The three phase P series quarter turn actuators have been designed for dependable performance in rugged industrial applications such as clean water and wastewater treatment, mining, process control, power and damper control.

ProMation Engineering has an extensive stock of electric actuators and can ship product very rapidly, worldwide.

Several key features increase the reliability:

- Motor Control Center with status lights, attached or some distance away, allows local or remote control
- Automatic Phase Monitoring
  - Checks for phase reversal, phase loss, and phase imbalance
  - Detects low or high voltage to protect the actuator from damage, such as during start-up
- AutoCalibration means less setup time (proportional only)

### Actuator Specifications

<table>
<thead>
<tr>
<th>Specifications</th>
<th>P4</th>
<th>P5</th>
<th>P6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque &quot;lb/Nm&quot;</td>
<td>3500&quot;lbs/400Nm</td>
<td>4400&quot;lbs/500Nm</td>
<td>5750&quot;lbs/650Nm</td>
</tr>
<tr>
<td>Supply Voltage</td>
<td>230/3/60</td>
<td>230/3/60</td>
<td>230/3/60</td>
</tr>
<tr>
<td>Max Inrush Current</td>
<td>1.8A</td>
<td>1.3A</td>
<td>1.4A</td>
</tr>
<tr>
<td>Running Current</td>
<td>1.0A</td>
<td>0.7A</td>
<td>0.6A</td>
</tr>
<tr>
<td>Motor</td>
<td>Polyphase</td>
<td>Polyphase</td>
<td>Polyphase</td>
</tr>
<tr>
<td>Runtime (90°@60Hz/vdc)</td>
<td>16 sec</td>
<td>22 sec</td>
<td>28 sec</td>
</tr>
<tr>
<td>Runtime (90°@50Hz)</td>
<td>18 sec</td>
<td>25 sec</td>
<td>31 sec</td>
</tr>
<tr>
<td>Duty Cycle</td>
<td>On/Off/Jog: 25%, Proportional: Managed (75% maximum)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor Starts</td>
<td>1200 per hour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>47lbs/22kg (add 12lbs/5.5kg for MCC)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanical Connections</td>
<td>ISO5211 F10 8pt 35mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical Entry</td>
<td>(2) 3/4″ NPT Remote Mount</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Field punched/drilled into MCC cabinet for Direct Mount</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Rating</td>
<td>NEMA 4, 4X (Actuator), MCC is NEMA 4 standard or optionally 4X SS or FBG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manual Override</td>
<td>7.6″ Handwheel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>On/Off/Jog or Proportional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actuator Case Material</td>
<td>Aluminum Alloy, Powder coated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor Protection</td>
<td>230°F/110°C Thermal F* Class</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Totally Enclosed Non-Ventilated Motors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient Temperature</td>
<td>-22°F to +125°F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Range</td>
<td>-30°C to +52°C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Product Notes:

1. The 3 Phase P Series can be ordered as an on/off (two position) model that can also be used in bump/jog applications.
2. It can also be ordered with a premium internal proportional control card that accepts a wide range of control signals, generates multiple feedback signals, and has look-ahead fault prevention.
3. P Series 3 phase versions are equipped with a Motor Control Center (MCC) which houses the phase monitor for Automatic phase monitoring. This checks for phase reversal, phase loss, phase imbalance, low voltage or high voltage specifically to protect the actuator from damage during start-up and operating service conditions.
4. The MCC houses the phase monitor for Automatic phase monitoring. This checks for phase reversal, phase loss, phase imbalance, low voltage or high voltage specifically to protect the actuator from damage during start-up and operating service conditions.
5. Requires 3rd and 4th auxiliary switch set (Option-X) to control MCC indicators.
**Wire Sizing Chart**

<table>
<thead>
<tr>
<th>MAX distance between Actuator and Supply (feet)</th>
<th>P4</th>
<th>P5</th>
<th>P6</th>
</tr>
</thead>
<tbody>
<tr>
<td>120vac Control ONLY</td>
<td>1.8A</td>
<td>1.3A</td>
<td>1.4A</td>
</tr>
<tr>
<td>HEATER</td>
<td>1.8A</td>
<td>1.3A</td>
<td>1.4A</td>
</tr>
<tr>
<td>Switch Stack (STANDARD)</td>
<td>1.8A</td>
<td>1.3A</td>
<td>1.4A</td>
</tr>
<tr>
<td>AUXILIARY SWITCH (STANDARD)</td>
<td>1.8A</td>
<td>1.3A</td>
<td>1.4A</td>
</tr>
<tr>
<td>FAN</td>
<td>1.8A</td>
<td>1.3A</td>
<td>1.4A</td>
</tr>
<tr>
<td>AUXILIARY SWITCH (STANDARD)</td>
<td>1.8A</td>
<td>1.3A</td>
<td>1.4A</td>
</tr>
<tr>
<td>ACTUATOR IN FULL OPEN POSITION</td>
<td>1.8A</td>
<td>1.3A</td>
<td>1.4A</td>
</tr>
<tr>
<td>OVERVOLTAGE DELAY TIME RESTART</td>
<td>1.8A</td>
<td>1.3A</td>
<td>1.4A</td>
</tr>
<tr>
<td>UNDERVOLTAGE</td>
<td>1.8A</td>
<td>1.3A</td>
<td>1.4A</td>
</tr>
</tbody>
</table>

*Wire sizing data is provided in the table to assist in the selection of the proper wire size for these actuators using various wire sizes over distance.

Please make sure to reference the correct voltage and do not exceed the indicated length of the wire run for each model.

Field Wiring (by others) Items within dotted line located inside MCC cabinet

Items within dotted line located inside actuator housing

Field Wiring (by others)
ProMation Premium Controller:
The Premium controller offers a full array of features - such as various control and feedback signals, alphanumeric readout, several fault indicators for operational diagnostics, extensive data logging that provides full proportional control for all industrial applications. ModBus communications are also an option on this controller.

- Pilot device 10A MAX. Auxiliary switches are rated 10A @ 250vac MAX.
- Terminals 13-18 are dry type Form C.
- Terminals accept 12-16ga solid/stranded wire.

Full Proportional Control Featuring:
• Autocalibration
• Programmable
• High resolution
• Alarm Outputs
• Data logging
• Simple User Interface
• Field Selection Friendly
• Thermal Management

<table>
<thead>
<tr>
<th>Signal</th>
<th>Input Impedance</th>
<th>Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10vdc</td>
<td>140k ohms</td>
<td>50mV</td>
</tr>
<tr>
<td>1-5vdc</td>
<td>250k ohms</td>
<td>20mV</td>
</tr>
<tr>
<td>2-10vdc</td>
<td>140k ohms</td>
<td>40mV</td>
</tr>
<tr>
<td>4-20mA</td>
<td>250 ohms</td>
<td>80µA</td>
</tr>
</tbody>
</table>

Control Signal Inputs
(selectable using program menu):
0-10vdc, 1-5vdc, 2-10vdc, 4-20mA
Factory set with common isolated from ground. Ground reference is possible.

Feedback Signal Output
(Can be different than input):
0-10vdc, 1-5vdc, 2-10vdc, 4-20mA
Max Load: 250 ohms
P4/5/6 Series Dimensional Data

Installation Notes:
1. These actuators are to be mounted ONLY between a horizontal and upright position.
2. When installing conduit, use proper techniques for entry into the actuator. Use drip loops to prevent conduit condensate from entering the actuator.
3. Both NPT conduit ports MUST use proper equipment to protect the NEMA 4x integrity of the housing.
4. The anti-condensate heater is to be used in ALL applications.
5. **Do not install or store the actuator outdoors or in humid environments without power to the heater.**
6. Use proper wire size to prevent actuator failure (see wire sizing chart).
7. Mechanical travel stops exist to prevent over-rotation for manual override only. They are not intended to stop motor driven rotation.
8. **Do not parallel wire multiple on/off actuators together without utilizing isolation relays!** If this is your intention, please contact ProMation Engineering for a multiple actuator parallel wiring diagram.

Switch Logic Map and Switch/Cam Arrangement

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

SW1 and SW2 are set at the factory and should NOT be changed. The INCLUDED auxiliary switches SW3 & SW4 are for terminals 7 thru 12 and those setpoints may be modified if need be. When so optioned, SW5 & SW6 auxiliary switches are initially set to function the same as auxiliary switches SW3 & SW4.
Motor Control Center Features:

**Exterior View**

- **Access Latch** (quarter-turn)
- **Actuator** interconnect terminals
- **120v control transformer**
- **Proportional Signal Cable**
- **Main 3 Phase Power Block Connections**
- **Mode Switch**
  - ON when actuator is fully CW
  - ON when actuator is RUNNING
  - ON when actuator is fully CCW
- **Phase Monitor**
- **Field Connection terminals**

**Interior View**

- **Actuator MOTOR connections**
- **Reversing Motor STARTER connections**
- **120v control transformer**
- **Access Latch** (quarter-turn)
- **Main 3 Phase Power Block Connections**

**WARNING!**
The Mode switch does NOT function as a service disconnect! Power is still present inside the enclosure when the mode switch is OFF.

**Phase Monitor Calibration:**

At the heart of the ProMation Engineering Motor Control Center (MCC) is the Phase monitor relay. Unlike other three-phase industrial actuators, the ProMation Phase monitor utilizes a microprocessor-based design to provide protection against phase loss, phase reversal, phase unbalance, undervoltage and overvoltage as well as unbalanced voltages or single phasing regardless of any regenerative voltages.

The relay is energized when the phase sequence and all voltages are correct. Any one of five fault conditions will de-energize the relay. As standard, re-energization is automatic upon correction of the fault condition.

The Phase monitor not only protects the motor, but the process as well. Phase disruption can cause the motor to run in an unintended direction.

A multi-color LED indicates normal condition and defines fault to simplify troubleshooting. The Phase monitor offers a variety of user-adjustable settings. The percent phase unbalance is adjustable from 2-10%, and also has a “Disable” setting for those applications where poor voltage conditions could cause nuisance tripping. The undervoltage drop-out can be set at 80-95% of operating voltage (overvoltage setting is fixed at 110% of nominal). The adjustable time delay drop-out on undervoltage (0.1-20 seconds) eliminates nuisance tripping caused by momentary voltage fluctuations. There is also an adjustable time delay (1-300 seconds) on both power up and restart after a fault has been cleared.
AVAILABE OPTIONS (Factory Installed)

- Premium Proportional Controller Option. Converts 2 position to proportional control.
- Mechanical Torque Switch Assembly
- IP68 Protection (actuator only), tested to 0.7kgf/cm² for 72 hours. P2~P8 only.
- 1k ohm position feedback potentiometer.
- 5k ohm position feedback potentiometer.
- 10k ohm position feedback potentiometer.
- 4-20mA feedback generator for On/Off/Jog actuators.
- Integral Thermostat for Heater Control - turns on at 32°F, turns off at 50°F.
- Cold weather auxiliary heater option. Thermostatically controlled, On 32°F, Off at 50°F, auto reset, hermetically sealed. 175W Internal Heater, 2A power consumption.
- Chain wheel override for applications where an actuator is mounted some distance from the floor. (Use with LCS).
- Epoxy coating (actuator) for increased environmental protection.
- Nylon coating (actuator) for increased environmental protection.
- Stainless Steel (actuator) enclosure. P2~P6 Only.
- Fiberglass (MCC) enclosure for NEMA 4X protection.
- Stainless Steel (MCC) enclosure for NEMA 4X protection.

ProMation Product Line

PL Series Linear Drive
Up to 4400lbs down/up force and up to 100mm (4") stem travel

P Series Non-Spring Return
55"lbs through 40,000"lbs. Quarter-Turn, with Manual Override
Available with On/Off/Jog or Proportional control. For 12vac/dc, 24vdc, 120vac, 230vac, 230v/3 phase, 380v/3 phase & 460v/3phase supplies.

PA~PD Series Spring Return
445"lbs through 2300"lbs. Quarter-Turn, both with and w/o manual override handwheel.
Spring either CW or CCW. Available with On/Off control for 24vac/dc and On/Off or Proportional control for 120vac & 230vac supplies. Stepdown for 3phase available.

PBU Battery Back-Up Systems
Provides power sufficient to drive P Series actuators to field-selectable fail-safe positions. For P Series & PL Series actuators in On/Off and Proportional control modes. Available for 24/120/230vac actuators. 120vac/230 vac supply.

ProMation Engineering follows a policy of continual product updates and enhancements. Our website is the best place to obtain the latest product documentation, including the wiring diagrams for these controllers. Visit us at www.promationei.com or use the QR code below to link to the site.