ASCO® General Controls
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H117 Hydramotor®
High-Flow Gas Fuel Valves

INSTALLATION AND SERVICE

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Effective: 10-96
Supersedes: 2-96

DESCRIPTION

H117 Hydramotor® High-Flow Gas Fuel Valves are normally closed, straight-through flapper type valves operated by ON-OFF, current failure type, self-contained hydraulic actuators for control and safety shutoff of gas supply to commercial or industrial burners. These valves have soft synthetic seats for tight shutoff of all gases.

USE ONLY WITH NATURAL, MIXED, MANUFACTURED OR LP GASES, INCLUDING HIGH SULFUR, SCRUBBED COKE, AND SCRUBBED AND DRIED SEWER GASES.

Yoke-mounted auxiliary switch units utilizing one, two or three SPDT switches may be factory or field mounted. Switches are adjustable to operate at any point of actuator stroke.

OPERATION (See Figure 2)

When actuator terminals are powered, the relief valve closes and electric motor-driven pump applies hydraulic pressure to the spring loaded piston. When the stem has fully retracted, a limit switch opens the pump motor circuit while the relief valve remains closed, holding stem in this position (fully open) until the control circuit is broken. At this time the relief valve opens and the spring-loaded piston returns the stem to its de-energized position (valve closed). Note that when the actuator is held in the energized position its motor may restart intermittently to maintain proper pressure against the piston.

CAUTIONS

- **This valve should be installed, serviced and tested for closure tightness only by a trained and qualified serviceperson.**
- **Check valve requirements against catalog specifications to assure proper valve has been selected. Seat disc temperature must not exceed 150° F (65° C).**
- **Install with flow arrow on valve body in direction of gas flow. Line gas pressure helps valve to close.**

INSTALLATION

1. **Turn off main gas supply before installing valve.**
2. Blow out all pipe lines to remove foreign matter. Install strainer in inlet piping, as close to valve as practicable.
3. Apply pipe dope sparingly to male threads, leaving two end threads bare. On LP gas installations, use pipe dope resistant to action of LP gas.
4. Valve is multipoised and may be mounted in any position Install valve in pipeline with flow arrow on body pointing in direction of gas flow.
5. All piping must comply with applicable local codes and ordinances and with the National Fuel Gas Code (ANSI Z223.1/NFPA No. 54).

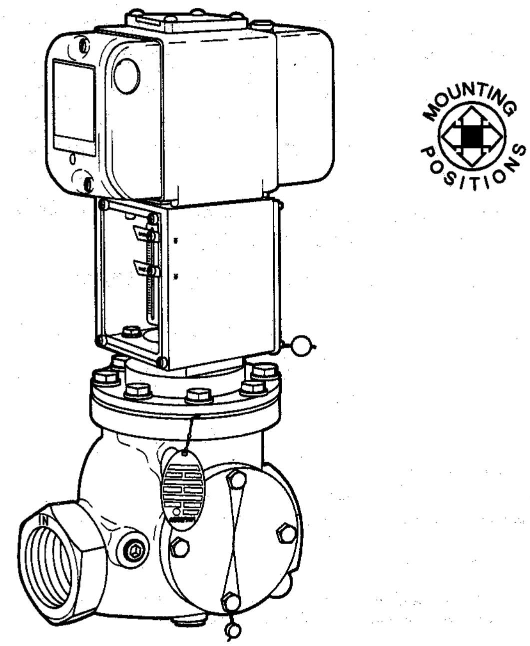

Figure 1. H117 Gas Fuel Valve

6. Connect valve using wrench on body hex at end being joined. Never use actuator as lever.
7. Connect electrical power (see WIRING, below).
8. After complete valve installation and with main gas cock shut off, run unit through five cycles to remove entrained air. Unit may operate sluggishly for the first few cycles.
9. Before valve is put into final operation, a closure tightness test must be made to insure proper and safe operation (see Closure Tightness Test, below).

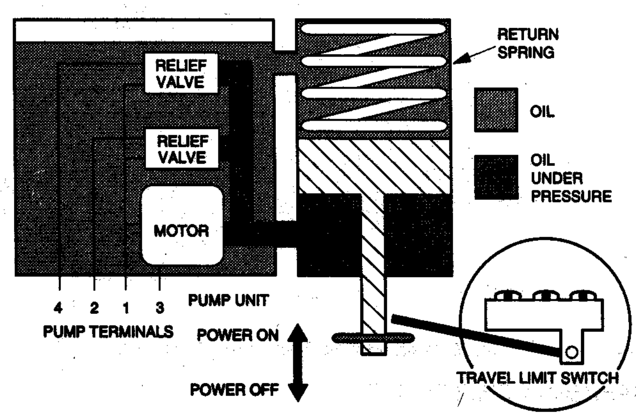

Figure 2. Hydraulic Actuator Operation

WIRING ACTUATOR

Follow equipment manufacturer's wiring instructions. Typical wiring connections are shown in figure 3.

CAUTIONS

- **Turn off electric power supply before wiring actuator to prevent electrical shock and damage to equipment.**
- **All wiring must be NEC Class I and conform to applicable electrical codes and ordinances.**
- **Wire limit controls in hot side of circuit. Limit controls must be capable of handling electrical load shown on actuator valve nameplate (volts, frequency and VA).**
- **Maximum connected load to motor and auxiliary switch must not exceed 2000 VA.**
- **Do not connect additional wiring to travel limit switch.**

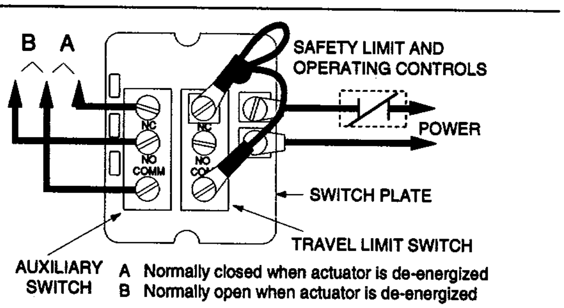

Figure 3. Two-Wire Circuit with Auxiliary Switch

AUXILIARY SWITCH ADJUSTMENT

The integral SPDT auxiliary switch is nonadjustable and actuates at end of actuator energized stroke (figure 2).

Each switch in the yoke-mounted auxiliary switch unit may be adjusted separately to actuate at any point of actuator stem travel. Turn individual switch adjustment screw counterclockwise to actuate switch closer to de-energized position. Turn screw only 1/8-turn at a time and check operation. Do not attempt to set switch for operation within 1/8-inch of either end of stroke (figure 4).

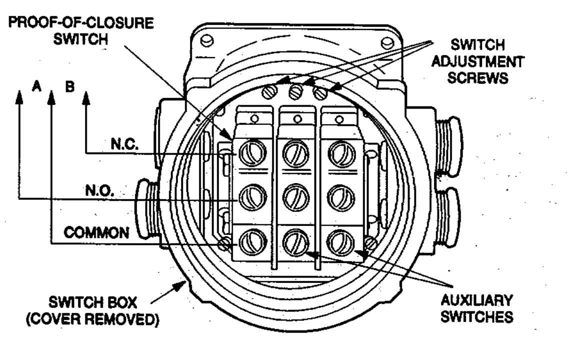

Figure 4. Yoke-Mounted Auxiliary Switch Adjustment

MAINTENANCE AND SERVICE

All system and burner controls should be checked on a routine basis at least once a month by qualified personnel. Because of their sealed design, Hydramotor® actuators require no maintenance.

VALVE SEAL OVERTRAVEL INTERLOCK SWITCH

H117 Hydramotor® valve models with F26V16 option have a valve seal overtravel interlock switch in the yoke-mounted housing which permits supervision of the valve's closed position and can be wired into the start-up or preignition interlock circuit. The switch is precisely set at the factory and is not field adjustable. Note: Valve body must be equipped with valve seal overtravel. Do not utilize valve body without this provision. If the Hydramotor® is equipped with more than one switch, the FM proof of closure switch is the one on the far left hand side when facing the open side of switch box.

STEM NUT ADJUSTMENT

If upper valve stem nut is removed during repair, it must be adjusted according to the following procedure (figure 5):

CAUTION

A nicked, scored or otherwise damaged valve stem can ruin the stem seal and cause leakage. Misalignment of the valve guide or damage to the seat ring can cause leakage. Read and follow directions carefully.

1. In order to obtain proper seating pressure and correct valve lift, distance from actuator shaft to stem nut must be in accordance with value in Table 1. Dimension "A" is measured with valve stem in DOWN position (closed) and actuator shaft in UP (energized position).

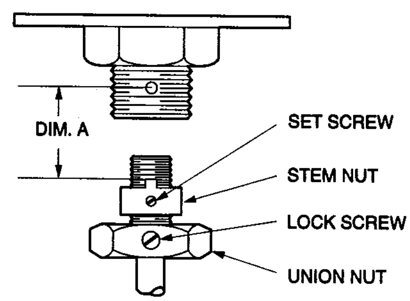

Figure 5. Stem Nut Adjustment

2. Adjust upper stem nut (see Table 1) and lock with set screws. Rotate stem to align prongs with grooves.

Table 1. Stem Nut Adjustment (inch)

Valve Pipe Size	Adjustment Dimension "A"
1 through 4	1
6	1 1/16

ACTUATOR REMOVAL/REPLACEMENT

1. Loosen lock screw in side of union nut. Remove union nut (figure 5).
2. Energize actuator to relieve pressure on valve stem.
3. Remove four hex head cap screws holding actuator to valve bonnet (2, figure 6).
4. Lift actuator off valve bonnet (6).
5. Energize new actuator and set on valve bonnet (6).
6. Replace and tighten four hex cap screws (2).

If upper valve stem nut has been removed see STEM NUT ADJUSTMENT.

REPLACEMENT OF STEM PACKING RING

1. **Turn off gas supply at upstream manual gas cock.**
2. Energize actuator to relieve pressure on valve stem (4).
3. Loosen union nut lockscrew and remove union nut (see figure 5).
4. Loosen set screws and remove stem nut.
5. Remove packing bushing (3, figure 6). Stem packing O-ring (5) is now accessible.

CAUTION

Use care when slipping packing ring (5) over threaded portion of stem (4).

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6. Inspect valve stem (4) for nicks or scoring. Replace valve stem if necessary.
7. Replace packing ring (5) and bushing (3). Turn bushing down snug.

VALVE SEAT CLEANING OR VALVE REPAIR

1. **Turn off gas supply at upstream manual gas cock.**

⚠ WARNING ⚠

Use extreme care, valve is heavily spring loaded to close on power interruption.

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2. Remove plug(s) or side access plate, to remove lever shaft (15, figure 6).
3. Energize actuator. Lift valve linkage so pin (14) may be removed. Push lever shaft (15) through valve, or pull lever shaft from valve with 10-32 screw, then remove valve lever (10) and seat disc assembly (12).
4. Assemble in reverse order of disassembly.

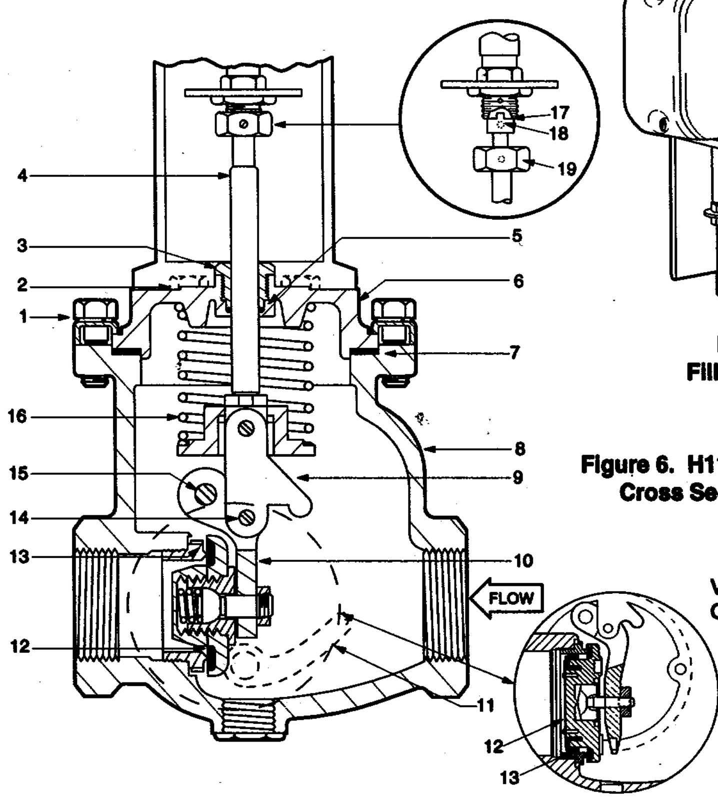

Figure 6. H117 Hydramotor® Cross Sectional View

NOTE: If stem assembly (4) or other upper valve parts are to be replaced, follow steps 2 and 3, then remove actuator as shown in ACTUATOR REMOVAL and proceed as follows:

5. Loosen packing bushing (3). Measure and note distance from top of stem nut to top of valve stem. Loosen lock screws (18) in stem nut (17) and remove stem nut.
6. Remove hex cap screws (1) holding bonnet (6) on valve body (8) and lift connected parts out of valve body. Replace or clean parts as necessary.
7. Assemble in reverse order of disassembly.

REPLACEMENT PARTS

Replacement parts and repair kits are available. When ordering, give complete catalog number and serial number. A parts list may be obtained from ASCO General Controls. See your local Factory Authorized Distributor for availability.

FILLING POWER UNIT WITH OIL

NOTE: Units are filled with MIL-H-5606 or equivalent oil, available from ASCO General Controls. A pint of specially prepared oil is included with each replacement power unit assembly.

CAUTION

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

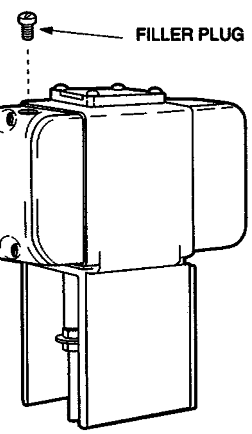

Figure 7.
Filling with Oil

1. De-energize actuator and place in upright position.
2. Unscrew filler plug from top of unit (figure 7).
3. Fill power units with oil not to exceed one pint. Power actuator ON and OFF for 15 to 20 minutes to release air from cylinder and bring oil temperature to 68° F or above. Add enough oil to fill container to base of filler tube.
4. Replace plug and tighten.

1	Hex Head Cap Screw, Bonnet Mounting (8)
2	Hex Head Cap Screw, Yoke Mounting (4)
3	Packing Bushing
4	Stem & Nut Assembly
5	O-Ring
6	Bonnet
7	Gasket
8	Body
9	Link
10	Lever
11	Gasket
12	Disc Assembly
13	Seat Ring
15	Lever Shaft
14	Pin
16	Spring
17	Stem Nut (Upper)
18	Set Screw
19	Union Nut

CLOSURE TIGHTNESS TEST

1. Turn off power to de-energize control system and H117 safety shutoff valve (SSOV).
2. Turn off gas supply at upstream manual gas cock (See Figure 8).
3. Make sure manual test petcock is closed.
4. Remove plug from leak test tap and connect test equipment to leak test tap as shown in Figure 8.
5. Close downstream manual gas cock.
6. Open upstream manual gas cock.
7. Program safety shutoff valve (SSOV) through the safety system to full open position, then immediately de-energize it to seat valve operationally.
8. Immerse 1/4" tube vertically into jar of water about 1/2 inch, as shown in illustration.
9. Slowly open test petcock.
10. As the rate of bubbles coming through the water stabilizes, count the number of bubbles appearing during a 10-second period. Each bubble that appears during 10-second period represents a flow rate of approximately 0.001 CFH. To meet all requirements leakage should not be more than 23 bubbles during a 10-second period [0.023 CFH = 650cc/hr (approximately)]. If leakage exceeds 23 bubbles valve bonnet and interior assembly must be replaced.
11. Close upstream manual gas cock.
12. Close test petcock, remove test equipment and replace leak test tap plug.
13. Turn on gas supply at upstream manual gas cock and energize H117 safety shutoff valve (SSOV).
14. Test for leaks at test tap with soap and water solution.
15. De-energize H117 safety shutoff valve (SSOV).
16. Open downstream manual gas cock.
17. Restore system to normal operation.

NOTE The following test steps are recommended for periodic maintenance: Steps 1, 3, 4, 5, 8, 9, 10, 12, 14, 16, and 17.

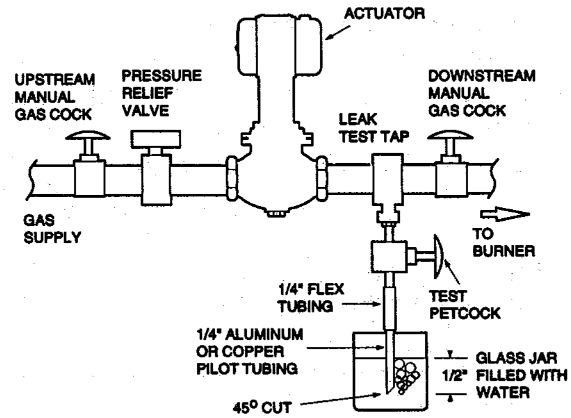

Figure 8. Test Setup for Checking Through-the-Valve Leakage