Quick Install Guide
00825-0100-4727, Rev DD
May 2019

Rosemount™ 8700 Magnetic Flowmeter Sensor

ROSEMOUNT™

EMERSON.

1 Handling and Lifting Safety

⚠ CAUTION

To reduce the risk of personal injury or damage to equipment, follow all lifting and handling instructions.

- Handle all parts carefully to prevent damage. Whenever possible, transport the system to the installation site in the original shipping container.
- 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.
- Keep the shipping plugs in the conduit ports until you are ready to connect and seal them. Appropriate care should be taken to prevent water ingress.
- The sensor should be supported by the pipeline. Pipe supports are recommended on both the inlet and outlet sides of the sensor pipeline. There should be no additional support attached to the sensor.
- Use proper PPE (Personal Protection Equipment) including safety glasses and steel toed shoes.
- Do not lift the meter by holding the electronics housing or junction box.
- 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.
- Do not drop the device from any height.

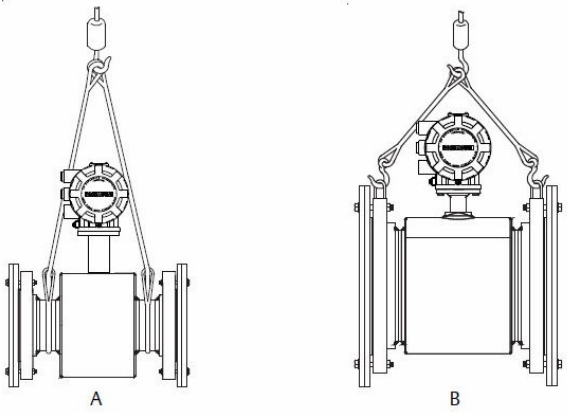
1.1 Lifting lugs

⚠ CAUTION

If provided, use the lifting lugs on each flange to handle the Magnetic Flowmeter when it is transported and lowered into place at the installation site. If lifting lugs are not provided, the Magnetic Flowmeter must be supported with a lifting sling on each side of the housing.

- Standard pressure 3-in. through 36-in. flanged magnetic flowmeters come with lifting lugs.
- High pressure (above 600#) 1-in. through 24-in. flanged magnetic flowmeters come with lifting lugs.
- Wafers and sanitary magnetic flowmeters do not come with lifting lugs.

Figure 1-1: Example lifting without and with lifting lugs



A. Without lifting lugs
B. With lifting lugs

2 Introduction

This document provides basic installation guidelines for the Rosemount 8700 Magnetic Flowmeter sensor.

- For transmitter installation instructions, refer to the appropriate document:

Product name	Document number(1)
8732EM Transmitter with HART® Protocol	00825-01xx-4444
8732EM Transmitter with FOUNDATION™ fieldbus	00825-05xx-4444
8732EM Transmitter with Modbus® RS-485 Protocol	00825-04xx-4444
8712EM Transmitter with HART® Protocol	00825-01xx-4445
8712EM Transmitter with FOUNDATION™ fieldbus	00825-05xx-4445
8712EM Transmitter with Modbus® RS-485 Protocol	00825-04xx-4445
8732E Magnetic Flowmeter System	00825-01xx-4662
8732E Magnetic Flowmeter System with FOUNDATION™ fieldbus	00825-01xx-4663
8732E Magnetic Flowmeter System with PROFIBUS PA digital fieldbus	00825-01xx-4665
8712E Magnetic Flowmeter System	00825-01xx-4664
8712H Magnetic Flowmeter Systems	00825-01xx-4729

(1) "xx" in the second segment of the document number indicates the language. See Table 2-1.

Table 2-1: Document language codes

Code	Language
00	English
02	Italian
03	French
05	German
06	Chinese (Simplified)
07	Russian
09	Spanish
15	Korean
22	Portuguese (Brazillian)

- For additional installation information, configuration, maintenance, and troubleshooting, refer to the appropriate reference manual.

All user documentation can be found at www.emerson.com. For more contact information see Emerson Flow customer service.

2.1 Return policy

Emerson procedures must be followed when returning equipment. These procedures ensure legal compliance with government transportation agencies and help provide a safe working environment for Emerson employees. Failure to follow Emerson procedures will result in your equipment being refused delivery.

2.2 Emerson Flow customer service

Email:

- Worldwide: flow.support@emerson.com
- Asia-Pacific: APflow.support@emerson.com

Telephone:

North and South America		Europe and Middle East		Asia Pacific	
United States	800 522 6277	U.K.	0870 240 1978	Australia	800 158 727
Canada	+1 303 527 5200	The Netherlands	+31 (0) 704 136 666	New Zealand	099 128 804
Mexico	+41 (0) 41 7686 111	France	0800 917 901	India	800 440 1468
Argentina	+54 11 4837 7000	Germany	0800 182 5347	Pakistan	888 550 2682
Brazil	+55 15 3413 8000	Italy	8008 77334	China	+86 21 2892 9000
Venezuela	+58 26 1731 3446	Central & Eastern	+41 (0) 41 7686 111	Japan	+81 3 5769 6803
		Russia/CIS	+7 495 981 9811	South Korea	+82 2 3438 4600
		Egypt	0800 000 0015	Singapore	+65 6 777 8211
		Oman	800 70101	Thailand	001 800 441 6426
		Qatar	431 0044	Malaysia	800 814 008
		Kuwait	663 299 01		
		South Africa	800 991 390		
		Saudi Arabia	800 844 9564		
		UAE	800 0444 0684		

3 Location and Position

3.1 Environmental considerations

To ensure maximum transmitter life, avoid extreme temperatures and excessive vibration. Typical problem areas include the following:

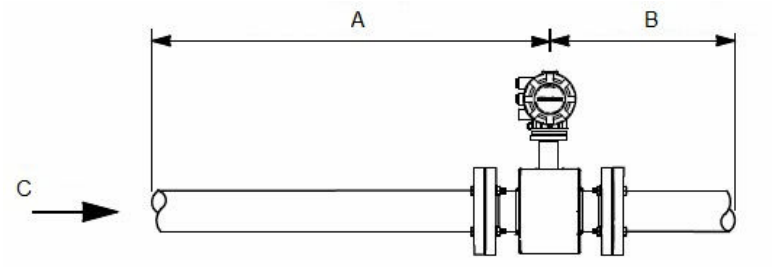
- High-vibration lines with integrally mounted transmitters
- Tropical/desert installations in direct sunlight
- Outdoor installations in arctic climates

Remote mounted transmitters may be installed in the control room to protect the electronics from the harsh environment and to provide easy access for configuration or service.

3.2 Upstream and downstream piping

To ensure specified accuracy over widely varying process conditions, install the sensor with a minimum of five straight pipe diameters upstream and two pipe diameters downstream from the electrode plane.

Figure 3-1: Upstream and downstream straight pipe diameters



A. Five pipe diameters (upstream)
B. Two pipe diameters (downstream)
C. Flow direction

Installations with reduced upstream and downstream straight runs are possible. In reduced straight run installations, the meter may not meet accuracy specifications. Reported flow rates will still be highly repeatable.

3.3 Flow direction

The sensor should be mounted so that the arrow points in the direction of flow.

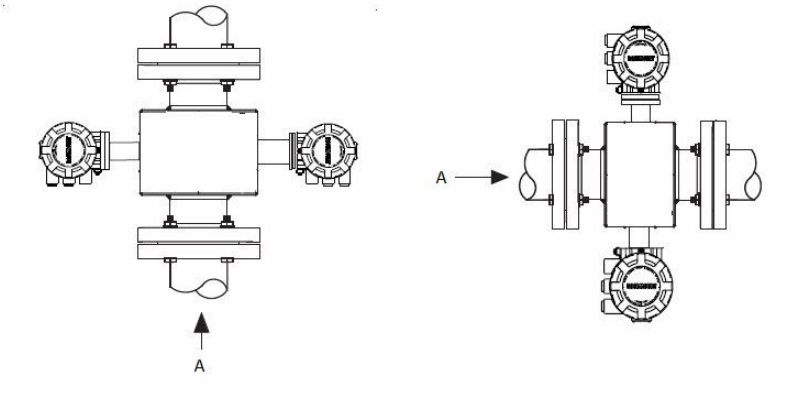
Figure 3-2: Flow direction arrow

3.4 Sensor piping location and orientation

The sensor should be installed in a location that ensures it remains full during operation. Depending on where it is installed, orientation must also be considered.

- Vertical installation with upward process fluid flow keeps the cross-sectional area full, regardless of flow rate.
- Horizontal installation should be restricted to low piping sections that are normally full.

Figure 3-3: Sensor orientation

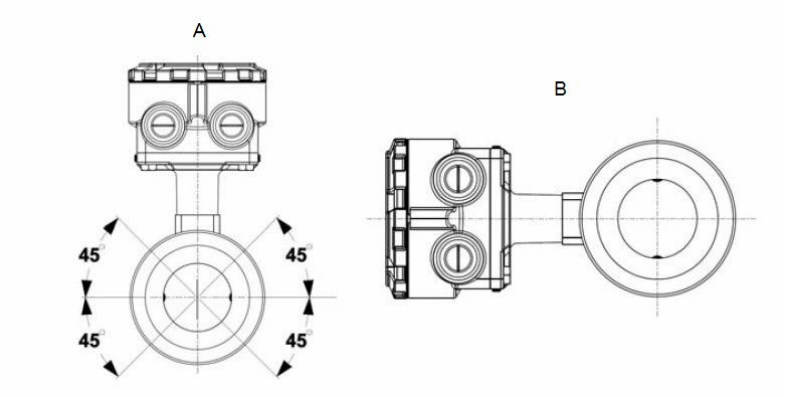


A. Flow direction

3.5 Electrode orientation

The electrodes in the sensor are properly oriented when the two measurement electrodes are in the 3 and 9 o'clock positions or within 45 degrees from the horizontal, as shown on the left side of Figure 3-4. Avoid any mounting orientation that positions the top of the sensor at 90 degrees from the vertical position as shown on the right of Figure 3-4.

Figure 3-4: Electrode orientation



A. Correct orientation
B. Incorrect orientation

The sensor may require a specific orientation to comply with Hazardous Area T-code rating. Refer to the appropriate reference manual for any potential restrictions.

4 Sensor Installation

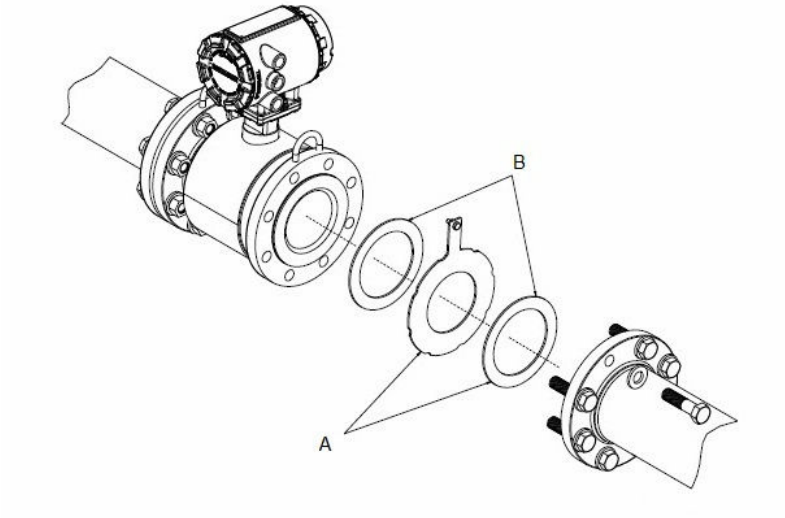
4.1 Flanged sensors

Gaskets

The sensor requires a gasket at each process connection. The gasket material must be compatible with the process fluid and operating conditions. Gaskets are required on each side of a grounding ring (see Figure 4-1). All other applications (including sensors with lining protectors or a grounding electrode) require only one gasket on each process connection.

Note
Metallic or spiral-wound gaskets should not be used as they will damage the liner face of the sensor. If spiral wound or metallic gaskets are required for the application, lining protectors must be used.

Figure 4-1: Gasket placement for flanged sensors



A. Grounding ring and gasket (optional)
B. Customer-supplied gasket

Bolts

Note
Do not bolt one side at a time. Tighten both sides simultaneously. Example:

1. Snug upstream
2. Snug downstream

3. Tighten upstream
4. Tighten downstream

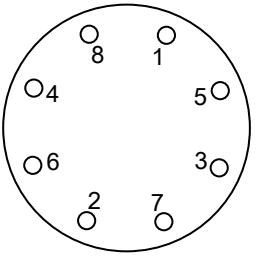
Do not snug and tighten the upstream side and then snug and tighten the downstream side. Failure to alternate between the upstream and downstream flanges when tightening bolts may result in liner damage.

Suggested torque values by sensor line size and liner type are listed in Table 4-2 for ASME B16.5 flanges and Table 4-3 or Table 4-4 for EN flanges. Consult the factory if the flange rating of the sensor is not listed. Tighten flange bolts on the upstream side of the sensor in the incremental sequence shown in Figure 4-2 to 20% of the suggested torque values. Repeat the process on the downstream side of the sensor. For sensors with greater or fewer flange bolts, tighten the bolts in a similar crosswise sequence. Repeat this entire tightening sequence at 40%, 60%, 80%, and 100% of the suggested torque values.

If leakage occurs at the suggested torque values, the bolts can be tightened in additional 10% increments until the joint stops leaking, or until the measured torque value reaches the maximum torque value of the bolts. Practical consideration for the integrity of the liner often leads to distinct torque values to stop leakage due to the unique combinations of flanges, bolts, gaskets, and sensor liner material.

Check for leaks at the flanges after tightening the bolts. Failure to use the correct tightening methods can result in severe damage. While under pressure, sensor materials may deform over time and require a second tightening 24 hours after the initial installation.

Figure 4-2: Flange bolt torquing sequence



Prior to installation, identify the lining material of the flow sensor to ensure the suggested torque values are applied.

Table 4-1: Lining material

Fluoropolymer liners	Other liners
T - PTFE	P - Polyurethane
F - ETFE	N - Neoprene

Table 4-1: Lining material *(continued)*

Fluoropolymer liners	Other liners
A - PFA	L - Linatex (Natural Rubber)
K - PFA+	D - Adiprene

Table 4-2: Suggested flange bolt torque values for Rosemount 8705 (ASME)

Size code	Line size	Fluoropolymer liners		Other liners	
		Class 150 (lb-ft)	Class 300 (lb-ft)	Class 150 (lb-ft)	Class 300 (pound feet)
005	0.5 inch (15 mm)	8	8	N/A	N /A
010	1 inch (25 mm)	8	12	6	10
015	1.5 inch (40 mm)	13	25	7	18
020	2 inch (50 mm)	19	17	14	11
025	2.5 inch (65 mm)	22	24	17	16
030	3 inch (80 mm)	34	35	23	23
040	4 inch (100 mm)	26	50	17	32
050	5 inch (125 mm)	36	60	25	35
060	6 inch (150 mm)	45	50	30	37
080	8 inch (200 mm)	60	82	42	55
100	10 inch (250 mm)	55	80	40	70
120	12 inch (300 mm)	65	125	55	105
140	14 inch (350 mm)	85	110	70	95
160	16 inch (400 mm)	85	160	65	140
180	18 inch (450 mm)	120	170	95	150
200	20 inch (500 mm)	110	175	90	150
240	24 inch (600 mm)	165	280	140	250
300	30 inch (750 mm)	195	415	165	375
360	36 inch (900 mm)	280	575	245	525

Table 4-3: Suggested flange bolt torque values for Rosemount 8705 sensors with fluoropolymer liners (EN 1092-1)

Size code	Line size	Fluoropolymer liners (in Newton-meters)			
		PN 10	PN 16	PN 25	PN 40
005	0.5 inch (15 mm)	N/A	N/A	N/A	10
010	1 inch (25 mm)	N/A	N/A	N/A	20
015	1.5 inch (40 mm)	N/A	N/A	N/A	50
020	2 inch (50 mm)	N/A	N/A	N/A	60
025	2.5 inch (65 mm)	N/A	N/A	N/A	50
030	3 inch (80 mm)	N/A	N/A	N/A	50
040	4 inch (100 mm)	N/A	50	N/A	70
050	5.0 inch (125 mm)	N/A	70	N/A	100
060	6 inch (150mm)	N/A	90	N/A	130
080	8 inch (200 mm)	130	90	130	170
100	10 inch (250 mm)	100	130	190	250
120	12 inch (300 mm)	120	170	190	270
140	14 inch (350 mm)	160	220	320	410
160	16 inch (400 mm)	220	280	410	610
180	18 inch (450 mm)	190	340	330	420
200	20 inch (500 mm)	230	380	440	520
240	24 inch (600 mm)	290	570	590	850

Table 4-4: Suggested flange bolt torque values for Rosemount 8705 sensors with non-fluoropolymer liners (EN 1092-1)

Size code	Line size	Non-fluoropolymer liners (in Newton-meters)			
		PN 10	PN 16	PN 25	PN 40
005	0.5 inch (15 mm)	N/A	N/A	N/A	20
010	1 inch (25 mm)	N/A	N/A	N/A	30
015	1.5 inch (40 mm)	N/A	N/A	N/A	40
020	2 inch (50 mm)	N/A	N/A	N/A	30
025	2.5 inch (65 mm)	N/A	N/A	N/A	35
030	3 inch (80 mm)	N/A	N/A	N/A	30
040	4 inch (100 mm)	N/A	40	N/A	50

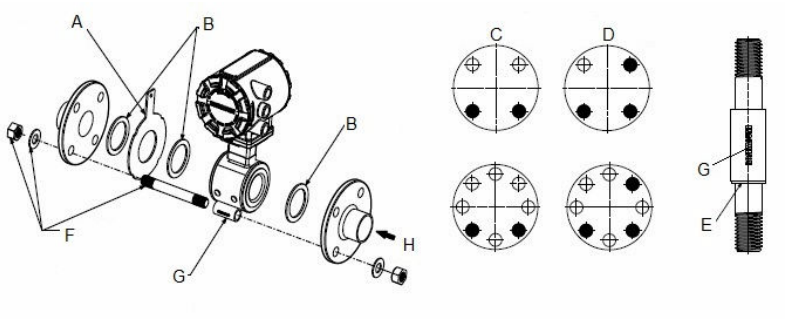
Table 4-4: Suggested flange bolt torque values for Rosemount 8705 sensors with non-fluoropolymer liners (EN 1092-1) *(continued)*

Size code	Line size	Non-fluoropolymer liners (in Newton-meters)			
		PN 10	PN 16	PN 25	PN 40
050	5.0 inch (125 mm)	N/A	50	N/A	70
060	6 inch (150mm)	N/A	60	N/A	90
080	8 inch (200 mm)	90	60	90	110
100	10 inch (250 mm)	70	80	130	170
120	12 inch (300 mm)	80	110	130	180
140	14 inch (350 mm)	110	150	210	288
160	16 inch (400 mm)	150	190	280	410
180	18 inch (450 mm)	130	230	220	280
200	20 inch (500 mm)	150	260	300	350
240	24 inch (600 mm)	200	380	390	560

4.2 Wafer sensors

When installing wafer sensors, there are several components that must be included and requirements that must be met.

Figure 4-3: Wafer sensors installation components and assembly requirements



A. *Ground ring (optional)*
B. *Customer supplied gaskets*
C. *Spacer installation (horizontal meters)*
D. *Spacer installation (vertical meters)*
E. *O-ring*
F. *Installation studs, nuts, and washers (optional)*
G. *Wafer alignment spacer*
H. *Flow*

Gaskets

The sensor requires a gasket at each process connection. The gasket material selected must be compatible with the process fluid and operating conditions. Gaskets are required on each side of a grounding ring. See Figure 4-3.

Note
Metallic or spiral-wound gaskets should not be used as they will damage the liner face of the sensor.

Alignment spacers

On 1.5 inch through 8 inch (40 through 200 mm) line sizes, alignment spacers are **required** to ensure proper centering of the wafer sensor between the process flanges. To order an Alignment Spacer Kit (quantity 3 spacers) use p/n 08711-3211-xxxx where xxxx equals the dash number shown in Table 4-5.

Table 4-5: Alignment spacers

Dash-no. (-xxxx)	Line size		Flange rating
	(in)	(mm)	
0A15	1.5	40	JIS 10K-20K

Table 4-5: Alignment spacers *(continued)*

Dash-no. (-xxxx)	Line size		Flange rating
	(in)	(mm)	
0A20	2	50	JIS 10K-20K
0A30	3	80	JIS 10K
0B15	1.5	40	JIS 40K
AA15	1.5	40	ASME- 150#
AA20	2	50	ASME - 150#
AA30	3	80	ASME - 150#
AA40	4	100	ASME - 150#
AA60	6	150	ASME - 150#
AA80	8	200	ASME - 150#
AB15	1.5	40	ASME - 300#
AB20	2	50	ASME - 300#
AB30	3	80	ASME - 300#
AB40	4	100	ASME - 300#
AB60	6	150	ASME - 300#
AB80	8	200	ASME - 300#
DB40	4	100	EN 1092-1 - PN10/16
DB60	6	150	EN 1092-1 - PN10/16
DB80	8	200	EN 1092-1 - PN10/16
DC80	8	200	EN 1092-1 - PN25
DD15	1.5	40	EN 1092-1 - PN10/16/25/40
DD20	2	50	EN 1092-1 - PN10/16/25/40
DD30	3	80	EN 1092-1 - PN10/16/25/40
DD40	4	100	EN 1092-1 - PN25/40
DD60	6	150	EN 1092-1 - PN25/40
DD80	8	200	EN 1092-1 - PN40
RA80	8	200	AS40871-PN16
RC20	2	50	AS40871-PN21/35
RC30	3	80	AS40871-PN21/35
RC40	4	100	AS40871-PN21/35

Table 4-5: Alignment spacers *(continued)*

Dash-no. (-xxxx)	Line size		Flange rating
	(in)	(mm)	
RC60	6	150	AS40871-PN21/35
RC80	8	200	AS40871-PN21/35

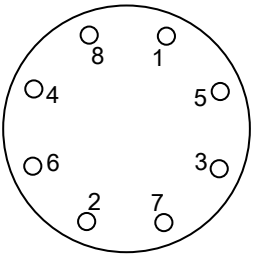
Studs

Wafer sensors require threaded studs. See Figure 4-4 for torque sequence. Always check for leaks at the flanges after tightening the flange bolts. All sensors require a second tightening 24 hours after initial flange bolt tightening.

Table 4-6: 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
1½–8-in. (40–200 mm)	CS, ASTM A193, Grade B7, threaded mounting studs

Figure 4-4: Flange bolt torquing sequence



4.2.1 Installation

1. Insert studs for the bottom side of the sensor between the pipe flanges and center the alignment spacer in the middle of the stud. See Figure 4-3 for the bolt hole locations recommended for the spacers provided. Stud specifications are listed in Table 4-6.
2. Place the sensor between the flanges. Make sure the alignment spacers are properly centered on the studs. For vertical flow installations slide the o-ring over the stud to keep the spacer in place. See Figure 4-3. Ensure the spacers match the flange size and class rating for the process flanges. See Table 4-5.
3. Insert the remaining studs, washers, and nuts.

4. Tighten to the torque specifications shown in Table 4-7. Do not over-tighten the bolts or the liner may be damaged.

Table 4-7: Rosemount 8711 torque specifications

Size code	Line size	Pound-feet	Newton-meter
015	1.5 inch (40 mm)	15	20
020	2 inch (50 mm)	25	34
030	3 inch (80 mm)	40	54
040	4 inch (100 mm)	30	41
060	6 inch (150 mm)	50	68
080	8 inch (200 mm)	70	95

4.3 Sanitary senors

Gaskets

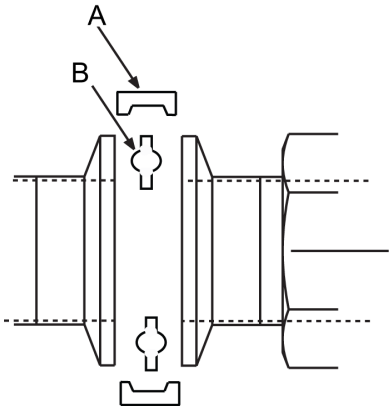
The sensor requires a gasket at each of its connections to adjacent devices or piping. The gasket material selected must be compatible with the process fluid and operating conditions.

Note
Gaskets are supplied between the IDF fitting and the process connection fitting, such as a Tri-Clamp fitting, on all Rosemount 8721 Sanitary sensors except when the process connection fittings are not supplied and the only connection type is an IDF fitting.

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 4-5: Sanitary sensor gasket and clamp alignment



A. User supplied clamp
B. User supplied gasket

5 Process reference connection

The figures shown in this section illustrate best practice installations for process reference connections only. For installations in conductive, unlined pipe it may be acceptable to use one ground ring or one lining protector to establish a process reference connection. Earth safety ground is also required as part of this installation, but is not shown in the figures. Follow national, local, and plant electrical codes for safety ground.

Use Table 5-1 to determine which process reference option to follow for proper installation.

Table 5-1: Process reference options

Type of pipe	Grounding straps	Grounding rings	Reference electrode	Lining protectors
Conductive unlined pipe	See Figure 5-1	See Figure 5-2	See Figure 5-4	See Figure 5-2
Conductive lined pipe	Insufficient grounding	See Figure 5-2	See Figure 5-1	See Figure 5-2
Non-conductive pipe	Insufficient grounding	See Figure 5-3	Not recommended	See Figure 5-3

Note
For line sizes 10-inch and larger the ground strap may come attached to the sensor body near the flange. See Figure 5-5.

Figure 5-1: Grounding straps in conductive unlined pipe or reference electrode in lined pipe

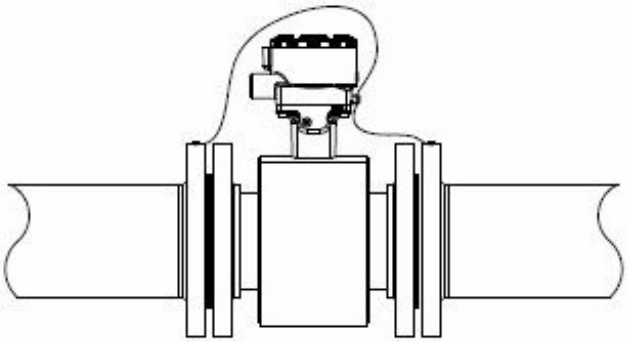
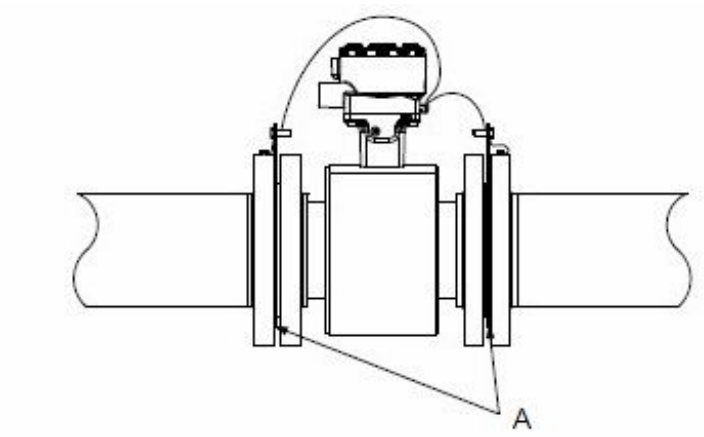
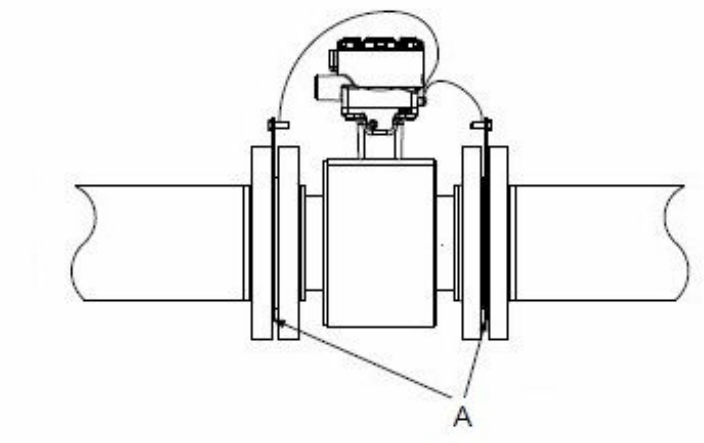


Figure 5-2: Grounding with grounding rings or lining protectors in conductive pipe



A. Grounding rings or lining protectors

Figure 5-3: Grounding with grounding rings or lining protectors in non-conductive pipe



A. Grounding rings or lining protectors

Figure 5-4: Grounding with reference electrode in conductive unlined pipe

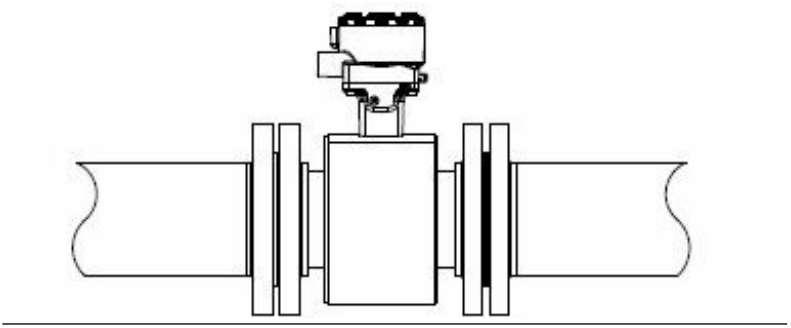
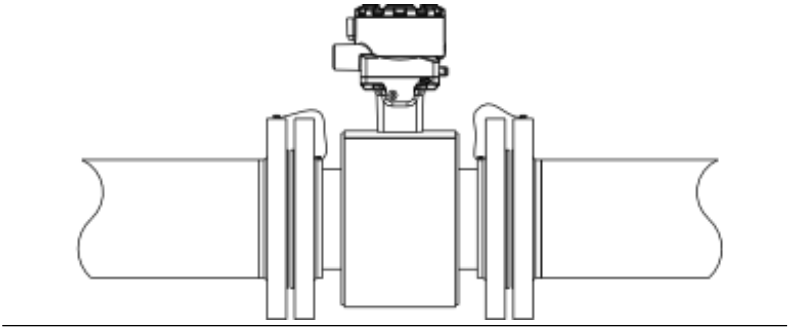


Figure 5-5: Grounding for line sizes 10-in. and larger



6 Wiring sensor to transmitter

Figure 6-1: Wiring 8732ES using component cable

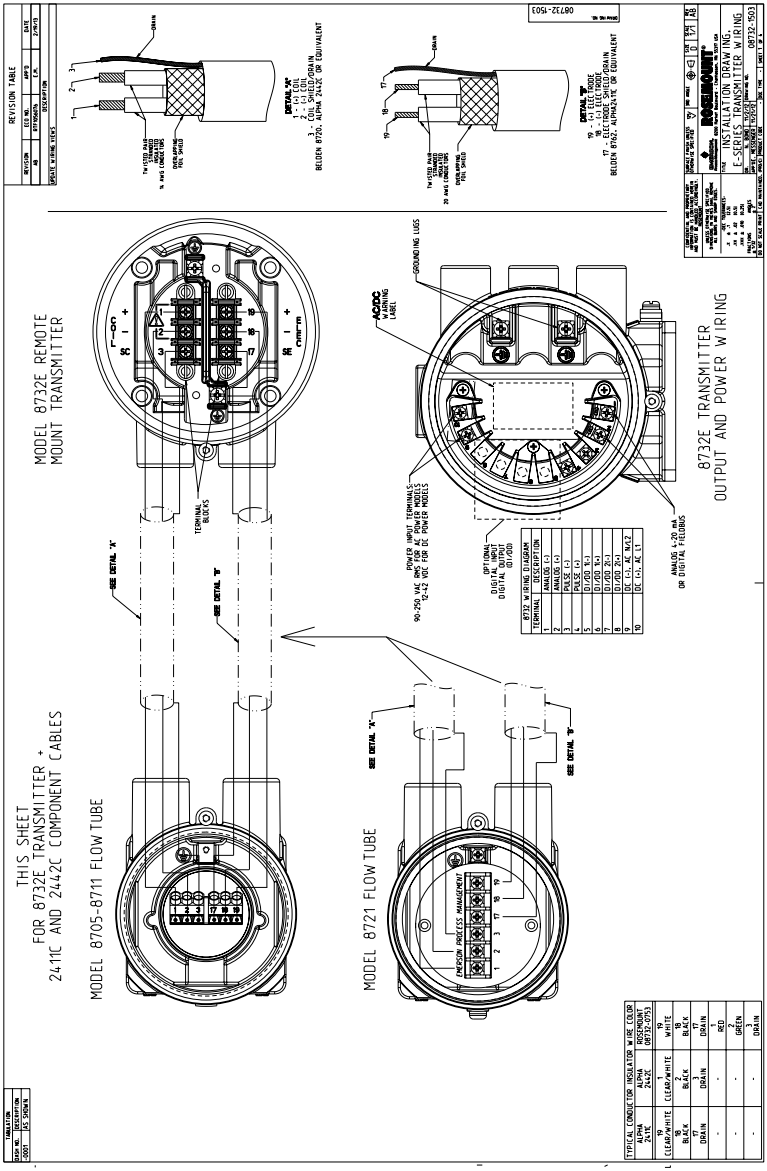


Figure 6-2: Wiring 8732ES using combination cable

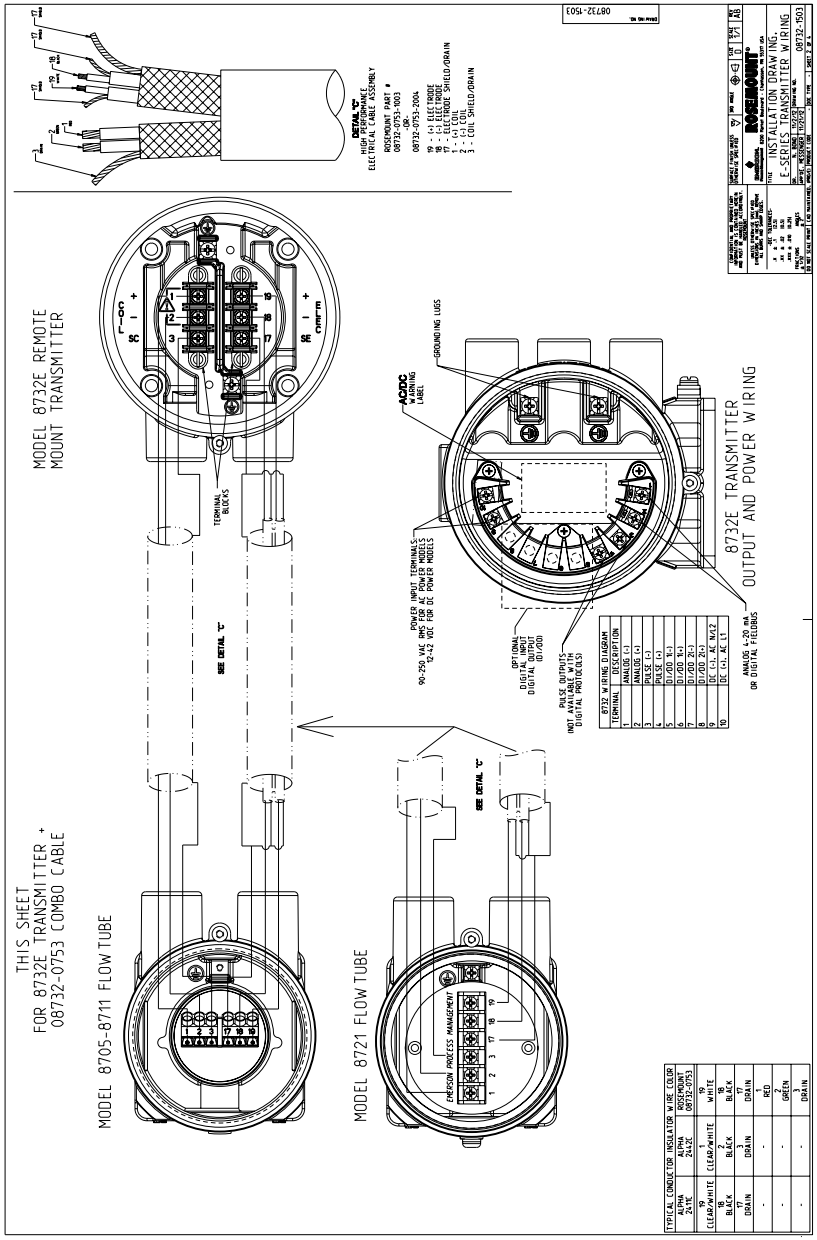


Figure 6-3: Wiring 8712ES using component cable

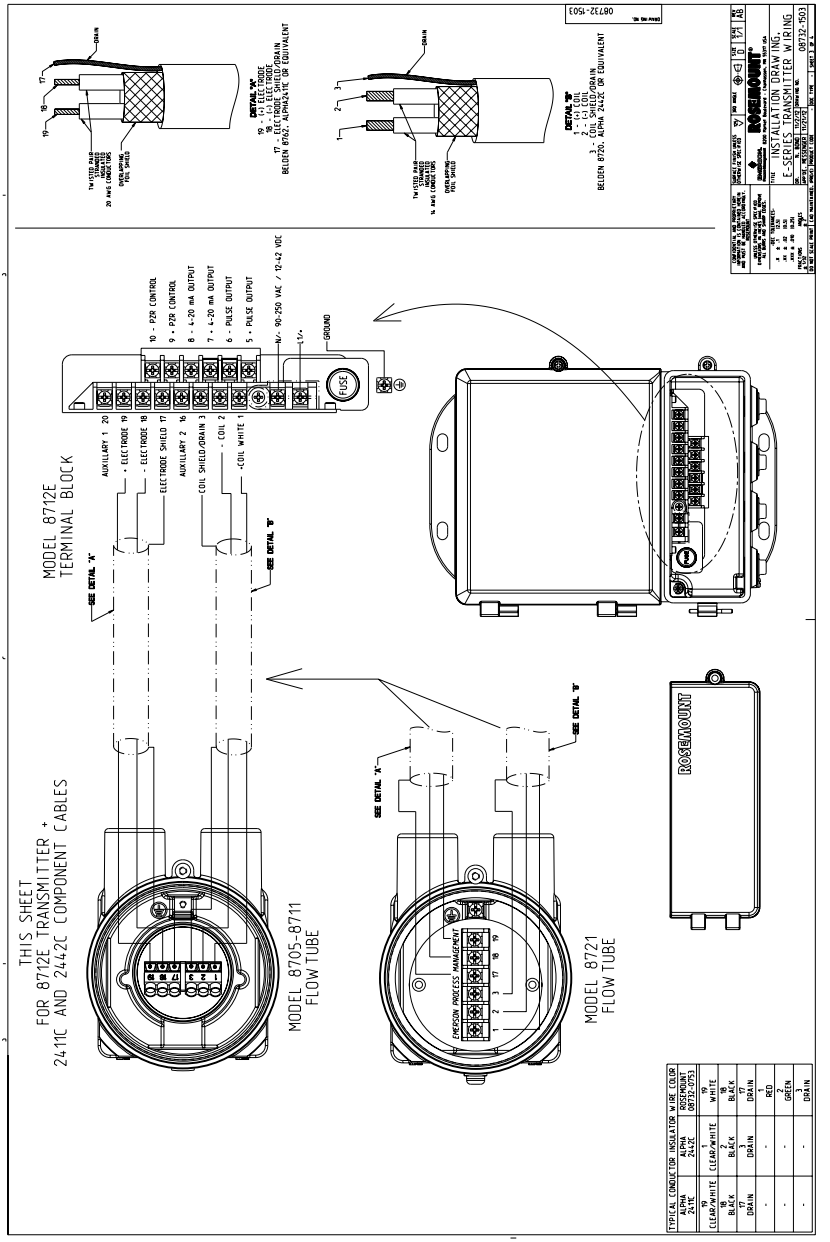


Figure 6-4: Wiring 8712ES using combination cable

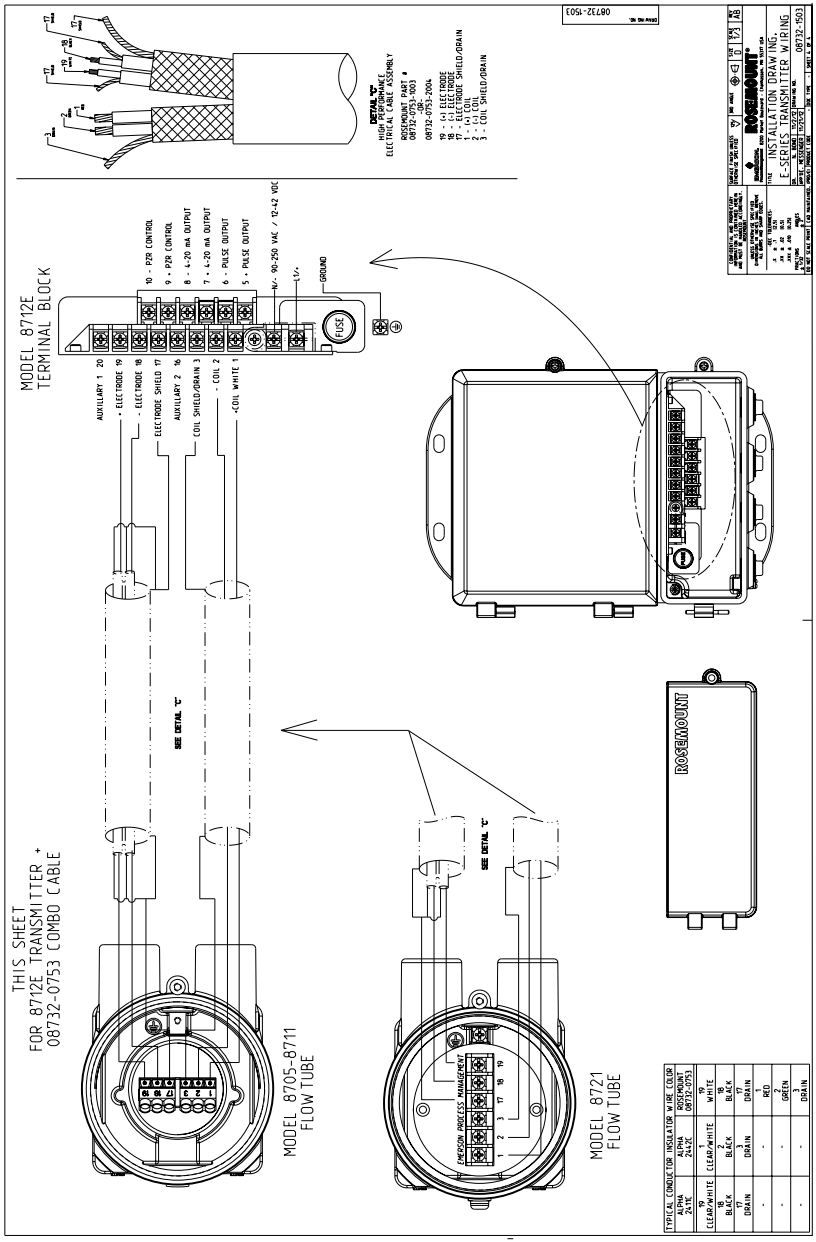


Figure 6-5: Wiring 8732EM using component cable

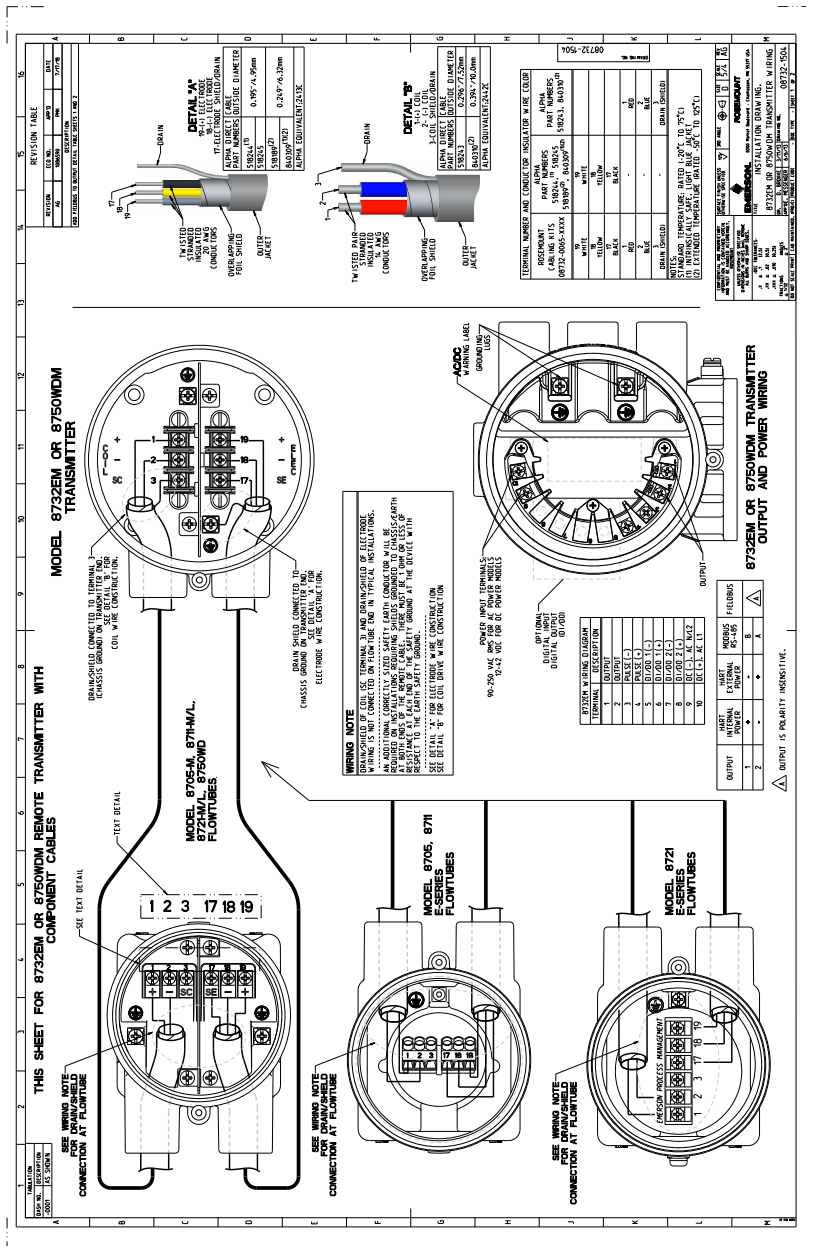


Figure 6-6: Wiring 8732EM using combination cable

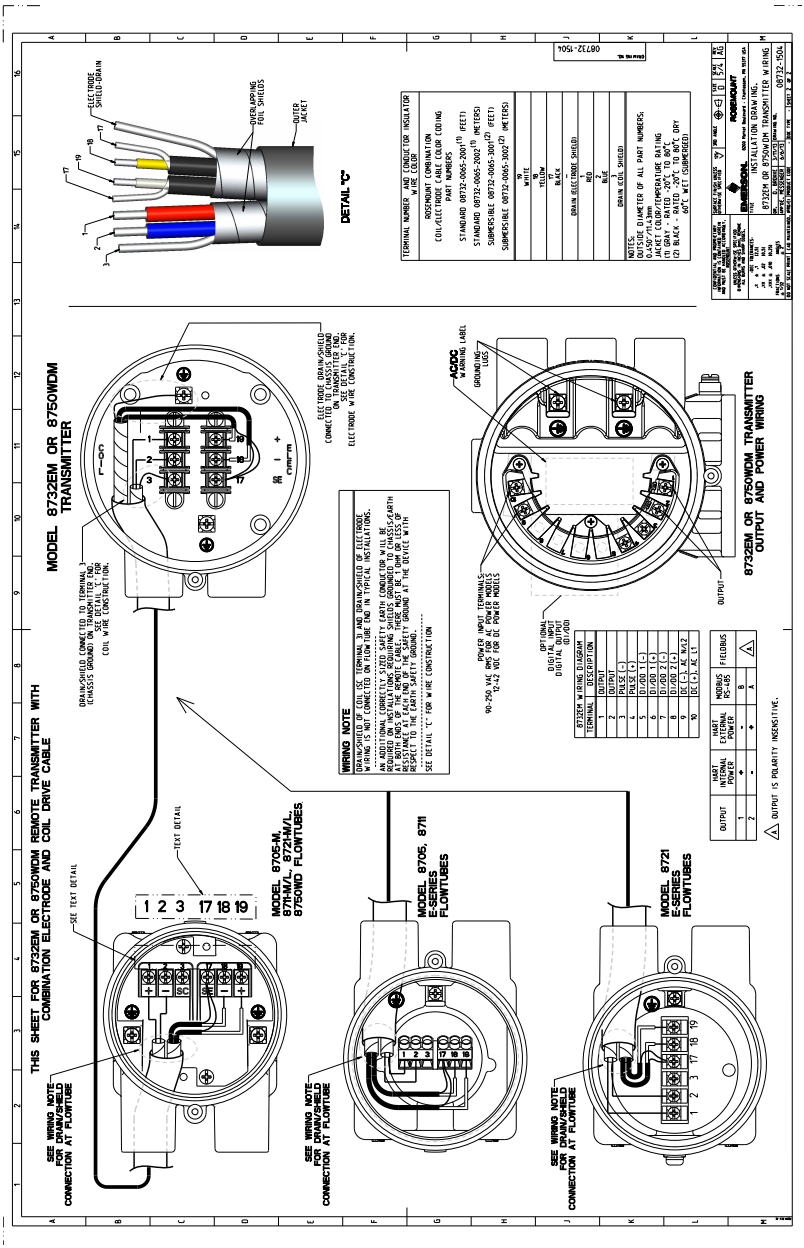


Figure 6-7: Wiring 8712EM using component cable

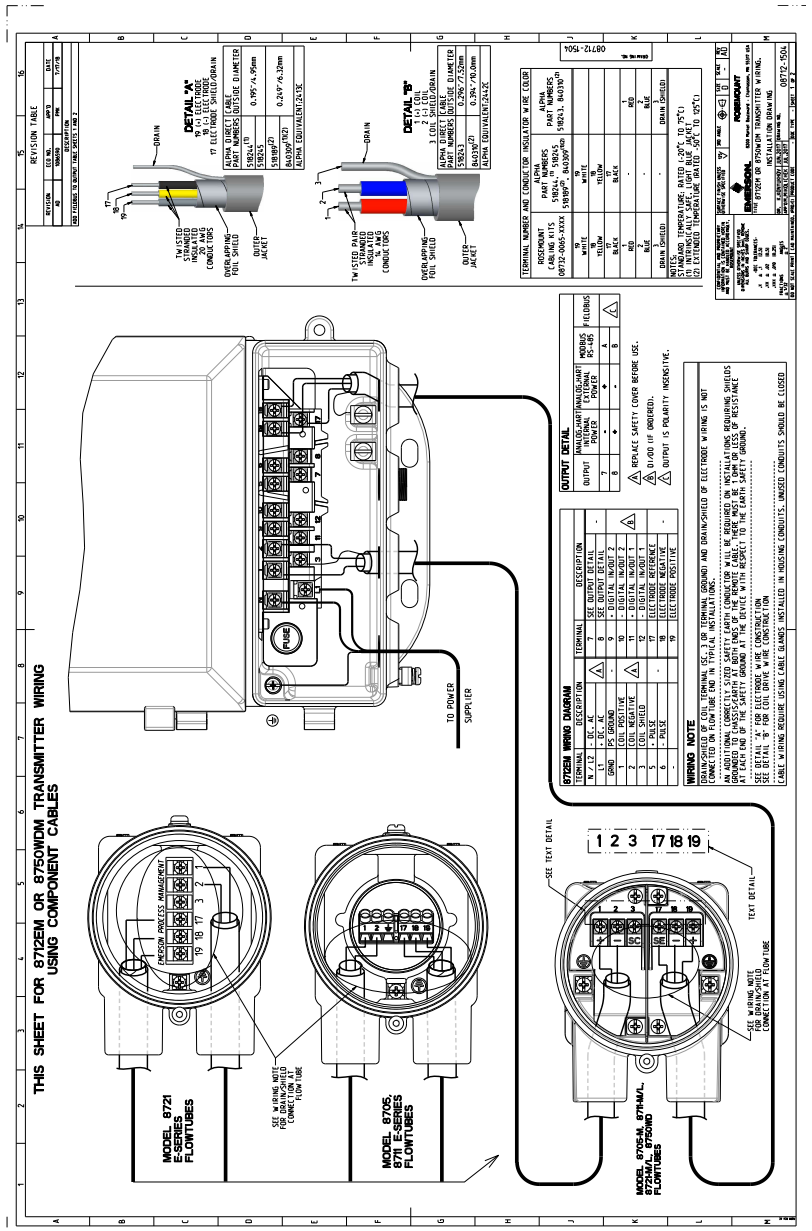
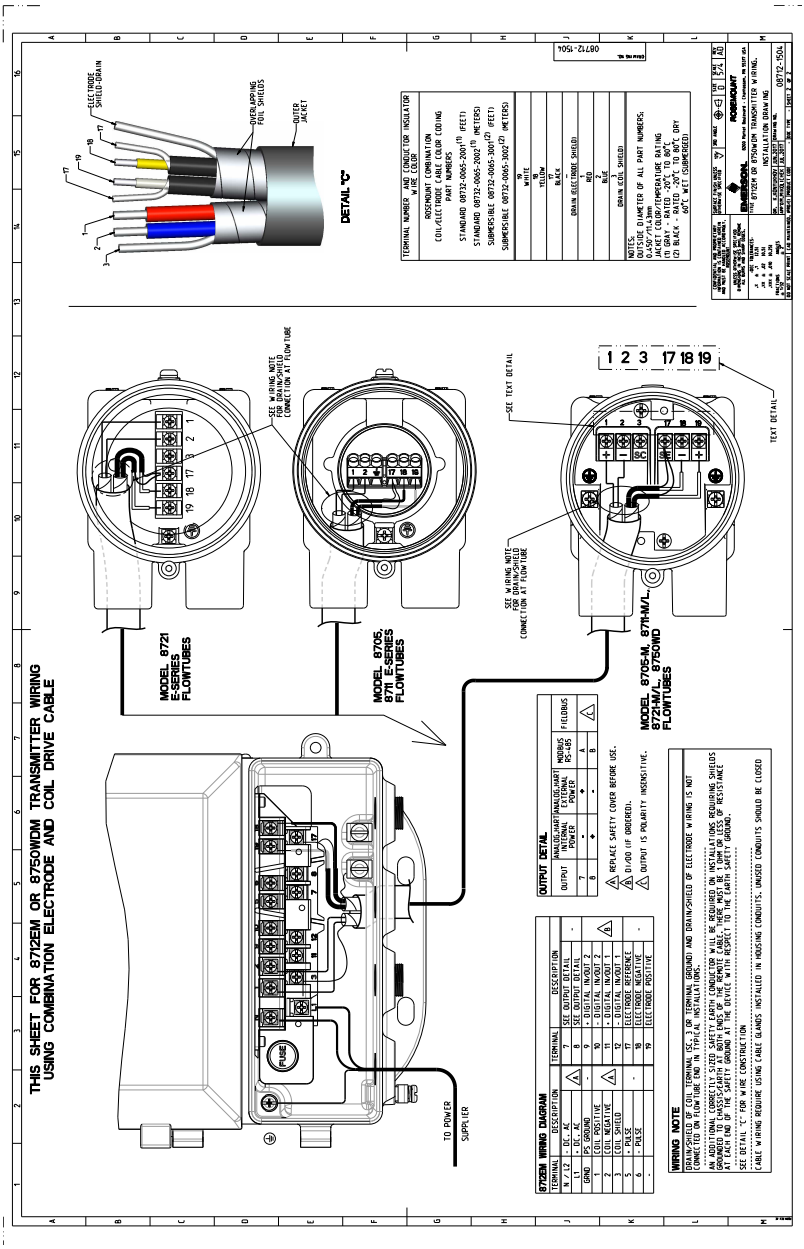


Figure 6-8: Wiring 8712EM using combination cable



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