

# Pulse Output Device (POD)

## Installation & Parts




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# Pulse Output Device

Congratulations on ownership of a Liquid Controls Pulse Output Device. This manual provides the technical details on installation, hardware, setup, operation, and regulatory information for your meter.

## Resources in this Guide

For convenience, you can easily download the [PDF edition of this guide](#). Liquid Controls recommends that you read through the introductory and safety information, and then proceed to the [Installation](#)  chapter.

### NOTICE

This manual provides warnings and procedures that are intended to inform the owner and/or operator of the hazards present when using the Liquid Controls Meter on LP gas and other products. The reading of these warnings and the avoidance of such hazards is strictly in the hands of the owner-operators of the equipment. Neglect of that responsibility is not within the control of the manufacturer.

## Publication Updates

The most current versions of all Liquid Controls publications are available on our web site, [www.LCmeter.com/resources/technical/manuals](http://www.LCmeter.com/resources/technical/manuals). If there are questions about the language or interpretation of any LC manuals, instructions, or specification sheets, please first contact your local distributor for help with your inquiry.

For service related issues that require further support from the Liquid Controls Service Team, use contact information shown on the last page of this document.

## Safety Procedures



### BE PREPARED

- Before using this product, read and understand the instructions.
- All work must be performed by qualified personnel trained in the proper application, installation, and maintenance of equipment and/or systems in accordance with all applicable codes and ordinances.
- When handling electronic components/boards, always use proper Electrostatic Discharge (ESD) equipment and follow proper procedures.
- Make sure that all necessary safety precautions have been taken.
- Provide for proper ventilation, temperature control, fire prevention, evacuation, and fire management.
- Provide easy access to appropriate fire extinguishers for your product.
- Consult with your local fire department, state, and local codes to ensure adequate preparation.
- Read this manual and all the literature provided in your owner's packet.
- Save these instructions for future reference.
- Failure to follow the instructions in this publication could result in, personal injury, or death from fire and/or explosion, property damage, or other hazards that may be associated with this type of equipment.



### SAFELY EVACUATE PIPING SYSTEM

Before disassembly of any meter or accessory component: **ALL INTERNAL PRESSURES MUST BE RELIEVED AND ALL LIQUID DRAINED FROM THE SYSTEM IN ACCORDANCE WITH ALL APPLICABLE PROCEDURES.**

- Pressure must be 0 (zero) psi.
- Close all liquid and vapor lines between the meter and liquid source.

**Failure to follow this warning could result in property damage, personal injury, or death from fire and/or explosion, or other hazards that may be associated with this type of equipment.**



## OBSERVE NATIONAL & LOCAL CODES

Power, input, and output (I/O) wiring must be in accordance with the area classification for which it is used (Class I, Div 1). For North America, installations must be per the U. S. National Electrical Code, NFPA 70, or the Canadian Electrical Code in order to maintain Class I, Division 1 ratings. This may require using connections or other adaptations in accordance with the requirements of the authority having jurisdiction.

Peripheral equipment must be suitable for the hazardous location where it is installed. (L'équipement périphérique doit être adapté à la zone dangereux où il est installé.)

### **WARNING: Explosion Hazard**

When in hazardous locations, turn power OFF before replacing or wiring modules. (Lorsque dans des endroits dangereux, coupler le courant avant de remplacer ou de câbler des modules.)

**DO NOT** disconnect equipment unless power has been switched OFF or the area is known to be Non-Hazardous. (NE PAS déconnecter l'équipement sans coupler l'alimentation ou sans s'assurer que la zone est non dangereuse.)

**WARNING: Use 3.5 in • lb (0.4 N • m) torque when tightening terminal block screws.**

## General Information

The Liquid Controls Pulse Output Device (POD) converts the rotary motion of the Liquid Controls Positive Displacement Flowmeter into electronic pulses. This allows the meter to interface with a wide variety of electronic monitoring devices and control equipment. The POD operates in standard and bidirectional flow applications.

### Check Each Shipment

Before installation, check your shipment against the packing list and ensure that no parts are missing. The packing list is inside the red information packet along with the Installation and Operation Manuals.

The POD mounts directly to the front cover of any Liquid Controls meter in place of the packing gland. The motion of the meter's blocking rotor is magnetically coupled through a stainless steel wall to the electronics compartment of the POD. This eliminates the dynamic seal of the packing gland and isolates the electronics from the process fluid in the meter.

Inside the electronics compartment, an optical shaft encoder converts the rotary motion into a high resolution, two-channel, quadrature square wave. Both outputs are driven by field effect transistors (FETs) and switch from zero volts in the "ON" state to the power supply voltage in the "OFF" state. As supplied from the factory, there is a 2.2K $\Omega$  pull-up resistor on each output which can be removed from the circuit in the field to produce a true "open drain" output. As open drain devices, the outputs can sink up to 100 mA in the "ON" state and sustain up to 30 VDC in the "OFF" state.

The electronics compartment also serves as a conduit junction box. The POD has an o-ring sealed, threaded cover. The standard wire entrance is a 1/2-14 NPT female hub which accepts threaded conduit or a cable gland. A screw-type, removable, terminal block on the circuit board facilitates wiring of the unit. With the wiring entrance sealed and the cover in place, the housing has a weatherproof rating of NEMA 4X.

## POD Models

These are the available POD models:

- **POD1** – Fork Drive with Buna-N O-Ring, 100 PPR Quad Pulser, 9 to 30VDC
- **POD2** – Fork Drive with PTFE O-Ring, 100 PPR Quad Pulser, 9 to 30VDC
- **POD3** – Blade Drive with Buna-N O-Ring, 100 PPR Quad Pulser, 9 to 30VDC
- **POD4** – Blade Drive with PTFE O-Ring, 100 PPR Quad Pulser, 9 to 30VDC
- **POD5** – Fork Drive with Buna-N O-Ring, 100 PPR Quad Pulser, 5 to 24VDC, POD5 is not IECEx approved
- **POD6** – Fork Drive with EPDM O-Ring, 100 POD7 PPR Quad Pulser, 9 to 30VDC
- **POD7** – BLADE DRIVE WITH EPDM O-RING, 100 PPR Quad Pulser, 9 to 30VDC

## Output Signal Resolutions

### Approximate K-Factors and Volumetric Reference Data

When initially calibrating a specific meter model, the K-Factor (Pulses/Unit) values given below are for reference only and are not to be used as a final K-Factor. **NOTE:** All Liquid Controls meter models listed below assume use of the 400ppr pulser with a 1:1 Packing Gland/Face Gear ratio when calculating the Pulses/Unit. For 2:1 ratio, divide the Pulses/Unit by 2.

	METER MODEL	PULSES/ GAL	MAX GAL/ MIN	REVS/GAL	GAL/REV	PULSES/L	MAX L/MIN	REVS/L	L/REV
Liquid Controls M & MA Series	MA-4	4894.8	30	12.2370	0.0817	1293.21	225	3.2330	0.3093
	M-5, MA-5	4894.8	60	12.2370	0.0817	1293.11	225	3.2328	0.3093
	M-5, MA-5 (3:1 Internal gearing)	1631.6	60	4.0790	0.2452	431.07	225	1.0777	0.9279
	M-7, MA-7	2222.0	100	5.5550	0.1800	587.05	380	1.4676	0.6814
	M-10	2222.0	150	5.5550	0.1800	587.05	550	1.4676	0.6814
	M-15, MA-15	823.2	200	2.0580	0.4859	217.49	760	0.5437	1.8392
	M-25	823.2	300	2.0580	0.4859	217.49	1140	0.5437	1.8392
	M-30	296.8	350	0.7420	1.3477	78.41	1325	0.1960	5.1011
	M-40	296.8	450	0.7420	1.3477	78.41	1700	0.1960	5.1011
	M-60 (New Style)	159.3	600	0.3983	2.5107	42.09	2270	0.1052	9.5029
	M-60 (Old Style)	101.8	600	0.2545	3.9293	26.90	2270	0.0672	14.8723
Liquid Controls MS Series	M80	159.3	800	0.3983	2.5107	42.09	3030	0.1052	9.5029
	MS-7	2222.0	100	5.5550	0.1800	587.05	380	1.4676	0.6814
	MS-15	823.2	200	2.0580	0.4859	217.49	760	0.5437	1.8392
	MS-25	823.2	350	2.0580	0.4859	217.49	1140	0.5437	1.8392
	MS-30	296.8	350	0.7420	1.3477	78.41	1325	0.1960	5.1011
	MS-40	159.3	450	0.3983	2.5107	42.09	1700	0.1052	9.5029
	MS-75	101.8	700	0.2545	3.9293	26.90	2650	0.0672	14.8723
	MS-120	63.2	1000	0.1579	6.3331	16.69	3780	0.0417	23.9709
Avery Hardoll BM & DM Series	BM250 (Single Capsule)	666.8	300	1.6670	0.5999	176.17	1140	0.4404	2.2705
	BM950 (Single Capsule)	666.8	362	1.6670	0.5999	176.17	1370	0.4404	2.2705
	BM350 (Dual Capsule)	333.5	660	0.8337	1.1995	88.11	2050	0.2203	4.5400
	BM450 (Dual Capsule)	333.5	542	0.8337	1.1995	88.11	2280	0.2203	4.5393
	BM550 (Dual Capsule)	333.5	602	0.8337	1.1995	88.11	2500	0.2203	4.5400
	BM650 (Triple Capsule)	222.3	793	0.5558	1.7992	58.74	3000	0.1468	6.8100
	BM750 (Triple Capsule)	222.3	793	0.5558	1.7992	58.74	3000	0.1468	6.8120
	DM	263.3	660	0.6583	1.5191	69.57	2500	0.1739	5.7504

Liquid Controls recommends that any meter-mounted register driven by the packing gland/face gear assembly uses the 1:1 Ratio for the highest resolution. Max flow rates listed above may vary depending on the meter class and regulatory approval.

*If using both channels and rising edge only, multiply the pulses per unit and maximum kHz by a factor of two.*

*For LCR applications using both channels and the rising and falling edge, multiply the pulses per unit and maximum kHz by a factor of four.*



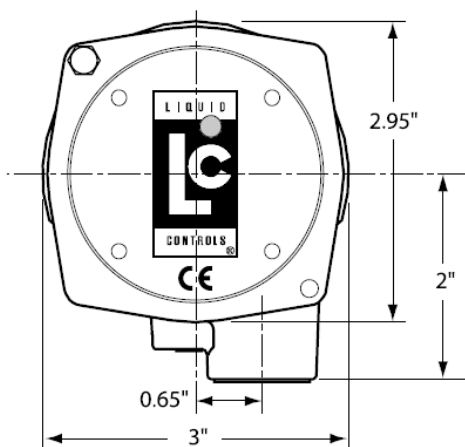
## Specifications

<b>Voltage</b>	<ul style="list-style-type: none"> <li>• 9 to 30 VDC</li> <li>• POD5 has a 5 VDC minimum but is not IECEx approved</li> </ul>
<b>Current Supply maximum</b>	<ul style="list-style-type: none"> <li>• 50 mA</li> </ul>
<b>Output Signal Resolution</b>	<ul style="list-style-type: none"> <li>• 100 pulses per channel per revolution, unscaled (see the <b>Output Signal Resolutions</b> table in <a href="#">General Information</a> (6))</li> </ul>
<b>Square Wave</b>	<ul style="list-style-type: none"> <li>• Single channel output – Channel A or channel B</li> <li>• Quadrature channel output – Channel A and channel</li> </ul>
<b>Pulse Timing</b>	<ul style="list-style-type: none"> <li>• Nominal 50% on and 50% off</li> </ul>
<b>Rise/Fall Time of Pulse</b>	<ul style="list-style-type: none"> <li>• &lt; 5 <math>\mu</math>s</li> </ul>
<b>Output</b>	<ul style="list-style-type: none"> <li>• Current sinking 100 mA maximum in “ON” state</li> <li>• V+ supply @ 2.2 K<math>\Omega</math> in “OFF” state.</li> <li>• Optional open-drain FET (Field-Effect Transistor).</li> <li>• FET rating (drain to source voltage) 30 VDC maximum</li> </ul>
<b>Pulse Transmission Distance</b>	<ul style="list-style-type: none"> <li>• 5,000 feet (1,524 meters)</li> </ul>
<b>Pulse Output Fidelity</b>	<ul style="list-style-type: none"> <li>• ISO 6551 Level A</li> <li>• API MPMS Chapter 5.5; Level A</li> <li>• OIML R117-1</li> <li>• Measurement Canada’s SVM-1</li> </ul>
<b>Materials of Construction</b>	<ul style="list-style-type: none"> <li>• Aluminum Alloy ADC12</li> <li>• Powder Coat: Corro-Coat PE 74-141 Polyester</li> </ul>
<b>Cable Entry</b>	<ul style="list-style-type: none"> <li>• ½"-14 NPT</li> </ul>

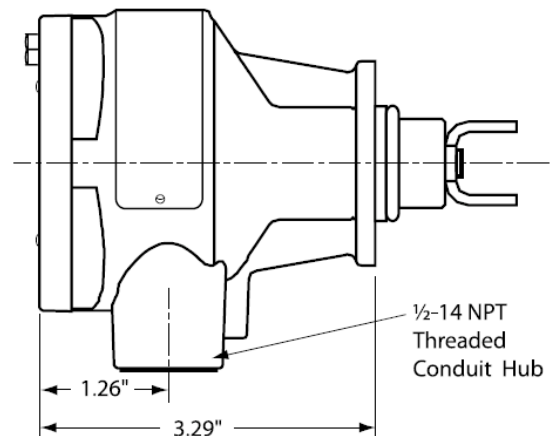
<b>Operating Temperature Range</b>	<ul style="list-style-type: none"> <li>• -40 to 176 °F (-40 to 80 °C)</li> </ul>
<b>Humidity Range</b>	<ul style="list-style-type: none"> <li>• 0-100%, non-condensing</li> </ul>
<b>Shock</b>	<ul style="list-style-type: none"> <li>• 50 G for 10 ms</li> </ul>
<b>Vibration</b>	<ul style="list-style-type: none"> <li>• 1 G at 10-150 Hz</li> </ul>
<b>Electromagnetic Compatibility (EMI, RFI, etc.)</b>	<p><b>POD with PC Board 84120</b></p> <ul style="list-style-type: none"> <li>• EU Directive 2004/108/EC (EMC)</li> <li>• IEC 61000-4-2</li> <li>• IEC 61000-4-3</li> <li>• IEC 61000-4-5</li> <li>• IEC 61000-4-6</li> <li>• IEC 61000-4-17</li> <li>• IEC 61000-4-29</li> <li>• IEC 61000-6-3</li> <li>• ISO 7637-2</li> </ul> <p><b>POD with PC Board 81999</b></p> <ul style="list-style-type: none"> <li>• IEC 801 standard</li> </ul>

## Dimensions














**FRONT**



**SIDE**



## Regulatory Compliance Tag Markings

 <b>LIQUID CONTROLS®</b> 9201 N I-35 Service Rd. Oklahoma City, OK 73131 USA	 II 2 G Ex db IIB T6 Gb -40 °C ≤ Tamb ≤ +80 °C IP66 TYPE 4X PRESAFE 18 ATEX 12438X IECEx PRE 19.0072X DNV 12.0091 X RATINGS: 9-30 VDC CLASS 2, 50 mA	 <b>UL</b> LISTED 2P46 TELEMETERING EQUIPMENT FOR USE IN HAZARDOUS LOCATIONS CLASS I, DIV. 1, GROUPS C & D	WARNING: DO NOT OPEN WHEN ENERGIZED ATENÇÃO: NÃO ABRA QUANDO ENERGIZADO ATTENTION: NE PAS OUVRIER SOUS TENSION ATENÇÃO: UTILIZE CABOS APROPRIADOS PARA A TEMPERATURA DE 100°C			
				○ MODEL _____	 <b>Segurança</b>    2460	○
				S/N _____	   2460	○
				YEAR _____	   2460	○



- This equipment has been found to comply with the European Directive for Equipment For Potentially Explosive Atmospheres 2014/34/EU (ATEX), and Certification Scheme for Explosive Atmospheres of INTERNATIONAL ELECTROTECHNICAL COMMISSION (IECEx). Evaluation was made in 2018 by DNV to the ATEX Directive with a certificate number PRESAFE 18 ATEX 12438X and in 2011 to IECEx scheme with a certificate number IECEx DNV 11.0012X, where X represents the following Special Conditions for Safe Use:
  - 1) Only Ex d certified cable glands and thread adapters are to be used; and 2) For ambient temperatures above 70 °C, use field wiring suitable for 20 °C above maximum ambient temperature.
- **II** – Suitable for use in surface (not mine) installations.
- **2G** – High level of protection is provided against flammable gases, vapors, or liquids, which may exist during normal operation.
- **Ex db** – Explosion protection is provided by a flameproof enclosure.
- **T6** – Temperature class for surface temperature limitations (T6 is ≤ 85 °C).
- **Gb** – Equipment group per IEC 60079-0 and EN 60079-0 and other regional standards based on IEC 60079 (such as GB/T3836)

### -40 °C ≤ Tamb ≤ 80 °C

- Safe limits of ambient temperature.

## IP66

- Ingress protection: dust tight and protected against powerful water jetting.



- This equipment complies with all applicable European Directives. The Quality Assurance Notification pursuant to the ATEX Directive has been performed by DNV (EU Notified Body registration number is 2460).

## Type 4X

- The enclosure has been evaluated by UL for outdoor use to provide protection against water and dust and an increased level of protection against corrosion; and that will be undamaged by the external formation of ice.



- Listed by UL to both the Canadian and US requirements for explosion proof products intended for use in Class I, Division 1 & 2, Groups C & D environments as classified by the US and/or Canadian Electrical Code.

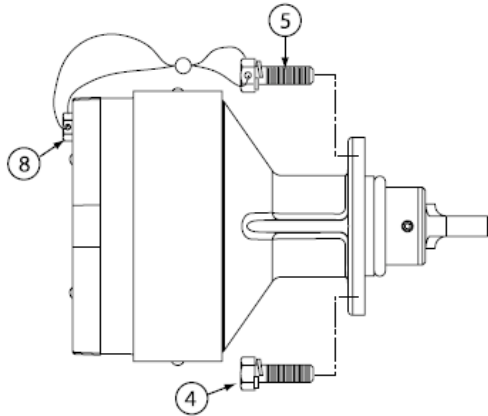
## 2P46

- UL listing control number.

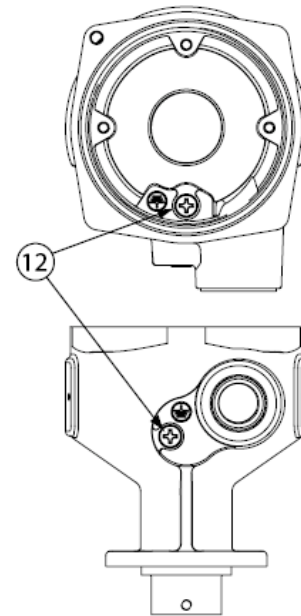
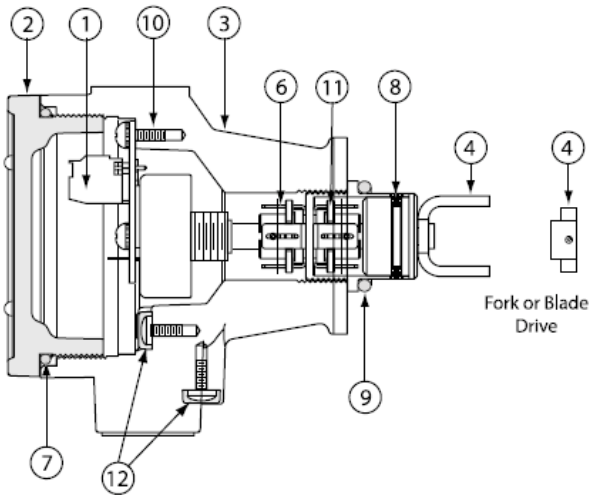
## DNV 12.0091 X

- Explosive atmosphere certification for Brazil (INMETRO).

# Bill of Materials



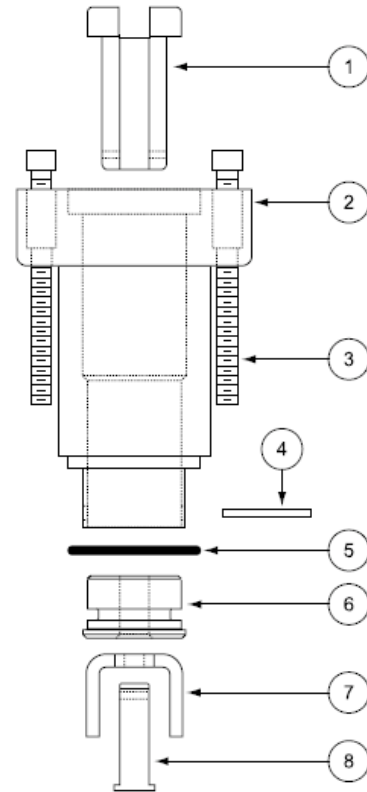
POD Assemblies		
Item #	Description	Part #
4	Screw, #10-24 x .625	09079
5	Screw, #10-24 x .625	40107
8	Set Screw, M4x.7	09438



POD Internal Components						
Item #	Description	Part # (POD1)	Part # (POD2)	Part # (POD3)	Part # (POD4)	Part # (POD5)
1	PC Board Assembly	84120	84120	84120	84120	84120
2	Cover Assembly	81163	81163	81163	81163	81163
3	Housing Assembly	N/S*	N/S	N/S	N/S	N/S
4	Drive Assembly	81165 (Fork)	81165 (Fork)	81172 (Blade)	81172 (Blade)	81165 (Fork)
6	Hub Magnet Assembly	N/S	N/S	N/S	N/S	N/S
7	O-Ring, Buna-N	09212	09212	09212	09212	09212
8	Screw, #5-40 x .125	09211	09211	09211	09211	09211
9	O-Ring, Buna-N or PTFE	06856 (Buna)	09151 (PTFE)	06856 (Buna)	09151 (PTFE)	06856 (Buna)
10	Screw, #6-32 x .375	08177 (Buna)	08177 (PTFE)	08177 (Buna)	08177 (PTFE)	08177 (Buna)
11	Hub Magnet Assembly	81159	81159	81159	81159	501241
12	(2) 6-32 x 1/4" Earth Ground Screw	08230	08230	08230	08230	08230

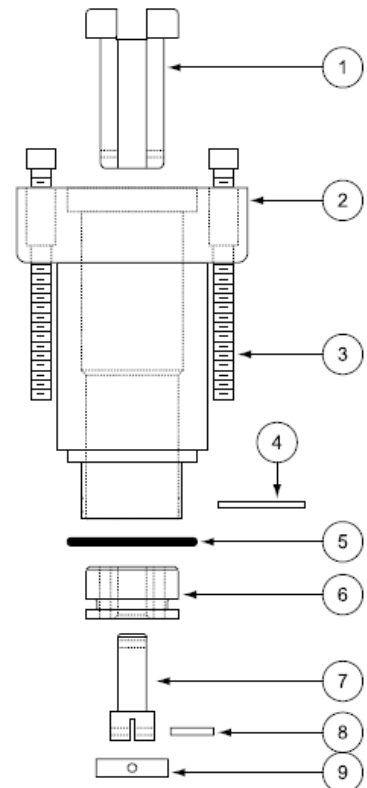
<b>POD Extension - FORK DRIVE</b>		
<b>MODELS 49754 &amp; 49756</b>		
<b>Item #</b>	<b>Description</b>	<b>Part #</b>
1	Pulser Extension Driver	N/S*
2	Pulser Housing	N/S
3	Screw, #10-24 x 2.00	09228
4	Dowel Pin	N/S
5	O-Ring, Buna-N (Model 49754)	06856
	O-Ring, Teflon (Model 49756)	09151
6	Mag Bearing	N/S
7	Fork Driver	48282
8	Fork Drive Shaft	N/S

N/S = Not for Sale



<b>POD Extension - BLADE DRIVE</b>		
<b>MODELS 49757 &amp; 49759</b>		
<b>Item #</b>	<b>Description</b>	<b>Part #</b>
1	Pulser Extension Driver	N/S
2	Pulser Housing	N/S
3	Screw, #10-24 x 2.00	09228
4	Dowel Pin	N/S
5	O-Ring, Buna-N (49757)	06856
	O-Ring, Teflon (49759)	09151
6	Mag Bearing	N/S
7	Blade Driver	N/S
8	Roll Pin	06051
9	Drive Blade	40812

N/S = Not for Sale



# Installation

## POD Installation

### New Installations



When ordered with the flowmeter, the POD comes factory installed on the meter and ready for wiring. Wiring instructions begins on page 10.



### RELIEVING INTERNAL PRESSURE

All internal pressure must be relieved to zero pressure before disassembly or inspection of the strainer, vapor eliminator, any valves in the system, the packing gland, and the front or rear covers.

**Serious injury or death from fire or explosion could result in performing maintenance on an improperly depressurized and evacuated system.**

Strictly follow this procedure Relieving Internal Pressure Procedure for LPG and NH3 Meters:

1. Close the belly valve of the supply tank.
2. Close the valve on the vapor return line.
3. Close the manual valve in the supply line on the inlet side of the meter. If no manual valve exists on the inlet side, consult the truck manufacturer for procedures to depressurize the system.
4. Slowly open the valve/nozzle at the end of the supply line.
5. After product has bled off, close the valve/nozzle at the end of the supply line.
6. Slowly crack the fitting on top of the differential valve to relieve product pressure in the system. Product will drain from the meter system.
7. As product is bleeding from the differential valve, slowly reopen and close the valve/nozzle on the discharge line. Repeat this step until the product stops draining from the differential valve and discharge line valve/nozzle.
8. Leave the discharge line valve/nozzle open while working on the system.

## Retrofit Installations

Follow these procedures to remove the existing hardware:

1. Relieve the pressure from the process piping to the meter.
2. Drain the meter by opening the meter's drain plugs.

**NOTE 1:** Meters with only two packing gland mounting screws are limited to four orientations.

**NOTE 2:** When using a cable gland to seal the wire entrance, any of the eight orientations can be used. However, when using conduit, the hub should face down so moisture that may accumulate in the conduit will drain away from the POD electronics.

3. Remove the mechanical counter, adjuster, and adjuster drive shaft from the front of the meter.
4. Some meters have a counter adapter bracket which is bolted on. If this is the case, remove the counter bracket by removing the bolts that hold it in place. If the counter adapter bracket is integral to the meter, it cannot be removed. In this case, one of four POD Pulser Extensions will be required.

1. Remove the packing gland mounting screws. Pull the packing gland out of the meter. If the O-Ring does not come out with the packing gland, be sure to remove it from the packing gland well before installing the POD.



Remove Packing Gland Mounting Screws



Packing Gland Removed



## Installing the POD

### POD Extension Kits

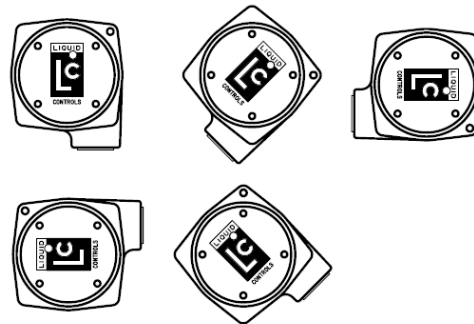
If a POD Extension Kit is necessary, it must be installed prior to installation of the POD. See [POD Extension Kit Installation](#) <sup>18</sup>.

Follow these steps to install the POD onto a flowmeter:

1. Verify that the proper POD Model was obtained by comparing the driver tang on the POD to the driver tang on the packing gland that was removed in Step 5 of the **Retrofit Installations** section above. There are two types of packing gland/POD driver tangs: blade type and fork type. Blade type packing glands must be replaced with blade type PODs. Fork type packing glands must be replaced with fork type PODs.
2. Determine the desired orientation of the conduit hub. The hub can be positioned in one of eight possible orientations as shown in the figure to the right.
3. Position the O-Ring over the bottom of the POD as shown to the right.
4. Align the fork style or blade style driver with the drive mechanism in the meter and guide the POD into the opening in the meter cover. When properly aligned, the POD will go in until its mounting flange abuts the meter cover.
5. Rotate the POD to the desired orientation and thread in the mounting screws until they are snug. Using a  $\frac{7}{32}$ "

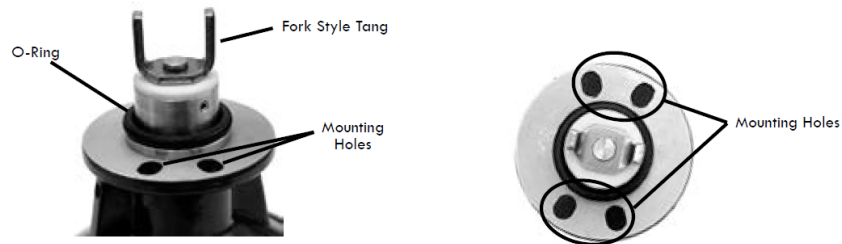


Blade Style Tang (Left) and Fork Style Tang (Right)



Recommended POD Conduit Hub Orientations

box end wrench, tighten the screws and torque them to 21-25 inch-pounds.



## POD Extension Kit Installation

The POD Extension is used when the meter has an integral counter adapter bracket or for high temperature applications. The POD Extension is used to extend the connection away from the meter.

There are four POD Extension models available:

- 49754 POD1 or POD5 – Fork Drive with Buna-N O-Ring
- 49756 POD2 – Fork Drive with Teflon O-Ring
- 49757 POD1 or POD5 – Blade Drive with Buna-N O-Ring
- 49759 POD2 – Blade Drive with Teflon O-Ring

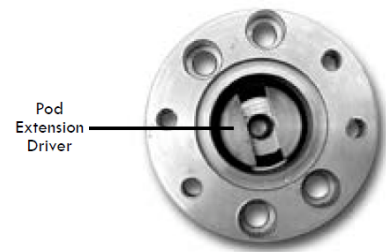
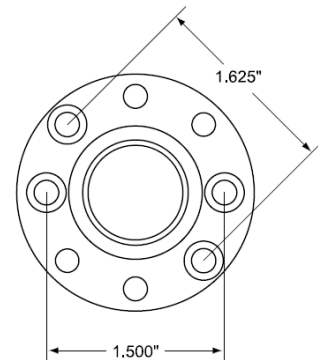


Once the existing hardware has been removed as described in the **Retrofit Installations** section of the [Installation](#) <sup>15</sup> topic above, the POD Extension can be installed.

**NOTE:** Regardless of the POD Extension being used, the POD Pulser must be a FORK drive pulser.

Follow these steps to install the POD Extension:

1. Verify that the proper POD Extension Model was obtained by comparing the driver tang on the POD Extension to the driver tang on the packing gland that was removed in Step 5 of the **Retrofit Installations** section of the [Installation](#) <sup>15</sup> topic above. There are two types of Packing Gland/POD Extension driver tangs: blade type and fork type. Blade type packing glands must be replaced with blade type POD Extensions. Fork type packing glands must be replaced with fork type POD Extensions.
2. Install the POD Extension using the two screws provided. There are two sets of holes in the POD Extension for these screws; one set is  $1\frac{5}{8}$ " apart and the other is  $1\frac{1}{2}$ " apart. Line up the holes with the meter to determine which set to use. Tighten the screws and torque them to 21-25 inch-pounds.
3. Once the POD Extension is in place, the POD may be installed onto the POD Extension. Align the POD Fork Tang with the internal POD Extension Driver. Use the two screws provided to mount the POD to the POD Extension using two of the tapped holes in the POD Extension. Using a  $\frac{7}{32}$ " box end wrench, tighten the screws and torque them to 21-25 inch-pounds.



## POD Wiring

### WIRING CONDUIT SYSTEM

When wiring the POD, the wires must enter through the POD's conduit hub. For explosion-proof rated systems (Class I, Div 1), the wiring must be in explosion-proof rated rigid conduit, or—for high vibration installations—explosion-proof rated braided flexible conduit. The conduit

must be engaged five (5) full threads into the female hub on the POD to meet explosion proof requirements.

When installing in a Division 2 location, use either rigid conduit, flexible conduit, or no conduit. When no conduit is used, the instrument cable must be brought into the POD conduit hub using a cable gland to seal the wiring to maintain the Enclosure NEMA 4X rating. Regardless of the type of connection used, thread sealant should be applied to prevent moisture from getting into the POD electrical housing.



## **OBSERVE NATIONAL & LOCAL CODES**

**Divisions Hazardous Areas** – Installations must be in full accordance with the National Electrical Code (US) or the Canadian Electrical Code to maintain the hazardous location ratings of the product.

**Zones Hazardous Areas** – Installations must be in full accordance with IEC 60079-14 to maintain the hazardous location ratings of the product and follow Special Conditions for Safe Use listed with Regulatory Compliance Tag Markings.

## **WIRING CABLE**

Multi-wire cable with an overall shield is recommended for POD wiring. If individual wires are used, they must be in a flexible metal conduit and must not be run with any other cables or wires. Use individual wires between 16 and 20 AWG or shielded cable no less than 22 AWG. Cable runs up to 5,000 ft (1,524 m) are possible, however cable runs over 1,000 ft (304.8 m) should use lower AWG wire to reduce the IR voltage drop and the inter-wire capacitance. In addition, long runs may require a lower value pull-up resistor (due to the additional cable capacitance that the pulser must drive). Cable that has a metalized foil plastic shield with a drain wire is recommended over cable with woven shields because it is easier to terminate the drain wire type cable.

## **TERMINAL BLOCK**

Removing the cover of the POD will expose a 4–position terminal block for connection to an electrical system. The terminal block can be unplugged from the board for ease of wiring. Pull it straight up to remove.

The terminal block screws require a straight blade screwdriver with a tip less than  $\frac{1}{8}$ " wide. Before inserting wires into the terminal block, strip  $\frac{1}{4}$ " of insulation off each wire. Turn each terminal screw counterclockwise a few turns to make sure that the wiring slot is fully open to accept wire. Insert the stripped end of the wire and tighten the terminal block screw.

Plug the terminal block back into the board if it was removed. Be sure it is properly oriented with the four pins.

## WIRING CONFIGURATIONS

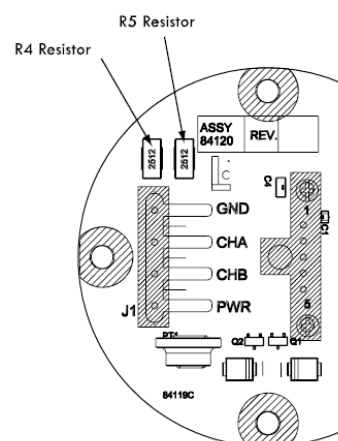
The wiring configuration used depends on the system needs. Check the input requirements of electronic controls to determine single channel or quadrature output. The POD can be wired using only one of the two channels (Channel A or B) if the flowmeter has flow in only one direction. To detect both forward and reverse flow, both channels (which are in quadrature to each other) must be used. Channel A will lead Channel B by  $90^\circ$  in one flow direction and Channel B will lead Channel A in the reverse direction. Quadrature is required in most Weights & Measures approved installations.

## CONVERSION TO OPEN DRAIN OUTPUT

As supplied by the factory, the POD has a 2.2 K $\Omega$  pull-up resistor to the positive power supply on each output transistor. The unit can be modified in the field to provide true Open Drain (Open Collector) outputs if desired.

Follow these steps to modify the POD to Open Drain outputs:

1. Turn off power to the unit and remove the cover by turning it counterclockwise.
2. Loosen the three circuit board mounting screws using a Philips screwdriver. Remove the entire circuit board assembly from the POD housing.
3. With a small tip soldering iron, remove the R4 and R5 resistors.
4. Carefully, apply heat to one pad of the resistor.
5. When the solder melts, push the resistor off the circuit board with the tip of the soldering iron.
6. Remove the second resistor using the same method.

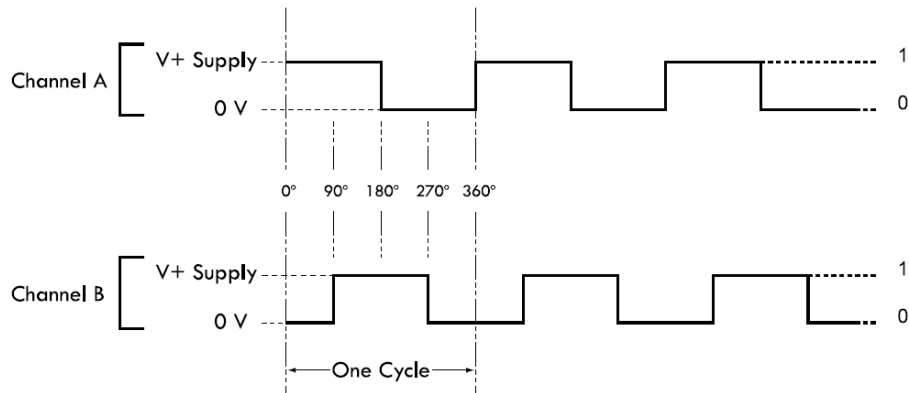


7. Reassemble the unit.

## SIGNAL OUTPUT

The diagram below shows the voltage output for a clockwise rotation of the Pulse Output Device (POD) with Channel A leading Channel B. For reverse flow applications (counterclockwise) Channel B leads Channel A.

**NOTE:** Quadrature channel voltage output is 90° out of phase with Channel B.

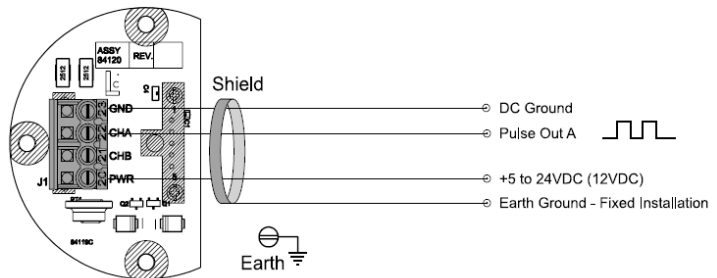


## POD Wiring Schematics

### Single Channel Applications

Follow these steps when wiring the POD:

1. Use metallic conduit with individual wires or use 3 conductor, 22 AWG, shielded cable.
2. Strip 1½" off of outer sheathing. Remove exposed shield and drain wire and then tape.
3. Strip ¼" insulation from each conductor and connect to the terminal blocks.

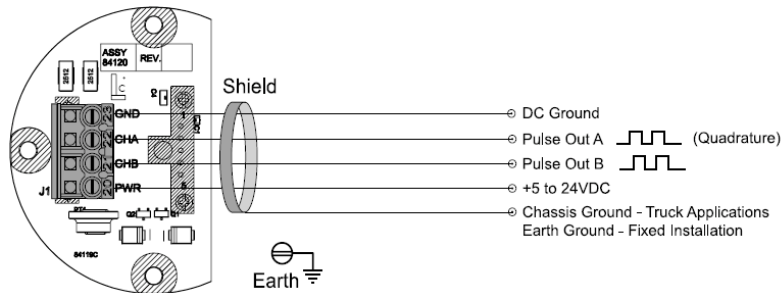


Description	POD: J1 Terminal	SP4000, SP3850, IT400 Terminal
Power	20 (12VDC)	11 (12VDC)
Channel A or B	21 or 22	9
DC Ground	23	12
Shield Wire	No Connection	Earth Ground Screw

## Power Source Requirement

An isolation source and overcurrent protective device rated 5A max must be installed in the power circuit. If a 5A-max isolation source and overcurrent protective device is not available, a Class 2 power source must be used.

### Dual Channel Quadrature Applications LECTROCOUNT® LCR®, LCR-II®, LC<sup>3</sup>, LCR 600, LCR.iQ, LCRx.iQ, MASTERLOAD.iQ, MASTERLOADx.iQ



Description	POD: J1 Terminal	LCR, LCR-II, LCR600™: J8	LC <sup>3</sup> : J3
Power	20 (12VDC)	31	19
Channel B	21	34	17
Channel A	22	33	18
Ground	23	38	15
Shield Wire	No Connection	J6-13 (case ground)	14 (case ground)



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