

## 2-Way & 3-Way Characterized Threaded Ball Valves

### Installation and Operation Instructions

The ball valves are equipped with non-spring return electric rotary-motion actuators of 3-wire on-off/floating or proportional control actions. The 3-wire on-off/floating actuators are available with 24, 120 or 230 V 50/60 Hz power supply while proportional actuators are available with 24 V 50/60 Hz power supply only.

The electric rotary actuators feature simplified mounting of the actuator to a direct-coupled bracket. The result is a very low profile unit with flexibility of mounting as well as fast and easy maintenance. All actuators include a manual override lever for manually positioning the valve when the actuator is not powered.

#### Optional Auxiliary Switches (On-Off/Floating Models Only)

The on-off/floating valves are available as an option with two built-in auxiliary switches that allow setting at 0° and 90° positions.

#### Feedback Signal (Proportional Models Only)

The proportional valves are provided with 0-10 VDC position feedback signal.

#### Direct Action (DA) or Reverse Action (RA)

##### Dip Switch Setting (Proportional Models Only)

DA is set for counter-clockwise (CCW) rotation when input signal increases and for clockwise (CW)

rotation when input signal decreases. The rotation is vice versa for RA setting.

#### Dip Switch Settings for Different Input Control Signals (Proportional Models Only)

Choice of 0-10 VDC, 2-10 VDC, 0-20 mA or 4-20 mA input signal can be achieved by setting switches 1 and 3 of the JP1 dip switches.

#### Input Signal Interruption Protection (Proportional Models Only)

When there is no input signal or input signal is open-circuited, the valve will return to its full closed or full open position, depending on whether the actuator is set for DA or RA action. The switch "2" setting of the JP1 dip switches determines the DA or RA action. While full closed position (0°) is for DA setting, full open position (90°) is for RA setting. The factory setting is DA.

**CAUTION:** Equipment Damage Hazard. Do not install the valve in atmospheres where explosive or corrosive vapors or escaping gases are present. This could result in damage to the unit.

**WARNING:** All valves are designed for use only in conjunction with operating controls. Where an operating control failure would result in personal injury and/or loss of property, it is the responsibility of the installer to add safety devices or alarm systems that protect against, and/or warn of, control failure.

## Run/Test Mode Operation

#### Test Mode

After power is turned on, set all dip switches of JP1 according to the above table. Firstly, set switch 4 of JP1 to "ON" position. Press STUDY/REPOSITION momentary switch SW1 once and power LED will start flickering. Actuator stem starts opening the valve until reaching its maximum stroke. When the gear chain is blocked, the actuator stem will start reversing its rotation until the valve is fully closed and the gear train is blocked again. The power LED becomes steady indicating that the test mode is finished and over. The valve stroke calibration data will be kept in the actuator's microcomputer memory and no further recalibration is required when power is turned on again.

After the test, place switch 4 to "OFF" position to put the actuator back into run mode. Note that if the

switch 4 is not placed back to its "OFF" position during the test mode, the valve assembly will still operate normally but the actuator will go through the test mode every time when power is turned on.

#### Run Mode

Every time when power is turned on, the power LED lights up steadily indicating that the actuator is now ready to act in accordance with the input signal.

#### Change of Operating Mode

If operating mode needs to be changed, change the dip switch positions of JP1 as desired and new settings will be confirmed after the STUDY/REPOSITION switch SW1 is pressed once. There is no need to turn the power off for this process to take place.

## Important Notes

**Please take the time to read these instructions. Disregarding these guidelines may adversely affect your piping components.**

Handling during transport, unpacking or installation can alter a product's performance, including connections. If torque is applied to the product during installation, dope will crack and a leak may occur. As a professional installer, please inspect, install and perform a thorough test during startup to correct any adverse handling or installation conditions that may affect the performance of the product.

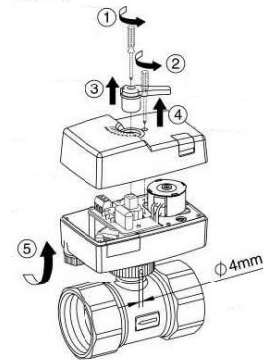
### O-Ring Replacement

Assembly must be made with care to protect the O-ring from damage during installation. Some of the more important features to ensure this are:

- Cleanliness is important for proper seal action and long O-ring life. Foreign particles like dirt, metal chips, etc. in the O-ring groove may cause leakage and damage the O-ring thus reducing its life.
- Using silicon oil or grease lubricant at assembly helps protect the O-ring from damage by abrasion, pinching or cutting. Do not use aerosol products or petroleum-based lubricants.
- Depending on the application, the O-ring should be placed in the groove or stretched over the threads.
- O-ring should not be twisted, forced or pulled over sharp corners, threads or other sharp edges.

### Fluid Compatibility

Please consult the factory for fluid compatibility other than water. Cleaning agents may adversely affect any seals or O-rings, especially if used for extended period of time.

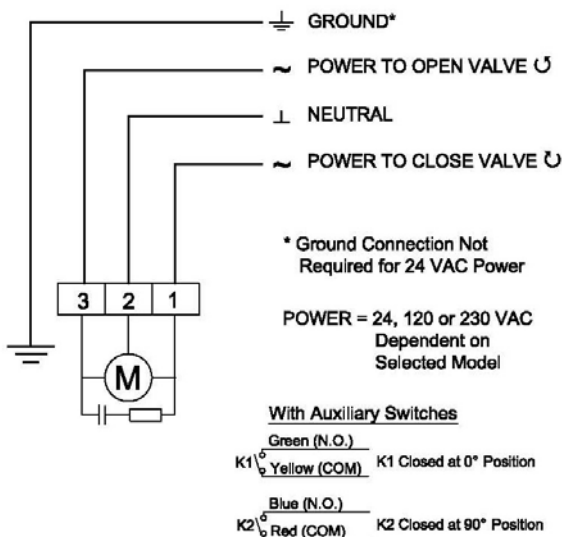


### Wiring Procedure

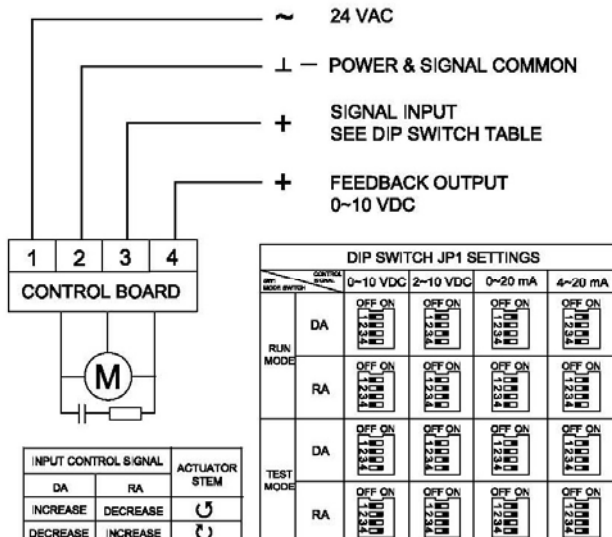
1. Press down the detach button and rotate the manual lever to one end.
2. Unscrew the lever, keeping the screw attached.
3. Remove the lever.
4. Remove the cover. Connect the wiring according to the wiring diagram.
5. Re-install cover.

## Wiring Diagrams

### For 3-Wire On-Off/Floating Actuators



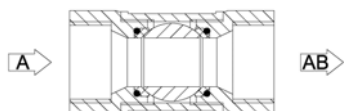
### For Proportional Actuators



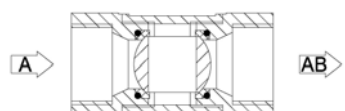
- Electrical Shock Hazard! Disconnect line-voltage power supply before and during installation to prevent electric shock and equipment damage.
- Make all connections in accordance with the wiring diagram and local electrical codes.

## Flow Directions

### 2-way Threaded Valves



A to AB Open



A to AB Closed

**Note:** 2-way valve must be installed on return side of coil.

### Actuator Removal

1. Unscrew nut counter-clockwise until free from valve body.
2. Lift up the actuator.

### Inspection

Inspect the package for damage. If package is damaged, notify the appropriate carrier immediately. If undamaged, open the package and inspect the device for obvious damage. Return damaged products.

### Manual Operating Lever

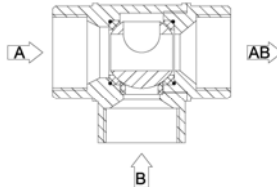
All valves are equipped with a manual operating lever which is also used as valve position indicator. Press and hold the detach button on the plastic cover and move the manual lever slowly left and right to the desired valve position.

### Valve Orientation

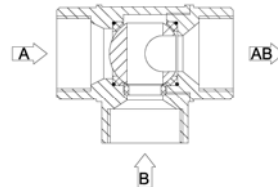
The valves can be mounted in horizontal or vertical piping. When installed in horizontal piping, the actuator can be tilted left or right but it must not be tilted below 90° from vertical.

The valve assemblies should be installed with a degree of accessibility to enable quick and economical servicing or replacement.

### 3-way Threaded Valves



A to AB Open



A to AB Closed

All 3-way valves are assembled with ball ports labeled as A, B and AB and shipped as standard with For 3-Wire On-Off/Floating Actuator  
A closed to AB at 0° clockwise or rotate counter-clockwise to open.

For 0(2)-10 VDC/4(0)-20 mA Actuator With DA Setting  
A closed to AB at 0 (2) VDC or 4 (0) mA.

### Mixing Applications:

Fluid enters through two inlets (A, B) and exits through one outlet (AB).

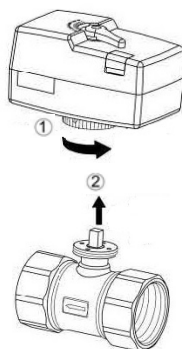
A is service port.  
B is bypass port.

### Diverting Applications (for Full-Port Valves Only):

Fluid enters through one inlet (AB) and exits through two outlets (A, B).

A is service port.  
B is bypass port.

**NOTE:** 3-way valves with characterized opening can be piped in mixing configuration only while 3-way valves with full ports can be piped in either mixing or diverting configuration.



### Valve Installation

To avoid valve cracking or breaking, clamp the wrenches on the same side of the valve body when tightening.

