

SmartLine Multivariable Transmitter SMV800 Quick Start Installation Guide

34-SM-25-04, Revision 3, December 2017

This document provides descriptions and procedures for the quick installation of Honeywell's family of SmartLine transmitters.

The SmartLine Multivariable transmitter is available in a variety of models for measuring differential pressure, static pressure, process temperature, volume and mass flow and Totalizer.

For full details refer to the manuals listed below for protocols, user Interface (HMI) operation, Installation, configuration, calibration, maintenance, parts, and safety and approvals etc. including options

Various other documents are available on the CD supplied with your shipment. Documents in hardcopy can also be ordered.

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References

The following list identifies all documents that may be sources of reference for material discussed in this publication.

Document Title	Document #
SMV800 SmartLine Transmitter User's Manual	34-SM-25-03
SMV800 SmartLine Transmitter Safety Manual	34-SM-25-05
SMV800 SmartLine Transmitter HART User Manual	34-SM-25-06
SMV800 Pocket Configuration Guide	34-SM-00-05

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INSTALLATION

Evaluate the site selected for the transmitter installation with respect to the process system design specifications and Honeywell's published performance characteristics for your model.

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.

Features and Options

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 1](#) 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.

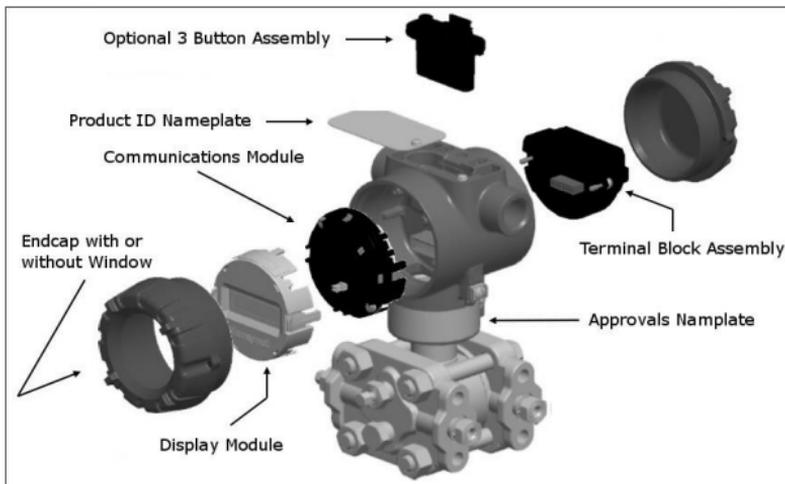


Figure 1 – Electronic housing components

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 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.

Device Variables

SMV800 supports 6 device variables:

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

First 5 variables can be mapped to PV, SV, TV, QV (Analog Out). The 6th one, Meter Body temperature can be mapped to SV, TV, QV, but not to PV (Analog out)

MOUNTING THE TRANSMITTER

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

Typical Bracket mounted Installations

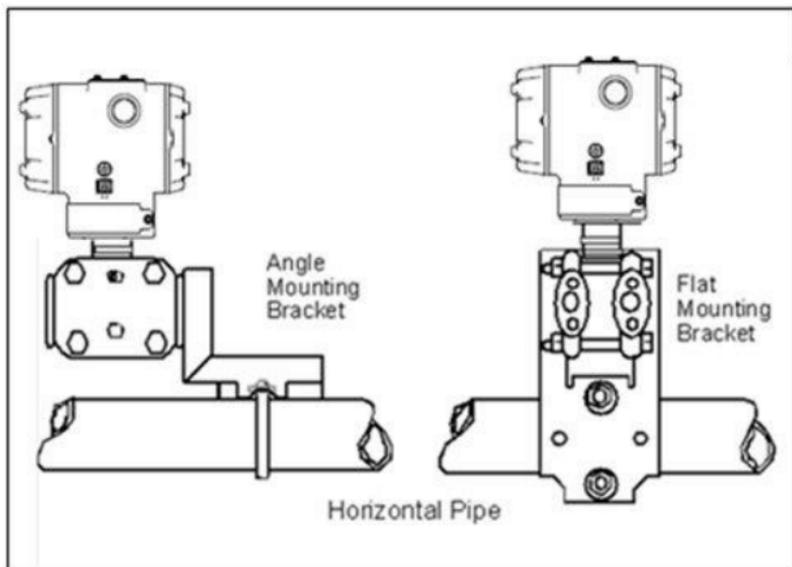


Figure 2: Mounting brackets

Bracket mounting

Mounting bracket, see [Figure 3](#)

Rotate the transmitter housing, see [Figure 4](#)

Level a transmitter with small absolute or differential pressure spans, see [Figure 5](#).

Mounting bracket

Position bracket on 2-inch (50.8 mm) and install “U” bolt around pipe and through holes in bracket. Secure with nuts and lock washers provided.

Figure 3 Example - Angle mounting bracket secured to horizontal or vertical pipe.

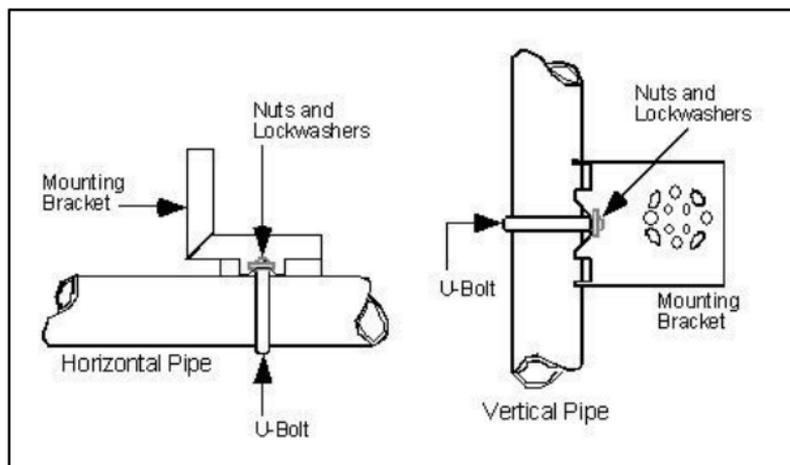


Figure 3: Angle mounting bracket

Rotating transmitter housing

Use a 2mm hex wrench to loosen the set screw on outside neck of transmitter one full turn. Rotate the transmitter housing to a maximum of 180 degree increment in left or right direction from center to position you require and tighten set screw (1.46 to 1.68 Nm/13 to 15 lb-in).

Figure 4 Example – Rotating transmitter housing.

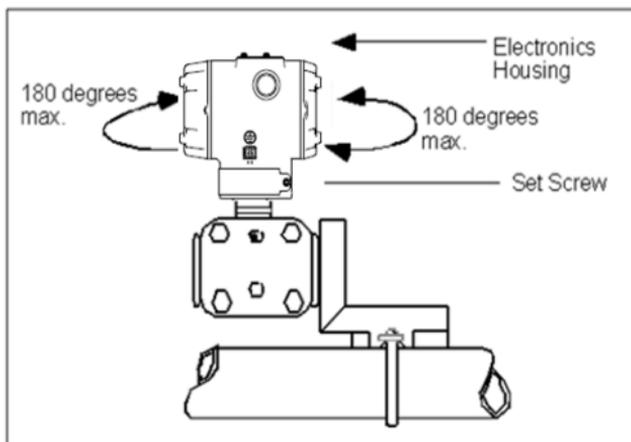


Figure 4: Rotating transmitter housing

Leveling transmitters with small absolute or differential pressure spans

Mounting position of these transmitters is critical due to the smaller transmitter spans.

To minimize these positional effects on calibration (zero shift), take the appropriate mounting precautions that follow for the given transmitter model.

See [Figure 5](#) for suggestions on how to level the transmitter using a spirit balance.

To perform a **Zero Trim** after leveling, refer to **Trim the transmitter** on [page 17](#).

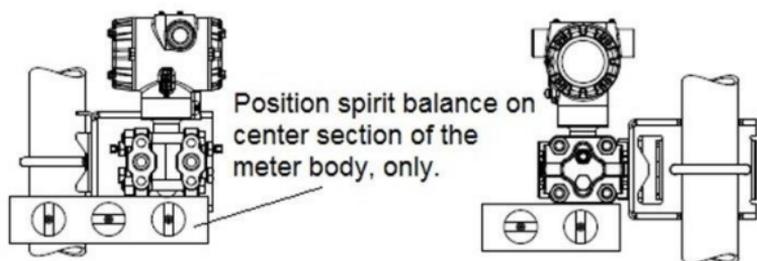


Figure 5: Using level to mount transmitter

For a model SMA810 or SMA845 transmitters, you must ensure that the transmitter is vertical when mounting it. You do this by leveling the transmitter side-to-side and front-to-back.

Mount transmitter vertically to assure best accuracy. Position a spirit balance on pressure connection surface of AP body.

CONDUIT ENTRY CONNECTORS, PLUGS AND ADAPTERS

Procedures

It is the user/installer's responsibility to install the transmitters in accordance with national and local code requirements. Conduit entry plugs and adapters shall be suitable for the environment, shall be certified for the hazardous location when required and acceptable to the authority having jurisdiction for the plant.

CONDUIT ENTRY PRECAUTIONARY NOTICE

THE CONDUIT/CABLE GLAND ENTRIES OF THIS PRODUCT ARE SUPPLIED WITH PLASTIC DUST CAPS WHICH ARE NOT TO BE USED IN SERVICE.

IT IS THE USER'S RESPONSIBILITY TO REPLACE THE DUST CAPS WITH CABLE GLANDS, ADAPTORS AND/OR BLANKING PLUGS WHICH ARE SUITABLE FOR THE ENVIRONMENT INTO WHICH THIS PRODUCT WILL BE INSTALLED. THIS INCLUDES ENSURING COMPLIANCE WITH HAZARDOUS LOCATION REQUIREMENTS AND REQUIREMENTS OF OTHER GOVERNING AUTHORITIES AS APPLICABLE.

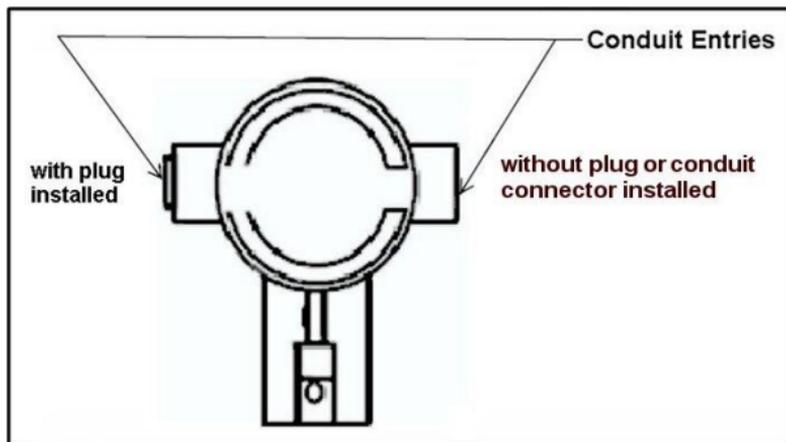
Use the following procedures for installation.

Table 1 - Conduit entry connectors and plugs

Step	Action			
1	Remove the protective plastic cap from the threaded conduit entry.			
2	To ensure the environmental ingress protection rating on tapered (NPT), a non-hardening thread sealant may be used.			
3	Thread the appropriate size conduit connector or plug (M20 or ½" NPT) into the conduit entry opening. Do not install conduit entry connectors or plugs in conduit entry openings if adapters or reducers will be used.			
4	Tighten plugs per the following table.			
	Description	Tool	Torque	
	M20 Conduit Entry	10mm Hex Wrench	32 Nm	24 Lb-ft
	½" NPT Conduit Entry	10mm Hex Wrench	32 Nm	24 Lb-ft

Table 2 - Conduit adapters

Step	Action		
1	Remove the protective plastic cap from the threaded conduit entry.		
2	To ensure the environmental ingress rating on tapered threads (NPT), a non-hardening thread sealant may be used.		
3	Thread the appropriate size adapter ($\frac{1}{2}$ NPT) into the conduit entry opening		
4	Tighten adapters per the following table.		
	Description	Tool	Torque
	$\frac{1}{2}$ to $\frac{3}{4}$ NPT Adapter	1 $\frac{1}{4}$ " Wrench	32 Nm 24 Lb-ft

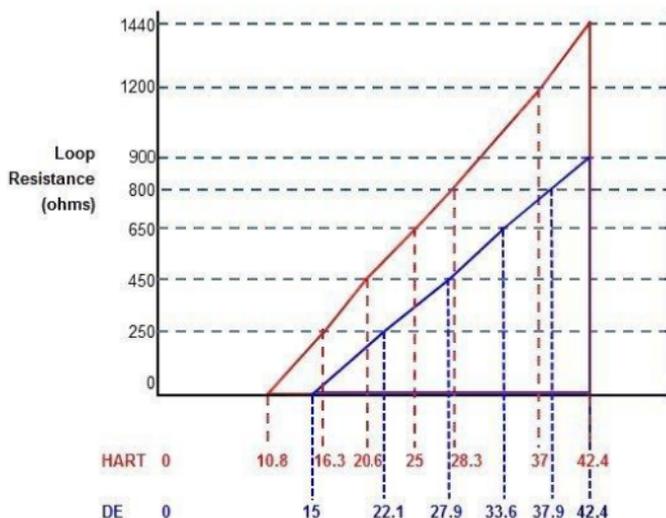
**Figure 6: Electronic housing conduit entries**

Note. No conduit connectors or plugs come installed in the housings. All housings come with temporary plastic dust protectors (red) installed and are not certified for use in any installation.

WIRING CONNECTIONS AND POWER UP

Summary

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 7.



For DE, $R_{\text{max}} = 35 * (\text{Power Supply Voltage} - 15)$

For HART, $R_{\text{max}} = 45.6 * (\text{Power Supply Voltage} - 10.8)$

A minimum of 250 ohms of loop resistance is required to support communications. Loop resistance = barrier resistance, + wire resistance, = receiver resistance, + peripheral device resistance

Figure 7: HART/DE transmitter operating ranges

Loop wiring is connected to the transmitter by 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 8. Connect the loop power wiring shield to earth ground only at the power supply end.

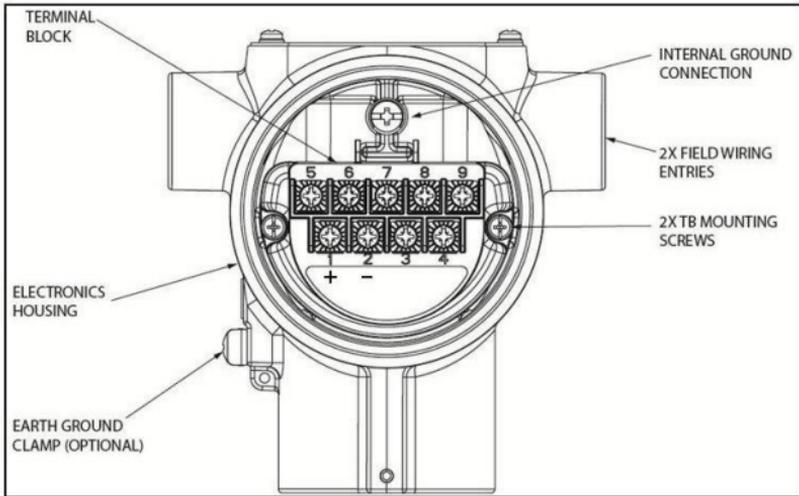


Figure 8: Transmitter terminal board and grounding screw

As shown in [Figure 8](#), 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, 2, 3, 5, 6, 7 & 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.

The transmitter is designed to operate in a two-wire power/current loop with loop resistance and power supply voltage within the operating range; see [Figure 7](#).

With an optional remote meter, the voltage drop for this must be added to the basic power supply voltage requirements to determine the required transmitter voltage and maximum loop resistance. Additional consideration is required when selecting intrinsic safety barriers to ensure that they will supply at least minimum transmitter voltage, including the required 250 ohms of resistance (typically within the barriers) needed for digital communications.

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.

This procedure shows the steps for connecting power to the transmitter.



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 the SmartLine Multivariable Transmitter User's Manual 34-SM-25-03) for details.

Input Sensor Wiring

Connect the input sensors as shown in [Figure 9](#) below:

- 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.

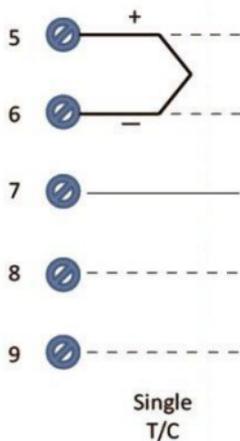


Figure 9: Thermocouple connections

Figure 10: RTD connections

- 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.

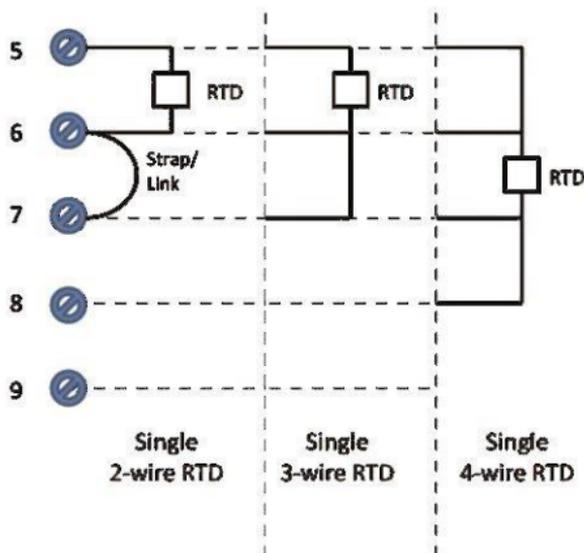


Figure 10: RTD connections

Step	Action
1	See Figure 8 , above, for parts locations.
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	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.

5	Feed input sensor wires through the 2 nd conduit entrance and connect wire.
6	Replace the end cap, and secure it in place.

EXPLOSION-PROOF CONDUIT SEAL



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

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

Transmitters installed as explosion proof in Class I, Division 1, Group A Hazardous (classified) locations in accordance with ANSI/NFPA 70, the US National Electrical Code, require a LISTED explosion proof seal to be installed in the conduit, within 18 inches (457.2 mm) of the transmitter. Crouse-Hinds type EYS/EYD or EYSX/EYDX are examples of LISTED explosion proof seals that meet this requirement. Transmitters installed as explosion proof in Class I, Division 1, Group B, C or D hazardous (classified) locations do not require that explosion proof seal be installed in the conduit.

TRIM THE TRANSMITTER

Procedure to trim the transmitter

For a transmitter with a small differential pressure span, you must ensure that the transmitter is vertical when mounting it. You do this by leveling the transmitter side-to-side and front-to-back. See [Figure 5](#) for suggestions on how to level the transmitter using a spirit balance. You must also zero the transmitter by following the steps in this table.

Step	Action
1	Attach the transmitter to the mounting bracket but do not completely tighten the mounting bolts
2	Connect a tube between the input connections in the high pressure (HP) and low pressure (LP) heads to eliminate the effects of any surrounding air currents.
3	Connect 24 Vdc power to the transmitter. For HART/DE, connect a digital voltmeter to monitor the PV output.
4	Use applicable communicator to establish communications with the transmitter. For DE transmitter use the SmartLine Configuration Toolkit (SCT3000). For HART, use MCT404-FDC application or other HART Communicator with applicable Honeywell DD's.
5	While reading the transmitter's output on a communication tool or a voltmeter, position the transmitter so the output reading is at or near zero, and then completely tighten the mounting bolts.
6	The local display or applicable communicator can be used to perform the zero corrects. This corrects the transmitter for any minor error that may occur after the mounting bolts are tightened.
7	Remove the tube from between the input connections, the power, and the digital voltmeter or communication tool.

SET THE JUMPERS FOR HART/DE

Setting failsafe direction and write protect jumpers

The SmartLine Multivariable transmitter (DE or HART) provides two jumpers to set the desired failsafe action and write protect option.

See [Figure 11](#).

The top jumper on the electronics module sets the failsafe direction. The default setting is up-scale failsafe.

Upscale drives the loop to a value greater than 21mA while down scale drives the loop to a value less than 3.8mA.

You can change the failsafe direction by moving the failsafe jumper (top jumper) to the desired position (UP or DOWN).

The bottom jumper sets the write protect.

The default setting is OFF (Un-protected).

When set to the ON (Protected) position, changed configuration parameters cannot be written to the transmitter.

When set to the OFF (Un-protected) position, changed configuration parameters can be written to the transmitter.



ATTENTION: *Electrostatic Discharge (ESD) hazards. Observe precautions for handling electrostatic sensitive devices*

Step	Action
1	Turn OFF transmitter power.
2	Loosen the end-cap lock, and unscrew the end cap from the electronics side of the transmitter housing.
3	If applicable, carefully depress the tabs on the sides of the display module and pull it off. If necessary, move the interface connector from the communication module to the display module to provide the preferred orientation of the display module in the window.
4	Set the failsafe jumper (top jumper) to the desired action (UP or DOWN). And the write protect jumper (Bottom jumper) to the desired behavior (Protected or Unprotected) See Error! Reference source not found. for jumper positioning.
5	Screw on the end cap and tighten the end-cap lock.
6	Turn ON transmitter power.

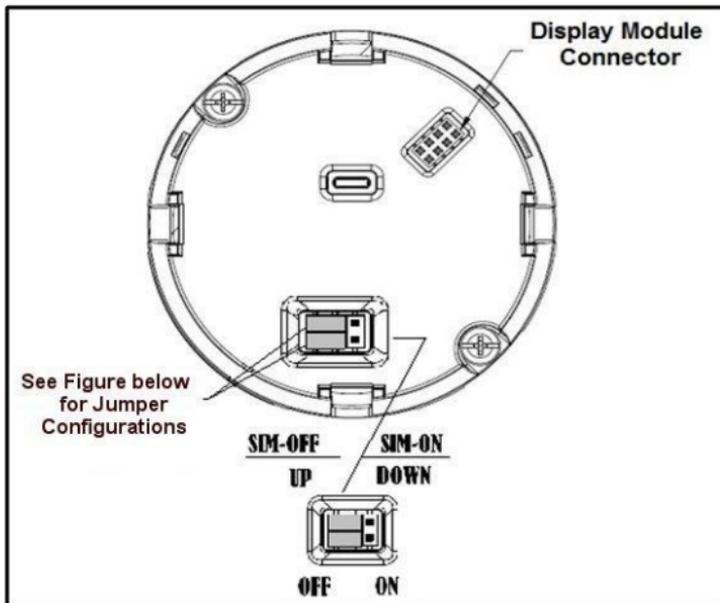


Figure 11: Jumper location HART

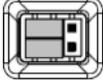
Jumper Settings	Description
	<i>Failsafe = UP (High) Write Protect = OFF (Not Protected)</i>
	<i>Failsafe = DOWN (Low) Write Protect = OFF (Not Protected)</i>
	<i>Failsafe = UP (High) Write Protect = ON (Protected)</i>
	<i>Failsafe = DOWN (Low) Write Protect = ON (Protected)</i>

Figure 12: Jumper settings HART

CONFIGURATION GUIDE

Table 3 shows the transmitter display configuration.

Parameters in Italics are read-only.

* Applicable to HART only, not DE

	Pressure Parameters		Common Parameters
	Temperature Parameters		Flow Parameters
			Totalizer Parameters

Table 3 – Advanced Display Configuration

Diagnostics	Critical	<i>Active Diags</i>
		<i>Meter Body</i>
		<i>Meter Body Comm</i>
		<i>Temp Sensor Board</i>
		<i>Temp Input</i>
		<i>Temp Sensor Comm</i>
		<i>Comm Module</i>
		<i>Comm VCC Fault</i>
Diagnostics	Non-Critical	<i>Active Diags</i>
		<i>Analog Out Mode</i>
		<i>DP Zero Correct</i>
		<i>DP Span Correct</i>
		<i>Meter Body Input</i>
		<i>Meter Body Temp</i>
		<i>Meter Body Comm</i>
		<i>Pressure Fac Cal*</i>
		<i>Temp Cal Correct</i>
		<i>Temp Module Temp</i>
		<i>Temp Input Range</i>
		<i>CJ Range</i>
		<i>Temp Input</i>
		<i>Temp Input TB6</i>
		<i>Temp Fac Cal</i>
		<i>Temp Comm</i>
		<i>PV Out of Range</i>
<i>Supply Voltage</i>		

Diagnostics	Non-Critical	<i>Comm Module Temp</i>
		<i>DAC Temp Comp</i>
		<i>Display Setup</i>
		<i>Flow Divide by 0</i>
		<i>Flow Sqrt of Neg</i>
		<i>Flow Direction</i>
		<i>Flow SP/PT Comp</i>
		<i>Totalizer at Max*</i>
		<i>Totalizer Status*</i>
		<i>Totalizer Flow*</i>
		<i>DP Simulation</i>
		<i>SP Simulation</i>
		<i>PT Simulation</i>
		<i>Flow Simulation</i>

* Applicable to HART only, not DE

Display Setup	LCD Contrast	Set Contrast
	Common Setup	Set Password
		Language
		Screen Rotate
		Rotation Time
		DP Units
		SP Units
		Temp Units
	Screen 1to Screen 8	Mass FI Units
		Vol FI Units
		Totalizer Unit
		Screen Format
		PV Selection
		PV Scaling*
Display Units		
Custom Units*		
Decimals		
Scaling Low Lim*		
Scaling High Lim*		
Scaling Unit*		
Trend Hours		
Disp Low Lim		
Disp High Lim		
Scrn Custom Tag		

Calibration	Set Time Stamp*	Hour, Minute, Year, Month, Day
	DP Zero Correct	Set Time Stamp Do DP Zero Correct
	DP LRV Correct	Set Time Stamp* Do DP LRV Correct
	DP URV Correct	Set Time Stamp Do DP URV Correct
	DP Reset Correct	Set Time Stamp Do DP Reset Correct
	SP Zero Correct	Set Time Stamp Do SP Zero Correct
	SP LRV Correct	Set Time Stamp Do SP LRV Correct
	SP URV Correct	Set Time Stamp Do SP URV Correct
	SP Reset Correct	Set Time Stamp Do SP Reset Correct
	Temp Cal Points*	Temp Cal Lo Pt Temp Cal Hi Pt
	Temp Cal Lo Corr	Set Time Stamp Do Temp Cal Lo
	Temp Cal Hi Corr	Set Time Stamp Do Temp Cal Hi
	Temp Reset Corr	Set Time Stamp Reset Temp Corr
	DAC Trim	Trim Zero Trim Span Set DAC Normal
Loop Test	Set DAC Output Set DAC Normal	

* Applicable to HART only, not DE

Device Setup	Device Setup	Tag ID Loop Source NAMUR Output
	HART Setup*	<i>Device ID</i> <i>Universal Rev</i> <i>Field Device Rev</i> Final Assy Num Loop mA Poll Address PV, SV, TV, QV Units (Device units. Depends upon what variable is mapped to PV, SV, TV, QV)
	HART Date*	Year, Month, Day, Install Date, Write Date
	Dev Instl Date*	Year, Month, Day, Install Date, Write Date

* Applicable to HART only, not DE

Pressure Setup	Pressure Params	Device DP Unit Device SP Unit MBT Unit DP Damping sec SP Damping sec Transfer Function Filter Perform*
	DP LRV	DP LRV (in preferred unit)
	DP URV	DP URV(in preferred unit)
	Set DP LRV	Set DP LRV(in preferred unit)
	Set DP URV	Set DP URV(in preferred unit)
	DP Factory Cal*	Active Cal Set Select Cal Set
	SP LRV	SP LRV(in preferred unit)
	SP URV	SP URV(in preferred unit)
	Set SP LRV	Set SP LRV(in preferred unit)
	Set SP URV	Set SP URV(in preferred unit)
SP Factory Cal*	Active Cal Set Select Cal Set	

* Applicable to HART only, not DE

Temperature Setup	Temp Sensor	Device PT Unit* T Damping sec Break Detect Latching CJ Source Fixed CJ Value Sensor Type Sensor ID RTD Type* RTD Lead Res Sensor Bias
	Temp LRV	Temp [LRV] (in preferred unit)
	Temp URV	Temp [URV] (in preferred unit)
	Set Temp LRV	Set [LRV] (in preferred unit)
	Set Temp URV	Set [URV] (in preferred unit)
	T Mod Instal Date*	Year, Month, Day, Install Date, Write Date
	Sens Instl Date*	Year, Month, Day, Write Date

* Applicable to HART only, not DE

Flow Setup	Flow Parameters	FI Damping sec Mass FI Units Vol FI Units Dev Flow Unit* Barom Pressure K-User Factor Algorithm Type Compens Mode Fluid State Pri Elem Type Pipe Diameter Flow Cust Unit* Base Unit* Conv Factor*
	<i>Flow URL</i>	<i>Flow URL</i> (in preferred unit)
	Flow LRV	Flow LRV (in preferred unit)
	Flow URV	Flow URV (in preferred unit)
	Flow Cutoff	Cutoff Hi Lim Cutoff Low Lim

Totalizer* Setup	Totalizer Mode	Start Totalizer
		Stop Totalizer
		Reset Pos Value
		Reset Neg Value
		Clr Exceed Ctr
	Totalizer Parameters	Maximum value
		Preset Value
		Totalizer Unit
		Sampling Rate
		Custom Unit
		Conv Base Unit
		Conv Factor
	Status Latency	
	Totalizer URV	Totalizer URV (in preferred unit)
		Totalizer URV (in preferred unit)
	Totalizer LRV	Totalizer LRV (in preferred unit)
		Totalizer LRV (in preferred unit)
Statistics	Pos Totalizer	
	Neg Totalizer	
	Exceed Count	

Information	Display	<i>Firmware Version</i>
	Comm Module	<i>Firmware Version Software Rev Protocol</i>
	Meter Body	<i>Firmware Version Model Key DP LRL DP URL DP Units (preferred unit) SP LRL SP URL SP Units (preferred unit)</i>
	Temp Module	<i>Firmware Version Temp LRL Temp URL Temp Units (preferred unit)</i>
	Options*	<i>Universal Temp</i>
		<i>Serial Number</i>
<i>License key</i>		

* Applicable to HART only, not DE

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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