C Db	4-20 mA/ DE/HART/ FF	Note 1	-50°C to 85°C
		Intrinsically Safe: 0 Ex ia IIC T4 Ga Ex ia IIIC T4 Db FISCO Field Device (Only for FF Option) 0 Ex ia IIC T4	4-20 mA/ DE/HART/ FF	Note 2	-50°C to 70°C FISCO: -50°C to 45°C
		Non Sparking: 2 Ex nAc IIC T4	4-20 mA/ DE/HART/ FF	Note 1	-50°C to 85°C
		Enclosure: IP66/ IP67	ALL	ALL	ALL

Notes

1. Operating Parameters:

4-20 mA/DE/HART (Loop Terminal)

Voltage= 11 to 42 V

Current= 4-20 mA Normal (3.8 – 23 mA Faults)

FF (Loop Terminal)

Voltage= 9 to 32 V

Current= 25 mA

2. Intrinsically Safe Entity Parameters

Terminals 1 and 2- LOOP: $U_i = 30$ Vdc, $I_i = 225$ mA, $P_i = 900$ mW, $C_i = 4$ nF, $L_i = 0$ μ H

Terminals 5, 6, 7, 8, 9- SENSOR: $C_i = 4$ nF, $L_i = 0$ μ H

DIGITAL OUTPUT OPTION:

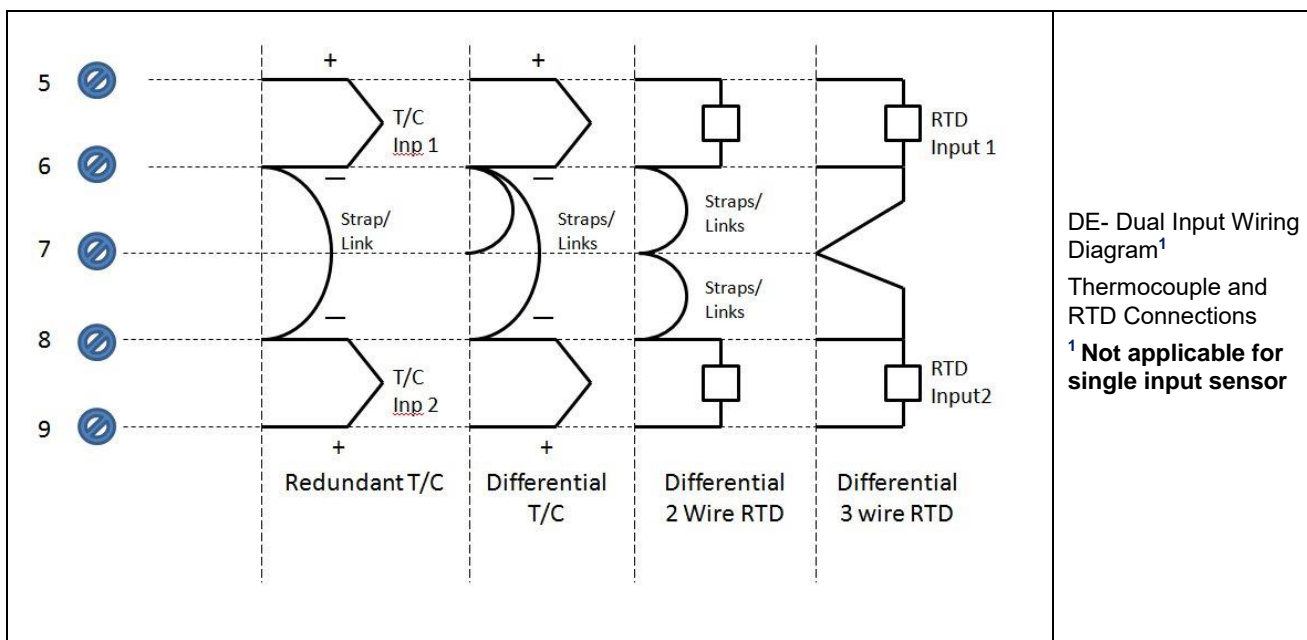
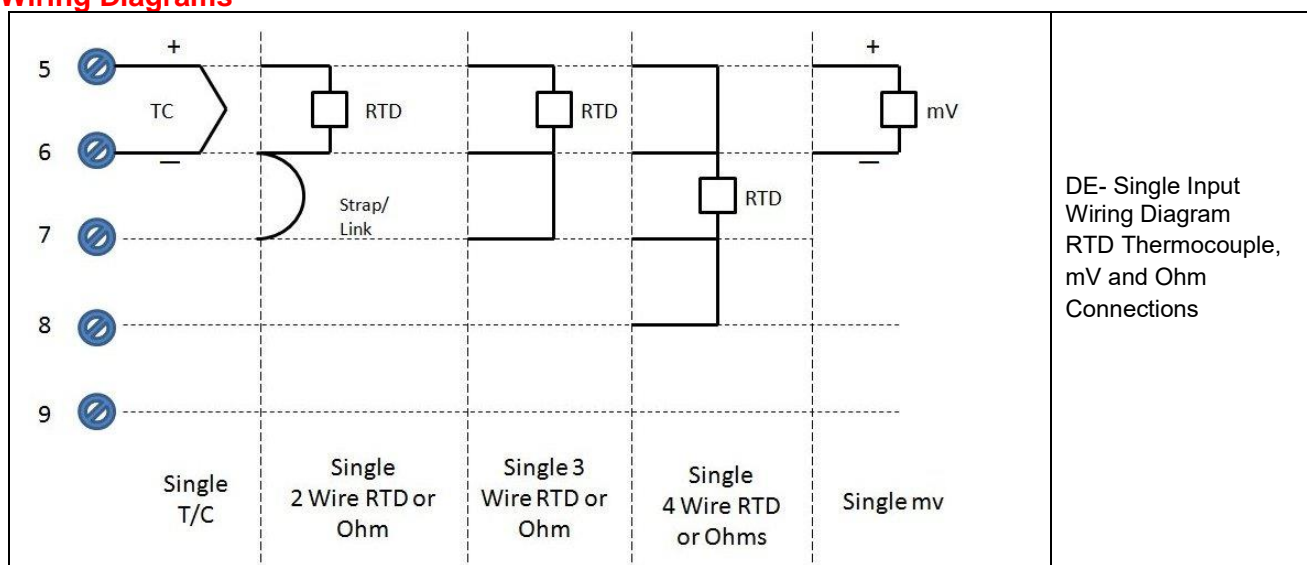
Terminals 1 and 2- LOOP: $U_i = 30$ Vdc, $I_i = 225$ mA, $P_i = 900$ mW, $C_i = 4$ nF, $L_i = 0$ μ H

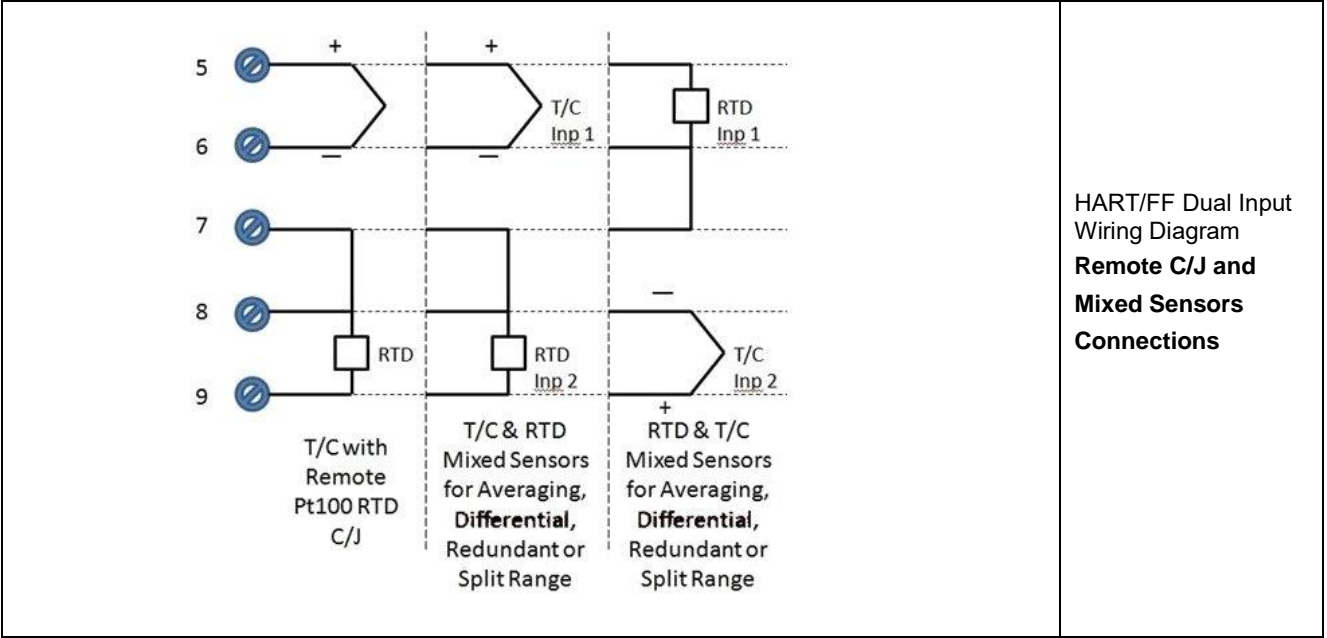
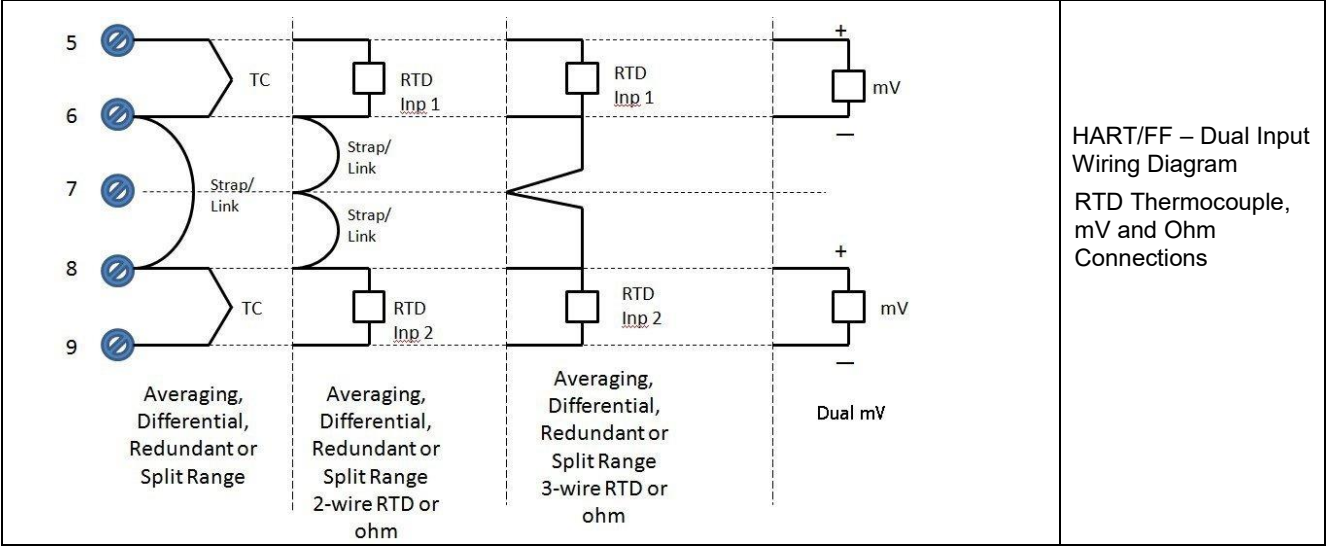
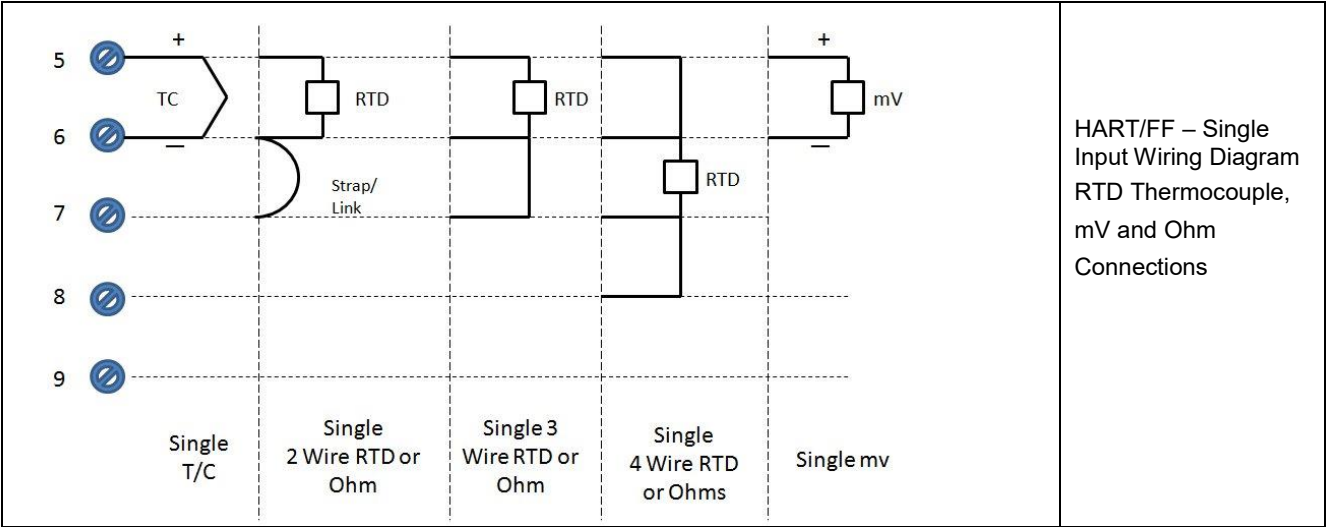
Terminals 4 and 9, DO OPTION: $U_i = 30$ Vdc, $I_i = 40$ mA, $P_i = 500$ mW, $C_i = 4$ nF, $L_i = 0$ μ H

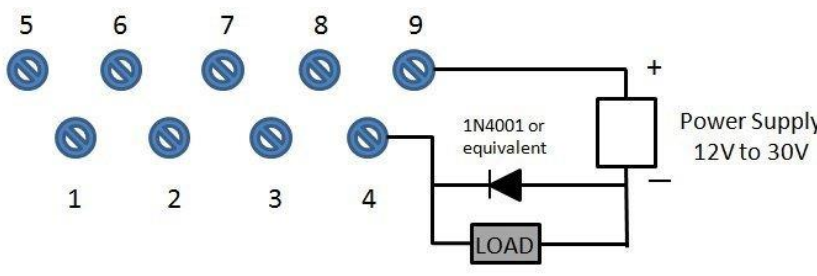
Terminals 5, 6, 7, 8 - SENSOR: $C_i = 4$ nF, $L_i = 0$ μ H

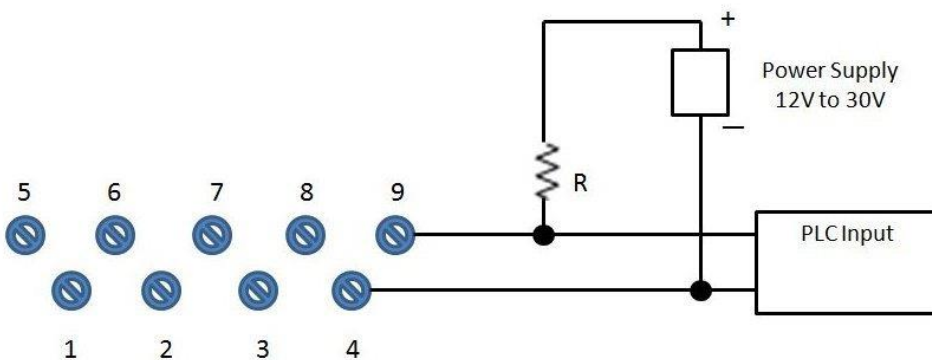
SIL 2/3 Certification	IEC 61508 SIL 2 for non-redundant use and SIL 3 for redundant use according to EXIDA and TÜV Nord Sys Tec GmbH & Co. KG under the following standards: IEC61508-1: 2010; IEC 61508-2: 2010; IEC61508-3: 2010.
MID Approval	Issued by NMI Certin B.V. in accordance with WELMEC guide 8.8, OIML R117.1 Edition 2007 (E), and EN 12405-1+A2 Edition 2006. Applicable to Pt100 sensor only.
MARINE TYPE APPROVAL	Lloyd's Register Certificate Number: 16/60011 Environmental categories ENV1, ENV2, ENV3 and ENV5 as defined in Lloyd's Register Test Specification No. 1, February 2015

Wiring Diagrams





 <p>Maximum Digital Output Current = 40mA Minimum Load = Power Supply Voltage / 40mA Example: If the power supply voltage = 24V then the load must be a minimum of $24\text{ V} / 40\text{mA} = 600\ \Omega$</p>	<p>Digital Output Connections for mA Load (HART only)</p>
---	---

 <p>Resistor should allow approximately 5mA of drop Example: If the power supply voltage = 24V then the Resistor should be $24\text{ V} / 5\text{mA} = 4,800\ \Omega$ Resistor Wattage should be greater than $2 \times \text{power supply voltage}^2 / \text{resistance}$ Example: If power supply voltage = 24V and resistance = $4800\ \Omega$ then wattage should be greater than $2 \times 24^2 / 4800 = 0.24\text{Watts}$</p>	<p>Digital Output Connections for PLC Counting Input (HART only)</p>
---	--

Mounting & Dimensional Drawings

TRANSMITTER ENCLOSURE CAN BE ROTATED A TOTAL OF 90° FROM THE STANDARD MOUNTING POSITION

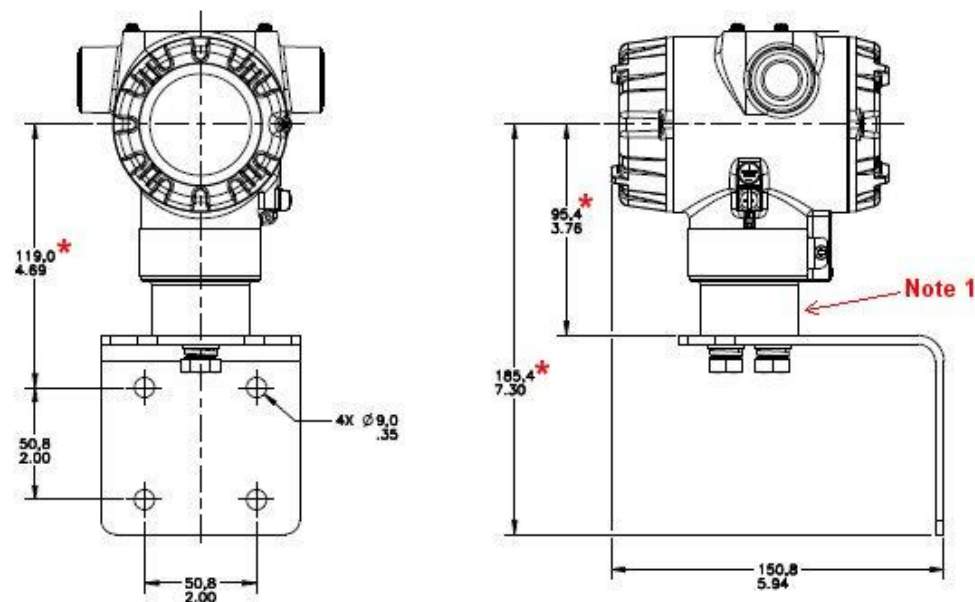
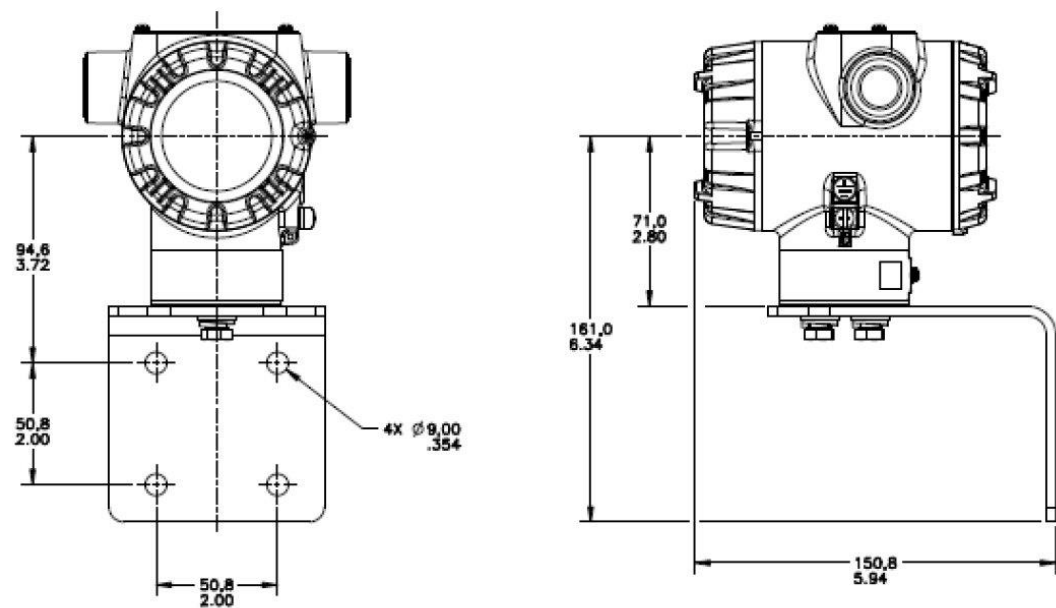


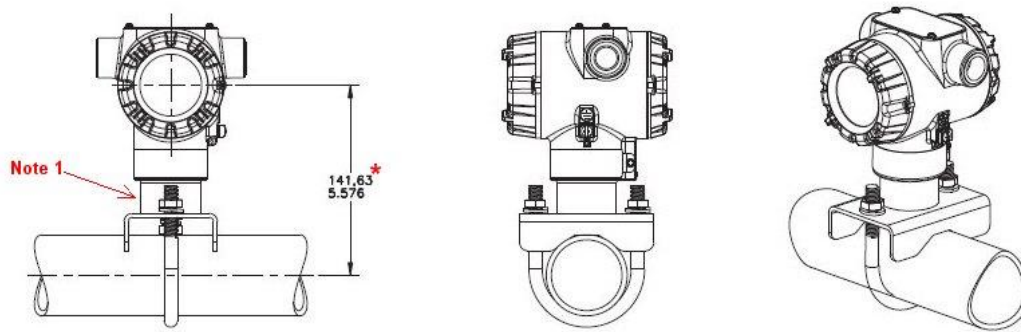
Figure 3 – STT850 with adapter housing - Horizontal Wall Mounting



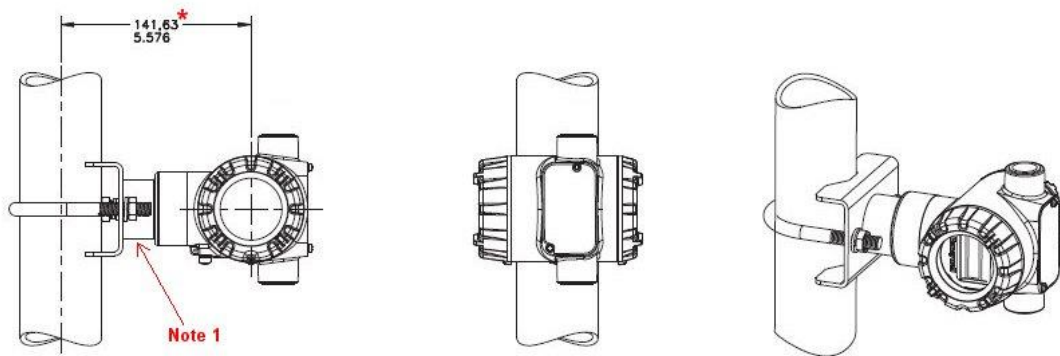
HORIZONTAL WALL MOUNT

TRANSMITTER ENCLOSURE CAN BE ROTATED A TOTAL OF 90° FROM THE MOUNTING POSITION SELECTED

Figure 4 – STT850 No-Adapter Horizontal Wall Mounting

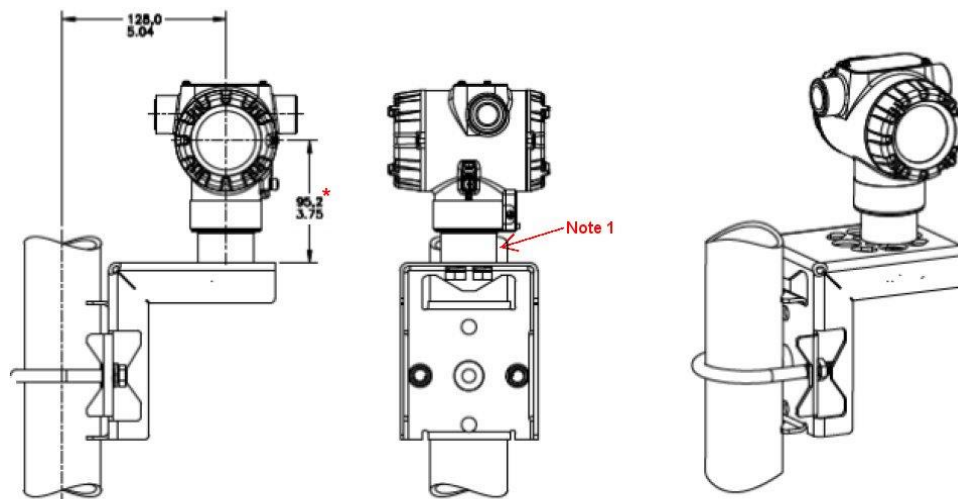


HORIZONTAL FLAT PIPE MOUNT



VERTICAL FLAT PIPE MOUNT

Figure 5 – STT850 Pipe Mount with adapter housing - Horizontal & Vertical



VERTICAL ANGLE PIPE MOUNT

Figure 6 - STT850 Pipe Mount, Vertical

* **Note 1:** Figures 5 and 6. The housing adapter may not be present on all transmitter models. If the housing adapter is not present, subtract 24,5mm (0,96 inches) from the dimension specified.

Mounting & Dimensional Drawings

Reference Dimensions: $\frac{\text{millimeters}}{\text{inches}}$



Model Selection Guide_

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[illegible]

KEY NUMBER		Input Type		Availability Selection	
		Universal Input		STT850	*
Table I		No of Inputs			
Input Details		Single			
		Dual			
Table II		Digital Output			
Digital Output		No			
		Yes			
TABLE III		Agency Approvals (see data sheet for Approval Code Details)			
Approvals		No Approvals Required			
		FM Explosion proof, Intrinsically Safe, Non-incendive, & Dustproof			
		CSA Explosion proof, Intrinsically Safe, Non-incendive, & Dustproof			
		ATEX Explosion proof, Intrinsically Safe & Non-incendive			
		IECEX Explosion proof, Intrinsically Safe & Non-incendive			
		SAEx/CCoE Explosion proof, Intrinsically Safe & Non-incendive			
		INMETRO Explosion proof, Intrinsically Safe & Non-incendive			
		NEPSI Explosion proof, Intrinsically Safe & Non-incendive			
		KOSHA Explosion proof, Intrinsically Safe & Non-incendive			
		EAC Explosion proof, Intrinsically Safe & Non-incendive			
TABLE IV		TRANSMITTER ELECTRONICS SELECTIONS			
a. Electronic Housing Material & Connection Type		Housing and Material		Connection	Lightning protection
		Polyester Powder Coated Aluminum		1/2 NPT	None
		Polyester Powder Coated Aluminum		M20	None
		Polyester Powder Coated Aluminum		1/2 NPT	Yes
		Polyester Powder Coated Aluminum		M20	Yes
		316 Stainless Steel (Grade CF8M)		1/2 NPT	None
		316 Stainless Steel (Grade CF8M)		M20	None
		316 Stainless Steel (Grade CF8M)		1/2 NPT	Yes
		316 Stainless Steel (Grade CF8M)		M20	Yes
b. Output/ Protocol		Analog Output		Digital Protocol	
		4-20mA dc		HART Protocol	
		4-20mA dc		DE Protocol	
		none		Foundation Fieldbus	
c. Customer Interface Selections		Indicator	Ext Zero, Span & Config Buttons		Languages
		None	None		None
		None	Yes (Zero/Span Only)		None
		Basic	None		English
		Basic	Yes		English
		Advanced	None		EN,GR,FR,IT,SP,RU,TU
		Advanced	Yes		EN,GR,FR,IT,SP,RU,TU
		Advanced	None		EN, CH, JP
		Advanced	Yes		EN, CH, JP
				Availability Selection	
				S	*
				T	e
				0	*
				1	a
				0	*
				A	h
				B	*
				C	*
				D	*
				E	h
				F	h
				G	h
				H	h
				J	h
				A__	*
				B__	*
				C__	*
				D__	*
				E__	*
				F__	*
				G__	*
				H__	*
				_H	*
				_D	*
				_F	*
				_ _ 0	*
				_ _ A	f
				_ _ B	*
				_ _ C	*
				_ _ D	*
				_ _ E	*
				_ _ H	*
				_ _ J	*

TABLE V	CONFIGURATION SELECTIONS		
a. Application Software	Diagnostics		
	Standard Diagnostics		
	Advanced Diagnostics - Rate of Change and Deviation Alarm		
b. Output Limit, Failsafe & Write Protect Settings	Write Protect	Fail Mode	High & Low Output Limits ³
	Disabled	High> 21.0mAdc	Honeywell Std (3.8 - 20.8 mAdc)
	Disabled	Low< 3.6mAdc	Honeywell Std (3.8 - 20.8 mAdc)
	Enabled	High> 21.0mAdc	Honeywell Std (3.8 - 20.8 mAdc)
	Enabled	Low< 3.6mAdc	Honeywell Std (3.8 - 20.8 mAdc)
	Enabled	N/A	N/A Fieldbus
	Disabled	N/A	N/A Fieldbus
c. General Configuration	Factory Standard		
	Custom Configuration		

1 _ _	*
2 _ _	c

_ 1 _	f
_ 2 _	f
_ 3 _	f
_ 4 _	f
_ 5 _	g
_ 6 _	g

_ _ S	*
_ _ C	*

³ NAMUR Output Limits 3.8 - 20.5mAdc can be configured by the customer or select custom configuration Table Vc

TABLE VI	CALIBRATION & ACCURACY SELECTIONS		
Accuracy and Calibration	Accuracy	Calibrated Range	Calibration Qty
	Standard	Factory Std	Single Calibration
	Standard	Custom (Unit Data Required)	Single Calibration

A	*
B	*

TABLE VII	ACCESSORY SELECTIONS	
a. Mounting Bracket	Bracket Type	Material
	None	None
	Flat Pipe Mounting Bracket	Carbon Steel
	Flat Pipe Mounting Bracket	316 SS
	Angle Pipe Mounting Bracket	Carbon Steel
	Angle Pipe Mounting Bracket	316 SS
	Wall Mounting Bracket	Carbon Steel
	Wall Mounting Bracket	316 SS
b. Customer Tag	Customer Tag Type	
	No customer tag	
	One Wired Stainless Steel Tag (Up to 4 lines 26 char/line)	
	Two Wired Stainless Steel Tag (Up to 4 lines 26 char/line)	
	One Wired Stainless Steel Blank Tag (Up to 4 lines 26 char/line)	
c. Unassembled Conduit Plugs & Adapters	Unassembled Conduit Plugs & Adapters	
	No Conduit Plugs or Adapters Required	
	1/2 NPT Male to M20 Female 316 SS Certified Conduit Adapter (qty 2)	
	1/2 NPT Male to 3/4 NPT Female 316 SS Certified Conduit Adapter	
	1/2 NPT 316 SS Certified Conduit Plug	
	M20 316 SS Certified Conduit Plug	
	Minifast® 4 pin (1/2 NPT) (not suitable for X-Proof applications)	
	Minifast® 4 pin (M20) (not suitable for X-Proof applications)	

0 _ _ _	*
1 _ _ _	*
2 _ _ _	*
3 _ _ _	*
4 _ _ _	*
5 _ _ _	*
6 _ _ _	*

_ 0 _ _	*
_ 1 _ _	*
_ 2 _ _	*
_ 3 _ _	*

_ _ A0	*
_ _ A1	n
_ _ A2	n
_ _ A6	n
_ _ A7	m
_ _ A8	n
_ _ A9	m

TABLE VIII	Other Certifications and Options	
Certifications and Warranty	None - No additional options	
	Marine (DNV, ABS, BV, KR, LR)	
	MID approved transmitter - Contact tech support for specific MID approved ranges	
	Certificate of Conformance	
	Calibration Test Report & Certificate of Conformance	
	Certificate of Origin	
	SIL2/3 Certificate	
	Extended Warranty Additional 1 year	
	Extended Warranty Additional 2 years	
	Extended Warranty Additional 3 years	
	Extended Warranty Additional 4 years	
	Extended Warranty Additional 15 years	
	00	*
	MT	d
	MD	*
	F3	*
	F1	*
	F5	*
	FE	j
	01	*
	02	*
	03	*
	04	*
	15	*

b

b

TABLE IX	Manufacturing Specials	
Factory	Factory Identification	

0000	*
------	---

MODEL RESTRICTIONS

Restriction Letter	Available Only with		Not Available with	
	Table	Selection(s)	Table	Selection(s)
a	I	S		
	IV	_ H _		
c			IVb	_ D,F _
d			VIIa	1,3,5,6
e	II	0		
f			IVb	_ F _
g			IVb	_ H,D _
h			II	1
j	IVb	_ H _	Vb	_ 1,2,5,6 _
m	IVa	B,D,F,H _		
n	IVa	A,C,E,G _		
b	Select only one option from this group			

FIELD INSTALLABLE REPLACEMENT PARTS

Description	Kit Number
Integrally Mounted Basic Indicator Kit (Compatible with all Electronic Modules)	50049911-502
Integrally Mounted Advanced Indicator Kit (compatible with all Electronic Modules)	50049846-503
Single Input Terminal Strip w/o Lightning Protection for HART or DE Modules	50086421-501
Dual Input Terminal Strip w/o Lightning Protection Kit for HART or DE Modules	50086421-502
Single Input Terminal Strip w/Lightning Protection for HART or DE Modules	50086421-503
Dual Input Terminal Strip w/Lightning Protection Kit for HART or DE Modules	50086421-504
Single Input Terminal Strip w/o Lightning Protection FFB/ <i>Profibus</i> Module	50086421-507
Dual Input Terminal Strip w/o Lightning Protection FFB/ <i>Profibus</i> Module	50086421-508
Single Input Terminal Strip w/Lightning Protection Kit for FFB/ <i>Profibus</i> Module	50086421-509
Dual Input Terminal Strip w/Lightning Protection FFB/ <i>Profibus</i> Module	50086421-510
HART Electronics Module Kit	50086423-501
HART Electronics Module w/connection for external configuration buttons	50086423-502
DE Electronics Module Kit	50086423-503
DE Electronics Module w/connection for external configuration buttons	50086423-504
FFB Electronics Module Kit	50086423-505
FFB Electronics Module w/connection for external configuration buttons	50086423-506

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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Toll Free Fax:
1300-36-04-70

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AMERICA'S

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Specifications are subject to change without notice.

For more information
To learn more about SmartLine Temperature,
visit www.honeywellprocess.com
Or contact your Honeywell Account Manager

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