Reference Manual
00809-0100-4102, Rev AA
June 2012

Rosemount 2051 Wireless Series

Pressure, Level, and Flow Solutions with WirelessHART™ Protocol

IEC

WirelessHART

ROSEMOUNT

EMERSON.
Process Management

Rosemount 2051 Wireless Series Scalable Pressure, Flow, and Level Solutions

⚠ CAUTION

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 Rosemount® 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 Rosemount Sales Representative.

⚠ WARNING

Failure to follow these installation guidelines could result in death or serious injury:

- Make sure only qualified personnel perform the installation.

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 this manual for any restrictions associated with a safe installation.

- Before connecting a Field Communicator in an explosive atmosphere, ensure the instruments are installed in accordance with intrinsically safe or non-incendive field wiring practices.
- Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

Process leaks could result in death or serious injury.

- Install and tighten process connectors before applying pressure.
- Do not attempt to loosen or remove process connectors while the transmitter is in service.

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.

⚠ CAUTION

The Rosemount 2051 and all other wireless devices should be installed only after the Smart Wireless Gateway has been installed and is functioning properly. Wireless devices should also be powered up in order of proximity from the Smart Wireless Gateway, beginning with the closest. This will result in a simpler and faster network installation.

⚠ CAUTION

Shipping considerations for wireless products (Lithium Batteries: Green Power Module, model number 701PGNKF):

The unit was shipped to you without the Power Module installed. Please remove the Power Module from the unit prior to shipping.

Primary lithium batteries are regulated in transportation by the U. S. Department of Transportation, and are also covered by IATA (International Air Transport Association), ICAO (International Civil Aviation Organization), and ARD (European Ground Transportation of Dangerous Goods). It is the responsibility of the shipper to ensure compliance with these or any other local requirements. Please consult current regulations and requirements before shipping.

⚠ CAUTION

Using the Rosmeount 3051 Wireless Pressure Transmitter in a manner other than what is specified by the menufacturer may impair the protection provided by the equipment.

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Section 1: Introduction

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Section 1 Introduction

1.1 Using This Manual

The sections in this manual provide information on installing, operating, and maintaining the Rosemount 2051 Wireless pressure transmitter with WirelessHART™ protocol. The sections are organized as follows:

- Section 2: Configuration provides instruction on commissioning and operating 2051 Wireless transmitters. Information on software functions, configuration parameters, and online variables is also included.
- Section 3: Installation contains mechanical and electrical installation instructions.
- Section 4: Commissioning contains techniques for properly commissioning the device.
- Section 5: Operation and Maintenance 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 approval information.

1.2 Models Covered

The following Rosemount 2051 Pressure Transmitters are covered by this manual:

Rosemount 2051CD Differential Pressure Transmitter

Measures differential pressure up to 2000 psi (137,9 bar).

Rosemount 2051CG Gage Pressure Transmitter

Measures gage pressure up to 2000 psi (137,9 bar).

Rosemount 2051CA Absolute Pressure Transmitter

Measures absolute pressure up to 4000 psia (275,8 bar).

Rosemount 2051T Gage and Absolute Pressure Transmitter

Measures gage pressure up to 10000 psi (689,5 bar).

Rosemount 2051L Liquid Level Transmitter

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

1.3 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 Valves 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. If the product being returned was exposed to a hazardous substance as defined by OSHA, a copy of the required Material Safety Data Sheet (MSDS) for each hazardous substance identified must be included with the returned goods.

⚠ CAUTION

Shipping considerations for wireless products (Lithium Batteries: Green Power Module, model number 701PGNKF):

The unit was shipped to you without the Power Module installed. Please remove the Power Module from the unit prior to shipping.

Primary lithium batteries (charged or discharged) are regulated in transportation by the U. S. Department of Transportation, and are also covered by IATA (International Air Transport Association), ICAO (International Civil Aviation Organization), and ARD (European Ground Transportation of Dangerous Goods). It is the responsibility of the shipper to ensure compliance with these or any other local requirements. Please consult current regulations and requirements before shipping.

The Power Module contains one “D” size primary lithium/thionyl chloride battery (Green Power Module, model number 701PGNKF). Each Power Module contains approximately 5 grams of lithium. Under normal conditions, the Power Module materials are self-contained and are not reactive as long as the batteries and the module integrity are maintained. Care should be taken to prevent thermal, electrical or mechanical damage. Contacts should be protected to prevent premature discharge. Power Module hazards remain when cells are discharged.

Power Module should be stored in a clean and dry area. For maximum battery life, storage temperature should not exceed 30° C.

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

1.4 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

2.1 Overview

This section contains information on configuration and verification that should be performed prior to installation.

Field Communicator and AMS instructions are given to perform configuration functions. For convenience, Field Communicator fast key sequences are labeled “Fast Keys” for each software function below the appropriate headings.

Example Software Function

Fast Keys	1, 2, 3, etc.

2.2 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.

2.2.1 Warnings (⚠)

⚠ WARNING

Explosions can result in death or serious injury.

- Before connecting a Field Communicator in an explosive atmosphere, make sure the instruments are installed in accordance with intrinsically safe or nonincendive field wiring practices.

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.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: This device may not cause harmful interference this device must accept any interference received, including interference that may cause undesired operation.

This device must be installed to ensure a minimum antenna separation distance of 20cm from all persons.

2.3 Required Bench Top Configuration

Bench top configuration requires a Field Communicator, AMS, or any WirelessHART Communicator. Connect the Field Communicator leads to the terminals labeled “COMM” on the terminal block. See Figure 2-1 on page 7.

Bench top configuration consists of testing the transmitter and verifying transmitter configuration data. 2051 Wireless transmitters must be configured before installation. Configuring the transmitter on the bench before installation using a Field Communicator, AMS, or any WirelessHART Communicator ensures that all network settings are working correctly.

When using a Field Communicator, any configuration changes made must be sent to the transmitter by using the “Send” key (F2). AMS configuration changes are implemented when the “Apply” button is clicked.

AMS Wireless Configurator

AMS is capable of connecting to devices either directly, using a HART modem, or wirelessly via the Smart Wireless Gateway. When configuring the device, double click the device icon or right click and select Configure.

2.3.1 Connection Diagrams

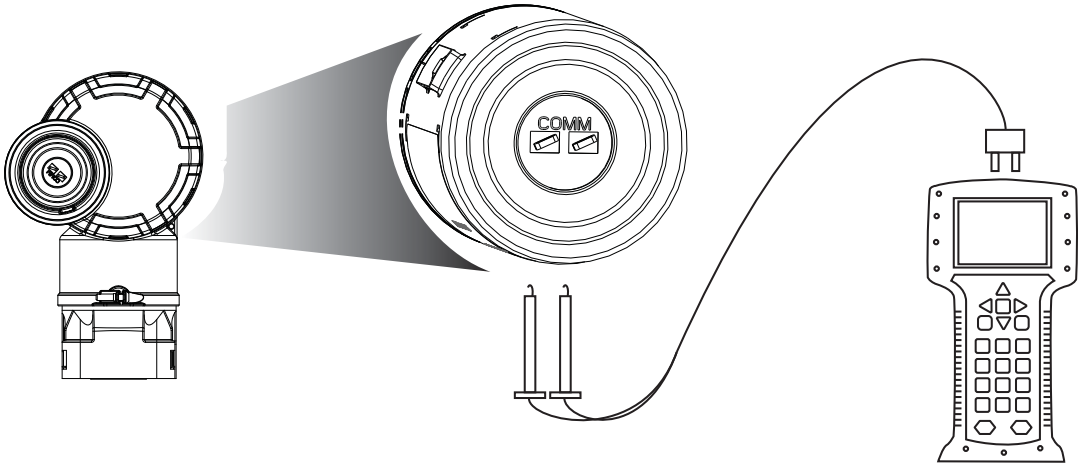
Bench Hook-up

Connect the bench equipment as shown in Figure 2-1, and turn on the Field Communicator by pressing the ON/OFF key or log into AMS. The Field Communicator or AMS will search for a HART-compatible device and indicate when the connection is made. If the Field Communicator or AMS fail to connect, it indicates that no device was found. If this occurs, refer to Section 6: Troubleshooting.

Field Hook-up

Figure 2-1 illustrates the wiring for a field hook-up with a Field Communicator or AMS. The Field Communicator or AMS may be connected at "COMM" on the transmitter terminal block.

Figure 2-1. Field Communicator Connection



For HART communication, a 2051 WirelessHART DD is required.

2.4 Device Network Configuration

2.4.1 Join Device to Network

Fast Keys	2, 1, 1

In order to communicate with the Smart Wireless Gateway, and ultimately the Host System, the transmitter must be configured to communicate over the wireless network. This step is the wireless equivalent of connecting wires from a transmitter to the host system.

1. From the *Home* screen, select 2: Configure.
2. Select 1: Guided Setup.
3. Select 1: Join Device to Network.

Using a Field Communicator or AMS, enter the Network ID and Join Key so that they match the Network ID and Join Key of the Smart Wireless Gateway and other devices in the network. If the Network ID and Join Key are not identical to those set in the Gateway, the transmitter will not communicate with the network. The Network ID and Join Key may be obtained from the Smart Wireless Gateway on the Setup>Network>Settings page on the web server.

2.4.2 Configure Update Rate

Fast Keys	2, 1, 2

The Update Rate is the frequency at which a new measurement is taken and transmitted over the wireless network. This by default is 1 minute. This may be changed at commissioning, or at any time via AMS Wireless Configurator. The Update Rate is user selectable from 8 seconds to 60 minutes.

1. From the *Home* screen, select 2: Configure.
2. Select 1: Guided Setup.
3. Select 2: Configure Update Rate.

When device configuration is completed, remove the Power Module and replace the housing cover. Tighten the cover so that metal contacts metal.

2.4.3 Remove Power Module

After the sensor and network have been configured, remove the Power Module and replace the housing cover. The Power Module should be inserted only when the device is ready to be commissioned.

Use caution when handling the Power Module. The Power Module may be damaged if dropped from heights in excess of 20 ft.

2.5 Review Configuration Data

The following is a list of factory default configurations that can be viewed by using the Field Communicator or AMS. Follow the steps below to review the transmitter configuration information.

Note
Information and procedures in this section that make use of Field Communicator fast key sequences and AMS assume that the transmitter and communication equipment are connected, powered, and operating correctly.

2.5.1 Review Pressure Information

Fast Keys	2, 2, 2

To view pressure information:

1. From the *Home* screen, select 2: Configure.
2. Select 2: Manual Setup.
3. Select 2: Pressure.
4. Select from the corresponding number to view each field:

1	Unit
2	Transfer Function
3	Damping
4	Upper Range Value
5	Lower Range Value
6	Maximum
7	Minimum
8	Minimum Span

2.5.2 Review Device Information

Fast Keys	2, 2, 4, 3

To view device information:

1. From the *Home* screen, select 2: Configure.
2. Select 2: Manual Setup.
3. Select 4: Device Information.
4. Select 3: Device.
5. Select from the corresponding number to view each field:

1	Manufacturer
2	Model

3	Final Assembly Number
4	Universal
5	Field Device
6	Software
7	Hardware
8	Descriptor
9	Message
10	Date
11	Model Number I
12	Model Number II
13	Model Number III
14	SI Unit Restriction
15	Country
16	Device ID

2.5.3 Review Sensor Information

Fast Keys	2, 2, 4, 4

To view sensor information:

1. From the *Home* screen, select 2: Configure.
2. Select 2: Manual Setup.
3. Select 4: Device Information.
4. Select 4: Sensor.
5. Select from the corresponding number to view each field:

1 Measurement Type
2 Module Type
3 Module Serial Number
4 Sensor Materials
- Isolator Material
- Fill Fluid

5 Process Connector
- Connector Type
- Connector Material
- O Ring Material
- Drain Vent Material

6 Remote Seal
- Number of Seals
- Seal Type
- Diaphragm Material
- Seal Fill Fluid

2.5.4 Review Radio Information

Fast Keys	2, 2, 4, 5

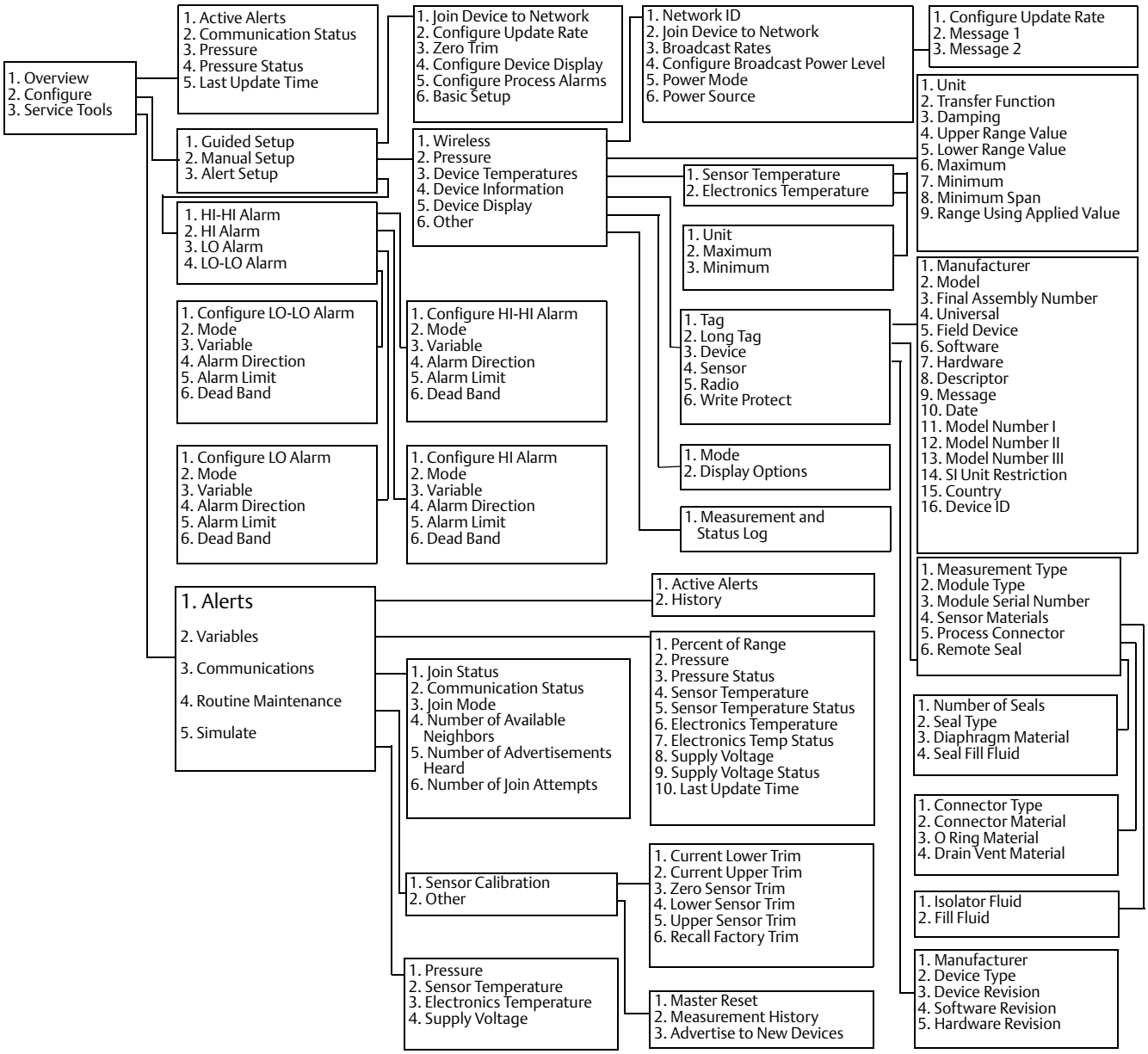
To view radio information:

1. From the *Home* screen, select 2: Configure.
2. Select 2: Manual Setup.
3. Select 4: Device Information.
4. Select 5: Radio.
5. Select from the corresponding number to view each field:

1 Manufacturer

2 Device Type
3 Device Revision
4 Software Revision
5 Hardware Revision

2.6 Field Communicator



2.7 Check Output

Before performing other transmitter operations, ensure that the transmitter is operating properly by checking the operating parameters.

2.7.1 Operating Parameters

Fast Keys	3, 2

The pressure output value in both engineering units and percent of range will reflect the applied pressure even when the applied pressure is outside of the configured range as long as the applied pressure is between the upper and lower range limit of the transmitter. For example, if a Range 2 2051T (LRL = 0 psi, URL = 150 psi) is ranged from 0 to 100 psi, an applied pressure of 150 psi will return a % of range output of 150% and an engineering output of 150 psi.

To view the *Operating Parameters* menu:

1. From the *Home* screen, select 3: Service Tools.
2. Select 2: Variables.

The Operating Parameters menu displays the following information pertaining to the device:

- Percent of Range
- Pressure
- Pressure Status
- Sensor Temperature
- Sensor Temperature Status
- Electronics Temperature
- Electronics Temperature Status
- Supply Voltage
- Supply Voltage Status
- Last Update Time

2.8 Basic Setup

2.8.1 Set Process Variable Unit

Fast Keys	2, 2, 2, 1

The PV Unit command sets the process variable units to allow you to monitor your process using the appropriate units of measure.

To select a unit of measure for the PV:

1. From the *Home* screen, select 2: Configure.
2. Select 2: Manual Setup.
3. Select 2: Pressure.
4. Select 1: Unit to select from the following engineering units:

- inH_2O
- inHg
- ftH_2O
- mmH_2O
- mmHg
- psi
- bar
- mbar
- g/cm^2
- kg/cm^2
- Pa
- kPa
- torr
- atm
- MPa
- inH_2O at 4 °C
- mmH_2O at 4 °C

2.8.2 Set Transfer Function

Fast Keys	2, 2, 2, 2

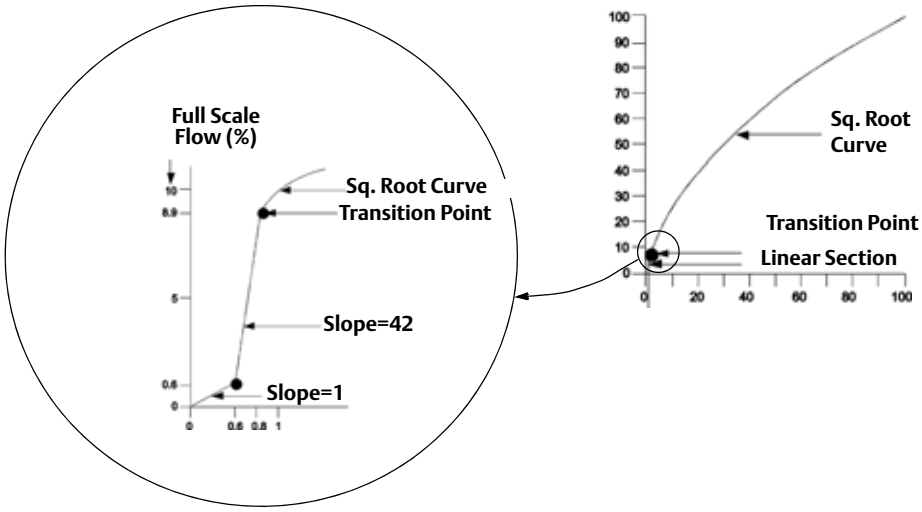
The 2051 Wireless has two output settings: Linear and Square Root. Activate the square root output option to make output proportional to flow. As input approaches zero, the 2051 Wireless automatically switches to linear output in order to ensure a more smooth, stable output near zero (see Figure 2-2).

From 0 to 0.6 percent of the ranged pressure input, the slope of the curve is unity (y = x). This allows accurate calibration near zero. Greater slopes would cause large changes in output (for small changes at input). From 0.6 percent to 0.8 percent, curve slope equals 42 (y = 42x) to achieve continuous transition from linear to square root at the transition point.

To select the output transfer function:

1. From the *Home* screen, select 2: Configure.
2. Select 2: Manual Setup.
3. Select 2: Pressure.
4. Select 2: Transfer Function and choose either Linear or Square Root.

Figure 2-2. Square Root Output Transition Point



2.8.3 Damping

Fast Keys	2, 2, 2, 3

The Damping command introduces a delay in processing which increases the response time of the transmitter; smoothing variations in output readings caused by rapid input changes. In the 2051 Wireless pressure transmitter, damping only takes effect when the device is placed in high power refresh mode and during calibration. In normal power mode, the effective damping is 0. Note that when the device is in high power refresh mode, battery power will be depleted rapidly. Determine the appropriate damp setting based on the necessary response time, signal stability, and other requirements of the loop dynamics of your system. The damping value of your device is user selectable from 0 to 25.6 seconds.

To determine the current damping value:

1. From the Home screen, select 2: Configure.
2. Select 2: Manual Setup.
3. Select 2: Pressure.
4. Select 3: Damping.

2.8.4 Write Protect

Fast Keys	2, 2, 4, 6

The 2051 Wireless has a software write protect security feature.

The view write protect security settings:

1. From the *Home* screen, select 2: Configure.
2. Select 2: Manual Setup.
3. Select 4: Device Information.
4. Select 6: Write Protect.

2.9 LCD Display

2.9.1 LCD Display Configuration

Fast Keys	2, 1, 4

The LCD display indicates output and abbreviated diagnostic messages.

Note
Use Rosemount Wireless LCD Part Number: 00753-9004-0002.

The LCD display features a four-line display and a bar graph. The first line of five characters displays the output description, the second line of seven digits displays the actual value, the third line of six characters displays engineering units and the fourth line displays “Error” when the transmitter is in alarm. The LCD display can also display diagnostic messages. The bar graph represents the network connectivity status.

See “LCD Screen Messages” on page 53 for more information on LCD messages.

To configure LCD display options:

1. From the *Home* screen, select 2: Configure.
2. Select 1: Guided Setup.
3. Select 4: Configure Device Display.

2.10 Detailed Setup

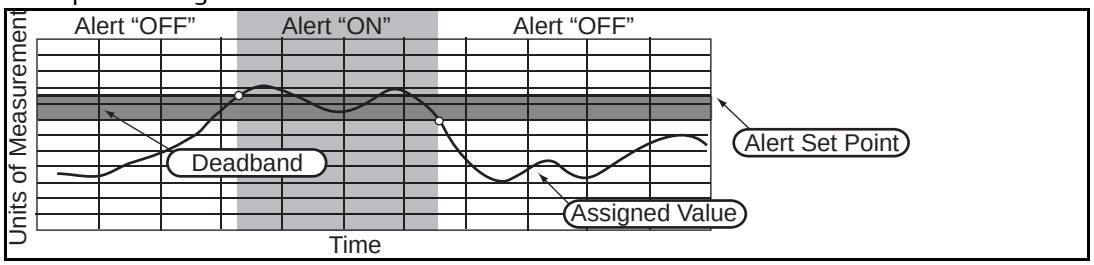
2.10.1 Configure Process Alarms

Fast Keys	2, 1, 5

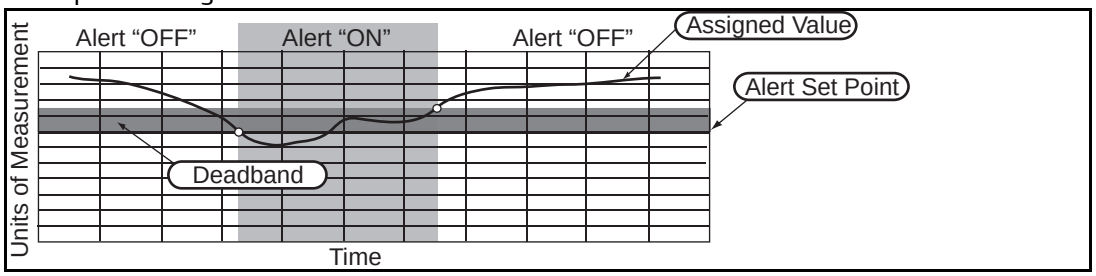
Alerts allow the user to configure the transmitter to output a HART message when the configured data point is exceeded. A process alert will be transmitted continuously if the set points are exceeded and the alert mode is ON. An alert will be displayed on a Field Communicator, AMS status screen or in the error section of the LCD display. The alert will reset once the value returns within range.

Note
HI alert value must be higher than the LO alert value. Both alert values must be within the pressure or temperature sensor limits.

Example 1: Rising Alert



Example 2: Falling Alert



To configure the process alerts, perform the following procedure:

1. From the *Home* screen, select 2: Configure.
2. Select 1: Guided Setup.
3. Select 5: Configure Process Alarms and follow the on-screen instructions to complete configure of process alarms.

2.10.2 Sensor Temperature Unit

Fast Keys	2, 2, 3, 1, 1

The Sensor Temperature Unit command selects between Celsius and Fahrenheit units for the sensor temperature. The sensor temperature output is accessible via HART only.

To select the sensor temperature unit:

1. From the *Home* screen, select 2: Configure.
2. Select 2: Manual Setup.
3. Select 3: Device Temperatures.
4. Select 1: Sensor Temperature.
5. Select 1: Unit to select from Celsius or Fahrenheit.

2.11 Diagnostics and Service

Diagnostics and service functions listed below are primarily for use after field installation. The Transmitter Test feature is designed to verify that the transmitter is operating properly, and can be performed either on the bench or in the field.

2.11.1 Master Reset

Fast Keys	3, 4, 2, 1

The master reset function will reset the device electronics. To perform a master reset:

1. From the *Home* screen, select 3: Service Tools.
2. Select 4: Routine Maintenance.
3. Select 2: Other.
4. Select 1: Master Reset.

2.11.2 Join Status

Fast Keys	3, 3, 1

To view the join status of the device, perform the following procedure:

1. From the *Home* screen, select 3: Service Tools.
2. Select 3: Communications.
3. Select 1: Join Status.

Wireless devices join the secure network through a four step process:

- Step 1. Network Found
- Step 2. Network Security Clearance Granted
- Step 3. Network Bandwidth Allocated
- Step 4. Network Join Complete

2.11.3 Number of Available Neighbors

Fast Keys	3, 3, 4

In a self-organizing network, the more neighbors a device has, the more robust the network will be. To view the number of available neighbors for the wireless device, perform the following procedure:

1. From the *Home* screen, select 3: Service Tools.
2. Select 3: Routine Maintenance.
3. Select 4: Number of Available Neighbors.

2.12 Advanced Functions for HART Protocol

2.12.1 Saving, Recalling, and Cloning Configuration Data

Fast Keys	left arrow, 1, 2

Use the cloning feature of the Field Communicator or the AMS "User Configuration" feature to configure several 2051 Wireless transmitters similarly. Cloning involves configuring a transmitter, saving the configuration data, then sending a copy of the data to a separate transmitter. Several possible procedures exist when saving, recalling, and cloning configuration data. For complete instructions refer to the Field Communicator manual (publication no. 00809-0100-4276) or AMS Books Online. One common method is as follows:

Field Communicator

1. Completely configure the first transmitter.
2. Save the configuration data:
   a. Select **F2 SAVE** from the Field Communicator **HOME/ONLINE** screen.
   b. Ensure that the location to which the data will be saved is set to **MODULE**. If it is not, select 1: Location to set the save location to **MODULE**.
   c. Select 2: Name, to name the configuration data. The default is the transmitter tag number.
   d. Ensure that the data type is set to **STANDARD**. If the data type is NOT **STANDARD**, select 3: Data Type to set the data type to **STANDARD**.
   e. Select **F2 SAVE**.
3. Connect and power the receiving transmitter and Field Communicator.
4. Select the back arrow from the **HOME/ONLINE** screen. The Field Communicator menu appears.
5. Select 1: Offline, 2: Saved Configuration, 1: Module Contents to reach the **MODULE CONTENTS** menu.
6. Use the **DOWN ARROW** to scroll through the list of configurations in the memory module, and use the **RIGHT ARROW** to select and retrieve the required configuration.
7. Select 1: Edit.
8. Select 1: Mark All.
9. Select **F2 SAVE**.
10. Use the **DOWN ARROW** to scroll through the list of configurations in the memory module, and use the **RIGHT ARROW** to select the configuration again.
11. Select 3: Send to download the configuration to the transmitter.
12. Select OK after the control loop is set to manual.
13. After the configuration has been sent, select OK.

When finished, the Field Communicator informs you of the status. Repeat Steps 3 through 13 to configure another transmitter.

Note
The transmitter receiving cloned data must have the same software version (or later) as the original transmitter.

AMS creating a Reusable Copy

To create a reusable copy of a configuration perform the following procedure:

1. Completely configure the first transmitter.
2. Select View then User Configuration View from the menu bar (or click the toolbar button).
3. In the User Configuration window, right click and select New from the context menu.
4. In the New window, select a device from the list of templates shown, and click OK.
5. The template is copied into the User Configurations window, with the tag name highlighted; rename it as appropriate and press Enter.

Note
A device icon can also be copied by dragging and dropping a device template or any other device icon from AMS Explorer or Device Connection View into the User Configurations window.

The “Compare Configurations” window appears, showing the Current values of the copied device on one side and mostly blank fields on the other (User Configuration) side.

6. Transfer values from the current configuration to the user configuration as appropriate or enter values by typing them into the available fields.
7. Click Apply to apply the values, or click OK to apply the values and close the window.

AMS Applying a User Configuration

Any amount of user configurations can be created for the application. They can also be saved, and applied to connected devices or to devices in the Device List or Plant Database.

To apply a user configuration perform the following procedure:

1. Select the desired user configuration in the User Configurations window.
2. Drag the icon onto a like device in AMS Explorer or Device Connection View. The Compare Configurations window opens, showing the parameters of the target device on one side and the parameters of the user configuration on the other.
3. Transfer parameters from the user configuration to the target device as desired, Click OK to apply the configuration and close the window.

Section 3 Installation

3.1 Overview

The information in this section covers installation considerations. A Quick Installation Guide (document number 00825-0100-4100) is shipped with every transmitter to describe basic installation and startup procedures. Dimensional drawings for each Rosemount 2051 Wireless variation and mounting configuration are included in Appendix A: Specifications and Reference Data.

Field Communicator and AMS instructions are given to perform configuration functions. For convenience, Field Communicator fast key sequences are labeled “Fast Keys” for each software function below the appropriate headings.

3.2 Safety Messages

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

3.2.1 Warnings (⚠)

⚠ WARNING

Failure to follow these installation guidelines could result in death or serious injury.

- Make sure only qualified personnel perform the installation.

Explosions can 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 2051 Wireless reference manual for any restrictions associated with a safe installation.

- Before connecting a Field Communicator in an explosive atmosphere, make sure the instruments are installed in accordance with intrinsically safe or non-incendive field wiring practices.
- Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

Electrical shock can result in death or serious injury.

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

⚠ WARNING

Process leaks could result in death or serious injury.

- Install and tighten process connectors before applying pressure.
- Do not attempt to loosen or remove process connectors while the transmitter is in service.

Replacement equipment or spare parts not approved by Rosemount Inc. for use as spare parts could reduce the pressure retaining capabilities of the transmitter and may render the instrument dangerous.

- Use only bolts supplied or sold by Rosemount Inc. as spare parts.

Improper assembly of manifolds to traditional flange can damage SuperModule™.

- For safe assembly of manifold to traditional flange, bolts must break back plane of flange web (i.e., bolt hold) but must not contact module housing.

The Power Module with the wireless unit contains one “D” size primary lithium/thionyl chloride battery (Green Power Module, model number 701PGNKF). Each Power Module contains approximately 5 grams of lithium. Under normal conditions, the Power Module materials are self-contained and are not reactive as long as the batteries and the pack integrity are maintained. Care should be taken to prevent thermal, electrical or mechanical damage. Contacts should be protected to prevent premature discharge.

3.3 Considerations

3.3.1 General

Measurement performance 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 performance. Also, consider 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.

3.3.2 Wireless

Power Up Sequence

The Power Module should not be installed on any wireless device until the Smart Wireless Gateway is installed and functioning properly. Wireless devices should also be powered up in order of proximity from the Smart Wireless Gateway beginning with the closest. This will result in a simpler and faster network installation. Enable High Speed Operation on the Gateway to ensure that new devices join the network faster. For more information see the Smart Wireless Gateway Manual (Doc. No. 00809-0200-4420).

Field Communicator Connections

In order for the Field Communicator to interface with the 2051, the Power Module must be connected.

Figure 3-1. Field Communicator Connections

3.3.3 Mechanical

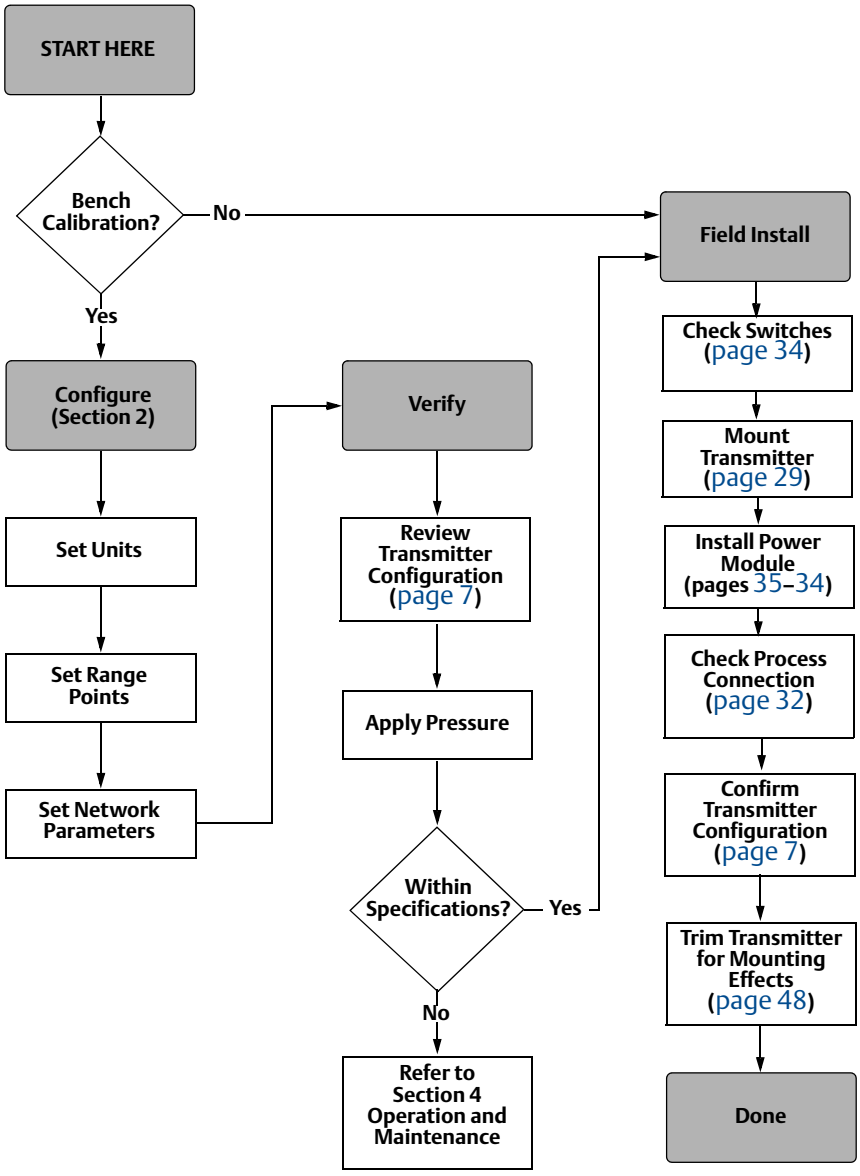
Note
For steam service or for applications with process temperatures greater than the limits of the transmitter, do not blow down impulse piping through the transmitter. Flush lines with the blocking valves closed and refill lines with water before resuming measurement.

Note
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 3.4.2 on page 32, keeping drain/vent connections on the bottom for gas service and on the top for liquid service.

3.3.4 Environmental

Access requirements and cover installation on page 29 can help optimize transmitter performance. Mount the transmitter to minimize ambient temperature changes, vibration, mechanical shock, and to avoid external contact with corrosive materials. Appendix A: Specifications and Reference Data lists temperature operating limits.

Figure 3-2. Installation Flowchart



3.4 Installation Procedures

For dimensional drawing information refer to “Dimensional Drawings” on page 83.

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

See “Consider Housing Rotation” on page 34.

Power Module Side of Electronics Housing

Mount the transmitter so the Power Module side is accessible. Clearance of 2.75-in. (70 mm) is required for cover removal.

Circuit Side of Electronics Housing

Provide 0.75 in. (19 mm) of clearance for units with out an LCD display. Three inches of clearance is required for cover removal if a meter is installed.

Cover Installation

Always ensure a proper seal by installing the electronics housing cover(s) so that polymer contacts polymer. Use Rosemount O-rings.

3.4.1 Mount the Transmitter

Mounting Brackets

Facilitate mounting transmitter to a 2-in. pipe, or to a panel. The B4 Bracket (SST) option is standard for use with the Coplanar and In-Line flanges. “Coplanar Flange Mounting Configurations” on page 83 shows bracket dimensions and mounting configurations for the B4 option.

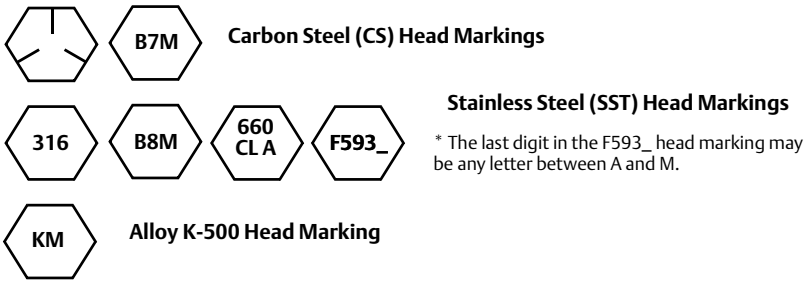
Options B1–B3 and B7–B9 are sturdy, epoxy/polyester-painted brackets designed for use with the traditional flange. The B1–B3 brackets have carbon steel bolts, while the B7–B9 brackets have stainless steel bolts. The BA and BC brackets and bolts are stainless steel. The B1/B7/BA and B3/B9/BC style brackets support 2-inch pipe-mount installations, and the B2/B8 style brackets support panel mounting.

Note
Most transmitters are calibrated in the horizontal position. Mounting the transmitter in any other position will shift the zero point to the equivalent amount of liquid head caused by the varied mounting position. To reset zero point, refer to “Sensor Trim” on page 49.

Position the antenna such that it is vertical, typically straight up (antenna may be pointed down as well.)

Flange Bolts

The 2051 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 2-6, 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:



Bolt Installation

⚠ Only use bolts supplied with the Rosemount 2051 or sold by Emerson Process Management as spare parts. When installing the transmitter to one of the optional mounting brackets, torque the bolts to 125 in-lb. (0,9 N-m). Use the following bolt installation procedure:

1. Finger-tighten the bolts.
2. Torque the bolts to the initial torque value using a crossing pattern.
3. Torque the bolts to the final torque value using the same crossing pattern.

Torque values for the flange and manifold adapter bolts are as follows:

Table 3-1. 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 K-500—Option L6	300 in.-lb (34 N-m)	650 in.-lb (73 N-m)
ASTM-A-453-660—Option L7	150 in.-lb (17 N-m)	300 in.-lb (34 N-m)
ASTM-A-193-B8M—Option L8	150 in.-lb (17 N-m)	300 in.-lb (34 N-m)

Impulse Piping

The piping between the process and the transmitter must accurately transfer the pressure to obtain accurate measurements. There are five possible sources of error: 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.

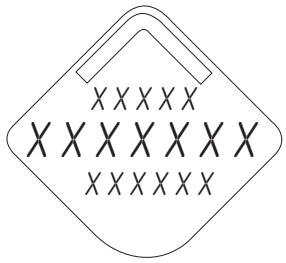
The best location for the transmitter in relation to the process pipe depends on the process itself. Use the following guidelines to determine transmitter location and placement of impulse piping:

- Keep impulse piping as short as possible.
- For liquid service, slope the impulse piping at least 1 inch per foot (8 cm per m) upward from the transmitter toward the process connection.
- For gas service, slope the impulse piping at least 1 inch per foot (8 cm per 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 SuperModule and flanges.
- Prevent sediment deposits in the impulse piping.
- Keep the liquid head balanced on both legs of the impulse piping.
- Avoid conditions that might allow process fluid to freeze within the process flange.

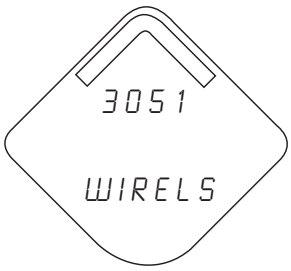
5.3 LCD Screen Messages

5.3.1 Startup Screen Sequence

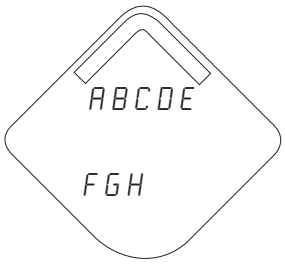
The following screens will display when the Power Module is first connected to the Rosemount 2051 Wireless.



All Segments On: used to visually determine if there are any bad segments on the LCD



Device Identification: used to determine Device Type.

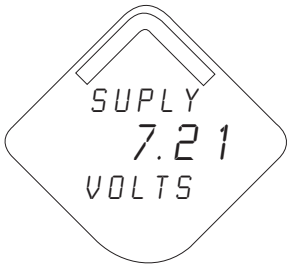


Device Information - Tag: user entered tag which is eight characters long - will not display if all characters are blank

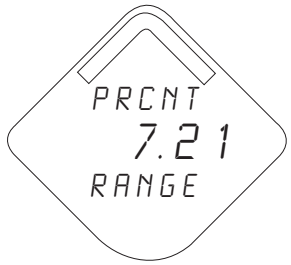
PV Screen - process pressure

SV Screen - sensor temperature value

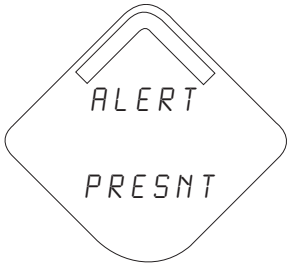
TV Screen - device temperature value



QV Screen - voltage reading at the power supply terminals



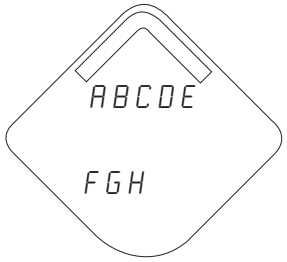
Percent Range Screen - percent range reading



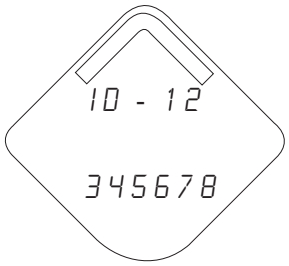
Alert Screen - at least one alert is present - this screen will not display if no alerts are present

5.3.2 Diagnostic button screen sequence

The following five screens will display when the device is operating properly and the Diagnostic Button has been pressed.



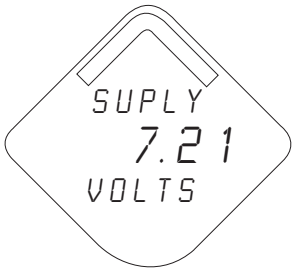
Device Information - Tag: user entered tag which is eight characters long - will not display if all characters are blank



Device Identification: used to determine Device ID

Diagnostic Button Screen 3: assuming the device has the correct join key, this ID tells the user what network the device can connect with

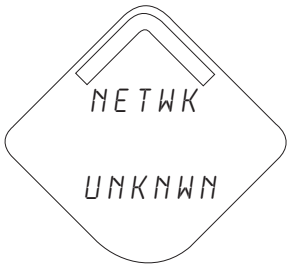
Diagnostic Button Screen 4: the device has joined a network and has been fully configured and has multiple parents



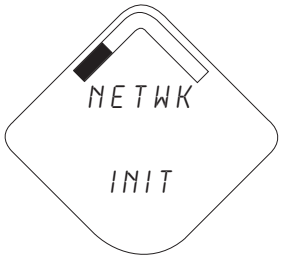
Diagnostic Button Screen 5: voltage reading at the power supply terminals

5.3.3 Network diagnostic status screens

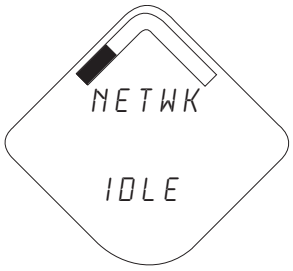
These screens display the network status of the device. Only one will be shown during the startup sequence or diagnostic sequence.



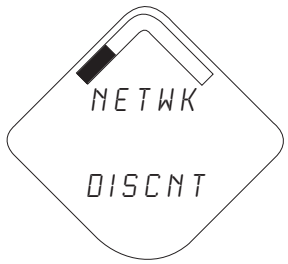
Diagnostic Button Screen 4.1: the device is attempting to start the radio



Diagnostic Button Screen 4.2: the device has just restarted

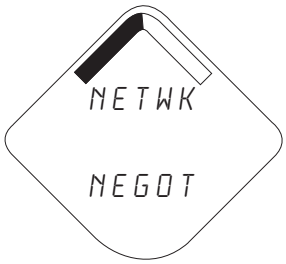


Diagnostic Button Screen 4.3: the device is starting to join the process

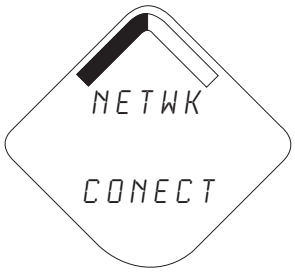


Diagnostic Button Screen 4.4: the device is in a disconnected state and requires a “Force Join” command to join the network

Diagnostic Button Screen 4.5: the device is searching for the Network



Diagnostic Button Screen 4.6: the device is attempting to join a network



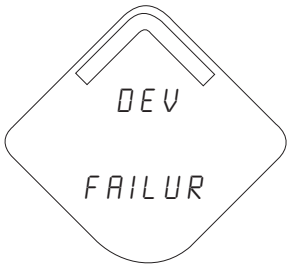
Diagnostic Button Screen 4.7: the device is connected to the Network, but is in a “Quarantined” state

Diagnostic Button Screen 4.8: the device is joined and operational, but is running with limited bandwidth for sending periodic data

Diagnostic Button Screen 4.9: the device has joined a network and has been fully configured and has multiple parents

5.3.4 Device Diagnostic Screens

The following screens will show the device diagnostics depending on the state of the device.

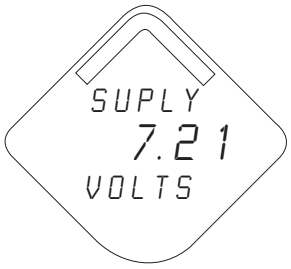


Device Information - Status: there is a critical error which may prevent the device from operating correctly. Check additional status screens for more information.

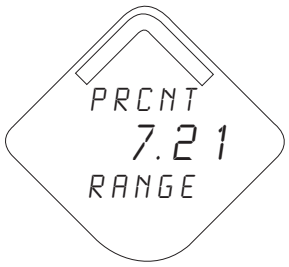
PV Screen - process pressure value

SV Screen - sensor temperature value

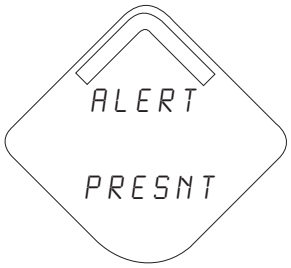
TV Screen - device temperature value



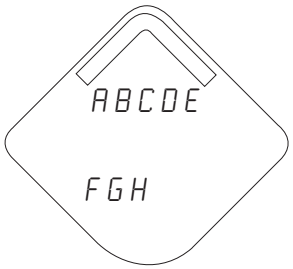
QV Screen - voltage reading at the power supply terminals



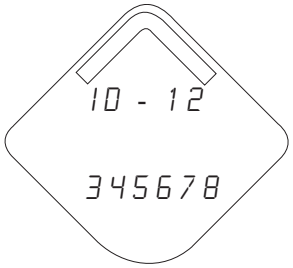
Percent Range Screen - percent range reading



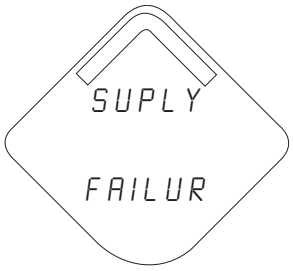
Alert Screen - at least one alert is present - this screen will not display if no alerts are present



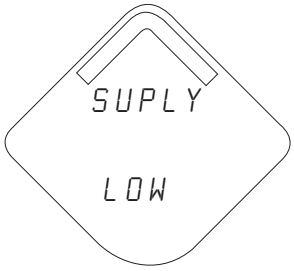
Diagnostic Button Screen 1 - Tag: user entered tag which is eight characters long - will not display if all characters are blank



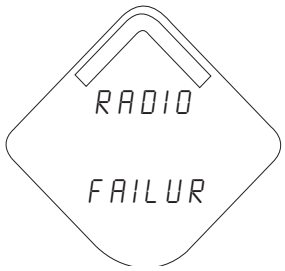
Diagnostic Button Screen 2: the device's identifier that is used to make up the HART long address - the Smart Wireless Gateway may use this to help identify devices if no unique user tag is available



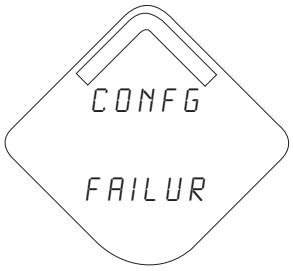
Diagnostic Button Screen 7.1: the terminal voltage has dropped below level of operating limit. Replace the Power Module (Part Number: 701PGNKF)



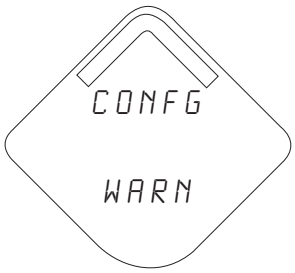
Diagnostic Button Screen 7.2: the terminal voltage is below the recommended operating range - if this is a battery operated device, the Power Module should be replaced - for line powered devices, the supply voltage should be increased



Diagnostic Button Screen 8: the device may not be able to communicate with the radio or the radio has an internal error. In this state the device may still be operational and publishing HART data

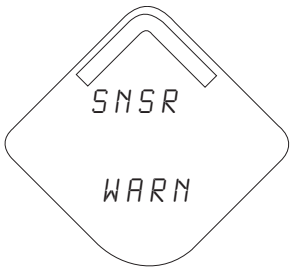


Diagnostic Button Screen 9.1: configuration of the transmitter is invalid such that critical operation of the device may be affected - check the extended configuration status to identify which configuration item(s) need to be corrected



Diagnostic Button Screen 9.2: configuration of the transmitter is invalid such that non-critical operation of the device may be affected - check the extended configuration status to identify which configuration item(s) need to be corrected

Diagnostic Button Screen 10.1: a sensor attached to the transmitter has failed, and valid readings from that sensor are no longer possible - check the sensor and sensor wiring connections - check additional status for more detailed information of the failure source



Diagnostic Button Screen 10.2: a sensor attached to the transmitter is degraded, readings from that sensor may not be within accuracy specifications - check the process, and sensor wiring connections - check additional status for more detailed information of the warning source

Note
Use the Rosemount Wireless LCD Part Number: 00753-9004-0002.

Section 6 Troubleshooting

6.1 Overview

Table 6-2 provides summarized maintenance and troubleshooting suggestions for the most common operating problems.

If you suspect malfunction despite the absence of any diagnostic messages on the Field Communicator display, follow the procedures described here to verify that transmitter hardware and process connections are in good working order. Always deal with the most likely checkpoints first.

6.2 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.

6.2.1 Warnings (⚠)

⚠ WARNING

Explosions can result in death or serious injury.

- Before connecting a Field Communicator in an explosive atmosphere, make sure that the instruments are installed according to intrinsically safe or nonincendive field wiring practices.

Static electricity can damage sensitive components.

- Observe safe handling precautions for static-sensitive components.

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.

Process leaks could result in death or serious injury.

- Install and tighten process connectors before applying pressure.
- Do not attempt to loosen or remove process connectors while the transmitter is in service.

Table 6-1. Rosemount 2051 Wireless Device Status Information

Device Status	Description	Recommended Action
Electronics Failure	An electronics error that could impact the device measement reading has occurred.	1. Reset the device 2. Reconfirm all configuration items in the device 3. If the condition persists, replace the electronics
Radio Failure	The wireless radio has detected a failure or stopped communicating.	1. Reset the device 2. If the condition persists, replace the electronics
Supply Voltage Failure	The supply voltage is too low for the device to function properly.	1. Replace the Power Module
Electronics Warning	The device has detected an electronics error that does not currently impact the device measurement reading.	1. Reset the device 2. Reconfirm all configuration items in the device 3. If the condition persists, replace the electronics
Pressure has Exceeded Limits	The sensor has exceeded the maximum measurement range.	1. Check process for possible saturation condition 2. Verify that the appropriate sensor was chosen for the application 3. Reconfirm sensor configuration 4. Reset the device 5. Replace the sensor
Electronics Temperature has Exceeded Limits	The electronics temperature has exceeded the transmitter's maximum range.	1. Verify environmental temperature is within the transmitter's range 2. Remote mount the transmitter away from process and environmental conditions 3. Reset the device 4. If the condition persists, replace the electronics
Supply Voltage Low	The supply voltage is low and may soon affect broadcast updates.	1. Replace the Power Module
Database Memory Warning	The device has failed to write to the database memory. Any data written during this time may have been lost.	1. Reset the device 2. Reconfirm all configuration items in the device 3. If logging dynamic data not needed, this advisory can be safely ignored 4. If the condition persists, replace the electronics

Device Status	Description	Recommended Action
Configuration Error	The device has detected a configuration error based on a change to the device.	1. Click on details for more information 2. Correct the parameter that has a configuration error 3. Reset the device 4. If the condition persists, replace the electronics
HI HI Alarm	The primary variable has surpassed the user defined limit.	1. Verify that the process variable is within user specified limits 2. Reconfirm the user defined alarm limit 3. If not needed, disable this alert
HI Alarm	The primary variable has surpassed the user defined limit.	1. Verify that the process variable is within user specified limits 2. Reconfirm the user defined alarm limit 3. If not needed, disable this alert
LO Alarm	The primary variable has surpassed the user defined limit.	1. Verify that the process variable is within user specified limits 2. Reconfirm the user defined alarm limit 3. If not needed, disable this alert
LO LO Alarm	The primary variable has surpassed the user defined limit.	1. Verify that the process variable is within user specified limits 2. Reconfirm the user defined alarm limit 3. If not needed, disable this alert
Button Stuck	A buttons on the Electronics Board is detected as stuck in the active position.	1. Check the buttons for obstructions 2. Reset the device 3. If the condition persists, replace the electronics
Simulation Active	The device is in simulation mode and may not be reporting actual information.	1. Verify that simulation is no longer required 2. Disable Simulation mode in Service Tools 3. Reset the device

Table 6-2. Rosemount 2051 Wireless Troubleshooting

Symptom	Recommended Actions
Transmitter will not respond to changes in applied pressure	Check test equipment Check impulse piping or manifold for blockage Verify applied pressure is within sensor limits
Digital Pressure Variable reading is low or high	Check test equipment (verify accuracy) Check impulse piping for blockage or low fill in wet leg Verify transmitter is calibrated properly Verify pressure calculations for application
Digital Pressure Variable reading is erratic	Check application for faulty equipment in pressure line Verify transmitter is not reacting directly to equipment turning on/off
LCD display is not functioning	Reseat the LCD according to "Installing the LCD Display" on page 35 Verify that the LCD display is a wireless LCD Meter. An LCD from a wired device will not function in a wireless device. Rosemount part number: 00753-9004-0002 Verify that the LCD display mode is not disabled.

Table 6-3. Wireless Network Troubleshooting

Symptom	Recommended Actions
Device not joining the network	Verify network ID and join key Wait longer (30 min.) Enable High Speed Operation on Smart Wireless Gateway Check Power Module Verify device is within range of at least one other device Verify network is in active network advertise Power Cycle device to try again Verify device is configured to join. Send the "Force Join" command to the device See troubleshooting section of Smart Wireless Gateway for more information
Short battery life	Check that "Power Always On" mode is off Verify device is not installed in extreme temperatures Verfiy that device is not a network pinch point Check for excessive network rejoins due to poor connectivity
Limited Bandwidth Error	Reduce the Update Rate on transmitter Increase communication paths by adding more wireless points Check that device has been online for at least an hour Check that device is not routing through a "limited" routing node Create a new network with an additional Smart Wireless Gateway

6.3 Disassembly Procedures

6.3.1 Remove from Service

Be aware of the following:

- Follow all plant safety rules and procedures.
- Isolate and vent the process from the transmitter before removing the transmitter from service.
- Detach the process flange by removing the four flange bolts and two alignment screws that secure it.
- 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.
- Whenever you remove the process flange or flange adapters, visually inspect the Teflon o-rings. Replace the o-rings if they show any signs of damage, such as nicks or cuts. If they are not damaged, reuse them.

The 2051 Wireless 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.

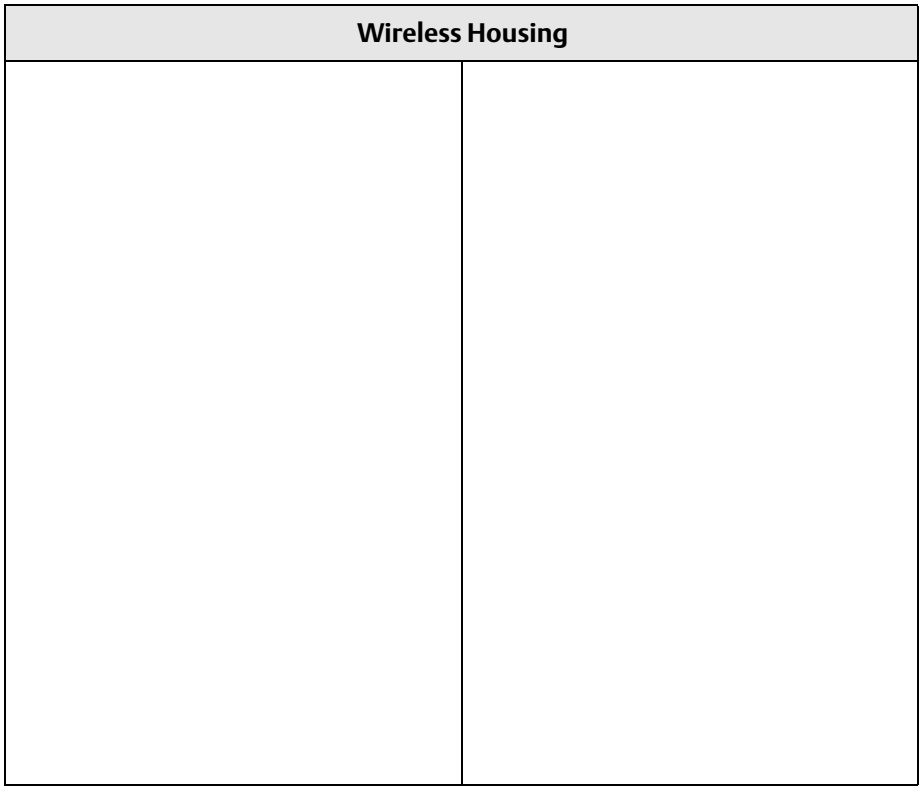
The 2051 Wireless In-line transmitter is attached to the process by a single hex nut process connection. Loosen the hex nut to separate the transmitter from the process.

6.3.2 Remove Feature Assembly

The Wireless Feature Board is located in the electronics compartment. To remove the assembly, perform the following procedure.

1. Remove the housing cover opposite the field terminal side.
2. Remove the LCD Display, if applicable. To do this, hold in the two clips and pull outward.
3. Loosen the two small screws located on the assembly.
4. Replace the LCD Display. This will help in removing the assembly.
5. Pull out the assembly to expose and locate the SuperModule connector and antenna connector.
6. Grasp antenna connector by the base and pull upwards to disconnect.
7. Grasp the SuperModule connector, squeeze the clips and pull upwards (avoid pulling wires).

Figure 6-1. Sensor module connector view



6.4 Reassembly Procedures

important
The V-Seal must be installed at the bottom of the housing.

6.4.1 Reassemble the Process Flange

1. Inspect the Teflon sensor module o-rings. If the o-rings are not damaged, reuse them. 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 flange on the sensor module. To hold the process flange in place, install the two alignment screws to finger tight (screws are not pressure retaining). Do not overtighten; this will affect module-to-flange alignment.

3. Install the appropriate flange bolts.
   a. If the installation requires a 1/4–18 NPT mounting, use four 1.75-in. flange bolts. Go to Step f.
   b. If the installation requires a 1/2–14 NPT mounting, use four 2.88-in. process flange/adapter bolts. For gage pressure configurations, use two 2.88-in. bolts and two 1.75-in. bolts. Go to Step d.
   c. If the installation uses a manifold (differential pressure applications only), use appropriate bolts. Go to Step e.
   d. Hold the flange adapters and adapter o-rings in place while finger-tightening the bolts. Go to Step g.
   e. Align the process flange with the manifold.
   f. Finger tighten the bolts.
   g. Tighten the bolts to the initial torque value using a crossed pattern. See Table 6-4 for appropriate torque values.
   h. Tighten the bolts to the final torque value using a crossed pattern. See Table 6-4 for appropriate torque values. When fully tightened, the bolts should extend through the top of the module housing.
   i. If the installation uses a manifold, then install flange adapters on the process end of the manifold using the 1.75-in. flange bolts supplied with the transmitter.

Table 6-4. 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 K-500—Option L6	300 in-lb. (34 N-m)	650 in-lb. (73 N-m)
ASTM-A-453-660—Option L7	150 in-lb. (17 N-m)	300 in-lb. (34 N-m)
ASTM-A-193-B8M—Option L8	150 in-lb. (17 N-m)	300 in-lb. (34 N-m)

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

5. Install the drain/vent valve.

   a. 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.

   b. 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.

   c. Tighten the drain/vent valve to 250 in-lb. (28.25 N-m).

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.

Appendix A Specifications and Reference Data

A.1 Specifications

A.2 Performance Specifications

For zero-based spans, reference conditions, silicone oil fill, glass-filled PTFE o-rings, SST materials, *Coplanar* flange (2051C) or
1/2 in.- 14 NPT (2051T) 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 ±3σ or better.

Digital Output

For wireless devices, use calibrated range in place of span.

Reference Accuracy[1]

Models[1]	Standard	High Accuracy Option
2051CD, 2051CG Range 0 (CD)	±0.10% of span For spans less than 2:1, accuracy = ±0.05% of URL	
Range 1	±0.10% of span For spans less than 15:1, accuracy = $\pm\left[0.025 + 0.005\left(\frac{URL}{Span}\right)\right]$% of Span	
Ranges 2-5	±0.065% of span For spans less than 10:1, accuracy = $\pm\left[0.015 + 0.005\left(\frac{URL}{Span}\right)\right]$% of Span	Ranges 2-4 High Accuracy Option, P8 ±0.04% of span For spans less than 5:1, accuracy = $\pm\left[0.015 + 0.005\left(\frac{URL}{Span}\right)\right]$% of Span
2051T Ranges 1-4	±0.065% of span For spans less than 10:1, accuracy = $\pm\left[0.0075\left(\frac{URL}{Span}\right)\right]$% of Span	Ranges 1-4 High Accuracy Option, P8 ±0.04% of span For spans less than 5:1, accuracy = $\pm\left[0.0075\left(\frac{URL}{Span}\right)\right]$% of Span
Range 5	±0.075% of span	
2051CA Ranges 1-4	±0.065% of span For spans less than 10:1, accuracy = $\pm\left[0.0075\left(\frac{URL}{Span}\right)\right]$% of Span	Ranges 2-4 High Accuracy Option, P8 ±0.04% of span For spans less than 5:1, accuracy = $\pm\left[0.0075\left(\frac{URL}{Span}\right)\right]$% of Span
2051H/2051L All Ranges	±0.075% of span For spans less than 10:1, accuracy = $\pm\left[0.025 + 0.005\left(\frac{URL}{Span}\right)\right]$% of Span	

(1) Total performance is determined by performing a root sum square calculation on reference accuracy, ambient temperature effect, and line pressure effect errors. For FOUNDATION fieldbus transmitters, use calibrated range in place of span. For zero based spans, reference conditions, silicone oil fill, SST materials, Coplanar flange (2051C) or 1/2 in. - 18 NPT (2051T) process connections, digital trim values set to equal range points.

Total Performance

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
2051C Ranges 2-5	±0.15% of span
2051T Ranges 1-4	±0.15% of span

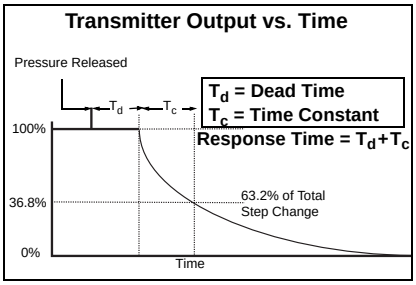
Long Term Stability

Models	Long Term Stability
2051C Ranges 2-5	±0.125% of URL for 5 years ±50 °F (28 °C) temperature changes, and up to 1000 psi (6,9 MPa) line pressure.
2051CD Low/Draft Range Ranges 0-1	±0.2% of URL for 1 year
2051T Ranges 1-4	±0.125% of URL for 5 years ±50 °F (28 °C) temperature changes, and up to 1000 psi (6,9 MPa) line pressure.

Dynamic Performance

	4 - 20 mA (*HART* protocol)(1)	Fieldbus protocol(3)	Typical HART Transmitter Response Time
Total Response Time ($T_d + T_c$)(2):			
2051C, Ranges 2-5: Range 1: Range 0: 2051T: 2051H/L:	100 ms 255 ms 700 ms 100 ms Consult factory	152 ms 307 ms 752 ms 152 ms Consult factory	
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) Transmitter fieldbus output only, segment macro-cycle not included.



Line Pressure Effect per 1000 psi (6,9 MPa)(1)

Models(1)	Line Pressure Effect
2051CD Range 0	Zero Error(2) ±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)
Range 0	Span Error ±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)
2051HD All Ranges	Zero Error(1) ±0.1% of URL/1000 psi (68,9 bar) for line pressures from 0 to 2000 psi (0 to 13,7 MPa)
All Ranges	Span Error ±0.1% of reading/1000 psi (68,9 bar)

(1) For zero error specifications for line pressures above 2000 psi (137,9 bar) or line pressure effect specifications for DP Ranges 4-5, see "Compensating for Line Pressure (Range 4 and Range 5)" on page 50.
(2) Can be calibrated out at line pressure.

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

Models	Ambient Temperature Effect
2051CD/CG 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 ±(0.025% URL + 0.125% span) from 5:1 to 100:1
2051T Range 1	±(0.025% URL + 0.125% span) from 1:1 to 10:1 ±(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 ±(0.035% URL + 0.125% span) from 30:1 to 100:1
Range 5	±(0.1% URL + 0.15% span)
2051CA 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
2051L	See Rosemount Inc. Instrument Toolkit® software.

Mounting Position Effects

Models	Mounting Position Effects
2051C	Zero shifts up to ±1.25 inH_2O (3,11 mbar), which can be calibrated out. No span effect.
2051L	With liquid level diaphragm in vertical plane, zero shift of up to 1 inH_2O (2,49 mbar). With diaphragm in horizontal plane, zero shift of up to 5 inH_2O (12,43 mbar) plus extension length on extended units. All zero shifts can be calibrated out. No span effect.
2051T/CA	Zero shifts up to 2.5 inH_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 0.21mm displacement peak amplitude / 60-2000 Hz 3g).

Power Supply Effect

Less than ±0.005% of calibrated span per volt.

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)

A.3 Functional Specifications

A.3.1 Range and Sensor Limits

Table A-1. 2051CD, 2051CG, 2051L, and 2051H Range and Sensor Limits

Range	Minimum Span		Range and Sensor Limits				
			Lower (LRL)				
	2051CD(1), CG, L, H	Upper (URL)	2051C Differential	2051C/ Gage	2051L Differential	2051L Gage	2051H Differential
0	0.1 inH_2O (0,25 mbar)	3.0 inH_2O (7,47 mbar)	–3.0 inH_2O (-7,47 mbar)	NA	NA	NA	NA
1	0.5 inH_2O (1,2 mbar)	25 inH_2O (62,3 mbar)	–25 inH_2O (–62,1 mbar)	–25 inH_2O (–62,1 mbar)	NA	NA	NA
2	2.5 inH_2O (6,2 mbar)	250 inH_2O (0,62 bar)	–250 inH_2O (–0,62 bar)	–250 inH_2O (–0,62 bar)	–250 inH_2O (–0,62 bar)	–250 inH_2O (–0,62 bar)	–250 inH_2O (–0,62 bar)
3	10 inH_2O (24,9 mbar)	1000 inH_2O (2,49 bar)	–1000 inH_2O (–2,49 bar)	0.5 psia (34,5 mbar abs)	–1000 inH_2O (–2,49 bar)	0.5 psia (34,5 mbar abs)	–1000 inH_2O (–2,49 bar)
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)	–300 psi (–20,6 bar)
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	– 2000 psi (–137,9 bar)

(1) Range 0 only available with 2051CD. Range 1 only available with 2051CD or 2051CG.

Zero and Span Adjustment Requirements (*HART* and Low Power)

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

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

Service

Liquid, gas, and vapor applications

4–20 mA (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.

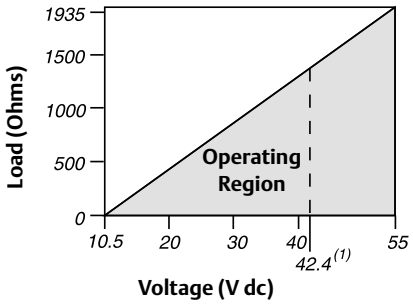
Power Supply

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.

Wireless Self-Organizing Networks

Output

WirelessHART, 2.4 GHz DSSS.

Local Display

The optional five-digit LCD can display user-selectable information such as primary variable in engineering units, percent of range, sensor module temperature, and electronics temperature. Display updates at up to once per minute.

Update Rate

User selectable, 1 sec. to 60 min.

Wireless Power Module

Field replaceable, keyed connection eliminates the risk of incorrect installation, Intrinsically Safe Lithium-thionyl chloride Power Module (Green Power Module, model number 701PGNKF) with polybutadine terephthalate (PBT) enclosure. Ten-year life at one minute update rate.(1)

(1) Reference conditions are 70 °F (21 °C), and routing data for three additional network devices. NOTE: Continuous exposure to ambient temperature limits of -40 °F or 185 °F (-40 °C or 85 °C) may reduce specified life by less than 20 percent.

Overpressure Limits

Transmitters withstand the following limits without damage:

Rosemount 2051CD/CG

- 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 2051CA

- 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 2051H

- All Ranges: 3626 psig (25 MPa)

Rosemount 2051TG/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)

Rosemount 2051L

Limit is flange rating or sensor rating, whichever is lower (see the table below).

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 2051CD 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

Coplanar or traditional process flange

- 10000 psig (689,5 bar).

2051T:

- Ranges 1–4: 11000 psi (758,4 bar)
- Range 5: 26000 psig (1792,64 bar)

Temperature Limits

Ambient

–40 to 185 °F (–40 to 85 °C)
With LCD display[1]: –40 to 175 °F (–40 to 80 °C)

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

Storage

–40 to 185 °F (–40 to 85 °C)

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

Process Temperature Limits

At atmospheric pressures and above.

2051C Coplanar	
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][3]
Inert Fill Sensor[1]	-40 to 185 °F (–40 to 85 °C)[4][5]
2051T In-Line (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]
2051L 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]
2051L High-Side Temperature Limits (Process Fill Fluid)	
Syltherm® XLT	–102 to 302 °F (–75 to 150 °C)
D. C.® Silicone 704[6]	32 to 400 °F (0 to 205 °C)
D. C. Silicone 200	–49 to 400 °F (–45 to 205 °C)
Inert (Halocarbon)	–49 to 320 °F (–45 to 160 °C)
Glycerin and Water	5 to 203 °F (–15 to 95 °C)
Neobee M-20®	5 to 400 °F (–15 to 205 °C)

2051C Coplanar	
Propylene Glycol and Water	5 to 203 °F (–15 to 95 °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) -20 °F (-29 °C) is the lower process temperature limit with option code P0.
(4) 160 °F (71 °C) limit in vacuum service.
(5) Not available for 2051_CA.
(6) Upper limit of 600 °F (315 °C) is available with 1199 seal assemblies mounted away from the transmitter with the use of capillaries and up to 500 °F (260 °C) with direct mount extension.

Humidity Limits

0–100% relative humidity

Volumetric Displacement

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

Damping

The Damping command introduces a delay in processing which increases the response time of the transmitter; smoothing variations in output readings caused by rapid input changes. In the 2051 Wireless pressure transmitter, damping only takes effect when the device is placed in high power refresh mode and during calibration. In normal power mode, the effective damping is 0. Note that when the device is in high power refresh mode, battery power will be depleted rapidly.

A.4 Physical Specifications

Electrical Connections

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

Process Connections

2051C

1/4–18 NPT on 2 1/8-in. centers

1/2–14 NPT and RC 1/2 on 2-in. (50.8 mm), 2 1/8-in. (54.0 mm), or 2 1/4-in. (57.2 mm) centers (process adapters)

2051T

1/2–14 NPT female,
Non-Threaded instrument flange (available in SST for Range 1–4 transmitters only),
G1/2 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).

2051L

High pressure side: 2-in.(50.8mm), 3-in. (72 mm), or 4-in. (102mm), ASME B 16.5 (ANSI) Class 150, 300 or 600 flange; 50, 80 or 100 mm, DIN 2501 PN 40 or 10/16 flange

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

Process-Wetted Parts

Process Isolating Diaphragms

Isolating Diaphragm Material	2051CD/CG	2051T	2051CA	2051H
316L SST	•	•	•	•
Alloy C-276	•	•	•	•

Drain/Vent Valves

316 SST, Alloy C-276, or Alloy 400/K-500 material
(Alloy 400/K-500 is not available with 2051L).

Process Flanges and Adapters

Plated carbon steel
SST: CF-8M (Cast 316 SST) per ASTM A743
Cast C-276: CW-12MW per ASTM A494
Cast Alloy 400: M-30C per ASTM A494

Wetted O-rings

Glass-filled PTFE
(Graphite-filled PTFE with Isolating Diaphragm code 6)

2051L 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 316L SST, material per ASTM A743), or CW-12MW (Cast C-276, material ASTM A494); fits schedule 40 and 80 pipe

Mounting Flange

Zinc-cobalt plated CS or 316 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 alloy or SST: CF-3M (Cast 316L SST) or CF-8M (Cast 316 SST)
NEMA 4X, IP66/68

Coplanar Sensor Module Housing

CF-3M (Cast version of 316L SST)

Bolts

Plated carbon steel per ASTM A449, Type 1
Austenitic 316 SST per ASTM F593
ASTM A453, Class D, Grade 660 SST
ASTM A193, Grade B7M alloy steel
ASTM A193, Class 2, Grade B8M SST
Alloy K-500

Sensor Module Fill Fluid

Silicone or inert halocarbon (Inert is not available with 2051CA). In-Line series uses Fluorinert® FC-43.

Process Fill Fluid (Liquid Level Only)

2051L: *Syltherm* XLT, *D.C.* Silicone 704,
D.C. Silicone 200, inert, glycerin and water,
Neobee M-20, propylene glycol and water.

Paint

Polyurethane

Cover O-rings

Buna-N

Power Module

Field replaceable, keyed connection eliminates the risk of incorrect installation, Intrinsically Safe Lithium-thionyl chloride Power Module (Green Power Module, model number 701PGNKF) with PBT enclosure

Shipping Weights for 2051 Wireless Pressure Transmitter

Table A-2. Transmitter weights without options

Complete Transmitter[1]	Add Weight In lb (kg)
2051C with engineered polymer housing	3.90 (1,8)
2051T with engineered polymer housing	2.3 (1,0)

(1) Fully functional transmitter with terminal block, covers, and SST flange.

Table A-3. 2051L 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	6.1 (2,8)	—	—	—
3-in., 150	12.3 (5,6)	13.0 (5,9)	14.2 (6,4)	15.5 (7,0)
4-in., 150	17.8 (8,1)	17.5 (7,9)	18.7 (8,4)	20.0 (9,1)
2-in., 300	7.9 (3,6)	—	—	—
3-in., 300	16.2 (7,3)	16.9 (7,7)	18.1 (8,2)	19.4 (8,8)
4-in., 300	27 (12,2)	26.9 (12,2)	28.1 (12,7)	29.4 (13,3)
2-in., 600	9.4 (4,3)	—	—	—
3-in., 600	18.7 (8,5)	19.4 (8,8)	20.6 (9,3)	21.9 (9,9)
DN 50 / PN 40	7.9 (3,6)	—	—	—
DN 80 / PN 40	12.6 (5,7)	13.3 (6,0)	14.5 (6,6)	15.8 (7,2)
DN 100 / PN 10/16	7.8 (3,5)	8.5 (3,9)	9.7 (4,4)	11.0 (5,0)
DN 100 / PN 40	9.2 (4,2)	9.9 (4,5)	11.1 (5,0)	12.4 (5,6)

Transmitter option weights

Option Code	Option	Add lb (kg)
B4	SST Mounting Bracket for Coplanar Flange	1.2 (0,5)
B1, B2, B3	Mounting Bracket for Traditional Flange	1.7 (0,8)
B7, B8, B9	Mounting Bracket for Traditional Flange with SST Bolts	1.7 (0,8)
BA, BC	SST Bracket for Traditional Flange	1.6 (0,7)
B4	SST Mounting Bracket for In-Line	1.3 (0,6)
F12, F22	SST Traditional Flange with SST Drain Vents[1]	3.2 (1,5)
F13, F23	Cast C-276 Traditional Flange with Alloy C-276 Drain Vents[1]	3.6 (1,6)
E12, E22	SST Coplanar Flange with SST Drain Vents[1]	1.9 (0,9)
F14, F24	Cast Alloy 400 Traditional Flange with Alloy 400/K-500 Drain Vents[1]	3.6 (1,6)
F15, F25	SST Traditional Flange with Alloy C-276 Drain Vents[1]	3.2 (1,5)
G21	Level Flange—3 in., 150	12.6 (5,7)
G22	Level Flange—3 in., 300	15.9 (7,2)
G11	Level Flange—2 in., 150	6.8 (3,1)
G12	Level Flange—2 in., 300	8.2 (3,7)
G31	DIN Level Flange, SST, DN 50, PN 40	7.8 (3,5)
G41	DIN Level Flange, SST, DN 80, PN 40	13.0 (5,9)

(1) Includes mounting bolts.

Item	Weight in lb. (kg)
Polymer Standard Cover	0.2 (0,09)
SST Standard Cover	1.3 (0,6)
Polymer Display Cover	0.2 (0,09)
SST Display Cover	1.5 (0,7)
Wireless Battery Cover	0.1 (0,04)
LCD Display[1]	0.1 (0,04)
Power Module	0.4 (0,18)

(1) Display only.

A.5 Dimensional Drawings

Dimensions are in inches (millimeters).
Process adapters (option D2) and Rosemount 305 integral manifolds must be ordered with the transmitter.

2051 Wireless Housing with In-Line and Coplanar SuperModule Platform

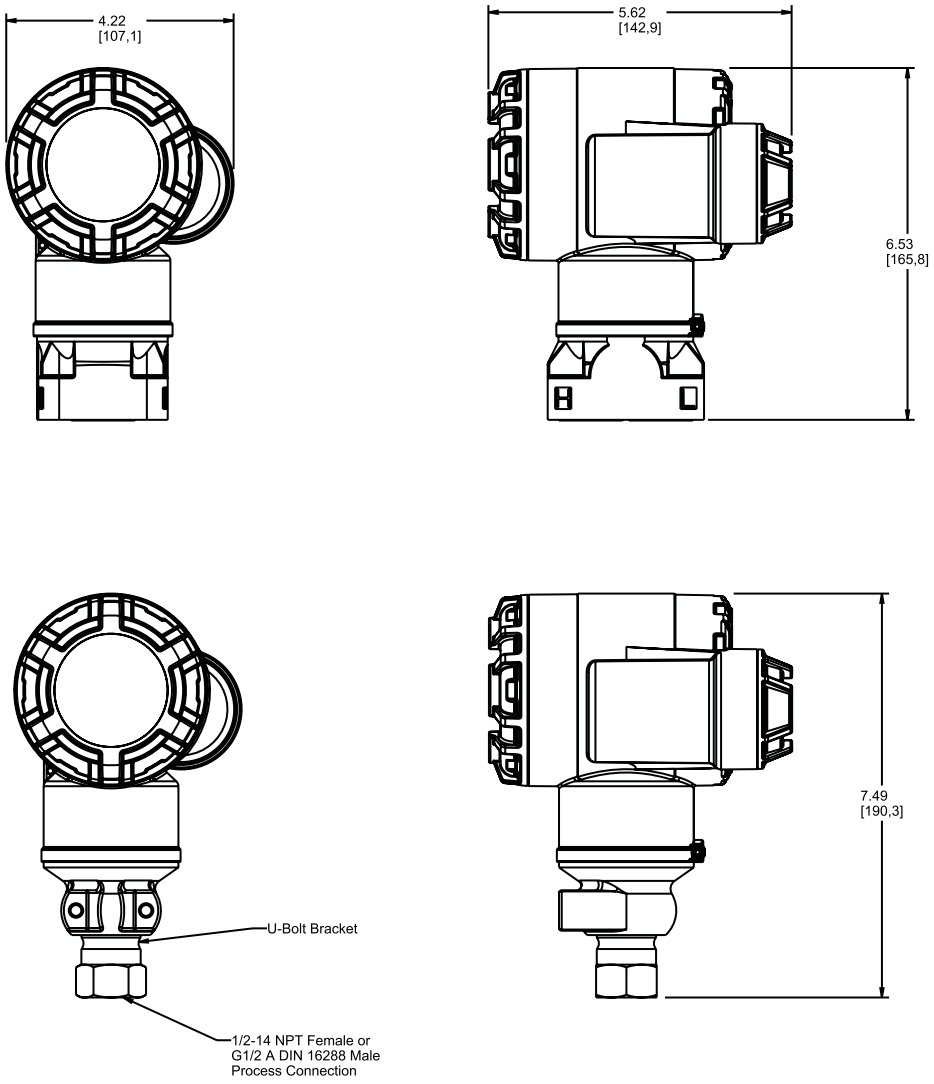


Table A-4. 2051L Dimensional Specifications

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	65 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)

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)	6.66 (169)
	3 (76)	3.6 (91)	0.97 (25)	1.31 (33)	6.66 (169)
	4 (102)	3.6 (91)	0.97 (25)	1.31 (33)	6.66 (169)
ASME B16.5 (ANSI) 300	2 (51)	2.12 (54)	0.97 (25)	1.31 (33)	6.66 (169)
	3 (76)	3.6 (91)	0.97 (25)	1.31 (33)	6.66 (169)
	4 (102)	3.6 (91)	0.97 (25)	1.31 (33)	6.66 (169)
ASME B16.5 (ANSI) 600	2 (51)	2.12 (54)	0.97 (25)	1.31 (33)	8.66 (219)
	3 (76)	3.6 (91)	0.97 (25)	1.31 (33)	8.66 (219)
DIN 2501 PN 10–40	DN 50	2.4 (61)	0.97 (25)	1.31 (33)	6.66 (169)
DIN 2501 PN 25/40	DN 80	3.6 (91)	0.97 (25)	1.31 (33)	6.66 (169)
	DN 100	3.6 (91)	0.97 (25)	1.31 (33)	6.66 (169)
DIN 2501 PN 10/16	DN 100	3.6 (91)	0.97 (25)	1.31 (33)	6.66 (169)

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

A.6 Ordering Information

Table A-5. 2051C 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			
2051C	Coplanar Pressure Transmitter			
Measurement Type				
Standard				Standard
D	Differential			★
G	Gage			★
Expanded				
A	Absolute			
Pressure Range				
	2051CD	2051CG	2051CA	
Standard				Standard
1	–25 to 25 inH_2O (–62.2 to 62.2 mbar)	–25 to 25 inH_2O (–62,1 to 62.2 mbar)	0 to 30 psia (0 to 2.1 bar)	★
2	–250 to 250 inH2O (–623 to 623 mbar)	–250 to 250 inH_2O (–621 to 623 mbar)	0 to 150 psia (0 to 10.3 bar)	★
3	–1000 to 1000 inH_2O (–2.5 to 2.5 bar)	–393 to 1000 inH_2O (–0.98 to 2.5 bar)	0 to 800 psia (0 to 55.2 bar)	★
4	–300 to 300 psi (–20.7 to 20.7 bar)	–14.2 to 300 psi (–0.98 to 20.7 bar)	0 to 4000 psia (0 to 275.8 bar)	★
5	–2000 to 2000 psi (–137.9 to 137.9 bar)	–14.2 to 2000 psi (–0.98 to 137.9 bar)	Not Applicable	★
Expanded				
0[1]	–3 to 3 inH_2O (–7.5 to 7.5 mbar)	Not Applicable	Not Applicable	
Transmitter Output				
Standard				Standard
A	4–20 mA with Digital Signal Based on HART Protocol			★
F	FOUNDATION fieldbus Protocol			★
W[2]	Profibus PA Protocol			★
X	Wireless			★
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[3]	Coplanar	Cast C-276	Alloy C-276	★
4	Coplanar	Cast Alloy 400	Alloy 400/K-500	★
5	Coplanar	Plated CS	SST	★
7[3]	Coplanar	SST	Alloy C-276	★
8[3]	Coplanar	Plated CS	Alloy C-276	★
0	Alternate Process Connection			★

Table A-5. 2051C 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.

Isolating Diaphragm			
Standard			Standard
2[(3)]	316L SST		★
3[(3)]	Alloy C-276		★
Expanded			
4	Alloy 400		
5	Tantalum (Available on 2051CD and CG, Ranges 2–5 only. Not available on 2051CA)		
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 (Differential and Gage only)		★
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	★
P	Engineered Polymer	N/A	★
Expanded			
D	Aluminum	G½	
M	SST	G½	

A.6.1 Options (Include with selected model number)

Wireless Transmit Rate, Operating Frequency and Protocol		
Standard		Standard
WA3	User Configurable Transmit Rate, 2.4 GHz WirelessHART	★
Antenna and SmartPower		
Standard		Standard
WP5	Internal Antenna, Compatible with Green Power Module (I.S. Power Module Sold Separately)	★
Plantweb Control Functionality		
Standard		Standard
A01	FOUNDATION fieldbus Advanced Control Function Block Suite	★
Plantweb Diagnostic Functionality		
Standard		Standard
D01	FOUNDATION fieldbus Diagnostics Suite	★

Table A-5. 2051C 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.

Alternate Flange[4]		
Standard		Standard
H2	Traditional Flange, 316 SST, SST Drain/Vent	★
H3[3]	Traditional Flange, Alloy C, Alloy C-276 Drain/Vent	★
H4	Traditional Flange, Cast Alloy 400, Alloy 400/K-500 Drain/Vent	★
H7[3]	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[5]	DIN Compliant Traditional Flange, SST, 10 mm Adapter/Manifold Bolting	
HL	DIN Compliant Traditional Flange, SST, 12mm Adapter/Manifold Bolting (Not available on 2051CD0)	
Manifold Assembly[5][9]		
Standard		Standard
S5	Assemble to Rosemount 305 Integral Manifold	★
S6	Assemble to Rosemount 304 Manifold or Connection System	★
Integral Mount Primary Element[5][9]		
Standard		Standard
S4[6]	Assemble to Rosemount Annubar or Rosemount 1195 Integral Orifice	★
S3	Assemble to Rosemount 405 Compact Orifice Plate	★
Seal Assemblies[9]		
Standard		Standard
S1[7]	Assemble to one Rosemount 1199 seal	★
S2[8]	Assemble to two Rosemount 1199 seals	★
All-Welded Seal Assemblies (for high vacuum applications)[9]		
Standard		Standard
S0	One Seal, All-Welded System (Direct Mount Connection Type)	★
S7	One Seal, All-Welded System (Capillary Connection Type)	★
S8	Two Seals, All-Welded System (Capillary Connection Type)	★
S9	Two Seals, All-Welded System (One Direct Mount and One Capillary Connection Type)	★

Table A-5. 2051C 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.

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[11]	INMETRO Flameproof	★
E3[11]	Chine Flameproof	
E4[10]	TIIS Flame-proof	★
E5	FM Explosion-proof, Dust Ignition-Proof	★
E7[11]	IECEx Flameproof, Dust Ignition-proof	★
E8	ATEX Flameproof and Dust Certification	★
I1[11]	ATEX Intrinsic Safety and Dust	★
I2[11]	INMETRO Intrinsic Safety	★
I3	China Intrinsic Safety	★
I4[12]	TIIS Intrinsic Safety	★
I5	FM Intrinsically Safe, Division 2	★
I7[11]	IECEx Intrinsic Safety	★
IA	ATEX FISCO Intrinsic Safety; for FOUNDATION fieldbus protocol only	★
IE	FM FISCO Intrinsically Safe; for FOUNDATION fieldbus protocol only	★
K2[11]	INMETRO Flameproof, Instrinsic Safety	★
K5	FM Explosion-proof, Dust Ignition-Proof, Intrinsically Safe, and Division 2	★
K6[11]	CSA and ATEX Explosion-proof, Intrinsically Safe, and Division 2 (combination of C6 and K8)	★
K7[11]	IECEx Flame-proof, Dust Ignition-proof, Intrinsic Safety, and Type n (combination of I7, N7, and E7)	★
K8[11]	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[11]	FM, CSA, and ATEX Explosion-proof, Intrinsically Safe (combination of K5, C6, I1, and E8)	★
N1[11]	ATEX Type n Certification and Dust	★
N3	China Type n	★
N7[11]	IECEx Type n Certification	★
Drinking Water Approval		
Standard		Standard
DW[13]	NSF drinking water approval	★
Shipboard Approvals		
Standard		Standard
SBS	American Bureau of Shipping	★

Table A-5. 2051C 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.

Custody Transfer		
Standard		Standard
C5[16]	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[14]	LCD Display with Local Operator Interface	★
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	★
Quality Certification for Safety		
Standard		Standard
QS[15]	Prior-use certificate of FMEDA data	★
QT	Safety certified to IEC 61508 with certificate of FMEDA data	★
Hardware Adjustments		
Standard		Standard
D1	Hardware adjustments (zero, span, alarm, security)	★
DZ	Digital Zero Trim	★
Hardware Adjustments		
Standard		Standard
J1[16][17]	Local Zero Adjustment Only	★
J3[16][17]	No Local Zero or Span Adjustment	★
Transient Protection Terminal Block		
Standard		Standard
T1[18]	Transient Protection Terminal Block	★
Software Configuration		
Standard		Standard
C1[16]	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)	

Table A-5. 2051C 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.

Gage Pressure Calibration		
Standard		Standard
C3	Gage Calibration (Model 2051CA4 only)	★
Alarm Limit		
Standard		Standard
C4[16][19]	Analog Output Levels Compliant with NAMUR Recommendation NE 43, Alarm High	★
CN[16][19]	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)*	
Performance		
Standard		Standard
P8[20]	High Performance Option	★
Flange Adapters		
Standard		Standard
DF[21]	1/2 -14 NPT flange adapter(s)	★
D3	¼–18 NPT Process Connections (No flange adapters), Hastelloy	
D3	¼–18 NPT Process Connections (No flange adapters), *Monel*	
Vent/Drain Valves		
Expanded		
D7	Coplanar Flange Without Drain/Vent Ports	
Conduit Plug		
Standard		Standard
DO[22]	316 SST Conduit Plug	★
RC1/4 RC1/2 Process Connection		
Expanded		
D9[23]	RC ¼ Flange with RC ½ Flange Adapter, CS - SST	
D9	JIS Process Connection—RC ¼ Flange with RC ½ Flange Adapter, 316SST	
Max Static Line Pressure		
Standard		Standard
P9	4500 psig (310 bar) Static Pressure Limit (2051CD Ranges 2–5 only)	★
Ground Screw		
Standard		Standard
V5[24]	External Ground Screw Assembly	★

Table A-5. 2051C 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.

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: 2051CD 2 A 2 2 A 1 A B4$13857 780		

(1) 2051CD0 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.
(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) Requires 0 code in Materials of Construction for Alternate Process Connection.
(5) Not valid with optional code P9 for 4500 psi Static Pressure.
(6) Process Flange limited to Coplanar (codes 2, 3, 5, 7, 8) or Traditional (H2, H3, H7).
(7) Not valid with optional code D9 for RC1/2 Adaptors.
(8) Not valid for optional codes DF and D9 for Adaptors.
(9) "Assemble-to" items are specified separately and require a completed model number.
(10) Available only with output codes A - 4-20 HART and F - FOUNDATION fieldbus.
(11) Not available with Low Power code M.
(12) Available only with 2051CD and 2051CG and output code A - 4-20 mA HART
(13) Not available with Alloy C-276 isolator (3 code), tantalum isolator (5 code), all cast C-276 flanges, all plated CS flanges, all DIN flanges, all Level flanges, assemble-to manifolds (S5 and S6 codes), assemble-to seals (S1 and S2 codes), assemble-to primary elements (S3 and S4 codes), surface finish certification (Q16 code), and remote seal system report (QZ code).
(14) Available only with output code W - Profibus PA.
(15) Only available with HART 4-20 mA output (output code A).
(16) Not available with Fieldbus (output code F) or Profibus (output code W).
(17) Local zero and span adjustments are standard unless Option Code J1 or J3 is specified
(18) The T1 option is not needed with FISCO Product Certifications; transient protection is included in the FISCO product certification codes IA and IE.
(19) NAMUR-Compliant operation is pre-set at the factory and cannot be changed to standard operation in the field.
(20) High Performance Option includes 0.04% Reference Accuracy. See Performance Specifications for details.
(21) Not valid with Alternate Process Connection options S3, S4, S5, and S6.
(22) Transmitter is shipped with 316 SST conduit plug (uninstalled) in place of standard carbon steel conduit plug.
(23) Not available with Alternate Process Connection; DIN Flanges and Level Flanges.
(24) The V5 option is not needed with the T1 option; external ground screw assembly is included with the T1 option.

Table A-6. 2051T In-Line 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**		
2051T	In-Line Pressure Transmitter		
Pressure Type			
Standard			Standard
G	Gage		★
A	Absolute		★
Pressure Range			
	2051TG[1]	**2051TA**	
Standard			Standard
1	-14.7 to 30 psi (-1.0 to 2.1 bar)	0 to 30 psia (0 to 2.1 bar)	★
2	-14.7 to 150 psi (-1.0 to 10.3 bar)	0 to 150 psia (0 to 10.3 bar)	★
3	-14.7 to 800 psi (-1.0 to 55 bar)	0 to 800 psia (0 to 55 bar)	★
4	-14.7 to 4000 psi (-1.0 to 276 bar)	0 to 4000 psia (0 to 276 bar)	★
5	-14.7 to 10000 psi (-1.0 to 689 bar)	0 to 10000 psia (0 to 689 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		★
X	Wireless		★
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 (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		★
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	★
P	Engineered Polymer with Aluminum Module Material	N/A	★
S	Engineered Polymer with SST Module Material	N/A	★
Expanded			
D	Aluminum	G½	
M	SST	G½	

Table A-6. 2051T In-Line 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.

A.6.2 Options (Include with selected model number)

Wireless Transmit Rate, Operating Frequency and Protocol		
Standard		Standard
WA3	User Configurable Transmit Rate, 2.4 GHz WirelessHART	★
Antenna and SmartPower		
Standard		Standard
WP5	Internal Antenna, Compatible with Green Power Module (I.S. Power Module Sold Separately)	★
PlantWeb Control Functionality		
Standard		Standard
A01	Advanced Control Function Block Suite	★
PlantWeb Diagnostic Functionality		
Standard		Standard
D01	FOUNDATION fieldbus Diagnostics Suite	★
Manifold Assemblies		
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	★

Table A-6. 2051T In-Line 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.

Drinking Water Approval		
Standard		Standard
DW[6]	NSF drinking water approval	★
Shipboard Approvals		
Standard		Standard
SBS	American Bureau of Shipping	★
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	★
Quality Certification for Safety		
Standard		Standard
QS[7]	Prior-use certificate of FMEDA Data	★
Zero/Span Adjustment		
Standard		Standard
J1[8][9]	Local Zero Adjustment Only	★
J3[8][9]	No Local Zero or Span Adjustment	★
DZ	Digital Zero Trim	★
Expanded		
D1	Hardware adjustments (zero, span, alarm, security)	
Display and Interface Options		
Standard		Standard
M4[10]	LCD Display with Local Operator Interface	★
M5	LCD Display	★
M6	LCD Display for SST Housing (Housing Codes J, K, L and M only)	★
Conduit Plug		
Standard		Standard
DO[11]	316 SST Conduit Plug	★
Transient Terminal Block		
Standard		Standard
T1[12]	Transient Protection Terminal Block	★
Software Configuration		
Standard		Standard
C1[8]	Custom Software Configuration (Completed CDS 00806-0100-4001 required with order)	★
Expanded		
C2[8]	0.8–3.2 V dc Output with Digital Signal Based on *HART* Protocol (Output Code M only)	
Alarm Limit		
Standard		Standard
C4[8][13]	Analog Output Levels Compliant with NAMUR Recommendation NE 43, Alarm High	★
CN[8][13]	Analog Output Levels Compliant with NAMUR Recommendation NE 43, Low Alarm	★

Table A-6. 2051T In-Line 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.

Pressure Testing		
Expanded		
P1	Hydrostatic Testing with Certificate	
Cleaning Process Area(14)		
Expanded		
P2	Cleaning for Special Service	
P3	Cleaning for <1 PPM Chlorine/Fluorine	
Performance		
Standard		Standard
P8(15)	High Performance Option	★
Ground Screw		
Standard		Standard
V5(16)	External Ground Screw Assembly	★
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:	**2051T G 5 F 2A 2 1 A B4**	

(1) 2051TG 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 Alloy C-276 isolator (3 code), tantalum isolator (5 code), all cast C-276 flanges, all plated CS flanges, all DIN flanges, all Level flanges, assemble-to manifolds (S5 and S6 codes), assemble-to seals (S1 and S2 codes), assemble-to primary elements (S3 and S4 codes), surface finish certification (Q16 code), and remote seal system report (QZ code).
(7) Only available with HART 4-20 mA output (output code A).
(8) Not available with fieldbus (output code F) or Profibus protocols (output code W).
(9) Local zero and span adjustments are standard unless Option Code J1 or J3 is specified.
(10) Available only with output code W - Profibus PA.
(11) Transmitter is shipped with 316 SST conduit plug (uninstalled) in place of standard carbon steel conduit plug.
(12) The T1 option is not needed with FISCO Product Certifications; transient protection is included in the FISCO product certification codes IA and IE.
(13) NAMUR-Compliant operation is pre-set at the factory and cannot be changed to standard operation in the field.
(14) Not valid with Alternate Process Connection S5.
(15) High Performance Option includes 0.04% Reference Accuracy. See Performance Specifications for details.
(16) The V5 option is not needed with T1 option; external ground screw assembly is included with the T1 option.

Table A-7. Rosemount 2051L 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			
2051L	Liquid Level Transmitter			
Pressure Range				
Standard				**Standard**
2	−250 to 250 inH_2O (−0,6 to 0,6 bar)			★
3	−1000 to 1000 inH_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			★
X	Wireless			★
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	★
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	★

Table A-7. Rosemount 2051L 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.

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	

Seal Fill Fluid (High 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)	★

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	★

Table A-7. Rosemount 2051L 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.

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		★
P	Engineered Polymer		N/A		★
Expanded					
D	Aluminum		G½		
M	SST		G½		

A.6.3 Options (Include with selected model number)

Wireless Transmit Rate, Operating Frequency and Protocol		
Standard		**Standard**
WA3	User Configurable Transmit Rate, 2.4 GHz WirelessHART	★
Antenna and SmartPower		
Standard		**Standard**
WP5	Internal Antenna, Compatible with Green Power Module (I.S. Power Module Sold Separately)	★
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	★

Table A-7. Rosemount 2051L 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.

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)	★
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	★
Shipboard Approvals		
Standard		**Standard**
SBS	American Bureau of Shipping	★
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[6]	LCD Display with Local Operator Interface	★
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[7]	Prior-use certificate of FMEDA data	★
Toolkit Total System Performance Reports		
Standard		**Standard**
QZ	Remote Seal System Performance Calculation Report	★

Table A-7. Rosemount 2051L 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.

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(8)(9)	Local Zero Adjustment Only			★
J3(8)(9)	No Local Zero or Span Adjustment			★
DZ	Digital Zero Trim			★
Transient Protection				
Standard				**Standard**
T1(10)	Transient Protection Terminal Block			★
Software Configuration				
Standard				**Standard**
C1(8)	Custom Software Configuration (Completed CDS 00806-0100-4001 required with order)			★
Low Power Output				
Standard				**Standard**
C2(8)	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(8)(11)	NAMUR alarm and saturation levels, high alarm			★
CN(8)(11)	NAMUR alarm and saturation levels, low alarm			★
Conduit Plug				
Standard				**Standard**
DO	316 SST Conduit Plug			★
Ground Screw				
Standard				**Standard**
V5(12)	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: 2051L 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) Available only with output code W - Profibus PA.
(7) Only available with HART 4-20 mA output (output code A).
(8) Not available with fieldbus (output code F) or profibus protocols (output code W).
(9) Local zero and span adjustments are standard unless Option Code J1 or J3 is specified.
(10) 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.
(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 A-8. Rosemount 2051CFA Annubar Flowmeter 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	Product Description	
2051CFA	Annubar Flowmeter	
Measurement Type		
Standard		Standard
D	Differential Pressure	★
Fluid Type		
Standard		Standard
L	Liquid	★
G	Gas	★
S	Steam	★
Line Size		
Standard		Standard
020	2-in. (50 mm)	★
025	2 1/2-in. (63.5 mm)	★
030	3-in. (80 mm)	★
035	3 1/2-in. (89 mm)	★
040	4-in. (100 mm)	★
050	5-in. (125 mm)	★
060	6-in. (150 mm)	★
070	7-in. (175 mm)	★
080	8-in. (200 mm)	★
100	10-in. (250 mm)	★
120	12-in. (300 mm)	★
Expanded		
140	14-in. (350 mm)	
160	16-in. (400 mm)	
180	18-in. (450 mm)	
200	20-in. (500 mm)	
240	24-in. (600 mm)	
300	30-in. (750 mm)	
360	36-in. (900 mm)	
420	42-in. (1066 mm)	
480	48-in. (1210 mm)	
600	60-in. (1520 mm)	
720	72-in. (1820 mm)	
780	78-in (1950 mm)	
840	84-in. (2100 mm)	
900	90-in. (2250 mm)	
960	96-in (2400 mm)	
Pipe I.D. Range		
Standard		Standard
C	Range C from the Pipe I.D. table	★
D	Range D from the Pipe I.D. table	★
Expanded		
A	Range A from the Pipe I.D. table	
B	Range B from the Pipe I.D. table	
E	Range E from the Pipe I.D. table	
Z	Non-standard Pipe I.D. Range or Line Sizes greater than 12 inches	

Table A-8. Rosemount 2051CFA Annubar Flowmeter 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.

Pipe Material / Mounting Assembly Material		
Standard		Standard
C	Carbon steel (A105)	★
S	316 Stainless Steel	★
0	No Mounting (Customer Supplied)	★
Expanded		
G	Chrome-Moly Grade F-11	
N	Chrome-Moly Grade F-22	
J	Chrome-Moly Grade F-91	
Piping Orientation		
Standard		Standard
H	Horizontal Piping	★
D	Vertical Piping with Downwards Flow	★
U	Vertical Piping with Upwards Flow	★
Annubar Type		
Standard		Standard
P	Pak-Lok	★
F	Flanged with opposite side support	★
Expanded		
L	Flange-Lok	
G	Gear-Drive Flo-Tap	
M	Manual Flo-Tap	
Sensor Material		
Standard		Standard
S	316 Stainless Steel	★
Expanded		
H	Alloy C-276	
Sensor Size		
Standard		Standard
1	Sensor size 1 — Line sizes 2-in. (50 mm) to 8-in. (200 mm)	★
2	Sensor size 2 — Line sizes 6-in. (150 mm) to 96-in. (2400 mm)	★
3	Sensor size 3 — Line sizes greater than 12-in. (300 mm)	★
Mounting Type		
Standard		Standard
T1	Compression or Threaded Connection	★
A1	150# RF ANSI	★
A3	300# RF ANSI	★
A6	600# RF ANSI	★
D1	DN PN16 Flange	★
D3	DN PN40 Flange	★
D6	DN PN100 Flange	★

Table A-8. Rosemount 2051CFA Annubar Flowmeter 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				
A9[(1)]	900# RF ANSI			
AF[(1)]	1500# RF ANSI			
AT[(1)]	2500 # RF ANSI			
R1	150# RTJ Flange			
R3	300# RTJ Flange			
R6	600# RTJ Flange			
R9[(1)]	900# RTJ Flange			
RF[(1)]	1500# RTJ Flange			
RT[(1)]	2500# RTJ Flange			
Opposite Side Support or Packing Gland				
Standard				Standard
0	No opposite side support or packing gland (Required for Pak-Lok and Flange-Lok models)			★
	Opposite Side Support – Required for Flanged Models			
C	NPT Threaded Opposite Support Assembly – Extended Tip			★
D	Welded Opposite Support Assembly – Extended Tip			★
Expanded				
	Packing Gland – Required for Flo-Tap Models			
	Packing Gland Material	*Rod Material*	*Packing Material*	
J	Stainless Steel Packing Gland / Cage Nipple	Carbon Steel	PTFE	
K	Stainless Steel Packing Gland / Cage Nipple	Stainless Steel	PTFE	
L	Stainless Steel Packing Gland / Cage Nipple	Carbon Steel	Graphite	
N	Stainless Steel Packing Gland / Cage Nipple	Stainless Steel	Graphite	
R	Alloy C-276 Packing Gland / Cage Nipple	Stainless Steel	Graphite	
Isolation Valve for Flo-Tap Models				
Standard				Standard
0	Not Applicable or Customer Supplied			★
Expanded				
1	Gate Valve, Carbon Steel			
2	Gate Valve, Stainless Steel			
5	Ball Valve, Carbon Steel			
6	Ball Valve, Stainless Steel			
Temperature Measurement				
Standard				Standard
T	Integral RTD – not available with Flanged model greater than class 600#			★
0	No Temperature Sensor			★
Expanded				
R	Remote Thermowell and RTD			
Transmitter Connection Platform				
Standard				Standard
3	Direct-mount, Integral 3-valve Manifold– not available with Flanged model greater than class 600			★
5	Direct -mount, 5-valve Manifold – not available with Flanged model greater than class 600			★
7	Remote-mount NPT Connections ($^1/_2$-in. NPT)			★
Expanded				
6	Direct-mount, high temperature 5-valve Manifold – not available with Flanged model greater than class 600			
8	Remote-mount SW Connections ($^1/_2$-in.)			

Table A-8. Rosemount 2051CFA Annubar Flowmeter 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.

Differential Pressure Range		
Standard		Standard
1	0 to 25 in H_2O (0 to 62,3 mbar)	★
2	0 to 250 in H_2O (0 to 623 mbar)	★
3	0 to 1000 in H_2O (0 to 2,5 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	★
X	Wireless	★
Expanded		
M	Low-Power, 1-5 V dc with Digital Signal Based on HART Protocol	

Transmitter Housing Material		**Conduit Entry Size**	
Standard			Standard
A	Aluminum	1/2-14 NPT	★
B	Aluminum	M20 x 1.5	★
J	SST	1/2-14 NPT	★
K	SST	M20 x 1.5	★
P	Engineered Polymer	N/A	★
Expanded			
D	Aluminum	G1/2	
M	SST	G1/2	

Transmitter Performance Class		
Standard		Standard
1	1.6% flow rate accuracy, 8:1 flow turndown, 5-yr. stability	★

A.6.4 Options (Include with selected model number)

Pressure Testing		
Expanded		
P1(3)	Hydrostatic Testing with Certificate	
PX(3)	Extended Hydrostatic Testing	
Special Cleaning		
Expanded		
P2	Cleaning for Special Services	
PA	Cleaning per ASTM G93 Level D (Section 11.4)	
Material Testing		
Expanded		
V1	Dye Penetrant Exam	
Material Examination		
Expanded		
V2	Radiographic Examination	
Flow Calibration		
Expanded		
W1	Flow Calibration (Average K)	
Special Inspection		
Standard		Standard
QC1	Visual & Dimensional Inspection with Certificate	★
QC7	Inspection & Performance Certificate	★

Table A-8. Rosemount 2051CFA Annubar Flowmeter 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.

Surface Finish		
Standard		Standard
RL	Surface finish for Low Pipe Reynolds # in Gas & Steam	★
RH	Surface finish for High Pipe Reynolds # in Liquid	★
Material Traceability Certification		
Standard		Standard
Q8[4]	Material Traceability Certification per EN 10474:2004 3.1	★
Code Conformance[5]		
Expanded		
J2	ANSI/ASME B31.1	
J3	ANSI/ASME B31.3	
Materials Conformance		
Expanded		
J5[6]	NACE MR-0175 / ISO 15156	
Country Certification		
Standard		Standard
J6	European Pressure Directive (PED)	★
Expanded		
J1	Canadian Registration	
Installed in Flanged Pipe Spool Section		
Expanded		
H3	150# Flanged Connection with Rosemount Standard Length and Schedule	
H4	300# Flanged Connection with Rosemount Standard Length and Schedule	
H5	600# Flanged Connection with Rosemount Standard Length and Schedule	
Instrument Connections for Remote Mount Options		
Standard		Standard
G2	Needle Valves, Stainless Steel	★
G6	OS&Y Gate Valve, Stainless Steel	★
Expanded		
G1	Needle Valves, Carbon Steel	
G3	Needle Valves, Alloy C-276	
G5	OS&Y Gate Valve, Carbon Steel	
G7	OS&Y Gate Valve, Alloy C-276	
Special Shipment		
Standard		Standard
Y1	Mounting Hardware Shipped Separately	★
Special Dimensions		
Expanded		
VM	Variable Mounting	
VT	Variable Tip	
VS	Variable length Spool Section	
PlantWeb Control Functionality		
Standard		Standard
A01[7]	FOUNDATION fieldbus Advanced Control Function Block Suite	★
PlantWeb Diagnostic Functionality		
Standard		Standard
D01[7]	FOUNDATION fieldbus Diagnostics Suite	★
Wireless Transmit Rate, Operating Frequency and Protocol		
Standard		Standard
WA3	User Configurable Transmit Rate, 2.4 GHz WirelessHART	★

Table A-8. Rosemount 2051CFA Annubar Flowmeter 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.

Antenna and SmartPower		
Standard		Standard
WP5	Internal Antenna, Compatible with Green Power Module (I.S. Power Module Sold Separately)	★
Product Certifications		
Standard		Standard
C6	CSA Explosion-proof, Dust Ignition-proof, Intrinsically Safe, Division 2	★
E5	FM Explosion-proof, Dust Ignition-proof	★
E7[8]	IECEx Flameproof, Dust Ignition-proof	★
E8	ATEX Flameproof, Dust	★
I1[8]	ATEX Intrinsic Safety	★
I5	FM Intrinsically Safe, Division 2	★
IA	ATEX FISCO Intrinsic Safety; for FOUNDATION fieldbus protocol only	★
K5	FM Explosion-proof, Dust Ignition-proof, Intrinsically Safe, Division 2 (combination of E5 and I5)	★
K6[8]	CSA Explosion-proof, Dust Ignition-proof, Intrinsically Safe, Division 2 (combination of E6 and I6)	★
K8[8]	ATEX Flameproof, Intrinsic Safety, Type n, Dust (combination of E8, I1 and N1)	★
KB	FM and CSA Explosion-proof, Dust Ignition-proof, Intrinsically Safe, Division 2 (combination of K5 and C6)	★
KD[8]	FM, CSA, and ATEX Explosion-proof, Intrinsically Safe (combination of K5, C6, I1, and E8)	★
N1[8]	ATEX Type n	★
Sensor Fill Fluid and O-ring Options		
Standard		Standard
L1	Inert Sensor Fill Fluid *Note: Silicone fill fluid is standard.*	★
L2	Graphite-Filled (PTFE) O-ring	★
LA	Inert Sensor Fill Fluid and Graphite-Filled (PTFE) O-ring	★
Shipboard Approvals		
Standard		Standard
SBS	American Bureau of Shipping	★
Display and Interface Options		
Standard		Standard
M4[9]	LCD Display with Local Operator Interface	★
M5	LCD Display	★
Transmitter Calibration Certification		
Standard		Standard
Q4	Calibration Certificate for Transmitter	★
Quality Certification for Safety		
Standard		Standard
QS[11]	Prior-use certificate of FMEDA data	★
Transient Protection		
Standard		Standard
T1[10]	Transient terminal block	★
Manifold for Remote Mount Option		
Standard		Standard
F2	3-Valve Manifold, Stainless Steel	★
F6	5-Valve Manifold, Stainless Steel	★
Expanded		
F1	3-Valve Manifold, Carbon Steel	
F3	3-Valve Manifold, Alloy C-276	
F5	5-Valve Manifold, Carbon Steel	
F7	5-Valve Manifold, Alloy C-276	

Table A-8. Rosemount 2051CFA Annubar Flowmeter 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.

Lower Power Output		
Standard		Standard
C2[11]	0.8-3.2 V dc Output with Digital Signal Based on Hart Protocol	★
Alarm Limit		
Standard		Standard
C4[11][12]	NAMUR Alarm and Saturation Levels, High Alarm	★
CN[11][12]	NAMUR Alarm and Saturation Levels, Low Alarm	★
Hardware Adjustments		
Standard		Standard
DZ	Digital Zero Sensor Trim Configuration Button	★
Ground Screw		
Standard		Standard
V5[13]	External Ground Screw Assembly	★
Typical Model Number: 2051CFA D L 060 D C H P S 2 T1 0 0 0 3 2 A A 1		

(1) Available in remote mount applications only.
(2) Option code M4 - LCD Display with Local Operator Interface required for local addressing and configuration.
(3) Applies to assembled flowmeter only, mounting not tested.
(4) Instrument Connections for Remote Mount Options and Isolation Valves for Flo-tap Models are not included in the Material Traceability Certification.
(5) Not available with Transmitter Connection Platform 6.
(6) Materials of Construction comply with metallurgical requirements within NACE MR0175/ISO 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.
(7) Only valid with FOUNDATION fieldbus Output Code F.
(8) Not available with Low Power code M.
(9) Available only with output code W - Profibus PA.
(10) The T1 option is not needed with FISCO Product Certifications, transient protection is included with the FISCO Product Certification code IA.
(11) Not available with FOUNDATION fieldbus (Output Code F) or Profibus (Output Code W).
(12) NAMUR-Compliant operation is pre-set at the factory and cannot be changed to standard operation in the field.
(13) The V5 option is not needed with the T1 option; external ground screw assembly is included with the T1 option.

Table A-9. Rosemount 2051CFC Compact Flowmeter 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	Product Description	
2051CFC	Compact Flowmeter	
Measurement Type		
Standard		Standard
D	Differential Pressure	★
Primary Element Technology		
Standard		Standard
C	Conditioning Orifice Plate	★
P	Orifice Plate	★
Material Type		
Standard		Standard
S	316 SST	★
Line Size		
Standard		Standard
005(1)	1/2-in. (15 mm)	★
010(1)	1-in. (25 mm)	★
015(1)	1 1/2-in. (40 mm)	★
020	2-in. (50 mm)	★
030	3-in. (80 mm)	★
040	4-in. (100 mm)	★
060	6-in. (150 mm)	★
080	8-in. (200 mm)	★
100	10-in. (250 mm)	★
120	12-in. (300 mm)	★
Primary Element Style		
Standard		Standard
N	Square Edged	★
Primary Element Type		
Standard		Standard
040	0.40 Beta Ratio	★
065(2)	0.65 Beta Ratio	★
Temperature Measurement		
Standard		Standard
0	No Temperature Sensor	★
Expanded		
R	Remote Thermowell and RTD	
Transmitter Connection Platform		
Standard		Standard
3	Direct-mount, Integral 3-valve Manifold	★
7	Remote-mount, 1/4-in. NPT Connections	★
Differential Pressure Range		
Standard		Standard
1	0 to 25 in H_2O (0 to 62,3 mbar)	★
2	0 to 250 in H_2O (0 to 623 mbar)	★
3	0 to 1000 in H_2O (0 to 2,5 bar)	★

Table A-9. Rosemount 2051CFC Compact Flowmeter 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.

Transmitter Output			
Standard			Standard
A	4–20 mA with digital signal based on HART Protocol		★
F	FOUNDATION fieldbus Protocol		★
W[3]	Profibus PA Protocol		★
X	Wireless		★
Expanded			
M	Low-Power, 1-5 V dc with Digital Signal Based on HART Protocol		
Transmitter Housing Material		**Conduit Entry Size**	
Standard			Standard
A	Aluminum	1/2-14 NPT	★
B	Aluminum	M20 x 1.5	★
J	SST	1/2-14 NPT	★
K	SST	M20 x 1.5	★
P	Engineered Polymer	N/A	★
Expanded			
D	Aluminum	G1/2	
M	SST	G1/2	
Transmitter Performance Class			
Standard			Standard
1	Up to ±1.75% flow rate accuracy, 8:1 flow turndown, 5-year stability		★

A.6.5 Options (Include with selected model number)

Installation Accessories		
Standard		Standard
AB	ANSI Alignment Ring (150#) (Only required for 10-in. (250 mm) and 12-in. (300mm) line sizes)	★
AC	ANSI Alignment Ring (300#) (Only required for 10-in. (250 mm) and 12-in. (300mm) line sizes)	★
AD	ANSI Alignment Ring (600#) (Only required for 10-in. (250 mm) and 12-in. (300mm) line sizes)	★
DG	DIN Alignment Ring (PN16)	★
DH	DIN Alignment Ring (PN40)	★
DJ	DIN Alignment Ring (PN100)	★
Expanded		
JB	JIS Alignment Ring (10K)	
JR	JIS Alignment Ring (20K)	
JS	JIS Alignment Ring (40K)	
Remote Adapters		
Standard		Standard
FE	Flange Adapters 316 SST (1/2-in NPT)	★
High Temperature Application		
Expanded		
HT	Graphite Valve Packing (T_{max} = 850 °F)	
Flow Calibration		
Expanded		
WC[4]	Flow Calibration Certification (3 point)	
WD[4]	Discharge Coefficient Verification (full 10 point)	
Pressure Testing		
Expanded		
P1	Hydrostatic Testing with Certificate	

Table A-9. Rosemount 2051CFC Compact Flowmeter 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.

Special Cleaning		
Expanded		
P2	Cleaning for Special Services	
PA	Cleaning per ASTM G93 Level D (Section 11.4)	
Special Inspection		
Standard		Standard
QC1	Visual & Dimensional Inspection with Certificate	★
QC7	Inspection and Performance Certificate	★
Transmitter Calibration Certification		
Standard		Standard
Q4	Calibration Certificate for Transmitter	★
Quality Certification for Safety		
Standard		Standard
QS[5]	Prior-use certificate of FMEDA data	★
Material Traceability Certification		
Standard		Standard
Q8	Material Traceability Certification per EN 10204:2004 3.1	★
Code Conformance		
Expanded		
J2	ANSI/ASME B31.1	
J3	ANSI/ASME B31.3	
J4	ANSI/ASME B31.8	
Materials Conformance		
Expanded		
J5[6]	NACE MR-0175 / ISO 15156	
Country Certification		
Expanded		
J1	Canadian Registration	
Product Certifications		
Standard		Standard
C6	CSA Explosion-proof, Dust Ignition-proof, Intrinsically Safe, Division 2	★
E5	FM Explosion-proof, Dust Ignition-proof	★
E7[7]	IECEx Flameproof, Dust Ignition-proof	★
E8	ATEX Flameproof, Dust	★
I1[7]	ATEX Intrinsic Safety	★
I5	FM Intrinsically Safe, Division 2	★
IA	ATEX FISCO Intrinsic Safety; for FOUNDATION fieldbus protocol only	★
K5	FM Explosion-proof, Dust Ignition-proof, Intrinsically Safe, Division 2 (combination of E5 and I5)	★
K6[7]	CSA Explosion-proof, Dust Ignition-proof, Intrinsically Safe, Division 2 (combination of E6 and I6)	★
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, 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	★
Sensor Fill Fluid and O-ring Options		
Standard		Standard
L1	Inert Sensor Fill Fluid	★
L2	Graphite-Filled (PTFE) O-ring	★
LA	Inert Sensor Fill Fluid and Graphite-Filled (PTFE) O-ring	★

Table A-9. Rosemount 2051CFC Compact Flowmeter 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.

Shipboard Approvals		
Standard		Standard
SBS	American Bureau of Shipping	★
Display and Interface Options		
Standard		Standard
M4[8]	LCD Display with Local Operator Interface	★
M5	LCD Display	★
Transient Protection		
Standard		Standard
T1[9]	Transient terminal block	★
Manifold for Remote Mount Option		
Standard		Standard
F2	3-Valve Manifold, Stainless Steel	★
F6	5-Valve Manifold, Stainless Steel	★
PlantWeb Control Functionality		
Standard		Standard
A01[10]	FOUNDATION fieldbus Advanced Control Function Block Suite	★
PlantWeb Diagnostic Functionality		
Standard		Standard
D01[10]	FOUNDATION fieldbus Diagnostic Suite	★
Wireless Transmit Rate, Operating Frequency and Protocol		
Standard		Standard
WA3	User Configurable Transmit Rate, 2.4 GHz WirelessHART	★
Antenna and SmartPower		
Standard		Standard
WP5	Internal Antenna, Compatible with Green Power Module (I.S. Power Module Sold Separately)	★
Low Power Output		
Standard		Standard
C2[11]	0.8-3.2 V dc Output with Digital Signal Based on Hart Protocol	★
Alarm Limit		
Standard		Standard
C4[11][12]	NAMUR Alarm and Saturation Levels, High Alarm	★
CN[11][12]	NAMUR Alarm and Saturation Levels, Low Alarm	★
Hardware Adjustments		
Standard		Standard
DZ	Digital Zero Sensor Trim Configuration Button	★
Ground Screw		
Standard		Standard
V5[13]	External Ground Screw Assembly	★
Typical Model Number: 2051CFC D C S 060 N 065 0 3 2 A A 1 WC E5 M5		

(1) Not available for Primary Element Technology C.
(2) For 2-in. (50 mm) line sizes the Primary Element Type is 0.6 for Primary Element Technology Code C.
(3) Option code M4 - LCD Display with Local Operator Interface required for local addressing and configuration.
(4) Not available with Primary Element Technology P.
(5) Not available with FOUNDATION fieldbus (Output Code F) or Profibus (Output Code W).
(6) Materials of Construction comply with metallurgical requirements within NACE MR0175/ISO 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.
(7) Not available with Low Power code M.
(8) Available only with output code W - Profibus PA.
(9) The T1 option is not needed with FISCO Product Certifications, transient protection is included with the FISCO Product Certification code IA.
(10) Only valid with FOUNDATION fieldbus Output Code F.
(11) Not available with FOUNDATION fieldbus (Output Code F) or Profibus (Output Code W).
(12) NAMUR-Compliant operation is pre-set at the factory and cannot be changed to standard operation in the field.
(13) The V5 option is not needed with the T1 option; external ground screw assembly is included with the T1 option.

Table A-10. Rosemount 2051CFP Integral Orifice Flowmeter 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	Product Description	
2051CFP	Integral Orifice Flowmeter	
Measurement Type		
Standard		Standard
D	Differential Pressure	★
Body Material		
Standard		Standard
S	316 SST	★
Line Size		
Standard		Standard
005	1/2-in. (15 mm)	★
010	1-in. (25 mm)	★
015	1 1/2-in. (40 mm)	★
Process Connection		
Standard		Standard
T1	NPT Female Body (Not Available with Remote Thermowell and RTD)	★
S1(1)	Socket Weld Body (Not Available with Remote Thermowell and RTD)	★
P1	Pipe Ends: NPT Threaded	★
P2	Pipe ends: Beveled	★
D1	Pipe Ends: Flanged, DIN PN16, slip-on	★
D2	Pipe Ends: Flanged, DIN PN40, slip-on	★
D3	Pipe Ends: Flanged, DIN PN100, slip-on	★
W1	Pipe Ends: Flanged, RF, ANSI Class 150, weld-neck	★
W3	Pipe Ends: Flanged, RF, ANSI Class 300, weld-neck	★
W6	Pipe Ends: Flanged, RF, ANSI Class 600, weld-neck	★
Expanded		
A1	Pipe Ends: Flanged, RF, ANSI Class 150, slip-on	
A3	Pipe Ends: Flanged, RF, ANSI Class 300, slip-on	
A6	Pipe Ends: Flanged, RF, ANSI Class 600, slip-on	
R1	Pipe Ends: Flanged, RTJ, ANSI Class 150, slip-on	
R3	Pipe Ends: Flanged, RTJ, ANSI Class 300, slip-on	
R6	Pipe Ends: Flanged, RTJ, ANSI Class 600, slip-on	
Orifice Plate Material		
Standard		Standard
S	316 SST	★
Expanded		
H	Alloy C-276	
M	Alloy 400	
Bore Size Option		
Standard		Standard
0066	0.066-in. (1.68 mm) for 1/2-in. Pipe	★
0109	0.109-in. (2.77 mm) for 1/2-in. Pipe	★
0160	0.160-in. (4.06 mm) for 1/2-in. Pipe	★
0196	0.196-in. (4.98 mm) for 1/2-in. Pipe	★
0260	0.260-in. (6.60 mm) for 1/2-in. Pipe	★
0340	0.340-in. (8.64 mm) for 1/2-in. Pipe	★
0150	0.150-in. (3.81 mm) for 1-in. Pipe	★

Table A-10. Rosemount 2051CFP Integral Orifice Flowmeter 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.

0250	0.250-in. (6.35 mm) for 1-in. Pipe		★
0345	0.345-in. (8.76 mm) for 1-in. Pipe		★
0500	0.500-in. (12.70 mm) for 1-in. Pipe		★
0630	0.630-in. (16.00 mm) for 1-in. Pipe		★
0800	0.800-in. (20.32 mm) for 1-in. Pipe		★
0295	0.295-in. (7.49 mm) for 1 1/2-in. Pipe		★
0376	0.376-in. (9.55 mm) for 1 1/2-in. Pipe		★
0512	0.512-in. (13.00 mm) for 1 1/2-in. Pipe		★
0748	0.748-in. (19.00 mm) for 1 1/2-in. Pipe		★
1022	1.022-in. (25.96 mm) for 1 1/2-in. Pipe		★
1184	1.184-in. (30.07 mm) for 1 1/2-in. Pipe		★
Expanded			
0010	0.010-in. (0.25 mm) for 1/2-in. Pipe		
0014	0.014-in. (0.36 mm) for 1/2-in. Pipe		
0020	0.020-in. (0.51 mm) for 1/2-in. Pipe		
0034	0.034-in. (0.86 mm) for 1/2-in. Pipe		
Transmitter Connection Platform			
Standard			Standard
D3	Direct-mount, 3-Valve Manifold, SST		★
D5	Direct-mount, 5-Valve Manifold, SST		★
R3	Remote-mount, 3-Valve Manifold, SST		★
R5	Remote-mount, 5-Valve Manifold, SST		★
Expanded			
D4	Direct-mount, 3-Valve Manifold, Alloy C-276		
D6	Direct-mount, 5-Valve Manifold, Alloy C-276		
D7	Direct-mount, High Temperature, 5-Valve Manifold, SST		
R4	Remote-mount, 3-Valve Manifold, Alloy C-276		
R6	Remote-mount, 5-Valve Manifold, Alloy C-276		
Differential Pressure Ranges			
Standard			Standard
1	0 to 25 in H_2O (0 to 62,3 mbar)		★
2	0 to 250 in H_2O (0 to 623 mbar)		★
3	0 to 1000 in H_2O (0 to 2,5 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		★
X	Wireless		★
Expanded			
M	Low-Power, 1-5 V dc with Digital Signal Based on HART Protocol		
Transmitter Housing Material		**Conduit Entry Size**	
Standard			Standard
A	Aluminum	1/2-14 NPT	★
B	Aluminum	M20 x 1.5	★
J	SST	1/2-14 NPT	★
K	SST	M20 x 1.5	★
P	Engineered Polymer	N/A	★
Expanded			

Table A-10. Rosemount 2051CFP Integral Orifice Flowmeter 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.

D	Aluminum	G1/2	
M	SST	G1/2	
Transmitter Performance Class			
Standard			Standard
1	up to ±1.75% flow rate accuracy, 8:1 flow turndown, 5-year stability		★

A.6.6 Options (Include with selected model number)

Transmitter Body / Bolt Material		
Expanded		
GT	High Temperature (850 °F / 454 °C)	
Temperature Sensor		
Expanded		
RT(3)	Thermowell and RTD	
Optional Connection		
Standard		Standard
G1	DIN 19213 Transmitter Connection	★
Pressure Testing		
Expanded		
P1(4)	Hydrostatic Testing with Certificate	
Special Cleaning		
Expanded		
P2	Cleaning for Special Services	
PA	Cleaning per ASTM G93 Level D (Section 11.4)	
Material Testing		
Expanded		
V1	Dye Penetrant Exam	
Material Examination		
Expanded		
V2	Radiographic Examination	
Flow Calibration		
Expanded		
WD(5)	Discharge Coefficient Verification	
Special Inspection		
Standard		Standard
QC1	Visual & Dimensional Inspection with Certificate	★
QC7	Inspection and Performance Certificate	★
Material Traceability Certification		
Standard		Standard
Q8	Material Traceability Certification per EN 10204:2004 3.1	★
Code Conformance		
Expanded		
J2(6)	ANSI/ASME B31.1	
J3(6)	ANSI/ASME B31.3	
J4(6)	ANSI/ASME B31.8	
Materials Conformance		
Expanded		
J5(7)	NACE MR-0175 / ISO 15156	
Country Certification		
Standard		Standard
J6	European Pressure Directive (PED)	★

Table A-10. Rosemount 2051CFP Integral Orifice Flowmeter 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		
J1	Canadian Registration	
Transmitter Calibration Certification		
Standard		Standard
Q4	Calibration Certificate for Transmitter	★
Quality Certification for Safety		
Standard		Standard
QS[8]	Prior-use certificate of FMEDA data	★
Product Certifications		
Standard		Standard
C6	CSA Explosion-proof, Dust Ignition-proof, Intrinsically Safe, Division 2	★
E5	FM Explosion-proof, Dust Ignition-proof	★
E7[9]	IECEx Flameproof, Dust Ignition-proof	★
E8	ATEX Flameproof, Dust	★
I1[9]	ATEX Intrinsic Safety	★
I5	FM Intrinsically Safe, Division 2	★
IA	ATEX FISCO Intrinsic Safety; for FOUNDATION fieldbus protocol only	★
K5	FM Explosion-proof, Dust Ignition-proof, Intrinsically Safe, Division 2 (combination of E5 and I5)	★
K6[9]	CSA Explosion-proof, Dust Ignition-proof, Intrinsically Safe, Division 2 (combination of E6 and I6)	★
K8[9]	ATEX Flameproof, Intrinsic Safety, Type n, Dust (combination of E8, I1 and N1)	★
KB	FM and CSA Explosion-proof, Dust Ignition-proof, Intrinsically Safe, Division 2 (combination of K5 and C6)	★
KD[9]	FM, CSA, and ATEX Explosion-proof, Intrinsically Safe (combination of K5, C6, I1 and E8)	★
N1[9]	ATEX Type n	★
Sensor Fill Fluid and O-ring Options		
Standard		Standard
L1	Inert Sensor Fill Fluid	★
L2	Graphite-Filled (PTFE) O-ring	★
LA	Inert Sensor Fill Fluid and Graphite-Filled (PTFE) O-ring	★
Shipboard Approvals		
Standard		Standard
SBS	American Bureau of Shipping	★
Display and Interface Options		
Standard		Standard
M4[10]	LCD Display with Local Operator Interface	★
M5	LCD Display	★
Transient Protection		
Standard		Standard
T1[11]	Transient terminal block	★
PlantWeb Control Functionality		
Standard		Standard
A01[12]	FOUNDATION fieldbus Advanced Control Function Block Suite	★
PlantWeb Diagnostic Functionality		
Standard		Standard
D01[12]	FOUNDATION fieldbus Diagnostic Suite	★
Wireless Transmit Rate, Operating Frequency and Protocol		
Standard		Standard
WA3	User Configurable Transmit Rate, 2.4 GHz WirelessHART	★
Antenna and SmartPower		
Standard		Standard

Table A-10. Rosemount 2051CFP Integral Orifice Flowmeter 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.

WP5	Internal Antenna, Compatible with Green Power Module (I.S. Power Module Sold Separately)	★
Lower Power Output		
Standard		Standard
C2[13]	0.8-3.2 V dc Output with Digital Signal Based on Hart Protocol	★
Alarm Limit		
Standard		Standard
C4[13][14]	NAMUR Alarm and Saturation Levels, High Alarm	★
CN[13][14]	NAMUR Alarm and Saturation Levels, Low Alarm	★
Hardware Adjustments		
Standard		Standard
DZ	Digital Zero Sensor Trim Configuration Button	★
Ground Screw		
Standard		Standard
V5[15]	External Ground Screw Assembly	★
Typical Model Number: 2051CFP D S 010 W1 S 0500 D3 2 A A 1 E5 M5		

(1) To improve pipe perpendicularity for gasket sealing, socket diameter is smaller than standard pipe O.D.
(2) Option code M4 - LCD Display with Local Operator Interface required for local addressing and configuration.
(3) Thermowell Material is the same as the body material.
(4) Does not apply to Process Connection codes T1 and S1.
(5) Not available for bore sizes 0010, 0014, 0020, or 0034.
(6) Not available with DIN Process Connection codes D1, D2, or D3.
(7) Materials of Construction comply with metallurgical requirements within NACE MR0175/ISO 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.
(8) Not available with FOUNDATION fieldbus (Output Code F) or Profibus (Output Code W).
(9) Not available with Low Power code M.
(10) Available only with output code W - Profibus PA.
(11) The T1 option is not needed with FISCO Product Certifications, transient protection is included with the FISCO Product Certification code IA.
(12) Only valid with FOUNDATION fieldbus Output Code F.
(13) Not available with FOUNDATION fieldbus (Output Code F) or Profibus (Output Code W).
(14) NAMUR-Compliant operation is pre-set at the factory and cannot be changed to standard operation in the field.
(15) The V5 option is not needed with the T1 option; external ground screw assembly is included with the T1 option.

Appendix B Product Certifications

B.1 Wireless Certifications

B.1.1 Approved manufacturing locations

Rosemount Inc. — Chanhassen, Minnesota USA
Fisher-Rosemount GmbH & Co. — Wessling, Germany
Emerson Process Management Asia Pacific Private Limited — Singapore
Beijing Rosemount Far East Instrument Co., LTD — Beijing, China

B.1.2 European directive information

The EC declaration of conformity can be found on . The most recent revision can be found at www.rosemount.com.

B.1.3 Telecommunication compliance

All wireless devices require certification to ensure that they adhere to regulations regarding the use of the RF spectrum. Nearly every country requires this type of product certification. Emerson is working with governmental agencies around the world to supply fully compliant products and remove the risk of violating country directives or laws governing wireless device usage.

B.1.4 FCC and IC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation. This device must be installed to ensure a minimum antenna separation distance of 20 cm from all persons.

B.1.5 Ordinary location certification for FM

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).

B.1.6 North American certifications

Factory Mutual (FM) approvals

I5 FM Intrinsically Safe, Non-Incendive, and Dust Ignition-proof.
Intrinsically Safe for Class I/II/III, Division 1, Groups A, B, C, D, E, F, and G.
Zone Marking: Class I, Zone 0, AEx ia IIC
Temperature Codes T4 (T_{amb} = -50 to 70 °C)
Non-Incendive for Class I, Division 2, Groups A, B, C, and D.
Dust Ignition-proof for Class II/III, Division 1, Groups E, F, and G.
Ambient temperature limits: -50 to 85 °C
For use with Rosemount power module P/N 00753-9220-0001 only.
Enclosure Type 4X / IP66/68

B.1.7 CSA - Canadian Standards Association

I6 CSA Intrinsically Safe
Intrinsically Safe for Class I, Division 1, Groups A, B, C, and D.
Temp Code T3C
Enclosure Type 4X / IP66/68
For use with Rosemount power module P/N 00753-9220-0001 only.

B.1.8 European certifications

I1 ATEX Intrinsic Safety
Certificate No.: BAS01ATEX1303X ⟨Ex⟩ II 1G
Ex ia IIC T4 (T_a = -60 °C to 70 °C)
For use with Rosemount power module options 00753-9220-0001 only.
IP66/68
CE 1180

Special Conditions for Safe Use (X)

The surface resistivity of the antenna is greater than one gigaohm. To avoid electrostatic charge build-up, it must not be rubbed or cleaned with solvents or a dry cloth.

I7 IECEx Intrinsic Safety
Certificate No.: IECEx BAS 04.0017X
Ex ia IIC T4 (Ta = -60 °C to 70 °C)
For use with Rosemount power module options 00753-9220-0001 only.
IP66/68

Special Conditions for Safe Use (X)

The surface resistivity of the antenna is greater than one gigaohm. To avoid electrostatic charge build-up, it must not be rubbed or cleaned with solvents or a dry cloth.

B.1.9 Japanese Certifications

I4 TIIS Intrinsic Safety
Ex ia IIC T4

Certificate	Description
TC18649	2051_CD/CG/LD/LG
TC18650	2051_CA/TA/TG/LA
TC18657	2051FA/SFC/SFP

B.1.10 China (NEPSI) Certifications

I3 China Intrinsic Safety
Certificate No. (manufactured in Chanhassen, MN): GYJ081078
Certificate No. (manufactured in Beijing, China): GYJ06367
Certificate No. (manufactured in Singapore): GYJ06365
Ex ia IIC T4

Special Conditions for Safe Use (X)

See appropriate certificate.

Reference Manual
00809-0100-4102, Rev AA
June 2012

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ROSEMOUNT

EMERSON.
Process Management

Reference Manual
00809-0100-4100, Rev AA
June 2012

Rosemount 3051 Wireless Series

Pressure, Level, and Flow Solutions with WirelessHART™ Protocol

IEC

WirelessHART

ROSEMOUNT

EMERSON.
Process Management

Rosemount 3051 Wireless Series Scalable Pressure, Flow, and Level Solutions

⚠ WARNING

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

⚠ 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.

- 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.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions.

This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation.

This device must be installed to ensure a minimum antenna separation distance of 8 in. (20 cm) from all persons.

The Power Module may be replaced in a hazardous area. The Power Module has surface resistivity greater than one gigaohm and must be properly installed in the wireless device enclosure. Care must be taken during transportation to and from the point of installation to prevent a potential electrostatic charging hazard.

Polymer enclosure has surface resistivity greater than one gigaohm. Care must be taken during transportation to and from the point of installation to prevent a potential electrostatic charging hazard.

Process leaks may cause harm or result in death.

- To avoid process leaks, only use the o-ring designed to seal with the corresponding flange adapter.

Electrical shock can result in death or serious injury.

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

⚠ CAUTION

The Rosemount 3051 and all other wireless devices should be installed only after the Smart Wireless Gateway has been installed and is functioning properly. Wireless devices should also be powered up in order of proximity from the Smart Wireless Gateway, beginning with the closest. This will result in a simpler and faster network installation.

⚠ CAUTION

Shipping considerations for wireless products (Lithium Batteries: Green Power Module, model number 701PGNKF):

The unit was shipped to you without the Power Module installed. Please remove the Power Module from the unit prior to shipping.

Each power module contains one “D” size primary lithium/thionyl chloride battery. Primary lithium batteries are regulated in transportation by the U.S. Department of Transportation, and are also covered by IATA (International Air Transport Association), ICAO (International Civil Aviation Organization), and ARD (European Ground Transportation of Dangerous Goods). It is the responsibility of the shipper to ensure compliance with these or any other local requirements. Please consult current regulations and requirements before shipping.

⚠ CAUTION

The power module with the wireless unit contains one “D” size primary lithium/thionyl chloride battery (Green Power Module, model number 701PGNKF). Each battery contains approximately 5.0 grams of lithium. Under normal conditions, the battery materials are self-contained and are not reactive as long as the battery and the pack integrity are maintained. Care should be taken to prevent thermal, electrical or mechanical damage. Contacts should be protected to prevent premature discharge.

Battery hazards remain when cells are discharged.

Power modules should be stored in a clean and dry area. For maximum battery life, storage temperature should not exceed 30 °C (86 °F).

The Power Module may be replaced in a hazardous area. The Power Module has surface resistivity greater than one gigaohm and must be properly installed in the wireless device enclosure. Care must be taken during transportation to and from the point of installation to prevent electrostatic charge build-up.

⚠ CAUTION

Using the Rosmeount 3051 Wireless Pressure Transmitter in a manner other than what is specified by the menufacturer may impair the protection provided by the equipment.

Contents

Section 1: Introduction

Section 2: Configuration

Section 3: Installation

Section 4: Commissioning

Section 5: Operation and Maintenance

Section 6: Troubleshooting

Appendix A: Specifications and Reference Data

Appendix B: Product Certifications

Section 1 Introduction

1.1 Using This Manual

The sections in this manual provide information on installing, operating, and maintaining the Rosemount 3051 Wireless pressure transmitter with WirelessHART™ protocol. The sections are organized as follows:

- Section 2: Configuration provides instruction on commissioning and operating 3051 Wireless transmitters. Information on software functions, configuration parameters, and online variables is also included.
- Section 3: Installation contains mechanical and electrical installation instructions.
- Section 4: Commissioning contains techniques for properly commissioning the device.
- Section 5: Operation and Maintenance contains operation and maintenance techniques.
- Section 6: Troubleshooting provides troubleshooting techniques for the most common operating problems.
- Section A: Specifications and Reference Data supplies reference and specification data, as well as ordering information.
- Section B: Product Certifications contains approval information.

1.2 Models Covered

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

1.2.1 Rosemount 3051CD Differential Pressure Transmitter

Measures differential pressure up to 2000 psi (137,9 bar).

1.2.2 Rosemount 3051CG Gage Pressure Transmitter

Measures gage pressure up to 2000 psi (137,9 bar).

1.2.3 Rosemount 3051CA Absolute Pressure Transmitter

Measures absolute pressure up to 4000 psia (275,8 bar).

1.2.4 Rosemount 3051T Gage and Absolute Pressure Transmitter

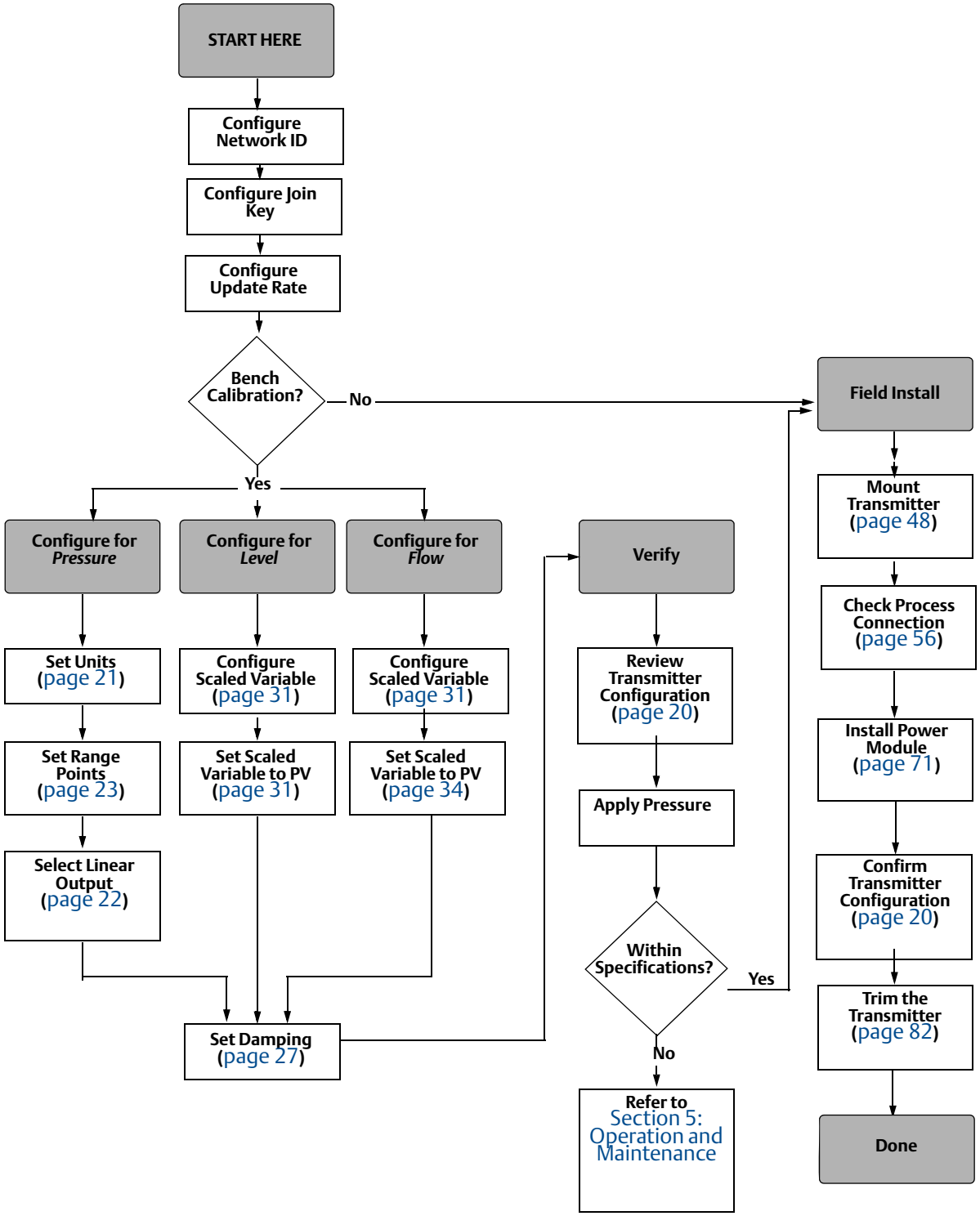
Measures gage pressure up to 10000 psi (689,5 bar).

1.2.5 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.

1.3 WirelessHART installation flowchart

Figure 1-1. WirelessHART installation flowchart



1.4 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 capacitance sensor technology for DP and GP measurements. The Rosemount 3051T and 3051CA utilize piezoresistive sensor technology for AP and GP measurements.

The major components of the Rosemount 3051 Wireless transmitter 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, a memory module, and the analog to digital signal converter (A/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 wireless antenna, and the battery. The basic block diagram of the Rosemount 3051CD Wireless device is illustrated in Figure X-X on page X.

For the Rosemount 3051, pressure is applied to the isolating diaphragm(s). The oil deflects the sensor which then changes its capacitance or voltage signal. This signal is then changed to a digital signal by the Signal Processing. The microprocessor then takes the signals from the Signal Processing and calculates the correct output of the transmitter. This signal is then sent via wireless communication to the Gateway.

An optional LCD can be ordered that connects directly to the interface board which maintains direct access to the signal terminals. The display indicates output and abbreviated diagnostic messages. A glass display cover is provided. For WirelessHART output, the LCD Display features a two-line display. The first line displays the actual measured value, the second line of six characters displays the engineering units. The LCD can also display diagnostics messages.

Note
LCD Display utilizes a 5x6 character display and can display output and diagnostic messages. See Figure 1-2.

Figure 1-2. LCD/LOI Display

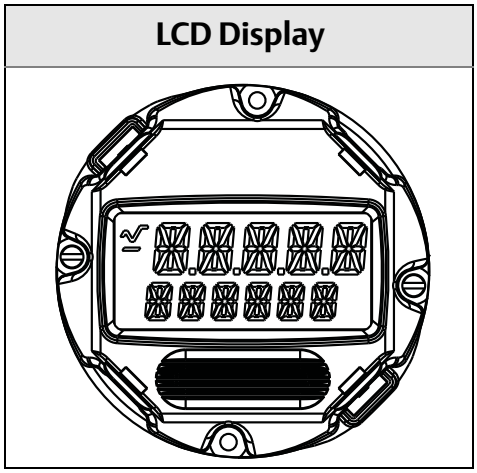
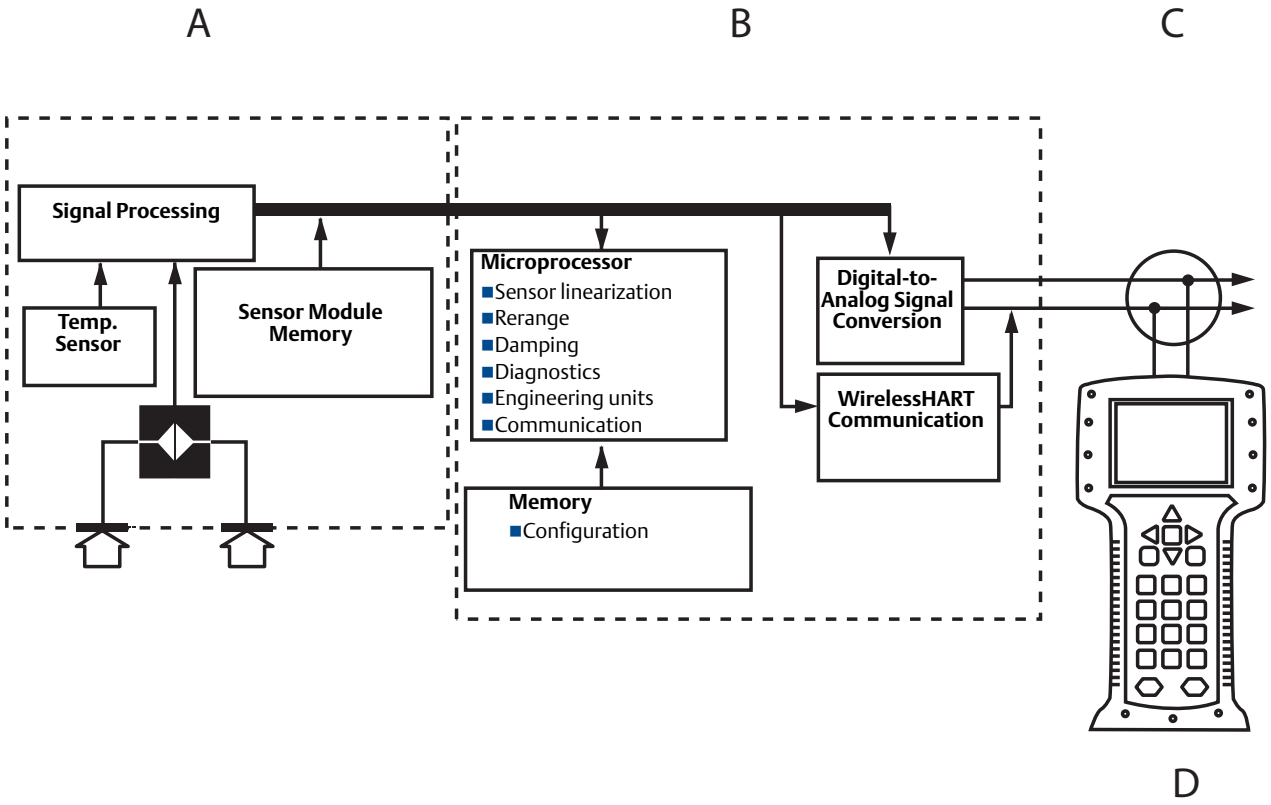


Figure 1-3. Block diagram of operation



A. Sensor Module
B. Electronics Board
C. WirelessHART Signal to Control System
D. Field Communicator

1.5 Considerations before transmitter installation

1.5.1 Wireless considerations

Power up sequence

The Smart Wireless Gateway (Gateway) should be installed and functioning properly before any wireless devices are powered. Install the power module, SmartPower Solutions, model number 701PGNKF green power module, into the 3051 to power the device. This results in a simpler and faster network installation. Enabling Active Advertising on the Gateway ensures that new devices are able to join the network faster. For more information see the Smart Wireless Gateway Reference Manual (Document No. 00809-0200-4420).

Antenna position

The antenna is internal to the pressure transmitter. To achieve optimal range, orient the transmitter with the sensor horizontal and the power module closest to the ground as shown in Figure X-X. Good connectivity can also be achieved in other orientations. The antenna should

also be approximately 1 m (3 ft.) from any large structure, building, or conductive surface to allow for clear communication to other devices. Refer to best practices for additional information on optimal mounting locations of device.

Recommended practices

When mounting the device, recommended practices should be considered to achieve the best wireless performance. See Appendix X for more information on recommended practices.

1.5.2 Mechanical

Location

When choosing an installation location and position, take into account access to the power module compartment for easy power module replacement

Electronics Cover

The electronics cover is tightened so that polymer contacts polymer. When removing the electronics cover, ensure that there is no damage done to the o-ring. If damaged replace before reattaching cover, ensuring polymer contacts polymer.

1.5.3 Electrical

Power Module

The Rosemount 3051 Wireless Pressure Transmitter is self-powered. The power module contains one "D" size primary lithium/thionyl chloride battery (Green Power Module, model number 701PGNKF). Each battery contains approximately 5.0 grams of lithium. Under normal conditions, the battery materials are self-contained and are not reactive as long as the battery and the power module are maintained. Care should be taken to prevent thermal, electrical, or mechanical damage. Contacts should be protected to prevent premature discharge.

Use caution when handling the power module, it may be damaged if dropped from heights in excess of 6.10 m (20 ft).

1.5.4 Environmental

Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

Temperature Effects

The transmitter will operate within specifications for ambient temperatures between -40 and 85 °C (-40 and 185 °F).

Heat from the process is transferred to the transmitter housing. If the process temperature is high, the ambient temperature will need to be lower to account for heat transferred to the transmitter housing. See Table 1-1 on page 1-7 for process temperature derating.

Table 1-1. Temperature Derating

Process Temperature (°C)	Process Temperature (°F)	Max Ambient (°C)	Max Ambient (°F)
260	500	41	105.8
240	464	45	113
220	428	49	120.2
200	392	53	127.4
180	356	57	134.6
160	320	61	141.8
140	284	64	147.2
120	248	68	154.4
100	212	72	161.6
85	185	75	167

1.6 Service support

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.

For inquiries outside of the United States, contact the nearest Emerson Process Management representative for RMA instructions.

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

⚠ 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.

⚠ CAUTION

Shipping considerations for wireless products (Lithium Batteries: Green Power Module, model number 701PGNKF):

The unit was shipped to you without the Power Module installed. Please remove the Power Module from the unit prior to shipping.

Each power module contains one "D" size primary lithium/thionyl chloride battery. Primary lithium batteries are regulated in transportation by the U.S. Department of Transportation, and are also covered by IATA (International Air Transport Association), ICAO (International Civil Aviation Organization), and ARD (European Ground Transportation of Dangerous Goods). It is the responsibility of the shipper to ensure compliance with these or any other local requirements. Please consult current regulations and requirements before shipping.

The Power Module contains one "D" size primary lithium/thionyl chloride battery (Green Power Module, model number 701PGNKF). Each Power Module contains approximately 5 grams of lithium. Under normal conditions, the Power Module materials are self-contained and are not reactive as long as the batteries and the module integrity are maintained. Care should be taken to prevent thermal, electrical or mechanical damage. Contacts should be protected to prevent premature discharge. Power Module hazards remain when cells are discharged.

Power Module should be stored in a clean and dry area. For maximum battery life, storage temperature should not exceed 30° C.

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

1.7 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

2.1 Overview

This section contains information on configuration and verification that should be performed prior to installation.

Field Communicator and AMS instructions are given to perform configuration functions. For convenience, Field Communicator fast key sequences are labeled “Fast Keys” for each software function below the appropriate headings.

Example software function

Fast Keys	1, 2, 3, etc.

2.2 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.

2.2.1 Warnings (⚠)

⚠ WARNING

Explosions can result in death or serious injury.

- Before connecting a Field Communicator in an explosive atmosphere, make sure the instruments are installed in accordance with intrinsically safe or nonincendive field wiring practices.

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.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: This device may not cause harmful interference this device must accept any interference received, including interference that may cause undesired operation.

This device must be installed to ensure a minimum antenna separation distance of 20cm from all persons.

2.3 Required Bench Top Configuration

Bench top configuration requires a Field Communicator, AMS, or any WirelessHART Communicator. Connect the Field Communicator leads to the terminals labeled “COMM” on the terminal block. See Figure 2-1 on page 11.

Bench top configuration consists of testing the transmitter and verifying transmitter configuration data. 3051 Wireless transmitters must be configured before installation. Configuring the transmitter on the bench before installation using a Field Communicator, AMS, or any WirelessHART Communicator ensures that all network settings are working correctly.

When using a Field Communicator, any configuration changes made must be sent to the transmitter by using the “Send” key (F2). AMS configuration changes are implemented when the “Apply” button is clicked.

AMS Wireless Configurator

AMS is capable of connecting to devices either directly, using a HART modem, or wirelessly via the Smart Wireless Gateway. When configuring the device, double click the device icon or right click and select Configure.

2.3.1 Connection Diagrams

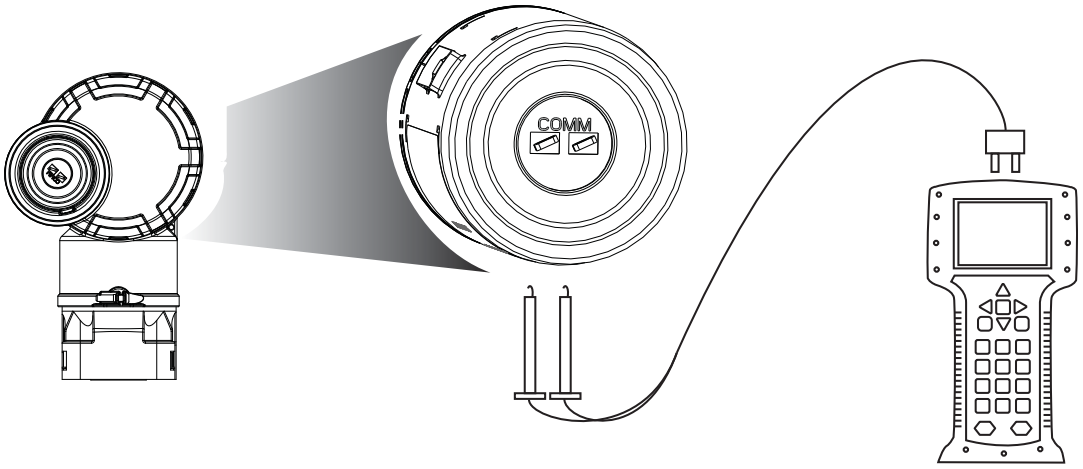
Bench Hook-up

Connect the bench equipment as shown in Figure 2-1 on page 11, and turn on the Field Communicator by pressing the ON/OFF key or log into AMS. The Field Communicator or AMS will search for a HART-compatible device and indicate when the connection is made. If the Field Communicator or AMS fail to connect, it indicates that no device was found. If this occurs, refer to Section 6: Troubleshooting.

Field Hook-up

Figure 2-1 on page 11 illustrates the wiring for a field hook-up with a Field Communicator or AMS. The Field Communicator or AMS may be connected at “COMM” on the transmitter terminal block.

Figure 2-1. Field Communicator Connection



For HART communication, a 3051 WirelessHART DD is required.

2.4 Device Network Configuration

2.4.1 Join Device to Network

Fast Keys	2, 1, 1

In order to communicate with the Smart Wireless Gateway, and ultimately the Host System, the transmitter must be configured to communicate over the wireless network. This step is the wireless equivalent of connecting wires from a transmitter to the host system.

1. From the *Home* screen, select 2: Configure.
2. Select 1: Guided Setup.
3. Select 1: Join Device to Network.

Using a Field Communicator or AMS, enter the Network ID and Join Key so that they match the Network ID and Join Key of the Smart Wireless Gateway and other devices in the network. If the Network ID and Join Key are not identical to those set in the Gateway, the transmitter will not communicate with the network. The Network ID and Join Key may be obtained from the Smart Wireless Gateway on the Setup>Network>Settings page on the web server.

2.4.2 Configure Update Rate

Fast Keys	2, 1, 2

The Update Rate is the frequency at which a new measurement is taken and transmitted over the wireless network. This by default is 1 minute. This may be changed at commissioning, or at any time via AMS Wireless Configurator. The Update Rate is user selectable from 8 seconds to 60 minutes.

1. From the *Home* screen, select 2: Configure.
2. Select 1: Guided Setup.
3. Select 2: Configure Update Rate.

When device configuration is completed, remove the Power Module and replace the housing cover. Tighten the cover so that metal contacts metal.

2.4.3 Remove Power Module

After the sensor and network have been configured, remove the Power Module and replace the housing cover. The Power Module should be inserted only when the device is ready to be commissioned.

Use caution when handling the Power Module. The Power Module may be damaged if dropped from heights in excess of 20 ft.

2.5 Review Configuration Data

The following is a list of factory default configurations that can be viewed by using the Field Communicator or AMS. Follow the steps below to review the transmitter configuration information.

Note
Information and procedures in this section that make use of Field Communicator fast key sequences and AMS assume that the transmitter and communication equipment are connected, powered, and operating correctly.

2.5.1 Review Pressure Information

Fast Keys	2, 2, 2

To view pressure information:

1. From the *Home* screen, select 2: Configure.
2. Select 2: Manual Setup.
3. Select 2: Pressure.
4. Select from the corresponding number to view each field:

1	Unit
2	Transfer Function
3	Damping
4	Upper Range Value
5	Lower Range Value
6	Maximum
7	Minimum
8	Minimum Span

2.5.2 Review Device Information

Fast Keys	2, 2, 4, 3

To view device information:

1. From the *Home* screen, select 2: Configure.
2. Select 2: Manual Setup.
3. Select 4: Device Information.
4. Select 3: Device.
5. Select from the corresponding number to view each field:

1	Manufacturer
2	Model

3	Final Assembly Number
4	Universal
5	Field Device
6	Software
7	Hardware
8	Descriptor
9	Message
10	Date
11	Model Number I
12	Model Number II
13	Model Number III
14	SI Unit Restriction
15	Country
16	Device ID

2.5.3 Review Sensor Information

Fast Keys	2, 2, 4, 4

To view sensor information:

1. From the *Home* screen, select 2: Configure.
2. Select 2: Manual Setup.
3. Select 4: Device Information.
4. Select 4: Sensor.
5. Select from the corresponding number to view each field:

1 Measurement Type
2 Module Type
3 Module Serial Number
4 Sensor Materials
   - Isolator Material
   - Fill Fluid
5 Process Connector
   - Connector Type
   - Connector Material
   - O Ring Material
   - Drain Vent Material
6 Remote Seal
   - Number of Seals
   - Seal Type
   - Diaphragm Material
   - Seal Fill Fluid

2.5.4 Review Radio Information

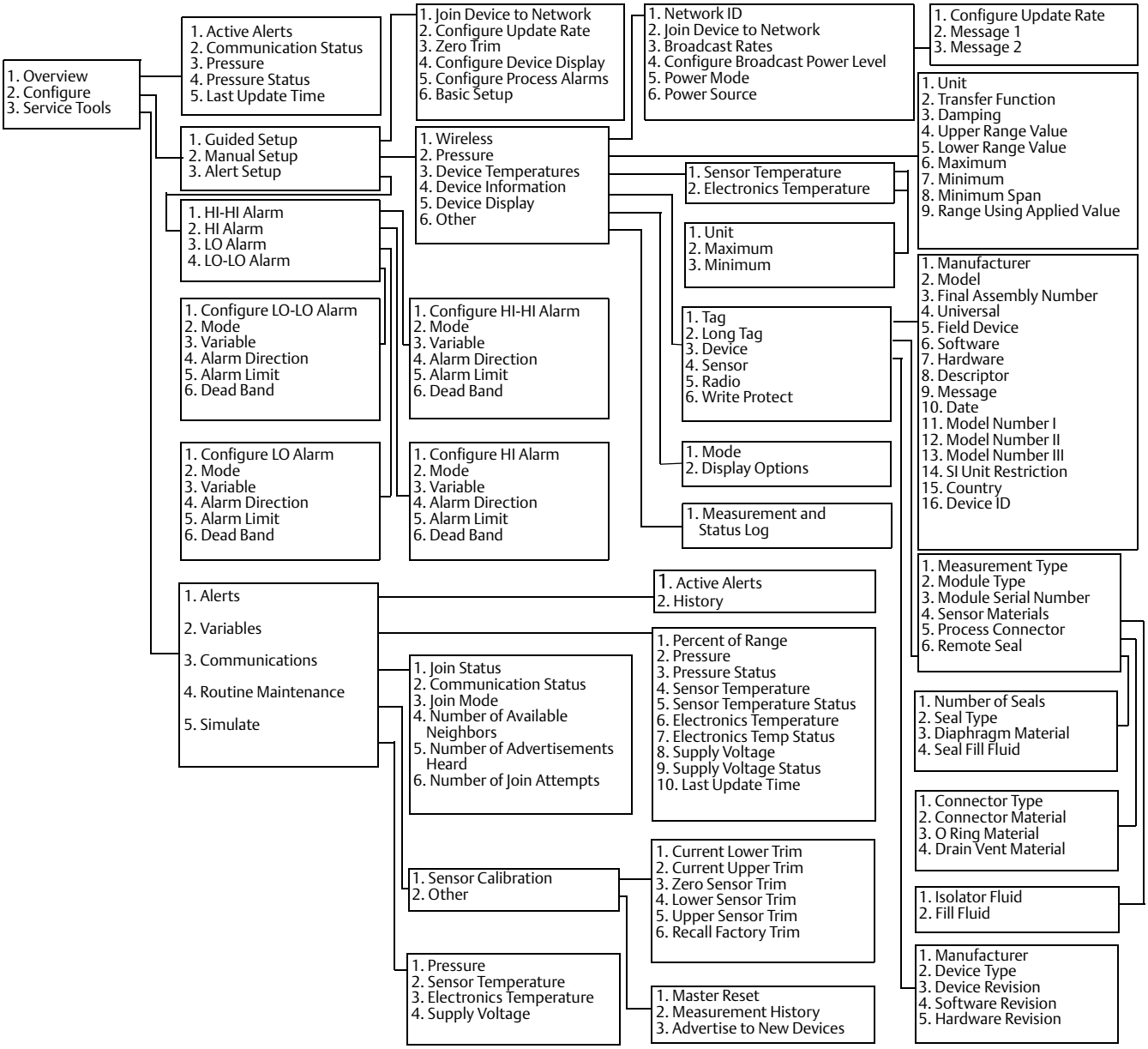
Fast Keys	2, 2, 4, 5

To view radio information:

1. From the *Home* screen, select 2: Configure.
2. Select 2: Manual Setup.
3. Select 4: Device Information.
4. Select 5: Radio.
5. Select from the corresponding number to view each field:

1 Manufacturer
2 Device Type
3 Device Revision
4 Software Revision
5 Hardware Revision

2.6 Field Communicator



2.7 Check Output

Before performing other transmitter operations, ensure that the transmitter is operating properly by checking the operating parameters.

2.7.1 Operating Parameters

Fast Keys	3, 2

The pressure output value in both engineering units and percent of range will reflect the applied pressure even when the applied pressure is outside of the configured range as long as the applied pressure is between the upper and lower range limit of the transmitter. For example, if a Range 2 3051T (LRL = 0 psi, URL = 150 psi) is ranged from 0 to 100 psi, an applied pressure of 150 psi will return a % of range output of 150% and an engineering output of 150 psi.

To view the *Operating Parameters* menu:

1. From the *Home* screen, select 3: Service Tools.
2. Select 2: Variables.

The Operating Parameters menu displays the following information pertaining to the device:

- Percent of Range
- Pressure
- Pressure Status
- Sensor Temperature
- Sensor Temperature Status
- Electronics Temperature
- Electronics Temperature Status
- Supply Voltage
- Supply Voltage Status
- Last Update Time

2.8 Basic Setup

2.8.1 Set Process Variable Unit

Fast Keys	2, 2, 2, 1

The PV Unit command sets the process variable units to allow you to monitor your process using the appropriate units of measure.

To select a unit of measure for the PV:

1. From the *Home* screen, select 2: Configure.
2. Select 2: Manual Setup.
3. Select 2: Pressure.
4. Select 1: Unit to select from the following engineering units:

- inH_2O
- inHg
- ftH_2O
- mmH_2O
- mmHg
- psi
- bar
- mbar
- g/cm^2
- kg/cm^2
- Pa
- kPa
- torr
- atm
- MPa
- inH_2O at 4 °C
- mmH_2O at 4 °C

2.8.2 Set Transfer Function

Fast Keys	2, 2, 2, 2

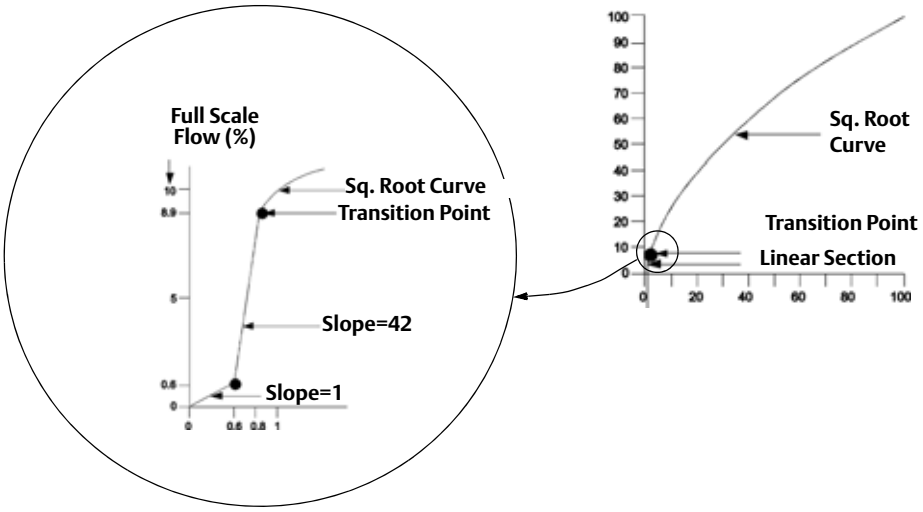
The 3051 Wireless has two output settings: Linear and Square Root. Activate the square root output option to make output proportional to flow. As input approaches zero, the 3051 Wireless automatically switches to linear output in order to ensure a more smooth, stable output near zero (see Figure 2-2).

From 0 to 0.6 percent of the ranged pressure input, the slope of the curve is unity (y = x). This allows accurate calibration near zero. Greater slopes would cause large changes in output (for small changes at input). From 0.6 percent to 0.8 percent, curve slope equals 42 (y = 42x) to achieve continuous transition from linear to square root at the transition point.

To select the output transfer function:

1. From the *Home* screen, select 2: Configure.
2. Select 2: Manual Setup.
3. Select 2: Pressure.
4. Select 2: Transfer Function and choose either Linear or Square Root.

Figure 2-2. Square Root Output Transition Point



2.8.3 Damping

Fast Keys	2, 2, 2, 3

The Damping command introduces a delay in processing which increases the response time of the transmitter; smoothing variations in output readings caused by rapid input changes. In the 3051 Wireless pressure transmitter, damping only takes effect when the device is placed in high power refresh mode and during calibration. In normal power mode, the effective damping is 0. Note that when the device is in high power refresh mode, battery power will be depleted rapidly. Determine the appropriate damp setting based on the necessary response time, signal stability, and other requirements of the loop dynamics of your system. The damping value of your device is user selectable from 0 to 25.6 seconds.

To determine the current damping value:

1. From the Home screen, select 2: Configure.
2. Select 2: Manual Setup.
3. Select 2: Pressure.
4. Select 3: Damping.

2.8.4 Write Protect

Fast Keys	2, 2, 4, 6

The 3051 Wireless has a software write protect security feature.

The view write protect security settings:

1. From the *Home* screen, select 2: Configure.
2. Select 2: Manual Setup.
3. Select 4: Device Information.
4. Select 6: Write Protect.

2.9 LCD Display

2.9.1 LCD Display Configuration

Fast Keys	2, 1, 4

The LCD display indicates output and abbreviated diagnostic messages.

Note
Use Rosemount Wireless LCD Part Number: 00753-9004-0002.

The LCD display features a four-line display and a bar graph. The first line of five characters displays the output description, the second line of seven digits displays the actual value, the third line of six characters displays engineering units and the fourth line displays “Error” when the transmitter is in alarm. The LCD display can also display diagnostic messages. The bar graph represents the network connectivity status.

See “LCD Screen Messages” on page 57 for more information on LCD messages.

To configure LCD display options:

1. From the *Home* screen, select 2: Configure.
2. Select 1: Guided Setup.
3. Select 4: Configure Device Display.

2.10 Detailed Setup

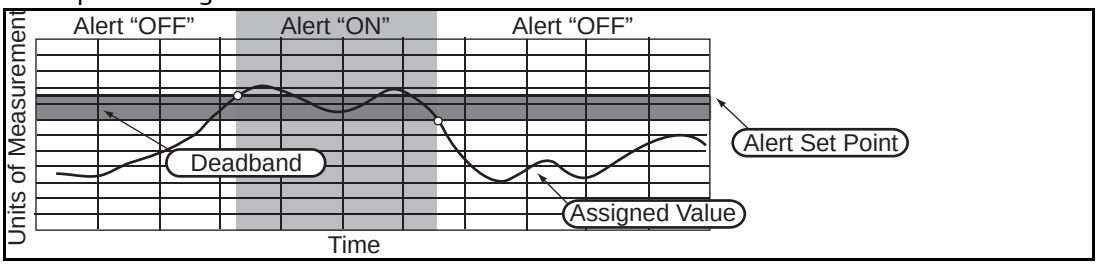
2.10.1 Configure Process Alarms

Fast Keys	2, 1, 5

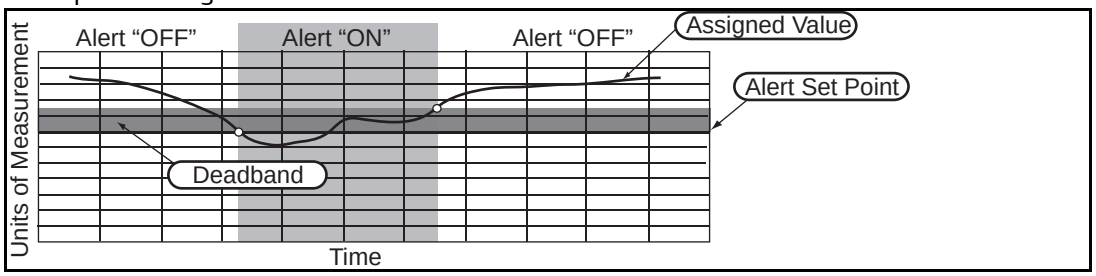
Alerts allow the user to configure the transmitter to output a HART message when the configured data point is exceeded. A process alert will be transmitted continuously if the set points are exceeded and the alert mode is ON. An alert will be displayed on a Field Communicator, AMS status screen or in the error section of the LCD display. The alert will reset once the value returns within range.

Note
HI alert value must be higher than the LO alert value. Both alert values must be within the pressure or temperature sensor limits.

Example 1: Rising Alert



Example 2: Falling Alert



To configure the process alerts, perform the following procedure:

1. From the *Home* screen, select 2: Configure.
2. Select 1: Guided Setup.
3. Select 5: Configure Process Alarms and follow the on-screen instructions to complete configure of process alarms.

2.10.2 Sensor Temperature Unit

Fast Keys	2, 2, 3, 1, 1

The Sensor Temperature Unit command selects between Celsius and Fahrenheit units for the sensor temperature. The sensor temperature output is accessible via HART only.

To select the sensor temperature unit:

1. From the *Home* screen, select 2: Configure.
2. Select 2: Manual Setup.
3. Select 3: Device Temperatures.
4. Select 1: Sensor Temperature.
5. Select 1: Unit to select from Celsius or Fahrenheit.

2.11 Diagnostics and Service

Diagnostics and service functions listed below are primarily for use after field installation. The Transmitter Test feature is designed to verify that the transmitter is operating properly, and can be performed either on the bench or in the field.

2.11.1 Master Reset

Fast Keys	3, 4, 2, 1

The master reset function will reset the device electronics. To perform a master reset:

1. From the *Home* screen, select 3: Service Tools.
2. Select 4: Routine Maintenance.
3. Select 2: Other.
4. Select 1: Master Reset.

2.11.2 Join Status

Fast Keys	3, 3, 1

To view the join status of the device, perform the following procedure:

1. From the *Home* screen, select 3: Service Tools.
2. Select 3: Communications.
3. Select 1: Join Status.

Wireless devices join the secure network through a four step process:

- Step 1. Network Found
- Step 2. Network Security Clearance Granted
- Step 3. Network Bandwidth Allocated
- Step 4. Network Join Complete

2.11.3 Number of Available Neighbors

Fast Keys	3, 3, 4

In a self-organizing network, the more neighbors a device has, the more robust the network will be. To view the number of available neighbors for the wireless device, perform the following procedure:

1. From the *Home* screen, select 3: Service Tools.
2. Select 3: Routine Maintenance.
3. Select 4: Number of Available Neighbors.

2.12 Advanced Functions for HART Protocol

2.12.1 Saving, Recalling, and Cloning Configuration Data

Fast Keys	left arrow, 1, 2

Use the cloning feature of the Field Communicator or the AMS "User Configuration" feature to configure several 3051 Wireless transmitters similarly. Cloning involves configuring a transmitter, saving the configuration data, then sending a copy of the data to a separate transmitter. Several possible procedures exist when saving, recalling, and cloning configuration data. For complete instructions refer to the Field Communicator manual (publication no. 00809-0100-4276) or AMS Books Online. One common method is as follows:

Field Communicator

1. Completely configure the first transmitter.
2. Save the configuration data:
   a. Select **F2 SAVE** from the Field Communicator **HOME/ONLINE** screen.
   b. Ensure that the location to which the data will be saved is set to **MODULE**. If it is not, select 1: Location to set the save location to **MODULE**.
   c. Select 2: Name, to name the configuration data. The default is the transmitter tag number.
   d. Ensure that the data type is set to **STANDARD**. If the data type is NOT **STANDARD**, select 3: Data Type to set the data type to **STANDARD**.
   e. Select **F2 SAVE**.
3. Connect and power the receiving transmitter and Field Communicator.
4. Select the back arrow from the **HOME/ONLINE** screen. The Field Communicator menu appears.
5. Select 1: Offline, 2: Saved Configuration, 1: Module Contents to reach the **MODULE CONTENTS** menu.
6. Use the **DOWN ARROW** to scroll through the list of configurations in the memory module, and use the **RIGHT ARROW** to select and retrieve the required configuration.
7. Select 1: Edit.
8. Select 1: Mark All.
9. Select **F2 SAVE**.
10. Use the **DOWN ARROW** to scroll through the list of configurations in the memory module, and use the **RIGHT ARROW** to select the configuration again.
11. Select 3: Send to download the configuration to the transmitter.
12. Select OK after the control loop is set to manual.
13. After the configuration has been sent, select OK.

When finished, the Field Communicator informs you of the status. Repeat Steps 3 through 13 to configure another transmitter.

Note
The transmitter receiving cloned data must have the same software version (or later) as the original transmitter.

AMS creating a Reusable Copy

To create a reusable copy of a configuration perform the following procedure:

1. Completely configure the first transmitter.
2. Select View then User Configuration View from the menu bar (or click the toolbar button).
3. In the User Configuration window, right click and select New from the context menu.
4. In the New window, select a device from the list of templates shown, and click OK.
5. The template is copied into the User Configurations window, with the tag name highlighted; rename it as appropriate and press Enter.

Note
A device icon can also be copied by dragging and dropping a device template or any other device icon from AMS Explorer or Device Connection View into the User Configurations window.

The “Compare Configurations” window appears, showing the Current values of the copied device on one side and mostly blank fields on the other (User Configuration) side.

6. Transfer values from the current configuration to the user configuration as appropriate or enter values by typing them into the available fields.
7. Click Apply to apply the values, or click OK to apply the values and close the window.

AMS Applying a User Configuration

Any amount of user configurations can be created for the application. They can also be saved, and applied to connected devices or to devices in the Device List or Plant Database.

To apply a user configuration perform the following procedure:

1. Select the desired user configuration in the User Configurations window.
2. Drag the icon onto a like device in AMS Explorer or Device Connection View. The Compare Configurations window opens, showing the parameters of the target device on one side and the parameters of the user configuration on the other.
3. Transfer parameters from the user configuration to the target device as desired, Click OK to apply the configuration and close the window.

Section 3 Installation

3.1 Overview

The information in this section covers installation considerations. A Quick Installation Guide (document number 00825-0100-4100) is shipped with every transmitter to describe basic installation and startup procedures. Dimensional drawings for each Rosemount 3051 Wireless variation and mounting configuration are included in Appendix A: Specifications and Reference Data.

Field Communicator and AMS instructions are given to perform configuration functions. For convenience, Field Communicator fast key sequences are labeled “Fast Keys” for each software function below the appropriate headings.

3.2 Safety Messages

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

3.2.1 Warnings (⚠)

⚠ WARNING

Failure to follow these installation guidelines could result in death or serious injury.

- Make sure only qualified personnel perform the installation.

Explosions can 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 Wireless reference manual for any restrictions associated with a safe installation.

- Before connecting a Field Communicator in an explosive atmosphere, make sure the instruments are installed in accordance with intrinsically safe or non-incendive field wiring practices.
- Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

Electrical shock can result in death or serious injury.

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

⚠ WARNING

Process leaks could result in death or serious injury.

- Install and tighten process connectors before applying pressure.
- Do not attempt to loosen or remove process connectors while the transmitter is in service.

Replacement equipment or spare parts not approved by Rosemount Inc. for use as spare parts could reduce the pressure retaining capabilities of the transmitter and may render the instrument dangerous.

- Use only bolts supplied or sold by Rosemount Inc. as spare parts.

Improper assembly of manifolds to traditional flange can damage SuperModule™.

- For safe assembly of manifold to traditional flange, bolts must break back plane of flange web (i.e., bolt hold) but must not contact module housing.

The Power Module with the wireless unit contains one “D” size primary lithium/thionyl chloride battery (Green Power Module, model number 701PGNKF). Each Power Module contains approximately 5 grams of lithium. Under normal conditions, the Power Module materials are self-contained and are not reactive as long as the batteries and the pack integrity are maintained. Care should be taken to prevent thermal, electrical or mechanical damage. Contacts should be protected to prevent premature discharge.

3.3 Considerations

3.3.1 General

Measurement performance 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 performance. Also, consider 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.

3.3.2 Wireless

Power Up Sequence

The Power Module should not be installed on any wireless device until the Smart Wireless Gateway is installed and functioning properly. Wireless devices should also be powered up in order of proximity from the Smart Wireless Gateway beginning with the closest. This will result in a simpler and faster network installation. Enable High Speed Operation on the Gateway to ensure that new devices join the network faster. For more information see the Smart Wireless Gateway Manual (Doc. No. 00809-0200-4420).

Field Communicator Connections

In order for the Field Communicator to interface with the 3051, the Power Module must be connected.

Figure 3-1. Field Communicator Connections

3.3.3 Mechanical

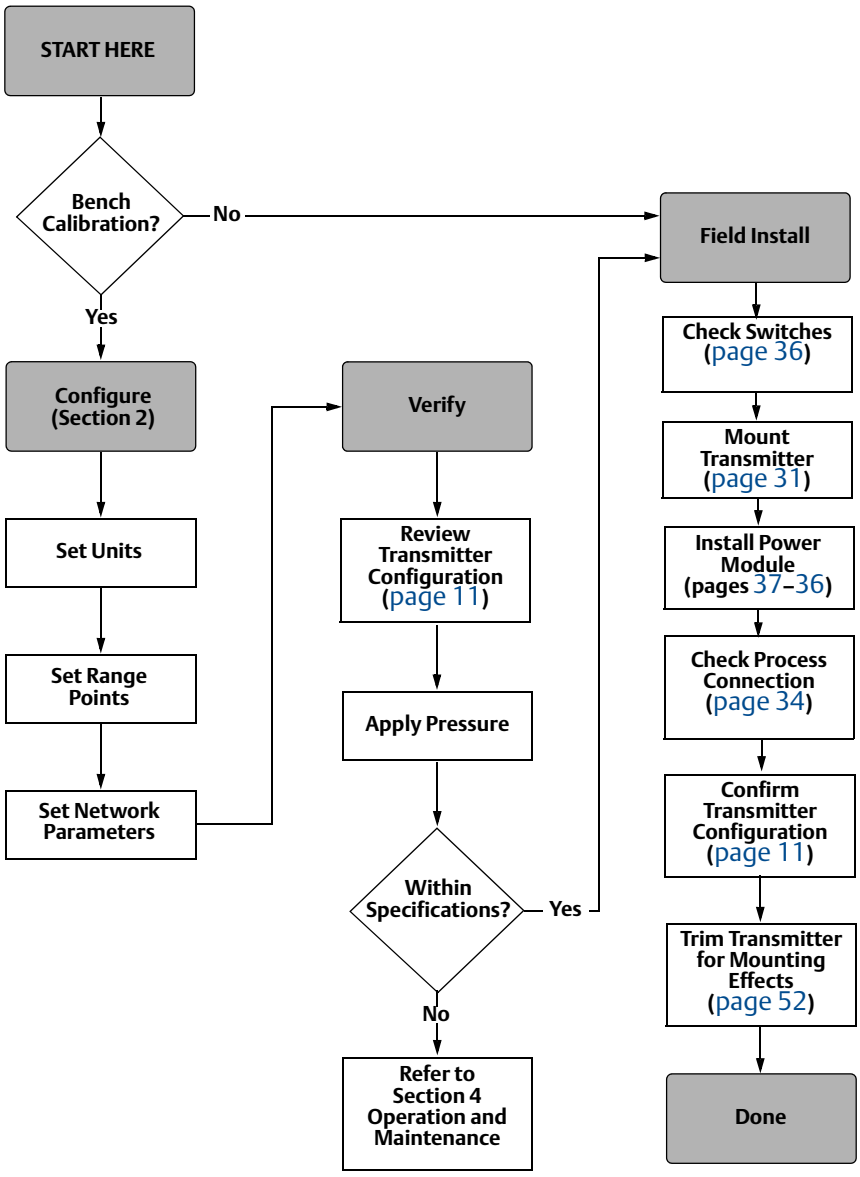
Note
For steam service or for applications with process temperatures greater than the limits of the transmitter, do not blow down impulse piping through the transmitter. Flush lines with the blocking valves closed and refill lines with water before resuming measurement.

Note
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 3.4.2 on page 34, keeping drain/vent connections on the bottom for gas service and on the top for liquid service.

3.3.4 Environmental

Access requirements and cover installation on page 31 can help optimize transmitter performance. Mount the transmitter to minimize ambient temperature changes, vibration, mechanical shock, and to avoid external contact with corrosive materials. Appendix A: Specifications and Reference Data lists temperature operating limits.

Figure 3-2. Installation Flowchart



3.4 Installation Procedures

For dimensional drawing information refer to “Dimensional Drawings” on page 93.

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

See “Consider Housing Rotation” on page 36.

Power Module Side of Electronics Housing

Mount the transmitter so the Power Module side is accessible. Clearance of 2.75-in. (70 mm) is required for cover removal.

Circuit Side of Electronics Housing

Provide 0.75 in. (19 mm) of clearance for units with out an LCD display. Three inches of clearance is required for cover removal if a meter is installed.

Cover Installation

Always ensure a proper seal by installing the electronics housing cover(s) so that polymer contacts polymer. Use Rosemount O-rings.

3.4.1 Mount the Transmitter

Mounting Brackets

Facilitate mounting transmitter to a 2-in. pipe, or to a panel. The B4 Bracket (SST) option is standard for use with the Coplanar and In-Line flanges. “Coplanar Flange Mounting Configurations” on page 93 shows bracket dimensions and mounting configurations for the B4 option.

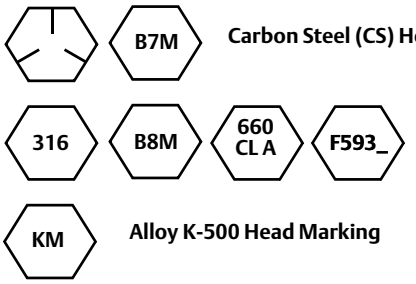
Options B1–B3 and B7–B9 are sturdy, epoxy/polyester-painted brackets designed for use with the traditional flange. The B1–B3 brackets have carbon steel bolts, while the B7–B9 brackets have stainless steel bolts. The BA and BC brackets and bolts are stainless steel. The B1/B7/BA and B3/B9/BC style brackets support 2-inch pipe-mount installations, and the B2/B8 style brackets support panel mounting.

Note
Most transmitters are calibrated in the horizontal position. Mounting the transmitter in any other position will shift the zero point to the equivalent amount of liquid head caused by the varied mounting position. To reset zero point, refer to “Sensor Trim” on page 53.

Position the antenna such that it is vertical, typically straight up (antenna may be pointed down as well.)

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 2-6, 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. When installing the transmitter to one of the optional mounting brackets, torque the bolts to 125 in-lb. (0,9 N-m). Use the following bolt installation procedure:

1. Finger-tighten the bolts.
2. Torque the bolts to the initial torque value using a crossing pattern.
3. Torque the bolts to the final torque value using the same crossing pattern.

Torque values for the flange and manifold adapter bolts are as follows:

Table 3-1. 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 K-500—Option L6	300 in.-lb (34 N-m)	650 in.-lb (73 N-m)
ASTM-A-453-660—Option L7	150 in.-lb (17 N-m)	300 in.-lb (34 N-m)
ASTM-A-193-B8M—Option L8	150 in.-lb (17 N-m)	300 in.-lb (34 N-m)

Impulse Piping

The piping between the process and the transmitter must accurately transfer the pressure to obtain accurate measurements. There are five possible sources of error: 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 depends on the process itself. 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 inch per foot (8 cm per m) upward from the transmitter toward the process connection.
- For gas service, slope the impulse piping at least 1 inch per foot (8 cm per 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 SuperModule and flanges.
- Prevent sediment deposits in the impulse piping.
- Keep the liquid head balanced on both legs of the impulse piping.
- Avoid conditions that might allow process fluid to freeze within the process flange.

Mounting Requirements

Refer to Figure 3.4.2 for examples of the following mounting configurations:

Liquid Flow Measurement

- Place taps to the side of the line to prevent sediment deposits on the process isolators.
- Mount the transmitter beside or below the taps so gases 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 to drain liquid into the process line.

Steam Flow Measurement

- Place taps to the side of the line.
- Mount the transmitter below the taps to ensure that impulse piping will remain filled with condensate.
- 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 Coplanar process flanges must not exceed 250 °F (121 °C) for transmitters with silicone fill, or 185 °F (85 °C) for inert fill. For vacuum service, these temperature limits are reduced to 220 °F (104 °C) for silicone fill and 160 °F (71 °C) for inert fill.

3.4.2 Process Connections

3051 Wireless transmitter flange process connection size is 1/4–18 NPT. Flange adapters with 1/2–14 NPT connections are available as the D2 option. Use your plant-approved lubricant or sealant when making the process connections. The process connections on the transmitter flange are on 2 1/8-inch (54 mm) centers to allow direct mounting to a three-valve or five-valve manifold. Rotate one or both of the flange adapters to attain connection centers of 2 inches (51 mm), 2 1/8 inches (54 mm), or 2 1/4 inches (57 mm).

⚠ Install and tighten all four flange bolts before applying pressure to avoid leakage. 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.

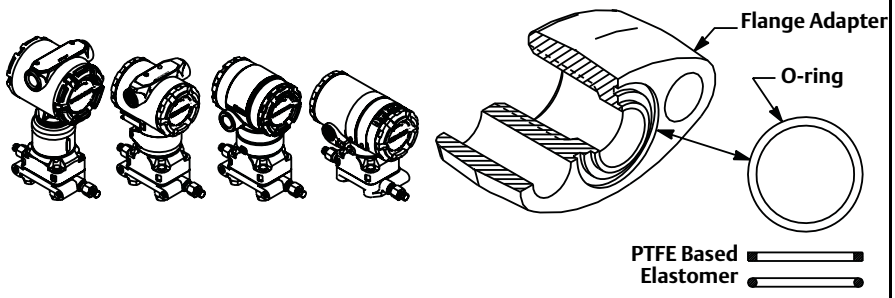
To install adapters to a Coplanar flange, perform the following procedure:

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 module using the longer of the bolts supplied.
4. Tighten the bolts. Refer to “Flange Bolts” on page 32 for torque specifications.

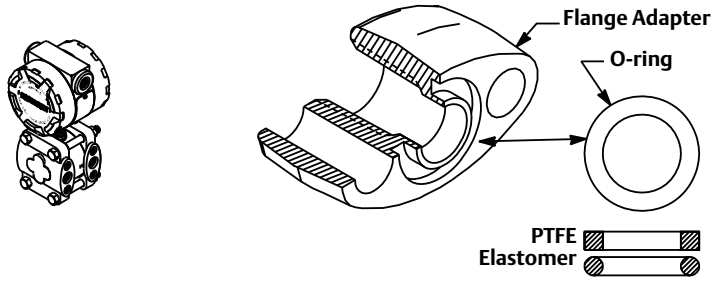
⚠ WARNING

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.

ROSEMOUNT 3051S / 3051 / 2051 / 3001 / 3095 / 2024



ROSEMOUNT 1151



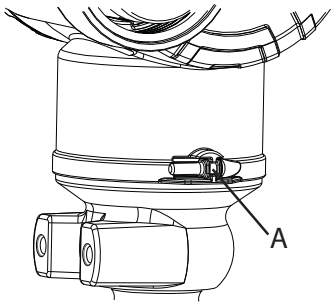
Note
PTFE O-rings should be replaced if the flange adapter is removed.

Whenever you remove flanges or adapters, visually inspect the Teflon® O-rings. Replace them if there are any signs of damage, such as nicks or cuts. If you replace the O-rings, re-torque the flange bolts after installation to compensate for cold flow. Refer to the process sensor body reassembly procedure in Section 6: Troubleshooting on page 67.

3.4.3 Consider Housing Rotation

The housing can be rotated to improve field access to wiring or to better view the optional LCD display. Perform the following procedure:

Figure 3-3. Housing rotation



A. Housing rotation screw (5/64-inch hex wrench required)

1. Loosen the housing rotation set screw.
2. Turn the housing up to 180 degrees to the left or right of its original (as shipped) position.

Note
Do not rotate the housing more than 180 degrees without first performing a disassembly procedure (see "Removing from Service" on page 72). Over-rotation may sever the electrical connection between the sensor module and the feature board.

3. Retighten the housing rotation set screw.

In addition to housing rotation, the optional LCD display can be rotated in 90-degree increments by squeezing the two tabs, pulling out, rotating and snapping back into place.

Note
If LCD pins are inadvertently removed from the interface board, carefully re-insert the pins before snapping the LCD display back into place.

3.4.4 Grounding

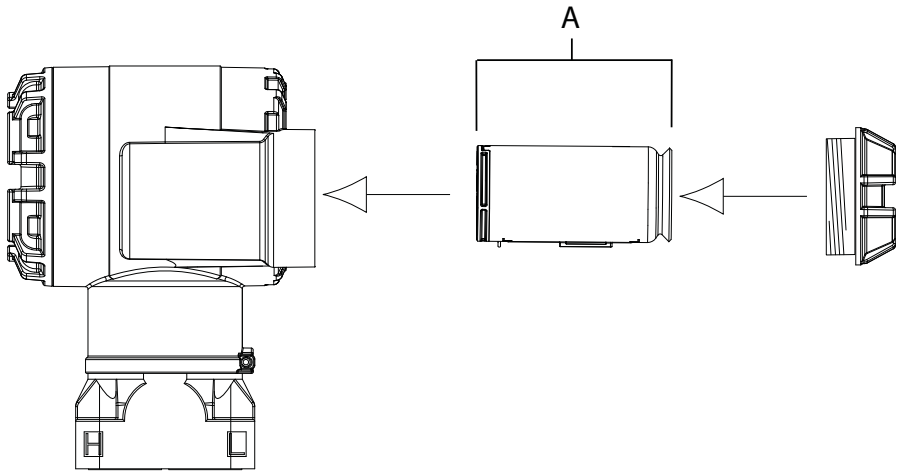
Transmitter Case

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:

- 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.

3.4.5 Power Module Installation

Figure 3-4. Power Module



A. Housing rotation screw (5/64-inch hex wrench required)

To make connections, perform the following procedure:

⚠ 1. Remove the housing cover on the Power Module compartment side. The Power Module supplies all power to the transmitter.

2. Connect Power Module 701PGNKF.

3. Replace the Power Module cover and tighten to safety specification (metal to metal).

3.4.6 Installing the LCD Display

Transmitters ordered with the LCD display will be shipped with the display installed.

Note
Only use Rosemount Wireless LCD Part Number: 00753-9004-0002

Note
An LCD from a wired device will not function in a wireless device.

In addition to housing rotation, the optional LCD display can be rotated in 90-degree increments by squeezing the two tabs, pulling out, rotating and snapping back into place.

If LCD pins are inadvertently removed from the interface board, carefully re-insert the pins before snapping the LCD display back into place.

Use the following procedure and Figure 3-5 to install the LCD display:

1. Remove the back cover and Power Module.
2. ⚠ Remove the transmitter cover opposite the field terminal side. Do not remove the instrument covers in explosive environments when the circuit is live.
3. Engage the four-pin connector into the LCD display and snap into place.

Note the following LCD temperature limits:

Operating:–40 to 175 °F (–40 to 80 °C)

Storage:–40 to 185 °F (–40 to 85 °C)

Figure 3-5. Optional LCD Display

3.5 Rosemount 304, 305 and 306 Integral Manifolds

The Rosemount 305 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 Rosemount 306 Integral Manifold is used with In-line transmitters to provide block-and-bleed valve capabilities of up to 10000 psi (690 bar). The Rosemount 304 comes in two basic styles: traditional (flange x flange and flange x pipe) and wafer. The 304 traditional manifold comes in 2, 3, and 5-valve configurations. The 304 wafer manifold comes in 3 and 5 valve configurations.

Figure 3-6. Integral Manifold Designs

3.5.1 Rosemount 305 Integral Manifold Installation Procedure

To install a 305 Integral Manifold to a 3051 Wireless transmitter:

⚠ 1. Inspect the Teflon sensor module O-rings. If the O-rings are undamaged, reusing them is recommended. If the O-rings are damaged (if they have nicks or cuts, for example), replace them with new O-rings.

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 32 for complete bolt installation information and torque values. When fully tightened, the bolts should extend through the top of the module housing.

3. If the Teflon 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.

4. If applicable, install flange adapters on the process end of the manifold using the 1.75-in. flange bolts supplied with the transmitter.

Note
Always perform a zero trim on the transmitter/manifold assembly after installation to eliminate mounting effects. See Section 5: Operation and Maintenance, "Zero Trim" on page 53.

3.5.2 Rosemount 306 Integral Manifold Installation Procedure

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

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

1. Place transmitter into holding fixture.
2. Apply appropriate thread paste or tape to threaded instrument end of the manifold.
3. Count total threads on the manifold before starting assembly.
4. Start turning the manifold by hand into the process connection on the transmitter.

Note
If using thread tape, be sure the thread tape does no strip when the manifold assembly is started.

5. Wrench tighten manifold into process connection. (Note: Minimum toque value is 425 in-lbs)
6. Count how many threads are still showing. (Note: Minimum engagement is 3 revolutions)
7. Subtract the number of threads showing (after tightening) from the total threads to calculate the revolutions engaged. Further tighten until a minimum of 3 rotations is achieved.
8. For block and bleed manifold, verify the bleed screw is installed and tightened. For two-valve manifold, verify the vent plug is installed and tightened.
9. Leak-check assembly to maximum pressure range of transmitter.

3.5.3 Rosemount 304 Conventional Manifold Installation Procedure

To install a 304 Conventional Manifold to a 3051 Wireless 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 module housing.
3. If applicable, install flange adapters on the process end of the manifold using the 1.75-in. flange bolts supplied with the transmitter.

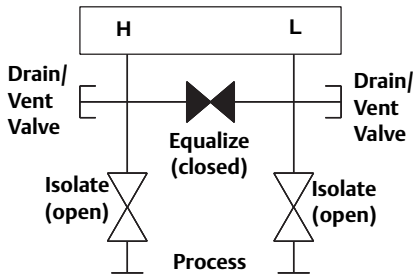
3.5.4 Manifold Operation

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

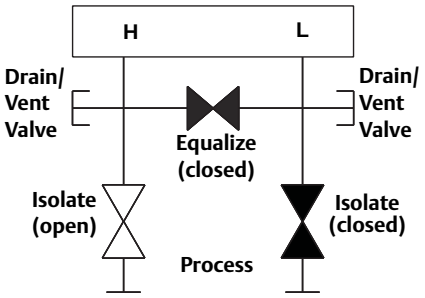
Always perform a zero trim on the transmitter/manifold assembly after installation to eliminate any shift due to mounting effects. See Section 5: Operation and Maintenance, “Sensor Trim Overview” on page 52.

Three and five-valve configurations shown:

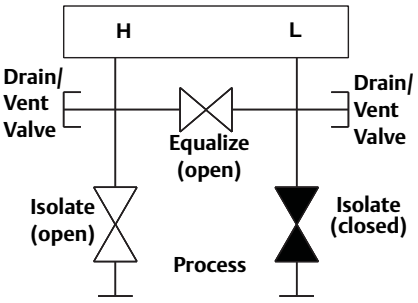
In normal operation the two block valves between the process and instrument ports will be open and the equalizing valve will be closed.



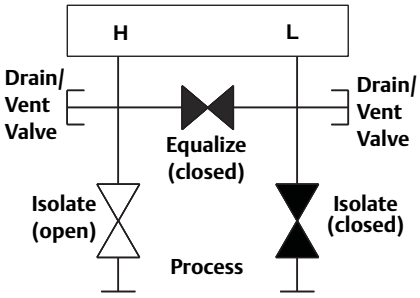
1. To zero the 3051, close the block valve to the low pressure (downstream) side of the transmitter first.



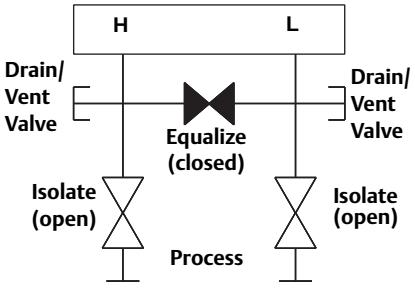
2. Open the center (equalize) valve to equalize the pressure on both sides of the transmitter. The manifold valves are now in the proper configuration for zeroing the transmitter.



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

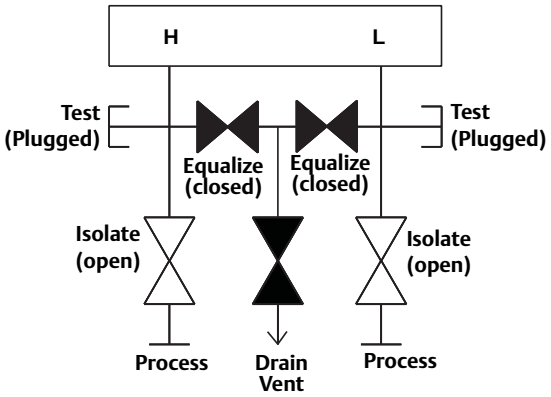


4. Open the block valve on the low pressure side of the transmitter to return the transmitter to service.

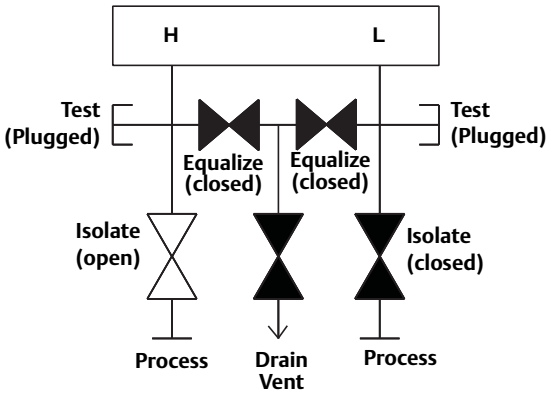


Five-valve Natural Gas configurations shown:

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

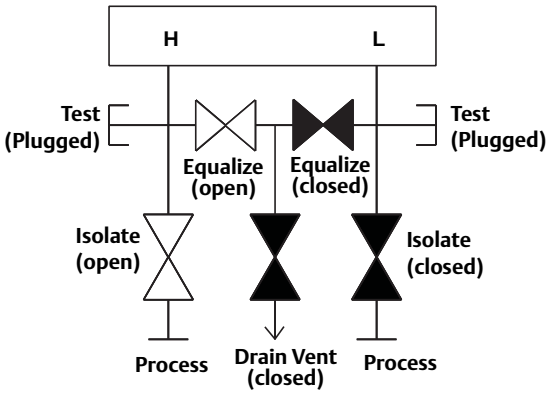


1. To zero the 3051, first close the block valve on the low pressure (downstream) side of the transmitter.

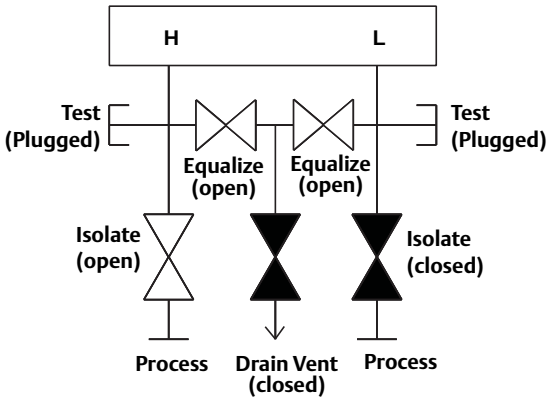


Note
Do not open the low side equalize valve before the high side equalize valve. Doing so will overpressure the transmitter.

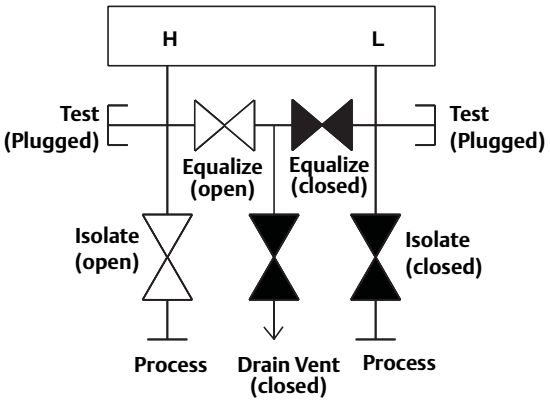
2. Open the equalize valve on the high pressure (upstream) side of the transmitter.



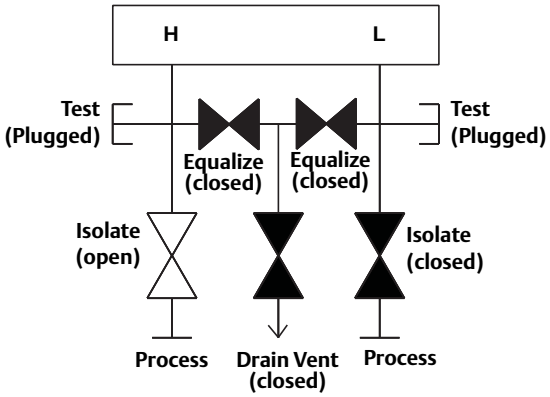
3. Open the equalize valve on the low pressure (downstream) side of the transmitter. The manifold is now in the proper configuration for zeroing the transmitter.



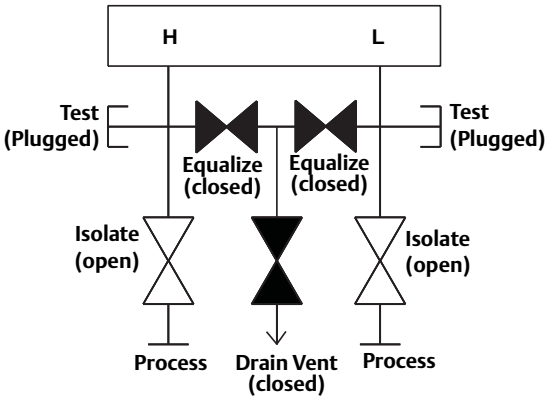
4. After zeroing the transmitter, close the equalize valve on the low pressure (downstream) side of the transmitter.



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.



Section 4 Commissioning

4.1 Safety Messages

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

4.1.1 Warnings (⚠)

⚠ WARNING

Failure to follow these installation guidelines could result in death or serious injury.

- Make sure only qualified personnel perform the installation.

Explosions could result in death or serious injury.

- Before connecting a Field Communicator in an explosive atmosphere, make sure the instruments are installed in accordance with intrinsically safe or non-incendive field wiring practices.
- Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

Process leaks could result in death or serious injury.

- Install and tighten process connectors before applying pressure.
- Do not attempt to loosen or remove process connectors while the transmitter is in service.

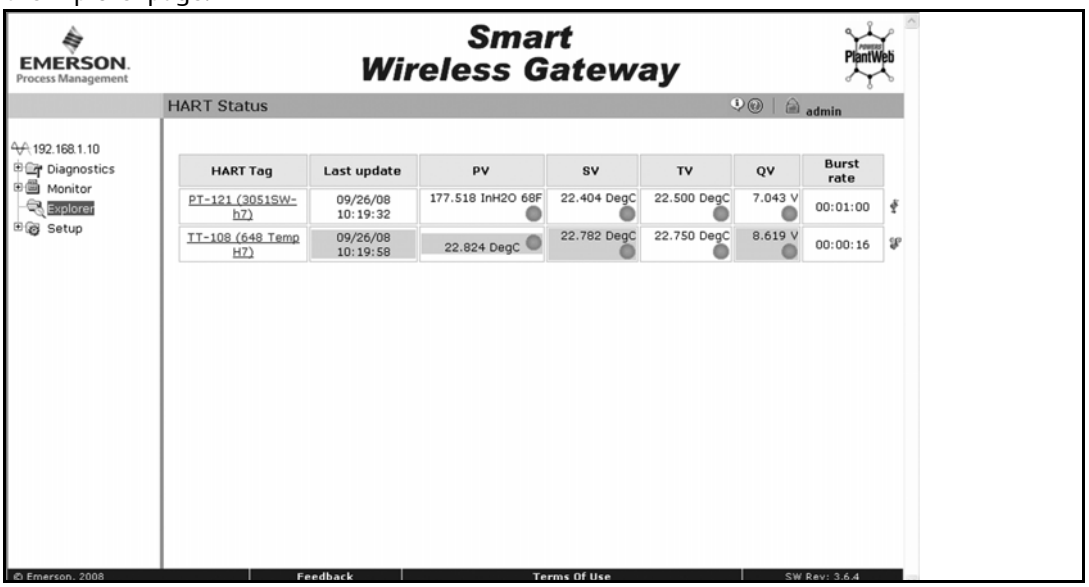
Electrical shock could cause death or serious injury.

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

Note
The Rosemount 3051 Wireless and all other wireless devices should be installed only after the Smart Wireless Gateway has been installed and is functioning properly.
Wireless devices should also be powered up in order of proximity from the Smart Wireless Gateway, beginning with the closest device to the Smart Wireless GatewaySmart. This will result in a simpler and faster network installation.

4.2 Network Status

If the Rosemount 3051 Wireless was configured with the Network ID and Join Key and sufficient time for network polling has passed, the transmitter should be connected to the network. To verify connectivity, open the Smart Wireless Gateway's integral web interface and navigate to the Explorer page.



This page will display the transmitter's HART tag, PV, SV, TV, QV, and Update Rate. A green status indicator means that the device is working properly. A red indicator means that there is a problem with either the device or its communication path. For more detail on a specific device, click on the tag name.

4.3 Verify Operation

Operation can be verified in three locations, at the device via the Local Display, using the Field Communicator, or at the Smart Wireless Gateway's integrated web interface.

Local Display

The LCD will display the PV value at the same rate as the configured update rate, but no faster than once every 60 seconds. Press the Diagnostic button to display the TAG, Device ID, Network ID, Network Join Status and Device Status screens.

For Device Status screens, see "LCD Screen Messages" on page 57.

Figure 4-1. Diagnostic Screen Sequence

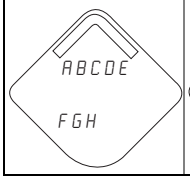
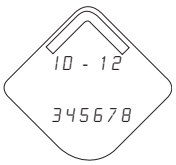
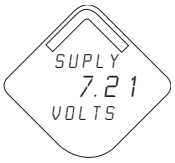
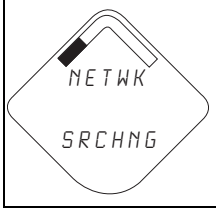
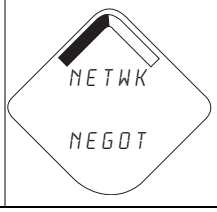
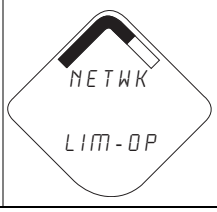
Tag	Device ID	Network ID	Network Join Status	Device Status
				

Figure 4-2. Network Join Status Screens

Searching for Network	Joining Network	Connected with Limited Bandwidth	Connected
			

Field Communicator

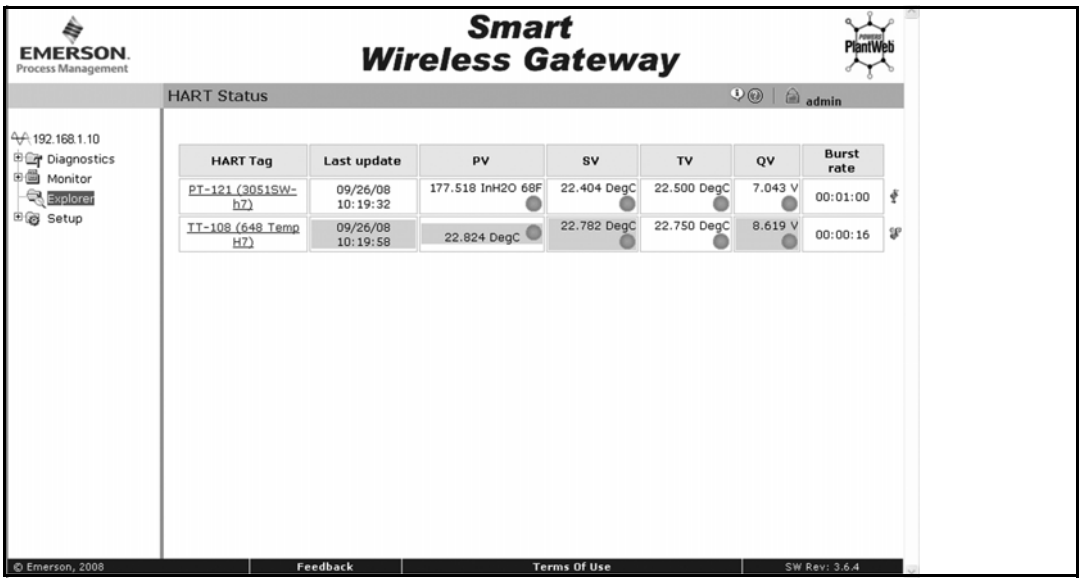
To verify device operation using a HART Field Communicator, a 3051 Wireless DD is required. For connecting with a Field Communicator, refer to Figure 2-1 on page 11.

Function	Key Sequence	Menu Items
Communications	3, 3	Join Status, Wireless Mode, Join Mode, Number of Available Neighbors, Number of Advertisements Heard, Number of Join Attempts.

Smart Wireless Gateway

To verify device operation using the Smart Wireless Gateway's integrated web interface, navigate to the Explorer page. This page will show whether the device has joined the network and if it is communicating properly.

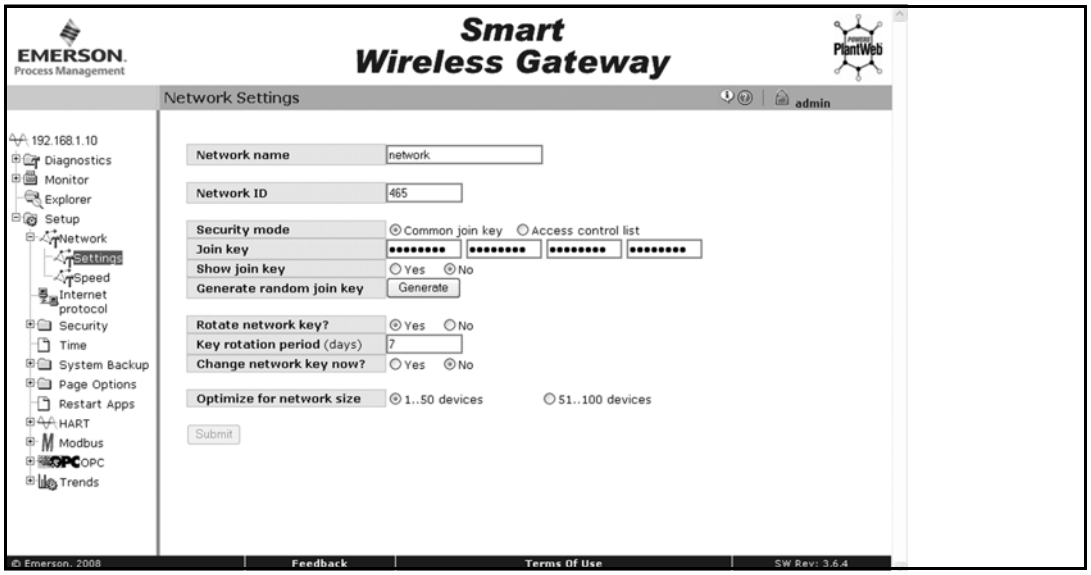
.



A green status indicator means that the device is working properly. A red indicator means that there is a problem with either the device or its communication path. For more detail on a specific device, click on the tag name.

Troubleshooting

The most common cause of incorrect operation is incorrect configuration of the Network ID and Join Key. The Network ID and Join Key in the device must match that of the Smart Wireless Gateway. The Network ID and Join Key may be obtained from the Smart Wireless Gateway on the Setup>Network>Settings page of the web interface.



Section 5 Operation and Maintenance

5.1 Overview

This section contains information on commissioning and operating 3051 Wireless Pressure Transmitters.

Field Communicator and AMS instructions are given to perform configuration functions. For convenience, Field Communicator fast key sequences are labeled “Fast Keys” for each software function below the appropriate headings.

5.2 Calibration

Calibrating a 3051 Wireless transmitter may include the following procedures:

- Sensor Trim: Adjusts the position of the factory sensor characterization curve to optimize performance over a specified pressure range, or to adjust for mounting effects.

The 3051 sensor module uses a microprocessor that contains information about the sensor’s specific characteristics in response to pressure and temperature inputs. A smart transmitter compensates for these sensor variations. The process of generating the sensor performance profile is called factory sensor characterization.

Sensor trimming requires an accurate pressure input and adds additional compensation that adjusts the position of the factory sensor characterization curve to optimize performance over a specific pressure range.

Note
Sensor trimming adjusts the position of the factory sensor characterization curve. It is possible to degrade performance of the transmitter if the trim is done improperly or with inaccurate equipment.

Table 5-1. Recommended Calibration Tasks

Transmitter	Bench Calibration Tasks	Field Calibration Tasks
3051CD 3051CG 3051L 3051TG, Range 1-4	1. Set output configuration parameters: a. Set the range points. b. Set the output units. c. Set the output type. d. Set the damping value. 2. *Optional*: Perform a sensor trim. (Accurate pressure source required.)	1. Reconfigure parameters if necessary. 2. Zero trim the transmitter to compensate for mounting effects or static pressure effects. 3. *Optional*: Perform an analog output trim. (Accurate multimeter required)
3051CA 3051TA 3051TG, Range 5	1. Set output configuration parameters: a. Set the range points. b. Set the output units. c. Set the output type. d. Set the damping value. 2. *Optional*: Perform a sensor trim if equipment available (accurate absolute pressure source required), otherwise perform the low trim value section of the sensor trim procedure.	1. Reconfigure parameters if necessary. 2. Perform low trim value section of the sensor trim procedure to correct for mounting position effects. 3. *Optional*: Perform an analog output trim (Accurate multimeter required)

Note:
A Field Communicator or AMS is required for all sensor and output trim procedures.

Rosemount 3051C Range 4 and Range 5 transmitters require a special calibration procedure when used in differential pressure applications under high static line pressure.

5.2.1 Sensor Trim Overview

Trim the sensor using either sensor or zero trim functions. Trim functions vary in complexity and are application-dependent. Both trim functions alter the transmitter's interpretation of the input signal.

Zero trim is 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. Since this correction maintains the slope of the characterization curve, it should not be used in place of a sensor trim over the full sensor range.

When performing a zero trim, ensure that the equalizing valve is open and all wet legs are filled to the correct levels.

Note
Do not perform a zero trim on 3051 Wireless absolute pressure transmitters. Zero trim is zero based, and absolute pressure transmitters reference absolute zero. To correct mounting position effects on a 3051 Wireless absolute pressure transmitter, perform a low trim within the sensor trim function. The low trim function provides an offset correction similar to the zero trim function, but it does not require zero-based input.

Sensor trim is a two-point sensor calibration where two end-point pressures are applied, and all output is linearized between them. Always adjust the low trim value first to establish the correct offset. Adjustment of the high trim value provides a slope correction to the characterization curve based on the low trim value. The trim values allow you to optimize performance over your specified measuring range at the calibration temperature.

During a trim operation, the 3051 Wireless is placed in high power refresh mode, which provides frequent pressure measurement updates and allows the configured damping to take effect. This behavior allows for more accurate calibration of the device. When the device is in high power refresh mode, the battery power supply will be depleted more rapidly.

5.2.2 Zero Trim

Fast Keys	2, 1, 3

Note
The transmitter must be within three percent of true zero (zero-based) in order to calibrate with zero trim function.

After properly venting the transmitter, calibrate the transmitter with the zero trim function:

1. From the *Home* screen, select 2: Configure.
2. Select 1: Guided Setup.
3. Select 3: Zero Trim and follow the on-screen instruction to complete the zero trim adjustment.

5.2.3 Sensor Trim

Fast Keys	3, 4, 1

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

To calibrate the transmitter using the sensor trim function:

1. Assemble and power the entire calibration system including the 3051, Field Communicator/AMS, power supply, pressure input source, and readout device.
2. From the *Home* screen, select 3: Service Tools.
3. Select 4: Routine Maintenance.
4. Select 1: Sensor Calibration.
5. Select 4: Lower Sensor Trim. The lower sensor trim value should be the sensor trim point that is closest to zero.
6. Follow the on-screen instructions to complete the adjustment of the lower value.
7. Repeat the procedure for the upper value. Select 5: Upper Sensor Trim and follow the on-screen instructions to complete the adjustment of the upper value.

Note
Select pressure input values so that lower and upper values are equal to or outside the Lower and Upper Operating points. Do not attempt to obtain reverse output by reversing the high and low points. The transmitter allows approximately five percent deviation.

5.2.4 Recall Factory Trim—Sensor Trim

Fast Keys	3, 4, 1, 6

The Recall Factory Trim—Sensor Trim command 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.

To restore sensor trim to as-shipped factory settings:

1. From the *Home* screen, Select 3: Service Tools.
2. Select 4: Routine Maintenance.
3. Select 1: Sensor Calibration.
4. Select 6: Recall Factory Trim.

5.2.5 Line Pressure Effect (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 82.

5.2.6 Compensating for Line Pressure (Range 4 and Range 5)

The Rosemount 3051 Wireless 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 Wireless differential pressure transmitters (Ranges 1, 2, and 3) do not require this procedure because optimization occurs in the sensor.

Applying high static pressure to the 3051 Wireless 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 53.

The following specifications show the static pressure effect for the 3051 Wireless 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.

Use the following example to compute corrected input values.

Example

A transmitter with model number 3051_CD4 will be used in a differential pressure application where the static line pressure is 1200 psi (83 bar). The transmitter output is ranged with 4 mA at 500 inH_2O (1,2 bar) and 20 mA at 1500 inH_2O (3,7 bar).

To correct for systematic error caused by high static line pressure, first use the following formulas to determine corrected values for the low trim and high trim.

LT = LRV + S x (LRV) x P

Where:	LT =	Corrected Low Trim Value
	LRV =	Lower Range Value
	S =	–(Span shift per specification)
	P =	Static Line Pressure

HT = URV + S x (URV) x P

Where:	HT =	Corrected High Trim Value
	URV =	Upper Range Value
	S =	–(Span shift per specification)
	P =	Static Line Pressure

In this example:

URV =	1500 inH_2O (3.74 bar)
LRV =	500 inH_2O (1.25 bar)
P =	1200 psi (82.74 bar)
S =	± 0.01/1000

To calculate the low trim (LT) value:

LT =	500 + (0.01/1000)(500)(1200)
LT =	506 inH_2O (1.26 bar)

To calculate the high trim (HT) value:

HT =	1500 + (0.01/1000)(1500)(1200)
HT =	1518 inH_2O (3.78 bar)

Complete a 3051 Wireless sensor trim and enter the corrected values for low trim (LT) and high trim (HT), refer to “Sensor Trim” on page 53.

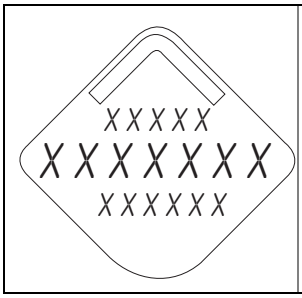
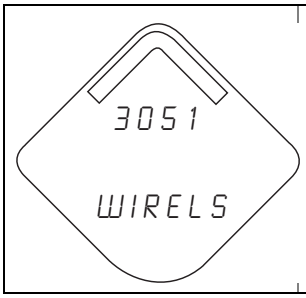
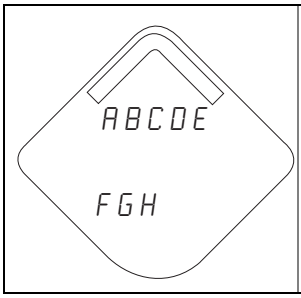
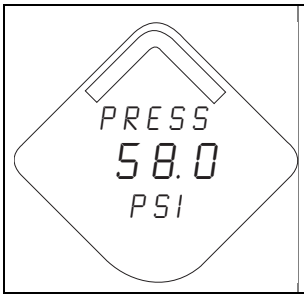
Enter the corrected input values for low trim and high trim through the Field Communicator keypad after you apply the nominal value of pressure as the transmitter input.

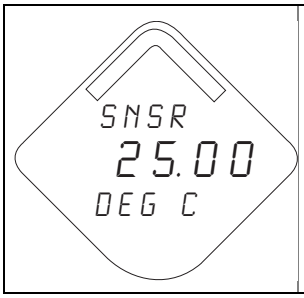
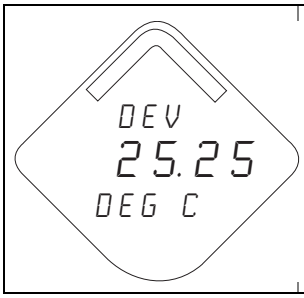
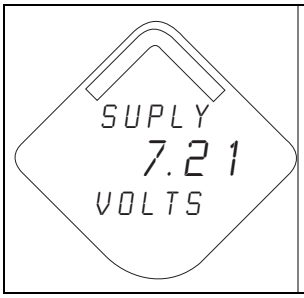
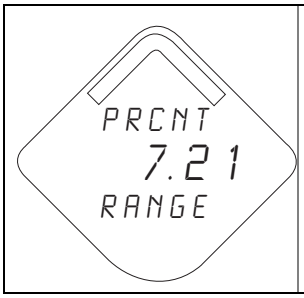
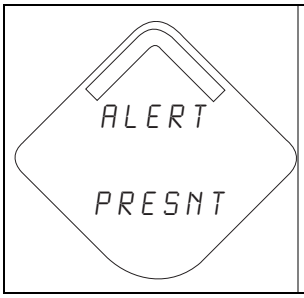
Note
After sensor trimming 3051 Wireless Range 4 and 5 transmitters for high differential pressure applications, verify that the Lower and Upper Operating points are at nominal values using the Field Communicator.

5.3 LCD Screen Messages

5.3.1 Startup Screen Sequence

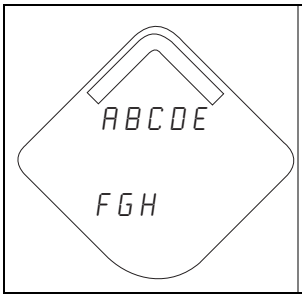
The following screens will display when the Power Module is first connected to the Rosemount 3051 Wireless.

	All Segments On: used to visually determine if there are any bad segments on the LCD
	Device Identification: used to determine Device Type.
	Device Information - Tag: user entered tag which is eight characters long - will not display if all characters are blank
	PV Screen - process pressure

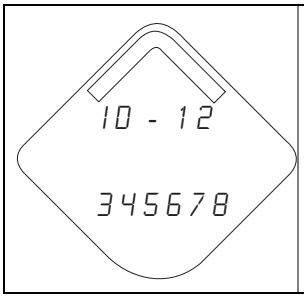
	SV Screen - sensor temperature value
	TV Screen - device temperature value
	QV Screen - voltage reading at the power supply terminals
	Percent Range Screen - percent range reading
	Alert Screen - at least one alert is present - this screen will not display if no alerts are present

5.3.2 Diagnostic Button Screen Sequence

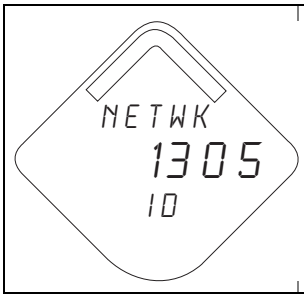
The following five screens will display when the device is operating properly and the Diagnostic Button has been pressed.



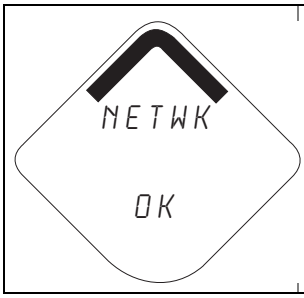
Device Information - Tag: user entered tag which is eight characters long - will not display if all characters are blank



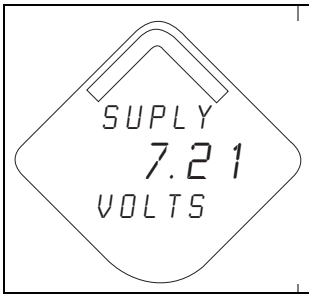
Device Identification: used to determine Device ID



Diagnostic Button Screen 3: assuming the device has the correct join key, this ID tells the user what network the device can connect with



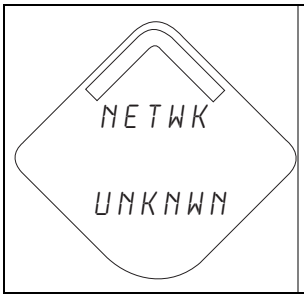
Diagnostic Button Screen 4: the device has joined a network and has been fully configured and has multiple parents



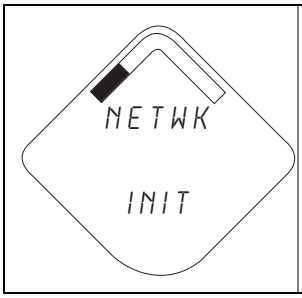
Diagnostic Button Screen 5: voltage reading at the power supply terminals

5.3.3 Network Diagnostic Status Screens

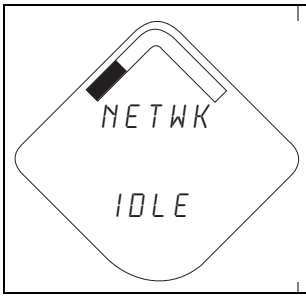
These screens display the network status of the device. Only one will be shown during the startup sequence or diagnostic sequence.



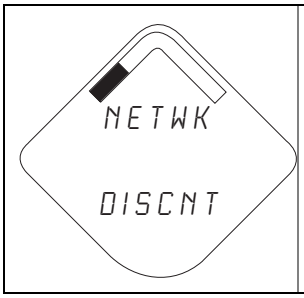
Diagnostic Button Screen 4.1: the device is attempting to start the radio



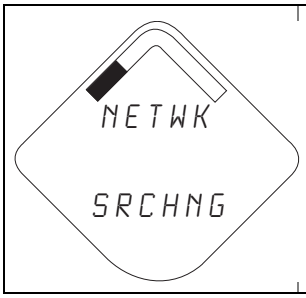
Diagnostic Button Screen 4.2: the device has just restarted



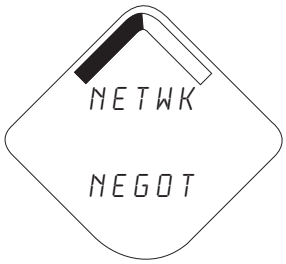
Diagnostic Button Screen 4.3: the device is starting to join the process



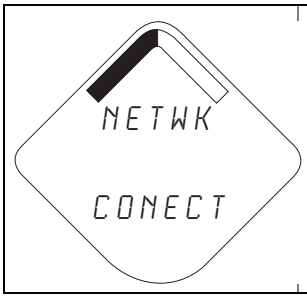
Diagnostic Button Screen 4.4: the device is in a disconnected state and requires a “Force Join” command to join the network



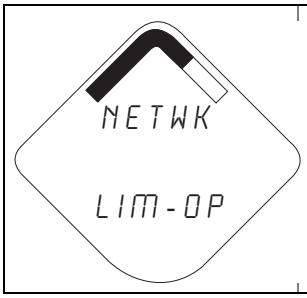
Diagnostic Button Screen 4.5: the device is searching for the Network



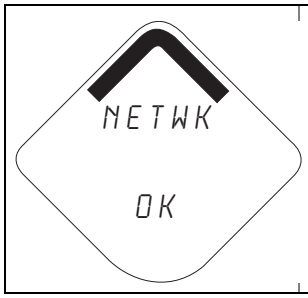
Diagnostic Button Screen 4.6: the device is attempting to join a network



Diagnostic Button Screen 4.7: the device is connected to the Network, but is in a “Quarantined” state



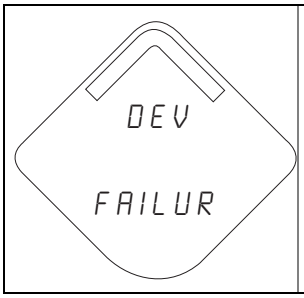
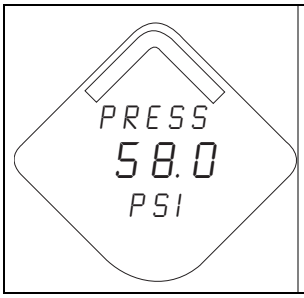
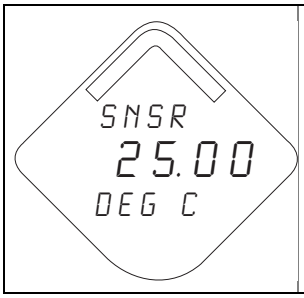
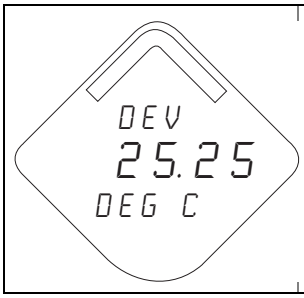
Diagnostic Button Screen 4.8: the device is joined and operational, but is running with limited bandwidth for sending periodic data

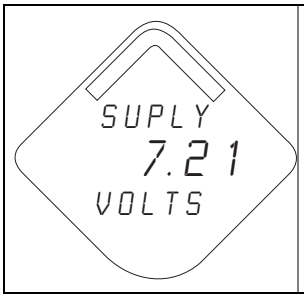
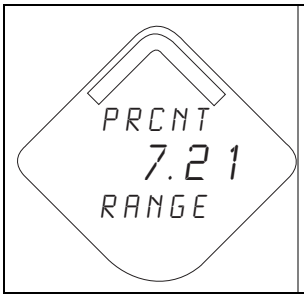
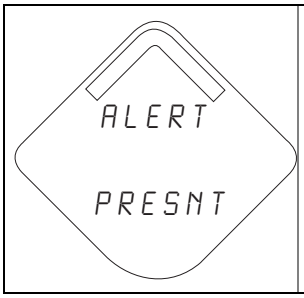
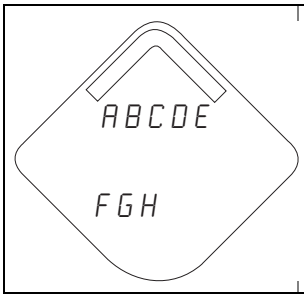
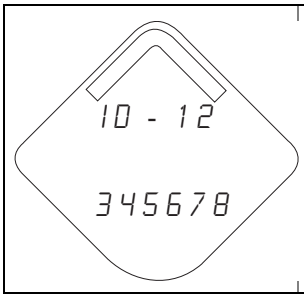


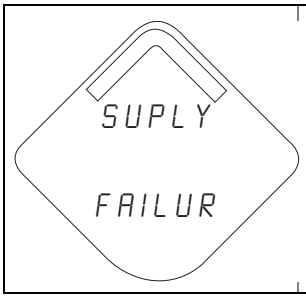
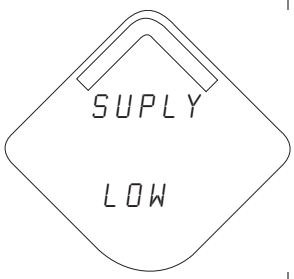
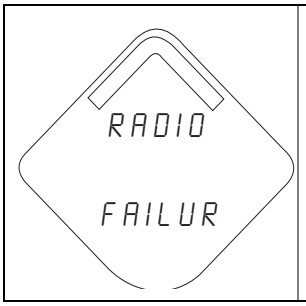
Diagnostic Button Screen 4.9: the device has joined a network and has been fully configured and has multiple parents

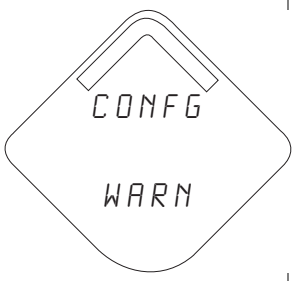
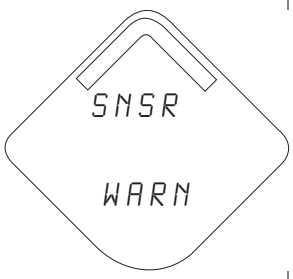
5.3.4 Device Diagnostic Screens

The following screens will show the device diagnostics depending on the state of the device.

	Device Information - Status: there is a critical error which may prevent the device from operating correctly. Check additional status screens for more information.
	PV Screen - process pressure value
	SV Screen - sensor temperature value
	TV Screen - device temperature value

	QV Screen - voltage reading at the power supply terminals
	Percent Range Screen - percent range reading
	Alert Screen - at least one alert is present - this screen will not display if no alerts are present
	Diagnostic Button Screen 1 - Tag: user entered tag which is eight characters long - will not display if all characters are blank
	Diagnostic Button Screen 2: the device's identifier that is used to make up the HART long address - the Smart Wireless Gateway may use this to help identify devices if no unique user tag is available

	Diagnostic Button Screen 7.1: the terminal voltage has dropped below level of operating limit. Replace the Power Module (Part Number: 701PGNKF)
	Diagnostic Button Screen 7.2: the terminal voltage is below the recommended operating range - if this is a battery operated device, the Power Module should be replaced - for line powered devices, the supply voltage should be increased
	Diagnostic Button Screen 8: the device may not be able to communicate with the radio or the radio has an internal error. In this state the device may still be operational and publishing HART data
	Diagnostic Button Screen 9.1: configuration of the transmitter is invalid such that critical operation of the device may be affected - check the extended configuration status to identify which configuration item(s) need to be corrected

	Diagnostic Button Screen 9.2: configuration of the transmitter is invalid such that non-critical operation of the device may be affected - check the extended configuration status to identify which configuration item(s) need to be corrected
	Diagnostic Button Screen 10.1: a sensor attached to the transmitter has failed, and valid readings from that sensor are no longer possible - check the sensor and sensor wiring connections - check additional status for more detailed information of the failure source
	Diagnostic Button Screen 10.2: a sensor attached to the transmitter is degraded, readings from that sensor may not be within accuracy specifications - check the process, and sensor wiring connections - check additional status for more detailed information of the warning source

Note
Use the Rosemount Wireless LCD Part Number: 00753-9004-0002.

Section 6 Troubleshooting

6.1 Overview

Table 6-2 provides summarized maintenance and troubleshooting suggestions for the most common operating problems.

If you suspect malfunction despite the absence of any diagnostic messages on the Field Communicator display, consider using Section X.X on page XX to identify any potential problem

6.2 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.

6.2.1 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.

- 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.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions.

This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation.

This device must be installed to ensure a minimum antenna separation distance of 8 in. (20 cm) from all persons.

The Power Module may be replaced in a hazardous area. The Power Module has surface resistivity greater than one gigaohm and must be properly installed in the wireless device enclosure. Care must be taken during transportation to and from the point of installation to prevent a potential electrostatic charging hazard.

Polymer enclosure has surface resistivity greater than one gigaohm. Care must be taken during transportation to and from the point of installation to prevent a potential electrostatic charging hazard.

Process leaks may cause harm or result in death.

- To avoid process leaks, only use the o-ring designed to seal with the corresponding flange adapter.

Electrical shock can result in death or serious injury.

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

Table 6-1. Rosemount 3051 Wireless Device Status Information

Device Status	Description	Recommended Action
Electronics Failure	An electronics error that could impact the device measement reading has occurred.	1. Reset the device 2. Reconfirm all configuration items in the device 3. If the condition persists, replace the electronics
Radio Failure	The wireless radio has detected a failure or stopped communicating.	1. Reset the device 2. If the condition persists, replace the electronics
Supply Voltage Failure	The supply voltage is too low for the device to function properly.	1. Replace the Power Module

Device Status	Description	Recommended Action
Electronics Warning	The device has detected an electronics error that does not currently impact the device measurement reading.	1. Reset the device 2. Reconfirm all configuration items in the device 3. If the condition persists, replace the electronics
Pressure has Exceeded Limits	The sensor has exceeded the maximum measurement range.	1. Check process for possible saturation condition 2. Verify that the appropriate sensor was chosen for the application 3. Reconfirm sensor configuration 4. Reset the device 5. Replace the sensor
Electronics Temperature has Exceeded Limits	The electronics temperature has exceeded the transmitter's maximum range.	1. Verify environmental temperature is within the transmitter's range 2. Remote mount the transmitter away from process and environmental conditions 3. Reset the device 4. If the condition persists, replace the electronics
Supply Voltage Low	The supply voltage is low and may soon affect broadcast updates.	1. Replace the Power Module
Database Memory Warning	The device has failed to write to the database memory. Any data written during this time may have been lost.	1. Reset the device 2. Reconfirm all configuration items in the device 3. If logging dynamic data not needed, this advisory can be safely ignored 4. If the condition persists, replace the electronics
Configuration Error	The device has detected a configuration error based on a change to the device.	1. Click on details for more information 2. Correct the parameter that has a configuration error 3. Reset the device 4. If the condition persists, replace the electronics
HI HI Alarm	The primary variable has surpassed the user defined limit.	1. Verify that the process variable is within user specified limits 2. Reconfirm the user defined alarm limit 3. If not needed, disable this alert

Device Status	Description	Recommended Action
HI Alarm	The primary variable has surpassed the user defined limit.	1. Verify that the process variable is within user specified limits 2. Reconfirm the user defined alarm limit 3. If not needed, disable this alert
LO Alarm	The primary variable has surpassed the user defined limit.	1. Verify that the process variable is within user specified limits 2. Reconfirm the user defined alarm limit 3. If not needed, disable this alert
LO LO Alarm	The primary variable has surpassed the user defined limit.	1. Verify that the process variable is within user specified limits 2. Reconfirm the user defined alarm limit 3. If not needed, disable this alert
Button Stuck	A buttons on the Electronics Board is detected as stuck in the active position.	1. Check the buttons for obstructions 2. Reset the device 3. If the condition persists, replace the electronics
Simulation Active	The device is in simulation mode and may not be reporting actual information.	1. Verify that simulation is no longer required 2. Disable Simulation mode in Service Tools 3. Reset the device

Table 6-2. Rosemount 3051 Wireless Troubleshooting

Symptom	Recommended Actions
Transmitter will not respond to changes in applied pressure	Check test equipment
	Check impulse piping or manifold for blockage
	Verify applied pressure is within sensor limits
Digital Pressure Variable reading is low or high	Check test equipment (verify accuracy)
	Check impulse piping for blockage or low fill in wet leg
	Verify transmitter is calibrated properly
	Verify pressure calculations for application
Digital Pressure Variable reading is erratic	Check application for faulty equipment in pressure line
	Verify transmitter is not reacting directly to equipment turning on/off
LCD display is not functioning	Reseat the LCD according to "Installing the LCD Display" on page 37
	Verify that the LCD display is a wireless LCD Meter. An LCD from a wired device will not function in a wireless device. Rosemount part number: 00753-9004-0002 Verify that the LCD display mode is not disabled.

Table 6-3. Wireless Network Troubleshooting

Symptom	Recommended Actions
Device not joining the network	Verify network ID and join key
	Wait longer (30 min.)
	Enable High Speed Operation on Smart Wireless Gateway
	Check Power Module
	Verify device is within range of at least one other device
	Verify network is in active network advertise
	Power Cycle device to try again
	Verify device is configured to join. Send the "Force Join" command to the device
	See troubleshooting section of Smart Wireless Gateway for more information
Short battery life	Check that "Power Always On" mode is off
	Verify device is not installed in extreme temperatures
	Verfiy that device is not a network pinch point
	Check for excessive network rejoins due to poor connectivity
Limited Bandwidth Error	Reduce the Update Rate on transmitter
	Increase communication paths by adding more wireless points
	Check that device has been online for at least an hour
	Check that device is not routing through a "limited" routing node
	Create a new network with an additional Smart Wireless Gateway

6.3 Disassembly Procedures

6.3.1 Removing from Service

Follow these steps:

1. Follow all plant safety rules and procedures.
2. Isolate and vent the process from the transmitter before removing the transmitter from service.
3. Remove the transmitter from the process connection.
   a. The Rosemount 3051C Wireless transmitter is attached to the process connection by four bolts and two cap screws. Remove the bolts and screws and separate the transmitter from the process connection. Leave the process connection in place and ready for re-installation. Reference Figure X-X on page 43 for coplanar flange.
   b. The Rosemount 3051T Wireless 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. See warning in "Inline process connection' on page XX.
4. Do not scratch, puncture, or depress the isolating diaphragms.
5. Clean isolating diaphragms with a soft rag and a mild cleaning solution, and rinse with clear water.
6. 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.

6.3.2 Removing the electronics board

The Wireless electronics board is located in the electronics compartment. To remove the assembly, perform the following procedure.

1. Remove the housing cover opposite the field terminal side.
2. Remove the LCD Display, if applicable. To do this, hold in the two clips and pull outward.

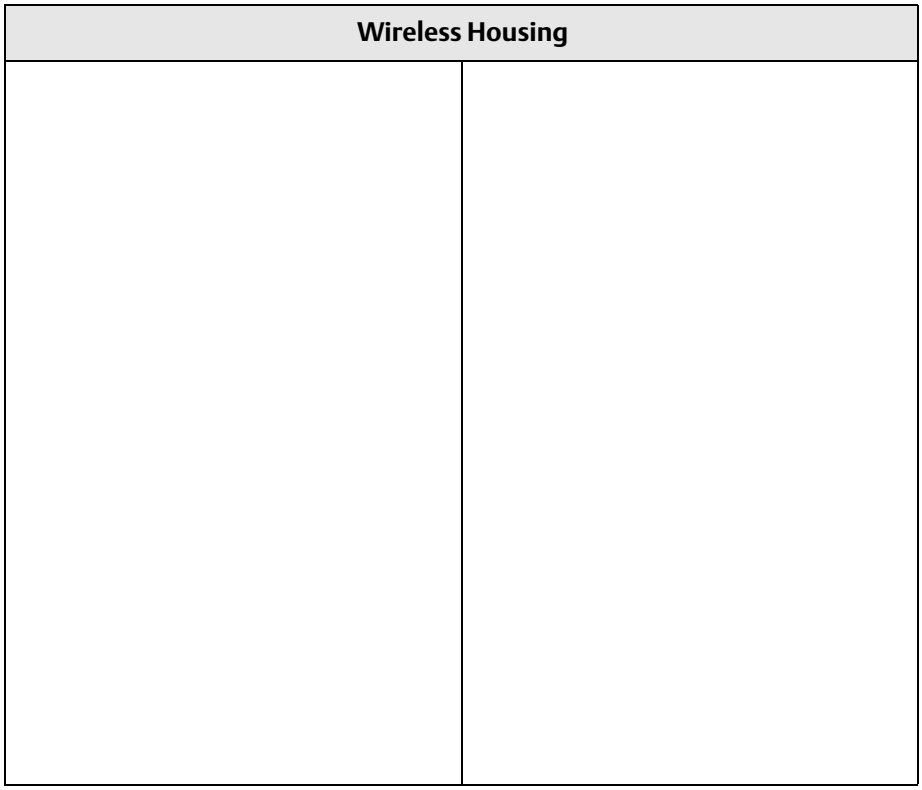
Note
The electronics board is electrostatically sensitive; observe handling precautions for static-sensitive components.

3. Loosen the two small screws located on the assembly.
4. Replace the LCD Display. This will help in removing the assembly.

Note
If an LCD is installed, use caution as there is an electronic pin connector that interfaces between the LCD and electronics board.

5. Pull out the assembly to expose and locate the sensor module connector.
6. Grasp the sensor module connector, squeeze the clips and pull upwards (avoid pulling wires).

Figure 6-1. Sensor module connector view



6.3.3 Removing the sensor from the housing

Note
To prevent damage to the senser module cable, disconnect it from the PlantWeb assembly before you remove the senser module from the housing.

1. Loosen the housing rotation screw with a $^{3}/_{32}$-inch hex wrench, then rotate back one full turn.
2. Unscrew the housing from the senser module.

6.4 Reassembly procedures

6.5 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 on the sensor module 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.

6.5.1 Attaching 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 power 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.

6.5.2 Reassembling 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.

⚠ See “Safety Messages” on page 67 for complete warning

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 (in the desired of the four possible process connection spacing configurations) using four 2.88-inch bolts to mount securely to the coplanar flange. For gage pressure configurations, use two 2.88-inch bolts and two 1.75-inch 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 6-4 on page 6-76 for appropriate torque values.
4. Using same cross pattern, tighten bolts to final torque values seen in Table 6-4 on page 6-76.

Table 6-4. 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-19 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
For Range 1 transmitters: after replacing o-rings 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.

⚠ See “Safety Messages” on page 67 for complete warning

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.

Product Certifications		
Standard		Standard
I1	ATEX Intrinsic Safety and Dust	★
I2	INMETRO Intrinsic Safety	★
I3	China Intrinsic Safety	★
I4	TIIS Intrinsic Safety	★
I5	FM Intrinsically Safe, Division 2	★
I7	IECEx Intrinsic Safety	★
Drinking Water Approval		
Standard		Standard
DW[11]	NSF drinking water approval	★
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
M5	LCD Display	★
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	★
Configuration Buttons		
Standard		Standard
DZ	Digital Zero Trim	★
Software Configuration		
Standard		Standard
C1	Custom Software Configuration (Completed CDS 00806-0100-4001 required with order)	★
Gage Pressure Calibration		
Standard		Standard
C3	Gage Calibration (Model 3051CA4 only)	★
Pressure Testing		
Expanded		
P1	Hydrostatic Testing with Certificate	
Cleaning Process Area		
Expanded		
P2	Cleaning for Special Service	

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.

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(12)	0.04% Accuracy to 5:1 turndown (Range 2-4)	★
Flange Adapters		
Standard		Standard
DF(13)	1/2 -14 NPT flange adapter(s)	★
D3	¼–18 NPT Process Connections (No flange adapters)	
Vent/Drain Valves		
Expanded		
D7	Coplanar Flange Without Drain/Vent Ports	
RC1/4 RC1/2 Process Connection		
Expanded		
D9(14)	RC ¼ Flange with RC ½ Flange Adapter, CS - SST	
Max Static Line Pressure		
Standard		Standard
P9	4500 psig (310 bar) Static Pressure Limit (3051CD Ranges 2–5 only)	★
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	★
Typical Model Number: 3051CD 2 A 2 2 A 1 A B4$13857 780		

(1)Wireless output (code X) available in absolute measurement type (Code A) with only range 1-4, 316L SST isolating diaphragm material (code 2), silicone fill fluid (code 1), and housing code (code P).
(2)Wireless output (code X) available in draft range 0 with only 316L SST isolating diaphragm (code 2), silicone fill fluid (code 1), housing code (code P), process flange (code 0), glass-filled o-ring (code A), and bolting option (code L4).
(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)Requires 0 code in Materials of Construction for Alternate Process Connection.
(5)Not valid with optional code P9 for 4500 psi Static Pressure.
(6)"Assemble-to" items are specified separately and require a completed model number.
(7)Process Flange limited to Coplanar (codes 2, 3, 5, 7, 8) or Traditional (H2, H3, H7).
(8)Not valid with optional code D9 for RC1/2 Adaptors.
(9)Not valid for optional codes DF and D9 for Adaptors.
(10)Panel mounting bolts are not supplied.
(11)Not available with Alloy C-276 isolator (3 code), tantalum isolator (5 code), all Cast Alloy C-276 flanges, all plated CS flanges, all DIN flanges, all Level flanges, assemble-to manifolds (S5 and S6 codes), assemble-to seals (S1 and S2 codes), assemble-to primary elements (S3 and S4 codes), surface finish certification (Q16 code), and remote seal system report (QZ code).
(12)Only available with Standard 3051. See specification section for more information.
(13)Not valid with Alternate Process Connection options S3, S4, S5, and S6.

(14)Not available with Alternate Process Connection; DIN Flanges and Level Flanges.

A.5.3 Rosemount 3051T In-Line Pressure Transmitter

3051T In-Line Pressure Transmitter

This ordering table contains the following Rosemount 3051T configurations:

Configuration	Transmitter Output Code
4-20 mA HART® -3051 -Enhanced 3051(1)	A
FOUNDATION™ fieldbus	F
Profibus	W

(1)The enhanced 4-20 mA HART device can be ordered with Transmitter Output option code A plus any of the following new option codes: DA0, M4, QT, DZ, CR, CS, CT, HR5, HR7.

See Options for more details on each configuration.

Additional Information

Dimensional Drawings: page 93

Table 2. 3051T In-Line 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	In-Line Pressure Transmitter		
Pressure Type			
Standard			Standard
G	Gage		★
A(1)	Absolute		★
Pressure Range			
	3051TG(2)	**3051TA**	
Standard			Standard
1	-14.7 to 30 psi (-1.0 to 2.1 bar)	0 to 30 psia (0 to 2.1 bar)	★
2	-14.7 to 150 psi (-1.0 to 10.3 bar)	0 to 150 psia (0 to 10.3 bar)	★
3	-14.7 to 800 psi (-1.0 to 55 bar)	0 to 800 psia (0 to 55 bar)	★
4	-14.7 to 4000 psi (-1.0 to 276 bar)	0 to 4000 psia (0 to 276 bar)	★
5	-14.7 to 10000 psi (-1.0 to 689 bar)	0 to 10000 psia (0 to 689 bar)	★
Transmitter Output			
Standard			Standard
X	Wireless		★
Process Connection Style			
Standard			Standard
2B	1/2–14 NPT Female		★
2C(3)	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 (Range 5 only)		
61	Non-threaded Instrument flange (Range 1-4 only)		

Table 2. 3051T In-Line 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.

Isolating Diaphragm		**Process Connection Wetted Parts Material**	
Standard			Standard
2[4]	316L SST	316L SST	★
3[4]	Alloy C-276	Alloy C-276	★
Sensor Fill Fluid			
Standard			Standard
1	Silicone		★
Housing Material		**Conduit Entry Size**	
Standard			Standard
P	Engineered polymer	No conduit entries	★

Wireless options (Requires option code X and Engineered Polymer housing code P)

Wireless Transmit Rate, Operating Frequency and Protocol		
Standard		Standard
WA3	User Configurable Transmit Rate, 2.4GHz WirelessHART	★
PlantWeb Diagnostic Functionality		
Standard		Standard
WP5	Internal Antenna, Compatible with Green Power Module (I.S. Power Module Sold Separately)	★

Options (Include with selected model number)

Integral Assembly		
Standard		Standard
S5[5]	Assemble to Rosemount 306 Integral Manifold	★
Diaphragm Seal Assemblies		
Standard		Standard
S1[5]	Assemble to one Rosemount 1199 seal	★
Mounting Bracket[6]		
Standard		Standard
B4	Bracket for 2-in. Pipe or Panel Mounting, All SST	★
Product Certifications		
Standard		Standard
I1	ATEX Intrinsic Safety and Dust	★
I2	INMETRO Intrinsic Safety	★
I3	China Intrinsic Safety	★
I5	FM Intrinsically Safe, Division 2	★
I7	IECEx Intrinsic Safety	★
Drinking Water Approval		
Standard		Standard
DW[7]	NSF drinking water approval	★
Calibration Certification		
Standard		Standard
Q4	Calibration Certificate	★
QG	Calibration Certificate and GOST Verification Certificate	★

Table 2. 3051T In-Line 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.

QP	Calibration Certification and tamper evident seal	★
Material Traceability Certification		
Standard		Standard
Q8	Material Traceability Certification per EN 10204 3.1.B	★
Configuration Buttons		
Standard		Standard
DZ	Digital Zero Trim	★
Display and Interface Options		
Standard		Standard
M5	LCD Display	★
Wireless Sensor Module		
Standard		Standard
WSM	Wireless SST Sensor Module	★
Software Configuration		
Standard		Standard
C1[6]	Custom Software Configuration (Completed CDS 00806-0100-4001 required with order)	★
Pressure Testing		
Expanded		
P1	Hydrostatic Testing with Certificate	
Cleaning Process Area[8]		
Expanded		
P2	Cleaning for Special Service	
P3	Cleaning for <1 PPM Chlorine/Fluorine	
High Accuracy		
Standard		Standard
P8[9]	0.04% Accuracy to 5:1 turndown (Range 2-4)	★
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	★
Typical Model Number:	**3051T G 5 F 2A 2 1 A B4**	

(1)Wireless output (code X) available in absolute measurement type (Code A) with only range 1-4, 316L SST isolating diaphragm material (code 2), silicone fill fluid (code 1), and housing code (code P).
(2)3051TG lower range limit varies with atmospheric pressure.
(3)Wireless output (code X) only available in G $^1/_2$ A DIN 16288 Male process connection (code 2C) with range 1-4, 316L SST isolating diaphragm (code 2), silcone fill fluid (code 1), and housing code (code P).
(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)Panel mounting bolts are not supplied.

(7)Not available with Alloy C-276 isolator (3 code), tantalum isolator (5 code), all Cast Alloy C-276 flanges, all plated CS flanges, all DIN flanges, all Level flanges, assemble-to manifolds (S5 and S6 codes), assemble-to seals (S1 and S2 codes), assemble-to primary elements (S3 and S4 codes), surface finish certification (Q16 code), and remote seal system report (QZ code).
(8)Not valid with Alternate Process Connection S5.
(9)Only available with Standard 3051. See specification section for more information.

A.5.4 Rosemount 3051CF Flowmeter Series

This ordering table contains the following Rosemount 3051CF configurations:

Configuration	Transmitter Output Code
4-20 mA HART® -3051 -Enhanced 3051(1)	A
FOUNDATION™ fieldbus	F
Profibus	W

(1)The enhanced 4-20 mA HART device can be ordered with Transmitter Output option code A plus any of the following new option codes: DA0, M4, QT, DZ, CR, CS, CT, HR5, HR7.

See Options for more details on each configuration.

Rosemount 3051CFA Annubar Flowmeter

Table 3. Rosemount 3051CFA Annubar Flowmeter 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	Product Description	
3051CFA	Annubar Flowmeter	
Measurement Type		
Standard		Standard
D	Differential Pressure	★
Fluid Type		
Standard		Standard
L	Liquid	★
G	Gas	★
S	Steam	★
Line Size		
Standard		Standard
020	2-in. (50 mm)	★
025	2 1/2-in. (63.5 mm)	★
030	3-in. (80 mm)	★
035	3 1/2-in. (89 mm)	★
040	4-in. (100 mm)	★
050	5-in. (125 mm)	★
060	6-in. (150 mm)	★
070	7-in. (175 mm)	★
080	8-in. (200 mm)	★
100	10-in. (250 mm)	★
120	12-in. (300 mm)	★
Expanded		
140	14-in. (350 mm)	
160	16-in. (400 mm)	
180	18-in. (450 mm)	

Table 3. Rosemount 3051CFA Annubar Flowmeter 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		
200	20-in. (500 mm)	
240	24-in. (600 mm)	
300	30-in. (750 mm)	
360	36-in. (900 mm)	
420	42-in. (1066 mm)	
480	48-in. (1210 mm)	
600	60-in. (1520 mm)	
720	72-in. (1820 mm)	
780	78-in (1950 mm)	
840	84-in. (2100 mm)	
900	90-in. (2250 mm)	
960	96-in (2400 mm)	
Pipe I.D. Range		
Standard		Standard
C	Range C from the Pipe I.D. table	★
D	Range D from the Pipe I.D. table	★
Expanded		
A	Range A from the Pipe I.D. table	
B	Range B from the Pipe I.D. table	
E	Range E from the Pipe I.D. table	
Z	Non-standard Pipe I.D. Range or Line Sizes greater than 12 inches	
Pipe Material / Mounting Assembly Material		
Standard		Standard
C	Carbon steel (A105)	★
S	316 Stainless Steel	★
0	No Mounting (Customer Supplied)	★
Expanded		
G	Chrome-Moly Grade F-11	
N	Chrome-Moly Grade F-22	
J	Chrome-Moly Grade F-91	
Piping Orientation		
Standard		Standard
H	Horizontal Piping	★
D	Vertical Piping with Downwards Flow	★
U	Vertical Piping with Upwards Flow	★
Annubar Type		
Standard		Standard
P	Pak-Lok	★
F	Flanged with opposite side support	★
Expanded		
L	Flange-Lok	
G	Gear-Drive Flo-Tap	
M	Manual Flo-Tap	

Table 3. Rosemount 3051CFA Annubar Flowmeter 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.

Sensor Material				
Standard				Standard
S	316 Stainless Steel			★
Expanded				
H	Alloy C-276			
Sensor Size				
Standard				Standard
1	Sensor size 1 — Line sizes 2-in. (50 mm) to 8-in. (200 mm)			★
2	Sensor size 2 — Line sizes 6-in. (150 mm) to 96-in. (2400 mm)			★
3	Sensor size 3 — Line sizes greater than 12-in. (300 mm)			★
Mounting Type				
Standard				Standard
T1	Compression or Threaded Connection			★
A1	150# RF ANSI			★
A3	300# RF ANSI			★
A6	600# RF ANSI			★
D1	DN PN16 Flange			★
D3	DN PN40 Flange			★
D6	DN PN100 Flange			★
Expanded				
A9[(1)]	900# RF ANSI			
AF[(1)]	1500# RF ANSI			
AT[(1)]	2500 # RF ANSI			
R1	150# RTJ Flange			
R3	300# RTJ Flange			
R6	600# RTJ Flange			
R9[(1)]	900# RTJ Flange			
RF[(1)]	1500# RTJ Flange			
RT[(1)]	2500# RTJ Flange			
Opposite Side Support or Packing Gland				
Standard				Standard
0	No opposite side support or packing gland (Required for Pak-Lok and Flange-Lok models)			★
	Opposite Side Support – Required for Flanged Models			
C	NPT Threaded Opposite Support Assembly – Extended Tip			★
D	Welded Opposite Support Assembly – Extended Tip			★
Expanded				
	Packing Gland – Required for Flo-Tap Models			
	Packing Gland Material	Rod Material	Packing Material	
J	Stainless Steel Packing Gland / Cage Nipple	Carbon Steel	PTFE	
K	Stainless Steel Packing Gland / Cage Nipple	Stainless Steel	PTFE	
L	Stainless Steel Packing Gland / Cage Nipple	Carbon Steel	Graphite	
N	Stainless Steel Packing Gland / Cage Nipple	Stainless Steel	Graphite	
R	Alloy C-276 Packing Gland / Cage Nipple	Stainless Steel	Graphite	
Isolation Valve for Flo-Tap Models				

Table 3. Rosemount 3051CFA Annubar Flowmeter 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.

Standard			Standard
0	Not Applicable or Customer Supplied		★
Expanded			
1	Gate Valve, Carbon Steel		
2	Gate Valve, Stainless Steel		
5	Ball Valve, Carbon Steel		
6	Ball Valve, Stainless Steel		
Temperature Measurement			
Standard			Standard
T	Integral RTD – not available with Flanged model greater than class 600#		★
0	No Temperature Sensor		★
Expanded			
R	Remote Thermowell and RTD		
Transmitter Connection Platform			
Standard			Standard
3	Direct-mount, Integral 3-valve Manifold– not available with Flanged model greater than class 600		★
5	Direct -mount, 5-valve Manifold – not available with Flanged model greater than class 600		★
7	Remote-mount NPT Connections ($^1/_2$-in. NPT)		★
Expanded			
6	Direct-mount, high temperature 5-valve Manifold – not available with Flanged model greater than class 600		
8	Remote-mount SW Connections ($^1/_2$-in.)		
Differential Pressure Range			
Standard			Standard
1	0 to 25 in H_2O (0 to 62,3 mbar)		★
2	0 to 250 in H_2O (0 to 623 mbar)		★
3	0 to 1000 in H_2O (0 to 2,5 bar)		★
Transmitter Output			
Standard			Standard
X	Wireless		★
Transmitter Housing Material		**Conduit Entry Size**	
Standard			Standard
P	Engineered polymer	No conduit entries	
Transmitter Performance Class			
Standard			Standard
1	1.6% flow rate accuracy, 8:1 flow turndown, 5-yr. stability		★

Wireless options (Requires option code X and Engineered Polymer housing code P)

Wireless Transmit Rate, Operating Frequency and Protocol	
Standard	
WA3	User Configurable Transmit Rate, 2.4GHz WirelessHART
PlantWeb Diagnostic Functionality	
Standard	
WP5	Internal Antenna, Compatible with Green Power Module (I.S. Power Module Sold Separately)

Table 3. Rosemount 3051CFA Annubar Flowmeter 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.

Options (Include with selected model number)

Pressure Testing		
Expanded		
P1[2]	Hydrostatic Testing with Certificate	
PX[2]	Extended Hydrostatic Testing	
Special Cleaning		
Expanded		
P2	Cleaning for Special Services	
PA	Cleaning per ASTM G93 Level D (Section 11.4)	
Material Testing		
Expanded		
V1	Dye Penetrant Exam	
Material Examination		
Expanded		
V2	Radiographic Examination	
Flow Calibration		
Expanded		
W1	Flow Calibration (Average K)	
Special Inspection		
Standard		Standard
QC1	Visual & Dimensional Inspection with Certificate	★
QC7	Inspection & Performance Certificate	★
Surface Finish		
Standard		Standard
RL	Surface finish for Low Pipe Reynolds # in Gas & Steam	★
RH	Surface finish for High Pipe Reynolds # in Liquid	★
Material Traceability Certification		
Standard		Standard
Q8[3]	Material Traceability Certification per EN 10474:2004 3.1	★
Code Conformance[4]		
Expanded		
J2	ANSI/ASME B31.1	
J3	ANSI/ASME B31.3	
Materials Conformance		
Expanded		
J5[5]	NACE MR-0175 / ISO 15156	
Country Certification		
Standard		Standard
J6	European Pressure Directive (PED)	★
Expanded		
J1	Canadian Registration	
Installed in Flanged Pipe Spool Section		
Expanded		
H3	150# Flanged Connection with Rosemount Standard Length and Schedule	
H4	300# Flanged Connection with Rosemount Standard Length and Schedule	

Table 3. Rosemount 3051CFA Annubar Flowmeter 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.

H5	600# Flanged Connection with Rosemount Standard Length and Schedule	
Instrument Connections for Remote Mount Options		
Standard		Standard
G2	Needle Valves, Stainless Steel	★
G6	OS&Y Gate Valve, Stainless Steel	★
Expanded		
G1	Needle Valves, Carbon Steel	
G3	Needle Valves, Alloy C-276	
G5	OS&Y Gate Valve, Carbon Steel	
G7	OS&Y Gate Valve, Alloy C-276	
Special Shipment		
Standard		Standard
Y1	Mounting Hardware Shipped Separately	★
Special Dimensions		
Expanded		
VM	Variable Mounting	
VT	Variable Tip	
VS	Variable length Spool Section	
Product Certifications		
Standard		Standard
I1	ATEX Intrinsic Safety and Dust	★
I2	INMETRO Intrinsic Safety	★
I3	China Intrinsic Safety	★
I5	FM Intrinsically Safe, Division 2	★
I7	IECEx Intrinsic Safety	★
Sensor Fill Fluid and O-ring Options		
Standard		Standard
L2	Graphite-Filled (PTFE) O-ring	★
Display and Interface Options		
Standard		Standard
M5	LCD Display	★
Transmitter Calibration Certification		
Standard		Standard
Q4	Calibration Certificate for Transmitter	★
Manifold for Remote Mount Option		
Standard		Standard
F2	3-Valve Manifold, Stainless Steel	★
F6	5-Valve Manifold, Stainless Steel	★
Expanded		
F1	3-Valve Manifold, Carbon Steel	
F3	3-Valve Manifold, Alloy C-276	
F5	5-Valve Manifold, Carbon Steel	
F7	5-Valve Manifold, Alloy C-276	
Configuration Buttons		
Standard		Standard
DZ	Digital Zero Trim	★

Table 3. Rosemount 3051CFA Annubar Flowmeter 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.

Typical Model Number:	**3051CFA**	**D**	**L**	**060**	**D**	**C**	**H**	**P**	**S**	**2**	**T1**	**0**	**0**	**0**	**3**	**2**	**A**	**A**	**1**	

(1)Available in remote mount applications only.
(2)Applies to assembled flowmeter only, mounting not tested.
(3)Instrument Connections for Remote Mount Options and Isolation Valves for Flo-tap Models are not included in the Material Traceability Certification.
(4)Not available with Transmitter Connection Platform 6.
(5)Materials of Construction comply with metallurgical requirements within NACE MR0175/ISO 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.

Rosemount 3051CFC Compact Flowmeter

Additional Information

Dimensional Drawings: 3

Table 4. Rosemount 3051CFC Compact Flowmeter 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	Product Description	
3051CFC	Compact Flowmeter	
Measurement Type		
Standard		Standard
D	Differential Pressure	★
Primary Element Technology		
Standard		Standard
C	Conditioning Orifice Plate	★
P	Orifice Plate	★
Material Type		
Standard		Standard
S	316 SST	★
Line Size		
Standard		Standard
005(1)	1/2-in. (15 mm)	★
010(1)	1-in. (25 mm)	★
015(1)	1 1/2-in. (40 mm)	★
020	2-in. (50 mm)	★
030	3-in. (80 mm)	★
040	4-in. (100 mm)	★
060	6-in. (150 mm)	★
080	8-in. (200 mm)	★
100	10-in. (250 mm)	★
120	12-in. (300 mm)	★
Primary Element Style		
Standard		Standard
N	Square Edged	★
Primary Element Type		
Standard		Standard
040	0.40 Beta Ratio	★
065(2)	0.65 Beta Ratio	★
Temperature Measurement		
Standard		Standard
0	No Temperature Sensor	★
Expanded		
R	Remote Thermowell and RTD	
Transmitter Connection Platform		
Standard		Standard

Table 4. Rosemount 3051CFC Compact Flowmeter 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.

3	Direct-mount, Integral 3-valve Manifold		★
7	Remote-mount, 1/4-in. NPT Connections		★
Differential Pressure Range			
Standard			Standard
1	0 to 25 in H_2O (0 to 62,3 mbar)		★
2	0 to 250 in H_2O (0 to 623 mbar)		★
3	0 to 1000 in H_2O (0 to 2,5 bar)		★
Transmitter Output			
Standard			Standard
X	Wireless		★
Transmitter Housing Material		**Conduit Entry Size**	
Standard			Standard
P	Engineered polymer	No conduit entries	★
Transmitter Performance Class			
Standard			Standard
1	Up to ±1.75% flow rate accuracy, 8:1 flow turndown, 5-year stability		★

Wireless options (Requires option code X and Engineered Polymer housing code P)

Wireless Transmit Rate, Operating Frequency and Protocol	
Standard	
WA3	User Configurable Transmit Rate, 2.4GHz WirelessHART
PlantWeb Diagnostic Functionality	
Standard	
WP5	Internal Antenna, Compatible with Green Power Module (I.S. Power Module Sold Separately)

Options (Include with selected model number)

Installation Accessories		
Standard		Standard
AB	ANSI Alignment Ring (150#) (Only required for 10-in. (250 mm) and 12-in. (300mm) line sizes)	★
AC	ANSI Alignment Ring (300#) (Only required for 10-in. (250 mm) and 12-in. (300mm) line sizes)	★
AD	ANSI Alignment Ring (600#) (Only required for 10-in. (250 mm) and 12-in. (300mm) line sizes)	★
DG	DIN Alignment Ring (PN16)	★
DH	DIN Alignment Ring (PN40)	★
DJ	DIN Alignment Ring (PN100)	★
Expanded		
JB	JIS Alignment Ring (10K)	
JR	JIS Alignment Ring (20K)	
JS	JIS Alignment Ring (40K)	
Remote Adapters		
Standard		Standard
FE	Flange Adapters 316 SST (1/2-in NPT)	★
High Temperature Application		
Expanded		
HT	Graphite Valve Packing (Tmax = 850 °F)	
Flow Calibration		
Expanded		
WC(3)	Flow Calibration Certification (3 point)	
WD(3)	Discharge Coefficient Verification (full 10 point)	
Pressure Testing		

Table 4. Rosemount 3051CFC Compact Flowmeter 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		
P1	Hydrostatic Testing with Certificate	
Special Cleaning		
Expanded		
P2	Cleaning for Special Services	
PA	Cleaning per ASTM G93 Level D (Section 11.4)	
Special Inspection		
Standard		Standard
QC1	Visual & Dimensional Inspection with Certificate	★
QC7	Inspection and Performance Certificate	★
Transmitter Calibration Certification		
Standard		Standard
Q4	Calibration Certificate for Transmitter	★
Material Traceability Certification		
Standard		Standard
Q8	Material Traceability Certification per EN 10204:2004 3.1	★
Code Conformance		
Expanded		
J2	ANSI/ASME B31.1	
J3	ANSI/ASME B31.3	
J4	ANSI/ASME B31.8	
Materials Conformance		
Expanded		
J5[(4)]	NACE MR-0175 / ISO 15156	
Country Certification		
Expanded		
J1	Canadian Registration	
Product Certifications		
Standard		Standard
I1	ATEX Intrinsic Safety and Dust	★
I2	INMETRO Intrinsic Safety	★
I3	China Intrinsic Safety	★
I5	FM Intrinsically Safe, Division 2	★
I7	IECEx Intrinsic Safety	★
Sensor Fill Fluid and O-ring Options		
Standard		Standard
L2	Graphite-Filled (PTFE) O-ring	★
Display and Interface Options		
Standard		Standard
M5	LCD Display	★
Manifold for Remote Mount Option		
Standard		Standard
F2	3-Valve Manifold, Stainless Steel	★
F6	5-Valve Manifold, Stainless Steel	★
Configuration Buttons		
Standard		Standard
DZ	Digitial Zero Trim	★
Typical Model Number: 3051CFC D C S 060 N 065 0 3 2 A A 1 WC E5 M5		

(1)Not available for Primary Element Technology C.
(2)For 2-in. (50 mm) line sizes the Primary Element Type is 0.6 for Primary Element Technology Code C.

(3)Not available with Primary Element Technology P.
(4)Materials of Construction comply with metallurgical requirements within NACE MR0175/ISO for sour oil field production environments. Environmental limitsapply to certain materials. Consult latest standard for details. Selected materials also conform to NACE MR0103 for sour refining environments.

Rosemount 3051CFP Integral Orifice Flowmeter

Additional Information

Dimensional Drawings: page 93

Table 5. Rosemount 3051CFP Integral Orifice Flowmeter 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	Product Description	
3051CFP	Integral Orifice Flowmeter	
Measurement Type		
Standard		Standard
D	Differential Pressure	★
Body Material		
Standard		Standard
S	316 SST	★
Line Size		
Standard		Standard
005	1/2-in. (15 mm)	★
010	1-in. (25 mm)	★
015	1 1/2-in. (40 mm)	★
Process Connection		
Standard		Standard
T1	NPT Female Body (Not Available with Remote Thermowell and RTD)	★
S1(1)	Socket Weld Body (Not Available with Remote Thermowell and RTD)	★
P1	Pipe Ends: NPT Threaded	★
P2	Pipe ends: Beveled	★
D1	Pipe Ends: Flanged, DIN PN16, slip-on	★
D2	Pipe Ends: Flanged, DIN PN40, slip-on	★
D3	Pipe Ends: Flanged, DIN PN100, slip-on	★
W1	Pipe Ends: Flanged, RF, ANSI Class 150, weld-neck	★
W3	Pipe Ends: Flanged, RF, ANSI Class 300, weld-neck	★
W6	Pipe Ends: Flanged, RF, ANSI Class 600, weld-neck	★
Expanded		
A1	Pipe Ends: Flanged, RF, ANSI Class 150, slip-on	
A3	Pipe Ends: Flanged, RF, ANSI Class 300, slip-on	
A6	Pipe Ends: Flanged, RF, ANSI Class 600, slip-on	
R1	Pipe Ends: Flanged, RTJ, ANSI Class 150, slip-on	
R3	Pipe Ends: Flanged, RTJ, ANSI Class 300, slip-on	
R6	Pipe Ends: Flanged, RTJ, ANSI Class 600, slip-on	
Orifice Plate Material		
Standard		Standard

Table 5. Rosemount 3051CFP Integral Orifice Flowmeter 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.

S	316 SST	★
Expanded		
H	Alloy C-276	
M	Alloy 400	
Bore Size Option		
Standard		Standard
0066	0.066-in. (1.68 mm) for 1/2-in. Pipe	★
0109	0.109-in. (2.77 mm) for 1/2-in. Pipe	★
0160	0.160-in. (4.06 mm) for 1/2-in. Pipe	★
0196	0.196-in. (4.98 mm) for 1/2-in. Pipe	★
0260	0.260-in. (6.60 mm) for 1/2-in. Pipe	★
0340	0.340-in. (8.64 mm) for 1/2-in. Pipe	★
0150	0.150-in. (3.81 mm) for 1-in. Pipe	★
0250	0.250-in. (6.35 mm) for 1-in. Pipe	★
0345	0.345-in. (8.76 mm) for 1-in. Pipe	★
0500	0.500-in. (12.70 mm) for 1-in. Pipe	★
0630	0.630-in. (16.00 mm) for 1-in. Pipe	★
0800	0.800-in. (20.32 mm) for 1-in. Pipe	★
0295	0.295-in. (7.49 mm) for 1 1/2-in. Pipe	★
0376	0.376-in. (9.55 mm) for 1 1/2-in. Pipe	★
0512	0.512-in. (13.00 mm) for 1 1/2-in. Pipe	★
0748	0.748-in. (19.00 mm) for 1 1/2-in. Pipe	★
1022	1.022-in. (25.96 mm) for 1 1/2-in. Pipe	★
1184	1.184-in. (30.07 mm) for 1 1/2-in. Pipe	★
Expanded		
0010	0.010-in. (0.25 mm) for 1/2-in. Pipe	
0014	0.014-in. (0.36 mm) for 1/2-in. Pipe	
0020	0.020-in. (0.51 mm) for 1/2-in. Pipe	
0034	0.034-in. (0.86 mm) for 1/2-in. Pipe	
Transmitter Connection Platform		
Standard		Standard
D3	Direct-mount, 3-Valve Manifold, SST	★
D5	Direct-mount, 5-Valve Manifold, SST	★
R3	Remote-mount, 3-Valve Manifold, SST	★
R5	Remote-mount, 5-Valve Manifold, SST	★
Expanded		
D4	Direct-mount, 3-Valve Manifold, Alloy C-276	
D6	Direct-mount, 5-Valve Manifold, Alloy C-276	
D7	Direct-mount, High Temperature, 5-Valve Manifold, SST	
R4	Remote-mount, 3-Valve Manifold, Alloy C-276	
R6	Remote-mount, 5-Valve Manifold, Alloy C-276	
Differential Pressure Ranges		
Standard		Standard
1	0 to 25 in H_2O (0 to 62,3 mbar)	★
2	0 to 250 in H_2O (0 to 623 mbar)	★

Table 5. Rosemount 3051CFP Integral Orifice Flowmeter 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.

3	0 to 1000 in H_2O (0 to 2,5 bar)		★
Transmitter Output			
Standard			Standard
X	Wireless		★
Transmitter Housing Material		**Conduit Entry Size**	
Standard			Standard
P	Engineered polymer	No conduit entries	★
Transmitter Performance Class			
Standard			Standard
1	up to ±1.75% flow rate accuracy, 8:1 flow turndown, 5-year stability		★

Wireless options (Requires option code X and Engineered Polymer housing code P)

Wireless Transmit Rate, Operating Frequency and Protocol	
Standard	
WA3	User Configurable Transmit Rate, 2.4GHz WirelessHART
PlantWeb Diagnostic Functionality	
Standard	
WP5	Internal Antenna, Compatible with Green Power Module (I.S. Power Module Sold Separately)

Options (Include with selected model number)

Transmitter Body / Bolt Material		
Expanded		
GT	High Temperature (850 °F / 454 °C)	
Temperature Sensor		
Expanded		
RT[(2)]	Thermowell and RTD	
Optional Connection		
Standard		Standard
G1	DIN 19213 Transmitter Connection	★
Pressure Testing		
Expanded		
P1[(3)]	Hydrostatic Testing with Certificate	
Special Cleaning		
Expanded		
P2	Cleaning for Special Services	
PA	Cleaning per ASTM G93 Level D (Section 11.4)	
Material Testing		
Expanded		
V1	Dye Penetrant Exam	
Material Examination		
Expanded		
V2	Radiographic Examination	
Flow Calibration		
Expanded		
WD[(4)]	Discharge Coefficient Verification	

Table 5. Rosemount 3051CFP Integral Orifice Flowmeter 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.

Special Inspection		
Standard		Standard
QC1	Visual & Dimensional Inspection with Certificate	★
QC7	Inspection and Performance Certificate	★
Material Traceability Certification		
Standard		Standard
Q8	Material Traceability Certification per EN 10204:2004 3.1	★
Code Conformance		
Expanded		
J2[5]	ANSI/ASME B31.1	
J3[5]	ANSI/ASME B31.3	
J4[5]	ANSI/ASME B31.8	
Materials Conformance		
Expanded		
J5[6]	NACE MR-0175 / ISO 15156	
Country Certification		
Standard		Standard
J6	European Pressure Directive (PED)	★
Expanded		
J1	Canadian Registration	
Transmitter Calibration Certification		
Standard		Standard
Q4	Calibration Certificate for Transmitter	★
Product Certifications		
Standard		Standard
I1	ATEX Intrinsic Safety and Dust	★
I2	INMETRO Intrinsic Safety	★
I3	China Intrinsic Safety	★
I5	FM Intrinsically Safe, Division 2	★
I7	IECEx Intrinsic Safety	★
Sensor Fill Fluid and O-ring Options		
Standard		Standard
L2	Graphite-Filled (PTFE) O-ring	★
Display and Interface Options		
Standard		Standard
M5	LCD Display	★
Configuration Buttons		
Standard		Standard
DZ	Digital Zero Trim	★
Typical Model Number: 3051CFP D S 010 W1 S 0500 D3 2 A A 1 E5 M5		

(1)To improve pipe perpendicularity for gasket sealing, socket diameter is smaller than standard pipe O.D.
(2)Thermowell Material is the same as the body material.
(3)Does not apply to Process Connection codes T1 and S1.
(4)Not available for bore sizes 0010, 0014, 0020, or 0034.
(5)Not available with DIN Process Connection codes D1, D2, or D3.

(6)Materials of Construction comply with metallurgical requirements within NACE MR0175/ISO 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.

A.5.5 Rosemount 3051L Level Transmitter

3051L Level Transmitter

This ordering table contains the following Rosemount 3051L configurations:

Configuration	Transmitter Output Code
4-20 mA HART® -3051 -Enhanced 3051(1)	A
FOUNDATION™ fieldbus	F
Profibus	W

(1)The enhanced 4-20 mA HART device can be ordered with Transmitter Output option code A plus any of the following new option codes: DA0, M4, QT, DZ, CR, CS, CT, HR5, HR7.

See Options for more details on each configuration.

Additional Information

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Table 6. Rosemount 3051L 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	Level Transmitter			
Pressure Range				
Standard				**Standard**
2	–250 to 250 inH_2O (–0,6 to 0,6 bar)			★
3	–1000 to 1000 inH_2O (–2,5 to 2,5 bar)			★
4	–300 to 300 psi (–20,7 to 20,7 bar)			★
Transmitter Output				
Standard				**Standard**
X	Wireless			★
Process Connection Size, Material, Extension length (High Side)				
Standard				**Standard**
Code	**Process Connection Size**	**Material**	**Extension Length**	
G0(1)	2-in./DN 50/A	316L SST	Flush Mount Only	★
H0(1)	2-in./DN 50	Alloy C-276	Flush Mount Only	★
J0	2-in./DN 50	Tantalum	Flush Mount Only	★
A0(1)	3-in./DN 80	316L SST	Flush Mount	★
A2(1)	3-in./DN 80	316L SST	2-in./50 mm	★
A4(1)	3-in./DN 80	316L SST	4-in./100 mm	★
Standard				**Standard**
Code	**Process Connection Size**	**Material**	**Extension Length**	
A6(1)	3-in./DN 80	316L SST	6-in./150 mm	★
B0(1)	4-in./DN 100	316L SST	Flush Mount	★
B2(1)	4-in./DN 100	316L SST	2-in./50 mm	★

Table 6. Rosemount 3051L 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.

B4[(1)]	4-in./DN 100	316L SST	4-in./100 mm	★
B6[(1)]	4-in./DN 100	316L SST	6-in./150 mm	★
C0[(1)]	3-in./DN 80	Alloy C-276	Flush Mount	★
C2[(1)]	3-in./DN 80	Alloy C-276	2-in./50 mm	★
C4[(1)]	3-in./DN 80	Alloy C-276	4-in./100 mm	★
C6[(1)]	3-in./DN 80	Alloy C-276	6-in./150 mm	★
D0[(1)]	4-in./DN 100	Alloy C-276	Flush Mount	★
D2[(1)]	4-in./DN 100	Alloy C-276	2-in./50 mm	★
D4[(1)]	4-in./DN 100	Alloy C-276	4-in./100 mm	★
D6[(1)]	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	★
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[(1)]	2-in.	ANSI/ASME B16.5 Class 150	SST	★
F[(1)]	3-in.	ANSI/ASME B16.5 Class 150	SST	★
G[(1)]	4-in.	ANSI/ASME B16.5 Class 150	SST	★
Y[(1)]	2-in.	ANSI/ASME B16.5 Class 300	SST	★
H[(1)]	3-in.	ANSI/ASME B16.5 Class 300	SST	★
J[(1)]	4-in.	ANSI/ASME B16.5 Class 300	SST	★
Z[(1)]	2-in.	ANSI/ASME B16.5 Class 600	SST	★
L[(1)]	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[(1)]	DN 50	PN 10-40 per EN 1092-1	SST	★
T[(1)]	DN 80	PN 40 per EN 1092-1	SST	★
U[(1)]	DN 100	PN 40 per EN 1092-1	SST	★
W[(1)]	DN 100	PN 10/16 per EN 1092-1	SST	★
7[(1)]	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	

Table 6. Rosemount 3051L 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.

4[(1)]	—	10K per JIS B2238	316 SST	
5[(1)]	—	20K per JIS B2238	316 SST	
6[(1)]	—	40K per JIS B2238	316 SST	

Seal Fill Fluid (High 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)	★

Low Pressure Side					
	Configuration	**Flange Adapter**	**Diaphragm Material**	**Sensor Fill Fluid**	
Standard					**Standard**
11[(1)]	Gage	SST	316L SST	Silicone	★
21[(1)]	Differential	SST	316L SST	Silicone	★
22[(1)]	Differential	SST	Alloy C-276	Silicone	★
2A[(1)]	Differential	SST	316L SST	Inert (Halocarbon)	★
2B[(1)]	Differential	SST	Alloy C-276	Inert (Halocarbon)	★
31[(1)]	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**
P	Engineered polymer	No conduit entries	★

Wireless options (Requires option code X and Engineered Polymer housing code P)

Wireless Transmit Rate, Operating Frequency and Protocol		
Standard		Standard
WA3	User Configurable Transmit Rate, 2.4GHz WirelessHART	★
Antenna and SmartPower		
Standard		Standard
WP5	Internal Antenna, Compatible with Green Power Module (I.S. Power Module Sold Separately)	★

Options (Include with selected model number)

Seal Assemblies	

Table 6. Rosemount 3051L 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.

Standard				**Standard**
S1[(2)]	Assembled to One Rosemount 1199 Seal (Requires 1199M)			★
Product Certifications				
Standard				**Standard**
I1	ATEX Intrinsic Safety and Dust			★
I2	INMETRO Intrinsic Safety			★
I3	China Intrinsic Safety			★
I5	FM Intrinsically Safe, Division 2			★
I7	IECEx Intrinsic Safety			★
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**
M5	LCD Display			★
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			★
Toolkit Total System Performance Reports				
Standard				**Standard**
QZ	Remote Seal System Performance Calculation Report			★
Configuration Buttons				
Standard				**Standard**
DZ	Digital Zero Trim			★
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	★

Table 6. Rosemount 3051L 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.

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)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.
(2)"Assemble-to" items are specified separately and require a completed model number.

A.6 Options

Standard configuration

Unless otherwise specified, transmitter is shipped as follows:

Engineering units ***Differential/Gage*:** ***Absolute/3051TA*:**	 inH_2O (Range 0, 1, 2, and 3) psi (Range 4 and 5) psi (all ranges)
Low Limit:	0 (engineering units above)
High Limit:	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
LCD Display:	Installed or none
Alarm:	High
Software tag:	(Blank)

Custom configuration

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 “Rosemount Enhanced 3051 Configuration Data Sheet” document number 00806-0100-4007.

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. Character limit is dependent on protocol.

  –- WirelessHART: 32 characters

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.

Other seals

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

Output information

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

Pressure			
atm	inH_2O@4 °C	g/cm^2	psi
mbar	mmH_2O	kg/cm^2	torr
bar	mmHg	Pa	cmH_20@4 °C
inH_20	mmH_2O@4 °C	kPa	cmHG@0 °C
inHg	ftH_20	MPa	ftH_20@60 °F
hPa	inH_20@60 °F	kg/SqM	mH_20@4 °C
mHg@0 °C	Psf	ftH_2O@4 °C	

Display and interface options

Digital display option provides diagnostic messages for local troubleshooting and has 90 degree rotation capability for easy viewing.

M5 Digital Display

- 2-Line, 5-Digit LCD for 4-20 mA HART

Configuration buttons

The 3051 Wireless transmitter comes with a Digital Zero installed with the LCD digital display.

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

Rosemount 3051C 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 7. Transmitter weights without options

Transmitter	Add weight In lb (kg)
3051C	3.9 (1,8)
3051L	Table 8
3051T	2.3 (1,0)

Table 8. 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 9. 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)
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)

A.7 Spare parts

Model 3051C Sensor Modules (Min. Span/Range)	Silicone Fill Part Number
Note: One spare part is recommended for every 50 transmitters. *Note: Listed by Range and Process Isolator Order Numbers.*	
–3 to 3/0.1 inH2O, Range 0 (includes Traditional SST flange and SST bolts).	
316L SST	03031-1045-0002
–25 to 25 inH_2O/0.5 inH_2O, Range 1	
316L SST	03031-1045-0012
Alloy C-276	03031-1045-0013
Alloy 400	03031-1045-0014
Gold-plated *Alloy 400*	03031-1045-0016
Gold-plated 316 SST	03031-1045-0017
–250 to 250 inH_2O/2.5 inH_2O, Range 2	
316L SST	03031-1045-0022
Alloy C-276	03031-1045-0023
Alloy 400	03031-1045-0024
Tantalum	03031-1045-0025
Gold-plated *Alloy 400*	03031-1045-0026
Gold-plated 316 SST	03031-1045-0027
–1000 to 1000 inH_2O/10 inH_2O, Range 3	
316L SST	03031-1045-0032
Alloy C-276	03031-1045-0033
Alloy 400	03031-1045-0034
Tantalum	03031-1045-0035
Gold-plated *Alloy 400*	03031-1045-0036
Gold-plated 316 SST	03031-1045-0037
–300 to 300 psi/3 psi, Range 4	
316L SST	03031-1045-2042
Alloy C-276	03031-1045-2043
Alloy 400	03031-1045-2044
Tantalum	03031-1045-2045
Gold-plated *Alloy 400*	03031-1045-2046
Gold-plated 316 SST	03031-1045-2047

–2000 to 2000/20 psi, Range 5	
316L SST	03031-1045-2052
Alloy C-276	03031-1045-2053
Alloy 400	03031-1045-2054
Tantalum	03031-1045-2055
Gold-plated *Alloy 400*	03031-1045-2056
Gold-plated 316 SST	03031-1045-2057

Rosemount 3051C gage and differential sensor modules (Min. Span/Range)			**Silicone 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
Alloy C-276			03031-1045-0013
Alloy 400			03031-1045-0014
Gold-plated Alloy 400			03031-1045-0016
Gold-plated 316 SST			03031-1045-0017
Range 2	**–250 to 250 inH_2O/2.5 inH_2O**	**–250 to 250 inH_2O/2.5 inH_2O**	
316L SST			03031-1045-0022
Alloy C-276			03031-1045-0023
Alloy 400			03031-1045-0024
Tantalum			03031-1045-0025
Gold-plated Alloy 400			03031-1045-0026
Gold-plated 316 SST			03031-1045-0027
Range 3	**–407 to 1000 inH_2O/10 inH_2O**	**-1000 to 1000 inH_2O/10 inH_2O**	
316L SST			03031-1045-0032
Alloy C-276			03031-1045-0033
Alloy 400			03031-1045-0034
Tantalum			03031-1045-0035
Gold-plated Alloy 400			03031-1045-0036
Gold-plated 316 SST			03031-1045-0037

Range 4	**–14.2 to 300 psi/3 psi**	**-300 to 300 psi/3 psi**	
316L SST			03031-1045-2042
Alloy C-276			03031-1045-2043
Alloy 400			03031-1045-2044
Tantalum			03031-1045-2045
Gold-plated Alloy 400			03031-1045-2046
Gold-plated 316 SST			03031-1045-2047
Range 5	**–14.2 to 2000 psi/20 psi**	**-2000 to 2000psi/20 psi**	
316L SST			03031-1045-2052
Alloy C-276			03031-1045-2053
Alloy 400			03031-1045-2054
Tantalum			03031-1045-2055
Gold-plated Alloy 400			03031-1045-2056
Gold-plated 316 SST			03031-1045-2057

Rosemount 3051C absolute sensor modules (Min. Span/Range)	**Silicone 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

Rosemount 3051T Sensor Modules (Min. Span/Range)	Silicone Fill Part Number
Note: One spare part is recommended for every 50 transmitters.	
Range 1	**Gage pressure range** **0-0.3/30 psig**
Aluminum, 316L SST Isolator	
1/4 –18 NPT Female	03031-3112-3112
1/2 –14 NPT Female	03031-3102-3112
G1/2 A DIN 16288 Male	03031-3132-3112
Aluminum, Alloy C-276 Isolator	
1/4 –18 NPT Female	03031-3112-3113
1/2 –14 NPT Female	03031-3102-3113
SST, 316L SST Isolator	
1/4 –18 NPT Female	03031-3111-3112
1/2 –14 NPT Female	03031-3101-3112
SST, AlloyC-276 Isolator	
1/4 –18 NPT Female	03031-3111-3113
1/2 –14 NPT Female	03031-3101-3113
Range 2	**0-1.5/150 psig**
Aluminum, 316L SST Isolator	
1/4 –18 NPT Female	03031-3112-3122
1/2 –14 NPT Female	03031-3102-3122
G1/2 A DIN 16288 Male	03031-3132-3122
Aluminum, Alloy C-276 Isolator	
1/4 –18 NPT Female	03031-3112-3122
1/2 –14 NPT Female	03031-3102-3122
G1/2 A DIN 16288 Male	03031-3132-3122

Aluminum, Alloy C-276 Isolator		
1/4 –18 NPT Female		03031-3112-3123
1/2 –14 NPT Female		03031-3102-3123
SST, 316L SST Isolator		
¼ –18 NPT Female		03031-3111-3122
1/2 –14 NPT Female		03031-3101-3122
SST, AlloyC-276 Isolator		
1/4 –18 NPT Female		03031-3111-3123
1/2 –14 NPT Female		03031-3101-3123
Range 3	**0-8/800 psig**	
Aluminum, 316L SST Isolator		
1/4 –18 NPT Female		03031-3112-3132
1/2 –14 NPT Female		03031-3102-3132
G1/2 A DIN 16288 Male		03031-3132-3132
Aluminum, Alloy C-276 Isolator		
1/4 –18 NPT Female		03031-3112-3133
1/2 –14 NPT Female		03031-3102-3133
SST, 316L SST Isolator		
1/4 –18 NPT Female		03031-3111-3132
1/2 –14 NPT Female		03031-3101-3132
SST, AlloyC-276 Isolator		
1/4 –18 NPT Female		03031-3111-3133
1/2 –14 NPT Female		03031-3101-3133
Range4	**0-40/4,000 psig**	
Aluminum, 316L SST Isolator		
1/4 –18 NPT Female		03031-3112-3142
1/2 –14 NPT Female		03031-3102-3142
G1/2 A DIN 16288 Male		03031-3132-3142
Aluminum, Alloy C-276 Isolator		
1/4 –18 NPT Female		03031-3112-3143
1/2 –14 NPT Female		03031-3102-3143
SST, 316L SST Isolator		
1/4 –18 NPT Female		03031-3111-3142
1/2 –14 NPT Female		03031-3101-3142
SST, AlloyC-276 Isolator		
1/4 –18 NPT Female		03031-3111-3143
1/2 –14 NPT Female		03031-3101-3143

Range 1	Gage pressure range 0-0.3/30 psia	
Aluminum, 316L SST Isolator		
1/4 –18 NPT Female		03031-3112-3012
1/2 –14 NPT Female		03031-3102-1012
G1/2 A DIN 16288 Male		03031-3132-3012
Aluminum, Alloy C-276 Isolator		
1/4 –18 NPT Female		03031-3112-3013
1/2 –14 NPT Female		03031-3102-3013
SST, 316L SST Isolator		
1/4 –18 NPT Female		03031-3111-3012
1/2 –14 NPT Female		03031-3101-3012
SST, AlloyC-276 Isolator		
1/4 –18 NPT Female		03031-3111-3013
1/2 –14 NPT Female		03031-3101-3013
Range 2	**0-1.5/150 psia**	
Aluminum, 316L SST Isolator		
1/4 –18 NPT Female		03031-3112-3022
1/2 –14 NPT Female		03031-3112-3022
G1/2 A DIN 16288 Male		03031-3132-3022
Aluminum, Alloy C-276 Isolator		
1/4 –18 NPT Female		03031-3112-3023
1/2 –14 NPT Female		03031-3102-3023
SST, 316L SST Isolator		
1/4 –18 NPT Female		03031-3111-3022
1/2 –14 NPT Female		03031-3101-3022
SST, AlloyC-276 Isolator		
1/4–18 NPT Female		03031-3111-3023
1/2 –14 NPT Female		03031-3101-3023
Range 3	**0-8/800 psia**	
Aluminum, 316L SST Isolator		
1/4–18 NPT Female		03031-3112-3032
1/2 –14 NPT Female		03031-3102-3032
G1/2 A DIN 16288 Male		03031-3132-3032
Aluminum, Alloy C-276 Isolator		
1/4 –18 NPT Female		03031-3112-3033
1/2 –14 NPT Female		03031-3102-3033

SST, 316L SST Isolator		
1/4 –18 NPT Female		03031-3111-3032
1/2 –14 NPT Female		03031-3101-3032
SST, AlloyC-276 Isolator		
1/4 –18 NPT Female		03031-3111-3033
1/2 –14 NPT Female		03031-3101-3033
Range 4	**0-40/4,000 psia**	
Aluminum, 316L SST Isolator		
1/4 –18 NPT Female		03031-3112-3042
1/2 –14 NPT Female		03031-3102-3042
G1/2 A DIN 16288 Male		03031-3132-3042
Aluminum, Alloy C-276 Isolator		
1/4 –18 NPT Female		03031-3112-3043
1/2 –14 NPT Female		03031-3102-3043
SST, 316L SST Isolator		
1/4 –18 NPT Female		03031-3111-3042
1/2 –14 NPT Female		03031-3101-3042
SST, AlloyC-276 Isolator		
1/4 –18 NPT Female		03031-3111-3043
1/2 –14 NPT Female		03031-3101-3043
Range 5	**0-2000/10,000 psia**	
Aluminum, 316L SST Isolator		
1/4 –18 NPT Female		03031-3112-3052
1/2 –14 NPT Female		03031-3102-3052
Autoclave type F-250-C		03031-3122-3052
Aluminum, Alloy C-276 Isolator		
1/4 –18 NPT Female		03031-3112-3053
1/2 –14 NPT Female		03031-3102-3053
SST, 316L SST Isolator		
1/4 –18 NPT Female		03031-3111-3052
1/2 –14 NPT Female		03031-3101-3052
Autoclave type F-250-C		03031-3121-3052
SST, AlloyC-276 Isolator		
1/4 –18 NPT Female		03031-3111-3053
1/2 –14 NPT Female		03031-3101-3053

LCD Display	Part number
LCD Display for 3051 Wireless with Polymer Housing	
LCD Display for 3051 WirelessHART	03151-9010-0001
Electrical housings	**Part number**
Standard - Polymer	
Engineered Polymer	
Housing covers (include o-ring)	**Part number**
Wireless Battery Cover - Polymer	
LCD Display Cover - Polymer	
Flanges	**Part number**
Differential Coplanar Flange	
316 SST	03031-0388-0022
Cast Alloy 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 Alloy C-276	03031-0388-1023
Cast Alloy 400	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 Alloy 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 Alloy 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 Alloy 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
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

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

Appendix B Product Certifications

B.1 Wireless Certifications

B.1.1 Approved manufacturing locations

Rosemount Inc. — Chanhassen, Minnesota USA
Fisher-Rosemount GmbH & Co. — Wessling, Germany
Emerson Process Management Asia Pacific Private Limited — Singapore
Beijing Rosemount Far East Instrument Co., LTD — Beijing, China

B.1.2 European directive information

The EC declaration of conformity can be found on . The most recent revision can be found at www.rosemount.com.

B.1.3 Telecommunication compliance

All wireless devices require certification to ensure that they adhere to regulations regarding the use of the RF spectrum. Nearly every country requires this type of product certification. Emerson is working with governmental agencies around the world to supply fully compliant products and remove the risk of violating country directives or laws governing wireless device usage.

B.1.4 FCC and IC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation. This device must be installed to ensure a minimum antenna separation distance of 20 cm from all persons.

B.1.5 Ordinary location certification for FM

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).

B.1.6 North American certifications

Factory Mutual (FM) approvals

I5 FM Intrinsically Safe, Non-Incendive, and Dust Ignition-proof.
Intrinsically Safe for Class I/II/III, Division 1, Groups A, B, C, D, E, F, and G.
Zone Marking: Class I, Zone 0, AEx ia IIC
Temperature Codes T4 (T_{amb} = -50 to 70 °C)
Non-Incendive for Class I, Division 2, Groups A, B, C, and D.
Dust Ignition-proof for Class II/III, Division 1, Groups E, F, and G.
Ambient temperature limits: -50 to 85 °C
For use with Rosemount power module P/N 00753-9220-0001 only.
Enclosure Type 4X / IP66/68

B.1.7 CSA - Canadian Standards Association

I6 CSA Intrinsically Safe
Intrinsically Safe for Class I, Division 1, Groups A, B, C, and D.
Temp Code T3C
Enclosure Type 4X / IP66/68
For use with Rosemount power module P/N 00753-9220-0001 only.

B.1.8 European certifications

I1 ATEX Intrinsic Safety
Certificate No.: BAS01ATEX1303X ⟨Ex⟩ II 1G
Ex ia IIC T4 (T_a = -60 °C to 70 °C)
For use with Rosemount power module options 00753-9220-0001 only.
IP66/68
CE 1180

Special Conditions for Safe Use (X)

The surface resistivity of the antenna is greater than one gigaohm. To avoid electrostatic charge build-up, it must not be rubbed or cleaned with solvents or a dry cloth.

I7 IECEx Intrinsic Safety
Certificate No.: IECEx BAS 04.0017X
Ex ia IIC T4 (Ta = -60 °C to 70 °C)
For use with Rosemount power module options 00753-9220-0001 only.
IP66/68

Special Conditions for Safe Use (X)

The surface resistivity of the antenna is greater than one gigaohm. To avoid electrostatic charge build-up, it must not be rubbed or cleaned with solvents or a dry cloth.

B.1.9 Japanese Certifications

I4 TIIS Intrinsic Safety
Ex ia IIC T4

Certificate	Description
TC18649	2051_CD/CG/LD/LG
TC18650	2051_CA/TA/TG/LA
TC18657	2051FA/SFC/SFP

B.1.10 China (NEPSI) Certifications

I3 China Intrinsic Safety
Certificate No. (manufactured in Chanhassen, MN): GYJ081078
Certificate No. (manufactured in Beijing, China): GYJ06367
Certificate No. (manufactured in Singapore): GYJ06365
Ex ia IIC T4

Special Conditions for Safe Use (X)

See appropriate certificate.

Reference Manual
00809-0100-4100, Rev AA
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