SmartLine

Technical Information

STT850 SmartLine Temperature Transmitter Specification 34-TT-03-14, September 2024

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 +/- 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 (FF).
- 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.

Standard LCD Display Features

- Modular (may be added or removed in the field).
- 0, 90,180, & 270-degree position adjustments.
- Deg C, F, R, Kelvin, Milli volts, and Ohm measurement units.
- 2 Lines 6 digits PV (9.95H x 4.20W mm), 8 Characters.
- Device configuration and calibration through integral buttons or optional external buttons.
- Up to 4 configurable display screens.
- Configurable screen rotation timing (2 to 20 sec).
- Write protect indication.
- 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 (HART), 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 display option is selected. Zero or span capabilities are also optionally available via these buttons with or without the selection of a display option.

Handheld Configuration

SmartLine transmitters feature two-way communication and configuration capability between the operator and the transmitter. This is accomplished via Honeywell Versatilis, field-rated, next generation multiple communication configuration tool.
The Honeywell Versatilis Handheld 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 handheld 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, DE & 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:

1. PV High
2. PV Low
3. Critical Diagnostic Active
4. Redundant Input Active**
5. PV Rate of Change Alarm*
6. PV Deviation Alarm*

Alarms can be configured as latching or non-latching. 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 Wiring Diagrams on **page 16**.

Performance Specifications[1,3]

Reference Accuracy [2] (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 (α=0.00385)
Pt100	-200 to 850	-328 to 1562	0.10	0.005	IEC751 (α=0.00385)
Pt200	-200 to 850	-328 to 1562	0.20	0.005	IEC751 (α=0.00385)
Pt500	-200 to 850	-328 to 1562	0.12	0.005	IEC751 (α=0.00385)
Pt1000[5]	-200 to 500	-328 to 932	0.10	0.005	IEC751 (α=0.00385)
Ni 120	-80 to 260	-112 to 500	0.08	0.005	Edison Curve #7 (α=0.00672)
Cu 10	-50 to 250	-58 to 482	1.00	0.005	Edison Copper Winding #15 (α=0.00427)
Thermocouples	**° C**	**° F**	**° C**	**%**	
B	200 to 300	392 to 572	3	0.005	IEC 584-1 (ITS-90)
	300 to 1820	572 to 3308	0.75	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 -100	-328 to -148	0.4	0.005	IEC 584-1 (ITS-90)
	-100 to 1370	-148 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 0	-58 to 32	1.5	0.005	IEC 584-1 (ITS-90)
	0 to 1760	32 to 3200	0.50	0.005	IEC 584-1 (ITS-90)
S	-50 to 0	-58 to 32	1.5	0.005	IEC 584-1 (ITS-90)
	0 to 1760	32 to 3200	0.50	0.005	IEC 584-1 (ITS-90)
T	-250 to -200	-418 to -328	1	0.005	IEC 584-1 (ITS-90)
	-200 to 400	-328 to 752	0.25	0.005	IEC 584-1 (ITS-90)
C (W_5 W_{26})	0 to 2000	32 to 3632	0.60	0.005	ANSI/ASTM E-230 (ITS-90)
	2000 to 2300	3632 to 4172	0.9	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 is 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.

EMC Confirmity (CE, Marine and SIL)

The STT850 device is compliant with IEC compliance EN 61326-1: 2013, EN IEC 61326-1: 2021 (CE) ; IEC 60533: 2015 / IACS Req. 1991/Rev.8 2021 (Marine) and IEC 61326-3-1: 2017 (SIL)

Performance specifications under EMC conditions (CE and Marine):

HART/DE Transmitter: Worst case deviation < 0.1% of full span (for both Analog and Digital).

Foundation Fieldbus Transmitter: Worst case deviation < 1°C.

Performance under Rated Conditions – All Models

Parameter	Description
Input Span Adjustment Range	No limits to adjustments within the maximum range except the 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 the protocol have polarity insensitive connections.
Output Failure Modes **(HART/DE only)**	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:** 5.5 sec. Foundation Fieldbus: Host dependent
Analog Input	**Stability:** 0.01% of URL per Year for 10 years **Maximum Lead Wire Resistance:** **Thermocouples:** 50 ohms per leg **RTD (all except Pt15) and Ohms:** 50 ohms per leg **RTD Pt25**: 10 ohms per leg
Input Impedance	1 Mega Ohm Nominal
Response Time **(delay + time constant)**	**DE/HART Analog Output** / **FOUNDATION Fieldbus** **Single Input:** 130 - 230 mSec / Host Dependent **Dual Input:** 305 - 455 mSec / Host Dependent
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	**Digital Accuracy** **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	**Contact Rating** **Voltage**: +12 to +30 Vdc. **Current:** 40mA maximum (controlled by load resistance) **Low Level:** 0 to 2 Vdc
Display	Digital Readout: 7 digits,
Display Resolution **(Advanced)**	0.01 unit for reading range (-999 to 999) 0.1 unit for reading range (-9999 to -1000) or (1000 unit to 9999). 1 unit for reading range (-99999 to -10000) or (10000 to 99999). 10 units for reading range (-999999 to -100000) or (100000 to 999999).
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.
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)

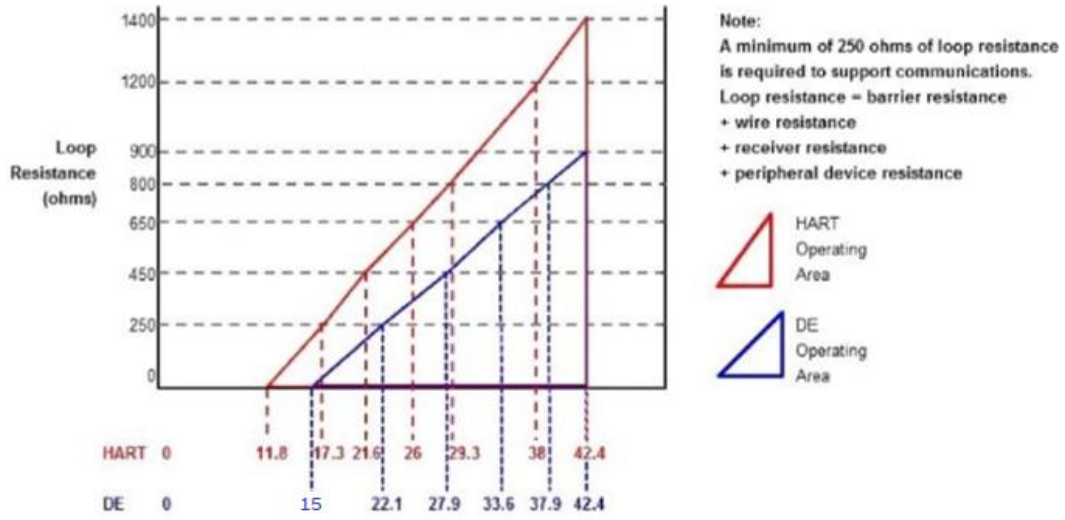
Performance under Rated Conditions – All Models (continued)

Parameter	Description
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. **Normal Mode** **AC (50 or 60 Hz):** 60 dB (with 100% span peak-to-peak maximum)

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, RImax =35* (power Supply Voltage – 15)
For HART, RImax = 45.6* (Power Supply Voltage – 11.8)

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). Preferred 18AWG and above for ease of wiring.
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: 20 mA

Software Download Current: 29 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

Physical Layer

Comply with IEC 61158 standard

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 Standard and Advanced integral displays, and 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 db IIC T6..T5 Gb Zone 21 AEx tb IIIC T 95°C Db	4-20 mA/ DE/HART/ F/ PROFIBUS	Note 1	T 95°C, 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) Class I Zone 0 Ex ia IIC T4 Ga	4-20 mA/ DE/HART/FF/ PROFIBUS	Note 2	-50°C to 70°C FISCO: -50°C to 45°C
		Non-Incendive, Certificate: FM16US0157X: Class I, Division 2, Groups A, B, C, D; T4 Class I Zone 2 AEx nA IIC T4 Gc	4-20 mA/ DE/HART/FF/ PROFIBUS	Note 1	-50°C to 85°C
		Enclosure: Type 4X/ IP66/ IP67	ALL	ALL	ALL
B	CSA-Canada and USA	**Explosion proof,** Certificate: 2689056: Class I, Division 1, Groups A, B, C, D; **Dust Ignition Proof:** Class II, Division 1, Groups E, F, G; Class III, Division 1 ;T6..T5 Class I Zone 1 AEx db IIC T6..T5 Gb ; Zone 21 Ex tb IIIC T 95°C Db Ex db IIC T6..T5 Gb ; Ex tb IIIC T 95°C Db	4-20 mA/ DE/HART/FF	Note 1	T 95°C, T5: Ta= -50°C to 85°C T6: Ta= -50°C to 65°C
		Intrinsically Safe, Certificate: 2689056: Class I, II, III, Division 1, Groups A, B, C, D, E, F, G; T4 Class I Zone 0 AEx ia IIC T4 Ga Class I Zone 2 Ex ic IIC T4 Gc Ex ia IIC T4 Ga Ex ic IIC T4 Gc FISCO Field Device (Only for FF Option) Class I Zone 0 AEx ia IIC T4 Ga Class I Zone 2Ex ic IIC T4 Gc Ex ia IIC T4 Ga Ex ic IIC T4 Gc	4-20 mA/ DE/HART/FF	Note 2	-50°C to 70°C FISCO: -50°C to 45°C
		Nonincendive, Certificate: 2689056: Class I, Division 2, Groups A, B, C, D; T4 Class I Zone 2 AEx 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. 61010-1: 2012; CSA-C22.2No.157-92 (reaffirmed 2012); C22.2 No. 213-2017; C22.2 No. 60529-2016 C22.2 No. CSA 60079-0:2011; C22.2 No. 60079-1: 2011; C22.2 No. 60079-11:2014; C22.2 No. 60079-15: 2012; C22.2 No. 60079-31:2015; ANSI/ ISA12.12.01-2017; ANSI/ ISA 60079-0 (12.00.01): 2013; ANSI/UL 60079-1 : 2015; ANSI/ ISA 60079-11(12.02.01) : 2012; ANSI/ ISA 60079-15(12.12.02) : 2012 ; ANSI/ ISA 60079-31: 2015; FM Class 3615: Aug 2006; FM Class 3616: Dec 2011; ANSI/ IEC 60529 : Edition 2.1 ANSI/ UL 913: 2015; ANSI/UL 61010-1: 2016; UL 50: Ed 11			
C	ATEX	**Flameproof,** Sira 14ATEX2046X: II 2 GD Ex db IIC T6..T5 Gb Ex tb IIIC T 95°C Db	4-20 mA/ DE/HART/FF	Note 1	T 95°C, T5: Ta= -50°C to 85°C T6: Ta= -50°C to 65°C
		Intrinsically Safe, Sira 14ATEX2046X: II 1 GD Ex ia IIC T4 Ga Ex ia IIIC T95°C Da FISCO Field Device (Only for FF Option) Ex ia IIC T4 Ga	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/A11:2013; EN 60079-1 : 2014; EN 60079-31 : 2014 EN 60079-11: 2011; EN 60079-26 : 2006; EN 60529 : 2000 + A1			
		Increase Safety/ Intrinsic Safety, Sira 14ATEX4052X: II 3 G Ex ec IIC T4 Gc Ex ic IIC T4 Gc FISCO Field Device (Only for FF Option) Ex ic IIC T4 Gc	4-20 mA/ DE/HART/FF	Note 1	-50°C to 85°C FISCO: -50°C to 45°C
		Enclosure: IP66/ IP67	ALL	ALL	ALL
		Standards: EN 60079-0: 2012/A11:2013; EN 60079-7:2015; EN 60079-11:2012			
D	IECEx	**Flameproof,** SIR 14.0020X Ex db IIC T6..T5 Gb Ex tb IIIC T 95°C Db	4-20 mA/ DE/HART/FF	Note 1	T 95°C, T5: Ta= -50°C to 85°C T6: Ta= -50°C to 65°C
		Intrinsically Safe, SIR 14.0020X Ex ia IIC T4 Ga Ex ia IIIC T95°C Da FISCO Field Device (Only for FF Option) Ex ia IIC T4 Ga	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 ecIIC T4 Gc Ex ic IIC T4 Gc FISCO Field Device (Only for FF Option) Ex ic IIC T4 Gc	4-20 mA/ DE/HART/ FF	Note 1	-50°C to 85°C FISCO: -50°C to 45°C
		Enclosure: IP66/ IP67	ALL	ALL	ALL
		Standards: IEC 60079-0: 2011; IEC 60079-1 : 2014,; IEC 60079-11 : 2011; IEC 60079-7:2015; IEC 60079-31 : 2013			

E	SAEx (South Africa)	**Flameproof**: Ex db IIC T6..T5 Gb Ex tb IIIC T 95ºC Db	4-20 mA/ DE/HART/FF	Note 1	T 95ºC, T5: Ta= --50ºC to 85ºC T6: Ta= -50ºC to 65ºC
		Intrinsically Safe: Ex ia IIC T4 Ga Ex ia IIIC T95ºC Da FISCO Field Device (Only for FF Option) Ex ia IIC T4 Ga	4-20 mA/ DE/HART/FF	Note 2	-50ºC to 70ºC FISCO: -50ºC to 45ºC
		Increase Safety/ Intrinsic Safety: Ex ec IIC T4 Gc Ex ic IIC T4 Gc FISCO Field Device (Only for FF Option) Ex ic IIC T4 Gc	4-20 mA/ DE/HART/FF	Note 1	-50ºC to 85ºC FISCO: -50ºC to 45ºC
		Enclosure: IP66/ IP67	ALL	ALL	ALL
F	INMETRO	**Flameproof**: Ex db IIC T6..T5 Gb Ex tb IIIC T 95ºC Db	4-20 mA/ DE/HART/FF	Note 1	T 95ºC, T5: Ta= -50ºC to 85ºC T6: Ta= -50ºC to 65ºC
		Intrinsically Safe: Ex ia IIC T4 Ga Ex ia IIIC T95ºC Da FISCO Field Device (Only for FF Option) Ex ia IIC T4 Ga	4-20 mA/ DE/HART/FF	Note 2	-50ºC to 70ºC FISCO: -50ºC to 45ºC
		Increase Safety/ Intrinsic Safety: Ex ec IIC T4 Gc Ex ic IIC T4 Gc FISCO Field Device (Only for FF Option) Ex ic IIC T4 Gc	4-20 mA/ DE/HART/FF	Note 1	-50ºC to 85ºC FISCO: -50ºC to 45ºC
		Enclosure: IP66/ IP67	ALL	ALL	ALL
G	NEPSI (CHINA)	**Flameproof**: Ex d IIC T6..T5 Gb Ex tD A21 IP66/IP67 T95ºC	4-20 mA/ DE/HART/FF	Note 1	T 95ºC, T5: Ta= -50ºC to 85ºC T6: Ta= -50ºC to 65ºC
		Intrinsically Safe: Ex ia IIC T4 Ex iaD 20 T95ºC FISCO Field Device (Only for FF Option) Ex ia IIC T4	4-20 mA/ DE/HART/FF	Note 2	-50ºC to 70ºC FISCO: -50ºC to 45ºC
		Non Sparking/ Intrinsic Safety: Ex nA IIC T4 Ex ic IIC T4 Gc	4-20 mA/ DE/HART/FF	Note 1	-50ºC to 85ºC
		Enclosure: IP66/ IP67	ALL	ALL	ALL
H	KOSHA (KOREA)	**Flameproof**: Ex d IIC T4 Gb Ex tD A21 T 95ºC IP 66/ IP67	4-20 mA/ DE/HART/FF	Note 1	-50ºC to 85ºC
		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	-50ºC to 70ºC FISCO: -50ºC to 45ºC
		Enclosure: IP66/ IP67	ALL	ALL	ALL

J	EAC Ex (Russia, Belarus and Kazakhstan)	**Flameproof**: 1 Ex d IIC T4 Gb Ex tb IIIC T95ºC Db	4-20 mA/ DE/HART/FF	Note 1	-50ºC to 85ºC
		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 Ga	4-20 mA/ DE/HART/FF	Note 2	-50ºC to 70ºC FISCO: -50ºC to 45ºC
		Non Sparking: 2 Ex nAc IIC T4	4-20 mA/ DE/HART/FF	Note 1	-50ºC to 85ºC
		Enclosure: IP66/ IP67	ALL	ALL	ALL
P	CCoE (India)	Ex ia IIC T4 Ga FISCO Field Device (Only for FF Option) Ex ia IIC T4	4-20 mA/ DE/HART/FF	Note 2	-50ºC to 70ºC FISCO: -50ºC to 45ºC
		Ex d IIC T4 Gb	4-20 mA/ DE/HART/FF	Note 1	-50ºC to 85ºC

Notes

1. **Operating Parameters:**

<u>4-20 mA/DE/HART (Loop Terminal)</u>
Voltage= 11 to 42 Vdc Current= 4-20 mA Normal (3.8 – 23 mA Faults)
<u>FF (Loop Terminal)</u>
Voltage= 9 to 32 VDC Current = 30 mA

2. **Intrinsically Safe Entity Parameters**

a. Analog/DE/HART Entity Values

Loop, Terminals 1 and 2:

Vmax = Ui = 30V	Imax= Ii = 225mA	Ci = 12nF	Li = 0µH	Pi = 0.9W

Temperature Sensor, Terminals 5, 6, 7 and 8:

Uo = 5.9V	Imax= Io = 2.65mA	Co = 39µF	Lo = 4.99H	Po = 15.48mW

Digital output Option, Terminals 4 and 9:

Vmax = Ui = 27V	Imax= Ii = 30mA	Ci = 81nF	Li = 3.98µH	Pi = 500mW

b. Foundation Fieldbus Entity Values

Loop, Terminals 1 and 2:

Vmax = Ui = 30V	Imax= Ii = 225mA	Ci = 4.84nF	Li = 0µH	Pi = 1W

Temperature Sensor, Terminals 5, 6, 7 and 8:

Uo = 5.9V	Imax= Io = 2.65mA	Co = 39µF	Lo = 4.99H	Po = 15.48mW

FISCO Values
Loop, Terminals 1 and 2:

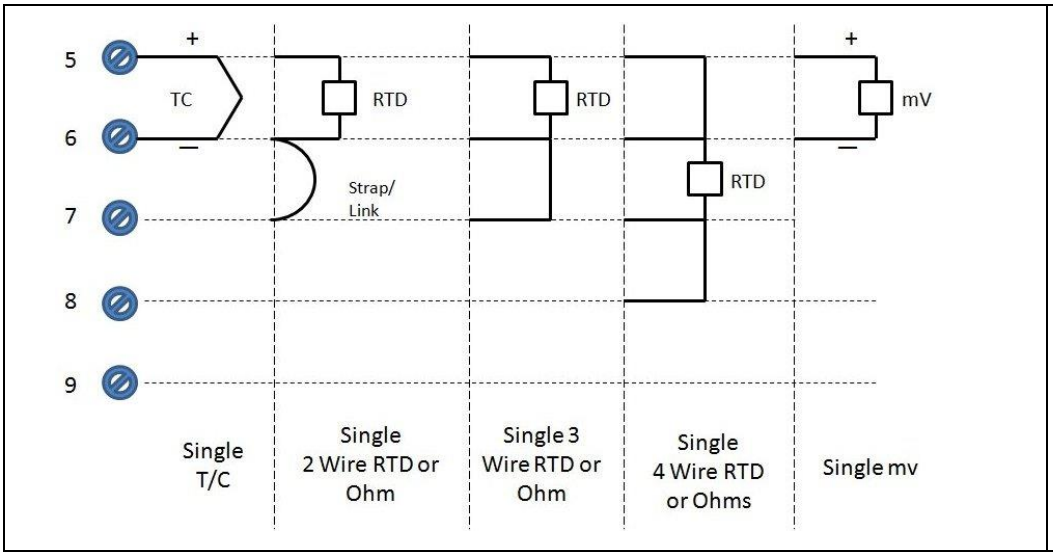
Vmax = Ui = 17.5V	Imax= Ii = 380mA	Ci = 4.84nF	Li = 0µH	Pi = 5.32W

Temperature Sensor, Terminals 5, 6, 7 and 8:

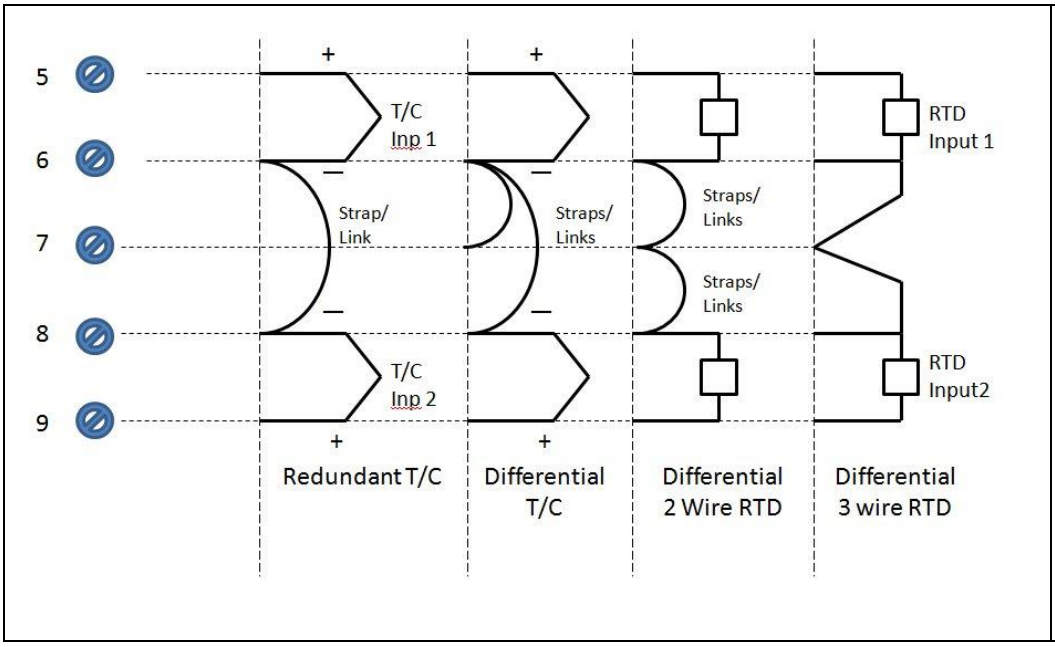
Uo = 5.9V	Imax= Io = 2.65mA	Co = 39µF	Lo = 4.99H	Po = 15.48mW

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. SIL EMI/EMC compliance as per Standard: IEC 61326-3-1
MID Approval	Issued by NMi Certin B.V. in accordance with WELMEC guide 8.8, OIML R117-1 Edition 2019 (E), and EN 12405-1+A2 Edition 2018. Applicable to Pt100 sensor Class A or AA, 4 wire, measuring range (-)50 to 150ºC.
MARINE TYPE APPROVAL	American Bureau of Shipping (ABS); Certificate number: 23-2416104-PDA Lloyd's Register (LR); Certificate number: LR23389941TA DNV: Certificate number TAA00003CV Bureau Veritas: Certificate number: 76077/A0 BV

Wiring Diagrams



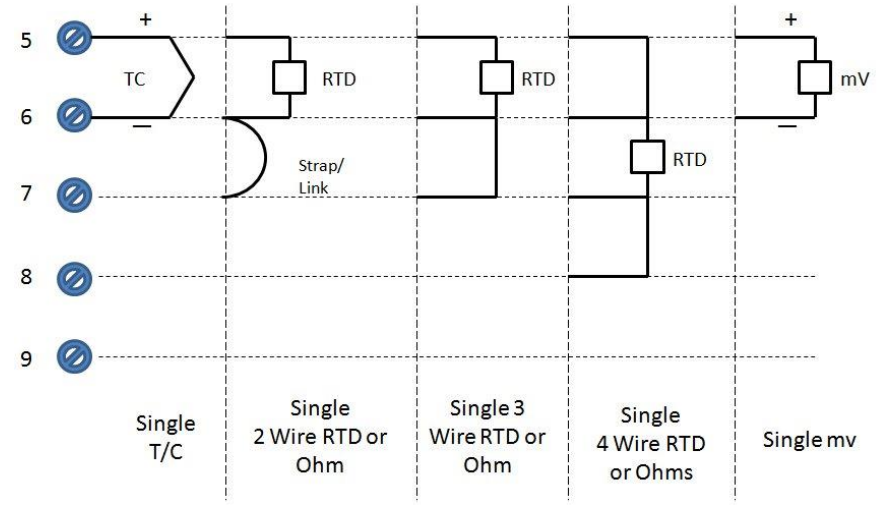
DE- Single Input Wiring Diagram
RTD Thermocouple, mV and Ohm Connections



DE- Dual Input Wiring Diagram[1]

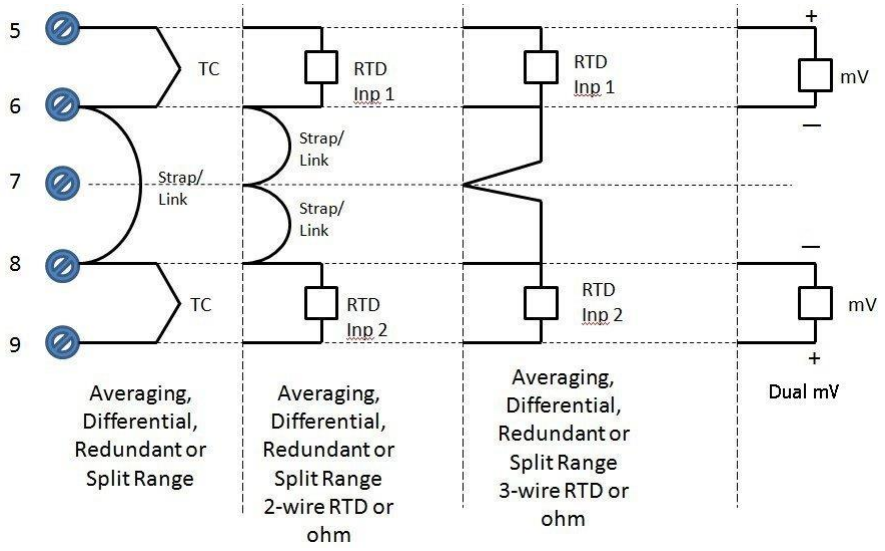
Thermocouple and RTD Connections

[1] **Not applicable for single input sensor**



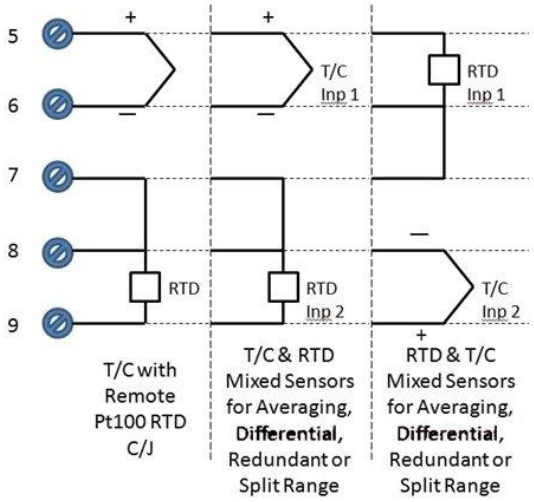
HART/FF – Single Input Wiring Diagram

RTD Thermocouple, mV and Ohm Connections



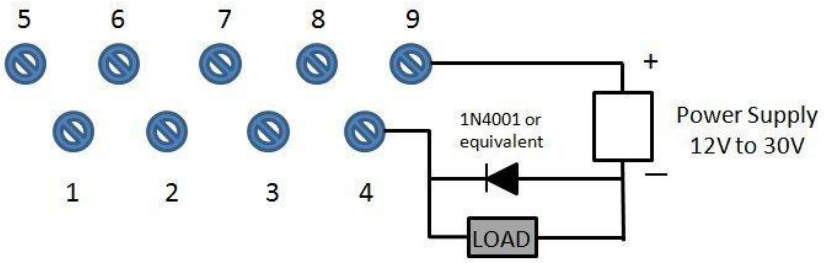
HART/FF – Dual Input Wiring Diagram

RTD Thermocouple, mV and Ohm Connections



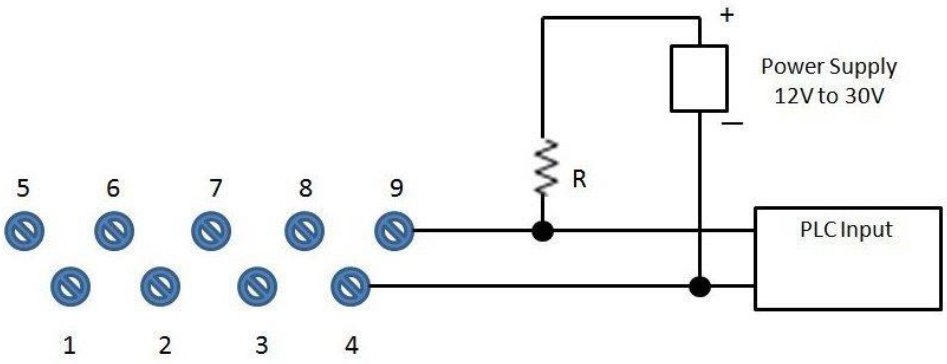
HART/FF Dual Input Wiring Diagram

Remote C/J and Mixed Sensors Connections



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 V / 40mA = 600 Ω

Digital Output Connections for mA Load (HART only)



Resistor should allow approximately 5mA of drop
Example: If the power supply voltage = 24V then the Resistor should be 24 V / 5mA = 4,800Ω
Resistor Wattage should be greater than 2 x power supply voltage^2 / resistance
Example: If power supply voltage = 24V and resistance = 4800 Ω
then wattage should be greater than 2 x 24^2 / 4800 = 0.24Watts

Digital Output Connections for PLC Counting Input (HART only)

Mounting & Dimensional Drawings

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

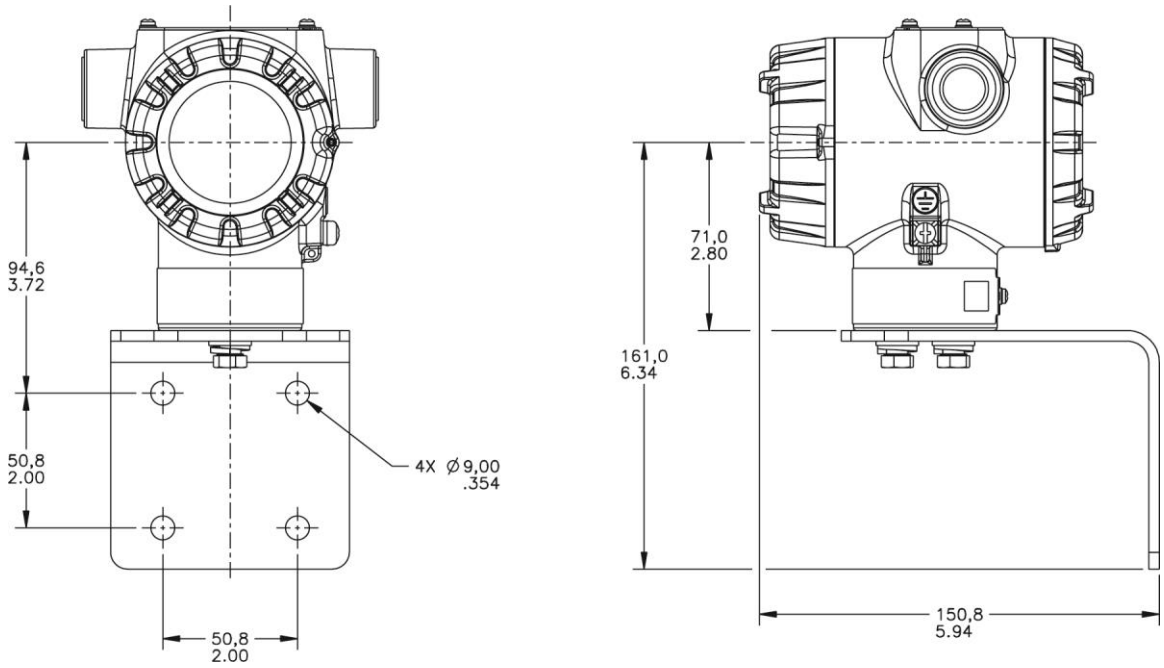
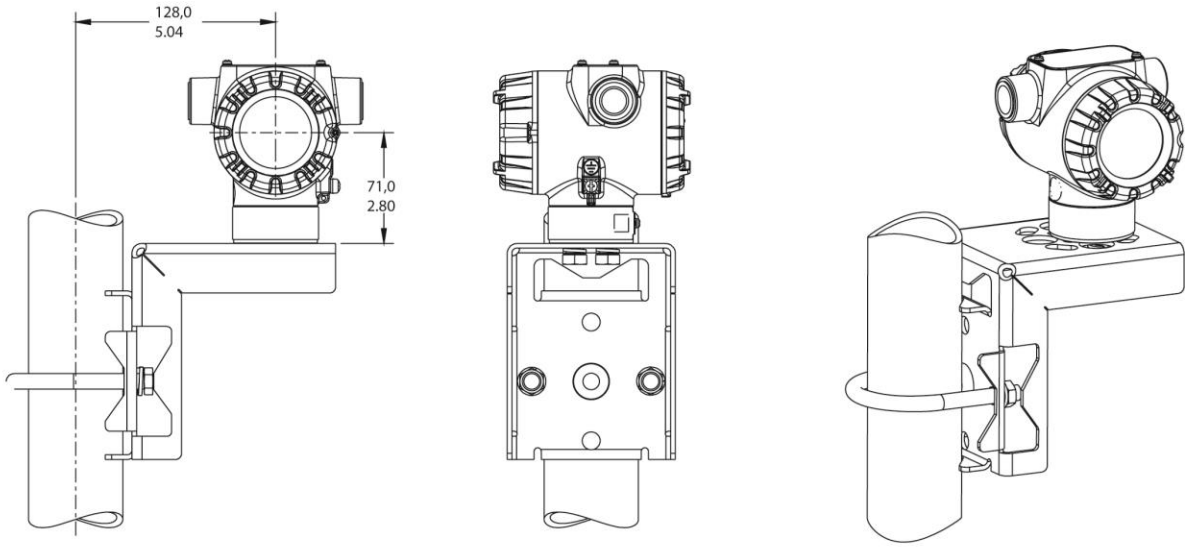
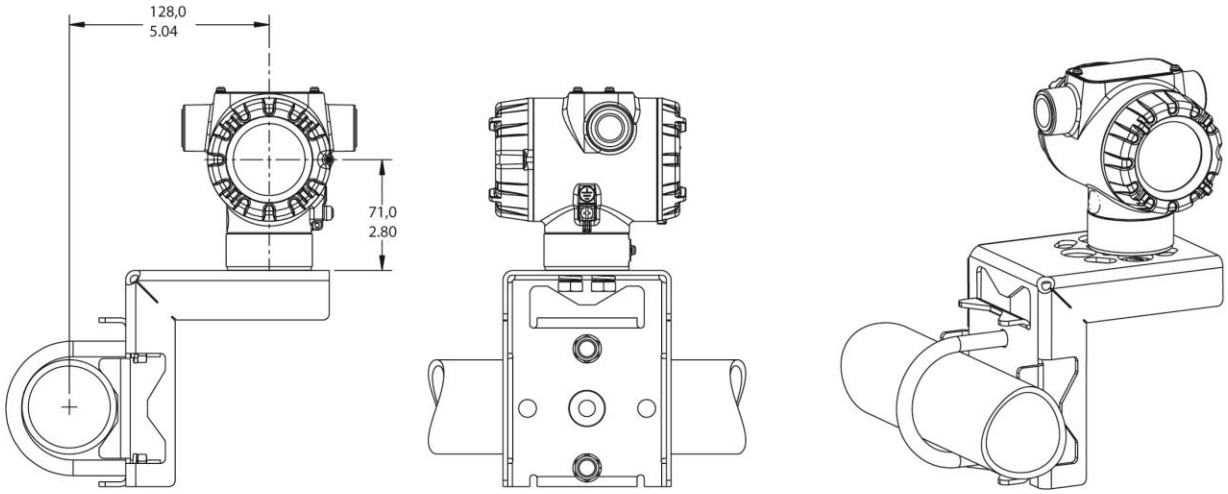


Figure 3 – STT850 housing- Horizontal Wall Mounting

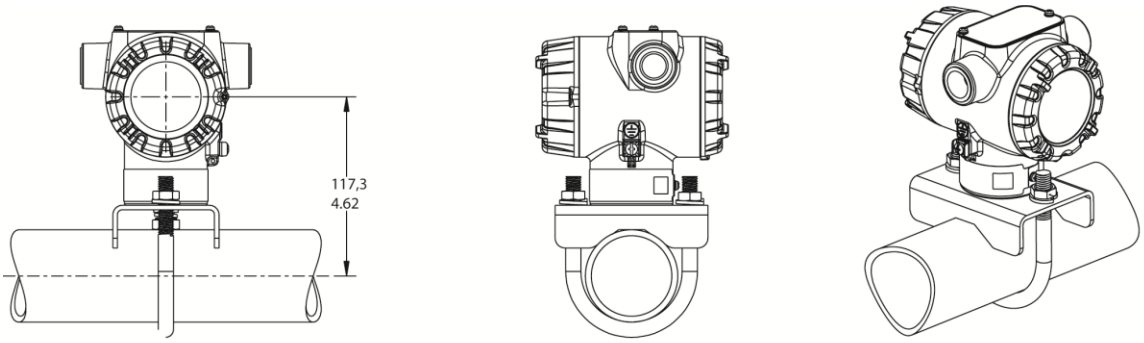


VERTICAL ANGLE BRACKET PIPE MOUNT

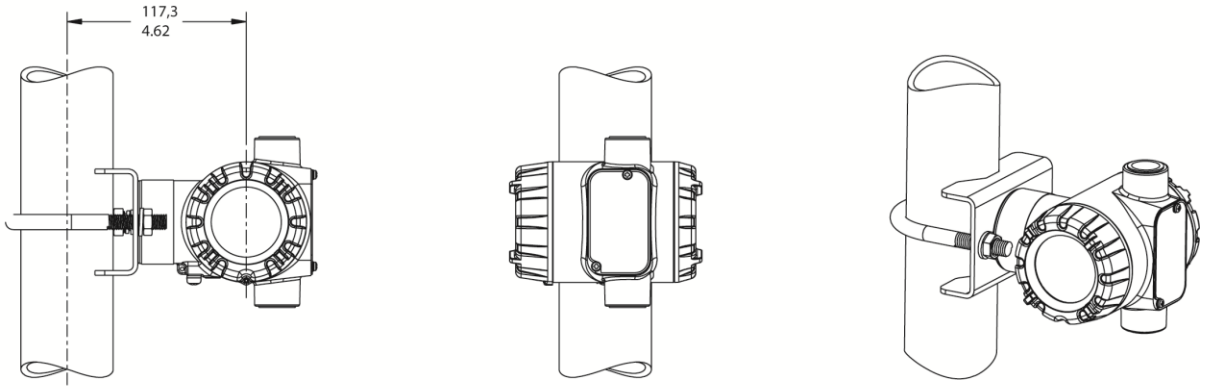


HORIZONTAL ANGLE BRACKET PIPE MOUNT

Figure 4 – STT850 Angle Bracket Pipe Mount - Horizontal & Vertical



HORIZONTAL PIPE MOUNT



VERTICAL PIPE MOUNT

Figure 5 - STT850 Pipe Mount housing - Horizontal & Vertical

.

Mounting & Dimensional Drawings

Reference Dimensions: millimeters / inches

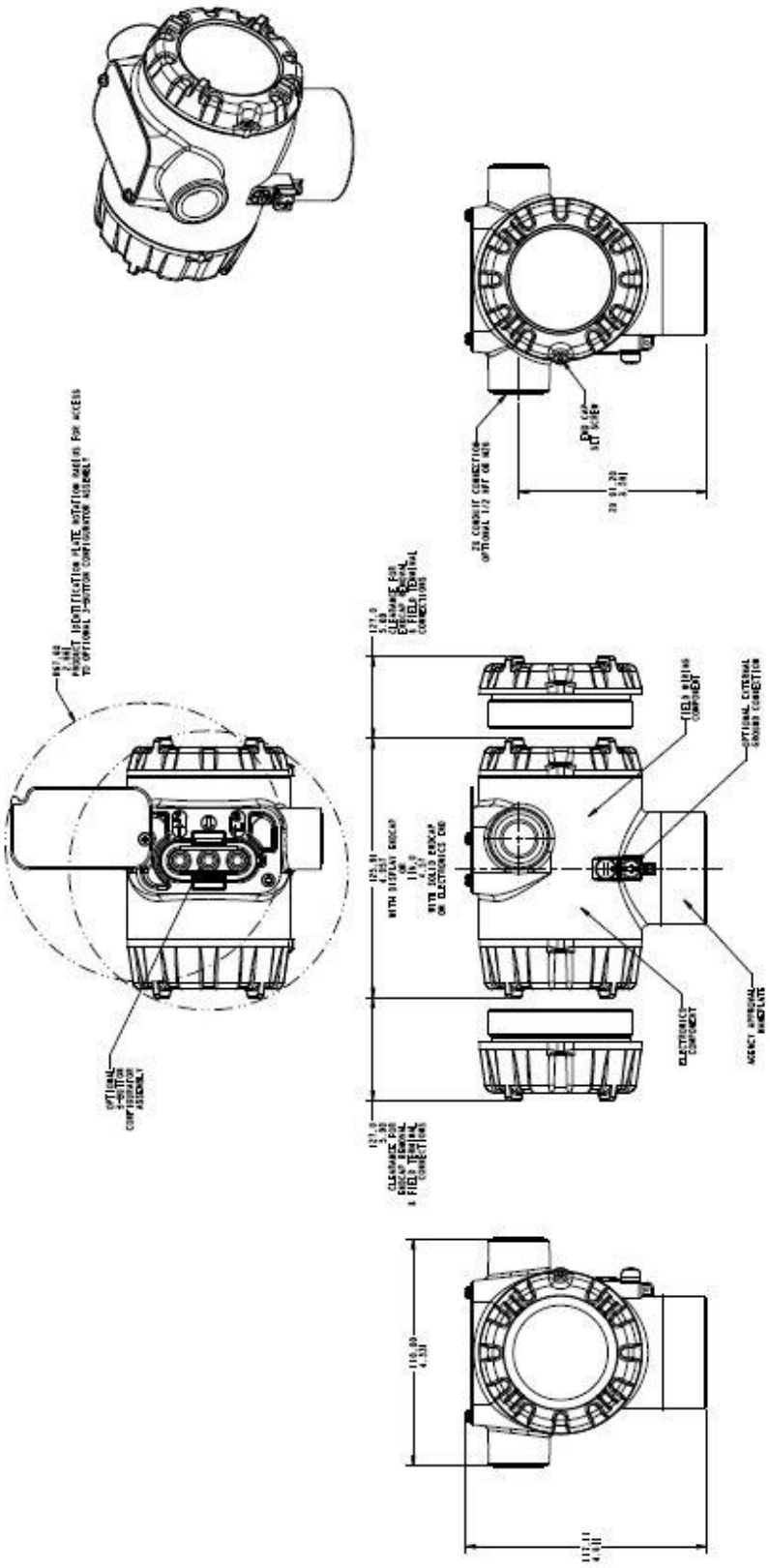


Figure 6 – STT850 housing dimensions

The Model Selection Guide is subject to change and is inserted into the specification as guidance only.

Model Selection Guide

Honeywell

Model STT850
Smart Temperature Transmitter

Model Selection Guide:

34-44-16-14 Issue 32 Honeywell Proprietary

Section 13
Page: STT8-1
Effective Date: XXXX XX, 2024

Instructions: Make selections from all Tables Key through XIII using column below the proper arrow. Asterisk indicates availability. Letter (a) refer to restrictions highlighted in the restrictions table. Tables delimited with dashes.
List Price: Price equals the sum of prices for all selections made.

List Price equals the sum of all selections made.

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

KEY NUMBER	INPUT TYPE	Availability Selection
	Universal Input	STT850 *

TABLE I	NUMBER OF INPUTS	
Input Details	Single	S *
	Dual	T e

TABLE II	DIGITAL OUTPUT	
Digital Output	No	0 *
	Yes	1 a

TABLE III	AGENCY APPROVALS (See data sheet for Approval Code Details)	
Approvals	No Approvals Required	0 *
	FM Explosion proof, Intrinsically Safe, Non-incendive, & Dustproof	A *
	CSA Explosion proof, Intrinsically Safe, Non-incendive, & Dustproof	B *
	ATEX Explosion proof, Intrinsically Safe & Non-incendive	C *
	IECEx Explosion proof, Intrinsically Safe & Non-incendive	D *
	SAEx Explosion proof, Intrinsically Safe & Non-incendive	E h
	INMETRO Explosion proof, Intrinsically Safe & Non-incendive	F h
	NEPSI Explosion proof, Intrinsically Safe & Non-incendive	G h
	KOSHA Explosion proof, Intrinsically Safe & Non-incendive	H h
	EAC Explosion proof, Intrinsically Safe & Non-incendive	J h
	CCoE Explosion proof, Intrinsically Safe & Non-incendive	P *

TABLE IV	TRANSMITTER ELECTRONICS SELECTIONS			
a. Electronic Housing Material & Connection Type	**Housing and Material**		**Connection**	**Lightning protection**
	Polyester Powder Coated Aluminum		1/2 NPT	Yes — C _ _ *
	Polyester Powder Coated Aluminum		M20	Yes — D _ _ *
	316 Stainless Steel (Grade CF8M)		1/2 NPT	Yes — G _ _ *
	316 Stainless Steel (Grade CF8M)		M20	Yes — H _ _ *
b. Output/ Protocol	**Analog Output**		**Digital Protocol**	
	4-20mA dc		HART Protocol	_ H _ *
	4-20mA dc		DE Protocol	_ D _ *
	none		Foundation Fieldbus	_ F _ *
c. Customer Interface Selections	**Display**	**Ext Zero, Span & Config Buttons**	**Languages**	
	None	None	None	_ _ 0 *
	None	Yes (Zero/Span Only)	None	_ _ A f
	Advanced	None	EN,GR,FR,IT,SP,RU,TU	_ _ D *
	Advanced	Yes	EN,GR,FR,IT,SP,RU,TU	_ _ E *
	Advanced	None	EN, CH, JP	_ _ H *
	Advanced	Yes	EN, CH, JP	_ _ J *
	Standard (w/internal Zero, Span & Conf Buttons)	None	English	_ _ S t
	Standard (w/internal Zero, Span & Conf Buttons)	Yes	English	_ _ T t

TABLE V	CONFIGURATION SELECTIONS				
a. Application Software	Diagnostics			1 _ _	*
	Standard Diagnostics			2 _ _	c
	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)	_ 1 _	f
	Disabled	Low< 3.6mAdc	Honeywell Std (3.8 - 20.8 mAdc)	_ 2 _	f
	Enabled	High> 21.0mAdc	Honeywell Std (3.8 - 20.8 mAdc)	_ 3 _	f
	Enabled	Low< 3.6mAdc	Honeywell Std (3.8 - 20.8 mAdc)	_ 4 _	f
	Enabled	N/A	N/A Fieldbus	_ 5 _	g
	Disabled	N/A	N/A Fieldbus	_ 6 _	g
c. General Configuration	Factory Standard			_ _ S	*
	Custom Configuration			_ _ 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	A	*
	Standard	Custom (Unit Data Required)	Single Calibration	B	*

TABLE VII	ACCESSORY SELECTIONS			
a. Mounting Bracket	Bracket Type	Material		
	None	None	0 _ _ _	*
	Flat Pipe Mounting Bracket	Carbon Steel	1 _ _ _	*
	Flat Pipe Mounting Bracket	316 SS	3 _ _ _	*
	Angle Pipe Mounting Bracket	Carbon Steel	2 _ _ _	*
	Angle Pipe Mounting Bracket	316 SS	4 _ _ _	*
	Wall Mounting Bracket	Carbon Steel	5 _ _ _	*
	Wall Mounting Bracket	316 SS	6 _ _ _	*
b. Customer Tag	Customer Tag Type			
	No customer tag		_ 0 _ _	*
	One Wired Stainless Steel Tag (Up to 4 lines 26 char/line)		_ 1 _ _	*
	Two Wired Stainless Steel Tag (Up to 4 lines 26 char/line)		_ 2 _ _	*
	One Wired Stainless Steel Blank Tag (Up to 4 lines 26 char/line)		_ 3 _ _	*
c. Unassembled Conduit Plugs & Adapters	Unassembled Conduit Plugs & Adapters			
	No Conduit Plugs or Adapters Required		_ _ A0	*
	1/2 NPT Male to M20 Female 316 SS Certified Conduit Adapter (qty 2)		_ _ A1	n
	1/2 NPT Male to 3/4 NPT Female 316 SS Certified Conduit Adapter		_ _ A2	n
	1/2 NPT 316 SS Certified Conduit Plug		_ _ A6	n
	M20 316 SS Certified Conduit Plug		_ _ A7	m
	Minifast® 4 pin (1/2 NPT) (not suitable for X-Proof applications)		_ _ A8	n
	Minifast® 4 pin (M20) (not suitable for X-Proof applications)		_ _ A9	m

TABLE VIII	OTHER CERTIFICATIONS AND OPTIONS		
Certifications and Warranty	None - No additional options	00	*
	Marine Approval (ABS, LR, DNV, BV)	MT	d
	MID approved transmitter - Contact tech support for specific MID approved ranges	MD	r
	Certificate of Conformance	F3	*
	Calibration Test Report & Certificate of Conformance	F1	*
	Certificate of Origin	F5	*
	SIL2/3 Certificate	FE	j
	Extended Warranty Additional 1 year	01	*
	Extended Warranty Additional 2 years	02	*
	Extended Warranty Additional 3 years	03	*
	Extended Warranty Additional 4 years	04	*
	Extended Warranty Additional 15 years	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	D,H_ _		
n	IVa	C,G_ _		
r	I	S	IVb	_D,F_
	II	_0		
	IVa	C,D,G,H_ _	Vc	_ _ S
	IVc	_ _0,A,D,E,H,J		
t	IVb	_ H _		
b	Select only one option from this group			

FIELD INSTALLABLE REPLACEMENT PARTS

Description	Kit Number
Integrally Mounted Advanced Indicator Kit	50049846-503
Integrally Mounted Standard Indicator Kit	50126003-501
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/Lightning Protection Kit for FFB Module	50086421-509
Dual Input Terminal Strip w/Lightning Protection FFB 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
FFB TB -COMM SGL input w/Lightning Protection w/o REED Sensor	50187380-501
FFB TB-COMM SGL input w/Lightning Protection w/ REED Sensor	50187380-502
FFB TB-COMM Dual input w/Lightning Protection w/o REED Sensor	50187380-503
FFB TB-COMM Dual input w/Lightning Protection w/REED Sensor	50187380-504

Note P - For part number pricing please refer to WEB Channel.

PRODUCT MANUALS

Description	Part Number
Product Manual STT850 Smart Temperature Transmitter User Manual - English	34-TT-25-03
Product Manual STT850 Smart Temperature Transmitter Safety Manual - English	34-TT-25-05
Product Manual STT850 Smart Temperature Transmitter HART/DE Communications Manual - English	34-TT-25-06
Product Manual STT850 Smart Temperature Transmitter Foundation Fieldbus Manual - English	34-TT-25-07

All product documentation is available at www.process.honeywell.com.

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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or
(TAC)
hfs-tac-support@honeywell.com

Specifications are subject to change without notice.

For more information
To learn more about SmartLine Temperature,
visit https://process.honeywell.com
Or contact your Honeywell Account Manager

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