

Technical Information

STT650 SmartLine DIN Rail Temperature Transmitter Specification 34-TT-03-15

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.

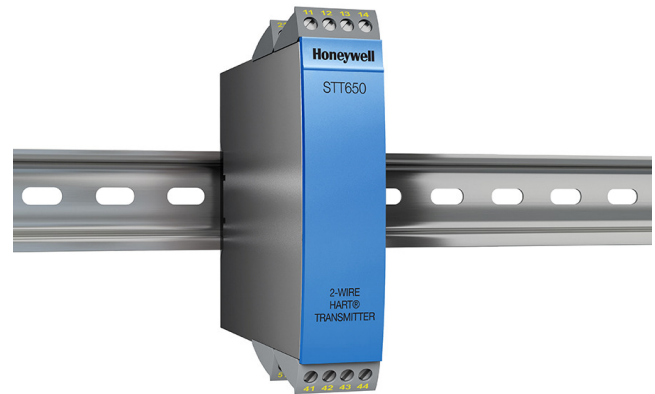


Figure 1– SmartLine STT650 DIN Rail Temperature Transmitter

Communications/Output Options:

- 4-20mA dc
- HART® (version 7.0)
- FOUNDATION™ Fieldbus* compliant to ITK 4.6.
- PROFIBUS® PA* ver. 3.0

* Device registration in progress for FF, Profibus, HART 7

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

Operating Conditions	
Ambient temperature, rated	-40 to + 85°C (-40 – 185°F)
Humidity	0 to 95% RH (non cond.)
Electrical Input specification	
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
Current Output Specifications	
Signal output range	4 to 20 mA
Update time	135 msec
Load resistance	≤ (V supply -8) / 0.023 A 0 to 870Ω
Alarm Levels	
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

Operating Conditions	
Ambient temperature, rated	-40 to + 85°C (-40 – 185°F)
Humidity	0 to 95% RH (non cond)
Cold junction Accuracy	+/- 1°C
Electrical Input specification	
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
Current Output Specifications	
Signal output range	4 to 20 mA
Update time	440 msec
Load resistance	≤ (V supply -7.2) / 0.023 A 0 to 904Ω
Alarm Levels	
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 ^{1,2,3}	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 B¹ accuracy specification range > 400°C

TC B² accuracy specification range > 160°C < 400°C

TC B³ accuracy specification range > 85°C < 160°C

Operating Conditions	
Ambient temperature, rated	-40 to + 85°C (-40 – 185°F)
Humidity	0 to 95% RH (non cond)
Cold junction Accuracy	+/- 1°C
Electrical Input specification	
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
Current Output Specifications	
Signal output range	4 to 20 mA
Update time	440 msec
Load resistance	≤ (V supply - 8) / 0.023 A 0 to 870Ω
Alarm Levels	
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

STT650 Universal Input type – FF/PA Protocol

Fieldbus and Profibus are separate models

Features

- FOUNDATION™ Fieldbus protocol*
- PROFIBUS® PA protocol*
- RTD, T/C, Ohm or mV input +mA +/- 100mA
- Single or dual (difference, average or redundant) sensor input
- Function blocks: 2 analogue, 1 PID
- FISCO certified
- Basic or LAS capability
- Galvanic isolation

FOUNDATION is a registered trademark of the Fieldbus Foundation.

* Device registration in progress

Performance specifications

Sensor Type RTD (2,3,4 wire)	Basic Accuracy*		Rated Range		Temperature Effects per 1.0 °C (1.8 °F)*** Change in Ambient Temperature	
	Fixed	% of reading	°C	°F	Fixed	% of reading
Pt100	0.1°C (1.8°F)	0,05%	-200 to 850	-328 to 1562	0.002°C (0.0036°F)	+/- 0.002
Pt1000	0.1°C (1.8°F)	0,05%	-200 to 850	-328 to 1562	0.002°C (0.0036°F)	+/- 0.002
Ni 100	0.15°C (0.27°F)	0,05%	-60 to 250	-76 to 482	0.002°C (0.0036°F)	+/- 0.002
Cu10	01.3°C (0.2.3°F)	0,05%	-200 to 260	-328 to 500	0.02°C (0.0036°F)	+/- 0.002
B	1°C (1.8°F)	0,05%	0 to 1820	+32 to 3308	0.025°C (0.045°F)	+/- 0.002
E	0.5°C (0.9°F)	0,05%	-100 to 1000	-148 to 1832	0.01°C (0.018°F)	+/- 0.002
J	0.5°C (0.9°F)	0,05%	-100 to 1200	-148 to 2192	0.01°C (0.018°F)	+/- 0.002
K	0.5°C (0.9°F)	0,05%	-180 to 1372	-292 to 2501	0.01°C (0.018°F)	+/- 0.002
L	0.5°C (0.9°F)	0,05%	-200 to 900	-328 to 1652	0.01°C (0.018°F)	+/- 0.002
N	0.5°C (0.9°F)	0,05%	-180 to 1300	-292 to 2372	0.01°C (0.018°F)	+/- 0.002
R	1°C (1.8°F)	0,05%	-50 to 1760	-58 to 3200	0.025°C (0.045°F)	+/- 0.002

S	1°C (1.8°F)	0,05%	-50 to 1760	-58 to 3200	0.025°C (0.045°F)	+/- 0.002
T	0.5°C (0.9°F)	0,05%	-200 to 400	-328 to 752	0.01°C (0.018°F)	+/- 0.002
U	0.5°C (0.9°F)	0,05%	-200 to 600	-328 to 1112	0.01°C (0.018°F)	+/- 0.002
W3	1°C (1.8°F)	0,05%	0 to 2300	+32 to 4172	0.025°C (0.045°F)	+/- 0.002
W5	1°C (1.8°F)	0,05%	0 to 2300	+32 to 4172	0.025°C (0.045°F)	+/- 0.002
mA	+/-1μA	0,05%	-100 to 100		0.06μA	+/- 0.003
Ohms	0.05Ω	0,05%	0 to 7000Ω		2 mΩ	+/- 0.002
mV	10μ	0,05%	-800 to 800 mV		0.2μ	+/- 0.002

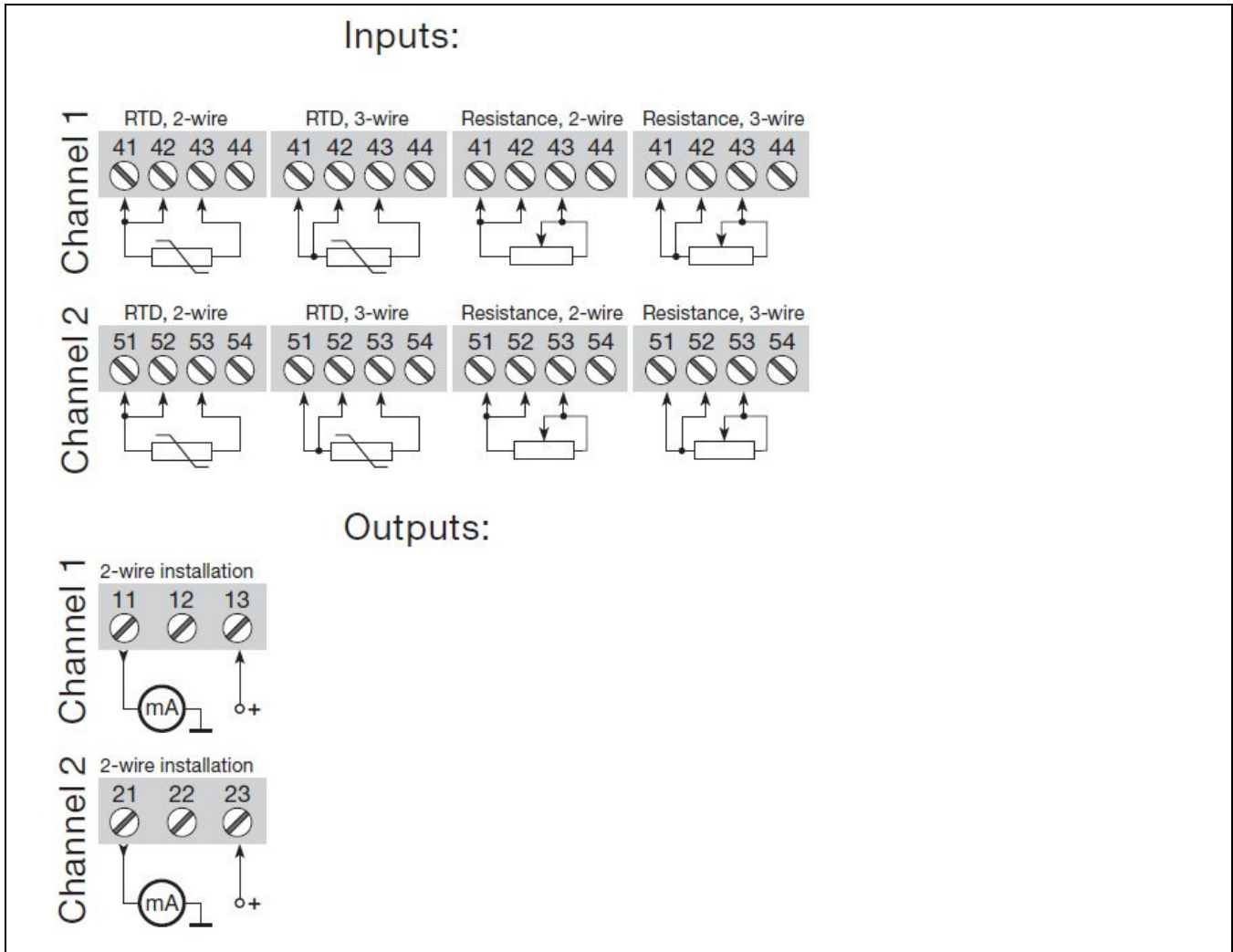
* Basic accuracy or +/- 0.1% of Span whichever is greater

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

Operating Conditions	
Ambient temperature, rated	-40 to + 85°C (-40 – 185°F)
Humidity	0 to 95% RH (non cond)
Cold junction Accuracy	+/- 0.5°C
Electrical Input Specification	
Supply voltage in FISCO installations	9 to 30 VDC 9 to 17.5 VDC
Consumption	11 mA / ch. max.
Warm-up time	30 sec
Response time (programmable)	1 to 60 sec
Galvanic isolation	1500 VAC
Update time	< 400 msec
Execution time, PID controller	< 200 msec
Execution time, analogue input	< 50 msec
Output Specifications	
Foundation™ Fieldbus connection	
Foundation Fieldbus version	ITK 4.6
Foundation F.capability	Basic or LAS
Foundation F.function blocks	2 analogue and PID
PROFIBUS® PA connection	
PROFIBUS PA protocol	Profile A&B, ver. 3.0
PROFIBUS PA protocol standard	EN 50170 vol. 2
PROFIBUS PA address (at delivery)	126
PROFIBUS PA function blocks	2 analogue

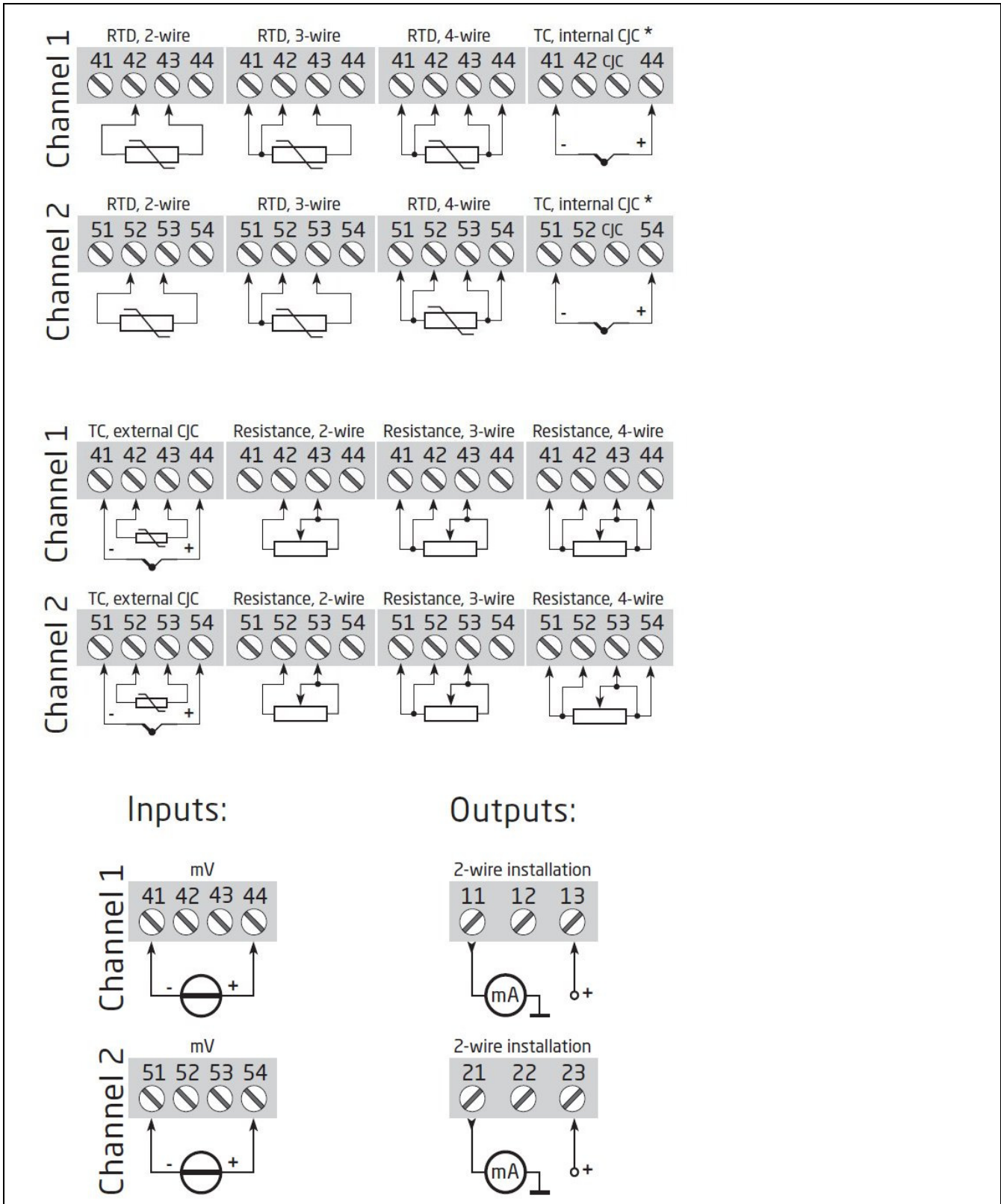
Wiring Connections

STT650 RTD Input type



Wiring Connections

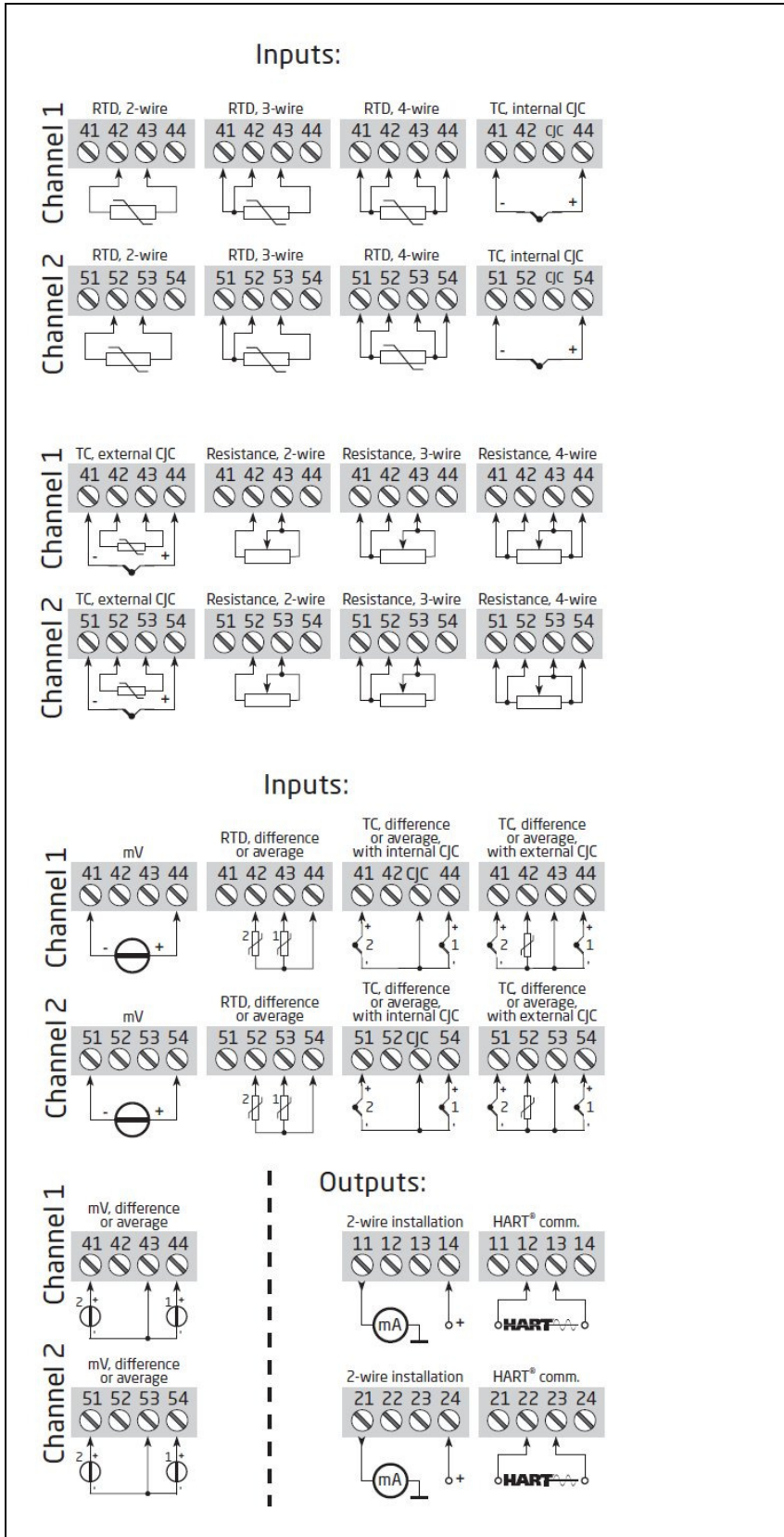
STT650 Universal Input type (Analogue Output model)



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

Wiring Connections

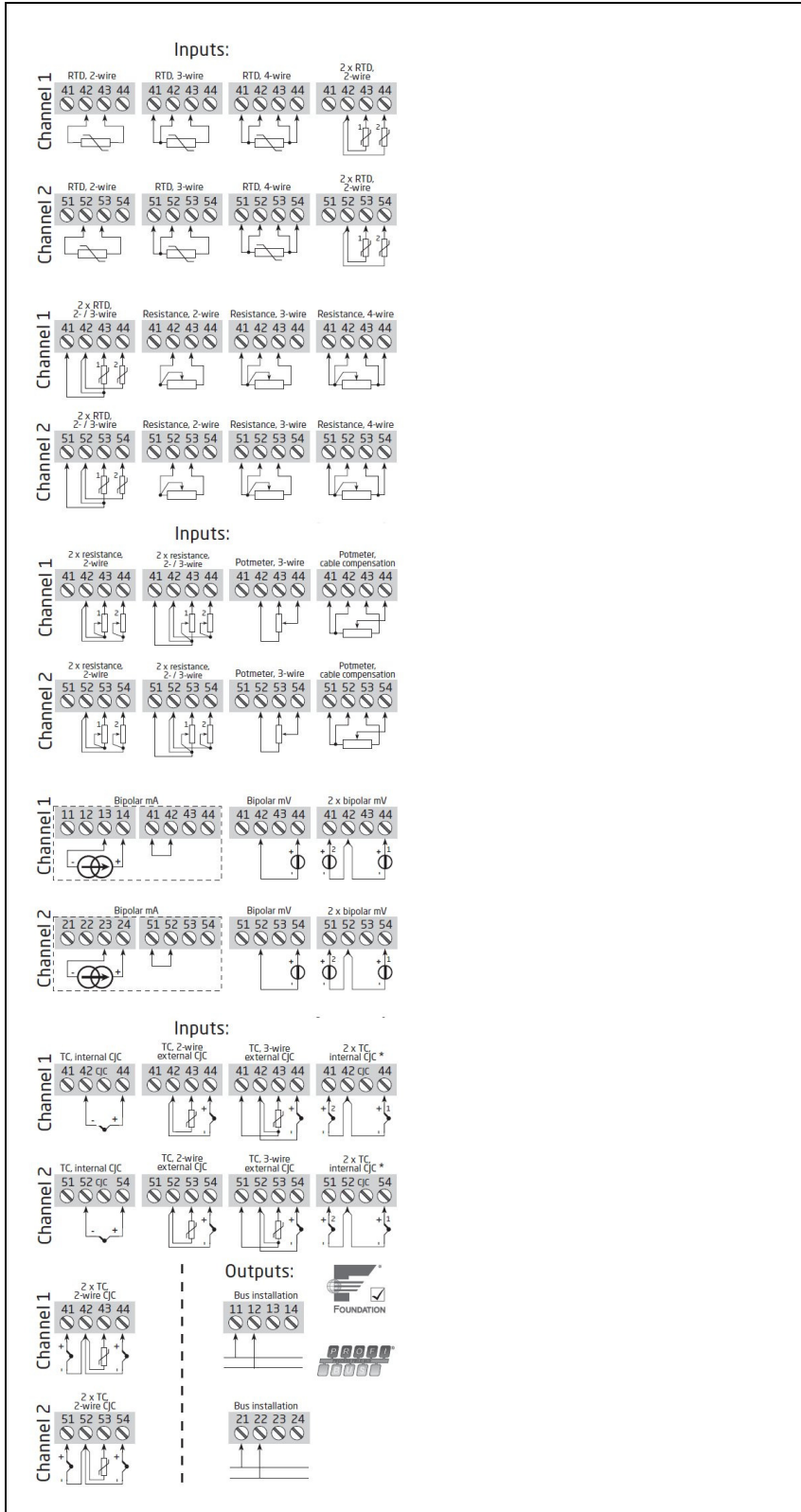
STT650 Universal Input type - HART Protocol



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

Wiring Connections

STT650 Universal Input type – FF/PA 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.

* Check with factory for the availability

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 Certifications

SIL Certification	Hardware assessed by EXIDA for use in SIL applications.
--------------------------	---

Mounting & Dimensional Drawings

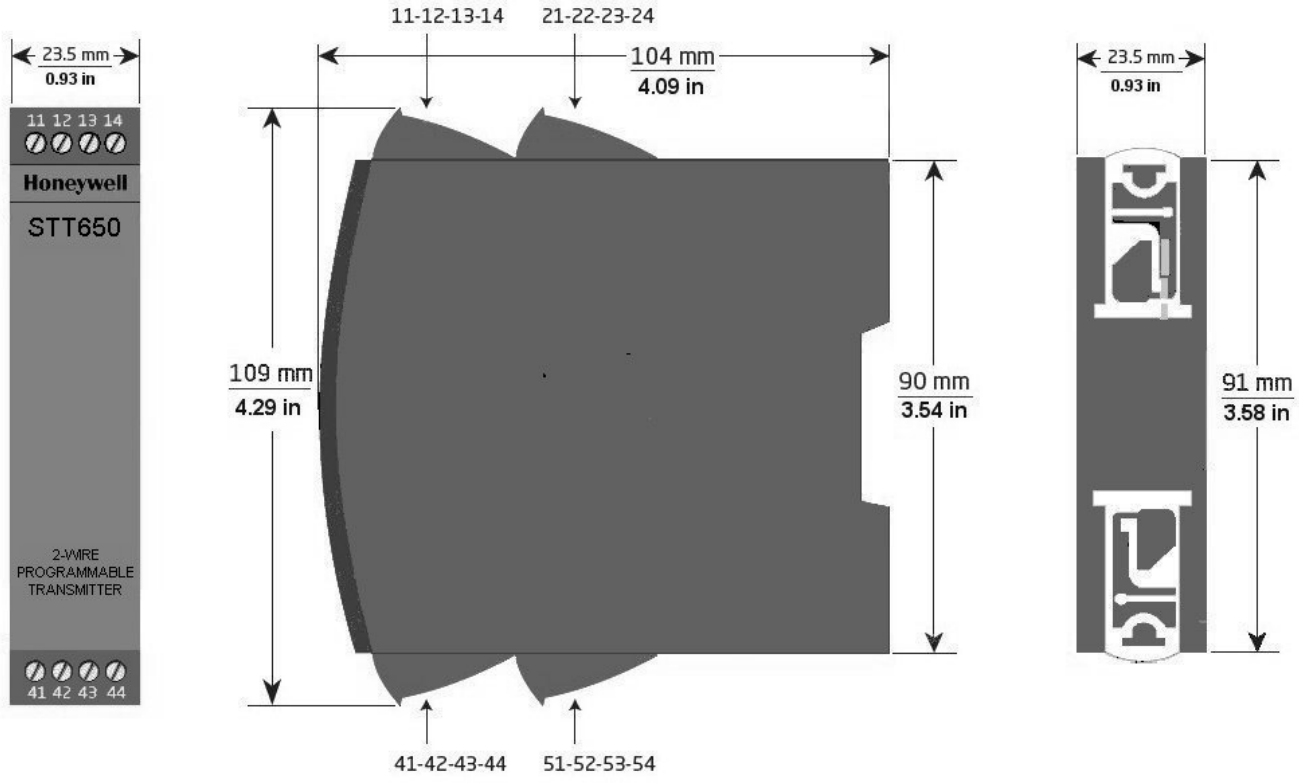


Figure 2 – STT650 DIN Rail Dimensions

Model Selection Guides are subject to change and are inserted into the specifications as guidance only. Prior to specifying or ordering a model check for the latest revision Model Selection Guides which are published at: www.honeywellprocess.com/en-US/pages/default.aspx

Model Selection Guide

**Model STT650
SmartLine Temperature DIN Rail**

Model Selection Guide:
34-44-16-16 Issue 1

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.

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

0	*
---	---

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
	none		Foundation Fieldbus
c. No selection	none		Profibus PA
	No Selection		

A__	h
C__	i

A	*
H	a
F	a
P	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 ³
	No	High > 21.0mAdc	Honeywell Std (3.8 - 20.8 mAdc)
	No	N/A	N/A Fieldbus or Profibus
c. General Configuration	Factory Standard		

1__	*
-----	---

3	f
6	g
__S	*

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			
a. Accuracy and Calibration	Accuracy	Calibrated Range	Calibration Qty
	Standard	Factory Std	Single Calibration

A	*
---	---

TABLE VII Other Certifications and Options				
c. Certifications and Warranty	None - No additional options	00	*	b
	Certificate of Conformance	F3	*	
	Certificate of Origin	F5	*	
	Extended Warranty Additional 1 year	01	*	b
	Extended Warranty Additional 2 years	02	*	
	Extended Warranty Additional 3 years	03	*	
	Extended Warranty Additional 4 years	04	*	
	Extended Warranty Additional 5 years	05	*	

TABLE VIII Manufacturing Specials	
Factory	Factory Identification

0000	*
------	---

MODEL RESTRICTIONS

Restriction Letter	Available Only with		Not Available with	
	Table	Selection(s)	Table	Selection(s)
a			I	S1,T1
f			IVb	_ F,P _
g			IVb	_ H,A _
h			IVb	_ H,F,P _
			I	S2,T2
i			I	S1,T1
j	IVb	_ H _	Vb	_ 6 _
b	Select only one option from this group			

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

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

or

(TAC)

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

or

(TAC)

hfs-tac-support@honeywell.com

Specifications are subject to change without notice.

For more information

To learn more about SmartLine Temperature, visit
www.honeywellprocess.com

Or contact your Honeywell Account Manager

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

www.honeywellprocess.com

Honeywell

34-TT-03-15

October 2014

©2014 Honeywell International Inc.