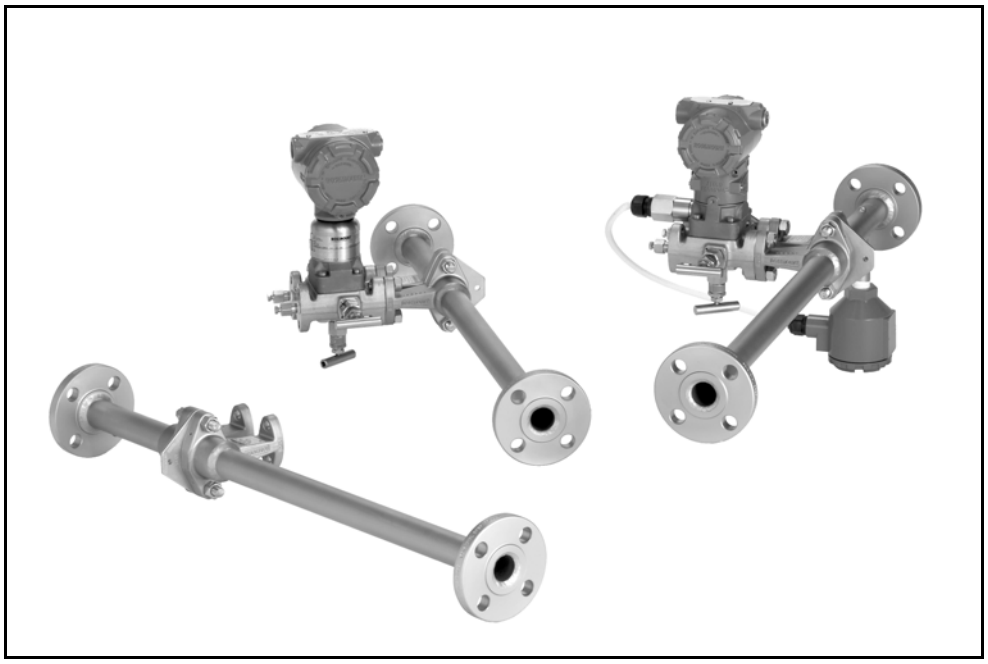
Reference Manual
00809-0100-4686, Rev JA
October 2011

Rosemount Integral Orifice Flowmeter Series



Rosemount 1195, 3051SFP and 3095MFP

FOUNDATION

HART COMMUNICATION PROTOCOL

ROSEMOUNT®

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EMERSON™
Process Management

Rosemount Integral Orifice Flowmeter Series

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.

The United States has two toll-free assistance numbers and one International number.

Customer Central
1-800-999-9307 (7:00 a.m. to 7:00 P.M. CST)

International
1-(952) 906-8888

National Response Center
1-800-654-7768 (24 hours a day)
Equipment service needs

⚠CAUTION

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

For information on Emerson Process Management nuclear-qualified products, contact your local Emerson Process Management Sales Representative.

This device is intended for use in temperature monitoring applications and should not be used in control and safety applications.

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APPENDIX A Specifications and Reference Data

APPENDIX B Approvals

Section 1 Introduction

TRANSMITTER INFORMATION

If the 1195 primary element was ordered assembled to a Rosemount 3051S transmitter, the new assembly is the Rosemount 3051SFP Proplate Flowmeter. See the Rosemount 3051S Series Pressure Transmitter reference manual (document number 00809-0100-4801) for information regarding transmitter installation, configuration, and operation.

If the 1195 primary element was ordered assembled to a Rosemount 3095MV transmitter, the new assembly is the Rosemount 3095MFP Mass Proplate Mass Flowmeter. See the Rosemount 3095MV Mass Flow Transmitter reference manual (document number 00809-0100-4801) for information regarding transmitter installation, configuration, and operation.

RECEIVING AND INSPECTION

Flowmeters are available in different models and with different options, so it is important to inspect and verify that the appropriate model was delivered before installation.

Upon receipt of the shipment, check the packing list against the material received and the purchase order. All items are tagged with a model number, serial number, and customer tag number. Report any damage to the carrier.

RETURNING THE PRODUCT

To expedite the return process, call the Rosemount National Response Center toll-free at 800-654-7768. This center, available 24 hours a day, will assist you with any needed information or materials.

⚠ The center will ask for the following information:

- Product model
- Serial numbers
- The last process material to which the product was exposed

The center will provide

- A Return Material Authorization (RMA) number
- Instructions and procedures that are necessary to return goods that were exposed to hazardous substances

NOTE
If a hazardous substance is identified, a Material Safety Data Sheet (MSDS), required by law to be available to people exposed to specific hazardous substances, must be included with the returned materials.

CONSIDERATIONS

Functional

The Rosemount 1195 produces the most accurate and repeatable measurement when it is used in single-phase flow or steam flow above the saturation temperature. Location of the 1195 in pulsating flow will cause a noisy signal. Vibration can also distort the output signal and compromise the structural limits of the flowmeter.

Mount the 1195 in a secure run of pipe as far as possible from pulsation sources such as check valves, reciprocating compressors or pumps, and control valves.

Install the 1195 in the correct location within the piping branch to prevent measurement inaccuracies caused by flow disturbances.

Maximum temperature for direct mount applications is 450 °F (232 °C). Maximum temperature for remote mount applications is 850 °F (454 °C).

Section 2 Installation

SAFETY MESSAGES

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Please refer to the following safety messages before performing any operation in this section.

⚠WARNING

Explosions could result in death or serious injury:

- Do not remove the transmitter cover in explosive atmospheres when the circuit is live.
- Before connecting a Field 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.
- Both transmitter covers must be fully engaged to meet explosion-proof requirements.

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

- Make sure only qualified personnel perform the installation.

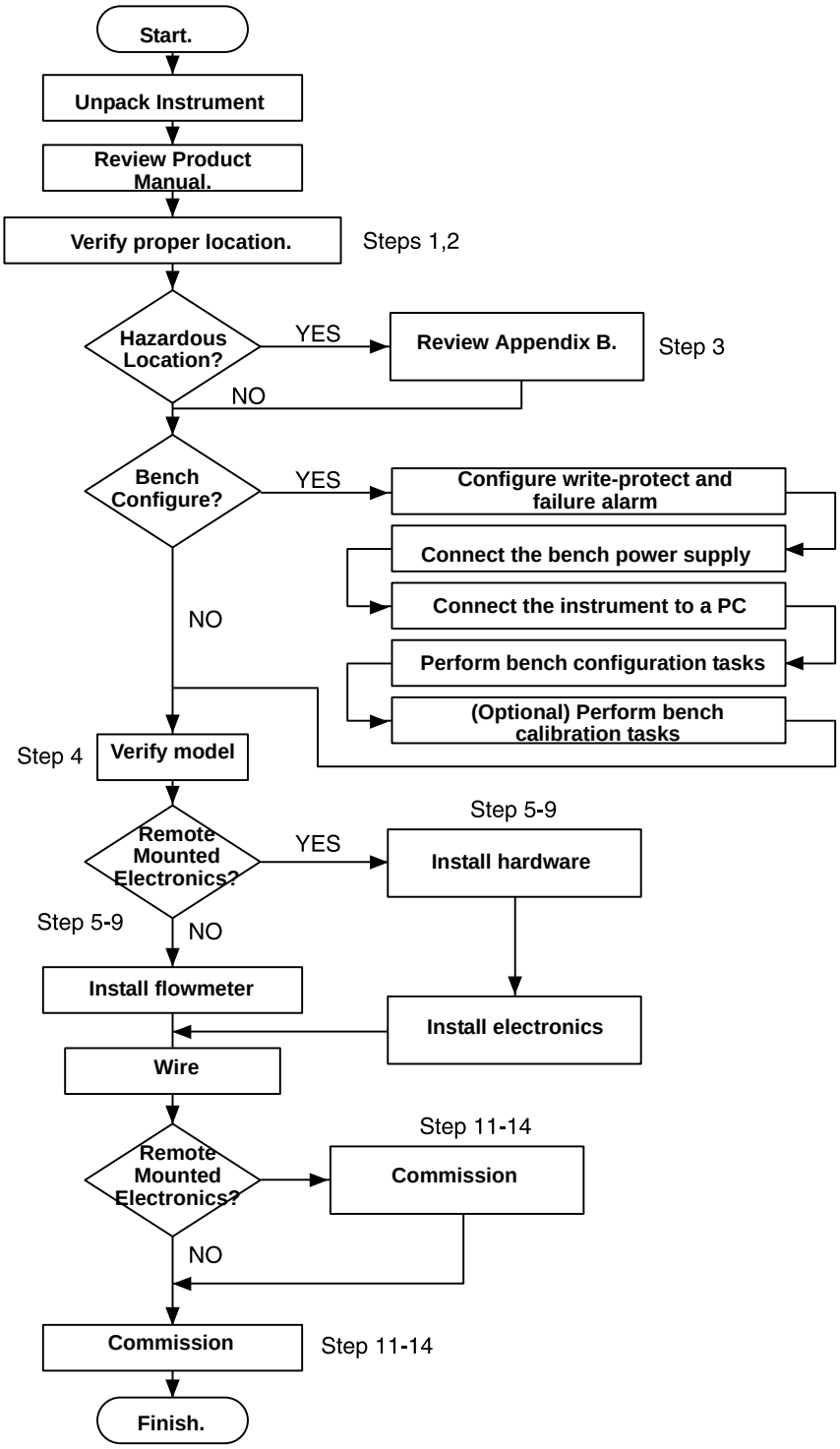
The product may be hot while in service, potentially causing burns. Handle with care.

INSTALLATION

Flowchart

Figure 2-1 is an installation flowchart that provides guidance through the installation process. Following the figure, an installation checklist has been provided to verify that all critical steps have been taken in the installation process. The checklist numbers are indicated in the flowchart.

Figure 2-1. Installation Chart



Handling

The product tag is not designed to withstand the weight of the orifice - do not lift the product by the tag.

Straight Run Requirements

Pipe Length Requirements for Installation

FIGURE A. Reducer (2 d to d over a length of 1.5 d to 3 d)

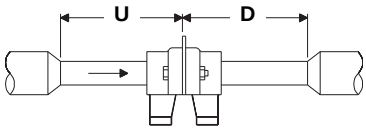


FIGURE B. Single 90° Bend flow from one branch only

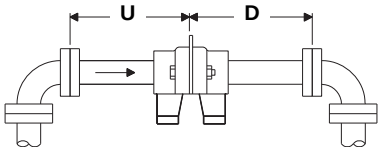


FIGURE C. Two or More 90° Bends in the Same Planes

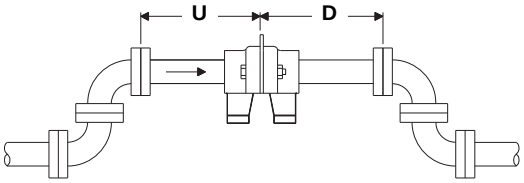


FIGURE D. Two or More 90° Bends in Different Planes

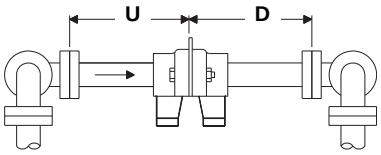
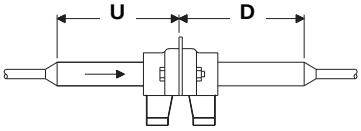


FIGURE E. Expander (0.5 d to d over a length of d to 2 d)



FIGURES F and G. Ball/Gate Valve Fully Open

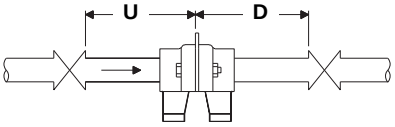


TABLE 1. Recommended lengths of pipe

The following chart gives the upstream (U) and downstream (D) lengths as a guideline recommended by ISO 5167 for the above installations. The lengths are given in terms of pipe diameters. For example, for a 1-in. line size with a beta ratio (b) of 0.4 using installation type B above, the straight length of upstream piping required is 16 ×1 = 16 in., and downstream 6 ×1 = 6 in.

	On Upstream (U)						
β	FIGURE A[(1)]	FIGURE B[(1)]	FIGURE C[(1)]	FIGURE D[(1)]	FIGURE E[(1)]	FIGURE F and G[(1)]	On Downstream (D) FIGURES A - G
<0.20	5[(2)]	6 (3)	10[(2)]	34 (17)	6[(2)]	12 (6)	4 (2)
0.40	5[(2)]	16 (3)	10[(2)]	50 (25)	12 (8)	12 (6)	6 (3)
0.50	8 (5)	22 (9)	18 (10)	75 (34)	20 (9)	12 (6)	6 (3)
0.60	9 (5)	42 (13)	30 (18)	65 (18)	26 (11)	14 (7)	7 (3,5)
0.67	12 (6)	44 (20)	44 (18)	60 (18)	28 (14)	18 (9)	7 (3,5)
0.75	13 (8)	44 (20)	44 (18)	75 (18)	36 (18)	24 (12)	8 (4)
	U						**D**

(1) Values in parenthesis correspond to an additional +0.5% discharge coefficient uncertainty.
(2) Straight length gives zero additional uncertainty; data not available for shorter lengths.

Bolting a transmitter to the Rosemount 1195

If the 1195 is ordered separately from the 3051S or 3095MV transmitter and will be used in a direct mount configuration, it will need to be assembled to the transmitter.

NOTE
Factory assembly is recommended for best performance.

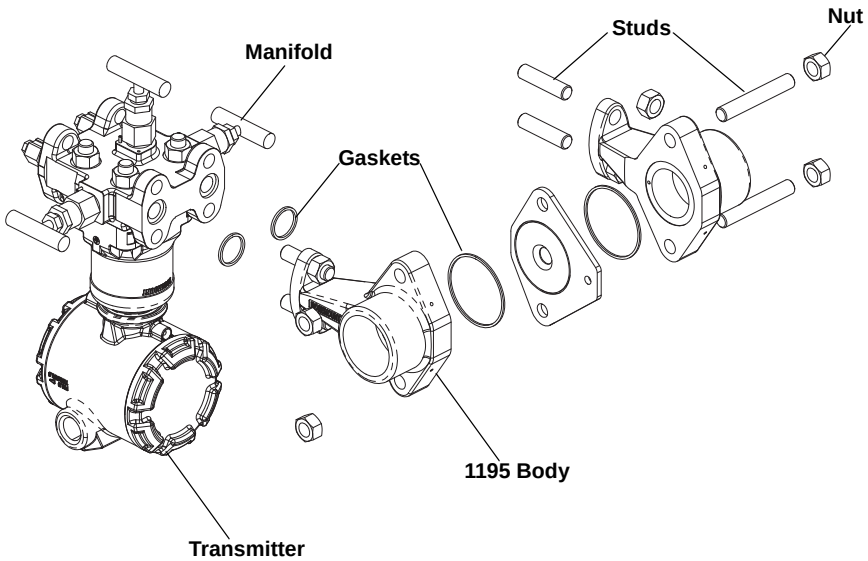
Bolt to a 3- or 5-Valve Manifold

1. Use studs and nuts supplied with the 1195 to connect to the transmitter sensor and manifold.
2. Always use a 3- or 5-valve manifold when direct mounting a transmitter to the 1195.
3. Observe the side of the orifice plate marked “Inlet.” This side should align to the High Pressure side of the DP transmitter.
4. Torque the bolts to 38 ft-lb.

NOTE
Protect the transmitter sensing diaphragms and do not remove the o-rings in transmitter sensor module.

5. Carefully assemble the 1195 to the pressure transmitter sensor making sure the “H” and “L” on transmitter and primary match.
6. Preload to 150 in./lbs then final torque at 300 in./lbs.

Figure 2-2. Bolting the 1195 to a transmitter



Direct Mount Orientation

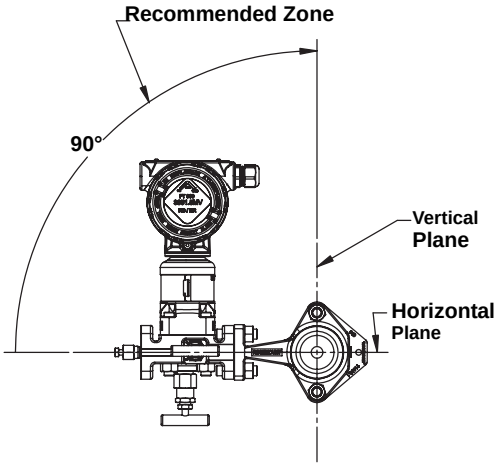
A direct mounted 1195 may be shipped with the transmitter already bolted directly to the sensor.

NOTE
The maximum acceptable temperature for direct mounting is 450 °F (232 °C). Refer to “Remote Mount Orientation” on page 2-7 if the process could potentially exceed this temperature.

⚠ Gas in Horizontal Pipes

The 1195 should be mounted above the pipe to ensure that condensate does not collect on the transmitter sensing diaphragms. Orient the unit within the recommended zone as shown in Figure 2-3.

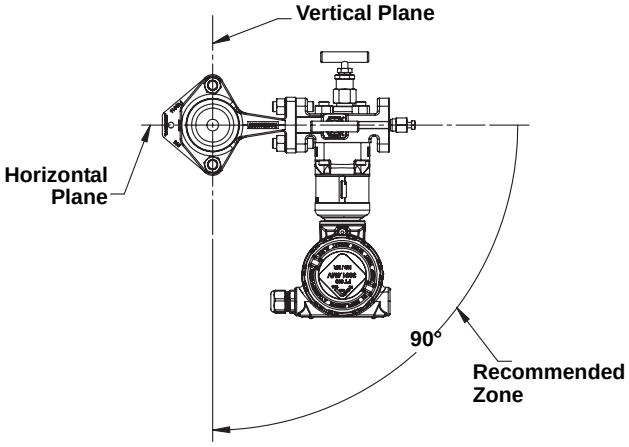
Figure 2-3. Direct Mount Gas in Horizontal Pipes



⚠ Liquid or Steam in Horizontal Pipes

The 1195 should be mounted below the pipe to ensure that gases do not collect on the transmitter sensing diaphragms. Orient the unit within the recommended zone as shown in Figure 2-4.

Figure 2-4. Direct Mount Liquid or Steam in Horizontal Pipes

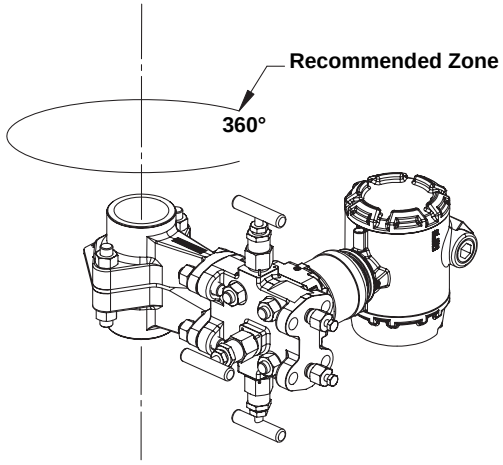


⚠ Liquid in Vertical Pipes

The 1195 should be mounted as shown.

NOTE
The 1195 should not be used in vertical liquid or steam applications if the fluid is flowing down.

Figure 2-5. Direct Mount Liquid in Vertical Pipes

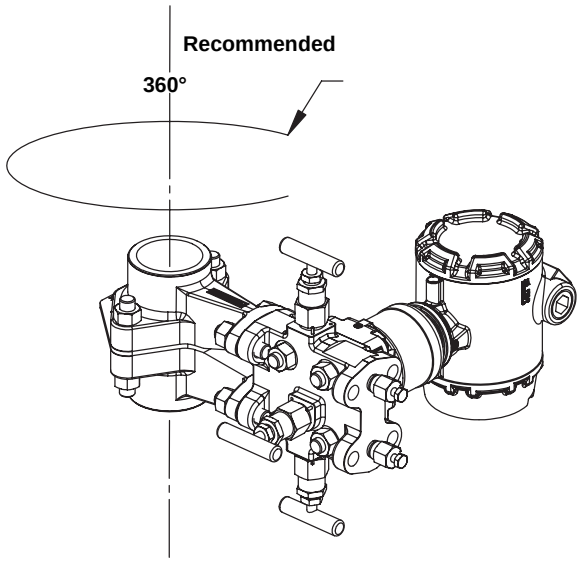


⚠ Gas in Vertical Pipes

The 1195 should be mounted as shown.

NOTE
Due to drain vent orientation, a direct mount 1195 should not be used in vertical gas applications if the fluid is flowing up. Consider remote mounting the pressure transmitter to facilitate condensate draining.

Figure 2-6. Direct Mount Gas in Vertical Pipes

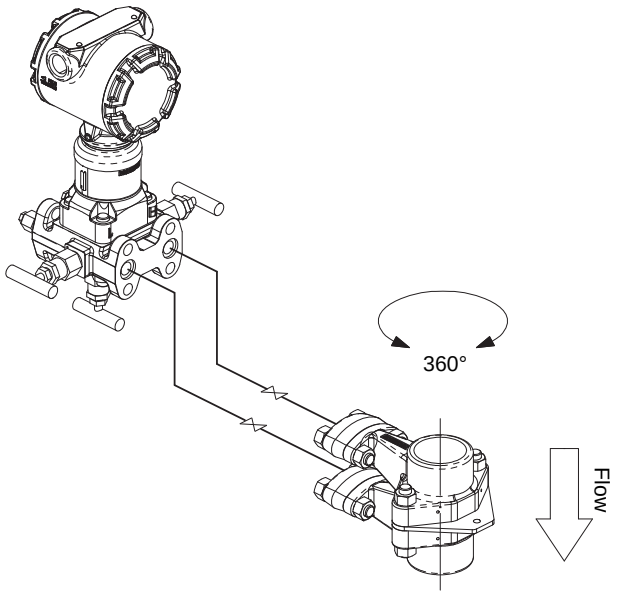


Remote Mount Orientation

⚠ Gas in Vertical or Horizontal Pipes

Mount the transmitter above the 1195 with the instrument lines sloping down.

Figure 2-7. Remote Mount Gas in Vertical or Horizontal Pipes

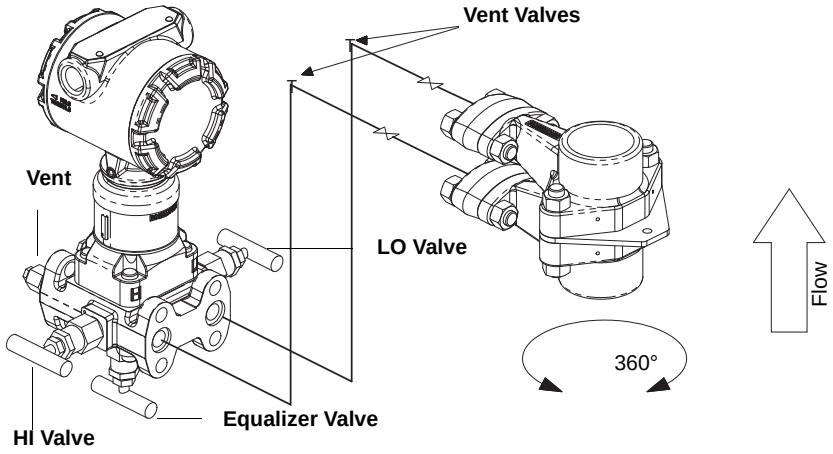


Liquid or Steam in Vertical or Horizontal Pipes

Mount the transmitter below the 1195 with the instrument lines sloping up.

NOTE
The 1195 should not be used in vertical liquid or steam applications if the fluid is flowing down.

Figure 2-8. Remote Mount Liquid or steam in Vertical or Horizontal Pipes



Process Connections (Remote Mount Only)

The 1195 is available with ½-in. – 14 NPT connections (option codes G2 and G3). The ½-in. connections can be rotated to attain connection centers of 2-in. (51 mm), 2 ⅛-in. (54 mm), or 2 ¼-in. (57 mm). The threads are Class 2; use a lubricant or sealant when making the process connections.

Ensure all four flange studs are installed and tightened prior to applying pressure to prevent process leakage.

NOTE
Do not attempt to loosen or remove the flange studs while the 1195 is in service.

Perform the following to install flange adapters to the head of the 1195 (see Figure 2-9).

⚠
1. Place o-ring in the groove on the instrument connection face.
2. Position flange adapters.
3. Insert studs through the 1195 flange and flange adapters.
4. Thread nuts onto studs. Tighten nuts to 38 ft.-lbs.

When compressed, PTFE o-rings tend to cold flow, which aids in their sealing capabilities. When removing adapters, visually inspect the o-rings. Replace them if there are any signs of damage, such as nicks or cuts. If they are undamaged, you may reuse them. If you replace the o-rings, retorque the nuts after installation to compensate for cold flow.

High Temperature Units (Option Code G)

⚠ Inconel® o-rings should be replaced any time the unit is disassembled.

Installation

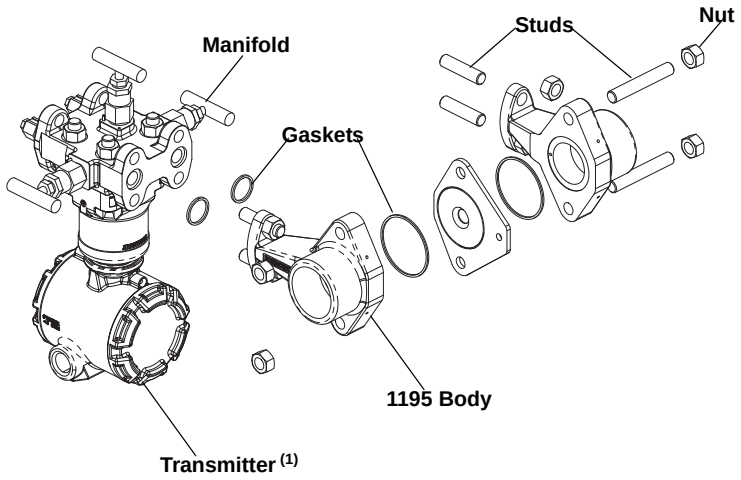
Install the 1195 according to the procedure below.

⚠
1. Orient the assembly according to the guidelines provided in “Temperature Sensors” on page 2-9. Ensure that the side of the orifice plate marked “Inlet” faces upstream.
2. Insert gaskets.

NOTE
For ease of installation, the gasket may be secured to the flange face with small pieces of tape. Be sure the gasket and/or tape do not protrude into the pipe.

3. Insert the 1195 between the flanges so that the indentations on the alignment ring contact the installed studs. The studs must contact the alignment ring in the indentation marked with the appropriate flange rating to ensure proper alignment.
4. Install remaining studs and nuts (hand tight). Ensure that three of the studs are in contact with the alignment ring.
5. Lubricate studs and tighten nuts in a cross pattern to the appropriate torque per local standards.

Figure 2-9. 1195 Installation



(1) Applies to both the 3051SFP (uses a 3051S transmitter) and a 3095MFP (uses a 3095MV transmitter).

Temperature Sensors

3095MFP flowmeters are supplied with a temperature sensor as standard. For direct mount configurations, the unit will be pre-wired to the 3095MV transmitter. On remote mount configurations a 12 ft. (3 m) cable will be provided. For FM/SCA explosion-proof locations the cable will be run inside conduit

No cabling is provided on 1195 and 3051SFP models ordered with temperature sensors.

Section 3 Commissioning

SAFETY MESSAGES

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Please refer to the following safety messages before performing any operation in this section.

⚠WARNING

Explosions could result in death or serious injury:

- Do not remove the transmitter cover in explosive atmospheres when the circuit is live.
- Before connecting a Field 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.
- Both transmitter covers must be fully engaged to meet explosion-proof requirements.

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

- Make sure only qualified personnel perform the installation.
- If the line is pressurized, serious injury or death could occur by opening valves.

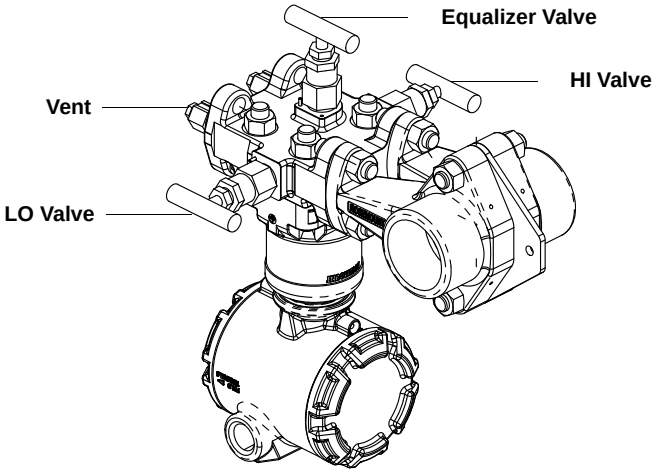
DIRECT MOUNT APPLICATIONS

Liquid Service

⚠

1. Pressurize line.
2. Open the equalizer valve.
3. Open the high and low side valves.
4. Bleed drain/vent valves until no gas is apparent in the liquid.
5. Close the vent/drain valves.
6. Close the low side valve.
7. Check the transmitter zero according to the transmitter product manual so that the output on the test meter reads zero percent of span.
8. Close the equalizer valve.
9. Open the low side valve. The system is now operational.

Figure 3-1. Direct Mount Liquid Service

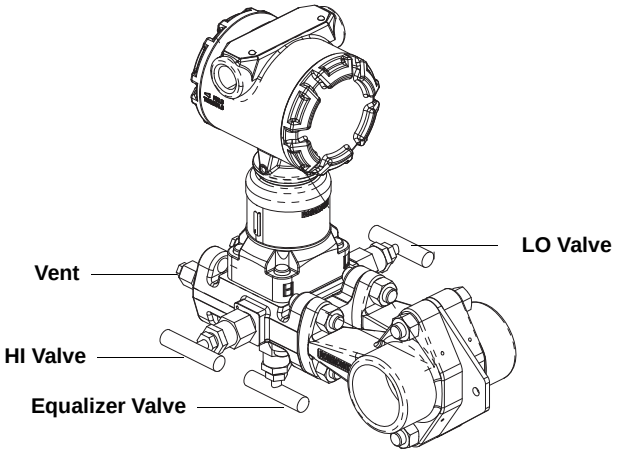


Gas Service

⚠

1. Pressurize line.
2. Open the equalizer valve.
3. Open the high and low side valves.
4. Open drain/vent valves to ensure no liquid is present.
5. Close the vent/drain valves.
6. Close the low side valve.
7. Check the transmitter zero according to the transmitter product manual so that the output on the test meter reads zero percent of span.
8. Close the equalizer valve.
9. Open the low side valve. The system is now operational.

Figure 3-2. Direct Mount Gas Service

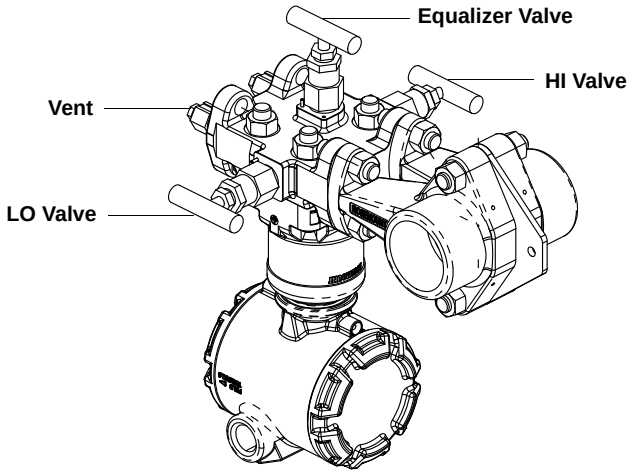


Steam Service

⚠

1. Remove pressure from line.
2. Open equalizer, high, and low side valves.
3. Fill manifold and transmitter with water via drain vents.
4. Close low side valve.
5. Pressurize line.
6. Gently tap electronics body, manifold head, and 1195 body with a small wrench to dislodge any entrapped air.
7. Zero electronics.
8. Close equalizer valve.
9. Open the low side valve. The system is now operational.

Figure 3-3. Direct Mount Steam Service



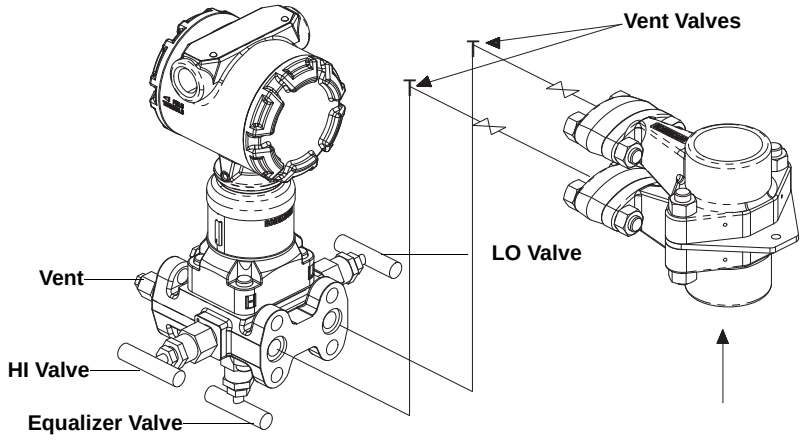
REMOTE MOUNT APPLICATIONS

Liquid Service

⚠

1. Pressurize line.
2. Open equalizer valve on transmitter manifold. Close equalizer valve at 1195, if one is used.
3. Open high and low side transmitter manifold valves and high and low block valves at 1195.
4. Bleed drain/vent valves on transmitter manifold until no air is present.
5. Close drain vent valves, then bleed vent valves at the 1195 block valves until no air is present.
6. Close vent valves at 1195 block valves.
7. Close equalizer valve at transmitter manifold.
8. Close low and high side block valves at 1195.
9. Open vent valves at 1195 block valves.
10. Check transmitter zero according to transmitter manual.
11. Close vent valves at 1195 block valves.
12. Open high and low side block valves at 1195.

Figure 3-4. Remote Liquid Service

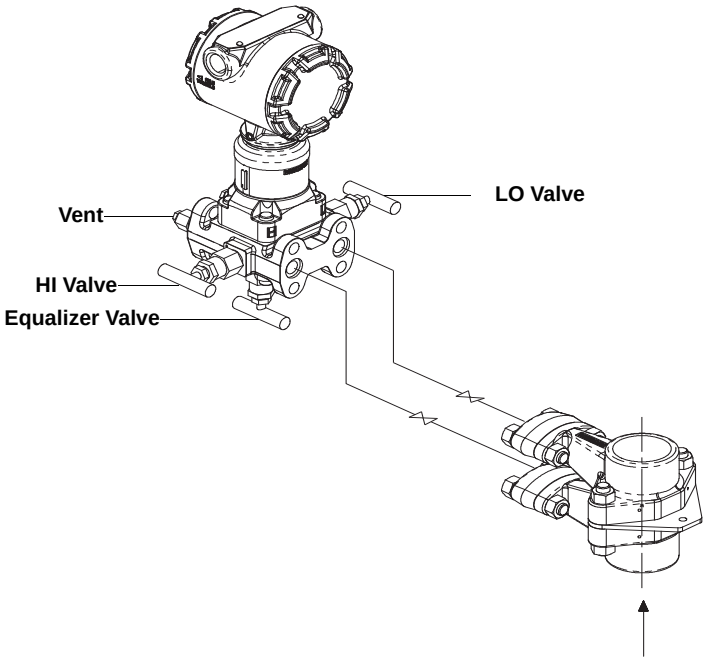


Gas Service

⚠

1. Pressurize line.
2. Open equalizer valve on transmitter manifold.
3. Open high and low side transmitter manifold valves.
4. Open drain/vent valves on transmitter manifold to ensure no liquids are present.
5. Close drain/vent valves.
6. Close low side transmitter manifold valve.
7. Check transmitter zero according to transmitter manual.
8. Close equalizer on transmitter manifold.
9. Open low side valve on transmitter manifold. The system is now operational.

Figure 3-5. Remote Gas Service

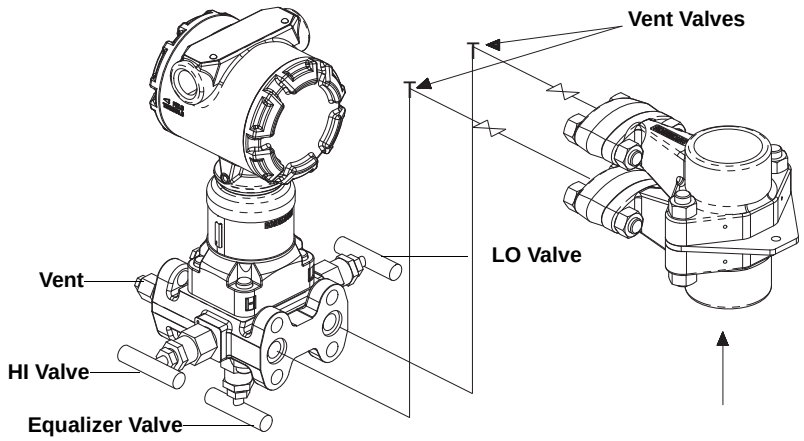


Steam Service

⚠

1. Remove pressure from line or close block valves at 1195.
2. Open equalizer valves, high and low side valves on the transmitter manifold. Close equalize valve at 1195, if one is used.
3. Open vent valves at 1195 block valves.
4. Fill transmitter manifold and instrument lines with water via low side vent at 1195 block valves.
5. Open and close vent valves at transmitter to bleed out trapped air.
6. Close the equalizer valve at transmitter manifold.
7. Complete filling the low side sensing line.
8. Gently tap electronics body, transmitter manifold, instrument lines, and 1195 with a small wrench to dislodge any trapped air.
9. Check transmitter zero according to transmitter manual.
10. Close vent valves at 1195 block valves.
11. If block valves at 1195 had been closed they should now be opened. System is now operational for steam flow measurement.

Figure 3-6. Remote Steam Service



Section 4 Operation and Maintenance

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.

⚠WARNING

Explosions can result in death or serious injury.

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

Electrical shock can result in death or serious injury.

- Avoid contact with the leads and the terminals.

TROUBLESHOOTING

If a malfunction is suspected despite the absence of diagnostic messages on the communicator display, follow the procedures described below to verify that the flowmeter hardware and process connections are in good working order. Always approach the most likely and easiest-to-check conditions first.

Table 4-1. Troubleshooting

Symptom	Possible Cause	Corrective Action
Questionable accuracy or erroneous flow signal	Improper installation	• Is the flow arrow pointed in the direction of the flow? • Verify that the cross reservoirs are perfectly level with one another. • Is there sufficient straight run upstream and downstream of the flowmeter?
	System leaks	Check for leaks in instrument piping. Repair and seal all leaks.
	Contamination/plugging	Remove the flowmeter and check for contamination.
	Closed valve	Verify that both HI and LO manifold valves are open. Verify that vent, equalizer, and line valves are properly positioned per the “start up procedure.”
	Connections (remote mount only)	Verify that the high side of the electronics is connected to the high side of the flowmeter. Check the same for the low side.
	Entrapped air (liquid applications)	Are there uneven water legs caused by air entrapment in the instrument connections? If so, bleed air.
	Operating conditions	Are the operating conditions in compliance with those given at the time the flowmeter was purchased? Check the flow calculation and the fluid parameters for accuracy. Double-check pipe inside diameter for proper sizing.
Spiking flow signal	Two-phase flow	The flowmeter is a head measurement device and will not accurately measure a two-phase flow.
Spiking flow signal (Stream Service)	Improper insulation (Vertical pipes only) Excessive vibration	Added insulation may be required to ensure that a phase change occurs at the cross reservoirs. Check the impulse piping for vibration.
Milliamp reading is zero		• Check if power polarity is reversed • Verify voltage across terminals (should be 10–55V dc) • Check for bad diode in terminal block • Replace electronics terminal block
Electronics not in communication		• Check power supply voltage at electronics (10.5V minimum) • Check load resistance (250 ohms minimum) • Check if unit is addressed properly • Replace electronics board
Milliamp reading is low or high		• Check pressure variable reading for saturation • Check if output is in alarm condition • Perform 4–20 mA output trim • Replace electronics board
No response to changes in applied flow		• Check test equipment • Check impulse piping for blockage • Check for disabled span adjustment • Check electronics security switch • Verify calibration settings (4 and 20 mA points) • Contact factory for replacement
Low reading/high reading		• Check impulse piping for blockage • Check test equipment • Perform full sensor trim (if software revision is 35 or higher) • Contact factory for replacement
Erratic reading for pressure variable		• Check impulse piping for blockage • Check damping • Check for EMF interference • Contact factory for replacement

Check Flow Direction

Check that the side of the orifice plate marked “Inlet” is facing upstream. If the DP transmitter is remote mounted from the 1195, be sure that the impulse tubing is connected correctly from the 1195 to the DP transmitter (high to high and low to low).

Check Orientation

Improper orientation can result in inaccurate measurements.

Check Zero

The transmitter may read off in the high or low direction if not zeroed properly at start-up/commissioning. Refer to the appropriate transmitter reference manual for additional information.

Check Valves

The correct valve setting for flow measurement are; equalizer valve fully closed, high and low side valves fully open.

Check Configuration/Scaling

Is the 20 mA DP URL of the 1195 set properly? This may involve sizing the 1195 in the Toolkit Software program to confirm.

Confirm the DCS or PLC and transmitter on 1195 are scaled consistently.

Is the square root being taken in the DCS or transmitter attached to the 1195? The square root should not be taken in both places.

Check 3095MV Configuration

If a Rosemount 3095MV transmitter is being used, its enhanced functionality should be taken into account during configuration and troubleshooting. The square root should not be taken in the DCS if a 3095MV transmitter is being used.

See the Rosemount 3095MV reference manual (document number 00809-0100-4716) for additional information.

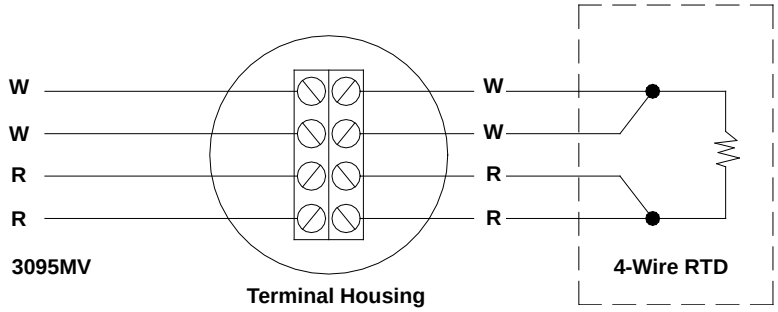
RTD MAINTENANCE

To test the 4-wire RTD (refer to Figure 4-1):

1. Disconnect power from the electronics.
2. Remove the Temperature Terminal Housing cover.
3. Disconnect the RTD lead wires from the terminal block.
4. Separate the wires so that the un-insulated ends are not touching anything.
5. Check that the resistance measured between the 2 red wires is the same as the resistance measured between the 2 white wires within +/- 0.1 ohms. Take note of the resistance value measured between the 2 white wires for use in step 6.
6. Measure the resistance between one red wire and one white wire. Subtract the resistance measured in step 5 from the resistance measured in this step. Refer to Table 4-1 to determine if this resistance matches the temperature that the RTD is in contact with.
7. Check the resistance between any wire and the RTD head or sheath. An acceptable resistance is 200 K ohms or greater.

8. If any of the above measurements are not within the acceptable range as stated above, contact an Emerson Process Management representative for a replacement RTD.
9. To return the RTD to service, connect the lead wires as shown in Figure 4-1.
10. Replace the Temperature Terminal Housing cover.
11. Re-connect power to the electronics.

Figure 4-1. Temperature Terminal Housing



Replacing an RTD

If an RTD needs to be replaced, proceed as follows:

1. Disconnect power from the electronics.
2. Remove the Temperature Terminal Housing cover.
3. Disconnect the RTD lead wires from the terminal block.

NOTE
Take care not to damage the RTD lead wires or insulation.

4. Use a 7/16 inch deep socket and a pair of vise grip pliers to remove the RTD from the thermowell. It is necessary to feed the wires through the socket to avoid damaging the lead wires. Grip the socket with the vise grip pliers and turn the socket to remove the RTD.

NOTE
A special tool (part number 28.509004-01) may be purchased to perform this task.

5. Install the new RTD using the socket and pliers as in step 4 above.
6. Connect the RTD lead wires to the terminal block (see Figure 4-1).
7. Replace the Temperature Terminal Housing cover.
8. Re-connect power to the electronics.

Table 4-2. Resistance vs. Temperature

IEC 751 Platinum 100, Alpha = 0.00385 RTD															
°F	**Ohms**	**°F**	**Ohms**	**°F**	**Ohms**	**°F**	**Ohms**	**°C**	**Ohms**	**°C**	**Ohms**	**°C**	**Ohms**	**°C**	**Ohms**
–330	18.04	60	106.07	450	187.65	840	263.80	–200	18.52	20	107.79	240	190.47	460	267.56
–320	20.44	70	108.23	460	189.67	850	265.68	–190	22.83	30	111.67	250	194.10	470	270.93
–310	22.83	80	110.38	470	191.68	860	267.56	–180	27.10	40	115.54	260	197.71	480	274.29
–300	25.20	90	112.53	480	193.70	870	269.44	–170	31.34	50	119.40	270	201.31	490	277.64
–290	27.57	100	114.68	490	195.71	880	271.31	–160	35.54	60	123.24	280	204.90	500	280.98
–280	29.93	110	116.83	500	197.71	890	273.17	–150	39.72	70	127.08	290	208.48	510	284.30
–270	32.27	120	118.97	510	199.71	900	275.04	–140	43.88	80	130.90	300	212.05	520	287.62
–260	34.61	130	121.11	520	201.71	910	276.90	–130	48.00	90	134.71	310	215.61	530	290.92
–250	36.94	140	123.24	530	203.71	920	278.75	–120	52.11	100	138.51	320	219.15	540	294.21
–240	39.26	150	125.37	540	205.70	930	280.61	–110	56.19	110	142.29	330	222.68	550	297.49
–230	41.57	160	127.50	550	207.69	940	282.46	–100	60.26	120	146.07	340	226.21	560	300.74
–220	43.88	170	129.62	560	209.67	950	284.30	–90	64.30	130	149.83	350	229.72	570	304.01
–210	46.17	180	131.74	570	211.66	960	286.14	–80	68.33	140	153.58	360	233.21	580	307.25
–200	48.46	190	133.86	580	213.63	970	287.98	–70	72.33	150	157.33	370	236.70	590	310.49
–190	50.74	200	135.97	590	215.61	980	289.82	–60	76.33	160	161.05	380	240.18	600	313.71
–180	53.02	210	138.08	600	217.58	990	291.65	–50	80.31	170	164.77	390	243.64	610	316.92
–170	55.29	220	140.19	610	219.55	1000	293.48	–40	84.27	180	168.48	400	247.09	620	320.12
–160	57.55	230	142.29	620	221.51	1010	295.30	–30	88.22	190	172.17	410	250.53	630	323.30
–150	59.81	240	144.39	630	223.47	1020	297.12	–20	92.16	200	175.86	420	253.96	640	326.48
–140	62.06	250	146.49	640	225.42	1030	298.94	–10	96.09	210	179.53	430	257.38	650	329.64
–130	64.30	260	148.58	650	227.38	1040	300.75	0	100.00	220	183.17	440	260.78	660	332.79
–120	66.54	270	150.67	660	229.33	1050	302.56	10	103.90	230	186.84	450	264.18		
–110	68.77	280	152.75	670	231.27	1060	304.37								
–100	71.00	290	154.83	680	233.21	1070	306.17								
–90	73.22	300	156.91	690	235.15	1080	307.97								
–80	75.44	310	158.98	700	237.09	1090	309.77								
–70	77.66	320	161.05	710	239.02	1100	311.56								
–60	79.86	330	163.12	720	240.95	1110	313.35								
–50	82.07	340	165.18	730	242.87	1120	315.14								
–40	84.27	350	167.24	740	244.79	1130	316.92								
–30	86.47	360	169.30	750	246.71	1140	318.70								
–20	88.66	370	171.35	760	248.62	1150	320.47								
–10	90.85	380	173.40	770	250.53	1160	322.24								
0	93.03	390	175.45	780	252.44	1170	324.01								
10	95.21	400	177.49	790	254.34	1180	325.77								
20	97.39	410	179.53	800	256.24	1190	327.53								
30	99.57	420	181.56	810	258.14	1200	329.29								
40	101.74	430	183.59	820	260.03	1210	331.04								
50	103.90	440	185.62	830	261.92	1220	332.79								

NOTE:

To convert from °C to °F:

[1.8 3 (°C)] + 32 = °F

Example: (1.8 3 100) + 32 = 212°F

To convert from °F to °C:

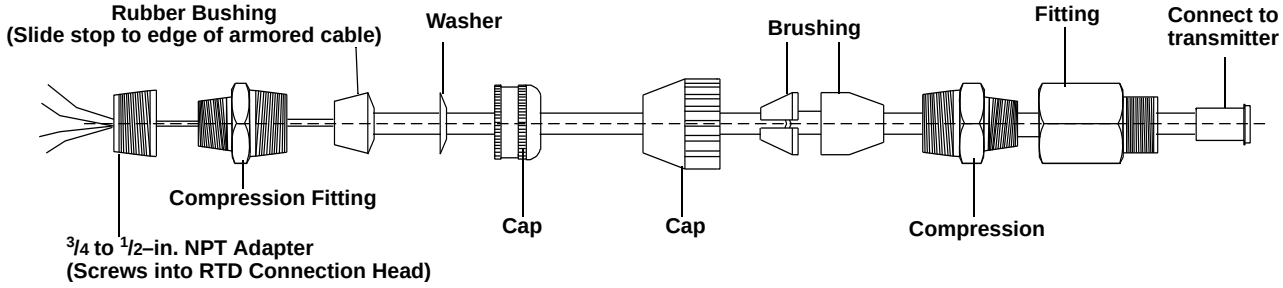
0.556 [(°F) – 32] = °C

Example: 0.556 (212 – 32) = 100°C

Remote Mount RTD

If an RTD needs to be replaced on a remote mount, proceed as follows:

1. Close instrument valves to ensure that the pressure is disconnected from the transmitter.
2. Open the bleed valves on the transmitter to remove all pressure.
3. Remove the cap.
4. Remove the RTD wiring only from the terminal.
5. Remove the Terminal Housing from the head.
6. Pull the RTD wire out of the nipple and remove the RTD. The RTD is in a thermowell, so no live line pressure will be present.
7. Install the new RTD and thread the wires through the nipple.
8. Using the appropriate thread lubricant or tape, install the terminal housing onto the remote head.
9. Reconnect the RTD wires to the terminal. This diagram is for a typical RTD transmitter wiring connection.
10. Open the instrument valves.



Appendix A Specifications and Reference Data

ROSEMOUNT 3051SFP PROPLATE FLOWMETER

SPECIFICATIONS

Performance

System Reference Accuracy

Percentage (%) of volumetric flow rate(1)

Beta (β)(2)	Classic (8:1 flow turndown)	Ultra (8:1 flow turndown)	Ultra for Flow (10:1 flow turndown)
$\beta < 0.1$	±2.70%	±2.65%	±2.60%
$0.1 < \beta < 0.2$	±1.60%	±1.45%	1.40%
$0.2 < \beta < 0.6$	±1.20%	±1.10%	±0.95%
$0.6 < \beta < 0.8$	±1.80%	±1.70%	±1.65%

(1) Without associated straight run piping, discharge coefficient uncertainty can add up to 1.5% - 5% additional error. Consult the factory for additional information.

(2) $\beta = \frac{\text{Orifice Plate Bore}}{\text{body I.D.}}$

Repeatability

±0.1%

Line Sizes

- 1/2-in. (15 mm)
- 1-in. (25 mm)
- 1 1/2-in. (40 mm)

Performance Statement Assumptions

- Use associated piping.
- Electronics are trimmed for optimum flow accuracy

Sizing

Contact a Emerson Process Management sales representative for assistance. A “Configuration Data Sheet” is required prior to order for application verification.

Functional

Service

- Liquid
- Gas
- Steam

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 SIS Safety transmitter: 12 to 42 Vdc with no load

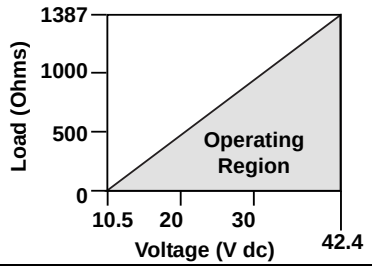
3051S HART Diagnostics transmitter: 12 to 42 Vdc with no load

Load Limitations

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

Standard Transmitter

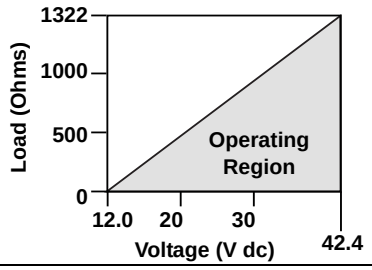
Maximum Loop Resistance = 43.5 * (Power Supply Voltage – 10.5)



The Field Communicator requires a minimum loop resistance of 250Ω for communication.

3051S SIS Safety Transmitter (output code B)
3051S HART Diagnostics Transmitter (option code DA1)

Maximum Loop Resistance = 43.5 * (Power Supply Voltage – 12.0)



The Field Communicator requires a minimum loop resistance of 250Ω for communication.

HART Diagnostics Suite (Option Code DA1)

The 3051S HART Diagnostics Transmitter provides Abnormal Situation Prevention (ASP) indication, device operating hours, variable logging, loop output readback diagnostic, 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 ASP algorithm uses these values and highly flexible configuration options for customization to detect many user-defined or application specific abnormal situations (e.g. plugged impulse line detection).

The device operating hours are logged along with the occurrence of diagnostic events 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 feedforward. 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	25 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 3095 Engineering Assistant.

FOUNDATION fieldbus Diagnostics Suite (Option Code D01)

3051S FOUNDATION fieldbus Diagnostics provide Abnormal Situation Prevention (ASP) 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 ASP algorithm uses these values and highly flexible configuration options for customization to detect many user-defined or application specific abnormal situations (e.g. plugged impulse line detection).

Process Temperature Limits

Direct Mount Electronics

- –40 to 450 °F (40 to 232 °C)

Remote Mount Electronics

- –148 to 850 °F (–100 to 454 °C)(1)

Electronics Temperature Limits

Ambient

- –40 to 185 °F (–40 to 85 °C)
- With Integral Mount LCD Display: –4 to 175 °F (–20 to 80 °C)

Storage

- –50 to 230 °F (–46 to 110 °C)
- With Integral Mount LCD Display: –40 to 185 °F (–40 to 85 °C)

Pressure Limits(2)

Direct Mount Electronics

- Pressure retention per ANSI B16.5 600# or DIN PN

(1) Bolt Material code G must be provided.
(2) Static pressure selection may effect pressure limitations.

Static Pressure Limits

- Range 1A: Operates within specification between static line pressures of 0.5 psia to 2000 psig (0.03 to 138 bar)
- Ranges 2A– 3A: Operates within specifications between static line pressures of 0.5 psia and 3626 psig (0.03 bar-A to 250 bar-G)

Burst Pressure Limits

Coplanar or traditional process flange

- 10000 psig (689,5 bar).

Overpressure Limits

Flowmeters withstand the following limits without damage:

- Range 1A: 2000 psig (138 bar)
- Ranges 2A–3A: 3626 psig (250 bar)

Table A-1. Overpressure Limits(1)

Standard	Type	Carbon Steel Rating	Stainless Steel Rating
ANSI/ASME	Class 150	285 (20)	275 (19)
ANSI/ASME	Class 300	740 (51)	720 (50)
ANSI/ASME	Class 600	1480 (102)	1440 (99)
At 100 °F (38 °C), the rating decreases with increasing temperature.			
DIN	PN 10/40	580 (40)	580 (40)
DIN	PN 10/16	232 (16)	232 (16)
DIN	PN 25/40	580 (40)	580 (40)
At 248 °F (120 °C), the rating decreases with increasing temperature.			

(1) Carbon Steel and Stainless Steel Ratings are measured in psig (bar).

Humidity Limits

- 0–100% relative humidity

Turn-On Time

Performance within specifications less than 2 seconds (typical) after power is applied to the transmitter

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 4-20 mA (output option codes A and B)

If self-diagnostics detect a gross transmitter failure, the analog signal will be driven offscale to alert the user. Rosemount standard (default), NAMUR, and custom alarm levels are available (see Table A-2).

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

Table A-2. 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)(3)	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.
(3) Not available with the 3051S SIS Safety Transmitter.

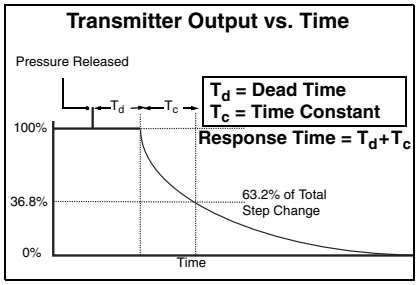
3051S SIS Safety Transmitter Failure Values

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%.

Dynamic Performance

	4 - 20 mA (HART®)(1)	Fieldbus protocol(2)	Typical Transmitter Response Time
Total Response Time (Td + Tc)(3):			
3051S_C, Ranges 2A - 3A:	100 milliseconds	152 milliseconds	
Range 1A:	255 milliseconds	307 milliseconds	
Process Variable Response Time			
3051S SIS, Ranges 2A - 3A:	220 milliseconds	Not Applicable	
Range 1A:	375 milliseconds	Not Applicable	
Dead Time (Td)(4)	45 milliseconds (nominal)	97 milliseconds	
Update Rate			
3051S	22 times per second	22 times per second	
3051S SIS	11 times per second	Not Applicable	



(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 (nominal) to 4-20 mA (HART®) total response time values.
(4) For option code DA1, dead time (Td) is 85 milliseconds (nominal).

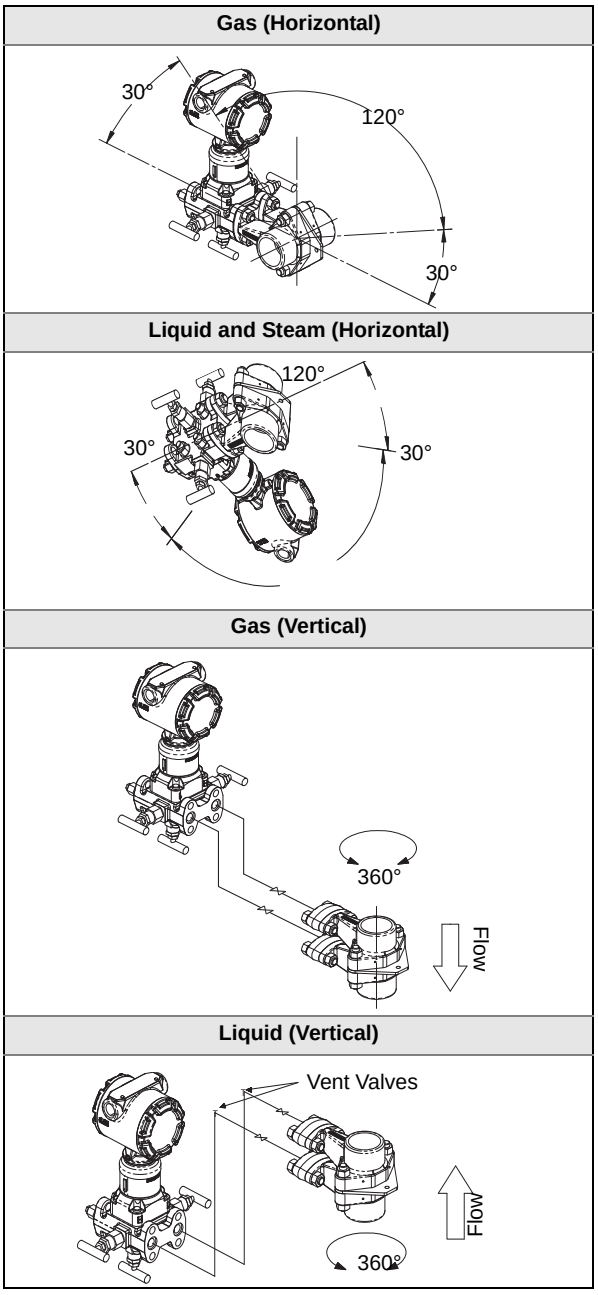
Installation Considerations

Pipe Orientation

Orientation/ Flow Direction	Process(1)		
	Gas	Liquid	Steam
Horizontal	D/R	D/R	D/R
Vertical Up	R	R	R
Vertical Down	R	NR	NR

(1) D = Direct mount acceptable (recommended)
R = Remote mount acceptable
NR = Not recommended

Flowmeter Orientation



Physical

Temperature Measurement

Remote RTD

- 100 Ohm platinum with 1/2-in. NPT nipple and union (078 series with Rosemount 644 housing)
- Standard RTD cable is shielded armored cable, length is 12 ft. (3.66 m)

Thermowell with Remote RTD with 1/2-in. SST weld couplet

Electrical Considerations

1/2–14 NPT, G1/2, and CM20 conduit. HART interface connections permanently fixed to terminal block

Material of Construction

Orifice Plate

- 316/316L SST
- *Alloy* C-276
- *Alloy* 400

Body

- 316 SST (CF8M), material per ASTM A351
- *Alloy* C-276 (CW12MW), material per ASTM A494

Flange and Pipe Material (If Applicable)

- A312 Gr 316/316L, B622 UNS N10276
- Flange pressure limits are per ANSI B16.5
- Flange face finish per ANSI B16.5, 125 to 250 RMS

Body Bolts/Studs

- ASTM A193 Gr B8M studs
- SAE J429 Gr 8 bolts (meets or exceeds ASTM A193 B7 requirements) for body bolt/stud material option code G for high temperatures.

Transmitter Connection Studs

- ASTM A193 Gr B8M studs

Gaskets/O-rings

- Glass filled (PTFE)
- Optional high temperature Inconel® X-750
- Gaskets and o-rings must be replaced each time the 3051SFP is disassembled for installation or maintenance.

Orifice Type

Square edged—orifice bore size

- 0.066-in and larger

Quadrant edged—orifice bore size (for 1/2-in. line size only)

- 0.034-in
- 0.020-in
- 0.014-in
- 0.010-in

NOTE
Integral orifice bodies contain corner tapped pressure ports.

Pipe Lengths

- Upstream and downstream associated piping sections are available on the 3051SFP. The table below lists the standard overall length (lay length) as a function of end connections and line size.

	Line Size		
Flanged Process Connection(1) (2) (3)	**1/2-in. (15 mm)**	**1-in. (25 mm)**	**1 1/2-in. (40 mm)**
RF, ANSI Class 150, slip-on	18.2 (463)	28.9 (734)	40.3 (1023)
RF, ANSI Class 300, slip-on	18.2 (463)	28.9 (734)	40.3 (1023)
RF, ANSI Class 600, slip-on	18.2 (463)	28.9 (734)	40.3 (1023)
RF, DIN PN16, slip-on	18.2 (463)	28.9 (734)	40.3 (1023)
RF, DIN PN40, slip-on	18.2 (463)	28.9 (734)	40.3 (1023)
RF, DIN PN100, slip-on	18.2 (463)	28.9 (734)	40.3 (1023)
RF, ANSI Class 150, weld-neck	21.8 (554)	33.2 (843)	44.9 (1140)
RF, ANSI Class 300, weld-neck	22.2 (559)	33.7 (856)	45.5 (1156)
RF, ANSI Class 600, weld-neck	22.8 (579)	34.3 (871	46.1 (1171)
RTJ, ANSI Class 150, slip-on	18.2 (463)	28.9 (734)	40.3 (1023)
RTJ, ANSI Class 300, slip-on	18.2 (463)	28.9 (734)	40.3 (1023)
RTJ, ANSI Class 600, slip-on	18.2 (463)	28.9 (734)	40.3 (1023)
NPT / Beveled Process Connection(1)(2)(3)	18 (457)	28.9 (734)	40.3 (1023)

(1) See the ordering information for model code description.
(2) Consult factory for other lengths.
(3) See page A-38 for additional information on associated pipe lengths.

Weight

The following weights are approximate

Line Size	With Body		With Flanged Piping(1)	
	lb	kg	lb	kg
1/2-in. (15 mm)	13.6	6.2	17.6	8.0
1-in. (25 mm)	15.6	7.1	21.6	9.8
1 1/2-in. (40 mm)	17.6	8.0	34.6	15.7

(1) As supplied with standard lengths, ANSI Class 150 flanges.

Process-Wetted Parts

Integral Manifolds
- 316 SST
- *Alloy* C-276

Remote Manifolds
- 316 SST
- *Alloy* C-276

Transmitter Vent Valves and Process Flanges
- 316 SST
- *Alloy* C-276

Process Isolating Diaphragms
- 316L SST
- *Alloy* C-276

O-rings
- Glass-filled TFE / Inconel X-750

Integral Manifold O-Rings
- PTFE / Graphite (D7)

Non-Wetted Parts

Sensor Module Fill Fluid
- Silicone oil
- Inert Fill optional

Cover O-rings
- Buna-N

Remote Mounting Brackets
- SST

Sensor mounting (including nuts, bolts, and gasket)
- SST (CS optional for high temperature)

Electronic Housing
- Low copper aluminum, NEMA 4x, IP65
- SST (optional)

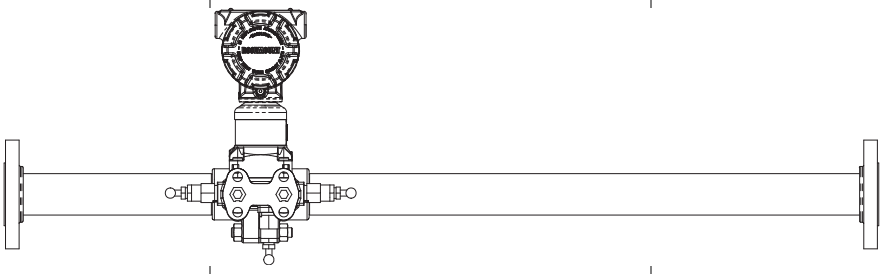
Paint
- Polyurethane

Bolts
- CS
- SST

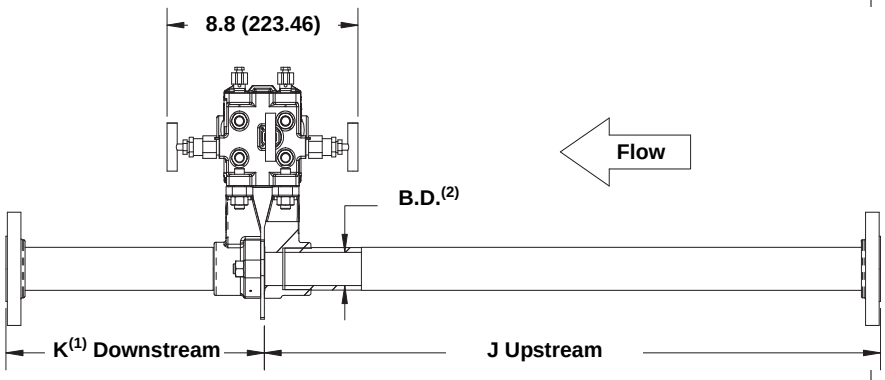
DIMENSIONAL DRAWINGS

Rosemount 3051SFP Proplate Flowmeter

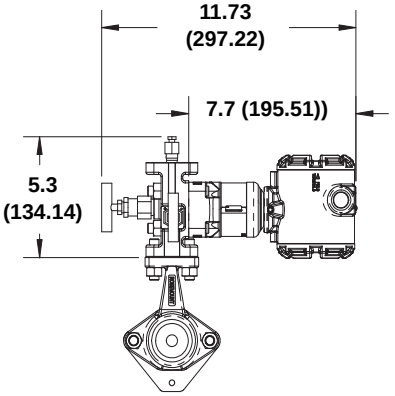
Front View



Bottom View



Side View



Dimensions are in inches (millimeters).

	Line Size					
Dimension	**1/2-in. (12.7 mm)**		**1-in. (25.4 mm)**		**1 1/2-in. (38.1 mm)**	
J (RF slip-on, RTJ slip-on, RF-DIN slip-on)	12.4-in.	318 mm	20.2-in.	513 mm	28.4-in.	721 mm
J (RF 150#, weld-neck)	14.3-in.	363 mm	22.3-in.	566 mm	30.7-in.	780 mm
J (RF 300#, weld-neck)	14.5-in.	368 mm	22.6-in.	574 mm	31.0-in.	787 mm
J (RF 600#, weld-neck)	14.8-in.	376 mm	22.9-in.	582 mm	31.3-in.	795 mm
K ((RF slip-on, RTJ slip-on, RF-DIN slip-on)(1)	5.7-in.	148 mm	8.7-in.	221 mm	11.9-in.	302 mm
K (RF 150#, weld-neck)	7.5-in.	191 mm	10.9-in.	277 mm	14.2-in.	361 mm
K (RF 300#, weld-neck)	7.7-in.	196 mm	11.1-in.	282 mm	14.5-in.	368 mm
K (RF 600#, weld-neck)	8.0-in.	203 mm	11.4-in.	290 mm	14.8-in.	376 mm
B.D.(2)	0.664-in.	16.9 mm	1.097-in.	27.86 mm	1.567-in.	39.80 mm

(1) Downstream length shown here includes plate thickness of 0.162-in. (4.11 mm).
(2) B.D is diameter of the precision bored portion of the upstream and downstream piping.

ORDERING INFORMATION

Rosemount 3051SFP Proplate Flowmeter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

Model	**Product Description**	
3051SFP	Proplate Flowmeter	
Code	**Measurement Type**	
Standard		**Standard**
D	Differential Pressure	★
Code	**Body Material**	
Standard		**Standard**
S	316 SST	★
Code	**Line Size**	
Standard		**Standard**
005	1/2-in. (15 mm)	★
010	1-in. (25 mm)	★
015	1 1/2-in. (40 mm)	★
Code	**Process Connection**	
Standard		**Standard**
T1	NPT Female Body (not available with remote thermowell and RTD)	★
S1(1)	Socket Weld Body (not available with remote thermowell and RTD)	★
P1	Pipe Ends: NPT threaded	★
P2	Pipe Ends: Beveled	★
D1	Pipe Ends: Flanged, RF, DIN PN16, slip-on	★
D2	Pipe Ends: Flanged, RF, DIN PN40, slip-on	★
D3	Pipe Ends: Flanged, RF, DIN PN100, slip-on	★
W1	Pipe Ends: Flanged, RF, ANSI Class 150, weld-neck	★
W3	Pipe Ends: Flanged, RF, ANSI Class 300, weld-neck	★
W6	Pipe Ends: Flanged, RF, ANSI Class 600, weld-neck	★
Expanded		
A1	Pipe Ends: Flanged, RF, ANSI Class 150, slip-on	
A3	Pipe Ends: Flanged, RF, ANSI Class 300, slip-on	
A6	Pipe Ends: Flanged, RF, ANSI Class 600, slip-on	
R1	Pipe Ends: Flanged, RTJ, ANSI Class 150, slip-on	
R3	Pipe Ends: Flanged, RTJ, ANSI Class 300, slip-on	
R6	Pipe Ends: Flanged, RTJ, ANSI Class 600, slip-on	
P9	Special process connections	
Code	**Orifice Plate Material**	
Standard		**Standard**
S	316 SST	★
Expanded		
H	*Alloy* C-276	
M	*Alloy 400*	
Code	**Bore Size Option**	
Standard		**Standard**
0066	0.066-in. (1.68 mm) for 1/2-in. pipe	★
0109	0.109-in. (2.77 mm) for 1/2-in. pipe	★
0160(2)	0.160-in. (4.06 mm) for 1/2-in. pipe	★
0196(2)	0.196-in. (4.98 mm) for 1/2-in. pipe	★
0260(2)	0.260-in. (6.60 mm) for 1/2-in. pipe	★
0340(2)	0.340-in. (8.64 mm) for 1/2-in. pipe	★
0150	0.150-in. (3.81 mm) for 1-in. pipe	★

Rosemount 3051SFP Proplate Flowmeter Ordering Information

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0250[2]	0.250-in. (6.35 mm) for 1-in. pipe			★
0345[2]	0.345-in. (8.76 mm) for 1-in. pipe			★
0500[2]	0.500-in. (12.70 mm) for 1-in. pipe			★
0630[2]	0.630-in. (16.00 mm) for 1-in. pipe			★
0800	0.800-in. (20.32 mm) for 1-in. pipe			★
0295	0.295-in. (7.49 mm) for 1 1/2-in. pipe			★
0376[2]	0.376-in. (9.55 mm) for 1 1/2-in. pipe			★
0512[2]	0.512-in. (13.00 mm) for 1 1/2-in. pipe			★
0748[2]	0.748-in. (19.00 mm) for 1 1/2-in. pipe			★
1022	1.022-in. (25.96 mm) for 1 1/2-in. pipe			★
1184	1.184-in. (30.07 mm) for 1 1/2-in. pipe			★
Expanded				
0010	0.010-in. (0.25 mm) for 1/2-in. pipe			
0014	0.014-in. (0.36 mm) for 1/2-in. pipe			
0020	0.020-in. (0.51 mm) for 1/2-in. pipe			
0034	0.034-in. (0.86 mm) for 1/2-in. pipe			
Code	**Transmitter Connection Platform**			
Standard				**Standard**
D3	Direct-mount, 3-valve manifold, SST			★
D5	Direct-mount, 5-valve manifold, SST			★
R3	Remote-mount, 3-valve manifold, SST			★
R5	Remote-mount, 5-valve manifold, SST			★
Expanded				
D4	Direct-mount, 3-valve Manifold, Alloy C-276			
D6	Direct-mount, 5-valve Manifold, Alloy C-276			
D7	Direct-mount, High Temperature, 5-valve Manifold, SST			
R4	Remote-mount, 3-valve Manifold, Alloy C-276			
R6	Remote-mount, 5-valve Manifold, Alloy C-276			
Code	**Differential Pressure Range**			
Standard				**Standard**
1A	0 to 25 in H_2O (0 to 62.2 mbar)			★
2A	0 to 250 in H_2O (0 to 623 mbar)			★
3A	0 to 1000 in H_2O (0 to 2.5 bar)			★
Code	**Output Protocol**			
Standard				**Standard**
A	4–20 mA with digital signal based on *HART* protocol			★
F[3]	*FOUNDATION* fieldbus protocol (Requires PlantWeb housing)			★
X	Wireless (Requires wireless options and wireless PlantWeb housing)			★
Code	**Electronics Housing Style**	**Material**	**Conduit Entry Size**	
Standard				**Standard**
00	None (Customer-supplied electrical connection)			★
1A	*PlantWeb* Housing	Aluminum	1/2-14 NPT	★
1B	*PlantWeb* Housing	Aluminum	M20 x 1.5 (CM20)	★
1J	*PlantWeb* Housing	316L SST	1/2-14 NPT	★
1K	*PlantWeb* Housing	316L SST	M20 x 1.5 (CM20)	★
2A	Junction Box Housing	Aluminum	1/2-14 NPT	★
2B	Junction Box Housing	Aluminum	M20 x 1.5 (CM20)	★
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)	★

Rosemount 3051SFP Proplate Flowmeter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

2J	Junction Box Housing	316L SST	1/2-14 NPT	★
2M	Junction Box Housing with output for remote display and interface	316L SST	1/2-14 NPT	★
5A	Wireless PlantWeb housing	Aluminum	1/2-14 NPT	★
5J	Wireless PlantWeb housing	SST	1/2-14 NPT	★
7J[4]	Quick Connect (A size Mini, 4-pin male termination)	316L SST		★
Expanded				
1C	*PlantWeb* Housing	Aluminum	G1/2	
1L	*PlantWeb* Housing	316L SST	G1/2	
2C	Junction Box Housing	Aluminum	G1/2	
2G	Junction Box Housing with output for remote display and interface	Aluminum	G1/2	
Code	**Performance Class**			
Standard				**Standard**
3[5]	Ultra for Flow: up to ±0.95% flow rate accuracy, 14:1 flow turndown, 10-year stability. limited 12-year warranty			★
1[5]	Ultra: up to ±1.05% flow rate accuracy, 8:1 flow turndown, 10-year stability, limited 12-year warranty			★
2	Classic: 1.50% flow rate accuracy, 8:1 flow turndown, 5-yr stability			★
Code	**Options**			
Transmitter / Body Bolt Material				
Expanded				
G	High temperature (850 °F (454 °C)) (SAE J429 Gr8 / Body bolts with A193 Gr B8M transmitter studs)			
Temperature Sensor				
Standard				**Standard**
T[6]	Thermowell and RTD			★
Optional Connection				
Standard				**Standard**
G1	DIN 19231 Transmitter Connection			★
Pressure Testing				
Expanded				
P1[7]	Hydrostatic Testing			
Special Cleaning				
Expanded				
P2	Cleaning for special processes			
PA	Cleaning per ASTM G93 Level D (section 11.4)			
Material Testing				
Expanded				
V1	Dye Penetrant Exam			
Material Examination				
Expanded				
V2	Radiographic Examination (available only with Process Connection code W1, W3, and W6)			
Flow Calibration				
Expanded				
WD[8]	Discharge Coefficient Verification			
WZ[8]	Special Calibration			
Special Inspection				
Standard				**Standard**
QC1	Visual and dimensional inspection with certificate			★
QC7	Inspection and performance certificate			★
Material Traceability Certification				
Standard				**Standard**
Q8[9]	Material Traceability Certification per EN 10204:2004 3.1			★

Rosemount 3051SFP Proplate Flowmeter Ordering Information

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Code Conformance		
Expanded		
J2[10]	ANSI / ASME B31.1	
J3[10]	ANSI / ASME B31.3	
J4[10]	ANSI / ASME B31.8	
Materials Conformance		
Expanded		
J5[11]	NACE MR-0175 / ISO 15156	
Country Certification		
Standard		**Standard**
J6	European Pressure Directive (PED)	★
Expanded		
J1	Canadian Registration	
Transmitter Calibration Certification		
Standard		**Standard**
Q4	Calibration Data Certificate for Transmitter	★
Safety Certification		
Standard		**Standard**
QT	Safety-certified to IEC 61508 with Certificate of FMEDA data	★
Product Certifications		
Standard		**Standard**
E1	ATEX Flameproof	★
I1	ATEX Intrinsically Safe	★
N1	ATEX Type n	★
IA[12]	ATEX FISCO Intrinsically Safe; for FOUNDATION fieldbus protocol only	★
K1	ATEX Flameproof, Intrinsically Safe, Type n, Dust (combination of E1, I1, N1, and ND)	★
ND	ATEX Dust	★
E4	TIIS Flameproof	★
E5	FM Explosion-proof, Dust Ignition-proof	★
I5	FM Intrinsic Safety, Division 2	★
K5	FM Explosion-proof, Dust Ignition-proof, Intrinsically Safe, Division 2 (combination of E5 and I5)	★
E6	CSA Explosion-proof, Dust Ignition-proof, Division 2	★
I6	CSA Intrinsically Safe	★
IF[12]	CSA FISCO Intrinsically Safe; for FOUNDATION fieldbus protocol only	★
K6	CSA Explosion-proof, Dust Ignition-proof, Intrinsically Safe, Division 2 (combination of E6 and I6)	★
E7[12]	IECEx Flameproof, Dust Ignition-proof	★
I7	IECEx Intrinsically Safe	★
IG[12]	IECEx FISCO Intrinsically Safe	★
K7	IECEx Flameproof, Dust Ignition-proof, Intrinsic Safety, Type n (combination of E7, I7 and N7)	★
E3	China Flameproof	★
I3	China Intrinsic Safety	★
N3	China Type n	★
KA	ATEX and CSA Flameproof, Intrinsically Safe (combination of E1, I1, E6, and I6) *Note: Only available on Housing Style codes 1A, 1J, 2A, 2J, 2E, or 2M.*	★
KB	FM and CSA Explosion-proof, Dust Ignition-proof, Intrinsically Safe, Div 2 (comb of E5, E6, I5, I6) *Note: Only available on Housing Style codes 1A, 1J, 2A, 2J, 2E, or 2M.*	★
KC	FM and ATEX Explosion-proof, Intrinsically Safe, Division 2 (combination of E5, E1, I5, and I1) *Note: Only available on Housing Style codes 1A, 1J, 2A, 2J, 2E, or 2M.*	★
KD	FM, CSA, and ATEX Explosion-proof, Intrinsically Safe, (combination of E5, E6, E1, I5, I6, and I1) *Note: Only available on Housing Style codes 1A, 1J, 2A, 2J, 2E, or 2M.*	★
Shipboard Approvals		
Standard		**Standard**
SBS	American Bureau of Shipping (ABS) Type Approval	★

Rosemount 3051SFP Proplate Flowmeter Ordering Information

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Sensor Fill Fluid and O-ring Options		
Standard		**Standard**
L1	Inert Sensor Fill Fluid	★
L2	Graphite-filled PTFE o-ring	★
LA	Inert sensor fill fluid and graphite-filled (PTFE) o-ring	★
Display[13]		
Standard		**Standard**
M5	*PlantWeb* LCD display	★
M7[5][14]	Remote mount LCD display and interface, *PlantWeb* housing, no cable, SST bracket	★
M8[5][14]	Remote mount LCD display and interface, *PlantWeb* housing, 50 foot cable, SST bracket	★
M9[5][14]	Remote mount LCD display and interface, *PlantWeb* housing, 100 foot cable, SST bracket	★
Terminal Blocks		
Standard		**Standard**
T1[13]	Transient terminal block	★
T2[15]	Terminal block with WAGO® spring clamp terminals	★
T3[15]	Transient terminal block with WAGO spring clamp terminals	★
***PlantWeb* Control Functionality**		
Standard		**Standard**
A01[16]	FOUNDATION fieldbus Advanced Control Function Block Suite	★
***PlantWeb* Diagnostic Functionality**		
Standard		**Standard**
D01[16]	FOUNDATION fieldbus Diagnostics Suite	★
DA2[17]	Advanced HART Diagnostics Suite	★
***PlantWeb* Enhanced Measurement Functionality**		
Standard		**Standard**
H01[16][18]	FOUNDATION fieldbus Fully Compensated Mass Flow Block	★
Wireless Update Rate, Operating Frequency and Protocol		
Standard		**Standard**
WA3	User Configurable Update Rate, 2.4GHz DSSS, IEC 62591 (WirelessHART)	★
Omnidirectional Wireless Antenna and SmartPower		
Standard		**Standard**
WK1	External Antenna, Adapter for Black Power Module (I.S. Power Module sold separately)	★
WM1	Extended Range, External Antenna, Adapter for Black Power Module (I.S. Power Module sold separately)	★
Cold Temperature		
Standard		**Standard**
BRR	-60 °F (-51 °C) Cold Temperature Start-up	★
Alarm Limits		
Standard		**Standard**
C4[19]	NAMUR alarm and saturation signal levels, high alarm	★
C5[19]	NAMUR alarm and saturation signal levels, low alarm	★
C6[5][19]	Custom alarm and saturation signal levels, high alarm *Note: Requires option code C1, custom software configuration. A Configuration Data Sheet must be completed*	★
C7[5][19]	Custom alarm and saturation signal levels, low alarm *Note: Requires option code C1, custom software configuration. A Configuration Data Sheet must be completed.*	★
C8[19]	Low alarm (standard Rosemount alarm and saturation signal levels)	★

Rosemount 3051SFP Proplate Flowmeter Ordering Information

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The Expanded offering is subject to additional delivery lead time.

Hardware Adustments and Ground Screw		
Standard		**Standard**
D1[19]	Hardware Adjustment (zero, span, alarm, security)	★
D4	External ground screw assembly	★
DA[19]	Hardware adjustment (zero, span, security) and external ground screw	★
Conduit Plug		
Standard		**Standard**
DO	316 SST Conduit Plug	★
Conduit Electrical Connector		
Expanded		
GE [20]	M12, 4-pin, Male Connector (*eurofast*®)	
GM[20]	A size Mini, 4-pin, Male Connector (*minifast*®)	
Typical Model Number: 3051SFP D S 010 A3 S 0150 D3 1A A 1A 3		

(1) To improve pipe perpendicularity for gasket sealing, socket diameter is smaller than standard pipe O.D.
(2) Best flow coefficient uncertainty is between (0.2 < β < 0.6).
(3) Requires PlantWeb housing.
(4) Available with output code A only. Available approvals are FM Intrinsically Safe, Non-incendive (option code I5) or ATEX Instrinsically Safe (option code I1). Contact an Emerson Process Management representative for additional information.
(5) Not available with Output Protocol code B.
(6) Thermowell material is the same as the body material.
(7) Does not apply to Process Connection codes T1 and S1.
(8) Not available for bore sizes 0010, 0014, 0020, or 0034.
(9) Includes certificates for mechanical and chemical properties of bodies, orifice plates, pipes, flanges, and adapters as applicable.
(10) Not available with DIN Process Connection codes D1, D2, or D3.
(11) Materials of Construction comply with metallurgical requirements within NACE MR0175/ISO for sour oil field production environments. Environmental limits apply to certain materials. Consult latest standard for details. Selected materials also conform to NACE MR0103 for sour refining environments.
(12) Consult factory for availability.
(13) Not available with Housing code 7J.
(14) Not available for Output Protocol code F, Housing code 01, or option code DA1.
(15) Available with Output Protocol code A and PlantWeb housing only.
(16) Requires PlantWeb housing and output code F.
(17) Requires PlantWeb housing and Output code A. Includes Hardware Adjustments as standard. Contact an Emerson Process Management representative regarding availability.
(18) Requires Rosemount 3095 Engineering Assistant to configure.
(19) Not available with Output Protocol code F.
(20) Not available with Housing code 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 NEMA 4X rating.

ROSEMOUNT 3095MFP MASS PROPLATE FLOWMETER

SPECIFICATIONS

Performance

System Reference Accuracy

Percentage (%) of mass flow rate(1)

Beta (β)(2)	Classic (8:1 flow turndown)	Ultra for Flow 10:1 flow turndown
β < 0.1	±2.60%	±2.55%
0.1 < β < 0.2	±1.50%	±1.35%
0.2 < β < 0.6	±1.10%	±0.95%
0.6 < β < 0.8	±1.70%	±1.60%

(1) Without associated straight run piping, discharge coefficient uncertainty can add up to 1.5% - 5% additional error. Consult the factory for additional information.

(2) $\beta = \frac{\text{Orifice Plate Bore}}{\text{body I.D.}}$

Repeatability

±0.1%

Line Sizes

- 1/2-in. (15 mm)
- 1-in. (25 mm)
- 1 1/2-in. (40 mm)

Output

Two-wire 4–20 mA, user-selectable for DP, AP, GP, PT, mass flow, or totalized flow. Digital *HART* protocol superimposed on 4–20 mA signal, available to any host that conforms to the *HART* protocol.

Performance Statement Assumptions

- Measured pipe I.D
- Electronics are trimmed for optimum flow accuracy

Sizing

Contact a Emerson Process Management sales representative for assistance. A “Configuration Data Sheet” is required prior to order for application verification.

Functional

Service

- Liquid
- Gas
- Steam

Power Supply

4–20 mA option

- External power supply required. Standard transmitter (4–20 mA) operates on 11 to 55 v dc with no load

Process Temperature Limits

Direct Mount Electronics

- –40 to 450 °F (–40 to 232 °C)

Remote Mount Electronics

- –148 to 850 °F (–100 to 454 °C)(1)

(1) Bolt Material code G must be selected.

Electronics Temperature Limits

Ambient

- –40 to 185 °F (–40 to 85 °C)
- With Integral Mount LCD Display: –4 to 175 °F (–20 to 80 °C)

Storage

- –50 to 230 °F (–46 to 110 °C)
- With Integral Mount LCD Display: –40 to 185 °F (–40 to 85 °C)

Overpressure Limits

- Zero to two times the absolute pressure range with a maximum of 3626 psia (250 bar).

Table A-3. Overpressure Limits

Line Size	Process Connection Code	Maximum Working Pressure @ 100 °F[(1)(2)]
1/2-in. (12.7 mm)	S1 or P2	3000 psig (207 bar)
	T1 or P1	1500 psig (103 bar)
1-in. (25.4 mm)	S1 or P2	2000 psig (138 bar)
	T1 or P1	1500 psig (103 bar)
1 1/2-in. (38.1 mm)	S1 or P2	1500 psig (103 bar)
	T1 or P1	1500 psig (103 bar)
All	Flanged	Meets flange primary pressure rating per ANSI B16.5 (EN-1092-1 for DIN flanges)

(1) For pressure ratings at temperatures less than -20 °F (-29 °C) or above 100 °F (38 °C) consult an Emerson Process Management representative.
(2) Transmitter static pressure range may limit maximum working pressure. Refer to Static Pressure Ranges specification.

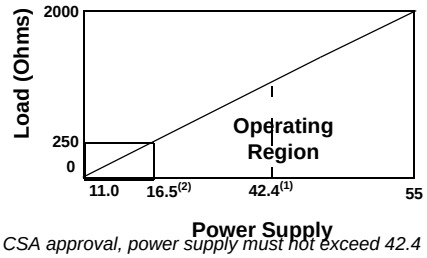
Static Pressure Limits

Operates within specification between static pressures of 0.5 psia (0.03 bar-A) and the URL of the static pressure sensor.

Load Limitations

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

$$\text{Maximum Loop Resistance} = \frac{\text{Power Supply} - 11.0}{0.022}$$



(1) For CSA approval, power supply must not exceed 42.4 V dc.
(2) HART protocol communication requires a loop resistance value between 250-1100 ohms, inclusive.

Humidity Limits

- 0–100% relative humidity

Turn-On Time

Digital and analog measured variables will be within specification 7 – 10 seconds after power is applied to the transmitter.

Digital and analog flow output will be within specifications 10 – 14 seconds after power is applied to the transmitter.

Damping

Analog output response to a step input change is user-selectable from 0 to 29 seconds for one time constant. This software damping is in addition to sensor module response time

Failure Mode Alarm

Output Code A

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

Output Code V

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

Configuration

HART Hand-held Communicator (Model 275 or 375)

- Performs traditional transmitter maintenance functions

3095 Multivariable Engineering Assistant (EA) software package

- Contains built-in physical property database
- Enables mass flow configuration, maintenance, and diagnostic functions via HART modem (output option code A)

  Enables mass flow configuration via PCMCIA Interface for FOUNDATION fieldbus (output option code V)

Physical Properties Database

- Maintained in Engineering Assistant Software Configurator
- Physical properties for over 110 fluids
- Natural gas per AGA
- Steam and water per ASME
- Other database fluids per American Institute of Chemical Engineers (AIChE)
- Optional custom entry

FOUNDATION fieldbus Function Blocks

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.

5 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 feedforward. Auto-tune capability allows for superior tuning for optimized control performance.

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 Bock

- 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.

Physical

Temperature Measurement

Remote RTD

- 100 Ohm platinum with 1/2-in. NPT nipple and union (078 series with Rosemount 644 housing)
- Standard RTD cable is shielded armored cable, length is12 feet (3.66 m)
- Remote RTD material is SST

Thermowell

- 1/2-in. x 1/2-in. NPT, 316 SST

Electrical Considerations

1/2–14 NPT, G1/2, and CM20 conduit. *HART* interface connections permanently fixed to terminal block

Material of Construction

Orifice Plate

- 316/316L SST
- *Alloy* C-276
- *Alloy* 400

Body

- 316 SST (CF8M), material per ASTM A351
- *Alloy* C-276 (CW12MW), material per ASTM A494

Flange and Pipe Material (If Applicable)

- A312 Gr 316/316L, B622 UNS N10276
- Flange pressure limits are per ANSI B16.5
- Flange face finish per ANSI B16.5, 125 to 250 RMS

Body Bolts/Studs

- ASTM A193 Gr B8M studs
- SAE J429 Gr 8 bolts (meets or exceeds ASTM A193 B7 requirements) for body bolt/stud material option code G for high temperatures.

Transmitter Connection Studs

- ASTM A193 Gr B8M studs

Gaskets/O-rings

- Glass filled PTFE
- Optional high temperature Inconel® X-750
- Gaskets and o-rings must be replaced each time the 3095MFP is disassembled for installation or maintenance.

Orifice Type

Square edged—orifice bore size

- 0.066-in and larger

Quadrant edged—orifice bore size (for 1/2-in. line size only)

- 0.034-in
- 0.020-in
- 0.014-in
- 0.010-in

NOTE
Integral Orifice bodies contain corner tapped pressure ports.

Pipe Lengths

- Upstream and downstream associated piping sections are available on the 1195. The table below lists the standard overall length (lay length) as a function of end connections and line size.

	Line Size		
Flanged Process Connection(1) (2) (3)	**1/2-in. (15 mm)**	**1-in. (25 mm)**	**1 1/2-in. (40 mm)**
RF, ANSI Class 150, slip-on	18.2 (463)	28.9 (734)	40.3 (1023)
RF, ANSI Class 300, slip-on	18.2 (463)	28.9 (734)	40.3 (1023)
RF, ANSI Class 600, slip-on	18.2 (463)	28.9 (734)	40.3 (1023)
RF, DIN PN16, slip-on	18.2 (463)	28.9 (734)	40.3 (1023)
RF, DIN PN40, slip-on	18.2 (463)	28.9 (734)	40.3 (1023)
RF, DIN PN100, slip-on	18.2 (463)	28.9 (734)	40.3 (1023)
RF, ANSI Class 150, weld-neck	21.8 (554)	33.2 (843)	44.9 (1140)
RF, ANSI Class 300, weld-neck	22.2 (559)	33.7 (856)	45.5 (1156)
RF, ANSI Class 600, weld-neck	22.8 (579)	34.3 (871	46.1 (1171)
RTJ, ANSI Class 150, slip-on	18.2 (463)	28.9 (734)	40.3 (1023)
RTJ, ANSI Class 300, slip-on	18.2 (463)	28.9 (734)	40.3 (1023)
RTJ, ANSI Class 600, slip-on	18.2 (463)	28.9 (734)	40.3 (1023)
NPT / Beveled Process Connection(1)(2)(3)	18 (457)	28.9 (734)	40.3 (1023)

(1) See the ordering information for model code description.
(2) Consult factory for other lengths.
(3) See page A-38 for additional information on associated pipe lengths.

Weight

The following weights are approximate

Line Size	**With Body**		**With Flanged Piping(1)**	
	lb	**kg**	**lb**	**kg**
1/2-in. (15 mm)	16.1	7.3	20.1	9.1
1-in. (25 mm)	18.1	8.2	24.1	10.9
1 1/2-in. (40 mm)	20.1	9.1	37.1	16.8

(1) As supplied with standard lengths, ANSI Class 150 flanges.

Installation Considerations

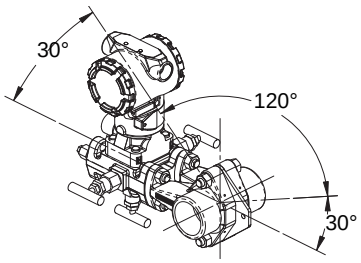
Pipe Orientation

Orientation/ Flow Direction	Process[1]		
	Gas	Liquid	Steam
Horizontal	D/R	D/R	D/R
Vertical Up	R	R	R
Vertical Down	R	NR	NR

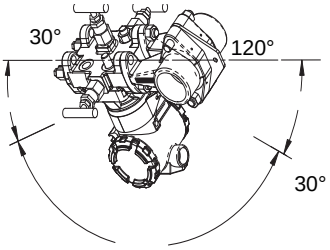
(1) D = Direct mount acceptable (recommended)
R = Remote mount acceptable
NR = Not recommended

Flowmeter Orientation

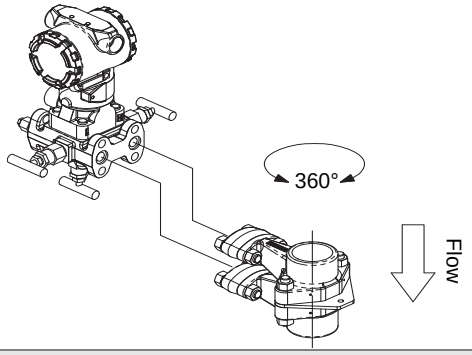
Gas (Horizontal)



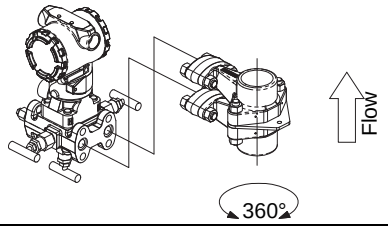
Liquid and Steam (Horizontal)



Gas (Vertical)



Liquid (Vertical)



Process-Wetted Parts

Integral Manifolds
- 316 SST
- *Alloy* C-276

Remote Manifolds
- 316 SST
- *Alloy* C-276

Transmitter Vent Valves and Process Flanges
- 316 SST
- *Alloy* C-276

Process Isolating Diaphragms
- 316L SST
- *Alloy* C-276

O-rings
- Glass-filled TFE / Inconel X-750

Integral Manifold O-Rings
- PTFE / Graphite (D7)

Non-Wetted Parts

Sensor Module Fill Fluid
- Silicone oil
- Inert Fill optional

Cover O-rings
- Buna-N

Remote Mounting Brackets
- SST

Sensor mounting (including nuts, bolts, and gasket)
- SST (CS optional for high temperature)

Electronic Housing
- Low copper aluminum, NEMA 4x, IP65
- SST (optional)

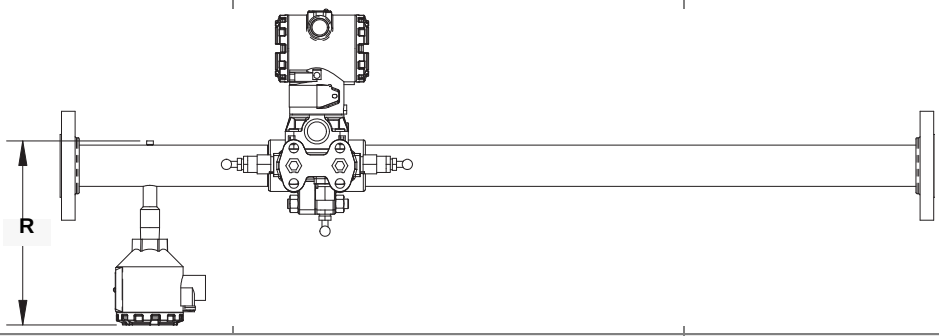
Paint
- Polyurethane

Bolts
- CS
- SST

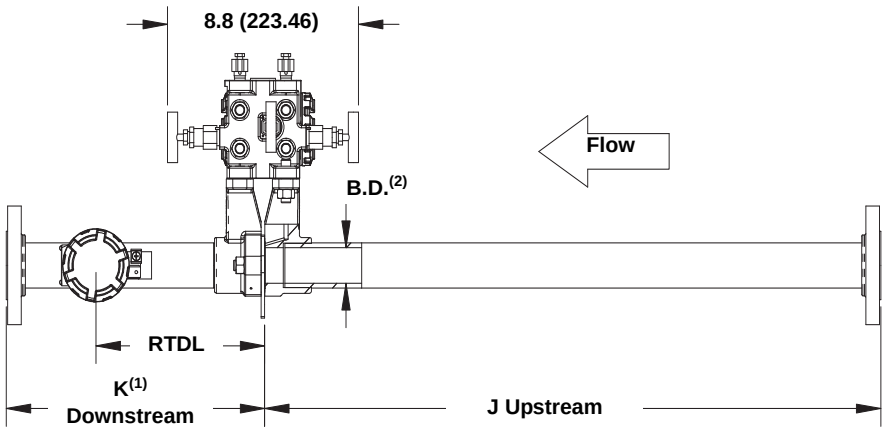
DIMENSIONAL DRAWINGS

Rosemount 3095MFP Mass Proplate Flowmeter

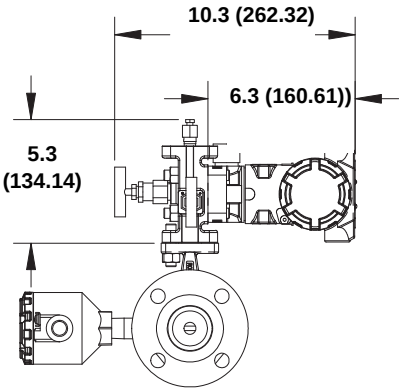
Top View



Bottom View



Side View



Dimensions are in inches (millimeters).

	Line Size					
Dimension	**1/2-in. (12.7 mm)**		**1-in. (25.4 mm)**		**1 1/2-in. (38.1 mm)**	
J (RF slip-on, RTJ slip-on, RF-DIN slip-on)	12.4-in.	318 mm	20.2-in.	513 mm	28.4-in.	721 mm
J (RF 150#, weld-neck)	14.3-in.	363 mm	22.3-in.	566 mm	30.7-in.	780 mm
J (RF 300#, weld-neck)	14.5-in.	368 mm	22.6-in.	574 mm	31.0-in.	787 mm
J (RF 600#, weld-neck)	14.8-in.	376 mm	22.9-in.	582 mm	31.3-in.	795 mm
K ((RF slip-on, RTJ slip-on, RF-DIN slip-on)(1)	5.7-in.	148 mm	8.7-in.	221 mm	11.9-in.	302 mm
K (RF 150#, weld-neck)	7.5-in.	191 mm	10.9-in.	277 mm	14.2-in.	361 mm
K (RF 300#, weld-neck)	7.7-in.	196 mm	11.1-in.	282 mm	14.5-in.	368 mm
K (RF 600#, weld-neck)	8.0-in.	203 mm	11.4-in.	290 mm	14.8-in.	376 mm
B.D.(2)	0.664-in.	16.9 mm	1.097-in.	27.86 mm	1.567-in.	39.80 mm
RTDL	3.11-in.	78.9 mm	5.25-in.	133.4 mm	7.50-in.	190.5 mm
R	7.4-in.	187.96 mm	7.8-in.	198.12 mm	8.4-in.	213.36 mm

(1) Downstream length shown here includes plate thickness of 0.162-in. (4.11 mm).
(2) B.D is diameter of the precision bored portion of the upstream and downstream piping.

ORDERING INFORMATION

Rosemount 3095MFP Mass Proplate Flowmeter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

Model	**Product Description**	
3095MFP	Mass Proplate Flowmeter	
Code	**Body Material**	
Standard		**Standard**
S	316 SST	★
Code	**Line Size**	
Standard		**Standard**
005	1/2-in. (15 mm)	★
010	1-in. (25 mm)	★
015	1 1/2-in. (40 mm)	★
Code	**Process Connection**	
Standard		**Standard**
T1	NPT Female Body (not available with remote thermowell and RTD, requires Temperature Sensor code N)	★
S1(1)	Socket Weld Body (not available with remote thermowell and RTD, requires Temperature Sensor code N)	★
P1	Pipe Ends: NPT threaded	★
P2	Pipe Ends: Beveled	★
D1	Pipe Ends: Flanged, DIN PN16, slip-on	★
D2	Pipe Ends: Flanged, DIN PN40, slip-on	★
D3	Pipe Ends: Flanged, DIN PN100, slip-on	★
W1	Pipe Ends: Flanged, WN, ANSI Class 150, weld-neck	★
W3	Pipe Ends: Flanged, WN, ANSI Class 300, weld-neck	★
W6	Pipe Ends: Flanged, WN, ANSI Class 600, weld-neck	★
Expanded		
A1	Pipe Ends: Flanged, RF, ANSI Class 150, slip-on	
A3	Pipe Ends: Flanged, RF, ANSI Class 300, slip-on	
A6	Pipe Ends: Flanged, RF, ANSI Class 600, slip-on	
R1	Pipe Ends: Flanged, RTJ, ANSI Class 150, slip-on	
R3	Pipe Ends: Flanged, RTJ, ANSI Class 300, slip-on	
R6	Pipe Ends: Flanged, RTJ, ANSI Class 600, slip-on	
P9	Special process connections	
Code	**Orifice Plate Material**	
Standard		**Standard**
S	316 SST	★
Expanded		
H	*Alloy* C-276	
M	*Alloy 400*	
Code	**Bore Size Option**	
Standard		**Standard**
0066	0.066-in. (1.68 mm) for 1/2-in. pipe	★
0109	0.109-in. (2.77 mm) for 1/2-in. pipe	★
0150	0.150-in. (3.81 mm) for 1-in. Pipe	★
0160(2)	0.160-in. (4.06 mm) for 1/2-in. pipe	★
0196(2)	0.196-in. (4.98 mm) for 1/2-in. pipe	★
0250	0.250-in. (6.35 mm) for 1-in. Pipe	★
0260(2)	0.260-in. (6.60 mm) for 1/2-in. pipe	★
0295	0.295-in. (7.49 mm) for 1 1/2-in. Pipe	★
0340(2)	0.340-in. (8.64 mm) for 1/2-in. pipe	★
0345(2)	0.345-in. (8.76 mm) for 1-in. pipe	★

Rosemount 3095MFP Mass Proplate Flowmeter Ordering Information

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0376	0.376-in. (9.55 mm) for 1 1/2-in. Pipe		★
0500[(2)]	0.500-in. (12.70 mm) for 1-in. pipe		★
0512	0.512-in. (13.00 mm) for 1 1/2-in. Pipe		★
0630[(2)]	0.630-in. (16.00 mm) for 1-in. pipe		★
0748	0.748-in. (19.00 mm) for 1 1/2-in. Pipe		★
0800	0.800-in. (20.32 mm) for 1-in. pipe		★
1022	1.022-in. (25.96 mm) for 1 1/2-in. Pipe		★
1184	1.184-in. (30.07 mm) for 1 1/2-in. Pipe		★
Expanded			
0010	0.010-in. (0.25 mm) for 1/2-in. pipe		
0014	0.014-in. (0.36 mm) for 1/2-in. pipe		
0020	0.020-in. (0.51 mm) for 1/2-in. pipe		
0034	0.034-in. (0.86 mm) for 1/2-in. pipe		
Code	**Transmitter Connection Platform**		
Standard			**Standard**
D3	Direct-mount, 3-valve manifold, SST		★
D5	Direct-mount, 5-valve manifold, SST		★
R3	Remote-mount, 3-valve manifold, SST		★
R5	Remote-mount, 5-valve manifold, SST		★
Expanded			
D4	Direct-mount, 3-valve manifold, *Alloy* C-276		
D7	Direct-mount, High Temperature, 5-valve manifold, SST		
D6	Direct-mount, 5-valve manifold, *Alloy* C-276		
R4	Remote-mount, 3-valve manifold, *Alloy* C-276		
R6	Remote-mount, 5-valve manifold, *Alloy* C-276		
Code	**Differential Pressure Range**		
Standard			**Standard**
1	0 to 25 in H_2O (0 to 62.2 mbar)		★
2	0 to 250 in H_2O (0 to 623 mbar)		★
3	0 to 1000 in H_2O (0 to 2.5 bar)		★
Code	**Static Pressure Range**		
Standard			**Standard**
B	0 – 8 to 0 – 800 psia (0 –55.16 to 0 – 5515.8 kPa)		★
C	0 – 8 to 0 – 800 psig (0 –55.16 to 0 – 5515.8 kPa)		★
D	0 – 36.2 to 0 – 3626 psia (0 –250 to 0 – 25000 kPa)		★
E	0 – 36.2 to 0 – 3626 psig (0 –250 to 0 – 25000 kPa)		★
Code	**Transmitter Output**		
Standard			**Standard**
A	4–20 mA with digital signal based on *HART* protocol		★
V	FOUNDATION fieldbus protocol		★
Code	**Transmitter Housing Material**	**Conduit Entry Size**	
Standard			**Standard**
1A	Polyurethane-covered aluminum	1/2-14 NPT	★
1B	Polyurethane-covered aluminum	M20 x 1.5 (CM20)	★
1J	SST	1/2-14 NPT	★
1K	SST	M20 x 1.5 (CM20)	★
Expanded			
1C	Polyurethane-covered aluminum	G 1/2	
1L	SST	G 1/2	

Rosemount 3095MFP Mass Proplate Flowmeter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

Code	Options	
Performance Class		
Standard		**Standard**
U3[3]	Ultra for Flow: up to ±0.95% mass flow rate accuracy, up to 10:1 turndown, 10-year stability, limited 12-year warranty	★
Transmitter / Body Bolt Material		
Expanded		
G	High temperature (850 °F (454 °C)) (SAE J429 Gr8 / Body bolts with A193 Gr B8M transmitter studs)	
Temperature Sensor[4]		
Expanded		
N	No Thermowell, Cable and RTD	
Optional Bore Calculation		
Standard		**Standard**
BC	Bore Calculation	★
Optional Connection		
Standard		**Standard**
G1	DIN 19231 Transmitter Connection	★
Pressure Testing		
Expanded		
P1[5]	Hydrostatic Testing with Certificate	
Special Cleaning		
Expanded		
P2	Cleaning for special processes	
PA	Cleaning per ASTM G93 Level D (section 11.4)	
Material Testing		
Expanded		
V1	Dye Penetrant Exam	
Material Examination		
Expanded		
V2	Radiographic Examination (available only with Process Connection codes W1, W3, and W6)	
Flow Calibration		
Expanded		
WD[6]	Flow Rate Calibration	
WZ[6]	Special Calibration	
Special Inspection		
Standard		**Standard**
QC1	Visual and dimensional inspection with certificate	★
QC7	Inspection and performance certificate	★
Material Traceability Certification		
Standard		**Standard**
Q8[7]	Material Traceability Certification per EN 10204:2004 3.1	★
Code Conformance		
Expanded		
J2[8]	ANSI / ASME B31.1	
J3[8]	ANSI / ASMEB31.3	
J4[8]	ANSI / ASMEB31.8	
Material Conformance		
Expanded		
J5[9]	NACE MR-0175 / ISO 15156	
Country Certification		
Standard		**Standard**
J6	European Pressure Directive (PED)	★

Rosemount 3095MFP Mass Proplate Flowmeter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

Expanded		
J1	Canadian Registration	
Transmitter Calibration Certificate		
Standard		**Standard**
Q4	Calibration Data Certificate for Transmitter	★
Product Certifications		
Standard		**Standard**
E1	ATEX Flameproof	★
I1	ATEX Intrinsically Safe	★
N1	ATEX Type n	★
K1	ATEX Flameproof, Intrinsic Safety, Type n	★
ND	ATEX Dust	★
E5	FM Approvals Explosion proof	★
I5	FM Approvals Intrinsically Safe, non-incendive	★
K5	FM Approvals Explosion-proof, Intrinsically Safe, Non-Incendive (combination of E5 and I5)	★
E6	CSA Explosion proof	★
K6	CSA Explosion-proof, Intrinsically Safe, Division 2	★
I7	IECEx Intrinsically Safe	★
IE(10)	FM FISCO Intrinsically Safe; for FOUNDATION fieldbus protocol only	★
IF(10)	CSA FISCO Intrinsically Safe; for FOUNDATION fieldbus protocol only	★
IA(10)	ATEX FISCO Intrinsically Safe; for FOUNDATION fieldbus protocol only	★
IG (10)	IECEx FISCO Intrinsically Safe	★
Alternative Transmitter Material of Construction		
Standard		**Standard**
L1	Inert Sensor Fill Fluid (not available with Static Pressure range codes B and D)	★
Display		
Standard		**Standard**
M5	Integral mount LCD display	★
Terminal Blocks		
Standard		**Standard**
T1	Transient Protection	★
Typical Model Number: 3095MFP S 010 A3 S 0150 D3 1 C A 1A		

(1) To improve pipe perpendicularity for gasket sealing, socket diameter is smaller than standard pipe O.D.
(2) Best flow coefficient uncertainty is between ($0.2 < \beta < 0.6$).
(3) Ultra for Flow applicable for HART protocol, DP ranges 2 and 3 with SST isolator material and silicone fill fluid options only.
(4) Rosemount 3095MFP is supplied with an integral temperature sensor as standard. Thermowell material is the same as the body material.
(5) Does not apply to Process Connection codes T1 and S1.
(6) Not available for bore sizes 0010, 0014, 0020, or 0034.
(7) Includes certificates for mechanical and chemical properties of bodies, orifice plates, pipes, flanges, and adapters as applicable.
(8) Not available with DIN Process Connection codes D1, D2, or D3.
(9) Materials of Construction comply with metallurgical requirements 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.
(10) Consult factory for availability.

ROSEMOUNT 1195 INTEGRAL ORIFICE PRIMARY ELEMENT

SPECIFICATIONS

Performance

Discharge Coefficient Uncertainty(1)

Beta (β)(2)	Discharge Coefficient Uncertainty
$\beta < 0.1$	±2.50%
$0.1 < \beta < 0.2$	±1.25%
$0.2 < \beta < 0.6$	±0.75%
$0.6 < \beta < 0.8$	±1.50%

(1) Without associated straight run piping, discharge coefficient uncertainty can add up to 1.5% - 5% additional error. Consult the factory for additional information.

(2) $\beta = \frac{\text{Orifice Plate Bore}}{\text{body I.D.}}$

Line Sizes

- 1/2-in. (15 mm)
- 1-in. (25 mm)
- 1 1/2-in. (40 mm)

Sizing

Contact a Emerson Process Management sales representative for assistance. A “Configuration Data Sheet” is required prior to order for application verification.

Functional

Service

- Liquid
- Gas
- Vapor

Process Temperature Limits

Standard (direct/remote mount):

- –40 to 450 °F (–40 to 232 °C)

Extended (remote mount only with option code T):

- –148 to 850 °F (–100 to 454 °C)

Maximum Working Pressure

- Pressure retention per ANSI B16.5 600# or DIN PN100

TABLE 1. Overpressure Limits

Line Size	Process Connection Code	Maximum Working Pressure @ 100 °F(1)(2)
1/2-in. (12.7 mm)	S1 or P2	3000 psig (207 bar)
	T1 or P1	1500 psig (103 bar)
1-in. (25.4 mm)	S1 or P2	2000 psig (138 bar)
	T1 or P1	1500 psig (103 bar)
1 1/2-in. (38.1 mm)	S1 or P2	1500 psig (103 bar)
	T1 or P1	1500 psig (103 bar)
All	Flanged	Meets flange primary pressure rating per ANSI B16.5 (EN-1092-1 for DIN flanges)

(1) For pressure ratings at temperatures less than -20 °F (-29 °C) or above 100 °F (38 °C) consult an Emerson Process Management representative.

(2) Transmitter static pressure range may limit maximum working pressure. Refer to Static Pressure Ranges specification.

Assembly to a transmitter

Select option code D11 for the Rosemount 3051S transmitter (or option code S3 for the Rosemount 3051C or 3095MV transmitters) to factory assemble the Rosemount 1195 to a Rosemount pressure transmitter. The D11 (or S3) option will drive square-root mode operation (output proportional to flow rate.) If the 1195 and transmitter are not factory assembled, they may be shipped separately. Option code S4 is required on the 1195 if assembly to a transmitter is required. For a consolidated shipment, inform an Emerson Process Management sales representative when placing the order.

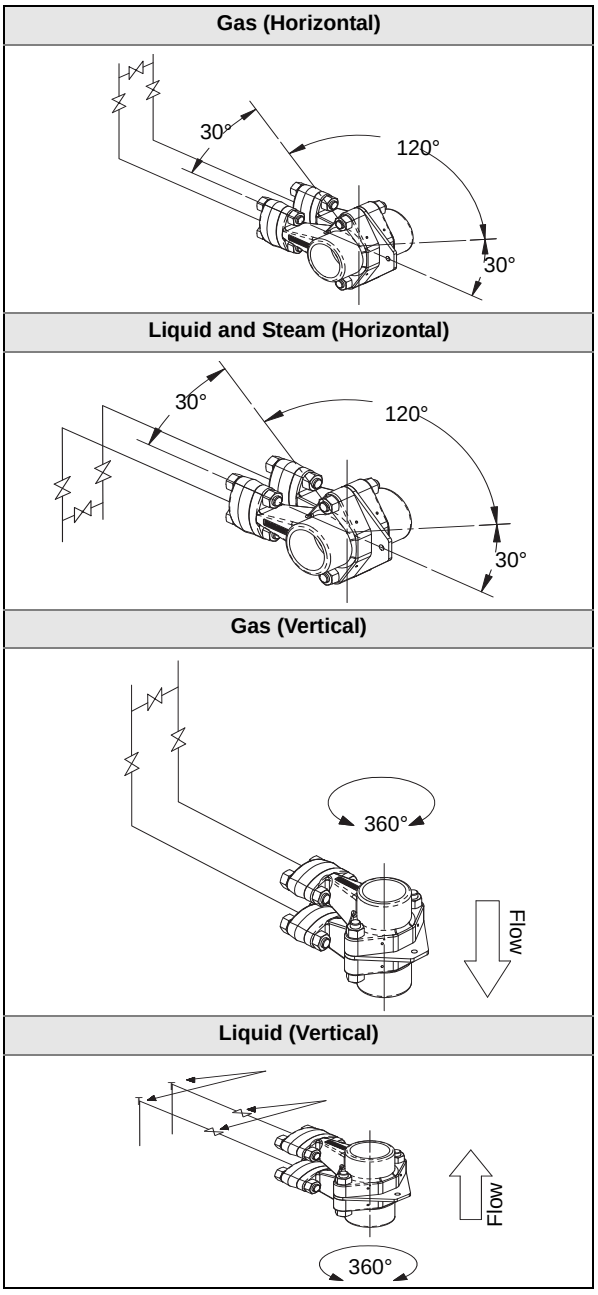
Installation Consideration

Pipe Orientation

Orientation/ Flow Direction	Process(1)		
	Gas	Liquid	Steam
Horizontal	D/R	D/R	D/R
Vertical Up	R	D/R	R
Vertical Down	D/R	NR	NR

(1) D = Direct mount acceptable (recommended)
R = Remote mount acceptable
NR = Not recommended

Primary Orientation



Physical

Material of Construction

Orifice Plate

- 316/316L SST
- *Alloy* C-276
- *Alloy* 400

Body

- 316 SST (CF8M), material per ASTM A351
- *Alloy* C-276 (CW12MW), material per ASTM A494

Flange and Pipe Material (If Applicable)

- A312 Gr 316/316L, B622 UNS N10276
- Flange pressure limits are per ANSI B16.5
- Flange face finish per ANSI B16.5, 125 to 250 RMS

Body Bolts/Studs

- ASTM A193 Gr B8M studs
- SAE J429 Gr 8 bolts (meets or exceeds ASTM A193 B7 requirements) for body bolt/stud material option code G for high temperatures.

Transmitter Connection Studs

- ASTM A193 Gr B8M studs

Gaskets/O-rings

- Glass filled PTFE
- Optional high temperature Inconel® X-750
- Gaskets and o-rings must be replaced each time the 1195 is disassembled for installation or maintenance.

Orifice Type

Square edge–orifice bore sizes

- 0.066-in. and larger

Quadrant edge–orifice bore sizes (for 1/2-in. line size only)

- 0.034-in.
- 0.020-in.
- 0.014-in.
- 0.010-in.

NOTE
Integral orifice bodies contain corner tapped pressure ports.

Pipe Lengths

Upstream and downstream associated piping sections are available on the 1195. The table below lists the standard overall length (lay length) as a function of end connections and line size.

	Line Size		
Flanged Process Connection(1) (2) (3)	**1/2-in. (15 mm)**	**1-in. (25 mm)**	**1 1/2-in. (40 mm)**
RF, ANSI Class 150, slip-on	18.2 (463)	28.9 (734)	40.3 (1023)
RF, ANSI Class 300, slip-on	18.2 (463)	28.9 (734)	40.3 (1023)
RF, ANSI Class 600, slip-on	18.2 (463)	28.9 (734)	40.3 (1023)
RF, DIN PN16, slip-on	18.2 (463)	28.9 (734)	40.3 (1023)
RF, DIN PN40, slip-on	18.2 (463)	28.9 (734)	40.3 (1023)
RF, DIN PN100, slip-on	18.2 (463)	28.9 (734)	40.3 (1023)
RF, ANSI Class 150, weld-neck	21.8 (554)	33.2 (843)	44.9 (1140)
RF, ANSI Class 300, weld-neck	22.2 (559)	33.7 (856)	45.5 (1156)
RF, ANSI Class 600, weld-neck	22.8 (579)	34.3 (871	46.1 (1171)
RTJ, ANSI Class 150, slip-on	18.2 (463)	28.9 (734)	40.3 (1023)
RTJ, ANSI Class 300, slip-on	18.2 (463)	28.9 (734)	40.3 (1023)
RTJ, ANSI Class 600, slip-on	18.2 (463)	28.9 (734)	40.3 (1023)
NPT / Beveled Process Connection(1)(2)(3)	18 (457)	28.9 (734)	40.3 (1023)

(1) See the ordering information for model code description.
(2) Consult factory for other lengths.
(3) See page A-38 for additional information on associated pipe lengths.

Transmitter Connections

2 1/8-in. (54 mm) center-to-center. Other transmitter spacing can be accommodated using the optional remote adapters and customer-supplied impulse piping. DIN 19213 connections are available.

Torque Values of Standard Bolts

Orifice Body Studs (for body bolt/stud material codes C or D)

- 60 ft-lb (81 N-m)

Orifice Body Bolts (for body bolt/stud material code G)

- 78 ft-lb (105 N-m)

Transmitter studs

- 34-38 ft-lb (46-52 N-m)

3-valve manifold bolting

- 34-38 ft-lb (46-52 N-m)

Weight

The following weights are approximate

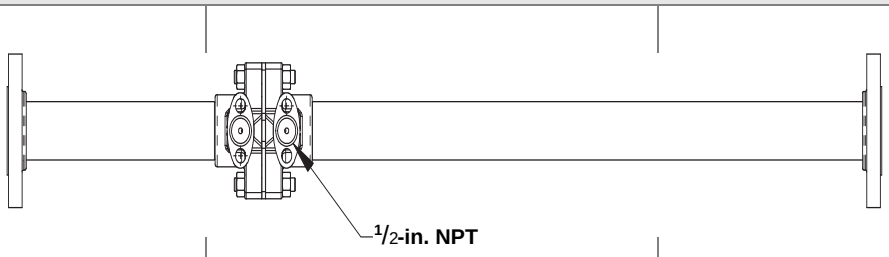
Line Size	1195 Only		With Flanged Piping(1)	
	lb	kg	lb	kg
1/2-in. (15 mm)	4.0	1.8	8	3.6
1-in. (25 mm)	6.0	2.7	12	5.4
1 1/2-in. (40 mm)	8.0	3.6	25	11.3

(1) As supplied with standard lengths, ANSI Class 150 flanges.

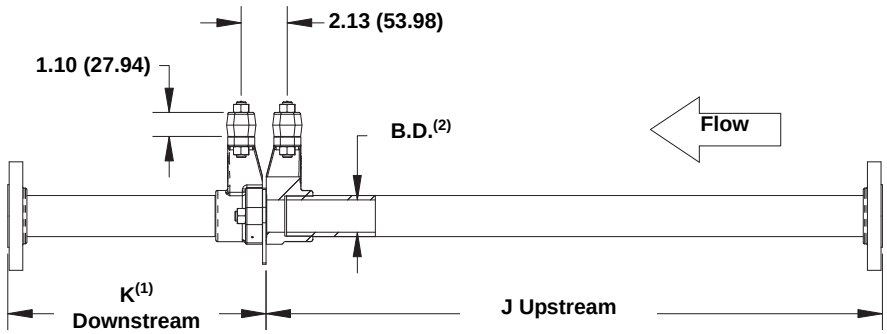
DIMENSIONAL DRAWINGS

Rosemount 1195 Integral Orifice Plate

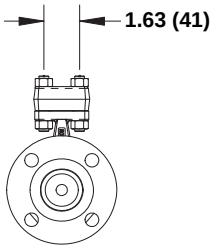
Top View



Bottom View



End View



Dimensions are in inches (millimeters).

	Line Size					
Dimension	**1/2-in. (12.7 mm)**		**1-in. (25.4 mm)**		**1 1/2-in. (38.1 mm)**	
J (RF slip-on, RTJ slip-on, RF-DIN slip-on)	12.4-in.	318 mm	20.2-in.	513 mm	28.4-in.	721 mm
J (RF 150#, weld-neck)	14.3-in.	363 mm	22.3-in.	566 mm	30.7-in.	780 mm
J (RF 300#, weld-neck)	14.5-in.	368 mm	22.6-in.	574 mm	31.0-in.	787 mm
J (RF 600#, weld-neck)	14.8-in.	376 mm	22.9-in.	582 mm	31.3-in.	795 mm
K ((RF slip-on, RTJ slip-on, RF-DIN slip-on)(1)	5.7-in.	148 mm	8.7-in.	221 mm	11.9-in.	302 mm
K (RF 150#, weld-neck)	7.5-in.	191 mm	10.9-in.	277 mm	14.2-in.	361 mm
K (RF 300#, weld-neck)	7.7-in.	196 mm	11.1-in.	282 mm	14.5-in.	368 mm
K (RF 600#, weld-neck)	8.0-in.	203 mm	11.4-in.	290 mm	14.8-in.	376 mm
B.D.(2)	0.664-in.	16.9 mm	1.097-in.	27.86 mm	1.567-in.	39.80 mm

(1) Downstream length shown here includes plate thickness of 0.162-in. (4.11 mm).
(2) B.D is diameter of the precision bored portion of the upstream and downstream piping.

ORDERING INFORMATION

Rosemount 1195 Integral Orifice Primary Element Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

Model	Product Description	
1195	Integral Orifice Primary Element	
Code	**Body Material**	
Standard		**Standard**
S	316 SST	★
Code	**Line Size**	
Standard		**Standard**
005	1/2-in. (15 mm)	★
010	1-in. (25 mm)	★
015	1 1/2-in. (40 mm)	★
Code	**Process Connection**	
Standard		**Standard**
T1	NPT Female Body (not available with remote thermowell and RTD)	★
S1(1)	Socket Weld Body (not available with remote thermowell and RTD)	★
P1	Pipe Ends: NPT threaded	★
P2	Pipe Ends: Beveled	★
D1	Pipe Ends: Flanged, RF, DIN PN16, slip-on	★
D2	Pipe Ends: Flanged, RF, DIN PN40, slip-on	★
D3	Pipe Ends: Flanged, RF, DIN PN100, slip-on	★
W1	Pipe Ends: Flanged, RF, ANSI Class 150, weld-neck	★
W3	Pipe Ends: Flanged, RF, ANSI Class 300, weld-neck	★
W6	Pipe Ends: Flanged, RF, ANSI Class 600, weld-neck	★
Expanded		
A1	Pipe Ends: Flanged, RF, ANSI Class 150, slip-on	
A3	Pipe Ends: Flanged, RF, ANSI Class 300, slip-on	
A6	Pipe Ends: Flanged, RF, ANSI Class 600, slip-on	
R1	Pipe Ends: Flanged, RTJ, ANSI Class 150, slip-on	
R3	Pipe Ends: Flanged, RTJ, ANSI Class 300, slip-on	
R6	Pipe Ends: Flanged, RTJ, ANSI Class 600, slip-on	
P9	Special process connections	
Code	**Orifice Plate Material**	
Standard		**Standard**
S	316 SST	★
Expanded		
H	*Alloy* C-276	
M	*Alloy 400*	
Code	**Bore Size Option**	
Standard		**Standard**
0066	0.066-in. (1.68 mm) for 1/2-in. pipe	★
0109	0.109-in. (2.77 mm) for 1/2-in. pipe	★
0150	0.150-in. (3.81 mm) for 1-in. pipe	★
0160(2)	0.160-in. (4.06 mm) for 1/2-in. pipe	★
0196(2)	0.196-in. (4.98 mm) for 1/2-in. pipe	★
0250(2)	0.250-in. (6.35 mm) for 1-in. pipe	★
0260(2)	0.260-in. (6.60 mm) for 1/2-in. pipe	★
0295	0.295-in. (7.49 mm) for 1 1/2-in. pipe	★
0340(2)	0.340-in. (8.64 mm) for 1/2-in. pipe	★

Rosemount 1195 Integral Orifice Primary Element Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

0345[2]	0.345-in. (8.76 mm) for 1-in. pipe	★
0376[2]	0.376-in. (9.55 mm) for 1 1/2-in. pipe	★
0500[2]	0.500-in. (12.70 mm) for 1-in. pipe	★
0512[2]	0.512-in. (13.00 mm) for 1 1/2-in. pipe	★
0630[2]	0.630-in. (16.00 mm) for 1-in. pipe	★
0748[2]	0.748-in. (19.00 mm) for 1 1/2-in. pipe	★
0800	0.800-in. (20.32 mm) for 1-in. pipe	★
1022	1.022-in. (25.96 mm) for 1 1/2-in. pipe	★
1184	1.184-in. (30.07 mm) for 1 1/2-in. pipe	★
Expanded		
0010	0.010-in. (0.25 mm) for 1/2-in. pipe	
0014	0.014-in. (0.36 mm) for 1/2-in. pipe	
0020	0.020-in. (0.51 mm) for 1/2-in. pipe	
0034	0.034-in. (0.86 mm) for 1/2-in. pipe	
Code	**Transmitter / Body Bolt Material**	
Standard		**Standard**
C	316 SST (1 1/2-in. transmitter studs)	★
Expanded		
G[3]	High temperature (850 °F (454 °C)) (SAE J429 Gr8 / Body bolts with A193 Gr B8M transmitter studs)	
Code	**Options**	
Temperature Sensor		
Standard		**Standard**
T[4]	Thermowell and RTD (Aluminum Temperature Housing)	★
Expanded		
S[4]	Thermowell and RTD (SST Temperature Housing)	
Assemble to Transmitter		
Expanded		
S4[5]	Factory assembly – attached to transmitter and manifold	
Optional Bore Calculation		
Standard		**Standard**
BC	Bore Calculation	★
Optional Connection		
Standard		**Standard**
G1	DIN 19231 Transmitter Connection	★
Adapters for Remote Mounting		
Standard		**Standard**
G2	1/2–14 NPT Remote Adapters – SST	★
Expanded		
G3	1/2–14 NPT Remote Adapters – *Alloy* C-276	
Pressure Testing		
Expanded		
P1[6]	Hydrostatic Testing	
Special Cleaning		
Expanded		
P2	Cleaning for special processes	
PA	Cleaning per ASTM G93 Level D (section 11.4)	
Material Testing		
Expanded		
V1	Dye Penetrant Exam	
Material Examination		
Expanded		
V2	Radiographic Examination (available only with Process Connection code W1, W3, and W6)	

Rosemount 1195 Integral Orifice Primary Element Ordering Information

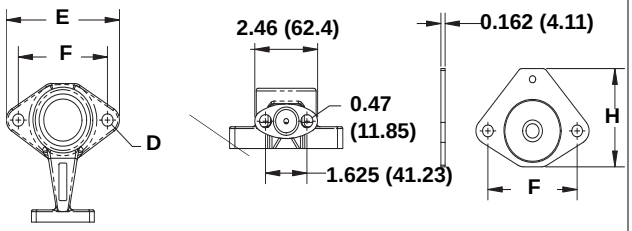
★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

Flow Calibration		
Expanded		
WD[7]	Discharge coefficient Verification	
WZ[7]	Special Calibration	
Special Inspection		
Standard		**Standard**
QC1	Visual and dimensional inspection with certificate	★
QC7	Inspection and performance certificate	★
Material Traceability Certification		
Standard		**Standard**
Q8[8]	Material certification per ISO 10474 3.1.B and EN 10204 3.1.B	★
Code Conformance		
Expanded		
J2[9]	ANSI / ASME B31.1	
J3[9]	ANSI / ASME B31.3	
J4[9]	ANSI / ASME B31.8	
Materials Conformance		
Expanded		
J5[10]	NACE MR-0175 / ISO 15156	
Country Certification		
Standard		**Standard**
J6	European Pressure Directive (PED)	★
Expanded		
J1	Canadian Registration	
Screw		
Expanded		
A1	External Ground Screw for Temperature Connection Head	
A2	Cover Clamp and External Ground Screw for Temperature Connection Head	
Typical Model Number: 1195 S 010 A3 S 0150 C		

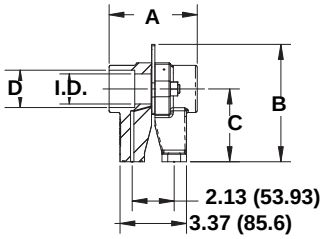
(1) To improve pipe perpendicularity for gasket sealing, socket diameter is smaller than standard pipe O.D.
(2) Best flow coefficient uncertainty is between ($0.2 < \beta < 0.6$).
(3) Not available with Assemble to Transmitter code S4 or Temperature Sensor code R with E5.
(4) Thermowell material is the same as the body material.
(5) Not available with Process Connection code S1.
(6) Does not apply to Process Connection codes T1 and S1.
(7) Not available for bore sizes 0010, 0014, 0020, or 0034.
(8) Includes certificates for mechanical and chemical properties of bodies, orifice plates, pipes, flanges, and adapters as applicable.
(9) Not available with DIN Process Connection codes D1, D2, or D3.
(10) Materials of Construction comply with metallurgical requirements 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.

DIMENSIONAL DRAWINGS

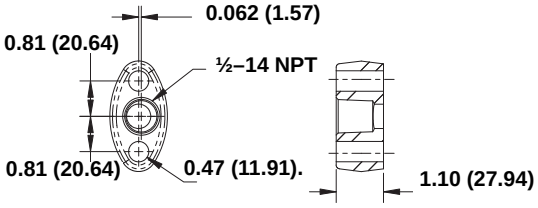
Orifice Plate



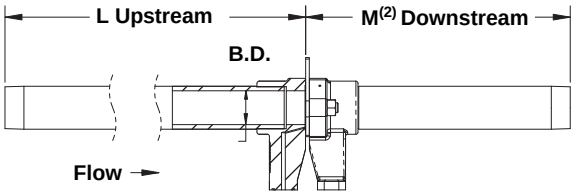
Socket-Weld or Threaded Body



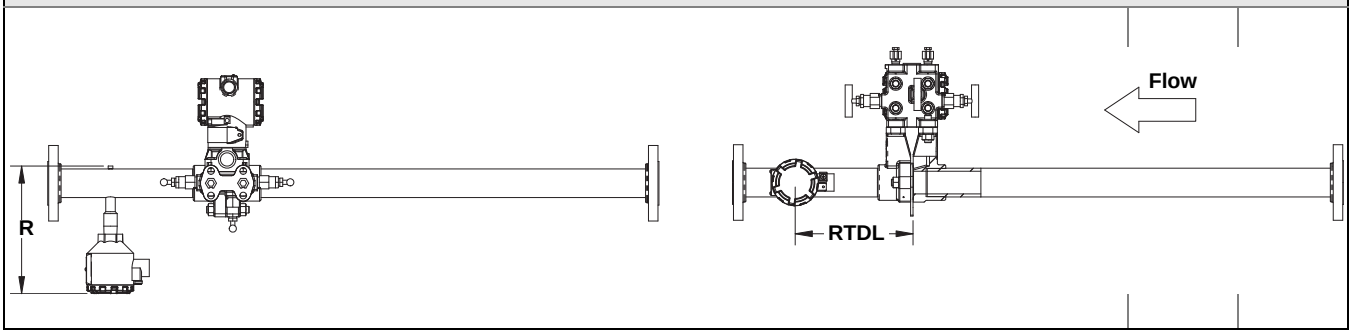
Remote Adapter



NPT / Beveled Piping (Prepared for welding)



Temperature Sensor



	Line Size					
Dimension	**1/2-in. (12.7 mm)**		**1-in. (25.4 mm)**		**1 1/2-in. (38.1 mm)**	
A	3.4-in.	86 mm	3.8-in.	97 mm	4.5-in.	114 mm
B	4.7-in.	119.38 mm	5.2-in.	132.08 mm	5.9-in.	149.86 mm
C	3.0-in.	76 mm	3.3-in.	84 mm	3.7-in.	94 mm
D(1)	0.805-in.	20.45 mm	1.280-in.	32.51 mm	1.865-in.	47.37 mm
E	3.6-in.	91 mm	3.9-in.	99 mm	4.4-in.	112 mm
F	2.6-in.	66 mm	3.0-in.	76 mm	3.5-in.	89 mm
H	2.5-in.	64 mm	3.0-in.	76 mm	3.5-in.	89 mm
L	12.4-in.	315 mm	20.1-in.	511 mm	28.2-in.	716 mm
M	5.6-in.	142 mm	8.6-in.	218 mm	11.7-in.	297 mm
B.D.(2)	0.664-in.	16.9 mm	1.097-in.	27.86 mm	1.567-in.	39.80 mm
I.D.	0.622-in.	15.8 mm	1.049-in.	26.64 mm	1.500-in.	38.1 mm

(1) To improve pipe perpendicularity for gasket sealing, socket diameter "D" is smaller than standard pipe O.D. Pipe O.D. must be machined smaller than socket diameter "D" to ensure proper fit.
(2) B.D is diameter of the precision bored portion of the upstream and downstream piping.

Pipe Length Requirements for Installation

FIGURE A. Reducer (2 d to d over a length of 1.5 d to 3 d)

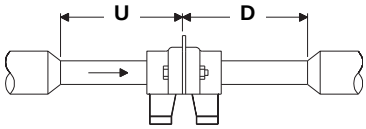


FIGURE B. Single 90° Bend flow from one branch only

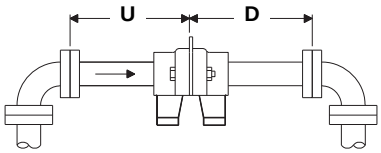


FIGURE C. Two or More 90° Bends in the Same Planes

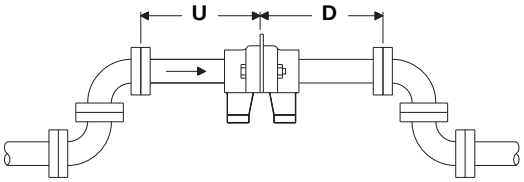


FIGURE D. Two or More 90° Bends in Different Planes

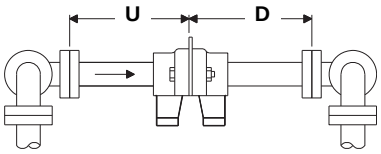
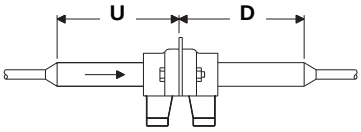


FIGURE E. Expander (0.5 d to d over a length of d to 2 d)



FIGURES F and G. Ball/Gate Valve Fully Open

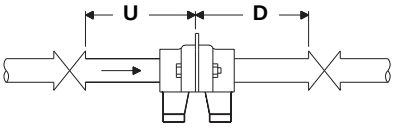


Table A-4. Recommended lengths of pipe

The following *chart* gives the upstream (U) and downstream (D) lengths as a guideline recommended by ISO 5167 for the above installations. The lengths are given in terms of pipe diameters. For example, for a 1-in. line size with a beta ratio (b) of 0.4 using installation type B above, the straight length of upstream piping required is 16 ×1 = 16 in., and downstream 6 ×1 = 6 in.

	On Upstream (U)						
β	FIGURE A[(1)]	FIGURE B[(1)]	FIGURE C[(1)]	FIGURE D[(1)]	FIGURE E[(1)]	FIGURE F and G[(1)]	On Downstream (D) FIGURES A - G
<0.20	5[(2)]	6 (3)	10[(2)]	34 (17)	6[(2)]	12 (6)	4 (2)
0.40	5[(2)]	16 (3)	10[(2)]	50 (25)	12 (8)	12 (6)	6 (3)
0.50	8 (5)	22 (9)	18 (10)	75 (34)	20 (9)	12 (6)	6 (3)
0.60	9 (5)	42 (13)	30 (18)	65 (18)	26 (11)	14 (7)	7 (3,5)
0.67	12 (6)	44 (20)	44 (18)	60 (18)	28 (14)	18 (9)	7 (3,5)
0.75	13 (8)	44 (20)	44 (18)	75 (18)	36 (18)	24 (12)	8 (4)
	U						**D**

(1) Values in parenthesis correspond to an additional +0.5% discharge coefficient uncertainty.
(2) Straight length gives zero additional uncertainty; data not available for shorter lengths.

SPARE PARTS

Description	Part Number
Plate O-Ring Kits	
Kit, Plate O-ring, PTFE, –40 to 450 °F (–40 to 232 °C), Bag of 10	
1/2-in. Line Size	01195-0036-0031
1-in. Line Size	01195-0036-0032
1 1/2-in. Line Size	01195-0036-0033
Kit, Plate O-ring, *Inconel*® X750, –148 to 850 °F (–64 to 454 °C), Bag of 4	
1/2-in. Line Size	01195-0036-0040
1-in. Line Size	01195-0036-0041
1 1/2-in. Line Size	01195-0036-0042
Instrument Flange O-Ring Kits / Mounting Gaskets	
Kit, Instrument Flange O-Ring, Bag of 10	
PTFE, –40 to 450 °F (–40 to 232 °C)	01195-0036-0034
PTFE, DIN19213, –40 to 450 °F (–40 to 232 °C)	01195-0036-0035
PTFE, *Inconel* X750, –148 to 850 °F (–64 to 454 °C)	01195-0036-0043
Bolting Kits	
Kit, Body Bolting, (7/16-in.–20 x 2.75-in. stud with nuts)	
A193 Gr B8M, < 450 °F (232 °C)	01195-0206-0004
J429 Gr 8, < 850 °F (454 °C)	01195-0206-0005
Kit, Manifold / Transmitter Bolting (Direct mount to traditional flange and 305RT/RM manifold), A193 Gr B8M (7/16-in.–20 x 2.75-in. stud with nuts) (< 850 °F (454 °C))	01195-0206-0006
Kit, Transmitter Bolting (Direct mount to 3051C / 2024-DIN))	01195-0206-0007
Remote Adapter Kits	
Kit, Remote Adapter, 316 SST (includes 316 SST studs with nuts)	
PTFE Gasket, < 450 °F (232 °C)	01195-0036-0051
Inconel Gasket, < 850 °F (454 °C)	01195-0036-0049
Kit, Remote Adapter, *Alloy-C*® (includes 316 SST studs with nuts)	
PTFE Gasket, < 450 °F (232 °C)	01195-0036-0052
Inconel Gasket, < 850 °F (454 °C)	01195-0036-0050

Description	Part Number
Temperature Sensor	
RTD Element, –40 to 900 °F (–40 to 518 °C), 1/8-in. NPT,	
3.35-in. x 0.093-in diameter, 1/2-in. (12.7 mm) Line Size	01195-3000-0335
3.6-in. x 0.093-in diameter, 1-in. (25.4 mm) Line Size	01195-3000-0360
3.9-in. x 0.093-in diameter, 1 1/2-in. (28.1 mm) Line Size	01195-3000-0390
Thread Adapter, 1/2-in. NPT x CM20, SST	00444-0282-0011
Thread Adapter, 1/2-in. NPT x G1/2, SST	03031-0649-0001
Cable Gland, 1/2-in. NPT, Plastic	12342-02
KEMA / CENELEC Cover Clamp Kit	28-59002-901
External Ground Screw Kit	TBA
Temperature Sensor Housing Cover	
Aluminum, Blue	03031-0632-0001
Stainless Steel	03031-0632-0001
Temperature Sensor Housing Cover Gasket, Buna-N	03031-0634-0001
Orifice Plate	
0.010 Line Size 1/2-in. (12.7 mm)	
316 SST	01195-0220-0010
Alloy C	01195-0220-1010
Alloy	01195-0220-2010
0.014 Line Size 1/2-in. (12.7 mm)	
316 SST	01195-0220-0014
Alloy C	01195-0220-1014
Alloy	01195-0220-2014
0.020 Line Size 1/2-in. (12.7 mm)	
316 SST	01195-0220-0020
Alloy C	01195-0220-1020
Alloy	01195-0220-2020
0.034 Line Size 1/2-in. (12.7 mm)	
316 SST	01195-0220-0034
Alloy C	01195-0220-1034
Alloy	01195-0220-2034
0.066 Line Size 1/2-in. (12.7 mm)	
316 SST	01195-0220-0066
Alloy C	01195-0220-1066
Alloy	01195-0220-2066
0.109 Line Size 1/2-in. (12.7 mm)	
316 SST	01195-0220-0109
Alloy C	01195-0220-1109
Alloy	01195-0220-2109
0.160 Line Size 1/2-in. (12.7 mm)	
316 SST	01195-0220-0160
Alloy C	01195-0220-1160
Alloy	01195-0220-2160
0.196 Line Size 1/2-in. (12.7 mm)	
316 SST	01195-0220-0196
Alloy C	01195-0220-1196
Alloy	01195-0220-2196
0.260 Line Size 1/2-in. (12.7 mm)	
316 SST	01195-0220-0260
Alloy C	01195-0220-1260
Alloy	01195-0220-2260
0.340 Line Size 1/2-in. (12.7 mm)	
316 SST	01195-0220-0340
Alloy C	01195-0220-1340

Description	Part Number
Alloy	01195-0220-2340
Blank Line Size 1/2-in. (12.7 mm)	
316 SST	01195-0220-0999
Alloy C	01195-0220-1999
Alloy	01195-0220-2999
Special Line Size 1/2-in. (12.7 mm)	
316 SST	01195-0220-0XXX
Alloy C	01195-0220-1XXX
Alloy	01195-0220-2XXX
0.150 Line Size 1-in. (25.4 mm)	
316 SST	01195-0221-0150
Alloy C	01195-0221-1150
Alloy	01195-0221-2150
0.250 Line Size 1-in. (25.4 mm)	
316 SST	01195-0221-0250
Alloy C	01195-0221-1250
Alloy	01195-0221-2250
0.345 Line Size 1-in. (25.4 mm)	
316 SST	01195-0221-0345
Alloy C	01195-0221-1345
Alloy	01195-0221-2345
0.500 Line Size 1-in. (25.4 mm)	
316 SST	01195-0221-0500
Alloy C	01195-0221-1500
Alloy	01195-0221-2500
0.630 Line Size 1-in. (25.4 mm)	
316 SST	01195-0221-0630
Alloy C	01195-0221-1630
Alloy	01195-0221-2630
0.800 Line Size 1-in. (25.4 mm)	
316 SST	01195-0221-0800
Alloy C	01195-0221-1800
Alloy	01195-0221-2800
Blank Line Size 1-in. (25.4 mm)	
316 SST	01195-0221-0999
Alloy C	01195-0221-1999
Alloy	01195-0221-2999
Special Line Size 1-in. (25.4 mm)	
316 SST	01195-0221-0XXX
Alloy C	01195-0221-1XXX
Alloy	01195-0221-2XXX

Description	Part Number
0.295 Line Size 1 1/2-in. (38.1 mm)	
316 SST	01195-0222-0295
Alloy C	01195-0222-1295
Alloy	01195-0222-2295
0.376 Line Size 1 1/2-in. (38.1 mm)	
316 SST	01195-0222-0376
Alloy C	01195-0222-1376
Alloy	01195-0222-2376
0.512 Line Size 1 1/2-in. (38.1 mm)	
316 SST	01195-0222-0512
Alloy C	01195-0222-1512
Alloy	01195-0222-2512
0.748 Line Size 1 1/2-in. (38.1 mm)	
316 SST	01195-0222-0748
Alloy C	01195-0222-1748
Alloy	01195-0222-2748
1.022 Line Size 1 1/2-in. (38.1 mm)	
316 SST	01195-0222-5022
Alloy C	01195-0222-6022
Alloy	01195-0222-7022
1.184 Line Size 1 1/2-in. (38.1 mm)	
316 SST	01195-0222-5184
Alloy C	01195-0222-6184
Alloy	01195-0222-7184
Blank Line Size 1 1/2-in. (38.1 mm)	
316 SST	01195-0222-0999
Alloy C	01195-0222-1999
Alloy	01195-0222-2999
Special Line Size 1 1/2-in. (38.1 mm)	
316 SST	01195-0222-0XXX
Alloy C	01195-0222-1XXX
Alloy	01195-0222-2XXX

Appendix B Approvals

ROSEMOUNT 3051SFP INTEGRAL ORIFICE FLOWMETER

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 – 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 ⟨Ex⟩ II 1G
EEx ia IIC T5 (-60°C ≤ T_a ≤ 40°C)
T4 (-60°C ≤ T_a ≤ 70°C)
T4 (-60°C ≤ T_a ≤ 40°C) (FISCO)
CE 1180

Table B-1. Input Parameters

Loop / Power	Groups
U_i = 30 V	HART / FOUNDATION fieldbus/ Remote Display / SIS
U_i = 17.5 V	FISCO
I_i = 300 mA	HART / FOUNDATION fieldbus/ Remote Display / SIS
I_i = 380 mA	FISCO
P_i = 1.0 W	HART / Remote Display / SIS
P_i = 1.3 W	FOUNDATION fieldbus
P_i = 5.32 W	FISCO
C_i = 30 nF	*SuperModule*™ Platform
C_i = 11.4 nF	HART / SIS
C_i = 0	FOUNDATION fieldbus / Remote Display / FISCO
L_i = 0	HART / FOUNDATION fieldbus/ SIS / FISCO
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*s 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 ⟨Ex⟩ II 3 G
EEx nL IIC T5 (T_a = -40 °C TO 70 °C)
Ui = 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 ⟨Ex⟩ 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 milliampere, 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.

E1 ATEX Flameproof
Certificate No.: KEMA00ATEX2143X ⟨Ex⟩ II 1/2 G
EEx d IIC T6 (-50 °C ≤ T_{amb} ≤ 65 °C)
EEx d IIC T5 (-50 °C ≤ T_{amb} ≤ 80 °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 Model 3051S pressure transmitter must include a Series 300S housing integrally mounted to a Series Model 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 *PlantWeb* Housing
TC15684	*Coplanar* with *PlantWeb* Housing and LCD Display
TC15685	In-Line SST with Junction Box Housing
TC15686	In-Line *Alloy* with Junction Box Housing
TC15687	In-Line SST with *PlantWeb* Housing
TC15688	In-Line *Alloy* with *Plantweb* Housing
TC15689	In-Line SST with *Plantweb* Housing and LCD Display
TC15690	In-Line *Alloy* with *PlantWeb* Housing and LCD Display

Australian Certifications

E7 SAA Explosion-proof and DIP
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 Model 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 T5 (T_a = -60 °C to 40 °C) -HART/SIS/Remote Meter
Ex ia IIC T4 (T_a = -60 °C to 70 °C) -HART/SIS/Remote Meter
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 1. Input Parameters

Loop / Power	Groups
U_i = 30 V	HART / FOUNDATION fieldbus/ Remote Display / SIS
U_i = 17.5 V	FISCO
I_i = 300 mA	HART / FOUNDATION fieldbus/ Remote Display / SIS
I_i = 380 mA	FISCO
P_i = 1.0 W	HART / Remote Display / SIS
P_i = 1.3 W	FOUNDATION fieldbus
P_i = 5.32 W	FISCO
C_i = 30 nF	*SuperModule*™ Platform
C_i = 11.4 nF	HART / SIS
C_i = 0	FOUNDATION fieldbus / Remote Display / FISCO
L_i = 0	HART / FOUNDATION fieldbus/ SIS / FISCO

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 T5 (Ta = -40 °C to 70 °C)
Ui = 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

ROSEMOUNT 3095MFP INTEGRAL ORIFICE MASS FLOWMETER

Rosemount 3095 with HART

European Directive Information

The EC declaration of conformity for all applicable European directives for this product can be found on the Rosemount website at www.rosemount.com. A hard copy may be obtained by contacting our local sales office.

ATEX Directive (94/9/EC)

Emerson Process Management complies with the ATEX Directive.

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

3095M_2/3,4/D Flow Transmitters — QS Certificate of Assessment - EC No. PED-H-20 Module H Conformity Assessment

All other 3095_ Transmitters/Level Controller — Sound Engineering Practice

Transmitter Attachments: Process Flange - Manifold — Sound Engineering Practice

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

3095MV Flow Transmitters

— EN 50081-1: 1992; EN 50082-2:1995; EN 61326-1:1997 – Industrial

Ordinary Location Certification for Factory Mutual

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/Class III, Division 1, Groups E, F, and G. Enclosure type NEMA 4X. Factory Sealed. Provides nonincendive RTD connections for Class I, Division 2, Groups A, B, C, and D.

I5 Intrinsically Safe for use in Class I, II and III, Division 1, Groups A, B, C, D, E, F, and G hazardous outdoor locations. Non-incendive for Class I, Division 2, Groups A, B, C, and D. Temperature Code T4. Factory Sealed.

For input parameters and installation see control drawing 03095-1020.

Canadian Standards Association (CSA)

E6 Explosion Proof for Class I, Division 1, Groups B, C, and D. Dust-Ignition Proof for Class II/Class III, Division 1, Groups E, F, and G. CSA enclosure Type 4X suitable for indoor and outdoor hazardous locations. Provides nonincendive RTD connection for Class I, Division 2, Groups A, B, C, and D.Factory Sealed. Install in accordance with Rosemount Drawing 03095-1024. Approved for Class I, Division 2, Groups A, B, C, and D.

I6 Intrinsically Safe for Class I, Division 1, Groups A, B, C, and D. when installed in accordance with Rosemount drawing 03095-1021. Temperature Code T3C.

For input parameters and installation see control drawing 03095-1021.

European Certifications

I1 ATEX Intrinsic Safety
Certificate Number: BAS98ATEX1359X ⟨Ex⟩ II 1 G
EEx ia IIC T5 (T_{amb} = –45 °C to 40 °C)
EEx ia IIC T4 (T_{amb} = –45 °C to 70 °C)
CE 1180

TABLE 2. Connection Parameters (Power/Signal Terminals)

U_i = 30V
I_i = 200 mA
P_i = 1.0 W
C_i = 0.012 µF
L_i = 0

TABLE 3. Temperature Sensor Connection Parameters

U_o = 30V
I_o = 19 mA
P_o = 140 mW
C_i = 0.002 µF
L_i = 0

TABLE 4. Temp Sensor Terminals Connection Parameters

C_o = 0.066 µF	Gas Group IIC
C_o = 0.560 µF	Gas Group IIB
C_o = 1.82 µF	Gas Group IIA
L_o = 96 mH	Gas Group IIC
L_o = 365 mH	Gas Group IIB
L_o = 696 mH	Gas Group IIA
L_o/R_o = 247 µH/ohm	Gas Group IIC
L_o/R_o = 633 µH/ohm	Gas Group IIB
L_o/R_o= 633 µH/ohm	Gas Group IIA

Special Conditions for Safe Use

The 3095, when fitted with the transient terminal block (order code B), are not capable of withstanding the 500 volts insulation test required by EN50 020, Clause 6.4.12 (1994). This condition must be accounted for during installation.

N1 ATEX Type N
Certificate Number: BAS98ATEX3360X ⟨Ex⟩ II 3 G
EEx nL IIC T5 (T_{amb} = –45 °C to 40 °C)
EEx nL IIC T4 (T_{amb} = –45 °C to 70 °C)
U_i = 55V
CE
The apparatus is designed for connection to a remote temperature sensor such as a resistance temperature detection (RTD)

Special Conditions for Safe Use

The 3095, when fitted with the transient terminal block (order code B), are not capable of withstanding the 500 volts insulation test required by EN50 021, Clause 9.1 (1995). This condition must be accounted for during installation.

E1 ATEX Flameproof
Certificate Number: KEMA02ATEX2320X ⟨Ex⟩ II 1/2 G
EEx d IIC T5 (-50°C ≤ T_{amb} ≤ 80°C)
T6 (-50°C ≤ T_{amb} ≤ 65°C)
CE 1180

Special Conditions for Safe Use (x):

The 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 fro installation and maintenance shall be followed in detail to assure safety during its expected lifetime.

ND ATEX Dust
Certificate Number: KEMA02ATEX2321 ⟨Ex⟩ II 1 D
V = 55 Vdc MAX
I = 23 mA MAX
IP66
CE 1180

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.

K5 E5 and I5 combination

K6 E6 and I6 combination

K1 I1, N1, E1, and ND combination

Rosemount 3095 with *Fieldbus*

European Directive Information

The EC declaration of conformity for all applicable European directives for this product can be found on the Rosemount website at www.rosemount.com. A hard copy may be obtained by contacting our local sales office.

ATEX Directive (94/9/EC)

Emerson Process Management complies with the ATEX Directive.

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

3095F_2/3,4/D and 3095M_2/3,4/D Flow Transmitters

— QS Certificate of Assessment - EC No. PED-H-20
Module H Conformity Assessment

All other 3095_ Transmitters/Level Controller

— Sound Engineering Practice

Transmitter Attachments: Process Flange - Manifold

— Sound Engineering Practice

Primary Elements, Flowmeter

— See appropriate Primary Element QIG

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

3095 Flow Transmitters

— EN 50081-1: 1992; EN 50082-2:1995; EN 61326-1:1997 – Industrial

Ordinary Location Certification for Factory Mutual

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).

Rosemount 3095 Fieldbus 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/Class III, Division 1, Groups E, F, and G. Enclosure type NEMA 4X. Factory Sealed. Provides nonincendive RTD connections for Class I, Division 2, Groups A, B, C, and D.

I5 Intrinsically Safe for use in Class I, II and III, Division 1, Groups A, B, C, D, E, F, and G hazardous outdoor locations. Non-incendive for Class I, Division 2, Groups A, B, C, and D. Temperature Code T4. Factory Sealed.

For input parameters and installation see control drawing 03095-1020.

IE FISCO for use in Class I, II and III, Division 1, Groups A, B, C, D, E, F, and G hazardous outdoor locations. Temperature Code T4. Factory Sealed.

For input parameters and installation see control drawing 03095-1020.

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.

K5 E5 and I5 combination

Canadian Standards Association (CSA)

IF CSA FISCO Intrinsically Safe; for FOUNDATION fieldbus protocol only

European Certifications

IA ATEX FISCO Intrinsically Safe; for FOUNDATION fieldbus protocol only

Australian Certifications

IG IECEx FISCO Intrinsic Safety

Reference Manual
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