

I/A Series® Intelligent Pressure Transmitters

**IGP25 and IGP50 Gauge Pressure
with FOUNDATION Fieldbus Communication**

Installation, Operation, Calibration, Configuration, and Maintenance

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1. Introduction

General Description

IGP25-F, and IGP50-F Intelligent Gauge Pressure Transmitters measure pressure by applying the pressure to a silicon strain gauge microsensor within the sensor assembly. This microsensor converts the pressure to a change in resistance, and the resistance change is converted to a digital signal proportional to the pressure. This measurement signal is transmitted to remote receivers over the same two wires that supply power to the transmitter electronics. These wires also carry two-way data signals between the transmitter and remote communication devices.

The IGP25 can be supplied with direct connected or remote pressure seals.

For more detailed information on the principle of operation of the transmitter, refer to document TI 037-096, available from Invensys.

The measurement signal is a FOUNDATION fieldbus digital signal for full communication with any FOUNDATION fieldbus Host equipped with a FOUNDATION fieldbus Interface Module. The communication functionality permits you to reconfigure a transmitter from a remote Fieldbus Host personal computer, or I/A Series system equipped with a FOUNDATION fieldbus Interface Module.

FOUNDATION fieldbus is an all-digital, serial, two-way communication system that runs at 31.25 kbps, interconnecting a fieldbus host and various field devices such as process sensors/transmitters, valves/actuators, and controllers — all connected in parallel to the same bus. Both ends of the bus must be terminated with standard characteristic impedance networks to minimize reflected signals. Power to all devices is supplied by a dc fieldbus power source connected anywhere on the bus.

— **NOTE** —

The power supply must be a fieldbus-specific power supply.

The communication signals between a fieldbus host and all other bus-connected devices, which are superimposed on the dc power signal on the bus, are controlled according to a strict cycle schedule and protocol. During intervals when control and data signals are not being transmitted according to the schedule, the devices are free to communicate with each other for such functions as local PID control, trend recording/indicating, etc.

FOUNDATION fieldbus uses “Function Blocks” (standardized automation functions) to implement measurement and control strategies. These blocks may be distributed throughout the array of devices in whatever manner is most efficient. A major advantage of the concept is that devices from many manufacturers may be intermixed in a seamless and integrated manner. Since all devices in a system connect to the same wire pair, the system requires less wire than comparable systems, fewer intrinsic safety barriers and fewer interface cards, resulting in significant cost savings.

The FOUNDATION fieldbus system used with IGP25-F and IGP50-F transmitters implements the following blocks — Resource Block, Transducer Block, Analog Input (AI) Blocks, and Proportional Integral Derivative (PID) Block. The Resource Block contains all parameters needed to define the device description for the transmitter. The Transducer Block handles all

configurable parameters that define the sensor, transmitter hardware, and manufacturer-specific data. The AI Blocks contain all configurable parameters needed to define the input data for use with the other function blocks. The PID Block contains parameters required for PID control.

Reference Documents

Table 1. Reference Documents

| Document | Description |
|------------------------------|--|
| Dimensional Prints | |
| DP 020-217 | Dimensional Print – Pressure Transmitters with Pulp and Paper Process Connections |
| DP 020-218 | Dimensional Print – Pressure Transmitters with Sanitary Tri-Clamp Type Process Connections |
| DP 020-219 | Dimensional Print – Pressure Transmitters with Sanitary Mini Tank Spud Process Connections |
| DP 020-343 | Dimensional Print – PSFPS and PSFES Pressure Seals |
| DP 020-345 | Dimensional Print – PSFAR Pressure Seals |
| DP 020-346 | Dimensional Print – PSFAD Pressure Seals |
| DP 020-347 | Dimensional Print – PSTAR Pressure Seals |
| DP 020-348 | Dimensional Print – PSTAD Pressure Seals |
| DP 020-349 | Dimensional Print – PSISR Pressure Seals |
| DP 020-350 | Dimensional Print – PSISD Pressure Seals |
| DP 020-351 | Dimensional Print – PSSCR Pressure Seals |
| DP 020-353 | Dimensional Print – PSSSR Pressure Seals |
| DP 020-447 | Dimensional Print – IAP10 and IAP20 Absolute Pressure and IGP10, IGP20, IGP25, and IGP50 Gauge Pressure Transmitters |
| Parts Lists | |
| PL 009-011 | Parts List – IGP25 Gauge Pressure Transmitter |
| PL 009-012 | Parts List – IGP50 Gauge Pressure Transmitter |
| Instructions | |
| MI 020-360 | Instruction, Wiring Guidelines for Foxboro FOUNDATION fieldbus Transmitters |
| MI 020-369 | Instruction – Pressure Seals |
| MI 022-138 | Instruction – Bypass Manifolds - Installation and Maintenance |
| Technical Information | |
| TI 37-75b | Technical Information – Transmitter Material Selection Guide |
| TI 037-097 | Technical Information – Process Sealing of I/A Series Pressure Transmitters for use in Class 1, Zone 0, 1, and 2 Hazardous Locations |

Transmitter Identification

See Figure 1 for transmitter data plate contents. For a complete explanation of the Model Number code, see the parts list. The sensor board firmware version is identified on the top line of the local display when **VIEW DB** (View Database) is selected in the top level structured. See Figure 2.

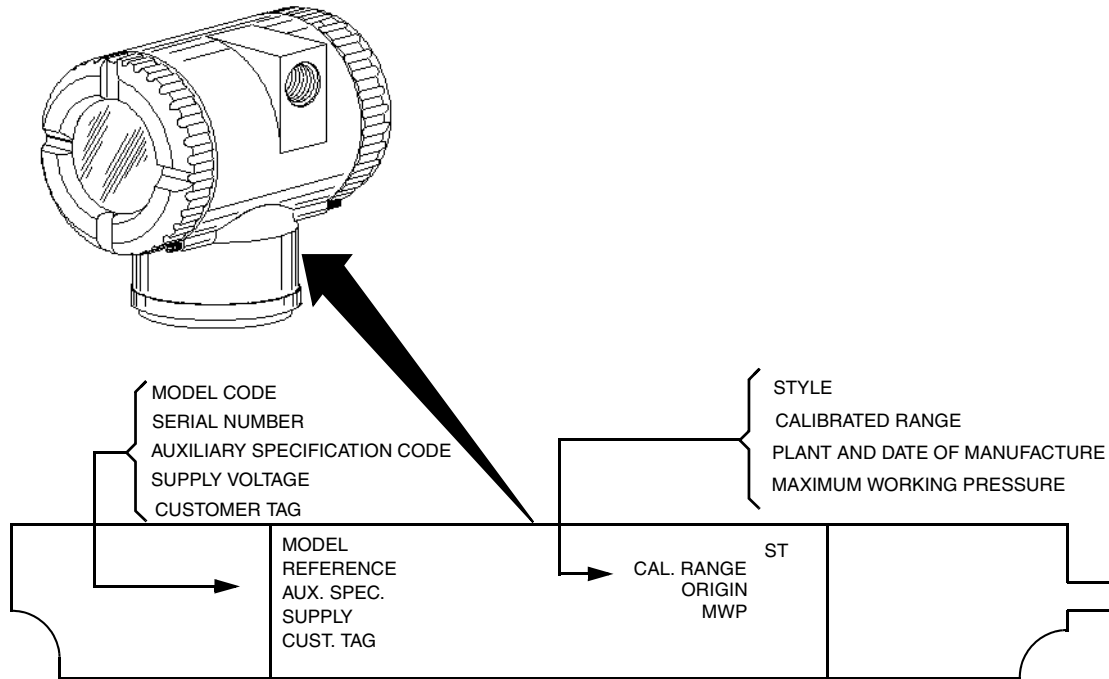


Figure 1. Transmitter Identification

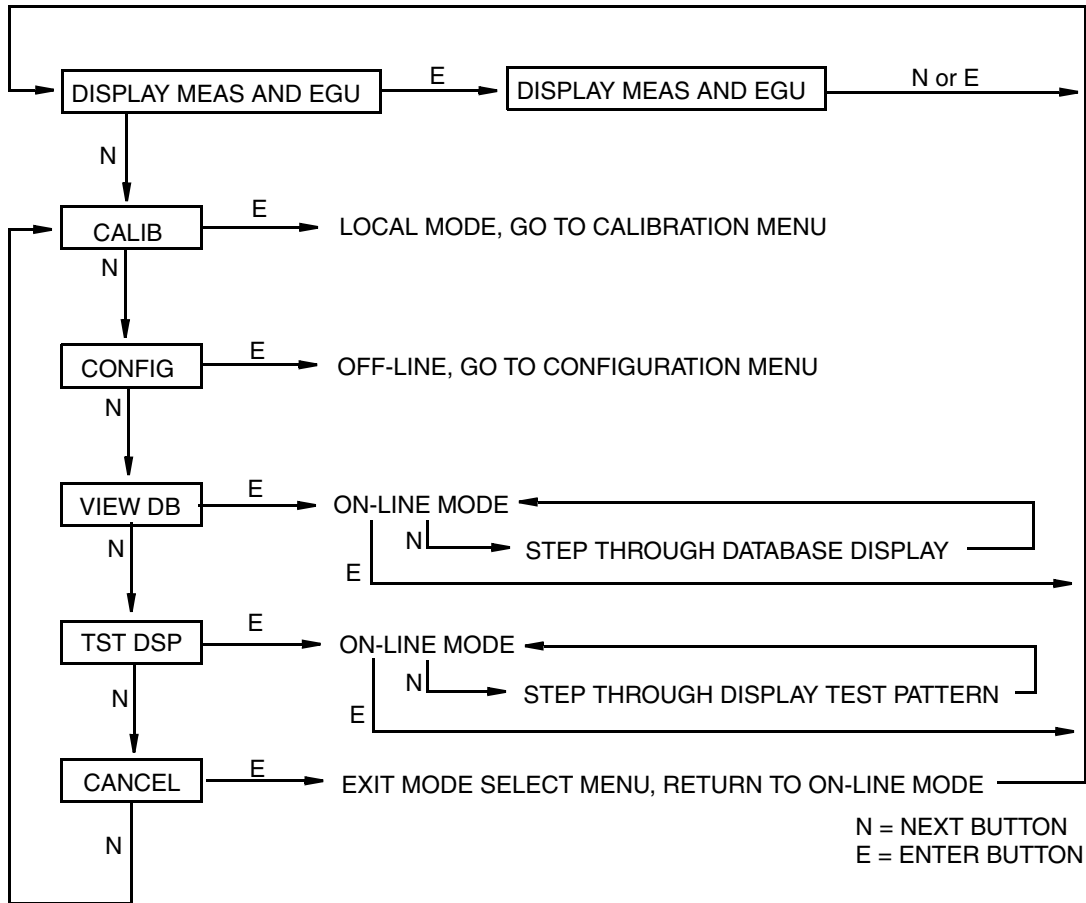
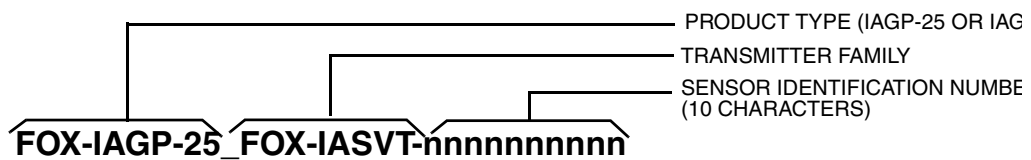
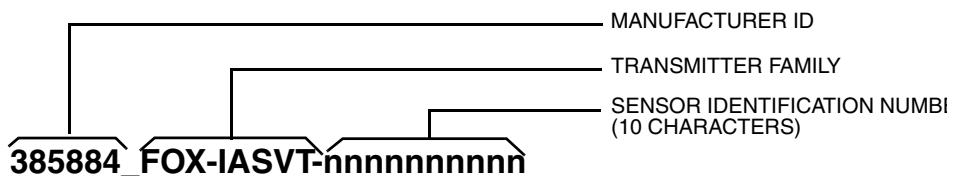


Figure 2. Top Level Structure Diagram

The initial PDTag of the device is:



The Device ID is:



Standard Specifications

Operative Limits

| Influence | Operative Limits |
|--|---|
| Sensor Body Temperature ^(a) | -46 and +121°C (-50 and +250°F) |
| Silicone Fill Fluid | -29 and +121°C (-20 and +250°F) |
| Fluorinert Fill Fluid | -18 and +121°C (0 and 250°F) |
| Neobee Fill Fluid | -7 and +82°C (20 and 180°F) |
| pvc Inserts | |
| Electronics Temperature With LCD Display | -40 and +85°C (-40 and +185°F) ^(b) -40 and +85°C (-40 and +185°F) ^(c) |
| Relative Humidity | 0 and 100% |
| Supply Voltage | 9 to 32 V dc |
| Mounting Position | No Limit |
| Pollution Degree | 2 |
| Installation Category (Overvoltage Category) | II |
| Vibration | 6.3 mm (0.25 in) double amplitude from 5 to 15 Hz with aluminum housing and from 5 to 9 Hz with 316 ss housing. 0 to 30 m/s (0 to 3 “g”) from 15 to 500 Hz with aluminum housing and 0 to 10 m/s (0 to 1 “g”) from 9 to 500 Hz with 316 ss housing. |

(a) Refer to MI 020-369 for temperature limits with pressure seals.

(b) -40 and +75°C (-40 and +167°F) for transmitters with ATEX flameproof classification.

(c) Display updates are slowed and readability decreased at temperatures below -20°C (-4°F).

Span and Range Limits

| Model | Span Limit Code | Span Limits | Range Limits |
|-------|-----------------|--------------------------------------|-------------------------------|
| IGP25 | D | 0.0035 and 1.4 MPa (0.5 and 200 psi) | 0 and 1.4 MPa (0 and 200 psi) |
| | E | 0.035 and 14 MPa (5 and 2000 psi) | 0 and 14 MPa (0 and 2000 psi) |
| IGP50 | D | 0.017 and 1.4 MPa (2.5 and 200 psi) | 0 and 1.4 MPa (0 and 200 psi) |
| | E | 0.17 and 14 MPa (25 and 2000 psi) | 0 and 14 MPa (0 and 2000 psi) |

Maximum Overage Pressure and Proof Pressure

| Model | Span Limit Code | Maximum Overage Pressure | Proof Pressure |
|-------|-----------------|--------------------------|-------------------|
| IGP25 | D | 2.1 MPa (300 psi) | 5.6 MPa (710 psi) |
| IGP50 | E | 21 MPa (3000 psi) | 56 MPa (7100 psi) |

! CAUTION

1. Exceeding the overrange pressure limit for the transmitter can cause damage to the transmitter, degrading its performance.
2. The transmitter may be nonfunctional after application of the proof pressure.

Suppressed Zero

For applications requiring a suppressed zero, the span and range limits of the transmitter can not be exceeded.

Sensor Fill Fluid

IGP25: Silicone Oil (DC 200) or Fluorinert (FC-43)
 Neobee M-20 (for transmitters with sanitary process connection)

IGP50: Silicone Oil (DC 200)

Minimum Allowable Absolute Pressure vs. Process Temperature

With Silicone Fill Fluid: At full vacuum: Up to 121°C (250°F)
 With Fluorinert Fill Fluid: Refer to Figure 3.

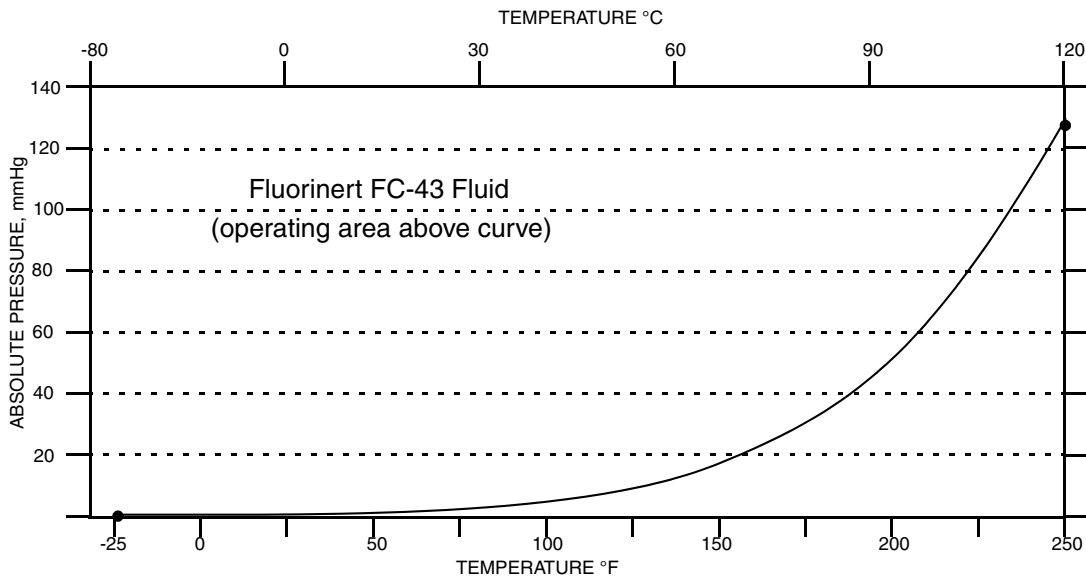


Figure 3. Minimum Allowable Absolute Pressure vs. Process Temperature with Fluorinert Fill Fluid

Mounting Position

The transmitter can be mounted in any orientation. It can be directly mounted to the process with either the direct connected or pipe mounted designs. The housing can be rotated up to one full turn to any desired position for access to adjustments, display, or conduit connections. See “Positioning the Housing” on page 19. The display (if present) can also be rotated in the housing to any of four different positions at 90° increments. See “Positioning the Display” on page 20.

— NOTE

Position effect zero shift for all calibrated spans can be eliminated by readjusting zero output after installation.

Approximate Mass

1.5 kg (3.3 lb) with aluminum housing

Add 1.1 kg (2.4 lb) with 316 ss housing

Process Connections

IGP25 or IGP50 transmitters can be directly connected to the process using its 1/2 NPT external thread or optional G 1/2 B connection. If the optional mounting bracket is used, the transmitter can be connected to the process via the 1/2 NPT external thread, 1/4 NPT internal thread, or optional G 1/2 B connection.

Process Wetted Materials

| | |
|---------------------|---------|
| Diaphragm: | 316L ss |
| Process Connectors: | 316L ss |

Reference Pressure Side (Low Pressure Side) Materials

Silicon, Pyrex, RTV, and 316 ss

Electrical Connections

Field wires enter through 1/2 NPT, PG 13.5 or M20 threaded **entrances** on either side of the electronics housing. Leads terminate under screw terminals and washers on the terminal block in the field terminal compartment. To maintain RFI/EMI, environmental, and explosionproof ratings, unused conduit connection must be plugged with metal plug (provided), inserted to five full threads for 1/2 NPT connections; seven full threads for M20 and PG 13.5 connections.

Adjustable Damping

The transmitter response time is normally 1.0 second or the electronically adjustable setting of 0.00 (none), 0.25, 0.50, 1, 2, 4, 8, 16, or 32 seconds, whichever is greater, for a 90% recovery from an 80% input step as defined in ANSI/ISA S51.1.

Output Signal

FOUNDATION fieldbus linear.

Zero and Span Adjustments

The zero and span is adjustable from the FOUNDATION fieldbus host computer or I/A Series console equipped with FOUNDATION fieldbus Interface Module. They are also adjustable at the transmitter using the display. An optional self-contained moisture sealed pushbutton assembly allows local resetting of the zero without removing the housing cover.

Shielding (Screening)

For best performance, fieldbus cables should be shielded. Use common multi-conductor (multi-core) “instrument” cable with one or more twisted pairs, an overall, metallized shield, and a shield wire. You can also use cable that has individually shielded pairs. For new installations, ask cable vendors for “fieldbus cable.”

Connect the shield on each spur to the trunk shield and connect the overall shield to ground **at one point only**. For most networks, the grounding point can be located anywhere.

In some instances, better high-frequency EMI shielding requires that the shield be connected to ground at multiple points. (See Mardiguan, M., and White, D.R.J., EMI Control Methodology and Procedures.) Fieldbus provides for this by allowing an rf ground at multiple points, consisting of a small capacitor from shield to ground.

Supply Voltage

Power supply (a FOUNDATION fieldbus Power Supply Module) must be capable of providing at least 14 mA for each transmitter connected.

A summary of the voltage requirements is listed in Table 2.

Table 2. Minimum Supply Voltage Requirements

| | |
|----------------------------|------|
| Minimum Supply Voltage | 9 V |
| Recommended Supply Voltage | 24 V |
| Maximum Supply Voltage | 32 V |

Electrical Ground Connections

The transmitter is equipped with an internal ground connection within the field wiring compartment and an external ground connection at the base of the electronics housing. To minimize galvanic corrosion, place the wire lead or terminal between the captive washer and loose washer on the external ground screw. Earth (ground) the shield at one place per segment **only**. Refer to MI 020-360 for wiring guidelines.

Remote Communications

Using the FOUNDATION fieldbus protocol, the transmitter communicates bidirectionally over the 2-wire field wiring to other FOUNDATION fieldbus devices (located anywhere in a Division 2 or nonhazardous area), or a FOUNDATION fieldbus host (anywhere in a nonhazardous area) and/or to an I/A Series system equipped with a FOUNDATION fieldbus Interface Module.

Communications Format

Communication is based upon the FOUNDATION fieldbus communication protocol. The signals are superimposed on the transmitter power leads.

Digital Output

The transmitter can be configured to send its differential pressure measurement to the I/A Series system as a digital signal. Remote communications occur between the transmitter and other FOUNDATION fieldbus devices and hosts. The data transmission rate is 31.25 kbits/second. The maximum communication distance is 1900 m (6235 ft). This distance includes spur length. Maximum spur length is 120 m (395 ft). Minimum spur length is 1 m (3.3 ft). For intrinsically safe installations, maximum spur length is 30 m (98 ft).

Product Safety Specifications

— DANGER

To prevent possible explosions and to maintain flameproof, explosionproof, and dust-ignitionproof protection, observe applicable wiring practices. Plug unused conduit opening with the provided metal pipe plug. Both plug and conduit must engage a minimum of five full threads for 1/2 NPT connections; seven full threads for M20 and PG 13.5 connections.

— WARNING

To maintain IEC IP66/IP68 and NEMA Type 4X protection, the unused conduit opening must be plugged with the metal plug provided. Use a suitable thread sealant on both conduit connections. In addition, the threaded housing covers must be installed. Turn covers to seat the O-ring into the housing and then continue to hand tighten until the cover contacts the housing metal-to-metal.

— NOTE

1. These transmitters have been designed to meet the electrical safety description listed in Table 3. For detailed information or status of testing laboratory approvals/certifications, contact Invensys.
2. Wiring restrictions required to maintain electrical certification of the transmitter are provided in “Wiring” on page 21.

Table 3. Electrical Safety Specifications

| Agency Certification, Types of Protection, and Area Classification | Application Conditions | Electrical Safety Design Code |
|--|--|-------------------------------|
| ATEX flameproof: II 2 GD EEx d IIC, Zone 1. | SIRA 04ATEX1349 Temperature Class T6, Ta = -40 to +75°C | D |

Table 3. Electrical Safety Specifications (Continued)

| Agency Certification, Types of Protection, and Area Classification | Application Conditions | Electrical Safety Design Code |
|--|---|-------------------------------|
| ATEX FISCO field device intrinsically safe: II 1 G EEx ia IIC, Zone 0. | SIRA 04ATEX2335X Temperature Class T4, Ta = -40 to +80°C | E |
| ATEX FNICO field device protection n for: II 3 G EEx nL IIC, Zone 2. | SIRA 04ATEX4019X Temperature Class T4, Ta = -40 to +80°C. | N |
| CSA FISCO field device intrinsically safe for Class I, Division 1, Groups A, B, C, and D; Class II, Division 1, Groups E, F, and G; Class III Division 1. Also, Zone certified intrinsically safe Ex ia IIC. | Connect per MI 020-427. Temperature Class T4A at 40°C; T3C at 85°C maximum ambient. | C |
| CSA FNICO field device nonincendive for Class I, Division 2, Groups A, B, C, and D; Suitable for Class II, Division 2, Groups F and G; Class III Division 2. | Connect per MI 020-427. Temperature Class T4A at 40°C; T3C at 85°C maximum ambient. | |
| CSA explosionproof for Class I, Division 1, Groups B, C, and D; dust-ignitionproof for Class II, Division 1, Groups E, F, and G; Class III, Division 1. | Maximum Ambient Temperature 85°C. | |
| CSA field device zone certified flameproof Ex d IIC. Also, all certifications of Code C above. | Maximum Ambient Temperature 85°C. | B |
| FM FISCO field device intrinsically safe for Class I, Division 1, Groups A, B, C, and D; Class II, Division 1, Groups E, F, and G; Class III Division 1. Also, Zone certified intrinsically safe AEx ia IIC. | Connect per MI 020-427. Temperature Class T4A at 40°C; T4 at 85°C maximum ambient. | F |
| FM FNICO field device nonincendive for Class I, Division 2, Groups A, B, C, and D; Suitable for Class II, Division 2, Groups F and G; Class III Division 2. | Connect per MI 020-427. Temperature Class T4A at 40°C; T4 at 85°C maximum ambient. | |
| FM explosionproof for Class I, Division 1, Groups B, C, and D; dust-ignitionproof for Class II, Division 1, Groups E, F, and G; Class III, Division 1. | Temperature Class T6 at 80°C and T5 at 85°C maximum ambient. | |

Table 3. Electrical Safety Specifications (Continued)

| Agency Certification, Types of Protection, and Area Classification | Application Conditions | Electrical Safety Design Code |
|--|---|-------------------------------------|
| FM field device zone certified flameproof AEx d IIC. Also, all certifications of Code F above. | Temperature Class T6 at 75°C maximum ambient. | G |
| IECEX FISCO field device intrinsically safe: Ex ia IIC, Zone 0. | IECEX SIR 04.0036X Temperature Class T4, Ta = -40 to +80°C | T |
| IECEX FNICO field device protection n: Ex nL IIC, Zone 2. | IECEX SIR 04.0023X Temperature Class T4, Ta = -40 to +80°C | U |
| IECEX flameproof: Ex d IIC, Zone 1. | IECEX SIR 05.0003X Temperature Class T6, Ta = -40 to +75°C | V |

ATEX and IECEx Warnings

Do not open while circuits are alive.

ATEX Compliance Documents

EN 50014: 1997 (inc amendments A1 and A2)
 EN 50018: 2000 (inc amendment A1)
 EN 50020: 2002
 EN 50281-1-1: 1998
 EN 50284: 1999
 EN 60079-15: 2003

IECEx Compliance Documents

IEC 60079-0 (Edition 3.1): 2000
 IEC 60079-1 (Edition 5): 2003
 IEC 60079-11 (Edition 4): 1999
 IEC 60070-15 (Edition 2): 2001

2. Installation

! CAUTION

To avoid damage to the transmitter sensor, do not use any impact devices, such as an impact wrench or stamping device, on the transmitter.

NOTE

1. The transmitter should be mounted so that any moisture condensing or draining into the field wiring compartment can exit through one of the two threaded conduit connections.
 2. Use a suitable thread sealant on all connections.
-

Transmitter Mounting

The IGP25 and IGP50 Transmitters with the 1/2 NPT external thread can be directly connected to the process or mounted to a vertical or horizontal pipe or a surface using the optional mounting set. See Figure 4.

For dimensional information, refer to DP 020-447.

NOTE

1. Do **not** directly mount the transmitters to the process using the 1/4 NPT internal thread. This thread should only be used to connect to the process when the transmitter is mounted with the optional mounting set.
 2. Do **not** mount the transmitters using the conduit connection and optional mounting set when vibration conditions exceed 20 m/s² (2 “g”).
 3. If the transmitter is not installed in the vertical position, readjust the zero output to eliminate the position zero effect.
-

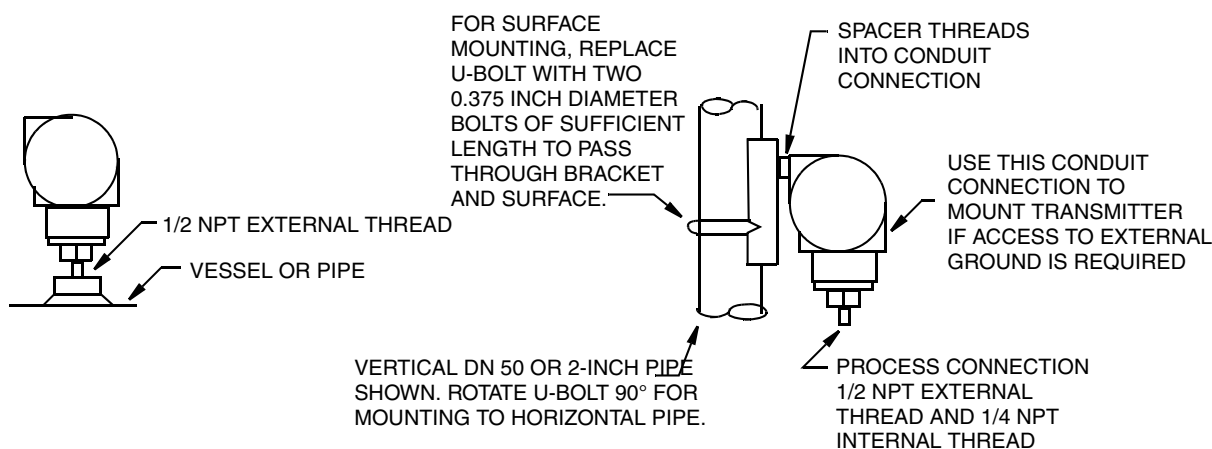


Figure 4. IGP25 and IGP50 Transmitter Mounting

Sanitary Process Connection

The IGP25 transmitters with a sanitary process connector employ a Tri-Clamp type connection or mini tank spud seal. Install the transmitter as shown in Figures 5 and 6. For dimensional information, see the following documents:

Tri-Clamp Type Connector: DP 020-218

Mini Tank Spud Connector: DP 020-219

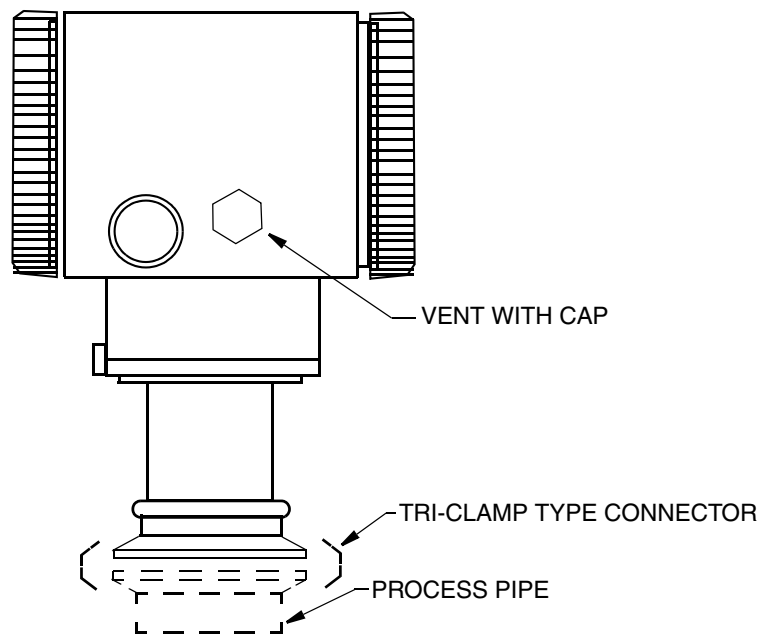


Figure 5. Mounting of Transmitter with Sanitary Tri-Clamp Type Connection

NOTE

If the transmitter is to be mounted horizontally (side of a tank), the housing should be oriented so that the vent is self draining. **Do not mount the vent facing up.**

If the vent is to face down, it is recommended that the protective cap be removed.

If the vent clogs, replace it with Foxboro Part Number D0186DQ (W.L.Gore part number PMF100318). It is recommended that spare vents be stocked and replaced at a predetermined interval as part of preventive maintenance. When installing a new vent, the applied torque should be 0.6 to 0.8 N•m (5 to 7 in•lb).

If the transmitter is subject to routine wash down such as in typical sanitary applications and the vent is orientated so that it is self draining, the vent will stay clear and longer intervals between preventive maintenance may be realized.

If the vent becomes clogged, the resulting pressure measurement error may be as much as 1.5 inH₂O per degree C change in temperature. This error is positive with decreasing temperature and negative with increasing temperature.

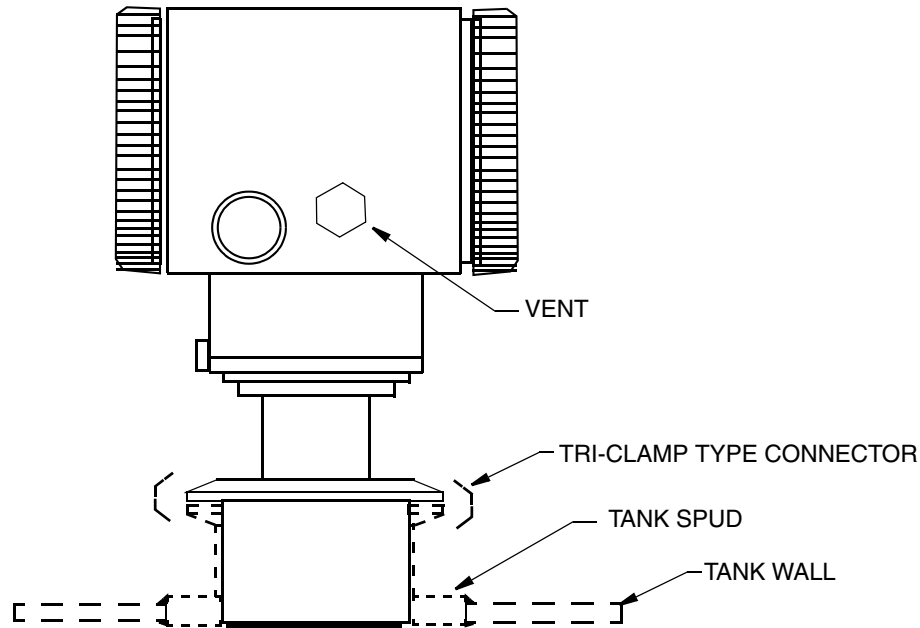


Figure 6. Mounting of Transmitter with Sanitary Mini Tank Spud Seal

The tank spud must be welded into a hole cut in the tank as follows:

1. Cut a hole into the process vessel to accept the spud. The spud should fit snugly and uniformly. The nominal diameter of the spud is: 3.73 inch (94.7 mm). To assure that the seal is always covered by process fluid, the top of the hole should be below the minimum measurement level.
2. Position the spud mounting ring so that it aligns as close as possible with the inside wall of the tank and that the weep hole is at the bottom.
3. Tack weld the spud mounting ring to the outside of the tank in four places.
4. Weld the spud mounting ring to the inner surface of the tank per the following notes.

— **NOTE** —

1. Spud is 316 stainless steel. Use compatible welding rod. Do not distort spud mounting ring by using excessive heat.
 2. Weld the spud mounting ring in sections as indicated in Figure 7.
 3. After each section is welded, cool right away with water until the temperature is less than 700°F (370°C) before welding the next section.
-
5. Grind the weld smooth so that the surface is free from irregularities where dirt can lodge.
 6. Outer surface can be welded if desired after inner weld is completed.

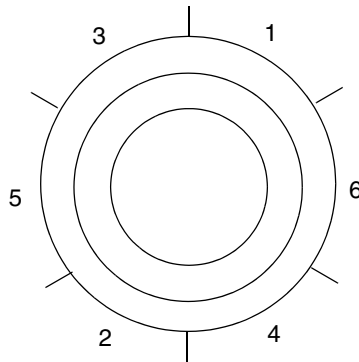


Figure 7. Welding Procedure

Pulp and Paper Process Connection

The IGP25 transmitters with a pulp and paper process connector are available in two designs - sleeve type and threaded type. Install the transmitter as explained below. For dimensional information, see DP 020-217.

Sleeve Type Connector

1. Cut a hole into the process vessel to accept the weld spud. The spud should fit snugly and uniformly. The nominal diameter of the spud is:
For nominal 1 inch connector: 1.32 inch (33.4 mm)
For Nominal 1 1/2 inch connector: 1.90 inch (48.3 mm)
2. Position the sleeve into the hole so that it aligns as close as possible with the inside wall of the vessel
3. Tack weld using the welding sequence shown in Figure 7. Cool each section with water until the temperature is below 700°F (370°C) before proceeding to the next section.
4. Weld the circumference of the sleeve using compatible stainless steel welding rod.

— NOTE

The welder should meet the requirements of ANSI B31.3, ASME Section IX or other codes, if applicable.

5. Lubricate the O-ring with appropriate lubricant and install it into the sleeve, ensuring that it is properly seated.

— NOTE

If the gasket is not properly seated, a process leak may occur.

6. Insert the transmitter sensor into the sleeve and hold it in place with cap screws.

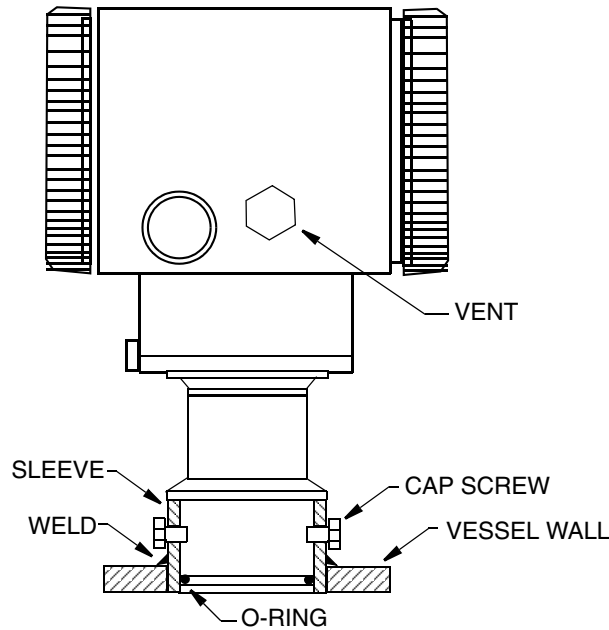


Figure 8. Mounting of Transmitter with Sleeve Type Pulp and Paper Process Connection

Threaded Type Connector

1. Cut a hole into the process vessel to accept the weld spud. The spud should fit snugly and uniformly. The nominal diameter of the spud is:
 For nominal 1 inch connector: 1.50 inch (38.1 mm)
 For nominal 1 1/2 inch connector: 2.38 inch (60.3 mm)
 For nominal 1 1/2 inch connector for Ametek spud: 1.99 inch (50.5 mm)
 Position the connector into the hole so that it aligns as close as possible with the inside wall of the vessel
2. Tack weld using the welding sequence shown in Figure 7. Cool each section with water until the temperature is below 700°F (370°C) before proceeding to the next section.

— NOTE

Invensys recommends using a heat sink during this operation.

1 inch size: Part Number N1214YS

1 1/2 inch size: Part Number N1214YR

3. Weld the circumference of the connector using compatible stainless steel welding rod.

— NOTE

The welder should meet the requirements of ANSI B31.3, ASME Section IX or other codes, if applicable.

4. After the connector has cooled, remove the heat sink.
5. Lubricate the gasket with appropriate lubricant and install it into the connector, ensuring that it is properly seated.

— NOTE

If the gasket is not properly seated, a process leak may occur.

6. Thread the sensor into the connector hand tight. Then tighten approximately 1/8 turn more.

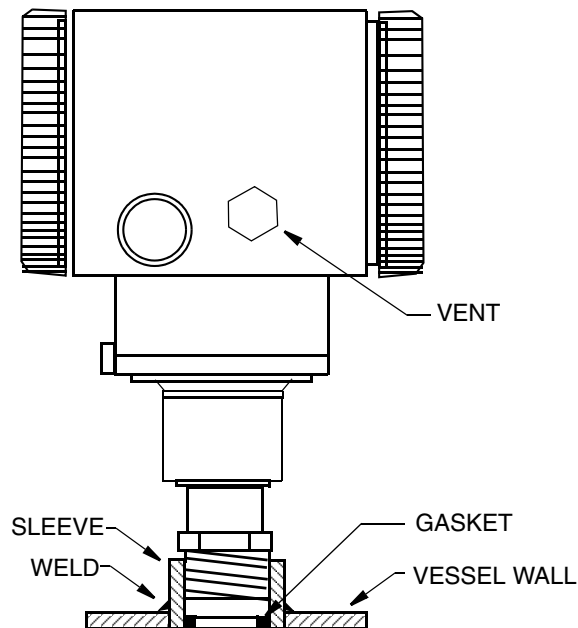


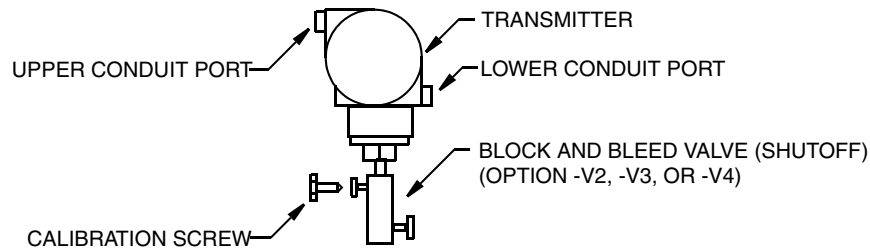
Figure 9. Mounting of Transmitter with Threaded Type Pulp and Paper Process Connection

Typical Transmitter Piping

Figure 10 shows a typical piping application. Calibration supply pressure can be applied via a calibration tee or calibration screw. The lower conduit port can be used as a drain for moisture buildup in terminal compartment.

— NOTE

1. 1. Invensys recommends the use of snubbers in installations prone to high levels of fluid pulsations.
2. 2. Transmitters mounted directly to process piping or a pressure vessel, could require the use of a shutoff valve (shown) to comply with the requirements of ASME Power Piping Code B31.1 and Chemical and Petroleum Piping Code B31.3.



NOTE: Block and Bleed Valve Maximum Pressure
 40 MPa (6000 psi at 38°C) (100°F)
 25 MPa (4000 psi at 250°C) (400°F)
 Calibration Screw Maximum Pressure
 0.7 MPa (100 psi with Poly-Flo Fitting) (F0101ES)

Figure 10. Typical Transmitter Piping

For hot process applications above the operative limits of your transmitter [121°C (250°F) for silicone fill fluid or 82°C (180°F) for fluorinert fill fluid], such as steam, additional piping is required to protect the transmitter from the hot process. See Figure 11. The piping is filled with water or process fluid. Mount the transmitter below the pressure connection at the pipe. Although the transmitter is shown mounted vertically, you can also mount it horizontally unless sediment is present. The calibration tee is not required if a calibration screw is used for field calibrations.

If trapped vapor pockets cannot be tolerated in a liquid service and a horizontal process connection is used, install a pipe elbow and vertically position the transmitter with the housing **below** the process connection.

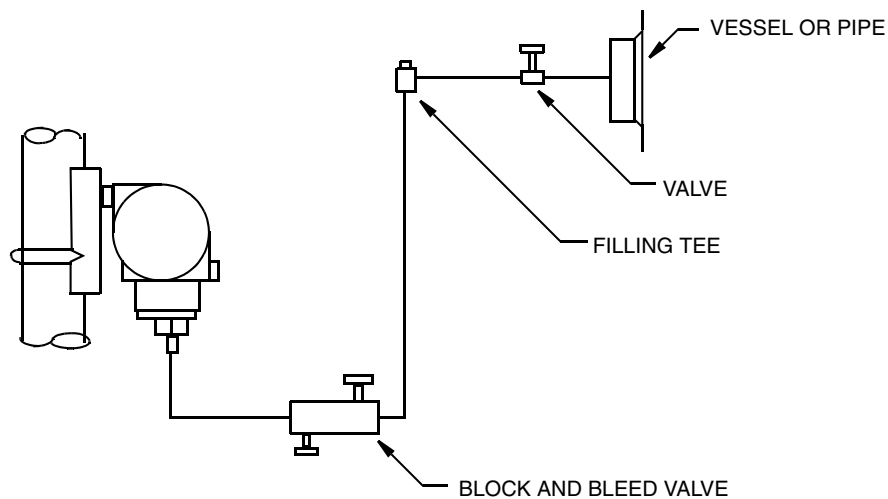


Figure 11. Hot Process Piping

Positioning the Housing

The transmitter housing (topworks) can be rotated up to one full turn in the counterclockwise direction when viewed from above for optimum access to adjustments, display, or conduit

connections. Housings have either an anti-rotation screw or a retention clip that prevent the housing from being rotated beyond a safe depth of housing/sensor thread engagement.

! WARNING

If the electronics housing is removed for maintenance, it must be hand tightened to the bottom of the threads, but not over-tightened upon reassembly. See “Removing and Reinstalling a Housing Assembly” on page 58.

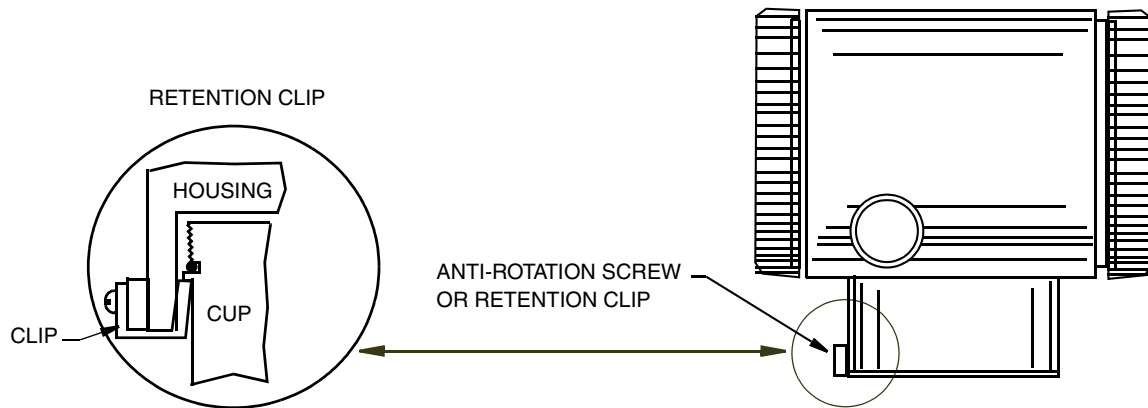


Figure 12. Housing Screw or Clip Location

Positioning the Display

The display (optional in some models) can be rotated within the housing to any of four positions at 90° increments. To do this, grasp the two tabs on the display and rotate it about 10° in a counterclockwise direction. Pull out the display. Ensure that the O-ring is fully seated in its groove in the display housing. Turn the display to the desired position, reinsert it in the electronics module, aligning the tabs on the sides of the assembly, and twist it in the clockwise direction.

! CAUTION

Do **not** turn the display more than 180° in any direction. Doing so could damage its connecting cable.

Setting the Write Protect Jumper

Your transmitter has write protection capability. This means that the external zero, local display, and remote communications can be prevented from making changes to the static or nonvolatile data base in the function block application of the resource. Write protection can be set by moving a jumper that is located in the electronics compartment behind the optional display. To activate write protection, remove the display as described in the previous section, then remove the jumper or move it to the lower position. See Figure 13. Replace the display. When configuring the

transmitter, select the **Hard W Lock** option in the **FEATURE_SEL** parameter in the Resource Block. For more information on write protection in fieldbus devices, see MI 014-900.

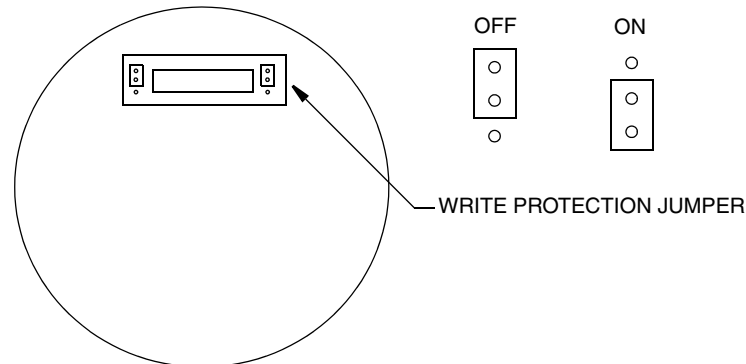


Figure 13. Write Protection Jumper

Cover Locks

Electronic housing cover locks, shown in Figure 14, are provided as standard with certain agency certifications and as part of the Custody Transfer Lock and Seal option. To lock the covers, unscrew the locking pin until approximately 6 mm (0.25 in) shows, lining up the hole in the pin with the hole in the housing. Insert the seal wire through the two holes, slide the seal onto the wire ends and crimp the seal.

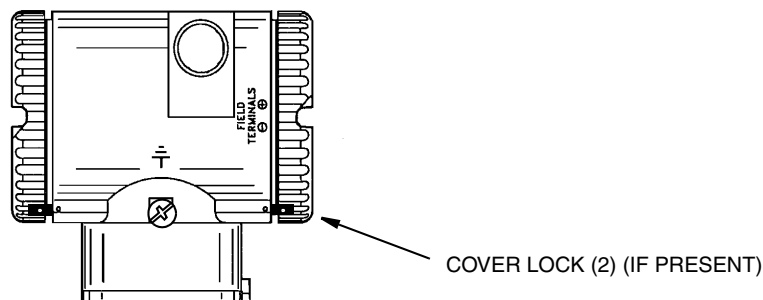


Figure 14. Cover Lock Location

Wiring

The installation and wiring of your transmitter must conform to local code requirements.

— **! WARNING** —

ATEX requires that when the equipment is intended to be used in an explosive atmosphere caused by the presence of combustible dust, cable entry devices and blanking elements shall provide a degree of ingress protection of at least IP6X. They shall be suitable for the conditions of use and correctly installed.

— NOTE

Invensys recommends the use of transient/surge protection in installations prone to high levels of electrical transients and surges.

Accessing Transmitter Field Terminals

For access to the field terminals, thread the cover lock (if present) into the housing to clear the threaded cover and remove the cover from the field terminals compartment as shown in Figure 15. Note that the embossed letters **FIELD TERMINALS** identify the proper compartment.

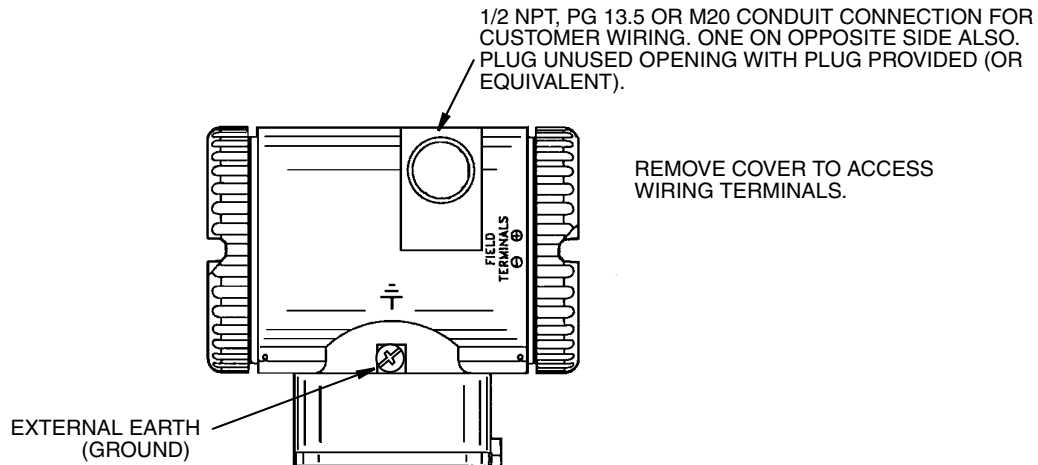


Figure 15. Accessing Field Terminals

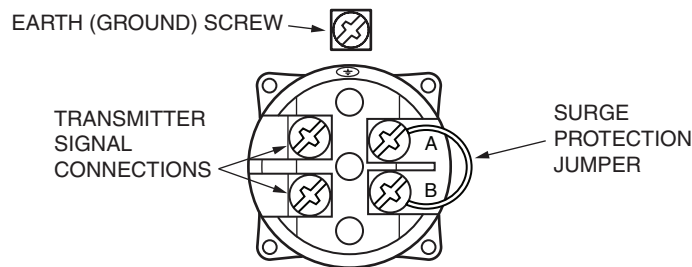


Figure 16. Identification of Field Terminals

Wiring Notes

Do not run transmitter wires in the same conduit as mains (ac power) wires.

Use FOUNDATION fieldbus approved cable (multi-core, shielded, twisted-pair cable) to protect remote communications from electrical noise. Refer to MI 020-360 or FOUNDATION fieldbus Application Guide AG-140, Rev 1.0 or later.

The transmitter is polarity independent and therefore cannot be wired incorrectly.

Power supply (a FOUNDATION fieldbus Power Supply Module) must be capable of providing at least 14 mA for each transmitter connected.

A summary of the voltage requirements is listed in Table 4:

Table 4. Minimum Supply Voltage Requirements

| | |
|----------------------------|------|
| Minimum Supply Voltage | 9 V |
| Recommended Supply Voltage | 24 V |
| Maximum Supply Voltage | 32 V |

Review suggested wiring practices as described in MI 020-360 to ensure proper communications capability and to minimize the effects of RFI.

Refer to Figure 17 for a wiring diagram of a typical transmitter installation.

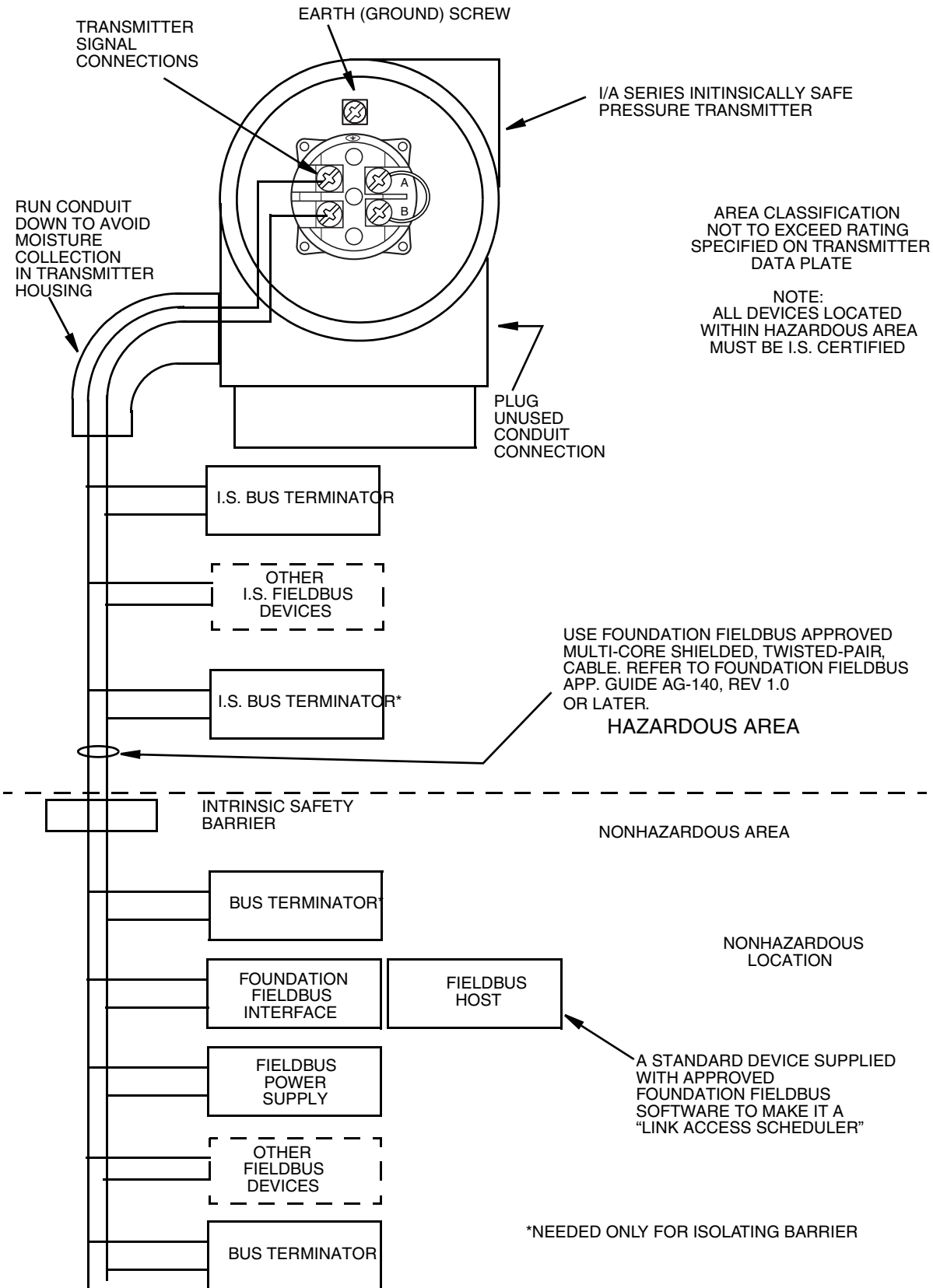


Figure 17. Wiring Diagram of Typical FOUNDATION Fieldbus Transmitter Installation

Wiring the Transmitter

Transmitters with a digital output signal connect to a FOUNDATION fieldbus host or an I/A Series system through the fieldbus. The maximum total resistance for each transmitter is 420 Ω . For example, if an intrinsically safe barrier with a resistance of 340 Ω is used, the maximum wire resistance is 80 Ω . Maximum recommended length for field wire is 1800 m (6000 ft).

Transmitter power is supplied by a FOUNDATION fieldbus Power Supply Module. This procedure identifies wire terminations in the transmitter. For other system wiring details, refer to the installation instructions provided with the I/A Series system.

Use the following procedure to wire the transmitter:

1. Remove the cover from the transmitter field terminal compartment.
2. Run signal wires (0.50 mm² or 18 AWG, typical) through one of the transmitter conduit connections. Use shielded twisted-pair cable to protect the digital output and/or remote communications from electrical noise.

— **NOTE** —

Do not run transmitter wires in same conduit as mains (ac power) wires.

3. Plug the unused conduit connection with the 1/2 NPT, PG 13.5 or M20 metal plug provided (or equivalent). To maintain specified explosionproof and dust-ignitionproof protection, the plug must engage a **minimum** of five full threads for 1/2 NPT connections; seven full threads for M20 and PG 13.5 connections.
4. Connect an earth (ground) wire to the earth terminal in accordance with local practice.

— **! CAUTION** —

To avoid errors resulting from earth loops or the possibility of short-circuiting groups of instruments in a loop, use only one earth in a loop.

5. Connect the FOUNDATION fieldbus bus to the two terminals on the terminal block in the field terminal compartment.
6. Reinstall the cover onto the housing by rotating it clockwise to seat the O-ring into the housing and then continue to hand tighten until the cover contacts the housing metal-to-metal. If cover locks are present, lock the cover per the procedure described in “Cover Locks” on page 21.

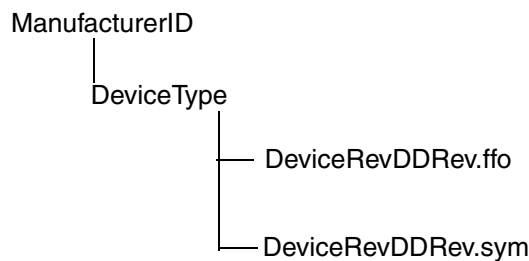
Installing the Fieldbus Software

Foxboro FOUNDATION fieldbus transmitters are shipped with a CD-ROM that contains specific device information and other files needed to configure the transmitters from a FOUNDATION fieldbus host. The files included on the CD-ROM are:

| Filename | Description |
|---------------------------|--|
| readme.doc | A WORD file with DD installation instructions |
| reademe.txt | A text file with DD installation instructions (for users without MS-WORD). |
| xyyy.ffo | DD binary file |
| where | xx = Device Rev. (Parameter 12 in Resource Block) yy = DD Rev. (Parameter 13 in Resource Block) |
| xyyy.sym | DD symbol file |
| xxbbzz.cff ^(a) | Capability File (zz=cff rev) |

(a) 'bb' may be the same as 'yy' or may be 'ff'.

Set up the following directory structure for the DD files of a device on the host computer. According to the FOUNDATION specification, the device description files must be present in the appropriate directories as described below.



where *.ffo is the DD binary file and *.sym is the symbol file.

The Manufacturer ID for Foxboro is 385884 and the Device Type for this pressure transmitter is BA30.

— **NOTE** —

1. The applicable DD and capability files are also available at www.fieldbus.org.
 2. Foxboro parameter values are depicted in this document in the hex format.
-

3. Operation Via Local Display

A local display, as shown in Figure 18, has two lines of information. The upper line is a 5-digit numeric display (4-digit when a minus sign is needed); the lower line is a 7-digit alphanumeric display. The display provides local indication of measurement information. The primary (M1) measurement is normally displayed. To view the secondary (M2) measurement, press the **Enter** button while in normal operating mode. Press the **Next** or **Enter** button to return to the primary measurement. If left in M2 display, an M2 message blinks in the lower right of the display. If power to the transmitter is interrupted, the display reverts to the M1 display.

The display also provides a means for performing calibration and configuration, viewing the database, and testing the display via the 2-button keypad. You can access these operations by means of a multi-level menu system. Entry to the Mode Select menu is made (from normal operating mode) by pressing the **Next** button. You can exit this menu, restore your prior calibration or configuration, and return to the normal operating mode at any time by going to **Cancel** and pressing the **Enter** button.

The following items can be selected from this menu: Calibration (**CALIB**), Configuration (**CONFIG**), Viewing the database (**VIEW DB**), and Testing the display (**TST DSP**). The top level structure diagram is shown in Figure 19.

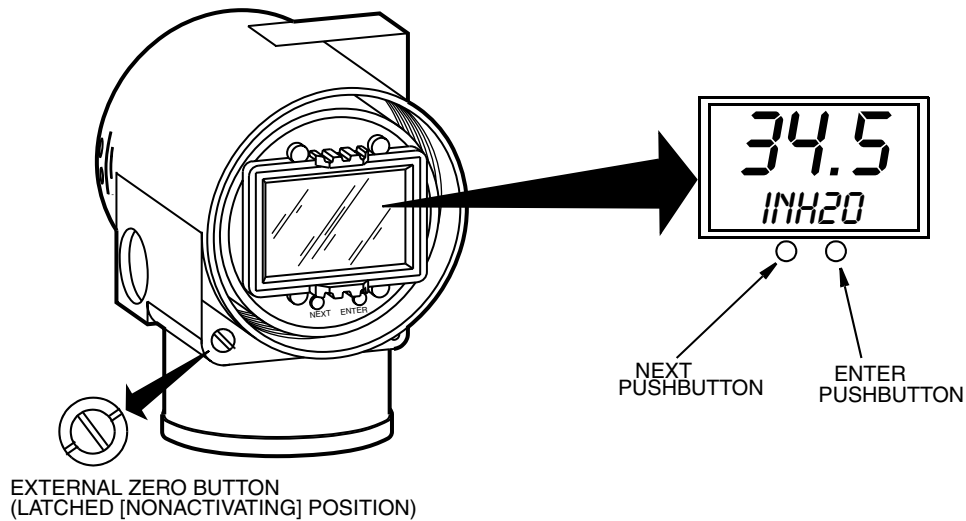


Figure 18. Local Display Module

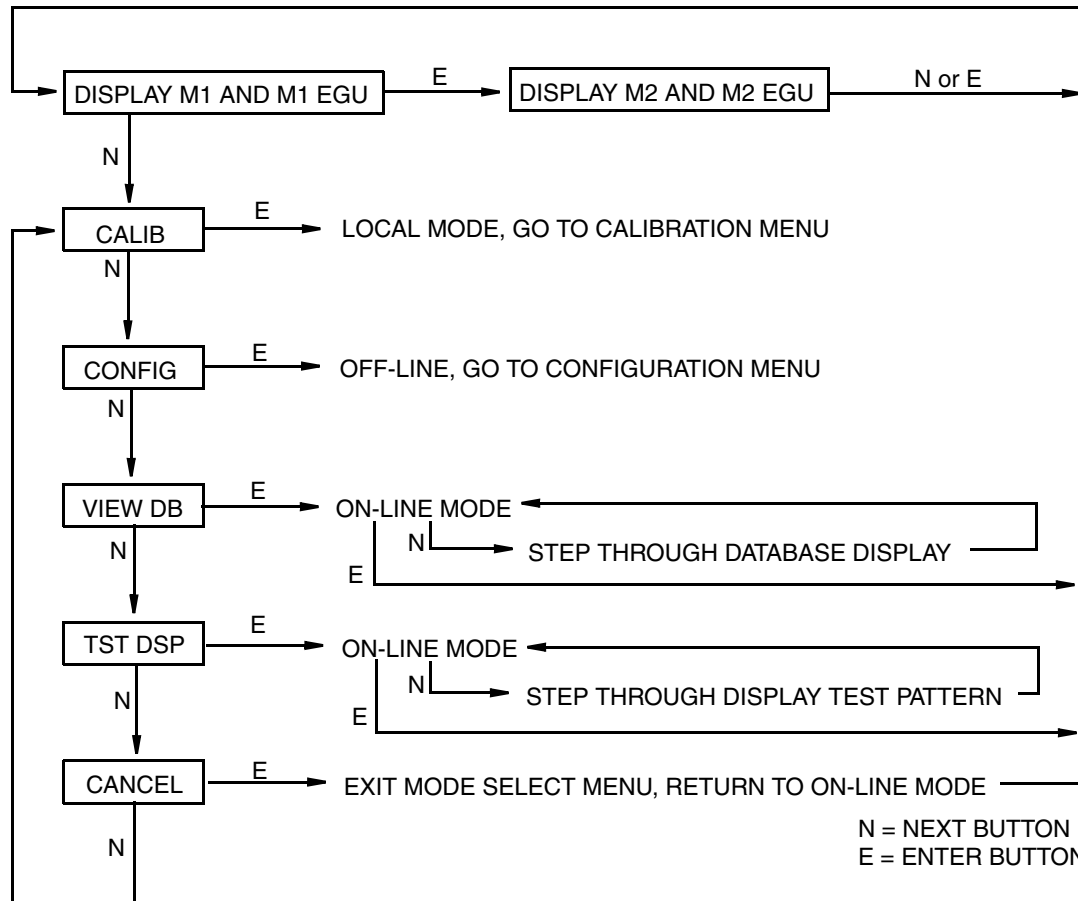


Figure 19. Top Level Structure Diagram

Entering Numerical Values

The general procedure for entering numerical values in Calibration and Configuration is as follows:

1. At the appropriate prompt, press the **Enter** button. The display shows the last (or default) value with the first digit flashing.
2. Use the **Next** button to select the desired first digit, then press the **Enter** button. Your selection is entered and the second digit flashes.
3. Repeat Step 2 until you have created your new value. If the number has less than five characters, use leading or trailing zeros for the remaining spaces. When you have configured the fifth space, the display prompts you to place the decimal point.
4. Move the decimal point with the **Next** button until it is where you want it and press the **Enter** button.

— NOTE

1. The decimal point may not be placed directly after the first digit. For example, you can not enter a value as 1.2300; you must enter it as 01.230.
 2. The decimal position is identified by flashing except at the position after the fifth digit. At that position (representing a whole number), the decimal point is assumed.
-

5. The display advances to the next menu item.

Viewing the Database

You can access the View Database mode by the multi-level menu system described above. Entry to the Mode Select menu is made (from normal operating mode) by pressing the **Next** button. The display reads **CALIB**, the first item on the menu. Press the **Next** button twice to get to the third item on the menu, **VIEW DB**. Acknowledge your choice of this selection by pressing the **Enter** button. The display shows the first item in the database. You can step through the database display by repeated use of the **Next** button. You can abort this procedure at any time by pressing the **Enter** button.

Viewing the Pressure Range

The values of **M1LRV** and **M1 URV** can be viewed in **VIEW DB** as described above. They can also be viewed in the **RERANGE** function in Calibration mode and Configuration mode.

Testing the Display

You can access the Test Display mode by the same multi-level menu system that was used to enter Calibration, Configuration, and View Database mode. Entry to the Mode Select menu is made (from normal operating mode) by pressing the **Next** button. The display reads **CALIB**, the first item on the menu. Press the **Next** button three times to get to the fourth item on the menu, **TST DSP**. Acknowledge your choice of this selection by pressing the **Enter** button. The display shows the first test segment pattern. You can step through the five patterns by repeated use of the **Next** button. You can abort the test at any time by pressing the **Enter** button. The five patterns are shown in Figure 20.

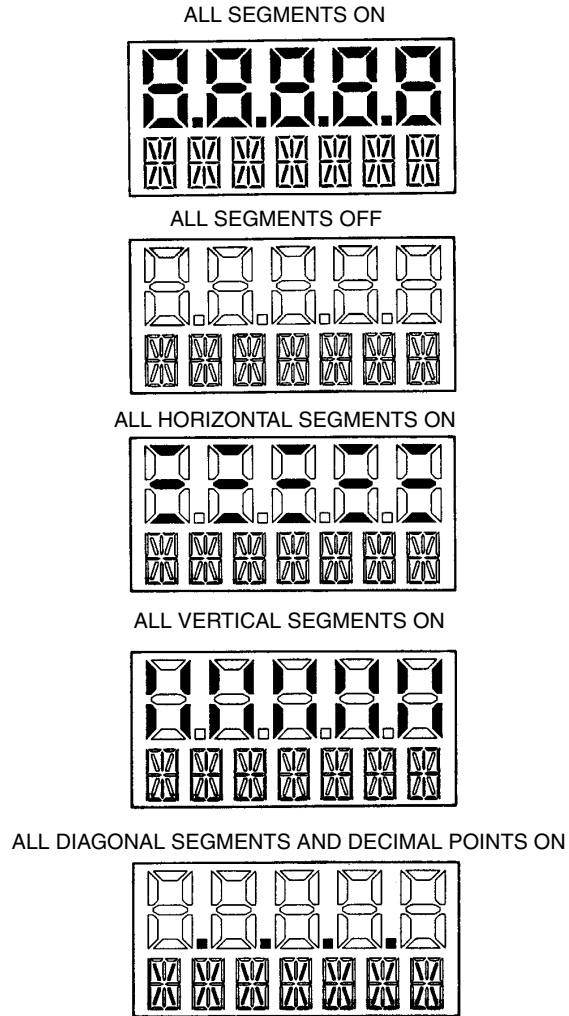


Figure 20. Display Test Segment Patterns

4. Calibration

— **NOTE** —

1. For best results in applications where high accuracy is required, rezero the transmitter output once it has stabilized at the final operating temperature.
 2. Zero shifts resulting from position effects and/or static pressure effects can be eliminated by rezeroing the transmitter output.
-

Calibration Setup

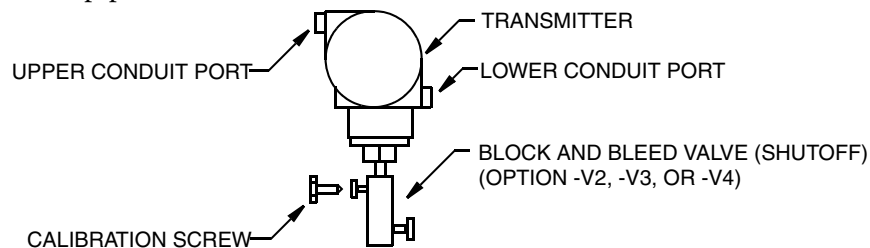
The following sections show setups for field or bench calibration. Use test equipment that is at least three times as accurate as the desired accuracy of the transmitter.

— **NOTE** —

It is not necessary to set up calibration equipment to rerange the transmitter to a different range. The transmitter can be accurately reranged by simply changing the lower range value and the upper range value, which are stored in the transmitter database.

Field Calibration Setup

Field calibration is performed without disconnecting the process piping. This is only possible if the transmitter is piped as shown below.



NOTE: Block and Bleed Valve Maximum Pressure
40 MPa (6000 psi at 38°C) (100°F)
25 MPa (4000 psi at 250°C) (400°F)
Calibration Screw Maximum Pressure
0.7 MPa (100 psi with Poly-Flo Fitting) (F0101ES)

Figure 21. Transmitter Piping

If the transmitter is to be removed from the process for calibration, refer to “Bench Calibration Setup” below.

An adjustable air supply and a pressure measuring device are required. For example, a dead weight tester or an adjustable clean air supply and pressure gauge can be used.

Bench Calibration Setup

The bench calibration setup requires disconnecting the process piping. For calibration setup without disconnecting the process piping, refer to “Field Calibration Setup” above.

The bench calibration setup is shown in Figure 22.

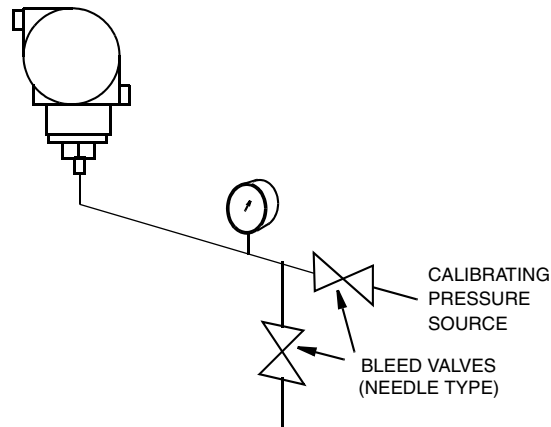


Figure 22. Bench Calibration Setup

Calibration Using the Optional Local Display

From the display, you can:

- ◆ Zero the transmitter at zero pressure
- ◆ Calibrate the lower range value (LRV or 0% range value)
- ◆ Calibrate the upper range value (URV or 100% range value)
- ◆ Rerange your transmitter by adjusting the 0% and 100% range values.

— NOTE —

1. 4 to 20 mA calibration is not available with FOUNDATION fieldbus transmitters.
 2. If calibration has been configured as password protected, you are asked to enter the password before you can proceed.
 3. If your transmitter is write protected, you cannot write your calibration to the electronics without disabling this feature.
-

To access the Calibration mode (from normal operating mode), press the **Next** button. The display reads **CALIB**, the first item on the menu. Acknowledge your choice of this selection by pressing the **Enter** button. The display shows the first item in the Calibration menu shown in Figure 23.

Proceed to calibrate your transmitter by using the **Next** button to select your item and the **Enter** button to specify your selection per Figure 23. At any point in the calibration you can **Cancel**, restore your prior calibration and return to the on-line mode or **Save** your new calibration.

— NOTE

Before doing a **CAL_ATO**, **CAL_LRV**, or **CAL_URV** calibration, check your **M1 LRV** and **M1 URV** values to make sure that they are the proper 0% and 100% range values for your application. If not, use the **Next** button to go to **RERANGE** to set the proper **M1 URV** and **M1 LRV**. Save these changes.

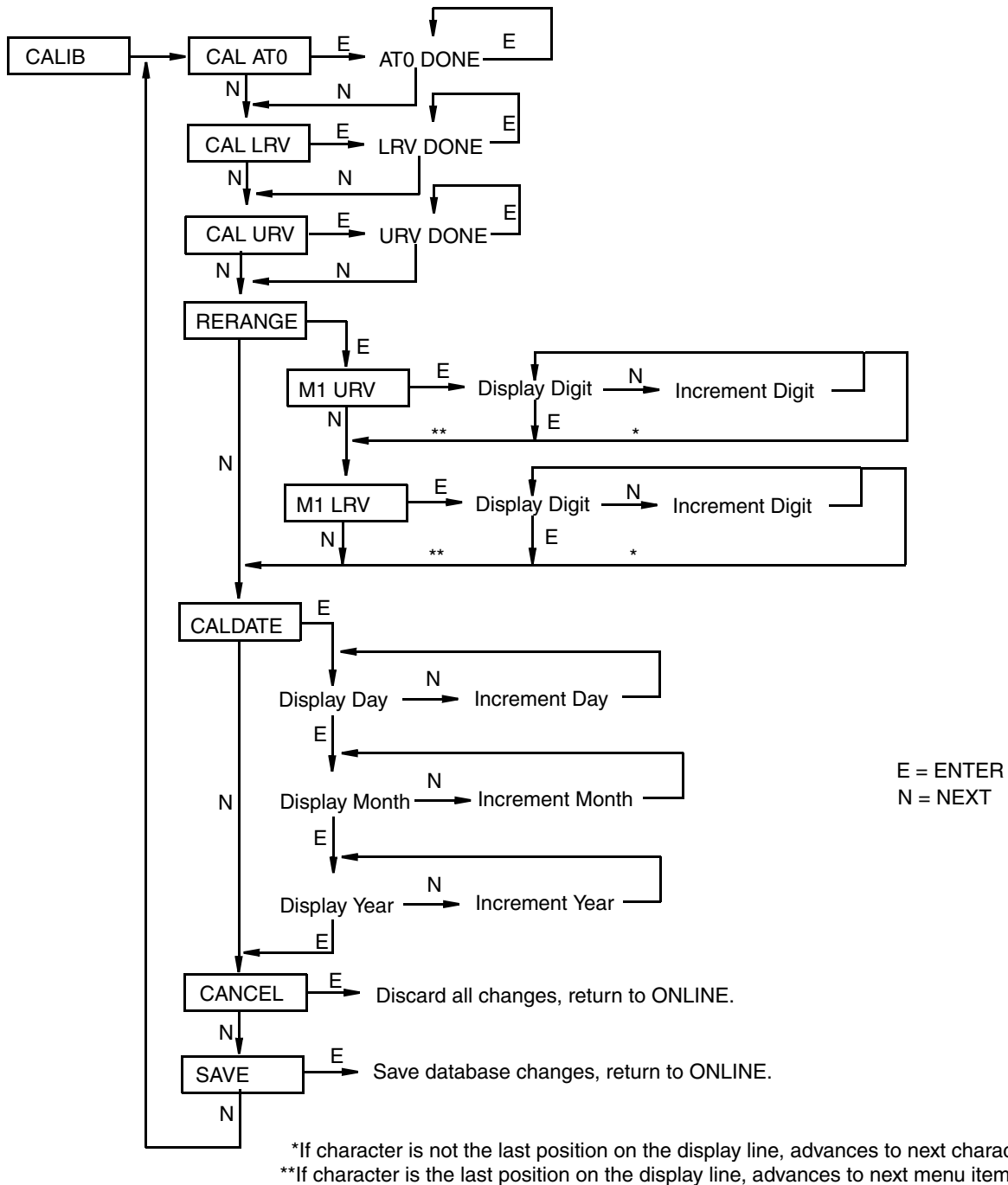


Figure 23. Calibration Structure Diagram

CAL_ATO:

To zero the transmitter at zero pressure, apply a zero pressure to the transmitter. Go to **CAL_ATO** using the **Next** button and press **Enter**. This can be done whether the LRV is zero or not. Completion is indicated by the display **ATO Done**.

— NOTE

This function cannot be done from a fieldbus host.

CAL_LRV:

To calibrate at 0% of range input, apply a pressure to the transmitter equal to the lower range value in the transmitter database. Go to **CAL_LRV** using the **Next** button and press **Enter**. Completion is indicated by the display **LRV Done**.

CAL_URV:

To calibrate at 100% of range input, apply a pressure to the transmitter equal to the lower range value in the transmitter database. Go to **CAL_URV** using the **Next** button and press **Enter**. Completion is indicated by the display **URV Done**.

RERANGE:

To adjust 100% and 0% range values without application pressure, go to **RERANGE** using the **Next** button and press **Enter**. You can then adjust **M1 URV** and/or **M1 LRV** in the following two submenus.

M1 URV:

To edit the upper range value, press **Enter** at the prompt **M1 URV**. Use the procedure “Entering Numerical Values” in Operation section to edit this parameter.

M1 LRV:

Similar to **M1 URV** immediately above.

CALDATE:

This is not a required entry but can be used for recordkeeping or plant maintenance purposes. To edit the calibration date, go to **CALDATE** with the **Next** button and press **Enter**. You then can change the day, month, and year. The display shows the last date with the day flashing. Use the **Next** button to step through the menu of digits to select the desired day, then press **Enter**. Repeat this process for the month and year.

Zero Adjustment Using External Zero Button

An external zero adjustment mechanism in the electronics housing allows calibration at zero pressure (the **CAL ATO** function) or at the lower range value pressure (the **CAL LRV** function) without removing the electronics compartment cover. The mechanism is magnetically activated through the housing wall to prevent moisture from entering the enclosure.

To use this feature:

1. Unlatch the external zero button by turning it 90° in a counterclockwise direction so that the screwdriver slot lines up with the two holes in the face of the adjacent part. Do **not** push the button in with the screwdriver while doing this.
2. To set or reset the zero point at zero pressure, apply zero pressure to the transmitter and press the external zero button until the display reads **CAL AT0**. Release the button. The display reads **CAL WAIT** and then **RESET** (calibration is complete).

To set or reset the 0% of range input, apply the lower range value (LRV) pressure to the transmitter and press and hold the external zero button until the display reads **CAL LRV** (it reads **CAL AT0** first). Release the button. The display reads **CAL WAIT** and then **RESET** (calibration is complete).

— **NOTE** —

If the optional display is not present, the same functions can be accomplished by depending on the length of time the external zero button is depressed. Press and hold the button for 1 to 3 seconds for **CAL AT0** or for 5 or more seconds for **CAL LRV**. Therefore, if your LRV is zero, just depress the button for a few seconds. However, if your LRV is not zero, use **caution** when using the external zero button without the optional display because you must rely strictly on the length of time the button is depressed to differentiate between **CAL AT0** and **CAL LRV**.

3. Another possible message is **DISABLD** if **EX ZERO** is configured **EXZ DIS**.
4. If additional rezeroing is required after Steps 1 and 2 have been accomplished repeat Step 2.
5. Relatch the external zero button by turning it 90° in a clockwise direction to prevent accidental pressing of the button. Do **not** push the button in with the screwdriver while doing this.

Calibration from a Fieldbus Host

— **NOTE** —

Before doing a calibration, check your **PRIMARY_VALUE_RANGE • EU_at_100% and EU_at_0%** values to make sure that they are the proper values for your application. If not, adjust these values as necessary. Refer to “Changing the Primary Range Values (Reranging) by Editing the Transducer Block Parameters” on page 49.

1. Put the Transducer Block in the Out Of Service (OOS) mode and make sure the **MODE_BLK • ACTUAL** reads **OOS**.

— **NOTE** —

It is important that you perform Steps 2 and 3 before Steps 4 and 5.

2. Apply the lower range value pressure to the transmitter.
3. Enter the value of the pressure applied to the transmitter into the **CAL_POINT_LO** parameter. Write the change to the transmitter.

4. Apply the upper range value pressure to the transmitter.
5. Enter the value of the pressure applied to the transmitter into the **CAL_POINT_HI** parameter. Write the change to the transmitter.

— **NOTE** —

The difference between the lower range and upper range pressures must equal or exceed the **CAL_MIN_SPAN**.

6. Select the method from the **SENSOR_CAL_METHOD** parameter (normally set for **User Trim Standard Calibration**).
7. Type in the location in the **SENSOR_CAL_LOC** parameter
8. Type in the initials of the person performing the calibration in the **SENSOR_CAL_WHO** parameter
9. Adjust the **SENSOR_CAL_DATE** parameter.
10. Write the changes to the transmitter.
11. Put the Transducer Block in the Auto mode and make sure the **MODE_BLK • ACTUAL** reads **Auto**.

5. Configuration

Configuration Using the Optional Local Display

The transmitter can be configured from the optional local display or from a FOUNDATION fieldbus host. Some of the parameters can be configured from either the display and the host; others can be configured only from the display or the host.

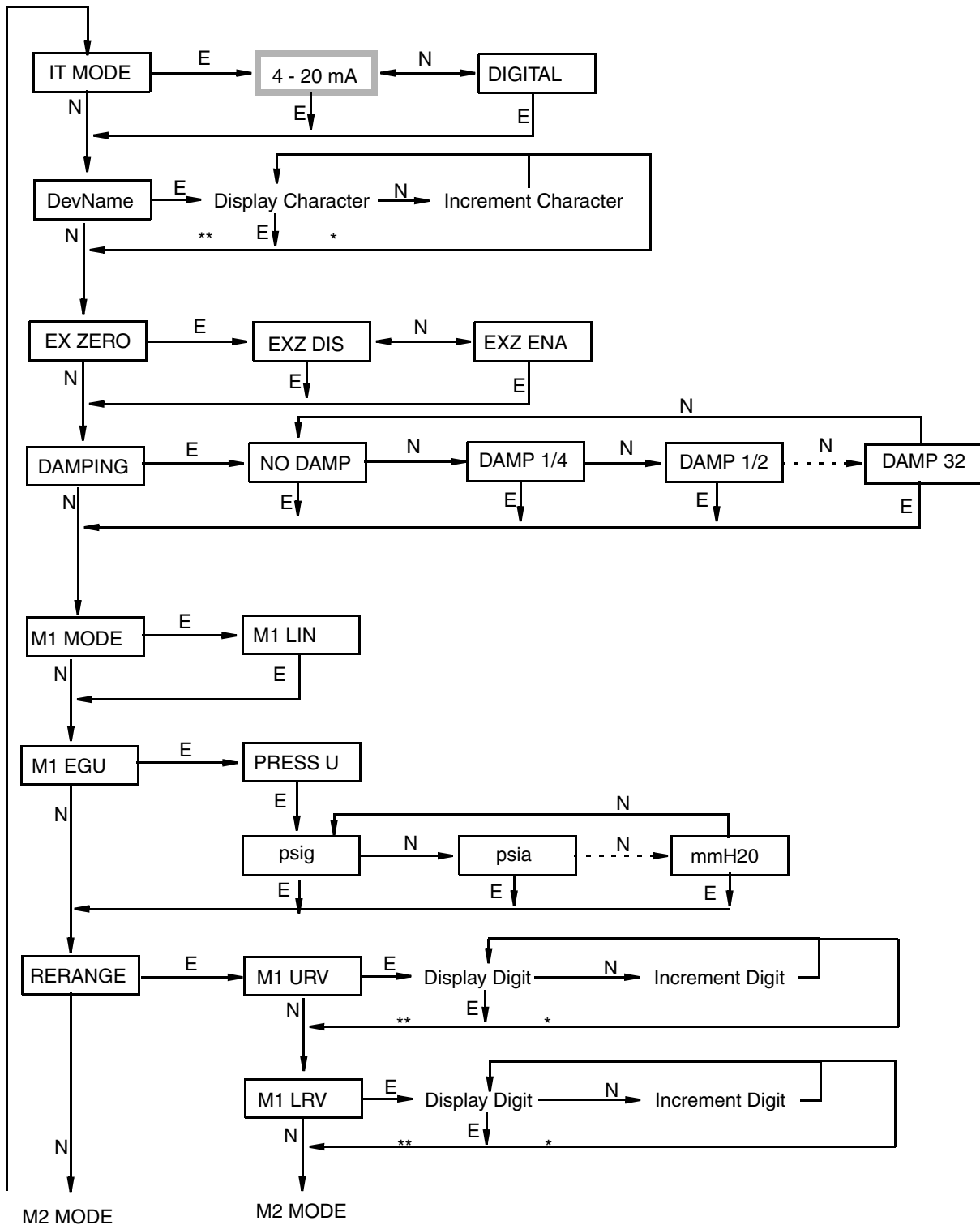
Table 5 lists all parameters that can be configured from the optional local display, the parameter values or options selected by the factory when the transmitter is shipped, and a list of comments and/or procedures to be followed when configuring the transmitter from a fieldbus host.

Table 5. Parameters Configurable from the Local Display

| Parameter | Available Choices when Configuring from the Local Display | Local Display Initial Factory Settings | Procedure when Configuring from a FOUNDATION fieldbus Host |
|-----------|---|--|---|
| IT_MODE | Digital only | Digital | N.A. |
| DevName | (up to six characters) | DevNam | N/A. |
| EXT_ZERO | Disable only | Disable | N.A. |
| DAMPING | None only | None | Edit Transducer Block SENSOR_DAMPING parameter |
| M1_MODE | Linear Only | Linear | N.A. |
| M1_EGU | User-selected engineering units | (Per Sales Order) | Edit Transducer Block PRIMARY_VALUE_RANGE • UNITS_INDEX parameter |
| M1_LRV | User (configurable value) | --- | Edit Transducer Block PRIMARY_VALUE_RANGE • EU_0 parameter. |
| M1_URV | User (configurable value) | --- | Edit Transducer Block PRIMARY_VALUE_RANGE • EU_100 parameter. |
| M2_MODE | Linear | Linear | Edit Transducer Block THIRD_VALUE_TYPE |
| M2_EGU | User-defined engineering units | % | Edit Transducer Block THIRD_VALUE_RANGE • UNITS_INDEX parameter. |
| CAL_DATE | Calibration Date | --- | Edit Transducer Block SENSOR_CAL_DATE parameter. |
| ENA_PWD | No Passwords, Configuration, or Config and Calibration | No Passwords | N.A. |

 **CAUTION**

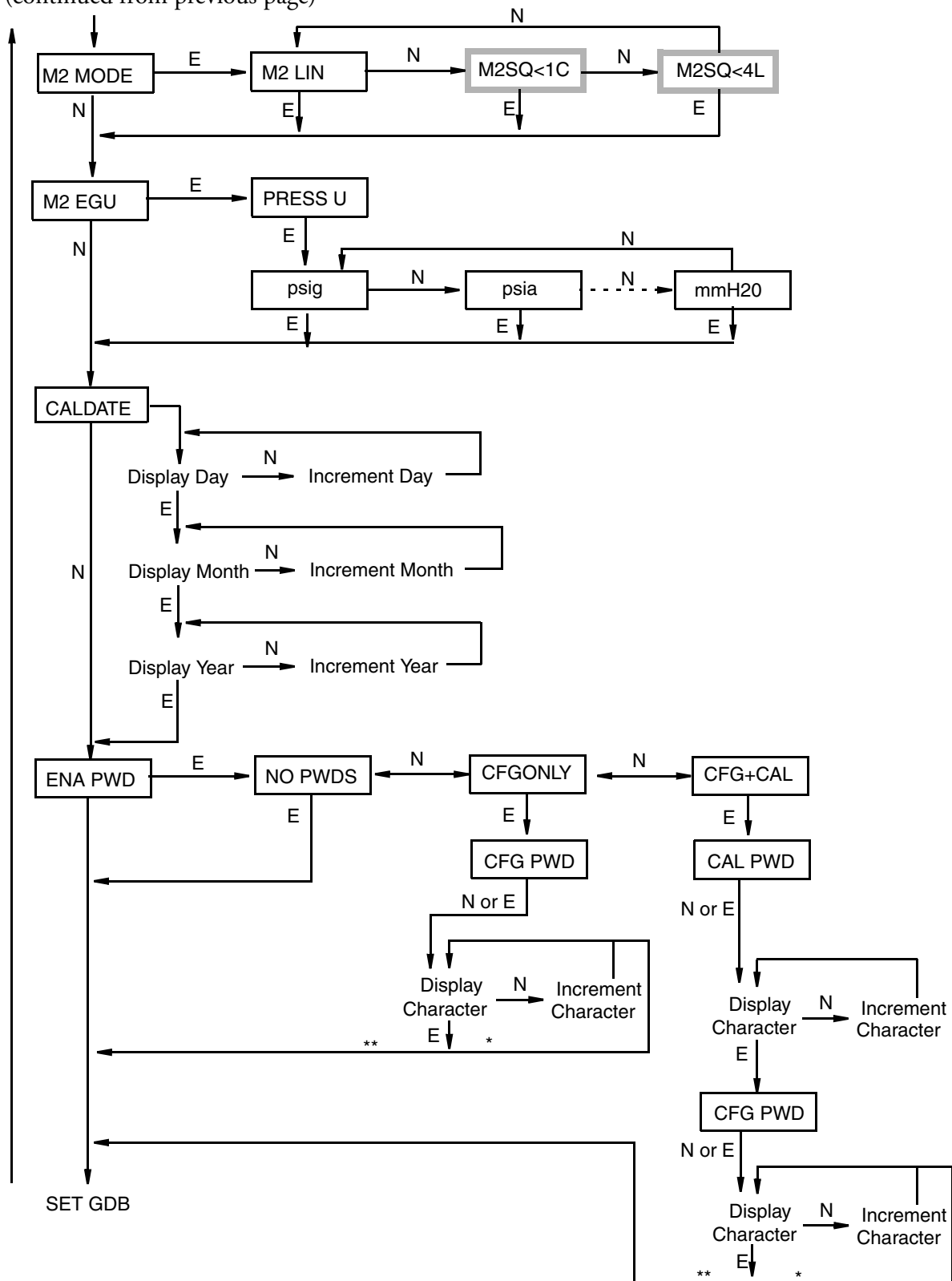
In the diagrams, a shaded outline box indicates a menu selection that is **not** valid for IGP25-F and IGP50-F transmitters. Therefore, you are cautioned **not** to configure such items.



*If character is not the last position on the display line, advances to next character.
 **If character is the last position on the display line, advances to next menu item.

Figure 24. Configuration Structure Diagram (1 of 3)

(continued from previous page)



*If character is not the last position on the display line, advances to next character.
 **If character is the last position on the display line, advances to next menu item.

Figure 25. Configuration Structure Diagram (2 of 3)

(continued from previous page)

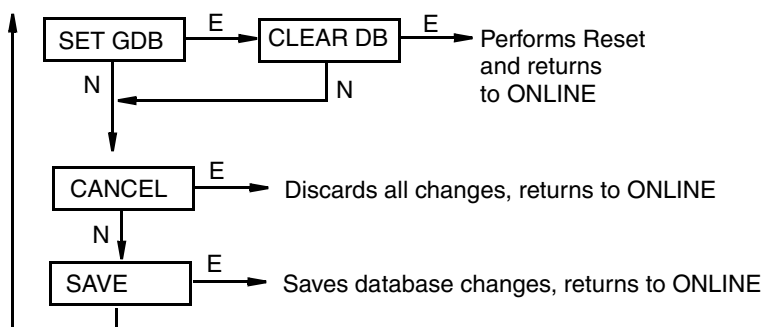


Figure 26. Configuration Structure Diagram (3 of 3)

Commentary on Configuration Structure Diagrams

In general, use the **Next** button to select your item and the **Enter** button to specify your selection.

IT MODE:

To configure the transmitter operating mode, press **Enter**. Use the **Next** button to select **DIGITAL** and press **Enter**. The **4 - 20 mA** selection is not valid for a FOUNDATION fieldbus transmitter.

DevName:

This parameter is not applicable for a FOUNDATION fieldbus transmitter.

EX ZERO:

The External Zero feature allows the optional external zero pushbutton to be disabled for additional security. To configure this feature, go to **EX ZERO** with the **Next** button and press **Enter**. Use the **Next** button to select **EXZ DIS** or **EXZ ENA** and press **Enter**.

DAMPING:

To configure additional damping, go to **DAMPING** with the **Next** button and press **Enter**. Use the **NEXT** button to select **NO DAMP**, **DAMP 1/4**, **DAMP 1/2**, **DAMP 1**, **DAMP 2**, **DAMP 4**, **DAMP 8**, **DAMP 16**, or **DAMP 32** and press **Enter**.

M1 MODE:

To configure the mode of the primary output, go to **M1 MODE** with the **Next** button and press **Enter**. Use the **Next** button to select **M1 LIN** (linear) and press **Enter**.

M1 EGU:

To configure engineering units for your display and transmission, go to **M1 EGU** with the **Next** button and press **Enter**. Use the **Next** button to select **PRESS U** and press **Enter**.

You are then asked to specify one of the following labels: **psig**, **psia**, **inHg**, **ftH₂O**, **inH₂O**, **atm**, **bar**, **mbar**, **MPa**, **kPa**, **Pa**, **kg/cm²**, **g/cm²**, **dy/cm²**, **cmHg**, **mmHg**, **torr**, **cmH₂O**, or **mmH₂O**.

RERANGE:

To adjust 100% and 0% range values without application pressure, go to **RERANGE** with the **Next** button and press **Enter**. You can then adjust **M1 URV** and/or **M1 LRV** in the following two submenus.

M1 URV:

To edit the upper range value, press **Enter** at the prompt **M1 URV**. Use the procedure “Entering Numerical Values” in Operation section to edit this parameter.

M1 LRV:

Similar to **M1URV** immediately above.

M2 MODE:

M2 is a secondary measurement that is read by the I/A Series system and can be displayed on the optional display. You might use this feature to display M1 in primary pressure units and M2 in other pressure units. To configure this parameter, go to **M2 MODE** with the **Next** button and press **Enter**. Use the next button to select **M2 LIN** (linear) and press **Enter**. The **M1SQ<1C** and **M1SQ<4L** selections are not valid for gauge pressure measurement.

M2 EGU:

Similar to **M1 EGU**.

CALDATE:

This is not a required entry but can be used for record keeping or plant maintenance purposes. To edit the calibration date, go to **CALDATE** with the **Next** button and press **Enter**. You then can change the day, month, and year. The display shows the last date with the day flashing. Use the **Next** button to step through the library of digits to select the desired day, then press **Enter**. Repeat this process for the month and year.

ENA PWD:

To enable or disable the password feature, go to **ENA PWD** with the **Next** button and press **Enter**. Use the **Next** button to select **NO PWDS** (password feature disabled), **CFGONLY** (password required to configure only), or **CFG+CAL** (password required to both configure and calibrate) and press **Enter**.

If you selected **CFG ONLY**, the display changes to **CFG PWD**. Press either the **Next** or **Enter** button. Use the **Next** button to step through the library of characters to select the desired first character, then press **Enter**. Your selection is entered and the second character flashes. Repeat this procedure until you have created your password. If the password has less than six characters, use blanks for the remaining spaces. When you have configured the sixth space, the display advances to the next menu item.

If you selected **CFG+CAL**, the display changes to **CAL PWD**. To create the Calibration password, press either the **Next** or **Enter** button. Use the **Next** button to step through the library of characters to select the desired first character, then press **Enter**. Your selection is entered and the second character flashes. Repeat this procedure until you have created your password. If the password has less than six characters, use blanks for the remaining spaces. When you have configured the sixth space, the display advances to **CFG PWD**. Use the same procedure to create the configuration password.

! CAUTION

Record your new password before saving changes to the database.

SET GDB:

If your transmitter database becomes corrupted and you receive an **INITERR** message upon startup, this function enables you to rewrite all calibration and configuration values with default values.

! CAUTION

Any calibration and configuration values that you have entered will be lost. Therefore, **SET GDB** should **not** be selected if your transmitter is functioning normally.

Character Lists

Table 6. Alphanumeric Character List

| Characters |
|-------------------------|
| (space) |
| % |
| * |
| + |
| – |
| / |
| 0 through 9 |
| < |
| = |
| > |
| A through Z (uppercase) |
| [|
| \ |
|] |
| Δ |
| - (underscore) |
| ∇ |
| a through z (lowercase) |

Table 7. Numeric Character List

| Characters |
|-------------------|
| – (minus sign) |
| . (decimal point) |
| 0 through 9 |

Configuration Using a Fieldbus Host

The transmitter can be configured from the optional local display or from a FOUNDATION fieldbus host. Some of the parameters can be configured from either the display and the host; others can be configured only from the display or the host.

— NOTE

After writing changes to your transmitter, wait at least 30 seconds before disconnecting your transmitter or otherwise removing power from it.

Configuration Procedure Using a Fieldbus Host

— NOTE

This procedure is for transmitters with a **DEV_REV** of 30 HEX (48 DEC) or higher.

A Foundation Fieldbus system is composed of two main parts: A Control Application Process (CAP) and a Device Application Process (DAP). The CAP contains the Resource Block, the Analog Input Blocks, and a PID Block if one is used. The contents of these blocks are defined by the Fieldbus FOUNDATION and are configured by the host, often using a template that has been developed. The DAP contains the Transducer Block. Its contents vary with the product and are usually configured by an operator using fieldbus configurator software.

Therefore, this configuration procedure will concentrate on setting the configurable parameters in the Transducer Block. It will also describe scaling parameters in the Analog Input Blocks that also must be set.

Configuring the Transducer Block

1. Open the Transducer Block. Put the block Out Of Service by setting **MODE_BLK • Target** to **OOS**.
2. Set the **PRIMARY_VALUE_RANGE • UNITS_INDEX** to a pressure engineering unit, such as inH₂O, kg/cm², and so forth. For unit codes, see Table 8.
3. Set the **THIRD_VALUE_TYPE** to Pressure Linear. Flow_comp_with_zero_cutoff and Flow_comp_with_linear_extrapolation are not valid for gauge pressure transmitters.
4. Set the **THIRD_VALUE_RANGE • UNITS_INDEX** to match the units in **XD_SCALE** for the AI Block connected to this channel.
5. The factory setting for **SENSOR_DAMPING** is **0**. If the process is noisy, increase the value in small increments, up to 32 seconds maximum. Select one of the following numbers: **0, 0.25, 0.50, 1, 2, 4, 8, 16** or **32**.
6. Write the changes to the transmitter.

Table 8. Unit names and Unit Codes

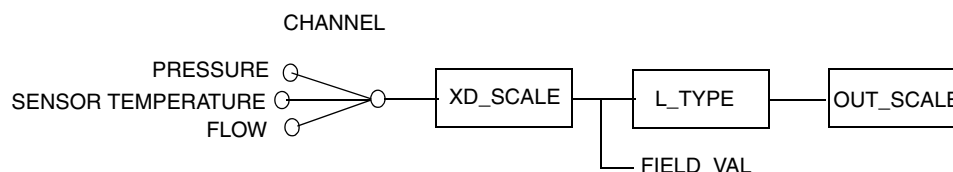
| Unit Name | Unit Code | Unit Name | Unit Code | Unit Name | Unit Code | Unit Name | Unit Code |
|-----------|-----------|-----------|-----------|--------------|-----------|-----------|-----------|
| Pa | 1130 | torr | 1139 | kgcm2 | 1145 | mmHg0C | 1158 |
| MPa | 1132 | atm | 1140 | inH2O | 1146 | cmHg | 31500 |
| kPa | 1133 | psia | 1142 | mmH2O20 C | 1151 | cmH2O | 31502 |
| bar | 1137 | psig | 1143 | ftH2O20C | 1154 | dycm2 | 31572 |
| mbar | 1138 | gcm2 | 1144 | inHg | 1155 | | |

Configuring the Scaling Parameters in the Analog Input Block

1. Open the Analog Input Block. Put the block Out Of Service by setting **MODE_BLK • Target** to **OOS**.
2. The **CHANNEL** parameter can be set to any of the following, depending upon what measurement you want to use:

| <u>CHANN</u> <u>EL</u> <u>Number</u> | <u>CHANNEL</u> <u>Parameter</u> | <u>Transducer Block Value Used By AI</u> <u>Block</u> |
|--|------------------------------------|--|
| 1 | Pressure | Primary Value |
| 2 | Sensor Temperature | Secondary Value (Transmitter Temperature) |
| 3 | Flow | Third Value |

3. The S Temperature is the temperature inside the pressure sensor used for compensation purposes. It may not be equal to the ambient temperature. It definitely is not the process temperature, and therefore should not be used for control purposes.
4. Write the changes to the transmitter.
5. Set the XD_SCALE, L_TYPE, and OUT_SCALE parameters as follows:



NOTE: FIELD_VAL IS THE MEASUREMENT IN % OF XD_SCALE

If CHANNEL is set for Pressure

Set the XD_SCALE•UNITS_INDEX exactly the same as the PRIMARY_VALUE_RANGE•UNITS_INDEX.

Set the XD_SCALE range to the desired range. It doesn't have to match the PRIMARY_VALUE_RANGE values.

If L_TYPE is Direct, set the OUT_SCALE parameters to match those of the XD_SCALE.

If L_TYPE is Indirect, set the OUT_SCALE at the desired unit and values.

L_TYPE Indirect Sq Rt is not applicable,

If CHANNEL is set for Sensor Temperature

Set the XD_SCALE•UNITS_INDEX to °C.

Set the XD_SCALE range to the desired range. Note that your transmitter can only read values within the range of (-50 to +105 °C).

If L_TYPE is Direct, set the OUT_SCALE parameters to match those of the XD_SCALE.

If L_TYPE is Indirect, set the OUT_SCALE at the desired unit and values. See example below.

L_TYPE Indirect Sq Rt is not applicable,

Example of Using Indirect L_TYPE

If you wanted to output sensor temperature from 0 to 100°C in degrees Fahrenheit:

Set the XD_SCALE•UNITS_INDEX to °C.

Set the XD_SCALE: EU_at 100% to 100, EU_at_0% to 0, and UNITS_INDEX to °C.

Set the L_TYPE as Indirect,

Set the OUT_SCALE: EU_at 100% to 212, EU_at_0% to 32, and UNITS_INDEX to °F. These are the equivalent values in °F of 0 100°C and 0°C respectively.

If CHANNEL is set for Flow and THIRD_VALUE_TYPE is Pressure Linear

Set the XD_SCALE•UNITS_INDEX exactly the same as the THIRD_VALUE_RANGE•UNITS_INDEX.

Set the XD_SCALE range to the desired range. It doesn't have to match the THIRD_VALUE_RANGE values.

If L_TYPE is Direct, set the OUT_SCALE parameters to match those of the XD_SCALE.

If L_TYPE is Indirect, set the OUT_SCALE at the desired unit and values.

L_TYPE Indirect Sq Rt is not applicable,

6. Write the changes to the transmitter.

Application Specific Configurations

Tables 9 and 10 show typical configuration parameters for various applications. Additional parameter configuration is required for various applications

Table 9. Pressure Applications

| Application Parameters | | Application 1 | Application 2 | Application 3 |
|--|-----------------------------------|---------------|----------------|---------------|
| Application | | Pressure | Pressure | Pressure |
| Calibrated Range | | 0 to 50 PSI | 0 to 75 Kg/cm2 | 0 to 200 Bar |
| Transmitter output | | 0 to 50 PSI | 0 to 75 Kg/cm2 | 0 to 100% |
| Indicator displays | | 0 to 50 PSI | 0 to 75 Kg/cm2 | 0 to 200 Bar |
| After pushing Enter key on indicator, the indicator displays | | 0 to 50 PSI | 0 to 75 Kg/cm2 | 0 to 200 Bar |
| Output of AI #1 to host system | | 0 to 50 PSI | 0 to 75 Kg/cm2 | 0 to 100% |
| Output of AI #2 (internal temperature) to host system | | °F | °C | °F |
| Block | Parameter Name | Configuration | Configuration | Configuration |
| TB | PRIMARY_VALUE_RANGE - EU_100 | 50 | 75 | 200 |
| | PRIMARY_VALUE_RANGE - EU_0 | 0 | 0 | 0 |
| | PRIMARY_VALUE_RANGE - UNITS_INDEX | PSI | Kg/cm2 | Bar |
| AI #1 | CHANNEL | Pressure | Pressure | Pressure |
| | XD_SCALE - EU_100 | 50 | 75 | 200 |
| | XD_SCALE - EU_0 | 0 | 0 | 0 |
| | XD_SCALE - UNITS_INDEX | PSI | Kg/cm2 | Bar |
| | L_TYPE | Direct | Direct | Indirect |
| | OUT_SCALE - EU_100 | 50 | 75 | 100 |
| | OUT_SCALE - EU_0 | 0 | 0 | 0 |
| OUT_SCALE - UNITS_INDEX | PSI | Kg/cm2 | % | |
| AI #2 | CHANNEL | S Temp | S Temp | S Temp |
| | XD_SCALE - EU_100 | 105 | 105 | 105 |
| | XD_SCALE - EU_0 | -50 | -50 | -50 |
| | XD_SCALE - UNITS_INDEX | °C | °C | °C |
| | L_TYPE | Indirect | Direct | Indirect |
| | OUT_SCALE - EU_100 | 220 | 105 | 220 |
| | OUT_SCALE - EU_0 | -58 | -50 | -58 |
| OUT_SCALE - UNITS_INDEX | °F | °C | °F | |

Table 10. Open Tank Applications

| Application Parameters | | Application |
|--|-----------------------------------|----------------------|
| Application | | Open Tank (see Note) |
| Calibrated Range | | 0 to 50 inH2O |
| Transmitter output | | 0 to 40 inches |
| Indicator displays | | 0 to 50 inH2O |
| After pushing Enter key on indicator, the indicator displays | | 0 to 50 inH2O |
| Output of AI #1 to host system | | 0 to 40 inches |
| Output of AI #2 (internal temperature) to host system | | °F |
| | | |
| Block | Parameter Name | Configuration |
| TB | PRIMARY_VALUE_RANGE - EU_100 | 50 |
| | PRIMARY_VALUE_RANGE - EU_0 | 0 |
| | PRIMARY_VALUE_RANGE - UNITS_INDEX | inH2O |
| AI #1 | CHANNEL | Pressure |
| | XD_SCALE - EU_100 | 50 |
| | XD_SCALE - EU_0 | 0 |
| | XD_SCALE - UNITS_INDEX | inH2O |
| | L_TYPE | Indirect |
| | OUT_SCALE - EU_100 | 40 (see Note) |
| | OUT_SCALE - EU_0 | 0 |
| | OUT_SCALE - UNITS_INDEX | in |
| AI #2 | CHANNEL | S Temp |
| | XD_SCALE - EU_100 | 105 |
| | XD_SCALE - EU_0 | -50 |
| | XD_SCALE - UNITS_INDEX | °C |
| | L_TYPE | Indirect |
| | OUT_SCALE - EU_100 | 220 |
| | OUT_SCALE - EU_0 | -58 |
| | OUT_SCALE - UNITS_INDEX | °F |

— NOTE

In this example, the fluid level change is 40 inches, with a specific gravity of 1.25, which results in a range of 0 to 50 inH2O.

Changing the Primary Range Values (Reranging) by Editing the Transducer Block Parameters

1. Open the Transducer Block. Put the block Out Of Service by setting **MODE_BLK • Target** to **OOS**.
2. Set the **PRIMARY_VALUE_RANGE** sub-parameters as follows:
 - EU_100** enter the 100% value of the calibrated range desired
 - EU_0** enter the 0% value of the calibrated range desired
3. Write the changes to the transmitter.
4. Calibrate the transmitter. Refer to “Calibration” on page 31.
5. Set the Target Mode in the Transducer Block to **Auto**. Make sure that the **MODE_BLK • ACTUAL** value reads **Auto**. Once in the Auto mode, the **PRIMARY_VALUE** and **SECONDARY_VALUE** should display the appropriate values. If not, check the Maintenance section. If the block does not change to **Auto**, go to **BLOCK_ERR_DESC_1** to see what is wrong. Fix the problem and close the Transducer Block window.
6. Reconfigure the **CHANNEL**, **XD_SCALE**, **L_TYPE**, and **OUT_SCALE** parameters in the Analog Input Block as necessary. See “Configuring the Scaling Parameters in the Analog Input Block” on page 45.

Disabling the Link Active Scheduler (LAS)

To disable the LAS, right mouse click on **DEV_TAG** and set “Device Type = yes” to OK.

— NOTE —

If more than one device has the LAS feature configured on, the LAS is applied to the devices in the order of their Node Address. Therefore, take LAS into consideration when selecting the Node Address.

— CAUTION —

Do not modify the parameters in the Link Settings (Advanced) tab without good reason. If you must modify parameters for certain transmitters, Invensys will recommend settings. Modifying these parameters can have an adverse affect on data throughput rates. If settings are incorrectly modified, some devices may disappear from the network.

— NOTE —

Invensys recommends, as a prudent measure, that multiple devices (two or more) on the bus be configured as link master devices.

6. Maintenance

— **⚠ DANGER** —

For nonintrinsically safe installations, to prevent a potential explosion in a Division 1 hazardous area, de-energize transmitters before you remove threaded housing covers. Failure to comply with this warning could result in an explosion resulting in severe injury or death.

— **NOTE** —

After writing changes to your transmitter, wait at least 30 seconds before disconnecting your transmitter or otherwise removing power from it.

Troubleshooting

Simulation Mode

The transmitter has a simulation capability that can be used for debugging/troubleshooting the system when the process is not running. Once the simulation jumper is set, the user can select any value as the input to the AI Block for testing or debugging purposes. The procedure is as follows:

1. Place the appropriate AI Block in Out of Service (OOS) mode using the configurator software.
2. Remove the housing cover and the optional indicator.
3. To activate Simulation mode, move the simulation jumper to the lower position as shown in Figure 27.

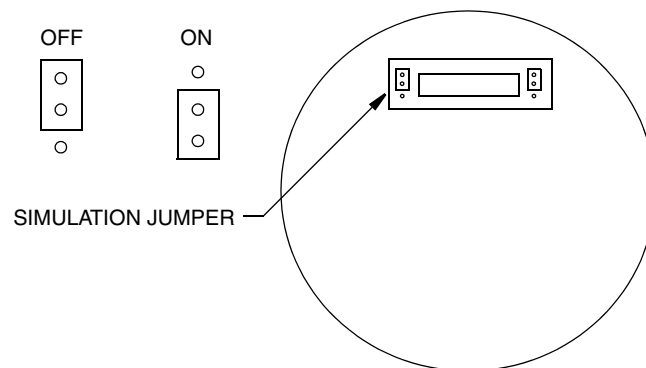


Figure 27. Simulation Jumper

4. Replace the electronic module, indicator, and housing cover, if desired.
5. Set the **SIMULATE_ENABLE • DISABLE** to **Active**

6. Set the **SIMULATE_STATUS_QUALITY** to **Good_NonCascade** (suggested setting) or other appropriate setting.
7. Type in the value you want as the output from the Transducer Block in the **Simulate_Value** parameter.
8. Click on the **Write Changes** button. If you try to send a simulated output without putting the jumper in the correct position (step #2), the software will not change anything (device did not accept this parameter value) and you will get an error response.
9. Set the AI Block to **AUTO** mode
10. Proceed with troubleshooting remembering that the output of the AI Block has been set by the value typed in step #7
11. After completion of troubleshooting, set the AI Block to Out of Service (OOS)
12. Set the **SIMULATE_ENABLE_DISABLE** to **Disabled**
13. Click on the **Write Changes** button.
14. Place the AI Block in **AUTO** mode using the configurator software. Make sure the **MODE_BLK • ACTUAL** reads **AUTO**.
15. Reset the jumper moved in Step 3.
16. Reassemble electronic module, indicator and housing cover.

Restart

The **RESTART** parameter in the Resource Block should only be used when the configuration in the transmitter is incorrect and you cannot fix the problem by using the troubleshooting information in this section. In all cases, try cycling the power to the transmitter first. Then go back to the block with the problem and try to write the changes to the transmitter. If that does not clear the problem, proceed with the RESTART procedure.

— CAUTION —

When you do a “Defaults” RESTART command in the Resource Block, the configured parameters will automatically default to the status and values predetermined by the Foundation. These are the same as the initial factory settings shown in Appendix A for the Resource, Analog Input, and PID Blocks but are different than those shown for the Transducer Block.

1. Open the Resource Block and put it in the OOS mode.
2. Open the RESTART box and select one of the following:
 - ◆ Uninitialized – do not use (may not appear on list)
 - ◆ Run – this is the default setting, the nominal state when not restarting
 - ◆ Defaults – Sets the parameters to the Foundation defaults, which may be different than the initial factory settings. This will reset all configurable function block application objects. It will also clear all configured Trend and Link Objects. A

restart of the processor will also be performed automatically after re-initialization has been completed.

- ◆ Processor – does a warm restart of CPU and has the same effect as cycling the power (OFF/ON) to the transmitter
3. Click on the **Write Changes** button.
 4. Put the Resource Block back into AUTO mode (the RESTART selection will automatically default to the Run position).
 5. Reconfigure the appropriate function blocks.

Switch Mode Checklist

1. Verify that the block is scheduled. (Note that resource block and transducer block are always scheduled.)
2. Check the error messages in the **BLOCK_ERR_DESC_1** parameter.
3. Verify that resource block is in Auto Mode.
4. Verify that requested mode is permitted.

Schedule Download Checklist

1. Verify that all blocks in the network have different tags.
2. Verify that no two blocks from the same devices are scheduled to be executed at the same time.
3. Verify that there is enough time for block execution.

Block Errors

Table 11 lists all of the possible error codes in the various function blocks. Not all error codes are possible in all of the blocks. The condition number is shown in the **BLOCK_ERR** parameter for all blocks (and in the **XD_ERROR** in the Transducer Block).

Table 11. Block Errors

| Bit Number | Name and Description |
|------------|--|
| 0 | No Error |
| 1 | Block Configuration Error: (See Table 12) |
| 2 | Link Configuration Error: A link used in one of the function blocks is improperly configured. |
| 3 | Simulate Active: The Simulation jumper is enabled. This is not an indication that the I/O blocks are using simulated data. |
| 4 | Local Override: |
| 5 | Device Fault State Set: |
| 6 | Device Needs Maintenance Soon: |

Table 11. Block Errors (Continued)

| Bit Number | Name and Description |
|------------|--|
| 7 | Input Failure/Process Variable Has Bad Status: The hardware is bad, an input is not connected, or a status is being simulated. |
| 8 | Output Failure: The output is bad based primarily upon a bad input. |
| 9 | Memory Failure: A memory failure has occurred in Flash, RAM or EEPROM memory. |
| 10 | Lost Static Data: Static data stored in non-volatile memory has been lost. |
| 11 | Lost NV Data: Non-volatile data stored in non-volatile memory has been lost. |
| 12 | Readback Check Failed: |
| 13 | Device Needs Maintenance Now: |
| 14 | Power Up: The Device was just powered - wait |
| 15 | Out Of Service: The actual mode is OSS, change to AUTO |

Table 12. Configuration Errors

| Error | Description |
|---|--|
| Resource Block | |
| All Static Parameters are Reset | Device needs a complete download |
| Analog Input (AI) Block | |
| $XD_SCALE.EU_0 \geq XD_SCALE.EU_100$ | Low end of scale must be less than high end |
| $OUT_SCALE.EU_0 \geq OUT_SCALE.EU_100$ | Low end of scale must be less than high end |
| $OUT_SCALE = XD_SCALE$ and $L_TYPE = Direct$ | Scales must match if L_TYPE is Direct |
| $XD_SCALE.UNITS_INDEX \neq$ Pressure Channel Units | Units in Transducer Block and AI Block must match |
| $XD_SCALE.UNITS_INDEX \neq$ Temperature Channel Units | Units in Transducer Block and AI Block must match |
| $XD_SCALE.UNITS_INDEX \neq$ Flow Channel Units | Units in Transducer Block and AI Block must match |
| AI Block not scheduled | AI Block must be scheduled to run by a host |
| Invalid Channel | AI Block Channel must be 1, 2, or 3 |
| Proportional Integral, Derivative (PID) Block | |
| SP not initialized | SP has never been written |
| BYPASS not initialized | BYPASS must be set to On or Off |
| SHED_OPT not initialized | SHED_OPT must be initialized for ROUT and RCAS modes |
| GAIN not initialized | GAIN must be greater than zero |
| $OUT_SCALE.EU_0 \geq OUT_SCALE.EU_100$ | Low end of scale must be less than high end |
| $PV_SCALE.EU_0 \geq PV_SCALE.EU_100$ | Low end of scale must be less than high end |

Table 12. Configuration Errors (Continued)

| Error | Description |
|--|--|
| FF_SCALE.EU_0 \geq FF_SCALE.EU_100 | Low end of scale must be less than high end |
| TRK_SCALE.EU_0 \geq TRK_SCALE.EU_100 | Low end of scale must be less than high end |
| PID Block not scheduled | PID Block must be scheduled to run by a host |

Interboard Communication Errors/Status

The SENSOR_STATUS parameter in the Transducer Block reflects the state of the sensor board. If the state is normal, SENSOR_STATUS indicates the following:

```
SENSOR_STATUS
SENSOR_STATUS No Parameter Offset
```

If something occurs that affects the state of the sensor board, a status message will be posted, for example:

```
SENSOR_STATUS Sensor Board is offline due to config
SENSOR_STATUS No Parameter Offset
```

which indicates the sensor interface is offline because someone is attempting to configure the transmitter via the local LCD display.

If a particular parameter is at fault it is displayed in the second portion of SENSOR_STATUS.

The following is a list of all the possible status messages:

1. No serial comm between Sensor and MAU
2. Sensor board is busy
3. Sensor board-Change to ONLINE failed after Re-Init
4. Sensor board is not in ONLINE mode
5. Sensor board M1_MODE is not LINEAR
6. Sensor board is not good for Pressure measurement
7. Sensor board M1EOFF or M2EOFF parameter is not ZERO
8. Sensor board M2 mode 'OFF' is selected
9. Sensor board M1DAMP parameter is not zero
10. EGU for M1 is not supported
11. EGU for M2 is not supported
12. Sensor board M2EGU should be '%flow
13. Transducer Block Initializing
14. EEPROM Error
15. Sensor Database is updating
16. Sensor Board is offline due to cal
17. Sensor Board is offline due to config

18. Sensor Board is Out Of Service

In general, any message that is permanently displayed or keeps returning for unknown reasons indicates a hardware failure of the sensor board and the board needs service.

Parts Replacement

Parts replacement is generally limited to the electronics module assembly, housing assembly, sensor assembly, terminal block assembly, cover O-rings, and optional display. For part numbers relating to the transmitter and its options, see the following parts lists:

IGP25 Gauge Pressure Transmitter: PL 009-011

IGP50 Gauge Pressure Transmitter: PL 009-012

Replacing the Terminal Block Assembly

1. Turn off transmitter power source.
2. Remove the Field Terminals and the Electronics compartment covers by rotating them counterclockwise. Screw in cover lock if applicable.
3. Remove the digital display (if applicable) as follows: grasp the two tabs on the display and rotate it about 10° in a counterclockwise direction.
4. Remove the electronics module from the housing by loosening the two captive screws that secure it to the housing. Then pull the module out of the housing far enough to gain access to the cable connectors on the rear of the module.
5. Remove the four socket head screws securing the terminal block.
6. Disconnect the terminal block cable connector from the electronics module.
7. Remove the terminal block and the gasket under it.
8. Connect the new terminal block cable connector to the electronics module.
9. Install the new terminal block and new gasket and reinstall the four screws to 0.67 N·m (6 in·lb) in several even increments.
10. Reinstall the electronics module (and digital display if applicable).
11. Reinstall the covers onto the housing by rotating them clockwise to seat the O-ring into the housing and then continue to hand tighten until the each cover contacts the housing metal-to-metal. If cover locks are present, lock the cover per the procedure described in “Cover Locks” on page 21.
12. Turn on transmitter power source.

Replacing the Electronics Module Assembly

To replace the electronics module assembly, refer to Figure 28 and proceed as follows:

1. Turn off transmitter power source.
2. Remove the electronics compartment cover by rotating it counterclockwise. Screw in cover lock if applicable.

3. Remove the digital display (if applicable) as follows: grasp the two tabs on the display and rotate it about 10° in a counterclockwise direction. Pull out the display and disconnect its cable.
4. Remove the electronics module from the housing by loosening the two captive screws that secure it to the housing. Then pull the module out of the housing far enough to gain access to the cable connectors on the rear of the module.

! CAUTION

The electronics module is “one assembly” at this point and is electrically and mechanically connected to topworks with a flexible ribbon signal cable, a 2-wire power cable, and in some cases, a cable for an external zero pushbutton. Do **not** exceed the slack available in these cables when removing the assembled module.

5. Unplug all cable connectors from the rear of the electronics module and place the module on a clean surface.
6. Predetermine connector orientation, then insert the cable connectors into the replacement module. Replace the module in the housing using care not to pinch the cables between the module and the housing. Tighten the two screws that secure the module to the housing.
7. Connect the cable from the digital display to the electronics module. Ensure that the O-ring is fully seated in the display housing. Then, holding the digital display by the tabs at the sides of the display, insert it into the housing. Secure the display to the housing by aligning the tabs on the sides of the assembly and rotating it about 10° in a clockwise direction.
8. Reinstall the cover onto the housing by rotating it clockwise to seat the O-ring into the housing and then continue to hand tighten until the cover contacts the housing metal-to-metal. If cover locks are present, lock the cover per the procedure described in “Cover Locks” on page 21.
9. Turn on transmitter power source.

The module replacement procedure is now complete.

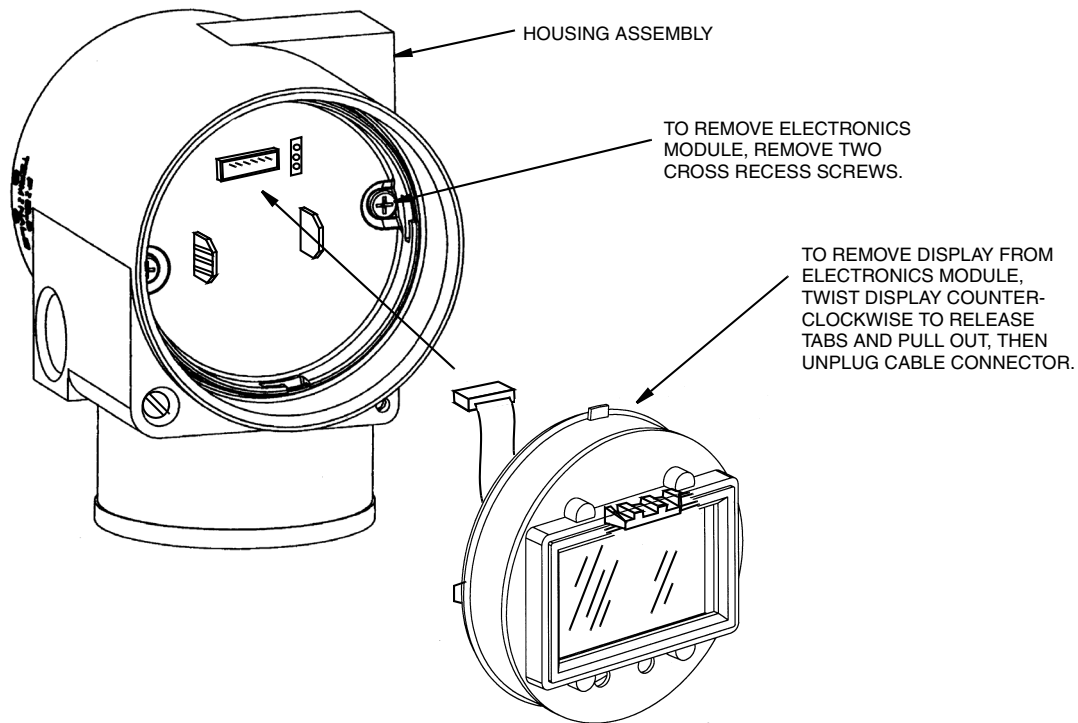


Figure 28. Replacing the Electronics Module Assembly and Display

Removing and Reinstalling a Housing Assembly

To remove and reinstall a housing assembly, refer to Figure 28 and proceed as follows:

1. Remove the electronics module per Steps 1 through 5 in the previous procedure.
2. If your housing has an anti-rotation screw, remove the red lacquer from the screw recess. Turn the screw three full turns counterclockwise.
3. If your housing has a retention clip, remove the red lacquer from the screw recess. Remove the screw completely, and slide the clip off the housing. Save the clip and screw for future use,
4. Remove the housing by rotating it counterclockwise (when viewed from the top). Use caution to avoid damaging the sensor cable.
5. Inspect the sensor O-ring for damage. If the O-ring is damaged, replace it with the appropriate O-ring. (See parts list for your transmitter). Lubricate the O-ring with silicone lubricant (Foxboro Part Number 0048130 or equivalent). Verify that the O-ring is situated in the groove of the neck.

! WARNING

Failure to reuse or install the proper O-ring for a CSA labeled product violates ANSI / ISA 12.27.01.

6. Feed the sensor cable through the housing neck into the electronics compartment.
7. Screw the housing onto the sensor neck until it bottoms. Do not over tighten. Be careful not to damage the sensor cable or dislodge the neck O-ring.

8. If your housing has an anti-rotation screw, engage the screw until it touches the sensor neck and back it off 1/8th turn. It is important that the screw is not touching the sensor. Fill the screw recess with red lacquer (Foxboro Part Number X0180GS or equivalent). the housing may then be rotated up to one full turn counterclockwise for optimum access.
9. If your housing has a retention clip, insert the clip over the boss in the housing neck so that the hole in the clip is aligned with the hole in the boss. Install the screw but do not tighten. Rotate the housing up to one full turn counterclockwise for optimum access. Tighten the retention clip screw and fill the screw recess with red lacquer (Foxboro Part Number X0180GS or equivalent). The housing can still be rotated for optimum access.
10. Reinstall the electronics module per Steps 6 through 9 in the previous procedure.

Adding the Optional Display

To add the optional display, refer to Figure 28 and proceed as follows:

1. Turn off transmitter power source.
2. Remove the electronics compartment cover by rotating it counterclockwise. Screw in cover lock if applicable.
3. Plug the display into the receptacle at the top of the electronics assembly.
4. Ensure that the O-ring is seated in its groove in the display housing. Then insert the display into the electronics compartment by grasping the two tabs on the display and rotating it about 10° in a clockwise direction.
5. Install the new cover (with a window) onto the housing by rotating it clockwise to seat the O-ring into the housing and then continue to hand tighten until the cover contacts the housing metal-to-metal. If cover locks are present, lock the cover per the procedure described in “Cover Locks” on page 21.
6. Turn on transmitter power source.

Replacing the Sensor Assembly

To replace the sensor assembly, refer to Figure 28 and proceed as follows:

1. Remove the electronics module as described above.
2. Remove the housing as described above. Sensor is left.
3. Install housing on new sensor.
4. Reinstall electronics module.

Appendix A. List of Parameters

An explanation of common fieldbus parameter terms is located in MI 014-900.

Table 13. Fieldbus Parameters

| Rel Index | Parameter Name | RO or R/W | Initial Factory Settings | Comments |
|-----------|-----------------------|-----------|--------------------------|---|
| | Network Configuration | | | |
| | PD_TAG | R/W | Unique Device ID | |
| | NODE_ADDRESS | R/W | Unique to a segment | |
| | Resource Block | | | |
| | BLOCK_TAG | R/W | RB(300) | Unique Block ID |
| 1 | ST_REV | RO | current rev | Static Data revision level |
| 2 | TAG_DESC | R/W | blank | User description of the block application |
| 3 | STRATEGY | R/W | 0 | To ID groups of blocks |
| 4 | ALERT_KEY | R/W | 0 | ID number of the plant unit |
| 5 | MODE_BLK | | | |
| | Target | R/W | OOS | Mode requested by operator |
| | Actual | RO | OOS | The current mode of the block |
| | Permitted | R/W | Auto, OOS | Modes allowed for this block |
| | Normal | R/W | Auto | Mode of block during normal operations |
| 6 | BLOCK_ERR | RO | OutOfService | Error status of the hardware or software |
| 7 | RS_STATE | RO | Standby | State of the function block application |
| 8 | TEST_RW | R/W | | Test parameter used only for conformance testing. |
| 9 | DD_RESOURCE | RO | | Tag of the resource identifying the DD |
| 10 | MANUFAC_ID | RO | Foxboro | Manufacturer ID number |
| 11 | DEV_TYPE | RO | BA30 | Manufacturer Model number |
| 12 | DEV_REV | RO | current device rev | Device revision number |
| 13 | DD_REV | RO | 01 | Initial DD revision number |
| 14 | GRANT_DENY | | | Options for controlling access of host computers and local control panels to operating, tuning, and alarm parameters. |
| | Grant | R/W | 0 (none selected) | |
| | Deny | R/W | 0 (none selected) | |
| 15 | HARD_TYPES | RO | Scalar Input | Type of hardware available to this resource |
| 16 | RESTART | R/W | Run | Defines the type of restart to be initiated |

Table 13. Fieldbus Parameters (Continued)

| Rel Index | Parameter Name | RO or R/W | Initial Factory Settings | Comments |
|-----------|----------------|-----------|---|---|
| 17 | FEATURES | RO | Reports, Hard W Lock Chg Bypass in Auto | Shows supported Resource Block options |
| 18 | FEATURE_SEL | R/W | Hard W Lock | Used to select Resource Block options |
| 19 | CYCLE_TYPE | RO | Scheduled Block execution | Block execution methods available |
| 20 | CYCLE_SEL | R/W | 0 (none selected) | Used to select Cycle Type |
| 21 | MIN_CYCLE_T | RO | 1900 1/32 ms | Duration of the shortest cycle interval |
| 22 | MEMORY_SIZE | RO | 0 | Available config memory in the empty resource |
| 23 | NV_CYCLE_T | RO | 480000 1/32 ms | Interval between writes to nonvolatile memory |
| 24 | FREE_SPACE | RO | 0 | % of memory available for further configuration |
| 25 | FREE_TIME | RO | 0 | % of block processing time available |
| 26 | SHED_RCAS | R/W | 640000 1/32 ms | Timeout for write attempts to RCas locations |
| 27 | SHED_ROUT | R/W | 640000 1/32 ms | Timeout for write attempts to ROut locations |
| 28 | FAULT_STATE | RO | Clear | When active, causes all output function flocks in the resource to go to the condition chosen by the fault state Type I/O option |
| 29 | SET_FSTATE | R/W | Off | Allows faultstate conditions to be manually set |
| 30 | CLR_FSTATE | R/W | Off | Allows faultstate conditions to be cleared |
| 31 | MAX_NOTIFY | RO | 8 | Maximum number of unconfirmed alert notify messages possible |
| 32 | LIM_NOTIFY | R/W | 8 | Maximum number of unconfirmed alert notify messages allowed |
| 33 | CONFIRM_TIME | R/W | 640000 1/32 ms | Minimum time between retries of alert reports |
| 34 | WRITE_LOCK | R/W | Not Locked | Locked setting prevents writing changes if FEATURE_SEL is set to Hard W Lock and the write protection jumper is in the locked position. |
| 35 | UPDATE_EVT | RO | | Generated by any change to static data of the block |
| 36 | BLOCK_ALM | RO | | For all configuration, hardware, connection failure, or system problems |

Table 13. Fieldbus Parameters (Continued)

| Rel Index | Parameter Name | RO or R/W | Initial Factory Settings | Comments |
|-----------|-------------------------|-----------|--------------------------|---|
| 37 | ALARM_SUM | | | The current alert status |
| | Current | RO | 0 | The active state of each alarm |
| | Unacknowledged | RO | 0 | The unacknowledged state of each alarm |
| | Unreported | RO | 0 | The unreported state of each alarm |
| | Disabled | R/W | no alarms disabled | The disabled state of each alarm |
| 38 | ACK_OPTION | R/W | no alarms auto ack'd | Selection of which alarms are automatically acknowledged |
| 39 | WRITE_PRI | R/W | 0 | Priority of alarm generated by clearing write lock |
| 40 | WRITE_ALM | RO | | Alert generated if the write lock parameter is cleared |
| 41 | ITK_VER | RO | 5 | Revision to which the DD has been tested |
| 42 | BLOCK_ERR_DESC_1 | RO | 0 | Details of a block error. |
| | Transducer Block | | | |
| | BLOCK_TAG | R/W | TR(550) | Unique Block ID |
| 1 | ST_REV | RO | current rev | Static data revision |
| 2 | TAG_DESC | R/W | blank | User description of the block application |
| 3 | STRATEGY | R/W | 0 | To ID groups of blocks |
| 4 | ALERT_KEY | R/W | 0 | ID number of plant unit |
| 5 | MODE_BLK | | | |
| | Target | R/W | Auto | Mode requested by operator |
| | Actual | RO | Auto | The current mode of the block |
| | Permitted | R/W | Auto, OOS | Modes allowed for this block |
| | Normal | R/W | Auto | Mode of block during normal operations |
| 6 | BLOCK_ERR | RO | OutOfService | Error status of the hardware or software |
| 7 | UPDATE_EVT | RO | | Generated by any change to static data of the block |
| 8 | BLOCK_ALM | RO | | For all configuration, hardware, connection failure, or system problems |
| 9 | TRANSDUCER_DIRECTORY | RO | 0 | Dir that specifies the number & start of data collection |
| 10 | TRANSDUCER_TYPE | RO | Std press w/calib | Identifies the transducer |
| 11 | XD_ERROR | RO | 0 | Transducer block alarm subcode |
| 12 | COLLECTION_DIRECTORY | RO | 0 | Directory that specifies the number & start of each transducer |

Table 13. Fieldbus Parameters (Continued)

| Rel Index | Parameter Name | RO or R/W | Initial Factory Settings | Comments |
|-----------|---------------------|-----------|---|---|
| 13 | PRIMARY_VALUE_TYPE | RO | Gauge Pressure or Absolute Pressure | Type of measurement of the primary value |
| 14 | PRIMARY_VALUE | | | |
| | Status | RO | GoodNonCascade, NonSpecific, NotLimited | Set by transmitter - status of measurement value |
| | Value | RO | 0 | Numerical quantity calculated by the transmitter |
| 15 | PRIMARY_VALUE_RANGE | | | The range, units, and precision of the primary value |
| | EU_at_100% | R/W | per sales order ⁽¹⁾ | The engineering units value at 100% of range |
| | EU_at_0% | R/W | per sales order ⁽¹⁾ | The engineering units value at 0% of range |
| | Units_Index | R/W | per sales order ⁽¹⁾ | Engineering units for the primary value |
| | Decimal | R/W | 5 (or per S.O.) | The number of digits to the right of the decimal point |
| 16 | CAL_POINT_HI | R/W | Same as PV Range | The highest calibrated value |
| 17 | CAL_POINT_LO | R/W | Same as PV Range | The lowest calibrated value |
| 18 | CAL_MIN_SPAN | RO | per device | The minimum calibration span |
| 19 | CAL_UNIT | R/W | Same as PV Range | Engineering units during last calibration |
| 20 | SENSOR_TYPE | R/W | Strain Gauge | The type of sensor |
| 21 | SENSOR_RANGE | RO | per device | The high and low range limits of the sensor, engineering units and digits to the right of the decimal point |
| 22 | SENSOR_SN | RO | per device | The sensor serial number |
| 23 | SENSOR_CAL_METHOD | R/W | 0 (none selected) | The method of last sensor calibration |
| 24 | SENSOR_CAL_LOC | R/W | Foxboro MA | The last calibration location |
| 25 | SENSOR_CAL_DATE | R/W | mm/dd/yy; hh:mm:ss | The date of the last sensor calibration |
| 26 | SENSOR_CAL_WHO | R/W | Foxboro | The name of the person responsible for the last calibration |
| 27 | SENSOR_ISOLATOR_MTL | RO | 0 | The material of the isolating diaphragms |
| 28 | SENSOR_FILL_FLUID | RO | 0 | The type of sensor fill fluid |

Table 13. Fieldbus Parameters (Continued)

| Rel Index | Parameter Name | RO or R/W | Initial Factory Settings | Comments |
|----------------------------|----------------------|-----------|----------------------------------|---|
| 29 | SECONDARY_VALUE | | | |
| | Status | RO | Bad, OutOfService, NotLimited | Set by transmitter - status of measurement value |
| | Value | RO | 0 | Numerical quantity calculated by the transmitter or entered by the user |
| 30 | SECONDARY_VALUE_UNIT | RO | °C (or per S.O.) | The engineering unit of the secondary value |
| 31 | THIRD_VALUE | | | Shows flow rate as a percentage of flow |
| | Status | RO | Bad, OutOfService, NotLimited | Set by transmitter - status of measurement value |
| | Value | RO | 0 | Numerical quantity calculated by the transmitter or entered by the user |
| 32 | THIRD_VALUE_RANGE | | | The range, units, and precision of the third value |
| | EU_at_100% | RO | 100 (or per S.O.) | The engineering units value at 100% of range |
| | EU_at_0% | RO | 0 (or per S.O.) | The engineering units value at 0% of range |
| | Units_Index | R/W | inH ₂ O (or per S.O.) | Engineering units for the third value |
| | Decimal | R/W | 5 (or per S.O.) | The number of digits to the right of the decimal point |
| 33 | THIRD_VALUE_TYPE | R/W | Pressure Linear | Type of measurement of the third value |
| 34 | SENSOR_DAMPING | R/W | 0 | The value of the sensor board M1DAMP parameter |
| 35 | FACTORY_STATUS | RO | 0 | Diagnostic parameter reserved for Foxboro use. |
| 36 | SENSOR_STATUS | RO | 0 | Set by transmitter - status of the sensor. |
| 37 | TRANSDUCER_COMMAND | R/W | 0 | Diagnostic parameter reserved for Foxboro use. |
| 38 | TRANSDUCER_RESPONSE | RO | 0 | Diagnostic parameter reserved for Foxboro use. |
| 39 | MAU_SW_REVISION | RO | current rev | MAU firmware version |
| 40 | SB_SW_REVISION | RO | current rev | SB firmware version |
| 41 | BLOCK_ERR_DESC_1 | RO | 0 | Details of a block error. |
| Analog Input Blocks | | | | |
| | BLOCK_TAG | R/W | AI1(350) or AI2(400) | Unique Block ID |

Table 13. Fieldbus Parameters (Continued)

| Rel Index | Parameter Name | RO or R/W | Initial Factory Settings | Comments |
|----------------|-------------------|-----------|-------------------------------|--|
| 1 | ST_REV | RO | current rev | Static data revision |
| 2 | TAG_DESC | R/W | blank | User description of the block application |
| 3 | STRATEGY | R/W | 0 | To ID groups of blocks |
| 4 | ALERT_KEY | R/W | 0 | ID number of plant unit |
| 5 | MODE_BLK | | | |
| | Target | R/W | OOS | Mode requested by operator |
| | Actual | RO | OOS | The current mode of the block |
| | Permitted | R/W | Auto, OOS, Man | Modes allowed for this block |
| | Normal | R/W | Auto | Mode of block during normal operations |
| 6 | BLOCK_ERR | RO | OutOfService | Error status of the hardware or software |
| 7 | PV | | | |
| | Status | RO | Bad, NonSpecific, NotLimited | The status of this block |
| | Value | RO | 0 | The value of this block |
| 8 | OUT | | | |
| | Status | RO | Bad, OutOfService, NotLimited | The status of this block |
| | Value | Note 2 | 0 | The primary analog value calculated by the transmitter or entered by the user in Manual mode |
| 9 | SIMULATE | | | Simulates the transducer input or output to this block |
| | Simulate Status | | | |
| | Quality | R/W | Bad | Quality of the measurement |
| | Substatus | R/W | NonSpecific | Substatus |
| | Limits | R/W | NotLimited | Limits |
| | Simulate Value | R/W | 0 | Used for the transducer value when simulation is enabled |
| | Transducer Status | RO | Bad, NonSpecific, NotLimited | Set by transmitter - status of the transducer |
| | Transducer Value | RO | 0 | Current value supplied by the transducer |
| Enable/Disable | R/W | Disabled | Enable/disable simulation | |

Table 13. Fieldbus Parameters (Continued)

| Rel Index | Parameter Name | RO or R/W | Initial Factory Settings | Comments |
|-----------|----------------|-----------|-------------------------------|---|
| 10 | XD_SCALE | | | The range, units, and precision of XD_SCALE |
| | EU_at_100% | R/W | 100 | The engineering units value at 100% of range |
| | EU_at_0% | R/W | 0 | The engineering units value at 0% of range |
| | Units_Index | R/W | inH2O | Engineering units for the transducer value |
| | Decimal | R/W | 5 | The number of digits to the right of the decimal point |
| 11 | OUT_SCALE | | | The range, units, and precision of OUT_SCALE |
| | EU_at_100% | R/W | 100 | The engineering units value at 100% of range |
| | EU_at_0% | R/W | 0 | The engineering units value at 0% of range |
| | Units_Index | R/W | % | Engineering units for the output value |
| | Decimal | R/W | 5 | The number of digits to the right of the decimal point |
| 12 | GRANT_DENY | | | Options for controlling access of host computers and local control panels to operating, tuning, and alarm parameters |
| | Grant | R/W | 0 (none selected) | |
| | Deny | R/W | 0 (none selected) | |
| 13 | IO_OPTS | R/W | 0 (none selected) | Options to alter input and output block processing |
| 14 | STATUS_OPTS | R/W | 0 (none selected) | Options for block processing of status |
| 15 | CHANNEL | R/W | AI1 = pressure AI2 = STemp | The logical channel connected to this block - Channel 1 is pressure, Channel 2 is sensor temperature, and Channel 3 is flow |
| 16 | L_TYPE | Note 2 | Indirect | Determines if value is to be used directly or converted |
| 17 | LOW_CUT | R/W | 0 | Not Applicable. Only used in square root processing |
| 18 | PV_FTIME | R/W | 0 | Time constant of a single exponential filter for the PV, in seconds. |
| 19 | FIELD_VAL | | | |
| | Status | RO | Bad, NonSpecific, NotLimited | Status of transducer condition before signal characterization or filtering |
| | Value | RO | 0 | Raw value of the field device in % of PV range |
| 20 | UPDATE_EVT | RO | | Generated by any change to static data of the block |

Table 13. Fieldbus Parameters (Continued)

| Rel Index | Parameter Name | RO or R/W | Initial Factory Settings | Comments |
|-----------|------------------|-----------|--------------------------|---|
| 21 | BLOCK_ALM | RO | | For all configuration, hardware, connection failure, or system problems |
| 22 | ALARM_SUM | | | The current alert status |
| | Current | RO | 0 | The active state of each alarm |
| | Unacknowledged | RO | 0 | The unacknowledged state of each alarm |
| | Unreported | RO | 0 | The unreported state of each alarm |
| | Disabled | R/W | no alarms disabled | The disabled state of each alarm |
| 23 | ACK_OPTION | R/W | no alarms auto ack'd | Selection of which alarms are automatically acknowledged |
| 24 | ALARM_HYS | R/W | 0.5% | Amount the PV must return within alarm limits before the alarm condition clears |
| 25 | HI_HI_PRI | R/W | 0 | Priority of the High-High alarm |
| 26 | HI_HI_LIM | R/W | 1.#INF | The setting for High-High alarm in engineering units |
| 27 | HI_PRI | R/W | 0 | Priority of the High alarm |
| 28 | HI_LIM | R/W | 1.#INF | The setting for High alarm in engineering units |
| 29 | LO_PRI | R/W | 0 | Priority of the Low alarm |
| 30 | LO_LIM | R/W | -1.#INF | The setting for Low alarm in engineering units |
| 31 | LO_LO_PRI | R/W | 0 | Priority of the Low-Low alarm |
| 32 | LO_LO_LIM | R/W | -1.#INF | The setting for Low-Low alarm in engineering units |
| 33 | HI_HI_ALM | RO | 0 | The status of the High-High alarm |
| 34 | HI_ALM | RO | 0 | The status of the High alarm |
| 35 | LO_ALM | RO | 0 | The status of the Low alarm |
| 36 | LO_LO_ALM | RO | 0 | The status of the Low-Low alarm |
| 37 | BLOCK_ERR_DESC_1 | RO | 0 | Details of a block error. |

| PID Block | | | | |
|-----------|-----------|-----|-------------|---|
| | BLOCK_TAG | R/W | PID(450) | Unique Block ID |
| 1 | ST_REV | RO | current rev | Static data revision |
| 2 | TAG_DESC | R/W | blank | User description of the block application |
| 3 | STRATEGY | R/W | 0 | To ID groups of blocks |
| 4 | ALERT_KEY | R/W | 0 | ID number of plant unit |

Table 13. Fieldbus Parameters (Continued)

| Rel Index | Parameter Name | RO or R/W | Initial Factory Settings | Comments |
|-----------|----------------|-----------|---------------------------------|--|
| 5 | MODE_BLK | | | |
| | Target | R/W | OOS | Mode requested by operator |
| | Actual | RO | OOS | The current mode of the block |
| | Permitted | R/W | Auto, Man, OOS, ROut, RCas, Cas | Modes allowed for this block |
| | Normal | R/W | Auto | Mode of block during normal operations |
| 6 | BLOCK_ERR | RO | Out of Service | Error status of the hardware or software |
| 7 | PV | | | |
| | Status | RO | Bad; NonSpecific; NotLimited | The status of this parameter |
| | Value | RO | 0 | The value of this parameter |
| 8 | SP | | | The value and status for this parameter |
| | Status | RO | Bad; OutOfService; NotLimited | The setpoint status is determined by the transmitter |
| | Value | Note 3 | 0 | The setpoint value must be written even if correctly shown |
| 9 | OUT | | | |
| | Status | RO | Bad; OutOfService; NotLimited | The status of the output of this block |
| | Value | Note 2 | 0 | The primary analog value calculated by the transmitter or entered by the user in Manual mode |
| 10 | PV_SCALE | | | The range, units, and precision of the PV parameter |
| | EU_at_100% | R/W | 100 | The engineering units value at 100% of range |
| | EU_at_0% | R/W | 0 | The engineering units value at 0% of range |
| | Units_Index | R/W | % | Engineering units |
| | Decimal | R/W | 5 | The number of digits to the right of the decimal point |

Table 13. Fieldbus Parameters (Continued)

| Rel Index | Parameter Name | RO or R/W | Initial Factory Settings | Comments |
|-----------|----------------|-----------|-------------------------------------|--|
| 11 | OUT_SCALE | | | The range, units, and precision of the OUT parameter |
| | EU_at_100% | R/W | 100 | The engineering units value at 100% of range |
| | EU_at_0% | R/W | 0 | The engineering units value at 0% of range |
| | Units_Index | R/W | % | Engineering units |
| | Decimal | R/W | 5 | The number of digits to the right of the decimal point |
| 12 | GRANT_DENY | | | Options for controlling access of host computers and local control panels to operating, tuning, and alarm parameters |
| | Grant | R/W | 0 (none selected) | |
| | Deny | R/W | 0 (none selected) | |
| 13 | CONTROL_OPTS | R/W | 0 (none selected) | Options to alter calculations in the control block |
| 14 | STATUS_OPTS | R/W | 0 (none selected) | Options for block processing of status |
| 15 | IN | | | |
| | Status | Note 4 | Bad; NotConnected; NotLimited | The status of this block |
| | Value | | 0 | The primary input value of this block |
| 16 | PV_FTIME | R/W | 0 | Time constant of a single exponential filter for the PV in seconds. |
| 17 | BYPASS | R/W | 0 (none selected) | Enables the normal control algorithm to be bypassed |
| 18 | CAS_IN | | | The remote setpoint status and value |
| | Status | Note 4 | Bad; NotConnected; NotLimited | The status of this block |
| | Value | | 0 | The value of this block |
| 19 | SP_RATE_DN | R/W | +INF | Ramp rate at which downward setpoint changes are acted upon in Auto mode |
| 20 | SP_RATE_UP | R/W | +INF | Ramp rate at which upward setpoint changes are acted upon in Auto mode |
| 21 | SP_HI_LIM | R/W | 100 | Setpoint high limit |
| 22 | SP_LO_LIM | R/W | 0 | Setpoint low limit |
| 23 | GAIN | R/W | 0 | Value used by the block algorithm in calculating the block output |
| 24 | RESET | R/W | +INF | Integral time constant in seconds per repeat |
| 25 | BAL_TIME | R/W | 0 | Time for internal working value of bias or ratio to return to the operator set bias or ratio in seconds |

Table 13. Fieldbus Parameters (Continued)

| Rel Index | Parameter Name | RO or R/W | Initial Factory Settings | Comments |
|-----------|----------------|-----------|-------------------------------------|---|
| 26 | RATE | R/W | 0 | Derivative time constant in seconds |
| 27 | BKCAL_IN | | | Value and status from a lower block's BKCAL_OUT |
| | Status | Note 4 | Bad; NotConnected; NotLimited | The status of this block |
| | Value | | 0 | The value of this block |
| 28 | OUT_HI_LIM | R/W | 100 | Limits the maximum output value |
| 29 | OUT_LO_LIM | R/W | 0 | Limits the minimum output value |
| 30 | BKCAL_HYS | R/W | 0.5 | Amount the output must change away from its output limit before the limit status is turned off (in % of span of the output) |
| 31 | BKCAL_OUT | | | Value and status from an upper block's BKCAL_IN |
| | Status | RO | Bad; NonSpecific; NotLimited | The status of this block |
| | Value | RO | 0 | The value of this block |
| 32 | RCAS_IN | | | Target setpoint and status provided by a supervisory host to an analog control or output block |
| | Status | R/W | Bad; OutOfService; NotLimited | The status of this block |
| | Value | R/W | 0 | The value of this block |
| 33 | ROUT_IN | | | Target setpoint and status provided by a host to the control block for use as the output |
| | Status | R/W | Bad; OutOfService; NotLimited | The status of this block |
| | Value | R/W | 0 | The value of this block |
| 34 | SHED_OPT | R/W | 0 (uninitialized) | Action to be taken on remote control device timeout |
| 35 | RCAS_OUT | | | Block setpoint and status after ramping |
| | Status | RO | Bad; NonSpecific; NotLimited | The status of this block |
| | Value | RO | 0 | The value of this block |
| 36 | ROUT_OUT | | | Block output and status provided to a host |
| | Status | RO | Bad; NonSpecific; NotLimited | The status of this block |
| | Value | RO | 0 | The value of this block |

Table 13. Fieldbus Parameters (Continued)

| Rel Index | Parameter Name | RO or R/W | Initial Factory Settings | Comments |
|-----------|----------------|-----------|-------------------------------------|--|
| 37 | TRK_SCALE | | | The range, units, and precision associated with TRK_VALr |
| | EU_at_100% | R/W | 100 | Engineering units value at 100% of scale |
| | EU_at_0% | R/W | 0 | Engineering units value at 0% of scale |
| | Units_Index | R/W | % | Engineering units |
| | Decimal | R/W | 5 | The number of digits to the right of the decimal point |
| 38 | TRK_IN_D | | | Used to initiate external tracking of the block output to the value specified in TRK_VAL |
| | Status | Note 4 | Bad; NotConnected; NotLimited | The status of this block |
| | Value | | 0 | The value of this block |
| 39 | TRK_VAL | | | Input used as the track value when external tracking is enabled by TRK_IN_D |
| | Status | Note 4 | Bad; NotConnected; NotLimited | The status of this block |
| | Value | | 0 | The value of this block |
| 40 | FF_VAL | | | The feed forward status and value |
| | Status | Note 4 | Bad; NotConnected; NotLimited | The status of this block |
| | Value | | 0 | The value of this block |
| 41 | FF_SCALE | | | The range, units and precision of the feed forward input |
| | EU_at_100% | R/W | 100 | Engineering units value at 100% of scale |
| | EU_at_0% | R/W | 0 | Engineering units value at 0% of scale |
| | Units_Index | R/W | % | Engineering units |
| | Decimal | R/W | 5 | The number of digits to the right of the decimal point |
| 42 | FF_GAIN | Note 2 | 0 | Gain that the feedforward input is multiplied by before it is added to the calculated control output |
| 43 | UPDATE_EVT | RO | | Generated by any change to static data of the block |
| 44 | BLOCK_ALM | RO | | For all config, hardware, connection failures, and system problems |
| 45 | ALARM_SUM | | | |
| | Current | RO | 0 | The active state of each alarm |
| | Unacknowledged | RO | 0 | The unacknowledged state of each alarm |
| | Unreported | RO | 0 | The unreported state of each alarm |
| | Disabled | R/W | no alarms disabled | The disabled state of each alarm |
| 46 | ACK_OPTION | R/W | no alarms auto ack'd | Selection of which alarms will be automatically ack'd |

Table 13. Fieldbus Parameters (Continued)

| Rel Index | Parameter Name | RO or R/W | Initial Factory Settings | Comments |
|-----------|------------------|-----------|--------------------------|---|
| 47 | ALARM_HYS | R/W | 0.5% | Amount the PV must return within alarm limits before the alarm condition clears |
| 48 | HI_HI_PRI | R/W | 0 | Priority of the High-High alarm (0-15) |
| 49 | HI_HI_LIM | R/W | +INF | Setting of High-High alarm in engineering units |
| 50 | HI_PRI | R/W | 0 | Priority of the High alarm (0-15) |
| 51 | HI_LIM | R/W | +INF | Setting of High alarm in engineering units |
| 52 | LO_PRI | R/W | 0 | Priority of the Low alarm (0-15) |
| 53 | LO_LIM | R/W | -INF | Setting for Low alarm in engineering units |
| 54 | LO_LO_PRI | R/W | 0 | Priority of the Low-Low alarm (0-15) |
| 55 | LO_LO_LIM | R/W | -INF | Setting of Low-Low alarm in engineering units |
| 56 | DV_HI_PRI | R/W | 0 | Priority for the high deviation alarm |
| 57 | DV_HI_LIM | R/W | +INF | Setting of high deviation alarm in engineering units |
| 58 | DV_LO_PRI | R/W | 0 | Priority for the low deviation alarm |
| 59 | DV_LO_LIM | R/W | -INF | Setting of low deviation alarm in engineering units |
| 60 | HI_HI_ALM | RO | 0 | Status and Value of the High-High alarm |
| 61 | HI_ALM | RO | 0 | Status and Value of the High alarm |
| 62 | LO_ALM | RO | 0 | Status and Value of the Low alarm |
| 63 | LO_LO_ALM | RO | 0 | Status and Value of the Low-Low alarm |
| 64 | DV_HI_ALM | RO | 0 | Status and Value of the High Deviation Alarm |
| 65 | DV_LO_ALM | RO | 0 | Status and Value of the Low Deviation Alarm |
| 66 | BLOCK_ERR_DESC_1 | RO | 0 | Details of a block error. |

(1) Transmitter parameters are configured as follows if calibrated range is not provided with the order:

Span Code D: 0 to 200 psi; Span Code E: 0 to 2000 psi

(2) R/W only in Manual or Out of Service mode.

(3) R/W only in Auto, ROut, or Out of Service

(4) R/W only when communication link not connected.

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