Reference Manual
00809-0100-4801, Rev AA
January 2002

Model 3051S Series
Pressure Transmitter Family

ROSEMOUNT®

www.rosemount.com

EMERSON™
Process Management

Reference Manual
00809-0100-4801, Rev AA
December 2001

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Model 3051S Series 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.

Rosemount Inc. has two toll-free assistance numbers:

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.

Section 1 Introduction

USING THIS MANUAL

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

- **Section 2: Installation** contains mechanical and electrical installation instructions, and field upgrade options for HART® and fieldbus protocols.
- **Section 3: Configuration** provides instruction on commissioning and operating Model 3051S Series transmitters. Information on software functions, configuration parameters, and online variables is also included. This section covers HART protocol only. For fieldbus protocol specific configuration see the Model 3051S fieldbus supplement document number 00809-0200-4801.
- **Section 4: Operation and Maintenance** contains operation and maintenance techniques for HART protocol only. For fieldbus protocol see the Model 3051S fieldbus supplement document number 00809-0200-4801.
- **Section 5: Troubleshooting** provides troubleshooting techniques for the most common operating problems for HART protocol only. For fieldbus protocol see the Model 3051S fieldbus supplement document number 00809-0200-4801.
- **Appendix A: Reference Data** supplies reference and specification data, as well as ordering information for HART and fieldbus protocols.
- **Appendix B: Approval Information** contains intrinsic safety approval information, European ATEX directive information, and approval drawings for HART and fieldbus protocols.

MODELS COVERED

Refer to Table 1-1 for the location of HART and fieldbus protocol information. This manual, for specific sections, covers both protocols. However, for more specific fieldbus information, see the fieldbus supplement (document number 00809-0200-4801).

Table 1-1. Location of HART and fieldbus protocol information

Section	HART	Fieldbus
Installation	This manual (00809-0100-4801)	This manual (00809-0100-4801)
Configuration	This manual (00809-0100-4801)	Fieldbus supplement (00809-0200-4801)
Operation and Maintenance	This manual (00809-0100-4801)	Fieldbus supplement (00809-0200-4801)
Troubleshooting	This manual (00809-0100-4801)	Fieldbus supplement (00809-0200-4801)
Reference data	This manual (00809-0100-4801)	This manual (00809-0100-4801)
Approvals	This manual (00809-0100-4801)	This manual (00809-0100-4801)

The following Model 3051S Series pressure transmitters and the Model 300S Housing Kit are covered in this manual.

Model 3051S Series Coplanar™ Pressure Transmitter

Performance Class	Measurement Type		
	Differential	Gage	Absolute
Ultra	X	X	X
Classic	X	X	X

Model 3051S Series In-Line Pressure Transmitter

Performance Class	Measurement Type		
	Differential	Gage	Absolute
Ultra	–	X	X
Classic	–	X	X

Model 3051S Series Liquid Level Pressure Transmitter

Performance Class	Measurement Type		
	Differential	Gage	Absolute
Classic	X	X	X

Model 300S Scalable Housing Kits

Kits are available for all models of Model 3051S Series pressure transmitters.

Service Support

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

Within the United States, call the Rosemount National 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.

Rosemount National 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 HART and fieldbus protocols. A Quick Installation Guide for HART protocol (document number 00825-0100-4801) is shipped with every transmitter to describe basic pipe-fitting and wiring procedures for initial installation. Dimensional drawings for each Model 3051S Series variation and mounting configuration are included in Appendix A: Reference Data.

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.

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 can result in death or serious injury.

- Do not remove the transmitter covers in explosive environments when the circuit is live.
- Fully engage both transmitter covers to meet explosion-proof requirements.
- Before connecting a 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.
- Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

⚠WARNING

Electrical shock can result in death or serious injury.

- Avoid contact with the leads and terminals.

⚠WARNING

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.

⚠WARNING

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

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

⚠WARNING

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

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

⚠WARNING

Upper and lower unit labeling must match exactly to maintain hazardous location approvals.

- When upgrading, it is imperative that approval codes match between the SuperModule and the 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 openings with a minimum of five threads engaged to comply with explosion-proof requirements.

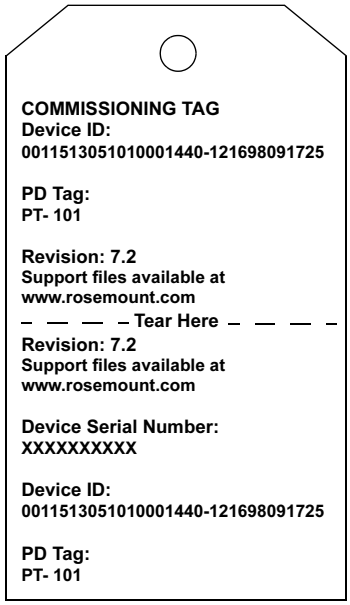
For material compatibility considerations, see document number 00816-0100-3045 on www.rosemount.com.

Tagging

Commissioning (Paper) Tag on a fieldbus segment

When commissioning more than one device on a fieldbus segment, it can be difficult to identify which device is at a particular location. A removable tag provided with the transmitter can aid in this process by linking the Device ID and a physical location. The Device ID is a unique code that identifies a particular device in the absence of a device tag. The device tag is used by the customer as an operational identification for the device and is usually defined by the Piping and Instrumentation Diagram (P & ID).

The installer should note the physical location in both places on the removable commissioning tag and tear off the bottom portion. This should be done for each device on the segment. The bottom portion of the tags can be used for commissioning the segment in the control system, providing a direct link between the Device ID and the tag location.



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 2-3 on page 2-10, keeping drain/vent connections on the bottom for gas service and on the top for liquid service.

ENVIRONMENTAL CONSIDERATIONS

Access requirements and cover installation on page 2-7 can help optimize transmitter performance. Mount the transmitter to minimize ambient temperature changes, vibration, mechanical shock, and to avoid external contact with corrosive materials. Appendix A: Reference Data lists temperature operating limits.

Figure 2-1. HART Installation Flowchart

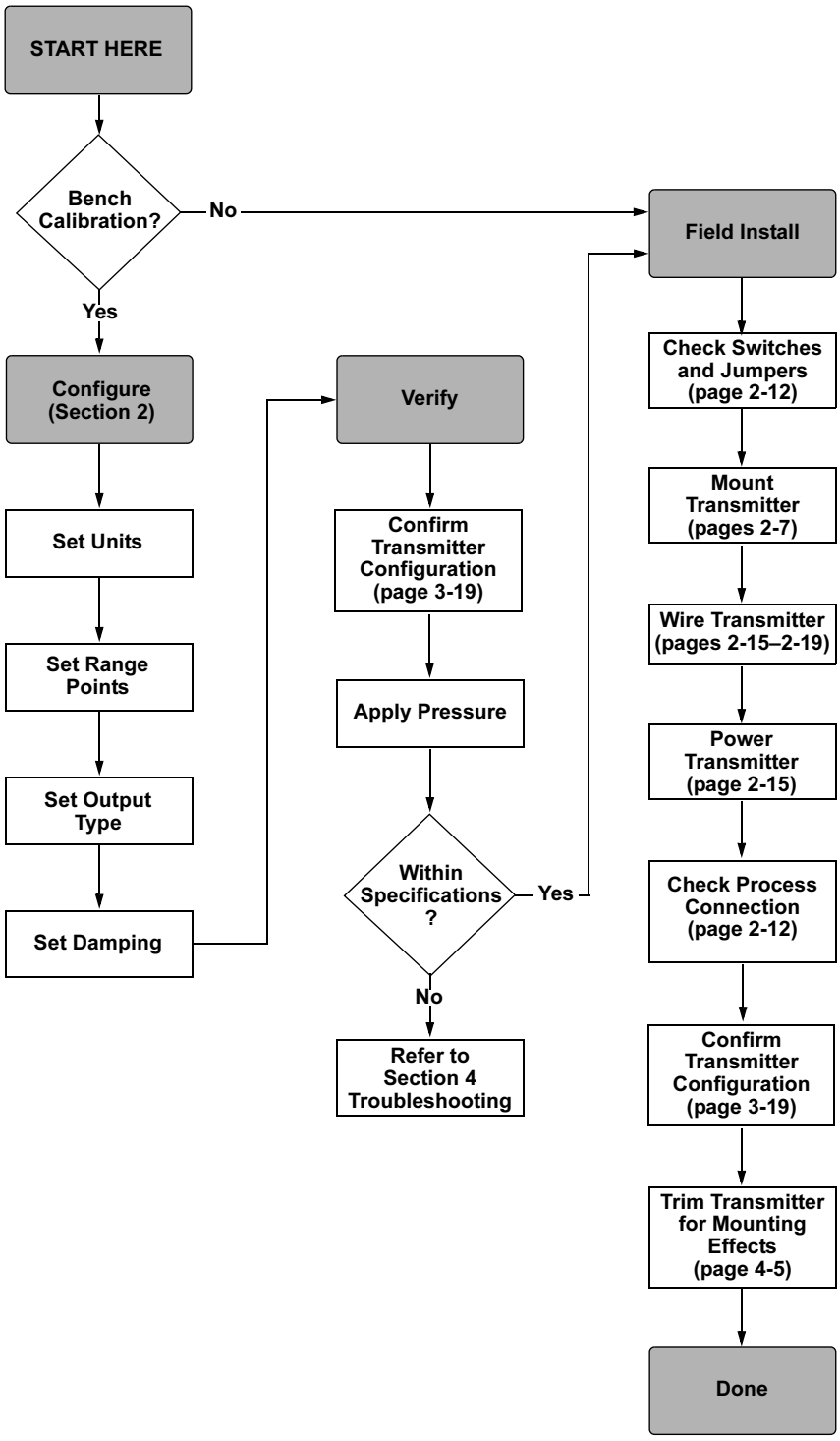
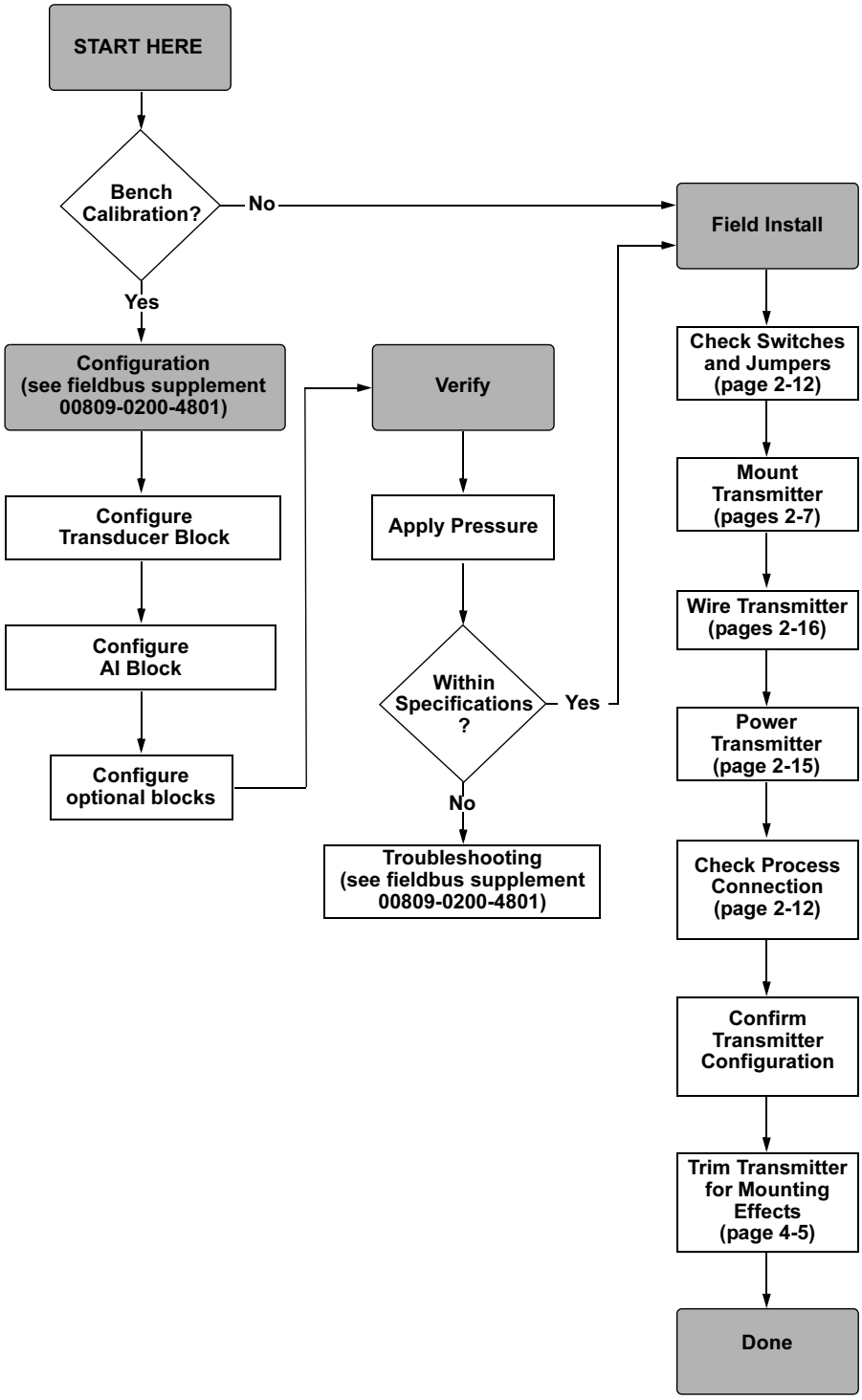


Figure 2-2. Fieldbus Installation Flowchart



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 need for a testing or calibration input.

Housing Rotation

See “Consider Housing Rotation” on page 2-12.

Terminal Side of Electronics Housing

Mount the transmitter so the terminal side is accessible. Clearance of 0.75-inch (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 inches (19 mm) of clearance for units with out an LCD meter. Three inches of clearance is required for cover removal if a meter is installed.

Cover Installation

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

Mount the Transmitter

Mounting Brackets

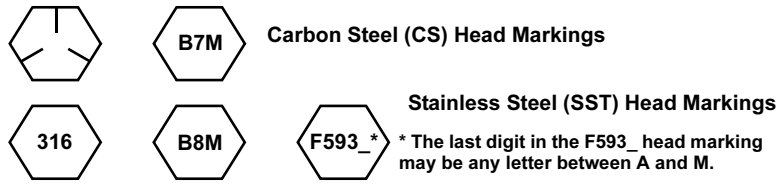
Facilitate mounting transmitter to a 2-in. pipe, or to a panel. The B4 Bracket (SST) option is standard for use with the Coplanar and In-Line flanges. “Coplanar flange mounting configurations” on page A-13 shows bracket dimensions and mounting configurations for the B4 option.

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

NOTE
Most transmitters are calibrated in the horizontal position. Mounting the transmitter in any other position will shift the zero point to the equivalent amount of liquid head caused by the varied mounting position. To reset zero point, refer to “Sensor Trim” on page 4-5.

Mounting Bolts

The Model 3051S Series is shipped with a Coplanar flange installed with four 1.75-inch flange bolts. “Coplanar flange mounting configurations” on page A-13 show mounting bolts and bolting configurations. Stainless steel bolts supplied by Rosemount Inc. 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 Rosemount Inc. are identified by their head markings:



Bolt Installation

⚠ Only use bolts supplied with the Model 3051S Series or sold by Rosemount Inc. 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:

Bolt	Initial	Final
Carbon Steel	300 in-lbs.	650 in-lbs.
SST	150 in-lbs.	300 in-lbs.

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

Impulse Piping

The piping between the process and the transmitter must accurately transfer the pressure to obtain accurate measurements. There are five possible sources of error: 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 depends on the process itself. Use the following guidelines to determine transmitter location and placement of impulse piping:

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

Mounting Requirements

Refer to Figure 2-3 for examples of the following mounting configurations:

Liquid Flow Measurement

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

Gas Flow Measurement

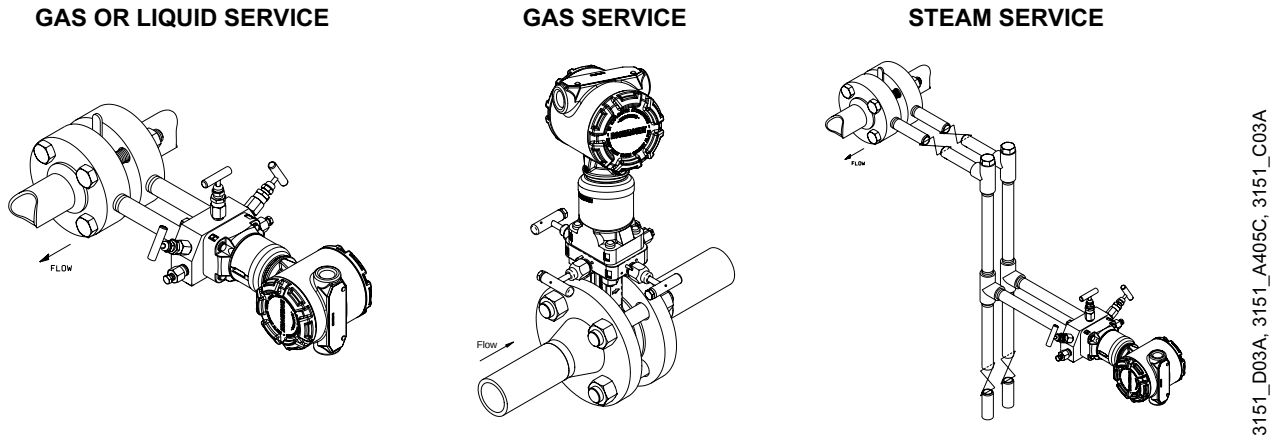
- Place taps in the top or side of the line.
- Mount the transmitter beside or above the taps so to drain liquid into the process line.

Steam Flow Measurement

- Place taps to the side of the line.
- Mount the transmitter below the taps to ensure that impulse piping will remain filled with condensate.
- Fill impulse lines with water to prevent steam from contacting the transmitter directly and to ensure accurate measurement start-up.

NOTE
For steam or other elevated temperature services, it is important that temperatures at the Coplanar process flanges must not exceed 250 °F (121 °C) for transmitters with silicone fill, or 185 °F (85 °C) for inert fill. For vacuum service, these temperature limits are reduced to 220 °F (104 °C) for silicone fill and 160 °F (71 °C) for inert fill.

Figure 2-3. Installation Examples



Process Connections

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

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

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

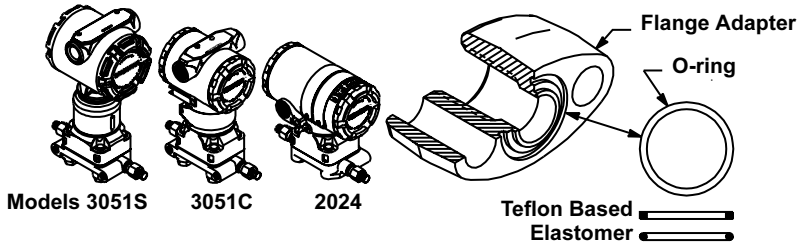
1. Remove the flange bolts.
2. Leaving the flange in place, move the adapters into position with the O-ring installed.
3. Clamp the adapters and the Coplanar flange to the transmitter module using the longer of the bolts supplied.
4. Tighten the bolts. Refer to “Mounting Bolts” on page 2-8 for torque specifications.

⚠WARNING

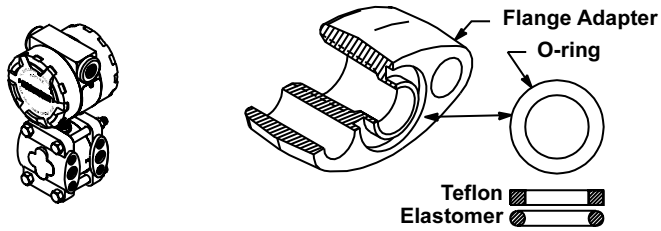
Failure to install proper flange adapter O-rings can cause process leaks, which can result in death or serious injury.

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.

MODELS 3051S/ 3051/3001/3095/2024



MODEL 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 Model 3051S Series transmitters.

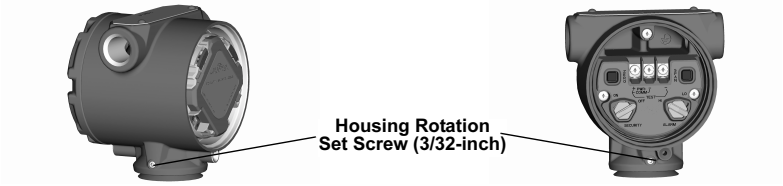
⚠ See “Safety Messages” on page 2-1 for complete warning information.

Whenever you remove flanges or adapters, visually inspect the Teflon® O-rings. Replace them if there are any signs of damage, such as nicks or cuts. If you replace the O-rings, re-torque the flange bolts after installation to compensate for cold flow. Refer to the process sensor body reassembly procedure in Section 4: Operation and Maintenance.

Consider 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 meter. To rotate the housing, perform the following procedure:

PlantWeb® Housing	Junction Box Housing



1. Loosen the housing rotation set screw using a 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.

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

Set Switches and Jumpers

Security (Write Protect)

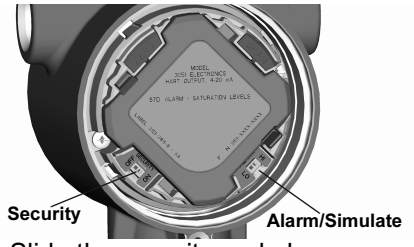
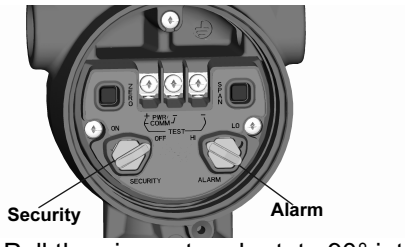
Changes can be prevented to the transmitter configuration data with the write protection PlantWeb housing switches and Junction Box housing jumpers. Security is controlled by the security (write protect) switch/jumper located on the interface assembly or terminal block. Position the switch/jumper in the “ON” position to prevent accidental or deliberate change of configuration data.

If the transmitter write protection switch/jumper 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 on.

To reposition the switches/jumpers, follow the procedure described below. (Alarm = HART protocol, Simulate = fieldbus protocol)

1. If the transmitter is installed, set the loop to manual and remove power.
2. ⚠ Remove the electronics compartment cover, opposite the field terminal side on the PlantWeb housing or the terminal block cover on the Junction Box housing. Do not remove the transmitter covers in explosive atmospheres when the circuit is live.
3. Follow the procedure in Figure 2-4 to reposition the switches/jumpers as desired for the specific housing compartment.
4. ⚠ Re-install the transmitter cover. Transmitter covers must be fully engaged to meet explosion-proof requirements.

Figure 2-4. Switch and jumper configuration

PlantWeb Housing Switches	Junction Box Housing Jumpers
	
Slide the security and alarm switches into the preferred position by using a small screwdriver. (A meter or adjustment module must be in place to activate the switches.)	Pull the pins out and rotate 90° into desired position to set the security and alarm. **NOTE:** Fieldbus protocol is not available with Junction Box housing.

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*. The simulate default is “Disable” for fieldbus protocol.

HART Communicator

Fast Keys	1, 3, 4, 5

Usage Note
The HART Communicator can be used to configure the security on and off. Otherwise, if the transmitter contains the D1 option, the switch/jumper will override any software configuration.

AMS

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 PlantWeb housing switches or Junction Box housing jumpers. Position the switch/ jumper 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). Otherwise, if the transmitter contains the D1 option, the switch/jumper on the transmitter will override the HART Communicator.

AMS

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

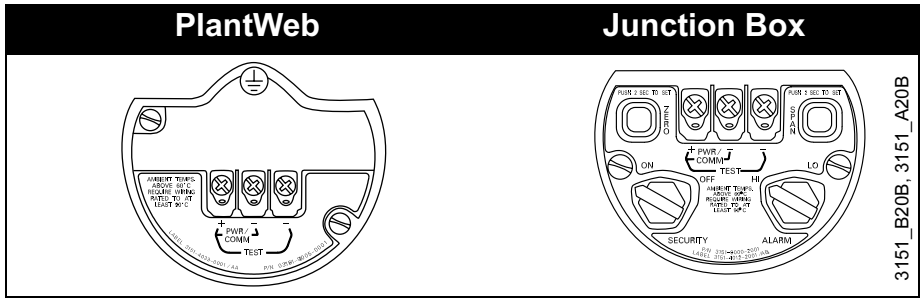
1. Enter desired alarm direction, click **Next**.
2. Click **Next** to acknowledge setting has changed. If hardware adjustments are activated, click **Next** to acknowledge the “Switch option detected, function disabled, alarm direction unchanged” screen. If the hardware adjustments are activated, the 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 (1 500 meters).

Figure 2-5. HART Terminal Blocks



To make connections, perform the following procedure:

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 connections 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.

Inductive-based transient protectors, including the Rosemount Model 470, can adversely affect the output of Model 3051S Series 4–20 mA transmitters. Do not use Model 470 for transient protection with a Model 3051S Series. If your application requires transient protection, install a transient protection terminal block.

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.

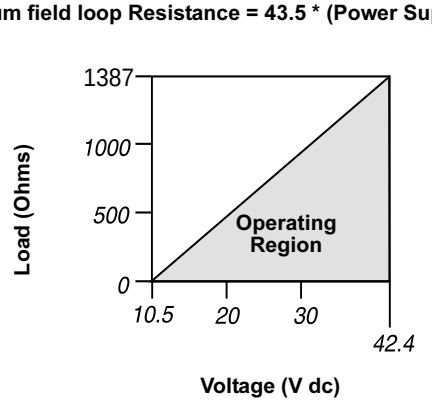
Power Supply 4–20 mA Transmitters

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. Note that the resistance of intrinsic safety barriers, if used, must be included.

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 Model 3051S Series transmitter, the power supply used, and circuitry common to the transmitters, should not have more than 20 ohms of impedance at 1200 Hz.

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

Figure 2-6. Power Supply Load Limitations, 4–20 mA Transmitters



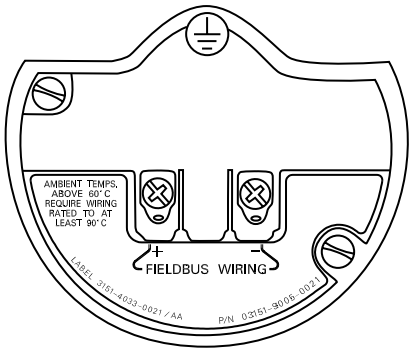
COSMOS/0103B

Wiring for fieldbus protocol

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 power leads to the terminals marked “FIELDBUS WIRING” as shown in Figure 2-7. The power terminals are not polarity sensitive.
3. Plug and seal unused conduit connections on the transmitter housing to avoid moisture accumulation in the terminal side. If you do not seal unused connections, mount the transmitter with the electrical housing positioned downward for drainage. Install wiring with a drip loop. Arrange the drip loop so the bottom is lower than the conduit connections and the transmitter housing.

NOTE
Do not apply high voltage (e.g. ac line voltage) to the transmitter terminals. Abnormally high voltage can damage the unit. (Transmitter poser terminals are rated to 32 V dc.

Figure 2-7. Fieldbus terminal block



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

Electrical Considerations

Proper electrical installation is necessary to prevent errors due to improper grounding and electrical noise. Shielded, twisted pair cable should be used for best results in electrically noisy environments. Cable Type A is recommended by FOUNDATION® fieldbus.

Power Supply

The transmitter requires between 9 and 32 V dc (9 and 15 V dc for FISCO) to operate and provide complete functionality. The dc power supply should provide power with less than 2% ripple.

Power Conditioner

A fieldbus segment requires a power conditioner to isolate the power supply filter and decouple the segment from other segments attached to the same power supply.

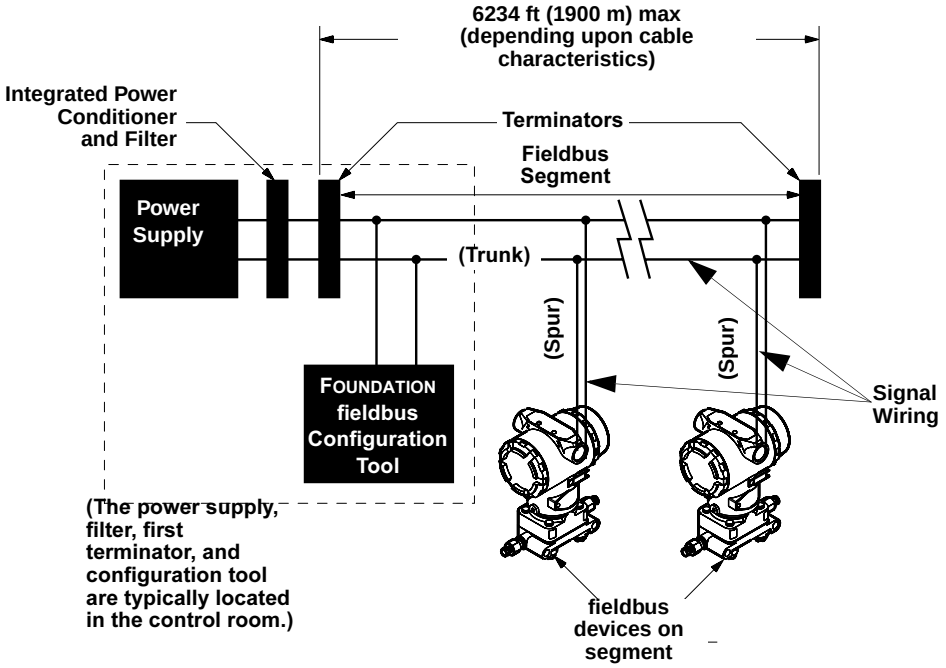
Grounding

Signal wiring of the fieldbus segment can not be grounded. Grounding out one of the signal wires will shut down the entire fieldbus segment.

Shield Wire Ground

To protect the fieldbus segment from noise, grounding techniques for shield wire usually require a single grounding point for shield wire to avoid creating a ground loop. The ground point is typically at the power supply.

Figure 2-8. Fieldbus transmitter field wiring



***Intrinsically safe installations may allow fewer devices per I.S. barrier due to current limitations.**

Surges/Transients
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.

Optional Transient Protection Terminal Block
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 Model 3051 transmitters in the field. The spare part number is 03031-0332-2002. The lightning bolt symbol shown in identifies the transient protection terminal block.

NOTE
The fieldbus physical layer specification requires transmitter communication during extreme operating conditions of 250 V_{rms} common mode signal. The transient terminal block was designed to limit common mode voltages to 90 V and cannot be used in these extreme operating conditions.

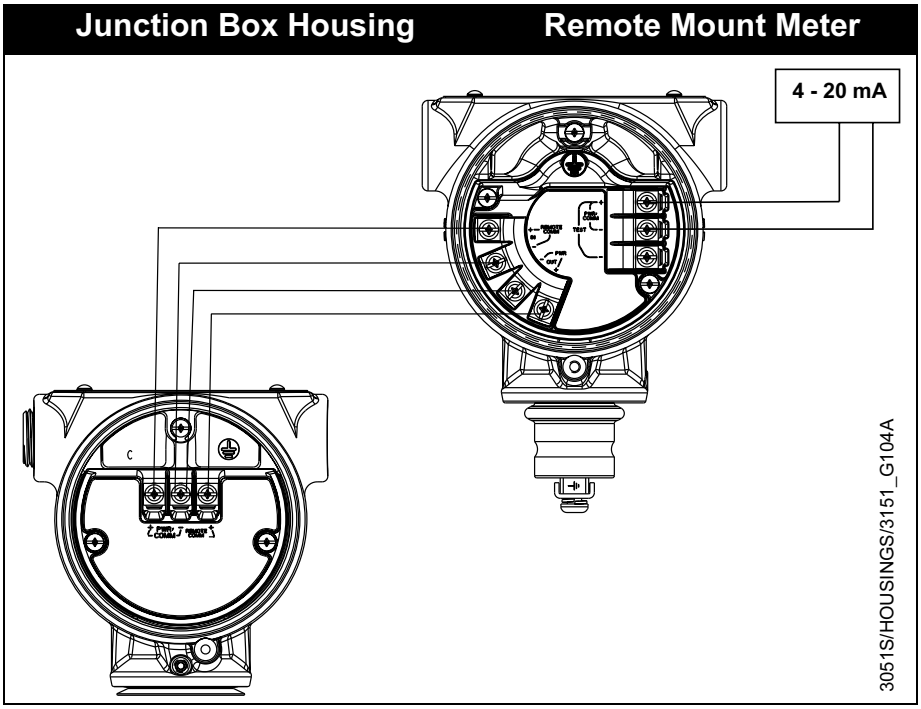
Remote Meter Wiring and Power Up

The Remote Mount Meter system consists of a local transmitter and a remote mount LCD meter assembly. The local Model 3051S transmitter assembly includes a Junction Box housing with a three position terminal block integrally mounted to a SuperModule. The remote mount LCD meter assembly consists of a dual compartment PlantWeb housing with a seven position terminal block. See “Remote Mount Meter wiring diagram” on page 2-19 for complete wiring instructions. The following is a list of necessary information specific to the Remote Mount Meter system:

- Each terminal block is unique for the remote meter system.
- A 316 SST housing adapter is permanently secured to the remote mount LCD meter PlantWeb housing providing an external ground and a means for field mounting with the provided mounting bracket.
- A cable is provided for wiring between the transmitter and remote mount LCD meter. The cable length is limited to 100 ft.

⚠ **IMPORTANT**
Do not apply power to the digital data bus terminal. Follow wiring instructions carefully to prevent damage to system components.

Figure 2-9. Remote Mount Meter wiring diagram



HAZARDOUS LOCATIONS

The Model 3051S Series has explosion-proof housing and circuitry suitable for intrinsically safe and non-incendive operation. Individual transmitters are clearly marked with a tag indicating the certifications they carry. See Appendix B: Approval Information for installation drawings.

NOTE
Once a device labeled with multiple approvals is installed, it should not be reinstalled using any other approval type(s). Permanently mark the certification label to distinguish the installed approval type from unused approval types.

Grounding the Transmitter Case

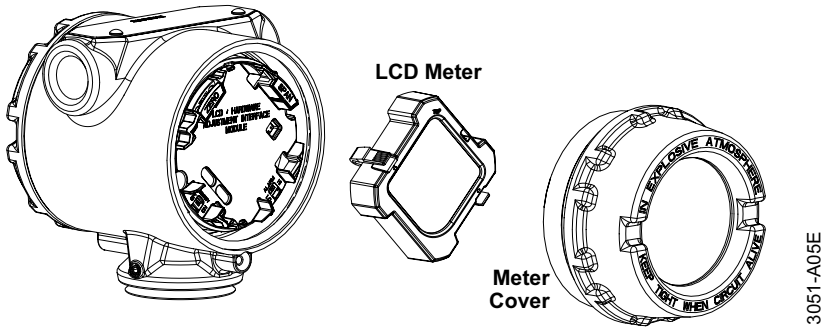
Always ground the transmitter case in accordance with national and local electrical codes. The most effective transmitter case grounding method is a direct connection to earth ground with minimal impedance. Methods for grounding the transmitter case include:

- **Internal Ground Connection**: The Internal Ground Connection screw is inside the terminal side of the electronics housing. The screw is identified by a ground symbol (⏚), and is standard on all Model 3051S Series transmitters.
- **External Ground Assembly**: This assembly is included with the optional transient protection terminal block (Option Code T1), and it is included with KEMA/CENELEC Flameproof Certification (Option Code E8), BASEEFA/CENELEC Intrinsic Safety Certification (Option Code I1), and BASEEFA/CENELEC Type n Certification (Option Code N1). The External Ground Assembly can also be ordered with the transmitter (Option Code D4), or as a spare part (03051-9060-0001).

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

INSTALLING THE LCD METER

Figure 2-10. Optional LCD Meter



Transmitters ordered with the LCD meter will be shipped with the meter installed. The LCD meter requires a PlantWeb housing. Installing the meter on an existing Model 3051S Series transmitter requires a small instrument screwdriver and the meter kit.

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

Use the following procedure and Figure 2-10 to install the LCD meter:

1. **IF** the transmitter is installed in a loop, **THEN** secure the loop and disconnect power.
2. ⚠ Remove the transmitter cover opposite the field terminal side. Do not remove the instrument covers in explosive environments when the circuit is live.
3. Remove Hardware Adjustment Interface Assembly Enable Module if installed. Engage the four-pin connector into the LCD meter and snap into place.

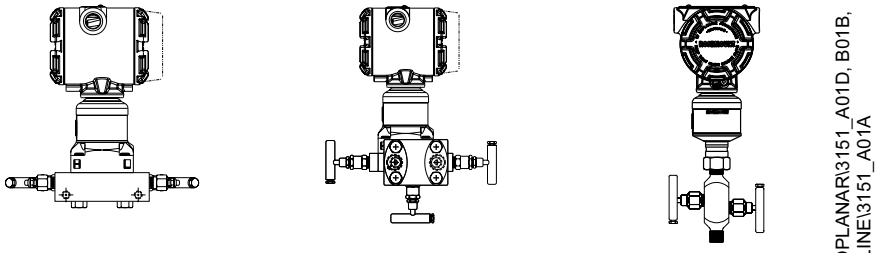
Note the following LCD temperature limits:
Operating: –4 to 175 °F (–20 to 80 °C)

Storage: –40 to 185 °F (–40 to 85 °C)

MODELS 305 AND 306 INTEGRAL MANIFOLDS

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

Figure 2-11. Integral Manifolds



Model 305 Integral Manifold Installation Procedure

To install a Model 305 Integral Manifold to a Model 3051S Series transmitter:

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

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

2. Install the Integral Manifold on the SuperModule. 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 “Mounting Bolts” on page 2-8 for complete bolt installation information and torque values. When fully tightened, the bolts should extend through the top of the module housing.
3. If the Teflon SuperModule 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.

Model 306 Integral Manifold Installation Procedure

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

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

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

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 Model 3051S HART configuration information only. For fieldbus information see the Model 3051S fieldbus supplement (document number 00809-0200-4801).

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.

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 can result in death or serious injury.

- Do not remove the transmitter covers in explosive environments when the circuit is live.
- Transmitter covers must be fully engaged to meet explosionproof requirements.
- Before connecting a communicator in an explosive atmosphere, make sure the instruments in the loop are installed in accordance with intrinsically safe or nonincendive field wiring practices.

⚠WARNING

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. Model 3051S Series transmitters can be commissioned either before or after installation. Commissioning the transmitter on the bench before installation using a Model 275 HART Communicator or AMS ensures that all transmitter components are in working order.

⚠ To commission on the bench, connect the transmitter and the HART Communicator or AMS as shown in Figure 3-1 and 3-2. Make sure the instruments in the loop are installed according to intrinsically-safe or nonincendive field wiring practices before connecting a communication in an explosive atmosphere. Connect HART Communicator leads at any termination point in the signal loop. For convenience, connect them to the terminals labeled “COMM” on the terminal block. Connecting across the “TEST” terminals will prevent successful communication. Avoid exposing the transmitter electronics to the plant environment after installation by setting all transmitter jumpers during the commissioning stage on the bench.

For 4–20 mA transmitters, the power supply must provide 10.5 to 42.4 V dc at the transmitter, and a meter to measure output current. To enable communication, a resistance of at least 250 ohms must be present between the HART Communicator loop connection and the power supply. Do not use inductive-based transient protectors with the Model 3051S Series.

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

For more information on the Model 275 HART Communicator see document 00275-8026-0002. AMS help can be found in the AMS on-line guides within the AMS system.

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 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 3-2, and turn on the HART Communicator by pressing the ON/OFF key or log into AMS. The HART Communicator or AMS will search for a HART-compatible device and indicate when the connection is made. If the HART Communicator or AMS fail to connect, it indicates that no device was found. If this occurs, refer to Section 5: Troubleshooting.

Field Hook-up

Figures 3-1 and 3-2 illustrate wiring loops for a field hook-up with a HART Communicator or AMS. Signal point may be grounded at any point or left ungrounded.

Figure 3-1. PlantWeb Wiring (4–20 mA)

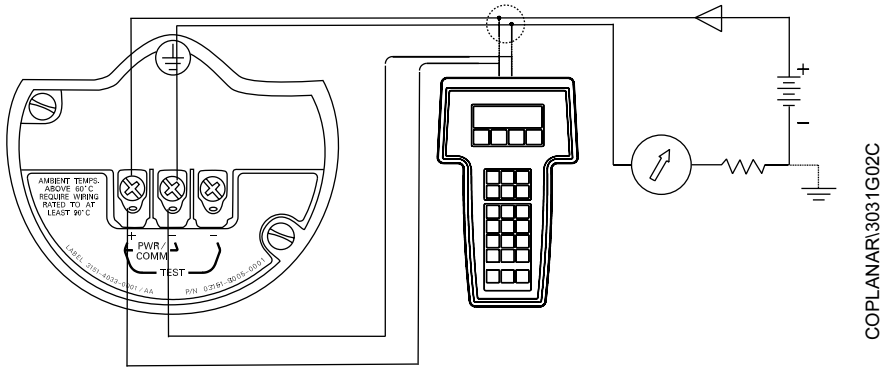
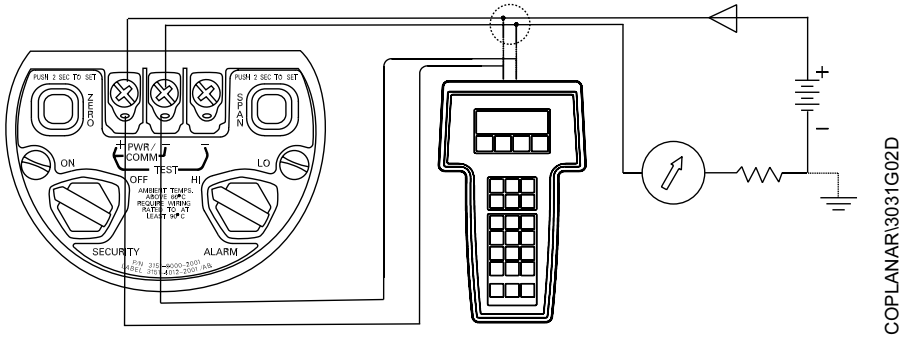


Figure 3-2. Junction Box Wiring (4–20 mA)



MODEL 275 HART COMMUNICATOR

The following menu indicates fast key sequences for common functions. For full Model 275 menu tree see www.rosemount.com.

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

REVIEW CONFIGURATION DATA

Fast Keys	1, 5

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

HART Communicator

Before placing the transmitter into operation, review the transmitter configuration data below which was set by the factory.

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

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

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

Fast Keys	1, 1

The process variables for the Model 3051S Series 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 SuperModule.

HART Communicator

The process variable menu displays the following process variables:

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

NOTE
Regardless of the range points, the Model 3051S Series 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.

AMS

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)

Sensor Temperature

Fast Keys	1, 1, 4

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

HART Communicator

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

AMS

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

Fast Keys	1, 3, 2

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

HART Communicator

Enter the fast key sequence below "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

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

Set Output (Transfer function)

Fast Keys	1, 3, 5

The Model 3051S 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 Model 3051S Series automatically switches to linear output in order to ensure a more smooth, stable output near zero (see Figure 3-3).

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

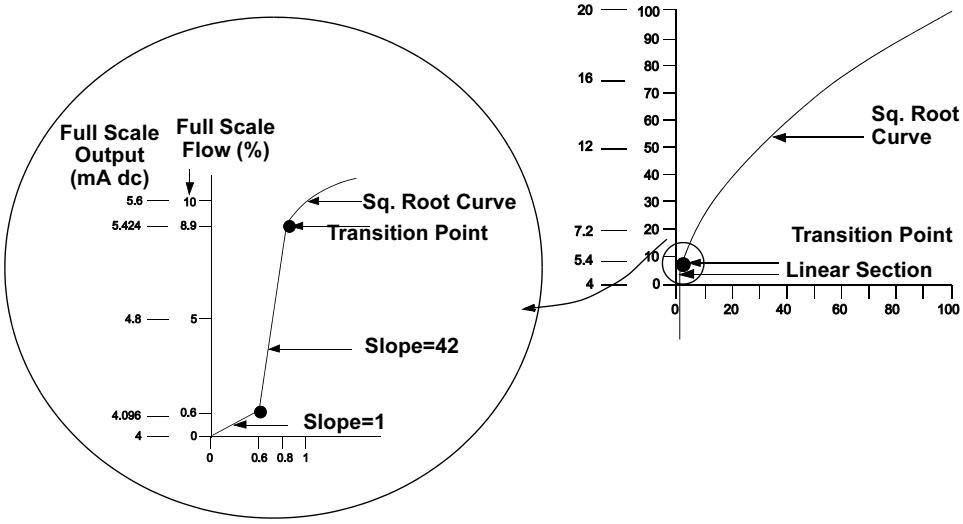
Enter the fast key sequence below "Set Output (Transfer function)."

AMS

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

1. In the Basic Setup tab, use "Xfer fnctn" drop down menu to select output, click **Apply**.
2. An "Apply Parameter Modification" screen appears, enter desired information and click **OK**.
3. After carefully reading the warning provided, select **OK**.

Figure 3-3. Square Root Output Transition Point



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.

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

Use 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 only.
- Rerange with a pressure input source and AMS.

NOTE
If the transmitter security jumper/switch is **ON,** adjustments to the zero and span will not be able to be made. Refer to “Set Switches and Jumpers” on page 2-12 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 below "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.

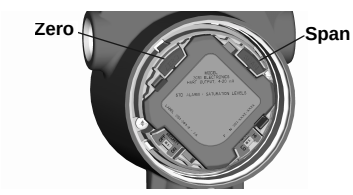
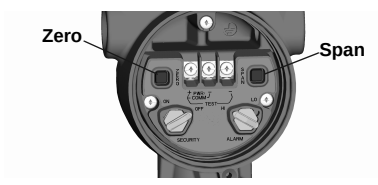
NOTE
The span is maintained when the 4 mA point is set. The span changes when the 20 mA point is set. If the lower range point is set to a value that causes the upper range point to exceed the sensor limit, the upper range point is automatically set to the sensor limit, and the span is adjusted accordingly.

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.

PlantWeb	Junction Box
	

Rerange with AMS only

Right click on the device and select “Configuration Properties” 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. An “Apply Parameter Modification” screen appears, enter desired information and click **OK**.
3. After carefully reading the warning provided, select **OK**.

Rerange with a Pressure Input Source and AMS

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

Fast Keys	1, 3, 6

The Damp command introduces a delay in processing which increases the response time of the transmitter; smoothing variations in output readings caused by rapid input changes. Determine the appropriate damp setting based on the necessary response time, signal stability, and other requirements of the of loop dynamics of your system. The default damping value is 0.4 seconds and is user-selectable from 0 to 60 seconds.

AMS

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

1. In the “Basic Setup” tab, enter the damping value in the “Damp” field, click **Apply**.
2. An “Apply Parameter Modification” screen appears, enter desired information and click **OK**.
3. After carefully reading the warning provided, select **OK**.

LCD Meter

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

The meter features a four-line display and a 0-100% scaled bar graph. The first line of five characters displays the output description, the second line of seven digits displays the actual value, the third line of six characters displays engineering units and the fourth line displays “Error” when the transmitter is in alarm. The LCD meter can also display diagnostic messages.

LCD Display Configuration

Fast Keys	1, 3, 7

The Meter Options command customizes the LCD meter. The LCD meter display will alternate between the items selected. Configure the meter to display the following information to suit your application needs:

- Engineering Units
- Percent of Range
- Scaled Variable
- Temperature

AMS

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

1. In the “Device” tab, locate the “LCD Display Configuration” area. Select the desired options to suit your application needs, click **Apply**.
2. An “Apply Parameter Modification” screen appears, enter desired information and click **OK**.
3. After carefully reading the warning provided, select **OK**.

DETAILED SETUP

Failure Mode Alarm and Saturation

Model 3051S Series 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 jumper, see “Set Switches and Jumpers” on page 2-12.

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

Model 3051S Series 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, see “Alarm and Saturation Level Configuration” on page 3-12. 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 will provide an error message if a configuration rule is violated.

Alarm and Saturation Level Configuration

Fast Keys	1, 4, 2, 7

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

HART Communicator

1. From the **HOME** screen, follow the fast key sequence under Alarm and Saturation Levels.
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

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 “Alarm 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, SuperModule, or LCD meter 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 3-12, and “Loop Test” on page 3-19).

Process Alerts

Fast Keys	1, 4, 3, 5

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 status screen or in the error section of the LCD meter. 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

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 Alert” to configure the pressure alert.
   Select 4, “Config Temp Alert” 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

Right click on the device and select “Configuration Properties” 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. An “Apply Parameter Modification” screen appears, enter desired information and click **OK**.
6. After carefully reading the warning provided, select **OK**.

Scaled Variable Configuration

Fast Keys	1, 4, 3, 4, 7

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 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

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 *.
   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

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

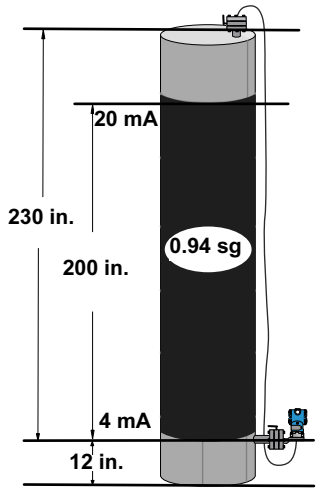
1. Click **Next** after setting the control loop to manual.
2. Enter desired scaled variable units in “Enter SV units” box and click **Next**.
3. Select scaled data options: Linear or Square Root and click **Next**. If square root is selected skip to Step 9.
4. Enter pressure value position 1 and click **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 14.
9. Select **Next** to acknowledge that “Pressure and Scaled Variable values for position 0 set to 0.”
10. Enter pressure value position 1 and click **Next**.
11. Enter scaled variable position 1 and click **Next**.
12. Enter low flow cutoff mode: Off or On. If off is selected skip to Step 14.
13. Enter low flow cutoff value and click **Next**.
14. Select **Next** to acknowledge that the loop can be returned to automatic control.
15. Select **Finish** to acknowledge the method is complete.

Use the following example to complete a Scaled Variable configuration.

Example

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 3-4, the Scaled Variable configuration would be as follows:

Figure 3-4. Example tank



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

Fast Keys	1, 4, 3, 6, 4

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 = Pressure
Secondary variable = Temperature
Tertiary variable = 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

From the **HOME** screen, enter the fast key sequence below “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

Right click on the device and select “Device Configuration,” then “Re-mapping” from the menu.

1. Click **Next** after setting the control loop to manual.
2. Choose desired primary variable then click **Next**.
3. Choose desired secondary variable then click **Next**.
4. Select **Next** to confirm tertiary variable setting.
5. Select **Next** to acknowledge the loop can be returned to automatic control.
6. Select **Finish** to acknowledge the method is complete.

Sensor Temperature Unit

Fast Keys	1, 4, 1, 2, 2

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

AMS

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

Fast Keys	1, 2, 1, 1

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.

AMS

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

Fast Keys	1, 2, 2

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

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 below “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 3-12).
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

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

1. Click **Next** after setting the control loop to manual.
2. Select desired analog output level. Click **Next**.
3. Click **Next** to acknowledge output being set to desired level.
4. 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.

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

ADVANCED FUNCTIONS FOR HART PROTOCOL

Saving, Recalling, and Cloning Configuration Data

Fast Keys	left arrow, 1, 2

Use the cloning feature of the HART Communicator or the AMS “User Configuration” feature to configure several Model 3051S Series 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. 00809-0100-4275) or AMS on-line guides. One common method is as follows:

HART Communicator

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 creating a Reusable Copy

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

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

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

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

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

AMS Applying a User Configuration

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

NOTE
When using AMS Revision 6.0 or later, the device to which the user configuration is applied, bust be the same model type as the one created in the user configuration. When using AMS 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 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

Fast Keys	1, 4, 3, 3, 3

When configured for burst mode, the Model 3051S Series 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 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 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

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

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

AMS

Right click on the device and select “Configuration Properties” 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. An “Apply Parameter Modification” screen appears, enter desired information and click **OK**.
4. After carefully reading the warning provided, select **OK**.

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.

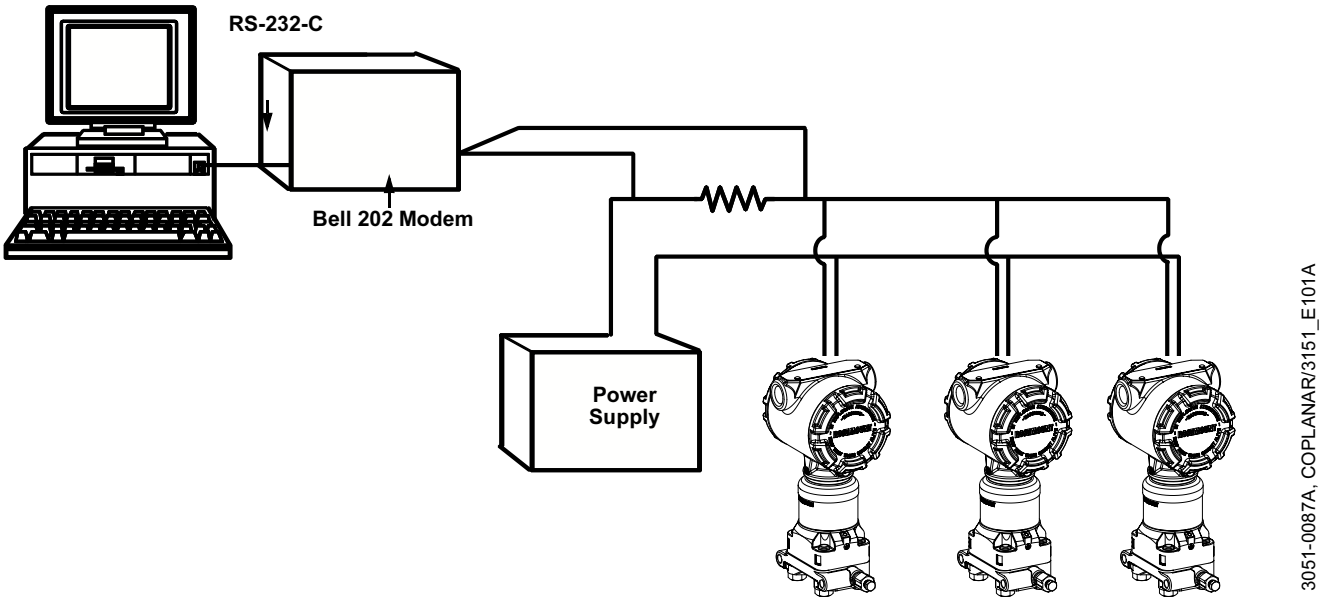
Multidrop installation requires consideration of the update rate necessary from each transmitter, the combination of transmitter models, and the length of the transmission line. Communication with transmitters can be accomplished with Bell 202 modems and a host implementing HART protocol. Each transmitter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

Figure 3-5 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 3-5. Typical Multidrop Network



The Model 3051S Series 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/jumper position. Failure signals in multidropped transmitters are communicated through HART messages.

Changing a Transmitter Address

Fast Keys	1, 4, 3, 3, 1

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

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

AMS

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. An "Apply Parameter Modification" screen appears, enter desired information and click **OK**.
3. After carefully reading the warning provided, select **OK**.

Communicating with a Multidropped Transmitter

Fast Keys	Left arrow, 4, 1, 1

HART Communicator

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 below "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

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

Polling a Multidropped Transmitter

Fast Keys	Left arrow, 4, 1

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

HART Communicator

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

AMS

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 Model 3051S Series Pressure Transmitters. Tasks that should be performed on the bench prior to installation are explained in this section. This section contains Model 3051S HART configuration information only. For Model 3051S fieldbus information see the Model 3051S fieldbus supplement (document number 00809-0200-4801).

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 Model 3051S 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 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 Model 3051S SuperModule 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 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 characterization curve stored in the microprocessor. Sensor trimming requires an accurate pressure input and adds additional compensation that adjusts the position of the factory characterization curve to optimize performance over a specific pressure range.

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

Table 4-1. Recommended Calibration Tasks

Transmitter	Bench Calibration Tasks	Field Calibration Tasks
Model 3051S_ CD Model 3051S_ CG Model 3051S_ L	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 full 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.
Model 3051S_ CA Model 3051S_ TA Model 3051S_ TG	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 full sensor trim if equipment available (accurate absolute pressure source required), otherwise perform the low trim value section of the full 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 full sensor trim procedure to correct for mounting position effects.

Calibration Overview

Complete calibration of the Model 3051S Series pressure transmitter involves the following tasks:

Configure the 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

- Full 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)

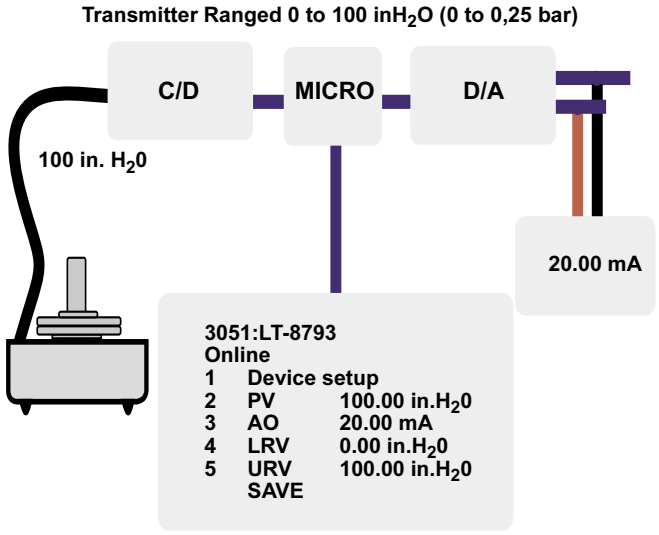
Figure 4-1 on page 4-3 illustrates Model 3051S Series transmitter data flow. Data flow can be summarized in four major steps:

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 Model 3051S Series 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 Model 3051S Series transmitter for bench or field calibration.

Figure 4-1. Transmitter Data Flow with Calibration Options



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

CALIBRATION

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:	Model 3051S_CD, Range 2A (URL=250 inH_2O), classic performance
Calibrated Span:	150 inH_2O
Ambient Temperature Change:	± 50 °F
Line Pressure:	500 psig

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] =

$$0.1\% \text{ reading per } 1000 \text{ psi} = \pm 0.05 \text{ of span at maximum span}$$

(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 Process Variable (PV) line on the HART Communicator On-line Menu or the Primary Variables screen in AMS.
   a. If the PV reading does not match the applied pressure (with high-accuracy test equipment), perform a sensor trim.
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 output trim.

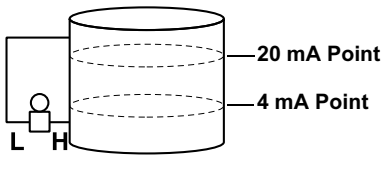
Sensor Trim

Trim the sensor using either full 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.

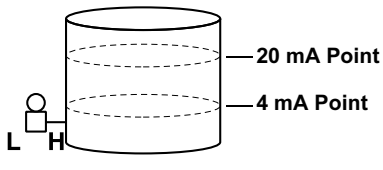
Zero trim is a single-point adjustment. It is useful for compensating for mounting position effects and is most effective when performed with the transmitter installed in its final mounting position. Since this correction maintains the slope of the characterization curve, it should not be used in place of a full 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.

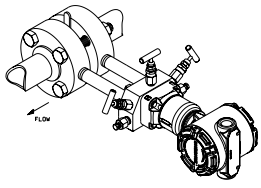
NOTE
Do not perform a zero trim on Model 3051S Series Absolute pressure transmitters. Zero trim is zero based, and absolute pressure transmitters reference absolute zero. To correct mounting position effects on a Model 3051S Series Absolute Pressure Transmitter, perform a low trim within the full sensor trim function. The low trim function provides a "zero" correction similar to the zero trim function, but it does not require zero-based input.



NONZERO-BASED LEVEL APPLICATION



ZERO-BASED LEVEL APPLICATION



ZERO-BASED FLOW APPLICATION

COPLANAR/3151_C03A,
3051_18A, 3051_18A19A

Full 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 factory-established characterization curve is not changed by this procedure. The trim values allow you to optimize performance over your specified measuring range at the calibration temperature.

Zero Trim

Fast Keys	1, 2, 3, 3, 1

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

HART Communicator

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 below “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.

Full Trim

Fast Keys	1, 2, 3, 3

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

To calibrate the sensor with a HART Communicator using the full 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 below under “Full Trim.”
3. Select 2: Lower sensor trim

NOTE
Select pressure input values so that low and high 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. The transmitter allows approximately five percent URL deviation from the characterized curve established at the factory.

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.”
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

The Recall Factory Trim commands allow the restoration of the as-shipped factory settings of the sensor trim and analog output trim.

Recall Factory Trim—Sensor Trim

Fast Keys	1, 2, 3, 4, 1

This command resets the transmitter sensor trim to the “as shipped” factory settings. The Recall Factory Trim—Sensor Trim command can be useful for recovering from an inadvertent zero trim of an absolute pressure unit or inaccurate pressure source.

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.

Recall Factory Trim—Analog Output

Fast Keys	1, 2, 3, 4, 2

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

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.

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

Fast Keys	1, 2, 3, 2, 1

HART Communicator

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 below "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

Fast Keys	1, 2, 3, 2, 2

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.

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.

Compensating for Line Pressure

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

Applying high static pressure to Model 3051S Series 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 Full Trim procedure on page 2-18.

The following specifications show the static pressure effect for Model 3051S Series 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)

±0.2% of the upper range limit per 1000 psi (69 bar) for line pressures above 2000 psi (138 bar)

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 3051S_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 (LRV) P

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

HT = URV + S (URV) 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
LRV =	500 inH_2O
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

To complete a Model 3051S Series full trim and enter the corrected values for low trim (LT) and high trim (HT), refer to “Full Trim” 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 calibrating Model 3051S Series Range 4 and 5 transmitters for high differential pressure applications, rerange the 4 and 20 mA points using the HART Communicator to maintain the systematic static line pressure correction. Re-zero the 4 mA point at line pressure after installation using the local zero button without affecting the completed calibration.

Diagnostic Messages

In addition to output, the LCD meter 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 meter 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 SuperModule is malfunctioning. Possible sources of problems include:

- Pressure or temperature updates are not being received in the SuperModule.
- A non-volatile memory fault that will affect transmitter operation has been detected in the 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 SuperModule. 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 meter 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 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 pressure read by the module is outside of the specified range, and the analog output has been driven to saturation levels.

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."

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. Contact Rosemount Customer Central at 800-999-9307 if you need assistance.

PRESS ALERT

A HART alert when the process 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 meter 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.

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 jumper is active. See “Security (Write Protect)” on page 2-12 for information on the software lockout.

STUCK KEY

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

FIELD UPGRADES

Labeling

⚠ Each housing and each SuperModule is labeled individually, so it is imperative that the approval codes on each label match exactly during upgrade. The label on the SuperModule reflects the replacement model code for reordering an assembled unit. The housing labeling will only reflect the approvals and communication protocol of the housing.

Upgrading Feature Boards

The PlantWeb housing allows for feature board upgrades. Feature boards are available with different protocols and are easily interchanged for upgrade. Keyed slots guide the boards into place, and boards are secured with two provided screws.

The D1 option is available for local hardware adjustments. This option is available for both the PlantWeb and Junction Box housings. In order to use zero, span, alarm, and security functions, replace the Standard Interface Assembly with the Hardware Adjustment Interface Assembly (p/n 03151-9017-0001) and install the LCD meter or hardware adjustment module.

Refer to “Disassembly Procedures” on page 5-3 for information on assembly

Section 5 Troubleshooting

OVERVIEW

Table 5-1 provides summarized maintenance and troubleshooting suggestions for the most common operating problems. This section contains Model 3051S HART troubleshooting information only. For Model 3051S fieldbus information see the Model 3051S fieldbus supplement (document number 00809-0200-4801).

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 can result in death or serious injury.

- Do not remove the transmitter covers in explosive environments when the circuit is live.
- Transmitter covers must be fully engaged to meet explosion proof requirements.
- Before connecting a communicator in an explosive atmosphere, make sure that the instruments in the loop are installed according to intrinsically safe or nonincendive field wiring practices.

⚠CAUTION

Static electricity can damage sensitive components.

- Observe safe handling precautions for static-sensitive components.

Table 5-1. Model 3051S 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. If they are not damaged, reuse them.

The Model 3051S Series 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 Model 3051S Series in-line transmitter is attached to the process by a single hex nut process connection. Loosen the hex nut to separate the transmitter from the process.

Remove Terminal Block

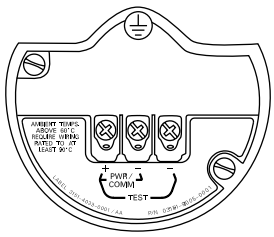
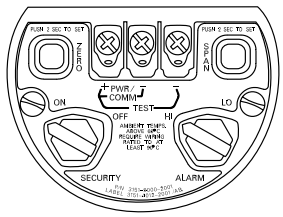
Electrical connections are located on the terminal block in the compartment labelled “FIELD TERMINALS.”

PlantWeb Housing

Loosen the two small screws located at the 10 o'clock and 4 o'clock positions, and pull the entire terminal block out.

Junction Box Housing

Loosen the two small screws located at the 8 o'clock and 4 o'clock positions, and pull the entire terminal block out. This procedure will expose the SuperModule connector, see Figure 5-1.

PlantWeb	Junction Box
	

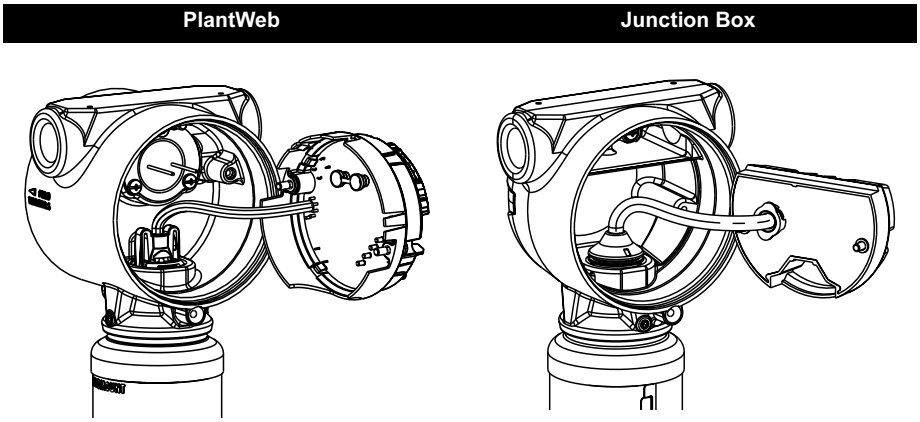
⚠ See “Safety Messages” on page 5-1 for complete warning information.

Remove Assembly

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

1. Remove the housing cover opposite the field terminal side.
2. Remove the LCD Meter or Adjustment Module. To do this, hold in the two clips and pull outward. This will expose the two screws located on the Standard Interface Assembly or Adjustment Interface Assembly.
3. Loosen the two small screws located on the assembly in the 8 o'clock and 2 o'clock positions.
4. Pull out the assembly to expose and locate the SuperModule connector.
5. Grasp the SuperModule connector and pull upwards (avoid pulling wires).

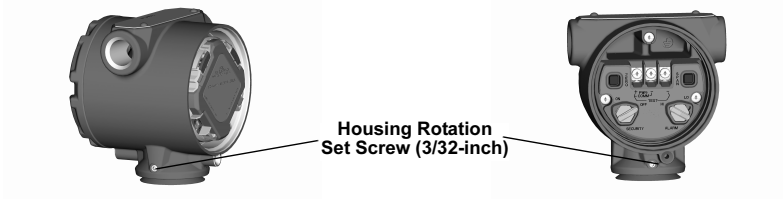
Figure 5-1. SuperModule connector view



Remove the SuperModule from the Housing

IMPORTANT
To prevent damage to the SuperModule cable, disconnect it from the PlantWeb assembly or Junction Box terminal block before you remove the SuperModule from the housing.

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



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

REASSEMBLY PROCEDURES

Attach the SuperModule to the Housing

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

1. Apply a light coat of low temperature silicon grease to the SuperModule threads and o-ring.
2. ⚠ Thread the housing completely onto the SuperModule. The housing must be no more than one full turn from flush with the SuperModule to comply with explosion-proof requirements.
3. Tighten the housing rotation set screw using a 3/32-inch hex wrench.

Install Assembly in the PlantWeb Housing

1. Apply a light coat of low temperature silicon grease to the SuperModule connector.
2. Insert the SuperModule connector into the top of the SuperModule.
3. Gently slide the assembly into the housing, making sure the pins from the PlantWeb housing properly engage the receptacles on the assembly.
4. Tighten the captive mounting screws.
5. ⚠ Attach the PlantWeb housing cover and tighten so that metal contacts metal to meet explosion-proof requirements.

Install the Terminal Block

PlantWeb Housing

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

Junction Box Housing

1. Apply a light coat of low temperature silicon grease to the SuperModule connector.
2. Insert the SuperModule connector into the top of the SuperModule.
3. Push the terminal block into the housing and hold for screw position alignment.
4. Tighten the captive mounting screws.
5. ⚠ Attach the Junction Box 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 Sensor Body

1. Inspect the Teflon super module o-rings. If the o-rings are not damaged, reuse them. Replace o-rings that show any signs of damage, such as nicks, cuts, or general wear.

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

2. Install the process flange on the super 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 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)

4. If you replaced the Teflon SuperModule o-rings, re-torque the flange bolts after installation to compensate for cold flow.
5. Install the drain/vent valve.
   a. Apply sealing tape to the threads on the seat. Starting at the base of the valve with the threaded end pointing toward the installer, apply two clockwise turns of sealing tape.
   b. Take care to place the opening on the valve so that process fluid will drain toward the ground and away from human contact when the valve is opened.
   c. Tighten the drain/vent valve to 250 in-lb. (28.25 N-m).

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

Appendix A Reference Data

PERFORMANCE SPECIFICATIONS

For zero-based spans, reference conditions, silicone oil fill, SST materials, Coplanar flange (Model 3051S_C) or 1/2 in.- 18 NPT (Model 3051S_T) process connections, digital trim values set to equal range points.

Conformance to specification (±3 Sigma)

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

Reference Accuracy

	Ultra[1] [2]	Classic[1][2]
Model 3051S_CD, CG	±0.04% of span; for spans less than 10:1, accuracy = $\pm\left[0.005 + 0.0035\left(\frac{URL}{Span}\right)\right]$% of Span Range 1: ±0.09% of span; for spans less than 15:1, accuracy = $\pm\left[0.015 + 0.005\left(\frac{URL}{Span}\right)\right]$% of Span Range 0: ±0.09% of span; for spans less than 2:1, accuracy= ±0.045% of URL	±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 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 Range 0: ±0.10% of span; for spans less than 2:1, accuracy= ±0.05% of URL
Model 3051S_T	±0.04% of span; for spans less than 10:1, accuracy = $\pm\left[0.004\left(\frac{URL}{Span}\right)\right]$% of Span	±0.065% of span; for spans less than 10:1, accuracy = $\pm\left[0.0065\left(\frac{URL}{Span}\right)\right]$% of Span
Model 3051S_CA	±0.04% of span; for spans less than 10:1, accuracy = $\pm\left[0.004\left(\frac{URL}{Span}\right)\right]$% of Span Range 0: ±0.075% of span; for spans less than 5:1, accuracy = $\pm\left[0.025 + 0.01\left(\frac{URL}{Span}\right)\right]$% of Span	±0.065% of span; for spans less than 10:1, accuracy = $\pm\left[0.0065\left(\frac{URL}{Span}\right)\right]$% of Span Range 0: ±0.075% of span; for spans less than 5:1, accuracy = $\pm\left[0.025 + 0.01\left(\frac{URL}{Span}\right)\right]$% of Span
Model 3051S_L	Not available	±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

(1) Stated reference accuracy includes terminal based linearity, hysteresis, and repeatability.
(2) For FOUNDATION fieldbus transmitters, use calibrated range in place of span.

Total Performance

	Ultra[1]	Classic[1]
Model 3051S_C CD Ranges 2-3 and CG Ranges 2-5	±0.125% of span; for ±50°F (28°C) temperature changes, 0-100% relative humidity, up to 1000 psi (68,9 bar) line pressure (CD only), from 1:1 to 5:1 rangedown.	±0.15% of span; for ±50°F (28°C) temperature changes, 0-100% relative humidity, up to 1000 psi (68,9 bar) line pressure (CD only), from 1:1 to 5:1 rangedown.

(1) Total performance is based on combined errors of reference accuracy, ambient temperature effect, and line pressure effect.

Long Term Stability

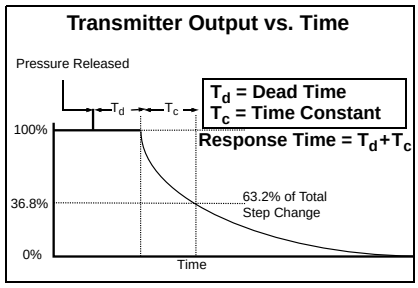
	Ultra	Classic
Model 3051S_C CD Ranges 2-3 and CG Ranges 2-5	±0.20% of URL for 10 years; for ±50°F (28°C) temperature changes, 0-100% relative humidity, up to 1000 psi (68,9 bar) line pressure (CD only)	±0.125% of URL for 5 years; for ±50°F (28°C) temperature changes, 0-100% relative humidity, up to 1000 psi (68,9 bar) line pressure (CD only)

Dynamic Performance

	4 - 20 mA (HART protocol)[1]	Fieldbus protocol[3]
Total Response Time (T_d + T_c)[2]:		
Model 3051S_C, Ranges 2-5:	100 milliseconds	152 milliseconds
Range 1:	255 milliseconds	307 milliseconds
Range 0:	700 milliseconds	752 millisecondS
Model 3051S_T:	100 milliseconds	152 milliseconds
Model 3051S_L:	Consult factory	Consult factory
Dead Time (Td)	45 milliseconds (nominal)	97 milliseconds
Update Rate	22 times per second	22 times per second

(1) Dead time and update rate apply to all models and ranges; analog output only
(2) Nominal total response time at 75 °F (24 °C) reference conditions.
(3) Transmitter fieldbus output only, segment macro-cycle not included.

Typical Transmitter Response Time



Ambient Temperature

Effect per 50 °F (28 °C)

	Ultra	Classic
Model 3051S_CD, CG	± (0.009% URL + 0.04% span) from 1:1 to 10:1 ± (0.018% URL + 0.08% span) from 10:1 to 200:1 Range 0: ± (0.25% URL + 0.05% span) Range 1: ± (0.1% URL + 0.25% span)	± (0.0125% URL + 0.0625% span) from 1:1 to 5:1 ± (0.025% URL + 0.125% span) from 5:1 to 100:1 Range 0: ± (0.25% URL + 0.05% span) Range 1: ± (0.1% URL + 0.25% span)
Model 3051S_T	± (0.0125% URL + 0.125% span) from 1:1 to 10:1 ± (0.025% URL + 0.125% span) from 10:1 to 200:1 Range 1: ± (0.025% URL + 0.125% span) from 1:1 to 10:1 ± (0.05% URL + 0.125% span) from 10:1 to 200:1 Range 5: ± (0.1% URL + 0.15% span)	± (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 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 5: ± (0.1% URL + 0.15% span)
Model 3051S_CA	± (0.025% URL + 0.125% span) from 1:1 to 30:1 ± (0.035% URL + 0.125% span) from 30:1 to 200:1 Range 0: ± (0.1% URL + 0.25% span)	± (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 0: ± (0.1% URL + 0.25% span)
Model 3051S_L	Not available	See Rosemount Instrument Toolkit

Line Pressure Effect

For line pressure above 2000psi (137,9 bar) and ranges 4-5, see “Compensating for Line Pressure” on page 4-10

	Ultra	Classic
Model 3051S_CD	**Zero Error** (1) ± 0.035% of URL for line pressures from 0 to 2000 psi (0 to 137,9 bar) per 1000 psi (69 bar) Range 0: ± 0.125% URL per 100 psi (6,89 bar) Range 1: ± 0.25% URL per 1000 psi (69 bar) **Span Error** ± 0.1% of reading per 1000 psi (69 bar) Range 0: ± 0.15% of reading per 100 psi (6,89 bar) Range 1: ± 0.4% of reading per 1000 psi (69 bar)	**Zero Error**(1) ± 0.05% URL for line pressures from 0 to 2000 psi (0 to 137,9 bar) per 1000 psi (69 bar) Range 0: ± 0.125% URL per 100 psi (6,89 bar) Range 1: ± 0.25% URL per 1000 psi (69 bar) **Span Error** ± 0.1% of reading per 1000 psi (69 bar) Range 0: ± 0.15% of reading per 100 psi (6,89 bar) Range 1: ± 0.4% of reading

(1) Zero error can be calibrated out

Mounting Position Effects

	Ultra and Classic
Model 3051S_C	Zero shifts up to ±1.25 inH_2O (3,11 mbar), which can be calibrated out; no span effect
Model 3051S_L	With liquid level diaphragm in vertical plane, zero shift of up to 1 inH_2O (25,4 mmH_2O); with diaphragm in horizontal plane, zero shift of up to 5 inH_2O (127 mmH_2O) plus extension length on extended units; all zero shifts can be calibrated out; no span effect
Model 3051S_T and Model 3051S_CA	Zero shifts to 2.5 inH2O (63,5 mmH20), which can be calibrated out; no span effect

Vibration Effect

All Models:
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 peak to peak displacement / 60-2000 Hz 3g).

Option Codes 1J, 1K, 1L
Less than ±0.1% of URL when tested per the requirements of IEC60770-1 field with general application or pipeline with low vibration level (10-60 Hz 0.15mm peak to peak displacement / 60-2000 Hz 2g).

Power Supply Effect

All Models:
Less than ±0.005% of calibrated span per volt

RFI Effects

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

Transient Protection (Option T1)

All Models:

Meets IEEE Standard 587, Category B
1 kV crest (10 × 1000 microseconds)

3 kV crest (8 × 20 microseconds)

6 kV crest (12 × 50 microseconds)

Meets IEEE Standard 472, Surge Withstand Capability
SWC 2.5 kV crest, 1 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: IEC 801-4, IEC 801-5

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

FUNCTIONAL SPECIFICATIONS

Range and Sensor Limits

Range	Minimum Span 3051S_		Range and Sensor Limits 3051S_			
				Lower (LRL)		
	Ultra	Classic	Upper (URL)	Model 3051S_CD	Model 3051S_CG	Model 3051S_LD
0	0.1 inH_2O (0,25 mbar)	0.1 inH_2O (0,25 mbar)	3.0 inH_2O (7,5 mbar)	–3.0 inH_2O (–7,5 mbar)	NA	NA
1	0.5 inH_2O (1,24 mbar)	0.5 inH_2O (1,24 mbar)	25.0 inH_2O (62,3 mbar)	–25.0 inH_2O (–62,3 mbar)	–25.0 inH_2O (–62,3 mbar)	–25.0 inH_2O (–62,3 mbar)
2	1.3 inH_2O (3,11 mbar)	2.5 inH_2O (6,23 mbar)	250.0 inH_2O (0,62 bar)	–250.0 inH_2O (–0,62 bar)	–250.0 inH_2O (–0,62 bar)	–250.0 inH_2O (–0,62 bar)
3	5.0 inH_2O (12.4 mbar)	10.0 inH_2O (24,9 mbar)	1000.0 inH_2O (2,49 bar)	–1000.0 inH_2O (2,49 bar)	0.5 psia (34,5 mbar)	–1000.0 inH_2O (–2,49 bar)
4	1.5 psi (103.4 mbar)	3.0 psi (206,8 mbar)	300.0 psi (20,7 bar)	–300.0 psi (–20,7 bar)	0.5 psia (34,5 mbar)	–300.0 psi (–20,7 bar)
5	10.0 psi (689,5 mbar)	20.0 psi (1,38 bar)	2000.0 psi (137,9 bar)	– 2000.0 psi (–137,9 bar)	0.5 psia (34,5 mbar)	– 2000.0 psi (–137,9 bar)

Model 3051S_CA Range and Sensor Limits				
	Minimum Span		Upper (URL)	Lower (LRL)
Range	Ultra	Classic		
0	0.167 psia (11,5 mbar)	0.167 psia (11,5 mbar)	5 psia (0,34 bar)	0 psia (0 bar)
1	0.3 psia (20,7 mbar)	0.3 psia (20,7 mbar)	30 psia (2,07 bar)	0 psia (0 bar)
2	0.75 psia (51,7 mbar)	1.5 psia (0,103 bar)	150 psia (10,34 bar)	0 psia (0 bar)
3	4 psia (275,8 mbar)	8 psia (0,55 bar)	800 psia (55,16 bar)	0 psia (0 bar)
4	20 psia (1,38 bar)	40 psia (2,76 bar)	4000 psia (275,8 bar)	0 psia (0 bar)

Model 3051S_T Range and Sensor Limits					
Range	Minimum Span		Upper (URL)	Lower (LRL) (Abs.)	Lower[1] (LRL) (Gage)
	Ultra	Classic			
1	0.15 psi (10,3 mbar)	0.3 psi (20,7 mbar)	30 psi (2,07 bar)	0 psia (0 bar)	–14.7 psig (–1,01 bar)
2	0.75 psi (51,7 mbar)	1.5 psi (0,103 bar)	150 psi (10,34 bar)	0 psia (0 bar)	–14.7 psig (–1,01 bar)
3	4 psi (275,8 mbar)	8 psi (0,55 bar)	800 psi (55,16 bar)	0 psia (0 bar)	–14.7 psig (–1,01 bar)
4	20 psi (1,38 bar)	40 psi (2,76 bar)	4000 psi (275,8 bar)	0 psia (0 bar)	–14.7 psig (–1,01 bar)
5	1000 psi (68,9 bar)	2000 psi (137,9 bar)	10000 psi (689,5 bar)	0 psia (0 bar)	–14.7 psig (–1,01 bar)

(1) Assumes atmospheric pressure of 14.7 psig.

Service

Liquid, gas, and vapor applications

4–20 mA (output code A)

Zero and Span Adjustment

Zero and span values can be set anywhere within the range. Span must be greater than or equal to the minimum span.

Output

Two-wire 4–20 mA is 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.

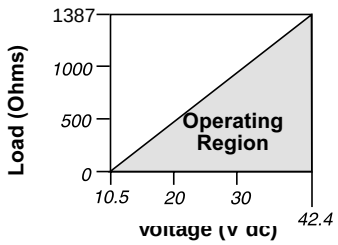
Power Supply

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.

FOUNDATION fieldbus (output code F)

Power Supply

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

Current Draw

17.5 mA for all configurations (including LCD meter option)

Over pressure Limits

Transmitters withstand the following limits without damage:

Model 3051S_CD, 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

Model 3051S_CA
Range 0: 60 psia (4,13 bar)
Range 1: 750 psia (8,3 bar)
Range 2: 300 psia (20,7 bar)
Range 3: 1600 psia (110,3 bar)
Range 4: 6000 psia (413,7 bar)

Model 3051S_TG, 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)

Model 3051S_LD, LG
Limit is 0 psia to the flange rating or sensor rating, whichever is lower (see the table below).

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

Model 3051S_CD Only
Operates within specifications between static line pressures of 0.5 psia and 3626 psig; 4500 psig (310,3 bar) for Option Code P9
Range 0: 0.5 psia to 750 psig (0,03 to 51,71 bar)
Range 1: 0.5 psia to 2000 psig (0,03 to137,90 bar)

Burst Pressure Limits

Burst pressure on Coplanar or traditional process flange is 10000 psig (689,5 bar).
Burst pressure for the Model 3051S_T is:
Ranges 1–4: 11000 psi (758,4 bar)
Range 5: 26000 psig (1792,64 bar)

Temperature Limits

Ambient
–40 to 185 °F (–40 to 85 °C)
With integral meter: –4 to 175 °F (–20 to 80 °C)

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

Process Temperature Limits
At atmospheric pressures and above.

Model 3051S_C Coplanar	
Silicone Fill Sensor(1)	
with Coplanar Flange	–40 to 250 °F (–40 to 121 °C)(2)
with Traditional Flange	–40 to 300 °F (–40 to 149 °C)(2)
with Level Flange	–40 to 300 °F (–40 to 149 °C)(2)
with Model 305 Integral Manifold	–40 to 300 °F (–40 to 149 °C)(2)
Inert Fill Sensor(1)	0 to 185 °F (–18 to 85 °C)(3)(4)
Model 3051S_T In-Line (Process Fill Fluid)	
Silicone Fill Sensor(1)	–40 to 250 °F (–40 to 121 °C)(2)
Inert Fill Sensor(1)	–22 to 250 °F (–30 to 121 °C)(2)
Model 3051S_L 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)
Model 3051S_L High-Side Temperature Limits (Process Fill Fluid)	
Syltherm® XLT	–100 to 300 °F (–73 to 149 °C)
D.C.® Silicone 704(5)	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.
(3) 160 °F (71 °C) limit in vacuum service.
(4) Not available for Model 3051S_CA.
(5) Upper limit of 600 °F (315 °C) is available with Model 1199 seal assemblies mounted away from the transmitter with the use of capillaries and up to 500 °F (260 °C) with direct mount extension.

Humidity Limits

0–100% relative humidity

Turn-On Time

Performance within specifications less than 2.0 seconds 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, NAMUR, and custom alarm levels are available (see the table below).

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

	High Alarm	Low Alarm
Rosemount	≥ 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 (June 27, 1996)
(2) Low alarm must be 0.1 mA less than low saturation and high alarm must be 0.1 mA greater than high saturation.

FOUNDATION Fieldbus (output code F)

The AI block allows the user to configure HI-HI, HI, LO, or LO-LO alarms.

PHYSICAL SPECIFICATIONS

Electrical Connections

1/2–14 NPT, G1/2, and M20 × 1.5 (CM20) conduit. HART interface connections fixed to terminal block for output code A.

Process Connections

Model 3051S_C

1/4–18 NPT on 2 1/8-in. centers

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

Model 3051S_T

1/2–14 NPT female, Non-Threaded instrument flange (available in SST for Range 1–4 transmitters only), G1/2 A DIN 16288 Male (available in SST for Range 1–4 transmitters only), or Autoclave type F-250-C (Pressure relieved 9/16–18 gland thread; 1/4 OD high pressure tube 60° cone; available in SST for Range 5 transmitters only).

Model 3051S_L

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

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

Process-Wetted Parts

Process Isolating Diaphragms

Isolating Diaphragm Material	Model 3051S_ CD, CG	T	CA	L
316L SST	•	•	•	See Below
Hastelloy® C-276®	•	•	•	
Monel 400	•		•	
Tantalum	•			
Gold-plated *Monel* 400	•		•	
Gold-plated 316L SST	•		•	

Drain/Vent Valves
316 SST, Hastelloy C-276, or Monel 400 material
(Monel is not available with Model 3051S_L.)

Process Flanges and Adapters
Plated carbon steel, CF-8M (Cast version of 316 SST, material per ASTM-A743), CW-12MW (Cast version of Hastelloy C-276, material per ASTM A494), M-30C (Cast version of Monel 400, material per ASTM A494).

Wetted O-rings
Glass-filled TFE (Graphite-filled TFE with isolating diaphragm Option Code 6)

Model 3051S_L 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 CW-12MW (Cast version of Hastelloy C®, material ASTM A494); fits schedule 40 and 80 pipe

Mounting Flange
Zinc-cobalt plated CS or 316 SST

Reference Process Connection (Transmitter Low Side)

Isolating Diaphragms
316L SST or 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 65, IP 66

Coplanar Sensor Module Housing
CF-3M (Cast version of 316L SST)

Bolts
Plated carbon steel per ASTM A449, Type 1: Austenitic 316 SST, ASME B 16.5 (ANSI)/ASTM-A-193-B7M, or Monel

Sensor Module Fill Fluid
Silicone or inert halocarbon (Inert is not available with Model 3051S_CA.)
In-Line series uses Fluorinert FC-43

Process Fill Fluid (Liquid Level Only)
Model 3051S_L: Syltherm XLT, D.C. Silicone 704,
D.C. Silicone 200, inert, glycerin and water,
Neobee M-20, propylene glycol and water

Paint
Polyurethane

Cover O-rings
Buna-N

Ordinary Locations Certifications

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

Shipping Weights for Model 3051S

Table A-1. SuperModule weights

SuperModule	Weight in lb. (kg)
Coplanar(1)	3.1 (1,4)
In-Line	1.4 (0,64)

(1) Flange and bolts not included.

Table A-2. Transmitter weights without options

Complete Transmitter(1)	Add Weight In lb (kg)
Model 3051S_C with junction box housing	6.9 (3,1)
Model 3051S_T with junction box housing	3.3 (1,5)
Model 3051S_C with PlantWeb housing	7.2 (3,3)
Model 3051S_T with PlantWeb housing	3.6 (1,6)

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

Table A-3. Model 3051S_L weights without options

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

Table A-4. Transmitter option weights

Code	Option	Add lb (kg)
1J, 1K, 1L	SST PlantWeb housing	3.4 (1,5)
2A, 2B, 2C	Aluminum Junction Box housing	1.2 (5,4)
1A, 1B, 1C	Aluminum PlantWeb housing	1.2 (5,4)
M5	LCD meter for aluminum PlantWeb housing(1), LCD meter for SST PlantWeb housing(1)	0.8 (0,4) 1.72 (0,8)
B4	SST mounting bracket for Coplanar flange	0.6 (0,3)
B1, B2, B3	Mounting Bracket for Traditional flange	2.3 (1,0)
B7, B8, B9	Mounting Bracket for Traditional flange with SST bolts	2.3 (1,0)
BA, BC	SST Bracket for Traditional flange	2.3 (1,0)
F12, F22	SST Traditional flange(2)	3.3 (1,5)
F13, F23	Traditional flange (Hastelloy)	2.7 (1,2)
E12, E22	SST Coplanar flange(2)	1.9 (8,6)
F14, F24	Traditional flange (Monel)	2.6 (1,2)
F15, F25	Traditional Flange (SST with Hastelloy D/V)	2.5 (1,1)
G21	Level flange—3 in., 150	10.8 (4,9)
G22	Level flange—3 in., 300	14.3 (6,5)
G11	Level flange—2 in., 150	10.7 (4,8)
G12	Level flange—2 in., 300	14.0 (6,3)
G31	DIN Level flange, SST, DN 50, PN 40	8.3 (3,8)
G41	DIN Level flange, SST, DN 80, PN 40	13.7 (6,2)

(1) Includes LCD meter connector board and meter cover
(2) Includes mounting bolts

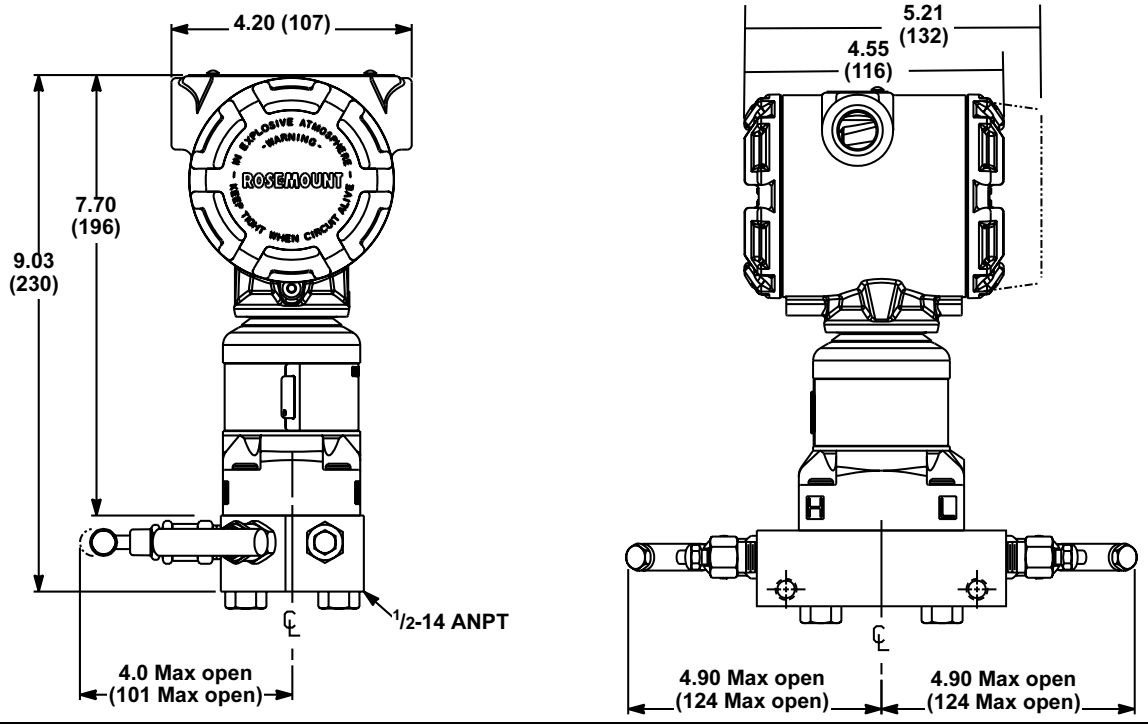
Item	Weight In lb. (kg)
Aluminum standard cover	0.4 (0,2)
SST standard cover	1.26 (0,6)
Aluminum meter cover	0.7 (0,3)
SST meter cover	1.56 (0,7)
LCD meter(1)	0.1 (0,1)
Junction Box terminal block	0.3 (0,2)
PlantWeb terminal block	0.2 (0,1)

(1) Display only

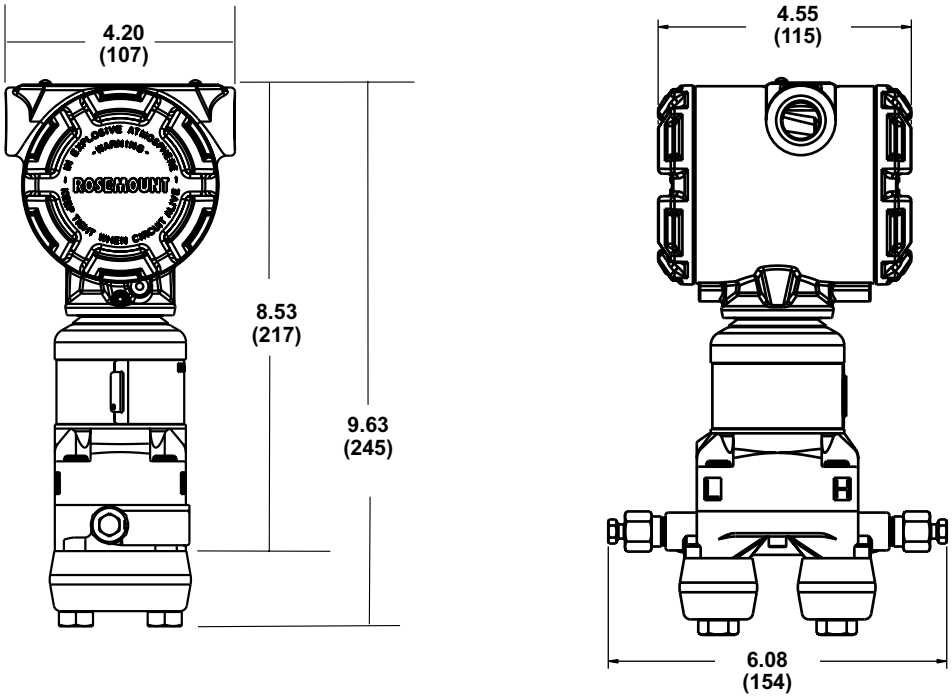
DIMENSIONAL DRAWINGS

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

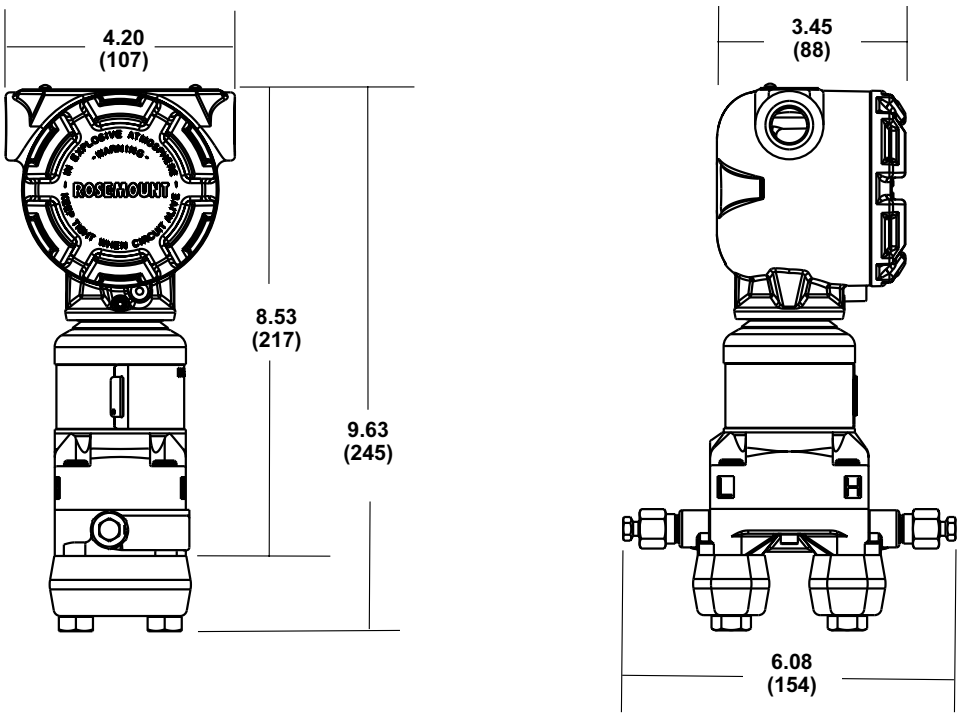
PlantWeb housing with Coplanar SuperModule and Model 305 Coplanar integral manifold



PlantWeb housing with Coplanar SuperModule and Coplanar flange



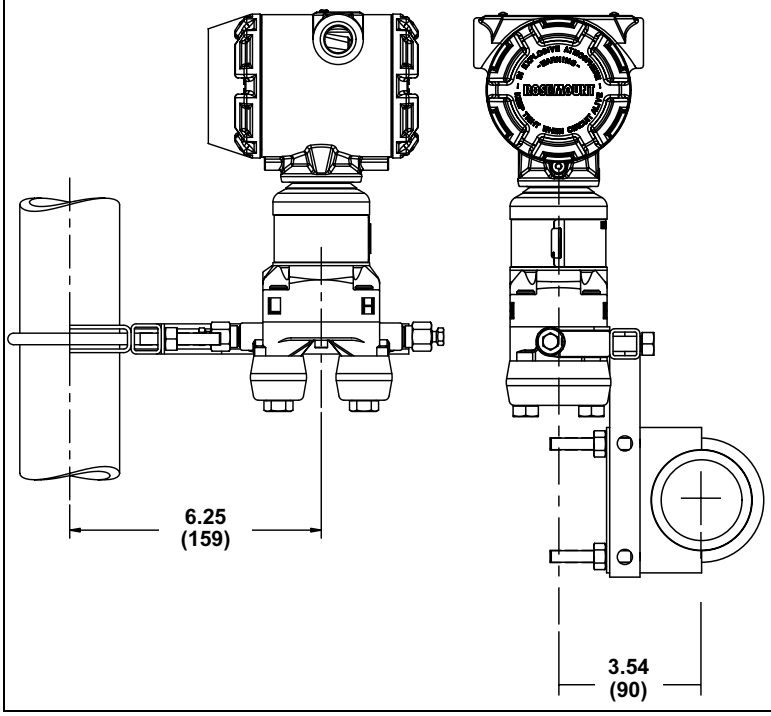
Junction Box housing with Coplanar SuperModule and Coplanar flange



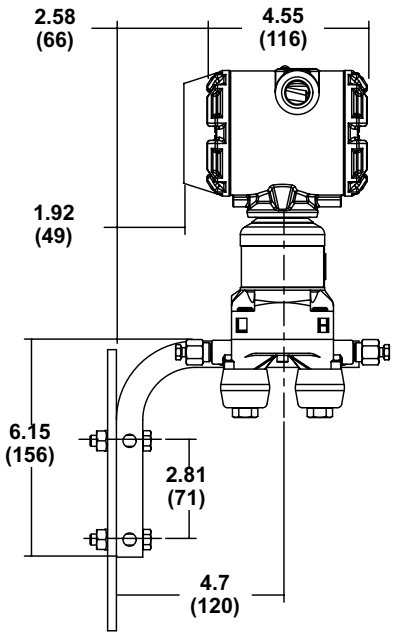
3051S/COPLANAR/ 3051B200A, C200A

Coplanar flange mounting configurations

Pipe Mount

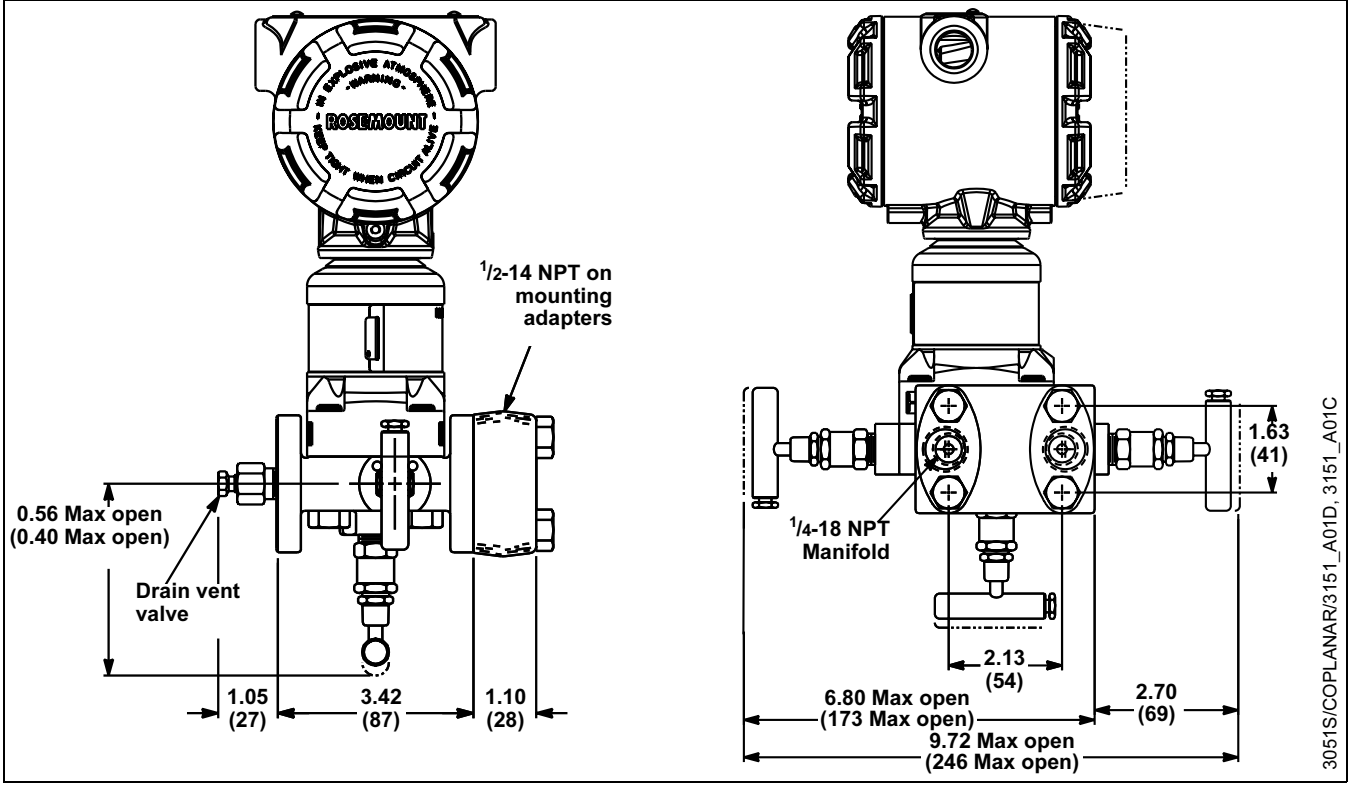


Panel Mount

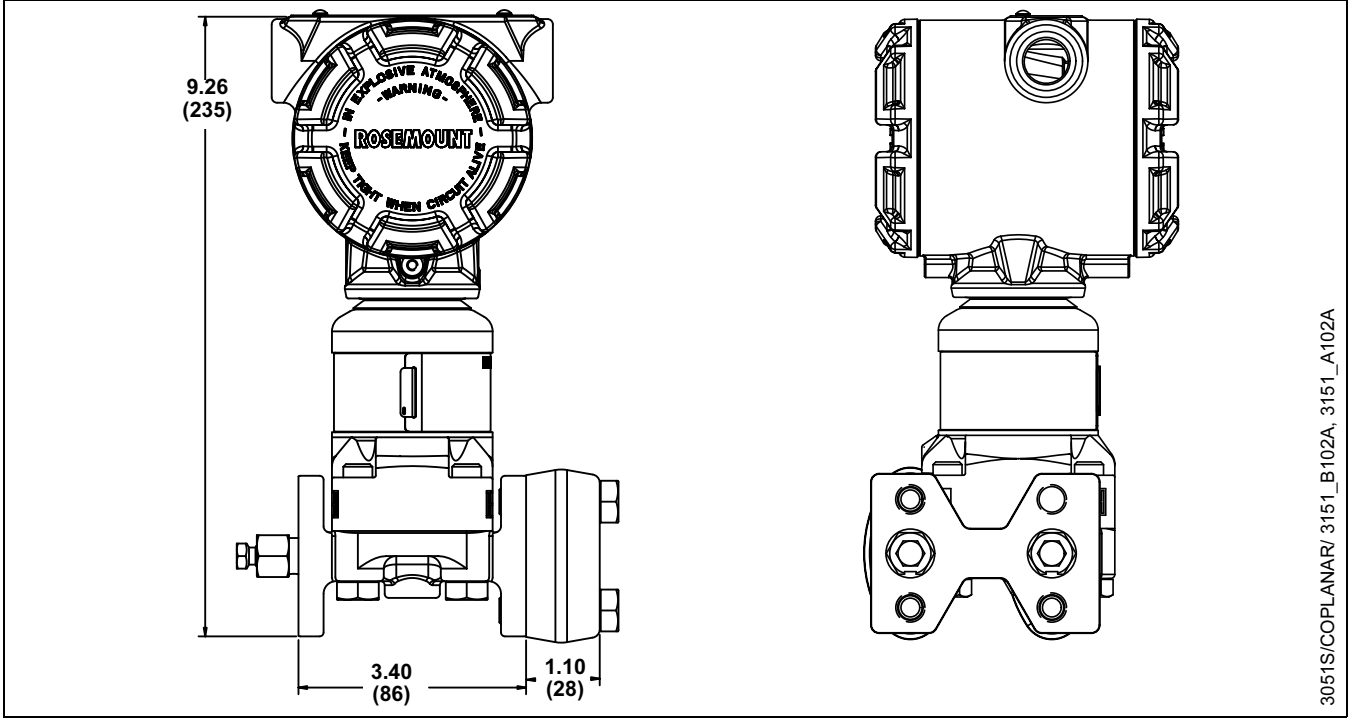


3051S/COPLANAR/3151/3151_F101A, 3151G_101A, 3151_H101A

PlantWeb housing with Coplanar SuperModule and Model 305 traditional integral manifold

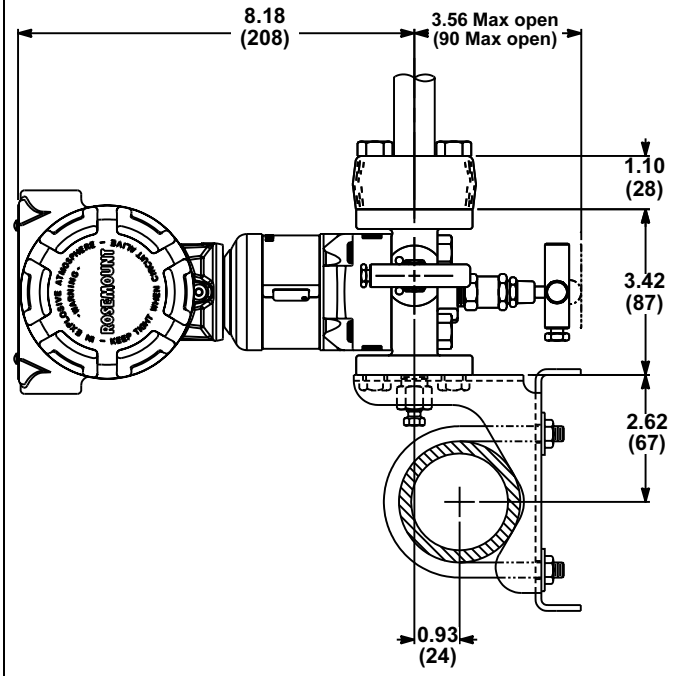


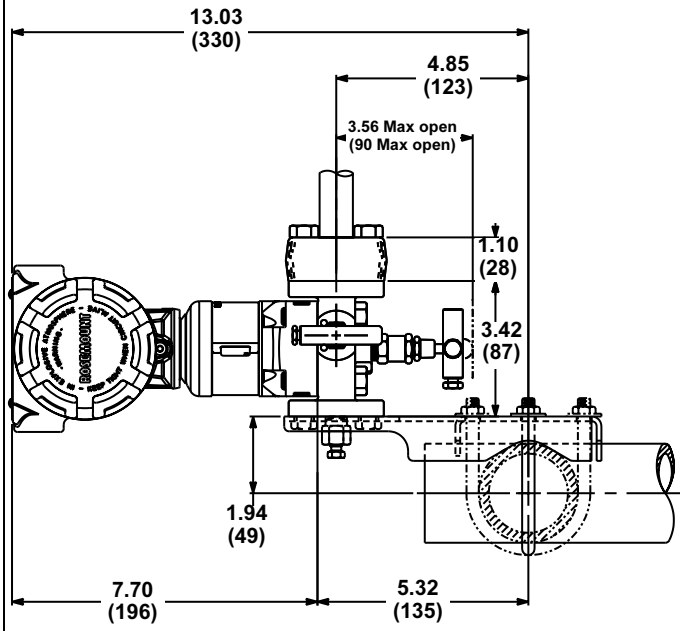
PlantWeb housing with Coplanar SuperModule and traditional flange



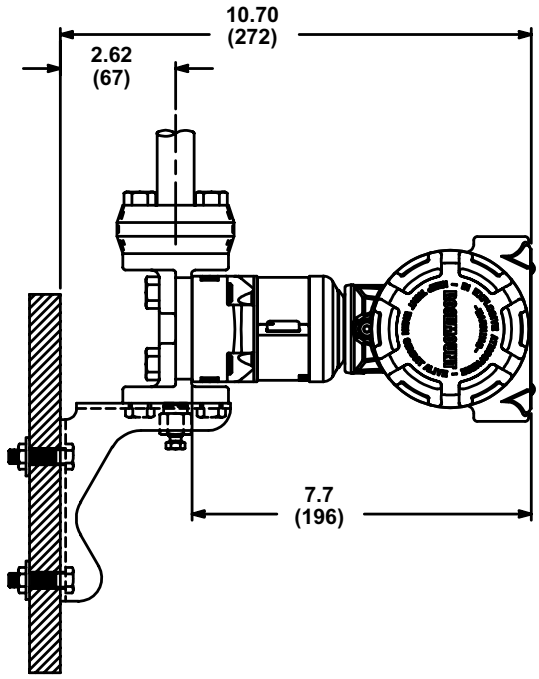
Traditional flange mounting configurations

Pipe Mount Model 305 integral manifold





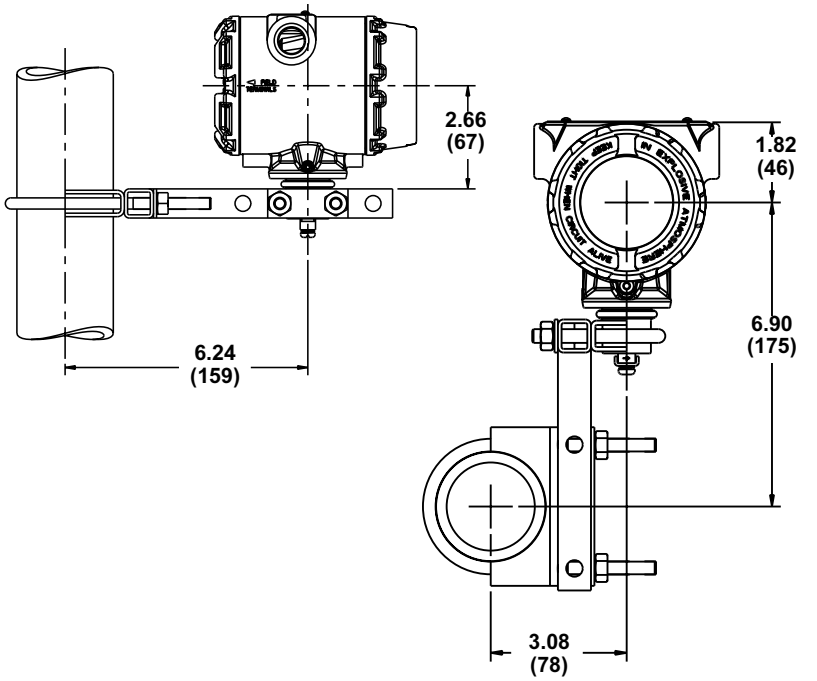
Panel Mount



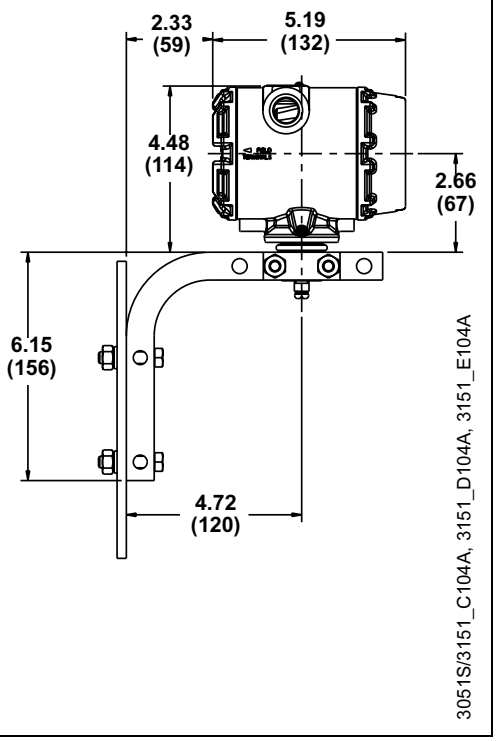
3051S/COPLANAR/3151_A01E, 3151_F519A

Remote Mount Meter mounting configurations

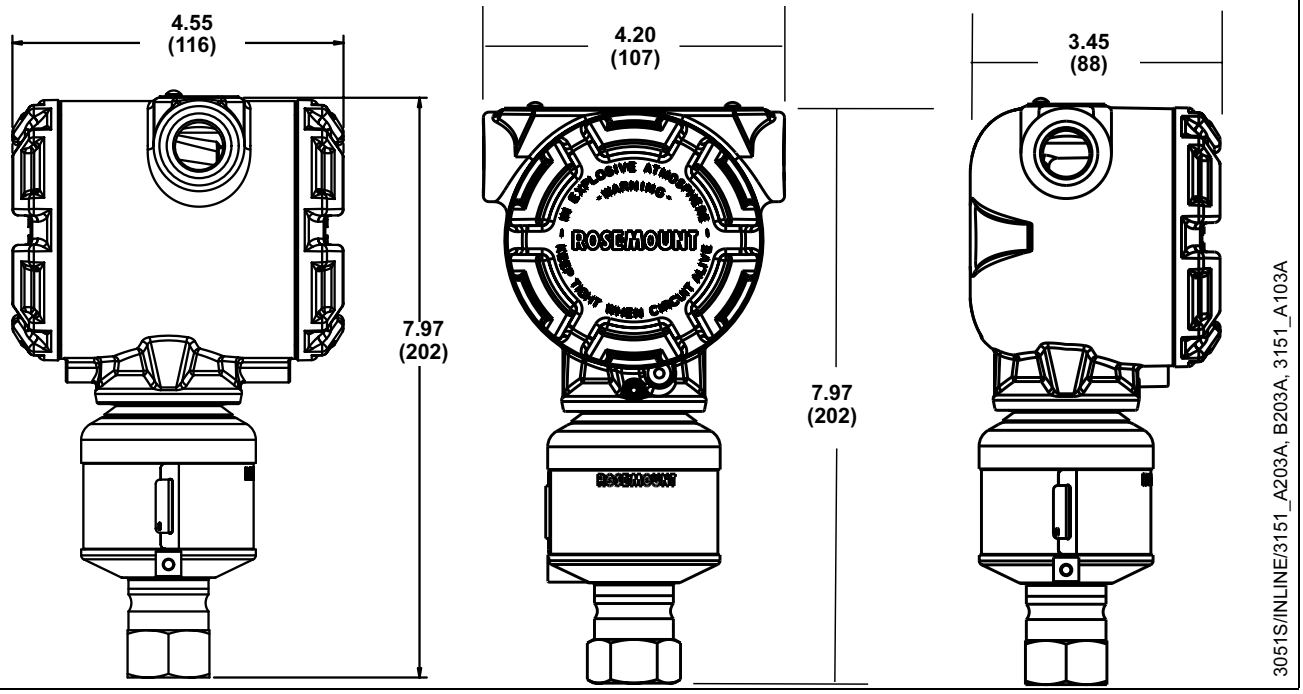
Pipe Mount



Panel Mount

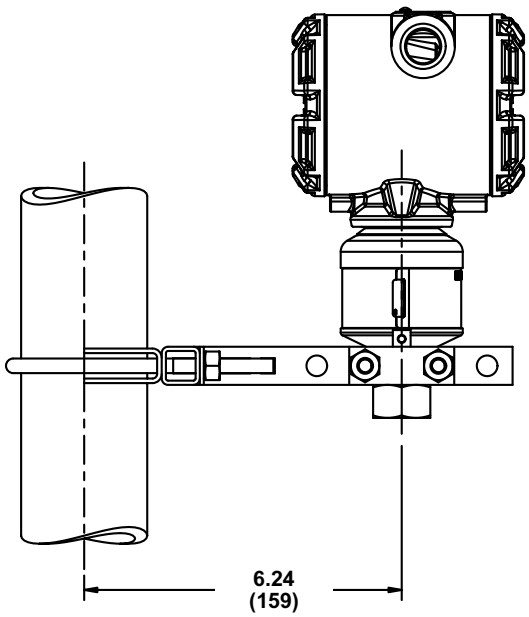


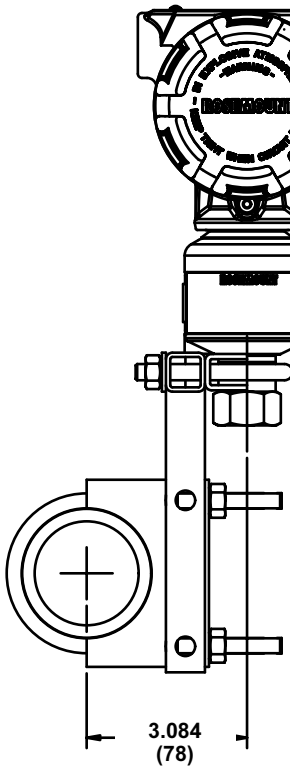
PlantWeb and Junction Box housings with In-Line SuperModule



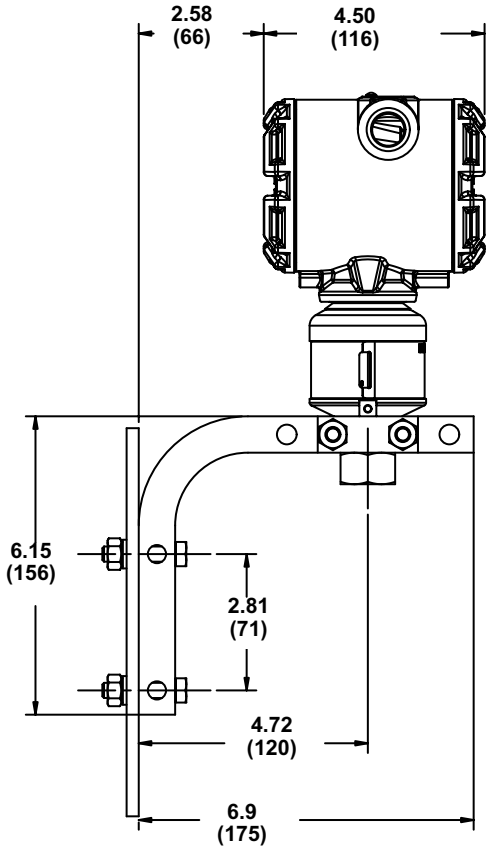
In-line mounting configurations with optional mounting bracket

Pipe Mount





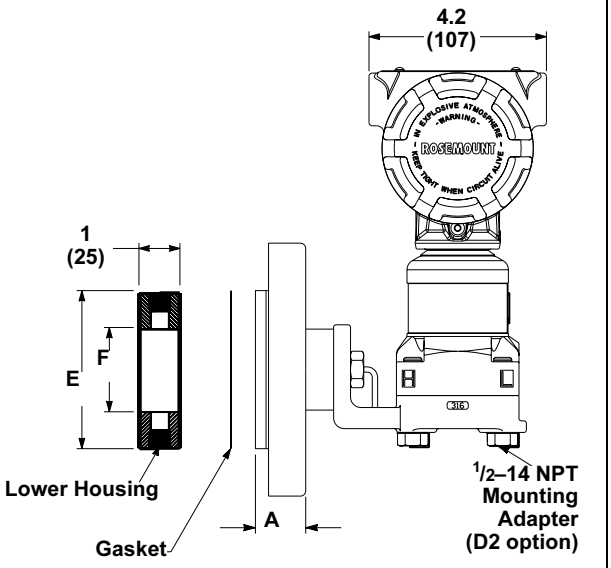
Panel Mount



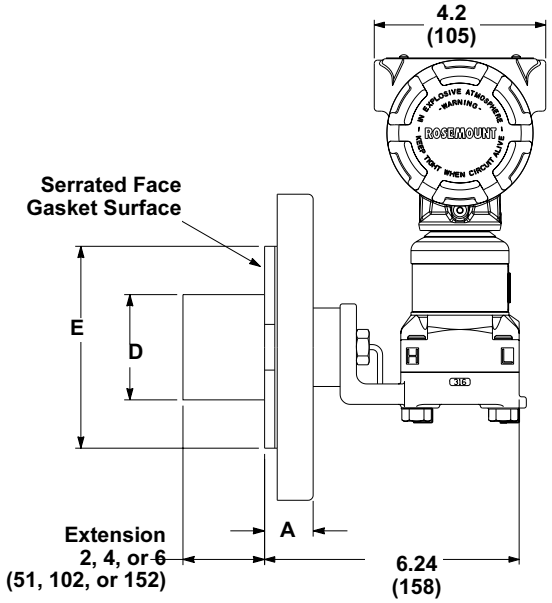
3051S/INLINE/3151_A103A, B103A

Model 3051S_L

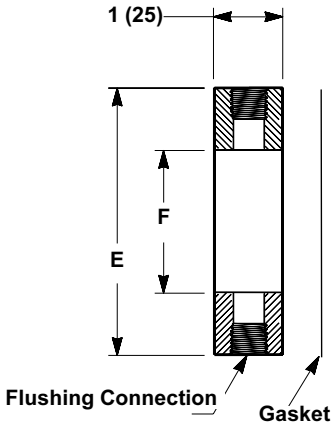
2-IN. FLANGE CONFIGURATION (FLUSH MOUNT ONLY)



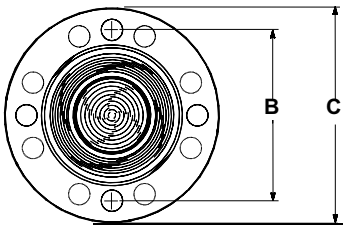
3- AND 4-IN. FLANGE CONFIGURATION

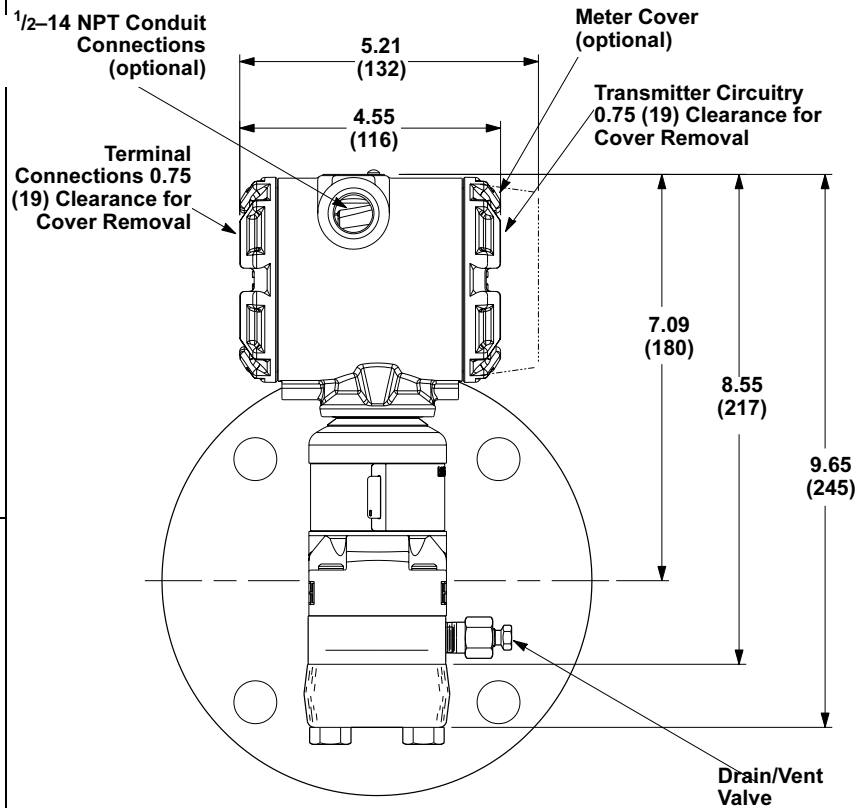


OPTIONAL FLUSHING CONNECTION RING (LOWER HOUSING)



DIAPHRAGM ASSEMBLY AND MOUNTING FLANGE





3051S/ COPLANAR/ 3051_B27A, B27D, C27E, A27C, C27B

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	Process Side F
ASME B 16.5 (ANSI) 150	2 (51)	1.12 (28)	4.75 (121)	6.0 (152)	4	0.75 (19)	NA	3.6 (92)	2.12 (54)
	3 (76)	1.31 (33)	6.0 (152)	7.5 (191)	4	0.75 (19)	2.58 (66)	5.0 (127)	3.5 (89)
	4 (102)	1.31 (33)	7.5 (191)	9.0 (229)	8	0.75 (19)	3.5 (89)	6.2 (158)	4.5 (114)
ASME B 16.5 (ANSI) 300	2 (51)	1.25 (32)	5.0 (127)	6.5 (165)	8	0.75 (19)	NA	3.6 (92)	2.12 (54)
	3 (76)	1.50 (38)	6.62 (168)	8.25 (210)	8	0.88 (22)	2.58 (66)	5.0 (127)	3.5 (89)
	4 (102)	1.62 (41)	7.88 (200)	10.0 (254)	8	0.88 (22)	3.5 (89)	6.2 (158)	4.5 (114)
ASME B 16.5 (ANSI) 600	2 (51)	1.12 (28)	5.0 (127)	6.5 (165)	8	0.75 (19)	NA	3.6 (92)	2.12 (54)
	3 (76)	1.37 (35)	6.62 (168)	6.62 (168)	8	0.88 (22)	2.58 (66)	5.0 (127)	3.5 (89)
DIN 2501 PN 10–40	DN 50	26 mm	125 mm	165 mm	4	18 mm	NA	4.0 (102)	2.5 (63)
DIN 2501 PN 25/40	DN 80	30 mm	160 mm	200 mm	8	18 mm	65 mm	5.4 (138)	3.7 (94)
	DN 100	30 mm	190 mm	235 mm	8	22 mm	89 mm	6.2 (158)	4.5 (114)
DIN2501 PN 10/16	DN 100	26 mm	180 mm	220 mm	8	18 mm	89 mm	6.2 (158)	4.5 (114)

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

ORDERING INFORMATION

Model 3051S Series
Coplanar

Model	Transmitter Type		
3051S	Scalable pressure transmitter		
Code	**Performance Class**		
1	Ultra: 0.04% accuracy, 200:1 turndown, 10 year stability, limited lifetime warranty		
2	Classic: 0.065% accuracy, 100:1 turndown, 5 year stability		
Code	**Connection Type**		
C	Coplanar		
Code	**Measurement Type**		
D	Differential		
G	Gage		
A	Absolute		
	Pressure Range		
Code	**Differential**	**Gage**	**Absolute**
0A	-3 to 3 inH_2O (-7,47 to 7,47 mbar)	N/A	0 to 5 psia (0 to 0,34 bar)
1A	-25 to 25 inH_2O (-62,2 to 62,2 mbar)	-25 to 25 inH_2O (-62,2 to 62,2 mbar)	0 to 30 psia (0 to 2,06 bar)
2A	-250 to 250 inH_2O (-623 to 623 mbar)	-250 to 250 inH_2O (-623 to 623 mbar)	0 to 150 psia (0 to 10,34 bar)
3A	-1000 to 1000 inH_2O (-2,5 to 2,5 bar)	-393 to 1000 inH_2O (-1,0 to 2,5 bar)	0 to 800 psia (0 to 55,2 bar)
4A	-300 to 300 psi (-20,7 to 20,7 bar)	-14.2 to 300 psi (-1,0 to 21 bar)	0 to 4000 psia (0 to 275,8 bar)
5A	-2000 to 2000 psi (-137,9 to 137,9 bar)	-14.2 to 2000 psig (-1,0 to 137,9 bar)	N/A
Code	**Isolating Diaphragm**		
2	316L SST[(1)]		
3	Hastelloy C-276[(1)]		
4	Monel 400[(1)]		
5	Tantalum (Not available on Model 3051S_CA.)		
6	Gold-plated Monel 400 (Includes graphite-filled TFE o-ring)		
7	Gold-plated 316L SST		

Table continued on next page

			Material Type[2]		
Code	**Process Connection**	**Size**	**Flange Material**	**Drain Vent**	**Bolting**
000	None				
A11	Assemble to integral manifold				
B11	Assemble to one diaphragm seal; available on performance class option code 2 only				
B12	Assemble to two diaphragm seals; available on performance class option code 2 only				
C11	Assemble to integral primary element				
E11	Coplanar flange	1/4–18 NPT	CS	316 SST	
E12	Coplanar flange	1/4–18 NPT	316 SST	316 SST	
E13[1]	Coplanar flange	1/4–18 NPT	Hastelloy C-276	Hastelloy C-276	
E14[1]	Coplanar flange	1/4–18 NPT	Monel 400	Monel 400	
E15[1]	Coplanar flange	1/4–18 NPT	316 SST	Hastelloy C-276	
E16[1]	Coplanar flange	1/4–18 NPT	CS	Hastelloy	
E21	Coplanar Flange	RC 1/4	CS	316 SST	
E22	Coplanar flange	RC 1/4	316 SST	316 SST	
E23[1]	Coplanar flange	RC 1/4	Hastelloy C-276	Hastelloy C-276	
E24[1]	Coplanar flange	RC 1/4	Monel 400	Monel 400	
E25[1]	Coplanar flange	RC 1/4	316 SST	Hastelloy C-276	
E26[1]	Coplanar flange	RC 1/4	CS	Hastelloy C-276	
F12	Traditional flange	1/4–18 NPT	316 SST	316 SST	
F13[1]	Traditional flange	1/4–18 NPT	Hastelloy C-276	Hastelloy C-276	
F14[1]	Traditional flange	1/4–18 NPT	Monel 400	Monel 400	
F15[1]	Traditional flange	1/4–18 NPT	316 SST	Hastelloy C-276	
F22	Traditional flange	RC 1/4	316 SST	316 SST	
F23[1]	Traditional flange	RC 1/4	Hastelloy C-276	Hastelloy C-276	
F24[1]	Traditional flange	RC 1/4	Monel 400	Monel 400	
F25[1]	Traditional flange	RC 1/4	316 SST	Hastelloy C-276	
F32	Bottom vent traditional flange	1/4–18 NPT	316 SST	316 SST	
F52	DIN-compliant traditional flange	1/4–18 NPT	316 SST	316 SST	7/16-in. bolting
F62	DIN-compliant traditional flange	1/4–18 NPT	316 SST	316 SST	M10 bolting
F72	DIN-compliant traditional flange	1/4–18 NPT	316 SST	316 SST	M12 bolting
G11[1]	Vertical mount level flange	2-in. ANSI class 150	316 SST		
G12[1]	Vertical mount level flange	2-in. ANSI class 300	316 SST		
G14[1]	Vertical mount level flange	2-in. ANSI class 150	Hastelloy C-276		
G15[1]	Vertical mount level flange	2-in. ANSI class 300	Hastelloy C-276		
G21[1]	Vertical mount level flange	3-in. ANSI class 150	316 SST		
G22[1]	Vertical mount level flange	3-in. ANSI class 300	316 SST		
G24[1]	Vertical mount level flange	3-in. ANSI class 150	Hastelloy C-276		
G25[1]	Vertical mount level flange	3-in. ANSI class 300	Hastelloy C-276		
G31[1]	Vertical mount level flange	DIN- DN 50 PN 40	316 SST		
G41[1]	Vertical mount level flange	DIN- DN 80 PN 40	316 SST		
Code	**Output**				
A	4–20 mA with digital signal based on HART protocol				
F	FOUNDATION fieldbus (AI block only); requires PlantWeb housing				

Table continued on next page

Code	Housing Style	Material[2]	Conduit Entry Size
00	None (Customer-supplied electrical connection or spare part SuperModule)		
1A	PlantWeb housing	Aluminum	1/2–14 NPT
1B	PlantWeb housing	Aluminum	M20 x 1.5 (CM20)
1C	PlantWeb housing	Aluminum	G1/2
1J	PlantWeb housing	316L SST	1/2–14 NPT
1K	PlantWeb housing	316L SST	M20 x 1.5 (CM20)
1L	PlantWeb housing	316L SST	G1/2
2A	Junction Box housing	Aluminum	1/2–14 NPT
2B	Junction Box housing	Aluminum	M20 x 1.5 (CM20)
2C	Junction Box housing	Aluminum	G1/2
2E	Junction Box with remote mount meter output	Aluminum	1/2–14 NPT
2F	Junction Box with remote mount meter output	Aluminum	M20 x 1.5 (CM20)
2G	Junction Box with remote mount meter output	Aluminum	G1/2
	OPTIONS		
Code	**PlantWeb Functionality**		
A01	Regulatory control suite: PID, arith, signal char, integ, etc.; requires PlantWeb housing and FOUNDATION fieldbus		
D01	Diagnostics suite, Plugged Impulse Line and SPM diagnostics; requires PlantWeb housing and fieldbus		
Code	**Mounting brackets**		
B4	Coplanar flange bracket, all SST, 2-in. pipe and panel		
B1	Traditional flange bracket, CS, 2-in. pipe		
B2	Traditional flange bracket, CS, panel		
B3	Traditional flange flat bracket, CS, 2-in. pipe		
B7	Traditional flange bracket, B1 with SST bolts		
B8	Traditional flange bracket, B2 with SST bolts		
B9	Traditional flange bracket, B3 with SST bolts		
BA	Traditional flange bracket, B1, all SST bolts		
BC	Traditional flange bracket, B3, all SST bolts		
Code	**Special configuration (software)**		
C1[3]	Custom software configuration (*A Configuration Data Sheet must be completed, see page A-36.)*		
C3	Gage pressure calibration on Model 3051S_CA4 only		
C4[3]	NAMUR alarm and saturation levels, high alarm		
C5[3]	NAMUR alarm and saturation levels, low alarm		
C6[3]	Custom alarm and saturation signal levels, high alarm *Note: Requires code C1, custom software configuration. A Configuration Data Sheet must be completed (see page A-36).*		
C7[3]	Custom alarm and saturation signal levels, low alarm *Note: Requires code C1, custom software configuration. A Configuration Data Sheet must be completed (see page A-36).*		
C8[3]	Low alarm (standard Rosemount alarm and saturation levels).		
Code	**Special configuration (hardware)**		
D1[3]	Hardware adjustments (zero, span, alarm, security)		
D2	process adapters 1/2-14 NPT		
D4	External ground screw assembly		
D5	Delete transmitter drain/vent valves (install plugs)		
D7	Coplanar flange without drain/vent ports		
D8	Ceramic drain/vent valves		
D9	RC 1/2 process adapters		

Table continued on next page

Code	Hazardous Locations Certifications
E1	CENELEC flameproof
I1	CENELEC Intrinsic Safety
IA	CENELEC FISCO Intrinsic Safety; for FOUNDATION fieldbus protocol only
N1	CENELEC Type n
K1	CENELEC Flameproof, Intrinsic Safety, Type N (combination of E1, I1, and N1)
ND	CENELEC Combustible Dust
E4	JIS flameproof
I4	JIS intrinsically safe
K4	JIS flameproof, intrinsically safe (combination of E4 and I4)
E5	FM explosion-proof
I5	FM intrinsically safe, non-incendive
IE	FM FISCO Intrinsic Safety; for FOUNDATION fieldbus protocol only
K5	FM explosion-proof, intrinsically safe, non-incendive (combination of E5 and I5)
E6	CSA explosion-proof
I6	CSA intrinsically safe, non-incendive
IF	CSA FISCO Intrinsic Safety; for FOUNDATION fieldbus protocol only
K6	CSA flameproof, intrinsically safe, non-incendive (combination of E6 and I6)
E7	SAA flameproof
I7	SAA intrinsically safe
N7	SAA Type n
K7	SAA flameproof, intrinsically safe, type N (combination of E7, I7, and N7)
KA	CENELEC and CSA Flameproof and Intrinsic Safety (combination of E1, I1, E6, and I6)
KB	FM and CSA Explosion Proof and Intrinsic Safety (combination of E5, E6, I5, and I6)
KC	FM and CENELEC Explosion Proof and Intrinsic Safety (combination of E5, E1, I5, and I1)
Code	**Alternate materials of construction**
L1	Inert sensor fill fluid (differential and gage only)
L2	Graphite-filled TFE o-ring
L4	Austenitic 316 SST bolts
L5	ANSI/ASTM-A-193-B7M bolts
L6	Monel bolts
L7	Grade 660, ASTM A453
Code	**Meters**
M5	Integral mount digital LCD meter (requires PlantWeb housing)
M8(3)	Remote mount LCD meter assembly, aluminum housing, SST bracket, 50 ft. (15.24 m) cable; requires 4-20 mA / HART protocol output
M9(3)	Remote mount LCD meter assembly, aluminum housing, SST bracket, 100 ft. (30.48 m) cable; requires 4-20 mA / HART protocol output
Code	**Special procedures**
P1	Hydrostatic testing
P2	Cleaning for special services
P3	Cleaning for less than 1PPM chlorine/fluorine
P9	4500 psig (310 bar) static pressure limit (Model 3051S_CD only)
Code	**Special certifications**
Q4	Calibration data certificate
Q8	Material traceability certification per EN 10204 3.1B
Code	**Terminal blocks**
T1	Transient protection
Typical Model Number: 3051S1CD 2 A 2 E12 A 1A B4	

(1) Materials of Construction meet NACE material recommendations per MR 01—75. Caution is strongly advised when considering the use of 316L SST isolating diaphragms in sour environments. Although these diaphragms meet the intent of the standard, it can be jeopardized by chlorine contaminates that are frequently found in sour process streams.

(2) Material specified is cast as follows: CF-8M is the cast version of 316 SST, CF-3M is the cast version of 316L SST, CW-12MW is the cast version of Hastelloy C-276, M-30C is the cast version of Monel 400. For housing, material is aluminum with polyurethane paint.

(3) Not available with fieldbus protocol.

End of Selections

Model 3051S Series
In-Line

Model	Transmitter Type		
3051S	Scalable pressure transmitter		
Code	**Performance Class**		
1	Ultra: 0.04% accuracy, 200:1 turndown, 10 year stability, limited lifetime warranty		
2	Classic: 0.065% accuracy, 100:1 turndown, 5 year stability		
Code	**Device Type**		
T	In-Line		
Code	**Measurement Type**		
G	Gage		
A	Absolute		
	Primary pressure range		
Code	**TG**	**TA**	
1A	-14.7 to 30 psi (-1,0 to 2,1 bar)	0 to 30 psia (2,1 bar)	
2A	-14.7 to 150 psi (-1,0 to 10,3 bar)	0 to 150 psia (10,3 bar)	
3A	-14.7 to 800 psi (-1,0 to 55 bar)	0 to 800 psia (55 bar)	
4A	-14.7 to 4000 psi (-1,0 to 276 bar)	0 to 4000 psia (276 bar)	
5A	-14.7 to 10000 psi (-1,0 to 689 bar)	0 to 10000 psia (689 bar)	
Code	**Isolating Diaphragm/Process Connection Material**		
2	316L SST[1]		
3	Hastelloy C-276[1]		
Code	**Process Connection Style**		
A11	Assemble to integral manifold		
B11	Assemble to one diaphragm seal; available on performance class option code 2 only		
E11	1/2–14 NPT female		
F11	Non-threaded instrument-flange (I-flange) (Range 1-4 only)		
G11	G1/2 A DIN 16288 male (Range 1-4 only)		
H11	Coned and threaded, compatible with autoclave type F-250-C (Range 5A only)		
Code	**Output**		
A	4–20 mA with digital signal based on HART protocol		
F	FOUNDATION fieldbus; requires PlantWeb housing		
Code	**Housing Style**	**Materials[2]**	**Conduit Entry Size**
00	None - for use with customer supplied connection or SuperModule spare part		
1A	PlantWeb housing	Aluminum	1/2–14 NPT
1B	PlantWeb housing	Aluminum	M20 x 1.5 (CM20)
1C	PlantWeb housing	Aluminum	G1/2
1J	PlantWeb housing	316L SST	1/2–14 NPT
1K	PlantWeb housing	316L SST	M20 x 1.5 (CM20)
1L	PlantWeb housing	316L SST	G 1/2
2A	Junction Box housing	Aluminum	1/2–14 NPT
2B	Junction Box housing	Aluminum	M20 x 1.5 (CM20)
2C	Junction Box housing	Aluminum	G 1/ 2
2E	Junction Box with remote mount meter output	Aluminum	1/2–14 NPT
2F	Junction Box with remote mount meter output	Aluminum	M20 x 1.5 (CM20)
2G	Junction Box with remote mount meter output	Aluminum	G1/2
	OPTIONS		
Code	**PlantWeb functionality**		
A01	Regulatory control suite: PID, arith, signal char, integ, etc.; requires PlantWeb housing and FOUNDATION fieldbus		
D01	Diagnostics suite: Plugged Impulse Line and SPM diagnostics; requires PlantWeb housing and FOUNDATION fieldbus		
Code	**Mounting bracket**		
B4	Bracket, all SST, 2-in. pipe and panel		

Table continued on next page

Code	Special configuration (software)
C1[3]	Custom software configuration (*A Configuration Data Sheet must be completed, see page A-36.)*
C[3]4	NAMUR alarm and saturation values, high alarm
C5[3]	NAMUR alarm and saturation values, low alarm
C6[3]	Custom alarm and saturation signal levels, high alarm *Note: Requires code C1, custom software configuration. A Configuration Data Sheet must be completed (see page A-36).*
C7[3]	Custom alarm and saturation signal levels, low alarm *Note: Requires code C1, custom software configuration. A Configuration Data Sheet must be completed (see page A-36).*
C8[3]	Low alarm (Standard Rosemount alarm and saturation signal levels)
Code	**Special configuration (hardware)**
D1[3]	Hardware adjustments (zero, span, alarm, security)
D2	1/2-14 NPT process adapter for Process Connection code F11, I-Flange
D4	External ground screw assembly
D9	RC 1/2 process adapters for Process Connection code F11, I-Flange
Code	**Hazardous Locations Certifications**
E1	CENELEC flameproof
I1	CENELEC Intrinsic Safety
IA	CENELEC FISCO Intrinsic Safety; for FOUNDATION fieldbus protocol only
N1	CENELEC Type n
K1	CENELEC Flameproof, Intrinsic Safety, Type N (combination of E1, I1, and N1)
ND	CENELEC Combustible Dust
E4	JIS flameproof
I4	JIS intrinsically safe
K4	JIS flameproof, intrinsically safe (combination of E4 and I4)
E5	FM explosion-proof
I5	FM intrinsically safe, non-incendive
IE	FM FISCO Intrinsic Safety; for FOUNDATION fieldbus protocol only
K5	FM explosion-proof, intrinsically safe, non-incendive (combination of E5 and I5)
E6	CSA explosion-proof
I6	CSA intrinsically safe, non-incendive
IF	CSA FISCO Intrinsic Safety; for FOUNDATION fieldbus protocol only
K6	CSA flameproof, intrinsically safe, non-incendive (combination of E6 and I6)
E7	SAA flameproof
I7	SAA intrinsically safe
N7	SAA Type n
K7	SAA flameproof, intrinsically safe, type N (combination of E7, I7, and N7)
KA	CENELEC and CSA Flameproof and Intrinsic Safety (combination of E1, I1, E6, and I6)
KB	FM and CSA Explosion Proof and Intrinsic Safety (combination of E5, E6, I5, and I6)
KC	FM and CENELEC Explosion Proof and Intrinsic Safety (combination of E5, E1, I5, and I1)
Code	**Alternate materials of construction**
L1	Inert sensor fill fluid
L4	Austenitic 316 SST bolts for Process Connection code F11, I-Flange
Code	**Meters**
M5	Integral mount digital LCD meter (requires PlantWeb housing)
M8[3]	Remote mount LCD meter assembly, aluminum housing, SST bracket, 50 foot cable; requires 4-20 mA / HART protocol output
M9[3]	Remote mount LCD meter assembly, aluminum housing, SST bracket, 100 foot cable; requires 4-20 mA / HART protocol output
Code	**Special procedures**
P1	Hydrostatic testing
P2	Cleaning for special services
P3	Cleaning for less than 1 PPM chlorine/fluorine
Code	**Special certifications**
Q4	Calibration data certificate
Q8	Material Traceability Certification per EN 10204 3.1B
Code	**Terminal blocks**
T1	Transient protection
Typical Model Number: 3051S1TG 2 A 2 E11 A 1A B4	

(1) Materials of Construction meet NACE material recommendations per MR 01—75. Caution is strongly advised when considering the use of 316L SST isolating diaphragms in sour environments. Although these diaphragms meet the intent of the standard, it can be jeopardized by chlorine contaminates that are frequently found in sour process streams.
(2) Material specified is cast as follows: CF-3M is the cast version of 316L SST. For housing, material is aluminum with polyurethane paint.
(3) Not available with fieldbus protocol.

End of Selections

Model 3051S Series Liquid Level

You must select either FF diaphragm seal type (see "Flush Flanged Seal" on page A-27) or for EF diaphragm seal type (see "Extended Flanged Seal" on page A-28) and then finish this selection by choosing transmitter options.

Model	Transmitter type		
3051S	Scalable pressure transmitter		
Code	**Pressure type**		
2	Classic: 0.065% accuracy, 100:1 turndown		
Code	**Connection type**		
L	Level		
Code	**Measurement type**		
D	Differential		
G	Gage		
A	Absolute		
Code	**Pressure range**		
	Differential (CD)	**Gage (CG)**	**Absolute (CA)**
1A	0 to 25 inH_2O	0 to 25 inH_2O	0 to 30 psi (2,1 bar)
2A	0 to 250 inH_2O (0 to 623 mbar)	0 to 250 inH_2O (0 to 623 mbar)	0 to 150 psia (10 bar)
3A	0 to 1000 inH_2O (0 to 2,5 bar)	0 to 1000 inH_2O (0 to 2,5 bar)	0 to 800 psia (55 bar)
4A	0 to 300 psi (0 to 20,68 bar)	0 to 300 psi (0 to 21 bar)	0 to 4000 psia (276 bar)
5A	0 to 2000 psi (138 bar)	0 to 2000 psi (138 bar)	
Code	**Output**		
A	4-20 mA HART		
F	FOUNDATION fieldbus - AI block only; requires PlantWeb housing		
Code	**Housing style**	**Material[(1)]**	**Conduit entry**
00	None (Customer-supplied electrical connection or spare part SuperModule)		
1A	PlantWeb housing	Aluminum	1/2–14 NPT
1B	PlantWeb housing	Aluminum	M20 x 1.5 (CM20)
1C	PlantWeb housing	Aluminum	G1/2
1J	PlantWeb housing	316L SST	1/2–14 NPT
1K	PlantWeb housing	316L SST	M20 x 1.5 (CM20)
1L	PlantWeb housing	316L SST	G1/2
2A	Junction Box housing	Aluminum	1/2–14 NPT
2B	Junction Box housing	Aluminum	M20 x 1.5 (CM20)
2C	Junction Box housing	Aluminum	G1/2
2E	Junction Box with remote mount meter output	Aluminum	1/2–14 NPT
2F	Junction Box with remote mount meter output	Aluminum	M20 x 1.5 (CM20)
2G	Junction Box with remote mount meter output	Aluminum	G1/2
Code	**Seal system type**		
1	Direct-mount diaphragm seal system		
Code	**High pressure side extension (between transmitter flange and seal)**		
0	No Extension		
Code	**Low pressure side connection (sensor module)**		
1	One capillary connection remote diaphragm seal (see additional Model 1199 ordering table for seal information)		
2	316L SST isolator / 316 SST transmitter flange		
3	Hastelloy C-276 isolator / 316 SST transmitter flange		
Code	**Capillary length**		
0	N/A		

Table continued on next page

Code	Diaphragm seal fill fluid
A	Syltherm XLT
C	D. C. Silicone 704
D	D. C. Silicone 200
H	Inert (Halocarbon)
G	Glycerine and Water
N	Neobee M-20
P	Propylene Glycol and Water

Next, select either Flush Flanged (FF) diaphragm seal (see table below) or Extended Flanged (EF) diaphragm seal (see page A-28).

(1) Material specified is cast as follows: CF-3M is the cast version of 316L SST. For housing, material is aluminum with polyurethane paint.

Seal Options (page A-27—A-28)

Flush Flanged Seal

Code	Process Connection Style	
FF	Flush Flanged, Ra 125-250 gasket surface	
Code	**Diaphragm Seal Size (High Side)**	
G	2-in./DN 50	
7	3-in.	
J	DN 80	
9	4-in./DN 100	
Code	**Flange Rating (High Side)**	
1	Class 150	
2	Class 300	
4	Class 600	
G	PN 40	
E	PN 10/16; available with 4 in. DN 100 only	
Code	**Isolator Material**	**Flange Material (High Side)**
CA	316L SST	CS
DA	316L SST	316 SST
CB	Hastelloy	CS
DB	Hastelloy	316 SST
CC	Tantalum - seam welded(1)	CS
DC	Tantalum - seam welded (1)	316 SST
Code	**Lower Housing Material (High Side)(2)**	
0	None	
A	316 SST	
B	Hastelloy	
Code	**Flushing Connection Quantity and Size (Lower Housing, High Side)**	
0	None	
1	1 (1/4-in.)	
3	2 (1/4-in.)	
7	1 (1/2-in.)	
9	2 (1/2-in.)	
Code	**Seal Options: Gaskets**	
SJ	Teflon gasket for lower housing	
SK	Gylon gasket for lower housing	
SN	Grafoil™ gasket for lower housing	
Code	**Other Options**	
ST	Materials per NACE MR 01—75	

Continue with transmitter options

(1) Not recommended for use with spiral wound metallic gaskets (see Model 1199 product data sheet, document 00813-0100-4016 for additional options)
(2) Standard gasket for lower housing consists of non-asbestos fiber.

Extended Flanged Seal

Code	Process Connection Style	
EF	Extended flanged, Ra 125-250 gasket surface	
Code	**Diaphragm Seal Size (High Side)**	
7	2.58-in. diaphragm, 3-in./DN 80	
9	3.5-in. diaphragm, 4-in./DN 100	
Code	**Flange Rating (High Side)**	
1	Class 150	
2	Class 300	
4	Class 600	
G	PN 40	
E	PN 10/16; available with 4 in. DN 100 only	
Code	**Isolator Material and Extension Material**	**Flange Material (High Side)**
CA	316L SST	CS
DA	316L SST	316 SST
CB	Hastelloy	CS
DB	Hastelloy	316 SST
Code	**Extension Length (High Side, 1st Position)**	
2	2-in./50 mm	
4	4-in./100 mm	
6	6-in./150 mm	
Code	**Extension Length (High Side, 2nd Position)**	
0	0-in./0 mm	
Continue with transmitter options		

Transmitter Options continued

(— = Not Applicable • = Applicable)

Code	TRANSMITTER OPTIONS PlantWeb Functionality	LD	LG	LA
A01	Regulatory control suite, PID, arith, signal char, integ, etc.; requires PlantWeb housing and fieldbus			
D01	Diagnostics suite, Plugged Impulse Line and SPM diagnostics; requires PlantWeb housing and fieldbus			
Code	**Special configuration (software)**			
C1[1]	Custom software configuration (*A Configuration Data Sheet must be completed, see page A-36.)*			
C3	Gage pressure calibration on Model 3051S_CA4 only			
C4	NAMUR alarm and saturation levels, high alarm			
C5	NAMUR alarm and saturation levels, low alarm			
C6	Custom alarm and saturation signal levels, high alarm *Note: Requires code C1, custom software configuration. A Configuration Data Sheet must be completed (see page A-36).*			
C7	Custom alarm and saturation signal levels, low alarm *Note: Requires code C1, custom software configuration. A Configuration Data Sheet must be completed (see page A-36).*			
C8	Low alarm (standard Rosemount alarm and saturation levels).			
Code	**Special configuration (hardware)**	**LD**	**LG**	**LA**
D1	Hardware adjustments (zero, span, alarm, security)	•	•	•
D2	1/2-14 NPT process connection process adapter	•	—	—
D4	External ground screw assembly	•	•	•
D5	Delete transmitter drain/vent valve (install plug)	•	—	—
D8	Ceramic drain/vent valve	•	—	—
D9	RC 1/2 process connection (process adapter)	•	—	—
Code	**Hazardous Locations Certifications**			
E1	CENELEC flameproof			
I1	CENELEC Intrinsic Safety			
IA	CENELEC FISCO Intrinsic Safety; for FOUNDATION fieldbus protocol only			
N1	CENELEC Type n			
K1	CENELEC Flameproof, Intrinsic Safety, Type N (combination of E1, I1, and N1)			
ND	CENELEC Combustible Dust			
E4	JIS flameproof			
I4	JIS intrinsically safe			
K4	JIS flameproof, intrinsically safe (combination of E4 and I4)			
E5	FM explosion-proof			
I5	FM intrinsically safe, non-incendive			
IE	FM FISCO Intrinsic Safety; for FOUNDATION fieldbus protocol only			
K5	FM explosion-proof, intrinsically safe, non-incendive (combination of E5 and I5)			
E6	CSA explosion-proof			
I6	CSA intrinsically safe, non-incendive			
IF	CSA FISCO Intrinsic Safety; for FOUNDATION fieldbus protocol only			
K6	CSA flameproof, intrinsically safe, non-incendive (combination of E6 and I6)			
E7	SAA flameproof			
I7	SAA intrinsically safe			
N7	SAA Type n			
K7	SAA flameproof, intrinsically safe, type N (combination of E7, I7, and N7)			
KA	CENELEC and CSA Flameproof and Intrinsic Safety (combination of E1, I1, E6, and I6)			
KB	FM and CSA Explosion Proof and Intrinsic Safety (combination of E5, E6, I5, and I6)			
KC	FM and CENELEC Explosion Proof and Intrinsic Safety (combination of E5, E1, I5, and I1)			

Table continued on next page

Code	Alternate materials of construction
L1	Inert sensor fill fluid (differential and gage only)
L2	Graphite-filled TFE o-ring
L4	Austenitic 316 SST bolts
L5	ANSI/ASTM-A-193-B7M bolts
L6	Monel bolts
L7	Grade 660, ASTM A453
Code	**Meters**
M5	Digital LCD meter (requires PlantWeb housing)
M8(3)	Remote mount LCD meter assembly, aluminum housing, SST bracket, 50 foot cable; requires 4-20 mA / HART protocol output
M9(3)	Remote mount LCD meter assembly, aluminum housing, SST bracket, 100 foot cable; requires 4-20 mA / HART protocol output
Code	**Special procedures**
P1	Hydrostatic testing
P2	Cleaning for special services
P3	Cleaning for less than 1PPM chlorine/fluorine
Code	**Special certifications**
Q4	Calibration data certificate
Q8	Material traceability certification per EN 10204 3.1B
Code	**Terminal blocks**
T1	Transient protection
Typical Model Number for FF seal: 3051S 2 LD	**2 A A 1A 1 0 2 0 D FF 7 1 DA 0 0**
Typical Model Number for EF seal: 3051S2 LD	**2 A A 1A 1 0 2 0 D EF 7 1 DA 2 0**

(1) Not available with fieldbus protocol.

End of Model 3051S_L selections.

Model 300S Series
Housing "Kit"

Model			
300S	Housing "Kit" for Model 3051S Scalable Pressure Transmitter		
Code	**Housing Style**	**Material[1]**	**Conduit Entry**
1A	PlantWeb housing	Aluminum	1/2–14 NPT
1B	PlantWeb housing	Aluminum	M20 x 1.5 (CM20)
1C	PlantWeb housing	Aluminum	G1/2
1J	PlantWeb housing	316L SST	1/2–14 NPT
1K	PlantWeb housing	316L SST	M20 x 1.5 (CM20)
1L	Plantweb housing	316L SST	G 1/2
2A	Junction Box housing	Aluminum	1/2–14 NPT
2B	Junction Box housing	Aluminum	M20 x 1.5 (CM20)
2C	Junction Box housing	Aluminum	G1/2
2E	Junction Box with remote mount meter output	Aluminum	1/2–14 NPT
2F	Junction Box with remote mount meter output	Aluminum	M20 x 1.5 (CM20)
2G	Junction Box with remote mount meter output	Aluminum	G1/2
3A	Remote mount meter housing	Aluminum	1/2–14 NPT
3B	Remote mount meter housing	Aluminum	M20 x 1.5 (CM20)
3C	Remote mount meter housing	Aluminum	G1/2
Code	**Output**		
A	4-20 mA with digital signal based on HART protocol		
F	FOUNDATION fieldbus; requires PlantWeb housing		
	OPTIONS		
Code	**PlantWeb Functionality**		
A01	Regulatory control suite: PID, Arith, Signal Char, Integ, etc.;requires PlantWeb housing and FOUNDATION fieldbus		
D01	Diagnostic suite: Plugged Impulse Line Detection and SPM; requires PlantWeb housing and FOUNDATION fieldbus		
Code	**Special Configuration (Hardware)**		
D1	Hardware adjustments (zero, span, alarm, security)[2]		
D4	External ground screw assembly		

Table continued on next page

Code	Hazardous Locations Certifications
E1	CENELEC flameproof
I1	CENELEC Intrinsic Safety
IA	CENELEC FISCO Intrinsic Safety; for FOUNDATION fieldbus protocol only
N1	CENELEC Type n
K1	CENELEC Flameproof, Intrinsic Safety, Type N (combination of E1, I1, and N1)
ND	CENELEC Combustible Dust
E4	JIS flameproof
I4	JIS intrinsically safe
K4	JIS flameproof, intrinsically safe (combination of E4 and I4)
E5	FM explosion-proof
I5	FM intrinsically safe, non-incendive
IE	FM FISCO Intrinsic Safety; for FOUNDATION fieldbus protocol only
K5	FM explosion-proof, intrinsically safe, non-incendive (combination of E5 and I5)
E6	CSA explosion-proof
I6	CSA intrinsically safe, non-incendive
IF	CSA FISCO Intrinsic Safety; for FOUNDATION fieldbus protocol only
K6	CSA flameproof, intrinsically safe, non-incendive (combination of E6 and I6)
E7	SAA flameproof
I7	SAA intrinsically safe
N7	SAA Type n
K7	SAA flameproof, intrinsically safe, type N (combination of E7, I7, and N7)
KA	CENELEC and CSA Flameproof and Intrinsic Safety (combination of E1, I1, E6, and I6)
KB	FM and CSA Explosion Proof and Intrinsic Safety (combination of E5, E6, I5, and I6)
KC	FM and CENELEC Explosion Proof and Intrinsic Safety (combination of E5, E1, I5, and I1)
Code	**Meters**
M5	Integral mount digital LCD meter (requires PlantWeb housing)
M8	Remote mount LCD meter, housing bracket, 50 foot cable; requires 4-20 mA / HART protocol output
M9	Remote mount LCD meter, housing bracket, 100 foot cable; requires 4-20 mA / HART protocol output
Code	**Terminal Blocks**
T1	Transient Protection Terminal Block(2)
Typical Model Number: 300S 1A A E5	

(1) Material specified is cast as follows: CF-3M is the cast version of 316L SST. For housing, material is aluminum with polyurethane paint.
(2) Not available with housing style option codes 3A, 3B, and 3C.

End of selections

SPARE PARTS

O-Ring Packages (package of 12)	Part Number
Process flange, glass-filled Teflon	03151-9042-0001
Process flange, graphite-filled Teflon	03151-9042-0002
Flange adapter, glass-filled Teflon	03151-9043-0001
Flange adapter, graphite-filled Teflon	03151-9043-0002
Flanges	**Part Number**
Differential Coplanar Flange	
Nickel-plated carbon steel	03151-9200-0025
316 SST	03151-9200-0022
Hastelloy C	03151-9200-0023
Monel	03151-9200-0024
Gage/Absolute Coplanar Flange	
Nickel-plated carbon steel	03151-9200-1025
316 SST	03151-9200-1022
Hastelloy C	03151-9200-1023
Monel	03151-9200-1024
Coplanar Flange Alignment Screw (package of 12)	03151-9202-0001
Traditional Flange	
316 SST	03151-9203-0002
Hastelloy C	03151-9203-0003
Monel	03151-9203-0004
Level Flange, Vertical Mount	
2 in., class 150, SST	03151-9205-0221
2 in., class 300, SST	03151-9205-0222
3 in., class 150, SST	03151-9205-0231
3 in., class 300, SST	03151-9205-0232
DIN, DN 50, PN 40	03151-9205-1002
DIN, DN 80, PN 40	03151-9205-1012
Flange Adapter Union	**Part Number**
Nickel-plated carbon steel	03151-9259-0005
316 SST	03151-9259-0002
Hastelloy C	03151-9259-0003
Monel	03151-9259-0004
Drain/Vent Valve Kits (each kit contains parts for one transmitter)	**Part Number**
Differential Drain/Vent Kits	
316 SST stem and seat kit	03151-9268-0022
Hastelloy C stem and seat kit	03151-9268-0023
Monel stem and seat kit	03151-9268-0024
316 SST ceramic ball drain/vent kit	03151-9258-0122
Hastelloy C ceramic ball drain/vent kit	03151-9268-0123
Monel ceramic ball drain/vent kit	03151-9268-0124
Gage/Absolute Drain/Vent Kits	
316 SST stem and seat kit	03151-9268-0012
Hastelloy C stem and seat kit	03151-9268-0013
Monel stem and seat kit	03151-9268-0014
316 SST ceramic ball drain/vent kit	03151-9268-0112
Hastelloy C ceramic ball drain/vent kit	03151-9268-0113
Monel ceramic ball drain/vent kit	03151-9268-0114

Mounting Brackets	
Coplanar Flange Bracket Kit	
B4 bracket, SST, 2-in. pipe mount, SST bolts	03151-9270-0001
In-line Bracket Kit	
B4 bracket, SST, 2-in. pipe mount, SST bolts	03151-9270-0002
Traditional Flange Bracket Kits	
B1 bracket, 2-in. pipe mount, CS bolts	03151-9272-0001
B2 bracket, panel mount, CS bolts	03151-9272-0002
B3 flat bracket for 2-in. pipe mount, CS bolts	03151-9272-0003
B7 (B1 style bracket with SST bolts)	03151-9272-0007
B8 (B2 style bracket with SST bolts)	03151-9272-0008
B9 (B3 style bracket with SST bolts)	03151-9272-0009
BA (SST B1 bracket with SST bolts)	03151-9272-0011
BC (SST B3 bracket with SST bolts)	03151-9272-0013
Bolt Kits	
COPLANAR FLANGE	
Flange Bolt Kit {44 mm (1.75 in.)}	
Carbon steel (set of 4)	03151-9280-0001
316 SST (set of 4)	03151-9280-0002
ANSI/ASTM-A-193-B7M	03151-9280-0003
Monel	03151-9280-0004
Flange/Adapter Bolt Kit {73 mm (2.88 in.)}	
Carbon steel (set of 4)	03151-9281-0001
316 SST (set of 4)	03151-9281-0002
ANSI/ASTM-A-193-B7M	03151-9281-0003
Monel	03151-9281-0004
Manifold/Flange Kit {57 mm (2.25 in.)}	
Carbon steel (set of 4)	03151-9282-0001
316 SST (set of 4)	03151-9282-0002
ANSI/ASTM-A-193-B7M	03151-9282-0003
Monel	03151-9282-0004
TRADITIONAL FLANGE	
Differential Flange and Adapter Bolt Kit {44 mm (1.75 in.)}	
Carbon steel (set of 8)	03151-9283-0001
316 SST (set of 8)	03151-9283-0002
ANSI/ASTM-A-193-B7M	03151-9283-0003
Monel	03151-9283-0004
Gage/Absolute Flange and Adapter Bolt Kit	
Carbon steel (set of 6)	03151-9283-1001
316 SST (set of 6)	03151-9283-1002
ANSI/ASTM-A-193-B7M	03151-9283-1003
Monel	03151-9283-1004
Manifold/Traditional Flange Bolts	
Carbon steel (use bolts supplied with Anderson Greenwood Manifold)	
316 SST (use bolts supplied with Anderson Greenwood Manifold)	
LEVEL FLANGE, VERTICAL MOUNT	
Flange Bolt Kit (Each kit contains bolts for one transmitter)	
Carbon steel (set of 4)	03151-9285-0001
316 SST (set of 4)	03151-9285-0002
O-Ring Packages (package of 12)	
Electronic housing, cover (standard and meter)	03151-9040-0001
Electronics housing, module	03151-9041-0001

Covers	
Aluminum electronics cover: cover, o-ring	03151-9030-0001
316 SST electronics cover: cover, o-ring	03151-9030-0002
Miscellaneous	
External ground screw assembly (option D4): screw, washer, and clamp	03151-9060-0001
Housing, PlantWeb and Junction Box: v-seal	03151-9061-0001

Terminal Block	Part Number
PlantWeb Housing Terminal Block, HART (4-20 mA)	
Standard dual compartment terminal block assembly	03151-9005-0001
Transient dual compartment terminal block assembly (option T1)	03151-9005-0002
PlantWeb Housing Terminal Block, Fieldbus	
Standard dual compartment terminal block assembly	03151-9005-0021
Transient dual compartment terminal block assembly (option T1)	03151-9005-0022
Fisco dual compartment terminal block assembly (option?)	03151-9005-0023
Junction Box Terminal Block, HART (4-20 mA)	
Standard Junction Box terminal block assembly	03151-9000-1001
Transient Junction Box terminal block assembly (option T1)	03151-9000-1002
Junction Box Terminal Block, HART (4-20 mA) with Adjustment	
Standard Junction Box terminal block assembly, switch	03151-9000-2001
Transient Junction Box terminal block assembly, switch (option T1)	03151-9000-2002
Alarm/security jumper with o-ring	03151-9001-0001
Remote Meter Terminal Blocks	
Plantweb Housing 7-Position Remote Communications Terminal Block	03151-9006-0101
Junction Box Remote Communications Standard Terminal Block	03151-9000-1010
Junction Box Remote Communications Transient Terminal Block	03151-9000-1011

Electronics Board for Plantweb Housing	Part Number
LCD / Housing Interface Assemblies for Hart Output	
Standard interface	03151-9010-0001
Hardware adjustment interface(1)	03151-9017-0001
Hardware adjustment module	03151-9019-0001
Remote Meter Interface	03151-9023-0001
Alternate Outputs	
FOUNDATION fieldbus	03151-9020-0001
Miscellaneous	
PlantWeb housing header cable o-ring (package of 12)	03151-9011-0001

(1) Operation of zero, span, and security adjustments requires installation of LCD P/N 03151-9193-0002 or Adjustment Module P/N 03151-9019-0001

Meters	Part Number
Indicating Meter for Plantweb Aluminum Housing	
Meter kit: LCD assembly, 4-pin interconnection header and aluminum, meter cover assembly	03151-9193-0001
Meter: LCD assembly, 4-pin interconnection header	03151-9193-0002
Cover assembly kit: aluminum meter cover assembly	03151-9193-0003
Indicating Meter for Plantweb 316 SST Housing	
Meter kit: LCD assembly, 4-pin interconnection header, SST meter cover assembly	03151-9193-0004
Meter hardware only: LCD assembly, 4-pin interconnection header	03151-9193-0002
Cover assembly kit: SST meter cover assembly	03151-9193-0005

MODEL 3051S HART CONFIGURATION DATA SHEET

★ = ***Defaults***

CONFIGURATION DATA SHEET

Customer _____ P.O. No. _____

Model No. _____ Line Item _____

OUTPUT INFORMATION: (Software Selectable)

Eng. Units = ☐ ***InH_2O*** ★ (2) ☐ psi (3) ☐ Pa ☐ ftH_2O ☐ MPa

☐ inHg ☐ bar ☐ kPa ☐ g/cm^2

☐ mbar ☐ Torr ☐ mmH_2O ☐ inH_2O at 4 °C

☐ Atm ☐ kg/cm^2 ☐ mmHg ☐ mmH_2O at 4 °C

Output = ☐ ***Linear*** ★ ☐ Square Root (For DP transmitters only)

Transmitter Sensor Temp. Units(1) = ☐ °***C*** ★ ☐ °F

Range Points: 4mA = |__|__|__|__|__|__|__| (0) ★ 20mA = |__|__|__|__|__|__|__| (URL) ★

Damping(1) (0–60 sec.): |__|__|.|__|__| (0.4 sec.) ★

TAGGING INFORMATION

☐ Wired (5 lines of 17 characters)

|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|

|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|

|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|

|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|

|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|

☐ Permanent (3 lines of 40 characters)

|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|

|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|

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Standard Software Tag: |__|__|__|__|__|__|__|__| (First 8 characters of wired or permanent tagging information—8 characters max)

TRANSMITTER INFORMATION (1)

Descriptor:|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|
(16 characters)

Message:|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|
(32 characters)

Date: ☐☐/☐☐ ☐☐/☐☐
Day Month Year

(1) Requires a C1 option code.
(2) H2O Range 0-3
(3) PSI Range 4-5, and all Model 3051T

METER INFORMATION (One or more of the listed variables can be selected to be displayed on the LCD Meter.)

☐ ***Engineering Units*** ★
☐ % of Range
☐ Scaled Variable
☐ Sensor Temperature

SIGNAL SELECTION(1)

☐ ***4–20 mA with simultaneous digital signal based on HART protocol*** ★
☐ Burst mode of HART digital process variable
Burst mode output options:
☐ Primary variable
☐ Primary variable in percent of range and mA
☐ All dynamic variables in engineering units
☐ All dynamic variables in engineering units and the primary variable mA value
☐ Multidrop Communication
Transmitter Address (1-15): |__|__| (default = 1)

SECURITY INFORMATION (1)

Write Protect: ☐ On ☐ ***Off*** ★ Local Zero and Span: ☐ ***Enabled*** ★ ☐ Disabled

ANALOG OUTPUT ALARM AND SATURATION SIGNAL LEVELS (1)

All categories must be completed for custom configuration. Rosemount or NAMUR NE 43 values should be selected via option code.

☐ Custom (Requires Option C6 or C7)= Low Alarm: (≤ |__|.|__|__| mA)—values must be between 3.8 and 3.6

Low Saturation (|__|.|__|__| mA)—values must be between 3.9 and 3.7

* Low alarm must be 0.1 mA lower than the low saturation value

High Alarm (≥ |__|__|.|__|__| mA)—values must be between 20.2 and 23.0

High Saturation (|__|__|.|__|__| mA)—values must be between 20.1 and 21.5

* High alarm must be at least 0.1 mA higher than the high saturation value

For Reference Only:
Alarm Values: Values (mA) the transmitter outputs if it detects a gross malfunction condition.
Saturation Values: Values (mA) the transmitter outputs if applied pressure goes outside the 4–20 mA range values.

Standard ★ =	Low Alarm: (≤ 3.75 mA)	Low Saturation (3.9 mA)
	High Alarm (≥ 21.75 mA)	High Saturation (20.8 mA)
NAMUR NE43 (Option C4 or C5) =	Low Alarm: (≤ 3.6 mA)	Low Saturation (3.8 mA)
	High Alarm (≥22.5 mA)	High Saturation (20.5 mA)

PROCESS VARIABLE OUTPUT ASSIGNMENTS (1)

Primary Variable ★	☐ ***Measured Pressure*** ★	☐ Scaled Variable	
Secondary Variable:	☐ Measured Pressure	☐ Scaled Variable	☐ ***Device Temperature*** ★
Tertiary Variable:	☐ Measured Pressure	☐ ***Scaled Variable*** ★	☐ Device temperature

(1) Requires a C1 option code.

SCALED VARIABLE INFORMATION(1)

Scaled Units = |__|__|__|__|__| (5 characters max—spaces consume 0-9, A-Z, /, %, -, and * character positions)

Transfer Function=

☐ ***Linear*** ★	☐ Square Root
Linear Scaled Variable (with Linear option only)	**Square Root Scaled Variable** (with Square Root option only)
Low pressure value |__|__|__|__|__|__|__| (Eng. Units)	Low pressure value: 0 (Eng. Units)
High pressure value |__|__|__|__|__|__|__|(Eng. Units)	High pressure value |__|__|__|__|__|__|__| (Eng. Units)
Low scaled value |__|__|__|__|__|__|__| (Scaled Units)	Low scaled value: 0 (Scaled Units)
High scaled value |__|__|__|__|__|__| __|(Scaled Units)	High scaled value |__|__|__|__|__|__|__| (Scaled Units)
Linear Offset |__|__|__|__|__|__|__| (Eng. Units)	**Low Flow Cut** ☐ On ☐ ***Off*** ★ |__|__|__|__|__|__|__| (Scaled unit)

Range Values—both categories must be completed.
(used when scaled variable is set to primary variable)

LRV |__|__|__|__|__|__|__| (Scaled Unit) (seven characters max)	URV |__|__|__|__|__|__|__| (Scaled Unit) (seven characters max)

PROCESS ALERT SETPOINTS(1)

Process alert setpoints are values set by the user where the transmitter outputs a HART message and meter display information when the applied pressure or temperature goes outside the designated range. The pressure values are limited to the range of the transmitter.

Pressure Process Alert (HART signal only) ☐ On ☐ ***Off*** ★	Temperature Process Alert (HART signal only) ☐ On ☐ ***Off*** ★
☐ Low alert |__|__|__|__|__|__|__| (Eng. Unit)	☐ Low alert |__|__|__|__|__| (Temp. Unit -40°F, -40 °C)
(LRL ≤ Low Alert ≤ High Alert ≤ URL)	(-40 °C ≤ Low Alert ≤ * High Alert ≤ 85°C) *must have a 5°C difference
☐ High Alert |__|__|__|__|__|__|__| (Eng. Unit)	☐ High Alert |__|__|__|__|__| (Temp. Unit 185°F, 85 °C)

Appendix B Approval Information

OVERVIEW

This section contains hazardous location certifications for Model 3051S HART and fieldbus protocols.

HAZARDOUS LOCATIONS CERTIFICATIONS

Factory Mutual (FM) Approvals

E5 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; hazardous locations; enclosure Type 4X, conduit seal not required, when installed according to Rosemount drawing 03151-1003

I5/IE Intrinsically Safe for use in Class I, Division 1, Groups A, B, C, and D; Temperature Code T4/T5; Non-incendive for Class I, Division 2, Groups A, B, C, and D), Enclosure Type 4X, when connected in accordance with Rosemount drawing 03151-1006; For entity parameters see control drawing 03151-1006.

BASEEFA/CENELEC

Intrinsic Safety Certification

Certificate No. BAS 01ATEX 1303X

ATEX Marking: II 1G

I1/IA EEx ia IIC T4/T5

For entity parameters and special conditions for safe use see certificate.

Non-incendive/Type nL Certification

Certificate No. BAS 01ATEX 3304X

ATEX Marking: II 3 G

N1 EEx nL IIC T5 (T_{amb} = –40 to +70 °C)

For special conditions for safe use see certificate.

Dust Certification

Certificate No. BAS 01ATEX 1374X

ND ATEX Marking: II 1 D T105, (T_{amb} = –20 to +70 °C)

For special conditions for safe use see certificate.

KEMA/CENELEC

Flameproof Certification

Certificate No. KEMA 00ATEX 1243X

ATEX Marking: II 1/2 G

E1 EEx d IIC T6 (-50°C ≤ T_{amb} ≤ 40°C);
EEx d IIC T5 (-50°C ≤ T_{amb} ≤ 70°C)

SPECIAL CONDITIONS FOR SAFE USE

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. The Model 3051S pressure transmitter must include a Series Model 300S housing integrally mounted to a Series Model 3051S SuperModule as per Rosemount drawing 03151-1023.

Japanese Industrial Standard (JIS)

Flameproof Certification

Approvals pending, consult factory for availability.

E4 Ex d IIC T5

I4 Ex ia IIC T4/T5

Canadian Standards Association (CSA) Approvals

E6 Explosion Proof for Class I, Division 1, Groups B, C, and D; dust-ignition proof for Class II and Class III, Division 1, Groups E, F, and G; suitable for Class I, Division 2, Groups A, B, C, and D, when installed per Rosemount drawing 03151-1013, CSA Enclosure Type 4X; conduit seal not required.

I6 Intrinsically Safe for Class I, Division 1, Groups A, B, C, and D when connected in accordance with Rosemount drawings 03151-1016; Temperature Code T3C
For entity parameters see control drawing 03151-1016.

Standards Association of Australia (SAA)

Approvals pending, consult factory for availability.

Intrinsic Safety Certification

I7 Ex ia IIC

Explosion Proof (Flameproof) Certification

E7 Ex d IIC

Type N (Non-sparking) Certification

N7 Ex n IIC

Combinations of Approvals

K1 Combination of **E1**, **I1**, and **N1**

K4 Combination of **E4** and **I4**

K5 Combination of **E5** and **I5**

K6 Combination of **E6** and **I6**

K7 Combination of **E7, I7,** and **N7**

KA Combination of **E1**, **I1**, **E6,** and **I6**

KB Combination of **E5**, **I5**, **I6** and **E6**

KC Combination of **E5**, **E1**, **I5** and **I1**

APPROVAL DRAWINGS

Factory Mutual (FM)

CONFIDENTIAL AND PROPRIETARY INFORMATION IS CONTAINED HEREIN AND MUST BE HANDLED ACCORDINGLY.	REVISIONS					
	ZONE	REV	DESCRIPTION	CHG. NO.	APP'D	DATE
		AA	NEW RELEASE	RTC1009618	P.C.S.	9/11/00

NOTES:

1. WIRING METHOD SUITABLE FOR CLASS I, DIV I or CLASS I, ZONE I WITH ANY LENGTH.
2. TRANSMITTER MUST NOT BE CONNECTED TO EQUIPMENT GENERATING MORE THAN 250 VAC.
3. ALL CONDUIT THREADS TO BE ASSEMBLED WITH FIVE FULL THREADS MINIMUM.
4. COMPONENTS REQUIRED TO BE APPROVED MUST BE APPROVED FOR GAS GROUP APPROPRIATE TO AREA CLASSIFICATION.
5. 3051SC OR 3051ST SENSOR MODULE MUST BE INSTALLED WITH FM FLAMEPROOF / EXPLOSIONPROOF APPROVED 300S1 OR 300S2 HOUSING ATTACHED TO MEET FLAMEPROOF / EXPLOSIONPROOF INSTALLATION REQUIREMENTS.
6. INSTALLATION TO BE IN ACCORDANCE WITH THE LATEST EDITION OF NATIONAL ELECTRICAL CODE (NFPA 70).
7. 300S1 OR 300S2 HOUSING MUST BE INSTALLED WITH FM FLAMEPROOF / EXPLOSIONPROOF APPROVED 3051SC OR 3051ST SENSOR MODULE ATTACHED TO MEET FLAMEPROOF / EXPLOSIONPROOF INSTALLATION REQUIREMENTS.
8. UNUSED CONDUIT ENTRY MUST BE CLOSED WITH SUITABLE BLANKING ELEMENT.

CAD Maintained, (Pro/E)

UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES [mm]. REMOVE ALL BURRS AND SHARP EDGES. MACHINE SURFACE FINISH 125 -TOLERANCES- .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 8/28/00 CHK'D . . APP'D Paul C. Sundet 9/11/00 APP'D GOVT.	ROSEMOUNT® MEASUREMENT FISHER-ROSEMOUNT	Rosemount Inc. 12001 Technology Drive Eden Prairie, MN 55344 USA
		TITLE: MODEL 3051 / 300 EXPLOSIONPROOF / FLAMEPROOF INSTALLATION DRAWING, FM	
		SIZE A; FSCM NO.; DRAWING NO. 03151-1003	
		SCALE 1:4; WT.; SHEET 1 OF 3	

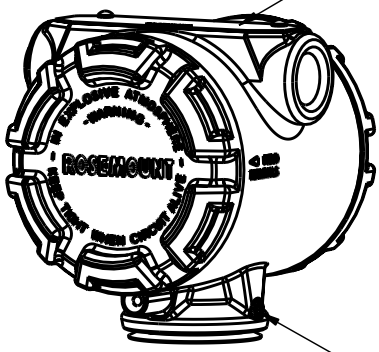
REVISIONS					
ZONE	REV	DESCRIPTION	CHG. NO.	APP'D	DATE
	AA				

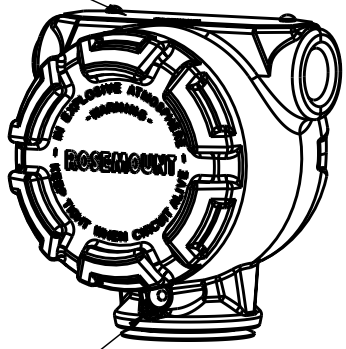
COMPONENT IDENTIFICATION

300S1____
PLANTWEB HOUSING
(DUAL COMPARTMENT)

300S2____
JUNCTION BOX HOUSING
(SINGLE COMPARTMENT)

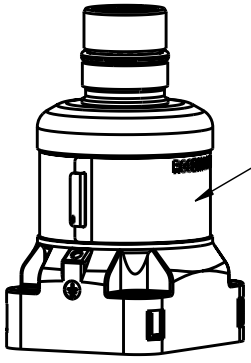
I.D. / APPROVAL LABEL





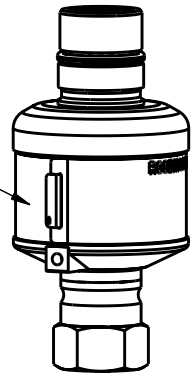
LOCKING SCREW

305IS_C____
SCALABLE COPLANAR
PRESSURE TRANSMITTER



I.D. / APPROVAL LABEL

305IS_T____
SCALABLE IN-LINE
PRESSURE TRANSMITTER

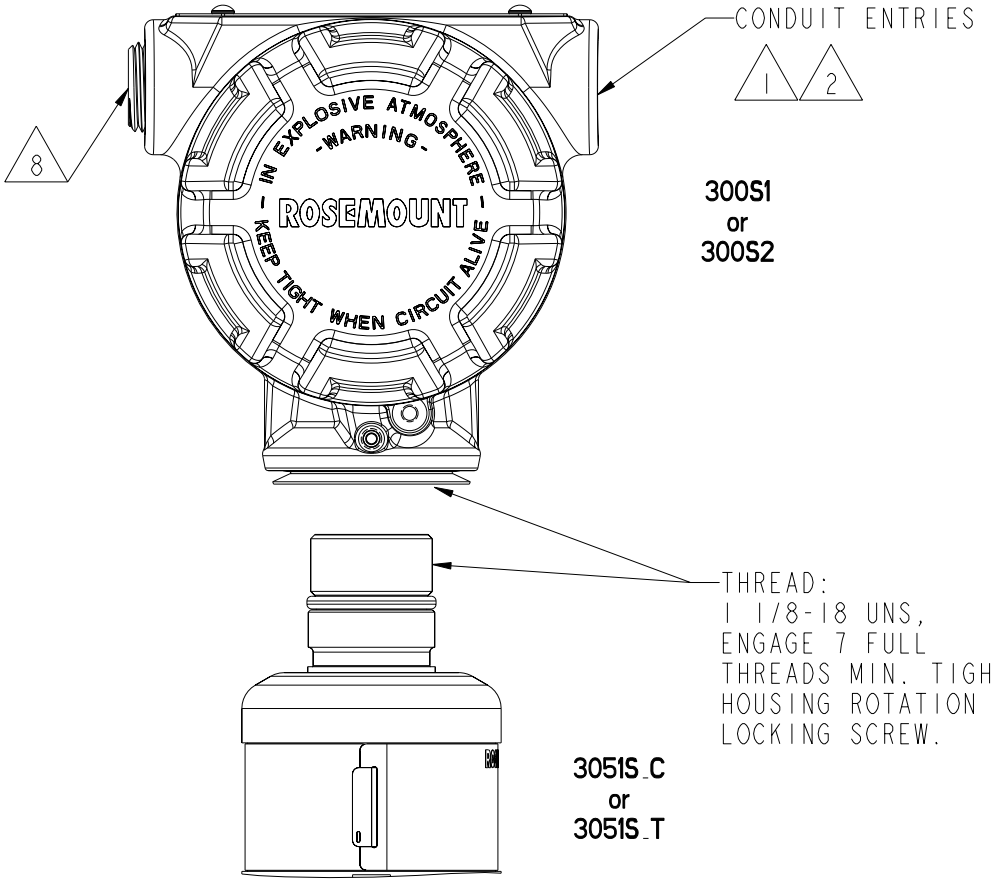


Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA				CAD Maintained, (Pro/E)	
DR. *Myles Lee Miller*	8/28/00	SIZE A	FSCM NO	DWG NO.	03151-1003
ISSUED		SCALE 1:2	WT.	SHEET 2	OF 3

Form Rev AC

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

HOUSING TO MODULE ASSEMBLY



Rosemount Inc. 12001 Technology Drive Eden Prairie, MN 55344 USA				CAD Maintained, (Pro/E)
DR. *Myles Lee Miller*	8/28/00	SIZE A	FSCM NO	DWG NO. 03151-1003
ISSUED		SCALE 1:4	WT.	SHEET 3 OF 3

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REVISIONS

REV	DESCRIPTION	CHG. NO.	APP'D	DATE
AA	NEW RELEASE	RTC1010632	P.C.S.	3/9/01
AB	UPDATE DRAWING; ADD FISCO INFO.	RTC1011951	P.C.S.	10/31/01

ENTITY APPROVALS FOR MODELS 3051S & 300S

OUTPUT CODE A (4-20 mA HART) I.S. SEE SHEETS 2-3
OUTPUT CODE F/W (FIELDBUS/PROFIBUS) I.S. SEE SHEETS 4
ALL OUTPUT CODES NONINCENDIVE SEE SHEETS 6
FISCO SEE SHEETS 6-7

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.

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

CAD MAINTAINED (MicroStation)

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

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

DO NOT SCALE PRINT

Form Rev A/C

CONTRACT NO.

DR. Myles Lee Miller 2/23/01

CHK'D

APP'D. Paul C. Sandet 3/9/01

APP'D. GOVT.

EMERSON Process Management

ROSEMOUNT®
8200 Market Boulevard • Chanhassen, MN 55317 USA

TITLE INDEX OF I.S. & NONINCENDIVE F.M. FOR 3051S

SIZE	FSCM NO	DWG NO.	
A		03151-1006	

SCALE N/A WT. SHEET 1 OF 8

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

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, Uo OR Vt) AND MAX. SHORT CIRCUIT CURRENT (Isc, Io, OR It) AND MAX. POWER Po(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, OR U_i), MAXIMUM SAFE INPUT CURRENT (Imax OR Ic), AND MAXIMUM SAFE INPUT POWER (Pmax OR P_i) OF THE INTRINSICALLY SAFE APPARATUS. IN ADDITION, THE APPROVED MAX. ALLOWABLE CONNECTED CAPACITANCE (Ca) OF THE ASSOCIATED APPARATUS MUST BE GREATER THAN THE SUM OF THE INTERCONNECTING CABLE CAPACITANCE AND THE UNPROTECTED INTERNAL CAPACITANCE (C_i) OF THE INTRINSICALLY SAFE APPARATUS, AND THE APPROVED MAX. ALLOWABLE CONNECTED INDUCTANCE (La) OF THE ASSOCIATED APPARATUS MUST BE GREATER THAN THE SUM OF THE INTERCONNECTING CABLE INDUCTANCE AND THE UNPROTECTED INTERNAL INDUCTANCE (L_i) OF THE INTRINSICALLY SAFE APPARATUS.

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

FOR OUTPUT CODE A MODEL 3051S
CLASS I, DIV. 1, GROUPS A, B, C AND D

U_i or V_{MAX} = 30V	Uo, V_T or V_{OC} IS LESS THAN OR EQUAL TO 30V
I_i or I_{MAX} = 300mA	Io, I_T or I_{SC} IS LESS THAN OR EQUAL TO 300mA
P_i or P_{MAX} = 1.0 WATT	$(\frac{V_T \times I_T}{4})$ or $(\frac{Voc \times Isc}{4})$ IS LESS THAN OR EQUAL TO 1.0 WATT
C_i = 30nF	C_A IS GREATER THAN 30nF
L_i = 0	L_A IS GREATER THAN 0 H
T4 = (Ta=-50°C to +70°C)	T5 (Ta = -50°C to +40°C)

FOR OUTPUT CODE A MODEL 300S
CLASS I, DIV. 1, GROUPS A, B, C AND D

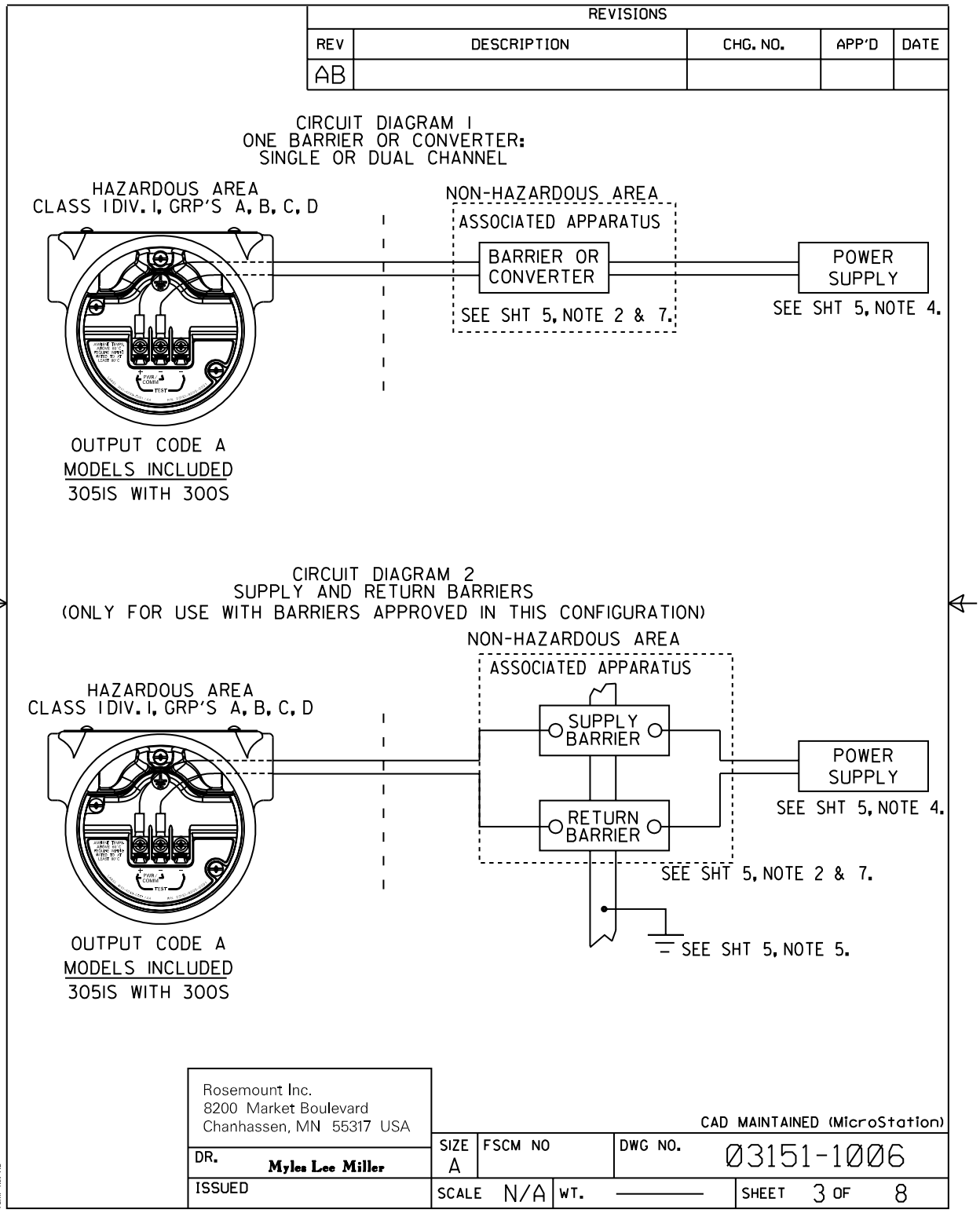
U_i or V_{MAX} = 30V	Uo, V_T or V_{OC} IS LESS THAN OR EQUAL TO 30V
I_i or I_{MAX} = 300mA	Io, I_T or I_{SC} IS LESS THAN OR EQUAL TO 300mA
P_i or P_{MAX} = 1.0 WATT	$(\frac{V_T \times I_T}{4})$ or $(\frac{Voc \times Isc}{4})$ IS LESS THAN OR EQUAL TO 1.0 WATT
C_i = 11.4nF	C_A IS GREATER THAN 11.4nF
L_i = 2.4 μH	L_A IS GREATER THAN 2.4 μH
T4 = (Ta=-50°C to +70°C)	
T5 = (Ta=-50°C to +40°C)	

Rosemount Inc.
8200 Market Boulevard
Chanhassen, MN 55317 USA

CAD MAINTAINED (MicroStation)

DR. Myles Lee Miller	SIZE A	FSCM NO	DWG NO. 03151-1006	
ISSUED	SCALE N/A	WT. ———	SHEET 2 OF 8	

Form Rev AC



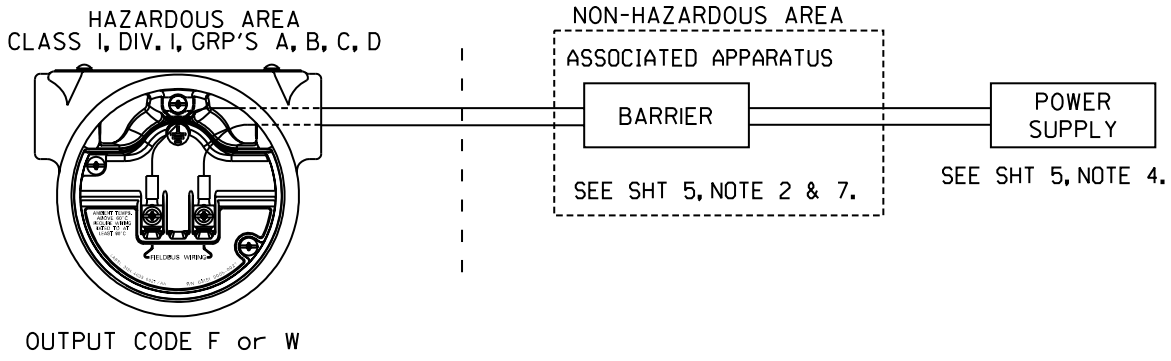
REVISIONS				
REV	DESCRIPTION	CHG. NO.	APP'D	DATE
AB				

FOR OUTPUT CODE F or W (MODEL 300S)

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

U_I or V_{MAX} = 30V	U_o, V_T, OR V_{OC} IS LESS THAN OR EQUAL TO 30V
I_I OR I_{MAX} = 300mA	I_o, I_T, OR I_{SC} IS LESS THAN OR EQUAL TO 300mA
P_I OR P_{MAX} = 1.3 WATT	P_I ($\frac{V_T \times I_T}{4}$) OR ($\frac{V_{OC} \times I_{SC}}{4}$) IS LESS THAN OR EQUAL TO 1.3 WATT
C_I = 0μf	C_A IS GREATER THAN 0μf
L_I = 0μH	L_A IS GREATER THAN 0μH
T4 (T_a = -50°C TO +60°C)	

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



OUTPUT CODE F or W

Rosemount Inc.
8200 Market Boulevard
Chanhassen, MN 55317 USA

CAD MAINTAINED (MicroStation)

DR. Myles Lee Miller	SIZE A	FSCM NO	DWG NO. 03151-1006
ISSUED	SCALE N/A	WT. ———	SHEET 4 OF 8

Form Rev A/C

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

NOTES:

1. NO REVISION TO THIS DRAWING WITHOUT PRIOR FACTORY MUTUAL APPROVAL.
2. ASSOCIATED APPARATUS MANUFACTURER'S INSTALLATION DRAWING MUST BE FOLLOWED WHEN INSTALLING THIS EQUIPMENT.
3. DUST-TIGHT CONDUIT SEAL MUST BE USED WHEN INSTALLED IN CLASS II AND CLASS III ENVIRONMENTS.
4. CONTROL EQUIPMENT CONNECTED TO BARRIER MUST NOT USE OR GENERATE MORE THAN 250 Vrms or Vdc.
5. RESISTANCE BETWEEN INTRINSICALLY SAFE GROUND AND EARTH GROUND MUST BE LESS THAN 1 OHM.
6. INSTALLATION SHOULD BE IN ACCORDANCE WITH ANSI/ISA-RP12.6 "INSTALLATION OF INTRINSICALLY SAFE SYSTEMS FOR HAZARDOUS (CLASSIFIED) LOCATIONS" AND THE NATIONAL ELECTRICAL CODE (ANSI/NFPA 70).
7. THE ASSOCIATED APPARATUS MUST BE FACTORY MUTUAL APPROVED.

Rosemount Inc.
8200 Market Boulevard
Chanhassen, MN 55317 USA

CAD MAINTAINED (MicroStation)

DR. Myles Lee Miller	SIZE A	FSCM NO	DWG NO. 03151-1006
ISSUED	SCALE N/A	WT. ———	SHEET 5 OF 8

Form Rev AC

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

FISCO CONCEPT

THE FISCO CONCEPT ALLOWS INTERCONNECTION OF INTRINSICALLY SAFE APPARATUS TO ASSOCIATED APPARATUS NOT SPECIALLY EXAMINED IN SUCH COMBINATION. THE CRITERIA FOR INTERCONNECTION IS THAT THE VOLTAGE (U_i OR Vmax) THE CURRENT (I_i OR Imax), AND THE POWER (P_i or Pmax) WHICH INTRINSICALLY SAFE APPARATUS CAN RECEIVE AND REMAIN INTRINSICALLY SAFE CONSIDERING FAULTS, MUST BE EQUAL OR GREATER THAN 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. IN ADDITION, THE MAXIMUM UNPROTECTED CAPACITANCE (C_i) AND THE INDUCTANCE (L_i) OR EACH APPARATUS (OTHER THAN THE TERMINATION) CONNECTED TO THE FIELDBUS MUST BE LESS THAN OR EQUAL TO 5 nF AND 10 µH RESPECTIVELY.

IN EACH SEGMENT ONLY ONE ACTIVE DEVICE, NORMALLY THE ASSOCIATED APPARATUS, IS ALLOWED TO PROVIDE THE NECESSARY ENERGY FOR THE FIELDBUS SYSTEM. THE VOLTAGE Uo (OR Voc OR Vt) OF THE ASSOCIATED APPARATUS IS LIMITED TO A RANGE OF 14V TO 24Vd.c. ALL OTHER EQUIPMENT CONNECTED TO THE BUS CABLE HAS TO BE PASSIVE, MEANING THAT THEY ARE NOT ALLOWED TO PROVICE ENERGY TO THE SYSTEM, EXCEPT A LEAKAGE CURRENT OF 50uA FOR EACH CONNECTED DEVICE. SEPARATELY POWERED EQUIPMENT NEEDS A GALVANIC ISOLATION TO ASSURE THAT THE INTRINSICALLY SAFE FIELDBUS CIRCUIT REMAINS PASSIVE.

THE CABLE USED TO INTERCONNECT DEVICES NEEDS TO HAVE THE PARAMETERS IN THE FOLLOWING RANGE:

Loop Resistance R':	15.....150 Ohm/km
Inductance per unit length L':	0.4.....1 mH/km
Capacitance per unit length C':	80.....200 nF

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

Length of trunk cable:	less than or equal to 1000m
Length of spur cable:	less than or equal to 30m
Length of spur splice:	less than or equal to 1m

AT EACH END OF THE TRUNK CABLE AN APPROVED INFALLIBLE LINE TERMINATION WITH THE FOLLOWING PARAMETERS IS SUITABLE:

R = 90.....100Ohm C = 0.....2.2uF

ONE OF THE ALLOWED TERMINATIONS MIGHT ALREADY BE INTEGRATED IN THE ASSOCIATED APPARATUS. THE NUMBER OF PASSIVE APPARATUS CONNECTED TO THE BUS SEGMENT IS NOT LIMITED DUE TO I. S. REASONS. IF THE ABOVE RULES ARE RESPECTED, UP TO A TOTAL LENGTH OF 1000 m (SUM OF TRUNK AND ALL SPUR CABLES), THE INDUCTANCE AND THE CAPACITANCE OF THE CABLE WILL NOT IMPAIR THE INTRINSIC SAFETY OF THE INSTALLATION.

Rosemount Inc.
8200 Market Boulevard
Chanhassen, MN 55317 USA

CAD MAINTAINED (MicroStation)

DR. Myles Lee Miller	SIZE A	FSCM NO	DWG NO. 03151-1006
ISSUED	SCALE N/A	WT. ———	SHEET 6 OF 8

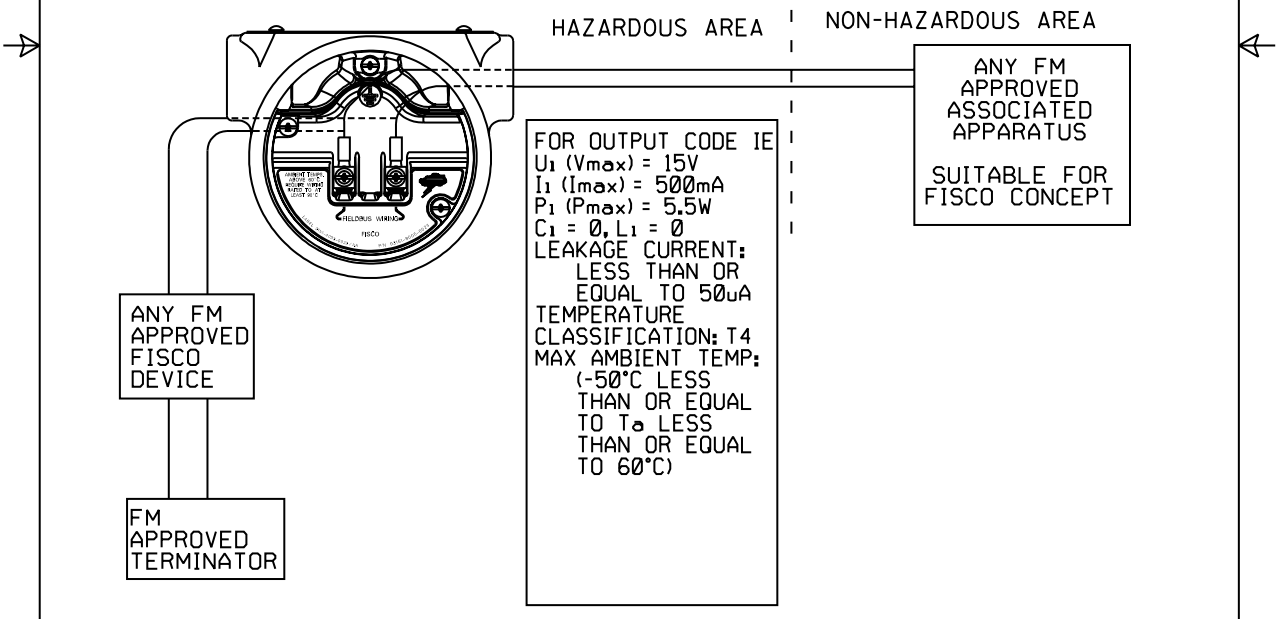
Form Rev AC

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

NOTES:

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

1. APPROVED ASSOCIATED APPARATUS MUST BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
2. FM APPROVED ASSOCIATED APPARATUS MUST MEET THE FOLLOWING PARAMETERS: Uo OR Voc OR V_i LESS THAN OR EQUAL TO U_i (Vmax) AND Io OR Isc OR It LESS THAN OR EQUAL TO I_i(Imax) AND Po OR Pmax LESS THAN OR EQUAL TO P_i (Pmax).
3. THE MAXIMUM NON-HAZARDOUS AREA VOLTAGE MUST NOT EXCEED 250V.
4. THE INSTALLATION MUST BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE NFPA 70 AND ANSI/ISA-Rp 12.6 (EXCEPT CHAPTER 5).
5. MULTIPLE EARTHING OF SCREEN IS ALLOWED ONLY, IF HIGH INTEGRITY EQUIPOTENTIAL SYSTEM IS REALIZED BETWEEN THE POINTS OF BONDING.
6. CAUTION: USE ONLY SUPPLY WIRES SUITABLE FOR 5°C ABOVE SURROUNDING TEMPERATURE.
7. WARNING: SUBSTITUTION OF COMPONENTS MAY INPAIR INTRISIC SAFETY.

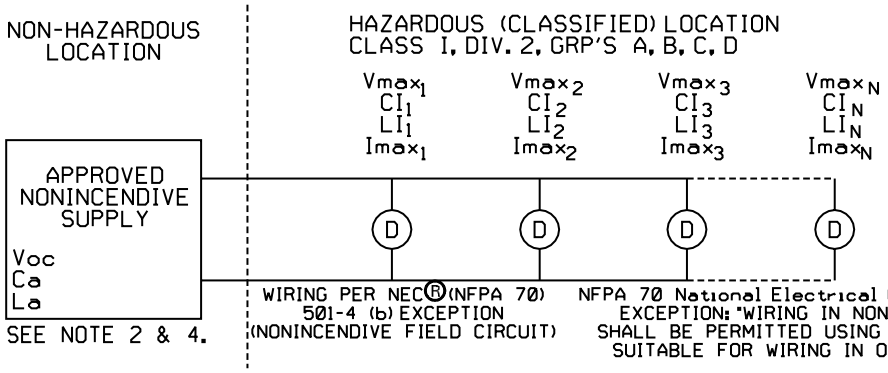


Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA			CAD MAINTAINED (MicroStation)
DR. Myles Lee Miller	SIZE A	FSCM NO	DWG NO. 03151-1006
ISSUED	SCALE N/A	WT. ———	SHEET 7 OF 8

Form Rev AC

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

NONINCENDIVE FIELD CIRCUIT
CLASS I, DIV. 2 LOCATIONS



IN NORMAL OPERATION

DEVICES CONTROL THROUGH-CURRENT

PARAMETERS	DEVICE	ROSEMOUNT 3051S/300S		
	3051S 4-20mA / HART	300S 4-20mA / HART		FIELDBUS (F or W)
Vmax	42.4v	Vmax	42.4v	35v
Maximum normal operating current	22mA	Maximum normal operating current	22mA	27mA
Ci	30nF	Ci	11.4nF	0uF
Li	0uH	Li	2.4μH	0uH

TEMP CODE: T5 (Ta = -50°C TO +70°C

$Imax_N >= Iq_N + Isignal_N$

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

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

Imax for an individual device = Iq + Isignal

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

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

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

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

ROSEMOUNT 3051 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 (FM3611 1999)

4. CONTROL EQUIPMENT CONNECTED TO BARRIER MUST NOT USE OR GENERATE MORE THAN 250 Vrms or Vdc.
3. THE ASSOCIATED APPARATUS MUST BE FACTORY MUTUAL APPROVED.
2. ASSOCIATED APPARATUS MANUFACTURER'S INSTALLATION DRAWING MUST BE FOLLOWED WHEN INSTALLING THIS EQUIPMENT.
1. NO REVISION TO THIS DRAWING WITHOUT PRIOR FACTORY MUTUAL APPROVAL.

NOTES:

Rosemount Inc.
8200 Market Boulevard
Chanhassen, MN 55317 USA

CAD MAINTAINED (MicroStation)

DR. Myles Lee Miller	SIZE A	FSCM NO	DWG NO. 03151-1006	
ISSUED	SCALE N/A	WT.		SHEET 8 OF 8

Form Rev. A/C

Canadian Standards Association (CSA)

CONFIDENTIAL AND PROPRIETARY INFORMATION IS CONTAINED HEREIN AND MUST BE HANDLED ACCORDINGLY.	REVISIONS					
	ZONE	REV	DESCRIPTION	CHG. NO.	APP'D	DATE
		AA	NEW RELEASE	RTC1009832	P.C.S.	10/19/00
		AB	UPDATE DRAWING	RTC1011011	P.C.S.	5/15/01

NOTES:

1. WIRING METHOD SUITABLE FOR CLASS I, DIV I WITH ANY LENGTH.
2. TRANSMITTER MUST NOT BE CONNECTED TO EQUIPMENT GENERATING MORE THAN 250 VAC.
3. ALL CONDUIT THREADS TO BE ASSEMBLED WITH FIVE FULL TAPERED THREADS MINIMUM.
4. COMPONENTS REQUIRED TO BE APPROVED MUST BE APPROVED FOR GAS GROUP APPROPRIATE TO AREA CLASSIFICATION.
5. 3051SC OR 3051ST SENSOR MODULE MUST BE INSTALLED WITH CSA FLAMEPROOF / EXPLOSIONPROOF APPROVED 300S1 OR 300S2 HOUSING ATTACHED TO MEET FLAMEPROOF / EXPLOSIONPROOF INSTALLATION REQUIREMENTS. MINIMUM OF 7 FULL THREADS ENGAGED AND LOCKED IN PLACE. SEE PAGE 3.
6. INSTALLATION TO BE IN ACCORDANCE WITH THE LATEST EDITION OF CANADIAN ELECTRICAL CODE.
7. 300S1 OR 300S2 HOUSING MUST BE INSTALLED WITH CSA FLAMEPROOF / EXPLOSIONPROOF APPROVED 3051SC OR 3051ST SENSOR MODULE ATTACHED TO MEET FLAMEPROOF / EXPLOSIONPROOF INSTALLATION REQUIREMENTS. MINIMUM OF 7 FULL THREADS ENGAGED AND LOCKED IN PLACE. SEE PAGE 3.
8. UNUSED CONDUIT ENTRY MUST BE CLOSED WITH SUITABLE BLANKING ELEMENT.

CAD Maintained, (Pro/E)

UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES [mm]. REMOVE ALL BURRS AND SHARP EDGES. MACHINE SURFACE FINISH 125	CONTRACT NO.	EMERSON. Process Management	ROSEMOUNT® 8200 Market Boulevard • Chanhassen, MN 55317 USA
-TOLERANCES- .X ± .1 [2,5] .XX ± .02 [0,5] .XXX ± .010 [0,25] FRACTIONS ± 1/32 ANGLES ± 2°	DR. Myles Lee Miller 8/28/00	TITLE	MODEL 3051 / 300 EXPLOSIONPROOF / FLAMEPROOF INSTALLATION DRAWING, CSA
	CHK'D . .		
	APP'D Paul C. Sundet 10/19/00		
	APP'D GOVT.	SIZE A / FSCM NO. / DRAWING NO.	03151-1013
DO NOT SCALE PRINT		SCALE 1:4 / WT.	SHEET 1 OF 3

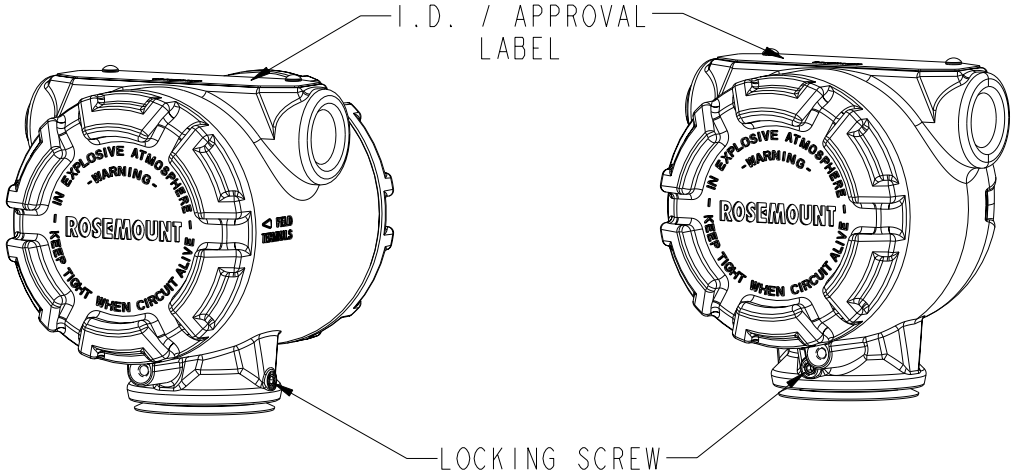
Form Rev AC

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

COMPONENT IDENTIFICATION

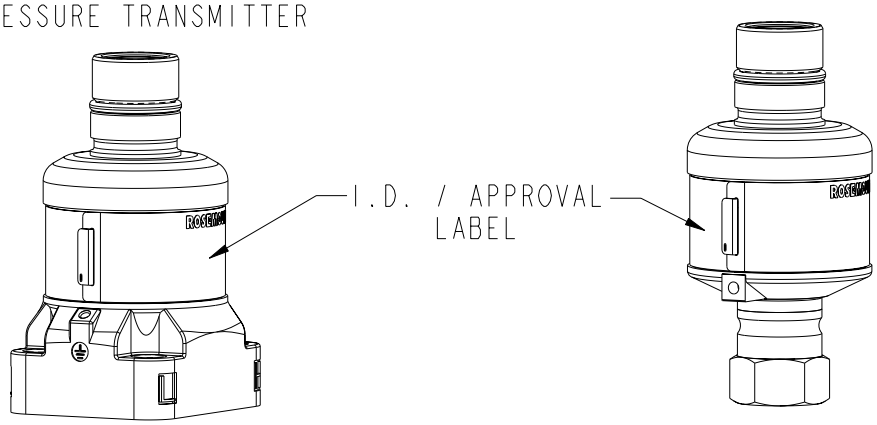
3051S_____
PLANTWEB HOUSING
(DUAL COMPARTMENT)

3051S2____
JUNCTION BOX HOUSING
(SINGLE COMPARTMENT)



3051S_C____
SCALABLE COPLANAR
PRESSURE TRANSMITTER

3051S_T____
SCALABLE IN-LINE
PRESSURE TRANSMITTER



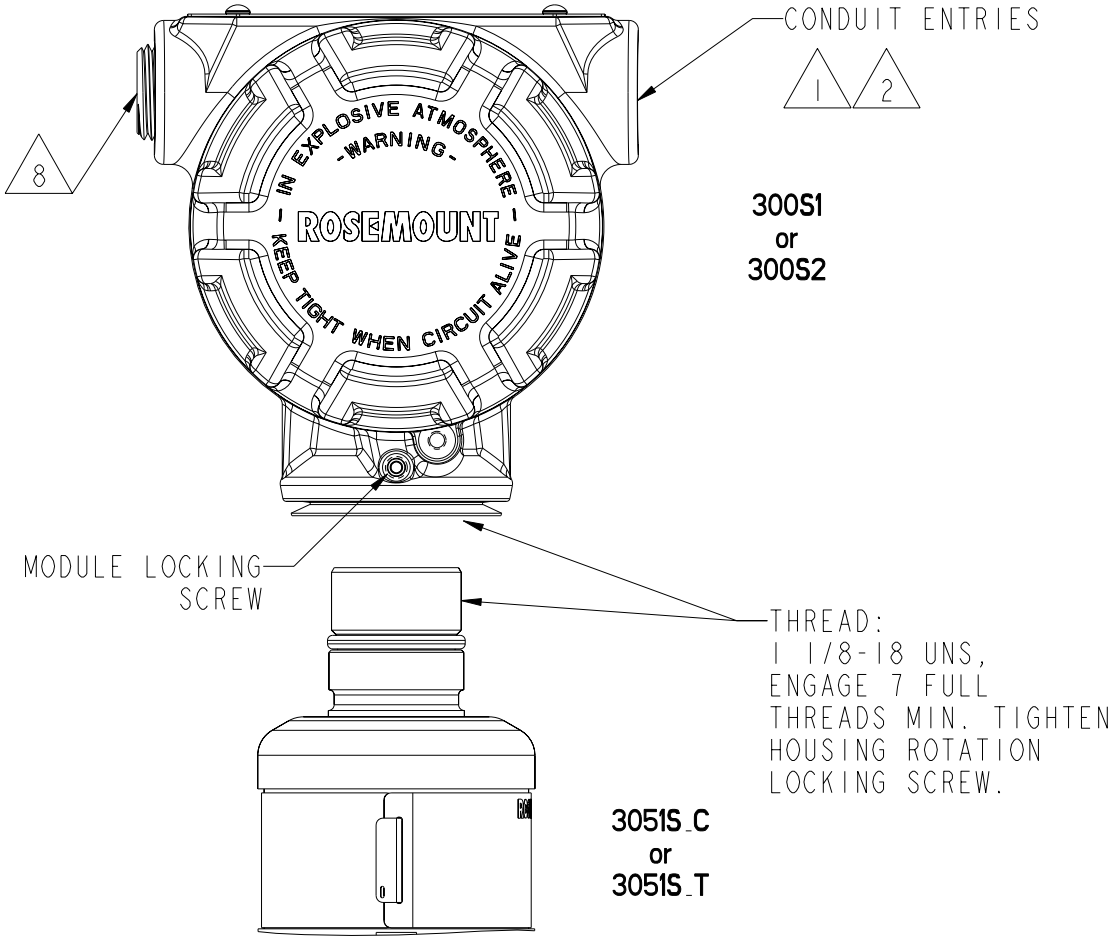
Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA				CAD Maintained, (Pro/E)	
DR. Myles Lee Miller	8/28/00	SIZE A	FSCM NO	DWG NO.	03151-1013
ISSUED		SCALE 1:2	WT.	SHEET 2 OF 3	

Form Rev AC

Electronic Master - PRINTED COPIES ARE UNCONTROLLED - Rosemount Proprietary

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

HOUSING TO MODULE ASSEMBLY



Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA			CAD Maintained, (Pro/E)	
DR. *Myles Lee Miller*	8/28/00	SIZE A	FSCM NO	DWG NO. 03151-1013
ISSUED		SCALE 1:4	WT.	SHEET 3 OF 3

Form Rev AC

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

REVISIONS

REV	DESCRIPTION	CHG. NO.	APP'D	DATE
AA	NEW RELEASE	RTC1010792	P.C.S.	8/6/01
AB	DELETE ENTITY PARAMETER FIGURE	RTC1011943	P.C.S.	10/16/01

APPROVALS FOR

OUTPUT CODE A (4-20 mA HART) I.S. SEE SHEETS 2-3

OUTPUT CODE F/W (FIELDBUS) I.S. SEE SHEETS 4
OUTPUT CODES A,F,W I.S. ENTITY PARAMETERS SHEET 5

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 I.

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

CAD MAINTAINED (MicroStation)

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

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

DO NOT SCALE PRINT

Form Rev AC

CONTRACT NO.

DR. Myles Lee Miller 3/7/01
CHK'D
APP'D. Paul C. Sundet 8/6/01
APP'D. GOVT.

EMERSON. Process Management

ROSEMOUNT®
8200 Market Boulevard • Chanhassen, MN 55317 USA

TITLE INDEX OF I.S. CSA FOR 3051S

SIZE	FSCM NO	DWG NO.	
A		03151-1016	
SCALE N/A	WT. ———	SHEET 1 OF 5	

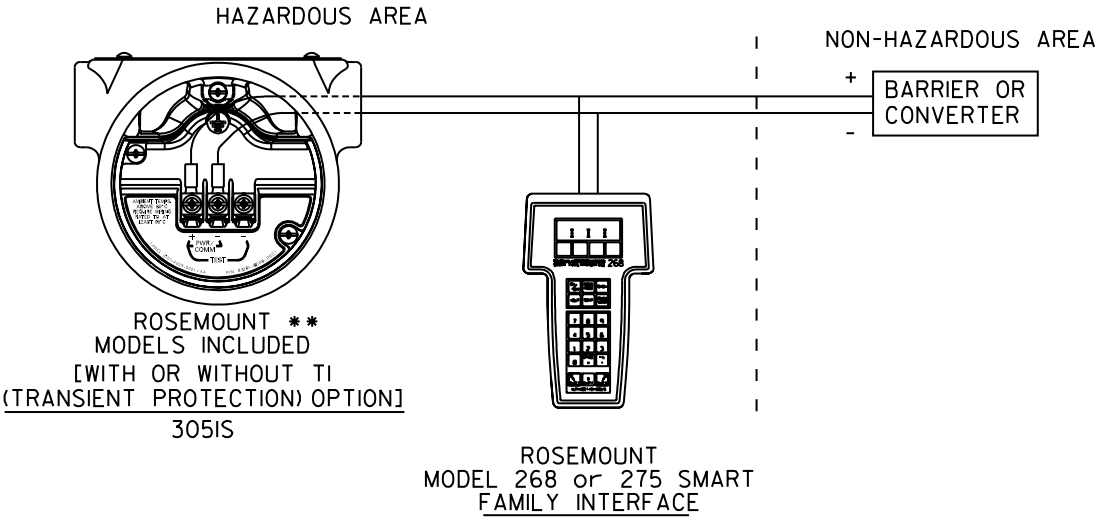
REVISIONS				
REV	DESCRIPTION	CHG. NO.	APP'D	DATE
AB				

CSA INTRINSIC SAFETY APPROVALS

CIRCUIT CONNECTION WITH BARRIER OR CONVERTER

Ex ia

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



** 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. Myles Lee Miller 3/7/001	SIZE A	FSCM NO	DWG NO. 03151-1016
ISSUED	SCALE N/A	WT.	SHEET 2 OF 5

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

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

Rosemount Inc.
8200 Market Boulevard
Chanhassen, MN 55317 USA

CAD MAINTAINED (MicroStation)

DR. Myles Lee Miller	SIZE A	FSCM NO	DWG NO. 03151-1016
ISSUED	SCALE N/A	WT. ———	SHEET 3 OF 5

Form Rev AC

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

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

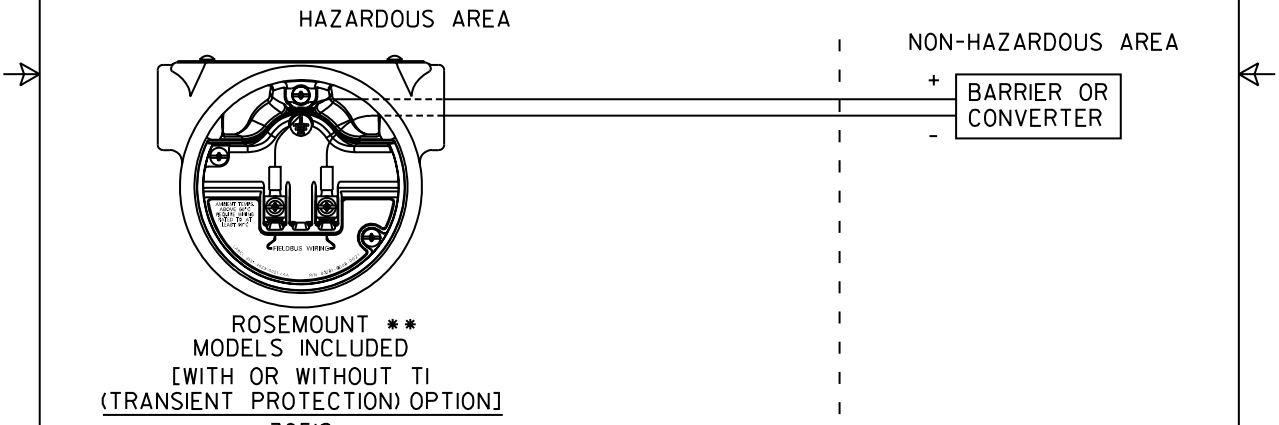
DEVICE	PARAMETERS	APPROVED FOR CLASS I, DIV.I
CSA APPROVED SAFETY BARRIER	30 V OR LESS 300 OHMS OR MORE 28 V OR LESS 235 OHMS OR MORE 25 V OR LESS 160 OHMS OR MORE 22 V OR LESS 100 OHMS OR MORE	GROUPS A, B, C, D

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]
3051S

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

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

Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA			CAD MAINTAINED (MicroStation)
DR. Myles Lee Miller	SIZE A	FSCM NO	DWG NO. 03151-1016
ISSUED	SCALE N/A	WT. ———	SHEET 4 OF 5

Form Rev AC

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

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	$(\frac{V_{OC} \times I_{SC}}{4})$ IS LESS THAN OR EQUAL TO 1 WATT
C_I = .01µf	C_A IS GREATER THAN .01µf + C CABLE
L_I =20µH	L_A IS GREATER THAN 10µH + 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	$(\frac{V_{OC} \times I_{SC}}{4})$ 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. Myles Lee Miller	SIZE A	FSCM NO	DWG NO. 03151-1016
ISSUED	SCALE N/A	WT. ———	SHEET 5 OF 5

Form Rev AC

KEMA

CONFIDENTIAL AND PROPRIETARY INFORMATION IS CONTAINED HEREIN AND MUST BE HANDLED ACCORDINGLY.	REVISIONS					
	ZONE	REV	DESCRIPTION	CHG. NO.	APP'D	DATE
		AA	NEW RELEASE	RTC1009618	P.C.S.	9/11/00

NOTES:

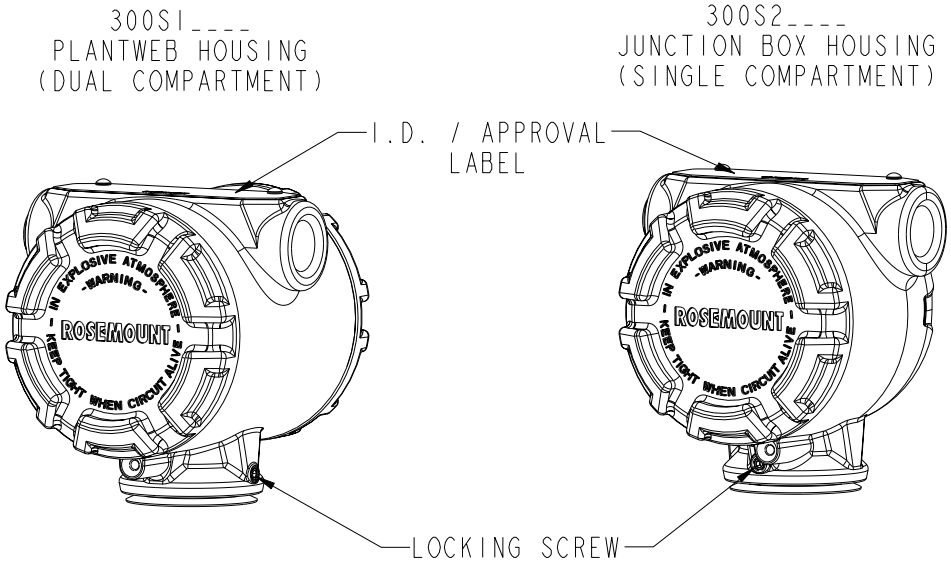
1. WIRING METHOD SUITABLE FOR CATEGORY 2, (ZONE 1) WITH ANY LENGTH.
2. TRANSMITTER MUST NOT BE CONNECTED TO EQUIPMENT GENERATING MORE THAN 250 VAC.
3. ALL CONDUIT THREADS TO BE ASSEMBLED WITH FIVE FULL THREADS MINIMUM.
4. COMPONENTS REQUIRED TO BE APPROVED MUST BE APPROVED FOR GAS GROUP APPROPRIATE TO AREA CLASSIFICATION.
5. 3051SC OR 3051ST SENSOR MODULE MUST BE INSTALLED WITH CENELEC FLAMEPROOF APPROVED 300S1 OR 300S2 HOUSING ATTACHED TO MEET FLAMEPROOF INSTALLATION REQUIREMENTS.
6. INSTALLATION TO BE IN ACCORDANCE WITH APPLICABLE LOCAL REQUIREMENTS.
7. 300S1 OR 300S2 HOUSING MUST BE INSTALLED WITH CENELEC FLAMEPROOF APPROVED 3051SC OR 3051ST SENSOR MODULE ATTACHED TO MEET FLAMEPROOF INSTALLATION REQUIREMENTS.
8. UNUSED CONDUIT ENTRY MUST BE CLOSED WITH A CENELEC FLAMEPROOF APPROVED BLANKING ELEMENT.

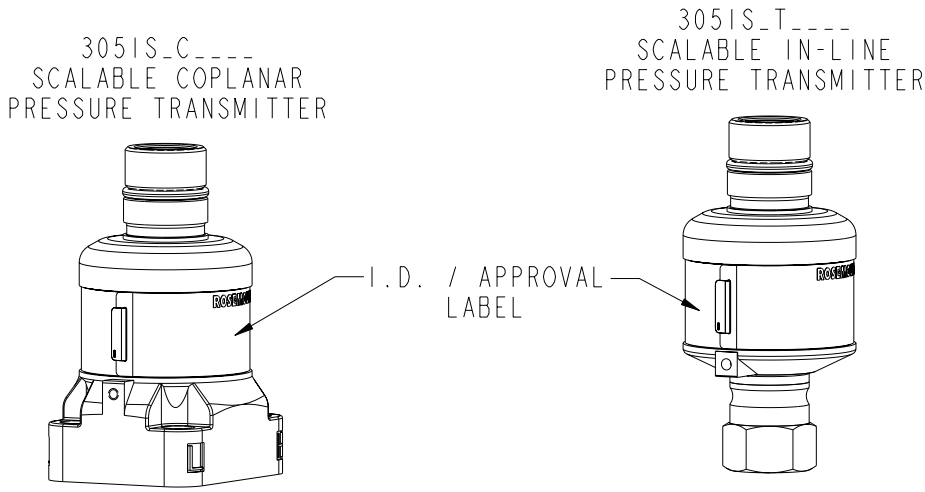
CAD Maintained, (Pro/E)

UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES [mm]. REMOVE ALL BURRS AND SHARP EDGES. MACHINE SURFACE FINISH 125 -TOLERANCES- .X ± .1 [2,5] .XX ± .02 [0,5] .XXX ± .010 [0,25] FRACTIONS ± 1/32 ANGLES ± 2° DO NOT SCALE PRINT	CONTRACT NO.		ROSEMOUNT® MEASUREMENT FISHER-ROSEMOUNT	Rosemount Inc. 12001 Technology Drive Eden Prairie, MN 55344 USA
	DR. *Myles Lee Miller*	8/28/00	TITLE	MODEL 3051 / 300 FLAMEPROOF INSTALLATION DRAWING, KEMA
	CHK'D .	.		
	APP'D *Paul C. Sundet*	9/11/00		
	APP'D GOVT.		SIZE A / FSCM NO. / DRAWING NO. 03151-1023	
			SCALE 1:4 / WT. / SHEET 1 OF 3	

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

COMPONENT IDENTIFICATION

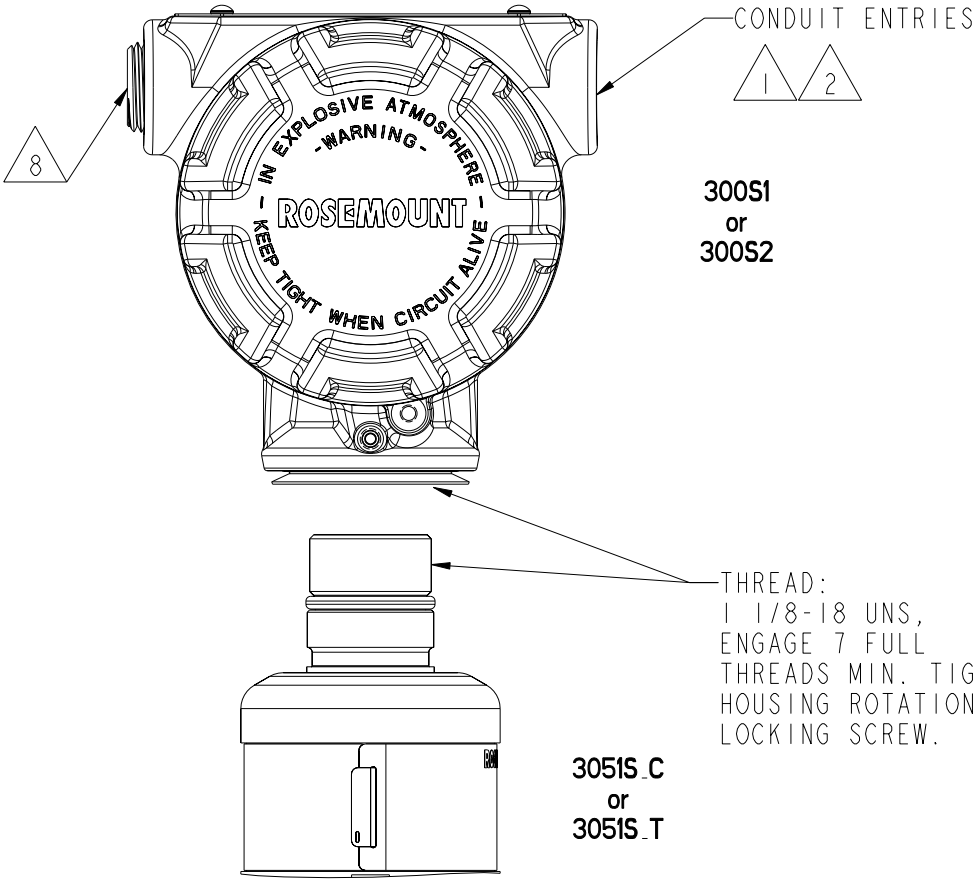




Rosemount Inc. 12001 Technology Drive Eden Prairie, MN 55344 USA				CAD Maintained, (Pro/E)	
DR. *Myles Lee Miller*	8/28/00	SIZE A	FSCM NO	DWG NO. 03151-1023	
ISSUED		SCALE 1:2	WT.	SHEET 2 OF 3	

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

HOUSING TO MODULE ASSEMBLY

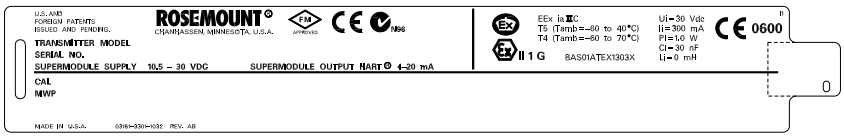


Rosemount Inc. 12001 Technology Drive Eden Prairie, MN 55344 USA				CAD Maintained, (Pro/E)
DR. *Myles Lee Miller*	8/28/00	SIZE A	FSCM NO	DWG NO. 03151-1023
ISSUED		SCALE 1:4	WT.	SHEET 3 OF 3

EUROPEAN ATEX DIRECTIVE INFORMATION

CENELEC/BASEEFA

Rosemount Model 3051S 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.



3151_B3301A

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

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

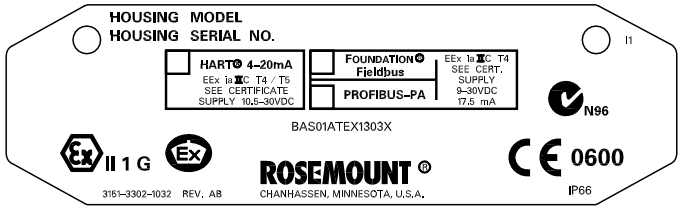
- Rosemount USA
- Rosemount Germany
- Rosemount Singapore

CE 0600

- Complete model number (see “Reference Data” on page A-1)
- The serial number of the device
- Year of construction
- Marking for explosion protection:
  EEx ia IIC T5 (T_{amb} = -60 to 40 °C)
  EEx ia IIC T4 (T_{amb} = -60 to 70 °C)
  Ui = 30 V dc, I_i = 300 mA, P_i = 1.0 W, C_i = 0.030 µF, Li = 0 mH
  BASEEFA ATEX certificate number: BAS01ATEX1303X

II 1G

Intrinsic Safety housing label



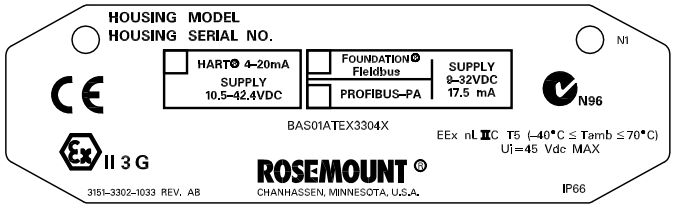
APPROVALS/3151-3302_A1032

- Marking for explosion protection:
  EEx ia IIC T5 (See Certificate)
  EEx ia IIC T4 (See Certificate)
  BASEEFA ATEX certificate number: BAS01ATEX1303X

II 1G

Type n housing label

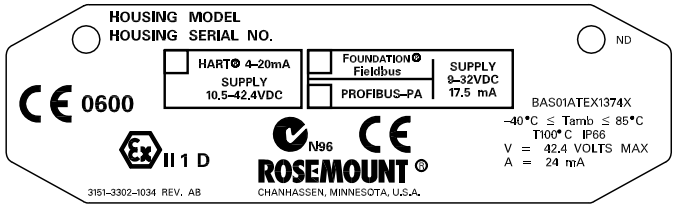
APPROVALS/3151-3302_A1033



- Marking for explosion protection: **II 3 G**
  EEx nL IIC T5 (-40 °C ≤ T_{amb} ≤ 70 °C)
  Ui = 45 Vdc MAX
  BASEEFA ATEX certificate number: BAS01ATEX3304X

Dust housing label

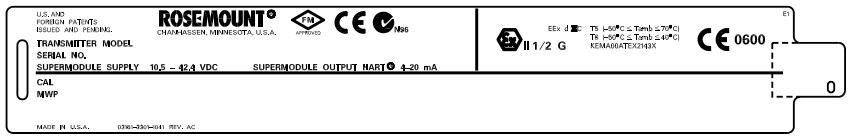
APPROVALS/3151-3302_A1034B



- Marking for explosion protection: **II 1 D**
  EEx nL IIC T5 (-40 °C ≤ T_{amb} ≤ 85 °C)
  T100°C
  IP66
  V = 42.4 VOLTS MAX
  A = 24 mA
  BASEEFA ATEX certificate number: BAS01ATEX------X

CENELEC/KEMA Flameproof

Rosemount Models 3051S and 300S 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.



3051-A3301A

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

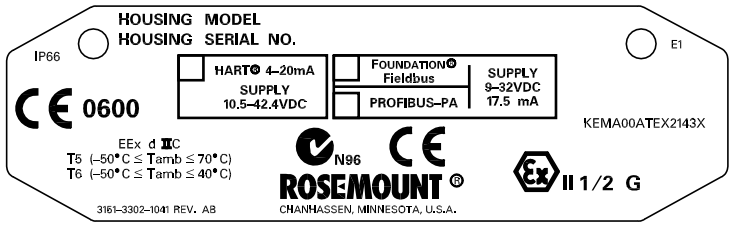
Name and address of the manufacturer (any of the following):

- Rosemount USA
- Rosemount Germany
- Rosemount Singapore

CE 0600

- Complete model number (see “Reference Data” on page A-1)
- The serial number of the device
- Year of construction
- Marking for explosion protection:
  EEx d IIC T6 (T_{amb} = –50 to 40 °C)
  EEx d IIC T5 (T_{amb} = –50 to 70 °C)
  ATEX certificate number: KEMA00ATEX2143X

Housing Label



APPROVALS/3151-3302_A1041A

- Marking for explosion protection:
  EEx d IIC T6 (T_{amb} = –50 to 40 °C)
  EEx d IIC T5 (T_{amb} = –50 to 70 °C)
  ATEX certificate number: KEMA00ATEX2143X

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Reference Manual
00809-0100-4801, Rev AA
January 2002

Model 3051S Series

Cover Photo: Cosmos/HighRes/305/0305h0061

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