## **SmartLine**

## Honeywell

#### **Technical Information**

# STT850 SmartLine Temperature Transmitter Specification 34-TT-03-14, November 2022



#### 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.
- o 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.
- o Comprehensive on-board diagnostic capabilities.
- o Full compliance to SIL 2/3 requirements.
- Available with 15-year warranty.
- o Supports Namur 107 Extended Diagnostics (FF).
- Supports Namur 89 Wire break.
- o Direct entry of Callendar-Van Dusen coefficients  $R_0$ ,  $\alpha$ ,  $\delta$  and  $\beta$  for calibrated RTD sensors (not available on DE units).



Figure 1– Smartline STT850 Temperature transmitter

#### **Lower Cost of Ownership**

- Universal input
- Dual sensor option
- o Multiple local display capabilities
- o 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)
- o 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)
- o 0, 90,180, & 270-degree position adjustments
- o Deg C, F, R and Kelvin measurement units
- o 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)
- o 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)
- o 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'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 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 intolerance 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<sup>1,3</sup>

Reference Accuracy <sup>2</sup> (conformance to +/-3 Sigma)

Input Type		tange Limits	Accuracy A		Standards
RTD (2,3,4 wire)	°C	° F	° C	%	
Pt25 <sup>6</sup>	-200 to 850	-328 to 1562	0.50	0.005	IEC751:1990 (α=0.00385)
Pt100	-200 to 850	-328 to 1562	0.10	0.005	IEC751:1990 (α=0.00385)
Pt200	-200 to 850	-328 to 1562	0.20	0.005	IEC751:1990 (α=0.00385)
Pt500	-200 to 850	-328 to 1562	0.12	0.005	IEC751:1990 (α=0.00385)
Pt1000 <sup>5</sup>	-200 to 500	-328 to 932	0.10	0.005	IEC751:1990 (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	%	
Б	200 to 300	392 to 572	3	0.005	IEC 584-1 (ITS-90)
В	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)
ν.	-200 to -100	-328 to -148	0.4	0.005	IEC 584-1 (ITS-90)
K	-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)
D	-50 to 0	-58 to 32	1.5	0.005	IEC 584-1 (ITS-90)
R	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)
3	0 to 1760	32 to 3200	0.50	0.005	IEC 584-1 (ITS-90)
Т	-250 to -200	-418 to -328	1	0.005	IEC 584-1 (ITS-90)
1	-200 to 400	-328 to 752	0.25	0.005	IEC 584-1 (ITS-90)
C (W <sub>5</sub> W <sub>26</sub> )	0 to 2000	32 to 3632	0.60	0.005	ANSI/ASTM E-230 (ITS-90)
○ (VV5 VV26)	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 <sup>5</sup>	-100 to 1200 mV	0.12 mV	0.005	
Millivolts	-20 to 125 mV	0.015 mV	0.005	
Ohms <sup>5</sup>	0 to 500 Ohms	0.2 Ohms	0.005	
Ohms	0 to 2000 Ohms	0.3 Ohms	0.005	
Ohms <sup>5</sup>	0 to 3000 Ohms	0.45 Ohms	0.005	

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

<sup>2.</sup> 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.

## **Performance under Rated Conditions – All Models**

Peromance under Rated (		vioueis				
Parameter	Description					
Input Span Adjustment Range	No limits to adjustr 1 engineering unit	nents within th	e maximum range e	except the minimum span limit of		
Analog Output		nA (HART & D	E Transmitters only	/)		
Digital Communications:		•	·	bus ITK 6.1.2 compliant		
g	-	-		arity insensitive connections.		
Output Failure Modes	,	Honeywell		NAMUR NE 43 Compliance:		
(HART/DE only)	Normal Limits:	•	20.8 mA	3.8 – 20.5 mA		
(,,	Failure Mode:		nd ≥ 21.0 mA	≤ 3.6 mA and ≥ 21.0 mA		
Output Accuracy (HART/DE only)		_ 0.0		_ = = = = = = = = = = = = = = = = = = =		
Supply Voltage Effect	0.005 % span per	volt.				
Transmitter Turn on Time	0.000 /0 opa po.					
(includes power up & test	<b>HART or DE:</b> 2.5 s	sec.	Foundation	n Fieldbus: Host dependent		
algorithms)	1 3. 22. 2.0	,00.	r odridatio	The labae. These dependent		
Analog Input	Stability: 0.01% o	fURL per Yea	r for 10 years			
,a.ogpar	Maximum Lead W	•	-			
		Thermocouples: 50 ohms per leg				
	•	•	•			
	RTD (all except Pt15) and Ohms: 50 ohms per leg RTD Pt25: 10 ohms per leg					
Response Time		DE/HART Ana	log Output	FOUNDATION Fieldbus		
(delay + time constant)	Single Input:	130 - 23		Host Dependent		
(delay + time constant)	Dual Input:	305 - 45		Host Dependent		
Update time	125 mSec for singl		5 IIIOCC	1103t Dependent		
opuate time	250 mSec for dual input units					
Damping Time Constant	HART: Adjustable from 0 to 102 seconds in 0.1 increments. <b>Default:</b> 0.50 seconds					
Damping Time Constant	<b>DE:</b> 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 secon		, 1.0, 0.1, 0.0, 12.7	, 20.0, 01.1, 102.0 00001100.		
Ambient Temperature Effect	Digital Accuracy	<u> </u>				
7 millione romporataro Enoce	For RTD Inputs: 0	0015 °C/°C				
	For T/C Inputs: 0					
	Output D/A: 0.00		rC			
Cold Junction Accuracy	±0.25 °C	50 70 0. opa				
Total Reference Accuracy	Digital Mode					
, , , , , , , , , , , , , , , , , , , ,	- U	C/J Accuracy	(T/C input types on	v)		
	Analog Mode (HA	-	( . , o part t) pas o	,,		
	•		curacy + C/J Accur	acy (T/C input types only)		
		•	•	ensor and 0 to 200°C range		
	· ·	_		%) * 0.005 % = 0.11 °C		
Sensor Burnout		-		n scale with critical status		
			•	wires will be indicated		
Digital Output	Contact Rating					
• · · · · · · · · · · · · · · · · · · ·			nt: 40mA maximur	n (controlled by load resistance		
	Low Level: 0 to 2					
Display	Digital Readout: 7					
Display Resolution				reading range (-9999 to -1000)		
(Advanced and Basic)				99 to -10000) or (10000 to 000) or (100000 to 999999).		
Vibration Effect	•			• • •		
VIDIALION LINGUL	Per IEC60770-1 field or pipeline, high vibration level (10-2000Hz: 0.21 displacement/3g max acceleration)					
Electromagnetic Compatibility	IEC 61326-3-1	ian acceletatio	11)			
Isolation						
EMC Compliance	2000 Vdc (1400Vrms) Galvanic isolation between inputs and output.  EN 61326-1 and EN 61326-3-1 (SIL)					
Lightning Protection Option	Leakage Current:	•	· ·			
Lightning Protection Option	Impulse rating:	8/20 uS	5000 A (>10 strike	es) 10000 A (1 strike min.)		
	•	0/20 uS 10/1000 uS	200 A (> 300 strike	•		
		10/1000 43	200 A (> 300 SITIKE	;o <sub>)</sub>		

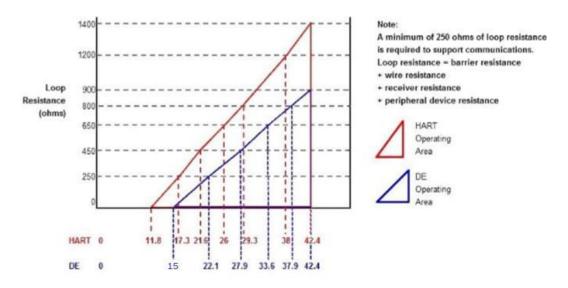
#### Performance under Rated Conditions – All Models (continued)

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.
	<b>DC:</b> 120 dB (with maximum source impedance of 50 ohms) or a ±1 LSB whichever is
	greater with 120 Vdc applied.
	<b>DC (to 1 KHz):</b> 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 <sup>1</sup>									
	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 M 0 to 1,40 DE Mod 0 to 1,30		ART Models: 11.8 to 42.4 Vdc at terminals (IS versions limited to 30 Vdc) to 1,400 ohms (as shown in Figure 2)  E Models: 13.8 to 42.4 Vdc at terminals (IS versions limited to 30 Vdc) to 1,300 ohms (as shown in Figure 2)  Models: 9.0 to 32.0 Vdc at terminals							

 $<sup>^1</sup>$  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 & IP68. 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			
Wounting	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, 2l	30 ms
Signal Characterizer	1P	30 ms

LCD Display	1P	n/a
Input Selector	1P	30 ms
Arithmetic	1P, 2l	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 Basic 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
		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; T6T5  Class 1, Zone 1, AEx db IIC T6T5 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
A	FM Approvals <sup>™</sup> (USA)	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
		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; T6T5  Class I Zone 1 AEx db IIC T6T5 Gb; Zone 21 Ex tb IIIC T 95°C Db  Ex db IIC T6T5 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
В	CSA-Canada and USA	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 Ga Ex ic IIC T4 Gc Nonincendive, Certificate: 2689056:	4-20 mA/ DE/HART/FF	Note 2	-50°C to 70°C FISCO: -50°C to 45°C
		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

MSG CODE	AGENCY	TYPE OF PROTECTION	COMM OPTION	Electrical Parameters	Ambient Temperature
		Enclosure: Type 4X/ IP66/ IP67	ALL	ALL	ALL

		Standards: CCA C22 2 No. 0 10: CCA 22 2	No 25 4000 (	o officer and 200	20).			
		Standards: CSA C22.2 No. 0-10; CSA 22.2	•		**			
		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);						
				7-92 (reaffirm	ea 2012);			
		C22.2 No. 213-2017; C22.2 No.		4 2044 225	2 N			
		C22.2 No. CSA 60079-0:2011; C		-	2 No. 60079-11:2014;			
В		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/	•	•				
		ANSI/ ISA 60079-15(12.12.02) :	•	•				
		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						
		Flameproof, Sira 14ATEX2046X:			T0500 T5 T 5000			
		II 2 GD	4-20 mA/	1	T 95°C, T5: Ta= -50°C to			
		Ex db IIC T6T5 Gb	DE/HART/FF	Note 1	85°C			
		Ex tb IIIC T 95°C Db			T6: Ta= -50°C to 65°C			
		Intrinsically Safe, Sira 14ATEX2046X:						
		II 1 GD			-50°C to 70°C			
		Ex ia IIC T4 Ga	4-20 mA/					
		Ex ia IIIC T95°C Da	DE/HART/FF	Note 2	FISCO:			
		FISCO Field Device (Only for FF Option)			-50°C to 45°C			
		Ex ia IIC T4 Ga						
		Enclosure: IP66/ IP67	ALL	ALL	ALL			
С	ATEX	·	Standards: EN 60079-0: 2012/A11:2013; EN 60079-1 : 2014; EN 60079-31 : 2014					
		EN 60079-11: 2011; EN 60079-2		•				
		Increase Safety/ Intrinsic Safety, Sira	,					
		14ATEX4052X:		Note 1				
		II 3 G	4-20 mA/ DE/HART/FF		-50°C to 85°C			
		Ex ec IIC T4 Gc			FISCO:			
		Ex ic IIC T4 Gc			-50°C to 45°C			
		FISCO Field Device (Only for FF Option)						
İ		Ex ic IIC T4 Gc						
		Enclosure: IP66/ IP67	ALL	ALL	ALL			
		Standards: EN 60079-0: 2012/A11:2013;	EN 60079-7:20	15; EN 60079	-11:2012			
		Flameproof, SIR 14.0020X	4 20 m 4 /		T 95°C, T5: Ta= -50°C to			
		Ex db IIC T6T5 Gb	4-20 mA/	Note 1	85°C			
		Ex tb IIIC T 95°C Db	DE/HART/FF		T6: Ta= -50°C to 65°C			
		Intrinsically Safe, SIR 14.0020X						
		Ex ia IIC T4 Ga	4 20 4 /		-50°C to 70°C			
		Ex ia IIIC T95°C Da	4-20 mA/	Note 2	FISCO:			
		FISCO Field Device (Only for FF Option)	DE/HART/ FF		-50°C to 45°C			
		Ex ia IIC T4 Ga						
D	IECEx	Non Sparking, SIR 14.0020X						
		Ex ecIIC T4 Gc	4 20 m 4 /		-50°C to 85°C			
		Ex ic IIC T4 Gc	4-20 mA/ DE/HART/ FF	Note 1	FISCO:			
		FISCO Field Device (Only for FF Option)	DE/HAKI/ FF		-50°C to 45°C			
		Ex ic IIC T4 Gc						
		Enclosure: IP66/ IP67	ALL	ALL	ALL			
		<b>Standards: IEC</b> 60079-0: 2011; IEC 60079	**					
		IEC 60079-11 : 2011; IEC 60079-7:2015;						
		IEC 60079-11 : 2011; IEC 60079-	-7:2015;					

		T-1 6	1		T 0500 T5 T =
		Flameproof:	4-20 mA/	Note 1	T 95°C, T5: Ta=50°C
		Ex db IIC T6T5 Gb	DE/HART/FF		to 85°C
		Ex tb IIIC T 95°C Db	,,		T6: Ta= -50°C to 65°C
		Intrinsically Safe:			
		Ex ia IIC T4 Ga	4-20 mA/		-50°C to 70°C
		Ex ia IIIC T95°C Da	DE/HART/FF	Note 2	FISCO:
	SAEx	FISCO Field Device (Only for FF Option)	DE/HART/FF		-50°C to 45°C
E	(South	Ex ia IIC T4 Ga			
	Africa)	Increase Safety/ Intrinsic Safety:			
		Ex ec IIC T4 Gc			-50°C to 85°C
		Ex ic IIC T4 Gc	4-20 mA/	Note 1	FISCO:
		FISCO Field Device (Only for FF Option)	DE/HART/FF		-50°C to 45°C
		Ex ic IIC T4 Gc			
		Enclosure: IP66/ IP67	ALL	ALL	ALL
		·			
		Flameproof:	4-20 mA/	1	T 95°C, T5: Ta= -50°C
		Ex db IIC T6T5 Gb	DE/HART/FF	Note 1	to 85°C
		Ex tb IIIC T 95°C Db	,,		T6: Ta= -50°C to 65°C
		Intrinsically Safe:			
		Ex ia IIC T4 Ga	4-20 mA/	Note 2	-50°C to 70°C
		Ex ia IIIC T95°C Da	DE/HART/FF		FISCO:
F	INMETRO	FISCO Field Device (Only for FF Option)	DETITALLIT		-50°C to 45°C
'		Ex ia IIC T4 Ga			
		Increase Safety/ Intrinsic Safety:			
		Ex ec IIC T4 Gc	4-20 mA/		-50°C to 85°C
		Ex ic IIC T4 Gc		HART/FF Note 1	FISCO:
		FISCO Field Device (Only for FF Option)	DE/HART/FF		-50°C to 45°C
		Ex ic IIC T4 Gc			
		Enclosure: IP66/ IP67	ALL	ALL	ALL
		Flameproof:	4 20 5 4		T 95°C, T5: Ta= -50°C
		Ex d IIC T6T5 Gb	4-20 mA/	Note 1	to 85°C
		Ex tD A21 IP66/IP67 T95°C	DE/HART/FF		T6: Ta= -50°C to 65°C
		Intrinsically Safe:			
		Ex ia IIC T4	4.20		-50°C to 70°C
	NEPSI	Ex iaD 20 T95°C	4-20 mA/	Note 2	FISCO:
G	(CHINA)	FISCO Field Device (Only for FF Option)	DE/HART/FF		-50°C to 45°C
	(2	Ex ia IIC T4			
		Non Sparking/ Intrinsic Safety:			5000
		Ex nA IIC T4	4-20 mA/	Note 1	-50°C to 85°C
		Ex ic IIC T4 Gc	DE/HART/FF		
		Enclosure: IP66/ IP67	ALL	ALL	ALL
Н	KOSHA	Flameproof:			
	(KOREA)	Ex d IIC T4 Gb	4-20 mA/	Note 1	-50°C to 85°C
	'	Ex tD A21 T 95°C IP 66/ IP67	DE/HART/FF		
		Intrinsically Safe:			
		Ex ia IIC T4	4-20 mA/		-50°C to 70°C
		FISCO Field Device (Only for FF Option)	DE/HART/FF	Note 2	FISCO:
		Ex ia IIC T4			-50°C to 45°C
		Enclosure: IP66/ IP67	ALL	ALL	ALL
	I	Endidoute: II do/ II d/	/ \LL	ALL	/1LL

J	EAC Ex (Russia, Belarus and	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
	Kazakhstan)	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	-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
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	-50°C to 70°C FISCO: -50°C to 45°C
		Ex d IIC T4 Gb	4-20 mA/ DE/HART/FF	Note 1	-50°C to 85°C

#### Notes

#### 1. Operating Parameters:

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

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

FF (Loop Terminal)

Voltage= 10 to 30 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 = 4.2nF	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 = 85nF	Li = 0µH	Pi = 0.9W

<u>Transmitter with Terminal Block Single (50086421-003), Dual (50086421-004) Input revision AA or DO (50086421-006) Option revision W or Later</u>

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	Ci = 4.2nF	Li = 0µH	Pi = 0.9W
-----------------	------------	----------	-----------

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

#### FISCO Values

#### Loop, Terminals 1 and 2:

$\label{eq:max} \begin{array}{ c c c c c c c c c c c c c c c c c c c$
---

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

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

Transmitter with Terminal Block Single (50086421-009), or Dual (50086421-010) Input revision S or Later

Loop, Terminals 1 and 2:

Vmax = Ui = 30V	Imax= Ii = 225mA	Ci = 4.84nF	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

#### FISCO Values

Loop, Terminals 1 and 2:

Vmax = Ui = 17.5V	Imax= Ii = 570mA	Ci = 4.84nF	$Li = 0\mu H$	Pi = 0.9W

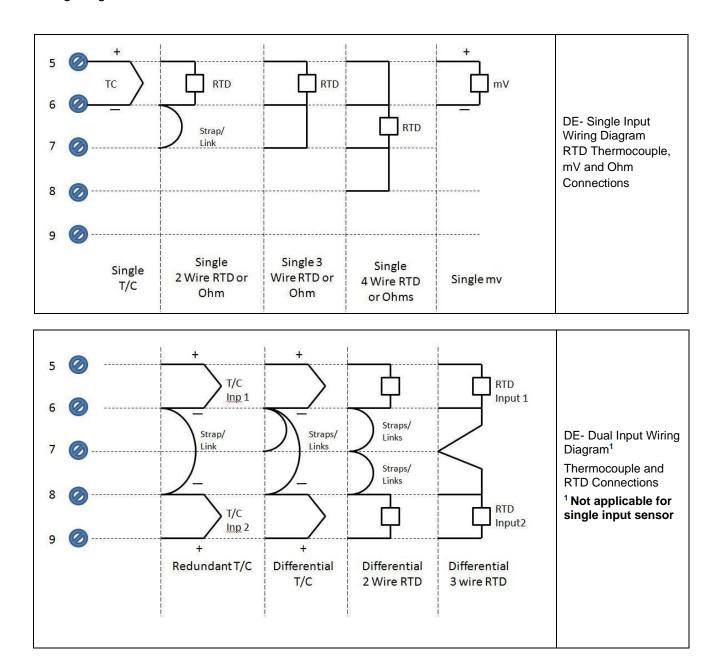
Temperature Sensor, Terminals 5, 6, 7 and 8:

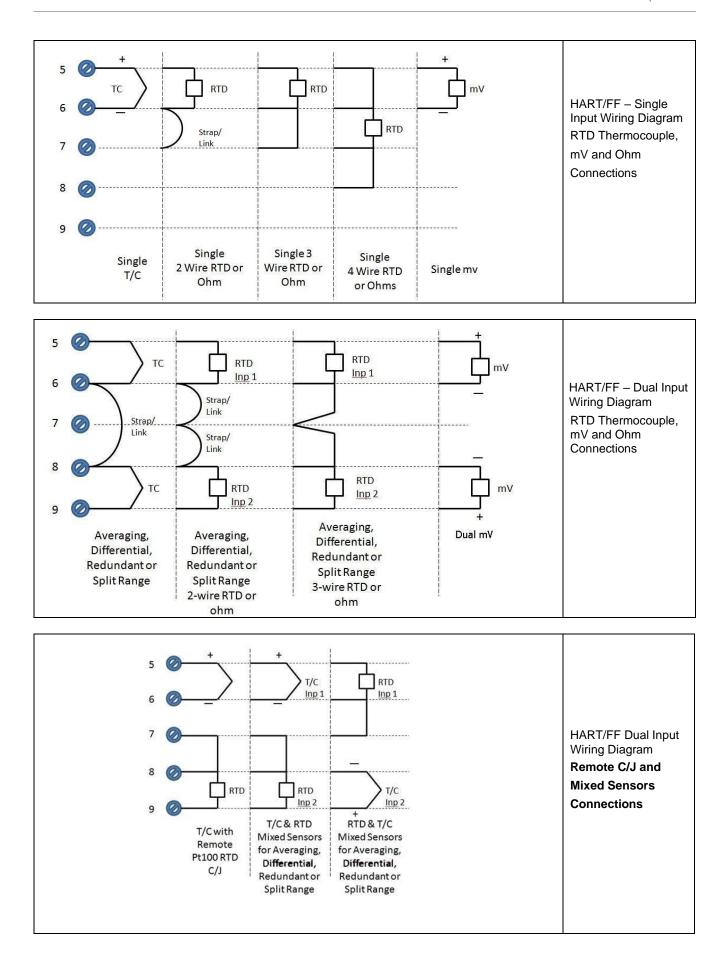
	F 0) /		0 00 5	1 10011	D 45 40 144
Uo =	= 5.9V	I Imax= Io = 2.65mA	Co = 39uF	l Lo = 4.99H	I Po = 15.48mW

Note: Transmitter with Terminal Block revision F or later, the revision is on the label that is on the module.

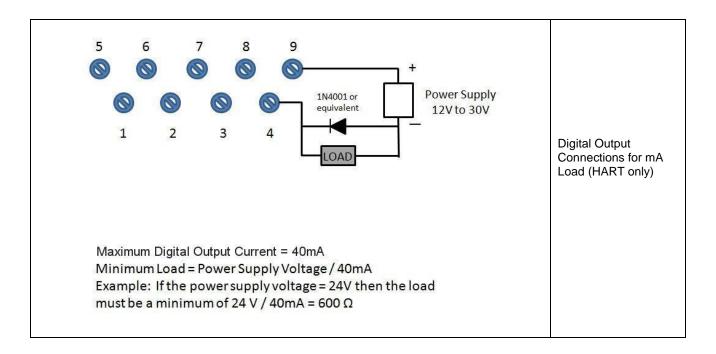
SIL 2/3 Certification	IEC 61508 SIL 2 for non-redundant use and SIL 3 for redundant use according to EXIDA and TÜV Nord Sys Tec GmbH & Co. KG under the following standards: IEC61508-1: 2010; IEC 61508-2: 2010; IEC61508-3: 2010. SIL EMI/EMC compliance as per Standard: IEC 61326-3-1
MID Approval	Issued by NMi Certin B.V. in accordance with WELMEC guide 8.8, OIML R117.1 Edition 2007 (E), and EN 12405-1+A2 Edition 2006. Applicable to Pt100 sensor, 4 wire only.
MARINE TYPE APPROVAL	In progress.

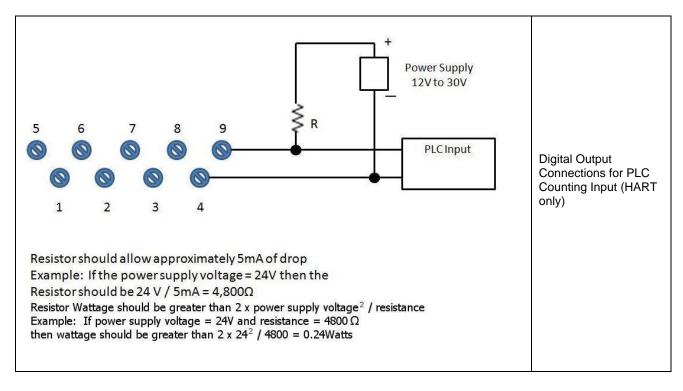
### Wiring Diagrams





STT850 Smart Temperature





### **Mounting & Dimensional Drawings**

### TRANSMITTER ENCLOSURE CAN BE ROTATED A TOTAL OF 900 FROM THE STANDARD MOUNTING POSITION

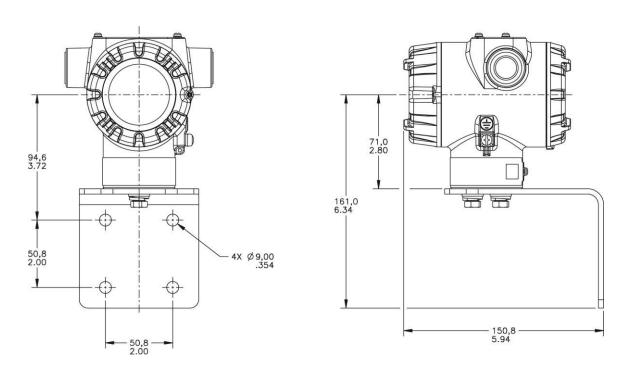
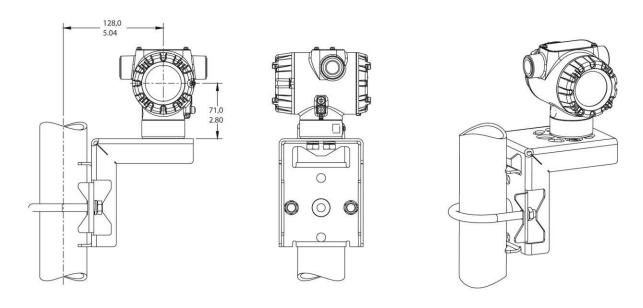
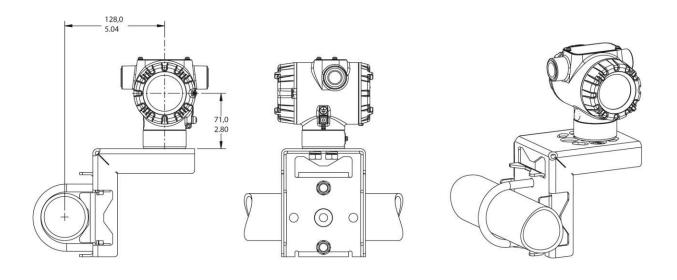


Figure 3 – STT850 housing- Horizontal Wall Mounting



## VERTICAL ANGLE BRACKET PIPE MOUNT



## HORIZONTAL ANGLE BRACKET PIPE MOUNT

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

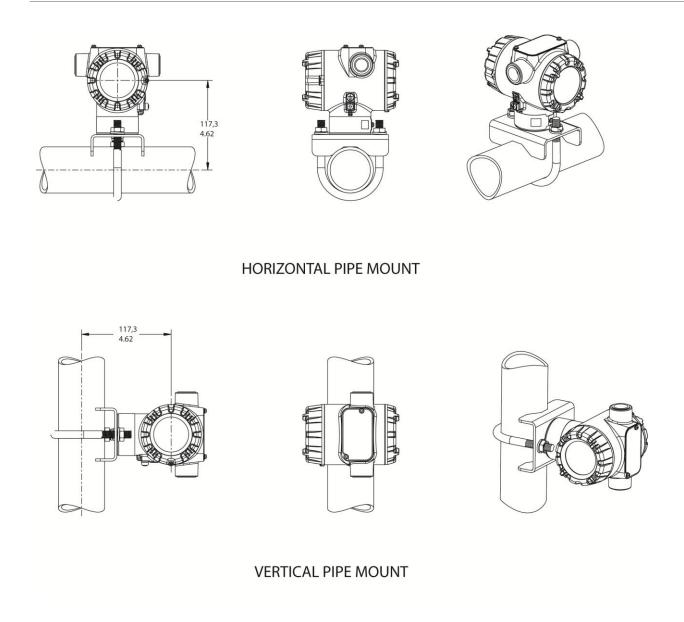


Figure 5 - STT850 Pipe Mount housing - Horizontal & Vertical

## **Mounting & Dimensional Drawings**

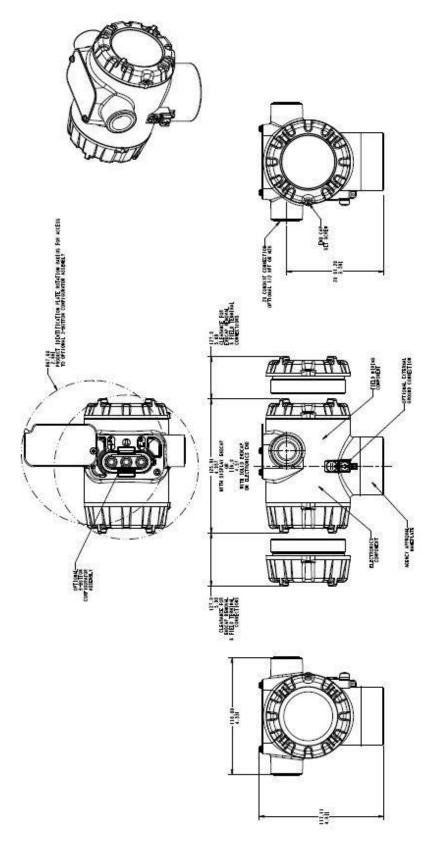


Figure 6 - STT850 housing dimensions

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



Section 13 Page: STT8-1 Effective Date: Nov 2022 **Model Selection Guide** with Price Data

## Model STT850 **Smart Temperature Transmitter**

Model Selection Guide: Rev 1 34-44-16-14 Issue 29



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 equals the List Price: Price equals the sum of prices for all selections made sum of all selections Key ΙX made. XXXXSTT850 Availability **KEY NUMBER INPUT TYPE** Selection STT850 Universal Input TABLE I NUMBER OF INPUTS Single S **Input Details** Dual TABLE II DIGITAL OUTPUT No 0 **Digital Output** Yes TABLE III AGENCY APPROVALS (See data sheet for Approval Code Details) 0 No Approvals Required FM Explosion proof, Intrinsically Safe, Non-incendive, & Dustproof CSA Explosion proof, Intrinsically Safe, Non-incendive, & Dustproof В ATEX Explosion proof, Intrinsically Safe & Non-incendive С IECEx Explosion proof, Intrinsically Safe & Non-incendive D **Approvals** SAEx Explosion proof, Intrinsically Safe & Non-incendive Ε h F INMETRO Explosion proof, Intrinsically Safe & Non-incendive h NEPSI Explosion proof, Intrinsically Safe & Non-incendive G h Н KOSHA Explosion proof, Intrinsically Safe & Non-incendive h EAC Explosion proof, Intrinsically Safe & Non-incendive h CCoE Explosion proof, Intrinsically Safe & Non-incendive h TRANSMITTER ELECTRONICS SELECTIONS TABLE IV **Housing and Material** Connection Lightning protection Polyester Powder Coated Aluminum 1/2 NPT Yes a. Electronic Housing D\_\_ Material & Polyester Powder Coated Aluminum M20 Yes **Connection Type** G\_\_ 316 Stainless Steel (Grade CF8M) 1/2 NPT Yes 316 Stainless Steel (Grade CF8M) M20 Yes **Analog Output Digital Protocol** 4-20mA dc HART Protocol b. Output/ Protocol D\_ 4-20mA dc DE Protocol Foundation Fieldbus none F Ext Zero, Span & Config Buttons Display Languages 0 None None None Yes (Zero/Span Only) f None None \_\_B Basic None **English** c. Customer Interface С Basic Yes **English** Selections Advanced EN,GR,FR,IT,SP,RU,TU D None EN,GR,FR,IT,SP,RU,TU Ε Advanced Yes EN, CH, JP Н Advanced None Advanced EN, CH, JP Yes

TABLE V	CONFIGURATION SELECTIONS							
a. Application	Diagnostics							
Software	Standard Diagnostics					*		
Joitware	Advanced Diagnostics - Rate of Change and Deviation Alarm					С		
	Write Protect	Fail Mode	High	h & Low Output Limits <sup>3</sup>				
	Disabled	High> 21.0mAdc	Honeywell Std	I (3.8 - 20.8 mAdc)	_1_	f		
	Disabled	Low< 3.6mAdc		I (3.8 - 20.8 mAdc)	_2_	f		
	Enabled	High> 21.0mAdc		I (3.8 - 20.8 mAdc)	3	f		
b. Output Limit,	Enabled	Low< 3.6mAdc		I (3.8 - 20.8 mAdc)	4	f		
Failsafe & Write	Enabled	N/A	N/A	Fieldbus	5	g		
Protect Settings	Disabled	N/A	N/A	Fieldbus	6	g		
c. General	Factory Standard				s	*		
Configuration	· ·	Custom Configuration						
TABLE VI	CALIBRATION & ACC	URACY SELECTION	NS					
Accuracy and	Accuracy	Calibrated Range		Calibration Qty				
Calibration	Standard	Factory Std		Single Calibration	Α	*		
	Standard	<u> </u>	Required)	Single Calibration	В	*		
TABLE VII		ACCESSORY SELECTIONS  Bracket Type Material						
a. Mounting	Bracket Type							
Bracket	None		None		0	*		
		Flat Pipe Mounting Bracket		Carbon Steel		*		
		Flat Pipe Mounting Bracket		316 SS		*		
	Angle Pipe Mounting Bracket 3 Wall Mounting Bracket C		Carbon Steel		2			
			316 SS Carbon Steel 316 SS		4	*		
					5	*		
		Wall Mounting Bracket			6			
b. Customer	Customer Tag Type							
Tag		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)					Î .		
						*		
	One Wired Stainless Steel Blank Tag (Up to 4 lines 26 char/line)							
c. Unassembled	Unassembled Conduit P				A0	*		
Conduit	No Conduit Plugs or Adapters Required 1/2 NPT Male to M20 Female 316 SS Certified Conduit Adapter (qty 2)							
Plugs & Adapters					A1	n 		
Adapters	1/2 NPT Male to 3/4 NF		ertified Conduit A	Adapter	A2 A6	n n		
		1/2 NPT 316 SS Certified Conduit Plug  M20 316 SS Certified Conduit Plug  Minifestal Amin (4/2 NPT) (not suitable for V. Proof amplications)						
	Minifast® 4 pin (1/2 NPT) (not suitable for X-Proof applications) Minifast® 4 pin (M20) (not suitable for X-Proof applications)					n m		
	Willingst 4 pin (WZO) (II	ot suitable for X-1 for	or applications)		A9			
TABLE VIII	OTHER CERTIFICATION							
Certifications and	None - No additional op				00	*		
Warranty	MID approved transmitter - Contact tech support for specific MID approved ranges					r		
	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					*		
						*		
						*		
						j		
						*		
						*		
	Extended Warranty Additional 3 years					*		
	Extended Warranty Additional 4 years					*		
	Extended Warranty Add	illional 15 years			15	_ ^		
TABLE IX	MANUFACTURING SPEC	CIALS						
Factory	Factory Identification				0000	*		

 $<sup>^3</sup>$  NAMUR Output Limits 3.8 - 20.5mAdc can be configured by the customer or select custom configuration Table Vc

#### MODEL RESTRICTIONS

Restriction Letter	Available Only with		Not Available with		
Restriction Letter	Table Selection(s)		Table	Selection(s)	
	1	s			
a	IV	_H_			
С		-	IVb	_D,F_	
е	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			
	I	S	IVb	_D,F_	
	II	_0			
r	IVa	C,D,G,H	Vc	s	
	IVc	0,A,D,E,H,J			
b	Select only one option from this group				

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/Lightning Protection Kit for FFB/Profibus Module	50086421-509
Dual Input Terminal Strip w/Lightning Protection FFB/Profibus 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.

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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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1300-36-04-70

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Specifications are subject to change without notice.

For more information
To learn more about SmartLine Temperature,
visit <a href="https://process.honeywell.com">https://process.honeywell.com</a>
Or contact your Honeywell Account Manager

Process Solutions Honeywell

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