SmartLine

Technical Information

# STF700 SmartLine Flange Mounted Level
# Specification 34-ST-03-123, March 2020


## Introduction

Part of the SmartLine® family of products, the STF700 is suitable for monitoring, control and data acquisition. STF700 products feature piezoresistive sensor technology combining pressure sensing with on chip temperature compensation capabilities providing high accuracy, stability and performance over a wide range of application pressures and temperatures. 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 0.065% standard
- Stability up to 0.020% of URL per year for 10 years
- Automatic static pressure & temperature compensation
- Rangeability up to 100:1
- Response times as fast as 100ms
- Easy to use and intuitive display capabilities
- Intuitive External zero, span, & configuration capability
- 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.

**Communications/Output Options:**

- HART ® (version 7.0)


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

**Span & Range Limits:**

| Model | URL "$H_2O$ (mbar) | LRL "$H_2O$ (mbar) | Max Span "$H_2O$ (mbar) | Min Span "$H_2O$ (mbar) |
|---|---|---|---|---|
| STF725 | 400 (1000) | -400 (-1000) | 400 (1000) | 4.0 (10.0) |
| STF72P | 400 (1000) | -400 (-1000) | 400 (1000) | 4.0 (10.0) |
| **Model** | **psi (bar)** | **psi (bar)** | **psi (bar)** | **psi (bar)** |
| STF735 | 100 (7.0) | -100 (-7.0) | 100 (7.0) | 1 (0.07) |
| STF73P | 100 (7.0) | -100 (-7.0) | 100 (7.0) | 1 (0.07) |

## 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.

## Indication/Display Option

**Standard 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, $mH_2O$, bar, mbar, $inH_2O$, inHG, $FTH_2O$, $mmH_2O$, 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 (√) and Write protect Indication
- Built in Basic Device Configuration through Internal or External 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
- 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, for all the basic parameters, via three externally accessible buttons when a display option is selected. Zero/span capabilities are also optionally available via two external buttons with or without selection of the display option.

**Internal Two Button Configuration Option**

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

**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 (MCT404).
The MCT404 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**

Field Device Manager (FDM) Software and FDM Express are also available for managing HART 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, standard displays or electronic modules without affecting overall performance. Each meter body is uniquely characterized to provide in-tolerance performance over a wide range of application variations in temperature and pressure.

Modular Features

- Meter body replacement
- Add or remove standard displays
- Add or remove lightning protection (terminal connection)

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 10 years) | Reference Accuracy[1,2] (% Span) |
|---|---|---|---|---|---|---|
| STF725 | 400 in $H_2O$/1000mbar | -400 in $H_2O$/-1000mbar | 4 in $H_2O$/10.0mbar | 100:1 | 0.020% | **0.065%** |
| STF72P | 400 in $H_2O$/1000mbar | -400 in $H_2O$/-1000mbar | 4 in $H_2O$/10.0mbar | 100:1 | 0.020% | **0.065%** |
| STF735 | 100 psi/7.0 bar | -100 psi/-7.0 bar | 1 psi/0.07 bar | 100:1 | 0.03% | **0.065%** |
| STF73P | 100 psi/7.0 bar | -100 psi/-7.0 bar | 1 psi/0.07 bar | 100:1 | 0.03% | **0.065%** |

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) | | | | Temperature Effect (% Span/50°F) | | Static Line Pressure Effect (% Span/300psi) | |
|---|---|---|---|---|---|---|---|---|---|
| Model | URL | Turn down greater than | A | B | C (see URL Units) | D | E | F | G |
| STF725 | 400 in $H_2O$(1000mbar) | 16:1 | 0.0125 | 0.0575 | 25 (62.5) | 0.280 | 0.045 | 0.110 | 0.0125 |
| STF72P | 400 in $H_2O$ (1000mbar) | | | | | 0.055 | 0.025 | 0.030 | 0.007 |
| Model | URL | Turn down greater than | A | B | C (see URL Units) | D | E | F | G |
| STF735 | 100 psi (7.0 bar) | 4:1 | 0.0125 | 0.0575 | 25 (1.7) | 0.080 | 0.080 | 0.110 | 0.0125 |
| STF73P | 100 psi (7.0 bar) | | | | | 0.070 | 0.015 | 0.032 | 0.005 |
| | | Turn Down Effect $\pm\left[A + B\left(\frac{C}{Span}\right)\right]$ % Span | | | | Temp Effect $\pm\left[D + E\left(\frac{URL}{Span}\right)\right]$ % Span per 28°C (50°F) | | Static Effect $\pm\left[F + G\left(\frac{URL}{Span}\right)\right]$ % Span per 300 psi | |

**Total Performance (% of Span):**

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

**Total Performance Examples:** (5:1 Turndown, up to 50 °F shift & up to 300 psi Static Pressure)

**STF725 @ 80" $H_2O$: 0.538** **STF735 @ 20 psi: 0.514**

**STF72P @ 80" $H_2O$: 0.202** **STF73P@ 20 psi**: 0.169

**Typical Calibration Frequency:**

Calibration verification is recommended every two (2) years

**Notes:**

1. Terminal Based Accuracy – Includes effects of linearity, hysteresis and repeatability. Analog output adds 0.006% of span
2. 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 |
| **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 | -40 to 230 | -40 to 125 | -40 to 257 | -55 to 120 | -67 to 248 |
| **Process Interface Temp.** STF725, STF735 only | 25±1 | 77±2 | -40 to 110 | -40 to 230 | -40 to 175[1] | -40 to 350[1] | -55 to 125 | -67 to 257 |
| **Humidity %RH** | 10 to 55 | | 0 to 100 | | 0 to 100 | | 0 to 100 | |
| **Minimum Pressure**<br>**mmHg absolute**<br>**in$H_2O$ absolute** | atmospheric<br>atmospheric | | 25<br>13 | | 2 (short term[2])<br>1 (short term[2]) | | | |
| **Supply Voltage** | 10.8 to 42.4 Vdc at terminals | | | | | | | |
| **Load Resistance** | 0 to 1,440 ohms (as shown in **Figure 2**) | | | | | | | |

1 For CTFE fill fluid, the maximum temperature rating is 150°C (300°F)
2 Short term equals 2 hours at 70°C (158 °F)

### Maximum Allowable Working Pressure (MAWP) [4,5]

(ST 700 products are rated to Maximum Allowable Working Pressure. MAWP depends on Approval Agency and transmitter materials of construction.)

| STF725 & STF735 | 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<br>**psi [ bar]** | Carbon Steel<br>304 S.S.<br>316 S.S. | 285 [19.6]<br>275 [19.0]<br>275 [19.0] | 245 [16.9]<br>218 [15.0]<br>225 [15.5] | 215 [14.8]<br>198 [13.7]<br>205 [14.1] |
| ANSI Class 300<br>**psi [bar]** | Carbon Steel<br>304 S.S.<br>316 S.S. | 740 [51.0]<br>720 [49.6]<br>720 [49.6] | 668 [46.0]<br>570 [39.3]<br>590 [40.7] | 645 [44.5]<br>518 [35.7]<br>538 [37.1] |
| DN PN40<br>**psi [bar]** | Carbon Steel<br>304 S.S.<br>316 S.S. | 580 [40.0] [3]<br>534 [36.8] [3]<br>534 [36.8] [3] | 574 [39.6]<br>419 [28.9]<br>434 [29.9] | 559 [38.5]<br>385 [26.5]<br>399 [27.5] |
| **STF72P& STF73P**<br>ANSI Class 150 psi [bar] | 316L Stainless Steel | 230 [15.9] | 185 [12.8] | No rating at this temp |

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

4 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.

5 Consult factory for MAWP of ST 700 transmitters with CSA approval.

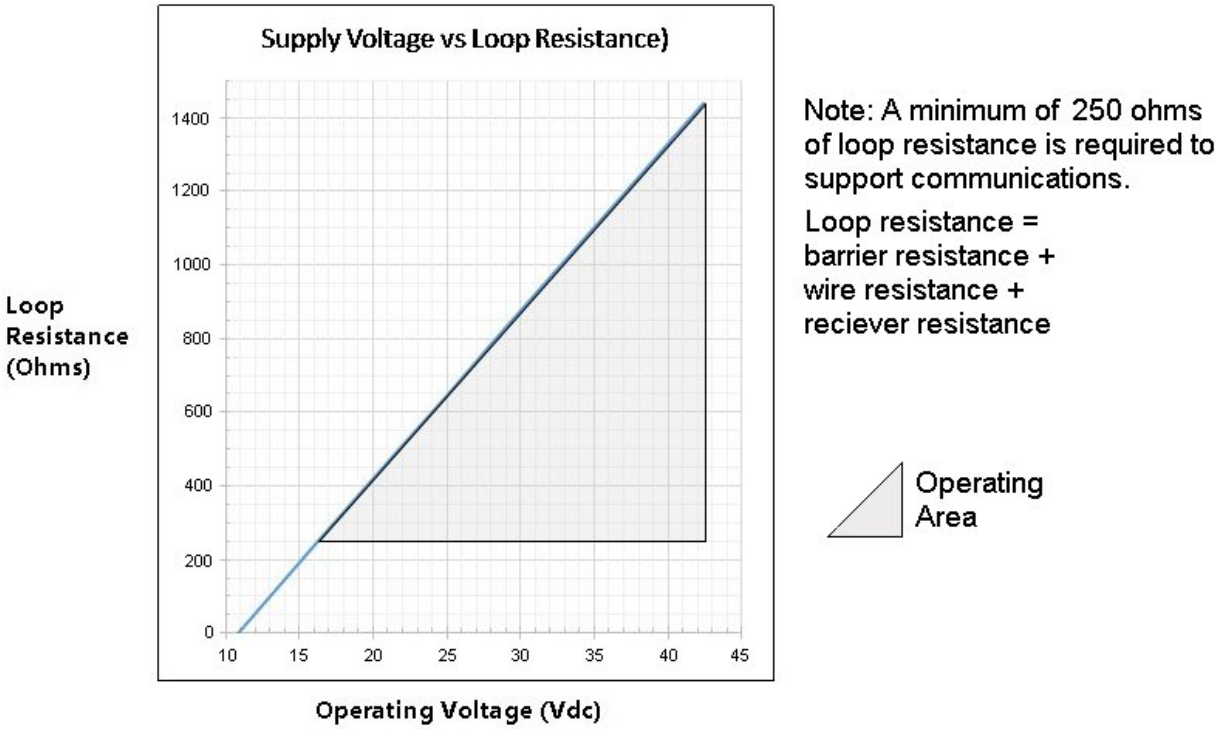



**Figure 2 - Supply voltage and loop resistance chart & calculations**

## Performance Under Rated Conditions – All Models

| Parameter | Description |
|---|---|
| **Analog Output**<br>**Digital Communications**: | Two-wire, 4 to 20 mA<br>Honeywell HART 7 protocol |
| **Output Failure Modes** | **Honeywell Standard:** / **NAMUR NE 43 Compliance**:<br>**Normal Limits:** 3.8 – 20.8 mA / 3.8 – 20.5 mA<br>**Failure Mode:** ≤ 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**<br>**(includes power up & test algorithms)** | 2.5 sec. |
| **Response Time**<br>(delay + time constant) | 100mS |
| **Damping Time Constant** | Adjustable from 0 to 32 seconds in 0.1 increments. **Default:** 0.50 seconds |
| **Vibration Effect** | Less than +/- 0.1% of URL w/o damping<br>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** | **Leakage Current:** 10uA max @ 42.4VDC 93C<br>**Impulse rating:** 8/20uS 5000A (>10 strikes) 10000A (1 strike min.)<br>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® C-276[2] |
| **Process Head Material** | 316 SS[4], Carbon Steel (Zinc-plated) [5], Hastelloy® C-276*[6] |
| **Vent/Drain Valves & Plugs [1]** | 316 SS[4], Hastelloy® C-276[2] |
| **Gasket Ring Material (Wetted)** | 316/316L SS, Hastelloy® C-276*[2] |
| **Extension Tube Material** | 316 SS[4] |
| **Head Gaskets** | Glass-filled PTFE standard. Viton® optional. |
| **Meter Body Bolting** | Carbon Steel (Zinc plated) standard. Options include 316 SS, NACE A286 SS bolts. |
| **Optional Adapter Flange and Bolts** | Adapter Flange materials include 316 SS[4], Hastelloy® C-276[6] Bolt material for flanges is dependent on process head bolts material chosen. Standard adaptor seal material is glass-filled PTFE. Viton optional. |
| **Mounting Flange**<br>**STF725, STF735**<br>**STF72P, STF73P** | **Flush or Extended Diaphragm:**<br>Zinc Chromate plated Carbon Steel[5], 304 SS, or 316 SS[4].<br>316L SS *(NOTE: Mounting Flange is process wetted.)* |
| **Fill Fluid** | Silicone 200, CTFE |
| **Electronic Housing** | Pure Polyester Powder Coated Low Copper (<0.4%)-Aluminum. Meets NEMA 4X, IP66, & P67. All stainless steel housing is optional. |
| **Mounting** | See **Figure 3** for typical flange mounting arrangement. |
| **Process Connections**<br>**All Models**<br>**STF725, STF735**<br>**STF72P, STF73P** | <br>**Process Head:** 1/4-inch NPT; 1/2-inch NPT with adapter and DIN, standard options.<br>**Flange:** 2, 3 or 4-inch Class 150 or 300 ANSI; DN50-PN40, DN80-PN40 or DN100-PN40 DIN flange.<br>**Extended Diaphragm:** 2, 4, or 6 inches (50, 101, 152 mm) long.<br>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** | STF72P, STF73P:14-19 pounds (6.4 - 8.7Kg) with Aluminum Housing<br>STF725, STF735: 18-32 pounds (8.2 - 14.5Kg) with Aluminum Housing |

[1] Vent/Drains are sealed with Teflon®

[2] Hastelloy® C-276 or UNS N10276

[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

* Flush design only.

## 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)

### 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 | Standard Display |
|---|---|
| Electronic Module DAC Failure | Fault Comm El |
| Meter Body NVM Corrupt | Fault Mtrbody |
| Config. Data Corrupt | Fault Comm El |
| Electronic Module Diag Failure | Fault Comm El |
| Meter Body Critical Failure | Fault Mtrbody |
| Sensor Comms Timeout | 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 |
| LRV Set Error – Zero Config. Button |
| URV Set Error – Zero Config. Button |
| AO Out of Range |
| Loop Current Noise |
| Meter Body Unreliable Comm |
| No DAC Calibration |
| Sensor Supply Voltage Low |

Refer to ST 700 manuals for additional level diagnostic information.

## Approval Certifications:

| AGENCY | TYPE OF PROTECTION | FIELD PARAMETERS | AMBIENT TEMP (Ta) |
|---|---|---|---|
| **FM Approvals™** | **Explosionproof:**<br>Class I, Division 1, Groups A, B, C, D;<br>**Dust Ignition Proof:**<br>Class II, III, Division 1, Groups E, F, G;<br><br>Class I, Zone 0/1, AEx d IIC Ga/Gb<br>Class II, Zone 21, AEx tb IIIC Db T 95°C | Note 1 | T5: -50 °C to 85°C<br>T6: -50 °C to 65°C |
| | **Intrinsically Safe:**<br>Class I, II, III, Division 1, Groups A, B, C, D, E, F, G:<br><br>Class I, Zone 0, AEx ia IIC Ga | | T4: -50 °C to 70°C |
| | **Nonincendive:**<br>Class I, Division 2, Groups A, B, C, D<br><br>Class I, Zone 2, AEx nA IIC Gc | Note 1 | T4: -50 °C to 85°C |
| | **Enclosure:** Type 4X/ IP66/ IP67 | All | - |
| **Canadian Standards Association (CSA)** | **Explosion Proof:**<br>Class I, Division 1, Groups A, B, C, D;<br>**Dust Ignition Proof:**<br>Class II, III, Division 1, Groups E, F, G;<br><br>Ex d IIC Ga<br>Ex tb IIIC Db T 95°C | Note 1 | T5: -50 °C to 85°C<br>T6: -50 °C to 65°C |
| | **Intrinsically Safe:**<br>Class I, II, III, Division 1, Groups A, B, C, D, E, F, G;<br><br>Ex ia IIC Ga | | T4: -50 °C to 70°C |
| | **Nonincendive:**<br>Class I, Division 2, Groups A, B, C, D; T4<br><br>Ex nA IIC Gc | Note 1 | T4: -50 °C to 85°C |
| | **Enclosure:** Type 4X/ IP66/ IP67 | All | - |
| **ATEX** | **Flameproof:**<br>II 1/2 G Ex d IIC Ga/Gb<br>II 2 D Ex tb IIIC Db T 95°C | Note 1 | T5: -50 °C to 85°C<br>T6: -50 °C to 65°C |
| | **Intrinsically Safe:**<br>II 1 G Ex ia IIC Ga | | T4: 50 °C to 70°C |
| | **Nonincendive:**<br>II 3 G Ex nA IIC Gc | Note 1 | T4: -50 °C to 85°C |
| | **Enclosure:** IP66/ IP67 | All | - |

## Approval Certifications: (Continued)

| | | | |
|---|---|---|---|
| **IECEx (World)** | **Flameproof :**<br>Ex d IIC Ga/Gb<br>Ex tb IIIC Db T 95°C | Note 1 | T5: -50 °C to 85°C<br>T6: -50 °C to 65°C |
| | **Intrinsically Safe:**<br>Ex ia IIC Ga | | T4: -50 °C to 70°C |
| | **Nonincendive:**<br>Ex nA IIC Gc | Note 1 | T4: -50 °C to 85°C |
| | **Enclosure:** IP66/ IP67 | All | - |
| **SAEx South Africa** | **Flameproof :**<br>Ex d IIC Ga/Gb T4<br>Ex tb IIIC Db T 95°C | Note 1 | -50 °C to 85°C |
| | **Intrinsically Safe:**<br>Ex ia IIC Ga T4 | Note 2a | -50 °C to 70°C |
| | **Nonincendive:**<br>Ex nA IIC Gc T4 | Note 1 | -50 °C to 85°C |
| | **Enclosure:** IP66/ IP67 | All | - |
| **INMETRO Brazil** | **Flameproof:**<br>Ex db IIC T6..T5 Ga/Gb<br>Ex tb IIIC T 95°C Db | Note 1 | 50 °C to 85°C |
| | **Intrinsically Safe:**<br>Ex ia IIC T4 Ga | Note 2a | 50 °C to 70°C |
| | **Nonincendive:**<br>Ex nA IIC T4 Gc | Note 1 | -50 °C to 85°C |
| | **Enclosure** : IP 66/67 | All | - |
| **NEPSI (China)** | **Flameproof:**<br>Ex d IIC Ga/Gb<br>Ex tb IIIC Db T 85°C | Note 1 | T5: -50 °C to 85°C<br>T6: -50 °C to 65°C |
| | **Intrinsically Safe:**<br>Ex ia IIC Ga | | T4: -50 °C to 70°C |
| | **Nonincendive:**<br>Ex nA IIC Gc | Note 1 | T4: -50 °C to 85°C |
| | **Enclosure** : IP 66/67 | All | - |
| **EAC Russia, Belarus and Kazakhstan** | **Flameproof:**<br>1 Ex d IIC Ga/Gb T4<br>Ex tb IIIC Db T 85°C | Note 1 | -50 °C to 85°C |
| | **Intrinsically Safe:**<br>0 Ex ia IIC Ga T4 | Note 2a | -50 °C to 70°C |
| | **Enclosure** : IP 66/67 | All | - |

Notes:

1. Operating Parameters:
   Voltage= 11 to 42 V DC  Current= 4-20 mA Normal

2. Intrinsically Safe Entity Parameters
   a. Analog/ DE/ HART Entity Values:

Vmax= Ui = 30V Imax= Ii= 105mA Ci = 4.2nF Li =984 uH Pi =0.9W

Transmitter with Terminal Block Revision E or Later

Vmax= Ui = 30V Imax= Ii= 225mA Ci = 4.2nF Li = 0 Pi =0.9W

Note : Transmitter with Terminal Block Revision E or later

The revision is on the label that is on the module. There will be two lines of text on the label:

- First is the Module Part #: 50049839-001 or 50049839-002
- Second line has the supplier information, along with the REVISION:

XXXXXXX-EXXXX, THE "X" is production related, THE POSITION of the "E" IS THE REVISION.

## Other Certification Options

**Materials**

o NACE MRO175, MRO103, ISO15156

| | |
|---|---|
| **SIL 2/3 Certification** | 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. |

## Dimensional Drawings

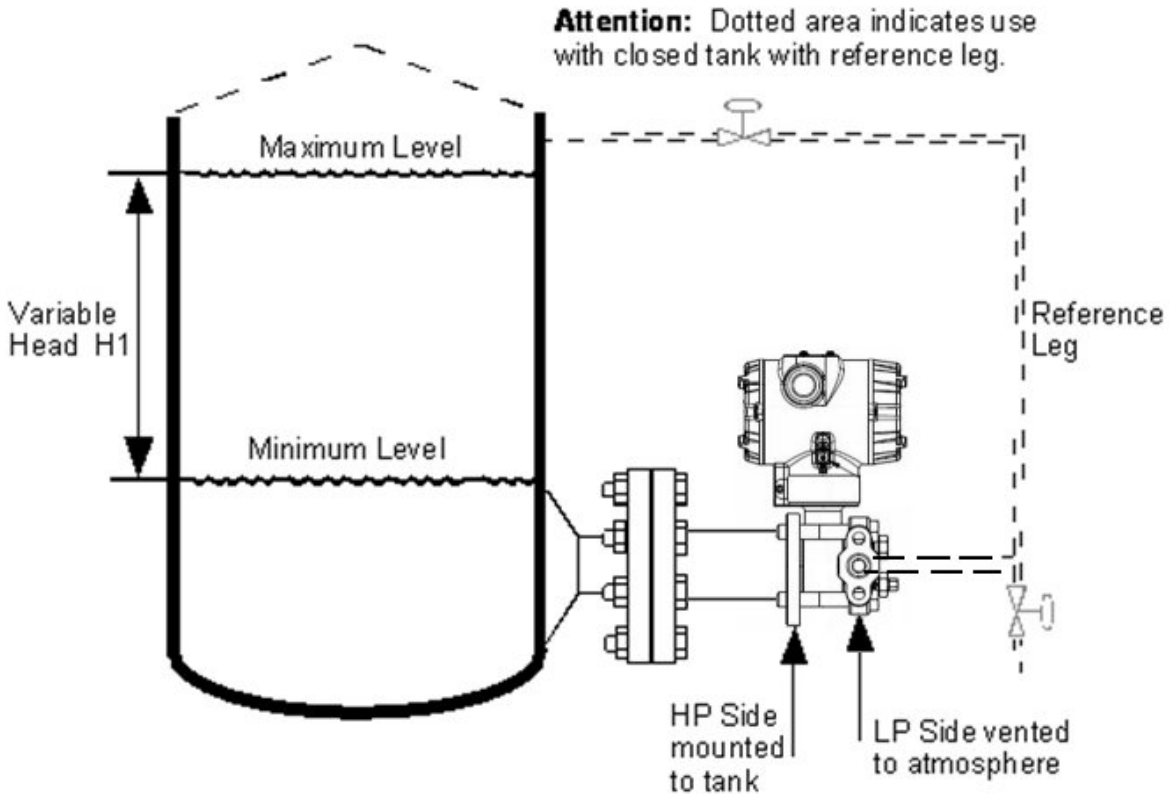
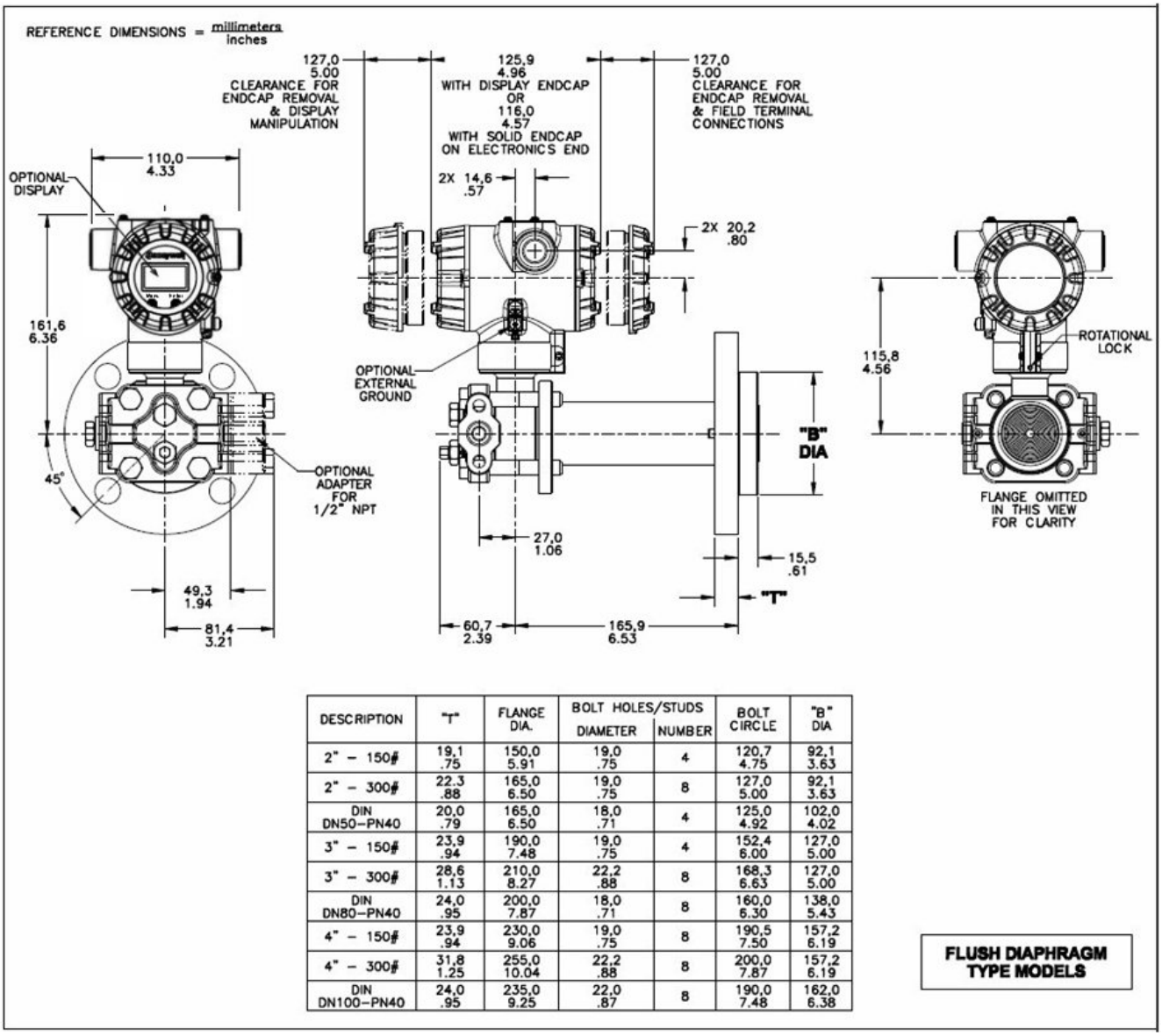



**Figure 3 – Typical mounting for flange mounted level transmitter**

## Dimensional Drawings (con't)

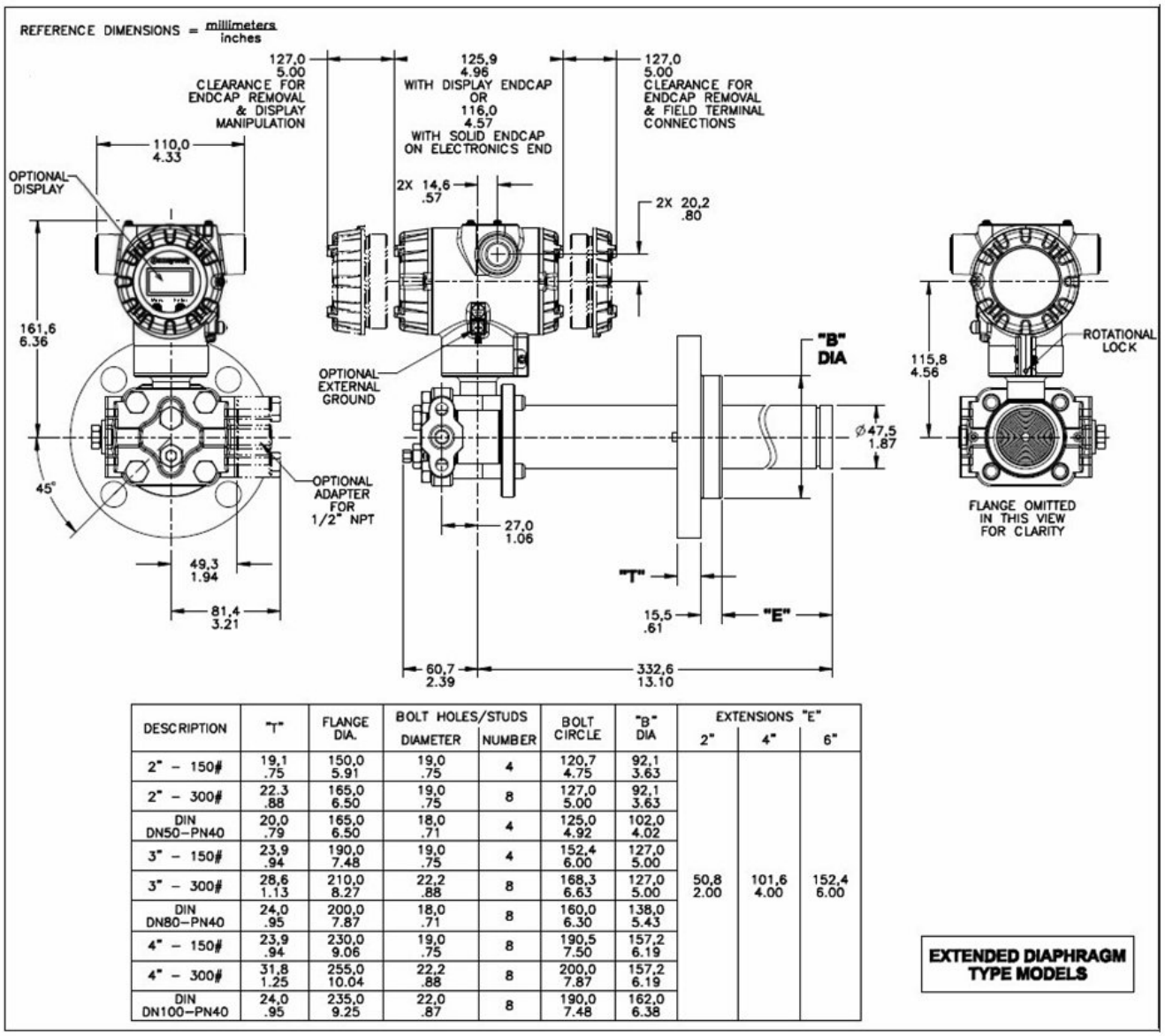



| DESCRIPTION | "T" | FLANGE DIA. | BOLT HOLES/STUDS DIAMETER | BOLT HOLES/STUDS NUMBER | BOLT CIRCLE | "B" DIA |
|---|---|---|---|---|---|---|
| 2" – 150# | 19,1 .75 | 150,0 5.91 | 19,0 .75 | 4 | 120,7 4.75 | 92,1 3.63 |
| 2" – 300# | 22,3 .88 | 165,0 6.50 | 19,0 .75 | 8 | 127,0 5.00 | 92,1 3.63 |
| DIN DN50–PN40 | 20,0 .79 | 165,0 6.50 | 18,0 .71 | 4 | 125,0 4.92 | 102,0 4.02 |
| 3" – 150# | 23,9 .94 | 190,0 7.48 | 19,0 .75 | 4 | 152,4 6.00 | 127,0 5.00 |
| 3" – 300# | 28,6 1.13 | 210,0 8.27 | 22,2 .88 | 8 | 168,3 6.63 | 127,0 5.00 |
| DIN DN80–PN40 | 24,0 .95 | 200,0 7.87 | 18,0 .71 | 8 | 160,0 6.30 | 138,0 5.43 |
| 4" – 150# | 23,9 .94 | 230,0 9.06 | 19,0 .75 | 8 | 190,5 7.50 | 157,2 6.19 |
| 4" – 300# | 31,8 1.25 | 255,0 10.04 | 22,2 .88 | 8 | 200,0 7.87 | 157,2 6.19 |
| DIN DN100–PN40 | 24,0 .95 | 235,0 9.25 | 22,0 .87 | 8 | 190,0 7.48 | 162,0 6.38 |

**FLUSH DIAPHRAGM TYPE MODELS**

**Figure 4 – Typical mounting dimensions for flush diaphragm type models STF725 and STF735.**

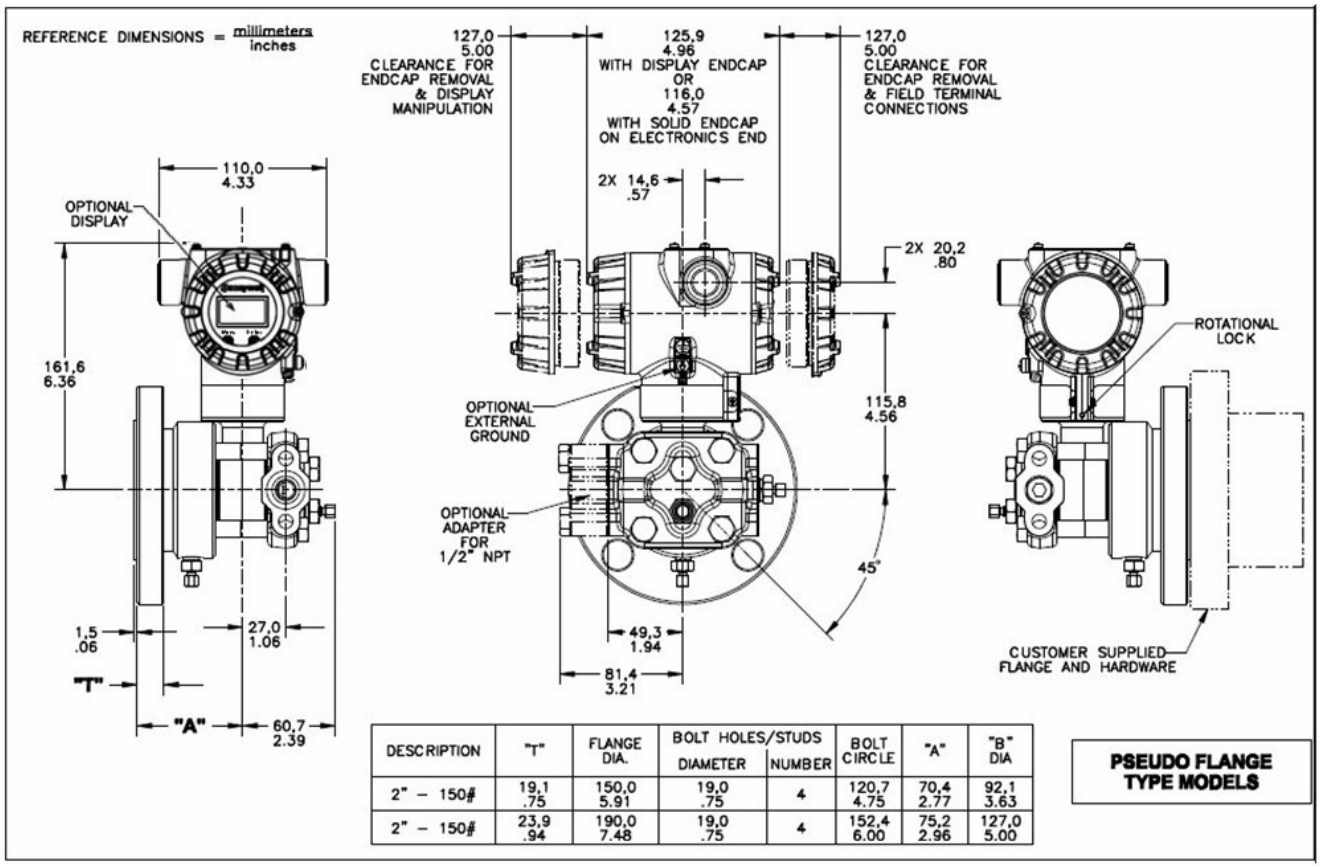
## Dimensional Drawings (con't)




| DESCRIPTION | "T" | FLANGE DIA. | BOLT HOLES/STUDS DIAMETER | BOLT HOLES/STUDS NUMBER | BOLT CIRCLE | "B" DIA | EXTENSIONS "E" 2" | 4" | 6" |
|---|---|---|---|---|---|---|---|---|---|
| 2" – 150# | 19,1 .75 | 150,0 5.91 | 19,0 .75 | 4 | 120,7 4.75 | 92,1 3.63 | 50,8 2.00 | 101,6 4.00 | 152,4 6.00 |
| 2" – 300# | 22.3 .88 | 165,0 6.50 | 19,0 .75 | 8 | 127,0 5.00 | 92,1 3.63 | | | |
| DIN DN50–PN40 | 20,0 .79 | 165,0 6.50 | 18,0 .71 | 4 | 125,0 4.92 | 102,0 4.02 | | | |
| 3" – 150# | 23,9 .94 | 190,0 7.48 | 19,0 .75 | 4 | 152,4 6.00 | 127,0 5.00 | | | |
| 3" – 300# | 28,6 1.13 | 210,0 8.27 | 22,2 .88 | 8 | 168,3 6.63 | 127,0 5.00 | | | |
| DIN DN80–PN40 | 24,0 .95 | 200,0 7.87 | 18,0 .71 | 8 | 160,0 6.30 | 138,0 5.43 | | | |
| 4" – 150# | 23,9 .94 | 230,0 9.06 | 19,0 .75 | 8 | 190,5 7.50 | 157,2 6.19 | | | |
| 4" – 300# | 31,8 1.25 | 255,0 10.04 | 22,2 .88 | 8 | 200,0 7.87 | 157,2 6.19 | | | |
| DIN DN100–PN40 | 24,0 .95 | 235,0 9.25 | 22,0 .87 | 8 | 190,0 7.48 | 162,0 6.38 | | | |

**Figure 5 – Typical mounting dimensions for extended diaphragm type models STF725 and STF735.**

## Dimensional Drawings (con't)




| DESCRIPTION | "T" | FLANGE DIA. | BOLT HOLES/STUDS DIAMETER | BOLT HOLES/STUDS NUMBER | BOLT CIRCLE | "A" | "B" DIA |
|---|---|---|---|---|---|---|---|
| 2" – 150# | 19,1 .75 | 150,0 5.91 | 19,0 .75 | 4 | 120,7 4.75 | 70,4 2.77 | 92,1 3.63 |
| 2" – 150# | 23,9 .94 | 190,0 7.48 | 19,0 .75 | 4 | 152,4 6.00 | 75,2 2.96 | 127,0 5.00 |

**PSEUDO FLANGE TYPE MODELS**

**Figure 6 – Typical mounting dimensions for pseudo flange type models STF72P and STF73P**

## 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-16-123 Issue 4

**Instructions**

- 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 _ _ | - _ _ _ _ _ _ | - _ _ _ | - _ | - _ _ _ | - _ _ _ | - _ | - _ _ _ _ | - _ _ ' _ _ | + 0 0 0 0 |

| KEY NUMBER | URL | LRL | Max Span | Min Span | Units | Selection | Availability | |
|---|---|---|---|---|---|---|---|---|
| Measurement Range Std Accuracy | 400 (1000) | -400 (-1000) | 400 (1000) | 4 (10) | " $H_2O$ (mbar) | STF725 | ↓ | |
| | 100 (7) | -100 (-7) | 100 (7) | 1 (0.07) | psi (bar) | STF735 | ↓ | |
| | 400 (1000) | -400 (-1000) | 400 (1000) | 1 (2.5) | " $H_2O$ (mbar) | STF72P | | ↓ |
| | 100 (7) | -100 (-7) | 100 (7) | 1 (0.07) | psi (bar) | STF73P | | ↓ |

| TABLE I | Materials of Construction | Design | Ref. Head | Vent Drain Valve on Ref. Head [2] | Barrier Diaphrm. (wetted) | Diaphrm. 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_ _ _ _ | ● | ● |

| 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 [11] | 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 _ _ | ● | ● | | |

| 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

| | | | | | | Availability STF7xx ↓ | ↓ |
|---|---|---|---|---|---|---|---|
| **TABLE II** | | | **Flange Material** | **Threaded Nut Ring Material** | **Selection** | **25 35** | **2P 3P** |
| **Flange Assembly** | **a. Flange (ANSI Flanges have 125-500 AARH Surface Finish)** | 3" ANSI Class 150 | Carbon Steel (non-wetted) | Carbon Steel (non-wetted) | 1 _ _ | • | |
| | | 3" ANSI Class 300 | | | 2 _ _ | • | |
| | | DN80-PN40 DIN | | | 3 _ _ | • | |
| | | 4" ANSI Class 150 | | | 4 _ _ | • | |
| | | 4" ANSI Class 300 | | | 5 _ _ | • | |
| | | DN100-PN40 DIN | | | 6 _ _ | • | |
| | | 2" ANSI Class 150 | | | 7 _ _ | • | |
| | | 2" ANSI Class 300 | | | 8 _ _ | • | |
| | | DN50-PN40 DIN | | | 9 _ _ | • | |
| | | 3" ANSI Class 150 | 304 SS (non-wetted) | 304 SS (non-wetted) | A _ _ | • | |
| | | 3" ANSI Class 300 | | | B _ _ | • | |
| | | DN80-PN40 DIN | | | C _ _ | • | |
| | | 4" ANSI Class 150 | | | D _ _ | • | |
| | | 4" ANSI Class 300 | | | E _ _ | • | |
| | | DN100-PN40 DIN | | | F _ _ | • | |
| | | 2" ANSI Class 150 | | | Q _ _ | • | |
| | | 2" ANSI Class 300 | | | U _ _ | • | |
| | | DN50-PN40 DIN | | | V _ _ | • | |
| | | 3" ANSI Class 150 | 316 SS (non-wetted) | 304 SS (non-wetted) | H _ _ | • | |
| | | 3" ANSI Class 300 | | | J _ _ | • | |
| | | DN80-PN40 DIN | | | K _ _ | • | |
| | | 4" ANSI Class 150 | | | L _ _ | • | |
| | | 4" ANSI Class 300 | | | M _ _ | • | |
| | | DN100-PN40 DIN | | | N _ _ | • | |
| | | 2" ANSI Class 150 | | | W _ _ | • | |
| | | 2" ANSI Class 300 | | | X _ _ | • | |
| | | DN50-PN40 DIN | | | Z _ _ | • | |
| | | **Pseudo Flange on Standard DP** | | | **Sel.** | | |
| | | 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 _ _ | | • |
| | **b. Gasket Ring (wetted)** | No Selection | | | _ 0 _ | | • |
| | | 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 (for 2", 3" or 4 " spud)[13] | | 2 inches | _ _ C | v | |
| | | | | 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/CCoE Explosion proof, Intrinsically Safe & Non-incendive | E | * | * |
| | INMETRO Explosion proof, Intrinsically Safe & Non-incendive | F | * | * |
| | NEPSI Explosion proof, Intrinsically Safe & Non-incendive | G | * | * |
| | EAC-Customs Union(Russia,Belarus and Kazakhstan)EX Approval Flameproof,Intrinsically Safe | I | * | * |

| **TABLE IV** | **TRANSMITTER ELECTRONICS SELECTIONS** | | | **Selection** | | |
|---|---|---|---|---|---|---|
| | **Material** | **Connection** | **Lightning Protection** | | | |
| **a. Electronic Housing Material & Connection Type** | 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 _ | * | * |
| **c. Customer Interface Selections** | **Indicator** | **Ext Zero, Span & Config Buttons** | **Languages** | | | |
| | None | None | None | _ _ 0 | * | * |
| | None | Yes (Zero/Span Only) | None | _ _ A | * | * |
| | Standard (w/Internal Zero,Span & Config Buttons) | None | English | _ _ S | * | * |
| | Standard (w/Internal Zero,Span & Config Buttons) | Yes | English | _ _ T | * | * |

| TABLE V | CONFIGURATION SELECTIONS | | | Selection | Availability STF7xx 25 35 | 2P 3P |
|---|---|---|---|---|---|---|
| a. Application Software | Diagnostics | | | | | |
| | Standard Diagnostics | | | 1 _ _ | * | * |
| | Write Protect | Fail Mode | High & Low Output Limits[3] | | | |
| b. Output Limit, Failsafe & Write Protect Settings | Disabled | High> 21.0mAdc | Honeywell Std (3.8 - 20.8 mAdc) | _ 1 _ | * | * |
| | Disabled | Low< 3.6mAdc | Honeywell Std (3.8 - 20.8 mAdc) | _ 2 _ | * | * |
| | Enabled | High> 21.0mAdc | Honeywell Std (3.8 - 20.8 mAdc) | _ 3 _ | * | * |
| | Enabled | Low< 3.6mAdc | Honeywell Std (3.8 - 20.8 mAdc) | _ 4 _ | * | * |
| 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 | * | * |

| 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 _ _ | * | * |
| 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 |

| 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 Process wetted parts only | FG | * | * | b |
| | NACE MR0175; MR0103; ISO15156 Process wetted and non-wetted parts | F7 | c | c | |
| | Marine (DNV, ABS, BV, KR, LR) | MT | d | d | |
| | EN10204 Type 3.1 Material Traceability | FX | * | * | |
| | Certificate of Conformance | F3 | * | * | b |
| | Calibration Test Report & Certificate of Conformance | F1 | * | * | |
| | Certificate of Origin | F5 | * | * | |
| | FMEDA (SIL 2/3) Certification | FE | j | j | |
| | Over-Pressure Leak Test Certificate (1.5X MAWP) | TP | * | * | |
| | Cert Clean for $O_2$ or $CL_2$ service per ASTM G93 | OX | e | e | |
| | PMI Certification[1] | PM | * | * | |
| | Extended Warranty Additional 1 Year | 01 | * | * | b |
| | Extended Warranty Additional 2 Year | 02 | * | * | |
| | Extended Warranty Additional 3 Year | 03 | * | * | |
| | Extended Warranty Additional 4 Year | 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 | Id | _ _ _ _ N _ _ | | |
| d | IVa | C, D, G, H _ _ | | |
| e | Ib | _ 2 _ _ _ _ | | |
| j | | | Vb | _ 1,2 _ |
| m | IVa | B,D,F,H _ _ | | |
| n | IVa | A,C,E,G _ _ | | |
| s | Ia | A,W,B,E,X,F,J _ _ _ _ _ | | |
| t | | | Ia | J _ _ _ _ _ |
| v | Ia | M,N,R,S _ _ _ _ _ | | |
| w | | | Ia | M,N,R,S _ _ _ _ _ |
| | | | IIb | _ 5 _ |

[1]The 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 |
|---|---|
| Terminal Strip w/o Lightning Protection Kit for HART | 50129832-501 |
| Terminal Strip w/Lightning Protection for HART Modules | 50129832-502 |
| HART Electronics Module | 50129828-501 |
| HART Electronics Module w/connection for external configuration buttons | 50129828-502 |
| Standard Display Module | 50126003-501 |

**PRODUCT MANUALS**

| Description | Part Number |
|---|---|
| ST 700 Smart Transmitter User Manual - English | 34-ST-25-44 |
| ST 700 Smart Transmitter HART Communications Manual - English | 34-ST-25-47 |
| ST 700 Smart Transmitter Safety Manual - English | 34-ST-25-37 |

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

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

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*Specifications are subject to change without notice.*

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