

STT 3000

SMART TEMPERATURE TRANSMITTER

Models STT350 and STT35F

EN01-5222 10/98

PRODUCT SPECIFICATION SHEET

OVERVIEW

Honeywell's microprocessor based STT350/35F Smart Temperature Transmitters convert a primary sensor input into a standard 4-20 mA or FOUNDATION™ Fieldbus output signal on a 2-wire signal plus power loop connection.

These universal temperature input models readily accept signals from a wide variety of industry standard thermocouples (T/Cs) or resistance temperature detectors (RTDs) as well as basic millivolt or Ohms sensors. The output signal is either proportional to the measured variable or linearized to temperature.

- For the STT350, the output is transmitted in either an analog 4-20 mA format or a digital DE protocol format for direct digital integration to the TPS/TDC 3000[®] control system. You easily select the analog or digital format for the output signal transmission through the Smart Field Communicator[®] (SFC) which is the common hand held operator interface for our Smartline™ Transmitters. All configuration, operation and communication functions are under the control of the STT350's microprocessors and are implemented through the SFC or the PC based Smart Configuration Toolkit (SCT).

For the STT35F, the output conforms to the low speed (H1) of the Fieldbus Physical Layer specification IEC 1158-2 (1993). The other protocol layers conform to the FOUNDATION™ Fieldbus which is supported by all the worldwide instrumentation suppliers and enables multidrop field instruments to be powered down a single wire pair and communicate measurement, control, configuration and diagnostic data at 31.25 kbps.

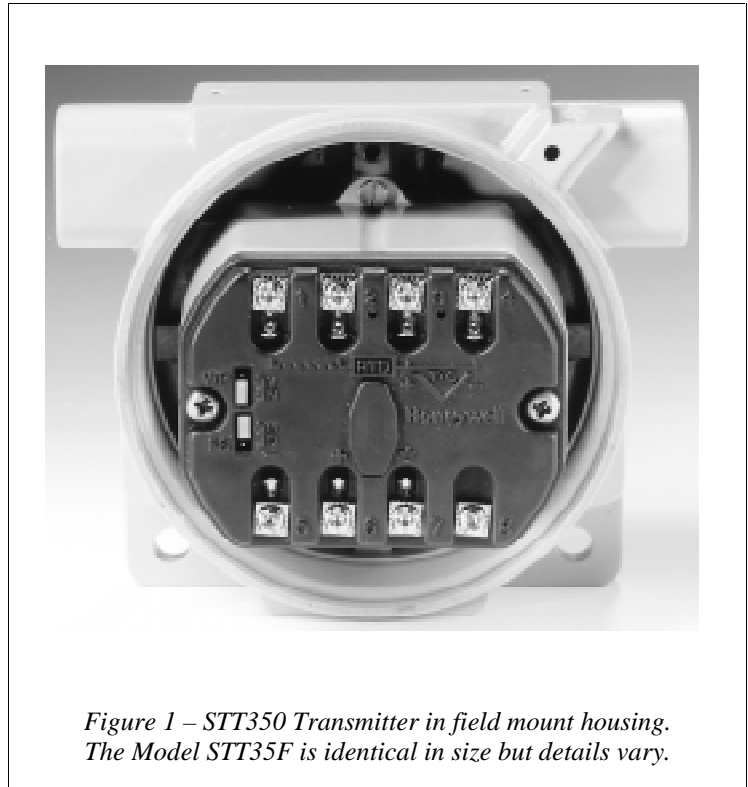


Figure 1 – STT350 Transmitter in field mount housing. The Model STT35F is identical in size but details vary.

COMMON FEATURES

- Single model accepts input signals from a choice of primary sensors to satisfy varying applications requirements with minimum transmitter inventory.
- Standard digital cold-junction compensation function provides accurate and reliable temperature measurement over a wide ambient operating range.
- Added Smart features include reading of the highest and lowest inputs, external cold junction compensation temperature at an isothermal block and engineering units displayed in degrees C, F, K, or R plus millivolt and Ohms.
- Smart transmitter personality with local or remote interfacing means significant manpower efficiency improvements in commissioning, start-up, and ongoing maintenance functions. Write protect link included to safeguard configuration settings.
- Includes sensor break detection on all input wires.
- Post read validation of the measured signal before providing fresh output.
- Suitable for DIN rail mounting or remote field mounting in a flameproof housing.
- Provides true differential temperature measurement of thermocouple or RTD inputs by individual linearization of each sensor reading and then computing the difference.
- Suitable for true 4-wire Pt100 measurement (or 3- or 2-wire).
- Write protect link included to safeguard configuration settings.
- Supports dual thermocouple sensor inputs for redundant sensor operation.
- Surge/lightning protection options can be installed internally in housing or externally in conduit.

Added STT350 Features

- Direct digital integration with TDC 3000^X system provides local measurement accuracy to the system level without adding typical A/D and D/A converter inaccuracies.
- Integral analog or digital indicating meter option.

Added STT35F Features

- Includes Fieldbus Foundation standard Function blocks to ensure full interoperable operation - Analog Input (AI), Control Block (PID), Resource Block (RB) and Transducer Block (XB).
- Includes Link Master capability to assume Link Active Scheduler (LAS) role of controlling the deterministic message communications in the event of primary LAS loss.
- Integral Digital Meter available without the need for an additional bus connection or power.
- Fieldbus Simulate link available for loop commissioning/troubleshooting.
- Includes Flash Memory for ease of software upgrade over the fieldbus for changes or improvements in this emerging technology.
- Configuration of the STT35F Function Blocks and the Fieldbus Application Parameters can be done with the National Instruments Configuration Toolkit or any other Fieldbus Foundation registered configurator.

DESCRIPTION

The STT350 and STT35F transmitters are suitable as a direct replacement for any conventional or Smart temperature transmitter in use today. Their memory contains the characteristics of most commonly used temperature sensors. This means that you can use the configuration tool to configure the transmitter for any of these sensors and it will automatically correct for their associated non-linearities.

The transmitter module can also be installed on a standard DIN rail (to EN50022) or remotely mounted in a

flameproof housing designed for either surface or two-inch pipe-stand mounting. Transmitters can be pre-configured at the factory to your exact specifications or they will be shipped with factory default configuration - ready to accept your own configuration.

Model STT350

You make all transmitter adjustments and diagnostic checks through an SFC connected anywhere across the 4-20mA wire route. This lets you initiate configuration and maintenance functions at locations remote from the transmitter itself. The SFC is also fully compatible with all other Honeywell Smartline Transmitters.

When digitally integrated to TPS/TDC 3000^X the operator or maintenance engineer has access to the transmitter database and diagnostics in addition to the measure signal being transferred as a digital PV in floating point high resolution. The system maintains a copy of the transmitter database for security of verification of any field-initiated changes. In the event of unauthorized changes the system treats the PV as a fault condition until the operator restores the original configuration.

Model STT35F

The H1 low speed FOUNDATION Fieldbus protocol is aimed at the replacement of 4-20 mA conventional or Smart transmitters by multidrop digital field devices with signal and power carried over a single wire pair and also meeting intrinsic safety requirements.

Configuration of the field devices and the bus operating parameters can be performed from the system console or from Windows 95 or NT PC based configuration tools such as the National Instruments Configurator. The driving force behind fieldbus is increased field intelligence and capabilities and these result in a wide range of available configuration selections such as the gain, integral, derivative settings in the PID control block, or its mode of operation - Manual, Automatic or cascade, or built in alarm settings, etc.

Performance under Rated Conditions

Input Type	Digital Accuracy for Maximum Range Limits	Maximum Range Limits		Digital Accuracy for Normal Range Limits	Normal Range Limits		Standards
		° C	° F	° C	° C	° F	
RTD:	% of Max Span						
Pt100	0.01	-200 to 850	-328 to 1562	0.1	-200 to 450	-328 to 842	IEC751:1986($\alpha=0.00385$)
Pt200	0.01	-200 to 850	-328 to 1562	0.1	-200 to 450	-328 to 842	IEC751:1986($\alpha=0.00385$)
Pt500	0.02	-200 to 850	-328 to 1562	0.1	-200 to 450	-328 to 842	IEC751:1986($\alpha=0.00385$)
Pt100J	0.01	-200 to 640	-328 to 1184	0.1	-200 to 450	-328 to 842	JISC 1604-81($\alpha=0.00392$)
Ni500	0.04	-80 to 150	-112 to 302	0.1	-50 to 150	-58 to 302	Honeywell Type A
Cu 10	0.37	-20 to 250	-4 to 482	1.0	-20 to 250	-4 to 482	General Electric
Cu 25	0.19	-20 to 250	-4 to 482	0.5	-20 to 250	-4 to 482	General Electric
T/C:							
B	0.14	200 to 1820	392 to 3308	1.0	550 to 1820	1022 to 3308	IEC 584-1 (ITS-90)
C	0.03	0 to 2300	32 to 4172	0.6	0 to 1650	32 to 3002	IPTS 68
D	0.03	0 to 2300	32 to 4172	0.6	330 to 1370	626 to 2498	IPTS 68
E	0.04	-200 to 1000	-328 to 1832	0.2	0 to 1000	32 to 1832	IEC 584-1 (ITS-90)
J	0.04	-200 to 1200	-328 to 2192	0.2	0 to 800	32 to 1472	IEC 584-1 (ITS-90)
K	0.04	-200 to 1370	-328 to 2498	0.3	-120 to 1370	-191 to 2498	IEC 584-1 (ITS-90)
N	0.06	-200 to 1300	-328 to 2372	0.3	0 to 1300	32 to 2372	IEC 584-1 (ITS-90)
R	0.09	-50 to 1760	-58 to 3200	0.5	500 to 1760	932 to 3200	IEC 584-1 (ITS-90)
S	0.08	-50 to 1760	-58 to 3200	0.5	500 to 1760	932 to 3200	IEC 584-1 (ITS-90)
T	0.14	-250 to 400	-418 to 752	0.2	-100 to 400	-148 to 752	IEC 584-1 (ITS-90)
NiNiMoly	0.03	0 to 1300	32 to 2372	0.3	780 to 1300	1436 to 3272	G.E. (IPTS - 68)
Radiamatic	0.6	420 to 1800	788 to 3272	0.7	780 to 1800	1436 to 2372	Honeywell (RH)
milliVolts	0.01	-20 to 120mV		8 μ V	-10 to 45 mV		
Ohms	0.01	0 to 2000 Ω		0.15 Ω	0 to 2000 Ω		

Note that the above Accuracy values are available merely by selecting the sensor type and range (i.e. without user calibration). Improvements of up to 2 times can be obtained for the accuracy by calibrating to the required LRV/URV values with simulated inputs from a calibrator box.

All STT350 units pass through 20 hours of Environmental Stress Screening (ESS) by fast cycling between -40 and +85°C to ensure maximum product reliability. During this ESS process, the ambient temperature compensation coefficients are determined for individual units and burned in transmitter memory to provide maximum performance over a wide range of operating conditions.

SPECIFICATIONS

Operating Conditions				
Parameter	Reference Conditions	Rated Condition	Operative Limits	Transportation and Storage
Ambient Temperature	23°C ±2	-40 to 85°C	-40 to 85°C *	-50 to 100°C
	73°F ±4	-40 to 185°F	-40 to 185°F	-58 to 212°F
Humidity				
Rack Mounting %RH	10 to 55	5 to 95	5 to 100	5 to 100
Mounted in EP %RH	10 to 55	5 to 100	5 to 100	5 to 100
Housing				
Supply Voltage and Load Resistance	Model STT350 Model STT35F 10.8 to 42.4 Vdc at the transmitter terminals 9.0 to 35 Vdc at the transmitter terminals 0 to 1450 Ohms (as shown in Fig 2) Dependent on number/ type of bus devices.			
Vibration	Maximum of 4g over 15 to 200 Hz (restricted to 3g with indication meter)			
Shock	Maximum of 40g			
Output D/A Accuracy**		±0.025% of span**		
Cold Junction Accuracy		±0.25°C		
Total Reference Accuracy	In Analog Mode** =	Digital Accuracy of input + Output D/A Accuracy** + CJ Accuracy (T/Cs only)		
	In Digital Mode =	Digital Accuracy of input + CJ Accuracy (T/Cs only)		
		(example: transmitter operating in Analog Mode with Pt100 sensor and 0 to 200°C		
		Total Reference Accuracy = $0.1 + \frac{200 \times 0.025}{100} = 0.15\%$		
Digital Ambient Temperature Effect (per 10°C change from 20°C reference)		RTDs or Ohms: 0.029% of reading T/Cs or mV: 0.042% of reading		
Cold Junction Rejection Effect		60:1 for changes from 23°C ambient		
Output D/A Ambient Temperature Effect**		0.045% of span per 10°C change**		
Total Output Ambient Temperature Effect (ATE)				
	In Analog Mode** =	Digital ATE + Output D/A ATE** + CJ ATE (T/Cs only)		
	In Digital Mode =	Digital ATE + CJ ATE (T/Cs only)		
Power Supply Voltage Effect		0.005% of span per Volt		

* = Short term operative limit of -50°C (-58°F)

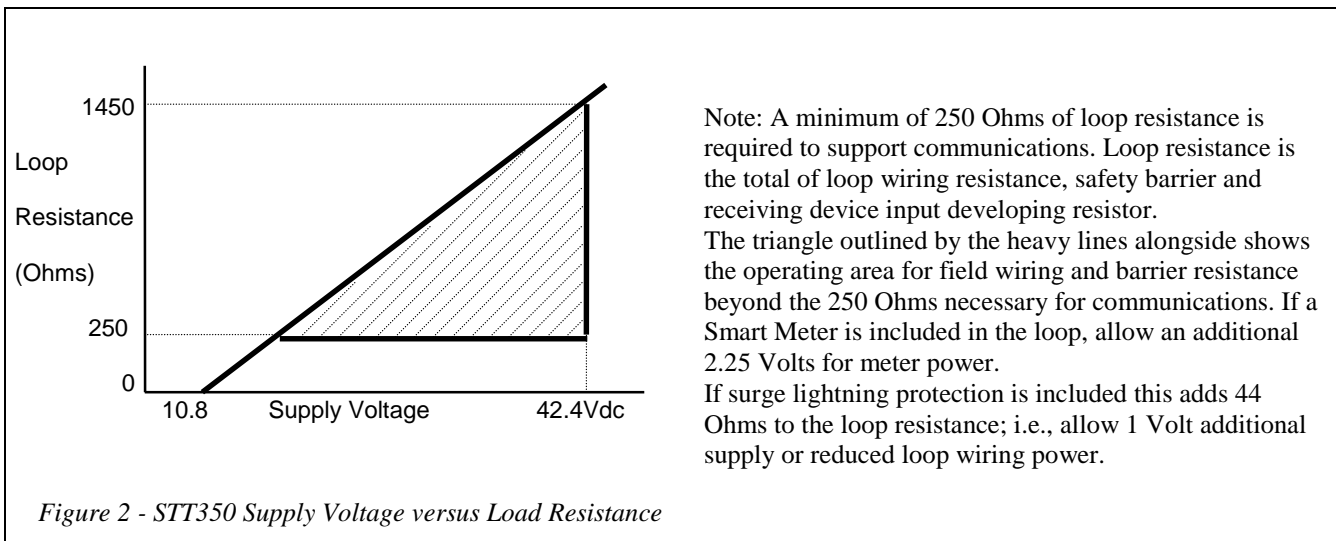
** = Not applicable for Model STT35F or for STT350 used in digital DE output mode.

Parameter	Description
Adjustment Range	No limits to adjustments between the maximum range and 1 eng. unit e.g. 1°C
Output (2 wire) STT350	4-20 mA or Honeywell DE digital protocol
STT35F	Extended range: 3.8-20.8 mA. Fail safe modes <3.8 mA or 21.8 mA IEC 1158-2 low speed H1 signaling in Manchester bi-phase L at 31.25 kbps.
Damping Time Constant	Adjustable from 0 to 102 seconds digital damping
Thermocouple Burnout	Burnout detection is user selectable. Upscale or downscale with critical status message on STT350.
Input to Output Galvanic Isolation	Meets dielectric strength test of 1400Vac rms (50/60 Hz) 2,000 Vdc for 1 minute.
Input and Output Common Mode Isolation	Withstands dielectric test of 700 Vac rms or 1,000 Vdc for 1 minute.
Common Mode Rejection	120 dB (1 million to 1) from 50 Hz to 50 kHz
Series Mode Rejection	40 dB (100 to 1) for 50 or 60 Hz ±0.5 Hz (with internal software filter set to local power line frequency)
EMC Compliance	In compliance with 89/336/EEC, Electro Magnetic - Compatibility (EMC) Directive
RFI Rejection	±0.1% of span at 30 V/m over 20 to 1,000 MHz in explosion proof housing with shielded cables
Stability/Time Drift	0.05% of maximum span per year. Auto calibration against internal reference every second.

Physical Mounting, Construction and Approvals

Parameter	Description	
Mounting	DIN rail (top hat or G rail) Explosion Proof/Flame Proof housing with surface mounting or 2-inch pipe mounting (IP 66/NEMA 4X Rating) The FM/CSA explosion proof housing meets the applicable requirements of NEMA 7 and 9	
Wiring	Screw Terminals - M3.5x6.7 mm nickel coated brass. Accepts up to 12 AWG, 16 AWG recommended	
Net Weight	Transmitter for DIN rail mount - 0.5kg (1.1 pounds) Transmitter in EP or XC housing - 1.6kg (3.6 pounds) Transmitter + indicator in housing - 2.4kg (5.2 pounds)	
Materials of Construction	Transmitter module - Aluminum housing with baked on polyester paint cover. Noryl terminal block. EP housing – Aluminum housing with baked on epoxy-polyester hybrid paint cover (beige) XC housing - Aluminum housing with baked on 2 coats epoxy resin cover (beige) ST02 housing - Aluminum housing with baked on 2 coats epoxy resin cover (red) 316 Stainless Steel housing available as a special.	
Dimensions	See Figure 3.	
Sensor/Cable Entry (EP, XC or ST02 housing)	1/2 inch NPT electrical connection with optional adapters for M20x1.5, or 3/4 inch NPT	
Safety Approvals (STT35F Pending)	STT350 Module	CENELEC Intrinsically Safe EEx ia IIC T4/T5/T6 with 30V/100mA/1.2W barrier (T4/T5/T6 = -20 to +80/+50/+40°C ambient) CSA Intrinsically Safe Class I, Div.1, Groups A to D FM Non-Incendive Class I, Div. 2, Groups A to D FM Suitable for Class II, III, Div. 2, Groups F and G GOSSTANDARD Tested and approved by Russian Certificate of pattern Approval No 332 of 18/10/94
	Additional approvals With EP, XC or ST02 housings	<u>With or without Integral Meter</u> Zone 2: T6, 28V/22mA CENELEC Flame Proof EEx d IIC T6 CSA Explosion Proof Class I, II, III, Div. 1, Groups B to G FM Explosion Proof Class I, II, III, Div. 1, Groups B to G <u>Without Integral Meter</u> FM Explosion Proof Class I, II, III, Div. 1, Groups A to G
Surge/Lightning Protection Options	Internal SP Selection	10 kA peak current (8/20 µs waveform), 10 kV peak Voltage (10/50 µs waveform)
	External LP Selection	10 kA peak current (10/20 µs waveform), 500A peak current (10/1000 µs waveform)

Parameter	Description
Thermowell & Probe Availability	<p>STT350 can be supplied integrally mounted with any of the previously listed standard resistance temperature devices (RTDs) and thermocouple (TCs) elements.</p> <p>Probe Types:</p> <ul style="list-style-type: none"> • 1/4" Rigid or spring loaded RTDs or T/Cs in Inconel or Stainless Steel sheaths in standard lengths from 3" to 24" (other lengths by request). • Standard or heavy duty service. • Locally mounted to the STT350 housing or remotely mounted into explosion-proof mounting heads. • With (or without) probe lag hardware: Hex nipple, Straight nipple or Double lag and Union connections. • Single or dual element availability; grounded or ungrounded. <p>Additionally, the following types of Thermowells can also be provided as an integral thermal solution:</p> <p>Thermowell Materials: Carbon Steel, 304SS, 316SS, 316L SS, 446SS, Hastelloy B, Hastelloy C, Monel, Inconel 600 (other materials by request).</p> <p>Thermowell Types: Threaded well, Flanged well, or Socket well (with or without thermowell lag extensions).</p> <p>Flange Types: Raised Face, Flat Faced and Ring Type Joint flange availability in 1", 1.5", 2" or 3" sizes.</p> <p>Flange ratings: ANSI 150, 300, 600, 900 and 1500 ratings.</p>



STT 3000 Temperature Transmitter Model STT350

Model Selection Guide

Model Selection Guide
34-44-16-02 Issue 5

Instructions

Select the desired Key Number. The arrow to the right marks the selection available.
Make one selection from each table using the column below the proper arrow.
A dot denotes unrestricted availability. A letter denotes restricted availability.
Restrictions follow Table IV.

Key Number I II III IV V VI VII

STT350 - - - - - - - -

KEY NUMBER	Description	Selection	Availability
	STT350 Smart Temperature Transmitter Module (4-20mA/DE) All modules carry the following approvals:	STT350	
FM:	Intrinsically Safe for Class I, II, III, Div. 1, Groups A,B,C,D,E,F,G Non-Incendive for Class I, Div. 2, Groups A,B,C,D Suitable for Class II, III, Div. 2, Groups F,G		
CSA:	Intrinsically Safe for Class I, II, III, Div. 1, Groups A,B,C,D,E,F,G		
CENELEC:	Intrinsically Safe for EEx ia IIC T4/T5/T6		
CE Mark:	All modules carry CE Mark and are in compliance with EN 50081-2 and 50082-2.		
	Russian Certificate of Pattern Approval No. 332 of 18/10/94.		

TABLE I - Sensor Probe and Thermowell Accessories

No Integral Sensor Probe or Thermowell Supplied	0	
Sensor Probe and/or Thermowell mounted or tested with STT 3000 ⁽¹⁾	1	j

TABLE II - Transmitter Housing and Integral Meters (Select approval body certification in Table VII)

Explosion-Proof Field Mount Housing ⁽²⁾	No Housing Supplied	00 __	
	Explosion-Proof Housing - with baked on beige polyester/epoxy hybrid paint - with beige epoxy paint	EP __ XC __	
	For Stainless Steel or Red Epoxy Painted Housing, select Table II EP __ and appropriate Table VI code.		
Integral Meter ⁽³⁾	No Meter Supplied	-- 00	
	Analog Meter (0-100 even, S900 model)	-- ME	j
	Smart Meter (S900 model)	-- SM	j

⁽¹⁾ Specify 8-digit customer I.D. when probe/well selected. See Price Pages 13:TP-1 to 16 for sensor/well selections and pricing.

⁽²⁾ With a housing, 20 characters max. of customer information is available on the nameplate at no charge.
(See 13:STT-OE-5 for ordering instructions.)

⁽³⁾ Remote Meter available as Model RMA300 (See Price Page 13:RM-1.)

Availability
STT350
Selection

TABLE III - Configuration & Tagging

Configuration	None - Factory Default Configuration Supplied Transmitter Configuration (see 13:STT-OE-5 for choices)	00 __ TC __	
Customer Tagging ⁽⁴⁾	No Tagging Requested	-- 00	
	Customer I.D. Tag (8 characters max. on module label)	-- CT	
	316 SS Wired-on Customer I.D. Tag (4 lines, 28 characters per line, customer specified information)	-- TG	j
	316 SS Wired-on Customer I.D. Tag (blank)	-- TB	j
	Both CT Label and TG Tag	-- T3	j
	Both CT Label and TB Tag	-- T4	j

TABLE IV – Optional Equipment

Mounting Arrangement	No Mounting Arrangement Supplied	00 _____		
	DIN Rail Mounting via 2 Clips (to Top Hat or "G" Rail)	DR _____	k	
	Carbon Steel Mounting Bracket for 2" Pipe	MB _____	j	
	Stainless Steel Mounting Bracket for 2" Pipe	SB _____	j	
316 SS Conduit Adaptor for Wiring Entry	No Adaptor(s) Supplied – 1/2" NPT Conduit Connection	-- 0 _____		
	1/2" NPT to M20 x 1.5 (Eex d IIC Approved)	1 Adaptor	-- 1 _____	c
		2 Adaptors	-- 2 _____	c
	1/2" NPT to 3/4" NPT	1 Adaptor	-- 3 _____	c
2 Adaptors		-- 4 _____	c	
Lightning Protection	No Lightning Protection Supplied	--- 00 ---		
	External Lightning Protection – Mountable to Housing	--- LP ---	j	
	Internal Surge/Lightning Protection	--- SP ---	j	
Operator's/User's Manual	None	----- 00		
	North American Version (1 manual for 5 units)	----- US		
	European Version (1 manual for 5 units)	----- EN		
	French Version (1 manual for 5 units)	----- FR		

TABLE V – Optional Extended Warranty Coverage & Certificates

Optional Extended Warranty	Standard Warranty	0 __	
	Additional Warranty – 1 year	1 __	
	Additional Warranty – 2 years	2 __	
	Additional Warranty – 3 years	3 __	
	Additional Warranty – 4 years	4 __	
	Additional Warranty – 5 years	5 __	
Optional Certificate ⁽⁴⁾	No Transmitter Configuration/ Calibration Certificate	_ 0 _	
	Transmitter Configuration/ Calibration Certificate (D-0097-RD.A)	_ D _	
	No Certificate of Conformance/ Origin	-- 0	
	Certificate of Conformance/ Origin (D-0098-RD.A)	-- C	

⁽⁴⁾ Installation Guide, chosen Operator's Manuals and chosen Certificates are automatically shipped with unit. See 13:STT-OE-7 for additional manuals and alternate shipping.

Availability
STT350

TABLE VI - Additional Features

Selection

No Selection	0000	
Red Epoxy Painted Housing Cap	ST01	j
Red Epoxy Painted Explosion-Proof Housing ⁽⁵⁾	ST02	g
316 Stainless Steel Explosion-Proof Housing ⁽⁵⁾	ST07	g

⁽⁵⁾ Must be ordered with Table II EP __.

TABLE VII - Safety Approval Body Selection Appearing on Housing Nameplate

Approval Body	Approval Type	Location or Classification		
None	-	No explosion-proof or flame-proof approval body certifications included	0000	
Factory Mutual	Explosion-Proof	Class I, Div. 1, Groups A,B,C,D	F1D3	f
	Dust Ignition-Proof	Class II, III Div. 1, Groups E,F,G		
	Intrinsically Safe	Class I, II, III, Div. 1, Groups A,B,C,D,E,F,G		
	Non-Incendive	Class I, Div. 2, Groups A,B,C,D Suitable for Class II, III, Div. 2, Groups F, G		
	Explosion-Proof	Class I, Div. 1, Groups B,C,D	F1C3	j
	Dust Ignition-Proof	Class II, III, Div. 1 Groups E,F,G		
	Intrinsically Safe	Class I, II, III, Div. 1, Groups A,B,C,D,E,F,G		
	Non-Incendive	Class I, Div. 2, Groups A,B,C,D Suitable for Class II, III, Div. 2, Groups F, G		
CSA	Explosion-Proof	Class I, Div. 1, Groups B,C,D	C1C3	j
	Dust Ignition-Proof	Class II, Div. 1, Groups E,F,G Suitable for Class III, Div. 1 & 2, Groups E,F,G CSA Enclosure 4		
	Intrinsically Safe	Class I, II, III, Div. 1, Groups A,B,C,D,E,F,G		
	Non-Incendive	Class I, Div. 2, Groups A,B,C,D		
GENELEC	Flame-Proof	EEx d IIC T6	E1D3	j
	Intrinsically Safe	EEx ia IIC T6/T5/T4	E0D2	
	Intrinsically Safe	EEx ia IIC T6/T5/T4		
Self-Certified	Zone 2	T6, 28v/22mA	N2T4	j

RESTRICTIONS

Restriction Letter	Available Only With		Not Available With	
	Table	Selection	Table	Selection
c	II	EP __, XC __	VII	C1C3
f	II	EP __, XC __	II	__ ME, __ SM
g	II	EP __		
j	II	EP __, XC __		
k	II	0000		

Note: See 13:STT-9 and User's Manual for part numbers.

See 13:STT-OE-5 for OMS Order Entry Information including tagging, transmitter configuration, manuals, certificates, drawings and SPINS.

To request a quotation for a non-published "special", fax RFQ to Marketing Applications at 602 313-6155.

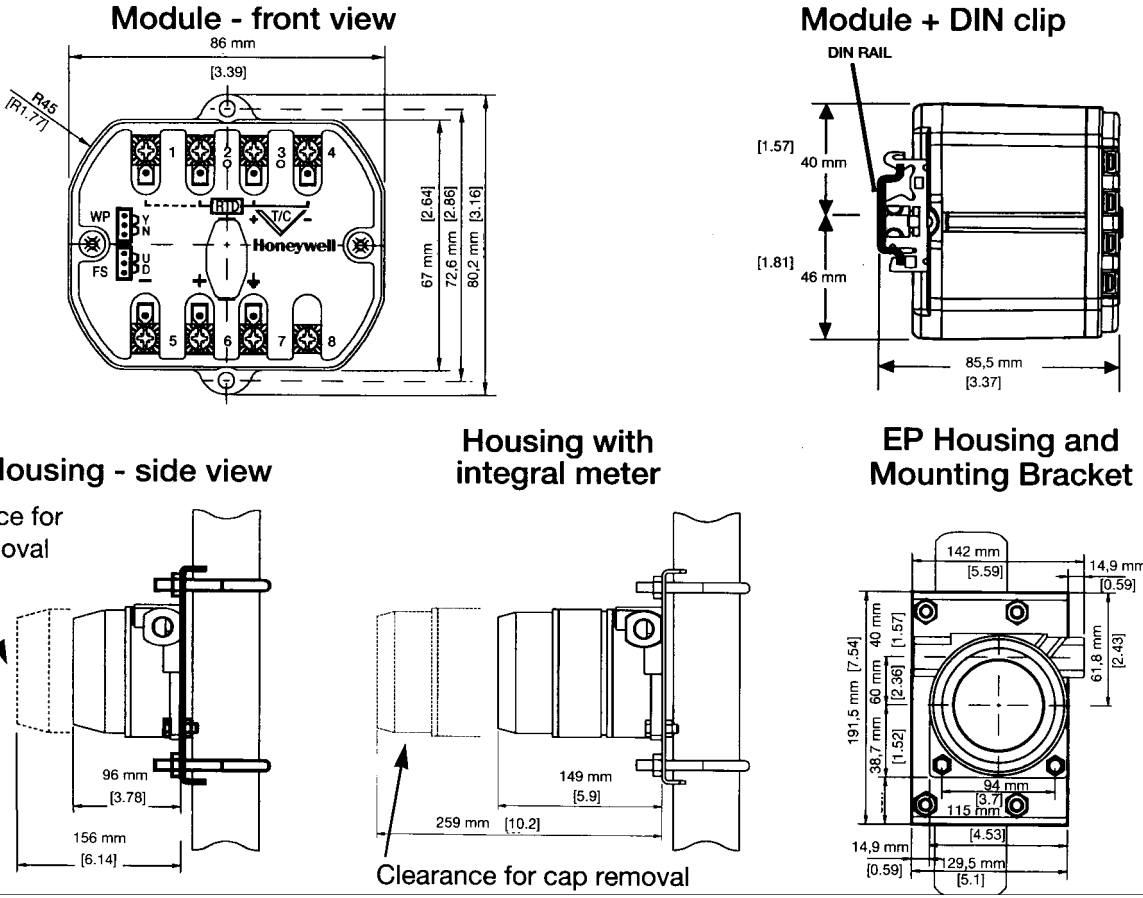


Figure 3. STT350/35F transmitter and optional flameproof housing dimensions – reference only

Distributor:



Honeywell

Industrial Automation and Control

Honeywell Inc.

U.S.A. : Honeywell Industrial Automation and Control, 16404 North Black Canyon Hwy., Phoenix, AZ 85023

Canada : The Honeywell Centre, 155 Gordon Baker Rd., North York, Ontario M2H 3N7

Latin America : Honeywell Inc., 480 Sawgrass Corporate Parkway, Suite 200, Sunrise, Florida 33325

Japan : Industrial Operations Tokyo, 4-28-1 Nishi-Rokugo Othu-ku, Tokyo 144, Japan,

Asia : Honeywell Asia Pacific Inc., Room 3213-3225, Sun Hung Kai Centre, No. 30 Harbour Road, Wanchai, Hong Kong

Pacific Division : Honeywell Pty Ltd., 5 Thomas Holt Drive, North Ryde NSW Australia 2113

Northern Europe and Southern Africa : Honeywell Ltd., Honeywell House, Arlington Business Park, Bracknell, RG 12 1 EB, U.K.

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