

## H11 Hydramotor® Actuator Pressure Limit, Push-Type

### INSTALLATION AND SERVICE

SDI: H11-1  
Effective: 12-96  
Supersedes: I/O 13 (6-88)



#### DESCRIPTION

Hydramotor® valves consist of three components: the actuator described in this sheet (Figure 1) together with a mounting yoke and a valve body.

H11 hydraulic actuators push when energized and retract, powered by an internal return spring, when deenergized, providing ON-OFF control of valves. The operating mechanism is completely immersed in oil, eliminating usual maintenance and service.

#### OPERATION (Figure 2)

When the actuator terminals are powered, relief valves close and an electric motor-driven pump applies hydraulic pressure to a spring-loaded piston. When the stem reaches full travel, a limit switch opens the pump motor circuit. The relief valves remain closed, holding the stem in its extended position until the actuator is deenergized, opening the relief valves and allowing the internal return spring to retract the piston.

**NOTE:** When the actuator is held in its energized position, the motor may restart intermittently to maintain proper pressure against the piston.

#### INSTALLATION

##### CAUTION

- This actuator should be installed and/or serviced by trained and experienced service technicians.
- Turn off electric power supply before wiring actuator to prevent electrical shock and damage to equipment.
- All wiring must conform to applicable electrical codes and ordinances (NEC Class 1).
- Limit controls must be capable of handling electrical load shown on actuator nameplate (volts, frequency). Wire limit controls in hot side of circuit. Do not connect additional wiring to limit switch.
- Maximum connected load of motor and auxiliary switch must not exceed 2000 VA.
- Ensure actuator selected is appropriate for the application.
- Actuators used in areas where dust, corrosive or explosive elements are present should be equipped with proper protective shields. Replace protective shields before operating valve.
- Actuator surface temperature should be kept below 175° F (80°C).
- Check application for proper voltage. A 60 cycle actuator is suitable for 50 cycle operation but power stroke timing will increase by approximately 20%.

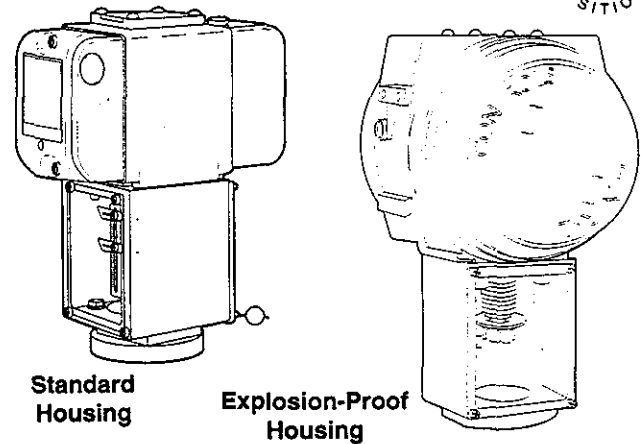


Figure 1. H11 Hydramotor® with Mounting Yoke

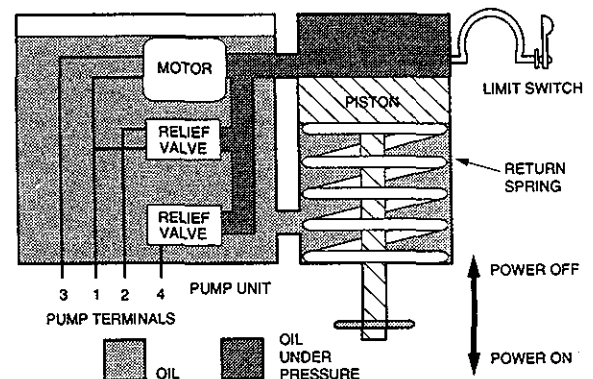


Figure 2. Typical H11 Operation

1. Follow equipment manufacturer's wiring instructions. Typical wiring connections are shown in Figures 3 and 4.
2. Check power source, actuator and all operating and limit switches in electrical circuit for proper operation.

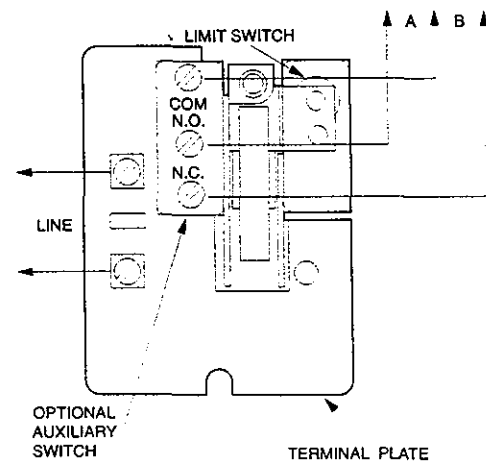


Figure 3. Two-Wire Circuit with Auxiliary Switch

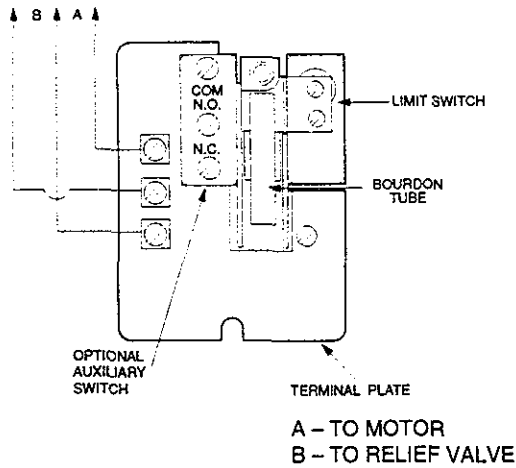


Figure 4. Three-Wire Circuit with Auxiliary Switch

### ACTUATOR REMOVAL/REPLACEMENT

#### Actuator Removal

1. Loosen lock screw, unscrew union nut to detach valve stem from actuator shaft (Figure 5).

#### CAUTION

Do not damage the polished surfaces of valve stem or actuator shaft.

2. Energize actuator to relieve pressure of closing spring.
3. Remove mounting bolts or bushing nut, depending on type of mounting, holding yoke to valve body.
4. Deenergize actuator and lift off of valve body.

### Actuator Replacement

Replace actuator with unit having identical catalog number. Reassembly is the reverse of disassembly:

1. Energize new actuator.
2. Secure actuator to valve.
3. Line up prongs of stem head nut with slot in actuator shaft.
4. Deenergize actuator.
5. Be sure prongs are in slot.
6. Tighten union nut fingertight.
7. Tighten lock screw to 25 in-lb.
8. Test for proper operation.

### TERMINAL PLATE REMOVAL/REPLACEMENT (Figure 6)

NOTE: To replace the power unit, the terminal plate must be removed to gain access to power unit mounting bolts.

#### CAUTION

When removing terminal plate with bourdon tube (1), do not adjust the two factory preset screws (2) that actuate limit switch (3).

1. Turn off all electrical power to actuator.
2. Remove covers. Remove two terminal plate screws (4) holding terminal plate, and one screw (5) holding pressure limit bourdon tube to actuator. Note position of O-rings (6). Lift terminal plate away from frame.

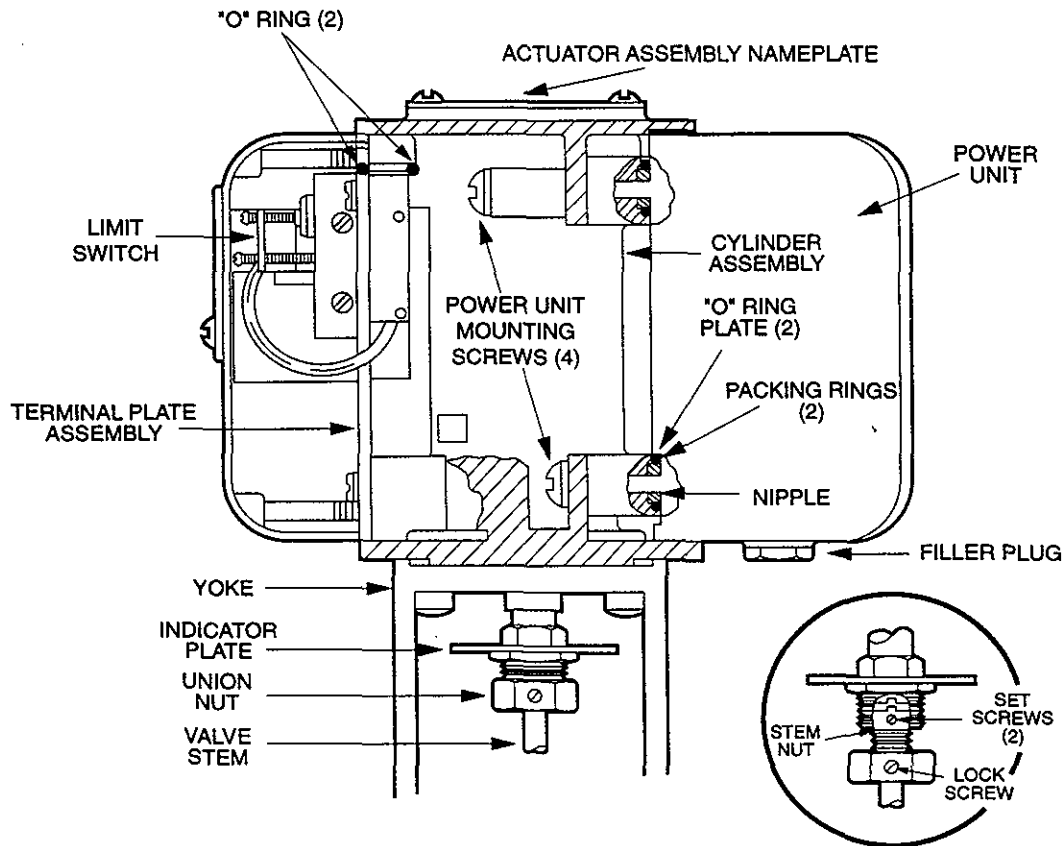


Figure 5. H11 Cross Section

- Note the proper position of leads between terminal plate and power unit. Tag leads if necessary to identify for reassembly. Pull lead clips from power unit.
- Proceed with power unit removal if necessary.
- When installing terminal plate, insert leads of terminal plate on proper terminals of power unit. Position terminal plate in frame using a gentle downward motion. *Be sure O-rings are in place.*

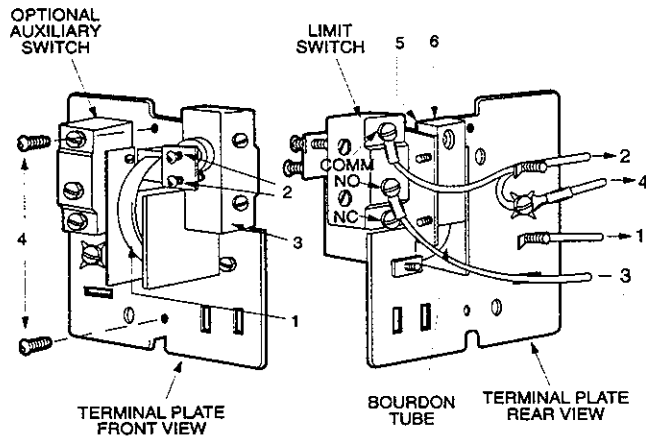


Figure 6. H11 Terminal Plate with Limit and Auxiliary Switches

#### POWER UNIT REMOVAL/REPLACEMENT

- Remove terminal plate, as described above. Remove four screws holding power unit to frame (figure 7) and pull power unit straight away, noting position of O-rings.
- Put new O-rings in place. Position new power unit to frame carefully to prevent damage to O-rings.
- Replace bolts holding power unit; tighten to  $70 \pm 10$  in-lb.
- Connect clips on leads to power unit.
- Replace terminal plate carefully (see step 5 above).

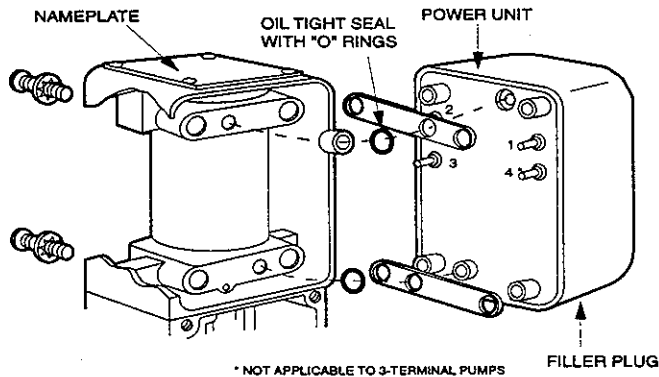


Figure 7. Exploded View of H11 (Covers Removed)

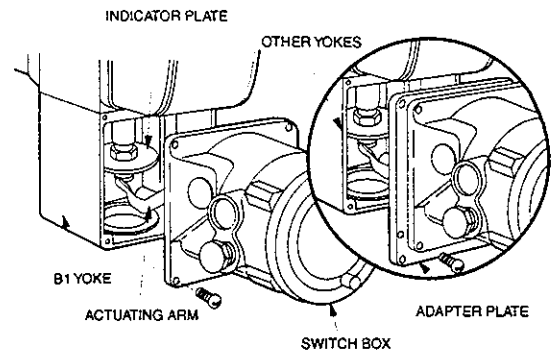


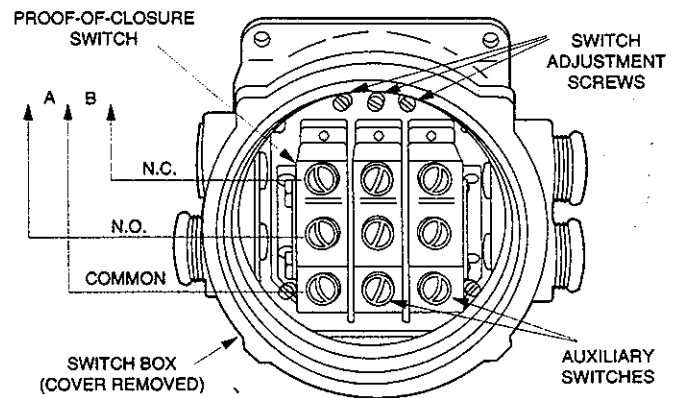
Figure 8. Yoke Mounted Auxiliary Switch Box

#### YOKE-MOUNTED AUXILIARY SWITCH KIT

A yoke-mounted switch unit with up to 3 SPDT independently adjustable auxiliary switches may be installed (figure 8).

**Installation:** The auxiliary switch unit is supplied with necessary hardware for installation – screws and adapter plate (if necessary) and replaces the dust shield where applicable. Mount adapter plate to yoke and auxiliary switch unit to adapter plate with self-tapping screws. Actuating arm tip must be under actuator stem indicator plate.

**Adjustment (Figure 9):** Each switch in auxiliary switch unit may be adjusted separately to actuate at any point of actuator stem travel. Turn individual switch adjustment screw *clockwise* to actuate switch closer to deenergized position. Turn screw only 1/8-turn at a time and check operation. Do not attempt to set switch for operation within 1/8" of either end of stroke.



A – N.O. when actuator deenergized

B – N.C. when actuator deenergized

Figure 9. Auxiliary Switch Adjustment

## FILLING REPLACEMENT POWER UNIT WITH OIL

Standard units are filled with MIL-H-5606 oil. Units with F5 in catalog number, for low ambient temperature use, are filled with Dow-Corning DC560 silicone oil. Either oil is available from ASCO General Controls and most industrial suppliers.

### CAUTION

Do not mix MIL-H-5606 oil with DC560 oils. Oil must be filtered if secured from a source other than ASCO General Controls. Take care that dirt, dust or lint does not enter pump unit or cylinder.

One pint of ASCO General Controls MIL-H-5606 oil is included with each replacement power unit assembly.

1. Filler plug is on bottom of unit. Actuator must be removed from valve body before filling with oil. (See Actuator Replacement). Unscrew filler plug (Figure 5).

### CAUTION

Actuator must be energized to evacuate entrained air. This is a force limit actuator. Force limit switch is inoperative when actuator is removed from valve. When powering actuator do not allow shaft to extend over 1/2 inch from deenergized position.

2. Fill power unit with oil, not to exceed one pint. Power actuator ON and OFF for 15 minutes to release air from cylinder and bring oil temperature to 68° F (20° C) or above. Add enough oil to fill reservoir to within 1/4" of base of filler port.
3. Replace plug and tighten.

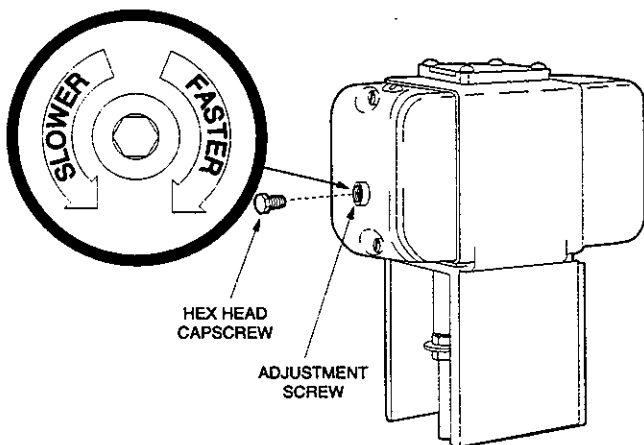


Figure 10. Actuator Adjustment

## OPENING SPEED ADJUSTMENT

Certain actuators are equipped with adjustment screw located on the power unit, opposite the terminal plate (Figure 10).

1. If the actuator is on a valve plumbed in an active system, close manual cock upstream of valve.
2. Deenergize the actuator.
3. Remove the hex cap screw.
4. Turn the screw only 1/2 turn at a time. Turn the screw clockwise to obtain a faster power stroke or turn it counterclockwise for a slower power stroke.
5. Energize the actuator and check the speed after each adjustment. Adjust until the desired speed is obtained.
6. Open manual cock upstream of valve and check the valve under normal usage. Be sure action is fast enough to provide proper light off if valve is used on gas burner.

### CAUTION

Do not attempt to obtain speeds faster than 22 seconds or slower than 60 seconds for full 1 1/4" actuator stroke.

If the adjustment screw is turned to full clockwise or counter clockwise, the position valve will not operate.

## REPLACEMENT PARTS ORDERING PROCEDURE

When ordering replacement or spare parts, specify the item number together with its name, the actuator catalog number serial number, and voltage, as shown on actuator nameplate. Specify the number of switches, and whether standard or explosion/weatherproof housing is desired. See also parts list SDP H10/H11.

**NOTE:** Stem, stem nut and stem nut set screws are part of the valve body. When ordering parts for valve assembly, consult factory or valve parts list.

Table 1. Parts Common to Power Unit Kits

(May be ordered separately)

Description	No. Reqd.	Part No.
Strainers*	2	50751A
Nipple*	1	15358A
O-Ring Plates*	2	18764A
Power Unit Screws*	2	101957-416-12
Power Unit Screws*	2	2754-416A24Z
Lockwashers*	4	3090-416LZ
O-Rings*	2	16606A56-7
Oil (pint, MIL-H-5606)*	1	S156202A
Oil (pint, DC560)	1	S156201A

\* Included in power unit kit.