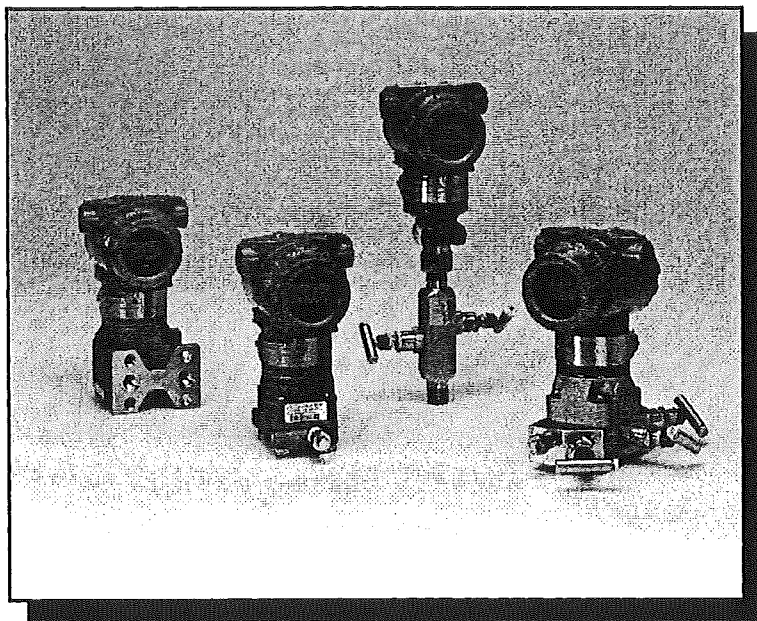


Model 3051 Pressure Transmitter

with HART protocol®



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EMERSON™
Process Management

Model 3051 Pressure Transmitter

NOTICE

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

Within the United States, Rosemount Inc. has two toll-free assistance numbers:

Customer Central

Technical support, quoting, and order-related questions.

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

North American Response Center

Equipment service needs.

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

Outside of the United States, contact your local Rosemount® representative.

⚠ CAUTION

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

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

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



Fisher-Rosemount satisfies all obligations coming from legislation to harmonize product requirements in the European Union.



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Model 3051

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December 2002

Section 1 Introduction

USING THIS MANUAL

The sections in this manual provide information on installing, operating, and maintaining devices from the Rosemount Model 3051 Smart Pressure Transmitter Family. The sections are organized as follows:

Section 2: Installation contains considerations, mechanical and electrical installation instructions.

Section 3: Configuration contains commissioning, output check, basic setup, LCD display configuration, detailed setup, diagnostic and services, advanced functions and multidrop communication instructions.

Section 4: Operation and Maintenance contains calibration and trim procedures for HART protocol only.

Section 5: Troubleshooting provides troubleshooting techniques for the most common operating problems.

Appendix A: Reference Information supplies reference and specification data, as well as ordering information and spare parts tables.

Appendix B: Product Certifications contains European directive information, Hazardous Location Certifications, and approval drawings.

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. The product being returned will require a copy of the required Material Safety Data Sheet (MSDS) for each substance must be included with the returned goods.

Rosemount National Response Center representatives will explain the additional information and procedures necessary to return goods exposed to hazardous substances.

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MODELS COVERED

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

Model 3051CD Differential Pressure Transmitter

The Model 3051CD measures differential pressures from 0.1 inH₂O to 2000 psi (0,02 to 13 800 kPa) with superior performance including 0.075% accuracy and 100:1 rangeability.

Model 3051CG Gage Pressure Transmitter

The Model 3051CG measures gage pressures from 2.5 inH₂O to 2000 psig (0,62 to 13 800 kPa) using proven Rosemount capacitance cell technology.

Model 3051CA Absolute Pressure Transmitter

The Model 3051CA measures absolute pressures from 0.167 to 4000 psia (8,6 mmHg_a to 27 580 kPa) using a Rosemount patented piezoresistive silicon sensor.

Model 3051T Gage and Absolute Pressure Transmitter

The Model 3051T measures absolute and gage pressures from 0.3 to 10000 psig/a (2,07 to 68 900 kPa). The Model 3051T uses a single isolator design, microprocessor-based electronics using a Rosemount patented piezoresistive silicon sensor.

Model 3051L Liquid Level Transmitter

The Model 3051L provides precise level and specific gravity measurements from 2.5 to 8310 inH₂O (0,62 to 2 070 kPa) for a wide variety of tank configurations.

Model 3051H High Process Temperature Pressure Transmitter

The Model 3051H provides high process temperature capability to 375 °F (191 °C) without the use of remote diaphragm seals or capillaries. Model 3051H transmitters are available for differential and gage configurations (3051HD and 3051HG).

Model 3051P Reference Class Pressure Transmitter

The Model 3051P, at 0.05% accuracy, is the most accurate pressure transmitter available. The Model 3051P is ideal for fiscal and allocation metering.

NOTE

For Model 3051 with FOUNDATION™ fieldbus, see Rosemount Product Manual 00809-0100-4774.

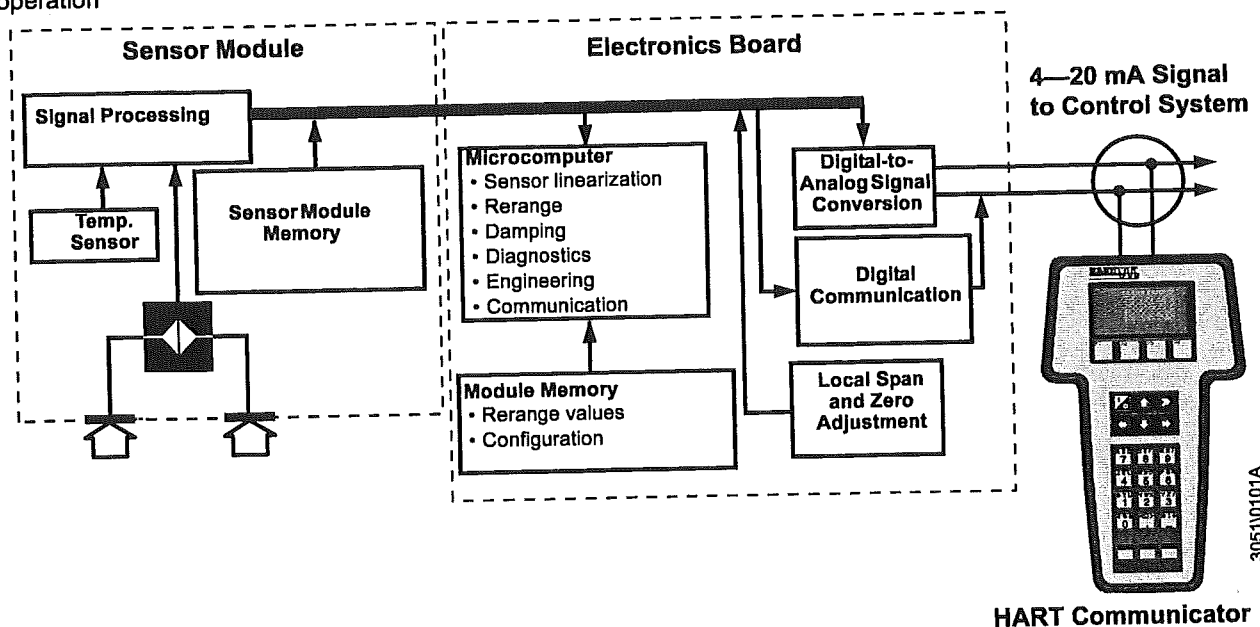
TRANSMITTER OVERVIEW

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

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

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

Figure 1-1. Block diagram of operation



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
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OVERVIEW

The information in this section covers installation considerations. Dimensional drawings for each Model 3051 variation and mounting configuration are found on page A-13.

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 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.
- Both transmitter covers must be fully engaged 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 with the Model 3051 or sold by Rosemount Inc. as spare parts for the Model 3051.

⚠ WARNING

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

- 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.

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. Keep in mind the need for easy access, personnel safety, practical field calibration, and a suitable transmitter environment. Install the transmitter to minimize vibration, shock, and temperature fluctuation.

IMPORTANT

Install the enclosed pipe plug in unused conduit openings with a minimum of five threads engaged to comply with Explosion-Proof requirements. The transmitter is shipped with the plug installed on transmitters ordered with CSA Explosion-Proof approval.

NOTE

Limit use if a continuous cyclic use of universal HART Commands if other than Commands 1, 2 or 3. If there is a requirement to conduct additional continuous cyclic HART Commands, please consult factory.

MECHANICAL CONSIDERATIONS

"Dimensional Drawings" beginning on page A-13 show dimensional drawings of Model 3051 transmitters. Figure 2-4 on page 2-10 shows installation examples.

NOTE

For Models 3051CD0 and 3051CD1, mount the transmitter solidly to prevent tilting. A tilt in the physical transmitter may cause a zero shift in the transmitter output.

NOTE

Do not blow down impulse piping through the transmitter. For steam service, first, isolate the transmitter then flush the lines and refill the lines with water before resuming measurement.

NOTE

When the transmitter is mounted on its side, position the Coplanar flange to ensure proper venting or draining. Mount the flange as shown in Figure 2-4 on page 2-10, keeping drain/vent connections on the bottom for gas service and on the top for liquid service.

NOTE

The Model 3051 transmitter incorporates two independent seals between the process connection and the conduit connection.

DRAFT RANGE CONSIDERATIONS

Installation

For the Model 3051CD0 draft range pressure transmitter, it is best to mount the transmitter with the isolators parallel to the ground. Installing the transmitter in this way reduces oil head effect and provides for optimal temperature performance.

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

Reducing Process Noise

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

Output Damping

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

Reference Side Filtering

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

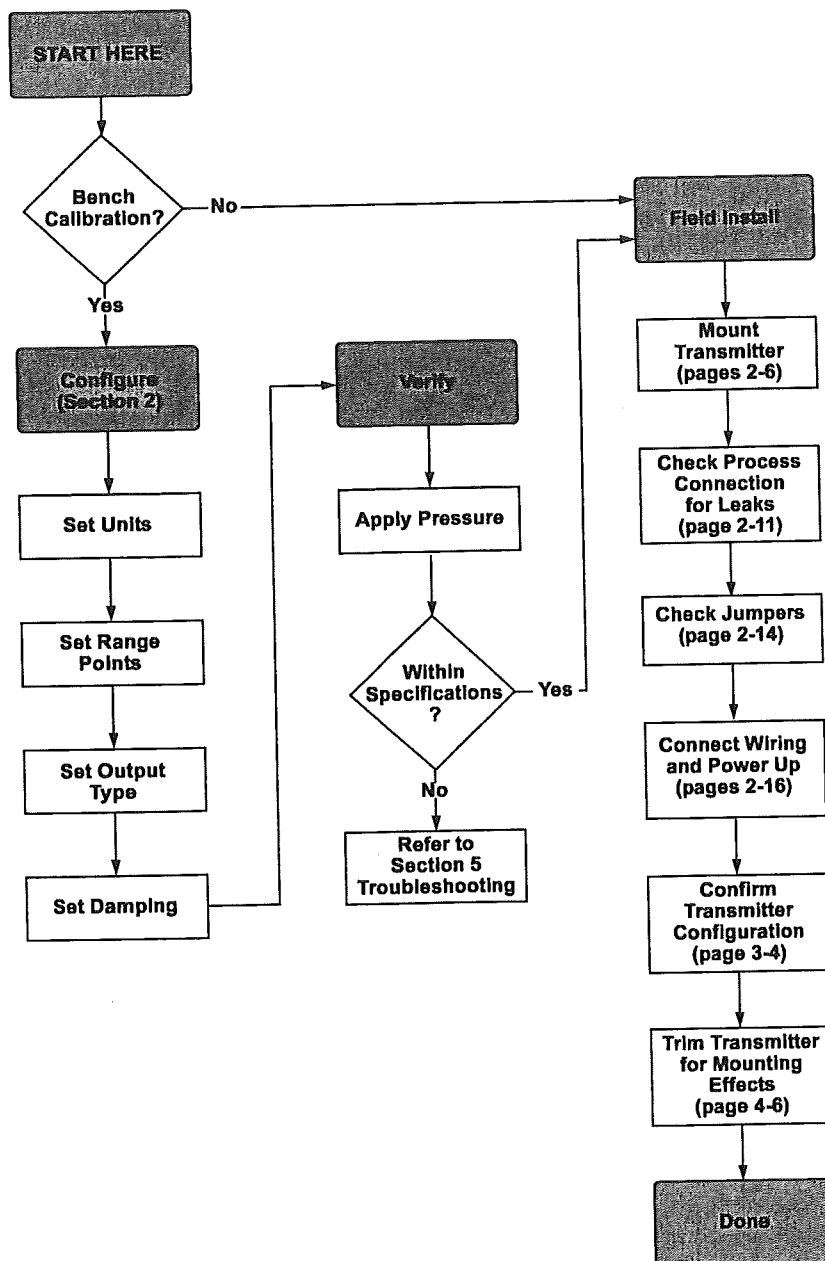
One method of reducing fluctuations in atmospheric pressure is to attach a length of tubing to the reference side of the transmitter to act as a pressure buffer.

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

ENVIRONMENTAL CONSIDERATIONS

The following guidelines 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: Range and Sensor Limits on page A-6 lists the transmitter temperature operating limits.

Figure 2-1. Installation Flowchart



INSTALLATION PROCEDURES

When choosing an installation location and position, take into account the need for access to the transmitter. For dimensional drawing information see page A-13.

Process Flange Orientation

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

Housing Rotation

See "Consider Housing Rotation" on page 2-13.

Terminal Side of Electronics Housing

Mount the transmitter so that the terminal side is accessible. A 0.75-inch (19 mm) clearance 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) clearance if possible for cover removal. Three inches of clearance is required for cover removal if a display is installed.

Exterior of Electronics Housing

The integral span and zero adjustments are located under the certifications plate on the top of the transmitter. Allow a minimum of 1.0 inch of clearance above the transmitter if you intend to use the integral zero and span adjustments.

Cover Installation

Always install the electronics housing covers metal-to-metal to ensure a proper seal.

Mount the transmitter

The Model 3051C Pressure Transmitter weighs 5.7 lbs (2,6 kg) without additional options. Optional mounting brackets available with the Model 3051 allow mounting to a panel, wall, or 2-inch pipe. The B4 Bracket Option for use with the Coplanar flange and the Model 3051T is 316 SST with 316 SST bolts. "Model 3051T Dimensional Drawings" on page A-16 show bracket dimensions and mounting configurations for the B4 Option.

Mounting Brackets

Bracket options B1, B2, B3, B7, B8, and B9 are sturdy polyurethane painted carbon steel brackets designed for use in pipe or panel mounting the traditional flange (H2, H3, H4, or H7 option). The B1–B3 brackets have carbon steel bolts, while the B7–B9 brackets have stainless steel bolts. Bracket options BA and BC are stainless steel with stainless steel bolts. Dimensionally, these brackets are identical to the B1–B3 brackets used with the Rosemount Model 1151 Pressure Transmitter except for the length of the bolts used to mount the transmitter to the bracket. Bracket options B5/B6 are used for Model 3051H transmitters. These bracket styles facilitate multiple mounting configurations, see "Model 3051H Pressure Transmitter Exploded View and Dimensional Drawings" on page A-17. When installing the transmitter to one of the mounting brackets, torque the bolts to 125 inch-pounds.

NOTE

The transmitter is calibrated in a horizontal or vertical position at the factory. Mounting the transmitter in a position other than factory calibration position will cause the zero point to shift by an amount equivalent to the liquid head. To reset the zero point, refer to "Sensor Trim" on page 4-6.

Mounting Bolts

The following guidelines have been established to ensure a tight flange, adapter, or manifold seal. The Model 3051 is shipped with the Coplanar/Traditional flange installed with four 1.75-inch flange bolts or integral manifold installed with four 2.25-inch bolts. The following bolts are also available to facilitate other mounting configurations:

Differential Pressure

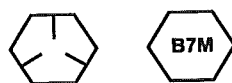
- Four 2.88-inch flange/adapter bolts for mounting the flange adapters to the Coplanar flange with DF option or as a bolt kit.
- Four 2.25-inch conventional manifold/flange bolts for mounting a three-valve manifold to the Coplanar flange when specified as an assembly or as a bolt kit. In this configuration, the 1.75-inch bolts may be used to mount the flange adapters to the process connection side of the manifold.

Gage/Absolute Pressure

- Two 2.88-inch flange/adapter bolts for mounting the flange adapters to the Coplanar flange with DF option or as a bolt kit.

Figure 2-3 shows mounting bolts and bolting configurations for a Coplanar flange. Figure 2-2 for bolting requirements for alternate mounting 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:

Carbon Steel (CS) Head Markings



Stainless Steel (SST) Head Markings



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

Bolt Installation

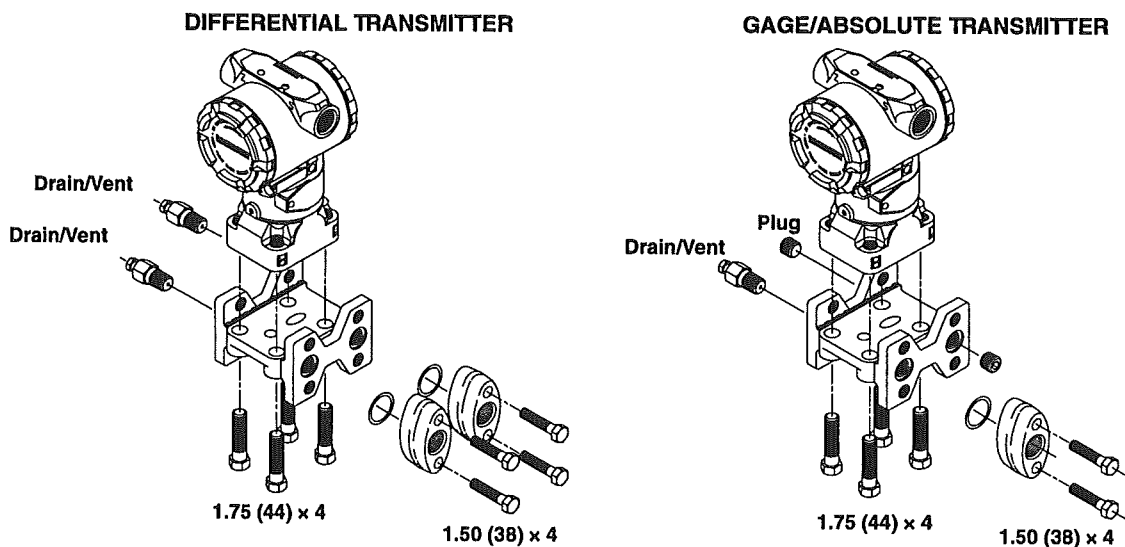
⚠ Only use bolts supplied with the Model 3051 or sold by Rosemount Inc. as spare parts for the Model 3051 transmitter. Use the following bolt installation procedure:

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

Table 2-1. Bolt Installation Torque Values

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

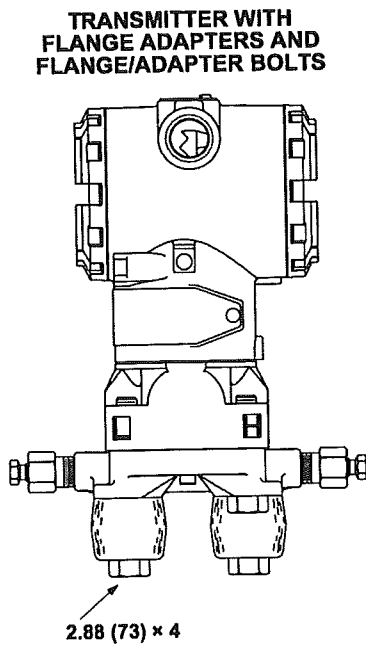
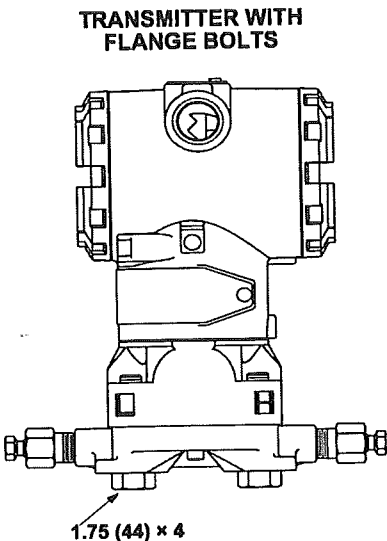
Figure 2-2. Traditional Flange Bolt Configurations



NOTE
Dimensions are in inches (millimeters).

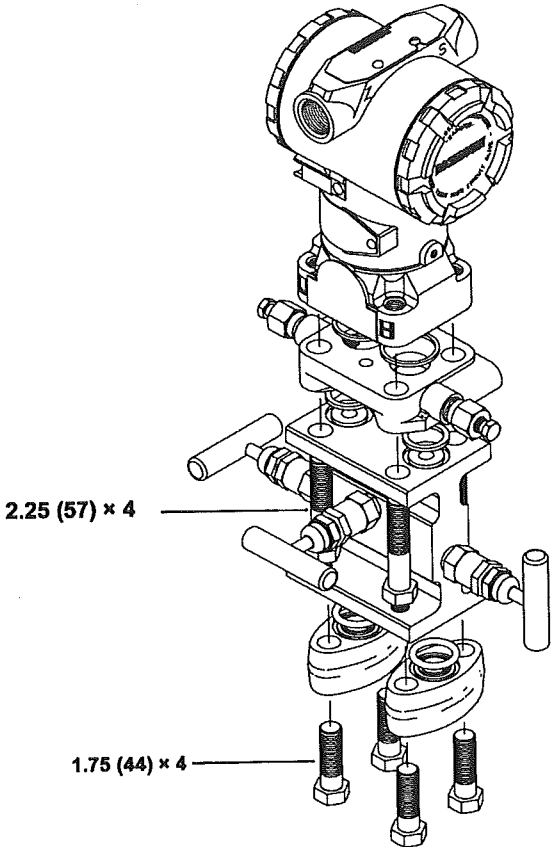
⚠ See "Safety Messages" on page 2-1 for complete warning information.

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



NOTE
Dimensions are in inches (millimeters).

**TRANSMITTER WITH 3-VALVE MANIFOLD
MANIFOLD/FLANGE BOLTS
FLANGE ADAPTERS
AND FLANGE/ADAPTER BOLTS**
(Differential Configuration Shown)



Description	Qty	Size in. (mm)
Differential Pressure		
Flange Bolts	4	1.75 (44)
Flange/Adapter Bolts	4	2.88 (73)
Manifold/Flange Bolts	4	2.25 (57)
Gage/Absolute Pressure ⁽¹⁾		
Flange Bolts	4	1.74 (44)
Flange/Adapter Bolts	2	2.88 (73)

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

3051-3031E06FD E06F; 305-3031A29P

Mounting Requirements

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

Liquid Flow Measurement

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

Gas Flow Measurement

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

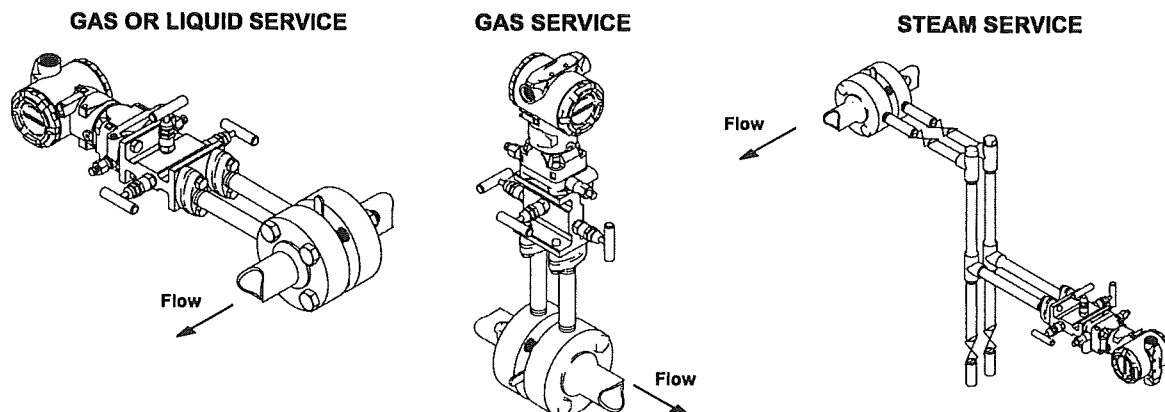
Steam Flow Measurement

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

NOTE

In steam or other elevated temperature services, it is important that temperatures at the coplanar process flanges not exceed 250 °F (121 °C) for transmitters with silicone fill or 185 °F (85 °C) for inert fill. In vacuum service, these temperature limits are reduced to 220 °F (104 °C) for silicone fill and 160 °F (71 °C) for inert fill. Models 3051L, 3051H, and the traditional flange allow higher temperatures.

Figure 2-4. Installation Examples



3051-3031A03B, B03C, C03B

Process Connections

Model 3051C process connection

Model 3051 process connections on the transmitter flange are $\frac{1}{4}$ –18 NPT. Flange adapter unions with $\frac{1}{2}$ –14 NPT connections must be ordered using the DF option. The threads are Class 2; use your plant-approved lubricant or sealant when making the process connections. The process connections on the transmitter flange are on $2\frac{1}{8}$ -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), $2\frac{1}{8}$ inches (54 mm), or $2\frac{1}{4}$ inches (57 mm). See page 2-12 for information on the Model 3051T process connection.

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

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

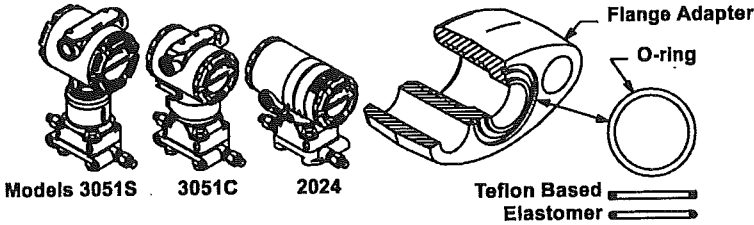
1. Remove the flange bolts.
2. Leaving the flange in place, move the adapters into position with the O-ring installed.
3. Clamp the adapters and the Coplanar flange to the transmitter module using the larger of the bolts supplied.
4. Tighten the bolts. Refer to "Mounting Bolts" on page 2-7 for torque 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.

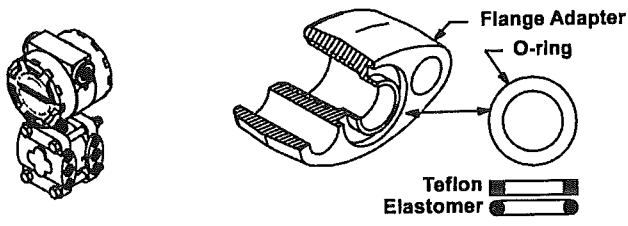
MODELS 3051S/ 3051/3001/3095/2024



Models 3051S 3051C 2024

Flange Adapter
O-ring
Teflon Based Elastomer

MODEL 1151



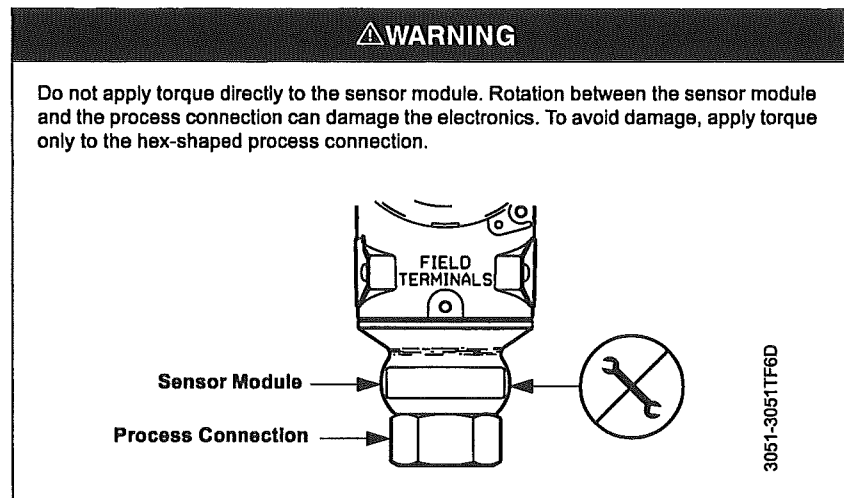
Flange Adapter
O-ring
Teflon Elastomer

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 3051 transmitters.

3051-0569A01A

When compressed, Teflon® O-rings tend to cold flow, which aids in their sealing capabilities. 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 they are undamaged, you may reuse them. If you replace the O-rings, retorque the flange bolts after installation to compensate for cold flow. Refer to the process sensor body reassembly procedure in Section 5: Troubleshooting.

Model 3051T Process Connection



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 sensor module 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.

Consider Housing Rotation

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

1. Loosen the housing rotation set screw using a $\frac{9}{64}$ -in. hex wrench.
2. Turn the housing up to 180 degrees to the left or right of its original (as shipped) position. **Do not rotate the housing more than 180 degrees without first performing a disassembly procedure (see "Disassembly Procedures" on page 5-3). Over-rotation will sever the electrical connection between the sensor module and the electronics module.**
3. Retighten the housing rotation set screw.

Set Jumpers

Security (Write Protect)

There are three security methods with the Model 3051 transmitter:

1. Security Jumper: prevents all writes to transmitter configuration.
2. Local Keys (Local Zero and Span) Software Lock Out: prevents changes to transmitter range points via local zero and span adjustment keys. With local keys security enabled, changes to configuration are possible via HART.
3. Physical Removal of Local Keys (Local Zero and Span) Magnetic Buttons: removes ability to use local keys to make transmitter range point adjustments. With local keys security enabled, changes to configuration are possible via HART.

NOTE

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

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

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

Configuring Transmitter Alarm and Security Jumper Procedure

To reposition the jumpers, follow the procedure described below.



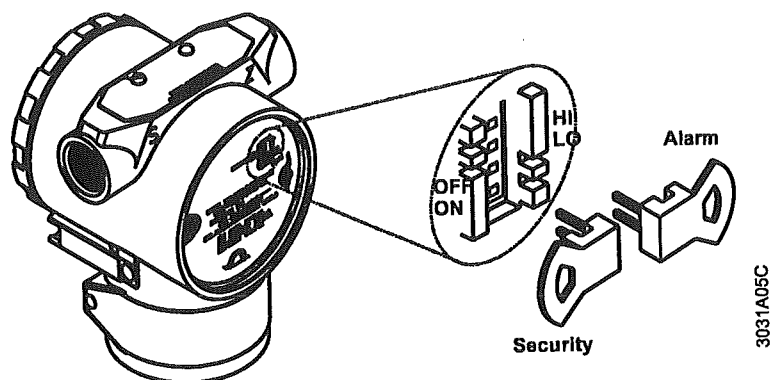
1. If the transmitter is installed, secure the loop and remove power.
-  2. Remove the housing cover opposite the field terminal side. Do not remove the transmitter covers in explosive atmospheres when the circuit is live.
3. Reposition the jumpers as desired.
 - Figure 2-5 shows the jumper positions for the electronics board.
 - Figure 2-6 shows transmitters with an optional LCD display.
 - Figure 2-7 shows the jumper positions for low-power transmitters.
-  4. Reattach the transmitter cover. Transmitter covers must be fully engaged to meet Explosion-Proof requirements.

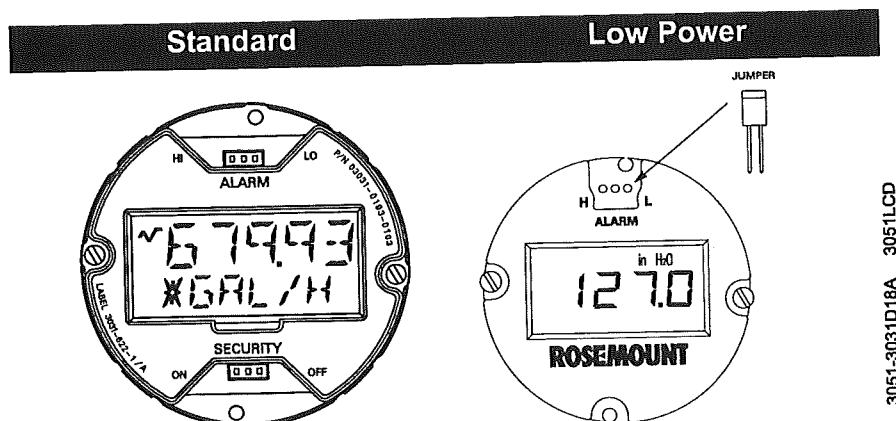
Figure 2-5. Electronics Board



NOTE

Security jumper not installed = Not Write Protected
Alarm jumper not installed = High Alarm

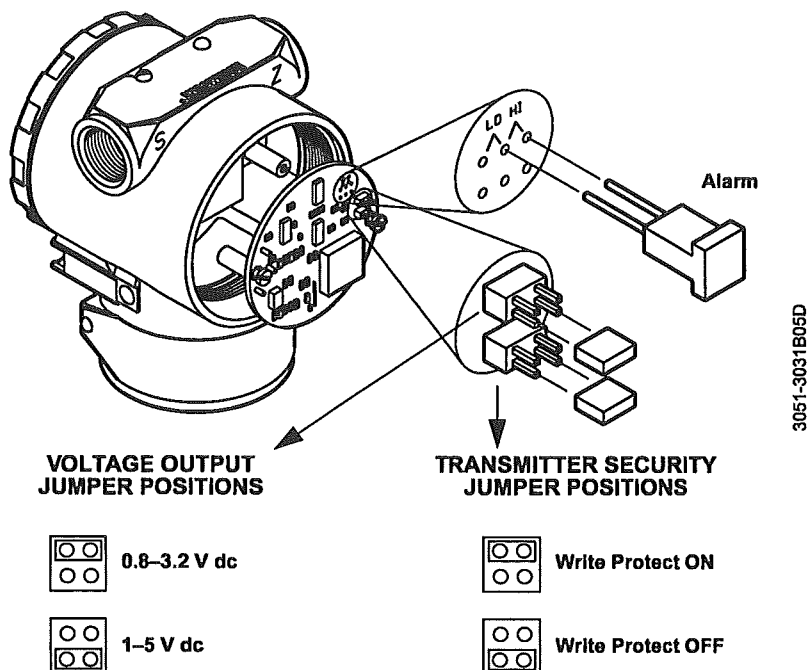
Figure 2-6. Model 3051 with
Optional LCD Display



NOTE

Security jumper not installed = Not Write Protected
Alarm jumper not installed = High Alarm

Figure 2-7. Low Power Transmitter Electronics Boards



NOTE

Security jumper not installed = Not Write Protected
Alarm jumper not installed = High Alarm
Voltage output jumper not installed = 1-5 V



Connect Wiring and Power Up

NOTE

Use shielded twisted pairs to yield best results. In order to ensure proper communication, use 24 AWG or larger wire, and do not exceed 5000 feet (1 500 meters). Installed signal wiring should not be run together and should not be in the same cable tray as AC power wiring.

The transmitter terminal block is in the compartment of the electronics housing labeled "FIELD TERMINALS." The other compartment contains the transmitter electronics module. Connections for the HART-based communicator are attached beneath the terminal screws on the terminal block. You can connect the Rosemount Model 282 Loop Validator at the signal terminals to provide power to the transmitter temporarily for calibration or diagnostic purposes. Or you can attach it to the test connections on the terminal block of the transmitter for indication purposes. Figure 2-8 shows power supply load limitations for the transmitter.

To make connections, perform the following procedure:

-  1. Remove the housing cover on the side marked "FIELD TERMINALS." Do not remove the cover in explosive atmospheres when the circuit is live. All power to the transmitter is supplied over the signal wiring.
-  2. Connect the lead that originates at the positive side of the power supply to the terminal marked "+" and the lead that originates from the negative side of the power supply to the terminal marked "-". Avoid contact with the leads and terminals. Do not connect the powered signal wiring to the test terminals. Power could damage the test diode in the test connection.
3. Plug and seal unused conduit connections on the transmitter housing to avoid moisture accumulation in the terminal side of the housing. If you do not seal the 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.

Inductive-based transient protectors, including the Rosemount Model 470, can adversely affect the output of Model 3051 4–20 mA transmitters. Do not use the Model 470 for transient protection with the Model 3051. If your application requires transient protection, install the Transient Protection Terminal Block (Section 5: Troubleshooting).

Signal Wiring Grounding

Do not run signal wiring in conduit or open trays with power wiring, or near heavy electrical equipment. You may 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. Device must be properly grounded or earthed according to local electric codes.

Power Supply for 4–20 mA Transmitters

The dc power supply should provide power with less than 2 percent ripple. The total resistance load is the sum of the resistance of the 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. See "Power Supply Effect" on page A-5 for additional power supply information.

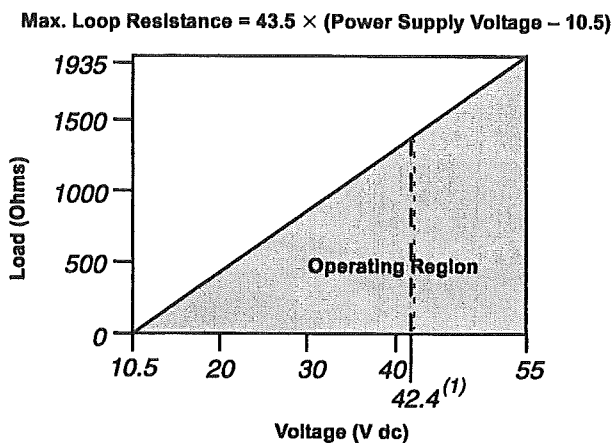
NOTE

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

Power supply for low power transmitters

Low-power transmitters require a 6–12 V dc external power supply.

Figure 2-8. Power Supply Load Limitations, 4–20 mA Transmitters



Communication requires a minimum loop resistance of 250 ohms.

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

3051-0103A

HAZARDOUS LOCATIONS

The Model 3051 has an 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: Product Certifications for specific approval categories and installation drawings.

IMPORTANT NOTE

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

Grounding the Transmitter Case

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

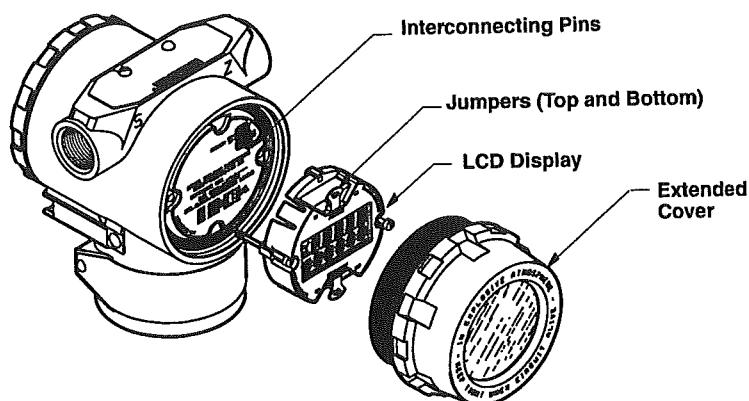
- **Internal Ground Connection:** The Internal Ground Connection screw is inside the FIELD TERMINALS side of the electronics housing. This screw is identified by a ground symbol (\oplus), and is standard on all Model 3051 transmitters.
- **External Ground Assembly:** This assembly is included with the optional transient protection terminal block (Option Code T1), and it is included with CESI/CENELEC Flame-Proof Certification (Option Code E8), BASEEFA/CENELEC Intrinsic Safety Certification (Option Code I1), and BASEEFA Type N Certification (Option Code N1). The External Ground Assembly can also be ordered with the transmitter (Option Code V5), or as a spare part (03031-0398-0001).

NOTE

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

**INSTALLING THE
LCD DISPLAY**

Figure 2-9. Optional LCD
Display



For transmitters ordered with the LCD display, the display is shipped installed. Installing the display on an existing Model 3051 transmitter requires a small instrument screwdriver and the display kit.

The kits vary depending on the version of transmitter electronics. Examine the following numbers carefully to ensure you are installing the correct kit.

For Use with Shrouded Electronics Board

Meter Kits

Option M5: P/N 03031-0193-0101 (Aluminum housing)

Option M6: P/N 03031-0193-0111 (SST housing)

For Use with Non-Shrouded Electronics Board

Meter Kits


Option M5: P/N 03031-0193-0001

Option M6: P/N 03031-0193-0011

The meter kit includes:

- one LCD display assembly
- one extended cover with O-ring installed
- two nylon standoffs
- two captive screws
- one ten-pin interconnection header


Use the following procedure and Figure 2-9 to install the LCD display. If the display is an upgrade from a previous version, upgrade the electronics board before attempting to install the display.

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 alive.
3. Remove the failure mode and alarm jumpers from the electronics module and insert them in their new positions above and below the display readout on the display assembly.

NOTE

On previous versions, remove only the alarm jumper.

4. Insert the interconnection header in the ten-pin socket exposed by removal of the jumpers. (Previous versions of the display use a six-pin connector.)
5. Remove the two captive screws from the electronics module. To do so, loosen the screws to release the module, then pull out the screws until they are stopped by the captive thread inside of the circuit board standoffs. Continue loosening the screws and remove them.
6. If necessary, rotate the electronics housing up to 180 degrees (left or right) to improve field access or to better view the LCD display. To rotate the housing:
 - a. Loosen the housing rotation set screw using a $\frac{9}{64}$ -in. hex wrench.
 - b. Turn the housing up to 180 degrees to the left or right of its original (as shipped) position. **Do not rotate the housing more than 180 degrees without first performing a disassembly procedure (see "Disassembly Procedures" on page 5-3). Over-rotation will sever the electrical connection between the sensor module and the electronics module.**
 - c. Retighten the housing rotation set screw.

7. Decide which direction to orient the display. Insert the long display screws into the two holes on the display assembly that coincide with the holes on the electronics module. You can install the display in 90-degree increments for easy viewing. Position one of the four connectors on the back of the display assembly to accept the interconnection header.
8. Attach the display assembly to the electronics module by threading the screws into the captive threads and attaching the display assembly to the interconnection pins. Tighten the screws to secure the display assembly and electronics board in place.
-  9. Attach and tighten the extended cover. Transmitter covers must be fully engaged to meet Explosion-Proof requirements and to achieve the proper environmental seal.

Note the following LCD temperature limits:

Operating: -4 to 175 °F (-20 to 80 °C)

Storage: -40 to 185 °F (-40 to 85 °C)

NOTE

Electronics board revision 5.3.163 or later (all shrouded designs) are able to verify alarm current levels. After replacing the transmitter electronics board, sensor module, or LCD display, an alarm level test is recommended before returning the transmitter to service (see page 3-19).

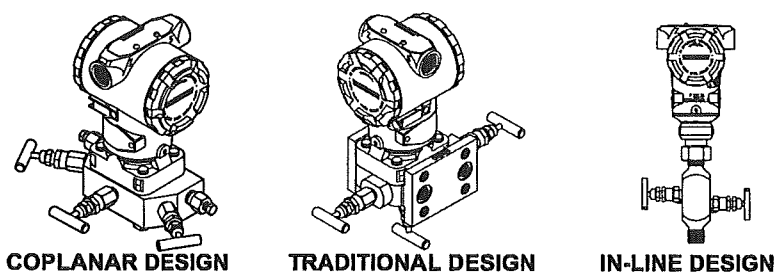
Model 3051

Reference Manual
00809-0100-4001, Rev EA
December 2002

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 2-10. Integral Manifolds



Model 305 Integral Manifold Installation Procedure

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

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

IMPORTANT

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

2. Install the Integral Manifold on the sensor module. Use the four 2.25-in. manifold bolts for alignment. Finger tighten the bolts, then tighten the bolts incrementally in a cross pattern to final torque value. See "Mounting Bolts" on page 2-7 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 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 3051T transmitter.

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

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

Section 3 Configuration

Commissioning on the bench with HART	page 3-2
Model 275 HART Communicator	page 3-4
Review Configuration Data	page 3-7
Check Output	page 3-7
Basic Setup	page 3-8
LCD Display	page 3-16
Detailed Setup	page 3-19
Diagnostics and Service	page 3-21
Advanced Functions	page 3-22
Multidrop Communication	page 3-25

OVERVIEW

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

For your convenience, HART communicator fast key sequences are listed for each software function. If you are unfamiliar with the communicator or how to follow fast key sequences, please refer to your communicator manual for communicator operations.

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 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. You may commission Model 3051 transmitters either before or after installation. Commissioning the transmitter on the bench before installation using a HART-based communicator or AMS ensures that all transmitter components are in good working order and acquaints you with the operation of the device.

-  To commission on the bench, connect the transmitter and the communicator as shown in Figure 3-1 and 3-2. Make sure the instruments in the loop are installed in accordance with intrinsically safe or nonincendive field wiring practices before connecting a communicator or AMS in an explosive atmosphere. Connect the communicator leads at any termination point in the signal loop. It is most convenient to connect them to the terminals labeled "COMM" on the terminal block. Connecting across the "TEST" terminals will prevent successful communication. To avoid exposing the transmitter electronics to the plant environment after installation, set all transmitter jumpers during the commissioning stage on the bench.

For 4–20 mA transmitters, you will need a power supply capable of providing 10.5 to 55 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 communicator or AMS loop connection and the power supply. Do not use inductive-based transient protectors with the Model 3051.

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 you are preparing to send or request data that would disrupt the loop or change the output of the transmitter, you must set your process application loop to manual. Both the HART Communicator Model 275 and AMS will prompt you to set the loop to manual when necessary. Keep in mind that acknowledging this prompt does not set the loop to manual. The prompt is only a reminder; you have to set the loop to manual yourself as a separate operation.

 See "Safety Messages" on page 3-1 for complete warning information.

Wiring Diagrams

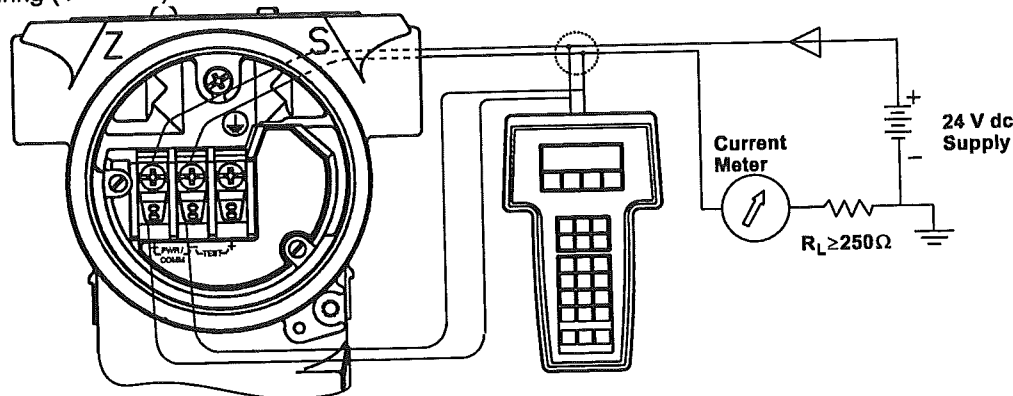
Bench Hook-up

Connect the bench equipment as shown in Figure 3-1 and 3-2, and turn on the HART-based communicator by pressing the ON/OFF key. The communicator will search for a HART-compatible device and will indicate when the connection is made. If the communicator fails to connect, it will indicate that no device was found. If this occurs, refer to Troubleshooting page 5-1.

Field Hook-up

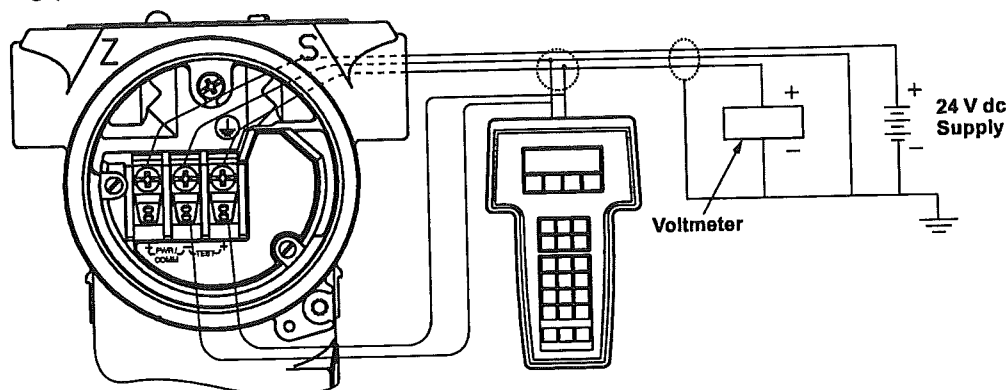
Figures 3-1 and 3-2 illustrate wiring loops for a field hook-up with a HART Communicator or AMS. Signal point may be grounded at any point or left ungrounded.

Figure 3-1. Wiring (4–20 mA)



3051-3031G02B

Figure 3-2. Wiring (Low-Power)



3051-3031I02B

MODEL 275 HART COMMUNICATOR

A check (✓) indicates the basic configuration parameters. At minimum, these parameters should be verified as part of the configuration and startup procedure.

Table 3-1. The Model 275 HART Communicator Fast Key Sequence

Function	Fast Key Sequence
Alarm and Saturation Levels	1, 4, 2, 7
Analog Output Alarm Type	1, 4, 3, 2, 4
Burst Mode Control	1, 4, 3, 3, 3
Burst Operation	1, 4, 3, 3, 3
Custom Meter Configuration	1, 3, 7, 2
Custom Meter Value	1, 4, 3, 4, 3
✓ 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
Disable Local Span/Zero Adjustment	1, 4, 4, 1, 7
Field Device Information	1, 4, 4, 1
Full Trim	1, 2, 3, 3
Keypad Input – Rerange	1, 2, 3, 1, 1
Local Zero and Span Control	1, 4, 4, 1, 7
Loop Test	1, 2, 2
Lower Sensor Trim	1, 2, 3, 3, 2
Message	1, 3, 4, 3
Meter Options	1, 4, 3, 4
Number of Requested Preambles	1, 4, 3, 3, 2
Poll Address	1, 4, 3, 3, 1
Poll a Multidropped Transmitter	Left Arrow, 4, 1, 1
✓ Range Values	1, 3, 3
Rerange	1, 2, 3, 1
Scaled D/A Trim (4-20 mA Output)	1, 2, 3, 2, 2
Self Test (Transmitter)	1, 2, 1, 1
Sensor Info	1, 4, 4, 2
Sensor Temperature	1, 1, 4
Sensor Trim Points	1, 2, 3, 3, 5
Status	1, 2, 1, 1
✓ Tag	1, 3, 1
✓ Transfer Function (Setting Output Type)	1, 3, 5
Transmitter Security (Write Protect)	1, 3, 4, 4
Trim Analog Output	1, 2, 3, 2
✓ Units (Process Variable)	1, 3, 2
Upper Sensor Trim	1, 2, 3, 3, 3
Zero Trim	1, 2, 3, 3, 1

Figure 3-3. HART
Communicator menu tree for
Model 3051

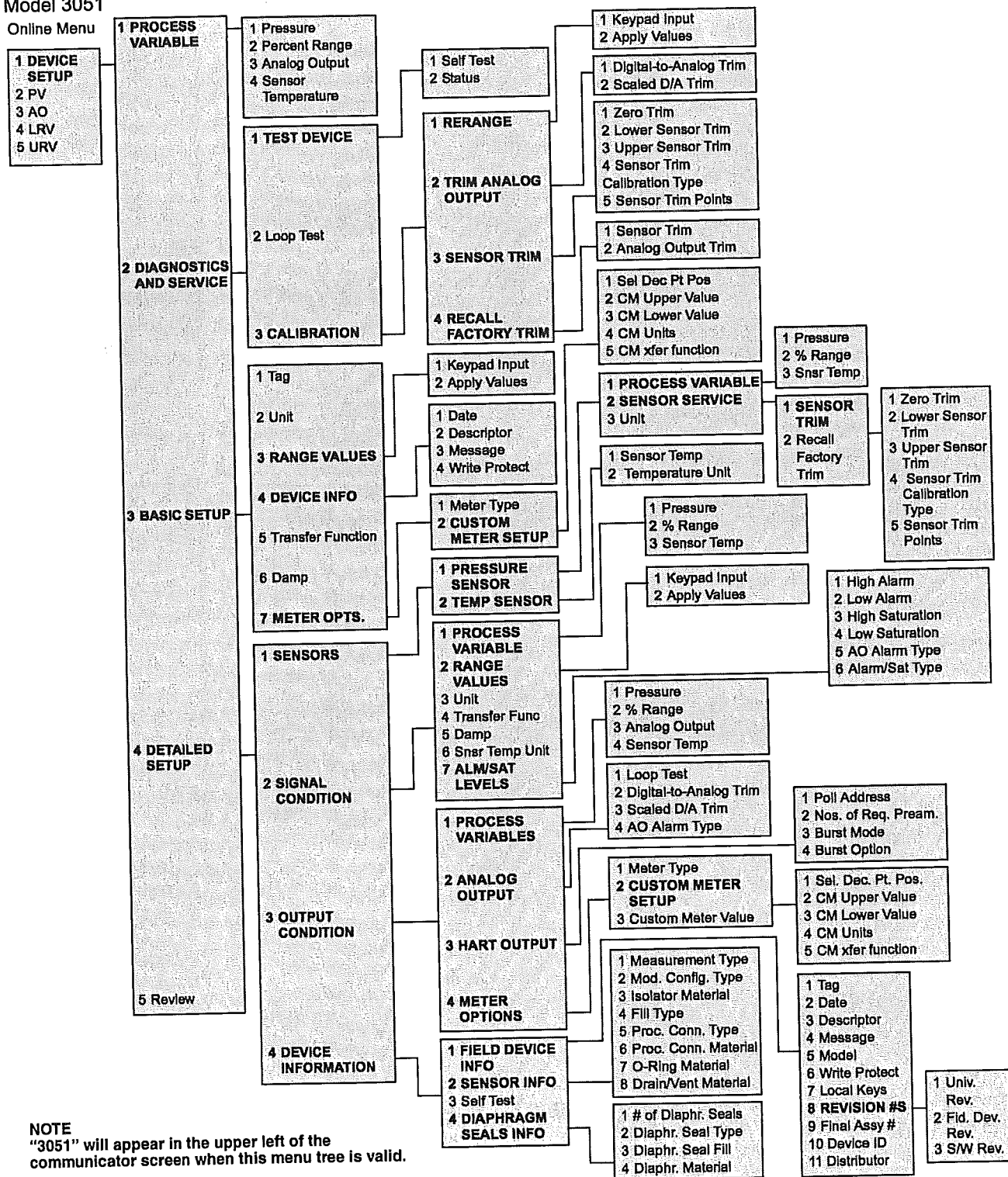
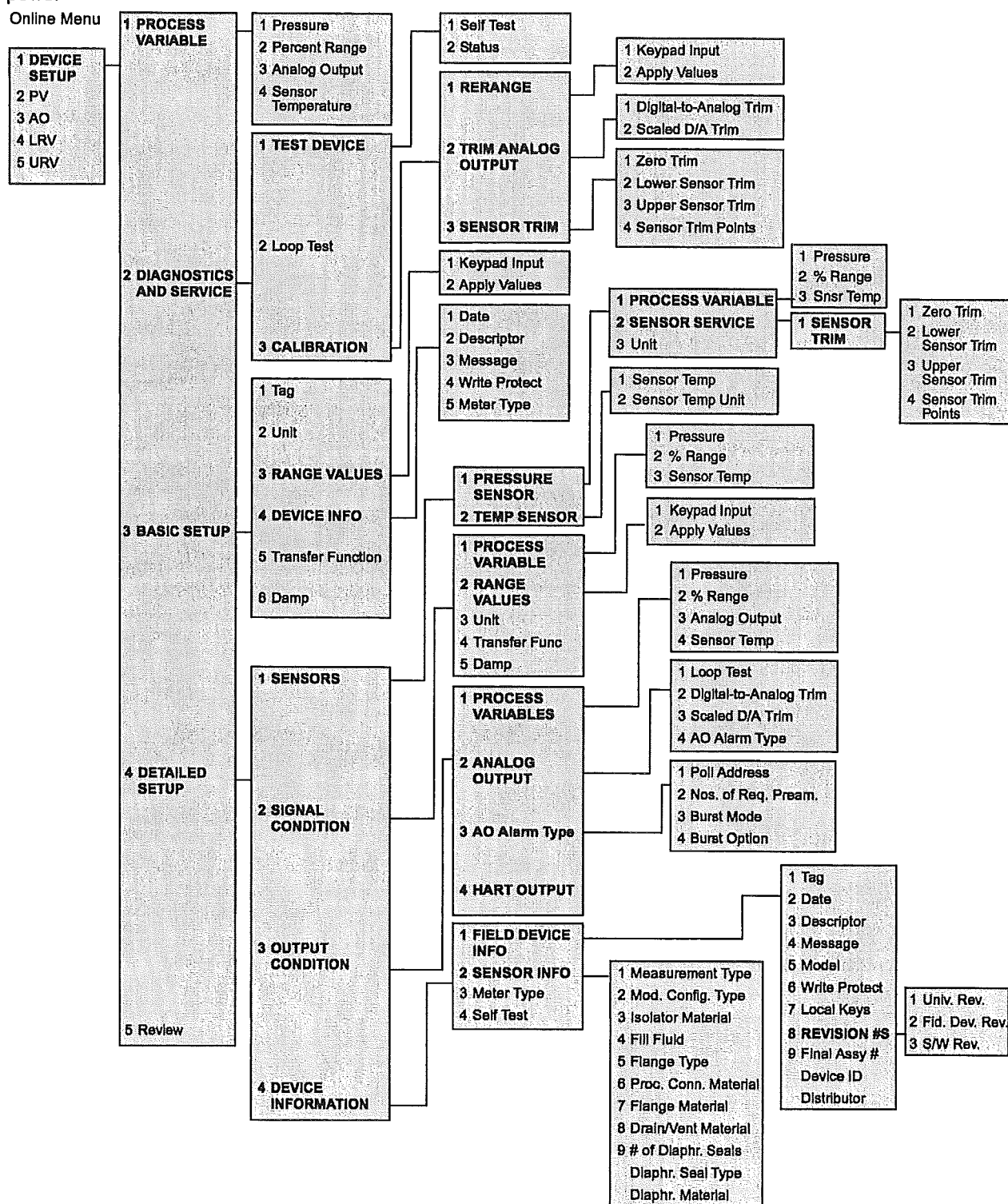


Figure 3-4. HART
Communicator menu tree for low
power



REVIEW CONFIGURATION DATA

HART Comm	1, 5
-----------	------

NOTE

Information and procedures in this section that make use of HART Communicator fast key sequences assume that the transmitter and communicator are connected, powered, and operating correctly. If you are not familiar with the HART Communicator refer to the HART Communicator manual, document 00809-0100-4275

HART Communicator

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

Transmitter Model	Type
Tag	Range
Date	Descriptor
Message	Minimum and Maximum Sensor Limits
Minimum Span	Units
4 and 20 mA points	Output (linear or sq. root)
Damping	Alarm Setting (high, low)
Security Setting (on, off)	Local Zero/Span Keys (enabled, disabled)
Integral Display	Sensor Fill
Isolator Material	Flange (type, material)
O-Ring Material	Drain/Vent
Remote Seal (type, fill fluid, isolator material, number)	Transmitter S/N
Address	Sensor S/N

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

HART Comm.	1, 1
------------	------

HART Communicator

The process variables for the Model 3051 provide the transmitter output, and are continuously updated. The process variable menu displays the following process variables:

- Pressure
- Percent of Range
- Analog Output

The pressure reading in both Engineering Units and Percent of Range will continue to track with pressures outside of the defined range from the lower to the upper range limit of the sensor module. (Previous versions of the software will track with pressure up to 105% of span and remain there as pressure increases.)

NOTE

Regardless of the range points, the Model 3051 will measure and report all readings within the digital limits of the sensor. For example, if the 4 and 20 mA points are set to 0 and 10 inH₂O, and the transmitter detects a pressure of 25 inH₂O, it digitally outputs the 25 inH₂O reading and a 250% of span reading. However, there may be up to $\pm 5.0\%$ 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

Sensor Temperature

HART Comm.	1, 1, 4
------------	---------

The Model 3051 contains a temperature sensor just above its pressure sensor in the sensor module. When reading this temperature, keep in mind that this 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

HART Comm.	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. Select from the following engineering units:

- | | |
|---|---|
| • inH ₂ O | • bar |
| • inHg | • mbar |
| • ftH ₂ O | • g/cm ² |
| • mmH ₂ O | • kg/cm ² |
| • mmHg | • Pa |
| • psi | • kPa |
| • torr | • atm |
| • inH ₂ O at 4 °C ⁽¹⁾ | • mmH ₂ O at 4 °C ⁽¹⁾ |

⁽¹⁾ Not available with low power or previous Model 3051 transmitters.

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

HART Comm.	1, 3, 5
------------	---------

Activate the transmitter square root output option to make the analog output proportional to flow. As the input approaches zero, the Model 3051 automatically switches to a linear output in order to ensure a more smooth, stable output near zero. See Figure 3-5.

The transition from linear to square root is not adjustable. It occurs at 0.8% of ranged pressure input or 9% of full-scale flow output in transmitters with Revision 5.2 or higher software. In earlier software, the transition point occurred at 4% of ranged pressure input, or 20% of full scale flow output.

From 0 percent 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, the slope of the curve equals 42 ($y = 42x$) to achieve continuous transition from linear to square root at the transition point.

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

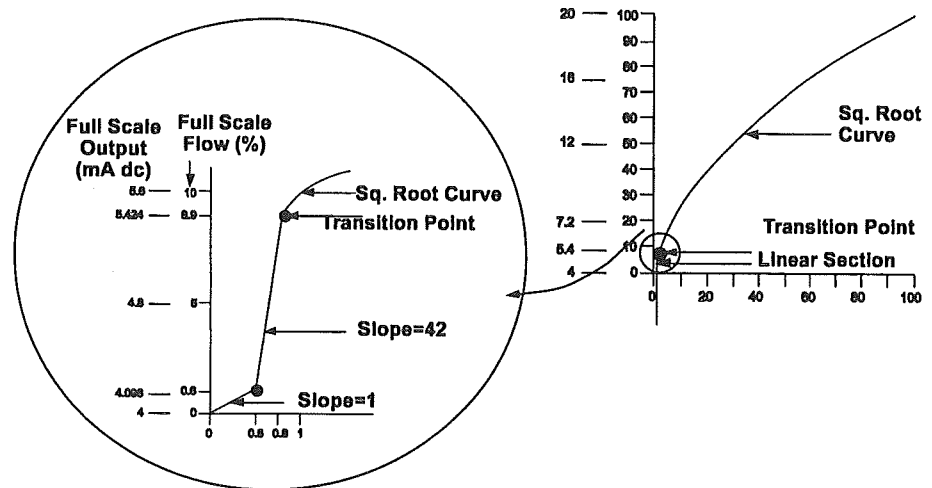
Selecting Output Range for Low-Power Output Transmitters

Low power transmitters output either 1–5 V dc or 0.8–3.2 V dc depending on the position of the voltage output jumper. To reposition the voltage output jumper, follow the procedure described on page 2-14.

NOTE

Default low power output is 1–5 V dc. After changing output between 1–5 V and 0.8–3.2 V, perform a low power output trim.

Figure 3-5. Square Root Output Transition Point



NOTE

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

Rerange

The Range Values command sets the 4 and 20 mA points (lower and upper range values). Setting the range values to the limits of expected readings maximizes transmitter performance. In practice, you may reset the transmitter range values as often as necessary to reflect changing process conditions.

NOTE

Regardless of the range points, the Model 3051 will measure and report all readings within the digital limits of the sensor. For example, if the 4 and 20 mA points are set to 0 and 10 inH₂O, and the transmitter detects a pressure of 25 inH₂O, it digitally outputs the 25 inH₂O reading and a 250% percent of span reading. However, there may be up to $\pm 5.0\%$ error associated with output outside of the range points.

Use one of three methods to rerange the transmitter. Each method is unique; examine all three closely before deciding which method to use.

Rerange with a Communicator Only

HART Comm.	1, 2, 3, 1, 1
------------	---------------

Reranging using only the communicator is the easiest and most popular way to rerange the transmitter. This method changes the values of the analog 4 and 20 mA points independently without a pressure input.

NOTE

Changing the lower or upper range point results in similar changes to the span.

To rerange using only the communicator, enter the fast-key sequence above, select *Keypad input*, and follow the on-line instructions. Or enter the values directly from the **HOME** screen.

NOTE

If the transmitter security jumper is in the **ON** position, you will not be able to make adjustments to the zero and span. Refer to "Set Jumpers" on page 2-14 for the appropriate placement of the transmitter security jumper.

Rerange with a Pressure Input Source and a Communicator

HART Comm.	1, 2, 3, 1, 2
------------	---------------

Reranging using the communicator and a pressure source or process pressure is a way of reranging the transmitter when specific 4 and 20 mA points are not known. This method changes the values of the analog 4 and 20 mA points.

NOTE

When you set the 4 mA point the span is maintained; when you set the 20 mA point the span changes. If you set the lower range point 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.

To rerange using the communicator and a pressure source or process pressure, enter the fast-key sequence above, select *Apply values*, and follow the on-line instructions.

NOTE

If the transmitter security jumper is in the **ON** position, you will not be able to make adjustments to the zero and span. Refer to "Set Jumpers" on page 2-14 for the appropriate placement of the transmitter security jumper.

Rerange with a Pressure Input Source and the Local Zero and Span Buttons

Reranging using the local zero and span adjustments (see Figure 3-6 on page 3-12) and a pressure source is a way of reranging the transmitter when specific 4 and 20 mA points are not known and a communicator is not available.

NOTE

When you set the 4 mA point the span is maintained; when you set the 20 mA point the span changes. If you set the lower range point 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.

To rerange the transmitter using the span and zero buttons, perform the following procedure:

1. Loosen the screw holding the certifications label on top of the transmitter housing, and rotate the label to expose the zero and span buttons (see Figure 3-6 on page 3-12).
2. 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.
3. To set the 4 mA point, press and hold the zero button for at least two seconds, then verify that the output is 4 mA. If a display is installed, it will display ZERO PASS.

NOTE

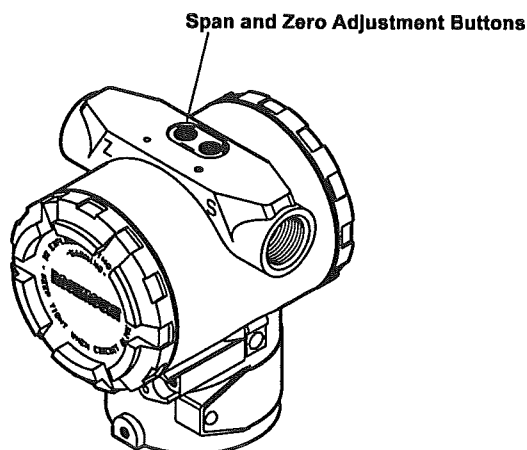
The zero and span adjustments on previous versions of the transmitter are screws instead of buttons. To activate the zero and span adjustments loosen the screws until they pop up.

4. Apply a pressure equivalent to the upper range value to the high side of the transmitter.
5. To set the 20 mA point, press and hold the span button for at least two seconds, then verify that the output is 20 mA. If a display is installed, it will display SPAN PASS.

NOTE

If the transmitter security jumper is in the **ON** position, or if the local zero and span adjustments are disabled through the software, you will not be able to make adjustments to the zero and span using the local buttons. Refer to "Set Jumpers" on page 2-14 for the proper placement of the transmitter security jumper. Or refer to "The Model 275 HART Communicator Fast Key Sequence" on page 3-4 for instructions on how to enable the span and zero buttons.

Figure 3-6. Local Zero and Span Buttons



3051-3031D02A

After you rerange the transmitter using the span and zero adjustments, it is possible to disable the adjustments to prevent further reranging.

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 Modifications" 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.

Model 3051C Differential/Gage Pressure Transmitter Range Limits										
Units	Range 1 Span		Range 2 Span		Range 3 Span		Range 4 Span		Range 5 Span	
	min	max	min	max	min	max	min	max	min	max
inH ₂ O	0.5	25	2.5	250	10	1000	83.040	8304	553.60	55360
inHg	0.03678	1.8389	0.18389	18.389	0.73559	73.559	6.1081	610.81	40.720	4072.04
ftH ₂ O	0.04167	2.08333	0.20833	20.8333	0.83333	83.3333	6.9198	691.997	46.13	4613.31
mmH ₂ O	12.7	635.5	63.553	6355	254	25421	2110.95	211095	14073	1407301
mmHg	0.93416	46.7082	4.67082	467.082	18.6833	1868.33	155.145	15514.5	1034.3	103430
psi	0.01808	0.903	0.0902	9.03183	0.36127	36.127	3	300	20	2000
bar	0.00125	0.06227	0.00623	0.62272	0.02491	2.491	0.20684	20.6843	1.37895	137.895
mbar	1.2454	62.2723	6.22723	622.723	24.9089	2490.89	206.843	20684.3	1378.95	137895
g/cm ²	1.26775	63.3875	6.33875	633.875	25.355	2535.45	210.547	21054.7	1406.14	140614
kg/cm ²	0.00127	0.0635	0.00635	0.635	0.0254	2.54	0.21092	21.0921	1.40614	140.614
Pa	124.545	6227.23	622.723	62160.6	2490.89	249089	20684.3	2068430	137895	13789500
kPa	0.12545	6.2272	0.62272	62.2723	2.49089	249.089	20.6843	2068.43	137.895	13789.5
torr	0.93416	46.7082	4.67082	467.082	18.6833	1868.33	155.145	15514.5	1034.3	103430
atm	0.00123	0.06146	0.00615	0.61460	0.02458	2.458	0.20414	20.4138	1.36092	136.092

NOTE

When used with the HART Communicator Model 275 or the Rosemount Model 268 Communicator, $\pm 5\%$ adjustability is allowed on the sensor limit to allow for unit conversions.

Model 3051

Reference Manual
00809-0100-4001, Rev EA
December 2002

Model 3051P Differential/Gage Pressure Transmitter Range Limits								
	Range 2 Span		Range 3 Span		Range 4 Span		Range 5 Span	
Units	min	max	min	max	min	max	min	max
inH ₂ O	25	250	100	1000	830.40	8304	5536.0	55360
inHg	1.8389	18.389	7.3559	73.559	61.081	610.81	407.20	4072.04
ftH ₂ O	2.08333	20.8333	8.3333	83.3333	69.200	691.997	461.3	4613.31
mmH ₂ O	635.5	6355	2542	25421	21109.5	211095	140730	1407301
mmHg	46.7082	467.082	186.833	1868.33	1551.45	15514.5	10343	103430
psi	0.903	9.03183	3.6127	36.127	30	300	200	2000
bar	0.06227	0.62272	0.2491	2.491	2.0684	20.6843	13.7895	137.895
mbar	62.2723	622.723	249.089	2490.89	2068.43	20684.3	13789.5	137895
g/cm ²	63.3875	633.875	253.55	2535.45	2105.47	21054.7	14061.4	140614
kg/cm ²	0.0635	0.635	0.254	2.54	2.1092	21.0921	14.0614	140.614
Pa	6216.06	62160.6	24908.9	249089	206843	2068430	1378950	13789500
kPa	6.2272	62.2723	24.9089	249.089	206.843	2068.43	1378.95	13789.5
torr	46.7082	467.082	186.833	1868.33	1551.45	15514.5	10343	103430
atm	0.06146	0.61460	0.2458	2.458	2.0414	20.4138	13.6092	136.092

NOTE

When used with the HART Communicator Model 275 or the Rosemount Model 268 Communicator, $\pm 5\%$ adjustability is allowed on the sensor limit to allow for unit conversions.

Model 3051L/3051H Pressure Transmitter Range Limits								
	Range 2 Span		Range 3 Span		Range 4 Span		Range 5 Span	
Units	min	max	min	max	min	max	min	max
inH ₂ O	2.5	250	10	1000	83.040	8304	553.60	55360
inHg	0.18389	18.389	0.73559	73.559	6.1081	610.81	40.720	4072.04
ftH ₂ O	0.20833	20.8333	0.83333	83.3333	6.9198	691.997	46.13	4613.31
mmH ₂ O	63.553	6355	254	25421	2110.95	211095	14073	1407301
mmHg	4.67082	467.082	18.6833	1868.33	155.145	15514.5	1034.3	103430
psi	0.0902	9.03183	0.36127	36.127	3	300	20	2000
bar	0.00623	0.62272	0.02491	2.491	0.20684	20.6843	1.37895	137.895
mbar	6.22723	622.723	24.9089	2490.89	206.843	20684.3	1378.95	137895
g/cm ²	6.33875	633.875	25.355	2535.45	210.547	21054.7	1406.14	140614
kg/cm ²	0.00635	0.635	0.0254	2.54	0.21092	21.0921	1.40614	140.614
Pa	622.723	62160.6	2490.89	249089	20684.3	2068430	137895	13789500
kPa	0.62272	62.2723	24.9089	249.089	20.6843	2068.43	137.895	13789.5
torr	4.67082	467.082	18.6833	1868.33	155.145	15514.5	1034.3	103430
atm	0.00615	0.61460	0.02458	2.458	0.20414	20.4138	1.36092	136.092

NOTE

When used with the HART Communicator Model 275 or the Rosemount Model 268 Communicator, $\pm 5\%$ adjustability is allowed on the sensor limit to allow for unit conversions.

Model 3051T Gage and Absolute Pressure Transmitter Range Limits										
Units	Range 1 Span		Range 2 Span		Range 3 Span		Range 4 Span		Range 5 Span	
	min	max	min	max	min	max	min	max	min	max
inH ₂ O	8.30397	831.889	41.5198	4159.45	221.439	22143.9	1107.2	110720	55360	276799
inHg	0.61081	61.0807	3.05403	305.403	16.2882	1628.82	81.441	8144.098	4072.04	20360.2
ftH ₂ O	0.69199	69.3241	3.45998	345.998	18.4533	1845.33	92.2663	9226.63	4613.31	23066.6
mmH ₂ O	211.10	21130	1054.60	105460.3	5634.66	563466	28146.1	2814613	1407301	7036507
mmHg	15.5145	1551.45	77.5723	7757.23	413.72	41372	2068.6	206860.0	103430	517151
psi	0.3	30	1.5	150	8	800	40	4000	2000	10000
bar	0.02068	3.06843	0.10342	10.3421	0.55158	55.1581	2.75791	275.7905	137.895	689.476
mbar	20.6843	2068.43	103.421	10342.11	551.581	55158.1	2757.91	275790.5	137895	689476
g/cm ²	21.0921	2109.21	105.461	10546.1	561.459	56145.9	2807.31	280730.6	140614	703067
kg/cm ²	0.02109	2.10921	0.10546	10.5461	0.56246	56.2456	2.81228	281.228	140.614	701.82
Pa	2068.43	206843	10342.1	1034212	55158.1	5515811	275791	27579054	13789500	68947600
kPa	2.06843	206.843	10.3421	1034.21	55.1581	5515.81	275.791	27579.05	13789.5	68947.6
torr	15.5145	1551.45	77.5726	7757.26	413.721	413721	2068.6	206859.7	103430	517151
atm	0.02041	2.04138	0.10207	10.2069	0.54437	54.4368	2.72184	272.1841	136.092	680.46

NOTE

When used with the HART Communicator Model 275 or the Rosemount Model 268 Communicator, $\pm 5\%$ adjustability is allowed on the sensor limit to allow for unit conversions.

Model 3051T Gage and Absolute Pressure Transmitter Range Limits										
Units	Range 1 Span		Range 2 Span		Range 3 Span		Range 4 Span		Range 5 Span	
	min	max	min	max	min	max	min	max	min	max
inH ₂ O	4.62254	138.399	8.30397	831.889	41.5198	4151.98	221.439	22143.9	1107.2	110720
inHg	0.34002	10.1801	0.61081	61.0807	3.05403	305.403	16.2882	1628.82	81.441	8144.098
ftH ₂ O	0.38521	11.5333	0.69199	69.3241	3.45998	345.998	18.4533	1845.33	92.2663	9226.63
mmH ₂ O	117.510	3518.2	211.10	21130	6.35308	635.308	5634.66	563466	28146.1	2814613
mmHg	8.63642	258.575	15.5145	1551.45	1055.47	105547	413.72	41372	2068.6	206860.0
psi	0.16667	5	0.3	30	1.5	150	8	800	40	4000
bar	0.01151	0.344738	0.02068	2.06843	0.10342	10.342	0.55158	55.1581	2.75791	275.7905
mbar	11.5142	344.738	20.6843	2068.43	103.421	10342.1	551.581	55158.1	2757.91	275790.5
g/cm ²	11.74	350.91	21.0921	2109.21	105.27	105.27	561.459	56145.9	2807.31	280730.6
kg/cm ²	0.01174	0.351535	0.02109	2.10921	0.10546	10.546	0.56246	56.2456	2.81228	281.228
Pa	1151.42	34473.8	2068.43	206843	10342.1	1034210	55158.1	5515811	275791	27579054
kPa	1.15142	34.4738	2.06843	206.843	10.3421	1034.21	55.1581	5515.81	275.791	27579.05
torr	8.63642	258.575	15.5145	1551.45	77.5726	7757.26	413.721	413721	2068.6	206859.7
atm	0.01136	0.34023	0.02041	2.04138	0.10207	10.207	0.54437	54.4368	2.72184	272.1841

NOTE

When used with the HART Communicator Model 275 or the Rosemount Model 268 Communicator, $\pm 5\%$ adjustability is allowed on the sensor limit to allow for unit conversions.

Damping

HART Comm.	1, 3, 6
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The Damp command changes the response time of the transmitter to smooth variations in output readings caused by rapid changes in input. Determine the appropriate damping 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,⁽¹⁾ and can be reset to any of ten pre-configured damping values between 0 and 25.6 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 Modifications" screen appears, enter desired information and click **OK**.
3. After carefully reading the warning provided, select **OK**.

LCD DISPLAY

HART Comm.	1, 4, 3, 4
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The Meter Options command allows you to customize the LCD display for use in your application. You can configure the display to display the following information:

- Engineering Units
- Percent of Range
- Custom Meter Display
- Alternating between Engineering Units and Percent of Range
- Alternating between Engineering Units and Custom Meter Display Installed (Arrow down - Factory Default)
- None
- Unknown
- Spcl

NOTE

The user-configurable LCD scale is a feature specific to the current 4–20 mA output transmitters. If you have a previous Model 3051 transmitter, upgrade the transmitter electronics board and LCD display to attain the current functionality.

⁽¹⁾ Model 3051CD0 default damping is 3.2 seconds. Model 3051CD1, with calibrations below 2.5 inH₂O (0.62 kPa), have damping set at 3.2 seconds.

Standard display Configuration

The factory default alternates between Engineering units and % Range (Factory default: INSTALLED = alt % Rnge/Eng units). To change the standard default, follow the following steps:

1. From the communicators main menu select (1) Device Setup (3) Basic Setup, (7) Meter Options.
2. Select (1) Meter Type. Using the up or down arrows scroll up or down until the desired display has been highlighted. Press ENTER (F4), SEND (F2), & HOME (F3).

NOTE

Use the up and down arrow keys to scroll through the meter type selection shown above. (Installed, None, Unknown, and Spcl are the same as Alt % rnge/Eng). These options are only present do backward software compatibility.

AMS

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

1. In the "Local Display" tab, locate the "Meter Type" 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**.

Custom display Configuration

The user-configurable scale is a feature that enables the LCD display to display flow, level, or custom pressure units. With this feature you can define the decimal point position, the upper range value, the lower range value, the engineering units, and the transfer function. The display can be configured using a Model 275 HART Communicator (see Table A-1 on page 1-3) or AMS.

The user-configurable scale feature can define:

- decimal point position
- upper range values
- lower range values
- engineering units
- transfer function

To configure the display using AMS, click the **LOCAL DISPLAY** tab on the **CONFIGURATION PROPERTIES** screen. To configure the display with a HART communicator, perform the following procedure:


1. Connect the communicator to the transmitter. Before connecting a communicator in an explosive atmosphere, make sure the instruments in the loop are installed according to intrinsically safe or nonincendive field wiring practices.
2. Change the Meter Type to "Custom Meter" by using the Fast Key sequence under "LCD Display" on page 3-16.
3. Next from the **ONLINE** screen, *Select 1 Device Setup, 3 Basic Setup, 7 Meter Options, 2 Meter Options, 2 Custom Meter Setup*
4. To specify decimal point position:
 - a. *Select 1 Sel dec pt pos.* Choose the decimal point representation that will provide the most accurate output for your application. For example, when outputting between 0 and 75 GPM, choose XX.XXX or use the decimal point examples below:

XXXXX
XXXX.X
XXX.XX
XX.XXX
X.XXXX

NOTE:

Make sure the selection has been sent and the decimal point has changed before proceeding to the next step.

- b. F2 SEND
5. To specify a custom upper range value:
 - a. *Select 2 CM Upper Value.* Type the value that you want the transmitter to read at the 20 mA point.
 - b. F2 SEND
6. To specify a custom lower range value:
 - a. *Select 3 CM Lower Value.* Type the value that you want the transmitter to read at the 4 mA point.
 - b. F2 SEND
7. To define custom units:
 - a. *Select 4 CM Units.* Enter the custom units (five characters maximum) that you want the display to display.
 - b. F2 SEND
8. To choose the transmitter transfer function for the display:
 - a. *Select 5 CM xfer fnct.* Enter the transmitter transfer function for the display. Select *sq root* to display flow units. The custom meter transfer function is independent of the analog output transfer function.
9. Select **F2 SEND** to upload the configuration to the transmitter.

 See "Safety Messages" on page 3-1 for complete warning information.

NOTE:

You must change the meter type to custom meter display, see "LCD Display" on page 3-16. Follow the change standard display configuration steps and select custom meter display.

DETAILED SETUP

Failure Mode Alarm and Saturation

Model 3051 transmitters automatically and continuously perform self-diagnostic routines. If the self-diagnostic routines detect a failure, the transmitter drives its output outside of the normal saturation values. The transmitter will drive its output low or high based on the position of the failure mode alarm jumper. See Table 3-2, Table 3-3, and Table 3-4 for failure mode and saturation output levels. To select alarm position, see "Set Jumpers" on page 2-14.

Table 3-2. 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 3-3. 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 3-4. Low-Power Alarm and Saturation Values

Level	1–5 V Saturation	1–5 V Alarm	0.8–3.2 V Saturation	0.8–3.2 V Alarm
Low	0.97 V	≤ 0.95 V	0.78 V	≤ 0.77 V
High	5.20 V	≥ 5.4 V	3.44 V	≥ 4.0 V

NOTE

You can alter the actual transmitter mA output values by performing an analog output trim.

NOTE

When a transmitter is in an alarm condition, the hand-held HART communicator indicates the analog output the transmitter would drive if the alarm condition did not exist. The transmitter will alarm high in the event of failure if the alarm jumper is removed.

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 (pressure) is burst with a status bit set.
- Percent of range follows primary variable (pressure).
- Temperature is burst with a status bit set.

Saturation

- Analog output switches to saturation value.
- Primary variable (pressure) 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 (pressure) is sent with a status bit set.
- Percent of range follows primary variable (pressure).
- Temperature is sent with a status bit set.

Saturation

- Primary variable (pressure) is sent normally.
- Temperature is sent normally.

Alarm Level Verification

Transmitters with shrouded design electronics boards (board version 5.3 or later) have increased functionality that allows verification testing of alarm current levels. If you repair or replace the transmitter electronics board, sensor module, or LCD display, verify the transmitter alarm level before you return the transmitter to service. This feature is also useful in testing the reaction of your 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 3-2, 3-3, and 3-4 on page 3-19, and "Loop Test" on page 3-21).

Sensor Temperature Unit

HART Comm.	1, 4, 1, 2, 2
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The *Sensor Temperature Output Unit Selection* command selects between Celsius and Fahrenheit units for output of the sensor temperature. The sensor temperature output is accessible via HART only. (The Sensor Temperature Output Units command is not available on previous design transmitters or via AMS.)

DIAGNOSTICS AND SERVICE

Transmitter Test

HART Comm.	1, 2, 1, 1
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The diagnostics and service functions listed here are primarily for use after you install the transmitter in the field. 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.

The transmitter test command initiates a more extensive diagnostics routine than that performed continuously by the transmitter. The transmitter test routine can quickly identify potential electronics problems.

HART Communicator

If the transmitter test detects a problem, messages to indicate the source of the problem are displayed on the 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

HART Comm.	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. To initiate a loop test, perform the following procedure:

1. Connect a reference meter to the transmitter. To do so, either connect the meter to the test terminals on the transmitter terminal block, or shunt the power to the transmitter through the meter at some point in the loop.
2. From the **HOME** screen, select *1 Device Setup, 2 Diagnostics and Service, 2 Loop Test*, to prepare to perform a loop test.
3. Select **OK** after you set the control loop to manual (see "Setting the Loop to Manual" on page 3-2). The communicator displays the loop test menu.
4. Select a discreet milliamp level for the transmitter to output. At the **CHOOSE ANALOG OUTPUT** prompt, select *1 4mA, 2 20mA*, or select *3 other* to manually input a value. IF you are performing a loop test to verify the output of a transmitter, THEN enter a value between 4 and 20 mA. IF you are performing a loop test to verify the transmitter alarm levels, THEN enter the milliamp value representing an alarm state (see Tables 3-2, 3-4, and 3-3 on page 3-19).
5. Check the electrical current meter installed in the test loop to verify that it reads the value you commanded the transmitter to output. IF the readings match, THEN the transmitter and the loop are configured and functioning properly. IF the readings do not match, THEN you may have the current meter attached to the wrong loop, there may be a fault in the wiring, the transmitter may require an output trim, or the electrical current meter may be malfunctioning.

After completing the test procedure, the display returns to the loop test screen and allows you to choose another output value or to exit 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

Saving, Recalling, and Cloning Configuration Data

HART Comm.	left arrow, 1, 2
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Use the cloning feature of the Model 275 HART Communicator if you need to configure several Model 3051 transmitters similarly. The cloning process involves configuring a transmitter, saving the configuration data, then sending a copy of the data to a separate transmitter. There are a number of possible procedures to use when saving, recalling, and cloning configuration data. For complete instructions refer to the HART Communicator manual, publication no. 00809-0100-4275. One common method is as follows:

1. Completely configure the first transmitter.
2. Save the configuration data:
 - a. Select **F2 SAVE** from the 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**, THEN select **3 Data Type** to set the data type to **STANDARD**.
 - e. Select **F2 SAVE**.
3. Connect and power the receiving transmitter and 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 the configuration you wish to retrieve.
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.

When finished, the communicator informs you of the status. To configure another transmitter, repeat Steps 3 through 10.

NOTE

The transmitter receiving the 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, must 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

HART Comm.	1, 4, 3, 3, 3
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When configured for burst mode, the Model 3051 provides faster digital communication from the transmitter to the control system by eliminating the time required for the control system to request information from the transmitter. Burst mode is compatible with use of 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-based communicator 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-based communicator 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. Many of the Rosemount SMART FAMILY® transmitters can be multidropped. With the HART smart communications protocol, up to 15 transmitters can be connected on a single twisted pair of wires or over leased phone lines. This feature can greatly reduce wiring costs.

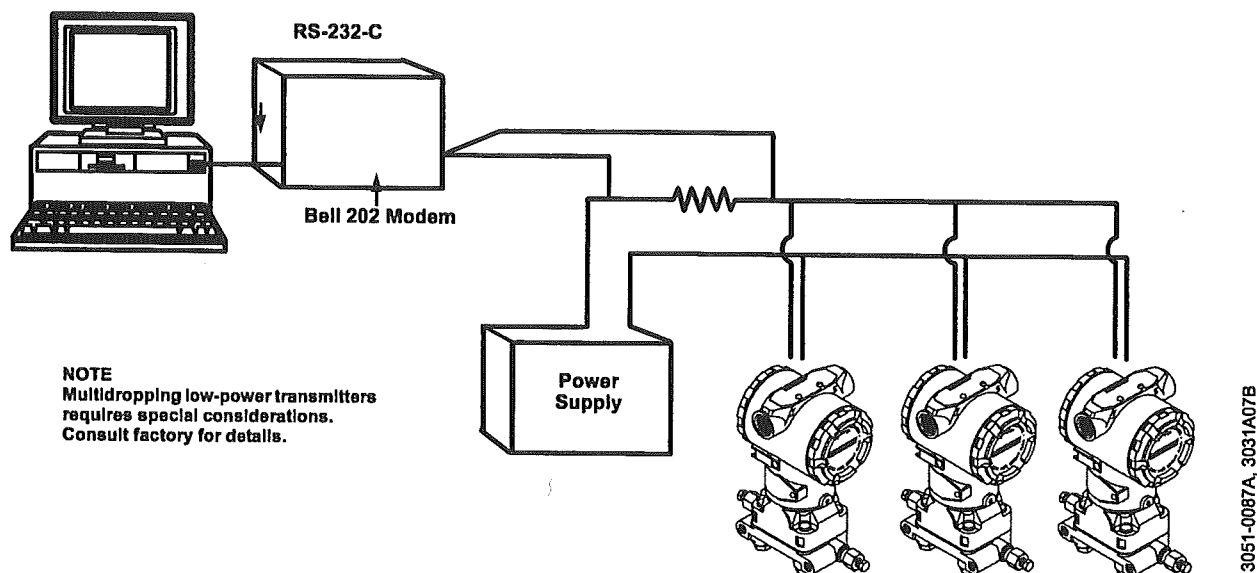
The application of a multidrop installation requires consideration of the update rate necessary from each transmitter, the combination of transmitter models, and the length of the transmission line. Communication with the transmitters can be accomplished with commercially available Bell 202 modems and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

Figure 3-7 shows a typical multidrop network. This figure is not intended as an installation diagram. Contact Rosemount product support with specific requirements for multidrop applications.

NOTE

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

Figure 3-7. Typical Multidrop Network



NOTE

The Model 3051 is set to address 0 at the factory, allowing it to operate 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 jumper position. Failure signals in multidropped transmitters are communicated through HART messages.

Changing a Transmitter Address

HART Comm.	1, 4, 3, 3, 1
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To change the address of a multidropped transmitter, follow these fast key sequences. To activate multidrop communication, the transmitter address must be changed to a number from 1 to 15, and each transmitter in a multidropped loop must have a unique 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

HART Comm.	1, 4, 3, 3, 2
------------	---------------

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

HART Comm.	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."

NOTE

The HART Communicator Model 275 requires you to use the **UTILITY** menu to perform and autopoll. This menu is available from the **MAIN** menu of the HART Communicator. Press the **LEFT ARROW** to move from the **ONLINE MENU** to the **MAIN** menu. Press 4 from the **MAIN** menu to access the **UTILITY** menu.

AMS

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

Model 3051

Reference Manual
00809-0100-4001, Rev EA
December 2002

Section 4

Operation and Maintenance

Calibration	page 4-2
Selecting Output Range for Low-Power	page 4-20
Detailed Setup	page 4-20

OVERVIEW

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 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.

CALIBRATION

Calibrating a smart transmitter is different from calibrating an analog transmitter. The one-step calibration process of an analog transmitter is done in three steps with a smart transmitter:

- **Rerange**—sets the 4 and 20 mA points at the desired pressures;
- **Sensor Trim**—Adjusts the position of the factory characterization curve to optimize the transmitter 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.

Smart transmitters operate differently than analog transmitters. A smart transmitter 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.

The trim and rerange functions also differ. Reranging sets the transmitter 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 transmitter performance over a specific pressure range.

NOTE

Sensor trimming adjusts the position of the factory characterization curve. It is possible to degrade the performance of the transmitter if the sensor trim is done improperly or with inaccurate equipment. Contact your local Rosemount representative or call Rosemount Customer Central at 800-999-9307 if you have questions.

Table 4-1. Recommended Calibration Tasks

Transmitter	Bench Calibration Tasks	Field Calibration Tasks
3051CD 3051CG 3051L 3051HD 3051HG	Set output configuration parameters: <ul style="list-style-type: none"> • Set the range points. • Set the output units. • Set the output type. • Set the damping value. <i>Optional</i> , perform a full sensor trim. (Accurate pressure source required.) <i>Optional</i> , perform an analog output trim. (Accurate multimeter required.)	Reconfigure parameters if necessary. Zero trim the transmitter to compensate for mounting effects or static pressure effects.
3051CA 3051TA 3051TG	Set output configuration parameters: <ul style="list-style-type: none"> • Set the range points. • Set the output units. • Set the output type. • Set the damping value. <i>Optional</i> : 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. <i>Optional</i> : Perform an analog output trim (multimeter required).	Reconfigure parameters if necessary. Perform low trim value section of the full sensor trim procedure to correct for mounting position effects.

NOTE:

A HART communicator is required for all sensor and output trim procedures.

Model 3051C Range 4 and Range 5 transmitters require a special calibration procedure when used in differential pressure applications under high static line pressure (see "Compensating for Line Pressure" on page 4-12).

Model 3051TG Range 5 transmitters use an absolute sensor that requires an accurate absolute pressure source to perform the optional full sensor trim.

Calibration Overview

Complete calibration of the Model 3051 Pressure Transmitter involves the following tasks:

Configure the Analog Output Parameters

Set Process Variable Units (page 3-8)

Set Output Type (page 3-9)

Rerange (page 3-10)

Set Damping (page 3-16)

Calibrate the Sensor

Full Trim (page 4-8)

Zero Trim (page 4-7)

Calibrate the 4–20 mA Output

4–20 mA Output Trim (page 4-10) or

4–20 mA Output Trim Using Other Scale (page 4-11) or

Low-Power 1–5 V dc or Low-Power 0.8–3.2 V dc (page 4-10)

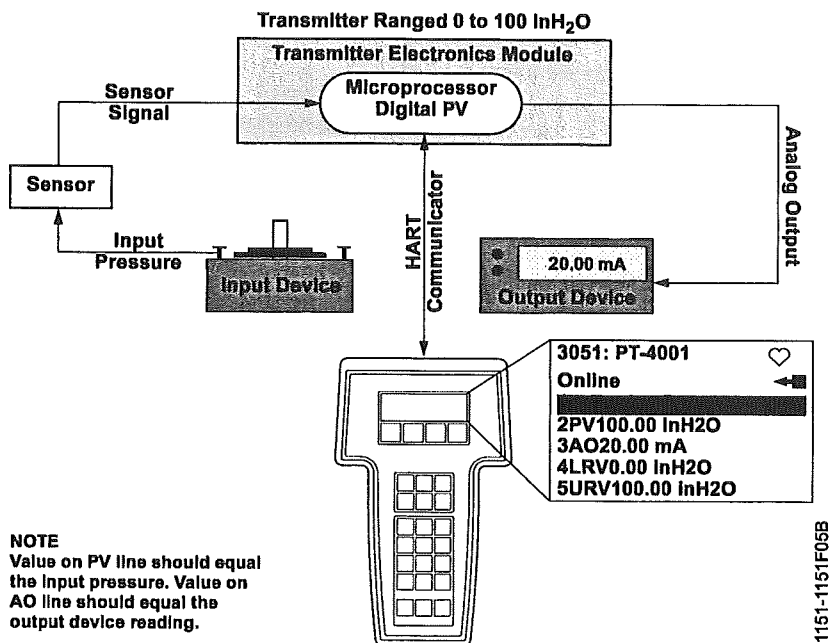
Figure 4-1 illustrates the Model 3051 transmitter data flow. This data flow can be summarized in four major steps:

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 can be 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. Note that the 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 3051 transmitter. In addition, 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 3051 transmitter for both bench and field calibration.

Figure 4-1. Transmitter Data Flow with Calibration Options

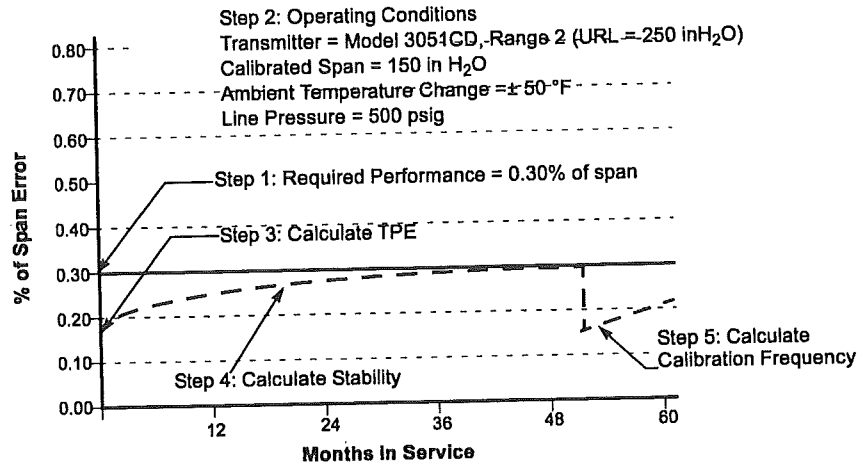


Determining Calibration Frequency

Calibration frequency can vary greatly depending on the application, performance requirements, and process conditions. The following procedure can be used as a guideline to estimate the calibration frequency. Actual calibration frequency should follow plant standard and sound engineering practice.

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.

Figure 4-2. Calculating 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 3051CD, Range 2 (URL=250 inH₂O)
Calibrated Span: 150 inH₂O
Ambient Temperature Change: ± 50 °F
Line Pressure: 500 psig

Step 3: Calculate total probable error (TPE).

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

Where:

Reference Accuracy = ± 0.075% of span

Ambient Temperature Effect =

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

Span Static Pressure Effect⁽¹⁾ =

$$0.1\% \text{ reading per } 1000 \text{ psi} = \% \text{ of range} \times 0.1\% \times \text{Cal. Span per } 1000 \text{ psi} = 0.035\% \text{ of span for line pressure of } 500 \text{ psig}$$

(1) Zero static pressure effect removed by zero trimming at line pressure, assume reading is 70% of span.

Step 4: Calculate the stability per month.

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

Step 5: Calculate calibration frequency.

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

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 is in need of calibration. To do so, refer to Figure 4-1 and perform the following procedure:

1. Connect a pressure source, a HART communicator, and a digital readout device to the transmitter.
2. Establish communication between the transmitter and the communicator.
3. Apply pressure equal to the upper range point pressure (100 inH₂O, for example).
4. Compare the applied pressure to the Process Variable (PV) line on the Communicator On-line Menu. IF the PV reading on the communicator does not match the applied pressure, and you are confident that your test equipment is accurate, THEN perform a sensor trim.
5. Compare the Analog Output (AO) line on the communicator on-line menu to the digital readout device. IF the AO reading on the communicator does not match the digital readout device, and you are confident that your test equipment is accurate, THEN perform an output trim.

Sensor Trim

You can trim the sensor using either the full trim or the zero trim function. The trim functions vary in complexity, and their use is application-dependent. Both trim functions alter the transmitter's interpretation of the input signal.

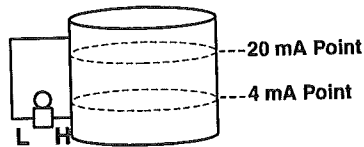
Zero trim is a single-point adjustment. It is useful for compensating for mounting position effects and is most effective when performed with the transmitter installed in its final mounting position. Since this correction maintains the slope of the characterization curve, it should not be used in place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

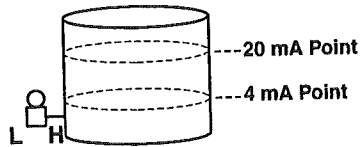
NOTE

Do not perform a zero trim on Model 3051 Absolute pressure transmitters. A zero trim is zero based, and absolute pressure transmitters reference absolute zero. To correct mounting position effects on a Model 3051 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 the input to be zero based.

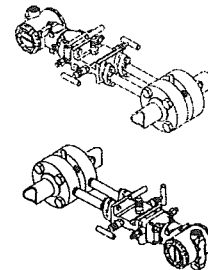
A full trim is a two-point sensor calibration where two end-point pressures are applied, and all output is linearized between them. You should always adjust the low trim value first to establish the correct offset. Adjustment of the high trim value provides a slope correction to the characterization 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.



NONZERO-BASED
LEVEL APPLICATION



ZERO-BASED LEVEL
APPLICATION



ZERO-BASED FLOW
APPLICATION

3051-3031B03D, B03C, 3051_18A,

Zero Trim

HART Comm.	1, 2, 3, 3, 1
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HART Communicator

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

1. Vent the transmitter and attach a communicator to the measurement loop.
2. From the communicator main menu select *1 Device setup*, *2 Diagnostics and service*, *3 Calibration*, *3 Sensor trim*, *1 Zero trim* to prepare to adjust the zero trim.

NOTE

The transmitter must be within 3% of true zero (zero based) in order to calibrate it using the zero trim function.

3. Follow the commands provided by the communicator to complete the adjustment of the zero trim.

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

HART Comm.	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.

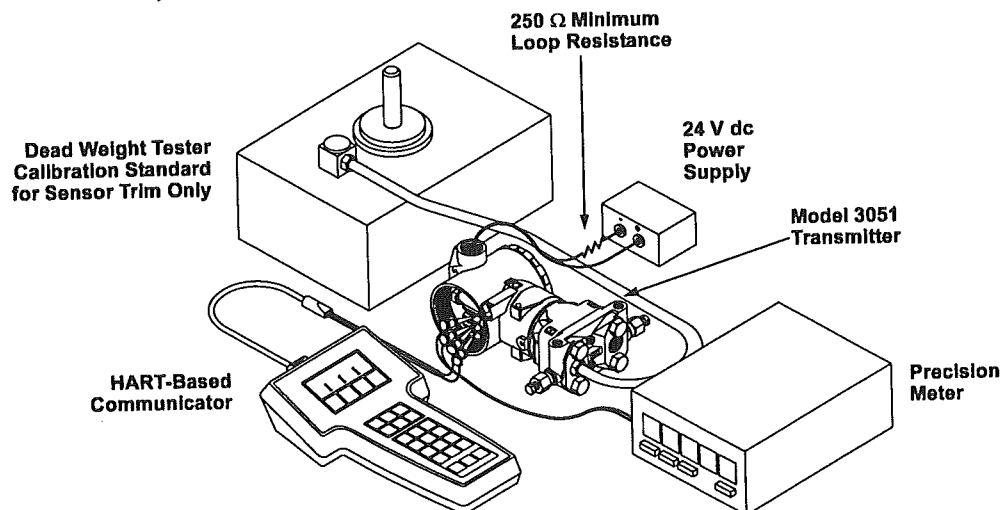
4. Follow the commands provided by the HART Communicator to complete the adjustment of the lower value.
5. Repeat the procedure for the upper value, replacing 2: Lower sensor trim with 3: Upper sensor trim in Step 3.

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.

Figure 4-3. Digital Trim
Connection Drawing
(4–20 mA Transmitters)



3051-3031A01B

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.

NOTE

The Recall Factory Trim commands are not available on previous design transmitters.

Recall Factory Trim — Sensor Trim

HART Comm.	1, 2, 3, 4, 1
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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.

HART Communicator

Enter the fast key sequence below “Recall Factory Trim — Sensor Trim” to reset the transmitter sensor trim.

Recall Factory Trim — Analog Output

HART Comm.	1, 2, 3, 4, 2
------------	---------------

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 zero trim on an absolute pressure transmitter.

HART Communicator

Enter the fast key sequence below “Recall Factory Trim — Analog Output” to reset the analog output trim.

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 4-4).

Analog Output Trim (Low Power)

HART Comm.	1, 2, 3, 2, 1
------------	---------------

The Model 3051 Low-Power Transmitter has two jumper-selectable output ranges: 1–5 V dc and 0.8–3.2 V dc. Positioning this jumper for the desired output range selects the proper coefficients for temperature corrections. The jumper position also sets the output values (1–5 or 0.8–3.2) which are communicated through HART protocol and accessed by a hand held communicator.

However, switching this jumper does not by itself select the new outputs; you must perform the "Digital-to-Analog Trim" procedure above to match the transmitter's output voltages to the new jumper selection.

Digital-to-Analog Trim

HART Comm.	1, 2, 3, 2, 1
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HART Communicator

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

1. From the **HOME** screen, select *1 Device setup*, *2 Diag/Service*, *3 Calibration*, *2 D/A trim*. Select **OK** after you set 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. To do so, connect the positive lead to the positive terminal and the negative lead to the test terminal in the transmitter terminal compartment, or shunt the transmitter 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 4.00 mA.
5. Record the actual value from the reference meter, and enter it at the **ENTER METER VALUE** prompt. The 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.
IF you select *1 Yes*, THEN proceed to Step 7.
IF you select *2 No*, THEN 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 you return the control loop 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

HART Comm.	1, 2, 3, 2, 2
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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 (1 to 5 volts if measuring across a 250 ohm load, or 0 to 100 percent if measuring from a DCS, for example). 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 the 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

Range 4 and 5 Differential Transmitters

Model 3051 Range 4 and Range 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 3051 differential pressure transmitters (Ranges 1, 2, and 3) do not require this procedure because the optimization occurs in the sensor.

Applying high static pressure to Model 3051 Range 4 and Range 5 pressure transmitters causes a systematic shift in the output. This shift is linear with static pressure; correct it by performing the Full Trim procedure on page 2-18.

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

Zero Effect:

±0.1% of the upper range limit per 1000 psi (6,9 MPa) for line pressures from 0 to 2000 psi (0 to 13,8 MPa)

±0.2% of the upper range limit per 1000 psi (6,9 MPa) for line pressures above 2000 psi (13,8 MPa)

Span Effect:

Correctable to ±0.2% of reading per 1000 psi for line pressures from 0 to 3626 psi.

The systematic span shift caused by the application of static line pressure is – 1.00% of reading per 1000 psi for 3051C Range 4 transmitters, and –1.25% of reading per 1000 psi for Range 5 transmitters.

Use the following example to compute corrected input values.

Example

A transmitter with model number 3051CD4 will be used in a differential pressure application where the static line pressure is 1200 psi. The transmitter is ranged so that the output is 4 mA at 500 inH₂O and 20 mA at 1500 inH₂O.

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 ₂ O
LRV =	500 inH ₂ O
P =	1200 psi
S =	± 0.01/1000

To calculate the low trim (LT) value:

LT =	$500 + (0.01/1000)(500)(1200)$
LT =	506 inH ₂ O

To calculate the high trim (HT) value:

HT =	$1500 + (0.01/1000)(1500)(1200)$
HT =	1518 inH ₂ O

To complete a Model 3051 full trim and enter the corrected values for low trim (LT) and high trim (HT), refer to "Full Trim" on page 4-8.

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

NOTE

After calibrating Model 3051 Range 4 and Range 5 transmitters for high differential pressure applications, rerange the 4 and 20 mA points using the communicator to maintain the systematic static line pressure correction. You may 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 the output, the LCD meter displays abbreviated operation, error, and warning messages for troubleshooting the transmitter. Messages appear according to their priority, with normal operating messages appearing last. To determine the cause of a message, use a Model 275 HART Communicator to further interrogate the transmitter. A description of each LCD diagnostic message follows.

Error

Error messages appear on the LCD meter display to inform you of serious problems effecting the operation of the transmitter. The meter displays an error message until the error condition is corrected, and the analog output is driven to the specified alarm level. No other transmitter information is displayed during an alarm condition.

FAIL⁽¹⁾

The transmitter CPU board and the sensor module are incompatible. If you encounter this message, contact Rosemount Customer Central at 800-999-9307 if you need assistance.

Fail Module

The sensor module is disconnected or is malfunctioning. Verify that the sensor module ribbon cable is connected to the back of the electronics board. If the ribbon cable is properly connected, there is a problem within the sensor module. Possible sources of problems include:

- Pressure or temperature updates are not being received in the sensor module.
- A non-volatile memory fault that will effect transmitter operation has been detected in the module by the memory verification routine.

Some non-volatile memory faults are user-repairable. Use a Model 275 HART Communicator 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, you must replace the sensor module. See "Disassembly Procedures" on page 5-3 or contact Rosemount Customer Central at 800-999-9307 if you need assistance.

(1) For previous versions of the meter, FAIL MODULE and FAIL ELECT were also grouped into the FAIL message. When dealing with a FAIL message on a previous version meter, review the information in the FAIL MODULE and FAIL ELECT sections as well.

Fail Elect

The transmitter electronics board is malfunctioning due to an internal fault. Some of the FAIL ELECT errors are user-repairable. Use a Model 275 HART Communicator 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, you must replace the electronics board. See "Disassembly Procedures" on page 5-3 or contact Rosemount Customer Central at 800-999-9307 if you need assistance.

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 Model 275 HART Communicator to interrogate and reconfigure the appropriate portion of the transmitter memory. Contact Rosemount Customer Central at 800-999-9307 if you need assistance.

Warnings

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

NOTE

The warning messages on previous versions of the LCD display may vary slightly from those listed here, but they represent the same warning.

Press Limit

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

Temp Limit

The secondary temperature variable read by the transmitter is outside of the transmitter's range.

Curr Fixed

The transmitter is in multidrop mode. The analog output is not tracking pressure changes.

Curr Saturd

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 Model 275 HART Communicator 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.

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 rangedown 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 rangedown allowed for a particular range, or the pressure sensed by the transmitter exceeds the sensor limits.

LOCAL DSBLD

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 may have been disabled by the transmitter security jumper on the transmitter circuit board or through software commands from the Model 275. See "Security (Write Protect)" on page 2-14 for information on the position of the security jumper and information on software lockout.

Write Protect

This message appears if you attempt to change the transmitter configuration data while the security jumper is in the **ON** position. See "Security (Write Protect)" on page 2-14 for more information about the security jumper.

HART Communicator Diagnostics

The following table is a list of messages used by the HART Communicator (HC) and their corresponding descriptions.

Variable parameters within the text of a message are indicated with *<variable parameter>*.

Reference to the name of another message is identified by *[another message]*.

Message	Description
1k snsr EEPROM error-factory ON	Replace the sensor module
1k snsr EEPROM error-user-no out ON	Use the HART communicator to reset the following parameters: remote seal isolator, remote seal fill fluid, flange material, o-ring material, transmitter type, remote seal type, flange type, meter type, number of remote seals.
1k snsr EEPROM error-user ON	Perform a full trim to recalibrate the transmitter.
4k micro EEPROM error-factory ON	Replace the electronics board.
4k micro EEPROM error-user-no out ON	Use the hart communicator to reset the message field.
4k micro EEPROM error-user ON	Use the HART communicator to reset the following parameters: units, range values, damping, analog output, transfer function, tag, scaled meter values. Perform a d/a trim to ensure that the error is corrected.
4k snsr EEPROM error-factory ON	Replace the sensor module.
4k snsr EEPROM error-user ON	Use the HART communicator to reset the temperature units and the calibration type.
Add item for ALL device types or only for this ONE device type.	Asks the user whether the hot key item being added should be added for all device types or only for the type of device that is connected.
Command Not Implemented Communication Error	The connected device does not support this function. The communicator and the device are not communicating correctly. Check all connections between the communicator and the device and resend the information.
Configuration memory not compatible with connected device	The configuration stored in memory is incompatible with the device to which a transfer has been requested.
CPU board not initialized ON	The electronics board is not initialized. Replace the electronics board.
CPU EEPROM write failure ON	Message sent to electronics board from HART signal failed. Replace the electronics board.
Device Busy	The connected device is busy performing another task.
Device Disconnected	The device failed to respond to a command. Check all connections between the communicator and the device and resend the command.
Device write protected	Device is in write-protect mode. Data can not be written.
Device write protected. Do you still want to shut off?	Device is in write-protect mode. Press YES to turn the HART communicator off and lose the unsent data.
Display value of variable on hotkey menu?	Asks whether the value of the variable should be displayed adjacent to its label on the hotkey menu if the item being added to the hotkey menu is a variable.
Download data from configuration memory to device	Press the SEND softkey to transfer information from the communicator memory to the device.
Exceed field width	Indicates that the field width for the current arithmetic variable exceeds the device-specified description edit format.
Exceed precision	Indicates that the precision for the current arithmetic variable exceeds the device-specified description edit format.
Ignore next 50 occurrences of status?	Select YES to ignore the next 50 occurrences of device status, or select no to display every occurrence.
Illegal character	An invalid character for the variable type was entered.
Illegal date	The day portion of the date is invalid.

Message	Description
Illegal month	The month portion of the date is invalid.
Illegal year	The year portion of the date is invalid.
Incompatible CPU board and module ON	Upgrade the electronics board or the sensor module to the current revision.
Incomplete exponent	The exponent of a scientific notation floating point variable is incomplete.
Incomplete field	The value entered is not complete for the variable type.
Looking for a device	Polling for multidropped devices at addresses 1–15.
Local buttons operator error ON	Illegal pressure applied during zero or span operation. Repeat the process after verifying the correct pressures.
Mark as read only variable on hotkey menu?	Asks whether the user should be allowed to edit the variable from the hotkey menu if the item being added to the hotkey menu is a variable.
Module EEPROM write failure ON	Message sent to the module from the HART signal failed. Replace the sensor module.
No device configuration in configuration memory	There is no configuration saved in memory available to re-configure off-line or transfer to a device.
No Device Found	Poll of address zero fails to find a device, or poll of all addresses fails to find a device if auto-poll is enabled.
No hotkey menu available for this device.	There is no menu named "hotkey" defined in the device description for this device.
No pressure updates ON	No pressure updates being received from the sensor module. Verify that the sensor module ribbon cable is attached correctly. Or replace the sensor module.
No offline devices available.	There are no device descriptions available to be used to configure a device offline.
No simulation devices available.	There are no device descriptions available to simulate a device.
No temperature updates ON	No temperature updates being received from the sensor module. Verify that the sensor module ribbon cable is attached correctly. Or replace the sensor module.
No UPLOAD_VARIABLES In ddi for this device	There is no menu named "upload_variables" defined in the device description for this device. This menu is required for offline configuration.
No Valid Items	The selected menu or edit display contains no valid items.
OFF KEY DISABLED	Appears when the user attempts to turn the HC off before sending modified data or before completing a method.
Online device disconnected with unsent data. RETRY or OK to lose data.	There is unsent data for a previously connected device. Press RETRY to send data, or press OK to disconnect and lose unsent data.
Out of memory for hotkey configuration. Delete unnecessary items.	There is no more memory available to store additional hotkey items. Unnecessary items should be deleted to make space available.
Overwrite existing configuration memory	Requests permission to overwrite existing configuration either by a device-to-memory transfer or by an offline configuration. User answers using the softkeys.
Press OK...	Press the OK softkey. This message usually appears after an error message from the application or as a result of HART communications.
Restore device value?	The edited value that was sent to a device was not properly implemented. Restoring the device value returns the variable to its original value.
ROM checksum error ON	Checksum of transmitter software has detected a fault. Replace the electronics board.
Save data from device to configuration memory	Prompts user to press SAVE softkey to initiate a device-to-memory transfer.

Message	Description
Saving data to configuration memory.	Data is being transferred from a device to configuration memory.
Sending data to device.	Data is being transferred from configuration memory to a device.
Sensor board not initialized ON	The sensor module electronics board is not initialized. Replace the sensor module.
There are write only variables which have not been edited. Please edit them.	There are write-only variables which have not been set by the user. These variables should be set or invalid values may be sent to the device.
There is unsent data. Send it before shutting off?	Press YES to send unsent data and turn the HC off. Press NO to turn the HC off and lose the unsent data.
Too few data bytes received	Command returns fewer data bytes than expected as determined by the device description.
Transmitter Fault	Device returns a command response indicating a fault with the connected device.
Units for <variable label> has changed. Unit must be sent before editing, or invalid data will be sent.	The engineering units for this variable have been edited. Send engineering units to the device before editing this variable.
Unsent data to online device. SEND or LOSE data	There is unsent data for a previously connected device which must be sent or thrown away before connecting to another device.
Upgrade 275 software to access XMTR function. Continue with old description?	The communicator does not contain the most recent Model 3051 Device Descriptors (DDs). Select YES to communicate using the existing DDs. Select NO to abort communication.
Use up/down arrows to change contrast. Press DONE when done.	Gives direction to change the contrast of the HC display.
Value out of range	The user-entered value is either not within the range for the given type and size of variable or not within the min/max specified by the device.
<message> occurred reading/writing <variable label>	Either a read/write command indicates too few data bytes received, transmitter fault, invalid response code, invalid response command, invalid reply data field, or failed pre- or post-read method; or a response code of any class other than SUCCESS is returned reading a particular variable.
<variable label> has an unknown value. Unit must be sent before editing, or invalid data will be sent.	A variable related to this variable has been edited. Send related variable to the device before editing this variable.

Local Zero and Span (Local Keys) Software Lock Out

To enable this feature, see "Local Span and Zero Control (Local Keys)" on page 4-20.

Physical Removal of Local Zero and Span (Local Keys)

To remove the magnetic buttons used to activate the local zero and span, use a small slotted head screwdriver and pry off the small, plastic cap located under the approval tag. Remove button assemblies and discard.

NOTE

On previous versions of Model 3051, remove the magnetic screws.

NOTE

Alarm jumper not installed = High Alarm

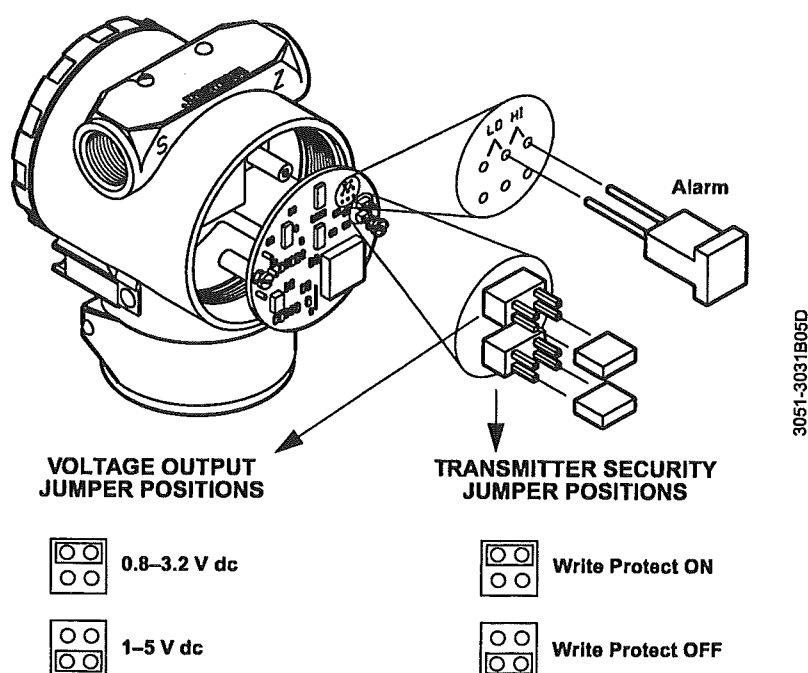
SELECTING OUTPUT RANGE FOR LOW-POWER

Low power transmitters output either 1–5 V dc or 0.8–3.2 V dc depending on the position of the voltage output jumper. To reposition the voltage output jumper, follow the procedure described on page 2-14.

NOTE

Default low power output is 1–5 V dc. After changing output between 1–5 V and 0.8–3.2 V, perform a low power output trim.

Figure 4-4. Low Power Transmitter Electronics Boards



NOTE

Security jumper not installed = Not Write Protected

Alarm jumper not installed = High Alarm

Voltage output jumper not installed = 1–5 V

DETAILED SETUP

Local Span and Zero Control (Local Keys)

HART Comm.	1, 4, 4, 1, 7
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The *Local keys* command allows software control over the use of the local span and zero adjustments. To enable or disable the span and zero adjustment buttons on your transmitter, perform the fast key sequence at left.

NOTE

Disabling the local keys does not disable all transmitter configuration changes. With the local keys disabled, you can still make changes to the transmitter configuration—including range values—using a HART communicator.

Section 5 Troubleshooting

Before Disassembling the Transmitter	page 5-3
Disassembly Procedures	page 5-3
Reassembly Procedures	page 5-5

OVERVIEW

Table 5-1 provides summarized troubleshooting suggestions for the most common operating problems.

If you suspect a malfunction despite the absence of any diagnostic messages on the 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 and easiest-to-check conditions 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.
- Both 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.

Model 3051

Reference Manual
00809-0100-4001, Rev EA
December 2002

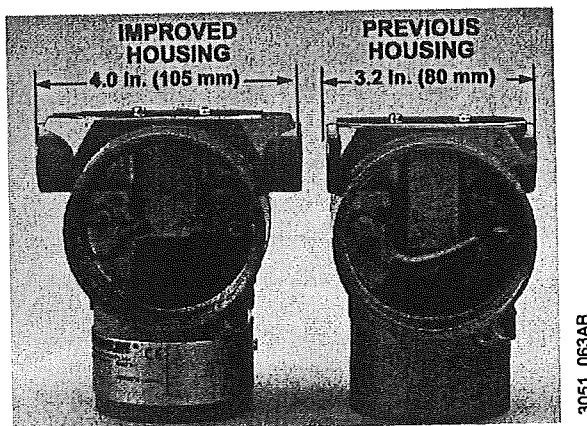
**Table 5-1. Model 3051S
troubleshooting table**

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

BEFORE DISASSEMBLING THE TRANSMITTER

Maintenance procedures differ for improved and previous style transmitter housings. Verify the specific physical characteristics of your transmitter before you begin any maintenance procedures. The width of the conduit entries is the most noticeable physical difference between the improved and the previous style housing (see Figure 5-1).

Figure 5-1. Improved and Previous Styles of the Model 3051 Transmitter Housing



DISASSEMBLY PROCEDURES

Remove the Transmitter from Service

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

NOTE

Once you have determined a transmitter to be inoperable, remove it from service.

Be aware of the following:

- 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 the 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 undamaged, you may reuse them.

The Model 3051C transmitter is attached to the process connection by four bolts and two cap screws. Remove the four bolts and separate the transmitter from the process connection manifold or flange. You can leave the process connection in place and ready for re-installation.

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

Remove the Terminal Block

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

Loosen the two small screws located at the 9 o'clock and 4 o'clock positions, and pull the entire terminal block out to remove it.

NOTE

If removing the terminal block from the housing of a previous version of the transmitter, you will have to manually disconnect the power leads from the rear of the terminal block before completely separating it from the housing.

Remove the Electronics Board

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

1. Remove the housing cover opposite the field terminal side.
2. Loosen the two captive screws that anchor the board to the housing. The electronics board is electrostatically sensitive; observe handling precautions for static-sensitive components.

NOTE

If you are disassembling a transmitter with a LCD display, loosen the two captive screws that are visible on the right and left side of the meter display. The two screws anchor the LCD display to the electronics board and the electronics board to the housing.

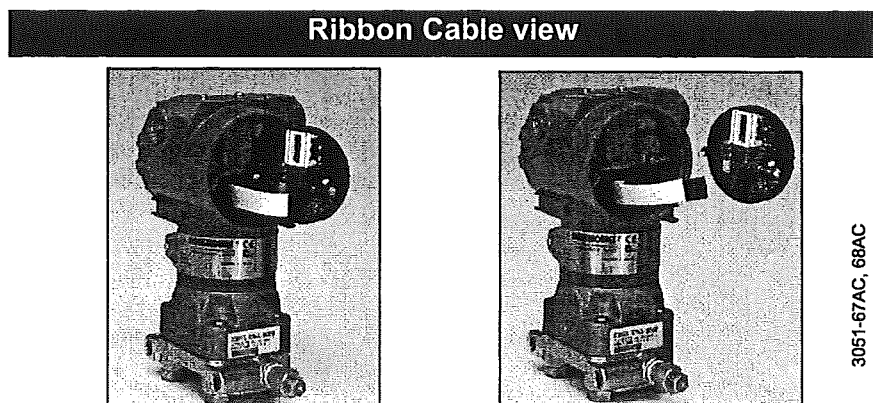
3. Slowly pull the electronics board out of the housing. With the two captive screws free of the transmitter housing, only the sensor module ribbon cable holds the board to the housing.

NOTE

Previous versions of the electronics board utilize a snap-in power plug and receptacle. Carefully unsnap the power plug from the receptacle to free the board from the power cord.

4. Disconnect the sensor module ribbon cable to release the electronics board from the transmitter.

Figure 5-2. Ribbon Cable view



Remove the Sensor Module from the Electronics Housing

1. Carefully tuck the cable connector completely inside of the internal shroud.

NOTE

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

2. Loosen the housing rotation set screw with a $\frac{9}{64}$ -inch hex wrench, and back off one full turn.

IMPORTANT

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

3. Unscrew the housing from the module, making sure the shroud and sensor cable do not catch on the housing.

IMPORTANT

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

REASSEMBLY PROCEDURES

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

IMPORTANT

To prevent damage to the cable connector, watch the cable and shroud as you attach the housing to the module. Make sure the cable connector does not slip out of the internal shroud and begin to rotate with the housing. Reinsert the cable connector into the shroud if it escapes before the housing is fully fastened.



5. Thread the housing completely onto the sensor module. The housing must be no more than one full turn from flush with the sensor module to comply with explosion proof requirements.
6. Tighten the housing rotation set screw using a $\frac{9}{64}$ -inch hex wrench.



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

Attach the Electronics Board


NOTE

Electronics board revision 5.3.163 or later (all shrouded designs) are able to verify alarm current levels. After replacing the transmitter electronics board, sensor module, or LCD meter, an alarm level test is recommended before returning the transmitter to service (see "Alarm Level Verification" on page 3-20).

1. Remove the cable connector from its position inside of the internal shroud and attach it to the electronics board.
2. Insert the electronics board into the housing, making sure that the posts from the electronics housing properly engage the receptacles on the electronics board.

NOTE

If you are reassembling a previous version of the electronics board (or placing a new version of the electronics board in a previous version of the housing), attach the snap-in power connection to the receptacle on the board with the black and red wires routed toward the center of the board and below the white reed switch holder.

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

NOTE

Electronics board revision 5.3.163 or later (all shrouded designs) are able to verify alarm current levels. After replacing the transmitter electronics board, sensor module, or LCD meter, an alarm level test is recommended before returning the transmitter to service (see "Alarm Level Verification" on page 3-20).

Install the Terminal Block

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

NOTE

If you are reassembling a previous version of the terminal block, attach the black and red wires to the back side of the block before you insert it into the electronics housing.

Reassemble the Process Sensor Body

1. Visually inspect the Teflon sensor module O-rings. If the O-rings are undamaged, you may reuse them. If the O-rings show signs of damage, such as nicks or cuts, or if there is any doubt about their ability to seal properly, replace them with new O-rings.

NOTE

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

2. Install the process flange on the sensor module. To hold the process flange in place, install the two hex head alignment screws. While these screws are not pressure retaining, tighten the hex head alignment screws to 33 in-lbs to ensure proper alignment. Do not overtighten; this will affect the module/flange alignment.
3. Install the appropriate flange bolts.
 - a. IF the installation requires a 1/4-18 NPT mounting, THEN use four 1.75-inch flange bolts. Go to **step f**.
 - b. IF the installation requires a 1/2-14 NPT mounting, THEN use four 2.88-inch process flange/adaptor bolts. EXCEPTION: For gage pressure configurations, use two 2.88-inch bolts and two 1.75-inch bolts. Go to **step d**.
 - c. IF the installation uses a three-valve manifold (differential pressure applications only), THEN use four 2.25-inch 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-inch 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)
<i>None!</i> —Option L6	300 in.-lb (34 N-m)	650 in.-lb (73 N-m)

4. IF you replaced the Teflon sensor module O-rings, THEN 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 the sealing tape.
 - b. Take care to place the opening on the valve so that process fluid will drain toward the ground and away from personnel when the valve is opened.
 - c. Tighten the drain/vent valve to 350 in.-lb. (39.54 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 Information

Performance Specifications	page A-1
Detailed Performance Specifications	page A-2
Functional Specifications	page A-6
Physical Specifications	page A-11
Dimensional Drawings	page A-13
Ordering Information	page A-21
Parts List	page A-35
Options	page A-45
HART Protocol C1 Option Configuration Data Sheet ...	page A-50

PERFORMANCE SPECIFICATIONS

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

Model 3051C (Ranges 2–5), Model 3051T

Reference Accuracy

±0.075% of span

Total Performance

±0.15% of span for ±50 °F (28 °C) temperature changes, up to 1000 psi (6,9 MPa) line pressure (CD only), from 1:1 to 5:1 rangedown.

Stability

±0.125% of URL for 5 years for ±50 °F (28 °C) temperature changes, and up to 1000 psi (6,9 MPa) line pressure.

Dynamic Performance Total Response Time ($T_d + T_c$)

HART output: 100 ms

Model 3051CD, Low/Draft Range (Ranges 0–1)

Reference Accuracy

±0.10% of span

Stability

±0.2% of URL for 1 year under reference conditions

Model 3051P—Reference Class

Reference Accuracy

±0.05% of span

Total Performance

±0.10% of span for ±50 °F (28 °C) temperature changes, up to 1000 psi (6,9 MPa) line pressure, from 1:1 to 5:1 rangedown

ROSEMOUNT

www.rosemount.com


EMERSON
Process Management

Stability

±0.125% of URL for 5 years for ±50 °F (28 °C) temperature changes, and up to 1000 psi (6,9 MPa) line pressure

Dynamic Performance Total Response Time ($T_d + T_c$)

100 ms

Model 3051L—Liquid Level

Reference Accuracy

±0.075% of span

Model 3051H—High Process Temperature

Reference Accuracy

±0.075% of span

Stability

±0.1% of URL for 12 months for Ranges 2 and 3

±0.2% of URL for 12 months for Ranges 4 and 5

DETAILED PERFORMANCE SPECIFICATIONS

Reference Accuracy

Stated reference accuracy includes hysteresis, terminal-based linearity and repeatability.

Model 3051CD Ranges 2–5 and 3051CG

±0.075% of span for spans less than 10:1, accuracy =

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

Model 3051CD Range 1

±0.10% of span for spans less than 15:1, accuracy =

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

Model 3051CD Range 0

±0.10% of span for spans less than 2:1, accuracy = ±0.05% of URL

Model 3051T/CA Ranges 1–5

±0.075% of span for spans less than 10:1, accuracy =

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

Model 3051CA Range 0

±0.075% of span for spans less than 5:1, accuracy =

$$\pm \left[0.025 + 0.01 \left(\frac{\text{URL}}{\text{Span}} \right) \right] \% \text{ of Span}$$

Model 3051H/3051L

±0.075% of span for spans less than 10:1, accuracy =

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

Model 3051P

±0.05% of span

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

Model 3051CD/CG

Range 2 - 5: $\pm(0.0125\% \text{ URL} + 0.0625\% \text{ span})$ from 1:1 to 5:1
 $\pm(0.025\% \text{ URL} + 0.125\% \text{ span})$ from 5:1 to 100:1
Range 1: $\pm(0.1\% \text{ URL} + 0.25\% \text{ span})$ from 1:1 to 30:1
 $\pm(0.147\% \text{ URL} + 0.15\% \text{ span})$ greater than 30:1
Range 0: $\pm(0.25\% \text{ URL} + 0.05\% \text{ span})$

Model 3051CA

Range 1 - 4: $\pm(0.025\% \text{ URL} + 0.125\% \text{ span})$ from 1:1 to 30:1
 $\pm(0.035\% \text{ URL} + 0.125\% \text{ span})$ from 30:1 to 100:1
Range 0: $\pm(0.1\% \text{ URL} + 0.25\% \text{ span})$

Model 3051P

All ranges: $\pm(0.006\% \text{ URL} + 0.03\% \text{ span})$

Model 3051H

All ranges: $\pm(0.025\% \text{ URL} + 0.125\% \text{ span} + 0.35 \text{ inH}_2\text{O})$
For spans below 30:1 rangedown:
 $\pm(0.035\% \text{ URL} + 0.125\% \text{ span} + 0.35 \text{ inH}_2\text{O})$

Model 3051L

See Rosemount Inc. Instrument Toolkit™ software.

Model 3051T

Ranges 2- 4: $\pm(0.025\% \text{ URL} + 0.125\% \text{ span})$ from 1:1 to 30:1
 $\pm(0.035\% \text{ URL} + 0.125\% \text{ span})$ from 30:1 to 100:1
Range 5: $\pm(0.1\% \text{ URL} + 0.15\% \text{ span})$
Range 1: $\pm(0.025\% \text{ URL} + 0.125\% \text{ span})$ from 1:1 to 10:1
 $\pm(0.05\% \text{ URL} + 0.125\% \text{ span})$ from 10:1 to 100:1

Model 3051

Reference Manual
00809-0100-4001, Rev EA
December 2002

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

Model 3051CD

Zero Error (can be calibrated out at line pressure)

±0.05% of URL for line pressures from 0 to 2000 psi
(0 to 13,7 MPa)

For line pressures above 2000 psi (13,7 MPa), see "Compensating for Line Pressure" on page 4-12.

Range 0: ±0.125% of URL/100 psi (6,89 bar)

Range 1: ±0.25% of URL

Span Error

±0.1% of reading

Range 0: ±0.15% of reading/100 psi (6,89 bar)

Range 1: ±0.4% of reading

Model 3051P

Zero Error (can be calibrated out at line pressure)

±0.04% of URL

Span Error

±0.10% of reading

Model 3051HD

Zero Error (can be calibrated out at line pressure)

±0.1% of URL for line pressures from 0 to 2000 psi (0 to 13,7 MPa)

For line pressures above 2000 psi (13,7 MPa), see "Compensating for Line Pressure" on page 4-12.

Span Error

±0.1% of reading

Dynamic Performance

Total Response Time ($T_d + T_c$)⁽²⁾:

Model 3051C/P, Ranges 2-5: 100 ms

Range 1: 255 ms

Range 0: 700 ms

Model 3051T: 100 ms

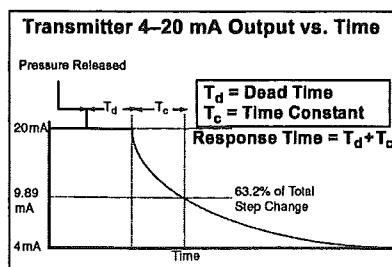
Model 3051H/L: Consult factory

Dead Time (T_d) 45 ms (nominal)

Update Rate 22 times per second

(1) Dead time and update rate apply to all models and ranges; analog output only
(2) Nominal total response time at 75 °F (24 °C) reference conditions.

Figure A-1. Typical Smart
Transmitter Response Time



3051-3051_17A

Mounting Position Effects

Model 3051C/P

Zero shifts up to ± 1.25 inH₂O (3,11 mbar), which can be calibrated out. No span effect.

Model 3051H

Zero shifts up to ± 5 inH₂O (127 mmH₂O), which can be calibrated out. No span effect.

Model 3051L

With liquid level diaphragm in vertical plane, zero shift of up to 1 inH₂O (25,4 mmH₂O).

With diaphragm in horizontal plane, zero shift of up to 5 inH₂O (127 mmH₂O) plus extension length on extended units. All zero shifts can be calibrated out. No span effect.

Model 3051T/CA

Zero shifts up to 2.5 inH₂O (63,5 mmH₂O), which can be calibrated out. No span effect.

Vibration Effect

All Models

Measurement effect due to vibrations is negligible except at resonance frequencies. When at resonance frequencies, vibration effect is less than $\pm 0.1\%$ of URL per g when tested between 15 and 2000 Hz in any axis relative to pipe-mounted process conditions.

Power Supply Effect

All Models

Less than $\pm 0.005\%$ of calibrated span per volt.

RFI Effects

All Models

$\pm 0.1\%$ of span from 20 to 1000 MHz and for field strength up to 30 V/m. Shielded cable needed for 30 V/m.

Transient Protection (Option Code T1)

All Models

Meets IEEE Standard 587, Category B

1 kV crest (10 \times 1 000 microseconds)

3 kV crest (8 \times 20 microseconds)

6 kV crest (1,2 \times 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

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

Range	Minimum Span			Range and Sensor Limits							
	Model 3051CD ⁽¹⁾ , CG, L, H	Model 3051P		Upper (URL)	Lower (LRL)						
					Model 3051C Differential	3051C/P ⁽²⁾ Gage	Model 3051P Differential	Model 3051L Differential	Model 3051L Gage	Model 3051H Differential	Model 3051H Gage
0	0.1 inH ₂ O (0,25 mbar)	NA	3.0 inH ₂ O (7,47 mbar)	-3.0 inH ₂ O (-7,47 mbar)	NA	NA	NA	NA	NA	NA	
1	0.5 inH ₂ O (1,2 mbar)	NA	25 inH ₂ O (62,3 mbar)	-25 inH ₂ O (-62,3 mbar)	-25 inH ₂ O (-62,3 mbar)	NA	NA	NA	NA	NA	
2	2.5 inH ₂ O (6,2 mbar)	25 inH ₂ O (62,3 mbar)	250 inH ₂ O (6,2 bar)	-250 inH ₂ O (-0,62 bar)	-250 inH ₂ O (-0,62 bar)	-250 inH ₂ O (-0,62 bar)	-250 inH ₂ O (-0,62 bar)	-250 inH ₂ O (-0,62 bar)	-250 inH ₂ O (-0,62 bar)	-250 inH ₂ O (-0,62 bar)	
3	10 inH ₂ O (24,9 mbar)	100 inH ₂ O (0,25 bar)	1000 inH ₂ O (2,49 bar)	-1000 inH ₂ O (-2,49 bar)	0.5 psia (34,5 mbar abs)	-1000 inH ₂ O (-2,49 bar)	-1000 inH ₂ O (-2,49 bar)	0.5 psia (34,5 mbar abs)	-1000 inH ₂ O (-2,49 bar)	0.5 psia (34,5 mbar abs)	
4	3 psi (0,20 bar)	30 psi (2,07 bar)	300 psi (20,6 bar)	-300 psi (-20,6 bar)	0.5 psia (34,5 mbar abs)	NA	-300 psi (-20,6 bar)	0.5 psia (34,5 mbar abs)	-300 psi (-20,6 bar)	0.5 psia (34,5 mbar abs)	
5	20 psi (1,38 bar)	200 psi (13,8 bar)	2000 psi (137,9 bar)	-2000 psi (-137,9 bar)	0.5 psia (34,5 mbar abs)	NA	NA	NA	-2000 psi (-137,9 bar)	0.5 psia (34,5 mbar abs)	

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

(2) Range 1 not available with Model 3051P.

Table A-2. Range and Sensor Limits

Model 3051CA				Model 3051T			
Range	Range and Sensor Limits			Range	Range and Sensor Limits		
	Minimum Span	Upper (URL)	Lower (LRL)		Minimum Span	Upper (URL)	Lower (LRL) (Gage)
0	0.167 psia (11,51 mbar)	5 psia (0,34 bar)	0 psia (0 bar)	1	0.3 psi (20,6 mbar)	30 psi (2,07 bar)	0 psia (-14,7 psig (-1,01 bar))
1	0.3 psia (20,6 mbar)	30 psia (2,07 bar)	0 psia (0 bar)	2	1.5 psi (0,103 bar)	150 psi (10,3 bar)	0 psia (-14,7 psig (-1,01 bar))
2	1.5 psia (0,103 bar)	150 psia (10,3 bar)	0 psia (0 bar)	3	8 psi (0,55 bar)	800 psi (55,2 bar)	0 psia (-14,7 psig (-1,01 bar))
3	8 psia (0,55 bar)	800 psia (55,2 bar)	0 psia (0 bar)	4	40 psi (2,76 bar)	4000 psi (275,8 bar)	0 psia (-14,7 psig (-1,01 bar))
4	40 psia (2,76 bar)	4000 psia (275,8 bar)	0 psia (0 bar)	5	2000 psi (137,9 bar)	10000 psi (689,4 bar)	0 psia (-14,7 psig (-1,01 bar))

(1) Assumes atmospheric pressure of 14.7 psig.

Zero and Span Adjustment Requirements (HART and Low Power)

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

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

Service

Liquid, gas, and vapor applications

4–20 mA (Output Code A)

Output

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

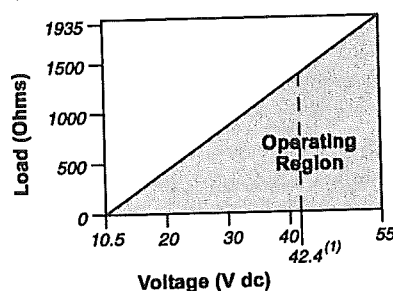
Power Supply

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

Load Limitations

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

$$\text{Max. Loop Resistance} = 43.5 (\text{Power Supply Voltage} - 10.5)$$



Communication requires a minimum
loop resistance of 250 ohms.

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

Low Power (Output Code M)

Output

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

Power Consumption

3.0 mA, 18–36 mW

Minimum Load Impedance

100 k Ω (V_{out} wiring)

Indication

Optional 5-digit LCD display

Overpressure Limits

Transmitters withstand the following limits without damage:

Model 3051CD/CG

Range 0: 750 psi (51,7 bar)
Range 1: 2000 psig (137,9 bar)
Ranges 2–5: 3626 psig (250 bar)

Model 3051CA

Range 0: 60 psia (4,14 bar)
Range 1: 750 psia (51,7 bar)
Range 2: 300 psia (20,7 bar)
Range 3: 1600 psia (110,3 bar)
Range 4: 6000 psia (413,7 bar)

Model 3051H

All Ranges: 3626 psig (25 MPa)

Model 3051TG/TA

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

Model 3051PG

Ranges 2-5: 3626 psig (250 bar)

Model 3051PD

Ranges 2 and 3: 2000 psig (13,8 MPa)

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

TABLE 1. Model 3051L and Level Flange Rating Limits

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

Static Pressure Limit

Model 3051CD Only

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

Range 0: 0.5 psia and 750 psig

Range 1: 0.5 psia and 2000 psig

Model 3051PD Only

Operates within specifications between static line pressures of 0.5 psia and 2000 psig.

Burst Pressure Limits

Burst pressure on Coplanar, traditional, or Model 3051H process flange is 10000 psig (69 MPa).

Burst pressure for the Model 3051T is

Ranges 1–4: 11000 psi (75,8 MPa)

Range 5: 26000 psig (179 MPa)

Failure Mode Alarm

Output Code A

If self-diagnostics detect a gross transmitter failure, the analog signal will be driven either below 3.75 mA or to 21.75 mA to alert the user. High or low alarm signal is user-selectable by internal jumper.

Output Code M

If self-diagnostics detect a gross transmitter failure, the analog signal will be driven either below 0.94 V or above 5.4 V to alert the user (below 0.75 V or above 4.4 V for Option C2). High or low alarm signal is user-selectable by internal jumper.

Output Code F and W

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

Temperature Limits

Ambient

–40 to 185 °F (–46 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

At atmospheric pressures and above. See Table A-3

Table A-3. Model 3051 Process Temperature Limits

Model 3051CD, 3051CG, 3051CA, 3051P	
Silicone Fill Sensor ⁽¹⁾	
with Coplanar Flange	-40 to 250 °F (-40 to 121 °C) ⁽²⁾
with Traditional Flange	-40 to 300 °F (-40 to 149 °C) ⁽²⁾⁽³⁾
with Level Flange	-40 to 300 °F (-40 to 149 °C) ⁽²⁾
with 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) ⁽⁴⁾⁽⁵⁾
Model 3051H (Process Fill Fluid)	
D.C.® Silicone 200 ⁽¹⁾	-40 to 375 °F (-40 to 191 °C)
Inert ⁽¹⁾	-50 to 350 °F (-45 to 177 °C)
Neobee M-20 ⁽¹⁾	0 to 375 °F (-18 to 191 °C)
Model 3051T (Process Fill Fluid)	
Silicone Fill Sensor ⁽¹⁾	-40 to 250 °F (-40 to 121 °C) ⁽²⁾
Inert Fill Sensor ⁽¹⁾	-22 to 250 °F (-30 to 121 °C) ⁽²⁾
Model 3051L Low-Side Temperature Limits	
Silicone Fill Sensor ⁽¹⁾	-40 to 250 °F (-40 to 121 °C) ⁽²⁾
Inert Fill Sensor ⁽¹⁾	0 to 185 °F (-18 to 85 °C) ⁽²⁾
Model 3051L High-Side Temperature Limits (Process Fill Fluid)	
Syltherm® XLT	-100 to 300 °F (-73 to 149 °C)
D.C. Silicone 704®	60 to 400 °F (15 to 205 °C)
D.C. Silicone 200	-40 to 400 °F (-40 to 205 °C)
Inert	-50 to 350 °F (-45 to 177 °C)
Glycerin and Water	0 to 200 °F (-18 to 93 °C)
Neobee M-20	0 to 400 °F (-18 to 205 °C)
Propylene Glycol and Water	0 to 200 °F (-18 to 93 °C)

(1) Process temperatures above 185 °F (85 °C) require derating the ambient limits by a 1.5:1 ratio (0.6:1 ratio for the Model 3051H).

(2) 220 °F (104 °C) limit in vacuum service; 130 °F (54 °C) for pressures below 0.5 psia.

(3) 3051CD0 process temperature limits are -40 to 212 °F (-45 to 100 °C)

(4) 160 °F (71 °C) limit in vacuum service.

(5) Not available for Model 3051CA.

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 in³ (0.08 cm³)

Damping

Analog output response to a step input change is user-selectable from 0 to 25.6 seconds for one time constant. This software damping is in addition to sensor module response time.

PHYSICAL SPECIFICATIONS

Electrical Connections

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

Process Connections

All Models except 3051L and 3051T

1/4-18 NPT on 2 1/8-in. centers

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

Model 3051L

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

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

Model 3051T

1/4-18 NPT, 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).

Process Wetted Parts

Drain/Vent Valves

316 SST, Hastelloy C®, or Monel material (Monel not available with Model 3051L or 3051H)

Process Flanges and Adapters

Plated carbon steel, CF-8M (Cast version of 316 SST, material per ASTM-A743), Hastelloy C, or Monel

Wetted O-rings

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

Process Isolating Diaphragms

Isolating Diaphragm Material	3051CD/CG	3051T	3051CA	3051P	3051H
316L SST	•	•	•	•	•
Hastelloy C-276®	•	•	•	•	•
Monel	•		•		
Tantalum	•				•
Gold-plated Monel	•		•		
Gold-plated SST	•		•		

Model 3051L Process-Wetted Parts

Flanged Process Connection (Transmitter High Side)

Process Diaphragms, Including Process Gasket Surface:

316L SST, Hastelloy C-276, or Tantalum

Extension

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

Mounting Flange

Zinc-cobalt plated CS or SST

Reference Process Connection (Transmitter Low Side)

Isolating Diaphragms

316L SST or Hastelloy C-276

Reference Flange and Adapter

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

Non-Wetted Parts

Electronics Housing

Low-copper aluminum or CF-3M (Cast version of 316L SST, material per ASTM-A743).
NEMA 4X, IP 65, IP 66, IP68

Coplanar Sensor Module Housing

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

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 not available with Model 3051CA or Model 3051H).
Model 3051T uses Fluorinert® FC-43

Process Fill Fluid (Model 3051L and 3051H only)

3051L: Syltherm XLT, D.C. Silicone 704,
D.C. Silicone 200, inert, glycerin and water, Neobee M-20 or propylene glycol and water
3051H: inert, Neobee M-20, or D.C. Silicone 200

Paint

Polyurethane

Cover O-rings

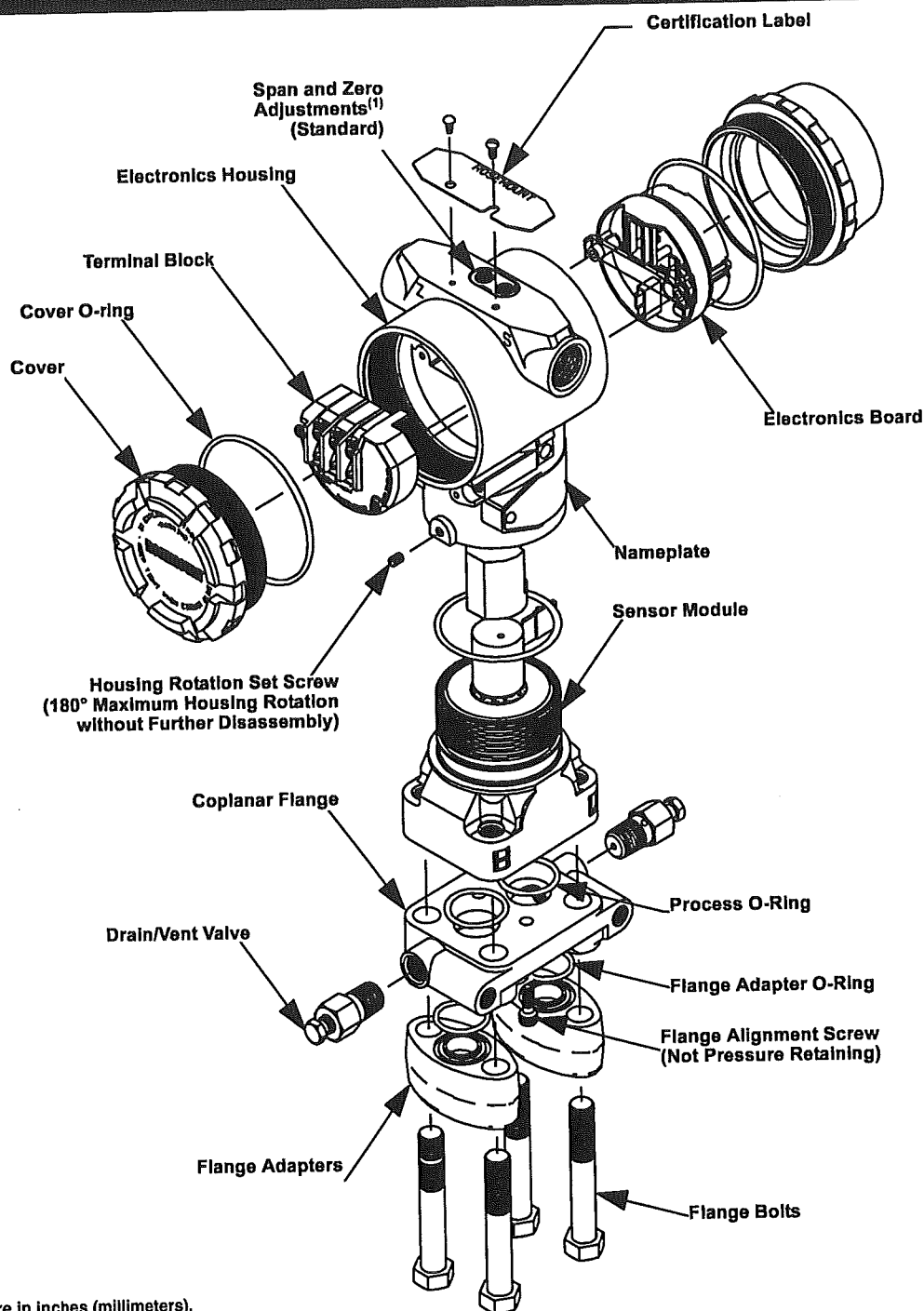
Buna-N

Shipping Weights

Refer to "Shipping Weights" on page A-49

DIMENSIONAL DRAWINGS

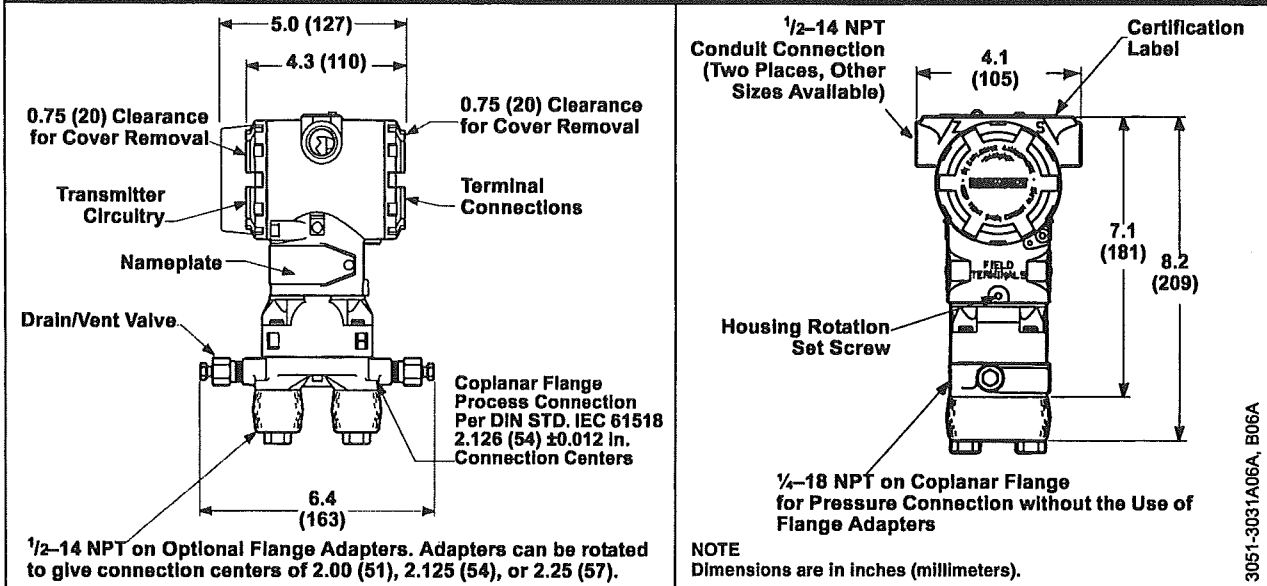
Model 3051 Exploded View



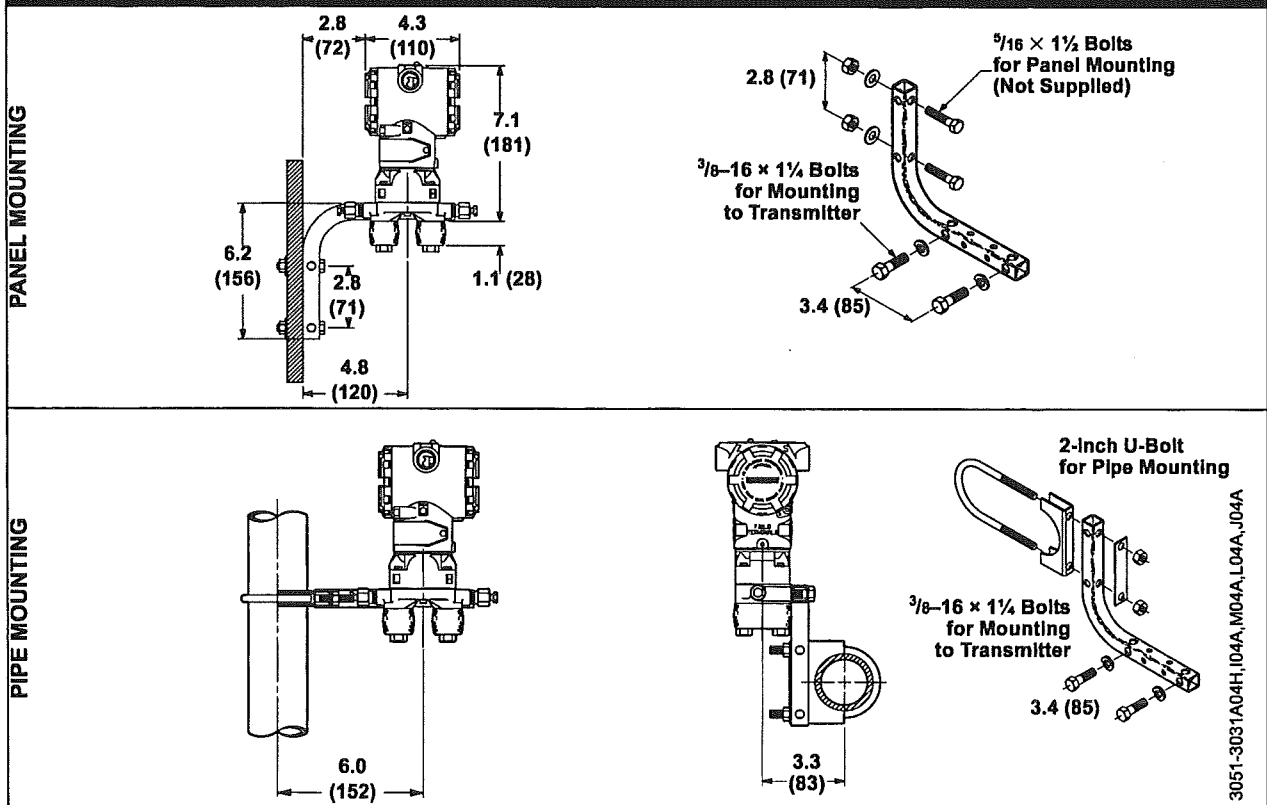
NOTE
Dimensions are in inches (millimeters).

3031B08A

Model 3051C Coplanar Flange Dimensional Drawing (Differential Pressure Transmitter Shown)



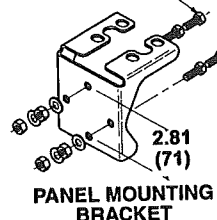
Coplanar Flange Mounting Configurations with Optional Bracket (B4) for 2-in. Pipe or Panel Mounting



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

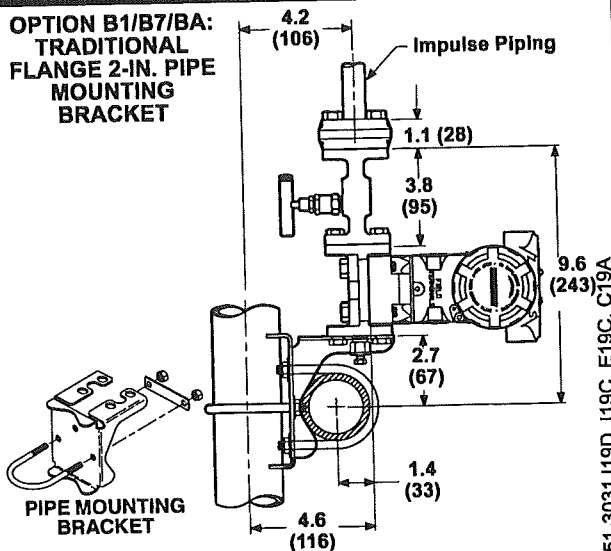
OPTION B2/B8: TRADITIONAL FLANGE PANEL MOUNTING BRACKET

$\frac{5}{16} \times \frac{7}{8}$ Bolts for Panel Mounting (Not Supplied)



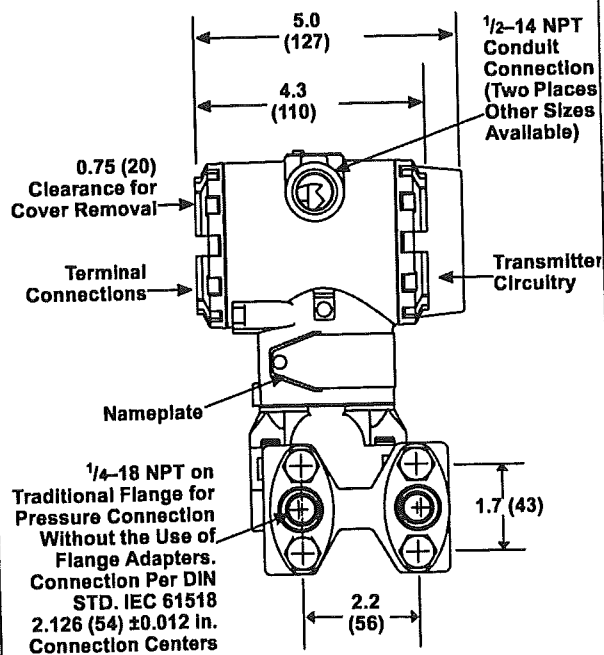
NOTE
Dimensions are in inches (millimeters).

OPTION B1/B7/BA: TRADITIONAL FLANGE 2-IN. PIPE MOUNTING BRACKET

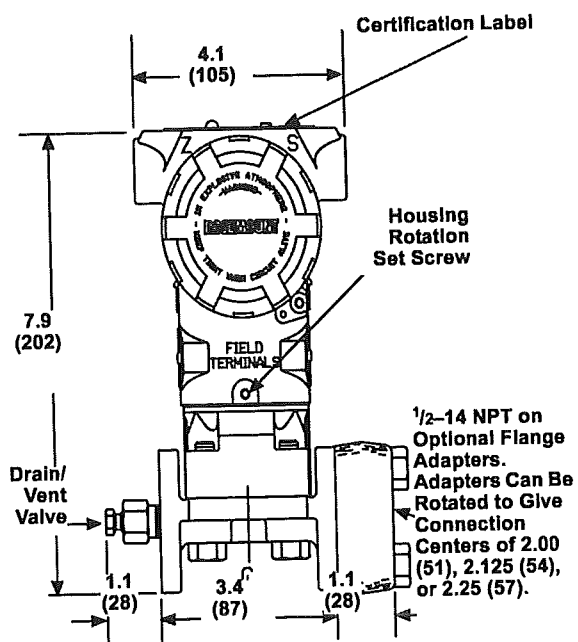


3051-3031J19D, I19C, E19C, C19A

Traditional Flange (Options H2-H7) Dimensional Drawing



NOTE
Dimensions are in inches (millimeters).

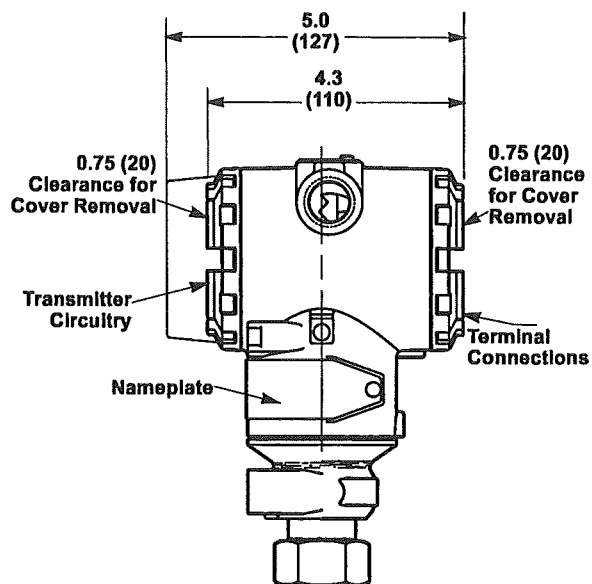


3051-3031E30A, D30B

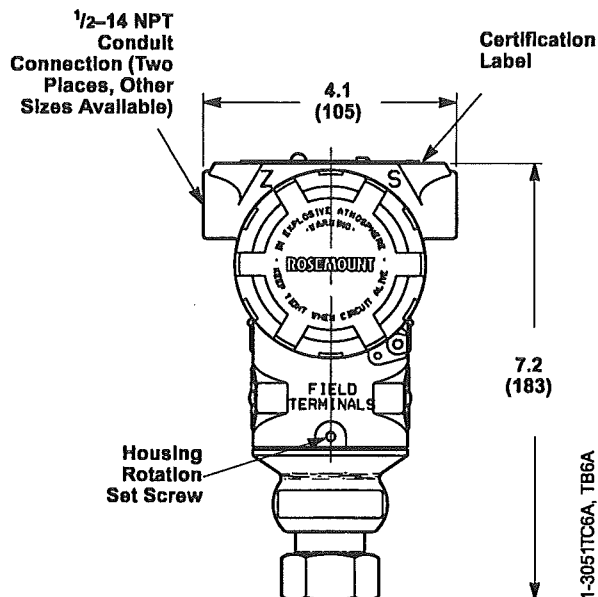
Model 3051

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Model 3051T Dimensional Drawings

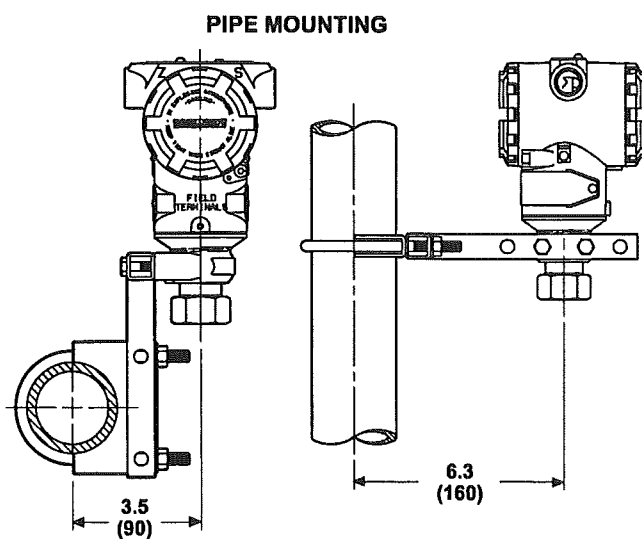


NOTE
Dimensions are in inches (millimeters).

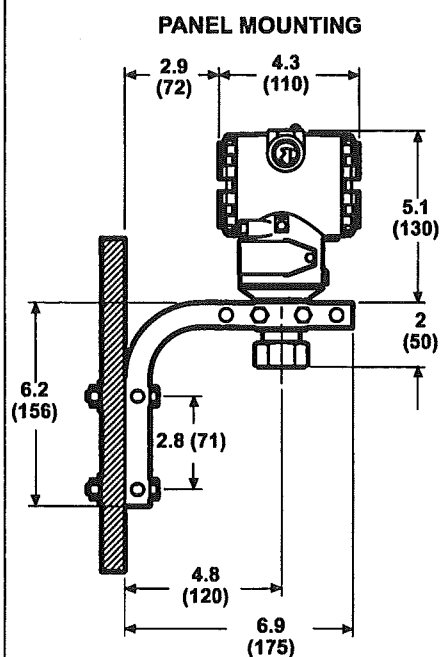


3051-3051TC6A, TB6A

Model 3051T Typical Mounting Configurations with Optional Mounting Bracket

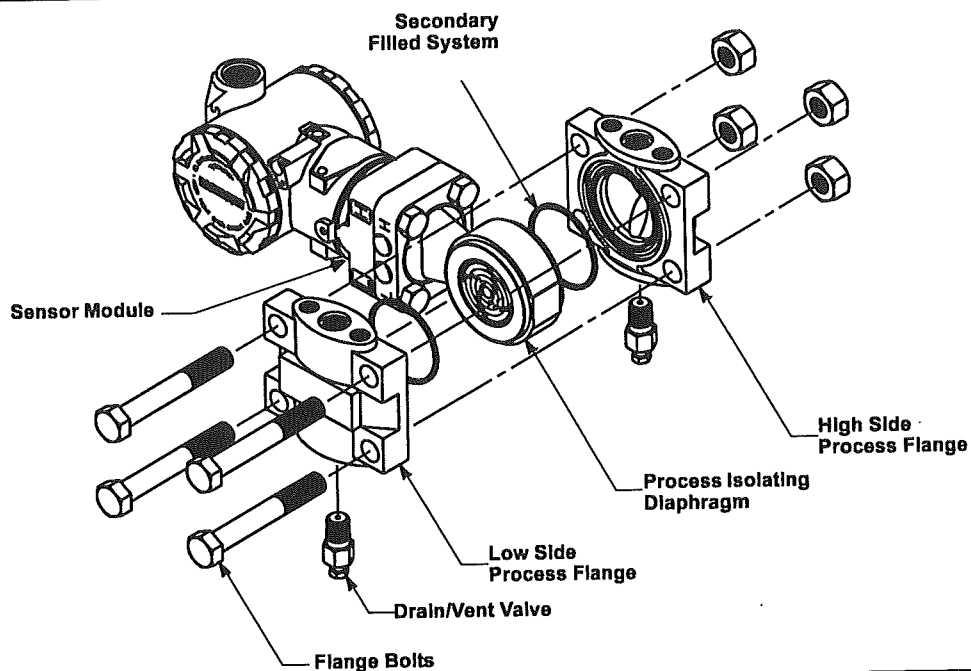


NOTE
Dimensions are in inches (millimeters).

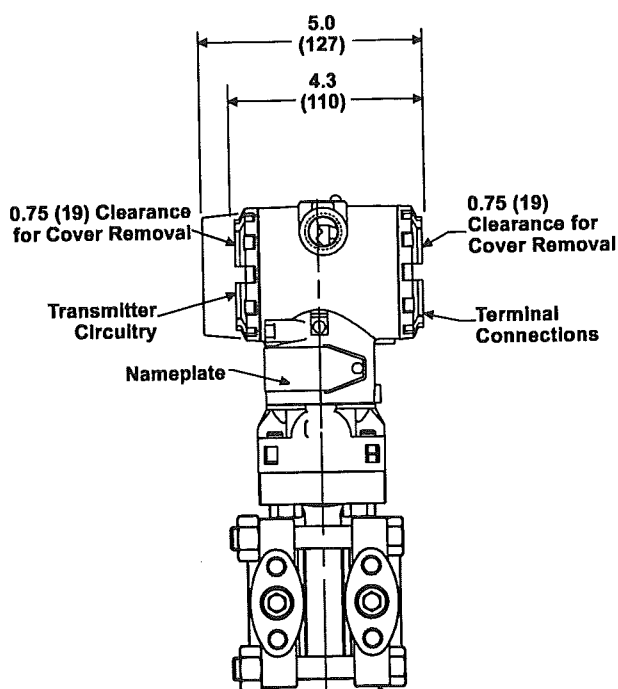


3051-3051TA4A, TB4A, TC4A

Model 3051H Pressure Transmitter Exploded View and Dimensional Drawings

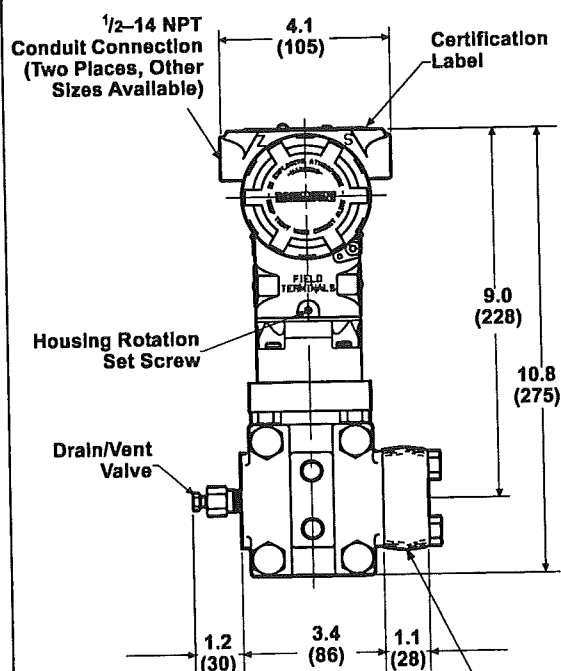


3051-3051HB2G



NOTE
Dimensions are in
inches (millimeters).

1/2-18 NPT on Process Flange for
Pressure Connection Without the
Use of Mounting Adapters

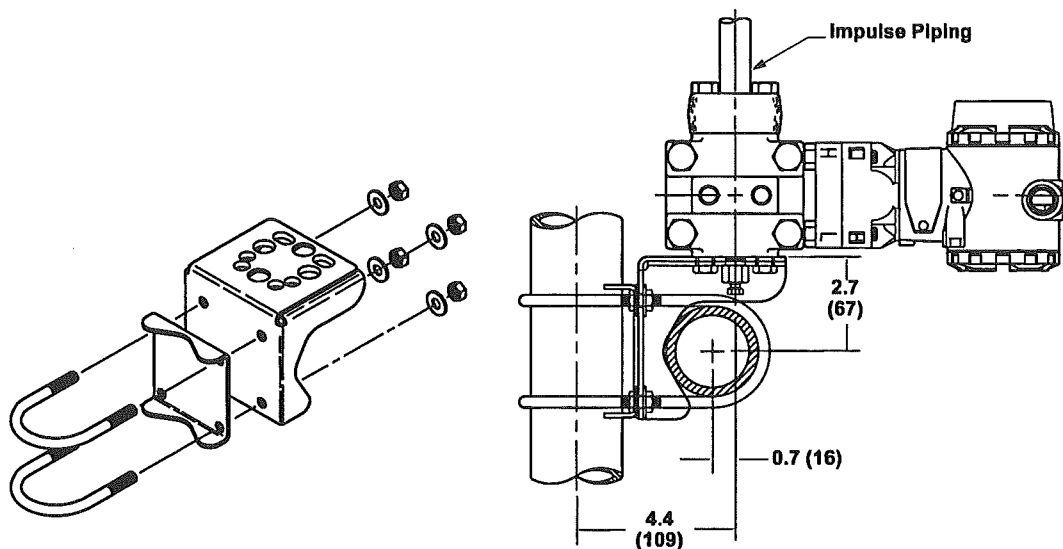


1/2-14 NPT on Optional Mounting
Adapters. Adapters Can Be Rotated
to Give Adapter Connection Centers of
2.00 (51), 2.1256 (54), or 2.25 (57).

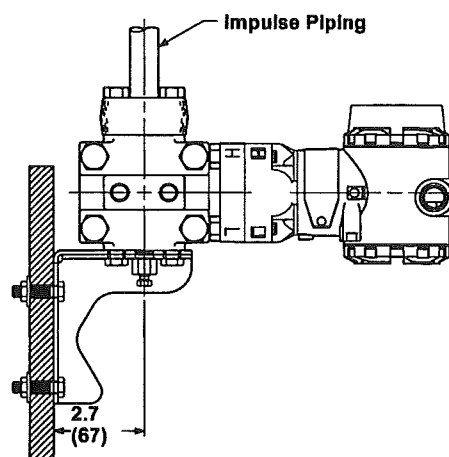
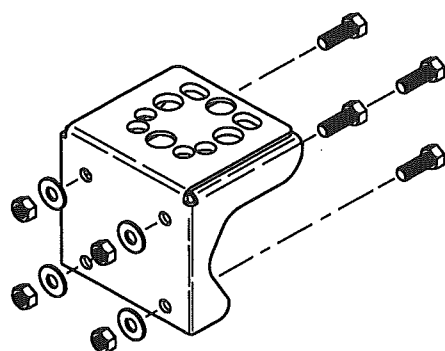
3051-3051H01A, H01B

Model 3051H Mounting Brackets for 2-in. Pipe and Panel Mount (Option Code B5/B6)

PIPE MOUNTING CONFIGURATION



PANEL MOUNTING CONFIGURATION 7/16-20x3/4 Bolts Supplied for Attaching Bracket to Transmitter

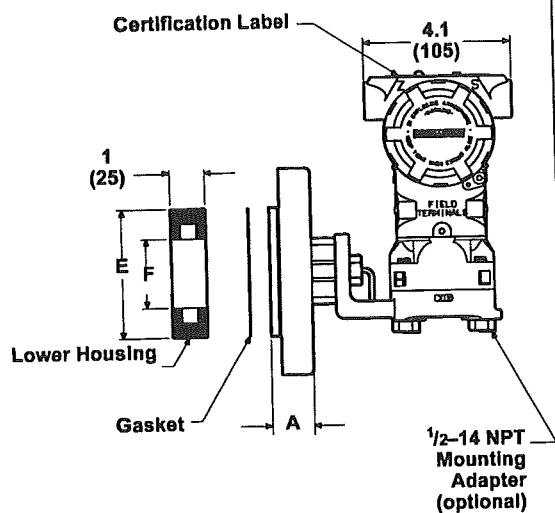


NOTE
Dimensions are in inches (millimeters).

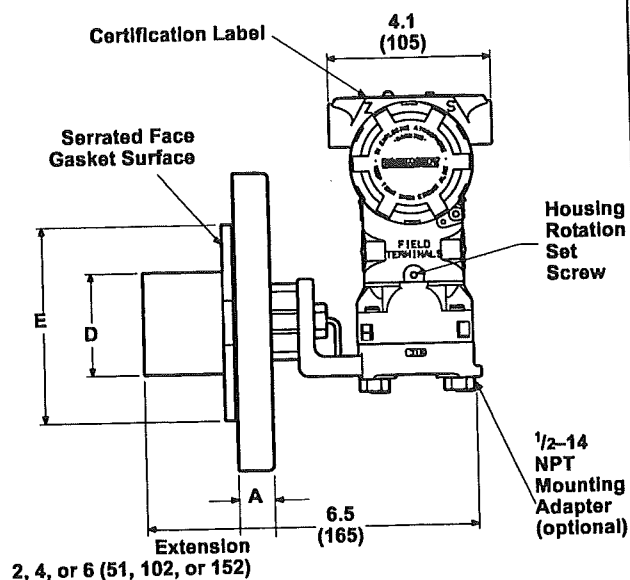
3051-3031G19A, F19B, 3051Hb3A, HA3B

Model 3051L Dimensional Drawings

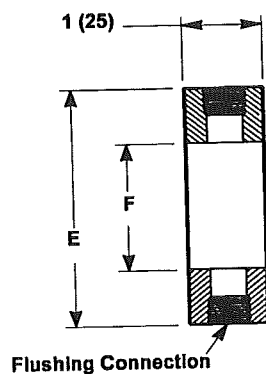
2-IN. FLANGE CONFIGURATION (FLUSH MOUNT ONLY)



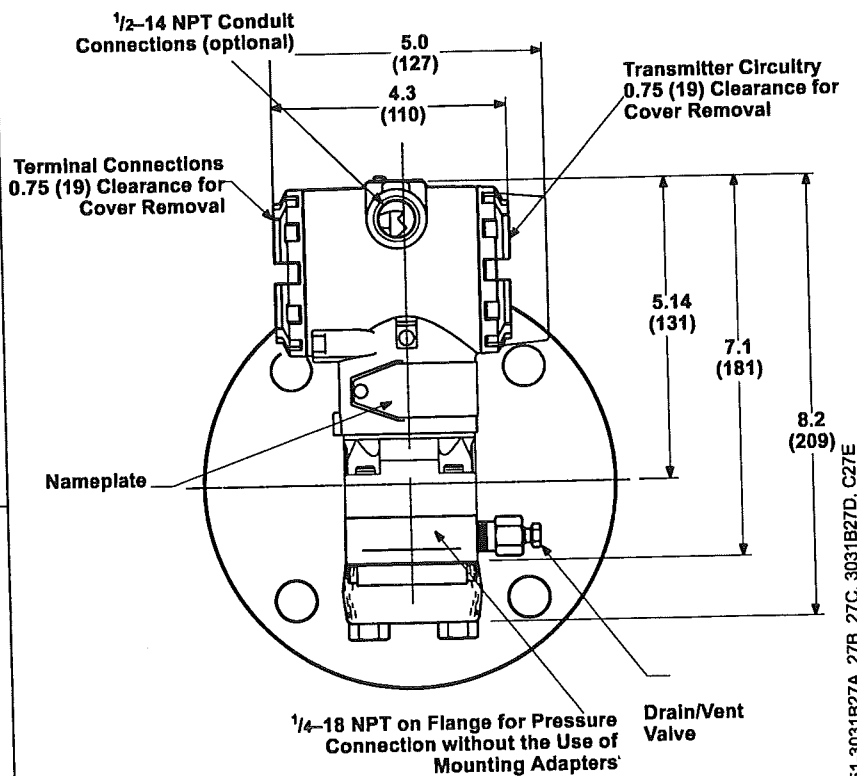
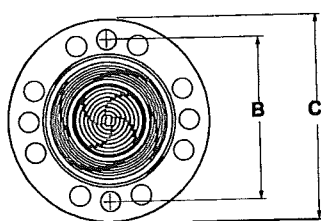
3- AND 4-IN. FLANGE CONFIGURATION



OPTIONAL FLUSHING CONNECTION RING (LOWER HOUSING)



DIAPHRAGM ASSEMBLY AND MOUNTING FLANGE



NOTE
Dimensions are in inches (millimeters).

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Class	Pipe Size	Flange Thickness	Bolt Circle Diameter	Outside Diameter	No. of Bolts	Bolt Hole Diameter	Exten. Diam. ⁽¹⁾ D	O.D. Gask. Surf. E	Proc. 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 PN 10-40	DN 50	26 mm	125 mm	165 mm	4	18 mm	NA	4.0 (102)	2.5 (63)
DIN 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)
DIN 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	Transmitter Type (Select One)	CD	CG	CA
3051CD	Differential Pressure Transmitter	.	—	—
3051CG	Gage Pressure Transmitter	—	.	—
3051CA	Absolute Pressure Transmitter	—	—	.
Model 3051CD		Model 3051CG		
Model 3051CD		Model 3051CG		
0 ⁽¹⁾	–3 to 3 inH ₂ O/0.1 inH ₂ O (–7,5 to 7,5 mbar/0,25 mbar)	Not Applicable	0 to 5 psia/0.167 psia (0 to 0,34 bar/11,5 mbar)	.
1	–25 to 25 inH ₂ O/0.5 inH ₂ O (–62,2 to 62,2 mbar/1,2 mbar)	–25 to 25 inH ₂ O/0.5 inH ₂ O (–62,2 to 62,2 mbar/1,2 mbar)	0 to 30 psia/0.3 psia (0 to 2,1 bar/20,7 mbar)	.
2	–250 to 250 inH ₂ O/2.5 inH ₂ O (–623 to 623 mbar/6,2 mbar)	–250 to 250 inH ₂ O/2.5 inH ₂ O (–623 to 623 mbar/6,2 mbar)	0 to 150 psia/1.5 psia (0 to 10,3 bar/0,1 bar)	.
3	–1000 to 1000 inH ₂ O/10 inH ₂ O (–2,5 to 2,5 bar/25 mbar)	–407 to 1000 inH ₂ O/10 inH ₂ O (–1,01 to 2,5 bar/25 mbar)	0 to 800 psia/8 psia (0 to 55,2 bar/0,55 bar)	.
4	–300 to 300 psi/3 psi (–20,7 to 20,7 bar/0,2 bar)	–14.7 to 300 psi/3 psi (–1,01 to 20,7 bar/0,2 bar)	0 to 4000 psia/40 psia (0 to 275,8 bar/2,8 bar)	.
5	–2000 to 2000 psi/20 psi (–137,9 to 137,9 bar/1,4 bar)	–14.7 to 2000 psig/20 psi (–1,01 to 137,9 bar/1,4 bar)	Not Applicable	—

NOTE: 3051CG lower range limit varies with atmospheric pressure.

Code	Output	CD	CG	CA
A	4–20 mA with Digital Signal Based on HART Protocol	.	.	.
M	Low-Power, 1–5 V dc with Digital Signal Based on HART Protocol (See Option C2 for 0.8–3.2 V dc)	.	.	.

NOTE: Not available with hazardous locations certification Options Codes I1, N1, E4, K6 and K8.

Materials of Construction

Code	Process Flange Type	Flange Material	Drain/Vent	CD	CG	CA
2	Coplanar	SST	SST	.	.	.
3	Coplanar	Hastelloy C	Hastelloy C	.	.	.
4	Coplanar	Monel	Monel	.	.	.
5	Coplanar	Plated CS	SST	.	.	.
7	Coplanar	SST	Hastelloy C	.	.	.
8	Coplanar	Plated CS	Hastelloy C	.	.	.
0	Alternate Flange—See Options on page A-22					

NOTE: Materials of Construction Codes 3, 7, and 8 meet NACE material recommendations per MR 01-75.

Code	Isolating Diaphragm	CD	CG	CA
2	316L SST	.	.	.
3	Hastelloy C-276 (Meets NACE material recommendations per MR 01-75)	.	.	.
4	Monel	.	.	.
5	Tantalum (Available on Model 3051CD and CG, Ranges 2–5 only. Not available on Model 3051CA)	.	.	—
6	Gold-plated Monel (Use in combination with O-ring Option Code B.)	.	.	.
7	Gold-plated SST	.	.	.
Code	O-ring	CD	CG	CA
A	Glass-filled TFE	.	.	.
B	Graphite-filled TFE	.	.	.
Code	Fill Fluid	CD	CG	CA
1	Silicone	.	.	.
2	Inert fill (Halocarbon)	.	.	—

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Code	Housing Material	Conduit Entry Size	CD	CG	CA
A	Polyurethane-covered Aluminum	½–14 NPT	•	•	•
B	Polyurethane-covered Aluminum	M20 × 1.5 (CM20)	•	•	•
C	Polyurethane-covered Aluminum	PG 13.5	•	•	•
D	Polyurethane-covered Aluminum	G½	•	•	•
J	SST	½–14 NPT	•	•	•
K	SST	M20 × 1.5 (CM20)	•	•	•
L	SST	PG 13.5	•	•	•
M	SST	G½	•	•	•
Code	Alternate Flange Options (Requires Materials of Construction Code 0)		CD	CG	CA
H2	Traditional Flange, 316 SST, SST Drain/Vent		•	•	•
H3	Traditional Flange, <i>Hastelloy C</i> , <i>Hastelloy C</i> Drain/Vent		•	•	•
H4	Traditional Flange, <i>Monel</i> , <i>Monel</i> Drain/Vent		•	•	•
H7	Traditional Flange, 316 SST, <i>Hastelloy C</i> Drain/Vent		•	•	•
HJ	DIN Compliant Traditional Flange, SST, 7/16 in. Adapter/Manifold Bolting		•	•	•
HK	DIN Compliant Traditional Flange, SST, 10 mm Adapter/Manifold Bolting		•	•	•
HL	DIN Compliant Traditional Flange, SST, 12mm Adapter/Manifold Bolting (not available on Model 3051CD0)		•	•	•
FA	Level Flange, SST, 2 in., ANSI Class 150, Vertical Mount		•	•	•
FB	Level Flange, SST, 2 in., ANSI Class 300, Vertical Mount		•	•	•
FC	Level Flange, SST, 3 in., ANSI Class 150, Vertical Mount		•	•	•
FD	Level Flange, SST, 3 in., ANSI Class 300, Vertical Mount		•	•	•
FP	DIN Level Flange, SST, DN 50, PN 40, Vertical Mount		•	•	•
FQ	DIN Level Flange, SST, DN 80, PN 40, Vertical Mount		•	•	•
NOTE: Option Codes H3 and H7 meet NACE material recommendations per MR 01-75.					
Code	Integral Mount Manifold Options				
S5	Assemble to Model 305 Integral Manifold		•	•	•
Code	Integral Mount Primary Elements (Optional)		CD	CG	CA
S4	Factory Assembly to Rosemount Primary Element (<i>AnnuBar</i> or Model 1195 Integral Orifice)		•	—	—
NOTE: With the primary element installed, the maximum operating pressure will equal the lesser of either the transmitter or the primary element. Option is available for factory assembly to range 1–4 transmitters only.					
Code	Diaphragm Seal Assemblies (Optional)		CD	CG	CA
NOTE: Standard flange and adapter bolts are austenitic 316 SST.					
S1	One Diaphragm Seal (Direct Mount or Capillary Connection Type)		•	•	•
S2	Two Diaphragm Seals (Direct Mount or Capillary Connection Type)		•	—	—
Code	Optional All Welded Diaphragm Seal Systems (for high vacuum applications)		CD	CG	CA
NOTE: Standard flange and adapter bolts are austenitic 316 SST.					
S7	One Diaphragm Seal, All-Welded System (Capillary Connection Type)		•	•	•
S8	Two Diaphragm Seals, All-Welded System (Capillary Connection Type)		•	—	—
S0	One Diaphragm Seal, All-Welded System (Direct Mount Connection Type)		•	•	•
S9	Two Diaphragm Seals, All-Welded System (One Direct Mount and One Capillary Connection Type)		•	—	—
Continued on next page					

Continued on next page

Code	Mounting Bracket Options	CD	CG	CA
B4	Coplanar Flange Bracket for 2-in. Pipe or Panel Mounting, all SST	.	.	.
B1	Traditional Flange Bracket for 2-in. Pipe Mounting, CS Bolts	.	.	.
B2	Traditional Flange Bracket for Panel Mounting, CS Bolts	.	.	.
B3	Traditional Flange Flat Bracket for 2-in. Pipe Mounting, CS Bolts	.	.	.
B7	B1 Bracket with Series 300 SST Bolts	.	.	.
B8	B2 Bracket with Series 300 SST Bolts	.	.	.
B9	B3 Bracket with Series 300 SST Bolts	.	.	.
BA	SST B1 Bracket with Series 300 SST Bolts	.	.	.
BC	SST B3 Bracket with Series 300 SST Bolts	.	.	.
Code	Product Certification Options	CD	CG	CA
Hazardous Locations Certifications				
E5	FM Explosion-Proof Approval	.	.	.
I5	FM Non-Incendive and Intrinsic Safety Approval	.	.	.
K5	FM Explosion-Proof and Intrinsic Safety Approval	.	.	.
I1	CENELEC Intrinsic Safety and Dust Certification <i>NOTE: Not available with low-power Option Code M.</i>	.	.	.
N1	CENELEC Type nL and Dust Certification <i>NOTE: Not available with low-power Option Code M.</i>	.	.	.
E8	CENELEC Flame-Proof and Dust Certification	.	.	.
E4	JIS Flame-Proof Certification <i>NOTE: Not available with low-power Option Code M.</i>	.	.	.
C5	Measurement Canada Accuracy Approval <i>NOTE: Limited availability depending on transmitter type and range. Contact your Rosemount representative.</i>	.	.	.
C6	Canadian Standards Association (CSA) Explosion-Proof and Intrinsic Safety Approval	.	.	.
K6	Combination of CSA and CENELEC Explosion-Proof and Intrinsic Safety Approval <i>NOTE: Not available with low-power Option Code M.</i>	.	.	.
KB	Combination of FM and CSA Explosion-Proof and Intrinsic Safety Approvals	.	.	.
K7	Combination of SAA Flame-Proof and Intrinsic Safety Approvals	.	.	.
K8	Combination of CENELEC Flame-Proof and Intrinsic Safety Approvals <i>NOTE: Not available with low-power Option Code M.</i>	.	.	.
I7	SAA Intrinsic Safety Certification	.	.	.
E7	SAA Flame-Proof Certification	.	.	.
N7	SAA Type N Certification	.	.	.
Code	Bolting Options	CD	CG	CA
L4	Austenitic 316 SST Bolts	.	.	.
L5	ASME B 16.5 (ANSI)/ASTM-A-193-B7M Bolts	.	.	.
L6	Monel Bolts	.	.	.
Code	LCD Display (Optional)	CD	CG	CA
M5	LCD display for Aluminum Housing (Housing Codes A, B, C, and D only)	.	.	.
M6	LCD display for SST Housing (Housing Codes J, K, L, and M only)	.	.	.

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Code	Other Options			
Q4	Calibration Data Sheet	.	.	.
Q8	Material Traceability Certification per EN 10204 3.1.B <i>NOTE: This option is available for the sensor module housing and Coplanar or traditional flanges and adapters (Model 3051C), and for the sensor module housing and low-volume Coplanar flange and adapter (Model 3051C with Option Code S1).</i>	.	.	.
QP	Calibration certification and tamper evident seal	.	.	.
QS	Quality Certification for safety	.	.	.
J1	Local Zero Adjustment Only <i>NOTE: Local zero and span adjustments are standard unless Option Code J1 or J3 is specified.</i>	.	.	.
J3	No Local Zero or Span Adjustment <i>NOTE: Local zero and span adjustments are standard unless Option Code J1 or J3 is specified.</i>	.	.	.
T1	Transient Protection Terminal Block <i>NOTE: Not available with hazardous locations certification Option Code I1, K6 or K8.</i>	.	.	.
C1	Custom Software Configuration (Completed CDS 00806-0100-4001 required with order)	.	.	.
C2	0.8–3.2 V dc Output with Digital Signal Based on HART Protocol (Output Code M only)	.	.	.
C3	Gage Calibration (Model 3051CA4 only)	—	—	.
C4	Analog Output Levels Compliant with NAMUR Recommendation NE43, 27-June-1996 <i>NOTE: NAMUR-Compliant operation is pre-set at the factory and cannot be changed to standard operation in the field.</i>	.	.	.
CN	Analog Output Levels Compliant with NAMUR Recommendation NE43, 27-June-1996: Alarm Configuration—Low <i>NOTE: NAMUR-Compliant operation is pre-set at the factory and cannot be changed to standard operation in the field.</i>	.	.	.
P1	Hydrostatic Testing	.	.	.
P2	Cleaning for Special Service	.	.	.
P3	Cleaning for <1 PPM Chlorine/Fluorine	.	.	.
P4	Calibrate at line pressure <i>Note: Specify Q48 on order for corresponding certificate</i>	.	.	.
DF	1/2 -14 NPT flange adapter(s)— Material determined by flange material	.	.	.
D7	Coplanar Flange Without Drain/Vent Ports	.	.	.
D8	Ceramic Ball Drain/Vents	.	.	.
D9	JIS Process Connection—RC 1/4 Flange with RC 1/4 Flange Adapter	.	.	.
P9	4500 psig Static Pressure Limit (Model 3051CD Ranges 2–5 only)	.	—	—
V5 ⁽²⁾	External Ground Screw Assembly	.	.	.
Typical Model Number: 3051CD 2 A 2 2 A 1 A B4				

- (1) Model 3051CD0 is available only with Output Code A, Process Flange Code 0 (Alternate Flange H2, H7, HJ, or HK), Isolating Diaphragm Code 2, O-ring Code A, and Bolting Option L4.
- (2) The V5 option is not needed with the T1 option; external ground screw assembly is included with the T1 option.

Model	Transmitter Type	
3051T	Pressure Transmitter	
Code	Pressure Type	
G	Gage	
A	Absolute	
Code	PRESSURE RANGES (RANGE/MIN. SPAN)	
	3051TG	3051TA
1	-14.7 to 30 psi/0.3 psi (-1,01 to 2,1 bar/20,7 mbar)	0 to 30 psia/0.3 psia (0 to 2,1 bar/20,7 mbar)
2	-14.7 to 150 psi/1.5 psi (-1,01 to 10,3 bar/103,4 mbar)	0 to 150 psia/1.5 psia (0 to 10,3 bar/103,4 mbar)
3	-14.7 to 800 psi/8 psi (-1,01 to 55,2 bar/0,55 bar)	0 to 800 psia/8 psia (0 to 55,2 bar/0,55 bar)
4	-14.7 to 4000 psi/40 psi (-1,01 to 275,8 bar/2,8 bar)	0 to 4000 psia/40 psia (0 to 275,8 bar/2,8 bar)
5	-14.7 to 10000 psi/2000 psi (-1,01 to 689,5 bar/138 bar)	0 to 10000 psia/2000 psia (0 to 689,5 bar/138 bar)
NOTE: 3051TG lower range limit varies with atmospheric pressure.		
Code	Output	
A	4-20 mA with Digital Signal Based on HART Protocol	
M	Low-Power 1-5 V dc with Digital Signal Based on HART Protocol (See Option Code C2 for 0.8-3.2 V dc Output)	
NOTE: Not available with hazardous certification Option Codes I1, N1, E4, K6 or K8.		
Code	Process Connection Style	
2A	½-18 NPT Female	
2B	½-14 NPT Female	
2C	G½ A DIN 16288 Male (Available in SST for Range 1-4 only)	
2F	Coned and Threaded, Compatible with Autoclave Type F-250-C	
61	Non-threaded Instrument flange (Available in Range 1-4 only)	
Code	Isolating Diaphragm	Process Connection Wetted Parts Material
2	316L SST	316L SST
3	Hastelloy	Hastelloy
NOTE: Meets NACE requirements per MR 01-75.		
Code	Fill Fluid	
1	Silicone	
2	Inert	
Code	Housing Material	Conduit Entry Size
A	Polyurethane-covered Aluminum	½-14 NPT
B	Polyurethane-covered Aluminum	M20 × 1.5 (CM20)
C	Polyurethane-covered Aluminum	PG 13.5
D	Polyurethane-covered Aluminum	G½
J	SST	½-14 NPT
K	SST	M20 × 1.5 (CM20)
L	SST	PG 13.5
M	SST	G½
Code	Integral Mount Manifold (Optional)	
S5	Assemble to Model 306 Integral Manifold (Requires ½ in. process connection code 2B)	
Code	Remote Diaphragm Seals Assemblies (Optional)	
S1	One remote diaphragm seal (Direct Mount or Capillary Connection Type)	

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Code	Mounting Brackets (Optional)
B4	Bracket for 2-in. Pipe or Panel Mounting, All SST
Code	Product Certifications (Optional)
	Hazardous Locations Certifications
E5	FM Explosion-Proof Approval
I5	FM Non-Incendive and Intrinsic Safety Approval
K5	FM Explosion-Proof and Intrinsic Safety Approval
C5	Measurement Canada accuracy approval
	<i>Note: Limited availability depending on transmitter type and range. Contact your Rosemount representative.</i>
C6	CSA Explosion-Proof and Intrinsic Safety Approval
K6	Combination of CSA and CENELEC Explosion-Proof and Intrinsic Safety Approval
	<i>NOTE: Not available with low-power Option Code M.</i>
K8	Combination of CENELEC Flame-Proof and Intrinsic Safety Approvals
	<i>NOTE: Not available with low-power Option Code M.</i>
K7	Combination of SAA Flame-Proof and Intrinsic Safety Approvals
KB	Combination of FM and CSA Explosion-Proof and Intrinsic Safety Approvals
I7	SAA Intrinsic Safety Certification
E4	JIS Flame-Proof Certification
	<i>NOTE: Not available with low-power Option Code M.</i>
E7	SAA Flame-Proof Certification
N7	SAA Type n Certification
I1	CENELEC Intrinsic Safety and Dust Certification
	<i>NOTE: Not available with low-power Option Code M.</i>
N1	CENELEC Type nL and Dust Certification
	<i>NOTE: Not available with low-power Option Code M.</i>
E8	CENELEC Flame-Proof and Dust Certification
DW	NSF drinking water approval
Code	Other Options
Q4	Calibration Data Sheet
Q8	Material Traceability Certification per EN 10204 3.1.B
	<i>NOTE: This option applies to the process connection only.</i>
QP	Calibration certification and tamper evident seal
QS	Quality certification for safety
J1	Local Zero Adjustment Only
	<i>NOTE: Local zero and span adjustments are standard unless Option Code J1 or J3 is specified.</i>
J3	No Local Zero or Span Adjustment
	<i>NOTE: Local zero and span adjustments are standard unless Option Code J1 or J3 is specified.</i>
M5	LCD display for Aluminum Housing (Housing Codes A, B, C, and D only)
M6	LCD display for SST Housing (Housing Codes J, K, L and M only)
T1	Transient Protection Terminal Block
	<i>NOTE: Not available with hazardous locations certification Option Code I1, K6 or K8.</i>
C1	Custom Software Configuration (Completed CDS 00808-0100-4001 required with order)
C2	0.8–3.2 V dc Output with Digital Signal Based on HART Protocol (Output Code M only)
C4	Analog Output Levels Compliant with NAMUR Recommendation NE43, 27-June-1996
	<i>NOTE: NAMUR-Compliant operation is pre-set at the factory and cannot be changed to standard operation in the field.</i>
CN	Analog Output Levels Compliant with NAMUR Recommendation NE43, 27-June-1996: Low Alarm Configuration
	<i>NOTE: NAMUR-Compliant operation is pre-set at the factory and cannot be changed to standard operation in the field.</i>
P1	Hydrostatic Testing
P2	Cleaning for Special Service
P3	Cleaning for <1 PPM Chlorine/Fluorine
V5 ⁽¹⁾	External Ground Screw Assembly
Typical Model Number: 3051T G 5 F 2A 2 1 A B4	

(1) The V5 option is not needed with T1 option; external ground screw assembly is included with the T1 option.

Model	Transmitter Type
3051L	Flange-Mounted Liquid Level Transmitter
Code	PRESSURE RANGES (RANGE/MIN. SPAN)
2	-250 to 250 inH ₂ O/2.5 inH ₂ O (-0,6 to 0,6 bar/6,2 mbar)
3	-1000 to 1000 inH ₂ O/10 inH ₂ O (-2,5 to 2,5 bar/25 mbar)
4	-300 to 300 psi/3 psi (-20,7 to 20,7 bar/0,2 bar)
Code	Output
A	4-20 mA with Digital Signal Based on HART Protocol
M	Low-Power 1-5 V dc with Digital Signal Based on HART Protocol (See Option Code C2 for 0.8-3.2 V dc Output)
NOTE: Not available with hazardous certification Option Codes I1, N1, E4, K6, and K8.	

HIGH PRESSURE SIDE			
Code	Diaphragm Size	Material	Extension Length
G0	2 in./DN 50	316L SST	Flush Mount Only
H0	2 in./DN 50	Hastelloy	Flush Mount Only
J0	2 in./DN 50	Tantalum	Flush Mount Only
A0	3 in./DN 80	316L SST	Flush Mount
A2	3 in./DN 80	316L SST	2 in./50 mm
A4	3 in./DN 80	316L SST	4 in./100 mm
A6	3 in./DN 80	316L SST	6 in./150 mm
B0	4 in./DN 100	316L SST	Flush Mount
B2	4 in./DN 100	316L SST	2 in./50 mm
B4	4 in./DN 100	316L SST	4 in./100 mm
B6	4 in./DN 100	316L SST	6 in./150 mm
C0	3 in./DN 80	Hastelloy	Flush Mount
C2	3 in./DN 80	Hastelloy	2 in./50 mm
C4	3 in./DN 80	Hastelloy	4 in./100 mm
C6	3 in./DN 80	Hastelloy	6 in./150 mm
D0	4 in./DN 100	Hastelloy	Flush Mount
D2	4 in./DN 100	Hastelloy	2 in./50 mm
D4	4 in./DN 100	Hastelloy	4 in./100 mm
D6	4 in./DN 100	Hastelloy	6 in./150 mm
E0	3 in./DN 80	Tantalum	Flush Mount Only
F0	4 in./DN 100	Tantalum	Flush Mount Only
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MOUNTING FLANGE				
Code	Size	ASME B 16.5 (ANSI) or DIN Flange Rating	Material	
M	2 in.	Class 150	CS	
A	3 in.	Class 150	CS	
B	4 in.	Class 150	CS	
N	2 in.	Class 300	CS	
C	3 in.	Class 300	CS	
D	4 in.	Class 300	CS	
P	2 in.	Class 600	CS	
E	3 in.	Class 600	CS	
X	2 in.	Class 150	SST	
F	3 in.	Class 150	SST	
G	4 in.	Class 150	SST	
Y	2 in.	Class 300	SST	
H	3 in.	Class 300	SST	
J	4 in.	Class 300	SST	
Z	2 in.	Class 600	SST	
L	3 in.	Class 600	SST	
Q	DN 50	PN 10-40	CS	
R	DN 80	PN 40	CS	
S	DN 100	PN 40	CS	
V	DN 100	PN 10/16	CS	
K	DN 50	PN 10-40	SST	
T	DN 80	PN 40	SST	
U	DN 100	PN 40	SST	
W	DN 100	PN 10/16	SST	
Code	Process Fill-High Pressure Side		Temperature Limits	
A	Syltherm XLT		−100 to 300 °F (−73 to 135 °C)	
C	D. C. Silicone 704		60 to 400 °F (15 to 205 °C)	
D	D. C. Silicone 200		−40 to 400 °F (−40 to 205 °C)	
H	Inert (Halocarbon)		−50 to 350 °F (−45 to 177 °C)	
G	Glycerine and Water		0 to 200 °F (−17 to 93 °C)	
N	Neobee M-20		0 to 400 °F (−17 to 205 °C)	
P	Propylene Glycol and Water		0 to 200 °F (−17 to 93 °C)	
LOW PRESSURE SIDE				
Code	Configuration	Flange Adapter	Diaphragm Material	Sensor Fill Fluid
11	Gage	SST	316L SST	Silicone
21	Differential	SST	316L SST	Silicone
22	Differential	SST	Hastelloy C-276	Silicone
2A	Differential	SST	316L SST	Inert (Halocarbon)
2B	Differential	SST	Hastelloy C-276	Inert (Halocarbon)
31	Remote Seal	SST	316L SST	Silicone (Requires Option Code S1)
Code	O-ring Material			
A	Glass-filled TFE			

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Code	Housing Material	Conduit Entry Size
A	Polyurethane-covered Aluminum	½–14 NPT
B	Polyurethane-covered Aluminum	M20 × 1.5 (CM20)
C	Polyurethane-covered Aluminum	PG 13.5
D	Polyurethane-covered Aluminum	G½
J	SST	½–14 NPT
K	SST	M20 × 1.5 (CM20)
L	SST	PG 13.5
M	SST	G½
Code	Diaphragm Seal Assemblies (Optional)	
S1	One Diaphragm Seal (requires low pressure side Option Code 31 capillary connection type)	
Code	Product Certification Options	
Hazardous Locations Certifications		
E5	FM Explosion-Proof Approval	
I5	FM Non-incendive and Intrinsic Safety Approval	
K5	FM Explosion-Proof and Intrinsic Safety Approval	
I1	CENELEC Intrinsic Safety and Dust Certification (NOTE: Not available with low-power Option Code M.)	
N1	CENELEC Type n and Dust Certification (NOTE: Not available with low-power Option Code M.)	
E8	CENELEC Flame-Proof and Dust Certification	
E4	JIS Flame-Proof Certification (NOTE: Not available with low-power Option Code M.)	
C6	CSA Explosion-Proof and Intrinsic Safety Approval	
K6	Combination of CSA and CENELEC Explosion-Proof and Intrinsic Safety Approval NOTE: Not available with low-power Option Code M.	
K7	Combination of SAA Flame-Proof and Intrinsic Safety Approvals	
K8	Combination of CENELEC Flame-Proof and Intrinsic Safety Approvals NOTE: Not available with low-power Option Code M.	
KB	Combination of FM and CSA Explosion-Proof and Intrinsic Safety Approvals	
I7	SAA Intrinsic Safety Certification	
E7	SAA Flame-Proof Certification	
N7	SAA Type n Certification	
Code	Bolt for Flange and Adapters (Optional)	
L5	ASME B 16.5 (ANSI)/ASTM-A-193-B7M Bolts (Austenitic 316 SST bolts standard)	
Code	LCD Display Options	
M5	LCD display for Aluminum Housing (Housing Codes A, B, C, and D only)	
M6	LCD display for SST Housing (Housing Codes J, K, L, and M only)	

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Code	Other Options
Q4	Calibration Data Sheet
Q8	Material Traceability Certification per EN 10204 3.1.B <i>NOTE: This options is available with the diaphragm, upper housing, Coplanar flange, adapter, sensor module housing, lower housing/flushing connection, and extension.</i>
QP	Calibration certification and tamper evident seal
J1	Local Zero Adjustment Only <i>NOTE: Local zero and span adjustments are standard unless Option Code J1 or J3 is specified.</i>
J3	No Local Zero or Span Adjustment <i>NOTE: Local zero and span adjustments are standard unless Option Code J1 or J3 is specified.</i>
T1	Transient Protection Terminal Block <i>NOTE: Not available with hazardous locations certification Option Code I1, K6, or K8.</i>
C1	Custom Software Configuration (Completed CDS 00806-0100-4001 required with order)
C2	0.8–3.2 V dc Output with Digital Signal Based on HART Protocol (Output Code M only)
C4	Analog Output Levels Compliant with NAMUR Recommendation NE43, 27-June-1996 <i>NOTE: NAMUR-Compliant operation is pre-set at the factory and cannot be changed to standard operation in the field.</i>
CN	Analog Output Levels Compliant with NAMUR Recommendation NE43, 27-June-1996: Alarm Configuration–Low <i>NOTE: NAMUR-Compliant operation is pre-set at the factory and cannot be changed to standard operation in the field.</i>
D8	Ceramic Ball Drain/Vents
V5 ⁽¹⁾	External Ground Screw Assembly

Lower Housing Flushing Connections						
Code	Ring Material	Number	Size	Diaphragm Size		
				2 in.	3 in.	4 in.
F1	SST	1	¼	•	•	•
F2	SST	2	¼	•	•	•
F3	Hastelloy	1	¼	•	•	•
F4	Hastelloy	2	¼	•	•	•
F7	SST	1	½	•	•	•
F8	SST	2	½	•	•	•
F9	Hastelloy	1	½	•	•	•
F0	Hastelloy	2	½	•	•	•

NOTE: Flushing Codes F3 and F4 are not available with Option Codes A0, B0, and G0.

Typical Model Number:

(1) The V5 option is not needed with the T1 option; external ground screw assembly is included with the T1 option.

Model	Transmitter Type (Select One)	HD	HG	
3051HD	Differential Pressure Transmitter for High-Temperature Processes	.	—	
3051HG	Gage Pressure Transmitter for High-Temperature Processes	—	.	
Code	3051HD	3051HG		
2	–250 to 250 inH ₂ O/2.5 inH ₂ O (–0,62 to 0,62 bar/6,2 mbar)	–250 to 250 inH ₂ O/2.5 inH ₂ O (–0,62 to 0,62 bar/6,2 mbar)		
3	–1000 to 1000 inH ₂ O/10 inH ₂ O (–2,5 to 2,5 bar/25 mbar)	–407 to 1000 inH ₂ O/10in H ₂ O (–1,01 to 2,5 bar/25 mbar)		
4	–300 to 300 inH ₂ O/3 psi (–747 to 747 mbar/0,2 bar)	–14.7 to 300 psi/3 psi (–1,01 to 20,7 bar/0,2 bar)		
5	–2000 to 2000 psi/20 psi (–138 to 138 bar/1,4 bar)	–14.7 to 2000 psig/20 psi (–1,01 to 138 bar/1,4 bar)		
NOTE: 3051HG lower range limit varies with atmospheric pressure.				
Code	Output	HD	HG	
A	4–20 mA with Digital Signal Based on HART Protocol	.	.	
M	Low-Power 1–5 V dc with Digital Signal Based on HART Protocol (See Option Code C2 for 0.8–3.2 V dc Output)	.	.	
NOTE: Not available with hazardous certification Option Codes I1, N1, E4, K6, and K8.				
Code	PROCESS CONNECTION	HD	HG	
	Process Flange Material			
2	SST	.	.	
7	SST	.	.	
NOTE: Process Connection Code 7 meets NACE material recommendations per MR 01-75.				
Code	Process Isolating Diaphragm	HD	HG	
2	316L SST	.	.	
3	Hastelloy C-276 (Meets NACE material recommendations per MR 01-75)	.	.	
5	Tantalum	.	.	
Code	O-ring Material	HD	HG	
A	Glass-Filled TFE	.	.	
Code	Process Fill Fluid	HD	HG	
D	D.C. 200 Silicone	.	.	
H	Inert	.	.	
N	Neobee M-20	.	.	
Code	Sensor Module Isolator Material	HD	HG	
2	SST	.	.	
Code	Sensor Module Fill Fluid	HD	HG	
1	Silicone	.	.	
2	Inert (Halocarbon)	.	.	
Code	Housing Material	Conduit Entry Size	HD	HG
A	Polyurethane-covered Aluminum	½–14 NPT	.	.
B	Polyurethane-covered Aluminum	M20 × 1.5 (CM20)	.	.
C	Polyurethane-covered Aluminum	PG 13.5	.	.
D	Polyurethane-covered Aluminum	G½	.	.
J	SST	½–14 NPT	.	.
K	SST	M20 × 1.5 (CM20)	.	.
L	SST	PG 13.5	.	.
M	SST	G½	.	.
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Code	Integral Mount Primary Elements (Optional)	HD	HG
S4	Factory Assembly to Rosemount Primary Element (Diamond II+Annubar/Model 1195 Integral Orifice) <i>NOTE: With the primary element installed, the maximum operating pressure will equal the lesser of either the transmitter or the primary element. Option is available for factory assembly to range 1-4 transmitters only.</i>	.	—
Code	Mounting Bracket Options	HD	HG
B5	Universal Mounting Bracket for 2-in. Pipe or Panel Mount, CS Bolts	.	.
B6	Universal Mounting Bracket for 2-in. Pipe or Panel Mount, SST Bolts	.	.
Code	Product Certification Options	HD	HG
Hazardous Locations Certifications			
E5	FM Explosion-Proof Approval	.	.
I5	FM Non-incendive and Intrinsic Safety Approval	.	.
K5	FM Explosion-Proof and Intrinsic Safety Approval	.	.
I1	CENELEC Intrinsic Safety and Dust Certification (<i>NOTE: Not available with low-power Option Code M.</i>)	.	.
N1	CENELEC Type n and Dust Certification (<i>NOTE: Not available with low-power Option Code M.</i>)	.	.
E8	CENELEC Flame-Proof and Dust Certification	.	.
E4	JIS Flame-Proof Certification (<i>NOTE: Not available with low-power Option Code M.</i>)	.	.
C6	CSA Explosion-Proof and Intrinsic Safety Approval	.	.
K6	Combination of CSA and CENELEC Explosion-Proof and Intrinsic Safety Approval (<i>NOTE: Not available with low-power Option Code M.</i>)	.	.
K7	Combination of SAA Flame-Proof and Intrinsic Safety Approvals	.	.
K8	Combination of CENELEC Flame-Proof and Intrinsic Safety Approvals (<i>NOTE: Not available with low-power Option Code M.</i>)	.	.
KB	Combination of FM and CSA Explosion-Proof and Intrinsic Safety Approvals	.	.
I7	SAA Intrinsic Safety Certification	.	.
E7	SAA Flame-Proof Certification	.	.
N7	SAA Type n Certification	.	.
Code	Bolt for Flange and Adapter Options	HD	HG
L4	Austenitic 316 SST Bolts	.	.
Code	LCD Display Options	HD	HG
M5	LCD display for Aluminum Housing (Housing Codes A, B, C, and D only)	.	.
M6	LCD display for SST Housing (Housing Codes J, K, L, and M only)	.	.
Code	Other Options	HD	HG
Q4	Calibration Data Sheet	.	.
Q8	Material traceability certification per EN 10204 3.1.B	.	.
QP	Calibration certification and tamper evident seal	.	.
J1	Local Zero Adjustment Only <i>NOTE: Local zero and span adjustments are standard unless Option Code J1 or J3 is specified.</i>	.	.
J3	No Local Zero or Span Adjustment <i>NOTE: Local zero and span adjustments are standard unless Option Code J1 or J3 is specified.</i>	.	.
T1	Transient Protection Terminal Block <i>NOTE: Not available with hazardous locations certification Option Code I1, K6, or K8.</i>	.	.
C1	Custom Software Configuration (Completed CDS 00808-0100-4001 required with order)	.	.
C2	0.8–3.2 V dc Output with Digital Signal Based on HART Protocol (Output Code M only)	.	.
C4	Analog Output Levels Compliant with NAMUR Recommendation NE43, 27-June-1996 <i>NOTE: NAMUR-Compliant operation is pre-set at the factory and cannot be changed to standard operation in the field.</i>	.	.
CN	Analog Output Levels Compliant with NAMUR Recommendation NE43, 27-June-1996: Alarm Configuration—Low <i>NOTE: NAMUR-Compliant operation is pre-set at the factory and cannot be changed to standard operation in the field.</i>	.	.
P1	Hydrostatic Testing	.	.
P2	Cleaning for Special Service	.	.
P3	Cleaning for <1 PPM Chlorine/Fluorine	.	.
DF	1/2–14 NPT flange adapters—SST	.	.
D8	Ceramic Ball Drain/Vents	.	.
V5 ⁽¹⁾	External Ground Screw Assembly	.	.
Typical Model Number: 3051HG 2 A 2 2 A H 2 1 A B5			

(1) The V5 option is not needed with the T1 option; external ground screw assembly is included with the T1 option.

Model	Transmitter Type (Select One)	PD	PG	
3051PD	Model 3051P Reference Class Differential Pressure Transmitter	.	—	
3051PG	Model 3051 P Reference Class Gage Pressure Transmitter	.	.	
Pressure Ranges (Range/Min. Span)				
Code	Model 3051 PD	Model 3051 PG		
2	–250 to 250 inH ₂ O/25 inH ₂ O (–0,62 to 0,62 bar/62,3 mbar)	–250 to 250 inH ₂ O/25 inH ₂ O (–0,62 to 0,62 bar/6,2 mbar)	.	
3	–1000 to 1000 inH ₂ O/100 inH ₂ O (–2,5 to 2,5 bar/25 mbar)	–407 to 100 inH ₂ O/100 in H ₂ O (–1,01 to 2,5 bar/250 mbar)	.	
4	Not Applicable	–14.7 to 30 psi/30 psi (–1,01 to 20,7 bar/207 mbar)	—	
5	Not Applicable	–14.7 to 200 psig/200 psi (–1,01 to 138 bar/1,4 bar)	.	
NOTE: 3051PG lower range limit varies with atmospheric pressure.				
Code	Output	PD	PG	
A	4–20 mA with Digital Signal Based on HART Protocol	.	.	
MATERIALS OF CONSTRUCTION				
Code	Process Flange Type	Flange Material	Drain/Vent	
2	Coplanar	SST	SST	
0 ⁽¹⁾	Alternate Flange—See Alternate Flange Options page A-33.			
Code	Isolating Diaphragm	PD	PG	
2	316L SST	.	.	
Code	O-ring Material	PD	PG	
A	Glass-Filled TFE	.	.	
Code	Fill Fluid	PD	PG	
1	Silicone	.	.	
2	Inert (Halocarbon)	.	.	
Code	Housing Material	Conduit Entry Size	PD	PG
A	Polyurethane-covered Aluminum	½–14 NPT	.	.
B	Polyurethane-covered Aluminum	M20 × 1.5 (CM20)	.	.
C	Polyurethane-covered Aluminum	PG 13.5	.	.
D	Polyurethane-covered Aluminum	G½	.	.
J	SST	½–14 NPT	.	.
K	SST	M20 × 1.5 (CM20)	.	.
L	SST	PG 13.5	.	.
M	SST	G½	.	.
Code	Alternate Flange Options (Requires Materials of Construction Code 0)	PD	PG	
H2	Traditional Flange, 316 SST Drain/Vent, SST Flange Adapter	.	.	
FA	Level Flange, SST, 2 in., ANSI Class 150, Vertical Mount	.	.	
FB	Level Flange, SST, 2 in., ANSI Class 300, Vertical Mount	.	.	
FC	Level Flange, SST, 3 in., ANSI Class 150, Vertical Mount	.	.	
FD	Level Flange, SST, 3 in., ANSI Class 300, Vertical Mount	.	.	
FP	DIN Level Flange, SST, DN 50, PN 40, Vertical Mount	.	.	
FQ	DIN Level Flange, SST, DN 80, PN 40, Vertical Mount	.	.	
Code	Integral Mount Manifold Options	PD	PG	
S5	Assemble to Model 305 Integral Manifold	.	.	
Code	Integral Mount Primary Elements (Optional)	PD	PG	
S4	Factory Assembly to Rosemount Primary Element (Diamond II+Annubar/Model 1195 Integral Orifice)	.	—	
NOTE: With the primary element installed, the maximum operating pressure will equal the lesser of either the transmitter or the primary element. Option is available for factory assembly to range 2–3 transmitters only.				
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Code	Mounting Bracket Options	PD	PG
B4	Coplanar Flange Bracket for 2-In. Pipe or Panel Mounting, All SST	.	.
B1	Traditional Flange Bracket for 2-In. Pipe Mounting, CS Bolts	.	.
B2	Traditional Flange Bracket for Panel Mounting, CS Bolts	.	.
B7	B1 Bracket with Series 300 SST Bolts	.	.
B8	B2 Bracket with Series 300 SST Bolts	.	.
BA	SST B1 Bracket with Series 300 SST Bolts	.	.
BC	SST B3 Bracket with Series 300 SST Bolts	.	.
Code	Product Certification Options		
Hazardous Locations Certifications			
E5	FM Explosion-Proof Approval	.	.
I5	FM Non-incendive and Intrinsic Safety Approval	.	.
K5	FM Explosion-Proof and Intrinsic Safety Approval	.	.
I1	CENELEC Intrinsic Safety and Dust Certification	.	.
N1	CENELEC Type n and Dust Certification	.	.
E8	CENELEC Flame-Proof and Dust Certification	.	.
E4	JIS Flame-Proof Certification	.	.
C8	Canadian Standards Association (CSA) Explosion-Proof and Intrinsic Safety Approval	.	.
K6	Combination of CSA and CENELEC Explosion-Proof and Intrinsic Safety Approval	.	.
K7	Combination of SAA Flame-Proof and Intrinsic Safety Approvals	.	.
K8	Combination of CENELEC Flame-Proof and Intrinsic Safety Approvals	.	.
KB	Combination of FM and CSA Explosion-Proof and Intrinsic Safety Approvals	.	.
I7	SAA Intrinsic Safety Certification	.	.
E7	SAA Flame-Proof Certification	.	.
N7	SAA Type n Certification	.	.
Code	Other Options		
Q4	Calibration Data Sheet	.	.
Q8	Material Traceability Certification per EN 10204 3.1.B <i>NOTE: This option is available for the sensor module housing and Coplanar or traditional flanges and adapters.</i>	.	.
QP	Calibration Certification and Tamper Evident Seal	.	.
L4	Austenitic 316 SST Bolts	.	.
L5	ANSI/ASTM-A-193-B7M Bolts	.	.
L6	Monel Bolts	.	.
M5	LCD display for Aluminum Housing (Housing Codes A, B, C, and D only)	.	.
M6	LCD display for SST Housing (Housing Codes J, K, L, and M only)	.	.
J1	Local Zero Adjustment Only <i>NOTE: Local zero and span adjustments are standard unless Option Code J1 or J3 is specified.</i>	.	.
J3	No Local Zero or Span Adjustment <i>NOTE: Local zero and span adjustments are standard unless Option Code J1 or J3 is specified.</i>	.	.
T1	Transient Protection Terminal Block <i>NOTE: Not available with hazardous locations certification Option Code I1.</i>	.	.
C1	Custom Software Configuration (Completed CDS 00808-0100-4001 required with order)	.	.
C4	Analog Output Levels Compliant with NAMUR Recommendation NE43, 27-June-1996 <i>NOTE: NAMUR-Compliant operation is pre-set at the factory and cannot be changed to standard operation in the field.</i>	.	.
CN	Analog Output Levels Compliant with NAMUR Recommendation NE43, 27-June-1996: Alarm Configuration—Low <i>NOTE: NAMUR-Compliant operation is pre-set at the factory and cannot be changed to standard operation in the field.</i>	.	.
P1	Hydrostatic Testing	.	.
P2	Cleaning for Special Service	.	.
P3	Cleaning for <1 PPM Chlorine/Fluorine	.	.
P4	Calibrate at line pressure <i>NOTE: Specify Q48 on order for corresponding certificate.</i>	.	.
DF	1/2-14 NPT flange adapters—SST	.	.
D7	Coplanar Flange Without Drain/Vent Ports	.	.
V5 ⁽²⁾	External Ground Screw Assembly	.	.
Typical Model Number: 3051PD 3 A 2 2 A 1 A B4			

(1) NOTE: May impact temperature performance under certain conditions.

(2) The V5 option is not needed with the T1 option; external ground screw assembly is included with the T1 option.

PARTS LIST

Item numbers are references to figure callouts (pages 13–19).

Model 3051C Sensor Modules (Min. Span/Range)	Silicone Fill Part Number	Inert Fill Part Number
<i>Note: One spare part is recommended for every 50 transmitters.</i>		
<i>Note: Listed by Range and Process Isolator Order Numbers.</i>		
–3 to 3/0.1 inH₂O, Range 0 (includes Traditional SST flange and SST bolts).		
316L SST	03031-1045-0002	03031-1145-0002
–25 to 25 inH₂O/0.5 inH₂O, Range 1		
316L SST	03031-1045-0012	03031-1145-0012
Hastelloy C-276	03031-1045-0013	03031-1145-0013
Monel	03031-1045-0014	03031-1145-0014
Gold-plated Monel	03031-1045-0016	03031-1145-0016
Gold-plated 316 SST	03031-1045-0017	03031-1145-0017
–250 to 250 inH₂O/2.5 inH₂O, Range 2		
316L SST	03031-1045-0022	03031-1145-0022
Hastelloy C-276	03031-1045-0022	03031-1145-0022
Monel	03031-1045-0024	03031-1145-0024
Tantalum	03031-1045-0025	03031-1145-0025
Gold-plated Monel	03031-1045-0026	03031-1145-0026
Gold-plated 316 SST	03031-1045-0027	03031-1145-0027
–1000 to 1000 inH₂O/10 inH₂O, Range 3		
316L SST	03031-1045-0032	03031-1145-0032
Hastelloy C-276	03031-1045-0033	03031-1145-0033
Monel	03031-1045-0034	03031-1145-0034
Tantalum	03031-1045-0035	03031-1145-0035
Gold-plated Monel	03031-1045-0036	03031-1145-0036
Gold-plated 316 SST	03031-1045-0037	03031-1145-0037
–300 to 300 psi/3 psi, Range 4		
316L SST	03031-1045-2042	03031-1145-2042
Hastelloy C-276	03031-1045-2043	03031-1145-2043
Monel	03031-1045-2044	03031-1145-2044
Tantalum	03031-1045-2045	03031-1145-2045
Gold-plated Monel	03031-1045-2046	03031-1145-2046
Gold-plated 316 SST	03031-1045-2047	03031-1145-2047
–2000 to 2000/20 psi, Range 5		
316L SST	03031-1045-2052	03031-1145-2052
Hastelloy C-276	03031-1045-2053	03031-1145-2053
Monel	03031-1045-2054	03031-1145-2054
Tantalum	03031-1045-2055	03031-1145-2055
Gold-plated Monel	03031-1045-2056	03031-1145-2056
Gold-plated 316 SST	03031-1045-2057	03031-1145-2057

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Model 3051C Gage Modules (Min. Span/Range)	Silicone Fill Part Number	Inert Fill Part Number
<i>Note: One spare part is recommended for every 50 transmitters.</i>		
<i>Note: Listed by Range and Process Isolator Order Numbers.</i>		
-250 to 250 inH₂O/2.5 inH₂O, Range 2		
316L SST	03031-1045-0022	03031-1145-0022
Hastelloy C-276	03031-1045-0023	03031-1145-0023
Monel	03031-1045-0024	03031-1145-0024
Tantalum	03031-1045-0025	03031-1145-0025
Gold-plated Monel	03031-1045-0026	03031-1145-0026
Gold-plated 316 SST	03031-1045-0027	03031-1145-0027
-335 to 1000 inH₂O/10 inH₂O, Range 3		
316L SST	03031-1045-0032	03031-1145-0032
Hastelloy C-276	03031-1045-0033	03031-1145-0033
Monel	03031-1045-0034	03031-1145-0034
Tantalum	03031-1045-0035	03031-1145-0035
Gold-plated Monel	03031-1045-0036	03031-1145-0036
Gold-plated 316 SST	03031-1045-0037	03031-1145-0037
-12 to 300 psi/3 psi, Range 4		
316L SST	03031-1045-1042	03031-1145-1042
Hastelloy C-276	03031-1045-1043	03031-1145-1043
Monel	03031-1045-1044	03031-1145-1044
Tantalum	03031-1045-1045	03031-1145-1045
Gold-plated Monel	03031-1045-1046	03031-1145-1046
Gold-plated 316 SST	03031-1045-1047	03031-1145-1047
-12 to 2000 psi/20 psi, Range 5		
316L SST	03031-1045-1052	03031-1145-1052
Hastelloy C-276	03031-1045-1053	03031-1145-1053
Monel	03031-1045-1054	03031-1145-1054
Tantalum	03031-1045-1055	03031-1145-1055
Gold-plated Monel	03031-1045-1056	03031-1145-1056
Gold-plated 316 SST	03031-1045-1057	03031-1145-1057

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Model 3051C Absolute Sensor Modules (Min. Span/Range)	Silicone Fill	Inert Fill
	Part Number	Part Number
<i>Note: One spare part is recommended for every 50 transmitters.</i>		
<i>Note: Listed by Range and Process Isolator Order Numbers.</i>		
0 to 0.167 psia/5 psia, Range 0 (includes Traditional SST flange and SST bolts).		
316L SST	03031-2020-0002	—
Hastelloy C-276	03031-2020-0003	—
Monel	03031-2020-0004	—
Gold-plated Monel	03031-2020-0006	—
Gold-plated 316 SST	03031-2020-0007	—
0 to 30 psia/0.3 psia, Range 1		
316L SST	03031-2020-0012	—
Hastelloy C-276	03031-2020-0013	—
Monel	03031-2020-0014	—
Gold-plated Monel	03031-2020-0016	—
Gold-plated 316 SST	03031-2020-0017	—
0 to 150/1.5 psia, Range 2		
316L SST	03031-2020-0022	—
Hastelloy C-276	03031-2020-0023	—
Monel	03031-2020-0024	—
Gold-plated Monel	03031-2020-0026	—
Gold-plated 316 SST	03031-2020-0027	—
0 to 800 psia/8 psia, Range 3		
316L SST	03031-2020-0032	—
Hastelloy C-276	03031-2020-0033	—
Monel	03031-2020-0034	—
Gold-plated Monel	03031-2020-0036	—
Gold-plated 316 SST	03031-2020-0037	—

Model 3051T Sensor Modules ⁽¹⁾	Isolating Diaphragm	Housing Material	Silicone Fill	Inert Fill
			Part Number	Part Number
Gage Sensor Module ⁽²⁾				
0-0.3/30 psig, Range 1				
1/4-18 NPT Female	316L SST	Aluminum	03031-3112-3112	03031-3112-1112
1/4-18 NPT Female	Hastelloy C	Aluminum	03031-3112-3113	03031-3112-1113
1/2-14 NPT Female	316L SST	Aluminum	03031-3102-3112	03031-3102-1112
1/2-14 NPT Female	Hastelloy C	Aluminum	03031-3102-3113	03031-3102-1113
G1/2A DIN 16288 Male	316L SST	Aluminum	03031-3132-3112	03031-3132-1112
1/4-18 NPT Female	316L SST	SST	03031-3111-3112	03031-3111-1112
1/4-18 NPT Female	Hastelloy C	SST	03031-3111-3113	03031-3111-1113
1/2-14 NPT Female	316L SST	SST	03031-3101-3112	03031-3101-1112
1/2-14 NPT Female	Hastelloy C	SST	03031-3101-3113	03031-3101-1113

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Model 3051T Sensor Modules ⁽¹⁾	Isolating Diaphragm	Housing Material	Silicone Fill	Inert Fill
			Part Number	Part Number
Gage Sensor Module(2) 0–1.5/150 psig, Range 2				
1/4–18 NPT Female	316L SST	Aluminum	03031-3112-3122	03031-3112-1122
1/4–18 NPT Female	Hastelloy C	Aluminum	03031-3112-3123	03031-3112-1123
1/2–14 NPT Female	316L SST	Aluminum	03031-3102-3122	03031-3102-1122
1/2–14 NPT Female	Hastelloy C	Aluminum	03031-3102-3123	03031-3102-1123
G1/2A DIN 16288 Male	316L SST	Aluminum	03031-3132-3122	03031-3132-1122
1/4–18 NPT Female	316L SST	SST	03031-3111-3122	03031-3111-1122
1/4–18 NPT Female	Hastelloy C	SST	03031-3111-3123	03031-3111-1123
1/2–14 NPT Female	316L SST	SST	03031-3101-3122	03031-3101-1122
1/2–14 NPT Female	Hastelloy C	SST	03031-3101-3123	03031-3101-1123
Gage Sensor Module(2) 0–8/800 psig, Range 3				
1/4–18 NPT Female	316L SST	Aluminum	03031-3112-3132	03031-3112-1132
1/4–18 NPT Female	Hastelloy C	Aluminum	03031-3112-3133	03031-3112-1133
1/2–14 NPT Female	316L SST	Aluminum	03031-3102-3132	03031-3102-1132
1/2–14 NPT Female	Hastelloy C	Aluminum	03031-3102-3133	03031-3102-1133
G1/2A DIN 16288 Male	316L SST	Aluminum	03031-3132-3132	03031-3132-1132
1/4–18 NPT Female	316L SST	SST	03031-3111-3132	03031-3111-1132
1/4–18 NPT Female	Hastelloy C	SST	03031-3111-3133	03031-3111-1133
1/2–14 NPT Female	316L SST	SST	03031-3101-3132	03031-3101-1132
1/2–14 NPT Female	Hastelloy C	SST	03031-3101-3133	03031-3101-1133
Gage Sensor Module(2) 0–40/4000 psig, Range 4				
1/4–18 NPT Female	316L SST	Aluminum	03031-3112-3142	03031-3112-1142
1/4–18 NPT Female	Hastelloy C	Aluminum	03031-3112-3143	03031-3112-1143
1/2–14 NPT Female	316L SST	Aluminum	03031-3102-3142	03031-3102-1142
1/2–14 NPT Female	Hastelloy C	Aluminum	03031-3102-3143	03031-3102-1143
G1/2A DIN 16288 Male	316L SST	Aluminum	03031-3132-3142	03031-3132-1142
1/4–18 NPT Female	316L SST	SST	03031-3111-3142	03031-3111-1142
1/4–18 NPT Female	Hastelloy C	SST	03031-3111-3143	03031-3111-1143
1/2–14 NPT Female	316L SST	SST	03031-3101-3142	03031-3101-1142
1/2–14 NPT Female	Hastelloy C	SST	03031-3101-3143	03031-3101-1143
Absolute Sensor Module(2) 0–0.3/30 psig, Range 1				
1/4–18 NPT Female	316L SST	Aluminum	03031-3112-3012	03031-3112-1012
1/4–18 NPT Female	Hastelloy C	Aluminum	03031-3112-3013	03031-3112-1013
1/2–14 NPT Female	316L SST	Aluminum	03031-3102-3012	03031-3102-1012
1/2–14 NPT Female	Hastelloy C	Aluminum	03031-3102-3013	03031-3102-1013
G1/2A DIN 16288 Male	316L SST	Aluminum	03031-3132-3012	03031-3132-1012
1/4–18 NPT Female	316L SST	SST	03031-3111-3012	03031-3111-1012
1/4–18 NPT Female	Hastelloy C	SST	03031-3111-3013	03031-3111-1013
1/2–14 NPT Female	316L SST	SST	03031-3101-3012	03031-3101-1012
1/2–14 NPT Female	Hastelloy C	SST	03031-3101-3013	03031-3101-1013

Model 3051T Sensor Modules ⁽¹⁾	Isolating Diaphragm	Housing Material	Silicone Fill	Inert Fill
			Part Number	Part Number
Absolute Sensor Module(2) 0-1.5/150 psig, Range 2				
1/4-18 NPT Female	316L SST	Aluminum	03031-3112-3022	03031-3112-1022
1/4-18 NPT Female	Hastelloy C	Aluminum	03031-3112-3023	03031-3112-1023
1/2-14 NPT Female	316L SST	Aluminum	03031-3102-3022	03031-3102-1022
1/2-14 NPT Female	Hastelloy C	Aluminum	03031-3102-3023	03031-3102-1023
G1/2A DIN 16288 Male	316L SST	Aluminum	03031-3132-3022	03031-3132-1022
1/4-18 NPT Female	316L SST	SST	03031-3111-3022	03031-3111-1022
1/4-18 NPT Female	Hastelloy C	SST	03031-3111-3023	03031-3111-1023
1/2-14 NPT Female	316L SST	SST	03031-3101-3022	03031-3101-1022
1/2-14 NPT Female	Hastelloy C	SST	03031-3101-3023	03031-3101-1023
Absolute Sensor Module(2) 0-8/800 psig, Range 3				
1/4-18 NPT Female	316L SST	Aluminum	03031-3112-3032	03031-3112-1032
1/4-18 NPT Female	Hastelloy C	Aluminum	03031-3112-3033	03031-3112-1033
1/2-14 NPT Female	316L SST	Aluminum	03031-3102-3032	03031-3102-1032
1/2-14 NPT Female	Hastelloy C	Aluminum	03031-3102-3033	03031-3102-1033
G1/2A DIN 16288 Male	316L SST	Aluminum	03031-3132-3032	03031-3132-1032
1/4-18 NPT Female	316L SST	SST	03031-3111-3032	03031-3111-1032
1/4-18 NPT Female	Hastelloy C	SST	03031-3111-3033	03031-3111-1033
1/2-14 NPT Female	316L SST	SST	03031-3101-3032	03031-3101-1032
1/2-14 NPT Female	Hastelloy C	SST	03031-3101-3033	03031-3101-1033
Absolute Sensor Module(2) 0-40/4000 psig, Range 4				
1/4-18 NPT Female	316L SST	Aluminum	03031-3112-3042	03031-3112-1042
1/4-18 NPT Female	Hastelloy C	Aluminum	03031-3112-3043	03031-3112-1043
1/2-14 NPT Female	316L SST	Aluminum	03031-3102-3042	03031-3102-1042
1/2-14 NPT Female	Hastelloy C	Aluminum	03031-3102-3043	03031-3102-1043
G1/2A DIN 16288 Male	316L SST	Aluminum	03031-3132-3042	03031-3132-1042
1/4-18 NPT Female	316L SST	SST	03031-3111-3042	03031-3111-1042
1/4-18 NPT Female	Hastelloy C	SST	03031-3111-3043	03031-3111-1043
1/2-14 NPT Female	316L SST	SST	03031-3101-3042	03031-3101-1042
1/2-14 NPT Female	Hastelloy C	SST	03031-3101-3043	03031-3101-1043
Absolute Sensor Module(2) 0-2000/10000 psig, Range 5				
1/4-18 NPT Female	316L SST	Aluminum	03031-3112-3052	03031-3112-1052
1/4-18 NPT Female	Hastelloy C	Aluminum	03031-3112-3053	03031-3112-1053
1/2-14 NPT Female	316L SST	Aluminum	03031-3102-3052	03031-3102-1052
1/2-14 NPT Female	Hastelloy C	Aluminum	03031-3102-3053	03031-3102-1053
G1/2A DIN 16288 Male	316L SST	Aluminum	03031-3122-3052	03031-3122-1052
1/4-18 NPT Female	316L SST	SST	03031-3111-3052	03031-3111-1052
1/4-18 NPT Female	Hastelloy C	SST	03031-3111-3053	03031-3111-1053
1/2-14 NPT Female	316L SST	SST	03031-3101-3052	03031-3101-1052
1/2-14 NPT Female	Hastelloy C	SST	03031-3121-3053	03031-3121-1053

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

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PART DESCRIPTION	PART NUMBER	CD	CG	CA	L	H	T
Electronics Board—Assembly Required							
Improved Standard (4–20 mA/HART protocol) ⁽¹⁾	03031-0001-0002	•	•	•	•	•	•
Improved NAMUR Compliant (4–20 mA/HART protocol) ⁽¹⁾	03031-0001-0003	•	•	•	•	•	•
Low Power (1–5/0.8–3.2 Volts) ⁽¹⁾	03031-0001-1001	•	•	•	•	•	•
Electronics Housing, Covers, Terminal Block							
NOTE: See drawings below for Previous and Improved Electronics Boards, Housings, and Terminal Blocks. For information on ordering "Previous Design" spare parts, contact your local Rosemount office. In the U.S., call the Response Center at 1-800-654-7768.							
Improved Standard (4–20 mA) Aluminum Housing							
Electronics Housing without terminal block							
½–14 NPT conduit, Includes RFI Filters	03031-0635-0001	•	•	•	•	•	•
M20×1.5 (CM20) conduit, Includes RFI filters	03031-0635-0002	•	•	•	•	•	•
PG 13.5 conduit, Includes RFI Filters	03031-0635-0003	•	•	•	•	•	•
G½ conduit, Includes RFI Filters	03031-0635-0004	•	•	•	•	•	•
Electronics Cover (Includes wiring label) ⁽²⁾	03031-0292-0001	•	•	•	•	•	•
Standard Terminal Block Assembly ⁽¹⁾	03031-0332-0003	•	•	•	•	•	•
Transient Terminal Block Assy. (Option T1) ⁽²⁾	03031-0332-0004	•	•	•	•	•	•
Local Zero and Span Kit ⁽¹⁾	03031-0293-0002	•	•	•	•	•	•
External Ground Assembly (Option V5) ⁽¹⁾	03031-0398-0001	•	•	•	•	•	•
Improved Standard (4–20 mA) 316 SST Housing							
Electronics Housing without Terminal Block							
½–14 NPT conduit, Includes RFI Filters	03031-0635-0041	•	•	•	•	•	•
M20×1.5 (CM20) conduit, Includes RFI Filters	03031-0635-0042	•	•	•	•	•	•
PG 13.5 conduit, Includes RFI Filters	03031-0635-0043	•	•	•	•	•	•
Electronics Cover (Includes wiring label) ⁽²⁾	03031-0292-0002	•	•	•	•	•	•
Standard Terminal Block Assembly ⁽¹⁾	03031-0332-0003	•	•	•	•	•	•
Transient Terminal Block Assy. (Option T1) ⁽²⁾	03031-0332-0004	•	•	•	•	•	•
Local Zero and Span Kit ⁽¹⁾	03031-0293-0002	•	•	•	•	•	•
External Ground Assembly (Option V5) ⁽¹⁾	03031-0398-0001	•	•	•	•	•	•
Improved Low Power Aluminum Housing							
Electronics Housing without Terminal Block							
½–14 NPT conduit, Includes RFI Filters	03031-0635-0101	•	•	•	•	•	•
Electronics Cover (Includes wiring label) ⁽²⁾	03031-0292-0001	•	•	•	•	•	•
Low Power Terminal Block Assembly ⁽¹⁾	03031-0332-1001	•	•	•	•	•	•
Low Power Transient Terminal Block Assembly (Option T1) ⁽²⁾	03031-0332-1002	•	•	•	•	•	•
Local Zero and Span Kit ⁽¹⁾	03031-0293-0002	•	•	•	•	•	•
External Ground Assembly (Option V5) ⁽¹⁾	03031-0398-0001	•	•	•	•	•	•
Improved Low Power 316 SST Housing							
Electronics Housing without Terminal Block							
½–14 NPT conduit, Includes RFI Filters	03031-0635-0141	•	•	•	•	•	•
Electronics Cover (Includes wiring label) ⁽²⁾	03031-0292-0002	•	•	•	•	•	•
Low Power Terminal Block Assembly ⁽¹⁾	03031-0332-1001	•	•	•	•	•	•
Low Power Transient Terminal Block Assembly (Option T1) ⁽²⁾	03031-0332-1002	•	•	•	•	•	•
Local Zero and Span Kit ⁽¹⁾	03031-0293-0002	•	•	•	•	•	•
External Ground Assembly (Option V5) ⁽¹⁾	03031-0398-0001	•	•	•	•	•	•

Flanges		CD	CG	CA	L	H	T
PROCESS FLANGES							
Differential Coplanar Flange							
Nickel-plated Carbon Steel	03031-0388-0025	•	—	—	—	—	—
316 SST	03031-0388-0022	•	—	—	—	—	—
Hastelloy C	03031-0388-0023	•	—	—	—	—	—
Monel	03031-0388-0024	•	—	—	—	—	—
Gage/Absolute Coplanar Flange							
Nickel-plated Carbon Steel	03031-0388-1025	—	•	•	—	—	—
316 SST	03031-0388-1022	—	•	•	—	—	—
Hastelloy C	03031-0388-1023	—	•	•	—	—	—
Monel	03031-0388-1024	—	•	•	—	—	—
Coplanar Flange Alignment Screw (package of 2 screws)	03031-0309-0001	•	•	•	—	—	—
Traditional Flange							
316 SST	03031-0320-0002	•	•	•	—	—	—
Hastelloy C	03031-0320-0003	•	•	•	—	—	—
Monel	03031-0320-0004	•	•	•	—	—	—
Level Flange, Vertical Mount							
2 in., Class 150, SST	03031-0393-0221	•	•	•	—	—	—
2 in., Class 300, SST	03031-0393-0222	•	•	•	—	—	—
3 in., Class 150, SST	03031-0393-0231	•	•	•	—	—	—
3 in., Class 300, SST	03031-0393-0232	•	•	•	—	—	—
DIN, DN 50, PN 40	03031-0393-1002	•	•	•	—	—	—
DIN, DN 80, PN 40	03031-0393-1012	•	•	•	—	—	—
Model 3051H Flanges							
Process Flange	02051-0072-0002	—	—	—	—	•	—
Blank Flange (GP Low Side)	02051-0236-0002	—	—	—	—	•	—
Flange Adapter Union		CD	CG	CA	L	H	T
Nickel-plated Carbon Steel	02024-0069-0005	•	•	•	—	—	—
316 SST	02024-0069-0002	•	•	•	—	—	—
Hastelloy C	02024-0069-0003	•	•	•	—	—	—
Monel	02024-0069-0004	•	•	•	—	—	—
Drain/Vent Valve Kits		CD	CG	CA	L	H	T
Differential Drain/Vent Kits(1)							
316 SST Stem and Seat Kit	01151-0028-0022	•	—	—	—	•	—
Hastelloy C Stem and Seat Kit	01151-0028-0023	•	—	—	—	•	—
Monel Stem and Seat Kit	01151-0028-0024	•	—	—	—	•	—
316 SST Ceramic Ball Drain/Vent Kit	01151-0028-0122	•	—	—	—	•	—
Hastelloy C Ceramic Ball Drain/Vent Kit	01151-0028-0123	•	—	—	—	•	—
Monel Ceramic Ball Drain/Vent Kit	01151-0028-0124	•	—	—	—	•	—
Gage/Absolute Drain/Vent Kits(1)							
316 SST Stem and Seat Kit	01151-0028-0012	—	•	•	•	•	—
Hastelloy C Stem and Seat Kit	01151-0028-0013	—	•	•	•	•	—
Monel Stem and Seat Kit	01151-0028-0014	—	•	•	•	•	—
316 SST Ceramic Ball Drain/Vent Kit	01151-0028-0112	—	•	•	•	•	—
Hastelloy C Ceramic Ball Drain/Vent Kit	01151-0028-0113	—	•	•	•	•	—
Monel Ceramic Ball Drain/Vent Kit	01151-0028-0114	—	•	•	•	•	—
(Each kit contains parts for one transmitter.)							

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O-Ring Packages		CD	CG	CA	L	H	T
Electronic Housing, Cover (Std. and Meter) ⁽¹⁾	03031-0232-0001	•	•	•	•	•	•
Electronics Housing, Module ⁽¹⁾	03031-0233-0001	•	•	•	•	•	•
Process Flange, Glass-filled Teflon ⁽¹⁾	03031-0234-0001	•	•	•	—	—	—
Process Flange, Graphite-filled Teflon	03031-0234-0002	•	•	•	—	—	—
Flange Adapter, Glass-filled Teflon ⁽¹⁾	03031-0242-0001	•	•	•	—	—	—
Flange Adapter, Graphite-filled Teflon	03031-0242-0002	•	•	•	—	—	—
3051H Process Flange, TFE	02051-0167-0001	—	—	—	—	•	—
Mounting Brackets		CD	CG	CA	L	H	T
Coplanar Flange Bracket Kit							
B4 Bracket, SST, 2-in. Pipe Mount, SST Bolts	03031-0189-0003	•	•	•	—	—	—
3051T Bracket Kit							
B4 Bracket, SST, 2-in. Pipe Mount, SST Bolts	02088-0071-0001	—	—	—	—	—	•
Traditional Flange Bracket Kits							
B1 Bracket, 2-in. Pipe Mount, CS Bolts	03031-0313-0001	•	•	•	—	—	—
B2 Bracket, Panel Mount, CS Bolts	03031-0313-0002	•	•	•	—	—	—
B3 Flat Bracket for 2-in. Pipe Mount, CS Bolts	03031-0313-0003	•	•	•	—	—	—
B7 (B1 Style Bracket with SST Bolts)	03031-0313-0007	•	•	•	—	—	—
B8 (B2 Style Bracket with SST Bolts)	03031-0313-0008	•	•	•	—	—	—
B9 (B3 Style Bracket with SST Bolts)	03031-0313-0009	•	•	•	—	—	—
BA (SST B1 Bracket with SST Bolts)	03031-0313-0011	•	•	•	—	—	—
BC (SST B3 Bracket with SST Bolts)	03031-0313-0013	•	•	•	—	—	—
Model 3051H Bracket Kits							
B5 Universal Bracket for 2-in. Pipe and Panel Mount, CS Bolts	03051-1081-0001	—	—	—	—	•	—
B6 Universal Bracket for 2-in. Pipe or Panel Mount, SST Bolts	03051-1081-0002	—	—	—	—	•	—

Bolt Kits		CD	CG	CA	L	H	T
Coplanar Flange							
Flange Bolt Kit {44 mm (1.75 in.)}					—	—	—
Carbon Steel (set of 4)	03031-0312-0001	•	•	•	—	—	—
316 SST (set of 4)	03031-0312-0002	•	•	•	—	—	—
ANSI/ASTM-A-193-B7M	03031-0312-0003	•	•	•	—	—	—
Monel	03031-0312-0004	•	•	•	—	—	—
Flange/Adapter Bolt Kit {73 mm (2.88 in.)}							
Carbon Steel (set of 4)	03031-0306-0001	•	•	•	—	—	—
316 SST (set of 4)	03031-0306-0002	•	•	•	—	—	—
ANSI/ASTM-A-193-B7M	03031-0306-0003	•	•	•	—	—	—
Monel	03031-0306-0004	•	•	•	—	—	—
Manifold/Flange Kit {57 mm (2.25 in.)}							
Carbon Steel (set of 4)	03031-0311-0001	•	—	—	—	—	—
316 SST (set of 4)	03031-0311-0002	•	—	—	—	—	—
ANSI/ASTM-A-193-B7M	03031-0311-0003	•	—	—	—	—	—
Monel	03031-0311-0004	•	—	—	—	—	—
Traditional Flange							
Differential Flange and Adapter Bolt Kit {44 mm (1.75 in.)}							
Carbon Steel (set of 8)	03031-0307-0001	•	—	—	—	—	—
316 SST (set of 8)	03031-0307-0002	•	—	—	—	—	—
ANSI/ASTM-A-193-B7M	03031-0307-0003	•	—	—	—	—	—
Monel	03031-0307-0004	•	—	—	—	—	—
Gage/Absolute Flange and Adapter Bolt Kit							
Carbon Steel (set of 6)	03031-0307-1001	—	•	•	—	—	—
316 SST (set of 6)	03031-0307-1002	—	•	•	—	—	—
ANSI/ASTM-A-193-B7M	03031-0307-1003	—	•	•	—	—	—
Monel	03031-0307-1004	—	•	•	—	—	—
Manifold/Traditional Flange Bolts							
Carbon Steel	Use bolts supplied with manifold						
316 SST	Use bolts supplied with manifold						
Level Flange, Vertical Mount							
Flange Bolt Kit							
Carbon Steel (set of 4)	03031-0395-0001	•	•	•	—	—	—
316 SST (set of 4)	03031-0395-0002	•	•	•	—	—	—
(Each kit contains bolts for one transmitter.)							
Model 3051H Flange							
Process Flange Bolt Kit, Carbon Steel	02051-0164-0001	—	—	—	—	•	—
FlangeBolt (set of 4)							
Flange Nut (set of 4)							
Adapter Bolts (set of 4)							
Other							
Process Flange Bolt Kit, 316 SST	02051-0164-0002	—	—	—	—	•	—
Bolt for Process Flange (set of 4)							
Nut for Process Flange (set of 4)							
Adapter Bolts (set of 4)							

- (1) One spare part is recommended for every 25 transmitters.
(2) One spare part is recommended for every 50 transmitters

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Part Description	Part Number	CD	CG	CA	L	H	T
Meter for current Aluminum Housing							
<i>Meter Kit</i>	03031-0193-0101	.	.	.	.	.	.
Meter Display							
Captive Mounting Hardware							
10-pin Interconnection Header							
Cover Assembly							
<i>Meter Hardware Only</i>	03031-0193-0103	.	.	.	.	.	.
Meter Display							
Captive Mounting Hardware							
10-pin Interconnection Header							
<i>Cover Assembly Kit</i>	03031-0193-0002	.	.	.	.	.	.
Meter for current 316 SST Housing							
<i>Meter Kit ⁽¹⁾</i>	03031-0193-0111	.	.	.	.	.	.
Meter Display							
Captive Mounting Hardware							
10-pin Interconnection Header							
Cover Assembly							
<i>Meter Hardware Only</i>	03031-0193-0103	.	.	.	.	.	.
Meter Display							
Captive Mounting Hardware							
10-pin Interconnection Header							
<i>Cover Assembly Kit</i>	03031-0193-0012	.	.	.	.	.	.
Meter for Previous Aluminum Housing							
<i>Previous Meter Kit ⁽¹⁾</i>	03031-0193-0001	.	.	.	.	.	.
<i>NOTE: Previous Meter Kit includes meter display, captive mounting hardware, 6-pin interconnection header, and cover assembly.</i>							
<i>Improved Kit for Previous Aluminum Housing ⁽¹⁾</i>	03031-0193-1101	.	.	.	.	.	.
Meter Display							
Captive Mounting Hardware							
10-pin Interconnection Header							
Cover Assembly							
<i>Previous Meter Hardware Only ⁽¹⁾</i>	03031-0193-0003	.	.	.	.	.	.
<i>NOTE: Previous Meter Hardware includes meter display, captive mounting hardware, and 6-pin interconnection header only.</i>							
<i>Improved Meter for Previous Housing</i>	03031-0193-1103	.	.	.	.	.	.
Meter Display							
Captive Mounting Hardware							
10-pin Interconnection Header							
<i>Cover Assembly Kit</i>	03031-0193-0002	.	.	.	.	.	.
Meter for Previous 316 SST Housing							
<i>Previous Meter Kit ⁽¹⁾</i>	03031-0193-0011	.	.	.	.	.	.
<i>Improved Kit for Previous SST Housing ⁽¹⁾</i>	03031-0193-1111	.	.	.	.	.	.
Meter Display							
Captive Mounting Hardware							
10-pin Interconnection Header							
Cover Assembly							
<i>Previous Meter Hardware Only ⁽¹⁾</i>	03031-0193-0003	.	.	.	.	.	.
<i>Improved Meter for Previous Housing ⁽¹⁾</i>	03031-0193-1103	.	.	.	.	.	.
Meter Display							
Captive Mounting Hardware							
10-pin Interconnection Header							
<i>Cover Assembly Kit</i>	03031-0193-0012	.	.	.	.	.	.

OPTIONS

Standard Configuration

Unless otherwise specified, transmitter is shipped as follows:

ENGINEERING UNITS

Differential/Gage:

InH₂O (Range 0, 1, 2, and 3) psi (Range 4 and 5)
psi (all ranges)

Absolute/3051T:

4 mA (1 V dc): 0 (engineering units above)

20 mA (5 V dc): Upper range limit

Output: Linear

Flange type: Specified model code option

Flange material: Specified model code option

O-ring material: Specified model code option

Drain/vent: Specified model code option

Integral meter: Installed or none

Alarm: Upscale

Software tag: (Blank)

Custom Configuration HART protocol only (Option Code C1)

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

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

Refer to the "HART Protocol C1 Option Configuration Data Sheet" on page 50.

Tagging

Three customer tagging options are available:

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

Optional Model 305 or Model 306 Integral Manifolds

Factory assembled to Model 3051C and Model 3051T transmitters. Refer to the following Rosemount document for more information: Product Data Sheet 00813-0100-4733

Optional Three-Valve Manifolds

(Packaged Separately)

Part No.1151-0150-0001

3-Valve Manifold, Carbon Steel

Part No. 1151-0150-0002

3-Valve Manifold, 316 SST

Optional Diaphragm and Sanitary Seals

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

Output Information

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

InH ₂ O	InH ₂ O@4 °C ⁽¹⁾	psi	Pa
InHg	ftH ₂ O	bar	kPa
mmH ₂ O	mmH ₂ O@4 °C ⁽¹⁾	mbar	torr
mmHg	g/cm ²	kg/cm ²	atm

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

LCD Display

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

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

M6 Digital Meter with 316 Stainless Steel Cover

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

Local Span and Zero Adjustment

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

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

J1 Local Zero Adjustment Only

J3 No Local Zero or Span Adjustment

Transient Protection

- Integral transient protection terminal block
- Meets IEEE Standard 587, Category B
 - 1 kV crest ($10 \times 1\,000$ microseconds)
 - 3 kV crest (8×20 microseconds)
 - 6 kV crest (1.2×50 microseconds)
- Meets IEEE Standard 472,
Surge Withstand Capability
SWC 2.5 kV crest, 1 MHz wave form
- Applicable standards: 61000-4-4, 61000-4-5

T1 Integral Transient Protection Terminal Block

Bolts for Flanges and Adapters

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

L4 Austenitic 316 Stainless Steel Bolts

L5 ASTM-A-193-B7M Bolts

L6 Monel Bolts

Model 3051C/P Coplanar Flange and Model 3051T Bracket Option

B4 Bracket for 2-in. Pipe or Panel Mounting

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

Model 3051H Bracket Options

B5 Bracket for 2-in. Pipe or Panel Mounting

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

B6 B5 Bracket with SST Bolts

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

Traditional Flange Bracket Options

B1 Bracket for 2-in. Pipe Mounting

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

B2 Bracket for Panel Mounting

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

B3 Flat Bracket for 2-in. Pipe Mounting

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

B7 B1 Bracket with SST Bolts

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

B8 B2 Bracket with SST Bolts

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

B9 B3 Bracket with SST Bolts

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

BA Stainless Steel B1 Bracket with SST Bolts

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

BC Stainless Steel B3 Bracket with SST Bolts

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

Shipping Weights

Table A-4. Transmitter Weights without Options

Transmitter	Add Weight In lb (kg)
Model 3051C/P	6.0 (2,7)
Model 3051L	Table A-7 on page A-49
Model 3051H	13.6 (6,2)
Model 3051T	3.0 (1,4)

Table A-5. Model 3051L Weights without Options

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

Table A-6. Transmitter Options Weights

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

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HART PROTOCOL C1 OPTION CONFIGURATION DATA SHEET

★ = Default Value⁽¹⁾

CONFIGURATION DATA SHEET	
Customer: _____	P.O. No.: _____
Model No.: _____	Line Item: _____
SST Tag No.: _____	
Software Tag: | | | | | | | |	

OUTPUT INFORMATION: (Software Selectable)	
4 mA (1, 0.8 Volts) = _____	0 ★
20 mA (5, 3.2 Volts) = _____	Upper Range Limit ★
Pressure Units = <input type="checkbox"/> inH ₂ O ⁽²⁾ ★ <input type="checkbox"/> psi ⁽³⁾ ★ <input type="checkbox"/> Pa <input type="checkbox"/> ftH ₂ O	
<input type="checkbox"/> inHg <input type="checkbox"/> bar <input type="checkbox"/> kPa <input type="checkbox"/> g/cm ²	
<input type="checkbox"/> mbar <input type="checkbox"/> Torr <input type="checkbox"/> mmH ₂ O <input type="checkbox"/> inH ₂ O at 4 °C ⁽⁵⁾	
<input type="checkbox"/> Atm <input type="checkbox"/> kg/cm ² <input type="checkbox"/> mmHg <input type="checkbox"/> mmH ₂ O at 4 °C ⁽⁵⁾	
Output = <input type="checkbox"/> Linear ★ <input type="checkbox"/> Square Root (For DP transmitters only)	
Damping ⁽⁴⁾ = <input type="checkbox"/> 0.00 sec. <input type="checkbox"/> 0.05 sec. <input type="checkbox"/> 0.10 sec. <input type="checkbox"/> 0.20 sec. <input type="checkbox"/> 0.40 sec.★	
<input type="checkbox"/> 0.80 sec. <input type="checkbox"/> 1.60 sec. <input type="checkbox"/> 3.20 sec. <input type="checkbox"/> 12.8 sec. <input type="checkbox"/> 25.6 sec.	

TRANSMITTER INFORMATION: (Software Selectable)	
Descriptor ⁽⁴⁾ : (16 characters)	
Message ⁽⁴⁾ : (32 characters)	
Date ⁽⁴⁾ : <input type="checkbox"/> <input type="checkbox"/> / <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> / <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Day Month Year	
Local Span and Zero: <input type="checkbox"/> Enabled ★ <input type="checkbox"/> Disabled	

(1) Default values may be different outside the U.S. A. Consult your Rosemount Sales Representative for details.

(2) inH₂O for CD/CG ranges 1-3

(3) psi for CD/CG range 4 and 5, all CA ranges

(4) C1 option required for configuration of this parameter.

(5) Not available with low power output.

LCD METER CONFIGURATION (Software Adjustable – M5 or M6 option must be specified in model number)

Meter Display Type⁽⁴⁾:

- | | |
|--|---|
| <input type="checkbox"/> Eng. Units only | <input type="checkbox"/> Alternate Eng. Units &% of Range ★ |
| <input type="checkbox"/> % of Range only | <input type="checkbox"/> Alternate Eng. Units & Custom Display ⁽⁵⁾ |
| <input type="checkbox"/> Custom Display only | <input type="checkbox"/> Alternate % of Range & Custom Display ⁽⁵⁾ |

Custom Display Configuration: (must be filled out if Custom Display is selected as meter type)

Decimal Point Position
(fixed)— $X_{\square} X_{\square} X_{\square}^* X_{\square} X_{\square}$
Indicate decimal point location:

Enter Lower Range Value (Decimal point must be in the same position as specified above.)
(circle sign) + – $\square_{\square} \square_{\square} \square_{\square} \square_{\square} \square_{\square} \square_{\square}$ +000.00 ★

Enter Upper Range Value (Decimal point must be in the same position as specified above.)
(circle sign) + – $\square_{\square} \square_{\square} \square_{\square} \square_{\square} \square_{\square} \square_{\square}$ +100.00 ★

Custom Units—spaces consume A-Z, 0-9, /, *, %, blank
 $\square_{\square} \square_{\square} \square_{\square} \square_{\square}$ %RNGE ★

Custom Display Transfer Function (Independent of Analog Output)
☐ Linear ★ ☐ Square Root

HARDWARE SELECTABLE INFORMATION

Alarm Option: ☐ High ☐ Low
Transmitter Security: ☐ Off ☐ On

Note: Specify C4 Option in model structure when ordering NAMUR-compliant alarm and saturation limits.⁽⁵⁾

SIGNAL SELECTION: (Software Selectable)

- ☐ 4–20 mA with simultaneous digital signal based on HART protocol★
☐ Burst mode of HART digital process variable ⁽⁴⁾

Burst mode output options:

- ☐ Primary variable in engineering units
☐ Primary variable in percent of range
☐ All dynamic variables in engineering units and the primary variable mA value

☐ Multidrop Communication⁽⁴⁾⁽⁶⁾

Choose transmitter address⁽⁷⁾ (1-15): _____

⁽⁴⁾ C1 option required for configuration of this parameter.

⁽⁵⁾ Not available with low power output.

⁽⁶⁾ This option fixes the transmitter analog output at 4mA.

⁽⁷⁾ Default address is 1 if multidrop communication is selected.

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Appendix B Product Certifications

Approved Manufacturing Locations	page B-2
European Directive Information	page B-2
Ordinary Location Certification for Factory Mutual	page B-3
Hazardous Locations Certifications	page B-4
Approval Drawings	page B-9

OVERVIEW

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

SAFETY MESSAGES

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

Warnings

⚠ WARNING

Explosions could result in death or serious injury:

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

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

Process leaks may cause harm or result in death.

- Install and tighten process connectors before applying pressure.

Electrical shock can result in death or serious injury.

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

⚠ WARNING

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

APPROVED MANUFACTURING LOCATIONS


Rosemount Inc. — Chanhassen, Minnesota, USA
Fisher-Rosemount GmbH & Co. — Wessling, Germany
Emerson Process Management Asia Pacific Private Limited — Singapore

EUROPEAN DIRECTIVE INFORMATION


ATEX Directive

Rosemount Inc. complies with the ATEX Directive. Specific ATEX Directive Information is located within Appendix B.


Intrinsic safety Ex ia protection type in accordance with EN50 020

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

Flame-Proof enclosure Ex d protection type in accordance with EN50 018

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

Type n protection type in accordance with EN50 021

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

(1) Lightning protection

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

Models 3051CA4; 3051CD2, 3, 4, 5 (*also with P9 option*); 3051HD2, 3, 4, 5
Pressure Transmitters are category III equipment—
QS Certificate of Assessment - EC No. PED-H-20

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

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

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

Mandatory CE-marking for pressure transmitters in accordance with Article 15
of the PED can be found on the transmitter body (CE 0434).

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

**Electro Magnetic
Compatibility (EMC)**

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

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

To improve protection against signal interference, shielded cable is
recommended, see "Connect Wiring and Power Up" on page 2-16 for more
information.

**Other important
guidelines**

Only use new, original parts.

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

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

Maintenance shall only be done by qualified personnel.

**ORDINARY LOCATION
CERTIFICATION FOR
FACTORY MUTUAL**

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

HAZARDOUS LOCATIONS CERTIFICATIONS

North American Certifications



Factory Mutual (FM)

- E5** Explosion-Proof for Class I, Division 1, Groups B, C, and D.
Dust-Ignition-Proof for Class II, Division 1, Groups E, F, and G.
Dust-Ignition-Proof for Class III, Division 1.
T5 (Ta = 85 °C), Factory Sealed, Enclosure Type 4x
- I5** Intrinsically Safe for use in Class I, Division 1, Groups A, B, C, and D;
Class II, Division 1, Groups E, F, and G; Class III, Division 1 when
connected per Rosemount drawing 03031-1019 and 00268-0031 (When
used with a HART communicator); Non-incendive for Class I, Division 2,
Groups A, B, C, and D.
Temperature Code: T4 (Ta = 40 °C), T3 (Ta = 85 °C),
Enclosure Type 4x
For input parameters see control drawing 03031-1019.

Canadian Standards Association (CSA)

- E6** Explosion-Proof for Class I, Division 1, Groups B, C, and D.
Dust-Ignition-Proof for Class II and Class III, Division 1, Groups E, F, and
G. Suitable for Class I, Division 2 Groups A, B, C, and D for indoor and
outdoor hazardous locations. Enclosure type 4X, factory sealed
- C6** Explosion-Proof and intrinsically safe approval. Intrinsically safe for Class
I, Division 1, Groups A, B, C, and D when connected in accordance with
Rosemount drawings 03031-1024. Temperature Code T3C.
Explosion-Proof for Class I, Division 1, Groups B, C, and D.
Dust-Ignition-Proof for Class II and Class III, Division 1, Groups E, F, and
G. Suitable for Class I, Division 2 Groups A, B, C, and D hazardous
locations. Enclosure type 4X, factory sealed
For input parameters see control drawing 03031-1024.

European Certifications


- I1** CENELEC Intrinsic Safety and Dust
Certification No.: BAS 97ATEX1089X  II 1 GD
EEx ia IIC T5 (Tamb = -60 to +40 °C)
EEx ia IIC T4 (Tamb = -60 to +70 °C)
Dust Rating: T80 °C (Tamb -20 to 40 °C) IP66
 1180

CENELEC I1 Input Parameters

$U_i = 30 \text{ V}$
 $I_i = 200 \text{ mA}$
 $P_i = 0.9 \text{ W}$
 $C_i = 0.012 \mu\text{F}$
 $L_i = 0.0$

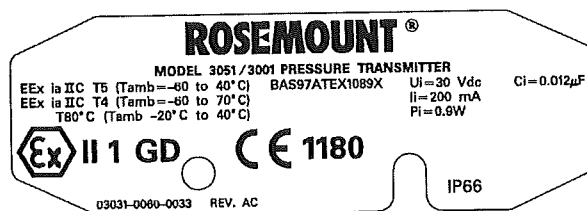
Special conditions for Safe Use (X): When the optional transient protection terminal block is installed, the apparatus is not capable of withstanding the 500V insulation test required by Clause 6.4.12 of EN50020:1994. This must be taken into account when installing the apparatus.

NOTE

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

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

Figure B-1. Approval Ex label example



3031_A33A

N1 CENELEC Non-incendive/Type n and Dust
Certification No.: BAS 00ATEX3105X Ⓢ II 3 GD
EEx nL IIC T5 ($T_{amb} = -40$ to $+70$ °C)
 $U_i = 55$ Vdc max
Dust rating: T80 °C ($T_{amb} = -20$ to 40 °C) IP66

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

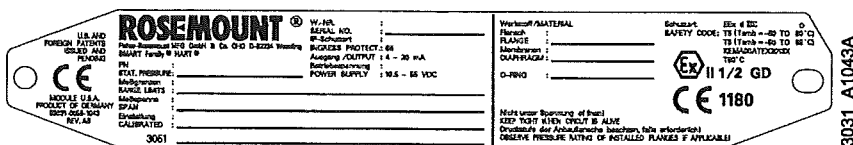
E8 CENELEC Flame-Proof and Dust
Certification No.: KEMA 00ATEX2013X Ⓢ II 1/2 GD
EEx d IIC T6 ($T_{amb} = -50$ to 65 °C)
EEx d IIC T5 ($T_{amb} = -50$ to 80 °C)
Dust rating T90 °C, IP66
CE 1180
 $V_{max} = 55$ V dc

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

NOTE

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

Figure B-2. Transmitter neck approval label example



Japanese Certifications

E4 JIS Flame-Proof

Certificate	Description
Ex d IIC T5 + G5	
C13432	3051C/L/H/P Differential and Gauge (no meter)
C13433	3051C/L/H/P Differential and Gauge (with meter)
C13434	3051CA (no meter)
C13435	3051CA (with meter)
C13436	3051T (no meter)
C13437	3051T (with meter)
Ex d IIC T6	
C15151	3051C/D/1 4-20 mA HART (no meter)
C15152	3051C/D/1 4-20 mA HART (with meter)
C15155	3051T/G/1 4-20 mA HART, SST Silicone (no meter)
C15156	3051T/G/1 4-20 mA HART, Hast. Silicone (no meter)
C15157	3051T/G/1 4-20 mA HART, SST Silicone (with meter)
C15158	3051T/G/1 4-20 mA HART, Hast. Silicone (with meter)

I4 JIS Intrinsic Safety
Certification No.: C13266
Ex ia IIC T4

Australian Certifications

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

Ex ia IIC T4 ($T_{amb} = 70^{\circ}\text{C}$)

Ex ia IIC T5 ($T_{amb} = 40^{\circ}\text{C}$)

IP65

When connected per Rosemount drawing 03031-1026

Special Conditions for Safe Use (X):

The apparatus may only be used with a passive current limited power source Intrinsic Safety application. The power source must be such that $P_o \leq (U_o * I_o) / 4$.

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

The conductor used for the connection shall be equivalent to a copper conductor of 4 mm² minimum cross-sectional area.

SAA Approved Input Parameters

$U_i = 30\text{ V}$

$I_i = 200\text{ mA}$

$I_i = 160\text{ mA}$ (Option Code T1)

$P_i = 0.9\text{ W}$

$C_i = 0.01\text{ }\mu\text{F}$ (Output Code A)

$C_i = 0.042\text{ }\mu\text{F}$ (Output Code M)

$L_i = 10\text{ }\mu\text{H}$

$L_i = 1.05\text{ mH}$ (Output Code A with T1)

$L_i = 0.75\text{ mH}$ (Output Code M with T1)

E7 SAA Explosion-Proof (Flame-Proof)

Certification No.: AUS EX 1347X

Ex d IIC T6 ($T_{amb} = 40\text{ }^{\circ}\text{C}$)

Ex d IIC T5 ($T_{amb} = 80\text{ }^{\circ}\text{C}$)

DIP T6 ($T_{amb} = 40\text{ }^{\circ}\text{C}$)

DIP T5 ($T_{amb} = 80\text{ }^{\circ}\text{C}$)

IP65

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

N7 SAA Type n (Non-sparking)

Certification No.: AUS EX 1249X

Ex n IIC T4 ($T_{amb} = 70\text{ }^{\circ}\text{C}$)

Ex n IIC T5 ($T_{amb} = 40\text{ }^{\circ}\text{C}$)

IP65

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

Combinations of Certifications

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

K5 E5 and I5 combination

KB K5 and C6 combination

K6 C6, I1, and E8 combination

K8 E8 and I1 combination

K7 E7, I7, and N7 combination

APPROVAL DRAWINGS

Factory Mutual
03031-1019

CONFIDENTIAL AND PROPRIETARY INFORMATION IS CONTAINED HEREIN AND MUST BE HANDLED ACCORDINGLY		REVISIONS			
REV	DESCRIPTION	CHG. NO.	APP'D	DATE	
AA	ADD FIELDBUS	RTC1004088	MLM.	5/28/98	
AB	ADD PROFIBUS, NONINCENDIVE PARAMETERS	RTC1008309	PCS.	2/1/00	
AC	ADD FISCO DETAILS	RTC1011731	J.P.W.	9/9/01	

ENTITY APPROVALS FOR

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

OUTPUT CODE A (4-20 mA HART) I.S. SEE SHEETS 2-4
 OUTPUT CODE M (LOW POWER) I.S. SEE SHEETS 5-6
 OUTPUT CODE F/W (FIELDBUS) I.S. SEE SHEETS 7-11
 ALL OUTPUT CODES NONINCENDIVE SEE SHEETS 12

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

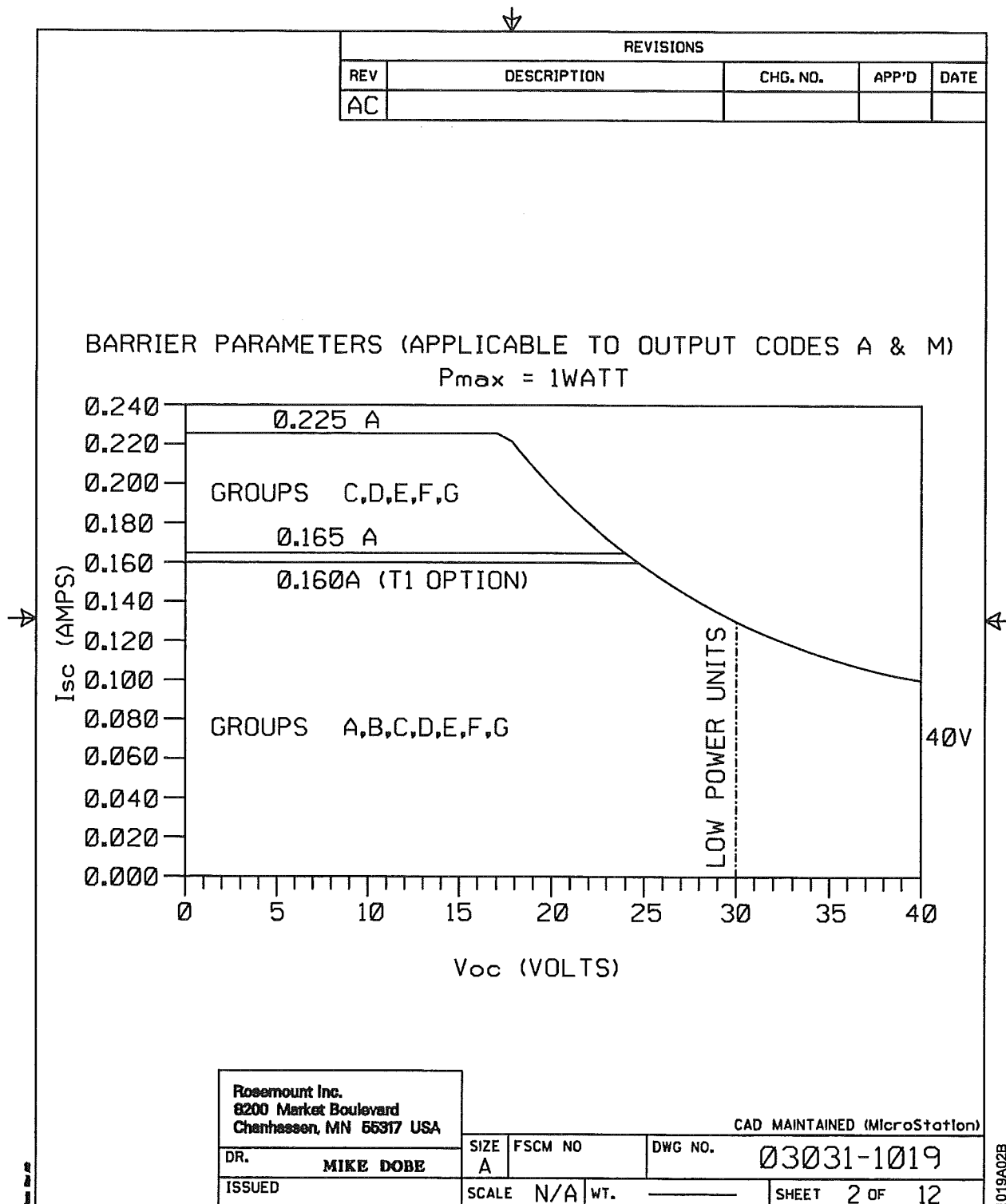
TO ASSURE AN INTRINSICALLY SAFE SYSTEM, THE TRANSMITTER AND BARRIER
 MUST BE WIRED IN ACCORDANCE WITH THE BARRIER MANUFACTURER'S FIELD WIRING
 INSTRUCTIONS AND THE APPLICABLE CIRCUIT DIAGRAM.

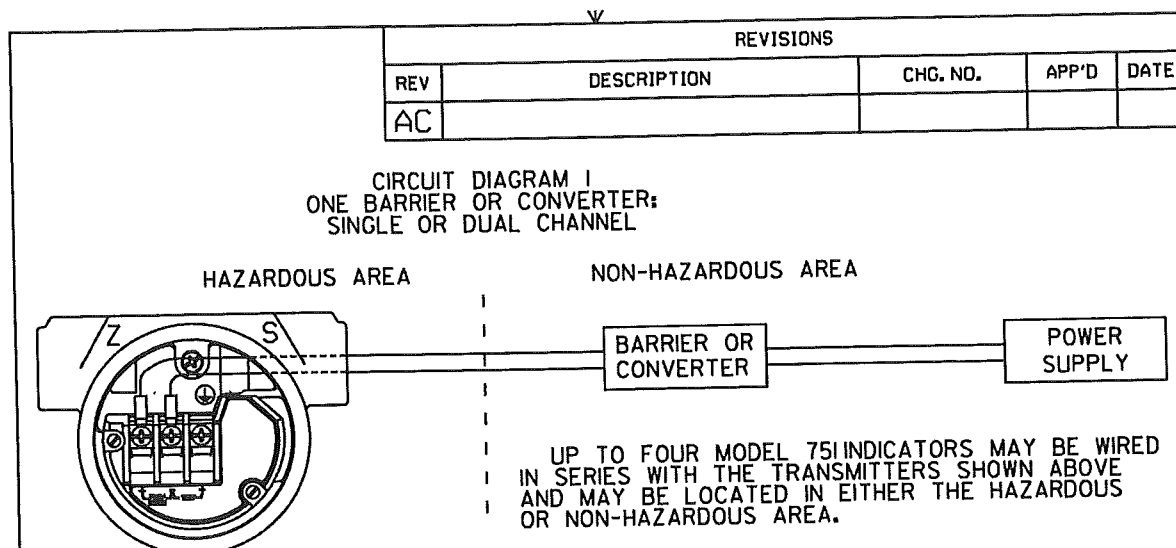
CAD MAINTAINED (MicroStation)									
UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES (mm) REMOVE ALL BURRS AND SHARP EDGES, MACHINE SURFACE FINISH Q25 -TOLERANCE- .X ± .1 (2.5) .XX ± .02 (0.5) .XXX ± .010 (0.25) FRACTIONS ANGLES ± 1/32 ± 2° DO NOT SCALE PRINT	<table style="width: 100%;"> <tr> <td colspan="2" style="text-align: center;"> ROSEMOUNT <small>2200 Market Boulevard • Channahon, ILL 60017 USA</small> </td> </tr> <tr> <td style="width: 40%;"> CONTRACT NO. DR. MIKE DOBE 03/21/89 CHK'D APP'D. KELLY ORTH 03/22/89 APP'D. GOVT. </td> <td style="width: 60%;"> TITLE INDEX OF I.S. & NONINCENDIVE F.M. FOR 3051C/L/P/H/T AND 3001C/S </td> </tr> <tr> <td> SIZE A </td> <td> FSCM NO. DWG NO. 03031-1019 </td> </tr> <tr> <td> SCALE N/A </td> <td> WT. _____ SHEET 1 OF 12 </td> </tr> </table>	 ROSEMOUNT <small>2200 Market Boulevard • Channahon, ILL 60017 USA</small>		CONTRACT NO. DR. MIKE DOBE 03/21/89 CHK'D APP'D. KELLY ORTH 03/22/89 APP'D. GOVT.	TITLE INDEX OF I.S. & NONINCENDIVE F.M. FOR 3051C/L/P/H/T AND 3001C/S	SIZE A	FSCM NO. DWG NO. 03031-1019	SCALE N/A	WT. _____ SHEET 1 OF 12
 ROSEMOUNT <small>2200 Market Boulevard • Channahon, ILL 60017 USA</small>									
CONTRACT NO. DR. MIKE DOBE 03/21/89 CHK'D APP'D. KELLY ORTH 03/22/89 APP'D. GOVT.	TITLE INDEX OF I.S. & NONINCENDIVE F.M. FOR 3051C/L/P/H/T AND 3001C/S								
SIZE A	FSCM NO. DWG NO. 03031-1019								
SCALE N/A	WT. _____ SHEET 1 OF 12								

1019A01B

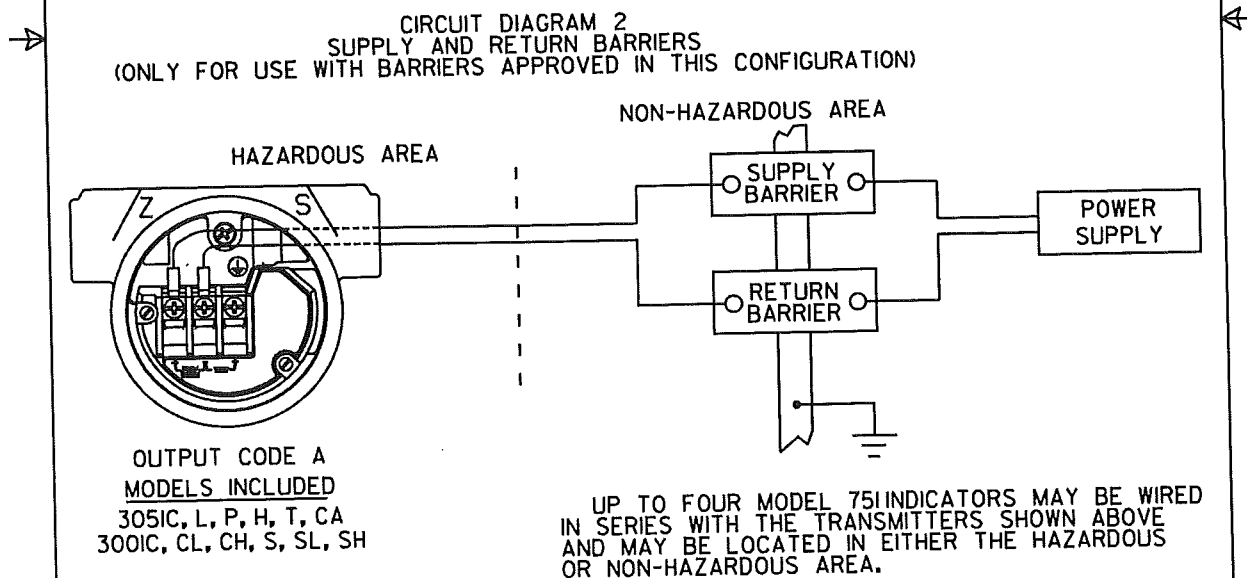
Model 3051

Reference Manual
00809-0100-4001, Rev EA
December 2002





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



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

Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA		CAD MAINTAINED (MicroStation)			
		SIZE	FSCM NO	DWG NO.	03031-1019
DR.	MIKE DOBE	A			
ISSUED		SCALE	N/A	WT.	SHEET 3 OF 12

1019A03B

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

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 (V_{oc} OR V_t) AND MAX. SHORT CIRCUIT CURRENT (I_{sc} OR I_t) AND MAX. POWER ($V_{oc} \times I_{sc}/4$) OR ($V_t \times I_t/4$), FOR THE ASSOCIATED APPARATUS MUST BE LESS THAN OR EQUAL TO THE MAXIMUM SAFE INPUT VOLTAGE (V_{max}), MAXIMUM SAFE INPUT CURRENT (I_{max}), AND MAXIMUM SAFE INPUT POWER (P_{max}) 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 NOTE: ENTITY PARAMETERS LISTED APPLY ONLY TO ASSOCIATED APPARATUS WITH LINEAR OUTPUT.

CLASS I, DIV. 1, GROUPS A AND B

$V_{MAX} = 40V$	V_T OR V_{OC} IS LESS THAN OR EQUAL TO 40V
$I_{MAX} = 165mA$	I_T OR I_{SC} IS LESS THAN OR EQUAL TO 165mA
$P_{MAX} = 1 \text{ WATT}$	$(\frac{V_T \times I_T}{4})$ OR $(\frac{V_{OC} \times I_{SC}}{4})$ IS LESS THAN OR EQUAL TO 1 WATT
$C_i = .01\mu f$	C_A IS GREATER THAN .01 μf
$L_i = 10\mu H$	L_A IS GREATER THAN 10 μH

* FOR T1 OPTION:

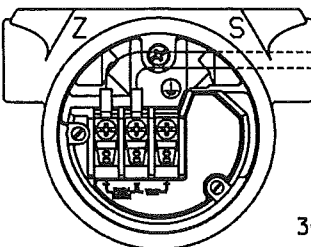
$I_{max} = 160mA$	I_T OR I_{SC} IS LESS THAN OR EQUAL TO 160mA
$L_i = 1.05mH$	L_A IS GREATER THAN 1.05mH

CLASS I, DIV. 1, GROUPS C AND D

$V_{MAX} = 40V$	V_T OR V_{OC} IS LESS THAN OR EQUAL TO 40V
$I_{MAX} = 225mA$	I_T OR I_{SC} IS LESS THAN OR EQUAL TO 225mA
$P_{MAX} = 1 \text{ WATT}$	$(\frac{V_T \times I_T}{4})$ OR $(\frac{V_{OC} \times I_{SC}}{4})$ IS LESS THAN OR EQUAL TO 1 WATT
$C_i = .01\mu f$	C_A IS GREATER THAN .01 μf
$L_i = 10\mu H$	L_A IS GREATER THAN 10 μH

* FOR T1 OPTION:

$L_i = 1.05mH$	L_A IS GREATER THAN 1.05mH
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HAZARDOUS AREA | NON-HAZARDOUS AREA

ASSOCIATED APPARATUS
(SEE SHEET 3)

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

Rosemount Inc.
8200 Market Boulevard
Chanhassen, MN 55317 USA

CAD MAINTAINED (MicroStation)

DR. MIKE DOBE	SIZE A	FSCM NO.	DWG NO. 03031-1019
ISSUED	SCALE N/A	WT.	SHEET 4 OF 12

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

FOR OUTPUT CODE M

CLASS I, DIV. 1, GROUPS A AND B

$V_{MAX} = 30V$	V_T OR V_{OC} IS LESS THAN OR EQUAL TO 30V
$I_{MAX} = 165mA$	I_T OR I_{SC} IS LESS THAN OR EQUAL TO 165mA
$P_{MAX} = 1 \text{ WATT}$	$(V_T \times I_T)$ OR $(V_{OC} \times I_{SC})$ IS LESS THAN OR EQUAL TO 1 WATT
$C_I = .042\mu f$	C_A IS GREATER THAN $.042\mu f$
$L_I = 10\mu H$	L_A IS GREATER THAN $10\mu H$

* FOR T1 OPTION:

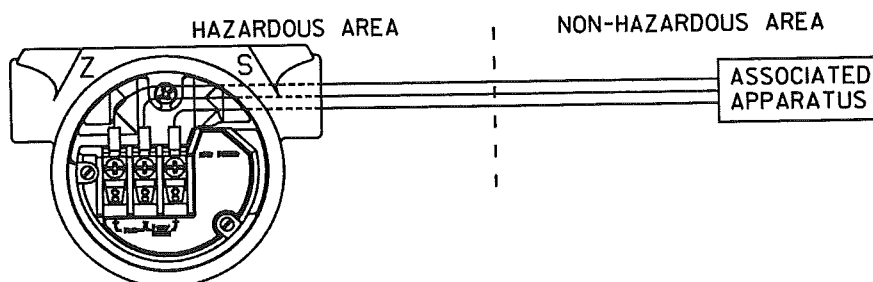
$L_I = 0.75mH$	L_A IS GREATER THAN $0.75mH$
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CLASS I, DIV. 1, GROUPS C AND D

$V_{MAX} = 30V$	V_T OR V_{OC} IS LESS THAN OR EQUAL TO 30V
$I_{MAX} = 225mA$	I_T OR I_{SC} IS LESS THAN OR EQUAL TO 225mA
$P_{MAX} = 1 \text{ WATT}$	$(V_T \times I_T)$ OR $(V_{OC} \times I_{SC})$ IS LESS THAN OR EQUAL TO 1 WATT
$C_I = .042\mu f$	C_A IS GREATER THAN $.042\mu f$
$L_I = 10\mu H$	L_A IS GREATER THAN $10\mu H$

* FOR T1 OPTION:

$L_I = 0.75mH$	L_A IS GREATER THAN $0.75mH$
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OUTPUT CODE M
AVAILABLE FOR THE MODELS LISTED

305IC 305IH
305IL 305ICA
305IP 305IT

Rosemount Inc.
8200 Market Boulevard
Chanhassen, MN 55317 USA

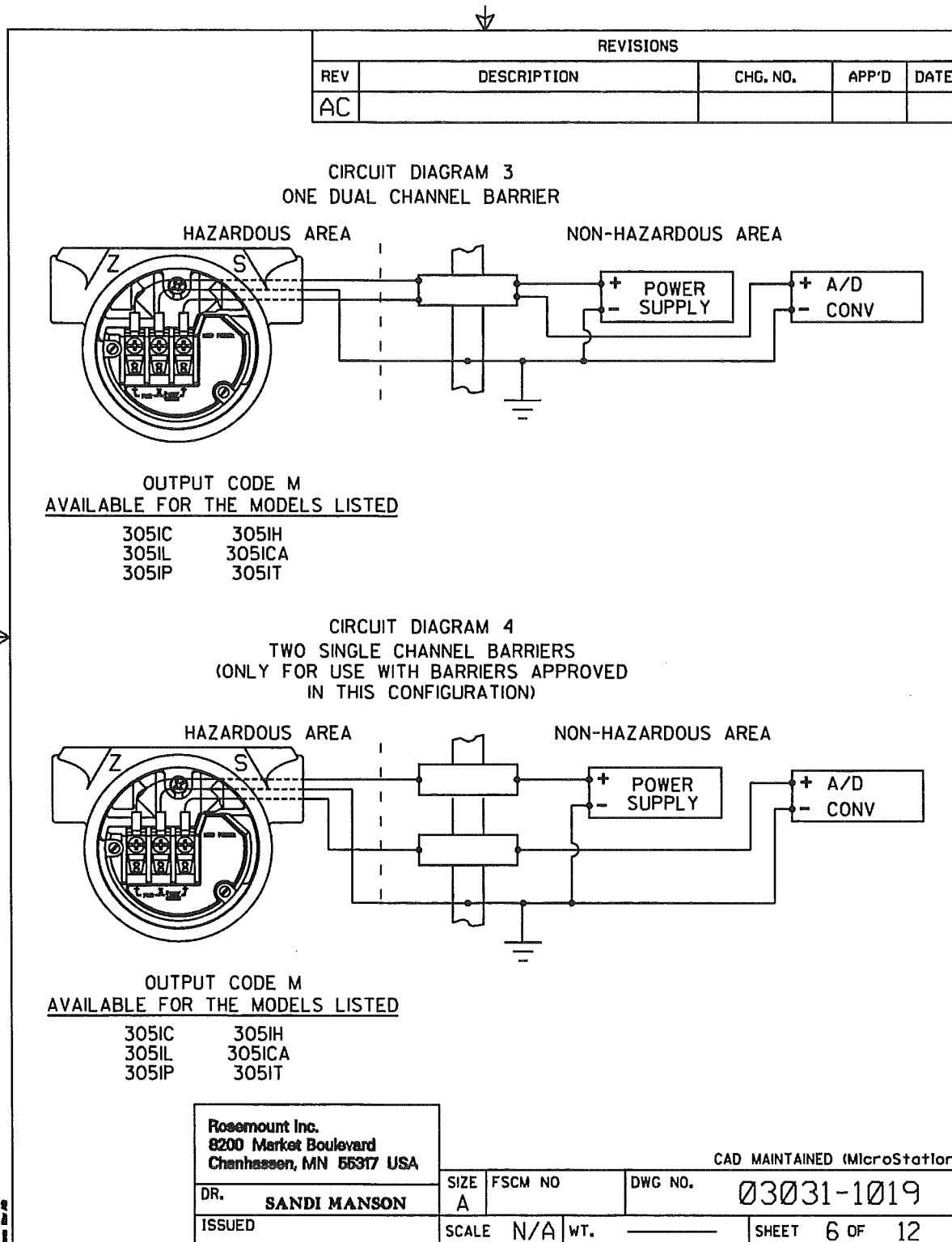
CAD MAINTAINED (MicroStation)

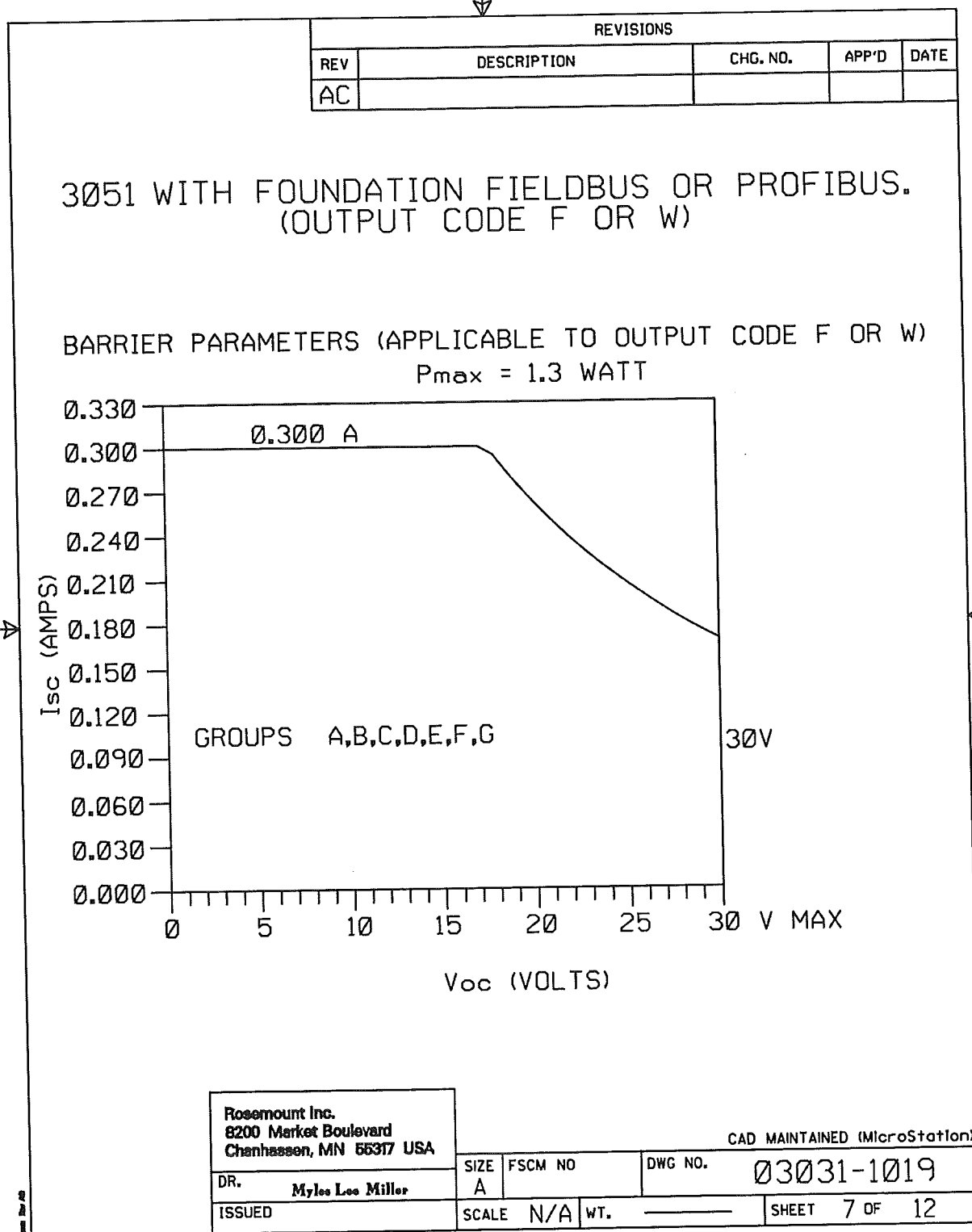
DR.	MIKE DOBE	SIZE	A	FSCM NO.		DWG NO.	03031-1019
ISSUED		SCALE	N/A	WT.		SHEET	5 OF 12

1019A05B

Model 3051

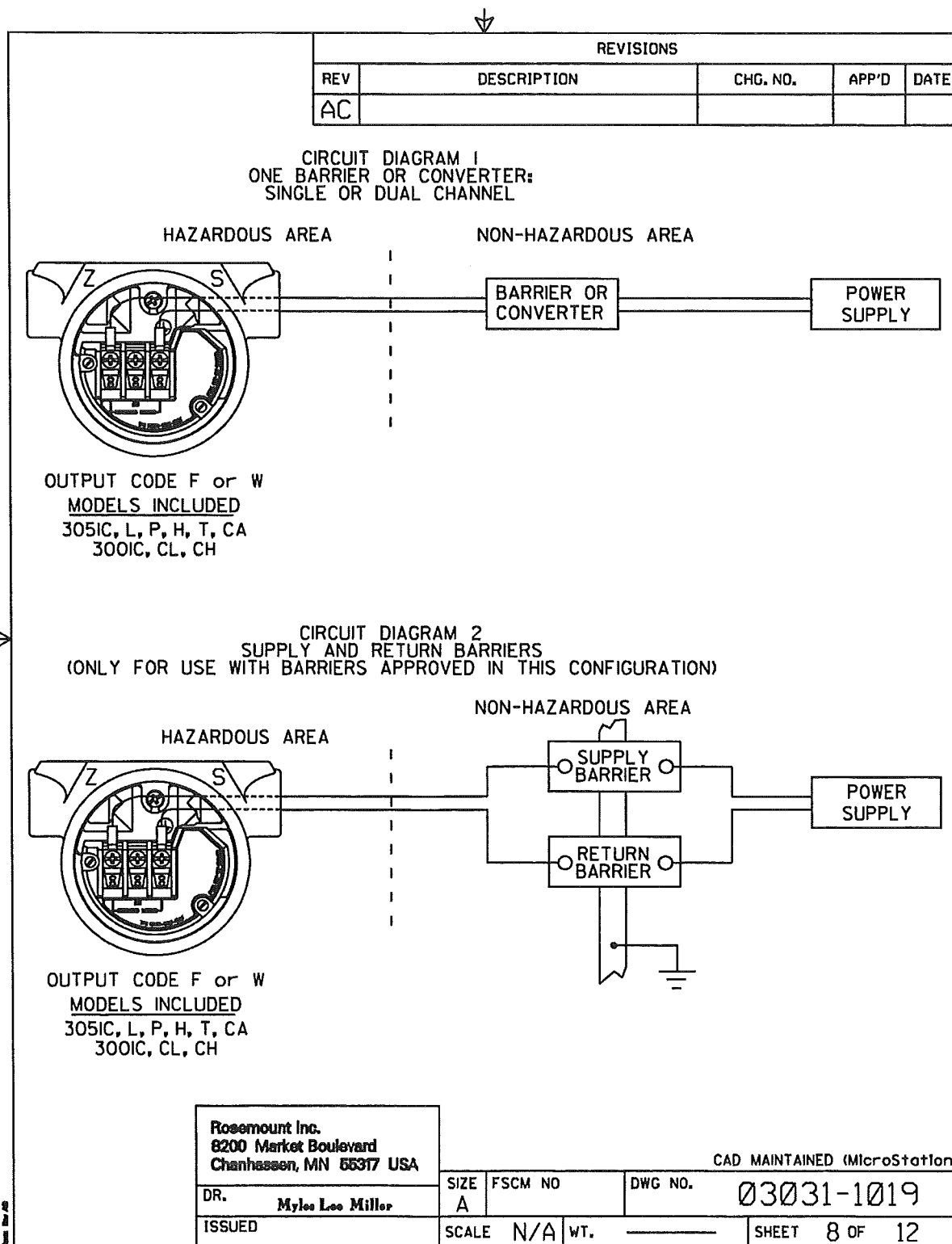
Reference Manual
00809-0100-4001, Rev EA
December 2002





Model 3051

Reference Manual
00809-0100-4001, Rev EA
December 2002



1019A08B

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

ENTITY CONCEPT APPROVALS

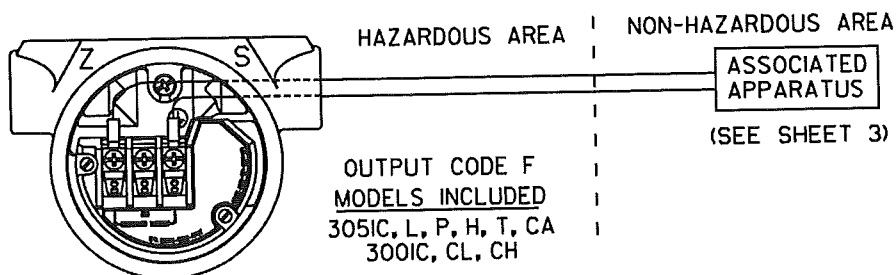
THE ENTITY CONCEPT ALLOWS INTERCONNECTION OF INTRINSICALLY SAFE APPARATUS TO ASSOCIATED APPARATUS NOT SPECIFICALLY EXAMINED IN COMBINATION AS A SYSTEM. THE APPROVED VALUES OF MAX. OPEN CIRCUIT VOLTAGE (V_{oc} OR V_t) AND MAX. SHORT CIRCUIT CURRENT (I_{sc} OR I_t) AND MAX. POWER ($V_{oc} \times I_{sc}/4$) OR ($V_t \times I_t/4$), FOR THE ASSOCIATED APPARATUS MUST BE LESS THAN OR EQUAL TO THE MAXIMUM SAFE INPUT VOLTAGE (V_{max}), MAXIMUM SAFE INPUT CURRENT (I_{max}), AND MAXIMUM SAFE INPUT POWER (P_{max}) 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.

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

FOR OUTPUT CODE F or W

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

$V_{MAX} = 30V$	V_T OR V_{OC} IS LESS THAN OR EQUAL TO 30V
$I_{MAX} = 300mA$	I_T OR I_{SC} IS LESS THAN OR EQUAL TO 300mA
$P_{MAX} = 1.3 \text{ WATT}$	$(V_T \times I_T)$ OR $(V_{OC} \times I_{SC})$ IS LESS THAN OR EQUAL TO 1.3 WATT
$C_i = 0\mu f$	C_a IS GREATER THAN $0\mu f$
$L_i = 0\mu H$	L_a IS GREATER THAN $0\mu H$



Rosemount Inc.
8200 Market Boulevard
Chanhassen, MN 55317 USA

CAD MAINTAINED (MicroStation)

DR.	Myles Lee Miller	SIZE	A	FSCM NO.		DWG NO.	03031-1019
ISSUED		SCALE	N/A	WT.		SHEET	9 OF 12

1019A09B



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

FISCO CONCEPT APPROVALS

THE FISCO CONCEPT ALLOWS INTERCONNECTION OF INTRINSICALLY SAFE APPARATUS TO ASSOCIATED APPARATUS NOT SPECIALLY EXAMINED IN SUCH COMBINATION. FOR THIS INTERCONNECTION TO BE VALID THE VOLTAGE (U_i or V_{max}), THE CURRENT (I_i or I_{max}), AND THE POWER (P_i or P_{max}) THAT INTRINSICALLY SAFE APPARATUS CAN RECEIVE AND REMAIN INTRINSICALLY SAFE, INCLUDING FAULTS, MUST BE EQUAL OR GREATER THAN THE VOLTAGE (U_o , V_{oc} , or V_t), THE CURRENT (I_o , I_{sc} , or I_t), AND THE POWER (P_o or P_{max}) LEVELS WHICH CAN BE DELIVERED BY THE ASSOCIATED APPARATUS, CONSIDERING FAULTS AND APPLICABLE FACTORS. ALSO, THE MAXIMUM UNPROTECTED CAPACITANCE (C_i) AND THE INDUCTANCE (L_i) OF EACH APPARATUS (BESIDES THE TERMINATION) CONNECTED TO THE FIELD BUS MUST BE LESS THAN OR EQUAL TO 5nF AND 10μH RESPECTIVELY. ONLY ONE ACTIVE DEVICE IN EACH SECTION (USUALLY THE ASSOCIATED APPARATUS) IS ALLOWED TO CONTRIBUTE THE DESIRED ENERGY FOR THE FIELD BUS SYSTEM. THE ASSOCIATED APPARATUS' VOLTAGE U_o (or V_{oc} or V_t) IS LIMITED TO A RANGE OF 14V TO 24 V.D.C. ALL OTHER EQUIPMENT COMBINED IN THE BUS CABLE MUST BE PASSIVE (THEY CANNOT PROVIDE ENERGY TO THE SYSTEM, EXCEPT A LEAKAGE CURRENT OF 50 μA FOR EACH CONNECTED DEVICE) SEPARATELY POWERED EQUIPMENT REQUIRES A GALVANIC ISOLATION TO AFFIRM THAT THE INTRINSICALLY SAFE FIELD BUS CIRCUIT WILL REMAIN PASSIVE. THE PARAMETER OF THE CABLE USED TO INTERCONNECT THE DEVICES MUST BE IN THE FOLLOWING RANGE:

LOOP RESISTANCE R_i : 15...150 OHM/km
 INDUCTANCE PER UNIT LENGTH L_i : 0.4...1mH/KM
 CAPACITANCE PER UNLIT LENGTH C_i : 80...200nF

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

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

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

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

NOTES:

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

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

Rosemount Inc.
8200 Market Boulevard
Chanhassen, MN 55317 USA

CAD MAINTAINED (MicroStation)

DR. Myles Leo Miller

SIZE A FSCM NO.

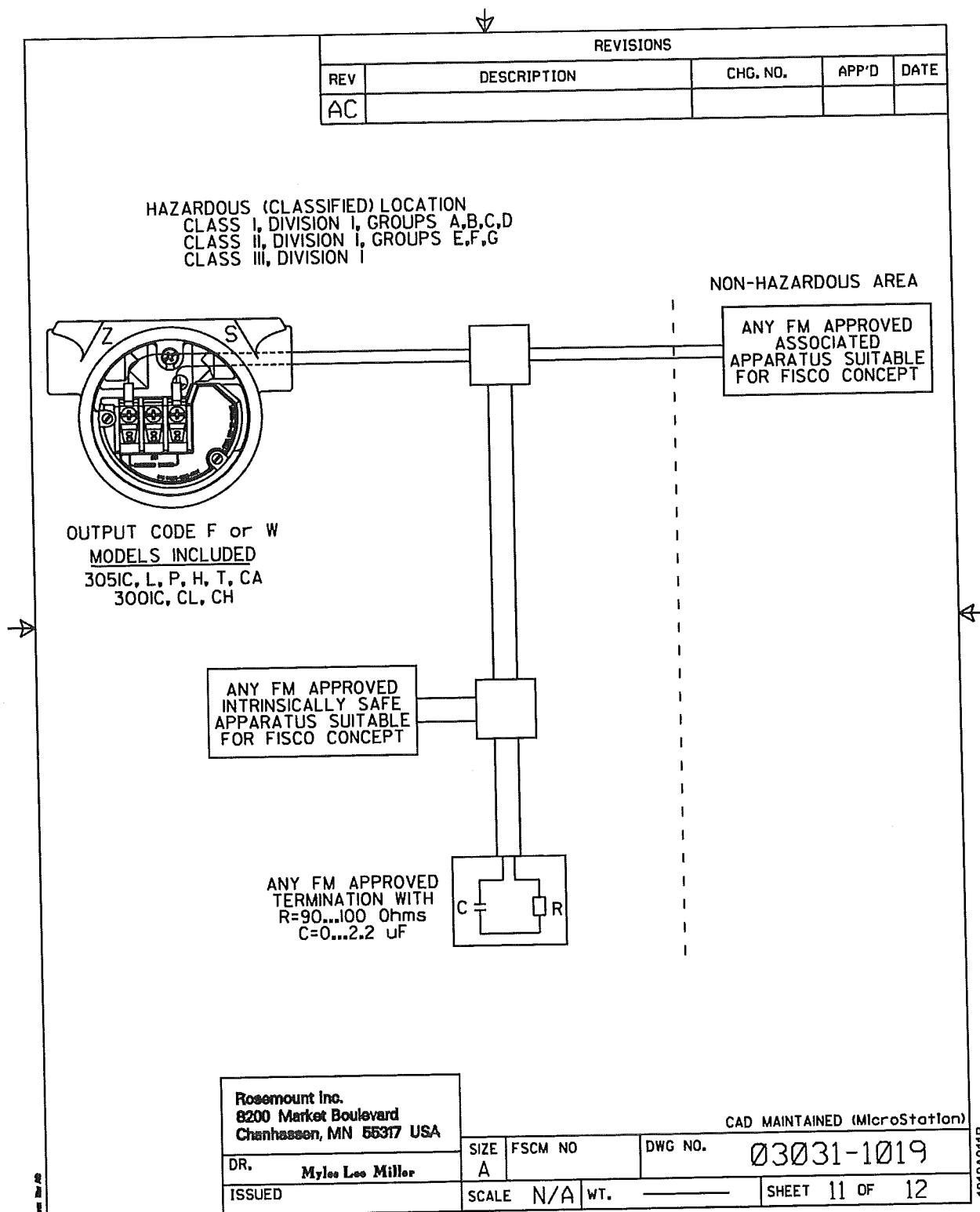
DWG NO. 03031-1019

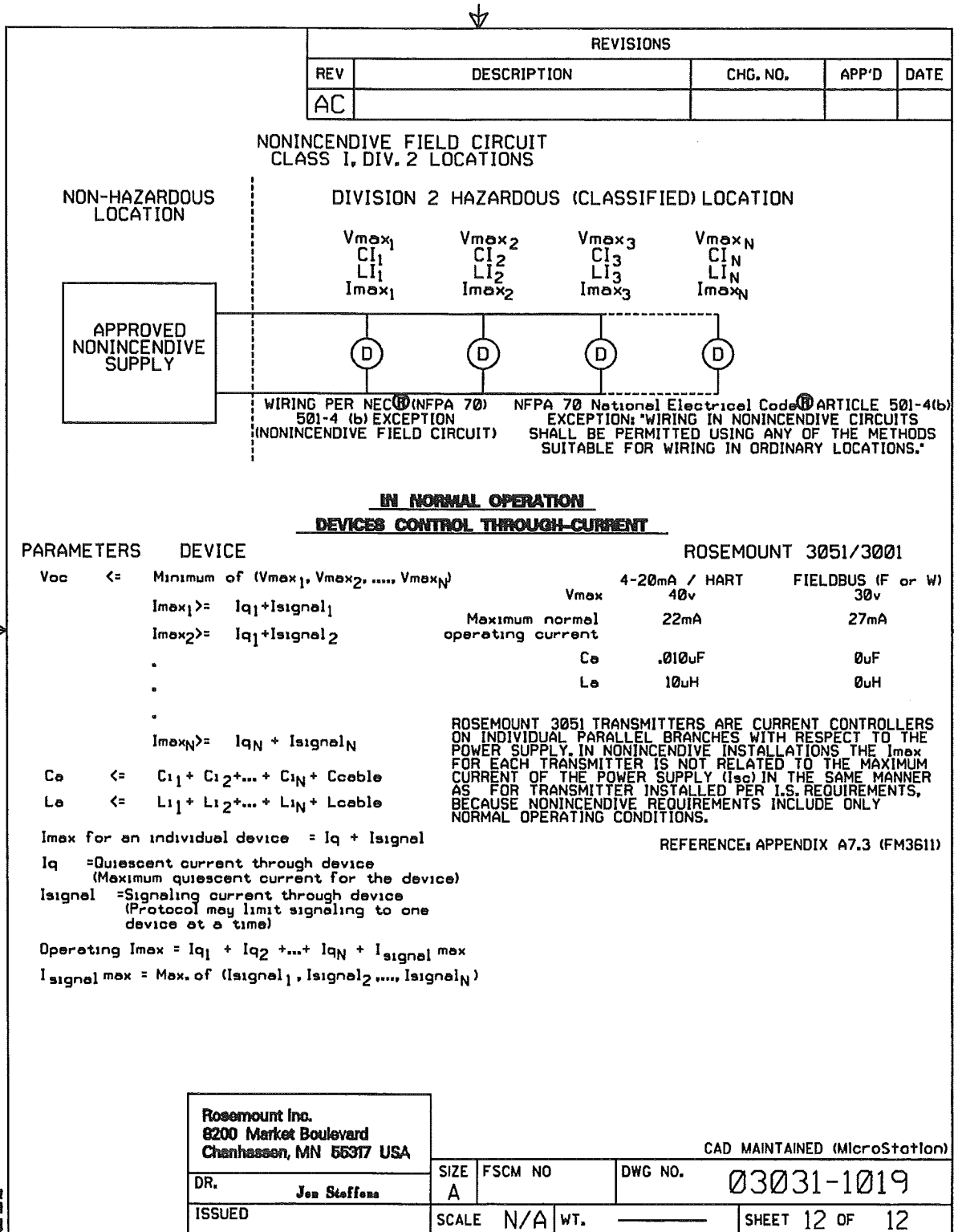
ISSUED

SCALE N/A WT.

SHEET 10 OF 12

1019A010B





Canadian Standards
Association (CSA)
03031-1024

CONFIDENTIAL AND PROPRIETARY INFORMATION IS CONTAINED HEREIN AND MUST BE HANDLED ACCORDINGLY		REVISIONS			
REV	DESCRIPTION	CHG. NO.	APP'D	DATE	
AA	ADD FIELDBUS	RTC1004232	M.L.M.	5/28/98	
AB	ADD PROFIBUS, ENTITY PARAMETERS	RTC1008326	P.C.S.	2/4/00	
AC	REM It, Vt FROM ENTITY PARAMETERS	RTC1009279	W.C.R.	7/11/00	
AD	ADD FISCO FIELDBUS	RTC1012624	J.P.W.	4/4/02	

APPROVALS FOR

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

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

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

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

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

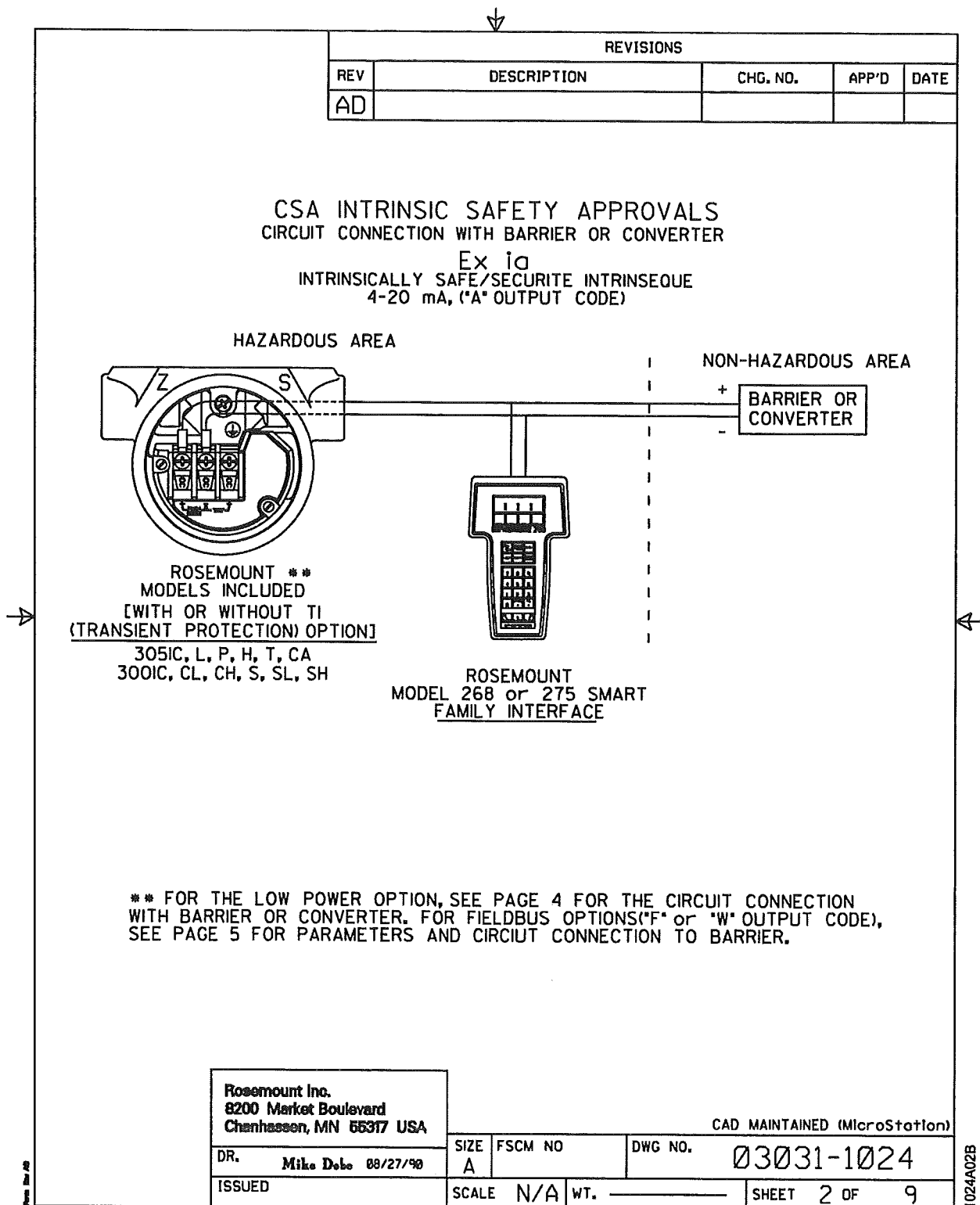
CAD MAINTAINED (MicroStation)

UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES (mm). REMOVE ALL BURRS AND SHARP EDGES. MACHINE SURFACE FINISH 125	CONTRACT NO.	 ROSEMOUNT <small>6200 Market Boulevard • Chanhassen, MN 55997 USA</small>	TITLE INDEX OF I.S. CSA FOR 3051C/L/P/H/T & 3001C/S
	DR. Mike Doh 08/27/98 CHK'D APP'D. GLEN MONZO 8/31/98	SIZE A FSCM NO SCALE N/A WT.	DWG NO. 03031-1024 SHEET 1 OF 9
-TOLERANCE- .X ± .1 [2,5] .XX ± .02 [0,5] .XXX ± .010 [0,25] FRACTIONS ANGLES ± 1/32 ± 2° DO NOT SCALE PRINT	APP'D. GOVT.		

1024A01B

Model 3051

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

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

DEVICE	PARAMETERS	APPROVED FOR CLASS I, DIV. I
CSA APPROVED SAFETY BARRIER	30 V OR LESS * 330 OHMS OR MORE * 28 V OR LESS * 300 OHMS OR MORE 25 V OR LESS 200 OHMS OR MORE * 22 V OR LESS 180 OHMS OR MORE	GROUPS A, B, C, D
FOXBORO CONVERTER 2AI-12V-CGB, 2AI-13V-CGB, 2AS-13I-CGB, 3A2-12D-CGB, 3A2-13D-CGB, 3AD-13I-CGB, 3A4-12D-CGB, 2AS-12I-CGB, 3F4-12DA		GROUPS B, C, D
CSA APPROVED SAFETY BARRIER	30 V OR LESS 150 OHMS OR MORE	GROUPS C, D

LOW POWER, ("M" OUTPUT CODE)

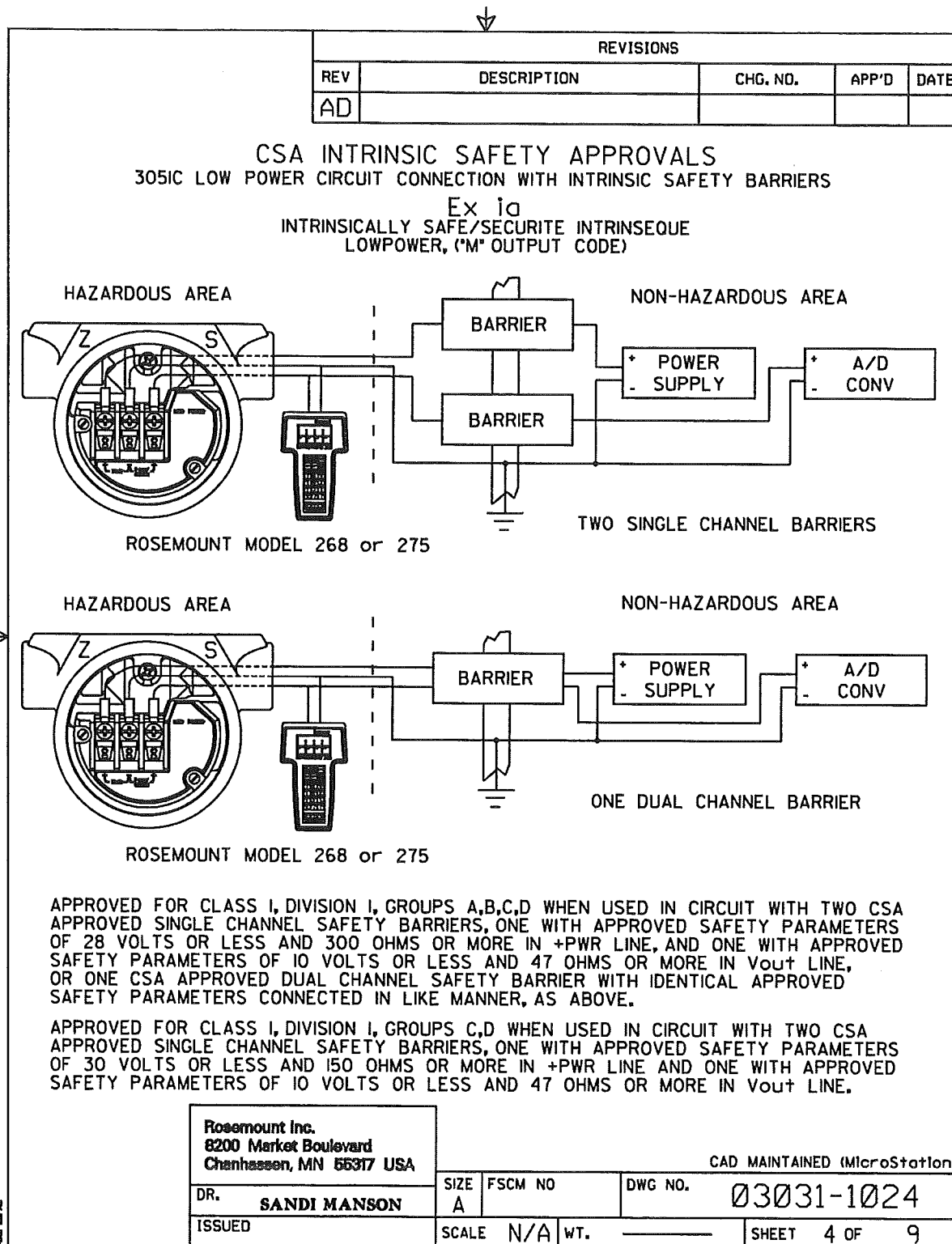
DEVICE	PARAMETERS	APPROVED FOR CLASS I, DIV. I
	Supply $\leq 28V, \geq 300 \Omega$ Return $\leq 10V, \geq 47 \Omega$	GROUPS A, B, C, D
CSA APPROVED SAFETY BARRIER	Supply $\leq 30V, \geq 150 \Omega$ Return $\leq 10V, \geq 47 \Omega$	GROUPS C, D

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

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

Model 3051

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REV	DESCRIPTION	CHG. NO.	APP'D	DATE
AD				

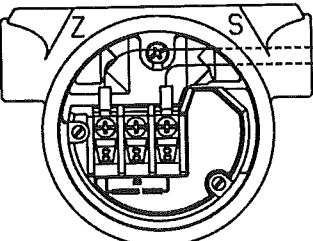
FIELD BUS, ("F" or "W" OUTPUT CODE)

DEVICE	PARAMETERS	APPROVED FOR CLASS I, DIV. J
CSA APPROVED SAFETY BARRIER	30 V OR LESS	GROUPS A, B, C, D
	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	

CSA INTRINSIC SAFETY APPROVALS
CIRCUIT CONNECTION WITH BARRIER OR CONVERTER

Ex ia
INTRINSICALLY SAFE/SECURITE INTRINSEQUE
FIELD BUS, ("F" or "W" OUTPUT CODE)

HAZARDOUS AREA



NON-HAZARDOUS AREA

BARRIER OR CONVERTER

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

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

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

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

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

FISCO CONCEPT APPROVALS

THE FISCO CONCEPT ALLOWS INTERCONNECTION OF INTRINSICALLY SAFE APPARATUS TO ASSOCIATED APPARATUS NOT SPECIALLY EXAMINED IN SUCH COMBINATION. FOR THIS INTERCONNECTION TO BE VALID THE VOLTAGE (U_i or V_{max}), THE CURRENT (I_i or I_{max}), AND THE POWER (P_i or P_{max}) THAT INTRINSICALLY SAFE APPARATUS CAN RECEIVE AND REMAIN INTRINSICALLY SAFE, INCLUDING FAULTS, MUST BE EQUAL OR GREATER THAN THE VOLTAGE (U_o , V_{oc} , or V_t), THE CURRENT (I_o , I_{sc} , or I_t), AND THE POWER (P_o or P_{max}) LEVELS WHICH CAN BE DELIVERED BY THE ASSOCIATED APPARATUS, CONSIDERING FAULTS AND APPLICABLE FACTORS. ALSO, THE MAXIMUM UNPROTECTED CAPACITANCE (C_i) AND THE INDUCTANCE (L_i) OF EACH APPARATUS (BESIDES THE TERMINATION) CONNECTED TO THE FIELD BUS MUST BE LESS THAN OR EQUAL TO 5nF AND 10μH RESPECTIVELY.

ONLY ONE ACTIVE DEVICE IN EACH SECTION (USUALLY THE ASSOCIATED APPARATUS) IS ALLOWED TO CONTRIBUTE THE DESIRED ENERGY FOR THE FIELD BUS SYSTEM. THE ASSOCIATED APPARATUS' VOLTAGE U_o (or V_{oc} or V_t) IS LIMITED TO A RANGE OF 14V TO 24 V.D.C. ALL OTHER EQUIPMENT COMBINED IN THE BUS CABLE MUST BE PASSIVE (THEY CANNOT PROVIDE ENERGY TO THE SYSTEM, EXCEPT A LEAKAGE CURRENT OF 50 μA FOR EACH CONNECTED DEVICE) SEPARATELY POWERED EQUIPMENT REQUIRES A GALVANIC ISOLATION TO AFFIRM THAT THE INTRINSICALLY SAFE FIELD BUS CIRCUIT WILL REMAIN PASSIVE. THE PARAMETER OF THE CABLE USED TO INTERCONNECT THE DEVICES MUST BE IN THE FOLLOWING RANGE:

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

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

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

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

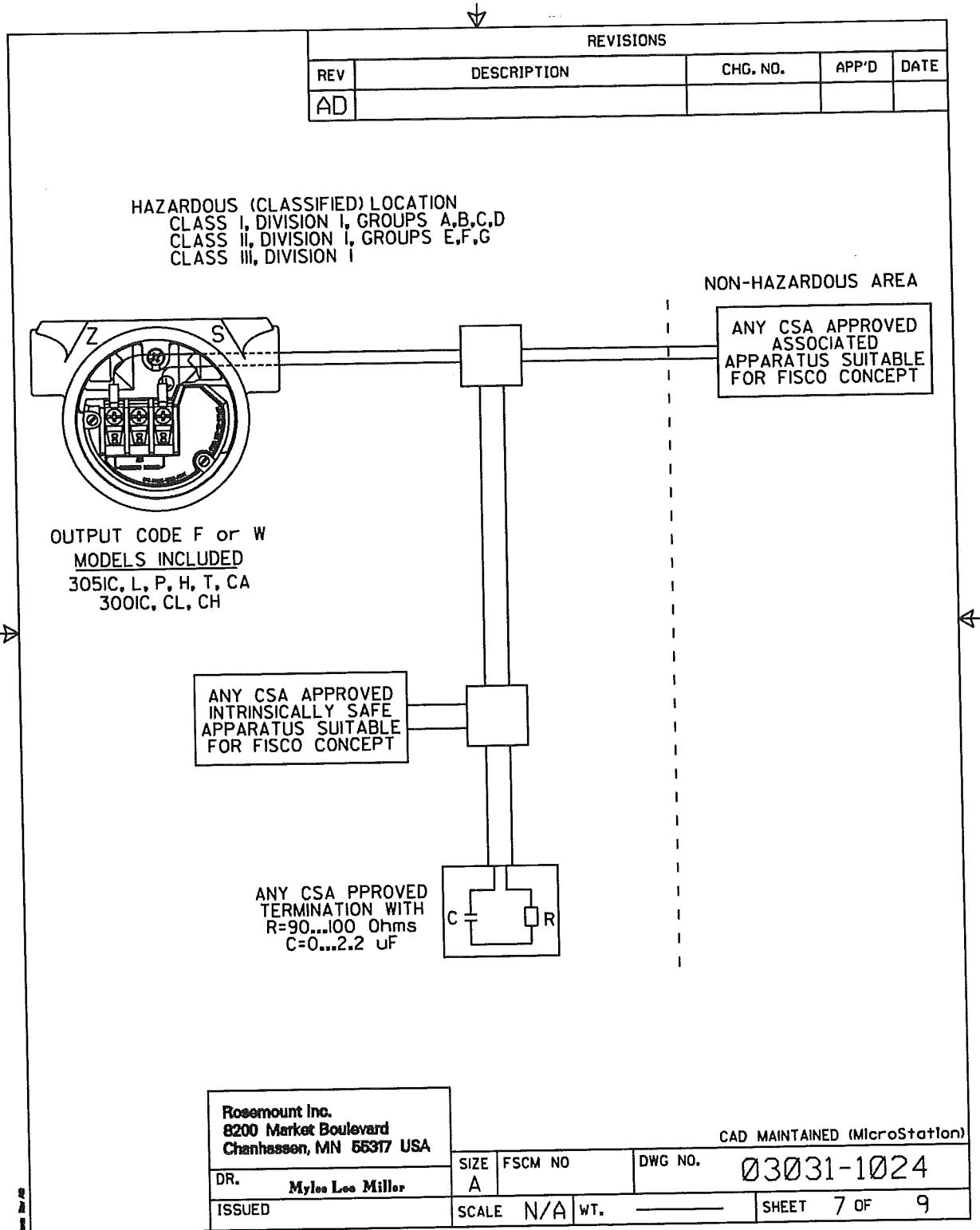
$R = 90...100 \text{ OHMS}$ $C = 2.2\mu\text{F}$

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

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

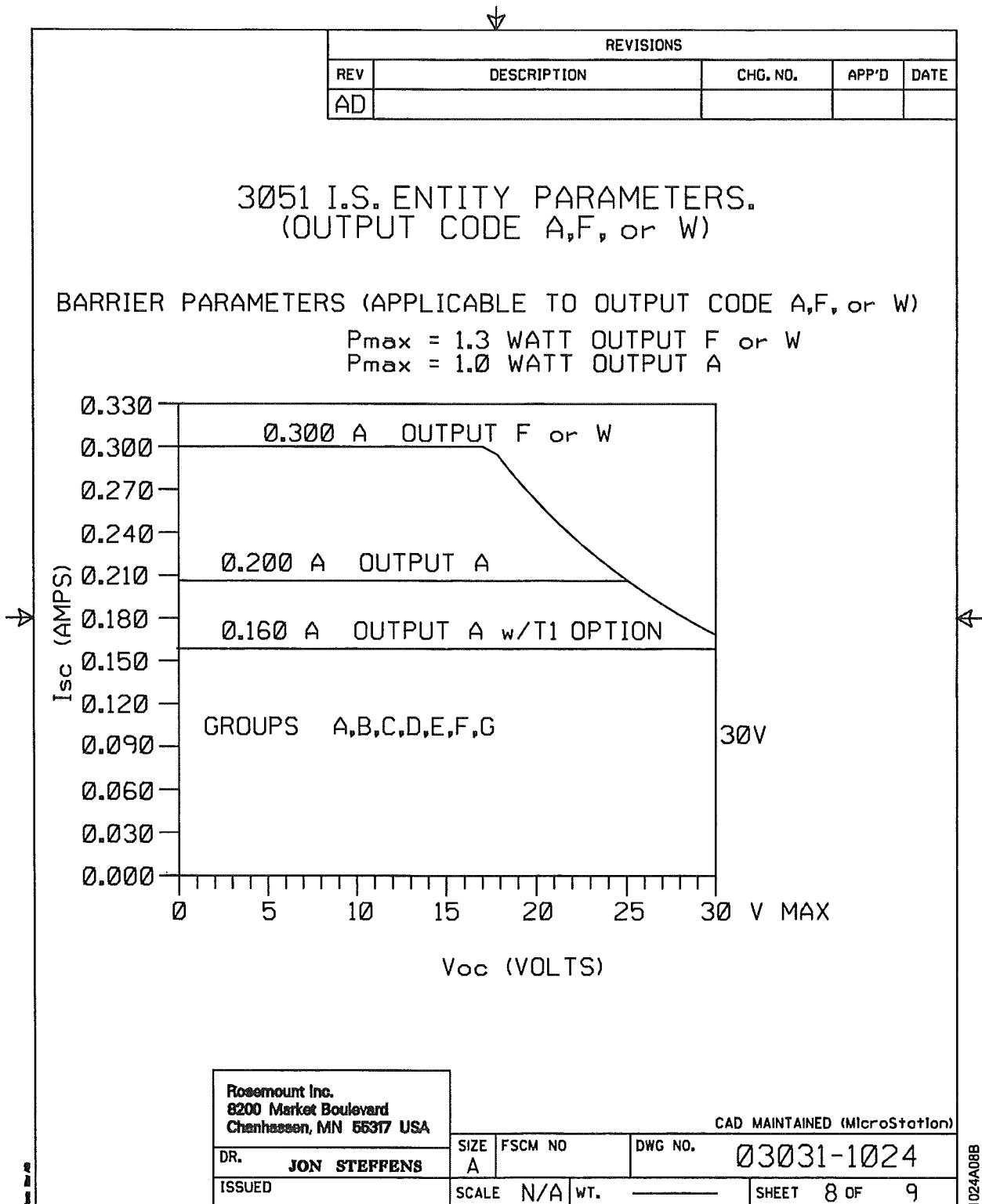
1. THE MAXIMUM NON-HAZARDOUS AREA VOLTAGE MUST NOT EXCEED 250 V.
2. CAUTION: ONLY USE SUPPLY WIRES SUITABLE FOR 5°C ABOVE SURROUNDING TEMPERATURE.
3. WARNING: REPLACEMENT OF COMPONENTS MAY DAMAGE INTRINSIC SAFETY.

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



Model 3051

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December 2002

Model 3051



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

ENTITY CONCEPT APPROVALS

THE ENTITY CONCEPT ALLOWS INTERCONNECTION OF INTRINSICALLY SAFE APPARATUS TO ASSOCIATED APPARATUS NOT SPECIFICALLY EXAMINED IN COMBINATION AS A SYSTEM. THE APPROVED VALUES OF MAX. OPEN CIRCUIT VOLTAGE (V_{oc}) AND MAX. SHORT CIRCUIT CURRENT (I_{sc}) AND MAX. POWER ($V_{oc} \times I_{sc}/4$), FOR THE ASSOCIATED APPARATUS MUST BE LESS THAN OR EQUAL TO THE MAXIMUM SAFE INPUT VOLTAGE (V_{max}), MAXIMUM SAFE INPUT CURRENT (I_{max}), AND MAXIMUM SAFE INPUT POWER (P_{max}) 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
$P_{MAX} = 1 \text{ WATT}$	$(V_{oc} \times I_{sc})$ IS LESS THAN OR EQUAL TO 1 WATT
$C_i = .01\mu f$	C_a IS GREATER THAN $.01\mu f + C \text{ CABLE}$
$L_i = 10\mu H$	L_a IS GREATER THAN $10\mu H + L \text{ CABLE}$

* FOR T1 OPTION:

$I_{max} = 160mA$	I_{sc} IS LESS THAN OR EQUAL TO 160mA
$L_i = 1.05mH$	L_a IS GREATER THAN $1.05mH + L \text{ CABLE}$

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
$P_{MAX} = 1.3 \text{ WATT}$	$(V_{oc} \times I_{sc})$ IS LESS THAN OR EQUAL TO 1.3 WATT
$C_i = 0\mu f$	C_a IS GREATER THAN $0\mu f + C \text{ CABLE}$
$L_i = 0\mu H$	L_a IS GREATER THAN $0\mu H + L \text{ CABLE}$

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

Rosemount Inc.
8200 Market Boulevard
Chanhassen, MN 55317 USA

CAD MAINTAINED (MicroStation)

DR. JON STEFFENS

SIZE A FSCM NO.

DWG NO.

03031-1024

ISSUED

SCALE N/A WT.

SHEET 9 OF 9

1024A09B

Model 3051

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Standards Association of
Australia (SAA)
03031-1026

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

SAA ENTITY CONCEPT APPROVALS

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

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

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

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 ANGLES ± 1/32 ± 2° DO NOT SCALE PRINT	CONTRACT NO.		ROSEMOUNT MEASUREMENT FISHER-ROSEMOUNT Rosemount Inc. 12001 Technology Drive Eden Prairie, MN 55344 USA	
	DR. Mike Dole 12/30/91			
	CHK'D		TITLE SAA I.S. INDEX FOR 3051 & 3001	
	APP'D. GLEN MONZO 5/8/92			
	APP'D. GOVT.		SIZE A	FSCM NO	DWG NO. 03031-1026
		SCALE N/A	WT.	SHEET 1 OF 4

1026A01B

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

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

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

APPROVED TRANSMITTERS

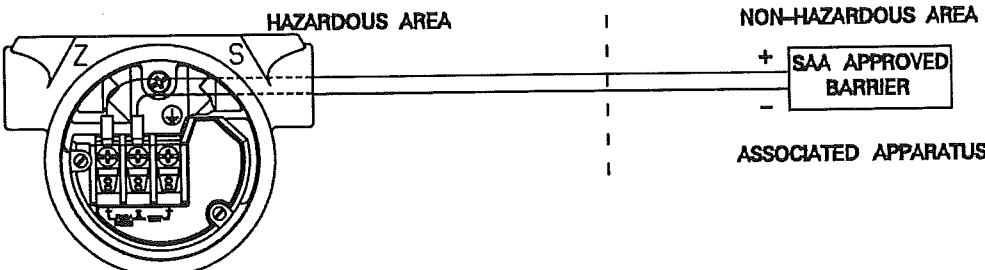
3051C	3051H	3001C	3001S
3051L	3051T	3001CL	
3051P	3051CA	3001CH	

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

APPARATUS PARAMETER	BARRIER PARAMETER
$V_{max} = 30V$ $I_{max} = 200mA$ $P_{max} = 0.9W$ $C_i = 0.01\mu F$ $L_i = 10\mu H$ FOR T1 OPTION ONLY $I_{max} = 180mA$ $L_i = 1.05mH$	V_{oc} IS LESS THAN OR EQUAL TO 30V I_{sc} IS LESS THAN OR EQUAL TO 200mA $\frac{V_{oc} \times I_{sc}}{4}$ IS LESS THAN OR EQUAL TO 0.9W C_a IS GREATER THAN 0.01 MICROFARADS L_a IS GREATER THAN 10 MICROHENRIES I_{sc} IS LESS THAN OR EQUAL TO 180mA L_a IS GREATER THAN 1.05 MILLIHENRIES

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

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



Rosemount Inc. 12001 Technology Drive Eden Prairie, MN 55344 USA		CAD Maintained, (MICROSTATION)	
DR.	Mike Dole	SIZE	A
ISSUED		FSCM NO	DWG NO. 03031-1026
		SCALE	N/A WT. — SHEET 2 OF 4

1026A02B

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

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

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

APPROVED TRANSMITTERS WITH LOW POWER CONFIGURATION

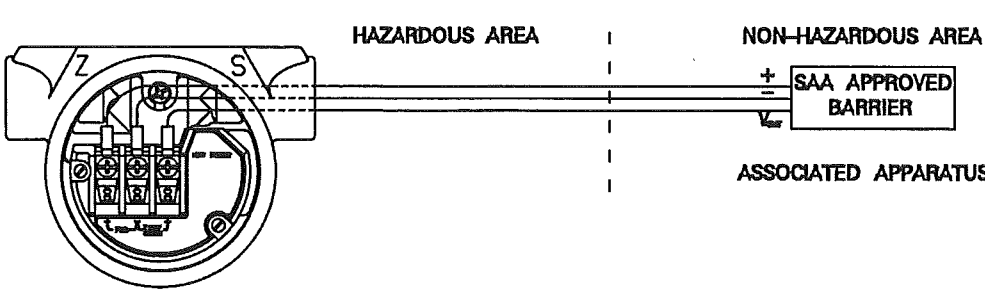
3051C 3051L 3051P 3051H	3051T 3051CA
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ENTITY PARAMETER FOR Ex Ia IIC T5 CLASS I, ZONE 0 PROTECTION:

APPARATUS PARAMETER	BARRIER PARAMETER
$V_{max} = 30V$ $I_{max} = 200mA$ $P_{max} = 0.9W$ $C_i = 0.042\mu F$ $L_i = 10\mu H$ FOR TI OPTION ONLY $L_i = 0.75mH$	V_{oc} IS LESS THAN OR EQUAL TO 30V I_{sc} IS LESS THAN OR EQUAL TO 200mA $\frac{V_{oc} \cdot I_{sc}}{4}$ IS LESS THAN OR EQUAL TO 0.9W C_a IS GREATER THAN 0.042 MICROFARADS L_a IS GREATER THAN 10 MICROHENRIES L_a IS GREATER THAN 0.75 MILLIHENRIES

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

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



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

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

**OUTPUT CODE F / W (FIELD BUS, PROFIBUS)
SAA ENTITY CONCEPT APPROVALS**

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

APPROVED TRANSMITTERS

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

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

APPARATUS PARAMETER	BARRIER PARAMETER
$V_{max} = 30V$ $I_{max} = 300mA$ $P_{max} = 1.3W$ $C_i = 0 \mu F$ $L_i = 0 \mu H$	V_{oc} IS LESS THAN OR EQUAL TO 30V I_{sc} IS LESS THAN OR EQUAL TO 300mA $\frac{V_{oc} * I_{sc}}{4}$ IS LESS THAN OR EQUAL TO 1.3W C_a IS GREATER THAN 0 MICROFARADS L_a IS GREATER THAN 0 MICROHENRIES

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

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

The diagram shows a transmitter (labeled Z and S) in a 'HAZARDOUS AREA' connected via a single wire to a 'NON-HAZARDOUS AREA'. In the non-hazardous area, the wire connects to an 'SAA APPROVED BARRIER' (positive terminal) and then to 'ASSOCIATED APPARATUS' (negative terminal).

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

1026A04B

Model 3051

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00809-0100-4001, Rev EA
December 2002

CONFIDENTIAL AND PROPRIETARY INFORMATION IS CONTAINED HEREIN AND MUST BE HANDLED ACCORDINGLY		REVISIONS			
REV	DESCRIPTION	CHG. NO.	APP'D	DATE	
G	ADD SHT 4&5, DELETE CLASS II & I	1. 636328	B.S.J.	08/01/90	
H	ADD 3051 P/L/H, 3001C CL /CH	636904	K.D.V.	09/06/90	
J	ADD SHT. 6, FIX TBL. 1.	638723	B.S.J.	01/02/91	
K	ADD 3044C	641710	W.R.K.	06/13/91	
L	ADD 3001S & SHT 7 FOR 3051C-LP	642380	G.E.M.	08/13/91	
M	ADD 3095	653145	K.D.V.	4/8/93	

THE ROSEMOUNT MODEL 268 SMART FAMILY INTERFACE IS APPROVED BY FACTORY
MUTUAL AS INTRINSICALLY SAFE FOR THE CLASS I, DIVISION 1 GROUPS INDICATED WHEN
USED IN CIRCUIT WITH THE BARRIERS AND CONVERTERS LISTED BELOW AND THE ROSE-
MOUNT SMART FAMILY TRANSMITTERS DEPICTED IN THE ACCOMPANYING CIRCUIT DIAGRAMS.

BARRIER MANUFACTURER	MODEL	APPROVED FOR CLASS I DIVISION 1, GROUPS
FOXBORO	2AI-I2V-FGB 2AI-I3V-FGB 2AS-I3I-FGB 3A2-I2D-CS-E/FGB-A 3A2-I3D-CS-E/FGB-A	A,B,C,D ↓
HONEYWELL	38545-000-0110-113-F5B5 38545-000-0110-111/112-F5B5	C,D ↓
MTL	115 122 322 715 722	A,B,C,D ↓
R. STAHL	8901/31-199/100/7 8901/30-199/100/7 8901/31-280/165/7 8901/30-280/165/7 [8903/51-200/050/7 8901/31-086/150/7 [8901/31-280/165/7 8901/31-086/150/7 9005/01-245/060 9005/01-252/100	C,D C,D A,B,C,D A,B,C,D C,D C,D A,B,C,D A,B,C,D ↓
TAYLOR	5850FL81200 5851FL81200 1130FF21000 1130FF22000 1135FF21000 1135FF22000	C,D ↓

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 ANGLES = 1/32 = 2° DO NOT SCALE PRINT	CONTRACT NO.	ROSEMOUNT MEASUREMENT FISHEROSEMOUNT ROSEMOUNT INC. 12001 TECHNOLOGY DRIVE EDEN PRAIRIE, MN 55344 USA	
	DR. MIKE DOBE 2/7/90	TITLE INDEX OF I.S. BARRIER SYSTEMS FOR MOD. 268 SMART FAMILY INTERFACE	
	CHK'D	SIZE A	FSCM NO
	APP'D. K. CARLSON 03/13/90	DWG NO. 00268-0031	
APP'D. GOVT.	SCALE	WT.	SHEET 1 OF 7

0031A01A

REVISIONS				
REV	DESCRIPTION	CHG. NO.	APP'D	DATE
M		653145		

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 MAXIMUM OPEN CIRCUIT VOLTAGE (V_T OR V_{OC}) AND MAXIMUM SHORT CIRCUIT CURRENT (I_T OR I_{SC}) AND MAXIMUM OUTPUT POWER ($V_{OC} \times I_{SC}$ OR $V_T \times I_T$), FOR THE ASSOCIATED APPARATUS MUST BE LESS THAN OR EQUAL TO THE MAXIMUM SAFE INPUT VOLTAGE (V_{MAX}), MAXIMUM SAFE INPUT CURRENT (I_{MAX}) AND MAXIMUM SAFE INPUT POWER (P_{MAX}) OF THE INTRINSICALLY SAFE APPARATUS. IN ADDITION, THE APPROVED MAXIMUM ALLOWABLE CONNECTED CAPACITANCE (C_A) AND INDUCTANCE (L_A) OF THE ASSOCIATED APPARATUS MUST BE GREATER THAN THE MAXIMUM UNPROTECTED INTERNAL CAPACITANCE (C_I) AND INDUCTANCE (L_I) OF THE INTRINSICALLY SAFE APPARATUS. THE APPROVED ENTITY CONCEPT PARAMETERS ARE AS FOLLOWS:

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

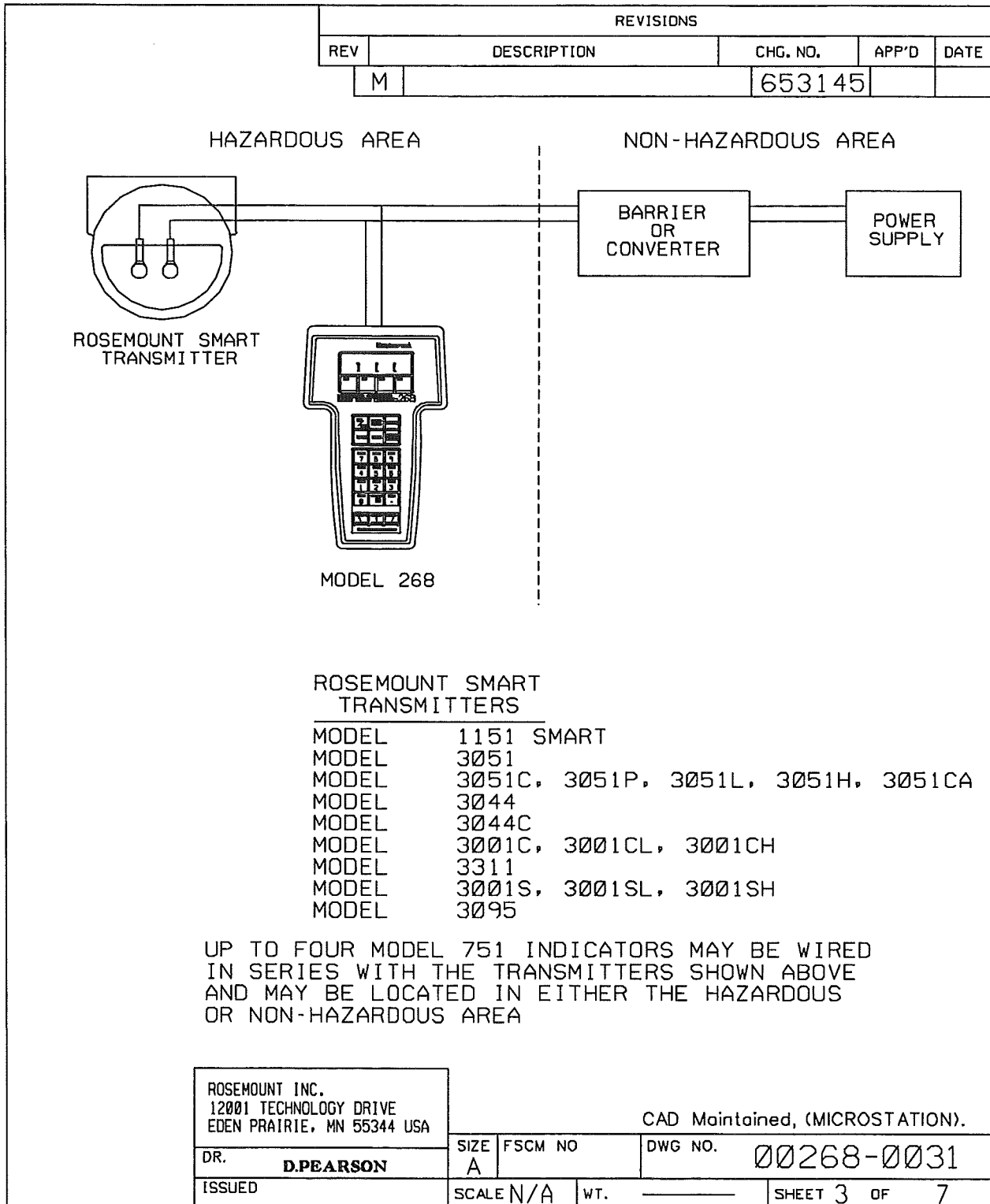
INPUT PARAMETERS (CLASS I, DIV. 1, GROUPS A, B, C, D)				
VMAX = 32 VDC	V _T or V _{OC} of barrier must be ≤ 32 Vdc			
IMAX = 186 MA	I _T or I _{SC} of barrier must be ≤ 186 mA			
CI = 0.01 UF	C _A of barrier must be ≥ 0.01 μF			
LI = 1.1 MH	L _A of barrier must be ≥ 1.1 mH			
PMAX:	1.1W	0.8W	0.6W	V _{OC} × I _{SC} of barrier must be ≤ specified value.
TEMP CODE	T4A	T5	T6	

OUTPUT PARAMETERS
VOC = 1.5 VD.C.
ISC = 27 MA
C _A = 10.000 UF
L _A = 46 MH

<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> ROSEMOUNT INC. 12001 TECHNOLOGY DRIVE EDEN PRAIRIE, MN 55344 USA </div> <div> DR. D. PEARSON ISSUED </div>	<div style="text-align: right; margin-bottom: 5px;">CAD Maintained, (MICROSTATION).</div> <div> <div style="display: flex; justify-content: space-between;"> <div> SIZE A </div> <div> FSCM NO </div> <div> DWG NO. 00268-0031 </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div>SCALE N/A</div> <div>WT. —</div> <div>SHEET 2 OF 7</div> </div> </div>
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0031A03A

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THE MAXIMUM ALLOWABLE CONNECTED INDUCTANCE (L_a) OF THE ASSOCIATED APPARATUS IS DETERMINED BY ADDING 27 mA TO THE I_{sc} OF THE BARRIER ($I_m = I_{sc} + 27\text{mA}$) AND ENTERING TABLE 1 (SHT 5) AT THE RESULTING VALUE, I_m , OR THE NEXT HIGHER VALUE OF I_m , TO DETERMINE THE L_a . (THE L_a MUST INCLUDE THE L_1 OF THE MODEL 268, WHICH IS 1.1mH).

EXAMPLE #1: I_{sc} OF BARRIER = 100mA.
 $I_m = 100\text{mA} + 27\text{mA} = 127\text{mA}$
 ENTER TABLE AT $I_m = 130\text{mA}$; $L_a = 2.0\text{mH}$

--WARNING-- BEFORE CONNECTING THE MODEL 268 INTO THE LOOP, DETERMINE THE CONNECTED INDUCTANCE OF THE SYSTEM BY ADDING THE L_1 OF THE TRANSMITTER, CABLE, AND MODEL 268. THE SUM MUST BE LESS THAN THE L_a DETERMINED FROM THE TABLE IN ORDER FOR THE MODEL 268 TO BE CONNECTED INTO THE LOOP. IF THE CONNECTED INDUCTANCE IS GREATER THAN THE VALUE DETERMINED FROM THE TABLE, A BARRIER WITH A LOWER I_{sc} MUST BE CHOSEN.

EXAMPLE #2: BARRIER $I_{sc} = 41.8\text{mA}$; BARRIER $L_a = 20.0\text{mH}$
 $I_m = 41.8\text{mA} + 27\text{mA} = 68.8\text{mA}$
 ENTER TABLE AT 70mA AND READ $L_a = 7.5\text{mH}$
 ADD CONNECTED INDUCTANCE OF SYSTEM:

MODEL 268	$L_1 = 1.1\text{mH}$
MODEL 3051 TRANSMITTER	$L_1 = 0.48\text{mH}$
INDUCTANCE OF LOOP WIRING	1.0mH
TOTAL CONNECTED INDUCTANCE = 2.58mH	

TOTAL CONNECTED INDUCTANCE IS LESS THAN $L_a = 7.5\text{mH}$ AS DETERMINED ABOVE AND IS ALSO LESS THAN THE BARRIER L_a . THE MODEL 268 MAY SAFELY BE CONNECTED INTO THE LOOP. IF THE MODEL 751 INDICATORS ARE USED, THEIR TOTAL INDUCTANCE (LABEL VALUE * NUMBER OF INDICATORS) MUST ALSO BE INCLUDED.

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ISSUED	SCALE N/A	WT.	SHEET 4 OF 7

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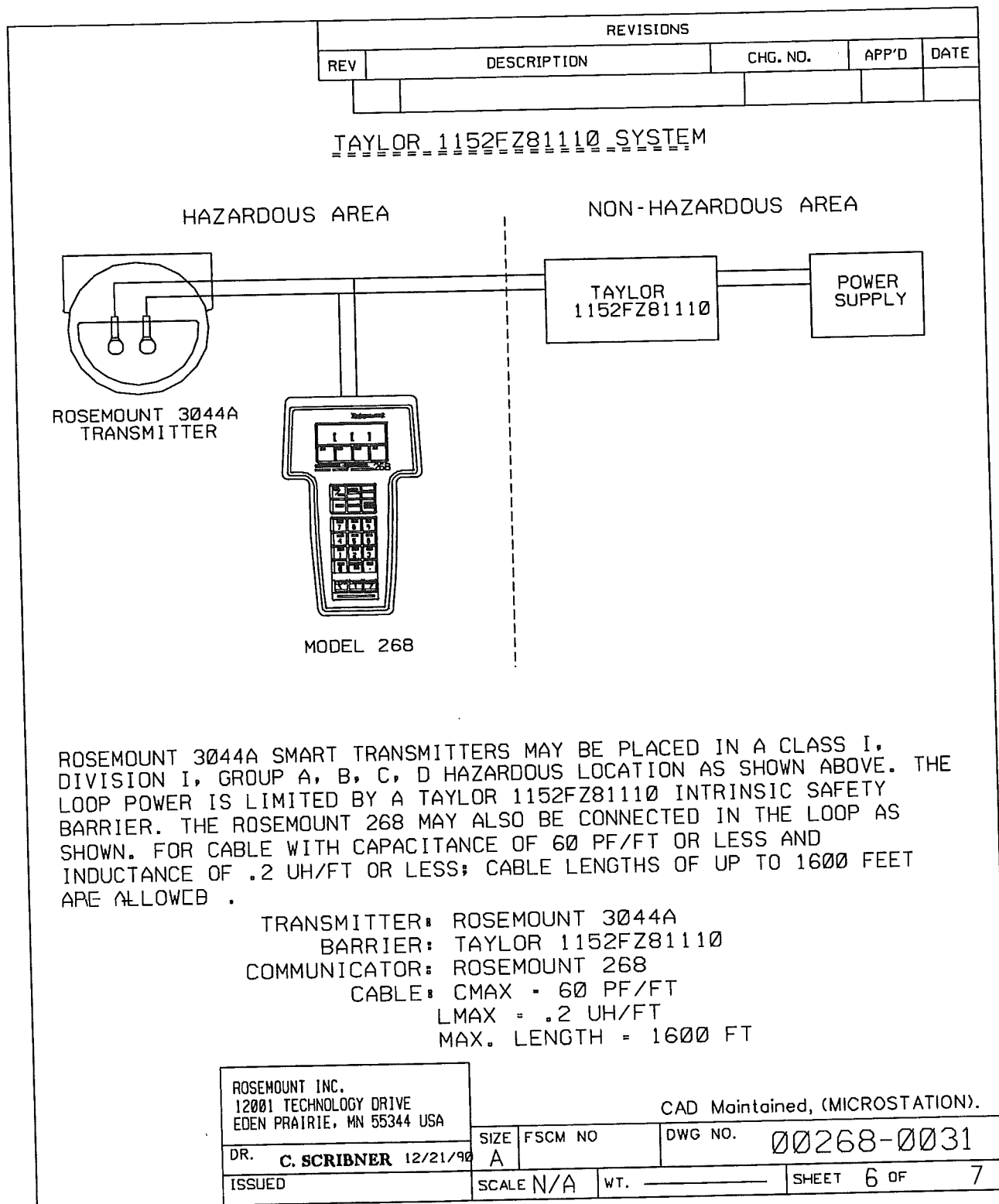
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Im (mA)	La (mH)
150	1.3
145	1.5
140	1.6
130	2.0
120	2.5
110	3.0
100	4.0
90	5.0
85	5.5
80	6.0
75	6.7
70	7.5
65	8.8
62	9.5
60	10.0
57	11.0
55	12.0
50	15.0
45	19.0
40	23.0
35	31.0

TABLE 1

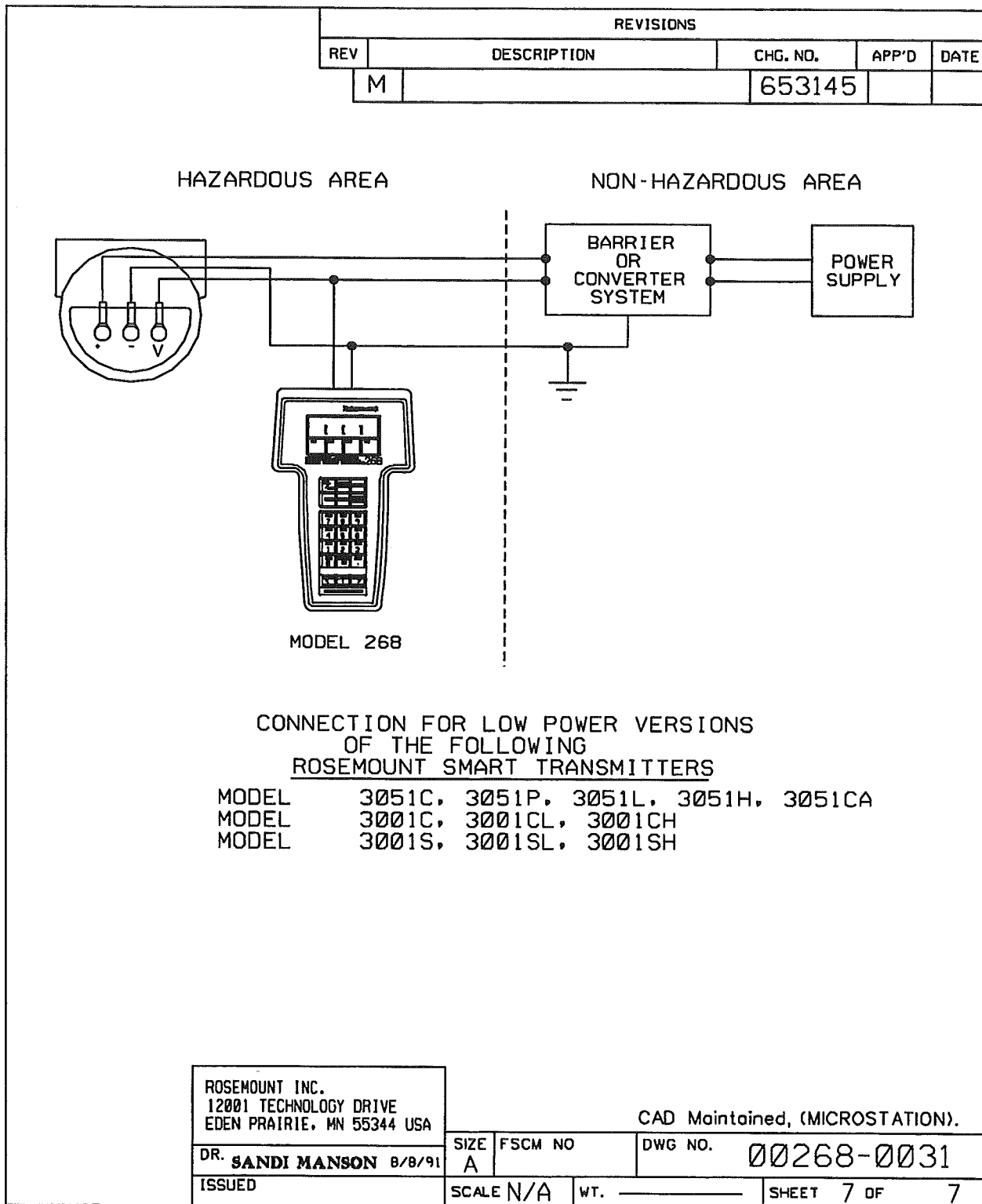
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