



## MAXIMA+ Series Rotary Level Indicator



BinMaster: Division of Garner Industries

**OPERATING INSTRUCTIONS  
PLEASE READ CAREFULLY**

# TABLE OF CONTENTS

GENERAL SPECIFICATIONS.....	3
SAFETY SUMMARY.....	4
1.0 INTRODUCTION .....	5
2.0 INSTALLATION.....	5
2.1 Location and Mounting .....	5
2.2 Input Power and Field Wiring.....	6
2.3 Grounding .....	7
3.0 RELAYS .....	7
3.1 DPDT Relay .....	7
3.2 Fail-Safe High .....	7
3.3 Fail-Safe Low .....	8
3.4 STATUS Relay .....	8
4.0 TIME DELAY .....	9
4.1 Changing Time Delay .....	9
5.0 EXTERNAL LED.....	10
6.0 WARRANTY AND CUSTOMER SERVICE .....	10
7.0 DISPOSAL .....	10
EUROPEAN DECLARATION OF CONFORMITY .....	11

# SPECIFICATIONS

## MAXIMA+ GENERAL SPECIFICATIONS

<b>Supply:</b>	<b>AC MODEL</b>	24/115/230 VAC 50/60 Hz (selectable)
	<b>DC MODELS</b>	12 VDC Model or 24 VDC Model
<b>Supply Tolerance:</b>		-15% +10%
<b>Load:</b>		AC Model = 8 VA; DC Models = 4 VA
<b>External Overcurrent Protection:</b>		
	<b>AC MODEL</b>	24 VAC = 750 mA; 115 VAC = 200 mA; 230 VAC = 100 mA
	<b>DC MODELS</b>	Internally protected, no external fusing required
<b>Ambient Temperature:</b>		
	<b>(Electronics)</b>	-40°F to +158°F (-40°C to +70°C)
<b>Enclosure:</b>		Type 4X, 5, 9, & 12 (Hazardous locations, Class II, Groups E, F & G)
<b>DPDT Relay Output:</b>		10 Amps 250 VAC
<b>Fail-Safe:</b>		Switch selectable "High" or "Low" level modes
<b>Status Indicator Relay:</b>		SPDT = 10 A 250 VAC (optional) DC Solid State Relay = 1 A 42 VDC (optional) AC Solid State Relay = 1 A 250 VAC
<b>Time Delay:</b>		Selectable 5 seconds (default); programmable to 25 seconds
<b>Mounting:</b>		1-1/4" NPT
<b>Conduit Entry:</b>		3/4" NPT

# SAFETY

## SAFETY SUMMARY

Review the following safety precautions to avoid injury and prevent damage to the equipment.

The product should be installed, commissioned, and maintained by qualified and authorized personnel only.

Install according to installation instructions and comply with all national and local codes.

Use electrical wire that is sized and rated for the maximum voltage and current of the application.

Properly ground the enclosure to an adequate earth ground.

Observe all terminal and relay contact ratings as called out on the nameplate and in the installation manual.

Ensure that the enclosure cover is in place and secured tightly during normal operation.

If this product is used in a manner not specified by the manufacturer, the safety protection could be compromised.

## Safety Terms and Symbols



**WARNING:** Warning statements identify conditions or practices that could result in injury or loss of life. Risk of electrical shock.



**CAUTION:** Caution statements identify conditions or practices that could result in damage to this product or other property.

## Safety Precaution



**CAUTION:** Before removing the enclosure cover, open all circuits entering the enclosure. Be aware that there may be more than one live circuit.

# INTRODUCTION

## 1.0 INTRODUCTION

The BinMaster MAXIMA+ is a rotating paddle style level sensor that provides reliable point level detection for bulk solids, including powder, pellet, and granular materials. The unit's status is continually monitored, and its fail-safe circuitry will fail to a "safe" condition in the event of a unit failure or power failure. A visual LED continually indicates the sensor's status, giving a quick visual monitoring of paddle rotation, covered condition or fault condition. A status relay is also provided for monitoring the status of the sensor.

The MAXIMA+ motor rotates the drive shaft and paddle at 1 RPM (2 RPM on 24 VDC Model). When the vessel material fills to the level of the indicator paddle, the material causes the paddle to stop rotating indicating a covered condition. When the material falls away, the paddle starts rotating again to indicate an uncovered condition.

## 2.0 INSTALLATION

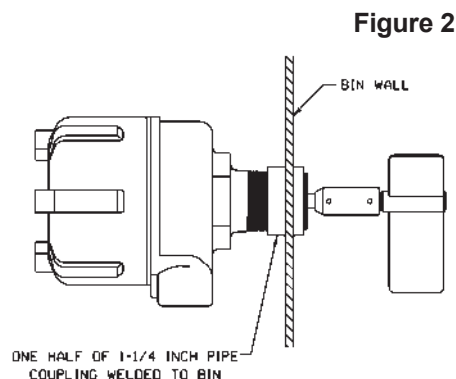
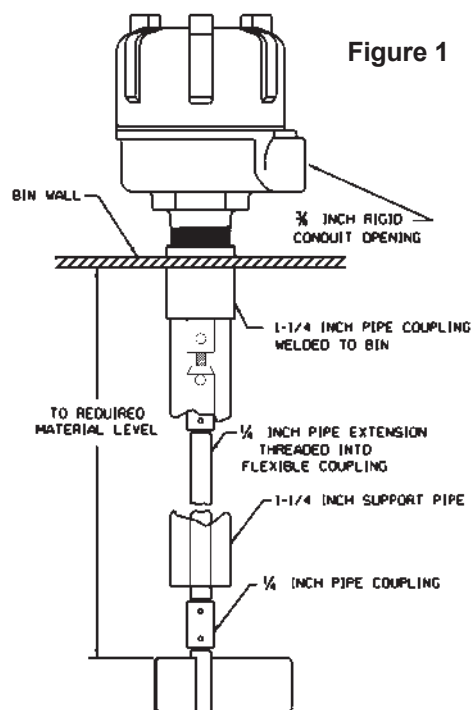
### 2.1 Location and Mounting

#### TOP MOUNT

1. Locate and cut hole in top of bin to fit outside diameter of 1-1/4" pipe coupling (1.950").
2. Position coupling halfway into bin and weld.
3. Turn unit so conduit opening is in desired location.
4. Add 1/4" extension pipe to desired length with standard 1/4" coupling on bottom end.
5. Cut 1-1/4" support pipe approximately 4" shorter than overall length of 1/4" pipe shaft when used with flexible coupling.
6. Insert 1-1/4" pipe into coupling and tighten.
7. Insert paddle into 1/4" coupling and drill holes for lock pins.

#### SIDE MOUNT

1. Locate and cut hole in side of bin to fit outside diameter of 1-1/4" pipe coupling.
2. Weld on half of standard 1-1/4" pipe coupling to bin wall flush with inside of bin.
3. Insert hub into coupling and turn so the conduit openings are pointed down.
4. Screw paddle into place and replace lock pin.
5. Shaft and paddle should be shielded in low level mounting when subjected to material flow.
6. For side mount, a solid coupler is recommended.



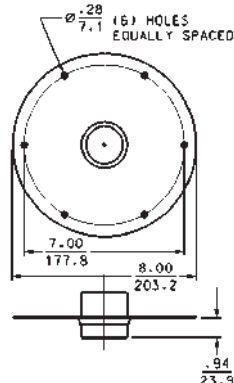
## MOUNTING PLATES

Mounting plates are necessary when a completely assembled unit is to be mounted on the bin wall from the outside. A 5-1/2" hole is cut in the bin. Six bolt holes are drilled around the hole to match the mounting plate. The plate, with the unit attached, is then bolted in place. All mounting plates are available in carbon and stainless steel.

### Full Coupling

For use with all rotary level controls. This model is used for top of bin installations where shaft extensions and shaft guards are required.

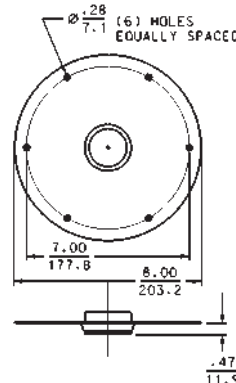
Figure 4



### Half Coupling

For use with all rotary level controls. This model is used primarily for side of bin installations.

Figure 5



## 2.2 Input Power and Field Wiring

**!** The MAXIMA+ is available in an AC Model and two DC Models. See the voltage rating on the nameplate for the appropriate supply voltage. The AC Model can be powered from either a 24 VAC, 115 VAC, or 230 VAC supply (see diagram below). **The voltage selector switch must be put in the correct voltage position for the power supplied to the LINE input terminals N and L.** Field wiring should conform to all national and local electrical codes and any other agency or authority having jurisdiction over the installation. For power input, use wire that is sized and rated for the maximum voltage and current as per equipment ratings and has a temperature rating of at least 70°C. For relay outputs, use wire that is sized and rated for the maximum voltage and current as per application, up to 250 VAC 10A. Installation shall be done by qualified personnel.

**!** Caution: Use supply wires suitable for 25°C above surrounding ambient. Attention: Utiliser des fils D'Alimentation qui conviennent à une température de 25°C au-dessus de la température ambiante.

### AC Models

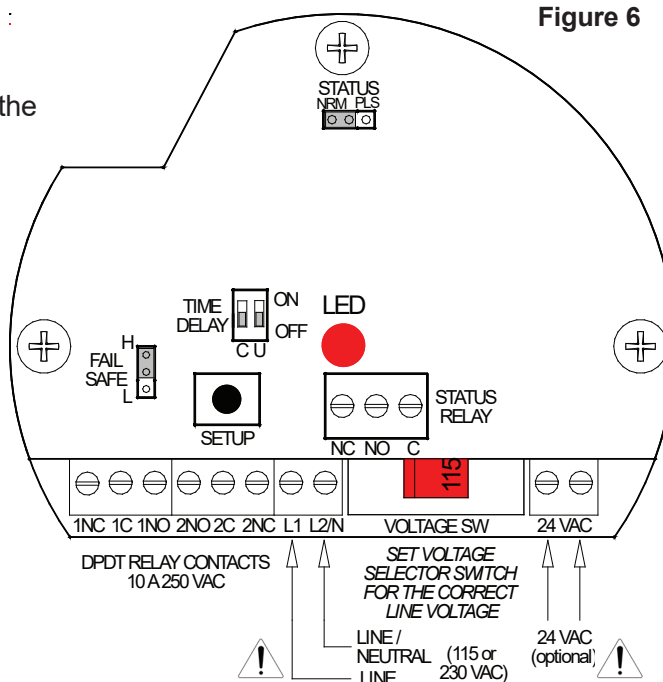
#### **!** 115 or 230 VAC Input Power

1. Confirm that the voltage selector switch is in the correct position for the voltage applied.
2. The LINE INPUT is connected to terminals L1 and L2/N when the input voltage is either 115 VAC or 230 VAC.
3. If your circuit has a neutral conductor, connect it to the L2/N terminal. Connect the hot conductor to the L1 terminal.
4. External overcurrent protection:  
115 VAC = 200 mA 230 VAC = 100 mA


#### **!** 24 VAC Input Power

1. The 24 VAC terminals are used when the input voltage is 24 VAC.
2. When powered from a 24 VAC system, **neither conductor can be grounded.**
3. External overcurrent protection 24 VAC = 750 mA

Figure 6



## DC MAXIMA+ Wiring

 DC MAXIMA+ units are available in either a 24 VDC or 12 VDC model.

1. Confirm that the DC MAXIMA+ unit is rated for the DC voltage that is used.
2. Refer the drawing to the right for correct terminal location.
3. The positive (+) conductor of the power input is connected to the (+) terminal of the DC INPUT.
4. The negative (-) conductor of the input power is connected to the (-) terminal of the DC INPUT.

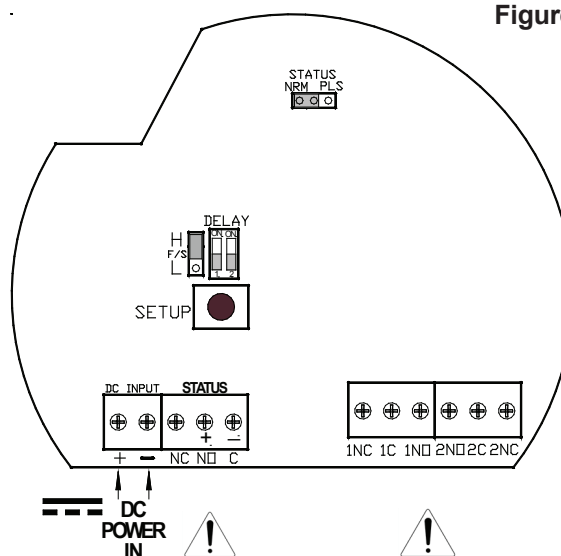




Figure 7

## 2.3 Grounding

 An equipment grounding connection (earth ground) must be supplied to the unit for safety. Connect the ground conductor to the green equipment grounding screw identified in the enclosure.

## 3.0 RELAYS

 The MAXIMA+ has two different relays, a DPDT relay and a STATUS relay. The DPDT relay is used for covered and uncovered indication. The Status relay is used for monitoring the status of the MAXIMA+ unit. The DPDT relay outputs may be connected to different phases, only for voltages up to 125 VAC. For voltages above 125 VAC, the relays shall be connected to the same phase circuit only.

### 3.1 DPDT Relay

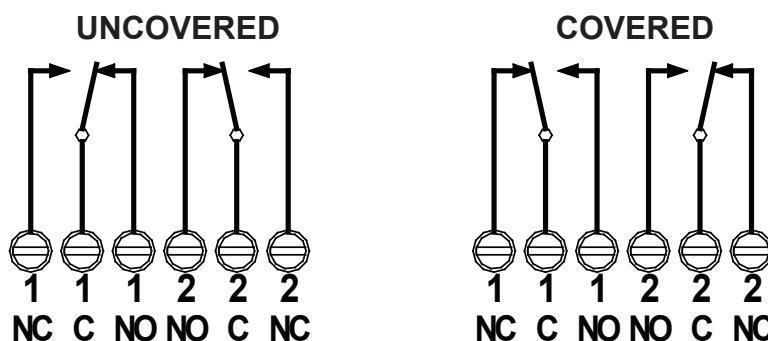
The DPDT relay utilizes a Fail-Safe selection jumper F/S. There are two positions for this jumper High (H) and Low (L). A Fail-Safe condition means that the DPDT relay contact positions are set up so that in the event of a fault condition or a power failure the relay will be de-energized and the contacts will indicate a condition that is deemed safe for the application.

### 3.2 Fail-Safe High

Fail-Safe High means that the relay will be energized when the paddle is rotating (uncovered) and will de-energize when the paddle is covered. In this mode, a fault condition or a power failure will cause the relay contacts to indicate that the paddle is covered, whether it is or not.

Figure 8

### FAIL-SAFE "HIGH" RELAY CONTACT POSITION

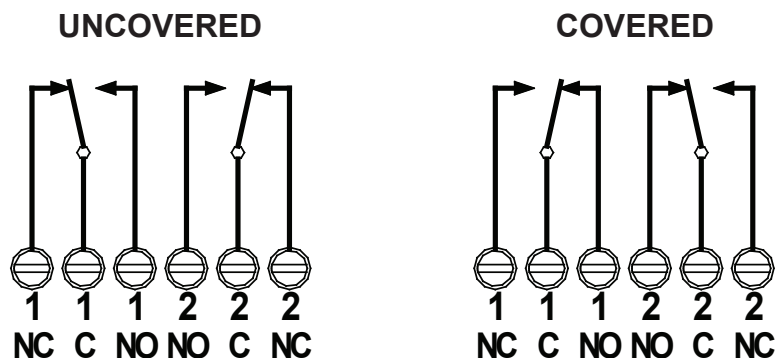


### 3.3 Fail-Safe Low

Fail-Safe Low means that the relay will be de-energized when the paddle is rotating (uncovered) and will energize when the paddle is covered. In this mode, a fault condition or a power failure will cause the relay contacts to indicate that the paddle is uncovered whether it is or not.

Figure 9

#### FAIL-SAFE "LOW" RELAY CONTACT POSITION

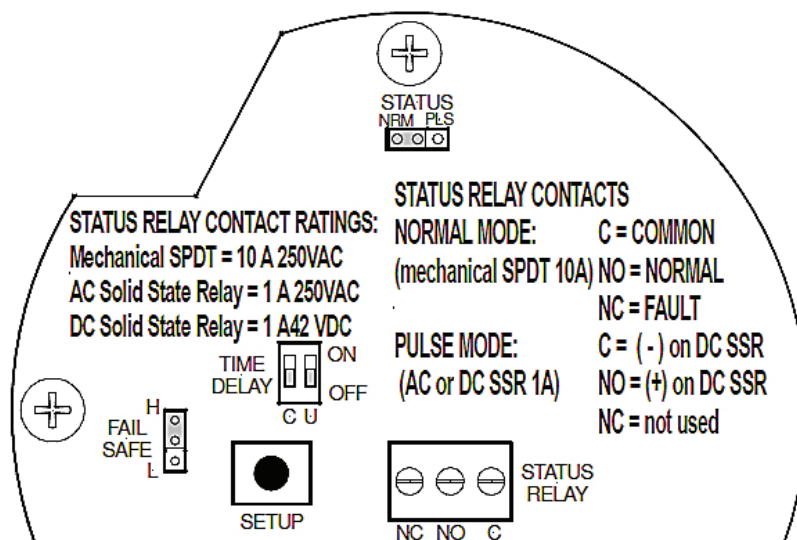


### 3.4 Status Relay

The Status Relay indicates the status of the MAXIMA+. There are two modes of operation for the Status Relay, Normal (NRM) and Pulse (PLS). The mode for the Status Relay is selected by the STATUS jumper at the top of the circuit board (see Figure 10).

In the NORMAL (NRM) position, the Status Relay is energized when the MAXIMA+ is operating correctly. In this mode the shaft rotation is monitored. If the shaft is not rotating then the "covered" switch is monitored to see if there is a covered condition. If the shaft is not rotating and the "covered switch" is not indicating covers, then the Maxima will go into a Fault condition. A Fault condition is indicated by both the Status Relay and the DPDT de-energizing and the visual LED going off.

Figure 10





In NRM mode, the Status Relay will have a connection between the C and the NO terminal. In a Fault condition there will be a connection between the C and NC terminals when using the standard SPDT relay. The solid state relays are SPST, they do not use the NC terminal. In Normal mode with either of the solid state relay options, there will be a connection between the C and NO terminal when the MAXIMA+ is operating normal. During a Fault condition there will be no connection between the C and NO terminal.

In the Pulse (PLS) mode it is recommended to have one of the solid state relay options. In Pulse Mode (PLS) the Status Relay will be energized during a covered condition and there will be a connection between the C and NO terminals. When the paddle is rotating (uncovered) the Status Relay will be pulsing ON and OFF like the visual LED. During a Fault condition the Status Relay will de-energize.

## 4.0 TIME DELAY

The MAXIMA+ has selectable time delay for the DPDT relay contacts. This time delay can be selected for switching from an uncovered to a covered condition or it can be selected for switching between a covered to an uncovered condition or both. The time delay is selected by the two time delay DIP switches. Switch 1 is for selecting a time delay for going from an uncovered to a covered condition. Switch 2 is for selecting a time delay for going from a covered to an uncovered condition. When the switch is OFF there is no time delay. When the switch is ON there will be a time delay for that condition.

By default the time delay is set to 5 seconds for both switches. This time delay can be changed by using the SETUP push button switch on the circuit board. (Refer to Figure 10). The Delay Time can be set for each switch independently or for both together if the same delay time is desired for both "delay on covered" and "delay on uncovered". The maximum time delay that can be programmed is 25 seconds. Follow the procedure in 4.1 to change the delay time.

### 4.1 Changing Delay Time

**Step 1.** Select the switch for the delay time that you want to change by placing it in the ON position. Switch 1 is for "Delay on Covered". Switch 2 is for "Delay on Uncovered". The new delay time will be set for switch or switches in the ON position. At least one of the delay switches must be ON in order to enter the programming mode.

**Step 2.** Press and hold the SETUP switch (refer to Figure 10) for three seconds to initiate the programming mode. The LED will flash for these three seconds at a fast rate to indicate entry of the program mode. Releasing the SETUP switch during this initial three second period will abort the program mode and leave the delay times unchanged.

**Step 3.** After the three seconds has passed, continue holding the SETUP switch for the desired amount of delay time in seconds. The LED stops flashing and will blink every second to give you indication of the delay time so far. Each one second flash is one second of delay time.

**Step 4.** After the desired amount of delay has passed, let go of the SETUP switch and the delay time will be set for the delay switches that are in the ON position. You may enter up to 25 seconds. Holding the SETUP switch longer than this will have no effect and limit the delay to 25 seconds.

## 5.0 EXTERNAL LED

MAXIMA+ models include an external view LED. This LED provides an externally visible status indication for the MAXIMA+. When this LED is flashing, it indicates a normal Un-covered condition. When this LED is ON steady, it indicates a Covered condition. When this LED is OFF, it indicates a power failure or fault condition.

## 6.0 WARRANTY AND CUSTOMER SERVICE

### 6.1 Limited Warranty

The manufacturer warrants this equipment for two (2) years according to the following terms:

- 1.) This warranty extends to the original purchaser only and commences on the date of original purchase. The original purchaser must mail to the manufacturer the "Warranty Registration" card to confirm the equipment purchase. Failure to do so may void the warranty.
- 2.) The manufacturer will repair or replace any part of this equipment found to be defective, provided such part is delivered prepaid, to the factory. Manufacturer's obligation is limited to the cost of material and labor to repair or replace and does not include transportation expenses.
- 3.) This warranty shall not apply to any product that has, in our judgment, been tampered with, altered, subject to misuse, neglect or accident. In addition, the warranty does not extend to repairs made necessary by normal wear.
- 4.) This warranty is in lieu of all other warranties, expressed or implied.

## 7.0 DISPOSAL

This product consists of materials that can be recycled by specialized recycling companies. It uses recyclable materials and the electronics are designed to be easily separated. Consult local authorities for proper disposal locations.

# Declaration of Conformity

BinMaster declares that all models of the MAXIMA+ level control devices as listed below comply with the following directives and harmonized standards. This product if installed, operated and maintained as described in this manual will provide a safe and reliable point level control device for bulk solid materials.

Low Voltage Directive 73/23/EEC  
Standard IEC 61010-1:2001

**Product:** Rotary point level control device.

**Models:** MAXIMA+ AC Model 24 VAC / 115 VAC / 230 VAC; DC Models 12 VDC and 24 VDC

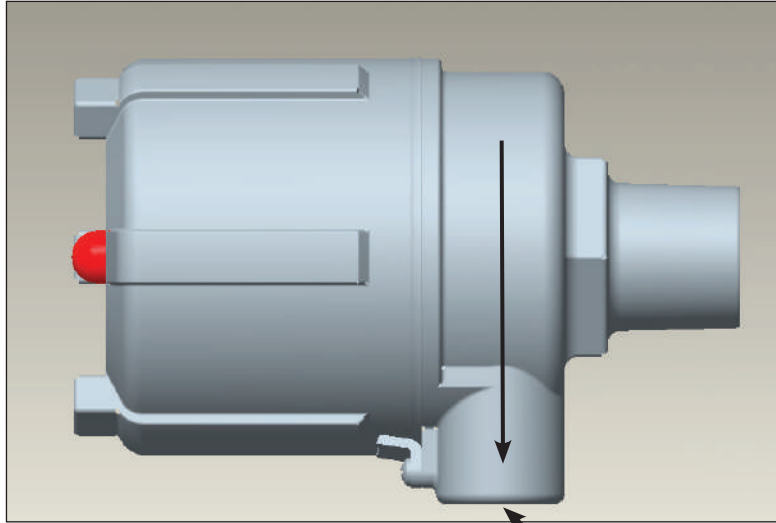
All test reports and documentation are held and can be obtained from BinMaster.

**Manufacturing Location:** Lincoln, Nebraska, USA

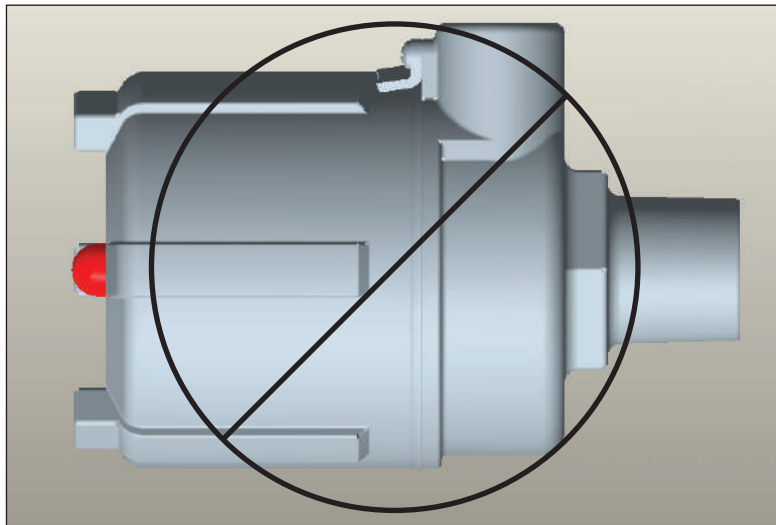


Scott McLain  
President  
3/25/2008

# Mounting Instructions



Always mount unit with  
conduit opening down



## Conduit Seal

When installing this level indicator in environments where it is possible for moisture or moist air to enter the enclosure through the electrical conduit, the conduit opening should be sealed with a duct seal compound or putty appropriate for the purpose.