



*Instrumentation designed  
with the user in mind*

Instruction Manual  
**Princo MagneLevel™**  
**Model LML**

Two-Wire Magnetic Coupled Level Transmitter

11 Nov 05



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# PRINCO MagneLevel

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# PRINCO MagneLevel

## 1 Description

### 1.1 General Description

The Princo Model LML MagneLevel™ is a magnetically coupled, two-wire level transmitter which can accurately measure the level of a process liquid within a storage vessel and transmit a proportional 4 to 20mA signal to a receiving instrument or controller. A sensing rod, which extends the full length of the span to be measured, and a concentric magnetic float sense the level.

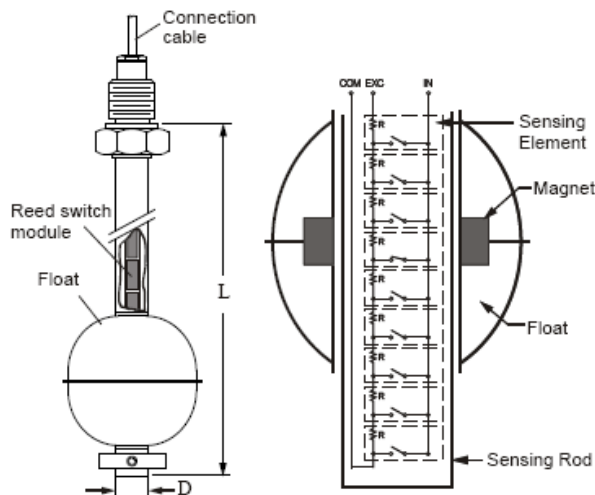


Figure 1-1: LML Sensing Rod Construction

### 1.2 Functional Description

The Model LML is comprised of a magnetic float and rod assembly and a two-wire transmitter module. The rod extends the full length of the span to be monitored. It is composed internally of a series of sensing elements, each composed of a resistor and a Reed relay (see Figure 1-1). The resistors are wired in series along the length of the probe. The transmitter module is effectively a three-wire ohmmeter. It supplies an excitation current that runs continuously through the entire string of resistors and back through a common connection. The Reed relays are activated by the magnetic float which is mounted concentrically around the rod. The relays, when activated, switch their respective resistance junctures to the voltage sensing junctures of the transmitter. Only one relay is active at a time. As the float rises along the length of the probe, it successively activates the next higher relay and de-activates the previous one. Thus, the transmitter senses a successively higher voltage drop at each step along the way. The

transmitter is calibrated to put out a 4 to 20mA signal relative to the high and low steps along the probe. The linearity and resolution of the output signal are directly proportional to the number of sensing elements per inch of probe length. The 4 to 20mA signal is modulated on the same two wires which power the device, thus the term “two-wire” transmitter.

### 1.3 Basic Features

- Two-wire, loop-powered 4 to 20mA output
- Wetted parts – choice of 304 stainless steel, or polypropylene or PVDF
- Aluminum or polypropylene housing, NEMA 4X
- Level reading is not affected by changes in conductivity or by changes in specific gravity within specified limits.
- Measures levels up to 12 feet
- Process temperatures up to 248 °F
- Process pressures up to 425 psi
- Measurement resolution +/- 0.25 inches

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## 2 Specifications

### 2.1 LML Electronic Module

- TYPE  
Two-wire, loop-powered
- POWER REQUIREMENTS  
12 to 36 Vdc
- AMBIENT TEMPERATURE RANGE  
-4 to 176 °F (-20 to 80 °C)
- OUTPUT RESOLUTION  
+/-0.25 inches
- LOAD RESISTANCE  
Less than 600 Ω
- ADJUSTABLE RANGE  
10%

### 2.2 System Specifications

- INPUT  
2 MΩ
- PROCESS TEMPERATURE  
-4 to 248 °F (-20 to 120 °C)
- WETTED SURFACES  
304 SST, Polypropylene or PVDF
- VESSEL CONNECTION  
2" NPT
- MINIMUM SPECIFIC GRAVITY  
See chart below.
- MEASUREMENT RANGE  
2 feet to 12 feet

	System I	System II	System III	System IV	System IV
<b>Housing</b>	Aluminum, IP65, NEMA 4X (B type)	Aluminum, IP65, NEMA 4X (B type)	PP + Fiber, IP65, NEMA 4X (C type)	PP + Fiber, IP65, NEMA 4X (C type)	PP + Fiber, IP65, NEMA 4X (C type)
<b>Ambient Temperature</b>	140 °F (60 °C)	140 °F (60 °C)	140 °F (60 °C)	140 °F (60 °C)	140 °F (60 °C)
<b>Process Temperature</b>	-4 to 248 °F (-20 to 120 °C)	-4 to 248 °F (-20 to 120 °C)	-4 to 248 °F (-20 to 120 °C)	PP: -4 to 248°F (-20 to 120 °C) PVDF: -4 to 248°F (-20 to 120 °C)	14 to 176 °F (10 to 80 °C)
<b>Wetted Surfaces</b>	304 SST	304 SST	PVDF	PP or PVDF	PP
<b>Vessel Connection</b>	2" NPT	2.5", 150# SS flange	2.5", 150# SS flange	2" NPT	2.5", 150# PP flange
<b>Minimum Specific Gravity</b>	0.5	0.5	0.8	0.8	0.6
<b>Measurement Range</b>	2 feet to 12 feet	2 feet to 12 feet	2 feet to 12 feet	2 feet to 12 feet	2 feet to 12 feet

# PRINCO MagneLevel

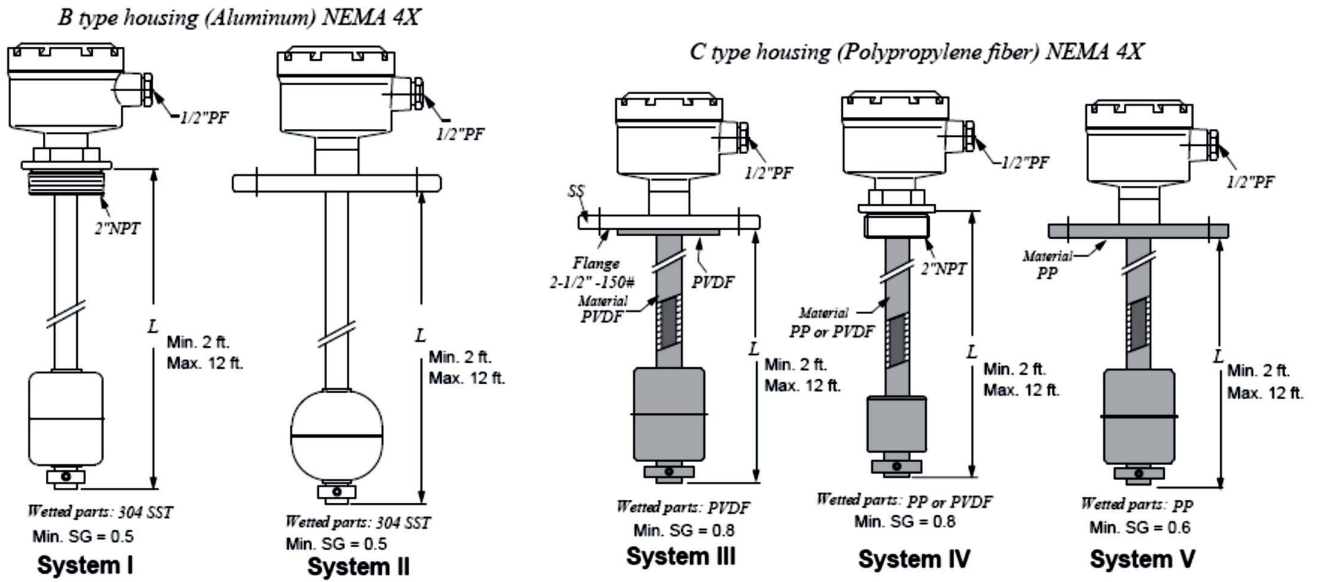


Figure 2-1: Systems Diagrams

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## 3 Installation and Calibration

### 3.1 Mechanical Installation

- Mount the unit into the storage vessel by means of its NPT connector or flange mount. Assure proper sealing.
- The MagneLevel transmitter should be mounted away from the liquid inlet, as liquid fluctuation could produce an error in the output signal.

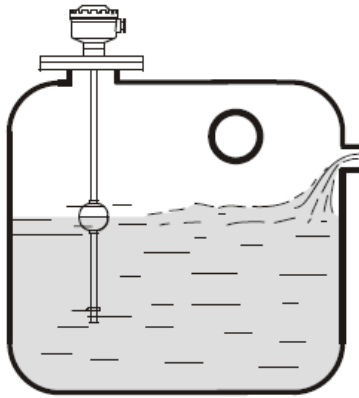


Figure 3-1: Mounting Location

- A stilling well or equivalent device should be installed to normalize the transmitter's output signal if an agitator is used in the application.

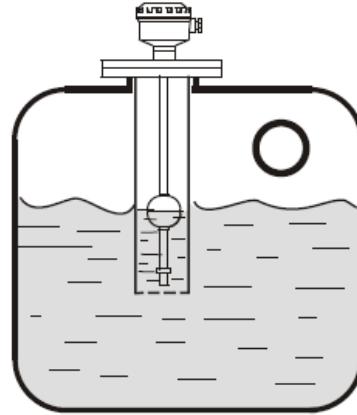


Figure 3-2: Mounting Location

### 3.2 Electrical Connections

Remove the lid of the MagneLevel electronic housing. Feed the loop power wires through the conduit opening and connect them to the terminal block, positive to +24V and negative to O/P. See Figure 3-3 below.

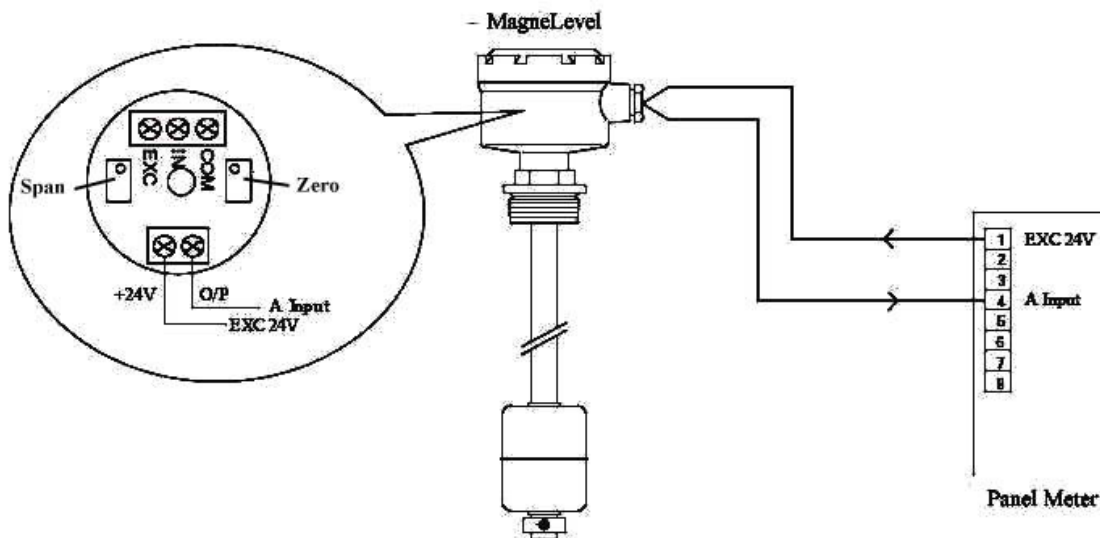


Figure 3-3: Electrical Connections and Adjustments

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## 3.3 Calibration

MagneLevel units are normally shipped from the factory calibrated at zero level and span for 4 and 20 mA respectively. If adjustment is necessary, refer to Figure 3-3 for location of adjustments:

- Put the float at the low level position and adjust the ZERO adjustment pot for 4 mA into the meter.
- Put the float at the high level position and adjust the SPAN adjustment pot for 20 mA into the meter.
- Check low and high level outputs. Repeat adjustments if necessary.

## 4 Equipment Service

### 4.1 Getting Help

If your Princo equipment is not functioning properly, and attempts to solve the problem have failed, contact the closest Princo sales representative in your area, or call the factory direct and ask for service assistance. The factory telephone number is 1-800-221-9237.

To assist us in providing an efficient solution to the particular problem, please have the following information available when you call:

1. Instrument Model Number
2. Purchase Order Number
3. Date of Purchase Order
4. Process Material Being Monitored
5. Detailed Description of the Problem

If your equipment problem cannot be resolved over the phone, then it may be necessary to return the equipment for checkout/repair.

Do not return equipment without first contacting the factory for a Return Material Authorization number (RMA #).

Any equipment that is returned MUST include the following information in addition to the list above.

6. RMA Number
7. Person to contact at your Company
8. Return (Ship to) Address

Princo MagneLevel instruments are covered by a 1-year limited warranty. You will not be charged if it is determined that the problem is covered under

warranty. Please return your equipment with freight charges prepaid. If repair is covered under warranty, Princo will pay return freight charges.

If telephone assistance or equipment return is not a practical solution to the problem, then it may be necessary for field assistance. Trained field servicemen are available from the factory on a time/expense basis to assist in these instances.

### 4.2 Warranty Statement

The PRINCO MagneLevel Transmitter is backed by a 1-year warranty. PRINCO will repair or replace, at its option, any instrument that fails under normal use for up to 1 year after purchase.