Reference Manual
00809-0100-4051, Rev AA
January 2007

Rosemount 3051 Pressure Transmitter

Includes Transmitter Option TR

ROSEMOUNT®

www.rosemount.com

EMERSON™
Process Management

Reference Manual
00809-0100-4051, Rev AA
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Rosemount 3051 Pressure Transmitter

NOTICE

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

For technical assistance, contacts are listed below:

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

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

Asia Pacific- 65 777 8211

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

North American Response Center
Equipment service needs.

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

Outside of these areas, contact your local 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.

Rosemount 3051 Pressure Transmitters may be protected by one or more of the following: U.S. Patent Nos. 4466290; 4612812; 4791352; 4798089; 4818994; 4866435; 4878012; 4988990; 4926340; 5083091; 5122794; 5166678; 5248167; 5278543; 5287746; 5329818; 5333504; 5585777; 6017143; 6119047; 6295875; Des. 317266; Des. 318432; Des 342456. May depend on model. Other U.S. and foreign patents issued and pending.

Table of Contents

SECTION 6 Safety Instrumented Systems

APPENDIX A Reference Data

Section 1 Introduction

USING THIS MANUAL

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

- **Section 2: Installation** contains mechanical and electrical installation instructions, and field upgrade options for HART® protocol.
- **Section 3: Configuration** provides instruction on commissioning and operating Rosemount 3051 transmitters. Information on software functions, configuration parameters, and online variables is also included. This section covers HART protocol only.
- **Section 4: Operation and Maintenance** contains operation and maintenance techniques for HART protocol only.
- **Section 5: Troubleshooting** provides troubleshooting techniques for the most common operating problems for HART protocol only.
- **Section 6: Safety Instrumented Systems** contains identification, commissioning, maintenance, and operations information for the 3051 SIS Safety Transmitter.
- **Appendix A: Reference Data** supplies reference and specification data, as well as ordering information for HART protocol.
- **Appendix B: Approval Information** contains intrinsic safety approval information, European ATEX directive information, and approval drawings for HART protocol.

MODELS COVERED

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

Rosemount 3051C Coplanar™ Pressure Transmitter

Measurement Type		
Differential	Gage	Absolute
X	X	X

Rosemount 3051T In-Line Pressure Transmitter

Measurement Type		
Differential	Gage	Absolute
–	X	X

Rosemount 3051L Liquid Level Pressure Transmitter

Measurement Type		
Differential	Gage	Absolute
X	X	–

All Rosemount 3051 Pressure Transmitters are available with SIS safety certification (option code QT).

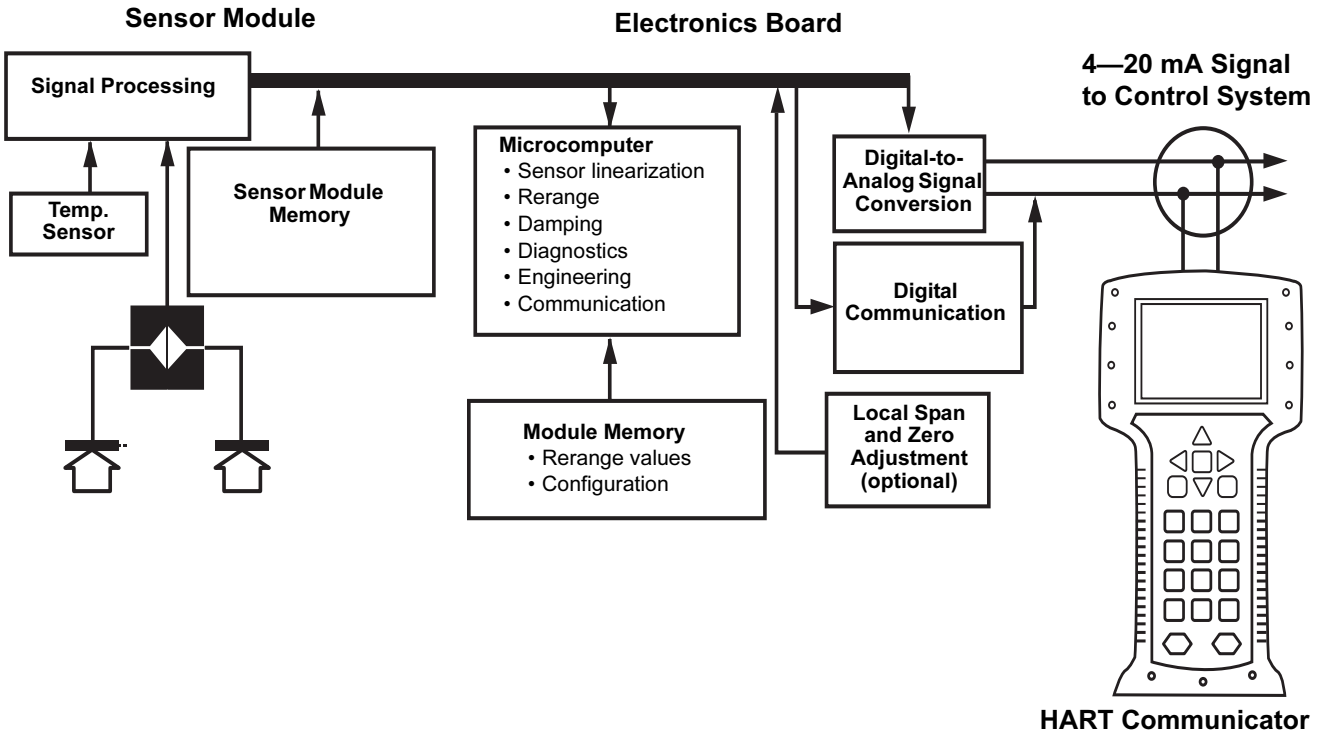
TRANSMITTER OVERVIEW

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

The major components of the Rosemount 3051 are the sensor module and the electronics housing. The sensor module contains the oil filled sensor system (isolating diaphragms, oil fill system, and sensor) and the sensor electronics. The sensor electronics are installed within the sensor module and include a temperature sensor (RTD), a memory module, and the capacitance to digital signal converter (C/D converter). The electrical signals from the sensor module are transmitted to the output electronics in the electronics housing. The electronics housing contains the output electronics board, the local zero and span buttons, and the terminal block. The basic block diagram of the Rosemount 3051CD is illustrated in Figure 1-1.

For the Rosemount 3051C design, pressure is applied to the isolating diaphragms, the oil deflects the center diaphragm, which then changes the capacitance. This capacitance signal is then changed to a digital signal in the C/D converter. The microprocessor then takes the signals from the RTD and C/D converter calculates the correct output of the transmitter. This signal is then sent to the D/A converter, which converts the signal back to an analog signal and superimposes the HART signal on the 4-20 mA output.

Figure 1-1. Block diagram of operation



SERVICE SUPPORT

To expedite the return process outside of the United States, contact the nearest Rosemount 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.

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

Section 2 Installation

OVERVIEW

The information in this section covers installation considerations for the 3051C and 3051T HART protocols. A Quick Installation Guide for HART protocol (document number 00825-0100-4051) is shipped with every transmitter to describe basic pipe-fitting and wiring procedures for initial installation. Dimensional drawings for each 3051 variation and mounting configuration are included in Appendix A: Reference Data.

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

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.

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 3051S reference manual for any restrictions associated with a safe installation.
- Before connecting a HART communicator in an explosive atmosphere, ensure the instruments in the loop are installed in accordance with intrinsically safe or non-incendive field wiring practices.
- In an Explosion-Proof/Flameproof installation, do not remove the transmitter covers when power is applied to the unit.

Process leaks may cause harm or result in death.
- Install and tighten process connectors before applying pressure.

Electrical shock can result in death or serious injury.
- Avoid contact with the leads and terminals. High voltage that may be present on leads can cause electrical shock.

⚠WARNING

Electrical shock can result in death or serious injury.

- Avoid contact with the leads and terminals.

Process leaks could result in death or serious injury.

- Install and tighten all four flange bolts before applying pressure.
- Do not attempt to loosen or remove flange bolts while the transmitter is in service.

Replacement equipment or spare parts not approved by Emerson Process Management 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 Emerson Process Management as spare parts.

Improper assembly of manifolds to traditional flange can damage sensor module.

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

GENERAL CONSIDERATIONS

Measurement accuracy depends upon proper installation of the transmitter and impulse piping. Mount the transmitter close to the process and use a minimum of piping to achieve best accuracy. 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.

IMPORTANT
Install the enclosed pipe plug (found in the box) in unused conduit opening with a minimum of five threads engaged to comply with explosion-proof requirements.

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

MECHANICAL CONSIDERATIONS

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 2-4 on page 2-10, keeping drain/vent connections on the bottom for gas service and on the top for liquid service.

DRAFT RANGE CONSIDERATIONS

Installation

For the Rosemount 3051CD0 Draft Range pressure transmitter, it is best to mount the transmitter with the isolators parallel to the ground. Installing the transmitter with isolators parallel to the ground reduces oil mounting effect and provides for optimal temperature performance.

Be sure the transmitter is securely mounted. Tilting of the transmitter may cause a zero shift in the transmitter output.

Reducing Process Noise

There are two recommended methods of reducing process noise: output damping and, in gage applications, reference side filtering.

Output Damping

The output damping for the Rosemount 3051CD0 is factory set to 3.2 seconds as a default. If the transmitter output is still noisy, increase the damping time. If faster response is needed, decrease the damping time. Damping adjustment information is available on page 3-16.

Reference Side Filtering

In gage applications it is important to minimize fluctuations in atmospheric pressure to which the low side isolator is exposed.

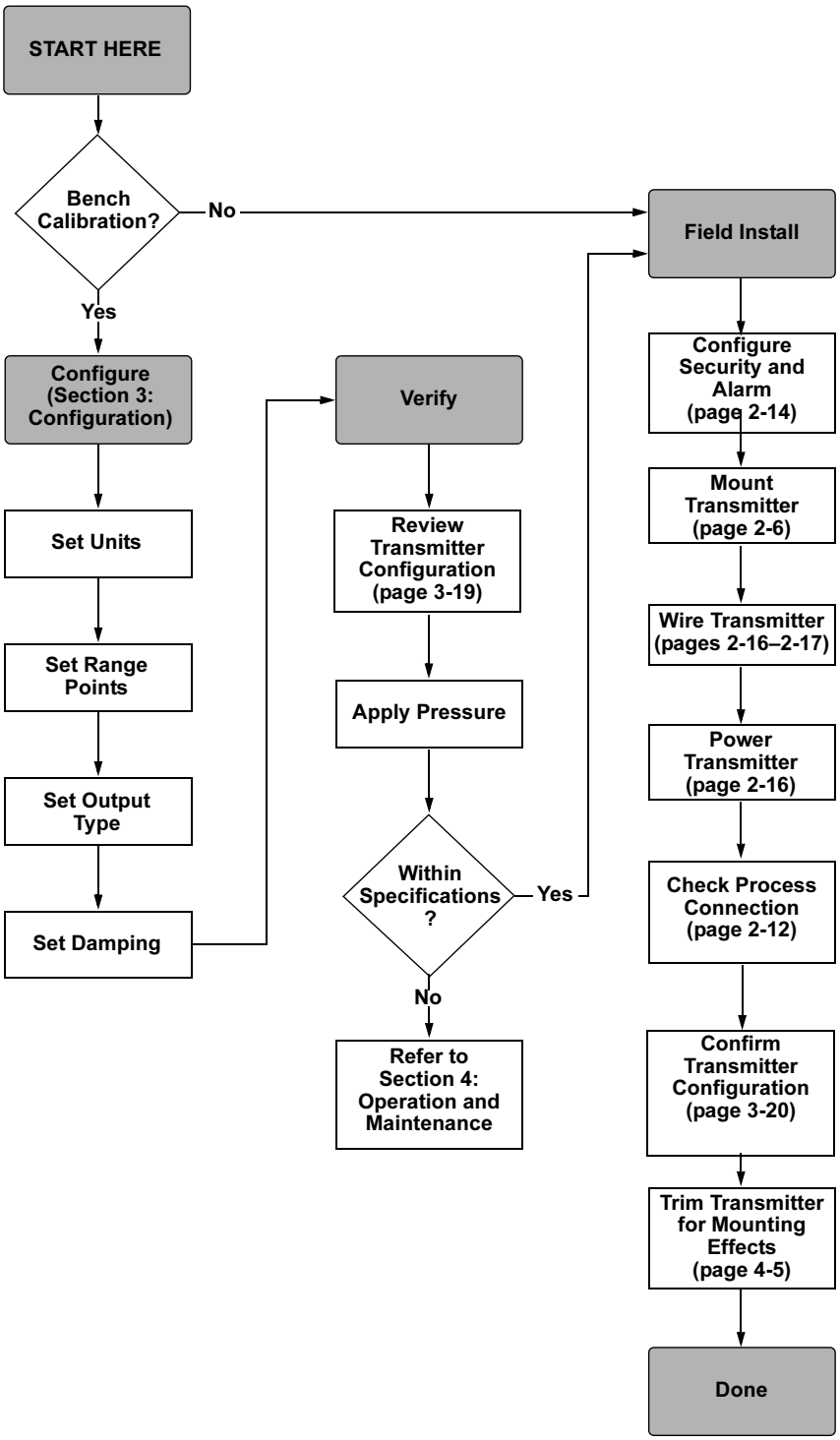
One method of reducing fluctuations in atmospheric pressure is to attach a length of tubing to the reference side of the transmitter to act as a pressure buffer.

Another method is to plumb the reference side to a chamber that has a small vent to atmosphere. If multiple draft transmitters are being used in an application, the reference side of each device can be plumbed to a chamber to achieve a common gage reference.

ENVIRONMENTAL CONSIDERATIONS

See page 2-6 for access requirements and cover installation to 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: Reference Data lists temperature operating limits.

Figure 2-1. HART Installation Flowchart



INSTALLATION PROCEDURES

For dimensional drawing information refer to Appendix A: Reference Data on page A-12.

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 accessibility for a testing or calibration input.

Housing Rotation

See “Housing Rotation” on page 2-12.

Terminal Side of Electronics Housing

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

Circuit Side of Electronics Housing

Provide 0.75 in. (19 mm) of clearance for units without an LCD display. Provide three inches of clearance for units installed with LCD.

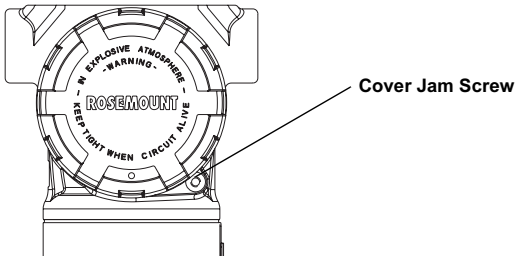
Cover Installation

Always ensure a proper seal by installing the electronics housing covers so that metal contacts metal. Use Rosemount o-rings.

Cover Jam Screw

For transmitter housings shipped with a cover jam screw, the screw should be properly installed once the transmitter has been wired and powered up. The cover jam screw is intended to disallow the removal of the transmitter cover in flameproof environments without the use of tooling. Follow these steps to install the cover jam screw:

1. Verify that the cover jam screw is completely threaded into the housing.
2. Install the transmitter housing cover and verify that the cover is tight against the housing.
3. Using an M4 hex wrench, loosen the jam screw until it contacts the transmitter cover.
4. Turn the jam screw an additional 1/2 turn counterclockwise to secure the cover. (Note: Application of excessive torque may strip the threads.)
5. Verify that the cover cannot be removed.



Mount the Transmitter

Mounting Brackets

Facilitate mounting transmitter to a 2-in. (51 mm) pipe, or to a panel. The B4 Bracket (SST) option is standard for use with the Coplanar and In-Line process connections. “Coplanar flange mounting configurations” on page A-13 shows bracket dimensions and mounting configurations for the B4 option.

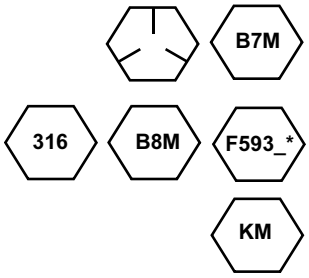
Options B1–B3 and B7–B9 are polyester-painted brackets designed for use with the traditional flange. The B1–B3 brackets are supplied with carbon steel bolts, while the B7–B9 brackets are supplied with stainless steel bolts. Bracket options BA and BC are stainless steel brackets supplied with stainless steel bolts. The B1/B7/BA and B3/B9/BC style brackets support 2-in. (55 mm) pipe-mount installations, and the B2/B8 style brackets support panel mounting.

Refer to page A-12.

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 pressure caused by the varied mounting position. To reset zero point, refer to “Sensor Trim” on page 4-5.

Flange Bolts

The 3051 is shipped with a Coplanar flange installed with four 1.75-in. (44 mm) flange bolts. “Coplanar flange mounting configurations” on page A-13 illustrate mounting bolts and bolting configurations. 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 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.**

Monel® Head Marking

Bolt Installation

⚠ Only use bolts supplied with the 3051 or provided by Emerson 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:

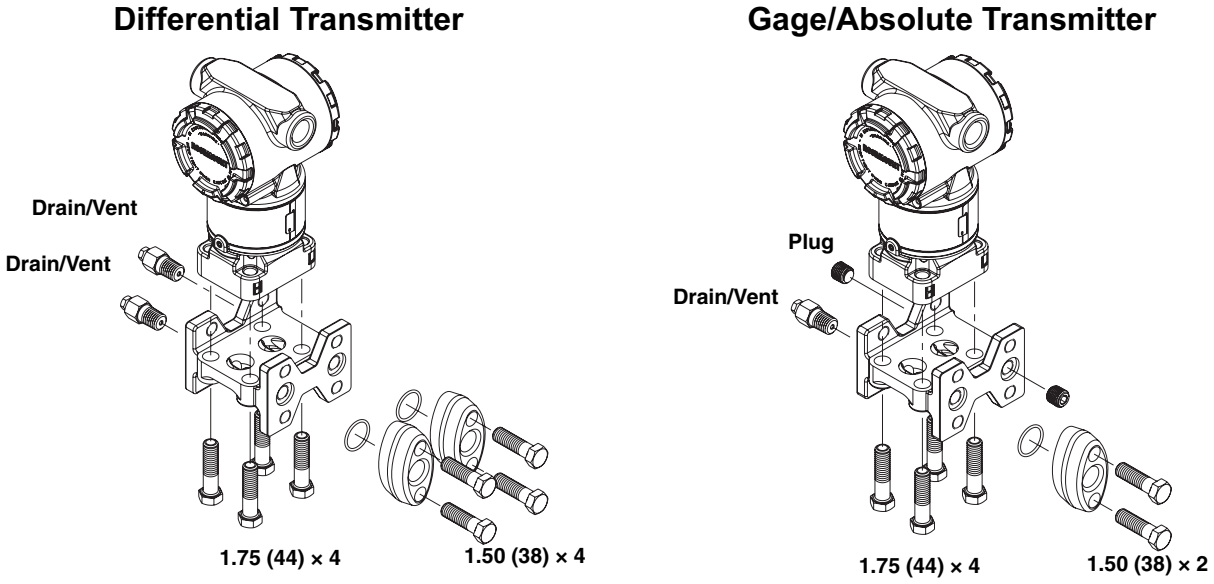
1. Finger-tighten the bolts.
2. Torque the bolts to the initial torque value using a crossing pattern.
3. Torque the bolts to the final torque value using the same crossing pattern.

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

Table 2-1. 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)
Monel®—Option L6	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)

Figure 2-2. Traditional Flange Bolt Configurations

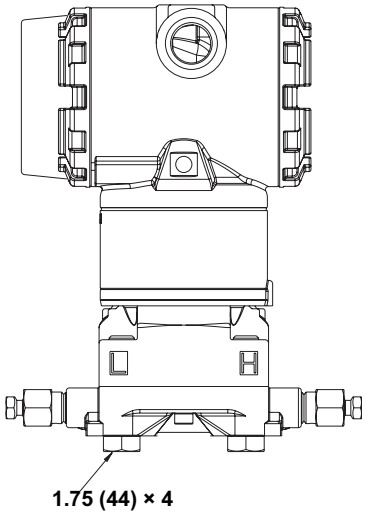


NOTE
Dimensions are in inches (millimeters).

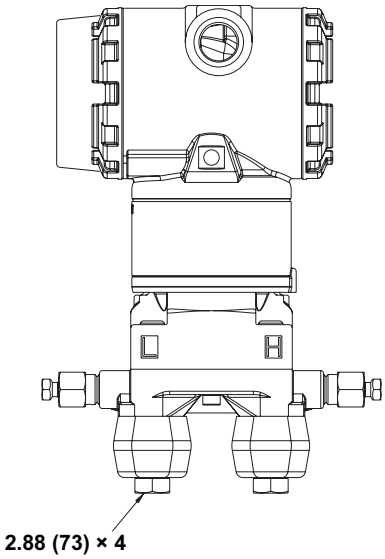
⚠ See “Safety Messages” on page 2-1 for complete warning information.

Figure 2-3. Mounting Bolts and Bolt Configurations for Coplanar Flange

TRANSMITTER WITH FLANGE BOLTS



TRANSMITTER WITH FLANGE ADAPTERS AND FLANGE/ADAPTER BOLTS



Description	Size in. (mm)
Flange Bolts	1.75 (44)
Flange/Adapter Bolts	2.88 (73)
Manifold/Flange Bolts	2.25 (57)

Note: Rosemount 3051T transmitters are direct mount and do not require bolts for process connection.

NOTE
Dimensions are in inches (millimeters).

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 impulse piping error: pressure transfer, leaks, friction loss (particularly if purging is used), trapped gas in a liquid line, liquid in a gas line, and density variations between the legs.

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

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

Mounting Requirements

Refer to Figure 2-4 for examples of the following mounting configurations:

Liquid Flow

For liquid flow measurement, place taps on the side of the line to prevent sediment deposits, and mount the transmitter beside or below these taps so gases can vent into the process line.

Gas Flow

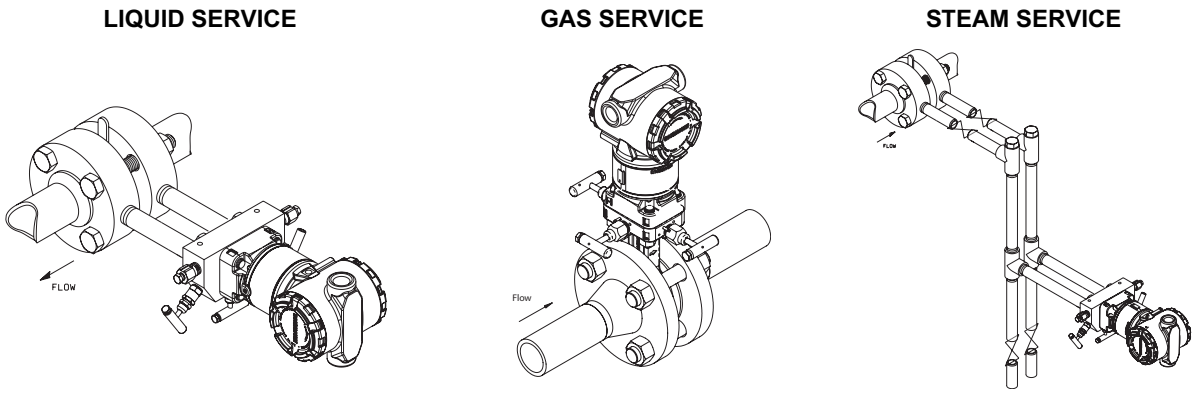
For gas flow measurement, place taps in the top or side of the line and mount the transmitter beside or above the taps so liquid will drain into the process line.

Steam Flow

For steam flow measurement, place taps to the side of the line, with the transmitter mounted below the taps to ensure the impulse piping remains filled with condensate.

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.

Figure 2-4. Installation Examples



Process Connections

Rosemount 3051 Process Connection

Rosemount 3051 process connections on the transmitter flange are 1/4–18 NPT. Flange adapter unions with 1/2–14 NPT connections must be ordered using the DF option. The threads are Class 2; use your plant-approved lubricant or sealant when making the process connections. The process connections on the transmitter flange are on 2 1/8-in. (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). See page 2-12 for information on the Rosemount 3051T Process Connection.

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

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

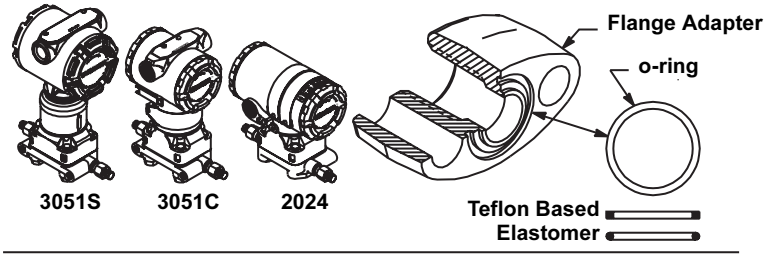
1. Remove the flange bolts.
2. Leaving the flange in place, move the adapters into position with the o-ring installed.
3. Clamp the adapters and the Coplanar flange to the transmitter sensor module using the larger of the bolts supplied.
4. Tighten the bolts. Refer to “Flange Bolts” on page 2-6 for torque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

⚠WARNING

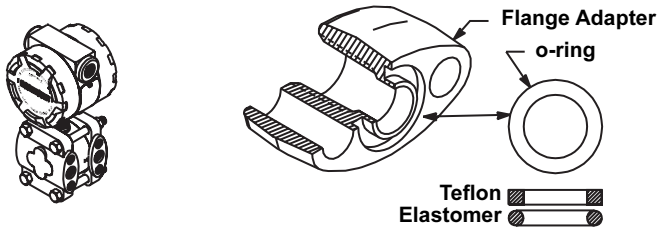
Failure to install proper flange adapter o-rings can cause process leaks, which can result in death or serious injury.

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/ 3051/3001/3095/2024



ROSEMOUNT 1151



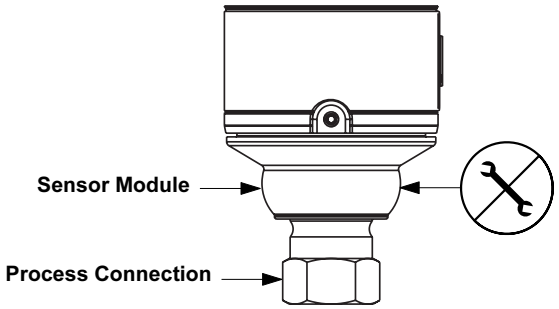
Refer to the Spare Parts list in Appendix A: Reference Data for the correct part numbers of the flange adapters and o-rings designed for Rosemount 3051 transmitters.

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

Rosemount 3051T Process Connection

⚠WARNING

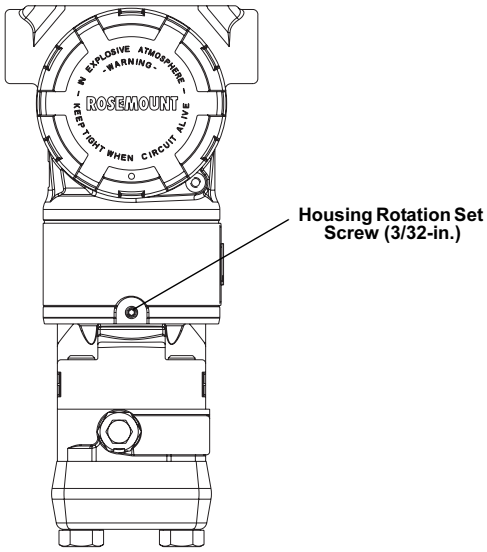
Do not apply torque directly to the sensor module. Rotation between the sensor module and the process connection can damage the electronics. To avoid damage, apply torque only to the hex-shaped process connection.



Housing Rotation

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

1. Loosen the housing rotation set screw using a $\frac{3}{32}$ -in. hex wrench.
2. Turn the housing left or right up to 180° from its original position. Over rotating will damage the transmitter.
3. Retighten the housing rotation set screw.

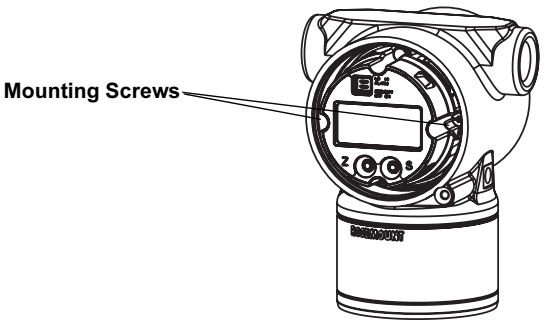


LCD Display Rotation

Transmitters ordered with the LCD option are shipped with the display installed. Installing the display on an existing 3051 transmitter requires a small instrument screwdriver and the display kit.

In addition to housing rotation, the optional LCD can be rotated in 90-degree increments by performing the following procedure:

1. Remove the housing cover.
2. Loosen the mounting screws by turning counterclockwise 4-5 turns. **Do not fully remove the screws.**



3. Rotate the LCD counterclockwise slightly to disengage snap fit.

NOTE
The LCD is connected with communication wires. Do not attempt to detach the LCD from the transmitter by pulling the LCD out of the transmitter.

4. Withdraw the LCD approximately 2 inches (5 cm) and rotate the LCD either clockwise or counterclockwise 90 or 180 degrees to the desired location.
5. Align the LCD placement holes to the clips and screws.
6. Rotate the LCD clockwise until it snaps into place.
7. Verify all four LCD placement holes are engaged.
8. Tighten the screws to secure the LCD to the transmitter.
9. Reinstall the transmitter housing cover. Ensure cover seals properly by installing cover so that metal contacts metal. Use Rosemount o-rings.

Configure Security and Alarm

NOTE
If alarm and security adjustments are not installed, the transmitter will operate normally with the default alarm condition alarm *high* and the security *off*.

Configure Security (Write Protect)

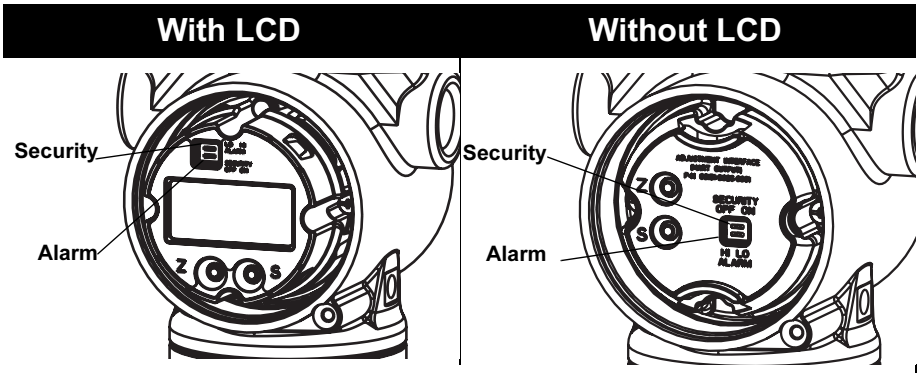
Changes can be prevented to the transmitter configuration data with the write protection switches. Security is controlled by the security (write protect) switch located on the interface assembly. Position the switch in the “ON” position to prevent accidental or deliberate change of configuration data.

If the transmitter write protection switch is in the “ON” position, the transmitter will not accept any “writes” to its memory. Configuration changes, such as digital trim and reranging, cannot take place when the transmitter security is in the “ON” position.

To reposition the switches, follow the procedure described below.

1. Do not remove the transmitter covers in explosive atmospheres when the circuit is live. If the transmitter is installed, set the loop to manual and remove power.
2. Remove the electronics compartment cover, opposite the field terminal side. See Figure 2-5 to reposition the switch as desired.
3. Re-install the transmitter housing cover. Transmitter covers must be fully engaged to meet explosion-proof requirements.

Figure 2-5. Security and alarm configuration (option D1)



Slide the security and alarm switches into the preferred position by using a small screwdriver.

HART Communicator

Fast Keys	1, 3, 4, 5

The HART Communicator can configure the security “ON” and “OFF” using the fast key sequence described. Otherwise, if the transmitter contains the D1 option, the security switch will override any software configuration.

AMS Device Manager

AMS Device Manager can be used to configure the security “ON” and “OFF”.

Right click on the device and select “Device Configuration”, then “Config Write Protect” from the menu.

1. Enter write protect setting, click **Next**.
2. Click **Next** to acknowledge setting has changed. If hardware adjustments are activated, click **Next** to acknowledge the “Switch option detected, function disabled, write protect unchanged” screen. If the hardware adjustments are activated, the write protect will not configure.
3. Click **Finish** to acknowledge the method is complete.

Configure Alarm Direction

The transmitter alarm direction is set by repositioning the switches. Position the switch in the HI position for fail high and in the LO position for fail low.

HART Communicator

Fast Keys	1, 4, 2, 7, 6

Usage Note
The HART Communicator can be used to configure the alarm direction to High (HI) or Low (LO) using the fast key sequence described. Otherwise, if the transmitter contains the D1 option, the switch on the transmitter will override the HART Communicator.

AMS Device Manager

AMS Device Manager can be used to configure the alarm direction.

Right click on the device and select “Device Configuration,” then “Alarm/Saturation Levels,” then “Alarm Direction” from the menu.

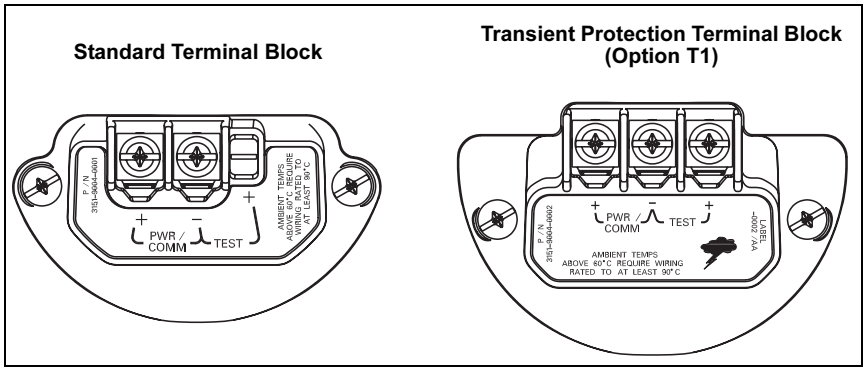
1. Enter desired alarm direction, click **Next**.
2. Click **Next** to acknowledge setting has changed. If hardware adjustments are activated, click **Next** to acknowledge the “Switch option detected, function disabled, alarm direction unchanged” screen. If the hardware adjustments are activated, the write protect will not configure.
3. Click **Finish** to acknowledge the method is complete.

Connect Wiring and Power Up

Wiring for HART Protocol

NOTE
Use shielded twisted pairs to yield best results. To ensure proper communication, use 24 AWG or larger wire, and do not exceed 5000 feet (1500 meters).

Figure 2-6. HART Terminal Blocks



Perform the following procedure to make wiring connections:

1. Remove the housing cover on terminal compartment side. Do not remove the cover in explosive atmospheres when the circuit is live. Signal wiring supplies all power to the transmitter.
2. Connect the positive lead to the terminal marked (+) and the negative lead to the terminal marked (pwr/comm –). Avoid contact with leads and terminals. Do not connect powered signal wiring to the test terminals. Power could damage the test diode.
3. Plug and seal unused conduit connection on the transmitter housing to avoid moisture accumulation in the terminal side. Install wiring with a drip loop. Arrange the drip loop so the bottom is lower than the conduit connections and the transmitter housing.

Signal Wiring Grounding

Do not run signal wiring in conduit or open trays with power wiring, or near heavy electrical equipment. Ground the signal wiring at any one point on the signal loop, or leave it ungrounded. The negative terminal of the power supply is a recommended grounding point.

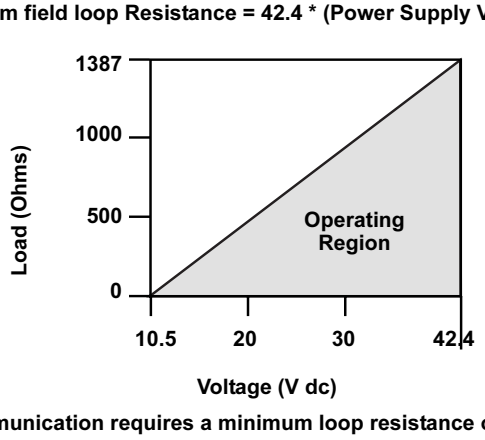
Power Supply 4–20 mA Transmitters

The dc power supply should provide power with less than two percent ripple. Total resistance load is the sum of resistance from signal leads and the load resistance of the controller, indicator, and related pieces. The resistance of intrinsic safety barriers, if used, must be included.

See “Safety Messages” on page 2-1 for complete warning information.

NOTE
A minimum loop resistance of 250 ohms is required to communicate with a HART Communicator. If a single power supply is used to power more than one 3051 transmitter, the power supply used, and circuitry common to the transmitters, should not have more than 20 ohms of impedance at 1200 Hz.

Figure 2-7. Power Supply Load Limitations, 4–20 mA Transmitters



Optional Transient Protection Terminal Block

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

The transient protection terminal block can be ordered as an installed option (Option Code T1 in the transmitter model number) or as a spare part to retrofit existing 3051 transmitters in the field. See “Spare Parts” on page A-38 for spare part numbers. The lightning bolt symbol shown in Figure 2-6 identifies the transient protection terminal block.

Grounding the Transmitter Case

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

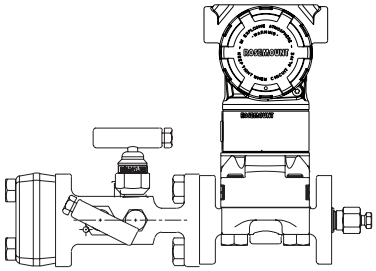
- **Internal Ground Connection**: The Internal Ground Connection screw is inside the FIELD TERMINALS side of the electronics housing. This screw is identified by a ground symbol (⏚). The ground connection screw is standard on all Rosemount 3051 transmitters.
- **External Ground Assembly**: This assembly is included with the optional transient protection terminal block (Option Code T1), and it is included with various hazardous location certifications. The External Ground Assembly can also be ordered with the transmitter (Option Code V5), or as a spare part. See “Spare Parts” on page A-38.

NOTE
Grounding the transmitter housing using the threaded conduit connection may not provide a sufficient ground. The transient protection terminal block (Option Code T1) does not provide transient protection unless the transmitter housing is properly grounded. Use the above guidelines to ground the transmitter housing. Do not run the transient protection ground wire with signal wiring as the ground wire may carry excessive current if a lightning strike occurs.

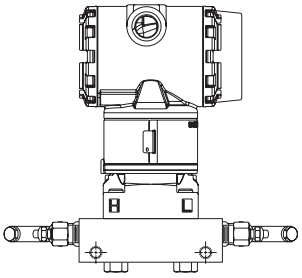
ROSEMOUNT 305, 306 AND 304 MANIFOLDS

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

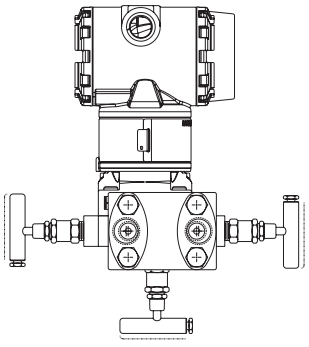
Figure 2-8. Manifolds



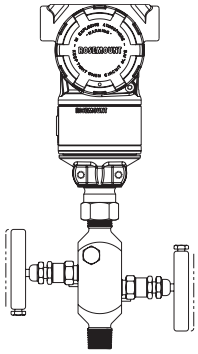
3051C AND 304 CONVENTIONAL



3051C AND 305 INTEGRAL COPLANAR



3051C AND 305 INTEGRAL TRADITIONAL



3051T AND 306 IN-LINE

Rosemount 305 Integral Manifold Installation Procedure

To install a 305 Integral Manifold to a 3051 transmitter:

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

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

2. Install the Integral Manifold on the sensor module. Use the four 2.25-in. manifold bolts for alignment. Finger tighten the bolts, then tighten the bolts incrementally in a cross pattern to final torque value. See “Flange Bolts” on page 2-6 for complete bolt installation information and torque values. When fully tightened, the bolts should extend through the top of the sensor module housing.
3. 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.

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

Rosemount 306 Integral Manifold Installation Procedure

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

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

Rosemount 304 Conventional Manifold Installation Procedure

To install a 304 Conventional Manifold to a 3051 transmitter:

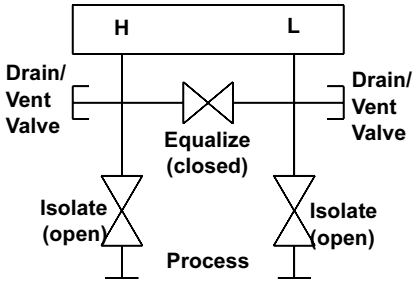
1. Align the Conventional Manifold with the transmitter flange. Use the four manifold bolts for alignment.
2. Finger tighten the bolts, then tighten the bolts incrementally in a cross pattern to final torque value. See “Flange Bolts” on page 2-6 for complete bolt installation information and torque values.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

⚠ See “Safety Messages” on page 2-1 for complete warning information.

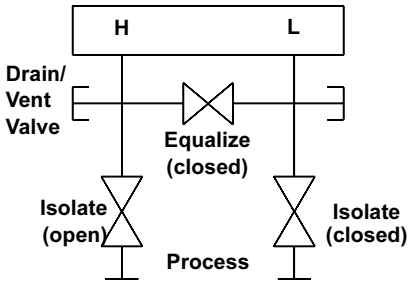
Integral Manifold Operation

Three-valve configuration shown.

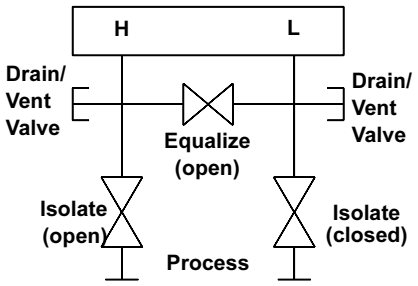
In normal operation the two isolate valves between the process and instrument ports will be open and the equalizing valve(s) will be closed.



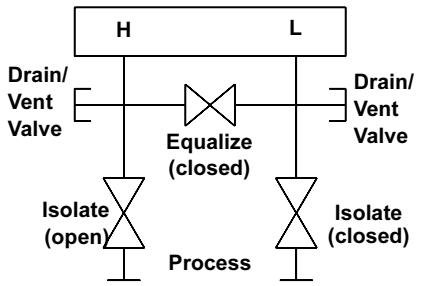
To zero the 3051, close the isolate valve to the low pressure (downstream side) of the transmitter first.



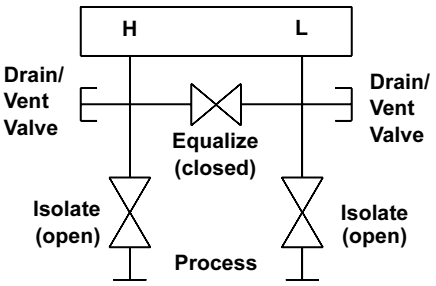
Next, open the center (equalize) valve(s) to equalize the pressure on both sides of the transmitter.



The manifold valves are now in the proper configuration for zeroing the transmitter. To return the transmitter to service, close the equalizing valve(s) first.



Next, open the isolate valve on the low pressure side of the transmitter.



Section 3 Configuration

OVERVIEW

This section contains information on commissioning and tasks that should be performed on the bench prior to installation. This section contains Rosemount 3051 HART configuration information only.

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

SAFETY MESSAGES

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

Warnings

⚠WARNING

Explosions could result in death or serious injury:
Installation of this transmitter in an explosive environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Please review the approvals section of the 3051S reference manual for any restrictions associated with a safe installation.
- Before connecting a HART communicator in an explosive atmosphere, ensure the instruments in the loop are installed in accordance with intrinsically safe or non-incendive field wiring practices.
- In an Explosion-Proof/Flameproof installation, do not remove the transmitter covers when power is applied to the unit.

Process leaks may cause harm or result in death.
- Install and tighten process connectors before applying pressure.

Electrical shock can result in death or serious injury.
- Avoid contact with the leads and terminals. High voltage that may be present on leads can cause electrical shock.

COMMISSIONING ON THE BENCH WITH HART

Commissioning consists of testing the transmitter and verifying transmitter configuration data. 3051 transmitters can be commissioned either before or after installation. Commissioning the transmitter on the bench before installation using a HART Communicator or AMS Device Manager ensures that all transmitter components are in working order.

⚠ To commission on the bench, required equipment includes a power supply, a milliamp meter, and a HART Communicator or AMS Device Manager. Wire equipment as shown in Figure 3-1. Verify transmitter terminal voltage is between 10.5 - 42.4 Vdc. To ensure successful communication, a resistance of at least 250 ohms must be present between the HART Communicator loop connection and the power supply. Connect the HART Communicator leads to the terminals labeled “COMM” on the terminal block. (Connecting across the “TEST” terminals will prevent successful communication.

Set all transmitter hardware adjustments during commissioning to avoid exposing the transmitter electronics to the plant environment after installation.

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

Setting the Loop to Manual

Whenever sending or requesting data that would disrupt the loop or change the output of the transmitter, set the process application loop to manual. The HART Communicator or AMS Device Manager will prompt you to set the loop to manual when necessary. Acknowledging this prompt does not set the loop to manual. The prompt is only a reminder; set the loop to manual as a separate operation.

Wiring Diagrams

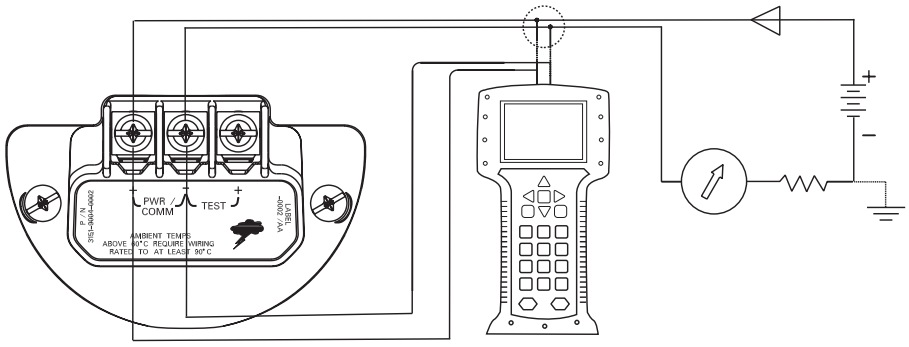
Bench Hook-up

Connect the bench equipment as shown in Figures 3-1, and turn on the HART Communicator by pressing the ON/OFF key or log into AMS Device Manager. The HART Communicator or AMS Device Manager will search for a HART-compatible device and indicate when the connection is made. If the HART Communicator or AMS Device Manager fail to connect, it indicates that no device was found. If this occurs, refer to Section 5: Troubleshooting.

Field Hook-up

Figures 3-1 illustrate wiring loops for a field hook-up with a HART Communicator or AMS Device Manager. The HART Communicator or AMS Device Manager may be connected at “COMM” on the transmitter terminal block, across the load resistor, or at any termination point in the signal loop. Signal point may be grounded at any point or left ungrounded.

Figure 3-1. Wiring (4-20 mA)



CONFIGURATION DATA REVIEW

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

The following is a list of factory default configurations. These can be reviewed by using the HART Communicator or AMS Device Manager.

HART Communicator

Fast Keys	1, 5

Enter the fast key sequence to view the configuration data.

Manufacturer “Rosemount”	O-Ring material
Transmitter model	Drain/Vent material
Measurement type	Number of diaphragm seals
Module configuration type	Seal type
Range	Remote seal isolator material
PV Unit	Seal fill fluid
PV Lower Sensor Limit (LSL)	Tag
PV Upper Sensor Limit (USL)	Date
PV Lower Range Value (LRV)	Descriptor
PV Upper Range Value (URV)	Message
PV minimum span	Write protect
Lower sensor trim point	Meter type
Upper sensor trim point	Local keys
Sensor trim calibration type	Universal revision
Transfer function	Field device revision
Damping	Software revision
Alarm direction	Hardware revision
High Alarm (Value)	Physical signal code
Low Alarm (Value)	Final assembly number
High saturation	Device ID
Low saturation	Burst mode
Alarm/Saturation type	Burst option
Sensor S/N	Poll address
Isolator material	Number req preams
Fill fluid	Multisensor device
Process connector	Command #39, EEProm Control required
Process connector material	Distributor

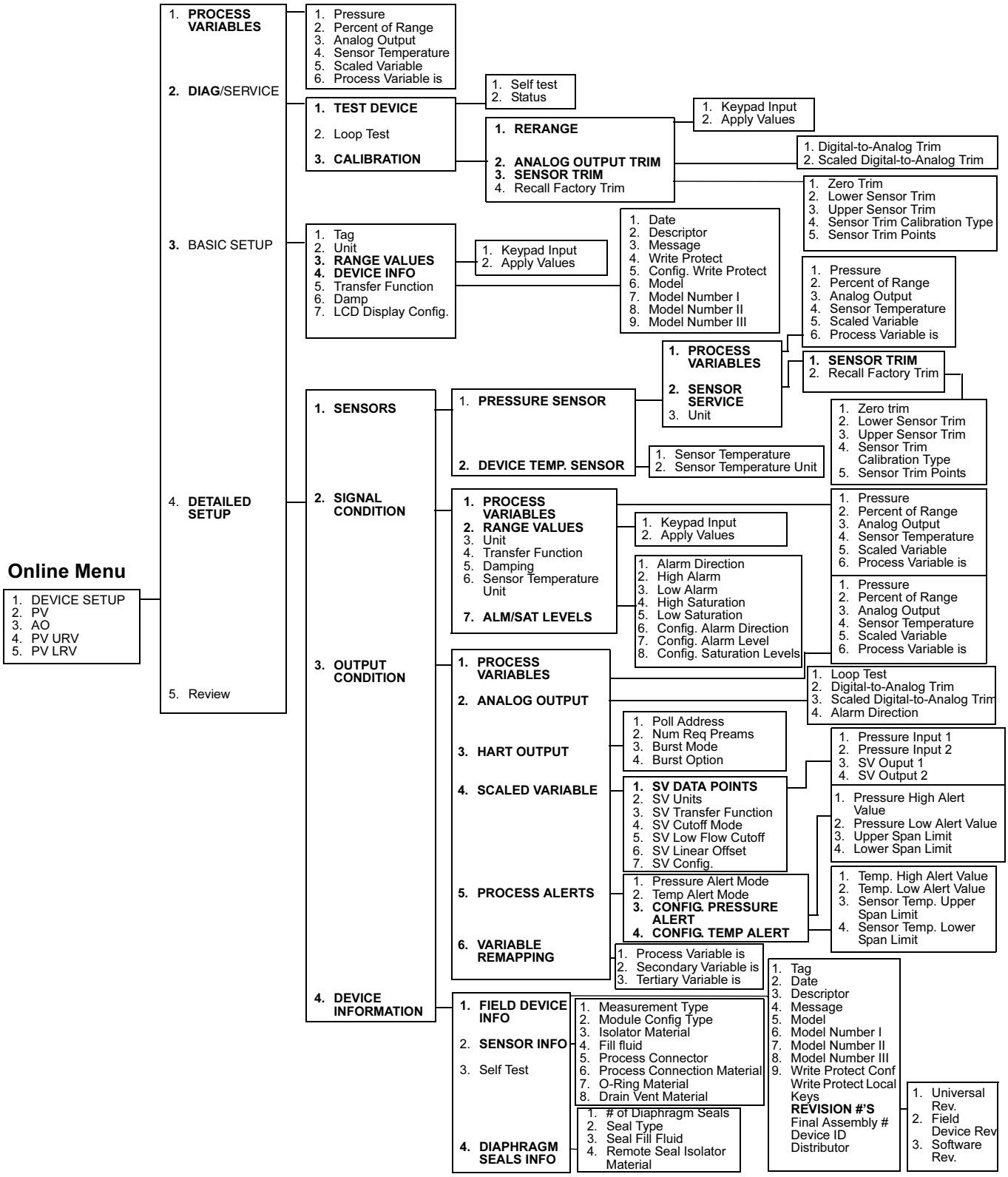
AMS Device Manager

Right click on the device and select “Configuration Properties” from the menu. Select the tabs to review the transmitter configuration data.

HART COMMUNICATOR

For 3051 SIS Safety Certified transmitter, see Section 6: Safety Instrumented Systems.

Menu Tree



Fast Key Sequence

The following menu indicates fast key sequences for common functions. For full menu tree see www.emersonprocess.com/rosemount.

	Function	HART Fast Key Sequence
	Alarm Level Config.	1, 4, 2, 7, 7
	Alarm and Saturation Levels	1, 4, 2, 7
	Analog Output Alarm Direction	1, 4, 2, 7, 6
	Analog Output Trim	1, 2, 3, 2
	Burst Mode On/Off	1, 4, 3, 3, 3
	Burst Options	1, 4, 3, 3, 4
√	Damping	1, 3, 6
	Date	1, 3, 4, 1
	Descriptor	1, 3, 4, 2
	Digital To Analog Trim (4-20 mA Output)	1, 2, 3, 2, 1
	Field Device Information	1, 4, 4, 1
	Loop Test	1, 2, 2
	Lower Sensor Trim	1, 2, 3, 3, 2
	Message	1, 3, 4, 3
	Meter Configuration	1, 3, 7
	Number of Requested Preambles	1, 4, 3, 3, 2
	Pressure Alert Config.	1, 4, 3, 5, 3
	Poll Address	1, 4, 3, 3, 1
	Poll a Multidropped Transmitter	Left Arrow, 4, 1, 1
	Re-mapping	1, 4, 3, 6, 4
	Rerange- Keypad Input	1, 2, 3, 1, 1
	Saturation Level Config.	1, 4, 2, 7, 8
	Scaled D/A Trim (4–20 mA Output)	1, 2, 3, 2, 2
	Scaled Variable Config.	1, 4, 3, 4, 7
	Self Test (Transmitter)	1, 2, 1, 1
	Sensor Information	1, 4, 4, 2
	Sensor Temperature	1, 1, 4
	Sensor Trim	1, 2, 3, 3
	Sensor Trim Points	1, 2, 3, 3, 5
	Status	1, 2, 1, 2
	Tag	1, 3, 1
√	Temperature Alert Config.	1, 4, 3, 5, 4
	Transfer Function (Setting Output Type)	1, 3, 5
√	Transmitter Security (Write Protect)	1, 3, 4, 5
	Units (Process Variable)	1, 3, 2
√	Upper Sensor Trim	1, 2, 3, 3, 3
	Zero Trim	1, 2, 3, 3, 1
	√ = *Commonly Used*	

CHECK OUTPUT

Before performing other transmitter on-line operations, review the digital output parameters to ensure that the transmitter is operating properly and is configured to the appropriate process variables.

Process Variables

The process variables for the 3051 provide transmitter output, and are continuously updated. The pressure reading in both engineering units and percent of range will continue to track with pressures outside of the defined range from the lower to the upper range limit of the sensor module.

HART Communicator

Fast Keys	1, 1

The process variable menu displays the following process variables:

- Pressure
- Percent of range
- Analog output
- Sensor temperature
- Scaled Variable (SV)
- Primary Variable (PV)

AMS Device Manager

Right click on the device and select “Process Variables...” from the menu.The process variable screen displays the following process variables:

- Pressure
- Percent of range
- Analog output
- Sensor temperature
- Scaled Variable (SV)
- Primary Variable (PV)

Sensor Temperature

The 3051 contains a temperature sensor near the pressure sensor in the sensor module. When reading this temperature, keep in mind the sensor is not a process temperature reading.

HART Communicator

Fast Keys	1, 1, 4

Enter the fast key sequence “Sensor Temperature” to view the sensor temperature reading.

AMS Device Manager

Right click on the device and select “Process Variables...” from the menu. “Snsr Temp” is the sensor temperature reading.

BASIC SETUP

Set Process Variable Units

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

HART Communicator

Fast Keys	1, 3, 2

Enter the fast key sequence "Set Process Variable Units." 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

AMS Device Manager

Right click on the device and select "Configure" from the menu. In the Basic Setup tab, use "Unit" drop down menu to select units.

Set Output (Transfer function)

The 3051 has two output settings: Linear and Square Root. Activate the square root output option to make analog output proportional to flow. As input approaches zero, the 3051 automatically switches to linear output in order to ensure a more smooth, stable output near zero (see Figure 3-2).

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.

NOTE
If Scaled Variable is mapped as the primary variable and square root mode is desired, select Square Root during Scaled Variable Configuration or as part of the set output configuration. Avoid duplication of Square Root configuration.

HART Communicator

Fast Keys	1, 3, 5

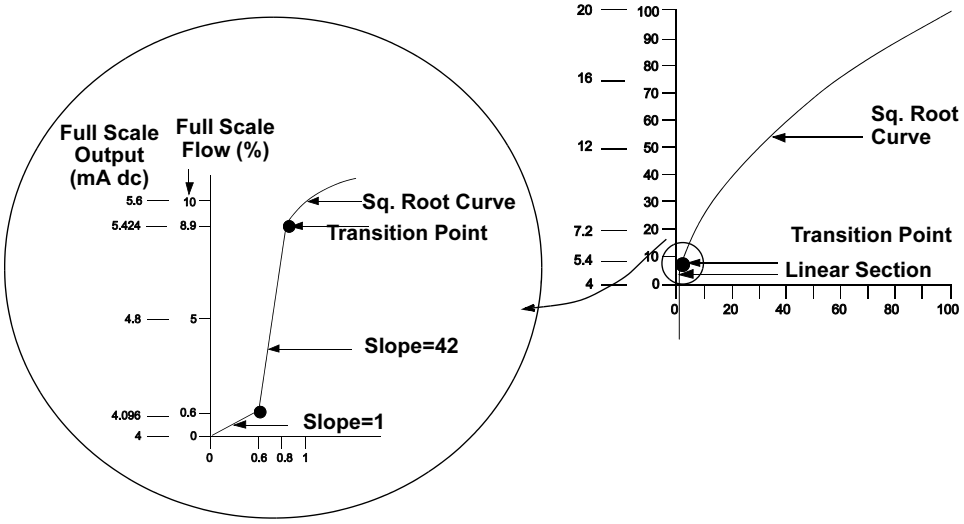
Enter the fast key sequence.

AMS Device Manager

Right click on the device and select "Configure" from the menu.

1. In the Basic Setup tab, use "Xfer fnctn" drop down menu to select output, click **Apply**.
2. After carefully reading the warning provided, select **yes**.

Figure 3-2. Square Root Output Transition Point



NOTE
For a flow turndown of greater than 10:1 it is not recommended to perform a square root extraction in the transmitter. Instead, perform the square root extraction in the system.

Rerange

The Range Values command sets the 4 and 20 mA points (lower and upper range values). In practice, you may reset the transmitter range values as often as necessary to reflect changing process conditions. Changing the lower or upper range point results in similar changes to the span. For a complete listing of Range & Sensor limits, refer to the “Range & Sensor Limits” table on page A-4.

NOTE
Transmitters are shipped from Rosemount Inc. fully calibrated per request or by the factory default of full scale (zero to upper range limit).

NOTE
Regardless of the range points, the 3051 will measure and report all readings within the digital limits of the sensor. For example, if the 4 and 20 mA points are set to 0 and 10 inH_2O, and the transmitter detects a pressure of 25 inH_2O, it digitally outputs the 25 inH_2O reading and a 250% of span reading. However, there may be up to ±5.0% error associated with output outside of the range points.

Select from one of the methods below to rerange the transmitter. Each method is unique; examine all options closely before deciding which method works best for your process.

- Rerange with a HART Communicator only.
- Rerange with a pressure input source and a HART Communicator.
- Rerange with a pressure input source and the local zero and span buttons (option D1).
- Rerange with AMS Device Manager only.
- Rerange with a pressure input source and AMS Device Manager.

NOTE
If the transmitter security switch is **ON,** adjustments to the zero and span will not be able to be made. Refer to “Configure Security and Alarm” on page 2-14 for security information.

Rerange with a HART Communicator Only

Fast Keys	1, 2, 3, 1, 1

The easiest and most popular way to rerange is to use the HART Communicator only. This method changes the values of the analog 4 and 20 mA points independently without a pressure input.

From the **HOME** screen, enter the fast key sequence “Rerange with a Communicator Only.”

1. At “Keypad Input” select 1 and use the keypad to enter lower range value.
2. From “Keypad Input” select 2 and use the key pad to enter upper range value.

Rerange with a Pressure Input Source and HART Communicator

Fast Keys	1, 2, 3, 1, 2

Reranging using the HART Communicator and a pressure source or process pressure is a way of reranging the transmitter when specific 4 and 20 mA points are unknown. This method changes the values of the analog 4 and 20 mA points.

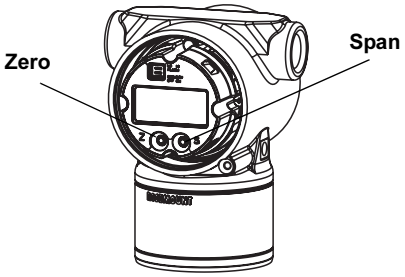
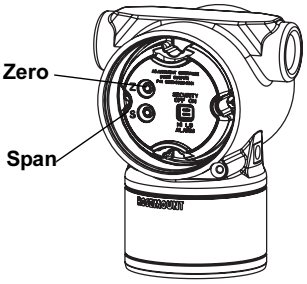
NOTE
The span is maintained when the 4 mA point is set. The span changes when the 20 mA point is set. If the lower range point is set to a value that causes the upper range point to exceed the sensor limit, the upper range point is automatically set to the sensor limit, and the span is adjusted accordingly.

1. From the **HOME** screen, enter the fast key sequence below “Rerange with a Pressure Input Source and a HART Communicator” to configure lower and upper range values and follow the on-line instructions.

Rerange with a Pressure Input Source and the Local Zero and Span buttons (option D1)

Reranging using the local zero and span adjustments and a pressure source is a way of reranging the transmitter.

1. Using a pressure source with an accuracy three to ten times the desired calibrated accuracy, apply a pressure equivalent to the lower range value to the high side of the transmitter.
2. Push and hold the zero adjustment button for at least two seconds but no longer than ten seconds.
3. Apply a pressure equivalent to the upper range value to the high side of the transmitter.
4. Push and hold the span adjustment button for at least two seconds but no longer than ten seconds.

With LCD	Without LCD
	

Rerange with AMS Device Manager only

Right click on the device and select “Configure” from the menu. In the Basic Setup tab, locate the Analog Output box and perform the following procedure:

1. Enter the lower range value (LRV) and the upper range value (URV) in the fields provided. Click **Apply**.
2. After carefully reading the warning provided, select **yes**.

Rerange with a Pressure Input Source and AMS Device Manager

Right click on the device, select “Calibrate”, then “Apply values” from the menu.

1. Select **Next** after the control loop is set to manual.
2. From the “Apply Values” menu, follow the on-line instructions to configure lower and upper range values.
3. Select **Exit** to leave the “Apply Values” screen.
4. Select **Next** to acknowledge the loop can be returned to automatic control.
5. Select **Finish** to acknowledge the method is complete.

Damping

The “Damp” command introduces a delay in the micro-processing which increases the response time of the transmitter; smoothing variations in output readings caused by rapid input changes. Determine the appropriate damping setting based on the necessary response time, signal stability, and other requirements of the loop dynamics within your system. The damping value of your device is user selectable from 0 to 60 seconds. The current damping value can be determined by executing the HART Communicator fast keys or going to "Configure" in AMS Device Manager.

HART Communicator

Fast Keys	1, 3, 6

AMS Device Manager

Right click on the device and select “Configure” from the menu.

1. In the “Basic Setup” tab, enter the damping value in the “Damp” field, click **Apply**.
2. After carefully reading the warning provided, select **yes**.

LCD DISPLAY

The LCD display connects directly to the interface board which maintains direct access to the signal terminals. The display indicates output and abbreviated diagnostic messages. A display cover is provided to accommodate the display.

The LCD display features a two-line display. The first line of five characters displays the actual value, the second line of six characters displays the engineering units. The LCD display can also display diagnostic messages.

LCD Display Configuration

HART Communicator

Fast Keys	1, 3, 7

The factory default LCD display setting is engineering units. The LCD Display Configuration command allows customization of the LCD display to suit application requirements. The LCD display will alternate between the selected items (up to four may be chosen):

- Pressure (Engineering Units)
- Percent of Range
- Scaled Variable
- Temperature

AMS Device Manager

Right click on the device and select “Configure” from the menu.

1. In the “LCD” tab, select the desired options to suit your application needs, click **Apply**.
2. After carefully reading the warning provided, select **yes**.

DETAILED SETUP

Failure Mode Alarm and Saturation

Rosemount 3051 transmitters automatically and continuously perform self-diagnostic routines. If the self-diagnostic routines detect a failure, the transmitter drives the output to configured alarm values. The transmitter will also drive the output to configured saturation values if the applied pressure goes outside the 4-20 mA range values.

The transmitter will drive its output low or high based on the position of the failure mode alarm, see “Configure Security and Alarm” on page 2-14.

NOTE
The failure mode alarm direction can also be configured using the HART Communicator or AMS Device Manager.

Rosemount 3051 transmitters have three configurable options for failure mode alarm and saturation levels:

- Rosemount (Standard), see Table 3-1
- NAMUR, see Table 3-2
- Custom, see Table 3-3

Table 3-1. Rosemount (Standard) Alarm and Saturation Values

Level	4–20 mA Saturation	4–20 mA Alarm
Low	3.9 mA	≤ 3.75 mA
High	20.8 mA	≥ 21.75 mA

Table 3-2. NAMUR-Compliant Alarm and Saturation Values

Level	4–20 mA Saturation	4–20 mA Alarm
Low	3.8 mA	≤ 3.6 mA
High	20.5 mA	≥ 22.5 mA

Table 3-3. Custom Alarm and Saturation Values

Level	4–20 mA Saturation	4–20 mA Alarm
Low	3.7 mA — 3.9 mA	3.6 mA — 3.8 mA
High	20.1 mA — 21.5 mA	20.2 mA — 23.0 mA

Failure mode alarm and saturation levels can be configured using a HART Communicator or AMS Device Manager, see “Alarm and Saturation Level Configuration” on page 3-14. Per Table 3-3, custom alarm and saturation levels can be configured between 3.6 mA and 3.9 mA for low values and between 20.1 mA and 23 mA for high values. The following limitations exist for custom levels:

- Low alarm level must be less than the low saturation level
- High alarm level must be higher than the high saturation level
- High saturation level must not exceed 21.5 mA
- Alarm and saturation levels must be separated by at least 0.1 mA

The HART Communicator or AMS Device Manager will provide an error message if a configuration rule is violated.

Alarm and Saturation Level Configuration

To configure alarm and saturation levels with a HART Communicator or AMS Device Manager perform the following procedure:

HART Communicator

Fast Keys	1, 4, 2, 7

1. From the **HOME** screen, follow the fast key sequence.
2. Select 7, **Config. Alarm Level** to configure alarm levels.
3. Select **OK** after setting the control loop to manual.
4. Select **OK** to acknowledge current settings.
5. Select desired setting, if “OTHER” is selected enter HI and LO custom values.
6. Select **OK** to acknowledge the loop can be returned to automatic control.
7. Select 8, **Config. Sat. Levels** to configure saturation levels.
8. Repeat steps 3-6 to configure saturation levels.

AMS Device Manager

Right click on the device, select “Device Configuration”, then select “Alarm/Saturation Levels,” then “Alarm Levels” from the menu.

1. Click **Next** after setting the control loop to manual.
2. Click **Next** after acknowledging the current alarm levels.
3. Select the desired alarm settings: NAMUR, Rosemount, Other
4. If “Other” is selected, enter desired “HI Value” and “LO Value” custom values.
5. Click **Next** to acknowledge new alarm levels.
6. Select **Next** to acknowledge the loop can be returned to automatic control.
7. Select **Finish** to acknowledge the method is complete.
8. Right click on the device, select “Device Configuration,” then select “Alarm/Saturation Levels,” then “Saturation Levels” from the menu.
9. Select **Saturation Levels**.
10. Repeat steps 2 - 8 to configure saturation levels.

Alarm and Saturation Levels for Burst Mode

Transmitters set to burst mode handle saturation and alarm conditions differently.

Alarm Conditions:

- Analog output switches to alarm value
- Primary variable is burst with a status bit set
- Percent of range follows primary variable
- Temperature is burst with a status bit set

Saturation:

- Analog output switches to saturation value
- Primary variable is burst normally
- Temperature is burst normally

Alarm and Saturation Values for Multidrop Mode

Transmitters set to multidrop mode handle saturation and alarm conditions differently.

Alarm Conditions:

- Primary variable is sent with a status bit set
- Percent of range follows primary variable
- Temperature is sent with a status bit set

Saturation:

- Primary variable is sent normally
- Temperature is sent normally

Alarm Level Verification

If the transmitter electronics board, sensor module, or LCD display is repaired or replaced, verify the transmitter alarm level before returning the transmitter to service. This feature is also useful in testing the reaction of the control system to a transmitter in an alarm state. To verify the transmitter alarm values, perform a loop test and set the transmitter output to the alarm value (see Tables 3-1 and 3-2 on page 3-13, and “Loop Test” on page 3-20).

Process Alerts

Process alerts allow the user to configure the transmitter to output a HART message when the configured data point is exceeded. Process alerts can be set for pressure, temperature, or both. A process alert will be transmitted continuously if the pressure or temperature set points are exceeded and the alert mode is **ON**. An alert will be displayed on a HART Communicator, AMS Device Manager 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.

HART Communicator

Fast Keys	1, 4, 3, 5

To configure the process alerts with a HART Communicator, perform the following procedure:

1. From the **HOME** screen, follow the fast key sequence below “Process Alerts.”
2. Select 3, “Config Press Alerts” to configure the pressure alert.
   Select 4, “Config Temp Alerts” to configure the temperature alerts.
3. Use the right arrow key to configure the HI and LO alert values.
4. Use the left arrow to move back to the process alert menu.
   Select 1, “Press Alert Mode” to turn on the pressure alert mode.
   Select 2, “Temp Alert Mode” to turn on the temperature alert mode.

AMS Device Manager

Right click on the device and select “Configure” from the menu.

1. In the “Analog Output” tab, locate the “Configuration Pressure Alerts” box, enter “Press Hi Alert Val” and “Press Lo Alert Val” to configure the pressure alerts.
2. Configure “Press Alert Mode” to “ON” or “OFF” using the drop down menu.
3. In the “Configuration Temperature Alerts” box, enter “Temp Hi Alert Val” and “Temp Lo Alert Val” to configure the temperature alerts.
4. Configure “Temp Alert Mode” to “ON” or “OFF” using the drop down menu and click **Apply**.
5. After carefully reading the warning provided, select **yes**.

Scaled Variable Configuration

The scaled variable configuration allows the user to create a relationship/conversion between the pressure reading and custom units.

The scaled variable configuration defines the following items:

- Scaled variable units - Custom engineering units to be displayed.
- Scaled data options - Defines the transfer function for the application
  a. Linear
  b. Square root
- Pressure value position 1 - Lower known value point (possible 4 mA point) with consideration of linear offset.
- Scaled variable value position 1 - Custom unit equivalent to the lower known value point (The lower known value point may or may not be the 4 mA point.)
- Pressure value position 2 - Upper known value point (possible 20 mA point)
- Scaled variable value position 2 - This is the custom unit equivalent to the upper known value point (possible 20 mA point)
- Linear offset - The value required to zero out pressures effecting the desired pressure reading.
- Low flow cutoff - Point at which output is driven to zero to prevent problems caused by process noise.

NOTE
If Scaled Variable is mapped as the primary variable and square root mode is desired, select Square Root during Scaled Variable Configuration or as part of the set output configuration. Avoid duplication of Square Root configuration.

HART Communicator

Fast Keys	1, 4, 3, 4, 7

To configure the scaled variable with a HART Communicator, perform the following procedure:

1. From the **HOME** screen follow the fast key sequence below “Scaled Variable Configuration.”
2. Select **OK** after the control loop is set to manual.
3. Enter the scaled variable units.
   a. Units can be up to six characters long and include A — Z, 0 — 9, -, /,%, and *. Default unit is DEFLT.
   b. The first character is always an asterisk (*), which identifies the units displayed are scaled variable units.
4. Select scaled data options
   a. Select linear if the relationship between PV and scaled variable units are linear. Linear prompts for two data points.
   b. Select square root if the relationship between PV and scaled variable is square root (flow applications). Square root will prompt for one data point.
5. Enter pressure value position 1. Pressure values must be within the range of the transmitter.
   a. (If performing a **Linear Function**) Enter the lower known value point considering any linear offset.
   b. (If performing a **Square Root Function**) Select **OK** to acknowledge pressure and scaled variable values for position Zero is set to zero, then enter the upper known value point.
6. Enter scaled variable position 1.
   a. (If performing a **Linear Function**) Enter the lower known value point; this value must be no longer than seven digits.
   b. (If performing a **Square Root Function**) Enter custom unit equivocality of the value in step 5b; this value must be no longer than seven digits. Skip to step 10.
7. Enter pressure value position 2. Pressure values must be within the range of the transmitter.
   a. (If performing a **Linear Function**) Enter the upper known value point.
8. Enter scaled variable position 2.
   a. (If performing a **Linear Function**) Enter custom unit equivalent to the upper known value point; this value must be no longer than seven digits.
9. Enter linear offset (If performing a **Linear Function**). Skip to step 11.
10. Enter Low Flow cutoff mode (If performing a **Square Root Function**)
    a. Select **OFF** if a low flow cutoff value is not desired.
    b. Select **ON** if a low flow cutoff value is desired and enter this value on the next screen.
11. Select **OK** to acknowledge that the loop can be returned to automatic control.

AMS Device Manager

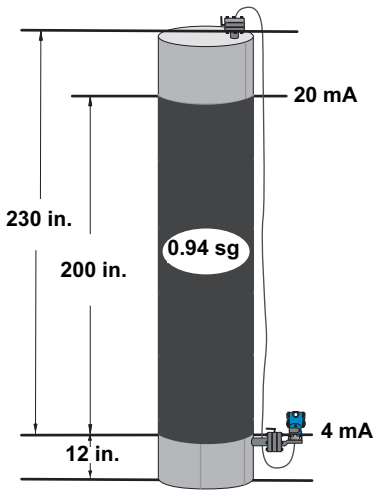
Right click on the device and select “Device Configuration” then select “SV Config” from the menu.

1. Click **Next** after setting the control loop to manual.
2. Enter desired scaled variable units in “Enter SV units” box and click **Next**.
3. Select scaled data options: Linear or Square Root and click **Next**. If square root is selected skip to Step 9.
4. Enter pressure value position 1 and click **Next**.
5. Enter scaled variable position 1 and click **Next**.
6. Enter pressure value position 2 and click **Next**.
7. Enter scaled variable position 2 and click **Next**.
8. Enter linear offset and click **Next**. Skip to Step 15.
9. Select **Next** to acknowledge that “Pressure value for position 1 set”value.”
10. Select **Next** to acknowledge that “square root value for position 1 set to “value”.”
11. Enter scaled variable position 2 and click **Next**.
12. Enter square root value for position 2 in DEFLT and click **Next**.
13. Enter low flow cutoff mode: Off or On. If off is selected skip to Step 15.
14. Enter low flow cutoff value and click **Next**.
15. Select **Next** to acknowledge that the loop can be returned to automatic control.
16. Select **Finish** to acknowledge the method is complete.

Use the following example to complete a Scaled Variable configuration.

Example

Figure 3-3. Example tank



A differential transmitter is used in a level application where the span is 188 inH_2O (200 in. * 0.94 sg). Once installed on an empty tank and taps vented, the process variable reading is -209.43 inH_2O. The process variable reading is the head pressure created by fill fluid in the capillary. Based on Figure 3-3, the Scaled Variable configuration would be as follows:

Scaled Variable units:	inches
Scaled data options:	linear
Pressure value position 1:	0 inH_2O
Scaled Variable position 1:	12 in.
Pressure value position 2:	188 inH_2O
Scaled Variable position 2:	212 in.
Linear offset:	-209.43 inH_2O

Re-mapping

The re-mapping function allows the transmitter primary, secondary, and tertiary variables to be configured as desired. Default configuration for transmitter variables is as shown below:

Primary variable (PV) = Pressure
Secondary variable (SV) = Temperature
Tertiary variable (TV) = Scaled Variable

NOTE
Variable assigned as the primary variable drives the 4-20 mA analog output.

The scaled variable can be remapped as the primary variable if desired.

HART Communicator

Fast Keys	1, 4, 3, 6, 4

From the **HOME** screen, enter the fast key sequence “Re-mapping.”

1. Select **OK** after the control loop is set to manual (see “Setting the Loop to Manual” on page 3-2).
2. Choose desired primary variable and select **Enter**.
3. Choose desired secondary variable and select **Enter**.
4. Select **OK** to acknowledge the tertiary variable setting.
5. Select **OK** to acknowledge that the loop can be returned to automatic control.

AMS Device Manager

Right click on the device and select “Configure”.

1. In “Basic Setup” tab, locate “Variable Mapping” box.
2. Choose desired primary variable then click **Next**.
3. Choose desired secondary variable then click **Next**.
4. Choose desired tertiary variable.
5. Click **Apply** and then select **Next** to acknowledge the loop can be returned to automatic control.
6. Select **Finish** to acknowledge the method is complete.

Sensor Temperature Unit

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

HART Communicator

Fast Keys	1, 4, 1, 2, 2

AMS Device Manager

Right click on the device and select “Configuration Properties” from the menu.

1. In the “Process Input” tab, use the drop down menu “Snsr temp unit” to select F (Farenheit) or C (Celsius). Click **Apply**.
2. Click **Next** to acknowledge send warning.
3. Select **Finish** to acknowledge the method is complete.
4. An “Apply Parameter Modification” screen appears, enter desired information and click **OK**.
5. After carefully reading the warning, select **OK**.

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. The Loop Test feature is designed to verify proper loop wiring and transmitter output, and should only be performed after you install the transmitter.

Transmitter Test

The Transmitter Test command initiates a more extensive diagnostics routine than that performed continuously by the transmitter. The test routine can quickly identify potential electronics problems. If the test detects a problem, messages to indicate the source of the problem are displayed on the HART Communicator screen.

HART Communicator

Fast Keys	1, 2, 1, 1

AMS Device Manager

Right click on the device and select “Diagnostics and Test,” then “Self Test” from the menu.

1. Click **Next** to acknowledge test results.
2. Select **Finish** to acknowledge the method is complete.

Loop Test

The Loop Test command verifies the output of the transmitter, the integrity of the loop, and the operations of any recorders or similar devices installed in the loop.

HART Communicator

Fast Keys	1, 2, 2

To initiate a loop test, perform the following procedure:

1. Connect a reference meter to the transmitter by either connecting the meter to the test terminals on the terminal block, or shunting transmitter power through the meter at some point in the loop.
2. From the **HOME** screen, enter the fast key sequence “Loop Test” to verify the output of the transmitter.
3. Select **OK** after the control loop is set to manual (see “Setting the Loop to Manual” on page 3-2).

4. Select a discrete milliamp level for the transmitter to output. At the **CHOOSE ANALOG OUTPUT** prompt select 1: 4mA, select 2: 20mA, or select 3: “Other” to manually input a value.
   a. If you are performing a loop test to verify the output of a transmitter, enter a value between 4 and 20 mA.
   b. If you are performing a loop test to verify alarm levels, enter the milliamp value representing an alarm state (see Tables 3-1, 3-3, and 3-2 on page 3-13).
5. Check the reference meter installed in the test loop to verify that it displays the commanded output value.
   a. If the values match, the transmitter and the loop are configured and functioning properly.
   b. If the values do not match, the current meter may be attached to the wrong loop there may be a fault in the wiring, the transmitter may require an output trim, or the reference meter may be malfunctioning.

After completing the test procedure, the display returns to the loop test screen to choose another output value or to end loop testing.

AMS Device Manager

Right click on the device and select “Diagnostics and Test,” then “Loop test” from the menu.

1. Connect a reference meter to the transmitter by either connecting the meter to the test terminals on the terminal block, or shunting transmitter power through the meter at some point in the loop.
2. Click **Next** after setting the control loop to manual.
3. Select desired analog output level. Click **Next**.
4. Click **Next** to acknowledge output being set to desired level.
5. Check the reference meter installed in the test loop to verify that it displays the commanded output value.
   a. If the values match, the transmitter and the loop are configured and functioning properly.
   b. If the values do not match, the current meter may be attached to the wrong loop there may be a fault in the wiring, the transmitter may require an output trim, or the reference meter may be malfunctioning.

After completing the test procedure, the display returns to the loop test screen to choose another output value or to end loop testing.

6. Select **End** and click **Next** to end loop testing.
7. Select **Next** to acknowledge the loop can be returned to automatic control.
8. Select **Finish** to acknowledge the method is complete.

ADVANCED FUNCTIONS FOR HART PROTOCOL

Saving, Recalling, and Cloning Configuration Data

Use the cloning feature of the HART Communicator or the AMS Device Manager “User Configuration” feature to configure several 3051 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 HART Communicator manual (publication no. 00809-0100-4276) or AMS Device Manager on-line guides. One common method is as follows:

HART Communicator

Fast Keys	left arrow, 1, 2

1. Completely configure the first transmitter.
2. Save the configuration data:
   a. Select **F2 SAVE** from the HART 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 HART Communicator.
4. Select the back arrow from the **HOME/ONLINE** screen. The HART 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** to acknowledge that the loop can be returned to automatic control.

When finished, the HART 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 Device Manager 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 Device Manager 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 the values into the available fields.
7. Click Apply to apply the values, or click **OK** to apply the values and close the window.

AMS Device Manager 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.

NOTE
When using AMS Device Manager Revision 6.0 or later, the device to which the user configuration is applied, must be the same model type as the one created in the user configuration. When using AMS Device Manager Revision 5.0 or earlier, the same model type and revision number are required.

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 Device Manager 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.

Burst Mode

When configured for burst mode, the 3051 provides faster digital communication from the transmitter to the control system by eliminating the time required for the control system to request information from the transmitter. Burst mode is compatible with the analog signal. Because the HART protocol features simultaneous digital and analog data transmission, the analog value can drive other equipment in the loop while the control system is receiving the digital information. Burst mode applies only to the transmission of dynamic data (pressure and temperature in engineering units, pressure in percent of range, and/or analog output), and does not affect the way other transmitter data is accessed.

Access to information other than dynamic transmitter data is obtained through the normal poll/response method of HART communication. A HART Communicator, AMS Device Manager or the control system may request any of the information that is normally available while the transmitter is in burst mode. Between each message sent by the transmitter, a short pause allows the HART Communicator, AMS Device Manager or a control system to initiate a request. The transmitter will receive the request, process the response message, and then continue “bursting” the data approximately three times per second.

HART Communicator

Fast Keys	1, 4, 3, 3, 3

To configure the transmitter for burst mode, perform the following step:

1. From the HOME screen, enter the fast key sequence “Burst Mode.”

AMS Device Manager

Right click on the device and select “Configure” from the menu.

1. In the “HART” tab, use the drop down menu to select “Burst Mode ON or OFF.” For “Burst option” select the desired properties from the drop down menu. Burst options are as follows:
   - PV
   - % range/current
   - Process vars/crnt
   - Process variables
2. After selecting options click **Apply**.
3. After carefully reading the warning provided, select **yes**.

MULTIDROP COMMUNICATION

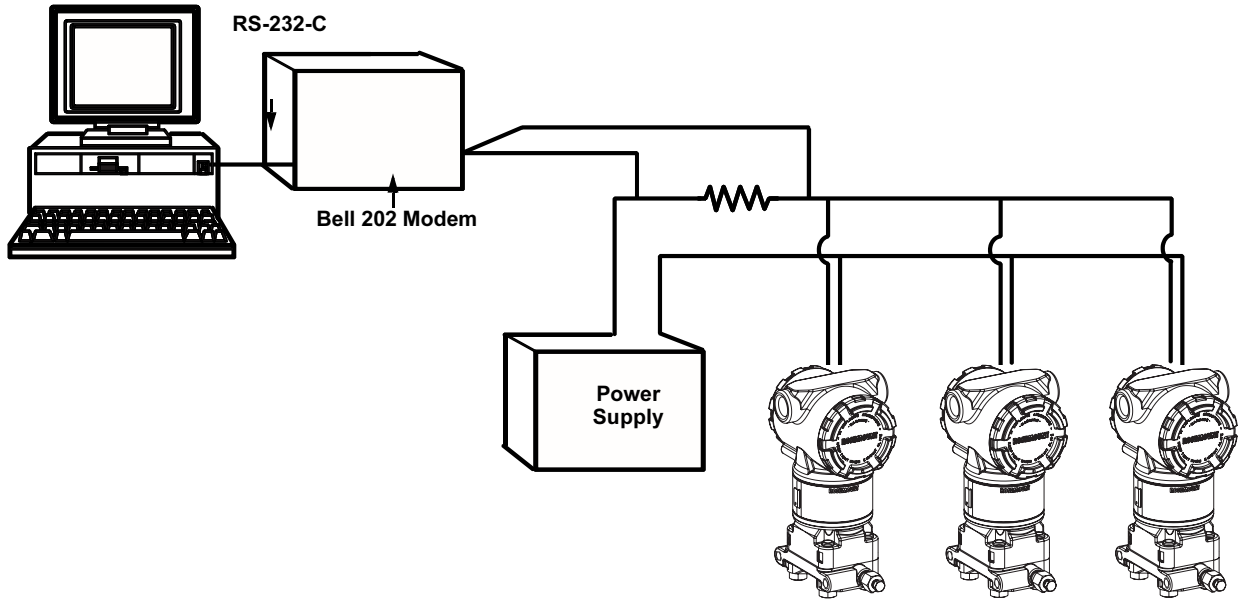
Multidropping transmitters refers to the connection of several transmitters to a single communications transmission line. Communication between the host and the transmitters takes place digitally with the analog output of the transmitters deactivated. With smart communications protocol, up to fifteen transmitters can be connected on a single twisted pair of wires, or over leased phone lines.

Multidrop installation requires consideration of the update rate necessary from each transmitter, the combination of transmitter models, and the length of the transmission line. Communication with transmitters can be accomplished with Bell 202 modems and a host implementing HART protocol. Each transmitter is identified by a unique address (1–15) and responds to the commands defined in the HART protocol. HART Communicators and AMS Device Manager can test, configure, and format a multidropped transmitter the same way as a transmitter in a standard point-to-point installation.

Figure 3-4 shows a typical multidrop network. This figure is not intended as an installation diagram.

NOTE
A transmitter in multidrop mode has the analog output fixed at 4 mA. If a meter is installed to a transmitter in multidrop mode, it will alternate the display between “current fixed” and the specified meter output(s).

Figure 3-4. Typical Multidrop Network



The 3051 is set to address zero (0) at the factory, which allows operation in the standard point-to-point manner with a 4–20 mA output signal. To activate multidrop communication, the transmitter address must be changed to a number from 1 to 15. This change deactivates the 4–20 mA analog output, sending it to 4 mA. It also disables the failure mode alarm signal, which is controlled by the upscale/downscale switch position. Failure signals in multidropped transmitters are communicated through HART messages.

Changing a Transmitter Address

To activate multidrop communication, the transmitter poll address must be assigned a number from 1 to 15, and each transmitter in a multidropped loop must have a unique poll address.

HART Communicator

Fast Keys	1, 4, 3, 3, 1

1. From the **HOME** screen, enter the fast key sequence “Changing a Transmitter Address.”

AMS Device Manager

Right click on the device and select “Configuration Properties” from the menu.

1. In the “HART” tab, in “ID” box, enter poll address located in the “Poll addr” box, click **Apply**.
2. After carefully reading the warning provided, select **yes**.

Communicating with a Multidropped Transmitter

HART Communicator

Fast Keys	Left arrow, 3, 1, 1

To communicate with a multidropped transmitter, configure the HART Communicator to poll for a non-zero address.

1. From the **HOME** screen, enter the fast key sequence “Communicating with a Multidropped Transmitter.”
2. On the polling menu, scroll down and select “Digital Poll.” In this mode, the HART Communicator automatically polls for devices at addresses 0-15 upon start up.

AMS Device Manager

Click on the HART modem icon and select “Scan All Devices.”

Polling a Multidropped Transmitter

Polling a multidropped loop determines the model, address, and number of transmitters on the given loop.

HART Communicator

Fast Keys	Left arrow, 3, 1

1. From the **HOME** screen, enter the fast key sequence “Polling a Multidropped Transmitter.”

AMS Device Manager

Click on the HART modem icon and select “Scan All Devices.”

Section 4 Operation and Maintenance

OVERVIEW

This section contains information on commissioning and operating Rosemount 3051 Pressure Transmitters. Tasks that should be performed on the bench prior to installation are explained in this section.

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

CALIBRATION FOR HART PROTOCOL

Calibrating a 3051 transmitter may include the following procedures:

- Rerange: Sets the 4 and 20 mA points at required pressures.
- 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.
- Analog Output Trim: Adjusts the analog output to match the plant standard or the control loop.

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 characterization. Factory sensor characterization also provides the ability to readjust the 4 and 20 mA points without applying pressure to the transmitter.

Trim and rerange functions also differ. Reranging sets analog output to the selected upper and lower range points and can be done with or without an applied pressure. Reranging does not change the factory sensor characterization curve stored in the microprocessor. 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.

NOTE:
A HART communicator 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 (see “Compensating for Line Pressure” on page 4-10).

Table 4-1. 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.) 3. *Optional*: Perform an analog output trim. (Accurate multimeter required)	1. Reconfigure parameters if necessary. 2. Zero trim the transmitter to compensate for mounting effects or static pressure effects.
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. 3. *Optional*: Perform an analog output trim (Accurate multimeter required)	1. Reconfigure parameters if necessary. 2. Perform low trim value section of the sensor trim procedure to correct for mounting position effects.

Calibration Overview

Complete calibration of the 3051 pressure transmitter involves the following tasks:

Configure the analog output parameters

- Set Process Variable Units (page 3-6)
- Set Output Type (page 3-7)
- Rerange (page 3-8)
- Set Damping (page 3-10)

Calibrate the sensor

- Sensor Trim (page 4-6)
- Zero Trim (page 4-6)

Calibrate the 4–20 mA output

- 4–20 mA Output Trim (page 4-8); or
- 4–20 mA Output Trim Using Other Scale (page 4-9)

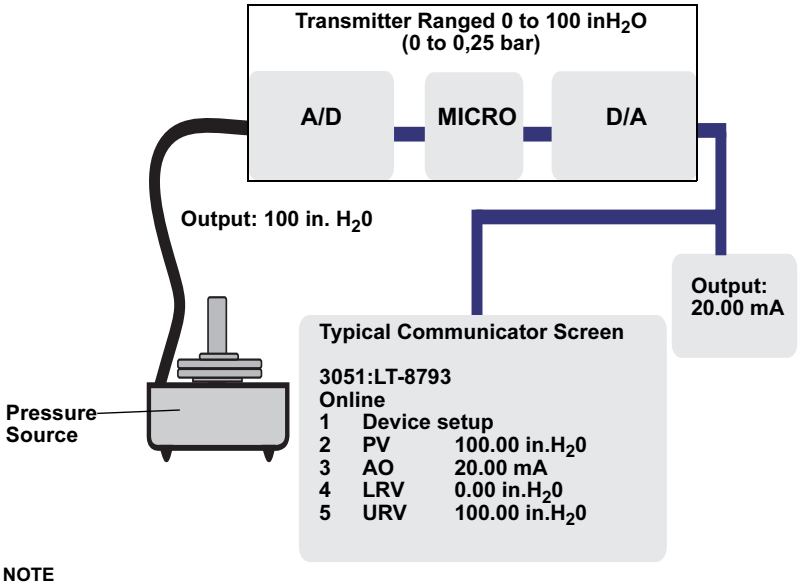
Figure 4-1 on page 4-3 illustrates 3051 transmitter data flow. Data flow can be summarized in four major steps:

1. A change in pressure is measured by a change in the sensor output (Sensor Signal).
2. The sensor signal is converted to a digital format that is understood by the microprocessor (Analog-to-Digital Signal Conversion).
3. Corrections are performed in the microprocessor to obtain a digital representation of the process input (Digital PV).
4. The Digital PV is converted to an analog value (Digital-to-Analog Signal Conversion).

Figure 4-1 also identifies the approximate transmitter location for each calibration task. Data flows from left to right, and a parameter change affects all values to the right of the changed parameter.

Not all calibration procedures should be performed for each 3051 transmitter. Some procedures are appropriate for bench calibration, but should not be performed during field calibration. Table 4-1 identifies the recommended calibration procedures for each type of 3051 transmitter for bench or field calibration.

Figure 4-1. Transmitter Data Flow with Calibration Options



NOTE
Value on communicator screen PV line should equal the input pressure.
Value on communicator screen AO line should equal the output device reading.

Determining Calibration Frequency

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

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

Sample Calculation

Step 1: Determine the performance required for your application.

Required Performance: 0.30% of span

Step 2: Determine the operating conditions.

Transmitter:	3051CD, Range 2 [URL=250 inH_2O(623 mbar)]
Calibrated Span:	150 inH_2O (374 mbar)
Ambient Temperature Change:	± 50 °F (28 °C)
Line Pressure:	500 psig (34,5 bar)

Step 3: Calculate total probable error (TPE).

$$TPE = \sqrt{(ReferenceAccuracy)^2 + (TemperatureEffect)^2 + (StaticPressureEffect)^2} = 0.117\% \text{ of span}$$

Where:

Reference Accuracy = ± 0.065% of span

Ambient Temperature Effect =

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

Span Static Pressure Effect[1] =

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

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

Step 4: Calculate the stability per month.

$$Stability = \pm\left[\frac{(0.125 \times URL)}{Span}\right]\% \text{ of span for 5 years} = \pm 0.0035\% \text{ of span per month}$$

Step 5: Calculate calibration frequency.

$$\text{Cal. Freq.} = \frac{(\text{Req. Performance} - TPE)}{\text{Stability per Month}} = \frac{(0.3\% - 0.117\%)}{0.0035\%} = 52 \text{ months}$$

Choosing a Trim Procedure

To decide which trim procedure to use, you must first determine whether the analog-to-digital section or the digital-to-analog section of the transmitter electronics need calibration. Refer to Figure 4-1 and perform the following procedure:

1. Connect a pressure source, a HART Communicator or AMS, and a digital readout device to the transmitter.
2. Establish communication between the transmitter and the HART Communicator.
3. Apply pressure equal to the upper range point pressure.
4. Compare the applied pressure to the pressure process variable valve on the Process Variables menu on the HART Communicator or the Process Variables screen in AMS. For instructions on how to access process variables, see page 3-7 of Section 3: Configuration.
   a. If the pressure reading does not match the applied pressure (with high-accuracy test equipment), perform a sensor trim. See “Sensor Trim Overview” on page 4-5 to determine which trim to perform.
5. Compare the Analog Output (AO) line, on the HART Communicator or AMS, to the digital readout device.
   a. If the AO reading does not match the digital readout device (with high-accuracy test equipment), perform an analog output trim. See “Analog Output Trim” on page 4-8.

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 Rosemount 3051 Absolute pressure transmitters. Zero trim is zero based, and absolute pressure transmitters reference absolute zero. To correct mounting position effects on a 3051 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.

Zero Trim

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

HART Communicator

Fast Keys	1, 2, 3, 3, 1

Calibrate the sensor with a HART Communicator using the zero trim function as follows:

1. Vent the transmitter and attach a HART Communicator to the measurement loop.
2. From the **HOME** screen, follow the fast key sequence “Zero Trim.”
3. Follow the commands provided by the HART Communicator to complete the zero trim adjustment.

AMS

Right click on the device and select “Calibrate,” then “Zero trim” from the menu.

1. Click **Next** after setting the control loop to manual.
2. Click **Next** to acknowledge warning.
3. Click **Next** after applying appropriate pressure to sensor.
4. Select **Next** to acknowledge the loop can be returned to automatic control.
5. Select **Finish** to acknowledge the method is complete.

Sensor Trim

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.

HART Communicator

Fast Keys	1, 2, 3, 3

To calibrate the sensor with a HART Communicator using the sensor trim function, perform the following procedure:

1. Assemble and power the entire calibration system including a transmitter, HART Communicator, power supply, pressure input source, and readout device.
2. From the **HOME** screen, enter the fast key sequence under “Sensor Trim.”
3. Select 2: Lower sensor trim. The lower sensor trim value should be the sensor trim point that is closest to zero.

Examples:

Calibration: 0 to 100 "H2O - lower trim = 0, upper trim = 100

Calibration: -100 to 0 "H2O - lower trim = 0, upper trim = -100

Calibration: -100 to 100 "H2O - lower trim = -100 or 100,
upper trim = -100 or 100

NOTE
Select pressure input values so that lower and upper values are equal to or outside the 4 and 20 mA points. Do not attempt to obtain reverse output by reversing the high and low points. This can be done by going to "Rerange" on page 3-9 of Section 3: Configuration. The transmitter allows approximately five percent deviation.

4. Follow the commands provided by the HART Communicator to complete the adjustment of the lower value.
5. Repeat the procedure for the upper value, replacing 2: Lower sensor trim with 3: Upper sensor trim in Step 3.

AMS

Right click on the device and select "Calibrate," then "Sensor trim" from the menu.

1. Select "Lower sensor trim." The lower sensor trim value should be the sensor trim point that is closest to zero.
2. Click **Next** after setting the control loop to manual.
3. Click **Next** after applying appropriate pressure to sensor.
4. Select **Next** to acknowledge the loop can be returned to automatic control.
5. Select **Finish** to acknowledge the method is complete.
6. Right click on the device and select "Calibrate," select "Sensor trim" from the menu.
7. Select "Upper sensor trim" and repeat steps 2-5.

Recall Factory Trim—Sensor Trim

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.

HART Communicator

Fast Keys	1, 2, 3, 4, 1

AMS

Right click on the device and select "Calibrate," then "Recall Factory Trim" from the menu.

1. Click **Next** after setting the control loop to manual.
2. Select “Sensor trim” under “Trim to recall” and click **Next**.
3. Click **Next** to acknowledge restoration of trim values is complete.
4. Select **Next** to acknowledge the loop can be returned to automatic control.
5. Select **Finish** to acknowledge the method is complete.

Analog Output Trim

The Analog Output Trim commands allow you to adjust the transmitter’s current output at the 4 and 20 mA points to match the plant standards. This command adjusts the digital to analog signal conversion (see Figure 4-1 on page 4-3).

Digital-to-Analog Trim

HART Communicator

Fast Keys	1, 2, 3, 2, 1

To perform a digital-to-analog trim with a HART Communicator, perform the following procedure.

1. From the **HOME** screen, enter the fast key sequence “Digital-to-Analog Trim.” Select **OK** after setting the control loop to manual, see “Setting the Loop to Manual” on page 3-2.
2. Connect an accurate reference ammeter to the transmitter at the **CONNECT REFERENCE METER** prompt. Connect the positive lead to the positive terminal and the negative lead to the test terminal in the transmitter terminal compartment, or shunt power through the reference meter at some point.
3. Select **OK** after connecting the reference meter.
4. Select **OK** at the **SETTING FLD DEV OUTPUT TO 4 MA** prompt. The transmitter outputs 4.0 mA.
5. Record the actual value from the reference meter, and enter it at the **ENTER METER VALUE** prompt. The HART Communicator prompts you to verify whether or not the output value equals the value on the reference meter.
6. Select 1: Yes, if the reference meter value equals the transmitter output value, or 2: No if it does not.
   a. If 1 is selected: Yes, proceed to Step 7.
   b. If 2 is selected: No, repeat Step 5.
7. Select **OK** at the **SETTING FLD DEV OUTPUT TO 20 MA** prompt, and repeat Steps 5 and 6 until the reference meter value equals the transmitter output value.
8. Select **OK** after the control loop is returned to automatic control.

AMS

Right click on the device and select “Calibrate,” then “D/A Trim” from the menu.

1. Click **Next** after setting the control loop to manual.
2. Click **Next** after connecting the reference meter.
3. Click **Next** at the “Setting fld dev output to 4mA” screen.
4. Record the actual value from the reference meter, and enter it at the “Enter meter value” screen and click **Next**.
5. Select **Yes**, if the reference meter value equals the transmitter output value, or **No** if it does not. Click **Next**.
   a. If Yes is selected, proceed to Step 6.
   b. If No is selected, repeat Step 4.
6. Click **Next** at the “Setting fld dev output to 20mA” screen.
7. Repeat Step 4 - Step 5 until the reference meter equals the transmitter output value.
8. Select **Next** to acknowledge the loop can be returned to automatic control.
9. Select **Finish** to acknowledge the method is complete.

Digital-to-Analog Trim Using Other Scale

The Scaled D/A Trim command matches the 4 and 20 mA points to a user selectable reference scale other than 4 and 20 mA (for example, 1 to 5 volts if measuring across a 250 ohm load, or 0 to 100 percent if measuring from a Distributed Control System (DCS)). To perform a scaled D/A trim, connect an accurate reference meter to the transmitter and trim the output signal to scale, as outlined in the Output Trim procedure.

NOTE
Use a precision resistor for optimum accuracy. If you add a resistor to the loop, ensure that the power supply is sufficient to power the transmitter to a 20 mA output with additional loop resistance.

HART Communicator

Fast Keys	1, 2, 3, 2, 2

AMS

Right click on the device and select “Calibrate,” then “Scaled D/A trim” from the menu.

1. Click **Next** after setting the control loop to manual.
2. Select **Change** to change scale, click **Next**.
3. Enter Set scale-Lo output value, click **Next**.
4. Enter Set scale-Hi output value, click **Next**.
5. Click **Next** to proceed with Trim.
6. Click **Next** after connecting the reference meter.
7. Click **Next** at the “Setting fld dev output to 4 mA” screen.
8. Record the actual value from the reference meter, and enter it at the “Enter meter value” screen and click **Next**.
9. Select **Yes**, if the reference meter value equals the transmitter output value, or **No** if it does not. Click **Next**.
   a. If Yes is selected, proceed to Step 10.
   b. If No is selected, repeat Step 8.
10. Click **Next** at the “Setting fld dev output to 20mA” screen.
11. Repeat Step 8 - Step 9 until the reference meter equals the transmitter output value.
12. Select **Next** to acknowledge the loop can be returned to automatic control.
13. Select **Finish** to acknowledge the method is complete.

Recall Factory Trim—Analog Output

The Recall Factory Trim—Analog Output command allows the restoration of the as-shipped factory settings of the analog output trim. This command can be useful for recovering from an inadvertent trim, incorrect Plant Standard or faulty meter.

HART Communicator

Fast Keys	1, 2, 3, 4, 2

AMS

Right click on the device and select “Calibrate,” then “Recall Factory Trim” from the menu.

1. Click **Next** after setting the control loop to manual.
2. Select “Analog output trim” under “Trim to recall” and click **Next**.
3. Click **Next** to acknowledge restoration of trim values is complete.
4. Select **Next** to acknowledge the loop can be returned to automatic control.
5. Select **Finish** to acknowledge the method is complete.

Compensating for Line Pressure

Rosemount 3051 Range 4 and 5 pressure transmitters require a special calibration procedure when used in differential pressure applications. The purpose of this procedure is to optimize transmitter performance by reducing the effect of static line pressure in these applications. The 3051 differential pressure transmitters (Ranges 0, 1, 2, and 3) do not require this procedure because optimization occurs in the sensor.

Applying high static pressure to 3051 Range 4 and Range 5 pressure transmitters causes a systematic shift in the output. This shift is linear with static pressure; correct it by performing the Sensor Trim procedure on page 4-6.

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

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

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

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

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

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

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

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 (1.24 bar)
P =	1200 psi
S =	± 0.01/1000

To calculate the low trim (LT) value:

LT = 500 + (0.01/1000)(500)(1200)

LT = 506 inH_2O

To calculate the high trim (HT) value:

HT = 1500 + (0.01/1000)(1500)(1200)

HT = 1518 inH_2O

Complete a 3051 sensor trim and enter the corrected values for low trim (LT) and high trim (HT), refer to “Note” on page 4-6.

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

NOTE
After sensor trimming 3051 Range 4 and 5 transmitters for high differential pressure applications, verify that the 4 and 20 mA points are at nominal values using the HART Communicator. For the example above, this would be 500 and 1500 respectively. The zero effect can be eliminated by doing a zero sensor trim at line pressure after installation without affecting the completed calibration.

Diagnostic Messages

In addition to output, the LCD display displays abbreviated operation, error, and warning messages for troubleshooting. Messages appear according to their priority; normal operating messages appear last. To determine the cause of a message, use a HART Communicator or AMS to further interrogate the transmitter. A description of each LCD diagnostic message follows.

ERROR INDICATOR

An error indicator message appears on the LCD display to warn of serious problems affecting the operation of the transmitter. The meter displays an error message until the error condition is corrected, and analog output is driven to the specified alarm level. No other transmitter information is displayed during an alarm condition.

FAIL MODULE

The Module is malfunctioning. Possible sources of problems include:

- Pressure or temperature updates are not being received in the sensor module.
- A non-volatile memory fault that will affect transmitter operation has been detected in the sensor module by the memory verification routine. Some non-volatile memory faults are user-repairable. Use a HART Communicator or AMS to diagnose the error and determine if it is repairable. Any error message that ends in “Factory” is not repairable. In cases of non-user-repairable errors, replace the sensor module. See “Disassembly Procedures” on page 5-3.

FAIL CONFIG

A memory fault has been detected in a location that could effect transmitter operation, and is user-accessible. To correct this problem, use a HART Communicator or AMS to interrogate and reconfigure the appropriate portion of the transmitter memory.

WARNINGS

Warnings appear on the LCD display to alert you of user-repairable problems with the transmitter, or current transmitter operations. Warnings appear alternately with other transmitter information until the warning condition is corrected or the transmitter completes the operation that warrants the warning message.

PV LIMIT
The primary process variable read by the transmitter is outside of the transmitter's range.

NONPV LIMIT
A secondary variable read by the transmitter is outside of the transmitter's range.

CURR SAT
The primary variable read by the sensor module is outside of the specified range, and the analog output has been driven to saturation levels.

XMTR INFO
A non-volatile memory fault has been detected in the transmitter memory by the memory verification routine. The memory fault is in a location containing transmitter information. To correct this problem, use a HART Communicator or AMS to interrogate and reconfigure the appropriate portion of the transmitter memory. This warning does not effect the transmitter operation.

PRESS ALERT
A HART alert when the pressure variable read by the transmitter is outside of the user set alert limits.

TEMP ALERT
A HART alert when the secondary temperature variable read by the transmitter is outside of the user set alert limits.

OPERATION

Normal operation messages appear on the LCD display to confirm actions or inform you of transmitter status. Operation messages are displayed with other transmitter information, and warrant no action to correct or alter the transmitter settings.

LOOP TEST

A loop test is in progress. During a loop test or 4–20 mA trim, the analog output is set to a fixed value. The meter display alternates between the current selected in milliamps and "LOOP TEST."

ZERO PASS
The zero value, set with the local zero adjustment button, has been accepted by the transmitter, and the output should change to 4 mA.

ZERO FAIL
The zero value, set with the local zero adjustment button, exceeds the maximum range down allowed for a particular range, or the pressure sensed by the transmitter exceeds the sensor limits.

SPAN PASS
The span value, set with the local span adjustment button, has been accepted by the transmitter, and the output should change to 20 mA.

SPAN FAIL
The span value, set with the local span adjustment button, exceeds the maximum range down allowed for a particular range, or the pressure sensed by the transmitter exceeds the sensor limits.

KEYS DISABL
This message appears during reranging with the integral zero and span buttons and indicates that the transmitter local zero and span adjustments have been disabled. The adjustments have been disabled by software commands from the HART Communicator or AMS. Keys are not detected when write protect switch is active. See “Configure Security (Write Protect)” on page 2-14 for information on the software lockout.

STUCK KEY
The zero or span button is stuck in the depressed state or pushed too long.

Section 5 Troubleshooting

OVERVIEW

Table 5-1 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 HART 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.

SAFETY MESSAGES

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

Warnings (⚠)

⚠WARNING

Explosions could result in death or serious injury:
Installation of this transmitter in an explosive environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Please review the approvals section of the 3051S reference manual for any restrictions associated with a safe installation.
- Before connecting a HART communicator in an explosive atmosphere, ensure the instruments in the loop are installed in accordance with intrinsically safe or non-incendive field wiring practices.
- In an Explosion-Proof/Flameproof installation, do not remove the transmitter covers when power is applied to the unit.

Process leaks may cause harm or result in death.
- Install and tighten process connectors before applying pressure.

Electrical shock can result in death or serious injury.
- Avoid contact with the leads and terminals. High voltage that may be present on leads can cause electrical shock.

Table 5-1. Rosemount 3051 troubleshooting table

Symptom	Corrective Actions
Transmitter milliamp reading is zero	Verify power is applied to signal terminals Check power wires for reversed polarity Verify terminal voltage is 10.5 to 42.4 V dc Check for open diode across test terminal
Transmitter Not Communicating with HART Communicator	Verify the output is between 4 and 20 mA or saturation levels Verify clean DC Power to transmitter (Max AC noise 0.2 volts peak to peak) Check loop resistance, 250 Ω minimum (PS voltage -transmitter voltage/loop current) Check if unit is addressed properly
Transmitter milliamp reading is low or high	Verify applied pressure Verify 4 and 20 mA range points Verify output is not in alarm condition Verify if 4 – 20 mA output trim is required
Transmitter will not respond to changes in applied pressure	Check test equipment Check impulse piping or manifold for blockage Verify applied pressure is between the 4 and 20 mA set points Verify output is not in alarm condition Verify transmitter is not in Loop Test mode
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 Verify damping is set properly for application
Milliamp reading is erratic	Verify power source to transmitter has adequate voltage and current Check for external electrical interference Verify transmitter is properly grounded Verify shield for twisted pair is only grounded at one end

DISASSEMBLY PROCEDURES

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

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.
- Remove all electrical leads and conduit.
- 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. Undamaged o-rings may be reused.

The Rosemount 3051C transmitter is attached to the process connection by four bolts and two cap screws. Remove the bolts and separate the transmitter from the process connection. Leave the process connection in place and ready for re-installation.

The Rosemount 3051T transmitter is attached to the process by a single hex nut process connection. Loosen the hex nut to separate the transmitter from the process. Do not wrench on neck of transmitter.

Remove Terminal Block

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

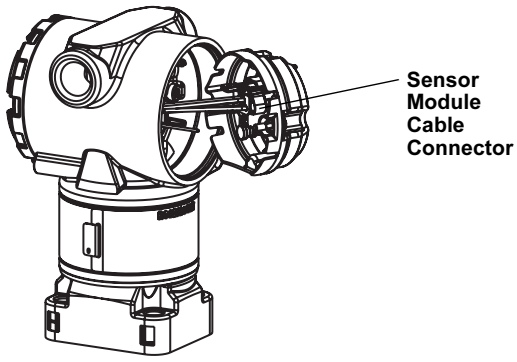
1. Remove the housing cover from the field terminal side.
2. Loosen the two small screws located on the assembly in the 9 o’clock and 3 o’clock positions.
3. Pull the entire terminal block out to remove it.

Remove Interface Assembly

The Interface Assembly is located in the compartment opposite the terminal side in the housing. To remove the assembly, perform the following procedure:

1. Remove the housing cover opposite the field terminal side.
2. Loosen the two small screws located on the assembly in the 9 o'clock and 3 o'clock positions.
3. Pull out the assembly to expose and locate the sensor module cable connector.
4. To release, hold the Interface Assembly and press the clip to remove five-pin wire connection (avoid pulling wires).

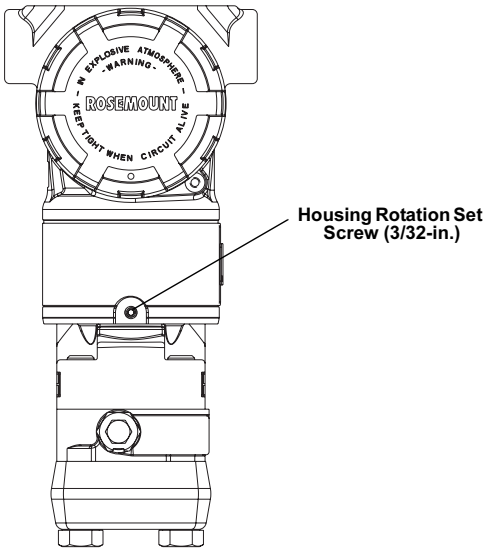
Figure 5-1. Sensor module connector view



Remove the Sensor Module from the Housing

IMPORTANT
To prevent damage to the sensor module cable, disconnect it from the assembly before removing the housing.

1. Loosen the housing rotation set screw with a 3/32-in. hex wrench, then rotate back one full turn.
2. Unscrew the housing from the sensor module. To prevent damage to the cable, make certain the cable spins freely while housing is being rotated.



REASSEMBLY PROCEDURES

Attach the Sensor Module to the Housing

1. Apply a light coat of low temperature silicon grease to the sensor module threads and o-ring.
2. ⚠ Thread the housing completely onto the sensor module. To prevent damage to the cable, make certain the cable spins freely while housing is being rotated. The housing must be no more than one full turn from flush with the sensor module to comply with explosion-proof requirements.
3. Tighten the housing rotation set screw using a $^{3}/_{32}$-in. hex wrench.

Install Interface Assembly

1. Insert sensor module cable connector into the receptacle in the back of the Interface Assembly, making sure that the clip snaps into place to lock the connector into the receptacle.
2. Gently slide the assembly into the housing, making sure the pins from the housing properly engage the receptacles on the assembly.
3. Tighten the captive mounting screws.
4. ⚠ Attach the housing cover and tighten so that metal contacts metal to meet explosion-proof requirements.

Install the Terminal Block

1. Gently slide the terminal block into the housing, making sure the pins from the housing properly engage the receptacles on the terminal block.
2. Tighten the captive screws on the terminal block.
3. ⚠ Attach the housing cover and tighten so that metal contacts metal to meet explosion-proof requirements.

⚠ See “Safety Messages” on page 5-1 for complete warning information.

Reassemble the Process Flange

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

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

2. Install the process 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 three-valve manifold (differential pressure applications only), use four 2.25-in. manifold flange 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 three-valve manifold.
   f. Finger tighten the bolts.
   g. Tighten the bolts to the initial torque value using a crossed pattern. See Table 5-2 for appropriate torque values.
   h. Tighten the bolts to the final torque value using a crossed pattern. See Table 5-2 for appropriate torque values. When fully tightened, the bolts should extend through the top of the sensor module housing.
   i. If the installation uses a three-valve manifold, then install flange adapters on the process end of the manifold using the 1.75-in. flange bolts supplied with the transmitter.

Table 5-2. Bolt Installation Torque Values

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

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

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.

Section 6 Safety Instrumented Systems

SAFETY MESSAGES

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

Warnings

⚠WARNING

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

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

Process leaks may cause harm or result in death.

- Install and tighten process connectors before applying pressure.

Electrical shock can result in death or serious injury.

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

CERTIFICATION

The 3051 is certified to IEC 61508 for non-redundant use in SIL 1 and SIL 2 Safety Instrumented Systems and redundant use in SIL 3 Safety Instrumented Systems.

3051 SAFETY CERTIFIED IDENTIFICATION

All 3051 transmitters must be identified as safety certified before installing into SIS systems.

To identify a safety certified 3051, verify that option code QT is included in the transmitter model code.

INSTALLATION

No special installation is required in addition to the standard installation practices outlined in this document. Always ensure a proper seal by installing the electronics housing covers so that metal contacts metal if housing is used.

Environmental limits are available in the 3051 Product Data Sheet (document number 00813-0100-4051). This document can be found at *www.emersonprocess.com/rosemount/safety/certtechdocumentation.htm.*

The loop must be designed so the terminal voltage does not drop below 10.5 Vdc when the transmitter output is 23 mA.

If hardware security switches are installed, the security switch should in the “ON” position during normal operation. See Figure 6-2, “Security and alarm configuration (option D1)” on page 6-4. If hardware security switches are not installed, security should be “ON” in the software to prevent accidental or deliberate change of configuration data during normal operation.

COMMISSIONING

To commission the 3051 Safety Certified Transmitter, use the HART “Menu Tree” on page 3-5 and HART “Fast Key Sequence” on page 3-6.

NOTE
Transmitter output is not safety-rated during the following: configuration changes, multidrop, and loop test. Alternative means should be used to ensure process safety during transmitter configuration and maintenance activities.

For more information on the 375 Field Communicator see document 00809-0100-4276. AMS help can be found in the AMS on-line guides within the AMS system.

Damping

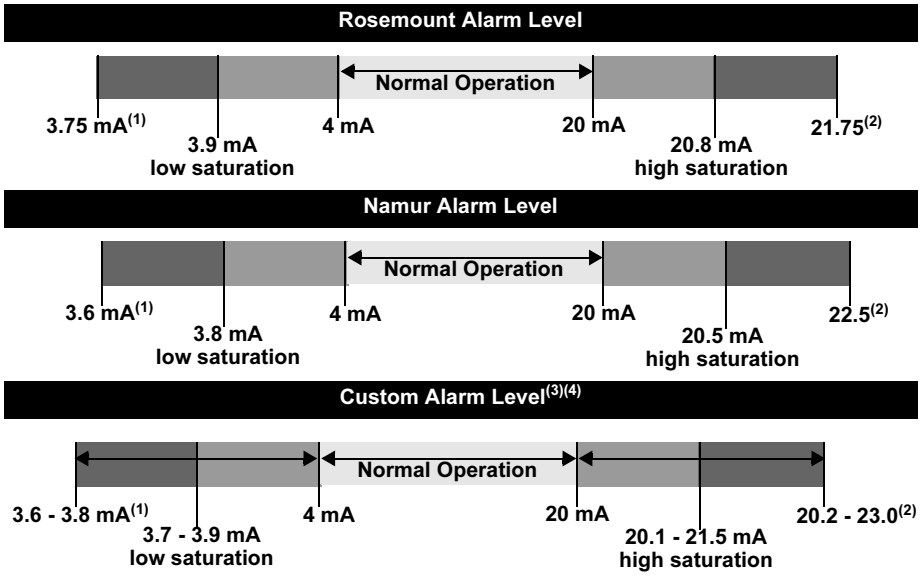
User-selected damping will affect the transmitters ability to respond to changes in the applied process. The *damping value* + *response time* should not exceed the loop requirements.

Fast Key Sequence - 1, 3, 6

Alarm and Saturation Levels

DCS or safety logic solver should be configured to match transmitter configuration. Figure 6-1 identifies the three alarm levels available and their operation values.

Figure 6-1. Alarm Levels

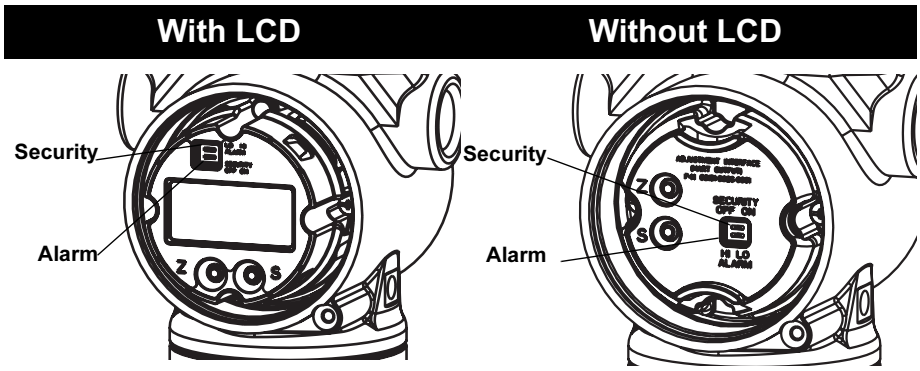


(1) Transmitter Failure, hardware or software alarm in LO position.
(2) Transmitter Failure, hardware or software alarm in HI position.
(3) High alarm must be at least 0.1 mA higher than the high saturation value.
(4) Low alarm must be at least 0.1 mA lower than the low saturation value.

NOTE
Some detected faults are indicated on the analog output at a level above high alarm regardless of the alarm switch selection.

Setting the alarm values and direction is dependent on whether or not the hardware switch option is installed. You can use a HART master or communicator to set the Alarm and Saturation values.

Figure 6-2. Security and alarm configuration (option D1)



Slide the security and alarm switches into the preferred position by using a small screwdriver.

Switches installed

1. If using a communicator, use the following fast key sequence to set the Alarm and Saturation values.
   Alarm Levels - Fast Key; 1, 4, 2, 7, 7
   Saturation Levels - Fast Key; 1, 4, 2, 7, 8
2. Manually set the direction for the Alarm to HI or LO using the ALARM switch as shown in the picture below.

Switches not installed

1. If using a communicator, use the following fast key sequence to set the Alarm and Saturation values and the Alarm Direction:
   Alarm Levels - Fast Key; 1, 4, 2, 7, 7
   Saturation Levels - Fast Key; 1, 4, 2, 7, 8
   Alarm Direction Fast Key; 1, 4, 2, 7, 6

OPERATION AND MAINTENANCE

Proof Test

The following proof tests are recommended.
Proof test results and corrective actions taken must be documented at *www.emersonprocess.com/rosemount/safety/certtechdocumentation.htm (Report a Failure button)* in the event that an error is found in the safety functionality.

Use “Fast Key Sequence” on page 3-6 to perform a Loop Test, Analog Output Trim, or Sensor Trim.

Proof Test 1

Conducting an analog output Loop Test satisfies the proof test requirements and will detect more than 52% of DU failures not detected by the 3051C or 3051L automatic diagnostics, and more than 62% of DU failures not detected by the 3051T automatic diagnostics.

Required tools: HART host/communicator and mA meter.

1. On HART host/communicator enter the Fast Key Sequence 1, 2, 2.
2. Select “4 Other.”
3. Enter the milliampere value representing a high alarm state.
4. Check the reference meter to verify the mA output corresponds to the entered value.
5. Enter the milliampere value representing a low alarm state.
6. Check the reference meter to verify the mA output corresponds to the entered value.
7. Document the test results per your requirements.

Proof Test 2

This proof test, when combined with Proof Test 1, will detect over 92% of DU failures not detected by the 3051C or 3051L automatic diagnostics, and over 95% of DU failures not detected by the 3051T automatic diagnostics.

Required tools: HART host/communicator and pressure calibration equipment.

1. Perform a minimum two point sensor calibration check using the 4-20mA range points as the calibration points.
2. Check the reference mA meter to verify the mA output corresponds to the pressure input value.
3. If necessary, use one of the “Trim” procedures on page 4-5.
4. Document the test results per your requirements.

NOTE
The user determines the proof-test requirements for impulse piping.

Inspection

Visual Inspection

Not required.

Special Tools

Not required.

Product Repair

The 3051 is repairable by major component replacement.

All failures detected by the transmitter diagnostics or by the proof-test must be reported. Feedback can be submitted electronically at *www.emersonprocess.com/rosemount/safety/certtechdocumentation.htm (Report a Failure button)*.

SPECIFICATIONS

The 3051 must be operated in accordance to the functional and performance specifications provided in the 3051 Product Data Sheet (document number 00813-0100-4051).

Failure Rate Data

The FMEDA report includes failure rates and common cause Beta factor estimates.

The report is available at *www.emersonprocess.com/rosemount/safety/certtechdocumentation.htm*.

Product Life

50 years – based on worst case component wear-out mechanisms – not based on wear-out of process wetted materials

Report any safety related product information at *www.emersonprocess.com/rosemount/safety/certtechdocumentation.htm*.

SPARE PARTS

Additional spare parts are available in Appendix A.

Appendix A Reference Data

PERFORMANCE SPECIFICATIONS

Total Performance is based on combined errors of reference accuracy, ambient temperature effect, and static pressure effect.
This appendix covers HART protocols (Zero-based spans, reference conditions, silicone oil fill, 316 SST isolating diaphragms, and digital trim values equal to the 4-20 mA span setpoints).

Conformance to specification (±3 Sigma)

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

Reference Accuracy(1)

Models	Standard	High Accuracy Option
3051CD, 3051CG		
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
3051T		
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
Range 5	±0.075% of span	

(1) Reference accuracy includes hysteresis, terminal-based linearity, and repeatability of the pressure sensor.

3051CA

Ranges 1-4 ±0.065% of span
For spans less than 10:1, accuracy =

$$\pm\left[0.0075\left(\frac{URL}{Span}\right)\right]\% \text{ of Span}$$

Ranges 2-4
High Accuracy Option, P8
±0.04% of span
For spans less than 5:1, accuracy =

$$\pm\left[0.0075\left(\frac{URL}{Span}\right)\right]\% \text{ of Span}$$

3051L

All Ranges ±0.075% of span
For spans less than 10:1, accuracy =

$$\pm\left[0.025 + 0.005\left(\frac{URL}{Span}\right)\right]\% \text{ of Span}$$

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
3051C	
Ranges 2-5	±0.15% of span
3051T	
Ranges 1-4	±0.15% of span

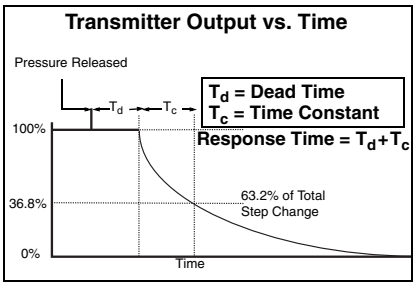
Long Term Stability

Models	Long Term Stability
3051C	
Ranges 2-5	±0.125% of URL for 5 years ±50 °F (28 °C) temperature changes, and up to 1000 psi (6,9 MPa) line pressure.
3051CD	
Ranges 0-1	±0.2% of URL for 1 year
3051T	
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]	Typical HART Transmitter Response Time
Total Response Time (T_d + T_c)[2]:		
3051C, Ranges 2-5:	100 ms	
Range 1:	255 ms	
Range 0:	700 ms	
3051T:	100 ms	
3051L:	Consult factory	
Dead Time (Td)	45 ms (nominal)	
Update Rate	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.



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

For line pressures above 2000 psi (13,7 MPa), see user manual (Rosemount publication number 00809-0100-4051).

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

(1) Zero error can be calibrated out.

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

Models	Ambient Temperature Effect
3051CD/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
3051T	
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)
3051CA	
All Ranges	±(0.025% URL + 0.125% span) from 1:1 to 30:1 ±(0.035% URL + 0.125% span) from 30:1 to 100:1
3051L	See Rosemount Inc. Instrument Toolkit™ software.

Mounting Position Effects

Models	Mounting Position Effects
3051C	Zero shifts up to ±1.25 inH_2O (3,11 mbar), which can be calibrated out. No span effect.
3051L	Zero shifts up to 1 inH_2O (2,49 mbar) with liquid level diaphragm in vertical plane. Zero shifts up to 5 inH_2O (12,43 mbar) plus extension length on extended units, with diaphragm in horizontal plane. All zero shifts can be calibrated out. No span effect.
3051T/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 IEC/EN 61326 and NAMUR NE-21.

Transient Protection (Option Code T1)

Meets IEEE C62.41-2002, Location Category B

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

Meets IEEE C37.90.1-2002, Surge Withstand Capability
SWC 2.5 kV crest, 1.25 MHz wave form

General Specifications:

Response Time: < 1 nanosecond
Peak Surge Current: 5000 amps to housing
Peak Transient Voltage: 100 V dc
Loop Impedance: < 25 ohms
Applicable Standards: IEC61000-4-4, IEC61000-4-5

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

FUNCTIONAL SPECIFICATIONS

Range and Sensor Limits

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

3051CD, 3051CG, 3051L						
	Minimum Span		Range and Sensor Limits			
			Lower (LRL)			
Range	3051CD[(1)], CG, L	Upper (URL)	3051C Differential	3051C/ Gage	3051L Differential	3051L Gage
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
1	0.5 inH_2O (1,2 mbar)	25 inH_2O (62,3 mbar)	–25 inH_2O (–62,3 mbar)	–25 inH_2O (–62,3 mbar)	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)
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)
4	3 psi (0,20 bar)	300 psi (20,6 bar)	–300 psi (–20,6 bar)	0.5 psia (34,5 mbar abs)	–300 psi (–20,6 bar)	0.5 psia (34,5 mbar abs)
5	20 psi (1,38 bar)	2000 psi (137,9 bar)	– 2000 psi (–137,9 bar)	0.5 psia (34,5 mbar abs)	NA	NA

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

Table A-2. 3051CA Range and Sensor Limits

Range	3051CA Range and Sensor Limits		
	Minimum Span	Upper (URL)	Lower (LRL)
1	0.3 psia (20,6 mbar)	30 psia (2,07 bar)	0 psia (0 bar)
2	1.5 psia (0,103 bar)	150 psia (10,3 bar)	0 psia (0 bar)
3	8 psia (0,55 bar)	800 psia (55,2 bar)	0 psia (0 bar)
4	40 psia (2,76 bar)	4000 psia (275,8 bar)	0 psia (0 bar)

Table A-3. 3051T Range and Sensor Limits

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

(1) Assumes atmospheric pressure of 14.7 psig (1.01 bar).

Service

Liquid, gas, and vapor applications

HART 4–20 mA (Output Code A)

Zero and Span Adjustment

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

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

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.

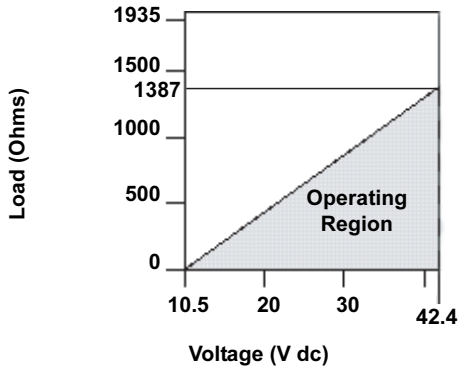
Power Supply

External power supply required. Standard transmitter (4–20 mA) operates on 10.5 to 42.4 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.

Overpressure Limits

Transmitters withstand the following limits without damage:

Rosemount 3051CD/CG

- Range 0: 750 psi (51,7 bar)
- Range 1: 2000 psig (137,9 bar)
- Ranges 2–5: 3626 psig (250,0 bar)
  4500 psig (310,3 bar) for Option Code P9
  6092 psig (420,0 bar) for Option Code P0

Rosemount 3051CA

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

Rosemount 3051TG/TA

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

Rosemount 3051L

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

Table A-4. 3051L and Level Flange Rating Limits

Standard	Type	CS Rating	SST Rating
ANSI/ASME	Class 150	285 psig	275 psig
ANSI/ASME	Class 300	740 psig	720 psig
ANSI/ASME	Class 600	1480 psig	1440 psig
At 100 °F (38 °C), the rating decreases with increasing temperature.			
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.			

Static Pressure Limit

Rosemount 3051CD Only

Operates within specifications between static line pressures of 0.5 psia (0,03 bar) and 3626 psig (250 bar), with the exception of:

- Range 0: 0.5 psia to 750 psig (0,03 to 51,7 bar)
- Range 1: 0.5 psia to 2000 psig (0,03 to 137,9 bar)
- Option code P9: 4500 psig (310,3 bar)
- Option code P0: 6092 psig (420,0 bar)

Burst Pressure Limits

Coplanar or traditional process flange:

- 10000 psig (689,5 bar)

3051T:

- Ranges 1–4: 11000 psi (758,4 bar)
- Range 5: 26000 psig (1792,6 bar)

Temperature Limits

Ambient
–40 to 185 °F (–40 to 85 °C)
With integral display: –40 to 175 °F (–40 to 80 °C)(1)
With option code P0: -4 to 185°F (-20 to 85 °C)

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

Storage
–50 to 230 °F (–46 to 110 °C)
With integral display: –40 to 185 °F (–40 to 85 °C)

Process
At atmospheric pressures and above. See Table A-5.

Table A-5. 3051 Process Temperature Limits

3051CD, 3051CG, 3051CA	
Silicone Fill Sensor[1]	
with *Coplanar* Flange	–40 to 250 °F (–40 to 121 °C)[2]
with Traditional Flange	–40 to 300 °F (–40 to 149 °C)[2][3]
with Level Flange	–40 to 300 °F (–40 to 149 °C)[2]
with 305 Integral Manifold	–40 to 300 °F (–40 to 149 °C)[2]
Inert Fill Sensor[1]	0 to 185 °F (–18 to 85 °C)[4][5]
3051T (Process Fill Fluid)	
Silicone Fill Sensor[1]	–40 to 250 °F (–40 to 121 °C)[2]
Inert Fill Sensor[1]	–22 to 250 °F (–30 to 121 °C)[2]
3051L Low-Side Temperature Limits	
Silicone Fill Sensor[1]	–40 to 250 °F (–40 to 121 °C)[2]
Inert Fill Sensor[1]	0 to 185 °F (–18 to 85 °C)[2]
3051L High-Side Temperature Limits (Process Fill Fluid)	
Syltherm® XLT	–100 to 300 °F (–73 to 149 °C)
D.C. Silicone 704®	60 to 400 °F (15 to 205 °C)
D.C. Silicone 200	–40 to 400 °F (–40 to 205 °C)
Inert	–50 to 350 °F (–45 to 177 °C)
Glycerin and Water	0 to 200 °F (–18 to 93 °C)
Neobee M-20	0 to 400 °F (–18 to 205 °C)
Propylene Glycol and Water	0 to 200 °F (–18 to 93 °C)

(1) Process temperatures above 185 °F (85 °C) require derating the ambient limits by a 1.5:1 ratio.
(2) 220 °F (104 °C) limit in vacuum service; 130 °F (54 °C) for pressures below 0.5 psia (0,03 bar).
(3) 3051CD0 process temperature limits are –40 to 212 °F (–45 to 100 °C)
(4) 160 °F (71 °C) limit in vacuum service.
(5) Not available for 3051CA.

Humidity Limits

0–100% relative humidity

Turn-On Time

Performance within specifications less than 2.0 seconds (typical) after power is applied to the transmitter

Volumetric Displacement

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

Damping

Analog output response to a step input change is user-selectable from 0 to 60 seconds for one time constant. This software damping is in addition to sensor module response time.

Failure Mode Alarm

HART 4-20mA (Output Code A)

If self-diagnostics detect a gross transmitter failure, the analog signal will be driven offscale to alert the user. Rosemount standard (default), NAMUR, and custom alarm levels are available (see Table A-6 below).

High or low alarm signal is software-selectable or hardware-selectable via the optional switch (option D1).

Table A-6. Alarm Configuration Options

	High Alarm	Low Alarm
Standard	≥ 21.75 mA	≤ 3.75 mA
NAMUR compliant(1)	≥ 22.5 mA	≤ 3.6 mA
Custom levels(2)	20.2 - 23.0 mA	3.6 - 3.8 mA

(1) Analog output levels are compliant with NAMUR recommendation NE 43, see option codes C4 or CN.

(2) Low alarm must be 0.1 mA less than low saturation and high alarm must be 0.1 mA greater than high saturation.

Safety Certified Transmitter Failure Values

Safety accuracy: 2.0%(1)

Safety response time: 1.5 seconds

(1) A 2% variation of the transmitter mA output is allowed before a safety trip. Trip values in the DCS or safety logic solver should be derated by 2%.

PHYSICAL SPECIFICATIONS

Electrical Connections

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

Process Connections

Rosemount 3051C

1/4–18 NPT on 2 1/8-in. centers

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

Rosemount 3051L

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

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

Rosemount 3051T

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

Process-Wetted Parts

Drain/Vent Valves
316 SST, *Hastelloy* C276, or *Monel* material (*Monel* not available with 3051L)

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

Wetted O-rings
Glass-filled PTFE or Graphite-filled PTFE

Process Isolating Diaphragms

Isolating Diaphragm Material	3051CD/CG	3051T	3051CA
316L SST	•	•	•
Hastelloy C276	•	•	•
Monel	•		•
Tantalum	•		
Gold-plated *Monel*	•		•
Gold-plated SST	•		•

Rosemount 3051L Process Wetted Parts

Flanged Process Connection (Transmitter High Side)

Process Diaphragms, Including Process Gasket Surface
316L SST, Hastelloy C-276, or Tantalum

Extension
CF-3M (Cast version of 316L SST, material per ASTM-A743), or *Hastelloy* C276. Fits schedule 40 and 80 pipe.

Mounting Flange
Zinc-cobalt plated CS or SST

Reference Process Connection (Transmitter Low Side)

Isolating Diaphragms
316L SST or Hastelloy C-276

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

Non-Wetted Parts

Electronics Housing
Low-copper aluminum or CF-3M (Cast version of 316L SST)
NEMA 4X, IP 66, IP 68

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

Bolts
ASTM A449, Type 1
ASTM F593G, Condition CW1
ASTM A193, Grade B7M
ASTM A193 Class 2, Grade B8M
Monel K-500

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

Process Fill Fluid (3051L only)
Sylthern XLT, D.C. Silicone 704, D.C. Silicone 200, inert, glycerin and water, Neobee M-20 or propylene glycol and water

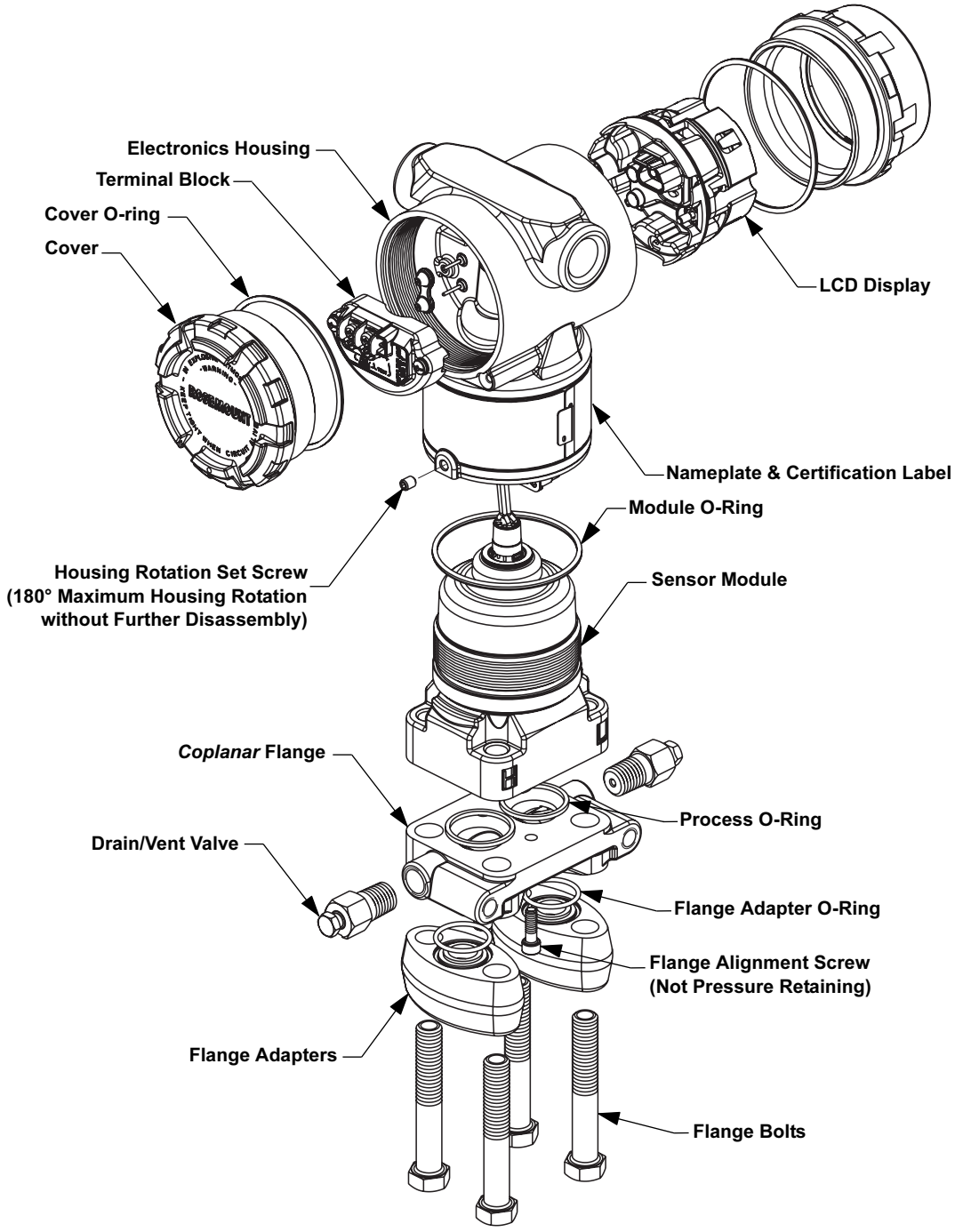
Paint
Polyurethane

Cover O-rings
Buna-N

Shipping Weights
Refer to “Shipping Weights” on page A-32

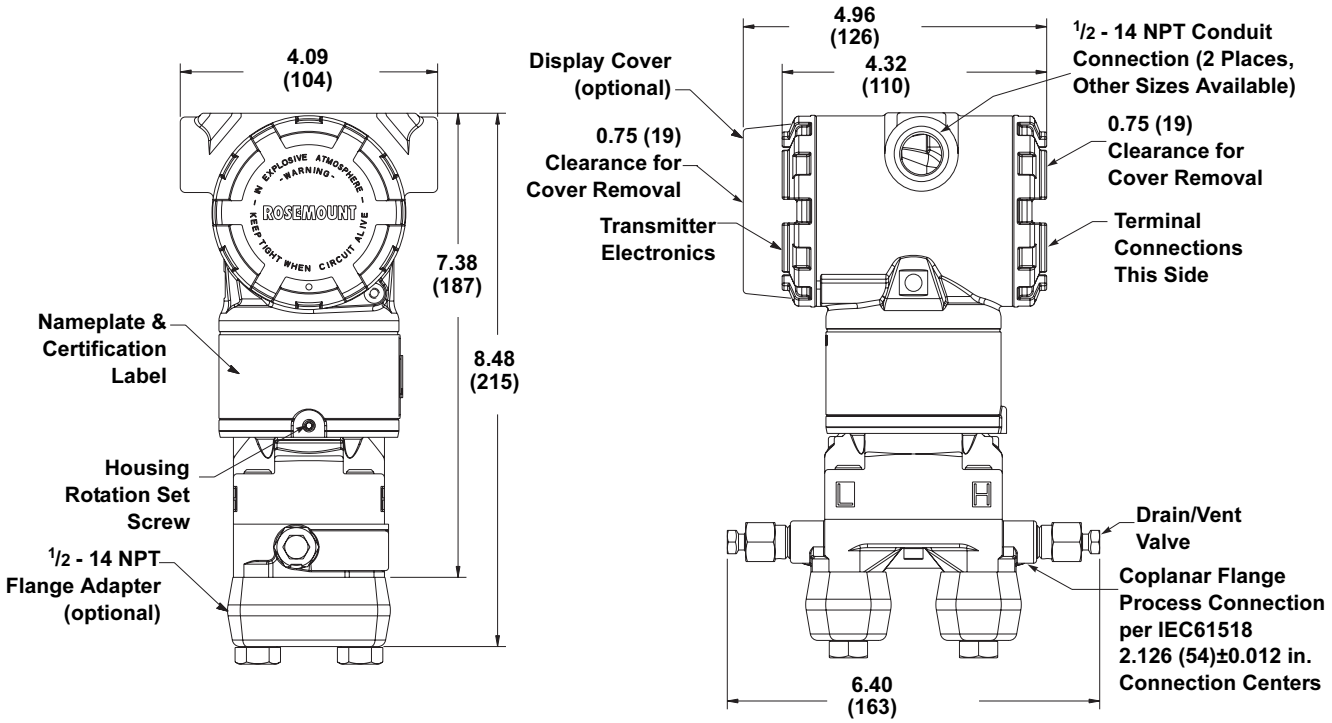
DIMENSIONAL DRAWINGS

3051 Exploded View

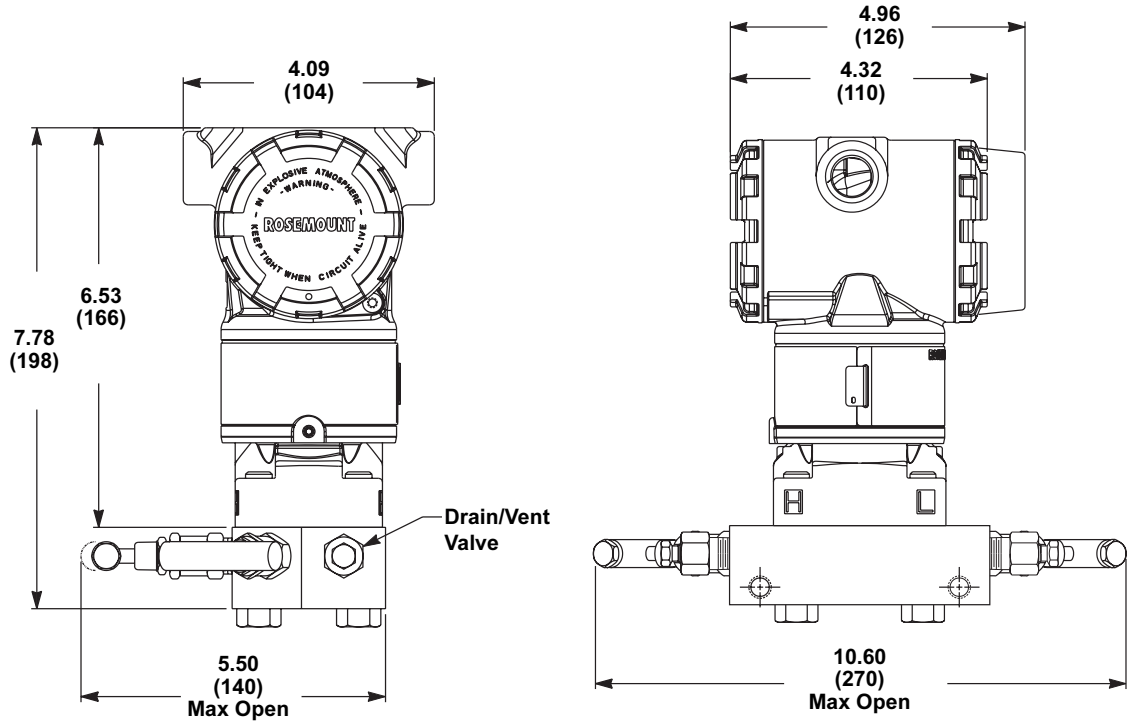


Dimensions are in inches (mm).

3051C *Coplanar* with *Coplanar* Flange

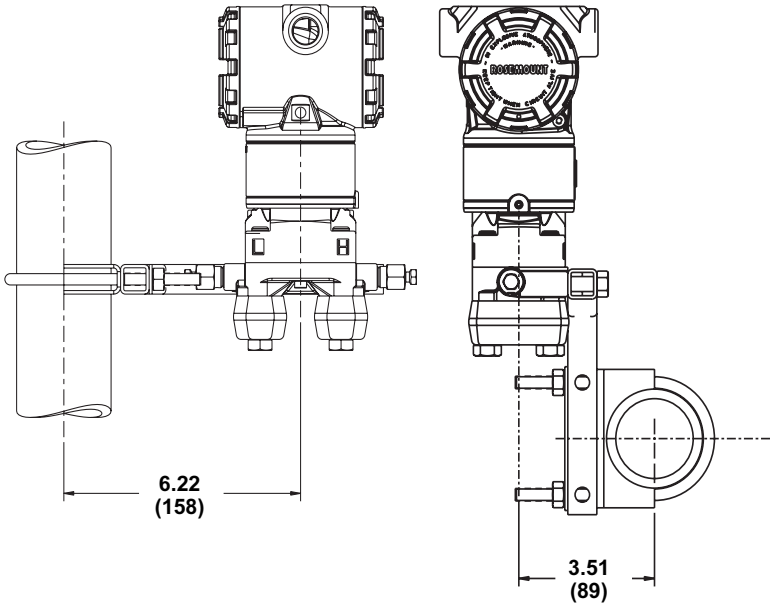


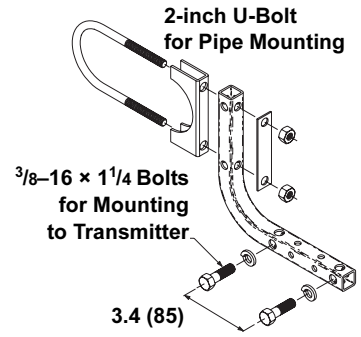
3051C *Coplanar* with Rosemount 305 *Coplanar* Integral Manifold



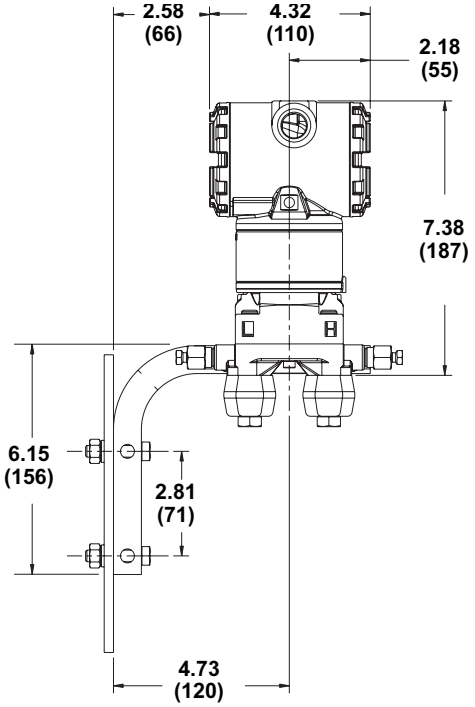
Coplanar Flange Mounting Configurations with Optional Bracket (option B4) for 2-in. Pipe or Panel Mounting

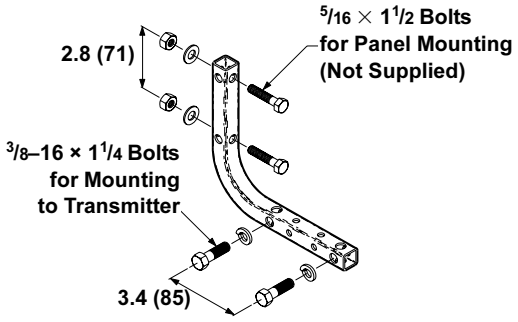
Pipe Mount



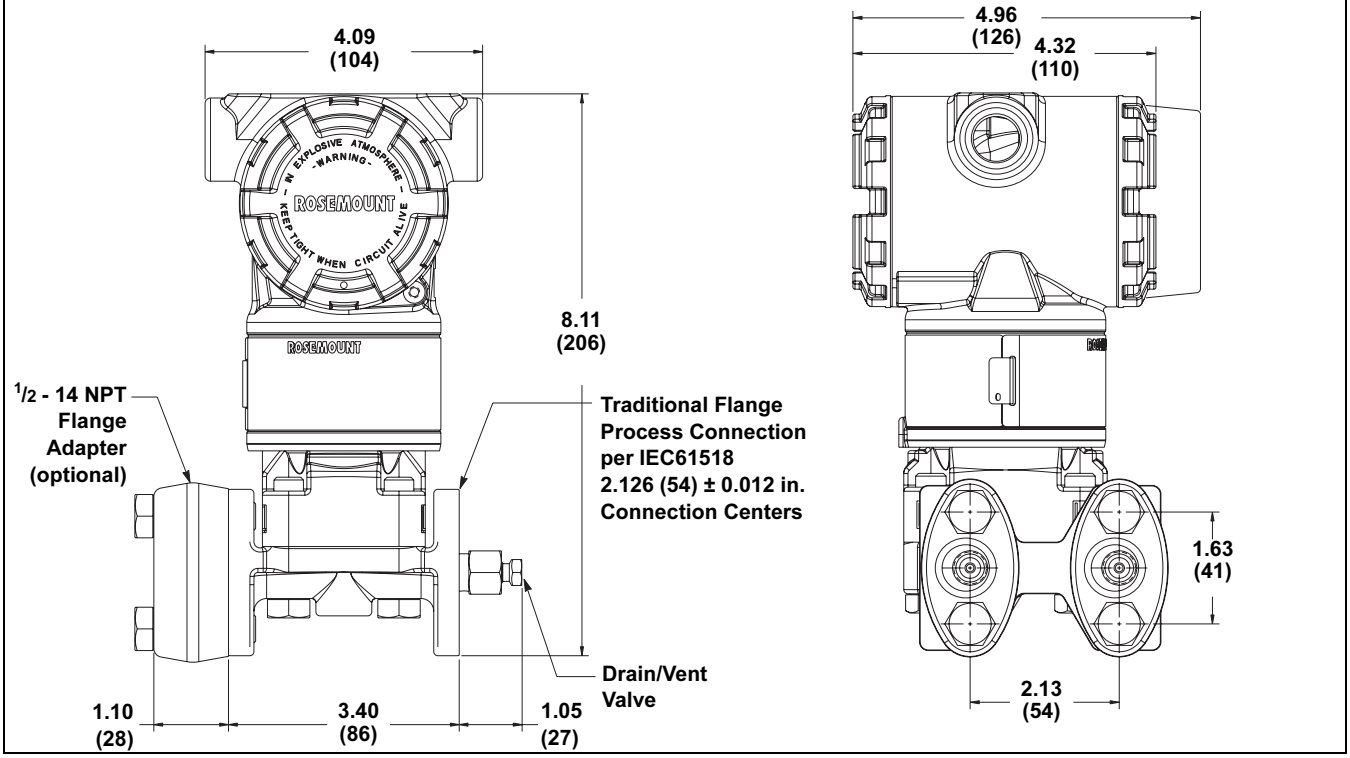


Panel Mount

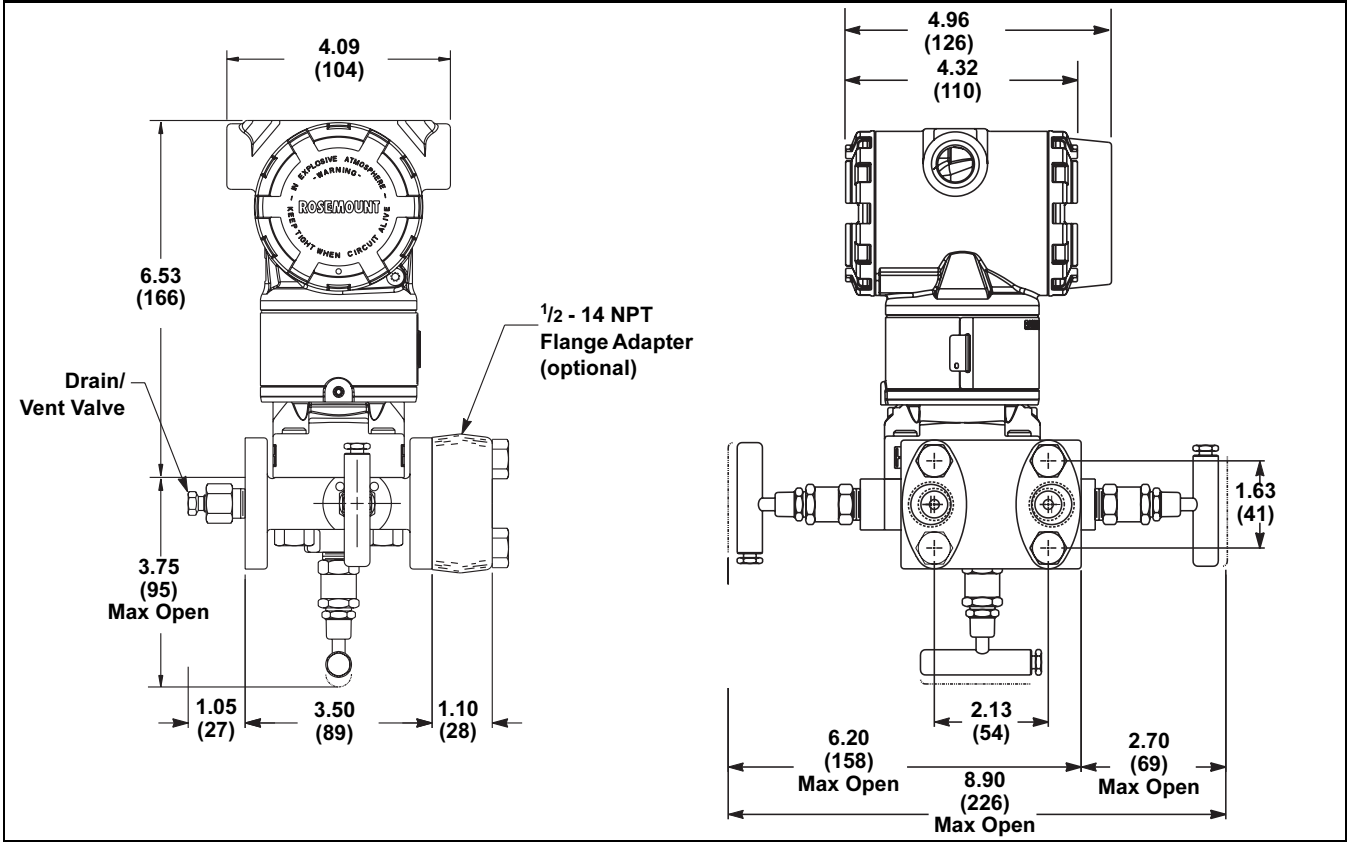




3051C *Coplanar* with Traditional Flange

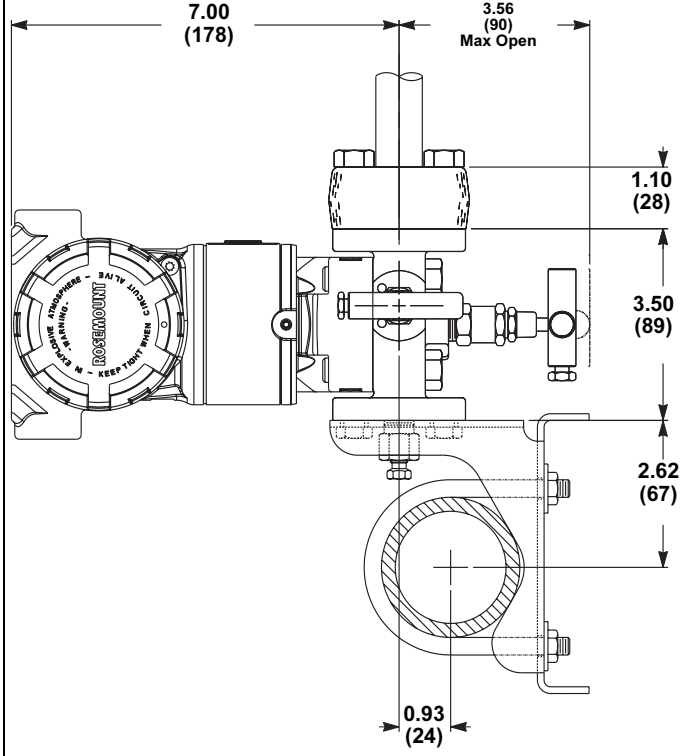


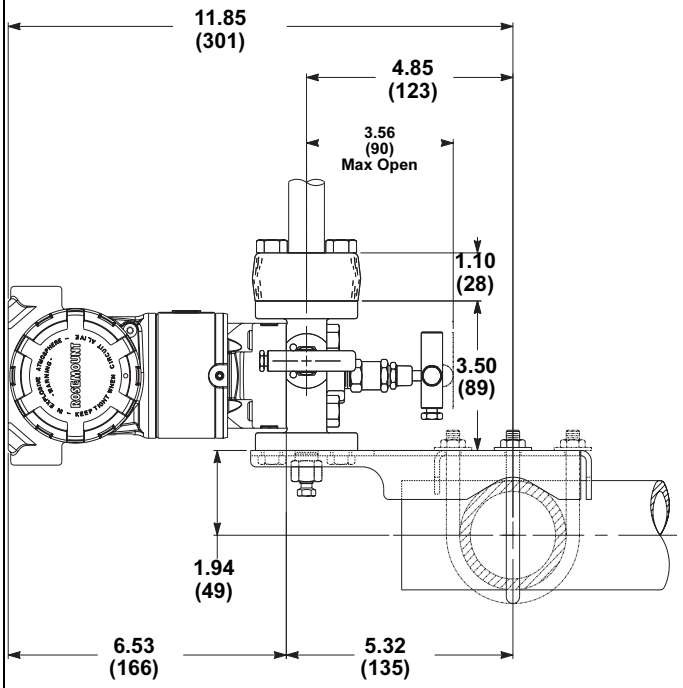
3051C *Coplanar* with Rosemount 305 Traditional Integral Manifold



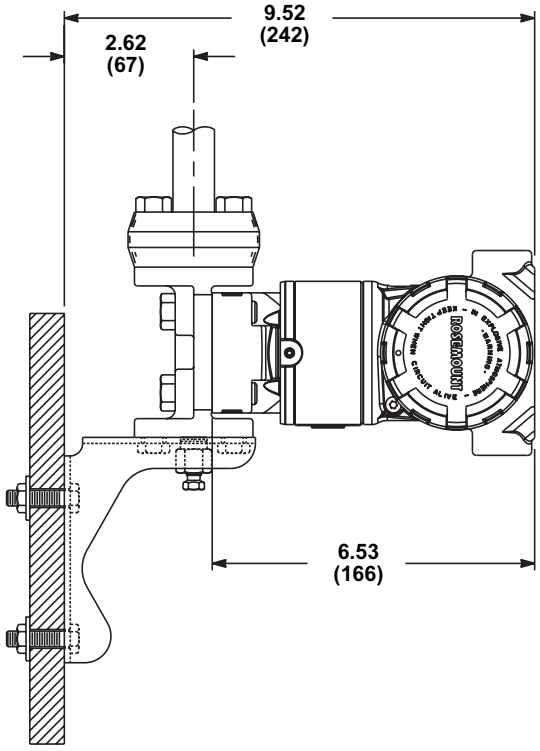
Traditional Flange Mounting Configurations with Optional Brackets for 2-in. Pipe or Panel Mounting

Pipe Mount 305 Integral Manifold (option B1/B7/BA)

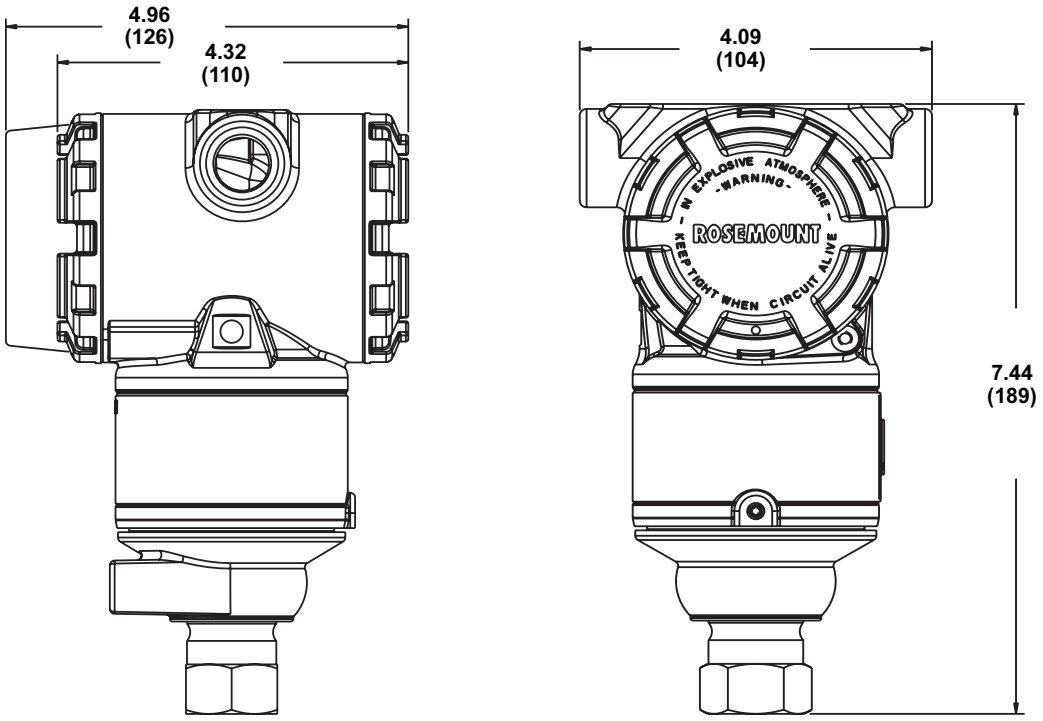




Panel Mount (option B2/B8)

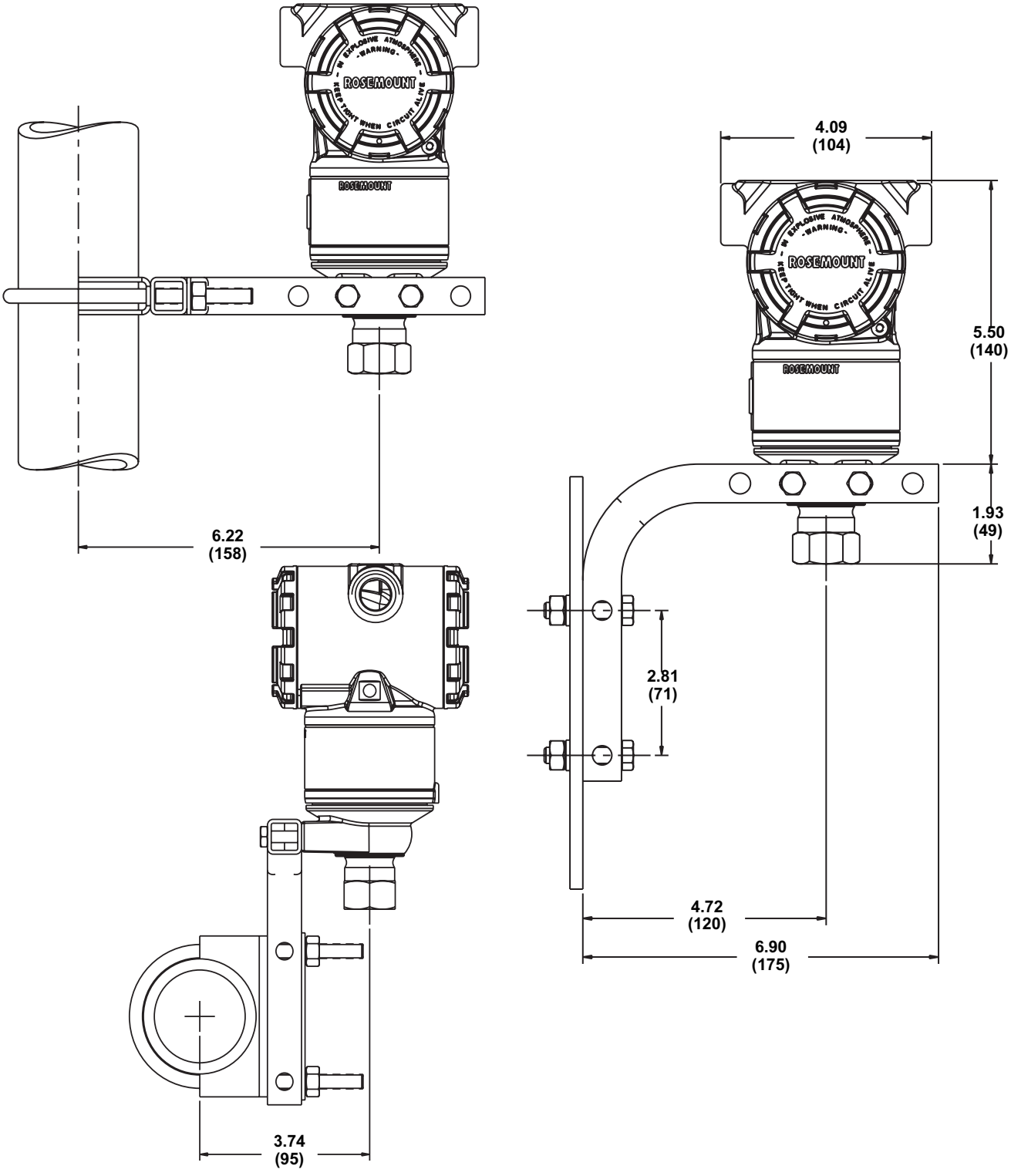


3051T Inline



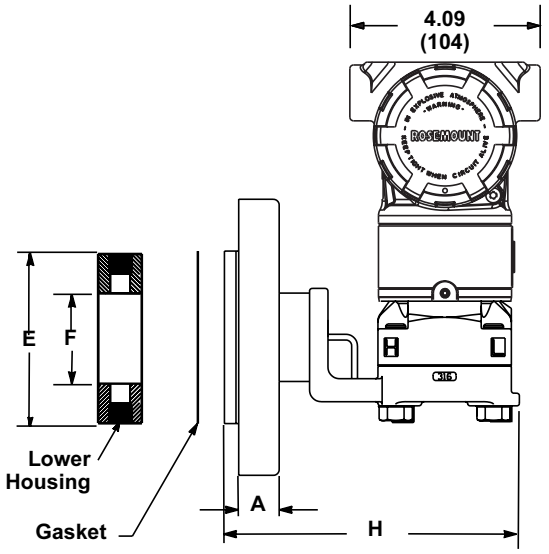
3051T Inline Mounting Configurations with Optional Bracket (option B4) for 2-in. Pipe or Panel Mounting

Pipe Mount **Panel Mount**

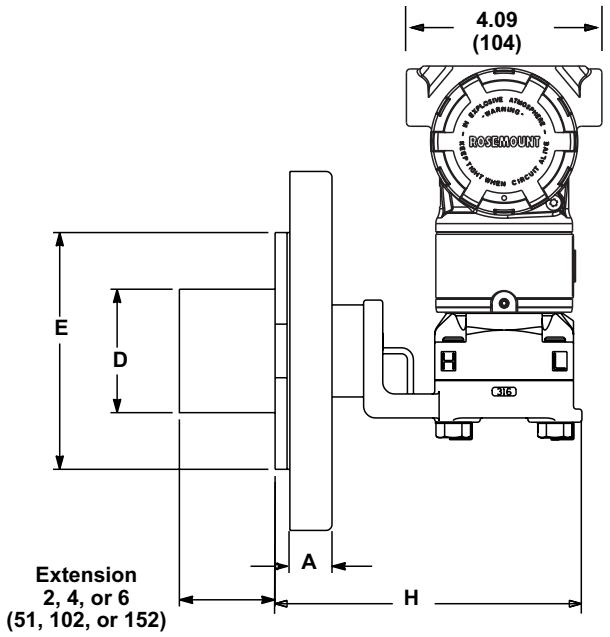


3051L Liquid-Level

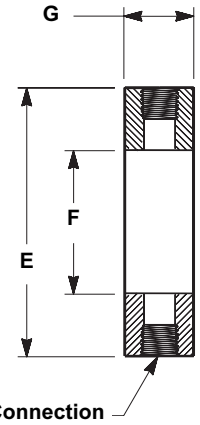
Flush Flanged Configuration



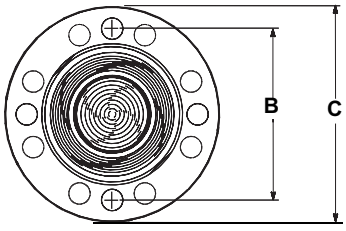
Extended Flange Configuration



Optional Flushing Connection Ring
(Lower Housing)



Diaphragm Assembly
and Mounting Flange



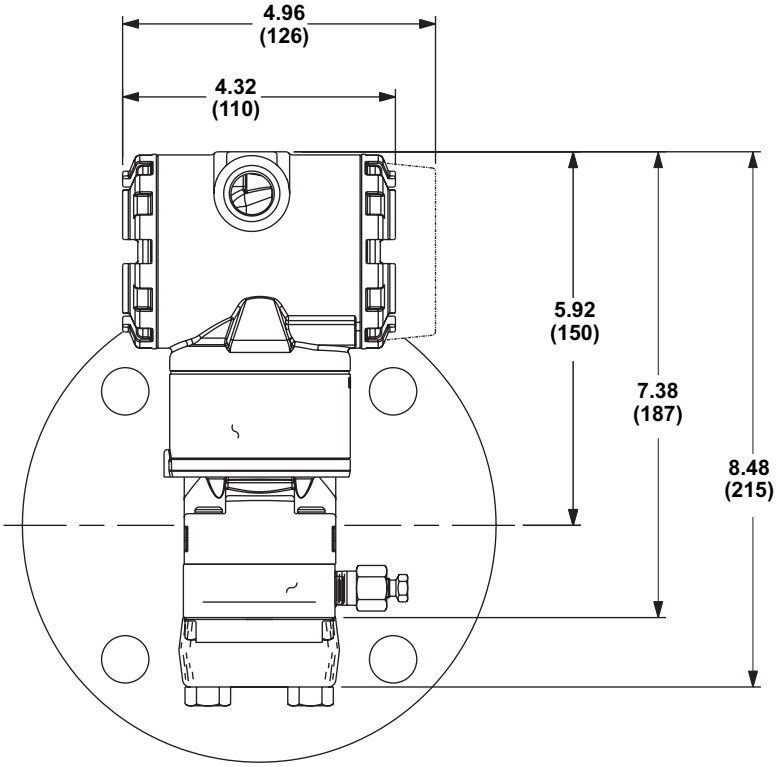


Table A-7. 3051L Dimensional Specifications
Except where indicated, dimensions are in inches (millimeters).

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

ORDERING INFORMATION

Table A-8. 3051C Differential, Gage, and Absolute Pressure Transmitters — = Not Applicable • = Applicable

Model	Transmitter Type (Select One)			CD	CG	CA
3051 CD	Differential Pressure Transmitter (requires option code TR)			•	—	—
3051 CG	Gage Pressure Transmitter (requires option code TR)			—	•	—
3051 CA	Absolute Pressure Transmitter (requires option code TR)			—	—	•
	3051CD	**3051CG(1)**	**3051CA**	**CD**	**CG**	**CA**
0(2)	–3 to 3 inH_2O/0.1 inH_2O (–7,5 to 7,5 mbar/0,25 mbar)	Not Applicable	Not Applicable	•	—	—
1	–25 to 25 inH_2O/0.5 inH_2O (–62,2 to 62,2 mbar/1,2 mbar)	–25 to 25 inH_2O/0.5 inH_2O (–62,2 to 62,2 mbar/1,2 mbar)	0 to 30 psia/0.3 psia (0 to 2,1 bar/20,7 mbar)	•	•	•
2	–250 to 250 inH2O/2.5 inH_2O (–623 to 623 mbar/6,2 mbar)	–250 to 250 inH_2O/2.5 inH_2O (–623 to 623 mbar/6,2 mbar)	0 to 150 psia/1.5 psia (0 to 10,3 bar/0,1 bar)	•	•	•
3	–1000 to 1000 inH_2O/10 inH_2O (–2,5 to 2,5 bar/25 mbar)	–393 to 1000inH_2O/10in H_2O (–0,98 to 2,5 bar/25 mbar)	0 to 800 psia/8 psia (0 to 55,2 bar/0,55 bar)	•	•	•
4	–300 to 300 psi/3 psi (–20,7 to 20,7 bar/0,2 bar)	–14.2 to 300 psi/3 psi (–0,98 to 20,7 bar/0,2 bar)	0 to 4000 psia/40 psia (0 to 275,8 bar/2,8 bar)	•	•	•
5	–2000 to 2000 psi/20 psi (–137,9 to137,9 bar/1,4 bar)	–14.2 to 2000 psig/20 psi (–0,98 to 137,9 bar/1,4 bar)	Not Applicable	•	•	—
Code	**Output**			**CD**	**CG**	**CA**
A	4–20 mA with Digital Signal Based on *HART* Protocol			•	•	•
Code	**Materials of Construction**			**CD**	**CG**	**CA**
	Process Flange Type	**Flange Material**	**Drain/Vent**			
2	*Coplanar*	SST	SST	•	•	•
3(3)	*Coplanar*	*Alloy C*	*Hastelloy* C276	•	•	•
4	*Coplanar*	*Monel*	*Monel*	•	•	•
5	*Coplanar*	Plated CS	SST	•	•	•
7(3)	*Coplanar*	SST	*Hastelloy* C276	•	•	•
8(3)	*Coplanar*	Plated CS	*Hastelloy* C276	•	•	•
0	Alternate Flange—See Options on page A-22			•	•	•
Code	**Isolating Diaphragm**			**CD**	**CG**	**CA**
2(3)	316L SST			•	•	•
3(3)	*Hastelloy* C276			•	•	•
4	*Monel*			•	•	•
5	Tantalum *(Available on 3051CD and CG, Ranges 2–5 only. Not available on 3051CA)*			•	•	—
6	Gold-plated *Monel (Use in combination with O-ring Option Code B.)*			•	•	•
7	Gold-plated SST			•	•	•
Code	**O-ring**					
A	Glass-filled PTFE			•	•	•
B	Graphite-filled PTFE			•	•	•
Code	**Fill Fluid**			**CD**	**CG**	**CA**
1	Silicone			•	•	•
2	Inert fill (Halocarbon)			•	•	—
Code	**Housing Material**		**Conduit Entry Size**	**CD**	**CG**	**CA**
A	Polyurethane-covered Aluminum		½–14 NPT	•	•	•
B	Polyurethane-covered Aluminum		M20 × 1.5 (CM20)	•	•	•
D	Polyurethane-covered Aluminum		G½	•	•	•
J	SST *(consult factory for availability)*		½–14 NPT	•	•	•
K	SST *(consult factory for availability)*		M20 × 1.5 (CM20)	•	•	•
M	SST *(consult factory for availability)*		G½	•	•	•

Table A-8. 3051C Differential, Gage, and Absolute Pressure Transmitters — = Not Applicable • = Applicable

Code	Alternate Flange Options (Requires Materials of Construction Code 0)	CD	CG	CA
H2	Traditional Flange, 316 SST, SST Drain/Vent	•	•	•
H3[3]	Traditional Flange, *Alloy C*, *Hastelloy* C276 Drain/Vent	•	•	•
H4	Traditional Flange, *Monel*, *Monel* Drain/Vent	•	•	•
H7[3]	Traditional Flange, 316 SST, *Hastelloy* C276 Drain/Vent	•	•	•
HJ	DIN Compliant Traditional Flange, SST, 7/16 in. Adapter/Manifold Bolting	•	•	•
HK	DIN Compliant Traditional Flange, SST, 10 mm Adapter/Manifold Bolting	•	•	•
HL	DIN Compliant Traditional Flange, SST, 12mm Adapter/Manifold Bolting *(Not available on 3051CD0)*	•	•	•
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	•	•	•
Code	**Integral Mount Manifold Options (Requires Materials of Construction Code 0)**	**CD**	**CG**	**CA**
S5	Assemble to Rosemount 305 Integral Manifold (specified separately, see the Rosemount 305 and 306 Integral Manifolds PDS (document number 00813-0100-4733))	•	•	•
S6	Assemble to Rosemount 304 Manifold or Connection System	•	•	•
Code	**Integral Mount Primary Elements Options**	**CD**	**CG**	**CA**
S4	Factory Assembly to Rosemount Primary Element (Rosemount *Annubar* or Rosemount 1195 Integral Orifice) *(With the primary element installed, the maximum operating pressure will equal the lesser of either the transmitter or the primary element. Option is available for factory assembly to range 1–4 transmitters only)*	•	—	—
S3	Factory Assembly to Rosemount 405 Primary Element	•	—	—
Code	**Diaphragm Seal Assemblies Options** ***NOTE: Standard flange and adapter bolts are austenitic 316 SST.***	**CD**	**CG**	**CA**
S1	One Diaphragm Seal (Direct Mount or Capillary Connection Type)	•	•	•
S2	Two Diaphragm Seals (Direct Mount or Capillary Connection Type)	•	—	—
Code	**Optional All Welded Diaphragm Seal Systems (for high vacuum applications)** ***NOTE: Standard flange and adapter bolts are austenitic 316 SST.***	**CD**	**CG**	**CA**
S7	One Diaphragm Seal, All-Welded System (Capillary Connection Type)	•	•	•
S8	Two Diaphragm Seals, All-Welded System (Capillary Connection Type)	•	—	—
S0	One Diaphragm Seal, All-Welded System (Direct Mount Connection Type)	•	•	•
S9	Two Diaphragm Seals, All-Welded System (One Direct Mount and One Capillary Connection Type)	•	—	—
Code	**Mounting Bracket Options**	**CD**	**CG**	**CA**
B4	*Coplanar* Flange Bracket for 2-in. Pipe or Panel Mounting, all SST	•	•	•
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	•	•	•
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	•	•	•
Code	**Hazardous Locations Certification Options**	**CD**	**CG**	**CA**
E5	FM Explosion-proof	•	•	•
I5	FM Intrinsically safe, non-incendive	•	•	•
K5	FM Explosion-proof, Intrinsically safe, non-incendive (combination of E5 and I5)	•	•	•
I1	ATEX Intrinsically safe, Dust	•	•	•
N1	ATEX Type n, Dust	•	•	•
E8	ATEX Flameproof, Dust	•	•	•
E4	JIS Flameproof (consult factory for availability)	•	•	•
I4	JIS Intrinsically safe (consult factory for availability)	•	•	—

Table A-8. 3051C Differential, Gage, and Absolute Pressure Transmitters — = Not Applicable • = Applicable

C5	Measurement Canada Accuracy *(Limited availability depending on transmitter type and range. Contact an Emerson Process Management representative)*	•	•	•
C6	CSA Explosion-proof, Intrinsically safe	•	•	•
K6	CSA and ATEX Flameproof, Intrinsically safe (combination of C6, I1, and E8)	•	•	•
KB	FM and CSA Explosion-proof, Intrinsically safe, Dust (combination of K5 and C6)	•	•	•
K7	SAA Flameproof, Intrinsically safe (combination of I7, N7, and E7)	•	•	•
K8	ATEX Flameproof, Intrinsically safe (combination of I1 and E8)	•	•	•
KD	FM, CSA, and ATEX Explosion-proof, Intrinsically Safe (combination of K5, C6, I1, and E8)	•	•	•
I7[(4)]	SAA Intrinsically safe	•	•	•
E7	SAA Flameproof	•	•	•
N7	SAA Type n	•	•	•
DW[(5)]	NSF Drinking Water	•	•	•
Code	**Bolting Options**	**CD**	**CG**	**CA**
L4	Austenitic 316 SST Bolts	•	•	•
L5	ASTM A 193, Grade B7M Bolts	•	•	•
L6	*Monel* Bolts	•	•	•
L8	ASTM A 193 Class 2, Grade B8M Bolts	•	•	•
Code	**Displays Options**	**CD**	**CG**	**CA**
M5	LCD Display	•	•	•

Table A-8. 3051C Differential, Gage, and Absolute Pressure Transmitters — = Not Applicable • = Applicable

	OTHER OPTIONS	CD	CG	CA
Code	**Special Certifications**			
Q4	Calibration Data Sheet	•	•	•
Q8	Material Traceability Certification per EN 10204 3.1.B *(Only available for the sensor module housing and Coplanar or traditional flanges and adapters (3051C), and for the sensor module housing and low-volume Coplanar flange and adapter (3051C with Option Code S1))*	•	•	•
Q16	Surface finish certification for sanitary remote seals	•	•	•
QP	Calibration certification and tamper evident seal	•	•	•
QG	Calibration certificate and GOST verification certificate	•	•	•
QS	Prior-use certificate of FMEDA data	•	•	•
QT	Safety certified to IEC 61508 with certificate of FMEDA data	•	•	•
Code	**Terminal Blocks**			
T1	Transient Protection Terminal Block	•	•	•
Code	**Special Configuration (Software)**			
C1	Custom Software Configuration (Completed CDS 00806-0100-4051 required with order)	•	•	•
C3	Gage Calibration (3051CA4 only)	—	—	•
C4(6)	Analog Output Levels Compliant with NAMUR Recommendation NE 43: 27-June-1996 and High Alarm Level	•	•	•
CN(6)	Analog Output Levels Compliant with NAMUR Recommendation NE 43: 27-June-1996 and Low Alarm Level	•	•	•
CR(7)	Custom alarm and saturation signal levels, high alarm	•	•	•
CS(7)	Custom alarm and saturation signal levels, low alarm	•	•	•
CT	Low alarm (standard Rosemount alarm and saturation levels)	•	•	•
Code	**Special Procedures**			
P1	Hydrostatic Testing with Certificate	•	•	•
P2	Cleaning for Special Service	•	•	•
P3	Cleaning for <1 PPM Chlorine/Fluorine	•	•	•
P4	Calibrate at line pressure *(Specify Q48 on order for corresponding certificate)*	•	•	•
Code	**Special Configuration (Hardware)**			
DF	1/2 -14 NPT flange adapter(s)— Material determined by flange material	•	•	•
D7	*Coplanar* Flange Without Drain/Vent Ports	•	•	•
D8	Ceramic Ball Drain/Vents	•	•	•
D9	JIS Process Connection—RC ¼ Flange with RC ½ Flange Adapter	•	•	•
P8(8)	0.04% accuracy to 5:1 turndown (Range 2-4)	•	•	•
P9	4500 psig (310,3 bar) Static Pressure Limit (3051CD Ranges 2–5 only)	•	—	—
P0(9)	6092 psig (420,0 bar) Static Pressure Limit (3051CD Ranges 2-5 only)	•	—	—
D1	Hardware Adjustments (zero, span, alarm, security)	•	•	•
V5(10)	External Ground Screw Assembly	•	•	•
Code	**Transmitter Version Options**			
TR	Transmitter Version 5	•	•	•

(1) 3051CG lower range limit varies with atmospheric pressure.
(2) 3051CD0 is available only with Output Code A, Process Flange Code 0 (Alternate Flange H2, H7, HJ, or HK), Isolating Diaphragm Code 2, O-ring Code A, and Bolting Option L4.
(3) 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 stainless steel housings (Option Codes J, K and M) for Group I mining applications.
(5) Requires 316L SST wetted materials, glass-filled PTFE o-ring (standard) and process connection code 2.
(6) NAMUR-Compliant operation is pre-set at the factory and cannot be changed to standard operation in the field.
(7) Requires option code C1, custom software configuration. A Configuration Data Sheet must be completed, see A-34
(8) Requires 316L SST (option 2) or Hastelloy C276 (option 3) isolating materials.
(9) Requires 316L SST or Hastelloy C-276 diaphragm material, assemble to Rosemount 305 integral manifold or DIN-compliant traditional flange process connection, and bolting option L8.
(10) The V5 option is not needed with the T1 option; external ground screw assembly is included with the T1 option.

Table A-9. 3051T Gage and Absolute Pressure Transmitter

Model	Transmitter Type	
3051T	Pressure Transmitter (requires option code TR)	
Code	**Pressure Type**	
G	Gage	
A	Absolute	
Code	**Pressure Ranges (Range/Min. Span)** **3051TG(1)**	**3051TA**
1	–14.7 to 30 psi/0.3 psi (–1,01 to 2,1 bar/20,7 mbar)	0 to 30 psia/0.3 psia (0 to 2,1 bar/20,7 mbar)
2	–14.7 to 150 psi/1.5 psi (–1,01 to 10,3 bar/103,4 mbar)	0 to 150 psia/1.5 psia (0 to 10,3 bar/103,4 mbar)
3	–14.7 to 800 psi/8 psi (–1,01 to 55,2 bar/0,55 bar)	0 to 800 psia/8 psia (0 to 55,2 bar/0,55 bar)
4	–14.7 to 4000 psi/40 psi (–1,01 to 275,8 bar/2,8 bar)	0 to 4000 psia/40 psia (0 to 275,8 bar/2,8 bar)
5	–14.7 to 10000 psi/2000 psi (–1,01 to 689,5 bar/138 bar)	0 to 10000 psia/2000 psia (0 to 689,5 bar/138 bar)
Code	**Output**	
A	4–20 mA with Digital Signal Based on *HART* Protocol	
Code	**Process Connection Style**	
2B	1/2–14 NPT Female	
2C	G½ A DIN 16288 Male (Available in SST for Range 1–4 only)	
2F	Coned and Threaded, Compatible with Autoclave Type F-250-C *(Only available in SST for Range 5)*	
Code	**Isolating Diaphragm**	**Process Connection Wetted Parts Material**
2(2)	316L SST	316L SST
3(2)	*Hastelloy* C276	*Hastelloy* C276
Code	**Fill Fluid**	
1	Silicone	
2	Inert (Fluorinert® FC-43)	
Code	**Housing Material**	**Conduit Entry Size**
A	Polyurethane-covered Aluminum	½–14 NPT
B	Polyurethane-covered Aluminum	M20 × 1.5 (CM20)
D	Polyurethane-covered Aluminum	G½
J	SST *(consult factory for availability)*	½–14 NPT
K	SST *(consult factory for availability)*	M20 × 1.5 (CM20)
M	SST *(consult factory for availability)*	G½
Code	**Integral Mount Manifold Options**	
S5	Assemble to Rosemount 306 Integral Manifold (specified separately, see the Rosemount 305 and 306 Integral Manifolds PDS (document number 00813-0100-4733)) (*Requires 1/2-in. process connection code 2B)*	
Code	**Diaphragm Seal Assemblies Options**	
S1	One Diaphragm Seal (Direct Mount or Capillary Connection Type) (Requires Process Connection Style code 2B)	
Code	**Mounting Brackets Options**	
B4	Bracket for 2-in. Pipe or Panel Mounting, All SST	
Code	**Hazardous Locations Certifications Options**	
E5	FM Explosion-proof	
I5	FM Intrinsically safe, non-incendive	
K5	FM Explosion-proof, Intrinsically safe, non-incendive (combination of E5 and I5)	
I1	ATEX Intrinsically safe, Dust	
N1	ATEX Type n, Dust	
E8	ATEX Flameproof, Dust	
E4	JIS Flameproof (consult factory for availability)	
I4	JIS Intrinsically safe (consult factory for availability)	
C5	Measurement Canada Accuracy *(Limited availability depending on transmitter type and range. Contact an Emerson Process Management representative)*	
C6	CSA Explosion-proof, Intrinsically safe	
K6	CSA and ATEX Flameproof, Intrinsically safe (combination of C6, I1, and E8)	
KB	FM and CSA Explosion-proof, Intrinsically safe, Dust (combination of K5 and C6)	
K7	SAA Flameproof, Intrinsically safe (combination of I7, N7, and E7)	
K8	ATEX Flameproof, Intrinsically Safe (combination of I1 and E8)	

Table A-9. 3051T Gage and Absolute Pressure Transmitter

KD	FM, CSA, and ATEX Explosion-proof, Intrinsically Safe (combination of K5, C6, I1, and E8)
I7[3]	SAA Intrinsically safe
E7	SAA Flameproof
N7	SAA Type n
DW[4]	NSF Drinking Water
	OTHER OPTIONS
Code	**Special Certifications**
Q4	Calibration Data Sheet
Q8	Material Traceability Certification per EN 10204 3.1.B *NOTE: This option applies to the process connection only.*
Q16	Surface finish certification for sanitary remote seals
QP	Calibration certification and tamper evident seal
QS	Prior-use certificate of FMEDA data
QT	Safety certified to IEC 61508 with certificate of FMEDA data
Code	**Display**
M5	LCD Display
Code	**Terminal Blocks**
T1	Transient Protection Terminal Block
Code	**Special Configuration (Software)**
C1	Custom Software Configuration (Completed CDS 00806-0100-4001 required with order)
C4[5]	Analog Output Levels Compliant with NAMUR Recommendation NE 43: 27-June-1996 and High Alarm Level
CN[5]	Analog Output Levels Compliant with NAMUR Recommendation NE 43: 27-June-1996 and Low Alarm Level
CR[6]	Custom alarm and saturation signal levels, high alarm
CS[6]	Custom alarm and saturation signal levels, low alarm
CT	Low alarm (standard Rosemount alarm and saturation levels)
Code	**Special Procedures**
P1	Hydrostatic Testing with Certificate
P2	Cleaning for Special Service
P3	Cleaning for <1 PPM Chlorine/Fluorine
P8[7]	0.04% accuracy to 5:1 turndown (Range 1-4)
Code	**Special Configuration (Hardware)**
D1	Hardware Adjustments (zero, span, alarm, security)
V5[8]	External Ground Screw Assembly
Code	**Transmitter Version Options**
TR	Transmitter Version 5
Typical Model Number: 3051T G 5 F 2A 2 1 A B4 TR	

(1) 3051TG lower range limit varies with atmospheric pressure.
(2) 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.
(3) Requires stainless steel housings (Option Codes J, K and M) for Group I mining applications.
(4) Requires 316L SST wetted materials, glass-filled PTFE o-ring (standard) and process connection code 2.
(5) NAMUR-Compliant operation is pre-set at the factory and cannot be changed to standard operation in the field.
(6) Requires option code C1, custom software configuration. A Configuration Data Sheet must be completed, see A-34
(7) Requires 316L SST (option 2) or Hastelloy C276 (option 3) isolating materials.
(8) The V5 option is not needed with T1 option; external ground screw assembly is included with the T1 option.

Table A-10. 3051L Flange-Mounted Liquid Level Transmitter

Model	**Transmitter Type**		
3051L	Flange-Mounted Liquid Level Transmitter (requires option code TR)		
Code	**Pressure Ranges (Range/Min. Span)**		
2	–250 to 250 inH_2O/2.5 inH_2O (–0,6 to 0,6 bar/6,2 mbar)		
3	–1000 to 1000 inH_2O/10 inH_2O (–2,5 to 2,5 bar/25 mbar)		
4	–300 to 300 psi/3 psi (–20,7 to 20,7 bar/0,2 bar)		
Code	**Output**		
A	4–20 mA with Digital Signal Based on *HART* Protocol		
High Pressure Side			
Code	**Diaphragm Size**	**Material**	**Extension Length**
G0	2 in./DN 50	316L SST	Flush Mount Only
H0	2 in./DN 50	*Hastelloy* C276	Flush Mount Only
J0	2 in./DN 50	Tantalum	Flush Mount Only
A0	3 in./DN 80	316L SST	Flush Mount
A2	3 in./DN 80	316L SST	2 in./50 mm
A4	3 in./DN 80	316L SST	4 in./100 mm
A6	3 in./DN 80	316L SST	6 in./150 mm
B0	4 in./DN 100	316L SST	Flush Mount
B2	4 in./DN 100	316L SST	2 in./50 mm
B4	4 in./DN 100	316L SST	4 in./100 mm
B6	4 in./DN 100	316L SST	6 in./150 mm
C0	3 in./DN 80	*Hastelloy* C276	Flush Mount
C2	3 in./DN 80	*Hastelloy* C276	2 in./50 mm
C4	3 in./DN 80	*Hastelloy* C276	4 in./100 mm
C6	3 in./DN 80	*Hastelloy* C276	6 in./150 mm
D0	4 in./DN 100	*Hastelloy* C276	Flush Mount
D2	4 in./DN 100	*Hastelloy* C276	2 in./50 mm
D4	4 in./DN 100	*Hastelloy* C276	4 in./100 mm
D6	4 in./DN 100	*Hastelloy* C276	6 in./150 mm
E0	3 in./DN 80	Tantalum	Flush Mount Only
F0	4 in./DN 100	Tantalum	Flush Mount Only
Code	**Mounting Flange**		
	Size	**ASME B 16.5 (ANSI) or DIN Flange Rating**	**Material**
M	2 in.	Class 150	CS
A	3 in.	Class 150	CS
B	4 in.	Class 150	CS
N	2 in.	Class 300	CS
C	3 in.	Class 300	CS
D	4 in.	Class 300	CS
P	2 in.	Class 600	CS
E	3 in.	Class 600	CS
X	2 in.	Class 150	SST
F	3 in.	Class 150	SST
G	4 in.	Class 150	SST
Y	2 in.	Class 300	SST
H	3 in.	Class 300	SST
J	4 in.	Class 300	SST
Z	2 in.	Class 600	SST
L	3 in.	Class 600	SST
Q	DN 50	PN 10-40	CS
R	DN 80	PN 40	CS
S	DN 100	PN 40	CS
V	DN 100	PN 10/16	CS

Table A-10. 3051L Flange-Mounted Liquid Level Transmitter

K	DN 50	PN 10-40		SST
T	DN 80	PN 40		SST
U	DN 100	PN 40		SST
W	DN 100	PN 10/16		SST
Code	**Process Fill-High Pressure Side**		**Temperature Limits**	
A	*Syltherm* XLT		–100 to 300 °F (–73 to 149 °C)	
C	*D. C. Silicone 704*		60 to 400 °F (15 to 205 °C)	
D	*D. C. Silicone 200*		–40 to 400 °F (–40 to 205 °C)	
H	Inert (Halocarbon)		–50 to 350 °F (–45 to 177 °C)	
G	Glycerine and Water		0 to 200 °F (–17 to 93 °C)	
N	*Neobee M-20*		0 to 400 °F (–17 to 205 °C)	
P	Propylene Glycol and Water		0 to 200 °F (–17 to 93 °C)	
Low Pressure Side				
Code	**Configuration**	**Flange Adapter**	**Diaphragm Material**	**Sensor Fill Fluid**
11	Gage	SST	316L SST	Silicone
21	Differential	SST	316L SST	Silicone
22	Differential	SST	*Hastelloy* C276	Silicone
2A	Differential	SST	316L SST	Inert (Halocarbon)
2B	Differential	SST	*Hastelloy* C276	Inert (Halocarbon)
31	Remote Seal	SST	316L SST	Silicone *(Requires Option Code S1)*
Code	**O-ring Material**			
A	Glass-filled PTFE			
Code	**Housing Material**		**Conduit Entry Size**	
A	Polyurethane-covered Aluminum		½–14 NPT	
B	Polyurethane-covered Aluminum		M20 × 1.5 (CM20)	
D	Polyurethane-covered Aluminum		G½	
J	SST *(consult factory for availability)*		½–14 NPT	
K	SST *(consult factory for availability)*		M20 × 1.5 (CM20)	
M	SST *(consult factory for availability)*		G½	
Code	**Diaphragm Seal Assemblies Options**			
S1	One Diaphragm Seal *(requires low pressure side Option Code 31 capillary connection type)*			
Code	**Hazardous Locations Certification Options**			
E5	FM Explosion-proof			
I5	FM Intrinsically safe, non-incendive			
K5	FM Explosion-proof, Intrinsically safe, non-incendive (combination of E5 and I5)			
I1	ATEX Intrinsically safe, Dust			
N1	ATEX Type n, Dust			
E8	ATEX Flameproof, Dust			
E4	JIS Flameproof (consult factory for availability)			
I4	JIS Intrinsically safe (consult factory for availability)			
C6	CSA Explosion-proof, Intrinsically safe			
K6	CSA and ATEX Flameproof, Intrinsically safe (combination of C6, I1, and E8)			
KB	FM and CSA Explosion-proof, Intrinsically safe, Dust (combination of K5 and C6)			
K7	SAA Flameproof, Intrinsically safe (combination of I7, N7, and E7)			
K8	ATEX Flameproof, Intrinsically Safe (combination of I1 and E8)			
KD	FM, CSA, and ATEX Explosion-proof, Intrinsically Safe (combination of K5, C6, I1, and E8)			
I7[(1)]	SAA Intrinsically safe			
E7	SAA Flameproof			
N7	SAA Type n			
Code	**Bolt for Flange and Adapters Options**			
L5	ASTM A 193, Grade B7M Bolts			
Code	**Display**			
M5	LCD Display			

Table A-10. 3051L Flange-Mounted Liquid Level Transmitter

	OTHER OPTIONS					
Code	**Special Certifications**					
Q4	Calibration Data Sheet					
Q8	Material Traceability Certification per EN 10204 3.1.B (*Available with the diaphragm, upper housing, Coplanar flange, adapter, sensor module housing, lower housing/flushing connection, and extension)*					
QP	Calibration certification and tamper evident seal					
QS	Prior-use certificate of FMEDA data					
QT	Safety certified to IEC 61508 with certificate of FMEDA data					
Code	**Terminal Blocks**					
T1	Transient Protection Terminal Block					
Code	**Special Configuration (Software)**					
C1	Custom Software Configuration (*Completed CDS 00806-0100-4001 required with order)*					
C4(2)	Analog Output Levels Compliant with NAMUR Recommendation NE 43: 27-June-1996 and High Alarm Level					
CN(2)	Analog Output Levels Compliant with NAMUR Recommendation NE 43: 27-June-1996 and Low Alarm Level					
CR(3)	Custom alarm and saturation signal levels, high alarm					
CS(3)	Custom alarm and saturation signal levels, low alarm					
CT	Low alarm (standard Rosemount alarm and saturation levels)					
Code	**Special Procedures**					
P1	Hydrostatic Testing with Certificate					
Code	**Special Configuration (Hardware)**					
D1	Hardware Adjustments (zero, span, alarm, security)					
D8	Ceramic Ball Drain/Vents					
V5(4)	External Ground Screw Assembly					
Code	**Lower Housing Flushing Connections**					
	Ring Material	**Number**	**Size**	**2 in.**	**3 in.**	**4 in.**
F1	SST	1	1/4	•	•	•
F2	SST	2	1/4	•	•	•
F3(5)	*Hastelloy* C276	1	1/4	•	•	•
F4(5)	*Hastelloy* C276	2	1/4	•	•	•
F7	SST	1	1/2	•	•	•
F8	SST	2	1/2	•	•	•
F9	*Hastelloy* C276	1	1/2	•	•	•
F0	*Hastelloy* C276	2	1/2	•	•	•
Code	**Transmitter Version Options**					
TR	Transmitter Version 5					

Typical Model Number: 3051L 2 A A0 A D 21 A A F1 TR

(1) Requires stainless steel housings (Option Codes J, K and M) for Group I mining applications.
(2) NAMUR-Compliant operation is pre-set at the factory and cannot be changed to standard operation in the field.
(3) Requires option code C1, custom software configuration. A Configuration Data Sheet must be completed, see A-34
(4) The V5 option is not needed with the T1 option; external ground screw assembly is included with the T1 option.
(5) Not available with Option Codes A0, B0, and G0.

OPTIONS

Standard Configuration

Unless otherwise specified, transmitter is shipped as follows:

ENGINEERING UNITS	
***Differential/Gage*:**	inH_2O (Range 0, 1, 2, and 3) psi (Range 4 and 5)
***Absolute/3051T*:**	psi (all ranges)
4 mA	0 (engineering units above)
20 mA	Upper range limit
Output:	Linear
Flange type:	Specified model code option
Flange material:	Specified model code option
O-ring material:	Specified model code option
Drain/vent:	Specified model code option
Integral meter:	Installed or none
Alarm:	Upscale
Software tag:	(Blank)

Custom Configuration *HART* protocol only

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

- Output Information
- LCD Display Configuration
- Analog Output Alarm and Saturation Signal Levels
- Scaled Variable Information
- Process Alert Setpoints

Tagging (3 options available)

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

Optional Rosemount 304, 305 or 306 Integral Manifolds

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

Optional Diaphragm and Sanitary Seals

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

Output Information

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

inH2O	inH2O@4 °C	psi	Pa
inHg	ftH2O	bar	kPa
mmH2O	mmH2O@4 °C	mbar	torr
mmHg	g/cm2	kg/cm2	atm
MPa			

Transmitter Version Option

TR Transmitter Version 5

- Optional safety certification to IEC 61508
- Scaled variable and expanded diagnostics (process alerts, configurable alarms, PlantWeb alerts)
- Optional static line pressure to 6,092 psi (420 bar)

LCD display

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

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

Hardware Adjustments

D1 Local zero, span, alarm, and security

- Internal hardware adjustment buttons and switches

Transient Protection

T1 Integral Transient Protection Terminal Block

Meets IEEE C62.41-2002, Location Category B

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

Meets IEEE C37.90.1-2002, Surge Withstand Capability
SWC 2.5 kV crest, 1.25 MHz wave form

General Specifications:

- Response Time: < 1 nanosecond
  Peak Surge Current: 5000 amps to housing
  Peak Transient Voltage: 100 V dc
  Loop Impedance: < 25 ohms
  Applicable Standards: IEC61000-4-4, IEC61000-4-5

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 per ASTM F593G

L5 Plated Alloy Steel bolts per ASTM A 193, Grade B7M

L6 *Monel* Bolts

L8 Austenitic 316 SST bolts per ASTM A193, Class 2, Grade B8M

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

Traditional Flange Bracket Options

B1 Bracket for 2-in. Pipe Mounting

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

B2 Bracket for Panel Mounting
- For use with the traditional flange option
- Bracket for mounting transmitter on wall or panel
- Carbon steel construction with carbon steel bolts
- Coated with polyurethane paint

B3 Flat Bracket for 2-in. Pipe Mounting
- For use with the traditional flange option
- Bracket for vertical mounting of transmitter on 2-in. pipe
- Carbon steel construction with carbon steel bolts
- Coated with polyurethane paint

B7 B1 Bracket with SST Bolts
- Same bracket as the B1 option with Series 300 stainless steel bolts

B8 B2 Bracket with SST Bolts
- Same bracket as the B2 option with Series 300 stainless steel bolts

B9 B3 Bracket with SST Bolts
- Same bracket as the B3 option with Series 300 stainless steel bolts

BA Stainless Steel B1 Bracket with SST Bolts
- B1 bracket in stainless steel with Series 300 stainless steel bolts

BC Stainless Steel B3 Bracket with SST Bolts
- B3 bracket in stainless steel with Series 300 stainless steel bolts

Shipping Weights

Table A-11. Transmitter Weights without Options

Transmitter	Add Weight In lb (kg)
3051C	6.8 (3.1)
3051L	Table A-12 on page A-32
3051T	3.1 (1.4)

Table A-12. 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	13.3 (6.0)	—	—	—
3-in., 150	18.3 (8.3)	20.3 (9.2)	21.3 (9.7)	22.3 (10.1)
4-in., 150	24.3 (11.0)	27.3 (12.4)	29.3 (13.3)	31.3 (14.2)
2-in., 300	18.3(8.3)	—	—	—
3-in., 300	23.3 (10.6)	25.3 (11.5)	26.3 (11.9)	27.3 (12.4)
4-in., 300	33.3 (15.1)	36.3 (16.5)	38.3 (17.4)	40.3 (18.3)
2-in., 600	16.1(7.3)	—	—	—
3-in., 600	26.0 (11.8)	28.0 (12.7)	29.0 (13.2)	30.0 (13.6)
DN 50/PN 40	14.6 (6.6)	—	—	—
DN 80/PN 40	20.3 (9.2)	22.3 (10.1)	23.3 (10.6)	24.3 (11.0)
DN 100/ PN 10/16	18.6 (8.4)	20.6 (9.3)	21.6 (9.8)	22.6 (10.3)
DN 100/ PN 40	24.0 (10.9)	26.0 (11.8)	27.0 (12.2)	28.0 (12.7)

Table A-13. Transmitter Options Weights

Code	Option	Add lb (kg)
J, K, L, M	Stainless Steel Housing(T)	4.4 (2.0)
J, K, L, M	Stainless Steel Housing (C, L, H, P)	3.5 (1.6)
M5	LCD display for Aluminum Housing	0.5 (0.2)
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)

Item	Weight In lb. (kg)
Aluminum standard cover	0.4 (0,2)
SST standard cover	1.26 (0,6)
Aluminum display cover	0.7 (0,3)
SST display cover	1.56 (0,7)
LCD display(1)	0.1 (0,1)

(1) Display only

PARTS LIST

Item numbers are references to figure callouts (pages A-12–A-19).

Model 3051C Sensor Modules (Min. Span/Range)	Silicone Fill Part Number	Inert Fill Part Number
Note: One spare part is recommended for every 50 transmitters.		
Note: Listed by Range and Process Isolator Order Numbers.		
–3 to 3/0.1 inH2O, Range 0 (includes Traditional SST flange and SST bolts).		
316L SST	03031-9141-1602	
–25 to 25 inH_2O/0.5 inH_2O, Range 1		
316L SST	03031-9100-0112	03031-9100-0212
Hastelloy C-276	03031-9100-0113	03031-9100-0213
Monel	03031-9100-0114	03031-9100-0214
Gold-plated *Monel*	03031-9100-0116	03031-9100-0216
Gold-plated 316 SST	03031-9100-0117	03031-9100-0217
–250 to 250 inH_2O/2.5 inH_2O, Range 2		
316L SST	03031-9100-0122	03031-9100-0222
Hastelloy C-276	03031-9100-0123	03031-9100-0223
Monel	03031-9100-0124	03031-9100-0224
Tantalum	03031-9100-0125	03031-9100-0225
Gold-plated *Monel*	03031-9100-0126	03031-9100-0226
Gold-plated 316 SST	03031-9100-0127	03031-9100-0227
–1000 to 1000 inH_2O/10 inH_2O, Range 3		
316L SST	03031-9100-0132	03031-9100-0232
Hastelloy C-276	03031-9100-0133	03031-9100-0233
Monel	03031-9100-0134	03031-9100-0234
Tantalum	03031-9100-0135	03031-9100-0235
Gold-plated *Monel*	03031-9100-0136	03031-9100-0236
Gold-plated 316 SST	03031-9100-0137	03031-9100-0237
–300 to 300 psi/3 psi, Range 4		
316L SST	03031-9100-0142	03031-9100-0242
Hastelloy C-276	03031-9100-0143	03031-9100-0243
Monel	03031-9100-0144	03031-9100-0244
Tantalum	03031-9100-0145	03031-9100-0245
Gold-plated *Monel*	03031-9100-0146	03031-9100-0246
Gold-plated 316 SST	03031-9100-0147	03031-9100-0247
–2000 to 2000/20 psi, Range 5		
316L SST	03031-9100-0152	03031-9100-0252
Hastelloy C-276	03031-9100-0153	03031-9100-0253
Monel	03031-9100-0154	03031-9100-0254
Tantalum	03031-9100-0155	03031-9100-0255
Gold-plated *Monel*	03031-9100-0156	03031-9100-0256
Gold-plated 316 SST	03031-9100-0157	03031-9100-0257

Model 3051C Gage Modules (Min. Span/Range)	Silicone Fill Part Number	Inert Fill Part Number
Note: One spare part is recommended for every 50 transmitters.		
Note: Listed by Range and Process Isolator Order Numbers.		
–250 to 250 inH_2O/2.5 inH_2O, Range 2		
316L SST	03031-9100-0122	03031-9100-0222
Hastelloy C-276	03031-9100-0123	03031-9100-0223
Monel	03031-9100-0124	03031-9100-0224
Tantalum	03031-9100-0125	03031-9100-0225
Gold-plated *Monel*	03031-9100-0126	03031-9100-0226
Gold-plated 316 SST	03031-9100-0127	03031-9100-0227
–335 to 1000 inH_2O/10 inH_2O, Range 3		
316L SST	03031-9100-0132	03031-9100-0232
Hastelloy C-276	03031-9100-0133	03031-9100-0233
Monel	03031-9100-0134	03031-9100-0234
Tantalum	03031-9100-0135	03031-9100-0235
Gold-plated *Monel*	03031-9100-0136	03031-9100-0236
Gold-plated 316 SST	03031-9100-0137	03031-9100-0237
–12 to 300 psi/3 psi, Range 4		
316L SST	03031-9100-0142	03031-9100-0242
Hastelloy C-276	03031-9100-0143	03031-9100-0243
Monel	03031-9100-0144	03031-9100-0244
Tantalum	03031-9100-0145	03031-9100-0245
Gold-plated *Monel*	03031-9100-0146	03031-9100-0246
Gold-plated 316 SST	03031-9100-0147	03031-9100-0247
–12 to 2000 psi/20 psi, Range 5		
316L SST	03031-9100-0152	03031-9100-0252
Hastelloy C-276	03031-9100-0153	03031-9100-0253
Monel	03031-9100-0154	03031-9100-0254
Tantalum	03031-9100-0155	03031-9100-0255
Gold-plated *Monel*	03031-9100-0156	03031-9100-0256
Gold-plated 316 SST	03031-9100-0157	03031-9100-0257

Model 3051C Absolute Sensor Modules (Min. Span/Range)	Silicone Fill Part Number	Inert Fill Part Number
Note: One spare part is recommended for every 50 transmitters.		
Note: Listed by Range and Process Isolator Order Numbers.		
0 to 30 psia/0.3 psia, Range 1		
316L SST	03031-9100-3112	—
Hastelloy C-276	03031-9100-3113	—
Monel	03031-9100-3114	—
Gold-plated *Monel*	03031-9100-3116	—
Gold-plated 316 SST	03031-9100-3117	—
0 to 150/1.5 psia, Range 2		
316L SST	03031-9100-3122	—
Hastelloy C-276	03031-9100-3123	—
Monel	03031-9100-3124	—
Gold-plated *Monel*	03031-9100-3126	—
Gold-plated 316 SST	03031-9100-3127	—
0 to 800 psia/8 psia, Range 3		
316L SST	03031-9100-3132	—
Hastelloy C-276	03031-9100-3133	—
Monel	03031-9100-3134	—
Gold-plated *Monel*	03031-9100-3136	—
Gold-plated 316 SST	03031-9100-3137	—

3051T Sensor Modules[1]	Isolating Diaphragm	Housing Material	Silicone Fill Part Number	Inert Fill Part Number
Gage Sensor Module[2] 0–0.3/30 psig, Range 1				
1/2–14 NPT Female	316L SST	Aluminum	03031-9101-6112	03031-9101-6212
1/2–14 NPT Female	*Hastelloy C*	Aluminum	03031-9101-6113	03031-9101-6213
G1/2A DIN 16288 Male	316L SST	Aluminum	03031-9102-6112	03031-9102-6212
1/2–14 NPT Female	316L SST	SST	03031-9101-4112	03031-9101-4212
1/2–14 NPT Female	*Hastelloy C*	SST	03031-9101-4113	03031-9101-4213
Gage Sensor Module[2] 0–1.5/150 psig, Range 2				
1/2–14 NPT Female	316L SST	Aluminum	03031-9101-6122	03031-9101-6222
1/2–14 NPT Female	*Hastelloy C*	Aluminum	03031-9101-6123	03031-9101-6223
G1/2A DIN 16288 Male	316L SST	Aluminum	03031-9102-6122	03031-9102-6222
1/2–14 NPT Female	316L SST	SST	03031-9101-4122	03031-9101-4222
1/2–14 NPT Female	*Hastelloy C*	SST	03031-9101-4123	03031-9101-4223
Gage Sensor Module[2] 0–8/800 psig, Range 3				
1/2–14 NPT Female	316L SST	Aluminum	03031-9101-6132	03031-9101-6232
1/2–14 NPT Female	*Hastelloy C*	Aluminum	03031-9101-6133	03031-9101-6233
G1/2A DIN 16288 Male	316L SST	Aluminum	03031-9102-6132	03031-9102-6232
1/2–14 NPT Female	316L SST	SST	03031-9101-4132	03031-9101-4232
1/2–14 NPT Female	*Hastelloy C*	SST	03031-9101-4133	03031-9101-4233
Gage Sensor Module[2] 0-40/4000 psig, Range 4				
1/2–14 NPT Female	316L SST	Aluminum	03031-9101-6142	03031-9101-6242
1/2–14 NPT Female	*Hastelloy C*	Aluminum	03031-9101-6143	03031-9101-6243
G1/2A DIN 16288 Male	316L SST	Aluminum	03031-9102-6142	03031-9102-6242
1/2–14 NPT Female	316L SST	SST	03031-9101-4142	03031-9101-4242
1/2–14 NPT Female	*Hastelloy C*	SST	03031-9101-4143	03031-9101-4243

3051T Sensor Modules[1]	Isolating Diaphragm	Housing Material	Silicone Fill Part Number	Inert Fill Part Number
Absolute Sensor Module[2] 0–0.3/30 psig, Range 1				
1/2–14 NPT Female	316L SST	Aluminum	03031-9101-7112	03031-9101-7212
1/2–14 NPT Female	*Hastelloy C*	Aluminum	03031-9101-7113	03031-9101-7213
G1/2A DIN 16288 Male	316L SST	Aluminum	03031-9102-7112	03031-9102-7212
1/2–14 NPT Female	316L SST	SST	03031-9101-5112	03031-9101-5212
1/2–14 NPT Female	*Hastelloy C*	SST	03031-9101-5113	03031-9101-5213
Absolute Sensor Module[2] 0–1.5/150 psig, Range 2				
1/2–14 NPT Female	316L SST	Aluminum	03031-9101-7122	03031-9101-7222
1/2–14 NPT Female	*Hastelloy C*	Aluminum	03031-9101-7123	03031-9101-7223
G1/2A DIN 16288 Male	316L SST	Aluminum	03031-9102-7122	03031-9102-7222
1/2–14 NPT Female	316L SST	SST	03031-9101-5122	03031-9101-5222
1/2–14 NPT Female	*Hastelloy C*	SST	03031-9101-5123	03031-9101-5223
Absolute Sensor Module[2] 0–8/800 psig, Range 3				
1/2–14 NPT Female	316L SST	Aluminum	03031-9101-7132	03031-9101-7232
1/2–14 NPT Female	*Hastelloy C*	Aluminum	03031-9101-7133	03031-9101-7233
G1/2A DIN 16288 Male	316L SST	Aluminum	03031-9102-7132	03031-9102-7232
1/2–14 NPT Female	316L SST	SST	03031-9101-5132	03031-9101-5232
1/2–14 NPT Female	*Hastelloy C*	SST	03031-9101-5133	03031-9101-5233
Absolute Sensor Module[2] 0-40/4000 psig, Range 4				
1/2–14 NPT Female	316L SST	Aluminum	03031-9101-7142	03031-9101-7242
1/2–14 NPT Female	*Hastelloy C*	Aluminum	03031-9101-7143	03031-9101-7243
G1/2A DIN 16288 Male	316L SST	Aluminum	03031-9102-7142	03031-9102-7242
1/2–14 NPT Female	316L SST	SST	03031-9101-5142	03031-9101-5242
1/2–14 NPT Female	*Hastelloy C*	SST	03031-9101-5143	03031-9101-5243
Absolute Sensor Module[2] 0-2000/10000 psig, Range 5				
1/2–14 NPT Female	316L SST	Aluminum	03031-9101-7152	03031-9101-7252
1/2–14 NPT Female	*Hastelloy C*	Aluminum	03031-9101-7153	03031-9101-7253
G1/2A DIN 16288 Male	316L SST	Aluminum	03031-9102-7152	03031-9102-7252
1/2–14 NPT Female	316L SST	SST	03031-9101-5152	03031-9101-5252
1/2–14 NPT Female	*Hastelloy C*	SST	03031-9101-5153	03031-9101-5253

(1) For Model 3051TG Range 5 spare sensor module, order absolute configuration and perform zero trim for gage calibrations.
(2) One spare part is recommended for every 50 transmitters.

SPARE PARTS

O-Ring Packages (package of 12)	Part Number
Electronic housing, cover (standard and meter)	03031-0232-0001
Electronics housing, module	03031-9233-0001
Process flange, glass-filled Teflon	03031-0234-0001
Process flange, graphite-filled Teflon	03031-0234-0002
Flange adapter, glass-filled Teflon	03031-0242-0001
Flange adapter, graphite-filled Teflon	03031-0242-0002
3051H Process Flange, TFE	02051-0167-0001
Flanges	**Part Number**
Differential Coplanar Flange	
Nickel-plated carbon steel	03031-0388-0025
316 SST	03031-0388-0022
Hastelloy C	03031-0388-0023
Monel	03031-0388-0024
Gage/Absolute Coplanar Flange	
Nickel-plated carbon steel	03031-0388-1025
316 SST	03031-0388-1022
Hastelloy C	03031-0388-1023
Monel	03031-0388-1024
Coplanar Flange Alignment Screw (package of 12)	03031-0309-0001
Traditional Flange	
316 SST	03031-0320-0002
Hastelloy C	03031-0320-0003
Monel	03031-0320-0004
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 Union	**Part Number**
Nickel-plated carbon steel	02024-0069-0005
316 SST	02024-0069-0002
Hastelloy C	02024-0069-0003
Monel	02024-0069-0004
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
Hastelloy C stem and seat kit	01151-0028-0023
Monel stem and seat kit	01151-0028-0024
316 SST ceramic ball drain/vent kit	01151-0028-0122
Hastelloy C ceramic ball drain/vent kit	01151-0028-0123
Monel ceramic ball drain/vent kit	01151-0028-0124
Gage/Absolute Drain/Vent Kits	
316 SST stem and seat kit	01151-0028-0012
Hastelloy C stem and seat kit	01151-0028-0013
Monel stem and seat kit	01151-0028-0014
316 SST ceramic ball drain/vent kit	01151-0028-0112
Hastelloy C ceramic ball drain/vent kit	01151-0028-0113
Monel ceramic ball drain/vent kit	01151-0028-0114

Mounting Brackets	
Coplanar Flange Bracket Kit	
B4 bracket, SST, 2-in. pipe mount, SST bolts	03031-0189-0003
3051T Bracket Kit	
B4 bracket, SST, 2-in. pipe mount, SST bolts	03031-0189-0004
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 for 2-in. pipe mount, CS bolts	03031-0313-0003
B7 (B1 style bracket with SST bolts)	03031-0313-0007
B8 (B2 style bracket with SST bolts)	03031-0313-0008
B9 (B3 style bracket with SST bolts)	03031-0313-0009
BA (SST B1 bracket with SST bolts)	03031-0313-0011
BC (SST B3 bracket with SST bolts)	03031-0313-0013
Bolt Kits	
COPLANAR FLANGE	
Flange Bolt Kit {44 mm (1.75 in.)}	
Carbon steel (set of 4)	03031-0312-0001
316 SST (set of 4)	03031-0312-0002
ANSI/ASTM-A-193-B7M	03031-0312-0003
Monel	03031-0312-0004
ANSI/ASTM-A-193-B8M	03031-0312-0005
Flange/Adapter Bolt Kit {73 mm (2.88 in.)}	
Carbon steel (set of 4)	03031-0306-0001
316 SST (set of 4)	03031-0306-0002
ANSI/ASTM-A-193-B7M	03031-0306-0003
Monel	03031-0306-0004
ANSI/ASTM-A-193-B8M	03031-0306-0005
Manifold/Flange Kit {57 mm (2.25 in.)}	
Carbon steel (set of 4)	03031-0311-0001
316 SST (set of 4)	03031-0311-0002
ANSI/ASTM-A-193-B7M	03031-0311-0003
Monel	03031-0311-0004
ANSI/ASTM-A-193-B8M	03031-0311-0020
TRADITIONAL FLANGE	
Differential Flange and Adapter Bolt Kit {44 mm (1.75 in.)}	
Carbon steel (set of 8)	03031-0307-0001
316 SST (set of 8)	03031-0307-0002
ANSI/ASTM-A-193-B7M	03031-0307-0003
Monel	03031-0307-0004
ANSI/ASTM-A-193-B8M	03031-0307-0005
Gage/Absolute Flange and Adapter Bolt Kit	
Carbon steel (set of 6)	03031-0307-1001
316 SST (set of 6)	03031-0307-1002
ANSI/ASTM-A-193-B7M	03031-0307-1003
Monel	03031-0307-1004
ANSI/ASTM-A-193-B8M	03031-0307-1005
Manifold/Traditional Flange Bolts	
Carbon steel (use bolts supplied with Anderson Greenwood Manifold)	Use bolts supplied with manifold
316 SST (use bolts supplied with Anderson Greenwood Manifold)	Use bolts supplied with manifold

LEVEL FLANGE, VERTICAL MOUNT	
Flange Bolt Kit (Each kit contains bolts for one transmitter)	
Carbon steel (set of 4)	03031-0395-0001
316 SST (set of 4)	03031-0395-0002
(Each kit contains bolts for one transmitter.)	
Other	
Process Flange Bolt Kit, 316 SST	02051-0164-0002
Bolt for Process Flange (set of 4)	
Nut for Process Flange (set of 4)	
Adapter Bolts (set of 4)	
Covers	
Aluminum electronics cover: cover, o-ring	03031-0292-0001
316 SST electronics cover: cover, o-ring	03031-0292-0002
Miscellaneous	
External ground screw assembly (option V5)	03031-0398-0001

Terminal Block	Part Number
Terminal Block, HART (4-20 mA)	
Standard terminal block assembly	03151-9004-0001
Transient terminal block assembly (option T1)	03151-9004-0002

Electronics Board	Part Number
Interface Assemblies for Hart Output	
HART, With Hardware Adjustments (zero, span, alarm, and security)	03151-9026-0001
HART, Without Hardware Adjustments	03151-9026-0002

LCD Display	Part Number
Display for Aluminum Housing	
Display Kit: LCD assembly, Hardware Adjustments (zero, span, alarm, and security) and aluminum meter cover assembly	03151-9025-0011
Display Kit: LCD assembly, Hardware Adjustments (zero, span, alarm, and security)	03151-9025-0001
Display Kit: LCD assembly and aluminum meter cover assembly	03151-9025-0012
Display Kit: LCD assembly	03151-9025-0002
Aluminum Display Cover Assembly	03151-9025-0010
Display for SST Housing	
Display Kit: LCD assembly, Hardware Adjustments (zero, span, alarm, and security) and SST meter cover assembly	03151-9025-0021
Display Kit: LCD assembly, Hardware Adjustments (zero, span, alarm, and security)	03151-9025-0001
Display Kit: LCD assembly and SST meter cover assembly	03151-9025-0022
Display Kit: LCD assembly	03151-9025-0002
SST Display Cover Assembly	03151-9025-0020

PRODUCT COMPATIBILITY

The spare parts within this manual (pages A-38 - A-40) support the 3051 transmitter with option code TR. The transmitter revision can be determined via HART communication. See table below:

Universal Rev	Software Rev	Device Rev	Hardware Rev
5	7	7	5

Revision Level Indicators

Determine the revision level of the Rosemount 3051 transmitter by using AMS Device Manager or HART Communicator.

HART Communicator

Fast Keys	1, 4, 4, 1, 9

3051 SAFETY CERTIFIED IDENTIFICATION

All 3051 transmitters must be identified as safety certified before installing into SIS systems.

Revision Level Indicators

To identify a safety certified 3051, the model number must include option code QT and the revision level must match the table below.

Universal Rev	Software Rev	Device Rev	Hardware Rev
5	7	7	5

To determine the model number has option code QT, review the name plate or access the information via HART communication.

HART Communicator

Fast Keys	1, 3, 4, 6

To determine revision Level of the Rosemount 3051 transmitter, use HART communication.

HART Communicator

Fast Keys	1, 4, 4, 1, 9

Appendix B Approval Information

OVERVIEW

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

SAFETY MESSAGES

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

Warnings

⚠WARNING

Explosions could result in death or serious injury:

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

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

Process leaks may cause harm or result in death.

- Install and tighten process connectors before applying pressure.

Electrical shock can result in death or serious injury.

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

⚠WARNING

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

APPROVED MANUFACTURING LOCATIONS

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

Emerson Process Management — Wessling, Germany

Emerson Process Management Asia Pacific Private Limited — Singapore

Beijing Rosemount Far East Instrument Co., LTD — Beijing, China

EUROPEAN DIRECTIVE INFORMATION

ATEX Directive

Emerson Process Management complies with the ATEX Directive.

Intrinsic safety Ex ia protection type in accordance with EN50 020

- Pressure transmitter with ia type protection shall operate with a certified intrinsic safety power supply only.
- ⚠ Closing of entries in the device must be carried out using the appropriate EExe or EExn metal cable gland and metal blanking plug or any appropriate ATEX approved cable gland and blanking plug with IP66 rating certified by an EU approved certification body.
- Pressure transmitter with intrinsic safety type protection is not valid if it is not connected to an intrinsic safety circuit.
- The Rosemount 3051 with option code T1(1) does not pass the 500V high voltage test and using it with a shunt-diode safety barrier is not allowed. Transmitter without option code T1(1) can be tested using the 500V high voltage test.

Flameproof enclosure Ex d protection type in accordance with EN50 018

- Pressure transmitter with flameproof enclosure type protection shall only be opened when power is removed.
- ⚠ Closing of entries in the device must be carried out using the appropriate EE d metal cable gland and metal blanking plug or any appropriate ATEX approved cable gland and blanking plug with IP66 rating certified by an EU approved certification body.
- Do not exceed the energy level, which is stated on the approval label.

Type n protection type in accordance with EN60079-15

- The Rosemount 3051 with option code T1(1) does not pass the 500V high voltage test and using it with a shunt-diode safety barrier is not allowed. Transmitter without option code T1(1) can be tested using the 500V high voltage test.
- ⚠ Closing of entries in the device must be carried out using the appropriate EExe or EExn metal cable gland and metal blanking plug or any appropriate ATEX approved cable gland and blanking plug with IP66 rating certified by an EU approved certification body.

(1) Lightning protection.

European Pressure Equipment Directive (PED) (97/23/EC)

Rosemount 3051CA4; 3051CD2, 3, 4, 5 *(also with P9 option)*;
Pressure Transmitters are category III equipment—
QS Certificate of Assessment - EC No. PED-H-100

All other Rosemount 3051/3001 Pressure Transmitters —
Sound Engineering Practice

Transmitter Attachments: Diaphragm Seal - Process Flange - Manifold —
Sound Engineering Practice

Pressure transmitters that are SEP or Category I with Explosion-Proof protection are outside the scope of PED and cannot be marked for compliance with PED.

Mandatory CE-marking for pressure transmitters in accordance with Article 15 of the PED can be found on the transmitter body (CE 0575).

Pressure transmitters categories I – IV, use sensor module H for conformity assessment procedures.

Electro Magnetic Compatibility (EMC)

Installed signal wiring should not be run together and should not be in the same cable tray as AC power wiring.

Device must be properly grounded or earthed according to local electric codes.

To improve protection against signal interference, shielded cable is recommended.

Other important guidelines

Only use new, original parts.

To prevent the process medium escaping, do not unscrew or remove process flange bolts, adapter bolts or bleed screws during operation.

When accessories are added to the transmitter, the minimum pressure rating of any component shall not be exceeded.

Maintenance shall only be done by qualified personnel.

ORDINARY LOCATION CERTIFICATION FOR FACTORY MUTUAL

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

HAZARDOUS LOCATIONS CERTIFICATIONS

North American Certifications

Factory Mutual (FM)

E5 Explosion-Proof for Class I, Division 1, Groups B, C, and D.
Dust-Ignition-Proof for Class II, Division 1, Groups E, F, and G.
Dust-Ignition-Proof for Class III, Division 1.
T5 (Ta = 85 °C), Factory Sealed, Enclosure Type 4x

I5 Intrinsically Safe for use in Class I, Division 1, Groups A, B, C, and D; Class II, Division 1, Groups E, F, and G; Class III, Division 1 when connected per Rosemount drawing 03151-1109 and 00268-0031 (When used with a HART communicator); Non-incendive for Class I, Division 2, Groups A, B, C, and D.
Temperature Code:T4 (Ta = 40 °C), T3 (Ta = 85 °C),
Enclosure Type 4x.

For input parameters see control drawing 03151-1109.

Canadian Standards Association (CSA)

C6 Explosion-Proof and intrinsically safe approval. Intrinsically safe for Class I, Division 1, Groups A, B, C, and D when connected in accordance with Rosemount drawings 03031-1024. Temperature Code T3C.

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

For input parameters see control drawing 03031-1024.

European Certifications

I1 ATEX Intrinsically Safe and Dust
Certification No.: BAS 97ATEX1089X ⟨Ex⟩ II 1 GD

EEx ia IIC T4 (Tamb = –60 to +70 °C)
Dust Rating: T80 °C (Tamb –20 to 40 °C) IP66/IP68
CE 1180

ATEX I1 Input Parameters

U_i= 30 V
I_i = 200 mA
P_i = 0.9 W
C_i = 0.012 µF
L_i = 0.0

Special conditions for Safe Use (X): When the optional transient protection terminal block is installed, the apparatus is not capable of withstanding the 500V insulation test required by Clause 6.4.12 of EN50020:1994. This must be taken into account when installing the apparatus.

NOTE
a) Pressure transmitter with ia type protection shall operate with a certified intrinsic safety power supply only.
⚠ b) Closing of entries in the device must be carried out using the appropriate EExe or EExn metal cable gland and metal blanking plug or any appropriate ATEX approved cable gland and blanking plug with IP66 rating certified by an EU approved certification body.
c) Pressure transmitter with intrinsic safety type protection is not valid if it is not connected to an intrinsic safety circuit.

The transmitter complies with category one (highest category) and is allowed to be installed in ZONE 0.

N1 ATEX Non-incendive/Type n and Dust
Certification No.: BAS 00ATEX3105X ⟨Ex⟩ II 3 GD

EEx nL IIC T5 (T_{amb} = –40 to +70 °C)
U_i = 45 Vdc max
Dust rating: T80 °C (T_{amb} = –20 to 40 °C) IP66/IP68

Special Conditions for Safe Use (x): When the optional transient protection terminal block is installed, the apparatus is not capable of withstanding a 500V r.m.s. by Clause 8.1 of EN60079-15 test to case. This must be taken into account on any installation in which it is used, for example by assuring that the supply to the apparatus is galvanically isolated.

E8 ATEX Flame-Proof and Dust
Certification No.: KEMA 00ATEX2013X ⟨Ex⟩ II 1/2 GD

EEx d IIC T6 (T_{amb} = –50 to 65 °C)
EEx d IIC T5 (T_{amb} = –50 to 80 °C)
Dust rating T90 °C, IP66/IP68
CE 1180
Vmax = 45 V dc

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

NOTE
a) Pressure transmitter with flameproof enclosure type protection shall only be opened when power is removed.
b) Closing of entries in the device must be carried out using the appropriate EE d metal cable gland and metal blanking plug or any appropriate ATEX approved cable gland and blanking plug with IP66 rating certified by an EU approved certification body.
c) Do not exceed the energy level, which is stated on the approval label.

Japanese Certifications

Approvals pending, consult factory for availability.

E4 JIS Flame-Proof

I4 JIS Intrinsic Safety

Australian Certifications

I7 SAA Intrinsic Safety
Certification No.: AUS EX 1249X

Ex ia IIC T4 (T_{amb} = 70 °C)
Ex ia I (T_{amb} = -60 °C to +70 °C)
IP65
When connected per Rosemount drawing 03031-1026

Special Conditions for Safe Use (X):
The apparatus may only be used with a passive current limited power source Intrinsic Safety application. The power source must be such that $Po \leq (Uo * Io) / 4$.

Sensor modules using transient protection in the terminal assembly (T1 transient protection models) the apparatus enclosure is to be electrically bonded to the protective earth.

The conductor used for the connection shall be equivalent to a copper conductor of 4 mm^2 minimum cross-sectional area.

SAA Approved Input Parameters
U_i = 30 V
I_i = 200 mA
I_i = 160 mA (Option Code T1)
P_i = 0.9 W
C_i = 0.01 µF (Output Code A)
L_i = 10 µH
L_i = 1,05 mH (Output Code A with T1)(1)

E7 SAA Explosion-Proof (Flame-Proof)
Certification No.: AUS EX 1347X

Ex d IIC T6 (T_{amb} = 40 °C)
Ex d IIC T5 (T_{amb} = 80 °C)
DIP T6 (T_{amb} = 40 °C)
DIP T5 (T_{amb} = 80 °C)
IP65

Special Conditions for Safe Use (x): It is a condition of safe use for transmitter enclosures having cable entry thread other than metric conduit thread that the equipment be utilized with an appropriate certified thread adaptor.

N7 SAA Type n (Non-sparking)
Certification No.: AUS EX 1249X

Ex n IIC T4 (T_{amb} = 70 °C)
Ex n IIC T5 (T_{amb} = 40 °C)
IP65

Special Conditions for Safe Use (x): Where the equipment is installed such that there is an unused conduit entry, it must be sealed with a suitable blanking plug to maintain the IP40 degree of protection. Any blanking plug used with the equipment shall be of a type which requires the use of a tool to effect its removal. Voltage source shall not exceed 60V ac or 75V dc.

Combinations of Certifications

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

K5 **E5** and **I5** combination

KB **K5** and **C6** combination

K6 **C6**, **I1**, and **E8** combination

K8 **E8** and **I1** combination

K7 **E7**, **I7**, and **N7** combination

KD **K5, C6, I1,** and **E8** combination

(1) SAA intrinsically safe requires stainless steel housing for Group I mining applications.

APPROVAL DRAWINGS

Factory Mutual (FM)

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

REVISIONS

REV	DESCRIPTION	CHG. NO.	APP'D	DATE
AA	NEW RELEASE	RTC1022986	J.G.K.	11/28/06

ENTITY APPROVALS FOR
3051C
3051L
3051H
3051CA
3051T

OUTPUT CODE A (4-20 mA HART) I.S. SEE SHEETS 2-4
NONINCENDIVE SEE SHEET 5

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

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

CAD MAINTAINED (MicroStation)

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

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

DO NOT SCALE PRINT

CONTRACT NO.

DR. Myles Lee Miller 11/28/06

CHK'D

APP'D. Jon Koehler 11/28/06

APP'D. GOVT.

EMERSON. Process Management

ROSEMOUNT®
8200 Market Boulevard • Chanhassen, MN 55317 USA

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

SIZE	FSCM NO	DWG NO.
A		03151-1109

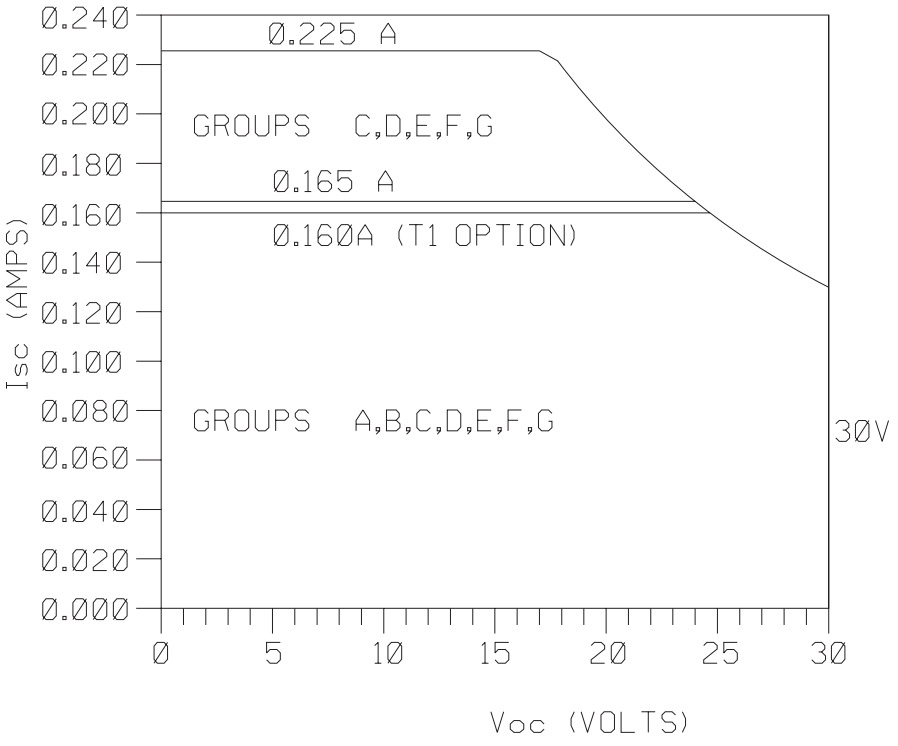
SCALE N/A WT. ——— SHEET 1 OF 5

Form Rev AC

REVISIONS				
REV	DESCRIPTION	CHG. NO.	APP'D	DATE
AA				

BARRIER PARAMETERS (APPLICABLE TO OUTPUT CODES A & M)

Pmax = 1WATT



Rosemount Inc.
8200 Market Boulevard
Chanhassen, MN 55317 USA

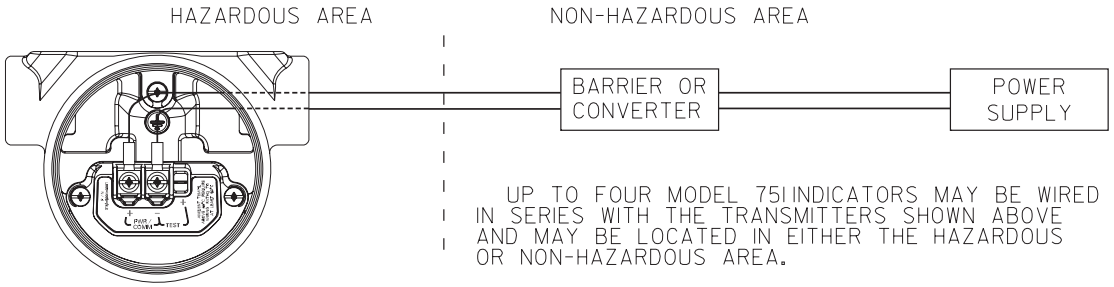
CAD MAINTAINED (MicroStation)

DR. Myles Lee Miller	SIZE A	FSCM NO	DWG NO. 03151-1109	
ISSUED	SCALE N/A	WT. ———	SHEET 2 OF 5	

Form Rev AC

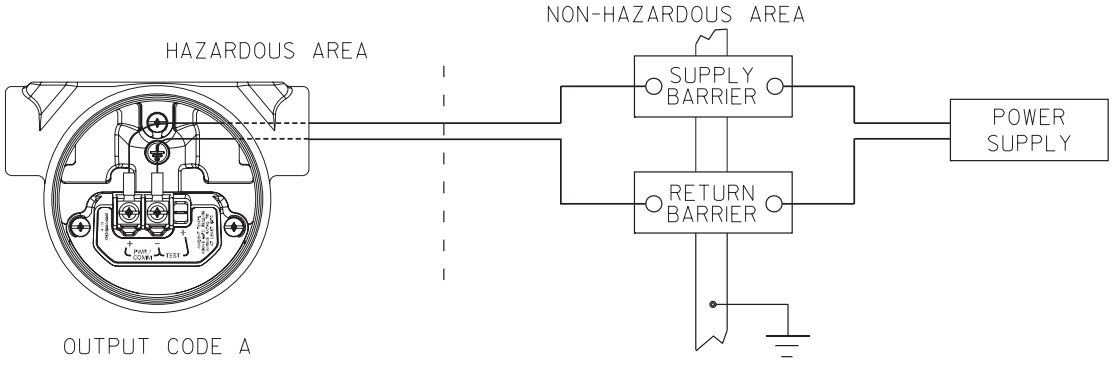
REVISIONS				
REV	DESCRIPTION	CHG. NO.	APP'D	DATE
AA				

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



OUTPUT CODE A
MODELS INCLUDED
305IC, L, H, T, CA

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



OUTPUT CODE A
MODELS INCLUDED
305IC, L, H, T, CA

Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA			CAD MAINTAINED (MicroStation)
DR. Myles Lee Miller	SIZE A	FSCM NO	DWG NO. 03151-1109
ISSUED	SCALE N/A	WT. ———	SHEET 3 OF 5

Form Rev AC

REVISIONS				
REV	DESCRIPTION	CHG. NO.	APP'D	DATE
AA				

ENTITY CONCEPT APPROVALS

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

FOR OUTPUT CODE A

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

CLASS I, DIV. 1, GROUPS A AND B

V_{MAX} = 30V	V_T OR V_{OC} IS LESS THAN OR EQUAL TO 30V
I_{MAX} = 165mA	I_T OR I_{SC} IS LESS THAN OR EQUAL TO 165mA
P_{MAX} = 1 WATT	$(\frac{V_T \times I_T}{4})$ OR $(\frac{Voc \times Isc}{4})$ IS LESS THAN OR EQUAL TO 1 WATT
C_I = .Ø12μf	C_A IS GREATER THAN .Ø12μf
L_I =1Ø μH	L_A IS GREATER THAN 1Ø μH

✳ FOR T1 OPTION:

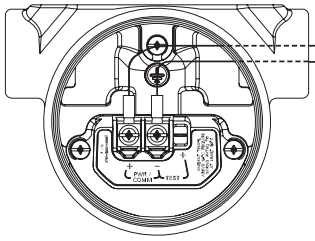
Imax = 160mA	I_T OR I_{SC} IS LESS THAN OR EQUAL TO 160mA
L_I =1.Ø5mH	L_A IS GREATER THAN 1.Ø5mH

CLASS I, DIV. 1, GROUPS C AND D

V_{MAX} = 30V	V_T OR V_{OC} IS LESS THAN OR EQUAL TO 30V
I_{MAX} = 225mA	I_T OR I_{SC} IS LESS THAN OR EQUAL TO 225mA
P_{MAX} = 1 WATT	$(\frac{V_T \times I_T}{4})$ OR $(\frac{Voc \times Isc}{4})$ IS LESS THAN OR EQUAL TO 1 WATT
C_I = .Ø12μf	C_A IS GREATER THAN .Ø12μf
L_I =1Ø μH	L_A IS GREATER THAN 1Ø μH

✳ FOR T1 OPTION:

L_I =1.Ø5mH	L_A IS GREATER THAN 1.Ø5mH



HAZARDOUS AREA | NON-HAZARDOUS AREA

ASSOCIATED APPARATUS

(SEE SHEET 3)

OUTPUT CODE A

MODELS INCLUDED

305IC, L, H, T, CA

Rosemount Inc.
8200 Market Boulevard
Chanhassen, MN 55317 USA

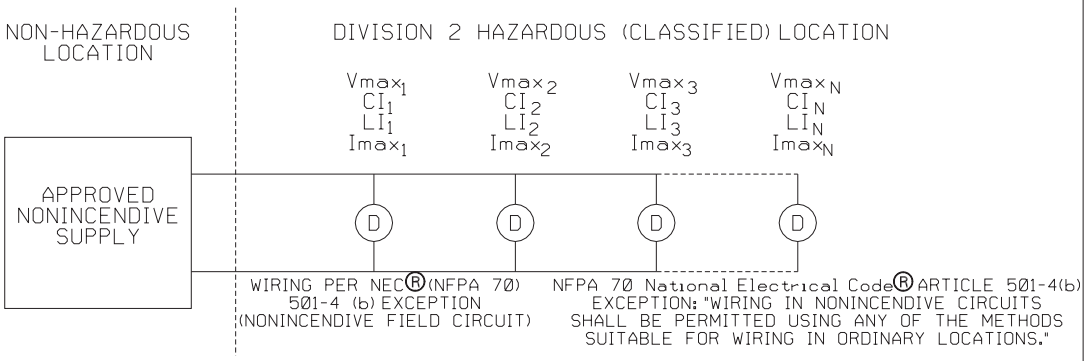
CAD MAINTAINED (MicroStation)

DR. Myles Lee Miller	SIZE A	FSCM NO	DWG NO. Ø3151-1109
ISSUED	SCALE N/A	WT. ———	SHEET 4 OF 5

Form Rev AC

REVISIONS				
REV	DESCRIPTION	CHG. NO.	APP'D	DATE
AA				

NONINCENDIVE FIELD CIRCUIT
CLASS I, DIV. 2 LOCATIONS



IN NORMAL OPERATION

DEVICES CONTROL THROUGH-CURRENT

PARAMETERS DEVICE

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

$Imax_1$ >= Iq_1 + $Isignal_1$

$Imax_2$ >= Iq_1 + $Isignal_2$

.

.

.

$Imax_N$ >= Iq_N + $Isignal_N$

Ca <= C_{i_1} + C_{i_2} +... + C_{i_N} + Ccable

La <= L_{i_1} + L_{i_2} +... + L_{i_N} + Lcable

Imax for an individual device = Iq + Isignal

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

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

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

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

ROSEMOUNT 3051

	4-20mA / HART	FIELDBUS (F or W)
Vmax	30v	30v
Maximum normal operating current	22mA	27mA
Ca	.012uF	0uF
La	10uH	0uH

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

REFERENCE: APPENDIX A7.3 (FM3611)

Rosemount Inc.
8200 Market Boulevard
Chanhassen, MN 55317 USA

CAD MAINTAINED (MicroStation)

DR. Myles Lee Miller	SIZE A	FSCM NO	DWG NO. 03151-1109	
ISSUED	SCALE N/A	WT. ———	SHEET 5 OF 5	

Form Rev AC

Canadian Standards Association (CSA)

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

REVISIONS

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

APPROVALS FOR

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

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

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

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

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

CAD MAINTAINED (MicroStation)

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

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

DO NOT SCALE PRINT

CONTRACT NO.

DR. Mike Dobe 08/27/90

CHK'D

APP'D. GLEN MONZO 8/31/90

APP'D. GOVT.

EMERSON. Process Management

ROSEMOUNT®
8200 Market Boulevard • Chanhassen, MN 55317 USA

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

SIZE	FSCM NO	DWG NO.
A		03031-1024

SCALE N/A WT. ——— SHEET 1 OF 9

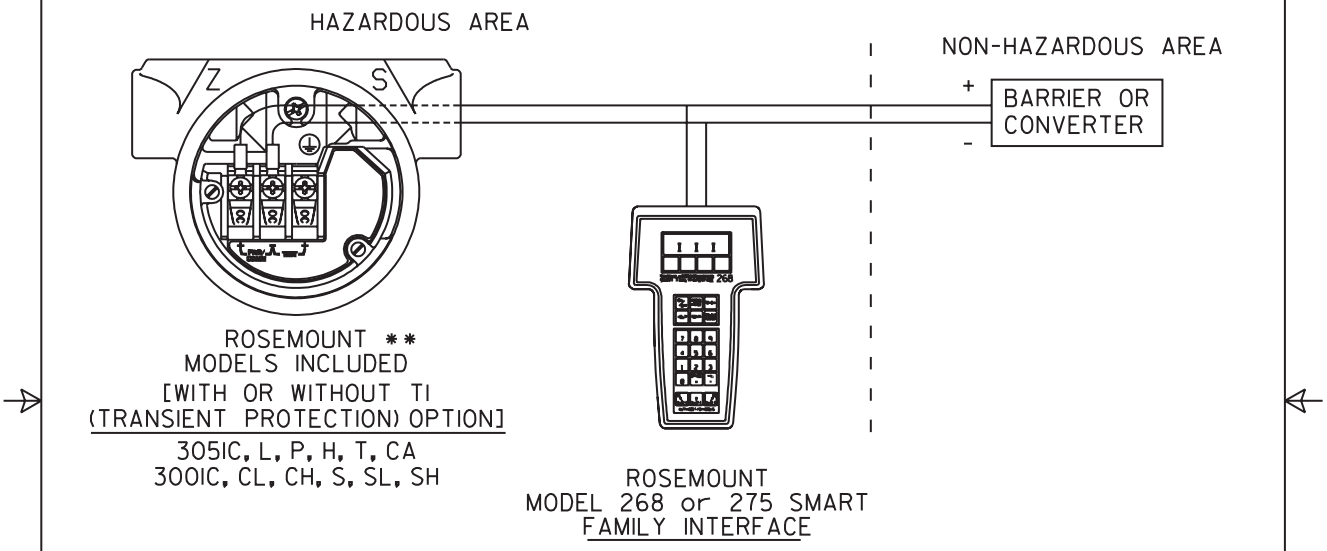
REVISIONS				
REV	DESCRIPTION	CHG. NO.	APP'D	DATE
AD				

CSA INTRINSIC SAFETY APPROVALS

CIRCUIT CONNECTION WITH BARRIER OR CONVERTER

Ex ia

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



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

ROSEMOUNT
MODEL 268 or 275 SMART
FAMILY INTERFACE

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

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

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

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

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

LOW POWER, ("M" OUTPUT CODE)

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

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

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

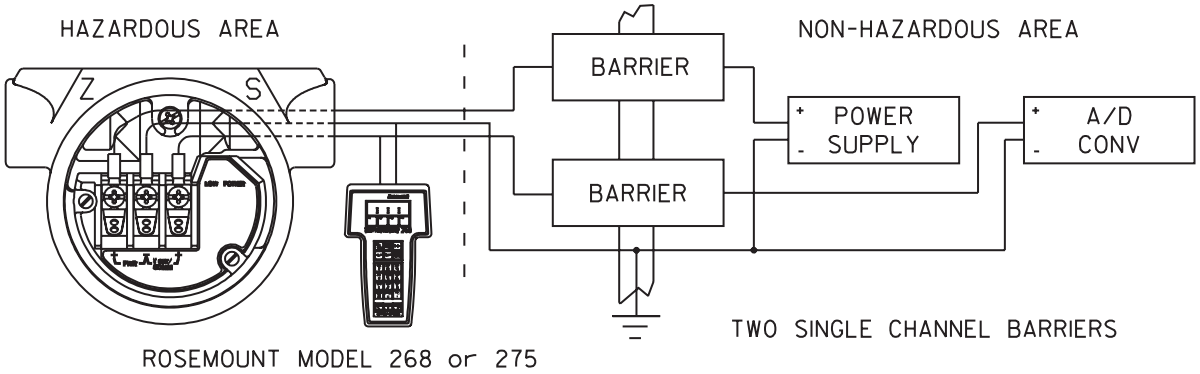
REVISIONS				
REV	DESCRIPTION	CHG. NO.	APP'D	DATE
AD				

CSA INTRINSIC SAFETY APPROVALS

305IC LOW POWER CIRCUIT CONNECTION WITH INTRINSIC SAFETY BARRIERS

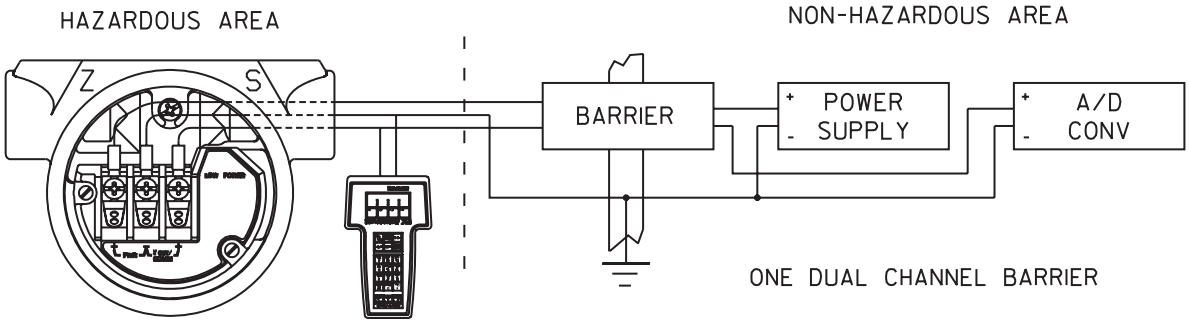
Ex ia

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



ROSEMOUNT MODEL 268 or 275

TWO SINGLE CHANNEL BARRIERS



ROSEMOUNT MODEL 268 or 275

ONE DUAL CHANNEL BARRIER

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

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

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

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

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

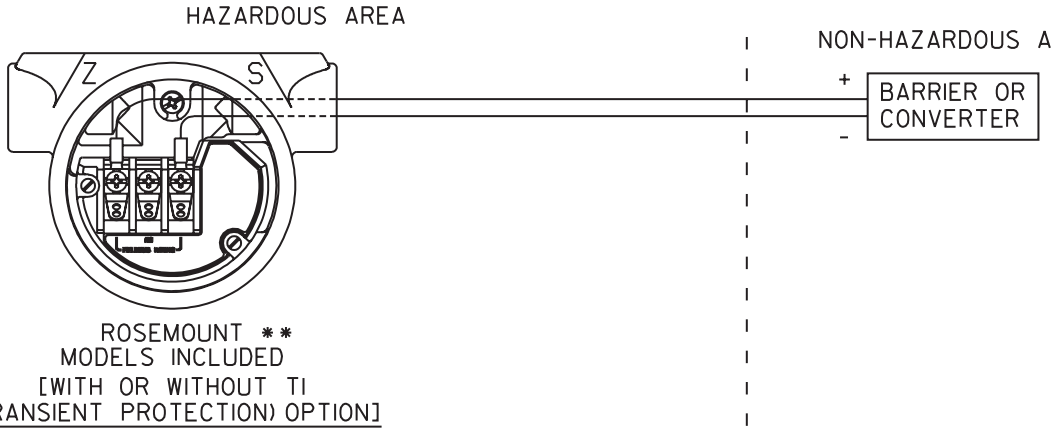
DEVICE	PARAMETERS	APPROVED FOR CLASS I, DIV.I
CSA APPROVED SAFETY BARRIER	30 V OR LESS 300 OHMS OR MORE 28 V OR LESS 235 OHMS OR MORE 25 V OR LESS 160 OHMS OR MORE 22 V OR LESS 100 OHMS OR MORE	GROUPS A, B, C, D

CSA INTRINSIC SAFETY APPROVALS

CIRCUIT CONNECTION WITH BARRIER OR CONVERTER

Ex ia

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



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

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

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

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

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

FISCO CONCEPT APPROVALS

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

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

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

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

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

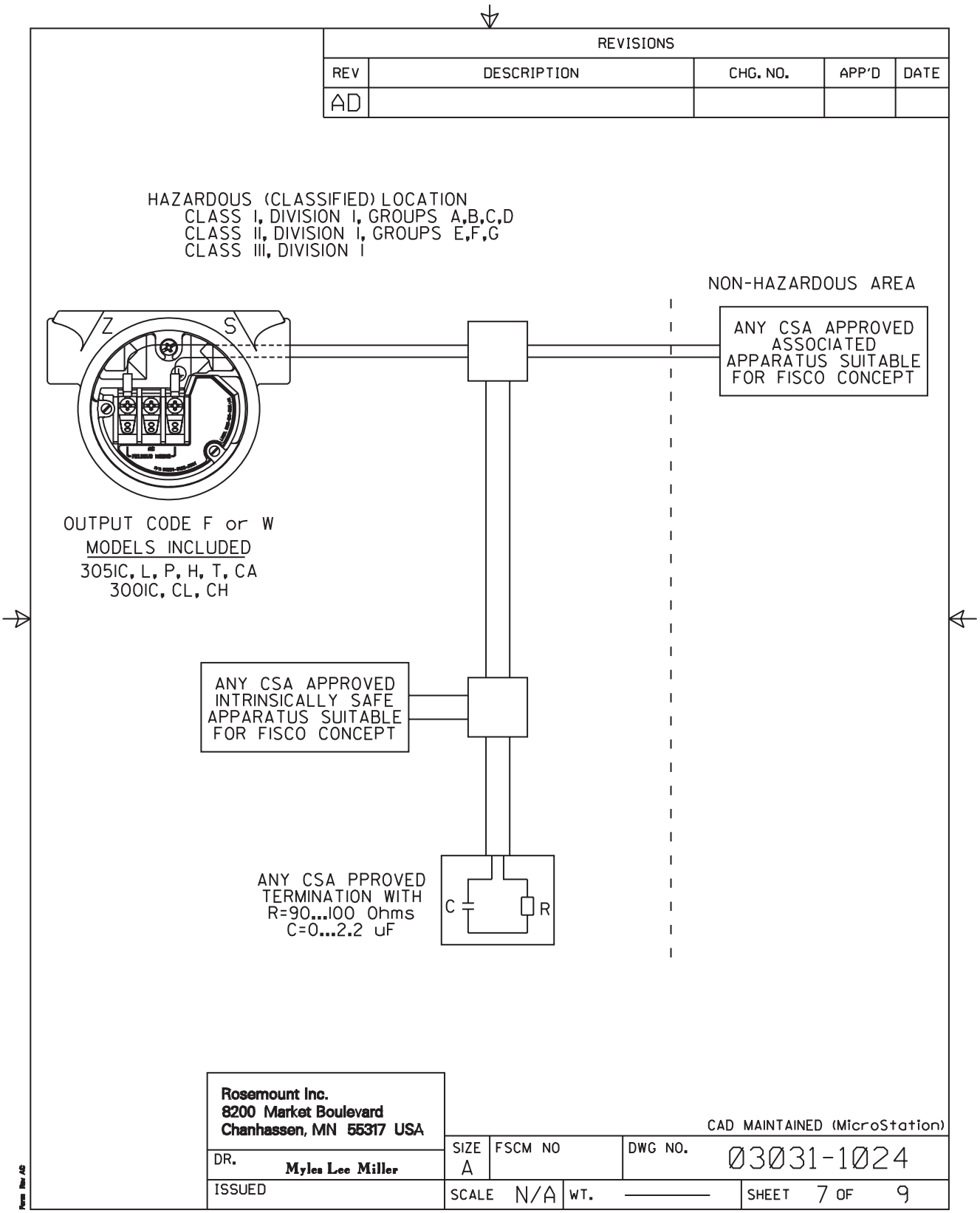
R = 90...100 OHMS C = 2.2μF

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

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

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

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

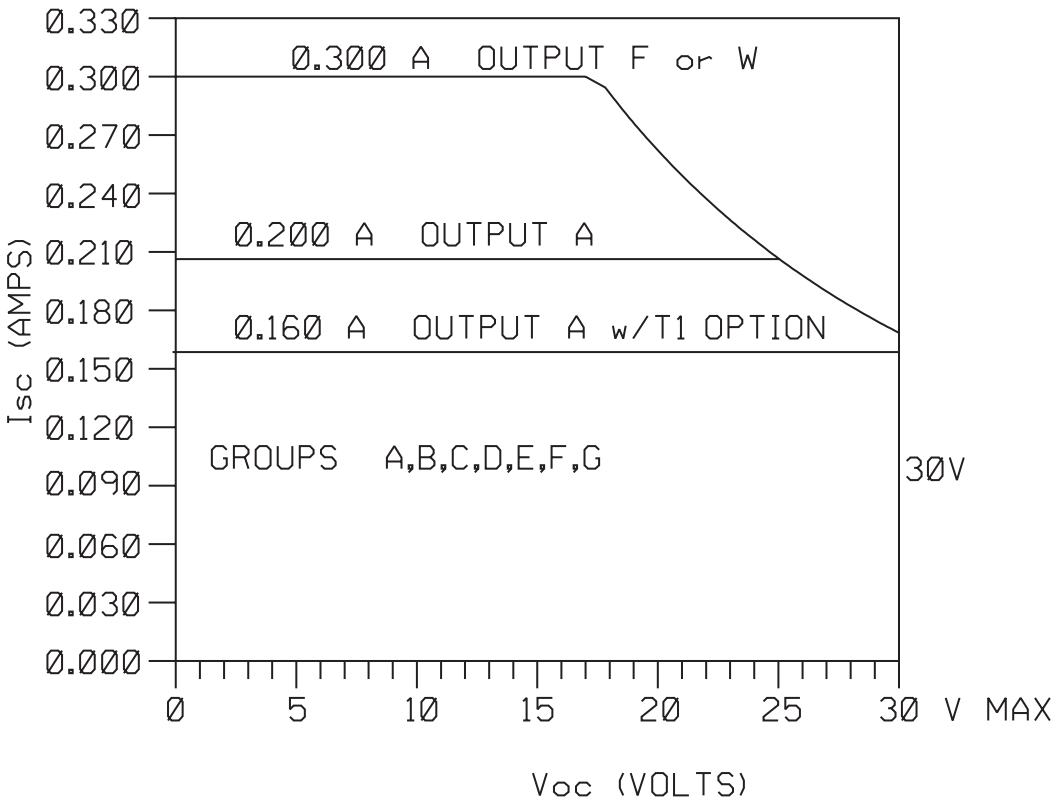

REVISIONS
REV
DESCRIPTION
CHG. NO.
APP'D
DATE
AD
HAZARDOUS (CLASSIFIED) LOCATION
CLASS I, DIVISION I, GROUPS A,B,C,D
CLASS II, DIVISION I, GROUPS E,F,G
CLASS III, DIVISION I
NON-HAZARDOUS AREA
ANY CSA APPROVED ASSOCIATED APPARATUS SUITABLE FOR FISCO CONCEPT
OUTPUT CODE F or W
MODELS INCLUDED
305IC, L, P, H, T, CA
300IC, CL, CH
ANY CSA APPROVED INTRINSICALLY SAFE APPARATUS SUITABLE FOR FISCO CONCEPT
ANY CSA PPROVED TERMINATION WITH R=90...100 Ohms C=0...2.2 uF
C
R
Rosemount Inc.
8200 Market Boulevard
Chanhassen, MN 55317 USA
DR.
Myles Lee Miller
ISSUED
CAD MAINTAINED (MicroStation)
SIZE
A
FSCM NO
DWG NO.
03031-1024
SCALE N/A
WT.
SHEET 7 OF 9

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

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

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

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



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

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

ENTITY CONCEPT APPROVALS

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

FOR OUTPUT CODE A

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

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

* FOR T1 OPTION:

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

FOR OUTPUT CODE F or W

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

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

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

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

Standards Association of Australia (SAA)

CONFIDENTIAL AND PROPRIETARY INFORMATION IS CONTAINED HEREIN AND MUST BE HANDLED ACCORDINGLY	REVISIONS				
	REV	DESCRIPTION	CHG. NO.	APP'D	DATE
	AA	UPDATE ENTITY PARAMETERS	RTC1002910	J.D.J.	12/2/97
	AB	ADD FIELDBUS AND PROFIBUS	RTC1006448	J.D.J.	4/26/99

SAA ENTITY CONCEPT APPROVALS

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

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

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

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

CAD Maintained, (MICROSTATION)

UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES [mm]. REMOVE ALL BURRS AND SHARP EDGES. MACHINE SURFACE FINISH 125 -TOLERANCE- .X ± .1 [2.5] .XX ± .02 [0.5] .XXX ± .010 [0.25] FRACTIONS ± 1/32 ANGLES ± 2° DO NOT SCALE PRINT	CONTRACT NO. DR. Mike Dobe 12/30/91 CHK'D APP'D. GLEN MONZO 5/8/92 APP'D. GOVT.	ROSEMOUNT® MEASUREMENT FISHER-ROSEMOUNT Rosemount Inc. 12001 Technology Drive Eden Prairie, MN 55344 USA TITLE SAA I.S. INDEX FOR 3051 & 3001 SIZE A FSCM NO DWG NO. 03031-1026 SCALE N/A WT. SHEET 1 OF 4

REVISIONS				
REV	DESCRIPTION	CHG. NO.	APP'D	DATE
AB		RTC1006448		

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

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

APPROVED TRANSMITTERS

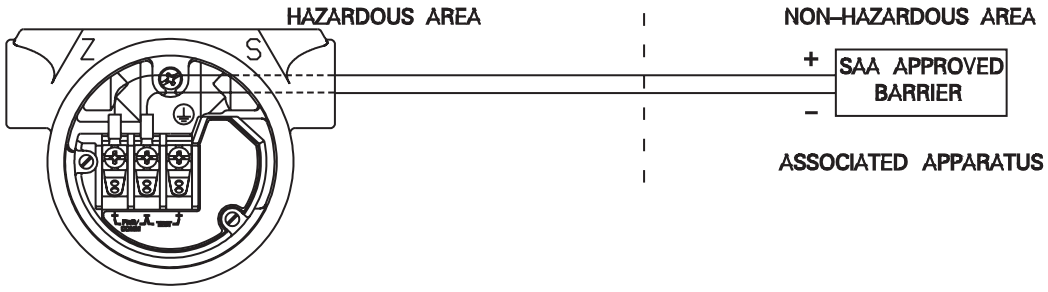
3051C	3051H	3001C	3001S
3051L	3051T	3001CL	
3051P	3051CA	3001CH	

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

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

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

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



Rosemount Inc.
12001 Technology Drive
Eden Prairie, MN 55344 USA

CAD Maintained, (MICROSTATION)

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

REVISIONS				
REV	DESCRIPTION	CHG. NO.	APP'D	DATE
AB		RTC1006448		

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

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

APPROVED TRANSMITTERS WITH LOW POWER CONFIGURATION

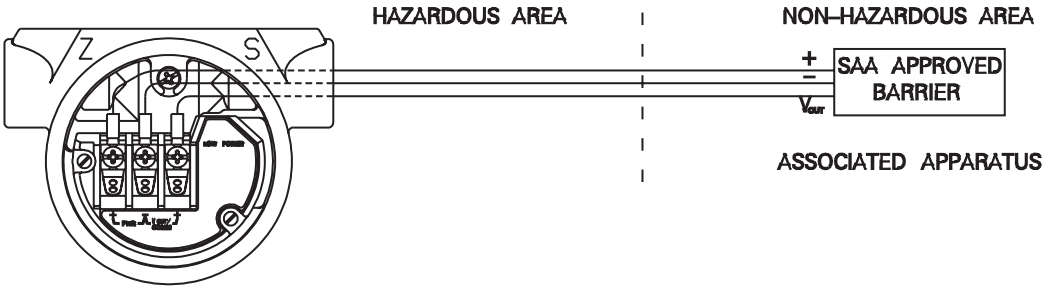
3051C
3051L
3051P
3051H
3051T
3051CA

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

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

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

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



Rosemount Inc. 12001 Technology Drive Eden Prairie, MN 55344 USA			CAD Maintained, (MICROSTATION)	
DR. Mike Debe	SIZE A	FSCM NO	DWG NO. 03031-1026	
ISSUED	SCALE N/A	WT. ———	SHEET 3 OF 4	

REVISIONS				
REV	DESCRIPTION	CHG. NO.	APP'D	DATE
AB		RTC1006448		

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

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

APPROVED TRANSMITTERS

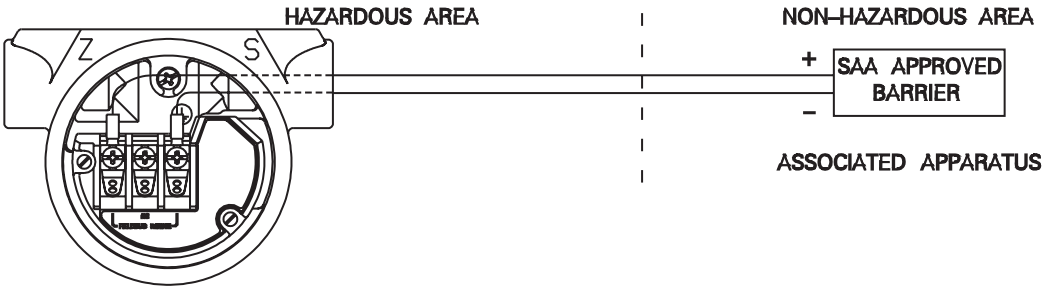
3051C	3051H	3001C	3001S
3051L	3051T	3001CL	
3051P	3051CA	3001CH	

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

APPARATUS PARAMETER	BARRIER PARAMETER
Vmax = 30V Imax = 300mA Pmax = 1.3W Ci = 0 μF Li = 0μH	Voc IS LESS THAN OR EQUAL TO 30V Isc IS LESS THAN OR EQUAL TO 300mA $\frac{Voc * Isc}{4}$ IS LESS THAN OR EQUAL TO 1.3W Ca IS GREATER THAN 0 MICROFARADS La IS GREATER THAN 0 MICROHENRIES

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

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



Rosemount Inc.
12001 Technology Drive
Eden Prairie, MN 55344 USA

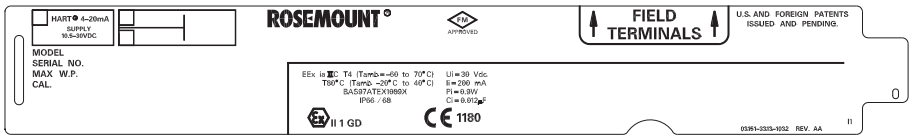
CAD Maintained, (MICROSTATION)

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

EUROPEAN ATEX DIRECTIVE INFORMATION

CENELEC/BASEEFA

Rosemount 3051 pressure transmitters that have the following label attached, have been certified to comply with Directive 94/9/EC of the European Parliament and the Council as published in the Official Journal of the European Communities No. L 100/1 on 19–April–1994.



The following information is provided as part of the labeling of the transmitter:

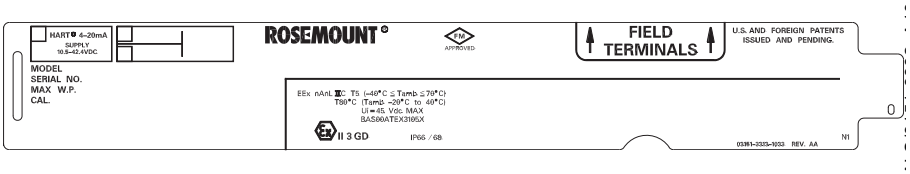
Name and address of the manufacturer (any of the following):

- Rosemount USA
- Rosemount Germany
- Rosemount Singapore
- Rosemount China

CE 1180

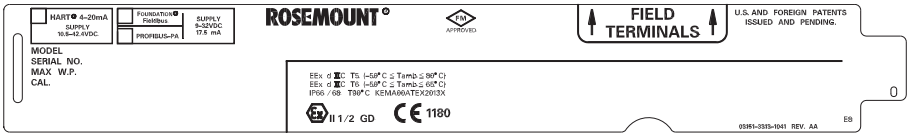
- Complete model number (see “Reference Data” on page A-1)
- The serial number of the device
- Year of construction
- Marking for explosion protection: **II 1G**
  EEx ia IIC T4 (T_{amb} = -60 to 70 °C)
  Ui = 30 V dc, I_i = 200 mA, P_i = 0.9 W, C_i = 0.012 µF, Li = 0 mH
  BASEEFA ATEX certificate number: BAS97ATEX1089X

Type n housing label



- Marking for explosion protection: **II 3 G**
  EEx nAnL IIC T5 (-40 °C ≤ T_{amb} ≤ 70 °C)
  Ui = 45 Vdc MAX
  BASEEFA ATEX certificate number: BAS00ATEX3105X

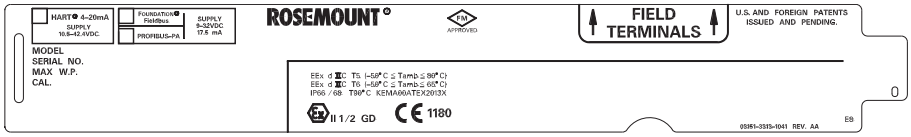
Dust housing label



- Marking for explosion protection: **II 1 D**
  T90°C
  IP66/68
  V = 42.4 VOLTS MAX
  KEMA ATEX certificate number: KEMA00ATEX2013X

CENELEC/KEMA Flameproof

Rosemount 3051 pressure transmitters that have the following label attached, have been certified to comply with Directive 94/9/EC of the European Parliament and the Council as published in the Official Journal of the European Communities No. L 100/1 on 19–April–1994.



The following information is provided as part of the labeling of the transmitter:

Name and address of the manufacturer (any of the following):

- Rosemount USA
- Rosemount Germany
- Rosemount Singapore
- Rosemount China

CE **1180**

- Complete model number (see “Reference Data” on page A-1)
- The serial number of the device
- Year of construction
- Marking for explosion protection: **II 1/2 G**
  EEx d IIC T6 (T_{amb} = –50 to 40 °C)
  EEx d IIC T5 (T_{amb} = –50 to 70 °C)
  ATEX certificate number: KEMA00ATEX2013X

Index

Reference Manual
00809-0100-4051, Rev AA
January 2007

Rosemount 3051

Emerson Process Management

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Fax 49 (8153) 939172

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Singapore 128461
Tel (65) 777-8211
Fax (65) 777-0947
Enquiries@AP.EmersonProcess.com

EMERSON™
Process Management