



**PROMATION
ENGINEERING**

Precision Actuation for Industry

Installation & Operation Manual

**This IOM is for the following
ProMation Engineering Products:**

PZ6-24N4-ACDC

PZ6-120N4

PZ6-230N4

PZ15-24N4-ACDC

PZ15-120N4

PZ15-230N4



PROMATION ENGINEERING

Precision Actuation for Industry

Field Manual PZ- Series On/Off/Jog Control ISO5211 F03/05 8P14



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FM_PZ N4_Ver F_031920

Product Specifications

Actuator Specifications	PZ6			PZ15		
Torque "lb/Nm	55"lbs/6Nm			135"lbs/15Nm		
Supply Voltage	24vac/ dc	120vac	120vac	24vac/ dc	230vac	120vac
Max Inrush Current	1.5A	0.4A	0.3A	1.5A	0.4A	0.3A
Running Current	1.1A	0.3A	0.2A	1.1A	0.3A	0.2A
Motor	Synchronous AC					
Runtime (90°@60Hz/vdc)	8 sec			19 sec		
Runtime (90°@50Hz)	11 sec			22 sec		
Duty Cycle	30%					
Motor Starts	1200 per hour					
Weight	4lbs/2kg					
Mechanical Connections	ISO5211 F03/F05 8pt 14mm					
Electrical Entry	1/4" PF Gland					
Electrical Terminations	1m 6c 18ga connection lead					
Environmental Rating	NEMA 4/4X					
Manual Override	OVD tool (provided)					
Control	On/Off/Jog					
Actuator Case Material	Aluminum Alloy, Powder coated					
Motor Protection	230°F/110°C Thermal F* Class *Totally Enclosed Non-Ventilated Motors					
Ambient Temperature Operating Range	-22°F to +125°F -30°C to +52°C					

Introduction

The following procedure is to be followed for set-up, calibration, testing and use of the P Series quarter-turn electric actuators. Each unit is shipped from the factory with initial calibration of cams and switches completed for 0-90 degree operation. However, these are general settings and serve as a starting point for proper calibration of the actuator in its real-world application. There are no mechanical stops on this model.

Safety

Safety is a basic factor any time you maintain and operate mechanical equipment. Use of proper handling methods, tools and clothes can help prevent serious accidents -- accidents which can cause injuries to you or a fellow worker. This manual was created to enable a trained user to install, adjust and troubleshoot your ProMation P Series actuator.

Only competent and trained personnel should install, maintain and repair ProMation Actuators. Any work related to this Actuator must be carried out in accordance with this manual and related codes and regulations. Local workplace health and safety rules should always be followed.

Duty cycle

Duty cycle is the percent of time that an actuator spends running as a fraction of the total time. Duty Cycle is directly related to heat; overusing an actuator typically results in motor overheating which can permanently damage it. Overheating also consumes more electricity. Generally speaking, the hotter a motor becomes, the longer 'rest' it needs to cool down so it runs efficiently.

Shipping and Handling

1. This actuator is shipped in the FULLY CW (position indicator shows “C”) position.
2. **NOTE, THIS ACTUATOR MUST HAVE WATER TIGHT EMT FITTINGS, WITH CONDUIT DRAINAGE INSTALLED AT THE TIME OF INSTALLATION.**
3. **Storage: This unit should NOT be stored outside unless it is powered up and has proper conduit terminations. When NOT powered up, it should be stored in a clean, dry environment at all times.**
4. This actuator has been **factory calibrated to operate between 0 degrees and 90 degrees. Most quarter-turn products will not require recalibration of these settings.** If any travel adjustment is necessary, please refer to pages 5 for instructions.



The actuator is shipped from the factory in its fully CW position. This can be verified by aligning the override tool port with the “C” indicator on the side of the actuator housing.

Product Mounting and Setup

1. Fully CLOSE the valve or damper to which the actuator is to be mounted.
 - Keep in mind this actuator rotates CW (as viewed from above the unit) when driving CLOSED.
2. Assemble necessary linkage components and attach the actuator to the driven device.
3. Tighten mounting bolts, making sure actuator is centered on the device drive shaft.
4. Utilize the override tool to check for unobstructed manual operation from fully CW to fully CCW positions BEFORE applying power to the unit.

Do not operate the actuator under power with the override tool installed. Cams set at other than factory settings will cause DAMAGE if the override tool is left in place while the motor is driving. -- This will DAMAGE the gear train, override tool, or motor and VOID the warranty.



The mounting system is ISO5211 compliant at F03/F05 bolt patterns with a 14mm double square female drive. The manual release is seen above and left of center. The included manual operation tool is used to position the release between the engaged and disengaged positions.

5. Make the electrical connections per wiring diagram on page 4.
 - For operation only four connections are needed. The balance of the connections are used for options and features.
 - Terminals 5 and 6 are pilot duty signals indicating:
 - Terminal 5 indicates the fully OPEN position has been reached.
 - Terminal 6 indicates the fully CLOSED position has been reached.
6. Do NOT apply power at this time.

Installation Notes

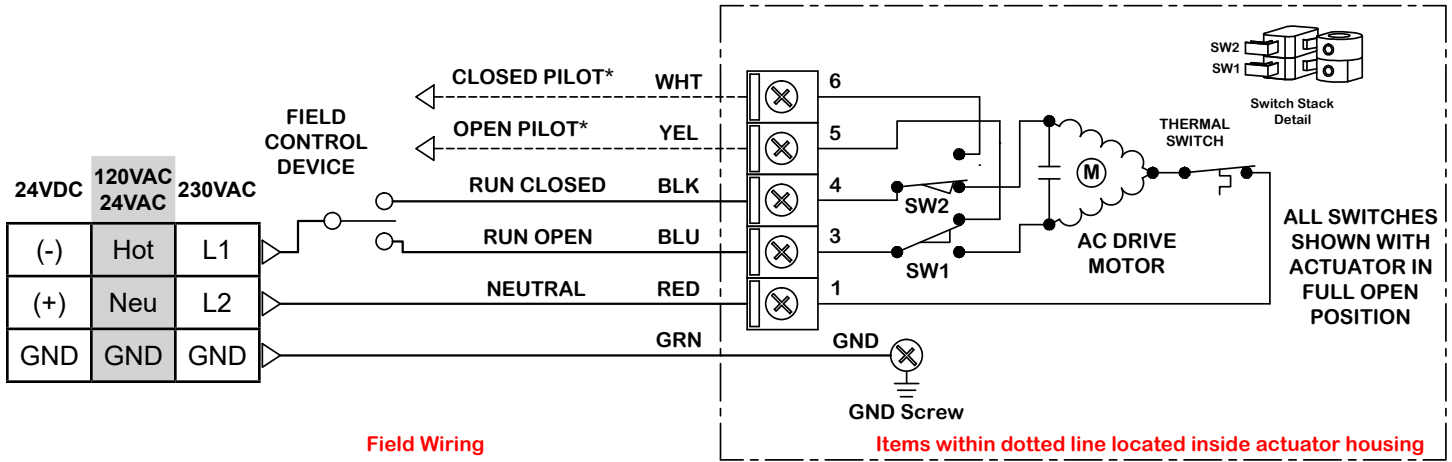
- There are no mechanical stops on this model.
- These actuators are designed to be used in either a horizontal or upright position. Do NOT mount the assembly with the actuator top below a horizontal position.
- When installing conduit, use proper techniques for entry into the actuator. Use drip loops to prevent conduit condensate from entering the actuator.
- Both NPT conduit ports MUST use proper equipment to protect the NEMA 4X integrity of the housing.
- The internal heater is to be used in ALL applications.
- Do NOT install the actuator outdoors or in humid environments unless it is powered up and the heater is functioning.
- Use proper wire size to prevent actuator failure (see chart on page 4 for proper wire sizing).
- All terminals accept 14-18AWG solid/stranded wire.



The manual override tool in use (shown in the CW (CLOSED) position).

Wiring Diagram

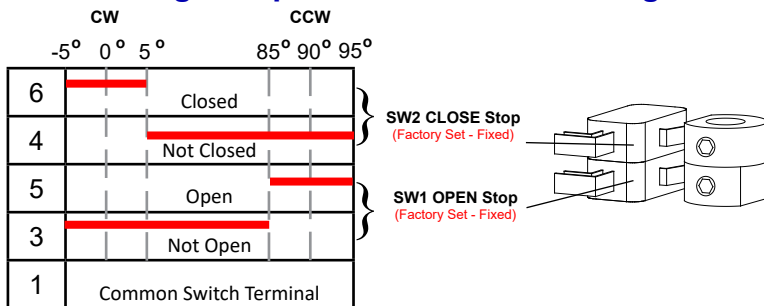
On/Off/Jog Control



Switch sequencing data is provided in the table below to show the change-of-state points during the rotation of the actuator from CCW to CW and back again. The red bars show when that terminal makes with its respective common.

Switches for terminals 3 thru 6 are set at the factory and should NOT be changed.

Switch Logic Map and Switch/Cam Arrangement



Check End of Travel Settings

The actuators are tested, calibrated and shipped in the Full CW position and End of Travel cams are set at 90 degrees from each other.

- A. Set the control device (valve or damper) to the closed position.
- B. Mount the actuator to the device to be controlled (valve or damper).
- C. Insure that the CW End of Travel cam trips the CW End of Travel switch at the correct CW point.
 - C.1. If the switch does not change state at the correct CW position, adjust Cam #2 per instructions below.
- D. Manually move (see Manual Override photo on page 3) the actuator so the valve or damper is in the fully CCW position.
- E. Insure that the CCW End of Travel cam trips the CCW End of Travel switch at the correct CCW point.
 - E.1. If the switch does not change state at the correct CCW position, adjust Cam #1 per instructions below.

Adjusting the actuator CCW and CW positions (Cam adjustment)

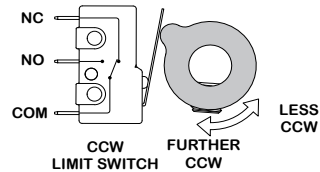
Remove power from this device BEFORE making any End of Travel cam adjustments.



Cam 1

Cam 1 Adjustment

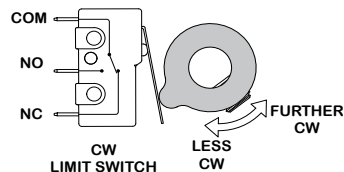
1. The lower cam is Cam 1, the CCW end-of-travel adjustment. Once the actuator is at its required CCW position, with POWER OFF, use a 2mm hex key to free up the cam set screw. Once it is free, rotate the hex key to the LEFT 10-15 degrees to reset the switch roller arm. Then snug the set screw up against the camshaft (CW) until slight pressure is felt. Then SLOWLY rotate the hex key pushing the cam to the RIGHT until you hear the “click” on the bottom switch indicating that correct adjustment has been achieved. Tighten the cam.



2. Apply power to the actuator and drive CW at least 15-20 degrees. Then drive the actuator CCW until the cam stops the electrical travel. Check to be sure this is the correct CCW position you require. Repeat step 1 if further adjustment is needed.

Cam 2 Adjustment

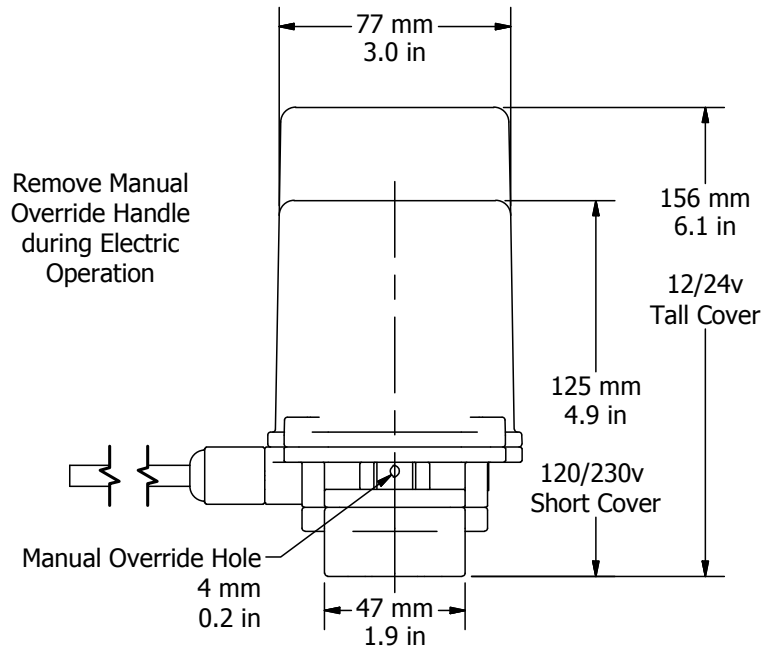
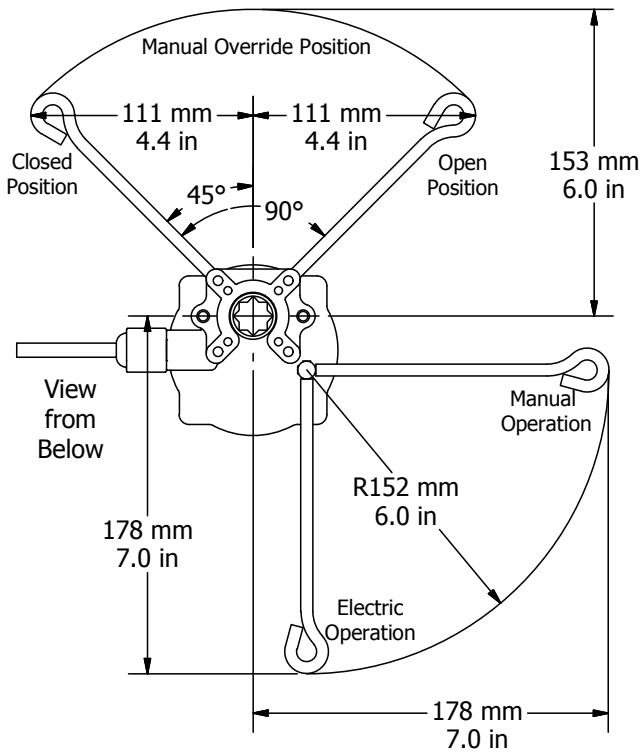
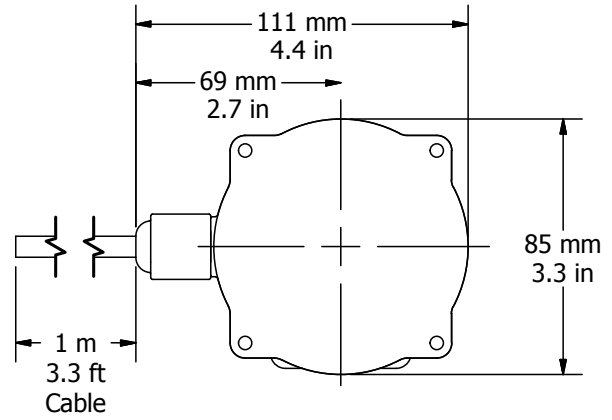
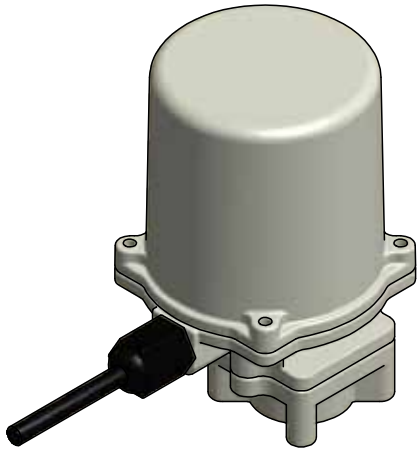
1. The second cam is Cam 2, the CW end of travel adjustment. Once the actuator is at its required CW position with POWER OFF, use a 2mm hex key to free up the cam set screw. Once it is free, rotate the hex key to the RIGHT 10-15 degrees to reset the switch roller arm. Then snug the set screw up against the camshaft (CW) until slight pressure is felt. Then SLOWLY rotate the hex key to the LEFT until you hear the “click” on the second switch indicating that correct adjustment has been achieved. Tighten the cam set screw.
2. Apply power to the actuator and drive CCW at least 15-20 degrees. Then drive the actuator CW until the cam stops the electrical travel. Check to be sure this is the correct CW position you require. Repeat step 1 if further adjustment is needed. Remove power from the actuator.



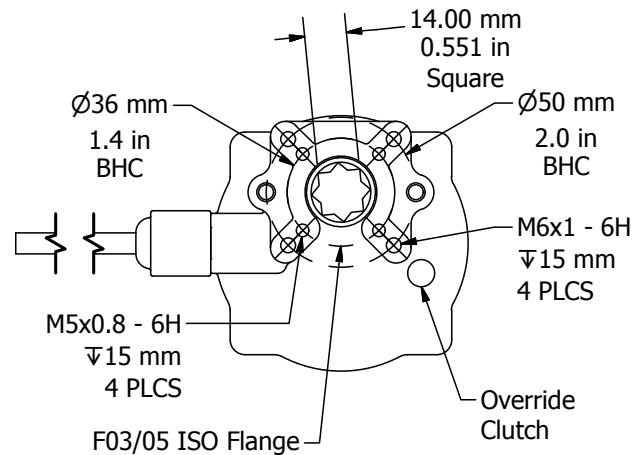
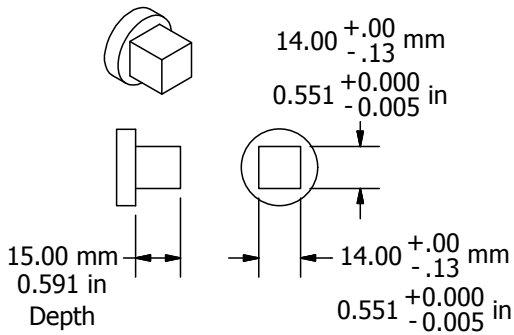
Cam 2

Mechanical Data

PZ Series Dimensional Data



Drive Coupling Fabrication Data



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Commissioning

This procedure will assume that the actuator is installed correctly both mechanically and electrically with correct power.

1. Apply the correct supply power to the actuator.

1.A NORMAL OPERATION

- I. Power applied to terminals marked 1 & 3 will cause the actuator to run CCW.
- II. Power applied to terminals marked 1 & 4 will cause the actuator to run CW.

2. Test Full CW and CCW Positions

2.A Apply power to terminals marked 1 & 3

- I. The actuator will drive to the full CCW position (as viewed from ABOVE the actuator).
- II. If this is NOT the correct stop position, refer to Adjusting the actuator CCW position instructions for CAM 1 on Page 5 in this document.

2.B Apply power to terminals marked 1 & 4

- I. The actuator will drive to the full CW position (as viewed from ABOVE the actuator).
- II. If this is NOT the correct stop position, refer to Adjusting the actuator CW position instructions for CAM 2 on Page 5 in this document.

Industrial Applications

ProMation Engineering actuators have been installed to operate process controls such as butterfly valves, ball valves, high performance valves, plug valves, gate valves and dampers, in a broad range of demanding industrial applications.

**Power
Generation**



**Water
Processes**



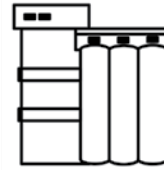
Mining



Oil and Gas



Agriculture



Chemicals



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