



# **INDELAC CONTROLS, INC.**

## **ELECTRIC ACTUATORS & CONTROLS**

### **Electric Actuator Installation, Operation & Maintenance Manual**

*For Use with:  
All Standard AC Voltage Models*

*Additional supplements may be needed for selected optional equipment including, but not limited to models with: modulating controls, timers, speed controllers, remote/off/local controls, and external battery backup systems.*

REVISED: JUNE 2016

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For a digital copy of this manual, access to training videos, access to 3D product renderings,  
or to request additional support

VISIT OUR WEBSITE AT [WWW.INDELAC.COM](http://WWW.INDELAC.COM)



## INTRODUCTION:

Thank you for selecting Indelac Controls, Inc. (ICI) for your valve or damper automation requirement. We at ICI are proud of our products and feel confident they will meet or exceed your expectations of quality and reliability.

Every precaution has been taken to insure that your equipment will arrive undamaged; however, accidents do occur. Therefore, the first thing you must do upon receipt of your package is to inspect it for damage. If the box is damaged there is a possibility that the equipment inside the box may be damaged as well. If this is the case **YOU MUST FILE A CLAIM** with the delivering **CARRIER**. All shipments are **F.O.B.** our factory and it is **YOUR RESPONSIBILITY** to file a claim for damages.

## STORAGE:

If the actuators are scheduled for installation at a later date:

1. Store off the floor.
2. Store in a climate controlled building.
3. Store in a clean and dry area.

## FOR FUTURE REFERENCE RECORD:

1. Actuator model number \_\_\_\_\_
2. Actuator enclosure type NEMA 4 \_\_, NEMA 4X \_\_, NEMA 7 \_\_, NEMA 4 & 7 \_
3. Actuator output torque \_\_\_\_\_ LB-IN
4. Motor characteristics, Voltage \_\_\_\_\_ Hertz \_\_\_\_\_ Phase \_\_\_\_\_
5. Actuator serial number \_\_\_\_\_
6. Date of installation \_\_\_\_\_ Put into operation \_\_\_\_\_
7. Valve Data:
  - 7a. Manufacturer \_\_\_\_\_
  - 7b. Style & fig. No. \_\_\_\_\_
  - 7c. Size \_\_\_\_\_
  - 7d. End connection \_\_\_\_\_
  - 7e. Material of construction, Body \_\_\_\_\_ Stem & ball \_\_\_\_\_
  - 7f. Brake away torque \_\_\_\_\_ LB-IN @ \_\_\_\_\_ PSI
  - 7g. Other helpful data \_\_\_\_\_

## MEDIA:

1. System media \_\_\_\_\_
2. Temperature, \_\_\_\_\_ (deg. F.) Maximum, \_\_\_\_\_ Minimum, \_\_\_\_\_.
3. Pressure \_\_\_\_\_ PSI

\*As this information is listed it is important to pay attention to all of the actuator specifications relative to the valve specifications and system requirements. If the actuator is not properly sized for the valve and application the life will be shortened or it may not work at all.



## TOOLS REQUIRED:

***\*ADDITIONAL TOOLS WILL BE REQUIRED FOR THE SCREWS TO MOUNT THE VALVE TO THE ACTUATOR.***

### R SERIES

Cover Screws	9/64" Allen Wrench.
Terminal Strip Screws	1/8" Wide Flat Head Screwdriver.
Cam Set Screw	5/64" Allen Wrench.
Mounting Pad Screws	3/8" Socket.

### S SERIES

Cover Screws	SD, Phillips Head Screwdriver, Deep Base, 9/64 Allen Wrench, <b>NEMA 7</b> Enclosure, 7/16" Socket.
Position Indicator	5/64" Allen Wrench.
Terminal Strip Screws	1/8" Wide Flat Head Screwdriver.
Cam Set Screw	5/64" Allen Wrench.
Mounting Pad Screws	3/8" Socket.

### M SERIES

Cover Screws	5/32" Allen Wrench, <b>NEMA 7</b> Enclosure, 7/16" Socket.
Terminal Strip Screws	3/16" Wide Flat Head Screwdriver.
Cam Set Screw	5/64" Allen Wrench.
Mounting Pad Screws	1/2" Socket.

### L SERIES

Cover Screws	7/16" Socket.
Terminal Strip Screws	3/16" Wide Flat Head Screwdriver.
Cam Set Screw	5/64" Allen Wrench.
Mounting Pad Screws	9/16" Socket.

### K SERIES

Cover Screws	1/2" Socket.
Position Indicator	5/64" Allen Wrench.
Terminal Strip Screws	3/16" Wide Flat Head Screw Driver.
Cam Set Screw	5/64" Allen Wrench.
Mounting Pad Screws	3/4" Socket.



## SUGGESTED MAXIMUM TORQUE VALUES FOR FASTENERS (IN-LBS.)

SCREW SIZE	LOW CARBON STEEL	18-8 SS	316 SS	ALUMINUM
2-56	2.2	2.5	2.6	1.4
4-40	4.7	5.2	5.5	2.9
6-32	9	10	10	5
8-32	18	20	21	10
10-24	21	23	24	13
10.32	30	32	33	19
¼-20	65	75	79	45
5/16-18	129	132	138	80
3/8-16	212	236	247	143
½-13	465	517	542	313
5/8-11	1000	1110	1160	715

### INSTALLATION:

The actuator is shipped in the open position from the factory. It is important to make sure the valve and actuator are in the same position before mounting the actuator on the valve!

1. Manually open valve.
  2. Remove valve mechanical stops.
- CAUTION:** DO NOT REMOVE ANY PARTS NECESSARY FOR THE PROPER OPERATION OF THE VALVE, I.E., PACKING GLAND, GLAND NUT, ETC.
3. Check again that the valve and actuator are in the same position.
  4. Install mounting hardware on valve, do not tighten bolts securely at this time, mount actuator to valve, and once actuator screws have been started securely tighten all nuts and bolts.

**NOTE:** ACTUATOR CONDUIT ENTRY IS NORMALLY POSITIONED PERPENDICULAR TO PIPE LINE.

5. Remove actuator cover.
6. Wire actuator using the wiring diagram inside of the actuator. If there is no wiring diagram call the factory to obtain the proper wiring diagram before attempting to wire the actuator. Equipment failure due to improper wiring is not covered under the factory warranty.

**CAUTION:** BE SURE POWER IS OFF AT THE MAIN POWER BOX.

7. Turn on power to actuator.
- CAUTION:** USE EXTREME CAUTION, AS THERE ARE LIVE CIRCUITS THAT COULD CAUSE ELECTRICAL SHOCK OR DEATH.
8. Operate the valve to the close position, check the alignment & adjust cams if necessary.
  9. Operate the valve to the open position, check the alignment & adjust cams if necessary.
  10. Check to ensure that the cover gasket is properly set in its groove. If the gasket is out of the groove, manipulate it back into place with your fingers to ensure a proper seal to eliminate the ingress of water, dust, or other debris.
  11. Replace cover and secure cover screws.



## CALIBRATION:

**AFTER CHECKING THE ALIGNMENT OF THE VALVE PORT CALIBRATION MAY BE REQUIRED.**

### To Set The Open Position:

Operate valve to the open position by applying power to terminal connections #1 and #2, the valve will rotate counter clockwise, CCW, viewing top of actuator.

**NOTE: WHEN THE ACTUATOR IS IN THE OPEN POSITION THE SETSCREW SECURING THE CAM TO THE SHAFT IS EASILY ACCESSIBLE.**

1. If the valve did not open completely.
  - a. Loosen 8-32 set screw in top cam.
  - b. Rotate cam clockwise (CW) until the switch makes contact, listen carefully for a slight click. The valve will begin to rotate CCW. By making small incremental CW movements of the cam the valve can be positioned precisely in the desired position.
  - c. Securely tighten the setscrew.
2. If valve traveled too far open.

**CAUTION: VALVES WITH MECHANICAL STOPS MAY BE DAMAGED OR CAUSE DAMAGE TO THE ACTUATOR IF ALLOWED TO TRAVEL TOO FAR.**

- a. Apply power to terminal connections #1 and #3, the valve will begin to rotate CW, allow it to travel to the mid position.
- b. Follow directions of "To set open position".

### To Set The Close Position:

Operate valve to the close position by applying power to terminal connections #1 and #3, the valve will rotate CW viewing the top of the actuator.

**NOTE: WHEN THE ACTUATOR IS IN THE CLOSE POSITION THE SETSCREW SECURING THE CAM TO THE SHAFT IS EASILY ACCESSIBLE.**

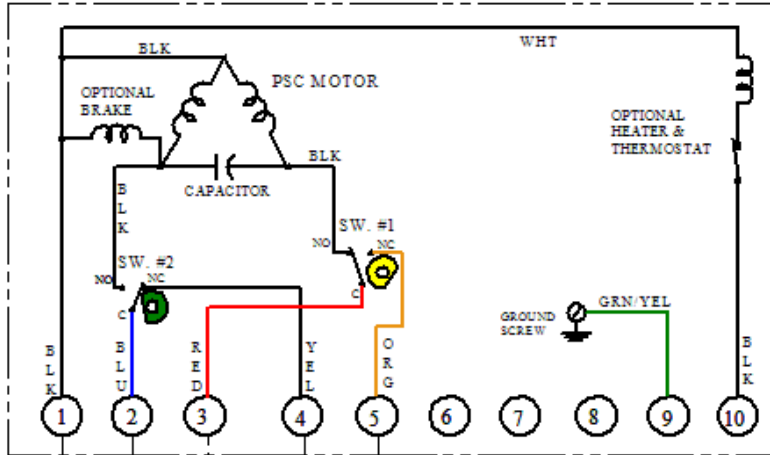
1. If valve did not close completely.
  - a. Loosen 8-32 set screw in bottom cam.
  - b. Rotate cam CCW until the switch makes contact, listen for a slight click. The valve will begin to rotate CW. By making small CCW incremental movements of the cam the valve can be positioned precisely in the close position.
  - c. Securely tighten the setscrew.
2. If the valve has traveled too far closed.

**CAUTION: VALVES WITH MECHANICAL STOPS MAY BE DAMAGED OR CAUSE DAMAGE TO THE ACTUATOR IF ALLOWED TO TRAVEL TOO FAR CLOSED.**

- a. Apply power to terminal connections #1 and #2, the valve will begin to rotate CCW, allow it to travel to the mid position.
- b. Follow directions of "To Set Close Position".

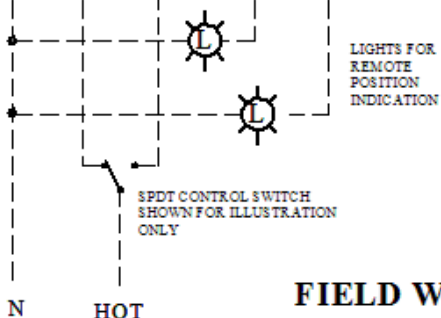
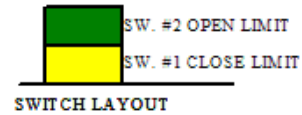


**CUSTOMER ELECTRICAL CONNECTIONS:**



MOTOR WIRING:

ACTUATOR SERIES	CLOSE	OPEN
R, SD, SR, SX, MH	BRN	RED
MR, MS, ML	RED	BRN



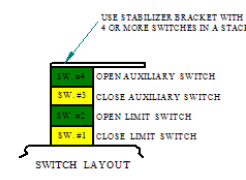
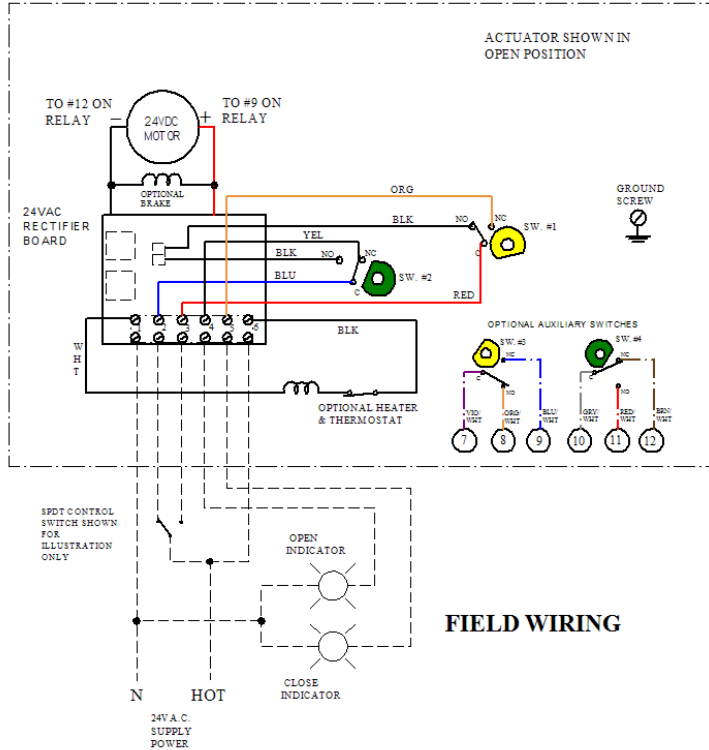
NOTES:  
 POWER TO TERMINALS ONE & TWO OPENS THE VALVE (CCW ROTATION)  
 POWER TO TERMINALS ONE & THREE CLOSES THE VALVE (CW ROTATION)  
 TERMINALS 4 & 5 ARE FOR LIGHT INDICATION

WIRING DIAGRAM ILLUSTRATES THE ACTUATOR IN THE OPEN POSITION

115/230VAC  
 SUPPLY  
 POWER

W990520

**STANDARD 115VAC ACTUATOR WIRING DIAGRAM**

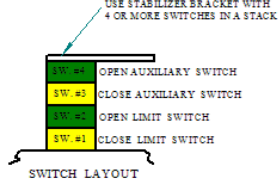
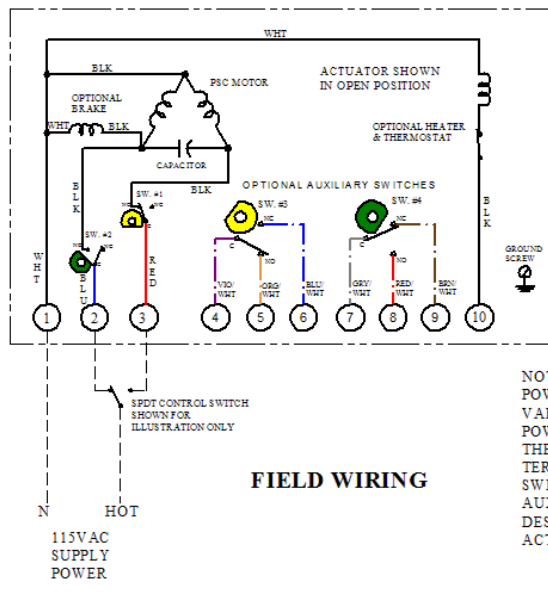


NOTES:  
 POWER TO TERMINALS ONE & TWO OPENS THE VALVE (CCW ROTATION)  
 POWER TO TERMINALS ONE & THREE CLOSSES THE VALVE (CW ROTATION)  
 TERMINALS 4 THROUGH 9 FOR AUXILIARY SWITCH CONNECTIONS.

**MOTOR WIRE RELAY CONNECTIONS:**  
 "SD" 9 SECOND UNIT & "MH" = (+) PIN 12 // (-) PIN 9  
 ALL OTHERS = (+) PIN 9 // (-) PIN 12

**W080601**

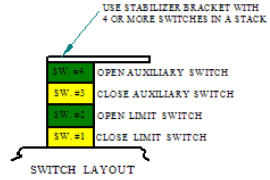
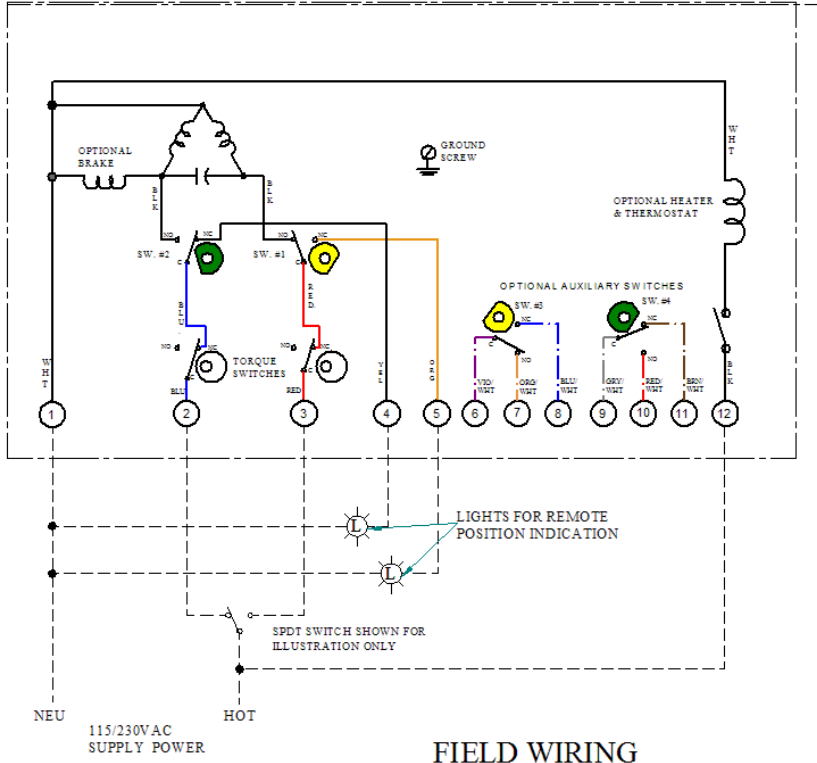
## 24VAC ACTUATOR WITH 2 AUXILIARY SWITCHES (OPTIONAL) WIRING DIAGRAM



NOTES:  
 POWER TO TERMINALS ONE & TWO OPENS THE VALVE (CCW ROTATION).  
 POWER TO TERMINALS ONE & THREE CLOSSES THE VALVE (CW ROTATION).  
 TERMINALS 4 THROUGH 9 FOR AUXILIARY SWITCH CONNECTIONS.  
 AUXILIARY SWITCHES MAY BE SET TO ANY DESIRED POSITION THROUGHOUT THE ACTUATOR TRAVEL.

**W990405**

## 115VAC ACTUATOR WITH 2 AUXILIARY SWITCHES & HEATER AND THERMOSTAT (OPTIONAL) WIRING DIAGRAM



NOTES:  
 POWER TO TERMINALS ONE & TWO OPENS THE VALVE (CCW ROTATION)  
 POWER TO TERMINALS ONE & THREE CLOSES THE VALVE (CW ROTATION)  
 TERMINALS 4 & 5 FOR LIGHT INDICATION  
 TERMINALS 6 THROUGH 11 FOR AUXILIARY SWITCHES & TERMINAL 12 FOR HEATER & THERMOSTAT.

WIRING DIAGRAM SHOWS THE ACTUATOR IN THE OPEN POSITION

W091125

# 115VAC K SERIES ACTUATOR WITH 2 AUXILIARY SWITCHES (OPTIONAL) & STANDARD MECHANICAL TORQUE SWITCHES WIRING DIAGRAM





## MAINTENANCE:

After your ICI electric actuator has been properly installed there is little or no maintenance ever required. The gear train has been permanently lubricated at the factory and requires no routine maintenance. In the event it becomes necessary to perform maintenance on the actuator upon reassembling, we recommend using Lubriplate EMB grease.

## SET AUXILIARY SWITCHES:

### TOOLS REQUIRED:

- |                   |   |                           |
|-------------------|---|---------------------------|
| 1. COVER REMOVAL  | - | PHILLIPS HEAD SCREWDRIVER |
| 2. CAM ADJUSTMENT | - | 5/64" ALLEN WRENCH        |

### NOTE:

*Read these instructions completely before beginning installation, if you have any questions please call our service technician at 1-800-662-9424 for assistance.*

1. Turn off power supply to actuator.
  2. Remove screws securing cover to gearbox, remove cover.
  3. Turn on power to actuator.
- CAUTION: At this time there are live circuits in the actuator; contact may cause electrical shock or death.**
4. Operate actuator to the close position.
  5. Rotate the third cam up from the base CCW so the setscrew is accessible and the round of the cam has switch arm compressed.
  6. Rotate the cam CW until the switch snap from the NO to the NC contact & switch arm moves away from switch body.
  7. Lock cam in position by securing 8-32 x 1/4" long set screw to shaft.
  8. Operate actuator to the open position.
  9. Rotate top cam CW so set screw is accessible and round of cam has switch arm compressed.
  10. Rotate top cam CCW until the switch snaps from the NO to the NC contact & switch arm moves away from switch body.
  11. Lock cam in position by securing 8-32 x 1/4" long set screw to shaft.
  12. Test setting to assure proper operation using DNM for proper switch closure.
  13. If desired setting has not been achieved repeat steps 2 through 11.
  14. Once proper settings have been accomplished replace cover and secure cover screws.

## CHECK POWER OFF BRAKE:

### TOOLS REQUIRED:

1. 5/32" ALLEN WRENCH
2. 3/16" WIDE FLAT SCREWDRIVER
3. 0.050 ALLEN WRENCH
4. PHILLIPS HEAD SCREWDRIVER (COVER REMOVAL: SD SERIES).

1. Turn off supply power to actuator.
2. Remove screws securing cover to gearbox, remove cover.
3. Using .050 Allen wrench loosen setscrew in brake armature hub to motor shaft.
4. Pull up center hub to remove from brake & motor shaft.

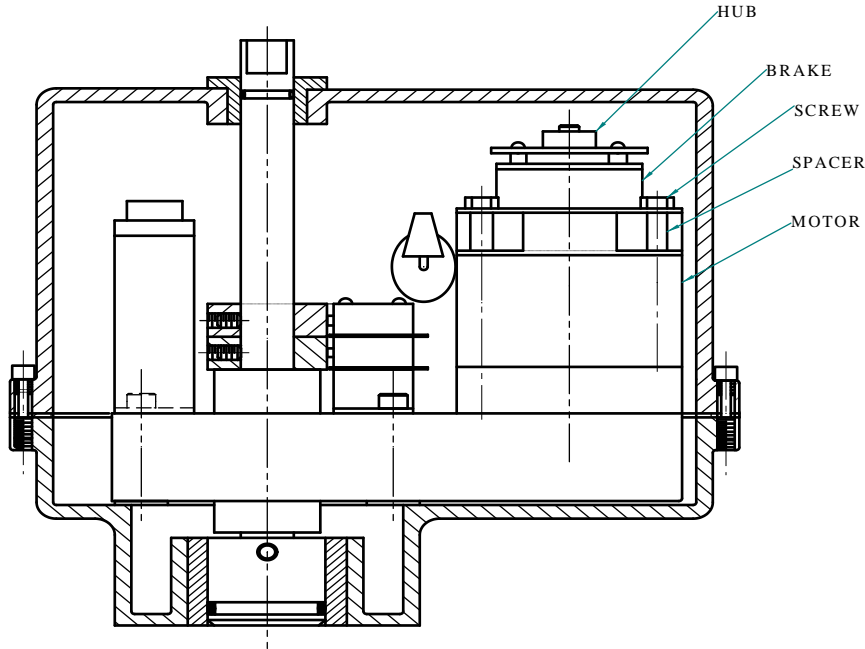


FIG. 1

5. Apply power to terminals #1 and #2, actuator should rotate to the open position.
6. Apply power to terminals #1 and #3, actuator should rotate to the close position.
7. If actuator runs, brake is bad and should be replaced.

### **DUTY CYCLE:**

ICI actuators rated 100 LB-IN up to 1500 LB-IN output torque are rated for 25% duty cycle at 100% ambient temperature at rated torque (75% duty cycle motors are available upon request). Actuators rated for 2000 LB-IN output torque and greater are rated for continuous duty. All direct current (dc) motors are rated for 75% duty cycle.

### **THERMAL OVER LOAD:**

All alternating current (AC) motors are equipped with thermal over load protection to guard the motor against damage from overheating.

### **MECHANICAL OVER LOAD:**

ICI' actuators are all designed to withstand stall conditions. It is not recommended to subject the unit to repeated stall conditions; however, should it occur the actuator would not experience gear damage.



## ORDERING PARTS:

When ordering parts please specify:

- Actuator Model Number
- Actuator Serial Number
- Part Number
- Part Description

## RECOMMENDED SPARE PARTS:

Set of cams and switches.

## NEMA 7 ENCLOSURE, GENERAL:

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

1. **DO NOT** install in ambient temperatures that exceed **140 degrees F**.
2. **DO NOT** under any circumstances **remove the actuator cover** while in a hazardous location when the contacts are still live, this could cause ignition of hazardous atmospheres.
3. **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**. The actuator is clearly tagged with the NEMA classification it was designed for.
4. Mount, test and calibrate actuator on valve in non-hazardous location.
5. When removing the cover care must be taken not to scratch, scar or deform the flame path of the cover or base of the actuator, this will negate the NEMA 7 rating of the enclosure.
6. When replacing the cover on actuators rated NEMA 4 and 7 take care that the gasket is in place to assure the proper clearance after the cover is secured. After securing the cover screws check the clearance between the cover and the base, a .002" thick by 1/2" wide feeler gauge may not enter between the two mating faces more than .125".
7. All electrical connections must be to state and local codes and in accordance with the specifications for which the unit is being used.

*\*After proper installation the actuator will require little or no maintenance. In the event maintenance is required remove it from the hazardous location before attempting to work on it. If the actuator is in a critical application and down time is not permitted it is advisable to have a spare actuator in stock.*



**INDELAC CONTROLS INC.**   
**AMERICAN MADE ACTUATORS & CONTROLS**



**INDELAC 1-YEAR STANDARD WARRANTY POLICY:**

INDELAC CONTROLS, INC. (ICI) WARRANTS THAT FOR A PERIOD OF **1 YEAR** FROM THE DATE OF SHIPMENT IT WILL EITHER REPAIR OR REPLACE, AT ITS OPTION, ANY OF ITS PRODUCTS, WHICH PROVE TO BE DEFECTIVE IN MATERIAL OR WORKMANSHIP.

THIS WARRANTY DOES NOT COVER DAMAGE RESULTING FROM CAUSES SUCH AS ABUSE, MISUSE, MODIFICATION OR TAMPERING.

THIS WARRANTY IS EXTENDED ONLY TO THE REGISTERED PARTY, FOR WHICH THE PRODUCT SERIAL NUMBER MATCHES. THE EXTENDED WARRANTY OF ICI'S PRODUCT AND IS NOT TRANSFERABLE.

TO OBTAIN SERVICE UNDER THIS WARRANTY, THE PURCHASER MUST FIRST OBTAIN A RETURN AUTHORIZATION NUMBER FROM ICI. PRODUCTS MUST BE RETURNED TO ICI FREIGHT PREPAID FOR EVALUATION.

IF THE UNIT FAILED DUE TO POOR WORKMANSHIP OR MATERIALS THE UNIT WILL BE REPAIRED OR REPLACED. THE UNIT WILL BE RETURNED GROUND/STANDARD FREIGHT PAID BY ICI, IF AIR/RUSH SHIPMENT IS REQUESTED THE PURCHASER SHALL PAY THE DIFFERENCE.

THIS WARRANTY IS IN LIEU OF ALL OTHER OBLIGATIONS, LIABILITIES OR EXPRESSED WARRANTIES. ANY IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY ARE HEREBY EXPRESSLY EXCLUDED.

IN NO EVENT SHALL ICI 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.

6810 POWERLINE DR. - FLORENCE, KY. 41042 - TELEPHONE 859-727-7890, TOLL FREE 1-800-662-9424  
FAX. 859-727-4070, E-MAIL: [DVOGES@INDELAC.COM](mailto:DVOGES@INDELAC.COM), OR [MROBINSON@INDELAC.COM](mailto:MROBINSON@INDELAC.COM)  
VISIT OUR WEBSITE AT [WWW.INDELAC.COM](http://WWW.INDELAC.COM)

**REGISTER ONLINE FOR INDELAC'S EXTENDED 2-YEAR WARRANTY**

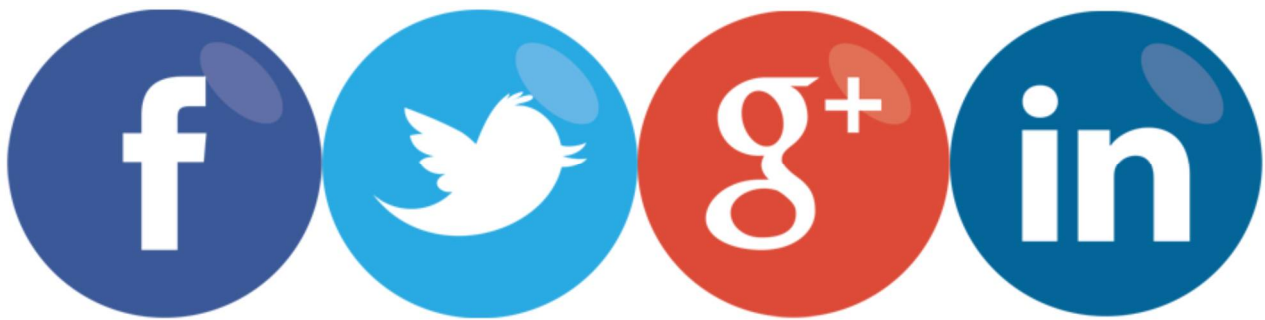


## Frequently Asked Questions

SYMPTOM	PROBLEM	SOLUTION
<b>ACTUATOR DOES NOT RESPOND TO CONTROL SIGNAL.</b>	Power not on Actuator wired wrong Wrong voltage  Thermal overload activated  Actuator and valve in opposite positions when actuator was mounted.  Torque trip point set too low  Torque trip delay set too short  Bad Brake	Turn on power Check wiring diagram & rewire Check power supply & make appropriate changes Allow motor to cool, actuator will automatically reset Remove actuator and rotate 90 degrees & remount  Increase trip point  Increase delay time  Remove brake hub & try to run
<b>ACTUATOR WILL NOT OPEN OR CLOSE COMPLETELY.</b>	Travel limits set wrong Valve torque too high for actuator Mechanical stops not removed  Torque trip point set too low  Torque trip delay set too short	Reset cams. Install correct size actuator. Remove stops, CAUTION: Do not remove any part required for proper operation  Increase trip point  Increase delay time
<b>VALVE OSCILLATES.</b>	Valve torque too high for actuator Actuator without brake installed on butterfly valve Motor brake out of adjustment. Set screw loose in brake disc	Install correct size actuator.  Install brake Adjust brake Adjust brake and tighten set-screw
<b>MOTOR RUNS BUT OUTPUT SHAFT DOES NOT ROTATE.</b>	Gear damage or sheared pin	Contact ICI or nearest distributor







### Contact Information

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Talbot Caywood	<a href="mailto:tcaywood@indelac.com">tcaywood@indelac.com</a>	859-727-7890 ext. 110

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