



Worcester Controls

08932-F

Series 34 Pneumatic Actuator

Installation, Operation and Maintenance Instructions

DESCRIPTION

Pneumatically powered, ¼ turn valve actuator using modified scotch yoke mechanism to match torque requirements of ball valves.

▲ WARNING: SERIES 34 ACTUATORS ARE ELECTROMECHANICAL DEVICES SUBJECT TO NORMAL WEAR AND TEAR. ACTUATOR LIFE IS DEPENDENT UPON APPLICATION AND ENVIRONMENTAL CONDITIONS. IF APPLIED IN HAZARDOUS SERVICES, SUCH AS BUT NOT LIMITED TO MEDIA TEMPERATURE EXTREMES, TOXINS, FLAMMABLES, OR OTHER SERVICES WHERE IMPROPER OR INCOMPLETE OPERATION COULD PRODUCE A SAFETY HAZARD, IT IS INCUMBENT UPON THE SYSTEM DESIGNER AND THE USER TO PROVIDE PROPER WARNING DEVICES SUCH AS TEMPERATURE SENSORS, OXYGEN SENSORS AND FLOW SENSORS. FLOWSERVE ALSO RECOMMENDS THAT THE OPTIONAL AUXILIARY LIMIT SWITCHES BE USED FOR MONITORING AND/OR ELECTRICAL INTERLOCK.

CAUTION: Flowserve recommends that all product which must be stored prior to installation be stored indoors, in an environment suitable for human occupancy. Do not store product in areas where exposure to relative humidity above 85%, acid or alkali fumes, radiation above normal background, ultraviolet light, or temperatures above 120°F or below 40°F may occur. Do not store within 50 feet of any source of ozone.

A. INSTALLATION

CAUTION: Ball valves can trap pressurized media in the cavity. If it is necessary to remove any valve body bolts, stem nuts, or remove valve from the line, and if the valve is or has been in operation, make sure there is NO pressure to or in the valve and operate valve one full cycle.

1. Mounting (In-line)

NOTE: It is not necessary to remove any valve body bolts or remove valve from line in order to mount actuator.

- a. Close valve (valve is closed when flats on stem are perpendicular to the line of flow). If valve information is marked on stop plate or handle, it will be necessary to transfer this information to the bracket nameplate.

For ¼"-2" 44, ¼"-1½" 59 Series top-mount style valves and ½"-2" 51/52, ½"-1½" 82/83 Series valves with high-cycle stem packing as standard, remove handle nut, lockwasher, handle, separate stop plate (if any), retaining nut and stop pin(s). Add the two additional Belleville washers with their larger diameter sides touching each other. Add the self-locking nut to the stem and tighten while holding the stem flats with wrench. Tighten until Belleville washers are flat, the nut will "bottom", and then back nut off ⅓ of a turn. The two additional Belleville washers and the self-locking nut are included in the mounting kit.

CAUTION: The self-locking stem nut is difficult to tighten, and must fully flatten Belleville washers before backing off.

For 2" 59, 82/83 and 2½" 45 valves, remove handle assembly, retaining nut, stop and stop screws. Replace with valve stem spacer or, if valve has graphite stem packing, with two Belleville washers, and replace retaining nut.

NOTE: Belleville washers are installed with larger diameters touching each other. Using a wrench to prevent stem from turning, tighten retaining nut until stem packing is fully compressed or Bellevilles, if used, are fully flattened, then back off nut ⅓ turn. Excessive tightening causes higher torque and shorter seal life.

NOTE: Valves with V51 high-cycle stem packing option installed, identified by two Belleville washers installed and handle assembly, stop and stop screws removed, do not require stem area disassembly.

- b. Attach mounting bracket to actuator using four (4) cap screws and lockwashers, provided in mounting kit, and tighten securely. For small size top-mount style valves, attach bracket such that bracket nameplate will be to side of valve. Place coupling on valve stem.
- c. Check position of indicator flats on top of actuator shaft. If they are parallel to the line, they indicate "Open", if perpendicular, "Closed". Be certain the porthole in the ball and the indicator flats of the shaft agree.

- d. Attach bracket and actuator assembly to valve using cap screws and lockwashers provided in mounting kit. Tighten securely. For small size top mount style valves, bracket nameplate will be to side of valve.

NOTE: When mounting 34 actuators to 90° Diverter/Three-way valves (V-1 style), the actuator must be mounted across the pipeline (defined by the two side ports of the valve).

2. Connections

- a. Actuators without solenoids (“N” Models), (A34N, B34N, A34SN, B34SN).

Air is supplied to the actuator through remote pilot or manual air switches. With the actuator mounted in-line with the valve, air supplied to the plate on the housing end opens the valve; air supplied to the cylinder end closes the valve. Air connections: “N” model actuators have two 1/8" NPT connections.

NOTE: For “S” models air is not required to close valve.

- b. Actuators with solenoids (A34, B34, A34S, B34S).

Normally the actuator is mounted in-line with the pipeline so that the valve will open when the solenoid is energized and will close when the solenoid is de-energized. (Normally closed position).

Installation is accomplished by placing the valve and actuator in the line and connecting the air supply and connecting the solenoid to the proper signal source. Air connections: double-acting or spring-return have one 1/4" NPT connection.

If it is desired to close the valve by energizing the solenoid, (normally open operation), it can be done by either of the following methods:

1. Mount the actuator across the pipeline by removing actuator from bracket, reinstall the actuator 90° from the in-line position.
OR
2. Remove actuator from bracket, remove coupling and open valve. Remove shaft from actuator by removing retaining clip. Index shaft 90°, reinstall shaft. Reinstall coupling and actuator. Secure actuator to bracket with mounting screws. Be certain retaining clip is completely seated.

CAUTION: If shaft retaining clip is not properly seated, the shaft may blowout under pressure. The clip should be solidly in its groove with the stamped numbers exposed.

NOTE: Double-acting units have a speed control screw in the solenoid block and will not function if it is screwed in all the way. The screw controls opening speed and is shipped from the factory in the full open position.

- c. Spring-return models utilize the spring to close the valve when the actuator is mounted in-line with the valve. This may be changed to spring to open by mounting the actuator as in 2.b.1 and 2.b.2 above.

On spring-return and double-acting models with solenoid, the closing speed may be controlled by installing the hexagonal nut with adjusting screw (shipped separately in envelope) on the end of the solenoid, using the instructions received with the nut.

B. OPERATION

1. The operation of the solenoid-controlled models requires energizing the solenoid for one cycle (to open or to close, depending upon mounting), and de-energizing the solenoid for the other cycle. The air pressure should be continuously maintained during use.

2. Air Flow

The A34 and B34 actuators require at least the equivalent of 10 CFM air at 100 psig in the supply lines. Minimum line size for these units is 1/4" OD tubing.

3. Air Pressure

All series 34 actuators require a minimum of 60 psig and a maximum of 125 psig clean lubricated air. (80 to 125 psig for spring-return units).

4. Air Volume (Standard Conditions) for 90° operation.

A Size – 5.09 cubic inches

B Size – 8.10 cubic inches

5. Electrical Supply (model with integral solenoid only).

The solenoid coil wattage and required amperage are as follows:

GENERAL PURPOSE SOLENOID

| Voltage | Holding Amps | Inrush Amps | Watts |
|------------------|--------------|-------------|-------|
| 24 VAC 50/60 Hz | .80 | 1.20 | 11 |
| 120 VAC 50/60 Hz | .15 | .30 | 11 |
| 240 VAC 50/60 Hz | .08 | .12 | 11 |
| 12 VDC | .70 | — | 11 |
| 24 VDC | .35 | — | 11 |

WATERTIGHT AND HAZARDOUS LOCATIONS SOLENOIDS

| Voltage | Holding Amps | Inrush Amps | Watts |
|------------------|--------------|-------------|-------|
| 24 VAC 50/60 Hz | .71 | 1.13 | 11 |
| 120 VAC 50/60 Hz | .14 | .23 | 10 |
| 240 VAC 50/60 Hz | .07 | .11 | 10 |
| 12 VDC | .81 | — | 10 |
| 24 VDC | .41 | — | 10 |

6. Ambient temperature limits: 0°F to 160°F unless high-temperature option is being used. (High-temperature option not available with solenoid.)

C. MAINTENANCE

1. During operation, the only maintenance required is periodic inspection of all fittings and fasteners for tightness.
2. If the unit fails to function, use the following checklist.
 - a. Check assembly in line:
 1. Adequate air pressure? (60 to 125 psi) (80 TO 125 psi on spring-return.)
 2. Adequate volume? (1/4" tubing minimum for supply.)
 3. Speed control screws backed off?
 4. Electricity? (Adequate voltage.)
 5. Solenoid operational? (Listen for a clicking sound.)
 6. Valve operative? (Manually)
 7. Actuator operative? (Manually)
 - b. When de-energized:

If exhausting continuously from solenoid port, replace piston or solenoid.

If exhausting continuously from block port, replace spool cartridge in block.

D. REBUILDING

CAUTION: If shaft retaining clip is not properly seated, the shaft may blowout under pressure. The clip should be solidly in its groove with the stamped numbers exposed.

Following replacement of any parts, reassembly is essentially the reverse order of the following instructions. Please note that the instructions are separated into the various subassemblies should the disassembly involve only one part of the entire actuator.

When reassembling actuator, grease pins, links, shaft, and piston with a lubricant appropriate for the temperature of the service. Petroleum jelly is suitable for most applications.

Prior to beginning disassembly, disconnect air and electrical connections and remove actuator from valve.

1. Solenoid Valve Block and Associated Parts
 - a. Unscrew solenoid assembly from valve block by turning counterclockwise. Remove O-ring from solenoid cavity in valve block.
 - b. Remove tubing assembly (if any) by loosening fittings. Remove valve block from housing by removing the two mounting screws.

- c. If spool cartridge must be removed from the block, remove snap ring first (snap ring must be replaced with stamped numbers visible, solidly seated in its groove), then the cartridge itself, noting its position, and exercising care in not damaging O-rings. Care must be taken in reinserting into the valve block to avoid damage to O-rings. Cartridges are not used on spring-return units.
2. Cylinder

Using a strap wrench, turn cylinder counterclockwise until locking wire (which will protrude through side) can be removed. Pull cylinder from the housing.
3. Housing and Linkage
 - a. Remove retaining ring and washer from top of shaft.
 - b. Deburr shaft and remove by pressing down through housing.
 - c. Remove piston links, pins and lever by pulling piston away from housing.
 - d. Links may now be lifted off pins and piston may be removed.
4. To disassemble a spring-return actuator follow instructions as in Steps 1, 2 and 3 above plus:
 - a. Remove snap ring clip and end plate from rear of cylinder assembly and remove spring assembly.
 - b. Remove spring compression bolt from inside of flange at rear of spring assembly.

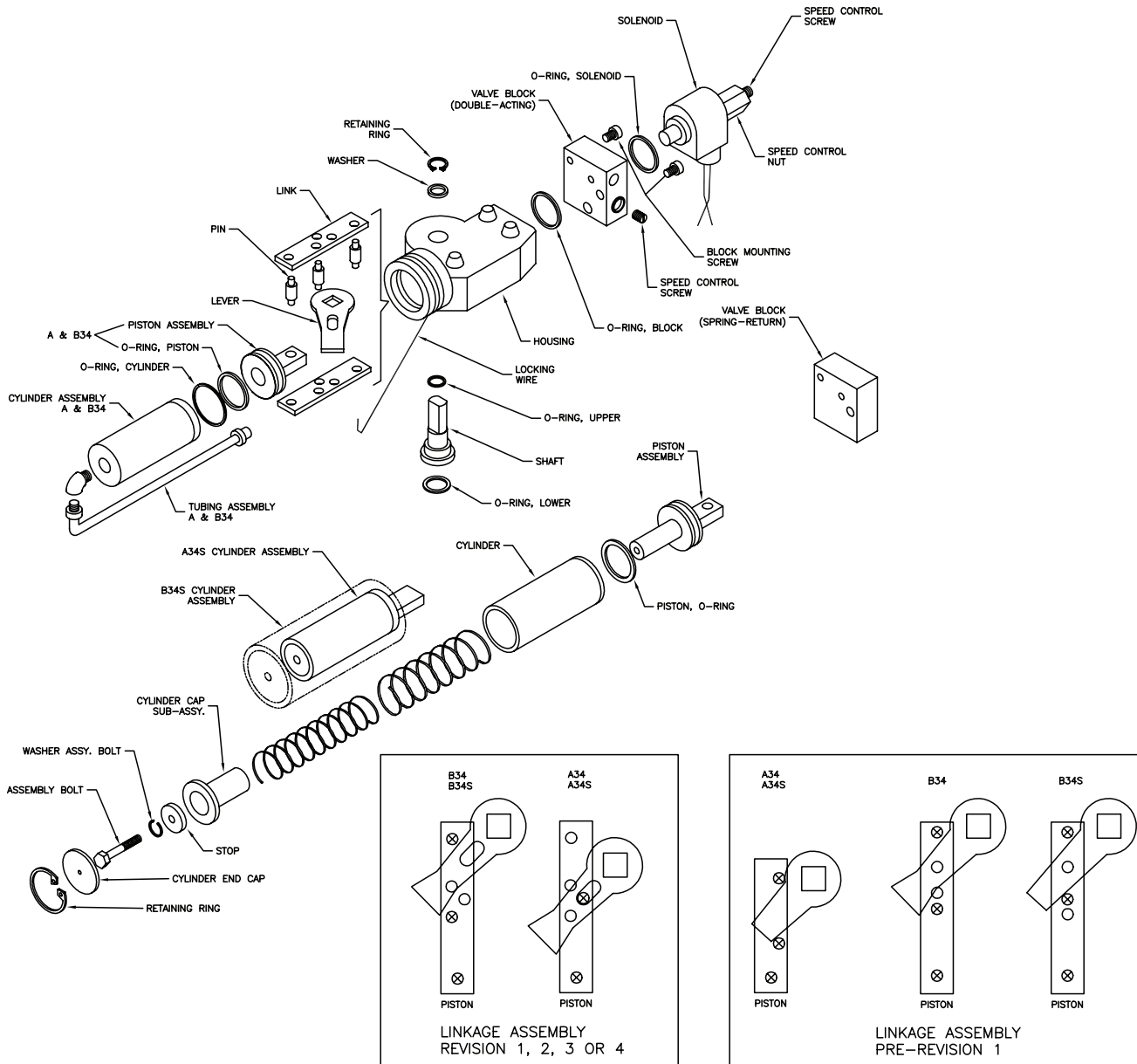
E. RECOMMENDED SPARE PARTS: REBUILDING KITS

1. The spare parts recommended for the Series 34 Actuators are contained in pre-packaged kits which are available through your Worcester Controls Distributor. When ordering repair kits, give actuator size, style and revision number.

Example: ARK34SN R1

When ordering parts, specify size and model of actuator and revision number and use the standard nomenclature shown on the accompanying exploded drawings.

Example: B34N R1 Link



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For more information about Flowserve Corporation, contact www.flowserve.com or call USA 1-800-225-6989.

FLOWERVE CORPORATION
FLOW CONTROL DIVISION
 1978 Foreman Drive
 Cookeville, Tennessee 38501 USA
 Phone: 931 432 4021
 Facsimile: 931 432 3105
www.flowserve.com