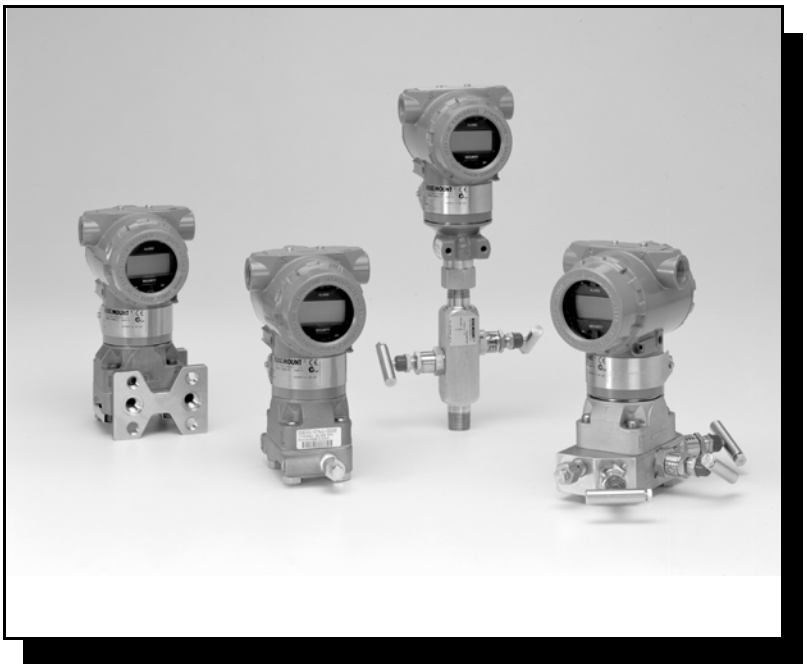
**Reference Manual**
00809-0100-4797, Rev CA
August 2010

# Rosemount 3051 Pressure Transmitter

## with Profibus PA Protocol



PROFI PROCESS FIELD BUS

ROSEMOUNT®

www.rosemount.com

EMERSON™
Process Management

# Rosemount 3051 Pressure Transmitter

**NOTICE**

Read this manual before working with the product. For personal and system safety, and for optimum product performance, make sure you thoroughly understand the contents before installing, using, or maintaining this product.

For technical assistance, contacts are listed below:

**Customer Central**
Technical support, quoting, and order-related questions.

United States - 1-800-999-9307 (7:00 am to 7:00 pm CST)

Asia Pacific- 65 777 8211

Europe/ Middle East/ Africa - 49 (8153) 9390

**North American Response Center**
Equipment service needs.

1-800-654-7768 (24 hours—includes Canada)

Outside of these areas, contact your local Emerson Process Management representative.

**⚠CAUTION**

The products described in this document are NOT designed for nuclear-qualified applications. Using non-nuclear qualified products in applications that require nuclear-qualified hardware or products may cause inaccurate readings.

For information on Rosemount nuclear-qualified products, contact your local Emerson Process Management Sales Representative.

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## SECTION 4 Electrical Installation



## SECTION 5 Calibration



## SECTION 6 Troubleshooting

## APPENDIX A Specifications and Reference Data

# Section 1 Introduction

## USING THIS MANUAL

The sections in this manual provide information on installing, operating, and maintaining the Rosemount 3051. The sections are organized as follows:

**Section 2: Configuration** provides instruction on commissioning and operating Rosemount 3051 transmitters. Information on software functions, configuration parameters, and online variables is also included.

**Section 3: Hardware Installation** contains mechanical installation instructions, and field upgrade options.

**Section 4: Electrical Installation** contains electrical installation instructions, and field upgrade options.

**Section 5: Calibration** contains operation and maintenance techniques.

**Section 6: Troubleshooting** provides troubleshooting techniques for the most common operating problems.

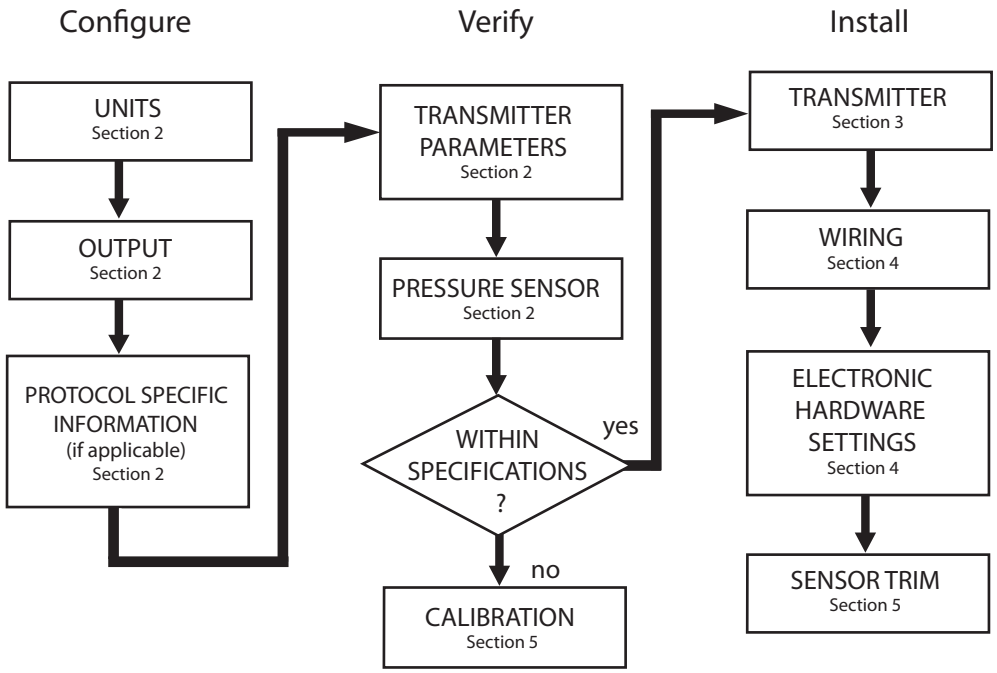
**Appendix A: Specifications and Reference Data** supplies reference and specification data, as well as ordering information.

**Appendix B: Product Certifications** contains intrinsic safety approval information, European ATEX directive information, and approval drawings.

**Appendix C: Local Operator Interface Menu** contains the complete Local Operator Interface menu.

**Appendix D: Profibus Block Information** contains Profibus block and parameter information.

Figure 1-1. Commissioning and Installation Flowchart




## SERVICE SUPPORT

To expedite the return process outside of the United States, contact the nearest Emerson Process Management representative.

Within the United States, call the Emerson Process Management Instrument and Valve Response Center using the 1-800-654-RSMT (7768) toll-free number. This center, available 24 hours a day, will assist you with any needed information or materials.

The center will ask for product model and serial numbers, and will provide a Return Material Authorization (RMA) number. The center will also ask for the process material to which the product was last exposed.

**⚠CAUTION**

Individuals who handle products exposed to a hazardous substance can avoid injury if they are informed of and understand the hazard. The product being returned will require a copy of the required Material Safety Data Sheet (MSDS) for each substance must be included with the returned goods.

Emerson Process Management Instrument and Valve Response Center representatives will explain the additional information and procedures necessary to return goods exposed to hazardous substances.

## MODELS COVERED

The following Rosemount 3051 Pressure Transmitters are covered by this manual:

**Rosemount 3051C Coplanar Pressure Transmitter**

**Rosemount 3051CD Differential Pressure Transmitter**
Measures differential pressure up to 2000 psi (137,9 bar).

**Rosemount 3051CG Gage Pressure Transmitter**
Measures gage pressure up to 2000 psi (137,9 bar).

**Rosemount 3051CA Absolute Pressure Transmitter**
Measures absolute pressure up to 4000 psia (275,8 bar).

**Rosemount 3051T In-Line Pressure Transmitter**

**Rosemount 3051T Gage and Absolute Pressure Transmitter**
Measures gage pressure up to 10000 psi (689,5 bar).

**Rosemount 3051L Liquid Level Transmitter**

Provides precise level and specific gravity measurements up to 300 psi (20,7 bar) for a wide variety of tank configurations.

**NOTE**
For Rosemount 3051 with HART®, see Rosemount Product Manual 00809-0100-4001. For Rosemount 3051 with FOUNDATION™ fieldbus, see Rosemount Product Manual 00809-0100-4774.

## DEVICE REVISIONS

Table 1-1. Device Revisions (NE53)

| Date | Software Revision | Profibus Profile | Changes to Software | Compatible Files | Manual Revision |
|---|---|---|---|---|---|
| 08/10 | 2.5.0 [1...1] | 3.02 | New Product | 3051 GSD: rmt4444.gsd<br>Profile 3.02 GSD: pa139700.gsd<br>DD: ROPA3__TP_3051.ddl<br>DTM: Pressure_Profibus_3.02_DTM_v1.0.8.exe | CA |

## TRANSMITTER OVERVIEW

The Rosemount 3051C Coplanar™ design is offered for Differential Pressure (DP), Gage Pressure (GP) and Absolute Pressure (AP) measurements. The Rosemount 3051C utilizes Emerson Process Management capacitance sensor technology for DP and GP measurements. Piezoresistive sensor technology is utilized in the Rosemount 3051T and 3051CA measurements.

The major components of the Rosemount 3051 are the sensor module and the electronics housing. The sensor module contains the oil filled sensor system (isolating diaphragms, oil fill system, and sensor) and the sensor electronics. The sensor electronics are installed within the sensor module and include a temperature sensor (RTD), a memory module, and the capacitance to digital signal converter (C/D converter). The electrical signals from the sensor module are transmitted to the output electronics in the electronics housing. The electronics housing contains the output electronics board, the optional local operator interface (LOI) buttons, and the terminal block.

For the Rosemount 3051C design pressure is applied to the isolating diaphragms, the oil deflects the center diaphragm, which then changes the capacitance. This capacitance signal is then changed to a digital signal in the C/D converter. The microprocessor then takes the signals from the RTD and C/D converter calculates the correct output of the transmitter.

## PRODUCT RECYCLING/DISPOSAL

Recycling of equipment and packaging should be taken into consideration and disposed of in accordance with local and national legislation/regulations.

# Section 2 Configuration



## OVERVIEW

This section contains information on commissioning the Rosemount 3051 Profibus Pressure Transmitter using either the Local Operator Interface (LOI) or class two master.

## SAFETY MESSAGES

Procedures and instructions in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that raises potential safety issues is indicated by a warning symbol (⚠). Refer to the following safety messages before performing an operation preceded by this symbol.

### Warnings

**⚠WARNING**

Explosions could result in death or serious injury:

Installation of this transmitter in an explosive environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Please review the approvals section of the 3051 reference manual for any restrictions associated with a safe installation.

- In an Explosion-Proof/Flameproof installation, do not remove the transmitter covers when power is applied to the unit.

Process leaks may cause harm or result in death.

- Install and tighten process connectors before applying pressure.

Electrical shock can result in death or serious injury.

- Avoid contact with the leads and terminals. High voltage that may be present on leads can cause electrical shock.

## HAZARDOUS LOCATIONS CERTIFICATIONS

⚠ Individual transmitters are clearly marked with a tag indicating the approvals they carry. Transmitters must be installed in accordance with all applicable codes and standards to maintain these certified ratings. Refer to “Hazardous Locations Certifications” on page B-2 for information on these approvals.

## CONFIGURATION GUIDELINES

The Rosemount 3051 can be configured either before or after installation. Configuring the transmitter on the bench using the Local Operator Interface (LOI) or class two master ensures that all transmitter components are in working order prior to installation.

To configure on the bench, required equipment includes a power supply, an LOI (option M4) or a class two master with DP/PA coupler, proper cable and terminators.

Verify that the Security hardware jumper is set to the OFF position in order to proceed with configuration. See Figure 4-2 for jumper location.

## Profile 3.02 Identification Number Adaptation Mode

Rosemount 3051 Profibus Profile 3.02 devices are set to Identification Number Adaptation mode (0127) when shipped from the factory. This mode allows the transmitter to communicate with any Profibus class one master with either the generic Profile GSD (9700) or Rosemount 3051 specific GSD (4444).

## Block Modes

When configuring a device with the LOI, the output status will change to *Good – Function Check* to alert hosts that the transmitter is not in standard operation mode.

When configuring a device with a class two master, blocks must be set to *Out of Service (OOS)* in order to download parameters that could affect the output. This prevents the class one master from seeing a jump in output without a status change. Setting the blocks *OOS* and back into *Auto* is done automatically using the class two master when using the Rosemount 3051 DD or DTM, so no additional action is required when configuring the device.

## Configuration Tools

The Rosemount 3051 can be configured using two tools: LOI or class two master.

The LOI requires option code M4 to be ordered. To activate the LOI, push either configuration button located under the top tag of the transmitter. See Table 2-1 and Figure 2-1 for operation and menu information. See Appendix D for a complete LOI menu tree.

Class two masters require either DD or DTM files for configuration. These files can be found at www.rosemount.com or by contacting your local Emerson Process representative.

The remainder of this section will cover the configuration tasks using either configuration tool.

**NOTE**
Instructions in this section use the language found in the class two master or LOI. See Appendix D: Profibus Block Information to cross reference parameters between the class two master, LOI and Profibus specification.

## BASIC SETUP TASKS

The following tasks are recommended for initial configuration of the Rosemount 3051 Profibus device.

### Assign Address

The Rosemount 3051 is shipped with a temporary address of 126. This must be changed to a unique value between 0 and 125 in order to establish communication with the class one master. Usually, addresses 0-2 are reserved for masters, therefore transmitter addresses between 3 and 125 are recommended for the device.

Address can be set using either:

- LOI – see Table 2-1 and Figure 2-1
- Class two master – see respective class two master manual for setting instrument addresses

### Pressure Configuration

Unless otherwise requested, the Rosemount 3051 ships with the following settings:

- Measurement Type: Pressure
- Engineering Units: Inches H2O
- Linearization: None
- Scaling: None

Each of these parameters can be set using,

- LOI – see Table 2-1 and Figure 2-1
- Class two master – see Table 2-2 for configuration

**Pressure Unit Parameters**

The LOI was designed to automatically set the following parameters when selecting a Pressure Unit:

- Measurement Type: Pressure
- Linearization: None
- Scaling: None

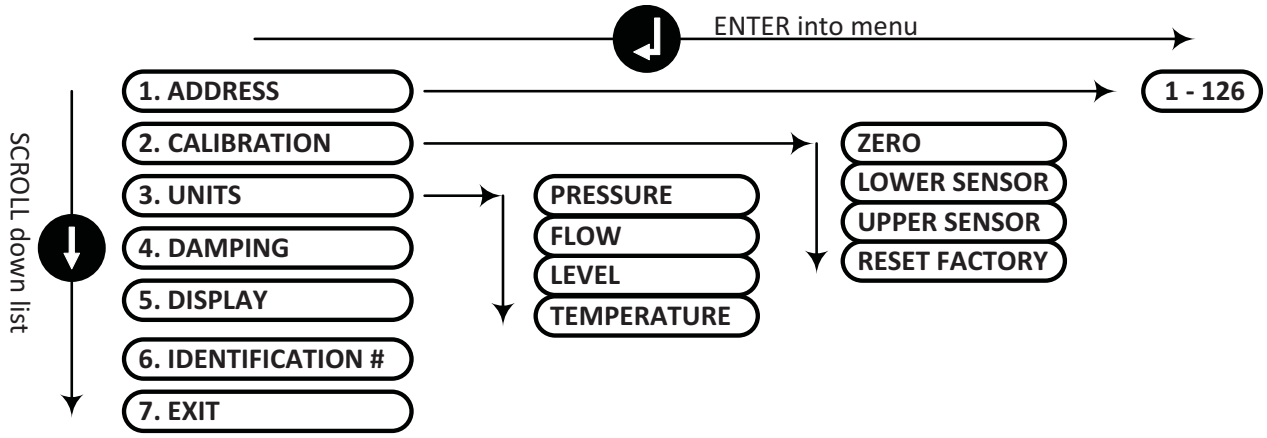
See Flow or Level Configuration for defaults when configuring with the LOI.

Table 2-1. LOI Operation

| Button | Action | Navigation | Character Entry | Save? |
|---|---|---|---|---|
|  | Scroll | Moves down menu categories | Changes character value(1) | Changes between Save and Cancel |
|  | Enter | Select menu category | Enters character and advances | Saves |

*(1) Characters flash when they can be changed.*

Figure 2-1. LOI Menu




**NOTE**
See Appendix C for a more detailed LOI menu and unit list.

Table 2-2. Pressure Configuration using class two master

| Steps | Category >> Field >> Value |
|---|---|
| **Set Measurement Type**(1) | Primary Value >> Primary Value Type >> Pressure |
| **Select Units**<br>All units must match | Scale In (Transducer Block) >> Unit (Secondary Value 1) >> [Pressure unit]<br>Scale Out (Transducer Block) >> Unit (PV) >> [Pressure unit]<br>Output Signal (AI Block) >> Unit (Output) >> [Pressure unit] |
| **Enter Scaling**<br>Scaling is done in the Transducer Block.<br>No scaling required for Pressure measurement. | Scale In (Transducer Block) >> Lower Value >> 0<br>Scale In (Transducer Block) >> Upper Value >> 100<br>Scale Out (Transducer Block) >> Lower Value >> 0<br>Scale Out (Transducer Block) >> Upper Value >> 100 |
| **Verify Analog Input (AI) Block**<br>Scaling should not be repeated in the AI Block | Process Value Scale (AI Block) >> Lower Value >> 0<br>Process Value Scale (AI Block) >> Upper Value >> 100<br>Output Signal (AI Block) >> Lower Value >> 0<br>Output Signal (AI Block) >> Upper Value >> 100<br>Output Signal (AI Block) >> Characterization Type >> No Linearization |

*(1) Measurement Type Pressure drives Linearization to None (Characterization >> Characterization Type >> No linearization) when downloaded to the device. Re-upload configuration to verify new Characterization Type.*

## DETAILED SETUP TASKS

The following tasks explain how to configure the Rosemount 3051 for Flow or Level measurement and how to configure additional parameters found in the device.

## Flow Configuration

### LOI

To configure the Rosemount 3051 for Flow measurement with the LOI, select UNITS >> FLOW. When configuring Flow units, the following parameters are set:

Measurement Type: Flow
Linearization: Square Root

During unit configuration, the user defines scaling, units and low flow cutoff per the application requirements. See Appendix D for detailed menu for further scaling help.

**NOTE**
The LOI assumes a zero based scaling (minimum pressure = minimum flow = zero) for Flow applications in order to improve configuration efficiency. Class two masters can be used if non-zero based scaling is required. Low Flow Cutoff has a default value of 5.0%. Low Flow Cutoff can be set to 0% if required.

### Class two master

See Table 2-3 for Flow configuration with a class two master.

Table 2-3. Flow Configuration using class two master

| Steps | Category >> Field >> Value |
|---|---|
| **Set Measurement Type**(1) | Primary Value >> Primary Value Type>> Flow |
| **Select Units**<br>Flow units must match | Scale In (Transducer Block) >> Unit (Secondary Value 1) >> [Pressure unit]<br>Scale Out (Transducer Block) >> Unit (PV) >> [Flow unit]<br>Output Signal (AI Block) >> Unit (Output) >> [Flow unit] |
| **Enter Scaling**<br>Scaling is done in the Transducer Block. | Scale In (Transducer Block) >> Lower Value >> 0<br>Scale In (Transducer Block) >> Upper Value >> [HI Pressure Value]<br>Scale Out (Transducer Block) >> Lower Value >> 0<br>Scale Out (Transducer Block) >> Upper Value >> [HI Flow Value]<br>Primary Value > Low Flow Cut Off >> [% of Flow Range] |
| **Verify Analog Input (AI) Block**<br>Scaling should not be repeated in the AI Block | Process Value Scale (AI Block) >> Lower Value >> 0<br>Process Value Scale (AI Block) >> Upper Value >> 100<br>Output Signal (AI Block) >> Lower Value >> 0<br>Output Signal (AI Block) >> Upper Value >> 100<br>Output Signal (AI Block) >> Characterization Type >> No Linearization |

*(1) Measurement Type Flow drives Linearization to Square Root (Characterization >> Characterization Type >> Square Root) when downloaded to the device. Re-upload configuration to verify new Characterization Type.*

## Level Configuration

### LOI

To configure the Rosemount 3051 for Level measurement with the LOI, select UNITS >> LEVEL. When configuring Level units, the following parameters are set:

- Measurement Type: Level
- Linearization: None

During unit configuration, the user defines scaling and units per the application requirements. See Appendix D for detailed menu for further scaling help.

### Class two master

See Table 2-4 for Level configuration with a class two master.

Table 2-4. Level Configuration using class two master

| Steps | Category >> Field >> Value |
|---|---|
| **Set Measurement Type**(1) | Primary Value >> Primary Value Type >> Level |
| **Select Units**<br>Level units must match | Scale In (Transducer Block) >> Unit (Secondary Value 1) >> [Pressure unit]<br>Scale Out (Transducer Block) >> Unit (PV) >> [Level unit]<br>Output Signal (AI Block) >> Unit (Output) >> [Level unit] |
| **Enter Scaling**<br>Scaling is done in the Transducer Block. | Scale In (Transducer Block) >> Lower Value >> [LO Pressure Value]<br>Scale In (Transducer Block) >> Upper Value >> [HI Pressure Value]<br>Scale Out (Transducer Block) >> Lower Value >> [LO Level Value]<br>Scale Out (Transducer Block) >> Upper Value >> [HI Level Value] |
| **Verify Analog Input (AI) Block**<br>Scaling should not be repeated in the AI Block | Output Signal (AI Block) >> Lower Value >> 0<br>Output Signal (AI Block) >> Upper Value >> 100<br>Output Signal (AI Block) >> Characterization Type >> No Linearization |

*(1) Measurement Type Level drives Linearization to None (Characterization >> Characterization Type >> Square Root) when downloaded to the device. Re-upload configuration to verify new Characterization Type.*

## Square-Root of DP Configuration

The Rosemount 3051 has two Pressure output settings: Linear and Square Root. Activate the square root output option to make output proportional to flow.

To configure the transmitter to output square root of differential pressure, a class two master must be used. See Table 2-5 for configuration.

Table 2-5. Square-Root of DP Configuration using class two master

| Steps | Category >> Field >> Value |
|---|---|
| **Set Measurement Type**(1) | Primary Value >> Primary Value Type >> Pressure |
| **Select Units**<br>All units must match | Scale In (Transducer Block) >> Unit (Secondary Value 1) >> [Pressure unit]<br>Scale Out (Transducer Block) >> Unit (PV) >> [Pressure unit]<br>Output Signal (AI Block) >> Unit (Output) >> [Pressure unit] |
| **Enter Scaling**<br>Scaling is done in the Transducer Block.<br>No scaling required for Pressure measurement. | Scale In (Transducer Block) >> Lower Value >> 0<br>Scale In (Transducer Block) >> Upper Value >> 100<br>Scale Out (Transducer Block) >> Lower Value >> 0<br>Scale Out (Transducer Block) >> Upper Value >> 100 |
| **Verify Analog Input (AI) Block**<br>Square Root needs to be applied in AI Block | Process Value Scale (AI Block) >> Lower Value >> 0<br>Process Value Scale (AI Block) >> Upper Value >> 1<br>Output Signal (AI Block) >> Lower Value >> 0<br>Output Signal (AI Block) >> Upper Value >> 1<br>Output Signal (AI Block) >> Characterization Type >> Square Root |

*(1) Measurement Type Pressure drives Linearization to None (Characterization >> Characterization Type >> No Linearization) when downloaded to the device. Therefore Square Root is set in the AI Block as shown.*

## Damping

User-selected damping will affect the transmitters ability to respond to changes in the applied process. The Rosemount 3051 has a default damping value of 0.0 seconds applied in the Analog Input (AI) block.

Damping can be set using,

- LOI – see Table 2-1 and Figure 2-1
- Class two master – see Table 2-6 for configuration

Table 2-6. Damping Configuration using class two master

| Steps | Category >> Field >> Value |
|---|---|
| **Set Damping** | Damping >> Filter Time Const >> [Value] |

## Process Alerts

Process alerts activate an output alert status when the configured alert point is exceeded. A process alert will be transmitted continuously if the output set points are exceeded. The alert will reset once the value returns within range.

Process Alert parameters are defined as follows

- Upper Alarm: Changes Output Status to Good – Critical Alarm – Hi Limit
- Upper Warning: Changes Output Status to Good – Advisory Alarm – Hi Limit
- Lower Warning: Changes Output Status to Good – Advisory Alarm – Lo Limit
- Lower Alarm: Changes Output Status to Good – Critical Alarm – Lo Limit
- Alarm Hysteresis: Amount the output value must pass back into range before alarm is cleared.

  *Example:* Upper Alarm = 100 psi. Alarm Hysteresis = 0.5 psi. After activation at 100 psi, the alarm will clear once the output goes below 99.5 psi = 100 - 0.5 psi.

Process Alerts can be set using,

- Class two master – see Table 2-7 for configuration

Table 2-7. Process Alert Configuration using class two master

| Steps | Category >> Field >> Value |
|---|---|
| **Enter Process Alerts** | Output Limits >> Lower Limit Alarm >> [Value] |
| | Output Limits >> Lower Limit Warning >> [Value] |
| | Output Limits >> Upper Limit Warning >> [Value] |
| | Output Limits >> Upper Limit Alarm >> [Value] |
| | Output Limits >> Alarm Hysteresis >> [Value] |

## LCD Display

The LCD display connects directly to the electronics board which maintains direct access to the signal terminals. A display cover is provided to accommodate the display.

The display always indicates the transmitter output (Pressure, Flow or Level) as well as abbreviated diagnostic status when applicable. Sensor temperature and pressure are optional variables that can be configured using LOI or class two master. When turned on, the display will alternate between the selected variables.

For LCD display configuration using,

- LOI – see Table 2-1 and Figure 2-1 on page 2-4
- Class two master – see Table 2-8

Table 2-8. LCD Display Configuration using class two master

| Steps | Category >> Field >> Value |
|---|---|
| **Select Display Variables** | Local Operator Interface (LOI) >> Display Selection >> [Select] |

## Security

The Rosemount 3051 has a hierarchy of security features. The security jumper on the electronics board (or optional LCD display) provides the highest level of security. With the jumper in the ON position, all writes to the transmitter will be disabled (including writes from the LOI or a class two master).

See Section 4: Configure Security and Simulation for details on jumper configuration.

## LOI Security

In addition to the security jumper, the Rosemount 3051 Profibus LOI can be protected using two different software parameters:

- LOI Enable: Prevents operation of the local configuration buttons, hence disabling the LOI.
- LOI Password: Requires a user to enter a non-zero four digit password at the transmitter in order to operate the LOI.

These parameters can be set using,

- Class two master – See Table 2-9

Table 2-9. LOI Security Configuration using class two master

| Steps | Category >> Field >> Value |
|---|---|
| **Disable Buttons** | Local Operator Interface (LOI) >> LOI Enable? >> Disabled |
| **Enable Buttons** | Local Operator Interface (LOI) >> LOI Enable? >> Enabled |
| **Turn LOI Password On** | Local Operator Interface (LOI) >> Password >> [Enter Value] |
| **Turn LOI Password Off** | Local Operator Interface (LOI) >> Password >> 0 |

**NOTE**
Security jumper must be in the off position and the buttons must be enabled for the LOI to operate. The Password appears after the LOI is activated using the local configuration buttons.

## Simulation

Simulation is in the AI block and used to verify the output from the transducer block. The Rosemount 3051 has a simulation jumper located on the electronics board (or optional LCD display) that must be set to the ON position in order to simulate.

**NOTE**
This jumper position is ignored when the transmitter is initially powered. The jumper position must be changed while the transmitter is powered to activate simulation. If power is removed and restored, the simulation mode will be OFF regardless of jumper position.

With simulation enabled, the actual measurement value has no impact on the OUT value or the status. The OUT value will equal the simulated value from the transducer block plus any scaling or linearization effects performed in the AI block.

Once the simulation jumper is set to on, simulation mode can be activated using,

- Class two master – see Table 2-10

Table 2-10. Simulation Configuration using class two master

| Steps | Category >> Field >> Value |
|---|---|
| **Enable Simulation** | Select the following from the menu:<br>Device >> Simulation >> Simulation<br>Select Enabled<br>Enter Simulation Value<br>Select Simulation Status<br>Press Transfer |
| **Disable Simulation** | Select the following from the menu:<br>Device >> Simulation >> Simulation<br>Select Disabled<br>Press Transfer<br>Press Close |

# Section 3 Hardware Installation



## OVERVIEW

The information in this section covers installation considerations for the Rosemount 3051. A Quick Installation Guide is shipped with every transmitter to describe pipe-fitting, wiring procedures and basic configuration for initial installation.

## SAFETY MESSAGES

Procedures and instructions in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that raises potential safety issues is indicated by a warning symbol (⚠). Refer to the following safety messages before performing an operation preceded by this symbol.

### Warnings

**⚠WARNING**

Explosions could result in death or serious injury:

Installation of this transmitter in an explosive environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Please review the approvals section of the 3051 reference manual for any restrictions associated with a safe installation.

- In an Explosion-Proof/Flameproof installation, do not remove the transmitter covers when power is applied to the unit.

Process leaks may cause harm or result in death.

- Install and tighten process connectors before applying pressure.

Electrical shock can result in death or serious injury.

- Avoid contact with the leads and terminals. High voltage that may be present on leads can cause electrical shock.

## INSTALLATION CONSIDERATIONS

Measurement accuracy depends upon proper installation of the transmitter and impulse piping. Mount the transmitter close to the process and use a minimum of piping to achieve best accuracy. Keep in mind the need for easy access, personnel safety, practical field calibration, and a suitable transmitter environment. Install the transmitter to minimize vibration, shock, and temperature fluctuation.

**IMPORTANT**
Install the enclosed pipe plug (found in the box) in unused conduit opening. Engage a minimum of five threads to comply with explosion-proof requirements. Use a minimum of five threads engaged to comply with explosion-proof requirements. See Conduit Entry Threads for additional requirements. For NEMA 4X, IP66, and IP68 requirements, use thread seal (PTFE) tape or paste on male threads to provide a watertight seal.

For material compatibility considerations, see document number 00816-0100-3045 on www.emersonprocess.com/rosemount.

## Mechanical Considerations

### Steam Service

For steam service or for applications with process temperatures greater than the limits of the transmitter, do not blow down impulse piping through the transmitter. Flush lines with the blocking valves closed and refill lines with water before resuming measurement.

### Side Mounted

When the transmitter is mounted on its side, position the Coplanar flange to ensure proper venting or draining. Mount the flange as shown in Figure 3-9 on page 3-9, keeping drain/vent connections on the bottom for gas service and on the top for liquid service.

## Environmental Considerations

Best practice is to mount the transmitter in an environment that has minimal ambient temperature change. The transmitter electronics temperature operating limits are –40 to 185 °F (–40 to 85 °C). Refer to Appendix A: Specifications and Reference Data that lists the sensing element operating limits. Mount the transmitter so that it is not susceptible to vibration and mechanical shock and does not have external contact with corrosive materials.

# INSTALLATION PROCEDURES

## Mount the Transmitter

For dimensional drawing information refer to Appendix A: Specifications and Reference Data on page A-13.

### Process Flange Orientation

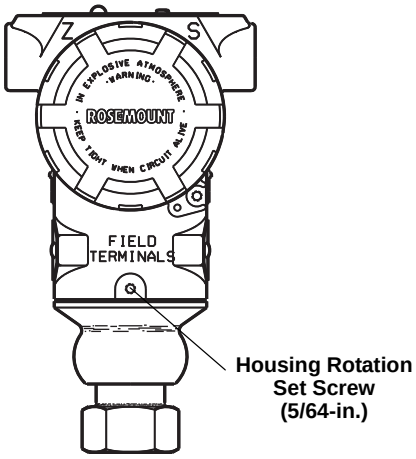
Mount the process flanges with sufficient clearance for process connections. For safety reasons, place the drain/vent valves so the process fluid is directed away from possible human contact when the vents are used. In addition, consider the need for a testing or calibration input.

### Housing Rotation

The electronics housing can be rotated up to 180 degrees in either direction to improve field access, or to better view the optional LCD display. To rotate the housing, perform the following procedure:

1. Loosen the housing rotation set screw using a $\frac{5}{64}$ -in. hex wrench.
2. Turn the housing left or right up to 180° from its original position. Over rotating will damage the transmitter.
3. Retighten the housing rotation set screw.

Figure 3-1. Housing Rotation




### Terminal Side of Electronics Housing

Mount the transmitter so the terminal side is accessible. Clearance of 0.75 in. (19 mm) is required for cover removal. Use a conduit plug in the unused conduit opening.

### Circuit Side of Electronics Housing

Provide 0.75 in. (19 mm) of clearance for units with out an LCD display. If LCD display is installed, mount for clear visibility. Three inches of clearance is required for LCD display cover removal.

### Conduit Entry Threads

For NEMA 4X, IP66, and IP68 requirements, use thread seal (PTFE) tape or paste on male threads to provide a watertight seal.

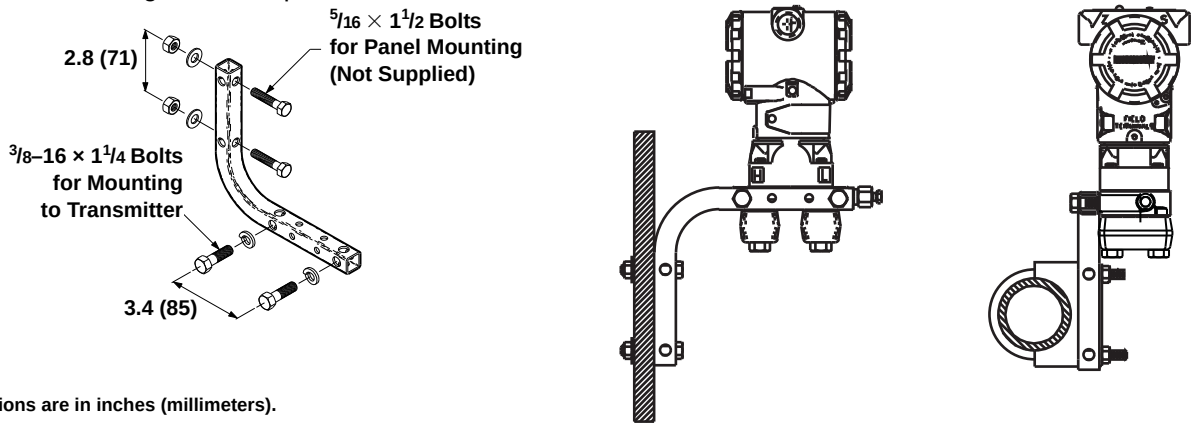
### Mounting Brackets

Rosemount 3051 may be panel-mounted or pipe-mounted through an optional mounting bracket. Refer to Table 3-1 for the complete offering and see Figure 3-2 through Figure 3-6 on pages 3-4 and 3-5 for dimensions and mounting configurations.

Table 3-1. Mounting Brackets

| 3051 Brackets | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Process Connections | | | Mounting | | | Materials | | | |
| Option Code | Coplanar | In-Line | Traditional | Pipe Mount | Panel Mount | Flat Panel Mount | CS Bracket | SST Bracket | CS Bolts | SST Bolts |
| B4 | X | X | | X | X | X | | X | | X |
| B1 | | | X | X | | | X | | X | |
| B2 | | | X | | X | | X | | X | |
| B3 | | | X | | | X | X | | X | |
| B7 | | | X | X | | | X | | | X |
| B8 | | | X | | X | | X | | | X |
| B9 | | | X | | | X | X | | | X |
| BA | | | X | X | | | | X | | X |
| BC | | | X | | | X | | X | | X |

Figure 3-2. Mounting Bracket Option Code B4




**NOTE**
**Dimensions are in inches (millimeters).**

Figure 3-3. Mounting Bracket Option Codes B1, B7, and BA

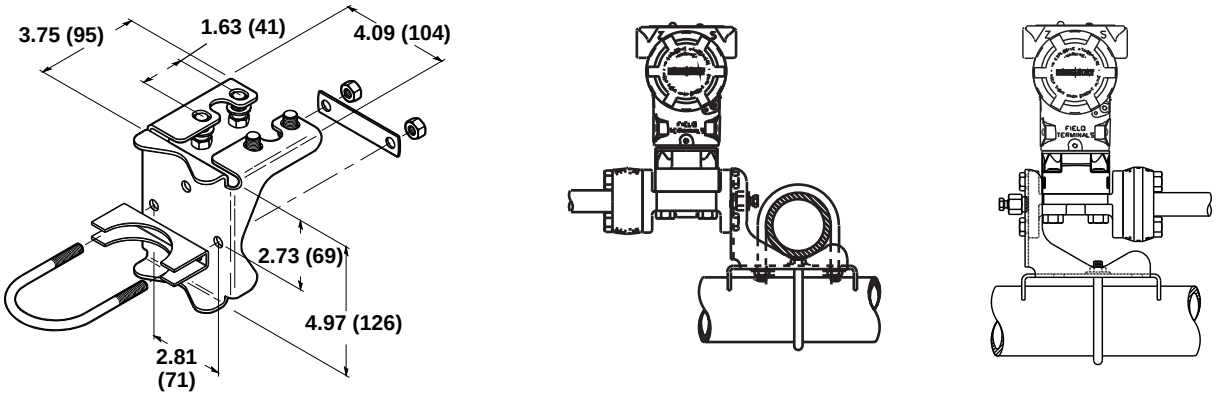



Figure 3-5. Panel Mounting Bracket Option Codes B2 and B8

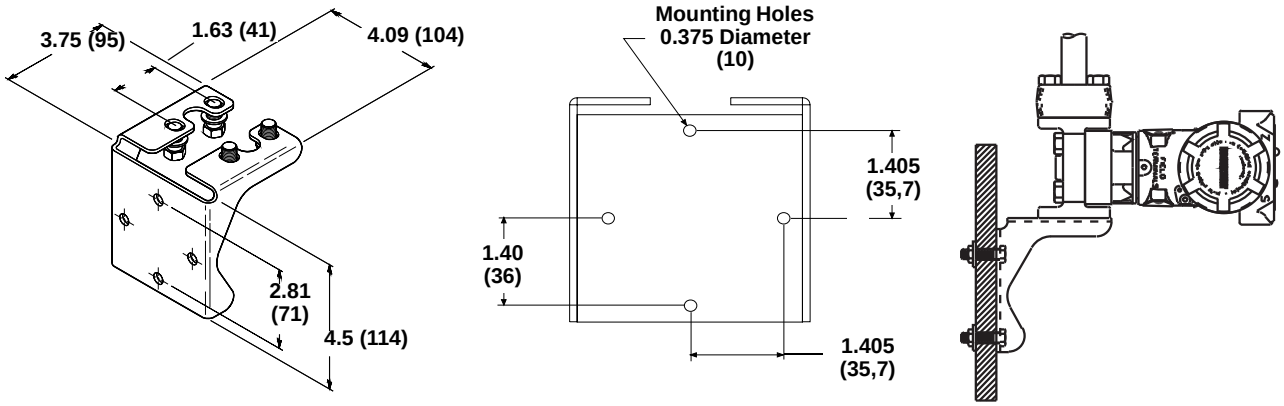
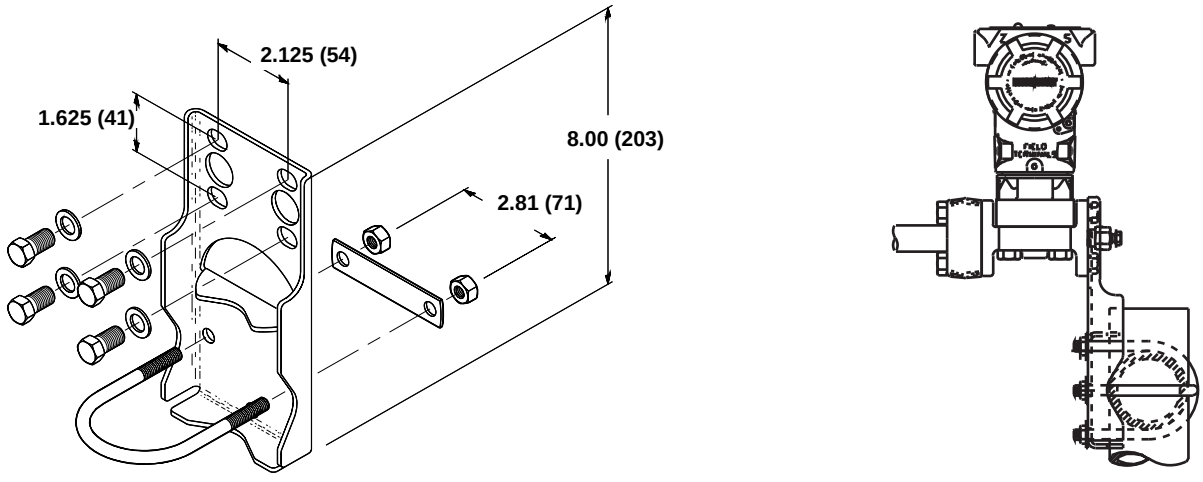



Figure 3-6. Flat Mounting Bracket Option Codes B3 and BC

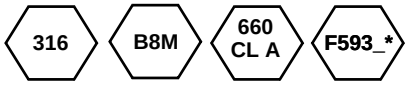



**NOTE**
**Dimensions are in inches (millimeters).**

### Flange Bolts

The 3051 can be shipped with a Coplanar flange or a Traditional flange installed with four 1.75-inch flange bolts. Mounting bolts and bolting configurations for the Coplanar and Traditional flanges can be found on page 3-7. Stainless steel bolts supplied by Emerson Process Management are coated with a lubricant to ease installation. Carbon steel bolts do not require lubrication. No additional lubricant should be applied when installing either type of bolt. Bolts supplied by Emerson Process Management are identified by their head markings:


**Carbon Steel (CS) Head Markings**




**Stainless Steel (SST) Head Markings**

*** The last digit in the F593_ head marking may be any letter between A and M.**


**Alloy K-500 Head Marking**

### Bolt Installation

⚠ Only use bolts supplied with the Rosemount 3051 or sold by Emerson Process Management as spare parts for the Rosemount 3051 transmitter. Use the following bolt installation procedure:

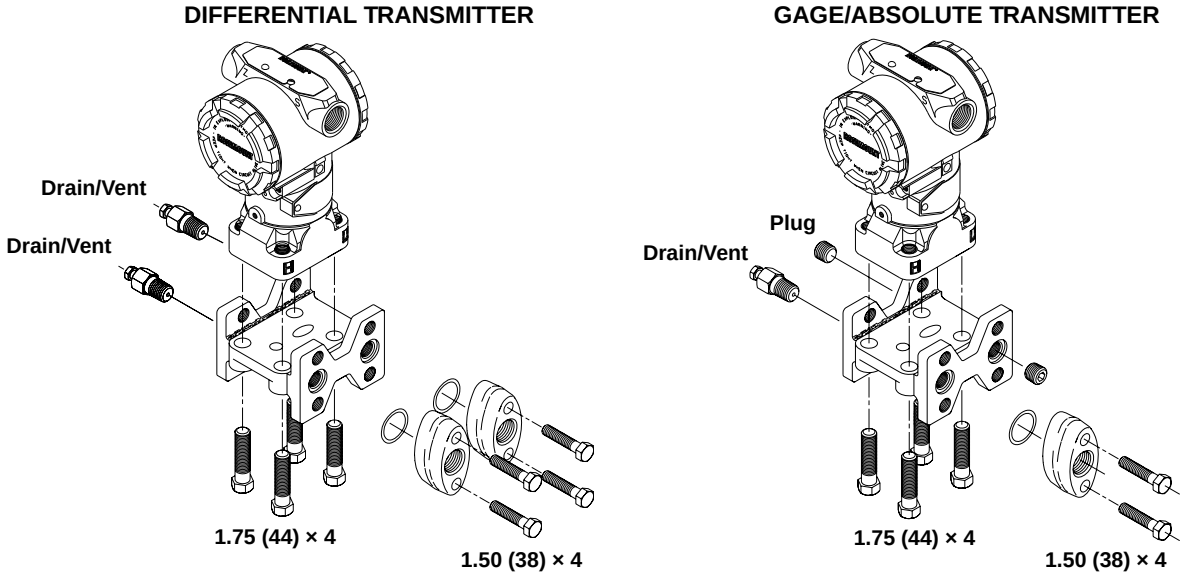
1. Finger-tighten the bolts.
2. Torque the bolts to the initial torque value using a crossing pattern (see Table 3-2 for torque values).
3. Torque the bolts to the final torque value using the same crossing pattern.

Table 3-2. Bolt Installation Torque Values

| Bolt Material | Initial Torque Value | Final Torque Value |
|---|---|---|
| CS-ASTM-A445 Standard | 300 in.-lb (34 N-m) | 650 in.-lb (73 N-m) |
| 316 SST—Option L4 | 150 in.-lb (17 N-m) | 300 in.-lb (34 N-m) |
| ASTM-A-193-B7M—Option L5 | 300 in.-lb (34 N-m) | 650 in.-lb (73 N-m) |
| Alloy 400—Option L6 | 300 in.-lb (34 N-m) | 650 in.-lb (73 N-m) |

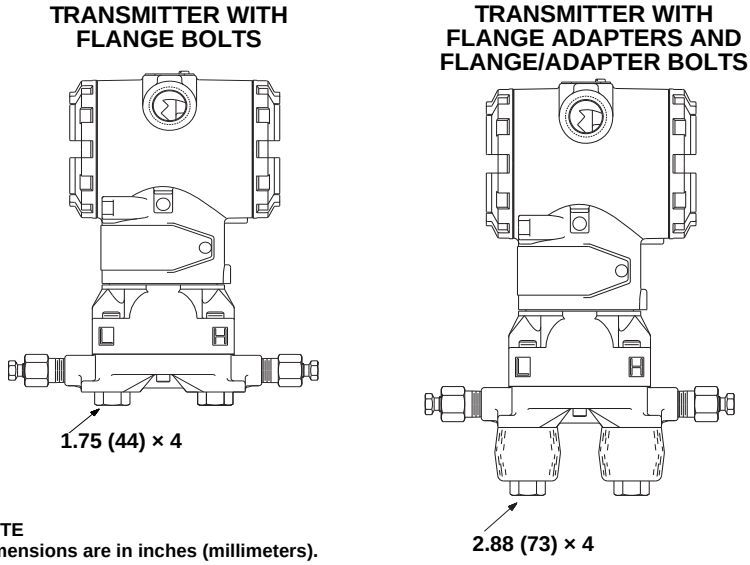
⚠ See “Safety Messages” on page 3-1 for complete warning information.

Figure 3-7. Traditional Flange Bolt Configurations




**NOTE**
**Dimensions are in inches (millimeters).**

Figure 3-8. Mounting Bolts and Bolt Configurations for Coplanar Flange




| Description | Qty | Size in. (mm) |
|---|---|---|
| **Differential Pressure** | | |
| Flange Bolts | 4 | 1.75 (44) |
| Flange/Adapter Bolts | 4 | 2.88 (73) |
| **Gage/Absolute Pressure** (1) | | |
| Flange Bolts | 4 | 1.75 (44) |
| Flange/Adapter Bolts | 2 | 2.88 (73) |

*(1) Rosemount 3051T transmitters are direct mount and do not require bolts for process connection.*

**NOTE**
**Dimensions are in inches (millimeters).**

## Impulse Piping

### Mounting Requirements

Impulse piping configurations depend on specific measurement conditions. Refer to Figure 3-9 for examples of the following mounting configurations:

**Liquid Flow Measurement**

- Place taps to the side of the line to prevent sediment deposits on the transmitter's process isolators.
- Mount the transmitter beside or below the taps so gases can vent into the process line.
- Mount drain/vent valve upward to allow gases to vent.

**Gas Flow Measurement**

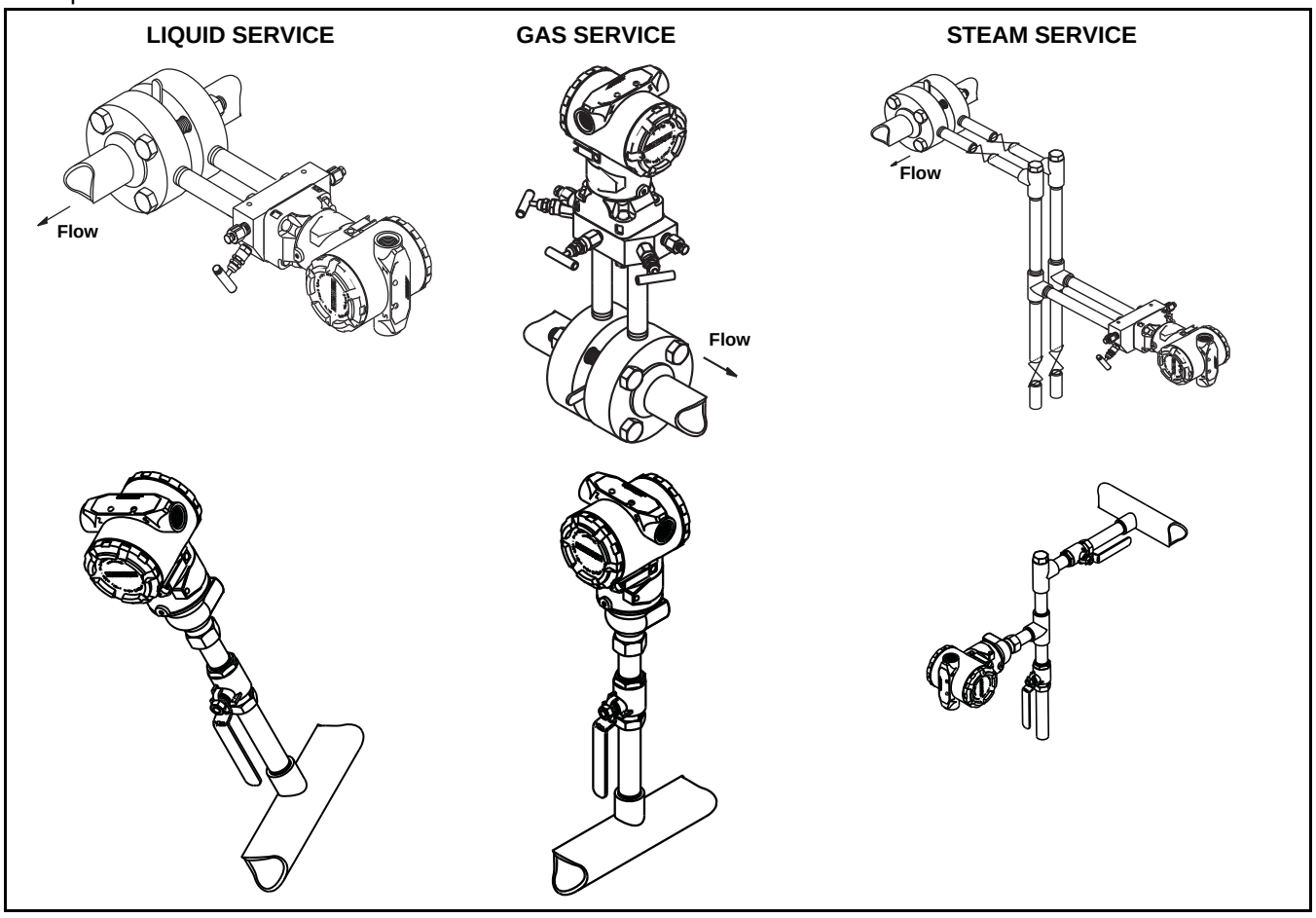
- Place taps in the top or side of the line.
- Mount the transmitter beside or above the taps so liquid will drain into the process line.

**Steam Flow Measurement**

- Place taps to the side of the line.
- Mount the transmitter below the taps to ensure that the impulse piping will stay filled with condensate.
- In steam service above 250 °F (121 °C), fill impulse lines with water to prevent steam from contacting the transmitter directly and to ensure accurate measurement start-up.

**NOTE**
For steam or other elevated temperature services, it is important that temperatures at the process connection do not exceed the transmitter's process temperature limits.

Figure 3-9. Installation Examples



### Best Practices

The piping between the process and the transmitter must accurately transfer the pressure to obtain accurate measurements. There are five possible sources of error: pressure transfer, leaks, friction loss (particularly if purging is used), trapped gas in a liquid line, liquid in a gas line, and density variations between the legs.

The best location for the transmitter in relation to the process pipe is dependent on the process. Use the following guidelines to determine transmitter location and placement of impulse piping:

- Keep impulse piping as short as possible.
- For liquid service, slope the impulse piping at least 1 in./foot (8 cm/m) upward from the transmitter toward the process connection.
- For gas service, slope the impulse piping at least 1 in./foot (8 cm/m) downward from the transmitter toward the process connection.
- Avoid high points in liquid lines and low points in gas lines.
- Make sure both impulse legs are the same temperature.
- Use impulse piping large enough to avoid friction effects and blockage.
- Vent all gas from liquid piping legs.
- When using a sealing fluid, fill both piping legs to the same level.
- When purging, make the purge connection close to the process taps and purge through equal lengths of the same size pipe. Avoid purging through the transmitter.
- Keep corrosive or hot (above 250 °F [121 °C]) process material out of direct contact with the sensor module and flanges.
- Prevent sediment deposits in the impulse piping.
- Maintain equal leg of head pressure on both legs of the impulse piping.
- Avoid conditions that might allow process fluid to freeze within the process flange.

## Process Connections

### Coplanar or Traditional Process Connection

⚠ Install and tighten all four flange bolts before applying pressure, or process leakage will result. When properly installed, the flange bolts will protrude through the top of the sensor module housing. Do not attempt to loosen or remove the flange bolts while the transmitter is in service.

⚠ **Flange Adaptors:**

Rosemount 3051DP and GP process connections on the transmitter flanges are 1/4–18 NPT. Flange adapters are available with standard 1/2–14 NPT class 2 connections. The flange adapters allow users to disconnect from the process by removing the flange adapter bolts. Use plant-approved lubricant or sealant when making the process connections. Refer to Dimensional Drawings on page A-13 for the distance between pressure connections. This distance may be varied ±1/8 in. (3.2 mm) by rotating one or both of the flange adapters.

To install adapters to a Coplanar flange, perform the following procedure:

1. Remove the flange bolts.
2. Leaving the flange in place, move the adapters into position with the o-ring installed.
3. Clamp the adapters and the Coplanar flange to the transmitter sensor module using the larger of the bolts supplied.
4. Tighten the bolts. Refer to “Flange Bolts” on page 3-6 for torque specifications.

Whenever you remove flanges or adapters, visually inspect the PTFE o-rings. Replace with o-ring designed for Rosemount transmitter if there are any signs of damage, such as nicks or cuts. Undamaged o-rings may be reused. If you replace the o-rings, retorque the flange bolts after installation to compensate for cold flow. Refer to the process sensor body reassembly procedure in Section 5: Troubleshooting.

⚠ When compressed, PTFE O-rings tend to “cold flow,” which aids in their sealing capabilities.

**NOTE**
PTFE O-rings should be replaced if the flange adapter is removed.

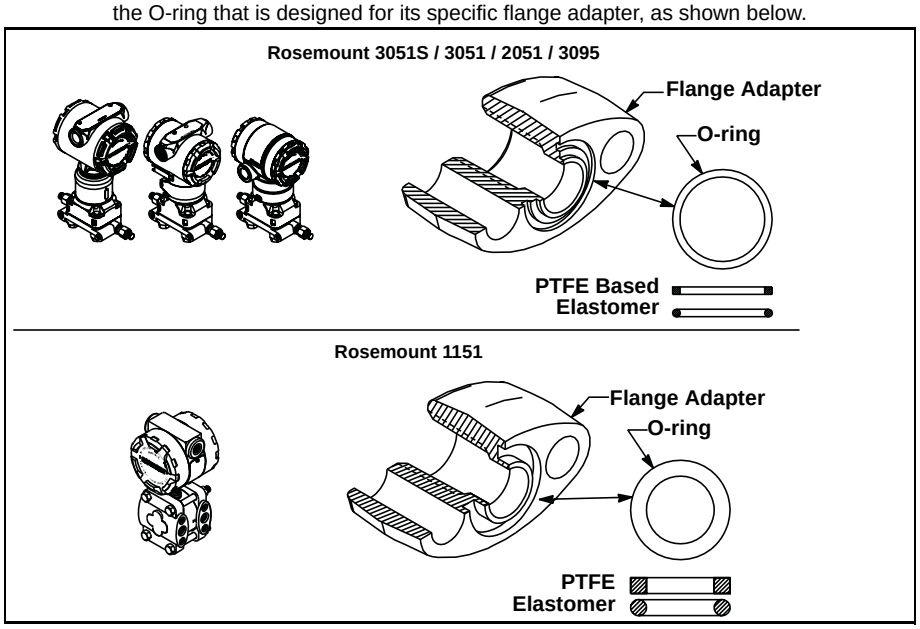
**O-rings:**

The two styles of Rosemount flange adapters (Rosemount 1151 and Rosemount 3051S/3051/2051/3095) each require a unique O-ring (see Figure 3-10). Use only the O-ring designed for the corresponding flange adaptor.

Figure 3-10. O-Rings.

**⚠WARNING**

Failure to install proper flange adapter O-rings may cause process leaks, which can result in death or serious injury. The two flange adapters are distinguished by unique O-ring grooves. Only use the O-ring that is designed for its specific flange adapter, as shown below.



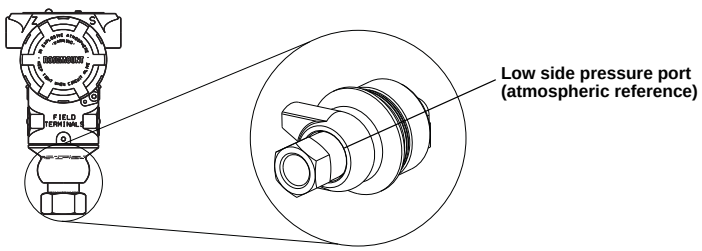

## Inline Process Connection

**Inline Gage Transmitter Orientation**

The low side pressure port on the inline gage transmitter is located in the neck of the transmitter, behind the housing. The vent path is 360 degrees around the transmitter between the housing and sensor (See Figure 3-11).

Keep the vent path free of any obstruction, such as paint, dust, and lubrication by mounting the transmitter so that the process can drain away.

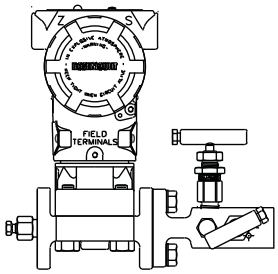
Figure 3-11. Inline Gage Low Side Pressure Port



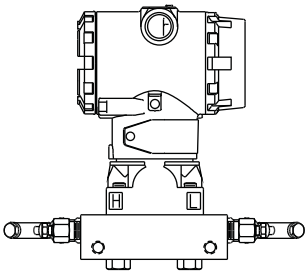
## ROSEMOUNT 305, 306 AND 304 MANIFOLDS

The 305 Integral Manifold is available in two designs: Traditional and Coplanar. The traditional 305 Integral Manifold can be mounted to most primary elements with mounting adapters in the market today. The 306 Integral Manifold is used with the 3051T in-line transmitters to provide block-and-bleed valve capabilities of up to 10000 psi (690 bar).

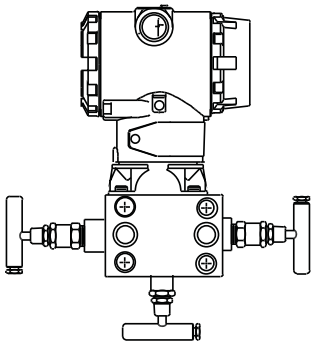
Figure 3-12. Manifolds



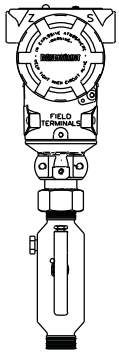

**3051C AND 304 CONVENTIONAL**



**3051C AND 305 INTEGRAL COPLANAR**



**3051C AND 305 INTEGRAL TRADITIONAL**




**3051T AND 306 IN-LINE**

## Rosemount 305 Integral Manifold Installation Procedure

To install a 305 Integral Manifold to a 3051 transmitter:

⚠ 1. Inspect the PTFE sensor module o-rings. Undamaged o-rings may be reused. If the o-rings are damaged (if they have nicks or cuts, for example), replace with o-rings designed for Rosemount transmitter.

**IMPORTANT**
If replacing the o-rings, take care not to scratch or deface the o-ring grooves or the surface of the isolating diaphragm while you remove the damaged o-rings.

2. Install the Integral Manifold on the sensor module. Use the four 2.25-in. manifold bolts for alignment. Finger tighten the bolts, then tighten the bolts incrementally in a cross pattern to final torque value. See “Flange Bolts” on page 3-6 for complete bolt installation information and torque values. When fully tightened, the bolts should extend through the top of the sensor module housing.
3. If the PTFE sensor module o-rings have been replaced, the flange bolts should be re-tightened after installation to compensate for cold flow of the o-rings.

**NOTE**
Always perform a zero trim on the transmitter/manifold assembly after installation to eliminate mounting effects.

## Rosemount 306 Integral Manifold Installation Procedure

The 306 Manifold is for use only with a 3051T In-line transmitter.

⚠ Assemble the 306 Manifold to the 3051T In-line transmitter with a thread sealant.

## Rosemount 304 Conventional Manifold Installation Procedure

To install a 304 Conventional Manifold to a 3051 transmitter:

1. Align the Conventional Manifold with the transmitter flange. Use the four manifold bolts for alignment.
2. Finger tighten the bolts, then tighten the bolts incrementally in a cross pattern to final torque value. See “Flange Bolts” on page 2-6 for complete bolt installation information and torque values. When fully tightened, the bolts should extend through the top of the sensor module housing.
3. Leak-check assembly to maximum pressure range of transmitter.

⚠ See “Safety Messages” on page 3-1 for complete warning information.

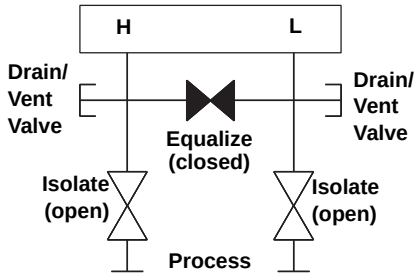
## Manifold Operation

⚠ Improper installation or operation of manifolds may result in process leaks, which may cause death or serious injury.

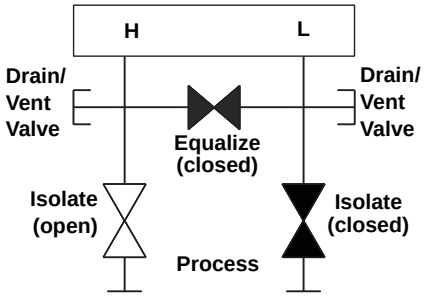
Always perform a zero trim on the transmitter/manifold assembly after installation to eliminate any shift due to mounting effects. See “Sensor Trim Overview” on page 4-10.

**Three and five-valve configurations shown:**

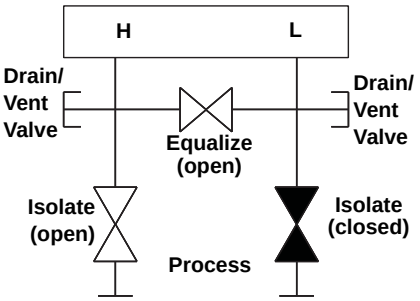
In normal operation the two block valves between the process and instrument ports will be open and the equalizing valve will be closed.



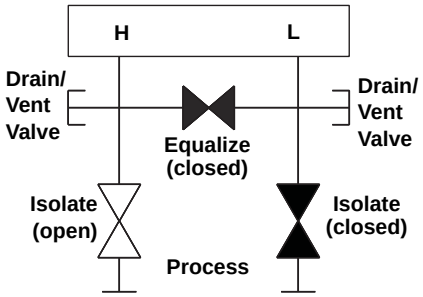

1. To zero the 3051, close the block valve to the low pressure (downstream) side of the transmitter first.



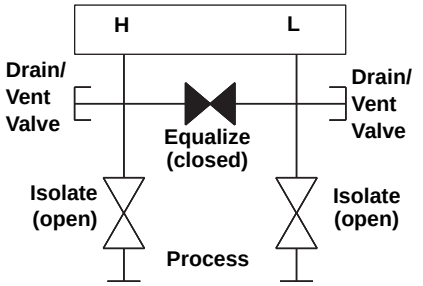

2. Open the center (equalize) valve to equalize the pressure on both sides of the transmitter. The manifold valves are now in the proper configuration for zeroing the transmitter.



3. After zeroing the transmitter, close the equalizing valve.

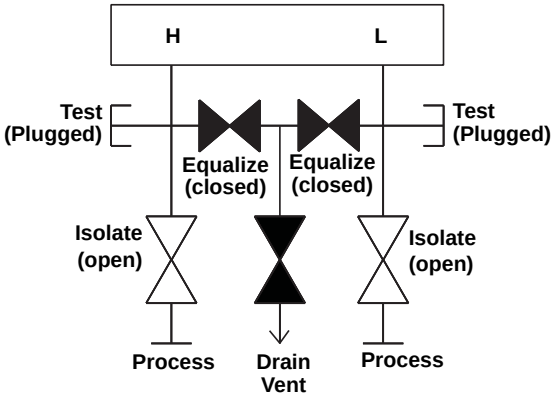



4. Open the block valve on the low pressure side of the transmitter to return the transmitter to service.

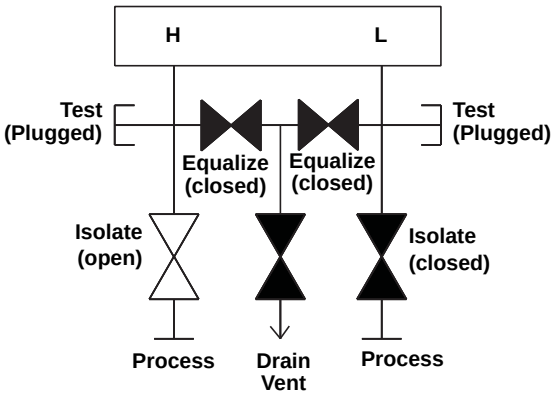


**Five-valve Natural Gas configurations shown:**

In normal operation, the two block valves between the process and instrument ports will be open, and the equalizing valves will be closed.

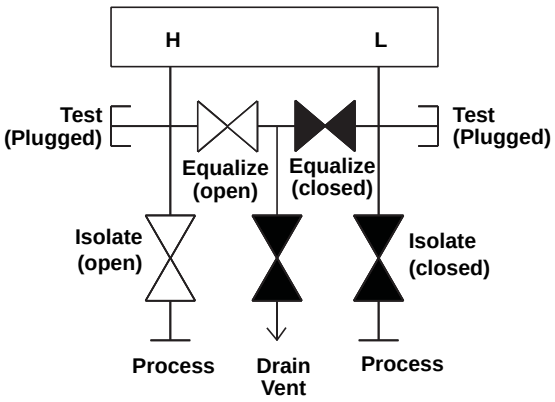



1. To zero the 3051, first close the block valve on the low pressure (downstream) side of the transmitter.

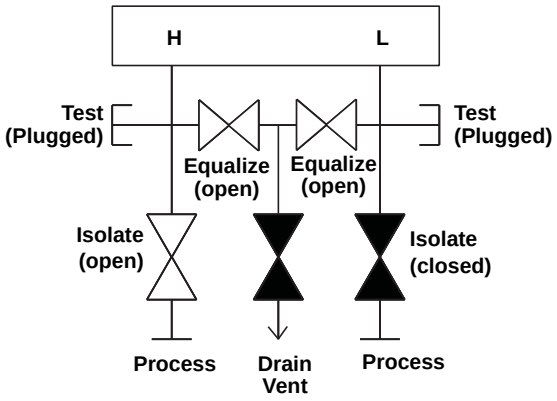



**NOTE**
Do not open the low side equalize valve before the high side equalize valve. Doing so will overpressure the transmitter.

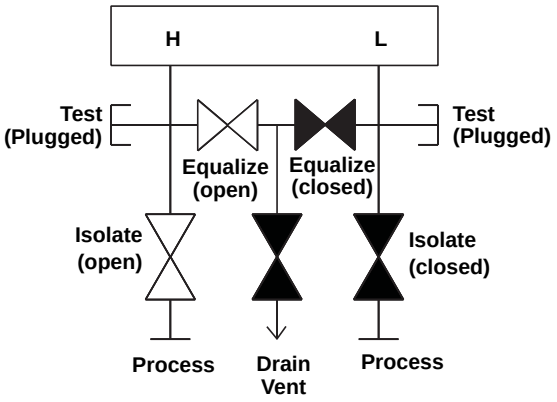
2. Open the equalize valve on the high pressure (upstream) side of the transmitter.



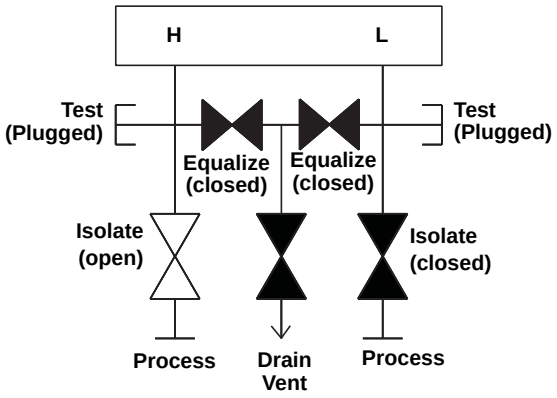
3. Open the equalize valve on the low pressure (downstream) side of the transmitter. The manifold is now in the proper configuration for zeroing the transmitter.



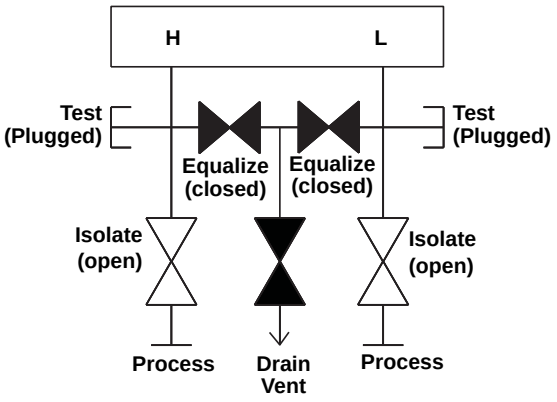

4. After zeroing the transmitter, close the equalize valve on the low pressure (downstream) side of the transmitter.




5. Close the equalize valve on the high pressure (upstream) side.




6. Finally, to return the transmitter to service, open the low side isolation valve.



## LIQUID LEVEL MEASUREMENT

Differential pressure transmitters used for liquid level applications measure hydrostatic pressure head. Liquid level and specific gravity of a liquid are factors in determining pressure head. This pressure is equal to the liquid height above the tap multiplied by the specific gravity of the liquid. Pressure head is independent of volume or vessel shape.

### Open Vessels

A pressure transmitter mounted near a tank bottom measures the pressure of the liquid above.

Make a connection to the high pressure side of the transmitter, and vent the low pressure side to the atmosphere. Pressure head equals the liquid's specific gravity multiplied by the liquid height above the tap.

Zero range suppression is required if the transmitter lies below the zero point of the desired level range. Figure 3-13 shows a liquid level measurement example.

### Closed Vessels

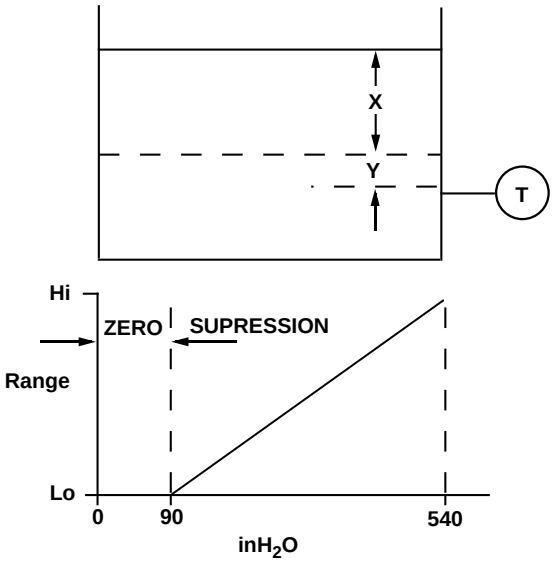
Pressure above a liquid affects the pressure measured at the bottom of a closed vessel. The liquid specific gravity multiplied by the liquid height plus the vessel pressure equals the pressure at the bottom of the vessel.

To measure true level, the vessel pressure must be subtracted from the vessel bottom pressure. To do this, make a pressure tap at the top of the vessel and connect this to the low side of the transmitter. Vessel pressure is then equally applied to both the high and low sides of the transmitter. The resulting differential pressure is proportional to liquid height multiplied by the liquid specific gravity.

#### Dry Leg Condition

Low-side transmitter piping will remain empty if gas above the liquid does not condense. This is a dry leg condition. Range determination calculations are the same as those described for bottom-mounted transmitters in open vessels, as shown in Figure 3-13.

Figure 3-13. Liquid Level Measurement Example.




Let **X** equal the vertical distance between the minimum and maximum measurable levels (500 in.).
Let **Y** equal the vertical distance between the transmitter datum line and the minimum measurable level (100 in.).
Let **SG** equal the specific gravity of the fluid (0.9).
Let **h** equal the maximum head pressure to be measured in inches of water.
Let **e** equal head pressure produced by **Y** expressed in inches of water.
Let **Range** equal **e** to **e** + **h**.

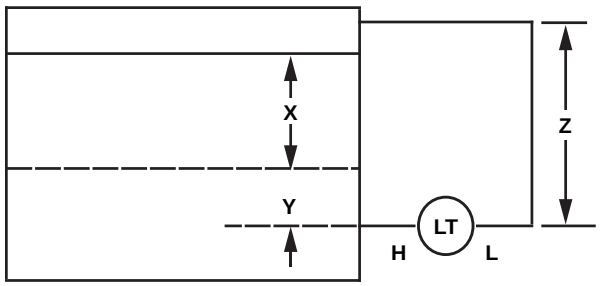
Then h = (**X**)(**SG**)
= 500 x 0.9
= 450 in$H_2O$
e = (**Y**)(**SG**)
= 100 x 0.9
= 90 in$H_2O$
**Range** = 90 to 540 in$H_2O$

### Wet Leg Condition

Condensation of the gas above the liquid slowly causes the low side of the transmitter piping to fill with liquid. The pipe is purposely filled with a convenient reference fluid to eliminate this potential error. This is a wet leg condition.

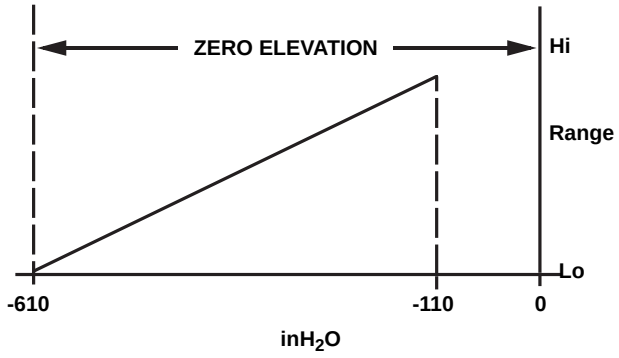
The reference fluid will exert a head pressure on the low side of the transmitter. Zero elevation of the range must then be made. See Figure 3-14

Figure 3-14. Wet Leg Example.




Let **X** equal the vertical distance between the minimum and maximum measurable levels (500 in.).
Let **Y** equal the vertical distance between the transmitter datum line and the minimum measurable level (50 in.).
Let **z** equal the vertical distance between the top of the liquid in the wet leg and the transmitter datum line (600 in.).
Let $\mathbf{SG_1}$ equal the specific gravity of the fluid (1.0).
Let $\mathbf{SG_2}$ equal the specific gravity of the fluid in the wet leg (1.1).
Let **h** equal the maximum head pressure to be measured in inches of water.
Let **e** equal the head pressure produced by **Y** expressed in inches of water.
Let **s** equal head pressure produced by **z** expressed in inches of water.
Let **Range** equal **e** – **s** to **h** + **e** – **s**.

Then h = $\mathbf{(X)(SG_1)}$
= 500 x 1.0
= 500 in $H_2O$
e = $\mathbf{(Y)(SG_1)}$
= 50 x 1.0
= 50 in$H_2O$
s = $\mathbf{(z)(SG_2)}$
= 600 x 1.1
= 660 in$H_20$
**Range** = **e – s** to **h + e – s**.
= 50 – 660 to 500 + 50 – 660
= –610 to –110 in$H_20$

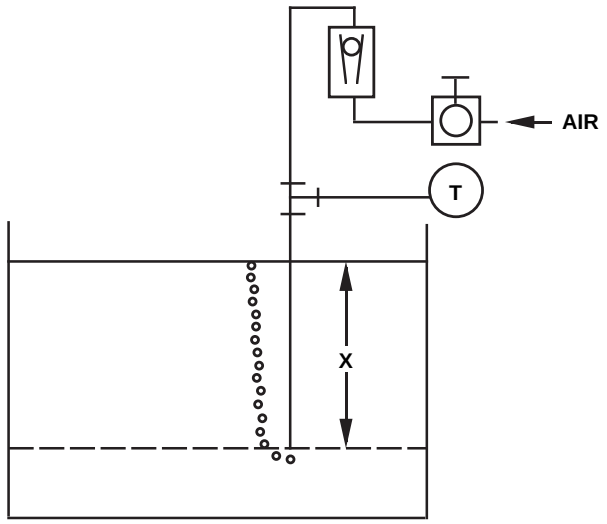


### Bubbler System in Open Vessel

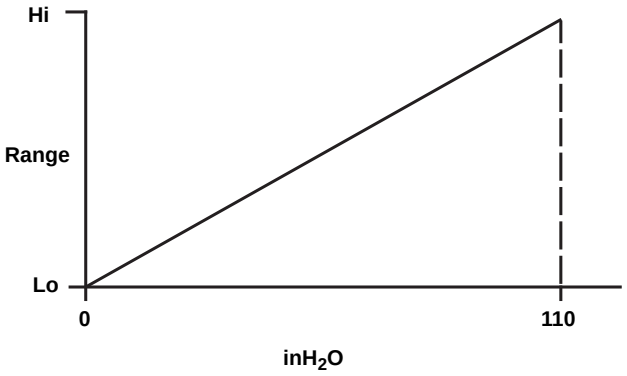
A bubbler system that has a top-mounted pressure transmitter can be used in open vessels. This system consists of an air supply, pressure regulator, constant flow meter, pressure transmitter, and a tube that extends down into the vessel.

Bubble air through the tube at a constant flow rate. The pressure required to maintain flow equals the liquid's specific gravity multiplied by the vertical height of the liquid above the tube opening. Figure 3-15 shows a bubbler liquid level measurement example.

Figure 3-15. Bubbler Liquid Level Measurement Example.




Let **X** equal the vertical distance between the minimum and maximum measurable levels (100 in.).
Let **SG** equal the specific gravity of the fluid (1.1).
Let **h** equal the maximum head pressure to be measured in inches of water.
Let **Range** equal **zero** to **h**.
Then **h** = **(X)(SG)**
= 100 x 1.1
= 110 in$H_2O$
**Range** = 0 to 110 in$H_2O$



# Section 4 Electrical Installation



## OVERVIEW

The information in this section covers installation considerations for the Rosemount 3051. A Quick Installation Guide is shipped with every transmitter to describe pipe-fitting, wiring procedures and basic configuration for initial installation.

## SAFETY MESSAGES

Procedures and instructions in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that raises potential safety issues is indicated by a warning symbol (⚠). Refer to the following safety messages before performing an operation preceded by this symbol.

### Warnings

**⚠WARNING**

Explosions could result in death or serious injury:

Installation of this transmitter in an explosive environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Please review the approvals section of the 3051 reference manual for any restrictions associated with a safe installation.

- In an Explosion-Proof/Flameproof installation, do not remove the transmitter covers when power is applied to the unit.

Process leaks may cause harm or result in death.

- Install and tighten process connectors before applying pressure.

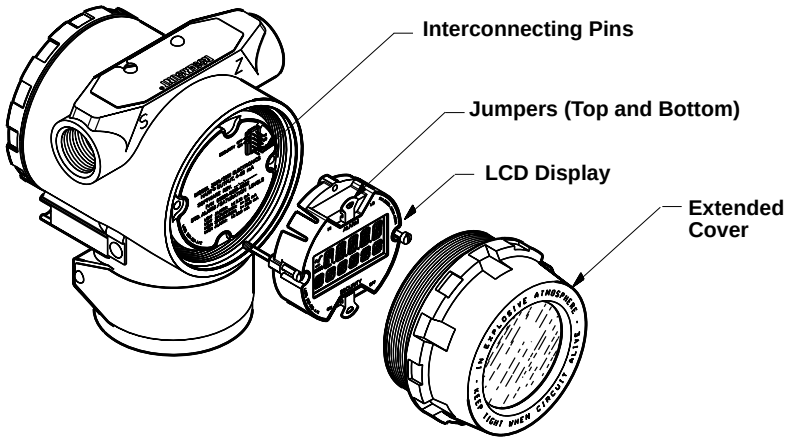
Electrical shock can result in death or serious injury.

- Avoid contact with the leads and terminals. High voltage that may be present on leads can cause electrical shock.

### LCD Display

Transmitters ordered with the LCD display option (M5) are shipped with the display installed. Installing the display on an existing Rosemount 3051 requires a small instrument screwdriver.

Figure 4-1. LCD Display




## LCD Display with Local Operator Interface

Transmitters ordered with the LCD display with Local Operator Interface option (M4) are shipped with the display and local configuration buttons installed. The configuration buttons are located under the top tag as indicated by the sticker. See Table 2-1 for LOI operation. Upgrading to an LOI transmitter requires installation of a new electronics board, configuration buttons and LCD display (if not previously ordered).

## Configure Security and Simulation

### Security (Write Protect)

There are three security methods with the Rosemount 3051 transmitter:

1. Security Jumper: prevents all writes to transmitter configuration.
2. Local Keys Software Lock Out: prevents changes to transmitter range points using local configuration buttons.
3. Physical Removal of Local Buttons: removes ability to use local buttons.

You can prevent changes to the transmitter configuration data with the write protection jumper. Security is controlled by the security (write protect) jumper located on the electronics board or LCD display. Position the jumper on the transmitter circuit board in the “ON” position to prevent accidental or deliberate change of configuration data.

If the transmitter write protection jumper is in the “ON” position, the transmitter will not accept any “writes” to its memory.

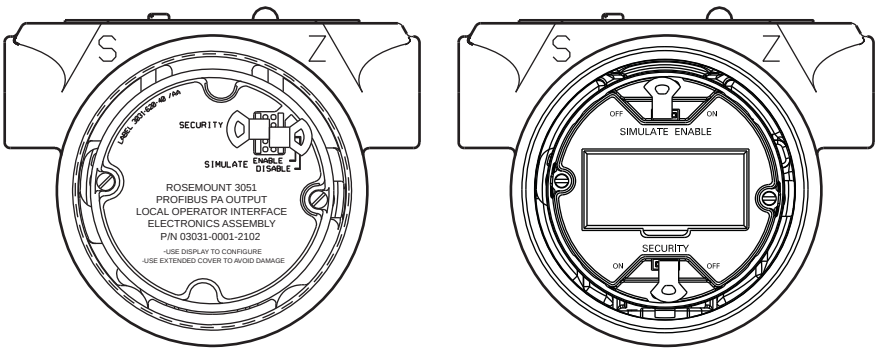
**NOTE**
If the security jumper is not installed, the transmitter will continue to operate in the security OFF configuration.

### Simulate

The Rosemount 3051 has a simulate jumper located on the electronics board (or optional LCD display) that must be set to the ON position in order to activate simulate mode using a class two master.

See Section 2: Configuration for details on Simulate mode.

Figure 4-2. Transmitter Jumper Locations




## ELECTRICAL CONSIDERATIONS

Make sure all electrical installation is in accordance with national and local code requirements.

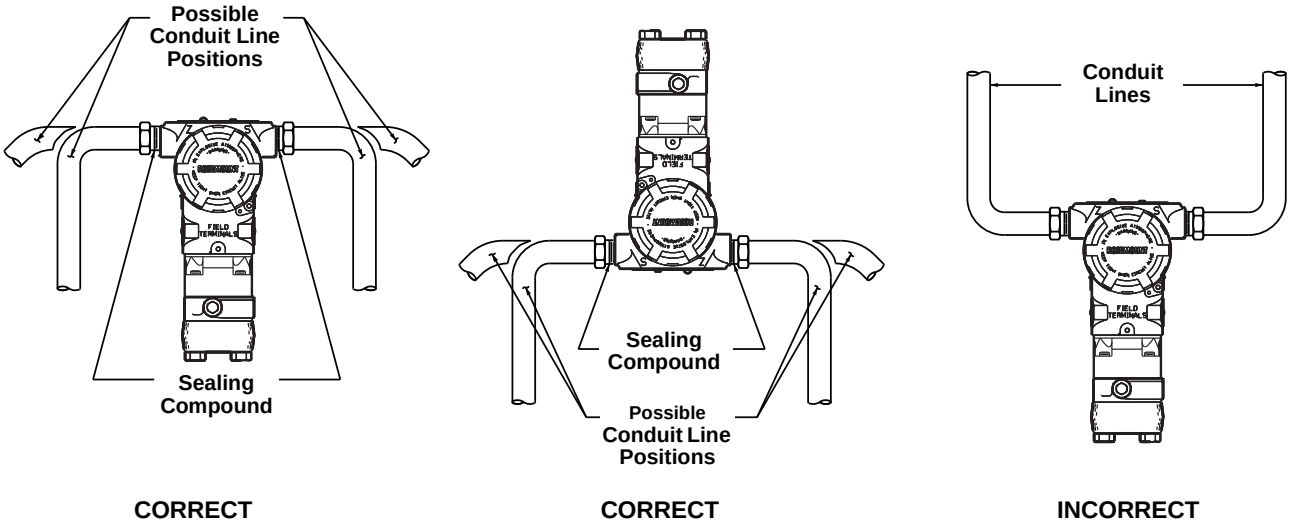
### Conduit Installation

Recommended conduit connections are shown in Figure 4-3.

**⚠CAUTION**

If all connections are not sealed, excess moisture accumulation can damage the transmitter. Make sure to mount the transmitter with the electrical housing positioned downward for drainage. To avoid moisture accumulation in the housing, install wiring with a drip loop, and ensure the bottom of the drip loop is mounted lower than the conduit connections or the transmitter housing.

Figure 4-3. Conduit Installation Diagrams.



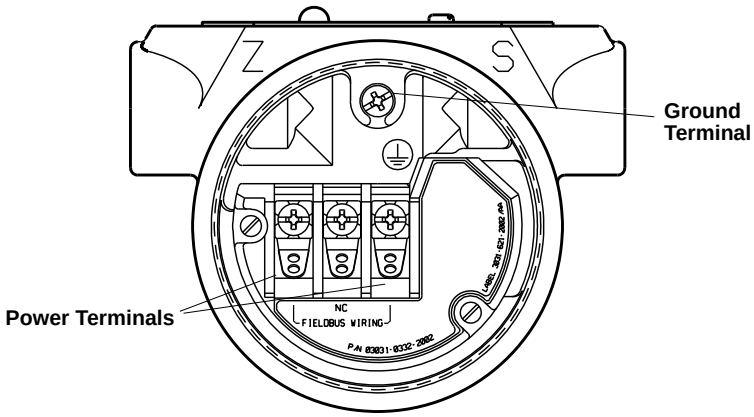
## Wiring

See Figure 4-5 for a basic Profibus PA system configuration.

Use the following steps to wire the transmitter:

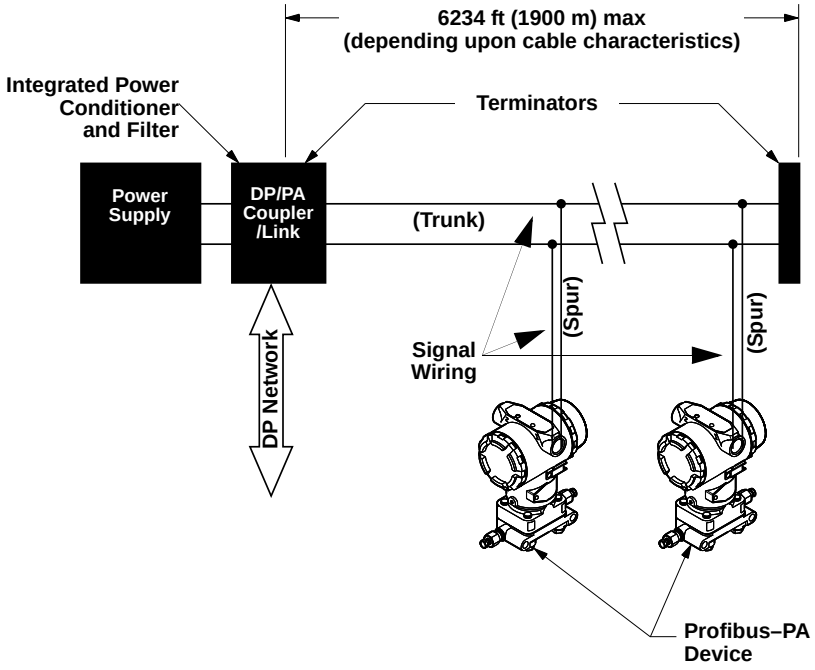
1. Remove the housing cover on the FIELD TERMINALS side.
2. Connect the power leads to the terminals indicated on the terminal block label. See Figure 4-4 3051 Profibus Terminal Block.
   - Power terminals are polarity insensitive - connect positive or negative to either terminal
3. Ensure proper grounding. It is important that the instrument cable shield: See Figure 4-6.
   - be trimmed close and insulated from touching the transmitter housing
   - be connected to the next shield if cable is routed through a junction box
   - be connected to a good earth ground at the power supply end
4. Plug and seal unused conduit connections.
5. If applicable, install wiring with a drip loop. See Figure 4-3.
6. Replace the housing cover.

Figure 4-4. 3051 Profibus Terminal Block




**"NC" is a No Connect terminal (do not use)**

Figure 4-5. Basic Profibus PA System Configuration

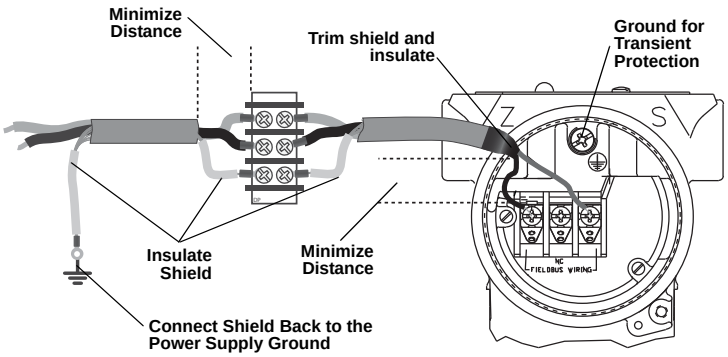


## Signal Wiring Grounding

Do not run signal wiring in conduit or open trays with power wiring, or near heavy electrical equipment. Grounding terminations are provided on the outside of the electronics housing and inside the Terminal Compartment. These grounds are used when transient protect terminal blocks are installed or to fulfill local regulations. See Step 2 below for more information on how the cable shield should be grounded.

1. Remove the Field Terminals housing cover.
2. Connect the wiring pair and ground as indicated in Figure 4-6. The cable shield should:
   a. Be trimmed close and insulated from touching the transmitter housing.
   b. Continuously connect to the termination point.
   c. Be connected to a good earth ground at the power supply end.

Figure 4-6. Wiring




3. Replace the housing cover. It is recommended that the cover be tightened until there is no gap between the cover and the housing.
4. Plug and seal unused conduit connections.

### Power Supply

The dc power supply should provide power with less than two percent ripple. The transmitter requires between 9 and 32 Vdc at the terminals to operate and provide complete functionality

### Power Conditioner

The DP/PA Coupler / Link often includes an integrated power conditioner.

### Grounding

Transmitters are electrically isolated to 500 Vac rms. Signal wiring can not be grounded.

### Shield Wire Ground

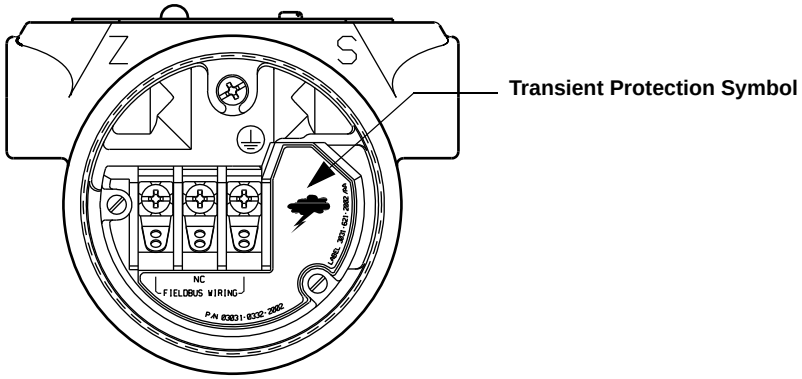
Grounding techniques for shield wire usually require a single grounding point for shield wire to avoid creating a ground loop. The ground point is typically at the power supply.

## Transient Protection Terminal Block

The transmitter will withstand electrical transients of the energy level usually encountered in static discharges or induced switching transients. However, high-energy transients, such as those induced in wiring from nearby lightning strikes, can damage the transmitter.

The transient protection terminal block can be ordered as an installed option (Option Code T1 in the transmitter model number) or as a spare part to retrofit existing 3051 transmitters in the field. See “Parts List” on page A-42 for spare part numbers. The lightning bolt symbol shown in Figure 4-7 identifies the transient protection terminal block.

Figure 4-7. Wiring with transient protection




**NOTE**
The transient protection terminal block does not provide transient protection unless the transmitter case is properly grounded. Use the guidelines to ground the transmitter case. Refer to page 4-7.

Do not run the transient protection ground wire with signal wiring as the ground wire may carry excessive current if a lightning strike occurs.

## Grounding

⚠ Use the following techniques to properly ground the transmitter signal wiring and case:

**Signal Wiring**

Do not run signal wiring in conduit or open trays with power wiring or near heavy electrical equipment. It is important that the instrument cable shield be:

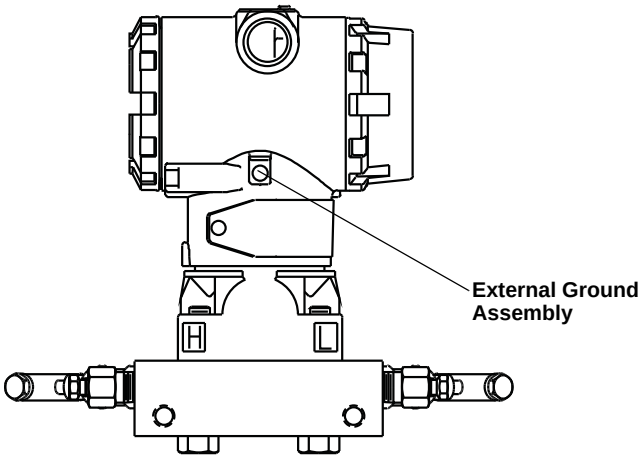
- Trimmed close and insulated from touching the transmitter housing
- Connected to the next shield if cable is routed through a junction box
- Connected to a good earth ground at the power supply end

### Transmitter Case

Always ground the transmitter case in accordance with national and local electrical codes. The most effective transmitter case grounding method is a direct connection to earth ground with minimal impedance. Methods for grounding the transmitter case include:

- **Internal Ground Connection**: The Internal Ground Connection screw is inside the FIELD TERMINALS side of the electronics housing. This screw is identified by a ground symbol (⏚). The ground connection screw is standard on all Rosemount 3051 transmitters. Refer to Figure 4-4.
- **External Ground Assembly**: This assembly is included with the optional transient protection terminal block (Option Code T1), and it is included with various hazardous location certifications. The External Ground Assembly can also be ordered with the transmitter (Option Code V5), or as a spare part. See “Parts List” on page A-42. Refer to Figure 4-8 for location of the External Ground Screw.

Figure 4-8. External Ground Assembly




**NOTE**
Grounding the transmitter case using threaded conduit connection may not provide sufficient ground continuity.

# Section 5 Calibration



## OVERVIEW

This section contains information on calibrating the Rosemount 3051 Profibus Pressure Transmitter using either the Local Operator Interface (LOI) or a class two master.

## SAFETY MESSAGES

Procedures and instructions in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that raises potential safety issues is indicated by a warning symbol ( ⚠ ). Refer to the following safety messages before performing an operation preceded by this symbol.

### Warnings

**⚠WARNING**

Explosions could result in death or serious injury:

Installation of this transmitter in an explosive environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Please review the approvals section of the 3051 reference manual for any restrictions associated with a safe installation.

- In an Explosion-Proof/Flameproof installation, do not remove the transmitter covers when power is applied to the unit.

Process leaks may cause harm or result in death.

- Install and tighten process connectors before applying pressure.

Electrical shock can result in death or serious injury.

- Avoid contact with the leads and terminals. High voltage that may be present on leads can cause electrical shock.

## CALIBRATION OVERVIEW

Calibration is defined as the process required to optimize transmitter accuracy over a specific range by adjusting the factory sensor characterization curve located in the microprocessor. This is done by performing one of the following procedures,

### Zero Trim

A single-point offset adjustment. It is useful for compensating for mounting position effects and is most effective when performed with the transmitter installed in its final mounting position.

When performing a zero trim with a manifold, refer to “Manifold Operation” on page 3-15.

**NOTE**
Do not perform a zero trim on absolute pressure transmitters. Zero trim is zero based, and absolute pressure transmitters reference absolute zero. To correct mounting position effects on absolute pressure transmitters, perform a lower trim within the sensor trim function. The lower trim function provides an offset correction similar to the zero trim function, but it does not require zero-based input.

### Sensor Trim

A two-point sensor calibration where two end-point pressures are applied, and all output is linearized between them. Always adjust the lower trim value first to establish the correct offset. Adjustment of the upper trim value provides a slope correction to the characterization curve based on the lower trim value. The trim values allow you to optimize performance over your specified measuring range at the calibration temperature. Sensor trimming requires an accurate pressure input – at least 4 times more accurate than the transmitter – in order to optimize performance over a specific pressure range.

**NOTE**
The Rosemount 3051 has been carefully calibrated at the factory. Trimming adjusts the position of the factory characterization curve. It is possible to degrade performance of the transmitter if any trim is done improperly or with inaccurate equipment.

**NOTE**
Rosemount 3051C Range 4 and Range 5 transmitters require a special calibration procedure when used in differential pressure applications under high static line pressure. See “Compensating for Line Pressure” on page 5-7.

### Recall Factory Trim

A command that allows the restoration of the as-shipped factory settings of the sensor trim. This command can be useful for recovering from an inadvertent zero trim of an absolute pressure unit or inaccurate pressure source.

## DETERMINING CALIBRATION FREQUENCY

Calibration frequency can vary greatly depending on the application, performance requirements, and process conditions. Use the following procedure to determine calibration frequency that meets the needs of your application.

1. Determine the performance required for your application.
2. Determine the operating conditions.
3. Calculate the Total Probable Error (TPE).
4. Calculate the stability per month.
5. Calculate the calibration frequency.

### Sample Calculation For A Standard 3051C

Step 1: Determine the performance required for your application.

Required Performance: 0.20% of span

Step 2: Determine the operating conditions.

| | |
|---|---|
| Transmitter: | 3051CD, Range 2 [URL=250 in$H_2O$(623 mbar)] |
| Calibrated Span: | 150 in$H_2O$ (374 mbar) |
| Ambient Temperature Change: | ± 50 °F (28 °C) |
| Line Pressure: | 500 psig (34,5 bar) |

Step 3: Calculate total probable error (TPE).

$$TPE = \sqrt{(ReferenceAccuracy)^2 + (TemperatureEffect)^2 + (StaticPressureEffect)^2} = 0.108\% \text{ of span}$$

Where:

Reference Accuracy = ± 0.065% of span

Ambient Temperature Effect =

$$\pm\left(\frac{0.0125 \times URL}{Span} + 0.0625\right)\% \text{ per } 50\ °F = \pm 0.0833\% \text{ of span}$$

Span Static Pressure Effect[(1)] =

0.1% reading per 1000 psi (69 bar) = ±0.05% of span at maximum span

*(1) Zero static pressure effect removed by zero trimming at line pressure.*

Step 4: Calculate the stability per month.

$$Stability = \pm\left[\frac{(0.0125 \times URL)}{Span}\right]\% \text{ of span for 5 years} = \pm 0.0035\% \text{ of span per month}$$

Step 5: Calculate calibration frequency.

$$\text{Cal. Freq.} = \frac{(\text{Req. Performance} - TPE)}{\text{Stability per Month}} = \frac{(0.2\% - 0.108\%)}{0.00125\%} = 73 \text{ months}$$

**Sample Calculation for 3051C with P8 option (0.04% accuracy & 5-year stability)**

Step 1: Determine the performance required for your application.

Required Performance: 0.20% of span

Step 2: Determine the operating conditions.

| | |
|---|---|
| Transmitter: | 3051CD, Range 2 [URL=250 in$H_2O$(623 mbar)] |
| Calibrated Span: | 150 in$H_2O$ (374 mbar) |
| Ambient Temperature Change: | ± 50 °F (28 °C) |
| Line Pressure: | 500 psig (34,5 bar) |

Step 3: Calculate total probable error (TPE).

$$TPE = \sqrt{(ReferenceAccuracy)^2 + (TemperatureEffect)^2 + (StaticPressureEffect)^2} = 0.095\% \text{ of span}$$

Where:

Reference Accuracy = ± 0.04% of span

Ambient Temperature Effect =

$$\pm\left(\frac{0.0125 \times URL}{Span} + 0.0625\right)\% \text{ per } 50\ ^\circ F = \pm 0.070\% \text{ of span}$$

Span Static Pressure Effect(1) =

0.1% reading per 1000 psi (69 bar) = ±0.05% of span at maximum span

*(1) Zero static pressure effect removed by zero trimming at line pressure.*

Step 4: Calculate the stability per month.

$$Stability = \pm\left[\frac{(0.0125 \times URL)}{Span}\right]\% \text{ of span for 5 years} = \pm 0.00125\% \text{ of span per month}$$

Step 5: Calculate calibration frequency.

$$\text{Cal. Freq.} = \frac{(\text{Req. Performance} - TPE)}{\text{Stability per Month}} = \frac{(0.2\% - 0.095\%)}{0.00125\%} = 84 \text{ months}$$

## ZERO TRIM

**NOTE**
The transmitter PV at zero pressure must be within 10% x Upper Sensor Limit (USL) of zero in order to calibrate using the zero trim function.

### Local Operator Interface (LOI)

1. Enter Calibration >> Zero
   a. Verify measurement is within 10% x USL of zero
   b. Save

### Class Two Master

| Steps | Actions |
|---|---|
| Set Transducer block to Out of Service | Select the following from the menu:<br>Device>> Device Mode>> Transducer Block<br>Set Target Mode to Out of Service<br>Press Transfer |
| Calibrate Sensor | Select the following from the menu:<br>Device>> Sensor Calibration>> Lower Sensor Calibration<br>Enter 0 for Lower Calibration Point<br>Adjust pressure source to zero pressure<br>Verify Pressure Trimmed Value is stable and within 10% x USL of zero.<br>Press Transfer<br>Press Close |
| Set Transducer block to AUTO | Select the following from the menu:<br>Device>> Device Mode>> Transducer Block<br>Set Target Mode to Auto<br>Press Transfer<br>Press Close |

## SENSOR TRIM

**NOTE**
Use a pressure input source that is at least four times more accurate than the transmitter, and allow the input pressure to stabilize for ten seconds before entering any values.

### LOI

1. Enter Calibration >> Lower
   a. Enter trim unit and value
   b. Verify measurement is stable
   c. Save
2. Enter Calibration >> Upper menu
   a. Enter trim unit and value
   b. Verify measurement is stable
   c. Save

**Class Two Master**

| Steps | Actions |
|---|---|
| Set Transducer block to Out of Service | Select the following from the menu:<br>Device >> Device Mode >> Transducer Block<br>Set Target Mode to Out of Service<br>Press Transfer |
| Calibrate Sensor | Select the following from the menu:<br>Device>> Sensor Calibration>> Lower Sensor Calibration<br>Enter Lower Calibration Point<br>Adjust pressure source to desired pressure<br>Verify Pressure Trimmed Value is stable<br>Press Transfer<br><br>Select Upper Sensor Calibration Tab<br>Enter Upper Calibration Point<br>Adjust pressure source to desired pressure<br>Verify Pressure Trimmed Value is stable<br>Press Transfer<br>Press Close |
| Set Transducer block to AUTO | Select the following from the menu:<br>Device>> Device Mode>> Transducer Block<br>Set Target Mode to Auto<br>Press Transfer<br>Press Close |

## RECALL FACTORY TRIM

### LOI

1. Enter Calibration >> Reset
   a. Save.

**Class Two Master**

| Steps | Actions |
|---|---|
| Set Transducer block to Out of Service | Select the following from the menu: Device >> Device Mode >> Transducer Block<br>Set Target Mode to Out of Service<br>Press Transfer |
| Recall Factory Trim | Select the following from the menu:<br>Device >> Sensor Calibration >> Calibration Factory<br>Select Restores factory calibration units<br>Select Factory trim standard<br>Press Transfer<br>Press Close |
| Set Transducer block to AUTO | Select the following from the menu:<br>Device >> Device Mode >> Transducer Block<br>Set Target Mode to Auto<br>Press Transfer<br>Press Close |

## COMPENSATING FOR LINE PRESSURE

### Range 2 and Range 3

The following specifications show the static pressure effect for the Rosemount 3051 Range 2 and Range 3 pressure transmitters used in differential pressure applications where line pressure exceeds 2000 psi (138 bar).

**Zero Effect**
± 0.1% of the upper range limit plus an additional ± 0.1% of upper range limit error for each 1000 psi (69 bar) of line pressure above 2000 psi (138 bar).

Example: Line pressure is 3000 psi (207 bar) for Ultra performance transmitter. Zero effect error calculation:

± {0.05 + 0.1 x [3 kpsi - 2 kpsi]} = ± 0.15% of the upper range limit

**Span Effect**

Refer to “Line Pressure Effect” on page A-3.

### Range 4 and Range 5

Rosemount 3051 Range 4 and 5 pressure transmitters require a special calibration procedure when used in differential pressure applications. The purpose of this procedure is to optimize transmitter performance by reducing the effect of static line pressure in these applications. The 3051 differential pressure transmitters (Ranges 1, 2, and 3) do not require this procedure because optimization occurs in the sensor.

Applying high static pressure to 3051 Range 4 and Range 5 pressure transmitters causes a systematic shift in the output. This shift is linear with static pressure; correct it by performing the Sensor Trim procedure on page 5-2.

The following specifications show the static pressure effect for 3051 Range 4 and Range 5 transmitters used in differential pressure applications:

**Zero Effect:**
± 0.1% of the upper range limit per 1000 psi (69 bar) for line pressures from 0 to 2000 psi (0 to 138 bar)

For line pressures above 2000 psi (138 bar), the zero effect error is ± 0.2% of the upper range limit plus an additional ± 0.2% of upper range limit error for each 1000 psi (69 bar) of line pressure above 2000 psi (138 bar).

Example: Line pressure is 3000 psi (3 kpsi). Zero effect error calculation:

± {0.2 + 0.2 x [3 kpsi - 2 kpsi]} = ± 0.4% of the upper range limit

**Span Effect:**
Correctable to ±0.2% of reading per 1000 psi (69 bar) for line pressures from 0 to 3626 psi (0 to 250 bar)

The systematic span shift caused by the application of static line pressure is -1.00% of reading per 1000 psi (69 bar) for Range 4 transmitters, and -1.25% of reading per 1000 psi (69 bar) for Range 5 transmitters.

# Section 6 Troubleshooting



## OVERVIEW

This section contains information on how to troubleshoot the Rosemount 3051 Profibus Pressure Transmitter.

## SAFETY MESSAGES

Procedures and instructions in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that raises potential safety issues is indicated by a warning symbol (⚠). Refer to the following safety messages before performing an operation preceded by this symbol.

### Warnings (⚠)

**⚠WARNING**

Explosions could result in death or serious injury:

Installation of this transmitter in an explosive environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Please review the approvals section of the 3051 reference manual for any restrictions associated with a safe installation.

- In an Explosion-Proof/Flameproof installation, do not remove the transmitter covers when power is applied to the unit.

Process leaks may cause harm or result in death.

- Install and tighten process connectors before applying pressure.

Electrical shock can result in death or serious injury.

- Avoid contact with the leads and terminals. High voltage that may be present on leads can cause electrical shock.

## DIAGNOSTICS IDENTIFICATION AND RECOMMENDED ACTION

The Rosemount 3051 Profibus device diagnostics can be used to warn a user about a potential transmitter error. There is a transmitter error if the Output Status reads anything but *Good* or *Good - Function Check*, or the LCD reads *SNSR* or *ELECT*. Use Table 6-1 to identify what Diagnostic Condition exists based on the combination of errors under the *How to Identify* columns. Start with the Physical Block Diagnostic Extension and use Primary Value and Temperature status to identify Diagnostic Condition. If a box is blank, it is not necessary to identify that Diagnostic Condition. Once condition is identified, use the What to do column to remedy the error.

Table 6-1. Diagnostics Identification and Recommended Action

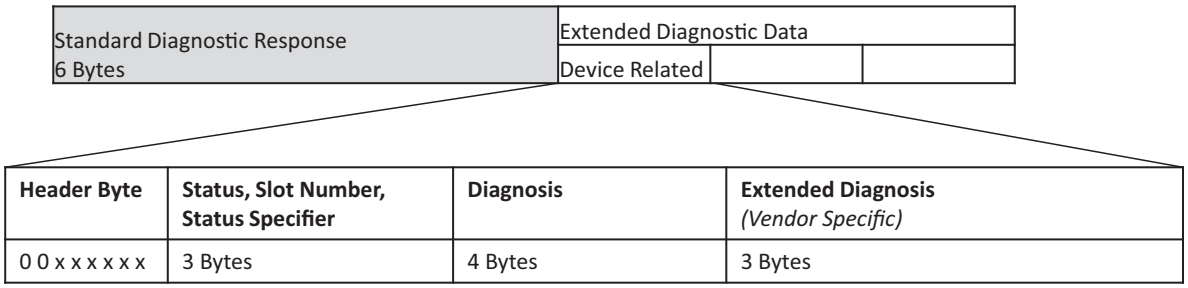
| How to Identify | Diagnostics | How to identify | | | What to do |
|---|---|---|---|---|---|
| | | Class one or two master | Class two master | | |
| | Diagnostic Condition | Physical Block Diagnostic Extension | Primary Value Status | Temperature Status | Recommended Action |
| | PV Simulation Enabled | Simulate Active | | | 1. Check the simulation switch<br>2. Replace the electronics |
| | Pressure beyond sensor limits | Sensor Transducer Block Error | Bad, sensor failure, underflow/overflow | | 1.Verify the applied pressure is within the range of the pressure sensor<br>2.Check for impulse line plugging or leaks<br>3.Replace the sensor module |
| | Module Temperature Beyond limits | | | Uncertain | 1.Verify the sensor temperature is between -45C and 90C<br>2.Replace the sensor module |
| | Sensor Module Memory Failure | | Bad, out of service (OOS) | | 1. Replace sensor module |
| | No Sensor Module Pressure Updates | | Bad, sensor failure, constant | | 1. Check cable connection between sensor module and electronics<br>2. Replace electronics<br>3. Replace sensor module |
| | No Device Temperature Updates | | | Bad | 1. Check cable connection between sensor module and electronics<br>2. Replace electronics<br>3. Replace sensor module |
| | Circuit Board Memory Failure | Memory Failure<br>or<br>Non Volatile Memory Integrity Error | | | 1. Replace electronics |
| | LOI button stuck | LOI Button Malfunction | | | 1. Check if button is stuck under housing<br>2. Replace buttons<br>3. Replace electronics |

## Extended Diagnostics Identification with class one master

If using a class one master to identify *Physical Block Diagnostic Extensions*, see Figure 6-1 and Figure 6-2 for diagnostic bit information. Table 6-2 and Table 6-3 list the diagnostic description for each bit.

**NOTE**
A class two master will automatically decode bits and provide diagnostic names.

Figure 6-1. Extended Diagnostics Identification




| Header Byte | Status, Slot Number, Status Specifier | Diagnosis | Extended Diagnosis *(Vendor Specific)* |
|---|---|---|---|
| 0 0 x x x x x x | 3 Bytes | 4 Bytes | 3 Bytes |

Figure 6-2. Diagnoses and Extended Diagnoses Bit Identification

**Diagnosis**

| | Byte 1 | | | | | | | | Byte 2 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Unit_Diag_Bit[1] | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 39 | 38 | 37 | 36 | 35 | 34 | 33 | 32 |

| | Byte 3 | | | | | | | | Byte 4 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| | 47 | 46 | 45 | 44 | 43 | 42 | 41 | 40 | 55 | 54 | 53 | 52 | 51 | 50 | 49 | 48 |

**Extended Diagnosis**

| | Byte 1 | | | | | | | | Byte 2 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Unit_Diag_Bit[1] | 63 | 62 | 61 | 60 | 59 | 58 | 57 | 56 | 71 | 70 | 69 | 68 | 67 | 66 | 65 | 64 |

| Byte 3 | | | | | | | |
|---|---|---|---|---|---|---|---|
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 79 | 78 | 77 | 76 | 75 | 74 | 73 | 72 |

*(1) Unit_Diag_Bit located in GSD file*

Table 6-2. Diagnosis Descriptions

| Device Related Diagnosis | | |
|---|---|---|
| **Byte-Bit** | **Unit_Diag_Bit (1)** | **Diagnostic Description** |
| 2-4 | 36 | Cold Start |
| 2-3 | 35 | Warm Start |
| 3-2 | 42 | Function Check |
| 3-0 | 40 | Maintenance Alarm |
| 4-7 | 55 | More Information Available |

*(1) Unit_Diag_Bit located in GSD file*

Table 6-3. Extended Diagnosis Descriptions(1)

| **Diagnostic Extension Byte-Bit** | | |
|---|---|---|
| **Byte-Bit** | **Unit_Diag_Bit (1)** | **Diagnostic Description** |
| 1-4 | 28 | Simulate Active |
| 1-7 | 63 | Other |
| 2-0 | 64 | Out-of-Service |
| 2-1 | 65 | Power-Up |
| 2-2 | 66 | Device Needs Maintenance now |
| 2-4 | 68 | Lost NV Data |
| 2-5 | 69 | Lost Static Data |
| 2-6 | 70 | Memory Failure |
| 3-1 | 73 | ROM Integrity Error |
| 3-3 | 75 | Non-Volatile Memory Integrity Error |
| 3-4 | 76 | Hardware/Software Incompatible |
| 3-5 | 77 | Manufacturing Block Integrity Error |
| 3-6 | 78 | Sensor Transducer Block Error |
| 3-7 | 79 | LOI Button Malfunction is detected |

*(1) Unit_Diag_Bit located in GSD file*

## PLANTWEB AND NE107 DIAGNOSTICS

Table 6-4 describes the recommended status of each diagnostic condition based on PlantWeb and Namur NE107 recommendations.

Table 6-4. Output Status

| Name | PlantWeb Alert Category | NE107 Category |
|---|---|---|
| PV Simulation Enabled | Advisory | Check |
| LOI button pressed | Advisory | Good |
| Pressure beyond sensor limits | Maintenance | Failure |
| Module Temperature Beyond limits | Maintenance | Out of spec |
| Sensor Module Memory Failure | Failure | Failure |
| No Sensor Module Pressure Updates | Failure | Failure |
| No Device Temperature Updates | Failure | Out of spec |
| Circuit Board Memory Failure | Failure | Failure |
| LOI button stuck | Failure | Failure |

## ALERT MESSAGES AND FAIL SAFE TYPE SELECTION

Table 6-5 defines the output status and LCD messages that will be driven by a diagnostic condition. This table can be used to determine what type of fail safe value setting is preferred. Fail safe type can be set with a class two master under fail safe >> fail safe mode.

Table 6-5. Alert Messages

| Diagnostic | Output Status (based on Fail Safe Type) | | | LCD |
|---|---|---|---|---|
| **Name** | **use fail safe value** | **use last good value** | **use wrong calculated value** | **LCD Status** |
| PV Simulation Enabled | Depends on simulated value/status | Depends on simulated value/status | Depends on simulated value/status | N/A |
| LOI button pressed | Good, function check | Good, function check | Good, function check | N/A |
| Pressure beyond sensor limits | Uncertain, substitute set | Uncertain, substitute set | Bad, process related, maintenance alarm | SNSR |
| Module Temperature Beyond limits | Uncertain, substitute set | Uncertain, process related, no maintenance | Uncertain, process related, no maintenance | SNSR |
| Sensor Module Memory Failure | Bad, passivated | Uncertain, substitute set | Bad, maintenance alarm | SNSR |
| No Sensor Module Pressure Updates | Uncertain, substitute set | Uncertain, substitute set | Bad, process related, maintenance alarm | SNSR |
| No Device Temperature Updates | Uncertain, process related, no maintenance | Uncertain, process related, no maintenance | Uncertain, process related, no maintenance | SNSR |
| Circuit Board Memory Failure | Bad, passivated | Bad, passivated | Bad, passivated | ELECT |
| LOI button stuck | Bad, passivated | Bad, passivated | Bad, passivated | ELECT |

Table 6-6. Output Status Bit Definition

| Description | HEX | DECIMAL |
|---|---|---|
| Bad - passivated | 0x23 | 35 |
| Bad, maintenance alarm, more diagnostics available | 0x24 | 36 |
| Bad, process related - no maintenance | 0x28 | 40 |
| Uncertain, substitute set | 0x4B | 75 |
| Uncertain, process related, no maintenance | 0x78 | 120 |
| Good, ok | 0x80 | 128 |
| Good, update event | 0x84 | 132 |
| Good, advisory alarm, low limit | 0x89 | 137 |
| Good, advisory alarm, high limit | 0x8A | 138 |
| Good, critical alarm, low limit | 0x8D | 141 |
| Good, critical alarm, high limit | 0x8E | 142 |
| Good, function check | 0xBC | 188 |

## DISASSEMBLY PROCEDURES

⚠ Do not remove the instrument cover in explosive atmospheres when the circuit is live.

### Remove from Service

Follow these steps:

- Follow all plant safety rules and procedures.
- Isolate and vent the process from the transmitter before removing the transmitter from service.
- Remove all electrical leads and disconnect conduit.
- Remove the transmitter from the process connection.
  - The Rosemount 3051C transmitter is attached to the process connection by four bolts and two cap screws. Remove the bolts and separate the transmitter from the process connection. Leave the process connection in place and ready for re-installation.
  - The Rosemount 3051T transmitter is attached to the process by a single hex nut process connection. Loosen the hex nut to separate the transmitter from the process. Do not wrench on neck of transmitter.
- Do not scratch, puncture, or depress the isolating diaphragms.
- Clean isolating diaphragms with a soft rag and a mild cleaning solution, and rinse with clear water.
- For the 3051C, whenever you remove the process flange or flange adapters, visually inspect the PTFE o-rings. Replace the o-rings if they show any signs of damage, such as nicks or cuts. Undamaged o-rings may be reused.

### Remove Terminal Block

Electrical connections are located on the terminal block in the compartment labeled “FIELD TERMINALS.”

1. Remove the housing cover from the field terminal side.
2. Loosen the two small screws located on the assembly in the 9 o’clock and 5 o’clock positions.
3. Pull the entire terminal block out to remove it.

⚠ See “Safety Messages” on page 6-1 for complete warning information.

## Remove the Electronics Board

The transmitter electronics board is located in the compartment opposite the terminal side. To remove the electronics board perform the following procedure:

1. Remove the housing cover opposite the field terminal side.
2. If you are disassembling a transmitter with a LCD display, loosen the two captive screws that are visible on the right and left side of the meter display.
3. Loosen the two captive screws that anchor the board to the housing. The electronics board is electrostatically sensitive; observe handling precautions for static-sensitive components. Use caution when removing the LCD as there is an electronic pin connector that interfaces between the LCD and electronics board. The two screws anchor the LCD display to the electronics board and the electronics board to the housing.
4. Using the two captive screws, slowly pull the electronics board out of the housing. The sensor module ribbon cable holds the electronics board to the housing. Disengage the ribbon cable by pushing the connector release.

## Remove the Sensor Module from the Electronics Housing

1. Remove the electronics board. Refer to ”Remove the Electronics Board”.

**IMPORTANT**
To prevent damage to the sensor module ribbon cable, disconnect it from the electronics board before you remove the sensor module from the electrical housing.

2. Carefully tuck the cable connector completely inside of the internal black cap.

**NOTE**
Do not remove the housing until after you tuck the cable connector completely inside of the internal black cap. The black cap protects the ribbon cable from damage that can occur when you rotate the housing.

3. Loosen the housing rotation set screw with a $^{5}/_{64}$-inch hex wrench, and loosen one full turn.
4. Unscrew the module from the housing, making sure the black cap and sensor cable do not catch on the housing.

## REASSEMBLY PROCEDURES

1. Inspect all cover and housing (non-process wetted) O-rings and replace if necessary. Lightly grease with silicone lubricant to ensure a good seal.
2. Carefully tuck the cable connector completely inside the internal black cap. To do so, turn the black cap and cable counterclockwise one rotation to tighten the cable.
3. Lower the electronics housing onto the module. Guide the internal black cap and cable through the housing and into the external black cap.
4. Turn the module clockwise into the housing.

**IMPORTANT**
Make sure the sensor ribbon cable and internal black cap remain completely free of the housing as you rotate it. Damage can occur to the cable if the internal black cap and ribbon cable become hung up and rotate with the housing.

⚠ 5. Thread the housing completely onto the sensor module. The housing must be no more than one full turn from flush with the sensor module to comply with explosion proof requirements.

6. Tighten the housing rotation set screw using a $^{5}/_{64}$-inch hex wrench.

## Attach the Electronics Board

1. Remove the cable connector from its position inside of the internal black cap and attach it to the electronics board.
2. Using the two captive screws as handles, insert the electronics board into the housing. Make sure the posts from the electronics housing properly engage the receptacles on the electronics board. Do not force. The electronics board should slide gently on the connections.
3. Tighten the captive mounting screws.

⚠ 4. Replace the electronics housing cover. The transmitter covers must be engaged metal-to-metal to ensure a proper seal and to meet Explosion-Proof requirements.

## Install the Terminal Block

1. Gently slide the terminal block into place, making sure the two posts from the electronics housing properly engage the receptacles on the terminal block.
2. Tighten the captive screws.
3. Replace the electronics housing cover. The transmitter covers must be fully engaged to meet Explosion-Proof requirements.

⚠ See “Safety Messages” on page 6-1 for complete warning information.

## Reassemble the 3051C Process Flange

1. Inspect the sensor module PTFE o-rings. Undamaged o-rings may be reused. Replace o-rings that show any signs of damage, such as nicks, cuts, or general wear.

**NOTE**
If you are replacing the o-rings, be careful not to scratch the o-ring grooves or the surface of the isolating diaphragm when removing the damaged o-rings.

2. Install the process connection. Possible options include:
   a. Coplanar Process Flange:
   - Hold the process flange in place by installing the two alignment screws to finger tightness (screws are not pressure retaining). Do not overtighten as this will affect module-to-flange alignment.
   - Install the four 1.75-in. flange bolts by finger tightening them to the flange.

   b. Coplanar Process Flange with Flange Adapters:
   - Hold the process flange in place by installing the two alignment screws to finger tightness (screws are not pressure retaining). Do not overtighten as this will affect module-to-flange alignment.
   - Hold the flange adapters and adapter o-rings in place while installing the four configurations, use four 2.88-in. bolts. For gage pressure configurations, use two 2.88-in. bolts and two 1.75-in. bolts.

   c. Manifold:
   - Contact the manifold manufacturer for the appropriate bolts and procedures.
3. Tighten the bolts to the initial torque value using a crossed pattern. See Table 6-7 for appropriate torque values.

Table 6-7. Bolt Installation Torque Values

| Bolt Material | Initial Torque Value | Final Torque Value |
|---|---|---|
| CS-ASTM-A445 Standard | 300 in-lb. (34 N-m) | 650 in-lb. (73 N-m) |
| 316 SST—Option L4 | 150 in-lb. (17 N-m) | 300 in-lb. (34 N-m) |
| ASTM-A-193-B7M—Option L5 | 300 in-lb. (34 N-m) | 650 in-lb. (73 N-m) |
| ASTM-A-193 class 2, Grade B8M—Option L8 | 150 in.-lb (17 N-m) | 300 in.-lb (34 N-m) |

**NOTE**
If you replaced the PTFE sensor module o-rings, re-torque the flange bolts after installation to compensate for cold flow.

**NOTE**
After replacing o-rings on Range 1 transmitters and re-installing the process flange, expose the transmitter to a temperature of 185 °F (85 °C) for two hours. Then re-tighten the flange bolts in a cross pattern, and again expose the transmitter to a temperature of 185 °F (85 °C) for two hours before calibration.

## Install the Drain/Vent Valve

1. Apply sealing tape to the threads on the seat. Starting at the base of the valve with the threaded end pointing toward the installer, apply two clockwise turns of sealing tape.
2. Tighten the drain/vent valve to 250 in-lb. (28.25 N-m).
3. Take care to place the opening on the valve so that process fluid will drain toward the ground and away from human contact when the valve is opened.

# Appendix A Specifications and Reference Data



## PERFORMANCE SPECIFICATIONS

Appendix A Rosemount 3051 HART, FOUNDATION fieldbus and Profibus PA protocols unless specified.

For zero-based spans, reference conditions, silicone oil fill, glass-filled PTFE o-rings, SST materials, Coplanar flange (3051C) or

1/2 in.- 14 NPT (3051T) process connections, digital trim values set to equal range points.

### Conformance To Specification (±3σ (Sigma))

Technology leadership, advanced manufacturing techniques and statistical process control ensure specification conformance to at least ±3σ.

## Reference Accuracy

Stated reference accuracy equations include terminal based linearity, hysteresis, and repeatability.

For FOUNDATION fieldbus and Profibus PA devices, use calibrated range in place of span.

| Models | Standard | High Accuracy Option |
|---|---|---|
| **3051CD, 3051CG**<br>Range 0 (CD) | ±0.10% of span<br>For spans less than 2:1, accuracy = ±0.05% of URL | |
| Range 1 | ±0.10% of span<br>For spans less than 15:1,<br>accuracy = $\pm\left[0.025 + 0.005\left(\frac{URL}{Span}\right)\right]$% of Span | |
| Ranges 2-5 | ±0.065% of span<br>For spans less than 10:1,<br>accuracy = $\pm\left[0.015 + 0.005\left(\frac{URL}{Span}\right)\right]$% of Span | Ranges 2-4<br>High Accuracy Option, P8<br>±0.04% of span<br>For spans less than 5:1,<br>accuracy = $\pm\left[0.015 + 0.005\left(\frac{URL}{Span}\right)\right]$% of Span |
| **3051T**<br>Ranges 1-4 | ±0.065% of span<br>For spans less than 10:1,<br>accuracy = $\pm\left[0.0075\left(\frac{URL}{Span}\right)\right]$% of Span | Ranges 2-4<br>High Accuracy Option, P8<br>±0.04% of span<br>For spans less than 5:1,<br>accuracy = $\pm\left[0.0075\left(\frac{URL}{Span}\right)\right]$% of Span |
| Range 5 | ±0.075% of span<br>For spans less than 10:1,<br>accuracy = $\pm\left[0.0075\left(\frac{URL}{Span}\right)\right]$% of Span | |
| **3051CA**<br>Ranges 1-4 | ±0.065% of span<br>For spans less than 10:1,<br>accuracy = $\pm\left[0.0075\left(\frac{URL}{Span}\right)\right]$% of Span | Ranges 2-4<br>High Accuracy Option, P8<br>±0.04% of span<br>For spans less than 5:1,<br>accuracy = $\pm\left[0.0075\left(\frac{URL}{Span}\right)\right]$% of Span |
| **3051L**<br>All Ranges | ±0.075% of span<br>For spans less than 10:1,<br>accuracy = $\pm\left[0.025 + 0.005\left(\frac{URL}{Span}\right)\right]$% of Span | |

## Flow Performance - Flow Reference Accuracy

| | | |
|---|---|---|
| **3051CFA Annubar Flowmeter** | | |
| Ranges 2-3 | | ±1.60% of Flow Rate at 8:1 flow turndown |
| **3051CFC Compact Orifice Flowmeter – Conditioning Option C** | | |
| Ranges 2-3 | β =0.4 | ±1.75% of Flow Rate at 8:1 flow turndown |
| | β =0.65 | ±1.95% of Flow Rate at 8:1 flow turndown |
| **3051CFC Compact Orifice Flowmeter – Orifice Type Option P(1)** | | |
| Ranges 2-3 | β =0.4 | ±2.00% of Flow Rate at 8:1 flow turndown |
| | β =0.65 | ±2.00% of Flow Rate at 8:1 flow turndown |
| **3051CFP Integral Orifice Flowmeter** | | |
| Ranges 2-3 | β <0.1 | ±3.00% of Flow Rate at 8:1 flow turndown |
| | 0.1<β <0.2 | ±1.95% of Flow Rate at 8:1 flow turndown |
| | 0.2<β <0.6 | ±1.75% of Flow Rate at 8:1 flow turndown |
| | 0.6<β <0.8 | ±2.15% of Flow Rate at 8:1 flow turndown |

*(1) For smaller line sizes, see Rosemount Compact Orifice*

## Total Performance

Total Performance is based on combined errors of reference accuracy, ambient temperature effect, and static pressure effect.

*For ±50 °F (28 °C) temperature changes, up to 1000 psi (6,9 MPa) line pressure (CD only), from 1:1 to 5:1 rangedown.*

| Models | Total Performance |
|---|---|
| **3051C** Ranges 2-5 | ±0.15% of span |
| **3051T** Ranges 1-4 | ±0.15% of span |

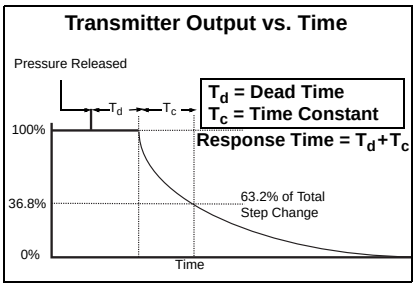
## Long Term Stability

| Models | Long Term Stability |
|---|---|
| **3051C** Ranges 2-5 | ±0.125% of URL for 5 years<br>±50 °F (28 °C) temperature changes, and up to 1000 psi (6,9 MPa) line pressure. |
| **3051CD Low/Draft Range** Ranges 0-1 | ±0.2% of URL for 1 year |
| **3051T** Ranges 1-4 | ±0.125% of URL for 5 years<br>±50 °F (28 °C) temperature changes, and up to 1000 psi (6,9 MPa) line pressure. |

## Dynamic Performance

| | 4 - 20 mA HART[1] 1-5 Vdc HART Low Power | FOUNDATION fieldbus and Profibus PA protocols[3] | Typical HART Transmitter Response Time |
|---|---|---|---|
| **Total Response Time ($T_d$ + $T_c$)[2]:** | | | |
| 3051C, Ranges 2-5: | 100 ms | 152 ms | |
| Range 1: | 255 ms | 307 ms | |
| Range 0: | 700 ms | N/A | |
| 3051T: | 100 ms | 152 ms | |
| 3051L: | See Instrument Toolkit® | See Instrument Toolkit | |
| **Dead Time (Td)** | 45 ms (nominal) | 97 ms | |
| **Update Rate** | 22 times per second | 22 times per second | |

*(1) Dead time and update rate apply to all models and ranges; analog output only*
*(2) Nominal total response time at 75 °F (24 °C) reference conditions.*
*(3) Transducer block response time, Analog Input block execution time not included.*




## Line Pressure Effect per 1000 psi (6,9 MPa)

For line pressures above 2000 psi (13,7 MPa) and Ranges 4-5, see user manual (Document number 00809-0100-4001 for HART, 00809-0100-4774 for FOUNDATION fieldbus, and 00809-0100-4797 for Profibus PA).

| Models | Line Pressure Effect |
|---|---|
| **3051CD, 3051CF** | Zero Error[1] |
| Range 0 | ±0.125% of URL/100 psi (6,89 bar) |
| Range 1 | ±0.25% of URL/1000 psi (68,9 bar) |
| Ranges 2-3 | ±0.05% of URL/1000 psi (68,9 bar) for line pressures from 0 to 2000 psi (0 to 13,7 MPa) |
| | Span Error |
| Range 0 | ±0.15% of reading/100 psi (6,89 bar) |
| Range 1 | ±0.4% of reading/1000 psi (68,9 bar) |
| Ranges 2-3 | ±0.1% of reading/1000 psi (68,9 bar) |

*(1) Can be calibrated out at line pressure.*

## Ambient Temperature Effect per 50°F (28°C)

| Models | Ambient Temperature Effect |
|---|---|
| **3051CD, 3051CG, 3051CF** | |
| Range 0 | ±(0.25% URL + 0.05% span) |
| Range 1 | ±(0.1% URL + 0.25% span) |
| Ranges 2-5 | ±(0.0125% URL + 0.0625% span) from 1:1 to 5:1<br>±(0.025% URL + 0.125% span) from 5:1 to 100:1 |
| **3051T** | |
| Range 1 | ±(0.025% URL + 0.125% span) from 1:1 to 10:1<br>±(0.05% URL + 0.125% span) from 10:1 to 100:1 |
| Range 2-4 | ±(0.025% URL + 0.125% span) from 1:1 to 30:1<br>±(0.035% URL + 0.125% span) from 30:1 to 100:1 |
| Range 5 | ±(0.1% URL + 0.15% span) |
| **3051CA** | |
| All Ranges | ±(0.025% URL + 0.125% span) from 1:1 to 30:1 |
| | ±(0.035% URL + 0.125% span) from 30:1 to 100:1 |
| **3051L** | See Instrument Toolkit software. |

## Mounting Position Effects

| Models | Mounting Position Effects |
|---|---|
| **3051C** | Zero shifts up to ±1.25 in$H_2O$ (3,11 mbar), which can be calibrated out. No span effect. |
| **3051L** | With liquid level diaphragm in vertical plane, zero shift of up to 1 in$H_2O$ (2,49 mbar). With diaphragm in horizontal plane, zero shift of up to 5 in$H_2O$ (12,43 mbar) plus extension length on extended units. All zero shifts can be calibrated out. No span effect. |
| **3051CA, 3051T** | Zero shifts up to 2.5 in$H_2O$ (6,22 mbar), which can be calibrated out. No span effect. |

## Vibration Effect

Less than ±0.1% of URL when tested per the requirements of IEC60770-1 field or pipeline with high vibration level (10-60 Hz 0.21 mm displacement peak amplitude / 60-2000 Hz 3g).

## Power Supply Effect

Less than ±0.005% of calibrated span per volt.

## RFI Effects

±0.1% of span from 20 to 1000 MHz and for field strength up to 30 V/m.

## Electromagnetic Compatibility (EMC)

Meets all relevant requirements of EN 61326 and Namur NE-21.

## Transient Protection (Option Code T1)

Meets IEEE C62.41, Category Location B

6 kV crest (0.5 μs - 100 kHz)
3 kV crest (8 × 20 microseconds)
6 kV crest (1.2 × 50 microseconds)

**NOTE**

Calibrations at 68 °F (20 °C) per ASME Z210.1 (ANSI)

# FUNCTIONAL SPECIFICATIONS

## Range and Sensor Limits

Table A-1. 3051CD, 3051CG, 3051CF, and 3051L Range and Sensor Limits

| Range | Minimum Span | | Range and Sensor Limits | | | |
|---|---|---|---|---|---|---|
| | | | Lower (LRL) | | | |
| | 3051CD[(1)], 3051CG, 3051CF, 3051L | Upper (URL) | 3051CD Differential 3051CF Flowmeters | 3051CG Gage | 3051L Differential | 3051LGage |
| 0 | 0.1 in$H_2O$ (0,25 mbar) | 3.0 in$H_2O$ (7,47 mbar) | -3.0 in$H_2O$ (-7,47 mbar) | NA | NA | NA |
| 1 | 0.5 in$H_2O$ (1,2 mbar) | 25 in$H_2O$ (62,3 mbar) | -25 in$H_2O$ (-62,1 mbar) | -25 in$H_2O$ (-62,1 mbar) | NA | NA |
| 2 | 2.5 in$H_2O$ (6,2 mbar) | 250 in$H_2O$ (0,62 bar) | -250 in$H_2O$ (-0,62 bar) | -250 in$H_2O$ (-0,62 bar) | -250 in$H_2O$ (-0,62 bar) | -250 in$H_2O$ (-0,62 bar) |
| 3 | 10 in$H_2O$ (24,9 mbar) | 1000 in$H_2O$ (2,49 bar) | -1000 in$H_2O$ (-2,49 bar) | 0.5 psia (34,5 mbar abs) | -1000 in$H_2O$ (-2,49 bar) | 0.5 psia (34,5 mbar abs) |
| 4 | 3 psi (0,20 bar) | 300 psi (20,6 bar) | -300 psi (-20,6 bar) | 0.5 psia (34,5 mbar abs) | -300 psi (-20,6 bar) | 0.5 psia (34,5 mbar abs) |
| 5 | 20 psi (1,38 bar) | 2000 psi (137,9 bar) | - 2000 psi (-137,9 bar) | 0.5 psia (34,5 mbar abs) | NA | NA |

*(1) Range 0 only available with 3051CD. Range 1 only available with 3051CD, 3051CG, or 3051CF.*

Table A-2. Range and Sensor Limits

| Range | 3051CA | | | | Range | 3051T | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Range and Sensor Limits | | | | | Range and Sensor Limits | | |
| | Minimum Span | Upper (URL) | Lower (LRL) | | | Minimum Span | Upper (URL) | Lower (LRL) | Lower[(1)] (LRL) (Gage) |
| 1 | 0.3 psia (20,6 mbar) | 30 psia (2,07 bar) | 0 psia (0 bar) | | 1 | 0.3 psi (20,6 mbar) | 30 psi (2,07 bar) | 0 psia (0 bar) | -14.7 psig (-1,01 bar) |
| 2 | 1.5 psia (0,103 bar) | 150 psia (10,3 bar) | 0 psia (0 bar) | | 2 | 1.5 psi (0,103 bar) | 150 psi (10,3 bar) | 0 psia (0 bar) | -14.7 psig (-1,01 bar) |
| 3 | 8 psia (0,55 bar) | 800 psia (55,2 bar) | 0 psia (0 bar) | | 3 | 8 psi (0,55 bar) | 800 psi (55,2 bar) | 0 psia (0 bar) | -14.7 psig (-1,01 bar) |
| 4 | 40 psia (2,76 bar) | 4000 psia (275,8 bar) | 0 psia (0 bar) | | 4 | 40 psi (2,76 bar) | 4000 psi (275,8 bar) | 0 psia (0 bar) | -14.7 psig (-1,01 bar) |
| | | | | | 5 | 2000 psi (137,9 bar) | 10000 psi (689,4 bar) | 0 psia (0 bar) | -14.7 psig (-1,01 bar) |

*(1) Assumes atmospheric pressure of 14.7 psig.*

## Service

Liquid, gas, and vapor applications

## 4-20 mA HART (Output Code A)

### Output

Two-wire 4-20 mA, user-selectable for linear or square root output. Digital process variable superimposed on 4-20 mA signal, available to any host that conforms to the *HART* protocol.

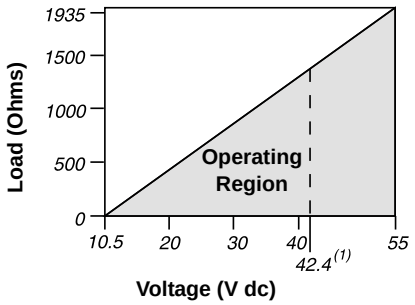
### Power Supply

External power supply required. Standard transmitter (4-20 mA) operates on 10.5 to 55 V dc with no load.

### Load Limitations

Maximum loop resistance is determined by the voltage level of the external power supply, as described by:

Max. Loop Resistance = 43.5 (Power Supply Voltage – 10.5)




*Communication requires a minimum loop resistance of 250 ohms.*

*(1) For CSA approval, power supply must not exceed 42.4 V.*

### Zero and Span Adjustment Requirements

Zero and span values can be set anywhere within the range limits stated in Table A-1 and Table A-2.

Span must be greater than or equal to the minimum span stated in Table A-1 and Table A-2.

### Indication

Optional two line LCD display

## FOUNDATION fieldbus (Output code F)

### Power Supply

External power supply required; transmitters operate on 9.0 to 32.0 V dc transmitter terminal voltage.

### Current Draw

17.5 mA for all configurations (including LCD display option)

### Indication

Optional two line LCD display

### FOUNDATION fieldbus Function Block Execution Times

| Block | Execution Time |
|---|---|
| Resource | - |
| Transducer | - |
| LCD Block | - |
| Analog Input 1, 2 | 30 milliseconds |
| PID | 45 milliseconds |
| Input Selector | 30 milliseconds |
| Arithmetic | 35 milliseconds |
| Signal Characterizer | 40 milliseconds |
| Integrator | 35 milliseconds |

### FOUNDATION fieldbus Parameters

| | |
|---|---|
| Schedule Entries | 7 (max.) |
| Links | 20 (max.) |
| Virtual Communications Relationships (VCR) | 12 (max.) |

### Standard Function Blocks

#### Resource Block

Contains hardware, electronics, and diagnostic information.

#### Transducer Block

Contains actual sensor measurement data including the sensor diagnostics and the ability to trim the pressure sensor or recall factory defaults.

#### LCD Block

Configures the local display.

#### 2 Analog Input Blocks

Processes the measurements for input into other function blocks. The output value is in engineering units or custom and contains a status indicating measurement quality.

#### PID Block

Contains all logic to perform PID control in the field including cascade and feedforward.

### Backup Link Active Scheduler (LAS)

The transmitter can function as a Link Active Scheduler if the current link master device fails or is removed from the segment.

### Advanced Control Function Block Suite (Option Code A01)

#### Input Selector Block

Selects between inputs and generates an output using specific selection strategies such as minimum, maximum, midpoint, average or first “good.”

### Arithmetic Block

Provides pre-defined application-based equations including flow with partial density compensation, electronic remote seals, hydrostatic tank gauging, ratio control and others.

### Signal Characterizer Block

Characterizes or approximates any function that defines an input/output relationship by configuring up to twenty X, Y coordinates. The block interpolates an output value for a given input value using the curve defined by the configured coordinates.

### Integrator Block

Compares the integrated or accumulated value from one or two variables to pre-trip and trip limits and generates discrete output signals when the limits are reached. This block is useful for calculating total flow, total mass, or volume over time.

### FOUNDATION fieldbus Diagnostics Suite (Option Code D01)

The 3051C FOUNDATION fieldbus Diagnostics provide Abnormal Situation Prevention (ASP) indication. The integral statistical process monitoring (SPM) technology calculates the mean and standard deviation of the process variable 22 times per second. The 3051C ASP algorithm uses these values and highly flexible configuration options for customization to many user-defined or application specific abnormal situations. The detection of plugged impulse lines is the first available predefined application.

## Profibus PA (Output Code W)

### Profile Version

3.02

### Power Supply

External power supply required; transmitters operate on 9.0 to 32.0 V dc transmitter terminal voltage.

### Current Draw

17.5 mA for all configurations (including LCD display option)

### Output Update Rate

Four times per second

### Standard Function Blocks

#### Analog Input (AI Block)

The AI function block processes the measurements and makes them available to the host device. The output value from the AI block is in engineering units and contains a status indicating the quality of the measurement.

#### Physical Block

The physical block defines the physical resources of the device including type of memory, hardware, electronics and diagnostic information.

#### Transducer Block

Contains actual sensor measurement data including the sensor diagnostics and the ability to trim the pressure sensor or recall factory defaults.

### Indication

Optional two line LCD display

### Local Operator Interface

Optional external configuration buttons

## 1-5 Vdc HART Low Power (Output Code M)

### Output

Three wire 1-5 V dc or 0.8-3.2 V dc (Option Code C2) user-selectable output. Also user selectable for linear or square root output configuration. Digital process variable superimposed on voltage signal, available to any host conforming to the *HART* protocol. Low-power transmitter operates on 6-12 V dc with no load.

### Power Consumption

3.0 mA, 18-36 mW

### Minimum Load Impedance

100 kΩ ($V_{out}$ wiring)

### Indication

Optional 5-digit LCD display

## Overpressure Limits

### Rosemount 3051CD/CG/CF

- Range 0: 750 psi (51,7 bar)
- Range 1: 2000 psig (137,9 bar)
- Ranges 2-5: 3626 psig (250 bar)
  4500 psig (310,3 bar) for option code P9

### Rosemount 3051CA

- Range 1: 750 psia (51,7 bar)
- Range 2: 1500 psia (103,4 bar)
- Range 3: 1600 psia (110,3 bar)
- Range 4: 6000 psia (413,7 bar)

### Rosemount 3051TG/TA

- Range 1: 750 psi (51,7 bar)
- Range 2: 1500 psi (103,4 bar)
- Range 3: 1600 psi (110,3 bar)
- Range 4: 6000 psi (413,7 bar)
- Range 5: 15000 psi (1034,2 bar)

For 3051L or Level Flange Option Codes FA, FB, FC, FD, FP, and FQ, limit is 0 psia to the flange rating or sensor rating, whichever is lower.

Table A-3. 3051L and Level Flange Rating Limits

| Standard | Type | CS Rating | SST Rating |
|---|---|---|---|
| ANSI/ASME | Class 150 | 285 psig | 275 psig |
| ANSI/ASME | Class 300 | 740 psig | 720 psig |
| ANSI/ASME | Class 600 | 1480 psig | 1440 psig |
| *At 100 °F (38 °C), the rating decreases with increasing temperature, per ANSI/ASME B16.5.* | | | |
| DIN | PN 10-40 | 40 bar | 40 bar |
| DIN | PN 10/16 | 16 bar | 16 bar |
| DIN | PN 25/40 | 40 bar | 40 bar |
| *At 248 °F (120 °C), the rating decreases with increasing temperature, per DIN 2401.* | | | |

## Static Pressure Limit

### Rosemount 3051CD Only

Operates within specifications between static line pressures of 0.5 psia and 3626 psig (4500 psig (310, 3 bar) for
Option Code P9).

Range 0: 0.5 psia and 750 psig (3, 4 bar and 51, 7 bar)

Range 1: 0.5 psia and 2000 psig (3, 4 bar and 137, 9 bar)

## Burst Pressure Limits

### 3051C, 3051CF Coplanar or Traditional process flange

10000 psig (69 MPa)

### 3051T Inline

Ranges 1-4: 11000 psi (75,8 MPa)

Range 5: 26000 psig (179 MPa)

## Failure Mode Alarm

If self-diagnostics detect a sensor or microprocessor failure, the analog signal is driven either high or low to alert the user. High or low failure mode is user-selectable with a jumper on the transmitter. The values to which the transmitter drives its output in failure mode depend on whether it is factory-configured to *standard* or *NAMUR-compliant* operation. The values for each are as follows:

| **Standard Operation** | | | |
|---|---|---|---|
| **Output Code** | **Linear Output** | **Fail High** | **Fail Low** |
| A | 3.9 ≤ I ≤ 20.8 | I ≥ 21.75 mA | I ≤ 3.75 mA |
| M | 0.97 ≤ V ≤ 5.2 | V ≥ 5.4 V | V ≤ 0.95V |

| **NAMUR-Compliant Operation** | | | |
|---|---|---|---|
| **Output Code** | **Linear Output** | **Fail High** | **Fail Low** |
| A | 3.8 ≤ I ≤ 20.5 | I ≥ 22.5 mA | I ≤ 3.6 mA |

### Output Code F and W

If self-diagnostics detect a gross transmitter failure, that information gets passed as a status along with the process variable.

## Temperature Limits

### Ambient

-40 to 185 °F (-40 to 85 °C)

With LCD display(1): -4 to 175 °F (-20 to 80 °C)

### Storage

-50 to 230 °F (-46 to 110 °C)

With LCD display: -40 to 185 °F (-40 to 85 °C)

### Process

At atmospheric pressures and above. See Table A-4

*(1) LCD display may not be readable and LCD updates will be slower at temperatures below -4 °F (-20 °C).*

Table A-4. 3051 Process Temperature Limits

| **3051CD, 3051CG, 3051CF, 3051CA** | |
|---|---|
| Silicone Fill Sensor[1] | |
| with Coplanar Flange | –40 to 250 °F (–40 to 121 °C)[2] |
| with Traditional Flange | –40 to 300 °F (–40 to 149 °C)[2][3] |
| with Level Flange | –40 to 300 °F (–40 to 149 °C)[2] |
| with 305 Integral Manifold | –40 to 300 °F (–40 to 149 °C)[2] |
| Inert Fill Sensor[1] | 0 to 185 °F (–18 to 85 °C)[4][5] |
| **3051T (Process Fill Fluid)** | |
| Silicone Fill Sensor[1] | –40 to 250 °F (–40 to 121 °C)[2] |
| Inert Fill Sensor[1] | –22 to 250 °F (–30 to 121 °C)[2] |
| **3051L Low-Side Temperature Limits** | |
| Silicone Fill Sensor[1] | –40 to 250 °F (–40 to 121 °C)[2] |
| Inert Fill Sensor[1] | 0 to 185 °F (–18 to 85 °C)[2] |
| **3051L High-Side Temperature Limits (Process Fill Fluid)** | |
| Syltherm® XLT | –100 to 300 °F (–73 to 149 °C) |
| D.C. Silicone 704® | 32 to 400 °F (0 to 205 °C) |
| D.C. Silicone 200 | –40 to 400 °F (–40 to 205 °C) |
| Inert | –50 to 350 °F (–45 to 177 °C) |
| Glycerin and Water | 0 to 200 °F (–18 to 93 °C) |
| Neobee M-20 | 0 to 400 °F (–18 to 205 °C) |
| Propylene Glycol and Water | 0 to 200 °F (–18 to 93 °C) |

*(1) Process temperatures above 185 °F (85 °C) require derating the ambient limits by a 1.5:1 ratio.*
*(2) 220 °F (104 °C) limit in vacuum service; 130 °F (54 °C) for pressures below 0.5 psia.*
*(3) 3051CD0 process temperature limits are* –40 to 212 °F (–45 to 100 °C)
*(4) 160 °F (71 °C) limit in vacuum service.*
*(5) Not available for 3051CA.*

## Humidity Limits

0–100% relative humidity

## Turn-On Time

Performance within specifications less than 2.0 seconds (10.0 s for Profibus protocol) after power is applied to the transmitter

## Volumetric Displacement

Less than 0.005 $in^3$ (0,08 $cm^3$)

## Damping

### 4-20 mA HART

Analog output response to a step input change is user-selectable from 0 to 36 seconds for one time constant. This software damping is in addition to sensor module response time.

### FOUNDATION fieldbus

Transducer block: 0.4 seconds fixed

AI Block: User configurable

### Profibus PA

AI Block only: User configurable

# PHYSICAL SPECIFICATIONS

## Electrical Connections

1/2–14 NPT, PG 13.5, G1/2, and M20 × 1.5 (CM20) conduit. *HART* interface connections fixed to terminal block.

## Process Connections

### Rosemount 3051C

1/4–18 NPT on 2 1/8-in. centers

1/2–14 NPT on 2-, 2 1/8-, or 2 1/4-in. centers

### Rosemount 3051L

High pressure side: 2-, 3-, or 4-in., ASME B 16.5 (ANSI) Class 150, 300 or 600 flange; 50, 80 or 100 mm, PN 40 or 10/16 flange

Low pressure side: 1/4–18 NPT on flange 1/2–14 NPT on adapter

### Rosemount 3051T

1/2–14 NPT female. A DIN 16288 Male (available in SST for Range 1–4 transmitters only), or Autoclave type F-250-C (Pressure relieved 9/16–18 gland thread; 1/4 OD high pressure tube 60° cone; available in SST for Range 5 transmitters only).

### Rosemount 3051CF

For 3051CFA, see 00813-01000-4485 in the 485 section

For 3051CFC, see 00813-01000-4485 in the 405 section

For 3051CFP, see 00813-01000-4485 in the 1195 section

## Process-Wetted Parts

### Drain/Vent Valves

316 SST, Alloy C-276, or Alloy 400 material (Alloy 400 not available with 3051L)

### Process Flanges and Adapters

Plated carbon steel, SST cast CF-8M (cast version of 316 SST, material per ASTM-A743), C-Type cast alloy CW12MW, or cast alloy M30C

### Wetted O-rings

Glass-filled PTFE or Graphite-filled PTFE

### Process Isolating Diaphragms

| Isolating Diaphragm Material | 3051CD 3051CG | 3051T | 3051CA |
|---|---|---|---|
| 316L SST | • | • | • |
| Alloy C-276 | • | • | • |
| Alloy 400 | • | | • |
| Tantalum | • | | |
| Gold-plated Alloy 400 | • | | • |
| Gold-plated SST | • | | • |

## Rosemount 3051L Process Wetted Parts

### Flanged Process Connection (Transmitter High Side)

#### Process Diaphragms, Including Process Gasket Surface

316L SST, Alloy C-276, or Tantalum

#### Extension

CF-3M (Cast version of 316L SST, material per ASTM-A743), or Alloy C-276. Fits schedule 40 and 80 pipe.

### Mounting Flange

Zinc-cobalt plated CS or SST

### Reference Process Connection (Transmitter Low Side)

### Isolating Diaphragms

316L SST or Alloy C-276

### Reference Flange and Adapter

CF-8M (Cast version of 316 SST, material per ASTM-A743)

## Non-Wetted Parts

### Electronics Housing

Low-copper aluminum or CF-8M (Cast version of 316 SST). Enclosure Type 4X, IP 65, IP 66, IP 68

### Coplanar Sensor Module Housing

CF-3M (Cast version of 316L SST, material per ASTM-A743)

### Bolts

ASTM A449, Type 1 (zinc-cobalt plated carbon steel)
ASTM F593G, Condition CW1 (Austenitic 316 SST)
ASTM A193, Grade B7M (zinc plated alloy steel)
Alloy K-500

### Sensor Module Fill Fluid

Silicone oil (D.C. 200) or Fluorocarbon oil (Halocarbon or Fluorinert® FC-43 for 3051T)

### Process Fill Fluid (3051L only)

Syltherm XLT, D.C. Silicone 704,
D.C. Silicone 200, inert, glycerin and water, Neobee M-20 or propylene glycol and water

### Paint

Polyurethane

### Cover O-rings

Buna-N

## Shipping Weights

Table A-5. Transmitter Weights without Options

| Transmitter | Add Weight In lb. (kg) |
|---|---|
| 3051C | 6.0 (2,7) |
| 3051T | 3.0 (1,4) |
| 3051L | Table A-6 on page A-14 |

Table A-6. 3051L Weights without Options

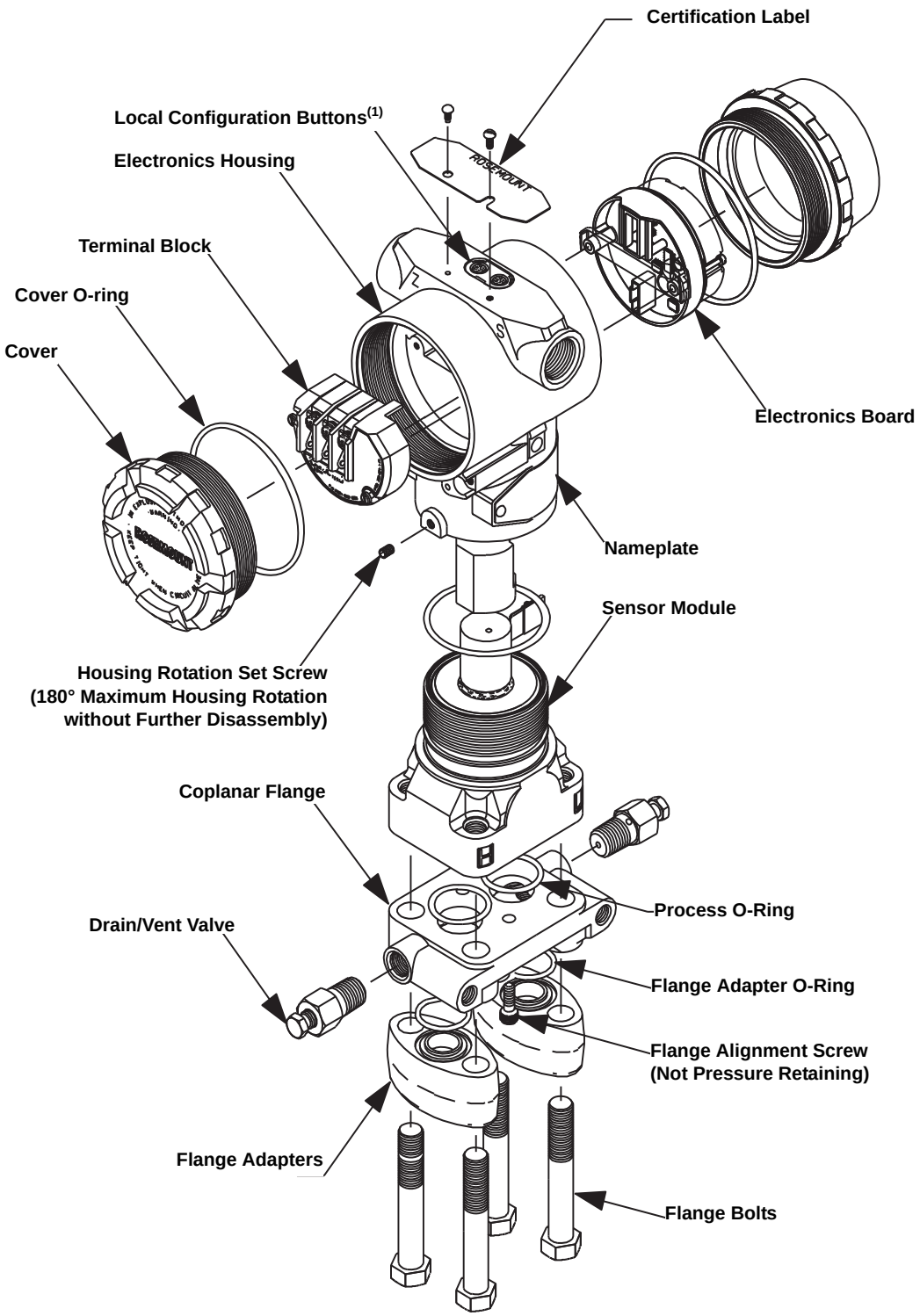
| Flange | Flush lb. (kg) | 2-in. Ext. lb. (kg) | 4-in. Ext. lb. (kg) | 6-in. Ext. lb. (kg) |
|---|---|---|---|---|
| 2-in., 150 | 12.5 (5,7) | — | — | — |
| 3-in., 150 | 17.5 (7,9) | 19.5 (8,8) | 20.5 (9,3) | 21.5 (9,7) |
| 4-in., 150 | 23.5 (10,7) | 26.5 (12,0) | 28.5 (12,9) | 30.5 (13,8) |
| 2-in., 300 | 17.5 (7,9) | — | — | — |
| 3-in., 300 | 22.5 (10,2) | 24.5 (11,1) | 25.5 (11,6) | 26.5 (12,0) |
| 4-in., 300 | 32.5 (14,7) | 35.5 (16,1) | 37.5 (17,0) | 39.5 (17,9) |
| 2-in., 600 | 15.3 (6,9) | — | — | — |
| 3-in., 600 | 25.2 (11,4) | 27.2 (12,3) | 28.2 (12,8) | 29.2 (13,2) |
| DN 50/PN 40 | 13.8 (6,2) | — | — | — |
| DN 80/PN 40 | 19.5 (8,8) | 21.5 (9,7) | 22.5 (10,2) | 23.5 (10,6) |
| DN 100/ PN 10/16 | 17.8 (8,1) | 19.8 (9,0) | 20.8 (9,5) | 21.8 (9,9) |
| DN 100/ PN 40 | 23.2 (10,5) | 25.2 (11,5) | 26.2 (11,9) | 27.2 (12,3) |

Table A-7. Transmitter Options Weights

| Code | Option | Add lb. (kg) |
|---|---|---|
| J, K, L, M | Stainless Steel Housing (T) | 3.9 (1,8) |
| J, K, L, M | Stainless Steel Housing (C, L, H, P) | 3.1 (1,4) |
| M4/M5 | LCD display for Aluminum Housing | 0.5 (0,2) |
| M4/M6 | LCD display for SST Housing | 1.25 (0,6) |
| B4 | SST Mounting Bracket for Coplanar Flange | 1.0 (0,5) |
| B1, B2, B3 | Mounting Bracket for Traditional Flange | 2.3 (1,0) |
| B7, B8, B9 | Mounting Bracket for Traditional Flange | 2.3 (1,0) |
| BA, BC | SST Bracket for Traditional Flange | 2.3 (1,0) |
| H2 | Traditional Flange | 2.4 (1,1) |
| H3 | Traditional Flange | 2.7 (1,2) |
| H4 | Traditional Flange | 2.6 (1,2) |
| H7 | Traditional Flange | 2.5 (1,1) |
| FC | Level Flange—3 in., 150 | 10.8 (4,9) |
| FD | Level Flange—3 in., 300 | 14.3 (6,5) |
| FA | Level Flange—2 in., 150 | 10.7 (4,8) |
| FB | Level Flange—2 in., 300 | 14.0 (6,3) |
| FP | DIN Level Flange, SST, DN 50, PN 40 | 8.3 (3,8) |
| FQ | DIN Level Flange, SST, DN 80, PN 40 | 13.7 (6,2) |

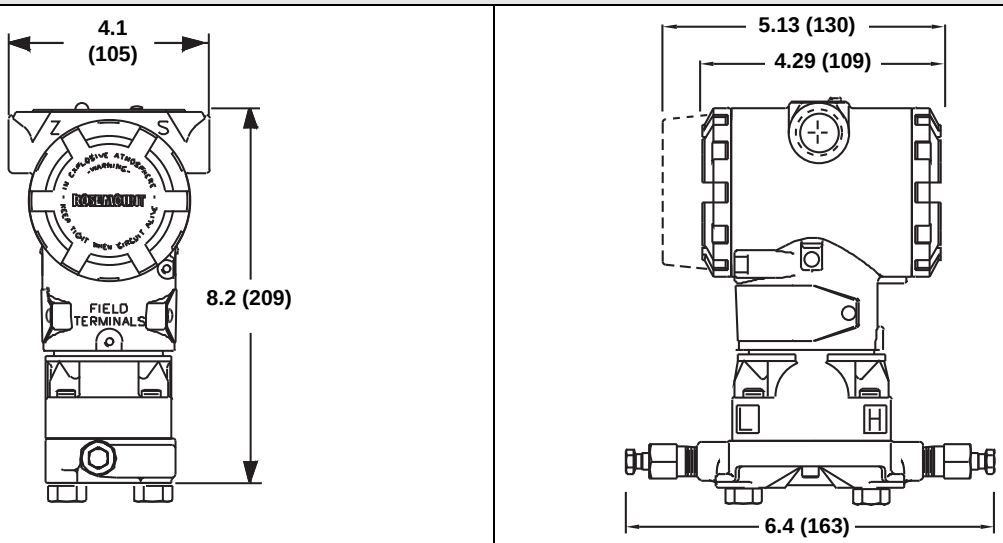
## DIMENSIONAL DRAWINGS

### 3051C Exploded View



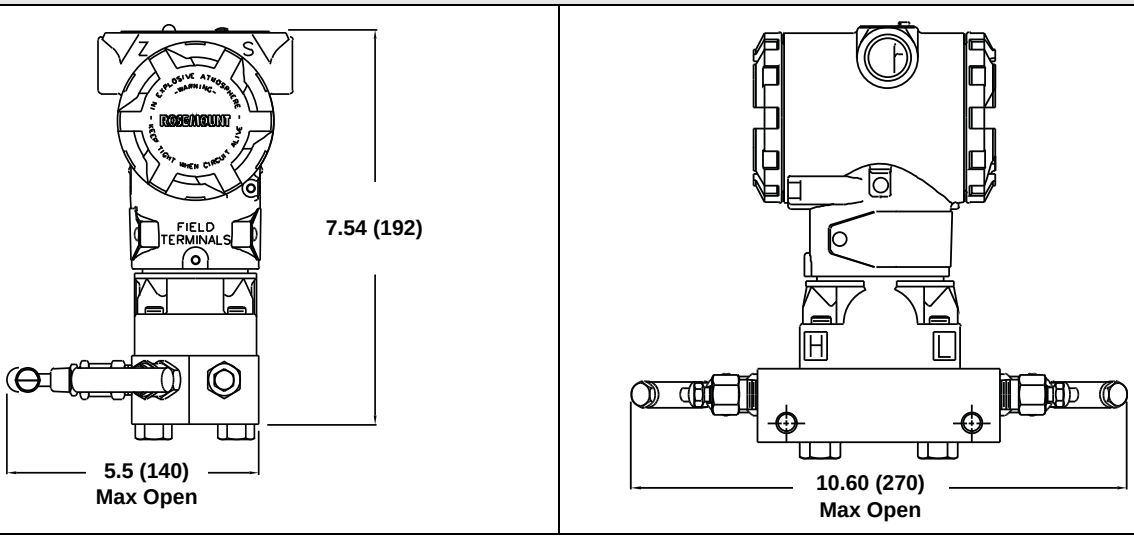

*1) Span and Zero Adjustment Buttons are standard with 4-20 mA and 1-5 Vdc HART protocol. Local Operator Interface buttons are optional for Profibus PA protocol. Local Configuration Buttons are not available with FOUNDATION fieldbus.*

## 3051C Coplanar Flange[1]




*(1) For FOUNDATION fieldbus and Profibus PA transmitters with LCD Display, housing length is 5.36 in. (136 mm).*

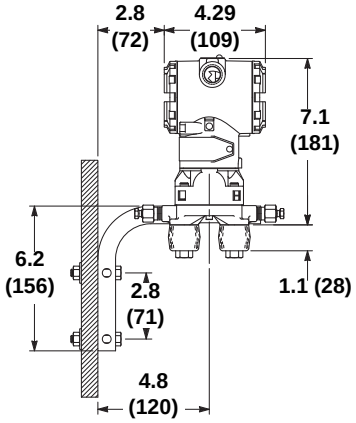
## 3051C Coplanar Flange with Rosemount 305 Coplanar Integral Manifold

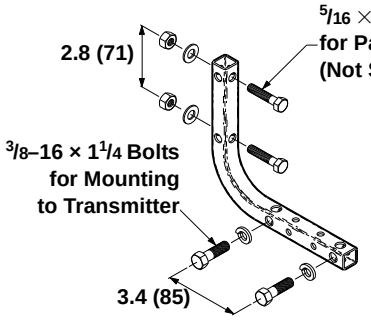



*Dimensions are in inches (millimeters)*

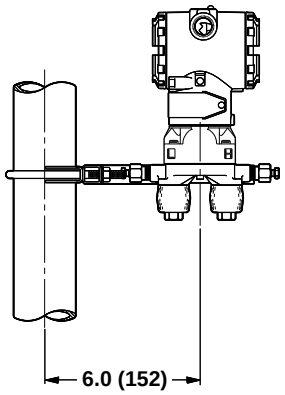
## Coplanar Flange Mounting Configurations with Optional Bracket (B4) for 2-in. Pipe or Panel Mounting

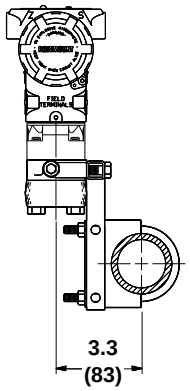
**PANEL MOUNTING**

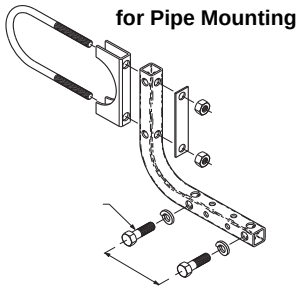



**PIPE MOUNTING**

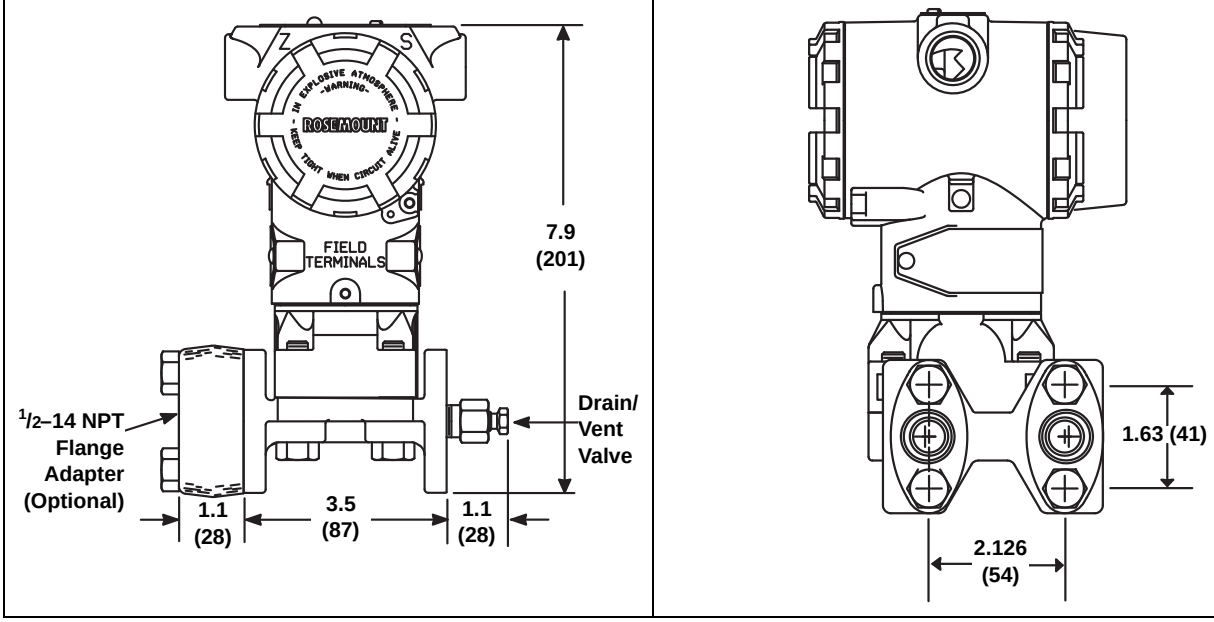


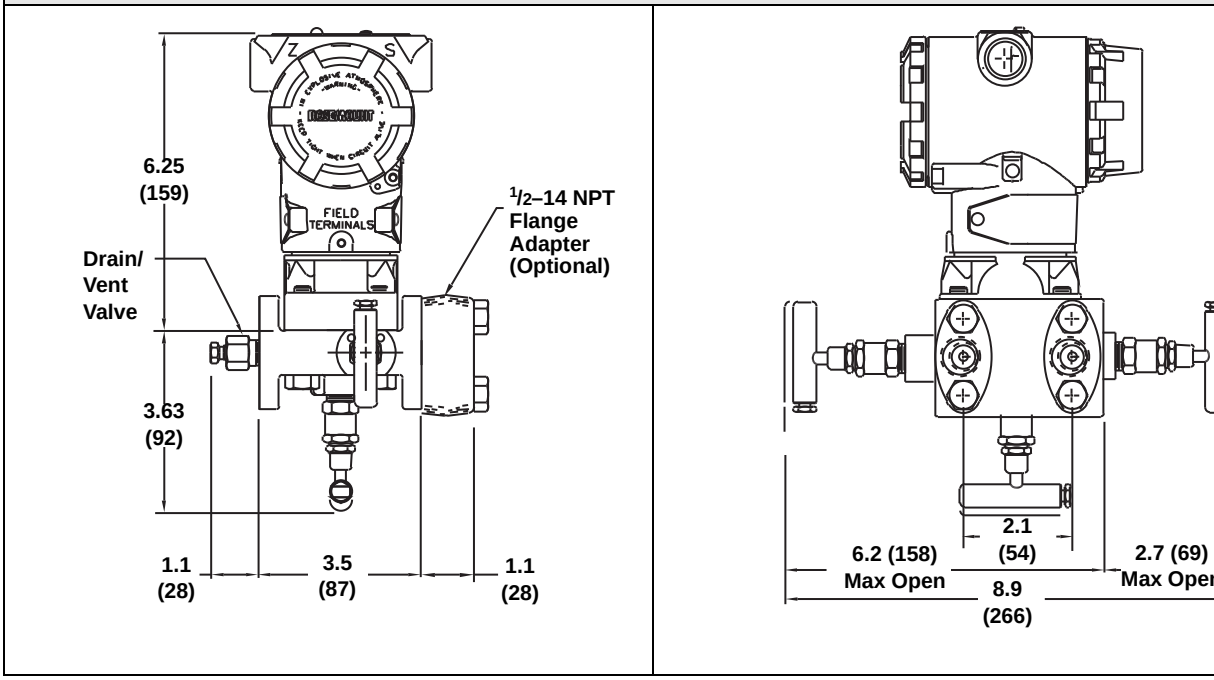




*Dimensions are in inches (millimeters)*

## 3051C Coplanar with Traditional Flange



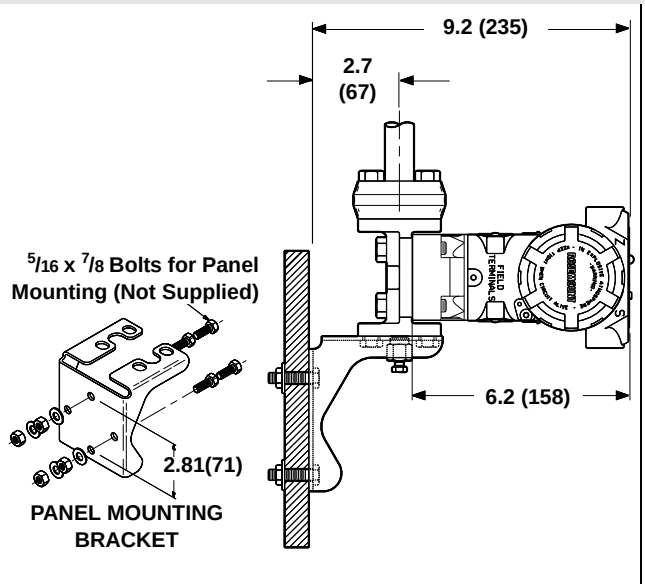

## 3051C Coplanar with Rosemount 305 Traditional Integral Manifold



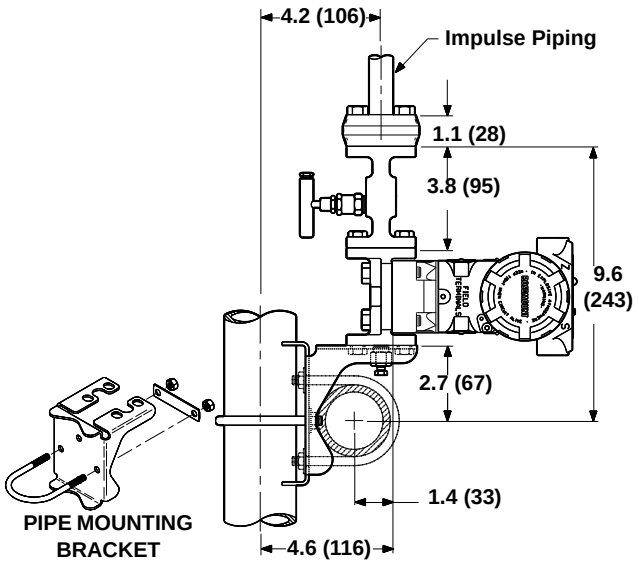

*Dimensions are in inches (millimeters)*

## Traditional Flange Mounting Configurations with Optional Brackets for 2-in. Pipe or Panel Mounting

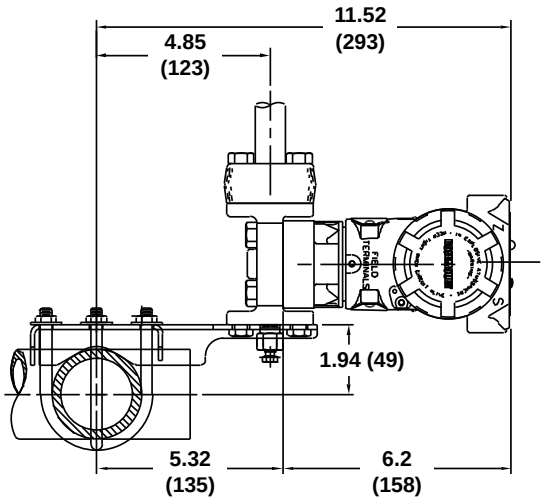
**Panel Mounting Bracket (option B2/B8)**




**2-in. Pipe Mounting Bracket (option B1/B7/BA)**

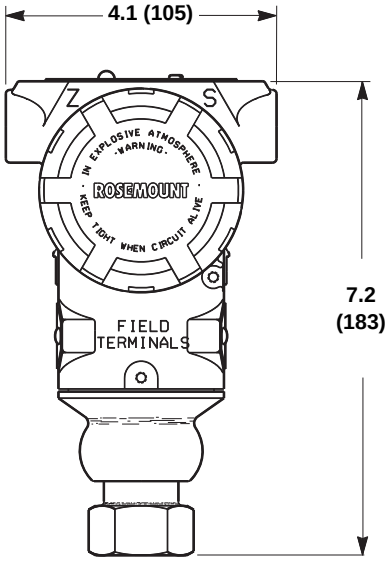


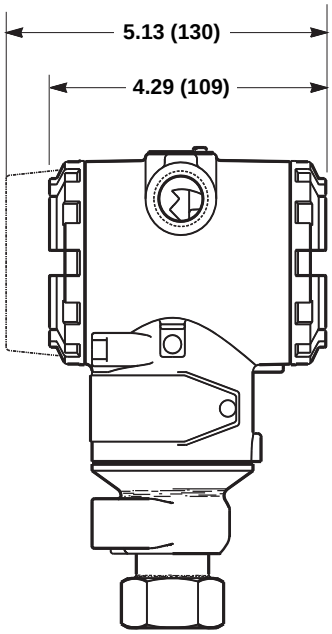

**2-in. Pipe Mounting Bracket (option B3/B9/BC)**




*Dimensions are in inches (millimeters)*

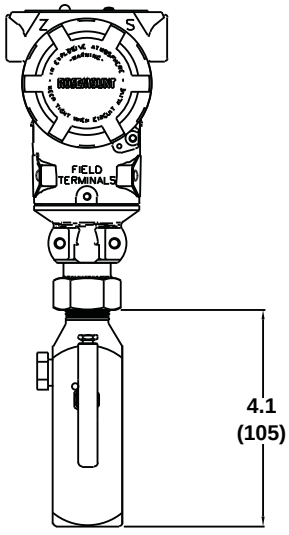
## 3051T Dimensional Drawings(1)

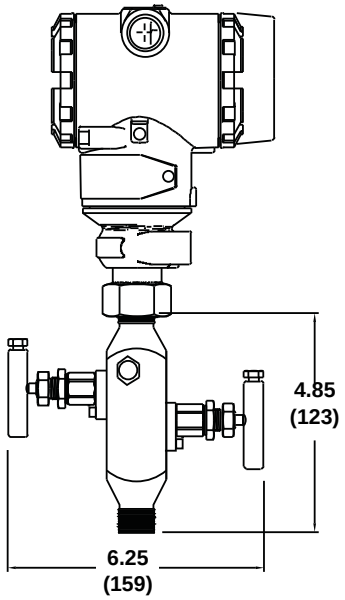



*(1) For FOUNDATION fieldbus and Profibus PA transmitters with LCD Display, housing length is 5.36 in. (136 mm).*

## 3051T with Rosemount 306 Integral Manifold

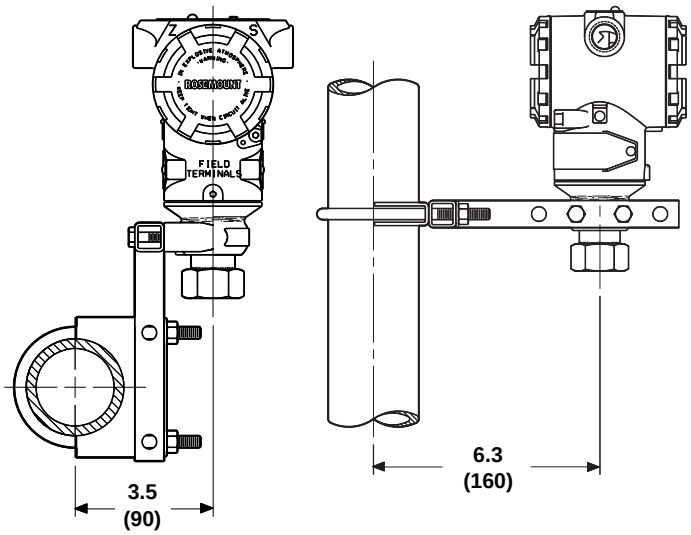


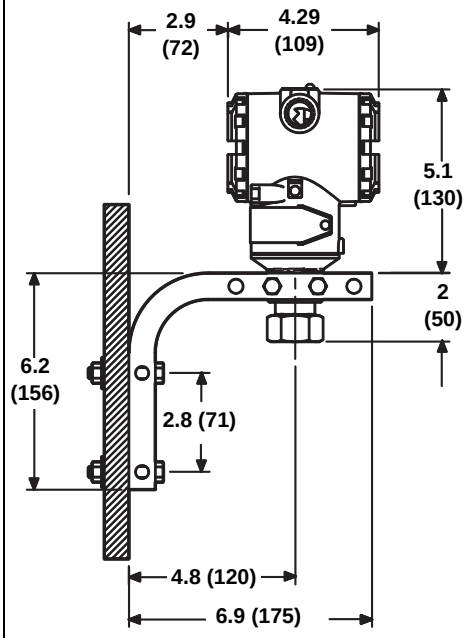

*Dimensions are in inches (millimeters)*

## 3051T Typical Mounting Configurations with Optional Mounting Bracket

**Pipe Mounting**



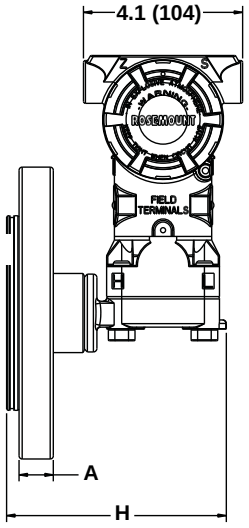

**Panel Mounting**



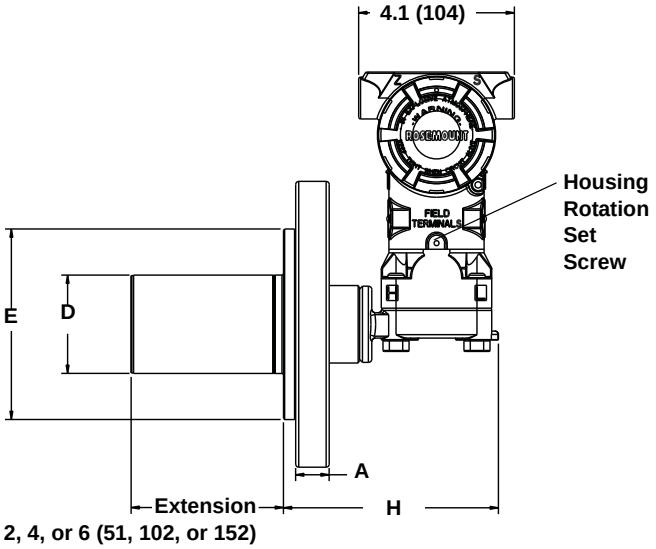

*Dimensions are in inches (millimeters)*

## 3051L Dimensional Drawings

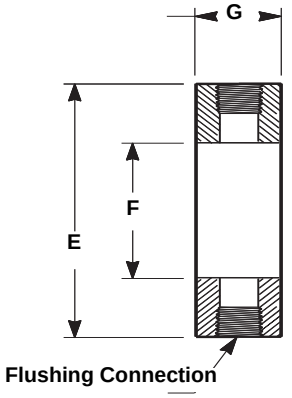
**2-in. Flange Configuring (Flush Mount Only)**



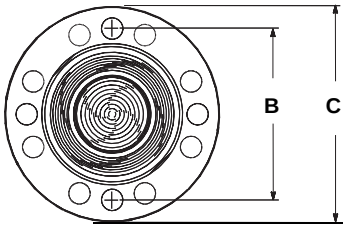

**3- and 4-in. Flange Configuration**

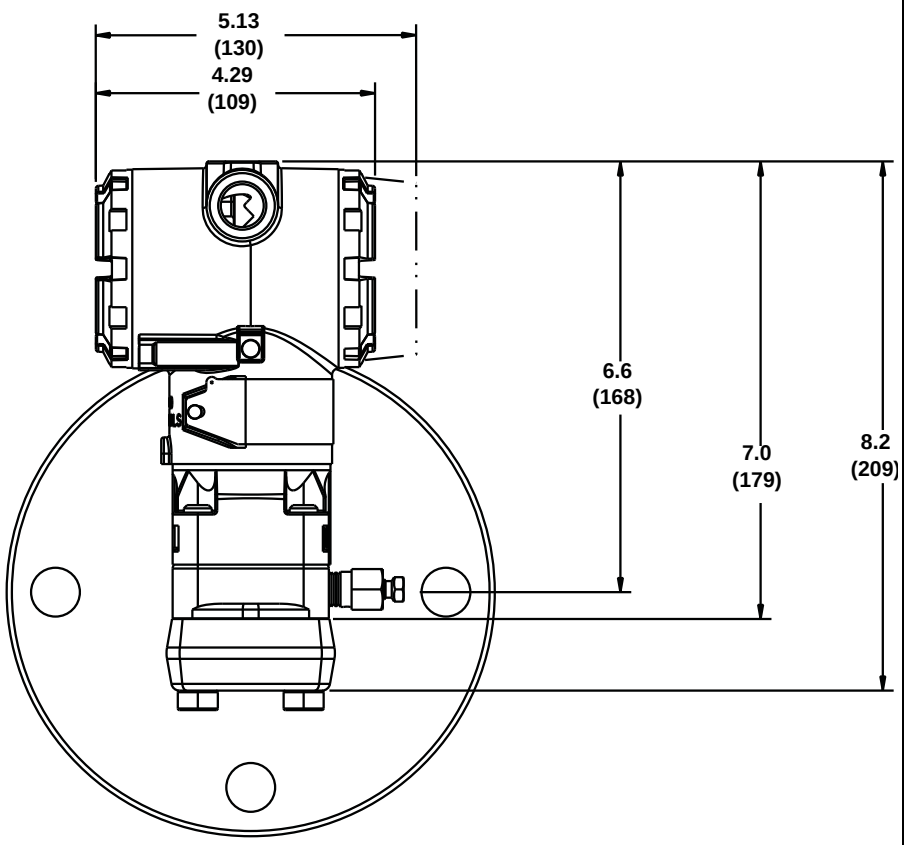



**Optional Flushing Connection Ring (Lower Housing)**




**Diaphragm Assembly and Mounting Flange**




*Dimensions are in inches (millimeters)*

Table A-8. 3051L Dimensional Specifications

**Except where indicated, dimensions are in inches (millimeters).**

| Class | Pipe Size | Flange Thickness A | Bolt Circle Diameter B | Outside Diameter C | No. of Bolts | Bolt Hole Diameter | Extension Diameter(1) D | O.D. Gasket Surface E |
|---|---|---|---|---|---|---|---|---|
| ASME B16.5 (ANSI) 150 | 2 (51) | 0.69 (18) | 4.75 (121) | 6.0 (152) | 4 | 0.75 (19) | NA | 3.6 (92) |
| | 3 (76) | 0.88 (22) | 6.0 (152) | 7.5 (191) | 4 | 0.75 (19) | 2.58 (66) | 5.0 (127) |
| | 4 (102) | 0.88 (22) | 7.5 (191) | 9.0 (229) | 8 | 0.75 (19) | 3.5 (89) | 6.2 (158) |
| ASME B16.5 (ANSI) 300 | 2 (51) | 0.82 (21) | 5.0 (127) | 6.5 (165) | 8 | 0.75 (19) | NA | 3.6 (92) |
| | 3 (76) | 1.06 (27) | 6.62 (168) | 8.25 (210) | 8 | 0.88 (22) | 2.58 (66) | 5.0 (127) |
| | 4 (102) | 1.19 (30) | 7.88 (200) | 10.0 (254) | 8 | 0.88 (22) | 3.5 (89) | 6.2 (158) |
| ASME B16.5 (ANSI) 600 | 2 (51) | 1.00 (25) | 5.0 (127) | 6.5 (165) | 8 | 0.75 (19) | NA | 3.6 (92) |
| | 3 (76) | 1.25 (32) | 6.62 (168) | 8.25 (210) | 8 | 0.88 (22) | 2.58 (66) | 5.0 (127) |
| DIN 2501 PN 10–40 | DN 50 | 20 mm | 125 mm | 165 mm | 4 | 18 mm | NA | 4.0 (102) |
| DIN 2501 PN 25/40 | DN 80 | 24 mm | 160 mm | 200 mm | 8 | 18 mm | 66 mm | 5.4 (138) |
| | DN 100 | 24 mm | 190 mm | 235 mm | 8 | 22 mm | 89 mm | 6.2 (158) |
| DIN 2501 PN 10/16 | DN 100 | 20 mm | 180 mm | 220 mm | 8 | 18 mm | 89 mm | 6.2 (158) |

*Dimensions are in inches (millimeters)*

| Class | Pipe Size | Process Side F | Lower Housing G | | H |
|---|---|---|---|---|---|
| | | | 1/4 NPT | 1/2 NPT | |
| ASME B16.5 (ANSI) 150 | 2 (51) | 2.12 (54) | 0.97 (25) | 1.31 (33) | 5.65 (143) |
| | 3 (76) | 3.6 (91) | 0.97 (25) | 1.31 (33) | 5.65 (143) |
| | 4 (102) | 3.6 (91) | 0.97 (25) | 1.31 (33) | 5.65 (143) |
| ASME B16.5 (ANSI) 300 | 2 (51) | 2.12 (54) | 0.97 (25) | 1.31 (33) | 5.65 (143) |
| | 3 (76) | 3.6 (91) | 0.97 (25) | 1.31 (33) | 5.65 (143) |
| | 4 (102) | 3.6 (91) | 0.97 (25) | 1.31 (33) | 5.65 (143) |
| ASME B16.5 (ANSI) 600 | 2 (51) | 2.12 (54) | 0.97 (25) | 1.31 (33) | 7.65 (194) |
| | 3 (76) | 3.6 (91) | 0.97 (25) | 1.31 (33) | 7.65 (194) |
| DIN 2501 PN 10–40 | DN 50 | 2.4 (61) | 0.97 (25) | 1.31 (33) | 5.65 (143) |
| DIN 2501 PN 25/40 | DN 80 | 3.6 (91) | 0.97 (25) | 1.31 (33) | 5.65 (143) |
| | DN 100 | 3.6 (91) | 0.97 (25) | 1.31 (33) | 5.65 (143) |
| DIN 2501 PN 10/16 | DN 100 | 3.6 (91) | 0.97 (25) | 1.31 (33) | 5.65 (143) |

*(1) Tolerances are 0.040 (1,02), –0.020 (0,51).*

## ORDERING INFORMATION

Table 1. 3051C Coplanar Pressure Transmitters Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

| Model | Transmitter Type | | | |
|---|---|---|---|---|
| 3051C | Coplanar Pressure Transmitter | | | |
| **Measurement Type** | | | | |
| **Standard** | | | | **Standard** |
| D | Differential | | | ★ |
| G | Gage | | | ★ |
| **Expanded** | | | | |
| A | Absolute | | | |
| **Pressure Ranges (Range/Min. Span)** | | | | |
| | **3051CD** | **3051CG(1)** | **3051CA** | |
| **Standard** | | | | **Standard** |
| 1 | –25 to 25 in$H_2O$/0.5 in$H_2O$<br>(–62,2 to 62,2 mbar/1,2 mbar) | –25 to 25 in$H_2O$/0.5 in$H_2O$<br>(–62,1 to 62,2 mbar/1,2 mbar) | 0 to 30 psia/0.3 psia<br>(0 to 2,1 bar/20,7 mbar) | ★ |
| 2 | –250 to 250 inH2O/2.5 in$H_2O$<br>(–623 to 623 mbar/6,2 mbar) | –250 to 250 in$H_2O$/2.5 in$H_2O$<br>(–621 to 623 mbar/6,2 mbar) | 0 to 150 psia/1.5 psia<br>(0 to 10,3 bar/0,1 bar) | ★ |
| 3 | –1000 to 1000 in$H_2O$/10 in$H_2O$<br>(–2,5 to 2,5 bar/25 mbar) | –393 to 1000 in$H_2O$/10in $H_2O$<br>(–0,98 to 2,5 bar/25 mbar) | 0 to 800 psia/8 psia<br>(0 to 55,2 bar/0,55 bar) | ★ |
| 4 | –300 to 300 psi/3 psi<br>(–20,7 to 20,7 bar/0,2 bar) | –14.2 to 300 psi/3 psi<br>(–0,98 to 20,7 bar/0,2 bar) | 0 to 4000 psia/40 psia<br>(0 to 275,8 bar/2,8 bar) | ★ |
| 5 | –2000 to 2000 psi/20 psi<br>(–137,9 to137,9 bar/1,4 bar) | –14.2 to 2000 psig/20 psi<br>(–0,98 to 137,9 bar/1,4 bar) | Not Applicable | ★ |
| **Expanded** | | | | |
| 0(2) | –3 to 3 in$H_2O$/0.1 in$H_2O$<br>(–7,5 to 7,5 mbar/0,25 mbar) | Not Applicable | Not Applicable | |
| **Output** | | | | |
| **Standard** | | | | **Standard** |
| A | 4–20 mA with Digital Signal Based on HART Protocol | | | ★ |
| F | FOUNDATION fieldbus Protocol | | | ★ |
| W(3) | Profibus PA Protocol | | | ★ |
| **Expanded** | | | | |
| M | Low-Power, 1–5 V dc with Digital Signal Based on HART Protocol *(See Option C2 for 0.8–3.2 V dc)* | | | |
| **Materials of Construction** | | | | |
| | **Process Flange Type** | **Flange Material** | **Drain/Vent** | |
| **Standard** | | | | **Standard** |
| 2 | Coplanar | SST | SST | ★ |
| 3(4) | Coplanar | Cast C-276 | Alloy C-276 | ★ |
| 4 | Coplanar | Cast Alloy 400 | Alloy 400/K-500 | ★ |
| 5 | Coplanar | Plated CS | SST | ★ |
| 7(4) | Coplanar | SST | Alloy C-276 | ★ |
| 8(4) | Coplanar | Plated CS | Alloy C-276 | ★ |
| 0 | Alternate Flange—See Options on page A-25 | | | ★ |
| **Isolating Diaphragm** | | | | |
| **Standard** | | | | **Standard** |
| 2(4) | 316L SST | | | ★ |
| 3(4) | Alloy C-276 | | | ★ |

Table 1. 3051C Coplanar Pressure Transmitters Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

| | | | |
|---|---|---|---|
| **Expanded** | | | |
| 4 | Alloy 400 | | |
| 5 | Tantalum (Available on 3051CD and CG, Ranges 2–5 only. Not available on 3051CA) | | |
| 6 | Gold-plated Alloy 400 (Use in combination with O-ring Option Code B.) | | |
| 7 | Gold-plated SST | | |
| **O-ring** | | | |
| **Standard** | | | **Standard** |
| A | Glass-filled PTFE | | ★ |
| B | Graphite-filled PTFE | | ★ |
| **Sensor Fill Fluid** | | | |
| **Standard** | | | **Standard** |
| 1 | Silicone | | ★ |
| 2 | Inert fill (Differential and Gage only) | | ★ |
| **Housing Material** | | **Conduit Entry Size** | |
| **Standard** | | | **Standard** |
| A | Polyurethane-covered Aluminum | ½–14 NPT | ★ |
| B | Polyurethane-covered Aluminum | M20 × 1.5 (CM20) | ★ |
| J | SST | ½–14 NPT | ★ |
| K | SST | M20 × 1.5 (CM20) | ★ |
| **Expanded** | | | |
| D | Polyurethane-covered Aluminum | G½ | |
| M | SST | G½ | |

## Options (Include with selected model number)

| | | |
|---|---|---|
| **Plantweb Control Functionality** | | |
| **Standard** | | **Standard** |
| A01 | FOUNDATION fieldbus Advanced Control Function Block Suite | ★ |
| **Plantweb Diagnostic Functionality** | | |
| **Standard** | | **Standard** |
| D01 | FOUNDATION fieldbus Diagnostics Suite | ★ |
| **Alternate Flange** | | |
| **Standard** | | **Standard** |
| H2 | Traditional Flange, 316 SST, SST Drain/Vent | ★ |
| H3[(4)] | Traditional Flange, Alloy C, Alloy C-276 Drain/Vent | ★ |
| H4 | Traditional Flange, Cast Alloy 400, Alloy 400/K-500 Drain/Vent | ★ |
| H7[(4)] | Traditional Flange, 316 SST, Alloy C-276 Drain/Vent | ★ |
| HJ | DIN Compliant Traditional Flange, SST, 1/16 in. Adapter/Manifold Bolting | ★ |
| FA | Level Flange, SST, 2 in., ANSI Class 150, Vertical Mount | ★ |
| FB | Level Flange, SST, 2 in., ANSI Class 300, Vertical Mount | ★ |
| FC | Level Flange, SST, 3 in., ANSI Class 150, Vertical Mount | ★ |
| FD | Level Flange, SST, 3 in., ANSI Class 300, Vertical Mount | ★ |
| FP | DIN Level Flange, SST, DN 50, PN 40, Vertical Mount | ★ |
| FQ | DIN Level Flange, SST, DN 80, PN 40, Vertical Mount | ★ |
| **Expanded** | | |
| HK | DIN Compliant Traditional Flange, SST, 10 mm Adapter/Manifold Bolting | |
| HL | DIN Compliant Traditional Flange, SST, 12mm Adapter/Manifold Bolting (Not available on 3051CD0) | |

Table 1. 3051C Coplanar Pressure Transmitters Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

| **Integral Assembly** | | |
|---|---|---|
| **Standard** | | **Standard** |
| S3[5] | Assemble to Rosemount 405 Compact Orifice Plate | ★ |
| S5[5] | Assemble to Rosemount 305 Integral Manifold (specified separately, see the Rosemount 305 and 306 Integral Manifolds PDS (document number 00813-0100-4733)) | ★ |
| S6[5] | Assemble to Rosemount 304 Manifold or Connection System | ★ |
| **Integral Mount Primary Element** | | |
| **Standard** | | **Standard** |
| S4[5] | Assemble to Rosemount Annubar or Rosemount 1195 Integral Orifice<br>*(With the primary element installed, the maximum operating pressure will equal the lesser of either the transmitter or the primary element. Option is available for factory assembly to range 1–4 transmitters only)* | ★ |
| **Seal Assemblies** | | |
| **Standard** | | **Standard** |
| S1[5] | Assemble to one Rosemount 1199 seal | ★ |
| S2[5] | Assemble to two Rosemount 1199 seals | ★ |
| **All-Welded Seal Assemblies (for high vacuum applications)** | | |
| **Standard** | | **Standard** |
| S0[5] | One Seal, All-Welded System (Direct Mount Connection Type) | ★ |
| S7[5] | One Seal, All-Welded System (Capillary Connection Type) | ★ |
| S8[5] | Two Seals, All-Welded System (Capillary Connection Type) | ★ |
| S9[5] | Two Seals, All-Welded System (One Direct Mount and One Capillary Connection Type) | ★ |
| **Mounting Bracket** | | |
| **Standard** | | **Standard** |
| B1 | Traditional Flange Bracket for 2-in. Pipe Mounting, CS Bolts | ★ |
| B2 | Traditional Flange Bracket for Panel Mounting, CS Bolts | ★ |
| B3 | Traditional Flange Flat Bracket for 2-in. Pipe Mounting, CS Bolts | ★ |
| B4 | Coplanar Flange Bracket for 2-in. Pipe or Panel Mounting, all SST | ★ |
| B7 | B1 Bracket with Series 300 SST Bolts | ★ |
| B8 | B2 Bracket with Series 300 SST Bolts | ★ |
| B9 | B3 Bracket with Series 300 SST Bolts | ★ |
| BA | SST B1 Bracket with Series 300 SST Bolts | ★ |
| BC | SST B3 Bracket with Series 300 SST Bolts | ★ |
| **Product Certifications** | | |
| **Standard** | | **Standard** |
| C6 | CSA Explosion-proof, Dust Ignition-proof, Intrinsically Safe, and Division 2 | ★ |
| E2[7] | INMETRO Flameproof | ★ |
| E3[7] | China Flameproof | ★ |
| E4[6] | TIIS Flame-proof | ★ |
| E5 | FM Explosion-proof, Dust Ignition-Proof | ★ |
| E7[7] | IECEx Flameproof, Dust Ignition-proof | ★ |
| E8 | ATEX Flameproof and Dust Certification | ★ |

Table 1. 3051C Coplanar Pressure Transmitters Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

| | | |
|---|---|---|
| I1[7] | ATEX Intrinsic Safety and Dust | ★ |
| I2[7] | INMETRO Intrinsic Safety | ★ |
| I3 | China Intrinsic Safety | ★ |
| I4[8] | TIIS Intrinsic Safety | ★ |
| I5 | FM Intrinsically Safe, Division 2 | ★ |
| I7[7] | IECEx Intrinsic Safety | ★ |
| IA | ATEX FISCO Intrinsic Safety; for FOUNDATION fieldbus protocol only | ★ |
| IE | FM FISCO Intrinsically Safe; for FOUNDATION fieldbus protocol only | ★ |
| K2[7] | INMETRO Flameproof, Intrinsic Safety | ★ |
| K5 | FM Explosion-proof, Dust Ignition-Proof, Intrinsically Safe, and Division 2 | ★ |
| K6[7] | CSA and ATEX Explosion-proof, Intrinsically Safe, and Division 2 (combination of C6 and K8) | ★ |
| K7[7] | IECEx Flame-proof, Dust Ignition-proof, Intrinsic Safety, and Type n (combination of I7, N7, and E7) | ★ |
| K8[7] | ATEX Flameproof, Intrinsic Safety, Type n, Dust (combination of E8, I1 and N1) | ★ |
| KB | FM and CSA Explosion-proof, Dust Ignition Proof, Intrinsically Safe, and Division 2 (combination of K5 and C6) | ★ |
| KD[7] | FM, CSA, and ATEX Explosion-proof, Intrinsically Safe (combination of K5, C6, I1, and E8) | ★ |
| N1[7] | ATEX Type n Certification and Dust | ★ |
| N3 | China Type n | ★ |
| N7[7] | IECEx Type n Certification | ★ |
| **Custody Transfer** | | |
| **Standard** | | **Standard** |
| C5[9] | Measurement Canada Accuracy Approval *(Limited availability depending on transmitter type and range. Contact an Emerson Process Management representative)* | ★ |
| **Bolting Material** | | |
| **Standard** | | **Standard** |
| L4 | Austenitic 316 SST Bolts | ★ |
| L5 | ASTM A 193, Grade B7M Bolts | ★ |
| L6 | Alloy K-500 Bolts | ★ |
| **Display and Interface Options** | | |
| **Standard** | | **Standard** |
| M4 | LCD Display with Local Operator Interface (Available only with output code W - Profibus PA) | ★ |
| M5 | LCD Display for Aluminum Housing (Housing Codes A, B, C, and D only) | ★ |
| M6 | LCD Display for SST Housing (Housing Codes J, K, L, and M only) | ★ |
| **Calibration Certificate** | | |
| **Standard** | | **Standard** |
| Q4 | Calibration Certificate | ★ |
| QG | Calibration Certificate and GOST Verification Certificate | ★ |
| QP | Calibration certification and tamper evident seal | ★ |
| **Material Traceability Certification** | | |
| **Standard** | | **Standard** |
| Q8 | Material Traceability Certification per EN 10204 3.1.B *(Only available for the sensor module housing and Coplanar or traditional flanges and adapters (3051C), and for the sensor module housing and low-volume Coplanar flange and adapter (3051C with Option Code S1))* | ★ |
| **Quality Certification for Safety** | | |
| **Standard** | | **Standard** |
| QS | Certificate of FMEDA Data | ★ |

Table 1. 3051C Coplanar Pressure Transmitters Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

| | | |
|---|---|---|
| **Zero/Span Adjustment** | | |
| **Standard** | | **Standard** |
| J1[9][10] | Local Zero Adjustment Only | ★ |
| J3[9][10] | No Local Zero or Span Adjustment | ★ |
| **Transient Protection Terminal Block** | | |
| **Standard** | | **Standard** |
| T1 | Transient Protection Terminal Block | ★ |
| **Software Configuration** | | |
| **Standard** | | **Standard** |
| C1[9] | Custom Software Configuration (Completed CDS 00806-0100-4001 required with order) | ★ |
| **Low Power Output** | | |
| **Expanded** | | |
| C2 | 0.8–3.2 V dc Output with Digital Signal Based on HART Protocol (Output Code M only) | |
| **Gage Pressure Calibration** | | |
| **Standard** | | **Standard** |
| C3 | Gage Calibration (Model 3051CA4 only) | ★ |
| **Alarm Limit** | | |
| **Standard** | | **Standard** |
| C4[9][11] | Analog Output Levels Compliant with NAMUR Recommendation NE 43, Alarm High | ★ |
| CN[9][11] | Analog Output Levels Compliant with NAMUR Recommendation NE 43, Alarm Low | ★ |
| **Pressure Testing** | | |
| **Expanded** | | |
| P1 | Hydrostatic Testing with Certificate | |
| **Cleaning Process Area** | | |
| **Expanded** | | |
| P2 | Cleaning for Special Service | |
| P3 | Cleaning for <1 PPM Chlorine/Fluorine | |
| **Pressure Calibration** | | |
| **Expanded** | | |
| P4 | Calibrate at Line Pressure *(Specify Q48 on order for corresponding certificate)* | |
| **High Accuracy** | | |
| **Standard** | | **Standard** |
| P8 | 0.04% accuracy to 5:1 turndown (Range 2-4) | ★ |
| **Flange Adapters** | | |
| **Standard** | | **Standard** |
| DF | 1/2 -14 NPT flange adapter(s) | ★ |
| **Vent/Drain Valves** | | |
| **Expanded** | | |
| D7 | Coplanar Flange Without Drain/Vent Ports | |
| **Conduit Plug** | | |
| **Standard** | | **Standard** |
| DO | 316 SST Conduit Plug | ★ |

Table 1. 3051C Coplanar Pressure Transmitters Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

| | | |
|---|---|---|
| **RC¼ RC½ Process Connection** | | |
| **Expanded** | | |
| D9 | JIS Process Connection—RC ¼ Flange with RC ½ Flange Adapter | |
| **Max Static Line Pressure** | | |
| **Standard** | | **Standard** |
| P9 | 4500 psig Static Pressure Limit (3051CD Ranges 2–5 only) | ★ |
| **Ground Screw** | | |
| **Standard** | | **Standard** |
| V5(12) | External Ground Screw Assembly | ★ |
| **Drinking Water Approval** | | |
| **Standard** | | **Standard** |
| DW | NSF drinking water approval | ★ |
| **Surface Finish** | | |
| **Standard** | | **Standard** |
| Q16 | Surface finish certification for sanitary remote seals | ★ |
| **Toolkit Total System Performance Reports** | | |
| **Standard** | | **Standard** |
| QZ | Remote Seal System Performance Calculation Report | ★ |
| **Conduit Electrical Connector** | | |
| **Standard** | | **Standard** |
| GE | M12, 4-pin, Male Connector (eurofast®) | ★ |
| GM | A size Mini, 4-pin, Male Connector (minifast®) | ★ |
| **Typical Model Number: 3051CD 2 A 2 2 A 1 A B4** | | |

*(1) 3051CG lower range limit varies with atmospheric pressure.*
*(2) 3051CD0 is available only with Output Code A, Process Flange Code 0 (Alternate Flange H2, H7, HJ, or HK), Isolating Diaphragm Code 2, O-ring Code A, and Bolting Option L4.*
*(3) Option code M4 - LCD Display with Local Operator Interface required for local addressing and configuration.*
*(4) Materials of Construction comply with recommendations per NACE MR0175/ISO 15156 for sour oil field production environments. Environmental limits apply to certain materials. Consult latest standard for details. Selected materials also conform to NACE MR0103 for sour refining environments.*
*(5) "Assemble-to" items are specified separately and require a completed model number.*
*(6) Available only with output codes A - 4-20 HART and F - Foundation fieldbus.*
*(7) Not available with Low Power code M.*
*(8) Available only with 3051CD and 3051CG and output code A - 4-20 mA HART*
*(9) Not available with Fieldbus (output code F) or Profibus (output code W).*
*(10) Local zero and span adjustments are standard unless Option Code J1 or J3 is specified*
*(11) NAMUR-Compliant operation is pre-set at the factory and cannot be changed to standard operation in the field.*
*(12) The V5 option is not needed with the T1 option; external ground screw assembly is included with the T1 option.*

Table 2. 3051T Gage and Absolute Pressure Transmitter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

| **Model** | **Transmitter Type** | | |
|---|---|---|---|
| 3051T | Pressure Transmitter | | |
| **Pressure Type** | | | |
| **Standard** | | | **Standard** |
| G | Gage | | ★ |
| A | Absolute | | ★ |
| **Pressure Upper Range Limit - Configurable Description** | | | |
| | **3051TG(1)** | **3051TA** | |
| **Standard** | | | **Standard** |
| 1 | 30 psi (2,1 bar) | 30 psia (2,1 bar) | ★ |
| 2 | 150 psi (10,3 bar) | 150 psia (10,3 bar) | ★ |
| 3 | 800 psi (55,2 bar) | 800 psia (55,2 bar) | ★ |
| 4 | 4000 psi (275,8 bar) | 4000 psia (275,8 bar) | ★ |
| 5 | 10000 psi (689,5 bar) | 10000 psia (689,5 bar) | ★ |
| **Transmitter Output** | | | |
| **Standard** | | | **Standard** |
| A | 4–20 mA with Digital Signal Based on HART Protocol | | ★ |
| F | FOUNDATION fieldbus Protocol | | ★ |
| W(2) | Profibus PA Protocol | | ★ |
| **Expanded** | | | |
| M | Low-Power 1–5 V dc with Digital Signal Based on HART Protocol | | |
| **Process Connection Style** | | | |
| **Standard** | | | **Standard** |
| 2B | 1/2–14 NPT Female | | ★ |
| 2C | G½ A DIN 16288 Male (Available in SST for Range 1–4 only) | | ★ |
| **Expanded** | | | |
| 2F | Coned and Threaded, Compatible with Autoclave Type F-250-C *(Includes Gland and Collar, Available in SST for Range 5 only)* | | |
| 61 | Non-threaded Instrument flange (Range 1-4 only) | | |
| **Isolating Diaphragm** | | **Process Connection Wetted Parts Material** | |
| **Standard** | | | **Standard** |
| 2(3) | 316L SST | 316L SST | ★ |
| 3(3) | Alloy C-276 | Alloy C-276 | ★ |
| **Sensor Fill Fluid** | | | |
| **Standard** | | | **Standard** |
| 1 | Silicone | | ★ |
| 2 | Inert (Fluorinert® FC-43) | | ★ |
| **Housing Material** | | **Conduit Entry Size** | |
| **Standard** | | | **Standard** |
| A | Polyurethane-covered Aluminum | ½–14 NPT | ★ |
| B | Polyurethane-covered Aluminum | M20 × 1.5 (CM20) | ★ |
| J | SST | ½–14 NPT | ★ |
| K | SST | M20 × 1.5 (CM20) | ★ |
| **Expanded** | | | |
| D | Polyurethane-covered Aluminum | G½ | |
| M | SST | G½ | |

## Options (Include with selected model number)

| **PlantWeb Control Functionality** | | |
|---|---|---|
| **Standard** | | **Standard** |
| A01 | Advanced Control Function Block Suite | ★ |

Table 2. 3051T Gage and Absolute Pressure Transmitter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

| | | |
|---|---|---|
| **PlantWeb Diagnostic Functionality** | | |
| **Standard** | | **Standard** |
| D01 | FOUNDATION fieldbus Diagnostics Suite | ★ |
| **Integral Assembly** | | |
| **Standard** | | **Standard** |
| S5[4] | Assemble to Rosemount 306 Integral Manifold | ★ |
| **Seal Assemblies** | | |
| **Standard** | | **Standard** |
| S1[4] | Assemble to one Rosemount 1199 seal | ★ |
| **Mounting Bracket** | | |
| **Standard** | | **Standard** |
| B4 | Bracket for 2-in. Pipe or Panel Mounting, All SST | ★ |
| **Product Certifications** | | |
| **Standard** | | **Standard** |
| C6 | CSA Explosion-proof, Dust Ignition-proof, Intrinsically Safe, and Division 2 | ★ |
| E2 | INMETRO Flameproof | ★ |
| E3 | China Flameproof | ★ |
| E4[5] | TIIS Flameproof | ★ |
| E5 | FM Explosion-proof, Dust Ignition-proof | ★ |
| E7[5] | IECEx Flameproof, Dust Ignition-proof | ★ |
| E8 | ATEX Flameproof and Dust Certification | ★ |
| I1[5] | ATEX Intrinsic Safety and Dust | ★ |
| I2 | INMETRO Intrinsic Safety | ★ |
| I3 | China Intrinsic Safety | ★ |
| I5 | FM Intrinsically Safe, Division 2 | ★ |
| I7[5] | IECEx Intrinsic Safety | ★ |
| IA | ATEX Intrinsic Safety for FISCO; for *FOUNDATION* fieldbus protocol only | ★ |
| IE | FM FISCO Intrinsically Safe; for FOUNDATION fieldbus protocol only | ★ |
| K2 | INMETRO Flameproof, Intrinsic Safety | ★ |
| K5 | FM Explosion-proof, Dust Ignition-proof, Intrinsically Safe, and Division 2 | ★ |
| K6[5] | CSA and ATEX Explosion-proof, Intrinsically Safe, and Division 2 (combination of C6 and K8) | ★ |
| K7[5] | IECEx Flameproof, Dust Ignition-proof, Intrinsic Safety, and Type n (combination of I7, N7, and E7) | ★ |
| K8[5] | ATEX Flame-proof, Intrinsic Safety, Type n, Dust (combination of E8, I1 and N1) | ★ |
| KB | FM and CSA Explosion-proof, Dust Ignition-proof, Intrinsically Safe, and Division 2 (combination of K5 and C6) | ★ |
| KD[5] | FM, CSA, and ATEX Explosion-proof, Intrinsically Safe (combination of K5, C6, I1, and E8) | ★ |
| N1[5] | ATEX Type n Certification and Dust | ★ |
| N3 | China Type n | ★ |
| N7[5] | IECEx Type n Certification | ★ |
| **Custody Transfer** | | |
| **Standard** | | **Standard** |
| C5 | Measurement Canada Accuracy Approval *(Limited availability depending on transmitter type and range. Contact an Emerson Process Management representative)* | ★ |
| **Calibration Certification** | | |
| **Standard** | | **Standard** |
| Q4 | Calibration Certificate | ★ |
| QG | Calibration Certificate and GOST Verification Certificate | ★ |
| QP | Calibration Certification and tamper evident seal | ★ |
| **Material Traceability Certification** | | |
| **Standard** | | **Standard** |
| Q8 | Material Traceability Certification per EN 10204 3.1.B *NOTE: This option applies to the process connection only.* | ★ |
| **Quality Certification for Safety** | | |
| **Standard** | | **Standard** |
| QS | Certificate of FMEDA Data | ★ |

Table 2. 3051T Gage and Absolute Pressure Transmitter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

| | | |
|---|---|---|
| **Zero/Span Adjustment** | | |
| **Standard** | | **Standard** |
| J1[(6)(7)] | Local Zero Adjustment Only | ★ |
| J3[(6)(7)] | No Local Zero or Span Adjustment | ★ |
| **Expanded** | | |
| D1 | Hardware adjustments (zero, span, alarm, security) | |
| **Display and Interface Options** | | |
| **Standard** | | **Standard** |
| M4 | LCD Display with Local Operator Interface (Available only with output code W - Profibus PA) | ★ |
| M5 | LCD Display | ★ |
| M6 | LCD Display for SST Housing (Housing Codes J, K, L and M only) | ★ |
| **Conduit Plug** | | |
| **Standard** | | **Standard** |
| DO | 316 SST Conduit Plug | ★ |
| **Transient Terminal Block** | | |
| **Standard** | | **Standard** |
| T1 | Transient Protection Terminal Block | ★ |
| **Software Configuration** | | |
| **Standard** | | **Standard** |
| C1[(6)] | Custom Software Configuration (Completed CDS 00806-0100-4001 required with order) | ★ |
| **Expanded** | | |
| C2[(6)] | 0.8–3.2 V dc Output with Digital Signal Based on *HART* Protocol (Output Code M only) | |
| **Alarm Limit** | | |
| **Standard** | | **Standard** |
| C4[(6)(8)] | Analog Output Levels Compliant with NAMUR Recommendation NE 43, Alarm High | ★ |
| CN[(6)(8)] | Analog Output Levels Compliant with NAMUR Recommendation NE 43, Low Alarm | ★ |
| **Pressure Testing** | | |
| **Expanded** | | |
| P1 | Hydrostatic Testing with Certificate | |
| **Cleaning Process Area** | | |
| **Expanded** | | |
| P2 | Cleaning for Special Service | |
| P3 | Cleaning for <1 PPM Chlorine/Fluorine | |
| **High Accuracy** | | |
| **Standard** | | **Standard** |
| P8 | 0.04% accuracy to 5:1 turndown (Range 2-4) | ★ |
| **Ground Screw** | | |
| **Standard** | | **Standard** |
| V5[(9)] | External Ground Screw Assembly | ★ |
| **Drinking Water Approval** | | |
| **Standard** | | **Standard** |
| DW | NSF drinking water approval | ★ |
| **Surface Finish** | | |
| **Standard** | | **Standard** |
| Q16 | Surface finish certification for sanitary remote seals | ★ |
| **Toolkit Total System Performance Reports** | | |
| **Standard** | | **Standard** |
| QZ | Remote Seal System Performance Calculation Report | ★ |

Table 2. 3051T Gage and Absolute Pressure Transmitter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

| **Conduit Electrical Connector** | | |
|---|---|---|
| **Standard** | | **Standard** |
| GE | M12, 4-pin, Male Connector (eurofast®) | ★ |
| GM | A size Mini, 4-pin, Male Connector (minifast®) | ★ |
| **Typical Model Number:** | **3051T G 5 F 2A 2 1 A B4** | |

*(1) 3051TG lower range limit varies with atmospheric pressure.*
*(2) Option code M4 - LCD Display with Local Operator Interface required for local addressing and configuration.*
*(3) Materials of Construction comply with recommendations per NACE MR0175/ISO 15156 for sour oil field production environments. Environmental limits apply to certain materials. Consult latest standard for details. Selected materials also conform to NACE MR0103 for sour refining environments.*
*(4) "Assemble-to" items are specified separately and require a completed model number.*
*(5) Not available with low-power Option Code M.*
*(6) Not available with fieldbus (output code F) or Profibus protocols (output code W).*
*(7) Local zero and span adjustments are standard unless Option Code J1 or J3 is specified.*
*(8) NAMUR-Compliant operation is pre-set at the factory and cannot be changed to standard operation in the field.*
*(9) The V5 option is not needed with T1 option; external ground screw assembly is included with the T1 option.*

Table 3. Rosemount 3051L Liquid Level Transmitter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

| **Model** | **Transmitter Type** | | | |
|---|---|---|---|---|
| 3051L | Liquid Level Transmitter | | | |
| **Pressure Range** | | | | |
| **Standard** | | | | **Standard** |
| 2 | –250 to 250 in$H_2O$ (–0,6 to 0,6 bar) | | | ★ |
| 3 | –1000 to 1000 in$H_2O$ (–2,5 to 2,5 bar) | | | ★ |
| 4 | –300 to 300 psi (–20,7 to 20,7 bar) | | | ★ |
| **Transmitter Output** | | | | |
| **Standard** | | | | **Standard** |
| A | 4–20 mA with Digital Signal Based on *HART* Protocol | | | ★ |
| F | FOUNDATION fieldbus Protocol | | | ★ |
| W[1] | Profibus PA Protocol | | | ★ |
| **Expanded** | | | | |
| M | Low-Power 1–5 V dc with Digital Signal Based on *HART* Protocol (See Option Code C2 for 0.8–3.2 V dc Output) | | | |
| **Process Connection Size, Material, Extension length (High Side)** | | | | |
| **Standard** | | | | **Standard** |
| **Code** | **Process Connection Size** | **Material** | **Extension Length** | ★ |
| G0[2] | 2-in./DN 50 | 316L SST | Flush Mount Only | ★ |
| H0[2] | 2-in./DN 50 | Alloy C-276 | Flush Mount Only | ★ |
| J0 | 2-in./DN 50 | Tantalum | Flush Mount Only | ★ |
| A0[2] | 3-in./DN 80 | 316L SST | Flush Mount | ★ |
| A2[2] | 3-in./DN 80 | 316L SST | 2-in./50 mm | ★ |
| A4[2] | 3-in./DN 80 | 316L SST | 4-in./100 mm | ★ |
| A6[2] | 3-in./DN 80 | 316L SST | 6-in./150 mm | ★ |
| B0[2] | 4-in./DN 100 | 316L SST | Flush Mount | ★ |
| B2[2] | 4-in./DN 100 | 316L SST | 2-in./50 mm | ★ |
| B4[2] | 4-in./DN 100 | 316L SST | 4-in./100 mm | ★ |
| B6[2] | 4-in./DN 100 | 316L SST | 6-in./150 mm | ★ |
| C0[2] | 3-in./DN 80 | Alloy C-276 | Flush Mount | ★ |
| C2[2] | 3-in./DN 80 | Alloy C-276 | 2-in./50 mm | ★ |
| C4[2] | 3-in./DN 80 | Alloy C-276 | 4-in./100 mm | ★ |
| C6[2] | 3-in./DN 80 | Alloy C-276 | 6-in./150 mm | ★ |
| D0[2] | 4-in./DN 100 | Alloy C-276 | Flush Mount | ★ |
| D2[2] | 4-in./DN 100 | Alloy C-276 | 2-in./50 mm | ★ |
| D4[2] | 4-in./DN 100 | Alloy C-276 | 4-in./100 mm | ★ |
| D6[2] | 4-in./DN 100 | Alloy C-276 | 6-in./150 mm | ★ |
| E0 | 3-in./DN 80 | Tantalum | Flush Mount Only | ★ |
| F0 | 4-in./DN 100 | Tantalum | Flush Mount Only | ★ |

Table 3. Rosemount 3051L Liquid Level Transmitter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

| **Mounting Flange Size, Rating, Material (High Side)** | | | | |
|---|---|---|---|---|
| | **Size** | **Rating** | **Material** | |
| **Standard** | | | | **Standard** |
| M | 2-in. | ANSI/ASME B16.5 Class 150 | CS | ★ |
| A | 3-in. | ANSI/ASME B16.5 Class 150 | CS | ★ |
| B | 4-in. | ANSI/ASME B16.5 Class 150 | CS | ★ |
| N | 2-in. | ANSI/ASME B16.5 Class 300 | CS | ★ |
| C | 3-in. | ANSI/ASME B16.5 Class 300 | CS | ★ |
| D | 4-in. | ANSI/ASME B16.5 Class 300 | CS | ★ |
| P | 2-in. | ANSI/ASME B16.5 Class 600 | CS | ★ |
| E | 3-in. | ANSI/ASME B16.5 Class 600 | CS | ★ |
| X[(2)] | 2-in. | ANSI/ASME B16.5 Class 150 | SST | ★ |
| F[(2)] | 3-in. | ANSI/ASME B16.5 Class 150 | SST | ★ |
| G[(2)] | 4-in. | ANSI/ASME B16.5 Class 150 | SST | ★ |
| Y[(2)] | 2-in. | ANSI/ASME B16.5 Class 300 | SST | ★ |
| H[(2)] | 3-in. | ANSI/ASME B16.5 Class 300 | SST | ★ |
| J[(2)] | 4-in. | ANSI/ASME B16.5 Class 300 | SST | ★ |
| Z[(2)] | 2-in. | ANSI/ASME B16.5 Class 600 | SST | ★ |
| L[(2)] | 3-in. | ANSI/ASME B16.5 Class 600 | SST | ★ |
| Q | DN 50 | PN 10-40 per EN 1092-1 | CS | ★ |
| R | DN 80 | PN 40 per EN 1092-1 | CS | ★ |
| S | DN 100 | PN 40 per EN 1092-1 | CS | ★ |
| V | DN 100 | PN 10/16 per EN 1092-1 | CS | ★ |
| K[(2)] | DN 50 | PN 10-40 per EN 1092-1 | SST | ★ |
| T[(2)] | DN 80 | PN 40 per EN 1092-1 | SST | ★ |
| U[(2)] | DN 100 | PN 40 per EN 1092-1 | SST | ★ |
| W[(2)] | DN 100 | PN 10/16 per EN 1092-1 | SST | ★ |
| 7[(2)] | 4 in. | ANSI/ASME B16.5 Class 600 | SST | ★ |
| **Expanded** | | | | |
| 1 | — | 10K per JIS B2238 | CS | |
| 2 | — | 20K per JIS B2238 | CS | |
| 3 | — | 40K per JIS B2238 | CS | |
| 4[(2)] | — | 10K per JIS B2238 | 316 SST | |
| 5[(2)] | — | 20K per JIS B2238 | 316 SST | |
| 6[(2)] | — | 40K per JIS B2238 | 316 SST | |

| **Process Fill-High Pressure Side** | | **Specific Gravity** | **Temperature Limits (Ambient Temperature of 70° F (21° C))** | |
|---|---|---|---|---|
| **Standard** | | | | **Standard** |
| A | Syltherm XLT | 0.85 | -102 to 293 °F (-75 to 145 °C) | ★ |
| C | Silicone 704 | 1.07 | 32 to 401 °F (0 to 205 °C) | ★ |
| D | Silicone 200 | 0.93 | -49 to 401 °F (-45 to 205 °C) | ★ |
| H | Inert (Halocarbon) | 1.85 | -49 to 320 °F (-45 to 160 °C) | ★ |
| G | Glycerine and Water | 1.13 | 5 to 203 °F (-15 to 95 °C) | ★ |
| N | Neobee M-20 | 0.92 | 5 to 401 °F (-15 to 205 °C) | ★ |
| P | Propylene Glycol and Water | 1.02 | 5 to 203 F (-15 to 95 °C) | ★ |

Table 3. Rosemount 3051L Liquid Level Transmitter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

| **Low Pressure Side** | | | | | |
|---|---|---|---|---|---|
| | **Configuration** | **Flange Adapter** | **Diaphragm Material** | **Sensor Fill Fluid** | |
| **Standard** | | | | | **Standard** |
| 11[2] | Gage | SST | 316L SST | Silicone | ★ |
| 21[2] | Differential | SST | 316L SST | Silicone | ★ |
| 22[2] | Differential | SST | Alloy C-276 | Silicone | ★ |
| 2A[2] | Differential | SST | 316L SST | Inert (Halocarbon) | ★ |
| 2B[2] | Differential | SST | Alloy C-276 | Inert (Halocarbon) | ★ |
| 31[2] | Tuned-System Assembly with Remote Seal | None | 316L SST | Silicone *(Requires Option Code S1)* | ★ |
| **O-ring** | | | | | |
| **Standard** | | | | | **Standard** |
| A | Glass-filled PTFE | | | | ★ |
| **Housing Material** | | | **Conduit Entry Size** | | |
| **Standard** | | | | | **Standard** |
| A | Aluminum | | ½–14 NPT | | ★ |
| B | Aluminum | | M20 × 1.5 | | ★ |
| J | SST | | ½–14 NPT | | ★ |
| K | SST | | M20 × 1.5 | | ★ |
| **Expanded** | | | | | |
| D | Aluminum | | G½ | | |
| M | SST | | G½ | | |

## Options (Include with selected model number)

| **PlantWeb Control Functionality** | | |
|---|---|---|
| **Standard** | | **Standard** |
| A01[3] | FOUNDATION fieldbus Advanced Control Function Block Suite | ★ |
| **PlantWeb Diagnostic Functionality** | | |
| **Standard** | | **Standard** |
| D01[3] | FOUNDATION fieldbus Diagnostics Suite | ★ |
| **Seal Assemblies** | | |
| **Standard** | | **Standard** |
| S1[4] | Assembled to One Rosemount 1199 Seal (Requires 1199M) | ★ |
| **Product Certifications** | | |
| **Standard** | | **Standard** |
| E5 | FM Explosion-proof, Dust Ignition-proof | ★ |
| I5 | FM Intrinsically Safe, Division 2 | ★ |
| K5 | FM Explosion-proof, Dust Ignition-proof, Intrinsically Safe, and Division 2 | ★ |
| I1[5] | ATEX Intrinsic Safety and Dust | ★ |
| N1[5] | ATEX Type n Certification and Dust | ★ |
| E8 | ATEX Flameproof and Dust Certification | ★ |
| E4[5] | TIIS Flameproof | ★ |
| C6 | CSA Explosion-proof, Dust Ignition-proof, Intrinsically Safe, and Division 2 | ★ |
| K6[5] | CSA and ATEX Explosion-proof, Intrinsically Safe, and Division 2 (combination of C6 and K8) | ★ |
| KB | FM and CSA Explosion-proof, Dust Ignition-proof, Intrinsically Safe, and Division 2 (combination of K5 and C6) | ★ |
| K7[5] | IECEx Flameproof, Dust Ignition-proof, Intrinsic Safety, and Type n (combination of I7, N7 and E7) | ★ |
| K8[5] | ATEX Flame-proof and Intrinsic Safety Approvals (combination of I1 and E8) | ★ |
| KD[5] | FM, CSA, and ATEX Explosion-proof, Intrinsically Safe (combination of K5, C6, I1, and E8) | ★ |

Table 3. Rosemount 3051L Liquid Level Transmitter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

| | | |
|---|---|---|
| I7[5] | IECEx Intrinsic Safety | ★ |
| E7[5] | IECEx Flameproof, Dust Ignition-proof | ★ |
| N7[5] | IECEx Type n Certification | ★ |
| IA | ATEX FISCO Intrinsic Safety | ★ |
| IE | FM FISCO Intrinsically Safe | ★ |
| E2 | INMETRO Flameproof | ★ |
| I2 | INMETRO Intrinsic Safety | ★ |
| K2 | INMETRO Flameproof, Intrinsic Safety | ★ |
| E3 | China Flameproof | ★ |
| I3 | China Intrinsic Safety | ★ |
| N3 | China Type n | ★ |
| **Bolting Material** | | |
| **Standard** | | **Standard** |
| L4 | Austenitic 316 SST Bolts | ★ |
| L5 | ASTM A 193, Grade B7M bolts | ★ |
| L6 | Alloy K-500 Bolts | ★ |
| L8 | ASTM A 193 Class 2, Grade B8M Bolts | ★ |
| **Display and Interface Options** | | |
| **Standard** | | **Standard** |
| M4 | LCD Display with Local Operator Interface (Available only with output code W - Profibus PA) | ★ |
| M5 | LCD Display for Aluminum Housing (Housing Codes A, B, C, and D only) | ★ |
| M6 | LCD Display for SST Housing (Housing Codes J, K, L, and M only) | ★ |
| **Calibration Certification** | | |
| **Standard** | | **Standard** |
| Q4 | Calibration Certificate | ★ |
| QP | Calibration Certificate and tamper evident seal | ★ |
| QG | Calibration Certificate and GOST Verification Certificate | ★ |
| **Material Traceability Certification** | | |
| **Standard** | | **Standard** |
| Q8 | Material Traceability Certification per EN 10204 3.1 | ★ |
| **Quality Certification for Safety** | | |
| **Standard** | | **Standard** |
| QS[6] | Certificate of FMEDA data | ★ |
| **Toolkit Total System Performance Reports** | | |
| **Standard** | | **Standard** |
| QZ | Remote Seal System Performance Calculation Report | ★ |
| **Conduit Electrical Connector** | | |
| **Standard** | | **Standard** |
| GE | M12, 4-pin, Male Connector (eurofast®) | ★ |
| GM | A size Mini, 4-pin, Male Connector (minifast®) | ★ |
| **Hardware Adjustments** | | |
| **Standard** | | **Standard** |
| J1[7][8] | Local Zero Adjustment Only | ★ |
| J3[7][8] | No Local Zero or Span Adjustment | ★ |
| **Transient Protection** | | |
| **Standard** | | **Standard** |
| T1[9] | Transient Protection Terminal Block | ★ |

Table 3. Rosemount 3051L Liquid Level Transmitter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

| | | | | |
|---|---|---|---|---|
| **Software Configuration** | | | | |
| **Standard** | | | | **Standard** |
| C1[7] | Custom Software Configuration (Completed CDS 00806-0100-4001 required with order) | | | ★ |
| **Low Power Output** | | | | |
| **Standard** | | | | **Standard** |
| C2[7] | 0.8–3.2 V dc Output with Digital Signal Based on HART Protocol (Available with Output code M only) | | | ★ |
| **Alarm Limit** | | | | |
| **Standard** | | | | **Standard** |
| C4[7][10] | NAMUR alarm and saturation levels, high alarm | | | ★ |
| CN[7][10] | NAMUR alarm and saturation levels, low alarm | | | ★ |
| **Conduit Plug** | | | | |
| **Standard** | | | | **Standard** |
| DO | 316 SST Conduit Plug | | | ★ |
| **Ground Screw** | | | | |
| **Standard** | | | | **Standard** |
| V5[11] | External Ground Screw Assembly | | | ★ |
| **Lower Housing Flushing Connection Options** | | | | |
| | **Ring Material** | **Number** | **Size (NPT)** | |
| **Standard** | | | | **Standard** |
| F1 | 316 SST | 1 | 1/4-18 NPT | ★ |
| F2 | 316 SST | 2 | 1/4-18 NPT | ★ |
| F3 | Alloy C-276 | 1 | 1/4-18 NPT | ★ |
| F4 | Alloy C-276 | 2 | 1/4-18 NPT | ★ |
| F7 | 316 SST | 1 | 1/2-14 NPT | ★ |
| F8 | 316 SST | 2 | 1/2-14 NPT | ★ |
| F9 | Alloy C-276 | 1 | 1/2-14 NPT | ★ |
| F0 | Alloy C-276 | 2 | 1/2-14 NPT | ★ |
| **Typical Model Number: 3051L 2 A A0 D 21 A A F1** | | | | |

*(1) Option code M4 - LCD Display with Local Operator Interface required for local addressing and configuration.*
*(2) Materials of Construction comply with metallurgical requirements highlighted within NACE MR0175/ISO 15156 for sour oil field production environments. Environmental limits apply to certain materials. Consult latest standard for details. Selected materials also conform to NACE MR0103 for sour refining environments.*
*(3) Only valid with FOUNDATION fieldbus Output Code F.*
*(4) "Assemble-to" items are specified separately and require a completed model number.*
*(5) Not available with low-power Option Code M*
*(6) Only available with HART 4-20 mA output (output code A).*
*(7) Not available with fieldbus (output code F) or profibus protocols (output code W).*
*(8) Local zero and span adjustments are standard unless Option Code J1 or J3 is specified.*
*(9) The T1 option is not needed with FISCO Product Certifications; transient protection is included in the FISCO product certification codes IA, IE, IF, and IG.*
*(10) NAMUR-Compliant operation is pre-set at the factory and cannot be changed to standard operation in the field.*
*(11) The V5 option is not needed with the T1 option; external ground screw assembly is included with the T1 option.*

## OPTIONS

### Standard Configuration

Unless otherwise specified, transmitter is shipped as follows:

| | |
|---|---|
| **ENGINEERING UNITS**<br>***Differential/Gage*:**<br>***Absolute/3051T*:** | <br>in$H_2O$ (Range 0, 1, 2, and 3) psi (Range 4 and 5)<br>psi (all ranges) |
| **4 mA (1 V dc)[(1)]:** | 0 (engineering units above) |
| **20 mA (5 V dc):** | Upper range limit |
| **Output:** | Linear |
| **Flange type:** | Specified model code option |
| **Flange material:** | Specified model code option |
| **O-ring material:** | Specified model code option |
| **Drain/vent:** | Specified model code option |
| **Integral meter:** | Installed or none |
| **Alarm[(1)]:** | Upscale |
| **Software tag:** | (Blank) |

*(1) Not applicable to fieldbus.*

### Custom Configuration HART protocol only[(1)]

If Option Code C1 is ordered, the customer may specify the following data in addition to the standard configuration parameters.

- Output Information
- Transmitter Information
- LCD display Configuration
- Hardware Selectable Information
- Signal Selection

Refer to the “HART Protocol C1 Option Configuration Data Sheet” document number 00806-0100-4001.

### Tagging (3 options available)

- Standard SST hardware tag is wired to the transmitter. Tag character height is 0.125 in. (3,18 mm), 56 characters maximum.
- Tag may be permanently stamped on transmitter nameplate upon request, 56 characters maximum.
- Tag may be stored in transmitter memory (30 characters maximum). Software tag is left blank unless specified.

### Commissioning tag (fieldbus only)

A temporary commissioning tag is attached to all transmitters. The tag indicates the device ID and allows an area for writing the location.

### Optional Rosemount 304, 305 or 306 Integral Manifolds

Factory assembled to 3051C and 3051T transmitters. Refer to the following Product Data Sheet (document number 00813-0100-4839 for Rosemount 304 and 00813-0100-4733 for Rosemount 305 and 306) for additional information.

### Optional Diaphragm and Sanitary Seals

Refer to Product Data Sheet 00813-0100-4016 or 00813-0201-4016. for additional information.

*(1) Not applicable to fieldbus.*

### Output Information(1)

Output range points must be the same unit of measure. Available units of measure include:

| | | | |
|---|---|---|---|
| inH2O | inH2O@4 °C(1) | psi | Pa |
| inHg | ftH2O | bar | kPa |
| mmH2O | mmH2O@4 °C(1) | mbar | torr |
| mmHg | g/cm2 | kg/cm2 | atm |

*(1) Not available on low power or previous versions.*

### LCD display

M5 Digital Display, 5-Digit, 2-Line LCD

- Direct reading of digital data for higher accuracy
- Displays user-defined flow, level, volume, or pressure units
- Displays diagnostic messages for local troubleshooting
- 90-degree rotation capability for easy viewing

M6 Digital Display with 316 Stainless Steel Cover

- For use with stainless steel housing option (housing codes J, K, and L)

### Local Span and Zero Adjustment(1)

Transmitters ship with local span and zero adjustments standard unless otherwise specified.

- Non-interactive external zero and span adjustments ease calibration
- Magnetic switches replace standard potentiometer adjustments to optimize performance

J1 Local Zero Adjustment Only(1)

J3 No Local Zero or Span Adjustment(1)

### Bolts for Flanges and Adapters

- Options permit bolts for flanges and adapters to be obtained in various materials
- Standard material is plated carbon steel per ASTM A449, Type 1

L4 Austenitic 316 Stainless Steel Bolts

L5 ASTM A 193, Grade B7M Bolts

L6 Alloy K-500 Bolts

### Rosemount 3051C Coplanar Flange and 3051T Bracket Option

B4 Bracket for 2-in. Pipe or Panel Mounting

- For use with the standard Coplanar flange configuration
- Bracket for mounting of transmitter on 2-in. pipe or panel
- Stainless steel construction with stainless steel bolts

*(1) Not applicable to fieldbus.*

**Rosemount 3051H Bracket Options**

B5 Bracket for 2-in. Pipe or Panel Mounting

- For use with the 3051H Pressure Transmitter for high process temperatures
- Carbon steel construction with carbon steel bolts

B6 B5 Bracket with SST Bolts

- Same bracket as the B5 option with Series 300 stainless steel bolts.

**Traditional Flange Bracket Options**

B1 Bracket for 2-in. Pipe Mounting

- For use with the traditional flange option
- Bracket for mounting on 2-in. pipe
- Carbon steel construction with carbon steel bolts
- Coated with polyurethane paint

B2 Bracket for Panel Mounting

- For use with the traditional flange option
- Bracket for mounting transmitter on wall or panel
- Carbon steel construction with carbon steel bolts
- Coated with polyurethane paint

B3 Flat Bracket for 2-in. Pipe Mounting

- For use with the traditional flange option
- Bracket for vertical mounting of transmitter on 2-in. pipe
- Carbon steel construction with carbon steel bolts
- Coated with polyurethane paint

B7 B1 Bracket with SST Bolts

- Same bracket as the B1 option with Series 300 stainless steel bolts

B8 B2 Bracket with SST Bolts

- Same bracket as the B2 option with Series 300 stainless steel bolts

B9 B3 Bracket with SST Bolts

- Same bracket as the B3 option with Series 300 stainless steel bolts

BA Stainless Steel B1 Bracket with SST Bolts

- B1 bracket in stainless steel with Series 300 stainless steel bolts

BC Stainless Steel B3 Bracket with SST Bolts

- B3 bracket in stainless steel with Series 300 stainless steel bolts

### Shipping Weights

Table A-9. Transmitter Weights without Options

| Transmitter | Add Weight In lb. (kg) |
|---|---|
| 3051C | 6.0 (2,7) |
| 3051L | Table A-10 |
| 3051H | 13.6 (6,2) |
| 3051T | 3.0 (1,4) |

Table A-10. 3051L Weights without Options

| Flange | Flush lb. (kg) | 2-in. Ext. lb. (kg) | 4-in. Ext. lb. (kg) | 6-in. Ext. lb. (kg) |
|---|---|---|---|---|
| 2-in., 150 | 12.5 (5,7) | — | — | — |
| 3-in., 150 | 17.5 (7,9) | 19.5 (8,8) | 20.5 (9,3) | 21.5 (9,7) |
| 4-in., 150 | 23.5 (10,7) | 26.5 (12,0) | 28.5 (12,9) | 30.5 (13,8) |
| 2-in., 300 | 17.5 (7,9) | — | — | — |
| 3-in., 300 | 22.5 (10,2) | 24.5 (11,1) | 25.5 (11,6) | 26.5 (12,0) |
| 4-in., 300 | 32.5 (14,7) | 35.5 (16,1) | 37.5 (17,0) | 39.5 (17,9) |
| 2-in., 600 | 15.3 (6,9) | — | — | — |
| 3-in., 600 | 25.2 (11,4) | 27.2 (12,3) | 28.2 (12,8) | 29.2 (13,2) |
| DN 50/PN 40 | 13.8 (6,2) | — | — | — |
| DN 80/PN 40 | 19.5 (8,8) | 21.5 (9,7) | 22.5 (10,2) | 23.5 (10,6) |
| DN 100/ PN 10/16 | 17.8 (8,1) | 19.8 (9,0) | 20.8 (9,5) | 21.8 (9,9) |
| DN 100/ PN 40 | 23.2 (10,5) | 25.2 (11,5) | 26.2 (11,9) | 27.2 (12,3) |

Table A-11. Transmitter Options Weights

| Code | Option | Add lb. (kg) |
|---|---|---|
| J, K, L, M | Stainless Steel Housing (T) | 3.9 (1,8) |
| J, K, L, M | Stainless Steel Housing (C, L, H, P) | 3.1 (1,4) |
| M5 | LCD display for Aluminum Housing | 0.5 (0,2) |
| M6 | LCD display for SST Housing | 1.25 (0,6) |
| B4 | SST Mounting Bracket for Coplanar Flange | 1.0 (0,5) |
| B1 B2 B3 | Mounting Bracket for Traditional Flange | 2.3 (1,0) |
| B7 B8 B9 | Mounting Bracket for Traditional Flange | 2.3 (1,0) |
| BA, BC | SST Bracket for Traditional Flange | 2.3 (1,0) |
| B5 B6 | Mounting Bracket for 3051H | 2.9 (1,3) |
| H2 | Traditional Flange | 2.4 (1,1) |
| H3 | Traditional Flange | 2.7 (1,2) |
| H4 | Traditional Flange | 2.6 (1,2) |
| H7 | Traditional Flange | 2.5 (1,1) |
| FC | Level Flange—3 in., 150 | 10.8 (4,9) |
| FD | Level Flange—3 in., 300 | 14.3 (6,5) |
| FA | Level Flange—2 in., 150 | 10.7 (4,8) |
| FB | Level Flange—2 in., 300 | 14.0 (6,3) |
| FP | DIN Level Flange, SST, DN 50, PN 40 | 8.3 (3,8) |
| FQ | DIN Level Flange, SST, DN 80, PN 40 | 13.7 (6,2) |

Table A-12. 3051C Differential/Gage Pressure Transmitter Range Limits

| | Range 1 Span | | Range 2 Span | | Range 3 Span | | Range 4 Span | | Range 5 Span | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Units** | **min.** | **max** | **min.** | **max** | **min.** | **max** | **min.** | **max** | **min.** | **max** |
| in$H_2O$ | 0.5 | 25 | 2.5 | 250 | 10 | 1000 | 83.040 | 8304 | 553.60 | 55360 |
| inHg | 0.03678 | 1.8389 | 0.18389 | 18.389 | 0.73559 | 73.559 | 6.1081 | 610.81 | 40.720 | 4072.04 |
| ft$H_2O$ | 0.04167 | 2.08333 | 0.20833 | 20.8333 | 0.83333 | 83.3333 | 6.9198 | 691.997 | 46.13 | 4613.31 |
| mm$H_2O$ | 12.7 | 635.5 | 63.553 | 6355 | 254 | 25421 | 2110.95 | 211095 | 14073 | 1407301 |
| mmHg | 0.93416 | 46.7082 | 4.67082 | 467.082 | 18.6833 | 1868.33 | 155.145 | 15514.5 | 1034.3 | 103430 |
| psi | 0.01806 | 0.903 | 0.0902 | 9.03183 | 0.36127 | 36.127 | 3 | 300 | 20 | 2000 |
| bar | 0.00125 | 0.06227 | 0.00623 | 0.62272 | 0.02491 | 2.491 | 0.20684 | 20.6843 | 1.37895 | 137.895 |
| mbar | 1.2454 | 62.2723 | 6.22723 | 622.723 | 24.9089 | 2490.89 | 206.843 | 20684.3 | 1378.95 | 137895 |
| g/$cm^2$ | 1.26775 | 63.3875 | 6.33875 | 633.875 | 25.355 | 2535.45 | 210.547 | 21054.7 | 1406.14 | 140614 |
| kg/$cm^2$ | 0.00127 | 0.0635 | 0.00635 | 0.635 | 0.0254 | 2.54 | 0.21092 | 21.0921 | 1.40614 | 140.614 |
| Pa | 124.545 | 6227.23 | 622.723 | 62160.6 | 2490.89 | 249089 | 20684.3 | 2068430 | 137895 | 13789500 |
| kPa | 0.12545 | 6.2272 | 0.62272 | 62.2723 | 2.49089 | 249.089 | 20.6843 | 2068.43 | 137.895 | 13789.5 |
| torr | 0.93416 | 46.7082 | 4.67082 | 467.082 | 18.6833 | 1868.33 | 155.145 | 15514.5 | 1034.3 | 103430 |
| atm | 0.00123 | 0.06146 | 0.00615 | 0.61460 | 0.02458 | 2.458 | 0.20414 | 20.4138 | 1.36092 | 136.092 |
| *When using a Field Communicator, ±5% adjustment is allowed on the sensor limit to allow for unit conversions.* | | | | | | | | | | |

Table A-13. 3051L/3051H Pressure Transmitter Range Limits

| | Range 2 Span | | Range 3 Span | | Range 4 Span | | Range 5 Span | |
|---|---|---|---|---|---|---|---|---|
| **Units** | **min.** | **max** | **min.** | **max** | **min.** | **max** | **min.** | **max** |
| in$H_2O$ | 2.5 | 250 | 10 | 1000 | 83.040 | 8304 | 553.60 | 55360 |
| inHg | 0.18389 | 18.389 | 0.73559 | 73.559 | 6.1081 | 610.81 | 40.720 | 4072.04 |
| ft$H_2O$ | 0.20833 | 20.8333 | 0.83333 | 83.3333 | 6.9198 | 691.997 | 46.13 | 4613.31 |
| mm$H_2O$ | 63.553 | 6355 | 254 | 25421 | 2110.95 | 211095 | 14073 | 1407301 |
| mmHg | 4.67082 | 467.082 | 18.6833 | 1868.33 | 155.145 | 15514.5 | 1034.3 | 103430 |
| psi | 0.0902 | 9.03183 | 0.36127 | 36.127 | 3 | 300 | 20 | 2000 |
| bar | 0.00623 | 0.62272 | 0.02491 | 2.491 | 0.20684 | 20.6843 | 1.37895 | 137.895 |
| mbar | 6.22723 | 622.723 | 24.9089 | 2490.89 | 206.843 | 20684.3 | 1378.95 | 137895 |
| g/$cm^2$ | 6.33875 | 633.875 | 25.355 | 2535.45 | 210.547 | 21054.7 | 1406.14 | 140614 |
| kg/$cm^2$ | 0.00635 | 0.635 | 0.0254 | 2.54 | 0.21092 | 21.0921 | 1.40614 | 140.614 |
| Pa | 622.723 | 62160.6 | 2490.89 | 249089 | 20684.3 | 2068430 | 137895 | 13789500 |
| kPa | 0.62272 | 62.2723 | 2.49089 | 249.089 | 20.6843 | 2068.43 | 137.895 | 13789.5 |
| torr | 4.67082 | 467.082 | 18.6833 | 1868.33 | 155.145 | 15514.5 | 1034.3 | 103430 |
| atm | 0.00615 | 0.61460 | 0.02458 | 2.458 | 0.20414 | 20.4138 | 1.36092 | 136.092 |
| *When using a Field Communicator, ±5% adjustment is allowed on the sensor limit to allow for unit conversions.* | | | | | | | | |

Table A-14. 3051T Gage and Absolute Pressure Transmitter Range Limits

| | Range 1 Span | | Range 2 Span | | Range 3 Span | | Range 4 Span | | Range 5 Span | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Units** | **min.** | **max** | **min.** | **max** | **min.** | **max** | **min.** | **max** | **min.** | **max** |
| in$H_2O$ | 8.30397 | 831.889 | 41.5198 | 4159.45 | 221.439 | 22143.9 | 1107.2 | 110720 | 55360 | 276799 |
| inHg | 0.61081 | 61.0807 | 3.05403 | 305.403 | 16.2882 | 1628.82 | 81.441 | 8144.098 | 4072.04 | 20360.2 |
| ft$H_2O$ | 0.69199 | 69.3241 | 3.45998 | 345.998 | 18.4533 | 1845.33 | 92.2663 | 9226.63 | 4613.31 | 23066.6 |
| mm$H_2O$ | 211.10 | 21130 | 1054.60 | 105460.3 | 5634.66 | 563466 | 28146.1 | 2814613 | 1407301 | 7036507 |
| mmHg | 15.5145 | 1551.45 | 77.5723 | 7757.23 | 413.72 | 41372 | 2068.6 | 206860.0 | 103430 | 517151 |
| psi | 0.3 | 30 | 1.5 | 150 | 8 | 800 | 40 | 4000 | 2000 | 10000 |
| bar | 0.02068 | 2.06843 | 0.10342 | 10.3421 | 0.55158 | 55.1581 | 2.75791 | 275.7905 | 137.895 | 689.476 |
| mbar | 20.6843 | 2068.43 | 103.421 | 10342.11 | 551.581 | 55158.1 | 2757.91 | 275790.5 | 137895 | 689476 |
| g/$cm^2$ | 21.0921 | 2109.21 | 105.461 | 10546.1 | 561.459 | 56145.9 | 2807.31 | 280730.6 | 140614 | 703067 |
| kg/$cm^2$ | 0.02109 | 2.10921 | 0.10546 | 10.5461 | 0.56246 | 56.2456 | 2.81228 | 281.228 | 140.614 | 701.82 |
| Pa | 2068.43 | 206843 | 10342.1 | 1034212 | 55158.1 | 5515811 | 275791 | 27579054 | 13789500 | 68947600 |
| kPa | 2.06843 | 206.843 | 10.3421 | 1034.21 | 55.1581 | 5515.81 | 275.791 | 27579.05 | 13789.5 | 68947.6 |
| torr | 15.5145 | 1551.45 | 77.5726 | 7757.26 | 413.721 | 413721 | 2068.6 | 206859.7 | 103430 | 517151 |
| atm | 0.02041 | 2.04138 | 0.10207 | 10.2069 | 0.54437 | 54.4368 | 2.72184 | 272.1841 | 136.092 | 680.46 |
| *When using a Field Communicator, ±5% adjustment is allowed on the sensor limit to allow for unit conversions.* | | | | | | | | | | |

Table A-15. 3051C Absolute Pressure Transmitter Range Limits

| | Range 1 Span | | Range 2 Span | | Range 3 Span | | Range 4 Span | |
|---|---|---|---|---|---|---|---|---|
| **Units** | **min.** | **max** | **min.** | **max** | **min.** | **max** | **min.** | **max** |
| in$H_2O$ | 8.30397 | 831.889 | 41.5198 | 4151.98 | 221.439 | 22143.9 | 1107.2 | 110720 |
| inHg | 0.61081 | 61.0807 | 3.05403 | 305.403 | 16.2882 | 1628.82 | 81.441 | 8144.098 |
| ft$H_2O$ | 0.69199 | 69.3241 | 3.45998 | 345.998 | 18.4533 | 1845.33 | 92.2663 | 9226.63 |
| mm$H_2O$ | 211.10 | 21130 | 6.35308 | 635.308 | 5634.66 | 563466 | 28146.1 | 2814613 |
| mmHg | 15.5145 | 1551.45 | 1055.47 | 105547 | 413.72 | 41372 | 2068.6 | 206860.0 |
| psi | 0.3 | 30 | 1.5 | 150 | 8 | 800 | 40 | 4000 |
| bar | 0.02068 | 2.06843 | 0.10342 | 10.342 | 0.55158 | 55.1581 | 2.75791 | 275.7905 |
| mbar | 20.6843 | 2068.43 | 103.421 | 10342.1 | 551.581 | 55158.1 | 2757.91 | 275790.5 |
| g/$cm^2$ | 21.0921 | 2109.21 | 105.27 | 105.27 | 561.459 | 56145.9 | 2807.31 | 280730.6 |
| kg/$cm^2$ | 0.02109 | 2.10921 | 0.10546 | 10.546 | 0.56246 | 56.2456 | 2.81228 | 281.228 |
| Pa | 2068.43 | 206843 | 10342.1 | 1034210 | 55158.1 | 5515811 | 275791 | 27579054 |
| kPa | 2.06843 | 206.843 | 10.3421 | 1034.21 | 55.1581 | 5515.81 | 275.791 | 27579.05 |
| torr | 15.5145 | 1551.45 | 77.5726 | 7757.26 | 413.721 | 413721 | 2068.6 | 206859.7 |
| atm | 0.02041 | 2.04138 | 0.10207 | 10.207 | 0.54437 | 54.4368 | 2.72184 | 272.1841 |
| *When using a Field Communicator, ±5% adjustment is allowed on the sensor limit to allow for unit conversions.* | | | | | | | | |

## SPARE PARTS

| Rosemount 3051C Gage and Differential Sensor Modules (Min. Span/Range) | | | Silicone Fill Part Number | Inert Fill Part Number |
|---|---|---|---|---|
| *Note: One spare part is recommended for every 50 transmitters.* | | | | |
| *Note: Listed by Range and Process Isolator Order Numbers.* | | | | |
| | **Gage Pressure Range** | **Differential Pressure Range** | | |
| **Range 1** | **–25 to 25 in H2O/0.5 in H2O** | **–25 to 25 in H2O/0.5 in H2O** | | |
| 316L SST | | | 03031-1045-0012 | 03031-1145-0012 |
| Alloy C-276 | | | 03031-1045-0013 | 03031-1145-0013 |
| Alloy 400 | | | 03031-1045-0014 | 03031-1145-0014 |
| Gold-plated Alloy 400 | | | 03031-1045-0016 | 03031-1145-0016 |
| Gold-plated 316 SST | | | 03031-1045-0017 | 03031-1145-0017 |
| **Range 2** | **–250 to 250 in$H_2O$/2.5 in$H_2O$** | **–250 to 250 in$H_2O$/2.5 in$H_2O$** | | |
| 316L SST | | | 03031-1045-0022 | 03031-1145-0022 |
| Alloy C-276 | | | 03031-1045-0023 | 03031-1145-0023 |
| Alloy 400 | | | 03031-1045-0024 | 03031-1145-0024 |
| Tantalum | | | 03031-1045-0025 | 03031-1145-0025 |
| Gold-plated Alloy 400 | | | 03031-1045-0026 | 03031-1145-0026 |
| Gold-plated 316 SST | | | 03031-1045-0027 | 03031-1145-0027 |
| **Range 3** | **–407 to 1000 in$H_2O$/10 in$H_2O$** | **-1000 to 1000 in$H_2O$/10 in$H_2O$** | | |
| 316L SST | | | 03031-1045-0032 | 03031-1145-0032 |
| Alloy C-276 | | | 03031-1045-0033 | 03031-1145-0033 |
| Alloy 400 | | | 03031-1045-0034 | 03031-1145-0034 |
| Tantalum | | | 03031-1045-0035 | 03031-1145-0035 |
| Gold-plated Alloy 400 | | | 03031-1045-0036 | 03031-1145-0036 |
| Gold-plated 316 SST | | | 03031-1045-0037 | 03031-1145-0037 |
| **Range 4** | **–14.2 to 300 psi/3 psi** | **-300 to 300 psi/3 psi** | | |
| 316L SST | | | 03031-1045-2042 | 03031-1145-2042 |
| Alloy C-276 | | | 03031-1045-2043 | 03031-1145-2043 |
| Alloy 400 | | | 03031-1045-2044 | 03031-1145-2044 |
| Tantalum | | | 03031-1045-2045 | 03031-1145-2045 |
| Gold-plated Alloy 400 | | | 03031-1045-2046 | 03031-1145-2046 |
| Gold-plated 316 SST | | | 03031-1045-2047 | 03031-1145-2047 |
| **Range 5** | **–14.2 to 2000 psi/20 psi** | **-2000 to 2000psi/20 psi** | | |
| 316L SST | | | 03031-1045-2052 | 03031-1145-2052 |
| Alloy C-276 | | | 03031-1045-2053 | 03031-1145-2053 |
| Alloy 400 | | | 03031-1045-2054 | 03031-1145-2054 |
| Tantalum | | | 03031-1045-2055 | 03031-1145-2055 |
| Gold-plated Alloy 400 | | | 03031-1045-2056 | 03031-1145-2056 |
| Gold-plated 316 SST | | | 03031-1045-2057 | 03031-1145-2057 |

| Rosemount 3051C Absolute Sensor Modules (Min. Span/Range) | Silicone Fill Part Number | Inert Fill Part Number |
|---|---|---|
| *Note: One spare part is recommended for every 50 transmitters.* | | |
| *Note: Listed by Range and Process Isolator Order Numbers.* | | |
| **Range 1, 0 to 30 psia/0.3 psia** | | |
| 316L SST | 03031-2020-0012 | — |
| Alloy C-276 | 03031-2020-0013 | — |
| Alloy 400 | 03031-2020-0014 | — |
| Gold-plated Alloy 400 | 03031-2020-0016 | — |
| Gold-plated 316 SST | 03031-2020-0017 | — |

| | | |
|---|---|---|
| **Range 2, 0 to 150/1.5 psia** | | |
| 316L SST | 03031-2020-0022 | — |
| Alloy C-276 | 03031-2020-0023 | — |
| Alloy 400 | 03031-2020-0024 | — |
| Gold-plated Alloy 400 | 03031-2020-0026 | — |
| Gold-plated 316 SST | 03031-2020-0027 | — |
| **Range 3, 0 to 800 psia/8 psia** | | |
| 316L SST | 03031-2020-0032 | — |
| Alloy C-276 | 03031-2020-0033 | — |
| Alloy 400 | 03031-2020-0034 | — |
| Gold-plated Alloy 400 | 03031-2020-0036 | — |
| Gold-plated 316 SST | 03031-2020-0037 | — |
| **Range 4, 0 to 400 psia/40 psia** | | |
| 316L SST | 03031-2020-0042 | — |
| Alloy C-276 | 03031-2020-0043 | — |
| Alloy 400 | 03031-2020-0044 | — |
| Gold-plated Alloy 400 | 03031-2020-0046 | — |
| Gold-plated 316 SST | 03031-2020-0047 | — |

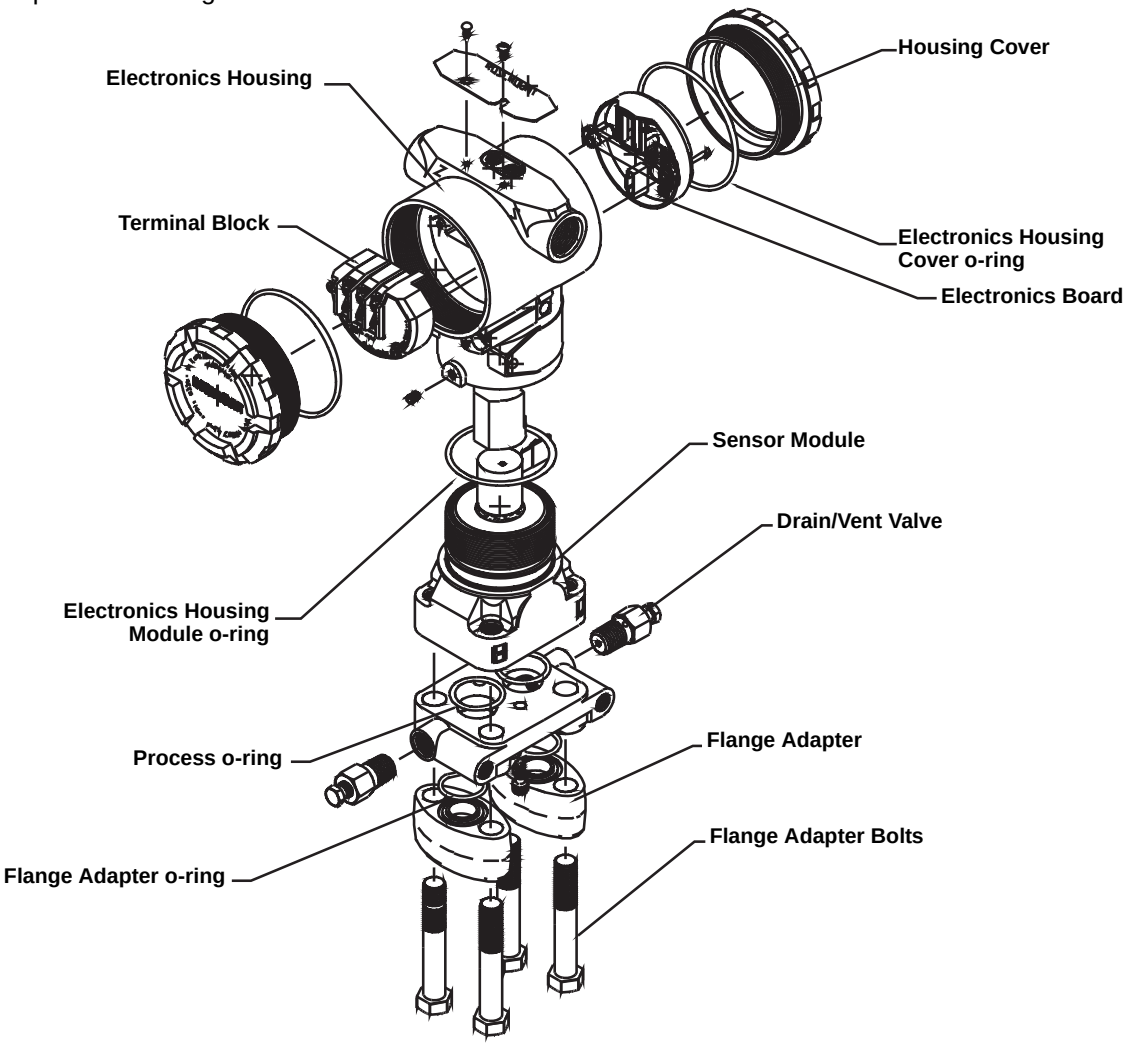
| **Electronics Board Assemblies** | **Part Number** |
|---|---|
| 4-20 mA HART Standard | 03031-0001-0002 |
| 4-20 mA HART NAMUR compliant | 03031-0001-0003 |
| 1-5 Vdc HART Low Power | 03031-0001-1001 |
| FOUNDATION fieldbus | 03031-0001-2001 |
| PROFIBUS PA fieldbus | 03031-0001-2101 |
| **LCD Display** | **Part Number** |
| **LCD Display Kits** | |
| Fieldbus (FOUNDATION or PROFIBUS PA) - Aluminum | 03031-0193-0104 |
| Fieldbus (FOUNDATION or PROFIBUS PA) - 316 SST | 03031-0193-0112 |
| **LCD Display Only** | |
| Fieldbus (FOUNDATION or PROFIBUS PA) | 03031-0193-0105 |
| **Local Operator Interface (includes new electronics board)** | **Part Number** |
| **Including LCD Display and Cover (to upgrade devices without displays)** | |
| Profibus - AL | 03031-9030-0001 |
| Profibus - SST | 03031-9030-0011 |
| **Without an LCD Display and Cover (to upgrade devices that have displays)** | |
| Profibus - AL | 03031-9030-1001 |
| Profibus - SST | 03031-9030-1011 |
| **Terminal Block Assemblies** | **Part Number** |
| **Fieldbus (FOUNDATION or PROFIBUS PA)** | |
| Standard terminal block | 03031-0332-2001 |
| Transient terminal block (option T1) | 03031-0332-2002 |
| FISCO terminal block | 03031-0332-2005 |
| **Electrical Housings (without Terminal Block)** | **Part Number** |
| **Standard - Aluminum** | |
| 1/2 - 14 NPT conduit entry | 03031-0635-0001 |
| M20 conduit entry | 03031-0635-0002 |
| G1/2 conduit entry | 03031-0635-0004 |
| **Standard - 316 SST** | |
| 1/2 - 14 NPT conduit entry | 03031-0635-0041 |
| M20 conduit entry | 03031-0635-0042 |

| **Housing Conduit Plugs** | **Part Number** |
|---|---|
| 1/2 NPT Conduit plug | 03031-0544-0003 |
| M20 Conduit plug | 03031-0544-0001 |
| G1/2 Conduit plug | 03031-0544-0004 |
| **Housing Covers (include o-ring)** | **Part Number** |
| Field terminal cover - Aluminum | 03031-0292-0001 |
| Field terminal cover - 316 SST | 03031-0292-0002 |
| Fieldbus extended electronics cover - Aluminum | 03031-0292-0003 |
| Fieldbus extended electronics cover - 316 SST | 03031-0292-0004 |
| Fieldbus extended LCD Display cover - Aluminum | 03031-0193-0007 |
| Fieldbus extended LCD Display cover - 316 SST | 03031-0193-0013 |
| **Miscellaneous Hardware** | **Part Number** |
| External ground screw assembly (option V5) | 03031-0398-0001 |
| **Flanges** | **Part Number** |
| **Differential Coplanar Flange** | |
| 316 SST | 03031-0388-0022 |
| Cast C-276 | 03031-0388-0023 |
| Cast Alloy 400 | 03031-0388-0024 |
| Nickel-plated carbon steel | 03031-0388-0025 |
| **Gage/Absolute Coplanar Flange** | |
| 316 SST | 03031-0388-1022 |
| Cast C-276 | 03031-0388-1023 |
| Cast Alloy 40 | 03031-0388-1024 |
| Nickel-plated carbon steel | 03031-0388-1025 |
| Coplanar flange alignment screw (package of 12) | 03031-0309-0001 |
| **Traditional Flange** | |
| 316 SST | 03031-0320-0002 |
| Cast C-276 | 03031-0320-0003 |
| Cast Alloy 400 | 03031-0320-0004 |
| 316 SST - DIN Compliant (Option Code HJ) | 03031-1350-0012 |
| **Level Flange, Vertical Mount** | |
| 2 in., class 150, SST | 03031-0393-0221 |
| 2 in., class 300, SST | 03031-0393-0222 |
| 3 in., class 150, SST | 03031-0393-0231 |
| 3 in., class 300, SST | 03031-0393-0232 |
| DIN, DN 50, PN 40 | 03031-0393-1002 |
| DIN, DN 80, PN 40 | 03031-0393-1012 |
| **Flange Adapter Kits (each kit contains parts for one DP transmitter or two GP/AP transmitters)** | **Part Number** |
| **CS bolts, glass-filled PTFE O-Rings** | |
| SST adapters | 03031-1300-0002 |
| Cast Alloy C-276 adapters | 03031-1300-0003 |
| Alloy 400 adapters | 03031-1300-0004 |
| Nickel-plated carbon steel adapters | 03031-1300-0005 |
| **SST bolts, glass-filled PTFE O-Rings** | |
| SST adapters | 03031-1300-0012 |
| Cast Alloy C-276 adapters | 03031-1300-0013 |
| Alloy 400 adapters | 03031-1300-0014 |
| Nickel-plated carbon steel adapters | 03031-1300-0015 |
| **CS bolts, graphite-filled PTFE O-Rings** | |
| SST adapters | 03031-1300-0102 |
| Cast Alloy C-276 adapters | 03031-1300-0103 |
| Alloy 400 adapters | 03031-1300-0104 |
| Nickel-plated carbon steel adapters | 03031-1300-0105 |

| | |
|---|---|
| **SST bolts, graphite-filled PTFE O-Rings** | |
| SST adapters | 03031-1300-0112 |
| Cast Alloy C-276 adapters | 03031-1300-0113 |
| Alloy 400 adapters | 03031-1300-0114 |
| Nickel-plated carbon steel adapters | 03031-1300-0115 |
| **Flange Adapters** | **Part Number** |
| **1/2 - 14 NPT Adapters** | |
| 316 SST | 02024-0069-0002 |
| Cast C-276 | 02024-0069-0003 |
| Cast Alloy 400 | 02024-0069-0004 |
| Nickel-plated carbon steel | 02024-0069-0005 |
| **Socket Weld Adapters** | |
| 316 SST | 02024-0069-1002 |
| Cast C-276 | 02024-0069-1003 |
| Cast Alloy 400 | 02024-0069-1004 |
| **O-Ring Packages (package of 12)** | **Part Number** |
| Electronics housing, cover | 03031-0232-0001 |
| Electronics housing, module | 03031-0233-0001 |
| Process flange, glass-filled PTFE (White) | 03031-0234-0001 |
| Process flange, graphite-filled PTFE (Black) | 03031-0234-0002 |
| Process flange for 3051H, PTFE (White) | 02051-0167-0001 |
| Flange adapter, glass-filled PTFE (Light Brown) | 03031-0242-0001 |
| Flange adapter, graphite-filled PTFE (Black) | 03031-0242-0002 |
| **Bolt Kits** | **Part Number** |
| **COPLANAR FLANGE** | |
| **Flange Bolt Kit {44mm (1.75 in.)} (set of 4)** | |
| Carbon steel | 03031-0312-0001 |
| 316 SST | 03031-0312-0002 |
| ASTM A 193, Grade B7M | 03031-0312-0003 |
| Alloy K-500 | 03031-0312-0004 |
| **Flange/Adapter Bolt Kit {73mm (2.88 in.)} (set of 4)** | |
| Carbon steel | 03031-0306-0001 |
| 316 SST | 03031-0306-0002 |
| ASTM A 193, Grade B7M | 03031-0306-0003 |
| Alloy K-500 | 03031-0306-0004 |
| **TRADITIONAL FLANGE** | |
| **Differential Flange/Adapter Bolt Kit {44mm (1.75 in.)} (set of 8)** | |
| Carbon steel | 03031-0307-0001 |
| 316 SST | 03031-0307-0002 |
| ASTM A 193, Grade B7M | 03031-0307-0003 |
| Alloy K-500 | 03031-0307-0004 |
| **Gage/Absolute Flange/Adapter Bolt Kit {44mm (1.75 in.)} (set of 6)** | |
| Carbon steel | 03031-0307-1001 |
| 316 SST | 03031-0307-1002 |
| ASTM A 193, Grade B7M | 03031-0307-1003 |
| Alloy K-500 | 03031-0307-1004 |
| **Conventional Manifold/Traditional Flange Bolts** | |
| Carbon steel | Use bolts supplied with manifold |
| 316 SST | Use bolts supplied with manifold |
| **Level Flange, Vertical Mount Bolt Kit (Set of 4)** | |
| Carbon steel | 03031-0395-0001 |
| 316 SST | 03031-0395-0002 |

| **3051H Process Flange Bolt Kit (Set of 4)** | |
|---|---|
| Carbon Steel | 02051-0164-0001 |
| 316 SST | 02051-0164-0002 |
| **Drain/Vent Valve Kits (each kit contains parts for one transmitter)** | **Part Number** |
| **Differential Drain/Vent Kits** | |
| 316 SST stem and seat kit | 01151-0028-0022 |
| Alloy C-276 stem and seat kit | 01151-0028-0023 |
| Alloy K-500 stem and Alloy 400 seat kit | 01151-0028-0024 |
| 316 SST ceramic ball drain/vent kit | 03031-0378-0022 |
| Alloy C-276 ceramic ball drain/vent kit | 03031-0378-0023 |
| Alloy 400/K-500 ceramic ball drain/vent kit | 03031-0378-0024 |
| **Gage/Absolute Drain/Vent Kits** | |
| 316 SST stem and seat kit | 01151-0028-0012 |
| Alloy C-276 stem and seat kit | 01151-0028-0013 |
| Alloy K-500 stem and Alloy 400 seat kit | 01151-0028-0014 |
| 316 SST ceramic ball drain/vent kit | 03031-0378-0012 |
| Alloy C-276 ceramic ball drain/vent kit | 03031-0378-0013 |
| Alloy 400/K-500 ceramic ball drain/vent kit | 03031-0378-0014 |
| **Mounting Brackets** | **Part Number** |
| **3051C and 3051L Coplanar Flange Bracket kit** | |
| B4 bracket, SST, 2-in. pipe mount, SST bolts | 03031-0189-0003 |
| **3051T Inline Bracket Kit** | |
| B4 bracket, SST, 2-in. pipe mount, SST bolts | 03031-0189-0004 |
| **3051C Traditional Flange Bracket Kits** | |
| B1 bracket, 2-in. pipe mount, CS bolts | 03031-0313-0001 |
| B2 bracket, panel mount, CS bolts | 03031-0313-0002 |
| B3 flat bracket, 2-in. pipe mount, CS bolts | 03031-0313-0003 |
| B7 (B1 bracket, SST bolts) | 03031-0313-0007 |
| B8 (B2 bracket, SST bolts) | 03031-0313-0008 |
| B9 (B3 bracket, SST bolts) | 03031-0313-0009 |
| BA (SST B1 bracket, SST bolts) | 03031-0313-0011 |
| BC (SST B3 bracket, SST bolts) | 03031-0313-0013 |
| **3051H Bracket Kits** | |
| B5 universal bracket, 2-in. pipe and panel mount, CS bolts | 03051-1081-0001 |
| B6 universal bracket, 2-in. pipe and panel mount, SST bolts | 03051-1081-0002 |

Figure A-1. Spare Parts Diagram



# Appendix B Product Certifications



## OVERVIEW

This Appendix contains information on Approved manufacturing locations, European directive information, Ordinary Location certification, Hazardous Locations Certifications and approval drawings for HART protocol.

## SAFETY MESSAGES

Procedures and instructions in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that raises potential safety issues is indicated by a warning symbol (⚠). Refer to the following safety messages before performing an operation preceded by this symbol.

### Warnings

**⚠WARNING**

**Explosions could result in death or serious injury:**

Installation of this transmitter in an explosive environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Please review this section of the Model 3051 reference manual for any restrictions associated with a safe installation.

- Before connecting a HART-based communicator in an explosive atmosphere, make sure the instruments in the loop are installed in accordance with intrinsically safe or non-incendive field wiring practices.
- In an Explosion-Proof/Flameproof installation, do not remove the transmitter covers when power is applied to the unit.

**Process leaks may cause harm or result in death.**

- Install and tighten process connectors before applying pressure.

**Electrical shock can result in death or serious injury.**

- Avoid contact with the leads and terminals. High voltage that may be present on leads can cause electrical shock.

**⚠WARNING**

Cable gland and plug must comply with the requirements listed on the certificates.

## APPROVED MANUFACTURING LOCATIONS

Emerson Process Management - Rosemount Inc. — Chanhassen, Minnesota, USA

Emerson Process Management — Wessling, Germany

Emerson Process Management Asia Pacific Private Limited — Singapore

Emerson Process Management — Beijing, China

Emerson Process Management — Daman, India

## EUROPEAN DIRECTIVE INFORMATION

The most recent revision of the EC declaration of conformity can be found at www.emersonprocess.com.

### Ordinary Location Certification for Factory Mutual

As standard, the transmitter has been examined and tested to determine that the design meets basic electrical, mechanical, and fire protection requirements by FM, a nationally recognized testing laboratory (NRTL) as accredited by the Federal Occupational Safety and Health Administration (OSHA).

## Hazardous Locations Certifications

### North American Certifications

*FM Approvals*

**E5** Explosion-Proof for Class I, Division 1, Groups B, C, and D. Dust-Ignition-Proof for Class II, Division 1, Groups E, F, and G. Dust-Ignition-Proof for Class III, Division 1.

**I5** Intrinsically Safe for use in Class I, Division 1, Groups A, B, C, and D; Class II, Division 1, Groups E, F, and G; Class III, Division 1 when connected per Rosemount drawing 03031-1019; Non-incendive for Class I, Division 2, Groups A, B, C, and D.

Temperature Code:T4 (Ta = 60 °C), T3 (Ta = 85 °C),
Enclosure Type 4X
For input parameters see control drawing 03031-1019.

*Canadian Standards Association (CSA)*

**E6** Explosion-Proof for Class I, Division 1, Groups B, C, and D. Dust-Ignition-Proof for Class II and Class III, Division 1, Groups E, F, and G. Suitable for Class I, Division 2 Groups A, B, C, and D for indoor and outdoor hazardous locations. Enclosure type 4X, factory sealed

**C6** Explosion-Proof and intrinsically safe approval. Intrinsically safe for Class I, Division 1, Groups A, B, C, and D when connected in accordance with Rosemount drawings 03031-1024. Temperature Code T3C.
Explosion-Proof for Class I, Division 1, Groups B, C, and D. Dust-Ignition-Proof for Class II and Class III, Division 1, Groups E, F, and G. Suitable for Class I, Division 2 Groups A, B, C, and D hazardous locations. Enclosure type 4X, factory sealed
For input parameters see control drawing 03031-1024.

## European Certifications

**I1** ATEX Intrinsic Safety and Dust
Certification No.: BAS 98ATEX1355X ⟨Ex⟩ II 1 GD
Ex ia IIC T4 ($T_{amb}$ = –60 to +60 °C)
CE 1180

TABLE 1. Input Parameters

| |
|---|
| $U_i$ = 30V |
| $I_i$ = 300 mA |
| $P_i$ = 1.3 W |
| $C_i$ = 0 µF |

TABLE 2. RTD Assembly (3051CFx Option T or R)

| |
|---|
| $U_i$ = 5 Vdc |
| $I_i$ = 500 mA |
| $P_i$ = 0.63W |

**Special Conditions for Safe Use (X):**

1. If the apparatus is fitted with an optional 90V transient suppressor, it is not capable of withstanding the 500V insulation test required by clause 6.3.12 of IEC 60079-11. This must be taken into account when installing the apparatus.
2. The enclosure may be made of aluminium alloy and given a protective polyurethane paint finish; however, care should be taken to protect it from impact or abrasion if located in Zone 0.

**IA** ATEX FISCO Intrinsic Safety
Certification No.: BAS 98ATEX1355X ⟨Ex⟩ II 1 G
Ex ia IIC T4 ($T_{amb}$ = –60 to +60 °C)
IP66
CE 1180

TABLE 3. Input Parameters

| |
|---|
| $U_i$ = 17.5 V |
| $I_i$ = 380 mA |
| $P_i$ = 5.32 W |
| $C_i$ = ≤ 5 µF |
| $L_i$ = ≤ 10 µH |

**Special Conditions for Safe Use (X):**
When the optional transient protection terminal block is installed, the apparatus is not capable of withstanding the 500V insulation test required by Clause 6.3.12 of EN60079-11. This must be taken into account when installing the apparatus.
The enclosure may be made of aluminium alloy and given a protective polyurethane paint finish; however care should be taken to protect it from impact or abrasion located in Zone 0.

**N1** ATEX Type n and Dust
Certification No.: BAS 98ATEX3356X ⟨Ex⟩ II 3 GD
$U_i$ = 40 Vdc max
Ex nA nL IIC T5 ($T_a$ = –40°C to 70 °C)
Dust rating: Ex tD A22 T80 °C ($T_{amb}$ = –20 to 40 °C) IP66

**Special Conditions for Safe Use (X):**
The apparatus is not capable of withstanding the 500V insulation test required by clause 6.8.1 of IEC 60079-15. This must be taken into account when installing the apparatus.

**E8** ATEX Flame-Proof and Dust
Certification No.: KEMA 00ATEX2013X ⟨Ex⟩ II 1/2 GD
Ex d IIC T6 ($T_{amb}$ = –50 to 65 °C)
Dust rating: Ex tD A20/21 T90 °C, IP66
CE 1180
Vmax = 55 V dc

**Special Conditions for Safe Use (X):**
This device contains a thin wall diaphragm. Installation, maintenance, and use shall take into account the environmental conditions to which the diaphragm will be subjected. The manufacturer's instructions for installation and maintenance shall be followed in detail to assure safety during its expected lifetime.

## Australian Certifications

**I7** IECEx Intrinsic Safety
Certification No.: IECEx BAS 09.0076X
Ex ia IIC T4 (–60 °C ≤ $T_a$ ≤ 60 °C)
IP66

TABLE 4. Input Parameters

| |
|---|
| $U_i$ = 30 V |
| $I_i$ = 300 mA |
| $P_i$ = 1.3 W |
| $C_i$ = 0 µF |
| $L_i$ = 0 µH |

TABLE 5. RTD Assembly (3051CFx Option T or R)

| |
|---|
| $U_i$ = 5 Vdc |
| $I_i$ = 500 mA |
| $P_i$ = 0.63W |

**Special Conditions for Safe Use (X):**
1. If the apparatus is fitted with an optional 90V transient suppressor, it is not capable of withstanding the 500V insulation test required by clause 6.3.12 of IEC 60079-11. This must be taken into account when installing the apparatus.
2. The enclosure may be made of aluminium alloy and given a protective polyurethane paint finish; however, care should be taken to protect it from impact or abrasion if located in Zone 0.

**E7** IECEx Explosion-Proof (Flame-Proof)
Certification No.: IECEx KEM 09.0034X
Ga/Gb Ex d IIC T6 or T5
Ex tD A20/A21 IP66 T90 °C
IP66

**Special Conditions for Safe Use (X):**
This device contains a thin wall diaphragm. Installation, maintenance and use shall take into account the environmental conditions to which the diaphragm will be subjected. The manufacturer's instructions for installation and maintenance shall be followed in detail to assure safety during its expected lifetime.

For information on the dimensions of the flameproof joints the manufacturer shall be contacted.

**N7** IECEx Type n
Certification No.: IECEx BAS 09.0077X
Ex nA nL IIC T5 (–40 °C ≤ $T_a$ ≤ 70 °C)
IP66

**Special Conditions for Safe Use (X):**
The apparatus is not capable of withstanding the 500V insulation test required by clause 6.8.1 of IEC 60079-15. This must be taken into account when installing the apparatus.

## Combinations of Certifications

Stainless steel certification tag is provided when optional approval is specified. Once a device labeled with multiple approval types is installed, it should not be reinstalled using any other approval types. Permanently mark the approval label to distinguish it from unused approval types.

**K5** **E5** and **I5** combination
**KB** **K5** and **C6** combination
**KD** **K5**, **C6**, **I1**, and **E8** combination
**K6** **C6**, **I1**, and **E8** combination
**K8** **E8** and **I1** combination
**K7** **E7**, **I7**, and **N7** combination

## APPROVAL DRAWINGS

### Factory Mutual
### 03031-1019

CONFIDENTIAL AND PROPRIETARY INFORMATION IS CONTAINED HEREIN AND MUST BE HANDLED ACCORDINGLY

REVISIONS

| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
|---|---|---|---|---|
| AE | ADD 3051G | RTC1019922 | J.G. | 7/11/05 |
| AF | ADD FISCO DETAILS | RTC1021913 | N.J.H. | 7/9/06 |
| AG | ADD FISCO ENTITY PARAMETERS TO SHT 12 | RTC1022876 | N.J.H. | 10/27/06 |

ENTITY APPROVALS FOR

| | |
|---|---|
| 3051C | 3001C |
| 3051L | 3001CL |
| 3051P | 3001CH |
| 3051H | 3001S |
| 3051CA | 3001SL |
| 3051T | 3001SH |
| 3051G | |

OUTPUT CODE A (4-20 mA HART) I.S. SEE SHEETS 2-5
OUTPUT CODE M (LOW POWER) I.S. SEE SHEETS 6-7
OUTPUT CODE F/W (FIELDBUS) I.S. SEE SHEETS 8-12
ALL OUTPUT CODES NONINCENDIVE SEE SHEET 13

THE ROSEMOUNT TRANSMITTERS LISTED ABOVE ARE F.M. APPROVED AS INTRINSICALLY SAFE WHEN USED IN CIRCUIT WITH F.M. APPROVED BARRIERS WHICH MEET THE ENTITY PARAMETERS LISTED IN THE CLASS I, II, AND III, DIVISION 1 GROUPS INDICATED, TEMP CODE T4. ADDITIONALLY, THE ROSEMOUNT 751 FIELD SIGNAL INDICATOR IS F.M. APPROVED AS INTRINSICALLY SAFE WHEN CONNECTED IN CIRCUIT WITH ROSEMOUNT TRANSMITTERS (FROM ABOVE) AND F.M. APPROVED BARRIERS WHICH MEET THE ENTITY PARAMETERS LISTED FOR CLASS I, II, AND III, DIVISION 1, GROUPS INDICATED, TEMP CODE T4.

TO ASSURE AN INTRINSICALLY SAFE SYSTEM, THE TRANSMITTER AND BARRIER MUST BE WIRED IN ACCORDANCE WITH THE BARRIER MANUFACTURER'S FIELD WIRING INSTRUCTIONS AND THE APPLICABLE CIRCUIT DIAGRAM.

CAD MAINTAINED (MicroStation)

UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES [mm]. REMOVE ALL BURRS AND SHARP EDGES. MACHINE SURFACE FINISH 125

-TOLERANCE-
.X ± .1 [2,5]
.XX ± .02 [0,5]
.XXX ± .010 [0,25]
FRACTIONS ± 1/32
ANGLES ± 2°

DO NOT SCALE PRINT

Form Rev A/C

CONTRACT NO.

DR. MIKE DOBE 03/21/89
CHK'D
APP'D. KELLY ORTH 03/22/89
APP'D. GOVT.

EMERSON. Process Management

ROSEMOUNT®
8200 Market Boulevard • Chanhassen, MN 55317 USA

TITLE INDEX OF I.S. & NONINCENDIVE F.M. FOR 3051C/L/P/H/T AND 3001C/S

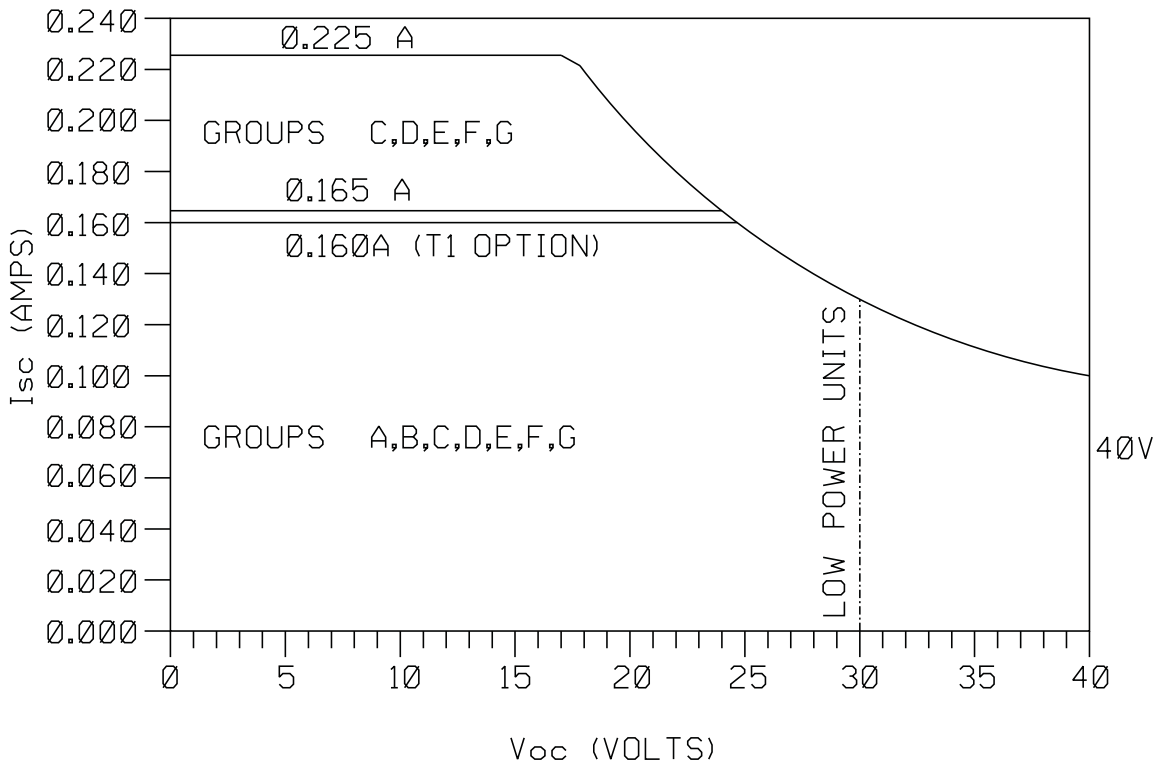
SIZE A | FSCM NO | DWG NO. 03031-1019

SCALE N/A | WT. ——— | SHEET 1 OF 13

| REVISIONS | | | | |
|---|---|---|---|---|
| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| AG | | | | |

BARRIER PARAMETERS (APPLICABLE TO OUTPUT CODES A & M)

Pmax = 1WATT

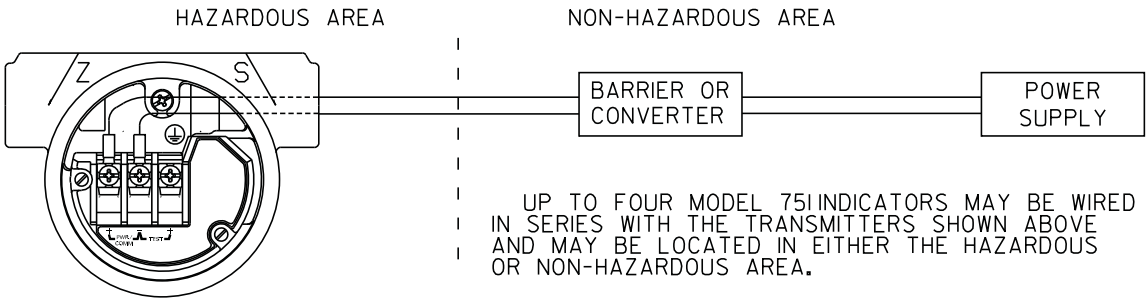



| | | | | |
|---|---|---|---|---|
| Rosemount Inc.<br>8200 Market Boulevard<br>Chanhassen, MN 55317 USA | | | CAD MAINTAINED (MicroStation) | |
| DR. MIKE DOBE | SIZE A | FSCM NO | DWG NO. 03031-1019 | |
| ISSUED | SCALE N/A | WT. ——— | SHEET 2 OF 13 | |

Form Rev AC

| REVISIONS | | | | |
|---|---|---|---|---|
| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| AG | | | | |

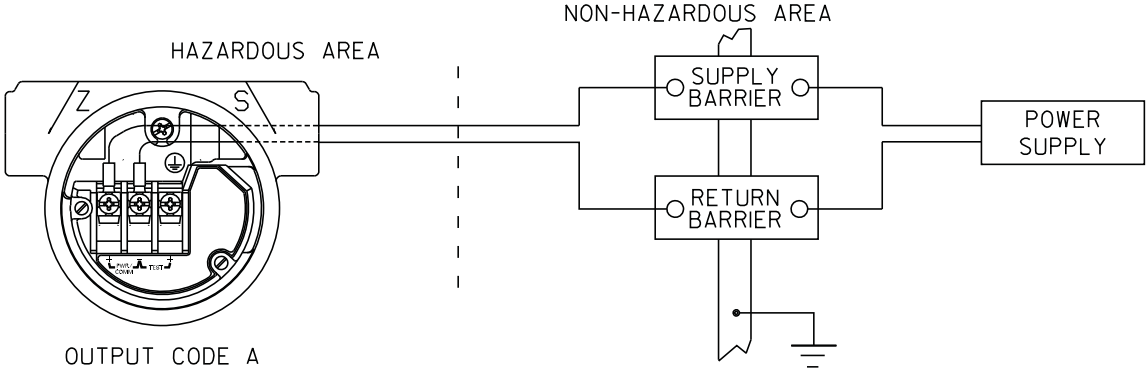
CIRCUIT DIAGRAM 1
ONE BARRIER OR CONVERTER:
SINGLE OR DUAL CHANNEL




UP TO FOUR MODEL 751 INDICATORS MAY BE WIRED IN SERIES WITH THE TRANSMITTERS SHOWN ABOVE AND MAY BE LOCATED IN EITHER THE HAZARDOUS OR NON-HAZARDOUS AREA.

OUTPUT CODE A
MODELS INCLUDED
3051C, L, P, H, T, CA, G
3001C, CL, CH, S, SL, SH

CIRCUIT DIAGRAM 2
SUPPLY AND RETURN BARRIERS
(ONLY FOR USE WITH BARRIERS APPROVED IN THIS CONFIGURATION)




OUTPUT CODE A
MODELS INCLUDED
3051C, L, P, H, T, CA, G
3001C, CL, CH, S, SL, SH

UP TO FOUR MODEL 751 INDICATORS MAY BE WIRED IN SERIES WITH THE TRANSMITTERS SHOWN ABOVE AND MAY BE LOCATED IN EITHER THE HAZARDOUS OR NON-HAZARDOUS AREA.

| | | | |
|---|---|---|---|
| Rosemount Inc.<br>8200 Market Boulevard<br>Chanhassen, MN 55317 USA | | | CAD MAINTAINED (MicroStation) |
| DR. MIKE DOBE | SIZE A | FSCM NO | DWG NO. 03031-1019 |
| ISSUED | SCALE N/A | WT. ——— | SHEET 3 OF 13 |

Form Rev AC

| REVISIONS | | | | |
|---|---|---|---|---|
| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| AG | | | | |

ENTITY CONCEPT APPROVALS

THE ENTITY CONCEPT ALLOWS INTERCONNECTION OF INTRINSICALLY SAFE APPARATUS TO ASSOCIATED APPARATUS NOT SPECIFICALLY EXAMINED IN COMBINATION AS A SYSTEM. THE APPROVED VALUES OF MAX. OPEN CIRCUIT VOLTAGE (Voc OR Vt) AND MAX. SHORT CIRCUIT CURRENT (Isc OR It) AND MAX. POWER (Voc X Isc/4) OR (Vt X It/4), FOR THE ASSOCIATED APPARATUS MUST BE LESS THAN OR EQUAL TO THE MAXIMUM SAFE INPUT VOLTAGE (Vmax), MAXIMUM SAFE INPUT CURRENT (Imax), AND MAXIMUM SAFE INPUT POWER (Pmax) OF THE INTRINSICALLY SAFE APPARATUS. IN ADDITION, THE APPROVED MAX. ALLOWABLE CONNECTED CAPACITANCE (Ca) OF THE ASSOCIATED APPARATUS MUST BE GREATER THAN THE SUM OF THE INTERCONNECTING CABLE CAPACITANCE AND THE UNPROTECTED INTERNAL CAPACITANCE ($C_i$) OF THE INTRINSICALLY SAFE APPARATUS, AND THE APPROVED MAX. ALLOWABLE CONNECTED INDUCTANCE (La) OF THE ASSOCIATED APPARATUS MUST BE GREATER THAN THE SUM OF THE INTERCONNECTING CABLE INDUCTANCE AND THE UNPROTECTED INTERNAL INDUCTANCE ($L_i$) OF THE INTRINSICALLY SAFE APPARATUS.

FOR OUTPUT CODE A

NOTE: ENTITY PARAMETERS LISTED APPLY ONLY TO ASSOCIATED APPARATUS WITH LINEAR OUTPUT.

CLASS I, DIV. 1, GROUPS A AND B

| | |
|---|---|
| $V_{MAX}$ = 40V | $V_T$ OR $V_{OC}$ IS LESS THAN OR EQUAL TO 40V |
| $I_{MAX}$ = 165mA | $I_T$ OR $I_{SC}$ IS LESS THAN OR EQUAL TO 165mA |
| $P_{MAX}$ = 1 WATT | $(\frac{V_T \times I_T}{4})$ OR $(\frac{V_{OC} \times I_{SC}}{4})$ IS LESS THAN OR EQUAL TO 1 WATT |
| $C_I$ = .01µf | $C_A$ IS GREATER THAN .01µf |
| $L_I$ =10µH | $L_A$ IS GREATER THAN 10µH |

✳ FOR T1 OPTION:

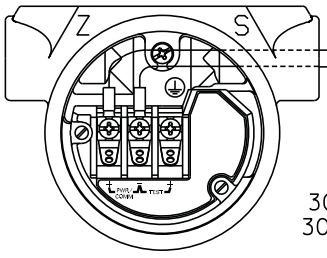
| | |
|---|---|
| Imax = 160mA | $I_T$ OR $I_{SC}$ IS LESS THAN OR EQUAL TO 160mA |
| $L_I$ =1.05mH | $L_A$ IS GREATER THAN 1.05mH |

CLASS I, DIV. 1, GROUPS C AND D

| | |
|---|---|
| $V_{MAX}$ = 40V | $V_T$ OR $V_{OC}$ IS LESS THAN OR EQUAL TO 40V |
| $I_{MAX}$ = 225mA | $I_T$ OR $I_{SC}$ IS LESS THAN OR EQUAL TO 225mA |
| $P_{MAX}$ = 1 WATT | $(\frac{V_T \times I_T}{4})$ OR $(\frac{V_{OC} \times I_{SC}}{4})$ IS LESS THAN OR EQUAL TO 1 WATT |
| $C_I$ = .01µf | $C_A$ IS GREATER THAN .01µf |
| $L_I$ =10µH | $L_A$ IS GREATER THAN 10µH |

✳ FOR T1 OPTION:

| | |
|---|---|
| $L_I$ =1.05mH | $L_A$ IS GREATER THAN 1.05mH |




HAZARDOUS AREA | NON-HAZARDOUS AREA

ASSOCIATED APPARATUS

(SEE SHEET 3)

OUTPUT CODE A

MODELS INCLUDED

305IC, L, P, H, T, CA, G

300IC, CL, CH, S, SL, SH

Rosemount Inc.
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Chanhassen, MN 55317 USA

CAD MAINTAINED (MicroStation)

| | | | |
|---|---|---|---|
| DR. MIKE DOBE | SIZE A | FSCM NO | DWG NO. 03031-1019 |
| ISSUED | SCALE N/A | WT. ——— | SHEET 4 OF 13 |

Form Rev AC

| REVISIONS | | | | |
|---|---|---|---|---|
| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| AG | | | | |

## MODEL 3051G

FOR OUTPUT CODE A

CLASS I, DIV. 1, GROUPS A AND B

| | |
|---|---|
| $V_{MAX}$ = 30V | Vt or Voc IS LESS THAN OR EQUAL TO 30V |
| $I_{MAX}$ = 165mA | It or Isc IS LESS THAN OR EQUAL TO 165mA |
| $P_{MAX}$ = 1 WATT | (Voc X Isc/4) or (Vt X It/4) IS LESS THAN OR EQUAL TO 1 WATT |
| $C_I$ = 0.01 $\mu$F | $C_A$ IS GREATER THAN 0.01 $\mu$F + $C_{CABLE}$ |
| $L_I$ = 10 $\mu$H | $L_A$ IS GREATER THAN 10 $\mu$H + $L_{CABLE}$ |

FOR T1 OPTION:

| | |
|---|---|
| $I_{MAX}$ = 160mA | It or Isc IS LESS THAN OR EQUAL TO 145mA |
| $L_I$ = 1.06 mH | $L_A$ IS GREATER THAN 1.06 mH + $L_{CABLE}$ |

CLASS I, DIV. 1, GROUPS C AND D

| | |
|---|---|
| $V_{MAX}$ = 30V | Vt or Voc IS LESS THAN OR EQUAL TO 30V |
| $I_{MAX}$ = 225mA | It or Isc IS LESS THAN OR EQUAL TO 225mA |
| $P_{MAX}$ = 1 WATT | (Voc X Isc/4) or (Vt X It/4) IS LESS THAN OR EQUAL TO 1 WATT |
| $C_I$ = 0.01 $\mu$F | $C_A$ IS GREATER THAN 0.01 $\mu$F + $C_{CABLE}$ |
| $L_I$ = 10 $\mu$H | $L_A$ IS GREATER THAN 10 $\mu$H + $L_{CABLE}$ |

FOR T1 OPTION:

| | |
|---|---|
| $L_I$ = 1.06 mH | $L_A$ IS GREATER THAN 1.06 mH + $L_{CABLE}$ |

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CAD MAINTAINED (MicroStation)

| | | | |
|---|---|---|---|
| DR. Myles Lee Miller | SIZE A | FSCM NO | DWG NO. 03031-1019 |
| ISSUED | SCALE N/A | WT. ——— | SHEET 5 OF 13 |

Form Rev AC

| REVISIONS | | | | |
|---|---|---|---|---|
| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| AG | | | | |

FOR OUTPUT CODE M

CLASS I, DIV. 1, GROUPS A AND B

| | |
|---|---|
| $V_{MAX}$ = 30V | $V_T$ OR $V_{OC}$ IS LESS THAN OR EQUAL TO 30V |
| $I_{MAX}$ = 165mA | $I_T$ OR $I_{SC}$ IS LESS THAN OR EQUAL TO 165mA |
| $P_{MAX}$ = 1 WATT | $(\frac{V_T \times I_T}{4})$ OR $(\frac{V_{OC} \times I_{SC}}{4})$ IS LESS THAN OR EQUAL TO 1 WATT |
| $C_I$ = .042µf | $C_A$ IS GREATER THAN .042µf |
| $L_I$ =10µH | $L_A$ IS GREATER THAN 10µH |

* FOR T1 OPTION:

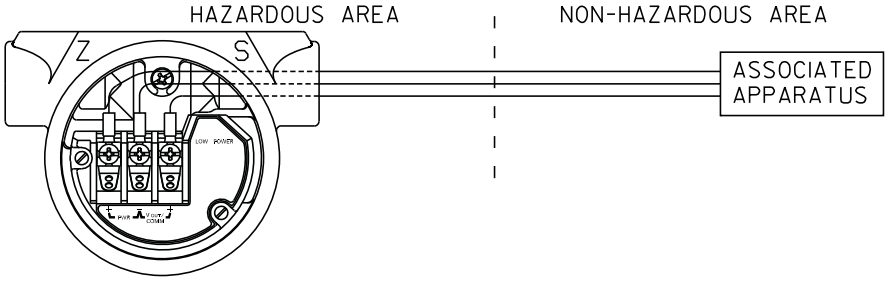
| | |
|---|---|
| $L_I$ =0.75mH | $L_A$ IS GREATER THAN 0.75mH |

CLASS I, DIV. 1, GROUPS C AND D

| | |
|---|---|
| $V_{MAX}$ = 30V | $V_T$ OR $V_{OC}$ IS LESS THAN OR EQUAL TO 30V |
| $I_{MAX}$ = 225mA | $I_T$ OR $I_{SC}$ IS LESS THAN OR EQUAL TO 225mA |
| $P_{MAX}$ = 1 WATT | $(\frac{V_T \times I_T}{4})$ OR $(\frac{V_{OC} \times I_{SC}}{4})$ IS LESS THAN OR EQUAL TO 1 WATT |
| $C_I$ = .042µf | $C_A$ IS GREATER THAN .042µf |
| $L_I$ =10µH | $L_A$ IS GREATER THAN 10µH |

* FOR T1 OPTION:

| | |
|---|---|
| $L_I$ =0.75mH | $L_A$ IS GREATER THAN 0.75mH |




OUTPUT CODE M
AVAILABLE FOR THE MODELS LISTED

| | |
|---|---|
| 3051C | 3051H |
| 3051L | 3051CA |
| 3051P | 3051T |

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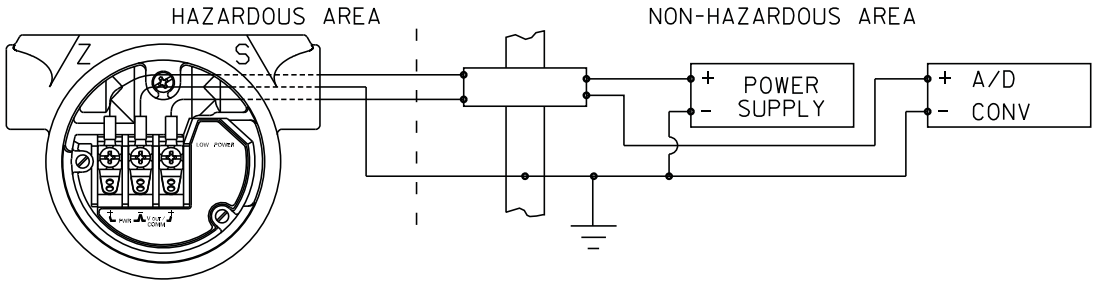
CAD MAINTAINED (MicroStation)

| | | | |
|---|---|---|---|
| DR. MIKE DOBE | SIZE A | FSCM NO | DWG NO. 03031-1019 |
| ISSUED | SCALE N/A | WT. ——— | SHEET 6 OF 13 |

Form Rev AC

| REVISIONS | | | | |
|---|---|---|---|---|
| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| AG | | | | |

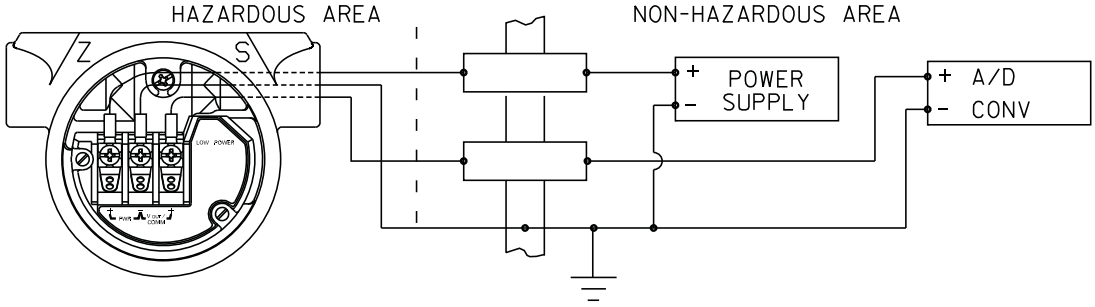
CIRCUIT DIAGRAM 3
ONE DUAL CHANNEL BARRIER




OUTPUT CODE M
AVAILABLE FOR THE MODELS LISTED

| | |
|---|---|
| 3051C | 3051H |
| 3051L | 3051CA |
| 3051P | 3051T |

CIRCUIT DIAGRAM 4
TWO SINGLE CHANNEL BARRIERS
(ONLY FOR USE WITH BARRIERS APPROVED
IN THIS CONFIGURATION)




OUTPUT CODE M
AVAILABLE FOR THE MODELS LISTED

| | |
|---|---|
| 3051C | 3051H |
| 3051L | 3051CA |
| 3051P | 3051T |

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| | | | |
|---|---|---|---|
| DR. SANDI MANSON | SIZE A | FSCM NO | DWG NO. 03031-1019 |
| ISSUED | SCALE N/A | WT. ——— | SHEET 7 OF 13 |

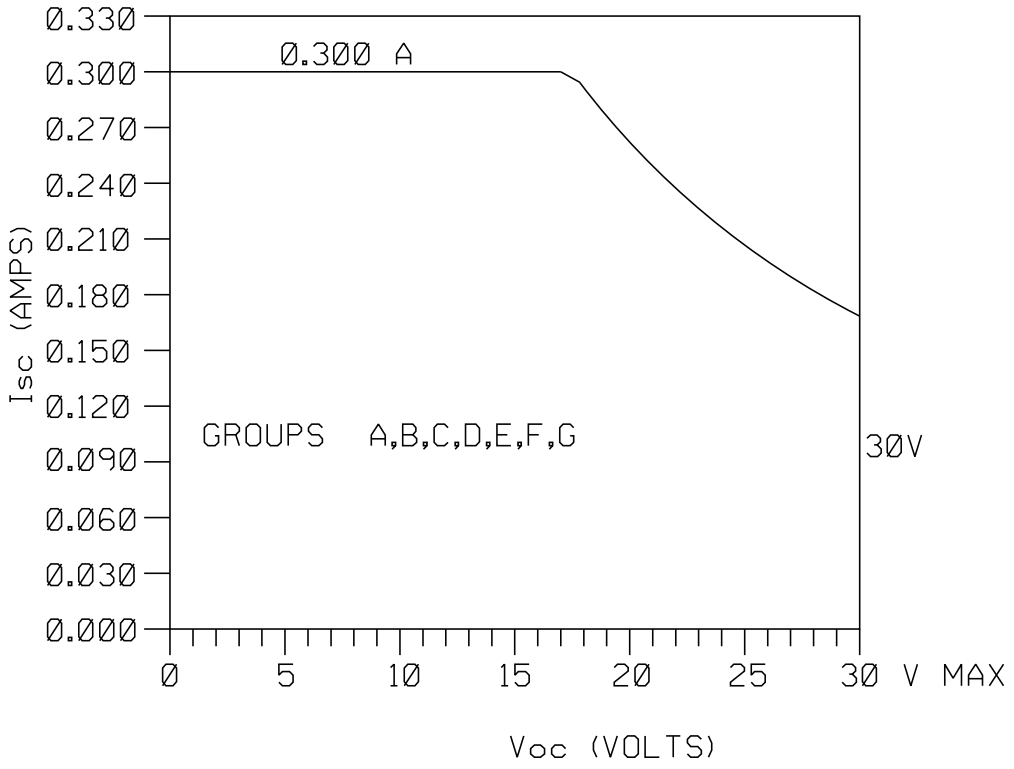
Form Rev AC

| REVISIONS | | | | |
|---|---|---|---|---|
| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| AG | | | | |

# 3051 WITH FOUNDATION FIELDBUS OR PROFIBUS. (OUTPUT CODE F OR W)

## BARRIER PARAMETERS (APPLICABLE TO OUTPUT CODE F OR W)

Pmax = 1.3 WATT

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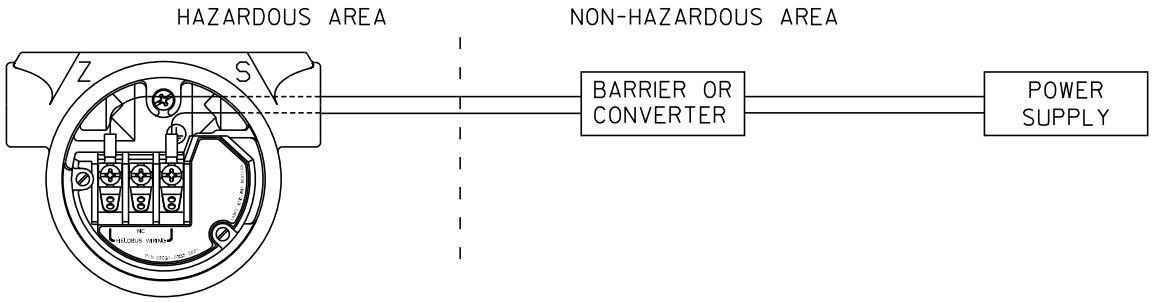
CAD MAINTAINED (MicroStation)

| | | | |
|---|---|---|---|
| DR. Myles Lee Miller | SIZE A | FSCM NO | DWG NO. 03031-1019 |
| ISSUED | SCALE N/A | WT. ——— | SHEET 8 OF 13 |

Form Rev AC

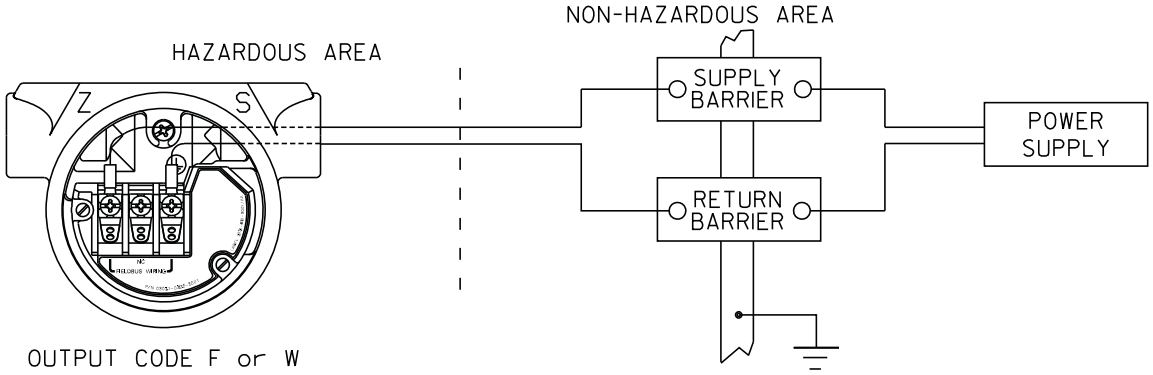
| REVISIONS | | | | |
|---|---|---|---|---|
| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| AG | | | | |

CIRCUIT DIAGRAM 1
ONE BARRIER OR CONVERTER:
SINGLE OR DUAL CHANNEL




OUTPUT CODE F or W
MODELS INCLUDED
305IC, L, P, H, T, CA
300IC, CL, CH

CIRCUIT DIAGRAM 2
SUPPLY AND RETURN BARRIERS
(ONLY FOR USE WITH BARRIERS APPROVED IN THIS CONFIGURATION)




OUTPUT CODE F or W
MODELS INCLUDED
305IC, L, P, H, T, CA
300IC, CL, CH

Rosemount Inc.
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Chanhassen, MN 55317 USA

CAD MAINTAINED (MicroStation)

| | | | |
|---|---|---|---|
| DR. Myles Lee Miller | SIZE A | FSCM NO | DWG NO. 03031-1019 |
| ISSUED | SCALE N/A | WT. ——— | SHEET 9 OF 13 |

Form Rev AC

| REVISIONS | | | | |
|---|---|---|---|---|
| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| AG | | | | |

ENTITY CONCEPT APPROVALS

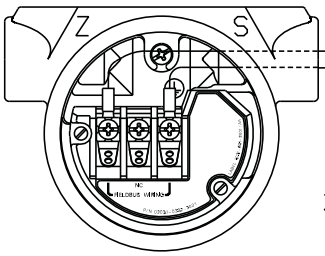
THE ENTITY CONCEPT ALLOWS INTERCONNECTION OF INTRINSICALLY SAFE APPARATUS TO ASSOCIATED APPARATUS NOT SPECIFICALLY EXAMINED IN COMBINATION AS A SYSTEM. THE APPROVED VALUES OF MAX. OPEN CIRCUIT VOLTAGE (Voc OR Vt) AND MAX. SHORT CIRCUIT CURRENT (Isc OR It) AND MAX. POWER (Voc X Isc/4) OR (Vt X It/4), FOR THE ASSOCIATED APPARATUS MUST BE LESS THAN OR EQUAL TO THE MAXIMUM SAFE INPUT VOLTAGE (Vmax), MAXIMUM SAFE INPUT CURRENT (Imax), AND MAXIMUM SAFE INPUT POWER (Pmax) OF THE INTRINSICALLY SAFE APPARATUS. IN ADDITION, THE APPROVED MAX. ALLOWABLE CONNECTED CAPACITANCE (Ca) OF THE ASSOCIATED APPARATUS MUST BE GREATER THAN THE SUM OF THE INTERCONNECTING CABLE CAPACITANCE AND THE UNPROTECTED INTERNAL CAPACITANCE ($C_i$) OF THE INTRINSICALLY SAFE APPARATUS, AND THE APPROVED MAX. ALLOWABLE CONNECTED INDUCTANCE (La) OF THE ASSOCIATED APPARATUS MUST BE GREATER THAN THE SUM OF THE INTERCONNECTING CABLE INDUCTANCE AND THE UNPROTECTED INTERNAL INDUCTANCE ($L_i$) OF THE INTRINSICALLY SAFE APPARATUS.

NOTE: ENTITY PARAMETERS LISTED APPLY ONLY TO ASSOCIATED APPARATUS WITH LINEAR OUTPUT.

FOR OUTPUT CODE F or W

CLASS I, DIV. 1, GROUPS A, B, C AND D

| | |
|---|---|
| $V_{MAX}$ = 30V | $V_T$ OR $V_{OC}$ IS LESS THAN OR EQUAL TO 30V |
| $I_{MAX}$ = 300mA | $I_T$ OR $I_{SC}$ IS LESS THAN OR EQUAL TO 300mA |
| $P_{MAX}$ = 1.3 WATT | $(\frac{V_T \times I_T}{4})$ OR $(\frac{V_{OC} \times I_{SC}}{4})$ IS LESS THAN OR EQUAL TO 1.3 WATT |
| $C_I$ = 0μf | $C_A$ IS GREATER THAN 0μf |
| $L_I$ = 0μH | $L_A$ IS GREATER THAN 0μH |




HAZARDOUS AREA | NON-HAZARDOUS AREA

ASSOCIATED APPARATUS

(SEE SHEET 3)

OUTPUT CODE F
MODELS INCLUDED
305IC, L, P, H, T, CA
300IC, CL, CH

Rosemount Inc.
8200 Market Boulevard
Chanhassen, MN 55317 USA

CAD MAINTAINED (MicroStation)

| | | | |
|---|---|---|---|
| DR. Myles Lee Miller | SIZE A | FSCM NO | DWG NO. 03031-1019 |
| ISSUED | SCALE N/A | WT. ——— | SHEET 10 OF 13 |

Form, Rev. AC

| REVISIONS | | | | |
|---|---|---|---|---|
| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| AG | | | | |

# FISCO CONCEPT APPROVALS

THE FISCO CONCEPT ALLOWS INTERCONNECTION OF INTRINSICALY SAFE APPARATUS TO ASSOCIATED APPARATUS NOT SPECIALLY EXAMINED IN SUCH COMBINATION. FOR THIS INTERCONNECTION TO BE VALID THE VOLTAGE ($U_i$ or Vmax), THE CURRENT ($I_i$ or Imax), AND THE POWER ($P_i$ or Pma) THAT INTRINSICALLY SAVE APPARATUS CAN RECEIVE AND REMAIN INTRINSICALY SAFE, INCLUDING FAULTS, MUST BE EQUAL OR GREATER THAN THE VOLTAGE (Uo, Voc, or Vt), THE CURRENT (Io, Isc, or It), AND THE POWER (Po or Pmax) LEVELS WHICH CAN BE DELIVERED BY THE ASSOCIATED APPARATUS, CONSIDERING FAULTS AND APPLICABLE FACTORS. ALSO, THE MAXIMUM UNPROTECTED CAPACITANCE ($C_i$) AND THE INDUCTANCE ($L_i$) OF EACH APPARATUS (BESIDES THE TERMINATION) CONNECTED TO THE FIELDBUS MUST BE LESS THAN OR EQUAL TO 5nF AND 10$\mu$H RESPECTVELY.
ONLY ONE ACTIVE DEVICE IN EACH SECTION (USUALLY THE ASSOCIATED APPARATUS) IS ALLOWED TO CONTRIBUTE THE DESIRED ENERGY FOR THE FIELDBUS SYSTEM. THE ASSOCIATED APPARATUS' VOLTAGE Uo (or Voc or Vt) IS LIMITED TO A RANGE OF 14V TO 24 V.D.C. ALL OTHER EQUIPENT COMBINED IN THE BUS CABLE MUST BE PASSIVE (THEY CANNOT PROVIDE ENERGY TO THE SYSTEM, EXCEPT A LEAKAGE CURRENT OF 50 $\mu$A FOR EACH CONNECTED DEVICE) SEPARATELY POWERED EQUIPMENT REQUIRES A GALVANIC ISOLATION TO AFFIRM THAT THE INTRINSICALLY SAFE FIELDBUS CIRCUIT WILL REMAIN PASSIVE. THE PARAMETER OF THE CABLE USED TO INTERCONNECT THE DEVICES MUST BE IN THE FOLLOWING RANGE:

| | |
|---|---|
| LOOP RESISTANCE R': | 15...150 OHM/km |
| INDUCTANCE PER UNIT LENGTH L': | 0.4...1mH/KM |
| CAPACITANCE PER UNLIT LENGTH C': | 80...200nF |

C' = C' LINE/LINE +0.5C' LINE/SCREEN, IF BOTH LINES ARE FLOATING, OR
C' = C' LINE/LINE +C' LINE/SCREEN, IF THE SCREEN IS CONNECTED TO ONE LINE

| | |
|---|---|
| TRUNK CABLE LENGTH: | ≤ 1000 m |
| SPUR CABLE LENGTH: | ≤ 30 m |
| SPLICE LENGTH: | ≤ 1 m |

AN APPROVED INFALLIBLE LINE TERMINATION TO EACH END OF THE TRUNK CABLE, WITH THE FOLLOWING PARAMETERS IS APPROPRIATE:

R = 90...100 OHMS C = 2.2$\mu$F

AN ALLOWED TERMINATION MIGHT ALREADY BE LINKED IN THE ASSOCIATED APPARATUS. DUE TO I.S. REASONS, THE NUMBER OF PASSIVE APPARATUS CONNECTED TO THE BUS SEGMENT IS NOT LIMITED. IF THE RULES ABOVE ARE FOLLOWED, UP TO A TOTAL LENGTH OF 1000 m (THE SUMMATION OF TRUNK AND ALL SPUR CABLES), THE INDUCTANCE AND THE CAPACITANCE OF THE CABLE WILL NOT DAMAGE THE INTRINSIC SAFETY OF THE SYSTEM.

NOTES:
INTRINSICALLY SAFE CLASS I, DIV. 1, GROUPS A, B, C, D

1. THE MAXIMUM NON-HAZARDOUS AREA VOLTAGE MUST NOT EXCEED 250 V.
2. CAUTION: ONLY USE SUPPLY WIRES SUITABLE FOR 5°C ABOVE SURROUNDING TEMPERATURE.
3. WARNING: REPLACEMENT OF COMPONENTS MAY DAMAGE INTRINSIC SAFETY.

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CAD MAINTAINED (MicroStation)

| | | | |
|---|---|---|---|
| DR. Myles Lee Miller | SIZE A | FSCM NO | DWG NO. 03031-1019 |
| ISSUED | SCALE N/A | WT. ——— | SHEET 11 OF 13 |

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|---|---|---|---|---|
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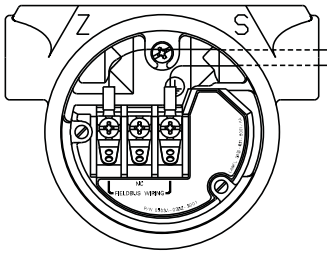
| AG | | | | |

HAZARDOUS (CLASSIFIED) LOCATION
CLASS I, DIVISION I, GROUPS A,B,C,D
CLASS II, DIVISION I, GROUPS E,F,G
CLASS III, DIVISION I

NON-HAZARDOUS AREA



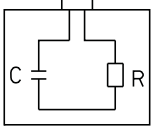
ANY FM APPROVED ASSOCIATED APPARATUS SUITABLE FOR FISCO CONCEPT

$U_i$ = 17.5V
$I_i$ = 380mA
$P_i$ = 5.32W
$C_i$ < 5nF
$L_i$ < 10$\mu$H

OUTPUT CODE F or W
MODELS INCLUDED
305IC, L, P, H, T, CA
300IC, CL, CH

ANY FM APPROVED INTRINSICALLY SAFE APPARATUS SUITABLE FOR FISCO CONCEPT

ANY FM APPROVED TERMINATION WITH
R=90...100 Ohms
C=0...2.2 uF




Rosemount Inc.
8200 Market Boulevard
Chanhassen, MN 55317 USA

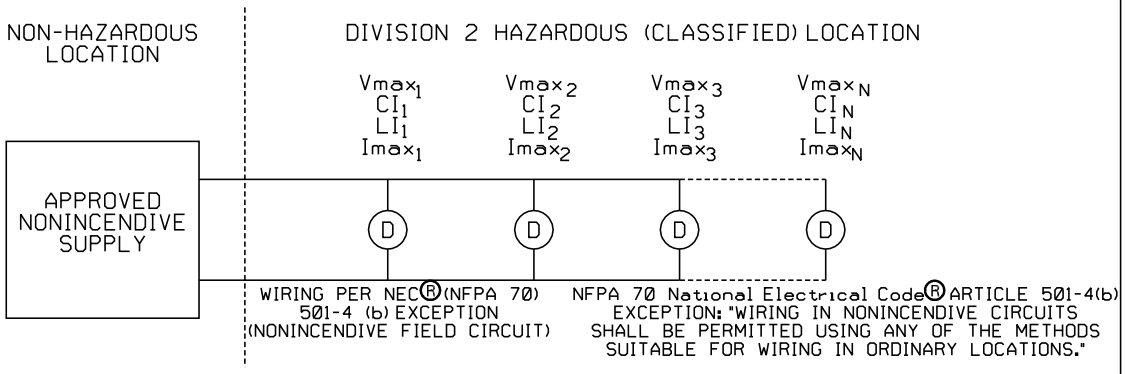
CAD MAINTAINED (MicroStation)

| DR. Myles Lee Miller | SIZE A | FSCM NO | DWG NO. 03031-1019 | |
|---|---|---|---|---|
| ISSUED | SCALE N/A | WT. ——— | SHEET 12 OF 13 | |

Form Rev AC

| REVISIONS | | | | |
|---|---|---|---|---|
| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| AG | | | | |

NONINCENDIVE FIELD CIRCUIT
CLASS I, DIV. 2 LOCATIONS




**IN NORMAL OPERATION**

**DEVICES CONTROL THROUGH-CURRENT**

PARAMETERS DEVICE

Voc <= Minimum of ($Vmax_1$, $Vmax_2$, ..... $Vmax_N$)

$Imax_1$ >= $Iq_1$ + $Isignal_1$

$Imax_2$ >= $Iq_1$ + $Isignal_2$

.

.

.

$Imax_N$ >= $Iq_N$ + $Isignal_N$

Ca <= $Ci_1$ + $Ci_2$ +... + $Ci_N$ + Ccable

La <= $Li_1$ + $Li_2$ +... + $Li_N$ + Lcable

Imax for an individual device = Iq + Isignal

Iq =Quiescent current through device (Maximum quiescent current for the device)

Isignal =Signaling current through device (Protocol may limit signaling to one device at a time)

Operating Imax = $Iq_1$ + $Iq_2$ +...+ $Iq_N$ + $I_{signal}$ max

$I_{signal}$ max = Max. of ($Isignal_1$, $Isignal_2$ ..... $Isignal_N$)

ROSEMOUNT 3051/3001

| | 4-20mA / HART | FIELDBUS (F or W) |
|---|---|---|
| Vmax | 40v | 30v |
| Maximum normal operating current | 22mA | 27mA |
| Ca | .010uF | 0uF |
| La | 10uH | 0uH |

ROSEMOUNT 3051 TRANSMITTERS ARE CURRENT CONTROLLERS ON INDIVIDUAL PARALLEL BRANCHES WITH RESPECT TO THE POWER SUPPLY. IN NONINCENDIVE INSTALLATIONS THE Imax FOR EACH TRANSMITTER IS NOT RELATED TO THE MAXIMUM CURRENT OF THE POWER SUPPLY (Isc) IN THE SAME MANNER AS FOR TRANSMITTER INSTALLED PER I.S. REQUIREMENTS, BECAUSE NONINCENDIVE REQUIREMENTS INCLUDE ONLY NORMAL OPERATING CONDITIONS.

REFERENCE: APPENDIX A7.3 (FM3611)

Rosemount Inc.
8200 Market Boulevard
Chanhassen, MN 55317 USA

CAD MAINTAINED (MicroStation)

| DR. Jon Steffens | SIZE A | FSCM NO | DWG NO. 03031-1019 | |
|---|---|---|---|---|
| ISSUED | SCALE N/A | WT. ——— | SHEET 13 OF 13 | |

Form Rev AC

## Canadian Standards Association (CSA) 03031-1024

CONFIDENTIAL AND PROPRIETARY INFORMATION IS CONTAINED HEREIN AND MUST BE HANDLED ACCORDINGLY

REVISIONS

| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
|---|---|---|---|---|
| AA | ADD FIELDBUS | RTC1004232 | M.L.M. | 5/28/98 |
| AB | ADD PROFIBUS, ENTITY PARAMETERS | RTC1008326 | P.C.S. | 2/4/00 |
| AC | REM It, Vt FROM ENTITY PARAMETERS | RTC1009279 | W.C.R. | 7/11/00 |
| AD | ADD FISCO FIELDBUS | RTC1012624 | J.P.W. | 4/4/02 |

APPROVALS FOR

3051C 3001C
3051L 3001CL
3051P 3001CH
3051H 3001S
3051CA 3001SL
3051T 3001SH

OUTPUT CODE A (4-20 mA HART) I.S. SEE SHEETS 2-3
OUTPUT CODE M (LOW POWER) I.S. SEE SHEETS 3-4
OUTPUT CODE F/W (FIELDBUS) I.S. SEE SHEETS 5-7
OUTPUT CODES A,F,W I.S. ENTITY PARAMETERS SHEET 8-9

TO ASSURE AN INTRINSICALLY SAFE SYSTEM, THE TRANSMITTER AND BARRIER MUST BE WIRED IN ACCORDANCE WITH THE BARRIER MANUFACTURER'S FIELD WIRING INSTRUCTIONS AND THE APPLICABLE CIRCUIT DIAGRAM.

WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2.

AVERTISSEMENT - RISQUE D'EXPLOSION - LA SUBSTITUTION DE COMPOSANTS PEUT RENDRE CE MATERIEL INACCEPTABLE POUR LES EMPLACEMENTS DE CLASSE I, DIVISION 2.

CAD MAINTAINED (MicroStation)

UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES [mm]. REMOVE ALL BURRS AND SHARP EDGES. MACHINE SURFACE FINISH 125

-TOLERANCE-
.X ± .1 [2,5]
.XX ± .02 [0,5]
.XXX ± .010 [0,25]
FRACTIONS ± 1/32
ANGLES ± 2°

DO NOT SCALE PRINT

CONTRACT NO.

DR. Mike Debe 08/27/90
CHK'D
APP'D. GLEN MONZO 8/31/90
APP'D. GOVT.

EMERSON. Process Management
ROSEMOUNT®
8200 Market Boulevard • Chanhassen, MN 55317 USA

TITLE
INDEX OF I.S. CSA FOR 3051C/L/P/H/T & 3001C/S

| SIZE | FSCM NO | DWG NO. | |
|---|---|---|---|
| A | | 03031-1024 | |
| SCALE N/A | WT. ——— | SHEET 1 OF 9 | |

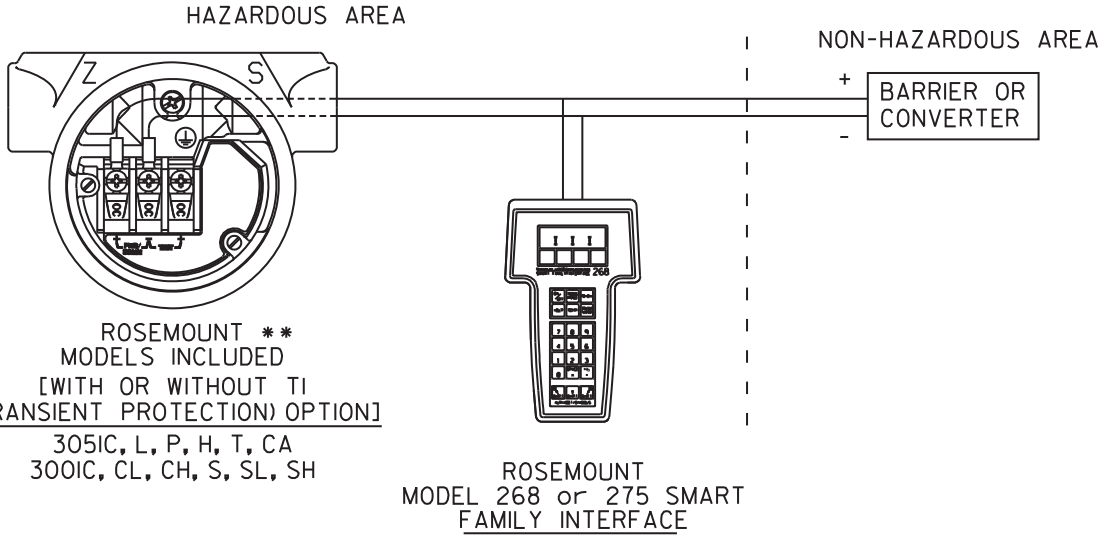
| REVISIONS | | | | |
|---|---|---|---|---|
| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| AD | | | | |

# CSA INTRINSIC SAFETY APPROVALS

CIRCUIT CONNECTION WITH BARRIER OR CONVERTER

Ex ia

INTRINSICALLY SAFE/SECURITE INTRINSEQUE
4-20 mA, ("A" OUTPUT CODE)




ROSEMOUNT **
MODELS INCLUDED
[WITH OR WITHOUT TI
(TRANSIENT PROTECTION) OPTION]

3051C, L, P, H, T, CA
3001C, CL, CH, S, SL, SH

ROSEMOUNT
MODEL 268 or 275 SMART
FAMILY INTERFACE

** FOR THE LOW POWER OPTION, SEE PAGE 4 FOR THE CIRCUIT CONNECTION WITH BARRIER OR CONVERTER. FOR FIELDBUS OPTIONS("F" or "W" OUTPUT CODE), SEE PAGE 5 FOR PARAMETERS AND CIRCIUT CONNECTION TO BARRIER.

| | | | |
|---|---|---|---|
| Rosemount Inc.<br>8200 Market Boulevard<br>Chanhassen, MN 55317 USA | | | CAD MAINTAINED (MicroStation) |
| DR. Mike Debe 08/27/90 | SIZE A | FSCM NO | DWG NO. 03031-1024 |
| ISSUED | SCALE N/A | WT. | SHEET 2 OF 9 |

| REVISIONS | | | | |
|---|---|---|---|---|
| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| AD | | | | |

## 4-20 mA, ("A" OUTPUT CODE)

| DEVICE | PARAMETERS | APPROVED FOR CLASS I, DIV.I |
|---|---|---|
| CSA APPROVED SAFETY BARRIER | 30 V OR LESS<br>*330 OHMS OR MORE<br>* 28 V OR LESS<br>300 OHMS OR MORE<br>25 V OR LESS<br>200 OHMS OR MORE<br>* 22 V OR LESS<br>180 OHMS OR MORE | GROUPS A, B, C, D |
| FOXBORO CONVERTER<br>2AI-I2V-CGB, 2AI-I3V-CGB,<br>2AS-I3I-CGB, 3A2-I2D-CGB,<br>3A2-I3D-CGB, 3AD-I3I-CGB,<br>3A4-I2D-CGB, 2AS-I2I-CGB,<br>3F4-I2DA | | GROUPS B, C, D |
| CSA APPROVED SAFETY BARRIER | 30 V OR LESS<br>150 OHMS OR MORE | GROUPS C, D |

## LOW POWER, ("M" OUTPUT CODE)

| DEVICE | PARAMETERS | APPROVED FOR CLASS I, DIV.I |
|---|---|---|
| | Supply ≤ 28V, ≥300 Ω<br>Return ≤ 10V, ≥47 Ω | GROUPS A, B, C, D |
| CSA APPROVED SAFETY BARRIER | Supply ≤ 30V, ≥150 Ω<br>Return ≤ 10V, ≥47 Ω | GROUPS C, D |

* MAY BE USED WITH ROSEMOUNT MODEL 268 or 275 SMART FAMILY INTERFACE.

| | | | |
|---|---|---|---|
| Rosemount Inc.<br>8200 Market Boulevard<br>Chanhassen, MN 55317 USA | | | CAD MAINTAINED (MicroStation) |
| DR. Mike Dobe | SIZE A | FSCM NO | DWG NO. 03031-1024 |
| ISSUED | SCALE N/A | WT. ——— | SHEET 3 OF 9 |

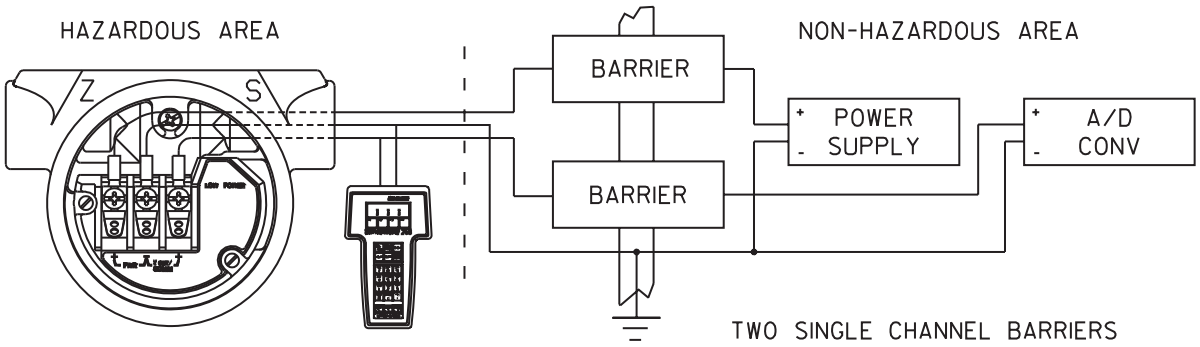
| REVISIONS | | | | |
|---|---|---|---|---|
| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| AD | | | | |

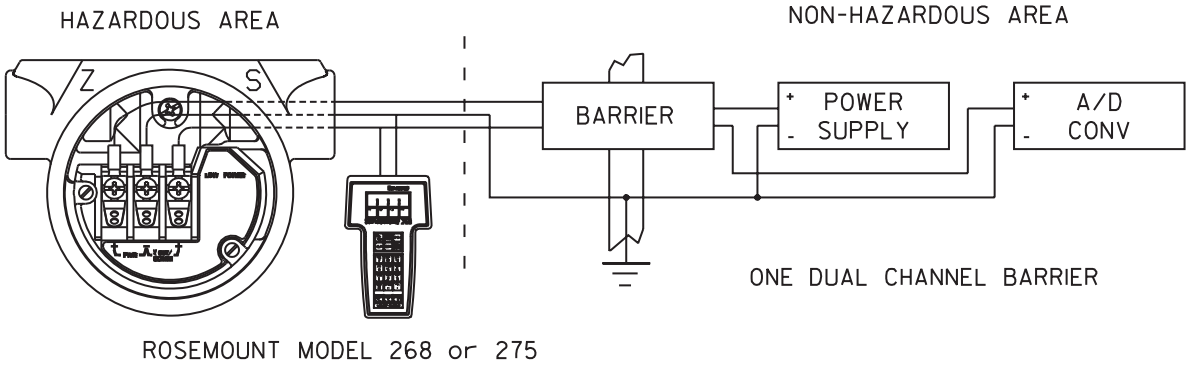
# CSA INTRINSIC SAFETY APPROVALS

305IC LOW POWER CIRCUIT CONNECTION WITH INTRINSIC SAFETY BARRIERS

Ex ia

INTRINSICALLY SAFE/SECURITE INTRINSEQUE
LOWPOWER, ("M" OUTPUT CODE)




APPROVED FOR CLASS I, DIVISION I, GROUPS A,B,C,D WHEN USED IN CIRCUIT WITH TWO CSA APPROVED SINGLE CHANNEL SAFETY BARRIERS, ONE WITH APPROVED SAFETY PARAMETERS OF 28 VOLTS OR LESS AND 300 OHMS OR MORE IN +PWR LINE, AND ONE WITH APPROVED SAFETY PARAMETERS OF 10 VOLTS OR LESS AND 47 OHMS OR MORE IN Vout LINE, OR ONE CSA APPROVED DUAL CHANNEL SAFETY BARRIER WITH IDENTICAL APPROVED SAFETY PARAMETERS CONNECTED IN LIKE MANNER, AS ABOVE.

APPROVED FOR CLASS I, DIVISION I, GROUPS C,D WHEN USED IN CIRCUIT WITH TWO CSA APPROVED SINGLE CHANNEL SAFETY BARRIERS, ONE WITH APPROVED SAFETY PARAMETERS OF 30 VOLTS OR LESS AND 150 OHMS OR MORE IN +PWR LINE AND ONE WITH APPROVED SAFETY PARAMETERS OF 10 VOLTS OR LESS AND 47 OHMS OR MORE IN Vout LINE.

| | | | |
|---|---|---|---|
| Rosemount Inc.<br>8200 Market Boulevard<br>Chanhassen, MN 55317 USA | | | CAD MAINTAINED (MicroStation) |
| DR. SANDI MANSON | SIZE A | FSCM NO | DWG NO. 03031-1024 |
| ISSUED | SCALE N/A | WT. ——— | SHEET 4 OF 9 |

| REVISIONS | | | | |
|---|---|---|---|---|
| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| AD | | | | |

## FIELDBUS, ("F" or "W" OUTPUT CODE)

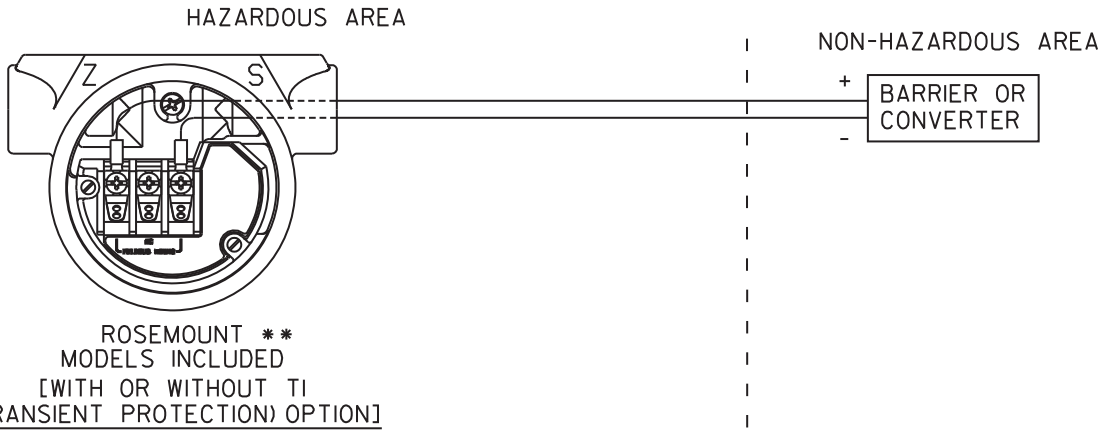
| DEVICE | PARAMETERS | APPROVED FOR CLASS I, DIV.I |
|---|---|---|
| CSA APPROVED SAFETY BARRIER | 30 V OR LESS<br>300 OHMS OR MORE<br>28 V OR LESS<br>235 OHMS OR MORE<br>25 V OR LESS<br>160 OHMS OR MORE<br>22 V OR LESS<br>100 OHMS OR MORE | GROUPS A, B, C, D |

## CSA INTRINSIC SAFETY APPROVALS

CIRCUIT CONNECTION WITH BARRIER OR CONVERTER

Ex ia

INTRINSICALLY SAFE/SECURITE INTRINSEQUE
FIELDBUS, ("F" or "W" OUTPUT CODE)




ROSEMOUNT ** MODELS INCLUDED
[WITH OR WITHOUT TI (TRANSIENT PROTECTION) OPTION]
3051C, L, P, H, T, CA
3001C, CL, CH, S, SL, SH

WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2.

AVERTISSEMENT - RISQUE D'EXPLOSION - LA SUBSTITUTION DE COMPOSANTS PEUT RENDRE CE MATERIEL INACCEPTABLE POUR LES EMPLACEMENTS DE CLASSE I, DIVISION 2.

| | | | |
|---|---|---|---|
| Rosemount Inc.<br>8200 Market Boulevard<br>Chanhassen, MN 55317 USA | | | CAD MAINTAINED (MicroStation) |
| DR. Myles Lee Miller | SIZE A | FSCM NO | DWG NO. 03031-1024 |
| ISSUED | SCALE N/A | WT. ——— | SHEET 5 OF 9 |

| REVISIONS | | | | |
|---|---|---|---|---|
| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| AD | | | | |

# FISCO CONCEPT APPROVALS

THE FISCO CONCEPT ALLOWS INTERCONNECTION OF INTRINSICALY SAFE APPARATUS TO ASSOCIATED APPARATUS NOT SPECIALLY EXAMINED IN SUCH COMBINATION. FOR THIS INTERCONNECTION TO BE VALID THE VOLTAGE ($U_i$ or Vmax), THE CURRENT ($I_i$ or Imax), AND THE POWER ($P_i$ or Pma) THAT INTRINSICALLY SAVE APPARATUS CAN RECEIVE AND REMAIN INTRINSICALY SAFE, INCLUDING FAULTS, MUST BE EQUAL OR GREATER THAN THE VOLTAGE (Uo, Voc, or Vt), THE CURRENT (Io, Isc, or It), AND THE POWER (Po or Pmax) LEVELS WHICH CAN BE DELIVERED BY THE ASSOCIATED APPARATUS, CONSIDERING FAULTS AND APPLICABLE FACTORS. ALSO, THE MAXIMUM UNPROTECTED CAPACITANCE ($C_i$) AND THE INDUCTANCE ($L_i$) OF EACH APPARATUS (BESIDES THE TERMINATION) CONNECTED TO THE FIELDBUS MUST BE LESS THAN OR EQUAL TO 5nF AND 10$\mu$H RESPECTVELY.
ONLY ONE ACTIVE DEVICE IN EACH SECTION (USUALLY THE ASSOCIATED APPARATUS) IS ALLOWED TO CONTRIBUTE THE DESIRED ENERGY FOR THE FIELDBUS SYSTEM. THE ASSOCIATED APPARATUS' VOLTAGE Uo (or Voc or Vt) IS LIMITED TO A RANGE OF 14V TO 24 V.D.C. ALL OTHER EQUIPENT COMBINED IN THE BUS CABLE MUST BE PASSIVE (THEY CANNOT PROVIDE ENERGY TO THE SYSTEM, EXCEPT A LEAKAGE CURRENT OF 50 $\mu$A FOR EACH CONNECTED DEVICE) SEPARATELY POWERED EQUIPMENT REQUIRES A GALVANIC ISOLATION TO AFFIRM THAT THE INTRINSICALLY SAFE FIELDBUS CIRCUIT WILL REMAIN PASSIVE. THE PARAMETER OF THE CABLE USED TO INTERCONNECT THE DEVICES MUST BE IN THE FOLLOWING RANGE:

LOOP RESISTANCE R': 15...150 OHM/km
INDUCTANCE PER UNIT LENGTH L': 0.4...1mH/KM
CAPACITANCE PER UNLIT LENGTH C': 80...200nF

C' = C' LINE/LINE +0.5C' LINE/SCREEN, IF BOTH LINES ARE FLOATING, OR
C' = C' LINE/LINE +C' LINE/SCREEN, IF THE SCREEN IS CONNECTED TO ONE LINE
TRUNK CABLE LENGTH: ≤ 1000 m
SPUR CABLE LENGTH: ≤ 30 m
SPLICE LENGTH: ≤ 1 m

AN APPROVED INFALLIBLE LINE TERMINATION TO EACH END OF THE TRUNK CABLE, WITH THE FOLLOWING PARAMETERS IS APPROPRIATE:

R = 90...100 OHMS C = 2.2$\mu$F

AN ALLOWED TERMINATION MIGHT ALREADY BE LINKED IN THE ASSOCIATED APPARATUS. DUE TO I.S. REASONS, THE NUMBER OF PASSIVE APPARATUS CONNECTED TO THE BUS SEGMENT IS NOT LIMITED. IF THE RULES ABOVE ARE FOLLOWED, UP TO A TOTAL LENGTH OF 1000 m (THE SUMMATION OF TRUNK AND ALL SPUR CABLES), THE INDUCTANCE AND THE CAPACITANCE OF THE CABLE WILL NOT DAMAGE THE INTRINSIC SAFETY OF THE SYSTEM.

NOTES:
INTRINSICALLY SAFE CLASS I, DIV. 1, GROUPS A, B, C, D

1. THE MAXIMUM NON-HAZARDOUS AREA VOLTAGE MUST NOT EXCEED 250 V.
2. CAUTION: ONLY USE SUPPLY WIRES SUITABLE FOR 5°C ABOVE SURROUNDING TEMPERATURE.
3. WARNING: REPLACEMENT OF COMPONENTS MAY DAMAGE INTRINSIC SAFETY.

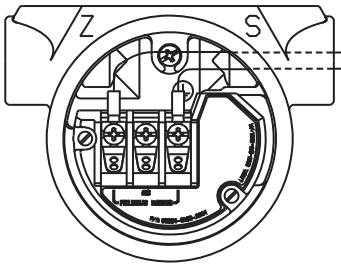
| | | | |
|---|---|---|---|
| Rosemount Inc.<br>8200 Market Boulevard<br>Chanhassen, MN 55317 USA | | | CAD MAINTAINED (MicroStation) |
| DR. Myles Lee Miller | SIZE A | FSCM NO | DWG NO. 03031-1024 |
| ISSUED | SCALE N/A | WT. ——— | SHEET 6 OF 9 |

Form Rev AD

| REVISIONS | | | | |
|---|---|---|---|---|
| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| AD | | | | |

HAZARDOUS (CLASSIFIED) LOCATION
CLASS I, DIVISION I, GROUPS A,B,C,D
CLASS II, DIVISION I, GROUPS E,F,G
CLASS III, DIVISION I

NON-HAZARDOUS AREA

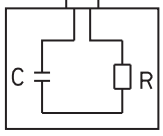



OUTPUT CODE F or W
MODELS INCLUDED
305IC, L, P, H, T, CA
300IC, CL, CH

ANY CSA APPROVED ASSOCIATED APPARATUS SUITABLE FOR FISCO CONCEPT

ANY CSA APPROVED INTRINSICALLY SAFE APPARATUS SUITABLE FOR FISCO CONCEPT

ANY CSA PPROVED TERMINATION WITH
R=90...100 Ohms
C=0...2.2 uF




Rosemount Inc.
8200 Market Boulevard
Chanhassen, MN 55317 USA

CAD MAINTAINED (MicroStation)

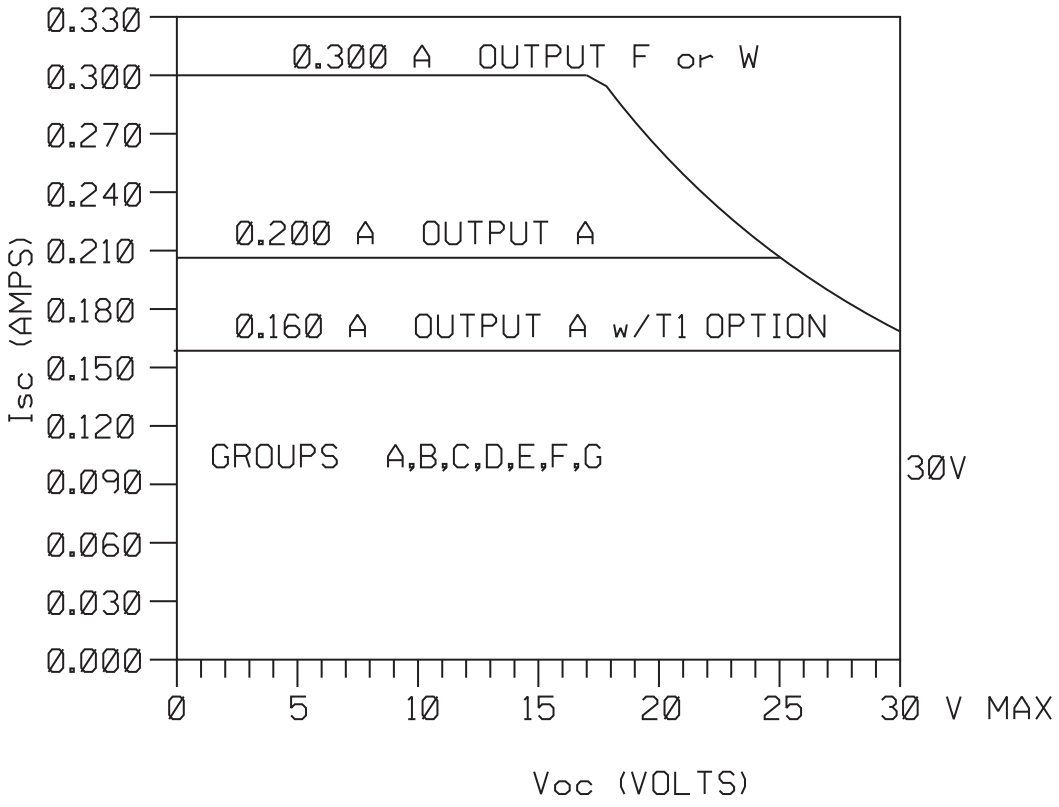
| DR. Myles Lee Miller | SIZE A | FSCM NO | DWG NO. 03031-1024 | |
|---|---|---|---|---|
| ISSUED | SCALE N/A | WT. ——— | SHEET 7 OF 9 | |

| REVISIONS | | | | |
|---|---|---|---|---|
| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| AD | | | | |

# 3051 I.S. ENTITY PARAMETERS. (OUTPUT CODE A,F, or W)

## BARRIER PARAMETERS (APPLICABLE TO OUTPUT CODE A,F, or W)

Pmax = 1.3 WATT OUTPUT F or W
Pmax = 1.0 WATT OUTPUT A




| | | | |
|---|---|---|---|
| Rosemount Inc.<br>8200 Market Boulevard<br>Chanhassen, MN 55317 USA | | | CAD MAINTAINED (MicroStation) |
| DR. JON STEFFENS | SIZE A | FSCM NO | DWG NO. 03031-1024 |
| ISSUED | SCALE N/A | WT. ——— | SHEET 8 OF 9 |

| REVISIONS | | | | |
|---|---|---|---|---|
| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| AD | | | | |

ENTITY CONCEPT APPROVALS

THE ENTITY CONCEPT ALLOWS INTERCONNECTION OF INTRINSICALLY SAFE APPARATUS TO ASSOCIATED APPARATUS NOT SPECIFICALLY EXAMINED IN COMBINATION AS A SYSTEM. THE APPROVED VALUES OF MAX. OPEN CIRCUIT VOLTAGE (Voc) AND MAX. SHORT CIRCUIT CURRENT (Isc) AND MAX. POWER (Voc X Isc/4), FOR THE ASSOCIATED APPARATUS MUST BE LESS THAN OR EQUAL TO THE MAXIMUM SAFE INPUT VOLTAGE (Vmax), MAXIMUM SAFE INPUT CURRENT (Imax), AND MAXIMUM SAFE INPUT POWER (Pmax) OF THE INTRINSICALLY SAFE APPARATUS. IN ADDITION, THE APPROVED MAX. ALLOWABLE CONNECTED CAPACITANCE (Ca) OF THE ASSOCIATED APPARATUS MUST BE GREATER THAN THE SUM OF THE INTERCONNECTING CABLE CAPACITANCE AND THE UNPROTECTED INTERNAL CAPACITANCE ($C_i$) OF THE INTRINSICALLY SAFE APPARATUS, AND THE APPROVED MAX. ALLOWABLE CONNECTED INDUCTANCE (La) OF THE ASSOCIATED APPARATUS MUST BE GREATER THAN THE SUM OF THE INTERCONNECTING CABLE INDUCTANCE AND THE UNPROTECTED INTERNAL INDUCTANCE ($L_i$) OF THE INTRINSICALLY SAFE APPARATUS.

FOR OUTPUT CODE A

CLASS I, DIV. 1, GROUPS A, B, C AND D

| | |
|---|---|
| $V_{MAX}$ = 30V | $V_{OC}$ IS LESS THAN OR EQUAL TO 30V |
| $I_{MAX}$ = 200mA | $I_{SC}$ IS LESS THAN OR EQUAL TO 200mA |
| $P_{MAX}$ = 1 WATT | $(\frac{Voc \times Isc}{4})$ IS LESS THAN OR EQUAL TO 1 WATT |
| $C_I$ = .01µf | $C_A$ IS GREATER THAN .01µf + C CABLE |
| $L_I$ =10µH | $L_A$ IS GREATER THAN 10µH + L CABLE |

* FOR T1 OPTION:

| | |
|---|---|
| Imax = 160mA | $I_{SC}$ IS LESS THAN OR EQUAL TO 160mA |
| $L_I$ =1.05mH | $L_A$ IS GREATER THAN 1.05mH + L CABLE |

FOR OUTPUT CODE F or W

CLASS I, DIV. 1, GROUPS A, B, C AND D

| | |
|---|---|
| $V_{MAX}$ = 30V | $V_{OC}$ IS LESS THAN OR EQUAL TO 30V |
| $I_{MAX}$ = 300mA | $I_{SC}$ IS LESS THAN OR EQUAL TO 300mA |
| $P_{MAX}$ = 1.3 WATT | $(\frac{Voc \times Isc}{4})$ IS LESS THAN OR EQUAL TO 1.3 WATT |
| $C_I$ = 0µf | $C_A$ IS GREATER THAN 0µf + C CABLE |
| $L_I$ = 0µH | $L_A$ IS GREATER THAN 0µH + L CABLE |

NOTE: ENTITY PARAMETERS LISTED APPLY ONLY TO ASSOCIATED APPARATUS WITH LINEAR OUTPUT.

Rosemount Inc.
8200 Market Boulevard
Chanhassen, MN 55317 USA

CAD MAINTAINED (MicroStation)

| | | | |
|---|---|---|---|
| DR. JON STEFFENS | SIZE A | FSCM NO | DWG NO. 03031-1024 |
| ISSUED | SCALE N/A | WT. ——— | SHEET 9 OF 9 |

## Standards Association of Australia (SAA) 03031-1026

CONFIDENTIAL AND PROPRIETARY INFORMATION IS CONTAINED HEREIN AND MUST BE HANDLED ACCORDINGLY

REVISIONS

| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
|---|---|---|---|---|
| AA | UPDATE ENTITY PARAMETERS | RTC1002910 | J.D.J. | 12/2/97 |
| AB | ADD FIELDBUS AND PROFIBUS | RTC1006448 | J.D.J. | 4/26/99 |
| AC | ADD 2088 & 2090's | RTC1017572 | K.J.K. | 6/11/04 |

SAA ENTITY CONCEPT APPROVALS

| | | |
|---|---|---|
| 3051C | 3001C | 2088 |
| 3051L | 3001CL | 2090P |
| 3051P | 3001CH | 2090F |
| 3051H | 3001S | |
| 3051CA | | |
| 3051T | | |

OUTPUT CODE A (4-20 mA HART) SEE SHEETS 2
OUTPUT CODE M (LOW POWER) SEE SHEETS 3
OUTPUT CODE F / W (FIELDBUS, PROFIBUS) SEE SHEETS 4

THE ROSEMOUNT PRESSURE TRANSMITTERS LISTED ABOVE ARE INTRINSICALLY SAFE WHEN USED IN THE CURCUIT WITH SAA APPROVED BARRIERS WHICH MEET THE LIST ENTITY PERAMETERS.

TO ASSURE AN INTRINSICALLY SAFE SYSTEM, THE TRANSMITTER AND BARRIER MUST BE WIRED IN ACCORDANCE WITH THE BARRIER MANUFACTURER'S FIELD WIRING INSTRUCTIONS AND THE APPLICABLE CIRCUIT DIAGRAM.

CAD MAINTAINED (MicroStation)

UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES [mm]. REMOVE ALL BURRS AND SHARP EDGES. MACHINE SURFACE FINISH 125

-TOLERANCE-
.X ± .1 [2,5]
.XX ± .02 [0,5]
.XXX ± .010 [0,25]

FRACTIONS ± 1/32
ANGLES ± 2°

DO NOT SCALE PRINT

CONTRACT NO.

DR. Mike Dobe 12/30/91

CHK'D

APP'D. GLEN MONZO 5/8/92

APP'D. GOVT.

EMERSON. Process Management

ROSEMOUNT®
8200 Market Boulevard • Chanhassen, MN 55317 USA

TITLE SAA I.S. INDEX FOR 2088, 2090, 3051 & 3001

SIZE A | FSCM NO | DWG NO. 03031-1026

SCALE N/A | WT. ——— | SHEET 1 OF 4

Form Rev AC

| REVISIONS | | | | |
|---|---|---|---|---|
| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| AC | | | | |

## OUTPUT CODE "A" (4–20MA / HART)
## SAA ENTITY CONCEPT APPROVALS

THE ROSEMOUNT PRESSURE TRANSMITTERS LISTED BELOW ARE INTRINSICALLY SAFE WHEN USED IN THE CIRCUIT WITH SAA APPROVED BARRIERS WHICH MEET THE LISTED ENTITY PARAMETERS.

APPROVED TRANSMITTERS

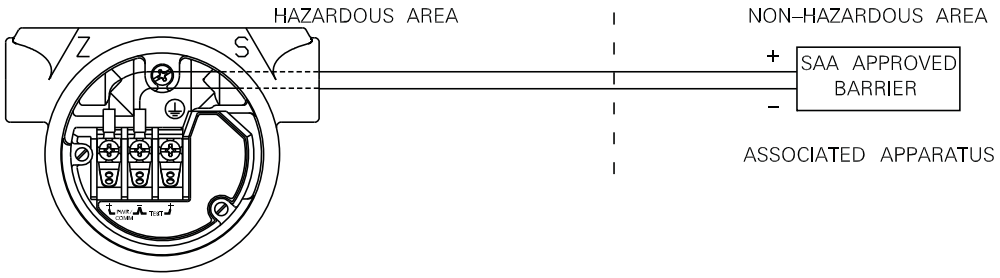
| | | | |
|---|---|---|---|
| 3051C | 3051H | 3001C | 2088 |
| 3051L | 3051T | 3001CL | 2090P |
| 3051P | 3051CA | 3001CH | 2090F |
| | | 3001S | |

ENTITY PARAMETER FOR Ex ia IIC T5 CLASS I, ZONE 0 PROTECTION:

| APPARATUS PARAMETER | BARRIER PARAMETER |
|---|---|
| Vmax = 30V | Voc IS LESS THAN OR EQUAL TO 30V |
| Imax = 200mA | Isc IS LESS THAN OR EQUAL TO 200mA |
| Pmax = 0.9W | $\frac{Voc * Isc}{4}$ IS LESS THAN OR EQUAL TO 0.9W |
| Ci = 0.01$\mu$F | Ca IS GREATER THAN 0.01 MICROFARADS |
| Li = 10$\mu$H | La IS GREATER THAN 10 MICROHENRIES |
| FOR T1 OPTION ONLY | |
| Imax = 160mA | Isc IS LESS THAN OR EQUAL TO 160mA |
| Li = 1.05mH | La IS GREATER THAN 1.05 MILLIHENRIES |

THE ENTITY CONCEPT ALLOWS INTERCONNECTION OF INTRINSICALLY SAFE APPARATUS NOT SPECIFICALLY EXAMINED IN COMBINATION AS A SYSTEM.

TO ASSURE AN INTRINSICALLY SAFE SYSTEM THE TRANSMITTER AND BARRIER MUST BE WIRED IN ACCORDANCE WITH THE BARRIER MANUFACTURERS FIELD WIRING INSTRUCTIONS AND THE CIRCUIT DIAGRAM SHOWN BELOW.




Rosemount Inc.
8200 Market Boulevard
Chanhassen, MN 55317 USA

CAD MAINTAINED (MicroStation)

| | | | |
|---|---|---|---|
| DR. Mike Dobe | SIZE A | FSCM NO | DWG NO. 03031-1026 |
| ISSUED | SCALE N/A | WT. ——— | SHEET 2 OF 4 |

Form Rev AC

| REVISIONS | | | | |
|---|---|---|---|---|
| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| AC | | | | |

## OUTPUT CODE "M" (LOW POWER)
## SAA ENTITY CONCEPT APPROVALS

THE ROSEMOUNT LOW POWER CONFIGURED PRESSURE TRANSMITTERS LISTED BELOW ARE SAA APPROVED AS INTRINSICALLY SAFE WHEN USED IN THE CIRCUIT WITH SAA APPROVED BARRIERS WHICH MEET THE LISTED ENTITY PARAMETERS.

APPROVED TRANSMITTERS WITH LOW POWER CONFIGURATION

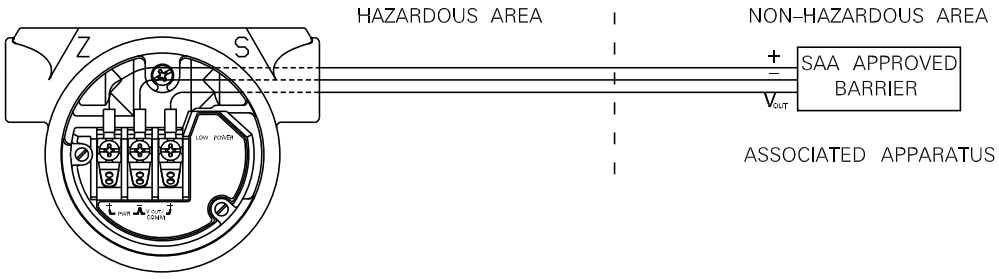
| | |
|---|---|
| 3051C | 3051T |
| 3051L | 3051CA |
| 3051P | |
| 3051H | |

ENTITY PARAMETER FOR Ex ia IIC T5 CLASS I, ZONE 0 PROTECTION:

| APPARATUS PARAMETER | BARRIER PARAMETER |
|---|---|
| Vmax = 30V | Voc IS LESS THAN OR EQUAL TO 30V |
| Imax = 200mA | Isc IS LESS THAN OR EQUAL TO 200mA |
| Pmax = 0.9W | $\frac{Voc * Isc}{4}$ IS LESS THAN OR EQUAL TO 0.9W |
| Ci = 0.042μF | Ca IS GREATER THAN 0.042 MICROFARADS |
| Li = 10μH | La IS GREATER THAN 10 MICROHENRIES |
| FOR T1 OPTION ONLY | |
| Li = 0.75mH | La IS GREATER THAN 0.75 MILLIHENRIES |

THE ENTITY CONCEPT ALLOWS INTERCONNECTION OF INTRINSICALLY SAFE APPARATUS NOT SPECIFICALLY EXAMINED IN COMBINATION AS A SYSTEM.

TO ASSURE AN INTRINSICALLY SAFE SYSTEM THE TRANSMITTER AND BARRIER MUST BE WIRED IN ACCORDANCE WITH THE BARRIER MANUFACTURERS FIELD WIRING INSTRUCTIONS AND THE CIRCUIT DIAGRAM SHOWN BELOW.




Rosemount Inc.
8200 Market Boulevard
Chanhassen, MN 55317 USA

CAD MAINTAINED (MicroStation)

| | | | |
|---|---|---|---|
| DR. Mike Dobe | SIZE A | FSCM NO | DWG NO. 03031-1026 |
| ISSUED | SCALE N/A | WT. ——— | SHEET 3 OF 4 |

Form Rev AC

| REVISIONS | | | | |
|---|---|---|---|---|
| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| AC | | | | |

## OUTPUT CODE F / W (FIELDBUS, PROFIBUS)
## SAA ENTITY CONCEPT APPROVALS

THE ROSEMOUNT PRESSURE TRANSMITTERS LISTED BELOW ARE INTRINSICALLY SAFE WHEN USED IN THE CIRCUIT WITH SAA APPROVED BARRIERS WHICH MEET THE LISTED ENTITY PARAMETERS.

APPROVED TRANSMITTERS

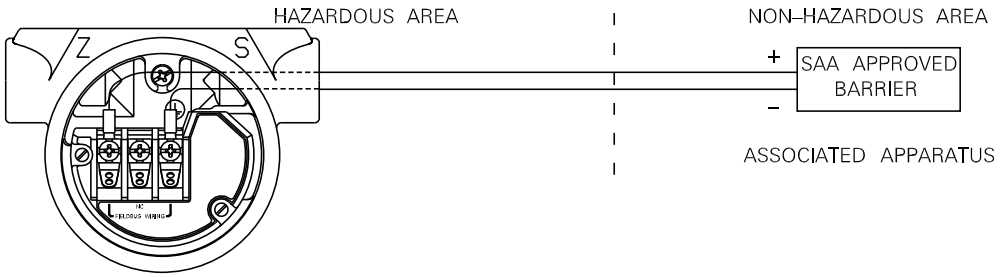
| | | | |
|---|---|---|---|
| 3051C | 3051H | 3001C | 3001S |
| 3051L | 3051T | 3001CL | |
| 3051P | 3051CA | 3001CH | |

ENTITY PARAMETER FOR Ex ia IIC T5 CLASS I, ZONE 0 PROTECTION:

| APPARATUS PARAMETER | BARRIER PARAMETER |
|---|---|
| Vmax = 30V<br>Imax = 300mA<br>Pmax = 1.3W<br><br>Ci = 0 $\mu$F<br>Li = 0$\mu$H | Voc IS LESS THAN OR EQUAL TO 30V<br>Isc IS LESS THAN OR EQUAL TO 300mA<br>$\frac{Voc * Isc}{4}$ IS LESS THAN OR EQUAL TO 1.3W<br>Ca IS GREATER THAN 0 MICROFARADS<br>La IS GREATER THAN 0 MICROHENRIES |

THE ENTITY CONCEPT ALLOWS INTERCONNECTION OF INTRINSICALLY SAFE APPARATUS NOT SPECIFICALLY EXAMINED IN COMBINATION AS A SYSTEM.

TO ASSURE AN INTRINSICALLY SAFE SYSTEM THE TRANSMITTER AND BARRIER MUST BE WIRED IN ACCORDANCE WITH THE BARRIER MANUFACTURERS FIELD WIRING INSTRUCTIONS AND THE CIRCUIT DIAGRAM SHOWN BELOW.

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| ISSUED | SCALE N/A | WT. ——— | SHEET 4 OF 4 |

Form Rev AC

# Appendix C Local Operator Interface Menu



## OVERVIEW

This Appendix contains the complete Local Operator Interface menu.

## SAFETY MESSAGES

Procedures and instructions in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that raises potential safety issues is indicated by a warning symbol ( ⚠ ). Refer to the following safety messages before performing an operation preceded by this symbol.

### Warnings

**⚠WARNING**

Explosions could result in death or serious injury:

Installation of this transmitter in an explosive environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Please review the approvals section of the 3051 reference manual for any restrictions associated with a safe installation.

- In an Explosion-Proof/Flameproof installation, do not remove the transmitter covers when power is applied to the unit.

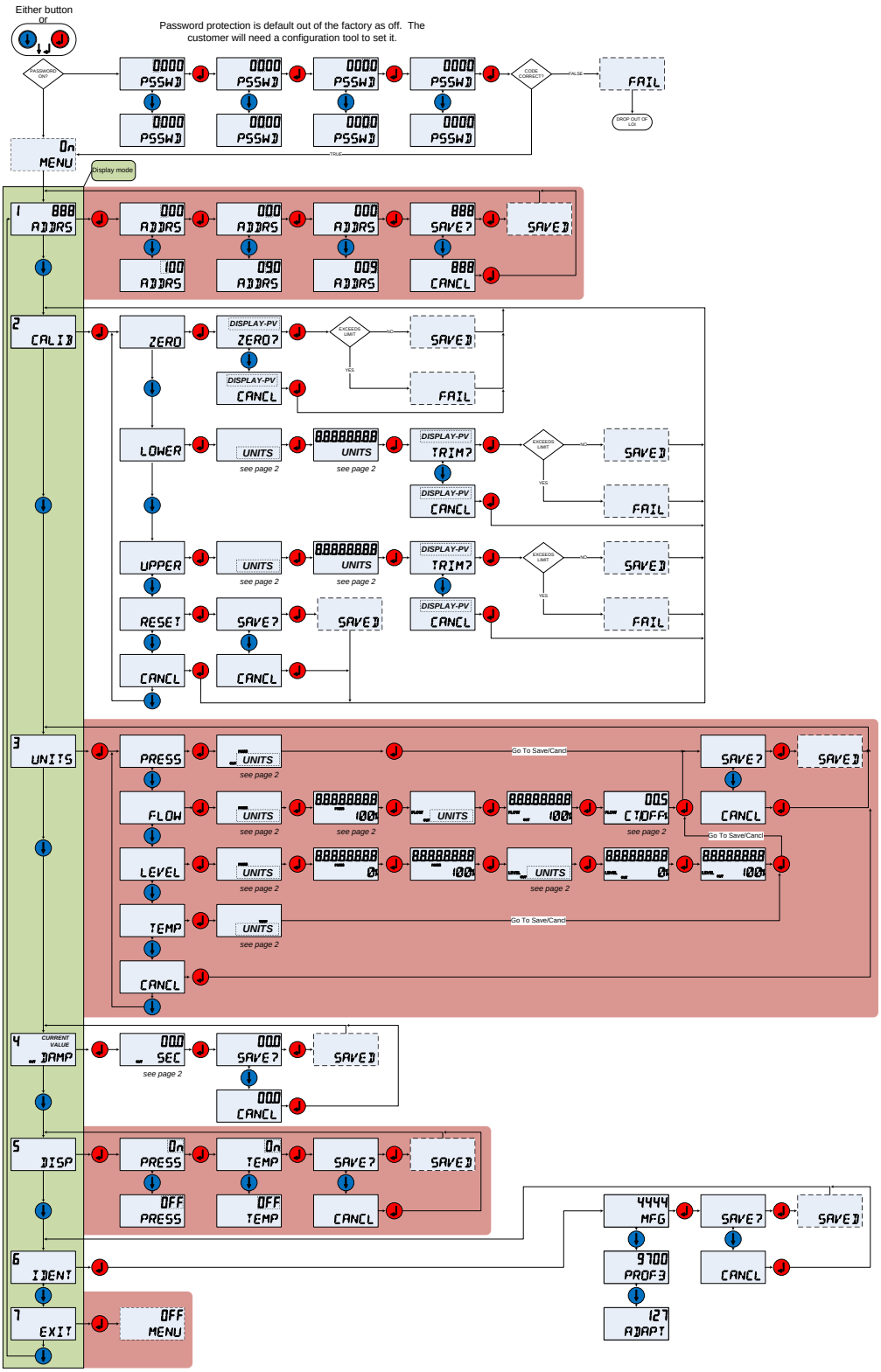
Process leaks may cause harm or result in death.

- Install and tighten process connectors before applying pressure.

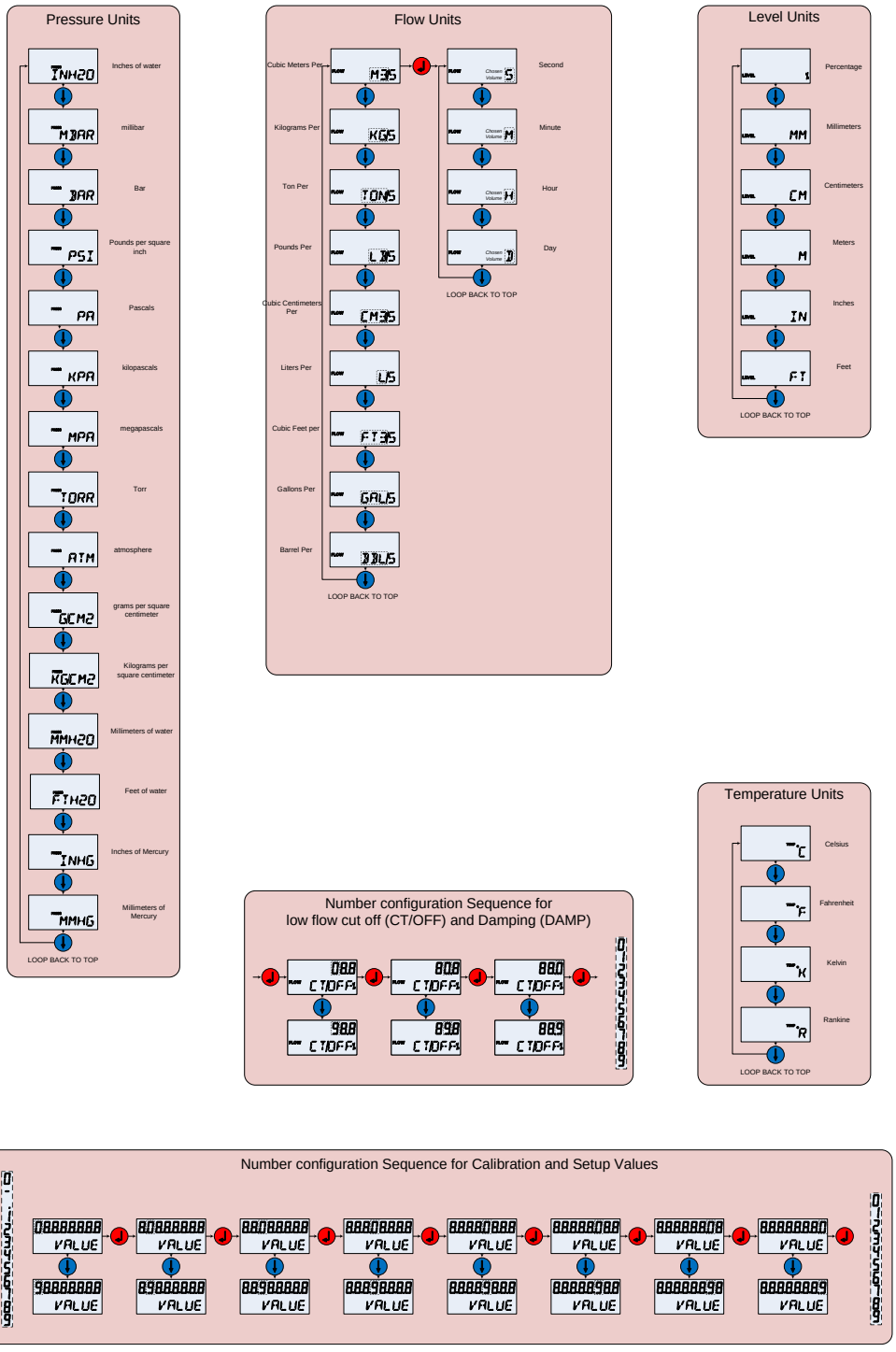
Electrical shock can result in death or serious injury.

- Avoid contact with the leads and terminals. High voltage that may be present on leads can cause electrical shock.

Figure C-1. Detailed LOI Menu



Details of LOI Map Infomation



# Appendix D Profibus Block Information



## OVERVIEW

This Appendix contains Profibus block and parameter information.

## SAFETY MESSAGES

Procedures and instructions in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that raises potential safety issues is indicated by a warning symbol (⚠). Refer to the following safety messages before performing an operation preceded by this symbol.

### Warnings

**⚠WARNING**

Explosions could result in death or serious injury:

Installation of this transmitter in an explosive environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Please review the approvals section of the 3051 reference manual for any restrictions associated with a safe installation.

- In an Explosion-Proof/Flameproof installation, do not remove the transmitter covers when power is applied to the unit.

Process leaks may cause harm or result in death.

- Install and tighten process connectors before applying pressure.

Electrical shock can result in death or serious injury.

- Avoid contact with the leads and terminals. High voltage that may be present on leads can cause electrical shock.

## PROFIBUS BLOCK PARAMETERS

Table D-1 through Table  can be used to cross reference parameters from the Profibus specification, class two master, and Local Operator Interface.

Table D-1. Physical Block Parameters

| Index | Parameter Name | DD Name | LOI location[1] | Definition |
|---|---|---|---|---|
| 0 | BLOCK OBJECT | Block Object | | |
| 1 | ST_REV | Static Revision No. | | The revision level of the static data associated with block; the revision value will be incremented each time a static parameter value in the block is changed. |
| 2 | TAG_DESC | Tag | | The user description of the intended block application. |
| 3 | STRATEGY | Strategy | | Grouping of function blocks. |
| 4 | ALERT_KEY | Alert Key | | The identification number of the plant unit. This information may be used in the host for sorting alarms, etc. |
| 5 | TARGET_MODE | Target Mode | | Contains desired mode of the block normally set by the operator or a control specification. |
| 6 | MODE_BLK | Actual Mode | | Contains the actual, permitted, and normal modes of the block. |
| 7 | ALARM_SUM | | | Contains the current states of the block alarms |
| 8 | SOFTWARE REVISION | Software Revision | | Software revision, includes a major, minor, and build revision. |
| 9 | HARDWARE_REVISION | Hardware Revision | | Hardware revision |
| 10 | DEVICE_MAN_ID | Manufacturer | | Identification code of the manufacturer of the field device |
| 11 | DEVICE_ID | Device ID | | Identification of the device (3051) |
| 12 | DEVICE_SER_NUM | Device Serial Num | | Serial number of the device (output board serial number). |
| 13 | DIAGNOSIS | Diagnosis | | Detailed information of the device bitwise coded. MSB (bit 31) represents more information available in Diagnosis extension. |
| 14 | DIAGNOSIS_EXTENSION | Diagnosis Extension | | Additional manufacturer diagnoses information (See DIAGNOSIS_EXTENSION table below). |
| 15 | DIAGNOSIS_MASK | | | Definition of supported DIAGNOSIS information bits |
| 16 | DIAGNOSIS_MASK_EXTENSION | | | Definition of supported DIAGNOSIS_EXTENSION information bits |
| 18 | WRITE_LOCKING | Write Locking | | Software write protection |
| 19 | FACTORY_RESET | Factory Reset | | Command for restarting device |
| 20 | DESCRIPTOR | Descriptor | | User-definable text to describe the device. |
| 21 | DEVICE_MESSAGE | Message | | User-definable message to the device or application in plant. |
| 22 | DEVICE_INSTAL_DATE | Installation Date | | Date of installation of the device. |
| 23 | LOCAL_OP_ENA | LOI Enable | | Disable/enable the optional Local Operator Interface (LOI) |
| 24 | IDENT_NUMBER_SELECTOR | Ident Number Selector | IDENT | Specifies the cyclic behavior of a device which is described in the corresponding GSD file |
| 25 | HW_WRITE_PROTECTION | HW Write Protection | | Status of the security jumper |
| 26 | FEATURE | Optional Device Features | | Indicates optional features implemented in the device |
| 27 | COND_STATUS_DIAG | | | Indicates the mode of a device that can be configured for status and diagnostic behavior |
| 33 | FINAL_ASSEMBLY_NUM | Final Assembly Number | | The same final assembly number placed on the neck label |
| 34 | DOWNLOAD_MODE | Factory Upgrade | | Puts the device into a manufacturer mode for upgrading the device |
| 35 | PASSCODE_LOI | Password | PSSWD | Password for the LOI |
| 36 | LOI_DISPLAY_SELECTION | Display Selection | DISP | Indicates process variables shown on the local display |
| 37 | LOI_BUTTON_STATE | Button State | | Status of the optional LOI buttons |

| Index | Parameter Name | DD Name | LOI location(1) | Definition |
|---|---|---|---|---|
| 38 | VENDOR_IDENT_NUMBER | Vendor Ident Number | IDENT | 0x4444 |
| 39 | LOI_PRESENT | LOI Present | | Parameter written during manufacturing to indicate if an optional LOI is present |
| 40 | HW_SIMULATE_PROTECTION | HW Simulation Protection | | Status of hardware simulation jumper |

*(1) If blank, parameter is not applicable to LOI.*

Table D-2. Transducer Block Parameters

| Index | Parameter Name | DD Name | LOI location(1) | Definition |
|---|---|---|---|---|
| 1 | ST_REV | Static Revision No. | | The revision level of the static data associated with block; the revision value will be incremented each time a static parameter value in the block is changed. |
| 2 | TAG_DESC | Tag | | The user description of the intended block application. |
| 3 | STRATEGY | Strategy | | Grouping of function blocks. |
| 4 | ALERT_KEY | Alert Key | | The identification number of the plant unit. This information may be used in the host for sorting alarms, etc. |
| 5 | TARGET_MODE | Target Mode | | Contains desired mode of the block normally set by the operator or a control specification. |
| 6 | MODE_BLK | Actual Mode | | Contains the actual, permitted, and normal modes of the block. |
| 7 | ALARM_SUM | | | Contains the current states of the block alarms |
| 8 | SENSOR_VALUE | Pressure raw value | | Raw sensor value, untrimmed, in SENSOR_UNIT |
| 9 | SENSOR_HI_LIM | Upper Sensor Limit | | Upper sensor range value, in SENSOR_UNIT |
| 10 | SENSOR_LO_LIM | Lower Sensor Limit | | Lower sensor range value, in SENSOR_UNIT |
| 11 | CAL_POINT_HI | Upper Calibration Point | CALIB-> UPPER | The value of the sensor measurement used for the high calibration point. Unit is derived from SENSOR_UNIT |
| 12 | CAL_POINT_LO | Lower Calibration Point | CALIB-> LOWER | The value of the sensor measurement used for the low calibration point. Unit is derived from SENSOR_UNIT |
| 13 | CAL_MIN_SPAN | Calibration Min Span | | The minimum span that is allowed between the calibration high and low points. |
| 14 | SENSOR_UNIT | Sensor Unit | UNITS | Engineering units for the calibration values |
| 15 | TRIMMED_VALUE | Pressure Trimmed Value | UNITS | Contains the sensor value after the trim processing. Unit is derived from SENSOR_UNIT |
| 16 | SENSOR_TYPE | Sensor Type | | Sensor type (capacitance, strain gauge) |
| 18 | SENSOR_SERIAL_NUMMER | Sensor Serial Number | | Sensor serial number |
| 19 | PRIMARY_VALUE | Primary Value | | Measured value and status available to the Function Block. The unit of PRIMARY_VALUE is the PRIMARY_VALUE_UNIT. |
| 20 | PRIMARY_VALUE_UNIT | Unit (PV) | | Engineering units for the primary value |
| 21 | PRIMARY_VALUE_TYPE | Primary Value Type | | Type of pressure application (pressure, flow, level) |
| 22 | SENSOR_DIAPHRAGM_ MATERIAL | Isolator Material | | Type of material of the sensor isolator |
| 23 | SENSOR_FILL_FLUID | Module Fill Fluid | | Type of fill fluid used in sensor |
| 24 | SENSOR_O_RING_MATERIAL | O Ring Material | | Type of material of the flange o-rings |
| 25 | PROCESS_CONNECTION_ TYPE | Process Connection Type | | Type of flange that is attached to the device |
| 26 | PROCESS_CONNECTION_ MATERIAL | Process Connection Material | | Type of material of the flange |
| 27 | TEMPERATURE | Temperature | | Sensor temperature, in TEMPERATURE_UNIT |
| 28 | TEMPERATURE_UNIT | Temperature Unit | UNITS | Engineering units of the sensor temperature |
| 29 | SECONDARY_VALUE_1 | Secondary Value 1 | UNITS | Trimmed pressure value, unscaled, in SECONDARY_VALUE_1_UNIT |

| Index | Parameter Name | DD Name | LOI location(1) | Definition |
|---|---|---|---|---|
| 30 | SECONDARY_VALUE_1_UNIT | Unit (Secondary Value 1) | UNITS | Engineering unit of SECONDARY_VALUE_1 |
| 31 | SECONDARY_VALUE_2 | Secondary Value 2 | UNITS | Measured value after input scaling |
| 33 | LIN_TYPE | Characterization type | UNITS | Linearization type |
| 34 | SCALE_IN | Scale in | UNITS | Input scaling in SECONDARY_VALUE_1_UNIT |
| 35 | SCALE_OUT | Scale out | UNITS | Output scaling in PRIMARY_VALUE_UNIT |
| 36 | LOW_FLOW_CUT_OFF | Low Flow Cut Off | UNITS-> FLOW | This is the point in percent of flow until the output of the flow function is set to zero. It is used for suppressing low flow values |
| 59 | FACT_CAL_RECALL | Restore Calibration Factory | CALIB-> RESET | Recalls the sensor calibration set at the factory |
| 60 | SENSOR_CAL_METHOD | Sensor Calibration Factor | | The method of last sensor calibration. |
| 61 | SENSOR_VALUE_TYPE | Transmitter Type | | Type of pressure measurement (differential, absolute, gage) |

*(1) If blank, parameter is not applicable to LOI.*

Table D-3. Analog Input Block Parameters

| Index | Parameter Name | DD Name | LOI location(1) | Definition |
|---|---|---|---|---|
| 1 | ST_REV | Static Revision No. | | The revision level of the static data associated with block; the revision value will be incremented each time a static parameter value in the block is changed. |
| 2 | TAG_DESC | Tag | | The user description of the intended block application. |
| 3 | STRATEGY | Strategy | | Grouping of function blocks. |
| 4 | ALERT_KEY | Alert Key | | The identification number of the plant unit. This information may be used in the host for sorting alarms, etc. |
| 5 | TARGET_MODE | Target Mode | | Contains desired mode of the block normally set by the operator or a control specification. |
| 6 | MODE_BLK | Actual Mode | | Contains the actual, permitted, and normal modes of the block. |
| 7 | ALARM_SUM | Alarm Summary | | Contains the current states of the block alarms |
| 8 | BATCH | Batch Information | | Used in Batch applications according to IEC 61512-1 |
| 10 | OUT | Value (Output) | | Value and status of the block output. |
| 11 | PV_SCALE | PV Scale | | Conversion of the Process Variable into percent using the high and low scale value, in TB.PRIMARY_VALUE_UNIT |
| 12 | OUT_SCALE | Output Scale | | The high and low scale values, units code, and number of digits to the right of the decimal point associated with OUT. |
| 13 | LIN_TYPE | Characterization Type | | Linearization type |
| 14 | CHANNEL | Channel | | Used to select the transducer block measurement value. Always 0x112. |
| 16 | PV_FTIME | Filter Time Const | DAMP | The time constant of the first order PV filter. Time required for a 63% change in the input value (seconds). |
| 17 | FSAFE_TYPE | Fail Safe Mode | | Defines the reaction of the device, if a fault is detected |
| 18 | FSAFE_VALUE | Fail Safe Default Value | | Default value for the OUT parameter, in OUT_SCALE units, if a sensor or sensor electronic fault is detected |
| 19 | ALARM_HYS | Limit Hysteresis | | The amount the alarm value must return within the alarm limit before the associated active alarm condition clears. |
| 21 | HI_HI_LIM | Upper Limit Alarm Limits | | The setting of the alarm limit used to detect the HI HI alarm condition. |
| 23 | HI_LIM | Upper Limit Warning Limits | | The setting of the alarm limit used to detect the HI alarm condition. |
| 25 | LO_LIM | Lower Limit Warning Limits | | The setting of the alarm limit used to detect the LO alarm condition. |
| 27 | LO_LO_LIM | Lower Limit Alarm Limits | | The setting of the alarm limit used to detect the LO LO alarm condition. |
| 30 | HI_HI_ALM | Upper Limit Alarm | | The HI Hi alarm data. |
| 31 | HI_ALM | Upper Limit Warning | | The HI alarm data |

| Index | Parameter Name | DD Name | LOI location(1) | Definition |
|---|---|---|---|---|
| 32 | LO_ALM | Lower Limit Warning | | The LO alarm data. |
| 33 | LO_LO_ALM | Lower Limit Alarm | | The LO LO alarm data. |
| 34 | SIMULATE | Simulation | | A group of data that contains the simulated transducer value and status, and the enable/disable bit. |

*(1) If blank, parameter is not applicable to LOI.*

## CONDENSED STATUS

The Rosemount 3051 device utilizes condensed status as recommended by the Profile 3.02 specification and NE 107. Condensed status has some additional bits and changed bit assignments from classic status. Confirm bit assignment using Table D-4 and Table D-5.

Table D-4. Diagnosis Descriptions

| Device Related Diagnosis | | |
|---|---|---|
| **Byte-Bit** | **Unit_Diag_Bit** | **Diagnostic Description** |
| 2-4 | 36 | Cold Start |
| 2-3 | 35 | Warm Start |
| 3-2 | 42 | Function Check |
| 3-0 | 40 | Maintenance Alarm |
| 4-7 | 55 | More Information Available |

Table D-5. Output Status Bit Definition

| Description | HEX | DECIMAL |
|---|---|---|
| Bad - passivated | 0x23 | 35 |
| Bad, maintenance alarm, more diagnostics available | 0x24 | 36 |
| Bad, process related - no maintenance | 0x28 | 40 |
| Uncertain, substitute set | 0x4B | 75 |
| Uncertain, process related, no maintenance | 0x78 | 120 |
| Good, ok | 0x80 | 128 |
| Good, update event | 0x84 | 132 |
| Good, advisory alarm, low limit | 0x89 | 137 |
| Good, advisory alarm, high limit | 0x8A | 138 |
| Good, critical alarm, low limit | 0x8D | 141 |
| Good, critical alarm, high limit | 0x8E | 142 |
| Good, function check | 0xBC | 188 |

# Index

**T**



**V**



**W**

# Rosemount 3051

**Reference Manual**
00809-0100-4797, Rev CA
August 2010



**Emerson Process Management**
**Rosemount Measurement**
8200 Market Boulevard
Chanhassen MN 55317 USA
Tel (USA) 1 800 999 9307
Tel (International) +1 952 906 8888
Fax +1 952 949 7001

**Emerson Process Management**
**GmbH & Co.**
Argelsrieder Feld 3
82234 Wessling
Germany
Tel 49 (8153) 9390
Fax 49 (8153) 939172

**Emerson Process Management Asia**
**Pacific Private Limited**
1 Pandan Crescent
Singapore 128461
T (65) 6777 8211
F (65) 6777 0947
Enquiries@AP.EmersonProcess.com

**Beijing Rosemount Far East**
**Instrument Co., Limited**
No. 6 North Street,
Hepingli, Dong Cheng District
Beijing 100013, China
T (86) (10) 6428 2233
F (86) (10) 6422 8586

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