

## Technical Information

### STT650 SmartLine DIN Rail Temperature Transmitter Specification 34-TT-03-15, April 2022



#### Introduction

Part of the SmartLine® family of products, the STT650 is a DIN Rail mounted high performance Temperature transmitter offering high measurement accuracy, stability and reliability over a wide range of process and ambient temperatures. SmartLine easily meets the most demanding needs for temperature measurement applications.

#### Description

The SmartLine Temperature transmitter is designed and manufactured to deliver very high performance. The total accuracy level of the transmitter including the ambient temperature effect in, harsh industrial environments, allows the STT650 to replace virtually any competitive transmitter available today.

#### Best in Class Features:

##### Leading performance

- High accuracy – 0.1 Deg C for RTD.
- Faster response, up to 135 msec update.
- Stable measurement, 0.12% of span for two years.

##### Reliable measurement

- Built in 1500VAC Galvanic Isolation.
- Superior noise performance.
- Sensor error detection in accordance with Namur 89.

##### Lower Cost of Ownership

- Universal input.
- Dual channel option saves panel space.
- Easy to configure, install and commission.
- Can double up as position and level transmitters for valves and ohmic level sensors.



Figure 1– SmartLine STT650 DIN Rail Temperature Transmitter

##### Communications/Output Options:

- 4-20mA dc
- HART ® (version 7.0)

## Common for all the Models

### EMC Specifications

All the STT650 DIN Rail models with universal input are tested for the following parameters:

- Conducted Noise - 10Vrms in the range of 15Hz to 100MHz.
- Radiated Noise - 10V/m in the range of 80 to 1000MHz.
- Surge test - 1KV Differential mode ; 2 KV Common mode.
- Burst Noise - 2.5KV.

### STT650 RTD Input type

#### Features

- Analog 4-20 mA output.
- RTD or Ohm input.
- Single or dual channel option.
- NAMUR NE43 sensor error response.
- Programmable using the STT17C PC Configuration tool.

### Performance specifications

Sensor Type RTD (2,3 wire)	Basic Accuracy*		Rated Range		Minimum Span**	Temperature Effects per 1.0 °C (1.8 °F)*** Change in Ambient Temperature	
	Fixed	% of span	°C	°F		Fixed	% of span
Pt100	0.3°C (32.54°F)	+/- 0.1	-200 to 850	-328 to 1562	25°C (45°F)	0.01°C (0.018°F)	+/- 0.01
Ni 100	0.3°C (32.54°F)	+/- 0.1	-60 to 250	-76 to 482	25°C (45°F)	0.01°C (0.018°F)	+/- 0.01
Ohms	0.2Ω	+/- 0.1	0 to 10000Ω		30Ω	20 mΩ	+/- 0.01

\* Basic accuracy or +/- 0.1% of Span whichever is greater.

\*\* or 50% of upper range value, whichever is greater.

\*\*\* Reference temperature 20 Deg C, Ambient temp effect is greater of the fixed value or the applicable % of Span.

<b>Operating Conditions</b>	
Ambient temperature, rated	-40 to + 85°C (-40 – 185°F)
Humidity	0 to 95% RH (non cond.)
<b>Electrical Input specification</b>	
Supply voltage	8 to 30 VDC for Intrinsically Safe version. 8 to 35 VDC for non-Intrinsically Safe version
Power supply voltage effect	≤ 0.005% of span per VDC
Warm-up time	5 min
Damping (programmable)	0.33 to 60 sec
<b>Current Output Specifications</b>	
Signal output range	4 to 20 mA
Update time	135 msec
Load resistance	≤ (V supply -8) / 0.023 A 0 to 870Ω
<b>Alarm Levels</b>	
Programmable	3.5 to 4 mA downscale 20 to 23 mA upscale
NAMUR NE43 Upscale	23 mA
NAMUR NE43 Downscale	3.5 mA

## STT650 Universal Input type – Analogue Output only

### Features

- Analog 4-20 mA output.
- RTD, T/C, Ohm or mV input.
- NAMUR NE43 sensor error response.
- Programmable using STT17C PC configuration tool.
- Galvanic isolation.

### Performance specifications

Sensor Type RTD (2,3,4 wire)	Basic Accuracy*		Rated Range		Minimum Span**	Temperature Effects per 1.0°C (1.8 °F)*** Change in Ambient Temperature	
	Fixed	% of span	°C	°F		Fixed	% of span
Pt100	0.2°C (0.36°F)	0,05%	-200 to 850	-328 to 1562	25°C (45°F)	0.01°C (0.018°F)	+/- 0.01
Ni 100	0.2°C (0.36°F)	0,05%	-60 to 250	-76 to 482	25°C (45°F)	0.01°C (0.018°F)	+/- 0.01
B	2°C (3.6°F)	0,05%	400 to 1820	+752 to 3308	100°C (180°F)	0.2°C (0.36°F)	+/- 0.01
E	1°C (1.8°F)	0,05%	-100 to 1000	-148 to 1832	50°C (90°F)	0.05°C (0.09°F)	+/- 0.01
J	1°C (0.1.8°F)	0,05%	-100 to 1200	-148 to 2192	50°C (90°F)	0.05°C (0.09°F)	+/- 0.01
K	1°C (0.1.8°F)	0,05%	-180 to 1372	-292 to 2501	50°C (90°F)	0.05°C (0.09°F)	+/- 0.01
L	1°C (0.1.8°F)	0,05%	-100 to 900	-148 to 1652	50°C (90°F)	0.05°C (0.09°F)	+/- 0.01
N	1°C (0.1.8°F)	0,05%	-180 to 1300	-292 to 2372	50°C (90°F)	0.05°C (0.09°F)	+/- 0.01
R	2°C (3.6°F)	0,05%	-50 to 1760	-58 to 320	100°C (180°F)	0.2°C (0.36°F)	+/- 0.01
S	2°C (3.6°F)	0,05%	-50 to 1760	-58 to 3200	100°C (180°F)	0.2°C (0.36°F)	+/- 0.01
T	1°C (1.8°F)	0,05%	-200 to 400	-328 to 752	50°C (90°F)	0.05°C (0.09°F)	+/- 0.01
U	1°C (1.8°F)	0,05%	-200 to 600	-328 to 1112	50°C (90°F)	0.05°C (0.09°F)	+/- 0.01
W3	2°C (3.6°F)	0,05%	0 to 2300	+32 to 4172	100°C (180°F)	0.2°C (0.36°F)	+/- 0.01
W5	2°C (3.6°F)	0,05%	0 to 2300	+32 to 4172	100°C (180°F)	0.2°C (0.36°F)	+/- 0.01
+Lr	2°C (3.6°F)	0,05%	-200 to 800	-328 to 1472	50°C (90°F)	0.2°C (0.36°F)	+/- 0.01
Ohms	0.1Ω	0,05%	0 to 5000Ω		30Ω	10 mΩ	+/- 0.01
mV	10μ	0,05%	-12 to 800 mV		5 mV	1μ	+/- 0.01

\* Basic accuracy or +/- 0.1% of Span whichever is greater.

\*\* or 50% of upper range value, whichever is greater.

\*\*\* reference temperature 20 Deg C, Ambient temp effect is greater of the fixed value or the applicable % of Span.

<b>Operating Conditions</b>	
Ambient temperature, rated	-40 to + 85°C (-40 – 185°F)
Humidity	0 to 95% RH (non-cond)
Cold junction Accuracy	+/- 1°C
<b>Electrical Input specification</b>	
Supply voltage	8 to 30 VDC for Intrinsically Safe version. 8 to 35 VDC for non-Intrinsically Safe version
Power supply voltage effect	≤ 0.005% of span per VDC
Warm-up time	5 min
Response time (programmable)	1 to 60 sec
Galvanic isolation	1500 VAC
<b>Current Output Specifications</b>	
Signal output range	4 to 20 mA
Update time	440 msec
Load resistance	≤ (V supply -7.2) / 0.023 A 0 to 904Ω
<b>Alarm Levels</b>	
Programmable	3.5 to 4 mA downscale 20 to 23 mA upscale
NAMUR NE43 Upscale	23 mA
NAMUR NE43 Downscale	3.5 mA

## STT650 Universal Input type - HART protocol

### Features

- HART™/4-20 mA output.
- RTD, T/C, Ohm or mV input.
- Single or dual channel option.
- Supports Differential or Averaging measurement.
- NAMUR NE43 sensor error response.
- Programmable using MCT404 or STT17C PC configuration tool.
- Galvanic isolation.

HART is a registered trademark of the HART Communication Foundation.

### Performance specifications

Sensor Type RTD (2,3,4 wire)	Basic Accuracy*		Rated Range		Minimum Span**	Temperature Effects per 1.0 °C (1.8 °F)*** Change in Ambient Temperature	
	Fixed	% of span	°C	°F		Fixed	% of span
Pt50	0.1°C (1.8°F)	0,05%	-200 to 850	-328 to 1562	25°C (45°F)	0.005°C (0.009°F)	+/- 0.005
Pt100	0.1°C (1.8°F)	0,05%	-200 to 850	-328 to 1562	25°C (45°F)	0.005°C (0.009°F)	+/- 0.005
Pt200	0.1°C (1.8°F)	0,05%	-200 to 850	-328 to 1562	25°C (45°F)	0.005°C (0.009°F)	+/- 0.005
Pt500	0.1°C (1.8°F)	0,05%	-200 to 850	-328 to 1562	25°C (45°F)	0.005°C (0.009°F)	+/- 0.005
Pt1000	0.1°C (1.8°F)	0,05%	-200 to 850	-328 to 1562	25°C (45°F)	0.005°C (0.009°F)	+/- 0.005
Ni 100	0.2°C (0.36°F)	0,05%	-60 to 250	-76 to 482	25°C (45°F)	0.1°C (0.18°F)	+/- 0.005
B <sup>1,2,3</sup>	1°C (1.8°F)	0,05%	0 to 1820	+32 to 3308	100°C (180°F)	0.1°C (0.18°F)	+/- 0.005
E	0.5°C (0.9°F)	0,05%	-100 to 1000	-148 to 1832	50°C (90°F)	0.025°C (0.045°F)	+/- 0.005
J	0.5°C (0.9°F)	0,05%	-100 to 1200	-148 to 2192	50°C (90°F)	0.025°C (0.045°F)	+/- 0.005
K	0.5°C (0.9°F)	0,05%	-180 to 1372	-292 to 2501	50°C (90°F)	0.025°C (0.045°F)	+/- 0.005
L	0.5°C (0.9°F)	0,05%	-100 to 900	-148 to 1652	50°C (90°F)	0.025°C (0.045°F)	+/- 0.005
N	0.5°C (0.9°F)	0,05%	-180 to 1300	-292 to 2372	50°C (90°F)	0.025°C (0.045°F)	+/- 0.005
R	1°C (1.8°F)	0,05%	-50 to 1760	-58 to 3200	100°C (180°F)	0.1°C (0.18°F)	+/- 0.005
S	1°C (1.8°F)	0,05%	-50 to 1760	-58 to 3200	100°C (180°F)	0.1°C (0.18°F)	+/- 0.005
T	0.5°C (0.9°F)	0,05%	-200 to 400	-328 to 752	25°C (45°F)	0.025°C (0.045°F)	+/- 0.005
U	0.5°C (0.9°F)	0,05%	-200 to 600	-328 to 1112	50°C (90°F)	0.025°C (0.045°F)	+/- 0.005
W3	1°C (1.8°F)	0,05%	0 to 2300	+32 to 4172	130°C (234°F)	0.1°C (0.18°F)	+/- 0.005
W5	1°C (1.8°F)	0,05%	0 to 2300	+32 to 4172	130°C (234°F)	0.1°C (0.18°F)	+/- 0.005
+Lr	1°C (1.8°F)	0,05%	-200 to 800	-328 to 1472	50°C (90°F)	0.1°C (0.18°F)	+/- 0.005
Ohms	0.1Ω	0,05%	0 to 7000Ω		25Ω	5 mΩ	+/- 0.005
mV	10μ	0,05%	-800 to 800 mV		2.5 mV	0.5μ	+/- 0.005

\* Basic accuracy or +/- 0.1% of Span whichever is greater

\*\* or 50% of upper range value, whichever is greater

\*\*\* reference temperature 20 Deg C, Ambient temp effect is greater of the fixed value or the applicable % of Span

1,2,3 TC B<sup>1</sup> accuracy specification range ..... > 400°C

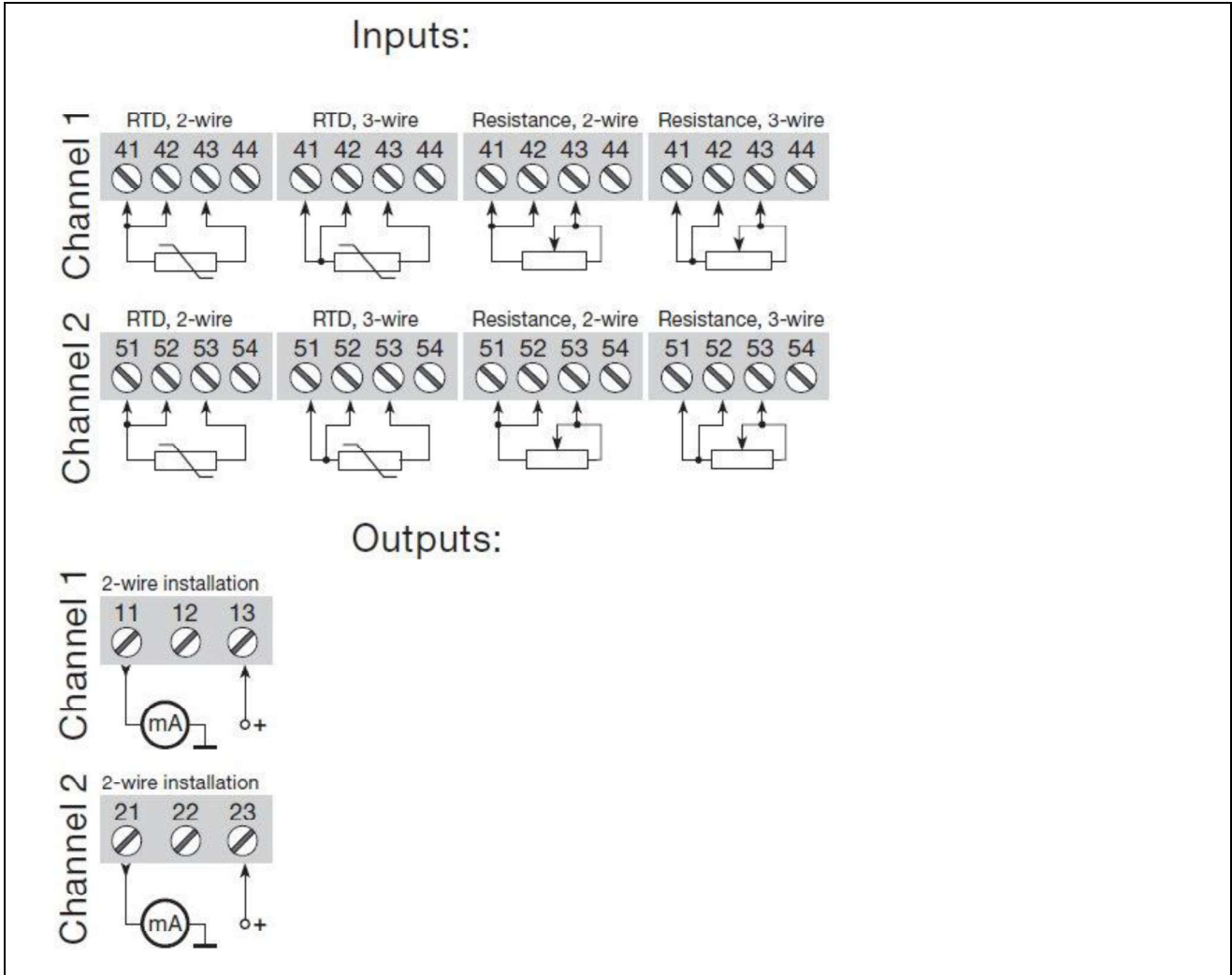
TC B<sup>2</sup> accuracy specification range ..... > 160°C < 400°C

TC B<sup>3</sup> accuracy specification range ..... > 85°C < 160°C

<b>Operating Conditions</b>	
Ambient temperature, rated	-40 to + 85°C (-40 – 185°F)
Humidity	0 to 95% RH (non-cond)
Cold junction Accuracy	+/- 1°C
<b>Electrical Input specification</b>	
Supply voltage	8 to 30 VDC for Intrinsically Safe version. 8 to 35 VDC for non-Intrinsically Safe version
Power supply voltage effect	≤ 0.005% of span per VDC
Warm-up time	30 sec
Response time (programmable)	1 to 60 sec
Galvanic isolation	1500 VAC
<b>Current Output Specifications</b>	
Signal output range	4 to 20 mA
Update time	440 msec
Load resistance	≤ (V supply -8) / 0.023 A 0 to 870Ω
<b>Alarm Levels</b>	
Programmable (Sensor error detection)	3.5 to 23 mA downscale 3.5 to 23 mA upscale
NAMUR NE43 Upscale	23 mA
NAMUR NE43 Downscale	3.5 mA

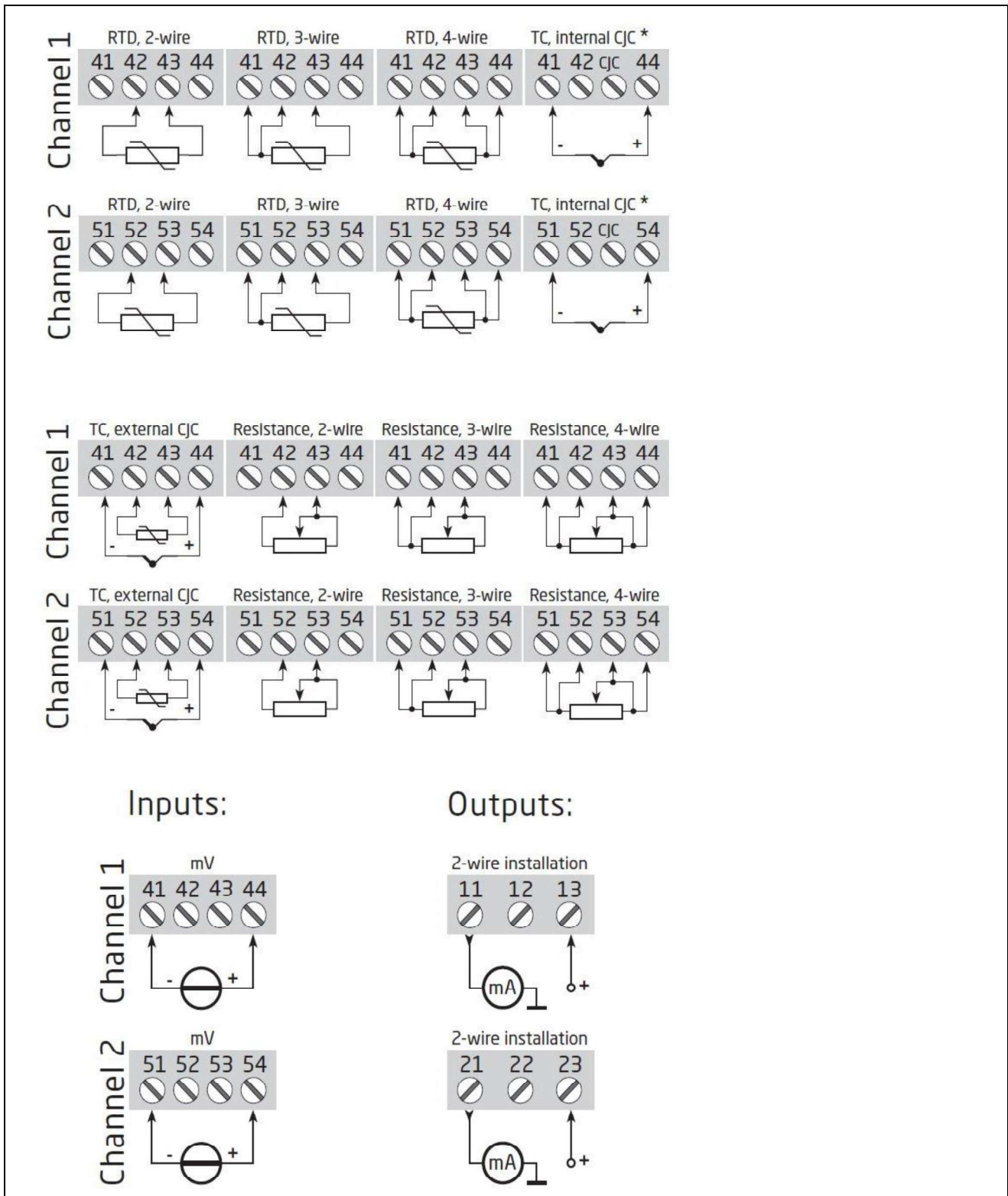
### Wiring Connections

#### STT650 RTD Input type



**Wiring Connections**

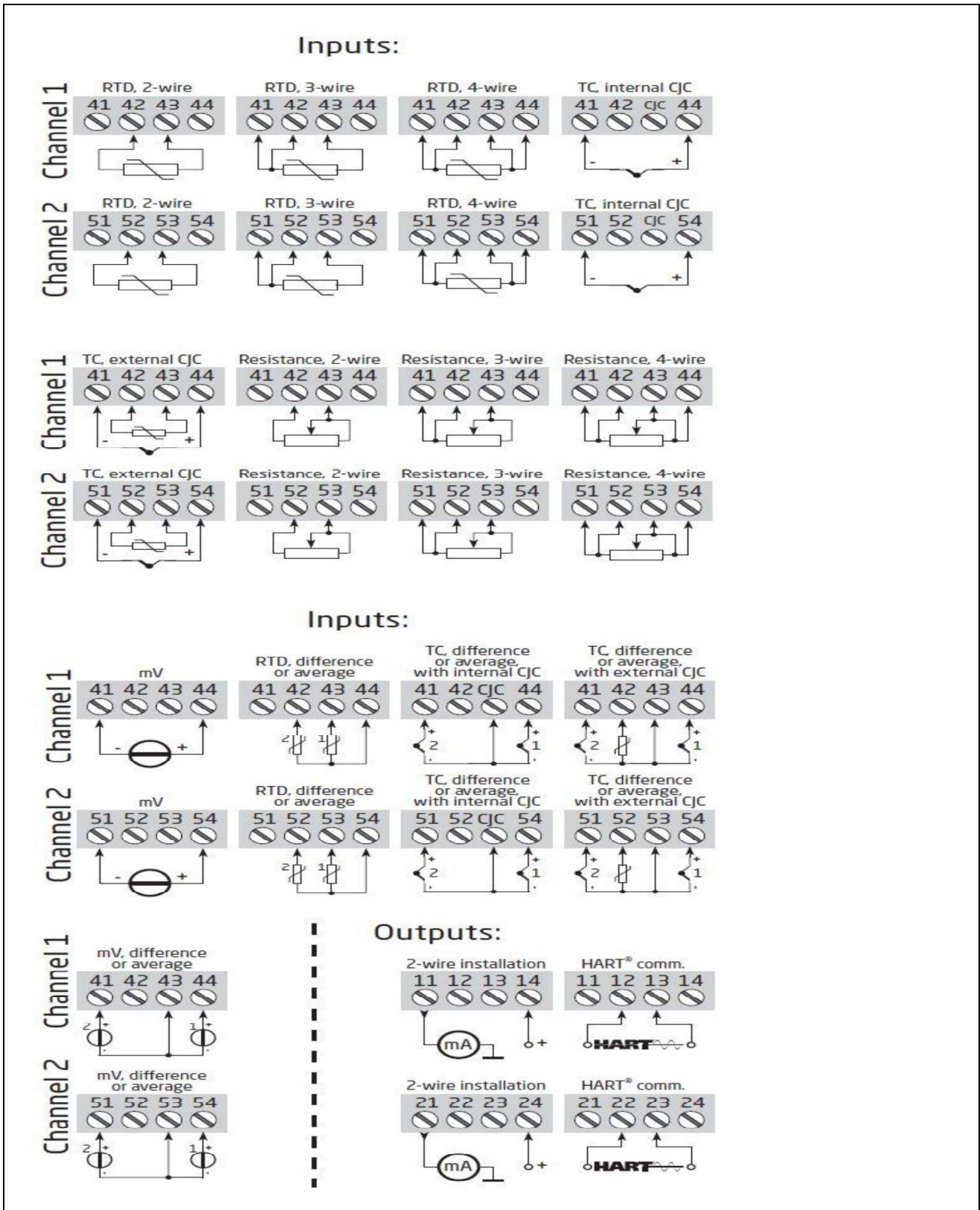
**STT650 Universal Input type (Analogue Output model)**



\* Terminal Block with built in CJC is supplied as a standard accessory for all the universal input STT650 Models.

**Wiring Connections**

**STT650 Universal Input type - HART Protocol**



\* Terminal Block with built in CJC is supplied as a standard accessory for all the universal input STT650 Models.

## Configuration Tools

The STT17C configures the STT650 programmable and HART units. The intuitive graphical user interface of the STT17C\* virtually eliminates the need for operator training after installation on a PC. The STT17C includes all software and transmitter interface hardware necessary to configure the STT650 programmable and HART models in non-hazardous work environments.

WARNING: The STT17C is not approved for use in Hazardous work environments.

## System Requirements:

Windows® XP, Vista and Windows 7/8/8.1 with the following recommendations:

Memory	:	16 MB
Display resolution:		800 x 600
Hard disk space	:	12 MB

## Approval Assessment

<b>SIL Assessment</b>	Hardware assessed by EXIDA for use in SIL applications.
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## Mounting & Dimensional Drawings

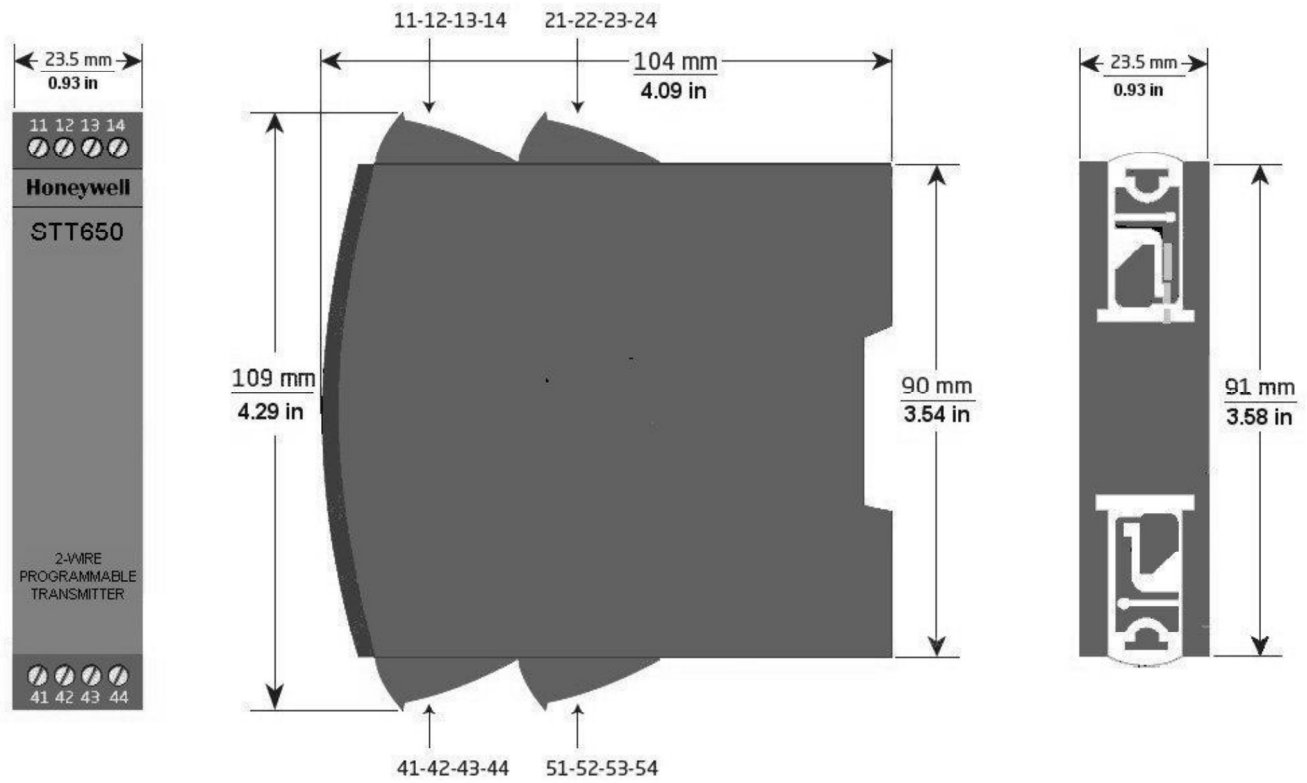



Figure 2 – STT650 DIN Rail Dimensions

**Approval Certifications:**

MSG Code	Table IV b. Protocol	Description
0	A or H	No Agency Certifications, does include the CE Mark
A	A or H	<p>IECEX- DEK 14.0084X                      Ex ia IIC T6..T4 Ga                      Ex ia IIIC Da                      Ex ia I Ma                      Entity Parameters: See Agency Control Drawing</p> <hr/> <p>DEKRA 14ATEX0134X                      II 1 G Ex ia IIC T6..T4 Ga   II 1 D Ex ia IIIC Da                      I M 1 Ex ia I Ma                      Entity Parameters: See Agency Control Drawing</p> <hr/> <p>CSA- 2214375                      IS Class I, Division 1 Grps ABCD T6..T4                      EX ia IIC T6..T4 Ga                      Class I Zone 0 AEX ia IIC T6..T4 Ga                      Entity Parameters: See Agency Control Drawing</p> <hr/> <p>FM Approvals- 3054236                      IS Class I, Division 1 Grps ABCD T6..T4                      Class I Zone 0 AEX ia IIC T6..T4 Ga                      NI Class I, Division 2 Grps ABCD T6..T4                      ANI Class I Division 2 ABCD T6..T4                      Entity Parameters: See Agency Control Drawing</p>

## Model Selection Guide

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



### Model STT650 SmartLine Temperature DIN Rail

Model Selection Guide:  
34-44-16-16 Issue 17

Section 13  
Page: STT6-1  
Effective Date: February 7, 2022

### Model Selection Guide with Price Data Honeywell Proprietary

**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.

Key	I	II	III	IV	V	VI	VII	VIII
STT650	-	-	-	-	-	-	-	0000

KEY NUMBER	INPUT TYPE
	DIN Rail Mount Temperature Transmitter

Availability

Selection	
STT650	*

Table I	NO. OF CHANNELS	INPUT
Channel Details	Single	RTD
	Single	Universal
	Dual	RTD
	Dual	Universal

S1	*
S2	*
T1	*
T2	*

Table II	NO SELECTION
	No Selection

0	*
---	---

TABLE III	AGENCY APPROVALS (See Data Sheet for Approval Code Details)
Approvals	No Approvals
	Zone 0 Approvals - Intrinsically Safe, Non-incendive, & Dustproof - (FM/CSA/ATEX/IECEX)
	Zone 2/Div 2 Approvals-Intrinsically Safe, Non-incendive&Dustproof-(cCSAus/ATEX/IECEX)

U	*
A	*
B	*

TABLE IV	TRANSMITTER ELECTRONICS SELECTIONS		
a. Electronic Housing Material & Input Type	Housing and Material	Input Type	Galvanic Isolation
	Plastic	RTD	No
	Plastic	Universal	Yes
b. Output/ Protocol	Analog Output		Digital Protocol
	4-20mA dc		PC Programable
	4-20mA dc		HART7 Protocol
c. No selection	No Selection		

A__	h
C__	i
_A_	*
_H_	a
0	*

TABLE V	CONFIGURATION SELECTIONS		
a. Application Software	Diagnostics		
	Standard Diagnostics		
b. Output Limit, Failsafe & Write Protect Settings	Write Protect	Fail Mode	High & Low Output Limits <sup>3</sup>
	No	High > 21.0mAdc	Honeywell Std (3.8 - 20.8 mAdc)
c. General Configuration	Factory Standard		
	Custom Configuration		

1__	*
_3_	*
__S	*
__C	*

<sup>3</sup> 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 - 3 Point
	Standard	Custom (Unit Data Required)	Single Calibration - 5 Point

A	*
B	*
C	*

TABLE VII OTHER CERTIFICATIONS AND OPTIONS	
Certifications and Warranty	None - No additional options
	Certificate of Conformance
	Calibration Test Report & Certificate of Conformance
	Certificate of Origin
	SIL Hardware assessment document - EXIDA
	Extended Warranty Additional 1 year
	Extended Warranty Additional 2 years
	Extended Warranty Additional 3 years
	Extended Warranty Additional 4 years
	Extended Warranty Additional 5 years

00	*	b
F3	*	
F1	*	
F5	*	b
FE	j	
01	*	
02	*	
03	*	
04	*	
05	*	

TABLE VIII MANUFACTURING SPECIALS	
Factory	Factory Identification

0000	*
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MODEL RESTRICTIONS

Restriction Letter	Available Only with		Not Available with	
	Table	Selection(s)	Table	Selection(s)
a			I	S1,I1
h			IVb	H
			I	S2,I2
i			I	S1,I1
j	IVb	_ H_		
b	Select only one option from this group			

The minimum value of orders acceptable for Honeywell is USD 500. Handling fee is the amount of the difference between USD 500 and the actual purchase price.

## Sales and Service

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

### ASIA PACIFIC

Honeywell Process Solutions,  
(TAC) [hfs-tac-support@honeywell.com](mailto:hfs-tac-support@honeywell.com)

#### Australia

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

#### China – PRC - Shanghai

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

#### Singapore

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

#### South Korea

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

### EMEA

Honeywell Process Solutions,  
Phone: + 80012026455 or  
+44 (0)1202645583

Email: (Sales)

[FP-Sales-Apps@Honeywell.com](mailto:FP-Sales-Apps@Honeywell.com)

or

(TAC)

[hfs-tac-support@honeywell.com](mailto:hfs-tac-support@honeywell.com)

### AMERICA'S

Honeywell Process Solutions,  
Phone: (TAC) 1-800-423-9883 or  
215/641-3610

(Sales) 1-800-343-0228

Email: (Sales)

[FP-Sales-Apps@Honeywell.com](mailto:FP-Sales-Apps@Honeywell.com)

or

(TAC)

[hfs-tac-support@honeywell.com](mailto: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

Process Solutions

Honeywell

1250 W Sam Houston Pkwy S

Houston, TX 77042

Honeywell Control Systems Ltd

Honeywell House, Skimped Hill Lane  
Bracknell, England, RG12 1EB

Shanghai City Centre, 100 Jungi Road

Shanghai, China 20061

<https://process.honeywell.com>



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