Honeywell

SmartLine Pressure Transmitters
ST 700 User's Manual

34-ST-25-44
Revision 11
June 2020

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Revision 11, June 2020

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About This Manual

This manual is a detailed *how to* reference for installing, piping, wiring, configuring, starting up, operating, maintaining, calibrating, and servicing Honeywell's family of ST 700 SmartLine pressure transmitters, Standard and basic models.
Users who have a Honeywell ST 700 SmartLine pressure transmitter configured for HART protocol or Honeywell's Digitally Enhanced (DE) are referred to the *ST 700 Series HART/DE Option User's Manual*, Document # 34-ST-25-47.
Users who have a Honeywell ST 700 SmartLine pressure transmitter configured for Fieldbus operation are referred to the *ST 700 Series Fieldbus Option User's Manual*, Document # 34-ST-25-48.

The configuration of your Transmitter depends on the mode of operation and the options selected for it with respect to operating controls, displays and mechanical installation. This manual provides detailed procedures to assist first-time users, and it further includes keystroke summaries, where appropriate, as quick reference or refreshers for experienced personnel.

To digitally integrate a Transmitter with one of the following systems:

- For the Experion PKS, you will need to supplement the information in this document with the data and procedures in the *Experion Knowledge Builder*.
- For Honeywell's TotalPlant Solutions (TPS), you will need to supplement the information in this document with the data in the *PM/APM SmartLine Transmitter Integration Manual*, which is supplied with the TDC 3000 book set. (TPS is the evolution of the TDC 3000).

Release Information

- *ST 700 SmartLine Pressure Transmitter User Manual*, Document # 34-ST-25-44, Revision 1, February, 2013
- Revision 2, May, 2013 – Updates to Parts list, Explosionproof Seal class, Fail Safe and Comms Module procedures.
- Revision 3, July 2013 – Control Drawing updated to Rev.D
- Revision 4, December 2013 – STG73P flush Mount
- Revision 5, December 2014 – MID and MARINE Approvals added
- Revision 6, March 2016 – Standard display added
- Revision 7, May 2016 – Approval updates and EU cert.
- Revision 8, December 2016 – Basic models added.
- Revision 9, September 2017 – Display enhancements to the simple display, Parts list updates
- Revsiosn 10, November 2018 - EU DECLARATION OF CONFORMITY and Approvals and Control Drawing updated and updated voltage chart.
- Revision 11, June 2020 – Std display updates - Russian language, Eng and PV units

References

The following list identifies publications that may contain information relevant to the information in this document.

- *SmartLine Pressure Transmitter ST 800/ST700 Standard Quick Start Guide*, # 34-ST-25-36
- *ST 800 & ST 700 Pressure Transmitter with HART Safety Manual*, # 34-ST-25-37
- *ST 700 SmartLine Pressure Transmitter HART/DE Option User's Manual*, # 34-ST-25-47
- *ST 700 FF Transmitter with FOUNDATION Fieldbus Option Installation & Device Reference Guide, # 34-ST-25-48*
- *MC Tookit User Manual*, for 400 or later, # 34-ST-25-20
- *PM/APM Smartline Transmitter Integration Manual*, # PM 12-410
- *ST 800 & ST 700 Series Pressure, Analog, HART and DE Communications* form, Honeywell drawing 50049892
- *Smart Field Communicator Model STS 103 Operating Guide*, # 34-ST-11-14

Patent Notice

The Honeywell ST 700 SmartLine pressure transmitter family is covered by one or more of the following U. S. Patents: 5,485,753; 5,811,690; 6,041,659; 6,055,633; 7,786,878; 8,073,098; and other patents pending.

Support and Contact Information

For Europe, Asia Pacific, North and South America contact details, refer to the back page of this manual or the appropriate Honeywell Solution Support web site:

Honeywell Corporate	www.honeywellprocess.com
Honeywell Process Solutions	www.honeywellprocess.com/pressue-transmitters/
Training Classes	http://www.honeywellprocess.com/en-US/training

Telephone and Email Contacts

Area	Organization	Phone Number
United States and Canada	Honeywell Inc.	1-800-343-0228 Customer Service 1-800-423-9883 Global Technical Support
Global Email Support	Honeywell Process Solutions	hfs-tac-support@honeywell.com

Symbol Descriptions and Definitions

The symbols identified and defined in the following table may appear in this document.

Symbol	Definition
	**ATTENTION: Identifies information that requires special consideration.**
	**TIP: Identifies advice or hints for the user, often in terms of performing a task.**
CAUTION	**Indicates a situation which, if not avoided, may result in equipment or work (data) on the system being damaged or lost, or may result in the inability to properly operate the process.**
	**CAUTION: Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.** **CAUTION symbol on the equipment refers the user to the product manual for additional information. The symbol appears next to required information in the manual.**
	**WARNING: Indicates a potentially hazardous situation, which, if not avoided, could result in serious injury or death.** **WARNING symbol on the equipment refers the user to the product manual for additional information. The symbol appears next to required information in the manual.**
	**WARNING, Risk of electrical shock: Potential shock hazard where HAZARDOUS LIVE voltages greater than 30 Vrms, 42.4 Vpeak, or 60 VDC may be accessible.**
	**ESD HAZARD: Danger of an electro-static discharge to which equipment may be sensitive. Observe precautions for handling electrostatic sensitive devices.**
	**Protective Earth (PE) terminal: Provided for connection of the protective earth (green or green/yellow) supply system conductor.**
	**Functional earth terminal: Used for non-safety purposes such as noise immunity improvement. Note: This connection shall be bonded to Protective Earth at the source of supply in accordance with national local electrical code requirements.**
	**Earth Ground: Functional earth connection. Note: This connection shall be bonded to Protective Earth at the source of supply in accordance with national and local electrical code requirements.**
	**Chassis Ground: Identifies a connection to the chassis or frame of the equipment shall be bonded to Protective Earth at the source of supply in accordance with national and local electrical code requirements.**
continued	

Symbol	Description
	The Factory Mutual®: Approval mark means the equipment has been rigorously tested and certified to be reliable.
	The Canadian Standards mark means the equipment has been tested and meets applicable standards for safety and/or performance.
	The Ex mark means the equipment complies with the requirements of the European standards that are harmonised with the 94/9/EC Directive (ATEX Directive, named after the French "ATmosphere EXplosible").

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1. ST 700 Transmitter Series

1.1 Overview

SmartLine pressure transmitter ST 700 family conists of a series of ST 700 standard transmitter models and a series of ST 700 basic transmitter models.

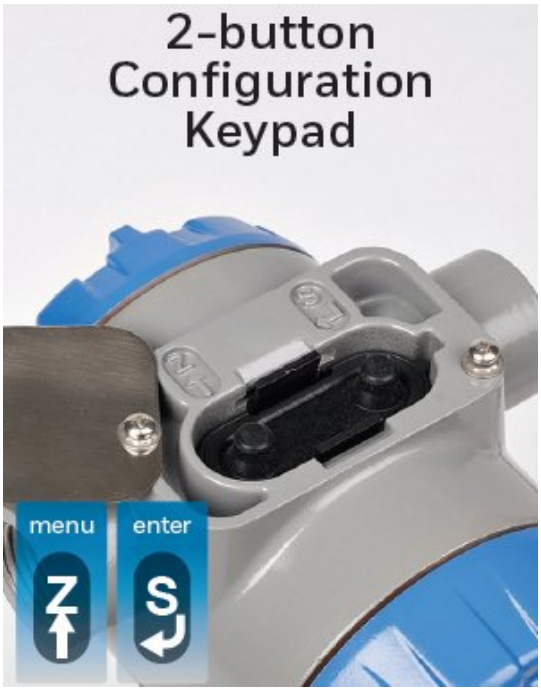
Note: The entire manual is broadly classified in two sections for std and basic transmitters.
The first half of this manual, sections **2** through **9**, are for ST 700 standard transmitter model series and the second half, sections **10** through **17,** are applicable only to ST 700 basic transmitter model series.

Which type of transmitter do I have?
To determine which version you have:
Look at the nameplate on top of the unit shown in Figure 3. Refer to the model number
If you have a ST 700 standard transmitter use sections **2** through **9**.
If you have a ST 700 basic transmitter go straight to sections **10** through **17.**
Appendix A - PRODUCT CERTIFICATIONS is applicable for both ST 700 standard and basic transmitters.

Table 1 below to identify which type of transmitter you have; standard or basic.

The standard transmitter will have a three button assembly (see Figure 17), the basic transmitter with have two button assembly (see Figure 18)

3-button Standard ST 700 Transmitter



2-button Basic ST 700 Transmitter

Table 1 – ST 700 Standard andf Basic model types

Transmitter Configuration	Smart Line Pressure ST700	
	Standard Models	Basic Models
Dual head DP	STD720/730/770	STD725/735/775
Dual head GP	STG730/740/770	STG735/745/775
Inline GP	STG73L/74L/77L/78L/79L	STG73S/74S/77S/78S/79S
Inline flush GP	STG73P	STG73SP
Dual head AP	STA722/740	STA725/745
Inline AP	STA72L/74L/77L	STA72S/74S/77S
Flush flanged level	STF724/732	STF725/735
Pseudo flanged level	STF72F/73F	STF72P/73P
Remote seal DP/GP	STR73D/74G	STR735D/745G

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2. Introduction to the ST 700 Standard Transmitter

This section is an introduction to the physical and functional characteristics Honeywell's family of the ST 700 Standard transmitters.

2.1 Features and Options

The ST 700 standard transmitter is available in a variety of models for measuring Differential Pressure (DP), Gauge Pressure (GP), and Absolute Pressure (AP). Table 2 lists the protocols, human interface (HMI), materials, approvals, and mounting bracket options.

Table 2 – Features and Options_ST 700 Standard transmitter

Feature/Option	Standard/Available Options
Communication Protocols	HART® version 7, Digitally Enhanced (DE), Fieldbus
Human-Machine Interface (HMI) Options (Basic Display/Standard Display)	**Basic Digital Display:** • Three-button programming (optional) • Basic display language: English only
	Standard Display (HART® only): • Two integral buttons programming (optional) • Standard display language: English and Russian • Two-mode operations: PV display and Menu Navigation
Calibration	Single
Approvals See Appendix A for details	FM, CSA, ATEX, IECEx, SAEx, INMETRO, NEPSI, EAC, KOSHA
Mounting Brackets	Angle/flat carbon steel/304 and 316 stainless steel, Marine 304 stainless steel, 316 Stainless Steel
Integration Tools	Experion

	The three-button option is available for the basic display. The two-button option is available for the standard display. Also, for the basic display, the three button reed switch is used only for span & zero correction and not for the display navigation.

2.1.1 Physical Characteristics

As shown in Figure 1, the ST 700 standard is packaged in two major assemblies: the electronics housing and the meter body. The elements in the electronic housing respond to setup commands and execute the software and protocol for the different pressure measurement types. Figure 2 shows the assemblies in the electronics housing with available options.

The meter body provides connection to a process system. Several physical interface configurations are available, as determined by the mounting and mechanical connections, all of which are described in the **Installation** section of this manual.

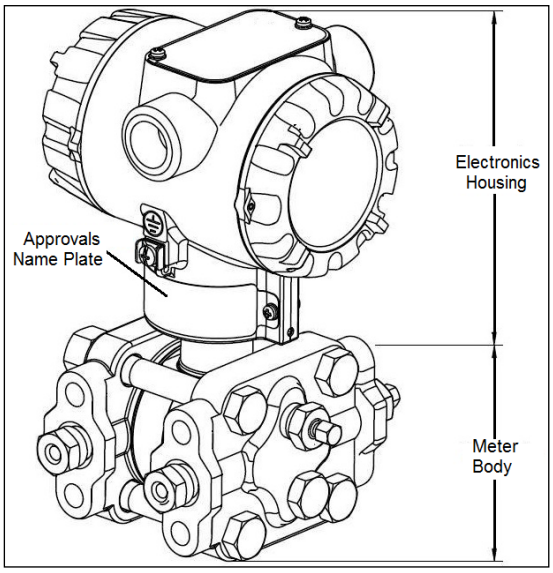


Figure 1 – ST 700 Standard Transmitter Major Assemblies

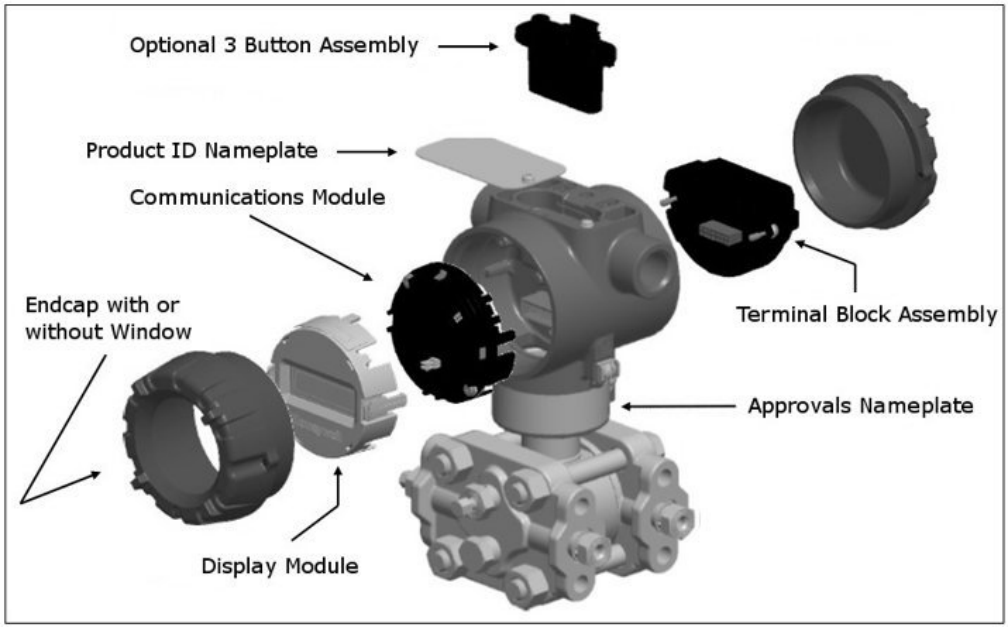


Figure 2 – ST 700 Standard Transmitter Electronics Housing Components

2.1.2 Functional Characteristics

The ST 700 standard transmitter measures process pressure and provides a proportional analog 4 to 20mA output to the measured process variable (PV). Available output communication protocols include Honeywell Digitally Enhanced (DE), HART®, and FOUNDATION™ Fieldbus.

The standard display is only available on HART transmitters.

An optional 3-button assembly is available to set up and make adjustments to the transmitter. In addition, a Honeywell Multi-Communication (MC) Toolkit (not supplied with the transmitter) can facilitate setup and adjustment procedures. Certain adjustments can be made through an Experion Station or a Universal Station if the transmitter is digitally integrated with Honeywell's Experion or TPS/TDC 3000 control system.

The standard display menu is implemented as one long single-level menu and will "wrap around" when it reaches the start or end of the menu. The standard display uses an optional two-button assembly to set up and make adjustments to the transmitter.

2.2 ST 700 Standard Transmitter Nameplate

The transmitter nameplate mounted on the bottom of the electronics housing (see Figure 1) lists its model number, physical configuration, electronics options, accessories, certifications, and manufacturing specialties. Figure 3 is an example of a typical Gauge Pressure (GP) or Atmospheric Pressure (AP) transmitter name plate. The model number format consists of a Key Number with several table selections. The Differential Pressure (DP), Absolute Pressure (AP), and Gauge Pressure (GP) name plates are essentially the same. The DP model provides one additional entry (7 vs. 6) in the meter body Selections (Table I) to accommodate the static pressure rating.

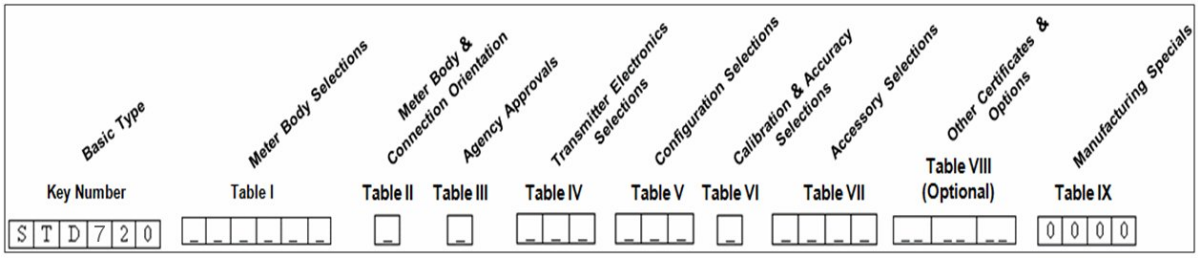


Figure 3 –ST 700 Standard Transmitter - Typical Name Plate

You can readily identify the series and basic transmitter type from the third and fourth digits in the key number. The letter in the third digit represents one of these basic transmitter types:

- A = Absolute Pressure
- D = Differential Pressure
- F = Flange Mounted
- G = Gauge Pressure
- R = Remote Seals

For a complete selection breakdown, refer to the appropriate Specification and Model Selection Guide provided as a separate document.

2.3 Safety Certification Information

An “approvals” name plate is located on the bottom of the electronics housing assy; see Figure 1for exact location. The approvals name plate contains information and service marks that disclose the transmitter compliance information.
Refer to Section Appendix A in this document for safety certification requirements and details.

2.4 Transmitter Adjustments

Zero and Span adjustments are possible in ST 700 standard transmitter with the optional 3 button and two-button assemblies.

You can also use the Honeywell MC Toolkit or other third-party hand-held configurator to make adjustments to the ST 700 standard transmitter. Alternately, certain adjustments can be made through the Experion or Universal Station, if the transmitter is digitally integrated with a Honeywell Experion or TPS system.

2.5 Display Options –Standard Display

Table 3 – Available Display Characteristics

Basic display	• Suitable for basic process needs • 360º rotation in 90º Increments • 2 lines, 16 characters • Standard units of measurement: Pa, KPa, MPa, KGcm^2, TORR, ATM, inH_2O, mH_2O, bar, mbar, inHg, FTH_2O, mmH_2O, MMHG, & PSI • Diagnostic messaging • Square root output indications
Standard display	• 360º rotation in 90º Increments • 2 lines, 8 characters • Standard units of measurement: Pressure Units: o atm, bar, ftH_2O68F, gf/cm^2, inH2O39F, inH_2O60F, inH_2O68F, inHg0C, kgf/cm^2, kPa, mbar, mmH_2O4C, m, mH_2O68F, mmHg0C , MPa, Pa, psi, Torr, mH_2O4C, cmH_2O4C • Flow Units (DP models only): o m3/hr, Kg/hr, MT/hr, L/sec, L/hr, SCFH, CFH, gal/hr, bbl/hr, I/gal/hr, %, SCFD, gal/min, Ib/hr, Ib/min, SCFM, MSCFH, MMSCFH • Diagnostic messaging

2.6 Optional Integrated Two-Button Assembly (Standard Display)

The standard display does not support all the transmitter configuration parameters and has limited features.
The optional Integrated two-button assembly for the standard display provides the following features and capabilities:

- Menu and enter key functionality.
- With the menu-driven display:
  - Comprehensive on-screen menu for navigation.
  - Transmitter configuration: enter LRV, enter URV and loop test.
  - Transmitter calibration
  - Display configuration (contrast only)
  - Set zero and span parameters.

	If you are using the optional external two-button assembly with the standard display then you can perform all the above operations without removing external glass cap using the external buttons

	**Lower range value (LRV):** A display parameter (standard display), which allows users to enter the measuring value for which the analog output will be scaled to 4mA. **Upper range value (URV):** A display parameter (standard display), which allows users to enter the measuring value for which the analog output will be scaled to 20mA.

3. Application Design for the ST 700 Standard Transmitter

3.1 Overview

This section discusses the considerations involved with deploying a Honeywell ST 700 standard transmitter in a process system. The following areas are covered:

- Safety
- Input and output data
- Reliability
- Environmental limits
- Installation considerations
- Operation and maintenance\
- Repair and replacement

3.2 Accuracy

The ST 700 standard transmitter measures the gauge, differential, or absolute pressure of a process and reports the measurement to a receiving device.

3.2.1 Diagnostic Messages

The transmitter standard diagnostics are reported in the two basic categories listed in Table 4. Problems detected as critical diagnostics drive the analog output to the programmed burnout level. Problems detected as non-critical diagnostics may affect performance without driving the analog output to the programmed burnout level. Informational messages (not listed in Table 4) report various transmitter status or setting conditions. The messages listed in Table 4 are specific to the transmitter, exclusive of those associated with HART and DE protocols. HART and DE diagnostic messages are listed and described in the *ST 700 SmartLine Pressure Transmitter HART/DE Option User Manual*, Document # 34-ST-25-47.

	**The standard display is only available on HART transmitters**

	**The standard display only displays critical diagnostics (meter body fault, electronics module fault and meter body communication fault). Non-critical diagnostics are not displayed.**

Table 4 – ST 700 Standard transmitter - Basic Display Diagnostics Messages

Critical Diagnostics (Failure Conditions)	Non-Critical Diagnostics (Warning Conditions)	
Sensor Comm Timeout	No DAC Compensation	No DAC Calibration
Meter Body Critical Failure	No Factory Calibration	Tamper Alarm
Electronic Module Diag Failure	PV Out of Range	Meter Body Unreliable Comm
Config Data Corrupt	Fixed Current Mode	Loop Current Noise
Meter Body NVM Corrupt	Sensor Over Temperature	AO Out of Range
Electronic Module DAC Failure	Meter Body Excess Correct	URV Set Error – Span Config Button
	Local Display	LRV Set Error – Span Config Button
	Low Supply Voltage	

3.3 Safety

3.3.1 Safety Integrity Level (SIL)

The ST 700 standard transmitter has met manufacturer design process requirements of Safety Integrity Level (SIL) 3. These are intended to achieve sufficient integrity against systematic errors of design by the manufacturer.

A Safety Instrumented Function (SIF) designed with this product must not be used at a SIL level higher than the statement, without "prior use" justification by the end user or diverse technology redundancy in the design.

Refer to the *Honeywell SmartLine Safety Manual*, Document # 34-ST-25-37, for additional information.

4. Installation and Startupfor the ST 700 Standard Transmitter

4.1 Installation Site Evaluation

Evaluate the site selected for the ST 700 standard transmitter installation with respect to the process system design specifications and Honeywell's published performance characteristics for your particular model. Some parameters that you may want to include in your site evaluation are:

- Environmental Conditions:
  - Ambient Temperature
  - Relative Humidity
- Potential Noise Sources:
  - Radio Frequency Interference (RFI)
  - Electromagnetic Interference (EMI)
- Vibration Sources
  - Pumps
  - Motorized System Devices (e.g., pumps)
  - Valve Cavitation
- Process Parameters
  - Temperature
  - Maximum Pressure Rating

4.2 Honeywell MC Toolkit

In preparation for post-installation processes, refer to the *MC Tookit User Manual,* Document # 34-ST-25-20, for battery conditioning and device operation and maintenance information.

4.3 Display Installation Precautions

Temperature extremes can affect display quality. The display can become unreadable at temperature extremes; however, this is only a temporary condition. The display will again be readable when temperatures return to within operable limits.

The display update rate may become slower at cold temperature extremes, but as with readability, normal updating resumes when temperatures are within limits for full operability.

	The ST 700 standard transmitter should not be operated without the endcap covers on. Covers can be removed temporarily for configuration with buttons or during maintenance/wiring. The static voltage must be discharged before removing the cover.

4.4 Mounting ST 700 Standard Transmitters

4.4.1 Summary

The ST 700 standard transmitter models, except flush mounts and those with integral flanges, can be attached to a two-inch (50 millimeters) vertical or horizontal pipe using Honeywell's optional angle or flat mounting bracket; alternately you can use your own bracket. flush-mount models are attached directly to a process pipe or tank by a one-inch weld nipple. Models with integral flanges are supported by the flange connection.

Figure 4 shows a typical bracket-mounted and flange-mounted transmitter installations.

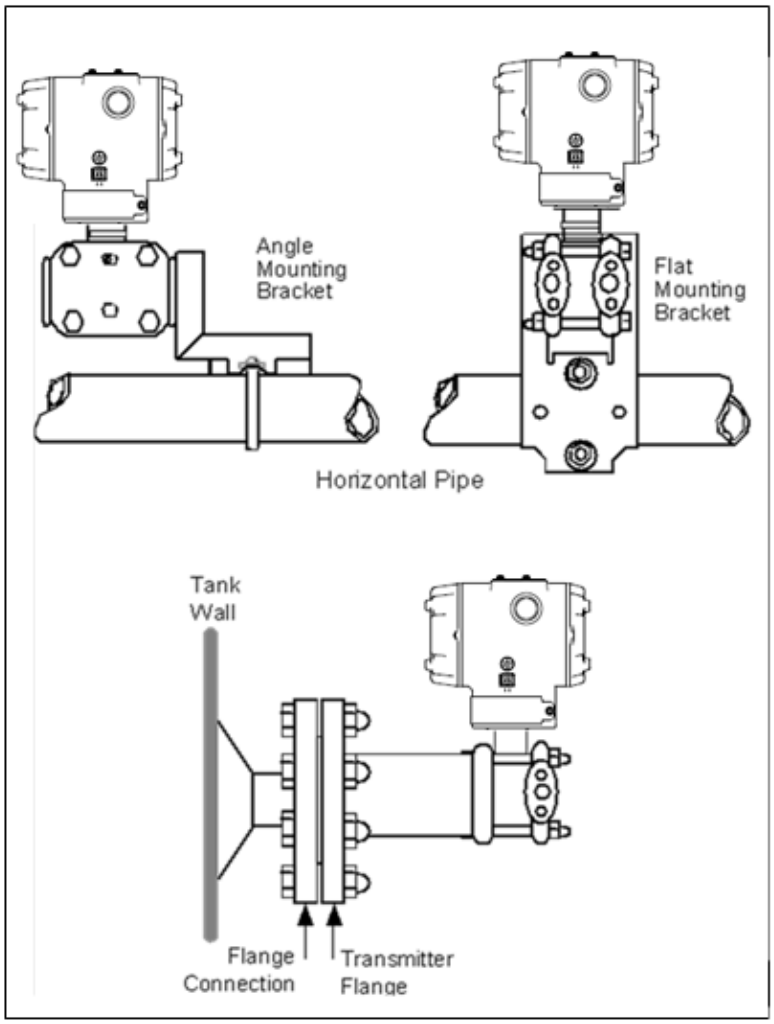


Figure 4 – ST 700 Standard Transmitter - Typical Bracket and Flange Mounted Installations

4.4.2 Flush mounting - ST 700 Standard Transmitter

To mount a flush mounted model, cut a hole for a 1” standard pipe in the tank or pipe where the transmitter is to be mounted. Weld the 1” mounting sleeve to the wall of the tank or to the hole cut on the pipe. Insert the meter body of the transmitter into the mounting sleeve and secure with the locking bolt. Tighten the bolt to a torque of 6,4 Nm +/- 0,30 Nm (4.7 ft-lbs +/- 0.2 ft.-lbs.). Figure 5 shows a typical installation for a transmitter with a flush mount on a pipe.

Once the transmitter is mounted, the electronics housing can be rotated to the desired position. See Figure 8 for details.

ATTENTION: On insulated tanks, remove enough insulation to accommodate the mounting sleeve.

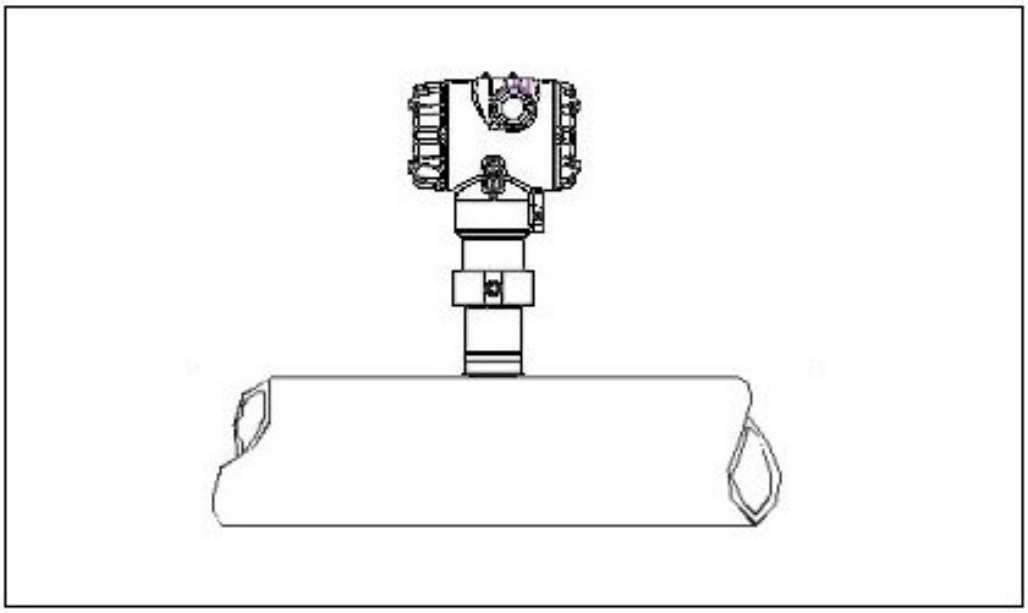


Figure 5 - ST 700 Standard Transmitter - Typical Flush Mounted Installation

4.4.3 Mounting Dimensions

Refer to Honeywell drawing number 50049930 (Dual Head), 50049931 (In-Line), 50049932 (flange mount) 50049933 (Extended flange), 50049934 (Remote Seal) and 50049936 (flush mount pressure transmitter) for detailed dimensions. Abbreviated overall dimensions are also shown on the Specification Sheets for the transmitter models. This section assumes that the mounting dimensions have already been taken into account and the mounting area can accommodate the transmitter.

4.4.4 Bracket Mounting Procedure

If you are using an optional bracket, start with Step 1. For an existing bracket, start with Step 2.

1. Refer to Figure 6. Position the bracket on a 2-inch (50.8mm nominal diameter, 2.38" (60.4mm) actual OD) for a horizontal or vertical pipe, and install a "U" bolt around the pipe and through the holes in the bracket. Secure the bracket with the nuts and lock washers provided.

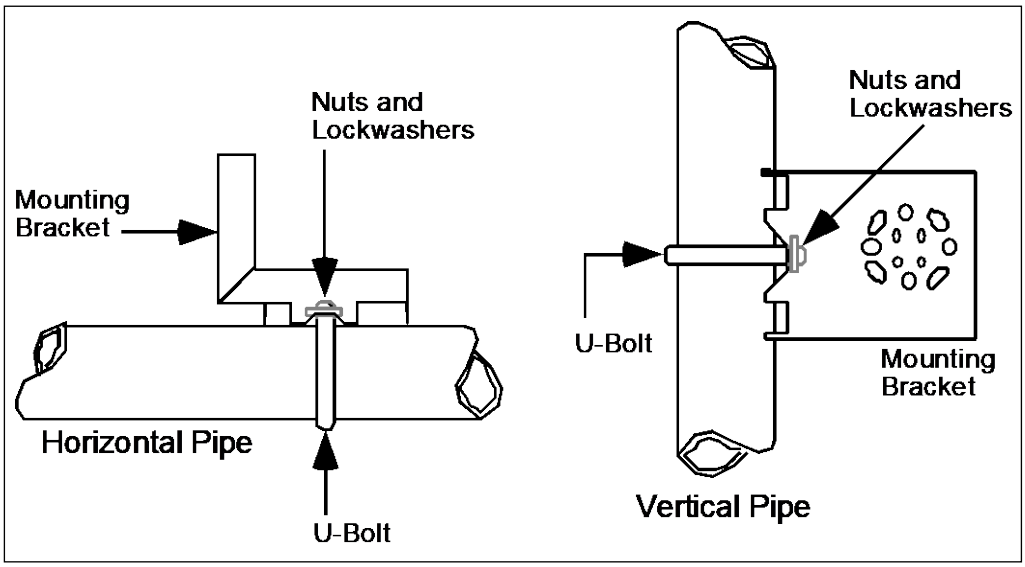


Figure 6 – ST 700 Standard Transmitter - Angle Mounting Bracket Secured to a Horizontal or Vertical Pipe

2. Align the appropriate mounting holes in the transmitter with the holes in the bracket. Use the bolts and washers provided to secure the transmitter to the bracket; see the following variations.

Table 5 - ST 700 Standard Transmitter - Mounting Bracket procedure

Transmitter Type	Use Hardware
DP with double-ended process heads and/or remote seals	Alternate mounting holes in the ends of the heads
ST 700 standard transmitter models only. In-line GP: STG7x0 and STG7xL AP models: STA7xL and STA72x, STA740	The smaller "U" bolt provided to attach the meter body to the bracket. See the following example.
Dual-head GP and AP	Mounting holes in the end of the process head.

Example: Inline model mounted to an optional angle bracket. See Figure 7**.**

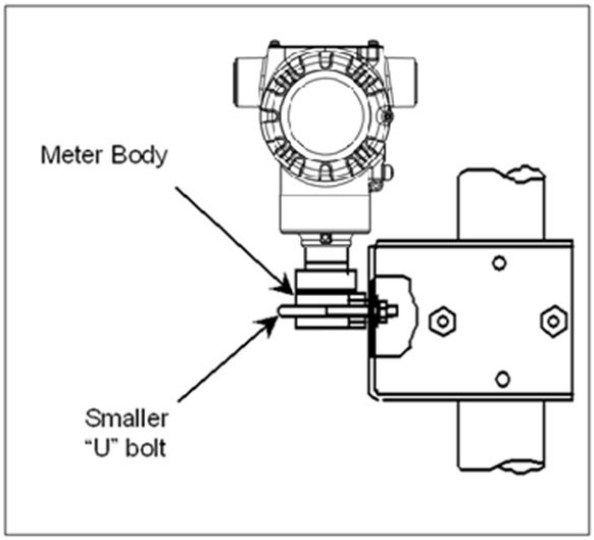


Figure 7 – ST 700 Standard Transmitter - Inline Model Mounted to an Optional Bracket

3. Loosen the set screw on the outside neck of the transmitter one (1) full turn.

4. Rotate the electronics housing a maximum of 180º left or right from the center to the position you require, and tighten the set screw using a 4mm metric socket head wrench. See the following example and Figure 8.

   Example: Rotating the electronics housing

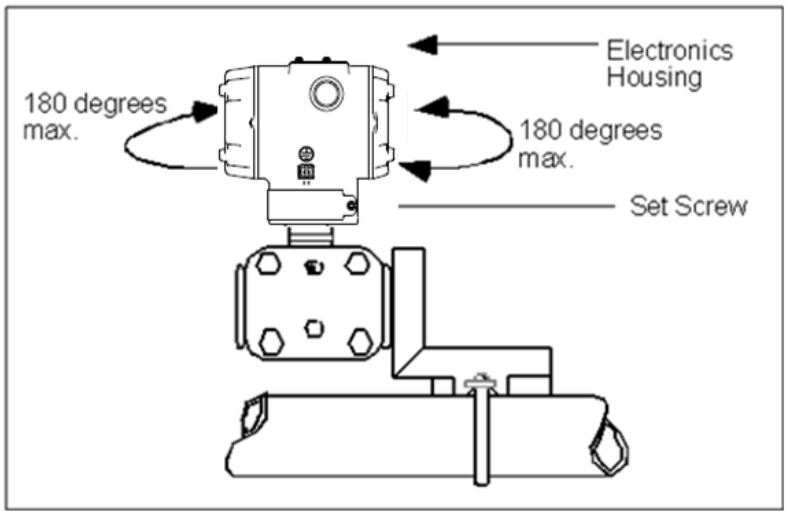


Figure 8 – ST 700 Standard Transmitter - Rotating the Electronics Housing

The mounting position of AP models STA722 and STA72L becomes critical as the transmitter spans become smaller. A maximum zero shift of 2.5mmHg for these models can result from a mounting position that is rotated 90o from the vertical.
A typical zero-shift of 0.12mmHg or 0.20 inH_2O can occur for a five (5)-degree rotation from the vertical.

4.4.5 Mounting Transmitters with Small Absolute or Differential Pressure Spans

To minimize positional effects on calibration (zero shift), take the appropriate mounting precautions for the respective transmitter model. Ensure that the transmitter is vertical when mounting models STA722 and STA72L. You do this by leveling the transmitter side-to-side and front-to-back. **Figure 9** shows how to level a transmitter using a spirit level.

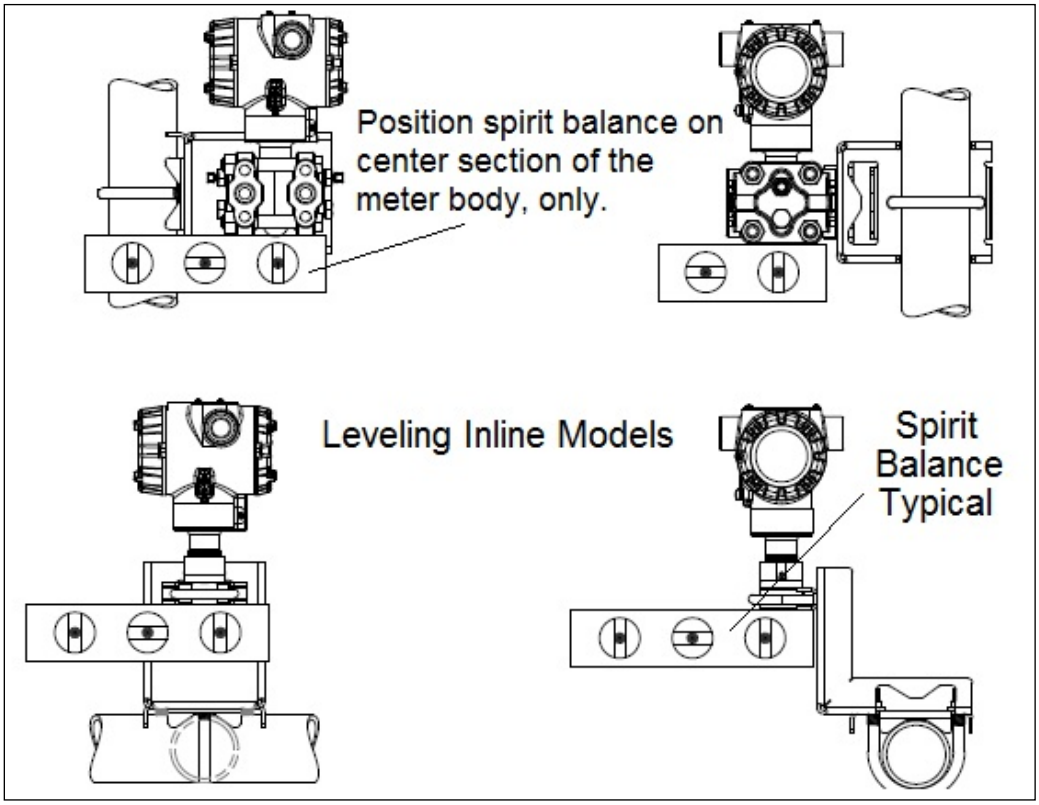


Figure 9 – ST 700 Standard Transmitter - Using a Spirit Balance to Level a Transmitter

4.4.6 Flange Mounting

Figure 10 shows a typical tank-flange mount installation, with the transmitter flange mounted to the pipe on the wall of the tank.

On insulated tanks, remove enough insulaiton to accommodate the flange extension.

When flange-mounting to a tank, note the following:

- The End User is responsible for providing a flange gasket and mounting hardware suitable for the transmitter service conditions.
- To avoid degrading performance in flush-mounted flanged transmitters, exercise care to ensure that the internal diameter of the flange gasket does not obstruct the sensing diaphragm.
- To prevent performance degradation in extended-mount flanged transmitters, ensure that sufficient clearance exists in front of the sensing diaphragm body.

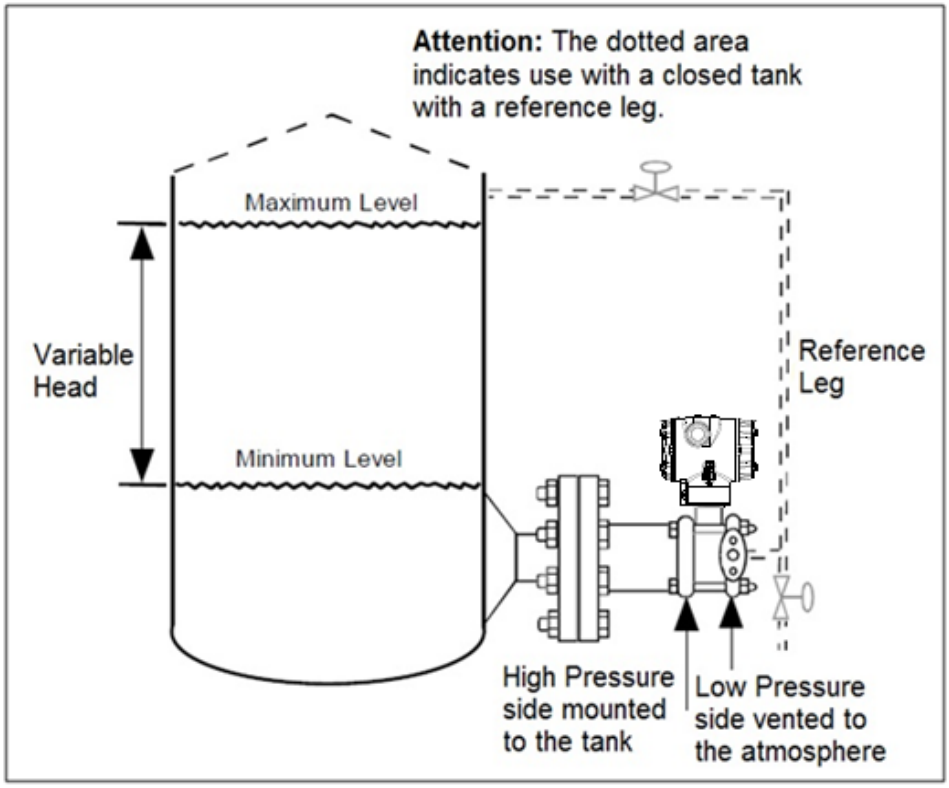


Figure 10 – ST 700 Standard Transmitter - Tank-Flange Mounted Transmitter

4.4.7 Remote Diaphragm Seal Mounting Information

The combination of tank vacuum and high pressure capillary head effect should not exceed nine (9) psi (300mmHg) absolute. For insulated tanks, be sure to remove enough insulation to accommodate the flange extension. The end user is responsible for supplying a flange gasket and mounting hardware suitable for the service condition of the transmitter.

Mount the transmitter flanges within the limits in **Table 6** for the fill fluid in the capillary tubes, with a tank at one (1) atmosphere.

Table 6 – ST 700 Standard Transmitter - Flange Mounting Guidelines

Fill Fluid	Mount the Flange…
Silicone 200 Oil	≤22 feet (6.7 meters) below the transmitter
Chlorotrifluorethylene (CTFE)	≤11 feet (3.4 meters) below the transmitter

Refer to Figure 11 for a representative remote diaphragm seal installation. Mount the transmitter at a remote distance determined by the length of the capillary tubing.

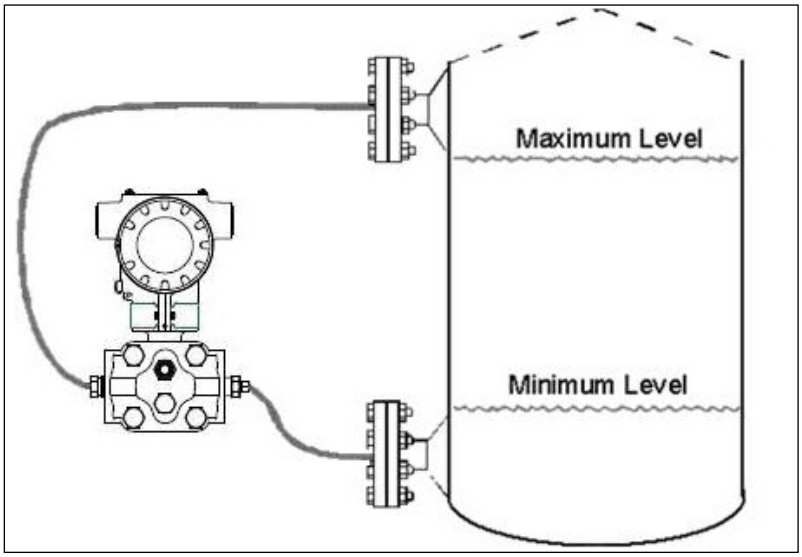


Figure 11 – ST 700 Standard Transmitter - Representative Remote Diaphragm Seal Transmitter Installation

Depending on transmitter model, connect the remote seal to the tank according to Table 7.

Table 7 – ST 700 Standard Transmitter - Remote Diaphragm Mounting Details

Transmitter Model	Connect the Remote Seal on ….	
	Variable Head	Fixed or Constant Head
STR73D	Transmitter High Pressure (HP) Side to tank wall lower flange mounting.	Transmitter Low Pressure (LP) side to tank wall upper flange.

4.5 Piping the ST 700 Standard Transmitter

4.5.1 Piping Arrangements

Piping arrangements vary depending upon process measurement requirements and the transmitter model. For example, a differential pressure transmitter comes with double-ended process heads with ¼-inch NPT connections, which can be modified to accept ½-inch NPT through optional flange adapters. Gauge pressure transmitters are available with various connections for direct mounting to a process pipe.

A ½-inch, schedule 80, steel pipe is commonly used for transmitter integration into a process system. Many piping arrangements use a three-valve manifold to connect the process piping to the transmitter. A manifold makes it easy to install and remove or re-zero a transmitter without interrupting the process. A manifold also accommodates the installation of blow-down valves to clear debris from pressure lines. Figure 12 represents a typical piping arrangement using a three-valve manifold and blow-down lines for a differential pressure transmitter being used to measure flow.

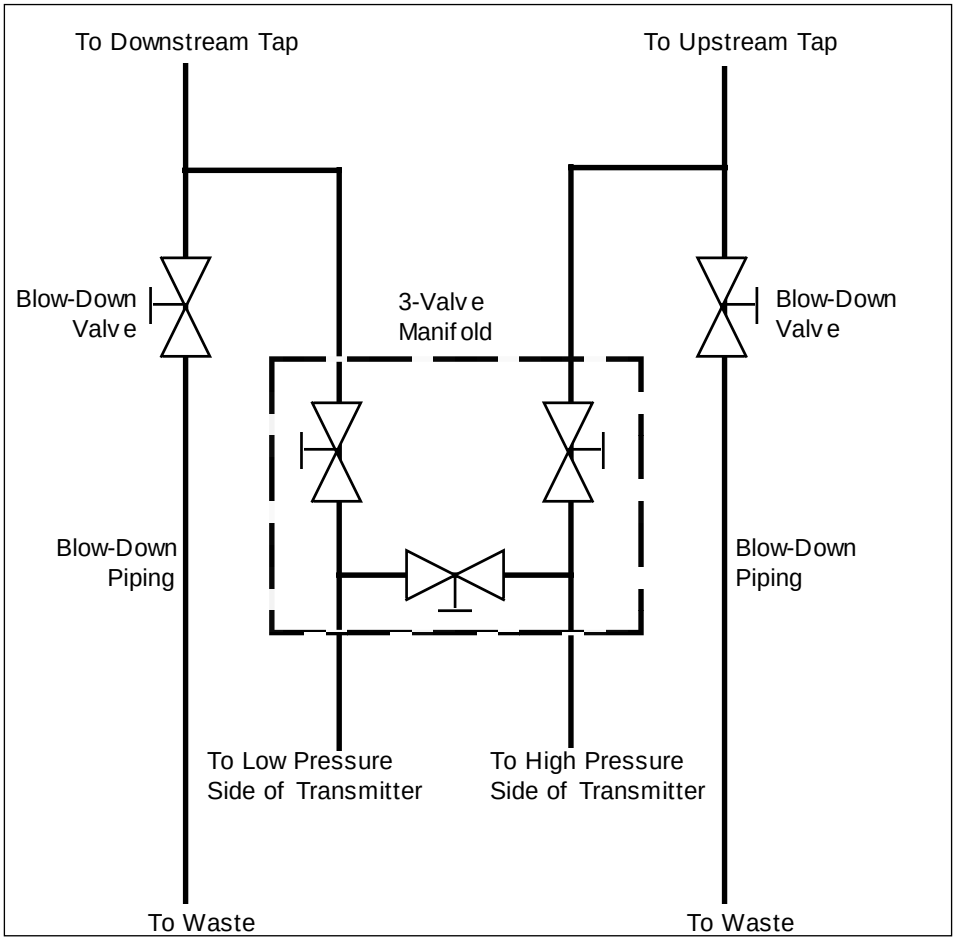


Figure 12 – ST 700 Standard Transmitter - Typical 3-Valve Manifold with Blow-Down Piping

4.5.2 Transmitter Location

The following are suggested connections based on what is being processed by the system.

Table 8 – ST 700 Standard Transmitter - Suggested Connection Locations

Process	Suggested Location	Description
Gases	Above the gas line.	The condensate drains away from the transmitter.
Liquids	Below but near the elevation of the process connection.	This minimizes that static head effect of the condensate.
	Level with or above the process connection.	This requires a siphon to protect thetransmitter from process steam. The siphon retains water as a *fill fluid*.

1. For liquid or steam, the piping should slope a minimum of 25.4mm (1 inch) per 305mm (1 foot).
2. Slope the piping down toward the transmitter if it is below the process connection to allow the bubbles to rise back into the piping through the liquid.
3. If the transmitter is located above the process connection, the piping should rise vertically above the transmitter. In this case, slope down toward the flow line with a vent valve at the high point.
4. For gas measurement, use a condensate leg and drain at the low point (freeze protection may be required here).

ATTENTION Care must be taken when installing transmitters on hot processes. The operating temperature limits for the device (as outlined in Table 5) must not be exceeded. Impulse piping may be used to reduce the temperature of the process that comes into contact with the transmitter meter body. As a general rule there is a 56°C drop (100°F) in the temperature of the process for every foot of ½ inch uninsulated piping.

4.5.3 General Piping Guidelines

- When measuring fluids that contain suspended solids, install permanent valves at regular intervals to blow-down piping.
- Blow-down all lines on new installations with compressed air or steam, and flush them with process fluids (where possible) before connecting these lines to the transmitter Meter body.
- Verify that the valves in the blow-down lines are closed tightly after the initial blow-down procedure and each maintenance procedure thereafter.

4.5.4 Procedure to Install Flange Adapters

The following procedure provides the steps for removing and replacing an optional flange adapter on the process head. Refer to Figure 13.

This procedure does not require that the meter body be removed from the electronics housing. If flange adapters are being replaced with parts from other kits (for example, process heads), follow the procedures for the kits and incorporate the following procedure.

The threaded hole in each flange adapter is offset from center. To ensure proper orientation for re-assembly, note the orientation of the offset relative to each process head **before removing the adapter**.

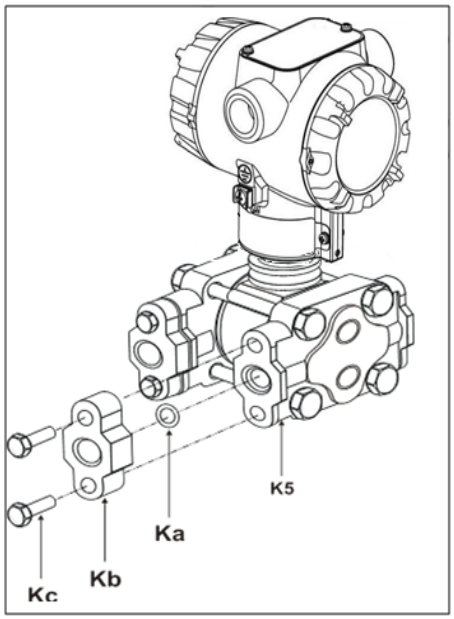


Figure 13 – ST 700 Standard Transmitter - Flange Adapter Removal and Replacement

Refer to the instructions included with the kit for removal and replacement procedures.

4.6 Wiring the ST 700 Standard Transmitter

4.6.1 Overview

The transmitter is designed to operate in a two-wire power/current loop with loop resistance and power supply voltage within the operating range shown in Figure 14.

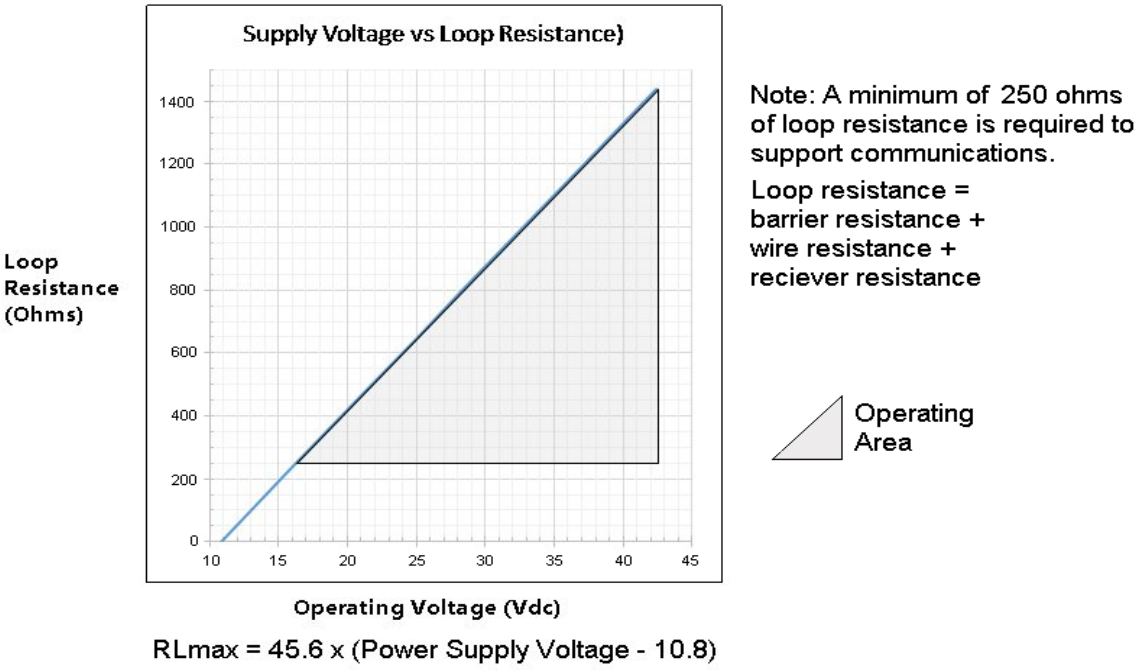


Figure 14 – ST 700 Standard Transmitter - Operating Ranges

Loop wiring is connected to the transmitter by simply attaching the positive (+) and negative (–) loop wires to the positive (+) and negative (–) terminals on the transmitter terminal block in the electronics housing shown in Figure 15.

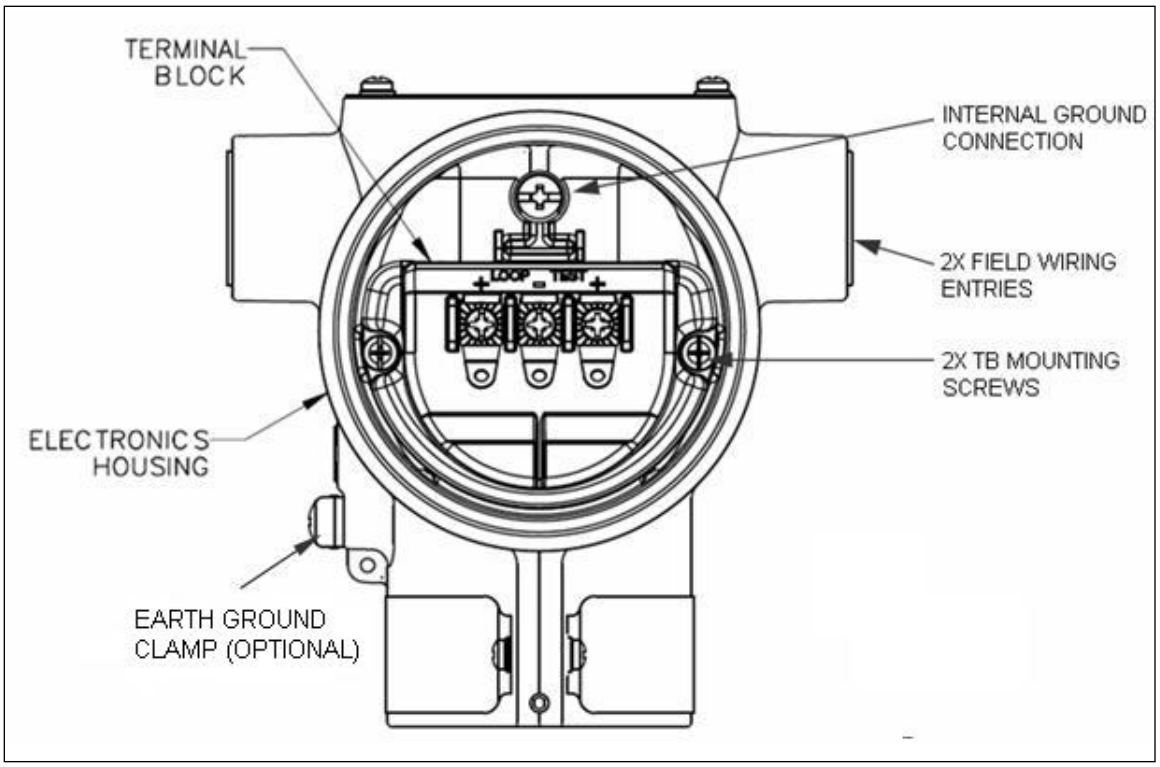


Figure 15 – ST 700 Standard Transmitter - 3-Screw Terminal Board and Grounding Screw

As shown in Figure 15, each transmitter has an internal terminal to connect it to earth ground. Optionally, a ground terminal can be added to the outside of the electronics housing. While it is not necessary to ground the transmitter for proper operation, doing so tends to minimize the possible effects of noise on the output signal and affords protection against lightning and static discharge. An optional lightning terminal block can be installed in place of the non-lightning terminal block for transmitters that will be installed in an area that is highly susceptible to lightning strikes.

Wiring must comply with local codes, regulations and ordinances. Grounding may be required to meet various approval body certification, for example CE conformity. Refer to Appendix A of this document for details.

Note: The right hand terminal is for loop test and is not applicable for the Fieldbus option.

The transmitter is designed to operate in a two-wire power/current loop with loop resistance and power supply voltage within the operating range; see Figure 14.
With optional lightning protection and/or a remote meter, the voltage drop for these options must be added to the basic 10.8-volt supply requirements to determine the required transmitter voltage (V_{XMTR}) and maximum loop resistance ($R_{LOOP\ MAX}$). Additional consideration is required when selecting intrinsic safety barriers to ensure that they will supply at least minimum transmitter voltage ($V_{XMTR\ MIN}$), including the required 250 ohms of resistance (typically within the barriers) needed for digital communications.

Transmitter loop parameters are as follows:
$R_{LOOP\ MAX}$ = maximum loop resistance (barriers plus wiring) that will allow proper Transmitter operation and is calculated as $R_{LOOP\ MAX} = (V_{SUPPLY\ MIN} - V_{XMTR\ MIN}) \div 21.8mA$.

In this calculation:

$V_{XMTR\ MIN} = 10.8V + V_{LP} + V_{SM}$
$V_{LP} = 1.1V$, lightning protection option, LP
$V_{SM} = 2.3V$, remote meter

Note that V_{SM} should only be considered if a remote meter will be connected to the transmitter.
The positive and negative loop wires are connected to the positive (+) and negative (–) terminals on the terminal block in the transmitter electronics housing.

Barriers can be installed per Honeywell's instructions for transmitters to be used in intrinsically safe applications.

4.6.2 Digital System Integration Information

Transmitters that are to be digitally integrated to Honeywell's Total Plant Solution (TPS) system will be connected to the pressure transmitter interface module in the Process Manager, Advanced Process Manager or High Performance Process Manager through a Field Termination Assembly. Details about the TPS system connections are given in the *PM/APM SmartLine Transmitter Integration Manual*, PM12-410, which is part of the TDC 3000^X system bookset.

If you are digitally integrating a transmitter in an Allen Bradley Programmable Logic Controller (PLC) process system, the same Field Terminal Assembly (FTA) and wiring procedures used with Honeywell's TPS system are also used with the Allen-Bradley 1771 and 1746 platforms.

4.6.3 Wiring Variations

The above procedures are used to connect power to a transmitter. For loop wiring and external wiring, detailed drawings are provided for transmitter installation in non-intrinsically safe areas and for intrinsically safe loops in hazardous area locations.

If you are using the transmitter with Honeywell's TPS system, see *PM/APM Smartline Transmitter Integration Manual*, PM12-410, which is part of the TDC 3000^X system bookset.

4.6.4 Wiring Procedure

1. See Figure 15, above, for parts locations. Loosen the end cap lock using a 1.5mm Allen wrench.
2. Remove the end cap cover from the terminal block end of the electronics housing.
3. Feed loop power leads through one end of the conduit entrances on either side of the electronics housing. The transmitter accepts up to 16AWG wire.
4. Plug the unused conduit entrance with the appropriate plug for the environment.
5. Connect the positive loop power lead to the positive (+) terminal and the negative loop power lead to the negative (-) terminal. Note that the transmitter is not polarity-sensitive.
6. Replace the end cap, and secure it in place.

4.6.5 Lightning Protection

If your transmitter includes the optional lightning protection, connect a wire from the Earth Ground Clamp (see Figure 15) to Earth Ground to make the protection effective. Use a size 8 AWG or ($8.37mm^2$) bare or green covered wire for this connection.

4.6.6 Supply Voltage Limiting Requirements

If your transmitter complies with the ATEX 4 directive for self-declared approval per 94/9EC, the power supply has to include a voltage-limiting device. Voltage must be limited such that it does not exceed 42V DC. Consult the process design system documentation for specifics.

4.6.7 Process Sealing

The ST 700 SmartLine pressure transmitter is CSA-certified as a Dual Seal device in accordance with ANSI/ISA–12.27.01–2003, "Requirements for Process Sealing Between Electrical Systems and Flammable, or Combustible Process Fluids."

4.6.8 Explosion-Proof Conduit Seal

When installed as explosion proof in a Division 1 Hazardous Location, keep covers tight while the transmitter is energized. Disconnect power to the transmitter in the non-hazardous area prior to removing end caps for service.

When installed as non-incendive equipment in a Division 2 hazardous location, disconnect power to the transmitter in the non-hazardous area, or determine that the location is non-hazardous before disconnecting or connecting the transmitter wires.

Transmitters installed as explosion proof in Class I, Division 1, Group A Hazardous (classified) locations in accordance with ANSI/NFPA 70, the US National Electrical Code, with 1/2 inch conduit do not require an explosion-proof seal for installation. If 3/4 inch conduit is used, a LISTED explosion-proof seal to be installed in the conduit, within 18 inches (457.2mm) of the transmitter.

4.7 Startup – ST 700 Standard Transmitter

4.7.1 Overview

This section identifies typical start up tasks associated with several generic pressure measurement applications. It also includes the procedure for running an optional analog output check.

4.7.2 Startup Tasks

After completing the installation and configuration tasks for a transmitter, you are ready to start up the process loop. Startup usually includes:

- Checking zero input
- Reading inputs and outputs
- Applying process pressure to the transmitter.

You can also run an optional output check to *wring out* an analog loop and check out individual Process Variable (PV) outputs in Digitally Enhanced (DE) mode before startup.

The actual steps in a startup procedure vary based on the type of transmitter and the measurement application. In general, the procedures in this section are based on using Honeywell MC Toolkit to check the transmitter input and output under static process conditions, and make adjustments as required initiating full operation with the running process. Note that similar checks can be made using the optional three-button assembly, where the transmitter is equipped. Operation with the three-button assembly is discussed in the Operation section.

When the standard display is connected, the two-button assembly for the standard display is present. The buttons will function 1 second after powering up.

4.7.3 Output Check Procedures

The Output Check comprises the following procedures:

- The loop test procedure checks for continuity and the condition of components in the output current loop.
- The Trim DAC Current procedure calibrates the output of the Digital-to-Analog converter for minimum (0%) and maximum (100%) values of 4mA and 20mA, respectively. This procedure is used for transmitters operating online in analog mode to ensure proper operation with associated circuit components (for example, wiring, power supply, control equipment). Precision test equipment (an ammeter or a voltmeter in parallel with precision resistor) is required for the Trim DAC Current procedure.
- The Apply Values procedure uses actual Process Variable (PV) input levels for calibrating the range of a transmitter. To measure a liquid level for example, a sight-glass can be used to determine the minimum (0%) and maximum (100%) level in a vessel. The PV is carefully adjusted to stable minimum and maximum levels, and the LRV and URV are then set by commands from the MC Toolkit.

The transmitter does not measure the given PV input or update the PV output while it operates in the Output mode.

4.7.4 Constant Current Source Mode Procedure

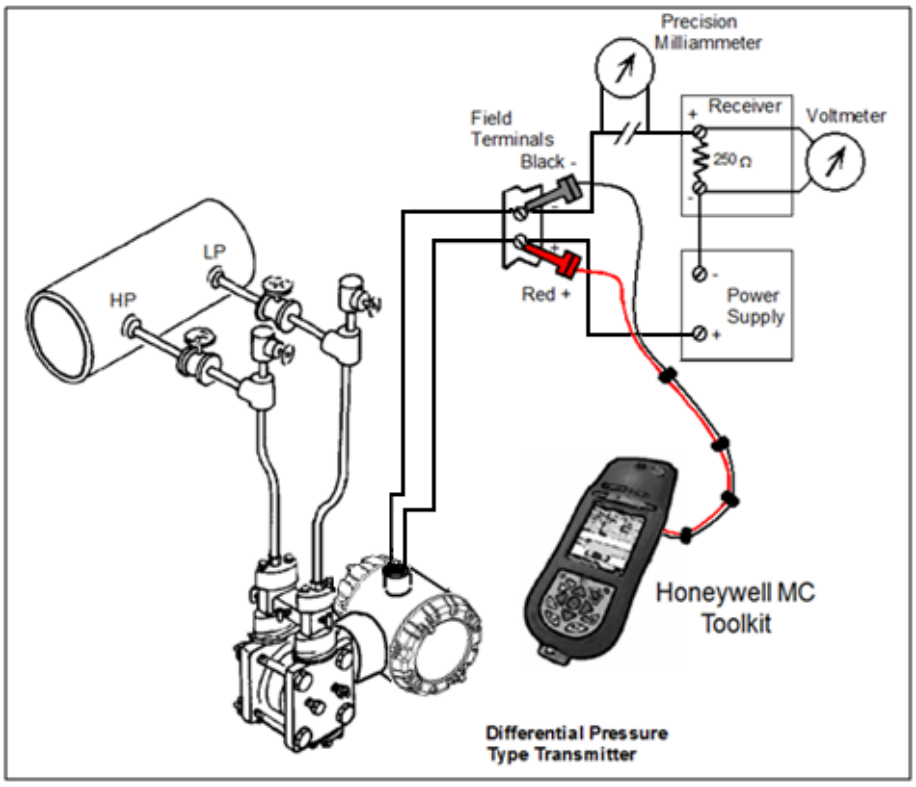


Figure 16 – ST 700 Standard Transmitter - Current Loop Test Connections

1. Refer to Figure 16 for test connections. Verify the integrity of electrical components in the output current loop.
2. Establish communication with the transmitter. For these procedures, the values of components in the current loop are not critical if they support reliable communication between the transmitter and the Toolkit.
3. On the Toolkit, display the **Output Calibration** box.
4. In the Output Calibration box, select the **Loop Test** button; the **LOOP TEST** box will be displayed.
5. Select the desired constant-level Output: 0%, 100%, or Other (any between 0% - 100%).
6. Select the Set button. A box will be displayed asking **Are you sure you want to place the transmitter in output mode?**

With the transmitter in Analog mode, you can observe the output on an externally-connected meter or on a local meter. In DE mode, you can observe the output on the local meter or on the Toolkit Monitor display.

7. Select the **Yes** button. Observe the output current at the percentage you selected in Step 5.
8. To view the monitor display, navigate back from the **LOOP TEST** display, and select the **MONITOR** display. A **Confirm** popup will be displayed.
9. Select **Yes** to continue. This concludes the Startup procedure.

5. Operation_ST 700 Standard Transmitter

5.1 Overview

This section provides the information and processes involved for both Digitally Enhanced (DE) and HART operation using the three-button basic and two-button standard options for the ST 700 standard transmitter.

5.2 Three-Button Operation

The ST 700 standrad transmitter has optional three-button interface that provides a user interface and operation capability without opening the transmitter. Figure 17 shows the location of the three-button option and the labels for each button.

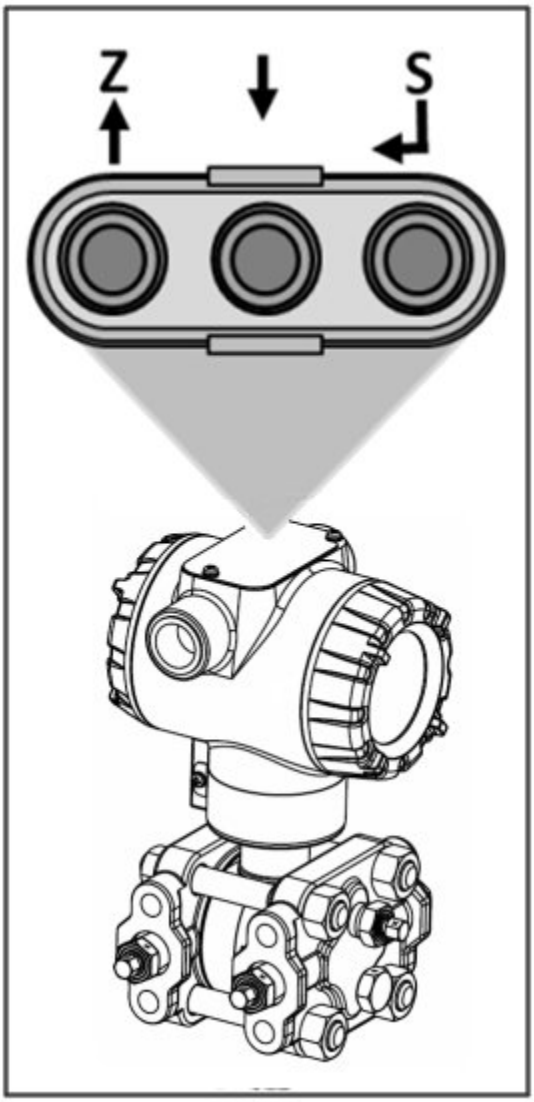


Figure 17 – ST 700 Standard Transmitter - Three-Button Option

Table 9 – Three-Button Option Functions

Physical Button	Basic Display	Action
Left ↑	Increment Previous menu Item	Scroll to previous menu item in an active list. Scroll through alphanumeric list to desired character (ex. for entering Tag names or numeric values)
Center ↓	Decrement Next menu Item	Scroll to next menu item in an active list. Scroll through alphanumeric list to desired character (ex. for entering Tag names or numeric values)
Right ↵	Select displayed menu item for activation or editing	Call up the main menu. Select an item for data entry. Confirm a data entry operation Activate the service associated with a selected menu item.

5.2.1 The Basic Display Menu

The basic display menu is implemented as one long single-level menu and will "wrap around" when it reaches the start or end of the menu. Operation is as follows:

Press the ↵ button to call up the menu.

1. Select **<Exit Menu>** and press ↵ to exit the menu.
2. Use the ↑ and ↓ buttons to scroll through the list of menu items.
3. Press the ↵ button to select an item for data entry or activation. When an item is selected for data entry or activation, the cursor will jump to the lower line of the LCD to allow editing of the value. No action is taken against a menu item until the user presses the ↵ button.
4. If you want to abort a data entry operation, simply refrain from pushing any buttons for 10 seconds; the data entry operation will time out and the original value of the selected item will be preserved.

Table 10 – The Basic Display Menus

Menu	Submenu/Selection/ Value Entry	Description		Action
LCD Contrast	»»»»»»	Adjust the LCD contrast level. Range from » (1) to »»»»»»»»»»» (9) Default: »»»»»»»»»(7)		Press ↵ to enter menu selection ↑ and ↓ to select level. ↵ to enter
PV Display	Pressure	Pressure Units	Select Process Variable (PV) to be shown on the display from list.	
	Percent Output	%		
	Loop Output	mA		
PV Decimal	None	Select the PV decimal resolution to be shown on selected screen from list.		
	X.X			
	X.XX			
	X.XXX			
Pressure Units	atm, bar ftH2O @ 68ºF gf/cm2 inH2O @ 39ºF inH2O @ 60ºF inH2O @ 68ºF inHg @ 0ºC kgf/cm2, kPa mbar, mmH2O @ 4ºC, mmH2O @ 68ºF, mmHg @ 0ºC, MPa, Pa, psi Torr, mHg @ 0ºC cmH2O@4DegC mH2O@4DegC	Choose appropriate engineering units from list		
Zero Correct	Do Correct	Executing this selection corrects the Zero based on the input pressure		Press ↵ to enter menu selection Press ↵ to initiate action
LRV Correct	Do Correct	Executing this selection corrects the LRV based on the input pressure		
URV Correct	Do Correct	Executing this selection corrects the URV based on the input pressure		
Reset Corrects	Do Correct	Executing this selection Resets the Zero, LRV, and URV Corrects back to Factory values		
DAC Zero Trim Note: Loop must be removed from Automatic Control	DAC Zero Trim	This selection allows the loop zero output 4mA value to be trimmed. Note: You must connect a current meter to the transmitter to monitor the loop output.		Press ↵ to enter menu selection ↑ and ↓ to select number. ↵ to enter and shift to the next digit to the right

Menu	Submenu/Selection/ Value Entry	Description	Action
DAC Span Trim Note: Loop must be removed from Automatic Control	DAC Span Trim	This selection allows the loop span output 20mA value to be trimmed. Note: You must connect a current meter to the transmitter to monitor the loop output.	Press ↵ to enter menu selection ↑ and ↓ to select number. ↵ to enter and shift to the next digit to the right
Loop Test Note: Loop must be removed from Automatic Control	Loop Test 12.000	This selection allows the user to force the DAC output to any value between 3.8 and 20.8 mA. Note: This selection will put the DAC into Fixed Output Mode, as indicated by the flashing output value. Navigation away from this menu item will return the loop to Normal (Automatic) Mode.	
LRV URV	#. ## #. ##	The limits are: 2X the Lower Range Limit (LRL) of the Meter body and 2X the Upper Range Limit (URL) of the Meter body	
Damping	#. ##	Selection applies digital filtering to suppress noise effects on the PV. The limits for this value are 0.0 to 32.0 seconds	
NAMUR	Enabled Disabled	Disabling sets the loop output and burnout levels to the Honeywell levels	Press ↵ to enter menu selection ↑ and ↓ to select from list ↵ to enter
Filter Perf	Fast SOR Standard SOR	Fast Speed of Response Standard Speed of Response	
Transfer Function (only available for DP transmitters)	Linear	The loop output of the transmitter is a linear representation of the differential pressure	Press ↵ to enter menu selection ↑ and ↓ to select Alphanumeric ↵ to enter and shift to next character to the right.
	Square Root	The loop output of the transmitter represents %Flow as defined by the DP Square Root flow equation.	

Menu	Submenu/Selection/ Value Entry	Description	Action
Flow Cutoff	Single Breakpt	Allows the user to specify a single breakpoint as the low flow cutoff point. This item is only available when the Transfer Function is set to Square Root.	
	Dual Slope	Uses a dual slope formula to determine the low flow cutoff point. This item is only available when the Transfer Function is set to Square Root.	
Flow Breakpoint	##. #%	Enter the low flow cutoff point when Single Breakpt is selected. Range: 0 to 25.0 %Flow.	
Tag ID	□□□□□□□□	Enter Tag ID name up to 8 characters long. □ = any Alphanumeric value	Press ↵ to enter menu selection ↑ and ↓ to select Alphanumeric ↵ to enter and shift to next character to the right.
Device ID	Unique for each device		Read Only
PV Units	Units of transmitted PV		
Install Date	DD MM YYYY	This selection allows the user to enter the date a transmitter is installed. The Install Date is entered in sequence of Day, Month, and Year, followed by the new date and the prompt Write Date to confirm the entry. **CAUTION**: The Install Date can only be written once in the life of the transmitter. You cannot erase or overwrite the Install Date once it has been written.	Press ↵ to enter menu selection ↑ and ↓ to select number ↵ to enter and shift to next digit to the right. Read Only after entered
Firmware	Display Electronics Meterbody	Menu item shows the current Firmware versions of the display, electronics module and the meter body	Read Only Parameter
Protocol	HART DE	Menu item shows the communications protocol	
Model Key		Identifies the type and range of the transmitter	Read Only Parameter
<Exit Menu>			

5.2.2 Data Entry

Data entry is performed from left to right. Select a character / digit by pressing ↑ or ↓ buttons, and then press ↵ to advance to the next character position to the right. Select the cross-hatch character ▒ to terminate the entry or if the final character is already a space character, just press **<<** again.

All numeric entries are clamped at the low or high limit if needed. You can determine the low and high limit for a parameter by selecting either the **H** or **L** character while the cursor is positioned over the left-most digit and press ↵ button. The display will show the selected limit.

Table 11 – Three-Button Data Entry

Screen Symbol	Numeric data entry	Text entry
H	Display the high limit for this parameter. This symbol only appears in the left-most position of the data entry field.	Not Available
L	Display the low limit for this parameter. This symbol only appears in the left-most position of the data entry field.	Not Available
<<	Terminate the numeric entry	Terminate the text entry
0 thru 9, Minus, Decimal	These characters are used to enter numeric values. The minus sign only appears in the left-most digit.	These characters can be used to enter the Tag ID

5.2.3 Editing a Numeric value

Editing of a numeric value is a digit-by-digit process, starting with the left-most digit.

1. Press ↵ to begin the edit process.
2. The basic display will show the current value of the item on the lower line, left justified. The
3. Press the ↑ or ↓ buttons to select the desired digit, and then press ↵ to advance to the next digit to the right.
4. After the last digit has been entered, press ↵ one more time to write the new value to the transmitter.

5.2.4 Selecting a new setting from a list of choices

Use the procedure described below to select a new setting for parameters that present a list of choices (e.g., PV Display, Pressure Units, etc.).

1. Press ↵ to begin the edit process.
    a. The basic display will show the current setting of the item on the lower line, left justified.
2. Press the ↑ or ↓ buttons to scroll through the list of choices.

Press ↵ to make your selection. The new selection will be stored in the transmitter and will be displayed on the lower line, right justified.

5.3 Two-Button Operation

The ST 700 standrad transmitter has an optional two-button interface that provides an user interface that supports in both English and Russian Language and operation capability without opening the transmitter. Figure 18 shows the location of the two-button option and the labels for the buttons.

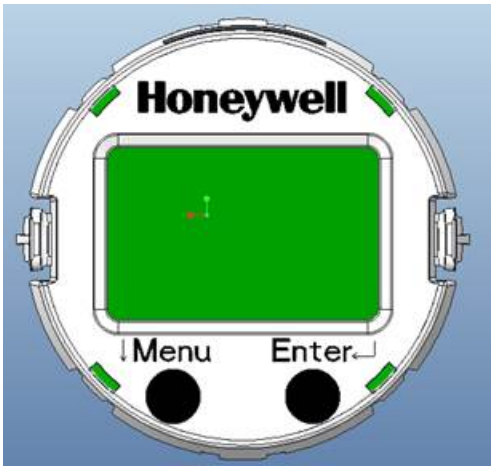


Figure 18 – ST 700 Standard Transmitter - Two-Button Option

5.3.1 The Standard Display Menu

The standard display menu is implemented as one long single-level menu, after entering into menu mode, and will "wrap around" when it reaches the end of the menu. To enter menu mode select ↵ in PV display mode. Operation is as follows:

1. Select <**Exit Menu**> and press ↵ to exit the menu.
2. Use the ↓ buttons to scroll through the list of menu items.
3. Press the ↵ button to select an item in menu mode for data entry or activation. When an item is selected for data entry or activation, the cursor will jump to the lower line of the LCD to allow editing of the value. No action is taken against a menu item until the user presses the ↵ button.
4. If you want to abort a data entry operation, simply refrain from pushing any buttons for more than 10 seconds; the data entry operation will time out and the original value of the selected item will be preserved.
5. If you want to abort a menu operation, simply refrain from pushing any buttons for more than 60 seconds; the menu operation will time out and the exit from menu & it will show PV value.

The menu is divided into standard menu and extended menu which can be enabled and disabled by extended menu enable/disable operation.

Note: The abort option is not available for Loop test parameter. The timeout for the DAC trim operation is more to enable user to calculate the loop current value to enter.

Table 12 – ST 700 Basic Transmitter: Standard Display Menus

Menu	Submenu/Selection/Value Entry		Description	Action
PV Display [1SEL PV]	Pressure (PRESURE)	Pressure Units	Select Process Variable (PV) to be shown on the display from list.	Press ↵ to enter Menu Mode
	Percent Output (% OUT)	%		
	Loop Output (LOOPOUT)	mA		
	Flow (FLOW) Note: Before seleting PV type as Flow, please ensure the LRV/URV values in (pressure unit) are as per application. For PV type Flow the pressure unit will not be visible.	Flow unit		
Pressure Units [2UNITS] (Visible for all PV except Flow)	Atm bar ftH2O68F gf/cm2 inH2O39F inH2O60F inH2O68F inHg0C kgf/cm2 kPa mbar mmH2O4C mmH2O68F mmHg0C MPa Pa psi Torr mH2O4C cmH2O4C	Choose appropriate engineering units from list		Press ↵ to enter menu selection Press ↵ to initiate action Press ↓Menu to Exit to Menu

Menu	Submenu/Selection/ Value Entry	Description	Action
Flow Units [3FLUNIT]	Cubic meter/hour[m3/hr] Kg/hour [Kg/hr] Metric Ton/hour [MT/hr] Liter per second [L/sec] Liters/hour [L/hr] Standard Cubic feet per hour[SCFH] Cubic feet per hour[CFH] Gallons/hour[gal/hr] Barrel/hour [bbl/hr] Imperial Gallons/hour[Igal/hr] Percentage [%] Standard Cubic Feet per day[SCFD] Gallons/min[gal/min] Pounds/hour[lb/hr] Pounds/min[lb/min] Standard Cubic feet per minute[SCFM] Metric standard Cubic Feet per hour[MSCFH] Million Metric Standard Cubic feet per hour[MMSCFH]	Choose appropriate engineering units from list	Press ↵ to enter Menu Mode Press ↵ to enter menu selection Press ↵ to initiate action Press ↓Menu to Exit to Menu
Scaling Low [4SCLLOW] Scaling High [5SCLHIG]	#. ## #. ##	The limits are: -999999 to 999999	Press ↵ to enter Menu Mode Press ↵ to enter menu selection ↓ Menu to select number. ↵ to enter and shift to the next digit to the right After complete value is Entered Press ↓Menu to Exit to Menu
Enter LRV [6ENTLRV] Enter URV [7ENTURV]	#. ## #. ##	The limits are: 2X the Lower Range Limit (LRL) of the Meter body and 2X the Upper Range Limit (URL) of the Meter body. The LRV/URV value will be available in Pressure Units (Standard display pressure unit)	
Zero Correct [8SETZRO]	Zero Correct	Executing this selection performing for Zero Correct operation	

Table 13 – ST 700 Basic Transmitter - Extended Display Menu

Menu	Submenu/Selection/ Value Entry	Description	Action
DAC Zero Trim [9ZEROTR] Note: Loop must be removed from Automatic Control	DAC Zero Trim	This selection allows the loop zero output 4mA value to be trimmed. Note: You must connect a current meter to the transmitter to monitor the loop output.	Press ↵ to enter Menu Mode Press ↵ to enter menu selection ↓ Menu to select number. ↵ to enter and shift to the next digit to the right After complete value is Entered Press ↓Menu to Exit to Menu
DAC Span Trim [10SPANTR] Note: Loop must be removed from Automatic Control	DAC Span Trim	This selection allows the loop span output 20mA value to be trimmed. Note: You must connect a current meter to the transmitter to monitor the loop output.	
Loop Test [11LPTEST] Note: Loop must be removed from Automatic Control	Loop Test 12.000	This selection allows the user to force the DAC output to any value between 3.8 and 20.8 mA. Note: This selection will put the DAC into Fixed Output Mode, as indicated by the flashing output value. Navigation away from this menu item will return the loop to Normal (Automatic) Mode.	
Set LRV [12SETLRV]	Set LRV	Executing this selection performing for Zero operation.	Press ↵ toto Enter the Menu Mode Press ↵ to enter Menu selection Menu to Enable or disable the Extended Menu ↵ to Enter Press ↓Menu to Exit to Menu
Set URV [13SETURV]	Set URV	Executing this selection for Span operation	
Contrast [14CNTRST]	»»»»»»	Adjust the LCD contrast level. Range from » (1) to »»»»»»»»»»» (7) Default: »»»»»»»»»(7)	
Enable Extended Menu [EXDMNU]	Enable/Disable	Enable the extended menu.The default is disabled	
	Exit Menu		

5.3.2 Standard Display Abbreviations:

Table 14 – ST 700 Basic Transmitter - The Standard Display abbreviations

Abbreviation	Meaning
OOR	Out of Range
PRSPAN	Push reduce span
Wrng Mo	Wrong Mode
Illegal	Illegal Value
Wrt Err	NVM write error
Too Hi	Value/Parameter Too High
Too Lo	Value/Parameter Too Low
LRV Hi	LRV too High
LRV Lo	LRV too Low
LargeSP	Span too large
SmallSP	Span too small
Locked	Device is locked
Multidr	Device in multidrop mode
Wrt Prt	Device in write protect mode
NotSprt	Not supported
Hi LMT	Value is greater than high Limit value
Low LMT	Value is less than low Limit value

5.3.3 Data Entry

Data entry is performed from left to right. Select a character / digit by pressing ↓ buttons, and then press ↵ to advance to the next character position to the right. Select the cross-hatch character ▒ to terminate the entry or if the final character is already a space character, just press **<<** again.

All numeric entries are clamped at the low or high limit if needed. You can determine the low and high limit for a parameter by selecting either the **H** or **L** character while the cursor is positioned over the left-most digit and press ↵ button. The display will show the selected limit.
For numeric entry sign is required to be entered only for negative numbers. For positive number, select space and move ahead.

Table 15 –Two-Button Data Entry

Screen Symbol	Numeric data entry
H	Display the high limit for this parameter. This symbol only appears in the left-most position of the data entry field.
L	Display the low limit for this parameter. This symbol only appears in the left-most position of the data entry field.
<<	Terminate the numeric entry
0 thru 9, Minus, Decimal	These characters are used to enter numeric values. The minus sign only appears in the left-most digit.

5.3.4 Editing a Numeric value

Editing a numeric value is a digit-by-digit process, starting with the left-most digit.

1. Press ↵ to begin the edit process.
2. The standard display will show the current value of the item on the lower line, left justified.
3. Press the ↓ buttons to select the desired digit, and then press ↵ to advance to the next digit to the right.
4. After the last digit has been entered, press ↵ one more time to write the new value to the transmitter.

5.3.5 Selecting a new setting from a list of choices

Use the procedure described below to select a new setting for parameters that present a list of choices (e.g. PV display, Pressure Units, and so forth.).

1. Press ↵ to begin the edit process.
    a. The standard display will show the current setting of the item on the lower line
2. Press the ↓ buttons to scroll through the list of choices.
3. Press ↵ to make your selection. The new selection will be stored in the transmitter and will be displayed on the lower line

5.4 Basic and Standard Display Operations

After removing and connecting the standard display please wait upto 15 seconds for the device to detect the presence of display as all the processing happens in the communication board. The standard display does not have any microcntroller.

Note: If existing communication board is updated with the new firmware that supports Russian display, please make sure to use the new standard display with Russian support to avoid seeing unexpected characters on the display.

5.4.1 Editing a Numeric value

Editing of a numeric value is a digit-by-digit process, starting with the left-most digit.

1. Press ↵ to begin the edit process:
   - The basic and standard display will display the current value of the item on the lower line, left justified.
   - **Basic Display:** Press the ↑ or ↓ buttons to select the relevant digit, and then press ↵ to advance to the next digit to the right.
   - **Standard Display:** Press the ↓ button to select the relevant digit, and then press ↵ (both button simultaneously) to advance to the next digit on the right.
2. Basic and standard displays: After the last digit has been entered, press ↵ one more time to write the new value to the transmitter.

5.4.2 Selecting a new setting from a list of choices

Use the procedure described below to select a new setting for parameters that present a list of choices (e.g. PV display, Pressure Units, etc.).

1. Press ↵ to begin the edit process.
   a. The basic display will show the current setting of the item on the lower line, left justified.
2. Press the ↑ or ↓ buttons to scroll through the list of choices.

   Press ↵ to make your selection. The new selection will be stored in the transmitter and will be displayed on the lower line, right justified.

5.5 Three Button Operation with no Display Installed

When there is no display installed, the buttons can be used to perform a Zero or Span adjustment of the ST 700 standard transmitter. Caution should be taken to insure these adjustments are only made when the correct input pressures are applied.

5.5.1 Zero Adjustment

This adjustment is the same as performing a Set LRV using the display.

1. Connect a current meter or voltmeter as shown in Figure 16 to monitor the PV output of the transmitter.
2. Using an accurate pressure source, apply pressure equivalent to the transmitter LRV.
3. Press the Down (↓) and Zero (↑) buttons together to set the Zero.
4. Verify that the output is now 4 mA.

5.5.2 Span Adjustment

This adjustment is the same as performing a Set URV using the display.

1. Connect a current meter or voltmeter as shown in Figure 16 to monitor the PV output of the transmitter.
2. Using an accurate pressure source, apply pressure equivalent to the desired Upper Range Value of the transmitter.
3. Press the **Down (↓)** and **Span (↵)** buttons together to set the span.
4. Verify that the PV output is now 20mA.

You can also use the MCT 202 Toolkit to make any adjustments to an ST 700 SmartLine pressure transmitter. Alternately, certain adjustments are possible through an Experion Station or Universal Station, if the ST 700 is digitally integrated with either of these stations.

5.6 Changing the Default Failsafe Direction

Transmitters are shipped with a default failsafe direction of upscale. This means that the transmitter output will set the current output to upscale failsafe (maximum output) upon detection of a critical status. You can change the direction from upscale failsafe to downscale failsafe (minimum output) by moving the top jumper located in the electronics module.

5.6.1 DE and Analog Differences

Failsafe operation is different between DE and analog operation:

- **Analog operation** – Upscale failsafe drives the transmitter output to 21.8mA. Downscale failsafe drives the transmitter output to 3.8mA.
- **DE operation** – Upscale failsafe causes the transmitter to generate a **+ infinity** digital signal. Downscale failsafe causes the transmitter to generate a **– infinity** digital signal.

The transmitter electronics module interprets either signal as *not-a-number* and initiates its own configured failsafe action for the control system.

5.6.2 Procedure to Establish Failsafe Operation

The failsafe direction display accessible via the toolkit shows only the state of the jumper as it correlates to analog transmitter operation. Failsafe action for the DE control system may be configured to operate in a manner different from analog, as indicated by the state of the transmitter jumper.

The integrated circuits in the transmitter PWA are vunerable to damage by stray static discharges when removed from the electronics housing. Minimize the possibility of static discharge damage when handling the PWA as follows:

Do not touch terminals, connectors, component leads, or circuits when handling the PWA.

When removing or installing the PWA, handle it by its edges or bracket section only. If you need to touch the PWA circuits, be sure you are grounded by staying in contact with a grounded surface or by wearing a grounded wrist strap.

When the PWA is removed from the transmitter, put it in an electrically conductive bag, or wrap it in aluminum foil to protect it.

The following procedure outlines the steps for positioning the write protect and failsafe jumpers on the electronics module. See Figure 19 for the locations of the failsafe and write protect jumpers.

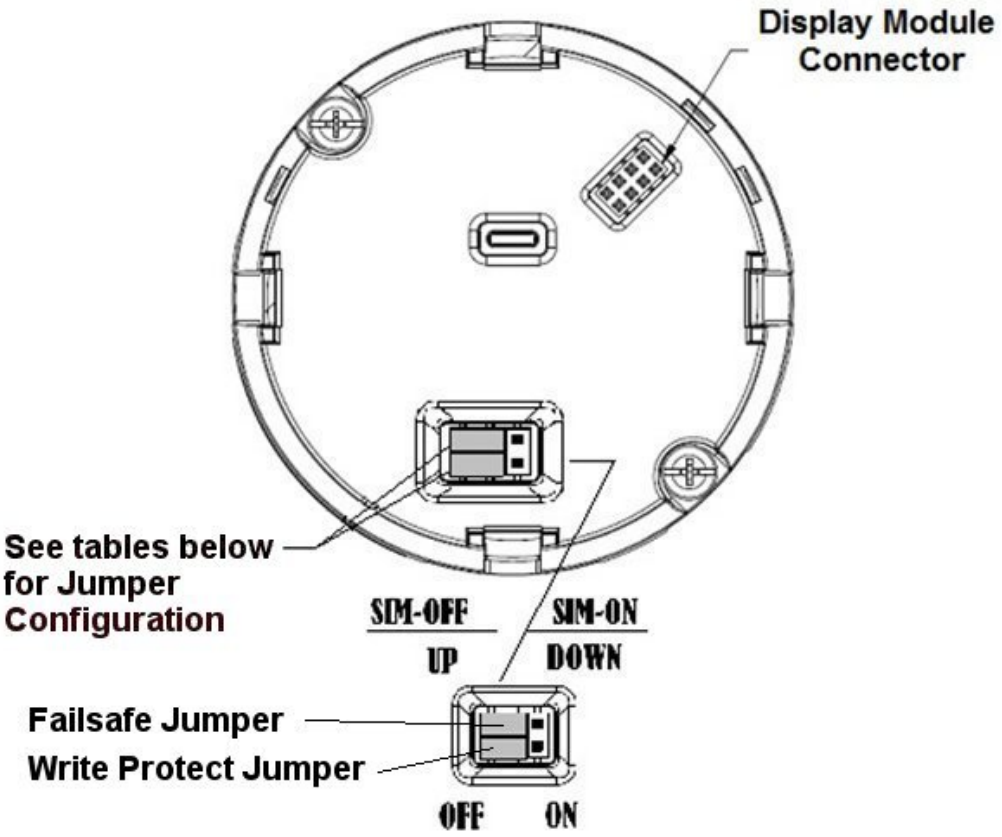


Figure 19 – ST 700 Standard Transmitter - Locating the Failsafe and Write Protect Jumpers

Table 16 – ST 700 Standard Transmitter - HART and DE Failsafe and Write Protect Jumpers

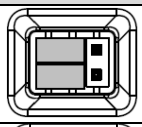
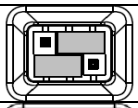
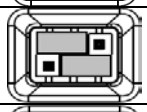
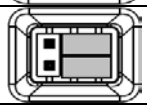
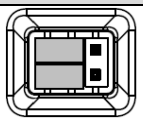
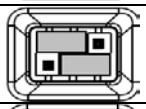
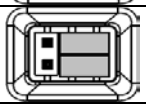
Jumper Arrangements	Description
	Failsafe = UP (High) Write Protect = OFF (Not Protected)
	Failsafe = DOWN (Low) Write Protect = OFF (Not Protected)
	Failsafe = UP (High) Write Protect = ON (Protected)
	Failsafe = Down (Low) Write Protect = On (Protected)

Table 17 – ST 700 Standard Transmitter - Fieldbus Simulation and Write Protect Jumpers

Jumper Arrangements	Description
	Fieldbus Simulation Mode = OFF Write Protect = OFF (Not Protected)
	Fieldbus Simulation Mode = OFF Write Protect = ON (Protected)
	Fieldbus SIM Mode = ON Write Protect = OFF (Not Protected)

1. Turn OFF transmitter power (Power removal is only required in accordance with area safety approvals. Power removal is only required in Class 1 Div 1 Explosionproof and Class 1 Div 2 environments).

2. Loosen the end cap lock, and unscrew the end cap from the electronics side of the transmitter housing.

3. If equipped with a display module, carefully depress the two tabs on the sides of the display module, and pull it off.

4. If necessary, unplug the interface connector from the communication module. Do not discard the connector.

5. Set the Failsafe Jumper (top jumper) to the desired position (UP or DOWN). See Table 16 and Table 17 for jumper positioning.

6. If applicable, re-install the display module as follows:

    - Orient the display as desired.
    - Install the Interface connector in the display module such that it will mate with the socket for the display in the communication module.
    - Carefully line up the display, and snap it into place. Verify that the two tabs on the sides of the display latch.

    Note: Installing a display module into a powered transmitter may cause a temporary upset to the loop output value.

    Orient the display for proper viewing through the end cap window. You can rotate the meter mounting orientation in 90° increments.

7. Restore transmitter power if removed.

5.7 Monitoring the Basic and Standard Displays for the ST 700 Standard Transmitter

This section describes the information shown on the operator screens of the basic and standard displays.

5.7.1 Basic Display_ST 700 Standard Transmitter -

Figure 20 illustrates the basic display format with Process Variable (PV).

- The PV value is user-configurable. This field has 7 characters. The maximum allowable numeric value is 9999999 or -999999. If fractional decimals are configured, the fractional positions will be dropped, as required. If the PV value exceeds the above limits, it is divided by 1000 and "K" is appended to the result, allowing a maximum value with multiplier of 999999K or -99999K.
- Process Variable Tag is user-configurable from a HART Host. This field has 14 characters.
- Engineering Units, this field is user-configurable. This field has 8 characters.

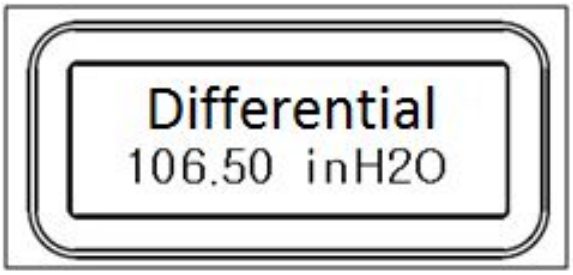


Figure 20 – ST 700 Standard Transmitter - Basic Display with Process Variable Format

5.7.2 Standard Display_ST 700 Standard Transmitter -

- The PV value is user-configurable. This field has 6 characters. The maximum allowable numeric value is 999999 or -999999.
    - If fractional decimals are configured, the fractional positions will be dropped, as required.
    - If the PV value exceeds the above limits, it is divided by 1000 and "K" is appended to the result, allowing a maximum value with multiplier of 99999K or -99999K.

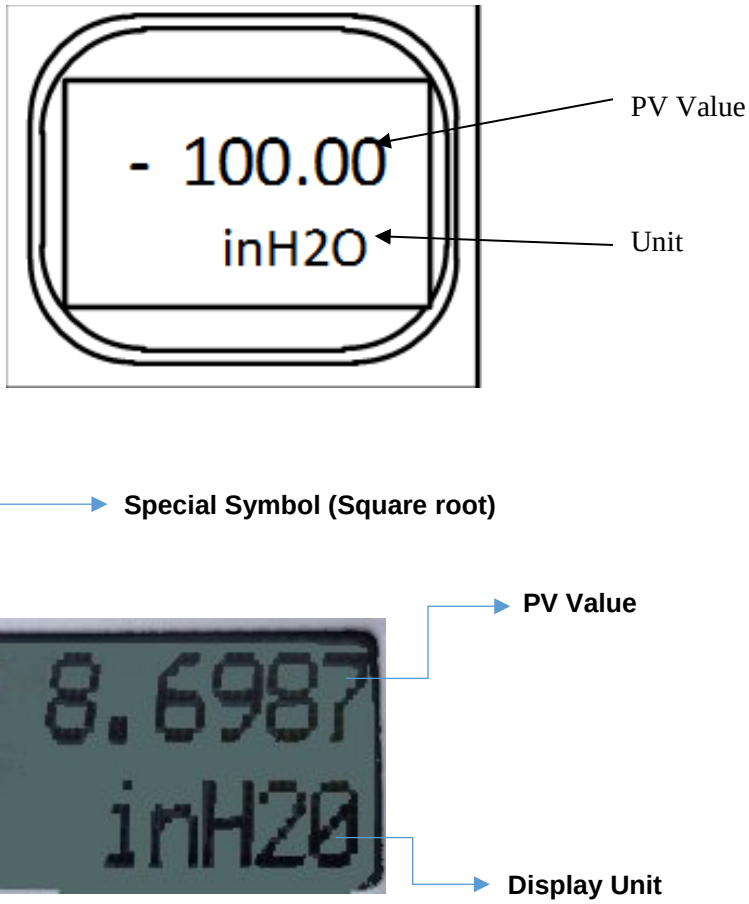


Figure 21 – ST 700 Standard Transmitter - Standard Display with Process Variable Format

6. Maintenance_ST 700 Standard Transmitter

6.1 Overview

This section provides information about preventive maintenance and replacing damaged parts. The topics covered in this section are:

- Preventive maintenance of the meter body barrier diaphragms and process piping to the transmitter.
- Replacement of damaged parts such as the transmitter Printed Wiring Assembly (PWA) and meter body

6.2 Preventive Maintenance Practices and Schedules

The ST 700 transmitter does not require any specific maintenance at regularly scheduled intervals. However, it is recommended that you perform these typical inspection and maintenance routines on a schedule that is dictated by the characteristics of the process medium and if blow-down facilities or purge systems are being used.

- Check piping for leaks.
- Clear piping of sediment or other foreign matter.
- Clean the transmitter process heads, including the barrier diaphragms.

6.3 Inspecting and Cleaning Barrier Diaphragms

Depending on the characteristics of the process medium, sediment or other foreign particles may collect in the process head cavity/chamber and cause faulty measurement. In addition, the barrier diaphragm(s) in the transmitter meter body may become coated with residue from the process medium. The latter is also true for external diaphragms on flange-mount and remote seal type transmitters.

In many cases, you can readily remove the process head(s) from the transmitter meter body to clean the process head cavity and inspect the barrier diaphragm(s). For flange-mount and remote seal diaphragms, you may only need to run a purge line in the tank to rinse off the face of the diaphragm(s).

The following procedure comprises the general steps for inspecting and cleaning barrier diaphragms. You may have to modify these steps to meet your particular process or transmitter model requirements. Figure 22 shows an exploded view of a Differential Pressure (DP) transmitter meter body for reference. For disassembly/reassembly purposes, Gauge Pressure (GP) and Absolute Pressure (AP) transmitters are similar.


It is recommended that you remove the transmitter from service and move it to a clean area before disassembling it.

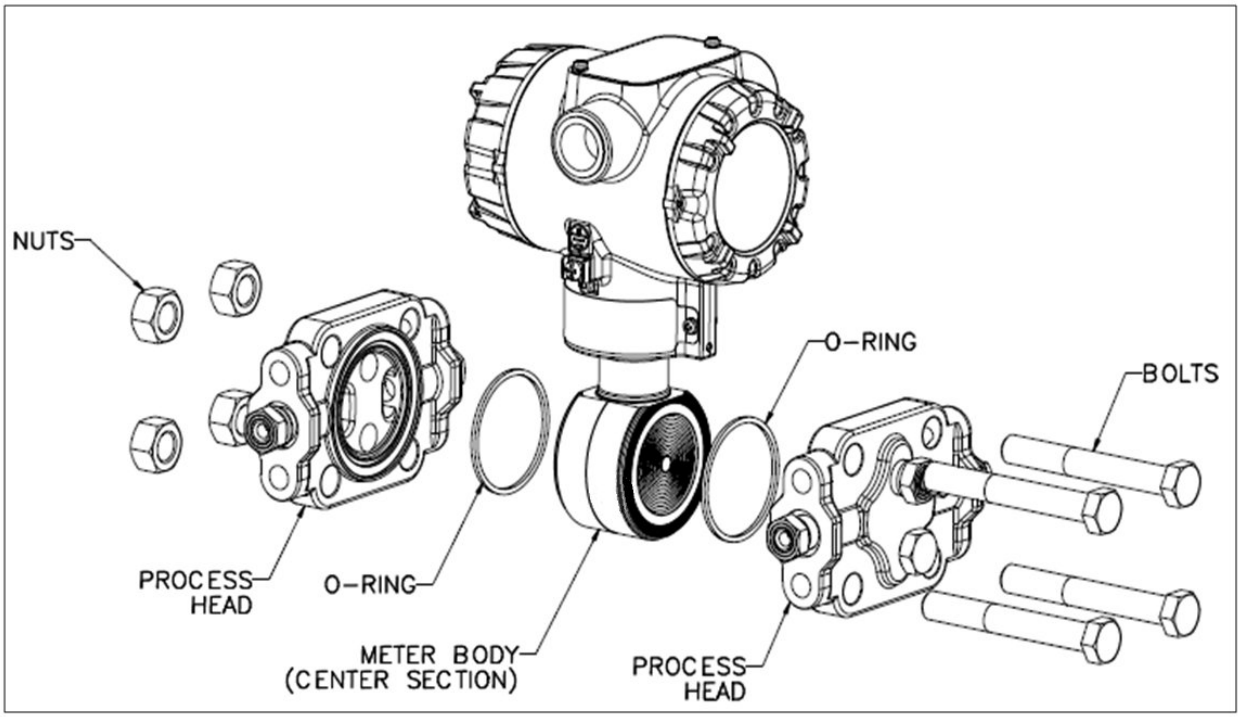


Figure 22 – ST 700 Standard Transmitter - DP Transmitter Head Disassembly

1. Close all valves to isolate the transmitter from the process.
2. Open the vent in the process head to drain fluid from the transmitter meter body, as necessary.
3. Remove the transmitter from the process.
4. Loosen the nuts in the sequence shown in Figure 23.
5. Remove the nuts from the bolts that hold the process head(s) to the meter body.
6. Remove the process heads and bolts.
7. Remove the gasket/ O-ring, and clean the interior of the process head using a soft bristle brush and an approved solvent.
8. Inspect the barrier diaphragm for signs of deterioration, corrosion, and distortion.
9. If the diaphragm is distorted contact Honeywell for assistance.
10. Install a new gasket/O-ring in each process head.
11. Coat threads on the process head bolts with a suitable anti-seize compound, such as “Neverseize,” or equivalent.
12. Using a torque wrench, gradually tighten the nuts in the sequence shown in Figure 23. Tighten head bolts in stages of 1/3-full torque, 2/3-full torque, and full torque. Refer to the values in Table 18 for torque requirements versus transmitter type and model.

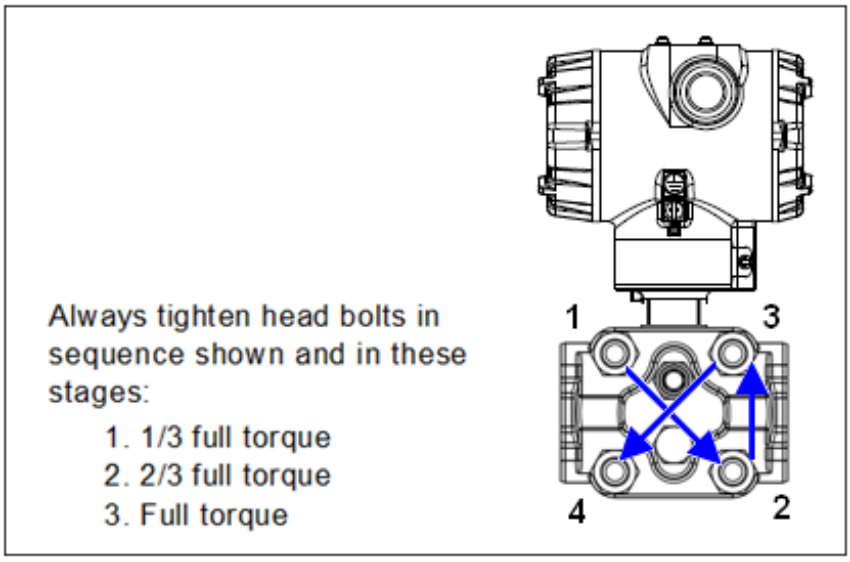


Figure 23 – ST 700 Standard Transmitter - Head Bolt Tightening Sequence

Table 18 – Head Bolt Torque Values

BOLTING TYPE	B7M BOLTING TABLE III B7 OPTION BOLT 51452557-004 NUT 51452559-003	PTFE COATED B7M BOLTING Y SPECIAL OPTION BOLT 51452557-007 NUT 51452559-007	MONEL K 500 BOLTING Y SPECIAL OPTION BOLT 51452557-005 NUT 51452559-005	25% CHROMIUM SUPER DUPLEX BOLTING Y SPECIAL OPTION BOLT 51452557-006 NUT 51452559-006	316 STAINLESS STEEL BOLTING TABLE III SS OPTION BOLT 51452557-003 NUT 51452557-003 BOLT 51452559-004	NACE CR BOLTING TABLE III CR OPTION BOLT 51452557-002 NUT 51452559-02	ALL GRADE 660 CLASS D BOLTING Y SPECIAL OPTION BOLT 51452557-001 NUT 51452559-008	CARBON STEEL BOLTING STANDARD OPTION BOLT 51452557-001 NUT 51452559-001	ALL GRADE 660 CLASS D BOLTING Y SPECIAL 6 KPSI OPTION BOLT 51452557-202 NUT 51452559-008
50049713XXXX, EXCEPT XXX5 ALL TRANSMITTERS EXCEPT DRAFT RANGE	48,8 N•M +/- 2,4 N•M (36.0 Lb-Ft +/- 1.8 Lb-Ft)				56,9 N•M +/- 2,8 N•M (42.0 Lb-Ft +/- 2.1 Lb-Ft)			67,8 N•M +/- 3,4 N•M (50.0 Lb-Ft +/- 2.5 Lb-Ft)	
50049713XXX5 DRAFT RANGE TRANSMITTER ONLY	20,3 N•M +/- 1,0 N•M (15.0 Lb-Ft +/- 0.8 Lb-Ft)								

6.4 Replacing the Communication Module

The communication module includes a connector to the sensor ribbon cable and a connector to the optional display module. This section includes the procedure to replace the communication module.

The transmitter does not have to be removed from service to replace the comm module

Please take appropriate steps to avoid ESD damage when handling the communication and display module assemblies

Refer to Figure 24 for parts locations.

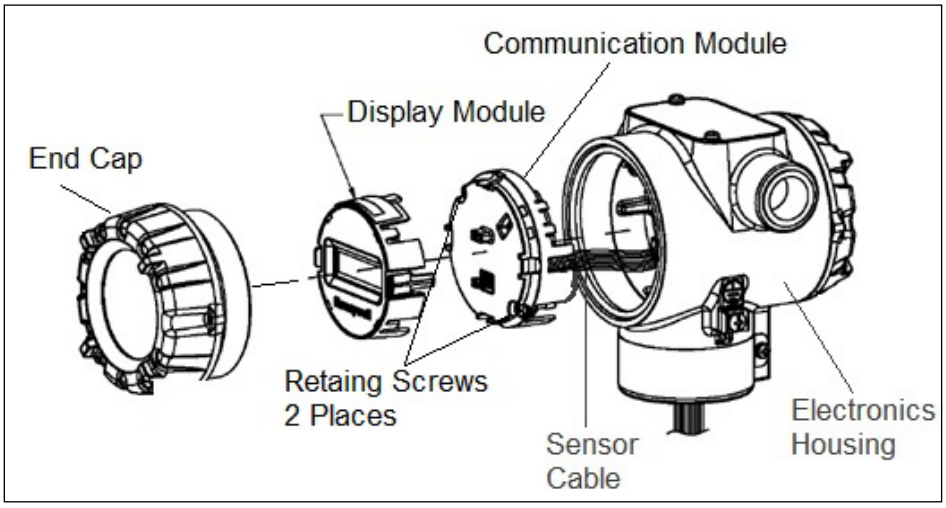


Figure 24 – ST 700 Standard Transmitter - PWA Replacement

1. Turn OFF transmitter power (Power removal is only required in accordance with area safety approvals. Power removal is only required in Class 1 Div 1 Explosion-proof and Class 1 Div 2 environments).
    - When removing the communications module with power applied, the loop will go to 0V. Likewise, installing a communications module into a transmitter with power applied will cause the loop output value to go to 12ma for several seconds then the loop output value will go to the configured value based on the PV input.
    - Installing a display module into a powered transmitter may cause a temporary upset to the loop output value.
2. Loosen the end cap lock, and unscrew the end cap from the electronics side of the transmitter housing.
3. If equipped with a display module, carefully depress the two tabs on the sides of the display module, and pull it off.
4. If necessary, unplug the interface connector from the communication module. **Do not discard the connector**.
5. Loosen the two retaining screws, and carefully pull the communication module from the Electronics compartment.

6. Carefully align and connect the Sensor Ribbon Cable to the connector “J4” at the bottom of the communication module. When installing the communication module in the next step, be careful not to pinch the Sensor Ribbon Cable.

7. Carefully, insert the communication module into the Electronics compartment. Ensure that the Sensor Ribbon Cable is not pinched.

8. Tighten the two communication module retaining screws.

9. Refer to the SmartLine User's Manual to change the FAILSAFE, READ/WRITE, and SIM-OFF/SIM-ON (Fieldbus Only) configuration settings.

10. If applicable, re-install the display module as follows:

    a. Orient the display as desired.

    b. Install the Interface connector in the display module such that it will mate with the socket for the display in the communication module.

    c. Carefully line up the display, and snap it into place. Verify that the two tabs on the sides of the display latch.

Orient the display for proper viewing through the end cap window. You can rotate the meter mounting orientation in 90 º increments.

11. Apply Parker Super O-ring Lubricant or equivalent to the end cap O-ring before installing the end cap. Reinstall the End Cap and tighten the End Cap locking screw.

12. Installing Optional External Configuration Button Assembly.

    a. Loosen (Do Not Remove) both top nameplate screws and pivot nameplate 90°.

    b. Align the protrusion on the button assembly with the matching opening in the housing and snap the button assembly into the housing.

    c. Rotate the nameplate back to the original position, and tighten the nameplate screws.

(Steps 13 - 16 required for Field Upgrades Only)

13. Loosen the End Cap locking screw and unscrew the End Cap from the Field Wiring side of the transmitter housing.

14. Select the proper communication/External Configuration upgrade kit label from the label strip provided and adhere to the inside of the Field Wiring compartment End Cap.

15. Apply Parker Super O-ring Lubricant or equivalent to the end cap o-ring before installing the end cap. Reinstall the End Cap and tighten the end cap locking screw.

16. Install external upgrade label (e.g. DEVICE MODIFIED…..) provided on outside of housing as shown in Figure 24.

17. Restore power if removed.

18. Check the settings of the transmitter Setup and display Setup parameters to make sure that the transmitter is configured correctly for your application. See the HART/DE User's Manual (ST 800 #34-ST-25-38, ST 700 #34-ST-25-44) for details on HART and DE transmitters. Refer to manual #34-ST-25-39 for additional information about Fieldbus transmitters.

19. If applicable, verify External Button Configuration operation. The transmitter is now available for use.

6.5 Replacing the Meter Body

You can replace the complete meter body, including the process heads, or the meter body only on certain Differential Pressure (DP), Gauge Pressure (GP), and Atmospheric Pressure (AP) transmitters by using the existing process head(s). Use the following procedure for meter body-only replacement.

1. Save or record device configuration data.
2. Turn off transmitter power.
3. Remove the transmitter from service, and move it to a clean area before disassembling it.
4. Refer to Figure 25. Loosen the End Cap Lock, and unscrew the End Cap from the electronics side of the transmitter housing.

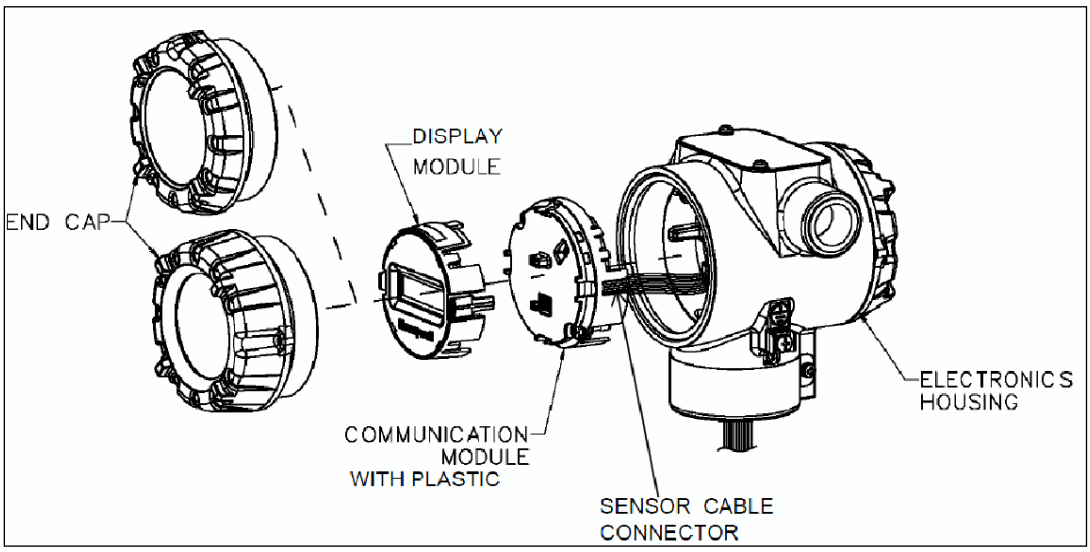


Figure 25 – ST 700 Standard Transmitter - Disassembly for Meter Body Replacement

Please take appropriate steps to avoid ESD damage when handling the communication and display module assemblies

5. If a display is present, press the two snaps along the side, and remove it from the communication module assembly.
   Note: Do not discard or misplace the display/communication connector, it will be required to reassemble the display module

6. Loosen the two retaining screws, and remove the communications module assembly, and remove the communication module assembly from the electronics housing.
7. Disconnect the Sensor Cable from the communications Board.
8. Refer to Figure 26. Use a 2mm hex wrench to completely loosen the set screw on the outside of the housing to permit rotating the meter body.

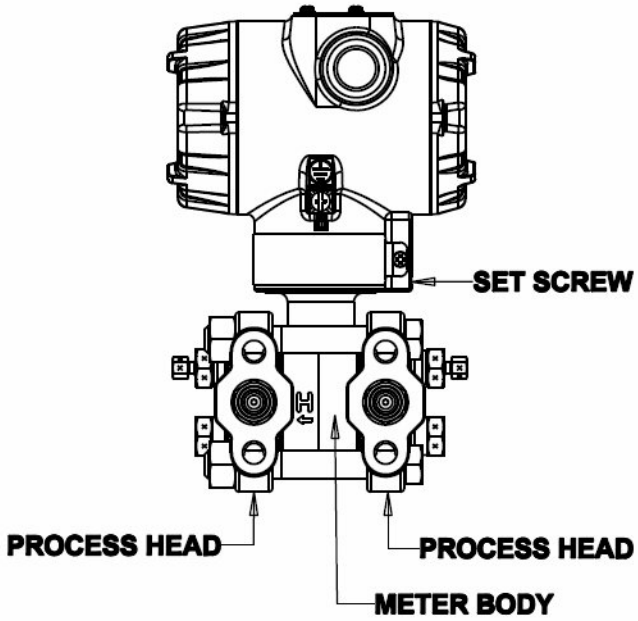


Figure 26 – ST 700 Standard Transmitter - Hardware Location to Remove the Meter Assembly

9. Carefully turn the complete meter body counterclockwise to unscrew it from the electronics housing.
10. Remove the nuts from bolts that hold the process head(s) to the meter body.
11. Remove process heads and bolts.
12. Remove the gaskets or O-rings from the process heads.
13. Clean the interior of the process head(s) with a soft bristle brush and suitable solvent.

CAUTION: To prevent damage to the diaphragm in the meter body, use extreme care when handling or placing the meter body on any surface. Carefully assemble gaskets or O-rings to the meter body. If installing O-rings, lubricate with water or leave dry.

14. Coat threads on process head bolts with anti-seize compound such as “Neverseize” or equivalent.
15. Refer to Figure 27. Apply Dow Corning #33 silicone grease to the meter body adapter O-ring and carefully assemble the O-ring to the meter body. Assemble the process head(s) and bolts to the new meter body. For now, make the bolts only finger-tight.

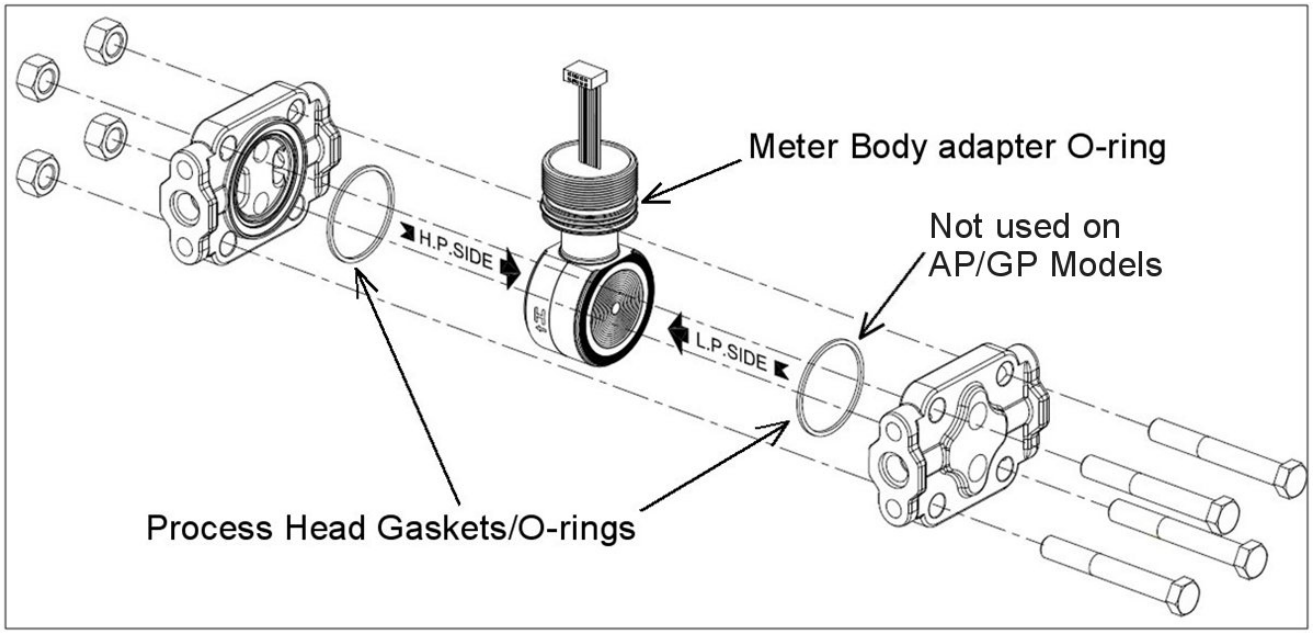


Figure 27 – ST 700 Standard Transmitter - Meter Body Reassembly

16. Use a torque wrench to gradually tighten nuts to torque rating in sequence shown in Figure 28. Tighten head bolts in stages of 1/3 full torque, 2/3 full torque, and then full torque.

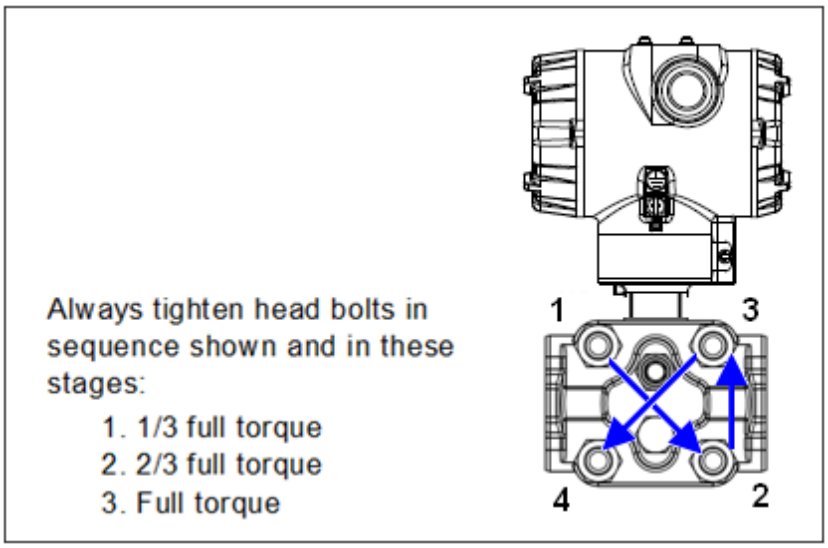


Figure 28 – ST 700 Standard Transmitter - Head Bolt Tightening Sequence

17. Feed the ribbon cable on the new meter body through the neck of the housing.

CAUTION: To prevent damage to the ribbon cable, use care when assembling the meter body to the electronics housing.

18. Screw the new meter body into the housing until the bottom of the meter body adapter is flush with the neck of the electronics housing.

19. Tighten the outside set screw to be sure it is fully seated in the slot in the header.
20. Loosen the set screw ½- turn.
21. Rotate the housing to the desired position (Max. 180^{o} in either direction), and tighten the set screw.
22. Carefully align and connect the Sensor Ribbon Cable to connector "J4" at the bottom of the communication module board. When installing the communication module in the next step, be careful not to pinch the Sensor Ribbon Cable.
23. Carefully, insert the communication module into the Electronics compartment. Ensure that the Sensor Ribbon Cable is not pinched.
24. Tighten the two communication module retaining screws.
25. If applicable, re-install the display module as follows:
    a. Orient the display as desired.
    b. Install the Interface connector in the display module such that it will mate with the socket for the display in the communication module.
    c. Carefully line up the display, and snap it into place. Verify that the two tabs on the sides of the display latch.


Orient the display for proper viewing through the end cap window.
You can rotate the meter mounting orientation in 90 o increments.

26. Connect the bracket to the transmitter housing.
27. Recalibrate the transmitter per section 7 Calibration, of this document.
28. Return the transmitter to service, and turn ON power
29. Verify the transmitter configuration data. Update the configuration if necessary.
30. Lubricate the end-cap O-ring with Parker Super O-ring silicone lubricant or equivalent before replacing the end caps.

7. Calibration for the ST 700 Standard Transmitter

7.1 Recommendations for Transmitter Calibration

The ST 700 standard transmitter does not require periodic calibration to maintain accuracy. Typically, calibration of a process-connected transmitter will degrade, rather than augment the capability of a smart transmitter. For this reason, it is recommended that a transmitter be removed from service before calibration. Moreover, calibration will be accomplished in a controlled, laboratory-type environment, using certified precision equipment.

7.2 Calibration Procedures

For a transmitter operating in analog mode, you must calibrate its output signal measurement range using any compatible hand-held communicator or a local display.

One calibration option is to use the Honeywell Smart Field Communicator (SFC). Refer to the *Smart Field Communicator Operating Guide,* Document # 34-ST-11-14 for calibration procedures.

Calibration information and procedures for a transmitter operating in the HART/DE mode are provided in the *ST 700 Series HART/DE Option User's Manual*, Document # 34-25-25-47.

8. Troubleshooting on the ST 700 Standard Transmitter

8.1 Overview

Troubleshooting involves responding to error messages, primarily displayed by the MC Toolkit. Error messages that may occur on the transmitter's local display are fairly self-explanatory and intuitive. However, this section covers the diagnostic messages that indicate critical conditions. Other than the critical conditions, additional detail is not provided. If you require assistance, contact your distributor or Honeywell Technical Support. All other messages are covered by the MC Toolkit Users' Manual.

8.2 Critical Diagnostics Screens

The basic display will display the message CRITCAL FAULT on the top line of the LCD and the appropriate diagnostic text on the lower line.
A description of the diagnostic conditions is given in Table 19 and Table 20 along with suggested actions for resolving the problem.

8.2.1 Fault Conditions and Recommended Corrective Actions – Basic Display

Table 19 – ST 700 Standard Transmitter - Fault Conditions and Recommended Corrective Actions for basic Display.

Condtion	Analysis	Recommended Corrective Action
Fault. A critical failure has been detected in the Meter body	Use a HART, DE, or FF communicator to read the detailed status information from the transmitter. Refer to the appropriate communicator manual to get more information about the possible causes of the failure.	Cycle power to the transmitter. If the problem continues to occur, replace the Meter body.
Electronics module Fault. A critical failure has been detected on the HART, DE, or FF Electronics module.	Use a HART, DE, or FF communicator to read the detailed status information from the transmitter. Refer to the appropriate communicator manual for more information about the possible failure causes.	Cycle power to the transmitter. If the problem continues to occur replace the Electronics module.
Meter body comm fault. Communications between the meter body and the electronics module has failed.	This could be the result of a failure on either of these modules or the cable that connects them. Use a HART, DE, or FF communicator to read the detailed status information from the transmitter. Refer to the appropriate communicator manual to get more information about the possible causes of the failure.	Check the ribbon cable that connects the meter body to the electronics module. Make sure that the cable is securely plugged into the electronics module. Make sure that all pins are plugged into the connector (e.g., make sure that the connector is not offset in a way that leaves some pins unconnected). Cycle power to the transmitter. If the problem continues to occur replace the electronics module. If this does not fix the problem, replace the Meter body.

8.2.2 Fault Conditions and Recommended Corrective Actions – Standard Display

The standard dsplay will display the message FAULT on the top line of the LCD and the appropriate diagnostic text on the lower line.

Table 20 – ST 700 Standard Transmitter - Fault Conditions and Recommended Corrective Actions.

Condtion	Analysis	Recommended Corrective Action
Mbd Com (Meter body Comm fault)	Communications between the meter body and the electronics module has failed.	Check the ribbon cable that connects the meter body to the electronics module. Ensure that the cable is securely plugged into the electronics module. Ensure that all pins are plugged into the connector (e.g. ensure that the connector is not offset in a way that leaves some pins unconnected). Cycle power to the transmitter. If the problem continues to occur replace the electronics module. If this does not fix the problem, replace the meter body.
Comm El (Communication Board fault)	A critical failure has been detected on the HART electronics module.	Cycle power to the transmitter. If the problem continues to occur replace the electronics module.
Mtrbody (Sensor Board Fault)	A critical failure has been detected in the meter body	Cycle power to the transmitter. If the problem continues to occur replace the electronics module.

9. Parts List_ST 700 Standard Transmitter

9.1 Overview

Individually saleable parts for the various transmitter models are listed in this section. Some parts are illustrated for identification. Parts are identified and listed in the corresponding tables as follows:

- Individually saleable parts are indicated in each figure by key number callout.
- Parts that are supplied in kits are indicated in each illustration by key number callout with the letter K prefix.

Table 21 is a list of recommended spare parts.

Table 21 – ST 700 Standard Transmitter - Summary List of Recommended Spare Parts

Part Number	Description	Figure No.	Key No.	1-10 Units	10-100 Units	100-1000 Units
Electronics Housing Assembly						
50049849-501	HART Electronics Module Without REED Sensor PWA	Figure 30	5	1	1-2	2-4
50049849-502	HART Electronics Module With REED Sensor PWA					
50049849-503	DE Electronics Module Without REED Sensor PWA					
50049849-504	DE Electronics Module With REED Sensor PWA					
50049849-509	Fieldbus Electronics Module Without REED Sensor PWA for ST700					
50049849-510	Fieldbus Electronics Module With REED Sensor PWA for ST700					
	Meter Body Seal kit (includes O-rings)	Figure 33	K1	1	1-2	2-4
51452865-501	Glass Filled PTFE					
51452865-502	VITON					
51452865-503	100% PTFE					
51462865-504	GRAPHITE					
50075472-531	HART/DE Terminal Block Assy Without Lightning Protection	Figure 31	3	1	1-2	2-4
50075472-532	HART/DE Terminal Block Assy With Lightning Protection					
50075472-533	FieldBus Terminal Block Assy Without Lightning Protection					
50075472-534	FieldBus Terminal Block Assy With Lightning Protection					

Process head gasket kit		Figure No.	Key No.	1-10 Units	10-100 Units	100-1000 Units
51452868-501	Gasket only, Process Head (12 PTFE packs)	Figure 33	Ka	12	12-24	24-48
51452868-502	Gasket only, Process Head (6 Viton Head O'Rings)			6	6-12	12-24
51452868-507	Gasket only, Process Head Graphite Gasket (replacement only for existing graphite gasket)			6	6-12	12-24
Meter Body						
Specify complete model number from nameplate	DP Models GP/AP HEAD Models LGP/LAP Models Flush Mount Models Flange Mount Models	Figure 32		1	1-2	2-4

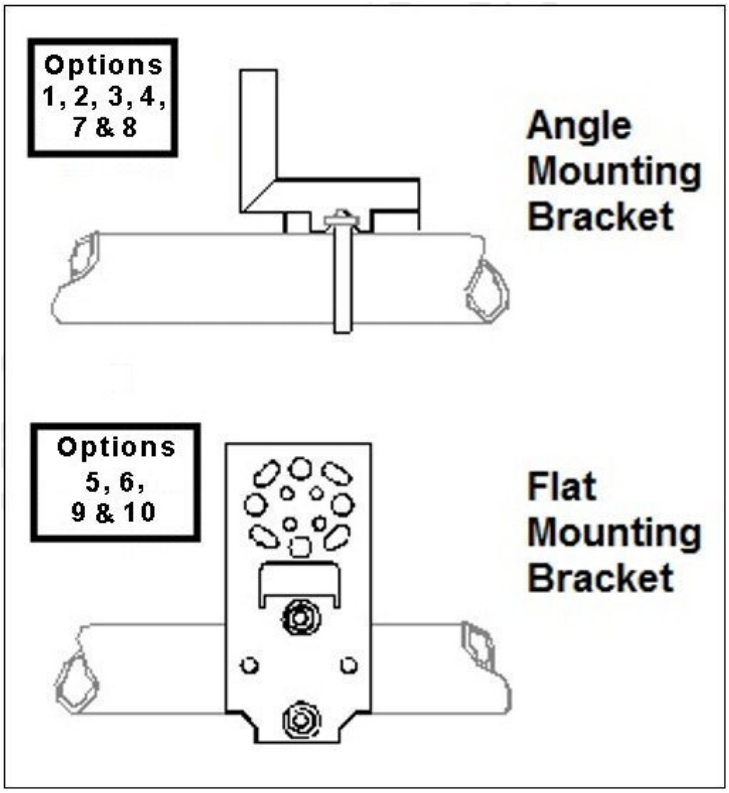


Figure 29 – ST 700 Standard Transmitter - Angle and Flat Bracket Parts

Table 22 – ST 700 Standard Transmitter - Angle and Flat Bracket Parts

(Refer to Figure 29)

Key No.	Part Number	Description	Quantity Per Unit
1	30752770-603	SS 304 Angle Bracket Mounting kit for all models except In-line and flush mount transmitters	1
2	30752770-604	SS 304 Angle Bracket Mounting kit for all In-Line and flush mount transmitters	1
3	30752770-803	Marine Approved Angle Bracket for all models except In-line and flush mount transmitters	1
4	30752770-804	Marine Approved Angle Bracket for all In-line and flush mount transmitters	1
5	51196557-505	SS 304 Flat Bracket Mounting kit for all models except In-line and flush mount transmitters	1
6	51196557-506	SS 304 Flat Bracket Mounting kit for all In-line transmitters and flush mount transmitters	1
7	30752770-603	SS 316 Angle Bracket Mounting kit for all In-line transmitters except In-Line and flush mount transmitters	1
8	30752770-604	SS 316 Angle Bracket Mounting kit for all In-Line and flush mount transmitters	1
9	51196557-508	SS 316 Flat Bracket Mounting kit for all In-line transmitters except In-Line and flush mount transmitters	1
10	51196557-509	SS 316 Flat Bracket Mounting kit for all In-Line and flush mount transmitters	1

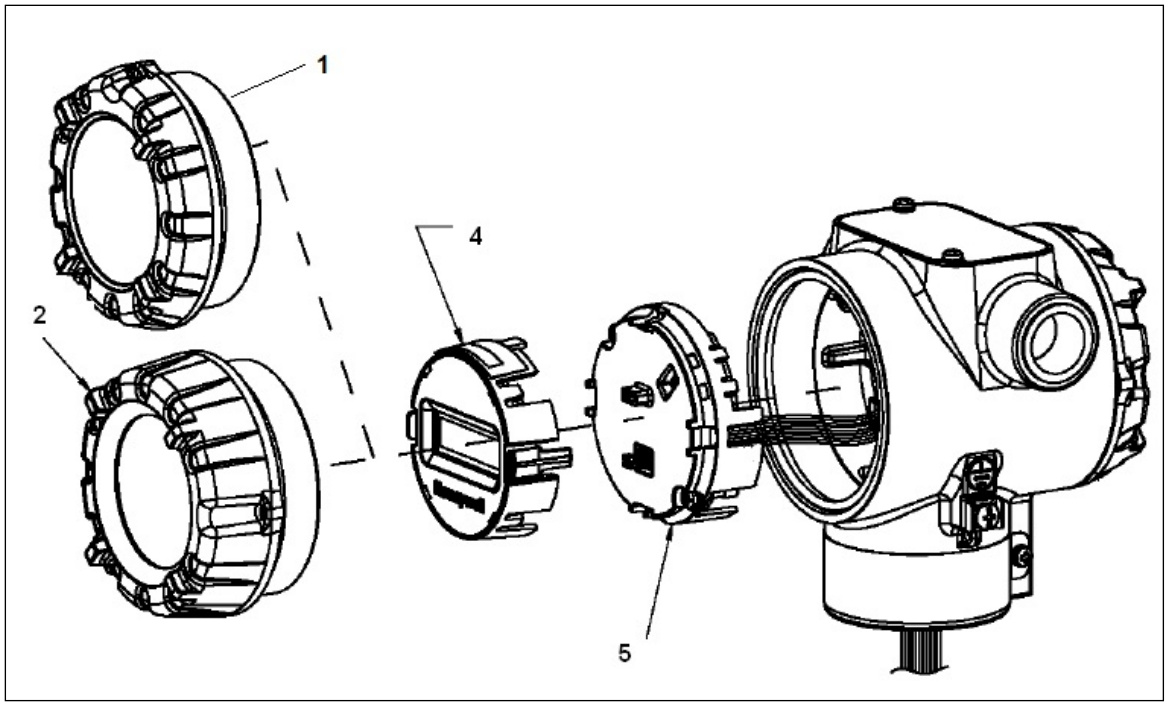


Figure 30 – ST 700 Standard Transmitter - Electronic Housing, Display End

Table 23 – ST 700 Standard Transmitter Major Assemblies

(Refer to Figure 31 and Figure 32)

Key No.	Part Number	Description	Quantity Per Unit
1	50049858-501 50049858-521	End Cap (Aluminum) End Cap (Stainless Steel)	1
2	50049832-501 50049832-521	End Cap, Display (Aluminium) with window End Cap, Display (Stainless Steel) with window	1
3	50075472-531 50075472-532 50075472-533 50075472-534	Terminal Assy HART/DE without Lightning protection Terminal Assy HART/DE with Lightning protection Terminal Assy FF/PB without Lightning protection Terminal Assy FF/PB with Lightning protection	1
4	50049911-501 50126003-501	Basic Display Standard Display	1
5	50049849-501 50049849-502 50049849-503 50049849-504 50049849-509 50049849-510	HART Electronics Module Assembly (PWA) without Reed sensor HART Electronics Module Assembly (PWA) with Reed sensor DE Electronics Module Assembly (PWA) without Reed sensor DE Electronics Module Assembly (PWA) with Reed sensor FF Electronics Module Assembly (PWA) without Reed sensor FF Electronics Module Assembly (PWA) with Reed sensor	1
6	50049915-501 50131077-501	External Zero, Span & Config Buttons (3- button Assembly) External Zero, Span & Config Buttons (2- button Assembly)	1
K1	30757503-005	Electronics housing seals kit (includes O-rings)	2

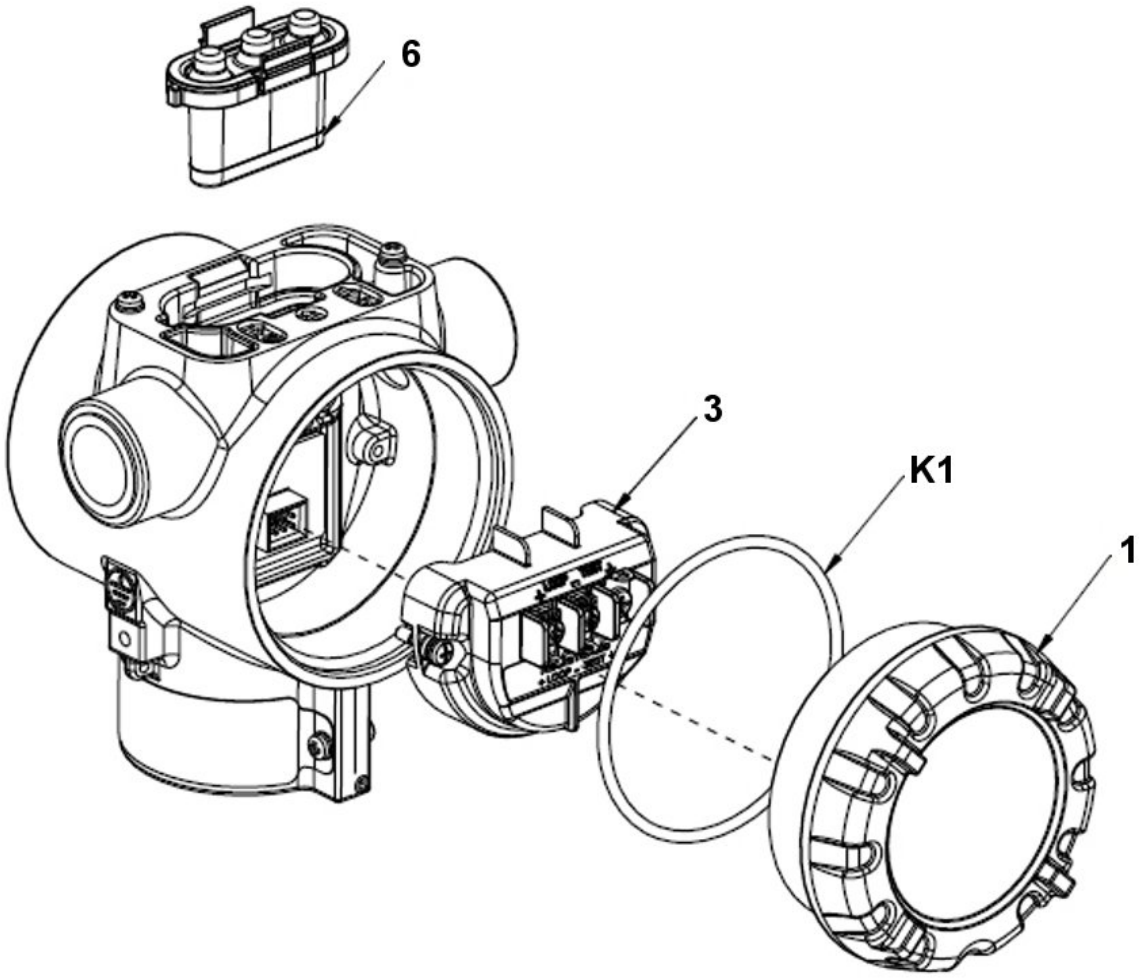


Figure 31 – ST 700 Standard Transmitter - Electronic Housing, Terminal Block End

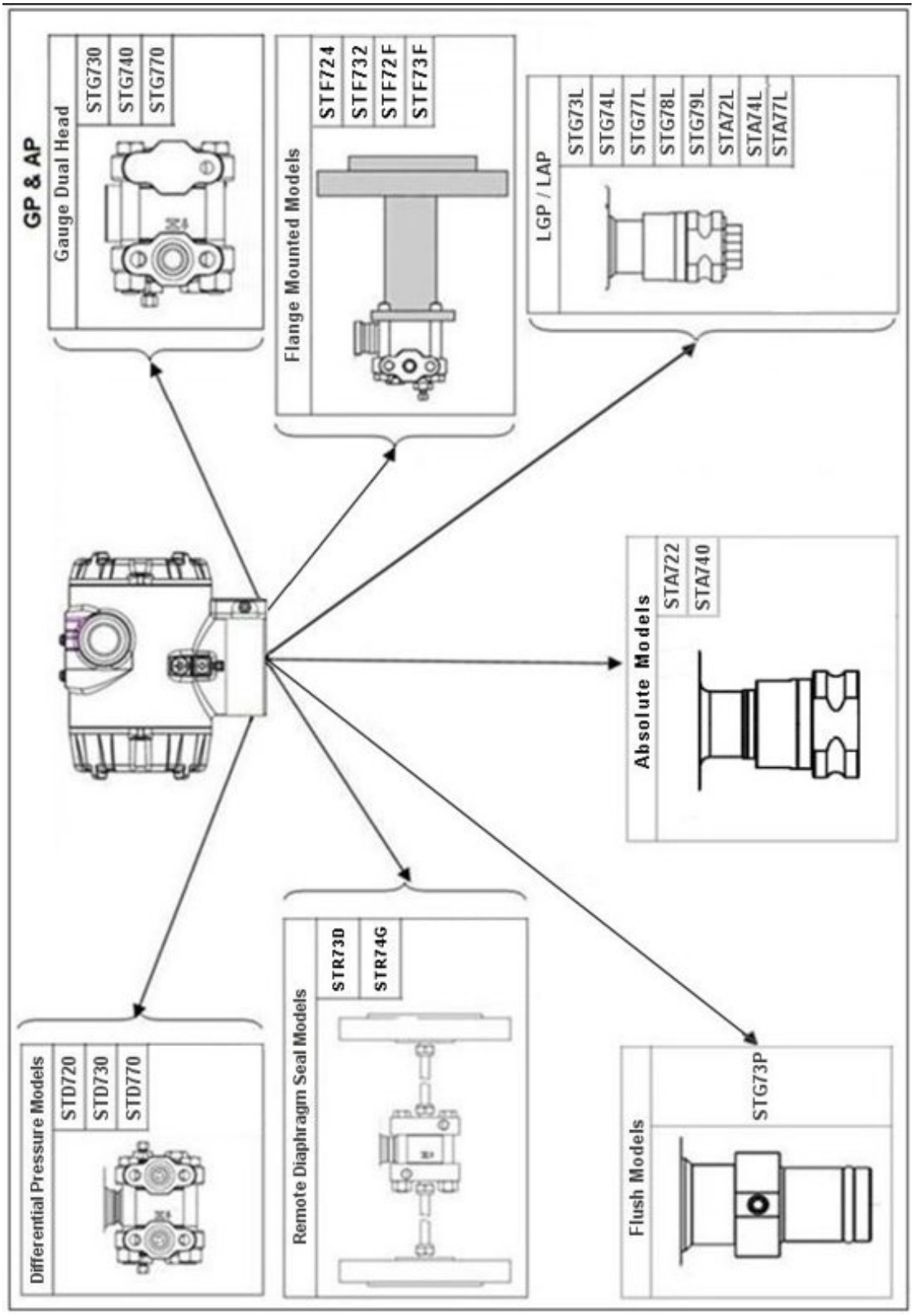


Figure 32 – ST 700 Standard Transmitter - Major Assemblies

Table 24 – ST 700 Standard Transmitter Models STD720, 730 & 770

(Refer to Figure 33)

Key No.	Part Number	Description	Qty/ Kit
		Meter Body Gasket Kits	
	51452865-501 51452865-502 51452865-503 51452865-504	Glass Filled PTFE VITON 100% PTFE GRAPHITE	
		Each Meter Body Gasket Kit includes:	
K6		Gasket, Process Head	6
Ka		Gasket, Flange Adapter	6
K7		O-Ring, Meter Body to Electronics Housing	3
		K7 Process Head Gasket Kits	
K6 K6 K6	51452868-501 51452868-502 51452868-507	Gasket, Process Head (6 Gaskets/ 1 Kit) Gasket, Flange Adapter (6 Gaskets/ 1 Kit) O-Ring, Meter Body to Electronics Housing (3 Gaskets/ 1 Kit)	12 6 6
		Flange Adapter Gasket Kits	
Ka Ka Ka	51452868-504 51452868-505 51452868-508	Gasket only, Flange Adapter, 6 PTFE Adapter Gaskets Gasket only, Flange Adapter, 6 VITON Adapter O-Rings Gasket only, Flange Adapter Graphite Gasket (use only as replacement of existing graphite gasket)	6 6 6
		½-inch NPT Flange Adapter Kits	
	 51452867-110 51452867-210 51452867-310 51452867-410 51452867-150 51452867-350 51452867-130 51452867-330	Flange Adapter Kit, with: SS Flange Adapters and with carbon steel bolts SS Flange Adapters and with A286 SS (NACE) bolts SS Flange Adapters and with 316 SS (non-NACE) bolts SS Flange Adapters and with B7M alloy steel bolts Monel Flange Adapters and with carbon steel bolts Monel Flange Adapters and with 316 SS (non-NACE) bolts Hastelloy C Flange Adapters and with carbon steel bolts Hastelloy C Flange Adapters and with 316 SS (non-NACE) bolts	
		Each ½-inch NPT Flange Adapter Kit includes:	
Ka		Gasket, Flange Adapter	2
Kb		½-inch NPT Flange Adapter	2
Kc		Bolt, hex head, 7/16-20 UNF, 1.50 inches long	4

Key No.	Part Number	Description	Qty/ Kit
Bolt And Nut Kit			
	51452866-501	Carbon steel bolt and Nut Kit	
	51452866-502	Stainless Steel Bolt and Nut Kit with NACE Certificate	
	51452866-503	Stainless Steel Bolt and Nut Kit without NACE Certificate	
	51452866-504	B7M Bolt and Nut Kit	
	51452866-505	All Stainless Steel NACE Bolt and Nut Kit	
	51452866-506	Monel Bolt and Nut Kit	
	51452866-507	Super Duplex Bolt and Nut Kit	
	51452866-508	Stainless Steel NACE 6K Bolt and Nut Kit	
Each Bolt and Nut Kit Includes:			
K8		Head Bolt	4
K4		Head Nut	4
Kc		Adapter Bolt	4

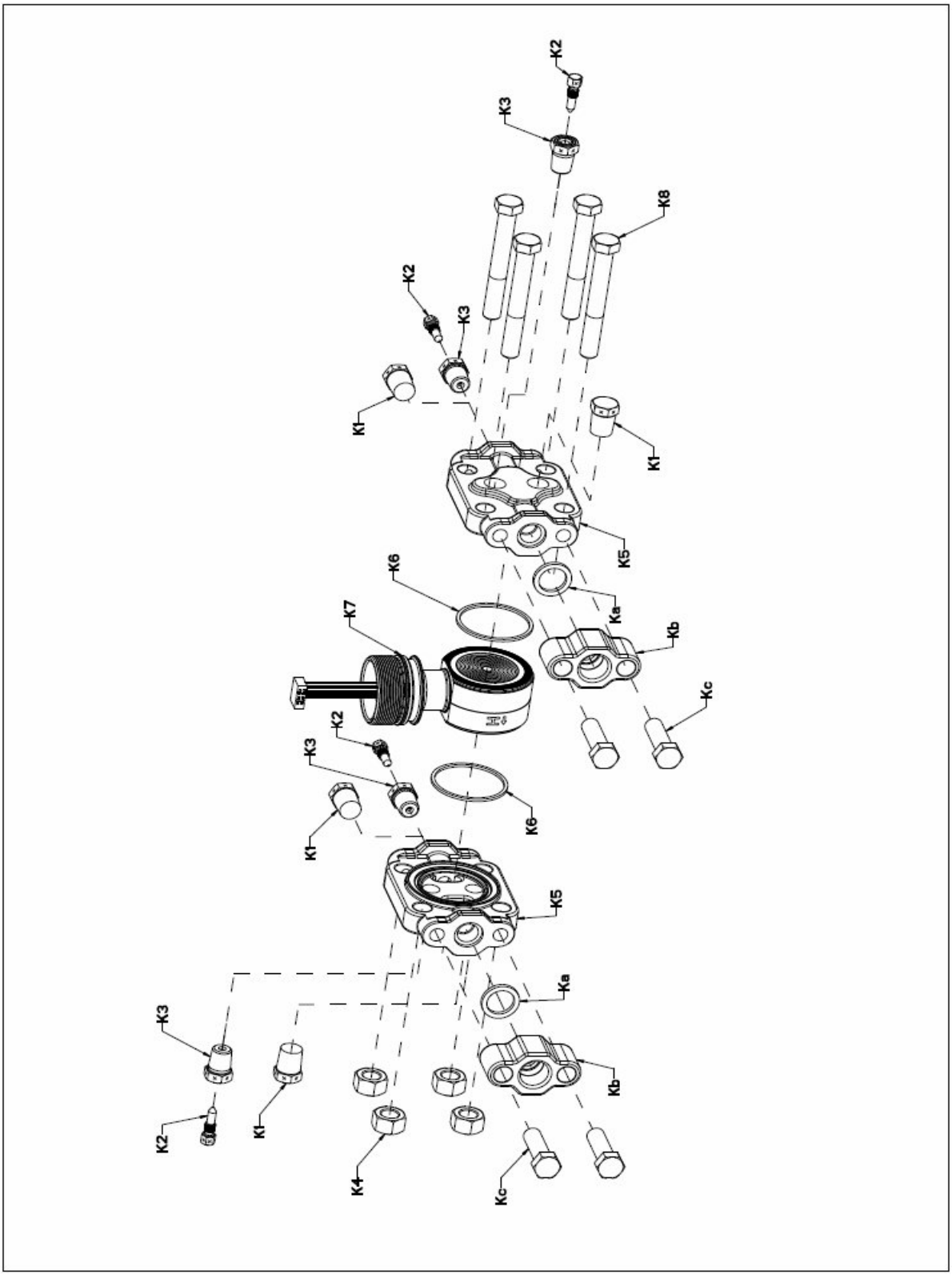


Figure 33 - ST 700 Standard Transmitter - ST 700 Models STD720, 730, 770

(Refer to Table 24)

Table 25 – ST 700 Standard Transmitter - Parts for STG730, 740, 770 and STD720, 730, 770 and STA722, 740 Transmitter Body

(Refer to Figure 34)

Key No.	Part Number	Description	Qty/Unit
Process Head Assembly Kits with PTFE Gaskets			
	51452864-010 51452864-012 51452864-020 51452864-022 51452864-030 51452864-032 51452864-040 51452864-042 51452864-050 51452864-052	Carbon steel head (zinc plated) without side vent/drain Carbon steel head (zinc plated) with side vent/drain Stainless steel head without side vent/drain Stainless steel head with side vent/drain Hastelloy C head without side vent/drain Hastelloy C head with side vent/drain Monel head without side vent/drain Monel head with side vent/drain Carbon steel head (nickel plated) without side vent/drain Carbon steel head (nickel plated) with side vent/drain	
Process Head Assembly Kits with VITON Gaskets			
	51452864-110 51452864-112 51452864-120 51452864-122 51452864-130 51452864-132 51452864-140 51452864-142 51452864-150 51452864-152	Carbon steel head (zinc plated) without side vent/drain Carbon steel head (zinc plated) with side vent/drain Stainless steel head without side vent/drain Stainless steel head with side vent/drain Hastelloy C head without side vent/drain Hastelloy C head with side vent/drain Monel head without side vent/drain Monel head with side vent/drain Carbon steel head (nickel plated) without side vent/drain Carbon steel head (nickel plated) with side vent/drain	
Each process head assembly kit includes:			
K1		Pipe Plug (See notes 1 & 2)	1
K2		Vent Plug (See note 1)	1
K3		Vent Bushing (See note 1.)	1
K5		Process Head	1
K6		Gasket (PTFE), Process Head	1
Ka		Gasket (PTFE), Flange Adapter	1
	Notes		
	Note 1: This item is made of the same material as the process head s, except for Kits with carbon steel process head s, which include stainless steel Pipe Plug, Vent Plug, and Vent Bushing. Note 2: The Kit for process head s without side vent/drain does not include Pipe Plugs (K1).		
Reference Head			
K9	51452951-502	316 SS Blind Reference Head	1

Key No.	Part Number	Description	Qty/Unit
Bolt And Nut Kit			
	51452866-501	Carbon steel bolt and Nut Kit	
	51452866-502	Stainless Steel Bolt and Nut Kit with NACE Certificate	
	51452866-503	Stainless Steel Bolt and Nut Kit without NACE Certificate	
	51452866-504	B7M Bolt and Nut Kit	
	51452866-505	All Stainless Steel NACE Bolt and Nut Kit	
	51452866-506	Monel Bolt and Nut Kit	
	51452866-507	Super Duplex Bolt and Nut Kit	
	51452866-508	Stainless Steel NACE 6K Bolt and Nut Kit	
Each Bolt and Nut Kit Includes:			
K8		Head Bolt	4
K4		Head Nut	4
Kc		Adapter Bolt	4

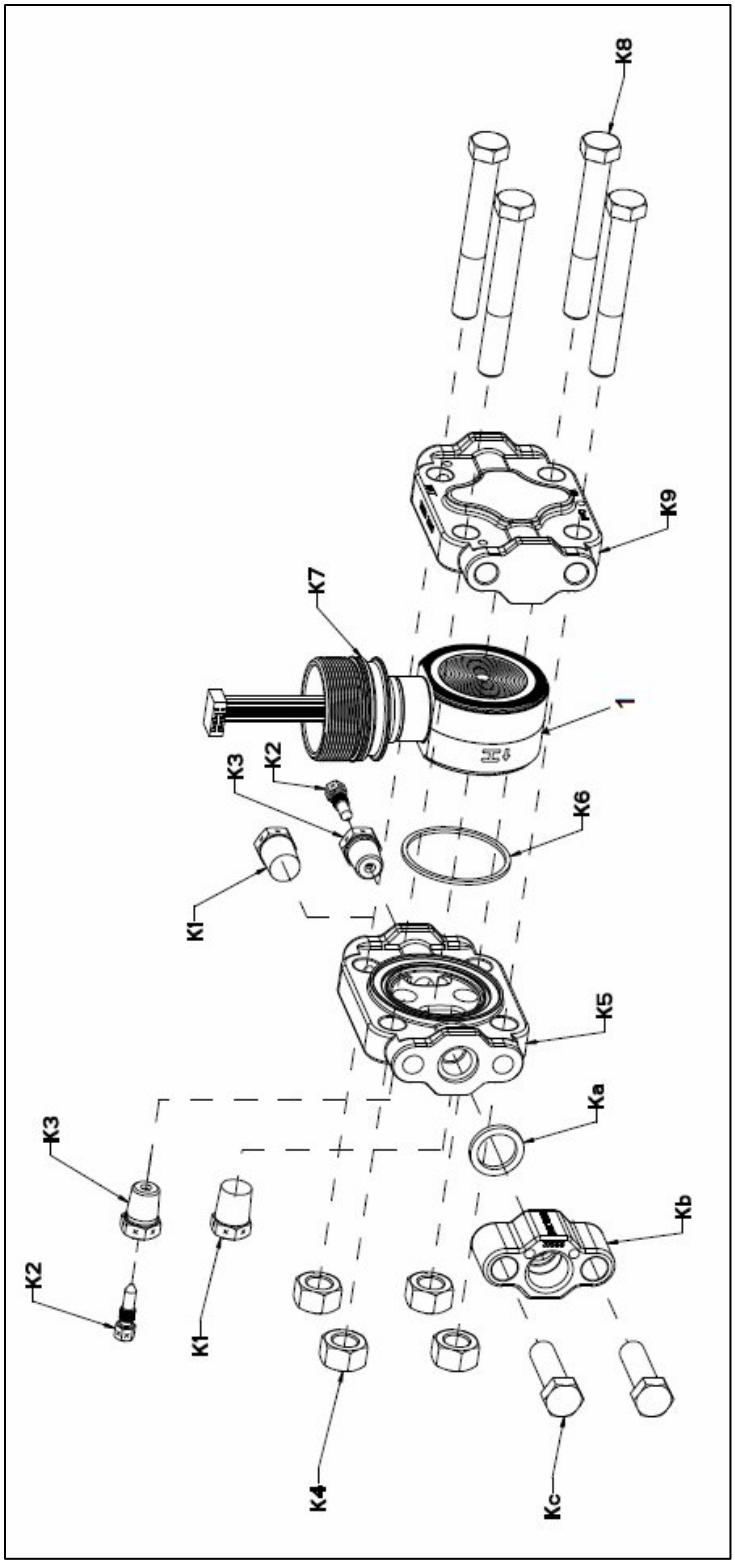


Figure 34 – ST 700 Standard Transmitter - STG730, 740, 770 and STA722, 740 Transmitter Body

Table 26 - ST 700 Standard Transmitter - Inline Gauge and Inline Atmospheric Meter Body Parts

(See Figure 35)

Key No.	Part Number	Description	Qty/Unit
	Specify complete model number from nameplate	ST Series replacement meter body (LAP/LGP model)	1

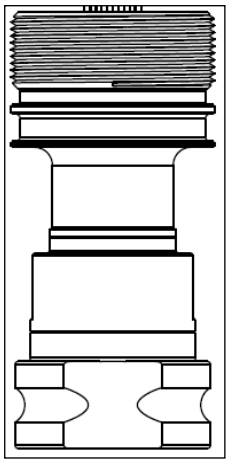


Figure 35 – ST 700 Standard Transmitter - Inline Gauge and Inline Atmospheric Meter Body Bodies

Table 27 – ST 700 Standard Transmitter - Flange-Mounted Meter Body Parts – STF724, 732

(Refer to Figure 36 and Figure 37)

Key No.	Part Number	Description	Qty/Unit
1	Specify complete model number from nameplate	ST Series 700 replacement meter body	1

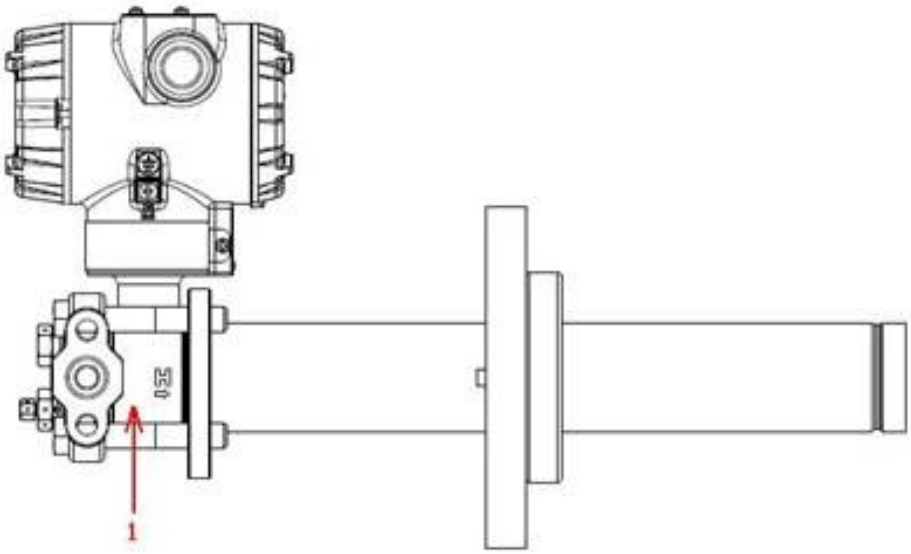


Figure 36 – ST 700 Standard Transmitter - Extended Flange Design

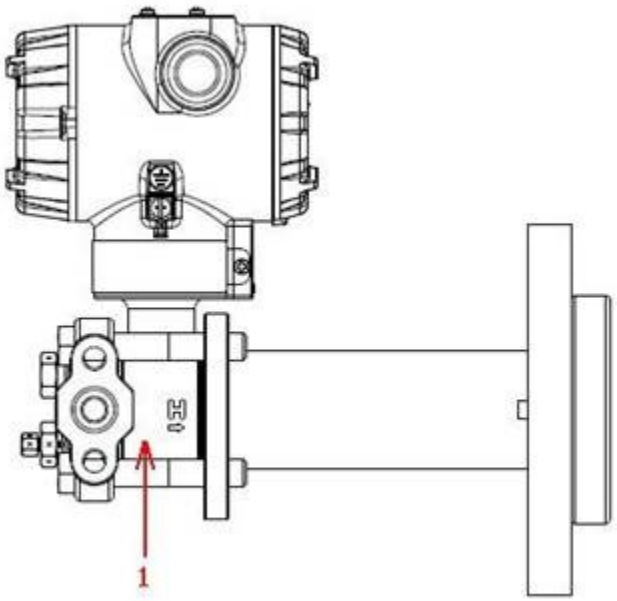


Figure 37 - ST 700 Standard Transmitter - Flush Flange Design

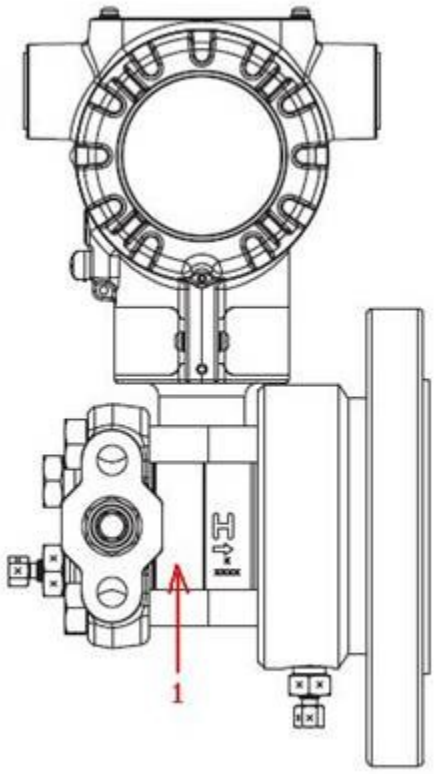


Figure 38 - ST 700 Standard Transmitter - Pseudo Flange Design

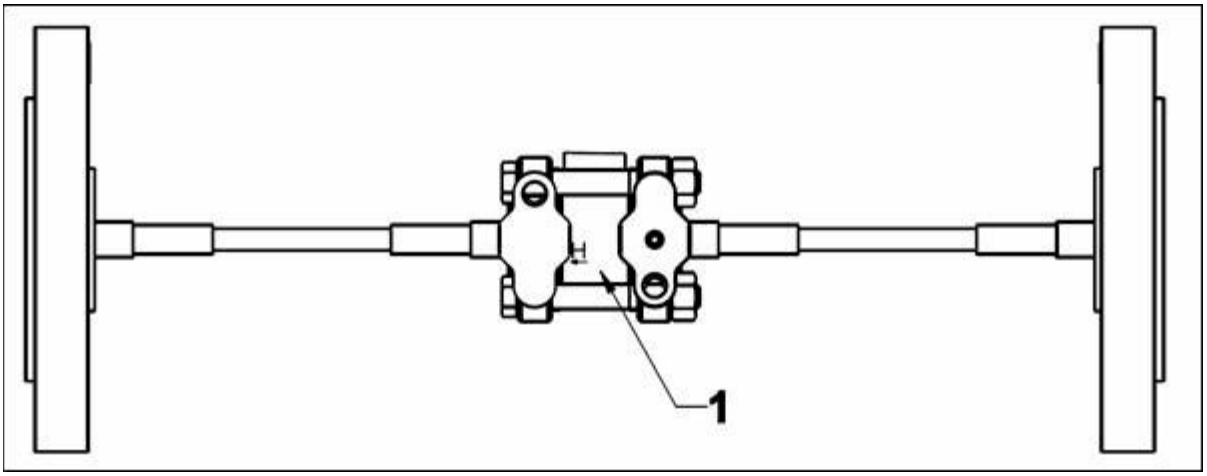


Figure 39 – ST 700 Standard Transmitter - Remote Seal Diaphragm

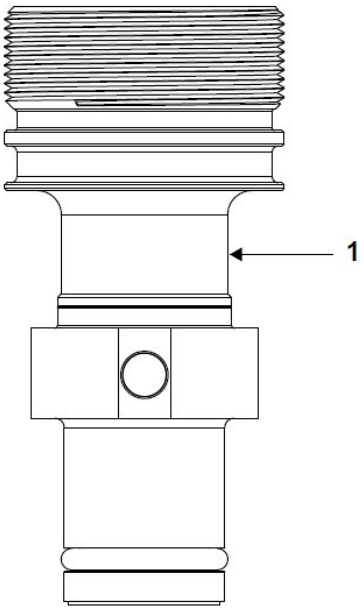


Figure 40 - ST 700 Standard Transmitter - Flush Mount Meter Body.

Table 28 – ST 700 Standard Transmitter - Flush Mount Meter Body Parts

(Refer to Figure 40)

Key No.	Part Number	Description	Qty/Unit
1	Specify complete model number from nameplate	Replacement meter body (flush Mount model)	1
	30756445-508	Gasket Kit (0-rings)	
	51204496-501	316L SS Mounting Sleeve Kit	
	51204497-501	Calibration Sleeve Kit	

Refer to Appendix A for Product Certifications and Approvals for the ST 700 standard and basic transmitter.

10. Introduction_ST 700 Basic Transmitter

10.1 Overview

This section is an introduction to the physical and functional characteristics Honeywell's family of the ST 700 basic SmartLine pressure transmitters.

If you are not sure which type of ST 700 you have, standrad or basic, please refer to Section 1 of this manual

If you have a ST 700 standard transmitter use Sections **2** through **9**.
If you have a ST 700 basic transmitter go straight to Section **10** through **17.**

10.2 Features and Options

The ST 700 basic transmitter is available in a variety of models for measuring Differential Pressure (DP), Gauge Pressure (GP), and Absolute Pressure (AP). Table 29 lists the protocols, human interface (HMI), materials, approvals, and mounting bracket options for the ST 700.

Table 29 – ST 700 Basic Transmitter - Features and Options

Feature/Option	Basic/Available Options
Communication Protocols	HART® version 7
Human-Machine Interface (HMI) Options (Standard Display/External Two buttons)	**Standard Display (HART® only):** • Two-button programming (optional) • Standard display language: English and Russian only • Two-mode operations: PV display and menu navigation
Calibration	Single
Approvals See Appendix A for details.	FM, CSA, ATEX, IECEx, SAEx, INMETRO, NEPSI, GOST
Mounting Brackets	Angle/flat carbon steel/304 and 316 stainless steel,
Integration Tools	Experion

	The 2-button option is available for the standard display. The external 2-buttons option is available in this model.This is used for navigation of standard display or for setting zero, span and zero correct where standard display is not connected.

10.2.1 Physical Characteristics

As shown in Figure 41 the ST 700 basic transmitter is packaged in two major assemblies: the electronics housing and the meter body. The elements in the electronic housing respond to setup commands and execute the software and protocol for the different pressure measurement types. Figure 42 shows the assemblies in the electronics housing with available options.

The meter body provides connection to a process system. Several physical interface configurations are available, as determined by the mounting and mechanical connections, all of which are described in the **Installation** section of this manual.

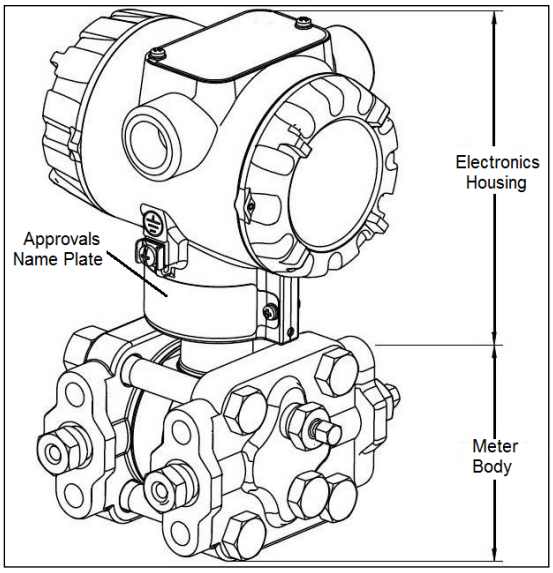


Figure 41 – ST 700 Basic Transmitter - Major Assemblies

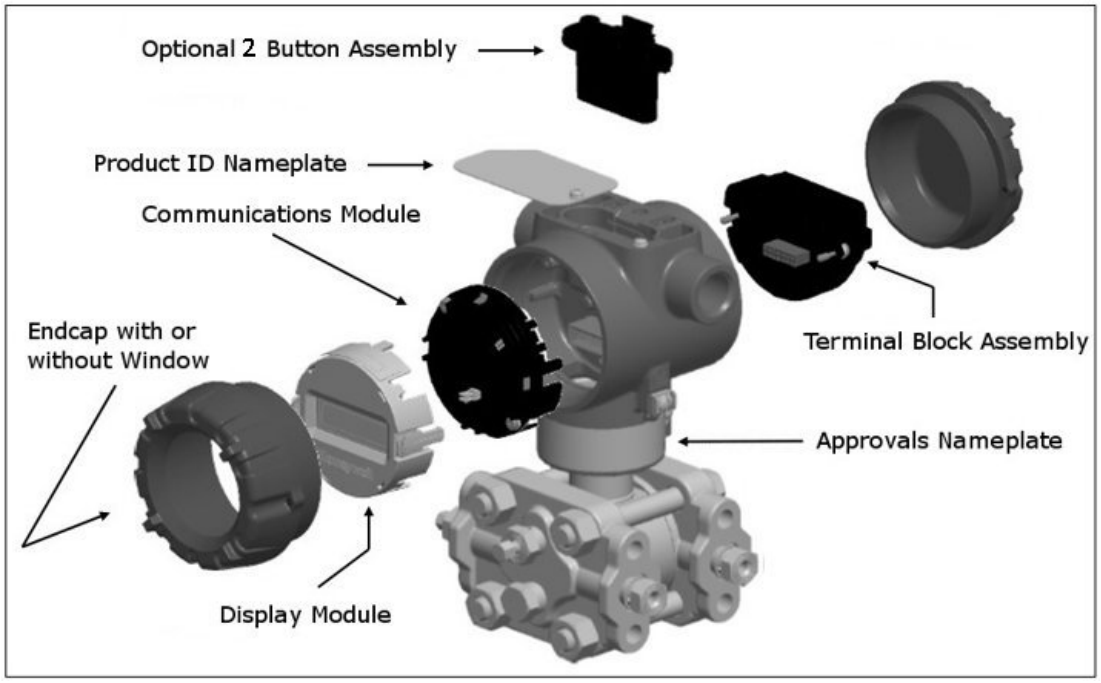


Figure 42 – ST 700 Basic transmitter Electronics Housing Components

10.2.2 Functional Characteristics

The transmitter measures process pressure and provides a proportional analog 4 to 20mA output to the measured process variable (PV). Available output communication protocols include HART®.

The standard display is only available on HART transmitters.

An optional external 2-button assembly is available to set up and make adjustments to the transmitter. In addition, a Honeywell Multi-Communication (MC) Toolkit (not supplied with the transmitter) can facilitate setup and adjustment procedures. Certain adjustments can be made through an Experion Station if the transmitter is digitally integrated with Honeywell's Experion.

The standard display menu is implemented as one long single-level menu and will "wrap around" when it reaches the start or end of the menu. The standard display uses an optional 2-button assembly to set up and make adjustments to the transmitter.

10.3 ST 700 Transmitter Nameplate

The transmitter nameplate mounted on the bottom of the electronics housing (see Figure 42) lists its model number, physical configuration, electronics options, accessories, certifications, and manufacturing specialties. Figure 43 is an example of a typical Gauge Pressure (GP) or Atmospheric Pressure (AP) transmitter name plate. The model number format consists of a Key Number with several table selections. The Differential Pressure (DP), Absolute Pressure (AP), and Gauge Pressure (GP) name plates are essentially the same. The DP model provides one additional entry (7 vs. 6) in the meter body selections (Figure 43) to accommodate the static pressure rating.

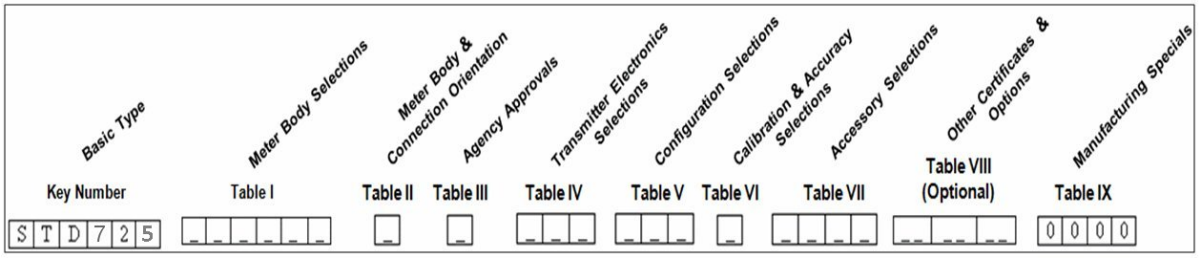


Figure 43 – ST 700 Basic Transmitter - Name Plate

You can readily identify the series and basic transmitter type from the third and fourth digits in the key number. The letter in the third digit represents one of these basic transmitter types:

- A = Absolute Pressure
- D = Differential Pressure
- F = Flange Mounted
- G = Gauge Pressure
- R = Remote Seals

For a complete selection breakdown, refer to the appropriate Specification and Model Selection Guide provided as a separate document.

10.4 Safety Certification Information

An “Approvals” name plate is located on the bottom of the Electronics Assembly; see Figure 42 exact location. The approvals name plate contains information and service marks that disclose the transmitter compliance information.
See Appendix A of this document for safety certification requirements and details.

10.5 Transmitter Adjustments

Zero and Span adjustments are possible in ST 700 basic transmitter with the optional external 2-button and integrated two-button assemblies. See Figure 42 for the external 2-button assembly.

You can also use the Honeywell MC Toolkit or other third-party hand-held configurator to make adjustments to the ST 700 basic transmitter. Alternately, certain adjustments can be made through the Experion or Universal Station, if the transmitter is digitally integrated with a Honeywell Experion or TPS system.

10.6 Display Options –Standard Display

Table 30 – ST 700 Basic Transmitter - Available Display Characteristics

Standard Display	• 360^{o} rotation in 90^{o} Increments • 2 lines, 8 characters o Standard units of measurement: Pressure Units: atm, bar, ftH_2O68F, gf/cm^2, inH_2O39F, inH_2O60F, inH2O68F, inHg0C, kgf/cm^2, kPa, mbar, mmH_2O4C, m, mH_2O68F, mmHg0C, MPa, Pa, psi, Torr, mH_2O4C, cmH_2O4C o Flow Units (DP models only): m3/hr, Kg/hr, MT/hr, L/sec, L/hr, SCFH, CFH, gal/hr, bbl/hr, Igal/hr, %, SCFD, gal/min, lb/hr, lb/min, SCFM, MSCFH, MMSCFH • Diagnostic messaging

10.7 Optional Integrated two-Button Assembly (Standard Display)

The standard display does not support all the transmitter configuration parameters and has limited features. The optional Integrated Two-Button Assembly for the standard display provides the following features and capabilities:

- Menu and enter key functionality.
- With the menu-driven display:
  - Comprehensive on-screen menu for navigation.
  - Transmitter configuration: enter LRV, enter URV and loop test.
  - Transmitter calibration
  - Display configuration (contrast only)
  - Set zero and span parameters.

	If you are using the optional external 2-button assembly with the standard display then you can perform all the above operations without removing external glass cap using the external buttons

	**Lower range value (LRV):** A display parameter (standard display), which allows users to enter the measuring value for which the analog output will be scaled to 4mA. **Upper range value (URV):** A display parameter (standard display), which allows users to enter the measuring value for which the analog output will be scaled to 20mA.

11. Application Design_ST 700 Basic Transmitter

11.1 Overview

This section discusses the considerations involved with deploying a Honeywell ST 700 basic transmitter in a process system. The following areas are covered:

- Safety
- Input and output data
- Reliability
- Environmental limits
- Installation considerations
- Operation and maintenance
- Repair and replacement

11.2 Accuracy

The ST 700 basic transmitter measures the gauge, differential, or absolute pressure of a process and reports the measurement to a receiving device.

11.2.1 Diagnostic Messages

Transmitter standard diagnostics are reported in the two basic categories listed in Table 4. Problems detected as critical diagnostics drive the analog output to the programmed burnout level. Problems detected as non-critical diagnostics may affect performance without driving the analog output to the programmed burnout level. Informational messages (not listed in Table 4 report various transmitter status or setting conditions.

	**The Standard Display is only available on HART transmitters**

	**The Standard Display only displays critical diagnostics (Meter Body Fault, Electronics Module Fault and Meter Body Communication Fault). Non-critical diagnostics are not displayed.**

11.3 Safety

11.3.1 Safety Integrity Level (SIL)

The ST 700 basic transmitter has met manufacturer design process requirements of Safety Integrity Level (SIL) 3. These are intended to achieve sufficient integrity against systematic errors of design by the manufacturer.

A Safety Instrumented Function (SIF) designed with this product must not be used at a SIL level higher than the statement, without “prior use” justification by the end user or diverse technology redundancy in the design.

Refer to the *Honeywell SmartLine Safety Manual*, Document # 34-ST-25-37, for additional information.

12. Installation and Startup_ST 700 Basic Transmitter

12.1 Installation Site Evaluation

Evaluate the site selected for the ST 700 basic transmitter installation with respect to the process system design specifications and Honeywell's published performance characteristics for your particular model. Some parameters that you may want to include in your site evaluation are:

- Environmental Conditions:
  - Ambient Temperature
  - Relative Humidity
- Potential Noise Sources:
  - Radio Frequency Interference (RFI)
  - Electromagnetic Interference (EMI)
- Vibration Sources
  - Pumps
  - Motorized System Devices (e.g., pumps)
  - Valve Cavitation
- Process Parameters
  - Temperature
  - Maximum Pressure Rating

12.2 Honeywell MC Toolkit

In preparation for post-installation processes, refer to the *MC Tookit User Manual*, Document # 34-ST-25-20, for battery conditioning and device operation and maintenance information.

12.3 Display Installation Precautions

Temperature extremes can affect display quality. The display can become unreadable at temperature extremes; however, this is only a temporary condition. The display will again be readable when temperatures return to within operable limits.

The display update rate may become slower at cold temperature extremes, but as with readability, normal updating resumes when temperatures are within limits for full operability.

	The transmitter should not be operated without the endcap covers on. Covers can be removed temporarily for configuration with buttons or during maintenance/wiring. The static voltage must be discharged before removing the cover.

12.4 Mounting_ST 700 Basic Transmitter

12.4.1 Summary

ST 700 basic transmitter models, except flush mounts and those with integral flanges, can be attached to a two-inch (50 millimeters) vertical or horizontal pipe using Honeywell's optional angle or flat mounting bracket; alternately you can use your own bracket. Flush-mount models are attached directly to a process pipe or tank by a one-inch weld nipple. Models with integral flanges are supported by the flange connection.

Figure 44 shows a typical bracket-mounted and flange-mounted transmitter installations.

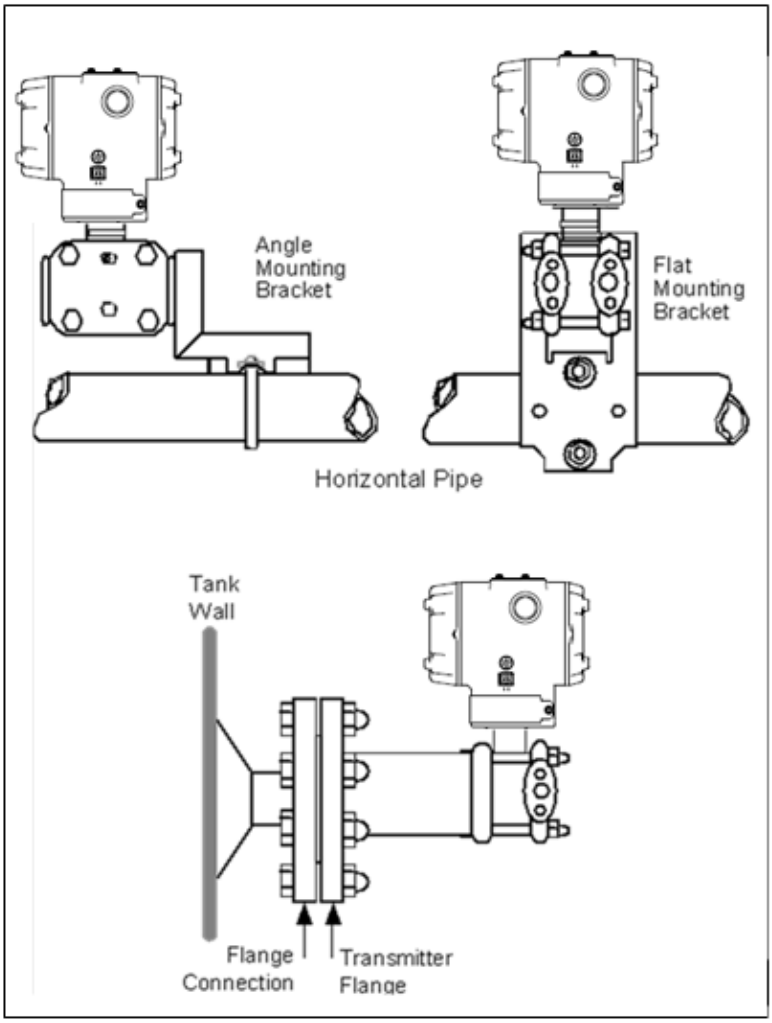


Figure 44 – ST 700 Basic Transmitter - Typical Bracket Mounted and Flange Mounted Installations

12.5 Flush mounting_ST 700 Basic Transmitter

To mount a flush mounted model, cut a hole for a 1” standard pipe in the tank or pipe where the transmitter is to be mounted. Weld the 1” mounting sleeve to the wall of the tank or to the hole cut on the pipe. Insert the meter body of the transmitter into the mounting sleeve and secure with the locking bolt. Tighten the bolt to a torque of 6,4 Nm +/- 0,30 Nm (4.7 ft-lbs +/- 0.2 ft.-lbs.). Figure 45 shows a typical installation for a transmitter with a flush mount on a pipe.

Once the transmitter is mounted, the electronics housing can be rotated to the desired position. See Figure 48 for details.

ATTENTION: On insulated tanks, remove enough insulation to accommodate the mounting sleeve.

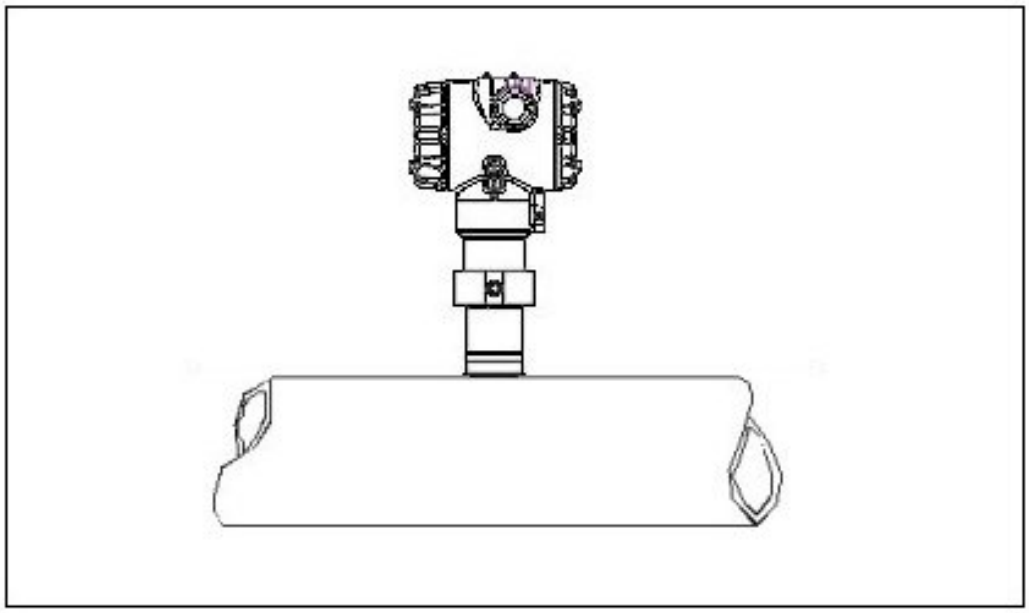


Figure 45 - ST 700 Basic Transmitter - Typical Flush Mounted Transmitter Installation

12.5.1 Mounting Dimensions, ST 700 Basic Transmitter

Refer to Honeywell drawing number 50049930 (Dual Head), 50049931 (In-Line), 50049932 (flange Mount) 50049933 (Extended flange), 50049934 (Remote Seal) and 50049936 (flush mount pressure transmitter) for detailed dimensions. Abbreviated overall dimensions are also shown on the Specification Sheets for the transmitter models. This section assumes that the mounting dimensions have already been taken into account and the mounting area can accommodate the transmitter.

12.5.2 Bracket Mounting Procedure for ST 700 Basic Transmitter,

If you are using an optional bracket, start with Step 1. For an existing bracket, start with Step 2.

5. Refer to Figure 46 for position of the bracket on a 2-inch (50.8mm) nominal, 2.38-inch (60.4mm) actual, horizontal or vertical pipe, and install a "U" bolt around the pipe and through the holes in the bracket. Secure the bracket with the nuts and lock washers provided.

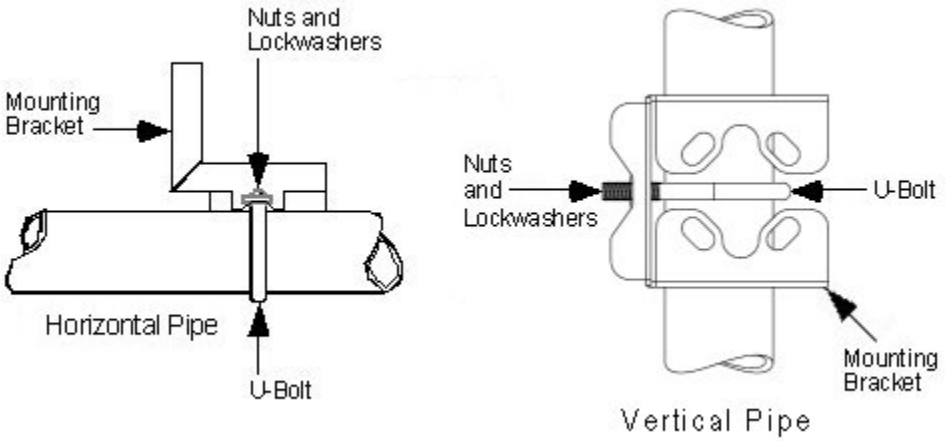


Figure 46 – ST 700 Basic Transmitter - Angle Mounting Bracket Secured to a Horizontal or Vertical Pipe

6. Align the appropriate mounting holes in the transmitter with the holes in the bracket. Use the bolts and washers provided to secure the transmitter to the bracket; see the following variations.

Table 31 - ST 700 Basic Transmitter - Mounting Bracket procedure

Transmitter Type	Use Hardware
DP with double-ended process heads and/or remote seals	Alternate mounting holes in the ends of the heads
In-line GP and AP models (STG7xS and STA7xS)	The smaller "U" bolt provided to attach the meter body to the bracket. See the following example.
Dual-head GP and AP	Mounting holes in the end of the process head.

Example: Inline model mounted to an optional angle bracket. See Figure 47.

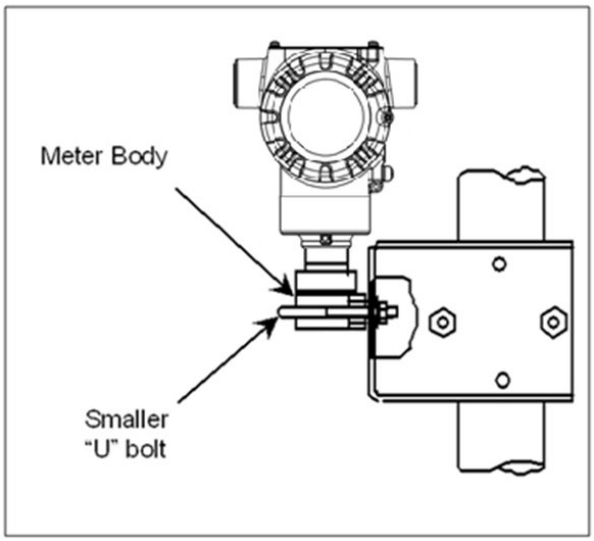


Figure 47 – ST 700 Basic Transmitter - Inline Model Mounted to an Optional Bracket

7. Loosen the set screw on the outside neck of the transmitter one (1) full turn.

8. Rotate the Electronics housing a maximum of 180º left or right from the center to the position you require, and tighten the set screw using a 4mm metric socket head wrench. See the following example and Figure 48.

   Example: Rotating the electronics housing

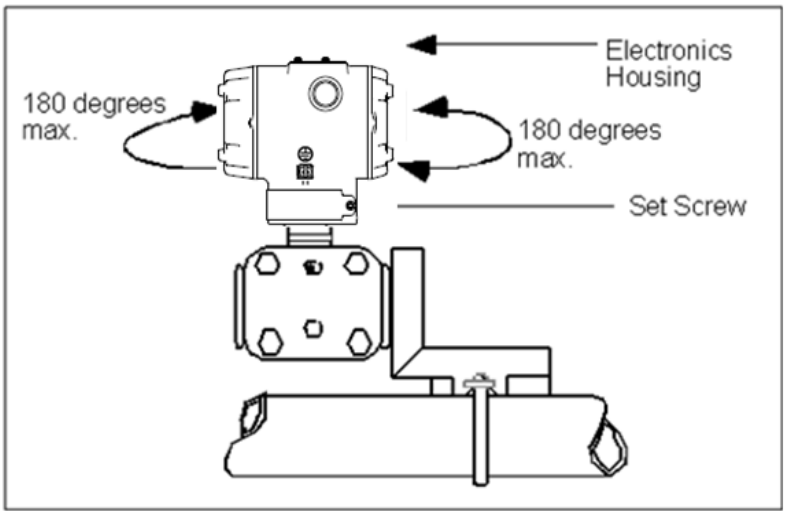


Figure 48 – ST 700 Basic Transmitter - Rotating the Electronics Housing

The mounting position of AP models STA725, STA745, STA72S, STA74S and STA77S becomes critical as the transmitter spans become smaller. A maximum zero shift of 2.5mmHg for these models can result from a mounting position that is rotated 90o from the vertical.

A typical zero-shift of 0.12mmHg or 0.20 inH_2O can occur for a five (5)-degree rotation from the vertical.

12.5.3 Mounting Transmitters with Small Absolute or Differential Pressure Spans

To minimize positional effects on calibration (zero shift), take the appropriate mounting precautions for the respective transmitter model. Ensure that the transmitter is vertical when mounting models STA725, STA745, STA72S, STA74S and STA77S. You do this by leveling the transmitter side-to-side and front-to-back.

Figure 49 shows how to level a transmitter using a spirit level.

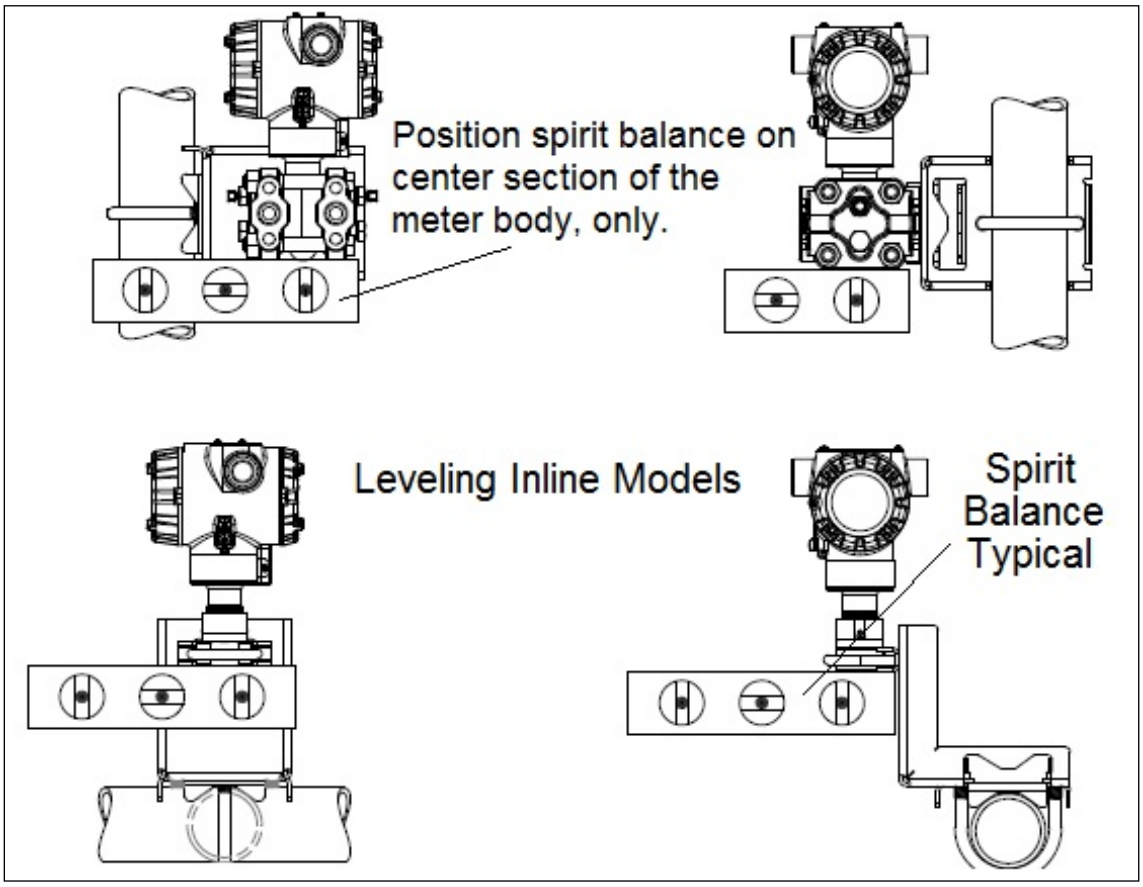


Figure 49 – ST 700 Basic Transmitter, using a Spirit Balance to Level a Transmitter

12.5.4 Flange Mounting_ST 700 Basic Transmitter

Figure 50 shows a typical tank-flange mount installation, with the transmitter flange mounted to the pipe on the wall of the tank.

On insulated tanks, remove enough insulaiton to accommodate the flange extension.

When flange-mounting to a tank, note the following:

- The End User is responsible for providing a flange gasket and mounting hardware suitable for the transmitter service conditions.
- To avoid degrading performance in flush-mounted flanged transmitters, exercise care to ensure that the internal diameter of the flange gasket does not obstruct the sensing diaphragm.
- To prevent performance degradation in extended-mount flanged transmitters, ensure that sufficient clearance exists in front of the sensing diaphragm body.

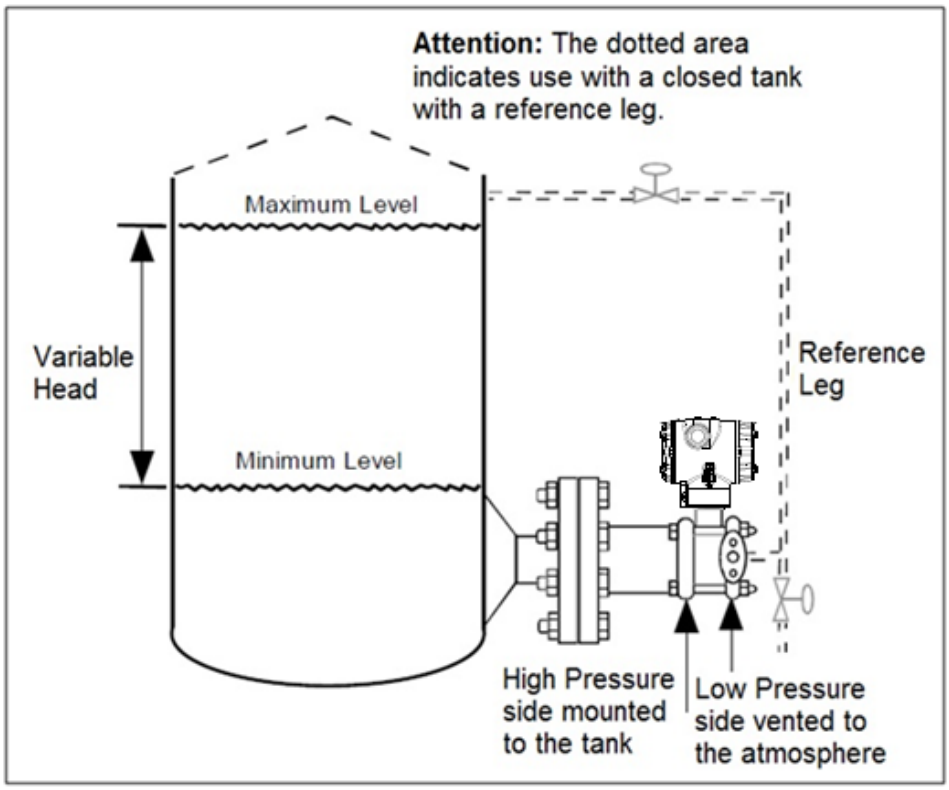


Figure 50 – ST 700 Basic Transmitter, Tank-Flange Mounted Transmitter

12.5.5 Remote Diaphragm Seal Mounting Information_ST 700 Basic Transmitter,

The combination of tank vacuum and high pressure capillary head effect should not exceed nine (9) psi (300mmHg) absolute. For insulated tanks, be sure to remove enough insulation to accommodate the flange extension. The end user is responsible for supplying a flange gasket and mounting hardware suitable for the service condition of the transmitter.

Mount the transmitter flanges within the limits in Table 32 for the fill fluid in the capillary tubes, with a tank at one (1) atmosphere.

Table 32 – ST 700 Basic Transmitter, Flange Mounting Guidelines

Fill Fluid	Mount the Flange…
Silicone 200 Oil	≤22 feet (6.7 meters) below the transmitter
Chlorotrifluorethylene (CTFE)	≤11 feet (3.4 meters) below the transmitter

Refer to Figure 51 for a representative remote diaphragm seal installation. Mount the transmitter at a remote distance determined by the length of the capillary tubing.

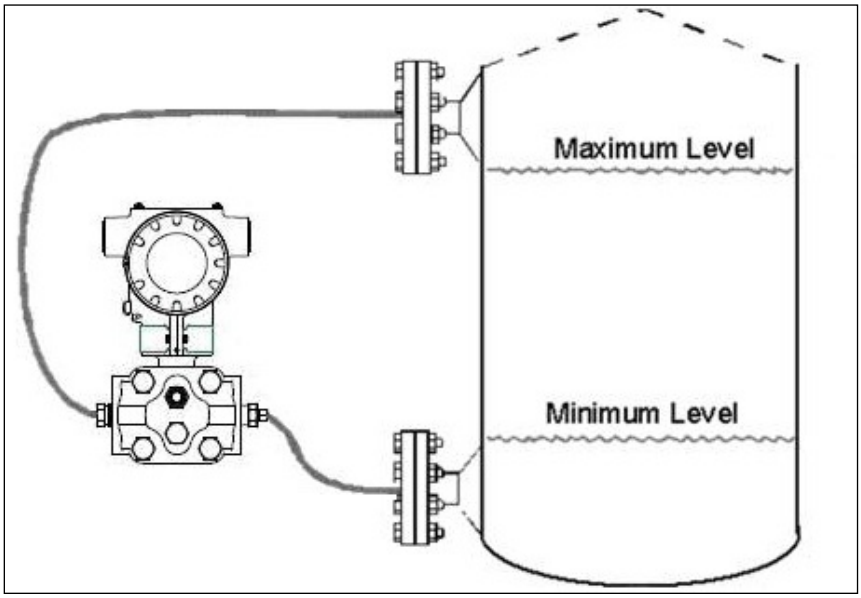


Figure 51 – ST 700 Basic Transmitter - Representative Remote Diaphragm Seal Transmitter Installation

Depending on transmitter model, connect the remote seal to the tank according to Table 33.

Table 33 – ST 700 Basic Transmitter - Remote Diaphragm Mounting Details

Transmitter Model	Connect the Remote Seal on ….	
	Variable Head	Fixed or Constant Head
STR735D	Transmitter High Pressure (HP) Side to tank wall lower flange mounting.	Transmitter Low Pressure (LP) side to tank wall upper flange.

12.6 Piping the ST 700 Basic Transmitter

12.6.1 Piping Arrangements

Piping arrangements vary depending upon process measurement requirements and the transmitter model. For example, a differential pressure transmitter comes with double-ended process heads with ¼-inch NPT connections, which can be modified to accept ½-inch NPT through optional flange adapters. Gauge pressure transmitters are available with various connections for direct mounting to a process pipe.

A ½-inch, schedule 80, steel pipe is commonly used for transmitter integration into a process system. Many piping arrangements use a three-valve manifold to connect the process piping to the transmitter. A manifold makes it easy to install and remove or re-zero a transmitter without interrupting the process. A manifold also accommodates the installation of blow-down valves to clear debris from pressure lines. Figure 52 represents a typical piping arrangement using a three-valve manifold and blow-down lines for a differential pressure transmitter being used to measure flow.

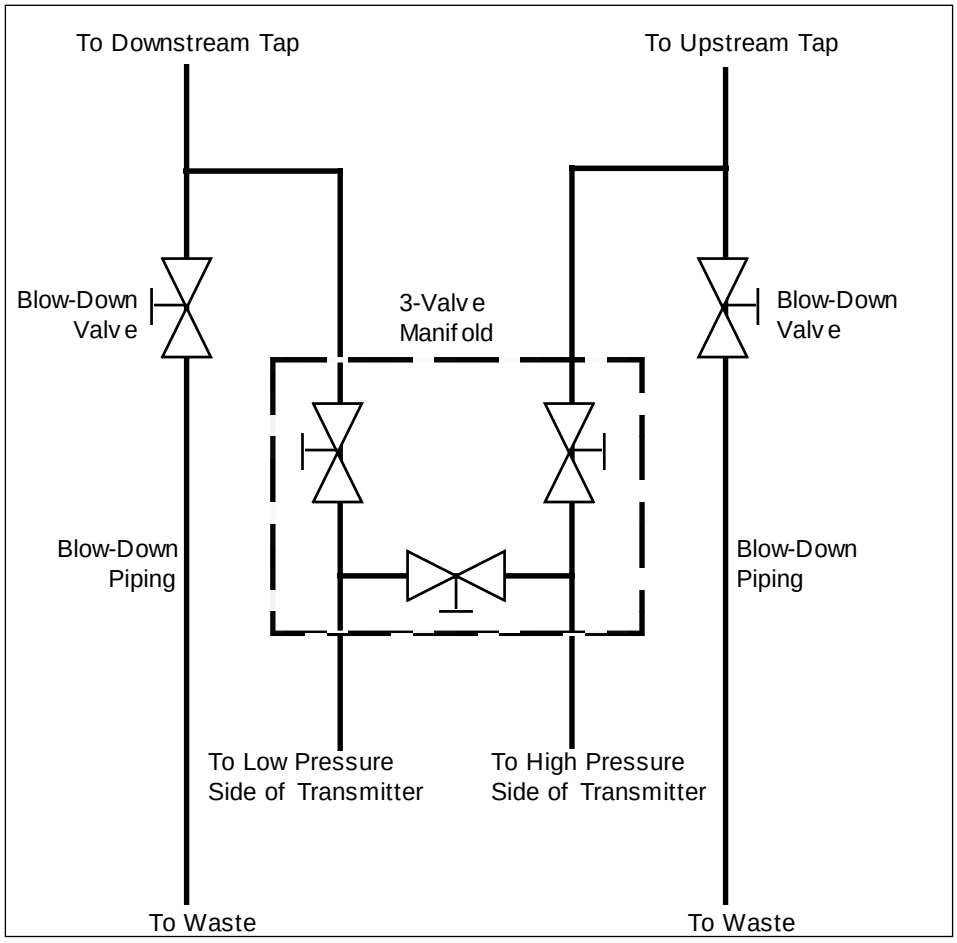


Figure 52– ST 700 Basic Transmitter - Typical 3-Valve Manifold with Blow-Down Piping

12.6.2 Suggestions for Transmitter Location

The following are suggested connections based on what is being processed by the system.

Table 34 – ST 700 Basic Transmitter - Suggested Connection Locations

Process	Suggested Location	Description
Gases	Above the gas line.	The condensate drains away from the transmitter.
Liquids	Below but near the elevation of the process connection.	This minimizes that static head effect of the condensate.
	Level with or above the process connection.	This requires a siphon to protect the transmitter from process steam. The siphon retains water as a *fill fluid*.

5. For liquid or steam, the piping should slope a minimum of 25.4mm (1 inch) per 305mm (1 foot).
6. Slope the piping down toward the transmitter if it is below the process connection to allow the bubbles to rise back into the piping through the liquid.
7. If the transmitter is located above the process connection, the piping should rise vertically above the transmitter. In this case, slope down toward the flow line with a vent valve at the high point.
8. For gas measurement, use a condensate leg and drain at the low point (freeze protection may be required here).

ATTENTION Care must be taken when installing transmitters on hot processes. The operating temperature limits for the device (as outlined in Table 5) must not be exceeded. Impulse piping may be used to reduce the temperature of the process that comes into contact with the transmitter meter body. As a general rule there is a 56°C drop (100°F) in the temperature of the process for every foot of ½ inch uninsulated piping.

12.6.3 General Piping Guidelines

- When measuring fluids that contain suspended solids, install permanent valves at regular intervals to blow-down piping.
- Blow-down all lines on new installations with compressed air or steam, and flush them with process fluids (where possible) before connecting these lines to the transmitter Meter body.
- Verify that the valves in the blow-down lines are closed tightly after the initial blow-down procedure and each maintenance procedure thereafter.

12.6.4 Procedure to Install Flange Adapters

The following procedure provides the steps for removing and replacing an optional flange adapter on the process head. Refer to Figure 53.

This procedure does not require that the Meter body be removed from the electronics housing. If flange adapters are being replaced with parts from other kits (for example, process heads), follow the procedures for the kits and incorporate the following procedure.

The threaded hole in each flange adapter is offset from center. To ensure proper orientation for re-assembly, note the orientation of the offset relative to each process head **before removing the adapter**.

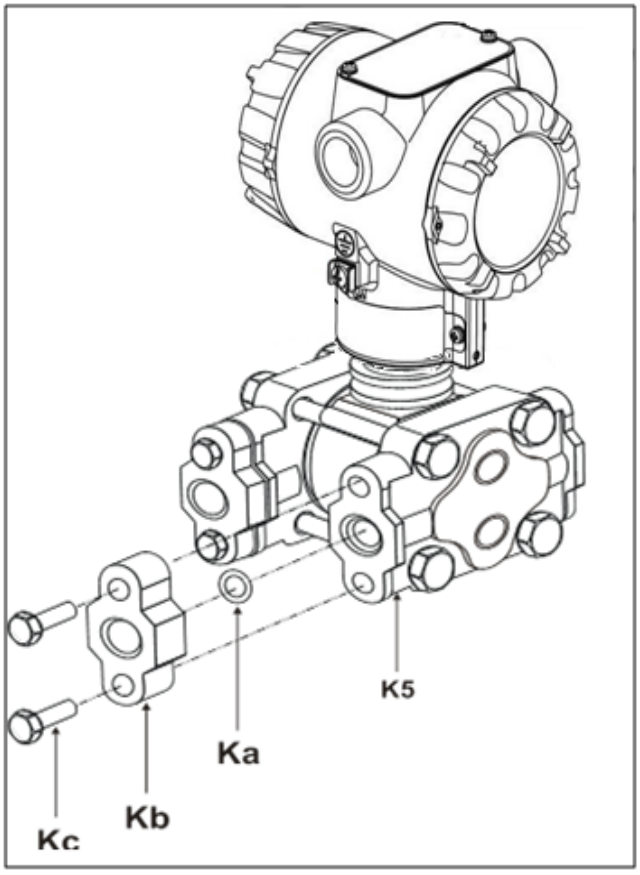


Figure 53 – ST 700 Basic Transmitter - Flange Adapter Removal and Replacement

Refer to the instructions included with the kit for removal and replacement procedures.

12.7 Wiring an ST 700 Basic Transmitter

12.7.1 Overview

The ST 700 basic transmitter is designed to operate in a two-wire power/current loop with loop resistance and power supply voltage within the operating range shown in Figure 54.

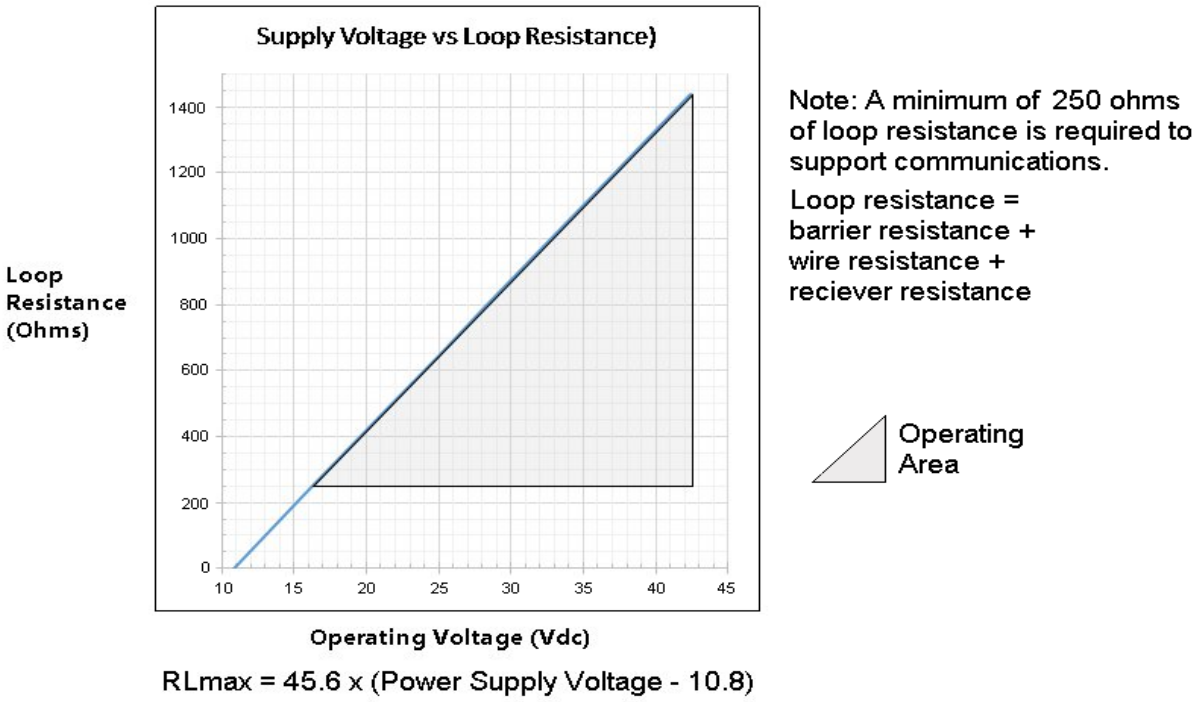


Figure 54 – ST 700 Basic Transmitter - Operating Ranges

Loop wiring is connected to the transmitter by simply attaching the positive (+) and negative (–) loop wires to the positive (+) and negative (–) terminals on the transmitter terminal block in the electronics housing shown in Figure 55.

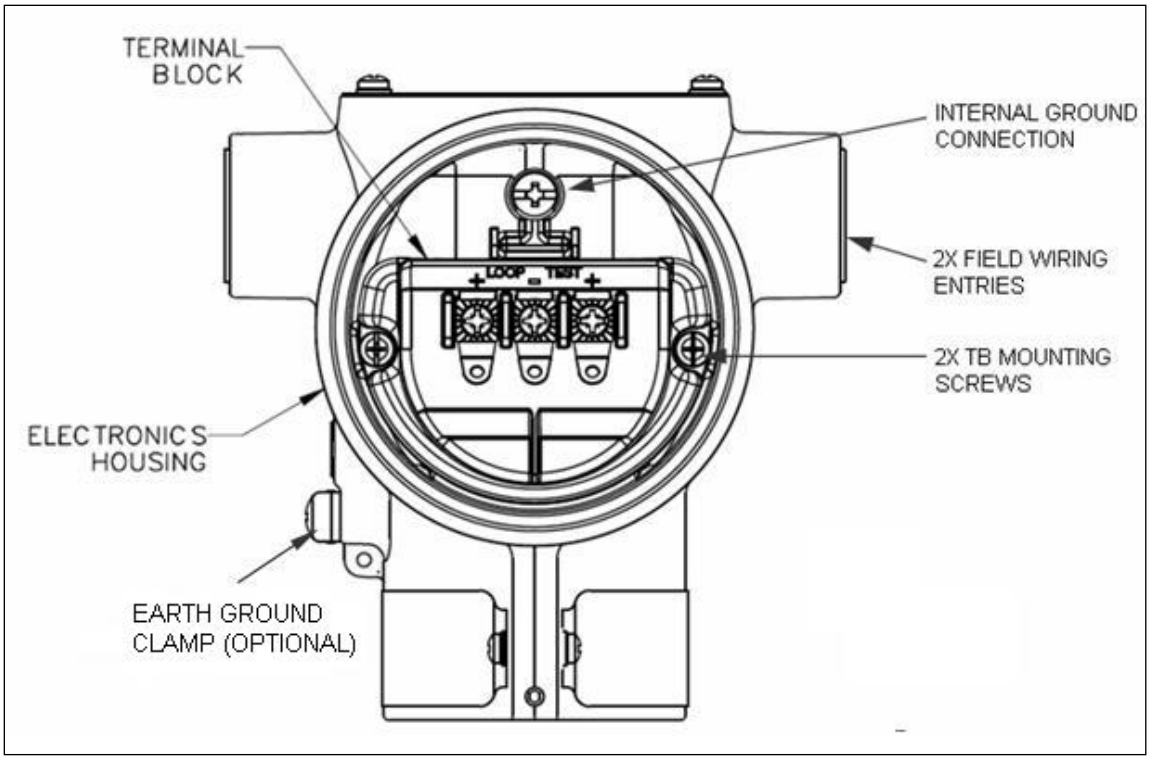


Figure 55 – ST 700 Basic Transmitter - 3-Screw Terminal Board and Grounding Screw

As shown in Figure 55 each transmitter has an internal terminal to connect it to earth ground. Optionally, a ground terminal can be added to the outside of the electronics housing. While it is not necessary to ground the transmitter for proper operation, doing so tends to minimize the possible effects of noise on the output signal and affords protection against lightning and static discharge. An optional lightning terminal block can be installed in place of the non-lightning terminal block for transmitters that will be installed in an area that is highly susceptible to lightning strikes.

Wiring must comply with local codes, regulations and ordinances. Grounding may be required to meet various approval body certification, for example CE conformity. Refer to Appendix A of this document for details.

The transmitter is designed to operate in a two-wire power/current loop with loop resistance and power supply voltage within the operating range; see

Figure **54**. With optional devices such as remote meter, the voltage drop for these options must be added to the basic 10.8-volt supply requirements to determine the required transmitter voltage (V_{XMTR}) and maximum loop resistance ($R_{LOOP\ MAX}$). Additional consideration is required when sel*ecting* intrinsic safety barriers to ensure that they will supply at least minimum transmitter voltage ($V_{XMTR\ MIN}$), including the required 250 ohms of resistance (typically within the barriers) needed for digital communications.

Transmitter loop parameters are as follows:
$R_{LOOP\ MAX}$ = maximum loop resistance (barriers plus wiring) that will allow proper transmitter operation and is calculated as $R_{LOOP\ MAX} = (V_{SUPPLY\ MIN} - V_{XMTR\ MIN}) \div 21.8mA$.

In this calculation:

$V_{XMTR\ MIN} = 10.8V + V_{LP} + V_{SM}$
$V_{LP} = 0V$ for Honeywell supplied lightning protection option, LP
$V_{SM} = 2.3V$, remote meter

Note that V_{SM} should only be considered if a remote meter will be connected to the transmitter.

The positive and negative loop wires are connected to the positive (+) and negative (–) terminals on the terminal block in the transmitter electronics housing.

Barriers can be installed per Honeywell's instructions for transmitters to be used in intrinsically safe applications.

12.7.2 Digital System Integration Information

Transmitters that are to be digitally integrated to Honeywell's Total Plant Solution (TPS) system will be connected to the pressure transmitter interface module in the Process Manager, Advanced Process Manager or High Performance Process Manager through a Field Termination Assembly. Details about the TPS system connections are given in the *PM/APM SmartLine Transmitter Integration Manual*, PM12-410, which is part of the TDC 3000^X system bookset.

If you are digitally integrating a transmitter in an Allen Bradley Programmable Logic Controller (PLC) process system, the same Field Terminal Assembly (FTA) and wiring procedures used with Honeywell's TPS system are also used with the Allen-Bradley 1771 and 1746 platforms.

12.7.3 Wiring Variations

The above procedures are used to connect power to a transmitter. For loop wiring and external wiring, detailed drawings are provided for transmitter installation in non-intrinsically safe areas and for intrinsically safe loops in hazardous area locations.

If you are using the transmitter with Honeywell's TPS system, see *PM/APM Smartline Transmitter Integration Manual*, PM12-410, which is part of the TDC 3000^X system bookset.

12.7.4 Wiring Procedure

7. See Figure 55 above, for parts locations. Loosen the end cap lock using a 1.5mm Allen wrench.
8. Remove the end cap cover from the terminal block end of the electronics housing.
9. Feed loop power leads through one end of the conduit entrances on either side of the electronics housing. The transmitter accepts up to 16AWG wire.
10. Plug the unused conduit entrance with the appropriate plug for the environment.
11. Connect the positive loop power lead to the positive (+) terminal and the negative loop power lead to the negative (-) terminal. Note that the transmitter is <u>not</u> polarity-sensitive.
12. Replace the end cap, and secure it in place.

12.7.5 Lightning Protection

If your transmitter includes the optional lightning protection, connect a wire from the Earth Ground Clamp (see Figure 55) to Earth Ground to make the protection effective. Use a size 8 AWG or (8.37mm^2) bare or green covered wire for this connection.

12.7.6 Supply Voltage Limiting Requirements

If your transmitter complies with the ATEX 4 directive for self-declared approval per 94/9EC, the power supply has to include a voltage-limiting device. Voltage must be limited such that it does not exceed 42V DC. Consult the process design system documentation for specifics.

12.7.7 Process Sealing

The ST 700 SmartLine pressure transmitter is CSA-certified as a Dual Seal device in accordance with ANSI/ISA–12.27.01–2003, "Requirements for Process Sealing Between Electrical Systems and Flammable, or Combustible Process Fluids."

12.7.8 Explosion-Proof Conduit Seal

When installed as explosion proof in a Division 1 Hazardous Location, keep covers tight while the transmitter is energized. Disconnect power to the transmitter in the non-hazardous area prior to removing end caps for service.

When installed as non-incendive equipment in a Division 2 hazardous location, disconnect power to the transmitter in the non-hazardous area, or determine that the location is non-hazardous before disconnecting or connecting the transmitter wires.

Transmitters installed as explosion proof in Class I, Division 1, Group A Hazardous (classified) locations in accordance with ANSI/NFPA 70, the US National Electrical Code, with 1/2 inch conduit do not require an explosion-proof seal for installation. If 3/4 inch conduit is used, a LISTED explosion-proof seal to be installed in the conduit, within 18 inches (457.2mm) of the transmitter.

12.8 Startup

12.8.1 Overview

This section identifies typical start up tasks associated with several generic pressure measurement applications. It also includes the procedure for running an optional analog output check.

12.8.2 Startup Tasks

After completing the installation and configuration tasks for a transmitter, you are ready to start up the process loop. Startup usually includes:

- Checking zero input
- Reading inputs and outputs
- Applying process pressure to the transmitter.

The actual steps in a startup procedure vary based on the type of transmitter and the measurement application. In general, the procedures in this section are based on using Honeywell MC Toolkit to check the transmitter input and output under static process conditions, and make adjustments as required initiating full operation with the running process. Note that similar checks can be made using the optional external 2-button assembly, where the transmitter is equipped. Operation with the 2-button assembly is discussed in the Operation section.

When the standard display is connected, the two-button assembly for the standard display is present. The buttons will function 1 second after powering up.

12.8.3 Output Check Procedures

The Output Check comprises the following procedures:

- The loop test procedure checks for continuity and the condition of components in the output current loop.
- The Trim DAC Current procedure calibrates the output of the Digital-to-Analog converter for minimum (0%) and maximum (100%) values of 4mA and 20mA, respectively. This procedure is used for transmitters operating online in analog mode to ensure proper operation with associated circuit components (for example, wiring, power supply, control equipment). Precision test equipment (an ammeter or a voltmeter in parallel with precision resistor) is required for the Trim DAC Current procedure.
- The Apply Values procedure uses actual Process Variable (PV) input levels for calibrating the range of a transmitter. To measure a liquid level for example, a sight-glass can be used to determine the minimum (0%) and maximum (100%) level in a vessel. The PV is carefully adjusted to stable minimum and maximum levels, and the LRV and URV are then set by commands from the MC Toolkit.

The transmitter does not measure the given PV input or update the PV output while it operates in the Output mode.

12.8.4 Constant Current Source Mode Procedure

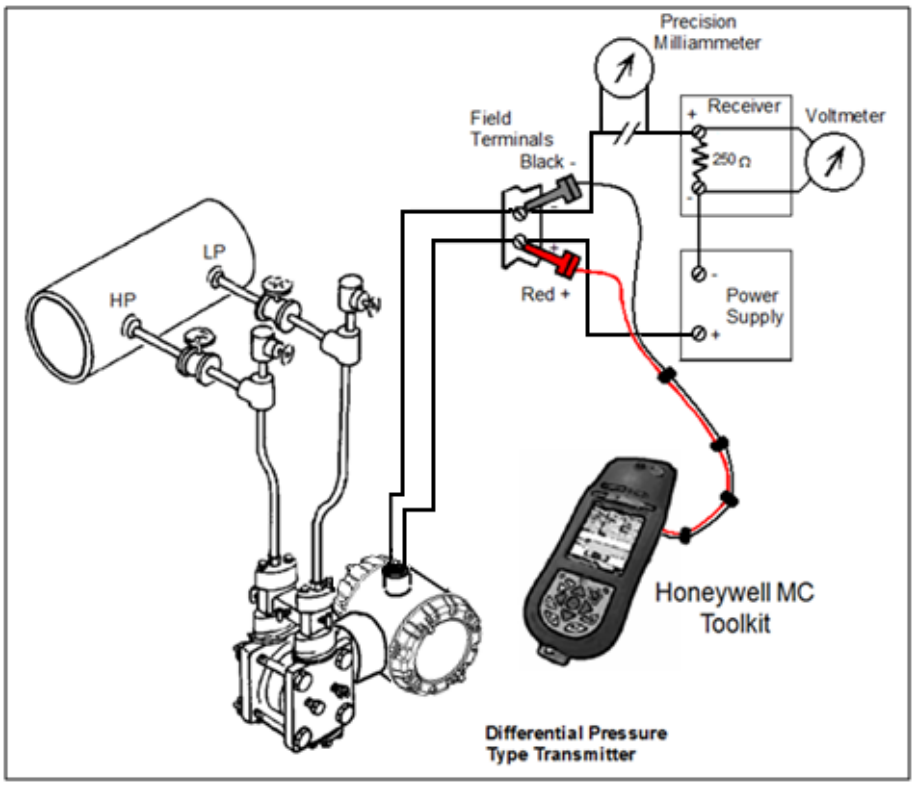


Figure 56 – ST 700 Basic Transmitter - Current Loop Test Connections

10. Refer to Figure 56 for test connections. Verify the integrity of electrical components in the output current loop.
11. Establish communication with the transmitter. For these procedures, the values of components in the current loop are not critical if they support reliable communication between the transmitter and the Toolkit.
12. On the Toolkit, display the **Output Calibration** box.
13. In the Output Calibration box, select the **Loop Test** button; the **LOOP TEST** box will be displayed.
14. Select the desired constant-level Output: 0%, 100%, or Other (any between 0% - 100%).
15. Select the Set button. A box will be displayed asking **Are you sure you want to place the transmitter in output mode?**

With the transmitter in Analog mode, you can observe the output on an externally-connected meter or on a local meter. In DE mode, you can observe the output on the local meter or on the Toolkit Monitor display.

16. Select the **Yes** button. Observe the output current at the percentage you selected in Step 5.
17. To view the monitor display, navigate back from the **LOOP TEST** display, and select the **MONITOR** display. A **Confirm** popup will be displayed.
18. Select **Yes** to continue. This concludes the Startup procedure.

13. Operation_ST 700 Basic Transmitter

13.1 Overview

This section provides the information and processes involved for operation of ST 700 basic transmitter using the external two-button options.

13.2 External Two-Button Operation

The ST 700 basic transmitter optional external two-button interface provides a user interface and operation capability without opening the transmitter. Figure 57 shows the location of the two-button option and the labels for each button. See Table 41 for button operation.

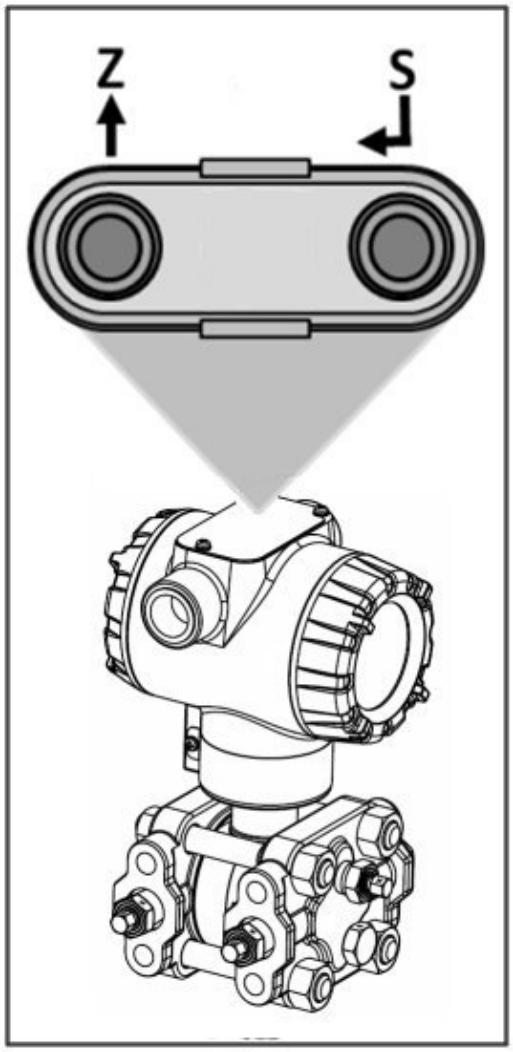


Figure 57 – ST 700 Basic Transmitter - Two-Button Option

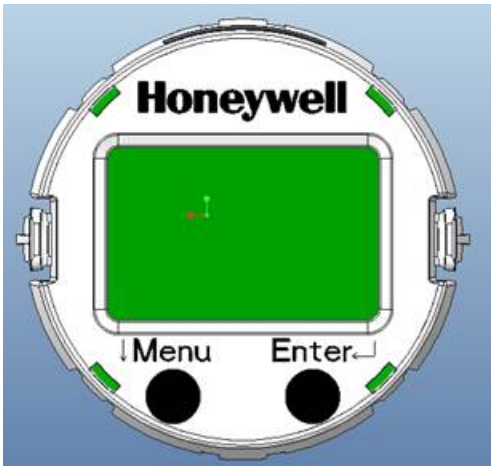
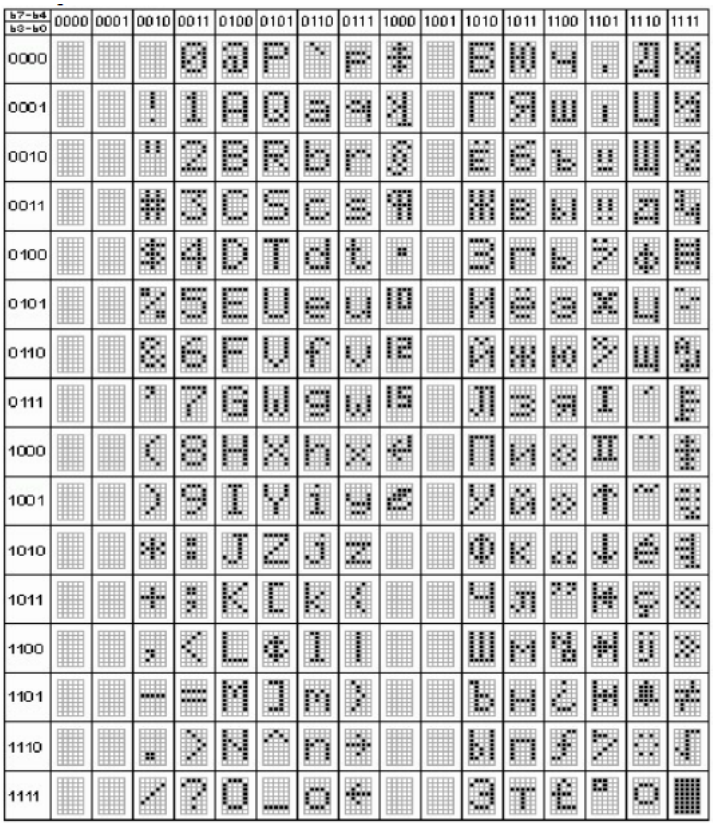


Figure 58 – ST 700 Basic Transmitter - Two-Button Option

The correspondence between Character Codes and Character Patterns used for English and Russian are shown below.

English and Russian character display reference



13.2.1 The Standard Display Menu

The standard display menu is implemented as one long single-level menu, after entering into menu mode, and will "wrap around" when it reaches the end of the menu. To enter menu mode select ↵ in PV display mode. Operation is as follows:

6. Select <**Exit Menu**> and press ↵ to exit the menu.
7. Use the ↓ buttons to scroll through the list of menu items.
8. Press the ↵ button to select an item in menu mode for data entry or activation. When an item is selected for data entry or activation, the cursor will jump to the lower line of the LCD to allow editing of the value. No action is taken against a menu item until the user presses the ↵ button.
9. If you want to abort a data entry operation, simply refrain from pushing any buttons for more than 10 seconds; the data entry operation will time out and the original value of the selected item will be preserved.
10. If you want to abort a menu operation, simply refrain from pushing any buttons for more than 60 seconds; the menu operation will time out and the exit from menu & it will show PV value.

The menu is divided into standard menu and extended menu which can be enabled and disabled by extended menu enable/disable operation.

Note: The abort option is not available for Loop test parameter. The timeout for the DAC trim operation is more to enable user to calculate the loop current value to enter.

Table 35 – ST 700 Standard Transmitter: Standard Display Menus
English

Menu	Submenu/Selection/Value Entry		Description	Action
PV Display [1SEL PV]	Pressure (PRESURE)	Pressure Units	Select Process Variable (PV) to be shown on the display from list.	Press ↵ to enter Menu Mode Press ↵ to enter menu selection Press ↵ to initiate action Press ↓Menu to Exit to Menu
	Percent Output (% OUT)	%		
	Loop Output (LOOPOUT)	mA		
	Flow (FLOW) Note: Before seleting PV type as Flow, please ensure the LRV/URV values in (pressure unit) are as per application. For PV type Flow the pressure unit will not be visible.	Flow unit		

Menu	Submenu/Selection/Value Entry	Description	Action
Pressure Units [2UNITS] (Visible for all PV except Flow)	atm bar ftH2O68F gf/cm2 inH2O39F inH2O60F inH2O68F inHg0C kgf/cm2 kPa mbar mmH2O4C mmH2O68F mmHg0C MPa Pa psi Torr mH2O4C cmH2O4C	Choose appropriate engineering units from list	
Flow Units [3FLUNIT]	Cubic meter/hour[m3/hr] Kg/hour [Kg/hr] Metric Ton/Hour [MT/hr] Liter per second [L/sec] Liters/hour [L/hr] Standard Cubic feet per hour[SCFH] Cubic feet per hour[CFH] Gallons/hour[gal/hr] Barrel/hours [bbl/hr] Imperial Gallons/hours[Igal/hr] Percentage[%] Standard Cubic Feet per day[SCFD] Gallons/min[gal/min] Pounds/hour[lb/hr] Pounds/min[lb/min] Standard Cubic feet per minute[SCFM] Metric standard Cubic Feet per hour[MSCFH] Million Metric Standard Cubic feet per hour[MMSCFH]	Choose appropriate engineering units from list	Press ↵ to enter Menu Mode Press ↵ to enter menu selection Press ↵ to initiate action Press ↓Menu to Exit to Menu

Menu	Submenu/Selection/Value Entry	Description	Action
Scaling Low [4SCLLOW] Scaling High [5SCLHIG]	#. ## #. ##	The limits are: -999999 to 999999	Press ↵ to enter Menu Mode Press ↵ to enter menu selection ↓ Menu to select number. ↵ to enter and shift to the next digit to the right After complete value is Entered Press ↓Menu to Exit to Menu
Enter LRV [6ENTLRV] Enter URV [7ENTURV]	#. ## #. ##	The limits are: 2X the Lower Range Limit (LRL) of the Meter body and 2X the Upper Range Limit (URL) of the Meter body. The LRV/URV value will be available in Pressure Units (Standard display pressure unit)	
Zero Correct [8SETZRO]	Zero Correct	Executing this selection performing for Zero Correct operation	Press ↵ to enter Menu Mode Press ↵ to enter menu selection Press ↵ to initiate action Press ↓Menu to Exit to Menu

Table 36 - ST 700 Standard Transmitter: Standard Display Menus
Russian

Menu	Submenu/Selection/Value Entry		Description	Action
1ВыбрPV [1SEL PV]	Давл-ие (PRESURE)	Pressure Units	Select Process Variable (PV) to be shown on the display from list.	Press ↵ to enter Menu Mode Press ↵ to enter menu selection Press ↵ to initiate action Press ↓Menu to Exit to Menu
	%Выхода (% OUT)	%		
	ТокВыхд (LOOPOUT)	mA		
	Расход (FLOW)	Flow unit		
2Ед.Изм [2UNITS]	атм (atm) Бар (bar) ftH2O68F гс/см2 (gf/cm2) inH2O39F inH2O60F inH2O68F inHg0C кгс/см2 (kgf/cm2) кПа (kPa) мБар (mbar) ммH2O4C (mmH2O4C) ммH2O68F (mmH2O68F) ммHg0C (mmHg0C) МПа (MPa) Па (Pa) пси (psi) торр (Torr) мH2O4C (mH2O4C) смH2O4C (cmH2O4C)	Choose appropriate engineering units from list		
3ЕдРасх [3FLUNIT]	м3/ч (m3/hr) кг/ч (Kg/hr) т/ч (MT/hr) л/с (L/sec) л/ч (L/hr) cft3/ч (SCFH) ft3/ч (CFH) гал/ч (gal/hr) барел/ч (bbl/hr) галл/ч (Igal/hr) % стft3/д (SCFD) галл/мн (gal/min) фунт/ч (lb/hr) фунт/мн (lb/min) cft3/мн (SCFM) стft3/ч (MSCFH) МстМ3/ч (MSCFH)	Choose appropriate engineering units from list		

Menu	Submenu/Selection/ Value Entry	Description	Action
4МасшLo[4SCLLOW] 5МасшUp [5SCLHIG]	#. ## #. ##	The limits are: -999999 to 999999	Press ↵ to enter Menu Mode Press ↵ to enter menu selection ↓ Menu to select number. ↵ to enter and shift to the next digit to the right After complete value is Entered Press ↓Menu to Exit to Menu
6ВвдLRV [6ENTLRV] 7ВвдURV [7ENTURV]	#. ## #. ##	The limits are: 2X the Lower Range Limit (LRL) of the Meter body and 2X the Upper Range Limit (URL) of the Meter body. The LRV/URV value will be available in Pressure Units (Standard display pressure unit)	
8УстНол [8SETZRO]	Zero Correct	Executing this selection performing for Zero Correct operation	Press ↵ to enter Menu Mode Press ↵ to enter menu selection Press ↵ to initiate action Press ↓Menu to Exit to Menu

Table 37 – ST 700 Standard Transmitter - Extended Display Menu

English

Menu	Submenu/Selection /Value Entry	Description	Action
DAC Zero Trim [9ZEROTR] Note: Loop must be removed from Automatic Control	DAC Zero Trim	This selection allows the loop zero output 4mA value to be trimmed. Note: You must connect a current meter to the transmitter to monitor the loop output.	Press ↵ to enter Menu Mode Press ↵ to enter menu selection ↓ Menu to select number. ↵ to enter and shift to the next digit to the right After complete value is Entered Press ↓Menu to Exit to Menu
DAC Span Trim [10SPANTR] Note: Loop must be removed from Automatic Control	DAC Span Trim	This selection allows the loop span output 20mA value to be trimmed. Note: You must connect a current meter to the transmitter to monitor the loop output.	
Loop Test [11LPTEST] Note: Loop must be removed from Automatic Control	Loop Test 12.000	This selection allows the user to force the DAC output to any value between 3.8 and 20.8 mA. Note: This selection will put the DAC into Fixed Output Mode, as indicated by the flashing output value. Navigation away from this menu item will return the loop to Normal (Automatic) Mode.	
Set LRV [12SETLRV]	Set LRV	Executing this selection performing for Zero operation.	Press ↵ to enter Menu Mode Press ↵ to enter menu selection Press ↵ to initiate action
Set URV [13SETURV]	Set URV	Executing this selection for Span operation	
Contrast [14CNTRST]	»»»»»»	Adjust the LCD contrast level. Range from » (1) to »»»»»»»»»»» (7) Default: »»»»»»»»»(7)	
LRV Corrects[15LRVCOR]	Calibration Methods	perform an input calibration correction by applying process input at the configured LRV level.	Press ↵ to enter menu selection Press ↵ to initiate action
URV Corrects[16URVCOR]	Calibration Methods	perform an input calibration correction by applying process input at the configured URV level.	
Reset Corrects[17RSTCOR]	Calibration Methods	clear all user calibration adjustments	

Menu	Submenu/Selection /Value Entry	Description	Action
Tag Id [18TAGID]	XXXXXXXX	Device tag will be displayed. X = any Alphanumeric value	↓Menu to select from list ↵ to enter
Device Firmware[19DEVFW]	x.xxxxxx	Menu item shows the current Firmware version of the device. x = any numeric value	
Sensor Firmware[20SENFW]	x.xxxxxx	Menu item shows the current Firmware version of the sensor. x = any numeric value	
PV Damping[21PVDAMP]	xx.x	Enter a value for damping of the device output. Entries may be any value from 0.00 to 32.00 seconds.	Press ↵ to enter menu selection ↓ to select number. ↵ to enter and shift to the next digit to the right
Filter Selection[22FLTSEL]	STDSOR FASTSOR	Filter Performance Selection: Configure the desired performance for the Output Speed of Response Filter. Select from: Standard SOR: excellent speed of response to input changes with optimal noise performance Fast SOR: fastest speed of response to input changes	Press ↵ to enter menu selection ↓Menu to select from list ↵ to enter
NAMUR [23NAMUR]	DISABLE ENABLE	select to enable or disable the Namur option for effect on output signal.	
Language Selection[24LNGSEL]	ENGLISH RUSSIAN	Select English or Russian option to show display in selected language.	
Transfer Function[25TXFRFN]	LINEAR SQRT	Pressure Transfer function: Select the pressure transfer function for calculated output: Linear: (output scaled linearly per configured range) Square Root: (output scaled as square root conversion per configured range - for flow measurements)	

Menu	Submenu/Selection /Value Entry	Description	Action
Low Flow Cut Off Mode[26CUTFMD]	ZROFLOW SBRKPT DAULSLP	For Square Root (Transfer function) configurations only, choose the operating mode to determine the low flow cutoff breakpoint: Dual slope: (breakpoint determined by dual slope calculation) User configuration: (breakpoint defined by user) Zero Flow: sets analog output to 4mA when square root / flow is below user defined flow cutoff value.	
Low Flow Cut Off Breakpoint[27%FLOW]	xx.xxx	When “User Configuration” is selected for Low Flow Cutoff Mode, enter the desired breakpoint value.	Press ↵ to enter menu selection ↓ to select number. ↵ to enter and shift to the next digit to the right
Enable Extended Menu [EXDMNU]	DISABLE ENABLE	Select ‘Enable’ to enter ‘EX MENU’ and ‘Disable‘ to enter into ‘SD MENU’. The default is disabled.	Press ↵ toto Enter the Menu Mode Press ↵ to enter Menu selection Menu to Enable or disable the Extended Menu ↵ to Enter Press ↓Menu to Exit to Menu
[EXIT]	Exit	Exit from Menu	↓Exit from Menu list ↵ to enter

Table 38 - ST 700 Standard Transmitter - Extended Display Menu
Russian

Menu	Submenu/Selection /Value Entry	Description	Action
9НолЦАП [9ZEROTR] Note: Loop must be removed from Automatic Control	DAC Zero Trim	This selection allows the loop zero output 4mA value to be trimmed. Note: You must connect a current meter to the transmitter to monitor the loop output.	Press ↵ to enter menu selection ↓ Menu to select number. ↵ to enter and shift to the next digit to the right Press ↵ to enter menu selection ↓ to select number. ↵ to enter and shift to the next digit to the right
10ШклЦАП [10SPANTR] Note: Loop must be removed from Automatic Control	DAC Span Trim	This selection allows the loop span output 20mA value to be trimmed. Note: You must connect a current meter to the transmitter to monitor the loop output.	
11ТокТст [11 LPTEST] Note: Loop must be removed from Automatic Control	Loop Test 12.000	This selection allows the user to force the DAC output to any value between 3.8 and 20.8 mA. Note: This selection will put the DAC into Fixed Output Mode, as indicated by the flashing output value. Navigation away from this menu item will return the loop to Normal (Automatic) Mode.	
12УстLRV [12SETLRV]	Set LRV	Executing this selection performing for Zero operation. Note: The PV value shown in bottom line will be available in Pressure Units (Simple Display pressure unit)	Press ↵ to enter menu selection Press ↵ to initiate action Press ↵ to enter Menu selection Menu to select level. ↵ to Enter
13УстURV [13SETURV]	Set URV	Executing this selection for Span operation Note: The PV value shown in bottom line will be available in Pressure Units (Simple Display pressure unit)	
14Кнтрст [14CNTRST]	Contrast level	Adjust the LCD contrast level. Range from » (1) to »»»»»»»»»» (7) Default: »»»»»»»» (7)	
15КорLRV [15LRVCOR]	Calibration Methods	perform an input calibration correction by applying process input at the configured LRV level.	Press ↵ to enter menu selection Press ↵ to initiate action
16КорURV [16URVCOR]	Calibration Methods	perform an input calibration correction by applying process input at the configured URV level.	Press ↵ to enter menu selection Press ↵ to initiate action

Menu	Submenu/Selection /Value Entry	Description	Action
17СбрКор [17RSTCOR]	Calibration Methods	clear all user calibration adjustments	Press ↵ to enter menu selection Press ↵ to initiate action
18№Позиц [18TAGID]	XXXXXXXX	Device tag will be displayed. X = any Alphanumeric value	↓Menu to select from list ↵ to enter
19DEV№ПО [19DEVFW]	x.xxxxxx	Menu item shows the current Firmware version of the device. x = any numeric value	
20SEN№ПО [20SENFW]	x.xxxxxx	Menu item shows the current Firmware version of the sensor. x = any numeric value	
21tдемпф [21PVDAMP]	PV Damping	Enter a value for damping of the device output. Entries may be any value from 0.00 to 32.00 seconds.	Press ↵ to enter menu selection ↓ to select number. ↵ to enter and shift to the next digit to the right
22Ответ [22FLTSEL]	СтдСкан (STDSOR) БыстСкн (FASTSOR)	Filter Performance: Configure the desired performance for the Output Speed of Response Filter. Select from: Standard SOR: excellent speed of response to input changes with optimal noise performance Fast SOR: fastest speed of response to input changes	Press ↵ to enter menu selection ↓Menu to select from list ↵ to enter
23NAMUR [23NAMUR]	Откл (DISABLE) Вкл (ENABLE)	NAMUR:select to enable or disable the Namur option for effect on output signal.	Press ↵ to enter menu selection ↓Menu to select from list ↵ to enter
24Язык [24LNGSEL]	Англ (ENGLISH) Русский (RUSSIAN)	Language selection: Select English or Russian option to show display in selected language.	Press ↵ to enter menu selection ↓Menu to select from list ↵ to enter
25Функц [25TXFRFN]	Линейн (LINEAR) КвдрКор (SQRT)	Pressure Transfer function: Select the pressure transfer function for calculated output: Linear: (output scaled linearly per configured range) Square Root: (output scaled as square root conversion per configured range - for flow measurements)	Press ↵ to enter menu selection ↓Menu to select from list ↵ to enter

Menu	Submenu/Selection /Value Entry	Description	Action
26Отсечк [26CUTFMD]	Нолтечь (ZROFLOW) 1Отсечк (SBRKPT) 2Отсечк (DUALSLP)	Low Flow Cutoff Mode: For Square Root (Transfer function) configurations only, choose the operating mode to determine the low flow cutoff breakpoint: Dual slope: (breakpoint determined by dual slope calculation) User configuration: (breakpoint defined by user) Zero Flow: sets analog output to 4mA when square root / flow is below user defined flow cutoff value.	
27%Отсеч [27%FLOW]	Low Flow Cutoff Breakpoint	When “User Configuration” is selected for Low Flow Cutoff Mode, enter the desired breakpoint value.	Press ↵ to enter menu selection ↓ to select number. ↵ to enter and shift to the next digit to the right
РасМню [EXDMNU]	Откл (DISABLE) -> СтМеню (SD MENU) Вкл (ENABLE) ->РсшМеню (EX MENU)	Select ‘Enable’ to enter ‘EX MENU’ and ‘Disable‘ to enter into ‘SD MENU’. The default is disabled.	Press ↵ to enter menu selection ↓Menu to select from list ↵ to enter
Выход [EXIT]	Exit	Exit from Menu	↓Exit from Menu list ↵ to enter

13.2.2 Standard Display Abbreviations:

Table 39 – The Standard Display abbreviations

English / Russian Abbreviations	Meaning
OOR / ВнеШкалы	Out of Range
PRSPAN / УмншШкал	Push reduce span
Wrng Mo / НпрвРежм	Wrong Mode
Illegal / НпрвЗнач	Illegal Value
Wrt Err / ОшбПамят	NVM write error
Too Hi / НижНизк	Value/Parameter Too High
Too Lo / ВышВысок	Value/Parameter Too Low
LRV Hi / LRVНизк	LRV too High
LRV Lo / LRVВысок	LRV too Low
URV Hi / URVНизк	URV too High
URV Lo / URVВысок	URV too Low
LargeSP / ВысШкала	Span too large
SmallSP / НизШкала	Span too small
Locked / Заблокир	Device is locked
Multidr / МнТочРеж	Device in multidrop mode
Wrt Prt / ЗащЗапис	Device in write protect mode
NotSprt / НеПоддер	Not supported

13.2.3 Data Entry

Data entry is performed from left to right. Select a character / digit by pressing ↓ buttons, and then press ↵ to advance to the next character position to the right. Select the cross-hatch character ▒ to terminate the entry or if the final character is already a space character, just press **<<** again.

All numeric entries are clamped at the low or high limit if needed. You can determine the low and high limit for a parameter by selecting either the **H** or **L** character while the cursor is positioned over the left-most digit and press ↵ button. The display will show the selected limit.
For numeric entry sign is required to be entered only for negative numbers. For positive number, select space and move ahead.

Table 40 – ST 700 Basic Transmitter - Two-Button Data Entry

Screen Symbol		Numeric data entry
H		Display the high limit for this parameter. This symbol only appears in the left-most position of the data entry field.
L		Display the low limit for this parameter. This symbol only appears in the left-most position of the data entry field.
<<		Terminate the numeric entry
0 thru 9, Minus, Decimal		These characters are used to enter numeric values. The minus sign only appears in the left-most digit.

13.2.4 Editing a Numeric value

Editing a numeric value is a digit-by-digit process, starting with the left-most digit.

1. Press ↵ to begin the edit process.
2. The standard display will show the current value of the item on the lower line, left justified.
3. Press the ↓ buttons to select the desired digit, and then press ↵ to advance to the next digit to the right.
4. After the last digit has been entered, press ↵ one more time to write the new value to the transmitter.

13.2.5 Selecting a new setting from a list of choices

Use the procedure described below to select a new setting for parameters that present a list of choices (e.g. PV display, Pressure Units, and so forth.).

1. Press ↵ to begin the edit process.
   a. The standard display will show the current setting of the item on the lower line
2. Press the ↓ buttons to scroll through the list of choices.
3. Press ↵ to make your selection. The new selection will be stored in the transmitter and will be displayed on the lower line

13.3 Two Button Operation with no Display Installed

When there is no display installed, the buttons can be used to perform a Zero or Span adjustment and zero correction of the ST 700 basic transmitter. Caution should be taken to insure these adjustments are only made when the correct input pressures are applied.

13.3.1 Zero Adjustment

This adjustment is the same as performing a Set LRV using the display.

1. Connect a current meter or voltmeter as shown in Figure 56 to monitor the PV output of the transmitter.
2. Using an accurate pressure source, apply pressure equivalent to the transmitter LRV.
3. Press the Zero (↑) button for more than 2 seconds to set the Zero.
4. Verify that the output is now 4 mA.

Note: Pressing the zero button for more than 5 seconds will ignore the button press.

13.3.2 Span Adjustment

This adjustment is the same as performing a Set URV using the display.

1. Connect a current meter or voltmeter as shown in Figure 56 to monitor the PV output of the transmitter.
2. Using an accurate pressure source, apply pressure equivalent to the desired Upper Range Value of the transmitter.
3. Press the **Span** (↵) button for more than 2 secondsr to set the span.
4. Verify that the PV output is now 20mA.

Note: Pressing the zero button for more than 5 seconds will ignore the button press.

13.3.3 Zero Correction

This adjustment is the same as performing a zero correct using the display.

1. Connect a current meter or voltmeter as shown in Figure 56 to monitor the PV output of the transmitter.
2. Using an accurate pressure source, apply pressure equivalent to the zero Value of the transmitter.
3. Press the Zero (↑) and **Span** (↵) buttons together for more than 5 sec to set the span.
4. Verify that the PV is set to 0 value.

Note: Pressing the SPAN button for more than 10 seconds will ignore the button press

You can also use the MCT Toolkit to make any adjustments to an ST 700 SmartLine pressure transmitter. Alternately, certain adjustments are possible through an Experion Station , if the ST 700 is digitally integrated with either of these stations.

13.4 Changing the Default Failsafe Direction

ST 700 basic transmitters are shipped with a default failsafe direction of upscale. This means that the transmitter output will set the current output to upscale failsafe (maximum output) upon detection of a critical status. You can change the direction from upscale failsafe to downscale failsafe (minimum output) by moving the top jumper located in the electronics module.

13.4.1 Procedure to Establish Failsafe Operation

The failsafe direction display accessible via the toolkit shows only the state of the jumper as it correlates to analog transmitter operation.

The integrated circuits in the transmitter PWA are vunerable to damage by stray static discharges when removed from the electronics housing. Minimize the possibility of static discharge damage when handling the PWA as follows:

Do not touch terminals, connectors, component leads, or circuits when handling the PWA.

When removing or installing the PWA, handle it by its edges or bracket section only. If you need to touch the PWA circuits, be sure you are grounded by staying in contact with a grounded surface or by wearing a grounded wrist strap.

When the PWA is removed from the transmitter, put it in an electrically conductive bag, or wrap it in aluminum foil to protect it.

The following procedure outlines the steps for positioning the write protect and failsafe jumpers on the electronics module. See Figure 59 for the locations of the failsafe and write protect jumpers.

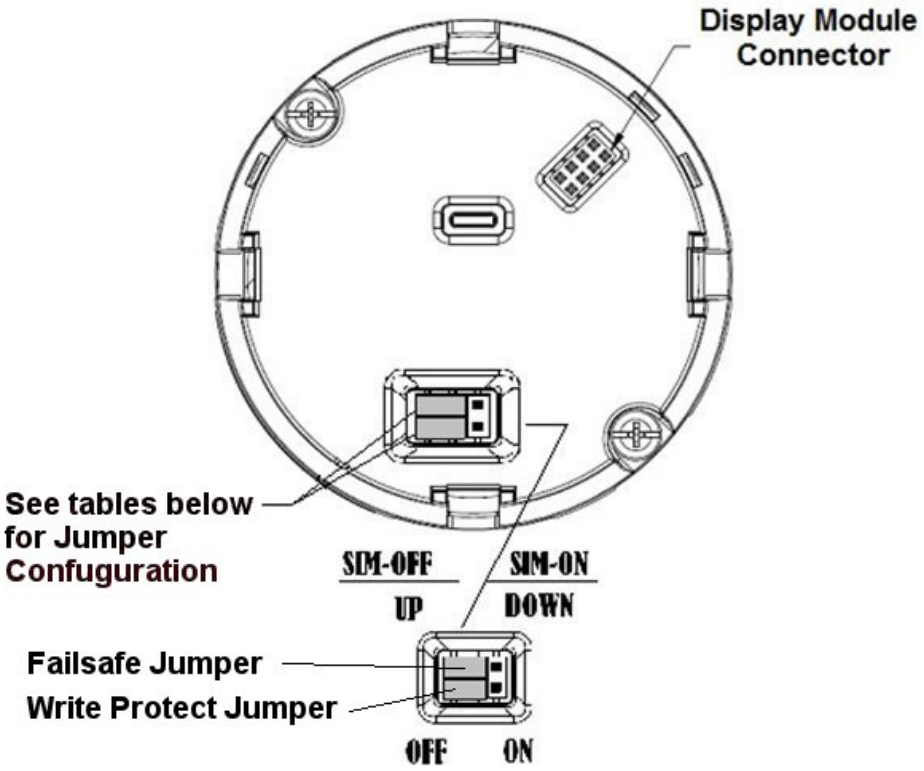
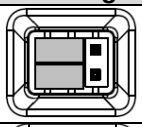
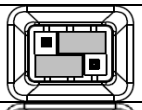
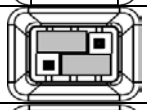
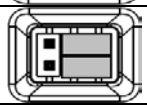


Figure 59 – ST 700 Basic Transmitter - Locating the Failsafe and Write Protect Jumpers

Table 41 – ST 700 Basic Transmitter - HART Failsafe and Write Protect Jumpers

Jumper Arrangements	Description
	Failsafe = UP (High) Write Protect = OFF (Not Protected)
	Failsafe = DOWN (Low) Write Protect = OFF (Not Protected)
	Failsafe = UP (High) Write Protect = ON (Protected)
	Failsafe = Down (Low) Write Protect = On (Protected)

1. Turn OFF transmitter power (Power removal is only required in accordance with area safety approvals. Power removal is only required in Class 1 Div 1 Explosionproof and Class 1 Div 2 environments).

2. Loosen the end cap lock, and unscrew the end cap from the electronics side of the transmitter housing.

3. If equipped with a display module, carefully depress the two tabs on the sides of the display module, and pull it off.

4. If necessary, unplug the interface connector from the communication module. Do not discard the connector.

5. Set the Failsafe Jumper (top jumper) to the desired position (UP or DOWN). See Figure 59 and Table 41 for jumper positioning.

6. If applicable, re-install the display module as follows:

   - Orient the display as desired.
   - Install the Interface connector in the display module such that it will mate with the socket for the display in the communication module.
   - Carefully line up the display, and snap it into place. Verify that the two tabs on the sides of the display latch.

   Note: Installing a display module into a powered transmitter may cause a temporary upset to the loop output value.

   Orient the display for proper viewing through the end cap window. You can rotate the meter mounting orientation in 90º increments.

7. Restore transmitter power if removed.

13.5 Monitoring the Standard Displays

This section describes the information shown on the operator screens of the standard display.

13.5.1 Standard Display

- The PV value is user-configurable. This field has 6 characters. The maximum allowable numeric value is 999999 or -999999.
    - If fractional decimals are configured, the fractional positions will be dropped, as required.
    - If the PV value exceeds the above limits, it is divided by 1000 and "K" is appended to the result, allowing a maximum value with multiplier of 99999K or -99999K.

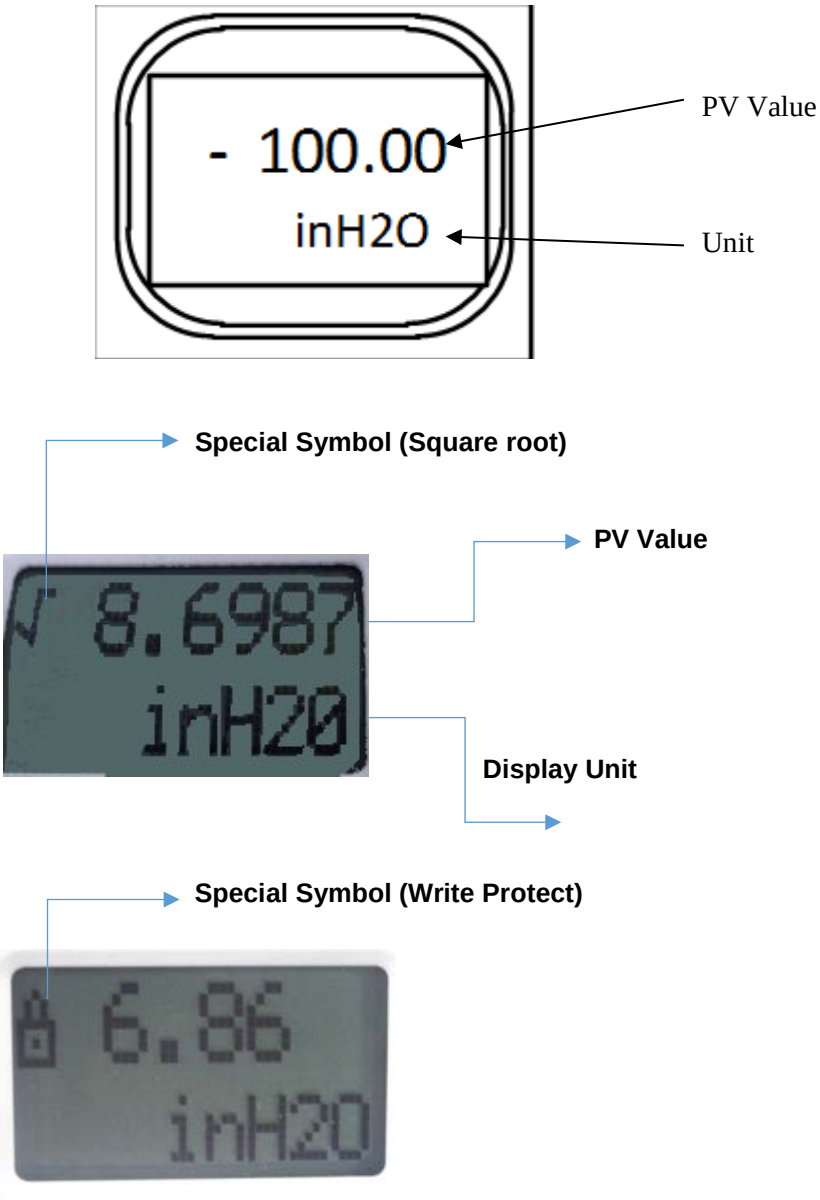


Figure 60 – ST 700 Basic Transmitter - Standard Display with Process Variable Format

14. Maintenance_ST 700 Basic Transmitter

14.1 Overview

This section provides information about preventive maintenance and replacing damaged parts. The topics covered in this section are:

- Preventive maintenance of the meter body barrier diaphragms and process piping to the transmitter.
- Replacement of damaged parts such as the transmitter Printed Wiring Assembly (PWA) and meter body

14.2 Preventive Maintenance Practices and Schedules

The ST 700 basic transmitter does not require any specific maintenance at regularly scheduled intervals. However, it is recommended that you perform these typical inspection and maintenance routines on a schedule that is dictated by the characteristics of the process medium and if blow-down facilities or purge systems are being used.

- Check piping for leaks.
- Clear piping of sediment or other foreign matter.
- Clean the transmitter process heads, including the barrier diaphragms.

14.3 Inspecting and Cleaning Barrier Diaphragms

Depending on the characteristics of the process medium, sediment or other foreign particles may collect in the process head cavity/chamber and cause faulty measurement. In addition, the barrier diaphragm(s) in the transmitter meter body may become coated with residue from the process medium. The latter is also true for external diaphragms on flange-mount and remote seal type transmitters.

In many cases, you can readily remove the process head(s) from the transmitter meter body to clean the process head cavity and inspect the barrier diaphragm(s). For flange-mount and remote seal diaphragms, you may only need to run a purge line in the tank to rinse off the face of the diaphragm(s).

The following procedure comprises the general steps for inspecting and cleaning barrier diaphragms. You may have to modify these steps to meet your particular process or transmitter model requirements. Figure 61 shows an exploded view of a Differential Pressure (DP) transmitter meter body for reference. For disassembly/reassembly purposes, Gauge Pressure (GP) and Absolute Pressure (AP) transmitters are similar.


It is recommended that you remove the transmitter from service and move it to a clean area before disassembling it.

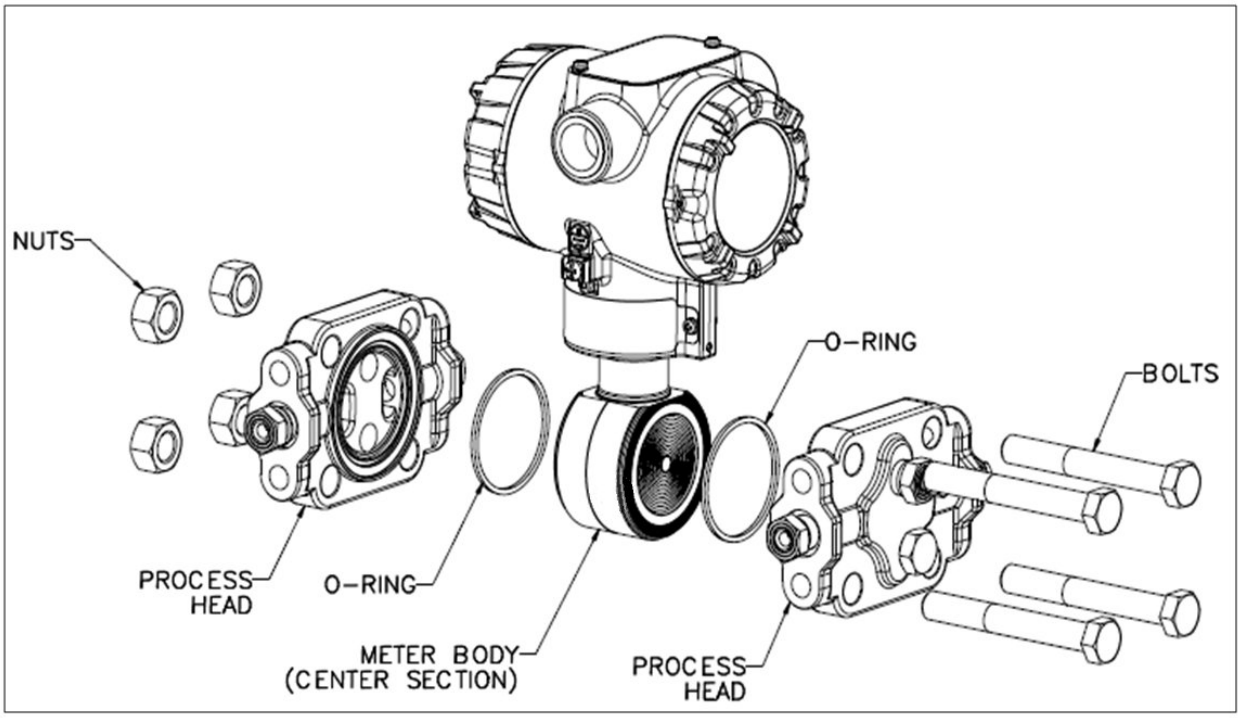


Figure 61 – ST 700 Basic Transmitter - DP Transmitter Head Disassembly

13. Close all valves to isolate the transmitter from the process.
14. Open the vent in the process head to drain fluid from the transmitter meter body, as necessary.
15. Remove the transmitter from the process.
16. Loosen the nuts in the sequence shown in Figure 62
17. Remove the nuts from the bolts that hold the process head(s) to the meter body.
18. Remove the process heads and bolts.
19. Remove the gasket/ O-ring, and clean the interior of the process head using a soft bristle brush and an approved solvent.
20. Inspect the barrier diaphragm for signs of deterioration, corrosion, and distortion.
21. If the diaphragm is distorted contact Honeywell for assistance.
22. Install a new gasket/O-ring in each process head.
23. Coat threads on the process head bolts with a suitable anti-seize compound, such as “Neverseize,” or equivalent.
24. Using a torque wrench, gradually tighten the nuts in the sequence shown in Figure 62
25. Tighten head bolts in stages of 1/3-full torque, 2/3-full torque, and full torque. See Table 42 or torque requirements versus transmitter type and model.

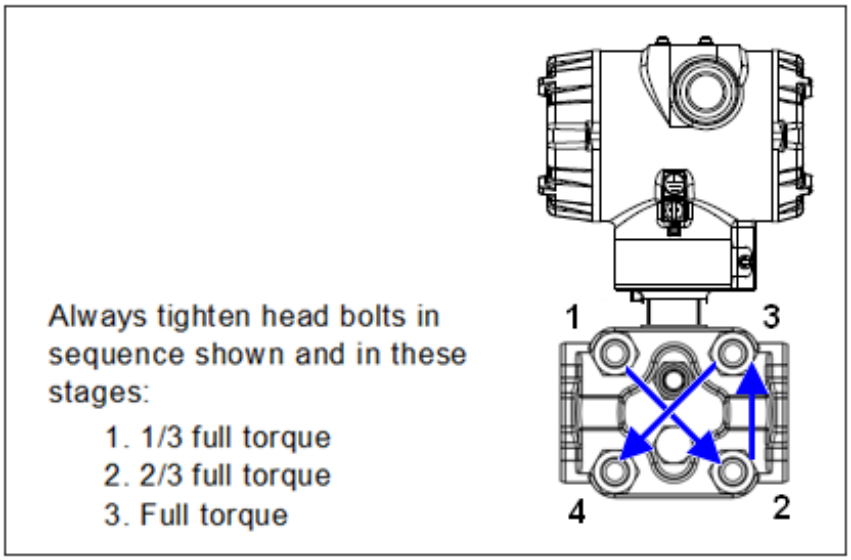


Figure 62 – ST 700 Basic Transmitter - Head Bolt Tightening Sequence

Table 42 – Head Bolt Torque Values

Bolting Type	**50049713XXXX all transmitters except draft range (XXX5)**	**50049713XXX5 Draft Range Transmitter only**
Super Duplex Bolting Option Bolt 514452557-006 Nut 51452559-006	48,8 N-M +/- 2,4 N-M (36.0 Lb-Ft +/- 1.8 Lb-Ft)	
316 Stainless Steel Bolting Option Bolt 51452557-003 Nut 51452559-004	56,9 N-M +/- 2,8 N-M (42.0 Lb-Ft +/- 2.1 Lb-Ft)	
Grade 660 NACE Bolts/NACE 304 Nuts Option Bolt 51452557-002 Nut 51452559-002		20,3 N-M (16.0 Lb-Ft +/- 0.8 Lb-Ft)
Grade 660 NACE Bolting Option Bolt 51452557-002 Nut 51452559-008	67,8 N-M +/- 3,4 N-M (50.0 Lb-Ft +/- 2.5 Lb-Ft)	
Carbon Steel Bolting Option Bolt 51452557-001 Nut 51452559-001		

14.4 Replacing the Communication Module

The communication module includes a connector to the sensor ribbon cable and a connector to the optional display module. This section includes the procedure to replace the communication module.

The transmitter does not have to be removed from service to replace the comm module

Please take appropriate steps to avoid ESD damage when handling the communication and display module assemblies

Refer to Figure 63 for parts locations.

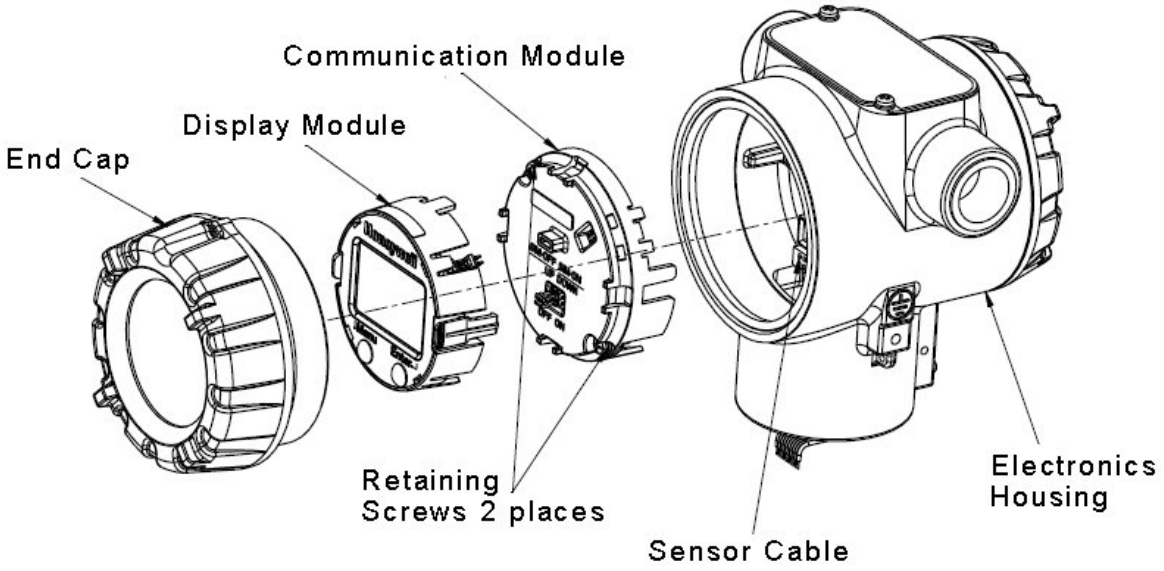


Figure 63 – ST 700 Basic Transmitter - PWA Replacement

1. Turn OFF transmitter power (Power removal is only required in accordance with area safety approvals. Power removal is only required in Class 1 Div 1 Explosion-proof and Class 1 Div 2 environments).
    - When removing the communications module with power applied, the loop will go to 0V. Likewise, installing a communications module into a transmitter with power applied will cause the loop output value to go to 12ma for several seconds then the loop output value will go to the configured value based on the PV input.
    - Installing a display module into a powered transmitter may cause a temporary upset to the loop output value.
2. Loosen the end cap lock, and unscrew the end cap from the electronics side of the transmitter housing.
3. If equipped with a display module, carefully depress the two tabs on the sides of the display module, and pull it off.

4. If necessary, unplug the interface connector from the communication module. **Do not discard the connector**.
5. Loosen the two retaining screws, and carefully pull the communication module from the Electronics compartment.

6. Carefully align and connect the Sensor Ribbon Cable to the connector "J4" at the bottom of the communication module. When installing the communication module in the next step, be careful not to pinch the Sensor Ribbon Cable.

7. Carefully, insert the communication module into the Electronics compartment. Ensure that the Sensor Ribbon Cable is not pinched.

8. Tighten the two communication module retaining screws.

9. Refer to the SmartLine User's Manual to change the FAILSAFE, READ/WRITE configuration settings.

10. If applicable, re-install the display module as follows:

    d. Orient the display as desired.

    e. Install the Interface connector in the display module such that it will mate with the socket for the display in the communication module.

    f. Carefully line up the display, and snap it into place. Verify that the two tabs on the sides of the display latch.

Orient the display for proper viewing through the end cap window. You can rotate the meter mounting orientation in 90 º increments.

11. Apply Parker Super O-ring Lubricant or equivalent to the end cap O-ring before installing the end cap. Reinstall the End Cap and tighten the End Cap locking screw.

12. Installing Optional External Configuration Button Assembly.

    d. Loosen (Do Not Remove) both top nameplate screws and pivot nameplate 90°.

    e. Align the protrusion on the button assembly with the matching opening in the housing and snap the button assembly into the housing.

    f. Rotate the nameplate back to the original position, and tighten the nameplate screws.

14.5 Replacing the Meter Body

You can replace the complete meter body, including the process heads, or the meter body only on certain Differential Pressure (DP), Gauge Pressure (GP), and Atmospheric Pressure (AP) transmitters by using the existing process head(s). Use the following procedure for meter body-only replacement.

1. Save or record device configuration data.
2. Turn off transmitter power.
3. Remove the transmitter from service, and move it to a clean area before disassembling it.
4. Refer to Figure 64. Loosen the End Cap Lock, and unscrew the End Cap from the electronics side of the transmitter housing.

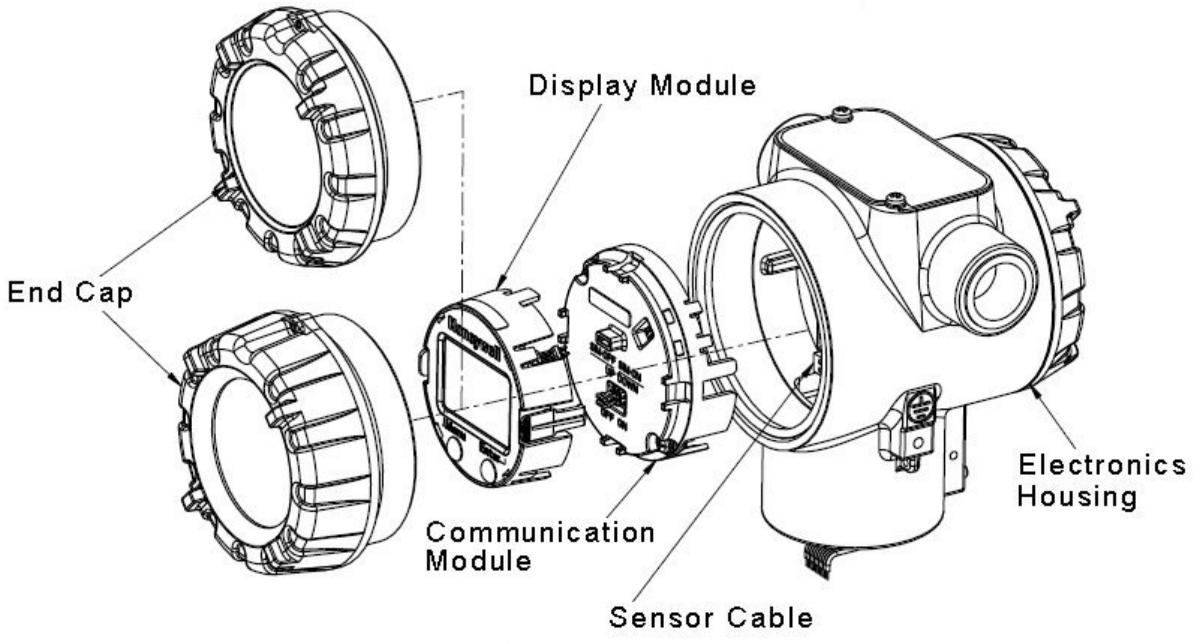


Figure 64 – ST 700 Basic Transmitter - Disassembly for Meter Body Replacement

Please take appropriate steps to avoid ESD damage when handling the communication and display module assemblies

5. If a display is present, press the two snaps along the side, and remove it from the communication module assembly.
   Note: Do not discard or misplace the display/communication connector, it will be required to reassemble the display module
6. Loosen the two retaining screws, and remove the communications module assembly, and remove the communication module assembly from the electronics housing.
7. Disconnect the Sensor Cable from the communications Board.
8. Refer to Figure 66. Use a 2mm hex wrench to completely loosen the set screw on the outside of the housing to permit rotating the meter body.

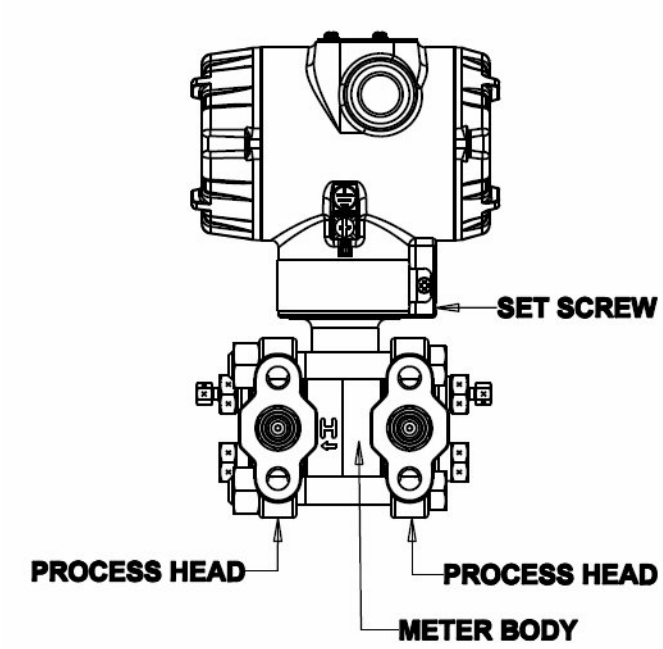


Figure 65 – ST 700 Basic Transmitter - Hardware Location to Remove the Meter Assembly

9. Carefully turn the complete meter body counterclockwise to unscrew it from the electronics housing.
10. Remove the nuts from bolts that hold the process head(s) to the meter body.
11. Remove process heads and bolts.
12. Remove the gaskets or O-rings from the process heads.
13. Clean the interior of the process head(s) with a soft bristle brush and suitable solvent.

CAUTION: To prevent damage to the diaphragm in the meter body, use extreme care when handling or placing the meter body on any surface. Carefully assemble gaskets or O-rings to the meter body. If installing O-rings, lubricate with water or leave dry.

14. Coat threads on process head bolts with anti-seize compound such as “Neverseize” or equivalent.
15. Refer to Figure 66. Apply Dow Corning #33 silicone grease to the meter body adapter O-ring and carefully assemble the O-ring to the meter body. Assemble the process head(s) and bolts to the new meter body. For now, make the bolts only finger-tight.

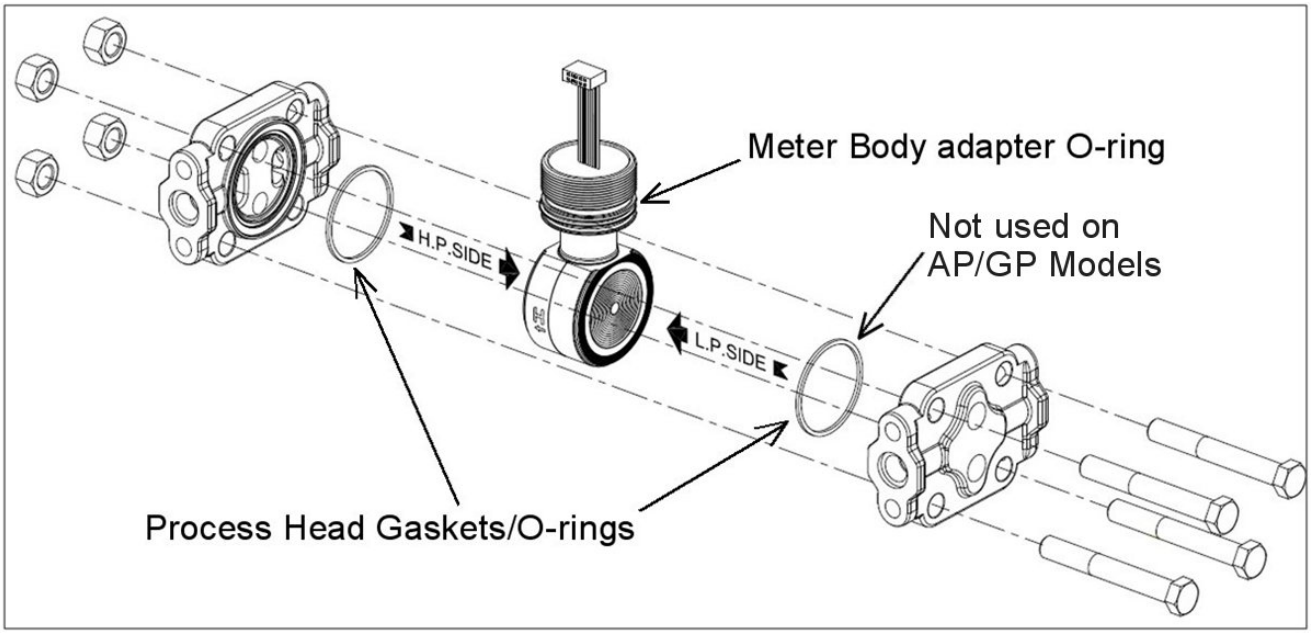


Figure 66 – ST 700 Basic Transmitter - Meter Body Reassembly

16. Use a torque wrench to gradually tighten nuts to torque rating in sequence shown in Figure 67. Tighten head bolts in stages of 1/3 full torque, 2/3 full torque, and then full torque as per Table 42

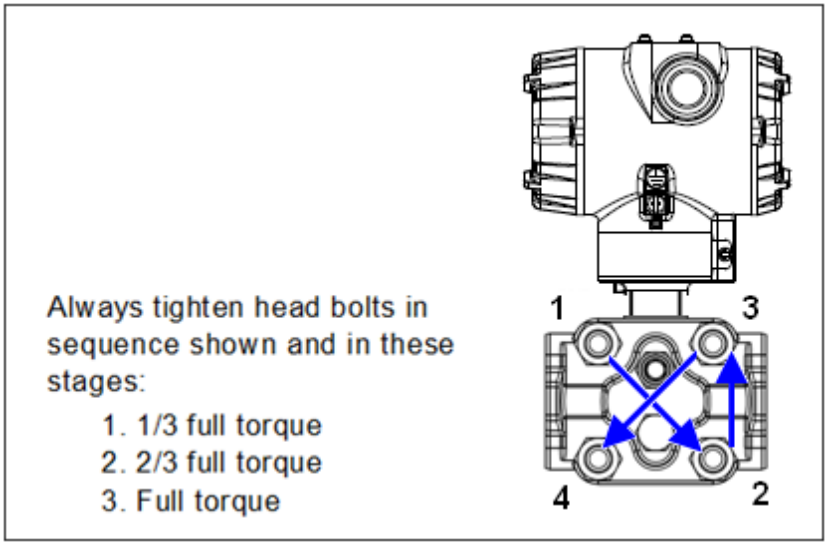


Figure 67 – ST 700 Basic Transmitter - Head Bolt Tightening Sequence

17. Feed the ribbon cable on the new meter body through the neck of the housing.

CAUTION: To prevent damage to the ribbon cable, use care when assembling the meter body to the electronics housing.

18. Screw the new meter body into the housing until the bottom of the meter body adapter is flush with the neck of the electronics housing.
19. Tighten the outside set screw to be sure it is fully seated in the slot in the header.

20. Loosen the set screw ½- turn.
21. Rotate the housing to the desired position (Max. 180^{o} in either direction), and tighten the set screw.
22. Carefully align and connect the Sensor Ribbon Cable to connector "J4" at the bottom of the communication module board. When installing the communication module in the next step, be careful not to pinch the Sensor Ribbon Cable.
23. Carefully, insert the communication module into the Electronics compartment. Ensure that the Sensor Ribbon Cable is not pinched.
24. Tighten the two communication module retaining screws.
25. If applicable, re-install the display module as follows:
    d. Orient the display as desired.
    e. Install the Interface connector in the display module such that it will mate with the socket for the display in the communication module.
    f. Carefully line up the display, and snap it into place. Verify that the two tabs on the sides of the display latch.

Orient the display for proper viewing through the end cap window.
You can rotate the meter mounting orientation in 90 o increments.

26. Connect the bracket to the transmitter housing.
27. Recalibrate the transmitter per section Calibration_ST 700 Basic Transmitter, of this document.
28. Return the transmitter to service, and turn ON power
29. Verify the transmitter configuration data. Restore the saved database if necessary.
30. Lubricate the end-cap O-ring with Parker Super O-ring silicone lubricant or equivalent before replacing the end caps.

15. Calibration_ST 700 Basic Transmitter

15.1 Recommendations for Transmitter Calibration

The ST 700 basic transmitter does not require periodic calibration to maintain accuracy. Typically, calibration of a process-connected transmitter will degrade, rather than augment the capability of a smart transmitter. For this reason, it is recommended that a transmitter be removed from service before calibration. Moreover, calibration will be accomplished in a controlled, laboratory-type environment, using certified precision equipment.

15.2 Calibration Procedures

For a transmitter operating in analog mode, you must calibrate its output signal measurement range using any compatible hand-held communicator or a local display.

One calibration option is to use the Honeywell Smart Field Communicator (SFC). Refer to the *Smart Field Communicator Operating Guide,* Document # 34-ST-11-14 for calibration procedures.

Calibration information and procedures for a transmitter operating in the HART/DE mode are provided in the *ST 700 Series HART/DE Option User's Manual*, Document # 34-25-25-47.

16. Troubleshooting_ST 700 Basic Transmitter

16.1 Overview

Troubleshooting involves responding to error messages, primarily displayed by the MC Toolkit. Error messages that may occur on the transmitter's local display are fairly self-explanatory and intuitive. However, this section covers the diagnostic messages that indicate critical conditions. Other than the critical conditions, additional detail is not provided. If you require assistance, contact your distributor or Honeywell Technical Support. All other messages are covered by the MC Toolkit Users' Manual.

16.2 Critical Diagnostics Screens

The standard display will display the fault message on the top line of the LCD .

16.2.1 Fault Conditions and Recommended Corrective Actions – Standard Display

The standard display will display the message FAULT on the top line of the LCD and the appropriate diagnostic text on the lower line.

Table 43 – ST 700 Basic Transmitter - Fault Conditions and Recommended Corrective Actions.

Condtion	Analysis	Recommended Corrective Action
Mbd Com (Meter body comm fault)	Communications between the meter body and the electronics module has failed.	Check the ribbon cable that connects the meter body to the electronics module. Ensure that the cable is securely plugged into the electronics module. Ensure that all pins are plugged into the connector (e.g. ensure that the connector is not offset in a way that leaves some pins unconnected). Cycle power to the transmitter. If the problem continues to occur replace the electronics module. If this does not fix the problem, replace the meter body.
Comm El (Communication Board fault)	A critical failure has been detected on the HART electronics module.	Cycle power to the transmitter. If the problem continues to occur replace the electronics module.
Mtrbody (Sensor Board Fault)	A critical failure has been detected in the Meter body	Cycle power to the transmitter. If the problem continues to occur replace the electronics module.

17. Parts List_ST 700 Basic Transmitter

17.1 Overview

Individually saleable parts for the various transmitter models are listed in this section. Some parts are illustrated for identification. Parts are identified and listed in the corresponding tables as follows:

- Individually saleable parts are indicated in each figure by key number callout.
- Parts that are supplied in kits are indicated in each illustration by key number callout with the letter K prefix.

Table 44 is a list of recommended spare parts.

Table 44 – ST 700 Basic Transmitter - Summary List of Recommended Spare Parts

Part Number	Description	Figure No.	Key No.	1-10 Units	10-100 Units	100-1000 Units
Electronics Assembly						
50129828-501 50129828-502	HART Comm Assembly without external 2 button support HART Comm Assembly with external 2 button support	Figure 69	5	1	1-2	2-4
 51452865-501 51452865-502 51452865-503 51462865-504	Meter Body Seal kit (includes O-rings) Glass Filled PTFE VITON 100% PTFE GRAPHITE	Figure 72	K1	1	1-2	2-4
50129832-501 50129832-502	HART Terminal Block Assy Without Lightning Protection HART Terminal Block Assy With Lightning Protection	Figure 70	3	1	1-2	2-4

Process head gasket kit		Figure No.	Key No.	1-10 Units	10-100 Units	100-1000 Units
51452868-501	Gasket only, Process Head (12 PTFE packs)	Figure 72	Ka	12	12-24	24-48
51452868-502	Gasket only, Process Head (6 Viton Head O'Rings)			6	6-12	12-24
51452868-507	Gasket only, Process Head Graphite Gasket (replacement only for existing graphite gasket)			6	6-12	12-24
Meter Body						
Specify complete model number from nameplate	DP Models GP/AP HEAD Models LGP/LAP Models Flush Mount Models Flange Mount Models	Figure 71		1	1-2	2-4

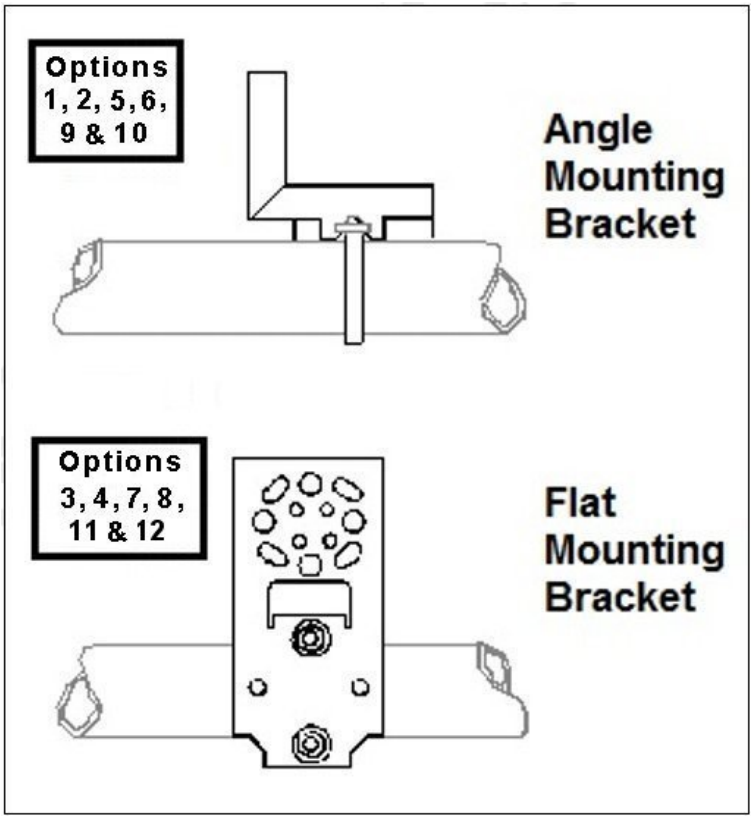


Figure 68 – ST 700 Basic Transmitter - Angle and Flat Bracket Parts

(refer to Table 46)

Table 45 - ST 700 Basic Transmitter - Angle and Flat Bracket Parts

(Refer to Figure 68)

Key No.	Part Number	Description	Quantity Per Unit
1	50132311-511	Carbon Steel Angle Bracket for all models **except** In-line and flush mount transmitters (CHINA MARKET ONLY)	1
2	50132311-521	Carbon Steel Angle Bracket for all In-line and flush mount transmitters (CHINA MARKET ONLY)	1
3	51196557-501	Carbon Steel Flat Bracket Mounting kit for all models **except** In-line and flush mount transmitters	1
4	51196557-502	Carbon Steel Flat Bracket Mounting kit for all In-line transmitters and flush mount transmitters	1
5	30752770-603	SS 304 Angle Bracket Mounting kit for all models **except** In-line and flush mount transmitters	1
6	30752770-604	SS 304 Angle Bracket Mounting kit for all In-Line and flush mount transmitters	1
7	51196557-505	SS 304 Flat Bracket Mounting kit for all models **except** In-line and flush mount transmitters	1
8	51196557-506	SS 304 Flat Bracket Mounting kit for all In-line transmitters and flush mount transmitters	1
9	50132311-513	SS 316 Angle Bracket Mounting kit for all In-line transmitters and flush mount transmitters (CHINA MARKET ONLY)	1
10	50132311-523	SS 316 Angle Bracket Mounting kit for all models **except** In-line and flush mount transmitters (CHINA MARKET ONLY)	1
11	51196557-508	SS 316 Flat Bracket Mounting kit for all In-line transmitters **except** In-Line and flush mount transmitters	1
12	51196557-509	SS 316 Flat Bracket Mounting kit for all In-Line and flush mount transmitters	1
1	50132311-511	Carbon Steel Angle Bracket for all models **except** In-line and flush mount transmitters (CHINA MARKET ONLY)	1
2	50132311-521	Carbon Steel Angle Bracket for all In-line and flush mount transmitters (CHINA MARKET ONLY)	1

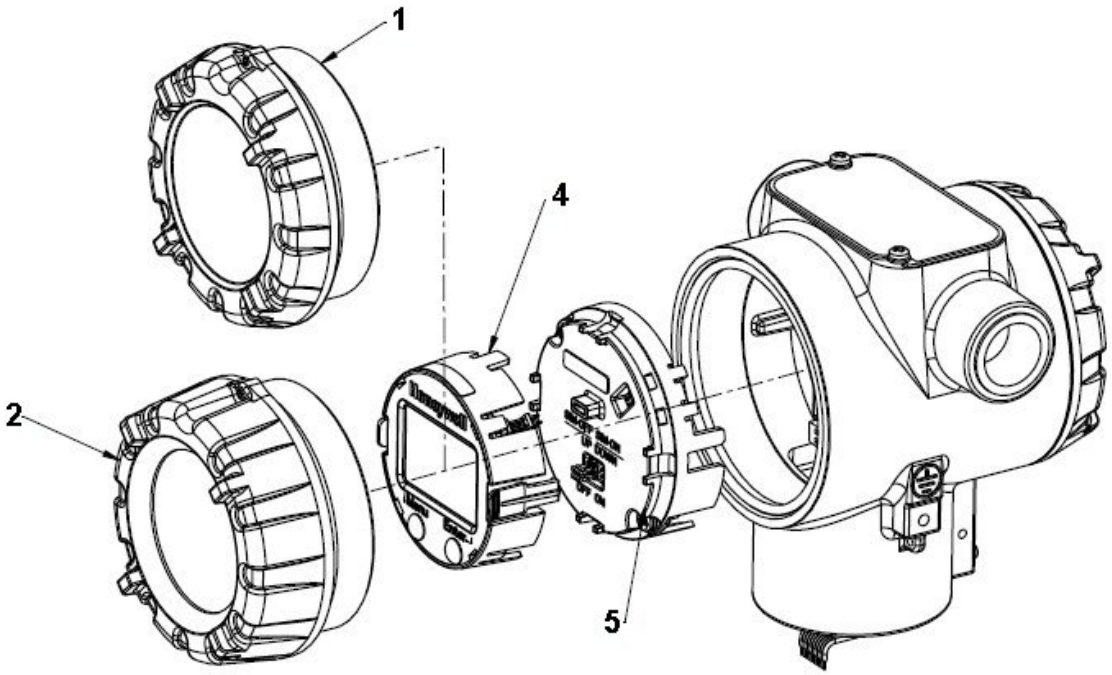


Figure 69 – ST 700 Basic Transmitter - Electronic Housing, Display End

Table 46 – ST 700 Basic Transmitter - Major Assemblies

(Refer to Figure 69, Figure 70 and Figure 72)

Key No.	Part Number	Description	Quantity Per Unit
1	50049858-501 50049858-521	End Cap (Aluminum) End Cap (Stainless Steel)	1
2	50049832-501 50049832-521	End Cap, Display (Aluminium) with window End Cap, Display (Stainless Steel) with window	1
3	50129832-501 50129832-502	Terminal Assy HART without Lightning protection Terminal Assy HART with Lightning protection	1
4	50049911-501 50126003-501	Basic Display Standard Display	1
5	50129828-501 50129828-502	HART Electronics Module Assembly (PWA) without MR sensor HART Electronics Module Assembly (PWA) with MR sensor	1
6	50131077-501	External Zero, Span & Config Buttons (2- button Assembly)	1
K1	30757503-005	Electronics housing seals kit (includes O-rings)	2

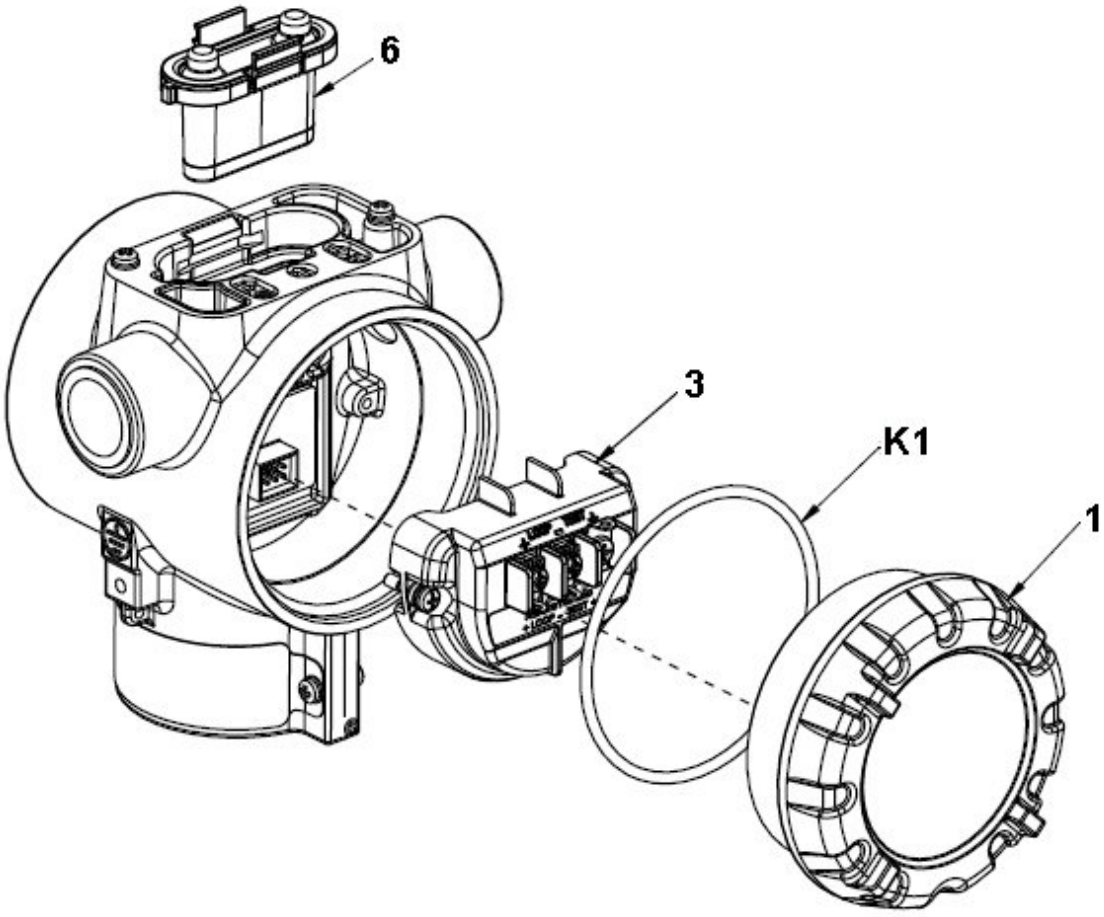


Figure 70 – ST 700 Basic Transmitter - Electronic Housing, Terminal Block End

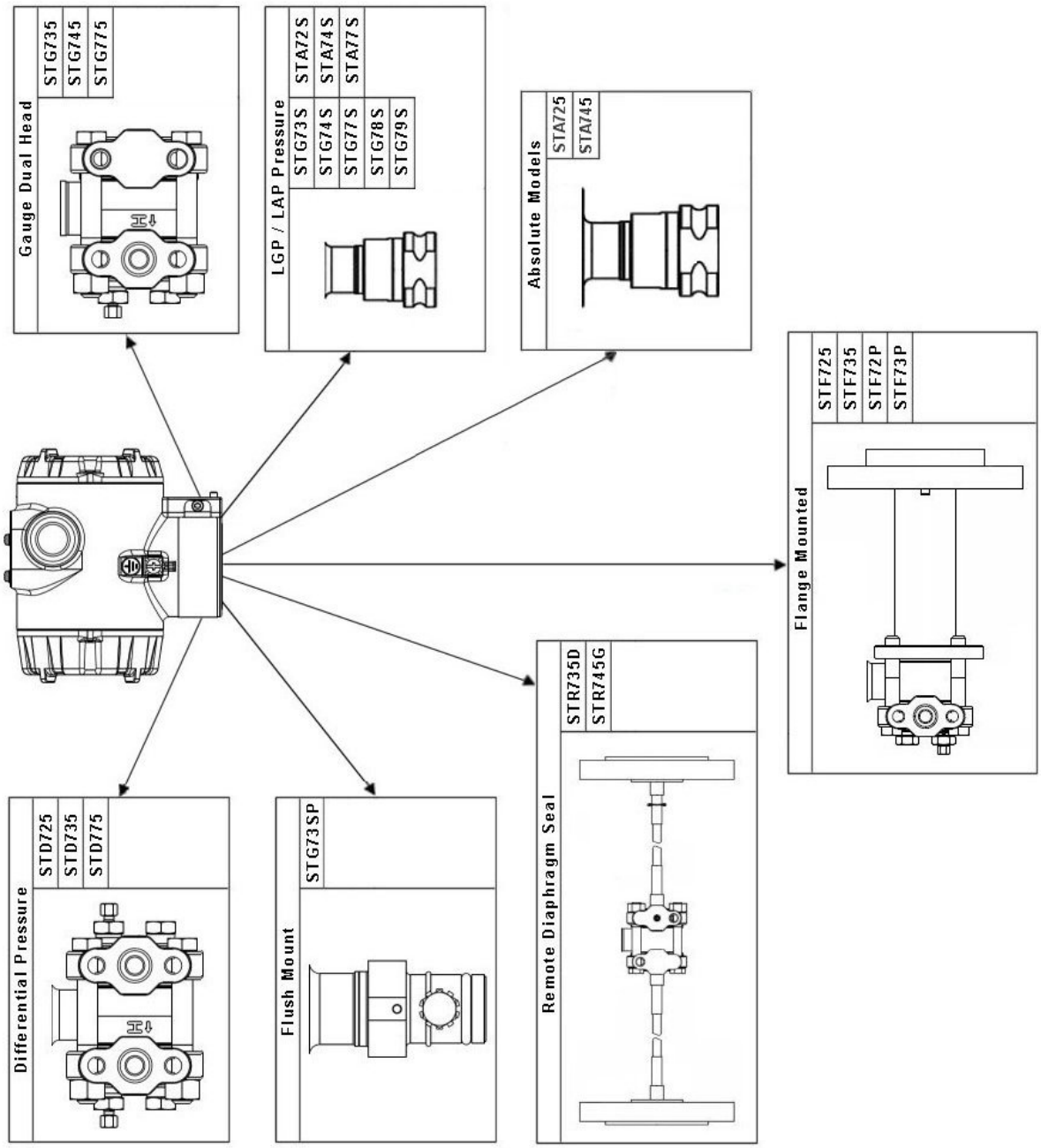


Figure 71 – ST 700 Basic Transmitter - Major Assemblies

Table 47 – ST 700 Basic Transmitter STG735, 745, 775, STD 725, 735, 775 & STA725 & 745, Transmitter Body.

(Refer to Figure 72)

Key No.	Part Number	Description	Qty/ Kit
		Meter Body Gasket Kits	
	51452865-501 51452865-502 51452865-503 51452865-504	Glass Filled PTFE VITON 100% PTFE GRAPHITE	
Each Meter Body Gasket Kit includes:			
K6		Gasket, Process Head (6 Gaskets/ 1 Kit)	6
Ka		Gasket, Flange Adapter (6 Gaskets/ 1 Kit)	6
K7		O-Ring, Meter Body to Electronics Housing (3 Gaskets/ 1 Kit)	3
		K7 Process Head Gasket Kits	
K6 K6 K6	51452868-501 51452868-502 51452868-507	Gasket only, Process Head (12 PTFE Gaskets/pack) Gasket only, Process Head (6 Viton Head O-Rings) Gasket only, Process Head Graphite Gasket (use only as replacement of existing graphite gasket)	12 6 6
		Flange Adapter Gasket Kits	
Ka Ka Ka	51452868-504 51452868-505 51452868-508	Gasket only, Flange Adapter, 6 PTFE Adapter Gaskets Gasket only, Flange Adapter, 6 VITON Adapter O-Rings Gasket only, Flange Adapter Graphite Gasket (use only as replacement of existing graphite gasket)	6 6 6
		½-inch NPT Flange Adapter Kits	
	 51452867-110 51452867-210 51452867-310 51452867-410 51452867-150 51452867-350 51452867-130 51452867-330	Flange Adapter Kit, with: SS Flange Adapters and with carbon steel bolts SS Flange Adapters and with A286 SS (NACE) bolts SS Flange Adapters and with 316 SS (non-NACE) bolts SS Flange Adapters and with B7M alloy steel bolts Monel Flange Adapters and with carbon steel bolts Monel Flange Adapters and with 316 SS (non-NACE) bolts Hastelloy C Flange Adapters and with carbon steel bolts Hastelloy C Flange Adapters and with 316 SS (non-NACE) bolts	
		Each ½-inch NPT Flange Adapter Kit includes:	
Ka		Gasket, Flange Adapter	2
Kb		½-inch NPT Flange Adapter	2
Kc		Bolt, hex head, 7/16-20 UNF, 1.50 inches long	4

Key No.	Part Number	Description	Qty/ Kit
Bolt And Nut Kit			
	51452866-501	Carbon steel bolt and Nut Kit	
	51452866-502	Stainless Steel Bolt and Nut Kit with NACE Certificate	
	51452866-503	Stainless Steel Bolt and Nut Kit without NACE Certificate	
	51452866-504	B7M Bolt and Nut Kit	
	51452866-505	All Stainless Steel NACE Bolt and Nut Kit	
	51452866-506	Monel Bolt and Nut Kit	
	51452866-507	Super Duplex Bolt and Nut Kit	
	51452866-508	Stainless Steel NACE 6K Bolt and Nut Kit	
Each Bolt and Nut Kit Includes:			
K8		Head Bolt	4
K4		Head Nut	4
Kc		Adapter Bolt	4

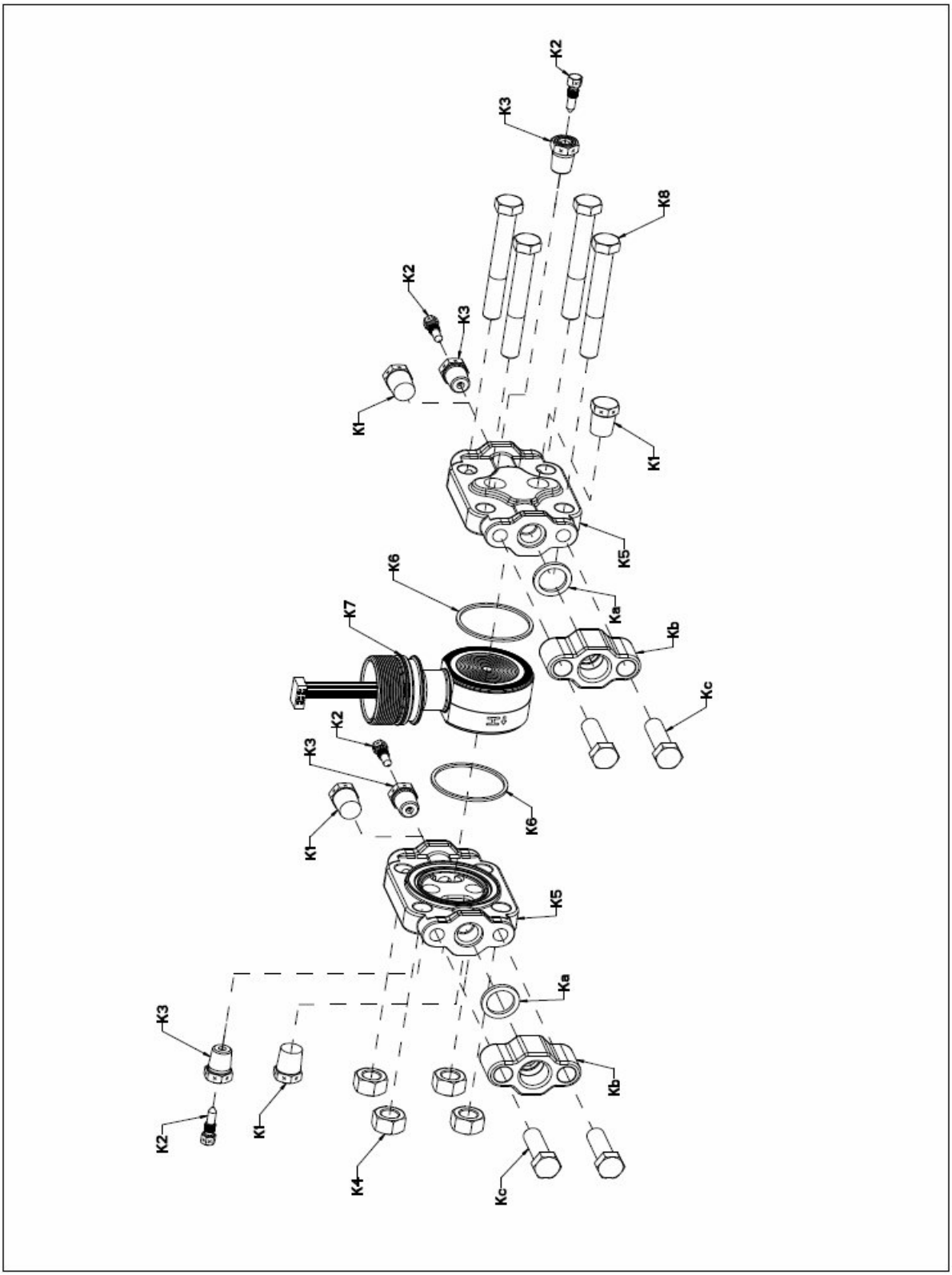


Figure 72 - ST 700 Basic Transmitter Models STD725, 735, 775 – refer to Table 45

Table 48 – ST 700 Basic Transmitter - Parts for STG725, 735, 745, 775, 745 Transmitter Body

(Refer to Figure 73)

Key No.	Part Number	Description	Qty/Unit
Process Head Assembly Kits with PTFE Gaskets			
	51452864-010 51452864-012 51452864-020 51452864-022 51452864-030 51452864-032	Carbon steel head (zinc plated) without side vent/drain Carbon steel head (zinc plated) with side vent/drain Stainless steel head without side vent/drain Stainless steel head with side vent/drain Hastelloy C head without side vent/drain Hastelloy C head with side vent/drain	
Process Head Assembly Kits with Viton® or Fluorocarbon Elastomer Gaskets			
	51452864-110 51452864-112 51452864-120 51452864-122 51452864-130 51452864-132	Carbon steel head (zinc plated) without side vent/drain Carbon steel head (zinc plated) with side vent/drain Stainless steel head without side vent/drain Stainless steel head with side vent/drain Hastelloy C head without side vent/drain Hastelloy C head with side vent/drain	
Each process head assembly kit includes:			
K1		Pipe Plug (See notes 1 & 2)	1
K2		Vent Plug (See note 1)	1
K3		Vent Bushing (See note 1.)	1
K5		Process Head	1
K6		Gasket (PTFE), Process Head	1
Ka		Gasket (PTFE), Flange Adapter	1
	Notes		
	Note 1: This item is made of the same material as the process head s, except for Kits with carbon steel process head s, which include stainless steel Pipe Plug, Vent Plug, and Vent Bushing. Note 2: The Kit for process head s without side vent/drain does not include Pipe Plugs (K1).		
Reference Head			
K9	51452951-502	316 SS Blind Reference Head	1

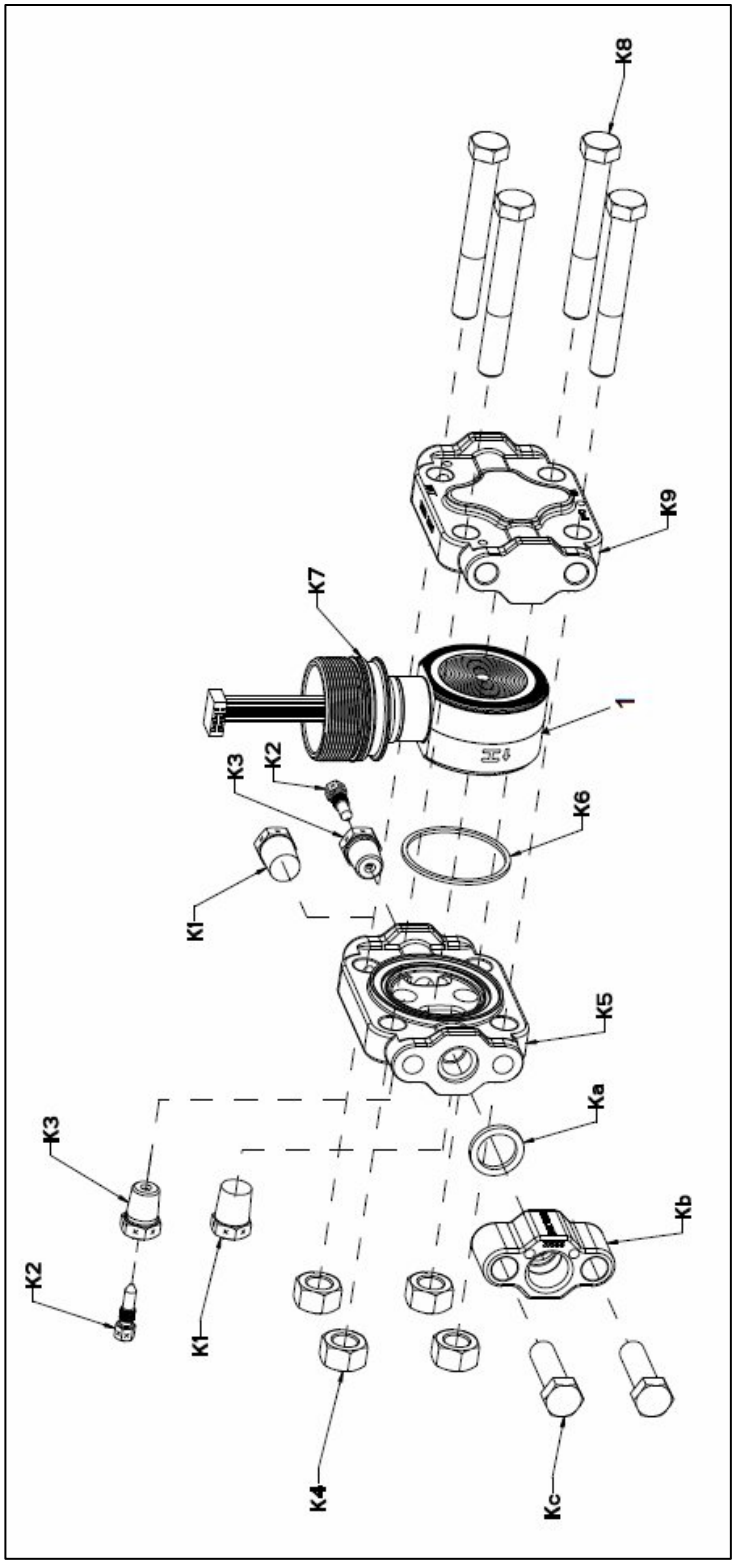


Figure 73 – ST 700 Basic Transmitter - STG735, 745, 775 and STA725, 745 Transmitter Body

Table 49 - ST 700 Basic Transmitter - Inline Gauge and Inline Atmospheric Meter Body Parts

(Refer to Figure 74)

Key No.	Part Number	Description	Qty/Unit
	Specify complete model number from nameplate	ST Series replacement meter body (LAP/LGP model)	1

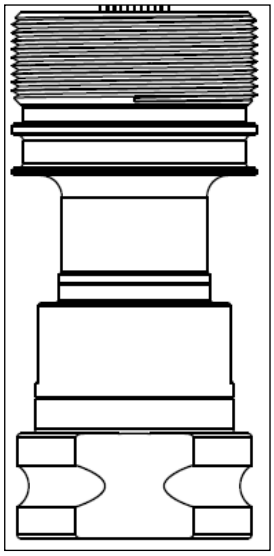


Figure 74 – ST 700 Basic Transmitter - Inline Gauge and Inline Atmospheric Meter Body Bodies

Table 50 – ST 700 Basic Transmitter - Flange-Mounted Meter Body Parts

(Refer to Figure 75 and Figure 76)

Key No.	Part Number	Description	Qty/Unit
1	Specify complete model number from nameplate	ST Series 700 replacement meter body	1

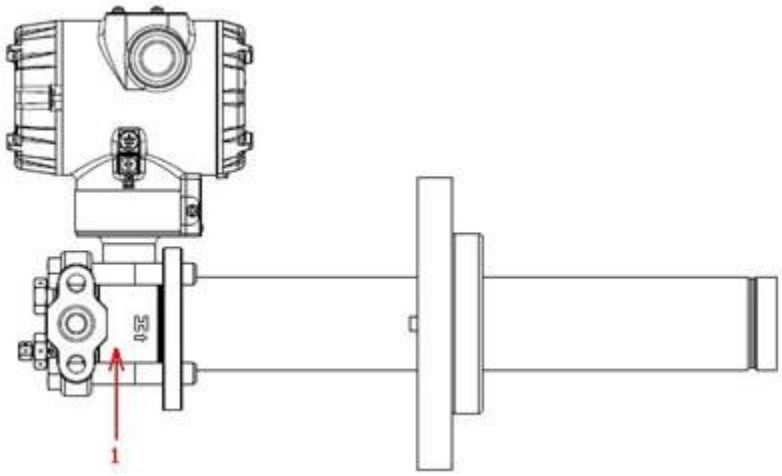


Figure 75 – ST 700 Basic Transmitter - Extended Flange Design

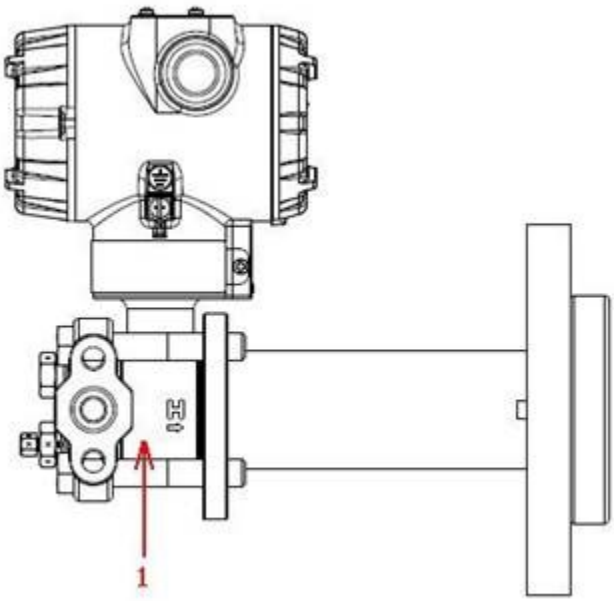


Figure 76 - ST 700 Basic Transmitter - Flush Flange Design

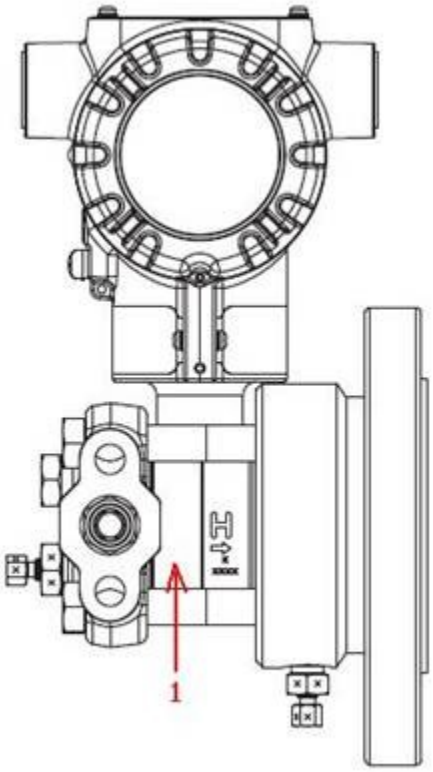


Figure 77 - ST 700 Basic Transmitter - Pseudo Flange Design

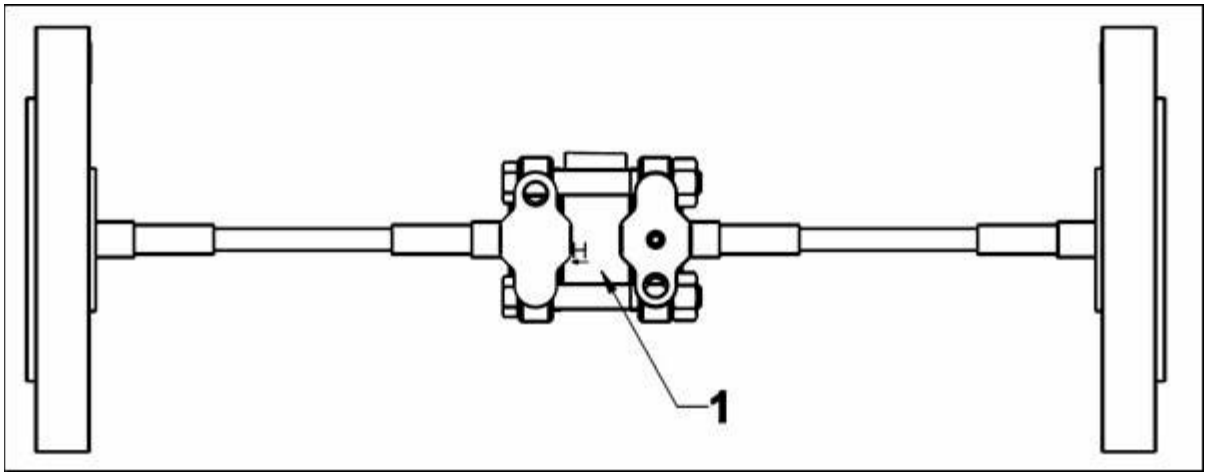


Figure 78 – ST 700 Basic Transmitter - Remote Seal Diaphragm

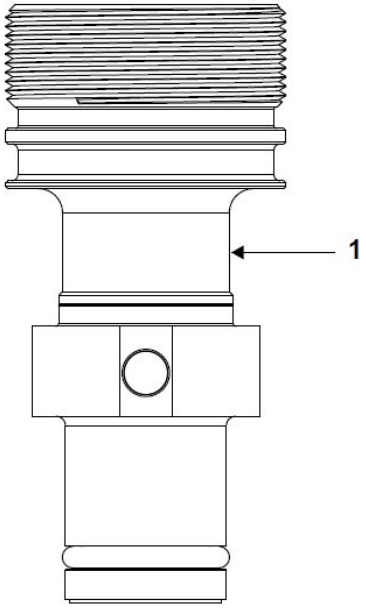


Figure 79 - ST 700 Basic Transmitter - Series 700 Flush Mount Meter Body.

Table 51 – ST 700 Basic Transmitter - Flush Mount Meter Body Parts

(Refer to Figure 79**)**

Key No.	Part Number	Description	Qty/Unit
1	Specify complete model number from nameplate	Replacement meter body (flush Mount model)	1
	30756445-508	Gasket Kit (0-rings)	
	51204496-501	316L SS Mounting Sleeve Kit	
	51204497-501	Calibration Sleeve Kit	

Appendix A - PRODUCT CERTIFICATIONS for the ST 700 Standard and Basic Transmitter

A.1 Safety Instrumented Systems (SIS) Installations

For Safety Certified Installations, please refer to the ST 800 and ST 700 Safety Manual 34-ST-25-37 for installation procedure and system requirements.

SIL 2/3 Certification	IEC 61508 SIL 2 for non-redundant use and SIL 3 for redundant use under the following standards: IEC61508-1: 2010; IEC 61508-2: 2010; IEC61508-3: 2010.

A.2 European Directive Information (CE Mark)

The latest EU DECLARATION OF CONFORMITY can be downloaded here:

- EU Declaration

A3. Hazardous Area 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 l, Zone 0/1, AEx db IIC T6..T5 Ga/Gb Class ll, Zone 21, AEx tb IIIC T95º Db	All	Note 1	T5: -50 ºC to 85ºC T6: -50 ºC to 65ºC
		Intrinsically Safe: Class I, II, III, Division 1, Groups A, B, C, D, E, F, G: T4 Class l, 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 ºC to 70ºC
			Foundation Fieldbus	Note 2b	-50 ºC to 70ºC
		Nonincendive: Class I, Division 2, Groups A, B, C, D locations, T4 Class l, Zone 2, AEx nA IIC T4 Gc	4-20 mA / DE/ HART/ Foundation Fieldbus	Note 1	-50 ºC to 85ºC
		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 T95º Db Ex tb IIIC T95º Db	All	Note 1	T5: -50ºC TO 85ºC T6: -50ºC TO 65ºC
		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	-50ºC TO 70ºC
			Foundation Fieldbus	Note 2	-50ºC TO 70ºC
		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	-50ºC to 85ºC
		Enclosure: Type 4X/ IP66/ IP67	All	All	-

MSG CODE	AGENCY	TYPE OF PROTECTION	COMM. OPTION	ELECTRICAL PARAMETERS	AMBIENT TEMP (Ta)
		STANDARDS: CSA C22.2 No. 0-10; CSA C22.2 No. 94-M91; CSA C22.2 No. 25-1966; CSA C22.2 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	4-20 mA / DE/ HART	Note 2a	-50°C TO 70°C
		FISCO Field Device (Only for FF Option) Ex ia IIC T4 Ga; Ex ic IIC T4 Gc	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** **(Not available for ST700 Basic Transmitter)**	**Flameproof :** Ex d IIC T4, T5, T6 Ex tD A21 IP66/IP67 T95ºC…T120 ºC	All	Note 1	T4: -50ºC TO 85ºC T5: -50ºC TO 85ºC T6: -50ºC TO 65ºC
		Intrinsically Safe: Ex ia IIC T4	4-20 mA / DE/ HART	Note 2	Ta= -50 ºC to 70ºC
			Foundation Fieldbus	Note 2	Ta= -50 ºC to 70ºC
		Enclosure: IP66/ IP67	All	All	-
I	**EAC Russia, Belarus and Kazakhstan**	**Flameproof:** Ga/Gb Ex d IIC T6..T5 Ex tb IIIC Db T 85ºC	All	Note 1	T5: -50ºC TO 85ºC T6: -50ºC TO 65ºC
		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	-50ºC TO 70ºC
			Foundation Fieldbus	Note 2	-50ºC TO 70ºC
		Zone 2, Non Sparking: 2 Ex nA IIC T4 Gc X	4-20 mA / DE/ HART/ Foundation Fieldbus	Note 1	-50ºC TO 85ºC
		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	-50ºC TO 85ºC
		Enclosure : IP 66/67	All	All	
J	**CCoE INDIA**	**Flameproof:** Ex d IIC T6..T5 Ga/Gb	All	Note 1	T5: -50ºC TO 85ºC T6: -50ºC TO 65ºC
		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	-50ºC TO 70ºC
			Foundation Fieldbus	Note 2	-50ºC TO 70ºC
		Non Sparking Ex nA IIC T4 Gc	4-20 mA / DE/ HART/ Foundation Fieldbus	Note 1	-50ºC TO 85ºC
		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 T95ºC…T120ºC Db	All	Note 1	T5: -50ºC TO 85ºC T6: -50ºC TO 65ºC
		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	-50ºC TO 70ºC
			Foundation Fieldbus	Note 2	-50ºC TO 70ºC
		Enclosure: IP66/ IP67	All	All	-

Notes

1. **Operating Parameters:**

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

2. **Intrinsically Safe Entity Parameters**

For details see Control Drawing 50049892.

3. **Marking ATEX Directive**

The following information is provided as part of the labeling of the transmitter:

- Name and Address of the manufacturer
- Notified Body identification: DEKRA Quality B.V., Arnhem, the Netherlands
- For complete model number, see the Model Selection Guide for the model of pressure transmitter.

The serial number of the transmitter is located on the Meter Body data-plate. The first two digits of the serial number identify the year (02) and the second two digits identify the week of the year (23); for example, 0223xxxxxxxx indicates that the product was manufactured in 2002, in the 23rd week

4. **Apparatus Marked with Multiple Types of Protection**

The user must determine the type of protection required for installation the equipment. The user shall then check the box [ ] adjacent to the type of protection used on the equipment certification nameplate. Once a type of protection has been checked on the nameplate, the equipment shall not then be reinstalled using any of the other certification types.

5. **WARNINGS and Cautions:**

Intrinsically Safe and Non-Incendive Equipment:
WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR USE IN HAZARDOUS LOCATIONS.
Explosion-Proof/ Flameproof:
WARNING: DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE MAY BE PRESENT
Non-Incendive Equipment:
WARNING: DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE MAYBE PRESENT
WARNING: FOR CONNECTION IN AMBIENTS ABOVE 60^{o}C USE WIRE RATED 105oC

6. **Conditions of Use for Ex Equipment, "Hazardous Location Equipment" or "Schedule of Limitations":**

Painted surface of the ST700/ST800 may store electrostatic charge and become a source of ignition in applications with a low relative humidity less than approximately30% relative humidity where the painted surface is relatively free of surface contamination such as dirt, dust or oil. Cleaning of the painted surface should only be done with a damp cloth.

Flame-proof Installations: The transmitter can installed in the boundary wall between an area of EPL Ga/ Class I Zone 0/ Category 1 and the less hazardous area, EPL Gb/ Class I Zone 1/ Category 2. In this configuration, the process connection is installed in EPL Ga/ Class I Zone 0/ Category 1, while the transmitter housing is located in EPL Gb/ Class I Zone 1/ Category 2.

The applicable temperature class, ambient temperature range and maximum process temperature of the equipment is as follows;

PROCESS TEMPERATURE VS AMBIENT TEMPERATURE

	Maximum Process Temperature		
Temperature Class	T6	T5	T4
Ambient Temperature			
-50°C TO +65 °C	80 °C	----	120 °C
-50°C TO +70 °C	-----	----	120 °C
-50°C TO +85 °C	-----	95 °C	110 °C

Consult the manufacturer for dimensional information on the flameproof joints for repair.
The transmitter can be installed in the boundary wall between an area of Category 1 and the less hazardous area, Category 2. In this configuration, the process connection is installed in Category 1 while the transmitter housing is installed in Category 2.

Intrinsically Safe: Must be installed per drawing 50049892

Division 2: This equipment is suitable for use in a Class I, Division 2, Groups A, B, C, D; T4 or Non-Hazardous Locations Only.

The enclosure is manufactured from low copper aluminum alloy. In rare cases, ignition sources due to impact and friction sparks could occur. This shall be considered during Installation, particularly if equipment is installed a Zone 0 location.

If a charge-generating mechanism is present, the exposed metallic part on the enclosure is capable of storing a level of electrostatic that could become Incendive for IIC gases. Therefore, the user/ installer shall implement precautions to prevent the buildup of electrostatic charge, e.g. earthing the metallic part. This is particularly important if equipment is installed a Zone 0 location.

A4. Control Drawing

PRE REL		
ISS	REVISION & DATE	APPD
G	06/20/2016 ECN 2016-3397	DGG

ST 800/ ST 700 Series Pressure,
ANALOG, HART/DE and FF/ PA Communications

1. Intrinsically safe installation shall be in accordance with
   a. FM (USA): ANSI/NFPA 70, NEC* Articles 504 and 505.
   b. CSA (Canada): Canadian Electrical Code (CEC), part I, section 18.
   c. ATEX: Requirements of EN 60079-14, 12.3 (See also 5.2.4).
   d. IECEx: Requirements of IEC 60079-14, 12.3 (See also 5.2.4).
2. ENTITY approved equipment shall be installed in accordance with the manufacturer's Intrinsic Safety Control Drawing.
3. The Intrinsic Safety ENTITY concept allows the interconnection of two ENTITY Approved Intrinsically safe devices with ENTITY parameters not specifically examined in combination as a system when:

   Uo, Voc, or Vt ≤ Ui or Vmax; Io, Isc, or It ≤ Ii or Imax; Ca or Co ≥ Ci + Ccable, La or Lo ≥ Li + Lcable, Po ≤ Pi. Where two separate barrier channels are required, one dual-channel or two single-channel barriers may be used, where in either case, both channels have been Certified for use together with combined entity parameters that meet the above equations.
4. System Entity Parameters:
   ST 800/ ST 700 Transmitter: Vmax Voc or Uo, Imax Isc or Io;
   ST 800/ ST 700 Transmitter: Ci + Ccable ≤ Control Apparatus Ca,
   ST 800/ ST 700 Transmitter: Li + Lcable ≤ Control Apparatus La.
5. When the electrical parameters of the cable are unknown, the following values may be used:
   Capacitance: 197pF/m (60 pF/ft)
   Inductance: 0.66µH/m (0.020µH/ft).
6. Control equipment that is connected to Associated Equipment must not use or generate more than 250 V.
7. Associated equipment must be FM, CSA ATEX or IECEx (depending on location) listed. Associated equipment may be installed in a Class I, Division 2 or Zone 2 Hazardous (Classified) location if so approved.
8. Non-Galvanically isolated equipment (grounded Zener Barriers) must be connected to a suitable ground electrode per:
   a. FM (USA): NFPA 70, Article 504 and 505. The resistance of the ground path must be less than 1.0 ohm.
   b. CSA (Canada): Canadian Electrical Code (CEC), part I, section 10.
   c. ATEX: Requirements of EN 60079-14, 12.2.4.
   d. IECEx: Requirements of IEC 60079-14, 12.2.4.
9. Intrinsically Safe DIVISION 1/ Zone 0 WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR USE IN HAZARDOUS LOCATIONS.
10. Division 2/ Zone 2: WARNING: DO NOT OPEN WHEN AN EXPLOSIVE GAS ATMOSPHERE IS PRESENT.
11. NO REVISION OF THIS CONTROL DRAWING IS PERMITTED WITHOUT AUTHORIZATION FROM THE AGENCIES listed.
12. For release approvals see ECO # 0094464.

DRAWN	KP	1/9/2015	Honeywell
CHECKED			CONTROL DRAWING ST 800/ ST 700 SERIES PRESSURE TRANSMITTER DIVISIONS 1 & 2 / ZONE 0 & 2
DEV ENG			
MFG ENG			
QA ENG			
TOLERANCE UNLESS NOTED			A A4 — 50049892
ANGULAR DIMENSION			SCALE: None / USED ON / SH. 1 OF 5

MASTER FILE TYPE: MS WORD

Output Protocol: H=HART or D=DE

All Models of ST800 and the following Models of the ST700: STA722, STA740, STA72L, STA74L, STA77L, STD720, STD730, STD770, STG730, STG740, STG770, STG73L, STG74L, STG77L, STG78L, STG79L, STF724, STF732, STF72F, STF73F, STR73D, STR74G, STR73D, and STR74G

ENTITY PARAMETERS	Associated Apparatus
Ui or Vmax ≤ 30V	Uo, Voc or Vt ≤ 30V
Ii or Imax ≤ 105 mA	Io (Isc or It) ≤ 105 mA
Pi or Pmax = 0.9W	Po ≤ 0.9 W
Ci= 3.9 nF	Ca or Co ≥ $C_{cable} + C_{ST\ 800/\ ST\ 700}$
Li= 984 µH	La or Lo ≥ $L_{cable} + L_{ST\ 800/\ ST\ 700}$

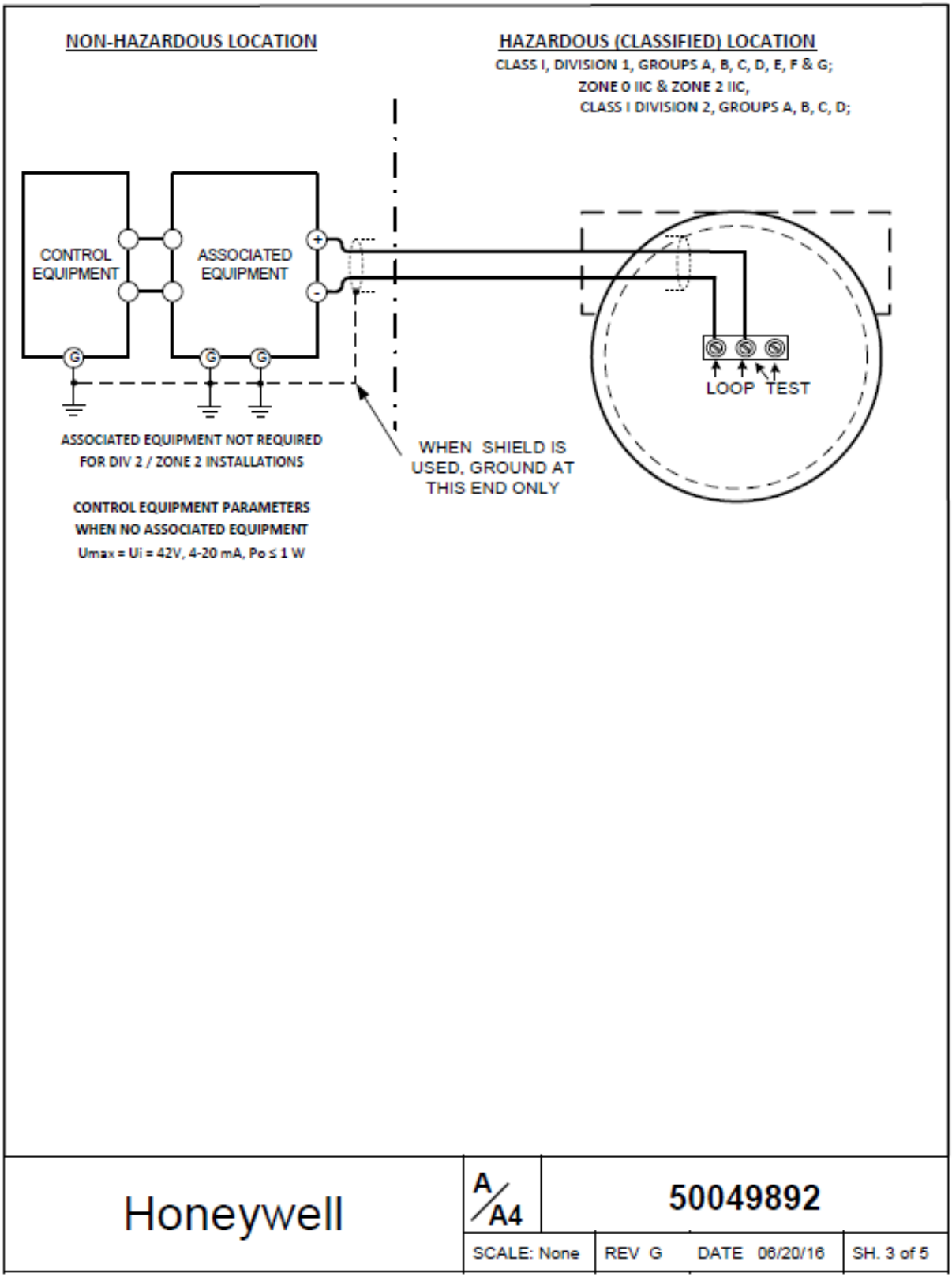
After 9/27/2013 (TERMINAL MODULE REVISION E OR LATER)

NOTE: 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.

Additionally for the ST700 Models: STA725, STA745, STA72S, STA74S, STA77S, STD725, STD735, STD775, STG735, STG745, STG775, STG73S, STG74S, STG77S, STG78S, STG79S, STF725, STF735, STF72P, STF73P, STR735D, and STR745G

ENTITY PARAMETERS (Divisions and Zones Ex ia and Ex ic)	Associated Apparatus
Ui or Vmax ≤ 30V	Uo, Voc or Vt ≤ 30V
Ii or Imax ≤ 225 mA	Io (Isc or It) ≤ 225 mA
Pi or Pmax = 0.9W	Po ≤ 0.9 W
Ci= 3.9 nF	Ca or Co ≥ $C_{cable} + C_{ST\ 800/\ ST\ 700}$
Li= 0 µH	La or Lo ≥ $L_{cable} + L_{ST\ 800/\ ST\ 700}$

Honeywell	A/A4	50049892	
	SCALE: None	REV G DATE 06/20/16	SH. 2 of 5


NON-HAZARDOUS LOCATION
HAZARDOUS (CLASSIFIED) LOCATION
CLASS I, DIVISION 1, GROUPS A, B, C, D, E, F & G;
ZONE 0 IIC & ZONE 2 IIC,
CLASS I DIVISION 2, GROUPS A, B, C, D;
CONTROL EQUIPMENT
ASSOCIATED EQUIPMENT
+
-
G
G
G
LOOP TEST
ASSOCIATED EQUIPMENT NOT REQUIRED
FOR DIV 2 / ZONE 2 INSTALLATIONS
WHEN SHIELD IS USED, GROUND AT THIS END ONLY
CONTROL EQUIPMENT PARAMETERS
WHEN NO ASSOCIATED EQUIPMENT
Umax = Ui = 42V, 4-20 mA, Po ≤ 1 W
Honeywell
A/A4
50049892
SCALE: None
REV G
DATE 06/20/16
SH. 3 of 5

Output Protocol: F=Foundation Fieldbus or P= PROFIBUS

All Models of ST800 and the following Models of the ST700: STA722, STA740, STA72L, STA74L, STA77L, STD720, STD730, STD770, STG730, STG740, STG770, STG73L, STG74L, STG77L, STG78L, STG79L, STF724, STF732, STF72F, STF73F, STR73D, STR74G, STR73D, and STR74G

ENTITY PARAMETERS	Associated Apparatus
Ui or Vmax ≤ 30V	Uo, Voc or Vt ≤ 30V
Ii or Imax ≤ 180 mA	Io (Isc or It) ≤ 180 mA
Pi or Pmax = 1W	Po ≤ 1 W
Ci= 0 nF	Ca or Co ≥ C_{cable} + $C_{ST\ 800/\ ST\ 700}$
Li= 984 µH	La or Lo ≥ L_{cable} + $L_{ST\ 800/\ ST\ 700}$

Terminal Module Revision F or Later

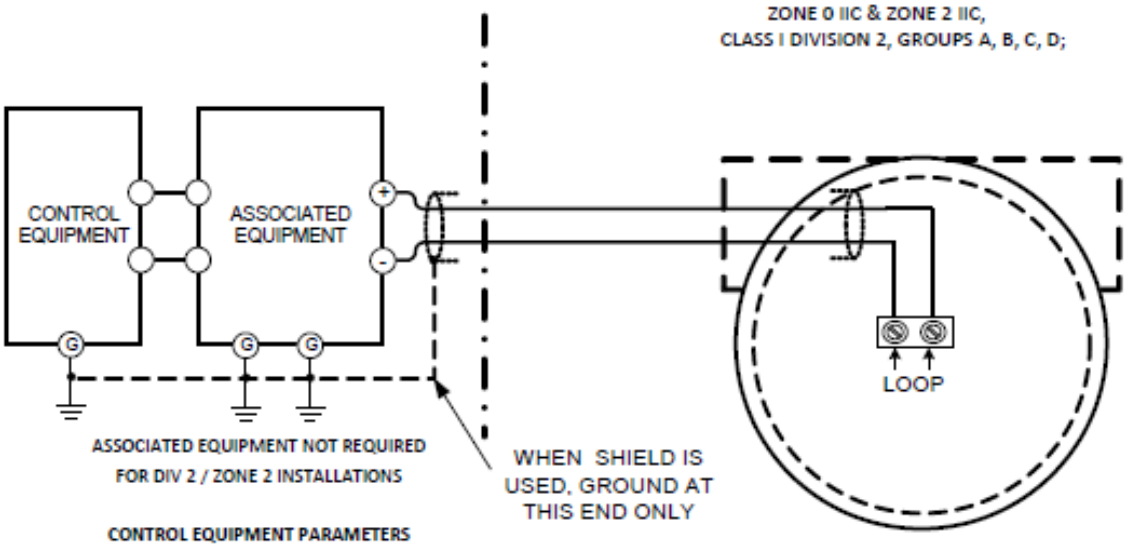
NOTE: THE REVISION IS ON THE LABEL THAT IS ON THE MODULE. THERE WILL BE TWO LINES OF TEXT ON THE LABEL:
- FIRST IS THE MODULE PART #: 50049839-003 OR 50049839-004
- SECOND LINE HAS THE SUPPLIER INFORMATION, ALONG WITH THE REVISION: XXXXXXX-FXXXX, THE "X" IS PRODUCTION RELATED; THE POSITION OF THE "F" IS THE REVISION.

ENTITY PARAMETERS	Associated Apparatus
Ui or Vmax ≤ 30V	Uo, Voc or Vt ≤ 30V
Ii or Imax ≤ 225 mA	Io (Isc or It) ≤ 225 mA
Pi or Pmax = 1W	Po ≤ 1 W
Ci= 0 nF	Ca or Co ≥ C_{cable} + $C_{ST\ 800/\ ST\ 700}$
Li= 0 µH	La or Lo ≥ L_{cable} + $L_{ST\ 800/\ ST\ 700}$

NON-HAZARDOUS LOCATION

HAZARDOUS (CLASSIFIED) LOCATION

CLASS I, CLASS II, DIVISION 1, GROUPS A, B, C, D, E, F & G;
ZONE 0 IIC & ZONE 2 IIC,
CLASS I DIVISION 2, GROUPS A, B, C, D;



ASSOCIATED EQUIPMENT NOT REQUIRED FOR DIV 2 / ZONE 2 INSTALLATIONS

WHEN SHIELD IS USED, GROUND AT THIS END ONLY

CONTROL EQUIPMENT PARAMETERS WHEN NO ASSOCIATED EQUIPMENT
Umax=Ui= 32V, 25 mA, Po ≤ 1 W

Honeywell	A/A4	50049892	
	SCALE: None	REV G DATE 06/20/16	SH. 4 of 5

Output Protocol: F=Foundation Fieldbus

All Models of ST800 and the following Models of the ST700: STA722, STA740, STA72L, STA74L, STA77L, STD720, STD730, STD770, STG730, STG740, STG770, STG73L, STG74L, STG77L, STG78L, STG79L, STF724, STF732, STF72F, STF73F, STR73D, STR74G, STR73D, and STR74G

FISCO Terminal Module Revision F or Later

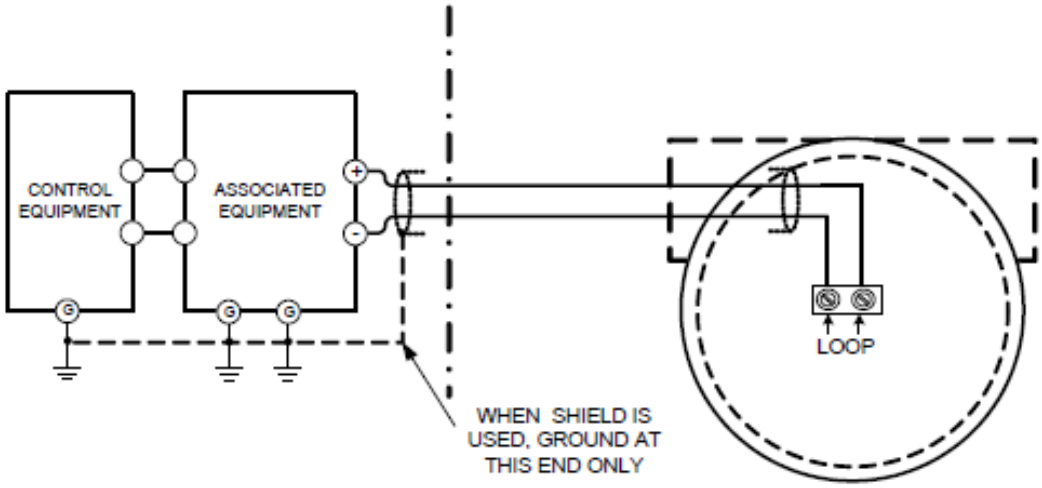
NOTE: THE REVISION IS ON THE LABEL THAT IS ON THE MODULE. THERE WILL BE TWO LINES OF TEXT ON THE LABEL:

- **FIRST IS THE MODULE PART #: 50049839-003 OR 50049839-004**
- **SECOND LINE HAS THE SUPPLIER INFORMATION, ALONG WITH THE REVISION: XXXXXXX-FXXXX, THE "X" IS PRODUCTION RELATED, THE POSITION OF THE "F" IS THE REVISION.**

ENTITY PARAMETERS (Ex ia and Ex ic)	Associated Apparatus
Ui or Vmax ≤ 18	Uo, Voc or Vt ≤ 18V
Ii or Imax ≤ 380 mA	Io (Isc or It) ≤ 380 mA
Pi or Pmax = 5.32W	Po ≤ 5.32 W
Ci= 0 nF	Ca or Co ≥ C_{cable} + $C_{ST\ 800/\ ST\ 700}$
Li= 0 µH	La or Lo ≥ L_{cable} + $L_{ST\ 800/\ ST\ 700}$

NON-HAZARDOUS LOCATION

HAZARDOUS (CLASSIFIED) LOCATION
ZONE 0 IIC & ZONE 2 IIC,



Honeywell	A/A4	50049892		
	SCALE: None	REV G	DATE 08/20/16	SH. 5 of 5

A5. Marine Approvals

American Bureau of Shipping (ABS)

Certificate Number: 14-HS1265317

ABS Rules: Rules for Conditions of Classification, Part 1 - 2014 Steel Vessel Rules 1-1-4/7.7, 1-1-A3, 1-1-A4 which Covers the following: Steel Vessels 4-6-2/5.15, 4-8-3/13, 4-8-4/27.5.1, 4-9-8/13; Offshore Support Vessels 4-8-3/13, 4-8-4/29.5.1, 4-9-8/13; High Speed Craft 4-6-3/9.1.1(a), 4-7-9/15.1; Rules for Conditions of Classification, Part 1 - 2014 Offshore Units and Structures 1-1-4/9.7, 1-1-A2, 1-1-A3

Bureau Veritas (BV)

Certificate Number: 39542/A0 BV

Requirements: Bureau Veritas Rules for the Classification of Steel Ships

EC Code: 41S

Det Norske Veritas (DNV)

Certificate Number: A-13982

Application/ 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.

Korean Register of Shipping (KR)

Appl. No: DLN-T0044-14

Lloyd's Register (LR)

Certificate Number: 14/60017

Application: For use in environmental categories ENV1, ENV2, ENV3 adn ENV5 as defined by Lloyd’s Register Test specification No. 1, 2013

Glossary

AP	Absolute Pressure
AWG	American Wire Gauge
DE	Digital Enhanced Communications Mode
DP	Differential Pressure
d1	Inside diameter of pipe
d2	Orifice plate bore diameter at flowing temperature
do	Inside diameter of orifice
EMI	Electromagnetic Interference
FTA	Field Termination Assembly
GP	Gauge Pressure
HP	High Pressure (also, High Pressure side of a differential pressure transmitter)
Hz	Hertz
inH_2O	Inches of Water
LGP	In-Line Gauge Pressure
LP	Low Pressure (also, Low Pressure side of a differential pressure transmitter)
LRL	Lower Range Limit
LRV	Lower Range Value
mAdc	Milliamperes Direct Current
mmHg	Millimeters of Mercury
mV	Millivolts
Nm	Newton·meters
NPT	National Pipe Thread
NVM	Non-Volatile Memory
Pa	Measured static pressure in PV4 algorithm
Pc	Absolute critical pressure of the gas
Pd	Static pressure at downstream point
Pdp	Measured differential pressure in Pascals in PV4 algorithm
Pf	Absolute pressure of flowing gas
Pr	Reduced pressure
Pu	Static pressure at upstream point
PM	Process Manger
PSI	Pounds per Square Inch
PSIA	Pounds per Square Inch Absolute
PV	Process Variable
PWA	Printed Wiring Assembly
RFI	Radio Frequency Interference
RTD	Resistance Temperature Detector
SFC	Smart Field Communicator
STIM	Pressure transmitter Interface Module
STIMV IOP	Pressure transmitter Interface Multivariable Input/Output Processor
T/C	Thermocouple
URL	Upper Range Limit
URV	Upper Range Value
US	Universal Station
Vac	Volts Alternating Current
Vdc	Volts Direct Current

A

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P

R

S

T

W

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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1300-36-04-70

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or
(TAC)
hfs-tac-support@honeywell.com

Web
Knowledge Base search
engine **http://bit.ly/2N5Vldi**

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hfs-tac-support@honeywell.com

Web
Knowledge Base search
engine **http://bit.ly/2N5Vldi**

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visit **www.honeywellprocess.com**
Or contact your Honeywell Account Manager

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