

***ICI* Indelac Controls, Inc.**

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Hazardous Duty Electric Actuator  
Installation, Operation &  
Maintenance Manual

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**INTRODUCTION:**

Thank you for selecting Indelac Controls, Inc. (ICI) for your valve or damper automation application. 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 has been 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.

At this time ICI strongly recommends that the valve and actuator specifications be reviewed to assure that you have received the correct components for your application. It is important to pay attention to all of the specifications relative to the valve, actuator and system requirements. If the actuator is not properly sized for the valve and application the life will be shortened or it may not operate at all. If the actuator enclosure is not suitable for the hazardous area it will be used in **DO NOT USE IT THAT AREA** using the actuator in an area it is not suitable for may cause property damage or death.

**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 enclosure NEMA TYPE 7 Class I Groups C & D, Class II Groups E, F & G Div. 1 & 2
2. Maximum operating temperature this actuator may be used in is 140 degrees F.
3. Date of installation \_\_\_\_\_ Date put into operation \_\_\_\_\_

**VALVE DATA:**

Manufacturer \_\_\_\_\_

Style & fig. No. \_\_\_\_\_

Size \_\_\_\_\_ End Connection \_\_\_\_\_

Material of construction, Body \_\_\_\_\_ Stem & ball \_\_\_\_\_

Break away torque \_\_\_\_\_ LB-IN @ \_\_\_\_\_ PSI

Other helpful data \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**MEDIA:**

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

## **TOOLS REQUIRED:**

### **S series**

Cover screws	7/16" socket.
Position indicator	5/64" Allen wrench.
Terminal strip screws	1/8" wide flat head screw driver.
Cam setscrew	5/64" Allen wrench.
Mounting pad screws	3/8" socket.

### **M series**

Cover screws	7/16" socket.
Terminal strip screws	1/8" wide flat head screw driver.
Cam setscrew	5/64" Allen wrench.
Mounting pad screws	1/2" socket.

Additional tools will be required for the screws to mount the valve to the actuator.

## **SPECIFICATIONS:**

Model Code	Voltage	Current Amps	Torque Lb-In	Cycle Time	Duty Cycle	TEMP.	Class/Groups/Div.
M	12Vdc	2.5	675	15	25%	140 F.	CL. I GRP. C & D
	115Vac/1Ph	1.0	675	15	25%	140 F.	CL. II GRP. E, F & G Div. 1 & 2
S	12Vdc	2.5	200	5	25%	140 F.	CL. I GRP. C & D
	115Vac/1ph	1.0	200	5	25%	140 F.	CL. II GRP. E, F & G Div. 1 & 2
S	12Vdc	2.5	300	5	25%	140 F.	CL. I GRP. C & D
	115Vac/1ph	1.0	300	5	25%	140 F.	CL. II GRP. E, F & G Div. 1 & 2

**CAUTION!** To prevent ignition of hazardous atmospheres do not remove cover while circuits are live. Do not install in ambient temperatures exceeding 140 F.

**WARNING!** To prevent ignition of hazardous atmospheres conduit runs must have a sealing fitting within 18" of this enclosure.

## **INSTALLATION:**

The actuator is shipped in the open position from the factory; it is **imperative** to make sure the valve and actuator are in the same position before mounting the actuator on the valve. As this is a hazardous duty actuator installation and calibration must be performed in a safe environment. During field installation all power to the actuator must be off and may not be turned on until the actuator cover is replaced and secured in position.

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, 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.  
**CAUTION:** Be sure power is off at the main power box.
6. Wire actuator using the wiring diagram inside cover (typical two position wiring diagram on page 5).
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.
9. Operate the valve to the open position, check the alignment.
10. Replace cover and secure cover screws.

### **CALIBRATION:**

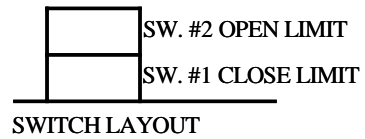
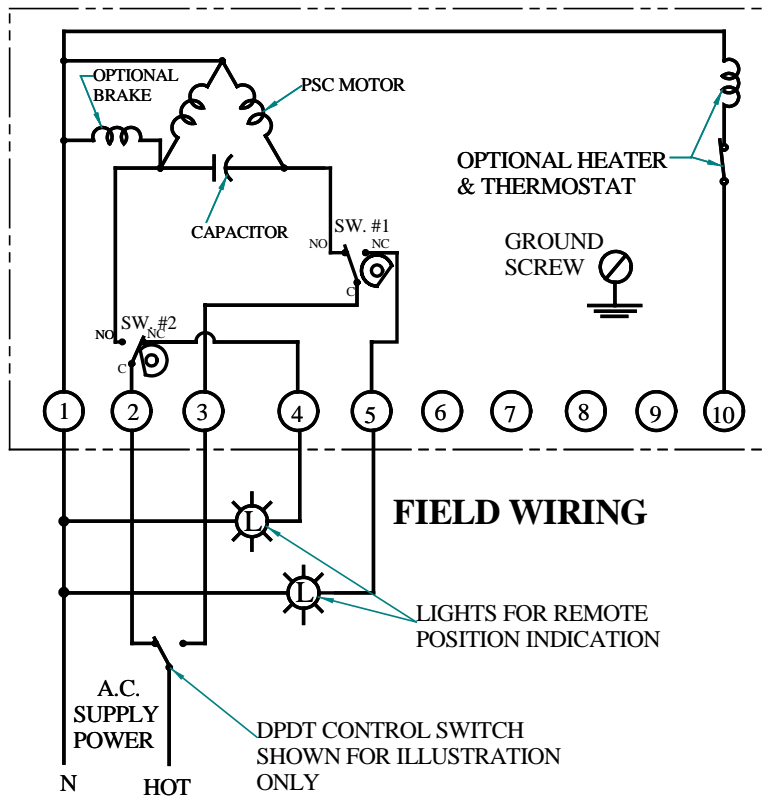
After checking the alignment of the valve port calibration may be required.

#### **To set the open position:**

1. Operate valve to the open position by applying power to terminal connections #1 and #2 (see wiring diagram on page 5), 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 will be easily accessible.
  - 1a. If valve did not open completely;
    - 1aa. Loosen 8-32 set screw in top cam.
    - 2aa. 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.
    - 3aa. Securely tighten the setscrew.
  - 1b. If valve traveled too far.  
**CAUTION:** Valves with mechanical stops may be damaged or cause damage to the actuator if allowed to travel too far.
    - 1bb. Apply power to terminal connections #1 and #3, the valve will begin to rotate CW, allow it to travel to the mid position.
    - 2bb. Follow directions in 1a of “To set open position”.

#### **To set close position:**

1. Operate valve to the close position by applying power to terminal connections #1 and #3 (see wiring diagram on page 5), the valve will rotate CW viewing the top of the actuator.  
**NOTE:** When the actuator is in the close position the setscrew securing the close cam to the shaft will be easily accessible.
  - 1a. If valve did not close completely;
    - 1aa. Loosen 8-32 set screw in bottom cam.
    - 2aa. 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.
    - 3aa. Securely tighten the setscrew.
  - 1b. 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.
    - 1bb. Apply power to terminal connection #1 and #2, the valve will begin to rotate CCW, allow to rotate to the mid position.
    - 2bb. Follow directions in 1a. of “To set close position”.



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

WIRING DIAGRAM FOR STANDARD 1PH/60Hz/AC ELECTRIC ACTUATOR ILLUSTRATING OPTIONAL HEATER, THERMOSTAT & BRAKE.

DWG. #990520

**MAINTENANCE:**

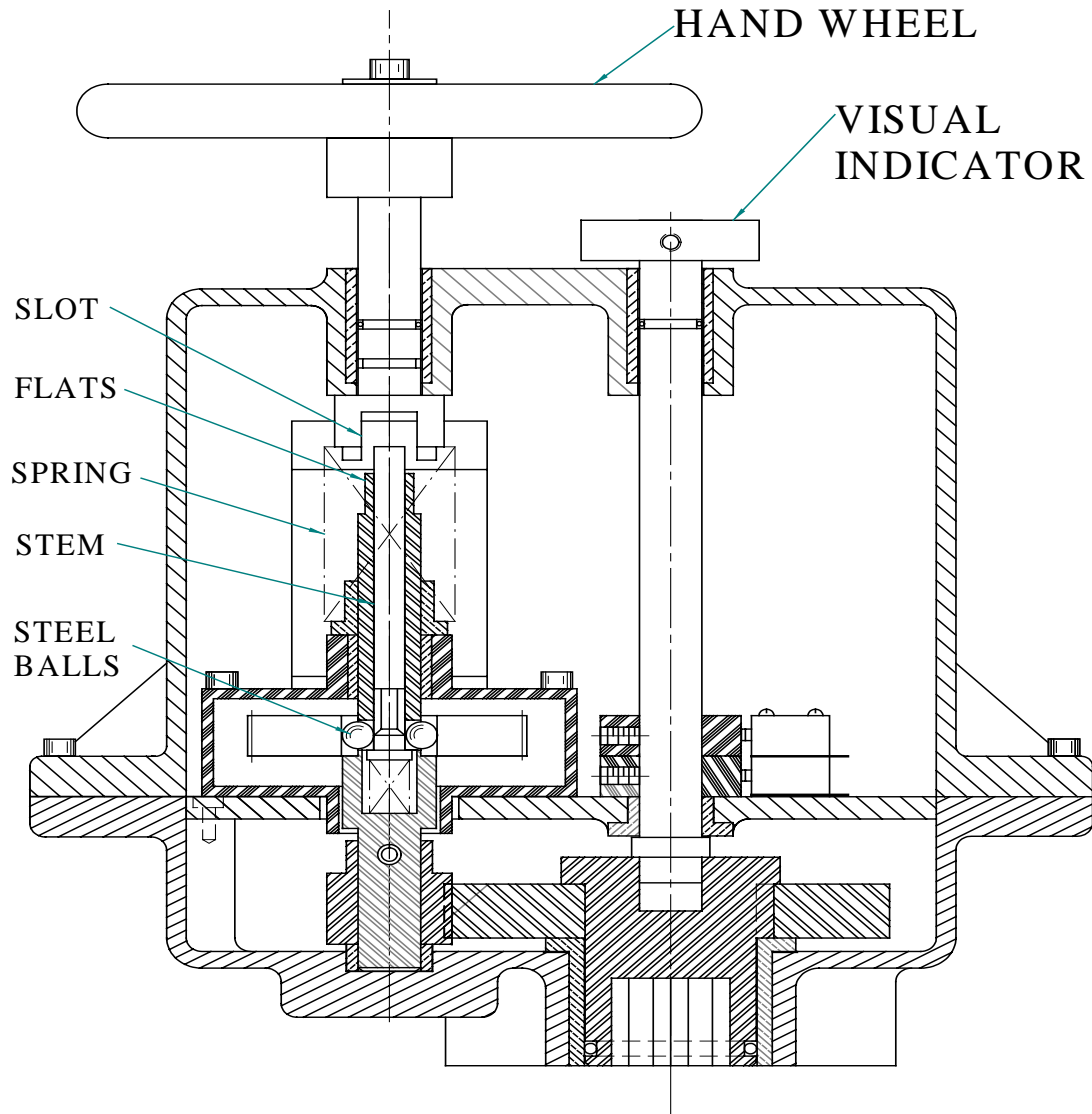
After your ICI electric actuator has been properly installed there is little or no maintenance required. The gear train has been permanently lubricated at the factory and requires no routine maintenance. In the event it becomes necessary to perform maintenance on the actuator:

- Turn off power to the actuator before removing the cover.
- Place a lock out pad on the power source.
- Upon assembly we recommend lubrication using Lubriplate EMB grease.
- Calibrate before placing back into hazardous location.
- Rewire actuator before removing lock out pad.
- Remove lock out pad after cover is replaced and secured.

## MANUAL OVER RIDE OPERATION INSTRUCTIONS

1. PUSH HAND WHEEL DOWN
2. ROTATE TO ALIGN SLOT WITH FLATS
3. PUSH DOWN A 2ND. TIME TO DISENGAGE GEAR TRAIN
4. ROTATE HAND WHEEL CLOCKWISE TO GO TO OPEN OR COUNTER  
CLOCKWISE TO GO TO CLOSE.

NOTE: ACTUATOR DOES NOT HAVE MECHANICAL STOPS DO NOT ROTATE PAST OPEN OR CLOSE POSITION, USE VISUAL INDICATOR TO POSITION ACTUATOR.



CROSS SECTION DRAWING FOR M SERIES NEMA TYPE 7  
ENCLOSURE FOR CLASS I GROUPS C & D, CLASS II GROUPS E, F &  
G DIV. 1 & 2 WITH DECLUTCHING MANUAL OVER RIDE

Manual over ride and visual indicator are optional equipment and must be specified at time of order.

### **DUTY CYCLE:**

ICI hazardous location actuators are rated at 25% duty cycle at 100% ambient temperature at rated torque.

### **THERMAL OVER LOAD:**

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

### **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 and Part description.

### **RECOMMENDED SPARE PARTS:**

**Two Position Actuators:**

Set of cams and switches.

**Modulating Actuators:**

Set of cams, switches, feedback potentiometer and a positioner card.

### **CAUTION, HAZARDOUS LOCATION:**

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 temperature exceeding 140 degrees F.
2. **DO NOT** under any circumstances remove the actuator cover while in a hazardous location, 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 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 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.

### **WARRANTY:**

Indelac Controls, Inc. (ICI) warrants that for a period of twelve months 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 immediate purchaser 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 freight paid by ICI, if air 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.

**TROUBLE SHOOTING:**

<b>SYMPTOM</b>	<b>PROBLEM</b>	<b>SOLUTION</b>
Actuator does not respond to control signal.	Power not on. Actuator wired wrong . Wrong voltage.  Thermal overload activated.  Actuator and valve in opposite positions when actuator was mounted. Motor Lamination Bind (1500 lb-in below)	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. Remove cover and gently tap square motor on all four sides to align laminations.
Actuator will not open or close completely.	Travel limits set wrong. Valve torque too high for actuator. Mechanical stops not removed.	Reset cams, see Pgs. 3 & 4. Install correct size actuator. Remove stops, CAUTION: Do not remove any part required for proper operation.
Valve oscillates.	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.
Motor runs but output shaft does not rotate.	Gear damage or sheared pin.	Contact ICI or nearest distributor.

ICIACMA1, 2-1-03  
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Rev. 2, 10-10-2003  
Rev .3, 11-12-2003  
Rev. 4, 1-28-2004  
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