

STF700 SmartLine Flange Mounted Level Specification 34-ST-03-103, Jan 2022



Introduction

Part of the SmartLine® family of products, the STF700 is a flange mounted level transmitter suitable for monitoring, control and data acquisition featuring piezoresistive sensor technology. STF700 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. STF700 offers high accuracy and stability over a wide range of level applications. The SmartLine family is also fully tested and compliant with Experion® PKS providing the highest level of compatibility assurance and integration capabilities. SmartLine easily meets the most demanding application needs for pressure measurement applications.

Best in Class Features:

- Accuracies up to 0.05% of span standard & 0.04% of span optional
- Stability up to 0.02% of URL per year for 10 years
- Automatic static pressure & temperature compensation
- Rangeability up to 100:1
- Response times as fast as 100ms
- Alphanumeric 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 additional 4-year warranty



Figure 1 – STF700 Flanged Level Transmitters feature field-proven piezoresistive sensor technology

Span & Range Limits:

Model	URL inH ₂ O (mbar)	LRL inH ₂ O (mbar)	Min Span inH ₂ O (mbar)
STF724	400 (1000)	-400 (-1000)	4.0 (10.0)
STF72F	400 (1000)	-400 (-1000)	4.0 (10.0)
Model	psi (bar)	psi (bar)	psi (bar)
STF732	100 (7.0)	-100 (-7.0)	1 (0.07)
STF73F	100 (7.0)	-100 (-7.0)	1 (0.07)

Communications/Output Options:

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

All transmitters are available with the above listed communications protocols.

Description

The SmartLine family pressure 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 Models) and temperature compensation measurements. This level of performance allows the ST 700 to replace most competitive transmitters available today.

Indication/Display Option

The ST 700 modular design accommodates a basic alphanumeric LCD display.

Basic Alphanumeric LCD Display Features

- Modular (may be added or removed in the field)
- 0, 90,180, & 270 degree position adjustments
- Configurable (HART only) and standard (Pa, KPa, MPa, KGcm², Torr, ATM, inH₂O, mH₂O, bar, mbar, inH₂O, inHG, FTH₂O, mmH₂O, mm HG, & psi) measurement units
- 2 Lines 16 Characters (4.13H x 1.83W mm)
- Square root output indication ($\sqrt{\quad}$)

Simple LCD Display Features

- Modular (may be added or removed in the field)
- Supports HART protocol variant
- 0, 90,180, & 270 degree position adjustments
- Configurable (HART only) and standard (Pa, KPa, MPa, KGcm², Torr, ATM, inH₂O, mH₂O, bar, mbar, inH₂O, inHG, FTH₂O, mmH₂O, mm HG, & psi) measurement units.
- Supports Flow engineering units
- 2 Lines 6 digits PV (9.95H x 4.20W mm) 8 Characters
- Square root output indication ($\sqrt{\quad}$) and Write protect Indication
- Built in Basic Device Configuration through Internal Buttons – Range/Engineering Unit/Loop Test /Loop Calibration/Zero /Span Setting

Diagnostics

SmartLine transmitters all offer digitally accessible diagnostics which aid in providing advanced warning of possible failure events minimizing unplanned shutdowns, providing **lower overall operational costs**

System Integration

- SmartLine communications protocols all meet the most current published standards for HART/DE/Fieldbus.
- Integration with Honeywell's Experion PKS offers the following unique advantages.
 - Tamper reporting
 - FDM Plant Area Views with Health summaries
 - All ST 700 units are Experion tested to provide the highest level of compatibility assurance

Configuration Tools

External Three Button Configuration Option

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

Internal Two Button Configuration Option

The Simple display has two buttons that can be used for Basic configuration such as re ranging, PV Engineering unit setting, Zero/Span settings and Loop testing and calibration functions.

Handheld Configuration

SmartLine transmitters feature two-way communication and configuration capability between the operator and the transmitter. All Honeywell transmitters are designed and tested for compliance with the offered communication protocols and are designed to operate with any standards compliant handheld configuration device.

Personal Computer Configuration

Honeywell's SCT 3000 Configuration Toolkit provides an easy way to configure Digitally Enhanced (DE) instruments using a personal computer as the configuration interface. Field Device Manager (FDM) Software and FDM Express are also available for managing HART & Fieldbus device configurations.

Modular Design

To help contain maintenance & inventory costs, all ST 700 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 indicator*
 - 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

Reference Accuracy (conformance to +/-3 Sigma)

Table 1

Model	URL	LRL	Min Span	Maximum Turndown Ratio	Stability (% URL/Year for ten years)	Reference Accuracy ^{1,2} (% Span) Standard/optional
STF724	400 in H ₂ O (1000mbar)	-400 in H ₂ O (-1000mbar)	4 in H ₂ O (10.0mbar)	100:1	0.02	0.050 / 0.040
STF72F	400 in H ₂ O (1000mbar)	-400 in H ₂ O (-1000mbar)	4 in H ₂ O (10.0mbar)	100:1	0.02	
STF732	100 psi (7.0 bar)	-100 psi (-7.0 bar)	1 psi (0.07 bar)	100:1	0.03	
STF73F	100 psi (7.0 bar)	-100 psi (-7.0 bar)	1 psi (0.07 bar)	100:1	0.03	

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

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

Table 2

		Accuracy ^{1,2} (% of Span)					Combined Zero & Span Temperature Effect (% Span / 28°C (50°F))		Combined Zero & Span Static Line Pressure Effect (% Span/300psi)	
	Model	URL	Reference Turndown	A	B	C (see URL units)	D	E	F	G
Standard Accuracy	STF724	400 in H ₂ O (1000 mbar)	16:1	0.005	0.045	25 (62.5)	0.026	0.040	0.095	0.010
	STF72F	400 in H ₂ O (1000 mbar)					0.050	0.020	0.025	0.005
	STF732	100 psi (7.0 bar)	4:1	0.005	0.045	25 (1.75)	0.075	0.075	0.095	0.010
	STF73F	100 psi (7.0 bar)					0.065	0.010	0.026	0.004
High Accuracy Option	STF724	400 in H ₂ O (1000 mbar)	16:1	0.005	0.035	25 (62.5)	0.026	0.040	0.095	0.010
	STF72F	400 in H ₂ O (1000 mbar)					0.050	0.020	0.025	0.005
	STF732	100 psi (7.0 bar)	4:1	0.005	0.035	25 (1.75)	0.075	0.075	0.095	0.010
	STF73F	100 psi (7.0 bar)					0.065	0.010	0.026	0.004
Turn Down Effect							Temp Effect		Static Effect	
$\pm [A + B] \text{ if Span} \geq C$ $\pm \left[A + B \left(\frac{C}{\text{Span}} \right) \right] \text{ if Span} < C$							$\pm \left[D + E \left(\frac{\text{URL}}{\text{Span}} \right) \right]$		$\pm \left[F + G \left(\frac{\text{URL}}{\text{Span}} \right) \right]$	

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 (for comparison): standard accuracy 5:1 Turndown, up to 50 °F shift & up to 300 psi Static Pressure

STF724 @ 80in H₂O: 0.273% of span

STF732 @ 20 psi: 0.477 % of span

STF72F @ 80in H₂O: 0.166% of span

STF73F @ 20 psi: 0.138% of span

Typical Calibration Frequency:

Calibration verification is recommended every two (2) years

Notes:

1. Terminal based Accuracy – Includes combined effects of linearity, hysteresis and repeatability. Analog output adds 0.005% of span
2. For zero based spans and reference conditions of 25°C (77°F).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
Ambient Temperature	25±1	77±2	-40 to 85	-40 to 185	-40 to 85	-40 to 185	-55 to 120	-67 to 248
Meter Body Temperature	25±1	77±2	-40 to 110 ¹	-40 to 230 ¹	-40 to 125	-40 to 257	-55 to 120	-67 to 248
Process Interface Temp. STF724, STF732 only	25±1	77±2	-40 to 110 ¹	-40 to 230 ¹	-40 to 175 ²	-40 to 350 ²	-55 to 125	-67 to 257
Humidity %RH	10 to 55		0 to 100		0 to 100		0 to 100	
Minimum Pressure mmHg absolute inH ₂ O absolute	atmospheric atmospheric		25 13		2 (short term ³) 1 (short term ³)			
Supply Voltage Load Resistance	HART: 10.8 to 42.4 VDC at terminals (IS versions limited to 30 VDC), 0 to 1,440 ohms DE: 15 to 49.3VDC at terminals (IS versions limited to 30VDC), 0 to 1,200 ohms (as shown in Figure 2) FOUNDATION Fieldbus: 9.0 to 32.0 VDC at terminals, steady state current: 17.6mA, software download current: 27.4mA							

¹ Silicone 704 minimum temperature rating is 0°C (32°F). NEOBEE® M-20 minimum temperature rating is -15°C (5°F)

NEOBEE® is a registered trademark of Stepan Company

² For CTFE fill fluid, the maximum temperature rating is 150°C (300°F)

³ Short term equals 2 hours at 70°C (158 °F)

Maximum Allowable Working Pressure (MAWP) ^{5, 6}

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

STF 724 & STF 732	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] ⁴	574 [39.6]	559 [38.5]
	304 S.S.	534 [36.8] ⁴	419 [28.9]	385 [26.5]
	316 S.S.	534 [36.8] ⁴	434 [29.9]	399 [27.5]
STF72F& STF73F ANSI Class 150 psi [bar]	316L Stainless Steel	230 [15.9]	185 [12.8]	No rating at this temp

⁴ Ambient Temperature for DN PN40 is -10 to 50°C [14 to 122 F]

⁵ 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.

⁶ Consult factory for MAWP of ST 800 transmitters with CSA approval.

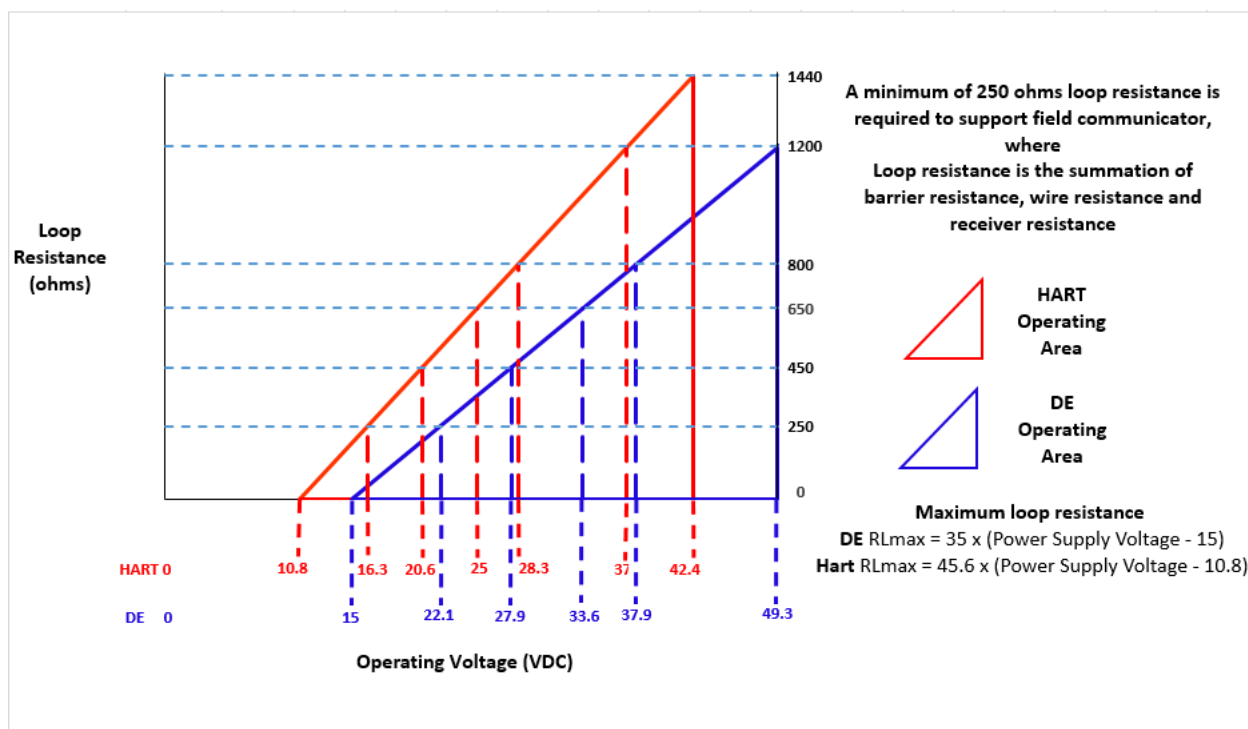


Figure 2 - Supply voltage and loop resistance chart & calculations

Parameter	Description
Process Connections All Models STF724, STF732 STF72F, STF73F	Process Head: 1/4-inch NPT; 1/2-inch NPT with adapter and DIN, standard options. Flange: 2, 3 or 4-inch Class 150 or 300 ANSI; DN50-PN40, DN80-PN40 or DN100-PN40 DIN flange. Extended Diaphragm: 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 Figure 4 , Figure 5 & Figure 6
Net Weight	STF72F, STF73F: 14-19 pounds (6.4 - 8.7Kg) with Aluminum Housing STF724, STF732: 18-32 pounds (8.2 - 14.5Kg) with Aluminum Housing

¹ Vent/Drains are sealed with Teflon®

² Hastelloy C-276 or UNS N10276

³ Monel 400 or UNS N04400

⁴ Supplied as 316 SS or as Grade CF8M, the casting equivalent of 316 SS.

⁵ 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.

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

⁷ 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

Foundation Fieldbus (FF)

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

* AI 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.

Standard Diagnostics

ST 700 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	Basic Display	Simple Display
Electronic Module DAC Failure	Electronics module fault	Fault Comm EI
Meter Body NVM Corrupt	Meter Body fault	Fault Mtrbody
Config. Data Corrupt	Electronics module fault	Fault Comm EI
Electronic Module Diag Failure	Electronics module fault	Fault Comm EI
Meter Body Critical Failure	Meter Body fault	Fault Mtrbody
Sensor Comms Timeout	Meter Body Comm fault	Fault Mbd Com

Non-Critical Diagnostics

HART DD/DTM Tools
Display Failure
Electronic Module Comm Failure
Meter Body Excess Correct
Sensor Over Temperature
Fixed Current Mode
PV Out of Range
No Factory Calibration
No DAC Compensation
LRV Set Error – Zero Config. Button
URV Set Error – Zero Config. Button
AO Out of Range
Loop Current Noise
Meter Body Unreliable Comm
Tamper Alarm,
No DAC Calibration
Sensor Supply Voltage Low

Refer to ST 700 manuals for additional level diagnostic information.

Hazardous Areal Certifications:

MSG CODE	AGENCY	TYPE OF PROTECTION	COMM. OPTION	ELECTRICAL PARAMETERS	AMBIENT TEMP (Ta)
A	FM Approvals™ USA	Explosionproof: Class I, Division 1, Groups A, B, C, D; Dust Ignition Proof: Class II, III, Division 1, Groups E, F, G; T6..T5 Class I, Zone 0/1, AEx db IIC T6..T5 Ga/Gb Class II, Zone 21, AEx tb IIIC T95° Db	All	Note 1	T5: -50 °C to 85°C T6: -50 °C to 65°C
		Intrinsically Safe: Class I, II, III, Division 1, Groups A, B, C, D, E, F, G: T4 Class I, Zone 0, AEx ia IIC T4 Ga FISCO Field Device (Only for FF Option) Ex ia IIC T4 Ga; Ex ic IIC T4 Gc	4-20 mA / DE/ HART	Note 2a	-50 °C to 70°C
			Foundation Fieldbus	Note 2b	-50 °C to 70°C
		Nonincendive: Class I, Division 2, Groups A, B, C, D locations, T4 Class I, Zone 2, AEx nA IIC T4 Gc	4-20 mA / DE/ HART/ Foundation Fieldbus	Note 1	-50 °C to 85°C
		Enclosure: Type 4X/ IP66/ IP67	All	All	-
		STANDARDS: FM Class 3600:2011; FM Class 3610: 2010; FM Class 3611: 2004; FM Class 3615: 2006; FM Class 3616: 2011; FM Class 3810: 2005; ANSI/ISA 60079-0: 2013; ANSI/UL 60079-1: 2015; ANSI/UL 60079-11: 2014; ANSI/ISA 60079-15: 2012; ANSI/UL 60079-26: 2017; ANSI/UL 60079-31: 2015; ANSI/NEMA 250: 2003; ANSI/ IEC 60529: 2004			
B	Canadian Standards Association (CSA) USA and Canada	Explosion Proof: Class I, Division 1, Groups A, B, C, D; Class II, Division 1, Groups E, F, G; Class III, Division 1, T6..T5 Class I Zone 1 AEx db IIC T6..T5 Ga/Gb Ex db IIC T6..T5 Ga/Gb Zone 22 AEx tb IIIC T95° Db Ex tb IIIC T95° Db	All	Note 1	T5: -50°C TO 85°C T6: -50°C TO 65°C
		Intrinsically Safe: Class I, II, III, Division 1, Groups A, B, C, D; Class II, Division 1, Groups E, F, G; Class III, Division 1, T4 Class I Zone 0, AEx ia IIC T4 Ga Class I Zone 2, AEx ic IIC T4 Gc Ex ia IIC T4 Ga Ex ic IIC T4 Gc FISCO Field Device (Only for FF Option) Ex ia IIC T4 Ga; Ex ic IIC T4 Gc	4-20 mA / DE/ HART	Note 2	-50°C TO 70°C
			Foundation Fieldbus	Note 2	-50°C TO 70°C
		Nonincendive: Class I, Division 2, Groups A, B, C, D; Class II, Division 2, Groups F, G; Class III, Division 2, T4 Class I Zone 2 AEx nA IIC T4 Gc Ex nA IIC T4 Gc	4-20 mA / DE/ HART/ Foundation Fieldbus	Note 1	-50°C to 85°C
		Enclosure: Type 4X/ IP66/ IP67	All	All	-
		STANDARDS: CSA C22.2 No. 0-10; CSA C22.2 No. 94-M91; CSA C22.2 No. 25-1966; CSA C22.2			

MSG CODE	AGENCY	TYPE OF PROTECTION	COMM. OPTION	ELECTRICAL PARAMETERS	AMBIENT TEMP (Ta)
		No. 30-M1986; CSA C22.2 No. 142-M1987; CSA C22.2 No. 157-92; CSA C22.2 No. 213-M1987; CSA-C22.2 No. 60529:05; CSA-C22.2 No. 60079-0:11; CSA-C22.2 No. 60079-1:11; CSA-C22.2 No. 60079-11:11; CSA-C22.2 No. 60079-15:12; CSA-C22.2 No. 60079-31:12; ISA 12.12.01-2010; ISA 60079-0: 2009; ISA 60079-11: 2011; ISA 60079-15: 2009; ISA 60079-26: 2008; ISA-60079-27:2007 (12.02.04)-2006 (R2011); UL 913 Ed. 6; UL 916:1998; ANSI/ISA-12.27.01-2011			
C	ATEX	Flameproof: SIRA 12ATEX2233X II 1/2 G Ex db IIC T6..T5 Ga/Gb II 2 D Ex tb IIIC T95°C...T120°C Db	All	Note 1	T5: -50°C TO 85°C T6: -50°C TO 65°C
		Intrinsically Safe: SIRA 12ATEX2233X II 1 G Ex ia IIC T4 Ga FISCO Field Device (Only for FF Option) II 1 G Ex ia IIC T4 Ga	4-20 mA / DE/ HART	Note 2	-50°C TO 70°C
			Foundation Fieldbus	Note 2	-50°C TO 70°C
		Zone 2, Increase Safety: SIRA 12ATEX4234X II 3 G Ex ec IIC T4 Gc	4-20 mA / DE/ HART/	Note 1	-50°C TO 85°C
		Zone 2, Intrinsically Safe: SIRA 12ATEX4234X II 3 G Ex ic IIC T4 Gc FISCO Field Device (Only for FF Option) II 3 G Ex ic IIC T4 Gc	4-20 mA / DE/ HART/ Foundation Fieldbus	Note 2	-50°C TO 85°C
		Enclosure: IP66/ IP67	All	All	-
		STANDARDS: EN 60079-0: 2012/A11: 2013; EN 60079-1: 2014; EN 60079-7: 2015; EN 60079-11: 2012; EN 60079-26: 2015; EN 60079-31: 2009			
D	IECEX World	Flameproof: IECEx SIR 12.0100X Ex db IIC T6..T5 Ga/Gb Ex tb IIIC T95°C...T120°C Db	All	Note 1	T5: -50°C TO 85°C T6: -50°C TO 65°C
		Intrinsically Safe: IECEx SIR 12.0100X Ex ia IIC T4 Ga FISCO Field Device (Only for FF Option) Ex ia IIC T4 Ga; Ex ic IIC T4 Gc	4-20 mA / DE/ HART	Note 2	-50°C TO 70°C
			Foundation Fieldbus	Note 2	-50°C TO 70°C
		Zone 2, Increase Safety: IECEx SIR 12.0100X Ex ec IIC T4 Gc	4-20 mA / DE/ HART/ Foundation Fieldbus	Note 1	-50°C TO 85°C
		Zone 2, Intrinsically Safe: IECEx SIR 12.0100X Ex ic IIC T4 Gc FISCO Field Device (Only for FF Option) Ex ic IIC T4 Gc	4-20 mA / DE/ HART/ Foundation Fieldbus	Note 2	-50°C TO 85°C
		Enclosure: IP66/ IP67	All	All	-
		STANDARDS: IEC 60079-0: 2011; IEC 60079-1: 2014; IEC 60079-7: 2017; IEC 60079-11: 2011; IEC 60079-26: 2014; IEC 60079-31: 2013			

E	SAEx South Africa	Flameproof : Ex d IIC T6...T5 Ga/Gb Ex tb IIIC T95°C...T120°C Db	All	Note 1	T5: -50°C TO 85°C T6: -50°C TO 65°C
		Intrinsically Safe: Ex ia IIC Ga T4 FISCO Field Device (Only for FF Option) Ex ia IIC T4 Ga; Ex ic IIC T4 Gc	4-20 mA / DE/ HART	Note 2	-50°C TO 70°C
			Foundation Fieldbus	Note 2	-50°C TO 70°C
		Zone 2, Increase Safety: II 3 G Ex ec IIC T4 Gc	4-20 mA / DE/ HART/ Foundation Fieldbus	Note 1	-50°C TO 85°C
		Zone 2, Intrinsically Safe: Ex ic IIC T4 Gc FISCO Field Device (Only for FF Option) Ex ic IIC T4 Gc	4-20 mA / DE/ HART/ Foundation Fieldbus	Note 2	-50°C TO 85°C
Enclosure: IP66/ IP67	All	All	-		
F	INMETRO Brazil	Flameproof: Ex db IIC T6..T5 Ga/Gb Ex tb IIIC T95°C...T120°C Db	All	Note 1	T5: -50°C TO 85°C T6: -50°C TO 65°C
		Intrinsically Safe: Ex ia IIC T4 Ga FISCO Field Device (Only for FF Option) Ex ia IIC T4 Ga; Ex ic IIC T4 Gc	4-20 mA / DE/ HART	Note 2a	-50°C TO 70°C
			Foundation Fieldbus	Note 2b	-50°C TO 70°C
		Zone 2, Increase Safety: II 3 G Ex ec IIC T4 Gc	4-20 mA / DE/ HART/ Foundation Fieldbus	Note 1	-50°C TO 85°C
		Zone 2, Intrinsically Safe: Ex ic IIC T4 Gc FISCO Field Device (Only for FF Option) Ex ic IIC T4 Gc	4-20 mA / DE/ HART/ Foundation Fieldbus	Note 2	-50°C TO 85°C
		Enclosure : IP 66/67	All	All	-
G	NEPSI CHINA	Flameproof: Ex db IIC T6..T5 Ga/Gb Ex tb IIIC T 95°C Db	All	Note 1	T5: -50°C TO 85°C T6: -50°C TO 65°C
		Intrinsically Safe: Ex ia IIC T4 Ga FISCO Field Device (Only for FF Option) Ex ia IIC T4 Ga; Ex ic IIC T4 Gc	4-20 mA / DE/ HART	Note 2	-50°C TO 70°C
			Foundation Fieldbus	Note 2	-50°C TO 70°C
		Zone 2, Increase Safety: II 3 G Ex ec IIC T4 Gc	4-20 mA / DE/ HART/ Foundation Fieldbus	Note 1	-50°C TO 85°C
		Zone 2, Intrinsically Safe: Ex ic IIC T4 Gc FISCO Field Device (Only for FF Option) Ex ic IIC T4 Gc	4-20 mA / DE/ HART/ Foundation Fieldbus	Note 2	-50°C TO 85°C
Enclosure : IP 66/67	All	All	-		

H	KOSHA Korea	Flameproof : Ex d IIC T4, T5, T6 Ex tD A21 IP66/IP67 T95°C...T120°C	All	Note 1	T4: -50°C TO 85°C T5: -50°C TO 85°C T6: -50°C TO 65°C
		Intrinsically Safe: Ex ia IIC T4	4-20 mA / DE/ HART	Note 2	Ta= -50 °C to 70°C
			Foundation Fieldbus	Note 2	Ta= -50 °C to 70°C
Enclosure: IP66/ IP67		All	All	-	
I	EAC Russia, Belarus and Kazakhstan	Flameproof: Ga/Gb Ex d IIC T6..T5 Ex tb IIIC Db T 85°C	All	Note 1	T5: -50°C TO 85°C T6: -50°C TO 65°C
		Intrinsically Safe: Ga Ex ia IIC T4 X FISCO Field Device (Only for FF Option) Ga Ex ia IIC T4 X	4-20 mA / DE/ HART	Note 2	-50°C TO 70°C
			Foundation Fieldbus	Note 2	-50°C TO 70°C
		Zone 2, Non Sparking: 2 Ex nA IIC T4 Gc X	4-20 mA / DE/ HART/ Foundation Fieldbus	Note 1	-50°C TO 85°C
		Zone 2, Intrinsically Safe: Ga Ex ic IIC T4 X FISCO Field Device (Only for FF Option) 2 Ex ic IIC T4 Gc X	4-20 mA / DE/ HART/ Foundation Fieldbus	Note 2	-50°C TO 85°C
Enclosure : IP 66/67		All	All		
J	CCoE INDIA	Flameproof: Ex d IIC T6..T5 Ga/Gb	All	Note 1	T5: -50°C TO 85°C T6: -50°C TO 65°C
		Intrinsically Safe: Ex ia IIC T4 Ga FISCO Field Device (Only for FF Option) Ex ia IIC T4 Ga; Ex ic IIC T4 Gc	4-20 mA / DE/ HART	Note 2	-50°C TO 70°C
			Foundation Fieldbus	Note 2	-50°C TO 70°C
		Non Sparking Ex nA IIC T4 Gc	4-20 mA / DE/ HART/ Foundation Fieldbus	Note 1	-50°C TO 85°C
Enclosure: IP66/ IP67		All	All	-	
K	UATR UKRAINE	Flameproof: II 1/2 G Ex db IIC T6..T5 Ga/Gb II 2 D Ex tb IIIC T95°C...T120°C Db	All	Note 1	T5: -50°C TO 85°C T6: -50°C TO 65°C
		Intrinsically Safe: II 1 G Ex ia IIC T4 Ga FISCO Field Device (Only for FF Option) II 1 G Ex ia IIC T4 Ga	4-20 mA / DE/ HART	Note 2	-50°C TO 70°C
			Foundation Fieldbus	Note 2	-50°C TO 70°C
Enclosure: IP66/ IP67		All	All	-	

Dimensional Drawings

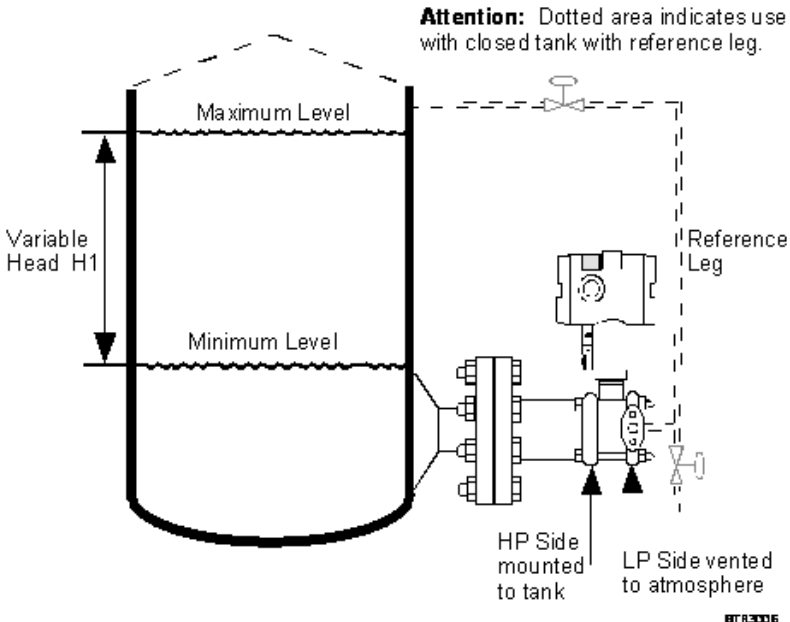


Figure 3 – Typical mounting for flange mounted level transmitter

Dimensional Drawings (con't)

Reference Dimensions: $\frac{\text{millimeters}}{\text{inches}}$

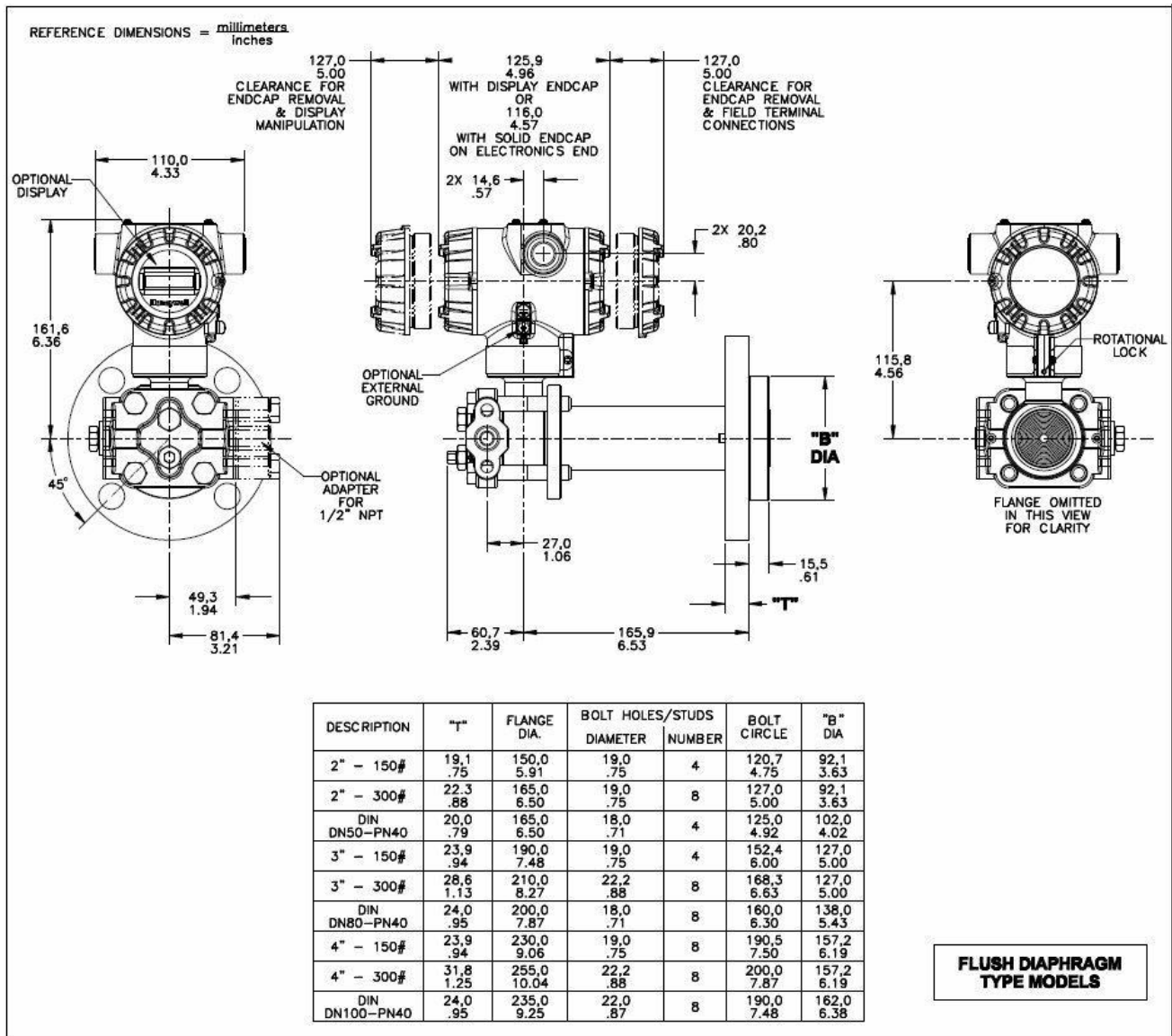


Figure 4 – Typical mounting dimensions for flush diaphragm type models STF724 and STF732.

Dimensional Drawings (con't)

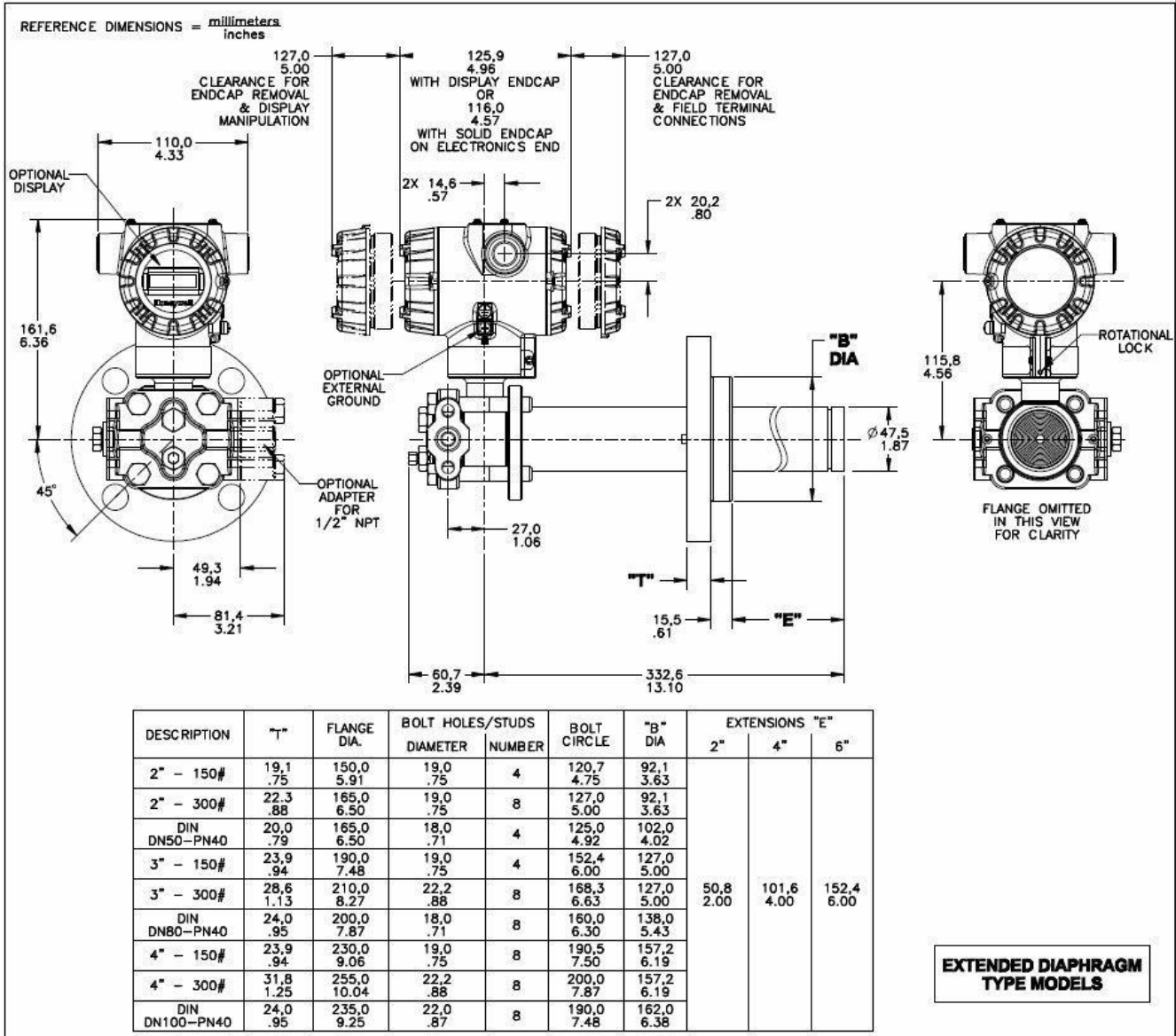


Figure 5 – Typical mounting dimensions for extended diaphragm type models STF724 and STF732.

Dimensional Drawings (con't)

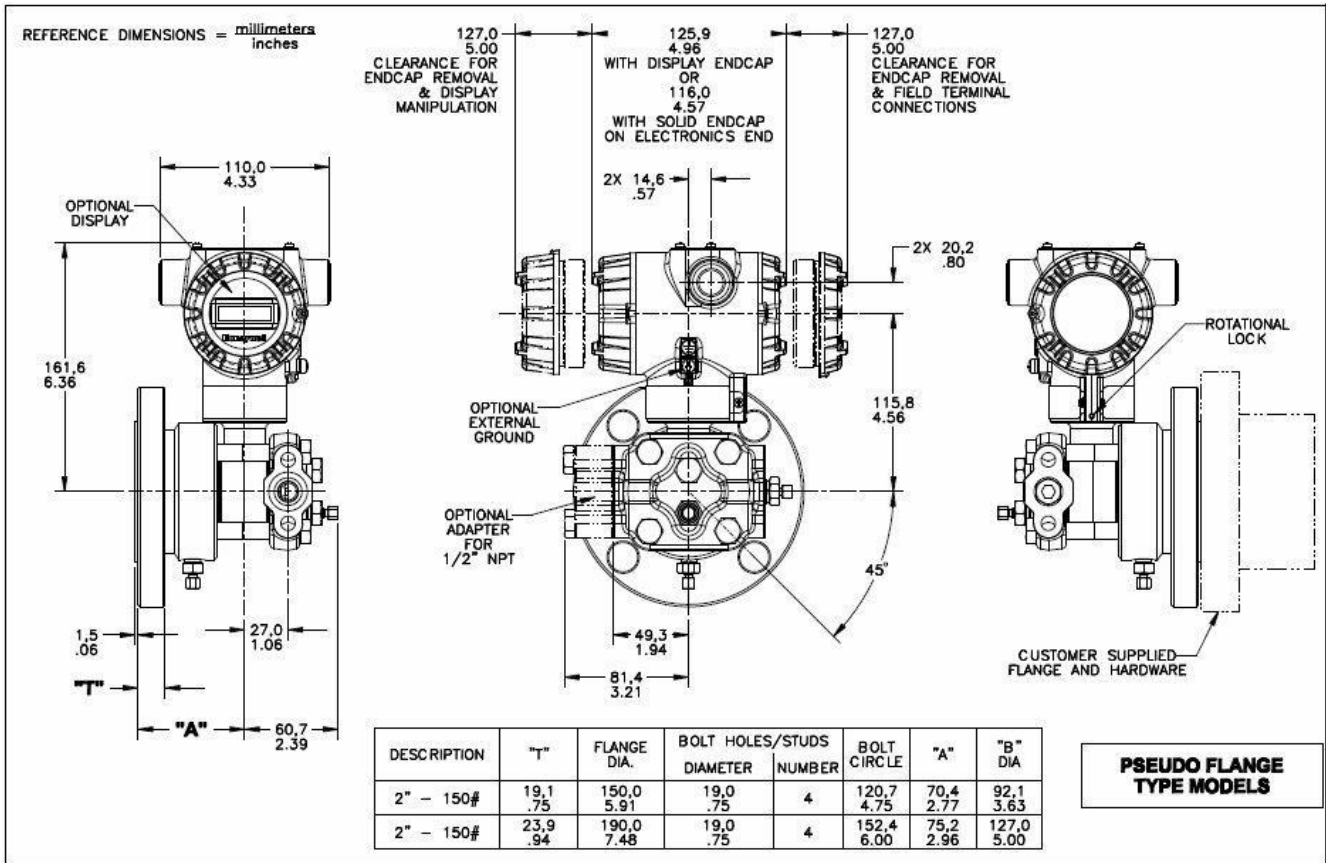


Figure 6 – Typical mounting dimensions for pseudo flange type models STF72F, STF73F, and STF74F.

Model Selection Guide

Model Selection Guides are subject to change and are inserted into the specifications as guidance only.

Model STF700 Flange Mounted Liquid Level Transmitter

Model Selection Guide
34-ST-16-103 Issue 21

Instructions									
<ul style="list-style-type: none"> Select the desired Key Number. 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	I	II	III	IV	V	VI	VII	VIII	IX
STF7 ___	- [] -	[] -	[] -	[] -	[] -	[] -	[] -	[] -	+ 0000

KEY NUMBER	URL	LRL	Max Span	Min Span	Units	Selection	Availability
Measurement Range Std	400 (1000)	-400 (-1000)	400 (1000)	4 (10)	" H ₂ O (mbar)	STF724	↓
	100 (7)	-100 (-7)	100 (7)	1 (0.07)	psi (bar)	STF732	↓
Accuracy	400 (1000)	-400 (-1000)	400 (1000)	1 (2.5)	" H ₂ O (mbar)	STF72F	↓
	100 (7)	-100 (-7)	100 (7)	1 (0.07)	psi (bar)	STF73F	↓

TABLE I											
	Materials of Construction	Design	Ref. Head	Vent Drain Valve on Ref. Head ²	Barrier Diaphragm. (wetted)	Diaphragm. Plate (wetted)	Extension (wetted)	Sel.			
Meter Body & Flange Design	a. Process Wetted Heads & Diaphragm Materials	Flush	Carbon ¹ Steel	316 SS	316L SS	316L SS	N/A	A	●	●	
					Hast C ³	316L SS		W	●	●	
					Hast C ³	Hast C ³		B	●	●	
			316 SS ⁵		316L SS	316L SS	E	●	●		
					Hast C ³	316L SS	X	●	●		
					Hast C ³	Hast C ³	F	●	●		
			Hast C ^{3,6}	Hast C ³	Hast C ³	Hast C ³	J	●	●		
			Extended	Carbon ¹ Steel	316 SS	316L SS	316L SS	316L SS	M	●	●
				Hast C ³		N			●	●	
			316 SS ⁵		316L SS	R	●	●			
					Hast C ³	S	●	●			
		Pseudo Flange	Carbon ¹ Steel	316 SS	316L SS	N/A	N/A	1	●	●	
			Hast C ³		2			●	●		
			316 SS ⁵		316L SS	4	●	●			
					Hast C ³	5	●	●			
		b. Fill Fluid (Meter Body & Flange)	Silicone Oil 200					1	●	●	
			Fluorinated Oil CTFE					2	●	●	
			Silicone Oil 704					3	●	●	
			NEOBEE® M-20					4	●	●	
		c. Process Connection	Reference Head				Flange		Sel.		
			1/4 NPT				High Pressure Side	A	●	●	
			1/2 NPT Adapter - material matches head material and head bolt material ¹¹				Low Pressure Side	C	●	●	
			High Pressure Side				H	●	●		
			Low Pressure Side				K	●	●		
	d. Bolts for Process Heads	Carbon Steel Bolts							C	●	●
		316 SS Bolts							S	●	●
		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 ¹¹		2	●	●		
		Single Ended	Ctr	Side	Stainless Steel Only		3	t	t		
		Dual Ended	Std	End	Matches Head Material ¹¹		4	●	●		
		Dual Ended	Cntr	End	Stainless Steel Only		5	t	t		
	Dual Ended	Vent/Plug	Side/End	Matches Head Material ¹¹		6	●	●			
	f. Gasket Material	Teflon® or PTFE (Glass Filled)					A	●	●		
		Viton® or Fluorocarbon Elastomer					B	●	●		

¹ 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.

² Vent/Drains are Teflon or PTFE coated for lubricity.

³ Hastelloy® C-276 or UNS N10276

⁵ Supplied as 316 SS or as Grade CF8M, the casting equivalent of 316 SS.

⁶ Supplied as indicated or as Grade CW12MW, the casting equivalent of Hastelloy® C-276

¹¹ Except Carbon Steel Heads shall use 316SS Vent/Drain, Plugs & Adapters when required

TABLE II		Flange Material	Threaded Nut Ring Material	Selection	24	2F
Flange Assembly	a. Flange (ANSI Flanges have 125-500 AARH Surface Finish)	Carbon Steel (non-wetted)	Carbon Steel (non-wetted)	1__	•	
				2__	•	
				3__	•	
				4__	•	
				5__	•	
				6__	•	
				7__	•	
				8__	•	
				9__	•	
		304 SS (non-wetted)	304 SS (non-wetted)	A__	•	
				B__	•	
				C__	•	
	316 SS (non-wetted)	304 SS (non-wetted)	D__	•		
			E__	•		
			F__	•		
Q__			•			
U__			•			
V__			•			
Pseudo Flange on Standard DP				Sel.		
b. Gasket Ring (wetted)	No Selection	316L SS	Not Applicable	S__		•
				T__		•
	Flush Design	316L SS	Hastelloy® C ³	_1_	s	
				2	s	
Extended Design	316L SS		_5_	v		
c. Extension (wetted)	No Selection			_0_		•
	Flush			_F_	w	
		Diameter	Length	Sel.		
	1.87 Inches		2 inches	_C_	v	
	(for 2", 3" or 4" spud) ¹³		4 inches	_D_	v	
		6 inches	_E_	v		

³ Hastelloy® C-276 or UNS N10276

¹³ 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	*	*
	SAEx Explosion proof, Intrinsically Safe & Non-incendive		E	*	*
	INMETRO Explosion proof, Intrinsically Safe & Non-incendive		F	*	*
	NEPSI Explosion proof, Intrinsically Safe & Non-incendive		G	*	*
	KOSHA Explosion proof, Intrinsically Safe & Non-incendive		H	*	*
	EAC Customs Union(Russia,Belarus,Kazakhstan) Ex Approval,Flame proof, Intrinsically Safe		I	*	*
	CCoE Explosion proof, Intrinsically Safe & Non-incendive		J	*	*
UATR Flameproof, Intrinsically Safe & Dustproof		K	*	*	

TABLE IV		TRANSMITTER ELECTRONICS SELECTIONS			Selection		
a. Electronic Housing Material & Connection Type	Material	Connection	Lightning Protection				
	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	Analog Output		Digital Protocol				
	4-20mA dc		HART Protocol	_H_	*	*	
	4-20mA dc		DE Protocol	_D_	*	*	
	none		Foundation Fieldbus	_F_	*	*	
c. Customer Interface Selections	Indicator	Ext Zero, Span & Config Buttons	Languages				
	None	None	None	_0_	*	*	
	None	Yes (Zero/Span Only)	None	_A_	f	f	
	Basic	None	English	_B_	*	*	
	Basic	Yes	English	_C_	*	*	
Standard (w/internal Zero, Span & Conf Buttons)	None	English	_D_	u	u		

Availability
STF7xx

TABLE V	CONFIGURATION SELECTIONS			Selection	24	2F
a. Application Software	Diagnostics				32	3F
	Standard Diagnostics			1 __	*	*
b. Output Limit, Failsafe & Write Protect Settings	Write Protect	Fail Mode	High & Low Output Limits ³			
	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 Fieldbus	_ 5 _	g	g
c. General Configuration	Factory Standard			_ _ S	*	*
	Custom Configuration (Unit Data Required from customer)			_ _ C	*	*

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			Selection		
Accuracy and Calibration	Accuracy	Calibrated Range	Calibration Qty			
	Standard	Factory Std	Single Calibration	A	*	*
	Standard	Custom (Unit Data Required)	Single Calibration	B	*	*
	High Accuracy	Factory Std	Single Calibration	E	h	h
High Accuracy	Custom (Unit Data Required)	Single Calibration	F	h	h	

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 [®] 4 pin (1/2 NPT)			_ _ A8	n	n
	Minifast [®] 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)	MT	i	i
	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 ₂ or CL ₂ service per ASTM G93	OX	e	e
	PMI Certification	PM	*	*
	Extended Warranty Additional 1 year	01	*	*
	Extended Warranty Additional 2 years	02	*	*
	Extended Warranty Additional 3 years	03	*	*
Extended Warranty Additional 4 years	04	*	*	

TABLE IX	Manufacturing Specials			
Factory	Factory Identification	0000	*	*

MODEL RESTRICTIONS

Restriction Letter	Available Only with		Not Available with	
	Table	Selection(s)	Table	Selection(s)
b		Select only one option from this group		
c	ld	___ N,B ___		
e	lb	_ 2 _		
f			IVb	_ F _
g			IVb	_ H,D _
h	la	A, E, M, R, 1, 4 _ _ _ _		
i	IVa	C,D,G,H _ _		
j	IVb	_ H _	Vb	_ 1,2,5,6, _
m	IVa	B,D,F,H _ _		
n	IVa	A,C,E,G _ _		
s	la	A,W,B,E,X,F,J _ _ _ _		
t			la	J _ _ _ _
u	IVb	_ H _		
v	la	M,N,R,S _ _ _ _		
w			la Iib	M,N,R,S _ 5 _

¹The PM option is available on all Smartline Pressure Transmitter process wetted parts such as process heads, flanges, bushings and vent plugs except plated carbon steel process heads and flanges. PM option information is also available on diaphragms except STG and STA in-line construction pressure transmitters.

FIELD INSTALLABLE REPLACEMENT PARTS

Description	Kit Number
Integrally Mounted Basic Indicator Kit (Compatible with all Electronic Modules)	50049911-501
Terminal Strip w/Lightning Protection Kit for HART or DE Modules	50075472-532
Terminal Strip w/Lightning Protection Kit for FFB Module	50075472-534
Terminal Strip w/o Lightning Protection for HART or DE Modules	50075472-531
Terminal Strip w/o Lightning Protection FFB Module	50075472-533
HART Electronics Module	50049849-501
HART Electronics Module w/connection for external configuration buttons	50049849-502
DE Electronics Module	50049849-503
DE Electronics Module w/connection for external configuration buttons	50049849-504
FFB Electronics Module Kit	50049849-509
FFB Electronics Module w/connection for external configuration buttons	50049849-510
Standard Display Module	50126003-501

PRODUCT MANUALS

Description	Part Number
ST 700 SmartLine Transmitter User Manual - English	34-ST-25-44
ST 700 SmartLine Transmitter HART/DE Communications Manual - English	34-ST-25-47
ST 700 SmartLine Transmitter Safety Manual - English	34-ST-25-37
ST 700 SmartLine Transmitter Foundation Fieldbus Manual - English	34-ST-25-48
Paper Manual ST 700 Smart Transmitter Function Block Manual - English	34-ST-25-49

All product documentation is available at www.honeywellprocess.com.

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FOUNDATION™ Fieldbus is a trademark of Fieldbus Foundation.
Viton® is a registered trademark of DuPont Performance Elastomers.
Teflon® is a registered trademark of DuPont.
FM ApprovalsSM is a service mark of FM Global
DC® 200 is a registered trademark of Dow Corning

Sales and Service

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

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Specifications are subject to change without notice.

For more information

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