



Automatic Platform Leveler Model 410

for automatic leveling of hydraulically elevated platforms

Application:

The Model 410 Platform Leveler is used wherever it is necessary to level a platform in one plane. This self-contained control can sense the degree and direction of an out-of-level condition, provide an output signal which will actuate a valve or motor contactor, and relevel the platform. The Platform Leveler can be used with both electric and hydraulic actuators.

Features:

The Model 410 has adjustments for angular sensitivity and electronic damping. The sensitivity or degree of horizontal level can be adjusted from .5 degrees to 6 degrees. The time delay can be adjusted from 0 to 3 seconds. Both parameters can be factory set for a specific requirement.

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 erratic oscillation due to vibration or other momentary inertial force.

Indicating lamps are located at the corners of the "+Y and -Y" axis for assistance in setup and system checkout. The lamps (LED's) are undamped to eliminate error in setup due to influence of the electronic time delay.

The self-contained electronics are protected against reverse polarity and short circuiting of the outputs. The outputs are off until the trip angle in each direction is reached. The current limited output can drive loads of up to 1.5 amp continuously.

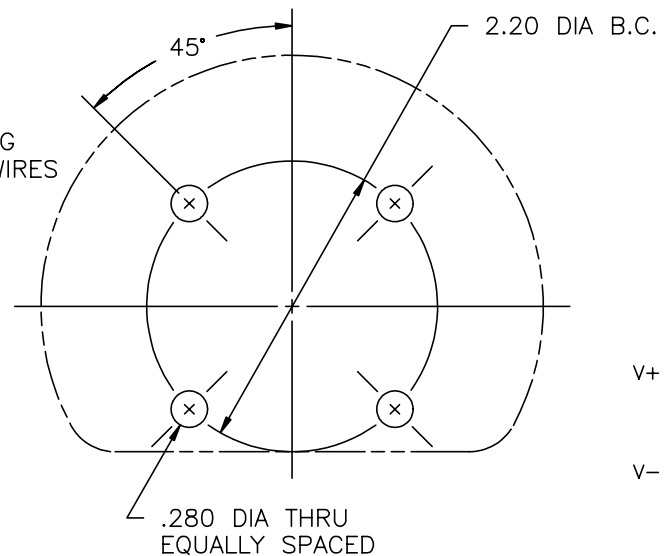
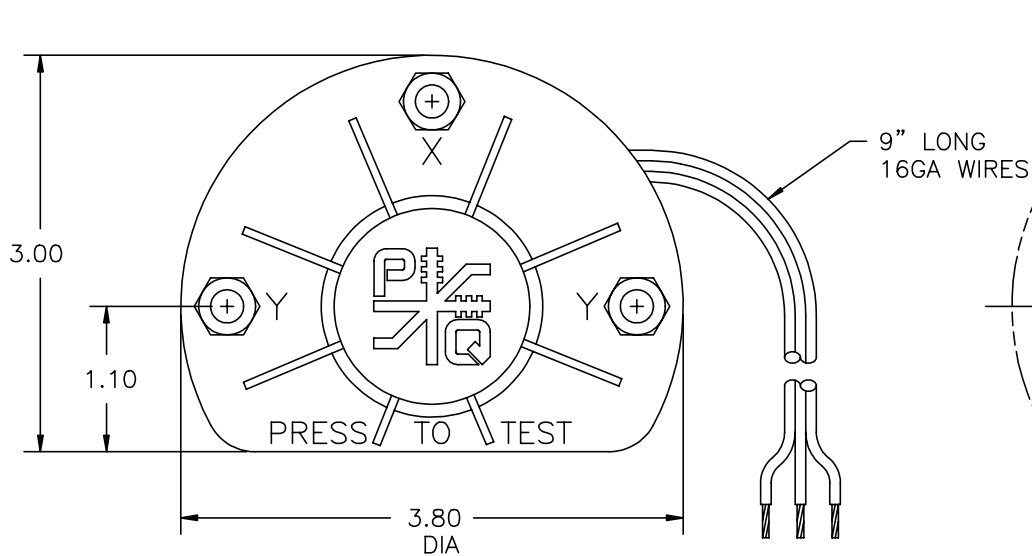
Other available models:

For level sensing, see Data Sheets 106 and 107 which describe the Model 400 Omni-directional and Model 420 Di-axial Level Sensors. Model 425 (Data Sheet 114) provides proportional "X" and "Y" axis output.

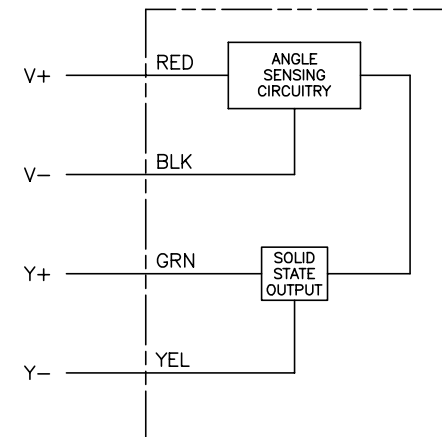


Specifications:

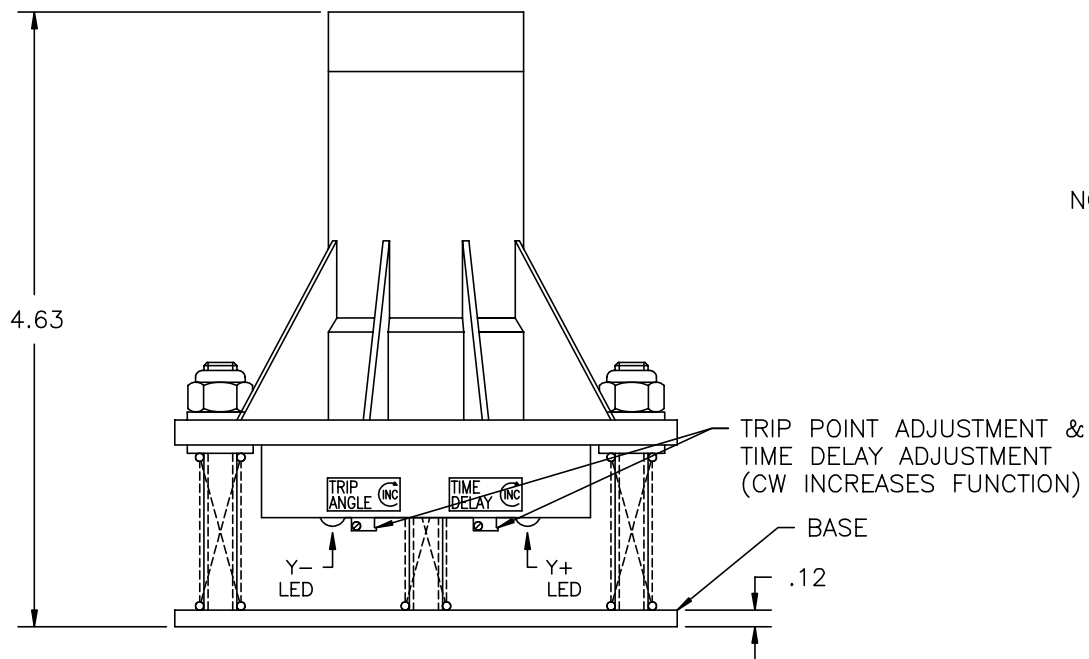
- Supply Voltage: 10 to 60 VDC
Min voltage 8.5 vdc, Max voltage 85 vdc
- Output Current: 1.2 amp continuous
- Trip Angle: 0.5 – 3.0 degrees or
3.5 – 6.0 degrees
(field adjustable)
- Time Delay: 0 - 3 seconds (field adjustable)
- Accuracy: Trip point repeatable within $\pm .1^\circ$
- Tolerance: $+0^\circ / -10\%$
- Hysteresis: $.3^\circ$
- Idle Current Draw: 7mA (no load)
- Operating Temperature: -40°C to $+70^\circ \text{C}$



REV.	DESCRIPTION	DATE
-	ORIGINAL RELEASE	05-11-01
JCH		



EQUIVALENT OUTPUT



- NOTES: 1) VOLTAGE SUPPLY IS TO BE 10-60VDC.
 2) OUTPUT: 1.2AMPS CONTINUOUS @ VS.
 3) FINAL TEST AND CALIBRATION PER #A-11745.
 REF: TRIP ANGLE IS FIELD ADJUSTABLE FROM 3.1 TO 6.0 DEGREES.
 FACTORY PRESET TO 4.0 DEGREES.
 TIME DELAY IS FIELD ADJUSTABLE FROM 0 TO 3 SECONDS.
 FACTORY PRESET TO 2.0 SECONDS.
 4) NEXT LOWER ASSEMBLY #C-11771.

	P-Q Controls, Inc. 95 Dolphin Rd. Bristol, CT 06010 PHONE: (860) 583-6994 FAX: (860) 583-6011	DWG. NO.	REV.
		B-11860	-
		SHEET	SCALE
			1:1
M410-40-20 INSTALLATION DWG PLATFORM LEVELER, N.C. ADJ TRIP & TIME DELAY			
DRAFTSMAN	CHECK	PROJECT ENGINEER	DATE
JCH			05-11-01

WARNING: P-Q Controls, Inc. products are intended as general purpose switches. They are NOT safety devices and as with any general purpose devices, malfunctions may occur. If P-Q products are used to initiate an operation where false operation could be dangerous, POINT-OF-OPERATION GUARDING DEVICES must be installed and maintained to meet all appropriate OSHA and ANSI machine safety standards. P-Q Controls, Inc. shall not accept responsibility for installation, application or safety of systems.



P-Q Controls, Inc.

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Rev: - Date: 5/25/2000

Author: HGK Page: 1 of 1

M410 Series Automatic Platform Leveler 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
- Small bubble level

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 #7.

- 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 lowest possible voltage reading.
- Step 5: Check voltage at trip point in both directions;
 - If the voltage reading is not symmetrical, repeat Step #4.
- Step 6: Place bubble level on top of sensor and adjust the **X** axis stud nut until level.
- Step 7: 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 #7).
 - If the LED has not tamed on at this point, proceed with Step # 8.
- Step 8: Rotate trip angle adjustment pot ccw until the LED comes on.
- Step 9: Rotate the time delay trimpot cw until the desired time delay is achieved.
- Step 10: Apply torque seal locking-compound to the leveling nuts and adjustment trimpots.



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Author: DG Page: 1 of 3

Model 410 Product Specification

Product Description and Use:

The Model 410 Platform Leveler is used wherever it is necessary to level a platform in one plane. It can sense the degree and direction of an out-of-level condition, provide an output signal which will actuate a valve or motor contactor, and relevel the platform. The Platform Leveler can be used with both electric and hydraulic actuators. The Model 410 has an adjustable trip point for the "Y" axis and an adjustable time delay.

STANDARD FEATURES

Voltage Supply: Recommended operating range

Minimum supply: 10 Volts

Maximum supply: 60 Volts

Absolute maximum before failure: 85 Volts

Minimum guaranteed ckt operation: 8.5 Volts

Supply Current: Idle current 7 mA (no load) over entire recommended operating range

Output: The output stage is a darlington transistor
Maximum output current = 1.2 Amp continuous

NOTE: Negligible leakage current allows the use of high impedance loads on the output.

Adjustments: Trip angle factory preset / field adjustable
Time delay factory preset / field adjustable

Adjustment range: minimum trip angle: 0.5° OR 3.0° Please See Application Rules
maximum trip angle: 3.1° OR 6.0°

minimum time delay: 0 Sec
maximum time delay: 3.0 Sec

Operating Temperature range: -40 to +70° Celsius

Trip Angle Characteristic: Tolerance --- +0% / - 10%
Accuracy --- ± .1° repeatability
Hysteresis -- .3° max



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Model 410 Product Specification

STANDARD FEATURES (cont.)

Moisture resistance: This is a potted control that will function normally when covered with heavy dew or frost. Although not recommended, the board will function normally when submerged in water.

Standard Protection: Reverse polarity protected
Short circuit protected
Voltage supply transient protected
Broken ground lead protected

APPLICATION RULES

Adjustment procedure: Trip point and Time delay adjustments are non-interactive. Turning either of the 25 turn trim pots clockwise will increase trip point or ramp respectively.

Trip Angle Adjustment Range: The Model 410 can be selected for two ranges of operation:

- * 1) 0.5° to 3° Please specify 3° or 6° when ordering
 - * 2) 3.1° to 6°
- * Please note that at the extremes of each range, the trip point adjustment is somewhat coarse due to the large span.

OPTIONAL FEATURES

- Bubble Level