Honeywell

SMV800
SmartLine MultiVariable Transmitter
User's Manual

34-SM-25-03
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Revision 5, December 2017

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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 SMV800 SmartLine MultiVariable Transmitters. Users who have a Honeywell SMV800 SmartLine MultiVariable Transmitters configured for HART protocol or Honeywell's Digitally Enhanced (DE) are referred to the *SMV800 SmartLine Multivariable Transmitter HART/DE Option User's manual*, document number 34-SM-25-06.

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:

SMV800 SmartLine Multivariable Transmitter User Manual, Document # 34-SM-25-03.

Rev. 1, October 2015 – First Release (RQUP)

Rev. 2, December 2015 – Prod Release

Rev. 3, September 2016 – Agency Approval updates

Rev. 4, March 2017 – SAEx / INMETRO / NEPSI / KOSHA / SIL Approval updates

Rev.5, December 2017 – Totalizer functionality added (R120)

References

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

SMV800 SmartLine Multivariable Transmitter Quick Start Installation Guide, Document # 34-SM-25-04

SMV800 SmartLine Multivariable Transmitter with HART Communications Options Safety Manual, # 34-SM-25-05

SMV800 SmartLine Multivariable Transmitter HART/DE Option User's Manual, Document # 34-SM-25-06

SmartLine Configuration Toolkit (SCT) Installation and startup Guide, 34-ST-10-08

MC Tookit User Manual (MCT404), Document # 34-ST-25-50. *MC Tookit User Manual (MCT202),* Document # 34-ST-25-20

PM/APM SmartLine Transmitter Integration Manual, Document # PM 12-410

ST 800 Series Pressure, Analog, HART and DE Communications form, Honeywell drawing 50049892

Smart Field Communicator Model STS 103 Operating Guide, Document # 34-ST-11-14

Patent Notice

The Honeywell SMV800 SmartLine Multivariable 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/pressure-transmitters/
Training Classes	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	ask-ssc@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 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 harmonized with the 94/9/EC Directive (ATEX Directive, named after the French "ATmosphere EXplosible").

Contents

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1. Introduction

1.1. Overview

This section is an introduction to the physical and functional characteristics of Honeywell's family of SMV800 SmartLine Multivariable Transmitters.

1.2. Features and Options

The SMV800 SmartLine MultiVariable Transmitter is available in a variety of models for measuring three process variables and calculating volumetric and mass flow rate for gas, steam and liquids. Table 1 lists the protocols, human machine interface (HMI), materials, approvals, and mounting bracket options for the SMV800.

Table 1 – Features and Options

Feature/Option	Standard/Available Options
Communication Protocols	HART revision 7, Digitally Enhanced (DE)
Human-Machine Interface (HMI) Options	Advanced Digital Display
	Three-button programming (optional)
	Display languages: English, German, French, Italian, Spanish, Turkish, Russian Chinese and Japanese
Calibration	Single, Dual and Triple Cal for PV1 (Diff.Pressure) and PV2 (Static Pressure)
Approvals (See Appendix for details.)	FM, ATEX, CSA, IECEx, NEPSI
Mounting Brackets	Angle/flat carbon steel/304 stainless steel, Marine 304 stainless steel, 316 Stainless Steel
Integration Tools	Experion
Configuration	SmartLine Configuration Tool for DE MCT404 toolkits can be used for HART

1.2.1. Physical Characteristics

As shown in Figure 1, the SMV800 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.

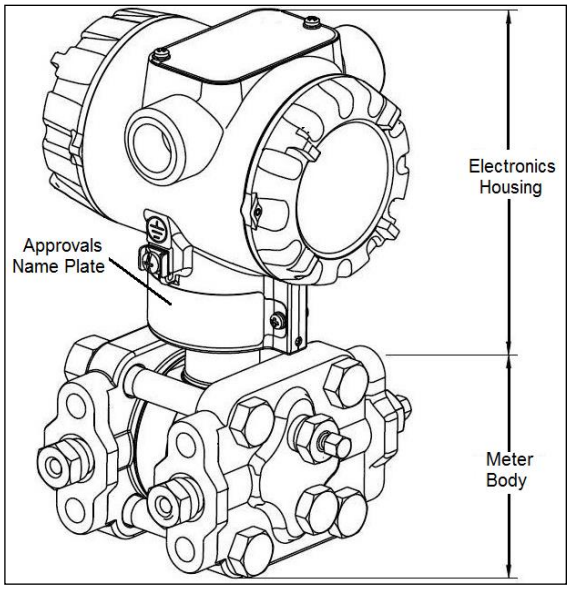

Figure 1 –SMV800 Major Assemblies

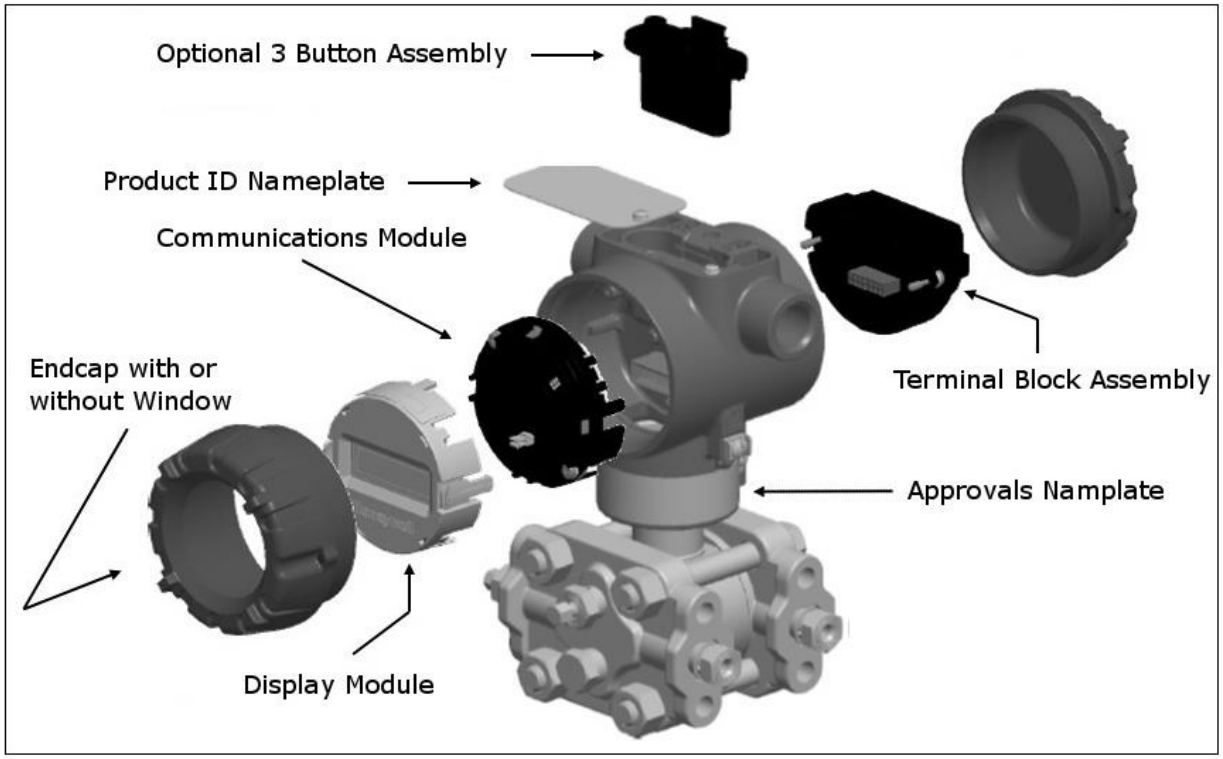

Figure 2 – Electronics Housing Components

1.2.2. Functional Characteristics

The SMV800 SmartLine MultiVariable transmitter measures Differential Pressure, Static Pressure (Absolute or Gauge), and Process Temperature. These measurements are used to calculate volumetric or mass flow rates. The measured values and calculated flow may be read by a connected Host. Available communication protocols are Honeywell Digitally Enhanced (DE) and HART. Digital or Analog (4-20ma) output modes are available. The SMV800 measures Process Temperature from an external RTD or Thermocouple.

SMV800 supports 6 device variables:

1. Differential Pressure
2. Static Pressure
3. Process Temperature
4. Calculated Flow Rate
5. Totalizer (HART only)
6. Meter Body Temperature.

First 5 variables can be mapped to PV (Primary Variable), SV (Secondary Variable), TV (Tertiary Variable), QV (Quaternary Variable)
The 6th one, Meter Body temperature can be mapped to SV, TV, QV, but not to PV (Analog Output)

Honeywell SMV800 supports Dynamic Compensation Mode for Industrial Flow Standards according to ASME-MFC-3-2004, ISO5167-2003, Gost8.586-2005, AGA3-2003 and flow calculations for Averaging Pitot Tube, Integral Orifice, VCone, and Wedge and Fixed Parameters.
Honeywell SMV800 also supports Standard Compensation Mode for Only Density Compensation.

SMV800 supported primary element list is as follows:

ASME-MFC-3-2004 Flange Pressure Taps
ASME-MFC-3-2004 Corner Pressure Taps
ASME-MFC-3-2004 D and D/2 Pressure Taps
ISO5167-2003 Flange Pressure Taps
ISO5167-2003 Corner Pressure Taps
ISO5167-2003 D and D/2 Pressure Taps
Gost 8.586-2005 Flange Pressure Taps
Gost 8.586-2005 Corner Pressure Taps
Gost 8.586-2005 Three-Radius Pressure Taps
AGA3-2003 Flange Pressure Taps
AGA3-2003 Corner Pressure Taps
ASME-MFC-3-2004 ASME Long Radius Nozzles
ASME-MFC-3-2004 Venturi Nozzles
ASME-MFC-3-2004 ISA 1932 Nozzles
ISO5167-2003 Long Radius Nozzles
ISO5167-2003 Venturi Nozzles
ISO5167-2003 ISA 1932 Nozzles
Gost 8.586-2005 Long Radius Nozzles
Gost 8.586-2005 Venturi Nozzles
Gost 8.586-2005 ISA 1932 Nozzles
ASME-MFC-3-2004 “As-Cast ” Convergent Section
ASME-MFC-3-2004 Machined Convergent Section
ASME-MFC-3-2004 Rough-Welded Convergent Section
ISO5167-2003 “As-Cast ” Convergent Section
ISO5167-2003 Machined Convergent Section

ISO5167-2003 Rough-Welded Sheet-Iron Convergent Section
Gost 8.586-2005 Cast Upstream Cone Part
Gost 8.586-2005 Machined Upstream Cone Part
Gost 8.586-2005 Welded Upstream Cone Part made of Sheet Steel
Averaging Pitot Tube
Standard VCone
Wafer Cone
Wedge
Integral Orifice
Fixed Cd, Y1, Viscosity, Density and Fa (Fixed input option) are supported for user to friendly customize the flow calculation

An optional 3-button assembly is available to set up and configure the transmitter via the Display. In addition, a Honeywell MCT404/MCT202 Toolkit is available for configuration of HART models. The SCT SmartLine Configuration Tool (not supplied with the Transmitter) can facilitate setup and configuration for DE devices.
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 for HART and DE transmitters.

1.3. SMV800 Transmitter Name Plate

The Transmitter nameplate mounted on the bottom of the electronics housing (see Figure 1) lists certifications. The model number, physical configuration, electronic options, accessories are located on the Product I.D. nameplate (see Figure 2). Figure 3 is an example of a SMV800 for the name plate information. The model number format consists of a Key Number with several table selections.

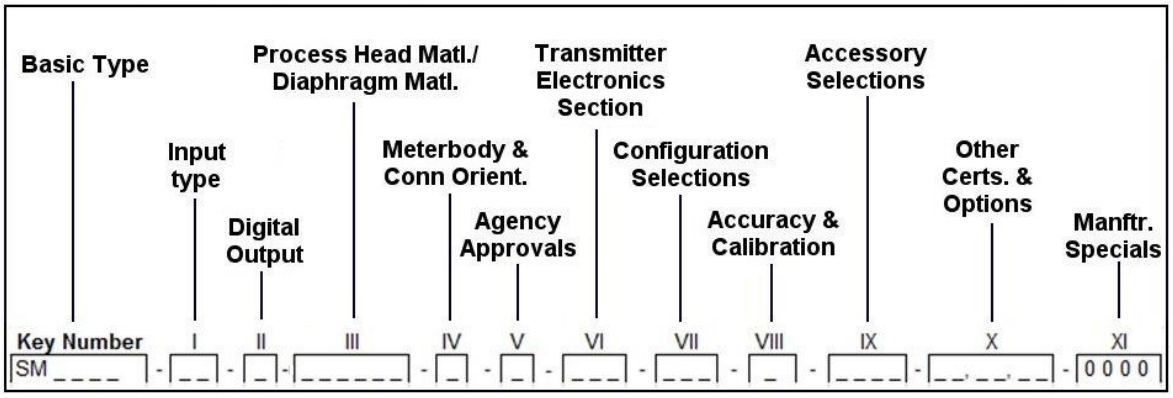

Figure 3 –Typical SMV800 Name Plate

E.g. SMA810, SMA845 or SMG870
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 measurement types for the Static Pressure:

- A = Absolute Pressure
- G = Gauge Pressure

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

1.4. Safety Certification Information

An “approvals” name plate is located on the bottom of the Electronics Assembly; see Figure 1 for exact location. The approvals name plate contains information and service marks that disclose the Transmitter compliance information. Refer to Appendix C of this document for safety certification requirements and details.

1.5. Transmitter Adjustments

For HART and DE variants Zero and Span adjustments are possible in SMV800 SmartLine MultiVariable Transmitters with the optional three-button assembly located at the top of the Electronic Housing (see Figure 2).

You can also use the Honeywell MCT404/MCT202 Configuration Tool – FDC application to make any adjustments to an SMV800 Transmitter with HART.
For DE models the SCT3000 PC tool application can be used to configure the device. STS103 can be used to Zero and Span adjustments.
Certain adjustments can also be made through the Experion or Universal Station if the Transmitter is digitally integrated with a Honeywell Experion or TPS system.

1.6. Display Options

The SMV800 SmartLine MultiVariable Transmitter has the following display option,

Table 2 – Available Display Characteristics

Display	• 360º rotation in 90º increments
	• Three (3) configurable screen formats with configurable rotation timing
	  o Large process variable (PV)
	  o PV with bar graph
	  o PV with trend (1-24 hours, configurable)
	• Eight (8) screens with 3-30 seconds rotation timing
	• Standard and custom engineering units
	• Diagnostic alerts and diagnostic messaging
	• Multiple language support:
	  o EN, FR, GE, SP, RU, IT & TU
	  o EN, CH (Kanji), JP
	• Square root output indication
	• Supports 3-button configuration and calibration
	• Supports transmitter messaging, and maintenance mode indications

1.7. Optional 3-Button Assembly

The optional 3-Button Assembly provides the following features and capabilities:

- Increment, decrement, and enter key functions.
- With the menu-driven display:
  - Comprehensive on-screen menu for navigation.
  - Transmitter configuration (for HART and DE).
  - Transmitter calibration (for HART and DE).
  - Display configuration.
  - Set zero and span parameters (for HART and DE).

1.8. Universal Temperature Sensor Option Licensing

In a standard device, only RTD Temperature sensor types may be used for measuring Process Temperature.

The Universal Temperature Sensor option can be enabled after the transmitter is shipped by purchasing and activating a license, to expand the selection of temperature sensor types to include thermocouples.

For DE models, this option is only available at time of order entry and no license for activation is supported.

To obtain and activate a license for the Universal Temperature Sensor option:

- Obtain the device's Serial Number from the local display menu or from the host interface.
- Place an order for Universal Temperature Sensor Field Upgrade for SMV800, part number #50127216-501 with the Serial Number.
- Based on this information the regional distribution center will generate and return a license key.
- The license is activated by entering the License Key parameter value from the local display menu or host interface.
- A restart of the display only will then occur.
- License activation can be confirmed by observing that the Universal Temperature Sensor option is enabled using the local display menu or host interface.

2. Application Design

2.1. Overview

This section discusses the considerations involved with deploying a Honeywell SMV800 SmartLine MultiVariable 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

2.2. Safety

2.2.1. Accuracy

The SMV800 SmartLine MultiVariable transmitter measures Differential Pressure, Static Pressure (Absolute or Gauge), and Process Temperature. These measurements are used to calculate volumetric or mass flow rates. The measured values and calculated flow may be read by a connected Host.

2.2.2. Diagnostic Messages

Transmitter standard diagnostics are reported in the two basic categories listed in Table 3 and Table 4. For devices configured for Analog Output, problems detected as critical diagnostics drive the analog output to the programmed burnout level for HART and DE. 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 3 and Table 4) report various Transmitter status or setting conditions. The messages listed in Table 3 and 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 SMV800 SmartLine Multivariable Transmitter HART/DE Option Manual document number.34-SM-25-06.

Table 3 - SMV800 Standard Diagnostics Messages - Critical

Critical Diagnostics	
HART DD/DTM Tools	**Display**
• Sensor Critical Fault	• Meter Body and/or • Meter Body Comm and/or • Temp Sense Board and/or • Temp Input and/or • Temp Sensor Comm
• SIL Diag Failure or • msp vcc fault and/or • Config Data Corrupt • DAC Failure	• Comm Module
• DAC Failure	• Comm Module Temp
• msp vcc fault	• msp vcc fault

Refer to Table 8 for the more detail on status of Critical Diagnostics Menu

Table 4 - SMV800 Standard Diagnostics Messages – Non Critical

Non-critical Diagnostics	
HART DD/DTM Tools	**Display**
Local Display	Display Setup
Fixed Current Mode	Analog Out Mode
Comm Sec NC Fault	N/A
Sensing Sec NC Fault	Temp cal Correct DP Zero Correct and/or DP Span Correct and/or Meter Body Input
Sensor Over Temperature	Temp Module Temp and/or Meter Body Temp
PV Out Of Range	PV Out Of Range
No Fact Calib	Pressure Fac Cal* and/or Temp Fac Cal
No DAC Compensation	DAC Temp Comp
N/A	Temp Cal Correct
LRV Set Err. Zero Config Button	N/A
URV Set Err. Span Config Button	N/A
CJ Out of Limit	CJ Range
AO Out of Range	N/A
Sensor Input Open	Temp Input and/or Temp Input TB6
Loop Current Noise	N/A
Sensor Unreliable Comm	Meter Body Comm and/or Temp Comm
Tamper Alarm	N/A
No DAC Calibration	N/A
Low Supply Voltage	Supply voltage
Totalizer Reached Max. Value	Totalizer Reached Max. ValueTemp Input and/or Temp Input TB6
Flow Calculation Details	Flow Divide by 0 and/or Flow Sqrt of Neg and/or Flow Direction and/or Flow SP/PT Comp
DP/SP/PT/FLOW Simulation Mode	DP Simulation and/or SP Simulation and/or PT Simulation and/or Flow Simulation
Sensor in Low Power Mode	N/A
Totalizer mapped to PV and stopped	Totalizer mapped to PV and stopped
No Flow Output	No Flow Output

* Applicable to HART only, not DE

Refer to Table 8 for the more detail on status of Non-Critical Diagnostics Menu

2.2.3. Safety Integrity Level (SIL)

The SMV800 units with the SIL2/3 capable designation on the nameplate are intended to achieve sufficient integrity against systematic errors by the manufacturer's design. 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 *SMV800 SmartLine Multivariable Transmitter Safety Manual*, 34-SM-25-05, for additional information.

2.3. Security Considerations

The SMV800 provides several features designed to prevent accidental changes to the device configuration or calibration data. These features include a local display password (HART option), a communication password (HART option), a Hardware Write Protect Jumper and a Software Write Protect configuration parameter. These features can be used in combination to provide multiple layers of change protection.

For both the local display and communication passwords, the initial user passwords are defined as "0000". A "0000" password indicates that the user has not set a user- defined password and the password protection is disabled. The password used on the local keyboard display is separate from the password provided for communication. Password protection from the local keyboard display does not inhibit changes by way of communication over the current loop. Reset / Forgot password option is supported where user can send the serial number of the device to Honeywell Technical Assistance Center and get the password code. Then user can enter this code to reset the password.

A hardware write-protect locks out changes regardless of the entry of a password. The hardware jumper requires physical access to the device as well as partial disassembly and should not be modified where the electronics are exposed to harsh conditions or where unsafe conditions exist. For configuration or calibration changes without changing the hardware jumper position the user may choose to rely on the password and software lockout features.

A tamper detection feature (see *SMV800 SmartLine Multivariable Transmitter HART/DE Option Manual*, Document # 34-SM-25-06) is available that can indicate that an attempt was made to change either the configuration or calibration of the device (whether or not a change was actually made). These security features are designed to avoid accidental changes and to provide a means to detect if an attempt was made to change the configuration and calibration.

3. Installation and Startup

3.1. Installation Site Evaluation

Evaluate the site selected for the SMV800 SmartLine MultiVariable 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

3.2. Honeywell SmartLine Configuration Toolkit

Use Honeywell SCT3000 for DE and DTM or MCT404 for HART, Document # 34-ST-25-50.
For SCT3000 refer to *SmartLine Configuration Toolkit (SCT 3000), 34-ST-10-08*.

3.3. 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 increase at cold temperature extremes, but as with readability, normal updating resumes when temperatures are within limits for full operability.

3.4. Mounting SMV800 SmartLine Multivariable Transmitters

3.4.1. Summary

Transmitter models can be attached to a 2-inch (50 millimeter) vertical or horizontal pipe using Honeywell's optional angle or flat mounting bracket; alternately you can use your own bracket.

Figure 4 shows typical bracket-mounted transmitter installations.

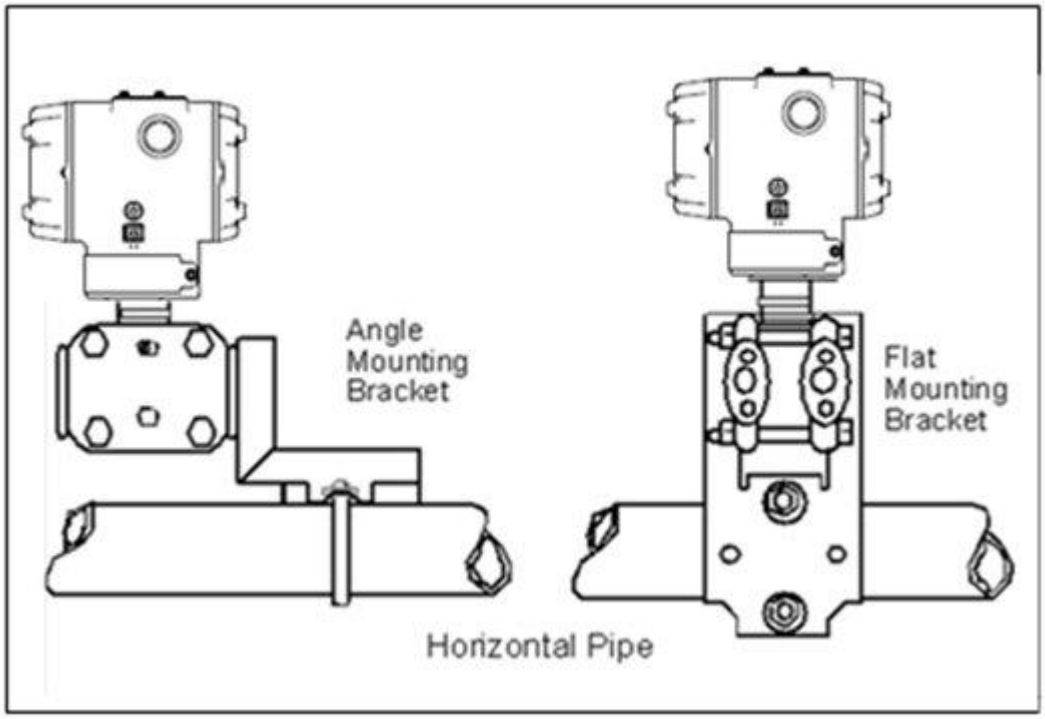

Figure 4 – Typical Bracket Mounted Installations

3.4.2. Mounting Dimensions

Refer to Honeywell drawing number 50049930 (SMV800), 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.

3.4.3. Bracket Mounting Procedure

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

1. Refer to Figure 5. Position the bracket on a 2-inch (50.8 mm) 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.

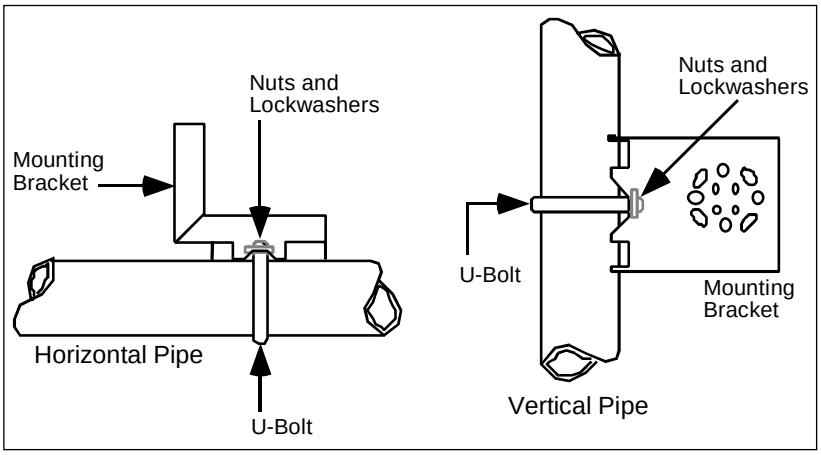

Figure 5 – Angle Mounting Bracket Secured to a Horizontal or Vertical Pipe

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.

Transmitter Type	Use Hardware
SMA/SMG	Alternate mounting holes in the ends of the heads

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

4. Rotate the Electronics housing a maximum of 180° left or right from the center to the position you require, and tighten the set screw 13 to 15 lb-in (1.46 to 1.68 Newton meters), using a 4mm metric hex key wrench. See the following example and Figure 6.
EXAMPLE: Rotating the Electronics Housing

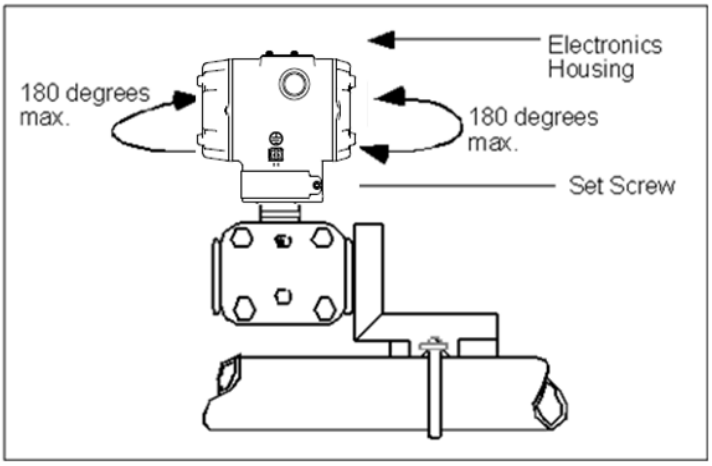

Figure 6 – Rotating the Electronics Housing

3.5. Piping SMV800 Transmitter

3.5.1. Summary

The actual piping arrangement will vary depending upon the process measurement requirements. Process connections can be made to standard 1/4-inch NPT female connections on 2-1/8 inch centers in the double-ended process heads of the transmitter's meter body. Or, the connections in the process heads can be modified to accept 1/2 inch NPT adapter flange for manifolds on 2, 2-1 /8, or 2-1 /4 inch centers

The most common type of impulse pipe used is 1/2 inch schedule 40 steel pipe. Many piping arrangements use a 3-valve or 5-valve manifold to connect the process piping to the transmitter. A manifold makes it easy to install and remove a transmitter without interrupting the process. It also accommodates the installation of blow-down valves to clear debris from pressure lines to the transmitter.

Figure 7 shows a diagram of a typical piping arrangement using a 3-valve manifold and blow-down lines for a flow measurement application.

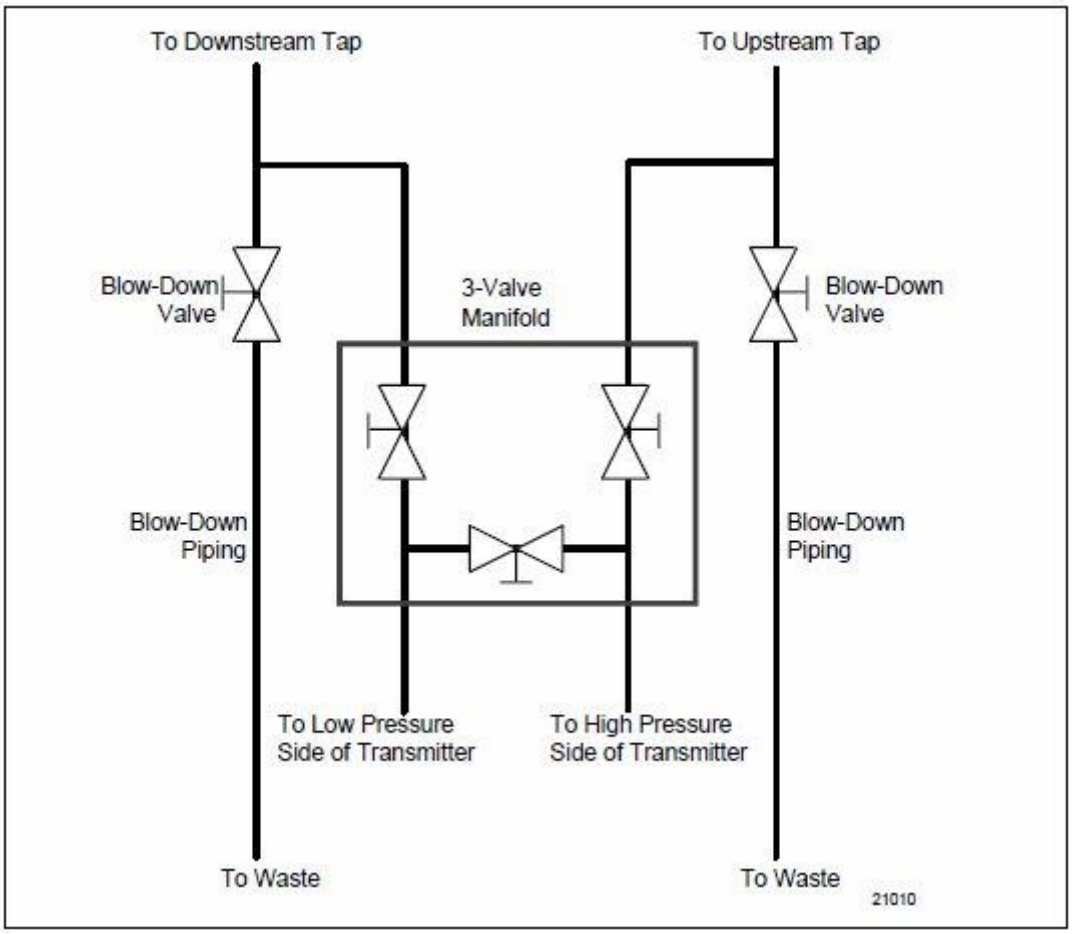

Figure 7 – Typical piping arrangement

3.5.2. Transmitter location

The suggested mounting location for the transmitter depends on the process to be measured. Figure 8 shows the transmitter located above the tap for gas flow measurement. This arrangement allows for condensate to drain away from the transmitter.

Figure 9 shows the transmitter located below the tap for liquid or steam flow measurement. This arrangement minimizes the static head effect of the condensate. Although the transmitter can be located level with or above the tap, this arrangement requires a siphon to protect the transmitter from process steam. (The siphon retains water as a "fill fluid.")

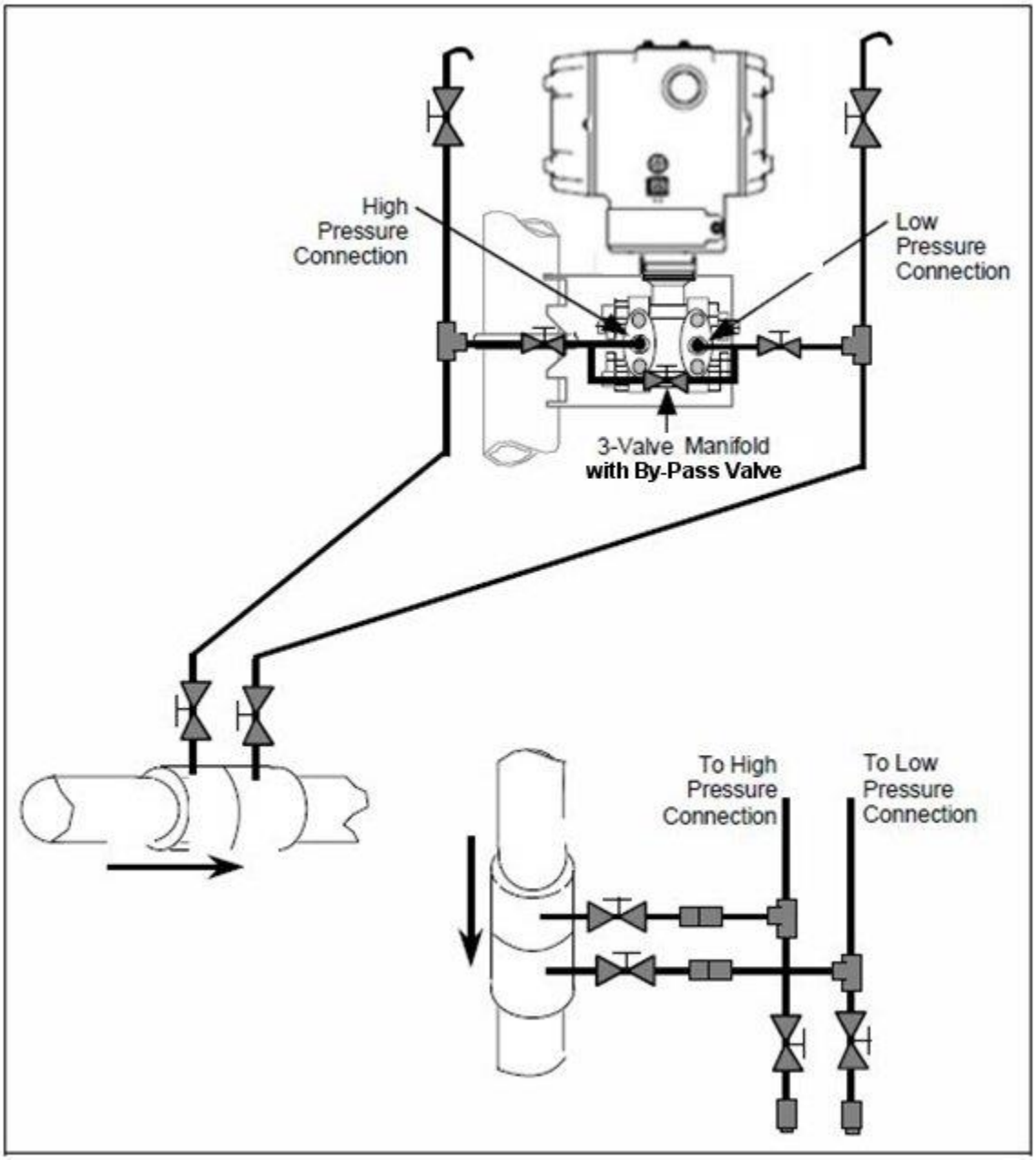

Figure 8 - Transmitter location above tap for gas flow measurement

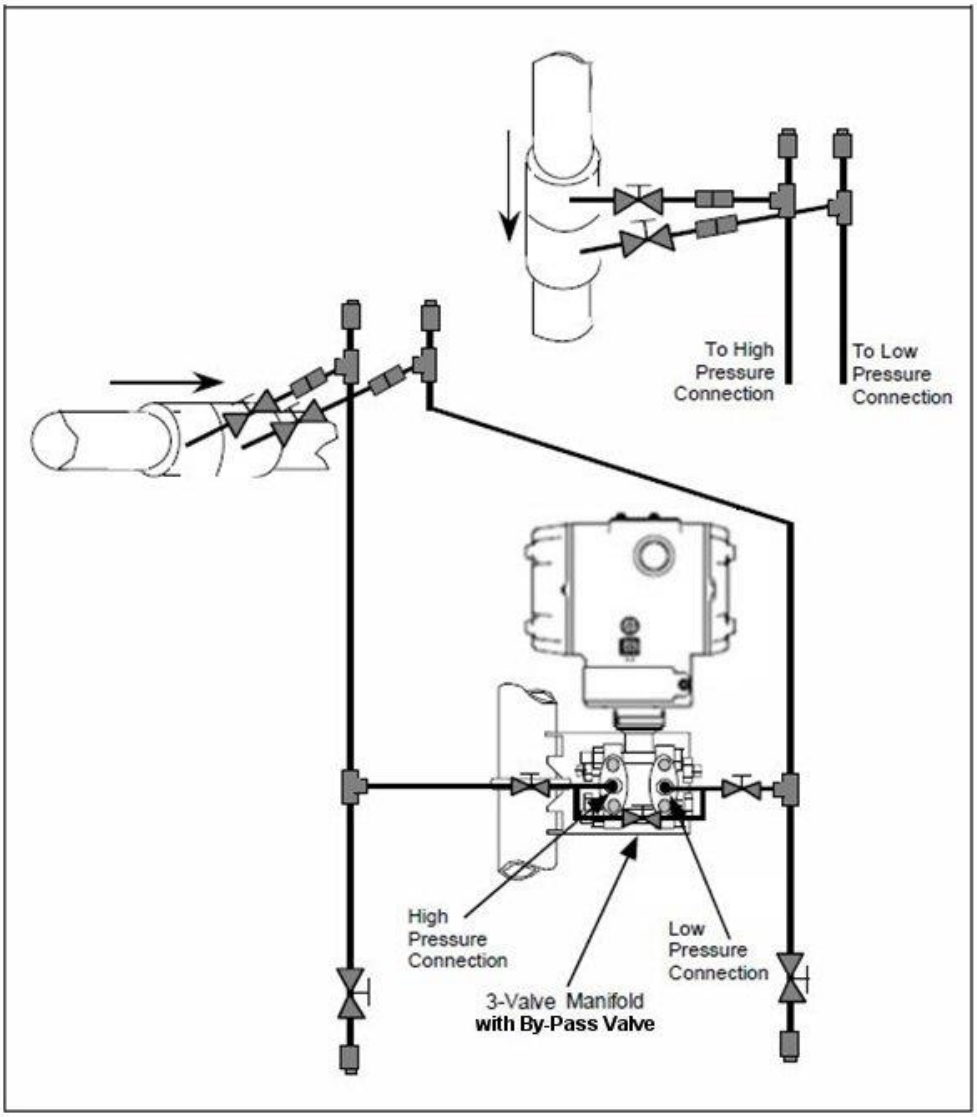

Figure 9 - Transmitter location below the tap for liquid or steam flow measurement

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ATTENTION

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

3.5.3. 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.

3.5.4. Procedure to Install Flange Adapters

The following procedure provides the steps for removing and replacing an optional flange adapter on the process head. See Figure 10.

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.

NOTE: 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 any adapter**.

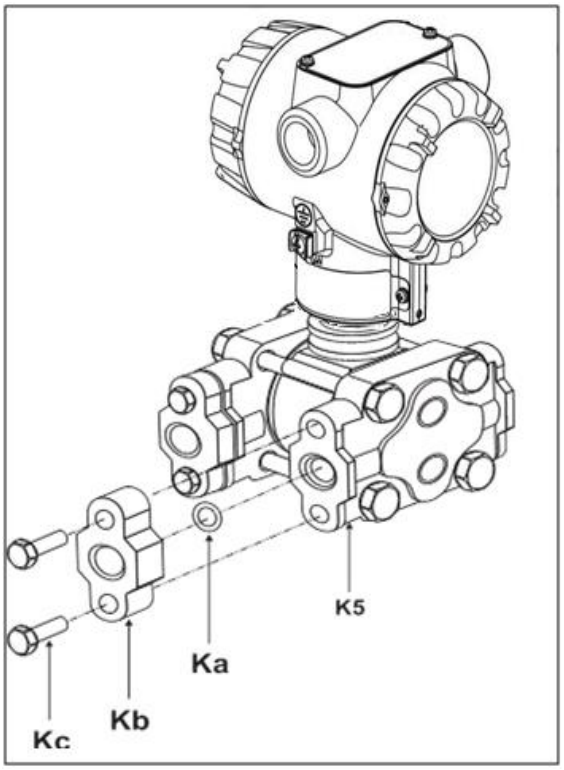


Figure 10 – Flange Adapter Removal and Replacement

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

3.6. Wiring a Transmitter

3.6.1. Overview

The transmitter is designed to operate in a two-wire power/current loop with loop resistance and power supply voltage within the HART/DE operating range shown in Figure 11.

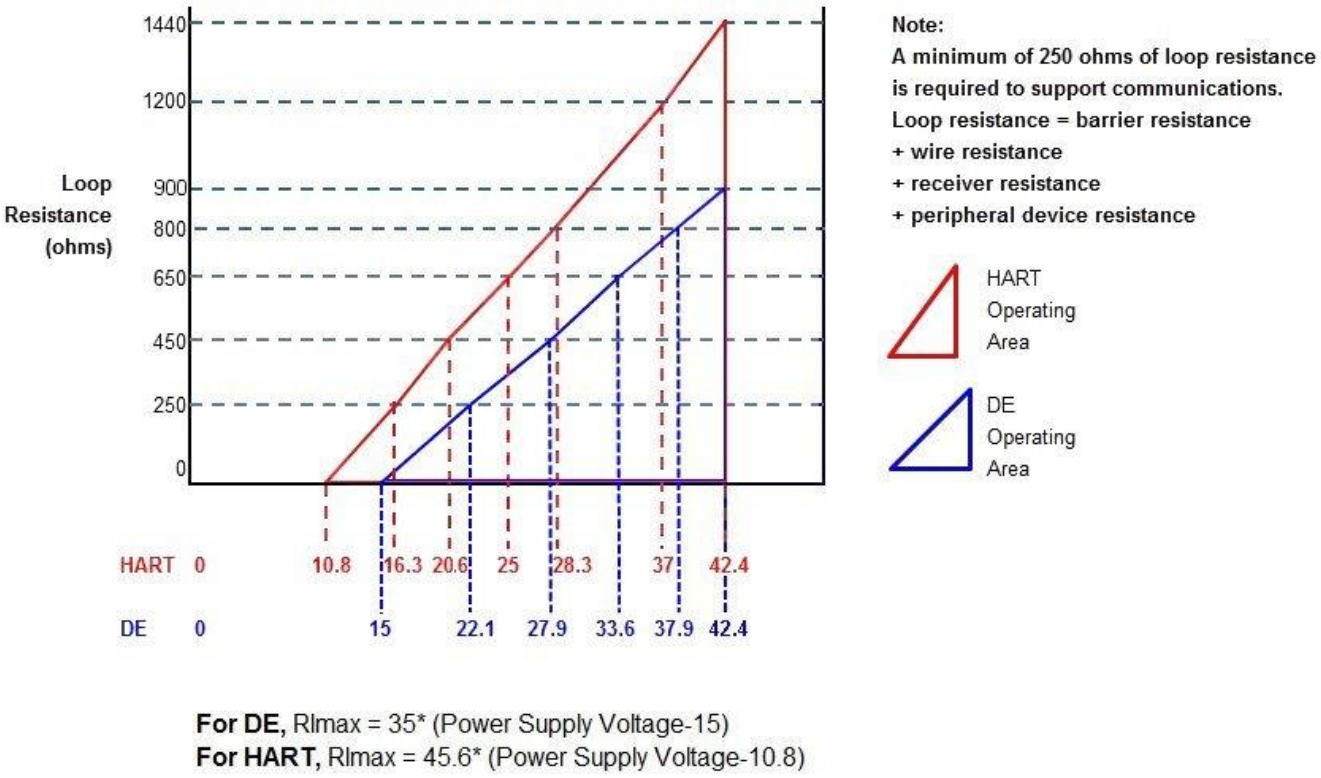


Figure 11 – HART/DE Transmitter Operating Ranges

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 12. Connect the Loop Power wiring shield to earth ground only at the power supply end.

Supply Voltage Load Resistance

HART Models: 10.8 to 42.4 Vdc at terminals (IS version limited to 30v)
0 to 1440 ohm (as shown in Figure 11)

DE Models: 15V to 42.4 Vdc at terminals (IS version limited to 30V)
0 to 900 ohm (as shown in Figure 11)

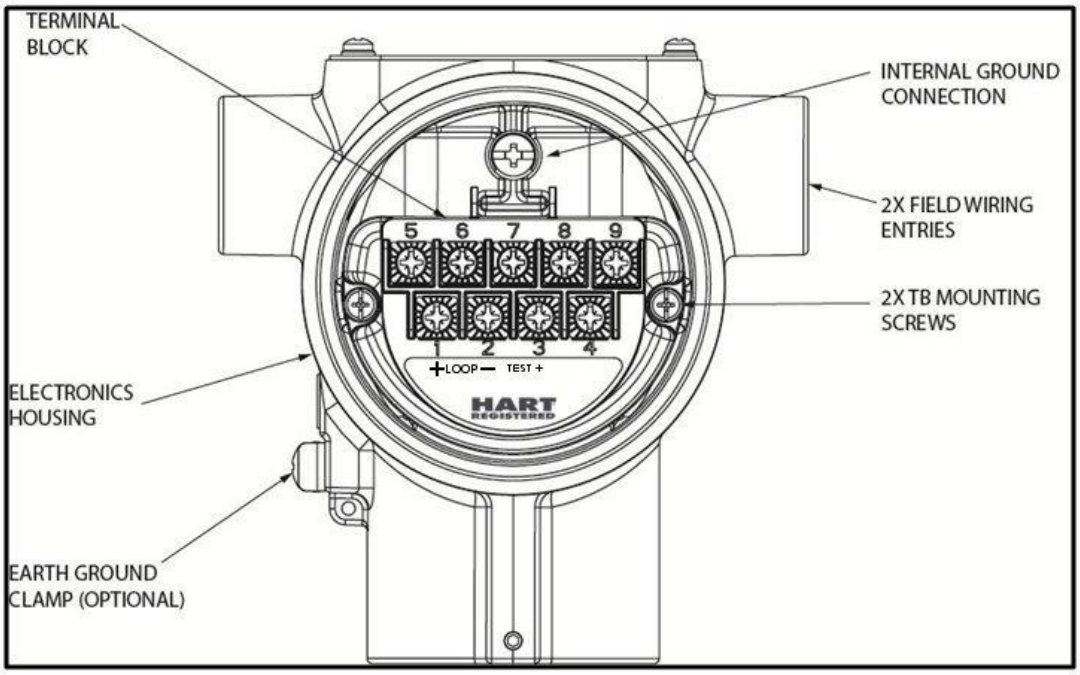


Figure 12 – Transmitter Terminal Board and Grounding Screw

As shown in Figure 12, 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.
Screw terminals 1 to 8 only required for single input, terminals 4 and 9 are not used. Grounding the Transmitter for proper operation is required, as 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 areas that are highly susceptible to lightning strikes. As noted above, the Loop Power wiring shield should only be connected to earth ground at the power supply end.

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.

For HART and DE the Transmitter is designed to operate in a 2-wire power/current loop with loop resistance and power supply voltage within the operating range; see Figure 11.
With optional lightning protection and/or a remote meter and/or any peripheral device, the voltage drop for these options must be added to the basic 10.8-volt (for HART) & 15-volt (for DE) supply requirements to determine the required Transmitter voltage (VXMTR) and maximum loop resistance (RLOOP MAX). Additional consideration is required when selecting intrinsic safety barriers to ensure that they will supply at least minimum Transmitter voltage (VXMTR MIN), including the required 250 ohms of resistance (typically within the barriers) needed for digital communications.

3.6.1. 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.

3.6.2. Input Sensor Wiring

Connect the input sensors as shown in Figure 13:

- To minimize common noise problems in the application, a strap/jumper should be wired between terminals 6 and 8. Applicable for Universal input modes only.

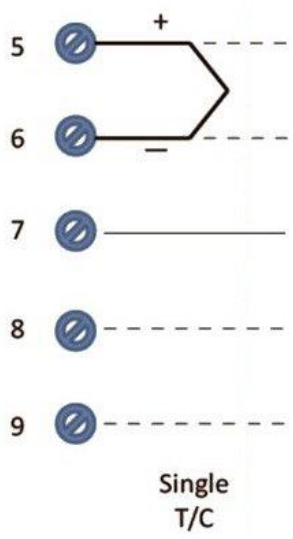


Figure 13 - Temperature Sensor Wiring Diagram

Error! Reference source not found.

- Resistance temperature detector (RTD) measurements use the 3 or 4 wire approach. The transmitter determines by itself if a 3 or 4 wire RTD is connected when powered up.

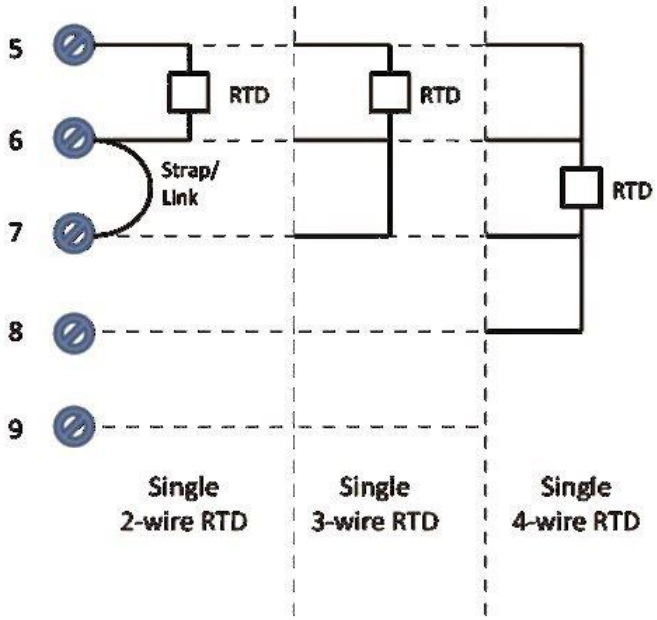


Figure 14 – RTD Connections

3.6.3. Loop Wiring Procedure

1. See Figure 12, above, for parts locations. Loosen the end cap lock using a 1.5 mm 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 16 AWG wire.
4. Plug the unused conduit entrance with a conduit plug appropriate 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.

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 $R_{LOOP\ MAX} = (V_{SUPPLY\ MIN} - V_{XMTR\ MIN}) \div 21.8\ mA$.

In this calculation:

$V_{XMTR\ MIN\ (HART)} = 10.8\ V + V_{SM}$

$V_{XMTR\ MIN\ (DE)} = 15\ V + V_{SM}$

V_{SM} = *Remote meter and/or other peripheral device*

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.

3.6.4. Digital System Integration Information

DE transmitters that are to be digitally integrated to Honeywell's Total Plant Solution (TPS) system will be connected to the 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™ 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.

3.6.5. Lightning Protection

If your Transmitter includes the optional lightning protection, connect a wire from the Earth Ground Clamp (see Figure 12) 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.

3.6.6. 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 42 V DC. Consult the process design system documentation for specifics.

3.6.7. Process Sealing

The SMV800 SmartLine Multivariable 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."

3.6.8. Explosionproof Conduit Seal

When installed as explosionproof 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 explosionproof 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 explosionproof seal for installation. If 3/4 inch conduit is used, a LISTED explosionproof seal to be installed in the conduit, within 18 inches (457.2 mm) of the transmitter.

3.7. Startup

3.7.1. 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.

3.7.2. Startup Tasks

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

- Setting initial resistance (T/C sensor types only)
- 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 SmartLine Configuration Toolkit for a DE transmitter or MCT404/MCT202 for a HART version, to check the Transmitter input and output under static process conditions, and make adjustments as required initiating full operation with the running process.
Note: checks can be made using the optional three-button assembly, if your Transmitter is so equipped. Operation with the three-button assembly is discussed in the "Operation" section of this manual.

3.7.3. Power-up sequence

The SMV800 device power-up sequence in Analog mode (with loop current mode Enabled) as measured across the 250 ohm loop resistor and/or the TEST terminals:

- Output starts at .90 volts for about 3 seconds (loop current of 3.6mA)
- Output steps to 3.00 volts (loop current of 12 mA)
- Output steps to true value with respect to applied input and configured span

Note: while checking the proper supply voltage VCC at the communication board, communication module sets the loop current to lower burnout. After reading the VCC, communication module will again set the loop current to normal power up current

The SMV800 device power-up sequence (with the loop current mode Disabled) as measured across the 250 ohm loop resistor and/or the TEST terminals:

- The device skips all initializations and goes directly to the fixed 1 volt (loop current of 4 ma).

3.7.4. 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 4 mA and 20 mA, 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 Lower Range Limit Value (LRV) and Upper Range Limit Value (URV) are then set by commands from the Host applications (For HART use MCT404 and for DE use SCT tool).

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

3.7.5. Constant Current Source Mode Procedure

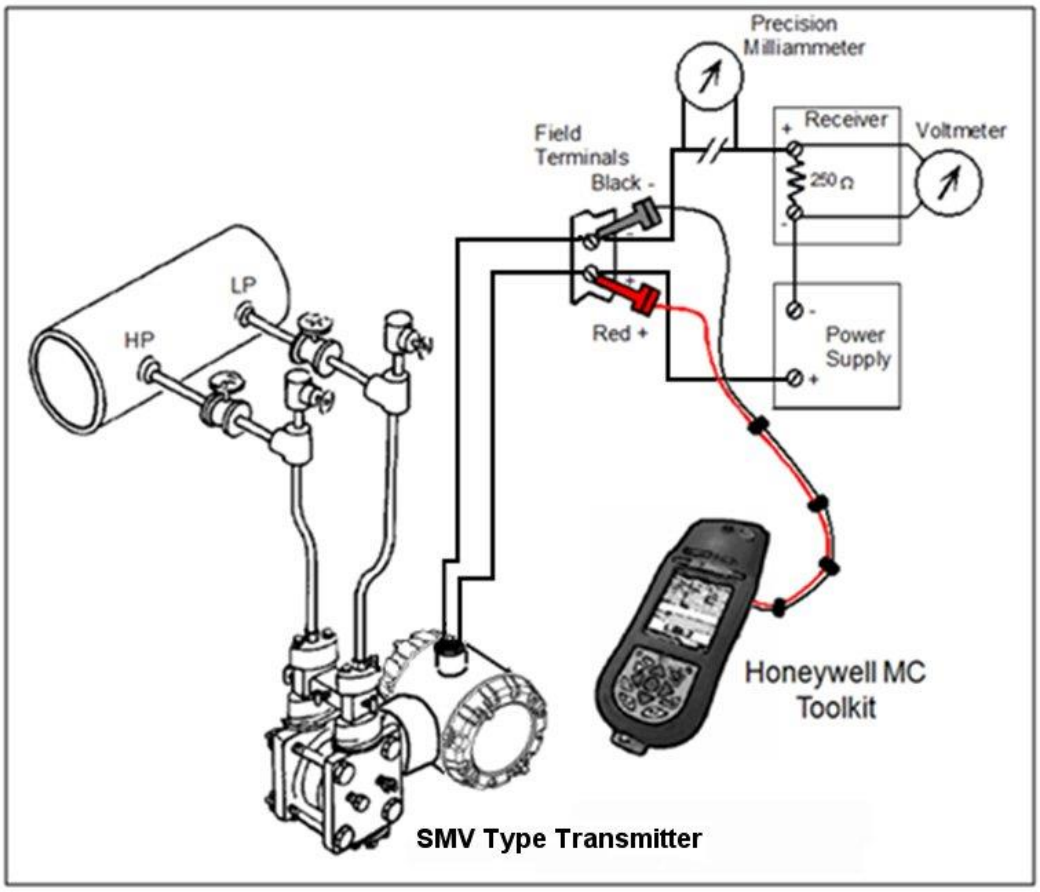


Figure 15 – Current Loop Test Connections

1. Refer to Figure 15 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 SCT 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.

4. Operation

4.1. Overview

This section provides the information and processes involved for both Digitally Enhanced (DE) and HART operation using the 3-button option.

4.2. Three-Button Operation

The SMV800 optional three-button interface provides a user interface and operation capability without opening the transmitter. Figure 16 shows the location of the three-button option and the labels for each button.

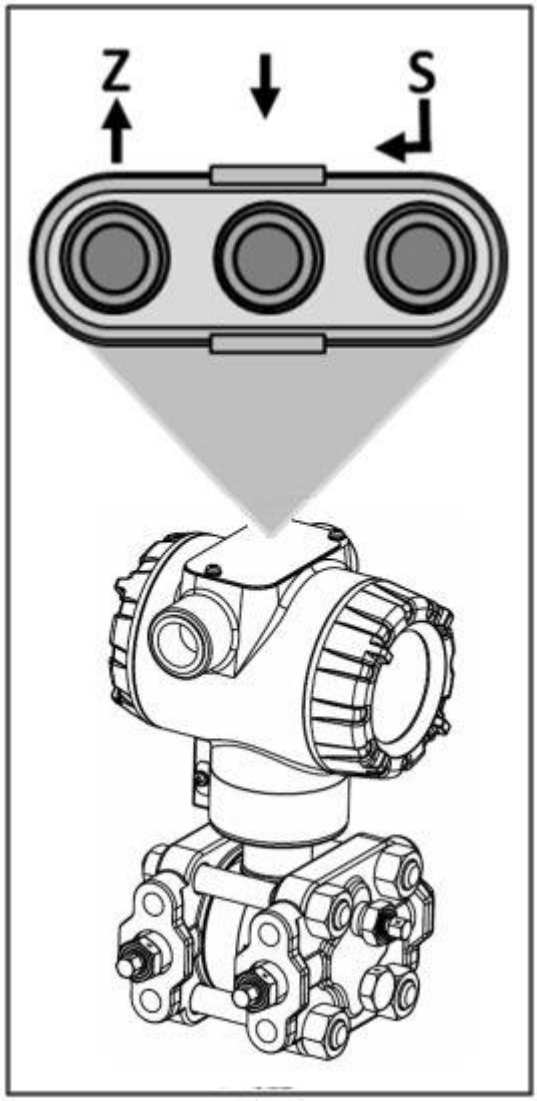


Figure 16 – Three-Button Option

Table 5 – Three-Button Option Functions

Physical Button	Display	Action
Left ↑	Increment Move cursor Up	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 Move cursor Down	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 ↵	Enter	Call up the Main Menu. Call up a lower-level menu. Select an item for data entry. Confirm a data entry operation Activate the service associated with a selected menu item.

4.2.1. Menu Navigation

The user must press ↵ button to call up the Main Menu. To exit the Main Menu and return to the PV display screen, select <**EXIT**>.

When on a lower level menu, return to the menu above by selecting <Return>. Alternately, the (up) and (down) buttons can be pressed simultaneously to return to the menu above. When on the highest level menu, pressing the (up) and (down) buttons simultaneously will exit the menu and return to the PV display.

Use the ↑ and ↓ buttons to scroll through the list of menu items. 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 call up a pop-up window to allow editing of the value. No action is taken against a menu item until the ↵ button is pressed.

If a user presses the ↵ button to begin a data entry operation, they must press another button within 10 seconds or the transmitter firmware will assume that the user wants to abort the operation or has walked away from the transmitter. After 10 seconds with no action, the data entry will time out and the original value of the parameter will be preserved.

If no button presses occur within 60 seconds, menu access will time out and the transmitter will exit the menu and return to the PV display.

4.2.2. 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 ▲ or ▼ character while the cursor is positioned over the left-most digit and press ↵ button. The Display will show the selected limit.

Table 6 – Three-Button Data Entry

Screen Symbol	Numeric data entry	Text entry
▲	Display the high limit for this parameter. This symbol only appears in the left-most position of the data entry field.	Not Available
▼	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 create custom tags and unit labels
A thru Z, 0 thru 9 special symbols	Not Available	These characters can be used to create custom tags and unit labels

4.2.3. 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 Display will show the current value of the item in a pop-up window in the middle of the screen
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.

4.2.4. 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., Screen Format, Display Units, etc.).

1. Press ↵ to begin the edit process. The display will show the current setting of the item in a pop-up window.
2. Press the ↑ or ↓ 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, right justified.

4.2.5. The Display Menus

The Display menus are organized into three levels, as shown by Table 7.
There is a <**Return**> menu item at each level that allows the user to return to the previous level.

Table 7 – Display Main Menu Structure

Level 1	Level 2	Level 3
<Exit>	n/a	n/a
Diagnostics	Critical Non-Critical	For details go to the Diagnostics Menu table
Display Setup	LCD Contrast Common Setup Screen 1 … Screen 8	For details go to the Display Setup Menu table. Note that the Display supports the configuration of up to 8 different screens.
Calibration	Set Time Stamp DP Zero Correct DP LRV Correct DP URV Correct DP Reset Correct SP Zero Correct SP LRV Correct SP URV Correct SP Reset Correct Temp Cal Pts Temp Cal Lo Corr Temp Cal Hi Corr Temp Reset Corr DAC Trim Loop Test	For details go to the Calibration Menu table.
Device Setup	Device Setup HART Setup HART Date Dev Instl Date	For details go to the Device Setup Menu table.

Level 1	Level 2	Level 3
Pressure Setup	Pressure Params DP LRV DP URV Set DP LRV Set DP URV DP Factory Cal SP LRV SP URV Set SP LRV Set SP URV SP Factory Cal	For details go to the Pressure Setup Menu table.
Temperature Setup	Temp Sensor Temp LRV Temp URV Set Temp LRV Set Temp URV T Mod Instal Date Sens Instl Date	For details go to the Temperature Setup Menu table.
Flow Setup	Flow Parameters Flow URL Flow LRV Flow URV Flow Cutoff	For details go to the Flow Setup Menu table.
Totalizer Setup	Totalizer Mode Totalizer Params Totalizer LRV Totalizer URV	For details go to the Totalizer Setup Menu table.
Information	Display Comm Module Meter Body Temp Module Options	For details go to the Information Menu table.

Table 8 – Diagnostics Menu

All Diagnostics menu items are Read Only.

<Return> Return to the Level 1 menu				
Critical	**Active Diags**	# #	**Lists the number of active diagnostics**	**Read only**
	Meter body	OK FAULT	FAULT: There is a problem with the Meter body	Read only
	Meter body Comm	OK FAULT	FAULT: There is a problem with the Meter body Comm	Read only
	Temp Sensor Board	OK FAULT	FAULT: There is a problem with the temperature module	Read only
	Temp Input	OK FAULT	FAULT: The temperature input is open and the loop control is process temperature	Read only
	Temp Sensor Comm	OK FAULT	FAULT: There is a problem with communication between the comm and temp sensor.	Read only
	Comm Module	OK FAULT	FAULT: There is a problem with the Comm Module (HART, DE)	Read only
	Comm VCC Fault	OK FAULT	FAULT: There is a problem with the power supplied to the comm.	Read only

Non-Critical	Active Diags	# #	Shows the number of Non-Critical Diagnostics that are currently active	Read only
	Analog Out Mode	Normal FIXED OUTPUT	Normal indicates that the Loop Output reflects the current value of the PV. FIXED OUTPUT indicates that the Loop Output of the transmitter is at a fixed value and not responding to process input. This may be due to Loop Current mode (or Analog Output mode) being disabled, or it may be due to a DAC Trim or Loop Test operation that is currently in progress.	Read only
	DP Zero Correct	OK EXCESSIVE	EXCESSIVE: Input applied exceeds 5% of URL).	Read only
	DP Span Correct	OK EXCESSIVE	EXCESSIVE: Input applied exceeds 5% of expected value (as defined by URV).	Read only
	Meter Body Input	OK MB OVERLOAD	MB OVERLOAD: Input to meter body is too high	Read only
	Meter Body Temp	OK OVER TEMP	OVERTEMP: Meter body temperature is greater than 125C	Read only
	Meter Body Comm	OK SUSPECT	SUSPECT: The interface between the Meter body and the Electronics Module is experiencing intermittent communication failures.	Read only
	Pressure Fac Cal (HART only)	OK NO FACTORY CAL	The transmitter has not been calibrated by the factory.	Read only

Non-Critical	Temperature Cal Correct	RESET CAL ACTIVE	CAL ACTIVE: A user calibration has been performed on the temperature input	Read only
	Temp Module Temp	OK OVER TEMP	OVERTEMP: Temperature Module temperature is greater than 85C or less than -40C.	Read only
	Temp Input Range	OK OUT OF RANGE	OUT OF RANGE: greater than temperature URV or less than temperature LRV	Read only
	CJ Range	OK OUT OF RANGE	OUT OF RANGE:	Read only
	Temp Input	OK OPEN	OPEN: Input is open.	Read only
	Temp Input TB6	OK OPEN	OPEN: Input Terminal TB6 is open.	Read only
	Temp Fac Cal	OK NO FACTORY CAL	The transmitter has not been calibrated by the factory.	Read only
	Temp Comm	OK OVER TEMP	OVERTEMP:	Read only
	PV Out of Range	OK OUT OF RANGE	OUT OF RANGE: PV value is too high or too low. PV>URV or <LRV	Read only
	Supply Voltage	OK LOW HIGH	LOW: Supply voltage is below the low specification limit HIGH: Supply voltage is above the high specification limit.	Read only
	Comm Module Temp	OK OVER TEMP	OVERTEMP: 85C	Read only
	DAC Temp Comp	OK NO COMPENSATION	The DAC has not been compensated for temperature effects. This is a factory operation.	Read only
	Display Setup	OK NVM Corrupt	NVM Corrupt: The Display memory is corrupt	Read only
	Flow Divide by 0	OK ACTIVE	ACTIVE: One or more flow parameters have been entered incorrectly causing a divide by zero error in the flow calculation.	Read only
	Flow Sqrt of Neg	OK ACTIVE	ACTIVE: One or more flow parameters have been entered incorrectly causing a square root of a negative value error in the flow calculation.	Read only
	Flow Direction	OK REVERSE	REVERSE: The flow is being reported as a reverse flow through the flow element.	Read only
	Flow SP/PT Comp	OK BAD	BAD: The SP or PT input has exceeded the applicable input limits, which will affect the SP or PT compensation in the flow calculation	Read only
	Totalizer at Max. (HART only)	ON OFF		Read only
	Totalizer Status (HART only)	ON OFF	ON:Totalizer mapped to PV and stopped, output will be fixed	Read only
	Totalizer Flow (HART only)			Read only

Non-critical	DP Simulation	ON OFF	ON: DP is being simulated	Read only
	SP Simulation	ON OFF	ON: SP is being simulated	Read only
	PT Simulation	ON OFF	ON: PT is being simulated	Read only
	Flow Simulation	ON OFF	ON: FLOW is being simulated	Read only

Table 9 – Display Setup Menus

<Return> Return to the Level 1 menu				
LCD Contrast	<Return>			
	Set Contrast	# #	Adjust the LCD contrast level. Range from 0 to 9. Default: 5	Press ↵ to enter menu selection ↑ and ↓ to select number. ↵ to enter and shift to next digit
Common Setup	<Return>			
	Set Password	####	Enter Display configuration password. Default: 0000. This value disables the password. All other values enable the password. When enabled, a prompt to enter the password is presented only on the first parameter successfully accessed to change after entering the menu.	
	Language	English, French, German, Italian, Spanish, Russian, Turkish, English, Chinese, Japanese	Select the language for the Display. Default: English	Press ↵ to enter menu selection ↑ and ↓ to select from list. ↵ to enter
	Screen Rotate	Enabled Disabled	Select to enable or disable the automatic rotation of Screens	
	Rotation Time	# #	Time duration, in seconds, that each configured screen is shown before moving to the next screen. Range: 3 to 30 seconds Default: 10 seconds	Press ↵ to enter menu selection ↑ and ↓ to select number. ↵ to enter and shift to next digit

Common Setup (continued)	DP/SP Units (preferred units)	atm bar ftH2O @ 68°F gf /cm2 inH2O @ 39°F inH2O @ 60°F inH2O @ 68°F inH2O @ 0°C inHg @ 32°F kgf/cm2 kPa mbar mmH2O @ 4°C mmH2O @ 68° F mmHg @ 0 C MPa Pa psi Torr	This selection determines the units of the values shown on the following menu items: • Enter LRV • Enter URV • Set LRV • Set URV • Zero Correct (Calib. menu) • LRV Correct(Calib. menu) • URV Correct(Calib. menu) • LRL (Meter body Info. menu) • URL (Meter body Info. menu) For calibration, this parameter allows the user to match the value displayed on the menus to the units supported by the user's calibration equipment.	Press ↵ to enter menu selection ↑ and ↓ to select from list ↵ to enter
	Temp Units (preferred units)	°C, °F, °R, K		
	Mass FI Units (preferred units)	g/sec g/min g/h kg/sec kg/min kg/h t/min [Metric tons] t/h [Metric tons] lb/sec lb/min lb/h lb/d STon/min STon/h STon/d LTon/h LTon/d Kg/d MetTon/d Custom	This selection determines the units of the values shown on the following menu items: Flow URL Flow URV Flow LRV Cutoff Hi Lim Cutoff Lo Lim	Press ↵ to enter menu selection and ↓ to select from list. ↵ to enter

Common Setup (continued)	Vol Fl Units (preferred units)	m3/h m3/min m3/sec m3/day gal/min gal/h gal/day l/min l/h ft3/min ft3/sec ft3/h bbl/day gal/s L/S Cuft/d NmlCum/h NmlL/h StdCuft/min Bbl/s Bbl/min Bbl/h Nml m3/d Nml m3/min Std ft3/d Std Ft3/h Std m3/d Std m3/h Std M3/min Custom	This selection determines the units of the values shown on the following menu items: Flow URL Flow URV Flow LRV Cutoff Hi Lim Cutoff Lo Lim	Press ↵ to enter menu selection and ↓ to select from list. ↵ to enter
	Totalizer Unit (HART only)			

Screens 1 thru 8	**<Return>**			
	Screen Format	None	Select the Screen format from the list.	Press ↵ to enter menu selection ↑ and ↓ to select from list. ↵ to enter
		PV		
		PV & Bar Graph		
		PV & Trend		
	PV Selection	Diff. Pressure	Select the Process Variable (PV) that will be shown this screen. Sensor Resistance is only available for RTDs and will read 0 for thermocouples	Press ↵ to enter menu selection ↑ and ↓ to select from list. ↵ to enter
		Meter body Temp		
		Loop Output		
		Percent Output		
		Static Press		
		Sensor 1	Process temperature	
		CJ Temperature	N/A	
		Sensor 1 Resistance	N/A	
		Totalizer	When selected Totalizer will show as the Process Variable (PV) on the selected screen.	
	PV Scaling	None	Selected PV will be displayed in default units	
		Linear	Selected PV will be re-scaled linearly using the entered Scaling Low and Scaling High values and will be displayed with the entered Custom Units. See details below.	
		Square Root	Applicable to DP input only. The DP input will be rescaled using a square root transfer function. It will be ranged using the entered Scaling Low and Scaling High values and will be displayed with the entered Custom Units. See details below.	
		Convert Units	Selected PV will be converted to the entered Display Units and will be displayed in the selected unit.	

Screens 1 thru 8 (continued)	Display Unit	atm , bar, ftHO @ 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, ºC, ºF, ºR, K	Select the Display Units for the selected PV.	Press ↵ to enter menu selection ↑ and ↓ to select from list. ↵ to enter
	Decimals	None X.X X.XX X.XXX	Select the decimal resolution for the PV.	Press ↵ to enter menu selection ↑ and ↓ to select from list. ↵ to enter
	Scaling Low Lim	#########	Enter the low limit for linear or square root scaling	
	Scaling High Lim	#########	Enter the high limit for linear or square root scaling	
	Scaling Unit	□□□□□□□□	Enter custom text using any alphanumeric value up to 8 characters long. Custom Units is only available if PV Scaling is set to Linear or Square Root.	Custom Units: ↑ and ↓ to select Alphanumeric ↵ to enter and shift to next character
	Trend Hours	##	Select the amount of historic data visible on the Trend screen. Range: 1 to 24 hours. Applies to the “PV & Trend” format only	Press ↵ to enter menu selection ↑ and ↓ to select number. ↵ to enter and shift to next digit
	Disp Low Limit	#########	Enter the lower limit shown on the Bar Graph or Trend screen	Press ↵ to enter menu selection ↑ and ↓ to select number. ↵ to enter and shift to next digit
	Disp High Limit	#########	Enter the upper limit shown on the Bar Graph or Trend screen.	Press ↵ to enter menu selection and ↓ to select number. ↵ to enter and shift to next digit
	Scrn Custom Tag	□□□□□□□□□□□□	Enter Custom Tag using any alphanumeric value up to 14 characters long	Press ↵ to enter menu selection ↑ and ↓ to select Alphanumeric ↵ to enter and shift to next char.

Note: Scaling only affects the value shown on the display, it does not affect the Loop Output

1. **Linear scaling of the displayed PV value**

When "Linear" is selected for PV Scaling, the Display will scale the selected PV input according to the following formula:

((PV value – input low limit) / input span) x (Scaling High – Scaling Low) + Scaling Low

If the PV Selection is Pressure, the input low and high limits are the LRV and URV respectively. If the PV Selection is Percent Output, the input low and high limits are 0 and 100%. If the PV Selection is Square Root, the input low and high limits are 0 and 100 %Flow.

2. **Square Root scaling of the displayed PV value**

When "Square Root" is selected for PV Scaling, the Display computes %Flow from the Differential Pressure. This calculation is independent of the Transfer Function setting in the transmitter. This allows the user to output Differential Pressure via the 4-20 mA loop output while displaying the equivalent flow value on the Display. In addition, the Display value can be scaled to show the flow in flow units (gal/min, gal/h, etc.) by entering the correct scaling limits via the Scaling Low and Scaling High parameters.

For example:

PV Selection:	Differential Pressure
PV Scaling:	Square Root
Scaling Low:	0.0
Scaling High:	2500.0
Display Units:	gal/h
LRV:	0.0
URV:	set as required by the process

The Display will calculate 0-100 %Flow from the Differential Pressure and then scale this to 0 to 2500 gal/h.

Note that the Square Root calculation is referenced to the LRV and URV settings of the transmitter and its uses the LRV and URV to calculate the %DP input into the Square Root flow algorithm. For normal flow applications, it is assumed that the LRV is set to zero and that zero pressure equals zero flow. If the LRV is less than zero, the Square Root calculation will calculate the flow as bi-directional flow.

Table 10 – Calibration Menus

<Return> Return to the Level 1 menu			
DP/SP Zero Correct	Set Time Stamp*	Hour, Minute, Year, Month, Day	Press ↵ to enter menu selection Scroll to DP URV Correct Press ↵ to initiate
	Do DP/SP Zero Correct	Execute these methods to perform a user zero calibration on the DP or SP inputs	
DP/SP LRV Correct	Set Time Stamp*	Hour, Minute, Year, Month, Day	
	Do DP/SP LRV, Correct	Executing this selection corrects the LRV based on the input pressure." To " Execute this method to perform a user calibration on the configured LRV with respect to applied input pressure.	
DP/SP URV Correct	Set Time Stamp*	Hour, Minute, Year, Month, Day	
	Do DP/SP URV Correct	Executing this selection corrects the URV based on the input pressure." To " Execute this method to perform a user calibration on the configured URV with respect to applied input pressure.	
DP/SP Reset Correct	Set Time Stamp*	Hour, Minute, Year, Month, Day	
	Do DP/SP Reset Correct	Execute these methods to reset all DP or SP user calibration, which will return the device to original factory calibration.	
Temp Cal Pts	Temp Cal Lo Pt Temp Cal Hi Pt	These values represent the Calibration Low and Calibration High values used when executing Temperature Calibration Low Correct and Temperature Calibration High Correct methods.	
Temp Cal (Lo, Hi) Corr	Set Time Stamp*	Hour, Minute, Year, Month, Day	
	DO Temp Cal Lo	Execute this method to perform a user calibration on the configured Temp Cal Lo Point with respect to applied input pressure.	
	DO Temp Cal Hi	Execute this method to perform a user calibration on the configured Temp Cal Hi Point with respect to applied input pressure.	
Temp Reset Corr	Set Time Stamp*	Hour, Minute, Year, Month, Day	
	Reset Temp Corr	Execute this method to reset all temperature user calibration, which will return the device to original factory calibration.	
DAC Trim	Trim Zero	This selection will calibrate the loop zero output to 4.000 mA. Connect a current meter to the transmitter to monitor the loop output. When you press Enter, the transmitter will set the loop output to 4 mA. When the prompt "Enter reading" appears, enter the value shown on the current meter (in milliamps) and press Enter again. The transmitter will adjust the DAC output to 4mA.	Press ↵ to enter menu selection Scroll to Trim Zero or Trim Span Press ↵ to initiate ↑ and ↓ to select number. ↵ to enter and shift to next digit
	Trim Span	This selection will calibrate the loop span output to 20.000 mA. Connect a current meter to the transmitter to monitor the loop output. When you press Enter, the transmitter will set the loop output to 20 mA. When the prompt "Enter reading" appears, enter the value shown on the current meter (in milliamps) and press	

DAC Trim		Enter again. The transmitter will adjust the DAC output to 20 mA.	
	Set DAC Normal	This selection allows the loop to be returned to its Normal mode (Automatic Control) after performing the Trim operation.	Press ↵ to enter menu selection Scroll to Set DAC Normal Press ↵ to initiate
Loop Test	Set DAC Output	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.	Press ↵ to enter menu selection Scroll to Set DAC Output Press ↵ to initiate ↑ and ↓ to select number. ↵ to enter and shift to next digit
	Set DAC Normal	This selection allows the loop to be returned to its Normal mode (Automatic Control) after performing the Set DAC Output operation	Press ↵ to enter menu selection Scroll to Set DAC Normal Press ↵ to initiate

* Applicable to HART only, not DE

Table 11 – Device Setup Menus

<Return>	**Return to the Level 1 menu**			
Device setup	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.
	Loop Ctrl Source	Differ. Press, Static Press, Process Temp, Flow	Selection defines which input is to be mapped to the analog output.	Press ↵ to enter menu selection ↑ and ↓ to select from list ↵ to enter
	NAMUR Output	Disabled	Disabling sets the loop output and burnout levels to the Honeywell levels	
		Enabled	Enabling sets the loop output and burnout levels to the NAMUR levels	

Table 12 – Device Setup Menus

HART Setup	Device ID		Unique for each device	Read Only
	Universal Rev		HART Revision	Read Only
	Field Device Rev		For DD/DTM compatibility	Read Only
	Final Assy Num		Asset tracking number – user specific	Press ↵ to enter menu selection and ↓ to select number. ↵ to enter and shift to next digit
	Loop mA		This selection enables or disables the loop control mode for the 4-20 mA output	Press ↵ to enter menu selection Scroll to desired selection. Press ↵ to select
	Poll Address		0 (default) to 63	Press ↵ to enter menu selection and ↓ to select number. ↵ to enter and shift to next digit
	PV Units (device unit. Depends upon what is mapped to PV)		Units of transmitted PV	Read Only
	SV Units (device unit. Depends upon what is mapped to PV)		Units of transmitted SV	
	TV Units (device unit. Depends upon what is mapped to PV)		Units of transmitted TV	
	QV Units (device unit. Depends upon what is mapped to PV)		Units of transmitted QV	
HART Date*	Year	# # # #	Enter the current year.	Press ↵ to enter menu selection and ↓ to select number. ↵ to enter and shift to next digit
	Month	January thru December	Select the current month.	
	Day	# #	Enter the day of the month.	
	Write Date	Press ENTER to write the HART Date to the transmitter.		Press ↵ to complete the write

Dev Instl Date*	Year	# # # #	Enter the current year. This item will only be visible if no Install Date has been written to the transmitter.	Press ↵ to enter menu selection and ↓ to select number. ↵ to enter and shift to next digit
	Month	January thru December	Select the current month. This item will only be visible if no Install Date has been written to the transmitter.	
	Day	# #	Enter the day of the month. This item will only be visible if no Install Date has been written to the transmitter.	
	Install Date	dd-mmm-yyyy	If no Install Date has been set in the transmitter, this value is a preview of the Year, Month, and Day entered above. Otherwise, this is the Install Date that was previously written to the transmitter.	Read only
	Write Date	Press ENTER to write the Install Date to the transmitter. **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 complete the write

* Applicable to HART only, not DE

Table 13 – Pressure Setup Menus

<Return>				
Pressure Params	Device DP Unit Device SP Unit Device MBT Unit DP Damping sec		Differential Pressure device variable unit Static Pressure device variable unit Meter body Temperature unit	Press ↵ to enter menu selection ↵ to execute Press ↵ to enter menu selection ↵ to execute
	SP Damping sec			
	Transfer Function			
	Filter Perform*			
DP LRV	DP LRV	###. ##	The limit for the Lower Range Value is 2X the Lower Range Limit (LRL) of the Meter body	Press ↵ to enter menu selection ↵ to execute Press ↵ to enter menu selection ↵ to execute
DP URV	DP URV	###. ##	The limit for the Upper Range Value is 2X the Upper Range Limit (URL) of the Meter body	
Set DP LRV	Set DP LRV	ATTENTION: Executing this service will set the Lower Range Value (LRV) equal to the input pressure		Press ↵ to enter menu selection ↵ to execute Press ↵ to enter menu selection ↵ to execute
Set DP URV	Set DP URV	ATTENTION: Executing this service will set the Upper Range Value (URV) equal to the input pressure		
DP Factory Cal*	Active Cal Set		Displays the calibration used by the transmitter.	Read only
	Select Cal Set	Cal Set A	This selection allows the user to choose calibration set from drop-down menu,	Press ↵ to enter menu selection Press ↑ and ↓ to select calibration type. ↵ to initiate
		Cal Set B*		
		Cal Set C**		
		Best Fit		
SP LRV	SP LRV	###. ##	The limit for the Lower Range Value is 2X the Lower Range Limit (LRL) of the Meter body	Press ↵ to enter menu selection ↵ to execute Press ↵ to enter menu selection ↵ to execute
SP URV	SP URV	###. ##	The limit for the Upper Range Value is 2X the Upper Range Limit (URL) of the Meter body	
Set SP LRV	Set SP LRV	ATTENTION: Executing this service will set the Lower Range Value (LRV) equal to the input pressure		Press ↵ to enter menu selection ↵ to execute
Set SP URV	Set SP URV	ATTENTION: Executing this service will set the Upper Range Value (URV) equal to the input pressure		
SP Factory Cal*	*Active Cal Set (read only)*		Displays the calibration used by the transmitter.	Read only
	Select Cal Set	Cal Set A	This selection allows the user to choose calibration set from drop-down menu,	Press ↵ to enter menu selection Press ↑ and ↓ to select calibration type. ↵ to initiate
		Cal Set B*		
		Cal Set C**		
		Best Fit		

* Applicable to HART only, not DE

Table 14 – Temperature Setup Menus

<Return>				
Temperature Sensor	Device Temp unit		Temperature Device variable unit	Press ↵ to enter menu selection ↑ and ↓ to select Alphanumeric ↵ to enter and shift to next character to the right.
	T Damping sec	##. #	Selection applies digital filtering to suppress noise effects on the PV. The limits for this value are 0.0 to 32.0 seconds	
	Break Detect	Enable, Disable	When enabled, adds a constant bias value to the Sensor 2 measured value to equate it to the Sensor 1 measured value at the moment selected.	
	Latching	Enabled, Disabled	When enabled, causes all critical sensor input failures to latch to the Critical Fault state. The fault may only be cleared by device reset. When disabled, the critical sensor input failure will be cleared if the input recovers.	
	CJ Source	Internal, External, Fixed	Determines the source of the Cold Junction compensation for Thermocouple Sensor types.	
	Fixed CJ Value	####.##	When CJ Type is Fixed, specifies the Cold Junction temperature value for thermocouple Sensor types. Degrees Celsius. Fixed CJ temperatures below -50 degrees have no effect on measured values.	
Temperature Sensor	Sensor Type	mV, TC, RTD, Ohm	Select Sensor Type1	Press ↵ to enter menu selection ↑ and ↓ to select entry. ↵ to enter
	Sensor ID*	Sensor ID for Input 1	Select Sensor ID for Input n for selected Sensor Type.	
	RTD Type*	2-Wire, 3-Wire, 4-Wire	Select the RTD Type according to the number of lead wires	
	RTD Lead Res*	####.##	Resistance valve of the sensor lead wire	
	Sensor Bias*	####.##	Bias on the measured value	
Temp LRV	###. ##	The limit for the Lower Range Value is the Lower Range Limit (LRL) of the selected Sensor ID.		Press ↵ to enter menu selection ↵ to execute
Temp URV	###. ##	The limit for the Upper Range Value is the Upper Range Limit (URL) of the selected Sensor ID.		
Set Temp LRV	Set Temp LRV	ATTENTION: Executing this service will set the Lower Range Value (LRV) equal to the Input 1 measurement		
Set Temp URV	Set Temp URV	ATTENTION: Executing this service will set the Upper Range Value (URV) equal to the Input 1 measurement		

T Mod Instal Date*	Year	# # # #	Enter the current year. This item will only be visible if no Install Date has been written to the transmitter.
	Month	January through December	Select the current month. This item will only be visible if no Install Date has been written to the transmitter.
	Day	# #	Enter the day of the month. This item will only be visible if no Install Date has been written to the transmitter.
	Install Date	dd-mm-yyyy	If no Install Date has been set in the transmitter, this value is a preview of the Year, Month, and Day entered above. Otherwise, this is the Install Date that was previously written to the transmitter.
	Write Date	Press ENTER to write the Install Date to the transmitter. **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.	
Sens Instl Date*	Year	# # # #	Enter the current year. This item will only be visible if no Install Date has been written to the transmitter.
	Month	January thru December	Select the current month. This item will only be visible if no Install Date has been written to the transmitter.
	Day	# #	Enter the day of the month. This item will only be visible if no Install Date has been written to the transmitter.
	Write Date	Press ENTER to write the Install Date to the transmitter.	

* Applicable to HART only, not DE

Table 15 – Flow Setup Menus

Flow Parameters	Fl Damping sec	Enter a value for damping for the flow output. Entries may be any value from 0.00 to 100.00 seconds.	Press ↵ to enter menu selection and ↓ to select number. ↵ to enter and shift to next digit
	Mass Fl Units	Displays the engineering units currently selected in the Display Common Setup for displaying values of mass flow URL, LRV, URV, and flow cutoff limits in this menu only.	Read only
	Vol Fl Units	Displays the engineering units currently selected in the Display Common Setup for displaying values of volume flow URL, LRV, URV, and flow cutoff limits in this menu only	Read only
	Dev Flow Unit (HART only)		
	Barom Pressure	Enter the value in psia that represents the local barometric pressure	Press ↵ to enter menu selection and ↓ to select number. ↵ to enter and shift to next digit

	K-User Factor	Displays the value entered for the K-User factor during configuration of the flow equation.	Read only
	Algorithm Type	Displays the flow algorithm type (SMV3000 legacy or SMV800 category) selected during configuration of the flow equation.	Read only
	Compens Mode	Displays the flow compensation mode (dynamic or standard (for SMV3000 legacy equations only)) selected during configuration of the flow equation.	Read only
	Fluid State	Displays the fluid state (gas, liquid, steam, etc.) selected during configuration of the flow equation.	Read only
	Pri Elem Type	Displays the primary flow element type (orifice, nozzle, etc.) selected during configuration of the flow equation.	Read only
	Pipe Diameter	Displays the entered/read value of the width of the pipe used in the process	Press ↵ to enter menu selection and ↓ to select number. ↵ to enter and shift to next digit
	Flow Cust Unit (HART only)		
	Base Unit (HART only)		
	Conv Factor (HART only)		
Flow URL	Flow URL	Displays the value entered for the flow Upper Range Limit in the flow units selected above.	Read only
Flow URV	Flow URV	Displays the value entered for the flow Upper Range Value in the flow units selected above.	Press ↵ to enter menu selection and ↓ to select number. ↵ to enter and shift to next digit
Flow LRV	Flow LRV	Displays the value entered for the flow Lower Range Value in the flow units selected above.	
Flow Cutoff	Cutoff Hi Lim Cutoff Low Lim	Enter the values desired for the low and high flow cutoff breakpoint limits.	

Table 16 – Totalizer Setup Menus

Totalizer Mode	Start Totalizer	Send a command to the HART board to start the totalizer.	Press ↵ twice to select and confirm. .
	Stop Totalizer	Send a command to the HART board to stop the totalizer.	
	Reset Pos Value	Send a command to the HART board to reset the positive totalizer value.	
	Reset Neg Value	Send a command to the HART board to reset the negative totalizer value.	
	Reset Exceed	Send a command to the HART board to reset the exceed counter.	
Totalizer Parameters	Maximum value	This is maximum user configurable totalizer value. When the totalizer reaches its maximum value, it automatically resets to zero and continues totalizing.	Press ↵ to enter menu selection and ↓ to select number. ↵ to enter and shift to next digit
	Base Value	Initializer totalizer value added before any otalizing occurs.	
	Totalizer Unit	HART engineering unit for totalizer value	
	Sampling Rate	This is sampling rate parameter. Based on sampling time device will take sample of flow value to calculate totalizer value, and the Totalizer value will be updated based on sampling time.	
	Tot Custom Tag	A custom unit label to be displayed on totalizer readings. User can Enter the desired custom unit label to be displayed for the Totalized Reading. Up to Eight characters including letters, numbers, and symbols can be entered in the custom unit field.	Read only
	Base Unit	Unit from which the custom unit is derived.	
	Conv Factor	A numeric value that represents the number of base units per one custom unit.	
	Status Latency	Command 48 status: Totalizer reached to max value bit will set if Totalizer reached to max value at least once. It will clear after latency time when user acknowledged it.[when this is cleared is based on the Totalizer status latency parameter]	Press ↵ to enter menu selection and ↓ to select number. ↵ to enter and shift to next digit
Totalizer URV	Totalizer URV	Displays the value entered for the totalizer Upper Range Value in the totalizer units selected above.	
Totalizer LRV	Totalizer LRV	Displays the value entered for the totalizer Lower Range Value in the totalizer units selected above.	
Statistics	Pos Totalizer	Total mass or volume totalized in the positive direction.	Read Only
	Neg Totalizer	Total mass or volume totalized in the negative direction.	Read Only
	Exceed Count	This parameter provides the number of times the totalizer has reached the maximum value.	Read Only

Table 17 - Information Menus

<Return> Return to the Level 1 menu			
Display	**<Return>**		
	Firmware Version	The firmware version of the Display Module	Read Only
Comm Module	**<Return>**		
	Firmware Version	The firmware version of the Comm Module	Read Only
	Software Rev	The software revision of the Comm Module	Read Only
	Protocol	The communications protocol of the transmitter: HART: HART protocol DE: Honeywell DE protocol	Read Only
Meter Body	**<Return>**		
	Firmware Version	The firmware version of the Pressure Module	Read Only
	Model Key	Identifies the type and range of the transmitter	Read Only
	DP LRL	The Lower Range Limit of the DP	Read Only
	DP URL	The Upper Range Limit of the DP	Read Only
	DP Units (preferred unit)	The Engineering Units for the LRL and URL. Note that you can change these Units from the Transmitter Setup menu, if desired (Transmitter Setup\Parameters\Units)	Read Only
	SP LRL(in preferred unit)	The Lower Range Limit of the SP	Read Only
	SP URL(in preferred unit)	The Upper Range Limit of the SP	Read Only
	SP Units (preferred unit)	The Engineering Units for the LRL and URL. Note that you can change these Units from the Transmitter Setup menu, if desired (Transmitter Setup\Parameters\Units)	Read Only
Temp Module	**<Return>**		
	Firmware Version	The firmware version of the Temperature Module	Read Only
	Temp LRL (in preferred unit)	The Lower Range Limit of the Temp	Read Only
	Temp URL (in preferred unit)	The Upper Range Limit of the Temp	Read Only
	Temp Units (preferred unit)	The Engineering Units for the LRL and URL. Note that you can change these Units from the Transmitter Setup menu, if desired (Transmitter Setup\Parameters\Units)	Read Only
Options*	Universal Temp	Universal Temp allows the user to see whether or not they have an SMV unit that has the optional TC temperature sensor types available	Read Only
	Serial number	The serial number of the device that is necessary for the user to obtain a license key to enable Universal Temp option.	Read Only
	License Key	License Key is necessary for a user who purchased the Universal Temp option to enable the Universal Temp, giving access to TC temperature inputs	Read Only

* Applicable to HART only, not DE

4.2.6. 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.
2. Press the ↑ or ↓ buttons to scroll through the list of choices.
3. Press ↵ to make your selection. The new selection will be stored in the transmitter and displayed on the lower line, right justified.

4.2.7. 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 Transmitter. Caution should be taken to insure these adjustments are only made when the correct input pressures are applied.

4.2.8. 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 15 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.

4.2.9. 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 15 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 20 mA.

You can also use the SCT3000 toolkit to make any adjustments to an SMV800 SmartLine Multivariable Transmitter for DE models and the MCT404/MCT202 for HART. Alternately, certain adjustments are possible through an Experion Station or Universal Station, if the SMV800 is digitally integrated with either of these stations.

4.3. 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.

4.3.1. DE and Analog Differences

Failsafe operation is somewhat different between DE and analog operation:

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

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

4.3.2. 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 vulnerable 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 17 for the locations of the failsafe and write protect jumpers.

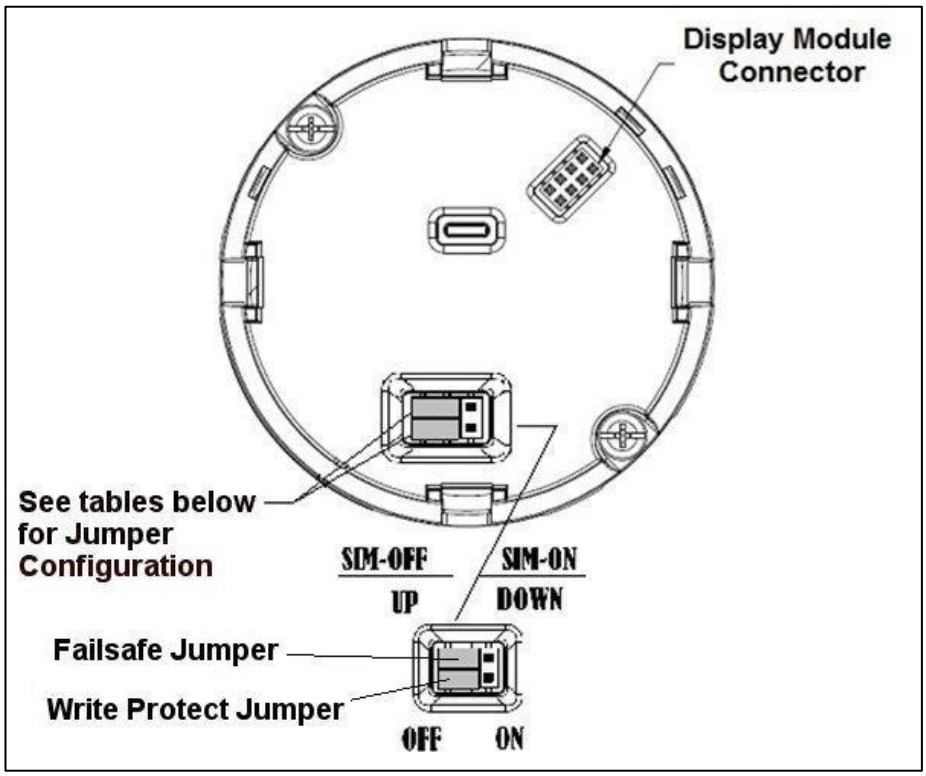
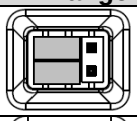
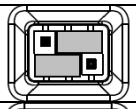
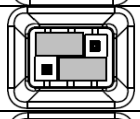
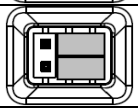


Figure 17 – Locating the Failsafe and Write Protect Jumpers HART/DE

Table 18– 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)

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 18 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 º increments.

7. Restore transmitter power if removed.

4.4. Monitoring the Displays

This section describes the information shown on the operator screens of the Display.

4.4.1. Displays

As shown in Figure 18, the Display provides three formats.

Table 19 lists and describes the fields in each of the three Display formats. Essentially, all three formats provide the same information, but with the following differences:

- Bar Graph. User Configurable 126 segment Bar Graph with range settings. The Bar Graph displays the current value of the configured PV.
- PV Trend. User-configurable display period from one hour to 24 hours. The chart displays minimum, maximum, and average of the configured PV over the selected trend period.

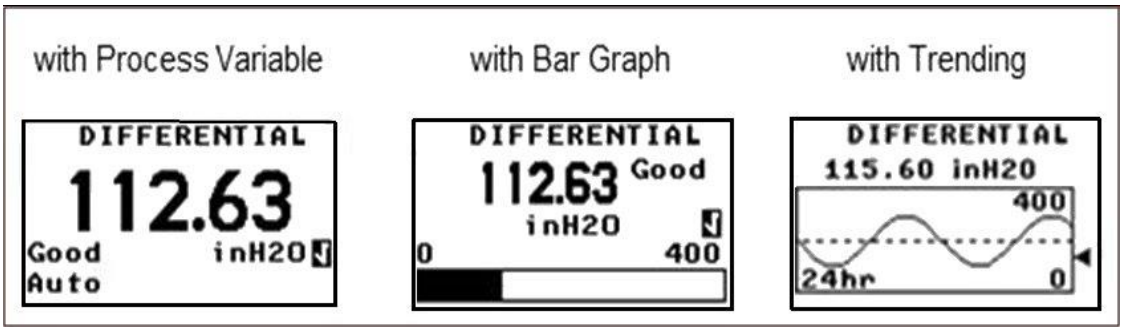


Figure 18 – Display Formats with the Process Variable

Table 19 – Displays with PV Format Display Indications

Display Indicator	What It Means
Diagnostic / Maintenance These indicators are displayed in the upper left corner of the screen when the associated conditions are present in the transmitter.	D Diagnostic condition present This indicator is displayed any time a diagnostic is present in the transmitter, either Critical or Non-Critical. If a Critical Diagnostic is present, the message “Critical Diag” will flash at the top of the screen and the appropriate Diagnostic screen will be inserted into the normal screen rotation.  To determine which Non-Critical diagnostics are active, use the local buttons to call up the Non-Critical diagnostics menu (Main Menu\Diagnostics\Non-Critical. Refer to Table 10 for details concerning the Non-Critical diagnostics. M Maintenance Mode is active This indicator is set by the Experion DCS. When this Mode is active, a screen with the text “Available for Maintenance” will be inserted into the normal screen rotation to make it easy to identify transmitters that are available for maintenance.
PV Value	User Configurable. This field has 7 characters. The maximum display with a decimal point then you can have a range of -99.999 to 999.999. Note that the negative sign will takes up a digit. If the value is greater than 7 digits, it is divided by 1000 and displayed as an integer with a K appended. Example: 10000000 will be displayed as 10000K. The range of displayable values is -10000000 < v < 100000000 by using the K (Kilo/1000) sign.
PV Status:	**Good:** The transmitter is operating normally **Bad:** The transmitter has detected a fault condition. The PV Status field will flash when this condition is present and the PV Value will be displayed on a black background as shown below: **Simulation Good/ Simulation Bad:** In HART, if the simulation mode is enabled from the Host for DP/SP/PT/FLOW, based on the respective PV status (good or bad), display will show Simulation Good/Bad. In DE, if the input mode is enabled from Host for PV1/PV2/PV3/PV4, based on the respective PV status (good or bad), display will show Simulation Good/Bad. 

<table>
<tr><td>Process Variable Tag</td><td colspan="4">User Configurable. This field has 14 characters</td></tr>
<tr><td rowspan="2">Engineering Units</td><td colspan="4">User Configurable. This field has 8 characters</td></tr>
<tr><td>Pressure:
atm
bar
ftH2O @ 68°F
gf /cm2
inH2O @ 39°F
inH2O @ 60°F
inH2O @ 68°F
inH2O @ 0°C
inHg @ 32°F
kgf/cm2
kPa
mbar
mmH2O @ 4°C
mmH2O @ 68° F
mmHg @ 0 C
MPa
Pa
psi
Torr</td><td>Temp:
º C
º F
º R
K (Kelvin)</td><td>Mass Fl Units:

See Table 20 for Mass Flow</td><td>Volume Fl Units:

See Table 20 for Volume Flow</td></tr>
<tr><td>Square Root Output</td><td colspan="4">This indicator is displayed when the Transfer Function of the transmitter is set to “Square Root”.

Note that this indicator is not displayed on the Trend screens.</td></tr>
<tr><td>Bar Graph</td><td colspan="4">The limits of the bar graph are user-configurable for each screen.</td></tr>
<tr><td>Trend Graph</td><td colspan="4">The limits of the trend graph are user-configurable for each screen.
The amount of time visible on the Trend graph is also configurable.</td></tr>
</table>

4.4.2. Button operation during monitoring

When the operator screens are active on the display, the Increment and Decrement buttons (↑ and ↓) can be used to move to the next or previous operator screen without waiting for the rotation time to expire. Pressing the Enter button (↵) will call up the Main Menu.

Table 20 – Flow Units

When Flow Output Type is Mass Flow:	When Flow Output Type is Volume Flow:
• g/sec • g/min • g/h • kg/sec • kg/min • kg/h • t/min [Metric tons] • t/h [Metric tons] • lb/sec • lb/min • lb/h • lb/d • STon/min • STon/h • STon/d • LTon/h • LTon/d • Kg/d • MetTon/d • Custom	• m3/h • m3/min • m3/sec • m3/day • gal/min • gal/h • gal/day • l/min • l/h • ft3/min • ft3/sec • ft3/h • bbl/day • gal/s • L/S • Cuft/d • NmlCum/h • NmlL/h • StdCuft/min • Bbl/s • Bbl/min • Bbl/h • Nml m3/d • Nml m3/min • Std ft3/d • Std Ft3/h • Std m3/d • Std m3/h • Std M3/min • Custom

5. Maintenance

5.1. 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

5.2. Preventive Maintenance Practices and Schedules

The SMV800 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.

5.3. 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.

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).

The following procedure comprises the general steps for inspecting and cleaning barrier diaphragms.

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

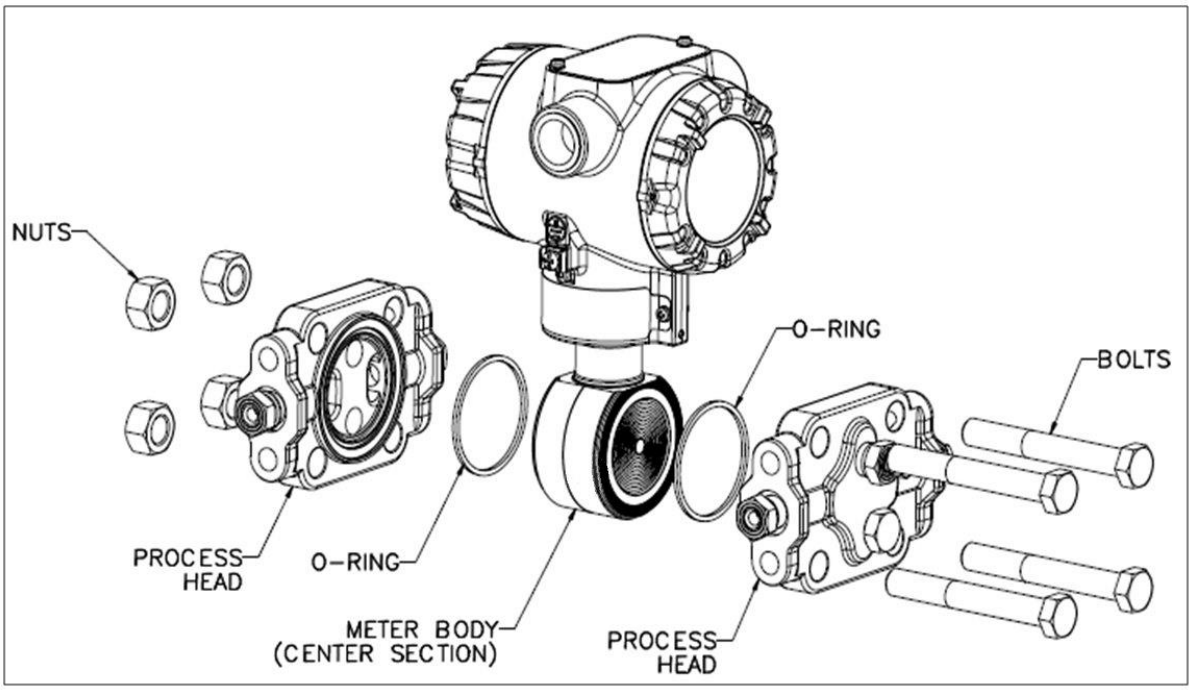


Figure 19 – DP Transmitter Head Disassembly

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 20.
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 20. Tighten head bolts in stages of 1/3-full torque, 2/3-full torque, and full torque. See Table 21 for torque requirements versus Transmitter type and model.

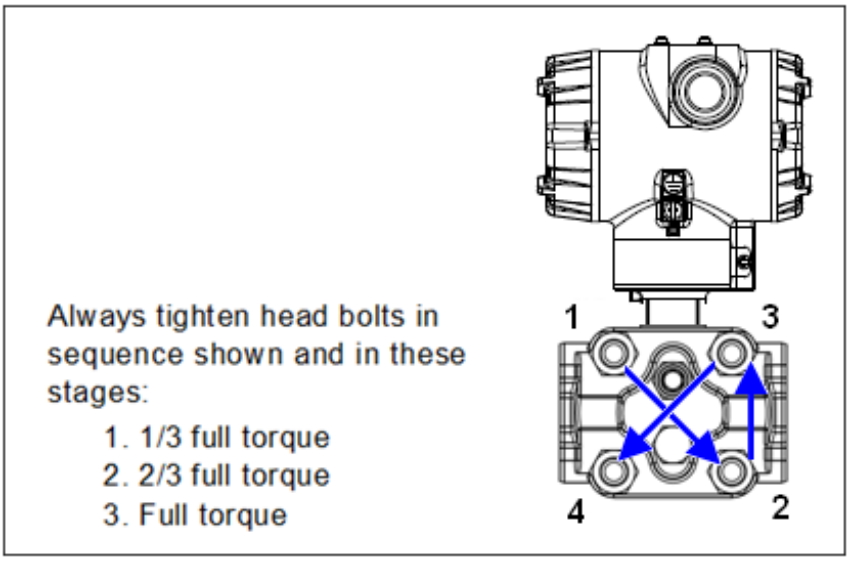


Figure 20 – Head Bolt Tightening Sequence

Table 21 – 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	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)	

5.4. 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 21 for parts locations.

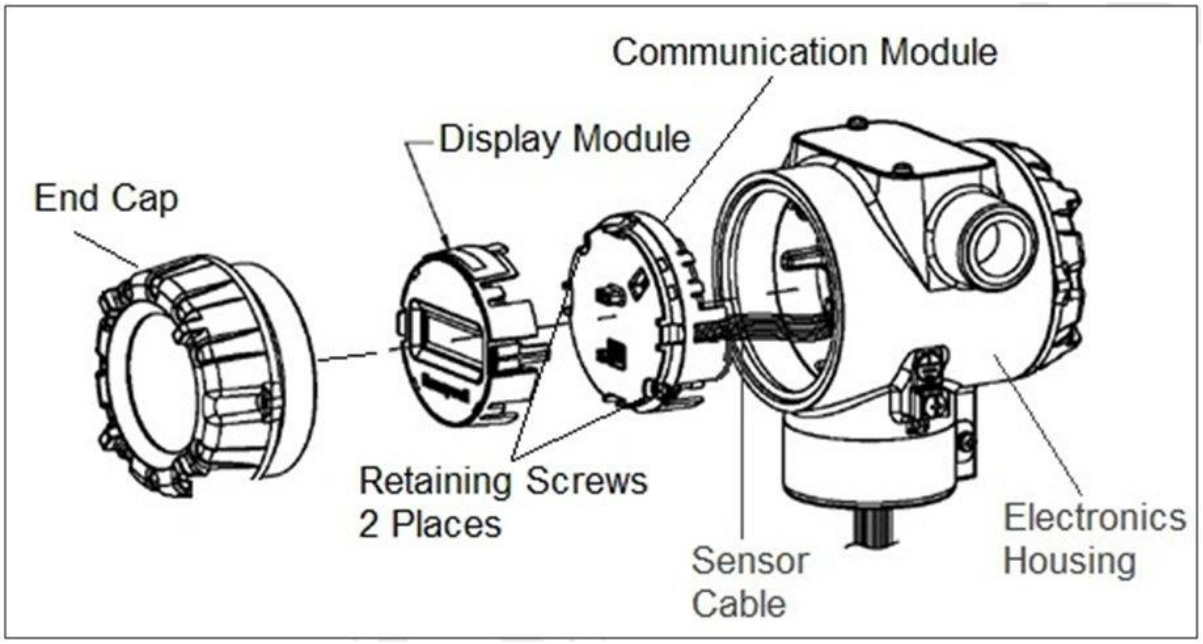


Figure 21 – PWA Replacement

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 Explosionproof 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 12 ma 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 Section 4.3 to change the FAILSAFE, READ/WRITE, and SIM-ON/SIM-OFF (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 (i.e. DEVICE MODIFIED…..) provided on outside of housing as shown in Figure 21.

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 and DE User's Manual (SMV800 #34-SM-25-06) for details on HART and DE transmitters.

19. If applicable, verify External Button Configuration operation.
    Ready to go.

5.5. Replacing the Meter Body

You can replace the complete meter body, including the process heads, or the meter body on All SMV 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 22. Loosen the End Cap Lock, and unscrew the End Cap from the electronics side of the Transmitter housing.

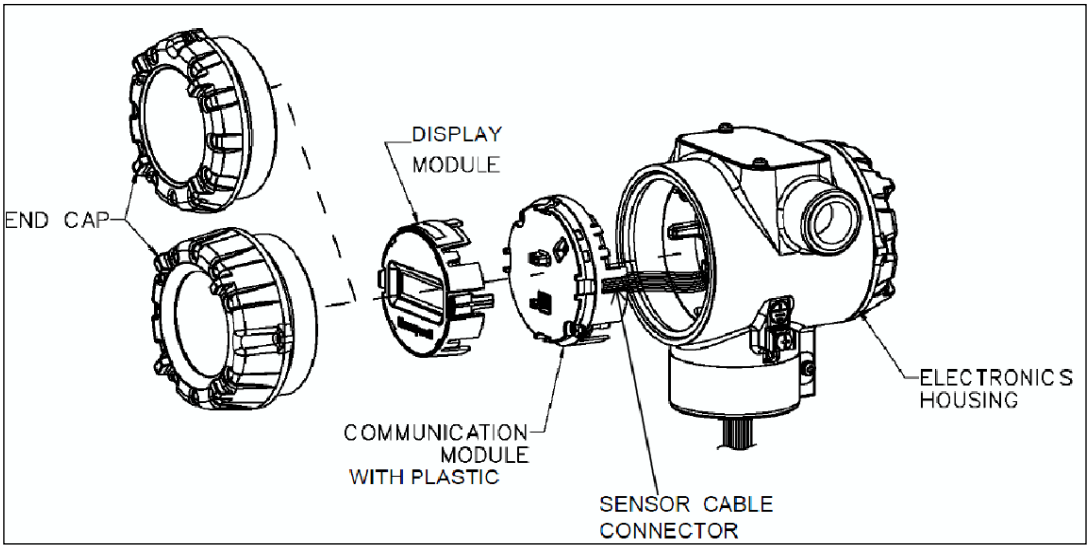


Figure 22 – Disassembly for Meter Body Replacement

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 23 . Use a 2 mm hex wrench to completely loosen the set screw on the outside of the housing to permit rotating the meter body.

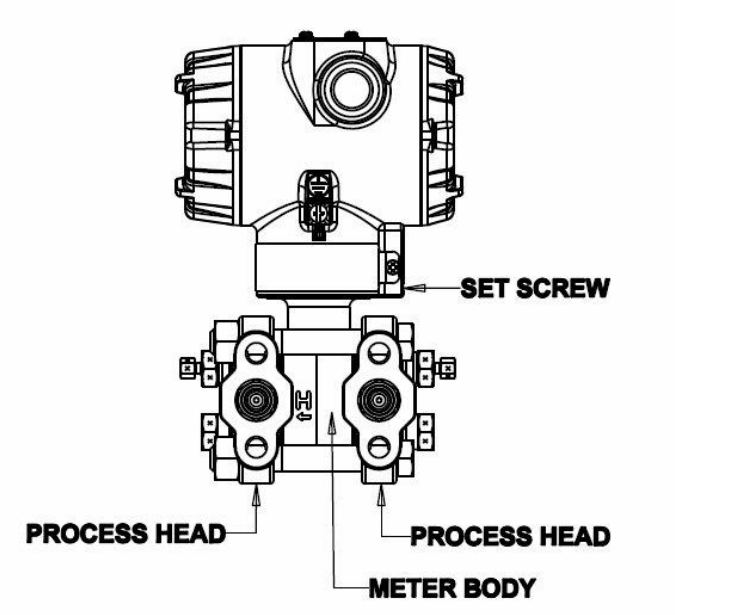


Figure 23 – Hardware Location to Remove the Meter Assembly

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 24. Apply Parker Super O-Lube O-Ring lubricant 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.

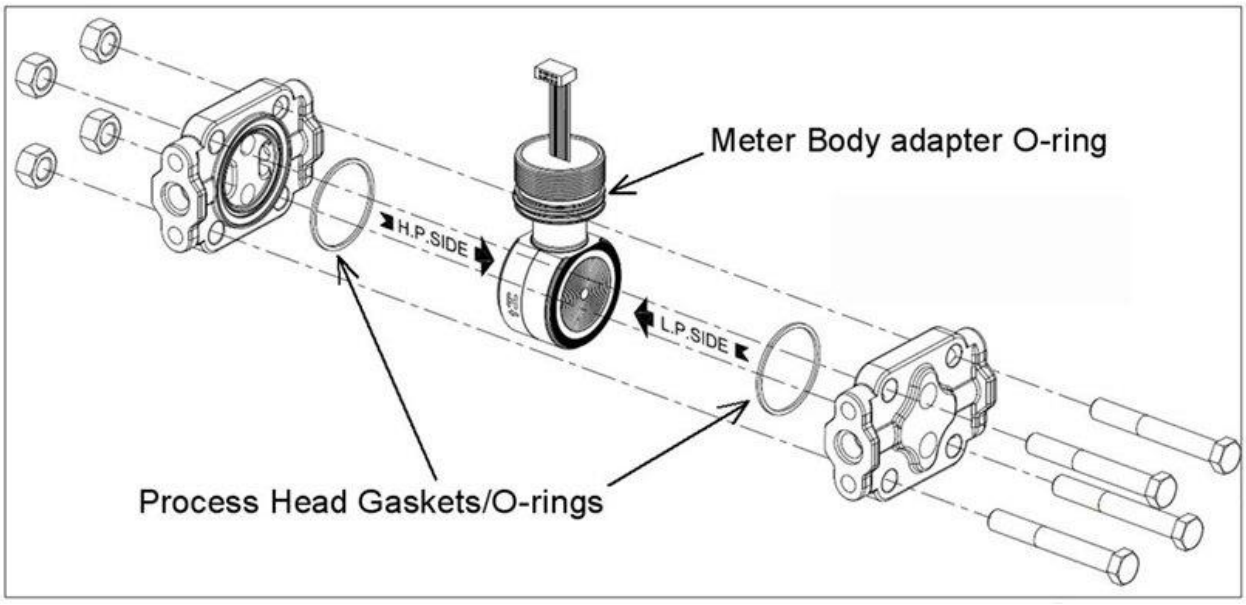


Figure 24 – Meter Body Reassembly

16. Use a torque wrench to gradually tighten nuts to torque rating in sequence shown in Figure 25. Tighten head bolts in stages of 1/3 full torque, 2/3 full torque, and then full torque.

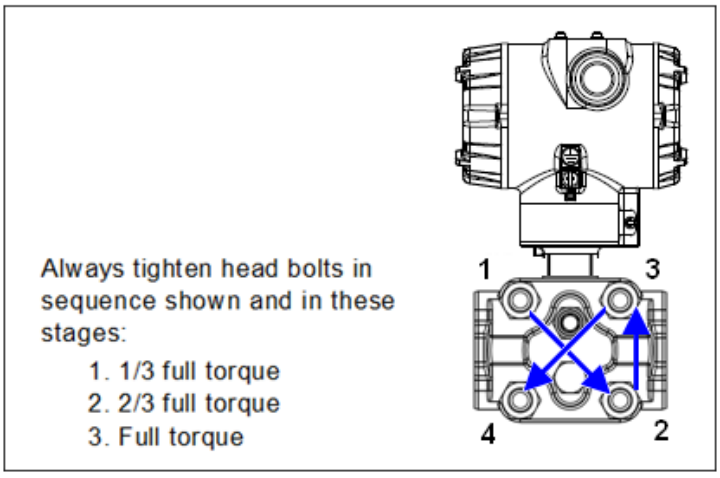


Figure 25 – Head Bolt Tightening Sequence

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 6 Calibration, 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.

6. Calibration

6.1. Recommendations for Transmitter Calibration

SMV800 requires Pressure Calibration and Temperature Calibration.

The SMV800 SmartLine Multivariable 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.

6.2. Calibration Procedures

All calibrations should be carried out in analogue mode as all the equipment used to calibrate the device can be certified with equipment used having traceable certificates. Calibrate the transmitter's output signal measurement range using any compatible hand-held communicator or a local display.

One calibration option for DE transmitters is to use the Honeywell SmartLine Configuration Toolkit (SCT3000). Please use the SMV800 HART/DE manual or SCT3000 manual which has the Calibration procedure. If 34-ST-10-08 SCT manual does not have calibration procedure then please refer 34-25-06 manual.

Calibration information and procedures for a Transmitter operating in the HART/DE mode are provided in the SMV800 SmartLine Multivariable Transmitter HART/DE Option Manual document number.34-SM-25-06, Section on "Calibration"

6.2.1. Dual/Triple Cal

SMV800 HART models are optionally offered with multiple calibrations for pressure. In lieu of a standard factory calibration, units can be supplied with 1, 2, or 3 customer specified calibrations. These calibrations are stored in the meter body and provide users with factory calibrated performance at up to three different calibrated ranges for the Differential Pressure sensor and the Absolute Pressure sensor. This increases application flexibility without requiring any costly recalibration or additional inventory.

7. Troubleshooting

7.1. Overview

Troubleshooting involves responding to error messages, primarily displayed by using a DE transmitter using the SCT3000 Toolkit. For HART transmitter refer to MCT202, MCT404 or PACTware error messages defined. 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. DE messages are covered in SCT3000 Guide (34-ST-10-08) and HART messages are covered in 34--25-06.

7.2. Critical Diagnostics Screens

When a Critical Diagnostic is present in the Transmitter, the display will show one or more of the screens pictured in Figure 26.

These screens will be inserted into the normal screen rotation and displayed between the user-defined operator screens. A description of the diagnostic conditions is given in Table 22, along with suggested actions for resolving the problem.

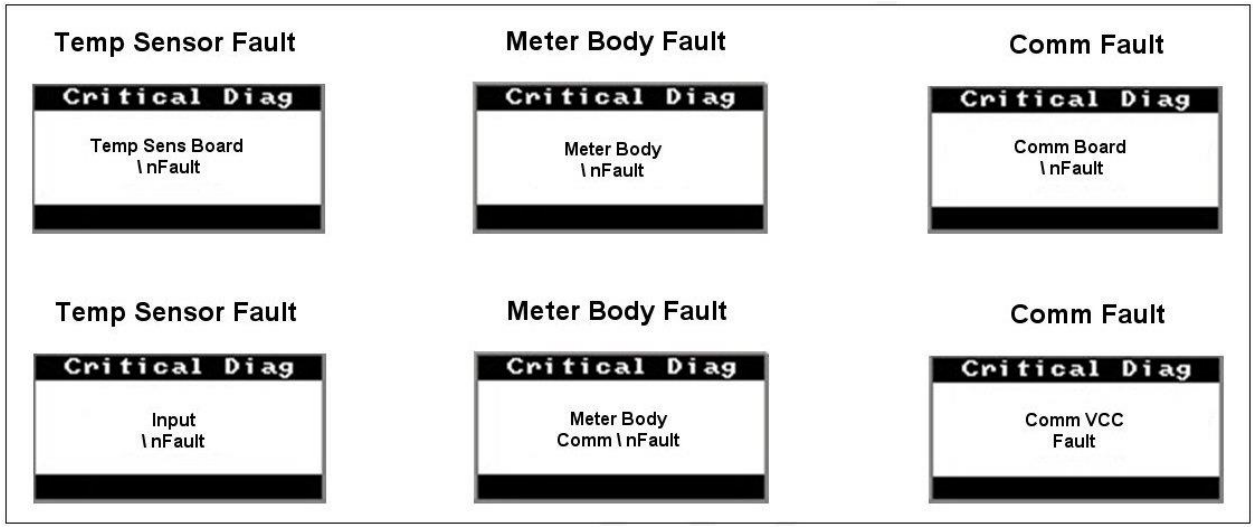


Figure 26 – Local Display Fault Diagnostic Conditions

7.2.1. Fault Conditions and Recommended Corrective Actions

Table 22 – Fault Conditions and Recommended Corrective Actions.

Condition	Analysis	Recommended Corrective Action
Meterbody fault. A critical failure has been detected in the Meterbody	Use a HART or DE Tool to read the detailed status information from the transmitter. Refer to the appropriate Tool 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 Meterbody.
Comm Module Fault. A critical failure has been detected on the HART Comm Module.	Use a HART or DE Tool to read the detailed status information from the transmitter. Refer to the appropriate Tool manual for more information about the possible failure causes.	Cycle power to the transmitter. If the problem continues to occur replace the Comm Module.
Meterbody Comm fault.	This could be the result of a failure on either of these modules or the cable that connects them.	Check the ribbon cable that connects the Meterbody 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 (i.e., make sure that the connector is not offset in a way that leaves some pins unconnected).
Communications between the Meterbody and the Electronics Module has failed.	Use a HART or DE Tool to read the detailed status information from the transmitter. Refer to the appropriate Tool 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 Electronics Module. If this does not fix the problem, replace the Meterbody.

7.3. Diagnostic Messages for DE transmitters

Diagnostic Messages

Refer to the SMV800 HART/DE option manual for details, 34-SM-25-06

8. Parts List

8.1. 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 23**Error! Reference source not found.** is a summarized list of recommended spare parts.

Table 23 – 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					
50127216-501	Universal Temperature Sensor Field Upgrade (provide serial number)	N/A				
50098718-501 50098718-502	HART Electronics Module Without REED Sensor PWA HART Electronics Module With REED Sensor PWA	Figure 28	5	1	1-2	2-4
50098718-503 50098718-504	DE Electronics Module Without REED Sensor PWA DE Electronics Module With REED Sensor PWA	Figure 28	5	1	1-2	2-4
51452865-201 51452865-202 51452865-203 51462865-204	**Meter Body Seal kit (includes o-rings)** Glass Filled PTFE VITON® 100% PTFE GRAPHITE	Figure 28	K6, Ka, K7	1	1-2	2-4
50086421-501 50086421-503	HART Terminal Block Assy Without Lightning Protection HART Terminal Block Assy With Lightning Protection	Figure 29	3			1 - 2
	Process head gasket kit	**Figure No.**	**Key No.**	**1-10 Units**	**10-100 Units**	**100-1000 Units**
51452868-501 51452868-502 51452868-507	Gasket only, Process Head (12 PTFE packs) Gasket only, Process Head (6 VITON® Head O-Rings) Gasket only, Process Head Graphite Gasket (replacement only for existing 6 graphite gaskets)	Figure 30	K6	12 6 6	12-24 6-12 6-12	24-48 12-24 12-24
	Meter Body	**Figure No.**	**Key No.**	**1-10 Units**	**10-100 Units**	**100-1000 Units**
Specify number from nameplate	SMV Models	Figure 30	1	1	1-2	2-4

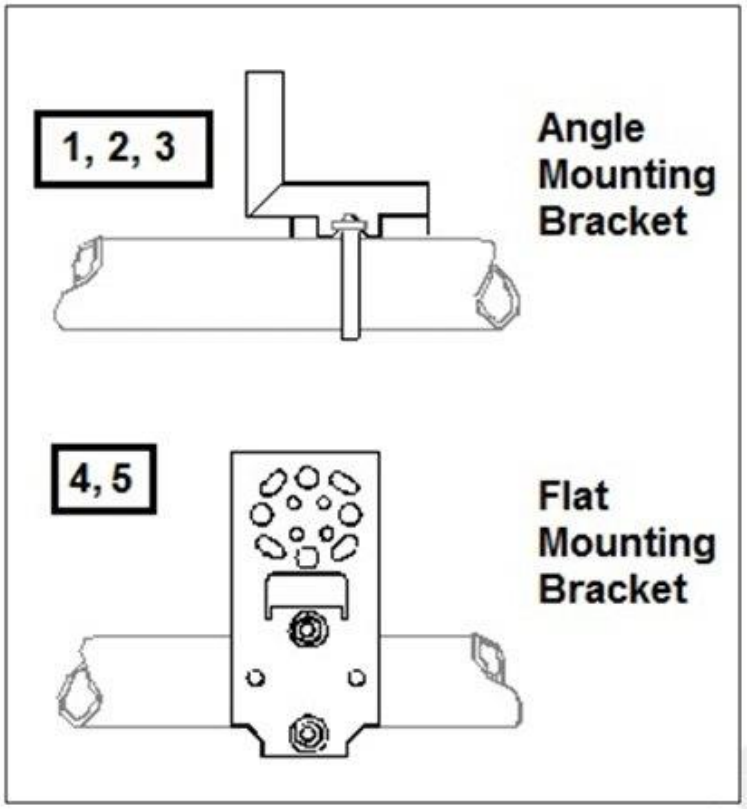


Figure 27 – Angle and Flat Brackets

Table 24 – Angle and Flat Bracket Parts

Refer to Figure 27

Key No.	Part Number	Description	Quantity Per Unit
1	30752770-103	SS 304 Angle Bracket Mounting kit	1
2	30752770-303	Marine Approved Angle Bracket	1
3	30752770-403	SS 316 Angle Bracket Mounting kit	1
4	51196557-005	SS 304 Flat Bracket Mounting kit	1
5	51196557-008	SS 316 Flat Bracket Mounting kit	1

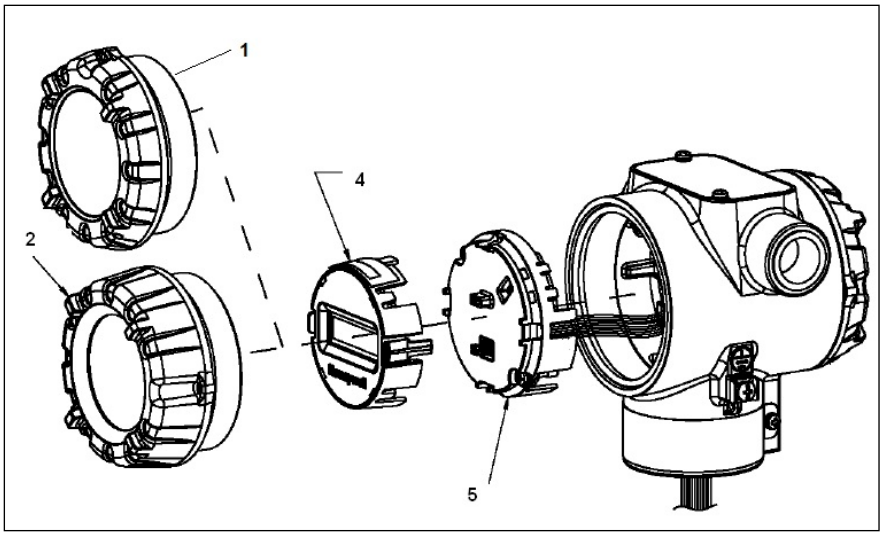


Figure 28 – Electronic Housing, Display End

Table 25 – Transmitter Major Assemblies
(Refer to Figure 28, Figure 29 and Figure 30)

Key No.	Part Number	Description	Quantity Per Unit
1	50049858-501 50049858-521	End Cap (Aluminum, includes o-ring) End Cap (Stainless Steel, includes o-'ring)	1
2	50049832-501 50049832-521	End Cap, Display (Aluminum, includes o-ring) End Cap, Display (Stainless Steel, includes o-ring)	1
3	50086421-501 50086421-503	Terminal Assy HART/DE without Lightning protection Terminal Assy HART/DE with Lightning protection	1
4	50049846-506	Display	1
5	50098718-501 50098718-502 50098718-503 50098718-504	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	1
6	50049915-501	External Zero, Span & Config Buttons	1
K1, K7	30757503-005	Electronics housing seals kit, includes end cap O-rings (qty 6) and meter body o-rings (qty 3)	

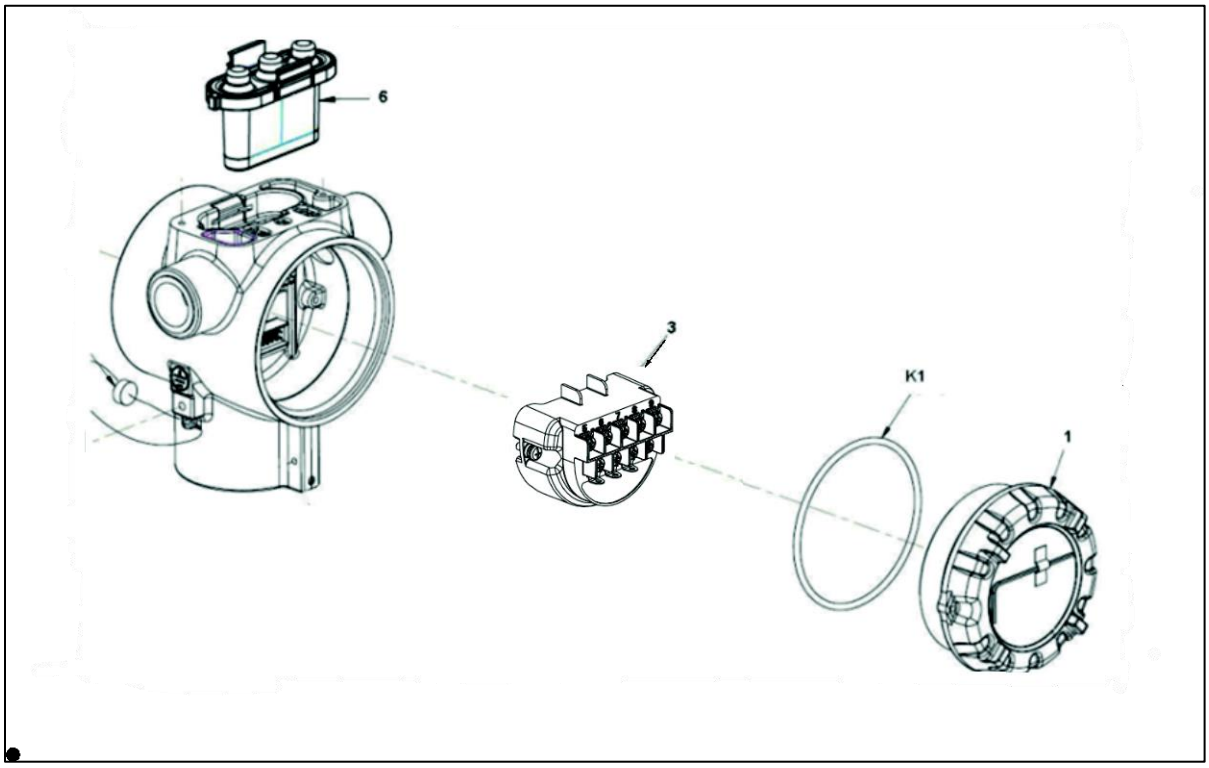


Figure 29 – Electronic Housing, Terminal Block End

Table 26 – SMV800 Models - SMA810, SMA845 & SMG870 (Refer to Figure 30)

Key No.	Part Number	Description	Qty/Unit
		Vent and Plug Kits	
	30753785-001 30753787-001 30753786-001	Drain and Plug Kit, stainless steel Drain and Plug Kit, Monel Drain and Plug Kit, Hastelloy C	
		Each Drain and Plug Kit includes:	
K1		Pipe Plug	4
K2		Vent Plug	2
K3		Vent Bushing	2
		Meter Body Gasket Kits	
	51452865-201 51452865-202 51452865-203 51452865-204	**Each Meter Body Gasket Kit includes:** Glass Filled PTFE VITON® 100% PTFE GRAPHITE	
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 only, Process Head, PTFE Gasket only, Process Head, VITON® 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 1/2-inch NPT Flange Adapter Kit includes:	
Ka		Gasket, Flange Adapter (glass-filled PTFE)*	2
Kb		1/2-inch NPT Flange Adapter*	2
Kc		Bolt, hex head, 7/16-20 UNF, 1.50 inches long*	4

*Other gasket materials are available in Flange Adapter Kits; glass filled PTFE is supplied for all the kit part numbers in this table.

Table 27 – Parts for SMV800 Models - SMA810, SMA845 & SMG870 Transmitter Body

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 PTFE 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 Heads, except for Kits with carbon steel Process Heads, which include stainless steel Pipe Plug, Vent Plug, and Vent Bushing. Note 2: The Kit for Process Heads without side vent/drain does not include Pipe Plugs (K1).		

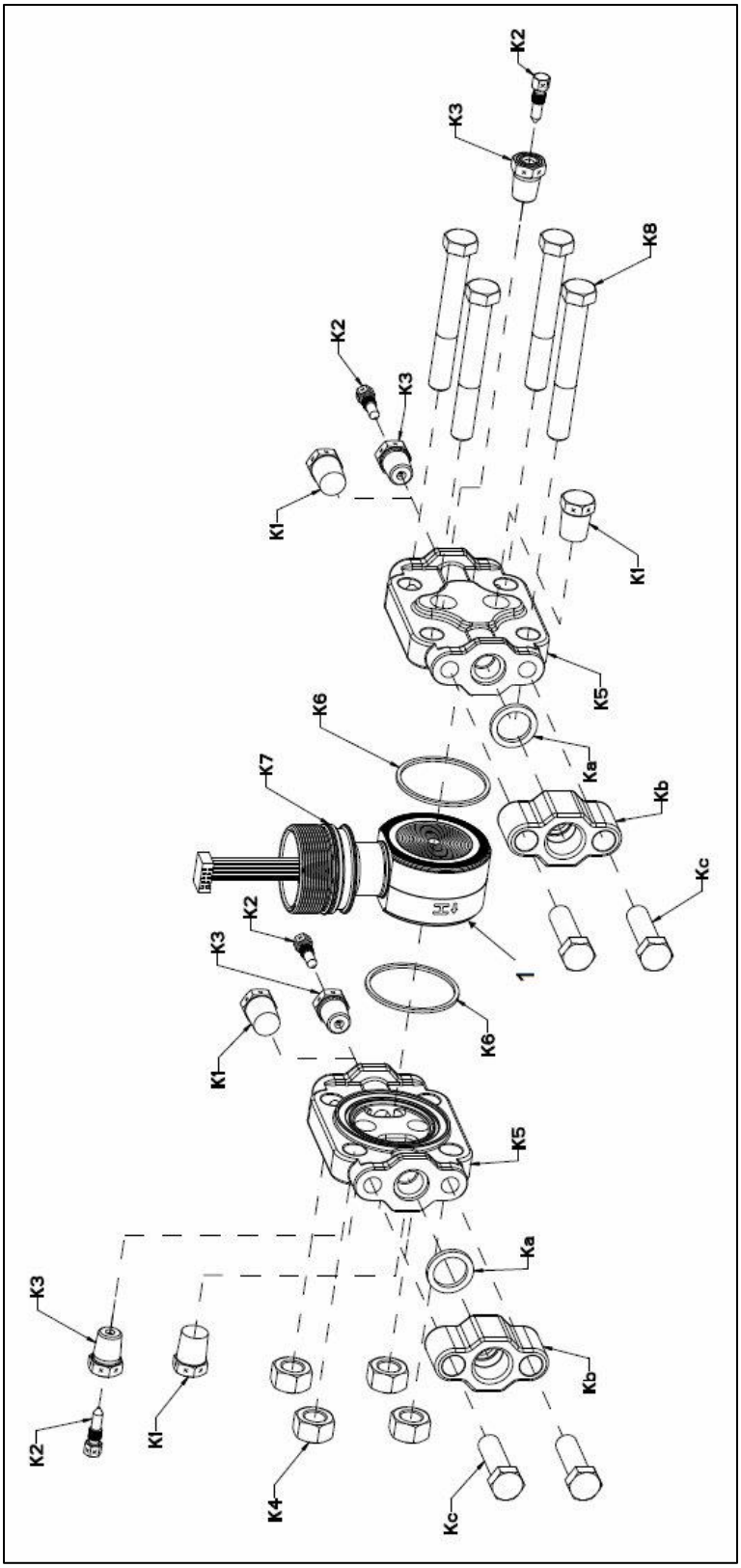


Figure 30 - SMV800 Models SMA810, SMA845, & SMG870

Table 28 - COPLANAR ADAPTER REPLACEMENT SEALS KITS

(**Refer to Figure 31**)

Key Number	Part Number	Description	Quantity
	50062206-006	**Coplanar Adapter Glass-Filled PTFE Gasket Kit**	
K1		Transmitter-side glass-filled PTFE Gaskets	2
K2		Manifold-side glass-filled PTFE Gaskets	2
	50062206-007	**Coplanar Adapter Fluorocarbon (VITON®) O-ring Kit**	
K1		Transmitter-side Fluorocarbon (VITON®) O-rings	2
K2		Manifold-side Fluorocarbon (VITON®) O-rings	2

USAGE NOTES

50062206-006 Only use new gaskets when assembling the Coplanar Adapter Kit. Gaskets are designed for one-time use. Do not use gaskets with nicks or other surface damage.

50062206-007 O-rings removed from service should be discarded and replaced with new o-rings. Do not use o-rings with nicks or other signs of damage.

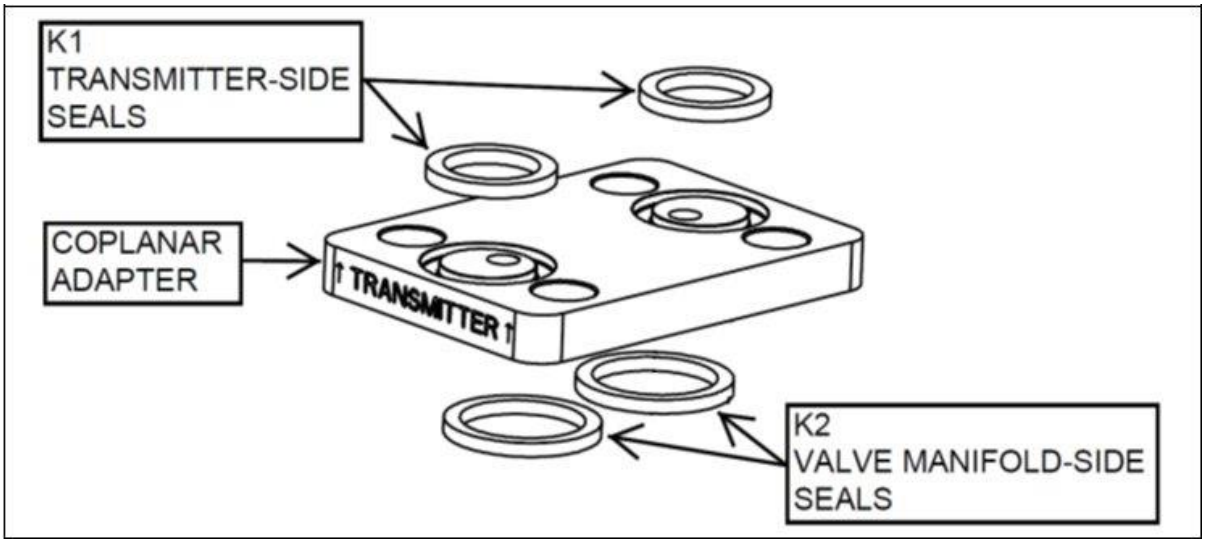


Figure 31 - COPLANAR ADAPTER REPLACEMENT SEALS KIT

Appendix A. PRODUCT CERTIFICATIONS

A1. Safety Instrumented Systems (SIS) Installations

For Safety Certified Installations, please refer to SMV800 SmartLine Multivariable Safety Manual 34-SM-25-05 for installation procedure and system requirements.

A2. European Directive Information (CE Mark)

CE

Honeywell

APPV-SMV800-CE
Revision: C

EU DECLARATION OF CONFORMITY

We,

Honeywell International Inc.
Honeywell Field Solutions
512 Virginia Drive
Fort Washington, PA 19034 USA

declare under our sole responsibility that the following products,

SMV 800 – Smart Series DE/ HART Multi-Variable Transmitter
SMA810, SMA845 and SMG870

to which this declaration relates, is in conformity with the provisions of the European Community Directives, including the latest amendments, as shown in the attached schedule.

Assumption of conformity is based on the application of the harmonized standards and when applicable or required, a European Community notified body certification, as shown in the attached schedule.

The authorized signatory to this declaration, on behalf of the manufacturer, and the Responsible Person is identified below.

Owen J. Murphy
Product Safety & Approvals Engineering
Issue Date: 18 May 2016

Honeywell

SCHEDULE
APPV-SMV800-CE
Revision: C

EMC Directive (2014/30/EU)

EN 61326-1:2013 — Electrical Equipment for Measurement, Control and Laboratory Use – EMC Requirements.

Overview of EMC Testing

Equipment Tested (EUT): SMV845 TRANSMITTER
Serial No: CE 001

Summary of Tests Performed:

PORT	TEST	STANDARD	CRITERIA (EN 61326-1)	RESULTS
Enclosure	Radiated Emission	CISPR 11	Group1, Class A 30 – 230 MHz: 40 dB 230 – 1000 MHz: 47 dB	PASS
	ESD Immunity	IEC61000-4-2	+/- 4KV Contact +/- 8KV Air	PASS
	EM Field- RF Radiated Susceptibility	IEC61000-4-3	10 V/m- 80 MHz to 1GHz 3 V/m - 1.4 GHz to 2.0 GHz 1 V/m- 2.0 GHz to 2.7 GHz	PASS PASS PASS
	50Hz/60Hz Magnetic Field Immunity	IEC 6100-4-8	30 A/m	N/A 1
DC Power	EFT(B) Immunity	IEC61000-4-4	+/- 1KV	PASS
	Surge Immunity	IEC61000-4-5	+/- 1KV	PASS
	RF Conducted Susceptibility	IEC61000-4-6	3V	PASS
I/O Signal/ Control (Including Earth Lines)	EFT(Burst) Immunity	IEC61000-4-4	+/- 1KV	2
	Surge Immunity	IEC61000-4-5	+/- 1KV	2
	RF Conducted Susceptibility	IEC61000-4-6	3V	2

Honeywell

SCHEDULE
APPV-SMV800-CE
Revision: C

PORT	TEST	STANDARD	CRITERIA (EN 61326-1)	RESULTS
AC Power	Voltage Dip	IEC61000-4-11	0% during 1 Cycle 40% during 10-12 Cycles 70% during 25-30 Cycles	N/A[3]
	Short Interruptions	IEC61000-4-11	0% during 250-300 Cycles	N/A[3]
	EFT(Burst) Immunity	IEC61000-4-4	2KV	N/A[3]
	Surge Immunity	IEC61000-4-5	1KV/ 2KV	N/A[3]
	RF Conducted Susceptibility	IEC61000-4-6	3V	N/A[3]

1. There is no magnetic sensitive circuitry.
2. Done as part of the DC Power Testing.
3. Product is DC Powered.

Test Report No : R-2367P

Testing performed at: **Retlif Testing Labatories**
3131 Detwiler Road
Harleysville, PA 19438
USA

ATEX Directive (2014/34/EU)

EC-Type Examination Certificate No: SIRA 15ATEX2039X Protection : Intrinsic Safety, Flameproof and Dust

Equipment Group II Category 1 G
- Ex ia IIC T4 Ga (Ta= -50°C TO 70°C)
- Ex ia IIC T4 Ga (Ta= -50°C TO 45°C)
- FISCO Field Device

Equipment Group II Category 1/ 2 G and Group II Caegrory 2 D
- Ex d IIC T5 Ga (Ta= -50°C TO 85°C)
- Ex d IIC T6 Ga (Ta= -50°C TO 65°C)
- Ex tb IIIC T95°C Db (Ta= -50°C TO 85°C)

Harmonized Standards :
- EN 60079-0: 2012/A11 :2013
- EN 60079-1: 2007
- EN 60079-26: 2007
- IEC 60079-31: 2013
- EN 60079-11: 2012

Honeywell

SCHEDULE
APPV-SMV800-CE
Revision: C

Type Examination Certificate No: SIRA 15ATEX4040 Protection : Non Sparking "n" and FISCO
Equipment Group II Category 3 G
Ex nA IIC T4 Ga (Ta= -50°C TO 70°C)
Ex ic IIC T4 Ga (Ta= -50°C TO 45°C)
FISCO Field Device

Harmonized Standards :
EN 60079-0: 2012/A11: 2013 EN 60079-11: 2012 EN 60079-15: 2010

ATEX Notified Body for EC Type Certificates
Sira Certifcation Service [Notified Body Number: 0518]
Unit 6, Hawarden Industrial Park,
Hawarden, Deeside, CH5 3US,
United Kingdom

ATEX Notified Body for Quality Assurance
DEKRA Certification B.V. [Notified Body Number: 0344]
Meander 1051
6825 MJ Arnhem
The Netherlands

Pressure Equipment Directive (PED) (97/23/EC)
Pressure Equipment Directive (PED) (2014/68/EU) *(After 18 July 2016)*

ASME Boiler and Pressure Vessel Code Section VIII 'Rules for Construction of Pressure Vessels: 2000

Pressure Transmitter	**PED Module**
Absolute Pressure	
SMA 810	Sound Engineering Practice (SEP)
SMA 845	
Gauge Pressure	
SMG870	Module A

4 of 4

A3. Hazardous Locations Approval Certifications

MSG CODE	AGENCY	TYPE OF PROTECTION	Electrical Parameters	Ambient Temperature
A	FM Approvals™	**Explosion proof:** Class I, Division 1, Groups A, B, C, D Class I, Zone 0/1, AEx d IIC T6..T5 Ga/Gb **Dust Ignition Proof:** Class II, Division 1, Groups E, F, G; Suitable for Division 1, Class III; Class II, Zone 21, AEx tb IIIC T 95°C Db	Note 1	T95 °C /T5: -50 °C to 85°C T6: -50 °C to 65°C
		Intrinsically Safe: Class I, II, III, Division 1, Groups A, B, C, D, E, F, G Class I Zone 0 AEx ia IIC T4 Ga	Note 2	T4: -50°C to 70°C
		Non-Incendive and Intrinsically Safe: Class I, Division 2, Groups A, B, C, D Class I Zone 2 AEx nA IIC T4 Gc	Note 1	T4: -50°C to 85°C
		Enclosure: Type 4X/ IP66/ IP67		
		Standards: FM 3600:2011; ANSI/ ISA 60079-0: 2013; FM 3615:2006; ANSI/ ISA 60079-1 : 2013; FM 3616 : 2011 ; ANSI/ ISA 60079-31 : 2013; FM 3610:2015; ANSI/ ISA 60079-11 : 2012; FM 3810 : 2005 ; ANSI/ ISA 60079-26 : 2011; FM 3611:2004; ANSI/ ISA 60079-15 : 2012 ; FM 3810 : 2005; ANSI/ ISA 61010-1: 2004;NEMA 250 : 2003 ; ANSI/ IEC 60529 : 2004		
B	CSA-Canada	**Explosion proof:** Class I, Division 1, Groups A, B, C, D **Dust Ignition Proof:** Class II, III, Division 1, Groups E, F, G Suitable for Division 1, Class III; Zone 0/1, Ex d IIC T6..T5 Ga/Gb Ex tb IIIC T 95°C Db	Note 1	T5: -50 °C to 85°C T6: -50 °C to 65 °C
		Intrinsically Safe: Class I, II, III, Division 1, Groups A, B, C, D, E, F, G; Ex ia IIC T4 Ga	Note 2	T4: -50°C to 70°C
		Non-Incendive and Intrinsically Safe: Class I, Division 2, Groups A, B, C, D Ex nA IIC T4 Gc	Note 1	T4: -50°C to 85°C
		Enclosure: Type 4X/ IP66/ IP67		
		Standards: CSA C22.2 No 0: 2010; CSA C22.2 No. 0-M91; CSA C22.2 No 25: 1966; CSA C22.2 No 30M; 1986; CSA C22.2 No. 142M: 1987; CAN/ CSA-C22.2 No.157: 1992; CSA C22.2 No 213M: 1987; CSA C22.2 No 60529: 2005; CSA C22.2 No 60079-0: 2011; CSA C22.2 No 60079-1: 2011; CSA C22.2 60079-11: 2011; CSA C22.2 60079-15: 2012; CSA C22.2 60079-31: 2012; ISA 12.12.01: 2010; ANSI/ ISA 60079-0: 2009; ANSI/ ISA 60079-1: 2012; ANSI/ ISA 60079-11: 2011; ANSI/ ISA 60079-15: 2009; ANSI/ ISA 60079-26 : 2011; ANSI/ ISA 60079-31 : 2012; ISA 60079-27: R2011; UL 913: ed 6; UL 916: 1998		

C	ATEX	**Flameproof:** Sira 15ATEX2039X II 1/2 G Ex d IIC T6..T5 Ga/Gb II 2 D Ex tb IIIC T 95°C..T125°C Db	Note 1	T5/ T95°C: -50 °C to 85°C T6: -50 °C to 65°C
		Intrinsically Safe: Sira 15ATEX2039X II 1 G Ex ia IIC T4 Ga	Note 2	T4: -50°C to 70°C
		Non Sparking and Intrinsically Safe: Sira12ATEX4234X II 3 G Ex nA IIC T4 Gc	Note 1	T4: -50°C to 85°C
		Standards: EN 60079-0: 2012+A11: 2013; EN 60079-1 : 2007; EN 60079-11 : 2012; EN 60079-31 : 2014 EN 60079-26 : 2007; EN 60529 : 2000 + A1; EN 60079-15 : 2010		
		Enclosure: IP66/ IP67		
D	IECEx	**Intrinsically Safe:** IECEx SIR 15.0022X Ex ia IIC T4 Ga	Note 2	T4: -50°C to 70°C
		Non Sparking: IECEx SIR 15.0022X Ex nA IIC T4 Gc	Note 1	T4: -50°C to 85°C
		Flameproof: Ex d IIC T6..T5 Ga/Gb Ex tb IIIC T 95°C..125 °C Db	Note 1	T5: -50 °C to 85°C T6: -50 °C to 65°C
		Enclosure: IP66/ IP67		
		Standards: IEC 60079-0: 2011; IEC 60079-1 : 2007; IEC 60079-11: 2011; IEC 60079-15 : 2011; IEC 60079-31: 2013; IEC 60079-26: 2006		
E	Coe (India)	**Intrinsically Safe:** Ex ia IIC T4 Ga	Note 2	T4: -50°C to 70°C
		Non Sparking: Ex nA IIC Gc	Note 1	T4: -50°C to 85°C
		Flameproof: Ex d IIC T6..T5 Ga/Gb Ex tb IIIC T95°C..T125 °C Db	Note 1	T5: -50 °C to 85°C T6: -50 °C to 65°C
E	SAEx (South Africa)	**Intrinsically Safe:** Ex ia IIC T4 Ga	Note 2	T4: -50°C to 70°C
		Non Sparking: Ex nA IIC Gc	Note 1	T4: -50°C to 85°C
		Flameproof: Ex d IIC T6..T5 Ga/Gb Ex tb IIIC T95°C..T125 °C Db	Note 1	T5: -50 °C to 85°C T6: -50 °C to 65°C
		Enclosure: IP66/ IP67		

F	INMETRO (Brazil)	**Intrinsically Safe:** Ex ia IIC Ga	Note 2	T4: -50°C to 70°C
		Non Sparking: Ex nA IIC T4 Gc	Note 1	T4: -50°C to 85°C
		Flameproof: Ex d IIC T6..T5 Ga/Gb Ex tb IIIC T 95°C..T125 °C Db	Note 1	T5: -50 °C to 85°C T6: -50 °C to 65°C
		Enclosure: IP66/ IP67		
		Standards: ABNT NBR IEC 60079-0:2013 (IEC 60079-0:2011); ABNT NBR IEC 60079-1:2009 (IEC 60079-1:2007); ABNT NBR IEC 60079-11:2013 (IEC 60079-11:2011); ABNT NBR IEC 60079-15:2012 (IEC 60079-15:2010); ABNT NBR IEC 60079-26:2008 (IEC 60079-26:2006); ABNT NBR IEC 60079-31:2014 (IEC 60079-31:2013).		
G	NEPSI (CHINA)	**Intrinsically Safe:** **Ex ia IIC T4 Ga**	Note 2	T4: -50°C to 70°C
		Non Sparking: **Ex nA IIC T4 Gc**	Note 1	T4: -50°C to 85°C
		Flameproof: Ex d IIC T6..T5 Ga/Gb Ex tb IIIC Db T95°C..T125 °C Db	Note 1	T5: -50 °C to 85°C T6: -50 °C to 65°C
		Enclosure: IP66/ IP67		
H	KOSHA (Korea)	**Flameproof:** Ex d IIC T6..T5 Ex tD A21 T 95°C..T125 °C	Note 1	T5: -50 °C to 85°C T6: -50 °C to 65°C
		Intrinsically Safe: **Ex ia IIC Ga**	Note 2	T4: -50°C to 70°C
I	EAC Ex	Ex d IIC T6..T5 Ga/Gb Ex tb IIIC T95°C Db	Note 1	T5: -50 °C to 85°C T6: -50 °C to 65°C
		Intrinsically Safe: Ex ia IIC T4 Ga	Note 2	T4: -50 °C to 70°C
		Non Sparking: **2 Ex nA IIC T4 Gc**	Note 1	T4: -50°C to 85°C
		Enclosure : IP 66/67		

Notes

1. Operating Parameters:

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

2. Intrinsically Safe Entity Parameters

Vmax= Ui= 30 V Imax= Ii= 225mA Ci=4 nF Li= 0 uH Pi= 0.9 W

A4. Marking ATEX Directive

General:

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


CE
0344

A.5 Conditions of Use" for Ex Equipment", Hazardous Location Equipment or "Schedule of Limitations":

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.

Painted surface of the SMV800 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.

Consult the manufacturer for dimensional information on the flameproof joints for repair.

WARNING: DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE MAY BE PRESENT

Non-Incendive Equipment:
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

WARNING: DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE MAY BE PRESENT

Intrinsically Safe: Must be installed per drawing 50128060

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.

WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR USE IN HAZARDOUS LOCATIONS

All Protective Measures:

WARNING: FOR CONNECTION IN AMBIENTS ABOVE 60°C USE WIRE RATED 105°C

A.6 Control Drawing

PRE REL		
ISS	REVISION & DATE	APPD
D	7/6/2016 ECN 2016- 3826	OJM

SMV800 Multi-Variable Transmitter, 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:
   SMV800 Transmitter: Vmax Voc or Uo, Imax Isc or Io;
   SMV800 Transmitter: Ci + Ccable ≤ Control Apparatus Ca,
   SMV 800 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 ECN 2015-5936.

	DRAWN		
	CHECKED		
	DEV ENG		
	MFG ENG		
	QA ENG		
	TOLERANCE UNLESS NOTED		
MASTER FILE TYPE: MS WORD	ANGULAR DIMENSION		

Honeywell

CONTROL DRAWING
SMV800 SERIES MULTI-VARIABLE TRANSMITTER
DIVISIONS 1 & 2 / ZONE 0 & 2

A/A4 — 50128060

SCALE: None | USED ON | SH. 1 OF 4

INSTRUCTIONS FOR INMETRO

1. Instalação de segurança intrínseca devem estar de acordo com
   Requisitos de IEC 60079-14, 12.3 (See also 5.2.4).

2. ENTIDADE equipamento aprovado deve ser instalado de acordo com a segurança intrínseca Desenho de Controle do fabricante.
3. O conceito de Segurança Intrínseca ENTIDADE permite a interligação de dois entidade credenciada dispositivos de segurança intrínseca com parâmetros de entidade não examinados especificamente em combinação como um sistema quando:

   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.
   Quando forem necessários dois canais separados de barreira, um dual-channel ou duas barreiras de canal único pode ser usado, onde em ambos os casos, ambos os canais foram certificados para uso em conjunto com os parâmetros entidade combinada que atendam as equações acima.
4. Parâmetros da Entidade de sistema::
   Vmax Voc or Uo, Imax Isc or Io;
   Ci + Ccable ≤ Control Apparatus Ca,
   Li + Lcable ≤ Control Apparatus La.

5. Quando os parâmetros eléctricos do cabo não são conhecidos, podem ser utilizados os seguintes valores::
   Capacidade: 197pF/m (60 pF/ft)
   Indutância: 0.66µH/m (0.020µH/ft).
6. Os equipamentos de controle que está ligado à Associated Equipment não deve usar ou gerar mais de 250 V.
7. Equipamentos associados devem ser IECExor INMETRO (dependendo da localização) listados. Equipamentos associados podem ser instalados em uma perigosos (classificados) local Classe I, Divisão 2 ou Zona 2 se for aprovado.
8. O equipamento não Galvanicamente isolado (Barreiras Zener aterradas) deve ser conectado a um eletrodo de aterramento adequado por IECEx or INMETRO: Requisitos de IEC 60079-14, 12.2.4.
9. Intrinsecamente seguro Divisão 1 / Zona 0 AVISO: substituição de componentes pode prejudicar a adequação para uso em locais perigosos.
10. Divisão 2 / Zona 2: AVISO: NÃO aberto quando uma atmosfera de gás explosiva.
11. Nenhuma revisão deste desenho CONTROL é permitida sem autorização dos órgãos listados.

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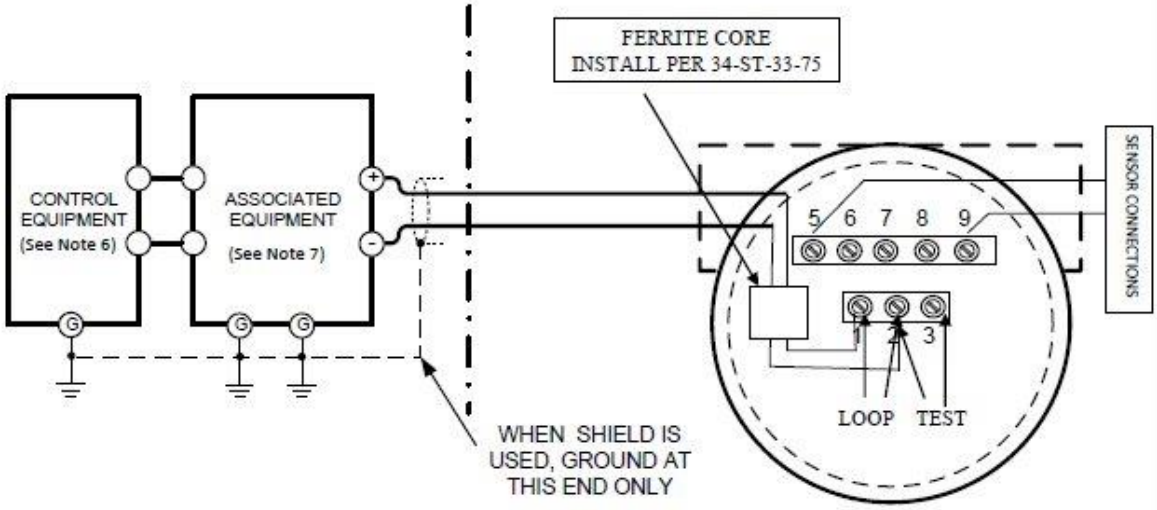
SMV800 HART/DE

Terminal	ENTITY PARAMETERS	Associated Apparatus
1,2 (Loop)	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= 4 nF	Ca or Co ≥ C_{cable} + C_{SMV800}
	Li= 9 µH	La or Lo ≥ L_{cable} + L_{SMV800}
5, 6, 7, 8 (SENSOR)	Co= 39 uF	-----
	Lo= 4.99 H	-----

NON-HAZARDOUS LOCATION

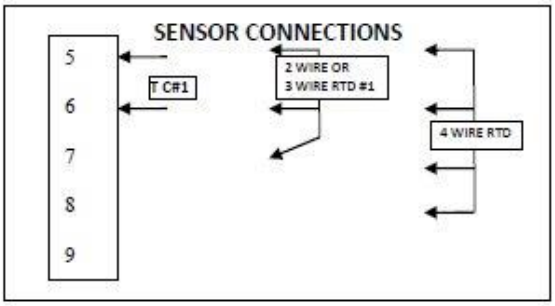
HAZARDOUS (CLASSIFIED) LOCATION

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;



FOR DIV 2 / ZONE 2 INSTALLATIONS

CONTROL EQUIPMENT PARAMETERS
Umax = Ui = 42V, 4-20 mA, Po ≤ 1 W
NOTE : ASSOCIATED EQUIPMENT NOT REQUIRED



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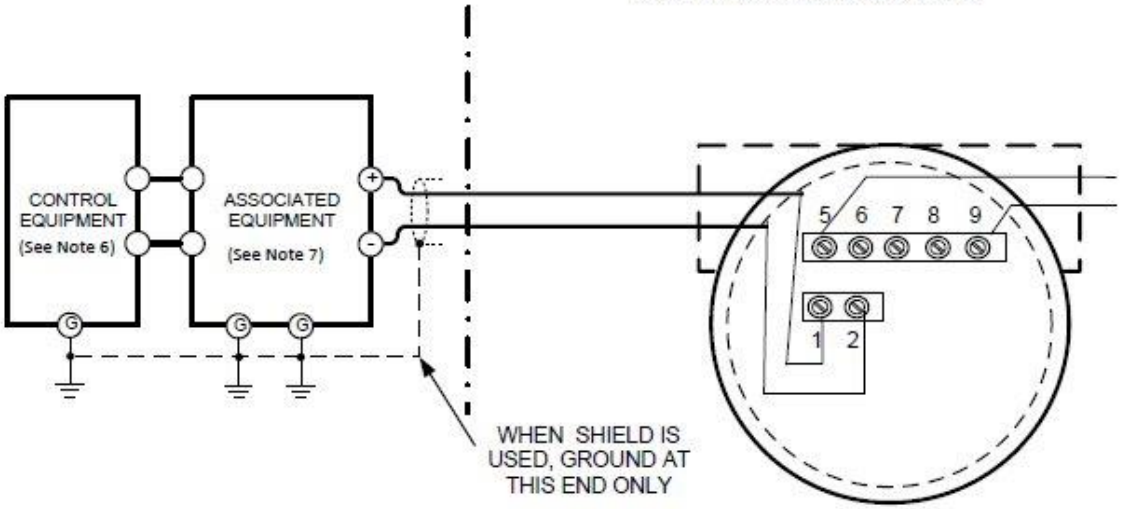
SMV800 FOUNDATION FIELDBUS/ PROFIBUS

TERMINALS	NON FISCO		FISCO	
	ENTITY PARAMETERS	Associated Apparatus	ENTITY PARAMETERS	Associated Apparatus
1,2 (FF CONNECTION)	Ui or Vmax ≤ 30V	Uo, Voc or Vt ≤ 30V	Ui or Vmax ≤ 17.5	Uo, Voc or Vt ≤ 18V
	Ii or Imax ≤ 225 mA	Io (Isc or It) ≤ 225 mA	Ii or Imax ≤ 380 mA	Io (Isc or It) ≤ 380 mA
	Pi or Pmax = 1W	Po ≤ 1 W	Pi or Pmax = 5.32W	Po ≤ 5.32 W
	Ci= 0 nF	Ca or Co ≥ C_{cable} + C_{SMV800}	Ci= 0 nF	Ca or Co ≥ C_{cable} + C_{SMV800}
	Li= 0 µH	La or Lo ≥ L_{cable} + L_{SMV800}	Li= 0 µH	La or Lo ≥ L_{cable} + L_{SMV800}
5, 6, 7, 8 (SENSOR)	Co= 39 uF	-----	Co= 39 uF	-----
	Lo= 4.99 H	-----	Lo= 4.99 H	-----

NON-HAZARDOUS LOCATION

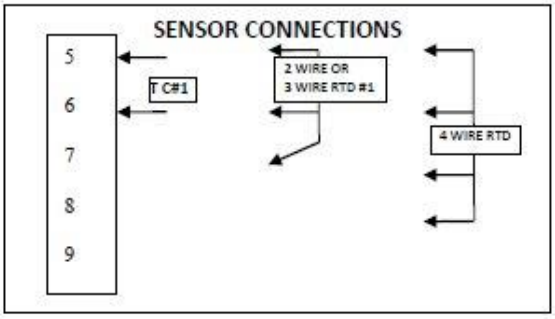
HAZARDOUS (CLASSIFIED) LOCATION

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;



DIV 2 / ZONE 2 INSTALLATIONS

CONTROL EQUIPMENT PARAMETERS
Umax=Ui= 32V, 25 mA, Po ≤ 1 W
NOTE : ASSOCIATED EQUIPMENT NOT REQUIRED



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9. Security

9.1. How to report a security vulnerability

For the purpose of submission, security vulnerability is defined as a software defect or weakness that can be exploited to reduce the operational or security capabilities of the software or device. Honeywell investigates all reports of security vulnerabilities affecting Honeywell products and services.

To report potential security vulnerability against any Honeywell product, please follow the instructions at:

https://honeywell.com/pages/vulnerabilityreporting.aspx

Submit the requested information to Honeywell using one of the following methods:

- • Send an email to security@honeywell.com.

  or

- Contact your local Honeywell Process Solutions Customer Contact Centre (CCC) or Honeywell Technical Assistance Centre (TAC) listed in the “Support and Contact information” section of this document.

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
DE	Digitally Enhanced
EMI	Electromagnetic Interference
FTA	Field Termination Assembly
GP	Gauge Pressure
HART	Highway Addressable Remote Transducer
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
mVar	MultiVariable
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
PSI	Pounds per Square Inch
PSIA	Pounds per Square Inch Absolute
PV	Process Variable
PWA	Printed Wiring Assembly
RTD	Resistance Temperature Detector
SCT	SmartLine Configuration Tool
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

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Sales and Service

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

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Specifications are subject to change without notice.

For more information
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Or contact your Honeywell Account Manager

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