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Reference Manual
00809-0100-4727, Rev EA
October 2010

Rosemount 8700 Series

Magnetic Flowmeter Sensors



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Reference Manual
00809-0100-4727, Rev EA
October 2010

Rosemount 8700 Series

Magnetic Flowmeter Sensors

NOTICE

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

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

Customer Central: 1-800-999-9307(*7:00 a.m. to 7:00 p.m. CST)*
Technical support, quoting, and order-related questions.

North American1-800-654-7768 (*24 hours a day – Includes Canada)*
Response Center: Equipment service needs.

For equipment service or support needs outside the United States, your local Emerson Process Management representative.

⚠CAUTION

The products described in this document are NOT designed for nuclear-qualified applications.

Using non-nuclear qualified products in applications that require nuclear-qualified hardware or products may cause inaccurate readings.

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

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Section 1 Introduction

Manual Description . . . . . page 1-1
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MANUAL DESCRIPTION

The Rosemount® Series 8700 Magnetic Flowmeter System combines separate sensor and transmitter units. This manual is designed to assist in the installation and operation of Rosemount 8705, 8707 High-Signal, and 8711 Magnetic Flowmeter Sensor.

⚠WARNING

Attempting to install and operate the Rosemount 8705, 8707 High-Signal, or 8711 Magnetic Flowmeter Sensor without reviewing the instructions contained in this manual could result in personal injury or equipment damage.

Section 1: Introduction

- Manual description
- Safety information
- Return of material

Section 2: Installation

- Installation instructions

Section 3: Operation and Maintenance

- Sensor calibration number
- Sensor configuration information.

Section 4: Maintenance and Troubleshooting

- Troubleshooting procedures
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- Instructions for removing and replacing the field-removable electrode assembly

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SAFETY INFORMATION

Procedures and instructions in this manual may require special precautions to ensure the safety of the personnel performing the operations. Refer to the safety messages listed at the beginning of each section before performing any operations.

RETURN OF MATERIALS

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

Within the United States and Canada, call the North American Response Center using the 800-654-RSMT (7768) toll-free number. The Response Center, available 24 hours a day, will assist you with any needed information or materials.

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

⚠ Mishandling products exposed to a hazardous substance may result in death or serious injury. If the product being returned was exposed to a hazardous substance as defined by OSHA, a copy of the required Material Safety Data Sheet (MSDS) for each hazardous substance identified must be included with the returned goods.

The North American Response Center will detail the additional information and procedures necessary to return goods exposed to hazardous substances.

⚠ See “Safety Information” on page 4-1 for complete warning information.

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Section 2 Installation

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This section covers the steps required to physically install the magnetic sensor. 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.

SAFETY MESSAGES

⚠ This symbol is used throughout this manual to indicate that special attention to warning information is required.

⚠WARNING

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

Installation and servicing instructions are for use by qualified personnel only. Do not perform any servicing other than that contained in the operating instructions, unless qualified. Verify that the operating environment of the sensor and transmitter is consistent with the appropriate hazardous area approval.

Do not connect a Rosemount transmitter to a non-Rosemount sensor that is located in an explosive atmosphere.

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⚠WARNING

Explosions could result in death or serious injury:

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

Electrical shock can result in death or serious injury

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

⚠WARNING

The sensor liner is vulnerable to handling damage. Never place anything through the sensor for the purpose of lifting or gaining leverage. Liner damage can render the sensor useless.

To avoid possible damage to the sensor liner ends, do not use metallic or spiral-wound gaskets. If frequent removal is anticipated, take precautions to protect the liner ends. Short spool pieces attached to the sensor ends are often used for protection.

Correct flange bolt tightening is crucial for proper sensor operation and life. All bolts must be tightened in the proper sequence to the specified torque limits. Failure to observe these instructions could result in severe damage to the sensor lining and possible sensor replacement.

Emerson Process Management can supply lining protectors to prevent liner damage during removal, installation, and excessive bolt torquing.

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SENSOR HANDLING

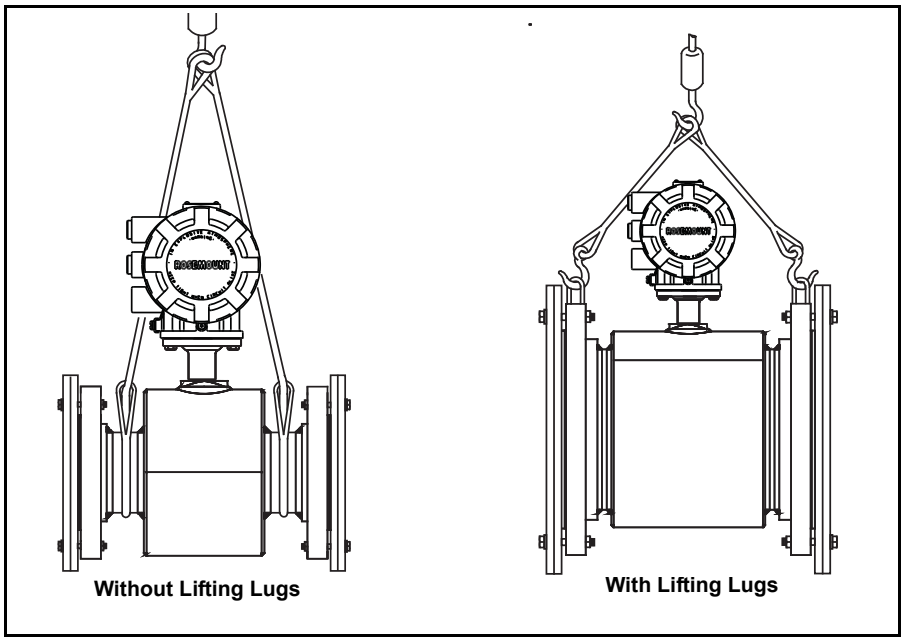
⚠ Handle all parts carefully to prevent damage. Whenever possible, transport the system to the installation site in the original shipping containers. PTFE-lined sensors are shipped with end covers that protect it from both mechanical damage and normal unrestrained distortion. Remove the end covers just before installation.

Flanged sensors with a lifting lug on each flange make the sensor easier to handle when it is transported and lowered into place at the installation site.

Flanged sensors that do not have lugs must be supported with a lifting sling on each side of the housing.

Figure 2-1 shows sensors correctly supported for handling and installation. Notice the plywood end pieces are still in place to protect the sensor liner during transportation.

Figure 2-1. Rosemount 8705 Sensor Support for Handling



⚠ See ”Safety Messages” on pages 2-1 and 2-2 for complete warning information.

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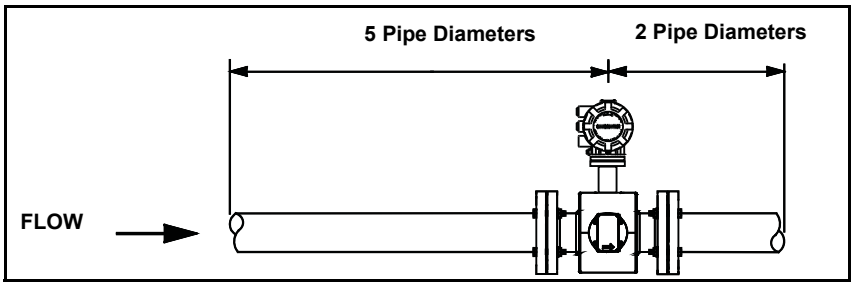
SENSOR MOUNTING

Physical mounting of a sensor is similar to installing a typical section of pipe. Conventional tools, equipment, and accessories (bolts, gaskets, and grounding hardware) are required.

Upstream/Downstream Piping

To ensure specification accuracy over widely varying process conditions, install the sensor a minimum of five straight pipe diameters upstream and two pipe diameters downstream from the electrode plane (see Figure 2-2).

Figure 2-2. Upstream and Downstream Straight Pipe Diameters



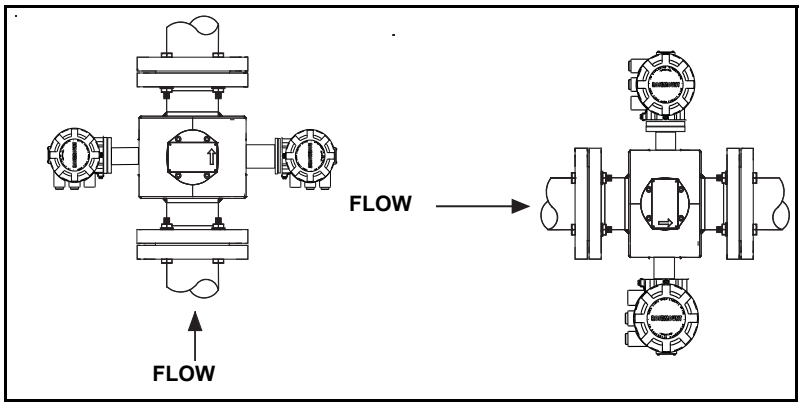
Sensor Orientation

The sensor should be installed in a position that ensures the sensor remains full during operation. Figures 2-3, 2-4, and 2-5 show the proper sensor orientation for the most common installations. The following orientations ensure that the electrodes are in the optimum plane to minimize the effects of entrapped gas.

Vertical installation allows upward process fluid flow and is generally preferred. Upward flow keeps the cross-sectional area full, regardless of flow rate. Orientation of the electrode plane is unimportant in vertical installations. As illustrated in Figures 2-3 and 2-4, avoid *downward* flows where back pressure does not ensure that the sensor remains full at all times.

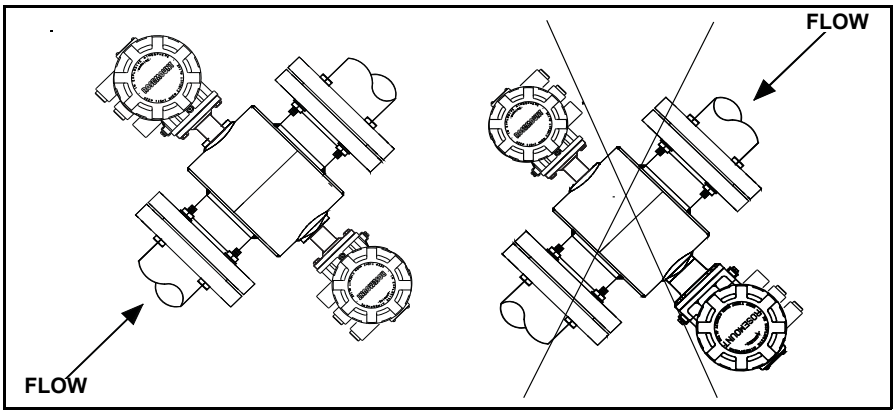
Installations with reduced straight runs from 0 to five pipe diameters are possible. In reduced straight pipe run installations, performance will shift to as much as 0.5% of rate. Reported flow rates will still be highly repeatable.

Figure 2-3. Vertical Sensor Orientation



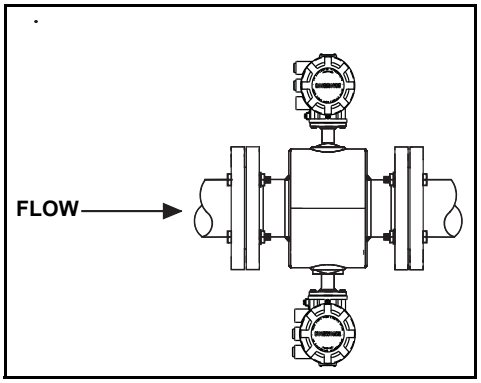
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Figure 2-4. Incline or Decline Orientation



Horizontal installation should be restricted to low piping sections that are normally full. Orient the electrode plane to within 45 degrees of horizontal in horizontal installations. A deviation of more than 45 degrees of horizontal would place an electrode at or near the top of the sensor thereby making it more susceptible to insulation by air or entrapped gas at the top of the sensor.

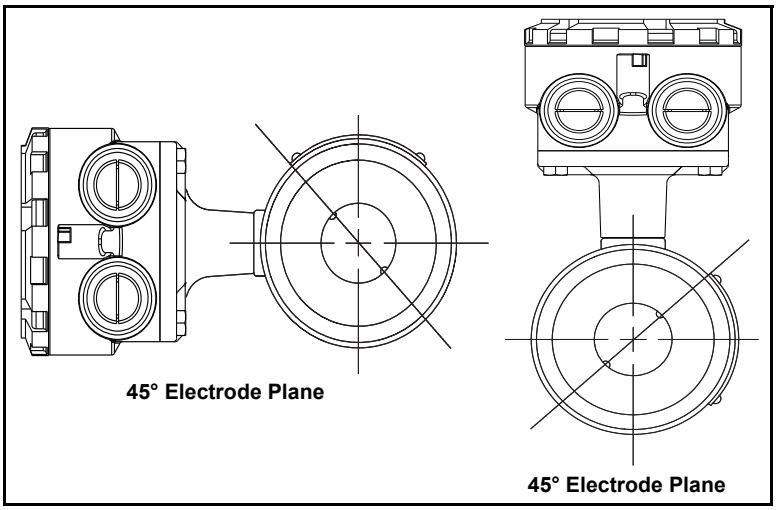
Figure 2-5. Horizontal Sensor Orientation



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The electrodes in the Rosemount 8711 are properly oriented when the top of the sensor is either vertical or horizontal, as shown in Figure 2-6. Avoid any mounting orientation that positions the top of the sensor at 45 degrees from the vertical or horizontal position.

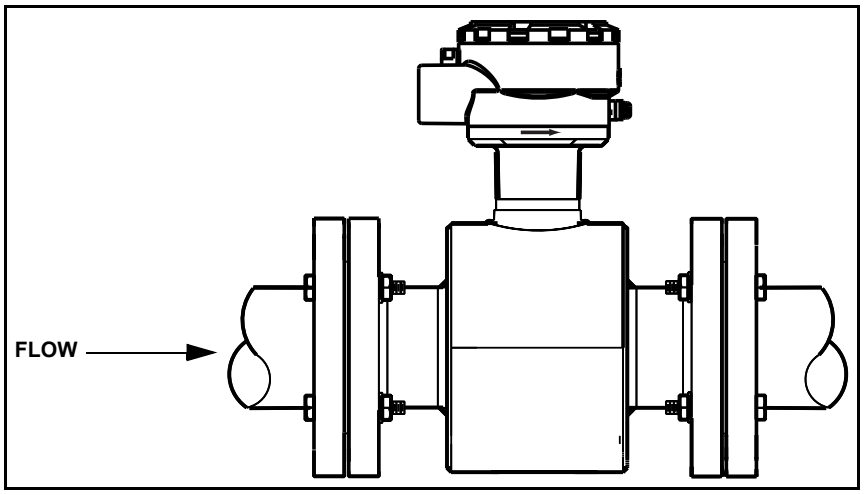
Figure 2-6. Rosemount 8711 Mounting Position



Flow Direction

The sensor should be mounted so that the FORWARD end of the flow arrow, shown on the sensor identification tag, points in the direction of flow through the sensor (see Figure 2-7).

Figure 2-7. Flow Direction



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INSTALLATION (FLANGED SENSOR)

The following section should be used as a guide in the installation of the flange-type Rosemount 8705 and Rosemount 8707 High-Signal Sensors. Refer to page 2-10 for installation of the wafer-type Rosemount 8711 Sensor.

Gaskets

⚠ The sensor requires a gasket at each of its connections to adjacent devices or piping. The gasket material selected must be compatible with the process fluid and operating conditions. **Metallic or spiral-wound gaskets can damage the liner.** If the gaskets will be removed frequently, protect the liner ends. All other applications (including sensors with lining protectors or a grounding electrode) require only one gasket on each end connection, as shown in Figure 2-8. If grounding rings are used, gaskets are required on each side of the grounding ring, as shown in Figure 2-9.

Figure 2-8. Gasket Placement

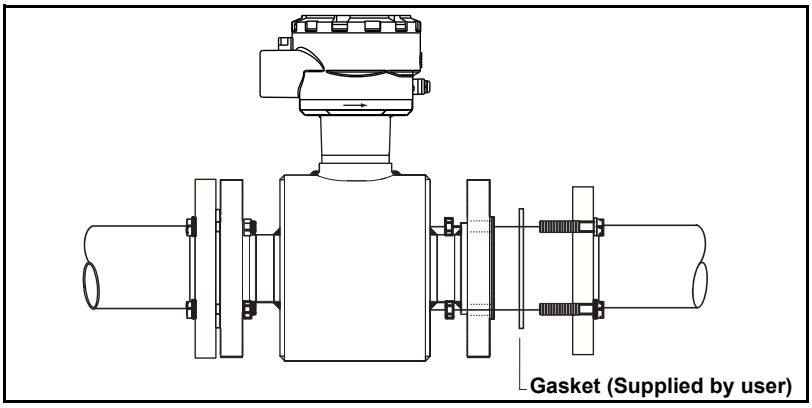
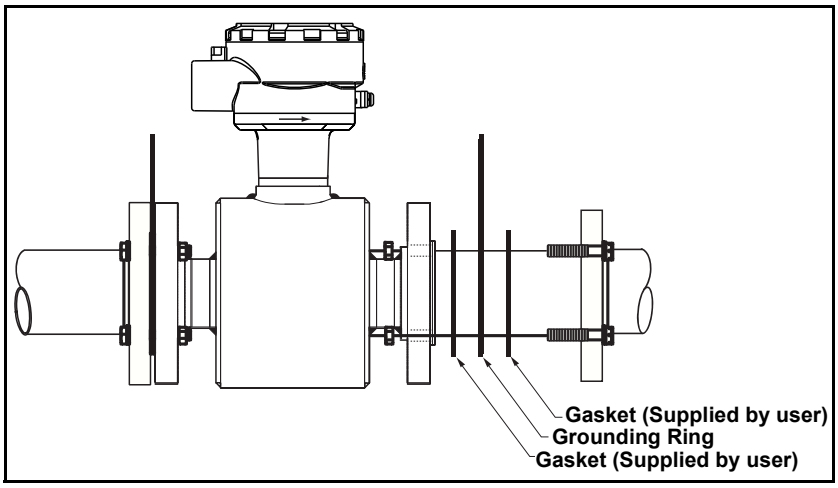


Figure 2-9. Gasket Placement with Non-attached Grounding Rings



Flange Bolts

Suggested torque values by sensor line size and liner type are listed in Table 2-1 on page 2-8 for ASME B16.5 (ANSI) flanges and Table 2-2 and Table 2-3 for DIN flanges. Consult the factory for other flange ratings. Tighten flange bolts in the incremental sequence as shown in Figure 2-10. See Table 2-1 and Table 2-2 for bolt sizes and hole diameters.

⚠ See ”Safety Messages” on pages 2-1 and 2-2 for complete warning information.

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NOTE
Do not bolt one side at a time. Tighten each side simultaneously. Example:
1. Snug left
2. Snug right
3. Tighten left
4. Tighten right

Do not snug and tighten the upstream side and then snug and tighten the downstream side. Failure to alternate between the upstream and downstream flanges when tightening bolts may result in liner damage.

⚠ Always check for leaks at the flanges after tightening the flange bolts. Failure to use the correct flange bolt tightening methods can result in severe damage. All sensors require a second torquing 24 hours after initial flange bolt tightening.

Table 2-1. Flange Bolt Torque Specifications for Rosemount 8705 and 8707 High-Signal Sensors

		PTFE/ETFE liner			Polyurethane liner	
Size Code	**Line Size**	**Class 150 (pound-feet)**	**Class 300 (pound-feet)**	**Class 600(1) (Derated to 1000 psi)**	**Class 150 (pound-feet)**	**Class 300 (pound-feet)**
005	0.5-in. (15 mm)	8	8	8	8	-
010	1- in. (25 mm)	8	12	13	13	-
015	1.5-in. (40 mm)	13	25	29	29	7
020	2-in. (50 mm)	19	17	20	20	14
030	3-in. (80 mm)	34	35	41	41	23
040	4-in. (100 mm)	26	50	68	68	17
060	6-in. (150mm)	45	50	77	77	30
080	8-in. (200 mm)	60	82	121	121	42
100	10-in. (250 mm)	55	80	129	129	40
120	12-in. (300 mm)	65	125	146	146	55
140	14-in. (350 mm)	85	110	194	194	70
160	16-in. (400 mm)	85	160	274	274	65
180	18-in. (450 mm)	120	170	432	432	95
200	20-in. (500 mm)	110	175	444	444	90
240	24-in. (600 mm)	165	280	731	731	140
300	30-in. (750 mm)	195	375	-	-	165
360	36-in. (900 mm)	280	575	-	-	245

(1) Derated available with PTFE lining only.

For sensors with ANSI 600# full rated, 900#, 1500#, and 2500# flanges, the liner is protected from over-compression by the flange design. Standard flange torque specifications as determined by ANSI and ASME should be followed. No special precaution is required to prevent liner damage caused by over torquing. Bolt tightening procedures laid out in this Quick Installation Guide must still be followed.

To prevent liner damage on any magnetic flowmeter, a flat gasket must be used. For optimum results on meters with high pressure flanges (ANSI 600# or above), it is recommended that a flat full face gasket be used.

Under NO circumstances should a spiral wound or flexitallic gasket be used as this will damage the liner sealing surface.

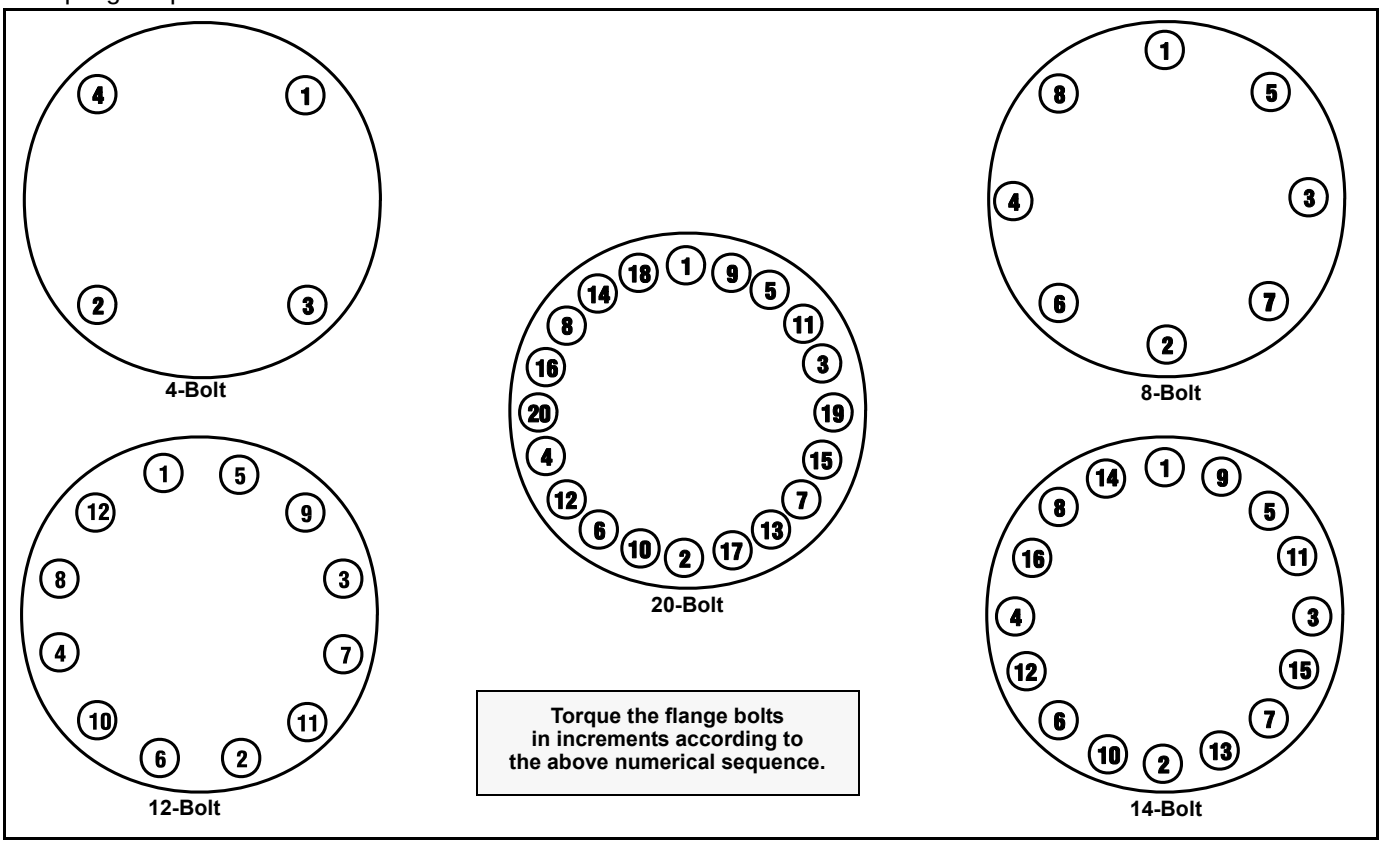
⚠ See ”Safety Messages” on pages 2-1 and 2-2 for complete warning information.

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Table 2-2. Flange Bolt Torque and Bolt Load Specifications for Rosemount 8705

Size Code	Line Size	PTFE/ETFE liner							
		PN10		PN 16		PN 25		PN 40	
		(Newton-meter)	(Newton)	(Newton-meter)	(Newton)	(Newton-meter)	(Newton)	(Newton-meter)	(Newton)
005	1/2-in. (15 mm)	7	3209	7	3809	7	3809	7	4173
010	1-in. (25 mm)	13	6983	13	6983	13	6983	13	8816
015	1 1/2-in. (40 mm)	24	9983	24	9983	24	9983	24	13010
020	2-in. (50 mm)	25	10420	25	10420	25	10420	25	14457
030	3-in. (80 mm)	14	5935	14	5935	18	7612	18	12264
040	4-in. (100 mm)	17	7038	17	7038	30	9944	30	16021
060	6-in. (150mm)	23	7522	32	10587	60	16571	60	26698
080	8-in. (200 mm)	35	11516	35	11694	66	18304	66	36263
100	10-in. (250 mm)	31	10406	59	16506	105	25835	105	48041
120	12-in. (300 mm)	43	14439	82	22903	109	26886	109	51614
140	14-in. (350 mm)	42	13927	80	22091	156	34578	156	73825
160	16-in. (400 mm)	65	18189	117	28851	224	45158	224	99501
180	18-in. (450 mm)	56	15431	99	24477	—	—	—	67953
200	20-in. (500 mm)	66	18342	131	29094	225	45538	225	73367
240	24-in. (600 mm)	104	25754	202	40850	345	63940	345	103014

Figure 2-10. Flange Bolt Torquing Sequence



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Table 2-3. Flange Bolt Torque and Bolt Load Specifications for Rosemount 8705

Size Code	Line Size	Polyurethane Liner							
		PN 10		PN 16		PN 25		PN 40	
		(Newton-meter)	(Newton)	(Newton-meter)	(Newton)	(Newton-meter)	(Newton)	(Newton-meter)	(Newton)
005	1/2-in. (15 mm)	1	521	1	826	2	1293	6	3333
010	1-in. (25 mm)	2	1191	3	1890	5	2958	10	5555
015	1 1/2-in. (40 mm)	5	1960	7	3109	12	4867	20	8332
020	2-in. (50 mm)	6	2535	10	4021	15	6294	26	10831
030	3-in. (80 mm)	5	2246	9	3563	13	5577	24	19998
040	4-in. (100 mm)	7	3033	12	4812	23	7531	35	11665
060	6-in. (150mm)	16	5311	25	8425	47	13186	75	20829
080	8-in. (200 mm)	27	8971	28	9487	53	14849	100	24687
100	10-in. (250 mm)	26	8637	49	13700	87	21443	155	34547
120	12-in. (300 mm)	36	12117	69	19220	91	22563	165	36660
140	14-in. (350 mm)	35	11693	67	18547	131	29030	235	47466
160	16-in. (400 mm)	55	15393	99	24417	189	38218	335	62026
200	20-in. (500 mm)	58	15989	114	25361	197	39696	375	64091
240	24-in. (600 mm)	92	22699	178	36006	304	56357	615	91094

INSTALLATION (WAFER SENSOR)

The following section should be used as a guide in the installation of the Rosemount 8711 Sensor. Refer to page 2-7 for installation of the flange-type Rosemount 8705 and 8707 High-Signal sensor.

Gaskets

⚠ The sensor requires a gasket at each of its connections to adjacent devices or piping. The gasket material selected must be compatible with the process fluid and operating conditions. **Metallic or spiral-wound gaskets can damage the liner.** If the gaskets will be removed frequently, protect the liner ends. If grounding rings are used, a gasket is required on each side of the grounding ring.

Alignment and Bolting

1. On 1 1/2 - through 8-in. (40 through 200 mm) line sizes, place centering rings over each end of the sensor. The smaller line sizes, 0.15- through 1-in. (4 through 25 mm), do not require centering rings.
2. Insert studs for the bottom side of the sensor between the pipe flanges. Stud specifications are listed in Table 2-4. **Using carbon steel bolts on smaller line sizes, 0.15- through 1-in. (4 through 25 mm), rather than the required stainless steel bolts, will degrade performance.**

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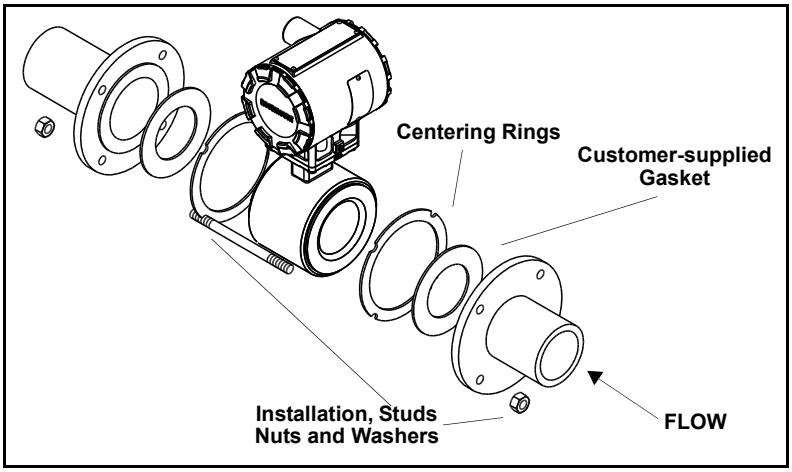
Table 2-4. Stud Specifications

Nominal Sensor Size	Stud Specifications
0.15 – 1-in. (4 – 25 mm)	316 SST ASTM A193, Grade B8M Class 1 threaded mounted studs
$1^1/_2$ – 8-in. (40 – 200 mm)	CS, ASTM A193, Grade B7, threaded mounting studs

3. Place the sensor between the flanges. Make sure that the centering rings are properly placed in the studs. The studs should be aligned with the markings on the rings that correspond to the flange you are using.
4. Insert the remaining studs, washers, and nuts.
5. Tighten to the torque specifications shown in Table 2-5. Do not overtighten the bolts or the liner may be damaged.

NOTE
On the 4- and 6- in. PN 10-16, insert the sensor with rings first and then insert the studs. The slots on this ring scenario are located on the inside of the ring.

Figure 2-11. Gasket Placement with Centering Rings



Flange Bolts

Sensor sizes and torque values for both Class 150 and Class 300 flanges are listed in Table 2-5. Tighten flange bolts in the incremental sequence, shown in Figure 2-10.

NOTE
Do not bolt one side at a time. Tighten each side simultaneously. Example:
1. Snug left
2. Snug right
3. Tighten left
4. Tighten right

Do not snug and tighten the upstream side and then snug and tighten the downstream side. Failure to alternate between the upstream and downstream flanges when tightening bolts may result in liner damage.

⚠ Always check for leaks at the flanges after tightening the flange bolts. All sensors require a second torquing 24 hours after initial flange bolt tightening.

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Table 2-5. Flange bolt Torque Specifications of Rosemount 8711 Sensors

Size Code	Line Size	Pound-feet	Newton-meter
15F	0.15-in. (4 mm)	5	6.8
30F	0.30-in. (8 mm)	5	6.8
005	1/2-in. (15 mm)	5	6.8
010	1-in. (25 mm)	10	13.6
015	1 1/2-in. (40 mm)	15	20.5
020	2-in. (50 mm)	25	34.1
030	3-in. (80 mm)	40	54.6
040	4-in. (100 mm)	30	40.1
060	6-in. (150 mm)	50	68.2
080	8-in. (200 mm)	70	81.9

INSTALLATION (SANITARY SENSOR)

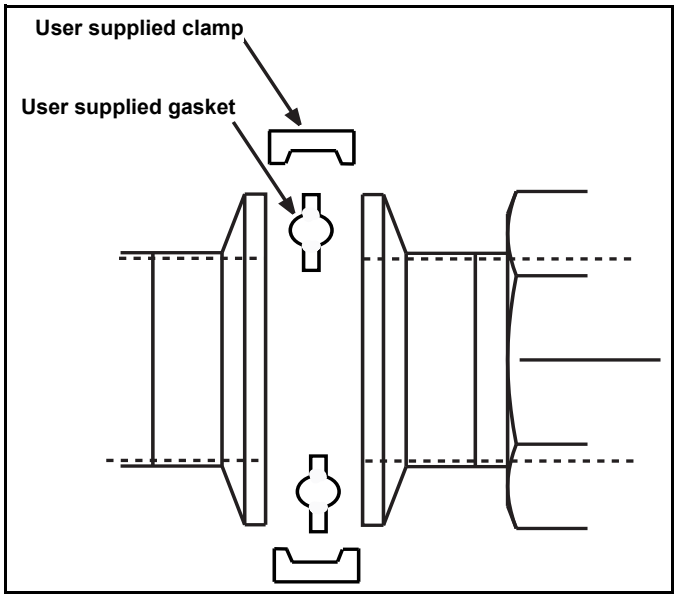
Gaskets

The sensor requires a gasket at each of its connections to adjacent devices or piping. The gasket material selected must be compatible with the process fluid and operating conditions. Gaskets are supplied with all Rosemount 8721 Sanitary sensors except when the process connection is an IDF sanitary screw type.

Alignment and Bolting

Standard plant practices should be followed when installing a magmeter with sanitary fittings. Unique torque values and bolting techniques are not required.

Figure 2-12. Rosemount 8721 Sanitary Installation



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PROCESS LEAK PROTECTION (OPTIONAL)

The Rosemount 8705 and 8707 High-Signal Sensor housing is fabricated from carbon steel to perform two separate functions. First, it provides shielding for the sensor magnetics so that external disturbances cannot interfere with the magnetic field and thus affect the flow measurement. Second, it provides the physical protection to the coils and other internal components from contamination and physical damage that might occur in an industrial environment. The housing is completely welded and gasket-free.

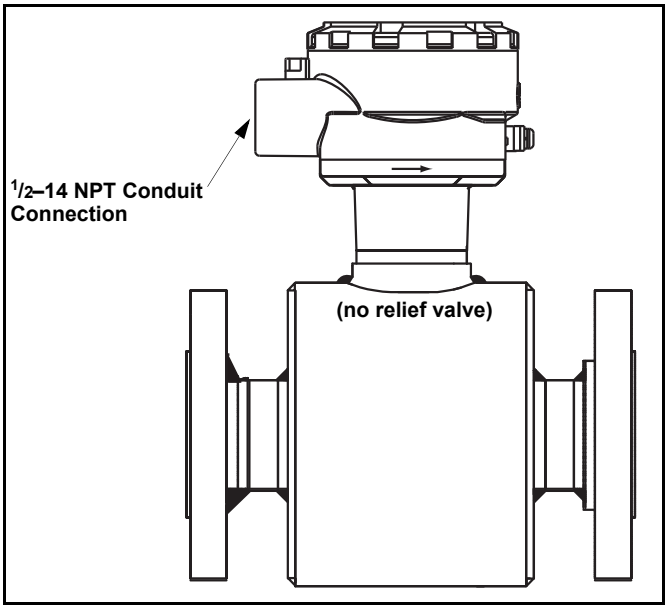
The three housing configurations are identified by the W0, W1, or W3 in the model number option code when ordering. Below are brief descriptions of each housing configuration, which are followed by a more detailed overview.

- **Code W0** — sealed, welded coil housing (standard configuration)
- **Code W1** — sealed, welded coil housing with a relief valve capable of venting fugitive emissions to a safe location (additional plumbing from the sensor to a safe area, installed by the user, is required to vent properly)
- **Code W3** — sealed, welded coil housing with separate electrode compartments capable of venting fugitive emissions (additional plumbing from the sensor to a safe area, installed by the user, is required to vent properly)

Standard Housing Configuration

The standard housing configuration is identified by a code W0 in the model number. This configuration does not provide separate electrode compartments with external electrode access. In the event of a process leak, these models will not protect the coils or other sensitive areas around the sensor from exposure to the pressure fluid (Figure 2-13).

Figure 2-13. Standard Housing Configuration — Sealed Welded Housing (Option Code W0)

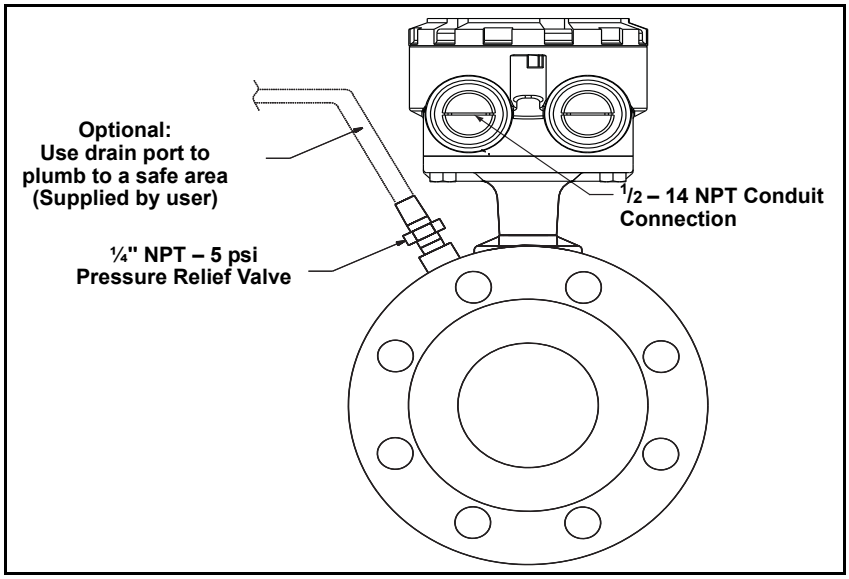


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Relief Valves

The first optional configuration, identified by the W1 in the model number option code, uses a completely welded coil housing. This configuration does not provide separate electrode compartments with external electrode access. This optional housing configuration provides a relief valve in the housing to prevent possible overpressuring, caused by damage to the lining or other situations that might allow process pressure to enter the housing. The relief valve will vent when the pressure inside the sensor housing exceeds five psi. Additional piping (provided by the user) may be connected to this relief valve to drain any process leakage to safe containment (see Figure 2-14).

Figure 2-14. Coil-Housing Configuration — Standard Welded Housing With Relief Valve (Option Code W1)



Process Leak Containment

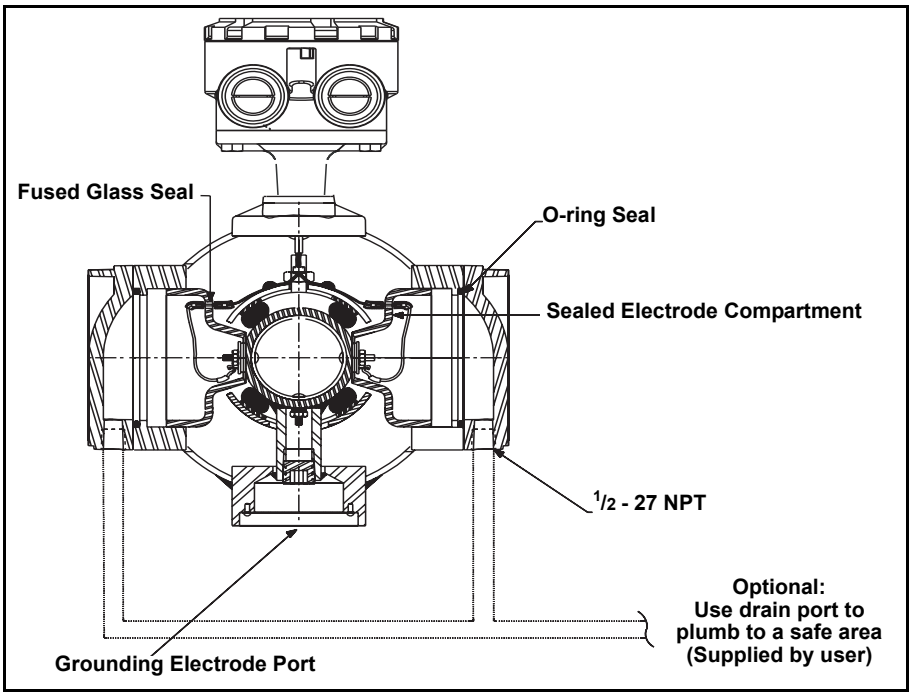
The second optional configuration, identified as option code W3 in the model number, divides the coil housing into three compartments: one for each electrode and one for the coils. Should a damaged liner or electrode fault allow process fluid to migrate behind the electrode seals, the fluid is contained in the electrode compartment. The sealed electrode compartment prevents the process fluid from entering the coil compartment where it would damage the coils and other internal components.

The electrode compartments are designed to contain the process fluid at full line pressure. An O-ring sealed cover provides access to each of the electrode compartments from outside the sensor; drainports are provided in each cover for the removal of fluid.

NOTE
The electrode compartment could contain full line pressure and it must be depressurized before the cover is removed.

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Figure 2-15. Housing Configuration — Sealed Electrode Compartment (Option Code W3)



If necessary, capture any process fluid leakage, connect the appropriate piping to the drainports, and provide for proper disposal (see Figure 2-15).

Conduit Ports and Connections

Both the sensor and transmitter junction boxes have ports for 1/2-in. NPT conduit connections, with optional CM20 and PG 13.5 adapter connections available. These connections should be made in accordance with national, local or plant electrical codes. Unused ports should be sealed with metal plugs and PTFE tape or other thread sealant. Connections should also be made in accordance with area approval requirements, see examples below for details. Proper electrical installation is necessary to prevent errors due to electrical noise and interference. Separate conduits are not necessary for the coil drive and signal cables connecting the transmitter to the sensor, but a dedicated conduit line between each transmitter and sensor is required. A shielded cable must be used.

Example 1: Installing flanged sensors into an IP68 area. Sensors must be installed with IP68 cable glands and cable to maintain IP68 rating. Unused conduit connections must be properly sealed to prevent water ingress. For added protection, dielectric gel can be used to pot the sensor terminal block. Consult technical document 00840-0100-4750 when installing meters into an IP68 installation.

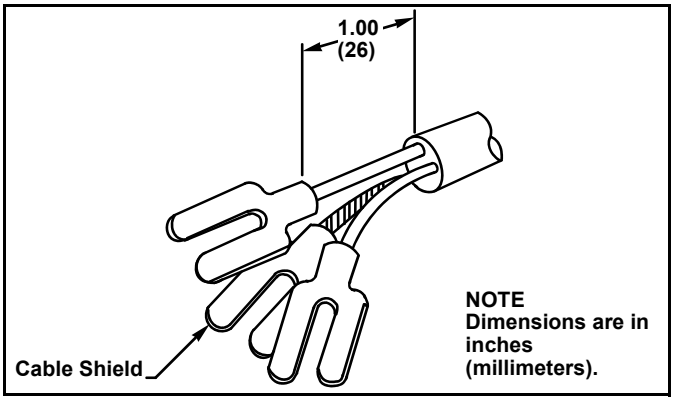
Example 2: Installing flowmeters into explosion-proof/flameproof areas. Conduit connections and conduit must be rated for use in the hazardous area to maintain flowmeter approval rating. Consult Appendix B: of this manual for installation requirements for hazardous areas.

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Conduit Cables

Run the appropriate size cable through the conduit connections in your magnetic flowmeter system. Run the power cable from the power source to the transmitter. Do not run power cables and output signal cables in the same conduit. For remote mount installations, run the coil drive and electrode cables between the flowmeter and transmitter. Refer to Electrical Considerations for wire type. Prepare the ends of the coil drive and electrode cables as shown in Figure 2-16. Limit the unshielded wire length to 1-in. on both the electrode and coil drive cables. Excessive lead length or failure to connect cable shields can create electrical noise, resulting in unstable meter readings.

Figure 2-16. Cable Preparation Detail



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Electrical Considerations

Before making any electrical connections to the Rosemount transmitter, consider the following standards and be sure to have the proper power supply, conduit, and other accessories. When preparing all wire connections, remove only the insulation required to fit the wire completely under the terminal connection. Removal of excessive insulation may result in an unwanted electrical short to the transmitter housing or other wire connections.

Transmitter Input Power

The Rosemount transmitter is designed to be powered by 90-250 Vac, 50–60 Hz or 12–42 Vdc. The eighth digit in the transmitter model number designates the appropriate power supply requirement.

Model Number	Power Supply Requirement
1	90-250 Vac
2	12-42 Vdc

Supply Wire Temperature Rating

Use 14 to 18 AWG wire rated for the proper temperature of the application. For connections in ambient temperatures above 140 °F (60 °C), use a wire rated for 176 °F (80 °C). For ambients greater than 176 °F (80 °C), use a wire rated for 230 °F (110 °C). For DC powered transmitters with extended power cable lengths, verify that there is a minimum of 12 Vdc at the terminals of the transmitter.

Disconnects

Connect the device through an external disconnect or circuit breaker. Clearly label the disconnect or circuit breaker and locate it near the transmitter.

Consult the applicable Rosemount Transmitter Documentation for detailed transmitter installation instructions.

Transmitter	Quick Installation Guide	Manual
8732E HART	00825-0100-4662	00809-0100-4662
8732E FOUNDATION fieldbus	00825-0100-4663	00809-0100-4663
8732E Profibus PA	00825-0100-4665	00809-0100-4665
8712E HART	00825-0100-4664	00809-0100-4664

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SENSOR CONNECTIONS

This section covers the steps required to physically install the transmitter including wiring and calibration.

Rosemount Sensors

To connect the transmitter to a non-Rosemount sensor, refer to the appropriate wiring diagram in “Universal Sensor Wiring Diagrams” on page E-1. The calibration procedure listed is not required for use with Rosemount sensors.

Transmitter to Sensor Wiring

Flanged and wafer sensors have two conduit ports as shown in Figure 2-17. Either one may be used for both the coil drive and electrode cables. Use the stainless steel plug that is provided to seal the unused conduit port. Use PTFE tape or thread sealant appropriate for the installation when sealing the conduit.

A single dedicated conduit run for the coil drive and electrode cables is needed between a sensor and a remote transmitter. Bundled cables in a single conduit are likely to create interference and noise problems in your system. Use one set of cables per conduit run. See Figure 2-17 for proper conduit installation diagram and Table 2-6 for recommended cable. For integral and remote wiring diagrams refer to Figure 2-18.

Figure 2-17. Conduit Preparation

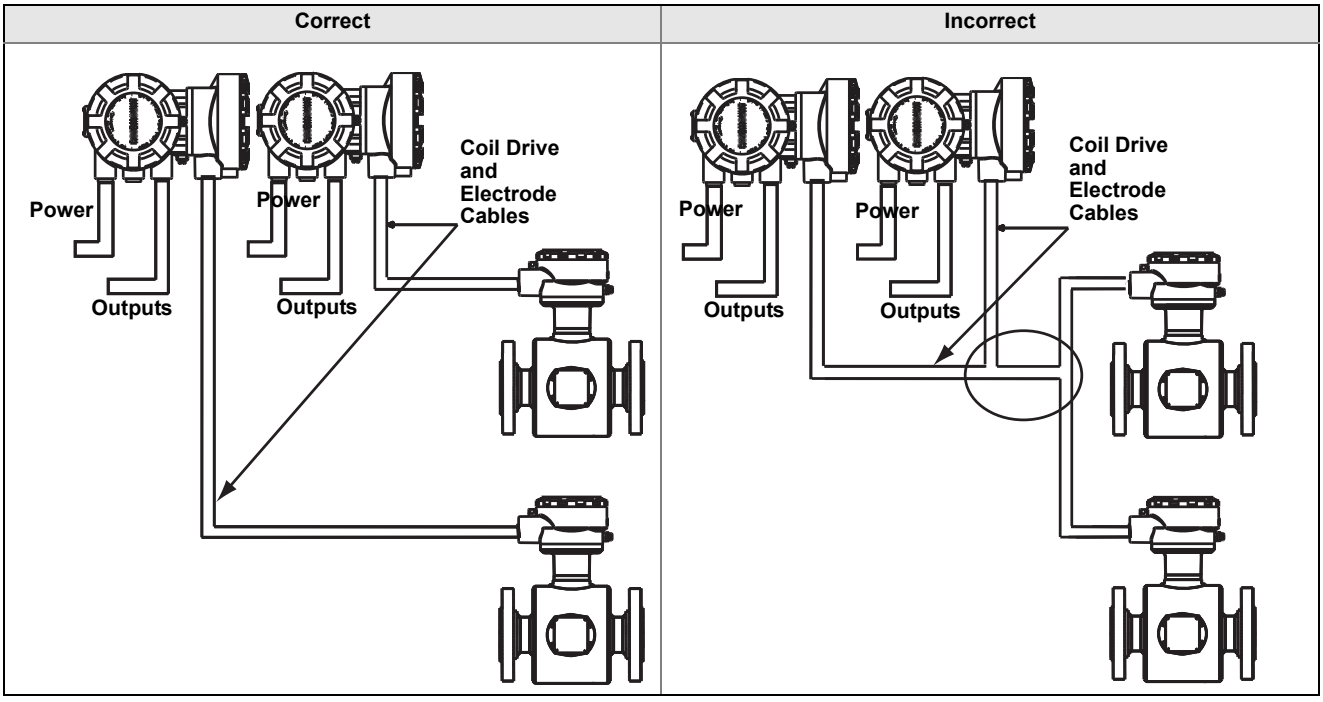


Table 2-6. Cable Requirements

Description	Units	Part Number
Signal Cable (20 AWG) Belden 8762, Alpha 2411 equivalent	ft m	08712-0061-0001 08712-0061-2003
Coil Drive Cable (14 AWG) Belden 8720, Alpha 2442 equivalent	ft m	08712-0060-0001 08712-0060-2003
Combination Signal and Coil Drive Cable (18 AWG)(1)	ft m	08712-0752-0001 08712-0752-2003

(1) Combination signal and coil drive cable is not recommended for high-signal magmeter system. For remote mount installations, combination signal and coil drive cable should be limited to less than 330 ft. (100 m).

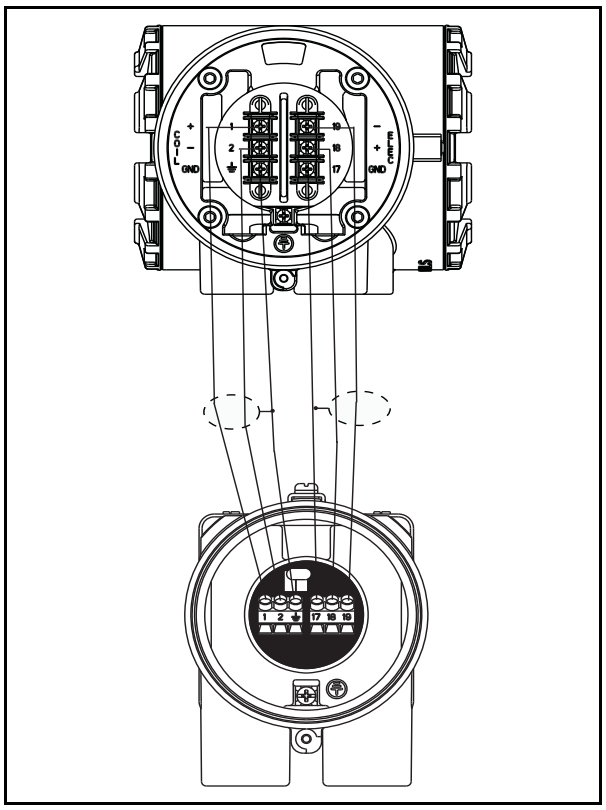
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Rosemount recommends using the combination signal and coil drive for N5, E5 approved sensors for optimum performance.

Remote transmitter installations require equal lengths of signal and coil drive cables. Integrally mounted transmitters are factory wired and do not require interconnecting cables.

Lengths from 5 to 1,000 ft. (1.5 to 300 m.) may be specified, and will be shipped with the sensor.

Figure 2-18. Wiring Diagram



Transmitter Terminal	Sensor Terminal	Wire Gauge	Wire Color
1	1	14	Clear or Red
2	2	14	Black
⏚	⏚	14	Shield
17	17	20	Shield
18	18	20	Black
19	19	20	Clear or Red

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Section 3 Operation and Maintenance

Calibration . . . . . **page 3-1**
Grounding . . . . . **page 3-1**
Material Selection . . . . . **page 3-3**
Magnetic Flowmeter Sizing . . . . . **page 3-4**

This section covers basic operation, software functionality, and basic configuration procedures for the Magnetic Sensor. For more information about the technology and the function blocks used in the sensor, refer to Appendix A: Reference Data and Appendix C: Field-Removable Electrodes.

CALIBRATION

Rosemount sensor are wet calibrated at the factory. They do not need further calibration during installation.

GROUNDING

Process grounding the sensor is one of the most important details of sensor installation. Proper process grounding ensures that the transmitter amplifier is referenced to the process. This creates the lowest noise environment for the transmitter to make a stable reading. Use Table 3-1 to determine which grounding option to follow for proper installation.

NOTE
Consult factory for installations requiring cathodic protection or situations where there are high currents or high potential in the process.

The sensor case should always be earth grounded in accordance with national and local electrical codes. Failure to do so may impair the protection provided by the equipment. The most effective grounding method is direct connection from the sensor to earth ground with minimal impedance.

The Internal Ground Connection (Protective Ground Connection), located inside the junction box, is the Internal Ground Connection screw. This screw is identified by the ground symbol: 

Table 3-1. Grounding Installation

	Grounding Options			
Type of Pipe	**No Grounding Options**	**Grounding Rings**	**Grounding Electrodes**	**Lining Protectors**
Conductive Unlined Pipe	See Figure 3-1	Not Required	Not Required	See Figure 3-2
Conductive Lined Pipe	Insufficient Grounding	See Figure 3-2	See Figure 3-1	See Figure 3-2
Non-Conductive Pipe	Insufficient Grounding	See Figure 3-3	See Figure 3-4	See Figure 3-3

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Figure 3-1. No Grounding Options or Grounding Electrode in Lined Pipe

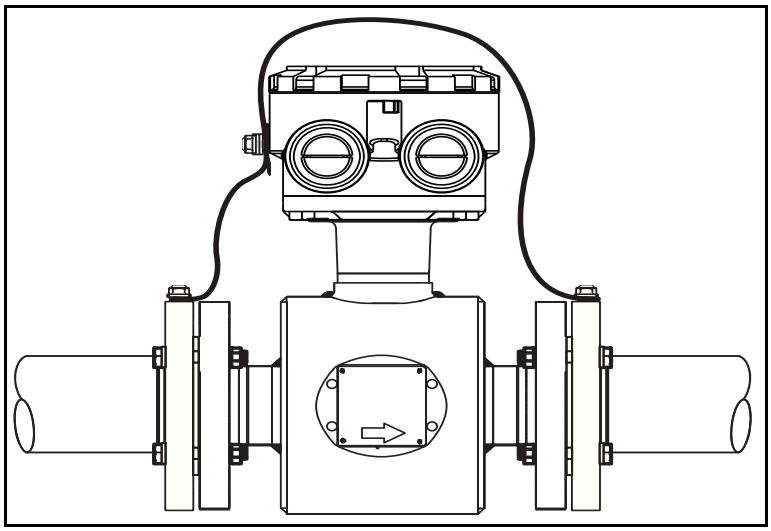
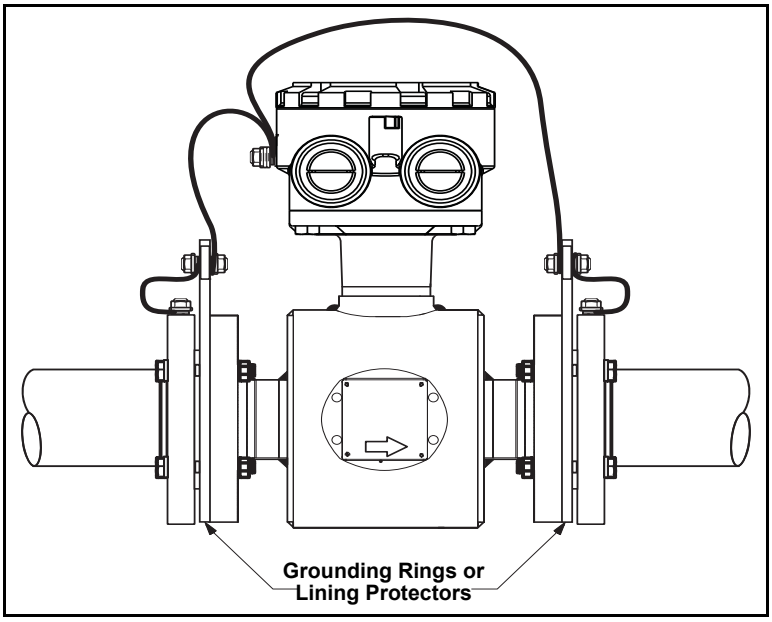


Figure 3-2. Grounding with Grounding Rings or Lining Protectors



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Figure 3-3. Grounding with Grounding Rings or Lining Protectors

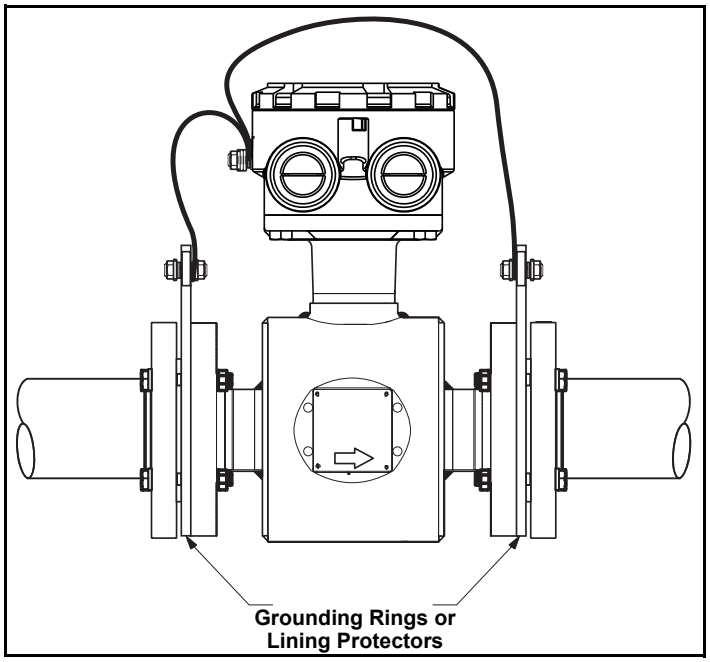
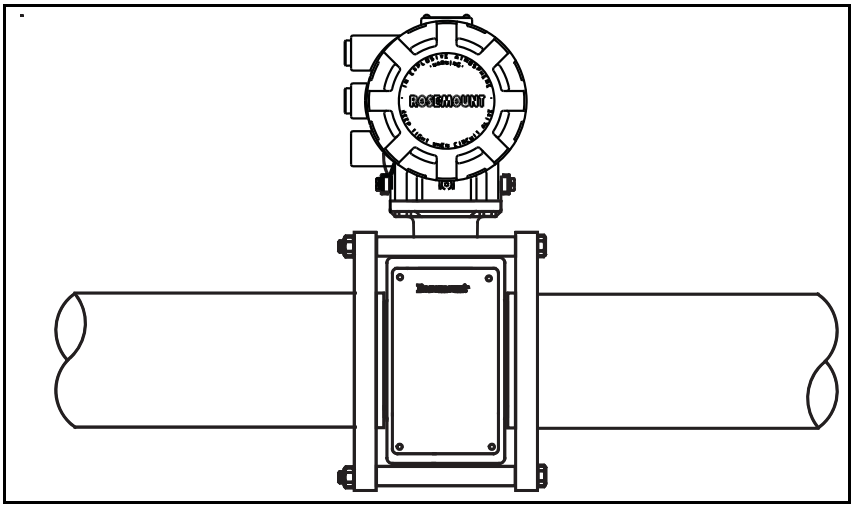


Figure 3-4. Grounding with Grounding Electrodes



MATERIAL SELECTION

Several liner types, electrode materials, and electrode types are available on Rosemount Magnetic Sensor to ensure compatibility with virtually any application. See Appendix A: for information on liner types, on electrode materials, and electrode types. For further guidance on selecting materials, refer to the Magnetic Flowmeter Material Selection Guide located on Rosemount.com (document number 00816-0100-3033).

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MAGNETIC FLOWMETER SIZING

Flowmeter Sizing

Because of its effect on flow velocity, sensor size is an important consideration. It may be necessary to select a magnetic flowmeter that is larger or smaller than the adjacent piping to ensure the fluid velocity is in the specified measuring range of the sensor. Suggested guidelines and examples for sizing normal velocities in different applications are listed in Table 3-2, Table 3-3, and Table 3-4. Operation outside these guidelines may also give acceptable performance.

Table 3-2. Sizing Guidelines

Application	Velocity Range (ft/s)	Velocity Range (m/s)
Normal Service	2–20	0.6–6.1
Abrasive Slurries	3–10	0.9–3.1
Non-Abrasive Slurries	5–15	1.5–4.6

To convert flow rate to velocity, use the appropriate factor listed in Table 3-2 and the following equation:

$$\text{Velocity} = \frac{\text{Flow Rate}}{\text{Factor}}$$

Example: SI Units

Magmeter Size: 100 mm **(factor from Table 3-3 = 492.0)**
Normal Flow Rate: 800 L/min.

$$\text{Velocity} = \frac{800}{\text{(L/min.)}}$$

Velocity = 1.7 m/s

Example: English Units

Magmeter Size: 4-in. **(factor from Table 3-3 = 39.679)**
Normal Flow Rate: 300 GPM

$$\text{Velocity} = \frac{300\ \text{(gpm)}}{39.679}$$

Velocity = 7.56 ft/s

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Table 3-3. Line Size vs. Conversion Factor

Nominal Line Size Inches (mm)	Gallons Per Minute Factor	Liters Per Minute Factor
0.30 (8)	0.220	2.732
½ (15)	0.947	11.745
1 (25)	2.693	33.407
1½ (40)	6.345	78.69
2 (50)	10.459	129.7
2 ½ (65)	14.922	185.0
3 (80)	23.042	285.7
4 (100)	39.679	492.0
6 (150)	90.048	1,116
8 (200)	155.94	1,933
10 (250)	245.78	3,048
12 (300)	352.51	4,371
14 (350)	421.70	5,229
16 (400)	550.80	6,830
18 (450)	697.19	8,645
20 (500)	866.51	10,745
24 (600)	1,253.2	15,541
30 (750)	2,006.0	24,877
36 (900)	2,935.0	36,398

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Table 3-4. Line Size vs. Velocity/Rate

Nominal Line Size in Inches (mm)	Minimum/Maximum Flow Rate							
	Gallons per Minute				Liters per Minute			
	at 0.04 ft/s (Low-flow Cutoff)	at 1 ft/s (Min Range Setting)	at 3 ft/s	at 39 ft/s (Max Range Setting)	at 0.012 m/s (Low-flow Cutoff)	at 0.3 m/s (Min Range Setting)	at 1 m/s	at 12 m/s (Max Range Setting)
.15 (4)	0.002	0.055	0.16	2.14	0.01	0.21	0.68	8.16
.30 (8)	0.009	0.220	0.66	8.58	0.03	0.83	2.73	32.76
1/2 (15)	0.038	0.947	2.84	36.93	0.14	3.58	11.74	140.88
1 (25)	0.108	2.694	8.08	105.07	0.41	10.18	33.40	424.80
1 1/2 (40)	0.254	6.345	19.03	247.46	0.96	23.98	78.69	944.28
2 (50)	0.418	10.459	31.37	407.90	1.58	39.54	129.7	1,556
2 1/2 (65)	0.597	14.922	44.77	582.0	2.22	55.51	185.0	2,220
3 (80)	0.922	23.042	69.12	898.64	3.49	87.10	285.7	3,428
4 (100)	1.588	39.667	119.0	1547.0	6.00	138.6	492.0	5,904
6 (150)	3.600	90.048	270.1	3511.8	13.61	340.3	1,116	13,400
8 (200)	6.240	155.94	467.7	6081.7	23.59	589.4	1,933	23,204
10 (250)	9.840	245.78	737.3	9585.4	37.20	929.0	3,048	36,576
12 (300)	14.200	352.51	1,059	13,747	53.68	1,332	4,371	52,548
14 (350)	16.800	421.70	1,265	16,446	63.50	1,594	5,230	62,755
16 (400)	22.000	550.80	1,652	21,481	83.16	2,082	6,830	81,964
18 (450)	27.800	697.19	2,091	27,190	105.0	2,635	8,646	103,750
20 (500)	34.600	866.51	2,599	33,793	130.7	3,275	10,740	128,948
24 (600)	50.200	1,253.2	3,759	48,874	189.7	4,737	15,540	186,496
30 (750)	80.200	2,006.0	6,018	78,234	303.1	7,582	24,880	298,527
36 (900)	117.40	2,935.0	8,805	114,465	443.7	11,094	36,390	436,779

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Section 4 Maintenance and Troubleshooting

Safety Information . . . . . **page 4-1**
Installation Check and Guide . . . . . **page 4-2**
Diagnostic Messages . . . . . **page 4-3**
Transmitter Troubleshooting . . . . . **page 4-5**
Quick Troubleshooting . . . . . **page 4-7**

This section covers basic transmitter and sensor troubleshooting. Problems in the magnetic flowmeter system are usually indicated by incorrect output readings from the system, error messages, or failed tests. Consider all sources when identifying a problem in your system. If the problem persists, consult your local Rosemount representative to determine if the material should be returned to the factory. Emerson Process Management offers several diagnostics that aid in the troubleshooting process.

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Please read the following safety messages before performing any operation described in this section. Refer to these warnings when appropriate throughout this section.

SAFETY INFORMATION

⚠WARNING

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

Installation and servicing instructions are for use by qualified personnel only. Do not perform any servicing other than that contained in the operating instructions, unless qualified. Verify that the operating environment of the sensor and transmitter is consistent with the appropriate FM or CSA approval.

Do not connect a Rosemount transmitter to a non-Rosemount sensor that is located in an explosive atmosphere.

Mishandling products exposed to a hazardous substance may result in death or serious injury. If the product being returned was exposed to a hazardous substance as defined by OSHA, a copy of the required Material Safety Data Sheet (MSDS) for each hazardous substance identified must be included with the returned goods.

The Rosemount transmitter performs self diagnostics on the entire magnetic flowmeter system: the transmitter, the sensor, and the interconnecting wiring. By sequentially troubleshooting each individual piece of the magmeter system, it becomes easier to pinpoint the problem and make the appropriate adjustments.

If there are problems with a new magmeter installation, see “Installation Check and Guide” on page 4-2 for a quick guide to solve the most common installation problems. For existing magmeter installations, Table 4-4 lists the most common magmeter problems and corrective actions.

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INSTALLATION CHECK AND GUIDE

Use this guide to check new installations of Rosemount magnetic flowmeter systems that appear to malfunction.

Before You Begin

Transmitter

Apply power to your system before making the following transmitter checks.

1. Verify that the correct sensor calibration number is entered in the transmitter. The calibration number is listed on the sensor nameplate.
2. Verify that the correct sensor line size is entered in the transmitter. The line size value is listed on the sensor nameplate.
3. Verify that the function blocks are not in Out of Service mode.
4. Verify that the transmitter is functioning correctly by using the 8714i Meter Verification diagnostic or the 8714D Calibration Reference Standard.

Sensor

Be sure that power to your system is removed before beginning sensor checks.

1. **For horizontal flow installations**, ensure that the electrodes remain covered by process fluid.

   For vertical or inclined installations, ensure that the process fluid is flowing up into the sensor to keep the electrodes covered by process fluid.
2. Ensure that the grounding straps on the sensor are connected to grounding rings, lining protectors, or the adjacent pipe flanges. Improper grounding will cause erratic operation of the system.

Wiring for Remote Configurations

1. The signal wire and coil drive wire must be twisted shielded cable. Emerson Process Management, Rosemount division, recommends 20 AWG twisted shielded cable for the electrodes and 14 AWG twisted shielded cable for the coils.
2. The cable shield must be connected at both ends of the electrode and coil drive cables. Connection of the signal wire shield at both ends is necessary for proper operation. It is recommended that the coil drive wire shield also be connected at both ends for maximum flowmeter performance.
3. The signal and coil drive wires must be separate cables, unless Emerson Process Management specified combo cable is used. See Table 2-2 on page 2-11.
4. The single conduit that houses both the signal and coil drive cables should not contain any other wires.

Process Fluid

1. The process fluid conductivity should be 5 microsiemens (5 micro mhos) per cm minimum.
2. The process fluid must be free of air and gasses.
3. The sensor should be full of process fluid.

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DIAGNOSTIC MESSAGES

Problems in the magnetic flowmeter system are usually indicated by incorrect output readings from the system, error messages, or failed tests. Consider all sources in identifying a problem in your system.

Table 4-1. Rosemount Basic Diagnostic Messages

Message	Local Display Error Message (English)	Potential Cause	Corrective Action
“Empty Pipe Detected”	Empty Pipe	Empty Pipe	None - message will clear when pipe is full
		Wiring Error	Check that wiring matches appropriate wiring diagrams - see Appendix E: Universal Sensor Wiring Diagrams
		Electrode Error	Perform sensor tests C and D (see Table 4-5 on page 4-8)
		Conductivity less than 5 microsiemens per cm	Increase Conductivity to greater than or equal to 5 microsiemens per cm
		Intermittent Diagnostic	Adjust tuning of Empty Pipe parameters
“Coil Drive Open Circuit”	Coil Open Ckt	Improper wiring	Check coil drive wiring and sensor coils Perform sensor test A - Sensor Coil
		Other manufacturer’s sensor	Change coil current to 75 mA Perform a Universal Auto Trim to select the proper coil current
		Circuit Board Failure	Replace Rosemount 8732 Electronics
		Coil Circuit OPEN Fuse	Return to factory for fuse replacement
“Auto Zero Failure (Cycle power to clear messages, no changes were made)”	Auto Zero Fail	Flow is not set to zero	Force flow to zero, perform autozero
		Unshielded cable in use	Change wire to shielded cable
		Moisture problems	See moisture problems in “Accuracy Section”
		Empty pipe is present	Fill sensor with process fluid
“Universal Trim Failure”	Univ Trim Fail	No flow in pipe while performing Universal Auto Trim	Establish a known flow in sensor, and perform Universal Auto-Trim calibration
		Wiring error	Check that wiring matches appropriate wiring diagrams - see “Universal Sensor Wiring Diagrams” on page E-1
		Flow rate is changing in pipe while performing Universal Auto-Trim routine	Establish a constant flow in sensor, and perform Universal Auto-Trim calibration
		Flow rate through sensor is significantly different than value entered during Universal Auto-Trim routine	Verify flow in sensor and perform Universal Auto-Trim calibration
		Incorrect calibration number entered into transmitter for Universal Auto-Trim routine	Replace sensor calibration number with 1000005010000001
		Wrong sensor size selected	Correct sensor size setting - See “Line Size” on page 3-9
		Sensor failure	Perform sensor tests C and D (see Table 4-5 on page 4-8)
“Electronics Failure”	Electronics Fail	Electronics self check failure	Replace Electronics
“Electronics Temperature Out of Range”	Temp Out of Rng	Ambient temperature exceeded the electronics temperature limits	Move transmitter to a location with an ambient temperature range of -40 to 165 °F (-40 to 74 °C)
“Reverse Flow Detected”	Reverse Flow	Electrode or coil wires reverse	Verify wiring between sensor and transmitter
		Flow is reverse	Turn ON Reverse Flow Enable to read flow
		Sensor installed backwards	Re-install sensor correctly, or switch either the electrode wires (18 and 19) or the coil wires (1 and 2)
“Sensor Hi Limit Exceeded”	Flow >Sens limit	Flow rate is greater than 43 ft/sec	Lower flow velocity, increase pipe diameter
		Improper wiring	Check coil drive wiring and sensor coils Perform sensor test A - Sensor Coil (see Table 4-5 on page 4-8)
“DSP Hardware not compatible with software”	Incompatible SW	DSP Software Revision is not equal to Hornet’s Expectations.	Install software revision equal to Hornet's Expectation

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Table 4-2. Rosemount Advanced Diagnostic Messages

Message	Local Display Error Message (English)	Potential Cause	Corrective Action
Grounding/Wiring Fault	Grnd/Wire Fault	Improper installation of wiring	See “Sensor Connections” on page 2-11
		Coil/Electrode shield not connected	See “Sensor Connections” on page 2-11
		Improper process grounding	See “Grounding” on page 5-12
		Faulty ground connection	Check wiring for corrosion, moisture in the terminal block, and refer to “Grounding” on page 5-12
		Sensor not full	Verify sensor is full and empty pipe diagnostic is on
High Process Noise	Hi Process Noise	Slurry flows - mining/pulp stock	Decrease the flow rate below 10 ft/s (3 m/s) Complete the possible solutions listed under “Step 2: Process Noise” on page 4-7
		Chemical additives upstream of the sensor	Move injection point downstream of the sensor, or move the sensor Complete the possible solutions listed under “Step 2: Process Noise” on page 4-7
		Electrode not compatible with the process fluid	Refer to the Rosemount Magnetic Flowmeter Material Selection Guide (00816-0100-3033)
		Air in line	Move the sensor to another location in the process line to ensure that it is full under all conditions
		Electrode coating	Use bulletnose electrodes Downsize sensor to increases flowrate above 3 ft/s (1 m/s) Periodically clean sensor
		Styrofoam or other insulating particles	Complete the possible solutions listed under “Step 2: Process Noise” on page 4-7 Consult factory
		Low conductivity fluids (below 10 microsiemens/cm)	Trim electrode and coil wires - refer to “Installation” on page 2-1

Table 4-3. Rosemount SMART Meter Verification Diagnostic Messages

Message	Potential Cause	Corrective Action
8714i Failed	Transmitter Calibration Verification test failed	Verify pass/fail criteria Rerun 8714i Meter Verification under no flow conditions Verify calibration using 8714D Calibration Standard Perform digital trim Replace electronics board
	Sensor Calibration test failed	Verify pass/fail criteria Perform sensor test - see Table 4-5 on page 4-8
	Sensor Coil Circuit test failed	Verify pass/fail criteria Perform sensor test - see Table 4-5 on page 4-8
	Sensor Electrode Circuit test failed	Verify pass/fail criteria Perform sensor test - see Table 4-5 on page 4-8

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TRANSMITTER TROUBLESHOOTING

Table 4-4. Advanced Troubleshooting

Symptom	Potential Cause	Corrective Action
Does not appear to be within rated accuracy	Transmitter, control system, or other receiving device not configured properly	Check all configuration variables for the transmitter, sensor, communicator, and/or control system Check these other transmitter settings: •Sensor calibration number •Units •Line size
	Electrode Coating	Use bulletnose electrodes; Downsize sensor to increase flow rate above 3 ft/s; Periodically clean sensor
	Air in line	Move the sensor to another location in the process line to ensure that it is full under all conditions.
	Moisture problem	Perform the sensor Tests A, B, C, and D (see Table 4-5 on page 4-8)
	Improper wiring	If electrode shield and signal wires are switched, flow indication will be about half of what is expected. Check wiring diagrams for your application.
	Flow rate is below 1 ft/s (specification issue)	See accuracy specification for specific transmitter and sensor
	Auto zero was not performed when the coil drive frequency was changed from 5 Hz to 37 Hz	Set the coil drive frequency to 37 Hz, verify the sensor is full, verify there is no flow, and perform the auto zero function.
	Sensor failure–Shorted electrode	Perform the sensor Tests C and D (see Table 4-5 on page 4-8)
	Sensor failure–Shorted or open coil	Perform the sensor Tests A and B (see Table 4-5 on page 4-8)
	Transmitter failure	Verify transmitter operation with an 8714 Calibration Standard or replace the electronic board
Noisy Process	Chemical additives upstream of magnetic flowmeter	Complete the Noisy Process Basic procedure. Move injection point downstream of magnetic flowmeter, or move magnetic flowmeter.
	Sludge flows–Mining/Coal/ Sand/Slurries (other slurries with hard particles)	Decrease flow rate below 10 ft/s
	Styrofoam or other insulating particles in process	Complete the Noisy Process Basic procedure; Consult factory
	Electrode coating	Use replaceable electrodes in Rosemount 8705. Use a smaller sensor to increase flow rate above 3 ft/s. Periodically clean sensor.
	Air in line	Move the sensor to another location in the process line to ensure that it is full under all conditions.
	Low conductivity fluids (below 10 microsiemens/cm)	• Trim electrode and coil wires – see “Conduit Cables” on page 2-6 • Keep flow rate below 3 FPS • Integral mount transmitter • Use 8712-0752-1,3 cable • Use N0 approval sensor
Advanced Troubleshooting continued on next page		

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Table 4-4. Advanced Troubleshooting

Symptom	Potential Cause	Corrective Action
Meter output is unstable	Medium to low conductivity fluids (10–25 microsiemens/cm) combined with cable vibration or 60 Hz interference	Eliminate cable vibration: • Integral mount • Move cable to lower vibration run • Tie down cable mechanically • Trim electrode and coil wires • See “Conduit Cables” on page 2-6 • Route cable line away from other equipment powered by 60 Hz • Use 8712-0752-1,3 cable
	Electrode incompatibility	Check the Technical Data Sheet, Magnetic Flowmeter Material Selection Guide (document number 00816-0100-3033), for chemical compatibility with electrode material.
	Improper grounding	Check ground wiring – see “Mount the Transmitter” on page 2-3 for wiring and grounding procedures
	High local magnetic or electric fields	Move magnetic flowmeter (20–25 ft away is usually acceptable)
	Control loop improperly tuned	Check control loop tuning
	Sticky valve (look for periodic oscillation of meter output)	Service valve
	Sensor failure	Perform the sensor Tests A, B, C, and D (See Table 4-5 on page 4-8)
Reading does not appear to be within rated accuracy	Transmitter, control system, or other receiving device not configured properly	Check all configuration variables for the transmitter, sensor, communicator, and/or control system Check these other transmitter settings: Sensor calibration number Units Line size
	Electrode coating	Use bulletnose electrodes in the Rosemount 8705 Sensor. Downsize the sensor to increase the flow rate above 3 ft/s. Periodically clean the sensor
	Air in line	Move the sensor to another location in the process line to ensure that it is full under all conditions
	Flow rate is below 1 ft/s (specification issue)	See the accuracy specification for specific transmitter and sensor
	Insufficient upstream/downstream pipe diameter	Move sensor to location where 5 pipe diameters upstream and 2 pipe diameters downstream is possible
	Cables for multiple magmeters run through same conduit	Run only one conduit cable between each sensor and transmitter
	Auto zero was not performed when the coil drive frequency was changed from 5 Hz to 37.5 Hz	Perform the auto zero function with full pipe and no flow
	Sensor failure—shorted electrode	See Table 4-5 on page 4-8
	Sensor failure—shorted or open coil	See Table 4-5 on page 4-8
	Transmitter failure	Replace the electronics board
	Transmitter wired to correct sensor	Check wiring

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QUICK TROUBLESHOOTING

Step 1: Wiring Errors

The most common magmeter problem is wiring between the sensor and the transmitter in remote mount installations. The signal wire and coil drive wire must be twisted shielded cable: 20 AWG twisted shielded cable for the electrodes and 14 AWG twisted shielded cable for the coils. Ensure that the cable shield is connected at both ends of the electrode and coil drive cables. Signal and coil drive wires must have their own cables. The single conduit that houses both the signal and coil drive cables should not contain any other wires. For more information on proper wiring practices, refer to “Transmitter to Sensor Wiring” on page 2-11.

Step 2: Process Noise

In some circumstances, process conditions rather than the magmeter can cause the meter output to be unstable. Possible solutions for addressing a noisy process situation are given below. When the output attains the desired stability, no further steps are required.

Use the Auto Zero function to initialize the transmitter for use with the 37.5 Hz coil drive mode only. Run this function only with the transmitter and sensor installed in the process. The sensor must be filled with process fluid with zero flow rate. Before running the auto zero function, be sure the coil drive mode is set to 37.5 Hz.

Set the loop to manual if necessary and begin the auto zero procedure. The transmitter completes the procedure automatically in about 90 seconds. A symbol appears in the lower right-hand corner of the display to indicate that the procedure is running.

1. Change the coil drive to 37.5 Hz. Complete the Auto Zero function, if possible (see “Coil Drive Frequency” on page 4-13).
2. Turn on Digital Signal Processing (see “Signal Processing” on page 4-25).
3. Increase the damping (see “Damping” on page 3-17).

If the preceding steps fail to resolve the process noise symptoms, consult your Rosemount sales representative about using a high-signal magnetic flowmeter system.

Step 3: Installed Sensor Tests

If a problem with an installed sensor is identified, Table 4-5 can assist in troubleshooting the sensor. Before performing any of the sensor tests, disconnect or turn off power to the transmitter. To interpret the results, the hazardous location certification for the sensor must be known. Applicable codes for the Rosemount 8705 are N0, N5, and KD. Applicable codes for the Rosemount 8707 are N0 and N5. Applicable codes for the Rosemount 8711 are N0, N5, E5, and KD. Always check the operation of test equipment before each test.

If possible, take all readings from inside the sensor junction box. If the sensor junction box is inaccessible, take measurements as close as possible. Readings taken at the terminals of remote-mount transmitters that are more than 100 feet away from the sensor may provide incorrect or inconclusive information and should be avoided. A sensor circuit diagram is provided in Figure 4-1 on page 4-9.

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Table 4-5. Sensor Test

Test	Sensor Location	Required Equipment	Measuring at Connections	Expected Value	Potential Cause	Corrective Action
A. Sensor Coil	Installed or Uninstalled	Multimeter	1 and 2 = R	$2\Omega \le R \le 18\Omega$	• Open or Shorted Coil	• Remove and replace sensor
B. Shields to Case	Installed or Uninstalled	Multimeter	17 and ⏚ ⏚ and case ground 17 and case ground	$< 0.2\Omega$	• Moisture in terminal block • Leaky electrode • Process behind liner	• Clean terminal block • Remove sensor
C. Coil Shield to Coil	Installed or Uninstalled	Multimeter	1 and ⏚ 2 and ⏚	$\infty\Omega$ (< 1nS) $\infty\Omega$ (< 1nS)	• Process behind liner • Leaky electrode • Moisture in terminal block	• Remove sensor and dry • Clean terminal block • Confirm with sensor coil test
D. Electrode Shield to Electrode	Installed	LCR (Set to Resistance and 120 Hz)	18 and 17 = R_1 19 and 17 = R_2	R_1 and R_2 should be stable NO: $\lvert R_1 - R_2 \rvert \le 300\Omega$ N5, E5, CD, ED: $\lvert R_1 - R_2 \rvert \le 1500\Omega$	• Unstable R_1 or R_2 values confirm coated electrode • Shorted electrode • Electrode not in contact with process • Empty Pipe • Low conductivity • Leaky electrode	• Remove coating from sensor wall • Use bulletnose electrodes • Repeat measurement • Pull sensor, complete test in Table 4-6 and Table 4-7 on page 4-10 out of line.

To test the sensor, a multimeter capable of measuring conductance in nanosiemens is preferred. Nanosiemens is the reciprocal of resistance.

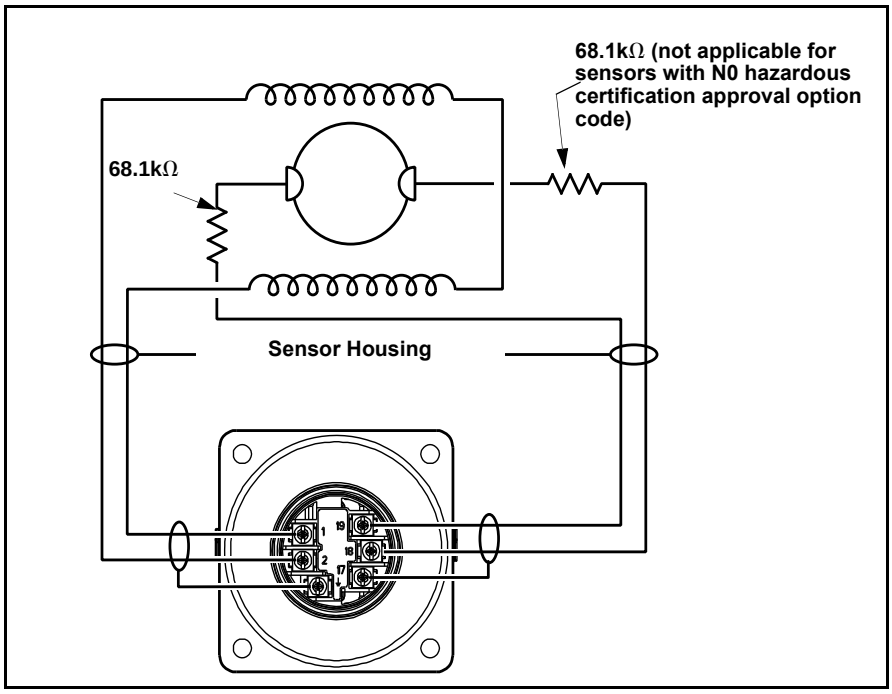
$$1\text{nanosiemens} = \frac{1}{1\text{gigaohm}}$$

or

$$1\text{nanosiemens} = \frac{1}{1 \times 10^{9}\text{ohm}}$$

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Figure 4-1. Sensor Circuit Diagram



Step 4: Uninstalled Sensor Tests

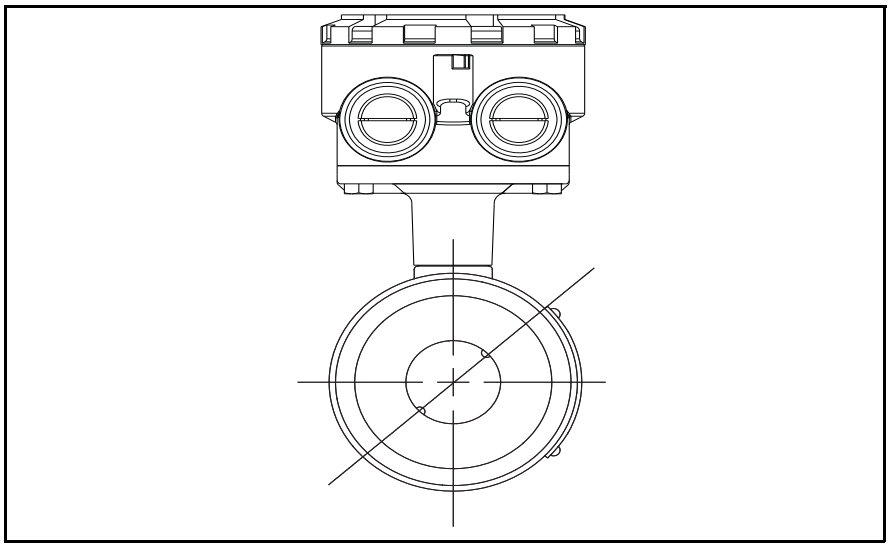
An uninstalled sensor can also be used for sensor troubleshooting. To interpret the results, the hazardous location certification for the sensor must be known. Applicable codes for the Rosemount 8705 are N0, N5, and KD. Applicable codes for the Rosemount 8707 are N0 and N5. Applicable codes for the Rosemount 8711 are N0, N5, E5, and KD.

A sensor circuit diagram is provided in Figure 4-1. Take measurements from the terminal block and on the electrode head inside the sensor. The measurement electrodes, 18 and 19, are on opposite sides in the inside diameter. If applicable, the third grounding electrode is in between the other two electrodes. On Rosemount 8711 sensors, electrode 18 is near the sensor junction box and electrode 19 is near the bottom of the sensor (Figure 4-2). The different sensor models will have slightly different resistance readings. Flanged sensor resistance readings are in Table 4-6 while wafer sensor resistance readings are in Table 4-7.

See “Safety Information” on page 4-1 for complete warning information.

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Figure 4-2. 45° Electrode Plane



To insure accuracy of resistance readings, zero out multimeter by shorting and touching the leads together.

Table 4-6. Uninstalled Rosemount 8705 / 8707 Flanged Sensor Tests

Measuring at Connections	Hazardous Location Certifications	
	N0	N5, KD
18 and Electrode(1)	≤ 275Ω	61kΩ ≤ R ≤ 75kΩ
19 and Electrode(1)	≤ 275Ω	61kΩ ≤ R ≤ 75kΩ
17 and Grounding Electrode	≤ 0.3Ω	≤ 0.3Ω
17 and Ground Symbol	≤ 0.3Ω	≤ 0.3Ω
17 and 18	Open	Open
17 and 19	Open	Open
17 and 1	Open	Open

(1) It is difficult to tell from visual inspection alone which electrode is wired to which number terminal in the terminal block. Measure both electrodes. One electrode should result in an open reading, while the other electrode should be less than 275Ω.

Table 4-7. Uninstalled Rosemount 8711 Wafer Sensor Tests

Measuring at Connections	Hazardous Location Certification	
	N0	N5, E5, CD
18 and Electrode(1)	≤ 0.3Ω	61kΩ ≤ R ≤ 75kΩ
19 and Electrode(2)	≤ 275Ω	61kΩ ≤ R ≤ 75kΩ
17 and Grounding Electrode	≤ 0.3Ω	≤ 0.3Ω
17 and Grounding Symbol	≤ 0.3Ω	≤ 0.3Ω
17 and 18	Open	Open
17 and 19	Open	Open
17 and 1	Open	Open

(1) Measure the electrode closest to the junction box
(2) Measure the electrode farthest away from the junction box.

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Appendix A Reference Data

Rosemount 8700 Series Product Specifications Overview page A-1
E-Series Performance Specifications . . . . . page A-5
High Signal System Performance Specifications . . . . . page A-7
Rosemount Flanged Sensor Specifications . . . . . page A-9
Rosemount 8711 Wafer Sensor Specifications . . . . . page A-13
Rosemount 8721 Sanitary Sensor Specifications . . . . . page A-16
Dimensional Drawings . . . . . page A-20

ROSEMOUNT 8700 SERIES PRODUCT SPECIFICATIONS OVERVIEW

Listed below are tables that outline some of the basic performance, physical, and functional specifications of the Rosemount 8700 Series Magnetic Flowmeter products.

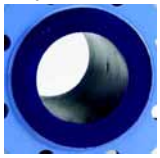
Table A-1. Rosemount 8700 Series Sensor Specifications

	Model	Style	Base Accuracy(1)	Line Sizes	Coil Drive Power	Design Features	Page for Detailed Specifications	Page for Ordering Information
	8705	Flanged	0.25% Standard 0.15% High Accuracy Option	0.5 to 36 in. (15 to 900 mm)	Pulsed DC	Standard Process Design	page A-9	page A-36
	8707	High-Signal (Flanged)	0.5% Standard 0.25% High Accuracy Option	3 to 36 in. (15 to 900 mm)	**High-Signal Pulsed DC**	Superior signal stability for Noisy Applications	page A-9	page A-36
	8711	Wafer	0.25% Standard 0.15% High Accuracy Option	0.15 to 8 in. (4 to 200 mm)	Pulsed DC	**Compact, Light Weight**	page A-13	page A-43
	8721	Hygienic	0.5% Standard 0.25% High Accuracy Option	0.5 to 4 in. (15 to 100 mm)	Pulsed DC	**3-A and EHEDG CIP/SIP**	page A-16	page A-46

(1) For complete accuracy specifications, please refer to the sensor detailed specifications.

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Table A-2. Lining Material Selection

	Liner Material	General Characteristics
	PFA 	• Best chemical resistance
		• Better abrasion resistance than PTFE
		• Best high temperature capabilities
		• -20 to 350 °F (-29 to 177 °C)
	PTFE 	• Highly chemical resistant
		• Excellent high temperature capabilities
		• -20 to 350 °F (-29 to 177 °C)
	ETFE 	• Excellent chemical resistance
		• Better abrasion resistance than PTFE
		• -20 to 300 °F (-29 to 149 °C)
	Polyurethane 	• Excellent abrasion resistance for slurries with small and medium particles
		• Limited chemical resistance
		• 0 to 140 °F (-18 to 60 °C)
		• Typically applied in clean water
	Neoprene 	• Very good abrasion resistance for small and medium particles
		• Better chemical resistance than polyurethane
		• 0 to 176 °F (-18 to 80 °C)
		• Typically applied in water with chemicals, and sea water
	Linatex Rubber 	• Very good abrasion resistance for large particles
		• Limited chemical resistance especially in acids
		• Softer material than polyurethane and neoprene
		• 0 to 158 °F (-18 to 70 °C)
		• Typically applied in mining slurries

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Table A-3. Electrode Selection

Electrode Material	General Characteristics
316L Stainless Steel	• Good corrosion resistance
	• Good abrasion resistance
	• Not recommended for sulfuric or hydrochloric acids
Nickel Alloy 276 (UNS N10276)	• Better corrosion resistance
	• High strength
	• Good in slurry applications
	• Effective in oxidizing fluids
Tantalum	• Excellent corrosion resistance
	• Not recommended for hydroflouric acid, fluorosilic acid, or sodium hydroxide
80% Platinum 20% Iridium	• Best chemical resistance
	• Expensive material
	• not recommended for aquaregia
Titanium	• Better chemical resistance
	• Better abrasion resistance
	• Good for sea water applications
	• Not recommended for hydrofluoric or sulfuric acid
Electrode Type	**General Characteristics**
Standard Measurement	• Lowest cost
	• Good for most applications
Standard Measurement + Grounding (Also see Table A-16 and Table A-5 for grounding options and installation	• Low cost grounding option especially for large line sizes
	• Minimum conductivity of 100 microsiemens/cm
	• Not recommended for electrolysis or galvanic corrosion applications
Bulletnose	• Slightly more expensive
	• Best option for coating processes

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Table A-4. Grounding Options

Grounding Options	General Characteristics
No Grounding Options (grounding straps)	• Acceptable for conductive unlined pipe
	• Grounding straps provided at no cost
Grounding Electrodes	• Same material as measurement electrodes
	• Sufficient grounding option when process fluid conductivity is greater than 100 microsiemens/cm
	• Not recommended in electrolysis applications, galvanic corrosion applications, or applications where the electrodes may coat.
Grounding Rings	• Low conductivity process fluids
	• Cathodic or electrolysis applications that may have stray currents in or around the process
	• Variety of materials for process fluid compatibility
Lining Protectors	• Protect upstream edge of sensor from abrasive fluids
	• Permanently installed on sensor
	• Protect liner material from over torquing of flange bolts
	• Provide ground path and eliminate need for grounding rings or grounding electrode

Table A-5. Grounding Installation

Type of Pipe	Grounding Options No Grounding Option (Straps Only)	Grounding Rings	Grounding Electrode	Lining Protectors
Conductive Unlined Pipe	Acceptable	Not Required	Not Required	Acceptable (Not Required)
Conductive Lined Pipe	Not Acceptable	Acceptable	Acceptable	Acceptable
Non-Conductive Pipe	Not Acceptable	Acceptable	Acceptable	Acceptable

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E-SERIES PERFORMANCE SPECIFICATIONS

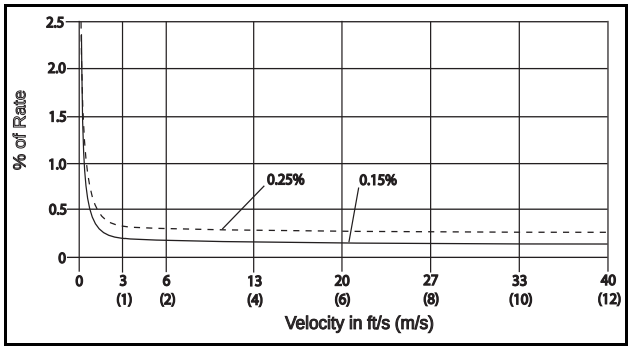
(System specifications are given using the frequency output and with the unit at reference conditions.)

Accuracy

Includes the combined effects of linearity, hysteresis, repeatability, and calibration uncertainty.

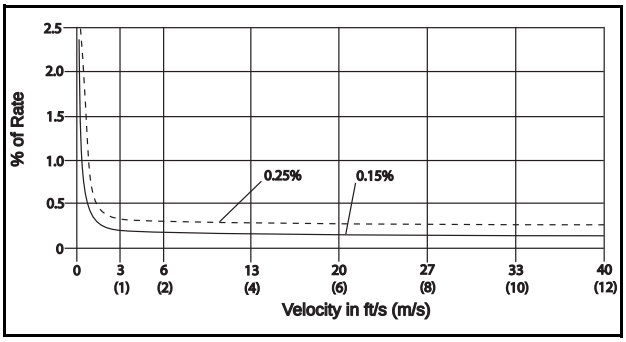
Rosemount E Series with 8705/8707 Sensor:
Standard system accuracy is ±0.25% of rate ±1.0 mm/sec from 0.04 to 6 ft./s (0.01 to 2 m/s); above 6 ft./s (2 m/s), the system has an accuracy of ±0.25% of rate ±1.5 mm/sec.

Optional high accuracy is ±0.15% of rate ±1.0 mm/sec from 0.04 to 13 ft./s (0.01 to 4 m/s); above 13 ft./s (4 m/s), the system has an accuracy of ±0.18% of rate.(1)



Rosemount E-Series with 8711 Sensor:
Standard system accuracy is ±0.25% of rate ±2.0 mm/sec from 0.04 to 39 ft./s (0.01 to 12 m/s).

Optional high accuracy is ±0.15% of rate ±1.0 mm/sec from 0.04 to 13 ft./s (0.01 to 4 m/s); above 13 ft./s (4 m/s), the system has an accuracy of ±0.18% of rate.

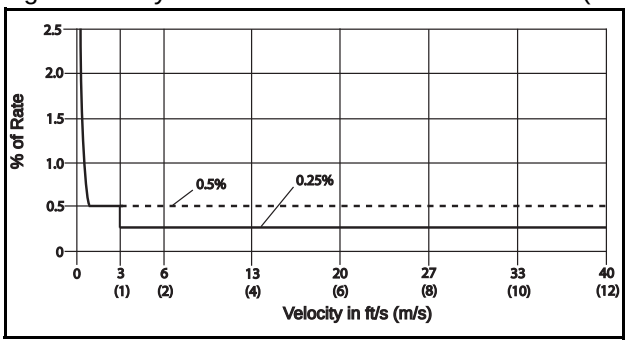


Rosemount E-Series with 8721 Sensor:
Standard system accuracy is ±0.5% of rate from 1 to 39 ft./s (0.3 to 12 m/s); between 0.04 and 1.0 ft./s (0.01 and 0.3 m/s), the system has an accuracy of ±0.005 ft./s (0.0015 m/s).

(1) For Sensor sizes greater than 12 in. (300 mm) the high accuracy is ±0.25% of rate from 3 to 39 ft./sec (1 to 12 m/sec).

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Optional high accuracy is ±0.25% of rate from 3 to 39 ft./s (1 to 12 m/s).



Rosemount E-Series with Legacy 8705/8707 Sensors:
Standard system accuracy is ±0.5% of rate from 1 to 39 ft./s (0.3 to 12 m/s); between 0.04 and 1.0 ft./s (0.01 and 0.3 m/s), the system has an accuracy of ±0.005 ft./s (0.0015 m/s).

Rosemount E-Series with Legacy 8711 Sensors:
Standard system accuracy is ±0.5% of rate from 3 to 39 ft./s (1 to 12 m/s); between 0.04 and 3.0 ft./s (0.01 and 1 m/s), the system has an accuracy of ±0.015 ft./s (0.005 m/s).

Rosemount E-Series with Other Manufacturers' Sensors:
When calibrated in the Rosemount Flow Facility, system accuracies as good as 0.5% of rate can be attained.

There is no accuracy specification for other manufacturers' sensors calibrated in the process line.

Analog Output Effect

Analog output has the same accuracy as frequency output plus an additional ±4μA.

Vibration Effect

IEC 60770-1

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Repeatability

±0.1% of reading

Response Time (Analog Output)

50 ms maximum response time to step change in input

Stability

±0.1% of rate over six months

Ambient Temperature Effect

±0.25% change over operating temperature range

EMC Compliance

EN61326-1: 2006 (Industrial) electromagnetic compatibility (EMC) for process and laboratory apparatus.

HIGH SIGNAL SYSTEM PERFORMANCE SPECIFICATIONS

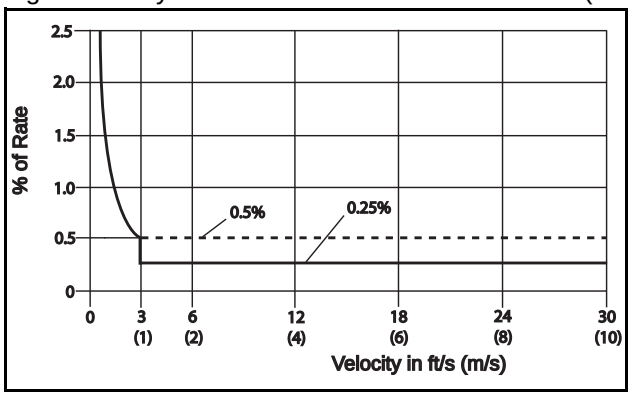
(System specifications are given using the frequency output and with the unit at referenced conditions.)

Accuracy

Includes the combined effects of linearity, hysteresis, repeatability, and calibration uncertainty.

Rosemount High Signal Flowmeter System
System accuracy is ±0.5% of rate from 3 to 30 ft./s (1 to 10 m/s); between 0.04 and 3.0 ft./s (0.01 and 0.3 m/s), the system has an accuracy of ±0.015 ft./s (0.005 m/s).

Optional high accuracy is ±0.25% of rate from 3 to 30 ft./s (1 to 10 m/s).



Analog Output Effect

Analog output has the same accuracy as frequency output plus an additional 0.1% of span.

Vibration Effect

±0.1% of span per SAMA PMC 31.1, Level 2

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Repeatability

±0.1% of reading

Response Time

0.2 seconds maximum response to step change in input

Stability

±0.1% of rate over six months

Ambient Temperature Effect

±1% per 100 °F (37.8 °C)

EMC Compliance

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ROSEMOUNT FLANGED SENSOR SPECIFICATIONS

FLANGED SENSOR FUNCTIONAL SPECIFICATIONS

Service

Conductive liquids and slurries

Line Sizes

1/2–36 in. (15–900 mm) for Rosemount 8705

3–36 in. (80–600 mm) for Rosemount 8707

Interchangeability

Rosemount 8705 Sensors are interchangeable with 8732 and 8712E Transmitters. Rosemount 8707 High-Signal Sensors are interchangeable with 8732, 8712E, and 8712H High-Signal Transmitters. System accuracy is maintained regardless of line size or optional features. Each sensor nameplate has a sixteen-digit calibration number that can be entered into a transmitter through the Local Operator Interface (LOI) or the Field Communicator. In a FOUNDATION fieldbus environment, the 8732E can be configured using the DeltaV™ fieldbus configuration tool or another FOUNDATION fieldbus configuration device. No further calibration is necessary.

Upper Range Limit

39 ft./s (12 m/s)

Process Temperature Limits

PTFE Lining
–20 to 350 °F (–29 to 177 °C)

ETFE Lining
–20 to 300 °F (–29 to 149 °C)

PFA Lining
-20 to 350 °F (-29 to 177 °C)

Polyurethane Lining
0 to 140 °F (–18 to 60 °C)

Neoprene Lining
0 to 176 °F (–18 to 80 °C)

Linatex Lining
0 to 158 °F (–18 to 70 °C)

Ambient Temperature Limits

–30 to 150 °F (–34 to 65 °C)

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Pressure Limits

See Table A-6, Table A-7, and Table A-8.

Vacuum Limits

PTFE Lining

Full vacuum to 350 °F (177 °C) through 4-in. (100 mm) line sizes. Consult factory for vacuum applications with line sizes of 6 inches (150 mm) or larger.

All Other Standard Sensor Lining Materials

Full vacuum to maximum material temperature limits for all available line sizes.

Submergence Protection(1)

IP68. Continuous submergence to 30 ft. (10 m) requires that conduit entries of the sensor remote junction box be properly sealed to prevent water ingress. This requires the user to install sealed IP68 approved cable glands, conduit connections, or conduit plugs. For more details on proper installation techniques for an IP68 / submersible application, reference Rosemount Technical Document 00840-0100-4750 available on www.Rosemount.com.

Conductivity Limits

Process liquid must have a conductivity of 5 microsiemens/cm (5 micromhos/cm) or greater for 8705. Process liquid must have a conductivity of 50 microsiemens/cm (50 micromhos/cm) for 8707 when used with 8712H, 5 microsiemens/cm when used with other transmitters. Excludes the effect of interconnecting cable length in remote mount transmitter installations.

Table A-6. Temperature vs. Pressure Limits(1)

Sensor Temperature vs. Pressure Limits for ASME B16.5 Class Flanges (1/2- to 36-in. line sizes) (2)					
		Pressure			
Flange Material	**Flange Rating**	**@ -20 to 100 °F (-29 to 38 °C)**	**@ 200 °F (93 °C)**	**@ 300 °F (149 °C)**	**@ 350 °F (177 °C)**
Carbon Steel	Class 150	285 psi	260 psi	230 psi	215 psi
	Class 300	740 psi	675 psi	655 psi	645 psi
	Class 600 (3)	1000 psi	800 psi	700 psi	650 psi
	Class 600 (4)	1480 psi	1350 psi	1315 psi	1292 psi
	Class 900	2220 psi	2025 psi	1970 psi	1935 psi
	Class 1500	3705 psi	3375 psi	3280 psi	3225 psi
	Class 2500	6170 psi	5625 psi	5470 psi	5375 psi
304 Stainless Steel	Class 150	275 psi	235 psi	205 psi	190 psi
	Class 300	720 psi	600 psi	530 psi	500 psi
	Class 600 (5)	1000 psi	800 psi	700 psi	650 psi
	Class 600 (6)	1440 psi	1200 psi	1055 psi	997 psi
	Class 900	2160 psi	1800 psi	1585 psi	1497 psi
	Class 1500	3600 psi	3000 psi	2640 psi	2495 psi
	Class 2500	6000 psi	5000 psi	4400 psi	4160 psi

(1) Liner temperature limits must also be considered. Polyurethane, Linatex, and Neoprene have temperature limits of 140 °F (60 °C), 158 °F (70 °C), and 176 °F (80 °C), respectively.
(2) 30- and 36-in. AWWA C207 Table A-7 Class D rated to 150 psi at atmospheric temperature.
(3) Option Code C6
(4) Option Code C7
(5) Option Code S6
(6) Option Code S7

(1) Available for Rosemount 8705 Sensors only.

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Table A-7. Temperature vs. Pressure Limits (1)

Sensor Temperature vs. Pressure Limits for AS2129 Table D and E Flanges (4- to 24-in. line sizes)					
		Pressure			
Flange Material	**Flange Rating**	**@ -200 to 50 °C (-320 to 122 °F)**	**@ 100 °C (212 °F)**	**@ 150 °C (302 °F)**	**@ 200 °C (392 °F)**
Carbon Steel	D	101.6 psi	101.6 psi	101.6 psi	94.3 psi
	E	203.1 psi	203.1 psi	203.1 psi	188.6 psi

(1) Liner temperature limits must also be considered. Polyurethane, Linatex, and Neoprene have temperature limits of 140 °F (60 °C), 158 °F (70 °C), and 176 °F (80 °C), respectively.

Table A-8. Temperature vs. Pressure Limits (1)

Sensor Temperature vs. Pressure Limits for DIN Flanges (15 to 600 mm line sizes)					
		Pressure			
Flange Material	**Flange Rating**	**@ -196 to 50 °C (-320 to 122 °F)**	**@ 100 °C (212 °F)**	**@ 150 °C (302 °F)**	**@ 175 °C (347 °F)**
Carbon Steel	PN 10	10 bar	10 bar	9.7 bar	9.5 bar
	PN 16	16 bar	16 bar	15.6 bar	15.3 bar
	PN 25	25 bar	25 bar	24.4 bar	24.0 bar
	PN 40	40 bar	40 bar	39.1 bar	38.5 bar
304 Stainless Steel	PN 10	9.1 bar	7.5 bar	6.8 bar	6.5 bar
	PN 16	14.7 bar	12.1 bar	11.0 bar	10.6 bar
	PN 25	23 bar	18.9 bar	17.2 bar	16.6 bar
	PN 40	36.8 bar	30.3 bar	27.5 bar	26.5 bar

(1) Liner temperature limits must also be considered. Polyurethane, Linatex, and Neoprene have temperature limits of 140 °F, 158 °F, and 176 °F, respectively.

FLANGED SENSOR PHYSICAL SPECIFICATIONS

Non-Wetted Materials

Sensor
AISI Type 304 SST or Type 316L SST

Flanges
Carbon steel, AISI Type 304/304L SST, or Type 316/316L SST

Housing
Welded steel

Paint
Polyurethane

Process Wetted Materials

Lining
PFA, PTFE, ETFE, polyurethane, neoprene, Linatex

Electrodes
316L SST, Nickel Alloy 276 (UNS N10276), tantalum, 80% platinum-20% iridium, titanium

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Process Connections

ASME B16.5 (ANSI) Class 150, Class 300, Class 600, Class 900, Class 1500, or Class 2500
0.5- to 36-in. (Class 150)

0.5- to 30-in. (Class 300)

0.5- to 24-in. (Class 600)(1)

1- to 12-in. (Class 900)(2)

1.5- to 12-in. (Class 1500)(2)

2- to 12-in. (Class 2500)(2)

AWWA C207 Table 3 Class D
30 and 36 in.

EN 1092 (DIN) PN 10, 16, 25, and 40
PN10: Not available for flange sizes from 15 to 150 mm

PN16: Not available for flange sizes from 15 to 80 mm

PN 25: Not available for flange sizes from 15 to 150 mm

PN40: Available for all flange sizes

AS 2129 Table D and E
0.5- to 36-in.

Electrical Connections

Two 1/2–14 NPT connections with number 8 screw terminals are provided in the terminal enclosure for electrical wiring.

Grounding Electrode

An optional grounding electrode can be installed similarly to the measurement electrodes through the sensor lining on 8705 sensors. It is available in all electrode materials.

Grounding Rings

Optional grounding rings can be installed between the flange and the sensor face on both ends of the sensor. Single ground rings can be installed on either end of the sensor. They have an I.D. slightly larger than the sensor I.D. and an external tab to attach ground wiring. Grounding rings are available in 316L SST, Nickel Alloy 276 (UNS N10276), titanium, and tantalum.

Lining Protectors

Optional lining protectors can be installed between the flange and the sensor face on both ends of the sensor. The leading edge of lining material is protected by the lining protector; lining protectors cannot be removed once they are installed. Lining protectors are available in 316L SST, Nickel Alloy 276 (UNS N10276), and titanium.

(1) For PTFE and ETFE, maximum working pressure is derated to 1000 psig.
(2) For Class 900 and higher flange ratings,.liner selection is limited to resilient liners.

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Dimensions

See Figure A-9.

Weight

See dimensional tables starting with Table A-9 on page A-21.



ROSEMOUNT 8711 WAFER SENSOR SPECIFICATIONS

8711 FUNCTIONAL SPECIFICATIONS

Service

Conductive liquids and slurries

Line Sizes

0.15-in. through 8 -in. (4 through 200 mm)

Interchangeability

Rosemount 8711 Sensors are interchangeable with 8732 and 8712E Transmitters. System accuracy is maintained regardless of line size or optional features. Each sensor nameplate has a sixteen-digit calibration number that can be entered into a transmitter through the Local Operator Interface (LOI) or the Field Communicator. In a digital fieldbus environment, the 8732E can be configured using any compatible digital fieldbus configuration tool. No further calibration is necessary.

Upper Range Limit

39 ft./s (12 m/s)

Process Temperature Limits

ETFE Lining
-20 to 300 °F (–29 to 149 °C) for 0.5- through 8-in. (15–200 mm) line sizes

PTFE Lining
-20 to 350 °F (-29 to 177 °C)

PFA Lining
-20 to 200 °F (-29 to 93 °C)

Ambient Temperature Limits

–30 to 150 °F (–34 to 65 °C)

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Maximum Safe Working Pressure at 100 °F (38 °C)

ETFE Lining
Full vacuum to 740 psi (5.1 MPa) for 0.5- through 8-in. (15 through 200 mm) sensors

PTFE Lining
Full vacuum through 4-in. (100 mm) line sizes. Consult factory for vacuum applications with line sizes of 6 inches (150 mm) or larger.

PFA Lining
Full vacuum to 285 psi (1.96 MPa) for 0.15- and 0.30-in. (4 and 8 mm) sensors

Conductivity Limits

Process liquid must have a conductivity of 5 microsiemens/cm (5 micromhos/cm) or greater for 8711. Excludes the effect of interconnecting cable length in remote mount transmitter installations.

8711 PHYSICAL SPECIFICATIONS

Non-Wetted Materials

Sensor
303 SST (ASTM A582)
CF3M or CF8M (ASTM A351)

Coil Housing
Investment cast steel (ASTM A-27)
ASTM A732 (cast), A519, A513, A53 (pipe), A569, A570 (sheet)

Paint
Polyurethane

Process-Wetted Materials

Lining
ETFE, PTFE, and PFA

Electrodes
316L SST, Nickel Alloy 276 (UNS N10276), tantalum, 80% platinum—20% iridium, titanium

Process Connections

Mounts between these Flange Configurations
ASME B16.5 (ANSI): Class 150, 300

EN 1092 (DIN): PN 10 and 25

BS: 10 Table D, E, and F

Studs, Nuts, and Washers[(1)]
ASME B16.5 (ANSI)

(1) 0.15- and 0.30-in. (4 and 80 mm) sensors mount between $^1/_2$-in. flange.

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0.15- through 1-in. (4 through 25 mm):
316 SST, ASTM A193, Grade B8M, Class 1 threaded mounting studs; ASTM A194, Grade 8M heavy hex nuts; SAE per ANSI B18.2.1, Type A, Series N flat washers.

1.5- through 8-in. (40 through 200 mm):
CS, ASTM A193, Grade B7, Class 1 threaded mounting studs; ASTM A194, Grade 2H heavy hex nuts; SAE per ANSI B18.2.1, Type A, Series N flat washers; all items clear, chromate zinc-plated.

EN 1092 (DIN)

4 through 25 mm (0.15- through 1-in.):
316 SST ASTM A193, Grade B8M Class 1 threaded mounting studs; ASTM A194, Grade 8M, DIN 934 H=D, metric heavy hex nuts; 316 SST, A4, DIN 125 flat washers.

40 through 200 mm (1.5- through 8-in.):
CS, ASTM A193, Grade B7 threaded mounting studs; ASTM A194, Grade 2H, DIN 934 H=D, metric heavy hex nuts; CS, DIN 125 flat washers; all items yellow zinc-plated.

Electrical Connections

Two $^{1}/_{2}$–14 NPT connections with number 8 screw terminals are provided in the terminal enclosure for electrical wiring.

Grounding Electrode

An optional grounding electrode can be installed similarly to the measurement electrodes through the sensor lining. It is available in all electrode materials.

Grounding Rings

Optional grounding rings can be installed between the flange and the sensor face on both ends of the sensor. They have an I.D. slightly smaller than the sensor I.D. and an external tab to attach ground wiring. Grounding rings are available in 316L SST, Nickel Alloy 276 (UNS N10276), titanium, and tantalum.

Dimensions and Weight

See Figure A-8, Figure A-9, and Table 1.

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ROSEMOUNT 8721 SANITARY SENSOR SPECIFICATIONS

8721 FUNCTIONAL SPECIFICATIONS

Service

Conductive liquids and slurries

Line Sizes

1/2 - 4 in. (15–100 mm)

Sensor Compatibility and Interchangeability

The Rosemount 8721 Sensors are interchangeable with Rosemount 8732 and 8712E transmitters. System accuracy is maintained regardless of line size or optional features.

Each sensor nameplate has a sixteen-digit calibration number that can be entered into the transmitter through the Local Operator Interface (LOI) or the Field Communicator. In a digital fieldbus environment, the 8732E can be configured using compatible digital fieldbus configuration tool. No further calibration is necessary.

Conductivity Limits

Process liquid must have a conductivity of 5 microsiemens/cm (5 micromhos/cm) or greater. Excludes the effect of interconnecting cable length in remote mount transmitter installations.

Sensor Coil Resistance

5Ω to 10Ω (line size dependent)

Flow Rate Range

Capable of processing signals from fluids that are traveling between 0.04 and 39 ft./s (0.01 to 12 m/s) for both forward and reverse flow in all sensor sizes. Full scale continuously adjustable between –39 and 39 ft./s (–12 to 12 m/s).

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Sensor Ambient Temperature Limits

14 to 140 °F (–15 to 60 °C)

Process Temperature Limits

PFA Lining
-20 to 350 °F (-29 to 177 °C)

Pressure Limits

Line Size	Max Working Pressure	CE Mark Max. Working Pressure
1/2 (15)	300 psi (20.7 bar)	300 psi (20.7 bar)
1 (25)	300 psi (20.7 bar)	300 psi (20.7 bar)
1 1/2 (40)	300 psi (20.7 bar)	300 psi (20.7 bar)
2 (50)	300 psi (20.7 bar)	300 psi (20.7 bar)
2 1/2 (65)	300 psi (20.7 bar)	240 psi (16.5 bar)
3 (80)	300 psi (20.7 bar)	198 psi (13.7 bar)
4 (100)	210 psi (14.5 bar)	148 psi (10.2 bar)

Vacuum Limits

Full vacuum at maximum lining material temperature; consult factory.

Submergence Protection (Sensor)

IP68. Continuous submergence to 30 ft. (10 m). Requires conduit entries of the sensor remote junction box be properly sealed to prevent water ingress. This requires the use of sealed IP68 approved cable glands, conduit connections, or conduit plugs. For more details on proper installation techniques for an IP 68/submersible application, reference Rosemount Technical Document 00840-0100-4750 available on www.rosemount.com.

8721 PHYSICAL SPECIFICATIONS

Mounting

Integrally mounted transmitters are factory-wired and do not require interconnecting cables. The transmitter can rotate in 90° increments. Remote mounted transmitters require only a single conduit connection to the sensor.

Non-Wetted Materials

Sensor
304 Stainless Steel (wrapper), 304 Stainless Steel (pipe)

Terminal Junction Box
Cast aluminum, polyurethane coated
Optional: 304 Stainless Steel

Paint
Polyurethane

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Weight

Table 1. 8721 Sensor Weight

Line Size	Sensor Only	008721-0350 Tri-Clamp fitting (each)
0.5	4.84 lbs (2.20 kg)	0.58 lbs (0.263 kg)
1.0	4.52 lbs (2.05 kg)	0.68 lbs (0.309 kg)
1.5	5.52 lbs (2.51 kg)	0.88 lbs (0.400 kg)
2.0	6.78 lbs (3.08 kg)	1.30 lbs (0.591 kg)
2.5	8.79 lbs (4.00 kg)	1.66 lbs (0.727 kg)
3.0	13.26 lbs (6.03 kg)	2.22 lbs (1.01 kg)
4.0	21.04 lbs (9.56 kg)	3.28 lbs (1.49 kg)

Aluminum remote junction box
Approximately 1 lb. (0.45 kg)

SST remote junction box
Approximately 2.5 lbs. (1.13 kg)

Process Wetted Materials (Sensor)

Liner
PFA with Ra < 32μ in. (0.81 μm)

Electrodes
316L SST with Ra < 15μ in. (0.38 μm)

Nickel Alloy 276 (UNS N10276) with Ra < 15μ in. (0.38 μm)

80% Platinum-20% Iridium with Ra < 15μ in. (0.38 μm)

Process Connections

The Rosemount 8721 Sanitary Sensor is designed using a standard IDF fitting as the basis for providing a flexible, hygienic interface for a variety of process connections. The Rosemount 8721 Sensor has the threaded or “male” end of the IDF fitting on the ends of the base sensor. The sensor can be directly connected with user supplied IDF fittings and gaskets. If other process connections are needed, the IDF fittings and gaskets can be provided and welded directly into the sanitary process tubing, or can be supplied with adapters to standard Tri-Clamp® process connections. All connections are PED compliant for group 2 fluids.

Tri-Clamp Sanitary Coupling

IDF Sanitary Coupling (screw type)
IDF specification per BS4825 part 4

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ANSI Weld Nipple

DIN 11850 Weld Nipple

DIN 11851 (Imperial and Metric)

DIN 11864-1 form A

DIN 11864-2 form A

SMS 1145

Cherry-Burrell I-Line

Process Connection Material

316L Stainless Steel with Ra < 32µ in. (0.81 µm)

Optional Electropolished Surface Finish with Ra < 15µ in. (0.38 µm)

Process Connection Gasket Material

Silicone

EPDM

Viton

Electrical Connections

Two 1/2–14 NPT connections with number 8 screw terminals are provided in the terminal enclosure for electrical wiring.

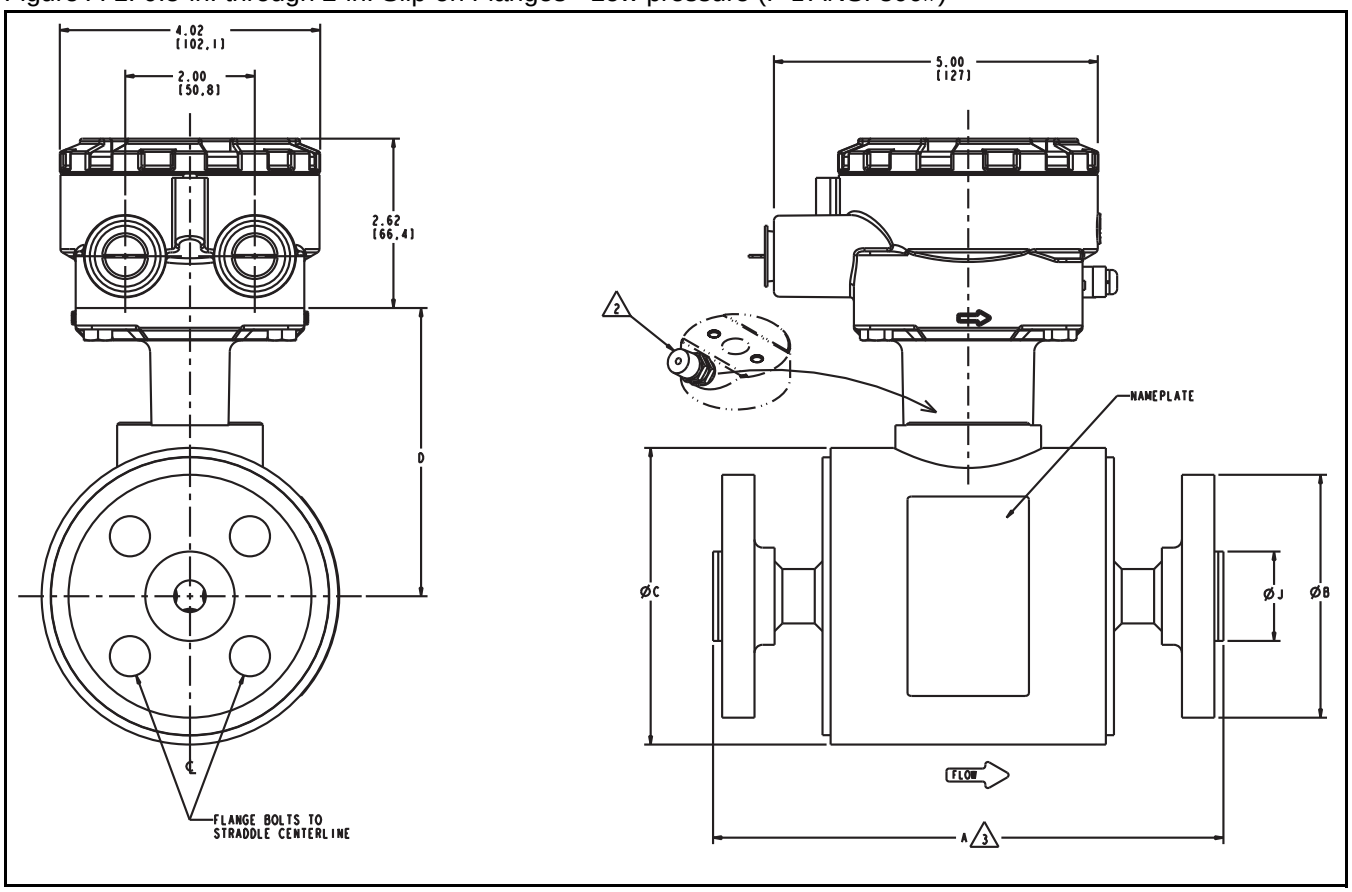
Sensor Dimensions

Refer to Figure A-8.

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DIMENSIONAL DRAWINGS

Figure A-1. 0.5-in. through 2-in. Slip-on Flanges - Low pressure (P ≤ ANSI 300#)



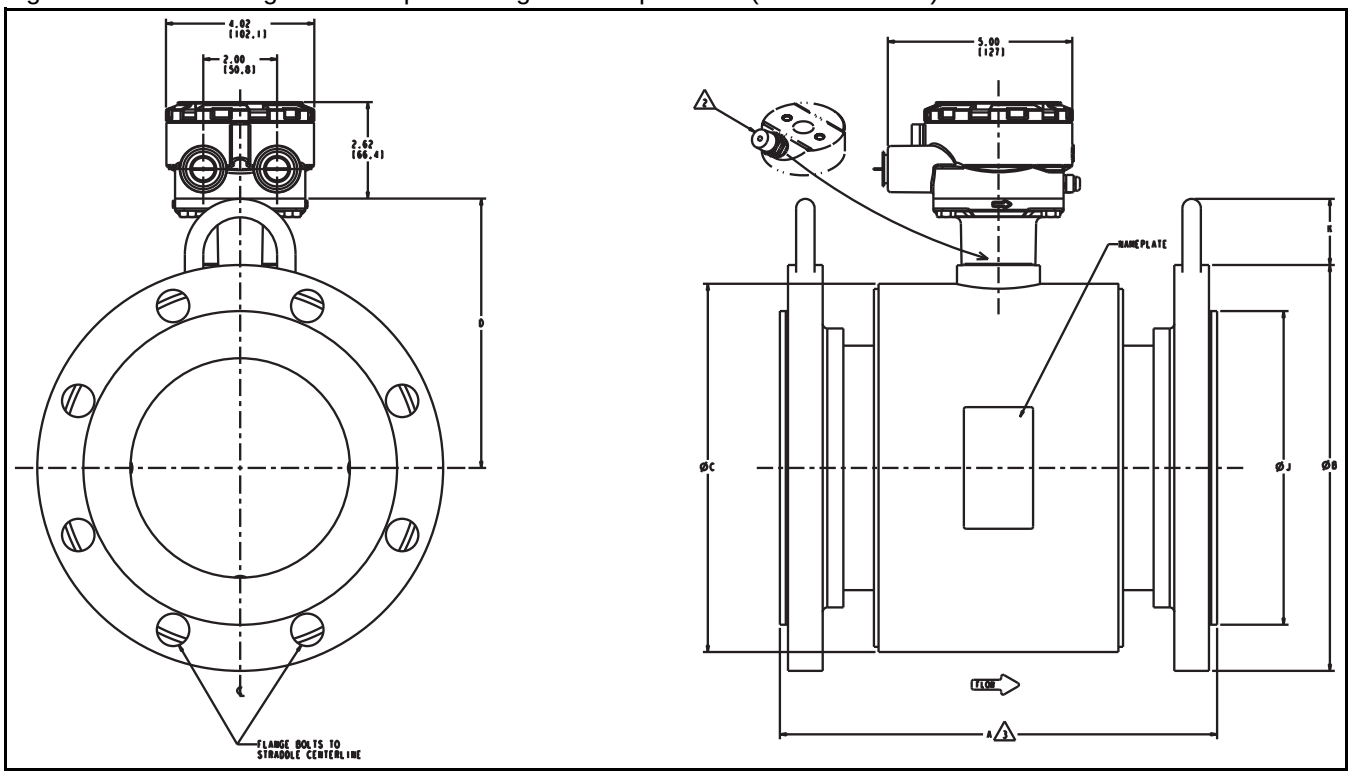
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Table A-9. 0.5-in. through 2-in. Slip-on Flanges (mm)

Size, Description	Overall Length		Body Dia. DIM "C"	CL to UMB DIM "D"	Liner Dia. on Face DIM "J"	Sensor Weight lbs. (kg)
	Dim "A"	Dim "A" Poly				
"0.5 (15) ANSI - 150#, SO / RF	7.88 (200)	7.88 (200)	4.50 (114)	4.41 (112)	1.38 (35)	15 (6.8)
"0.5 (15) ANSI - 300#, SO / RF	7.88 (200)	7.88 (200)	4.50 (114)	4.41 (112)	1.38 (35)	22 (10.0)
"0.5 (15) DIN - PN40, SO / RF	7.88 (200)	7.88 (200)	4.50 (114)	4.41 (112)	1.77 (45)	20 (9.1)
"0.5 (15) AUST. TABLE ""D"", SO / RF	7.88 (200)	7.88 (200)	4.50 (114)	4.41 (112)	1.38 (35)	15 (6.8)
"0.5 (15) AUST. TABLE ""E"", SO / RF	7.88 (200)	7.88 (200)	4.50 (114)	4.41 (112)	1.38 (35)	22 (10.0)
"0.5 (15) JIS - 10K, SO / RF	7.88 (200)	7.88 (200)	4.50 (114)	4.41 (112)	2.01 (51)	10 (4.5)
"0.5 (15) JIS - 20K, SO / RF	7.88 (200)	7.88 (200)	4.50 (114)	4.41 (112)	2.01 (51)	11 (4.7)
"1 (25) ANSI - 150#, SO / RF	7.88 (200)	7.88 (200)	4.50 (114)	4.41 (112)	2.00 (51)	18 (8.2)
"1 (25) ANSI - 300#, SO / RF	7.88 (200)	7.88 (200)	4.50 (114)	4.41 (112)	2.00 (51)	22 (10.0)
"1 (25) DIN - PN40, SO / RF	7.88 (200)	7.88 (200)	4.50 (114)	4.41 (112)	2.88 (73)	20 (9.1)
"1 (25) AUST. TABLE ""D"", SO / RF	7.88 (200)	7.88 (200)	4.50 (114)	4.41 (112)	2.00 (51)	18 (8.2)
"1 (25) AUST. TABLE ""E"", SO / RF	7.88 (200)	7.88 (200)	4.50 (114)	4.41 (112)	2.00 (51)	22 (10.0)
"1 (25) JIS - 10K, SO / RF	7.88 (200)	7.88 (200)	4.50 (114)	4.41 (112)	2.64 (67)	13 (5.9)
"1 (25) JIS - 20K, SO / RF	7.88 (200)	7.88 (200)	4.50 (114)	4.41 (112)	2.64 (67)	14 (6.4)
"1.5 (40) ANSI - 150#, SO / RF	7.87 (200)	7.88 (200)	5.21 (132)	4.82 (122)	2.88 (73)	22 (10.0)
"1.5 (40) ANSI - 300#, SO / RF	7.87 (200)	7.88 (200)	5.21 (132)	4.82 (122)	2.88 (73)	24 (10.9)
"1.5 (40) DIN - PN40, SO / RF	7.87 (200)	7.88 (200)	5.21 (132)	4.82 (122)	3.46 (88)	22 (10.0)
"1.5 (40) AUST. TABLE ""D"", SO / RF	7.87 (200)	7.88 (200)	5.21 (132)	4.82 (122)	2.88 (73)	22 (10.0)
"1.5 (40) AUST. TABLE ""E"", SO / RF	7.87 (200)	7.88 (200)	5.21 (132)	4.82 (122)	2.88 (73)	24 (10.9)
"1.5 (40) JIS - 10K, SO / RF	7.87 (200)	7.88 (200)	5.21 (132)	4.82 (122)	3.19 (81)	17 (7.5)
"1.5 (40) JIS - 20K, SO / RF	7.87 (200)	7.88 (200)	5.21 (132)	4.82 (122)	3.19 (81)	18 (8.2)
"2 (50) ANSI - 150#, SO / RF	7.87 (200)	7.88 (200)	5.21 (132)	4.82 (122)	3.62 (92)	26 (11.8)
"2 (50) ANSI - 300#, SO / RF	7.87 (200)	7.88 (200)	5.21 (132)	4.82 (122)	3.62 (92)	28 (12.7)
"2 (50) DIN - PN40, SO / RF	7.87 (200)	7.88 (200)	5.21 (132)	4.82 (122)	4.02 (102)	26 (11.8)
"2 (50) AUST. TABLE ""D"", SO / RF	7.87 (200)	7.88 (200)	5.21 (132)	4.82 (122)	3.62 (92)	26 (11.8)
"2 (50) AUST. TABLE ""E"", SO / RF	7.87 (200)	7.88 (200)	5.21 (132)	4.82 (122)	3.62 (92)	28 (12.7)
"2 (50) JIS - 10K, SO / RF	7.87 (200)	7.88 (200)	5.21 (132)	4.82 (122)	3.78 (96)	19 (8.7)
"2 (50) JIS - 20K, SO / RF	7.87 (200)	7.88 (200)	5.21 (132)	4.82 (122)	3.78 (96)	19 (8.7)

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Figure A-2. 3-in. through 36-in. Slip-on Flanges - Low pressure (P ≤ ANSI 300#)



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Table A-10. 3-in. through 36-in. Slip-on Flanges (mm)

Size, Description	Overall Length Dim "A" PTFE	Dim "A" Poly	Body Dia. DIM "C"	CL to UMB DIM "D"	Liner Dia. on Face DIM "J"	Lift Ring Height DIM "K"	Sensor Weight lbs. (kg)
"3 (80) ANSI - 150# SO / RF"	7.87 (200)	7.87 (200)	7.21 (183)	5.82 (148)	5.00 (127)	1.70 (43)	42 (19.1)
"3 (80) ANSI - 300# SO / RF"	8.63 (219)	8.63 (219)	7.21 (183)	5.82 (148)	5.00 (127)	1.70 (43)	47 (21.3)
"3 (80) DIN - PN40 SO / RF"	7.87 (200)	7.87 (200)	7.21 (183)	5.82 (148)	5.43 (138)	1.70 (43)	26 (11.8)
"3 (80) AUST. TABLE ""D"" SO / RF"	7.87 (200)	7.87 (200)	7.21 (183)	5.82 (148)	5.00 (127)	1.70 (43)	42 (19.1)
"3 (80) AUST. TABLE ""E"" SO / RF"	7.87 (200)	7.87 (200)	7.21 (183)	5.82 (148)	5.00 (127)	1.70 (43)	47 (21.3)
"3 (80) JIS - 10K SO / RF"	7.87 (200)	7.87 (200)	7.21 (183)	5.82 (148)	4.96 (126)	1.70 (43)	29 (13.2)
"3 (80) JIS - 20K SO / RF"	7.87 (200)	7.87 (200)	7.21 (183)	5.82 (148)	5.20 (132)	1.70 (43)	35 (16.0)
"4 (100) ANSI - 150# SO / RF"	9.84 (250)	9.84 (250)	7.91 (201)	6.17 (157)	6.19 (157)	1.70 (43)	57 (25.9)
"4 (100) ANSI - 300# SO / RF"	10.88 (276)	10.87 (276)	7.91 (201)	6.17 (157)	6.19 (157)	1.70 (43)	65 (29.5)
"4 (100) DIN - PN16 SO / RF"	9.84 (250)	9.84 (250)	7.91 (201)	6.17 (157)	6.22 (158)	1.70 (43)	48 (21.8)
"4 (100) DIN - PN40 SO / RF"	9.84 (250)	9.84 (250)	7.91 (201)	6.17 (157)	6.38 (162)	1.70 (43)	65 (29.5)
"4 (100) AUST. TABLE ""D"" SO / RF"	9.84 (250)	9.84 (250)	7.91 (201)	6.17 (157)	6.19 (157)	1.70 (43)	57 (25.9)
"4 (100) AUST. TABLE ""E"" SO / RF"	9.84 (250)	9.84 (250)	7.91 (201)	6.17 (157)	6.19 (157)	1.70 (43)	65 (29.5)
"4 (100) JIS - 10K SO / RF"	9.84 (250)	9.84 (250)	7.91 (201)	6.17 (157)	5.95 (151)	1.70 (43)	36 (16.4)
"4 (100) JIS - 20K SO / RF"	9.84 (250)	9.84 (250)	7.91 (201)	6.17 (157)	6.30 (160)	1.70 (43)	45 (20.6)
"6 (150) ANSI - 150# SO / RF"	11.81 (300)	11.81 (300)	9.98 (253)	7.30 (185)	8.50 (216)	1.70 (43)	71 (32.2)
"6 (150) ANSI - 300# SO / RF"	13.06 (332)	13.06 (332)	9.98 (253)	7.30 (185)	8.50 (216)	1.70 (43)	93 (42.2)
"6 (150) DIN - PN16 SO / RF"	11.81 (300)	11.81 (300)	9.98 (253)	7.30 (185)	8.35 (212)	1.70 (43)	81 (36.7)
"6 (150) DIN - PN25 SO / RF"	11.81 (300)	11.81 (300)	9.98 (253)	7.30 (185)	8.58 (218)	1.70 (43)	87 (39.6)
"6 (150) DIN - PN40 SO / RF"	13.06 (332)	13.06 (332)	9.98 (253)	7.30 (185)	8.58 (218)	1.70 (43)	93 (42.2)
"6 (150) AUST. TABLE ""D"" SO / RF"	11.81 (300)	11.81 (300)	9.98 (253)	7.30 (185)	8.50 (216)	1.70 (43)	71 (32.2)
"6 (150) AUST. TABLE ""E"" SO / RF"	11.81 (300)	11.81 (300)	9.98 (253)	7.30 (185)	8.50 (216)	1.70 (43)	93 (42.2)
"6 (150) JIS - 10K SO / RF"	11.81 (300)	11.81 (300)	9.98 (253)	7.30 (185)	8.35 (212)	1.70 (43)	66 (30.0)
"6 (150) JIS - 20K SO / RF"	11.81 (300)	11.81 (300)	9.98 (253)	7.30 (185)	9.06 (230)	1.70 (43)	85 (38.7)
"8 (200) ANSI - 150# SO / RF"	13.78 (350)	13.78 (350)	11.92 (303)	8.27 (210)	10.62 (270)	1.70 (43)	145 (65.8)
"8 (200) ANSI - 300# SO / RF"	15.60 (396)	15.60 (396)	11.92 (303)	8.27 (210)	10.62 (270)	1.70 (43)	162 (73.5)
"8 (200) DIN - PN10 SO / RF"	13.78 (350)	13.78 (350)	11.92 (303)	8.27 (210)	10.55 (268)	1.70 (43)	110 (49.9)
"8 (200) DIN - PN16 SO / RF"	13.78 (350)	13.78 (350)	11.92 (303)	8.27 (210)	10.55 (268)	1.70 (43)	110 (49.9)
"8 (200) DIN - PN25 SO / RF"	13.78 (350)	13.78 (350)	11.92 (303)	8.27 (210)	10.94 (278)	1.70 (43)	162 (73.5)
"8 (200) DIN - PN40 SO / RF"	15.60 (396)	15.60 (396)	11.92 (303)	8.27 (210)	11.22 (285)	1.70 (43)	162 (73.5)
"8 (200) AUST. TABLE ""D"" SO / RF"	13.78 (350)	13.78 (350)	11.92 (303)	8.27 (210)	10.62 (270)	1.70 (43)	145 (65.8)
"8 (200) AUST. TABLE ""E"" SO / RF"	13.78 (350)	13.78 (350)	11.92 (303)	8.27 (210)	10.62 (270)	1.70 (43)	162 (73.5)
"8 (200) JIS - 10K SO / RF"	13.78 (350)	13.78 (350)	11.92 (303)	8.27 (210)	10.32 (262)	1.70 (43)	82 (37.3)
"8 (200) JIS - 20K SO / RF"	15.60 (396)	15.60 (396)	11.92 (303)	8.27 (210)	10.83 (275)	1.70 (43)	137 (62.3)
"10 (250) ANSI - 150# SO / RF"	15.00 (381)	14.76 (376)	14.64 (372)	9.69 (246)	12.75 (324)	2.00 (51)	195 (88.5)
"10 (250) ANSI - 300# SO / RF"	17.13 (435)	16.89 (430)	14.64 (372)	9.69 (246)	12.75 (324)	2.00 (51)	300 (99.8)
"10 (250) DIN - PN10 SO / RF"	15.00 (381)	14.76 (376)	14.64 (372)	9.69 (246)	12.60 (320)	2.00 (51)	220 (99.8)
"10 (250) DIN - PN16 SO / RF"	15.00 (381)	14.76 (376)	14.64 (372)	9.69 (246)	12.60 (320)	2.00 (51)	220 (99.8)
"10 (250) DIN - PN25 SO / RF"	15.00 (381)	14.76 (376)	14.64 (372)	9.69 (246)	13.19 (335)	2.00 (51)	220 (99.8)
"10 (250) DIN - PN40 SO / RF"	17.13 (435)	16.89 (430)	14.64 (372)	9.69 (246)	13.58 (345)	2.00 (51)	300 (99.8)
"10 (250) AUST. TABLE ""D"" SO / RF"	15.00 (381)	14.76 (376)	14.64 (372)	9.69 (246)	12.75 (324)	2.00 (51)	195 (88.5)
"10 (250) AUST. TABLE ""E"" SO / RF"	15.00 (381)	14.76 (376)	14.64 (372)	9.69 (246)	12.75 (324)	2.00 (51)	300 (99.8)
"12 (300) ANSI - 150# SO / RF"	18.00 (457)	17.76 (452)	16.80 (427)	10.77 (274)	15.00 (381)	2.00 (51)	330 (149.7)
"12 (300) ANSI - 300# SO / RF"	20.14 (512)	19.89 (506)	16.80 (427)	10.77 (274)	15.00 (381)	2.00 (51)	435 (197.3)
"12 (300) DIN - PN10 SO / RF"	18.00 (457)	17.76 (452)	16.80 (427)	10.77 (274)	14.57 (370)	2.00 (51)	330 (149.7)
"12 (300) DIN - PN16 SO / RF"	18.00 (457)	17.76 (452)	16.80 (427)	10.77 (274)	14.88 (378)	2.00 (51)	330 (149.7)
"12 (300) DIN - PN25 SO / RF"	18.00 (457)	17.76 (452)	16.80 (427)	10.77 (274)	15.55 (395)	2.00 (51)	330 (149.7)
"12 (300) DIN - PN40 SO / RF"	20.14 (512)	19.89 (506)	16.80 (427)	10.77 (274)	16.14 (410)	2.00 (51)	435 (197.3)
"12 (300) AUST. TABLE ""D"" SO / RF"	18.00 (457)	17.76 (452)	16.80 (427)	10.77 (274)	15.00 (381)	2.00 (51)	330 (149.7)
"12 (300) AUST. TABLE ""E"" SO / RF"	18.00 (457)	17.76 (452)	16.80 (427)	10.77 (274)	15.00 (381)	2.00 (51)	435 (197.3)

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Table A-11. 14-in. through 36-in. with Slip-On Flanges (mm)

Size, Description	Overall Length Dim. "A" PTFE	Overall Length Dim. "A" Poly	Body Dim. "C"	CL to UMB Dim. "D"	Liner on Face Dim. "J"	Lift Ring Height Dim. "K"	Sensor Weight (lbs.)
"14 (350) ANSI - 150# SO / RF"	20.91 (531)	20.83 (529)	18.92 (481)	11.83 (300)	16.25 (413)	2.00 (51)	380 (172.4)
"14 (350) ANSI - 300# SO / RF"	23.16 (588)	23.08 (586)	18.92 (481)	11.83 (300)	16.25 (413)	2.00 (51)	573 (259.9)
"14 (350) DIN - PN10 SO / RF"	20.91 (531)	20.83 (529)	18.92 (481)	11.83 (300)	16.93 (430)	2.00 (51)	370 (167.8)
"14 (350) DIN - PN16 SO / RF"	20.91 (531)	20.83 (529)	18.92 (481)	11.83 (300)	17.24 (438)	2.00 (51)	370 (167.8)
"14 (350) DIN - PN25 SO / RF"	23.16 (588)	23.08 (586)	18.92 (481)	11.83 (300)	17.72 (450)	2.00 (51)	370 (167.8)
"14 (350) DIN - PN40 SO / RF"	23.16 (588)	23.08 (586)	18.92 (481)	11.83 (300)	18.31 (465)	2.00 (51)	573 (259.9)
"14 (350) AUST. TABLE ""D"" SO / RF"	20.91 (531)	20.83 (529)	18.92 (481)	11.83 (300)	16.25 (413)	2.00 (51)	380 (172.4)
"14 (350) AUST. TABLE ""E"" SO / RF"	20.91 (531)	20.83 (529)	18.92 (481)	11.83 (300)	16.25 (413)	2.00 (51)	573 (259.9)
"16 (400) ANSI - 150# SO / RF"	23.88 (607)	23.80 (607)	20.94 (532)	12.84 (326)	18.50 (470)	3.13 (80)	470 (213.2)
"16 (400) ANSI - 300# SO / RF"	26.13 (664)	26.05 (664)	20.94 (532)	12.84 (326)	18.50 (470)	3.13 (80)	755 (213.2)
"16 (400) DIN - PN10 SO / RF"	23.88 (607)	23.80 (607)	20.94 (532)	12.84 (326)	18.98 (482)	3.13 (80)	500 (213.2)
"16 (400) DIN - PN16 SO / RF"	23.88 (607)	23.80 (607)	20.94 (532)	12.84 (326)	19.29 (490)	3.13 (80)	500 (213.2)
"16 (400) DIN - PN25 SO / RF"	26.13 (664)	26.05 (664)	20.94 (532)	12.84 (326)	19.88 (505)	3.13 (80)	500 (213.2)
"16 (400) DIN - PN40 SO / RF"	26.13 (664)	26.05 (664)	20.94 (532)	12.84 (326)	21.06 (535)	3.13 (80)	755 (213.2)
"16 (400) AUST. TABLE ""D"" SO / RF"	23.88 (607)	23.80 (607)	20.94 (532)	12.84 (326)	18.50 (470)	3.13 (80)	470 (213.2)
"16 (400) AUST. TABLE ""E"" SO / RF"	23.88 (607)	23.80 (607)	20.94 (532)	12.84 (326)	18.50 (470)	3.13 (80)	755 (213.2)
"18 (450) ANSI - 150# SO / RF"	26.85 (682)	26.77 (680)	23.46 (596)	14.10 (358)	21.00 (533)	3.13 (80)	592 (268.5)
"18 (450) ANSI - 300# SO / RF"	29.97 (761)	29.89 (759)	23.46 (596)	14.10 (358)	21.00 (533)	3.13 (80)	1010 (458.1)
"18 (450) DIN - PN10 SO / RF"	26.85 (682)	26.72 (679)	23.46 (596)	14.10 (358)	20.94 (532)	3.13 (80)	522 (236.8)
"18 (450) DIN - PN16 SO / RF"	26.85 (682)	26.72 (679)	23.46 (596)	14.10 (358)	21.65 (550)	3.13 (80)	595 (269.9)
"18 (450) DIN - PN25 SO / RF"	29.97 (761)	29.89 (759)	23.46 (596)	14.10 (358)	21.85 (555)	3.13 (80)	693 (314.3)
"18 (450) DIN - PN40 SO / RF"	29.97 (761)	29.89 (759)	23.46 (596)	14.10 (358)	22.05 (560)	3.13 (80)	915 (415.0)
"18 (450) AUST. TABLE ""D"" SO / RF"	26.85 (682)	26.77 (680)	23.46 (596)	14.10 (358)	21.00 (533)	3.13 (80)	592 (268.5)
"18 (450) AUST. TABLE ""E"" SO / RF"	26.85 (682)	26.77 (680)	23.46 (596)	14.10 (358)	21.00 (533)	3.13 (80)	1010 (458.1)
"20 (500) ANSI - 150# SO / RF"	29.78 (756)	29.70 (754)	25.48 (647)	15.11 (384)	23.00 (584)	3.13 (80)	680 (308.4)
"20 (500) ANSI - 300# SO / RF"	33.04 (839)	32.96 (837)	25.48 (647)	15.11 (384)	23.00 (584)	3.13 (80)	1180 (535.2)
"20 (500) DIN - PN10 SO / RF"	29.78 (756)	29.70 (754)	25.48 (647)	15.11 (384)	23.03 (585)	3.13 (80)	680 (535.2)
"20 (500) DIN - PN16 SO / RF"	29.78 (756)	29.70 (754)	25.48 (647)	15.11 (384)	24.02 (610)	3.13 (80)	680 (535.2)
"20 (500) DIN - PN25 SO / RF"	33.04 (839)	32.96 (837)	25.48 (647)	15.11 (384)	24.21 (615)	3.13 (80)	680 (535.2)
"20 (500) DIN - PN40 SO / RF"	33.04 (839)	32.96 (837)	25.48 (647)	15.11 (384)	24.21 (615)	3.13 (80)	1180 (535.2)
"20 (500) AUST. TABLE ""D"" SO / RF"	29.78 (756)	29.70 (754)	25.48 (647)	15.11 (384)	23.00 (584)	3.13 (80)	680 (535.2)
"20 (500) AUST. TABLE ""E"" SO / RF"	29.78 (756)	29.70 (754)	25.48 (647)	15.11 (384)	23.00 (584)	3.13 (80)	1180 (535.2)
"24 (600) ANSI - 150# SO / RF"	35.75 (908)	35.67 (906)	30.03 (763)	17.39 (442)	27.25 (692)	3.13 (80)	1020 (462.7)
"24 (600) ANSI - 300# SO / RF"	39.38 (1000)	39.30 (998)	30.03 (763)	17.39 (442)	27.25 (692)	3.13 (80)	1865 (845.9)
"24 (600) DIN - PN10 SO / RF"	35.75 (908)	35.67 (906)	30.03 (763)	17.39 (442)	26.97 (685)	3.13 (80)	1000 (453.6)
"24 (600) DIN - PN16 SO / RF"	35.75 (908)	35.67 (906)	30.03 (763)	17.39 (442)	28.54 (725)	3.13 (80)	1000 (453.6)
"24 (600) DIN - PN25 SO / RF"	39.38 (1000)	39.30 (998)	30.03 (763)	17.39 (442)	28.35 (720)	3.13 (80)	1000 (453.6)
"24 (600) DIN - PN40 SO / RF"	39.38 (1000)	39.30 (998)	30.03 (763)	17.39 (442)	28.94 (735)	3.13 (80)	1615 (734.2)
"24 (600) AUST. TABLE ""D"" SO / RF"	35.75 (908)	35.67 (906)	30.03 (763)	17.39 (442)	27.25 (692)	3.13 (80)	1020 (462.7)
"24 (600) AUST. TABLE ""E"" SO / RF"	35.75 (908)	35.67 (906)	30.03 (763)	17.39 (442)	27.25 (692)	3.13 (80)	1865 (845.9)
"30 (750) AWWA CLASS D SO / RF"	37.00 (940)	36.93 (938)	35.50 (902)	20.13 (511)	33.75 (857)	3.13 (80)	1400 (635.0)
"30 (750) MSS SP44 - 150# SO / RF"	41.56 (1056)	41.48 (1054)	35.50 (902)	20.13 (511)	33.75 (857)	3.13 (80)	1782 (808.3)
"30 (750) MSS SP44 - 300# SO / RF"	47.25 (1200)	47.17 (1198)	35.50 (902)	20.13 (511)	33.75 (857)	3.13 (80)	2610 (1183.9)
"30 (750) AUST. TABLE ""D"" SO / RF"	37.00 (940)	36.93 (938)	35.50 (902)	20.13 (511)	34.96 (888)	3.13 (80)	1530 (694.0)
"30 (750) AUST. TABLE ""E"" SO / RF"	41.56 (1056)	41.48 (1054)	35.50 (902)	20.13 (511)	34.84 (885)	3.13 (80)	1663 (754.3)
"36 (900) AWWA CLASS D SO / RF"	40.63 (1032)	40.55 (1030)	43.37 (1102)	24.00 (1022)	40.25 (1022)	3.13 (80)	1975 (895.8)
"36 (900) MSS SP44 - 150# SO / RF"	47.25 (1200)	47.17 (1198)	43.37 (1102)	24.00 (1022)	40.25 (1022)	3.13 (80)	2777 (1259.6)
"36 (900) AUST. TABLE ""D"" SO / RF"	40.63 (1032)	40.55 (1030)	43.37 (1102)	24.00 (1022)	41.34 (1050)	3.13 (80)	2213 (1003.8)
"36 (900) AUST. TABLE ""E"" SO / RF"	47.25 (1200)	47.17 (1198)	43.37 (1102)	24.00 (1022)	41.34 (1050)	3.13 (80)	2437 (1105.4)

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Figure A-3. 0.5-in. through 36-in. with W3 Option

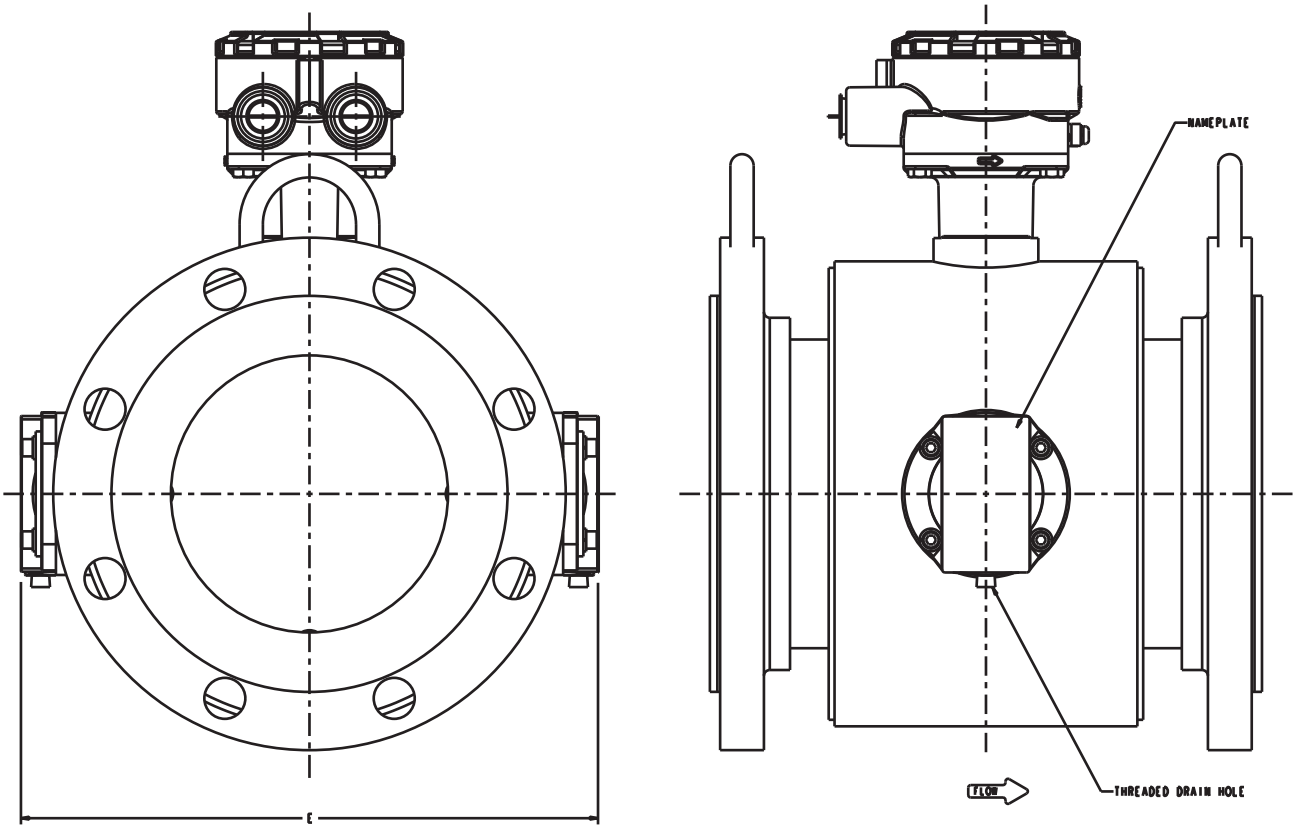


Table A-12. Body Width with Electrode Access (W3)

Size -- in (mm) All Flanges	Body Width with W3 DIM "E" (in.)	Body Width with W3 DIM "E" (mm)
0.5 (15)	6.22	158
1 (25)	6.68	170
1.5 (40)	7.47	190
2 (50)	7.47	190
3 (80)	9.45	240
4 (100)	10.15	258
6 (150)	12.34	313
8 (200)	14.28	363
10 (250)	17.00	432
12 (300)	19.15	486
14 (350)	21.28	541
16 (400)	23.30	592
18 (450)	25.82	656
20 (500)	27.84	707
24 (600)	32.39	823
30 (750)	38.04	966
36 (900)	45.91	1166

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Figure A-4. Lining Protector / Grounding Ring Assembly

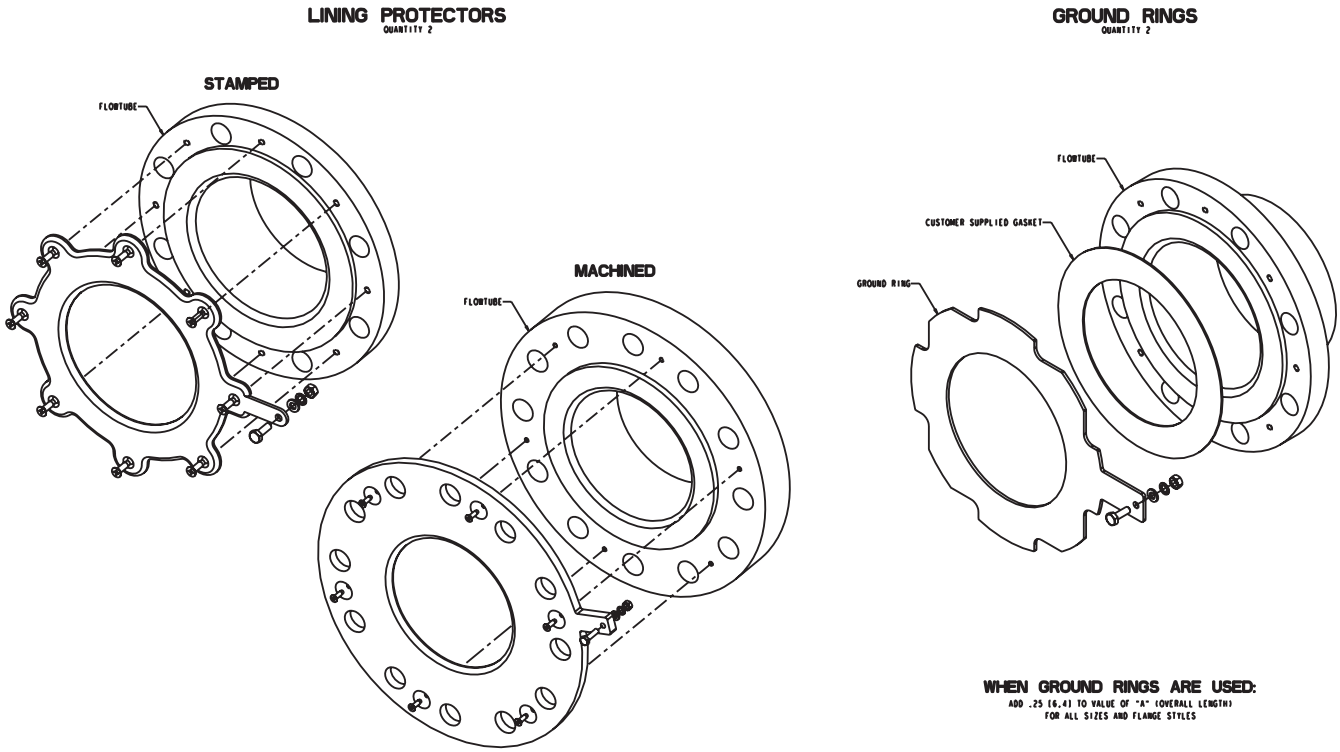
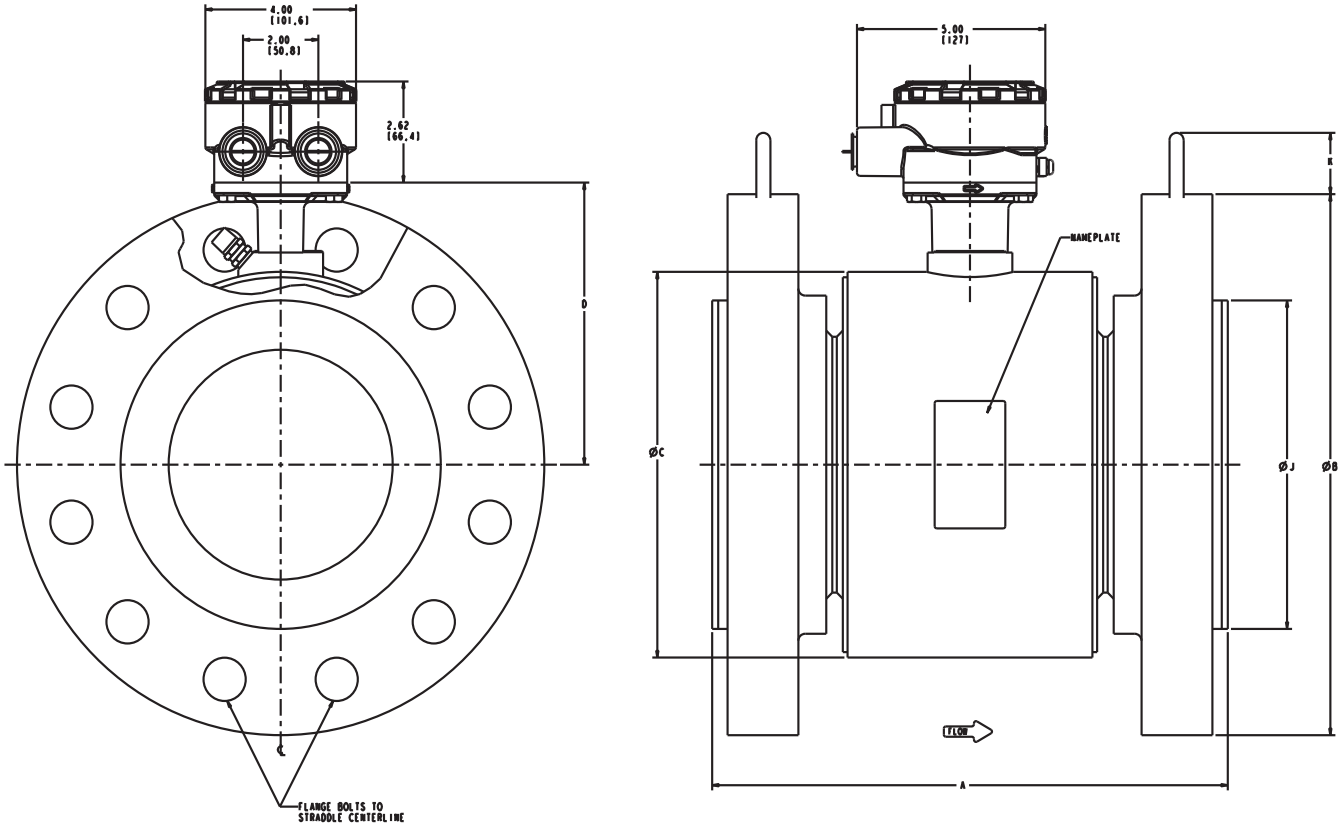


Table A-13. When Liner Protectors Are Used

Flange Style	Sensor Size	Add This Value to “A” (Overall Length)
ANSI	0.5-in. through 10-in.	.25 (6,4)
	12-in. through 24-in.	.60 (15,2)
	30-in.	.75 (19)
	36-in.	1.0 (25,4)
DIN	0.5-in. through 8-in.	.25 (6,4)
	10-in.	.75 (19)
	12-in.	1.0 (25,4)
	14-in. through 24-in.	.60 (15,2)
	30-in.	.75 (19)
	36-in.	1.0 (25,4)

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Figure A-5. 0.5-in. to 24-in. with slip-on flanges - High Pressure Meters (ANSI 600# - ANSI 900#)



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Table A-14. 0.5-in. through 24-in. with Slip-on Flanges (mm) High-pressure (P≥600#)

Size, Description	Overall Length DIM "A" PTFE	DIM "A" Poly	Body DIM "C"	CL to UMB DIM "D"	Liner on Face DIM "J"	Lift Ring Height DIM "K"	Sensor Weight lbs. (kg)
"0.5 (15) ANSI - 600# DERAT. SO / RF"	8.38 (213)	8.38 (213)	4.50 (114)	4.41 (112)	1.38 (35)		15 (6.8)
"1 (25) ANSI - 600# DERAT. SO / RF"	8.67 (220)	8.67 (220)	4.50 (114)	4.41 (112)	2.00 (51)		24 (10.9)
"1 (25) ANSI - 600# FULL SO / RF"		8.56 (217)	4.50 (114)	4.41 (112)	2.00 (51)		24 (10.9)
"1 (25) ANSI - 900# SO / RF"		9.68 (246)	4.50 (114)	4.41 (112)	2.00 (51)	1.70 (43)	30 (13.6)
"1.5 (40) ANSI - 600# DERAT. SO / RF"	8.63 (219)	8.63 (219)	5.21 (132)	4.82 (122)	2.88 (73)		22 (10.0)
"1.5 (40) ANSI - 600# FULL SO / RF"		8.54 (217)	5.21 (132)	4.82 (122)	2.88 (73)		22 (10.0)
"1.5 (40) ANSI - 900# SO / RF"		9.52 (242)	5.21 (132)	4.82 (122)	2.88 (73)	1.70 (43)	42 (19.1)
"2 (50) ANSI - 600# DERAT. SO / RF"	8.78 (223)	8.78 (223)	5.21 (132)	4.82 (122)	3.62 (92)		30 (13.6)
"2 (50) ANSI - 600# FULL SO / RF"		8.66 (220)	5.21 (132)	4.82 (122)	3.62 (92)		30 (13.6)
"2 (50) ANSI - 900# SO / RF"		10.28 (261)	5.21 (132)	4.82 (122)	3.62 (92)	1.70 (43)	63 (28.6)
"3 (80) ANSI - 600# DERAT. SO / RF"	12.40 (315)	12.40 (315)	7.21 (183)	5.82 (148)	5.00 (127)	1.70 (43)	52 (23.6)
"3 (80) ANSI - 600# FULL SO / RF"		12.22 (310)	7.21 (183)	5.82 (148)	5.00 (127)	1.70 (43)	52 (23.6)
"3 (80) ANSI - 900# SO / RF"		12.82 (326)	7.21 (183)	5.82 (148)	5.00 (127)	1.70 (43)	89 (40.4)
"4 (100) ANSI - 600# DERAT. SO / RF"	12.83 (326)	12.83 (326)	7.91 (201)	6.17 (157)	6.19 (157)	1.70 (43)	75 (34.0)
"4 (100) ANSI - 600# FULL SO / RF"		12.65 (321)	7.91 (201)	6.17 (157)	6.19 (157)	1.70 (43)	75 (34.0)
"4 (100) ANSI - 900# SO / RF"		13.89 (353)	7.91 (201)	6.17 (157)	6.19 (157)	2.00 (51)	138 (62.6)
"6 (150) ANSI - 600# DERAT. SO / RF"	14.23 (361)	14.21 (361)	9.98 (253)	7.30 (185)	8.50 (216)	1.70 (43)	120 (54.4)
"6 (150) ANSI - 600# FULL SO / RF"		14.01 (356)	9.98 (253)	7.30 (185)	8.50 (216)	1.70 (43)	120 (54.4)
"6 (150) ANSI - 900# SO / RF"		17.58 (447)	9.98 (253)	7.30 (185)	8.50 (216)	2.00 (51)	274 (124.3)
"8 (200) ANSI - 600# DERAT. SO / RF"	16.72 (425)	16.69 (424)	11.92 (303)	8.27 (210)	10.62 (270)	1.70 (43)	200 (90.7)
"8 (200) ANSI - 600# FULL SO / RF"		16.49 (419)	11.92 (303)	8.27 (210)	10.62 (270)	1.70 (43)	200 (90.7)
"8 (200) ANSI - 900# SO / RF"		20.61 (523)	11.92 (303)	8.27 (210)	10.62 (270)	3.13 (80)	499 (226.3)
"10 (250) ANSI - 600# DERAT. SO / RF"	19.54 (496)	19.30 (490)	14.64 (372)	9.69 (246)	12.75 (324)	2.00 (51)	455 (206.4)
"10 (250) ANSI - 600# FULL SO / RF"		18.75 (476)	14.64 (372)	9.69 (246)	12.75 (324)	2.00 (51)	455 (206.4)
"10 (250) ANSI - 900# SO / RF"		21.57 (548)	14.64 (372)	9.69 (246)	12.75 (324)	3.13 (80)	707 (320.7)
"12 (300) ANSI - 600# FULL SO / RF"		21.80 (554)	16.80 (427)	10.77 (274)	15.00 (381)	2.00 (51)	570 (258.5)
"12 (300) ANSI - 900# SO / RF"		23.49 (597)	16.80 (427)	10.77 (274)	15.00 (381)	3.13 (80)	1008 (457.2)
"14 (350) ANSI - 600# FULL SO / RF"		25.44 (646)	18.92 (481)	11.83 (300)	16.25 (413)	2.00 (51)	775 (352.3)
"16 (400) ANSI - 600# FULL SO / RF"		28.94 (735)	20.94 (532)	12.84 (326)	18.50 (470)	3.13 (80)	1104 (501.8)
"18 (450) ANSI - 600# FULL SO / RF"		32.42 (823)	23.46 (596)	14.10 (358)	21.00 (533)	3.13 (80)	1410 (641.0)
"20 (500) ANSI - 600# FULL SO / RF"		36.55 (928)	25.48 (647)	15.11 (384)	23.00 (584)	3.13 (80)	1827 (830.5)
"24 (600) ANSI - 600# FULL SO / RF"		41.05 (1043)	30.03 (763)	17.39 (442)	27.25 (692)	3.13 (80)	2700 (1227)

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Figure A-6. 1-in. through 24-in. Weld Neck Flanges - High-pressure Meters (ANSI 600# - ANSI 2500#)

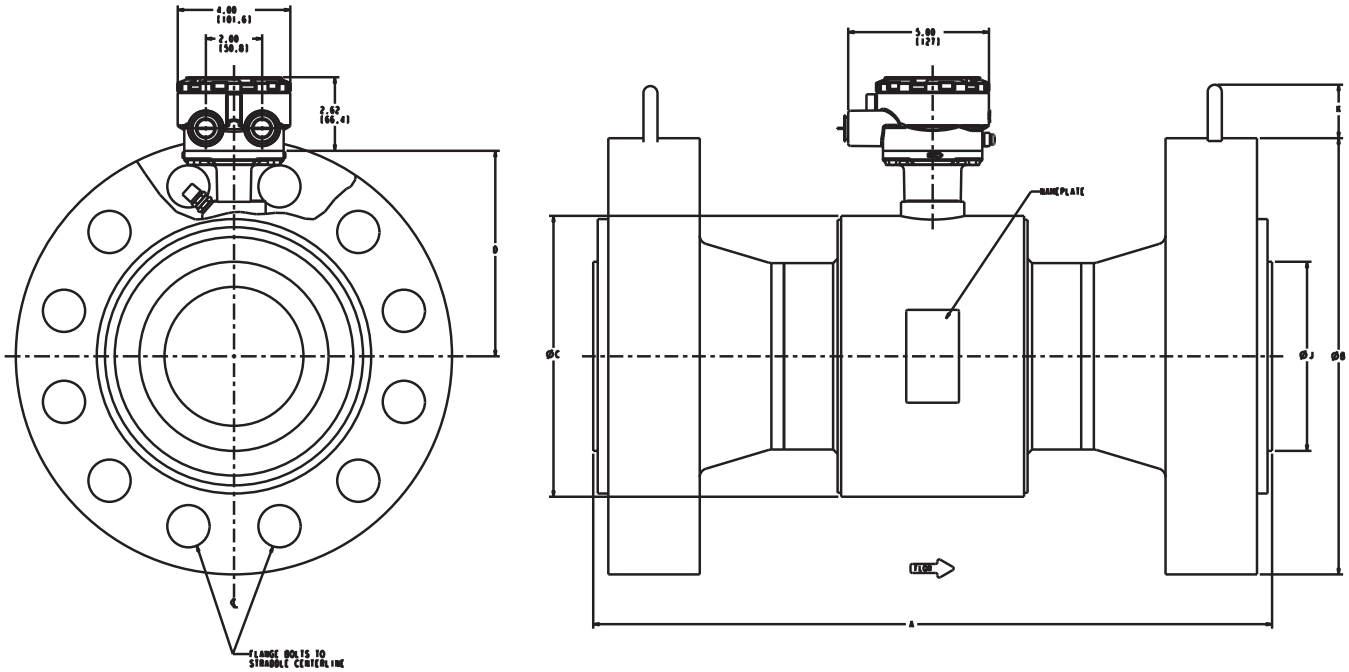


Table A-15. 1-in. through 24-in. Weld Neck Flanges (mm)

Size, Description	DIM "A" Neoprene	DIM "A" Linatex	DIM "A" Poly	Body DIM "C"	CL to UMB DIM "D"	Liner on Face DIM "J"	Lift Ring Height DIM "K"	Sensor Weight lbs. (kg)
1.5 (40) ANSI - 1500# WN / RTJ	13.12 (333)	13.12 (333)	13.12 (333)	5.21 (132)	4.82 (122)	3.62 (92)	1.70 (43)	43.8 (19.9)
2 (50) ANSI - 1500# WN / RTJ	14.92 (379)	14.92 (379)	14.92 (379)	5.21 (132)	4.82 (122)	4.88 (124)	1.70 (43)	85.9 (39.1)
2 (50) ANSI - 2500# WN / RTJ	17.01 (432)	17.01 (432)	17.01 (432)	5.21 (132)	4.82 (122)	5.25 (133)	1.70 (43)	116 (52.7)
3 (80) ANSI - 1500# WN / RTJ	16.42 (417)	16.42 (417)	16.42 (417)	7.21 (183)	5.82 (148)	6.62 (168)	1.70 (43)	153 (69.6)
3 (80) ANSI - 2500# WN / RTJ	20.70 (526)	20.70 (526)	20.70 (526)	7.21 (183)	5.82 (148)	6.62 (168)	1.70 (43)	257 (116.6)
4 (100) ANSI - 1500# WN / RTJ	18.33 (466)	18.33 (466)	18.33 (466)	7.91 (201)	6.17 (157)	7.62 (194)	2.00 (51)	226 (102.7)
4 (100) ANSI - 2500# WN / RTJ	24.12 (613)	24.12 (613)	24.12 (613)	7.91 (201)	6.17 (157)	8.00 (203)	2.00 (51)	407 (185)
6 (150) ANSI - 1500# WN / RTJ	24.12 (613)	24.12 (613)	24.12 (613)	9.98 (253)	7.30 (185)	9.75 (248)	2.00 (51)	521 (236.9)
6 (150) ANSI - 2500# WN / RTJ	32.32 (821)	32.32 (821)	32.32 (821)	9.98 (253)	7.30 (185)	11.00 (279)	2.00 (51)	1048 (476.4)
8 (200) ANSI - 1500# WN / RTJ	29.11 (739)	29.11 (739)	29.11 (739)	11.92 (303)	8.27 (210)	12.50 (318)	3.13 (80)	937 (425.9)
8 (200) ANSI - 2500# WN / RTJ	37.53 (953)	37.53 (953)	37.53 (953)	11.92 (303)	8.27 (210)	13.38 (340)	3.13 (80)	1722 (782.7)
10 (250) ANSI - 1500# WN / RTJ	32.44 (824)	32.44 (824)	32.44 (824)	14.64 (372)	9.69 (246)	14.62 (371)	3.13 (80)	1643 (746.8)
10 (250) ANSI - 2500# WN / RTJ	45.86 (1165)	45.86 (1165)	45.86 (1165)	14.64 (372)	9.69 (246)	16.75 (425)	3.13 (80)	3280 (1491)
12 (300) ANSI - 1500# WN / RTJ	37.76 (959)	37.76 (959)	37.76 (959)	16.50 (419)	10.77 (274)	17.25 (438)	3.13 (80)	2597 (1181)
12 (300) ANSI - 2500# WN / RTJ	52.41 (1331)	52.41 (1331)	52.41 (1331)	16.50 (419)	10.77 (274)	19.50 (495)	3.13 (80)	4961 (2255)

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Figure A-7. Standard Wafer Magmeters

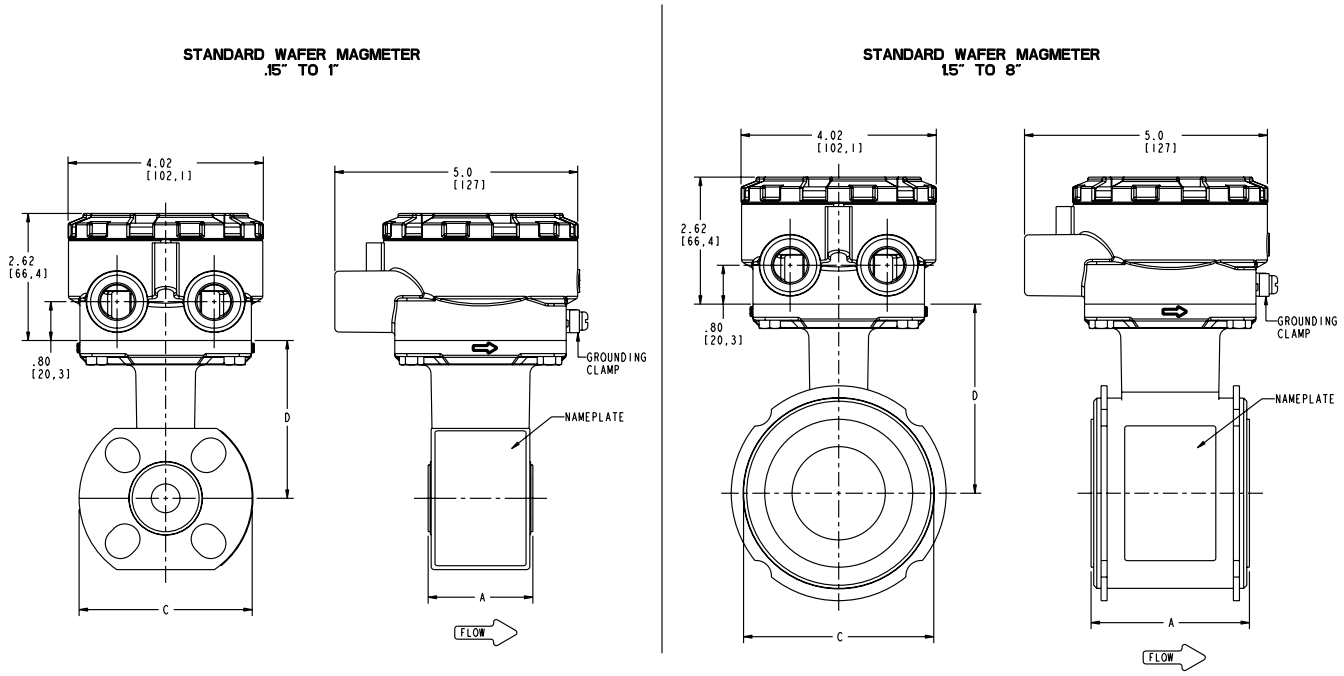


Table A-16. 0.15-in. through 8-in. Wafer (mm)

	Overall Length						
Size, Description	**DIM "A" PTFE**	**DIM "A" ETFE**	**DIM "A" PFA**	**Body DIM "C"**	**CL to UMB DIM "D"**	**Liner on Face DIM "J"**	**Sensor Weight lbs. (kg)**
0.15 (4) WAFER UP TO ANSI - 150# / DIN PN16			2.17 (55)	3.56 (90)	3.25 (83)	1.37 (35)	4 (1.8)
0.3 (8) WAFER UP TO ANSI - 150# / DIN PN16			2.17 (55)	3.56 (90)	3.25 (83)	1.37 (35)	4 (1.8)
0.5 (15) WAFER UP TO ANSI - 300# / DIN PN40	2.21 (56)	2.16 (55)		3.56 (90)	3.25 (83)	1.38 (35)	4 (1.8)
1 (25) WAFER UP TO ANSI - 300# / DIN PN40	2.26 (57)	2.13 (54)		4.50 (114)	3.56 (90)	1.94 (49)	5 (2.3)
1.5 (40) WAFER UP TO ANSI - 300# / DIN PN40	2.88 (73)	2.73 (69)		3.29 (84)	3.67 (93)	2.42 (61)	5 (2.3)
2 (20) WAFER UP TO ANSI - 300# / DIN PN40	3.32 (84)	3.26 (83)		3.92 (99)	3.89 (99)	3.05 (77)	7 (3.2)
3 (80) WAFER UP TO ANSI - 300# / DIN PN40	4.71 (120)	4.62 (117)		5.17 (131)	4.51 (115)	4.41 (112)	13 (5.9)
4 (100) WAFER UP TO ANSI - 300# / DIN PN40	5.87 (149)	5.83 (148)		6.39 (162)	5.12 (130)	5.80 (147)	22 (10.0)
6 (150) WAFER UP TO ANSI - 300# / DIN PN40	7.08 (180)	6.87 (174)		8.57 (218)	6.22 (158)	7.86 (200)	35 (15.9)
8 (200) WAFER UP TO ANSI - 300# / DIN PN40	9.06 (230)	8.86 (225)		10.63 (270)	7.25 (184)	9.86 (250)	60 (27.2)

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Figure A-8. Dimensional Drawings of Rosemount 8721 Sensors Typical of 1- through 4-in. (25 through 100mm) line sizes.

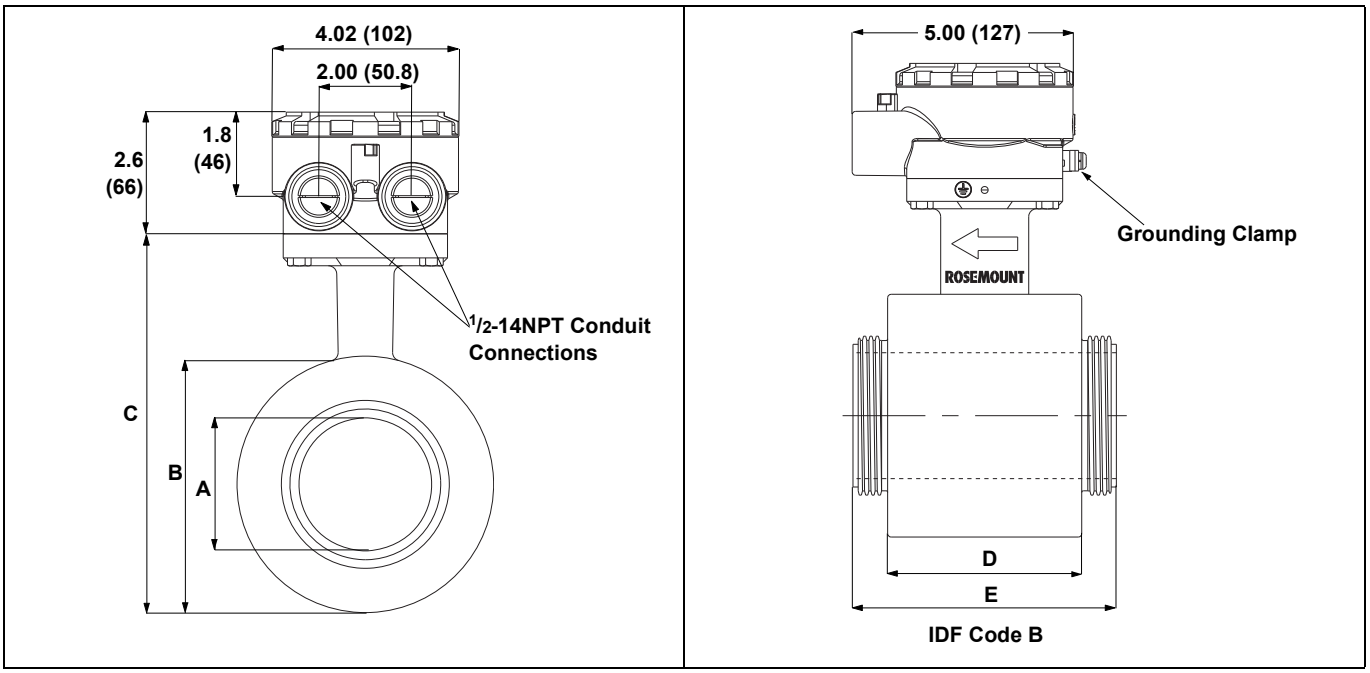


Table A-17. Rosemount 8721 Dimensions in Inches (Millimeters). Refer to Dimensional Drawing Figure A-8.

Line Size	Sensor Dimensions A	Body Diameter B	Sensor Height C	Body Length D	IDF Length E
1/2 (15)	0.62 (15.8)	2.87 (73.0)	5.51 (140.0)	2.13 (54.0)	3.66 (93.0)
1 (25)	0.87 (22.2)	2.87 (73.0)	5.51 (140.0)	2.13 (54.0)	3.66 (93.0)
1 1/2 (40)	1.37 (34.9)	3.50 (88.9)	6.14 (155.9)	2.40 (61.0)	3.96 (100.5)
2 (50)	1.87 (47.6)	4.00 (101.5)	6.63 (168.5)	2.83 (72.0)	4.41 (112.0)
2 1/2 (65)	2.38 (60.3)	4.53 (115.0)	7.17 (182.0)	3.58 (91.0)	5.23 (133.0)
3 (80)	2.87 (73.0)	5.57 (141.5)	8.21 (208.5)	4.41 (112.0)	5.98 (152.0)
4 (100)	3.84 (97.6)	6.98 (177.0)	9.61 (244.0)	5.20 (132.0)	6.77 (172.0)

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Figure A-9. Dimensional Drawings of Rosemount 8721 Sensors Typical of 1- through 4-in. (25 through 100mm) line sizes

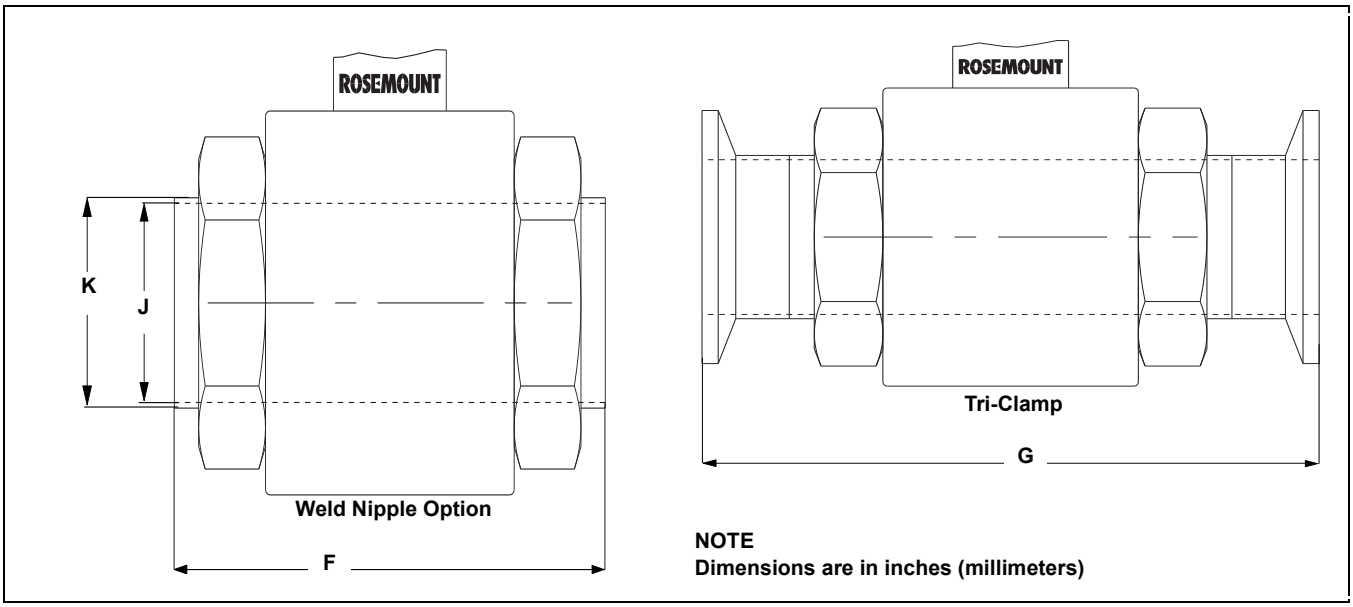


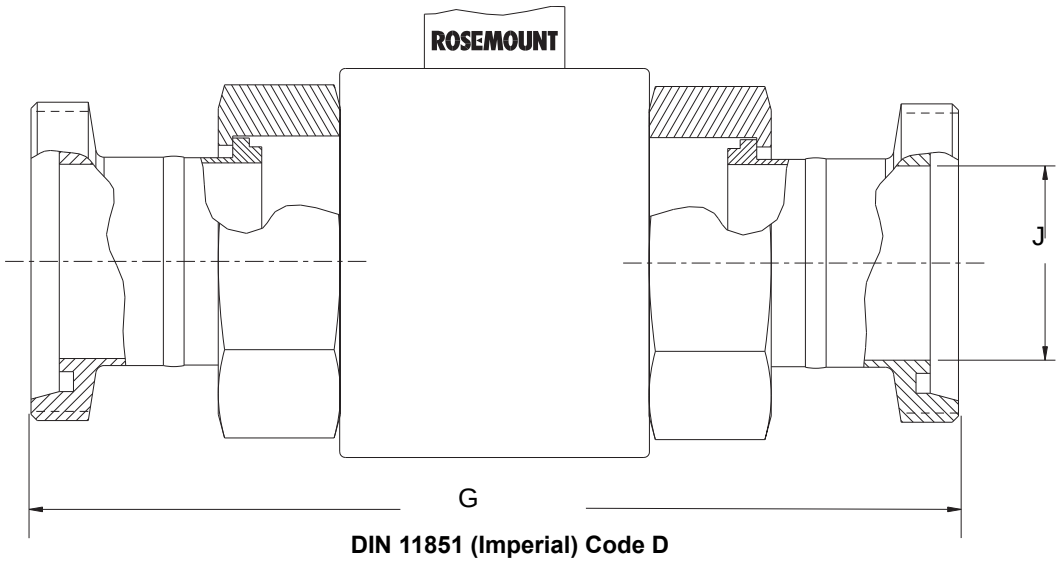
Table A-18. Rosemount 8721 Process Connection Lay Length in Inches (Millimeters). Refer to Figure A-9.

Line Size	Weld Nipple Length F	Weld Nipple Sensor ID J	Weld Nipple Sensor OD K	Tri Clamp Length G	HP Option Length G	DIN 11851 (Met and Imp) Length G	DIN 11851 (Met and Imp) ID J	DIN 11851 (Metric) ID J
1/2 (15)	5.61 (142)	0.62 (15.75)	0.75 (19.05)	8.31 (211)	NA	8.33 (211)	0.62 (15.75)	0.79 (19.99)
1 (25)	5.61 (142)	0.87 (22.2)	1.00 (25.65)	7.85 (199)	9.85 (250)	7.89 (200)	0.85 (21.52)	1.02 (26.01)
1 1/2 (40)	5.92 (150)	1.37 (34.9)	1.68 (42.7)	8.17 (207)	9.91 (252)	8.53 (217)	1.37 (34.85)	1.50 (38.00)
2 (50)	6.35 (161)	1.87 (47.6)	2.01 (51.05)	8.60 (218)	9.91 (252)	9.10 (231)	1.87 (47.60)	1.97 (50.01)
2 1/2 (65)	7.18 (182)	2.37 (60.3)	2.51 (63.75)	9.43 (239)	9.91 (252)	10.33 (262)	2.37 (60.30)	2.60 (65.99)
3 (80)	7.93 (201)	2.87 (73.0)	3.01 (76.45)	10.18 (258)	9.91 (252)	11.48 (291)	2.87 (72.97)	3.19 (81.03)
4 (100)	9.46 (240)	3.84 (97.6)	4.01 (101.85)	11.70 (297)	NA	13.72 (349)	3.84 (97.61)	3.94 (100.00)

Line Size	DIN 11864-1 Length G	DIN 11864-2 Length G	SMS 1145 Length G	Cherry-Burrell I-Line Length G
1/2 (15)	NA	NA	NA	NA
1 (25)	8.98 (228.0)	8.86 (225.0)	6.87 (174)	7.17 (182)
1 1/2 (40)	9.72 (247.0)	9.57 (243.0)	7.50 (190)	7.80 (198)
2 (50)	10.16 (258.0)	10.00 (254.0)	7.93 (201)	8.42 (214)
2 1/2 (65)	11.89 (302.0)	11.54 (293.0)	9.07 (230)	9.49 (241)
3 (80)	12.95 (329.0)	12.44 (316.0)	9.82 (249)	10.37 (263)
4 (100)	14.57 (370.0)	14.21 (361.0)	11.67 (296)	12.15 (309)

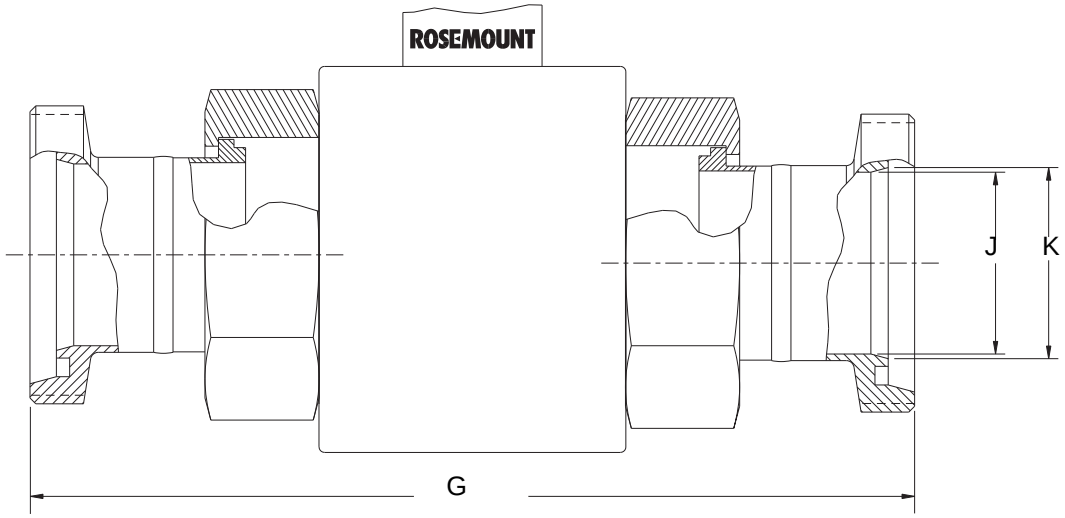
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Figure A-10.



DIN 11851 (Imperial) Code D

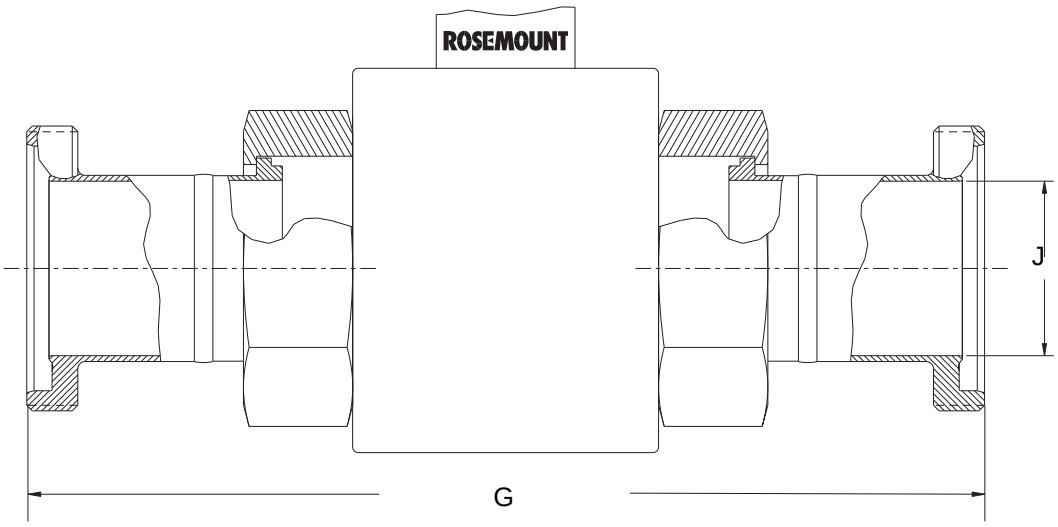
Figure A-11.



DIN 11851 (Metric) Code E

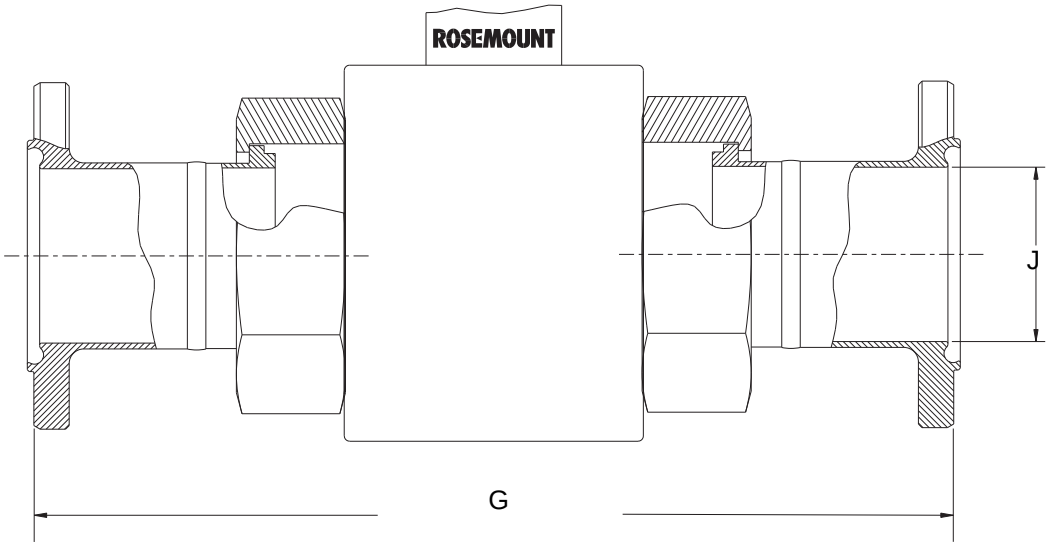
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Figure A-12.



11864-1

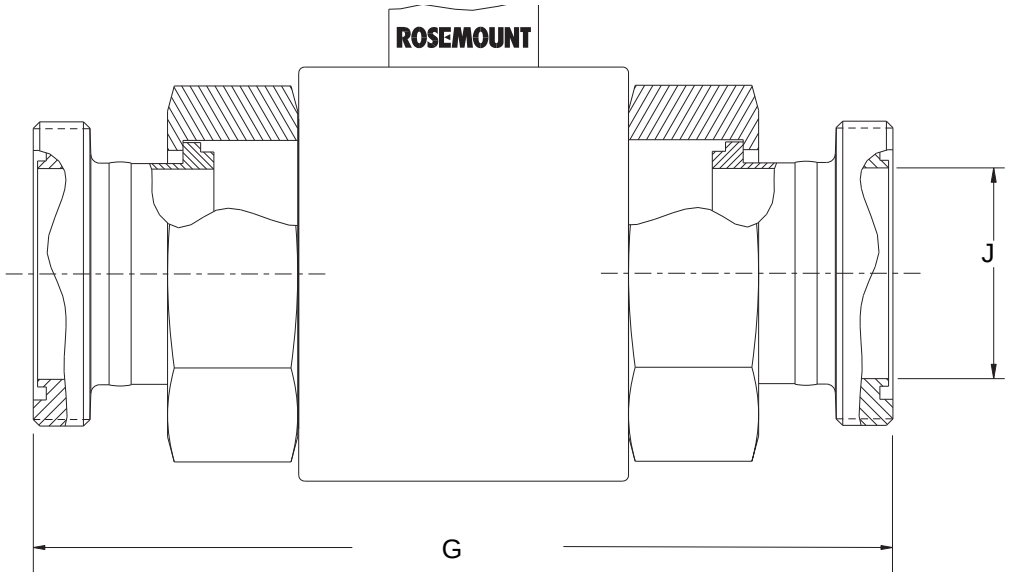
Figure A-13.



11864-2

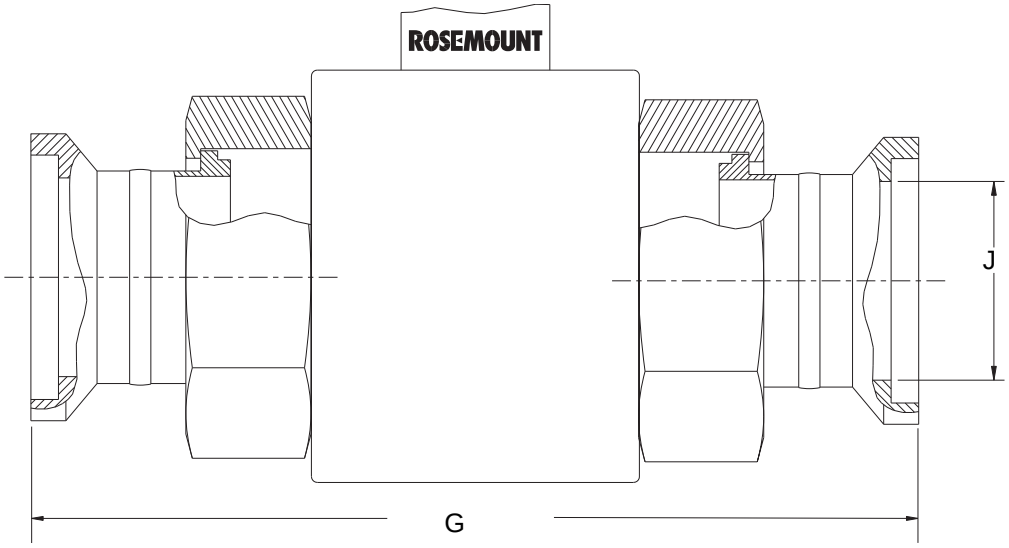
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Figure A-14.



SMS1145 Code H

Figure A-15.



Cherry Burrell I-Line Code J

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Rosemount Flanged Sensors

All flanged sensors are fabricated from stainless and carbon steel and welded to provide a hermetic seal that protects against moisture and other contaminants. Sizes range from 1/2 in. (15 mm) to 36 in. (900 mm). The sealed housing ensures maximum sensor reliability by protecting all internal components and wiring from the most hostile environments.



Rosemount High-Signal Magmeter System

The 8707 High-Signal Sensor, used in conjunction with the 8712H High-Signal Transmitter, forms the Rosemount High-Signal Magnetic Flowmeter System. This system provides stable flow measurement in the most difficult high-noise applications while maintaining the benefits of DC technology. The increased signal strength of the high-signal system is made possible through a combination of sensor coil design that incorporates the most advanced materials and an extremely efficient and innovative coil drive circuit. The increased signal strength of the Rosemount high-signal system, coupled with advanced signal processing and superior filtering techniques, provide the solution to demanding flow measurement applications.

Table 2. Rosemount Flanged Sensor 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	Product Description[1]	
8705	Magnetic Flowmeter Sensor	
8707	High-Signal Magnetic Flowmeter Sensor	
Lining Material		
Standard		**Standard**
T	PTFE[2]	★
P	Polyurethane[3]	★
Expanded		
A	PFA[4]	
F	ETFE[5]	
N	Neoprene[3]	
L	Linatex[3]	
Electrode Material		
Standard		**Standard**
S	316L Stainless Steel	★
H	Nickel Alloy 276 (UNS N10276)	★
T	Tantalum	★
P	80% Platinum - 20% Iridium	★
Expanded		
N	Titanium	

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Table 2. Rosemount Flanged Sensor 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.

Electrode Type		Electrode Material (From Above)					
		Code S	Code H	Code T	Code P	Code N	
Standard							**Standard**
A	2 Electrodes - Standard	•	•	•	•	•	★
E	3rd Grounding Electrode	•	•	•	•	•	★
Expanded							
B	2 Electrodes - Bullet Nose	•	•				
F	3rd Grounding Electrode Bullet Nose	•	•				
Line Size[6]		**Lining Material (From Above)**					
		Code A	**Code T**	**Code F**	**Code P**	**Code N and L**	
005	1/2-in. (15 mm) (8705 only)	•	•	•	NA	NA	
010	1-in. (25 mm) (8705 only)	•	•	•	•	•	
015	1 1/2-in. (40 mm) (8705 only)	•	•	•	•	•	
020	2-in. (50 mm) (8705 only)	•	•	•	•	•	
030	3-in. (80 mm)	•	•	•	•	•	
040	4-in. (100 mm)	•	•	•	•	•	
060	6-in. (150 mm)	•	•	•	•	•	
080	8-in. (200 mm)	•	•	•	•	•	
100	10-in. (250 mm)	•	•	•	•	•	
120	12-in. (300 mm)	•	•	•	•	•	
140	14-in. (350 mm)	•	•	•	•	•	
160	16-in. (400 mm)	NA	•	•	•	•	
180	18-in. (450 mm)	NA	•	NA	•	•	
200	20-in. (500 mm)	NA	•	NA	•	•	
240	24-in. (600 mm)	NA	•	NA	•	•	
300	30-in. (750 mm)	NA	•	NA	•	•	
360	36-in. (900 mm)	NA	•	NA	•	•	
Flange Material and Type[6]							
C	Carbon Steel Raised Face Slip-On						
S	Stainless Steel (304/304L) Raised Face Slip-On						
P	Stainless Steel (316/316L) Raised Face Slip-On						
J[7]	Carbon Steel Ring Type Joint (RTJ) Weld Neck						
K[7]	Stainless Steel (304/304L) Ring Type Joint (RTJ) Weld Neck						
Flange Type and Rating[6]		**Availability**					
1	ASME B16.5 ANSI Class 150 (30 and 36 in. AWWA C207 Class D Flat Face)	Refer to Table 3 on page A-41 for carbon steel flange material availability Refer to Table 4 on page A-41 for stainless steel flange material availability					
2	MSS SP44 Class 150 (30 and 36 in. line sizes only)						
3	ASME B16.5 (ANSI) Class 300/MSS-SP44 Class 300 (30-in only)						
6	ASME B16.5 (ANSI) Class 600 (Maximum Pressure: 1000 psig)[8]						
7	ASME B16.5 (ANSI) Class 600[9]						
9	ASME B16.5 (ANSI) Class 900[9][10]						
M	ASME B16.5 (ANSI) Class 1500[11]						
N	ASME B16.5 (ANSI) Class 2500[11]						

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Table 2. Rosemount Flanged Sensor 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.

D	EN 1092-1 (DIN) PN 10	Refer to Table 5 on page A-42 for flange material availability		
E	EN 1092-1 (DIN) PN 16			
F	EN 1092-1 (DIN) PN 25			
H	EN 1092-1 (DIN) PN 40			
K	AS2129 Table D[12]			
L	AS2129 Table E[12]			
P	JIS B 2220, nominal pressure 10K[13]	Refer to Table 6 on page A-42 for flange material availability		
R	JIS B 2220, nominal pressure 20K[13]			
Electrode Housing Configuration				
Standard				**Standard**
W0	Sealed, Welded Housing[14]			★
Expanded				
W1	Sealed, Welded Housing with Pressure Relief			
W3	Sealed, Welded Housing with Separate Electrode Compartments[15]			
Hazardous Area Approvals		**8705**	**8707**	
Standard				**Standard**
NA	CE Marked, No Approvals	•	•	★
FM & CSA				
Standard				**Standard**
N0	FM Class 1 Div 2 for Non-Flammable fluids; CSA Class 1 Div 2	•	•	★
N5	FM Class 1 Div 2 for Flammable fluids	•	•	★
Expanded				
E5[16]	FM Class 1 Div 1, Explosion Proof	•		
ATEX				
Standard				**Standard**
N1	ATEX EEx nA [L] IIC Type n Approval	•		★
KD	ATEX EEx e ia IIC T3..T6, Increased Safety Approval (with I.S. electrodes)	•		★
ND	ATEX Dust Approval	•		★
Expanded				
E1	ATEX EEx e ia IIC T3..T6, Increased Safety Approval (with I.S. electrodes), integral mount with 8732E only	•		
NEPSI				
Expanded				
E3	NEPSI Ex e ia IIC T3..T6, Increased Safety Approval (with I.S. electrodes), integral mount with 8732E only	•		
EP	NEPSI Ex e ia IIC T3..T6, Increased Safety Approval (with I.S. electrodes)	•		
KOSHA		**8705**	**8707**	
Expanded				
E9	KOSHA Ex e ia IIC T3..T6, Increased Safety Approval (with I.S. electrodes), integral mount with 8732E only	•		
EK	KOSHA Ex e ia IIC T3..T6, Increased Safety Approval (with I.S. electrodes)	•		
INMETRO				
Expanded				
E2	InMetro BR-Ex e ia IIC T3..T6, Increased Safety Approval (with I.S. electrodes), integral mount with 8732E only	•		
EB	InMetro BR-Ex e ia IIC T3..T6, Increased Safety Approval (with I.S. electrodes)	•		
	GOST			
E8	GOST Ex e ia IIC T3..T6, Increased Safety Approval (with I.S. electrodes), integral mount with 8732E only	•		
EM	GOST Ex e ia IIC T3..T6, Increased Safety Approval (with I.S. electrodes)	•		

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Table 2. Rosemount Flanged Sensor 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.

Options (Include with selected model number)

Certifications				
Standard				**Standard**
CR[17]	Canadian Registration Number (CRN) certification	•	•	★
PD	Pressure Equipment Directive Certification (PED, per 97/23/EC)	•	•	★
Expanded				
DW	NSF Drinking Water Certification[18]	•	•	
Optional Grounding Rings[19]				
Standard				**Standard**
G1	(2) 316L SST Ground Rings	•	•	★
G2	(2) Nickel Alloy 276 (UNS N10276) Ground Rings[20]	•	•	★
G5	(1) 316L SST Ground Rings	•	•	★
G6	(1) Nickel Alloy 276 (UNS N10276) Ground Rings[20]	•	•	★
Expanded				
G3	(2) Titanium Ground Rings[20]	•	•	
G4	(2) Tantalum Ground Rings[21]	•	•	
G7	(1) Titanium Ground Rings[20]	•	•	
G8	(1) Tantalum Ground Rings[21]	•	•	
Optional Lining Protectors[19]				
Expanded				
L1	(2) 316L SST Lining Protectors	•	•	
L2	(2) Nickel Alloy 276 (UNS N10276) Lining Protectors[20]	•	•	
Expanded				
L3	(2) Titanium Lining Protectors[20]	•	•	
H1	Lay-length matching 8701 using spool piece[20]	•	•	
H2	Lay-length matching 8701[22]	•	•	
H5	Lay-length matching Foxboro 2800 using spool piece[23]	•	•	
H7	Lay-length ABB CopaX and MagX using spool piece[20]	•	•	
Other Options				
Standard				**Standard**
B3	Integral Mount with 8732	•		★
J1	CM 20 Conduit Adapter	•	•	★
Expanded				
D1	High Accuracy Calibration (0.15% of rate for matched sensor and E-Series transmitter)[24] (0.25% of rate for matched 8707 and 8712H)	•	•	
DT	Heavy Duty Tagging	•	•	
J2	PG 13.5 Conduit Adapter	•	•	
SC	304 SST Junction Box, fully welded to housing	•	•	
		8705	**8707**	
TA	High Temperature Permeable Fluid Option (Contains vent holes provided for permeable fluids such as nitric acid, hydrofluoric acid, or sodium hydroxide at high temperatures)	•	•	
Q4	Calibration Certificate per ISO 10474 3.1B	•	•	
Q8	Material Traceability 3.1B	•	•	
Q9	Material Traceability Electrode only 3.1B	•	•	
Q66	Welding Procedure Qualification Record Documentation	•	•	
Q67	Welding Performance Qualification Record Documentation	•	•	
Q70	Weld Examination Inspection Certificate, ISO 10474 3.1B	•	•	
Typical Model Number: 8705 T SA 040 C1 W0 N0				

(1) The high-signal magmeter system is not currently available with CE mark.
(2) Available in 1/2-in. to 36-in. line sizes ANSI 150, ANSI 300, and DIN Flanges. Available in 1-in. to 10-in. ANSI 600 Derated only.

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(3) Available in 1-in. to 24-in. line sizes ANSI 150, ANSI 300, and DIN Flanges. Available in 30- and 36-in. AWWA Class 125 and ANSI 150. Available in 1-in. to 24-in. ANSI 600 full rated. Available in 1- to 12-in. ANSI 900, ANSI 1500, and ANSI 2500.
(4) Available in 1/2-in. to 12-in. line sizes ANSI 150, ANSI 300, and DIN Flanges. Available in 14-in. ANSI 150 only. Not available with electrode housing code W3.
(5) Available in 1/2-in. to 14-in. line sizes ANSI 150, ANSI 300, and DIN Flanges. Available in 16-in. ANSI 150 only. Available in 1- to 10-in. ANSI 600 Derated only.
(6) Refer to Table 3, Table 4, and Table 5 on page A-41 and page A-42 for Standard vs. Expanded offering.
(7) Available in ANSI 1500 and ANSI 2500 only.
(8) Electrode type options limited to two measurement electrodes or two measurement electrodes + third grounding electrode.
(9) Electrode type options limited to two measurement electrodes only.
(10) Lining protectors not available.
(11) Available with liner options P, N, or L line size limited to 1.5-in. to 12-in. for ANSI 1500 and 2-in. to 6-in. for ANSI 2500, available with two measurement electrodes only, not available with ground rings or lining protectors.
(12) Liner material options limited to T, P, or F; cannot be ordered with ground rings, lining protectors, or H (x) options.
(13) Available with liner option T only, line size 1/2-in. to 8-in. only, not available with grounding rings or lining protectors.
(14) Available with ANSI 150, ANSI 300, and DIN flanges.
(15) Available in 3-in. and larger meters for the 8705. Available in 8-in. and larger meters for 8707.
(16) Available in sensor line sizes 0.5- through 8-in. (15 through 200 mm).
(17) CRN Approval covers Alberta and Ontario as a standard. Consult the Factory for availability of other Provinces.
(18) Only available with PTFE or Polyurethane Liner Material with 316L SST Electrode Material.
(19) Grounding Rings and Lining Protectors provide the same fluid grounding function. Lining Protectors available for PTFE and ETFE only.
(20) Available in sensor line sizes 0.5- through 12-in. (15 through 300 mm).
(21) Available in sensor line sizes 0.5- through 8-in. (15 through 200 mm).
(22) Available in sensor line sizes 0.5- through 16-in. (15 through 400 mm).
(23) Available in sensor line sizes 3- through 18-in. (80 through 450 mm).
(24) D1 Option Code must be ordered with sensor and transmitter.

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Table 3. Carbon Steel ASME B16.5 (ANSI) Flange Rating Availability[1]

Line Size Code	Line Size Inches (mm)	Class 150 (C1)	MSS-SP44 Class 150 (C2)	Class 300 (C3)	Class 600 (C6)	Class 600 (C7)	Class 900 (C9)	Class 1500 (JM)	Class 2500 (JN)
005	0.5 (15)	★	NA	★	•	NA	NA	NA	NA
010	1 (25)	★	NA	★	•	•	•	NA	NA
015	1.5 (40)	★	NA	★	•	•	•	•	•
020	2 (50)	★	NA	★	•	•	•	•	•
030	3 (80)	★	NA	★	•	•	•	•	•
040	4 (100)	★	NA	★	•	•	•	•	•
060	6 (150)	★	NA	★	•	•	•	•	•
080	8 (200)	★	NA	★	•	•	•	•	•
100	10 (250)	★	NA	★	•	•	•	•	•
120	12 (300)	★	NA	★	CF	•	•	•	•
140	14 (350)	•	NA	•	CF	•	NA	NA	NA
160	16 (400)	•	NA	•	CF	•	NA	NA	NA
180	18 (450)	•	NA	•	CF	•	NA	NA	NA
200	20 (500)	•	NA	•	CF	•	NA	NA	NA
240	24 (600)	•	NA	•	CF	•	NA	NA	NA
300[2]	30 (750)	•	•	•	NA	NA	NA	NA	NA
360[3]	36 (900)	•	•	NA	NA	NA	NA	NA	NA

(1) Stars (★) represent a Standard offering while dots represent an Expanded offering.
(2) MSS-SP44 Class 300 Flanges for option C3
(3) AWWA C207 Class D Flat Face Flange for option C1 only

Table 4. Stainless Steel ASME B16.5 (ANSI) Flange Rating Availability[1]

Line Size Code	Line Size Inches (mm)	Class 150 (S1)	MSS-SP44 Class 150 (S2)	Class 300 (S3)	Class 600 (S6)	Class 600 (S7)	Class 900 (S9)	Class 1500 (KM)	Class 2500 (KN)	Class 150 (P1)	MSS-SP44 Class 150 (P2)	Class 300 (P3)
005	0.5 (15)	★	NA	•	•	NA	NA	NA	NA	•	NA	•
010	1 (25)	★	NA	•	•	•	•	NA	NA	•	NA	•
015	1.5 (40)	★	NA	•	•	•	•	•	•	•	NA	•
020	2 (50)	★	NA	•	•	•	•	•	•	•	NA	•
030	3 (80)	★	NA	•	•	•	•	•	•	•	NA	•
040	4 (100)	★	NA	•	•	•	•	•	•	•	NA	•
060	6 (150)	★	NA	•	•	•	•	•	•	•	NA	•
080	8 (200)	★	NA	•	•	•	•	•	•	•	NA	•
100	10 (250)	★	NA	•	•	•	•	•	•	•	NA	•
120	12 (300)	★	NA	•	CF	•	•	•	•	•	NA	•
140	14 (350)	•	NA	•	CF	•	NA	NA	NA	•	NA	•
160	16 (400)	•	NA	•	CF	•	NA	NA	NA	•	NA	•
180	18 (450)	•	NA	•	CF	•	NA	NA	NA	•	NA	•
200	20 (500)	•	NA	•	CF	•	NA	NA	NA	•	NA	•
240	24 (600)	•	NA	•	CF	•	NA	NA	NA	•	NA	•
300[2]	30 (750)	•	•	•	NA	NA	NA	NA	NA	•	•	•
360[3]	36 (900)	•	•	NA	NA	NA	NA	NA	NA	•	•	NA

(1) Stars (★) represent a Standard offering while dots represent an Expanded offering.
(2) MSS-SP44 Class 300 Flanges for option S3 or P3
(3) AWWA C207 Class D Flat Face Flange for option S1 or P1 Only

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Table 5. EN 1092-1 (DIN) Flange Rating Availability[1]

Line Size Code	Line Size Inches (mm)	Carbon Steel PN 10 (CD)	Carbon Steel PN 16 (CE)	Carbon Steel t PN 25 (CF)	Carbon Steel PN 40 (CH)	Carbon Steel Table D (CK)	Carbon Steel Table E (CL)	Stainless Steel PN 10 (SD)	Stainless Steel PN 16 (SE)	Stainless Steel PN 25 (SF)	Stainless Steel PN 40 (SH)
005	0.5 (15)	NA	NA	NA	★	•	•	NA	NA	NA	★
010	1 (25)	NA	NA	NA	★	•	•	NA	NA	NA	★
015	1.5 (40)	NA	NA	NA	★	•	•	NA	NA	NA	★
020	2 (50)	NA	NA	NA	★	•	•	NA	NA	NA	★
030	3 (80)	NA	NA	NA	★	•	•	NA	NA	NA	★
040	4 (100)	NA	★	NA	★	•	•	NA	★	NA	★
060	6 (150)	NA	★	NA	★	•	•	NA	★	NA	★
080	8 (200)	★	★	•	★	•	•	•	★	•	★
100	10 (250)	★	★	•	•	•	•	•	•	•	•
120	12 (300)	★	★	•	•	•	•	•	•	•	•
140	14 (350)	•	•	•	•	•	•	•	CF	CF	CF
160	16 (400)	•	•	•	•	•	•	•	CF	CF	CF
180	18 (450)	•	•	•	•	•	•	•	CF	CF	CF
200	20 (500)	•	•	•	•	•	•	•	CF	CF	CF
240	24 (600)	•	•	•	•	•	CF	•	CF	CF	CF

(1) Stars (★) represent a Standard offering while dots represent an Expanded offering.

Table 6. JIS 2220 B Flange Rating Availability

Line Size Code	Line Size Inches (mm)	Carbon Steel 10 K (CP)	Carbon Steel 20 K (CR)	304 SST 10 K (SP)	304 SST 20 K (SR)
005	0.5 (15)	•	•	•	•
010	1 (25)	•	•	•	•
015	1.5 (40)	•	•	•	•
020	2 (50)	•	•	•	•
030	3 (80)	•	•	•	•
040	4 (100)	•	•	•	•
060	6 (150)	•	•	•	•
080	8 (200)	•	•	•	•

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Rosemount 8711 Wafer Sensors

The flangeless design of the 8711 wafer sensor makes it an economical, compact, and lightweight alternative to flanged magnetic flowmeters. Alignment rings provided with every 8711, center the sensor in the process line and makes installation easier.

Table 7. Rosemount 8711 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	
8711	Magnetic Flowmeter Wafer Sensor	
Lining Material		
Standard		**Standard**
T	ETFE[1]	★
Expanded		
A	PFA[2]	
S	PTFE[3]	
Electrode Material		
Standard		**Standard**
S	316L Stainless Steel	★
H	Nickel Alloy 276 (UNS N10276)	★
T	Tantalum	★
P	80% Platinum - 20% Iridium	★
Expanded		
N	Titanium	
Electrode Type		
Standard		**Standard**
A	2 Electrodes - Standard	★
E	3rd Grounding Electrode - Standard	★
Expanded		
B	2 Electrodes - Bullet Nose[4]	
F	3rd Grounding Electrode Bullet Nose[4]	
Line Size		
Standard		**Standard**
005	½ in. (15 mm)	★
010	1 in. (25 mm)	★
015	1½ in. (40mm)	★
020	2 in. (50mm)	★
030	3 in. (80 mm)	★
040	4 in. (100 mm)	★
060	6 in. (150 mm)	★
080	8 in. (200 mm)	★
Expanded		
15F	0.15 in. (4 mm)	
30F	0.3 in. (8 mm)	

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Table 7. Rosemount 8711 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.

Transmitter Mounting Configuration		
Standard		**Standard**
R	Remote	★
U	Integral, mounted to Rosemount 8732E Transmitter	★
Mounting Kit		
Expanded Kit: Includes two alignment rings (where applicable), threaded SST studs, and nuts		
Standard		**Standard**
1	ASME B16.5 (ANSI) Class 150	★
2	EN 1092-1 (DIN) PN 10/16[5]	★
3	ASME B16.5 (ANSI) Class 300	★
4	EN 1092-1 (DIN) PN 25/40[6]	★
Standard Kit: Includes two alignment rings (where applicable)		
Standard		**Standard**
5	ASME B16.5 (ANSI) Class 150	★
6	EN 1092-1 (DIN) PN 10/16[5]	★
7	ASME B16.5 (ANSI) Class 300	★
8	EN 1092-1 (DIN) PN 25/40[6]	★
Hazardous Area Approval		
Standard		**Standard**
NA	CE Marked, No Approvals	★
FM & CSA		
Standard		**Standard**
N0	FM Class 1 Div 2 for Non-Flammable fluids; CSA Class 1 Div 2	★
N5	FM Class 1 Div 2 for Flammable fluids	★
E5	FM Class 1 Div 1, Explosion Proof	★
ATEX		
Standard		**Standard**
KD	ATEX EEx e ia IIC T3… T6, Increased Safety Approval (with I.S. electrodes)	★
ND	ATEX Dust Approval	★
Expanded		
E1	ATEX EEx e ia IIC T3… T6, Increased Safety Approval (with I.S. electrodes), integral mount with 8732E only	
N1	ATEX EEx nA [L] IIC Type n Approval	
NEPSI		
Expanded		
E3	NEPSI Ex e ia IIC T3... T6, Increased Safety Approval (with I.S. electrodes), integral mount with 8732E only	
EP	NEPSI Ex e ia IIC T3… T6, Increased Safety Approval (with I.S. electrodes)	
KOSHA		
Expanded		
E9	KOSHA Ex e ia IIC T3... T6, Increased Safety Approval (with I.S. electrodes), integral mount with 8732E only	
EK	KOSHA Ex e ia IIC T3… T6, Increased Safety Approval (with I.S. electrodes)	
InMetro		
Expanded		
E2	InMetro BR-Ex e ia IIC T3... T6, Increased Safety Approval (with I.S. electrodes), integral mount with 8732E only	
EB	InMetro BR-Ex e ia IIC T3… T6, Increased Safety Approval (with I.S. electrodes)	
GOST		
Expanded		
E8	GOST Ex e ia IIC T3... T6, Increased Safety Approval (with I.S. electrodes), integral mount with 8732E only	
EM	GOST Ex e ia IIC T3… T6, Increased Safety Approval (with I.S. electrodes)	

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Table 7. Rosemount 8711 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.

Options (Include with selected model number)

Certifications		
Standard		**Standard**
DW	NSF Drinking Water Certification(7)	★
Expanded		
PD	Pressure Equipment Directive Certification (PED, per 97/23/EC)	
Optional Grounding Rings		
Standard		**Standard**
G1	(2) 316L SST Ground Rings	★
G5	Single 316L SST Ground Ring	★
Expanded		
G2	(2) Nickel Alloy 276 (UNS N10276) Ground Rings	
G3	(2) Titanium Ground Rings	
G4	(2) Tantalum Ground Rings	
G6	Single Nickel Alloy 276 (UNS N10276) Ground Ring	
G7	Single Titanium Ground Ring	
G8	Single Tantalum Ground Ring	
Other Options		
Expanded		
D1	High Accuracy Calibration (0.15% of rate for matched sensor and transmitter)(8)	
DT	Heavy Duty Tagging	
Q4	Calibration Certificate per ISO 10474 3.1B	
Q8	Material Traceability 3.1B	
Q9	Material Traceability Electrode only 3.1B	
Q66	Welding Procedure Qualification Record Documentation(9)	
Q67	Welding Performance Qualification Record Documentation(9)	
Q70	Weld Examination Inspection Certificate, ISO 10474 3.1B(9)	
Typical Model Number: 8711 TSA 020 R 5 N0		

(1) Not available with 0.15- and 0.30-in. (4 and 8 mm) line sizes.
(2) Available with 0.15- and 0.30-in. (4 and 8 mm) line sizes only.
(3) Not available with 0.15- and 0.30-in. (4 and 8 mm) line sizes.
(4) Bullet nose electrodes are available in 1.5-in. to 8-in. meters (40 mm to 200 mm).
(5) 8-in. (200 mm) has a PN 10 mounting kit only.
(6) 8-in. (200 mm) has a PN 25 mounting kit only.
(7) Only available with PTFE Liner Material with 316L SST Electrode Material.
(8) D1 Option Code must be ordered with sensor and transmitter.
(9) 6- and 8-in. (150 and 200 mm) line sizes only.

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Rosemount 8721 Hygienic Sensors

The 8721 hygienic sensor is specifically designed for the demanding applications in food, beverage, and life sciences. The robust, all-welded, full diameter sensor is constructed of FDA approved materials and is authorized to display the 3-A Symbol (Authorization #1222), is certified by EHEDG (#C03-5229), and is approved for use in FDA Grade A milk meter based timing loops (M-b 350). Sizes range from 1/2-in. (15mm) to 4-in. (100mm) and are available in a variety of industry standard process connections.

Table 8. Rosemount 8721 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	
8721	Hygienic Magnetic Flowmeter Sensor	
Lining Material		
Standard		**Standard**
A	PFA	★
Electrode Material		
Standard		**Standard**
S	316L SST (standard)	★
Expanded		
H	Nickel Alloy 276 (UNS N10276)	
P	80% Platinum-20% Iridium	
Electrode Construction		
Standard		**Standard**
A	Standard measurement electrodes	★
Line Sizes		
Standard		**Standard**
005	15 mm (1/2 in.)	★
010	25 mm (1 in.)	★
015	40 mm (1 1/2 in.)	★
020	50 mm (2.0 in.)	★
025	65 mm (2 1/2 in.)	★
030	80 mm (3.0 in.)	★
040	100 mm (4.0 in.)	★
Transmitter Mounting Configuration		
Standard		**Standard**
R	Remote, for use with 8712, or remote version of 8732 transmitter	★
U	Integral, mounted to 8732 transmitter	★
X	Sensor only (does not include terminal junction box)	★
Process Connection Type		
Standard		**Standard**
A	Tri-Clamp (1)	★
B	IDF Sanitary screw type (2)	★

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Table 8. Rosemount 8721 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		
C	ANSI Weld Nipple [2]	
D	DIN 11851 (Imperial)	
E	DIN 11851 (Metric)	
F	DIN 11864-1 form A	
G	DIN 11864-2 form A	
H	SMS Connection	
J	Cherry-Burrell I-Line	
K	DIN 11850 Weld Nipple	
Process Gasket Material		
Standard		**Standard**
1	Silicone gasket seal	★
2	EPDM	★
Expanded		
4	Viton	
8	EPDM Compression - limiting [3]	
9	Viton Compression - limiting [3]	
X	No gasket (User supplied; only applicable with Process Connection B)	
Product Certifications		
Standard		**Standard**
NA	CE Marked, No Approvals	★
N0	Factory Mutual (FM) Ordinary Location; CSA; CE Marking; 3-A; EHEDG Type EL[3]	★

Options (Include with selected model number)

Expanded		
AH	Electropolished process connection surface finish < 15 μin. Ra (0.38 μm Ra)	
D1	High Accuracy Calibration [0.25% of rate from 3-30 ft/s (0.9-10 m/s)] matched sensor and transmitter system	
D3	High Velocity Meter Verification. Calibration verified at 1, 3, 10, and 20 ft./sec (0.3., 1, 3, and 6 m/s)	
HD	DanFoss Lay Length	
HP	Process Data PD340 (Alfa-Laval PD340) 250 mm lay length and Tri-Clamp process connections	
J1	CM20 Conduit Adapter (Applies to Transmitter Mount Option “R” only)	
J2	PG13.5 Conduit Adapter (Applies to Transmitter Mount Option “R” only)	
Q4	Calibration Certificate per ISO 10474 3.1B	
Q8	Material Traceability Certificate per ISO 10474 3.1B (product contact surfaces)	
SJ	304 Stainless Steel terminal junction box (Remote configuration only)	
Typical Model Number: 8721 A S A 020 U A 1 N0		

(1) Tri-Clamp specification per BPE-2002
(2) IDF Specification per BS4825 Part 4
(3) EHEDG Document 8 requires mechanical compression limiting, provided by Compression - limiting gaskets for line sizes 1- 4-in. only.

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Tagging

The sensor and transmitter will be tagged, at no charge, in accordance with customer requirements.

Transmitter tag character height is 0.125 in. (3.18 mm). Sensor tag: 40 character maximum.
Transmitter tag: see Configuration Data Sheet for character maximum.

Ordering Procedure

To order, select the desired sensor and/or transmitter by specifying model codes from the ordering table.

For remote transmitter applications, note the cable specification requirements.

Sensors and transmitters must be selected from Product Data Sheet 00813-0100-4727.

Standard Configuration

Unless the Configuration Data Sheet is completed, the transmitter will be shipped as follows:

Engineering Units:	ft/sec
4 mA (1 Vdc):	0
20 mA (5 Vdc):	30
Sensor Size:	3-in.
Empty Pipe:	Off
Sensor Calibration Number:	1000005010000000

Integrally Mounted Rosemount 8732E Transmitters are factory configured with the attached sensor size and appropriate calibration number.

Cable Requirements for Remote Transmitters

Description	Length	P/N
Signal Cable (20 AWG) Belden 8762, Alpha 2411 equivalent	ft m	08712-0061-0001 08712-0061-2003
Coil Drive Cable (14 AWG) Belden 8720, Alpha 2442 equivalent	ft m	08712-0060-0001 08712-0060-2003
Combination Signal and Coil Drive Cable (18 AWG)(1)	ft m	08712-0752-0001 08712-0752-2003

(1) Combination signal and coil drive cable is not recommended for high-signal magmeter system. For remote mount installations, combination signal and coil drive cable should be limited to less than 330 ft (100 m).

Remote transmitter installations require equal lengths of signal and coil drive cables. Integrally mounted transmitters are factory wired and do not require interconnecting cables.

Lengths from 5 to 1,000 ft. (1.5 to 300 m) may be specified, and will be shipped with the sensor. Cable longer than 100 ft. (30 m) is not recommended for high-signal systems.

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Appendix B Approvals

Approved Manufacturing Locations . . . . . page B-1
European Directive Information . . . . . page B-1
Hazardous Locations Product Approvals Offering . . . . . page B-3
Hazardous Location Certifications . . . . . page B-7

APPROVED MANUFACTURING LOCATIONS

Rosemount Inc. — Eden Prairie, Minnesota, USA

Fisher-Rosemount Technologias de Flujo, S.A. de C.V. — Chihuahua Mexico

Emerson Process Management Flow — Ede, The Netherlands

Asia Flow Technologies Center — Nanjing, China

EUROPEAN DIRECTIVE INFORMATION

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

ATEX Directive

Rosemount Inc. complies with the ATEX Directive.

Type n protection type in accordance with EN50 021

- Closing of entries in the device must be carried out using the appropriate EEx e or EEx n metal cable gland and metal blanking plug or any appropriate ATEX approved cable gland and blanking plug with IP66 rating certified by an EU approved certification body.

For Rosemount 8732E transmitters:

Complies with Essential Health and Safety Requirements:
EN 60079-0: 2006
EN 60079-1: 2007
EN 60079-7: 2007
EN 60079-11: 2007
EN 60079-15: 2005
EN 61241-0: 2004
EN 61241-1: 2006

For Rosemount 8712E transmitters:

Complies with Essential Health and Safety Requirements:
EN 60079-15: 2003

For Rosemount 8700 Series Sensors:

Complies with Essential Health and Safety Requirements:
EN 61241-0: 2006
EN 61241-1: 2004

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

Rosemount 8705 and 8707 Magnetic Flowmeter sensors in line size and flange combinations:

Line Size: $1^1/_2$ in. - 24 in. with all DIN flanges and ANSI 150 and ANSI 300 flanges. Also available with ANSI 600 flanges in limited line sizes.

Line Size: 30 in. - 36 in. with AWWA 125 flanges

QS Certificate of Assessment - EC No. PED-H-100
Module H Conformity Assessment

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Rosemount 8711 Magnetic Flowmeter Sensors
Line Sizes: 1.5, 2, 3, 4, 6, and 8 in.

QS Certificate of Assessment - EC No. PED-H-100
Module H Conformity Assessment

Rosemount 8721 Sanitary Magmeter Sensors
in line sizes of 1 1/2 in. and larger:

Module A Conformity Assessment

All other Rosemount 8705/8707/8711/8721
Sensors —
in line sizes of 1 in. and less:
Sound Engineering Practice

Sensors that are SEP are outside the scope of PED and cannot be marked for compliance with PED.

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

Sensor category I is assessed for conformity per module A procedures.

Sensor categories II – III, use module H for conformity assessment procedures.

Electro Magnetic Compatibility (EMC) (2004/108/EC)

Model 8732E, 8712E, and 8712D EN 61326: 2006

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

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

Rosemount combination cable model number 08712-0752-0001 (ft.) or 08712-0752-0003 (m) is required to be used to meet EMC requirements.

Low Voltage Directive (2006/95/EC)

Model 8732E, 8712E, and 8712D - EN 61010 -1: 2001

Other important guidelines

Only use new, original parts.

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

Maintenance shall only be done by qualified personnel.

CE Marking

Compliance with all applicable European Union Directives. (Note: CE Marking is not available on Rosemount 8712H).

IECEx Certificates

C-Tick Marking

Rosemount Inc. complies with the following IEC Requirements.

For Rosemount 8732E transmitters:
IEC 60079-0: 2004
IEC 60079-0: 2007
IEC 60079-1: 2007
IEC 60079-11: 2006
IEC 60079-15: 2005
IEC 60079-7: 2006
IEC 61241-0: 2004
IEC 61241-1: 2004

For Rosemount 8712E transmitters:
IEC 60079-0: 2004
IEC 60079-15: 2005-03

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HAZARDOUS LOCATIONS PRODUCT APPROVALS OFFERING

The Rosemount 8700 Series Magnetic Flowmeters offer many different hazardous locations certifications. The table below provides an overview of the available hazardous area approval options. Equivalent hazardous locations certifications for sensor and transmitter must match in integrally mounted magnetic flowmeter systems. Remote mounted magnetic flowmeter systems do not require matched hazardous location certifications. For complete information about the hazardous area approval codes listed, see Hazardous Location Certifications starting on page B-7.

Table B-1. Factory Mutual (FM) Approvals Offering

	Transmitter	**8732E**			**8712E**(1)			**8712H**(1)
	Sensor	**8705**	**8707**	**8711**	**8705**	**8707**	**8711**	**8707**
Hazardous Area Approval Code								
Non-Classified Locations								
Transmitter		NA	NA	NA	NA	NA	NA	N0
Sensor		NA	N0	NA	NA	N0	NA	N0
Suitable for Class I, Division 1								
Explosion-Proof								
Trans: Groups C, D T6		E5(2)	-	E5	-	-	-	-
Sensor: Groups C, D T6		E5(2)	-	E5	-	-	-	-
Explosion-Proof with Intrinsically Safe Output								
Trans: Groups C, D T6		E5(2)(3)	-	E5(3)	-	-	-	-
Sensor: Groups C, D T6		E5(2)	-	E5	-	-	-	-
Suitable for Class I, Division 2								
Non-Flammable Fluids								
Trans: Groups A,B,C,D T4		N0	N0	N0	N0	N0	N0	N0
Sensor: Groups A,B,C,D T5		N0	N0(4)	N0	N0	N0(4)	N0	N0(4)
Flammable Fluids								
Trans: Groups A,B,C,D T4		N5	N5	N5	N5	N5	N5	N5
Sensor: Groups A,B,C,D T5		N5	N5(4)	N5	N5	N5(4)	N5	N5(4)
Non-Flammable Fluids with Intrinsically Safe Output								
Trans: Groups A,B,C,D T4		N0(3)	N0(3)	N0(3)	-	-	-	-
Sensor: Groups A,B,C,D T5		N0	N0(4)	N0	-	-	-	-
Other Certifications		**Product Certification Code**(5)						
Canadian Registration Number (CRN)		CR	CR	Standard	CR	CR	Standard	CR
European Pressure Equipment Directive (PED)		PD	-	PD	PD	-	PD	-
NSF 61 Drinking Water(6)		DW	-	DW	DW	-	DW	-

(1) Remote Transmitter Only.
(2) Available in line sizes 0.5-in. to 8-in. (15 mm to 200 mm) only.
(3) For I.S. Output, Output Code B or F must be ordered.
(4) 8707 Sensor has Temp Code - T3C.
(5) Product Certification Codes are added to the Sensor model number only.
(6) Only available with PTFE or Polyurethane Lining Material and 316L SST Electrodes.

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Table B-2. Canadian Standards Association (CSA) Approvals Offering

	Transmitter	**8732E**			**8712E[1]**			**8712H[1]**
	Sensor	**8705**	**8707**	**8711**	**8705**	**8707**	**8711**	**8707**
Hazardous Area Approval Code								
Non-Classified Locations								
Transmitter		NA	-	NA	NA	-	NA	-
Sensor		NA	-	NA	NA	-	NA	-
Suitable for Class I, Division 2								
Non-Flammable Fluids								
Trans: Groups A,B,C,D T4		N0	N0	N0	N0	N0	N0	N0
Sensor: Groups A,B,C,D T5		N0	N0[2]	N0	N0	N0[2]	N0	N0[2]
Other Certifications		**Product Certification Code[3]**						
Canadian Registration Number (CRN)		CR	CR	Standard	CR	CR	Standard	CR
European Pressure Equipment Directive (PED)		PD	-	PD	PD	-	PD	-
NSF 61 Drinking Water[4]		DW	-	DW	DW	-	DW	-

(1) Remote Transmitter Only.
(2) 8707 Sensor has Temp Code - T3C.
(3) Product Certification Codes are added to the Sensor model number only.
(4) Only available with PTFE or Polyurethane Lining Material and 316L SST Electrodes.

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Table B-3. ATEX Approvals Offering

	Transmitter	**8732E**		**8712E**(1)	
	Sensor	**8705**	**8711**	**8705**	**8711**
Hazardous Area Approval Code					
Non-Hazardous					
Trans: LVD and EMC		NA	NA	NA	NA
Sensor: LVD and EMC		NA	NA	NA	NA
Equipment Category 2					
Gas Group IIB					
Trans: Ex d IIB T6		ED	ED	-	-
Sensor: Ex e ia IIC T3...T6		KD(2)	KD(2)	-	-
Gas Group IIC					
Trans: Ex d IIC T6		E1	E1	-	-
Sensor: Ex e ia IIC T3...T6		E1	E1	-	-
Gas Group IIB with Intrinsically Safe Output					
Trans: Ex de [ia] IIB T6		ED(3)	ED(3)	-	-
Sensor: Ex e ia IIC T3...T6		KD(2)	KD(2)	-	-
Gas Group IIC with Intrinsically Safe Output					
Trans: Ex de [ia] IIC T6		E1(3)	E1(3)	-	-
Sensor: Ex e ia IIC T3...T6		E1	E1	-	-
Equipment Category 3					
Gas Group IIC					
Trans: Ex nA nL IIC T4		N1	N1	N1	N1
Sensor: Ex nA [L] IIC T3...T6		N1	N1	N1	N1
Equipment Category 1 - Dust Environment					
Dust Environment Only					
Trans: Dust Ignition Proof		ND	ND	-	-
Sensor: Dust Ignition Proof		ND	ND	-	-
Other Certifications		**Product Certification Code**(4)			
Canadian Registration Number (CRN)		CR	Standard	CR	Standard
European Pressure Equipment Directive (PED)		PD	PD	PD	PD
NSF 61 Drinking Water(5)		DW	DW	DW	DW

(1) Remote Transmitter Only.
(2) With integral mount transmitter, approval is valid for Gas Group IIB.
(3) For I.S. Output, Output Code B or F must be ordered.
(4) Product Certification Codes are added to the Sensor model number only.
(5) Only available with PTFE or Polyurethane Lining Material and 316L SST Electrodes.

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Table B-4. IECEx Approvals Offering

	Transmitter	**8732E[1]**		**8712E**	
	Sensor	**8705**	**8711**	**8705**	**8711**
Hazardous Area Approval Code					
Non-Hazardous					
Trans: Low Voltage and EMC		NA	NA	NA	NA
Sensor: Low Voltage and EMC		NA	NA	NA	NA
Suitable for Zone 1					
Gas Group IIB					
Trans: Ex d IIB T6		EF	EF		
Gas Group IIC					
Trans: Ex d IIC T6		E7	E7		
Gas Group IIB with Intrinsically Safe Output					
Trans: Ex de [ia] IIB T6		EF[2]	EF[3]		
Gas Group IIC with Intrinsically Safe Output					
Trans: Ex de [ia] IIC T6		E1[3]	E1[3]		
Suitable for Zone 2					
Gas Group IIC					
Trans: Ex nA nL IIC T4		N7	N7	N7	N7
Suitable for Zone 20					
Dust Environment Only					
Trans: Dust Ignition Proof		NF	NF		
Other Certifications		**Product Certification Code[3]**		**Product Certification Code[4]**	
Canadian Registration Number (CRN)		CR	Standard	CR	Standard
European Pressure Equipment Directive (PED)		PD	PD	PD	PD
NSF 61 Drinking Water[5]		DW	DW	DW	DW

(1) Available in remote mount configuration only. Requires equivalent ATEX approval on the sensor.
(2) For I.S. Output, Output Code B or F must be ordered.
(3) Product Certification Codes are added to the Sensor model number only.
(4) Product Certification Codes are added to the Sensor model number only.
(5) Only available with PTFE or Polyurethane Lining Material and 316L SST Electrodes.

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HAZARDOUS LOCATION CERTIFICATIONS

Equivalent Hazardous Location Certifications for sensor and transmitter must match in integrally-mounted magnetic flowmeter systems. Remote-mounted systems do not require matched hazardous location certification option codes.

North American Certifications

Factory Mutual (FM)

N0 **Division 2 Approval for Non-Flammable Fluids (All Sensors)**

Class I, Division 2, Groups A, B, C, D
Temp Code – T5 (8705/8711 at 60 °C)
Temp Code – T3C (8707 at 60 °C)

Dust-Ignition proof Class II/III, Division 1, Groups E, F, G
Temp Code – T6 (8705/8711 at 60 °C)
Temp Code – T3C (8707 at 60 °C)

Enclosure Type 4X

N0 **for 8721 Hygienic Sensor**

Factory Mutual (FM) Ordinary Location;
CE Marking; 3-A Symbol Authorization #1222;
EHEDG Type EL

N5 **Division 2 Approval for Flammable Fluids (All Sensors)**

Class I, Division 2, Groups A, B, C, D
Temp Code – T5 (8705/8711 at 60 °C)
Temp Code – T3C (8707 at 60 °C)

Dust-Ignition proof Class II/III, Division 1, Groups E, F, G
Temp Code – T6 (8705/8711 at 60 °C)
Temp Code – T3C (8707 at 60 °C)

Enclosure Type 4X

E5 Explosion-Proof (8705 and 8711 Only)

Explosion-Proof for Class I, Division 1, Groups C, D
Temp Code – T6 at 60 °C

Dust-Ignition proof Class II/III, Division 1, Groups E, F, G
Temp Code – T6 at 60 °C

Class I, Division 2, Groups A, B, C, D
Temp Code – T5 at 60 °C

Enclosure Type 4X

Canadian Standards Association (CSA)

N0 Suitable for Class I, Division 2, Groups A, B, C, D
Temp Code – T5 (8705/8711 at 60 °C)
Temp Code – T3C (8707 at 60 °C)

Dust-Ignition proof Class II/III, Division 1, Groups E, F, G

Enclosure Type 4X

N0 **for 8721 Hygienic Sensor**

Canadian Standards Association (CSA) Ordinary Location;
CE Marking; 3-A Symbol Authorization #1222;
EHEDG Type EL

European Certifications

ND ATEX Dust Certificate No.: KEMA 06ATEX0006
Ⓔx II 1D Ex tD A20 IP6x T105°C (-50 ≤ T_{amb} ≤ 65 °C)
CE 0575

INSTALLATION INSTRUCTIONS

The cable and conduit entry devices and blanking elements shall be of a certified IP6x type, suitable for the conditions of use and correctly installed. At maximum ambient temperatures or at process temperatures above 60 °C heat resistant cables with a temperature rating of at least 90 °C shall be used.

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N1 ATEX Non-Sparking/Non-incendive

Certificate No: KEMA02ATEX1302X ⟨Ex⟩ II 3G
EEx nA [L] IIC T3... T6
Ambient Temperature Limits -20 to 65 °C

SPECIAL CONDITIONS FOR SAFE USE (X):

The relation between ambient temperature, process temperature, and temperature class is to be taken from Table B-7. The electrical data is to be taken from the summary in Table B-5.

E1, ATEX Increased Safety with IS Electrodes

KD Certificate No: KEMA03ATEX2052X ⟨Ex⟩ II 1/2G
EEx e ia IIC T3... T6 (Ta = -20 to +60°)
CE 0575
V_{max} = 40 V

SPECIAL CONDITIONS FOR SAFE USE (X):

The relation between ambient temperature, process temperature, and temperature class is to be taken from Table B-6. The electrical data is to be taken from the summary in Table B-5.

INSTALLATION INSTRUCTIONS:

At ambient temperature above 50 °C, the flowmeter shall be used with heat resistant cables with a temperature rating of at least 90 °C.
A fuse with a rating of maximum 0,7 A according to IEC 60127-1 shall be included in the coil excitation circuit if the sensors are used with other flow transmitters (e.g. Rosemount 8712).

International Certifications

IECEX

NF IECEx Dust

Certificate Number: IECEx KEM 09.0078
Ex tD A20 IP6x T105 °C (-50 ≤ T_{amb} ≤ 65 °C)

INSTALLATION INSTRUCTIONS:

The cable and conduit entry devices and blanking elements shall be of a certified IP6x type, suitable for the conditions of use and correctly installed. At maximum ambient temperatures or at process temperatures above 60 °C heat, resistant cables with a temperature rating of at least 90 °C shall be used.

NEPSI - China

E3, NEPSI Increased Safety with IS Electrodes

EP Certificate No: GYJ071438X
Ex e ia IIC T3... T6 (Ta = -20 to +60°)
V_{max} = 40 V

InMetro - Brazil

E2, InMetro Increased Safety with IS Electrodes

EB Certificate No: NCC 5030/08
BR-Ex e ia IIC T3... T6 (Ta = -20 to +60°)
V_{max} = 40 V

KOSHA - Korea

E9, KOSHA Increased Safety with IS Electrodes

EK Certificate No: 2005-2233-Q1X
Ex e ia IIC T3... T6 (Ta = -20 to +60°)
V_{max} = 40 V

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Table B-5. Electrical Data

Rosemount 8732 Flow Transmitter	
Power supply:	250 V AC, 1 A or 42 V DC, 1 A, 20 W maximum
Pulsed output circuit:	30 V DC (pulsed), 0,25 A, 7,5 W maximum
4-20 mA output circuit:	30 V DC, 30 mA, 900 mW maximum
Rosemount 8705 and 8711 Sensors	
Coil excitation circuit:	40 V 0,5 A, 20 W maximum
Electrode circuit:	in type of explosion protection intrinsic safety EEx ia IIC, U_i = 5 V, I_i = 0.2 mA, P_i = 1 mW, U_m = 250 V

Table B-6. Relation between ambient temperature, process temperature, and temperature class(1)

Meter Size (Inches)	Maximum Ambient Temperature	Maximum Process Temperature	Temperature Class
1/2	149°F (65°C)	239°F (115°C)	T3
1	149°F (65°C)	248°F (120°C)	T3
1	95°F (35°C)	95°F (35°C)	T4
1 1/2	149°F (65°C)	257°F (125°C)	T3
1 1/2	122°F (50°C)	148°F (60°C)	T4
2	149°F (65°C)	257°F (125°C)	T3
2	149°F (65°C)	167°F (75°C)	T4
2	104°F (40°C)	104°F (40°C)	T5
3 - 4	149°F (65°C)	266°F (130°C)	T3
3 - 4	149°F (65°C)	194°F (90°C)	T4
3 - 4	131°F (55°C)	131°F (55°C)	T5
3 - 4	104°F (40°C)	104°F (40°C)	T6
6	149°F (65°C)	275°F(135°C)	T3
6	149°F (65°C)	230°F (110°C)	T4
6	149°F (65°C)	167°F (75°C)	T5
6	140°F (60°C)	140°F (60°C)	T6
8-60	149°F (65°C)	284°F (140°C)	T3
8-60	149°F (65°C)	239°F (115°C)	T4
8-60	149°F (65°C)	176°F (80°C)	T5
8-60	149°F (65°C)	149°F (65°C)	T6

Table B-7. Relation between the maximum ambient temperature, the maximum process temperature, and the temperature class(2)

Maximum Ambient Temperature	Maximum process temperature °F (°C) per temperature class			
	T3	T4	T5	T6
0.5 in. sensor size				
149°F (65°C)	297°F (147°C)	138°F (59°C)	54°F (12°C)	18°F (-8°C)
140°F (60°C)	309°F (154°C)	151°F (66°C)	66°F (19°C)	28°F (-2°C)
131°F (55°C)	322°F (161°C)	163°F (73°C)	79°F (26°C)	41°F (5°C)
122°F (50°C)	334°F (168°C)	176°F (80°C)	90°F (32°C)	54°F (12°C)
113°F (45°C)	347°F (175°C)	189°F (87°C)	102°F (39°C)	66°F (19°C)
104°F (40°C)	351°F (177°C)	199°F (93°C)	115°F (46°C)	79°F (26°C)
95°F (35°C)	351°F (177°C)	212°F (100°C)	127°F (53°C)	90°F (32°C)
86°F (30°C)	351°F (177°C)	225°F (107°C)	138°F (59°C)	102°F (39°C)
77°F (25°C)	351°F (177°C)	237°F (114°C)	151°F (66°C)	115°F (46°C)
68°F (20°C)	351°F (177°C)	248°F (120°C)	163°F (73°C)	127°F (53°C)
149°F (65°C)	318°F (159°C)	158°F (70°C)	72°F (22°C)	34°F (1°C)
140°F (60°C)	331°F (166°C)	171°F (77°C)	84°F (29°C)	46°F (8°C)

(1) This table is applicable for the E1 and KD approval codes only.

(2) This table is applicable for N1 option codes only.

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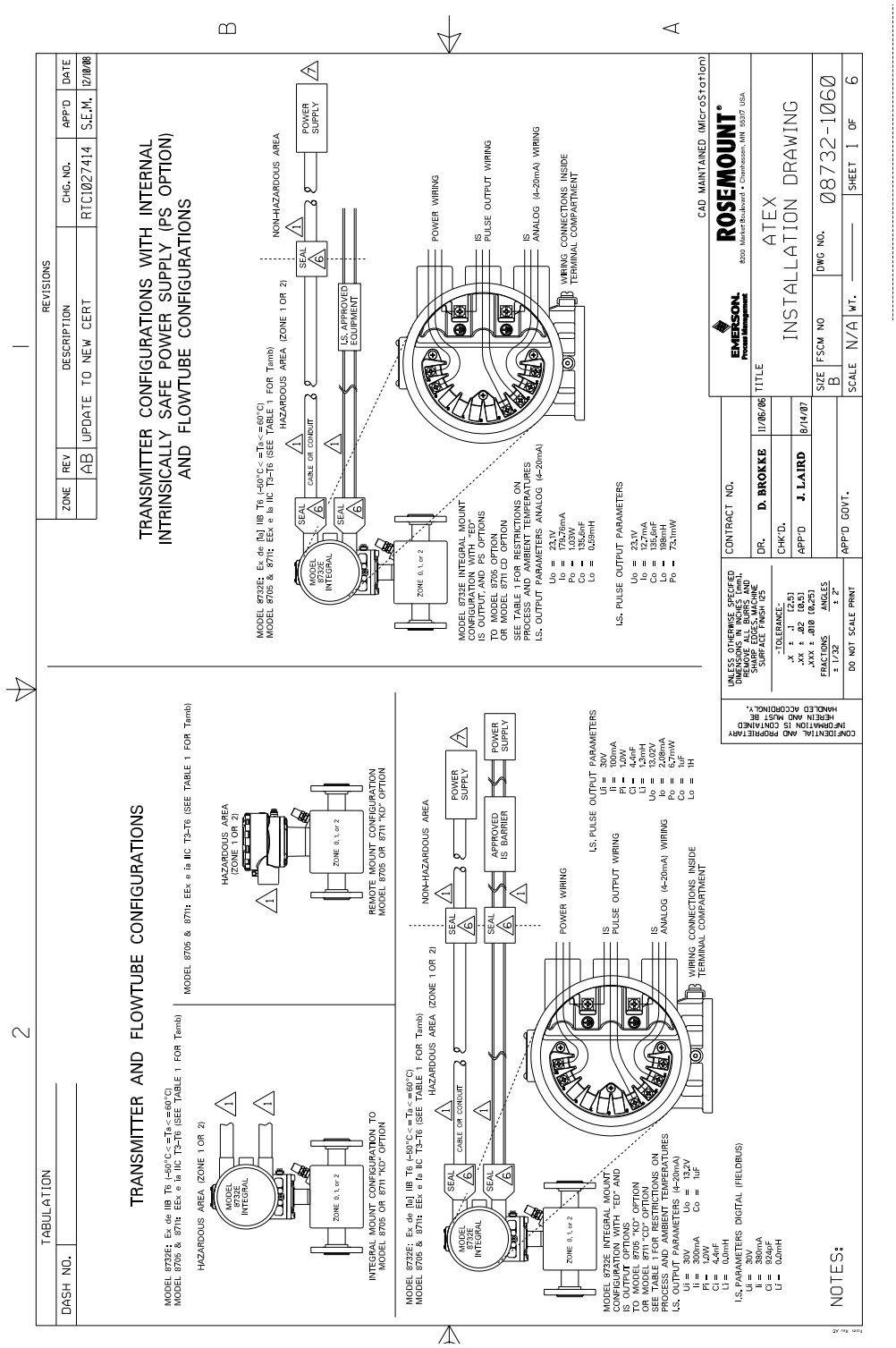
Maximum Ambient Temperature	Maximum process temperature °F (°C) per temperature class			
	T3	T4	T5	T6
1.0 in. sensor size				
131°F (55°C)	343°F (173°C)	183°F (84°C)	97°F (36°C)	59°F (15°C)
122°F (50°C)	351°F (177°C)	196°F (91°C)	109°F (43°C)	72°F (22°C)
113°F (45°C)	351°F (177°C)	207°F (97°C)	122°F (50°C)	84°F (29°C)
104°F (40°C)	351°F (177°C)	219°F (104°C)	135°F (57°C)	97°F (36°C)
95°F (35°C)	351°F (177°C)	232°F (111°C)	145°F (63°C)	109°F (43°C)
86°F (30°C)	351°F (177°C)	244°F (118°C)	158°F (70°C)	122°F (50°C)
77°F (25°C)	351°F (177°C)	257°F (125°C)	171°F (77°C)	135°F (57°C)
68°F (20°C)	351°F (177°C)	270°F (132°C)	183°F (84°C)	145°F (63°C)
1.5 in. sensor size				
149°F (65°C)	297°F (147°C)	160°F (71°C)	88°F (31°C)	55°F (13°C)
140°F (60°C)	307°F (153°C)	171°F (77°C)	97°F (36°C)	66°F (19°C)
131°F (55°C)	318°F (159°C)	181°F (83°C)	108°F (42°C)	77°F (25°C)
122°F (50°C)	329°F (165°C)	192°F (89°C)	118°F (48°C)	88°F (31°C)
113°F (45°C)	340°F (171°C)	203°F (95°C)	129°F (54°C)	97°F (36°C)
104°F (40°C)	351°F (177°C)	214°F (101°C)	140°F (60°C)	108°F (42°C)
95°F (35°C)	351°F (177°C)	223°F (106°C)	151°F (66°C)	118°F (48°C)
86°F (30°C)	351°F (177°C)	234°F (112°C)	160°F (71°C)	129°F (54°C)
77°F (25°C)	351°F (177°C)	244°F (118°C)	171°F (77°C)	140°F (60°C)
68°F (20°C)	351°F (177°C)	255°F (124°C)	181°F (83°C)	151°F (66°C)
2.0 in. sensor size				
149°F (65°C)	289°F (143°C)	163°F (73°C)	95°F (35°C)	66°F (19°C)
140°F (60°C)	300°F (149°C)	172°F 78(°C)	104°F (40°C)	75°F (24°C)
131°F (55°C)	309°F (154°C)	183°F (84°C)	115°F (46°C)	84°F (29°C)
122°F (50°C)	318°F (159°C)	192°F (89°C)	124°F (51°C)	95°F (35°C)
113°F (45°C)	329°F (165°C)	201°F (94°C)	135°F (57°C)	104°F (40°C)
104°F (40°C)	338°F (170°C)	212°F (100°C)	144°F (62°C)	115°F (46°C)
95°F (35°C)	349°F (176°C)	221°F (105°C)	153°F (67°C)	124°F (51°C)
86°F (30°C)	351°F (177°C)	232°F (111°C)	163°F (73°C)	135°F (57°C)
77°F (25°C)	351°F (177°C)	241°F (116°C)	172°F (78°C)	144°F (62°C)
68°F (20°C)	351°F (177°C)	252°F (122°C)	183°F (84°C)	153°F (67°C)
3 to 60 in. sensor size				
149°F (65°C)	351°F (177°C)	210°F (99°C)	117°F (47°C)	75°F (24°C)
140°F (60°C)	351°F (177°C)	223°F (106°C)	129°F (54°C)	90°F (32°C)
131°F (55°C)	351°F (177°C)	237°F (114°C)	144°F (62°C)	102°F (39°C)
122°F (50°C)	351°F (177°C)	250°F (121°C)	156°F (69°C)	117°F (47°C)
113°F (45°C)	351°F (177°C)	264°F (129°C)	171°F (77°C)	129°F (54°C)
104°F (40°C)	351°F (177°C)	266°F (130°C)	183°F (84°C)	144°F (62°C)
95°F (35°C)	351°F (177°C)	266°F (130°C)	198°F (92°C)	156°F (69°C)
86°F (30°C)	351°F (177°C)	266°F (130°C)	203°F (95°C)	171°F (77°C)
77°F (25°C)	351°F (177°C)	266°F (130°C)	203°F (95°C)	176°F (80°C)
68°F (20°C)	351°F (177°C)	266°F (130°C)	203°F (95°C)	176°F (80°C)

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Maximum Ambient Temperature	Maximum process temperature °F (°C) per temperature class			
	T3	T4	T5	T6
2.0 in. sensor size				
149°F (65°C)	289°F (143°C)	163°F (73°C)	95°F (35°C)	66°F (19°C)
140°F (60°C)	300°F (149°C)	172°F 78(°C)	104°F (40°C)	75°F (24°C)
131°F (55°C)	309°F (154°C)	183°F (84°C)	115°F (46°C)	84°F (29°C)
122°F (50°C)	318°F (159°C)	192°F (89°C)	124°F (51°C)	95°F (35°C)
113°F (45°C)	329°F (165°C)	201°F (94°C)	135°F (57°C)	104°F (40°C)
104°F (40°C)	338°F (170°C)	212°F (100°C)	144°F (62°C)	115°F (46°C)
95°F (35°C)	349°F (176°C)	221°F (105°C)	153°F (67°C)	124°F (51°C)
86°F (30°C)	351°F (177°C)	232°F (111°C)	163°F (73°C)	135°F (57°C)
77°F (25°C)	351°F (177°C)	241°F (116°C)	172°F (78°C)	144°F (62°C)
68°F (20°C)	351°F (177°C)	252°F (122°C)	183°F (84°C)	153°F (67°C)
3 to 60 in. sensor size				
149°F (65°C)	351°F (177°C)	210°F (99°C)	117°F (47°C)	75°F (24°C)
140°F (60°C)	351°F (177°C)	223°F (106°C)	129°F (54°C)	90°F (32°C)
131°F (55°C)	351°F (177°C)	237°F (114°C)	144°F (62°C)	102°F (39°C)
122°F (50°C)	351°F (177°C)	250°F (121°C)	156°F (69°C)	117°F (47°C)
113°F (45°C)	351°F (177°C)	264°F (129°C)	171°F (77°C)	129°F (54°C)
104°F (40°C)	351°F (177°C)	266°F (130°C)	183°F (84°C)	144°F (62°C)
95°F (35°C)	351°F (177°C)	266°F (130°C)	198°F (92°C)	156°F (69°C)
86°F (30°C)	351°F (177°C)	266°F (130°C)	203°F (95°C)	171°F (77°C)
77°F (25°C)	351°F (177°C)	266°F (130°C)	203°F (95°C)	176°F (80°C)
68°F (20°C)	351°F (177°C)	266°F (130°C)	203°F (95°C)	176°F (80°C)

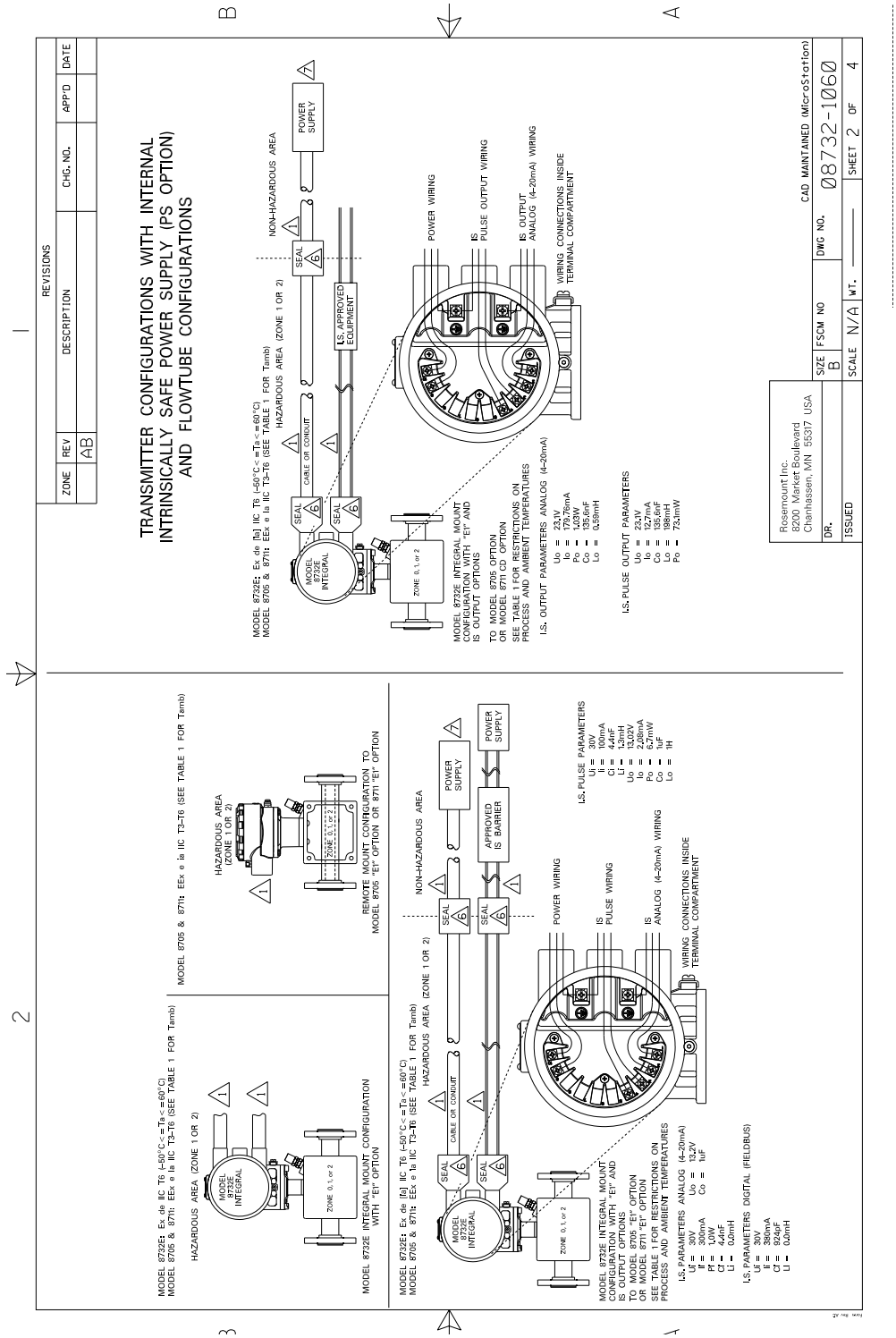
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Figure B-1. ATEX Installation Drawings



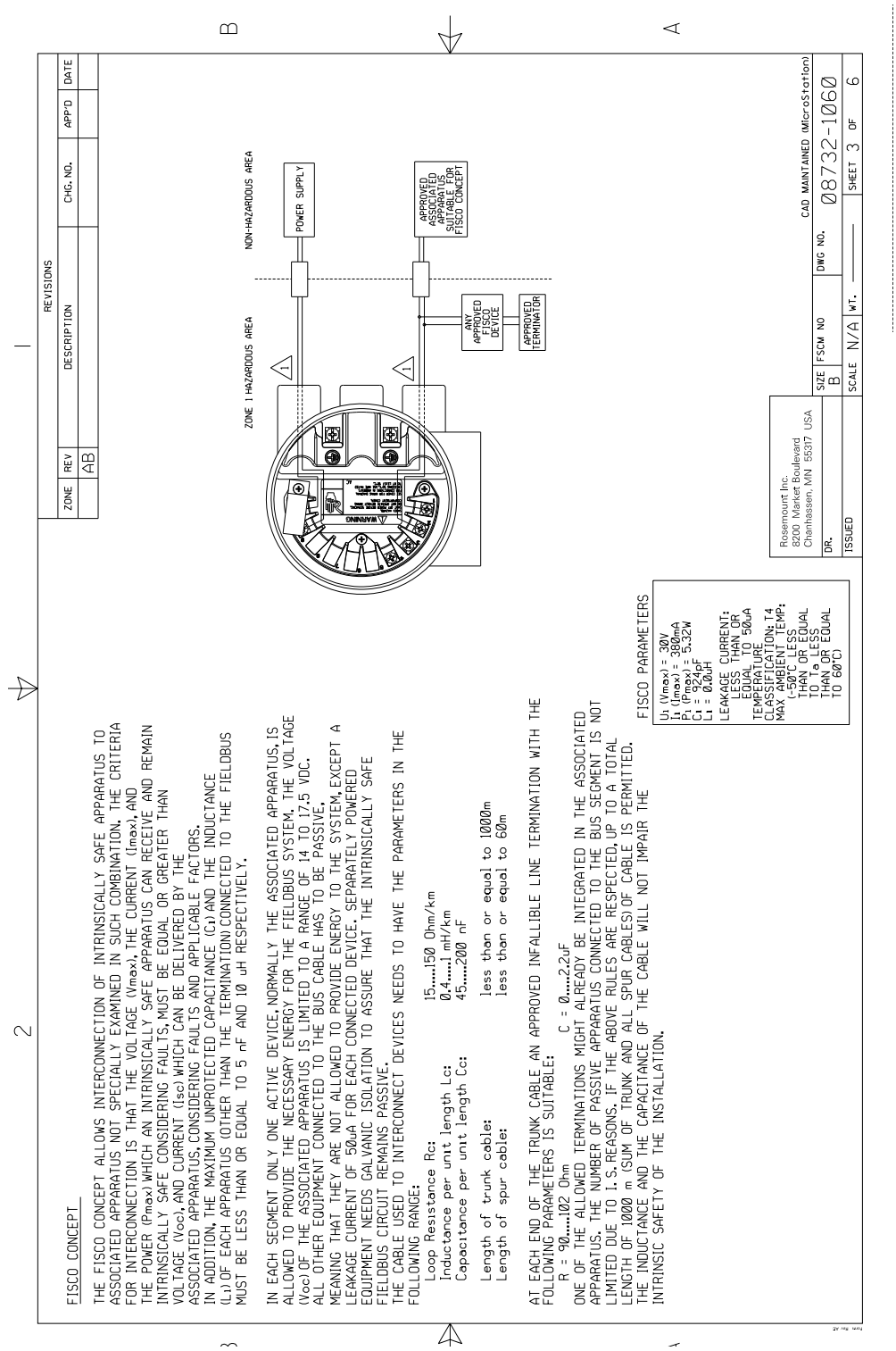
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Figure B-2. ATEX Installation Drawings (Cont.)



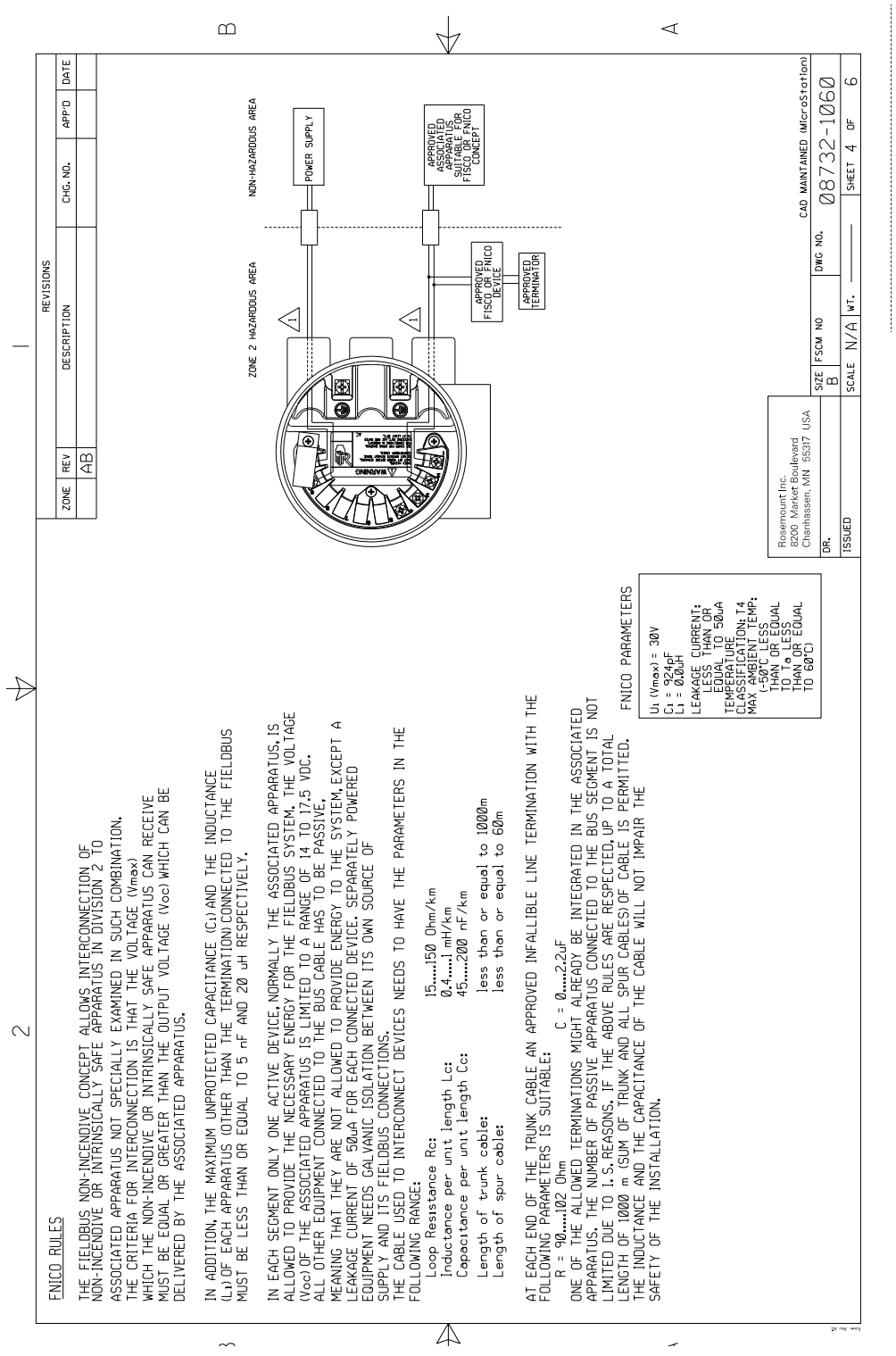
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Figure B-3. ATEX Installation Drawings (Cont.)



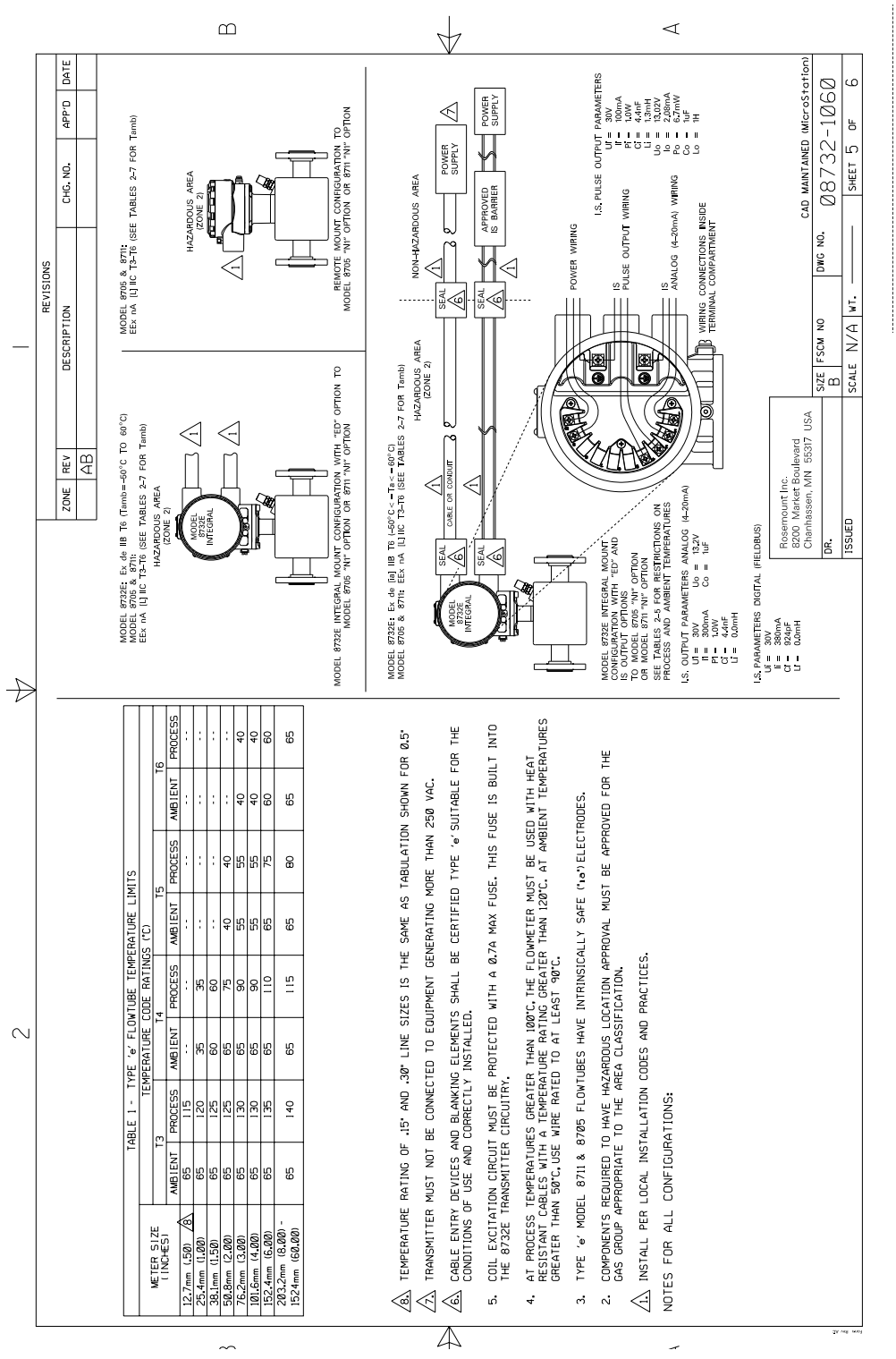
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Figure B-4. ATEX Installation Drawings (Cont.)



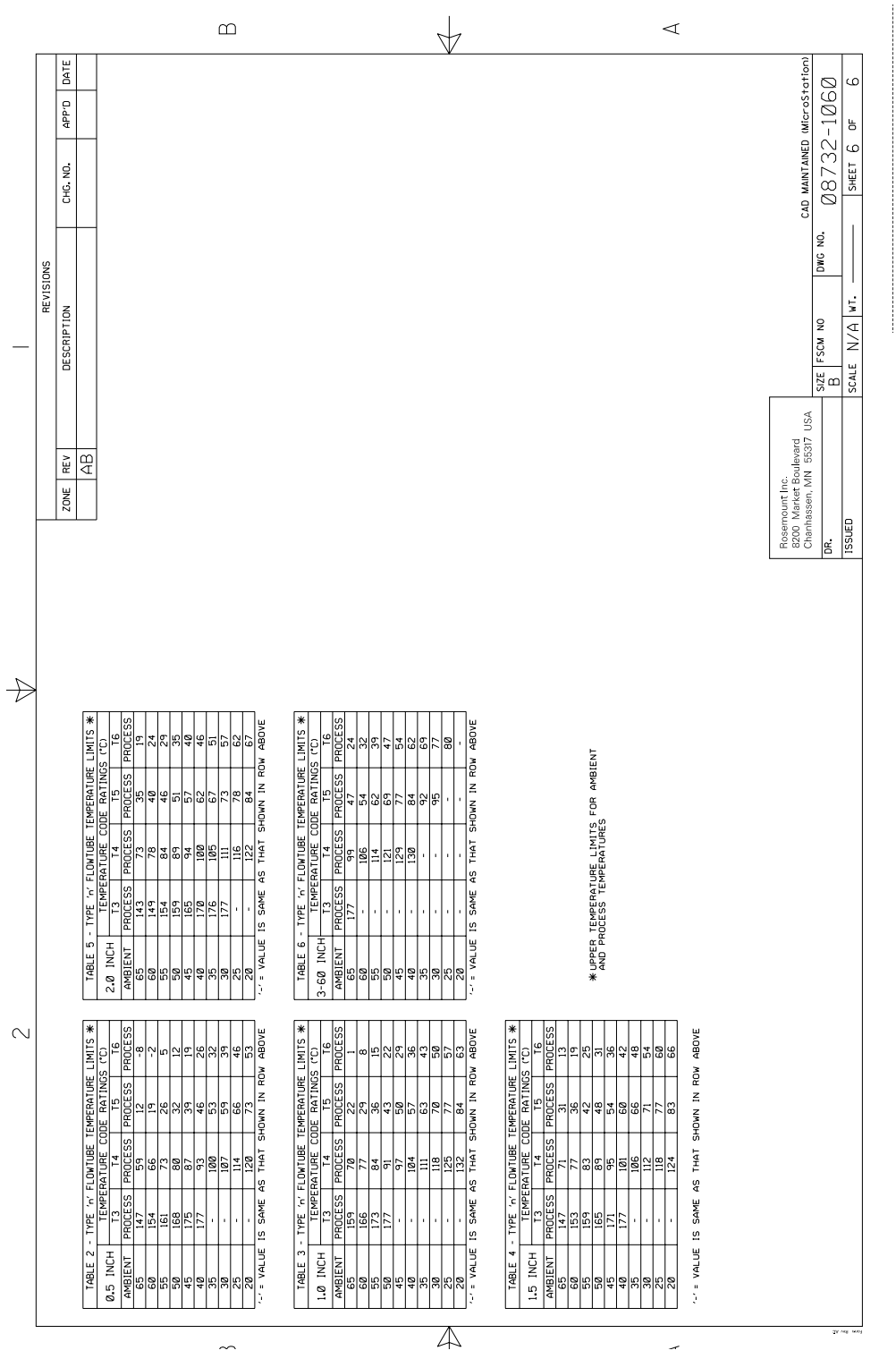
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Figure B-5. ATEX Installation Drawings (Cont.)



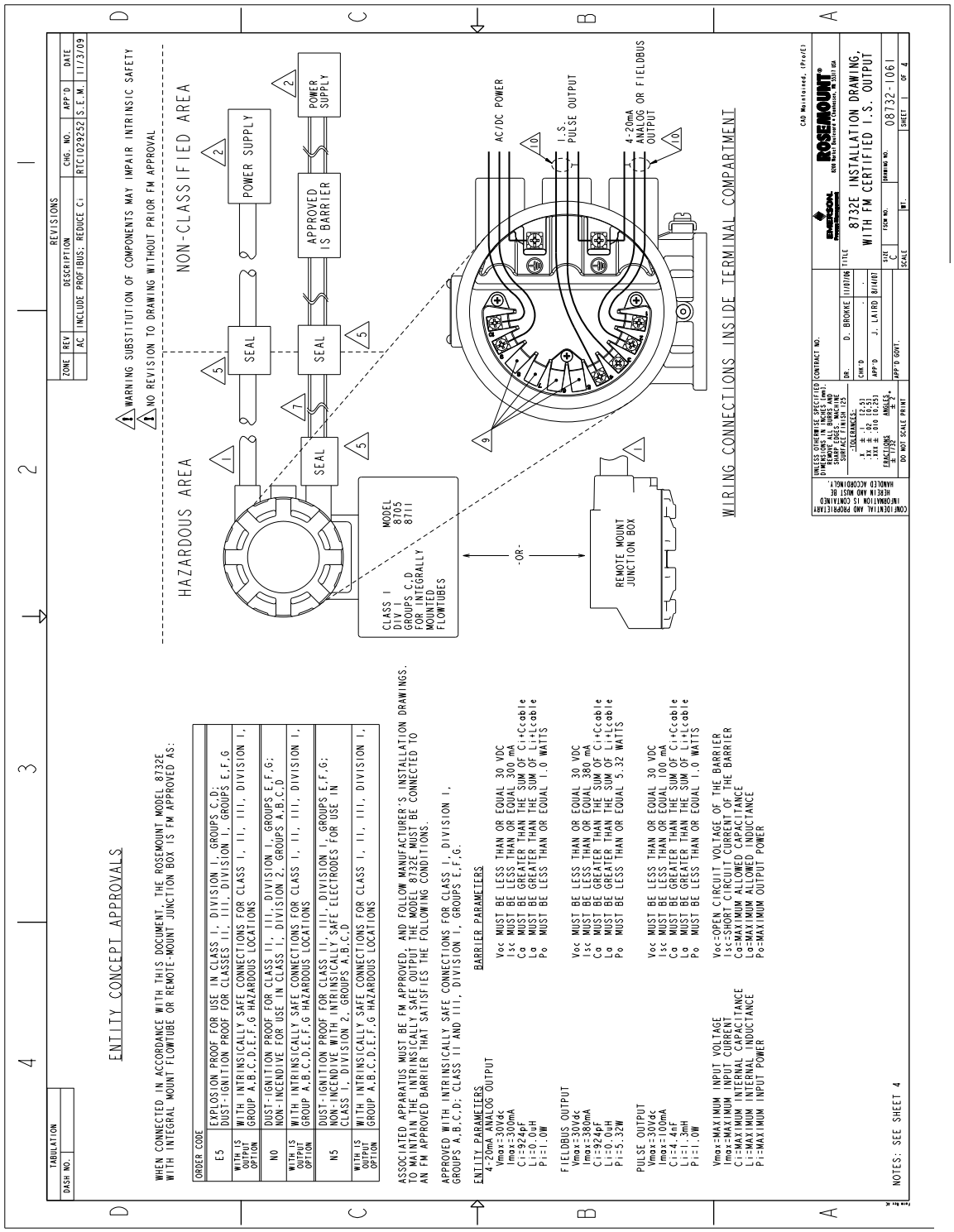
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Figure B-6. ATEX Installation Drawings (Cont.)



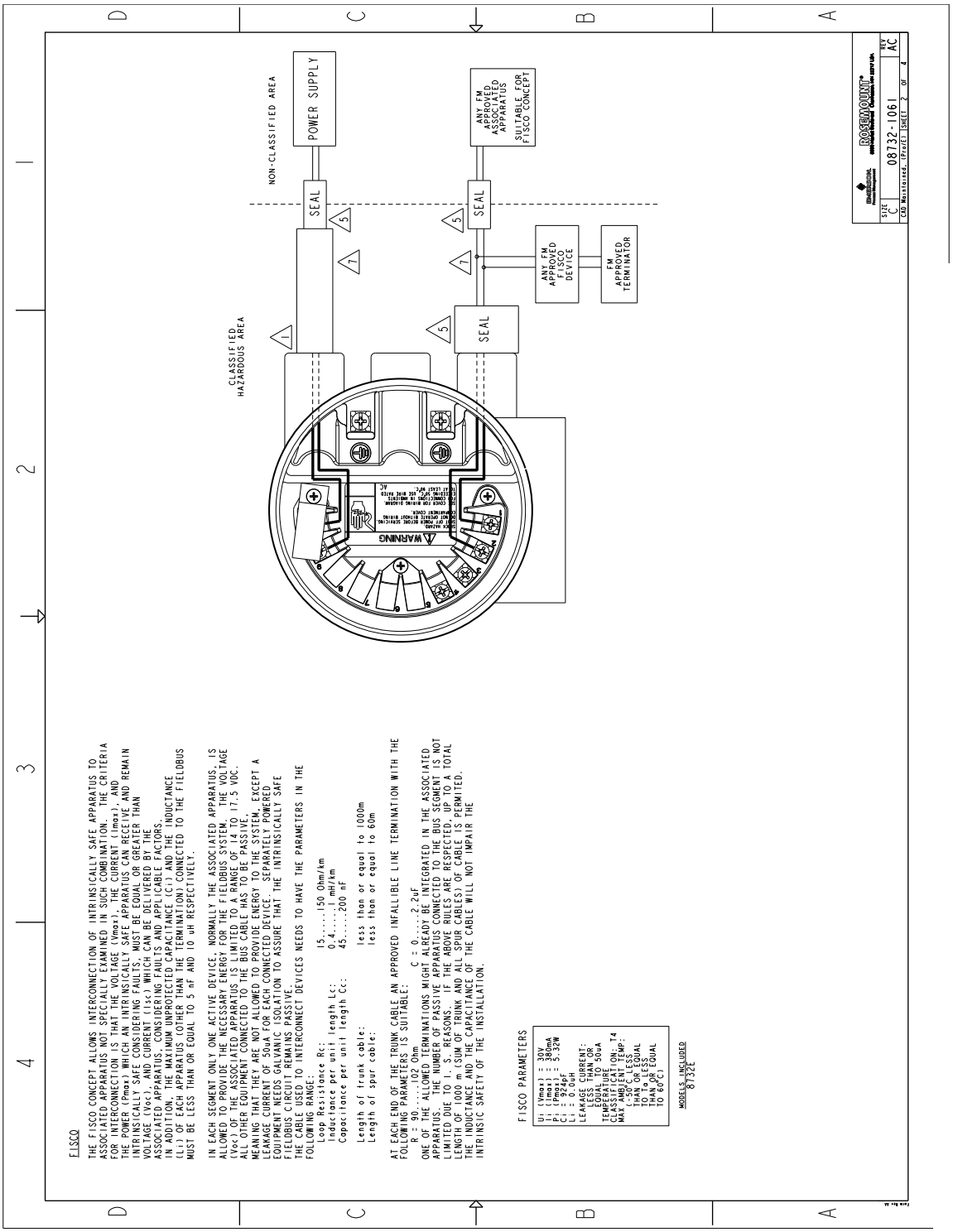
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Figure B-7. Installation Drawings with FM Certified I.S. Output



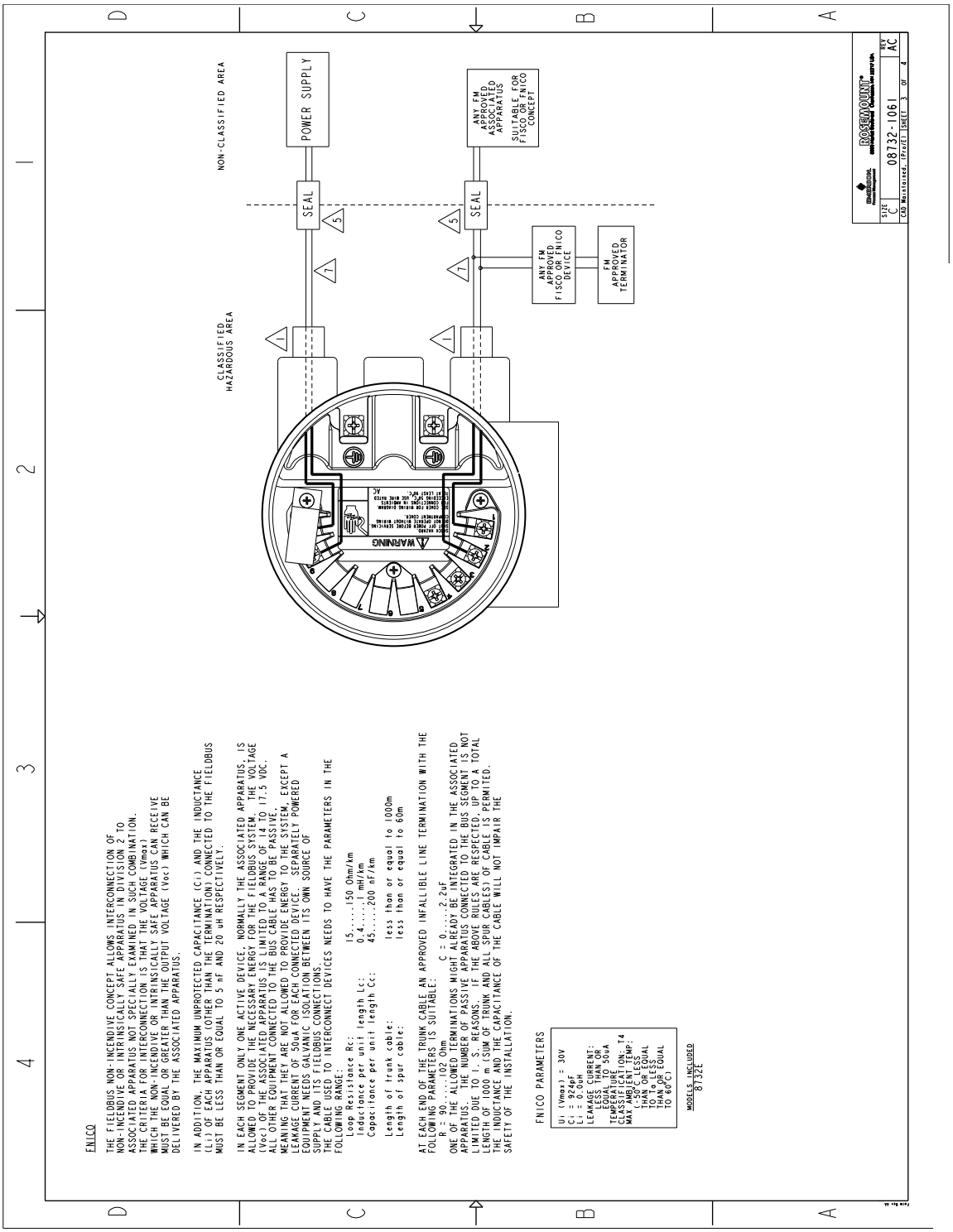
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Figure B-8. Installation Drawings with FM Certified I.S. Output (Cont.)



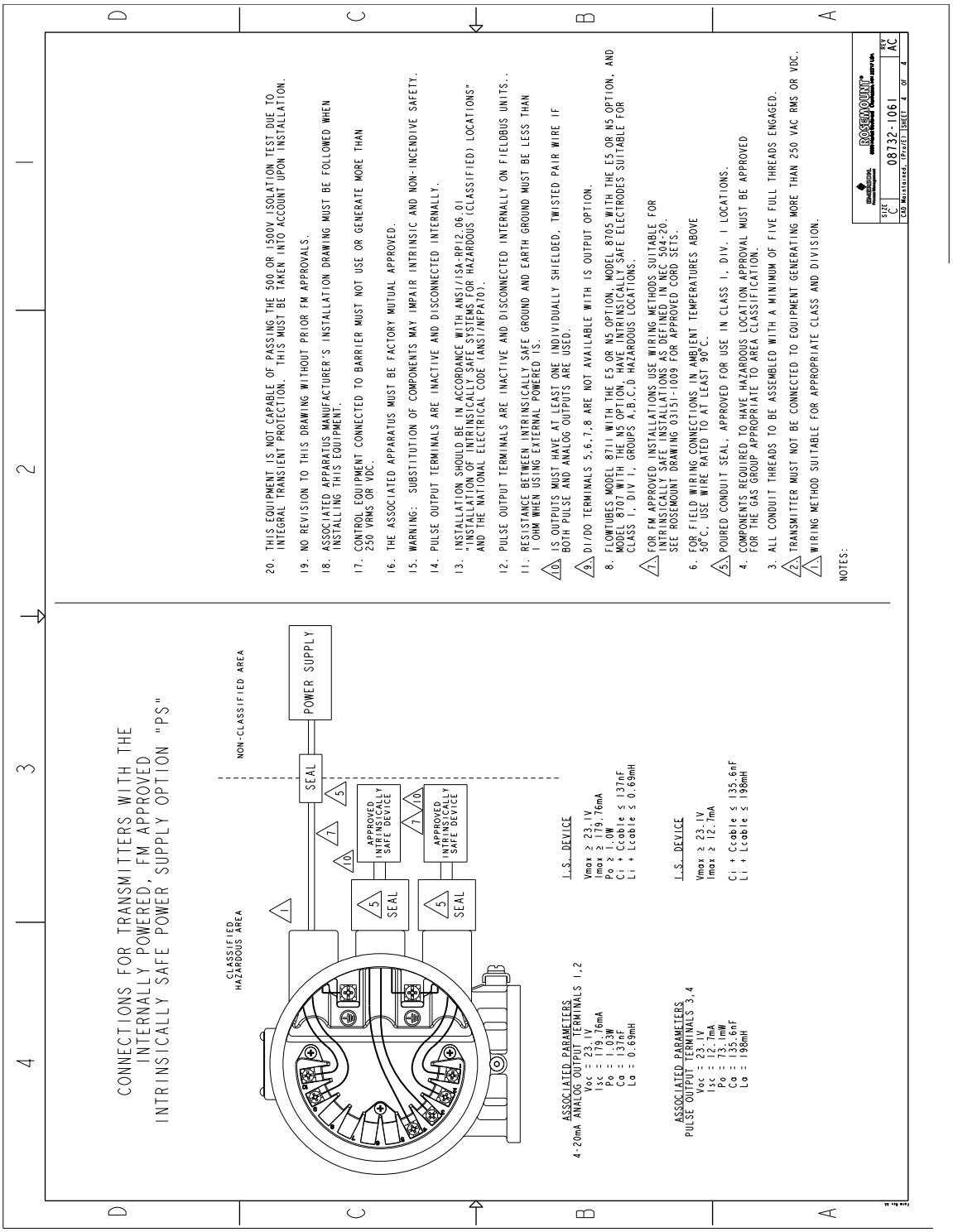
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Figure B-9. Installation Drawings with FM Certified I.S. Output (Cont.)



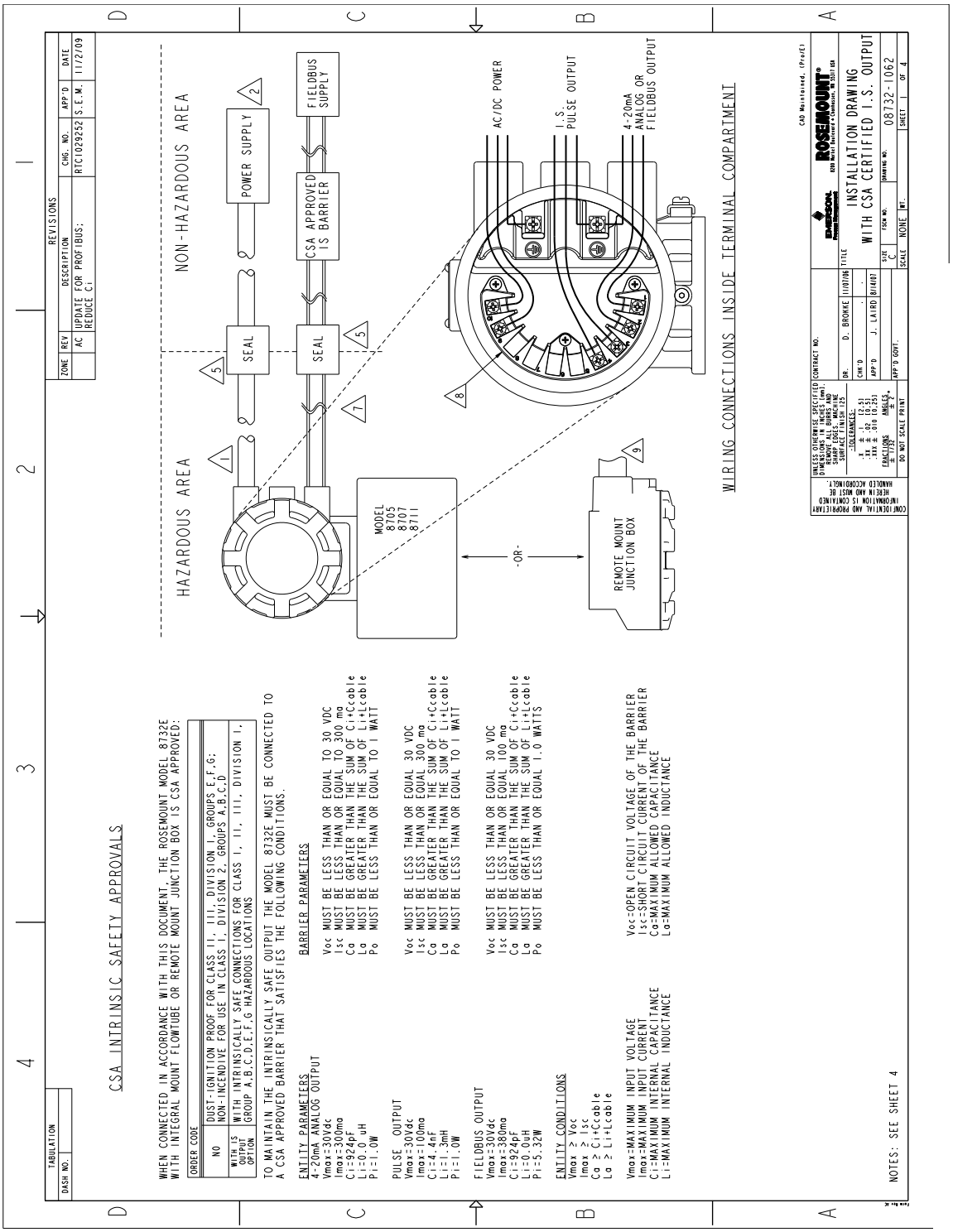
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Figure B-10. Installation Drawings with FM Certified I.S. Output (Cont.)



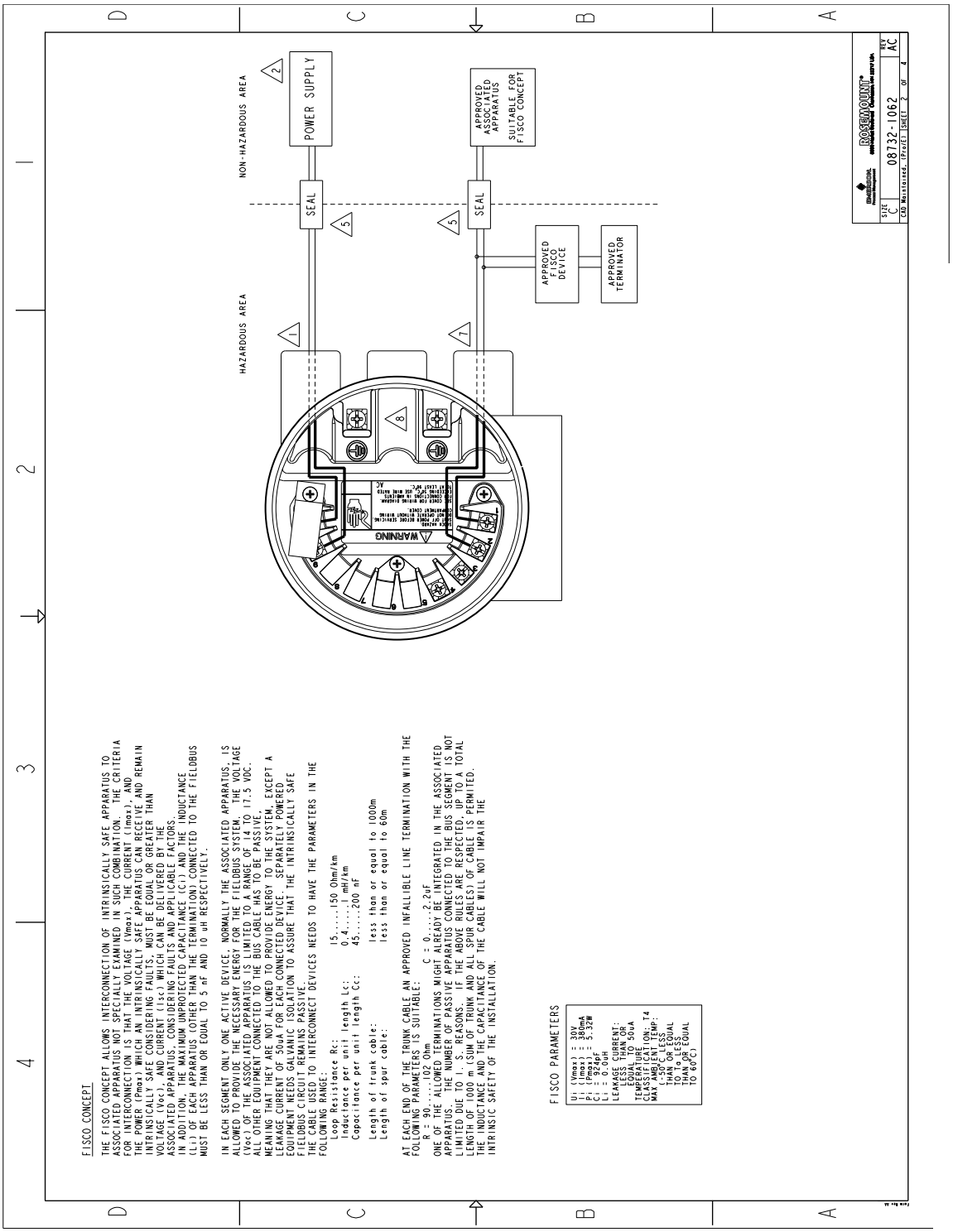
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Figure B-11. Installation Drawings with CSA Certified I.S. Output



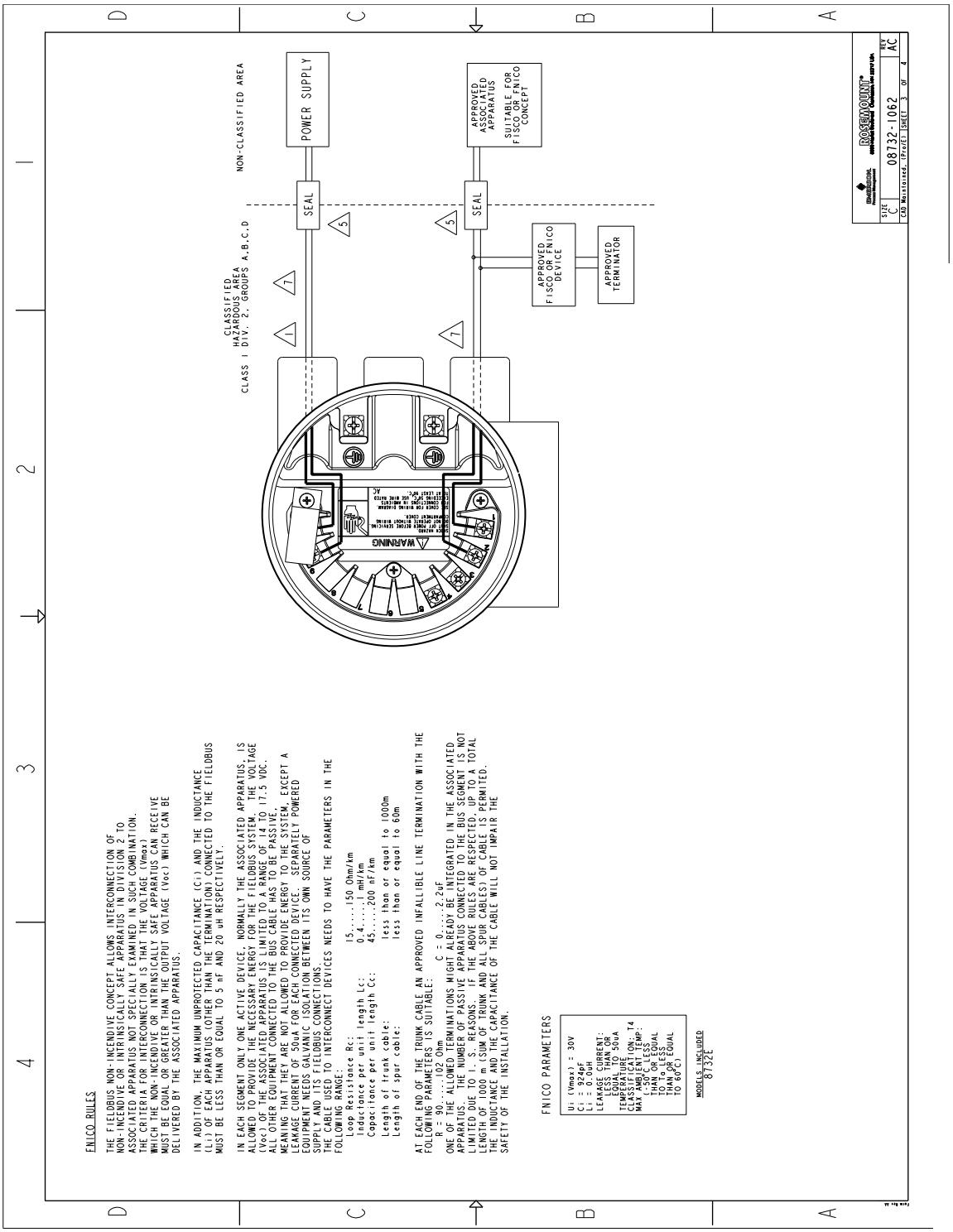
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Figure B-12. Installation Drawings with CSA Certified I.S. Output (Cont.)



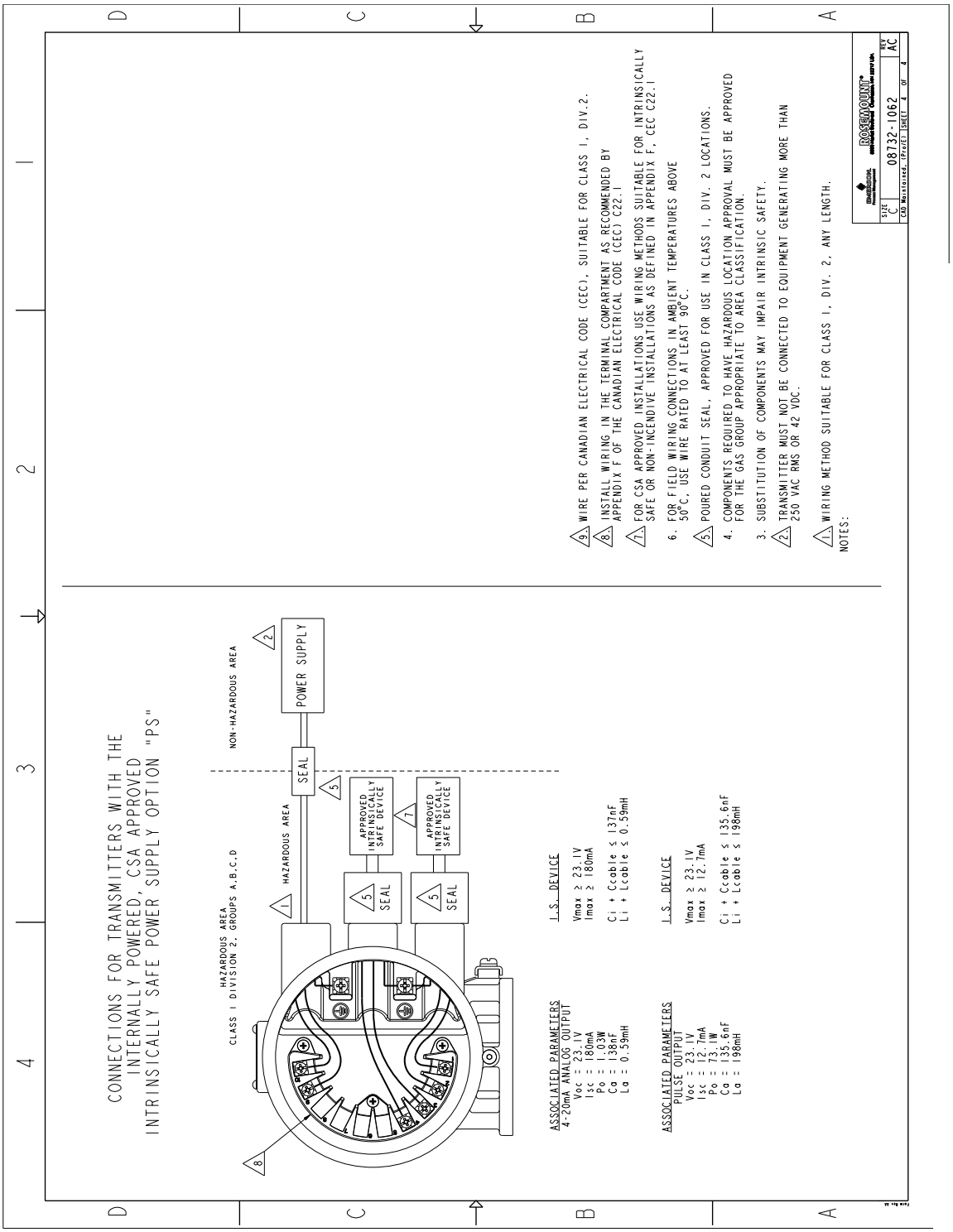
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Figure B-13. Installation Drawings with CSA Certified I.S. Output (Cont.)



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Figure B-14. Installation Drawings with CSA Certified I.S. Output (Cont.)



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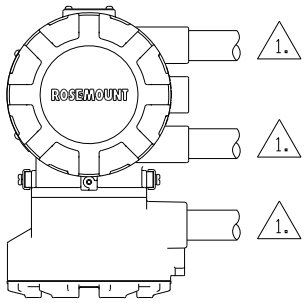
Figure B-15. Installation Drawings Hazardous (Classified Location)

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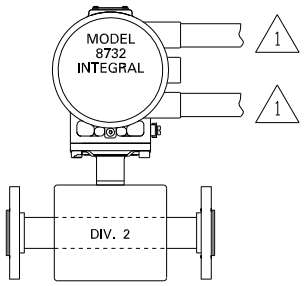
REVISIONS				
REV	DESCRIPTION	CHG. NO.	APP'D	DATE
AE	UPDATE TRANSMITTER, JUNCTION BOX VIEWS	RTC1029252	S.E.M.	10/12/09

HAZARDOUS (CLASSIFIED) LOCATION

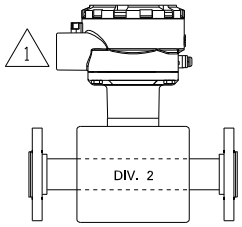
DUST-IGNITION PROOF FOR
CLASS II/III, DIV. 1, GROUPS E, F, & G;
SUITABLE FOR
CLASS I, DIV. 2, GROUPS A, B, C, & D.
CSA ENCLOSURE TYPE 4X
AMBIENT TEMP. LIMITS: -50°C TO +60°C.



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MODEL 8705, 8707, 8711, OR 8750W INTEGRAL,
"STANDARD PRODUCT OFFERING"



MODEL 8705, 8707, 8750W REMOTE
OR
MODEL 8711 REMOTE
"STANDARD PRODUCT OFFERING"

1. INSTALL PER CANADIAN ELECTRICAL CODE (CEC).

2. MODEL 8705, 8707, 8711, & 8750W FLOWTUBES HAVE NON-INCENDIVE ELECTRODES FOR CLASS I, DIVISION 2, GROUPS A, B, C, AND D.

WARNING EXPLOSIVE HAZARD-
SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIV 2

WARNING EXPLOSIVE HAZARD-
DO NOT SET UP SWITCHES UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS

CAD MAINTAINED (MicroStation)

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

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

DO NOT SCALE PRINT

CONTRACT NO.

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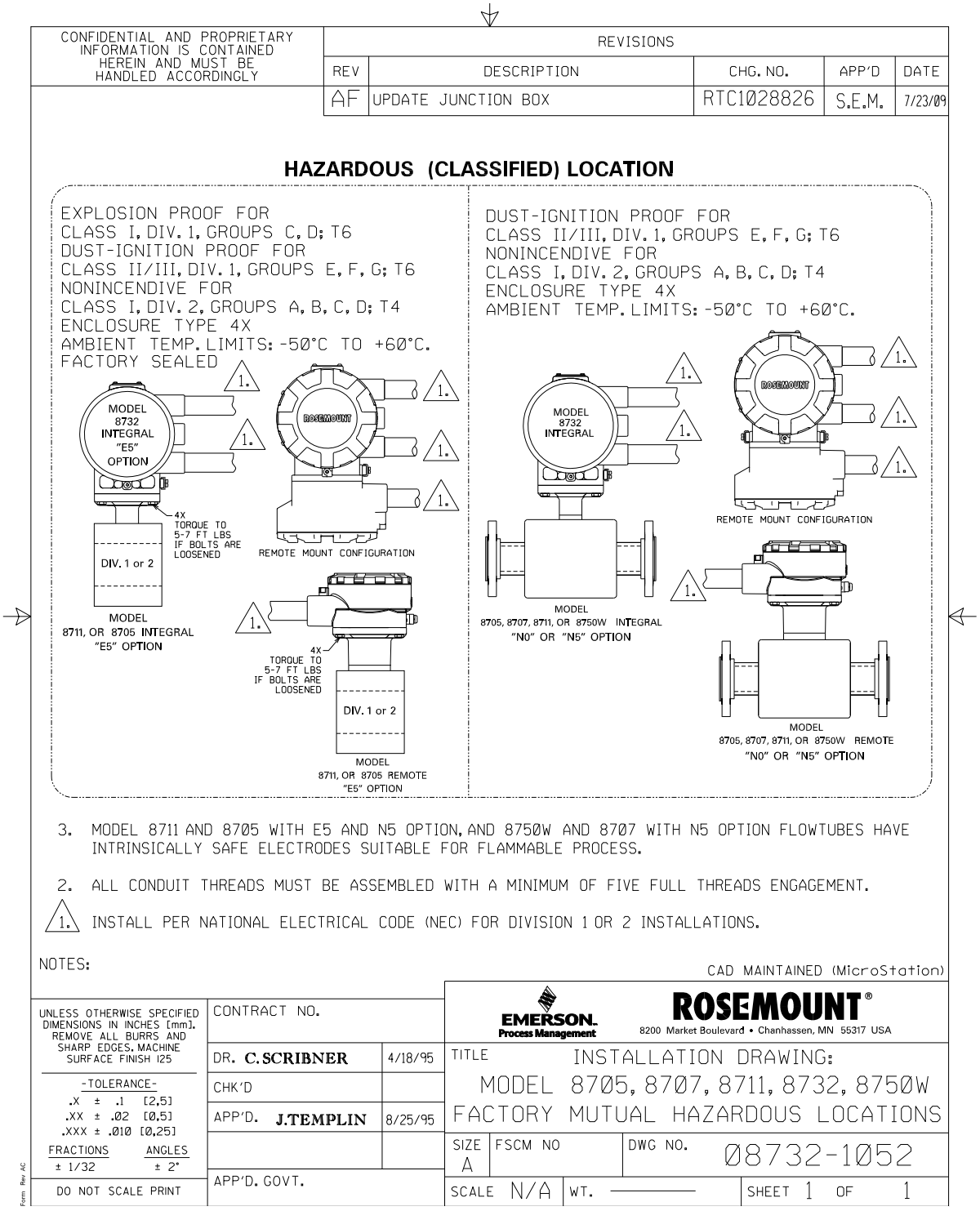
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TITLE INSTALLATION DRAWING:
MODEL 8732, 8705, 8707, 8711, 8750W
CSA

SIZE A | FSCM NO | DWG NO. 08732-1051
SCALE N/A | WT. ——— | SHEET 1 OF 1

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Figure B-16. Installation Drawings Factory Mutual Hazardous Location



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Reference Manual
00809-0100-4727, Rev EA
October 2010

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