

### STF800 SmartLine Flange Mounted Level Specification 34-ST-03-87



#### Introduction

Part of the SmartLine® family of products, the STF800 is a high performance flange mounted level transmitter featuring piezoresistive sensor technology. STF800 transmitters may be directly mounted onto a tank flange and are offered with a variety of tank connections including various flush and extended diaphragm configurations. STF800 offers high accuracy and stability over a wide range of level applications. SmartLine products are also fully tested and compliant with Experion® PKS providing the highest level of compatibility assurance and integration capabilities. SmartLine easily meets the most demanding application needs for tank level measurement applications.

#### Best in Class Features:

- Accuracies up to 0.0375% standard
- Stability up to 0.01% of URL per year for ten years
- Automatic static pressure & temperature compensation
- Rangeability up to 100:1
- Response times as fast as 90ms
- Multiple local display capabilities
- External zero, span, & configuration capability
- Polarity insensitive electrical connections
- Comprehensive on-board diagnostic capabilities
- Integral Dual Seal design for highest safety based on ANSI/NFPA 70-202 and ANSI/ISA 12.27.0
- World class overpressure protection
- Full compliance to SIL 2/3 requirements.
- Modular design characteristics
- Available with 15 year warranty

#### Span & Range Limits:

Model	URL “H <sub>2</sub> O (mbar)”	LRL “H <sub>2</sub> O (mbar)”	Max Span “H <sub>2</sub> O (mbar)”	Min Span “H <sub>2</sub> O (mbar)”
STF828	400 (1000)	-400 (-1000)	400 (1000)	4.0 (10.0)
STF82F	400 (1000)	-400 (-1000)	400 (1000)	4.0 (10.0)
Model	psi (bar)	psi (bar)	psi (bar)	psi (bar)
STF832	100 (7.0)	-100 (-7.0)	100 (7.0)	1 (0.07)
STF83F	100 (7.0)	-100 (-7.0)	100 (7.0)	1 (0.07)



Figure 1 – STF800 Flanged Level Transmitters feature field-proven piezoresistive sensor technology

#### Communications/Output Options:

- 4-20mA dc
- Honeywell Digitally Enhanced (DE)
- HART® (version 7.0)
- FOUNDATION™ Fieldbus

All transmitters are available with the above listed communications protocols.

## Description

The SmartLine transmitters are designed around a high performance piezo-resistive sensor. This one sensor actually integrates multiple sensors linking process pressure measurement with on-board static pressure (DP & Level Models) and temperature compensation measurements resulting in the best total performance available. This level of performance allows the ST 800 to replace virtually any competitive transmitter available today.

## Unique Indication/Display Options

The ST 800 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)
- 0, 90, 180, & 270 degree position adjustments
- Pa, KPa, MPa, KGcm<sup>2</sup>, Torr, ATM, iH<sub>2</sub>O, mH<sub>2</sub>O, bar, mbar, inH<sub>2</sub>O, inHG, FTH<sub>2</sub>O, mmH<sub>2</sub>O, mm HG, & psi measurement units
- 2 Lines 16 Characters (4.13H x 1.83W mm)
- Square root output indication ( $\sqrt{\quad}$ )

### Advanced Graphics LCD Display Features

- Modular (may be added or removed in the field)
- 0, 90, 180, & 270 degree position adjustments
- Standard and custom measurement units available.
- Up to eight display screens with 3 formats are possible (Large PV with Bar Graph or PV with Trend Graph)
- Configurable screen rotation timing (1 to 30 sec)
- Display Square Root capabilities may be set separately from the 4-20mA dc output signal
- Unique "Health Watch" indication provides instant visibility of diagnostics
- Multiple language capability. (EN, GE, FR, IT, SP, RU, TR, CN, JP)

## 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**

## Configuration Tools

### Integral Three Button Configuration Option

Suitable for all electrical and environmental requirements, SmartLine offer the ability to configure the transmitter and display via three externally accessible buttons when either display option is selected. Zero/span capabilities are also optionally available via these buttons with or without selection of a display option.

## Hand Held 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 Configurator (MCT202).

The MCT202 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 hand held 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 & Fieldbus device configurations.

## 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
  - FDM Plant Area Views with Health summaries
  - All ST 800 units are Experion tested to provide the highest level of compatibility assurance

## Modular Design

To help contain maintenance & inventory costs, all ST 800 transmitters are modular in design supporting the user's ability to replace meter bodies, add indicators or change electronic modules without affecting overall performance or approval body certifications. Each meter body is uniquely characterized to provide in-tolerance performance over a wide range of application variations in temperature and pressure and due to the Honeywell advanced interface, electronic modules may be swapped with any electronics module without losing in-tolerance performance characteristics.

## Modular Features

- Meter body replacement
- Exchange/replace electronics/comms modules\*
- Add or remove integral indicators\*
- Add or remove lightning protection (terminal connection)\*

\* 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**.

## Performance Specifications<sup>1</sup>

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

Table 1

Model	URL	LRL	Min Span	Maximum Turndown Ratio	Stability (%URL/Year for ten years)	Reference Accuracy <sup>1</sup> (% Span)
STF828	400 in H <sub>2</sub> O/1000mbar	-400 in H <sub>2</sub> O/-1000mbar	4 in H <sub>2</sub> O/10.0mbar	100:1	0.03%	<b>0.0375%</b>
STF82F	400 in H <sub>2</sub> O/1000mbar	-400in H <sub>2</sub> O/-1000mbar	4 in H <sub>2</sub> O/10.0mbar	100:1	0.015%	<b>0.0375%</b>
STF832	100 psi/7.0 bar	-100 psi/-7.0 bar	1 psi/0.07 bar	100:1	0.04%	<b>0.05%</b>
STF83F	100 psi/7.0 bar	-100 psi/-7.0 bar	1 psi/0.07 bar	100:1	0.04%	<b>0.05%</b>

Zero and span may be set anywhere within the listed (URL/LRL) range limits

Accuracy at Specified Span, Temperature and Static Pressure: (Conformance to +/-3)

Table 2

Model	URL	Accuracy <sup>1</sup> (% of Span)				Temperature Effect (% Span/50°F)		Static Line Pressure Effect (% Span/300psi)	
		For Spans below	A	B	C "H <sub>2</sub> O/mbar	D	E	F	G
STF828	400 in H <sub>2</sub> O / 1000mbar	16:1	0.0125	0.025	25 / 62.5	0.210	0.040	0.095	0.010
STF82F	400 in H <sub>2</sub> O / 1000mbar					0.025	0.007	0.025	0.005
Model	URL	For Spans below	A	B	C psid/bar	D	E	F	G
STF832	100 psi / 7.0 bar	6.67:1	0.0125	0.0375	15 / 1.03	0.075	0.050	0.095	0.010
STF83F	100 psi / 7.0 bar					0.025	0.004	0.026	0.004
<b>Turn Down Effect</b>						<b>Temp Effect</b>		<b>Static Effect</b>	
$\pm \left[ A + B \left( \frac{C}{\text{Span}} \right) \right]$ % Span						$\pm \left[ D + E \left( \frac{\text{URL}}{\text{Span}} \right) \right]$ % Span per 28°C (50°F)		$\pm \left[ F + G \left( \frac{\text{URL}}{\text{Span}} \right) \right]$ % Span per 300 psi	

Total Performance (% of Span):

$$\text{Total Performance} = \pm \sqrt{(\text{Accuracy})^2 + (\text{Temp Effect})^2 + (\text{Static Line Pressure Effect})^2}$$

Total Performance Examples: (5:1 Turndown, up to 50 °F shift & up to 300 psi Static Pressure<sup>3</sup>)

STF828 @ 80" H<sub>2</sub>O: 0.436% of span

STF832 @ 20 psi: 0.359 % of span

STF82F @ 80" H<sub>2</sub>O: 0.087% of span

STF83F @ 20 psi: 0.081 % of span

Typical Calibration Frequency:

Calibration verification is recommended every four (4) years

Notes:

- Terminal Based Accuracy – Includes effects of linearity, hysteresis and repeatability. Analog output adds 0.005% of span
- For zero based spans and reference conditions of 25°C, 0 psig static pressure, 10 to 55% RH.

## Operating Conditions – All Models

Parameter	Reference Condition		Rated Condition		Operative Limits		Transportation and Storage	
	°C	°F	°C	°F	°C	°F	°C	°F
<b>Ambient Temperature<sup>1</sup></b>	25±1	77±2	-40 to 85	-40 to 185	-40 to 85	-40 to 185	-55 to 120	-67 to 248
<b>Meter Body Temperature</b>	25±1	77±2	-40 to 110*	-40 to 230*	-40 to 125	-40 to 257	-55 to 120	-67 to 248
<b>Process Interface Temp.</b> STF828, STF832 only	25±1	77±2	-40 to 110*	-40 to 230*	-40 to 175**	-40 to 350**	-55 to 125	-67 to 257
<b>Humidity %RH</b>	10 to 55		0 to 100		0 to 100		0 to 100	
<b>Minimum Pressure</b> mmHg absolute inH <sub>2</sub> O absolute	atmospheric atmospheric		25 13		2 (short term ***) 1 (short term ***)			
<b>Supply Voltage</b> <b>Load Resistance</b>	10.8 to 42.4 Vdc at terminals 0 to 1,440 ohms (as shown in <a href="#">Figure 2</a> )							

\* For CTFE fill fluid, the rating is -15 to 110 °C (5 to 230°F)

\*\* For CTFE fill fluid, the maximum temperature rating is 150°C (300°F)

\*\*\* Short term equals 2 hours at 70°C (158 °F)

#### Maximum Allowable Working Pressure (MAWP)<sup>3,4</sup>

(ST 800 products are rated to Maximum Allowable Working Pressure. MAWP depends on Approval Agency and transmitter materials of construction.)

STF828 & STF832	Flange Material	Ambient Temperature -29 to 38°C [-20 to 100°F]	Max Meterbody Temperature 125°C [257°F]	Process Interface Temperature 175°C [350°F]
ANSI Class 150 psi [bar]	Carbon Steel	285 [19.6]	245 [16.9]	215 [14.8]
	304 S.S.	275 [19.0]	218 [15.0]	198 [13.7]
	316 S.S.	275 [19.0]	225 [15.5]	205 [14.1]
ANSI Class 300 psi [bar]	Carbon Steel	740 [51.0]	668 [46.0]	645 [44.5]
	304 S.S.	720 [49.6]	570 [39.3]	518 [35.7]
	316 S.S.	720 [49.6]	590 [40.7]	538 [37.1]
DN PN40 psi [bar]	Carbon Steel	580 [40.0] <sup>1</sup>	574 [39.6]	559 [38.5]
	304 S.S.	534 [36.8] <sup>1</sup>	419 [28.9]	385 [26.5]
	316 S.S.	534 [36.8] <sup>1</sup>	434 [29.9]	399 [27.5]
<b>STF82F &amp; STF83F</b> ANSI Class 150 psi [bar]	316L Stainless Steel	230 [15.9]	185 [12.8]	No rating at this temp

<sup>1</sup> Ambient Temperature for DN PN40 is -10 to 50°C [14 to 122 F]

<sup>3</sup> MAWP applies for temperature range -40 to 125°C. However, Static Pressure Limit is de-rated to 3,000 psi from -26°C to -40°C.

Use of graphite o-rings de-rates transmitter to 3,625 psi. Use of adaptor with graphite o-rings de-rates transmitter to 3,000 psi.

<sup>4</sup> Consult factory for MAWP of ST 800 transmitters with CSA approval.

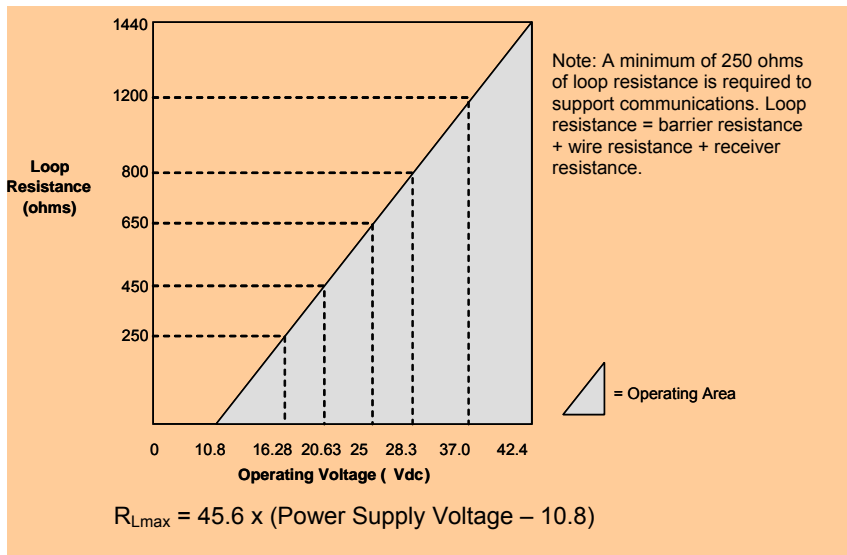


Figure 2 - Supply voltage and loop resistance chart & calculations

**Performance Under Rated Conditions – All Models**

Parameter	Description									
Analog Output	Two-wire, 4 to 20 mA (HART & DE Transmitters only)									
Digital Communications:	Honeywell DE, HART 7 protocol or FOUNDATION Fieldbus ITK 6.0.1 compliant All transmitters, irrespective of protocol have polarity insensitive connection.									
Output Failure Modes	<table border="0"><tr><td></td><td><b>Honeywell Standard:</b></td><td><b>NAMUR NE 43 Compliance:</b></td></tr><tr><td><b>Normal Limits:</b></td><td>3.8 – 20.8 mA</td><td>3.8 – 20.5 mA</td></tr><tr><td><b>Failure Mode:</b></td><td>≤ 3.6 mA and ≥ 21.0 mA</td><td>≤ 3.6 mA and ≥ 21.0 mA</td></tr></table>		<b>Honeywell Standard:</b>	<b>NAMUR NE 43 Compliance:</b>	<b>Normal Limits:</b>	3.8 – 20.8 mA	3.8 – 20.5 mA	<b>Failure Mode:</b>	≤ 3.6 mA and ≥ 21.0 mA	≤ 3.6 mA and ≥ 21.0 mA
	<b>Honeywell Standard:</b>	<b>NAMUR NE 43 Compliance:</b>								
<b>Normal Limits:</b>	3.8 – 20.8 mA	3.8 – 20.5 mA								
<b>Failure Mode:</b>	≤ 3.6 mA and ≥ 21.0 mA	≤ 3.6 mA and ≥ 21.0 mA								
Supply Voltage Effect	0.005% span per volt.									
Transmitter Turn on Time (includes power up & test algorithms)	HART or DE: 2.5 sec.      Foundation Fieldbus: Host dependant									
Response Time (delay + time constant)	<table border="0"><tr><td><b>DE/HART Analog Output</b></td><td><b>FOUNDATION Fieldbus</b></td></tr><tr><td>90mS</td><td>150mS (Host Dependant)</td></tr></table>	<b>DE/HART Analog Output</b>	<b>FOUNDATION Fieldbus</b>	90mS	150mS (Host Dependant)					
<b>DE/HART Analog Output</b>	<b>FOUNDATION Fieldbus</b>									
90mS	150mS (Host Dependant)									
Damping Time Constant	<b>HART:</b> Adjustable from 0 to 32 seconds in 0.1 increments. <b>Default:</b> 0.50 seconds <b>DE:</b> Discrete values 0, .16, .32, .48, 1, 2, 4, 8, 16, 32 seconds. <b>Default:</b> 0.48 seconds									
Vibration Effect	Less than +/- 0.1% of URL w/o damping Per IEC60770-1 field or pipeline, high vibration level (10-2000Hz: 0.21 displacement/3g max acceleration)									
Electromagnetic Compatibility	IEC 61326-3-1									
Lightning Protection Option	<b>Leakage Current:</b> 10uA max @ 42.4VDC 93C <b>Impulse rating:</b> 8/20uS 5000A (>10 strikes) 10000A (1 strike min.) 10/1000uS 200A (> 300 strikes)									

**Materials Specifications** (see model selection guide for availability/restrictions with various models)

Parameter	Description
Barrier Diaphragms Material	316L SS, Hastelloy <sup>®</sup> C-276 <sup>2</sup> , Monel <sup>®</sup> 400 <sup>**3</sup>
Process Head Material	316 SS <sup>4</sup> , Carbon Steel (Zinc-plated) <sup>5</sup> , Hastelloy C-276 <sup>*6</sup> , Monel 400 <sup>**7</sup>
Vent/Drain Valves & Plugs <sup>1</sup>	316 SS <sup>4</sup> , Hastelloy C-276 <sup>2</sup> , Monel 400 <sup>7</sup>
Gasket Ring Material (Wetted)	316/316L SS, Hastelloy <sup>®</sup> C-276 <sup>*2</sup> , Monel <sup>®</sup> 400 <sup>**3</sup>
Extension Tube Material	316 SS <sup>4</sup>
Head Gaskets	Glass-filled PTFE standard. Viton <sup>®</sup> and graphite are optional.
Meter Body Bolting	Carbon Steel (Zinc plated) standard. Options include 316 SS, NACE A286 SS bolts, Monel K500, Super Duplex and B7M.
Optional Adapter Flange and Bolts	Adapter Flange materials include 316 SS <sup>4</sup> , Hastelloy C-276 <sup>6</sup> and Monel 400 <sup>7</sup> . Bolt material for flanges is dependent on process head bolts material chosen. Standard adaptor o-ring material is glass-filled PTFE. Viton and graphite are optional.
Mounting Flange STF828, STF832 STF82F, STF83F	<b>Flush or Extended Diaphragm:</b> Zinc Chromate plated Carbon Steel <sup>5</sup> , 304 SS, or 316 SS <sup>4</sup> . 316L SS ( <i>NOTE: Mounting Flange is process wetted.</i> )
Fill Fluid	Silicone DC <sup>®</sup> 200 oil or CTFE (Chlorotrifluoroethylene).
Electronic Housing	Pure Polyester Powder Coated Low Copper (<0.4%)-Aluminum. Meets NEMA 4X, IP66, & P67. All stainless steel housing is optional.
Mounting	See <a href="#">Figure 3</a> for typical flange mounting arrangement.
Process Connections  All Models STF828, STF832  STF82F, STF83F	<b>Process Head:</b> 1/4-inch NPT; 1/2-inch NPT with adapter and DIN, standard options. <b>Flange:</b> 2, 3 or 4-inch Class 150 or 300 ANSI; DN50-PN40, DN80-PN40 or DN100-PN40 DIN flange. <b>Extended Diaphragm:</b> 2, 4, or 6 inches (50, 101, 152 mm) long. 2 or 3-inch, Class 150 ANSI flange.
Wiring	Accepts up to 16 AWG (1.5 mm diameter).
Dimensions	See <a href="#">Figure 4</a> , <a href="#">Figure 5</a> & <a href="#">Figure 6</a>
Net Weight	STF82F, STF83F: 14-19 pounds (6.4 - 8.7Kg). With Aluminum Housing STF828, STF832: 18-32 pounds (8.2 - 14.5Kg). With Aluminum Housing

<sup>1</sup> Vent/Drains are sealed with Teflon<sup>®</sup>

<sup>2</sup> Hastelloy C-276 or UNS N10276

<sup>3</sup> Monel 400 or UNS N04400

<sup>4</sup> Supplied as 316 SS or as Grade CF8M, the casting equivalent of 316 SS.

<sup>5</sup> Carbon Steel heads are zinc-plated and not recommended for water service due to hydrogen migration. For that service, use 316 stainless steel wetted Process Heads.

<sup>6</sup> Hastelloy C-276 or UNS N10276. Supplied as indicated or as Grade CW12MW, the casting equivalent of Hastelloy C-276

<sup>7</sup> Monel 400 or UNS N04400. Supplied as indicated or as Grade M30C, the casting equivalent of Monel 400

\* Flush design only.

\*\*Flush or pseudo flange design.

## Communications Protocols & Diagnostics

### HART Protocol

#### Version:

HART 7

#### Power Supply

Voltage: 10.8 to 42.4Vdc at terminals

Load: Maximum 1440 ohms See [Figure 2](#)

Minimum Load: 0 ohms. (For handheld communications a minimum load of 250 ohms is required)

### Foundation Fieldbus (FF)

#### Power Supply Requirements

Voltage: 9.0 to 32.0Vdc at terminals

Steady State Current: 17.6mAdc

Software Download Current: 27.4mAdc

#### Available Function Blocks

Block Type	Qty	Execution Time
Resource	1	n/a
Transducer	1	n/a
Diagnostic	1	n/a
Analog Input	1*	30 ms
PID w/Autotune	1	45 ms
Integrator	1	30 ms
Signal Char (SC)	1	30 ms
LCD Display	1	n/a
Flow Block	1	30 ms
Input Selector	1	30 ms
Arithmetic	1	30 ms

\* All block may have two (2) additional instantiations.

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 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: 6 devices/segment

#### Schedule Entries

18 maximum schedule entries

#### Number of VCR's: 24 max

**Compliance Testing:** Tested according to ITK 6.0.1

### Software Download

Utilizes Class-3 of the Common Software Download procedure as per FF-883 which allows the field devices of any manufacturer to receive software upgrades from any host.

### 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: 10.8 to 42.4Vdc at terminals

Load: Maximum 1440 ohms See [Figure 2](#).

### Standard Diagnostics

ST 800 top level diagnostics are reported as either critical or non-critical and readable via the DD/DTM tools or integral display as shown below.

Critical Diagnostics		
HART DD/DTM tools	Advanced Display	Basic Display
Electronic Module DAC Failure	Electronics Module fault	Electronics Module fault
Meter Body NVM Corrupt	Meterbody fault	Meterbody fault
Config Data Corrupt	Electronics Module fault	Electronics Module fault
Electronic Module Diag Failure	Electronics Module fault	Electronics Module fault
Meter Body Critical Failure	Meterbody fault	Meterbody fault
Sensor Comm Timeout	Meterbody Comm fault	Meterbody Comm fault

Non-Critical Diagnostics		
HART DD/DTM tools	Advanced Display	Basic Display
Display Failure	n/a	n/a
Electronic Module Comm Failure	n/a	n/a
Meter Body Excess Correct	Zero Correct (OK or EXCESSIVE) Span Correct (OK or EXCESSIVE)	n/a
Sensor Over Temperature	Meterbody Temp (OK, OVER TEMP)	n/a
Fixed Current Mode	Analog Out mode (Fixed or Normal)	n/a
PV Out of Range	Primary PV (OK or OVERLOAD)	n/a
No Factory Calibration	Factory Cal (OK, NO FACTORY CAL)	n/a
No DAC Compensation	DAC Temp Comp (OK, NO COMPENSATION)	n/a
LRV Set Error – Zero Config Button	n/a	n/a
URV Set Error – Span Config Button	n/a	n/a
AO Out of Range	n/a	n/a
Loop Current Noise	n/a	n/a
Meter Body Unreliable Comm	Meterbody Comm (OK, SUSPECT)	n/a
Tamper Alarm	n/a	n/a
No DAC Calibration	n/a	n/a
Sensor Supply Voltage Low	Supply Voltage (OK, LOW, or HIGH)	n/a

Refer to ST 800 diagnostics tech note for additional level diagnostics.

### Other Certification Options

#### Materials

- o NACE MRO175, MRO103, ISO15156

**Approval Certifications:**

AGENCY	TYPE OF PROTECTION	COMM. OPTION	FIELD PARAMETERS	AMBIENT TEMP (Ta)
<b>FM Approvals™</b>	<b>Explosionproof:</b> Class I, Division 1, Groups A, B, C, D; <b>Dust Ignition Proof:</b> Class II, III, Division 1, Groups E, F, G; T4 Class I, Zone 1/2, AEx d IIC T4 Class II, Zone 21, AEx tb IIIC T 85°C IP 66	All	Note 1	-50 °C to 85°C
	<b>Intrinsically Safe:</b> Class I, II, III, Division 1, Groups A, B, C, D, E, F, G; T4  Class 1, Zone 0, AEx ia IIC T4	4-20 mA / DE/ HART	Note 2a	-50 °C to 70°C
		Foundation Fieldbus	Note 2b	-50 °C to 70°C
	<b>Nonincendive:</b> Class I, Division 2, Groups A, B, C, D locations, Class 1, Zone 2, AEx nA IIC T4	4-20 mA / DE/ HART	Note 1	-50 °C to 85°C
		Foundation Fieldbus	Note 1	-50 °C to 85°C
	<b>Enclosure:</b> Type 4X/ IP66/ IP67	All	All	-
<b>Canadian Standards Association (CSA)</b>	<b>Explosion Proof:</b> Class I, Division 1, Groups A, B, C, D; <b>Dust Ignition Proof:</b> Class II, III, Division 1, Groups E, F, G; T4 Ex d IIC T4 Ex tD A21 T 95°C IP 66	All	Note 1	-50 °C to 85°C
	<b>Intrinsically Safe:</b> Class I, II, III, Division 1, Groups A, B, C, D, E, F, G; T4  Ex nA IIC T4	4-20 mA / DE/ HART	Note 2a	-50 °C to 70°C
		Foundation Fieldbus	Note 2b	-50 °C to 70°C
	<b>Nonincendive:</b> Class I, Division 2, Groups A, B, C, D; T4  Ex nA IIC T4	4-20 mA / DE/ HART	Note 1	-50 °C to 85°C
		Foundation Fieldbus	Note 1	-50 °C to 85°C
	<b>Enclosure:</b> Type 4X/ IP66/ IP67	All	All	-
	<b>Canadian Registration Number (CRN):</b>	All models have been registered in all provinces and territories in Canada and are marked CRN: 0F8914.5C.		
<b>ATEX</b>	<b>Flameproof:</b> II 1/2 G Ex d IIC T4 II 2 D Ex tb IIIC T 85°C IP 66	All	Note 1	-50 °C to 85°C
	<b>Intrinsically Safe:</b> II 1 G Ex ia IIC T4	4-20 mA / DE/ HART	Note 2a	-50 °C to 70°C
		Foundation Fieldbus	Note 2b	-50 °C to 70°C
	<b>Nonincendive:</b> II 3 G Ex nA IIC T4	4-20 mA / DE/ HART	Note 1	-50 °C to 85°C
		Foundation Fieldbus	Note 1	-50 °C to 85°C
<b>Enclosure:</b> IP66/ IP67	All	All	All	



**Approval Certifications: (Continued)**

<b>IECEX (World)</b>	<b>Flameproof :</b> Ga/Gb Ex d IIC T4 Ex tb IIIC T 85°C IP 66	All	Note 1	-50 °C to 85°C
	<b>Intrinsically Safe:</b> Ex ia IIC T4	4-20 mA / DE/ HART	Note 2a	-50 °C to 70°C
		Foundation Fieldbus	Note 2b	-50 °C to 70°C
	<b>Nonincendive:</b> Ex nA IIC T4	4-20 mA / DE/ HART	Note 1	-50 °C to 85°C
		Foundation Fieldbus	Note 1	-50 °C to 85°C
<b>Enclosure:</b> IP66/ IP67	All	All	All	
<b>SAEx (South Africa)</b>	<b>Flameproof :</b> Ga/Gb Ex d IIC T4 Ex tb IIIC T 85°C IP 66	All	Note 1	-50 °C to 85°C
	<b>Intrinsically Safe:</b> Ex ia IIC T4	4-20 mA / DE/ HART	Note 2a	-50 °C to 70°C
		Foundation Fieldbus	Note 2b	-50 °C to 70°C
	<b>Nonincendive:</b> Ex nA IIC T4	4-20 mA / DE/ HART	Note 1	-50 °C to 85°C
		Foundation Fieldbus	Note 1	-50 °C to 85°C
<b>Enclosure:</b> IP66/ IP67	All	All	All	
<b>INMETRO (Brazil)</b>	<b>Flameproof:</b> Br- Ga/Gb Ex d IIC T4 Br- Ex tb IIIC T 85°C IP 66	All	Note 1	-50 °C to 85°C
	<b>Intrinsically Safe:</b> Br- Ex ia IIC T4	4-20 mA / DE/ HART	Note 2a	-50 °C to 70°C
		Foundation Fieldbus	Note 2b	-50 °C to 70°C
	<b>Nonincendive:</b> Ex nA IIC T4	4-20 mA / DE/ HART	Note 1	-50 °C to 85°C
		Foundation Fieldbus	Note 1	-50 °C to 85°C
<b>Enclosure :</b> IP 66/67	All	All	-	
<b>NEPSI (China)</b>	<b>Flameproof:</b> Br- Ga/Gb Ex d IIC T4 Br- Ex tb IIIC T 85°C IP 66	All	Note 1	-50 °C to 85°C
	<b>Intrinsically Safe:</b> Br- Ex ia IIC T4	4-20 mA / DE/ HART	Note 2a	-50 °C to 70°C
		Foundation Fieldbus	Note 2b	-50 °C to 70°C
	<b>Nonincendive:</b> Ex nA IIC T4	4-20 mA / DE/ HART	Note 1	-50 °C to 85°C
		Foundation Fieldbus	Note 1	-50 °C to 85°C
<b>Enclosure :</b> IP 66/67	All	All	-	

## Notes:

## 1. Operating Parameters:

Voltage= 11 to 42 V DC = 10 to 30 V (FF)	Current= 4-20 mA Normal (3.8 – 23 mA Faults) = 30 mA (FF)
---	--

## 2. Intrinsically Safe Entity Parameters

## a. Analog/ DE/ HART Entity Values:

Vmax= Ui = 30V After 27th September 2013	I <sub>max</sub> = I <sub>i</sub> = 105 mA	C <sub>i</sub> = 4.2nF	Li = 984uH	Pi =0.9W
Vmax= Ui = 30V	I <sub>max</sub> = I <sub>i</sub> = 225mA	C <sub>i</sub> = 4.2nF	Li = 0 uH	Pi =0.9W

## b. Foundation Fieldbus Entity Values

Vmax= Ui = 30V	I <sub>max</sub> = I <sub>i</sub> = 225mA	C <sub>i</sub> = 0 nF	Li = 0 uH	Pi =1W
----------------	---	-----------------------	-----------	--------

**Approval Certifications: (Continued)**

<b>Marine Certificates</b>	This certificate defines the certifications covered for the ST 800 Pressure Transmitter family of products. It represents the compilation of the five certificates Honeywell currently has covering the certification of these products into marine applications.	
	<b>American Bureau of Shipping (ABS)</b> - 2009 Steel Vessel Rules 1-1-4/3.7, 4-6-2/5.15, 4-8-3/13 & 13.5, 4-8-4/27.5.1, 4-9-7/13. Certificate number: 04-HS417416-PDA	
	<b>Bureau Veritas (BV)</b> - Product Code: 389:1H. Certificate number: 12660/B0 BV	
	<b>Det Norske Veritas (DNV)</b> - Location Classes: Temperature D, Humidity B, Vibration A, EMC B, Enclosure C. For salt spray exposure; enclosure of 316 SST or 2-part epoxy protection with 316 SST bolts to be applied. Certificate number: A-11476	
	<b>Korean Register of Shipping (KR)</b> - Certificate number: LOX17743-AE001	
	<b>Lloyd's Register (LR)</b> - Certificate number: 02/60001(E1) & (E2)	
<b>SIL 2/3 Certification</b>	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.	
<b>MEASUREMENT INSTRUMENTS DIRECTIVE (MID) 2004/ 22/ EC</b>	<b>Certificate Issued by</b> NMI Certin B.V.	<b>Mechanical Class:</b> M3
	<b>Electromagnetic Environment:</b> E3	<b>Ambient Temperature Range:</b> -25 oC to + 55 oC
	<b>Unit</b>	<b>Custom Calibration</b>
	STD820	0 – 1000 mbar
	STD830	0 – 7 bar
	STA84L	0 – 35 bar A
	STG820	0 – 35 bar
	STD870	0 – 100 bar
	STA87L	0 – 100 barA
STG87L	0 – 100 bar	

Reference Drawing

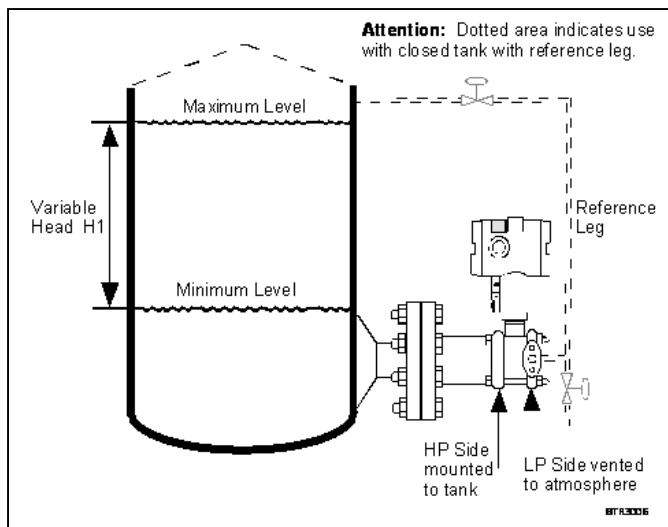


Figure 3 – Typical mounting for flange mounted level transmitter

Dimensional Drawings

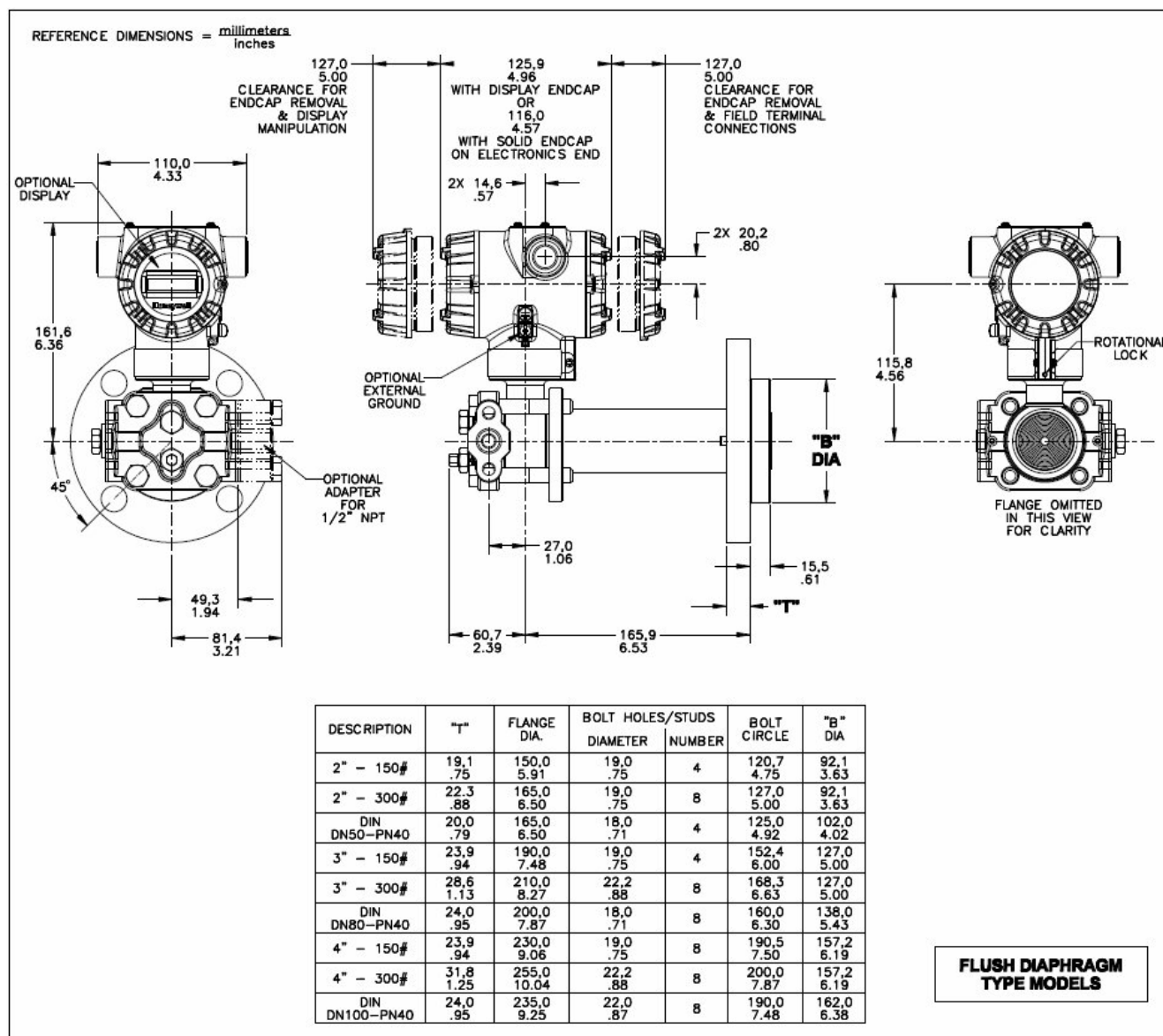


Figure 4– Typical mounting dimensions for flush diaphragm type models STF828 and STF832.

**Dimensional Drawings (con't)**

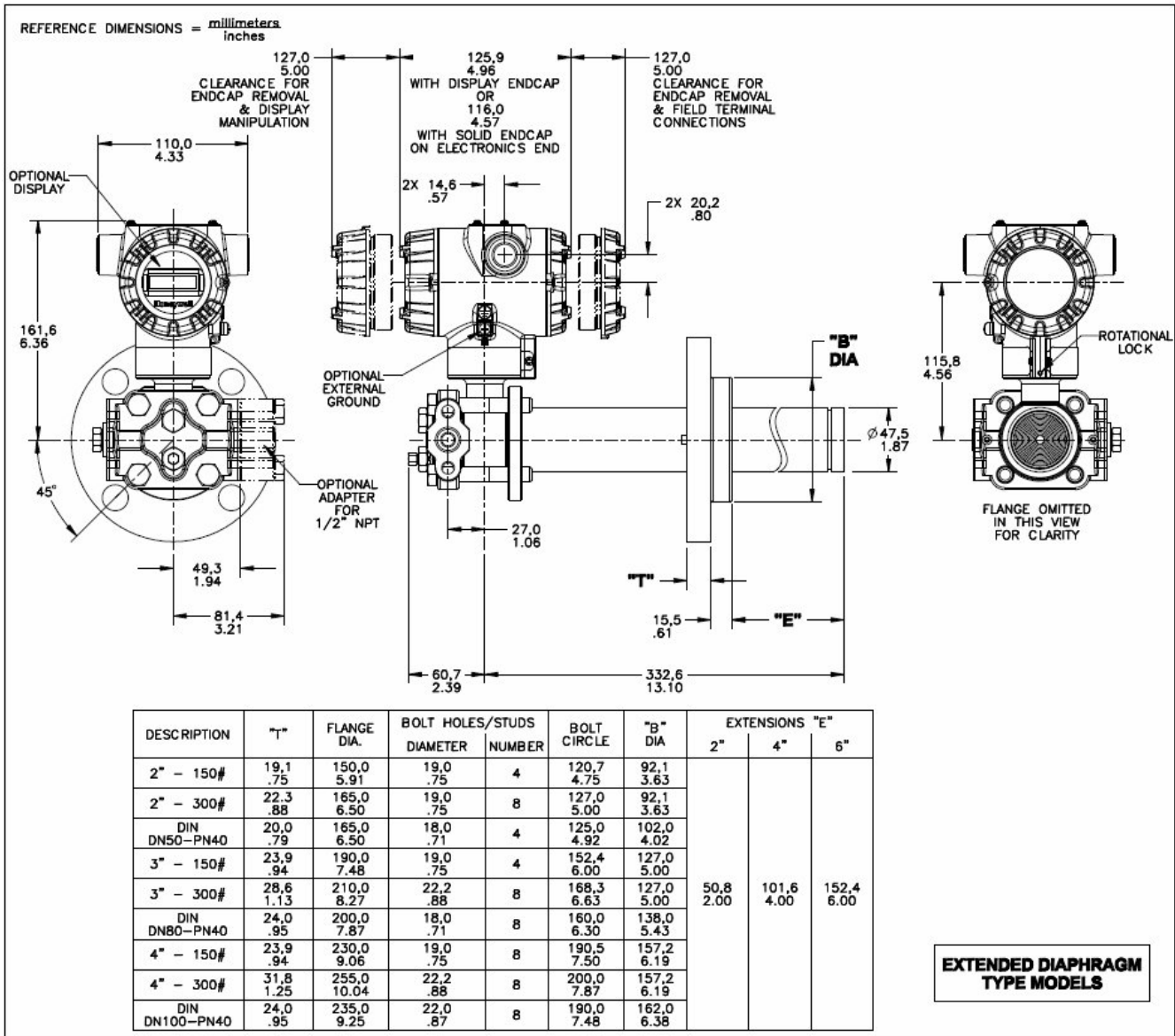


Figure 5– Typical mounting dimensions for extended diaphragm type models STF828 and STF832.

Dimensional Drawings (con't)

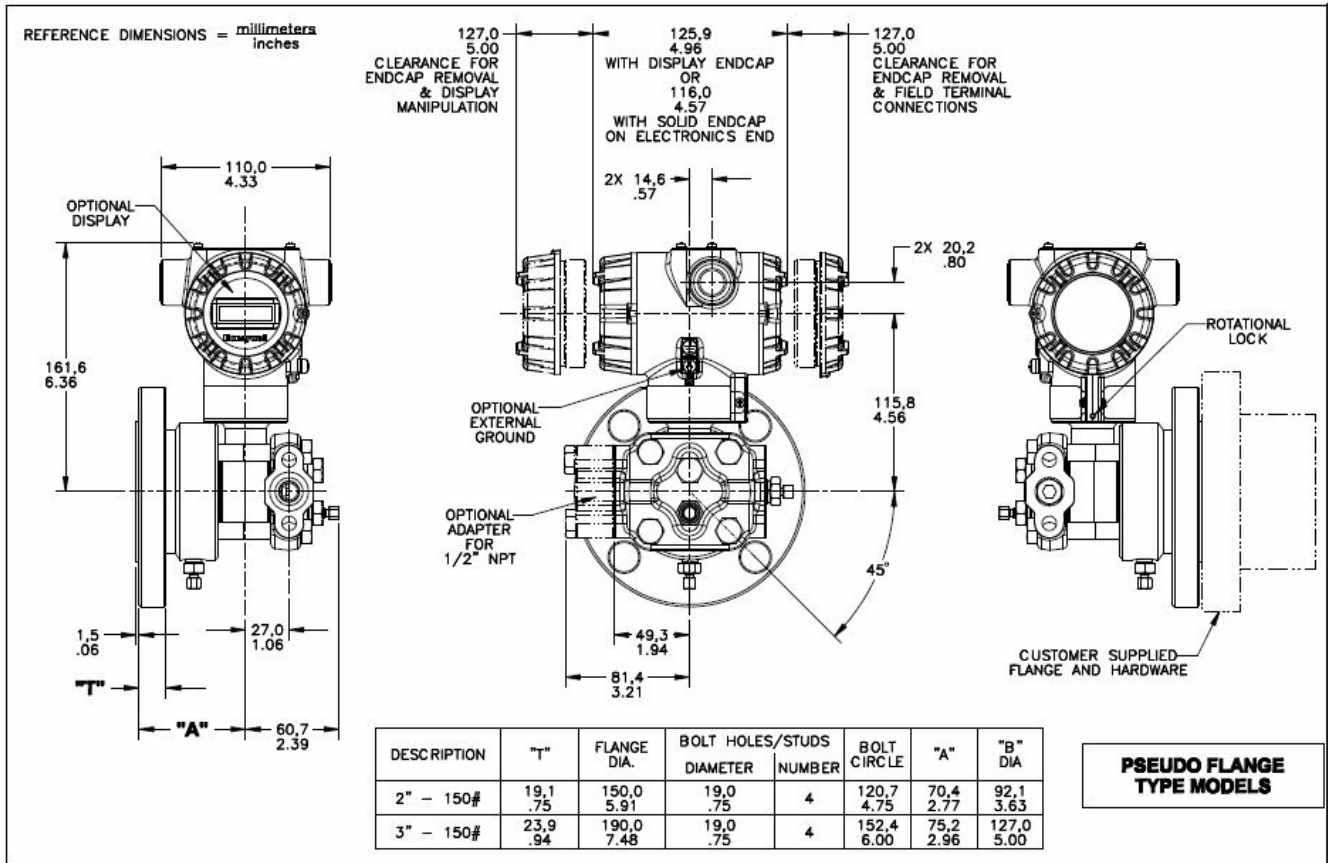


Figure 6– Typical mounting dimensions for pseudo flange type models STF82F, STF83F, and STF84F.

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](http://www.honeywellprocess.com/en-US/pages/default.aspx)

**Model Selection Guide**

**Model STF800  
Flange Mounted Liquid Level  
Transmitter**



Model Selection Guide  
34-ST-16-87 Issue 3

**Instructions**

- Select the desired KeyNumber. The arrow to the right marks the selection available.
- Make one selection from each Table (I, II and IX) using the column below the proper arrow.
- A (●) denotes unrestricted availability. A letter denotes restricted availability.
- Restrictions follow Table IX.

**Key Number**

STF8	I	II	III	IV	V	VI	VII	VIII (Optional)	IX
STF8	-	-	-	-	-	-	-	-	+ 0000

KEY NUMBER	URL	LRL	Max Span	Min Span	Units	Selection	Availability
Measurement	400 (1000)	-400 (-1000)	400 (1000)	4 (10)	" H <sub>2</sub> O (mbar)	STF828	↓
	100 (7)	-100 (-7)	100 (7)	1 (0.07)	psi (bar)	STF832	↓
Range Std	400 (1000)	-400 (-1000)	400 (1000)	1 (2.5)	" H <sub>2</sub> O (mbar)	STF82F	↓
	100 (7)	-100 (-7)	100 (7)	1 (0.07)	psi (bar)	STF83F	↓

TABLE I		Materials of Construction	Design	Ref. Head	Vent Drain Valve on Ref. Head <sup>2</sup>	Barrier Diaphragm (wetted)	Diaphragm Plate (wetted)	Extension (wetted)	Sel.		
Meter Body & Flange Design	a. Process Wetted Heads & Diaphragm Materials	Flush	Carbon <sup>1</sup> Steel	316 SS	316 SS	316L SS Hast C <sup>3</sup> Hast C <sup>3</sup> Monel 400 <sup>4</sup>	316L SS 316L SS Hast C <sup>3</sup> Monel 400 <sup>4</sup>	N/A	A	•	•
									W	•	•
			B			•	•				
			C			a	•				
			E			•	•				
			X			•	•				
		F	•	•							
		G	a	•							
		J	•	•							
		L	a	•							
		M	•	•							
		N	•	•							
R	•	•									
S	•	•									
Extended	Carbon <sup>1</sup> Steel	316 SS	316L SS Hast C <sup>3</sup>	316L SS	316L SS	316L SS	316L SS	1	•	•	
	316 SS <sup>5</sup>							316L SS Hast C <sup>3</sup>	2	•	•
Pseudo Flange	Carbon <sup>1</sup> Steel	316 SS	316L SS Hast C <sup>3</sup> Monel 400 <sup>4</sup>	316L SS	NA	NA	NA	3	•	a	
	316 SS <sup>5</sup>							316L SS Hast C <sup>3</sup> Monel 400 <sup>4</sup>	4	•	•
								5	•	•	
								6	•	a	
b. Fill Fluid (Meter Body & Flange)		Silicone Oil 200 Fluorinated Oil CTFE						- 1	•	•	
								- 2	•	•	
c. Process Connection		Reference Head			Flange			Sel.			
		1/4 NPT			High Pressure Side			A		•	•
					Low Pressure Side			C		•	•
		1/2 NPT Adapter - material matches head material and head bolt material <sup>11</sup>			High Pressure Side			H		•	•
					Low Pressure Side			K		•	•
d. Bolts for Process Heads		Carbon Steel Bolts						C		a	a
		316 SS Bolts						S		a	a
		A286 SS (NACE) Bolts						N		•	•
		B7M Bolts						B		•	•
e. Vent/Drain Type/Location		Ref. Head Type	Vent Type	Location	Vent Material			Sel.			
		Single Ended	None	None	None			1		•	•
		Single Ended	Std	Side	Matches Head Material <sup>11</sup>			2		•	•
		Single Ended	Ctr Vent	Side	Stainless Steel Only			3		t	t
		Dual Ended	Std	End	Matches Head Material <sup>11</sup>			4		•	•
		Dual Ended	Ctr Vent	End	Stainless Steel Only			5		t	t
		Dual Ended	Vent/Plug	Side/End	Matches Head Material <sup>11</sup>			6		•	•
f. Gasket Material		Teflon <sup>®</sup> or PTFE (Glass Filled)						A		•	•
		Viton <sup>®</sup> or Fluorocarbon Elastomer						B		•	•

<sup>1</sup> Carbon Steel heads are zinc-plated and not recommended for water service due to hydrogen migration. For that service, use the 316 stainless steel Wetted Reference Head.  
<sup>2</sup> Vent/Drains are Teflon or PTFE coated for lubricity.  
<sup>3</sup> Hastelloy<sup>®</sup> C-276 or UNS N10276  
<sup>4</sup> Monel 400<sup>®</sup> or UNS N04400  
<sup>5</sup> Supplied as 316 SS or as Grade CF8M, the casting equivalent of 316 SS.  
<sup>6</sup> Supplied as indicated or as Grade CW12MW, the casting equivalent of Hastelloy<sup>®</sup> C-276  
<sup>7</sup> Supplied as indicated or as Grade M30C, the casting equivalent of Monel 400<sup>®</sup>  
<sup>10</sup> Monel 400<sup>®</sup> or UNS N04400 or UNS N04405  
<sup>11</sup> Except Carbon Steel Heads shall use 316SS Vent/Drain, Plugs & Adapters when required

Availability  
STF8xx

TABLE II		Flange Material	Threaded Nut Ring Material	Selection	28 32	2F 3F
Flange Assembly	a. Flange  (ANSI Flanges have 125-500 AARH Surface Finish)	3" ANSI Class 150 3" ANSI Class 300 DN80-PN40 DIN	Carbon Steel (non-wetted)	Carbon Steel (non-wetted)	1__	•
		4" ANSI Class 150 4" ANSI Class 300 DN100-PN40 DIN			2__	•
		2" ANSI Class 150 2" ANSI Class 300 DN50-PN40 DIN			3__	•
					4__	•
					5__	•
					6__	•
					7__	•
					8__	•
					9__	•
		3" ANSI Class 150 3" ANSI Class 300 DN80-PN40 DIN	304 SS (non-wetted)	304 SS (non-wetted)	A__	•
		4" ANSI Class 150 4" ANSI Class 300 DN100-PN40 DIN			B__	•
		2" ANSI Class 150 2" ANSI Class 300 DN50-PN40 DIN			C__	•
					D__	•
					E__	•
					F__	•
		Q__			•	
		U__			•	
		V__			•	
		3" ANSI Class 150 3" ANSI Class 300 DN80-PN40 DIN	316 SS (non-wetted)	304 SS (non-wetted)	H__	•
	4" ANSI Class 150 4" ANSI Class 300 DN100-PN40 DIN	J__			•	
	2" ANSI Class 150 2" ANSI Class 300 DN50-PN40 DIN	K__			•	
		L__			•	
		M__			•	
		N__			•	
		W__			•	
		X__			•	
		Z__			•	
	<b>Pseudo Flange on Standard DP</b>			<b>Sel.</b>		
	2" ANSI Class 150 without Vent/Drain	316L SS (wetted)	Not Applicable	S__	•	
	2" ANSI Class 150 with Vent/Drain			T__	•	
	3" ANSI Class 150 without Vent/Drain			P__	•	
	3" ANSI Class 150 with Vent/Drain			R__	•	
	No Selection			0	•	
	b. Gasket Ring (wetted)		316L SS	1	s	
		Flush Design	Hastelloy® C <sup>3</sup>	2	s	
			Monel 400® <sup>4</sup>	3	q	
			316L SS	5	v	
	c. Extension (wetted)	No Selection		0	•	
		Flush			F	w
		<b>Diameter</b>	<b>Length</b>	<b>Sel.</b>		
		1.87 Inches	2 inches	C	v	
		(for 2", 3" or 4" spud) <sup>13</sup>	4 inches	D	v	
		6 inches	E	v		

<sup>3</sup> Hastelloy® C-276 or UNS N10276

<sup>4</sup> Monel 400® or UNS N04400

<sup>13</sup> For part numbers and pricing information on Tank Spuds refer to page ST-91 (Supplementary Accessories & Kits).

TABLE III	Agency Approvals (see data sheet for Approval Code Details)	Selection
Approvals	No Approvals Required	0
	FM Explosion proof, Intrinsically Safe, Non-incendive, & Dustproof	A
	CSA Explosion proof, Intrinsically Safe, Non-incendive, & Dustproof	B
	ATEX Explosion proof, Intrinsically Safe & Non-incendive	C
	IECEx Explosion proof, Intrinsically Safe & Non-incendive	D
	SAE/CCoE Explosion proof, Intrinsically Safe & Non-incendive	E
	INMETRO Explosion proof, Intrinsically Safe & Non-incendive	F
	NEPSI Explosion proof, Intrinsically Safe & Non-incendive	G

TABLE IV	TRANSMITTER ELECTRONICS SELECTIONS			Selection		
a. Electronic Housing Material & Connection Type	<b>Material</b>	<b>Connection</b>	<b>Lightning Protection</b>			
	Polyester Powder Coated Aluminum	1/2 NPT	None	A__		
	Polyester Powder Coated Aluminum	M20	None	B__		
	Polyester Powder Coated Aluminum	1/2 NPT	Yes	C__		
	Polyester Powder Coated Aluminum	M20	Yes	D__		
	316 Stainless Steel (Grade CF8M)	1/2 NPT	None	E__		
	316 Stainless Steel (Grade CF8M)	M20	None	F__		
	316 Stainless Steel (Grade CF8M)	1/2 NPT	Yes	G__		
			316 Stainless Steel (Grade CF8M)	M20	Yes	H__
b. Output/ Protocol	<b>Analog Output</b>		<b>Digital Protocol</b>			
	4-20mA dc		HART Protocol	H__		
	4-20mA dc		DE Protocol	D__		
	none		Foundation Fieldbus	F__		
c. Customer Interface Selections	<b>Indicator</b>	<b>Ext Zero, Span &amp; Config Buttons</b>	<b>Languages</b>			
	None	None	None	0		
	None	Yes (Zero/Span Only)	None	A		
	Basic	None	English	B		
	Basic	Yes	English	C		
	Advanced	None	EN, GR, IT, FR, SP, RU, TU	D		
	Advanced	Yes	EN, GR, IT, FR, SP, RU, TU	E		
Advanced	None	EN, CH, JP	H			
Advanced	Yes	EN, CH, JP	J			

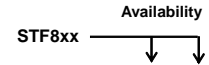


TABLE V	CONFIGURATION SELECTIONS			Selection	28	2F
a. Application Software	Diagnostics			1 __	28	2F
	Standard Diagnostics				*	*
b. Output Limit, Failsafe & Write Protect Settings	Write Protect	Fail Mode	High & Low Output Limits <sup>4</sup>			
	Disabled	High > 21.0mAdc	Honeywell Std (3.8 - 20.8 mAdc)	_ 1 _	f	f
	Disabled	Low < 3.6mAdc	Honeywell Std (3.8 - 20.8 mAdc)	_ 2 _	f	f
	Enabled	High > 21.0mAdc	Honeywell Std (3.8 - 20.8 mAdc)	_ 3 _	f	f
	Enabled	Low < 3.6mAdc	Honeywell Std (3.8 - 20.8 mAdc)	_ 4 _	f	f
	Enabled	N/A	N/A	_ 5 _	g	g
c. General Configuration	Factory Standard			_ _ S	*	*
	Custom Configuration (Unit Data Required from customer)			_ _ C	*	*

<sup>4</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			Selection		
Accuracy and Calibration	Accuracy	Calibrated Range	Calibration Qty			
	Standard	Factory Std	Single Calibration	A	*	*
	Standard	Custom (Unit Data Required)	Single Calibration	B	*	*

TABLE VII	ACCESSORY SELECTIONS			Selection		
a. Mounting Bracket	None (not required with flange mount unit)			0 _ _ _	*	*
b. Customer Tag	No customer tag			_ 0 _ _	*	*
	One Wired Stainless Steel Tag (Up to 4 lines 26 char/line)			_ 1 _ _	*	*
	Two Wired Stainless Steel Tag (Up to 4 lines 26 char/line)			_ 2 _ _	*	*
c. Unassembled Conduit Plugs & Adapters	No Conduit Plugs or Adapters Required			_ _ A0	*	*
	1/2 NPT Male to 3/4 NPT Female 316 SS Certified Conduit Adapter			_ _ A2	n	n
	1/2 NPT 316 SS Certified Conduit Plug			_ _ A6	n	n
	M20 316 SS Certified Conduit Plug			_ _ A7	m	m
	Minifast <sup>®</sup> 4 pin (1/2 NPT)			_ _ A8	n	n
	Minifast <sup>®</sup> 4 pin (M20)			_ _ A9	m	m

TABLE VIII	OTHER Certifications & Options: (String in sequence comma delimited (XX, XX, XX,....))	Selection		
Certifications & Warranty	None - No additional options	00	*	*
	NACE MR0175; MR0103; ISO15156 (FC33338) Process wetted parts only	FG	*	*
	NACE MR0175; MR0103; ISO15156 (FC33339) Process wetted and non-wetted parts	F7	c	c
	Marine (DNV, ABS, BV, KR, LR) (FC33340)	MT	*	*
	EN10204 Type 3.1 Material Traceability (FC33341)	FX	*	*
	Certificate of Conformance (F3391)	F3	*	*
	Calibration Test Report & Certificate of Conformance (F3399)	F1	*	*
	Certificate of Origin (F0195)	F5	*	*
	FMEDA (SIL 2/3) Certification (FC33337)	FE	j	j
	Over-Pressure Leak Test Certificate (1.5X MAWP) (F3392)	TP	*	*
	Cert Clean for O <sub>2</sub> or CL <sub>2</sub> service per ASTM G93	OX	e	e
	Extended Warranty Additional 1 year	01	*	*
	Extended Warranty Additional 2 years	02	*	*
	Extended Warranty Additional 3 years	03	*	*
	Extended Warranty Additional 4 years	04	*	*
Extended Warranty Additional 15 years	15	*	*	

TABLE IX	Manufacturing Specials			
Factory	Factory Identification	0000	*	*

**MODEL RESTRICTIONS**

Restriction Letter	Available Only with		Not Available with	
	Table	Selection(s)	Table	Selection(s)
a			VIII	FG, F7
b	Select only one option from this group			
c	Id	_ _ _ N,B _ _	Ia	C,G,L,3,6 _ _ _ _
e	lb	_ 2 _ _ _ _		
f			IVb	_ F _
g			IVb	_ H,D _
j	IVb	_ H _	Vb	_ 1,2,5,6, _
m	IVa	B,D,F,H _ _		
n	IVa	A,C,E,G _ _		
q	Ia	C,G,L _ _ _ _		
s	Ia	A,W,B,E,X,F,J _ _ _ _		
t			Ia	J,L _ _ _ _
v	Ia	M,N,R,S _ _ _ _		
w			Ia	M,N,R,S _ _ _ _
			IIb	_ 5 _



## Sales and Service

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

### ASIA PACIFIC

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or

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*Specifications are subject to change without notice.*

**For more information**

To learn more about HC 900 Process Controller,  
visit [www.honeywellprocess.com](http://www.honeywellprocess.com)  
Or contact your Honeywell Account Manager

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