

# F-3100 SERIES In-line Electromagnetic Flow Meter Wiring Instructions



## ELECTRICAL INSTALLATION

### Input Power Requirements

F-3000 Electromagnetic Flow Meters equipped with standard transmitters are available with two different options for input power. This is not a user selectable function and must be configured at the factory.

Special care is required to ensure that the F-3100 is properly connected to earth through an earth wire. This connection is required to prevent random electrical noise from interfering with the operation of the meter.

Low Voltage: 10 – 63 VDC, 15 – 45 VAC 45/66 Hz, 300 mA maximum  
High Voltage (Mains): 90 – 265 VAC 45/66 Hz, 35 mA maximum



### IMPORTANT NOTE

The voltage option is not field selectable. Contact the factory if you need to change the input voltage rating.



### CAUTION/WARNING

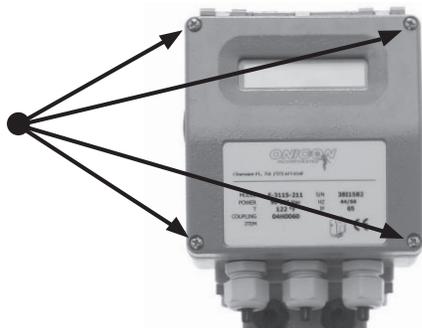
This product must be connected to earth ground for proper operation. Failure to do so will result in erratic operation and an increased risk of injury.



### WARNING

All mains voltage connections must be made through the pre-drilled conduit/strain relief opening located at the bottom of the enclosure. Failure to do so will result in an increased risk of injury.

**Step 1: Loosen screws to lift cover.**



**Step 2: Lift cover to expose electrical connections.**



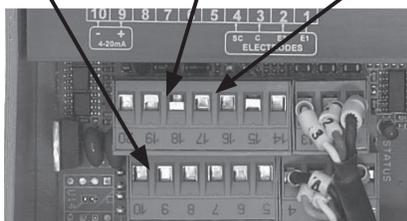
### Step 3: Make SIGNAL connections as shown. Pull straight out on connectors to remove them.

ONICON pre-programs the analog and pulse outputs based on application specific data provided at the time the meter is ordered. The table below shows how the pulse outputs are configured based on whether the application has bi-directional flow and if the meter will be connected to an ONICON peripheral device such as an ONICON BTU meter or display module.

Application	Pulse Output #1 Terminals: 16 (+) & 17 (-)	Pulse Output #2 Terminals: 18 (+) & 19 (-)
Standard	Frequency	Scaled Pulse
Bi-directional	*Scaled Output	Flow Direction

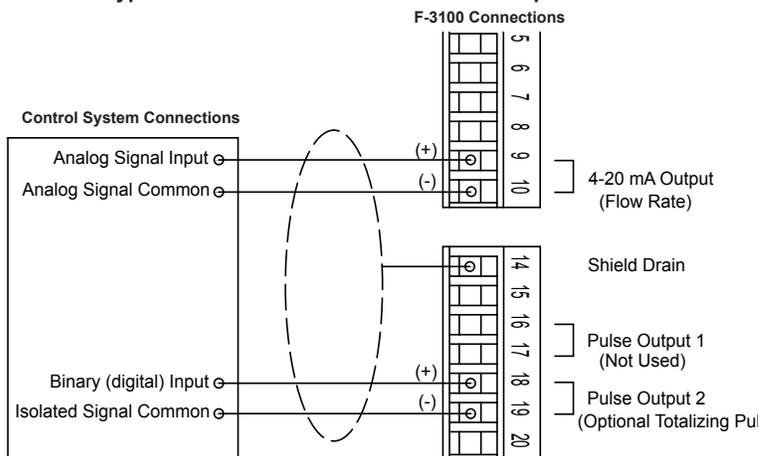
\* This output will be configured for frequency if the flow meter is provided with a peripheral device.

SIGNAL CONNECTIONS		
4-20 mA Output Pin 9 - Pos (+) Pin 10 - Neg (-)	Pulse Out 2 Pin 18 - Pos (+) Pin 19 - Neg (-)	Pulse Out 1 Pin 16 - Pos (+) Pin 17 - Neg (-)

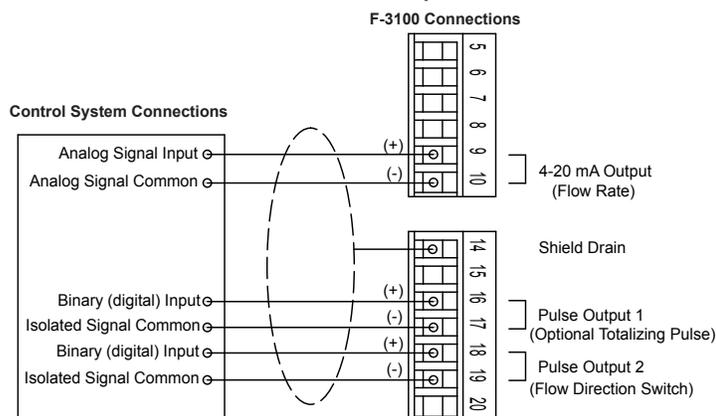


IMPORTANT NOTES
<ul style="list-style-type: none"> <li>• Meter provides an active 4-20 mA output. Do not apply voltage to 4-20 mA output.</li> <li>• 4-20 mA output - Maximum load resistance 1K<math>\Omega</math></li> <li>• Pulse out 1 &amp; Pulse out 2 are externally powered isolated open collector outputs.</li> <li>• Pulse out 1 &amp; Pulse out 2 maximum supply voltage: 40 VDC</li> <li>• Pulse out 1 &amp; Pulse out 2 maximum operating current: 100 mA</li> <li>• Pulse out 1 &amp; Pulse out 2 minimum load resistance = supply voltage / 0.1A</li> </ul>

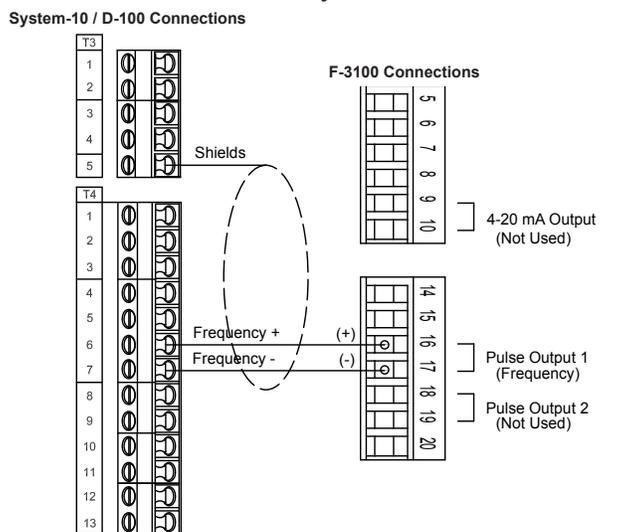
#### Typical Connections With No ONICON Peripheral Device



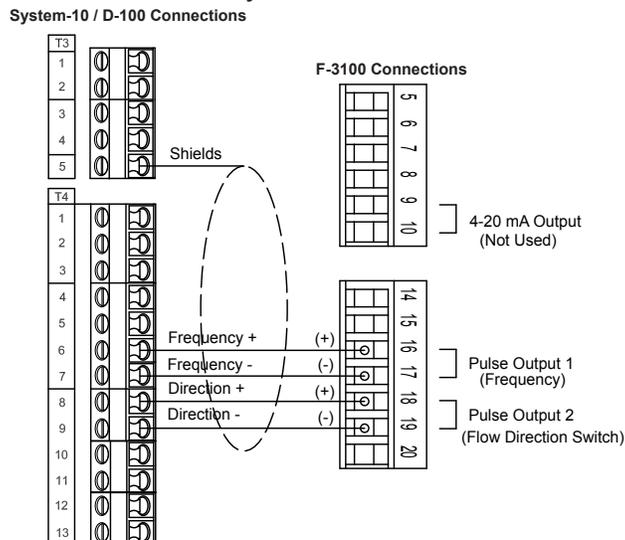
#### Typical Connections For Bi-Directional Flow and No ONICON Peripheral Device



#### Connections With ONICON System-10 or D-100



#### Bi-Directional Flow Connections With ONICON System-10 or D-100

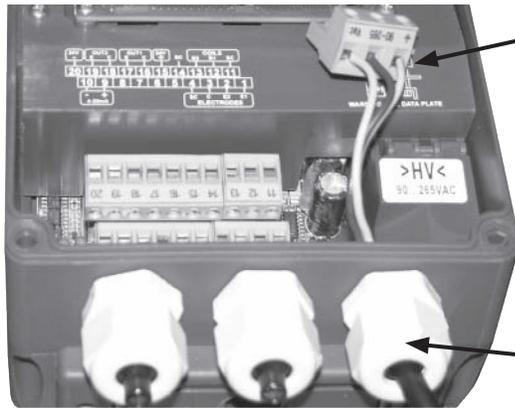
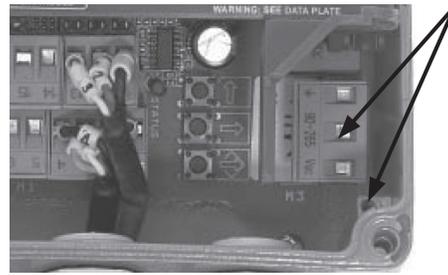


**Step 4: Open cover to expose POWER connections.**

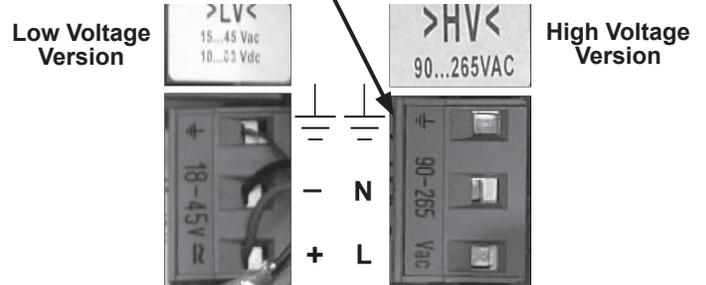
POWER CONNECTIONS	
Remove retaining screw to expose connector shown with High Voltage.	Power connections are under this cover.



**Step 5: Pull straight out on the connector to remove it.**



**Step 6: Wire the connector as shown based on input type. Earth connection must be made.**



**Step 7: Use the right hand strain relief for installing the power cable or power conduit.**

**Earth Connection**

F-3100 Electromagnetic Flow Meters are designed to detect microvolt signal levels at the electrodes located in the flow meter body. These signals are generated as conductive fluids flow through the magnetic field generated by the meter. If enough random electrical noise is present at the electrodes, it can interfere with the flow measurement. Care must be taken during installation to minimize the effects of electrical noise on the flow meter.

The most effective way to minimize the effects of electrical noise is to make sure that the pipe, fluid, flow meter body and flow meter transmitter are all connected to the same earth ground. This accomplishes two important goals. First, it ensures that the pipe, fluid, flow meter body and electronics are all at the same electrical potential. And second, it ensures that this electrical potential is the same as earth ground.

In order to be certain that the meter is properly connected to earth, the flow meter body earth connections (at the flanges or on the neck of wafer meters) and the transmitter earth connection should be run directly to a known earth connection. The length of this earth cable should be as short as practically possible, preferably  $\leq 25$  feet in length. The table below lists earth connections from best to worst.

**IMPORTANT NOTE**



Non-metallic pipes are more susceptible to electrical noise. Grounding rings installed upstream and downstream of the flow meter body to reduce the electrical noise present in the pipe may be required for proper operation.

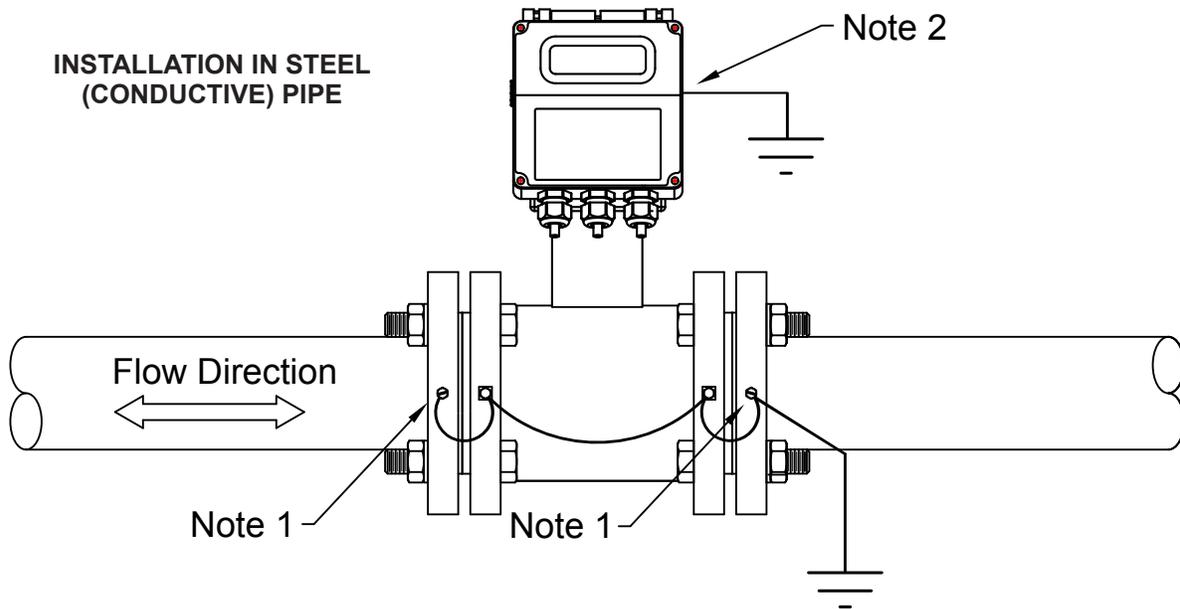
**CAUTION**



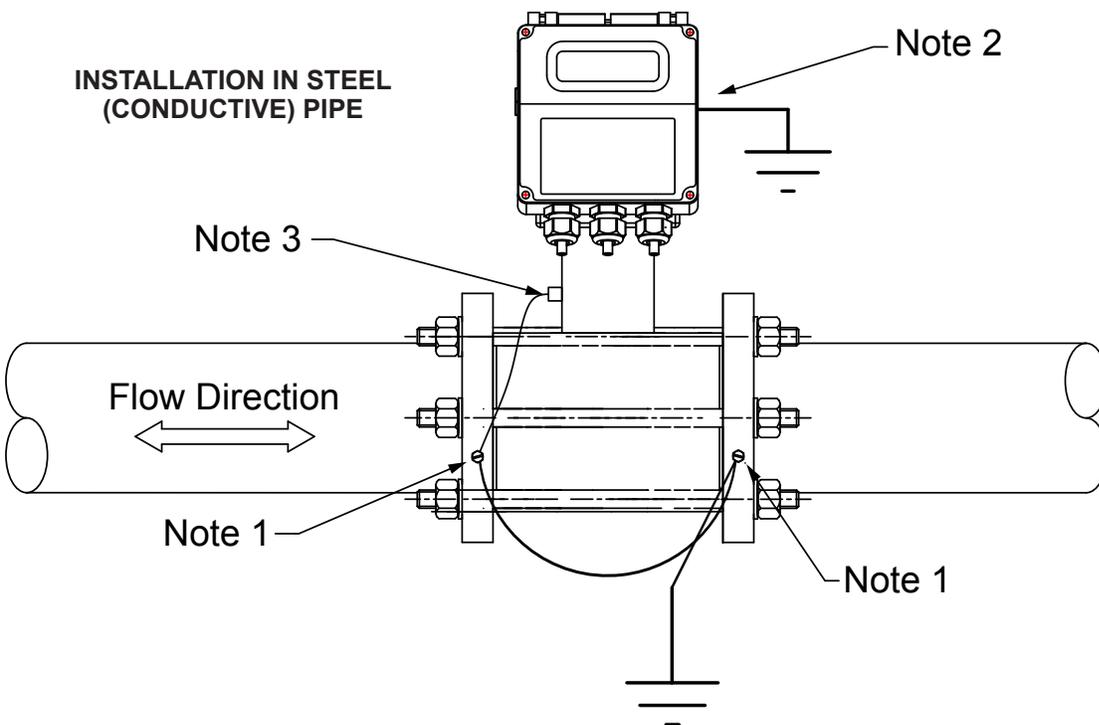
Do not use bolts that hold pressure to make earth connections. Using flange bolts may result in poor electrical connections due to the presence of paint and/or lubricants. Use the dedicated flange earth connections or the dedicated earth connection on the neck of wafer style meters.

Earth Connections (Stranded Wire 14 - 18 AWG)	
Best	Earth grounding rod driven into the ground
	Earth wire connected directly to the building electrical service panel
Worst	Earth wire connection inside an electrical outlet near the meter

## F-3000 Series Mating Flange Grounding Kit Instructions (Flanged Meter) (Kit Attached to Meter)



## F-3000 Series Mating Flange Grounding Kit Instructions (Wafer Style Meter)

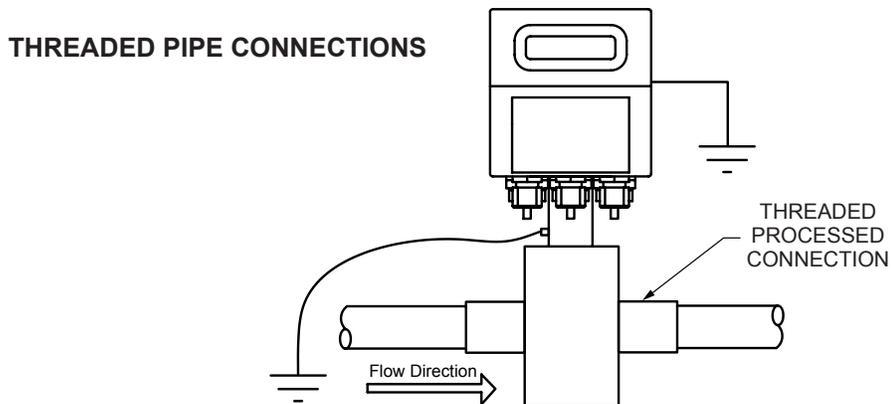
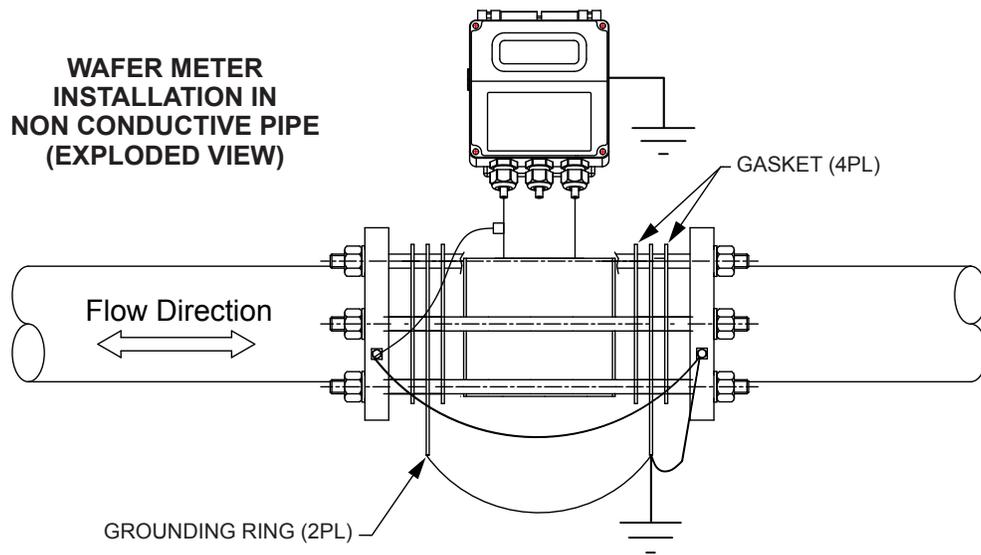
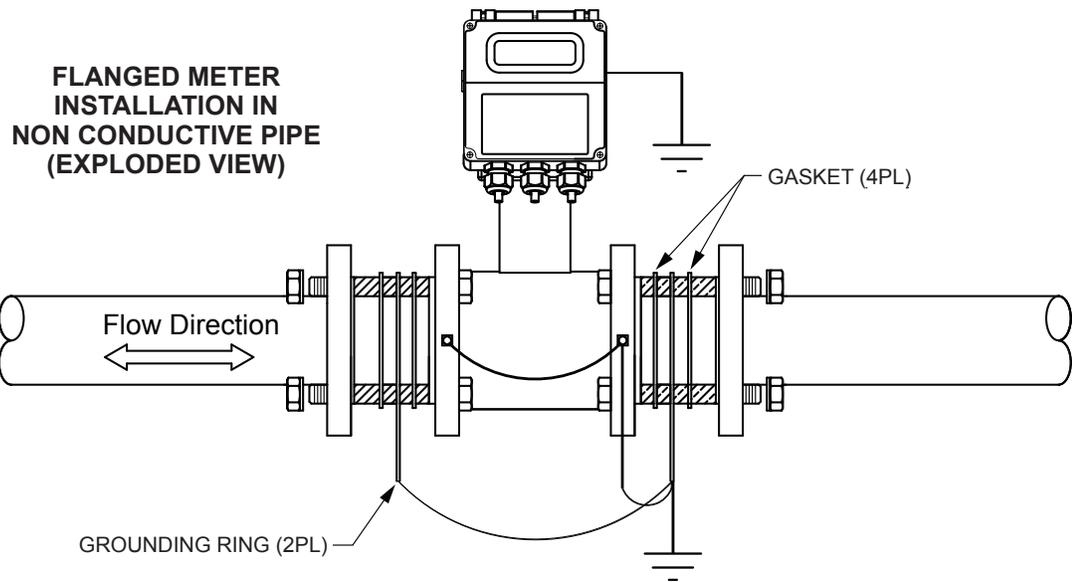


**Note 1:** Using a #21 (0.159") drill bit, drill a 1/2" deep hole in edge of each mating flange. Tap each hole using a 10-32 tap. Secure the included ring connectors and grounding wires to the flange using the provided green grounding screws. (Alternate method: Weld 10-32 studs not provided to the flange edges and attach ring connectors with 10-32 nuts not provided.)

**Note 2:** Provide a ground connection at the input power terminals inside the transmitter enclosure.

**Note 3:** For meters provided with a grounding electrode, connect grounding wire to terminal on the meter neck as shown.

## Installation Drawings for Non-Conductive Pipe and Threaded Pipe



### CAUTION

All earth connections must be made as shown. Failure to do so will result in erratic operation of the meter.