

Installation & Maintenance Instructions

**PUSH-TYPE LINEAR ACTUATOR WITH ON/OFF OPERATION
WITH GENERAL PURPOSE OR WATERTIGHT ENCLOSURE**

**SERIES
P149A**

▲ WARNING To prevent the possibility of death, serious injury or property damage, the actuator must be installed and serviced only by a qualified service technician avoiding the following hazards:

- **Electrical hazard:** Turn off all electrical power to actuator.
- **Risk of electric shock:** More than one disconnect switch may be required to de-energize the device for servicing.
- **Pressure hazard:** Depressurize valve and drain hazardous or combustible fluid to a safe area before inspection or removal of the actuator or valve from service.
- **Explosion, fire or toxic gas hazards:** Extinguish all open flames and avoid any type of sparking or ignition during leakage testing.

-SERVICE NOTICE-

▲ WARNING See separate **_148A Series Oil Valve Installation and Maintenance Instructions** for information on: **Operation, Positioning, Mounting, Piping, Flow Controls, Preventive Maintenance and Cause of Improper Operation.**

Do not install the P149A Series Actuator with general purpose enclosure (Type 1) in a location subject to weather, wash down or other sources for water ingress. Use Type 4 version of the actuator with watertight enclosure for these locations.

DESCRIPTION

The P149A Series Hydraulic Actuator is a self-contained linear, push-type actuator which extends when powered and retracts by spring force upon power interruption.

The P149A Series Actuator is typically used for control of oil-fired heating equipment, commonly to open and close a valve. The P149A Series Actuator positions **_148A Series Oil Valves.**

OPERATION

P149A1 - On/Off Actuator

Application of electrical power simultaneously drives an electric pump and closes a normally-open dump valve, resulting in up to 1100 N (250 lbf) of force on the actuator stem. This extends the actuator stem and attached valve poppet, to open the valve.

Upon reaching the fully extended position, a travel limit switch interrupts power to the electric motor while maintaining power to the dump valve, thus stabilizing hydraulic pressure to hold shaft position. Position indicators on both sides of the actuator show the actual position of the valve stem. Upon power interruption, the dump valve opens, releasing hydraulic pressure and allowing the return spring to retract the stem and close the valve fully. Closing time is one second or less.

OPTIONAL FEATURES

- **Auxiliary Switch** One or Two integral SPDT switches, field adjustable to actuate at any position of stroke. This is not a safety switch.
- **Proof-of-Closure Switch** A single factory set, non-field adjustable, SPDT switch to be used in conjunction with **_148A Series Oil Valves.**

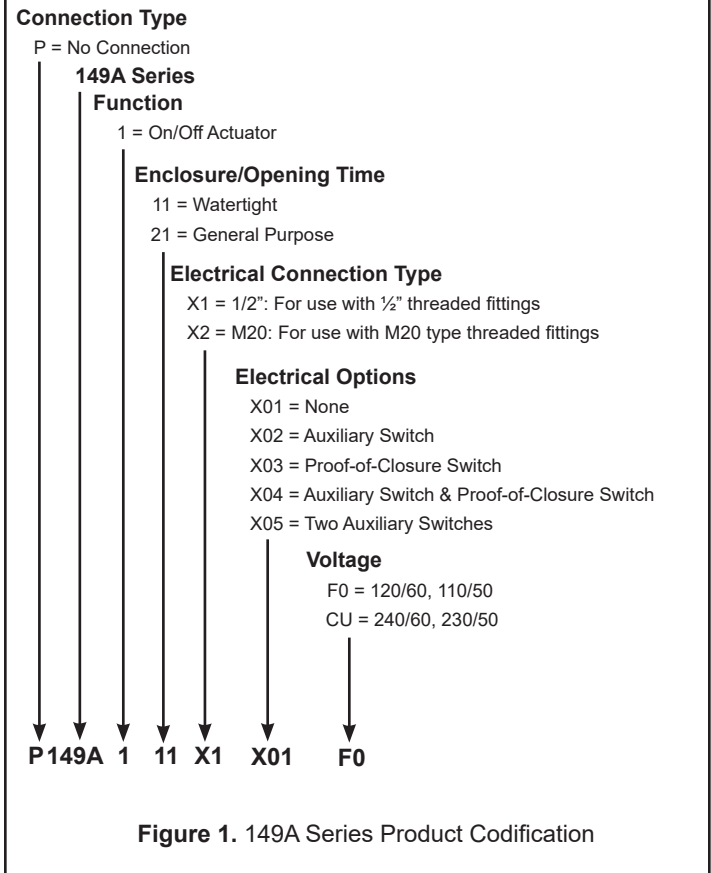


Figure 1. 149A Series Product Codification

Specifications

Force Output: 1100 N (250 lbf)
Stroke: 28.0±1 mm (1.10±0.04 in)

Electrical Characteristics:

ACTUATOR	Operating Voltage / Frequency	Current, in Amperes		
		In-rush	Open-ing	Hold-ing
P149A1 ON/OFF	120/60	11	1.7	0.06
	110/50	11.5	2.1	0.065
	240/60	5.0	0.7	0.03
	230/50	5.5	1.0	0.035

- Typical opening time approximately 9 seconds
- At temperatures below -30°C, actuator may take as long as 30 seconds to open.
- Maximum Closing Time: One second

Ambient Temperature and Duty Cycle Limitations

The actuator may be operated in ambient temperature conditions from -40 °C to 66 °C (-40 °F to 150 °F). During normal operation, the P149A Series Actuator can be cycled CLOSED to OPEN up to 60 times per hour at maximum ambient temperature of 66°C (150 °F). Higher cycle rates are possible with lower ambient temperatures.

NOTICE The P149A Series Actuator is fitted with a self-resetting thermal cutout device. If the recommended temperatures and duty cycles above are exceeded, the thermal cutout may trip causing the actuator to stop in its current position during valve opening. The valve closing time remains one second or less regardless of thermal cutout trip. Once the actuator cools, the cutout will self-reset and the actuator will resume operation. If the cutout trips repeatedly, verify that the application is within the ambient temperature and the duty cycle limits of the actuator. If the application is within the specified operating limits and the cutout continues to trip, replace actuator.

INSTALLATION

Check nameplate for correct catalog number and service. Check the catalog number against Figure 1 to ensure that the actuator meets the requirements of the application. Contact ASCO for more information about this actuator or other actuator options if this actuator is not suitable for your application.

Positioning / Mounting

Follow the _148A Series Oil Valves manufacturer's instructions when installing the actuator.

1. The P149A Series Actuator can be installed to operate in any position.
2. Check to ensure that the mounting gasket, if applicable, is in the proper position, clean and without damage. Position the actuator to operate the valve. Secure actuator with the three mounting set screws. Tighten set screws to 9,0 ± 0,5 N-m (80 ± 5 in-lbs) using a 4 mm hex bit socket. Ensure actuator base is fully secured against valve body mounting surface for proper operation. (See Figure 2).

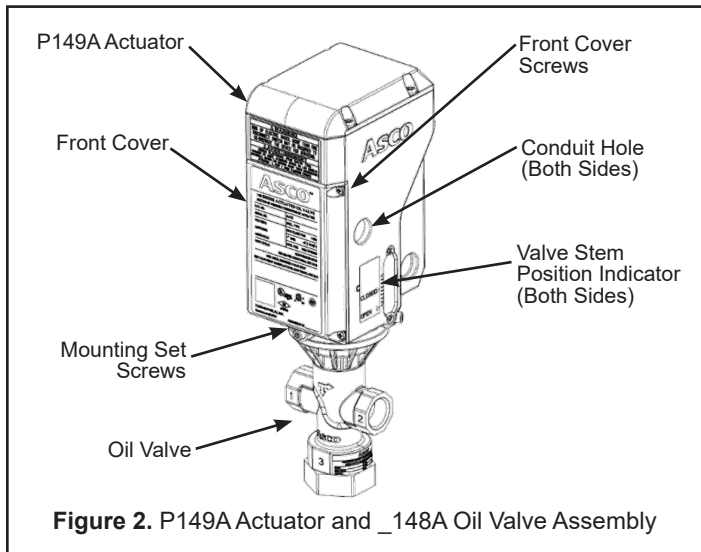


Figure 2. P149A Actuator and _148A Oil Valve Assembly

Wiring

Refer to Figure 3 for On/Off Actuator

WARNING To prevent damage to the valve DO NOT use the actuator as a step ladder or induce any additional weight to the actuator when installed in a horizontal position. The actuator could break loose causing serious injury or property damage.

WARNING Electrical hazard. To prevent the possibility of death, serious injury or property damage, open all circuits before inspection, service or disassembly.

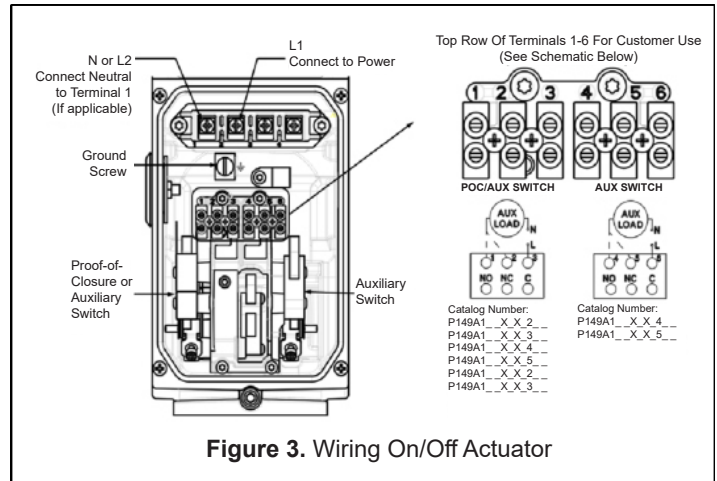


Figure 3. Wiring On/Off Actuator

Wiring must comply with all local codes and NFPA 70 National Electric Code edition appropriate for installation. Installation should conform to all actuator ratings. All wiring must be an approved type suitable for 90 °C.

1. Check the nameplate and confirm that the appropriate power will be supplied to the unit. Turn off all power to the unit prior to servicing. Remove the front cover and set aside to access electrical connections, taking care not to damage the cover O-ring (if applicable). A diagram is located on the inside of the cover to aid in making electrical connections. Take care not to damage or tear the diagram or nameplate when removing cover. Labels provide electrical insulation to the housing.
2. Upon removing the front cover, a temporary shipping plug will be installed in the right-hand side conduit hole. This plug should be removed & discarded prior to actuator installation. A reusable conduit plug will be installed on the left-hand side (for unused conduit). Install appropriate electrical fittings (not provided, end user supplied) in the desired conduit holes, and replace the reusable plug on the other (if needed). If reusable plug is removed, ensure when reinstalled, the plug is properly centered on conduit opening. Type 4 fittings must be used with watertight units. Tighten watertight plug hex nut until plug gasket is fully compressed against actuator housing surface for watertight seal. Route wiring through the installed electrical fitting(s). Take care not to scratch or otherwise damage the cover sealing surface when working on watertight enclosure.
3. Connect the power wires, stranded 12-14 AWG, to terminals 1 (Neutral/ L2) and 2 (Hot/L1). Connect the stranded ground wire of matching gauge, under the grounding terminal saddle provided in the housing below the hot and neutral power terminals.
4. Power Terminal Screw Torque: 1.4 N-m (12 in-lbs) Ensure all strands are securely fastened under terminal screw.
Ground Screw Torque: 2.3 N-m (20 in-lbs)
Ensure all strands are securely fastened under saddle clamp.
5. Using stranded 12-18 AWG wire, connect wiring from an external highfire switch (not supplied) to the 3-position terminal strip (position 5 and 6, see wiring diagram). The switch must be rated at 250 VA minimum. Torque terminal strip screws to 0.5 N-m (4.5 in-lbs) (Figure 4).
6. If a Proof-of-Closure or Auxiliary switch is being used make those electrical connections. **Use the markings located on the wiring diagram to determine normally open and normally closed terminals.**

Use stranded 12-18 AWG wire. Torque terminal strip screws to 0.5 N-m (4.5 in-lbs). Refer to Auxiliary switch adjustment section on page 4 for instructions on adjusting switch. Proof-of-Closure switches are set at the factory. **Do not adjust Proof-of-Closure switch.**

7. Install the front cover. Be certain that the O-ring (if applicable) and sealing surfaces are clean and there is no damage to the surfaces or O-ring. Snug down all screws before tightening. Torque screws to 1.4 to 1.8 N-m (12 to 16 in-lbs) evenly using crisscross pattern.
8. Operate actuator (with valve) through five cycles to verify proper operation of valve and damper/ linkage system prior to use.

Auxiliary and Proof-of-Closure Switch Ratings

120 VAC: 7 Amps Resistive, 3 Amps Inductive
 240 VAC: 7 Amps Resistive, 3 Amps Inductive

Total connected load of Auxiliary and Proof-of-Closure switches not to exceed 1800 VA.

Proof-of-Closure Switch (Refer to Figure 4)

The P149A Series Actuator with the optional Proof-of-Closure switch equipped, is to only be installed on 148A Series Oil Valves with overtravel seals. The Proof-of Closure switch is set at the factory to provide both a mechanical and electrical means of proving valve closed position interlock to the primary control. This switch is not to be field adjusted.

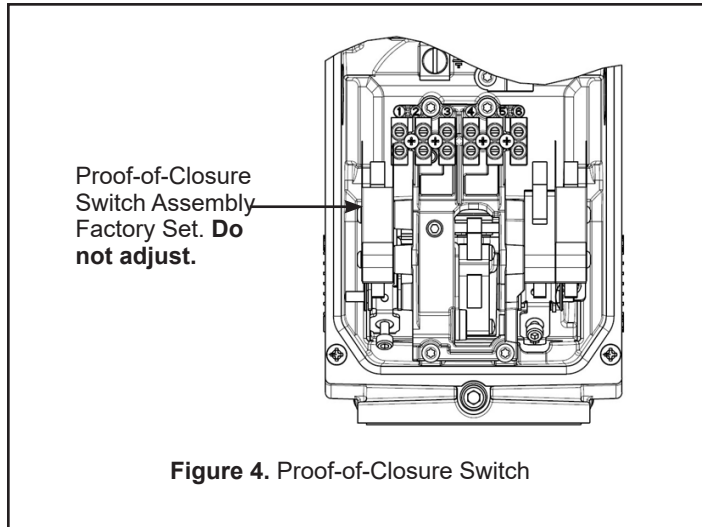


Figure 4. Proof-of-Closure Switch

4. Cycle the actuator to verify the switch setting and readjust as required.
5. Install the front cover. Be certain that the O-ring (if applicable) and sealing surfaces are clean and without damage. Snug down all screws before tightening. Torque screws to 1.4 to 1.8 N-m (12 to 16 in-lbs) evenly using crisscross pattern.

MAINTENANCE

Before inspection, maintenance or rebuild, review WARNING statements on page 1. Maintenance should include annual inspection and cleaning. Use a mild cleaning fluid, not aggressive solvents to remove dirt and oil. Organize a maintenance schedule based on environment and frequency of use. Check for loose electrical and mechanical connections and replace damaged parts. Do not remove the top cover for maintenance. There are no serviceable parts contained inside the actuator housing.

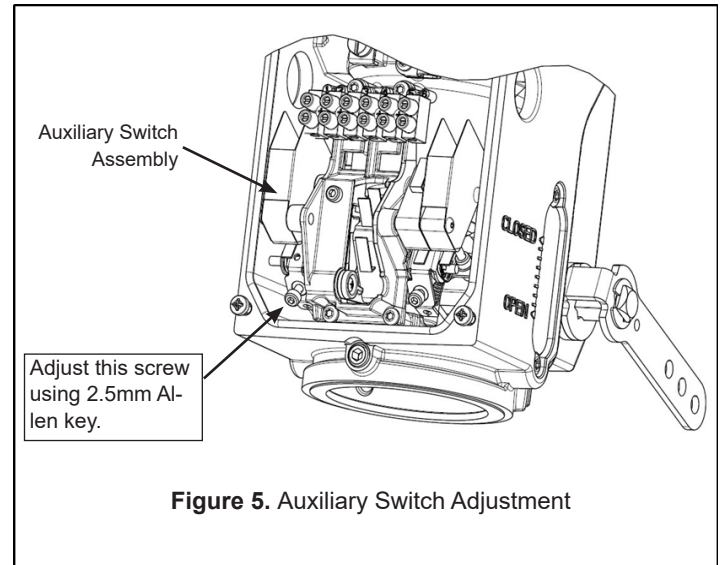


Figure 5. Auxiliary Switch Adjustment

Auxiliary Switch Adjustment (Refer to Figure 5)

NOTE: The Auxiliary switch is not a safety switch.

1. **Before removing the front cover, review WARNING statements on page 1.** Remove front cover (with O-ring, if applicable). Take care not to damage the sealing surfaces and front cover O-ring, if supplied.
2. Insert 2.5 mm Allen key into adjusting screw on auxiliary switch assembly.
3. Turn screw clockwise to move set point towards beginning of actuator stroke. Turn screw counterclockwise to move set point toward the end of the actuator stroke. (Approximately 7.5 turns from 0 to 100% travel).