 P-Q Controls, Inc., 95 Dolphin Rd., Bristol, CT 06010, Phone 860-583-6994, Fax 860-583-6011

Omni-directional Level Sensor Model 400

for monitoring the level attitude of platforms

Application:

The purpose of P-Q's Model 400 & 401 Omnidirectional Level Sensors is to monitor the level condition of a platform. A signal is provided to the operator whenever the base upon which the sensor is mounted is out of level in any direction. Typical applications include manlifts, cranes and mobile platforms.

Features:

Sensors come with two adjustments. The first is for setting the trip angle and is adjustable from 1.5° to 6.0°. The second is for varying the electronic time delay from 0.5 to 5.5 seconds. Both parameters will be factory set to your specifications. Single and dual trip point options are available.

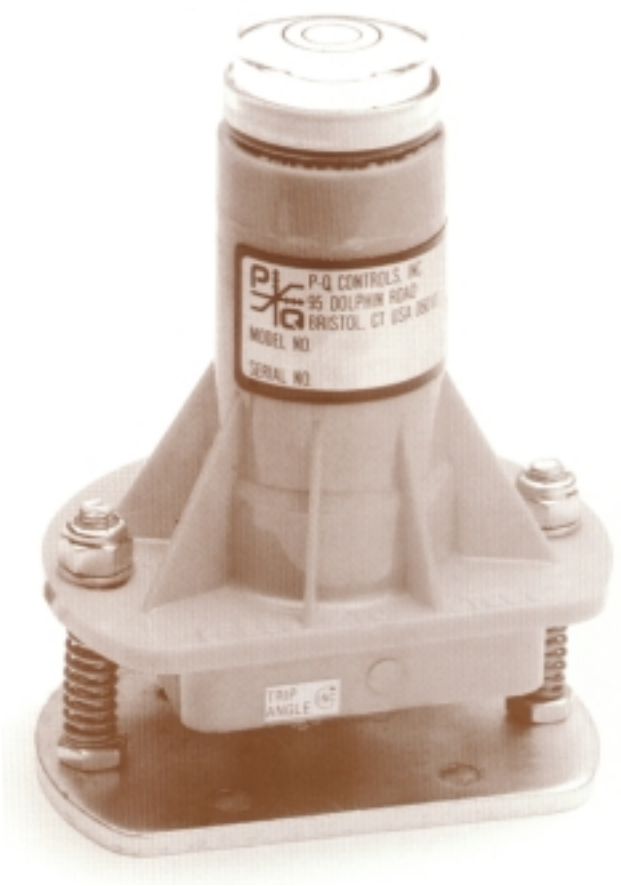
The sensing mechanism is a gimbal-mounted pendulum which is inductively coupled to the position-sensing electronics. The pendulum is viscously damped with a silicone fluid to prevent constant oscillation due to vibration.

An indicator lamp located between the adjustments gives an "ON" signal whenever the trip angle is reached or exceeded. This lamp (LED) is undamped and assists in system connection and checkout.

The self-contained electronics are protected against reverse polarity and short circuiting of output. The output is "fail-safe", live at supply voltage level (1.5 amp maximum) until the Sensor is tipped beyond its trip angle. The Sensor can also be supplied with inverted output, "OFF" (Model 401) until trip angle. Other options include ground switching and low output current models.

Other models:

- The Di-axial Level Sensor, Model 420 (Data Sheet 107) has separately adjustable "X" and "Y" axis trip angles.
- The Platform Leveler, Model 410 (Data Sheet 108) can be used to level a platform.
- Model 425 (Data Sheet 114) provides proportional "X" and "Y" axis output.



Specifications:

- Supply Voltage: 10 - 30 VDC or 10-60 VDC
- Output Current: 1.5 amp continuous, 10-30v 0.5 amp continuous, 10-60v
- Trip Angle: 1.5° to 5.0° or 3.0° to 6.0° (field adjustable)
- Trip Delay: 0.5 to 5.5 seconds (field adjustable)
- Accuracy: Trip repeatable within 0.2°
- Hysteresis: 0.3°
- Idle Current Draw: 30mA (no load)
- Operating Temperature: -40° C to +70° C

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Level Sensor Part Numbering

Example: M400B-30-20TR Normally closed, sourcing, 3° trip angle, 2 sec time delay on reset with Bubble Level

M400	B	30	20	TR

TYPE OF TIME DELAY

NONE	Delay on trip (Standard)
R	Delay on reset
TR	Delay on trip & reset

DURATION OF TIME DELAY

05	0.5 Seconds
10	1.0 Seconds
15	1.5 Seconds
etc….	*Range = 0-5 seconds*

TRIP ANGLE (M420 X axis)

15	1.5 Degrees
20	2.0 Degrees
25	2.5 Degrees
etc….	*Range = 1.5-8.0 degrees*

Trip Angle (M420 Y axis)

15	1.5 °
20	2.0 °
25	2.5 °

Degrees

OUTPUT TYPE

Blank	Sourcing
G	Sinking
B	Bubble
F	Fixed Time Delay

MODELS

M400	Normally closed
M401	Normally open
M404	Normally closed, Fixed time delay
M405	Normally open, Fixed time delay
M406	Dual Trip, NC
M407	Dual Trip. NO
M410	Platform Leveler
M420	Di-axial Level Sensor, NC
M421	Di-axial Level Sensor, NO
4E0X	Custom Products

M425	42	6VDC

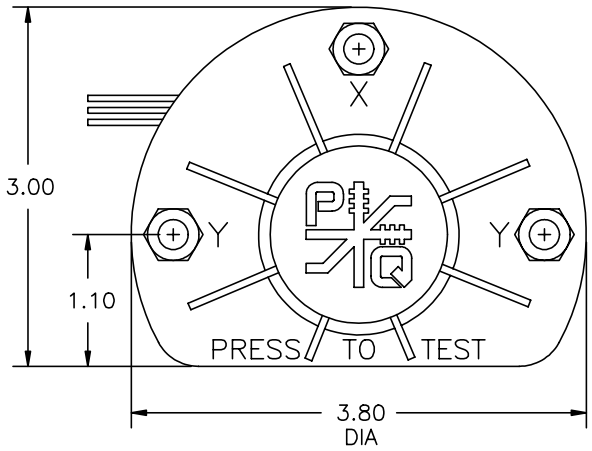
Supply Voltage

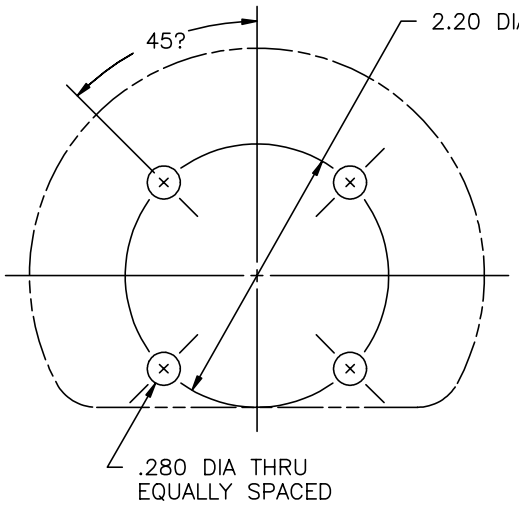
Models

M415	X Axis
M425	X & Y Axis

Signal Swing

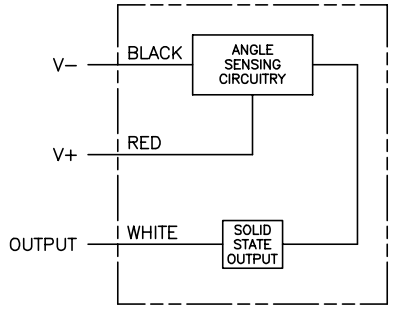
30	10%
42	30% (Standard)



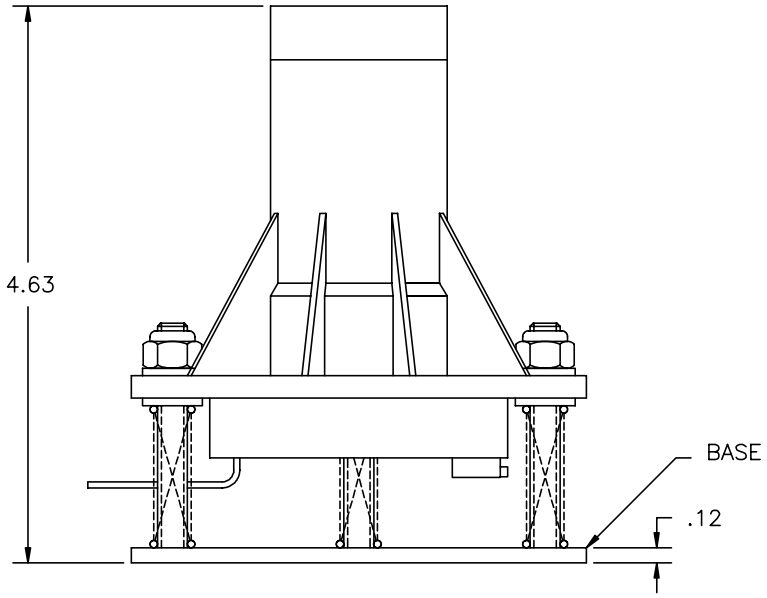


MOUNTING HOLE PATTERN
IN BASE PLATE. STEEL PLATE
ALSO SUITABLE FOR WELDING
TO MACHINE.

REV.	DESCRIPTION	DATE



EQUIVALENT OUTPUT



MODEL NUMBER: M400–XX–XX–XXVDC

400 – NORMALLY ON (FAILSAFE) OUTPUT
401 – NORMALLY OFF OUTPUT

TRIP ANGLE
40 – 4.0°
45 – 4.5°
50 – 5.0°
etc.

TIME DELAY
10 – 1.0 SEC
20 – 2.0 SEC
25 – 2.5 SEC
etc.

VOLTAGE SUPPLY
12 – 12VDC
24 – 24VDC

NOTES:
1) VOLTAGE SUPPLY IS TO BE 10–30VDC.
2) OUTPUT: 1.5AMPS CONTINUOUS @ VS.
3) TRIP ANGLE IS FIELD ADJUSTABLE FROM 1.5 TO 6 DEGREES.
4) TIME DELAY IS FIELD ADJUSTABLE FROM .5 TO 5 SECONDS.

WARNING: P–Q Controls, Inc. products are intended as general purpose switches. They are NOT safety devices. Like most solid–state devices, they are equally likely to fail in the conducting (on) state as in the non–conducting (off) state. If P–Q Controls products are used to initiate a machine or operation in which false operation could be dangerous, POINT–OF–OPERATION GUARDING DEVICES must be installed and maintained to meet all appropriate OSHA and ANSI B11 machine safety standards.

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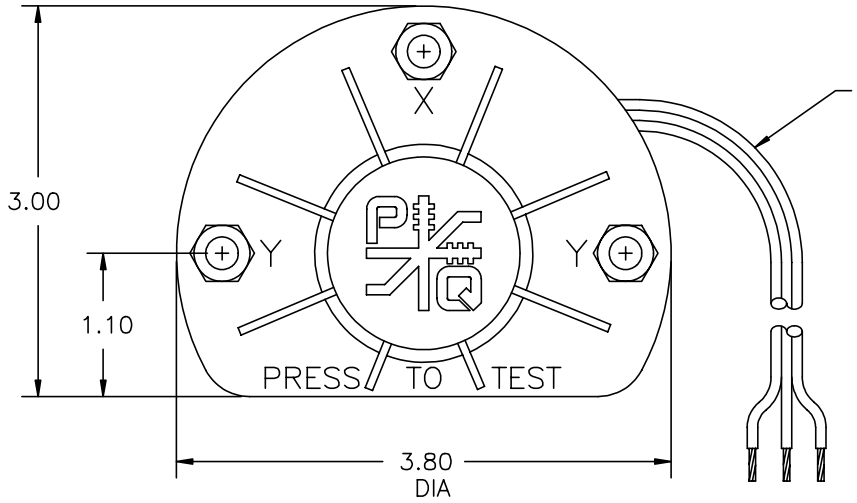
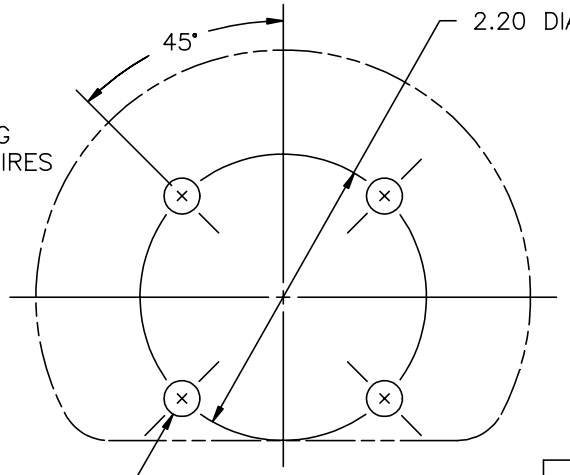
DWG. NO. B–07220 | REV.
SHEET | SCALE 1:1

M400/M401 INSTALLATION DWG
OMNI–DIRECTIONAL LEVEL SENSOR

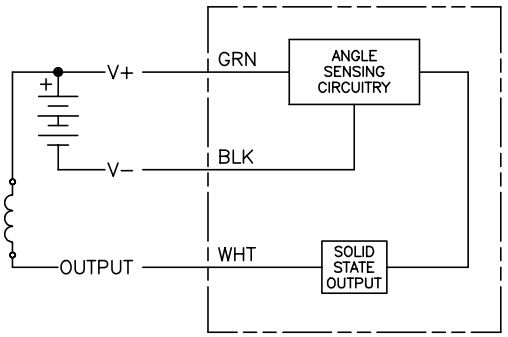
DRAFTSMAN	CHECK	PROJECT ENGINEER	DATE
JCH			05–26–92

REV.	DESCRIPTION	DATE

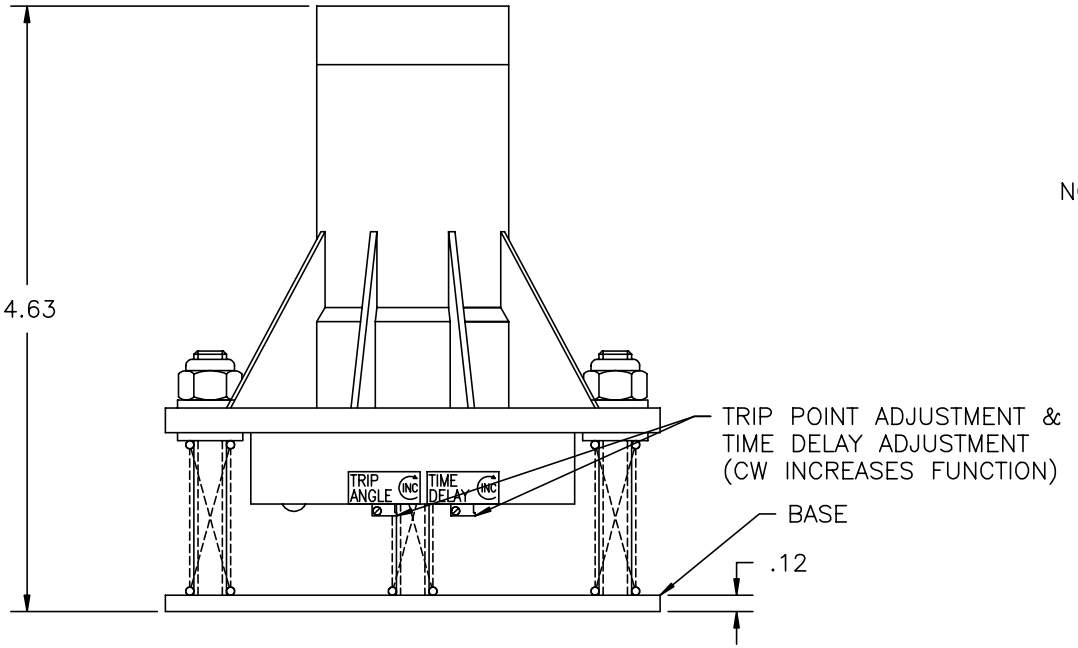




MOUNTING HOLE PATTERN
IN BASE PLATE. STEEL PLATE
ALSO SUITABLE FOR WELDING
TO MACHINE.



EQUIVALENT OUTPUT



NOTES:
1) VOLTAGE SUPPLY IS TO BE 10–30VDC.
2) OUTPUT: 1.5AMPS CONTINUOUS, GROUND SWITCHING.
3) FINAL TEST AND CALIBRATION PER #A–10567.
   REF: TRIP ANGLE IS FIELD ADJUSTABLE FROM 1.5 TO 5 DEGREES.
   FACTORY PRESET TO 2.0 DEGREES
   TIME DELAY IS FIELD ADJUSTABLE FROM 0 TO 5 SECONDS.
   FACTORY PRESET TO 2.5 SECONDS.
4) NEXT LOWER ASSEMBLY #C–10566.

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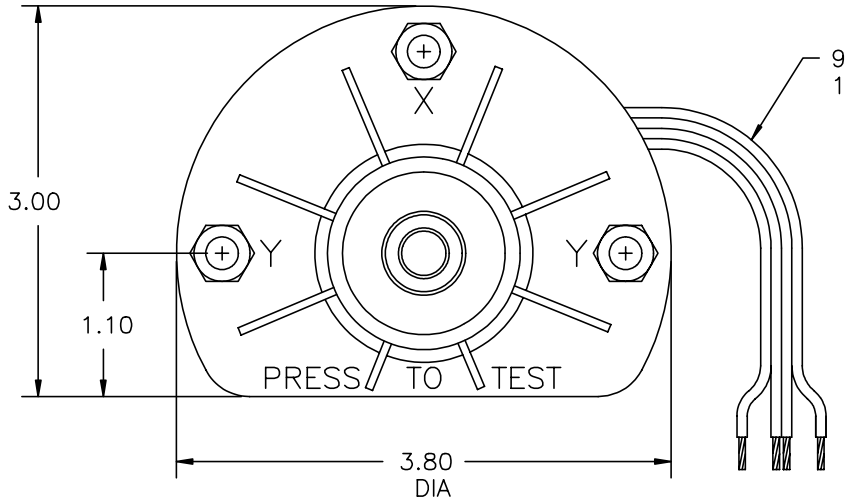
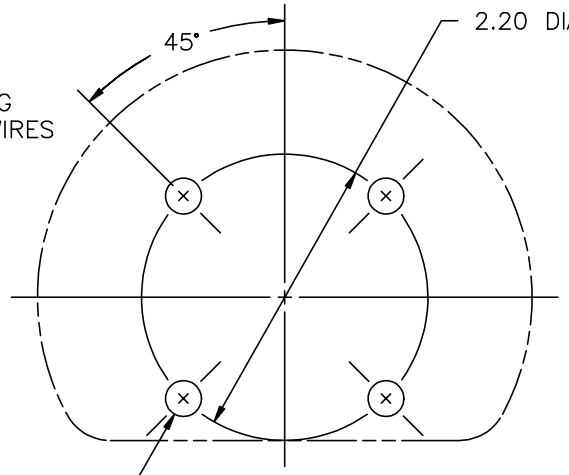
DWG. NO.	REV.
B–10567	
SHEET	SCALE
	1:1

M401G–20–25 INSTALLATION DWG
OMNI–DIRECTIONAL, N.O. ADJ TRIP & TIME DELAY

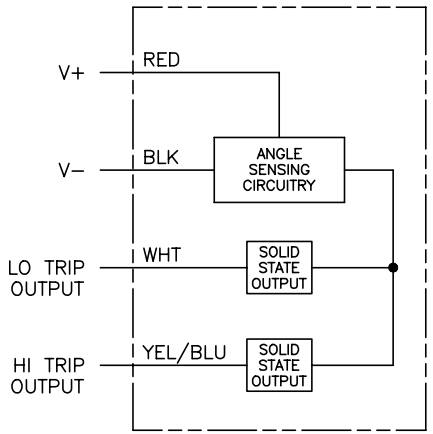
DRAFTSMAN	CHECK	PROJECT ENGINEER	DATE
JCH			01–11–99

REV.	DESCRIPTION	DATE

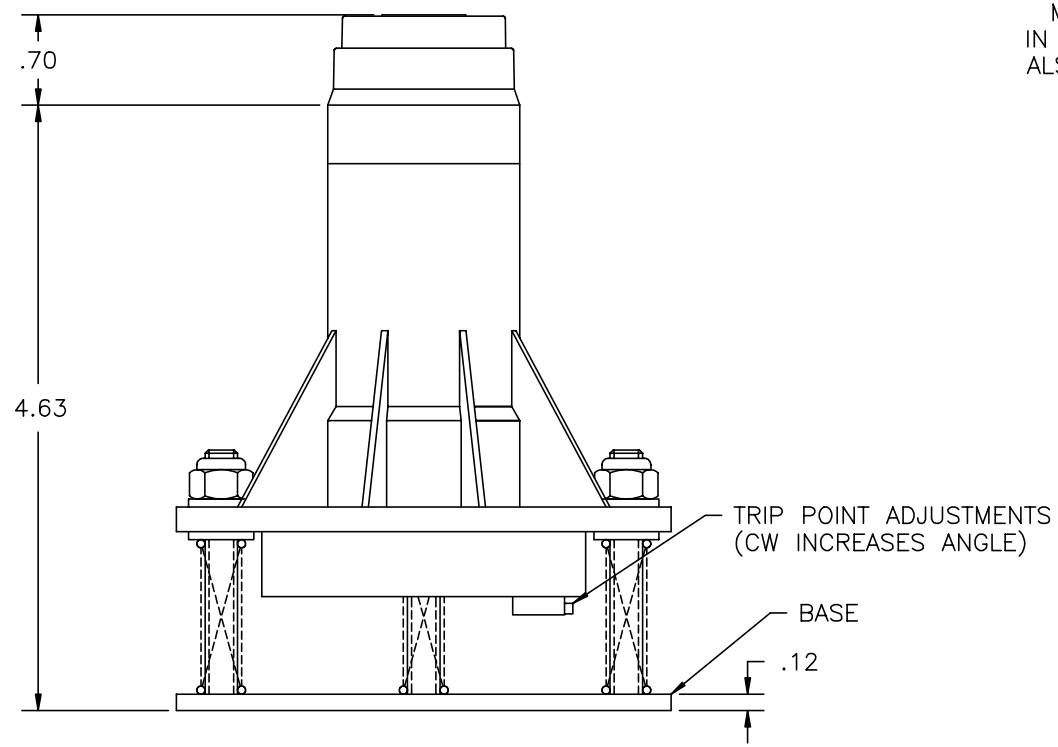




MOUNTING HOLE PATTERN
IN BASE PLATE. STEEL PLATE
ALSO SUITABLE FOR WELDING
TO MACHINE.



EQUIVALENT OUTPUT



NOTES:
1) VOLTAGE SUPPLY IS TO BE 10–30VDC.
2) OUTPUT: 1.5AMPS CONTINUOUS @ VS.
3) FINAL TEST AND CALIBRATION PER #A–11241.
   REF: LO TRIP ANGLE IS FACTORY PRESET TO 3.0 $^{+0.0}_{-0.2}$ DEGREES.
   HI TRIP ANGLE IS FACTORY PRESET TO 8.0 $^{+1.0}_{-0.0}$ DEGREES.
   TRIP TIME DELAY (LO TRIP ANGLE ONLY) IS FACTORY FIXED AT 1.0 SECONDS.
4) NEXT LOWER ASSEMBLY #C–11240.

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DWG. NO.	REV.
B–11241	
SHEET	SCALE
	1:1

M406–30–80–10 INSTALLATION DWG
DUAL TRIP LEVEL SENSOR

DRAFTSMAN	CHECK	PROJECT ENGINEER	DATE
JCH			04–12–00

P-Q Controls, Inc.
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M400 Series Omni Directional Level Sensor
Field Adjustment Procedure

Tools Needed:
Digital Voltmeter Set On Low Scale (2VDC)
Torque Seal Locking Compound
Small Slotted Screwdriver
7/16 Nut Driver or Socket Wrench

NOTE:

As received, the level sensor has been calibrated for the trip angle and time delay necessary for your application! If a minor adjustment is needed, please skip to Step #6.

Step 1: Final mount level sensor on machine.

Step 2: Rotate the **time delay trimpot** ccw until a click is heard.

Step 3: Connect the black lead of voltmeter to ground and the red lead to the small lead protruding from the potting on the bottom of the sensor.

Step 4: Adjust the leveling nuts to obtain the highest possible voltage reading.

Step 5: Check voltage at trip point in all 4 directions;

* If the voltage reading is not symmetrical, repeat Step #4.

Step 6: Slowly tilt sensor to desired trip angle;

* If the sensor is calibrated properly, the LED will turn on when the sensor has reached the proper trip angle.

* If the LED turns on before the desired trip angle, turn the trip angle pot cw until LED turns off (repeat Step #6).

* If the LED has not turned on at this point, proceed with Step #7.

Step 7: Rotate trip angle adjustment pot ccw until the LED comes on.

Step 8: Rotate the time delay trimpot cw until the desired time delay is achieved.

Step 9: Apply torque seal locking compound to the leveling nuts and adjustment trimpots.

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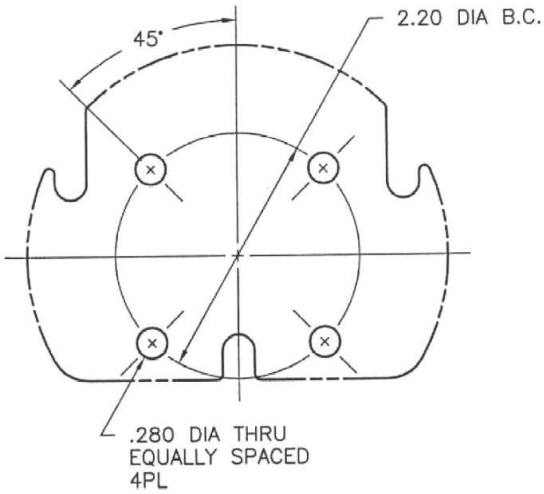
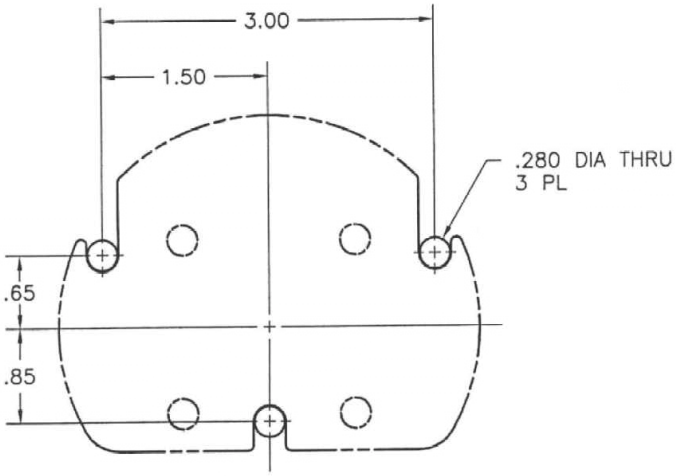
LEVEL SENSOR MOUNTING PATTERNS



MOUNTING PATTERN
OPTION 1
ALSO SUITABLE FOR WELDING TO MACHINE.



MOUNTING PATTERN
OPTION 2