



INSTALLATION, OPERATION AND
MAINTENANCE MANUAL
FOR BI-TORQ
ELECTRIC ACTUATORS

I. BASIC INSTALLATION

1. Operate valve manually and place in the open position. (NOTE: ALL ELECTRIC ACTUATORS ARE SHIPPED IN THE OPEN POSITION.)
2. Remove any mechanical stops the valve might have. (DO NOT REMOVE ANY PARTS NECESSARY FOR THE PROPER OPERATION OF THE VALVE, SUCH AS THE PACKING GLAND, PACKING NUT, ETC.)
3. Ensure that the actuator output shaft and valve stem are aligned properly. If they are not, operate the valve manually until they are correct.
4. Mount actuator to valve. Do not tighten nuts and bolts at this time.
5. Remove actuator cover.
6. Bring power to the actuator. CAUTION: Make sure power is OFF at the main box.
7. Wire the actuator per the diagram attached to the inside of the cover. Special actuators (those with positioner boards, etc.) will have diagrams enclosed inside the cover. NOTE: Actuators CANNOT be wired in parallel. AC voltage actuators use a split phase motor which internally steps up the applied 115VAC voltage and feeds it back to the off terminal (terminal 3). For example, when 115VAC power is applied at terminals 1 and 2, 230 volts will be fed back to terminal 3. This can create a problem for controllers with solid state outputs rated for less than 230VAC and it is suggested that relay outputs be used. Additionally due to this feedback, multiple actuators cannot be wired in parallel, and individual leads (isolated contacts) must be run to each actuator.
8. Securely tighten bolts used to mount the actuator to a mounting bracket or directly to the valve mounting pad if it is ISO5211 compliant.
9. Cycle the unit several times and check the open and closed positions of the valve. Cams are pre-adjusted at the factory; due to the variety of valve designs and types, however, slight adjustments might be required. (SEE II and III.)
10. Replace cover and tighten screws.

II. TO SET THE OPEN POSITION

1. Cycle the valve to the open position by applying power to terminals #1 and #2. The top cam and switch control this position. In the open position, the set screw in the top cam will be accessible.
2. If the valve is not open completely:
 - A. Slightly loosen the 8-32 x 1/4" set screw on the top cam.
 - B. Rotate the cam clockwise (CW) by hand until the switch makes contact. Contact is made when a slight click can be heard. By making incremental CW movements of the top cam, the valve can be positioned precisely in the desired position.
 - C. When the top cam is set, tighten the set screw securely.
3. If the valve opens too far:
 - A. Apply power to terminals #1 and #3. This will begin to rotate valve CW. When valve is full open and in the exact position desired, remove power from actuator.
 - B. Loosen the set screw in the top cam.
 - C. Rotate the top cam counterclockwise (CCW) until the switch arm drops off the round portion of the cam onto the flat section. A slight click can be heard as the switch changes state.
 - D. Continue applying power to terminals #1 and #3 until valve is in the desired position.

III. TO SET THE CLOSED POSITION

1. Apply power to terminals #1 and #3 to move the valve toward the closed position. The bottom cam and switch control the closed position. In the closed position, the set screw in the bottom cam will be accessible.
2. If the valve is not closed completely:
 - A. Slightly loosen the 8-32 x 1/4" set screw on the bottom cam.
 - B. Rotate the cam counter-clockwise (CCW) by hand until the switch makes contact. Contact is made when a slight click can be heard. By making incremental CCW movements of the bottom cam, the valve can be positioned precisely in the desired position.
 - C. When the top cam is set, tighten the set screw securely.
3. If the valve closes too far:
 - A. Apply power to terminals #1 and #2. This will begin to rotate valve CCW. When valve is fully closed and in the exact position desired, remove power from actuator.
 - B. Loosen the set screw in the top cam.
 - C. Rotate the top cam clockwise (CW) until the switch arm drops off the round portion of the cam onto the flat section. A slight click can be heard as the switch is no longer making contact with the round part of the cam.
 - D. Continue applying power to terminals #1 and #3 until valve is in the desired position.

IV. MAINTENANCE

Once the actuator has been properly installed, it requires no maintenance. The gear train has been permanently lubricated and in most cases will never be disturbed. In the event it becomes necessary to open the gear box for any reason, however, Shell Darina #2 grease is recommended for re-lubricating.

V. DUTY CYCLE

Most standard electric actuators are rated for 25% duty cycle at 100% ambient temperature at the rated torque.

VI. THERMAL OVERLOAD

All actuators are equipped with thermal overload protection to guard the motor against damage due to overheating.

VII. MECHANICAL OVERLOAD

All actuators are designed to withstand stall conditions. It is not recommended to subject the unit to repeated stall conditions.

VIII. SPARE PARTS

When ordering parts, please specify:

A. Model #	B. Serial #	C. Part Description
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Recommended spare parts include:

- A. Standard actuator: set of cams and switches
- B. Actuators w/positioner: set of cams and switches; 1K potentiometer; valve positioner board

IX. NEMA 7 ELECTRIC ACTUATORS

In general, operation and maintenance of a NEMA 7 electric actuator is no different that of a NEMA 4 actuator. However, some precautions must be followed:

1. DO NOT under any circumstances remove the cover of the actuator while in a hazardous location. Re

removal of the cover while in a hazardous location could cause ignition of hazardous atmospheres.

2. DO NOT under any circumstances use a NEMA 7 electric actuator in a hazardous location that does not meet the specifications for which the actuator was designed.

3. Always mount and cycle test the actuator on the valve in a non-hazardous location.

4. When removing the cover, care must be taken not to scratch, scar or deform the flame path of the cover and base of the actuator, since this will negate the NEMA rating of the enclosure.

5. When replacing the cover on actuators rated for both NEMA 4 & 7, take care that the gasket is in place to assure proper clearance after the cover is secured. After the cover screws are tightened, the clearance between the cover and the base should be checked. A .002" thick by 1/2" wide feeler gauge is used for this; it must not enter between the two mating faces more than .125"

6. All electrical connections must be in accordance with the specifications for which the unit is being used.

7. Should the unit ever require maintenance, remove from the hazardous location before attempting to work on the unit. If the actuator is in a critical application, it is advisable to have a standby unit in stock.

X. WARRANTY

AVK Carbo-Bond, Inc. warrants that for a period of twelve (12) months from the date of shipment of product it will either repair or replace, at the company's discretion, any of its products that prove to be defective in material or workmanship. The customer agrees that this warranty shall be effective so long as the goods are used solely for the normal purposes for which they are intended. This warranty does not cover damage resulting from causes such as abuse, misuse, modification or nonconformance with installation, operating and maintenance specifications. Violation of these specifications shall void this warranty and relieve the company of any obligation under this warranty.

Any implied warranties, included any implied warranty by the company or any of its representatives, are hereby excluded except as defined by this written warranty. This warranty may not be extended, altered or otherwise modified except by a written agreement specified and signed by this company. In no event shall the company be liable for special, incidental, or consequential damages arising in connection with the use of its products, or for any delay in the performance of this warranty due to causes beyond its control, including delays caused by unavailability of materials, equipment, supplies, labor, governmental regulations or acts of God.

If the customer receives any goods that are deemed to be defective, the product or products may be returned to AVK Carbo-Bond at 1N046 Linlar Drive in La Fox, IL 60147 only after receiving a return authorization from the company. Products must be returned to the factory PRE-PAID for inspection.

XI. BASIC TROUBLESHOOTING

PROBLEM	SYMPTOM	SOLUTION
ACTUATOR DOES NOT RESPOND TO SIGNAL	<ul style="list-style-type: none"> • POWER IS NOT ON • ACTUATOR IS NOT WIRED CORRECTLY • INCORRECT VOLTAGE • THERMAL OVERLOAD 	<ul style="list-style-type: none"> • TURN ON POWER • CHECK WIRING DIAGRAM AND RE-WIRE • BRING CORRECT VOLTAGE TO ACTUATOR • ALLOW MOTOR TO COOL; RE-SETS AUTOMATICALLY
ACTUATOR WILL NOT OPEN OR CLOSE COMPLETELY	<ul style="list-style-type: none"> • TRAVEL LIMIT SWITCH SET INCORRECTLY • VALVE TORQUE TOO HIGH • VALVE STOPS NOT REMOVED 	<ul style="list-style-type: none"> • SET CAMS (SEE SECTIONS II & III) • INSTALL CORRECTLY SIZED UNIT • REMOVE STOPS
VALVE OSCILLATES	<ul style="list-style-type: none"> • ACTUATOR WITHOUT BRAKE INSTALLED ON BUTTERFLY VALVE • MOTOR BRAKE MIS-ADJUSTED 	<ul style="list-style-type: none"> • INSTALL BRAKE • ADJUST BRAKE; TIGHTEN SCREW
MOTOR RUNS BUT SHAFT DOES NOT ROTATE	<ul style="list-style-type: none"> • GEAR DAMAGED OR SHEARED PIN 	<ul style="list-style-type: none"> • CONSULT FACTORY