

Rosemount 3051S Series Pressure Transmitter Family

with FOUNDATION™ Fieldbus protocol



ROSEMOUNT®

www.rosemount.com



EMERSON™
Process Management

Rosemount 3051S Series Pressure Transmitter with FOUNDATION Fieldbus Protocol

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.

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Reference Manual
00809-0200-4801, Rev BA
April 2007

Section 1 Introduction

OVERVIEW

This manual is for the 3051S Series Pressure Transmitter with FOUNDATION fieldbus communications. This transmitter's scalable architecture allows putting a FOUNDATION fieldbus output board with any performance class 3051S supermodule and any of its process connections.

This manual only describes the topics required for installation, operation, configuration, and troubleshooting the FOUNDATION fieldbus transmitter.

For Rosemount 3051S with HART, see Manual 00809-0100-4801.

USING THIS MANUAL

The sections in this manual provide information on configuring, troubleshooting, operating and maintaining Rosemount 3051S Series Pressure Transmitters specifically for FOUNDATION fieldbus protocol.

The sections in this manual are organized as follows:

- **Section 2: Installation** contains mechanical and electrical installation instructions, and field upgrade options.
- **Section 3: Configuration** provides instruction on configuration of the Rosemount 3051S Series transmitters with fieldbus protocol. Information on software functions, configuration parameters, and other variables are also included.
- **Section 4: Operation and Maintenance** contains operation and maintenance techniques.
- **Section 5: Troubleshooting** provides troubleshooting techniques for the most common operating problems.
- **Appendix A: Foundation Fieldbus Block Information** supplies reference block information such as parameter tables.
- **Appendix B: Specifications and Reference Data** supplies reference and specification data, as well as ordering information.
- **Appendix C: Product Certifications** contains intrinsic safety approval information, European ATEX directive information, and approval drawings.
- **Appendix D: 3051S FOUNDATION Fieldbus Revision 23 Release** contains new function block and new functionality information.

Rosemount 3051S

Service Support

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

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

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

CAUTION

Individuals who handle products exposed to a hazardous substance can avoid injury if they are informed of and understand the hazard. If the product being returned was exposed to a hazardous substance as defined by OSHA, a copy of the required Material Safety Data Sheet (MSDS) for each hazardous substance identified must be included with the returned goods.

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

DEVICE DESCRIPTION

Before configuring the device, ensure the host has the appropriate Device Description file revision for this device. The device descriptor can be found on www.fieldbus.org. The initial release of the Rosemount 3051S with FOUNDATION fieldbus protocol is device revision 20. This manual is for revision 23.

NODE ADDRESS

The transmitter is shipped at a temporary (248) address. This will enable FOUNDATION fieldbus host systems to automatically recognize the device and move it to a permanent address.

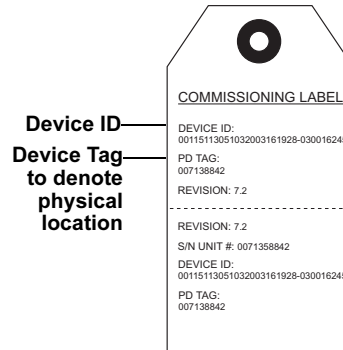
TAGGING

Commissioning Tag

The 3051S has been supplied with a removable commissioning tag that contains both the Device ID (the unique code that identifies a particular device in the absence of a device tag) and a space to record the device tag (PD_TAG) (the operational identification for the device as defined by the Piping and Instrumentation Diagram (P&ID)).

When commissioning more than one device on a fieldbus segment, it can be difficult to identify which device is at a particular location. The removable tag, provided with the transmitter, can aid in this process by linking the Device ID to its physical location. The installer should note the physical location of the transmitter on both the upper and lower location of the commissioning tag. The bottom portion should be torn off for each device on the segment and used for commissioning the segment in the control system.

Figure 1-1. Commissioning Tag



Transmitter Tag

If permanent tag is ordered:

- transmitter is tagged in accordance with customer requirements
- tag is permanently attached to the transmitter

Software (PD_TAG)

- If permanent tag is ordered, the PD Tag contains the permanent tag information up to 30 characters
- If permanent tag is NOT ordered, the PD Tag contains the transmitter serial number

FOUNDATION FIELDBUS FUNCTION BLOCKS

For reference information on the Resource, Sensor Transducer, AI, LCD Transducer, Advanced Diagnostics Transducer blocks refer to "Foundation Fieldbus Block Information" on page A-1. Reference information on the ISEL, INT, ARTH, SGCR and PID blocks can be found in the Function Block manual document number 00809-0100-4783.

Resource Block

The Resource block contains diagnostic, hardware and electronics information. There are no linkable inputs or outputs to the Resource Block.

Sensor Transducer Block

The Sensor Transducer Block contains sensor information including the sensor diagnostics and the ability to trim the pressure sensor or recall factory calibration.

LCD Transducer Block

The LCD Transducer Block is used to configure the LCD meter.

Advanced Diagnostics Transducer Block

The Advanced Diagnostics Transducer Block is optionally licensed. It will be licensed on a new transmitter if the D01 option is ordered or can be licensed in the field via a licensing code. Please contact your local sales person on how to acquire a license for a field upgrade.

This block allows a user to view, configure and monitor the plugged impulse line detection and statistical process monitoring diagnostics.

Analog Input Block

The Analog Input (AI) Function Block processes the measurements from the sensor and makes them available to other function blocks. The output value from the AI block is in engineering units and contains a status indicating the quality of the measurement. The AI block is widely used for scaling functionality.

Input Selector Block

The Input Selector (ISEL) Function Block can be used to select the first good, Hot Backup, maximum, minimum, or average of as many as eight input values and place it at the output. The block supports signal status propagation.

Integrator Block

The Integrator (INT) Function Block integrates one or two variables over time. The block compares the integrated or accumulated value to pre-trip and trip limits and generates discrete output signals when the limits are reached.

Arithmetic Block

The Arithmetic (ARTH) Function Block provides the ability to configure a range extension function for a primary input. It can also be used to compute nine different arithmetic functions.

Signal Characterizer Block

The Signal Characterizer (SGCR) Function Block characterizes or approximates any function that defines an input/output relationship. The function is defined by configuring as many as twenty X,Y coordinates. The block interpolates an output value for a given input value using the curve defined by the configured coordinates. Two separate analog input signals can be processed simultaneously to give two corresponding separate output values using the same defined curve.

PID Block

The PID Function Block combines all of the necessary logic to perform proportional/integral/derivative (PID) control. The block supports mode control, signal scaling and limiting, feed forward control, override tracking, alarm limit detection, and signal status propagation.

The block supports two forms of the PID equation: Standard and Series. You can choose the appropriate equation using the MATHFORM parameter. The Standard ISA PID equation is the default selection.

Integrator Block

The Integrator Block is used as a totalizer. This block will accept up to two inputs, has six options how to totalize the inputs, and two trip outputs.

Control Selector Block

The Control Selector Function Block selects one of two or three inputs to be the output. The inputs are normally connected to the outputs of PID or other function blocks. One of the inputs would be considered Normal and the other two overrides.

Output Splitter Block

The Output Splitter Function Block provides the capability to drive two control outputs from a single input. It takes the output of one PID or other control block to control two valves or other actuators.

Multiple Analog Input Block

The Multiple Analog Input Block allows for up to 8 variables to be published in one macro cycle. The primary purpose of this block to publish data that is channeled to it from the Advanced Diagnostic Block.

Analog Output Block

The Analog Output Function Block accepts an output value from a field device and assigns it to a specified I/O channel.

Mass Flow Transducer Block

The Mass Flow Function Block is an optionally licensed transducer block (H01 option) that will output a fully compensated mass flow value. It accepts Differential pressure, gage or absolute pressure and temperature inputs and then uses the flow calculation equation generated by the Engineering Assistant configuration tool to derive the output. The user can enter a fixed temperature if a temperature device is not available.

Table 1-1. Block Index Numbers

| Block Name | Revision 20 | Revision 23 |
|-----------------------------|-------------|------------------------|
| Advanced Diagnostic Block | 1300 | 1300 |
| Analog Input Block | 1400, 1500 | 1400, 1500, 2100, 2200 |
| PID Block | 1600 | 1600 |
| Input Selector Block | 1700 | 1700, 2400 |
| Signal Characterizer Block | 1800 | 1800 |
| Arithmetic Block | 1900 | 1900 |
| Integrator Block | 2000 | 2000 |
| Multiple Analog Input Block | | 2300 |
| Control Selector Block | | 2500 |
| Output Splitter Block | | 2600 |
| Analog Output Block | | 2700, 2800 |
| Mass Flow | | 2900 |

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Section 2 Installation

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| Rosemount 305, 306 and 304 Manifolds | page 2-14 |

OVERVIEW

The information in this section covers installation considerations for 3051S with protocol. A Quick Installation Guide for this product (document number 00825-0200-4801) is shipped with every transmitter to describe basic installation, wiring, and startup procedures. Dimensional drawings for each Rosemount 3051S variation and mounting configuration are included in Appendix B: Specifications and Reference Data.

SAFETY MESSAGES

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

Warnings

| ⚠ WARNING |
|--|
| <p>Explosions can result in death or serious injury.</p> <ul style="list-style-type: none">• Do not remove the transmitter covers in explosive environments when the circuit is live.• Fully engage both transmitter covers to meet explosion-proof requirements.• Before connecting a communicator in an explosive atmosphere, make sure the instruments in the loop are installed in accordance with intrinsically safe or non-incendive field wiring practices.• Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications. |

⚠ WARNING

Electrical shock can result in death or serious injury.

- Avoid contact with the leads and terminals.

Process leaks could result in death or serious injury.

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

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

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

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

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

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

- When upgrading, it is imperative that approval codes match between the SuperModule and the electronics housing.

CONSIDERATIONS

General

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

IMPORTANT

Install the enclosed pipe plug (found in the box) in the unused conduit opening. For straight threads, a minimum of 6 threads must be engaged. For tapered threads, install the plug wrench-tight.

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

Mechanical

NOTE

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

NOTE

When the transmitter is mounted on its side, position the Coplanar flange to ensure proper venting or draining. Mount the flange as shown in Figure 2-2 on page 2-9, keeping drain/vent connections on the bottom for gas service and on the top for liquid service.

Draft Range

Installation

For the 3051S_CD0 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 mounting effect and provides for optimal temperature performance.

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

Reducing Process Noise

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

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

Access requirements and cover installation on page 2-4 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 B: Specifications and Reference Data lists temperature operating limits.

INSTALLATION PROCEDURES

For dimensional drawing information refer to Appendix B: Specifications and Reference Data on page B-16.

Process Flange Orientation

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

Housing Rotation

See "Consider Housing Rotation" on page 2-11.

Terminal Side of Electronics Housing

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

Circuit Side of Electronics Housing

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

Cover Installation

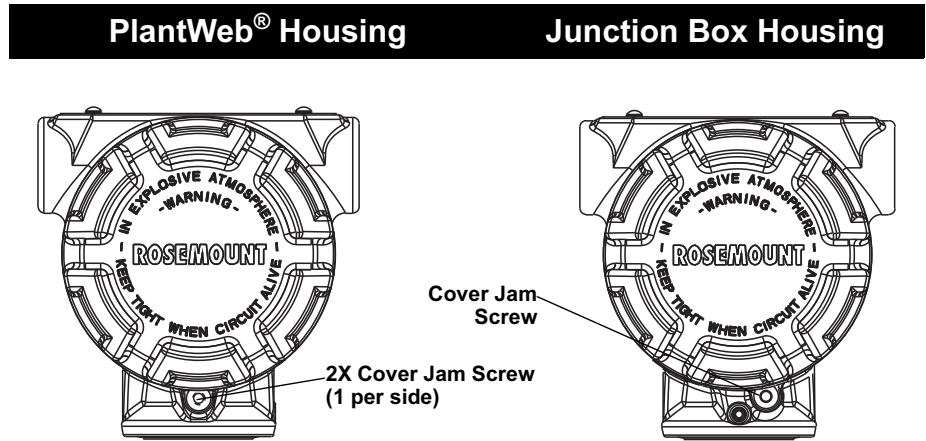
Always ensure a proper seal by installing the electronics housing cover(s) so that metal contacts metal. Use Rosemount O-rings.

Cover Jam Screw

For transmitter housings shipped with a cover jam screw, as shown in Figure 2-1, the screw should be properly installed once the transmitter has been wired and powered up. The cover jam screw is intended to disallow the removal of the transmitter cover in flameproof environments without the use of tooling. Follow these steps to install the cover jam screw:

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

Figure 2-1. Cover Jam Screw



Mount the Transmitter

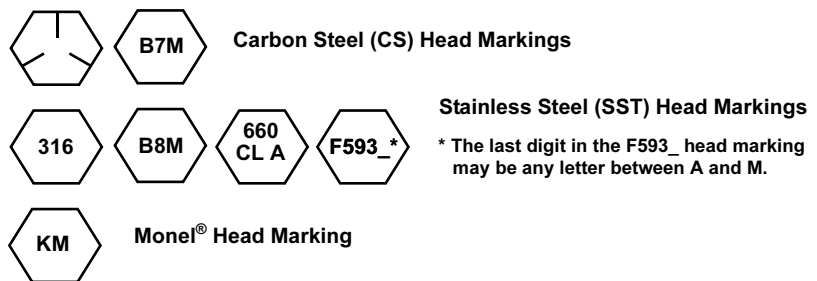
Mounting Brackets

Facilitate mounting transmitter to a 2-in. pipe, or to a panel. The B4 Bracket (SST) option is standard for use with the Coplanar and In-Line process connections. “Coplanar Flange Mounting Configurations” on page B-18 shows bracket dimensions and mounting configurations for the B4 option.

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

Flange Bolts

The 3051S can be shipped with a Coplanar flange or a Traditional flange installed with four 1.75-inch flange bolts. Mounting bolts and bolting configurations for the Coplanar and Traditional flanges can be found on page 2-7. Stainless steel bolts supplied by Emerson Process Management are coated with a lubricant to ease installation. Carbon steel bolts do not require lubrication. No additional lubricant should be applied when installing either type of bolt. Bolts supplied by Emerson Process Management are identified by their head markings:



Rosemount 3051S Series

Bolt Installation



Only use bolts supplied with the Rosemount 3051S or sold by Emerson Process Management as spare parts. When installing the transmitter to one of the optional mounting brackets, torque the bolts to 125 in.-lb. (0,9 N-m). Use the following bolt installation procedure:

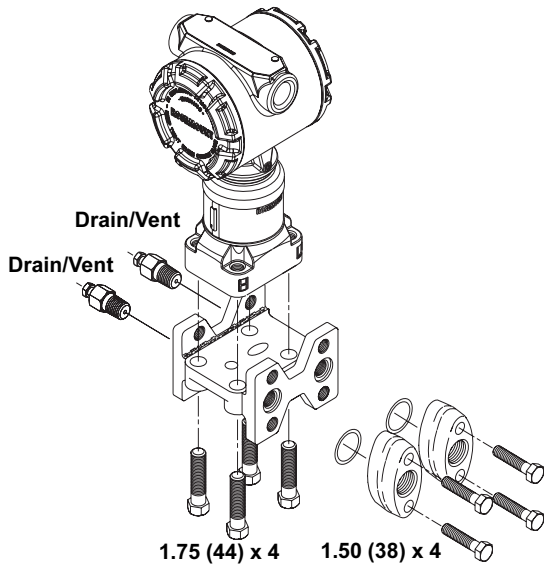
1. Finger-tighten the bolts.
2. Torque the bolts to the initial torque value using a crossing pattern.
3. Torque the bolts to the final torque value using the same crossing pattern.

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

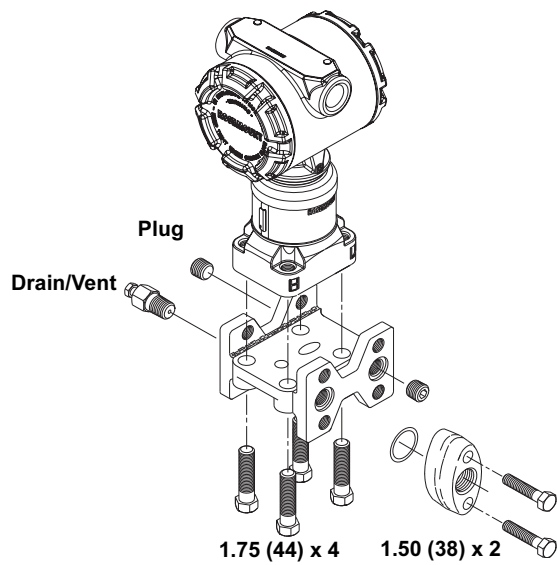
Table 2-1. Bolt Installation Torque Values

| 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) |
| <i>Mone</i> [®] —Option L6 | 300 in.-lb (34 N-m) | 650 in.-lb (73 N-m) |
| ASTM-A-453-660—Option L7 | 150 in.-lb (17 N-m) | 300 in.-lb (34 N-m) |
| ASTM-A-193-B8M—Option L8 | 150 in.-lb (17 N-m) | 300 in.-lb (34 N-m) |

DIFFERENTIAL TRANSMITTER



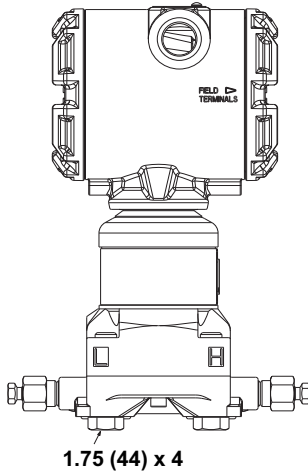
GAGE/ABSOLUTE TRANSMITTER



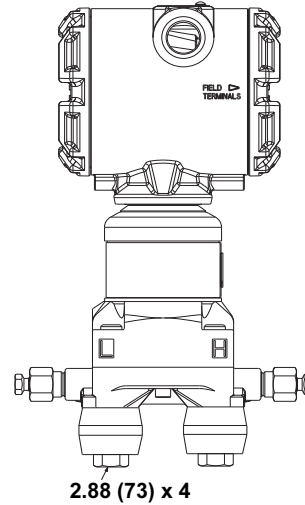
NOTE

Dimensions are in inches (millimeters).

**Transmitter with
Flange Bolts**



**Transmitter with
Flange Adapters
and Flange/ Adapter Bolts**



| Description | Qty | Size in in. (mm) |
|---|-----|--------------------------|
| Differential Pressure | | |
| Flange Bolts | 4 | 1.75 (44) |
| Adapter Bolts | 4 | 1.50 (38) ⁽¹⁾ |
| Flange/ Adapter Bolts | 4 | 2.88 (73) |
| Gage/Absolute Pressure⁽²⁾ | | |
| Flange Bolts | 4 | 1.75 (44) |
| Adapter Bolts | 2 | 1.50 (38) ⁽¹⁾ |
| Flange/ Adapter Bolts | 2 | 2.88(73) |

(1) DIN-compliant traditional flange requires 1.75 in. (44 mm) length adapter bolts.
 (2) Rosemount 3051S In-line transmitters are direct mount and do not require bolts for process connection.

Rosemount 3051S Series

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, density variations between the legs, and plugged impulse piping.

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

- Keep impulse piping as short as possible.
- For liquid service, slope the impulse piping at least 1 inch per foot (8 cm per m) upward from the transmitter toward the process connection.
- For gas service, slope the impulse piping at least 1 inch per foot (8 cm per m) downward from the transmitter toward the process connection.
- Avoid high points in liquid lines and low points in gas lines.
- Make sure both impulse legs are the same temperature.
- Use impulse piping large enough to avoid friction effects and blockage.
- Vent all gas from liquid piping legs.
- When using a sealing fluid, fill both piping legs to the same level.
- When purging, make the purge connection close to the process taps and purge through equal lengths of the same size pipe. Avoid purging through the transmitter.
- Keep corrosive or hot (above 250 °F [121 °C]) process material out of direct contact with the SuperModule and flanges.
- Prevent sediment deposits in the impulse piping.
- Keep the liquid head balanced on both legs of the impulse piping.
- Avoid conditions that might allow process fluid to freeze within the process flange.³

Mounting Requirements

Impulse piping configurations depend on specific measurement conditions. Refer to Figure 2-2 for examples of the following mounting configurations:

Liquid Flow Measurement

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

Gas Flow Measurement

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

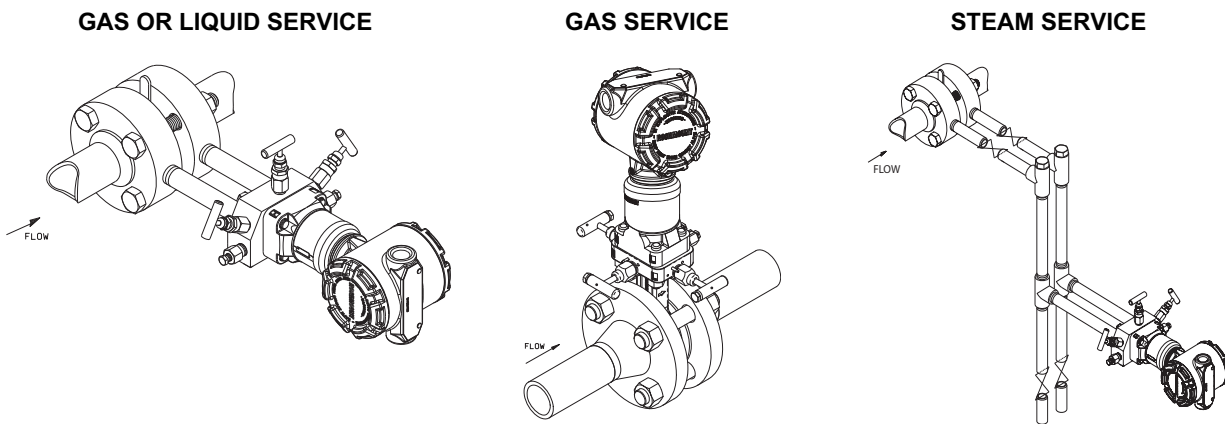
Steam Flow Measurement

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

NOTE

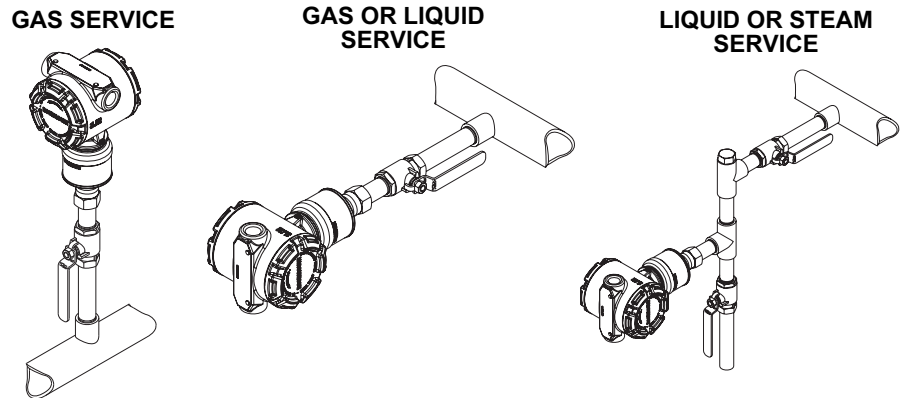
For steam or other elevated temperature services, it is important that temperatures at the process connection do not exceed the transmitter's process temperature limits. See "Process Temperature Limits" on page B-11 for details.

Figure 2-2. Coplanar Installation Examples




Rosemount 3051S Series

Figure 2-3. In-Line Installation Examples



Process Connections

3051S transmitter flange process connection size is $\frac{1}{4}$ –18 NPT. Flange adapters with $\frac{1}{2}$ –14 NPT connections are available as the D2 option. Use your plant-approved lubricant or sealant when making the process connections. The process connections on the transmitter flange are on $2\frac{1}{8}$ -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).

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

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

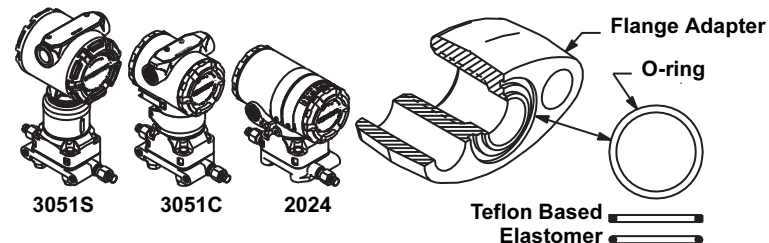
1. Remove the flange bolts.
2. Leaving the flange in place, move the adapters into position with the O-ring installed.
3. Clamp the adapters and the Coplanar flange to the transmitter module using the longer of the bolts supplied.
4. Tighten the bolts. Refer to Table 2-1 on page 2-6 for torque specifications.

⚠ WARNING

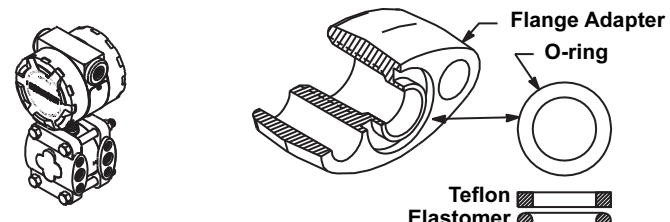
Failure to install proper flange adapter O-rings can cause process leaks, which can result in death or serious injury.

The two flange adapters are distinguished by unique O-ring grooves. Only use the O-ring that is designed for its specific flange adapter, as shown below.

ROSEMOUNT 3051S/ 3051/3001/3095/2024



ROSEMOUNT 1151



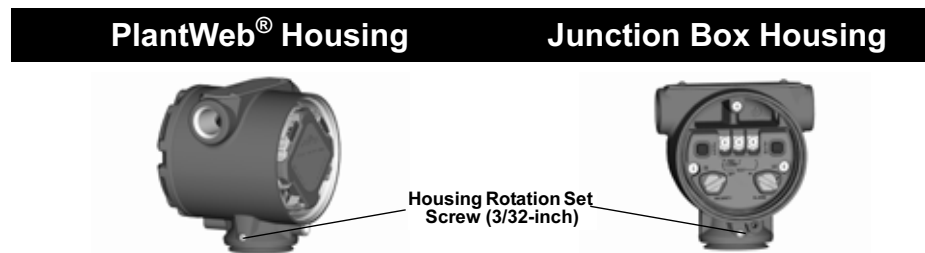
Refer to the Spare Parts list in Appendix B: Specifications and Reference Data for the correct part numbers of the flange adapters and O-rings designed for 3051S transmitters.

Whenever you remove flanges or adapters, visually inspect the Teflon[®] O-rings. Replace them if there are any signs of damage, such as nicks or cuts. If you replace the O-rings, re-torque the flange bolts after installation to compensate for cold flow. Refer to the process sensor body reassembly procedure in Section 5 Troubleshooting on page 5-6.

Consider Housing Rotation

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

Figure 2-4. Housings



1. Loosen the housing rotation set screw.
2. First rotate the housing clockwise to the desired location. If the desired location cannot be achieved due to thread limit, rotate the housing counter clockwise to the desired location (up to 360° from thread limit).
3. Retighten the housing rotation set screw.

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

NOTE

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

Configure Security

Security

The 3051S FOUNDATION fieldbus transmitter has a hierarchy of security. This switch provides the highest level of security. With the switch in the ON position, all writes to the transmitter will be disabled.

Simulate

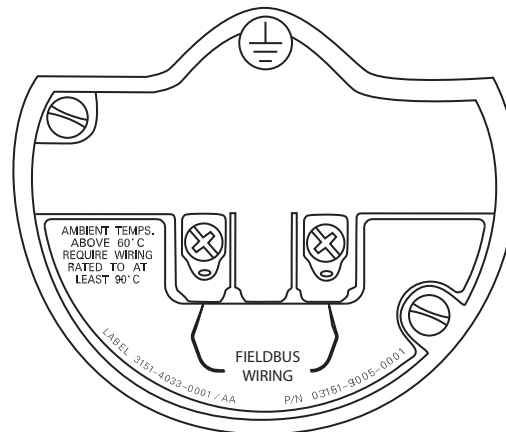
The Simulate switch must be in the ON position and the AI block in simulate mode to be able to enter and use user entered values.

NOTE

This switch position is ignored when the transmitter is initially powered. The switch must be activated with the transmitter powered. If power is removed, restore power and toggle this switch OFF and then back to the ON position if you plan to simulate inputs.

WIRING

Wiring and power supply requirements can be dependent upon the approval certification. As with all FOUNDATION fieldbus requirements, a conditioned power supply and terminating resistors are required for proper operation. The standard 3051S pressure transmitter terminal block is pictured below. The terminals are not polarity sensitive. The transmitter requires 9-32 Vdc to operate. Type A FOUNDATION fieldbus wiring 18 awg twisted shielded pair is recommended.



Grounding

Signal Wiring Grounding

Do not run signal wiring in conduit or open trays with power wiring, or near heavy electrical equipment. Ground the signal wiring shield at any one point on the signal loop.

Transmitter Case

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

- **Internal Ground Connection:** The Internal Ground Connection screw is inside the terminal side of the electronics housing. The screw is identified by a ground symbol (\oplus), and is standard on all 3051S transmitters.

NOTE

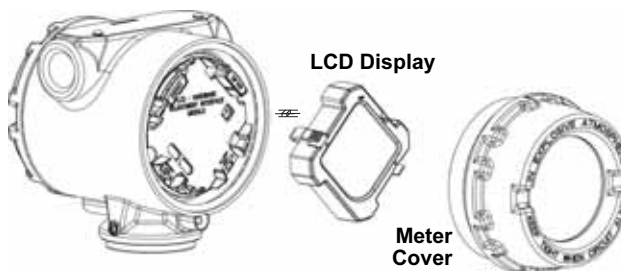
Grounding the transmitter case using the threaded conduit connection may not provide a sufficient ground. The transient protection terminal block (Option Code T1) will not provide transient protection unless the transmitter case is properly grounded. Use the above guidelines to ground the transmitter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

ROTATING THE LCD DISPLAY

Transmitters ordered with the LCD display will be shipped with the display installed. The display can be rotated in 90 degree increments. To rotate the display:

1. Ensure the power is removed from the transmitter.
2. Remove the cover to expose the LCD Display.
3. Squeeze the two tabs that hold the meter in and gently pull.
4. Ensure the four-pin connector is still in the transmitter circuit board. If the connector stayed in the meter, remove it from the meter and insert it into the transmitter circuit board.
5. Get the LCD in the orientation desired, squeeze the two tabs to remove the meter and gently insert the meter in to the electronics circuit board. If the meter does not insert correctly, check the alignment of the four-pin connector and try again.
6. Install the meter cover and tighten to ensure metal-to-metal contact.

Figure 2-5. Optional LCD Display



Rosemount 3051S Series

Setting Units

Units for both the Sensor Transducer Block and the AI Block are set in the AI Block. To change units:

- Set the AI Block to OOS mode
- Select XD_Scale.units_index
- Select only one of the engineering units listed on page 3-10
- Return AI Block to Auto mode

ZEROING TRANSMITTER

Before operating the transmitter, perform a Zero Trim and set the Damping. Refer to page 4-4 for zeroing procedures.

Damping

⚠ The damping parameter in the Transducer Block may be used to filter measurement noise. By increasing the damping time, the transmitter will have a slower response time, but will decrease the amount of process noise that is translated to the Transducer Block Primary Value. Because both the LCD and AI Block get input from the Transducer Block, adjusting the damping parameter will effect both blocks.

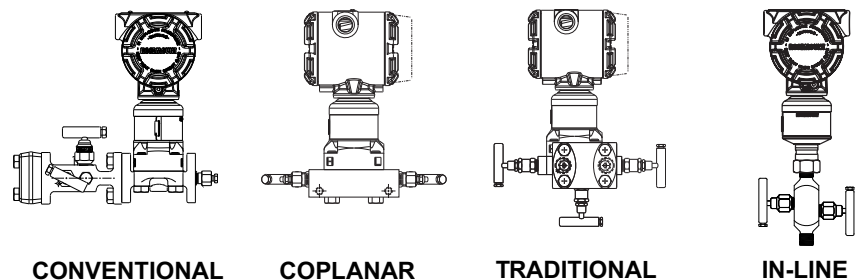
NOTE

The AI Block has it's own filtering parameter called PV_FTME. For simplicity, it is better to do filtering in the Transducer Block as damping will be applied to primary value on every sensor update. If filtering is done in AI block, damping will be applied to output every macrocycle.

ROSEMOUNT 305, 306 AND 304 MANIFOLDS

The Rosemount 305 is available in two designs: Traditional and Coplanar. The traditional 305 Integral Manifold can be mounted to most primary elements with mounting adapters in the market today. The Rosemount 306 In-Line Manifold is used with In-line transmitters to provide block-and-bleed valve capabilities of up to 10000 psi (690 bar). The Rosemount 304 comes in two basic styles: traditional (flange x flange and flange x pipe) and wafer. The 304 traditional manifold comes in 2, 3, and 5-valve configurations. The 304 wafer manifold comes in 3 and 5 valve configurations.

Figure 2-6. Integral Manifold Designs



Rosemount 305 Integral Manifold Installation Procedure

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

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

IMPORTANT

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


2. Install the Integral Manifold on the SuperModule. Use the four manifold bolts for alignment. Finger tighten the bolts, then tighten the bolts incrementally in a cross pattern to final torque value. See "Flange Bolts" on page 2-5 for complete bolt installation information and torque values. When fully tightened, the bolts should extend through the top of the module housing.
 3. If the Teflon SuperModule O-rings have been replaced, the flange bolts should be re-tightened after installation to compensate for cold flow of the O-rings.
 4. If applicable, install flange adapters on the process end of the manifold using the 1.75-in. flange bolts supplied with the transmitter.
-

NOTE

Always perform a zero trim on the transmitter/manifold assembly after installation to eliminate mounting effects. See Section 4 Operation and Maintenance, "Sensor Calibration, Zero Trim Method" on page 4-4.

Rosemount 306 In-Line Manifold Installation Procedure

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

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

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

NOTE

If using thread tape, be sure the thread tape does not strip when the manifold assembly is started.

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

Rosemount 3051S Series

Rosemount 304 Conventional Manifold Installation Procedure

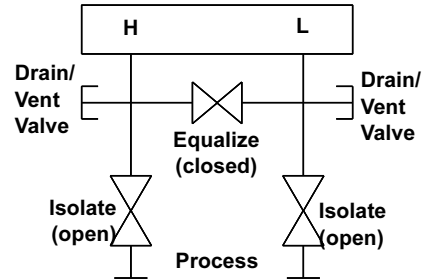
To install a 304 Conventional Manifold to a 3051S transmitter:

1. Align the Conventional Manifold with the transmitter flange. Use the four manifold bolts for alignment.
2. Finger tighten the bolts, then tighten the bolts incrementally in a cross pattern to final torque value. See "Flange Bolts" on page 2-5 for complete bolt installation information and torque values. When fully tightened, the bolts should extend through the top of the module housing plane of flange web (i.e. bolt hole) but must not contact module housing.
3. If applicable, install flange adapters on the process end of the manifold using the 1.75-in. flange bolts supplied with the transmitter.

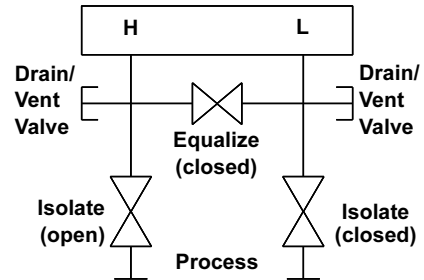
Manifold Operation

Three-valve configuration shown.

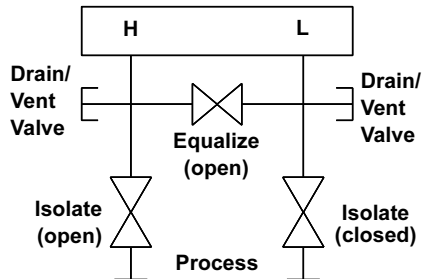
In normal operation the two block valves between the process and instrument ports will be open and the equalizing valve(s) will be closed.



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

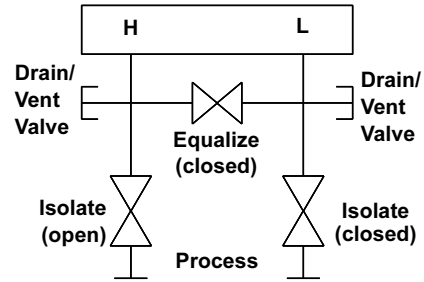


Next, open the center (equalize) valve(s) to equalize the pressure on both sides of the transmitter.

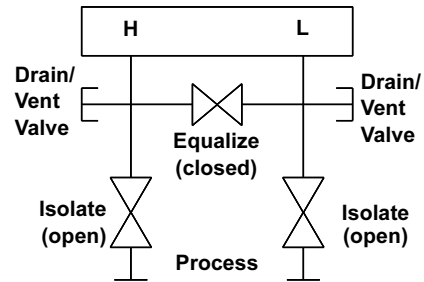


Rosemount 3051S Series

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



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



Section 3 Configuration

| | |
|---|-----------|
| Overview | page 3-1 |
| Safety Messages | page 3-1 |
| Device Capabilities | page 3-2 |
| General Block Information | page 3-3 |
| Resource Block | page 3-4 |
| Analog Input (AI) Function Block | page 3-8 |
| Multiple Analog Input (MAI) Function Block | page 3-16 |
| LCD Transducer Block | page 3-18 |
| Advanced Diagnostics Transducer Block (ADB) | page 3-21 |
| Mass Flow | page 3-27 |
| Engineering Assistant Software | page 3-28 |

OVERVIEW

This section covers basic operation, software functionality, and basic configuration procedures for the Rosemount 3051S pressure transmitter with FOUNDATION fieldbus. This section is organized by block information. For detailed information about the function blocks used in the Rosemount3051S pressure transmitter, refer to “Foundation Fieldbus Block Information” on page A-1 and the FOUNDATION fieldbus Block manual (00809-0100-4783).

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 configuration tool 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.

Rosemount 3051S

DEVICE CAPABILITIES

Link Active Scheduler

The Rosemount 3051S can be designated to act as the backup Link Active Scheduler (LAS) in the event that the LAS is disconnected from the segment. As the backup LAS, the 3051S will take over the management of communications until the host is restored.

The host system may provide a configuration tool specifically designed to designate a particular device as a backup LAS. Otherwise, this can be configured manually as follows:

- ⚠ 1. Access the Management Information Base (MIB) for the 3051S.
2. To activate the LAS capability, write 0x02 to the BOOT_OPERAT_FUNCTIONAL_CLASS object (Index 605). To deactivate, write 0x01.

Restart the processor.

Capabilities

Virtual Communication Relationship (VCRs)

There are a total of 20 VCRs. One is permanent and 19 are fully configurable by the host system. Twenty-five link objects are available.

| Network Parameter | Value |
|--|---------|
| Slot Time | 6 |
| Maximum Response Delay | 4 |
| Maximum Inactivity to Claim LAS Delay | 47 |
| Minimum Inter DLPDU Delay | 7 |
| Time Sync class | 4 (1ms) |
| Maximum Scheduling Overhead | 21 |
| Per CLPDU PhL Overhead | 4 |
| Maximum Inter-channel Signal Skew | 0 |
| Required Number of Post-transmission-gab-ext Units | 0 |
| Required Number of Preamble-extension Units | 1 |

Host timer recommendations

T1 = 96000
T2 = 1920000
T3 = 480000

Block Execution times

Analog Input = 20 ms
PID = 25 ms
Arithmetic = 20 ms
Input Selection = 20 ms
Signal Characterizer = 20 ms
Integrator = 20 ms
Analog Output = 20 ms
Output Splitter = 20 ms
Multiple Analog Input = 20 ms
Control Selector = 20 ms

GENERAL BLOCK INFORMATION

Modes

The Resource, Transducer, and all function blocks in the device have modes of operation. These modes govern the operation of the block. Every block supports both automatic (AUTO) and out of service (OOS) modes. Other modes may also be supported.

Changing Modes

To change the operating mode, set the `MODE_BLK.TARGET` to the desired mode. After a short delay, the parameter `MODE_BLOCK.ACTUAL` should reflect the mode change if the block is operating properly.

Permitted Modes

It is possible to prevent unauthorized changes to the operating mode of a block. To do this, configure `MODE_BLOCK.PERMITTED` to allow only the desired operating modes. It is recommended to always select OOS as one of the permitted modes.

Types of Modes

For the procedures described in this manual, it will be helpful to understand the following modes:

AUTO

The functions performed by the block will execute. If the block has any outputs, these will continue to update. This is typically the normal operating mode.

Out of Service (OOS)

The functions performed by the block will not execute. If the block has any outputs, these will typically not update and the status of any values passed to downstream blocks will be "BAD". To make some changes to the configuration of the block, change the mode of the block to OOS. When the changes are complete, change the mode back to AUTO.

MAN

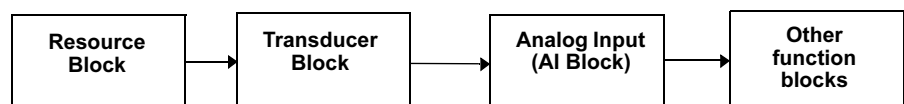
In this mode, variables that are passed out of the block can be manually set for testing or override purposes.

Other Types of Modes

Other types of modes are Cas, RCas, ROut, IMan and LO. Some of these may be supported by different function blocks in the Rosemount3051S. For more information, see the Function Block manual, document 00809-0100-4783.

NOTE

When an upstream block is set to OOS, this will impact the output status of all downstream blocks. The figure below depicts the hierarchy of blocks:



Rosemount 3051S

Block Instantiation

The Rosemount 3051S supports the use of Function Block Instantiation. When a device supports block instantiation, the number of blocks and block types can be defined to match specific application needs. The number of blocks that can be instantiated is only limited by the amount of memory within the device and the block types that are supported by the device. Instantiation does not apply to standard device blocks like the Resource, Sensor Transducer, LCD Transducer, and Advanced Diagnostics Blocks.

By reading the parameter "FREE_SPACE" in the Resource block you can determine how many blocks you can instantiate. Each block that you instantiate takes up 4.5573% of the "FREE_SPACE".

Block instantiation is done by the host control system or configuration tool, but not all hosts are required to implement this functionality. Please refer to your specific host or configuration tool manual for more information.

Simulation

Simulation is the functionality of the AI block. To support testing, either change the mode of the block to manual and adjust the output value or enable simulation through the configuration tool and manually enter a value for the measurement value and its status (this single value will apply to all outputs). In both cases, first set the ENABLE jumper on the field device.

NOTE

All fieldbus instruments have a simulation jumper. As a safety measure, the jumper has to be reset every time there is a power interruption. This measure is to prevent devices that went through simulation in the staging process from being installed with simulation enabled.

With simulation enabled, the actual measurement value has no impact on the OUT value or the status. The OUT values will all have the same value as determined by the simulate value.

RESOURCE BLOCK

FEATURES and FEATURES_SEL

The FEATURES parameter is read only and defines which features are supported by the 3051S. Below is a list of the FEATURES the 3051S supports.

FEATURES_SEL is used to turn on any of the supported features that are found in the FEATURES parameter. The default setting of the Rosemount 3051S does not select any of these features. Choose one or more of the supported features if any.

UNICODE

All configurable string variables in the 3051S, except tag names, are octet strings. Either ASCII or Unicode may be used. If the configuration device is generating Unicode octet strings, you must set the Unicode option bit.

REPORTS

The 3051S supports alert reports. The Reports option bit must be set in the features bit string to use this feature. If it is not set, the host must poll for alerts. If this bit is set, the transmitter will actively report alerts.

SOFTWARE LOCK and HARDWARE LOCK

Inputs to the security and write lock functions include the hardware security switch, the hardware and software write lock bits of the FEATURE_SEL parameter, the WRITE_LOCK parameter, and the DEFINE_WRITE_LOCK parameter.

The WRITE_LOCK parameter prevents modification of parameters within the device except to clear the WRITE_LOCK parameter. During this time, the block will function normally updating inputs and outputs and executing algorithms. When the WRITE_LOCK condition is cleared, a WRITE_ALM alert is generated with a priority that corresponds to the WRITE_PRI parameter.

The FEATURE_SEL parameter enables the user to select a hardware or software write lock or no write lock capability. To enable the hardware security function, enable the HW_SEL bit in the FEATURE_SEL parameter. When this bit has been enabled the WRITE_LOCK parameter becomes read only and will reflect the state of the hardware switch. In order to enable the software write lock, the SW_SEL bit must be set in the FEATURE_SEL parameter. Once this bit is set, the WRITE_LOCK parameter may be set to "Locked" or "Not Locked." Once the WRITE_LOCK parameter is set to "Locked" by either the software or the hardware lock, all user requested writes as determined by the DEFINE_WRITE_LOCK parameter shall be rejected.

The DEFINE_WRITE_LOCK parameter allows the user to configure whether the write lock functions (both software and hardware) will control writing to all blocks, or only to the resource and transducer blocks. Internally updated data such as process variables and diagnostics will not be restricted by the security switch.

The following table displays all possible configurations of the WRITE_LOCK parameter.

| FEATURE_SEL HW_SEL bit | FEATURE_SEL SW_SEL bit | SECURITY SWITCH | WRITE_LOCK | WRITE_LOCK Read/Write | DEFINE_WRITE_LOCK | Write access to blocks |
|------------------------|------------------------|-----------------|--------------|-----------------------|-------------------|------------------------|
| 0 (off) | 0 (off) | NA | 1 (unlocked) | Read only | NA | All |
| 0 (off) | 1 (on) | NA | 1 (unlocked) | Read/Write | NA | All |
| 0 (off) | 1 (on) | NA | 2 (locked) | Read/Write | Physical | Function Blocks only |
| 0 (off) | 1 (on) | NA | 2 (locked) | Read/Write | Everything | None |
| 1 (on) | 0 (off) ⁽¹⁾ | 0 (unlocked) | 1 (unlocked) | Read only | NA | All |
| 1 (on) | 0 (off) | 1 (locked) | 2 (locked) | Read only | Physical | Function Blocks only |
| 1 (on) | 0 (off) | 1 (locked) | 2 (locked) | Read only | Everything | None |

⁽¹⁾ The hardware and software write lock select bits are mutually exclusive and the hardware select has the highest priority. When the HW_SEL bit is set to 1 (on), the SW_SEL bit is automatically set to 0 (off) and is read only.

MAX_NOTIFY

The MAX_NOTIFY parameter value is the maximum number of alert reports that the resource can have sent without getting a confirmation, corresponding to the amount of buffer space available for alert messages. The number can be set lower, to control alert flooding, by adjusting the LIM_NOTIFY parameter value. If LIM_NOTIFY is set to zero, then no alerts are reported.

PlantWeb™ Alarms

The alarms and recommended actions should be used in conjunction with Section 2: Troubleshooting.

The Resource Block will act as a coordinator for PlantWeb alarms. There will be three alarm parameters (FAILED_ALARM, MAINT_ALARM, and ADVISE_ALARM) which will contain information regarding some of the device errors which are detected by the transmitter software. There will be a RECOMMENDED_ACTION parameter which will be used to display the recommended action text for the highest priority alarm. FAILED_ALARM will have the highest priority followed by MAINT_ALARM and ADVISE_ALARM will be the lowest priority.

NOTE

PlantWeb alerts for ADB and mass flow cannot be simulated.

FAILED_ALARMS

A failure alarm indicates a failure within a device that will make the device or some part of the device non-operational. This implies that the device is in need of repair and must be fixed immediately. There are five parameters associated with FAILED_ALARMS specifically, they are described below.

FAILED_ENABLED

This parameter contains a list of failures in the device which makes the device non-operational that will cause an alarm to be sent. Below is a list of the failures with the highest priority first.

1. Memory Failure
2. NV Memory Failure
3. Primary Value Failure
4. Secondary Value Failure
5. Sensor Module Memory Failure
6. Sensor Module Failure

FAILED_MASK

This parameter will mask any of the failed conditions listed in FAILED_ENABLED. A bit on means that the condition is masked out from alarming and will not be reported.

FAILED_PRI

Designates the alarming priority of the FAILED_ALM, see "Alarm Priority" on page 3-15. The default is 0 and the recommended value are between 8 and 15.

FAILED_ACTIVE

This parameter displays which of the alarms is active. Only the alarm with the highest priority will be displayed. This priority is not the same as the FAILED_PRI parameter described above. This priority is hard coded within the device and is not user configurable.

FAILED_ALM

Alarm indicating a failure within a device which makes the device non-operational.

MAINT_ALARMS

A maintenance alarm indicates the device or some part of the device needs maintenance soon. If the condition is ignored, the device will eventually fail. There are five parameters associated with MAINT_ALARMS, they are described below.

MAINT_ENABLED

The MAINT_ENABLED parameter contains a list of conditions indicating the device or some part of the device needs maintenance soon. If the condition is ignored, the device will eventually fail.

Below is a list of the conditions with the highest priority first.

1. Sensor Module Memory Warning
2. Primary Value Degraded
3. Secondary Value Degraded
4. Plugged Impulse Line Detected

MAINT_MASK

The MAINT_MASK parameter will mask any of the failed conditions listed in MAINT_ENABLED. A bit on means that the condition is masked out from alarming and will not be reported.

MAINT_PRI

MAINT_PRI designates the alarming priority of the MAINT_ALM, "Process Alarms" on page 3-15. The default is 0 and the recommended values is 3 to 7.

MAINT_ACTIVE

The MAINT_ACTIVE parameter displays which of the alarms is active. Only the condition with the highest priority will be displayed. This priority is not the same as the MAINT_PRI parameter described above. This priority is hard coded within the device and is not user configurable.

MAINT_ALM

An alarm indicating the device needs maintenance soon. If the condition is ignored, the device will eventually fail.

Advisory Alarms

An advisory alarm indicates informative conditions that do not have a direct impact on the device's primary functions. There are five parameters associated with ADVISE_ALARMS, they are described below.

ADVISE_ENABLED

The ADVISE_ENABLED parameter contains a list of informative conditions that do not have a direct impact on the device's primary functions. Below is a list of the advisories with the highest priority first.

1. Process Anomaly Detected (SPM)
2. LOI Failure
3. PWA Simulate Active
4. Defer NV Memory Write Detected
5. Mass Flow Transducer Block Reverse Flow
6. Mass Flow Transducer Block Sensor Out of Range
7. Mass Flow Transducer Block Out of Range
8. Process Anomaly Detected (SPM)

ADVISE_MASK

The ADVISE_MASK parameter will mask any of the failed conditions listed in ADVISE_ENABLED. A bit on means the condition is masked out from alarming and will not be reported.

ADVISE_PRI

ADVISE_PRI designates the alarming priority of the ADVISE_ALM, see "Process Alarms" on page 3-15. The default is 0 and the recommended values are 1 or 2.

ADVISE_ACTIVE

The ADVISE_ACTIVE parameter displays which of the advisories is active. Only the advisory with the highest priority will be displayed. This priority is not the same as the ADVISE_PRI parameter described above. This priority is hard coded within the device and is not user configurable.

ADVISE_ALM

ADVISE_ALM is an alarm indicating advisory alarms. These conditions do not have a direct impact on the process or device integrity.


Recommended Actions for PlantWeb Alarms

RECOMMENDED_ACTION

The RECOMMENDED_ACTION parameter displays a text string that will give a recommended course of action to take based on which type and which specific event of the PlantWeb alarms is active (See Table 5-12 on page 5-10).

ANALOG INPUT (AI) FUNCTION BLOCK

Configure the AI block

 A minimum of four parameters are required to configure the AI Block. The parameters are described below with example configurations shown at the end of this section.

CHANNEL

Select the channel that corresponds to the desired sensor measurement. The 3051S measures both pressure (channel 1) and sensor temperature (channel 2).

Table 3-1. I/O Channel Definitions

| Channel Number | Channel Description |
|----------------|--|
| 1 | differential pressure in AI.XD_SCALE units |
| 2 | sensor temperature in AI.XD_SCALE units |
| 3 | differential pressure in inH ₂ O @68°F (ADB) |
| 4 | mean differential pressure |
| 5 | absolute pressure (AO.OUT) |
| 6 | process temperature (AO.OUT) |
| 7 | mass flow |
| 8 | absolute pressure (AO.CAS_IN shadow) |
| 9 | process temperature (AO.CAS_IN shadow) |
| 10 | differential pressure in inH ₂ O @68°F (MFTB) |
| 11 | All MAI channels (12-19 below) |
| 12 | SPM1 mean (ADB) |
| 13 | SPM1 standard deviation (ADB) |
| 14 | SPM2 mean (ADB) |
| 15 | SPM2 standard deviation (ADB) |
| 16 | SPM3 mean (ADB) |
| 17 | SPM3 standard deviation (ADB) |
| 18 | SPM4 mean (ADB) |
| 19 | SPM4 standard deviation (ADB) |

NOTE

Channel 3 and channels 12-19 are only available when the Advanced Diagnostic Block is licensed. Channels 5-9 are only available when the Mass Flow Block is licensed.

L_TYPE

The L_TYPE parameter defines the relationship of the sensor measurement (pressure or sensor temperature) to the desired output of the AI Block (e.g. pressure, level, flow, etc.). The relationship can be direct, indirect, or indirect square root.

Direct

Select direct when the desired output will be the same as the sensor measurement (pressure or sensor temperature).

Indirect

Select indirect when the desired output is a calculated measurement based on the sensor measurement (e.g. a pressure measurement is made to determine level in a tank). The relationship between the sensor measurement and the calculated measurement will be linear.

Indirect Square Root

Select indirect square root when the desired output is an inferred measurement based on the sensor measurement and the relationship between the sensor measurement and the inferred measurement is square root (e.g. flow).

XD_SCALE and OUT_SCALE

The XD_SCALE and OUT_SCALE each include three parameters: 0%, 100%, and, engineering units. Set these based on the L_TYPE:

L_TYPE is Direct

When the desired output is the measured variable, set the XD_SCALE to the "Primary_Value_Range". This is found in the Sensor Transducer Block. Set OUT_SCALE to match XD_SCALE.

L_TYPE is Indirect

When an inferred measurement is made based on the sensor measurement, set the XD_SCALE to represent the operating range that the sensor will see in the process. Determine the inferred measurement values that correspond to the XD_SCALE 0 and 100% points and set these for the OUT_SCALE.

L_TYPE is Indirect Square Root

When an inferred measurement is made based on the sensor measurement AND the relationship between the inferred measurement and sensor measurement is square root, set the XD_SCALE to represent the operating range that the sensor will see in the process. Determine the inferred measurement values that correspond to the XD_SCALE 0 and 100% points and set these for the OUT_SCALE.:

| Pressure (Channel 1) | Temperature (Channel 2) | Flow (Channel 7) |
|-----------------------------|-------------------------|------------------|
| Pa | °C | lbm/sec |
| kPa | °F | lbm/min |
| bar | °K | lbm/hour |
| mPa | | lbm/day |
| mbar | | kg/sec |
| torr | | kg/min |
| atm | | kg/hour |
| psi | | grams/sec |
| g/cm2 | | grams/min |
| kg/cm2 | | grams/hour |
| inH ₂ O at 68 °F | | StdCuFt/sec |
| mmH ₂ O at 68 °F | | StdCuFt/min |
| in.H ₂ O at 4 °F | | StdCuFt/min |
| mmH ₂ O at 4 °F | | StdCuFt/hour |
| ftH ₂ O at 68 °F | | StdCuFt/day |
| inHg at 0 °C | | StdCuM/hour |
| mmHg at 0 °C | | StdCuM/day |
| | | NmlCuM/hour |
| | | NmlCuM/day |

NOTE

When the engineering units of the XD_SCALE are selected, this causes the engineering units of the PRIMARY_VALUE_RANGE in the Transducer Block to change to the same units. THIS IS THE ONLY WAY TO CHANGE THE ENGINEERING UNITS IN THE SENSOR TRANSDUCER BLOCK, PRIMARY_VALUE_RANGE parameter.

Configuration Examples

Pressure transmitter

Situation #1

A pressure transmitter with a range of 0 – 100 psi.

Solution

Table 3-2 lists the appropriate configuration settings.

Table 3-2. Analog Input function block configuration for a typical pressure transmitter.

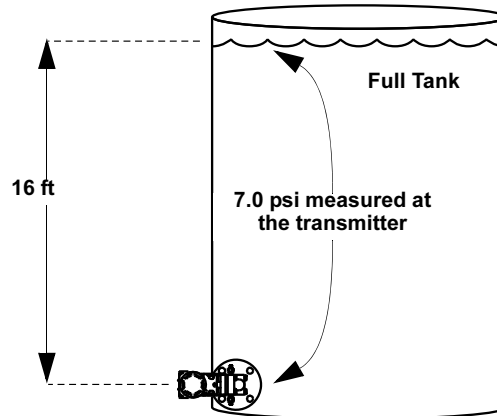
| Parameter | Configured Values |
|-----------|---------------------|
| L_TYPE | Direct |
| XD_SCALE | Primary_Value_Range |
| OUT_SCALE | Primary_Value_Range |
| Channel | 1 - pressure |

Pressure transmitter used to measure level in an open tank

Situation #2

The level of an open tank is to be measured using a pressure tap at the bottom of the tank. The maximum level at the tank is 16 ft. The liquid in the tank has a density that makes the maximum level correspond to a pressure of 7.0 psi at the pressure tap (see Figure 3-1).

Figure 3-1. Situation #2 Diagram.



Solution to Situation #2

Table 3-3 lists the appropriate configuration settings.

Table 3-3. Analog Input function block configuration for a pressure transmitter used in level measurement (situation #1).

| Parameter | Configured Values |
|-----------|-------------------|
| L_TYPE | Indirect |
| XD_SCALE | 0 to 7 psi |
| OUT_SCALE | 0 to 16 ft |
| Channel | 1 - pressure |

Output calculation for Situation #2

When the L_Type is configured as Indirect, the OUT parameter is calculated as:

$$OUT = \frac{PV - XD_SCALE_0\%}{XD_SCALE_100\% - XD_SCALE_0\%} * (OUT_SCALE_100\% - OUT_SCALE_0\%) + OUT_SCALE_0\%$$

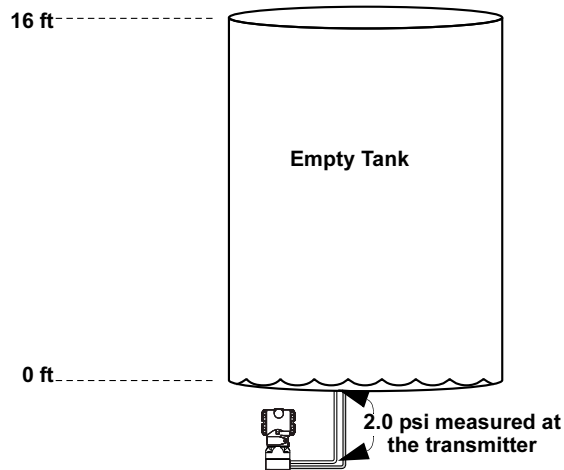
In this example, when PV is 5 psi, then the OUT parameter will be calculated as follows:

$$OUT = \frac{5 \text{ psi} - 0 \text{ psi}}{7 \text{ psi} - 0 \text{ psi}} * (16 \text{ ft.} - 0 \text{ ft.}) + 0 \text{ ft.} = 11.43 \text{ ft.}$$

Situation #3

The transmitter in situation #3 is installed below the tank in a position where the liquid column in the impulse line, with an empty tank, is equivalent to 2.0 psi (see Figure 3-2).

Figure 3-2. Situation #3 Diagram.



Solution to situation #3

Table 3-4 lists the appropriate configuration settings.

Table 3-4. Analog Input function block configuration for a pressure transmitter used in level measurement (Situation #3).

| Parameter | Configured Values |
|-----------|-------------------|
| L_TYPE | Indirect |
| XD_SCALE | 2 to 9 psi |
| OUT_SCALE | 0 to 16 ft |
| Channel | 1 - pressure |

In this example, when the PV is 4 psi, OUT will be calculated as follows:

$$OUT = 4 \text{ psi} - 2 \text{ psi} \times \frac{(16 \text{ ft.} - 0 \text{ ft.})}{9 \text{ psi} - 2 \text{ psi}} + 0 \text{ ft.} = 4.57 \text{ ft.}$$

Differential pressure transmitter to measure flow

Situation #4

The liquid flow in a line is to be measured using the differential pressure across an orifice plate in the line. Based on the orifice specification sheet, the differential pressure transmitter was calibrated for 0 to 20 inH₂O for a flow of 0 to 800 gal/min.

Solution

Table 3-5 lists the appropriate configuration settings.

Table 3-5. Analog Input Function Block Configuration for a Differential Pressure Transmitter.

| Parameter | Configured Values |
|-----------|-----------------------------|
| L_TYPE | Indirect Square Root |
| XD_SCALE | 0 to 20 in.H ₂ O |
| OUT_SCALE | 0 to 800 gal/min. |
| Channel | 1 - pressure |

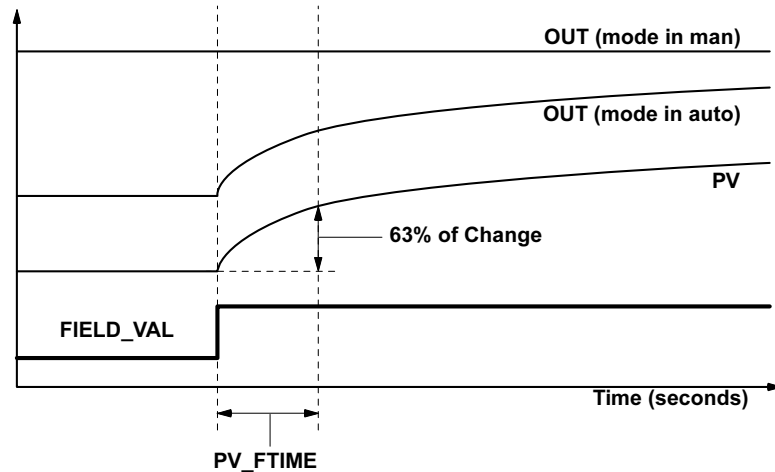
$$Out = \sqrt{\frac{PV - XDSCALE0}{XDSCALE100}} (OUTSCALE100 - OUTSCALE0) + OUTSCALE0$$

$$OUT = \sqrt{\frac{8 \text{ inH}_2\text{O} - 0 \text{ inH}_2\text{O}}{20 \text{ inH}_2\text{O} - 0 \text{ inH}_2\text{O}}} (800 \text{ gal/min.} - 0 \text{ gal/min.}) + 0 \text{ gal/min.} = 505.96 \text{ gal/min.}$$

Filtering

⚠ The filtering feature changes the response time of the device to smooth variations in output readings caused by rapid changes in input. Adjust the filter time constant (in seconds) using the PV_FTIME parameter. Set the filter time constant to zero to disable the filter feature.

Figure 3-3. Analog Input PV_FTIME filtering Diagram.



Low Cutoff

⚠ When the converted input value is below the limit specified by the LOW_CUT parameter, and the Low Cutoff I/O option (IO_OPTS) is enabled (True), a value of zero is used for the converted value (PV). This option is useful to eliminate false readings when the differential pressure measurement is close to zero, and it may also be useful with zero-based measurement devices such as flowmeters.

NOTE

Low Cutoff is the only I/O option supported by the AI block. Set the I/O option in **Manual** or **Out of Service** mode only.

Process Alarms

Process Alarm detection is based on the OUT value. Configure the alarm limits of the following standard alarms:

- High (HI_LIM)
- High high (HI_HI_LIM)
- Low (LO_LIM)
- Low low (LO_LO_LIM)

In order to avoid alarm chattering when the variable is oscillating around the alarm limit, an alarm hysteresis in percent of the PV span can be set using the ALARM_HYS parameter. The priority of each alarm is set in the following parameters:

- HI_PRI
- HI_HI_PRI
- LO_PRI
- LO_LO_PRI

Alarm Priority

Alarms are grouped into five levels of priority:

| Priority Number | Priority Description |
|-----------------|---|
| 0 | The alarm condition is not used. |
| 1 | An alarm condition with a priority of 1 is recognized by the system, but is not reported to the operator. |
| 2 | An alarm condition with a priority of 2 is reported to the operator. |
| 3-7 | Alarm conditions of priority 3 to 7 are advisory alarms of increasing priority. |
| 8-15 | Alarm conditions of priority 8 to 15 are critical alarms of increasing priority. |

Status Options

Status Options (STATUS_OPTS) supported by the AI block are shown below:

Propagate Fault Forward

If the status from the sensor is Bad, Device failure or Bad, Sensor failure, propagate it to OUT without generating an alarm. The use of these sub-status in OUT is determined by this option. Through this option, the user may determine whether alarming (sending of an alert) will be done by the block or propagated downstream for alarming.

Uncertain if Limited

Set the output status of the Analog Input block to uncertain if the measured or calculated value is limited.

BAD if Limited

Set the output status to Bad if the sensor is violating a high or low limit.

Uncertain if Man Mode

Set the output status of the Analog Input block to uncertain if the actual mode of the block is Man.

NOTES

The instrument must be in **Out of Service** mode to set the status option.

Rosemount 3051S

Advanced Features

The AI Function Block provides added capability through the addition of the following parameters:

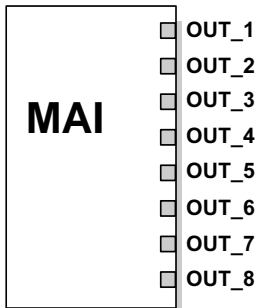
ALARM_TYPE

ALARM_TYPE allows one or more of the process alarm conditions detected by the AI function block to be used in setting its OUT_D parameter.

OUT_D

OUT_D is the discrete output of the AI function block based on the detection of process alarm condition(s). This parameter may be linked to other function blocks that require a discrete input based on the detected alarm condition.

MULTIPLE ANALOG INPUT (MAI) FUNCTION BLOCK

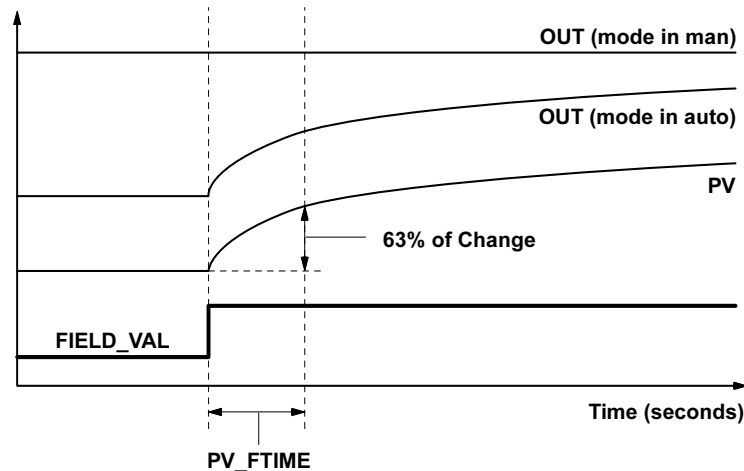


Out1 = The block output value and status for the first channel.

The Multiple Analog Input (MAI) function block has the ability to process up to eight field device measurements and make them available to other function blocks. The output values from the MAI block are in engineering units and contain a status indicating the quality of the measurement. The measuring device may have several measurements or derived values available in different channels. Use the channel numbers to define the variables that the MAI block processes.

The MAI block supports signal scaling, signal filtering, signal status calculation, mode control, and simulation. In Automatic mode, the block's output parameters (OUT_1 to OUT_8) reflects the process variable (PV) values and status. In Manual mode, values may be set manually. The Manual mode is reflected on the output status. The MAI block parameters and their units of measure, descriptions, and index numbers are listed.

Figure 3-4. Multiple Analog Input Function Block Timing Diagram



Block Errors

Table 3-6 lists conditions reported in the BLOCK_ERR parameter. Conditions in **bold** are inactive for the MAI block and are given for reference.

Table 3-6. Block Error Conditions

| Number | Name and Description |
|--------|--|
| 0 | Other |
| 1 | Block Configuration Error: the selected channel carries a measurement that is incompatible with the engineering units selected in XD_SCALE, the L_TYPE parameter is not configured, or WRITE_CHECK = zero. |
| 2 | Link Configuration Error |
| 3 | Simulate Active: Simulation is enabled and the block is using a simulated value in its execution. |
| 4 | Local Override |
| 5 | Device Fault State Set |
| 6 | Device Needs Maintenance Soon |
| 7 | Input Failure/Process Variable has Bad Status: The hardware is bad, or a bad status is being simulated. |
| 8 | Output Failure: The output is bad based primarily upon a bad input. |
| 9 | Memory Failure |
| 10 | Lost Static Data |
| 11 | Lost NV Data |
| 12 | Readback Check Failed |
| 13 | Device Needs Maintenance Now |
| 14 | Power Up |
| 15 | Out of Service: The actual mode is out of service. |

Modes

The MAI Function Block supports three modes of operation as defined by the MODE_BLK parameter:

Manual (Man)

The block output (OUT) may be set manually

Automatic (Auto)

OUT_1 to OUT_8 reflects the analog input measurement or the simulated value when simulation is enabled.

Out of Service (OOS)

The block is not processed. PV is not updated and the OUT status is set to Bad: Out of Service. The BLOCK_ERR parameter shows Out of Service. In this mode, changes can be made to all configurable parameters. The target mode of a block may be restricted to one or more of the supported modes.

Rosemount 3051S

LCD TRANSDUCER BLOCK

The LCD meter connects directly to the 3051S electronics FOUNDATION fieldbus output board. The meter indicates output and abbreviated diagnostic messages.

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

Each parameter configured for display will appear on the LCD for a brief period before the next parameter is displayed. If the status of the parameter goes bad, the LCD will also cycle diagnostics following the displayed variable:

Figure 3-5. LCD Messaging



Custom Meter Configuration

Shipped from the factory, Parameter #1 is configured to display the Primary Variable (pressure) from the LCD Transducer Block. Parameters 2 – 4 are not configured. To change the configuration of Parameter #1 or to configure additional parameters 2 – 4, use the configuration parameters below.

The LCD Transducer Block can be configured to sequence four different process variables as long as the parameters are sourced from a function block that is scheduled to execute within the 3051S pressure transmitter. If a function block is scheduled in the 3051S that links a process variable from another device on the segment, that process variable can be displayed on the LCD.

| Display Parameter 1 | |
|---------------------|------------|
| Block Type #1 | AI Block ▼ |
| Block Tag #1 | FFAI_RMT3 |
| Param Index #1 | OUT ▼ |
| Custom Tag #1 | |
| Units Type #1 | Auto ▼ |
| Custom Units #1 | |

DISPLAY_PARAM_SEL

The DISPLAY_PARAM_SEL parameter specifies how many process variables will be displayed. Select up to four display parameters.

BLK_TAG_#⁽¹⁾

Enter the Block Tag of the function block that contains the parameter to be displayed.

BLK_TYPE_#⁽¹⁾

Enter the Block Type of the function block that contains the parameter to be displayed. This parameter is generally selected via a drop-down menu with a list of possible function block types. (e.g. Transducer, PID, AI, etc.)

PARAM_INDEX_#⁽¹⁾

The PARAM_INDEX_# parameter is generally selected via a drop-down menu with a list of possible parameter names based upon what is available in the function block type selected. Choose the parameter to be displayed.

CUSTOM_TAG_#⁽¹⁾

The CUSTOM_TAG_# is an optional user-specified tag identifier that can be configured to be displayed with the parameter in place of the block tag. Enter a tag of up to five characters.

UNITS_TYPE_#⁽¹⁾

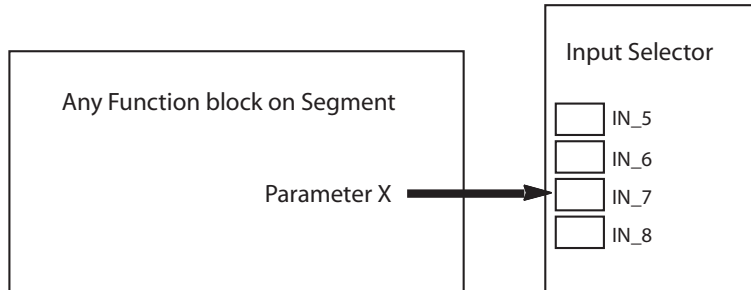
The UNITS_TYPE_# parameter is generally selected via a drop-down menu with three options: AUTO, CUSTOM, or NONE. Select AUTO only when the parameter to be displayed is pressure, temperature, or percent. For other parameters, select CUSTOM and be sure to configure the CUSTOM_UNITS_# parameter. Select NONE if the parameter is to be displayed without associated units.

(1) _# represents the specified parameter number.

CUSTOM_UNITS_#⁽¹⁾

Specify custom units to be displayed with the parameter. Enter up to six characters. To display Custom Units the UNITS_TYPE_# must be set to CUSTOM.

Displaying a variable from another device on the segment (Example)



Any variable from a device on the network can be displayed on the 3051S LDC but the variable must be on a regularly scheduled communications cycle and the variable must be linked to a block within the 3051S. A typical configuration to do this is to link the output of the function block of the variable to one of the unused inputs of the Input Selector Block.

Display bar graph

The 3051S LCD is equipped with a bar graph along the top portion of the display screen. The bar graph will display the percent of range of AI.OUT (see Figure 3-6) of the AI block configured for Channel 1 (pressure) of the Sensor Transducer Block.

The bar graph on the LCD can be enabled from the DISPLAY_PARAM_SEL parameter in the LCD block.

If no AI block is found to be configured for Channel 1 the bar graph (including annunciators) will remain blank. If more than one AI block is found to be configured for the Channel 1 the AI block with the lowest OD index will be used to calculate the bar graph value.

The following equation is used to calculate the percent of range of AI.OUT:

Figure 3-6. Bar Graph Value

$$\text{Bar Graph Value} = 100 * \frac{(\text{AI.OUT} - \text{AI.OUT_SCALE @ 0\%})}{(\text{AI.OUT_SCALE @ 100\%} - \text{AI.OUT_SCALE @ 0\%})}$$

If the bar graph value calculation returns a value less than 0%, the LCD will display a bar graph value of 0%.

If the bar graph value calculation returns a value greater than 100%, then the LCD will display a bar graph value of 100%.

ADVANCED DIAGNOSTICS TRANSDUCER BLOCK (ADB)

The Advanced Diagnostics Function Block is a licensable block. It will be licensed on a new transmitter if the D01 option is ordered or can be licensed in the field via a licensing code. Please contact your local sales person on how to acquire a license for a field upgrade.

The Advanced Diagnostics Block (ADB) transducer block contains two different algorithms, Plugged Impulse Line Detection and Statistical Process Monitoring. Configuration, learning, verifying, and detection are the different phases to the Plugged Impulse Line and Statistical Process Monitoring.

ADB Parameters

For a complete listing of the Advanced Diagnostic Block (ADB) parameters see "Advanced Diagnostics Transducer Block (ADB)" on page A-13.

Plugged Impulse Line Detection (PIL)

The PIL algorithm can detect a plugged impulse line of a gage pressure (GP) or absolute pressure (AP) transmitter. For Differential pressure (DP) transmitters it can detect either single impulse line or both impulse lines plugged. This is done by comparing process dynamics the algorithm has "Learned" to a set of "Detection" parameters that are configured by the user. Some of the parameter names may appear differently depending on your host system. Configuration learning, detection are the three different phases to the Plugged Impulse Line.

⚠ IMPORTANT

Running the Advanced Diagnostics Block could affect other block execution times. We recommend the device be configured as a basic device versus a Link Master device if this is a concern.

Configuration Phase

The configuration phase is an inactive state. The configuration phase is used to set up the parameters controlling the sensitivity, thresholds, affect on PV_STATUS, length of the learning and detecting phases.

Learning Phase

The learning phase begins after a valid configuration is present. In the learning phase, the algorithm establishes a baseline of the process mean and process dynamics. This base line data is used to compare current process data to the base line when in the "Detection Phase".

Verify Phase

The verifying phase is similar to the learning phase. It calculates a baseline value which is then compared to the learning phase baseline value. This is done to ensure a steady process before the detection phase. The amount of acceptable deviation between the two values is set up in PLINE_Learn_Sensitivity.

Detection Phase

The detection phase begins after the learning phase is complete. To determine if the impulse lines are plugged, the algorithm compares the most recent mean and standard deviation of the process to the baseline mean and standard deviation.

Configuration of the Plugged Impulse Line Detection

To configure the PIL, open the ADB transducer block and refer to the host documentation. The three parameters below are the minimum required for configuration.

PLINE_Affect_PV_Status

PLINE_Affect_PV_Status determines whether the quality of the pressure measurement from the Sensor Transducer Block will be affected by the Plugged Impulse Line status. The parameter default is “false”. When the algorithm detects plugged impulse lines there is no affect on the quality of the pressure measurement from the Sensor Transducer Block. If the parameter setting is “true”, the ADB status will cause the quality of the pressure measurement from the Sensor Transducer Block to go “UNCERTAIN”.

PLINE_Sensitivity

PLINE_Sensitivity determines the sensitivity of the PIL Detection Algorithm. Low sensitivity is primarily used if the process contains large amount of dynamics. Medium sensitivity would be recommended for normal processes. High sensitivity would be used for a process with minimal dynamics. Below is a guide for setting your “Plugging Sensitivity”.

Sensitivity levels for *all lines plugged* used for DP, AP or GP:

- **Low sensitivity**
An 80% reduction in dynamics (with respect to the baseline dynamics) in the last detection cycle time (default 1 min.).
- **Medium sensitivity**
A 70% reduction in dynamics (with respect to the baseline dynamics) in the last detection cycle time (default 1 min.).
- **High sensitivity**
A 60% reduction in dynamics (with respect to the baseline dynamics) in the last detection cycle time (default 1 min.).

Sensitivity levels for *one line plugged* used for DP only:

- **Low sensitivity**
A 100% increase in dynamics (with respect to the baseline dynamics) in the last detection cycle time (default 1 min.).
- **Medium sensitivity**
A 70% increase in dynamics (with respect to the baseline dynamics) in the last detection cycle time (default 1 min.).
- **High sensitivity**
A 40% increase in dynamics (with respect to the baseline dynamics) in the last detection cycle time (default 1 min.).

PLINE_ON

This parameter Enables or Disables the Plugged Impulse Line Algorithm. The PIL must be both licensed and activated in order to detect plugged impulse lines. The default state is disabled.

NOTE

For most applications the above parameters are all that are needed to configure the PIL for detection.

In order to use the Advanced Set of parameters below, fully understand the underlying technology of the PIL. These parameters will fine tune the PIL to fit process conditions.

**Plugged Impulse Line
Advanced Settings**

PLINE_Relearn

PLINE_Relearn allows the user to activate the learning phase of the PIL Detection Algorithm. To activate, "Relearn" must be selected. This can be used to reinstate the algorithm after a plugged line has been detected. The proper measures must be taken to clear the plug, and the process should be running normally before relearning the process. Relearning the process may also be necessary after changing parameters in the Advanced Set of parameters.

PLINE_Auto Relearn

PLINE_Auto Relearn determines whether or not the algorithm automatically changes to learning mode when the thresholds are exceeded. When the default "Enabled" is selected the algorithm will automatically relearn when the mean value changes by more than the Relearn Threshold value. If "Disabled" is selected, relearn must be started manually, see "PLINE_Relearn" on page 3-23.

PLINE_Relearn Threshold

PLINE_Relearn Threshold is a percent value of URL of the transmitter range. If the mean has changed by this value and Auto Relearn is "Enabled", then the algorithm will automatically go into the learning state. If the Auto Relearn is "Disabled" this value is ignored. The default is 190 of the URL.

PLINE_Learning Cycle

PLINE_Learning Cycle determines the length of time the learning cycle uses to calculate the mean and standard deviation for the baseline. The default value is five minutes. If the process has a slow change in the mean over time, a longer learning cycle may provide a better baseline.

PLINE_Learn_Sensitivity

The PLINE_Learn_Sensitivity parameters provide very specific adjustments to the sensitivity during the learning phase.

- Insufficient Dynamics Check: Ignores the insufficient dynamic check if not selected. Use only when there is very low process noise. PIL may not detect a plugged line condition.
- 10%, 20%, and 30% Stdev. Change Check: Allows for 10, 20, or 30% change in Standard Deviation while in the learning state. If this value is exceeded, the algorithm will stay in the verifying state until the value is not exceeded.
- Three or six Sigma Mean Change Check: Allows for a three or six Sigma change in the mean while in the learning state. If this value is exceeded, algorithm will stay in the verifying state until the value is not exceeded.
- 2% Mean Change Check: The mean value of the baseline calculation can not vary more than 2% during the learning or verifying states. If this value is exceeded, algorithm will stay in the verifying state until the value is not exceeded.

PLINE_Detect_Length

PLINE_Detect_Length is the length of time the algorithm uses to take the process values and calculate the dynamics to compare to the learned baseline. This value should not be longer than the PLINE_LEARNING_LENGTH to avoid false detections. The default value is one minute. The detection cycle must be larger than the macrocycle of the system.

PLINE_Detect_Sensitivity

PLINE_Detect_Sensitivity will override the "Plugged Sensitivity" value. The values for this parameter are 0%-100% change in dynamics. Low values are used in low noise processes, and high values are used in noisy processes. This value is used when detecting two lines plugged condition for DP and line plugged for AP and GP transmitters.

PLINE_Single_Detect_Sensitivity

PLINE_Single_Detect_Sensitivity will override the Plugged Sensitivity value. The allowed values for this parameter are 0%-100% change in dynamics. Low values are used in low noise processes, and high values are used in noisy processes. This value is used when detecting single line plugged condition with DP transmitters only.

Statistical Process Monitoring (SPM)

Statistical Process Monitoring algorithm is intended to provide basic information regarding the behavior of process measurements such as PID control block and actual valve position. The algorithm can monitor up to four user selected variables. The variables must either reside in a scheduled function block which is contained in the device or be the sensor transducer block. This algorithm can perform higher levels of diagnostics by distribution of computational power to field devices. The two statistical parameters monitored by the Statistical Process Monitoring are mean and standard deviation. By using the mean and standard deviation, the process or control levels and dynamics can be monitored for change over time. The algorithm also provides:

- Configurable limits/alarms for High variation, low dynamics, and mean changes with respect to the learned levels
- Necessary statistical information for Regulatory Control Loop Diagnostics, Root Cause Diagnostics, and Operations Diagnostics.

NOTE

In Fieldbus devices, a wealth of information is available to the user. Both process measurement and control is feasible at the device level. The devices themselves contain both the process measurements and control signals that are necessary to not only control the process, but to determine if the process and control is healthy. By looking at the process measurement data and control output over time, one can gain additional insight into the process. Under some load conditions and process demands, changes could be interpreted as degradation of instruments, valves or major components such as pumps, compressors, heat exchangers, etc.... This degradation may also indicate that the loop control scheme needs to be re-tuned or re-evaluated. By learning a healthy process and continually comparing current information to the known healthy information, problems due to degradation and eventual failure can be avoided and remedied ahead of time. These diagnostics are to aid in the engineering and maintenance of the devices. False alarms and missed detections may occur. If a reoccurring problem in your process exists, please contact Rosemount for assistance with the diagnostics.

Configuration Phase

The configuration phase is an inactive state when the SPM algorithm can be configured. In this phase, the block tags, block type, parameter, limits for high variation, low dynamics, and mean change detection can be set by the user. The "Statistical Process Monitoring Activation" parameter must be set to "disabled" to configure any SPM parameter. SPM can monitor any linkable input or output parameter of a scheduled function block that resides in the device.

Learning Phase

In the learning phase of Statistical Process Monitoring, the algorithm establishes a baseline of the mean and dynamics of a Statistical Process Monitoring variable. The baseline data is compared to current data for calculating any changes in mean or dynamics of the Statistical Process Monitoring variables.

Verify Phase

The verifying phase is similar to the learning phase. It calculates a baseline value which is then compared to the learning phase baseline value. This is done to ensure a steady process before the detection phase. The amount of acceptable deviation between the two values is set up in `PLINE_Learn_Sensitivity`.

Monitoring Phase

The monitoring phase starts after the learning process is complete. The algorithm compares the current values to the baseline values of the mean and standard deviation. During this phase the algorithm computes the percent change in mean and standard deviation to determine if the defined limits are violated.

SPM Configuration

SPM_Bypass_Verification

If "Yes" the verification of the baseline is turned off. If "No" the learned baseline is compared to the next current calculated value to ensure a good baseline value. The recommended value is NO.

SPM_Monitoring_Cycle

`SPM_Monitoring_Cycle` is the length of time the process values are taken and used in each calculation. A longer monitoring cycle may provide a more stable mean value. The default is 15 minutes.

SPM#_Block_Tag

Enter the Block Tag of the function block that contains the parameter to be monitored. Block tag must be entered, there is no pull-down menu to select the tag. The tag must be a valid "Block Tag" that is in the device. The default block tags from the factory are:

| | |
|-----------|----------------|
| AI 1400 | ARITH 1900 |
| AI 1500 | INTEG 2000 |
| AI 2100 | AO2700 |
| AI 2200 | AO2800 |
| PID 1600 | OSPL2600 |
| ISEL 1700 | CSEL2500 |
| ISEL 2400 | Mass Flow 2900 |
| CHAR 1800 | |

SPM can also monitor "out" parameters from other devices. To do this, link the "out" parameter to an input parameter of a function block that resides in the device, and set up SPM to monitor the input parameter.

SPM#_Block Type

Enter the Block Type of the function block that contains the parameter to be monitored.

SPM#_Parameter Index

Enter the Parameter Index of the parameter to be monitored.

Mass Flow

SPM#_Thresholds

The SPM#_Thresholds are used to allow alerts to be sent when the values are beyond the threshold values that have been set for each parameter.

Mean Limit

Alert Limit value in percent change of the Mean compared with the baseline mean value.

High Variation

Alert Limit value in percent change of the Stdev compared with the baseline Stdev value.

Low Dynamics

Alert Limit value in percent change of the Stdev compared with the baseline Stdev value.

SPM_Active

SPM_Active parameter that starts the Statistical Process Monitoring when "Enabled". "Disabled" turns the diagnostic monitoring off. Must be set to "Disabled" for configuration. Only set to "Enabled" after fully configuring the SPM.

SPM#_User Command

Select "Learn" after all the parameters have been configured to begin the Learning Phase. The monitoring phase will start after the learning process is complete. Select "Quit" to stop the SPM "Detect" may be selected to return to the monitoring phase.

Baseline Values

The Baseline Values are the calculated values from the process over the Learning Cycle.

SPM#_Baseline_Mean

SPM#_Baseline_Mean is the calculated average of the process variable over the Learning Cycle.

SPM#_Baseline_Standard_Deviation

SPM#_Baseline_Standard_Deviation is the square root of the variance of the process variable over the Learning Cycle.

MASS FLOW

The Mass Flow Function Block is a licensable block. It will be licensed on a new transmitter if the H01 option is ordered or it can be licensed in the field via a licensing code. Please contract your local sales person on how to acquire a license.

The Mass Flow Function Block has two distinct parts to its configuration. The first part is downloading the formula the block uses to calculate mass flow. The formula is generated by using the Engineering Assistant software. The two ways to download the formula is to have the factory do it on a new order which requires you to order and fill out a C2 Configuration Data Sheet or you can do it yourself by using a National Instruments Fieldbus interface.

The second part is configuring the Mass Flow Block to accept pressure and temperature inputs from other transmitters. The differential pressure is passed to the Mass Flow Block through a channel. The pressure and temperature inputs can be linked through any FOUNDATION fieldbus configurator.

If you already own a National Instruments Fieldbus interface device, you can go to rosemount.com to download the 3051S revision 23 Device Description. If you don't already own a National Instruments Fieldbus interface device, contact your local sales person for ordering options.

NOTE

Could affect block execution times.

ENGINEERING ASSISTANT SOFTWARE

Installation and Setup

Installing the 3051S Engineering Assistant for FOUNDATION Fieldbus

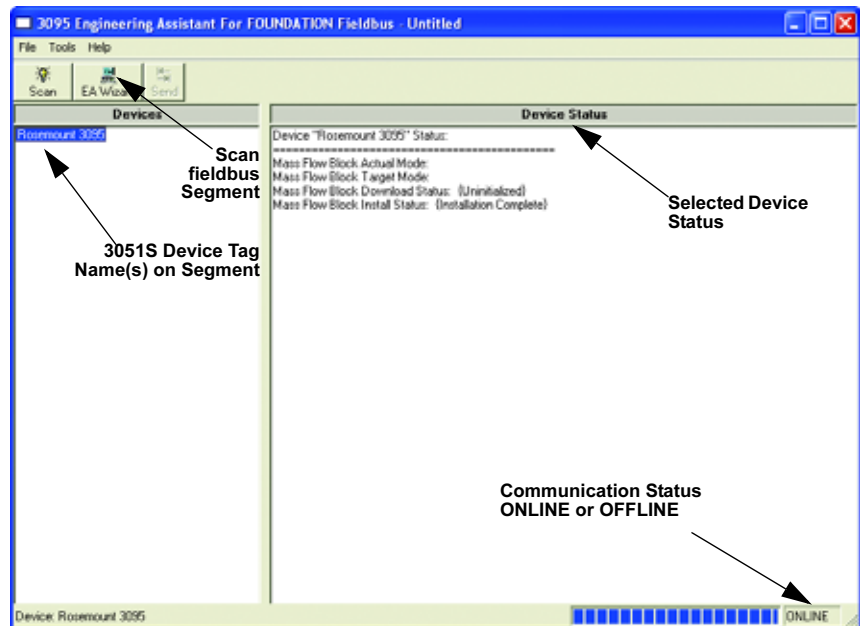
Operation of the software requires installation of both the 3051S Engineering Assistant (EA) for FOUNDATION Fieldbus program and FOUNDATION Fieldbus communication card drivers. The 3051S Engineering Assistant for FOUNDATION Fieldbus and 3051S Engineering Assistant for HART can be loaded onto the same computer. However, the programs cannot be opened simultaneously. Upgrades for the 3051S Engineering Assistant are available on www.rosemount.com.

1. Follow the instructions below to complete required software installation.
 - a. Place 3051S EA Software CD-ROM disk 2 into the disk drive.
 - b. Browse and select the EA-Ff folder using Windows NT, 2000, or XP.
 - c. Open the ReadMe.txt file and follow the instructions provided.**
2. Install the FOUNDATION Fieldbus PCMCIA communications card into the machine by following instructions provided with the card. Installation of the communications card is not required for offline operation of the 3051S EA for FOUNDATION Fieldbus software program.

Establish Communications with the 3051S FOUNDATION Fieldbus Transmitter using 3095 EA for FOUNDATION Fieldbus

1. Connect the 9-pin communications cable into the PCMCIA card port located in the computer.
2. Connect communication wiring to the cable connectors labeled “D+” and “D-”.
3. Open the transmitter cover on the side marked “Field Terminals”. Connect the communication wires to the 3051S transmitter terminals labeled “Fieldbus Wiring”.
4. Verify device is properly powered to establish communications.
5. Open the 3051S Engineering Assistant for FOUNDATION Fieldbus program. Select the 3051S Engineering Assistant for FOUNDATION Fieldbus from the program menu or use the 3051S EA for FF shortcut icon.
6. Select Scan to scan the FOUNDATION Fieldbus segment. Scanning will locate and present live 3051S or 3095 FOUNDATION Fieldbus transmitters on the segment that has a licensed mass flow block. The transmitter device tag name will appear on the screen in the Device view. The Device Status view will publish the status of the transmitter.
7. FOUNDATION Fieldbus communication status is represented in the lower right corner of the screen. If status is ONLINE, communication has been established. If status is OFFLINE, communication has not been established and/or communication has been disconnected.

Figure 3-7. Device View

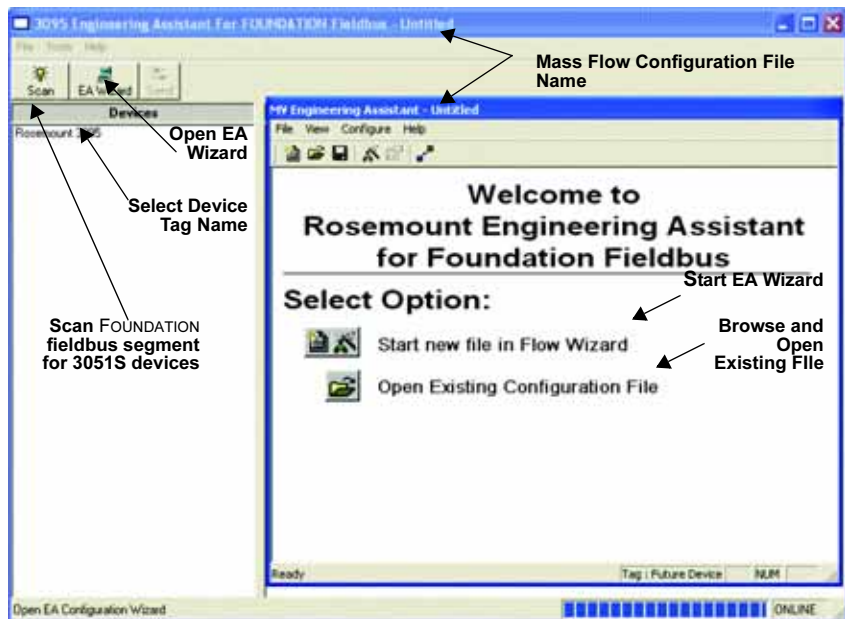


Create and Send a Mass Flow Configuration using 3051S EA for FOUNDATION Fieldbus

A mass flow configuration file can be created in either OFFLINE or ONLINE mode.

1. Select the device tag name requiring a new or updated mass flow configuration file. The selected device tag will become highlighted. Information about the selected device will appear on the Device Status portion of the screen.
2. Select the EA Wizard. A window stating, "Welcome to Rosemount Engineering Assistant for FOUNDATION Fieldbus" will appear.

Figure 3-8. Open EA Wizard



3. 3. Select either "Start new file in Flow Wizard" or "Open existing configuration files" in Flow Wizard. Select either create a new file or open a current (saved) file and edit. Follow the EA Wizard and step through completing a mass flow configuration (see page 3-33 for details.)

Figure 3-9. EA Wizard View



4. Upon completing a mass flow configuration using the EA Wizard, the file can be saved to disk. The file must be saved for review or to edit the mass flow configuration file in the future. FOUNDATION Fieldbus mass flow configuration files cannot be uploaded from the Mass Flow Transducer Block. If the file is not saved, it cannot be retrieved.
5. Select the “Send” button to download the mass flow configuration file to the Mass Flow Transducer Block. Sending the mass flow configuration file will overwrite the existing file in the Mass Flow Transducer Block. The transmitter must be out of service to send a mass flow configuration file.
6. A message box will appear confirming the action to send the mass flow configuration file to the Mass Flow Transducer Block. Select “OK” to send the mass flow configuration file.
7. Completing the download of the file to the Mass Flow Transducer Block, a screen that says “Installation Completed Successfully” will appear. Select OK.
8. The installation is now complete and will appear in the Device Status portion of the screen.
9. Bring the transmitter back into service using the host system, for example DeltaV.

Rosemount 3051S

Figure 3-10. Download Mass Flow Configuration File

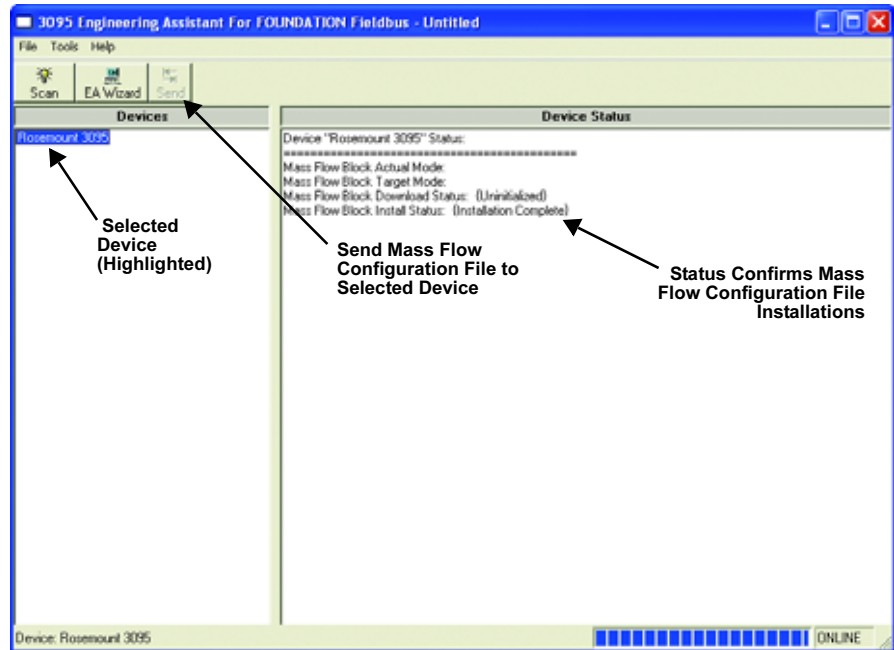


Table 3-7. Mass Flow Block Device - Specific Parameter Values

| Index | Parameter | Data Type/ Structure | Store | Size | Valid Range | Initial Value | Units | Mode | Description |
|-------|--------------------------------------|-------------------------|-------|------|---|---------------|----------------|----------------------------|---|
| 14 | DIFFERENTIAL _PRESSURE | DS-65 | D | 5 | | | inH2O @68°F | MAN | The differential pressure status and value |
| 15 | DIFFERENTIAL _PRESSURE_ SOURCE | Unsigned16 | S | 2 | 10: DP Sensor (scaled) | 10 | E | O/S | The channel through which the differential pressure is communicated (and converted to the proper units) |
| 16 | PRESSURE | DS-65 | D | 5 | | | Psia | MAN, O/S ⁽¹⁾ | The absolute pressure status and value |
| 17 | PRESSURE_ SOURCE | Unsigned16 | S | 2 | 5: Absolute Pressure (A0.OUT) 8: Absolute Pressure (CAS_IN shadow) 255: Constant | 8 | E | O/S | The channel through which the absolute pressure is communicated. When AO.OUT value is used, FAULT_STATE is used if status goes bad. When CAS_IN shadow is used, bad status/value will be propagated to the mass flow block. If a value of "Constant" is specified, the PRESSURE parameter becomes writable in O/S and the constant value is used in the calculation. |
| 18 | TEMPERATUR E | DS-65 | D | 5 | | | °F | MAN, O/S ⁽²⁾ | The process temperature status and value |
| 19 | TEMPERATUR E_SOURCE | Unsigned16 | S | 2 | 6: Process Temperature (CAS_IN shadow) 9: Process Temperature (CAS_IN shadow) 255: Constant | 9 | E | O/S | The channel through which the process temperature is communicated. When AO.OUT value is used, FAULT_STATE is used if status goes bad. When CAS_IN shadow is used, bad status/value will be propagated to the mass flow block. If a value of "Constant" is specified, the TEMPERATURE parameter becomes writable in O/S and the constant value is used in the calculation. |

(1) PRESSURE can be written in O/S mode if the PRESSURE_SOURCE is set to "Constant"

(2) TEMPERATURE can be written in O/S mode if the TEMPERATURE_SOURCE is set to "Constant"

Section 4 Operation and Maintenance

| | |
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| Overview | page 4-1 |
| Safety Messages | page 4-1 |
| Status | page 4-2 |
| Licensing Optional Blocks | page 4-2 |
| Calibration | page 4-4 |
| Advanced Diagnostics Transducer Block (ADB) | page 4-5 |

OVERVIEW

This section contains information on operation and maintenance procedures.

METHODS AND MANUAL OPERATION

Each FOUNDATION fieldbus host or configuration tool has different ways of displaying and performing operations. Some hosts will use Device Descriptions (DD) and DD Methods to complete device configuration and will display data consistently across platforms. The DD can be found on Foundation's website at www.fieldbus.org. There is no requirement that a host or configuration tool support these features.

For DeltaV users, the DD can be found at www.easydeltav.com. The information in this section will describe how to use methods in a general fashion. In addition, if your host or configuration tool does not support methods this section will cover manually configuring the parameters involved with each method operation. For more detailed information on the use of methods, see your host or configuration tool manual.

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.

⚠ WARNING

Performing a 'Restart with defaults' will set all function block information in the device to factory defaults. This includes the clearing of all function block links and schedule, as well as defaulting all Resource and Transducer Block user data (Advanced Diagnostic Block algorithm configurations, LCD Transducer Block parameter configuration, etc.).

STATUS

Along with the measured or calculated PV value, every FOUNDATION Fieldbus block passes an additional parameter called STATUS. The PV and STATUS are passed from the Transducer Block to the Analog Input Block. The STATUS can be one of the following: GOOD, BAD, or UNCERTAIN. When there are no problems detected by the self-diagnostics of the block, the STATUS will be GOOD. If a problem occurs with the hardware in the device, or, the quality of the process variable is compromised for some reason, the STATUS will become either BAD or UNCERTAIN depending upon the nature of the problem. It is important that the Control Strategy that makes use of the Analog Input Block is configured to monitor the STATUS and take action where appropriate when the STATUS is no longer GOOD.


LICENSING OPTIONAL BLOCKS

The Rosemount 3051S has two licensable blocks. One is the Advanced Diagnostic Block (ADB) that can be configured to detect plugged impulse lines or monitor the mean or standard deviation of a process variable. The other block is the Mass Flow Block which will calculate a fully compensated Mass Flow. The license information for these blocks is in the Resource Block. If there is a need for either of these blocks after the transmitter has been purchased, the licensing can be done in the field. To license either of these blocks:

1. Open the Resource Block and get the Output Board Serial Number (OUTPUT_BD_SN).
2. Contact your local sales person and tell them you would like to place an order for these functions and give them the Output board serial number.
3. Your sales person will contact the factory to obtain the license key.
4. When you are ready to license the block, set the Resource Block OOS.
5. Run the Method - Upgrade Device.
6. Return the Resource Block to Auto Mode.

Master Reset Method

Resource Block

 To perform a master reset, run the Master Reset Method. If your system does not support methods, manually configure the Resource Block parameters listed below.


1. Set the RESTART to one of the options below:

- Run - Default State
- Resource - Not Used



- Defaults - Sets all device parameters to FOUNDATION fieldbus default values
- Processor - Does a software reset of the CPU

Simulation

 Simulate replaces the channel value coming from the Sensor Transducer Block. For testing purposes, it is possible to manually drive the output of the Analog Input Block to a desired value. There are two ways to do this.

Manual Mode

To change only the OUT_VALUE and not the OUT_STATUS of the AI Block, place the TARGET MODE of the block to MANUAL. Then, change the OUT_VALUE to the desired value.

Simulate

1. If the SIMULATE switch is in the OFF position, move it to the ON position. If the SIMULATE jumper is already in the ON position, you must move it to off and place it back in the ON position.

NOTE


As a safety measure, the switch must be reset every time power is interrupted to the device in order to enable SIMULATE. This prevents a device that is tested on the bench from getting installed in the process with SIMULATE still active.

2. To change both the OUT_VALUE and OUT_STATUS of the AI Block, set the TARGET MODE to AUTO.
3. Set SIMULATE_ENABLE_DISABLE to 'Active'.
4. Enter the desired SIMULATE_VALUE to change the OUT_VALUE and SIMULATE_STATUS_QUALITY to change the OUT_STATUS.
 - If errors occur when performing the above steps, be sure that the SIMULATE jumper has been reset after powering up the device.

CALIBRATION

Sensor Calibration, Upper and Lower Trim Methods

Sensor Transducer

 In order to calibrate the transmitter, run the Upper and Lower Trim Methods. If your system does not support methods, manually configure the Transducer Block parameters listed below.

1. Set MODE_BLK.TARGET to OOS
2. Set CAL_UNIT to supported engineering units in the Transducer Block
3. Apply physical pressure that corresponds to the lower calibration point and allow the pressure to stabilize. The pressure must be between the range limits defined in PRIMARY_VALUE_RANGE.
4. Set values of CAL_POINT_LO to correspond to the pressure applied to the sensor.
5. Apply pressure, upper cal point.
6. Set CAL_POINT_HI


NOTE

CAL_POINT_HI must be within PRIMARY_VALUE_RANGE and greater than CAL_POINT_LO + CAL_MIN_SPAN

7. Set SENSOR_CAL_DATE to the current date.
8. Set SENSOR_CAL_WHO to the person responsible for the calibration.
9. Set SENSOR_CAL_LOC to the calibration location.
10. Set SENSOR_CAL_METHOD to User Trim
11. Set MODE_BLK.TARGET to AUTO

Sensor Calibration, Zero Trim Method

Sensor Transducer Block

 In order to zero the transmitter, run the Zero Trim Method. If your system does not support methods, manually configure the Transducer Block parameters listed below.

1. Set MODE_BLK.TARGET to OOS
2. Apply zero pressure to the sensor and allow the to reading stabilize
3. Set values CAL_POINT_LO to 0
4. Set SENSOR_CAL_DATE to the current date.
5. Set SENSOR_CAL_WHO to the person responsible for the calibration.
6. Set SENSOR_CAL_LOC to the calibration location.
7. Set SENSOR_CAL_METHOD to User Trim
8. Set MODE_BLK.TARGET to AUTO

Factory Trim Recall Method

Sensor Transducer Block

⚠ To perform a factory trim on the transmitter, run the Factory Trim Method. If your system does not support methods, manually configure the Transducer Block parameters listed below.

1. Set MODE_BLK.TARGET to OOS
2. Set FACTORY_CAL_RECALL to Recall
3. Set SENSOR_CAL_DATE to the current date.
4. Set SENSOR_CAL_WHO to the person responsible for the calibration.
5. Set SENSOR_CAL_LOC to the calibration location.
6. Set SENSOR_CAL_METHOD to Factory Trim
7. Set MODE_BLK.TARGET to AUTO

ADVANCED DIAGNOSTICS TRANSDUCER BLOCK (ADB)

Status of the Plugged Impulse Line

The Plugged Impulse Line contains the following status information:

Timestamp

Shows the timestamp of the last update to the Plugged Impulse Line Status.

PIL History Status

Current value of the Plugged Impulse Line Status. When there is no history there have been no plugged lines detected for this device.

| Status | Meaning |
|-----------------------|--|
| OK | Algorithm is in the detection state. |
| Inactive | The algorithm is not enabled or a "Quit" command was issued. |
| Learning | Algorithm is currently learning the process characteristics. |
| Verifying | Algorithm is currently comparing the learned baseline with the current process. |
| Insufficient Dynamics | The process does not have enough dynamics to detect or the sensitivity is not set high enough, see page 4-5. |
| Bad PV Status | The Sensor Transducer Status is uncertain or Bad, therefore the algorithm is paused. |
| Not Licensed | The ADB is not currently purchased in this device. |
| Plugged Line | Algorithm has detected a plugged line condition. This could be either all lines plugged for DP, GP, and AP transmitters, or one line plugged for DP, GP and AP transmitters. |

| Method | Block | Description |
|---------|------------------|--|
| Reset | Resource | Reset Device or Restore Default Parameters |
| Trim | Transducer block | Calibrate Sensor |
| Upgrade | Resource | License ADB or Mass Flow Block |

Monitoring and Status of the SPM

The Statistical Process Monitoring status includes the following monitoring and status information:

Monitoring

Baseline (SPM#_Mean and SPM# Standard Deviation)

Displays the Mean and Stdev values that were calculated during the learning state.

Monitoring (SPM#_Mean and SPM# Standard Deviation)

Current value that is calculated over the Monitoring Cycle.

Change (SPM#_Mean and SPM# Standard Deviation)

Value in percent that is calculated using the Monitoring and Baseline values. The alert thresholds are compared to this value to determine Mean change, High Variation and Low Dynamic detections.

Timestamp

Displays the time value for the recent detections.

Status

Shows the state that the diagnostic is currently in.

No Detections

Monitoring the process and no detections are currently active.

Inactive

User Command in "Idle", SPM not Enabled, or the block is not scheduled.

Learning

Learning has been set in the User Command, and the baseline values are being calculated

Verifying

Compares the learned values to the current calculated values to verify the process is stable.

Not Licensed

SPM is not currently purchased in this device.

Mean Change Detected

Alert resulting from the Mean Change exceeding the Threshold Mean Limit. Can be caused by a set point change, a load change in the flow, or an obstruction or the removal of an obstruction in the process.

High Variation Detected

Alert resulting from the Stdev Change exceeding the Threshold High Variation value.

Low Dynamics Detected

Alert resulting from the Stdev Change exceeding the Threshold Low Dynamics value. This is an indicator for a lower flow, or other change resulting in less turbulence in the flow.

Section 5 Troubleshooting

| | |
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| Overview | page 5-1 |
| Safety Messages | page 5-1 |
| Troubleshooting Guides | page 5-2 |
| Resource Block | page 5-5 |
| Sensor Transducer Block | page 5-6 |
| Analog Input (AI) Function Block | page 5-7 |
| LCD Transducer block | page 5-8 |
| Advanced Diagnostics Transducer Block (ADB) | page 5-9 |
| PlantWeb Alerts | page 5-10 |

OVERVIEW

This section provides summarized troubleshooting suggestions for the most common operating problems. This section contains Rosemount 3051S fieldbus troubleshooting information only. Disassembly and reassembly procedures can be found in the 3051S manual, document 00809-0100-4801 located in the Troubleshooting.

Follow the procedures described here to verify that transmitter hardware and process connections are in good working order. Always deal with the most likely checkpoints first.

SAFETY MESSAGES

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

Warnings

⚠ WARNING

Explosions can result in death or serious injury.

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

⚠ CAUTION

Static electricity can damage sensitive components.

- Observe safe handling precautions for static-sensitive components.

Rosemount 3051S

TROUBLESHOOTING GUIDES

Figure 5-1. Rosemount 3051S troubleshooting flowchart

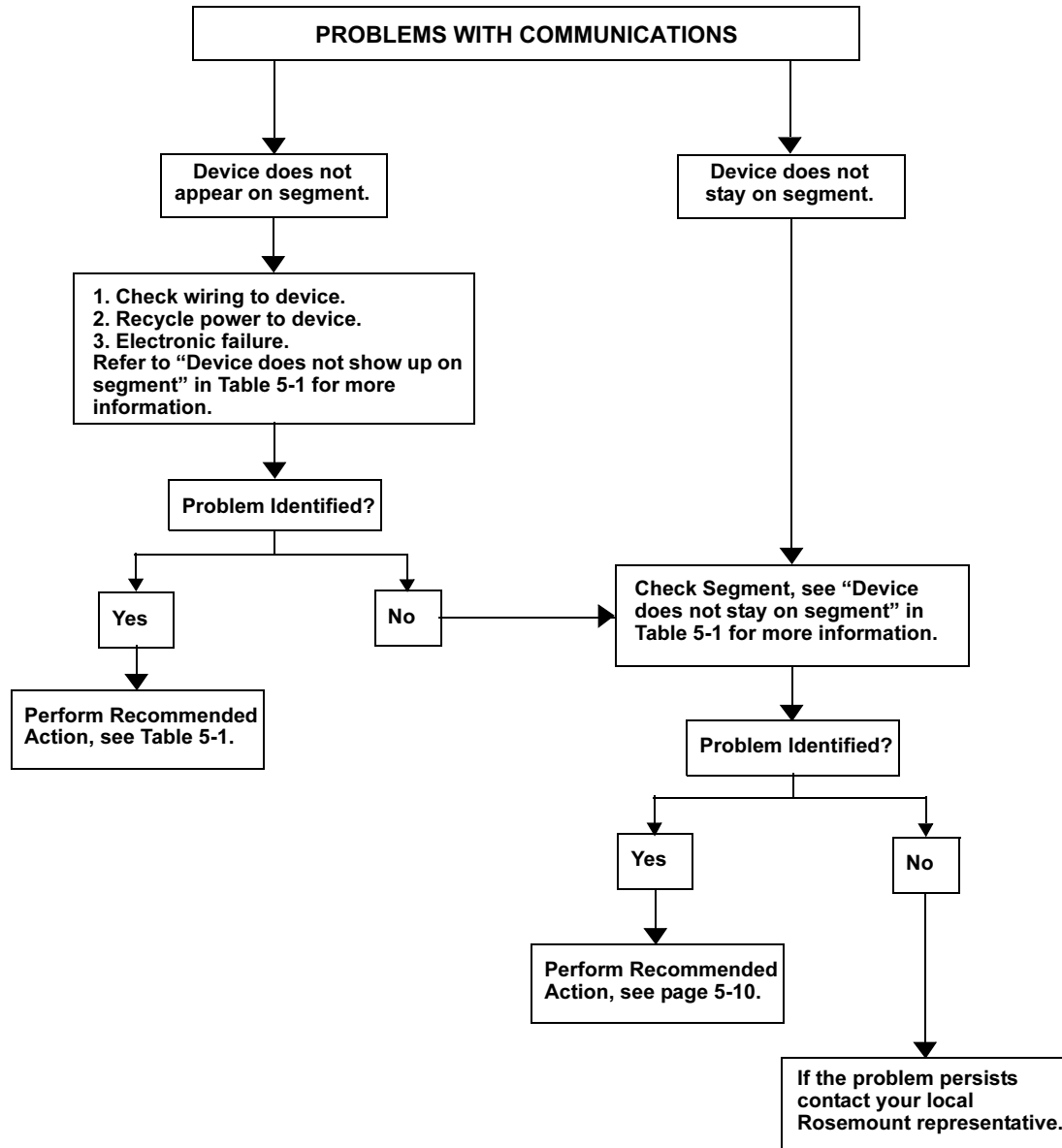
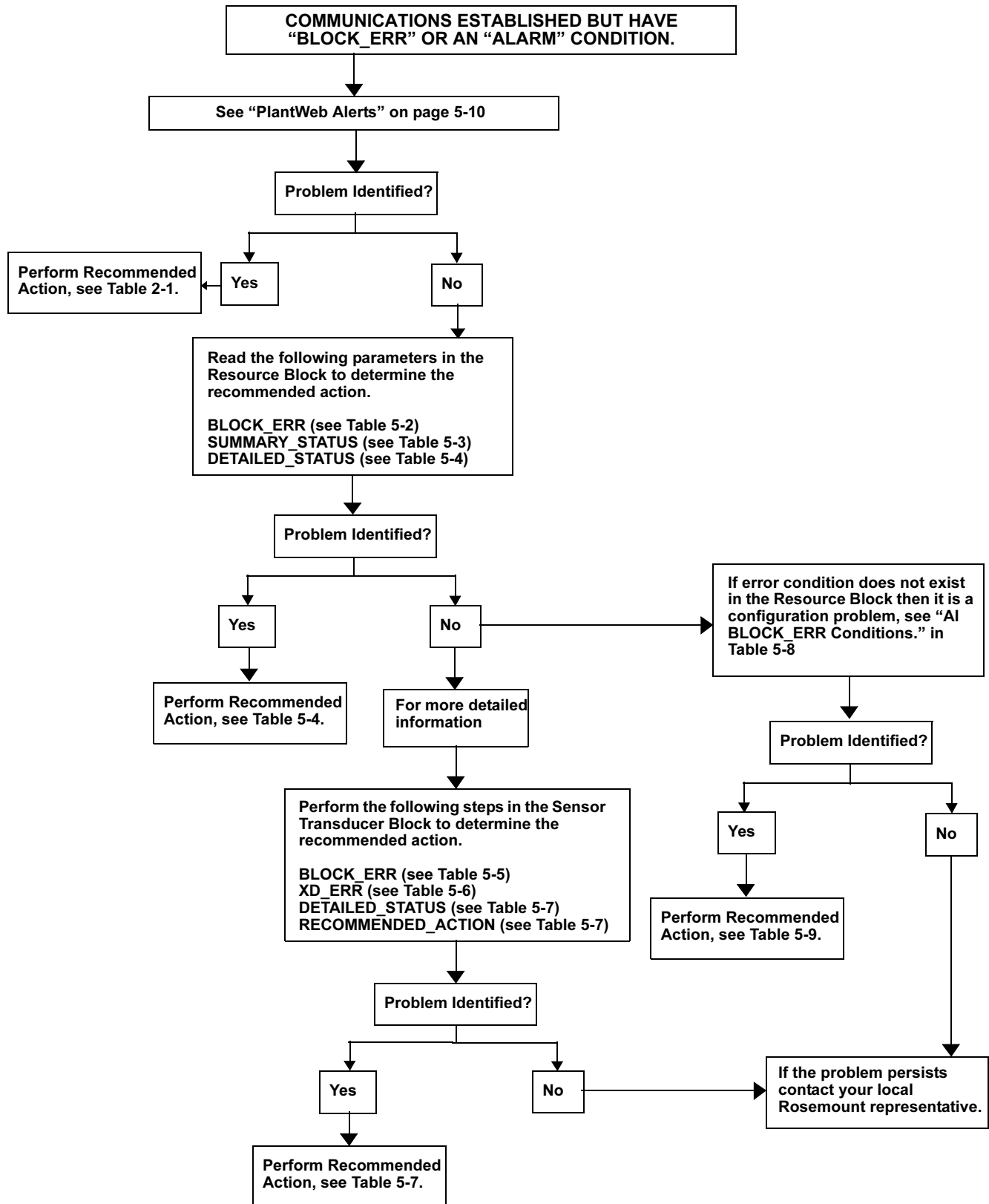


Figure 5-2. Problems with communications flowchart



Rosemount 3051S

Table 5-1. Troubleshooting guide

| Symptom ⁽¹⁾ | Cause | Recommended Actions |
|--|--|--|
| Device does not show up on segment | Unknown | Recycle power to device |
| | No power to device | <ol style="list-style-type: none"> 1. Ensure the device is connected to the segment. 2. Check voltage at terminals. There should be 9–32Vdc. 3. Check to ensure the device is drawing current. There should be approximately 17 mA. |
| | Segment problems | |
| | Electronics failing | <ol style="list-style-type: none"> 1. Electronics board loose in housing. 2. Replace electronics. |
| | Incompatible network settings | Change host network parameters. Refer to host documentation for procedure. |
| Device does not stay on segment ⁽²⁾ | Incorrect signal levels. Refer to host documentation for procedure. | <ol style="list-style-type: none"> 1. Check for two terminators. 2. Excess cable length. 3. Bad Power supply or conditioner |
| | Excess noise on segment. Refer to host documentation for procedure. | <ol style="list-style-type: none"> 1. Check for incorrect grounding. 2. Check for correct shielded wire. 3. Tighten wire connections. 4. Check for corrosion or moisture on terminals. 5. Check for Bad power supply. |
| | Electronics failing | <ol style="list-style-type: none"> 1. Tighten electronics board. 2. Replace electronics. |
| | Other | <ol style="list-style-type: none"> 1. Check for water in the terminal housing. |
| | | |

(1) The corrective actions should be done with consultation of your system integrator.

(2) Wiring and installation 31.25 kbit/s, voltage mode, wire medium application guide AG-140 available from the fieldbus Foundation.

RESOURCE BLOCK

This section describes error conditions found in the Resource block. Read Table 5-2 through Table 5-4 to determine the appropriate corrective action.

Table 5-2. Resource Block BLOCK_ERR messages

Block Errors

Table 5-2 lists conditions reported in the BLOCK_ERR parameter.

| Condition Name and Description |
|--|
| Other |
| Simulate Active: This indicates that the simulation switch is in place. This is not an indication that the I/O blocks are using simulated data. |
| Device Fault State Set |
| Device Needs Maintenance Soon |
| Memory Failure: A memory failure has occurred in FLASH, RAM, or EEPROM memory |
| Lost Static Data: Static data that is stored in non-volatile memory has been lost. |
| Lost NV Data: Non-volatile data that is stored in non-volatile memory has been lost. |
| Device Needs Maintenance Now |
| Out of Service: The actual mode is out of service. |

Table 5-3. Resource Block SUMMARY_STATUS messages

| Condition Name |
|---------------------|
| Uninitialized |
| No repair needed |
| Repairable |
| Call Service Center |

Table 5-4. Resource Block DETAILED_STATUS with recommended action messages

| Condition Name | Recommended Action |
|-------------------------------------|---|
| LOI Transducer block error | 1. Restart processor 2. Check display connection 3. Call service center |
| Sensor Transducer block error. | 1. Restart processor 2. Check SuperModule™ cable 3. Call service center |
| Mfg. Block integrity error | 1. Restart processor 2. Call service center |
| Non-Volatile memory integrity error | 1. Restart processor 2. Call service center |
| ROM integrity error | 1. Restart processor 2. Call service center |
| ADB transducer block error | 1. Check impulse lines 2. Check anomaly detected (SPM) 3. Call service center |

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SENSOR TRANSDUCER BLOCK

This section describes error conditions found in the Sensor Transducer Block. Read Table 5-5 through Table 5-7 to determine the appropriate corrective action.

Table 5-5. Sensor Transducer Block BLOCK_ERR messages

| Condition Name and Description |
|---|
| Other |
| Out of Service: The actual mode is out of service. |

Table 5-6. Sensor Transducer Block XD_ERR messages

| Condition Name and Description |
|--|
| Electronics Failure: An electrical component failed. |
| I/O Failure: An I/O failure occurred. |
| Data Integrity Error: Data stored in the device is no longer valid due to a non-volatile memory checksum failure, a data verify after write failure, etc. |
| Algorithm Error: The algorithm used in the transducer block produced an error due to overflow, data reasonableness failure, etc. |

Diagnostics

Table 5-7 lists the potential errors and the possible corrective actions for the given values. The corrective actions are in order of increasing system level compromises. The first step should always be to reset the transmitter and then if the error persists, try the steps in Table 5-7. Start with the first corrective action and then try the second.

Table 5-7. Sensor Transducer Block DETAILED_XD_STATUS and RECOMMENDED_ACTION messages

| Condition Name and Description | RECOMMENDED_ACTION |
|--|---|
| Pressure sensor not updating | 1. Restart Processor 2. Reconnect SuperModule cable 3. Send to Service Center |
| Temperature sensor not updating | 1. Restart Processor 2. Reconnect SuperModule cable 3. Send to Service Center |
| Sensor ROM Check sum failure | 1. Restart Processor 2. Send to Service Center |
| Sensor NV write failure | 1. Restart Processor 2. Send to Service Center |
| Sensor RAM check sum error | 1. Restart Processor 2. Send to Service Center |
| Sensor NV factory data warning | 1. Restart Processor 2. Send to Service Center |
| Sensor NV user data warning | 1. Restart Processor 2. Send to Service Center |
| Sensor NV user data error | 1. Restart Processor 2. Send to Service Center |
| Sensor NV factory data error | 1. Restart Processor 2. Send to Service Center |
| Pressure sensor out of limits | 1. Check pressure 2. Restart Processor |
| Sensor temperature out of limits | 1. Check Temperature 2. Restart Processor |
| Sensor temperature beyond failure limits | 1. Check Temperature 2. Restart Processor 3. Send to Service Center |

**ANALOG INPUT (AI)
FUNCTION BLOCK**

This section describes error conditions that are supported by the AI Block. Read Table 5-9 to determine the appropriate corrective action.

Table 5-8. AI BLOCK_ERR Conditions.

| Condition Number | Condition Name and Description |
|------------------|---|
| 0 | Other |
| 1 | Block Configuration Error: the selected channel carries a measurement that is incompatible with the engineering units selected in XD_SCALE, the L_TYPE parameter is not configured, or CHANNEL = zero. |
| 3 | Simulate Active: Simulation is enabled and the block is using a simulated value in its execution. |
| 7 | Input Failure/Process Variable has Bad Status: The hardware is bad, or a bad status is being simulated. |
| 14 | Power Up |
| 15 | Out of Service: The actual mode is out of service. |

Table 5-9. Troubleshooting the AI block

| Symptom | Possible Causes | Recommended Actions |
|--|--|---|
| Bad or no pressure readings (Read the AI "BLOCK_ERR" parameter) | BLOCK_ERR reads OUT OF SERVICE (OOS) | 1. AI Block target mode target mode set to OOS. 2. Resource Block OUT OF SERVICE. |
| | BLOCK_ERR reads CONFIGURATION ERROR | 1. Check CHANNEL parameter (see "CHANNEL" on page 3-8) 2. Check L_TYPE parameter (see "L_TYPE" on page 3-9) 3. Check XD_SCALE engineering units. (see "XD_SCALE and OUT_SCALE" on page 3-9) |
| | BLOCK_ERR reads POWERUP | Download Schedule into block. Refer to host for downloading procedure. |
| | BLOCK_ERR reads BAD INPUT | 1. Sensor Transducer Block Out Of Service (OOS) 2. Resource Block Out of Service (OOS) |
| | No BLOCK_ERR but readings are not correct. If using Indirect mode, scaling could be wrong. | 1. Check XD_SCALE parameter. 2. Check OUT_SCALE parameter. (see "XD_SCALE and OUT_SCALE" on page 3-9) |
| | No BLOCK_ERR. Sensor needs to be calibrated or Zero trimmed. | See Section 3: Operation and Maintenance to determine the appropriate trimming or calibration procedure. |
| OUT parameter status reads UNCERTAIN and substatus reads EngUnitRangViolation. | Out_ScaleEU_0 and EU_100 settings are incorrect. | See "XD_SCALE and OUT_SCALE" on page 3-9. |

**MAI Block
Troubleshooting**

| Symptom | Possible Causes | Corrective Action |
|-------------------------|----------------------|---|
| Mode will not leave OOS | Target mode not set. | Set target mode to something other than OOS. |
| | Configuration error | BLOCK_ERR will show the configuration error bit set. The following are parameters that must be set before the block is allowed out of OOS: <ul style="list-style-type: none"> Channel set to "1" on all ADB-SPM outputs. |
| | Resource block | The actual mode of the Resource block is OOS. See Resource Block Diagnostics for corrective action. |
| | Schedule | Block is not scheduled and therefore cannot execute to go to Target Mode. Typically, BLOCK_ERR will show "Power-Up" for all blocks that are not scheduled. Schedule the block to execute. |

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LCD TRANSDUCER BLOCK

This section describes error conditions found in the LCD Transducer Block. Read Table 5-10 and to determine the appropriate corrective action.

Self Test Procedure for the LCD

The SELF_TEST parameter in the Resource block will test LCD segments. When running, the segments of the display should light up for about five seconds.

If your host system supports methods refer to your host documentation on how to run the "Self Test" method. If your host system does not support methods than you can run this test manually be following the steps below.

1. Put Resource block into "OOS" (Out of Service).
2. Go to the parameter called "SELF_TEST" and write the value Self test (0x2).
3. Observe the LCD screen when you are doing this. All of the segments should light up.
4. Put the Resource block back into "AUTO".

Table 5-10. LCD Transducer Block BLOCK_ERR messages

| Condition Name and Description |
|---|
| Other |
| Out of Service: The actual mode is out of service. |

| Symptom | Possible Causes | Recommended Action |
|--|--|---|
| The LCD displays "DSPLY#INVALID." Read the BLOCK_ERR and if it says "BLOCK CONFIGURATION" perform the Recommended Action | One or more of the display parameters are not configured properly. | See "LCD Transducer Block" on page 2-16. |
| The Bar Graph and the AI.OUT readings do not match. | The OUT_SCALE of the AI block is not configured properly. | See "Analog Input (AI) Function Block" on page 2-9 and "Display bar graph" on page 2-18. |
| "3051" is being displayed or not all of the values are being displayed. | The LCD block parameter "DISPLAY_PARAMETER_SELECT is not properly configured. | See "LCD Transducer Block" on page 2-16. |
| The display reads OOS | The resource and or the LCD Transducer block are OOS. | Verify that both blocks are in "AUTO," |
| The display is hard to read. | Some of the LCD segments may have gone bad. Device is out o the temperature limit for the LCD. (-20 to 80 °C) | See XXXX (Self Test). If some of the segment is bad, replace the LCD. Check ambient temperature of the device. |

**ADVANCED
 DIAGNOSTICS
 TRANSDUCER BLOCK
 (ADB)**

This section describes error conditions found in the LCD Transducer Block. Read Table 5-11 to determine the appropriate corrective action.

Table 5-11. Advanced Diagnostic Block BLOCK_ERR messages

| Condition Name and Description |
|---|
| Other |
| Out of Service: The actual mode is out of service. |

| Symptom | Possible Causes | Recommended Action |
|--|--|---|
| PIL or SPM will not go to Learning, read the Status of the algorithm. If the Status reads "Inactive" read the Possible Causes to determine the recommended action. | ADB Block is not licensed. The algorithm Status should also say "Not Licensed." | 1. Check DIAG_OPTIONS in the Resource Block. PIL/SPM or a hex value of 0x00000300 should be shown. See "Advanced Diagnostics Block Licensing" on page 3-2 to license the ADB block. |
| | Resource Block Actual Mode is OOS. | Determine why the Resource block is in OOS. Correct problem then put Resource Block into Auto mode |
| | ADB block Actual mode is OOS. | Put ADB block into Auto mode. |
| | The algorithms were not activated. | To activate either of the algorithms see page 2-18. |
| | The SPM (only) algorithm was not configured properly. | 1. Configure at least one of the monitoring variables properly, see "SPM Configuration" on page 2-23. |
| | For the SPM algorithm only: The variable to be monitored is in an unscheduled function block | Download a schedule into the function block. Consult your host documentation for downloading schedules. |
| PIL Status reads "Insufficient Dynamics." | For SPM (only), the block in which the process variable is coming from is not in Auto mode. | Put monitored block into Auto mode. |
| | There is not enough process noise or there is no flow in the line. | 1. Check to see if the process is flowing. 2. Your process may have low process dynamics. You can turn off this check. This should only be done after a careful thought process, see "PLINE_Sensitivity" on page 2-19. |
| The PIL Status stay in Verifying. | The process dynamics are not stable. | Ensure that the process flow is stable. |
| | The PIL algorithm is not properly configured. | The process may be varying by more than the algorithm is configured for. Adjust the learning sensitivity to compensate for this, see "PLINE_Sensitivity" on page 2-19. |
| The PIL Status reads "Bad PV Status" | There is a problem in the Sensor Transducer Block. | See "Rosemount 3051S troubleshooting flowchart" on page 5-2. |

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PLANTWEB ALERTS

Table 5-12. Failure Alerts

| Failed Alert | What is this Alert Detecting? | What is the effect on the instrument? | Recommended Action | Help | Default Configuration "0" = Disabled, "1" = Enabled |
|---------------------------------|---|---|---|--|---|
| Primary Value Failure | Pressure updates from the sensor module stopped. | PV holds last good value with a BAD status. Device remains in Auto. | Check the Interface Cable Between the Sensor Module and the Fieldbus Electronics Board. | "Pressure updates are not occurring. 1. Check the interface cable between the Sensor Module and the Fieldbus Electronics Board. 2. Replace the Sensor Module and Fieldbus Electronics Boards." | 1 |
| Secondary Value Failure | Sensor Module temperature updates have stopped. | SV holds last good value with a BAD status. This will also cause the PV's to go to a BAD status. | Check the Interface Cable Between the Sensor Module and the Fieldbus Electronics Board. | "The instrument body temperature measurement has failed. This is caused by the following. Sensor Module temperature updates are not occurring. 1. Check the interface cable between the Sensor Module and the Fieldbus Electronics Board. 2. Replace the Sensor Module and Fieldbus Electronics Board. The Sensor Module body temperature reading is outside the factory configured failure limits. 3. If the ambient temperature of the instrument is within the limits then there is temperature sensor malfunction. Replace the Sensor Module." | 1 |
| Memory Failure | The Fieldbus Electronics Board has reported a ROM memory integrity error. | The device will be placed in OOS mode and all PV's will go to a BAD status. | Replace the Fieldbus Electronics Board. | "The Fieldbus Electronics Board has reported a Rom memory integrity error. 1. Replace the Fieldbus Electronics Board." | 1 |
| NM Memory Failure | User configuration data has been corrupted or pending user configuration data has been lost due to loss of power before storage could complete. | Default values are loaded into the faulty block. Potential errors in stored data may cause unwanted behavior. The device will be placed in OOS mode and all PV's will go BAD status. Device recovery is possible. | Reset the Device then Download the Device Configuration. | "The Fieldbus Electronics Board has reported a EEPROM memory integrity error (corrupt data). Default values were loaded into the faulty block. 1. Reset the device. 2. Download the device configuration. 3. If the failure reoccurs replace the Fieldbus Electronics Board." | 1 |
| Sensor Module Failure | The Sensor Module on the instrument has reported a memory failure. | PV/SV holds last good value with a BAD status. Device remains in Auto. | Replace the Sensor Module. | "The Sensor Module on the instrument has reported a memory failure. 1. Replace the Sensor Module." | 1 |
| Sensor Module NV Memory Failure | The Fieldbus Electronics Board has reported a EEPROM memory integrity error (corrupt data).Default values are loaded into the faulty block. | PV/SV holds last good value with a BAD status. Device remains in Auto. Device recovery is possible. | Replace the Sensor Module. | | 1 |

Table 5-13. Maintenance Alerts

| Maintenance Alert | What is this Alert Detecting? | What is the effect on the instrument? | Recommended Action | Help | Default Configuration "0" = Disabled, "1" = Enabled |
|-------------------------------|---|--|---|--|---|
| Primary Value Degraded | The PV is outside the operating range of the transmitter. | PV status will go UNCERTAIN. | The Instrument Pressure may be too High or too Low. Confirm that it is within the Operating Range of the Transmitter. | "The PV is outside the operating range of the transmitter. 1. Confirm that the process pressure is within the operating range of the transmitter. 2. If the pressure applied to the device is within the limits then there is a pressure sensor malfunction. Replace the Sensor Module." | 1 |
| Secondary Value Degraded | The instrument body temperature is outside the operating range of the transmitter. | PV status will go UNCERTAIN. | The Instrument Body Temperature may be too Hot or too Cold. Confirm that it is within the Operating Range of the Transmitter. | "The instrument body temperature is outside the operating range of the transmitter. 1. If the ambient temperature of the instrument is within the limits then there is temperature sensor malfunction. Replace the Sensor Module." | 1 |
| Sensor Module Memory Warning | There is a non-critical integrity check failure in the sensor EEPROM memory. This warning does not affect device performance. | Device may lose non-critical data (serial number, materials of construction, etc...). | Replace the Sensor Module at the next scheduled Maintenance. | "There is a non-critical integrity check failure in the sensor EEPROM Memory. This warning does not affect device performance. 1. Replace the Sensor Module at the next scheduled maintenance." | 1 |
| Plugged Impulse Line Detected | The device diagnostics has reported a plugged impulse line(s). | 1. This will have not affect of the device. Or 2. If this is configured to affect PV status then PV status will go UNCERTAIN. | Check the Device Impulse Line(s). | "The device diagnostics has reported a plugged impulse line(s). 1. Check the device impulse line(s). 2. Check for correct configuration of the impulse line parameters in the diagnostics transducer block." | Licensed |

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Table 5-14. Advisory Alerts

| Advisory Alert | What is this Alert Detecting? | What is the effect on the instrument? | Recommended Action | Help | Default Configuration "0" = Disabled, "1" = Enabled |
|--|---|---|---|--|---|
| Process Anomaly Detected (SPM) | The statistical process monitor in the device diagnostics has reported that a user defined limit was exceeded. | LCD will lose local PV indication. | Check Display and Sensor Connections. | The Statistical Process Monitor in the device diagnostics has reported that a user defined limit was exceeded. 1. Check the statistical process monitor status in the diagnostics transducer block. | Licensed |
| LOI Failure | Communications failure with LCD. | Alert Only | Check the Statistical Process Monitor Status in the ADB Block. | The Fieldbus Electronics Board has reported a Local Display failure. 1. Check Local Display connection. 2. Check the interface cable between the Sensor Module and the Fieldbus Electronics Board. (Sensor Module must be connected). 3. Replace the Local Display. | 1 |
| NV Writes Deferred | A high number of configuration changes have been detected. To prevent premature memory failure, the write operations have been deferred; the transmitter must remain powered through completion to avoid data loss. | The device continues to work as is with no affect to the PV's. Barring a power cycle by the device, the software will eventually save the NV data and the error will clear. | Limit the number of periodic writes to all static or non-volatile parameters. | A high number of writes has been detected to non-volatile memory. To prevent premature failure of the memory, the write operations have been deferred. The data will be saved on a 6 hour cycle. This condition usually exists because a program has been written that writes to function block parameters not normally expected to be written to on a cyclic basis. Any such automated write sequence should be modified to write the parameter(s) only when needed. It is recommended that you limit the number of periodic writes to all static or non-volatile parameters such as HI_HI_LIM, LOW_CUT, SP, TRACK_IN_D, OUT, IO_OPTS, BIAS, STATUS_OPTS, SP_HI_LIM, and so on. | 1 |
| Mass Flow Transducer Block Reverse Flow | DP value is negative (and beyond a threshold) indicating that flow is in the wrong direction | Mass Flow PV status will go BAD. | Check DP sensor configuration and trim as needed. | DP input was so low as to that flow is reversed. | Licensed |
| Mass Flow Transducer Block Sensor Out of Range | DP value is outside of operating range or sensor limits | PV status will go UNCERTAIN. | Check Engineering Assistant (EA) has generated configuration for the proper range of DP values. | DP input outside of operating range and/or implementation limits. | Licensed |
| Mass Flow Transducer Block SP of PT Clipped | SP or PT value is out of range and has been clipped in calculations | PV status will go UNCERTAIN. | Check Engineering Assistant (EA) has generated configuration for the proper ranges of SP & PT values. | SP or PT input outside of operating range and limited (clipped) to operating range in calculations. | Licensed |

Appendix A FOUNDATION Fieldbus Block Information

| | |
|---|-----------|
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| Resource Block | page A-1 |
| Sensor Transducer Block | page A-7 |
| Analog Input (AI) Function Block | page A-9 |
| LCD Display Transducer Block | page A-13 |
| Advanced Diagnostics Transducer Block (ADB) | page A-15 |

OVERVIEW

Figure A-1. Analog Input Function Block Schematic

RESOURCE BLOCK

This section contains information on the 3051S Resource Block. Descriptions of all Resource Block Parameters, errors, and diagnostics are included. Also the modes, alarm detection, status handling, and troubleshooting are discussed.

Definition

The resource block defines the physical resources of the device. The resource block also handles functionality that is common across multiple blocks. The block has no linkable inputs or outputs.

Table A-1. Resource Block Parameters

| Parameter | Index | Valid Range | Initial Value | Units | Other | Description |
|-------------|-------|-------------------------------|---------------|-------|-----------|---|
| ST_REV | 1 | 0-255 | | | Read Only | The revision level of the static data associated with the function block. |
| TAG_DESC | 2 | | spaces | N/A | | The user description of the intended application of the block. |
| STRATEGY | 3 | | 0 | N/A | | The strategy field can be used to identify grouping of blocks. |
| ALERT_KEY | 4 | 1-255 | 0 | N/A | | The identification number of the plant unit. |
| MODE_BLK | 5 | | O/S | N/A | | The actual, target, permitted, and normal modes of the block. |
| BLOCK_ERR | 6 | | | E | Read Only | This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown. |
| RS_STATE | 7 | | | N/A | Read Only | State of the function block application state machine. |
| TEST_RW | 8 | | | N/A | | Read/write test parameter - used only for conformance testing. |
| DD_RESOURCE | 9 | | NULL | N/A | Read Only | String identifying the tag of the resource which contains the Device Description for the resource. |
| MANUFAC_ID | 10 | Enumeration, controlled by FF | 0x1151 | E | Read Only | Manufacturer identification number - used by an interface device to locate the DD file for the resource. |
| DEV_TYPE | 11 | | 0x3051 | E | Read Only | Manufacturer's model number associated with the resource - used by interface devices to locate the DD file for the resource. |

| Parameter | Index | Valid Range | Initial Value | Units | Other | Description |
|-------------|-------|---|--|------------------|-----------|---|
| DEV_REV | 12 | | 23 | N/A | Read Only | Manufacturer revision number associated with the resource - used by an interface device to locate the DD file for the resource. |
| DD_REV | 13 | | 3 | N/A | Read Only | Revision of the DD associated with the resource - used by the interface device to locate the DD file for the resource. |
| GRANT_DENY | 14 | | | N/A | | Options for controlling access of host computer and local control panels to operating, tuning and alarm parameters of the block. |
| HARD_TYPES | 15 | | 0x0003 | N/A | Read Only | The types of hardware available as channel numbers. See <Ref 20> The supported hardware types are: SCALAR_INPUT, SCALAR_OUTPUT |
| RESTART | 16 | 1: Run 2: Restart resource 3: Restart with defaults 4: Restart processor | 1 | E | | Allows a manual restart to be initiated. |
| FEATURES | 17 | See Table 57 | 0x0C1F (Bits 0, 1, 2, 3, 4, 10, 11 set) | N/A | Read Only | Used to show supported resource block options. See <Ref 20> The supported features are: UNICODE_SUPPORT, REPORT_SUPPORT, FAULT_STATE_SUPPORT, SOFT_WRITE_LOCK_SUPPORT, HARD_WRITE_LOCK_SUPPORT, MULTI_BIT_ALARM_SUPPORT, and "restart/relink required" |
| FEATURE_SEL | 18 | See Table 57 | 0 | N/A | | Used to select resource block options. Default selected option is "restart/relink required" |
| CYCLE_TYPE | 19 | | 0x0003 | N/A | Read Only | Identifies the block execution methods available for this resource. See <Ref 20> The supported cycle types are: SCHEDULED, and COMPLETION_OF_BLOCK_EXECUTION |
| CYCLE_SEL | 20 | | 0 | N/A | | Used to select the block execution method for this resource. |
| MIN_CYCLE_T | 21 | | 1760 (55 msec) | 1/32 millisec | Read Only | Time duration of the shortest cycle interval of which the resource is capable. |
| MEMORY_SIZE | 22 | set by mfgr | | kbytes | Read Only | Available configuration memory in the empty resource. To be checked before attempting a download. |
| NV_CYCLE_T | 23 | | 345600000 (180 min.) | 1/32 millisec | Read Only | Minimum time interval specified by the manufacturer for writing copies of NV parameters to non-volatile memory. Zero means it will never be automatically copied. At the end of NV_CYCLE_T, only those parameters which have changed need to be updated in NVRAM. |
| FREE_SPACE | 24 | 0-100% | 5.5148 | % | Read Only | Percent of memory available for further configuration. Zero in preconfigured resource. |
| FREE_TIME | 25 | 0-100% | 0 | % | Read Only | Percent of the block processing time that is free to process additional blocks. |
| SHED_RCAS | 26 | | 640000 | 1/32 millisec | | Time duration at which to give up on computer writes to function block RCas locations. Shed from RCas will never happen when SHED_RCAS = 0. |
| SHED_ROUT | 27 | | 640000 | 1/32 millisec | | Time duration at which to give up on computer writes to function block ROut locations. Shed from ROut will never happen when SHED_ROUT = 0. |
| FAULT_STATE | 28 | 1: Clear 2: Active | | E | Read Only | Condition set by loss of communication to an output block, fault promoted to an output block or a physical contact. When Fault State condition is set, then output function blocks will perform their FSTATE actions. |
| SET_FSTATE | 29 | 1: Off 2: Set | 1 | E | | Allows the Fault State condition to be manually initiated by selecting Set. |
| CLR_FSTATE | 30 | 1: Off 2: Clear | 1 | E | | Writing a Clear to this parameter will clear the device fault state if the field condition, if any, has cleared. |

| Parameter | Index | Valid Range | Initial Value | Units | Other | Description |
|--------------------|-------|---|---------------|------------------|-----------|---|
| MAX_NOTIFY | 31 | 7 | | N/A | Read Only | Maximum number of unconfirmed notify messages possible. |
| LIM_NOTIFY | 32 | 0 to MAX_NOTIFY | MAX_NOTIFY | N/A | | Maximum number of unconfirmed alert notify messages allowed. |
| CONFIRM_TIME | 33 | | 640000 | 1/32 millisecond | | The time the resource will wait for confirmation of receipt of a report before trying again. Retry will not happen when CONFIRM_TIME=0. |
| WRITE_LOCK | 34 | 1: Unlocked 2: Locked | 1 | E | | If set, no writes from anywhere are allowed, except to clear WRITE_LOCK. Block inputs will continue to be updated. |
| UPDATE_EVT | 35 | | | N/A | | This alert is generated by any change to the static data. |
| BLOCK_ALM | 36 | | | N/A | | The BLOCK_ALM is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the Active status in the Status attribute. As soon as the Unreported status is cleared by the alert reporting task, another block alert may be reported without clearing the Active status, if the subcode has changed. |
| ALARM_SUM | 37 | | | N/A | | The current alert status, unacknowledged states, unreported states, and disabled states of the alarms associated with the function block. |
| ACK_OPTION | 38 | 0: Auto Ack Disabled 1: Auto Ack Enabled | 0 | N/A | | Selection of whether alarms associated with the block will be automatically acknowledged. |
| WRITE_PRI | 39 | 0 - 15 | 0 | N/A | | Priority of the alarm generated by clearing the write lock. |
| WRITE_ALM | 40 | | | N/A | | This alert is generated if the write lock parameter is cleared. |
| ITK_VER | 41 | set by FF | 5 | N/A | Read Only | Major revision number of the interoperability test case used in certifying this device as interoperable. The format and range are controlled by the Fieldbus Foundation. |
| DISTRIBUTOR | 42 | "Rosemount" | 0X26 | E | Read Only | Reserved for use as distributor ID. No Foundation enumerations defined at this time. |
| DEV_STRING | 43 | 0 to 0xFFFFFFFF | 0 | N/A | | This is used to load new licensing into the device. The value can be written but will always read back with a value of 0. |
| XD_OPTION | 44 | | | E | Read Only | Indicates which transducer block licensing options are enabled. |
| FB_OPTION | 45 | | | E | Read Only | Indicates which function block licensing options are enabled. |
| DIAG_OPTION | 46 | | | E | Read Only | Indicates which diagnostics licensing options are enabled. |
| MISC_OPTION | 47 | | | E | Read Only | Indicates which miscellaneous licensing options are enabled. |
| RB_SFTWR_REV_MAJOR | 48 | | set by build | N/A | Read Only | Major revision of software that the resource block was created with. |
| RB_SFTWR_REV_MINOR | 49 | | set by build | N/A | Read Only | Minor revision of software that the resource block was created with. |
| RB_SFTWR_REV_BUILD | 50 | | set by build | N/A | Read Only | Build of software that the resource block was created with. |
| RB_SFTWR_REV_ALL | 51 | | set by build | N/A | Read Only | The string will contains the following fields: Major rev: 1-3 characters, decimal number 0-255 Minor rev: 1-3 characters, decimal number 0-255 Build rev: 1-5 characters, decimal number 0-255 Time of build: 8 characters, xx:xx:xx, military time Day of week of build: 3 characters, Sun, Mon, ... Month of build: 3 characters, Jan, Feb. Day of month of build: 1-2 characters, decimal number 1-31 Year of build: 4 characters, decimal Builder: 7 characters, login name of builder |

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| Parameter | Index | Valid Range | Initial Value | Units | Other | Description |
|---------------------|-------|---|---------------|-------|-----------|---|
| HARDWARE_REV | 52 | | 3 | N/A | Read Only | Hardware revision of that hardware that has the resource block in it. |
| OUTPUT_BOARD_SN | 53 | set by mfgr | | N/A | Read Only | Output board serial number. |
| FINAL_ASSY_NUM | 54 | set by mfgr | | N/A | Read Only | The same final assembly number placed on the neck label. |
| DETAILED_STATUS | 55 | See Table 22 | | E | Read Only | Indicates the state of the transmitter. |
| SUMMARY_STATUS | 56 | 0: Uninitialized 1: No repair needed. 2: Repairable 3: Call service center | 0 | E | Read Only | An enumerated value of repair analysis. |
| MESSAGE_DATE | 57 | | 0 | N/A | | Date associated with the MESSAGE_TEXT parameter |
| MESSAGE_TEXT | 58 | | spaces | N/A | | Used to indicate changes made by the user to the device's installation, configuration, or calibration. |
| SELF_TEST | 59 | 0: Uninitialized 1: No test 2: Self test | 1 | E | | Used to self test the device. Tests are device specific. |
| DEFINE_WRITE_LOCK | 60 | 0: Uninitialized 1: Everything Locked 2: Only physical device locked | 1 | E | | Allows the operator to select how WRITE_LOCK behaves. The initial value is "lock everything". If the value is set to "lock only physical device" then the resource and transducer blocks of the device will be locked but changes to function blocks will be allowed. |
| SAVE_CONFIG_NOW | 61 | 0: Uninitialized 1: No save 2: Burn EEPROM with latest values | 1 | E | | Allows the user to optionally save all non-volatile information immediately. |
| SAVE_CONFIG_BLOCKS | 62 | | 0 | N/A | Read Only | Number of EEPROM blocks that have been modified since last burn. This value will count down to zero when the configuration is saved. |
| START_WITH_DEFAULTS | 63 | 0-4 | 1 | E | | 0 = Uninitialized 1 = do not power-up with NV defaults 2 = power-up with default node address 3 = power-up with default pd_tag and node address 4 = power-up with default data for the entire communications stack (no application data) |
| SIMULATE_IO | 64 | 0: Uninitialized 1: Off 2: On | 0 | E | Read Only | Status of Simulate jumper/switch |
| SECURITY_IO | 65 | 0: Uninitialized 1: Off 2: On | 0 | E | Read Only | Status of Security jumper/switch |
| SIMULATE_STATE | 66 | 0 - 3 | 1 | E | Read Only | The state of the simulate jumper 0 = Uninitialized 1 = Jumper/switch off, simulation not allowed 2 = Jumper/switch on, simulation not allowed (need to cycle jumper/switch) 3 = Jumper/switch on, simulation allowed |

| Parameter | Index | Valid Range | Initial Value | Units | Other | Description |
|--------------------|-------|--------------|---------------|-------|-----------|---|
| DOWNLOAD_MODE | 67 | 0 - 2 | 1 | E | | Gives access to the boot block code for over the wire downloads 0 = Uninitialized 1 = Run Mode 2 = Download Mode |
| RECOMMENDED_ACTION | 68 | | 0 | E | Read Only | Enumerated list of recommended actions displayed with a device alert. |
| FAILED_PRI | 69 | 0 - 15 | 0 | N/A | | Designates the alarming priority of the FAILED_ALM. |
| FAILED_ENABLE | 70 | | 0 | E | Read Only | Enabled FAILED_ALM alarm conditions. Corresponds bit for bit to the FAILED_ACTIVE. A bit on means that the corresponding alarm condition is enabled and will be detected. A bit off means the corresponding alarm condition is disabled and will not be detected. |
| FAILED_MASK | 71 | See Table 25 | 0 | E | | Mask of FAILED_ALM. Corresponds bit of bit to FAILED_ACTIVE. A bit on means that the condition is masked out from alarming. |
| FAILED_ACTIVE | 72 | | 0 | E | Read Only | Enumerated list of failure conditions within a device. |
| FAILED_ALM | 73 | | | N/A | | Alarm indicating a failure within a device which makes the device non-operational. |
| MAINT_PRI | 74 | 0 - 15 | 0 | N/A | | Designates the alarming priority of the MAINT_ALM |
| MAINT_ENABLE | 75 | | 0 | E | Read Only | Enabled MAINT_ALM alarm conditions. Corresponds bit for bit to the MAINT_ACTIVE. A bit on means that the corresponding alarm condition is enabled and will be detected. A bit off means the corresponding alarm condition is disabled and will not be detected. |
| MAINT_MASK | 76 | See Table 26 | 0 | E | | Mask of MAINT_ALM. Corresponds bit of bit to MAINT_ACTIVE. A bit on means that the condition is masked out from alarming. |
| MAINT_ACTIVE | 77 | | 0 | E | Read Only | Enumerated list of maintenance conditions within a device. |
| MAINT_ALM | 78 | | | N/A | | Alarm indicating the device needs maintenance soon. If the condition is ignored, the device will eventually fail. |
| ADVISE_PRI | 79 | 0 - 15 | 0 | N/A | | Designates the alarming priority of the ADVISE_ALM |
| ADVISE_ENABLE | 80 | | 0 | E | Read Only | Enabled ADVISE_ALM alarm conditions. Corresponds bit for bit to the ADVISE_ACTIVE. A bit on means that the corresponding alarm condition is enabled and will be detected. A bit off means the corresponding alarm condition is disabled and will not be detected. |
| ADVISE_MASK | 81 | See Table 27 | 0 | E | | Mask of ADVISE_ALM. Corresponds bit of bit to ADVISE_ACTIVE. A bit on means that the condition is masked out from alarming. |
| ADVISE_ACTIVE | 82 | | 0 | E | Read Only | Enumerated list of advisory conditions within a device. |

| Parameter | Index | Valid Range | Initial Value | Units | Other | Description |
|--------------|-------|--------------|---------------|-------|-----------|---|
| ADVISE_ALM | 83 | | | N/A | | Alarm indicating advisory alarms. These conditions do not have a direct impact on the process or device integrity. |
| HEALTH_INDEX | 84 | 1-100 | 100 | None | Read Only | <p>Parameter representing the overall health of the device, 100 being perfect and 1 being non-functioning. The value will be set based on the active PWA alarms in accordance with the requirements stated in "Device Alerts and Health Index PlantWeb Implementation Rules". Each device may implement its own unique mapping between the PWA parameters and HEALTH_INDEX although a default mapping will be available based on the following rules.</p> <p>HEALTH_INDEX will be set based on the highest priority PWA * _ACTIVE bit as follows: FAILED_ACTIVE: 0 to 31 – HEALTH_INDEX = 10 MAINT_ACTIVE: 27 to 31 – HEALTH_INDEX = 20 MAINT_ACTIVE: 22 to 26 – HEALTH_INDEX = 30 MAINT_ACTIVE: 16 to 21 – HEALTH_INDEX = 40 MAINT_ACTIVE: 10 to 15 – HEALTH_INDEX = 50 MAINT_ACTIVE: 5 to 9 – HEALTH_INDEX = 60 MAINT_ACTIVE: 0 to 4 – HEALTH_INDEX = 70 ADVISE_ACTIVE: 16 to 31 – HEALTH_INDEX = 80 ADVISE_ACTIVE: 0 to 15 – HEALTH_INDEX = 90 NONE – HEALTH_INDEX = 100</p> |
| PWA_SIMULATE | 85 | Off/On (0-1) | Off | None | | <p>Parameter that allows direct writes to PWA active parameters and the detailed status bytes that activate the Plant Web alerts. The simulate switch/jumper must be "ON" before PWA_SIMULATE can be turned on.</p> <p>0 = Simulation off 1 = Simulation on</p> |

SENSOR TRANSDUCER BLOCK

The transducer block contains the actual measurement data, including a pressure and temperature reading. The transducer block includes information about sensor type, engineering units, linearization, reranging, temperature compensation, and diagnostics.

Table A-2. Sensor Transducer Block Parameters

| Parameter | Index | Valid Range | Initial Value | Units | Other | Description |
|----------------------|-------|----------------------------|---------------|-------|-----------|--|
| ST_REV | 1 | 0-255 | | | | The revision level of the static data associated with the function block. |
| TAG_DESC | 2 | | spaces | N/A | | The user description of the intended application of the block. |
| STRATEGY | 3 | | 0 | N/A | | The strategy field can be used to identify grouping of blocks. |
| ALERT_KEY | 4 | 1-255 | 0 | N/A | | The identification number of the plant unit. |
| MODE_BLK | 5 | | O/S | N/A | | The actual, target, permitted, and normal modes of the block. |
| BLOCK_ERR | 6 | | | E | Read Only | This parameter reflects the error status associated with the hardware or software components associated with a block. it is a bit string, so that multiple errors may be shown. |
| UPDATE_EVT | 7 | | | N/A | | This alert is generated by any change to the static data. |
| BLOCK_ALM | 8 | | | N/A | | The BLOCK_ALM is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the Active status in the Status attribute. As soon as the Unreported status is cleared by the alert reporting task, another block alert may be reported without clearing the Active status, if the subcode has changed. |
| TRANSDUCER_DIRECTORY | 9 | | 0 | N/A | Read Only | A directory that specifies the number and starting indices of the transducers in the transducer block. |
| TRANSDUCER_TYPE | 10 | | 100 | E | Read Only | Identifies the transducer that follows. |
| XD_ERROR | 11 | | | E | Read Only | Provides additional error codes related to transducer blocks. |
| COLLECTION_DIRECTORY | 12 | | | N/A | Read Only | A directory that specifies the number, starting indices, and DD Item ID's of the data collections in each transducer block. |
| PRIMARY_VALUE_TYPE | 13 | See Table 35 and footnote | 0 | E | | The type of measurement represented by the primary value. |
| PRIMARY_VALUE | 14 | | | PVR | Read Only | The measured value and status available to the function block. |
| PRIMARY_VALUE_RANGE | 15 | 0-100% | | PVR | Read Only | The high and low range limit values, the engineering units code and the number of digits to the right of the decimal point to be used to display the final value. |
| CAL_POINT_HI | 16 | | +INF | CU | | The highest calibrated value. |
| CAL_POINT_LO | 17 | | -INF | CU | | The lowest calibrated value. |
| CAL_MIN_SPAN | 18 | | 0.0 | CU | Read Only | The minimum calibration span value allowed. This minimum span information is necessary to ensure that when calibration is done, the two calibrated points are not too close together. |
| CAL_UNIT | 19 | See Table 19 | % | E | | The Device Description engineering units code index for the calibration values. |
| SENSOR_TYPE | 20 | See Table 37 and footnote4 | 0 | E | | The type of sensor connected with the transducer block. |
| SENSOR_RANGE | 21 | 0-100% | | SR | Read Only | The high and low range limit values, the engineering units code and the number of digits to the right of the decimal point for the sensor. |
| SENSOR_SN | 22 | | | N/A | Read Only | The sensor serial number. |
| SENSOR_CAL_METHOD | 23 | See Table 40 | 0 | E | | The method of last sensor calibration. |

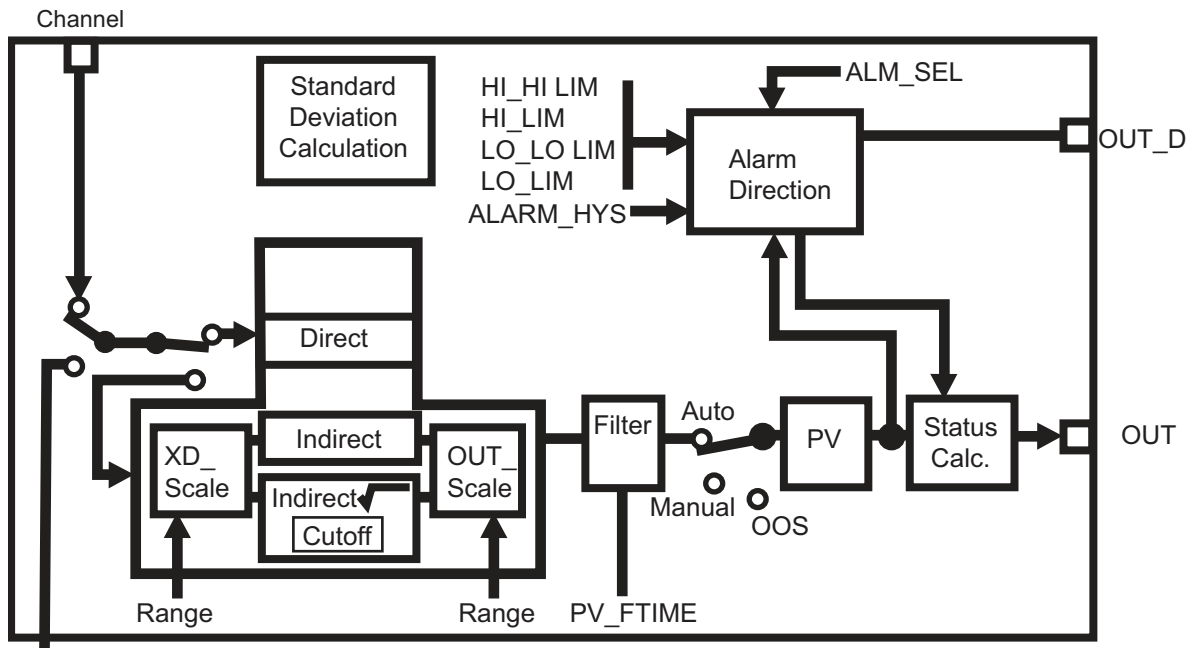
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| Parameter | Index | Valid Range | Initial Value | Units | Other | Description |
|-----------------------|-------|---|---------------|-------|-----------|---|
| SENSOR_CAL_LOC | 24 | | NULL | N/A | | The location of the last sensor calibration. This describes the physical location at which the calibration was performed. |
| SENSOR_CAL_DATE | 25 | | 0 | N/A | | The date of the last sensor calibration. This is intended to reflect the calibration of that part of the sensor that is usually wetted by the process. |
| SENSOR_CAL_WHO | 26 | | | N/A | | The name of the person responsible for the last sensor calibration. |
| SENSOR_ISOLATOR_MTL | 27 | | | E | Read Only | Defines the construction material for the isolating diaphragms. |
| SENSOR_FILL_FLUID | 28 | | | E | Read Only | Defines the type of fill fluid used in the sensor. |
| SECONDARY_VALUE | 29 | | | SVU | Read Only | The secondary value, related to the sensor. |
| SECONDARY_VALUE_UNIT | 30 | See Table 19 and footnote4 | | E | | The engineering units to be used with the SECONDARY_VALUE. |
| TB_DETAILED_STATUS | 31 | | | N/A | Read Only | Indicates the state of the transmitter. The parameter contains specific codes relating to the transducer block and the pressure sensor specifically. |
| FACTORY_CAL_RECALL | 32 | 1: No Recall 2: Recall 3: Save factory trim | 1 | E | | Recalls the sensor calibration set at the factory. If the device is in "factory mode", a value of 3 may be entered to save the current trim values into a factory area of NV memory to be used for factory calibration recall |
| MODULE_TYPE | 33 | | 252: Unknown | E | Read Only | Indicates the type of sensor module. |
| SENSOR_CAL_TYPE | 34 | See Table 39 | 252: Unknown | E | | The type of last sensor calibration. |
| FLANGE_TYPE | 35 | See Table 50 | 0 | N/A | | Indicates the type of flange that is attached to the device. See Flange Type Codes. |
| FLANGE_MTL | 36 | See Table 49 | 0 | N/A | | Indicates the type of material that the flange is made of. See Flange Material Codes. |
| REM_SEAL_NUM | 37 | See Table 45 | 0 | N/A | | Indicates the number of remote seals that are attached to the device. See Remote Seal Number Codes. |
| REM_SEAL_TYPE | 38 | See Table 46 | 0 | N/A | | Indicates the type of remote seals that are attached to the device. See Remote Seal Type Codes. |
| REM_SEAL_ISO_MTL | 39 | See Table 44 | 0 | N/A | | Indicates the type of material that the remote seal isolators are made of. See Remote Seal Isolator Material Codes. |
| REM_SEAL_FILL | 40 | See Table 43 | 0 | N/A | | Indicates the type of fill fluid used in the remote seals. See Remote Seal Fill Fluid Codes. |
| O_RING_MTL | 41 | See Table 48 | 0 | N/A | | Indicates the type of material that the flange o-rings are made of. See O-ring Material Codes. |
| DRAIN_VENT_MTL | 42 | See Table 47 | 0 | N/A | | Indicates the type of material that the drain vents on the flange are made of. See Drain Vent Material Codes. |
| PRIMARY_VALUE_DAMPING | 43 | ≥0.0f | 0.0 | Sec. | | Time constant of a single exponential filter for the PV, in seconds. |

**ANALOG INPUT (AI)
 FUNCTION BLOCK**

The Analog Input (AI) function block processes field device measurements and makes them available to other function blocks. The output value from the AI block is in engineering units and contains a status indicating the quality of the measurement. The measuring device may have several measurements or derived values available in different channels. Use the channel number to define the variable that the AI block processes.

The AI block supports alarming, signal scaling, signal filtering, signal status calculation, mode control, and simulation. In Automatic mode, the block's output parameter (OUT) reflects the process variable (PV) value and status. In Manual mode, OUT may be set manually. The Manual mode is reflected on the output status. A discrete output (OUT_D) is provided to indicate whether a selected alarm condition is active. Alarm detection is based on the OUT value and user specified alarm limits. Figure A-1 illustrates the internal components of the AI function block, and Table A-3 lists the AI block parameters and their units of measure, descriptions, and index numbers.



AI Parameter Table

Table A-3. Definitions of Analog Input Function Block System Parameters.

| Parameter | Index No. | Available Values | Units | Default | Read/Write | Description |
|------------|-----------|---|--------------------------|---|----------------|--|
| ACK_OPTION | 23 | 0 = Auto Ack Disabled 1 = Auto Ack Enabled | None | 0 all Disabled | Read and Write | Used to set auto acknowledgment of alarms. |
| ALARM_HYS | 24 | 0 – 50 | Percent | 0.5 | Read and Write | The amount the alarm value must return within the alarm limit before the associated active alarm condition clears. |
| ALARM_SEL | 38 | HI_HI, HI, LO, LO_LO | None | Non selected | Read and Write | Used to select the process alarm conditions that will cause the OUT_D parameter to be set. |
| ALARM_SUM | 22 | Enable/Disable | None | Enable | Read and Write | The summary alarm is used for all process alarms in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the Active status in the Status parameter. As soon as the Unreported status is cleared by the alert reporting task, another block alert may be reported without clearing the Active status, if the subcode has changed. |
| ALERT_KEY | 04 | 1 – 255 | None | 0 | Read and Write | The identification number of the plant unit. This information may be used in the host for sorting alarms, etc. |
| BLOCK_ALM | 21 | Not applicable | None | Not applicable | Read only | The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the Active status in the Status parameter. As soon as the Unreported status is cleared by the alert reporting task, another block alert may be reported without clearing the Active status, if the subcode has changed. |
| BLOCK_ERR | 06 | Not applicable | None | Not applicable | Read only | This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown. |
| CAP_STDDEV | 40 | > = 0 | Seconds | 0 | Read and Write | The time over which the VAR_INDEX is evaluated. |
| CHANNEL | 15 | 1 = Pressure 2 = Housing temperature | None | AI ⁽¹⁾ : Channel = 1 AI2: Channel = 2 | Read and Write | The CHANNEL value is used to select the measurement value. Refer to the appropriate device manual for information about the specific channels available in each device. You must configure the CHANNEL parameter before you can configure the XD_SCALE parameter. |
| FIELD_VAL | 19 | 0 – 100 | Percent | Not applicable | Read only | The value and status from the transducer block or from the simulated input when simulation is enabled. |
| GRANT_DENY | 12 | Program Tune Alarm Local | None | Not applicable | Read and Write | Normally the operator has permission to write to parameter values, but Program or Local remove that permission and give it to the host controller or a local control panel. |
| HI_ALM | 34 | Not applicable | None | Not applicable | Read only | The HI alarm data, which includes a value of the alarm, a timestamp of occurrence and the state of the alarm. |
| HI_HI_ALM | 33 | Not applicable | None | Not applicable | Read only | The HI HI alarm data, which includes a value of the alarm, a timestamp of occurrence and the state of the alarm. |
| HI_HI_LIM | 26 | Out_Scale ⁽²⁾ | Out_Scale ⁽²⁾ | Not applicable | Read and Write | The setting for the alarm limit used to detect the HI HI alarm condition. |
| HI_HI_PRI | 25 | 0 – 15 | None | 1 | Read and Write | The priority of the HI HI alarm. |
| HI_LIM | 28 | Out_Scale ⁽²⁾ | Out_Scale ⁽²⁾ | Not applicable | Read and Write | The setting for the alarm limit used to detect the HI alarm condition. |
| HI_PRI | 27 | 0 – 15 | None | 1 | Read and Write | The priority of the HI alarm. |
| IO_OPTS | 13 | Low Cutoff Enable/Disable | None | Disable | Read and Write | Allows the selection of input/output options used to alter the PV. Low cutoff enabled is the only selectable option. |

| Parameter | Index No. | Available Values | Units | Default | Read/Write | Description |
|-------------|-----------|--|--------------------------|----------------|----------------|---|
| L_TYPE | 16 | Direct Indirect Indirect Square Root | None | Direct | Read and Write | Linearization type. Determines whether the field value is used directly (Direct), is converted linearly (Indirect), or is converted with the square root (Indirect Square Root). |
| LO_ALM | 35 | Not applicable | None | Not applicable | Read only | The LO alarm data, which includes a value of the alarm, a timestamp of occurrence and the state of the alarm. |
| LO_LIM | 30 | Out_Scale ⁽²⁾ | Out_Scale ⁽²⁾ | Not applicable | Read and Write | The setting for the alarm limit used to detect the LO alarm condition. |
| LO_LO_ALM | 36 | Not applicable | None | Not applicable | Read only | The LO LO alarm data, which includes a value of the alarm, a timestamp of occurrence and the state of the alarm. |
| LO_LO_LIM | 32 | Out_Scale ⁽²⁾ | Out_Scale ⁽²⁾ | Not applicable | Read and Write | The setting for the alarm limit used to detect the LO LO alarm condition. |
| LO_LO_PRI | 31 | 0 – 15 | None | 1 | Read and Write | The priority of the LO LO alarm. |
| LO_PRI | 29 | 0 – 15 | None | 1 | Read and Write | The priority of the LO alarm. |
| LOW_CUT | 17 | > = 0 | Out_Scale ⁽²⁾ | 0 | Read and Write | If percentage value of transducer input fails below this, PV = 0. |
| MODE_BLK | 05 | Auto Manual Out of Service | None | Not applicable | Read and Write | The actual, target, permitted, and normal modes of the block. Target: The mode to “go to” Actual: The mode the “block is currently in” Permitted: Allowed modes that target may take on Normal: Most common mode for target |
| OUT | 08 | Out_Scale ⁽²⁾ ± 10% | Out_Scale ⁽²⁾ | Not applicable | Read and Write | The block output value and status. |
| OUT_D | 37 | Discrete_State 1 – 16 | None | Disabled | Read and Write | Discrete output to indicate a selected alarm condition. |
| OUT_SCALE | 11 | Any output range | All available | none | Read and Write | The high and low scale values, engineering units code, and number of digits to the right of the decimal point associated with OUT. |
| PV | 07 | Not applicable | Out_Scale ⁽²⁾ | Not applicable | Read only | The process variable used in block execution. |
| PV_FTIME | 18 | > = 0 | Seconds | 0 | Read and Write | The time constant of the first-order PV filter. It is the time required for a 63% change in the IN value. |
| SIMULATE | 09 | Not applicable | None | Disable | Read and Write | A group of data that contains the current transducer value and status, the simulated transducer value and status, and the enable/disable bit. |
| ST_REV | 01 | Not applicable | None | 0 | Read only | The revision level of the static data associated with the function block. The revision value will be incremented each time a static parameter value in the block is changed. |
| STATUS_OPTS | 14 | Propagate fault forward Uncertain if Limited Bad if Limited Uncertain if Man Mode | | 0 | Read and Write | |
| STDDEV | 39 | 0 – 100 | Percent | 0 | Read and Write | The average absolute error between the PV and its previous mean value over that evaluation time defined by VAR_SCAN. |
| STRATEGY | 03 | 0 – 65535 | None | 0 | Read and Write | The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block. |

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| Parameter | Index No. | Available Values | Units | Default | Read/Write | Description |
|------------|-----------|--------------------|---|--|----------------|--|
| TAG_DESC | 02 | 32 text characters | None | none | Read and Write | The user description of the intended application of the block. |
| UPDATE_EVT | 20 | Not applicable | None | Not applicable | Read only | This alert is generated by any change to the static data. |
| XD_SCALE | 10 | Any sensor range | inH ₂ O (68 °F) inHg (0 °C) ftH ₂ O (68 °F) mmH ₂ O (68 °F) mmHg (0 °C) psi bar mbar g/cm ² kg/cm ² Pa kPa torr atm deg C deg F | AI1 ⁽¹⁾ : Customer specification or inH ₂ O (68 °F) for DP/GP rng 1, 2, 3) or psi for DP/GP rng 4, 5 AP/3051T all rng AI2 deg C | | In all Rosemount devices the units of the transducer block is forced to match the unit code. |

(1) The host system may write over default values pre-configured by Rosemount Inc.
(2) Assume that when L_Type = Direct, the user configures Out_Scale which is equal to XD_Scale

**LCD DISPLAY
TRANSDUCER BLOCK**

Table A-4. LCD Display
Transducer Block Parameters

| Parameter | Index | Valid Range | Initial Value | Units | Other | Description |
|----------------------|-------|---------------------------------|---------------|-------|-----------|--|
| ST_REV | 1 | 0-255 | | | | The revision level of the static data associated with the function block. |
| TAG_DESC | 2 | | spaces | N/A | | The user description of the intended application of the block. |
| STRATEGY | 3 | | 0 | N/A | | The strategy field can be used to identify grouping of blocks. |
| ALERT_KEY | 4 | 1-255 | 0 | N/A | | The identification number of the plant unit. |
| MODE_BLK | 5 | | O/S | N/A | | The actual, target, permitted, and normal modes of the block. |
| BLOCK_ERR | 6 | | | E | Read Only | This parameter reflects the error status associated with the hardware or software components associated with a block. it is a bit string, so that multiple errors may be shown. |
| UPDATE_EVT | 7 | | | N/A | Read Only | This alert is generated by any change to the static data. |
| BLOCK_ALM | 8 | | | N/A | | The BLOCK_ALM is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the Active status in the Status attribute. As soon as the Unreported status is cleared by the alert reporting task, another block alert may be reported without clearing the Active status, if the subcode has changed. |
| TRANSDUCER_DIRECTORY | 9 | | | N/A | Read Only | A directory that specifies the number and starting indices of the transducers in the transducer block. |
| TRANSDUCER_TYPE | 10 | | 100 | E | Read Only | Identifies the transducer that follows. |
| XD_ERROR | 11 | | | E | Read Only | Provides additional error codes related to transducer blocks. |
| COLLECTION_DIRECTORY | 12 | | | N/A | Read Only | A directory that specifies the number, starting indices, and DD Item ID's of the data collections in each transducer block. |
| DISPLAY_PARAM_SEL | 13 | Bit 0 – Bit 4 | Bit 0 – DP1 | E | | This will determine which Display Parameters are active. Bit 0 = DP1 Bit 1 = DP2 Bit 2 = DP3 Bit 3 = DP4 Bit 4 = Bar Graph enable |
| BLK_TYPE_1 | 14 | See Table 33 | 0x8001 | E | | The enumerated block type for DP1's block. |
| BLK_TAG_1 | 15 | | "TRANSDUCER" | N/A | | The tag of the block containing DP1. |
| PARAM_INDEX_1 | 16 | | 14 | N/A | | The relative index of DP1 within its block. See Table 34 |
| CUSTOM_TAG_1 | 17 | | spaces | N/A | | The block description that is displayed for DP1. |
| UNITS_TYPE_1 | 18 | 1: Auto 2: Custom 3: None | 1 | E | | This parameter determines where the units for the display parameter come from. |
| CUSTOM_UNITS_1 | 19 | | spaces | N/A | | This is the user entered units that are displayed when UNITS_TYPE_1=Custom. |
| BLK_TYPE_2 | 20 | See Table 33 | 0 | E | | The enumerated block type for DP2's block. |
| BLK_TAG_2 | 21 | | spaces | N/A | | The tag of the block containing DP2. |
| PARAM_INDEX_2 | 22 | | 0 | N/A | | The relative index of DP2 within its block. See Table 34 |
| CUSTOM_TAG_2 | 23 | | spaces | N/A | | The block description that is displayed for DP2. |

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| Parameter | Index | Valid Range | Initial Value | Units | Other | Description |
|----------------|-------|---------------------------------|---------------|-------|-------|--|
| UNITS_TYPE_2 | 24 | 1: Auto 2: Custom 3: None | | E | | This parameter determines where the units for the display parameter come from. |
| CUSTOM_UNITS_2 | 25 | | spaces | N/A | | This is the user entered units that are displayed when UNITS_TYPE_2=Custom. |
| BLK_TYPE_3 | 26 | See Table 33 | 0 | E | | The enumerated block type for DP3's block. |
| BLK_TAG_3 | 27 | | spaces | N/A | | The tag of the block containing DP3. |
| PARAM_INDEX_3 | 28 | | 0 | N/A | | The relative index of DP3 within its block. See Table 34 |
| CUSTOM_TAG_3 | 29 | | spaces | N/A | | The block description that is displayed for DP3. |
| UNITS_TYPE_3 | 30 | 1: Auto 2: Custom 3: None | | E | | This parameter determines where the units for the display parameter come from. |
| CUSTOM_UNITS_3 | 31 | | spaces | N/A | | This is the user entered units that are displayed when UNITS_TYPE_3=Custom. |
| BLK_TYPE_4 | 32 | See Table 33 | 0 | E | | The enumerated block type for DP4's block. |
| BLK_TAG_4 | 33 | | spaces | N/A | | The tag of the block containing DP4. |
| PARAM_INDEX_4 | 34 | | 0 | N/A | | The relative index of DP4 within its block. See Table 34 |
| CUSTOM_TAG_4 | 35 | | spaces | N/A | | The block description that is displayed for DP4. |
| UNITS_TYPE_4 | 36 | 1: Auto 2: Custom 3: None | | E | | This parameter determines where the units for the display parameter come from. |
| CUSTOM_UNITS_4 | 37 | | spaces | N/A | | This is the user entered units that are displayed when UNITS_TYPE_4=Custom. |

**ADVANCED
 DIAGNOSTICS
 TRANSDUCER BLOCK
 (ADB)**

Table A-5. Advanced Diagnostic block Parameters

| Parameter | Index | Valid Range | Initial Value | Units | Other | Description |
|----------------------------|-------|--------------------------------|---|-------|-----------|--|
| ST_REV | 1 | 0-255 | | | Read Only | The revision level of the static data associated with the function block. |
| TAG_DESC | 2 | | spaces | N/A | | The user description of the intended application of the block. |
| STRATEGY | 3 | | 0 | N/A | | The strategy field can be used to identify grouping of blocks. |
| ALERT_KEY | 4 | 1-255 | 0 | N/A | | The identification number of the plant unit. |
| MODE_BLK | 5 | | O/S | N/A | | The actual, target, permitted, and normal modes of the block. |
| BLOCK_ERR | 6 | | | E | Read Only | This parameter reflects the error status associated with the hardware or software components associated with a block. it is a bit string, so that multiple errors may be shown. |
| UPDATE_EVT NOT IMPLEMENTED | 7 | | | N/A | Read Only | This alert is generated by any change to the static data. |
| BLOCK_ALM NOT IMPLEMENTED | 8 | | | N/A | | The BLOCK_ALM is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the Active status in the Status attribute. As soon as the Unreported status is cleared by the alert reporting task, another block alert may be reported without clearing the Active status, if the subcode has changed. |
| TRANSDUCER_DIRECTORY | 9 | | | N/A | Read Only | A directory that specifies the number and starting indices of the transducers in the transducer block. |
| TRANSDUCER_TYPE | 10 | | 100 | E | Read Only | Identifies the transducer that follows. |
| XD_ERROR | 11 | | | E | Read Only | Provides additional error codes related to transducer blocks. |
| COLLECTION_DIRECTORY | 12 | | | N/A | Read Only | A directory that specifies the number, starting indices, and DD Item ID's of the data collections in each transducer block. |
| ADB_STATUS | 13 | | Quality: Good SubStatus: Non-Specific Limit: 0 | N/A | Read Only | ADB status. For further info see <Ref 19> Status Attribute Definition |
| DIAG_EVT | 14 | | Unack: 0 Alarm State: 0 Time Stamp: 0 Subcode: 0 Value: 0 | N/A | Read Only | Diagnostic event |
| SPM_ACTIVE | 15 | 0 = Disabled 0xff = Enabled | Disabled | N/A | | Enables/Disables the Statistical Process Monitoring algorithm |
| SPM_MONITORING_CYCLE | 16 | 5 to 1440 | 15 | min. | | Baseline length and frequency of Mean and Stdev updates |
| SPM_BYPASS_VERIFICATION | 17 | 0 = No 0xff = Yes | No | N/A | | Enables/Disables Bypass of Process Stability Checks during Learning |

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| Parameter | Index | Valid Range | Initial Value | Units | Other | Description |
|-------------------------|-------|--|---------------|-------|-----------|---|
| SPM1_BLOCK_TYPE | 18 | All Function Blocks in the device (see Table 33) | 0 | N/A | | The function block type for the SPM variable |
| SPM1_BLOCK_TAG | 19 | All Function Blocks in the device | NULL | N/A | | Block tag for the process variable |
| SPM1_PARAM_INDEX | 20 | All DS-65 parameters for the block type of the entered block tag. Any number can be entered, but an invalid index will result in a rejection of a "True" write to the SPM_ACTIVE parameter | 0 | N/A | | OD Parameter index for the Block Tag that is entered. |
| SPM1_STATUS | 21 | 1.Inactive 2.Learning 3.Verifying 4.No Detections 5.Mean Change Detected 6.High Variation Detected 7.Low Dynamics Detected 8.Not Licensed | Inactive | N/A | Read Only | Status of the SPM1 Statistical Process Monitoring |
| SPM1_TIMESTAMP | 22 | All Times and Dates | 0 | time | Read Only | Timestamp of last SPM1 Statistical Process Monitoring status change |
| SPM1_USER_COMMAND | 23 | 1.Detect 2.Learn 3.Quit 4.Idle | 4 | N/A | | User control for the Statistical Process Monitoring session. |
| SPM1_MEAN | 24 | | 0.0f | N/A | Read Only | Last Mean of SPM1 |
| SPM1_MEAN_CHANGE | 25 | | 0.0f | % | Read Only | % Change in SPM1 Mean with respect to Baseline Mean |
| SPM1_STDEV | 26 | | 0.0f | N/A | Read Only | Last Stdev of SPM1 |
| SPM1_STDEV_CHANGE | 27 | | 0.0f | % | Read Only | Change in SPM1 Stdev with respect to Baseline Stdev |
| SPM1_BASELINE_MEAN | 28 | | 0.0f | N/A | Read Only | Baseline Mean for SPM1 |
| SPM1_BASELINE_STDEV | 29 | | 0.0f | N/A | Read Only | Baseline Stdev for SPM1 |
| SPM1_MEAN_LIM | 30 | ≥0.0f | 0.0f | % | | % Change in mean for SPM1 allowed by user |
| SPM1_HIGH_VARIATION_LIM | 31 | ≥ 0.0f | 0.0f | % | | % Increase in dynamics for SPM1 allowed by user |
| SPM1_LOW_DYNAMICS_LIM | 32 | ≤0.0f | 0.0f | % | | % Decrease in dynamics for SPM1 allowed by user |

| Parameter | Index | Valid Range | Initial Value | Units | Other | Description |
|-------------------------|-------|--|---------------|-------|-----------|---|
| SPM2_BLOCK_TYPE | 33 | All Function Blocks in the device | 0 | N/A | | The function block type for the SPM variable |
| SPM2_BLOCK_TAG | 34 | All Function Blocks in the device (see Table 33) | NULL | N/A | | Block tag for the process variable |
| SPM2_PARAM_INDEX | 35 | All DS-65 parameters for the block type of the entered block tag. Any number can be entered, but an invalid index will result in a rejection of a "True" write to the SPM_ACTIVE parameter | 0 | N/A | | OD Parameter index for the Block Tag that is entered. |
| SPM2_STATUS | 36 | 1.Inactive 2.Learning 3.Verifying 4.No Detections 5.Mean Change Detected 6.High Variation Detected 7.Low Dynamics Detected 8.Not Licensed | Inactive | N/A | Read Only | Status of the SPM2 Statistical Process Monitoring |
| SPM2_TIMESTAMP | 37 | All Times and Dates | 0 | time | Read Only | Timestamp of last SPM2 Statistical Process Monitoring status change |
| SPM2_USER_COMMAND | 38 | 1.Detect 2.Learn 3.Quit 4.Idle | 4 | N/A | | User control for the Statistical Process Monitoring session. |
| SPM2_MEAN | 39 | | 0.0f | N/A | Read Only | Last Mean of SPM2 |
| SPM2_MEAN_CHANGE | 40 | | 0.0f | % | Read Only | % Change in SPM2 Mean with respect to Baseline Mean |
| SPM2_STDEV | 41 | | 0.0f | N/A | Read Only | Last Stdev of SPM2 |
| SPM2_STDEV_CHANGE | 42 | | 0.0f | % | Read Only | Change in SPM2 Stdev with respect to Baseline Stdev |
| SPM2_BASELINE_MEAN | 43 | | 0.0f | N/A | Read Only | Baseline Mean for SPM2 |
| SPM2_BASELINE_STDEV | 44 | | 0.0f | N/A | Read Only | Baseline Stdev for SPM2 |
| SPM2_MEAN_LIM | 45 | ≥0.0f | 0.0f | % | | % Change in mean for SPM2 allowed by user |
| SPM2_HIGH_VARIATION_LIM | 46 | ≥ 0.0f | 0.0f | % | | % Increase in dynamics for SPM2 allowed by user |
| SPM2_LOW_DYNAMICS_LIM | 47 | ≤0.0f | 0.0f | % | | % Decrease in dynamics for SPM2 allowed by user |
| SPM3_BLOCK_TYPE | 48 | All Function Blocks in the device | 0 | N/A | | The function block type for the SPM variable |

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| Parameter | Index | Valid Range | Initial Value | Units | Other | Description |
|-------------------------|-------|--|---------------|-------|-----------|---|
| SPM3_BLOCK_TAG | 49 | All Function Blocks in the device (see Table 33) | NULL | N/A | | Block tag for the process variable |
| SPM3_PARAM_INDEX | 50 | All DS-65 parameters for the block type of the entered block tag. Any number can be entered, but an invalid index will result in a rejection of a "True" write to the SPM_ACTIVE parameter | 0 | N/A | | OD Parameter index for the Block Tag that is entered. |
| SPM3_STATUS | 51 | 1.Inactive 2.Learning 3.Verifying 4.No Detections 5.Mean Change Detected 6.High Variation Detected 7.Low Dynamics Detected 8.Not Licensed | Inactive | N/A | Read Only | Status of the SPM3 Statistical Process Monitoring |
| SPM3_TIMESTAMP | 52 | All Times and Dates | 0 | time | Read Only | Timestamp of last SPM3 Statistical Process Monitoring status change |
| SPM3_USER_COMMAND | 53 | 1.Detect 2.Learn 3.Quit 4.Idle | 4 | N/A | | User control for the Statistical Process Monitoring session. |
| SPM3_MEAN | 54 | | 0.0f | N/A | Read Only | Last Mean of SPM3 |
| SPM3_MEAN_CHANGE | 55 | | 0.0f | % | Read Only | % Change in SPM3 Mean with respect to Baseline Mean |
| SPM3_STDEV | 56 | | 0.0f | N/A | Read Only | Last Stdev of SPM3 |
| SPM3_STDEV_CHANGE | 57 | | 0.0f | % | Read Only | Change in SPM3 Stdev with respect to Baseline Stdev |
| SPM3_BASELINE_MEAN | 58 | | 0.0f | N/A | Read Only | Baseline Mean for SPM3 |
| SPM3_BASELINE_STDEV | 59 | | 0.0f | N/A | Read Only | Baseline Stdev for SPM3 |
| SPM3_MEAN_LIM | 60 | ≥0.0f | 0.0f | % | | % Change in mean for SPM3 allowed by user |
| SPM3_HIGH_VARIATION_LIM | 61 | ≥ 0.0f | 0.0f | % | | % Increase in dynamics for SPM3 allowed by user |
| SPM3_LOW_DYNAMICS_LIM | 62 | ≤0.0f | 0.0f | % | | % Decrease in dynamics for SPM3 allowed by user |
| SPM4_BLOCK_TYPE | 63 | All Function Blocks in the device | 0 | N/A | | The function block type for the SPM variable |

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| Parameter | Index | Valid Range | Initial Value | Units | Other | Description |
|-------------------------|-------|--|---------------|-------|-----------|---|
| SPM4_BLOCK_TAG | 64 | All Function Blocks in the device (see Table 33) | NULL | N/A | | Block tag for the process variable |
| SPM4_PARAM_INDEX | 65 | All DS-65 parameters for the block type of the entered block tag. Any number can be entered, but an invalid index will result in a rejection of a "True" write to the SPM_ACTIVE parameter | 0 | N/A | | OD Parameter index for the Block Tag that is entered. |
| SPM4_STATUS | 66 | 1.Inactive 2.Learning 3.Verifying 4.No Detections 5.Mean Change Detected 6.High Variation Detected 7.Low Dynamics Detected 8.Not Licensed | Inactive | N/A | Read Only | Status of the SPM4 Statistical Process Monitoring |
| SPM4_TIMESTAMP | 67 | All Times and Dates | 0 | time | Read Only | Timestamp of last SPM4 Statistical Process Monitoring status change |
| SPM4_USER_COMMAND | 68 | 1.Detect 2.Learn 3.Quit 4.Idle | 4 | N/A | | User control for the Statistical Process Monitoring session. |
| SPM4_MEAN | 69 | | 0.0f | N/A | Read Only | Last Mean of SPM4 |
| SPM4_MEAN_CHANGE | 70 | | 0.0f | % | Read Only | % Change in SPM4 Mean with respect to Baseline Mean |
| SPM4_STDEV | 71 | | 0.0f | N/A | Read Only | Last Stdev of SPM4 |
| SPM4_STDEV_CHANGE | 72 | | 0.0f | % | Read Only | Change in SPM4 Stdev with respect to Baseline Stdev |
| SPM4_BASELINE_MEAN | 73 | | 0.0f | N/A | Read Only | Baseline Mean for SPM4 |
| SPM4_BASELINE_STDEV | 74 | | 0.0f | N/A | Read Only | Baseline Stdev for SPM4 |
| SPM4_MEAN_LIM | 75 | ≥0.0f | 0.0f | % | | % Change in mean for SPM4 allowed by user |
| SPM4_HIGH_VARIATION_LIM | 76 | ≥ 0.0f | 0.0f | % | | % Increase in dynamics for SPM4 allowed by user |
| SPM4_LOW_DYNAMICS_LIM | 77 | ≤0.0f | 0.0f | % | | % Decrease in dynamics for SPM4 allowed by user |

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| Parameter | Index | Valid Range | Initial Value | Units | Other | Description |
|---------------------------------|-------|---|---------------|-------|-----------|--|
| PLINE_STATUS | 78 | 1.Inactive 2.Learning 3.Verifying 4.All Lines Plugged 5.OK 6.Insufficient Dynamics 7.BAD PV Status 8.Not Licensed | Inactive | N/A | Read Only | Last Impulse line status |
| PLINE_TIMESTAMP | 79 | All Times and Dates | 0 | | Read Only | Last Timestamp for PLINE_STATUS |
| PLINE_ON | 80 | 0 = FALSE 0xff = TRUE | FALSE | N/A | | Turns algorithm On/Off |
| PLINE_RELEARN | 81 | 1. Run 2. Relearn | 1 | N/A | | Resets the algorithm and reinitiates learning |
| PLINE_SENSITIVITY | 82 | 1. Low 2. Medium 3. High | Medium | N/A | | Detection Sensitivity |
| PLINE_AFFECT_PV_STATUS | 83 | 0 = FALSE 0xff = TRUE | FALSE | N/A | | Determines whether the quality of the pressure measurement will be affected or unaffected |
| PLINE_HISTORY_STATUS | 84 | 1. One Line Plugged 2. All Lines Plugged 3. No History | 3 | N/A | Read Only | Last plugged Line determination status |
| PLINE_HISTORY_TIMESTAMP | 85 | All Times and Dates | 0 | | Read Only | Previous plugged Line determination timestamp |
| PLINE_LEARN_LENGTH | 86 | 1 to 60 | 5 | Min. | | Length of Learning and Verification Cycles in Minutes |
| PLINE_DETECT_LENGTH | 87 | 1 to 60 | 1 | Min. | | Length of Detection Cycle Status Update in Minutes |
| PLINE_AUTO_RELEARN | 88 | 0 = Disabled 0xff = Enabled | Enabled | | | Enables/Disables Auto Relearn on Process Mean Changes |
| PLINE_RELEARN_THRESHOLD | 89 | 0 to 50 | 1.0 | %URL | | Threshold for Relearning in %URL of Sensor (excludes Range 1 and 2 DP...Those thresholds are fixed at 2 and 5 inH2O) |
| PLINE_LEARNING_SENSITIVITY | 90 | 1. Insufficient Dynamics Check 2. 10% StdevChange Check 3. 20% Stdev Change Check 4. 30% Stdev Change Check 5. 3*Stdev Mean Change Check 6. 6*Stdev Mean Change Check 7. 2% Mean Change Check | 0x55 | | | Learning Sensitivity Check Options. Only one of bits 2, 3 and 4 is allowed and only one of bits 5 and 6 is allowed. |
| PLINE_DETECT_SENSITIVITY | 91 | 0 to 100 | 0.0 | % | | Overrides IL Plugging Sensitivity if a non-zero value is entered. Value corresponds to a percentage decrease in standard deviation. |
| PLINE_SINGLE_DETECT_SENSITIVITY | 92 | 0 to 100 | 0.0 | % | | Overrides IL Plugging Sensitivity if a non-zero value is entered. Value corresponds to a percentage increase in standard deviation. (Used by DP transmitters only) |

Appendix B Specifications and Reference Data

| | |
|----------------------------------|-----------|
| Performance Specifications | page B-1 |
| Functional Specifications | page B-6 |
| Physical Specifications | page B-12 |
| Dimensional Drawings | page B-16 |
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| Spare Parts | page B-40 |

SPECIFICATIONS

Performance Specifications

For zero-based spans, reference conditions, silicone oil fill, glass-filled TFE o-rings, SST materials, *Coplanar* flange (3051S_C) or 1/2 in.- 14 NPT (3051S_T) process connections, digital trim values set to equal range points.

Conformance to specification ($\pm 3\sigma$ (Sigma))

Technology leadership, advanced manufacturing techniques and statistical process control ensure specification conformance to $\pm 3\sigma$ or better.

Reference Accuracy

| Models | Ultra ^{(1) (2)} | Classic ^{(1) (2)} | Ultra for Flow ^{(1) (3)} |
|--------------|---|--|---|
| 3051S_CD, CG | | | |
| Ranges 2 - 4 | $\pm 0.025\%$ of span. For spans less than 10:1, $\pm \left[0.005 + 0.0035 \left(\frac{URL}{span} \right) \right] \%$ of span | $\pm 0.055\%$ of span. For spans less than 10:1, $\pm \left[0.015 + 0.005 \left(\frac{URL}{span} \right) \right] \%$ of span | $\pm 0.04\%$ of reading up to 8:1 DP turndown from URL; $\pm [0.04 + 0.0023 (URL/RDG^{(4)})] \%$ reading to 200:1 DP turndown from URL |
| Range 5 | $\pm 0.05\%$ of span. For spans less than 10:1, $\pm \left[0.005 + 0.0045 \left(\frac{URL}{span} \right) \right] \%$ of span | $\pm 0.065\%$ of span. For spans less than 10:1, $\pm \left[0.015 + 0.005 \left(\frac{URL}{span} \right) \right] \%$ of span | |
| Range 1 | $\pm 0.09\%$ of span. For spans less than 15:1, $\pm \left[0.015 + 0.005 \left(\frac{URL}{span} \right) \right] \%$ of span | $\pm 0.10\%$ of span. For spans less than 15:1, $\pm \left[0.025 + 0.005 \left(\frac{URL}{span} \right) \right] \%$ of span | |
| Range 0 | $\pm 0.09\%$ of span. For spans less than 2:1 = $\pm 0.045\%$ of URL | $\pm 0.10\%$ of span. For spans less than 2:1 = $\pm 0.05\%$ of URL | |

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| Models | Ultra ^{(1) (2)} | Classic ^{(1) (2)} | Ultra for Flow ^{(1) (3)} |
|-----------------|---|---|-----------------------------------|
| 3051S_T | | | |
| Ranges 1 - 4 | ±0.025% of span. For spans less than 10:1, $\pm\left[0.004\left(\frac{\text{URL}}{\text{span}}\right)\right]\%$ of span | ±0.055% of span. For spans less than 10:1, $\pm\left[0.0065\left(\frac{\text{URL}}{\text{span}}\right)\right]\%$ of span | |
| Range 5 | ±0.04% of span. For spans less than 10:1, $\pm\left[0.004\left(\frac{\text{URL}}{\text{span}}\right)\right]\%$ of span | ±0.065% of span. For spans less than 10:1, $\pm\left[0.0065\left(\frac{\text{URL}}{\text{span}}\right)\right]\%$ of span | |
| 3051S_CA | | | |
| Ranges 1 - 4 | ±0.025% of span. For spans less than 10:1, $\pm\left[0.004\left(\frac{\text{URL}}{\text{span}}\right)\right]\%$ of span | ±0.055% of span. For spans less than 10:1, $\pm\left[0.0065\left(\frac{\text{URL}}{\text{span}}\right)\right]\%$ of span | |
| Range 0 | ±0.075% of span. For spans less than 5:1, $\pm\left[0.025 + 0.01\left(\frac{\text{URL}}{\text{span}}\right)\right]\%$ of span | ±0.075% of span. For spans less than 5:1, $\pm\left[0.025 + 0.01\left(\frac{\text{URL}}{\text{span}}\right)\right]\%$ of span | |
| 3051S_L | | | |
| | ±0.065% of span. For spans less than 10:1, $\pm\left[0.015 + 0.005\left(\frac{\text{URL}}{\text{span}}\right)\right]\%$ of span | ±0.065% of span. For spans less than 10:1, $\pm\left[0.015 + 0.005\left(\frac{\text{URL}}{\text{span}}\right)\right]\%$ of span | |

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

(2) For FOUNDATION fieldbus transmitters, use calibrated range in place of span.

(3) Ultra for Flow applicable for CD Ranges 2-3 only. For calibrated spans from 1:1 to 2:1 of URL, add ±0.005% of span analog output error.

(4) RDG refers to transmitter reading.

Total Performance

| Models | Ultra ⁽¹⁾ | Classic ⁽¹⁾ | Ultra for Flow ⁽¹⁾⁽²⁾ |
|---------------|---|---|---|
| 3051S_ | | | |
| CD Ranges 2-3 | ±0.1% of span; for ±50°F (28°C) | ±0.15% of span; for ±50°F (28°C) | ±0.1% of reading; for ±50°F (28°C) |
| CG Ranges 2-5 | temperature changes; 0-100% | temperature changes; 0-100% | temperature changes; 0-100% |
| T Ranges 2-4 | relative humidity, up to 740 psi | relative humidity, up to 740 psi | relative humidity, up to 740 psi |
| CA Ranges 2-4 | (51 bar) line pressure (CD only), from 1:1 to 5:1 rangedown. | (51 bar) line pressure (CD only), from 1:1 to 5:1 rangedown. | (51 bar) line pressure, over 8:1 DP turndown from URL. |

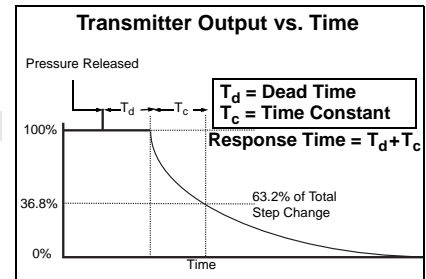
(1) Total performance is based on combined errors of reference accuracy, ambient temperature effect, and line pressure effect.
(2) Ultra for Flow applicable for CD Ranges 2-3 only.

Long Term Stability

| Models | Ultra and Ultra for Flow | Classic |
|---------------------------------------|--|--|
| 3051S_ | | |
| CD Ranges 2 - 5 | ±0.20% of URL for 10 years; for ±50°F (28°C) | ±0.125% of URL for 5 years; for ±50°F (28°C) |
| CG Ranges 2 - 5 | temperature changes, up to 1000 psi (68,9 bar) | temperature changes, up to 1000 psi (68,9 bar) |
| T Ranges 1 - 5 and CA Ranges 1 - 4 | line pressure (CD only) | line pressure (CD only) |

Dynamic Performance

| | 4 - 20 mA (HART®) ⁽¹⁾ | Fieldbus protocol ⁽²⁾ | Typical Transmitter Response Time |
|---|----------------------------------|----------------------------------|-----------------------------------|
| Total Response Time (Td + Tc)⁽³⁾: | | | |
| 3051S_C, Ranges 2 - 5: | 100 milliseconds | 152 milliseconds | |
| Range 1: | 255 milliseconds | 307 milliseconds | |
| Range 0: | 700 milliseconds | 752 milliseconds | |
| 3051S_T: | 100 milliseconds | 152 milliseconds | |
| 3051S_L: | See <i>Instrument Toolkit</i> ™. | See <i>Instrument Toolkit</i> | |
| Dead Time (Td)⁽⁴⁾ | 45 milliseconds (nominal) | 97 milliseconds | |
| Update Rate | | | |
| 3051S | 22 times per second | 22 times per second | |



(1) Dead time and update rate apply to all models and ranges; analog output only
(2) Transmitter fieldbus output only, segment macro-cycle not included.
(3) Nominal total response time at 75 °F (24 °C) reference conditions. For option code DA1, add 40 milliseconds () to 4-20 mA (HART®) total response time values.
(4) For option code DA1, dead time (Td) is 85 milliseconds (nominal).

Ambient Temperature Effect

| Models | Ultra | Classic | Ultra for Flow ⁽¹⁾ |
|----------------------------|---|---|--|
| 3051S_CD, CG | per 50 °F (28 °C) | per 50 °F (28 °C) | |
| Range 2 - 5 ⁽³⁾ | ± (0.009% URL + 0.025% span) from 1:1 to 10:1 ± (0.018% URL + 0.08% span) from >10:1 to 200:1 | ± (0.0125% URL + 0.0625% span) from 1:1 to 5:1 ± (0.025% URL + 0.125% span) from >5:1 to 100:1 | From -40 to 185 °F (-40 to 85 °C): ±0.13% reading up to 8:1 DP turndown from URL; ±[0.13 + 0.0187 (URL/RDG ⁽²⁾)]% reading to 100:1 DP turndown from URL |
| Range 0 | ± (0.25% URL + 0.05% span) from 1:1 to 30:1 | ± (0.25% URL + 0.05% span) from 1:1 to 30:1 | |
| Range 1 | ± (0.1% URL + 0.25% span) from 1:1 to 50:1 | ± (0.1% URL + 0.25% span) from 1:1 to 50:1 | |
| 3051S_T | | | |
| Ranges 2 - 4 | ± (0.009% URL + 0.025% span) from 1:1 to 10:1 ± (0.018% URL + 0.08% span) from >10:1 to 200:1 | ± (0.0125% URL + 0.0625% span) from 1:1 to 5:1 ± (0.025% URL + 0.125% span) from >5:1 to 100:1 | |
| Range 5 | ± (0.05% URL + 0.075% span) from 1:1 to 10:1 | ± (0.05% URL + 0.075% span) from 1:1 to 5:1 | |
| Range 1 | ± (0.0125% URL + 0.0625% span) from 1:1 to 5:1 ± (0.025% URL + 0.125% span) from >5:1 to 200:1 | ± (0.0125% URL + 0.0625% span) from 1:1 to 5:1 ± (0.025% URL + 0.125% span) from >5:1 to 100:1 | |
| 3051S_CA | | | |
| Ranges 2 - 4 | ± (0.009% URL + 0.025% span) from 1:1 to 10:1 ± (0.018% URL + 0.08% span) from >10:1 to 200:1 | ± (0.0125% URL + 0.0625% span) from 1:1 to 5:1 ± (0.025% URL + 0.125% span) from >5:1 to 100:1 | |
| Range 0 | ± (0.1% URL + 0.25% span) from 1:1 to 30:1 | ± (0.1% URL + 0.25% span) from 1:1 to 30:1 | |
| Range 1 | ± (0.0125% URL + 0.0625% span) from 1:1 to 5:1 ± (0.025% URL + 0.125% span) from >5:1 to 100:1 | ± (0.0125% URL + 0.0625% span) from 1:1 to 5:1 ± (0.025% URL + 0.125% span) from >5:1 to 100:1 | |
| 3051S_L | See <i>Instrument Toolkit</i> [™] . | See <i>Instrument Toolkit</i> . | |

- (1) Ultra for Flow applicable for CD Ranges 2-3 only.
 (2) RDG refers to transmitter reading.
 (3) Use Classic specification for 3051S_CD Range 5 Ultra.

Line Pressure Effect

For line pressures above 2000 psi (137,9 bar) and ranges 4-5, see the 3051S reference manual (document number 00809-0100-4801).

| Models | Ultra and Ultra for Flow | Classic |
|-----------------|---|---|
| 3051S_CD | Zero Error⁽¹⁾ | Zero Error⁽¹⁾ |
| Range 2 - 3 | ± 0.025% URL per 1000 psi (69 bar) | ± 0.05% URL per 1000 psi (69 bar) |
| Range 0 | ± 0.125% URL per 100 psi (6,89 bar) | ± 0.125% URL per 100 psi (6,89 bar) |
| Range 1 | ± 0.25% URL per 1000 psi (69 bar) | ± 0.25% URL per 1000 psi (69 bar) |
| | Span Error | Span Error |
| Range 2 - 3 | ± 0.1% of reading per 1000 psi (69 bar) | ± 0.1% of reading per 1000 psi (69 bar) |
| Range 0 | ± 0.15% of reading per 100 psi (6,89 bar) | ± 0.15% of reading per 100 psi (6,89 bar) |
| Range 1 | ± 0.4% of reading per 1000 psi (69 bar) | ± 0.4% of reading per 1000 psi (69 bar) |

- (1) Zero error can be calibrated out

Mounting Position Effects

| Models | Ultra, Ultra for Flow, and Classic |
|----------------------|---|
| 3051S_C | Zero shifts up to ± 1.25 inH ₂ O (3,11 mbar), which can be calibrated out; no span effect |
| 3051S_L | With liquid level diaphragm in vertical plane, zero shift of up to 1 inH ₂ O (25,4 mmH ₂ O); with diaphragm in horizontal plane, zero shift of up to 5 inH ₂ O (127 mmH ₂ O) plus extension length on extended units; all zero shifts can be calibrated out; no span effect |
| 3051S_T and 3051S_CA | Zero shifts to 2.5 inH ₂ O (63,5 mmH ₂ O), which can be calibrated out; no span effect |

Vibration Effect

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

Housing Style codes 1J, 1K, 1L, 2J

Less than $\pm 0.1\%$ of URL when tested per the requirements of IEC60770-1 field with general application or pipeline with low vibration level (10-60 Hz 0.15mm displacement peak amplitude / 60-500 Hz 2g).

Power Supply Effect

All Models:

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

Electromagnetic Compatibility (EMC)

All Models:

Meets all relevant requirements of IEC/EN 61326 and NAMUR NE-21.

Transient Protection (Option T1)

All Models:

Meets IEEE C62.41, Category B

6 kV crest (0.5 μ s - 100 kHz)

3 kV crest (8 \times 20 microseconds)

6 kV crest (1.2 \times 50 microseconds)

General Specifications:

Response Time: < 1 nanosecond

Peak Surge Current: 5000 amps to housing

Peak Transient Voltage: 100 V dc

Loop Impedance: < 25 ohms

Applicable Standards: IEC61000-4-4, IEC61000-4-5

NOTE:

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

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Functional Specifications

Range and Sensor Limits

| Range | Minimum Span 3051S_ | | Range and Sensor Limits 3051S_ | | | |
|-------|---|--|---|---|--|---|
| | Ultra and Ultra for Flow ⁽¹⁾ | Classic | Upper (URL) | Lower (LRL) | | |
| | | | | 3051S_CD ⁽²⁾ | 3051S_CG, LG ⁽³⁾ | 3051S_LD ⁽³⁾ |
| 0 | 0.1 inH ₂ O (0,25 mbar) | 0.1 inH ₂ O (0,25 mbar) | 3.0 inH ₂ O (7,5 mbar) | -3.0 inH ₂ O (-7,5 mbar) | NA | NA |
| 1 | 0.5 inH ₂ O (1,24 mbar) | 0.5 inH ₂ O (1,24 mbar) | 25.0 inH ₂ O (62,3 mbar) | -25.0 inH ₂ O (-62,3 mbar) | -25.0 inH ₂ O (-62,3 mbar) | -25.0 inH ₂ O (-62,3 mbar) |
| 2 | 1.3 inH ₂ O (3,11 mbar) | 2.5 inH ₂ O (6,23 mbar) | 250.0 inH ₂ O (0,62 bar) | -250.0 inH ₂ O (-0,62 bar) | -250.0 inH ₂ O (-0,62 bar) | -250.0 inH ₂ O (-0,62 bar) |
| 3 | 5.0 inH ₂ O (12,4 mbar) | 10.0 inH ₂ O (24,9 mbar) | 1000.0 inH ₂ O (2,49 bar) | -1000.0 inH ₂ O (-2,49 bar) | -393.0 inH ₂ O (-979 mbar) | -1000.0 inH ₂ O (-2,49 bar) |
| 4 | 1.5 psi (103,4 mbar) | 3.0 psi (206,8 mbar) | 300.0 psi (20,7 bar) | -300.0 psi (-20,7 bar) | -14.2 psig (-979 mbar) | -300.0 psi (-20,7 bar) |
| 5 | 10.0 psi (689,5 mbar) | 20.0 psi (1,38 bar) | 2000.0 psi (137,9 bar) | -2000.0 psi (-137,9 bar) | -14.2 psig (-979 mbar) | -2000.0 psi (-137,9 bar) |

- (1) Ultra for Flow applicable for CD Ranges 2 – 3 only.
(2) Lower (LRL) is 0 inH₂O (0 mbar) for Ultra for Flow.
(3) When specifying a 3051S_L Ultra, use Classic minimum span.

3051S_T Range and Sensor Limits

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

- (1) Assumes atmospheric pressure of 14.7 psig.

3051S_CA, LA⁽¹⁾ Range and Sensor Limits

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

- (1) When specifying a 3051S_L Ultra, use Classic minimum span.
(2) Range 0 is not available for 3051S_LA.

Service

Liquid, gas, and vapor applications

4–20 mA/HART

Zero and Span Adjustment

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

Output

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

Power Supply

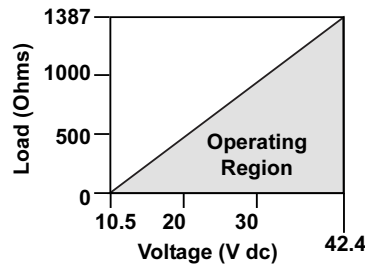
External power supply required.
Standard transmitter (4–20 mA): 10.5 to 42.4 V dc with no load
3051S HART Diagnostics transmitter: 12 to 42 Vdc with no load

Load Limitations

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

Standard Transmitter

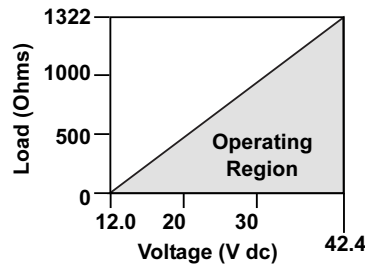
$$\text{Maximum Loop Resistance} = 43.5 * (\text{Power Supply Voltage} - 10.5)$$



The HART communicator requires a minimum loop resistance of 250Ω for communication.

3051S HART Diagnostics Transmitter (option code DA1)

$$\text{Maximum Loop Resistance} = 43.5 * (\text{Power Supply Voltage} - 12.0)$$



The HART communicator requires a minimum loop resistance of 250Ω for communication.

ASP™ Diagnostics Suite for HART (Option Code DA1)

The 3051S provides Abnormal Situation Prevention indication for a breakthrough in diagnostic capability. The New 3051S ASP™ Diagnostics Suite for HART includes Statistical Process Monitoring (SPM), variable logging with time stamp and advanced process alerts. The enhanced EDDL graphic display provides an intuitive and user-friendly interface to better visualize these diagnostics.

The integral SPM technology calculates the mean and standard deviation of the process variable 22 times per second and makes them available to the user. The 3051S uses these values and highly flexible configuration options for customization to detect many user-defined or application specific abnormal situations (e.g. detecting plugged impulse lines and fluid composition change). Variable logging with time stamp and advanced process alerts capture valuable process and sensor data to enable quick troubleshooting of application and installation issues.

FOUNDATION fieldbus

Power Supply

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

Current Draw

17.5 mA for all configurations (including LCD display option)

FOUNDATION fieldbus Parameters

| | |
|--|-----------|
| Schedule Entries | 14 (max.) |
| Links | 30 (max.) |
| Virtual Communications Relationships (VCR) | 20 (max.) |

Standard Function Blocks

Resource Block

- Contains hardware, electronics, and diagnostic information.

Transducer Block

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

LCD Block

- Configures the local display.

2 Analog Input Blocks

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

PID Block with Auto-tune

- Contains all logic to perform PID control in the field including cascade and feed forward. Auto-tune capability allows for superior tuning for optimized control performance.

Backup Link Active Scheduler (LAS)

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

Software Upgrade in the Field

Software for the 3051S with FOUNDATION fieldbus is easy to upgrade in the field using the FOUNDATION fieldbus Common Device Software Download procedure.

PlantWeb Alerts

Enable the full power of the PlantWeb digital architecture by diagnosing instrumentation issues, communicating advisory, maintenance, and failure details, and recommending a solution.

Advanced Control Function Block Suite

(Option Code A01)

Input Selector Block

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

Arithmetic Block

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

Signal Characterizer Block

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

Integrator Block

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

Output Splitter Block

- Splits the output of one PID or other control block so that the PID will control two valves or other actuators.

Control Selector Block

- Selects one of up to three inputs (highest, middle, or lowest) that are normally connected to the outputs of PID or other control function blocks.

| Block | Execution Time |
|----------------------|-----------------|
| Resource | - |
| Transducer | - |
| LCD Block | - |
| Analog Input 1, 2 | 20 milliseconds |
| PID with Auto-tune | 35 milliseconds |
| Input Selector | 20 milliseconds |
| Arithmetic | 20 milliseconds |
| Signal Characterizer | 20 milliseconds |
| Integrator | 20 milliseconds |
| Output Splitter | 20 milliseconds |
| Control Selector | 20 milliseconds |

Fully Compensated Mass Flow Block (Option Code H01)

Calculates fully compensated mass flow based on differential pressure with external process pressure and temperature measurements over the fieldbus segment. Configuration for the mass flow calculation is easily accomplished using the Rosemount Engineering Assistant.

ASP™ Diagnostics Suite for FOUNDATION fieldbus (Option Code D01)

The 3051S ASP™ Diagnostics Suite for FOUNDATION fieldbus provides Abnormal Situation Prevention indication and enhanced EDDL graphic displays for easy visual analysis.

The integral Statistical Process Monitoring (SPM) technology calculates the mean and standard deviation of the process variable 22 times per second and makes them available to the user. The 3051S uses these values and highly flexible configuration options for customization to detect many user-defined or application specific abnormal situations (e.g. detecting plugged impulse lines and fluid composition change).

Overpressure Limits

Transmitters withstand the following limits without damage:

3051S_CD, CG

- Range 0: 750 psi (51,7 bar)
- Range 1: 2000 psig (137,9 bar)
- Ranges 2–5: 3626 psig (250,0 bar)
- 4500 psig (310,3 bar) for option code P9
- 6092 psig (420 bar) for option code P0 (3051S2CD only)

3051S_CA

- Range 0: 60 psia (4,13 bar)
- Range 1: 750 psia (51,7 bar)
- Range 2: 1500 psia (103,4 bar)
- Range 3: 1600 psia (110,3 bar)
- Range 4: 6000 psia (413,7 bar)

3051S_TG, TA

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

3051S_LD, LG, LA

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

| Standard | Type | CS Rating | SST Rating |
|--|-----------|-----------|------------|
| ANSI/ASME | Class 150 | 285 psig | 275 psig |
| ANSI/ASME | Class 300 | 740 psig | 720 psig |
| ANSI/ASME | Class 600 | 1480 psig | 1440 psig |
| <i>At 100 °F (38 °C), the rating decreases with increasing temperature, per ANSI/ASME B16.5.</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, per DIN 2401.</i> | | | |

Static Pressure Limit

3051S_CD Only

Operates within specifications between static line pressures of 0.5 psia and 3626 psig;
4500 psig (310,3 bar) for option code P9
6092 psig (420 bar) for option code P0 (3051S2CD only)
Range 0: 0.5 psia to 750 psig (0,03 to 51,71 bar)
Range 1: 0.5 psia to 2000 psig (0,03 to 137,90 bar)

Burst Pressure Limits

Coplanar or traditional process flange

- 10000 psig (689,5 bar).

3051S_T:

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

Temperature Limits

Ambient

-40 to 185 °F (-40 to 85 °C)

With LCD display⁽¹⁾: -40 to 175 °F (-40 to 80 °C)

With option code P0: -4 to 185 °F (-20 to 85 °C)

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

Storage

-50 to 230 °F (-46 to 110 °C)

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

Process Temperature Limits

At atmospheric pressures and above.

| 3051S_C Coplanar | |
|--|---|
| Silicone Fill Sensor ⁽¹⁾ | |
| with Coplanar Flange | -40 to 250 °F (-40 to 121 °C) ⁽²⁾ |
| with Traditional Flange | -40 to 300 °F (-40 to 149 °C) ⁽²⁾⁽³⁾ |
| with Level Flange | -40 to 300 °F (-40 to 149 °C) ⁽²⁾ |
| with 305 Integral Manifold | -40 to 300 °F (-40 to 149 °C) ⁽²⁾⁽³⁾ |
| Inert Fill Sensor ⁽¹⁾ | 0 to 185 °F (-18 to 85 °C) ⁽⁴⁾⁽⁵⁾ |
| 3051S_T In-Line (Process Fill Fluid) | |
| Silicone Fill Sensor ⁽¹⁾ | -40 to 250 °F (-40 to 121 °C) ⁽²⁾ |
| Inert Fill Sensor ⁽¹⁾ | -22 to 250 °F (-30 to 121 °C) ⁽²⁾ |
| 3051S_L Low-Side Temperature Limits | |
| Silicone Fill Sensor ⁽¹⁾ | -40 to 250 °F (-40 to 121 °C) ⁽²⁾ |
| Inert Fill Sensor ⁽¹⁾ | 0 to 185 °F (-18 to 85 °C) ⁽²⁾ |
| 3051S_L High-Side Temperature Limits (Process Fill Fluid) | |
| Syltherm [®] XLT | -102 to 302 °F (-75 to 150 °C) |
| D. C. [®] Silicone 704 ⁽⁶⁾ | 32 to 500 °F (0 to 260 °C) |
| D. C. Silicone 200 | -49 to 401 °F (-45 to 205 °C) |
| Inert (Halocarbon) | -49 to 320 °F (-45 to 160 °C) |
| Glycerin and Water | 5 to 203 °F (-15 to 95 °C) |
| Neobee M-20 [®] | 5 to 437 °F (-15 to 225 °C) |
| Propylene Glycol and Water | 5 to 203 °F (-15 to 95 °C) |

- (1) Process temperatures above 185 °F (85 °C) require derating the ambient limits by a 1.5:1 ratio.
- (2) 220 °F (104 °C) limit in vacuum service; 130 °F (54 °C) for pressures below 0.5 psia.
- (3) -20 °F (-29 °C) is the lower process temperature limit with option code P0.
- (4) 160 °F (71 °C) limit in vacuum service.
- (5) Not available for 3051S_CA.
- (6) Upper limit of 600 °F (315 °C) is available with 1199 seal assemblies mounted away from the transmitter with the use of capillaries and up to 500 °F (260 °C) with direct mount extension.

Humidity Limits

0–100% relative humidity

Turn-On Time

Performance within specifications less than 2 seconds (typical) 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 60 seconds for one time constant. This software damping is in addition to sensor module response time.

Failure Mode Alarm

HART 4-20mA (output option codes A)

If self-diagnostics detect a gross transmitter failure, the analog signal will be driven offscale to alert the user. Rosemount standard (default), NAMUR, and custom alarm levels are available (see Table B-1 below).

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

Table B-1. Alarm Configuration

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

(1) Analog output levels are compliant with NAMUR recommendation NE 43, see option codes C4 or C5.

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

3051S Safety Certified Transmitter Failure Values

Safety accuracy: 2.0%⁽¹⁾

Safety response time: 1.5 seconds

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

Physical Specifications

Electrical Connections

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

Process Connections

3051S_C

¹/₄-18 NPT on 2¹/₈-in. centers

¹/₂-14 NPT and RC ¹/₂ on 2-in. (50.8mm), 2¹/₈-in. (54.0 mm), or 2¹/₄-in. (57.2mm) centers (process adapters)

3051S_T

¹/₂-14 NPT female,

Non-Threaded instrument flange (available in SST for Range 1-4 transmitters only),

G¹/₂ A DIN 16288 Male (available in SST for Range 1-4 transmitters only), or

Autoclave type F-250-C (Pressure relieved ⁹/₁₆-18 gland thread; ¹/₄ OD high pressure tube 60° cone; available in SST for Range 5 transmitters only).

3051S_L

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

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

Process-Wetted Parts

Process Isolating Diaphragms

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

Drain/Vent Valves

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

Process Flanges and Adapters

Plated carbon steel,

CF-8M (Cast version of 316 SST, material per ASTM-A743), CW-12MW (Cast version of Hastelloy C-276, material per ASTM-A494),

M-30C (Cast version of Monel 400, material per ASTM-A494).

Wetted O-rings

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

3051S_L Process Wetted Parts

Flanged Process Connection (Transmitter High Side)

Process Diaphragms, Including Process Gasket Surface

316L SST, *Hastelloy C-276*, or Tantalum

Extension

CF-3M (Cast version of 316L SST, material per ASTM-A743), or CW-12MW (Cast version of *Hastelloy C*, material ASTM A494); fits schedule 40 and 80 pipe

Mounting Flange

Zinc-cobalt plated CS or 316 SST

Reference Process Connection (Transmitter Low Side)

Isolating Diaphragms

316L SST or *Hastelloy C-276*

Reference Flange and Adapter

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

Non-Wetted Parts

Electronics Housing

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

Coplanar Sensor Module Housing

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

Bolts

Plated carbon steel per ASTM A449, Type 1

Austenitic 316 SST

ASTM A 453, Class A, Grade 660

ASTM A 193, Grade B7M

ASTM A 193, Class 2, Grade B8M

Monel

Sensor Module Fill Fluid

Silicone or inert halocarbon (Inert is not available with 3051S_CA). In-Line series uses Fluorinert® FC-43.

Process Fill Fluid (Liquid Level Only)

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

Paint

Polyurethane

Cover O-rings

Buna-N

Shipping Weights for 3051S

Table B-2. *SuperModule* Platform weights

| SuperModule Platform | Weight in lb. (kg) |
|--------------------------------|---------------------------|
| <i>Coplanar</i> ⁽¹⁾ | 3.1 (1,4) |
| In-Line | 1.4 (0,6) |

(1) Flange and bolts not included.

Table B-3. Transmitter weights without options

| Complete Transmitter ⁽¹⁾ | Add Weight In lb (kg) |
|--------------------------------------|-----------------------|
| 3051S_C with junction box housing | 6.9 (3,1) |
| 3051S_T with junction box housing | 3.3 (1,5) |
| 3051S_C with <i>PlantWeb</i> housing | 7.2 (3,3) |
| 3051S_T with <i>PlantWeb</i> housing | 3.6 (1,6) |

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

Table B-4. 3051S_L weights without options

| Flange | Flush lb. (kg) | 2-in. Ext. lb (kg) | 4-in. Ext. lb (kg) | 6-in. Ext. lb (kg) |
|-------------------|-------------------|-----------------------|-----------------------|-----------------------|
| 2-in., 150 | 12.5 (5,7) | — | — | — |
| 3-in., 150 | 17.5 (7,9) | 19.5 (8,8) | 20.5 (9,3) | 21.5 (9,8) |
| 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 (10,7) |
| 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 B-5. Transmitter option weights

| Option Code | Option | Add lb (kg) |
|-------------|---|-------------------------|
| 1J, 1K, 1L | SST <i>PlantWeb</i> housing | 3.4 (1,5) |
| 2J | SST Junction Box housing | 3.3 (1,5) |
| 7J | SST Quick Connect | 0.35 (0,16) |
| 2A, 2B, 2C | Aluminum Junction Box housing | 1.2 (0,5) |
| 1A, 1B, 1C | Aluminum <i>PlantWeb</i> housing | 1.2 (0,5) |
| M5 | LCD display for aluminum <i>PlantWeb</i> housing ⁽¹⁾ , LCD display for SST <i>PlantWeb</i> housing ⁽¹⁾ | 0.8 (0,4) 1.72 (0,8) |
| B4 | SST mounting bracket for <i>Coplanar</i> flange | 0.6 (0,3) |
| B1, B2, B3 | Mounting Bracket for Traditional flange | 2.3 (1,0) |
| B7, B8, B9 | Mounting Bracket for Traditional flange with SST bolts | 2.3 (1,0) |
| BA, BC | SST Bracket for Traditional flange | 2.3 (1,0) |
| F12, F22 | SST Traditional flange ⁽²⁾ | 3.3 (1,5) |
| F13, F23 | Traditional flange (<i>Hastelloy</i>) | 2.7 (1,2) |
| E12, E22 | SST <i>Coplanar</i> flange ⁽²⁾ | 1.9 (0,9) |
| F14, F24 | Traditional flange (<i>Monel</i>) | 2.6 (1,2) |
| F15, F25 | Traditional Flange (SST with <i>Hastelloy</i> D/V) | 2.5 (1,1) |
| G21 | Level flange—3 in., 150 | 10.8 (4,9) |
| G22 | Level flange—3 in., 300 | 14.3 (6,5) |
| G11 | Level flange—2 in., 150 | 10.7 (4,9) |
| G12 | Level flange—2 in., 300 | 14.0 (6,4) |
| G31 | DIN Level flange, SST, DN 50, PN 40 | 8.3 (3,8) |
| G41 | DIN Level flange, SST, DN 80, PN 40 | 13.7 (6,2) |

(1) Includes LCD display connector board and display cover

(2) Includes mounting bolts

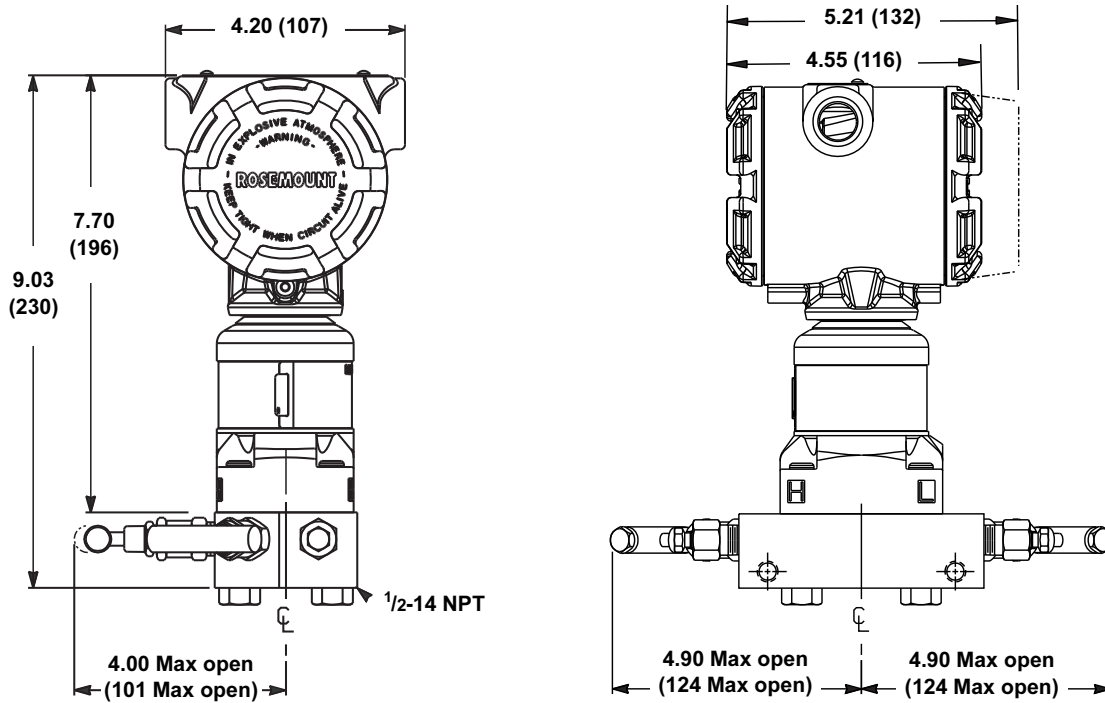
| Item | Weight In lb. (kg) |
|--------------------------------|--------------------|
| Aluminum standard cover | 0.4 (0,2) |
| SST standard cover | 1.26 (0,6) |
| Aluminum display cover | 0.7 (0,3) |
| SST display cover | 1.56 (0,7) |
| LCD display ⁽¹⁾ | 0.1 (0,1) |
| Junction Box terminal block | 0.3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

(1) Display only

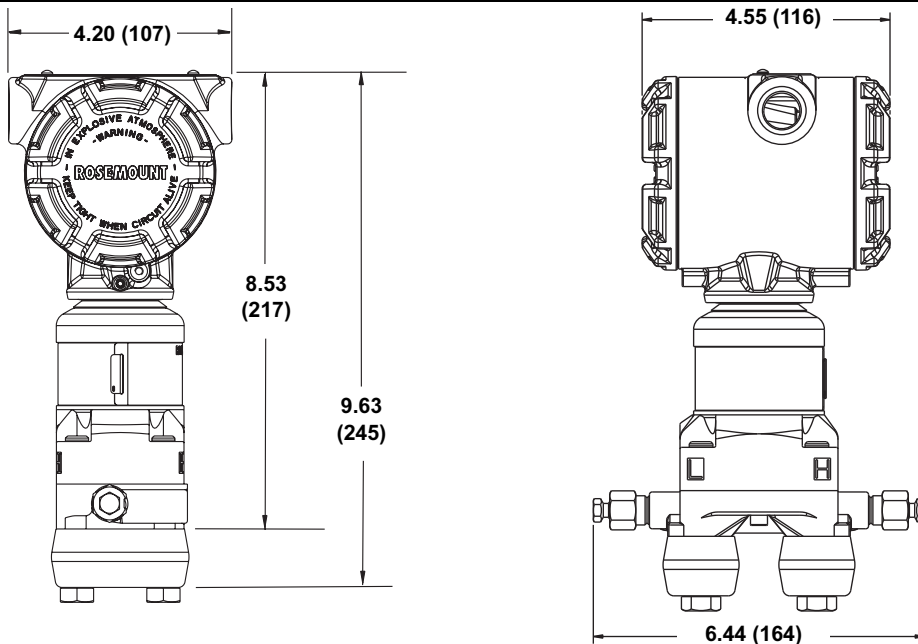
DIMENSIONAL DRAWINGS

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

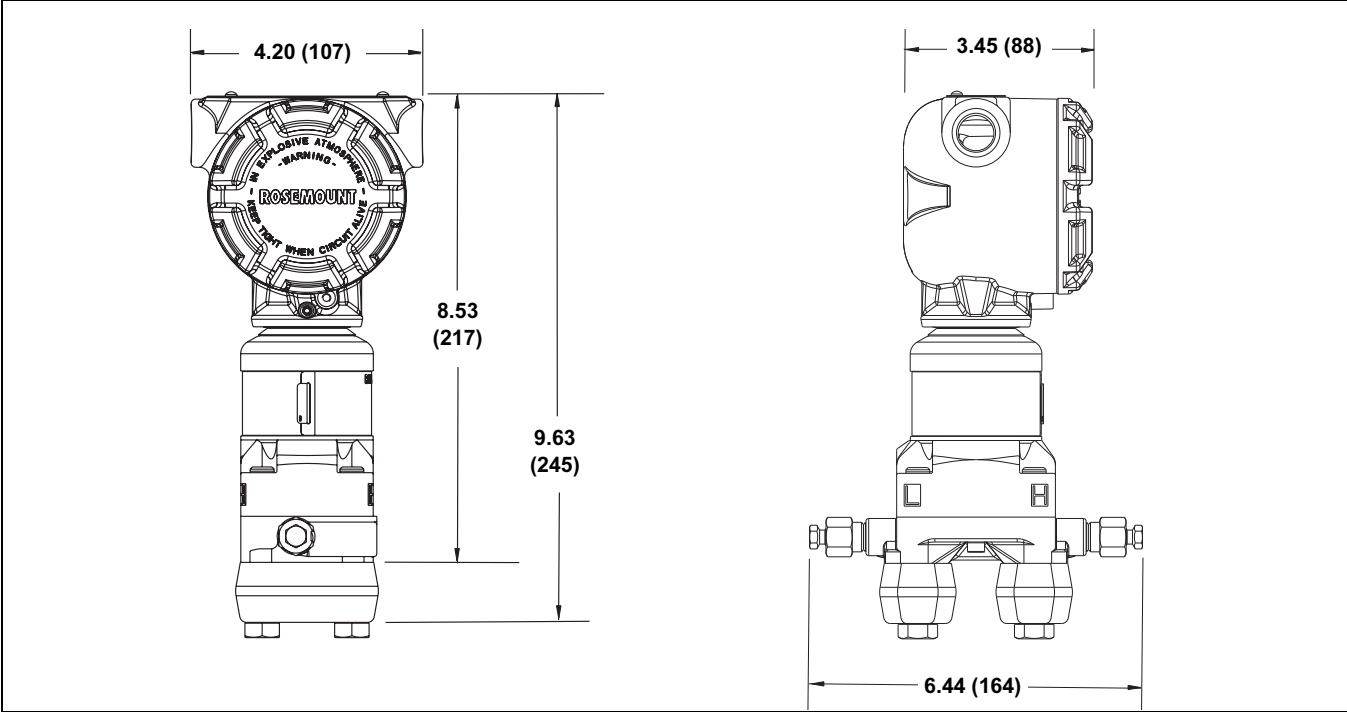
PlantWeb Housing with Coplanar SuperModule Platform and 305 Coplanar Integral Manifold



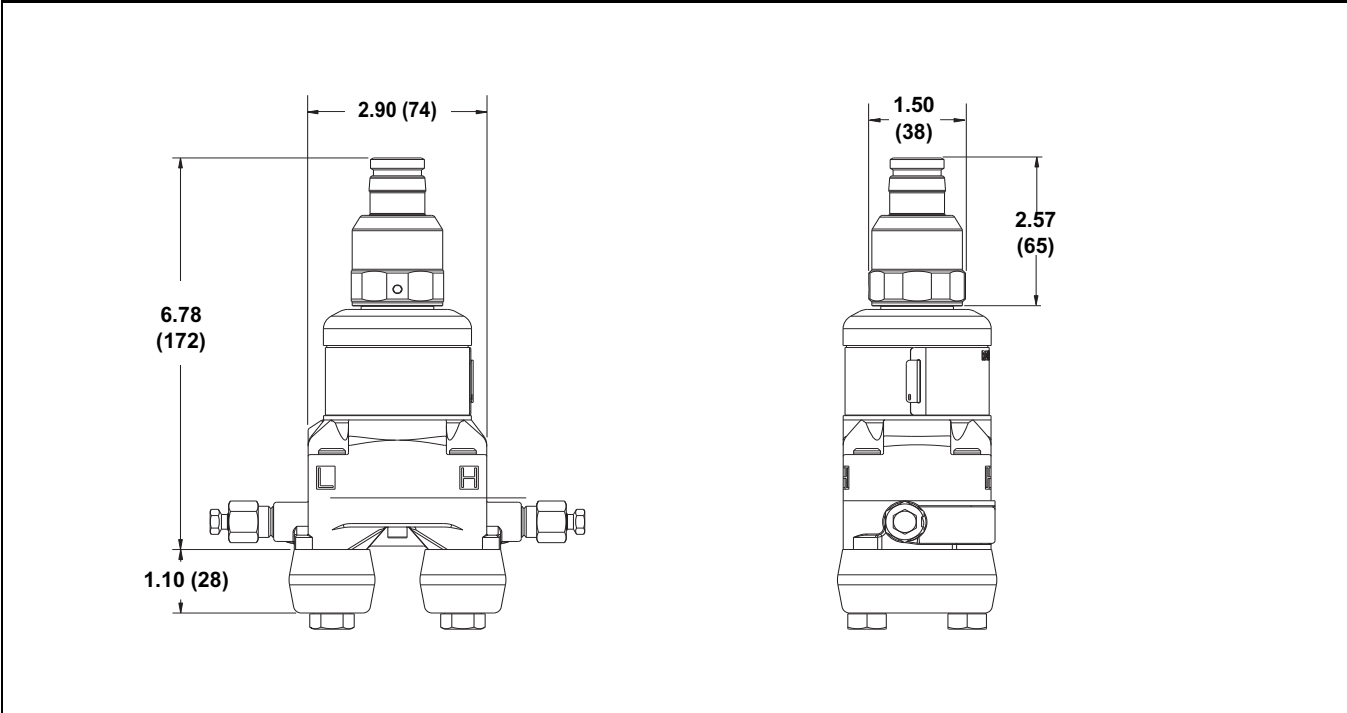
PlantWeb Housing with Coplanar SuperModule Platform and Coplanar Flange

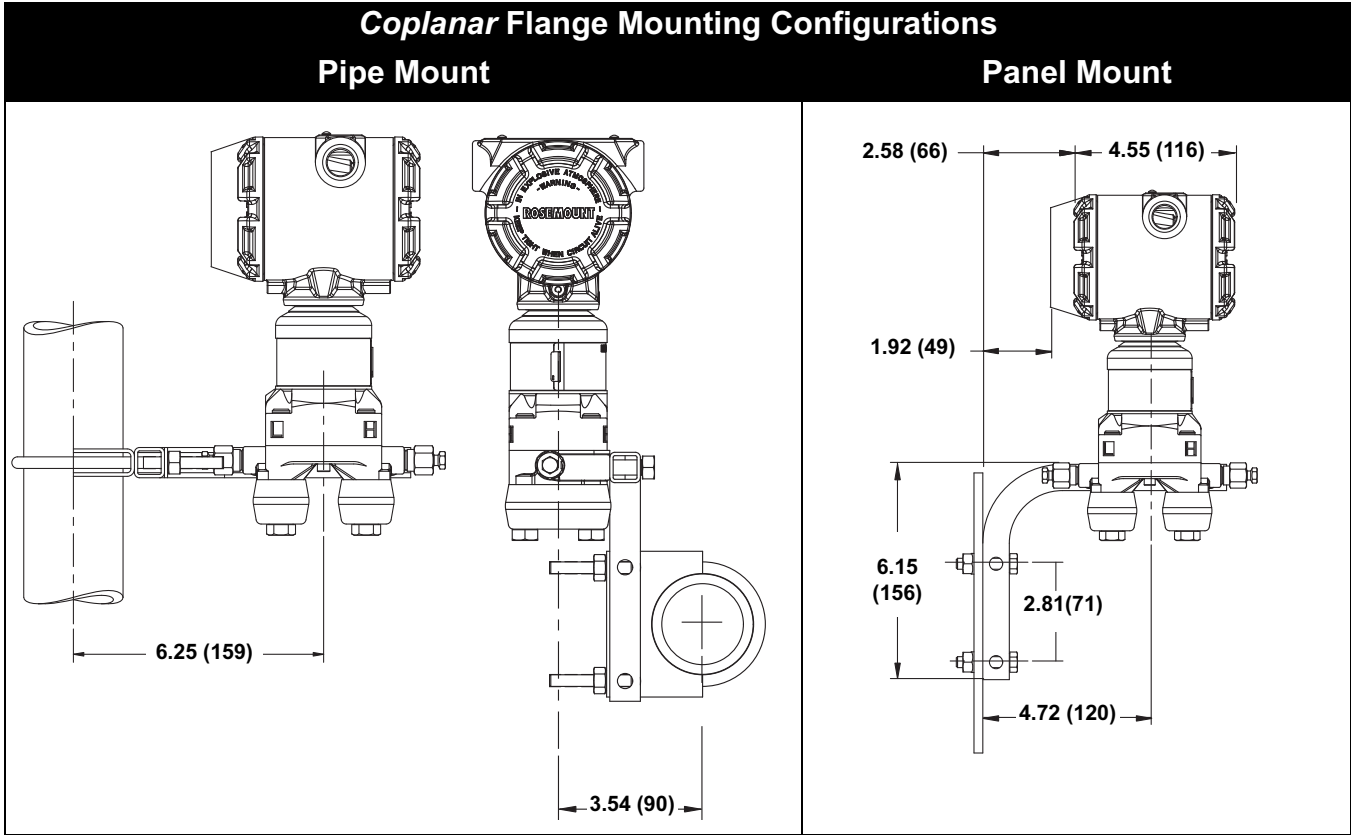


Junction Box Housing with *Coplanar SuperModule* Platform and *Coplanar* Flange

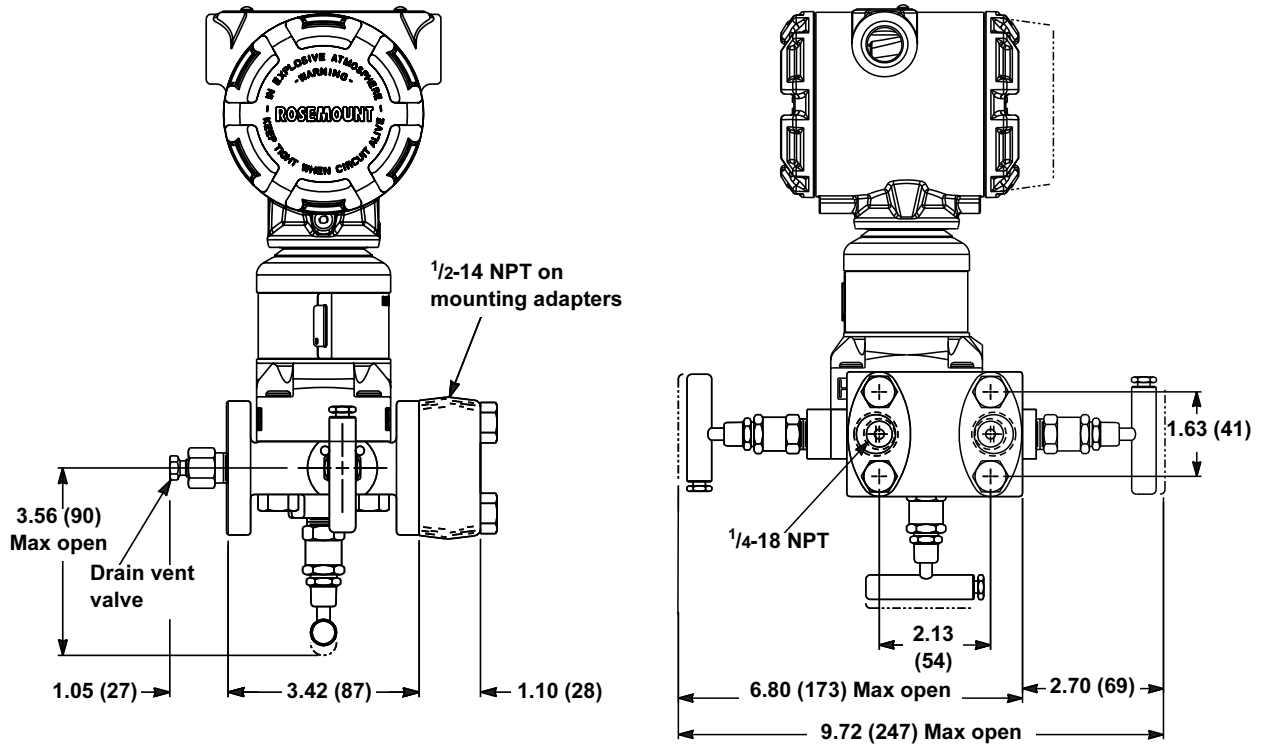


Quick Connect with *Coplanar SuperModule* Platform and *Coplanar* Flange

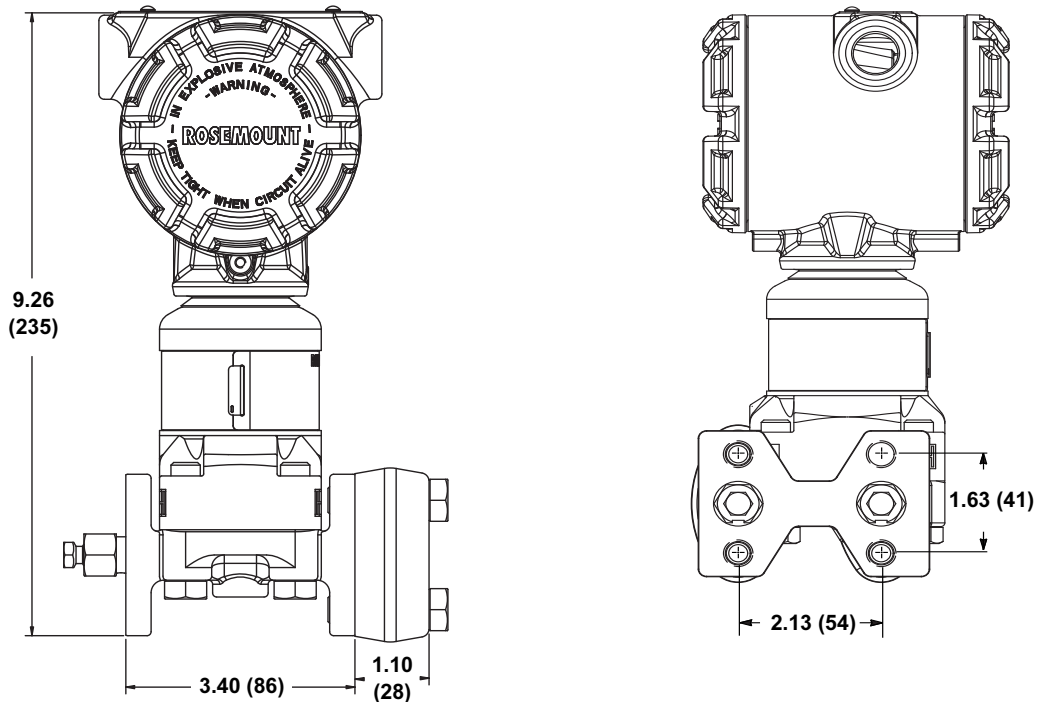


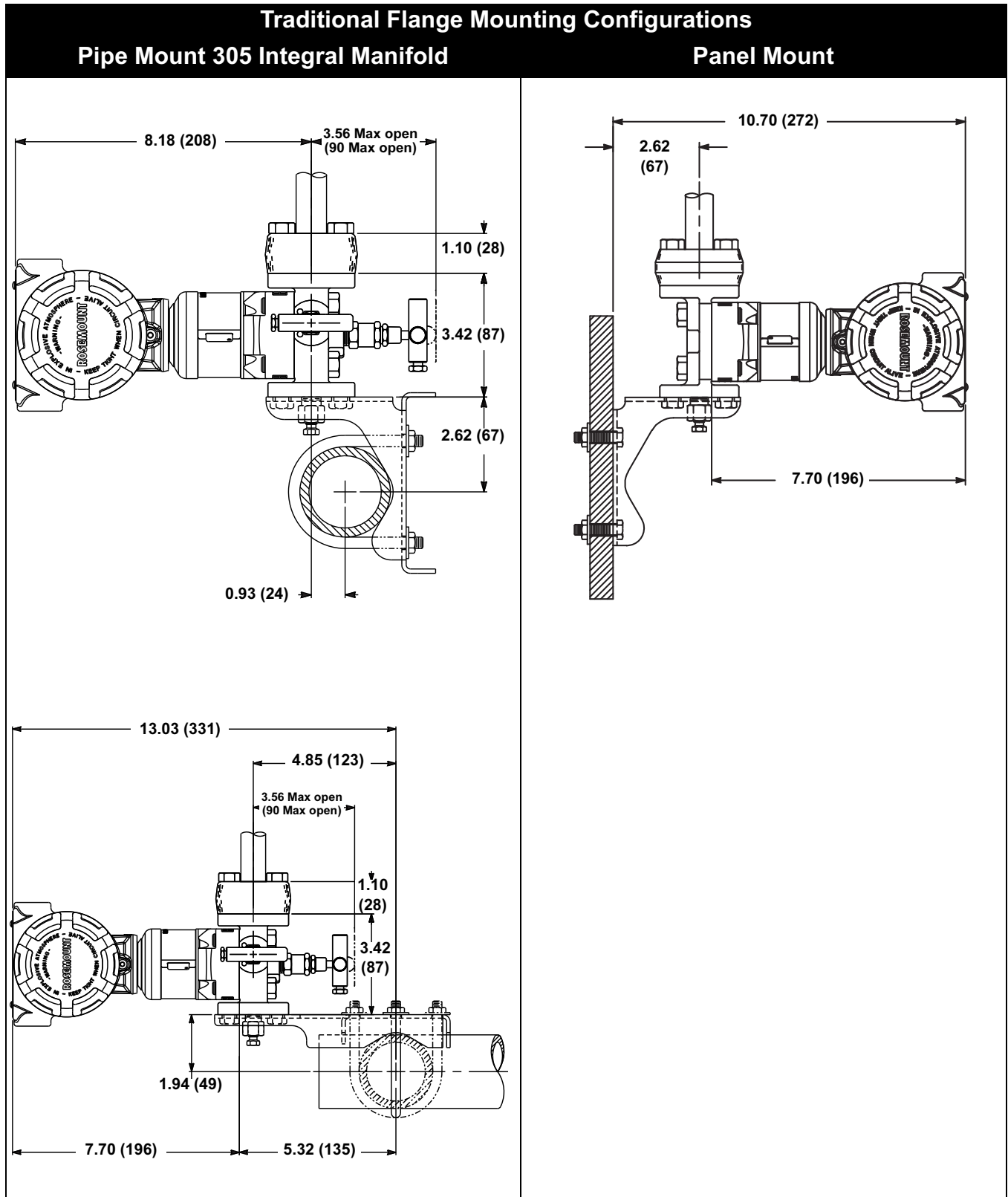


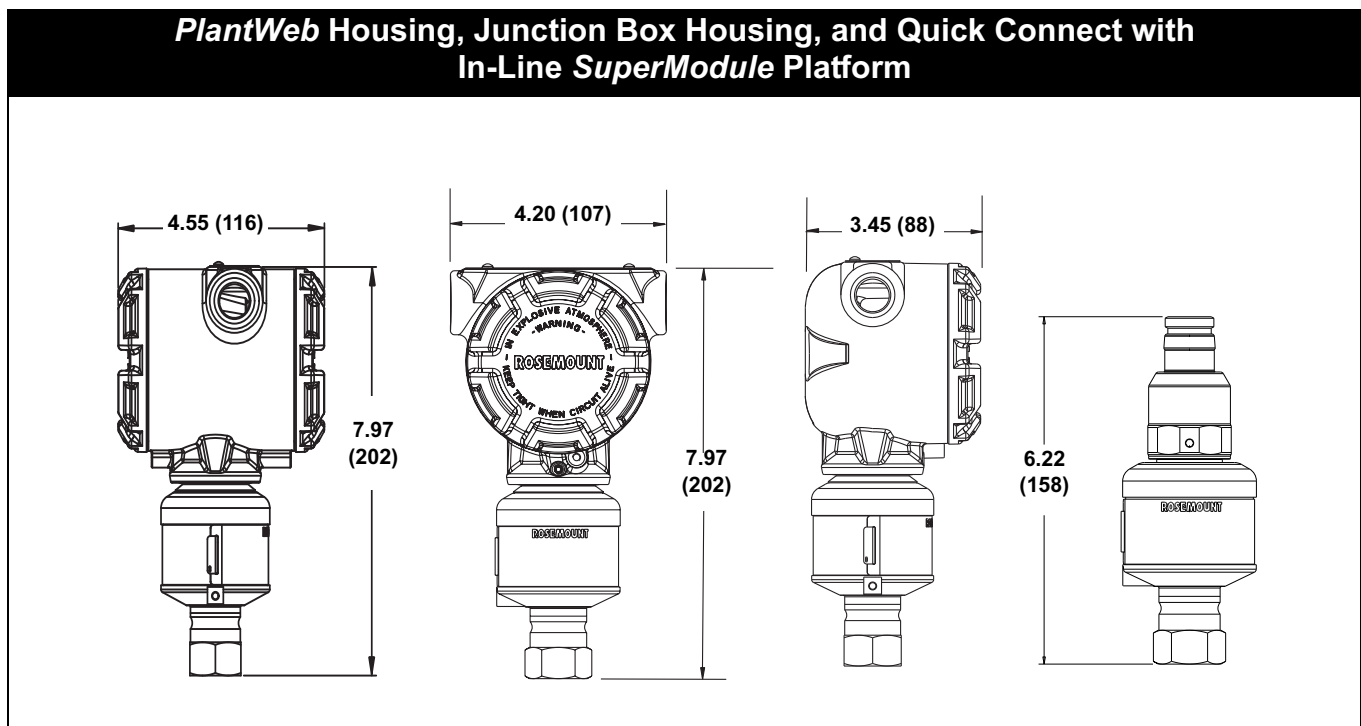
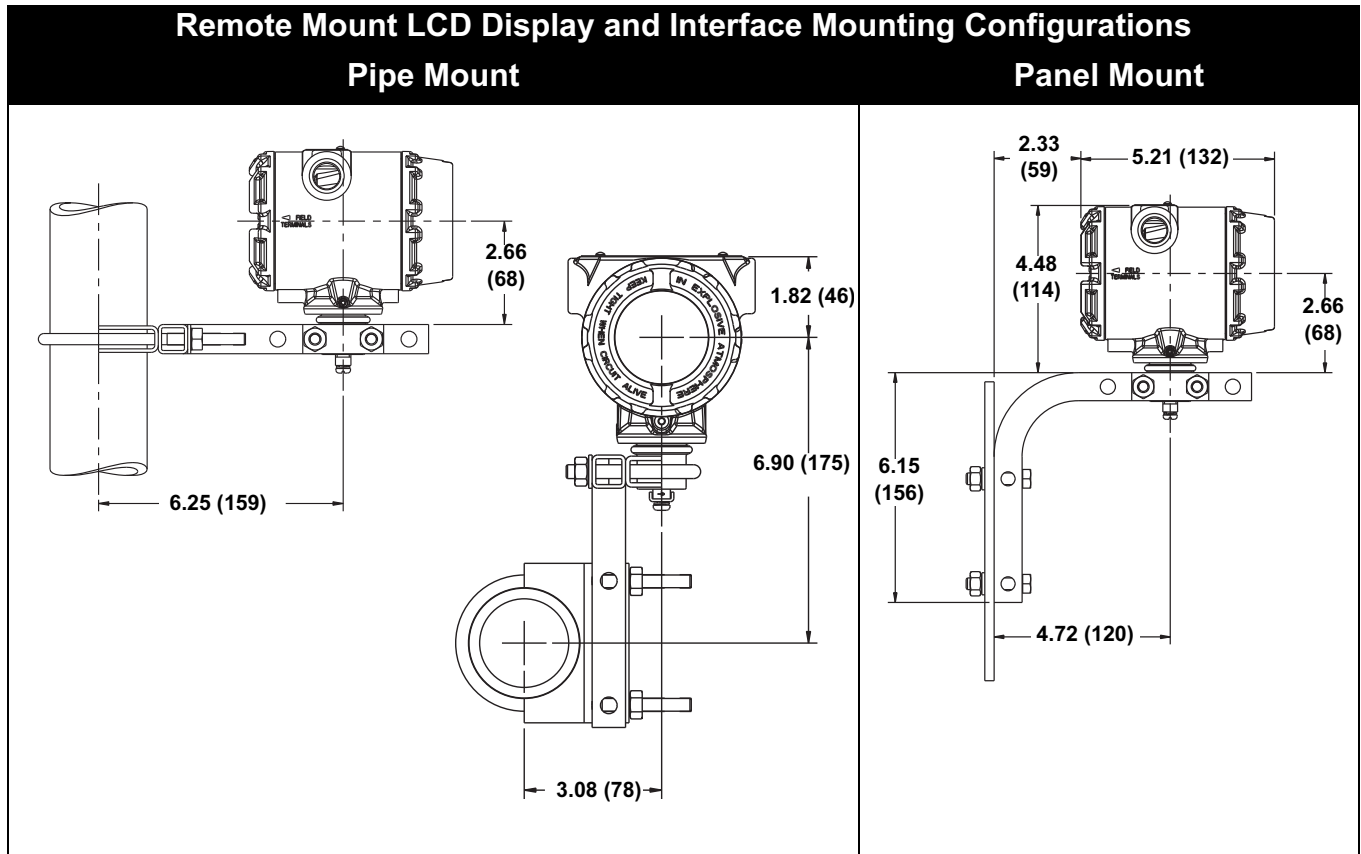
PlantWeb Housing with Coplanar SuperModule Platform and 305 Traditional Integral Manifold



PlantWeb Housing with Coplanar SuperModule Platform and Traditional Flange

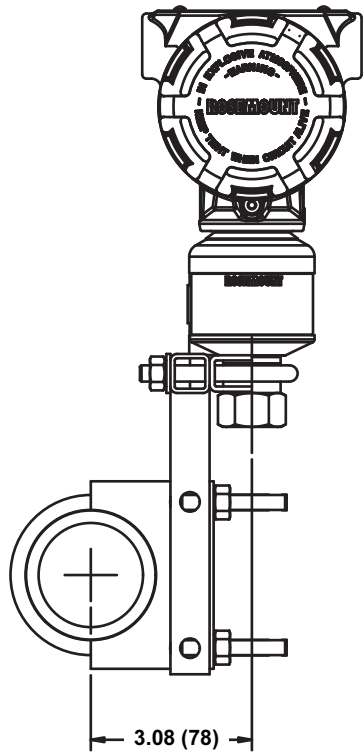
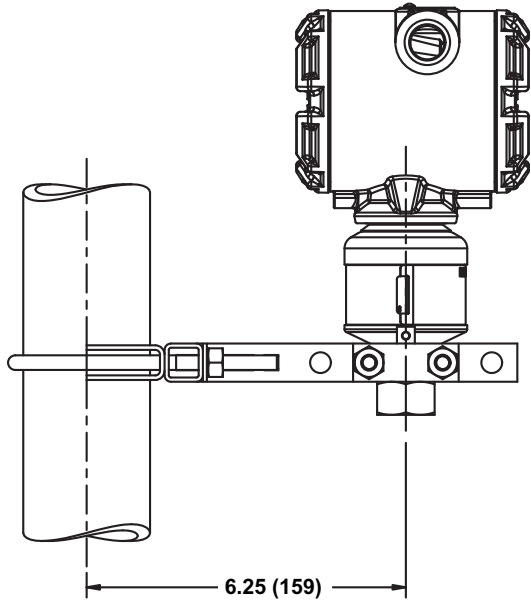




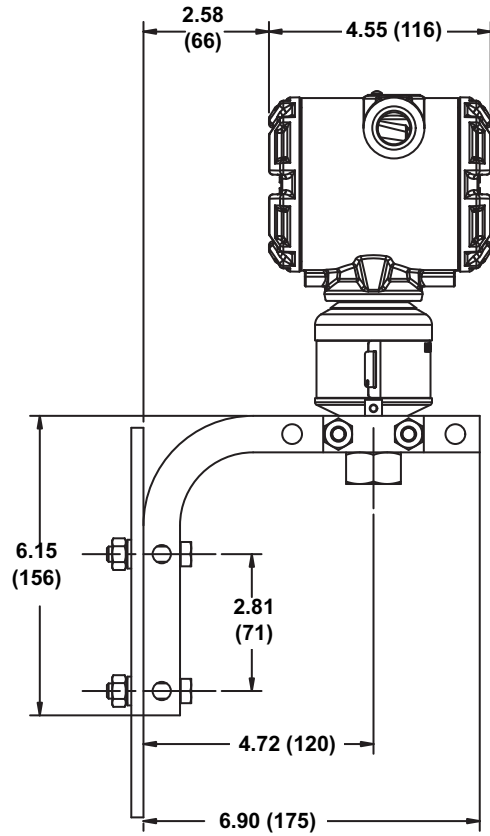


In-line Mounting Configurations with Optional Mounting Bracket

Pipe Mount

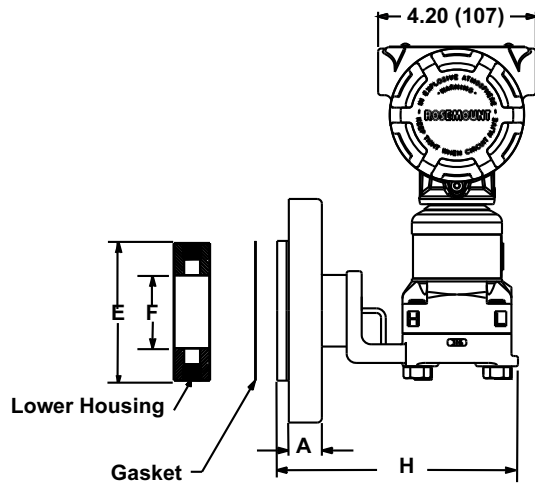


Panel Mount

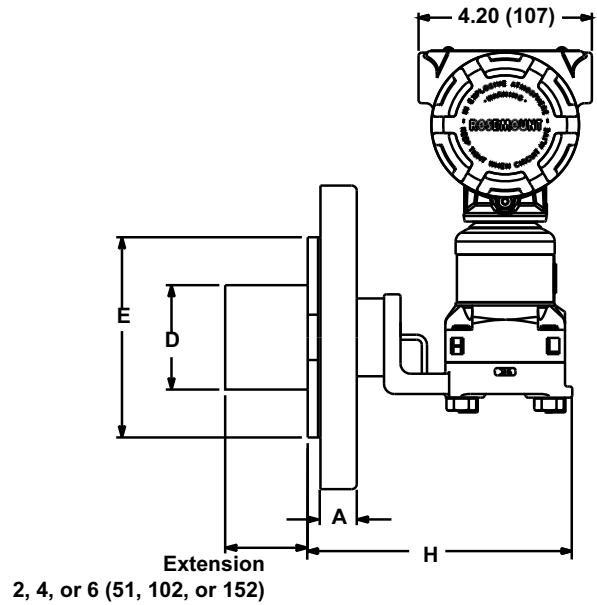


3051S_L Liquid Level

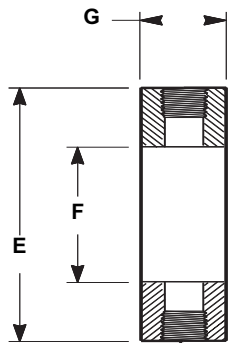
Flush Flanged Configuration



Extended Flanged Configuration



Optional Flushing Connection Ring
(Lower Housing)



Flushing Connection

Diaphragm Assembly and
Mounting Flange

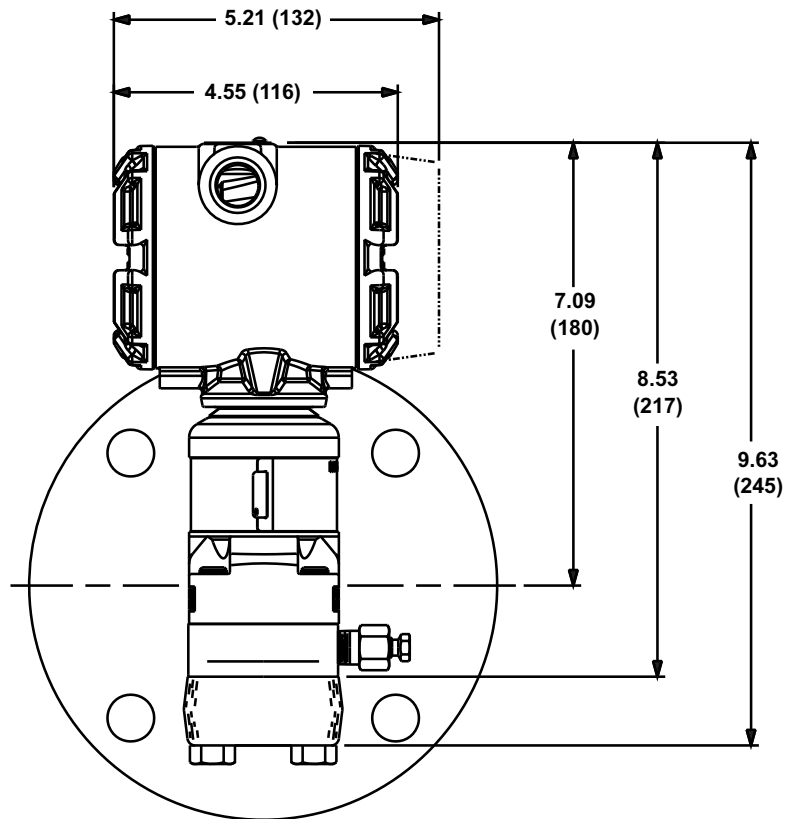
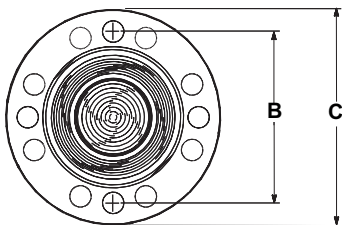


Table B-6. 3051S_L Dimensional Specifications

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

| Class | Pipe Size | Flange Thickness A | Bolt Circle Diameter B | Outside Diameter C | No. of Bolts | Bolt Hole Diameter | Extension Diameter ⁽¹⁾ D | O.D. Gasket Surface E |
|-----------------------|-----------|--------------------|------------------------|--------------------|--------------|--------------------|-------------------------------------|-----------------------|
| ASME B16.5 (ANSI) 150 | 2 (51) | 0.69 (18) | 4.75 (121) | 6.0 (152) | 4 | 0.75 (19) | NA | 3.6 (92) |
| | 3 (76) | 0.88 (22) | 6.0 (152) | 7.5 (191) | 4 | 0.75 (19) | 2.58 (66) | 5.0 (127) |
| | 4 (102) | 0.88 (22) | 7.5 (191) | 9.0 (229) | 8 | 0.75 (19) | 3.5 (89) | 6.2 (158) |
| ASME B16.5 (ANSI) 300 | 2 (51) | 0.82 (21) | 5.0 (127) | 6.5 (165) | 8 | 0.75 (19) | NA | 3.6 (92) |
| | 3 (76) | 1.06 (27) | 6.62 (168) | 8.25 (210) | 8 | 0.88 (22) | 2.58 (66) | 5.0 (127) |
| | 4 (102) | 1.19 (30) | 7.88 (200) | 10.0 (254) | 8 | 0.88 (22) | 3.5 (89) | 6.2 (158) |
| ASME B16.5 (ANSI) 600 | 2 (51) | 1.00 (25) | 5.0 (127) | 6.5 (165) | 8 | 0.75 (19) | NA | 3.6 (92) |
| | 3 (76) | 1.25 (32) | 6.62 (168) | 8.25 (210) | 8 | 0.88 (22) | 2.58 (66) | 5.0 (127) |
| DIN 2501 PN 10–40 | DN 50 | 20 mm | 125 mm | 165 mm | 4 | 18 mm | NA | 4.0 (102) |
| DIN 2501 PN 25/40 | DN 80 | 24 mm | 160 mm | 200 mm | 8 | 18 mm | 65 mm | 5.4 (138) |
| | DN 100 | 24 mm | 190 mm | 235 mm | 8 | 22 mm | 89 mm | 6.2 (158) |
| DIN 2501 PN 10/16 | DN 100 | 20 mm | 180 mm | 220 mm | 8 | 18 mm | 89 mm | 6.2 (158) |

| Class | Pipe Size | Process Side F | Lower Housing G | | |
|-----------------------|-----------|----------------|-----------------|-----------|------------|
| | | | 1/4 NPT | 1/2 NPT | H |
| ASME B16.5 (ANSI) 150 | 2 (51) | 2.12 (54) | 0.97 (25) | 1.31 (33) | 6.66 (169) |
| | 3 (76) | 3.6 (91) | 0.97 (25) | 1.31 (33) | 6.66 (169) |
| | 4 (102) | 3.6 (91) | 0.97 (25) | 1.31 (33) | 6.66 (169) |
| ASME B16.5 (ANSI) 300 | 2 (51) | 2.12 (54) | 0.97 (25) | 1.31 (33) | 6.66 (169) |
| | 3 (76) | 3.6 (91) | 0.97 (25) | 1.31 (33) | 6.66 (169) |
| | 4 (102) | 3.6 (91) | 0.97 (25) | 1.31 (33) | 6.66 (169) |
| ASME B16.5 (ANSI) 600 | 2 (51) | 2.12 (54) | 0.97 (25) | 1.31 (33) | 8.66 (219) |
| | 3 (76) | 3.6 (91) | 0.97 (25) | 1.31 (33) | 8.66 (219) |
| DIN 2501 PN 10–40 | DN 50 | 2.4 (61) | 0.97 (25) | 1.31 (33) | 6.66 (169) |
| DIN 2501 PN 25/40 | DN 80 | 3.6 (91) | 0.97 (25) | 1.31 (33) | 6.66 (169) |
| | DN 100 | 3.6 (91) | 0.97 (25) | 1.31 (33) | 6.66 (169) |
| DIN 2501 PN 10/16 | DN 100 | 3.6 (91) | 0.97 (25) | 1.31 (33) | 6.66 (169) |

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

Rosemount 3051S

ORDERING INFORMATION

Rosemount 3051S Series *Coplanar*

| Model | Transmitter Type | | | |
|--------------------|--|--|---------------------------------|------------------------|
| 3051S | Scalable pressure transmitter | | | |
| Code | Performance Class | | | |
| 1 | Ultra: 0.025% span accuracy, 200:1 rangedown, 10-year stability, limited 12-year warranty | | | |
| 3 ⁽¹⁾ | Ultra for Flow: 0.04% reading accuracy, 200:1 rangedown, 10-year stability, limited 12-year warranty | | | |
| 2 | Classic: 0.055% span accuracy, 100:1 rangedown, 5-year stability | | | |
| Code | Connection Type | | | |
| C | <i>Coplanar</i> | | | |
| Code | Measurement Type ⁽²⁾ | | | |
| D | Differential | | | |
| G | Gage | | | |
| A | Absolute | | | |
| Code | Pressure Range | | | |
| | Differential | Gage | Absolute | |
| 0A ⁽³⁾ | -3 to 3 inH ₂ O (-7,47 to 7,47 mbar) | N/A | 0 to 5 psia (0 to 0,34 bar) | |
| 1A | -25 to 25 inH ₂ O (-62,2 to 62,2 mbar) | -25 to 25 inH ₂ O (-62,2 to 62,2 mbar) | 0 to 30 psia (0 to 2,06 bar) | |
| 2A | -250 to 250 inH ₂ O (-623 to 623 mbar) | -250 to 250 inH ₂ O (-623 to 623 mbar) | 0 to 150 psia (0 to 10,34 bar) | |
| 3A | -1000 to 1000 inH ₂ O (-2,5 to 2,5 bar) | -393 to 1000 inH ₂ O (-0,98 to 2,5 bar) | 0 to 800 psia (0 to 55,2 bar) | |
| 4A | -300 to 300 psi (-20,7 to 20,7 bar) | -14.2 to 300 psig (-0,98 to 21 bar) | 0 to 4000 psia (0 to 275,8 bar) | |
| 5A | -2000 to 2000 psi (-137,9 to 137,9 bar) | -14.2 to 2000 psig (-0,98 to 137,9 bar) | N/A | |
| Code | Isolating Diaphragm | | | |
| 2 ⁽⁴⁾ | 316L SST | | | |
| 3 ⁽⁴⁾ | <i>Hastelloy C-276</i> | | | |
| 4 | <i>Monel 400</i> | | | |
| 5 ⁽⁵⁾ | Tantalum | | | |
| 6 | Gold-plated <i>Monel 400</i> <i>Note: Includes graphite-filled TFE o-ring.</i> | | | |
| 7 | Gold-plated 316L SST | | | |
| Code | Process Connection ⁽⁶⁾ | Size | Material Type ⁽⁷⁾ | |
| | | | Flange Material | Drain Vent |
| 000 | None | | | |
| A11 | Assemble to Rosemount 305 integral manifold | | | |
| A12 | Assemble to 304 or AMF manifold and 316 SST traditional flange | | | |
| B11 ⁽⁸⁾ | Assemble to one Rosemount 1199 diaphragm seal | | | |
| B12 ⁽⁸⁾ | Assemble to two Rosemount 1199 diaphragm seals | | | |
| C11 | Assemble to Rosemount 405 primary element | | | |
| D11 | Assemble to Rosemount 1195 integral orifice and Rosemount 305 integral manifold | | | |
| EA2 | Assemble to Rosemount <i>Annubar</i> Primary Element with <i>Coplanar</i> flange | | 316 SST | 316 SST |
| EA3 | Assemble to Rosemount <i>Annubar</i> Primary Element with <i>Coplanar</i> flange | | <i>Hastelloy C-276</i> | <i>Hastelloy C-276</i> |
| EA5 | Assemble to Rosemount <i>Annubar</i> Primary Element with <i>Coplanar</i> flange | | 316 SST | <i>Hastelloy C-276</i> |
| E11 | <i>Coplanar</i> flange | 1/4-18 NPT | CS | 316 SST |
| E12 | <i>Coplanar</i> flange | 1/4-18 NPT | 316 SST | 316 SST |
| E13 ⁽⁴⁾ | <i>Coplanar</i> flange | 1/4-18 NPT | <i>Hastelloy C-276</i> | <i>Hastelloy C-276</i> |
| E14 | <i>Coplanar</i> flange | 1/4-18 NPT | <i>Monel 400</i> | <i>Monel 400</i> |
| E15 ⁽⁴⁾ | <i>Coplanar</i> flange | 1/4-18 NPT | 316 SST | <i>Hastelloy C-276</i> |
| E16 ⁽⁴⁾ | <i>Coplanar</i> flange | 1/4-18 NPT | CS | <i>Hastelloy</i> |
| E21 | <i>Coplanar</i> flange | RC 1/4 | CS | 316 SST |
| E22 | <i>Coplanar</i> flange | RC 1/4 | 316 SST | 316 SST |
| E23 ⁽⁴⁾ | <i>Coplanar</i> flange | RC 1/4 | <i>Hastelloy C-276</i> | <i>Hastelloy C-276</i> |
| E24 | <i>Coplanar</i> flange | RC 1/4 | <i>Monel 400</i> | <i>Monel 400</i> |
| E25 ⁽⁴⁾ | <i>Coplanar</i> flange | RC 1/4 | 316 SST | <i>Hastelloy C-276</i> |
| E26 ⁽⁴⁾ | <i>Coplanar</i> flange | RC 1/4 | CS | <i>Hastelloy C-276</i> |
| F12 | Traditional flange | 1/4-18 NPT | 316 SST | 316 SST |
| F13 ⁽⁴⁾ | Traditional flange | 1/4-18 NPT | <i>Hastelloy C-276</i> | <i>Hastelloy C-276</i> |
| F14 | Traditional flange | 1/4-18 NPT | <i>Monel 400</i> | <i>Monel 400</i> |

| | | | Flange Material | Drain Vent | Bolting |
|--------------------|----------------------------------|----------------------|-----------------|-----------------|------------------|
| F15 ⁽⁴⁾ | Traditional flange | 1/4-18 NPT | 316 SST | Hastelloy C-276 | |
| F22 | Traditional flange | RC 1/4 | 316 SST | 316 SST | |
| F23 ⁽⁴⁾ | Traditional flange | RC 1/4 | Hastelloy C-276 | Hastelloy C-276 | |
| F24 | Traditional flange | RC 1/4 | Monel 400 | Monel 400 | |
| F25 ⁽⁴⁾ | Traditional flange | RC 1/4 | 316 SST | Hastelloy C-276 | |
| F32 | Bottom vent traditional flange | 1/4-18 NPT | 316 SST | 316 SST | |
| F52 | DIN-compliant traditional flange | 1/4-18 NPT | 316 SST | 316 SST | 7/16-in. bolting |
| F62 | DIN-compliant traditional flange | 1/4-18 NPT | 316 SST | 316 SST | M10 bolting |
| F72 | DIN-compliant traditional flange | 1/4-18 NPT | 316 SST | 316 SST | M12 bolting |
| G11 | Vertical mount level flange | 2-in. ANSI class 150 | 316 SST | | |
| G12 | Vertical mount level flange | 2-in. ANSI class 300 | 316 SST | | |
| G14 ⁽⁴⁾ | Vertical mount level flange | 2-in. ANSI class 150 | Hastelloy C-276 | | |
| G15 ⁽⁴⁾ | Vertical mount level flange | 2-in. ANSI class 300 | Hastelloy C-276 | | |
| G21 | Vertical mount level flange | 3-in. ANSI class 150 | 316 SST | | |
| G22 | Vertical mount level flange | 3-in. ANSI class 300 | 316 SST | | |
| G24 ⁽⁴⁾ | Vertical mount level flange | 3-in. ANSI class 150 | Hastelloy C-276 | | |
| G25 ⁽⁴⁾ | Vertical mount level flange | 3-in. ANSI class 300 | Hastelloy C-276 | | |
| G31 | Vertical mount level flange | DIN- DN 50 PN 40 | 316 SST | | |
| G41 | Vertical mount level flange | DIN- DN 80 PN 40 | 316 SST | | |

| Code | Output ⁽⁹⁾ |
|-------------------|--|
| A | 4-20 mA with digital signal based on HART protocol |
| F ⁽¹⁰⁾ | FOUNDATION fieldbus protocol |

| Code | Housing Style | Material ⁽⁷⁾ | Conduit Entry Size |
|--------------------|---|-------------------------|--------------------|
| 00 | None (<i>SuperModule</i> Platform only, no housing included) | | |
| 01 ⁽¹¹⁾ | Assemble to Rosemount 753R Web-Based Monitoring Indicator | | |
| 1A | <i>PlantWeb</i> housing | Aluminum | 1/2-14 NPT |
| 1B | <i>PlantWeb</i> housing | Aluminum | M20 x 1.5 (CM20) |
| 1C | <i>PlantWeb</i> housing | Aluminum | G1/2 |
| 1J | <i>PlantWeb</i> housing | 316L SST | 1/2-14 NPT |
| 1K | <i>PlantWeb</i> housing | 316L SST | M20 x 1.5 (CM20) |
| 1L | <i>PlantWeb</i> housing | 316L SST | G1/2 |
| 2A | Junction Box housing | Aluminum | 1/2-14 NPT |
| 2B | Junction Box housing | Aluminum | M20 x 1.5 (CM20) |
| 2C | Junction Box housing | Aluminum | G1/2 |
| 2J | Junction Box housing | 316L SST | 1/2-14 NPT |
| 2E | Junction Box Housing with output for remote display and interface | Aluminum | 1/2-14 NPT |
| 2F | Junction Box Housing with output for remote display and interface | Aluminum | M20 x 1.5 (CM20) |
| 2G | Junction Box Housing with output for remote display and interface | Aluminum | G1/2 |
| 2M | Junction Box Housing with output for remote display and interface | 316L SST | 1/2-14 NPT |
| 7J ⁽¹²⁾ | Quick Connect (A size Mini, 4-pin male termination) | 316L SST | |

| Code | Options |
|--|---|
| PlantWeb Control Functionality | |
| A01 ⁽¹³⁾ | FOUNDATION fieldbus Advanced Control Function Block Suite |
| PlantWeb Diagnostic Functionality | |
| D01 ⁽¹³⁾ | FOUNDATION fieldbus Diagnostics Suite |
| DA1 ⁽¹⁴⁾ | HART Diagnostics Suite |
| PlantWeb Enhanced Measurement Functionality | |
| H01 ⁽¹³⁾⁽¹⁵⁾ | Fully Compensated Mass Flow Block |

| Code | Options |
|---|---|
| Mounting Brackets⁽¹⁶⁾ | |
| B4 | <i>Coplanar</i> flange bracket, all SST, 2-in. pipe and panel |
| B1 | Traditional flange bracket, CS, 2-in. pipe |
| B2 | Traditional flange bracket, CS, panel |
| B3 | Traditional flange flat bracket, CS, 2-in. pipe |
| B7 | Traditional flange bracket, B1 with SST bolts |
| B8 | Traditional flange bracket, B2 with SST bolts |
| B9 | Traditional flange bracket, B3 with SST bolts |
| BA | Traditional flange bracket, B1, all SST |
| BC | Traditional flange bracket, B3, all SST |

Rosemount 3051S

Special Configuration (Software)

| | |
|--------------------|--|
| C1 ⁽¹⁷⁾ | Custom software configuration <i>Note: A Configuration Data Sheet must be completed, see 00806-0100-4801.</i> |
| C3 | Gage pressure calibration on Rosemount 3051S_CA4 only |
| C4 | NAMUR alarm and saturation levels, high alarm |
| C5 ⁽¹⁷⁾ | NAMUR alarm and saturation levels, low alarm |
| C6 ⁽¹⁷⁾ | Custom alarm and saturation signal levels, high alarm <i>Note: Requires option code C1, custom software configuration. A Configuration Data Sheet must be completed, see 00806-0100-4801.</i> |
| C7 ⁽¹⁷⁾ | Custom alarm and saturation signal levels, low alarm <i>Note: Requires option code C1, custom software configuration. A Configuration Data Sheet must be completed, see 00806-0100-4801.</i> |
| C8 ⁽¹⁷⁾ | Low alarm (standard Rosemount alarm and saturation levels) |

Special Configuration (Hardware)

| | |
|--------------------|--|
| D1 ⁽¹⁷⁾ | Hardware adjustments (zero, span, alarm, security) <i>Note: Not available with housing style codes 00, 01, 2E, 2F, 2G, 2M, 5A, or 7J.</i> |
| D2 ⁽¹⁶⁾ | Process adapters 1/2-14 NPT |
| D4 | External ground screw assembly |
| D5 ⁽¹⁶⁾ | Delete transmitter drain/vent valves (install plugs) |
| D7 ⁽¹⁶⁾ | Coplanar flange without drain/vent ports |
| D8 ⁽¹⁶⁾ | Ceramic drain/vent valves |
| D9 ⁽¹⁶⁾ | RC 1/2 process adapters |

Product Certifications⁽¹⁸⁾

| | |
|--------------------|---|
| E1 | ATEX Flameproof |
| I1 | ATEX Intrinsically Safe |
| IA | ATEX FISCO Intrinsically Safe; for FOUNDATION fieldbus protocol only |
| N1 | ATEX Type n |
| K1 | ATEX Flameproof, Intrinsically Safe, Type n, Dust (combination of E1, I1, N1, and ND) |
| ND | ATEX Dust |
| E4 | JIS Flameproof |
| E5 | FM Explosion-proof |
| I5 | FM Intrinsically Safe, Non-Incendive |
| IE | FM FISCO Intrinsically Safe; for FOUNDATION fieldbus protocol only |
| K5 | FM Explosion-proof, Intrinsically Safe, Non-Incendive (combination of E5 and I5) |
| E6 | CSA Explosion-proof, Division 2 |
| I6 | CSA Intrinsically Safe |
| IF | CSA FISCO Intrinsically Safe; for FOUNDATION fieldbus protocol only |
| K6 | CSA Explosion-proof, Intrinsically Safe, Division 2 (combination of E6 and I6) |
| D3 ⁽¹⁹⁾ | Measurement Canada Accuracy Approval |
| E7 | SAA Flameproof, Dust Ignition-proof |
| I7 | IECEX Intrinsically Safe |
| IG | IECEX FISCO Intrinsically Safe |
| N7 | IECEX Type n |
| K7 | SAA Flameproof, Dust Ignition-proof, IECEX Intrinsically Safe, and Type n (combination of E7, I7, and N7) |
| KA | ATEX and CSA Flameproof, Intrinsically Safe (combination of E1, I1, E6, and I6) <i>Note: Only available on Housing Style codes 00, IA, IJ, 2A, 2J, 2E, or 2M.</i> |
| KB | FM and CSA Explosion-proof, Intrinsically Safe, Division 2 (combination of E5, E6, I5, and I6) <i>Note: Only available on Housing Style codes 00, IA, IJ, 2A, 2J, 2E, or 2M.</i> |
| KC | FM and ATEX Explosion-proof, Intrinsically Safe, Non-Incendive (combination of E5, E1, I5, and I1) <i>Note: Only available on Housing Style codes 00, IA, IJ, 2A, 2J, 2E, or 2M.</i> |
| KD | FM, CSA, and ATEX Explosion-proof, Intrinsically Safe (combination of E5, I5, E6, I6, E1, and I1) <i>Note: Only available on Housing Style codes 00, IA, IJ, 2A, 2J, 2E, or 2M.</i> |
| DW ⁽²⁰⁾ | NSF Drinking Water Approval |

Alternate Materials of Construction

| | |
|--------------------|---|
| L1 | Inert sensor fill fluid (differential and gage only) <i>Note: Silicone fill fluid is standard.</i> |
| L2 | Graphite-filled Teflon [®] (PTFE) o-ring |
| L4 ⁽¹⁶⁾ | Austenitic 316 SST bolts |
| L5 ⁽¹⁶⁾ | ASTM A 193, Grade B7M bolts |
| L6 ⁽¹⁶⁾ | Monel bolts |
| L7 ⁽¹⁶⁾ | ASTM A 453, Class A, Grade 660 bolts |
| L8 ⁽¹⁶⁾ | ASTM A 193, Class 2, Grade B8M bolts |

Digital Display⁽²¹⁾

| | |
|--------------------|--|
| M5 | PlantWeb LCD Display |
| M7 ⁽²²⁾ | Remote mount LCD display and interface, no cable; PlantWeb housing, SST bracket, requires 4-20 mA / HART output <i>Note: Use Belden 3084A cable or equivalent. Contact an Emerson Process Management representative for additional information.</i> |
| M8 ⁽²²⁾ | Remote mount LCD display and interface, 50 ft. (15 m) cable; PlantWeb housing, SST bracket, requires 4-20 mA / HART output |
| M9 ⁽²²⁾ | Remote mount LCD display and interface, 100 ft. (31 m) cable; PlantWeb housing, SST bracket, requires 4-20 mA / HART output |

Special Procedures

| | |
|--------------------|---|
| P1 | Hydrostatic testing with certificate |
| P2 ⁽¹⁶⁾ | Cleaning for special services |
| P3 ⁽¹⁶⁾ | Cleaning for less than 1PPM chlorine/fluorine |
| P9 | 4500 psig (310 bar) static pressure limit (Rosemount 3051S_CD only) |
| P0 ⁽²³⁾ | 6092 psig (420 bar) static pressure limit (Rosemount 3051S2CD only) |

Special Certifications

| | |
|--------------------|--|
| Q4 | Calibration certificate |
| QP | Calibration certificate and tamper evident seal |
| Q8 | Material traceability certification per EN 10204 3.1.B |
| QS ⁽²⁴⁾ | Prior-use certificate of FMEDA Data |
| QT ⁽²⁵⁾ | Safety certified to IEC 61508 with certificate of FMEDA data |
| Q16 | Surface finish certification for sanitary remote seals |

Terminal Blocks

| | |
|--------------------|---|
| T1 ⁽²⁶⁾ | Transient terminal block |
| T2 ⁽²⁷⁾ | Terminal block with WAGO® spring clamp terminals |
| T3 ⁽²⁷⁾ | Transient terminal block with WAGO spring clamp terminals |

Conduit Electrical Connector

| | |
|--------------------|--|
| GE ⁽²⁸⁾ | M12, 4-pin, Male Connector (eurofast®) |
| GM ⁽²⁸⁾ | A size Mini, 4-pin, Male Connector (minifast®) |

Typical Model Number: 3051S1CD 2A 2 E12 A 1A DA1 B4 M5

- (1) Not available with Housing code 01. This option is only available with range codes 2A and 3A, 316L SST isolating diaphragm and silicone fill fluid.
- (2) Performance Class code 3 is available with Measurement Type code D only.
- (3) 3051S_CD0 is only available with traditional flange, 316 SST diaphragm material, silicone fill fluid, and Bolting option L4.
- (4) Materials of Construction comply with metallurgical requirements highlighted within NACE MR0175/ISO 15156 for sour oil field production environments. Environmental limits apply to certain materials. Consult latest standard for details. Selected materials also conform to NACE MR0103 for sour refining environments.
- (5) Tantalum diaphragm material is only available for ranges 2A - 5A, differential and gage.
- (6) Process connection option codes B12, C11, D11, EA2, EA3 and EA5 are only available on differential Measurement Type, code D.
- (7) Material specified is cast as follows: CF-8M is the cast version of 316 SST, CF-3M is the cast version of 316L SST, CW-12MW is the cast version of Hastelloy C-276, M-30C is the cast version of Monel 400. For housing, material is aluminum with polyurethane paint.
- (8) Consult an Emerson Process Management representative for performance specifications.
- (9) For spare SuperModule Platforms, select output code A.
- (10) Requires PlantWeb housing.
- (11) Available with output code A only. Not available with approvals. See Rosemount 753R Product Data Sheet, 00813-0100-4379, to specify Web-Based Monitoring Indicator. Does not integrate into plant host systems.
- (12) Available with output code A only. Available approvals are FM Intrinsically Safe, Non-Incendive (option code I5), ATEX Intrinsically Safe (option code I1), or IECEx Intrinsically Safe (option code I7). Contact an Emerson Process Management representative for additional information.
- (13) Requires PlantWeb housing and output code F.
- (14) Requires PlantWeb housing and output code A. Includes Hardware Adjustments as standard. Not available with option code QT.
- (15) Requires Rosemount Engineering Assistant to configure.
- (16) Not available with process connection option code A11.
- (17) Not available with output code F or Housing code 01.
- (18) Valid when SuperModule Platform and housing have equivalent approvals.
- (19) Requires PlantWeb housing and Hardware Adjustments option code D1. Limited availability depending on transmitter type and range. Contact an Emerson Process Management representative for additional information.
- (20) Requires 316L SST wetted materials, glass-filled TFE O-ring (standard), and Process Connection code E12 or F12.
- (21) Not available with Housing code 01 or 7J.
- (22) Not available with output code F, Housing code 01, option code DA1, or option code QT.
- (23) Requires 316L SST or Hastelloy C-276 diaphragm material, assemble to Rosemount 305 integral manifold or DIN-compliant traditional flange process connection, and bolting option L8. Limited to Pressure Range (Differential), ranges 2A - 5A.
- (24) Not available with Housing code 01.
- (25) Not available with output code F. Not available with housing code 01 or 7J.
- (26) Not available with Housing code 00, 01, 5A, or 7J.
- (27) Available with output code A and PlantWeb housing only.
- (28) Not available with Housing code 00, 01, 5A, or 7J. Available with Intrinsically Safe approvals only. For FM Intrinsically Safe, Non-Incendive approval (option code I5) or FM FISCO Intrinsically Safe approval (option code IE), install in accordance with Rosemount drawing 03151-1009 to maintain outdoor rating (NEMA 4X and IP66).

Rosemount 3051S

Rosemount 3051S Series In-Line

| Model | Transmitter Type | | |
|--|---|---------------------------|--------------------|
| 3051S | Scalable pressure transmitter | | |
| Code | Performance Class | | |
| 1 | Ultra: 0.025% span accuracy, 200:1 rangedown, 10-year stability, limited 12-year warranty | | |
| 2 | Classic: 0.055% span accuracy, 100:1 rangedown, 5-year stability | | |
| Code | Device Type | | |
| T | In-Line | | |
| Code | Measurement Type | | |
| G | Gage | | |
| A | Absolute | | |
| Code | Pressure Range | | |
| | TG | TA | |
| 1A | -14.7 to 30 psi (-1,0 to 2,1 bar) | 0 to 30 psia (2,1 bar) | |
| 2A | -14.7 to 150 psi (-1,0 to 10,3 bar) | 0 to 150 psia (10,3 bar) | |
| 3A | -14.7 to 800 psi (-1,0 to 55 bar) | 0 to 800 psia (55 bar) | |
| 4A | -14.7 to 4000 psi (-1,0 to 276 bar) | 0 to 4000 psia (276 bar) | |
| 5A | -14.7 to 10000 psi (-1,0 to 689 bar) | 0 to 10000 psia (689 bar) | |
| Code | Isolating Diaphragm / Process Connection Material | | |
| 2 ⁽¹⁾ | 316L SST | | |
| 3 ⁽¹⁾ | Hastelloy C-276 | | |
| Code | Process Connection Style | | |
| A11 | Assemble to Rosemount 306 integral manifold | | |
| B11 ⁽²⁾ | Assemble to one Rosemount 1199 diaphragm seal | | |
| E11 | 1/2-14 NPT female | | |
| F11 | Non-threaded instrument-flange (I-flange) (Range 1-4 only) | | |
| G11 | G1/2 A DIN 16288 male (Range 1-4 only) | | |
| H11 | Coned and threaded, compatible with autoclave type F-250-C (Range 5A only) | | |
| Code | Output ⁽³⁾ | | |
| A | 4-20 mA with digital signal based on HART protocol | | |
| F ⁽⁴⁾ | FOUNDATION fieldbus protocol | | |
| Code | Housing Style | Materials ⁽⁵⁾ | Conduit Entry Size |
| 00 | None (<i>SuperModule</i> Platform only, no housing included) | | |
| 01 ⁽⁶⁾ | Assemble to Rosemount 753R Web-Based Monitoring Indicator | | |
| 1A | <i>PlantWeb</i> housing | Aluminum | 1/2-14 NPT |
| 1B | <i>PlantWeb</i> housing | Aluminum | M20 x 1.5 (CM20) |
| 1C | <i>PlantWeb</i> housing | Aluminum | G1/2 |
| 1J | <i>PlantWeb</i> housing | 316L SST | 1/2-14 NPT |
| 1K | <i>PlantWeb</i> housing | 316L SST | M20 x 1.5 (CM20) |
| 1L | <i>PlantWeb</i> housing | 316L SST | G 1/2 |
| 2A | Junction Box housing | Aluminum | 1/2-14 NPT |
| 2B | Junction Box housing | Aluminum | M20 x 1.5 (CM20) |
| 2C | Junction Box housing | Aluminum | G 1/2 |
| 2J | Junction Box housing | 316L SST | 1/2-14 NPT |
| 2E | Junction Box housing with output for remote interface | Aluminum | 1/2-14 NPT |
| 2F | Junction Box housing with output for remote interface | Aluminum | M20 x 1.5 (CM20) |
| 2G | Junction Box housing with output for remote interface | Aluminum | G1/2 |
| 2M | Junction Box housing with output for remote interface | 316L SST | 1/2-14 NPT |
| 7J ⁽⁷⁾ | Quick Connect (A size Mini, 4-pin male termination) | 316L SST | |
| Code | Options | | |
| <i>PlantWeb</i> Control Functionality | | | |
| A01 ⁽⁸⁾ | FOUNDATION fieldbus Advanced Control Function Block Suite | | |
| <i>PlantWeb</i> Diagnostic Functionality | | | |
| D01 ⁽⁸⁾ | FOUNDATION fieldbus Diagnostics Suite | | |
| DA1 ⁽⁹⁾ | HART Diagnostics Suite | | |
| <i>PlantWeb</i> Enhanced Measurement Functionality | | | |

| H01 ⁽⁸⁾⁽¹⁰⁾ | Fully Compensated Mass Flow Block |
|--|--|
| Code | Options |
| Mounting Bracket | |
| B4 | Bracket, all SST, 2-in. pipe and panel |
| Special Configuration (Software)⁽¹¹⁾ | |
| C1 ⁽¹¹⁾ | Custom software configuration <i>Note: A Configuration Data Sheet must be completed, see 00806-0100-4801.</i> |
| C4 ⁽¹¹⁾ | NAMUR alarm and saturation values, high alarm |
| C5 ⁽¹¹⁾ | NAMUR alarm and saturation values, low alarm |
| C6 ⁽¹¹⁾ | Custom alarm and saturation signal levels, high alarm <i>Note: Requires option code C1, custom software configuration. A Configuration Data Sheet must be completed, see 00806-0100-4801.</i> |
| C7 ⁽¹¹⁾ | Custom alarm and saturation signal levels, low alarm <i>Note: Requires option code C1, custom software configuration. A Configuration Data Sheet must be completed, see 00806-0100-4801.</i> |
| C8 ⁽¹¹⁾ | Low alarm (Standard Rosemount alarm and saturation signal levels) |
| Special Configuration (Hardware) | |
| D1 ⁽¹¹⁾ | Hardware adjustments (zero, span, alarm, security) <i>Note: Not available with Housing Style codes 00, 01, 2E, 2F, 2G, 2M, 5A, or 7J.</i> |
| D4 | External ground screw assembly |
| Product Certifications⁽¹²⁾ | |
| E1 | ATEX Flameproof |
| I1 | ATEX Intrinsically Safe |
| IA | ATEX FISCO Intrinsically Safe; for FOUNDATION fieldbus protocol only |
| N1 | ATEX Type n |
| K1 | ATEX Flameproof, Intrinsically Safe, Type n, Dust (combination of E1, I1, N1, and ND) |
| ND | ATEX Dust |
| E4 | JIS Flameproof |
| E5 | FM Explosion-proof |
| I5 | FM Intrinsically Safe, Non-Incendive |
| IE | FM FISCO Intrinsically Safe; for FOUNDATION fieldbus protocol only |
| K5 | FM Explosion-proof, Intrinsically Safe, Non-Incendive (combination of E5 and I5) |
| E6 | CSA Explosion-proof, Division 2 |
| I6 | CSA Intrinsically Safe |
| IF | CSA FISCO Intrinsically Safe; for FOUNDATION fieldbus protocol only |
| K6 | CSA Explosion-proof, Intrinsically Safe, Division 2 (combination of E6 and I6) |
| D3 ⁽¹³⁾ | Measurement Canada Accuracy Approval |
| E7 | SAA Flameproof, Dust Ignition-proof |
| I7 | IECEX Intrinsically Safe |
| IG | IECEX FISCO Intrinsically Safe |
| N7 | IECEX Type n |
| K7 | SAA Flameproof, Dust Ignition-proof, IECEX Intrinsically Safe, and Type n (combination of E7, I7, and N7) |
| KA | ATEX and CSA Flameproof, Intrinsically Safe (combination of E1, I1, E6, and I6) <i>Note: Only available on Housing Style codes 00, IA, IJ, 2A, 2J, 2E, or 2M.</i> |
| KB | FM and CSA Explosion-proof, Intrinsically Safe, Division 2 (combination of E5, E6, I5, and I6) <i>Note: Only available on Housing Style codes 00, IA, IJ, 2A, 2J, 2E, or 2M.</i> |
| KC | FM and ATEX Explosion-proof, Intrinsically Safe, Non-Incendive (combination of E5, E1, I5, and I1) <i>Note: Only available on Housing Style codes 00, IA, IJ, 2A, 2J, 2E, or 2M.</i> |
| KD | FM, CSA, and ATEX Explosion-proof, Intrinsically Safe (combination of E5, I5, E6, I6, E1, and I1) <i>Note: Only available on Housing Style codes 00, IA, IJ, 2A, 2J, 2E, or 2M.</i> |
| DW ⁽¹⁴⁾ | NSF Drinking Water Approval |
| Alternate Materials of Construction | |
| L1 | Inert sensor fill fluid <i>Note: Silicone fill fluid is standard.</i> |
| Digital Display⁽¹⁵⁾ | |
| M5 | PlantWeb LCD Display |
| M7 ⁽¹⁶⁾ | Remote mount LCD display and interface, no cable; PlantWeb housing, SST bracket, requires 4-20 mA / HART output <i>Note: Use Belden 3084A cable or equivalent. Contact an Emerson Process Management representative for additional information.</i> |
| M8 ⁽¹⁶⁾ | Remote mount LCD display and interface, 50 ft. (15 m) cable; PlantWeb housing, SST bracket, requires 4-20 mA / HART output |
| M9 ⁽¹⁶⁾ | Remote mount LCD display and interface, 100 ft. (31 m) cable; PlantWeb housing, SST bracket, requires 4-20 mA / HART output |

Rosemount 3051S

Special Procedures

| | |
|--------------------|--|
| P1 | Hydrostatic testing with certificate |
| P2 ⁽¹⁷⁾ | Cleaning for special services |
| P3 ⁽¹⁷⁾ | Cleaning for less than 1 PPM chlorine/fluorine |

Special Certifications

| | |
|--------------------|--|
| Q4 | Calibration certificate |
| QP | Calibration certificate and tamper evident seal |
| Q8 | Material traceability certification per EN 10204 3.1.B |
| QS ⁽¹⁸⁾ | Prior-use certificate of FMEDA Data |
| QT ⁽¹⁹⁾ | Safety certified to IEC 61508 with certificate of FMEDA data |
| Q16 | Surface finish certification for sanitary remote seals |

Terminal Blocks

| | |
|--------------------|---|
| T1 ⁽²⁰⁾ | Transient terminal block |
| T2 ⁽²¹⁾ | Terminal block with WAGO® spring clamp terminals |
| T3 ⁽²¹⁾ | Transient terminal block with WAGO spring clamp terminals |

Conduit Electrical Connector

| | |
|--------------------|---|
| GE ⁽²²⁾ | M12, 4-pin, Male Connector (<i>euromast</i> ®) |
| GM ⁽²²⁾ | A size Mini, 4-pin, Male Connector (<i>minifast</i> ®) |

Typical Model Number: 3051S1TG 2A 2 E11 A 1A DA1 B4 M5

- (1) *Materials of Construction comply with metallurgical requirements highlighted within NACE MR0175/ISO 15156 for sour oil field production environments. Environmental limits apply to certain materials. Consult latest standard for details. Selected materials also conform to NACE MR0103 for sour refining environments.*
- (2) *Contact a Rosemount representative for performance specifications.*
- (3) *For spare SuperModule Platforms, select output code A.*
- (4) *Requires PlantWeb housing.*
- (5) *Material specified is cast as follows: CF-3M is the cast version of 316L SST. For housing, material is aluminum with polyurethane paint.*
- (6) *Available with output code A only. Not available with approvals. See Rosemount 753R Product Data Sheet, 00813-0100-4379, to specify Web-Based Monitoring Indicator. Does not integrate into plant host systems.*
- (7) *Available with output code A only. Available approvals are FM Intrinsically Safe, Non-Incendive (option code I5), ATEX Intrinsically Safe (option code I1), or IECEx Intrinsically Safe (option code I7). Contact an Emerson Process Management representative for additional information.*
- (8) *Requires PlantWeb housing and output code F.*
- (9) *Requires PlantWeb housing and output code A. Includes Hardware Adjustments as standard. Not available with option code QT.*
- (10) *Requires Rosemount Engineering Assistant to configure.*
- (11) *Not available with output code F or Housing code 01.*
- (12) *Valid when SuperModule Platform and housing have equivalent approvals.*
- (13) *Requires PlantWeb housing and Hardware Adjustments option code D1. Limited availability depending on transmitter type and range. Contact an Emerson Process Management representative for additional information.*
- (14) *Requires 316L SST wetted materials and Process Connection code E11 or G11.*
- (15) *Not available with Housing code 01 and 7J.*
- (16) *Not available with output code F, Housing code 01, option code DA1, or option code QT.*
- (17) *Not available with process connection option code A11.*
- (18) *Not available with Housing code 01.*
- (19) *Not available with output code F. Not available with housing code 01 or 7J.*
- (20) *Not available with Housing code 00, 01, 5A, or 7J.*
- (21) *Available with output code A and PlantWeb housing only.*
- (22) *Not available with Housing code 00, 01, 5A, or 7J. Available with Intrinsically Safe approvals only. For FM Intrinsically Safe, Non-Incendive approval (option code I5) or FM FISCO Intrinsically Safe approval (option code IE), install in accordance with Rosemount drawing 03151-1009 to maintain outdoor rating (NEMA 4X and IP66).*

Rosemount 3051S Series Liquid Level

Select either FF diaphragm seal type (see “Flush Flanged Seal” on page B-33) or for EF diaphragm seal type (see “Extended Flanged Seal” on page B-34) and then finish this selection by choosing transmitter options.

| Model | Transmitter Type | | |
|-------------------|---|--|-------------------------------|
| 3051S | Scalable pressure transmitter | | |
| Code | Performance Class | | |
| 1 | Ultra: 0.065% span accuracy, 100:1 rangedown, limited 12-year warranty | | |
| 2 | Classic: 0.065% span accuracy, 100:1 rangedown | | |
| Code | Connection Type | | |
| L | Level | | |
| Code | Measurement Type | | |
| D | Differential | | |
| G | Gage | | |
| A | Absolute | | |
| Code | Pressure Range | | |
| | Differential (LD) | Gage (LG) | Absolute (LA) |
| 1A | -25 to 25 inH ₂ O (-62,2 to 62,2 mbar) | -25 to 25 inH ₂ O (-62,2 to 62,2 mbar) | 0 to 30 psia (2,1 bar) |
| 2A | -250 to 250 inH ₂ O (-623 to 623 mbar) | -250 to 250 inH ₂ O (-623 to 623 mbar) | 0 to 150 psia (10 bar) |
| 3A | -1000 to 1000 inH ₂ O (-2,5 to 2,5 bar) | -393 to 1000 inH ₂ O (-0,98 to 2,5 bar) | 0 to 800 psia (55 bar) |
| 4A | -300 to 300 psi (-20,7 to 20,7 bar) | -14.2 to 300 psig (-0,98 to 21 bar) | 0 to 4000 psia (276 bar) |
| 5A | -2000 to 2000 psi (-137,9 to 137,9 bar) | -14.2 to 2000 psig (-0,98 to 137,9 bar) | N/A |
| Code | Output ⁽¹⁾ | | |
| A | 4-20 mA with digital signal based on HART protocol | | |
| F ⁽²⁾ | FOUNDATION fieldbus protocol | | |
| Code | Housing Style | Material ⁽³⁾ | Conduit Entry |
| 00 | None (<i>SuperModule</i> Platform only, no housing included) | | |
| 01 ⁽⁴⁾ | Assemble to Rosemount 753R Web-Based Monitoring Indicator | | |
| 1A | <i>PlantWeb</i> housing | Aluminum | 1/2-14 NPT |
| 1B | <i>PlantWeb</i> housing | Aluminum | M20 x 1.5 (CM20) |
| 1C | <i>PlantWeb</i> housing | Aluminum | G ¹ / ₂ |
| 1J | <i>PlantWeb</i> housing | 316L SST | 1/2-14 NPT |
| 1K | <i>PlantWeb</i> housing | 316L SST | M20 x 1.5 (CM20) |
| 1L | <i>PlantWeb</i> housing | 316L SST | G ¹ / ₂ |
| 2A | Junction Box housing | Aluminum | 1/2-14 NPT |
| 2B | Junction Box housing | Aluminum | M20 x 1.5 (CM20) |
| 2C | Junction Box housing | Aluminum | G ¹ / ₂ |
| 2J | Junction Box housing | 316L SST | 1/2-14 NPT |
| 2E | Junction Box with output for remote interface | Aluminum | 1/2-14 NPT |
| 2F | Junction Box with output for remote interface | Aluminum | M20 x 1.5 (CM20) |
| 2G | Junction Box with output for remote interface | Aluminum | G ¹ / ₂ |
| 2M | Junction Box with output for remote interface | 316L SST | 1/2-14 NPT |
| 7J ⁽⁵⁾ | Quick Connect (A size Mini, 4-pin male termination) | 316L SST | |
| Code | Seal System Type | | |
| 1 | Direct-mount diaphragm seal system | | |
| Code | High Pressure Side Extension (between transmitter flange and seal) | | |
| 0 | Direct-mount (No extension) | | |
| Code | Low Pressure Side Connection (sensor module) | | |
| 1 | One capillary connection remote diaphragm seal (see Rosemount 1199 ordering table for seal information) | | |
| 2 | 316L SST isolator / 316 SST transmitter flange | | |
| 3 | <i>Hastelloy</i> C-276 isolator / 316 SST transmitter flange | | |
| Code | Capillary Length | | |
| 0 | N/A | | |
| Code | Diaphragm Seal Fill Fluid | | |
| A | <i>Syltherm</i> XLT | | |
| C | D. C. Silicone 704 | | |
| D | D. C. Silicone 200 | | |
| H | Inert (Halocarbon) | | |
| G | Glycerine and Water | | |
| N | <i>Neobee</i> M-20 | | |
| P | Propylene Glycol and Water | | |

Next, select either Flush Flanged (FF) diaphragm seal (see page B-33) or Extended Flanged (EF) diaphragm seal (see page B-34).

Rosemount 3051S

Seal Options (page B-33—B-34)

Flush Flanged Seal

| Code | Process Connection Style | |
|-------------------|--|-----------------------------|
| FF | Flush Flanged, Ra 125-250 gasket surface | |
| Code | Diaphragm Seal Size (High Side) | |
| G | 2-in./DN 50 | |
| 7 | 3-in. | |
| J | DN 80 | |
| 9 | 4-in./DN 100 | |
| Code | Flange Rating (High Side) | |
| 1 | Class 150 | |
| 2 | Class 300 | |
| 4 | Class 600 | |
| G | PN 40 | |
| E | PN 10/16; available with 4 in. DN 100 only | |
| Code | Isolator Material | Flange Material (High Side) |
| CA | 316L SST | CS |
| DA | 316L SST | 316 SST |
| CB | Hastelloy | CS |
| DB | Hastelloy | 316 SST |
| CC | Tantalum - seam welded ⁽⁶⁾ | CS |
| DC | Tantalum - seam welded ⁽⁶⁾ | 316 SST |
| Code | Lower Housing Material (High Side) ⁽⁷⁾ | |
| 0 | None | |
| A | 316 SST | |
| B | Hastelloy | |
| Code | Flushing Connection Quantity and Size (Lower Housing, High Side) | |
| 0 | None | |
| 1 | 1 (1/4-in.) | |
| 3 | 2 (1/4-in.) | |
| 7 | 1 (1/2-in.) | |
| 9 | 2 (1/2-in.) | |
| Code | Seal Options: Gaskets | |
| SJ | Teflon [®] (PTFE) gasket for lower housing | |
| SK | Gylon gasket for lower housing | |
| SN | Grafoil [™] gasket for lower housing | |
| Code | Other Options | |
| ST ⁽⁸⁾ | Materials per NACE MR0175 | |

Continue with transmitter options on page B-34

- (1) For spare SuperModule Platforms, select output code A.
- (2) Requires PlantWeb housing.
- (3) Material specified is cast as follows: CF-3M is the cast version of 316L SST. For housing, material is aluminum with polyurethane paint.
- (4) Available with output code A only. Not available with approvals. See Rosemount 753R Product Data Sheet, 00813-0100-4379, to specify Web-Based Monitoring Indicator. Does not integrate into plant host systems.
- (5) Available with output code A only. Available approvals are FM Intrinsically Safe, Non-Incendive (option code I5), ATEX Intrinsically Safe (option code I1), or IECEx Intrinsically Safe (option code I7). Contact an Emerson Process Management representative for additional information.
- (6) Not recommended for use with spiral wound metallic gaskets (see 1199 product data sheet, document 00813-0100-4016 for additional options).
- (7) Standard gasket for lower housing consists of non-asbestos fiber.
- (8) Materials of Construction comply with metallurgical requirements highlighted within NACE MR0175/ISO 15156 for sour oil field production environments. Environmental limits apply to certain materials. Consult latest standard for details. Selected materials also conform to NACE MR0103 for sour refining environments.

Extended Flanged Seal

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

Transmitter Options continued from page B-32

(— = Not Applicable • = Applicable)

| Code | Options |
|--|--|
| PlantWeb Control Functionality | |
| A01 ⁽¹⁾ | FOUNDATION fieldbus Advanced Control Function Block Suite |
| PlantWeb Diagnostic Functionality | |
| D01 ⁽¹⁾ | FOUNDATION fieldbus Diagnostics Suite |
| DA1 ⁽²⁾ | HART Diagnostics Suite |
| PlantWeb Enhanced Measurement Functionality | |
| H01 ⁽¹⁾⁽³⁾ | Fully Compensated Mass Flow Block |
| Code | Options |
| Special Configuration (Software) | |
| C1 ⁽⁴⁾ | Custom software configuration <i>Note: A Configuration Data Sheet must be completed, see 00806-0100-4801.</i> |
| C3 | Gage pressure calibration on Rosemount 3051S_LA only |
| C4 ⁽⁴⁾ | NAMUR alarm and saturation levels, high alarm |
| C5 ⁽⁴⁾ | NAMUR alarm and saturation levels, low alarm |
| C6 ⁽⁴⁾ | Custom alarm and saturation signal levels, high alarm <i>Note: Requires option code C1, custom software configuration. A Configuration Data Sheet must be completed, see 00806-0100-4801.</i> |
| C7 ⁽⁴⁾ | Custom alarm and saturation signal levels, low alarm <i>Note: Requires option code C1, custom software configuration. A Configuration Data Sheet must be completed, see 00806-0100-4801.</i> |
| C8 ⁽⁴⁾ | Low alarm (standard Rosemount alarm and saturation levels) |

Rosemount 3051S

| Special Configuration (hardware) | | LD | LG | LA |
|---|--|-----------|-----------|-----------|
| D1 | Hardware adjustments (zero, span, alarm, security) <i>Note: Not available with fieldbus protocol or Housing Style codes 00, 01, 2E, 2F, 2G, 2M, 5A, or 7J.</i> | • | • | • |
| D2 | 1/2-14 NPT process connections process adapters | • | — | — |
| D4 | External ground screw assembly | • | • | • |
| D5 | Delete transmitter drain/vent valves (install plugs) | • | — | — |
| D8 | Ceramic drain/vent valves | • | — | — |
| D9 | RC 1/2 process connections (process adapters) | • | — | — |
| Product Certifications⁽⁹⁾ | | | | |
| E1 | ATEX Flameproof | | | |
| I1 | ATEX Intrinsically Safe | | | |
| IA | ATEX FISCO Intrinsically Safe; for FOUNDATION fieldbus protocol only | | | |
| N1 | ATEX Type n | | | |
| K1 | ATEX Flameproof, Intrinsically Safe, Type n, Dust (combination of E1, I1, N1, and ND) | | | |
| ND | ATEX Dust | | | |
| E4 | JIS Flameproof | | | |
| E5 | FM Explosion-proof | | | |
| I5 | FM Intrinsically Safe, Non-Incendive | | | |
| IE | FM FISCO Intrinsically Safe; for FOUNDATION fieldbus protocol only | | | |
| K5 | FM Explosion-proof, Intrinsically Safe, Non-Incendive (combination of E5 and I5) | | | |
| E6 | CSA Explosion-proof, Division 2 | | | |
| I6 | CSA Intrinsically Safe | | | |
| IF | CSA FISCO Intrinsically Safe; for FOUNDATION fieldbus protocol only | | | |
| K6 | CSA Explosion-proof, Intrinsically Safe, Division 2 (combination of E6 and I6) | | | |
| D3 ⁽⁶⁾⁽⁷⁾ | Measurement Canada Accuracy Approval | | | |
| E7 | SAA Flameproof, Dust Ignition-proof | | | |
| I7 | IECEX Intrinsically Safe | | | |
| IG | IECEX FISCO Intrinsically Safe | | | |
| N7 | IECEX Type n | | | |
| K7 | SAA Flameproof, Dust Ignition-proof, IECEX Intrinsically Safe, and Type n (combination of E7, I7, and N7) | | | |
| KA | ATEX and CSA Flameproof, Intrinsically Safe (combination of E1, I1, E6, and I6) <i>Note: Only available on Housing Style codes 00, IA, IJ, 2A, 2J, 2E, or 2M.</i> | | | |
| KB | FM and CSA Explosion-proof, Intrinsically Safe, Division 2 (combination of E5, E6, I5, and I6) <i>Note: Only available on Housing Style codes 00, IA, IJ, 2A, 2J, 2E, or 2M.</i> | | | |
| KC | FM and ATEX Explosion-proof, Intrinsically Safe, Non-Incendive (combination of E5, E1, I5, and I1) <i>Note: Only available on Housing Style codes 00, IA, IJ, 2A, 2J, 2E, or 2M.</i> | | | |
| KD | FM, CSA, and ATEX Explosion-proof, Intrinsically Safe (combination of E5, I5, E6, I6, E1, and I1) <i>Note: Only available on Housing Style codes 00, IA, IJ, 2A, 2J, 2E, or 2M.</i> | | | |
| Alternate Materials of Construction | | | | |
| L1 | Inert sensor fill fluid (differential and gage only) <i>Note: Silicone fill fluid is standard.</i> | | | |
| L2 | Graphite-filled TFE o-ring | | | |
| L4 | Austenitic 316 SST bolts | | | |
| L5 | ASTM A 193, Grade B7M bolts | | | |
| L6 | Monel bolts | | | |
| L7 | ASTM A 453, Class A, Grade 660 bolts | | | |
| L8 | ASTM A 193, Class 2, Grade B8M bolts | | | |
| Digital Display⁽⁸⁾ | | | | |
| M5 | PlantWeb LCD Display | | | |
| M7 ⁽⁹⁾ | Remote mount LCD display and interface, no cable; PlantWeb housing, SST bracket, requires 4-20 mA / HART output <i>Note: Use Belden 3084A cable or equivalent. Contact an Emerson Process Management representative for additional information.</i> | | | |
| M8 ⁽⁹⁾ | Remote mount LCD display and interface, 50 ft. (15 m) cable; PlantWeb housing, SST bracket, requires 4-20 mA / HART output | | | |
| M9 ⁽⁹⁾ | Remote mount LCD display and interface, 100 ft. (31 m) cable; PlantWeb housing, SST bracket, requires 4-20 mA / HART output | | | |
| Special Procedures | | | | |
| P1 | Hydrostatic testing with certificate | | | |
| P2 | Cleaning for special services | | | |
| P3 | Cleaning for less than 1PPM chlorine/fluorine | | | |

Special Certifications

| | |
|--------------------|--|
| Q4 | Calibration certificate |
| QP | Calibration certificate and tamper evident seal |
| Q8 | Material traceability certification per EN 10204 3.1.B |
| QS ⁽¹⁰⁾ | Prior-use certificate of FMEDA Data |
| QT ⁽¹¹⁾ | Safety certified to IEC 61508 with certificate of FMEDA data |

Terminal blocks

| | |
|--------------------|---|
| T1 ⁽¹²⁾ | Transient terminal block |
| T2 ⁽¹³⁾ | Terminal block with WAGO® spring clamp terminals |
| T3 ⁽¹³⁾ | Transient terminal block with WAGO spring clamp terminals |

Conduit Electrical Connector

| | |
|--------------------|---|
| GE ⁽¹⁴⁾ | M12, 4-pin, Male Connector (<i>eurofast</i> ®) |
| GM ⁽¹⁴⁾ | A size Mini, 4-pin, Male Connector (<i>minifast</i> ®) |

Typical Model Number for FF seal: 3051S2LD 2A A 1A 1 0 2 0 D FF 7 1 DA 0 0

Typical Model Number for EF seal: 3051S2LD 2A A 1A 1 0 2 0 D EF 7 1 DA 2 0

- (1) Requires PlantWeb housing and output code F.
- (2) Requires PlantWeb housing and output code A. Includes Hardware Adjustments as standard. Not available with option code QT.
- (3) Requires Rosemount Engineering Assistant to configure.
- (4) Not available with output code F or Housing code 01.
- (5) Valid when SuperModule Platform and housing have equivalent approvals.
- (6) Requires PlantWeb Housing and Hardware Adjustments option code D1.
- (7) Limited availability depending on transmitter type and range. Contact a sales representative for additional information.
- (8) Not available with Housing Code 01 or 7J.
- (9) Not available with output code F, Housing code 01, option code DA1, or option code QT.
- (10) Not available with Housing Code 01.
- (11) Not available with output code F. Not available with housing code 01 or 7J.
- (12) Not available with Housing code 00, 01, 5A, or 7J.
- (13) Available with output code A and PlantWeb housing only.
- (14) Not available with Housing code 00, 01, 5A, or 7J. Available with Intrinsically Safe approvals only. For FM Intrinsically Safe, Non-Incendive approval (option code I5) or FM FISCO Intrinsically Safe approval (option code IE), install in accordance with Rosemount drawing 03151-1009 to maintain outdoor rating (NEMA 4X and IP66).

Rosemount 3051S

Rosemount 300S Series Housing “Kit”

| Model | | | |
|---|--|-------------------------------|----------------------|
| 300S | Housing “Kit” for Rosemount 3051S Scalable Pressure Transmitter | | |
| Code | Housing Style | Material⁽¹⁾ | Conduit Entry |
| 1A | <i>PlantWeb</i> housing | Aluminum | 1/2–14 NPT |
| 1B | <i>PlantWeb</i> housing | Aluminum | M20 x 1.5 (CM20) |
| 1C | <i>PlantWeb</i> housing | Aluminum | G ^{1/2} |
| 1J | <i>PlantWeb</i> housing | 316L SST | 1/2–14 NPT |
| 1K | <i>PlantWeb</i> housing | 316L SST | M20 x 1.5 (CM20) |
| 1L | <i>Plantweb</i> housing | 316L SST | G ^{1/2} |
| 2A | Junction Box housing | Aluminum | 1/2–14 NPT |
| 2B | Junction Box housing | Aluminum | M20 x 1.5 (CM20) |
| 2C | Junction Box housing | Aluminum | G ^{1/2} |
| 2J | Junction Box housing | 316L SST | 1/2–14 NPT |
| 2E | Junction Box housing with output for remote interface | Aluminum | 1/2–14 NPT |
| 2F | Junction Box housing with output for remote interface | Aluminum | M20 x 1.5 (CM20) |
| 2G | Junction Box housing with output for remote interface | Aluminum | G ^{1/2} |
| 2M | Junction Box housing with output for remote interface | 316L SST | 1/2–14 NPT |
| 3A | Remote mount display and interface housing | Aluminum | 1/2–14 NPT |
| 3B | Remote mount display and interface housing | Aluminum | M20 x 1.5 (CM20) |
| 3C | Remote mount display and interface housing | Aluminum | G ^{1/2} |
| 3J | Remote mount display and interface housing | 316L SST | 1/2–14 NPT |
| 7J ⁽²⁾ | Quick Connect (A size Mini, 4-pin male termination) | 316L SST | |
| Code | Output | | |
| A | 4–20 mA with digital signal based on HART protocol | | |
| F ⁽³⁾ | FOUNDATION fieldbus protocol | | |
| Code | Options | | |
| <i>PlantWeb</i> Control Functionality | | | |
| A01 ⁽⁴⁾ | FOUNDATION fieldbus Advanced Control Function Block Suite | | |
| <i>PlantWeb</i> Diagnostic Functionality | | | |
| D01 ⁽⁴⁾ | FOUNDATION fieldbus Diagnostics Suite | | |
| DA1 ⁽⁵⁾ | HART Diagnostics Suite | | |
| <i>PlantWeb</i> Enhanced Measurement Functionality | | | |
| H01 ⁽⁴⁾⁽⁶⁾ | Fully Compensated Mass Flow Block | | |
| Special Configuration (Hardware) | | | |
| D1 ⁽⁷⁾ | Hardware adjustments (zero, span, alarm, security) <i>Note: Not available with Housing Style codes 2E, 2F, 2G, 2M, 3A, 3B, 3C, 3J, or 7J.</i> | | |
| D4 | External ground screw assembly | | |
| Product Certifications | | | |
| E1 | ATEX Flameproof | | |
| I1 | ATEX Intrinsically Safe | | |
| IA | ATEX FISCO Intrinsically Safe; for FOUNDATION fieldbus protocol only | | |
| N1 | ATEX Type n | | |
| K1 | ATEX Flameproof, Intrinsically Safe, Type n, Dust (combination of E1, I1, N1, and ND) | | |
| ND | ATEX Dust | | |
| E5 | FM Explosion-proof | | |
| I5 | FM Intrinsically Safe, Non-Incendive | | |
| IE | FM FISCO Intrinsically Safe; for FOUNDATION fieldbus protocol only | | |
| K5 | FM Explosion-proof, Intrinsically Safe, Non-Incendive (combination of E5 and I5) | | |
| E6 | CSA Explosion-proof, Division 2 | | |
| I6 | CSA Intrinsically Safe | | |
| IF | CSA FISCO Intrinsically Safe; for FOUNDATION fieldbus protocol only | | |
| K6 | CSA Explosion-proof, Intrinsically Safe, Division 2 (combination of E6 and I6) | | |
| E7 | SAA Flameproof, Dust Ignition-proof | | |
| I7 | IECEx Intrinsically Safe | | |
| IG | IECEx FISCO Intrinsically Safe | | |
| N7 | IECEx Type n | | |

| | |
|---|--|
| K7 | SAA Flameproof, Dust Ignition-proof, IECEx Intrinsically Safe, and Type n (combination of E7, I7, and N7) |
| KA | ATEX and CSA Flameproof, Intrinsically Safe (combination of E1, I1, E6, and I6) <i>Note: Only available on Housing Style codes 00, IA, IJ, 2A, 2J, 2E, or 2M.</i> |
| KB | FM and CSA Explosion-proof, Intrinsically Safe, Division 2 (combination of E5, E6, I5, and I6) <i>Note: Only available on Housing Style codes 00, IA, IJ, 2A, 2J, 2E, or 2M.</i> |
| KC | FM and ATEX Explosion-proof, Intrinsically Safe, Non-Incendive (combination of E5, E1, I5, and I1) <i>Note: Only available on Housing Style codes 00, IA, IJ, 2A, 2J, 2E, or 2M.</i> |
| KD | FM, CSA, and ATEX Explosion-proof, Intrinsically Safe (combination of E5, I5, E6, I6, E1, and I1) <i>Note: Only available on Housing Style codes 00, IA, IJ, 2A, 2J, 2E, or 2M.</i> |
| Digital Display⁽⁸⁾ | |
| M5 | PlantWeb LCD Display |
| M7 ⁽⁹⁾ | Remote mount LCD display and interface, no cable; PlantWeb housing, SST bracket, requires 4-20 mA / HART output <i>Note: Use Belden 3084A cable or equivalent. Contact an Emerson Process Management representative for additional information.</i> |
| M8 ⁽⁹⁾ | Remote mount LCD display and interface, 50 ft. (15 m) cable; SST bracket, requires 4-20 mA / HART output |
| M9 ⁽⁹⁾ | Remote mount LCD display and interface, 100 ft. (31 m) cable; SST bracket, requires 4-20 mA / HART output |
| Terminal Blocks | |
| T1 ⁽¹⁰⁾ | Transient terminal block |
| T2 ⁽¹¹⁾ | Terminal block with WAGO [®] spring clamp terminals |
| T3 ⁽¹¹⁾ | Transient terminal block with WAGO spring clamp terminals |
| Conduit Electrical Connector | |
| GE ⁽¹²⁾ | M12, 4-pin, Male Connector (eurofast [®]) |
| GM ⁽¹²⁾ | A size Mini, 4-pin, Male Connector (minifast [®]) |
| Typical Model Number: 300S 1A A E5 | |

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

(2) Available with output code A only. Not available with approvals. Contact an Emerson Process Management representative for additional information.

(3) Requires PlantWeb housing.

(4) Requires PlantWeb housing and output code F.

(5) Requires PlantWeb housing and output code A. Includes Hardware Adjustments as standard.

(6) Requires Rosemount Engineering Assistant to configure.

(7) Not available with output code F.

(8) Not available with Housing code 7J.

(9) Not available with output code F, or option code DA1. Only available on Housing Style codes 3A, 3B, 3C, or 3J.

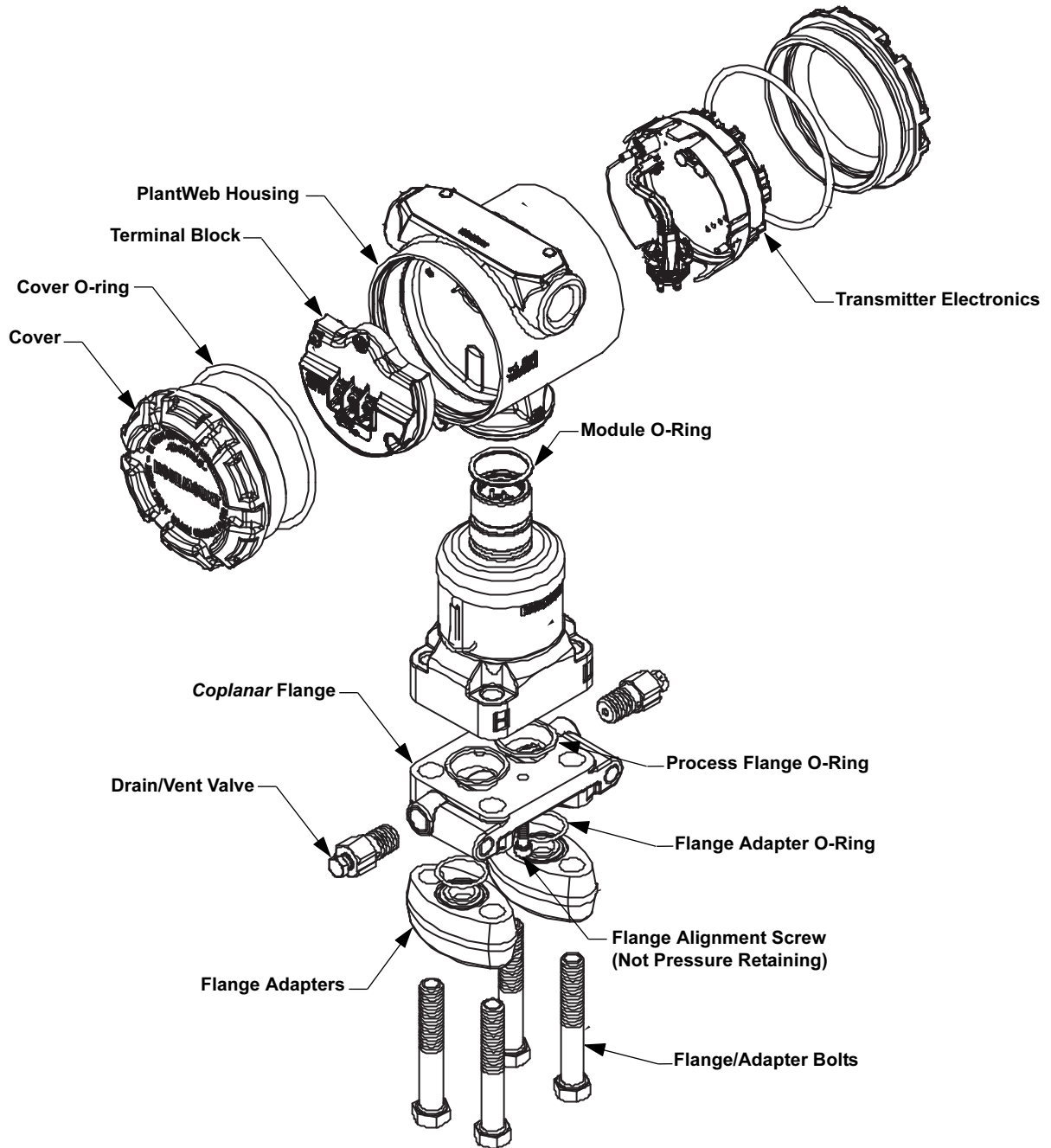
(10) Not available with Housing code 3A, 3B, 3C, 3J, or 7J.

(11) Available with output code A and PlantWeb housing only.

(12) Not available with Housing code 00, 01, or 7J. Available with Intrinsically Safe approvals only. For FM Intrinsically Safe, Non-Incendive approval (option code I5) or FM FISCO Intrinsically Safe approval (option code IE), install in accordance with Rosemount drawing 03151-1009 to maintain outdoor rating (NEMA 4X and IP66).

EXPLODED VIEW DIAGRAM

The following drawing shows the name and location for commonly ordered spare parts.



SPARE PARTS

See Rosemount 3051S_C, 3051S_T & 3051S_L ordering tables in Appendix B (B-25, B-29, and B-32 respectively) for ordering spare sensor modules.

- Typical Model Number 3051S1CD2A2000A00

Electronics Board Assembly Hardware (PlantWeb® Housing)

LCD/Housing Interface Assemblies for Hart Output

| | |
|-------------------------|-----------------|
| Standard Interface | 03151-9010-0001 |
| Hardware Adjustment Kit | 03151-9015-0001 |
| Adjustment Interface | |
| Adjustment Module | |
| Adjustment Interface | 03151-9017-0001 |
| Adjustment Module | 03151-9019-0001 |
| Remote Meter Interface | 03151-9023-0001 |

Fieldbus Output (Includes A01 and D01 PlantWeb Functionality)

| | |
|---|-----------------|
| FOUNDATION™ Fieldbus Upgrade Kit (Standard) | 03151-9021-0021 |
| FOUNDATION Fieldbus Output Electronics | |
| Standard Dual Compartment Terminal Block | |
| FOUNDATION Fieldbus Upgrade Kit (with Transient Protection) | 03151-9021-0022 |
| FOUNDATION Fieldbus Output Electronics | |
| Transient Dual Compartment Terminal Block | |
| FOUNDATION Fieldbus Upgrade Kit (FISCO) | 03151-9021-0023 |
| FOUNDATION Fieldbus Output Electronics | |
| FISCO Dual Compartment Terminal Block | |
| FOUNDATION Fieldbus Output Electronics | 03151-9020-0001 |

HART Advanced Diagnostics Electronics

| | |
|---------------------------------------|-----------------|
| HART Advanced Diagnostics Upgrade Kit | 03151-9070-0001 |
|---------------------------------------|-----------------|

Miscellaneous

| | |
|--|-----------------|
| PlantWeb housing header cable o-ring (package of 12) | 03151-9011-0001 |
|--|-----------------|

Electrical Housing, Terminal Blocks

See Rosemount 300S Series Housing "Kit" in Appendix B, page B-37 for ordering spare housings.

- Typical Model Number 300S1AAE5

PlantWeb Housing Terminal Block, HART (4-20 mA)

| | |
|--|-----------------|
| Standard Dual Compartment Terminal Block Assembly | 03151-9005-0001 |
| Transient Dual Compartment Terminal Block Assembly (Option T1) | 03151-9005-0002 |

PlantWeb Housing Terminal Block, Fieldbus

| | |
|--|-----------------|
| Standard Dual Compartment Terminal Block Assembly | 03151-9005-0021 |
| Transient Dual Compartment Terminal Block Assembly (Option T1) | 03151-9005-0022 |
| FISCO Dual Compartment Terminal Block Assembly | 03151-9005-0023 |

Junction Box Terminal Block, HART (4-20 mA)

| | |
|--|-----------------|
| Standard Junction Box Terminal Block Assembly | 03151-9000-1001 |
| Transient Junction Box Terminal Block Assembly (Option T1) | 03151-9000-1002 |

Junction Box Terminal Block, HART (4-20 mA) with Adjustment

| | |
|--|-----------------|
| Standard Junction Box Terminal Block Assembly, Switch | 03151-9000-2001 |
| Transient Junction Box Terminal Block Assembly, Switch (Option T1) | 03151-9000-2002 |
| Alarm/Security Jumper with O-ring | 03151-9001-0001 |

Remote Meter Terminal Blocks

| | |
|---|-----------------|
| PlantWeb Housing 7-Position Remote Communications Terminal Block Assembly | 03151-9006-0101 |
|---|-----------------|

| | |
|---|-----------------|
| Junction Box Remote Communications Standard Terminal Block Assembly | 03151-9000-1010 |
|---|-----------------|

| | |
|--|-----------------|
| Junction Box Remote Communications Transient Terminal Block Assembly | 03151-9000-1011 |
|--|-----------------|

Covers

| | |
|--|-----------------|
| Aluminum Electronics Cover; Cover and O-ring | 03151-9030-0001 |
|--|-----------------|

| | |
|--|-----------------|
| 316L SST Electronics Cover; Cover and O-ring | 03151-9030-0002 |
|--|-----------------|

Housing Miscellaneous

| | |
|--|-----------------|
| External Ground Screw Assembly (Option D4): Screw, clamp, washer | 03151-9060-0001 |
|--|-----------------|

| | |
|--|-----------------|
| Housing V-Seal for both PlantWeb and Junction Box housings | 03151-9061-0001 |
|--|-----------------|

| | |
|----------------|--------------------|
| Flanges | Part Number |
|----------------|--------------------|

| | |
|------------------------------|--|
| Differential Coplanar Flange | |
|------------------------------|--|

| | |
|----------------------------|-----------------|
| Nickel-plated Carbon Steel | 03151-9200-0025 |
|----------------------------|-----------------|

| | |
|---------|-----------------|
| 316 SST | 03151-9200-0022 |
|---------|-----------------|

| | |
|-------------|-----------------|
| Hastelloy C | 03151-9200-0023 |
|-------------|-----------------|

| | |
|-------|-----------------|
| Monel | 03151-9200-0024 |
|-------|-----------------|

| | |
|-------------------------------|--|
| Gage/Absolute Coplanar Flange | |
|-------------------------------|--|

| | |
|----------------------------|-----------------|
| Nickel-plated Carbon Steel | 03151-9200-1025 |
|----------------------------|-----------------|

| | |
|---------|-----------------|
| 316 SST | 03151-9200-1022 |
|---------|-----------------|

| | |
|-------------|-----------------|
| Hastelloy C | 03151-9200-1023 |
|-------------|-----------------|

| | |
|-------|-----------------|
| Monel | 03151-9200-1024 |
|-------|-----------------|

| | |
|---|-----------------|
| Coplanar Flange Alignment Screw (package of 12) | 03151-9202-0001 |
|---|-----------------|

| | |
|--------------------|--|
| Traditional Flange | |
|--------------------|--|

| | |
|---------|-----------------|
| 316 SST | 03151-9203-0002 |
|---------|-----------------|

| | |
|-------------|-----------------|
| Hastelloy C | 03151-9203-0003 |
|-------------|-----------------|

| | |
|-------|-----------------|
| Monel | 03151-9203-0004 |
|-------|-----------------|

| | |
|------------------------------|--|
| Level Flange, Vertical Mount | |
|------------------------------|--|

| | |
|-----------------------|-----------------|
| 2 in., Class 150, SST | 03151-9205-0221 |
|-----------------------|-----------------|

| | |
|-----------------------|-----------------|
| 2 in., Class 300, SST | 03151-9205-0222 |
|-----------------------|-----------------|

| | |
|-----------------------|-----------------|
| 3 in., Class 150, SST | 03151-9205-0231 |
|-----------------------|-----------------|

| | |
|-----------------------|-----------------|
| 3 in., Class 300, SST | 03151-9205-0232 |
|-----------------------|-----------------|

| | |
|-------------------|-----------------|
| DIN, DN 50, PN 40 | 03151-9205-1002 |
|-------------------|-----------------|

| | |
|-------------------|-----------------|
| DIN, DN 80, PN 40 | 03151-9205-1012 |
|-------------------|-----------------|

Flange Adapter Kits
(Each kit contains adapters, bolts, and o-ring for one DP transmitter or two GP/AP transmitters.)

Differential Flange Adapter Kits

| | |
|---------------------------------------|--|
| CS Bolts, Glass Filled Teflon O-Rings | |
|---------------------------------------|--|

| | |
|--------------|-----------------|
| SST Adapters | 03031-1300-0002 |
|--------------|-----------------|

| | |
|--------------------|-----------------|
| Hastelloy Adapters | 03031-1300-0003 |
|--------------------|-----------------|

| | |
|----------------|-----------------|
| Monel Adapters | 03031-1300-0004 |
|----------------|-----------------|

| | |
|-----------------------|-----------------|
| Ni Plated CS Adapters | 03031-1300-0005 |
|-----------------------|-----------------|

| | |
|--|--|
| SST Bolts, Glass Filled Teflon O-Rings | |
|--|--|

| | |
|--------------|-----------------|
| SST Adapters | 03031-1300-0012 |
|--------------|-----------------|

| | |
|--------------------|-----------------|
| Hastelloy Adapters | 03031-1300-0013 |
|--------------------|-----------------|

| | |
|----------------|-----------------|
| Monel Adapters | 03031-1300-0014 |
|----------------|-----------------|

| | |
|-----------------------|-----------------|
| Ni Plated CS Adapters | 03031-1300-0015 |
|-----------------------|-----------------|

| | |
|--------------------------------|--|
| CS Bolts, Graphite TFE O-Rings | |
|--------------------------------|--|

| | |
|--------------|-----------------|
| SST Adapters | 03031-1300-0102 |
|--------------|-----------------|

| | |
|--------------------|-----------------|
| Hastelloy Adapters | 03031-1300-0103 |
|--------------------|-----------------|

| | |
|----------------|-----------------|
| Monel Adapters | 03031-1300-0104 |
|----------------|-----------------|

| | |
|-----------------------|-----------------|
| Ni Plated CS Adapters | 03031-1300-0105 |
|-----------------------|-----------------|

| | |
|---------------------------------|--|
| SST Bolts, Graphite TFE O-Rings | |
|---------------------------------|--|

| | |
|--------------|-----------------|
| SST Adapters | 03031-1300-0112 |
|--------------|-----------------|

| | |
|-----------------------|-----------------|
| Hastelloy Adapters | 03031-1300-0113 |
| Monel Adapters | 03031-1300-0114 |
| Ni Plated CS Adapters | 03031-1300-0115 |

| Flange Adapter Union | Part Number |
|-----------------------------|--------------------|
|-----------------------------|--------------------|

| | |
|----------------------------|-----------------|
| Nickel-plated Carbon Steel | 03151-9259-0005 |
| 316 SST | 03151-9259-0002 |
| Hastelloy C | 03151-9259-0003 |
| Monel | 03151-9259-0004 |

| Drain/Vent Valve Kits (each kit contains parts for one transmitter) | Part Number |
|--|--------------------|
|--|--------------------|

Differential Drain/Vent Kits

| | |
|---|-----------------|
| 316 SST Valve Stem and Seat Kit | 03151-9268-0022 |
| Hastelloy C Valve Stem and Seat Kit | 03151-9268-0023 |
| Monel Valve Stem and Seat Kit | 03151-9268-0024 |
| 316 SST Ceramic Ball Drain/Vent Kit | 03151-9258-0122 |
| Hastelloy C Ceramic Ball Drain/Vent Kit | 03151-9268-0123 |
| Monel Ceramic Ball Drain/Vent Kit | 03151-9268-0124 |

Gage/Absolute Drain/Vent Kits

| | |
|---|-----------------|
| 316 SST Valve Stem and Seat Kit | 03151-9268-0012 |
| Hastelloy C Valve Stem and Seat Kit | 03151-9268-0013 |
| Monel Valve Stem and Seat Kit | 03151-9268-0014 |
| 316 SST Ceramic Ball Drain/Vent Kit | 03151-9268-0112 |
| Hastelloy C Ceramic Ball Drain/Vent Kit | 03151-9268-0113 |
| Monel Ceramic Ball Drain/Vent Kit | 03151-9268-0114 |

O-Ring Packages (package of 12)

| | |
|--|-----------------|
| Electronic Housing, Cover (Standard and Meter) | 03151-9040-0001 |
| Electronics Housing, Module | 03151-9041-0001 |
| Process Flange, Glass-filled Teflon® | 03151-9042-0001 |
| Process Flange, Graphite-filled Teflon | 03151-9042-0002 |
| Flange Adapter, Glass-filled Teflon | 03151-9043-0001 |
| Flange Adapter, Graphite-filled Teflon | 03151-9043-0002 |

Gland and Collar Kits

| | |
|-----------------------|-----------------|
| Gland and Collar Kits | 03151-9250-0001 |
|-----------------------|-----------------|

Mounting Brackets

Coplanar Flange Bracket Kit

| | |
|--|-----------------|
| B4 Bracket, SST, 2-in. pipe mount, SST bolts | 03151-9270-0001 |
|--|-----------------|

In-line Bracket Kit

| | |
|--|-----------------|
| B4 Bracket, SST, 2-in. pipe mount, SST bolts | 03151-9270-0002 |
|--|-----------------|

Traditional Flange Bracket Kits

| | |
|--|-----------------|
| B1 Bracket, 2-in. pipe mount, CS bolts | 03151-9272-0001 |
| B2 Bracket, panel mount, CS bolts | 03151-9272-0002 |
| B3 Flat Bracket for 2-in. pipe mount, CS bolts | 03151-9272-0003 |
| B7 (B1 style bracket with SST bolts) | 03151-9272-0007 |
| B8 (B2 style bracket with SST bolts) | 03151-9272-0008 |
| B9 (B3 style bracket with SST bolts) | 03151-9272-0009 |
| BA (SST B1 bracket with SST bolts) | 03151-9272-0011 |
| BC (SST B3 bracket with SST bolts) | 03151-9272-0013 |

| Bolt Kits | |
|---|----------------------------------|
| COPLANAR FLANGE | |
| Flange Bolt Kit {44 mm (1.75 in.)} | |
| Carbon Steel (set of 4) | 03151-9280-0001 |
| 316 SST (set of 4) | 03151-9280-0002 |
| ANSI/ASTM-A-193-B7M (set of 4) | 03151-9280-0003 |
| Monel (set of 4) | 03151-9280-0004 |
| Flange/Adapter Bolt Kit {73 mm (2.88 in.)} | |
| Carbon Steel (set of 4) | 03151-9281-0001 |
| 316 SST (set of 4) | 03151-9281-0002 |
| ANSI/ASTM-A-193-B7M (set of 4) | 03151-9281-0003 |
| Monel (set of 4) | 03151-9281-0004 |
| Manifold/Flange Kit {57 mm (2.25 in.)} | |
| Carbon Steel (set of 4) | 03151-9282-0001 |
| 316 SST (set of 4) | 03151-9282-0002 |
| ANSI/ASTM-A-193-B7M (set of 4) | 03151-9282-0003 |
| Monel (set of 4) | 03151-9282-0004 |
| TRADITIONAL FLANGE | |
| Differential Flange and Adapter Bolt Kit | |
| Carbon Steel (set of 8) | 03151-9283-0001 |
| 316 SST (set of 8) | 03151-9283-0002 |
| ANSI/ASTM-A-193-B7M (set of 8) | 03151-9283-0003 |
| Monel (set of 8) | 03151-9283-0004 |
| Gage/Absolute Flange and Adapter Bolt Kit | |
| Carbon Steel (set of 6) | 03151-9283-1001 |
| 316 SST (set of 6) | 03151-9283-1002 |
| ANSI/ASTM-A-193-B7M (set of 6) | 03151-9283-1003 |
| Monel (set of 6) | 03151-9283-1004 |
| 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 (Each kit contains bolts for one transmitter) | |
| Carbon Steel (set of 4) | 03151-9285-0001 |
| 316 SST (set of 4) | 03151-9285-0002 |
| Meters | Part Number |
| Indicating Meter for Plantweb Aluminum Housing | |
| Meter Kit: LCD assembly, 4-pin interconnection header and aluminum meter cover assembly | 03151-9193-0001 |
| Meter Only: LCD assembly, 4-pin interconnection header | 03151-9193-0002 |
| Cover Assembly Kit: aluminum meter cover assembly | 03151-9193-0003 |
| Indicating Meter for Plantweb 316L SST Housing | |
| Meter Kit: LCD assembly, 4-pin interconnection header, 316L SST meter cover assembly | 03151-9193-0004 |
| Meter Only: LCD assembly, 4-pin interconnection header | 03151-9193-0002 |
| Cover Assembly Kit: 316L SST meter cover assembly | 03151-9193-0005 |

Appendix C Product Certifications

| | |
|--|-----------|
| Approved Manufacturing Locations | page C-1 |
| European Directive Information | page C-1 |
| Ordinary Location Certification for FM | page C-1 |
| Hazardous Locations Certifications | page C-2 |
| Installation Drawings | page C-6 |
| European ATEX Directive Information | page C-39 |

This section contains hazardous location certifications for 3051S HART protocol.

APPROVED MANUFACTURING LOCATIONS

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

EUROPEAN DIRECTIVE INFORMATION

The EC declaration of conformity for all applicable European directives for this product can be found at www.rosemount.com. A hard copy may be obtained by contacting an Emerson Process Management representative.

ATEX Directive (94/9/EC)

Emerson Process Management complies with the ATEX Directive.

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

Models 3051S_CA4; 3051S_CD2, 3, 4, 5; (also with P9 option) Pressure Transmitters — QS Certificate of Assessment -

EC No. PED-H-20, Module H Conformity Assessment

All other Model 3051S Pressure Transmitters
— Sound Engineering Practice

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

Primary Elements, Flowmeter

— See appropriate Primary Element QIG

Electro Magnetic Compatibility (EMC) (89/336/EEC)

All Models: EN 50081-1: 1992; EN 50082-2:1995;
EN 61326-1:1997 + A1, A2, and A3 – Industrial

ORDINARY LOCATION CERTIFICATION FOR FM

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

HAZARDOUS LOCATIONS CERTIFICATIONS

North American Certifications

FM Approvals


- E5** Explosion-proof for Class I, Division 1, Groups B, C, and D; dust-ignition proof for Class II and Class III, Division 1, Groups E, F, and G; hazardous locations; enclosure Type 4X, conduit seal not required when installed according to Rosemount drawing 03151-1003.
- I5/IE** Intrinsically Safe for use in Class I, Division 1, Groups A, B, C, and D; Class II, Division 1, Groups E, F, and G; Class III, Division 1; Class I, Zone 0 AEx ia IIC when connected in accordance with Rosemount drawing 03151-1006; Non-incendive for Class I, Division 2, Groups A, B, C, and D Enclosure Type 4X
For entity parameters see control drawing 03151-1006.

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, when installed per Rosemount drawing 03151-1013, CSA Enclosure Type 4X; conduit seal not required.
- I6/IF** Intrinsically Safe for Class I, Division 1, Groups A, B, C, and D when connected in accordance with Rosemount drawings 03151-1016;
For entity parameters see control drawing 03151-1016.

European Certifications

I1/IA ATEX Intrinsic Safety

Certificate No.: BAS01ATEX1303X  II 1G

EEx ia IIC T4 (T_a = -60 °C to 70 °C) -HART/Safety-Certified/Remote Display/Quick Connect/HART Diagnostics

EEx ia IIC T4 (T_a = -60 °C to 70 °C) -FOUNDATION fieldbus

EEx ia IIC T4 (T_a = -60 °C to 40 °C) -FISCO

CE 1180


TABLE 1. Input Parameters

| Loop / Power | Groups |
|--------------------------|--|
| U _i = 30 V | HART / FOUNDATION fieldbus/ Remote Display / Safety-Certified / Quick Connect / HART Diagnostics |
| U _i = 17.5 V | FISCO |
| I _i = 300 mA | HART / FOUNDATION fieldbus/ Remote Display / Safety-Certified / Quick Connect / HART Diagnostics |
| I _i = 380 mA | FISCO |
| P _i = 1.0 W | HART / Remote Display / Safety-Certified / Quick Connect / HART Diagnostics |
| P _i = 1.3 W | FOUNDATION fieldbus |
| P _i = 5.32 W | FISCO |
| C _i = 30 nF | <i>SuperModule</i> [™] Platform / Quick Connect |
| C _i = 11.4 nF | HART / Safety-Certified / HART Diagnostics |
| C _i = 0 | FOUNDATION fieldbus / Remote Display / FISCO |
| L _i = 0 | HART / FOUNDATION fieldbus/ Safety-Certified / FISCO / Quick Connect / HART Diagnostics |
| L _i = 60 μH | Remote Display |

Special conditions for safe use (x)

1. The apparatus, excluding the Types 3051 S-T and 3051 S-C (In-line and *Coplanar SuperModule* Platforms respectively), is not capable of withstanding the 500V test as defined in Clause 6.4.12 of EN 50020. This must be considered during installation.
2. The terminal pins of the Types 3051 S-T and 3051 S-C must be protected to IP20 minimum.

N1 ATEX Type n

Certificate No.: BAS01ATEX3304X  II 3 G

EEx nL IIC T4 (T_a = -40 °C TO 70 °C)


U_i = 45 Vdc max

IP66

CE


Special conditions for safe use (x)

The apparatus is not capable of withstanding the 500V insulation test required by Clause 9.1 of EN 50021: 1999. This must be taken into account when installing the apparatus.

- ND** ATEX Dust
Certificate No.: BAS01ATEX1374X  II 1 D
T105°C (-20 °C ≤ T_{amb} ≤ 85 °C)
V_{max} = 42.4 volts max
A = 24 mA
IP66
CE 1180

Special conditions for safe use (x)

1. The user must ensure that the maximum rated voltage and current (42.4 volts, 22 milliamperes, DC) are not exceeded. All connections to other apparatus or associated apparatus shall have control over this voltage and current equivalent to a category “ib” circuit according to EN 50020.
2. Cable entries must be used which maintain the ingress protection of the enclosure to at least IP66.
3. Unused cable entries must be filled with suitable blanking plugs which maintain the ingress protection of the enclosure to at least IP66.
4. Cable entries and blanking plugs must be suitable for the ambient range of the apparatus and capable of withstanding a 7J impact test.
5. The 3051S must be securely screwed in place to maintain the ingress protection of the enclosure. (The 3051S SuperModule must be properly assembled to the 3051S housing to maintain ingress protection.)

- E1** ATEX Flameproof
Certificate No.: KEMA00ATEX2143X  II 1/2 G
EEx d IIC T6 (-50 °C ≤ T_{amb} ≤ 65 °C)
V_{max} = 42.4V
CE 1180

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

Japanese Certifications

E4 JIS Flameproof
Ex d IIC T6

| Certificate | Description |
|-------------|---|
| TC15682 | Coplanar with Junction Box Housing |
| TC15683 | Coplanar with <i>PlantWeb</i> Housing |
| TC15684 | Coplanar with <i>PlantWeb</i> Housing and LCD Display |
| TC15685 | In-Line SST with Junction Box Housing |
| TC15686 | In-Line <i>Hastelloy</i> with Junction Box Housing |
| TC15687 | In-Line SST with <i>PlantWeb</i> Housing |
| TC15688 | In-Line <i>Hastelloy</i> with <i>Plantweb</i> Housing |
| TC15689 | In-Line SST with <i>Plantweb</i> Housing and LCD Display |
| TC15690 | In-Line <i>Hastelloy</i> with <i>PlantWeb</i> Housing and LCD Display |
| TC17102 | Remote Display |

Australian Certifications

E7 SAA Explosion-proof and Dust Ignition-proof
Certification No.: AUS Ex 3798X
Ex d IIC T6 (T_a = 60°C) IP66
DIP A21 TA T6 (T_a = 60°C) IP66

Special conditions for safe use (x)

1. It is a condition of manufacture that each transmitter module shall be pressure tested in accordance with clause 4.3 of AS 2380.2 at minimum pressure of 1450 kPa. As the model 300S housing passed tests at 4 times the reference pressures (400 kPa for single and 3800 kPa for dual compartment housing) and are not of welded construction, they may be exempted from the routing pressure test of clause 4.3 of AS 2380.2.
2. It is a condition of manufacture that each transmitter module and housing combination shall be subjected to a routine high voltage test in accordance with clause 6.2 of AS 2380.1, with the following variation. The test voltage applied to each single or dual compartment housing shall not be less than 500 V, 47 to 62 Hz, for a period of not less than one minute, with a breakdown current of less than 5 mA.
3. It is a condition of safe use that each housing shall be connected to external circuits via suitable conduit or Standards Australia certified cable glands. Where only one entry is used for connection to external circuits, the unused entry shall be closed by means of the blanking plug supplied by the equipment manufacturer or by a suitable Standards Australia certified blanking plug.
4. It is a condition of safe use that a dielectric strength test shall be applied whenever the terminal block is changed or replaced in either the dual compartment or single compartment housings. The breakdown current shall be less than 5 mA, when 500 V, 47 to 62 Hz, is applied for one minute. **Note:** if tested with an optional T1 transient protector terminal block fitted, the protection will operate and hence there will be no current indicated.
5. It is a condition of safe use that each transmitter module shall be used with a Rosemount 300S housing, in order to comply with flameproof requirements.
6. It is a condition of safe use that each model 300S housing fitted with a transmitter module shall be marked with the same certification marking code information. Should the housing be replaced after initial supply to another model 300S housing, the replacement housing shall have the same certification marking code information as the housing it replaces.

IECEX Certifications

I7/IG IECEX Intrinsic Safety

Certificate No.: IECEXBAS04.0017X
 Ex ia IIC T4 (T_a = -60 °C to 70 °C) -HART/Safety-Certified/Remote Display/Quick Connect/
 HART Diagnostics
 Ex ia IIC T4 (T_a = -60 °C to 70 °C) -FOUNDATION fieldbus
 Ex ia IIC T4 (T_a = -60 °C to 40 °C) -FISCO
 IP66

TABLE 2. Input Parameters

| Loop / Power | Groups |
|--------------------------|---|
| U _i = 30 V | HART / FOUNDATION fieldbus/ Remote Display / Safety-Certified / Quick Connect / HART Diagnostics |
| U _i = 17.5 V | FISCO |
| I _i = 300 mA | HART / FOUNDATION fieldbus/ Remote Display / Safety-Certified / Quick Connect / HART Diagnostics |
| I _i = 380 mA | FISCO |
| P _i = 1.0 W | HART / Remote Display / Safety-Certified / Quick Connect / HART Diagnostics |
| P _i = 1.3 W | FOUNDATION fieldbus |
| P _i = 5.32 W | FISCO |
| C _i = 30 nF | <i>SuperModule</i> [™] Platform / Quick Connect |
| C _i = 11.4 nF | HART / Safety-Certified / HART Diagnostics |
| C _i = 0 | FOUNDATION fieldbus / Remote Display / FISCO / Quick Connect / HART Diagnostics |
| L _i = 0 | HART / FOUNDATION fieldbus/ Safety-Certified / FISCO / Quick Connect / HART Diagnostics |
| L _i = 60 μ H | Remote Display |

Special conditions for safe use (x)

- 1.The Models 3051S HART 4-20mA, 3051S fieldbus, 3051S Profibus and 3051S FISCO are not capable of withstanding the 500V test as defined in clause 6.4.12 of IEC 60079-11. This must be taken into account during installation.
- 2.The terminal pins of the Types 3051S-T and 3051S-C must be protected to IP20 minimum.

N7 IECEX Type n

Certificate No.: IECEXBAS04.0018X
 Ex nC IIC T4 (T_a = -40 °C to 70 °C)
 U_i = 45 Vdc MAX
 IP66

Special conditions for safe use (x)

The apparatus is not capable of withstanding the 500 V insulation test required by Clause 8 of IEC 79-15: 1987.

Combinations of Certifications

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

- K1** Combination of E1, I1, N1, and ND
- K5** Combination of E5 and I5
- K6** Combination of E6 and I6
- K7** Combination of E7, I7, and N7
- KA** Combination of E1, I1, E6, and I6
- KB** Combination of E5, I5, I6 and E6
- KC** Combination of E5, E1, I5 and I1
- KD** Combination of E5, I5, E6, I6, E1, and I1

INSTALLATION DRAWINGS

Factory Mutual (FM)

| REVISIONS | | | | | |
|-----------|-----|-------------------------------------|------------|--------|---------|
| ZONE | REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| | AA | NEW RELEASE | RTC1009618 | P.C.S. | 9/11/00 |
| | AB | ADD 3051S_L AND TRADITIONAL HOUSING | RTC1015145 | B.L.H. | 4/7/03 |

NOTES:

1. WIRING METHOD SUITABLE FOR CLASS I, DIV 1 or CLASS I, ZONE 1 WITH ANY LENGTH.
2. TRANSMITTER MUST NOT BE CONNECTED TO EQUIPMENT GENERATING MORE THAN 250 VAC.
3. ALL CONDUIT THREADS TO BE ASSEMBLED WITH FIVE FULL THREADS MINIMUM.
4. COMPONENTS REQUIRED TO BE APPROVED MUST BE APPROVED FOR GAS GROUP APPROPRIATE TO AREA CLASSIFICATION.
5. 3051SC, 3051ST OR 3051SL SENSOR MODULE MUST BE INSTALLED WITH FM FLAMEPROOF / EXPLOSIONPROOF APPROVED 300S1, 300S2 OR 300S4 HOUSING ATTACHED TO MEET FLAMEPROOF / EXPLOSIONPROOF INSTALLATION REQUIREMENTS.
6. INSTALLATION TO BE IN ACCORDANCE WITH THE LATEST EDITION OF NATIONAL ELECTRICAL CODE (NFPA 70).
7. 300S1, 300S2 OR 300S4 HOUSING MUST BE INSTALLED WITH FM FLAMEPROOF / EXPLOSIONPROOF APPROVED 3051SC, 3051ST OR 3051SL SENSOR MODULE ATTACHED TO MEET FLAMEPROOF / EXPLOSIONPROOF INSTALLATION REQUIREMENTS.
8. UNUSED CONDUIT ENTRY MUST BE CLOSED WITH SUITABLE BLANKING ELEMENT.

CAD Maintained, (Pro/E)

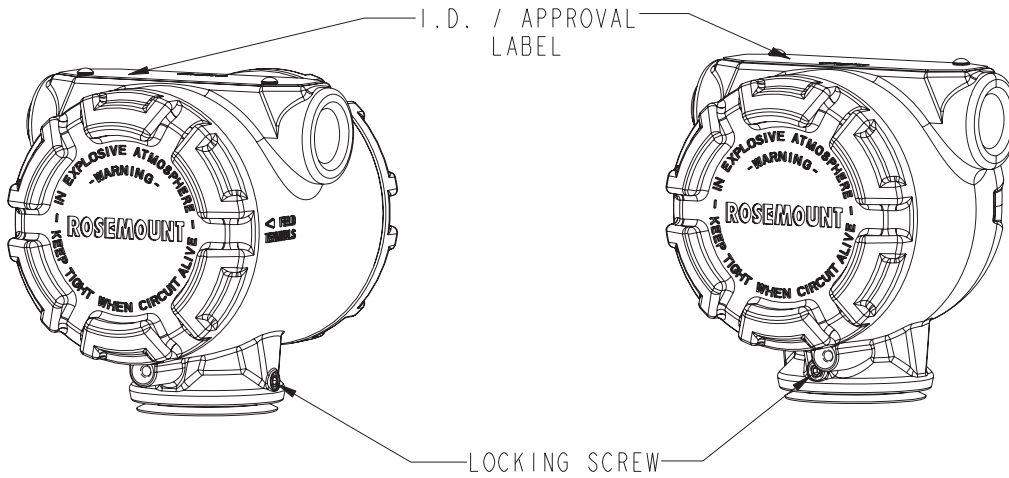
| | | | | | |
|--|-----------------------------|----------------|--|--------------|---------------------------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES [mm]. REMOVE ALL BURRS AND SHARP EDGES. MACHINE SURFACE FINISH 125 -TOLERANCES- .X ± .1 [2,5] .XX ± .02 [0,5] .XXX ± .010 [0,25] FRACTIONS ANGLES ± 1/32 ± 2 | CONTRACT NO. | | ROSEMOUNT® 8200 Market Boulevard • Chanhassen, MN 55317 USA | | |
| | DR. <i>Myles Lee Miller</i> | 8/28/00 | TITLE MODEL 3051 / 300 EXPLOSIONPROOF / FLAMEPROOF INSTALLATION DRAWING, FM | | |
| | CHK'D | . | | | |
| | APP'D <i>Paul C. Sundet</i> | 9/11/00 | SIZE A | FSCM NO. | DRAWING NO. 03151-1003 |
| APP'D GOVT. | | SCALE 1 : 4 | WT. | SHEET 1 OF 3 | |

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

COMPONENT IDENTIFICATION

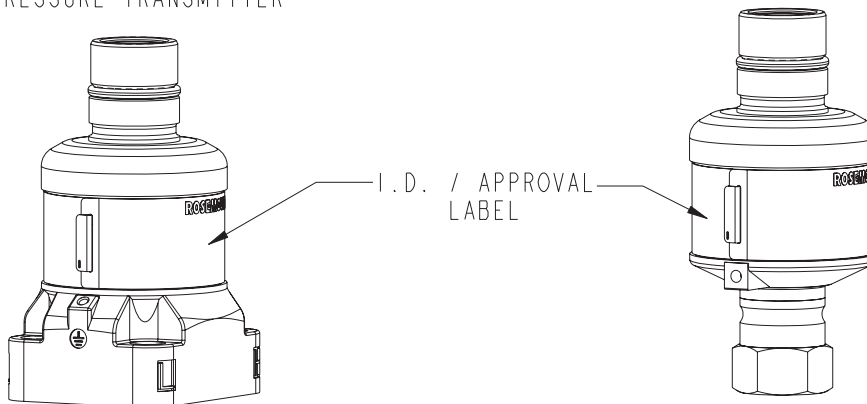
300S1____, PLANTWEB
 300S4____, TRADITIONAL
 (DUAL COMPARTMENT HOUSING)

300S2____
 JUNCTION BOX HOUSING
 (SINGLE COMPARTMENT)



3051S_C____
 3051S_L____
 SCALABLE COPLANAR
 PRESSURE TRANSMITTER

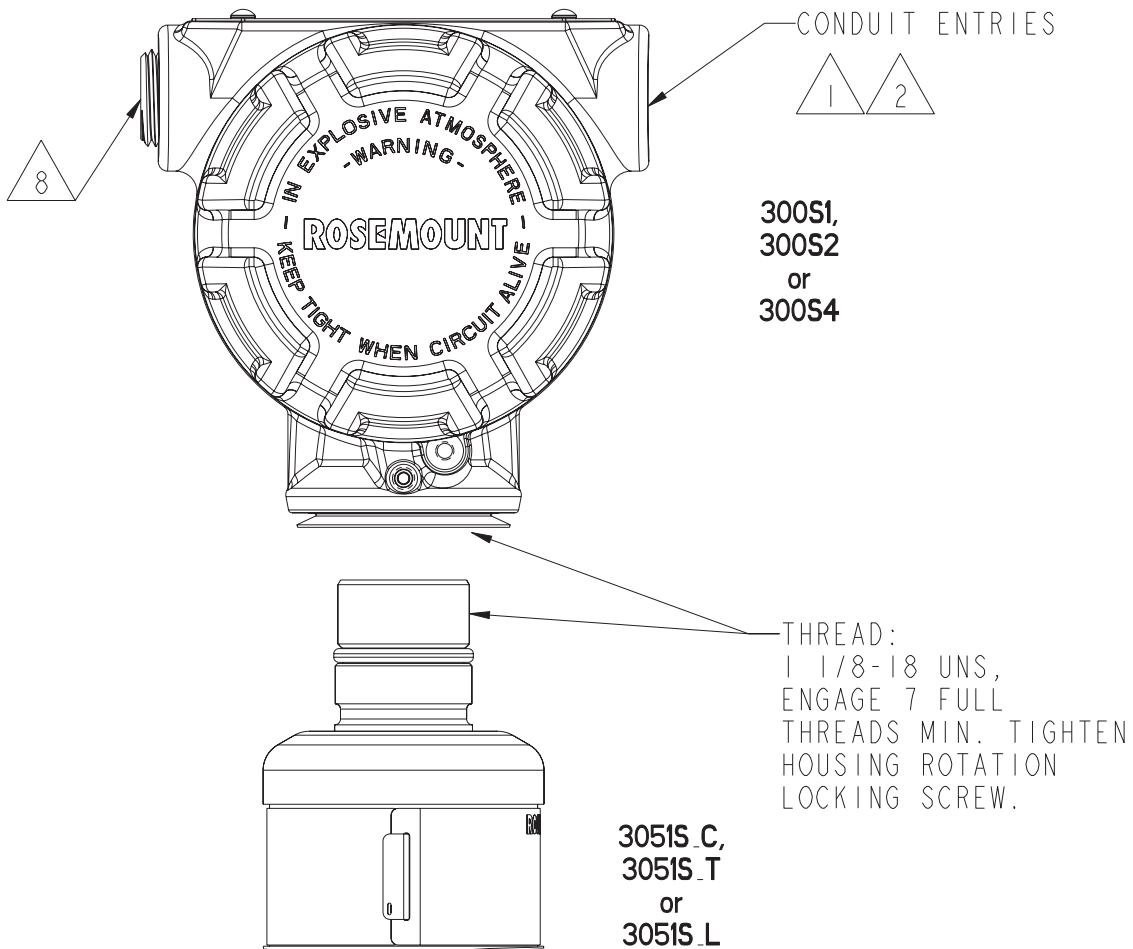
3051S_T____
 SCALABLE IN-LINE
 PRESSURE TRANSMITTER



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

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

HOUSING TO MODULE ASSEMBLY



| | | | | | |
|---|---------|-------------------------|----------|---------|--------------|
| Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA | | CAD Maintained, (Pro/E) | | | |
| DR. <i>Myles Lee Miller</i> | 8/28/00 | SIZE A | FSCM NO. | DWG NO. | 03151-1003 |
| ISSUED | | SCALE | 1 : 4 | WT. | SHEET 3 OF 3 |

| CONFIDENTIAL AND PROPRIETARY INFORMATION IS CONTAINED HEREIN AND MUST BE HANDLED ACCORDINGLY | REVISIONS | | | | |
|--|-------------------------------|---|------------|---------|---------|
| | REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| | AJ | ADD UPDATE TO OUTPUT CODE B | RTC1017135 | B.L.H. | 3/12/04 |
| | AK | ADD NOTE 10, CHANGE BARRIER CURRENT LIMIT FOR OUTPUT CODE B | RTC1017241 | B.L.H. | 3/26/04 |
| | AL | ADD QUICK CONNECT | RTC1017568 | B.L.H. | 5/15/04 |
| AM | ADD DIAGNOSTICS FEATURE BOARD | RTC1020856 | J.D.V. | 3/23/06 | |


ENTITY APPROVALS FOR MODELS 3051S & 300S

OUTPUT CODE A & B (4-20 mA HART) I.S. SEE SHEETS 2-5
 REMOTE DISPLAY (4-20 mA HART) I.S. SEE SHEET 6
 OUTPUT CODE F/W (FIELDBUS/PROFIBUS) I.S. SEE SHEET 7
 FISCO SEE SHEETS 8-9
 ALL OUTPUT CODES NONINCENDIVE SEE SHEET 10

THE ROSEMOUNT TRANSMITTERS LISTED ABOVE ARE F.M. APPROVED AS INTRINSICALLY SAFE WHEN USED IN CIRCUIT WITH F.M. APPROVED BARRIERS WHICH MEET THE ENTITY PARAMETERS LISTED IN THE CLASS I, II, AND III, DIVISION 1 GROUPS INDICATED.

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

CAD MAINTAINED (MicroStation)

| | | | | | | | |
|--|--|------------------------------|---|---------|------------|---|---------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES (mm). REMOVE ALL BURRS AND SHARP EDGES. MACHINE SURFACE FINISH 125 | CONTRACT NO. | |  ROSEMOUNT® 8200 Market Boulevard • Chanhassen, MN 55317 USA | | | | |
| | DR. Myles Lee Miller | 2/23/01 | | | TITLE | INDEX OF I.S. & NONINCENDIVE F.M. FOR 3051S | |
| | -TOLERANCE- | CHK'D | SIZE | FSCM NO | DWG NO. | | |
| | .X ± .1 [2,5] .XX ± .02 [0,5] .XXX ± .010 [0,25] | APP'D. Paul C. Sundet | A | | 03151-1006 | | |
| FRACTIONS ± 1/32 | ANGLES ± 2' | APP'D. GOVT. | SCALE | N/A | WT. | SHEET | 1 OF 11 |

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

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} , U_o OR V_t) AND MAX. SHORT CIRCUIT CURRENT (I_{sc} , I_o , OR I_t) AND MAX. POWER P_o ($V_{oc} \times I_{sc}/4$) 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} , OR U_i), MAXIMUM SAFE INPUT CURRENT (I_{max} OR I_i), AND MAXIMUM SAFE INPUT POWER (P_{max} OR P_i) 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 'A' MODEL 3051S SUPERMODULE CLASS I, DIV. 1, GROUPS A, B, C AND D

| | |
|---|--|
| U_i or $V_{MAX} = 30V$ | U_o, V_T or V_{OC} IS LESS THAN OR EQUAL TO 30V |
| I_i or $I_{MAX} = 300mA$ | I_o, I_T or I_{SC} IS LESS THAN OR EQUAL TO 300mA |
| P_i or $P_{MAX} = 1.0$ WATT | $(\frac{V_T \times I_T}{4})$ or $(\frac{V_{oc} \times I_{sc}}{4})$ IS LESS THAN OR EQUAL TO 1.0 WATT |
| $C_i = 38nF$ | C_A IS GREATER THAN 38nF |
| $L_i = \emptyset$ | L_A IS GREATER THAN \emptyset H |
| T4 ($T_a = -50^\circ C$ to $+70^\circ C$) | T5 ($T_a = -50^\circ C$ to $+40^\circ C$) |

FOR OUTPUT CODE 'A' MODEL 300S JUNCTION BOX, 300S PLANTWEB HOUSING, OR 3051S QUICK CONNECT CLASS I, DIV. 1, GROUPS A, B, C AND D

| | |
|---|--|
| U_i or $V_{MAX} = 30V$ | U_o, V_T or V_{OC} IS LESS THAN OR EQUAL TO 30V |
| I_i or $I_{MAX} = 300mA$ | I_o, I_T or I_{SC} IS LESS THAN OR EQUAL TO 300mA |
| P_i or $P_{MAX} = 1.0$ WATT | $(\frac{V_T \times I_T}{4})$ or $(\frac{V_{oc} \times I_{os}}{4})$ IS LESS THAN OR EQUAL TO 1.0 WATT |
| $C_i = 11.4nF$ | C_A IS GREATER THAN 11.4nF |
| $L_i = 2.4 \mu H$ | L_A IS GREATER THAN 2.4 μH |
| T4 ($T_a = -50^\circ C$ to $+70^\circ C$) | |
| T5 ($T_a = -50^\circ C$ to $+40^\circ C$) | |

FOR OUTPUT CODE 'A' WITH HART DIAGNOSTICS SUITE AND MODEL 300S PLANTWEB HOUSING CLASS I, DIV. 1, GROUPS A, B, C AND D

| | |
|---|--|
| U_i or $V_{MAX} = 30V$ | U_o, V_T or V_{OC} IS LESS THAN OR EQUAL TO 30V |
| I_i or $I_{MAX} = 240mA$ | I_o, I_T or I_{SC} IS LESS THAN OR EQUAL TO 240mA |
| P_i or $P_{MAX} = 1.0$ WATT | $(\frac{V_T \times I_T}{4})$ or $(\frac{V_{oc} \times I_{os}}{4})$ IS LESS THAN OR EQUAL TO 1.0 WATT |
| $C_i = 11.4nF$ | C_A IS GREATER THAN 11.4nF |
| $L_i = \emptyset$ | L_A IS GREATER THAN \emptyset |
| T4 ($T_a = -50^\circ C$ to $+70^\circ C$) | |
| T5 ($T_a = -50^\circ C$ to $+40^\circ C$) | |

| | | | |
|---|-------------------------------|---------|---|
| Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA | CAD MAINTAINED (MicroStation) | | |
| DR. | SIZE | FSCM NO | DWG NO. 03151-1006 |
| Myles Lee Miller | A | | |
| ISSUED | SCALE | N/A | WT. _____ SHEET 2 OF 11 |

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

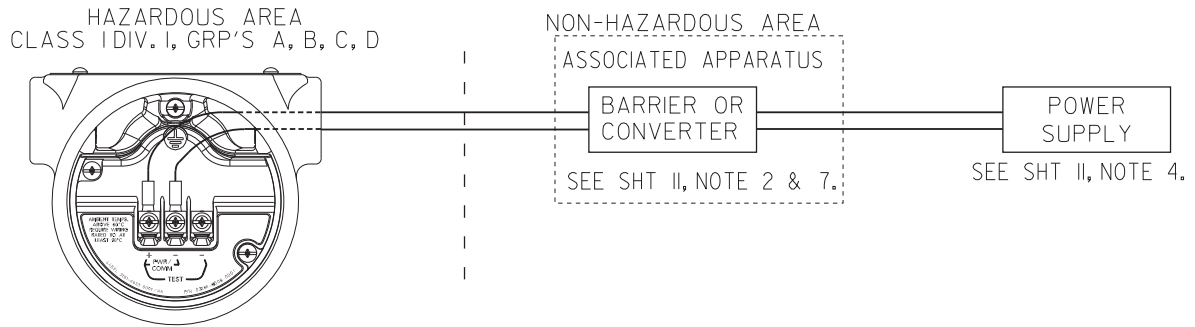
FOR OUTPUT CODE 'B' (SAFETY CERTIFIED) MODEL 300S CLASS 1, DIV. 1, GROUPS A, B, C AND D

| | |
|---|--|
| U_1 or $V_{MAX} = 30V$ | U_o, V_T or V_{OC} IS LESS THAN OR EQUAL TO 30V |
| I_1 or $I_{MAX} = 240mA$ | I_o, I_T or I_{SC} IS LESS THAN OR EQUAL TO 240mA |
| P_1 or $P_{MAX} = 1.0$ WATT | $(\frac{V_T \times I_T}{4})$ or $(\frac{V_{oc} \times I_{os}}{4})$ IS LESS THAN OR EQUAL TO 1.0 WATT |
| $C_1 = 11.4nF$ | C_A IS GREATER THAN 11.4nF |
| $L_1 = 570\mu H$ | L_A IS GREATER THAN 570 μH |
| T4 ($T_a = -50^\circ C$ to $+70^\circ C$) | |
| T5 ($T_a = -50^\circ C$ to $+40^\circ C$) | |

| | | | | |
|---|-----------|-------------------------------|------------|------------|
| Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA | | CAD MAINTAINED (MicroStation) | | |
| DR. Myles Lee Miller | SIZE A | FSCM NO | DWG NO. | 03151-1006 |
| ISSUED | SCALE N/A | WT. | SHEET 3 OF | 11 |

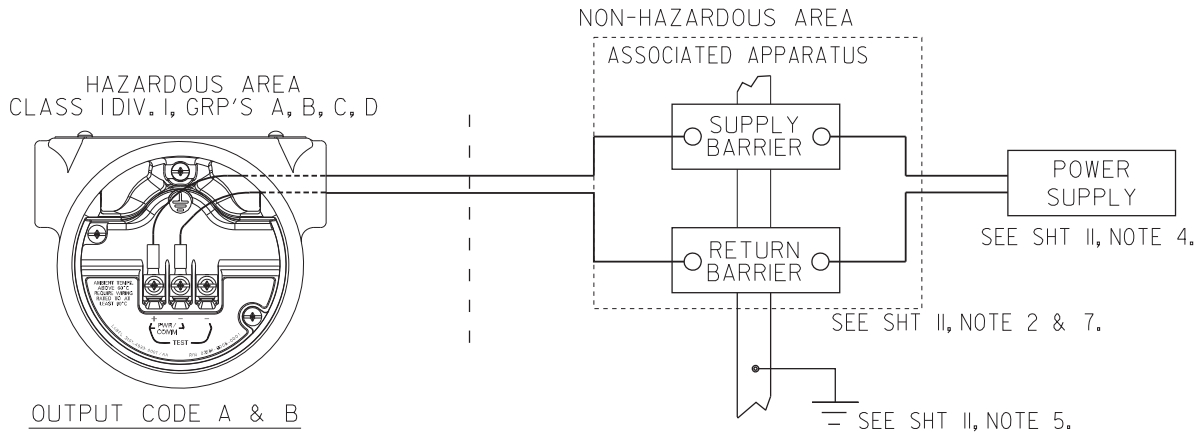
| REVISIONS | | | | |
|-----------|-------------|----------|-------|------|
| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| AM | | | | |

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



OUTPUT CODE A & B
MODELS INCLUDED
3051S WITH 300S
JUNCTION BOX or
PLANTWEB HOUSING

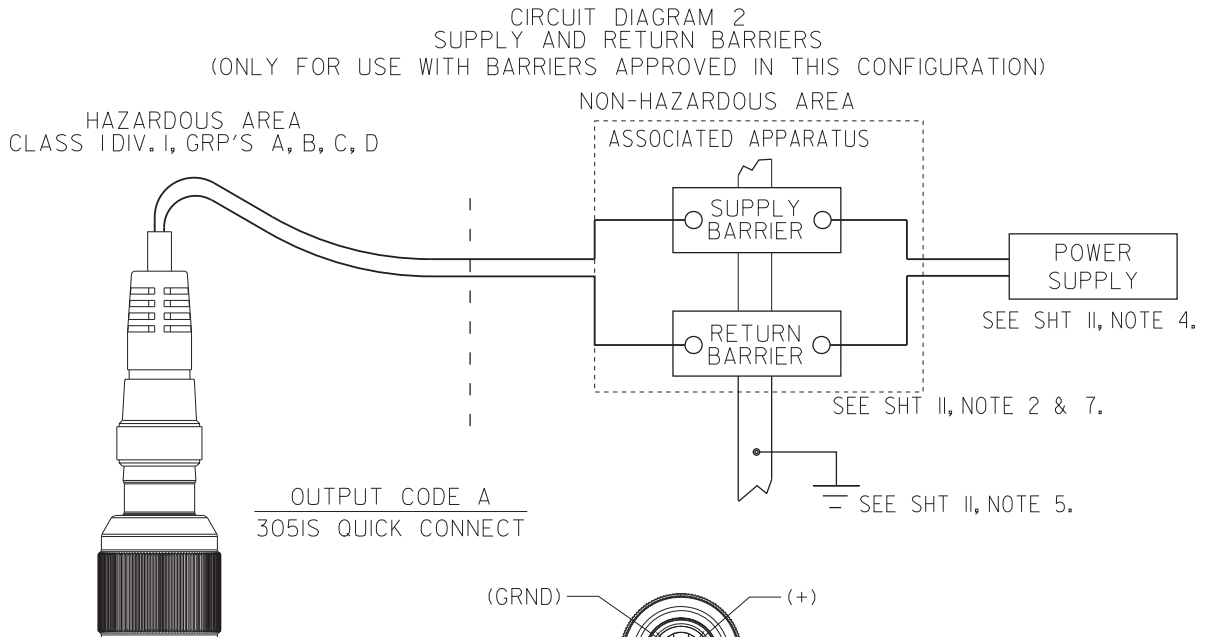
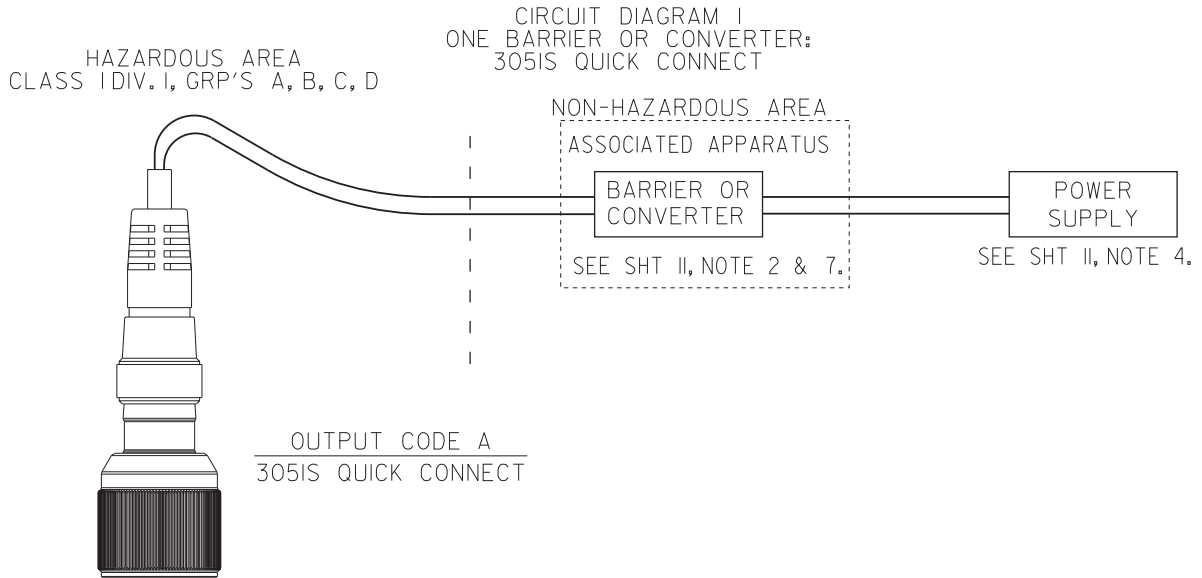
**CIRCUIT DIAGRAM 2
SUPPLY AND RETURN BARRIERS
(ONLY FOR USE WITH BARRIERS APPROVED IN THIS CONFIGURATION)**



OUTPUT CODE A & B
MODELS INCLUDED
3051S WITH 300S
JUNCTION BOX or
PLANTWEB HOUSING

| | | | | |
|---|-------------------------|-------------------------------|--------------|-----------------------|
| Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA | | CAD MAINTAINED (MicroStation) | | |
| DR. | Myles Lee Miller | SIZE A | FSCM NO | DWG NO. 03151-1006 |
| ISSUED | | SCALE N/A | WT. _____ | SHEET 4 OF 11 |

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



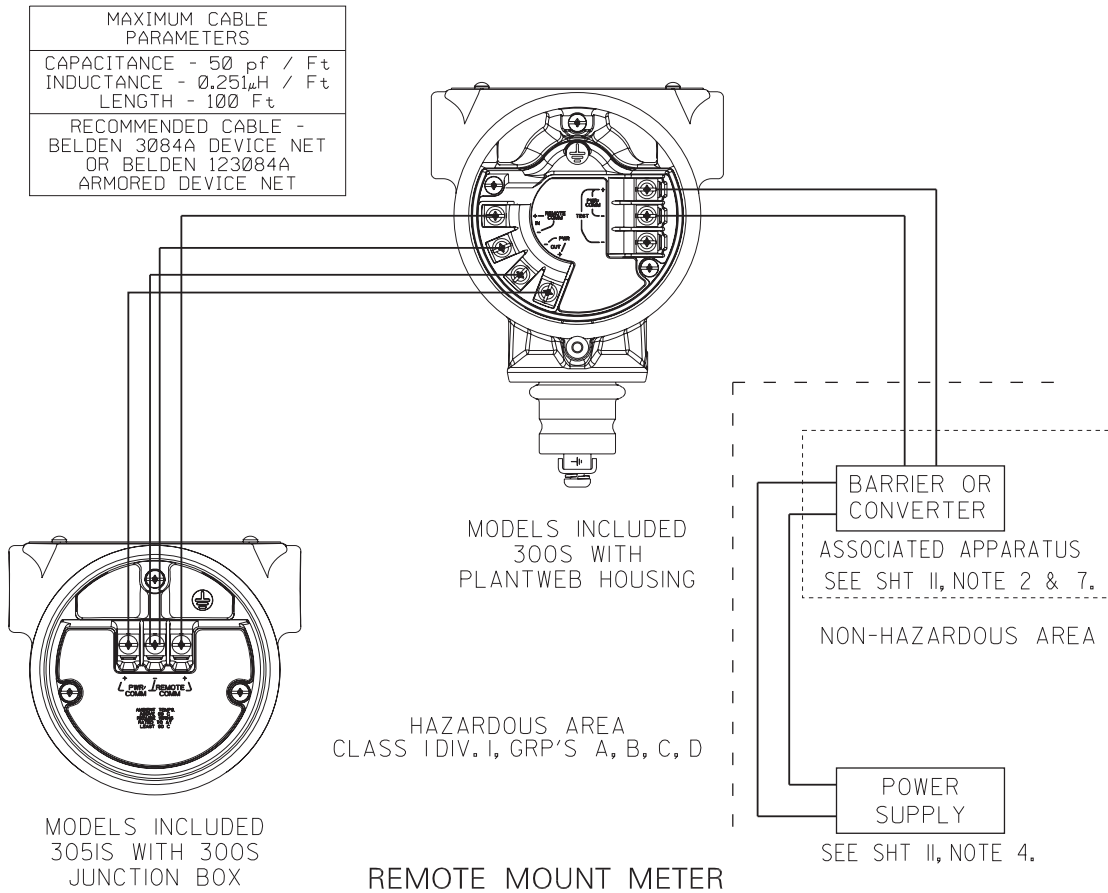
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|---|--------------|-------------------------------|-----------------------|--|
| Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA | | CAD MAINTAINED (MicroStation) | | |
| DR. Myles Lee Miller | SIZE A | FSCM NO | DWG NO. 03151-1006 | |
| ISSUED | SCALE N/A | WT. | SHEET 5 OF 11 | |

Rosemount 3051S

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

OUTPUT CODE A WITH M8 or M9 OPTION
CLASS I, DIV. 1, GROUPS A, B, C AND D

| |
|---|
| U_1 or $V_{MAX} = 30V$ |
| I_1 or $I_{MAX} = 300mA$ |
| P_1 or $P_{MAX} = 1.0$ WATT |
| $C_1 = 0$ |
| $L_1 = 58.2\mu H$ |
| T4 ($T_a = -50^\circ C$ to $+70^\circ C$) |
| T5 ($T_a = -50^\circ C$ to $+40^\circ C$) |



| | | | |
|---|--------------|-------------------------------|-----------------------|
| Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA | | CAD MAINTAINED (MicroStation) | |
| DR. Myles Lee Miller | SIZE A | FSCM NO | DWG NO. 03151-1006 |
| ISSUED | SCALE N/A | WT. | SHEET 6 OF 11 |

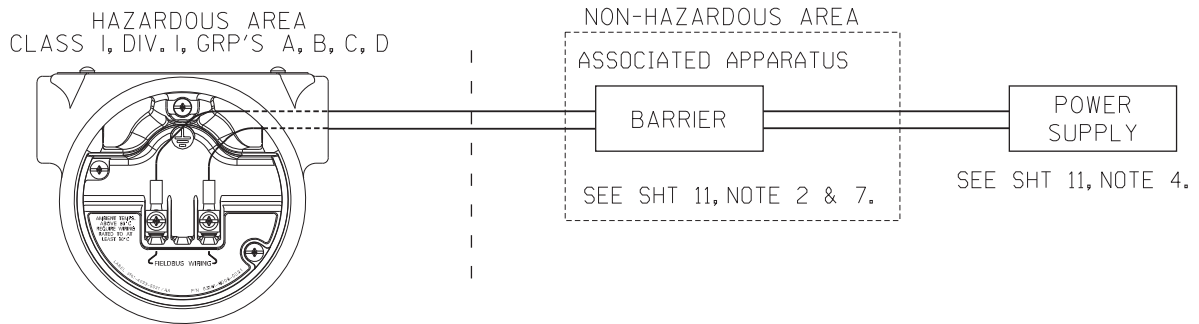
| REVISIONS | | | | |
|-----------|-------------|----------|-------|------|
| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| AM | | | | |

FOR OUTPUT CODE F or W (MODEL 300S)

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

| | |
|---|--|
| U_1 OR $V_{MAX} = 30V$ | $U_0, V_T, \text{ OR } V_{OC}$ IS LESS THAN OR EQUAL TO 30V |
| I_1 OR $I_{MAX} = 300mA$ | $I_0, I_T, \text{ OR } I_{SC}$ IS LESS THAN OR EQUAL TO 300mA |
| P_1 OR $P_{MAX} = 1.3 \text{ WATT}$ | $P_1 (\frac{V_T \times I_T}{4})$ OR $(\frac{V_{OC} \times I_{SC}}{4})$ IS LESS THAN OR EQUAL TO 1.3 WATT |
| $C_T = 0\mu f$ | C_A IS GREATER THAN $0\mu f$ |
| $L_T = 0\mu H$ | L_A IS GREATER THAN $0\mu H$ |
| T4 ($T_a = -50^\circ C$ TO $+60^\circ C$) | |

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



OUTPUT CODE F or W
 MODELS INCLUDED
 3051S WITH 300S
 PLANTWEB HOUSING

| | | | | |
|---|--------------|-------------------------------|-----------------------|--|
| Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA | | CAD MAINTAINED (MicroStation) | | |
| DR. Myles Lee Miller | SIZE A | FSCM NO | DWG NO. 03151-1006 | |
| ISSUED | SCALE N/A | WT. | SHEET 7 OF 11 | |

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

FISCO CONCEPT

THE FISCO CONCEPT ALLOWS INTERCONNECTION OF INTRINSICALLY SAFE APPARATUS TO ASSOCIATED APPARATUS NOT SPECIALLY EXAMINED IN SUCH COMBINATION. THE CRITERIA FOR INTERCONNECTION IS THAT THE VOLTAGE (U_1 OR V_{max}), THE CURRENT (I_1 OR I_{max}), AND THE POWER (P_1 OR P_{max}) WHICH AN INTRINSICALLY SAFE APPARATUS CAN RECEIVE AND REMAIN INTRINSICALLY SAFE CONSIDERING FAULTS, MUST BE EQUAL OR GREATER THAN VOLTAGE (U_0 , V_{oc} , OR V_t), THE CURRENT (I_0 , I_{sc} , OR I_t) AND THE POWER (P_0 OR P_{max}) LEVELS WHICH CAN BE DELIVERED BY THE ASSOCIATED APPARATUS, CONSIDERING FAULTS AND APPLICABLE FACTORS. IN ADDITION, THE MAXIMUM UNPROTECTED CAPACITANCE (C_1) AND THE INDUCTANCE (L_1) OF EACH APPARATUS (OTHER THAN THE TERMINATION) CONNECTED TO THE FIELDBUS MUST BE LESS THAN OR EQUAL TO 5 nF AND 10 μ H RESPECTIVELY.

IN EACH SEGMENT ONLY ONE ACTIVE DEVICE, NORMALLY THE ASSOCIATED APPARATUS, IS ALLOWED TO PROVIDE THE NECESSARY ENERGY FOR THE FIELDBUS SYSTEM. THE VOLTAGE U_0 (OR V_{oc} OR V_t) OF THE ASSOCIATED APPARATUS IS LIMITED TO A RANGE OF 14V TO 24Vd.c. ALL OTHER EQUIPMENT CONNECTED TO THE BUS CABLE HAS TO BE PASSIVE, MEANING THAT THEY ARE NOT ALLOWED TO PROVIDE ENERGY TO THE SYSTEM, EXCEPT A LEAKAGE CURRENT OF 50 μ A FOR EACH CONNECTED DEVICE. SEPARATELY POWERED EQUIPMENT NEEDS GALVANIC ISOLATION TO ASSURE THAT THE INTRINSICALLY SAFE FIELDBUS CIRCUIT REMAINS PASSIVE.

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

| | |
|--|-----------------------------|
| Loop Resistance R': | 15.....150 Ohm/km |
| Inductance per unit length L': | 0.4.....1 mH/km |
| Capacitance per unit length C': | 80.....200 nF |
| C' = C' line/line + 0.5C' line/screen, if both lines are floating, or | |
| C' = C' line/line + C' line/screen, if the screen is connected to one line | |
| Length of trunk cable: | less than or equal to 1000m |
| Length of spur cable: | less than or equal to 30m |
| Length of spur splice: | less than or equal to 1m |

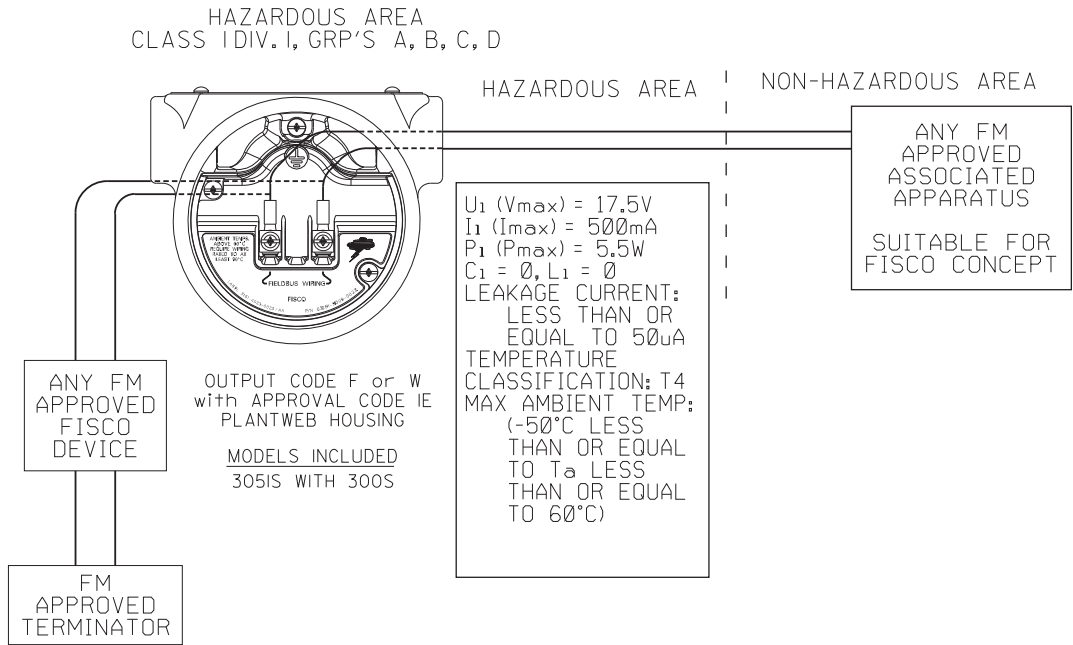
AT EACH END OF THE TRUNK CABLE AN APPROVED INFALLIBLE LINE TERMINATION WITH THE FOLLOWING PARAMETERS IS SUITABLE:

$$R = 90.....1000\Omega \quad C = 0.....2.2\mu F$$

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

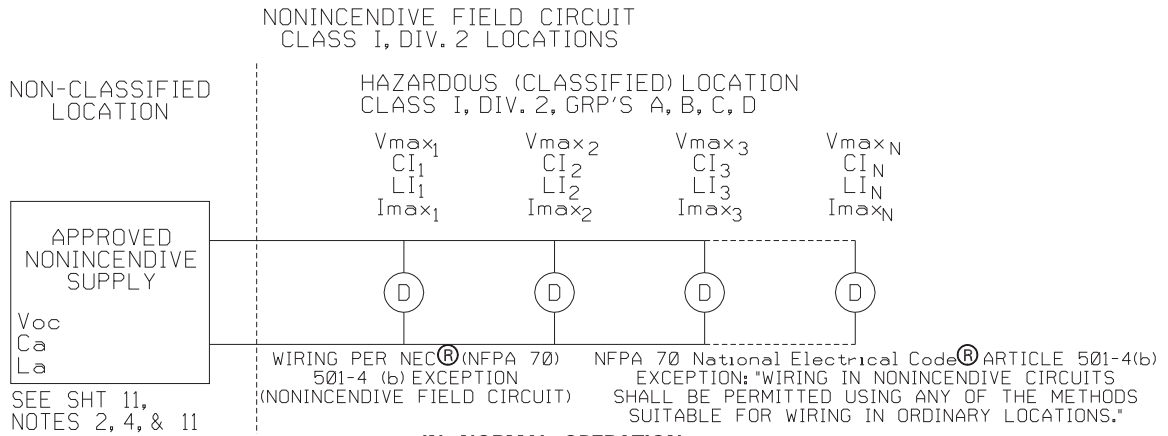
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|---|-------------------------|-------------------------------|---------------|--------------------|
| Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA | | CAD MAINTAINED (MicroStation) | | |
| DR. | Myles Lee Miller | SIZE A | FSCM NO | DWG NO. 03151-1006 |
| ISSUED | SCALE N/A | WT. _____ | SHEET 8 OF 11 | |

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



| | | | | |
|---|--------------|-------------------------------|---------|------------|
| Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA | | CAD MAINTAINED (MicroStation) | | |
| DR. Myles Lee Miller | SIZE A | FSCM NO | DWG NO. | 03151-1006 |
| ISSUED | SCALE N/A | WT. | SHEET | 9 OF 11 |

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



**IN NORMAL OPERATION
DEVICES CONTROL THROUGH-CURRENT**

| PARAMETERS (NON-INCENDIVE FIELD WIRING) | DEVICE | ROSEMOUNT 3051S/300S | | | | |
|---|------------------------|-----------------------------------|----------------------------------|--|--|----------------------|
| | | 3051S QUICK CONNECT OR 300S | | | 300S | |
| | | MODEL 300S REMOTE METER | OUTPUT CODE 'A' 4-20mA / HART | MODEL 300S HART DIAGNOSTICS OUTPUT CODE 'A' 4-20mA / HART | OUTPUT CODE 'B' (SAFETY CERTIFIED) 4-20mA / HART | FIELDBUS (F or W) |
| Vmax | 3051S 4-20mA / HART | 42.4v | 42.4v | 42.4v | 42.4v | 35v |
| Maximum normal operating current | 22mA | 22mA | 22mA | 22mA | 22mA | 27mA |
| C1 | 38nF | 0nF | 11.4nF | 11.4nF | 11.4nF | 0uF |
| L1 | 0uH | 58.2uH | 2.4uH | 0uH | 570uH | 0uH |

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

I_{max} for an individual device = $I_q + I_{signal}$

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

I_{signal} = Signaling current through device
(Protocol may limit signaling to one device at a time)

Operating $I_{max} = I_{q1} + I_{q2} + \dots + I_{qN} + I_{signal\ max}$
 $I_{signal\ max} = \text{Max. of } (I_{signal1}, I_{signal2}, \dots, I_{signalN})$

TEMP CODE: T5 ($T_a = -50^\circ\text{C}$ TO $+40^\circ\text{C}$)

REFERENCE: APPENDIX A7 (FM3611 1999)

| | | | | |
|---|--------------|-------------------------------|---|--|
| Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA | | CAD MAINTAINED (MicroStation) | | |
| DR. Myles Lee Miller | SIZE A | FSCM NO | DWG NO. 03151-1006 | |
| ISSUED | SCALE N/A | WT. | SHEET 10 OF 11 | |

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

NOTES:

1. NO REVISION TO THIS DRAWING WITHOUT PRIOR FACTORY MUTUAL APPROVAL.
2. ASSOCIATED APPARATUS MANUFACTURER'S INSTALLATION DRAWING MUST BE FOLLOWED WHEN INSTALLING THIS EQUIPMENT.
3. DUST-TIGHT CONDUIT SEAL MUST BE USED WHEN INSTALLED IN CLASS II AND CLASS III ENVIRONMENTS.
4. CONTROL EQUIPMENT CONNECTED TO BARRIER MUST NOT USE OR GENERATE MORE THAN 250 Vrms or Vdc.
5. RESISTANCE BETWEEN INTRINSICALLY SAFE GROUND AND EARTH GROUND MUST BE LESS THAN 1 OHM.
6. INSTALLATION SHOULD BE IN ACCORDANCE WITH ANSI/ISA-RP12.6 "INSTALLATION OF INTRINSICALLY SAFE SYSTEMS FOR HAZARDOUS (CLASSIFIED) LOCATIONS" AND THE NATIONAL ELECTRICAL CODE (ANSI/NFPA 70).
7. THE ASSOCIATED APPARATUS MUST BE FACTORY MUTUAL APPROVED.
8. WARNING - SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC AND NON-INCENDIVE SAFETY.
9. ASSOCIATED APPARATUS MUST MEET THE FOLLOWING PARAMETERS:
 U_o or V_{oc} or V_t LESS THAN or EQUAL TO U_1 (V_{max})
 I_o or I_{sc} or I_t LESS THAN or EQUAL TO I_1 (I_{max})
 P_o or P_{max} LESS THAN or EQUAL TO P_1 (P_{max})
 C_a IS GREATER THAN or EQUAL THE SUM OF ALL C_1 's PLUS C_{cable}
 L_a IS GREATER THAN or EQUAL THE SUM OF ALL L_1 's PLUS L_{cable}
10. WARNING - TO PREVENT IGNITION OF FLAMMABLE OR COMBUSTIBLE ATMOSPHERES, DISCONNECT POWER BEFORE SERVICING.

| | | | | |
|---|-------------------------|-------------------------------|---------|--------------------|
| Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA | | CAD MAINTAINED (MicroStation) | | |
| DR. | Myles Lee Miller | SIZE A | FSCM NO | DWG NO. 03151-1006 |
| ISSUED | SCALE N/A | WT. | _____ | SHEET 11 OF 11 |

Rosemount 3051S

| | | | | | |
|---|-----------|-------------|------------|--------|--------|
| CONFIDENTIAL AND PROPRIETARY INFORMATION IS CONTAINED HEREIN AND MUST BE HANDLED ACCORDINGLY. | REVISIONS | | | | |
| | REV | DESCRIPTION | ECO NO. | APP'D | DATE |
| | AA | NEW RELEASE | RTC1022362 | B.L.H. | 9/1/06 |

NOTES:

1. USE TURCK CORDSETS AS SPECIFIED IN THIS DRAWING WITH GE / GM OPTION TO ENSURE OUTDOOR RATING (NEMA 4X or IP66).
2. LOK-FAST GUARD IS REQUIRED FOR CLASS 1 DIVISION 2 INSTALLATIONS.
3. (X)XXV 49-4.5IN/14.5 IS INSTALLED INTO 1/2-14 NPT CONDUIT ENTRY THREADS. (X)XXV 49-4.5IN/M20 IS INSTALLED INTO CM20 CONDUIT ENTRY THREADS.
4. eurofast[®] AND minifast[®] ARE REGISTERED TRADEMARKS OF TURCK INC.

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

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

FRACTIONS ANGLES
 ± 1/32 ± 2°

DO NOT SCALE PRINT

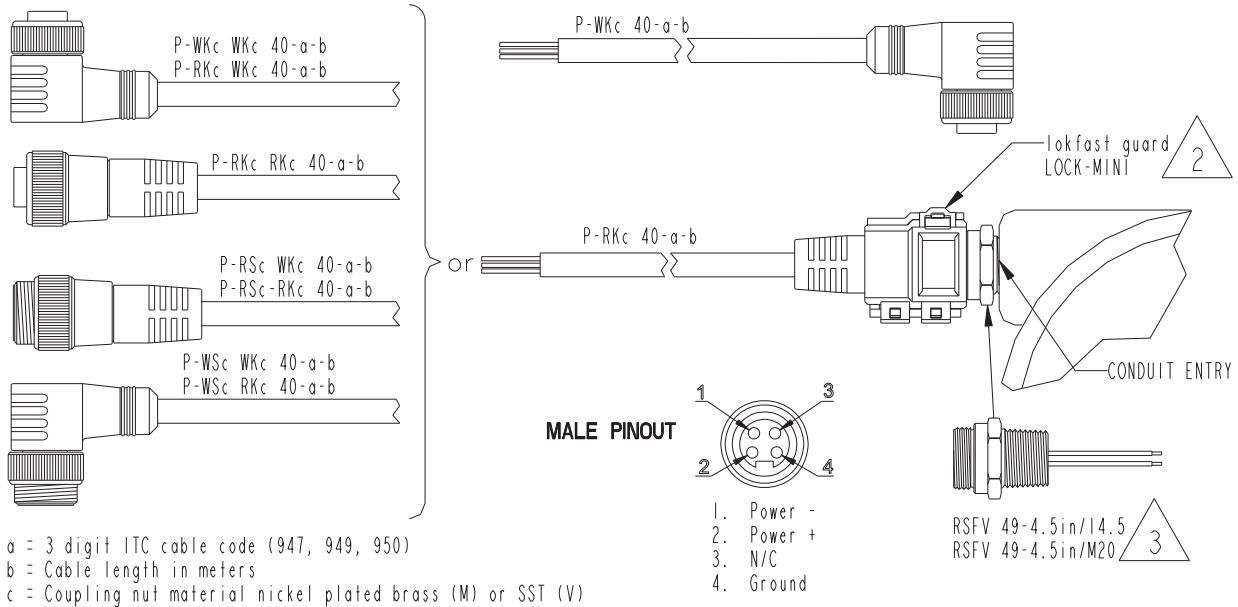


ROSEMOUNT[®]
8200 Market Boulevard Chanhassen, MN 55317 USA

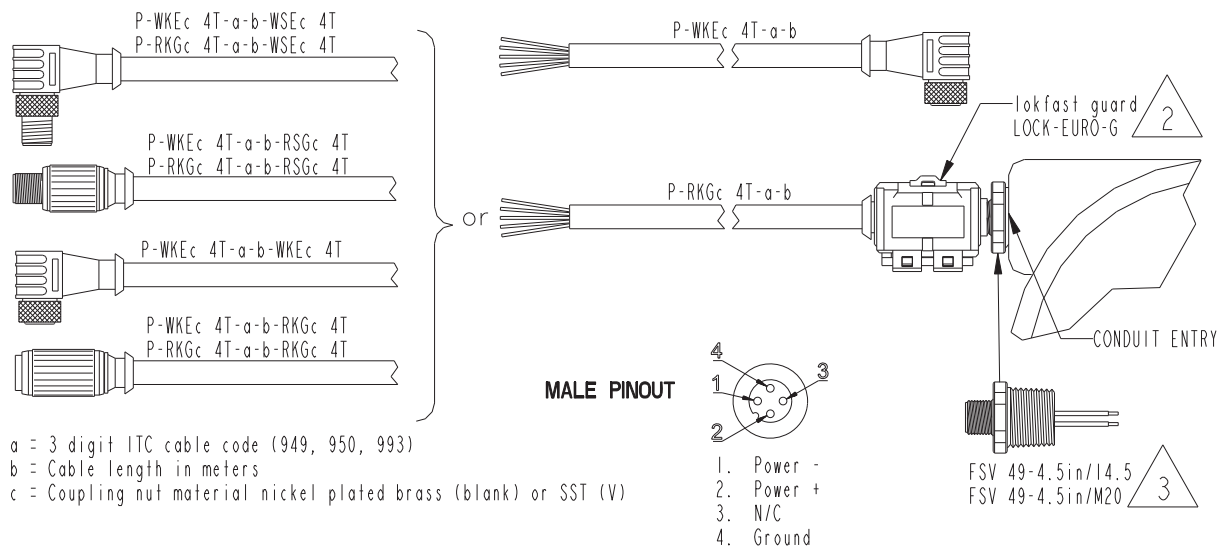
| | | | | | |
|--|------------------|---------|------|--------------|-----|
| TITLE | | | | | |
| GE / GM OPTION NEMA 4X INSTALLATION, FM | | | | | |
| DR. | Myles Lee Miller | 8/29/06 | SIZE | DRAWING NO. | REV |
| APP'D | Bryce Hagbom | 8/30/06 | A | 03151-1009 | AA |
| CAD MAINTAINED, (PRO/E) | | | | SHEET 1 OF 3 | |

Form Rev AA

GM OPTION WITH 4 - 20 mA / HART OUTPUT
 A-SIZE MINI (minifast[®]), 4-PIN CONNECTION

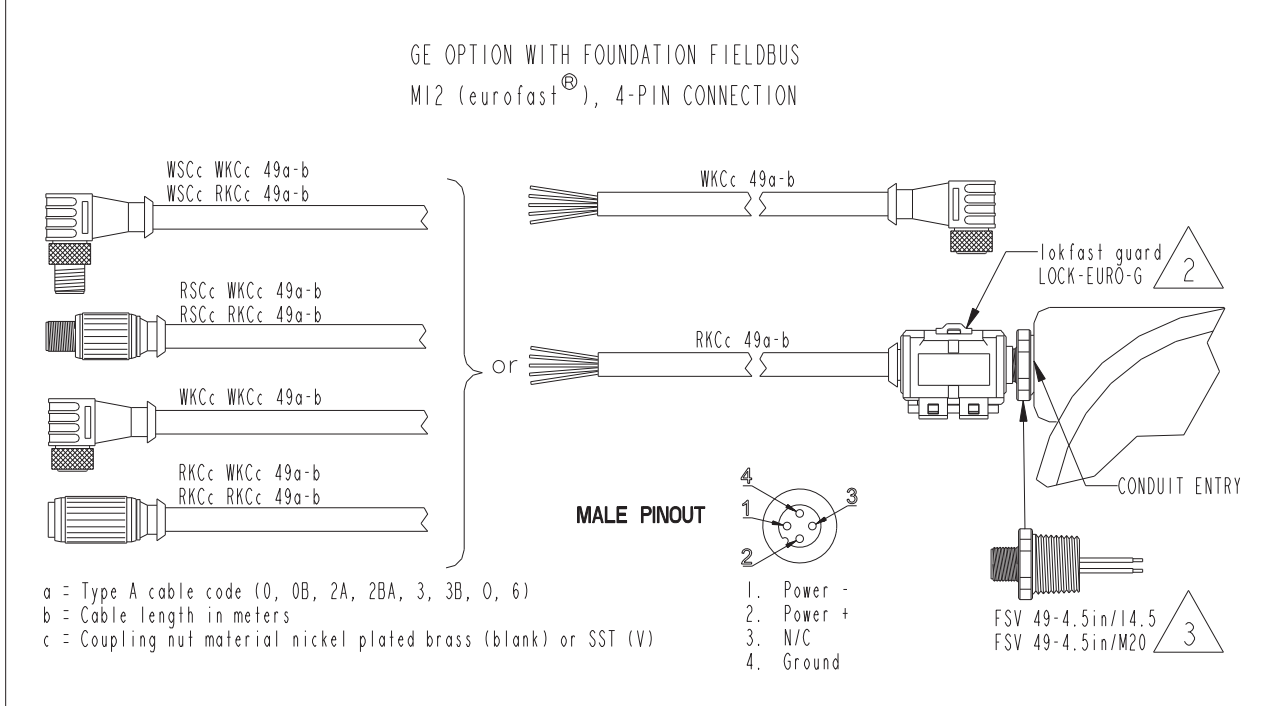
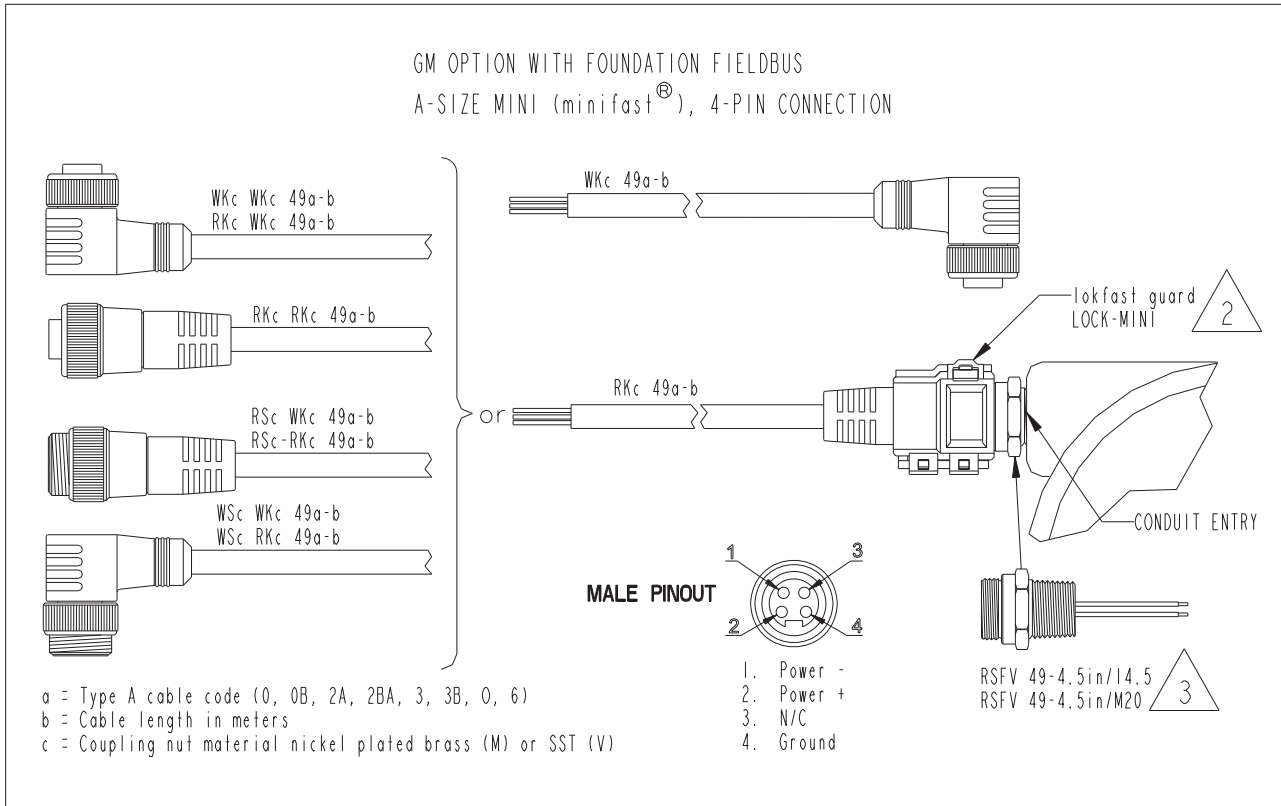


GE OPTION WITH 4 - 20 mA / HART OUTPUT
 M12 (eurofast[®]), 4-PIN CONNECTION



Form Rev. AA

| | | | |
|-------------------------|---------------------------|--|--|
| | | ROSEMOUNT[®] 8200 Market Boulevard Chanhassen, MN 55317 USA | |
| SIZE A | DRAWING NO. 03151-1009 | REV AA | |
| CAD Maintained, (Pro/E) | | SHEET 2 OF 3 | |



| | | | |
|--------------------------------------|---------------------------|---|------|
| EMERSON Process Management | | ROSEMOUNT® 8200 Market Boulevard Chanhassen, MN 55317 USA | |
| SIZE A | DRAWING NO. 03151-1009 | REV AA | |
| CAD Maintained, (Pro/E) | | SHEET 3 | OF 3 |

Form Rev AA

Canadian Standards Association (CSA)

| | | | | | | |
|---|-----------|------------|-------------------------------------|------------|---------|--------|
| CONFIDENTIAL AND PROPRIETARY INFORMATION IS CONTAINED HEREIN AND MUST BE HANDLED ACCORDINGLY. | REVISIONS | | | | | |
| | ZONE | REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| | | AC | ADD 3051S_L AND TRADITIONAL HOUSING | RTC1015145 | P.C.S. | 4/7/03 |
| | AD | ADD NOTE 9 | RTC1018745 | B.L.H. | 12/6/04 | |

NOTES:

1. WIRING METHOD SUITABLE FOR CLASS I, DIV I WITH ANY LENGTH.
2. TRANSMITTER MUST NOT BE CONNECTED TO EQUIPMENT GENERATING MORE THAN 250 VAC.
3. ALL CONDUIT THREADS TO BE ASSEMBLED WITH FIVE FULL TAPERED THREADS MINIMUM.
4. COMPONENTS REQUIRED TO BE APPROVED MUST BE APPROVED FOR GAS GROUP APPROPRIATE TO AREA CLASSIFICATION.
5. 3051SC, 3051ST OR 3051SL SENSOR MODULE MUST BE INSTALLED WITH CSA FLAMEPROOF / EXPLOSIONPROOF APPROVED 300S1, 300S2 OR 300S4 HOUSING ATTACHED TO MEET FLAMEPROOF / EXPLOSIONPROOF INSTALLATION REQUIREMENTS. MINIMUM OF 7 FULL THREADS ENGAGED AND LOCKED IN PLACE. SEE PAGE 3.
6. INSTALLATION TO BE IN ACCORDANCE WITH THE LATEST EDITION OF CANADIAN ELECTRICAL CODE.
7. 300S1, 300S2 OR 300S4 HOUSING MUST BE INSTALLED WITH CSA FLAMEPROOF / EXPLOSIONPROOF APPROVED 3051SC, 3051ST OR 3051SL SENSOR MODULE ATTACHED TO MEET FLAMEPROOF / EXPLOSIONPROOF INSTALLATION REQUIREMENTS. MINIMUM OF 7 FULL THREADS ENGAGED AND LOCKED IN PLACE. SEE PAGE 3.
8. UNUSED CONDUIT ENTRY MUST BE CLOSED WITH SUITABLE BLANKING ELEMENT.
9. TEMPERATURE CODE T5, Tambient = -50°C to 85°C.

CAD Maintained, (Pro/E)

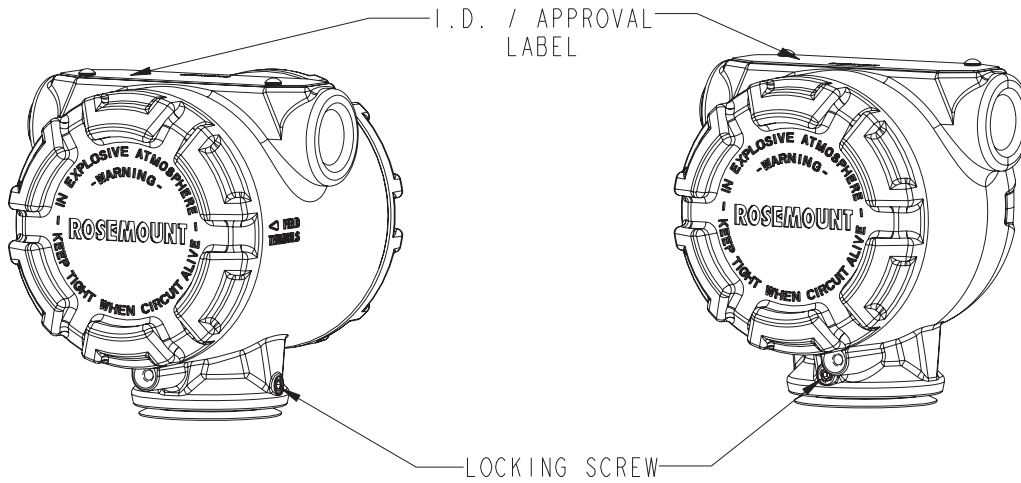
| | | | | | | |
|---|-----------------------------|-----------|---|----------|------------------------|--|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES [mm]. REMOVE ALL BURRS AND SHARP EDGES. MACHINE SURFACE FINISH 125 -TOLERANCES- .X ± .1 [2,5] .XX ± .02 [0,5] .XXX ± .010 [0,25] FRACTIONS ANGLES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

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

COMPONENT IDENTIFICATION

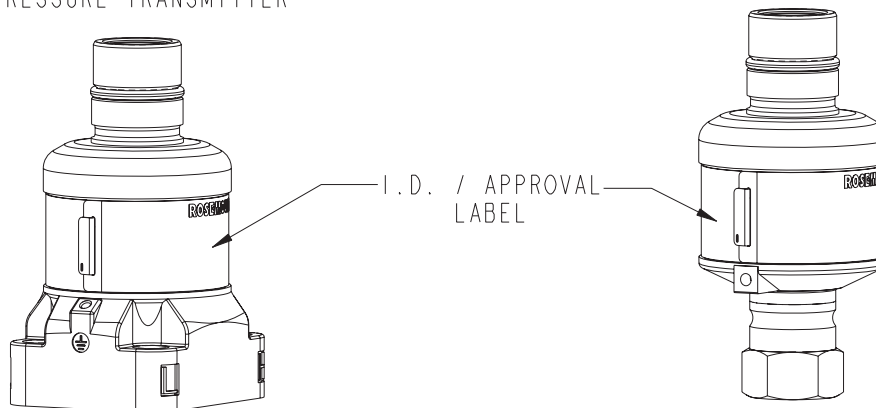
300S1_----, PLANTWEB
300S4_----, TRADITIONAL
(DUAL COMPARTMENT HOUSING)

300S2_----
JUNCTION BOX HOUSING
(SINGLE COMPARTMENT)



3051S_C_----
3051S_L_----
SCALABLE COPLANAR
PRESSURE TRANSMITTER

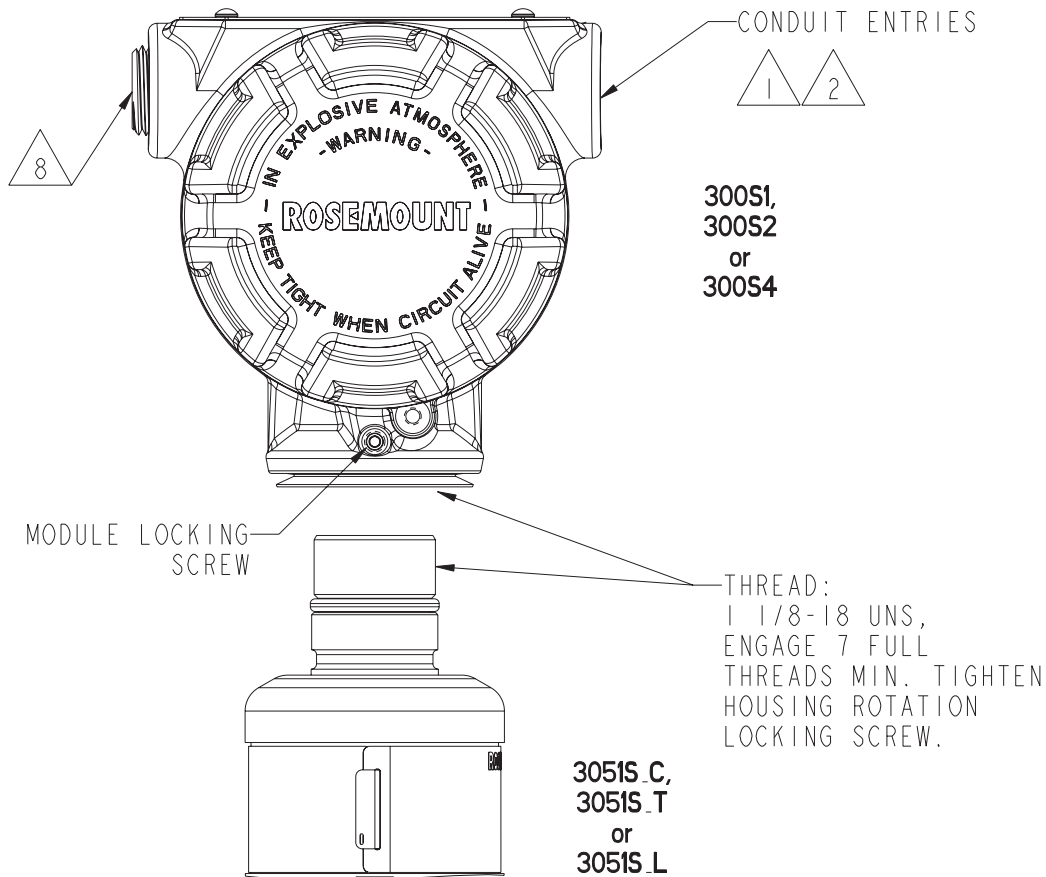
3051S_T_----
SCALABLE IN-LINE
PRESSURE TRANSMITTER



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

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

HOUSING TO MODULE ASSEMBLY



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

| CONFIDENTIAL AND PROPRIETARY INFORMATION IS CONTAINED HEREIN AND MUST BE HANDLED ACCORDINGLY | REVISIONS | | | | |
|---|-----------|----------------------------------|------------|--------|----------|
| | REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| | AF | CORRECTED C ₁ for SM | RTC1016190 | S.R.T. | 10/20/03 |
| | AG | ADD OUTPUT CODE B (SIS) | RTC1017150 | B.L.H. | 3/17/04 |
| | AH | CHG 'IE' to 'IF' ON PG 9 | RTC1019914 | B.L.H. | 7/21/05 |
| | AJ | ADD QUICK CONNECT | RTC1020189 | T.S. | 8/31/05 |
| | AK | ADD DIAGNOSTICS FEATURE BOARD | RTC1020856 | J.D.V. | 3/23/06 |

APPROVALS FOR


OUTPUT CODES A,B,F,W I.S. ENTITY PARAMETERS SHEETS 2-3
 OUTPUT CODES A,B (4-20 mA HART) I.S. SEE SHEETS 4-7
 REMOTE METER (4-20 mA HART) I.S. SEE SHEET 6
 OUTPUT CODE F/W (FIELDBUS) I.S. SEE SHEET 8
 FISCO SEE SHEETS 9-10

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

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

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

CAD MAINTAINED (MicroStation)

| | | | | | |
|--|-------------------------------------|--|---|-----------|-----------------------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES (mm). REMOVE ALL BURRS AND SHARP EDGES. MACHINE SURFACE FINISH 125 -TOLERANCE- .X ± .1 [2,5] .XX ± .02 [0,5] .XXX ± .010 [0,25] FRACTIONS ANGLES ± 1/32 ± 2° DO NOT SCALE PRINT | CONTRACT NO. | |  ROSEMOUNT® 8200 Market Boulevard • Chanhassen, MN 55317 USA | | |
| | DR. Myles Lee Miller 3/7/01 | | TITLE INDEX OF I.S. CSA FOR 3051S | | |
| | CHK'D | | | | |
| | APP'D. Paul C. Sundet 8/6/01 | | SIZE A | FSCM NO | DWG NO. 03151-1016 |
| | APP'D. GOVT. | | SCALE N/A | WT. _____ | SHEET 1 OF 10 |

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

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_1) 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_1) OF THE INTRINSICALLY SAFE APPARATUS.

FOR OUTPUT CODE A MODEL 3051S
 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 |
| $C_1 = 38nF$ | C_A IS GREATER THAN $38nF + C_{cable}$ |
| $L_1 = 0$ | L_A IS GREATER THAN $0H + L_{cable}$ |

FOR OUTPUT CODE A WITH MODEL 300S JUNCTION BOX, 300S PLANTWEB HOUSING, OR 3051S QUICK CONNECT 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 |
| $C_1 = 11.4nF$ | C_A IS GREATER THAN $11.4nF + C_{cable}$ |
| $L_1 = 2.4\mu H$ | L_A IS GREATER THAN $2.4\mu H + L_{cable}$ |

FOR OUTPUT CODE A WITH REMOTE METER CONFIGURATION (OPTION CODES M8 or M9)
 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 |
| $C_1 = 0nF$ | C_A IS GREATER THAN C_{cable} |
| $L_1 = 58.2\mu H$ | L_A IS GREATER THAN $58.2\mu H + L_{cable}$ |

FOR OUTPUT CODE A WITH HART DIAGNOSTICS SUITE AND MODEL 300S PLANTWEB HOUSING
 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 |
| $C_1 = 11.4nF$ | C_A IS GREATER THAN $11.4nF + C_{cable}$ |
| $L_1 = 0$ | L_A IS GREATER THAN $0H + L_{cable}$ |

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

| | | | | |
|---|-----------|-------------------------------|--------------------|--|
| Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA | | CAD MAINTAINED (MicroStation) | | |
| DR. Myles Lee Miller | SIZE A | FSCM NO. | DWG NO. 03151-1016 | |
| ISSUED | SCALE N/A | WT. _____ | SHEET 2 OF 10 | |

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

FOR OUTPUT CODE B (SAFETY CERTIFIED SIS) WITH MODEL 300S PLANTWEB HOUSING
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 |
| $C_1 = 11.4nF$ | C_A IS GREATER THAN 11.4nF + C_{cable} |
| $L_1 = 570\mu H$ | L_A IS GREATER THAN 570 μH + L_{cable} |

FOR OUTPUT CODE F or W WITH MODEL 300S PLANTWEB HOUSING
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 |
| $C_1 = 0\mu f$ | C_A IS GREATER THAN 0 μf + C_{cable} |
| $L_1 = 0\mu H$ | L_A IS GREATER THAN 0 μH + L_{cable} |

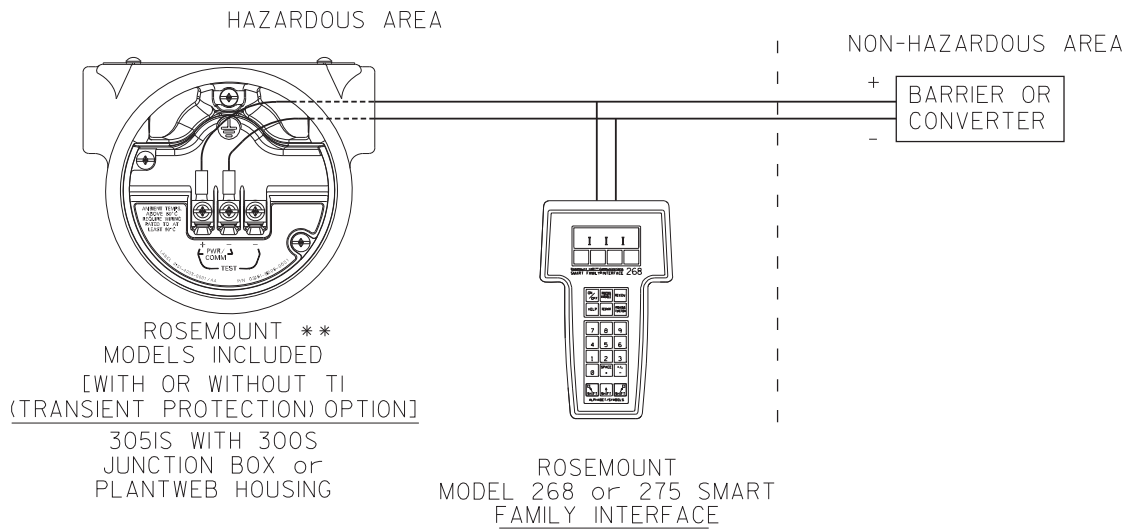
NOTE: ENTITY PARAMETERS LISTED APPLY ONLY TO ASSOCIATED
APPARATUS WITH LINEAR OUTPUT.

| | | | | |
|---|-----------|-------------------------------|---------------|------------|
| Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA | | CAD MAINTAINED (MicroStation) | | |
| DR. Myles Lee Miller | SIZE A | FSCM NO | DWG NO. | 03151-1016 |
| ISSUED | SCALE N/A | WT. _____ | SHEET 3 OF 10 | |

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

CSA INTRINSIC SAFETY APPROVALS
 CIRCUIT CONNECTION WITH BARRIER OR CONVERTER

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

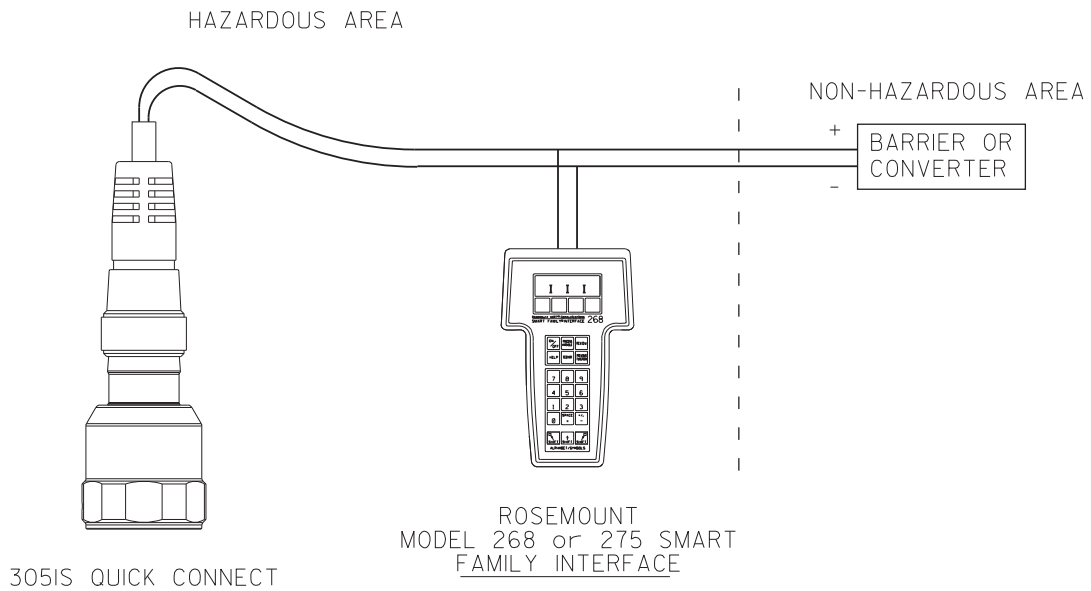


** FOR FIELDBUS OPTIONS("F" or "W" OUTPUT CODE),
 SEE PAGE 6 FOR PARAMETERS AND CIRCUIT CONNECTION TO BARRIER.

| | | | |
|---|-----------|-------------------------------|--------------------|
| Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA | | CAD MAINTAINED (MicroStation) | |
| DR. Myles Lee Miller 3/7/001 | SIZE A | FSCM NO | DWG NO. 03151-1016 |
| ISSUED | SCALE N/A | WT. _____ | SHEET 4 OF 10 |

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

CSA INTRINSIC SAFETY APPROVALS
CIRCUIT CONNECTION WITH BARRIER OR CONVERTER
Ex ia
INTRINSICALLY SAFE/SECURITE INTRINSEQUE
4-20 mA, ("A" OUTPUT CODE)

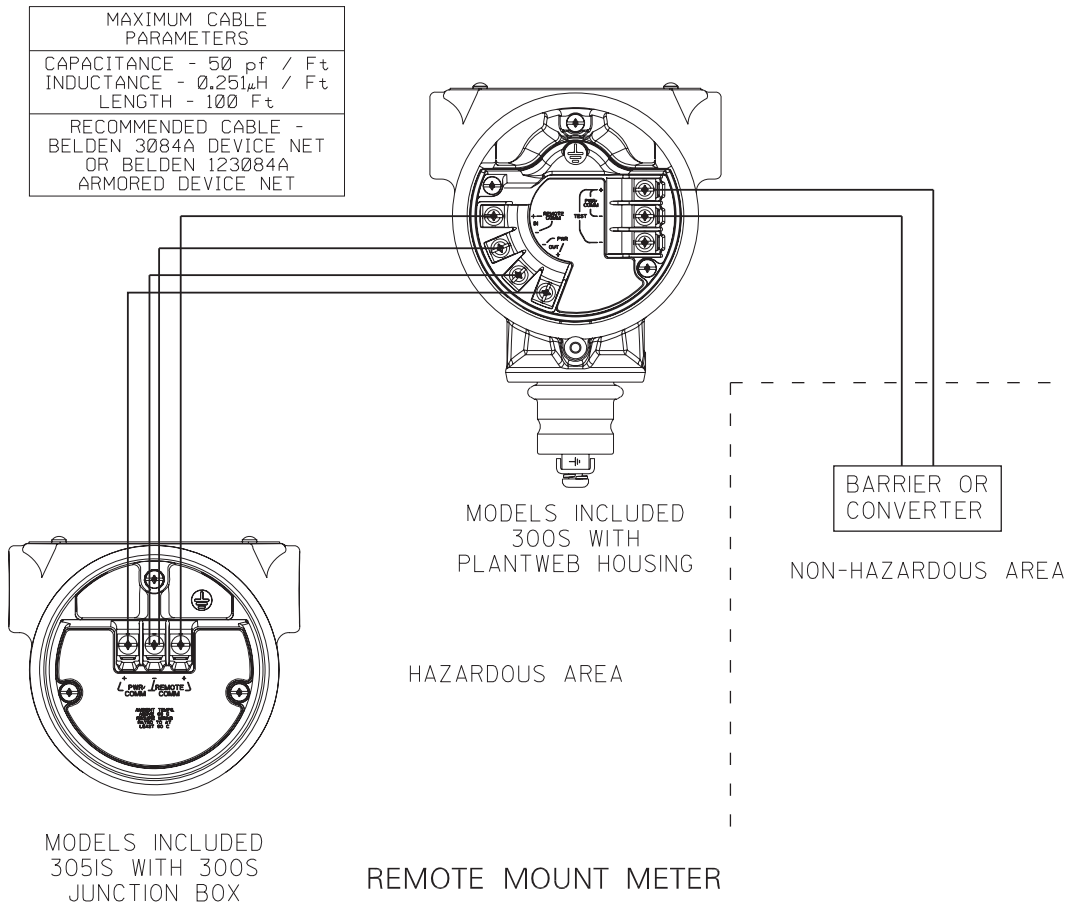


| | | | | |
|---|-----------|-------------------------------|---------------|------------|
| Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA | | CAD MAINTAINED (MicroStation) | | |
| DR. Myles Lee Miller 8/17/05 | SIZE A | FSCM NO | DWG NO. | 03151-1016 |
| ISSUED | SCALE N/A | WT. _____ | SHEET 5 OF 10 | |

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

CSA INTRINSIC SAFETY APPROVALS
 CIRCUIT CONNECTION WITH BARRIER OR CONVERTER

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



| | | | | |
|---|--------------|-------------------------------|---------|------------|
| Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA | | CAD MAINTAINED (MicroStation) | | |
| DR. Myles Lee Miller | SIZE A | FSCM NO | DWG NO. | 03151-1016 |
| ISSUED | SCALE N/A | WT. | SHEET | 6 OF 10 |

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

4-20 mA, ("A" or "B" 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 2A1-I2V-CGB, 2A1-I3V-CGB, 2AS-I3I-CGB, 3A2-I2D-CGB, 3A2-I3D-CGB, 3AD-I3I-CGB, 3A4-I2D-CGB, 2AS-I2I-CGB, 3F4-I2DA | | GROUPS B, C, D |
| CSA APPROVED SAFETY BARRIER | 30 V OR LESS 150 OHMS OR MORE | GROUPS C, D |

| | | | | |
|---|-----------|-------------------------------|--------------------|--|
| Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA | | CAD MAINTAINED (MicroStation) | | |
| DR. Myles Lee Miller | SIZE A | FSCM NO | DWG NO. 03151-1016 | |
| ISSUED | SCALE N/A | WT. _____ | SHEET 7 OF 10 | |

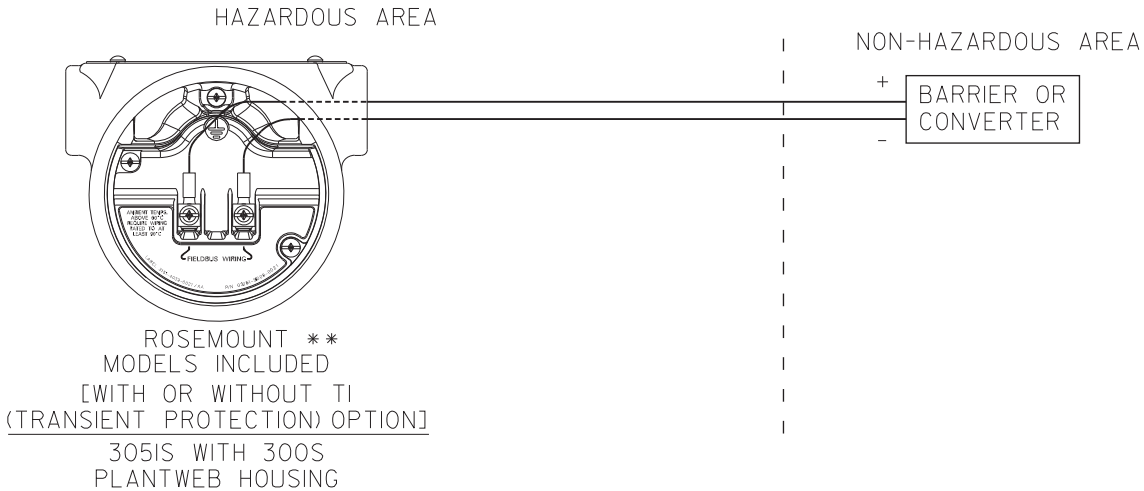
| REVISIONS | | | | |
|-----------|-------------|----------|-------|------|
| REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| AK | | | | |

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

| DEVICE | PARAMETERS | APPROVED FOR CLASS I, DIV. I |
|-----------------------------|----------------------------------|------------------------------|
| CSA APPROVED SAFETY BARRIER | 30 V OR LESS 300 OHMS OR MORE | GROUPS A, B, C, D |
| | 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)



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

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

| | | | |
|---|-----------|-------------------------------|--------------------|
| Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA | | CAD MAINTAINED (MicroStation) | |
| DR. Myles Lee Miller | SIZE A | FSCM NO. | DWG NO. 03151-1016 |
| ISSUED | SCALE N/A | WT. | SHEET 8 OF 10 |

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

FISCO CONCEPT

THE FISCO CONCEPT ALLOWS INTERCONNECTION OF INTRINSICALLY SAFE APPARATUS TO ASSOCIATED APPARATUS NOT SPECIALLY EXAMINED IN SUCH COMBINATION. THE CRITERIA FOR INTERCONNECTION IS THAT THE VOLTAGE (V_{max}), THE CURRENT (I_{max}), AND THE POWER (P_{max}) WHICH AN INTRINSICALLY SAFE APPARATUS CAN RECEIVE AND REMAIN INTRINSICALLY SAFE CONSIDERING FAULTS, MUST BE EQUAL OR GREATER THAN VOLTAGE (V_{oc}), AND CURRENT (I_{sc}) WHICH CAN BE DELIVERED BY THE ASSOCIATED APPARATUS, CONSIDERING FAULTS AND APPLICABLE FACTORS. IN ADDITION, THE MAXIMUM UNPROTECTED CAPACITANCE (C_1) AND THE INDUCTANCE (L_1) OF EACH APPARATUS (OTHER THAN THE TERMINATION) CONNECTED TO THE FIELDBUS MUST BE LESS THAN OR EQUAL TO 5 nF AND 10 μ H RESPECTIVELY.

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

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

| | |
|--|-----------------------------|
| Loop Resistance R': | 15.....150 Ohm/km |
| Inductance per unit length L': | 0.4.....1 mH/km |
| Capacitance per unit length C': | 80.....200 nF |
| C' = C' line/line + 0.5C' line/screen, if both lines are floating, or | |
| C' = C' line/line + C' line/screen, if the screen is connected to one line | |
| Length of trunk cable: | less than or equal to 1000m |
| Length of spur cable: | less than or equal to 30m |
| Length of spur splice: | less than or equal to 1m |

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

$$R = 90.....1000\Omega \quad C = 0.....2.2\mu F$$

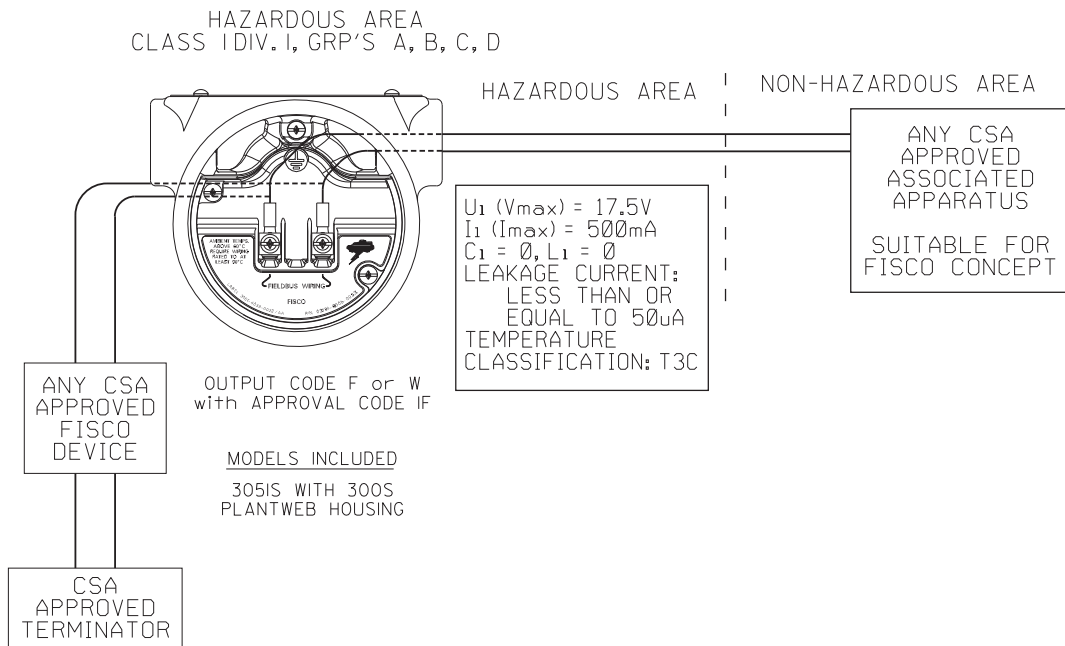
ONE OF THE ALLOWED TERMINATIONS MIGHT ALREADY BE INTEGRATED IN THE ASSOCIATED APPARATUS. THE NUMBER OF PASSIVE APPARATUS CONNECTED TO THE BUS SEGMENT IS NOT LIMITED DUE TO I. S. REASONS. IF THE ABOVE RULES ARE RESPECTED, UP TO A TOTAL LENGTH OF 1000 m (SUM OF TRUNK AND ALL SPUR CABLES) OF CABLE IS PERMITTED.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

| | | | | |
|---|-----------|-------------------------------|---------|------------|
| Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA | | CAD MAINTAINED (MicroStation) | | |
| DR. Myles Lee Miller | SIZE A | FSCM NO | DWG NO. | 03151-1016 |
| ISSUED | SCALE N/A | WT. _____ | SHEET | 9 OF 10 |

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

NOTES:

1. APPROVED ASSOCIATED APPARATUS MUST BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
2. CSA APPROVED ASSOCIATED APPARATUS MUST MEET THE FOLLOWING PARAMETERS:
 V_{oc} LESS THAN OR EQUAL TO (V_{max}) AND I_{sc} LESS THAN OR EQUAL TO (I_{max}) .
3. THE MAXIMUM NON-HAZARDOUS AREA VOLTAGE MUST NOT EXCEED 250V.
4. THE INSTALLATION MUST BE IN ACCORDANCE WITH CANADIAN ELECTRICAL
5. CAUTION: USE ONLY SUPPLY WIRES SUITABLE FOR 5°C ABOVE SURROUNDING TEMPERATURE.
6. WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.



| | | | | |
|---|-----------|-------------------------------|--------------------|--|
| Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA | | CAD MAINTAINED (MicroStation) | | |
| DR. Myles Lee Miller | SIZE A | FSCM NO. | DWG NO. 03151-1016 | |
| ISSUED | SCALE N/A | WT. | SHEET 10 OF 10 | |

KEMA

| CONFIDENTIAL AND PROPRIETARY INFORMATION IS CONTAINED HEREIN AND MUST BE HANDLED ACCORDINGLY. | REVISIONS | | | | | |
|---|-----------|------------------------------------|-------------|------------|--------|---------|
| | ZONE | REV | DESCRIPTION | CHG. NO. | APP'D | DATE |
| | | AA | NEW RELEASE | RTC1009618 | P.C.S. | 9/11/00 |
| | AB | ADD 3051SL AND TRADITIONAL HOUSING | RTC1015145 | B.L.H. | 4/7/03 | |

NOTES:

1. WIRING METHOD SUITABLE FOR CATEGORY 2, (ZONE 1) WITH ANY LENGTH.
2. TRANSMITTER MUST NOT BE CONNECTED TO EQUIPMENT GENERATING MORE THAN 250 VAC.
3. ALL CONDUIT THREADS TO BE ASSEMBLED WITH FIVE FULL THREADS MINIMUM.
4. COMPONENTS REQUIRED TO BE APPROVED MUST BE APPROVED FOR GAS GROUP APPROPRIATE TO AREA CLASSIFICATION.
5. 3051SC, 3051ST OR 3051SL SENSOR MODULE MUST BE INSTALLED WITH CENELEC FLAMEPROOF APPROVED 300S1, 300S2 OR 300S4 HOUSING ATTACHED TO MEET FLAMEPROOF INSTALLATION REQUIREMENTS.
6. INSTALLATION TO BE IN ACCORDANCE WITH APPLICABLE LOCAL REQUIREMENTS.
7. 300S1, 300S2 OR 300S4 HOUSING MUST BE INSTALLED WITH CENELEC FLAMEPROOF APPROVED 3051SC, 3051ST OR 3051SL SENSOR MODULE ATTACHED TO MEET FLAMEPROOF INSTALLATION REQUIREMENTS.
8. UNUSED CONDUIT ENTRY MUST BE CLOSED WITH A CENELEC FLAMEPROOF APPROVED BLANKING ELEMENT.

CAD Maintained. (Pro/E)

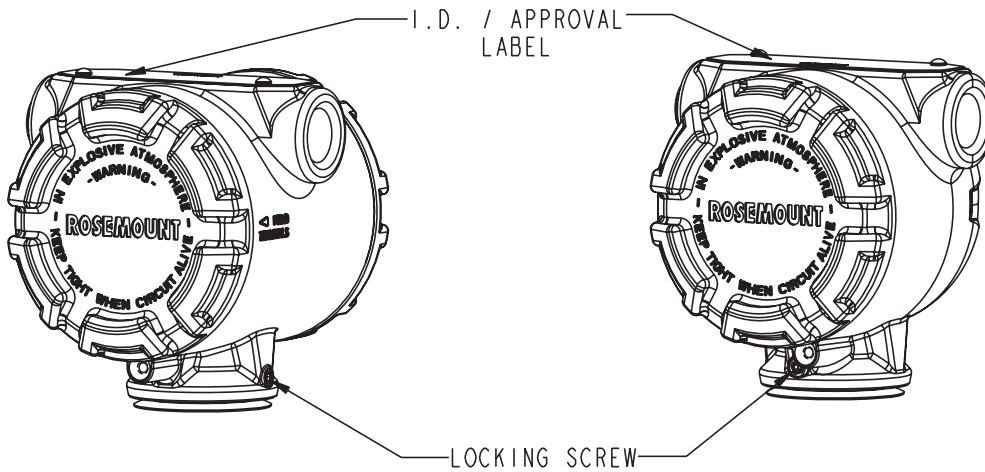
| | | | | | |
|---|-----------------------------|---------|---|--------------|---------------------------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES [mm]. REMOVE ALL BURRS AND SHARP EDGES. MACHINE SURFACE FINISH 125 -TOLERANCES- .X ± .1 [2,5] .XX ± .02 [0,5] .XXX ± .010 [0,25] FRACTIONS ANGLES ± 1/32 ± 2° DO NOT SCALE PRINT | CONTRACT NO. | | ROSEMOUNT® 8200 Market Boulevard • Chanhassen, MN 55317 USA | | |
| | DR. <i>Myles Lee Miller</i> | 8/28/00 | TITLE MODEL 3051 / 300 FLAMEPROOF INSTALLATION DRAWING, KEMA | | |
| | CHK'D | | | | |
| | APP'D <i>Paul C. Sundet</i> | 9/11/00 | SIZE A | FSCM NO. | DRAWING NO. 03151-1023 |
| | APP'D GOVT. | | SCALE | 1 : 4 | WT. |
| | | | | SHEET 1 OF 3 | |

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

COMPONENT IDENTIFICATION

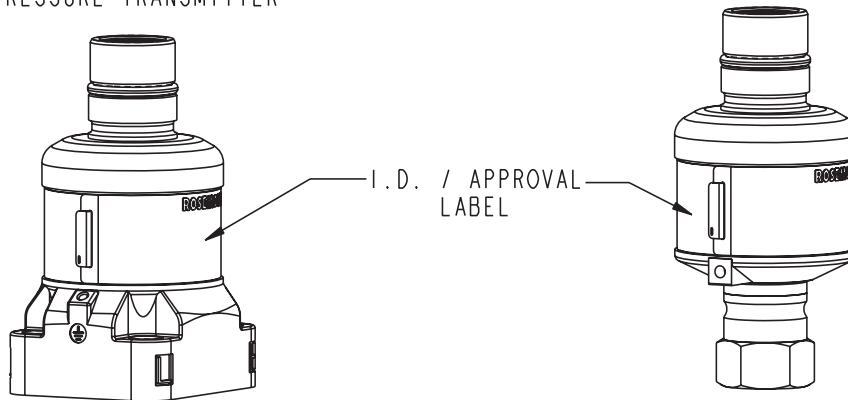
300S1_----, PLANTWEB
 300S4_----, TRADITIONAL
 (DUAL COMPARTMENT HOUSING)

300S2_----
 JUNCTION BOX HOUSING
 (SINGLE COMPARTMENT)



3051S_C_----
 3051S_L_----
 SCALABLE COPLANAR
 PRESSURE TRANSMITTER

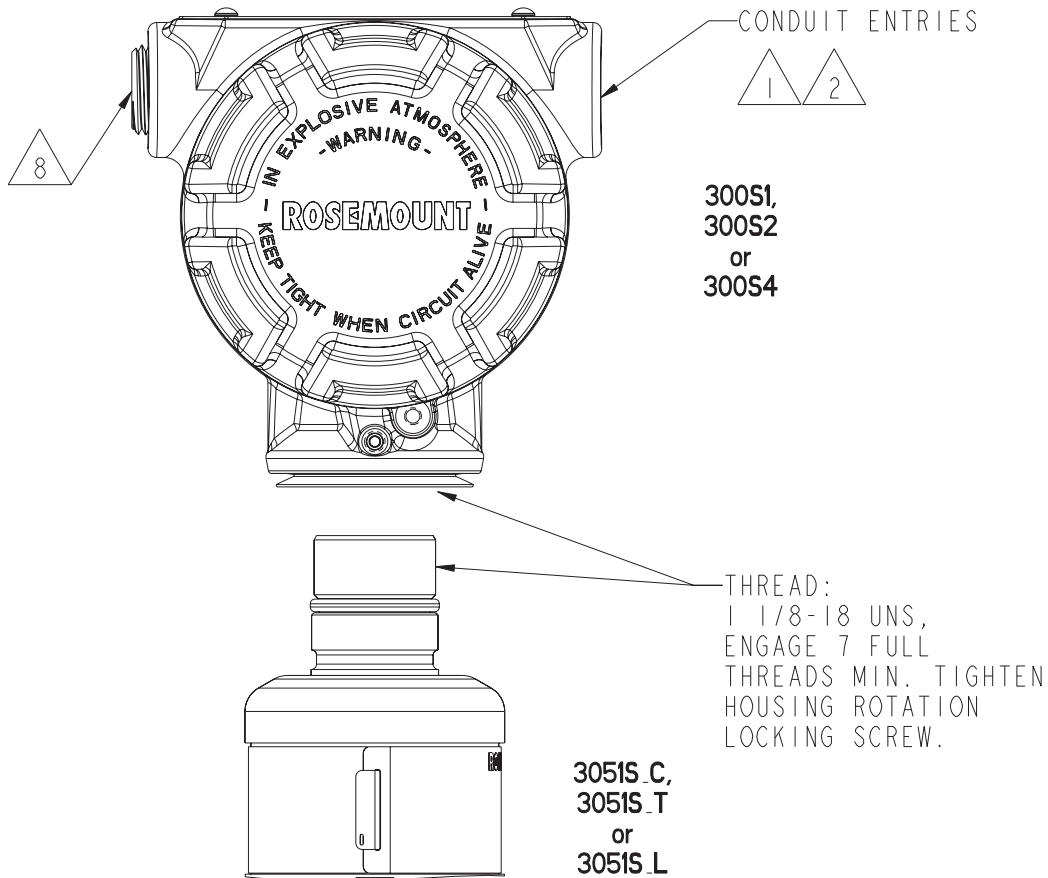
3051S_T_----
 SCALABLE IN-LINE
 PRESSURE TRANSMITTER



| | | | | |
|---|---------|-------------------------|----------|-----------------------|
| Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA | | CAD Maintained, (Pro/E) | | |
| DR. <i>Myles Lee Miller</i> | 8/28/00 | SIZE A | FSCM NO. | DWG NO. 03151-1023 |
| ISSUED | | SCALE 1:2 | WT. | SHEET 2 OF 3 |

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

HOUSING TO MODULE ASSEMBLY

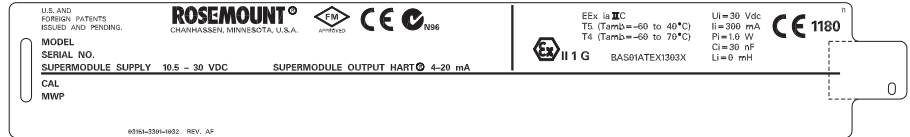


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|---|-------------------------|---------|-------------------------|---------|--------------------|
| Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA | | | CAD Maintained, (Pro/E) | | |
| DR. | <i>Myles Lee Miller</i> | 8/28/00 | SIZE A | FSCM NO | DWG NO. 03151-1023 |
| ISSUED | | | SCALE 1:4 | WT. | SHEET 3 OF 3 |

EUROPEAN ATEX DIRECTIVE INFORMATION

CENELEC/BASEEFA

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



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

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

- Rosemount USA
- Rosemount Germany
- Rosemount Singapore

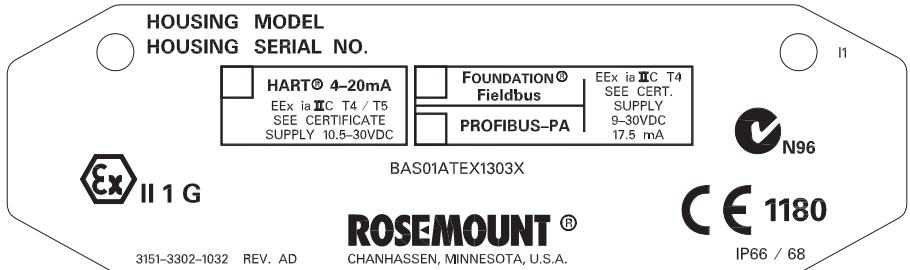


- Complete model number
- The serial number of the device
- Year of construction



- Marking for explosion protection:
 EEx ia IIC T5 ($T_{amb} = -60$ to $40\text{ }^{\circ}\text{C}$)
 EEx ia IIC T4 ($T_{amb} = -60$ to $70\text{ }^{\circ}\text{C}$)
 $U_i = 30\text{ V dc}$, $I_i = 300\text{ mA}$, $P_i = 1.0\text{ W}$, $C_i = 30\text{ nF}$, $L_i = 0\text{ mH}$
 BASEEFA ATEX certificate number: BAS01ATEX1303X

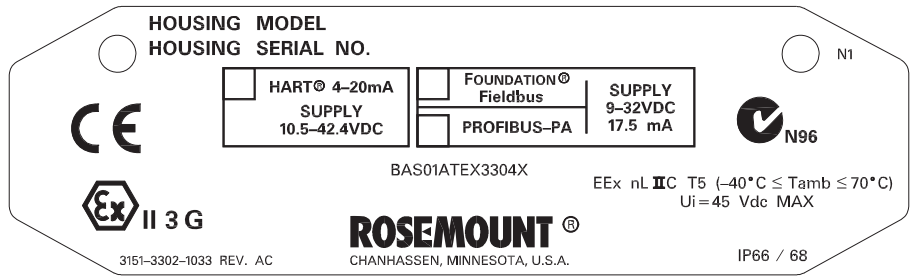
Intrinsic Safety housing label




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

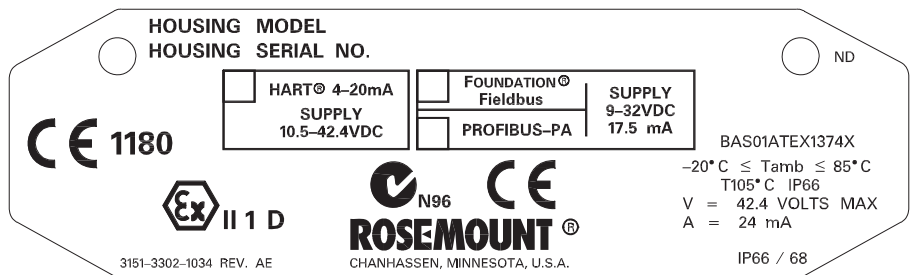


Type n housing label



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

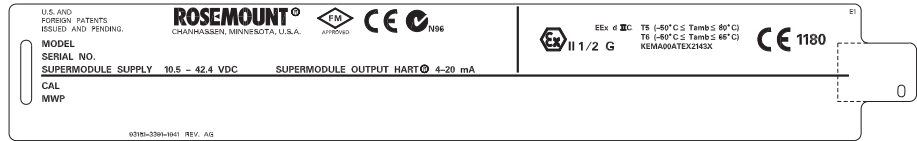
Dust housing label



- Marking for explosion protection:
-20 °C ≤ T_{amb} ≤ 85 °C
T105°C
IP66
V = 42.4 VOLTS MAX
A = 24 mA
BASEEFA ATEX certificate number: BAS01ATEX1374X

**CENELEC/KEMA
Flameproof**

The Rosemount 3051S and 300S pressure transmitters that have the following label attached, have been certified to comply with Directive 94/9/EC of the European Parliament and the Council as published in the Official Journal of the European Communities No. L 100/1 on 19–April–1994.



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

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

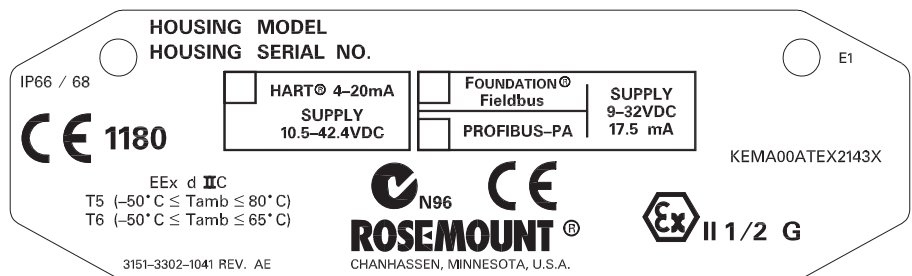
- Rosemount USA
- Rosemount Germany
- Rosemount Singapore



- Complete model number
- The serial number of the device
- Year of construction
- Marking for explosion protection:
EEx d IIC T6 ($T_{amb} = -50$ to 65 °C)
EEx d IIC T5 ($T_{amb} = -50$ to 80 °C)
ATEX certificate number: KEMA00ATEX2143X



Housing Label



- Marking for explosion protection:
EEx d IIC T6 ($T_{amb} = -50$ to 65 °C)
EEx d IIC T5 ($T_{amb} = -50$ to 80 °C)
ATEX certificate number: KEMA00ATEX2143X



Appendix D 3051S FOUNDATION Fieldbus Revision 23 Release

| | |
|---------------------------|----------|
| New Function Blocks | page D-1 |
| New Functionality | page D-2 |

NEW FUNCTION BLOCKS

Compensated Mass Flow Transducer Block

This block has all the functionality of the 3095 MultiVariable Mass Flow transmitter with its fully compensated real-time mass flow calculation. It uses the 3095 Engineering Assistant configuration package that contains a built in property data base with 110 fluids/gases and over 25 different primary elements to configure the flow calculation. The block can receive Line Pressure and Temperature measurements from separate Pressure and Temperature transmitters on the segment.

It also supports fixed static pressure and/or process temp values, entered by the operator.

The Mass flow value can be displayed on the LCD and can be totaled in the Integrator Block.

Analog Output Blocks

Two Analog Output Blocks are used bring in the static pressure and temperature variables needed to calculate mass flow.

Control Selector

The Control Selector is designed to select one of two or three inputs for control. The selection can be the highest, middle, or lowest. The inputs are normally connected to the outputs of PID or other function blocks. The block is configured to use one of the inputs to control its output. The other two inputs can be configured to override the selected input if the process conditions so require.

Output Splitter

The output splitter is designed to split the output of one PID or other control blocks so it can control two valves or actuators. Although there are many uses for the block, the example below is controlling the temperature inside a reactor with exothermic reaction. In order to start the reaction, the reactants have to be heated. The controller signal is split in a way to have the heating fluid valve controlling the temperature while the cooling valve remains closed. When the reaction starts, heat is liberated and the heating valve is closed. The coolant valve takes over. The block allows different combinations of actions.

Multiple Analog Input

A MAI block was added to publish statistical data from the Advanced Diagnostic Block.

NEW FUNCTIONALITY

PID with Auto Tuner

This block has now been improved to include an auto-tune function.

Advanced Diagnostic Block

The Statistical Process Monitoring with continuous update of mean and standard deviation at sensor update rate – Previous to Revision 23, SPM values, Mean and Standard Deviation, could be viewed but not connected to a control strategy. With the addition of the MAI Block and one extra AI block all the values can be connected to other Function Blocks, in the field devices or in the DCS. A rolling average of value is also now available out of the SPM function. This rolling average is the value of the variable updates during one macro cycle.

Live software download support

Fieldbus devices can be upgraded, in the field, with an upgraded version of software. As there are many new diagnostics and functions in development, this is a very important feature. The process to download the new software was proprietary in the past. The Foundation has now come out with a “Common Software Download Specification” specification for software download from any host. The 3051S complies with the CSDS standard and categorized as a Class 1 device which means the device remains fully functional while the new firmware is being downloaded. Other classes (2&3) require the transmitter to be offline and possibly disruptive to download software.

Sensor transducer block now complies with Standard with the recent Pressure Calibration profile

Calibrating a FF transmitter can be a cumbersome task. It requires a sequence of operations that must be followed properly or the device may not operate with the proper accuracy. Unfortunately different suppliers took different approaches on how to get this done and calibrator companies have been reluctant to make FF calibrators. The Foundation has since developed a standard for sensor transducer blocks which now comply with. This change does not affect our calibration methods, it will just make it easier for calibrator companies to enter the market.

Resource block with Health Index

The Resource Block now publishes the Health Index of the transmitter. The Health Index is a number from 0 to 100 and is calculated by using the all the Alarms, Alerts, and block statuses of the transmitter. The number reflects the transmitter health

NV memory metering

The most common types of Non Volatile memory have a limit for the number of writes that can be performed in a certain memory position. If this limit is exceeded, the memory is damaged. In normal operation conditions, the number of writes during the transmitter life is well below the limit. But some users may use non conventional configuration techniques that write continuously to the memory. A typical example is to write the alarm limits every control cycle. The NV metering algorithm limits the rate of writes, protecting the memory against excessive writes and alarms if the rate exceeds the tolerated rate.

Revised function blocks (comply w/ most recent ITK)

The Arithmetic, Characterizer and Integrator blocks had small changes made to them to bring them in compliance to ITK 5.0 (One of the first devices to pass this level).

Sensor status remains Uncertain when reading is beyond the sensor limits (increased robustness)

Previous to this release when a pressure went beyond the sensor limits the pressure status would go to BAD. For example; on a range 2 coplanar transmitter the published upper sensor limit is 250in H₂O although it will still accurately read up to 277 inH₂O and then continue to read much higher but without much accuracy. In the previous release once the pressure went about 277 inH₂O the status went to BAD which could initialize a safety action. Due to customer demand, if the pressure goes above 277 inH₂O the status now goes to uncertain which allows the operator to determine whether that pressure is bad or not.

The status does go to Bad when the absolute limit of the sensor is reached.

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Reference Manual

00809-0200-4801, Rev BA

April 2007

Rosemount 3051S

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Cover Photo: Cosmos/HighRes/305/0305h0061

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