

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

**Installation, Operation &
Maintenance Manual For
Electric Spring Return Actuator**



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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 arrives undamaged, however accidents do occur. Therefore the first thing you should do upon receipt of your package is to inspect the box 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, _____ deg. F. 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. The actuator that has been supplied is an electric spring return actuator, it is not intended to be used to control flow in any manner what so ever.

ABOUT ELECTRIC SPRING RETURN ACTUATORS:

ICI's electric spring return actuators are fail-safe actuators designed to prevent catastrophic loss of system media or production caused by a sudden loss of electricity. They are not designed for control applications. When used in the manner for which they were designed they will deliver years of protection for your system. Please read these instructions completely before installing and using your new ICI electric spring return actuator.

INSTALLATION:

The actuator is shipped in the DESIGNATED FAIL position from the factory; make sure the valve and actuator are in the same position before mounting.

1. Manually position valve to the designated fail position, if the actuator is to fail close on loss of power, the valve must be in the closed position when mounting the actuator.
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, mount actuator to valve securely tighten all bolts and screws once actuator screws have been started. **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.
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:

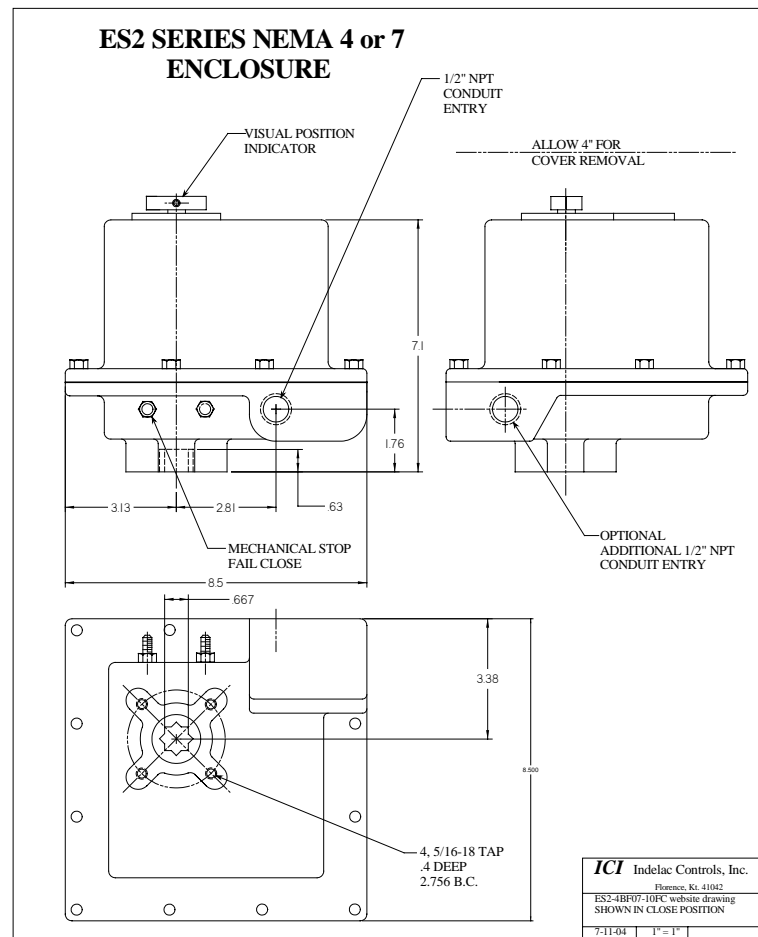
After checking the alignment of the valve port calibration may be required;

To set the open position:

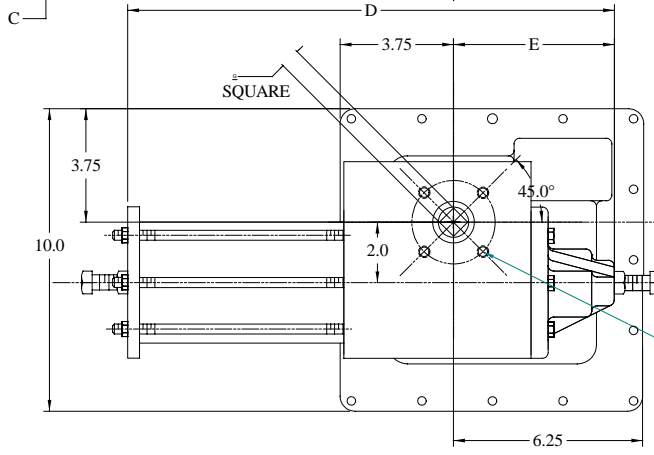
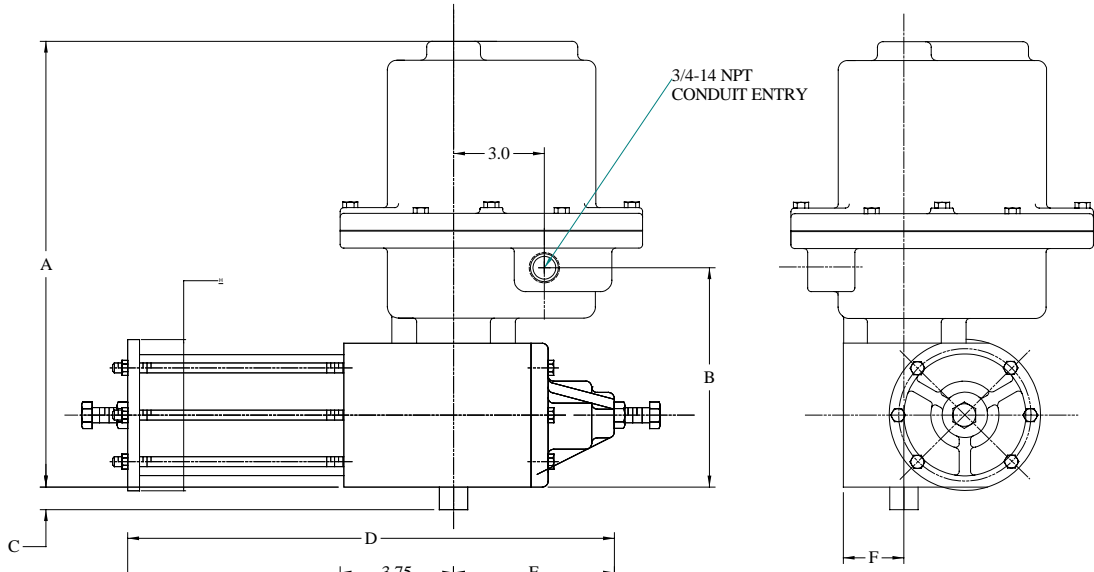
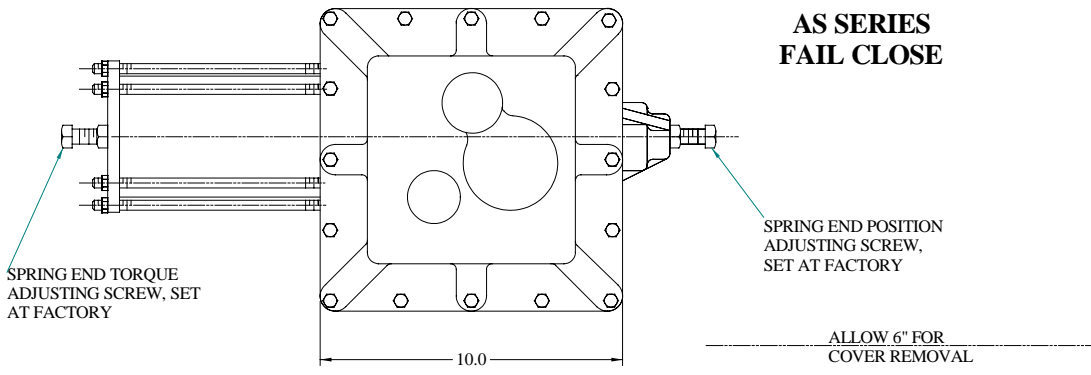
1. If the open position is the designated fail position loosen the jam nut on the mechanical stop and back the stop out. Operate valve to the open position by applying power to terminal connections #1 and #2, the valve will rotate counter clockwise (CCW) viewing top of actuator. **NOTE:** When the actuator is in the open position the setscrew securing the open 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".
 - 2b. After the position is set and if open is the designated fail position rotate the adjusting screw clockwise until the screw touches the mechanical stop then rotate it counter clockwise one full turn and lock the jam nut so the adjusting screw remains in position. By doing this the mechanical stop never comes in contact with the adjusting screw except upon loss of power.

To set close position:

1. If the close position is the designated fail position loosen the jam nut on the mechanical stop and back the stop out. 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 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 incremental movements 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 terminals 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”.
 - 2b. After the position is set and if close is the designated fail position rotate the adjusting screw clockwise until the screw touches the mechanical stop then rotate it counter clockwise one full turn and lock the jam nut so the adjusting screw remains in position. By doing this the mechanical stop never comes in contact with the adjusting screw except upon loss of power.



**AS SERIES
FAIL CLOSE**

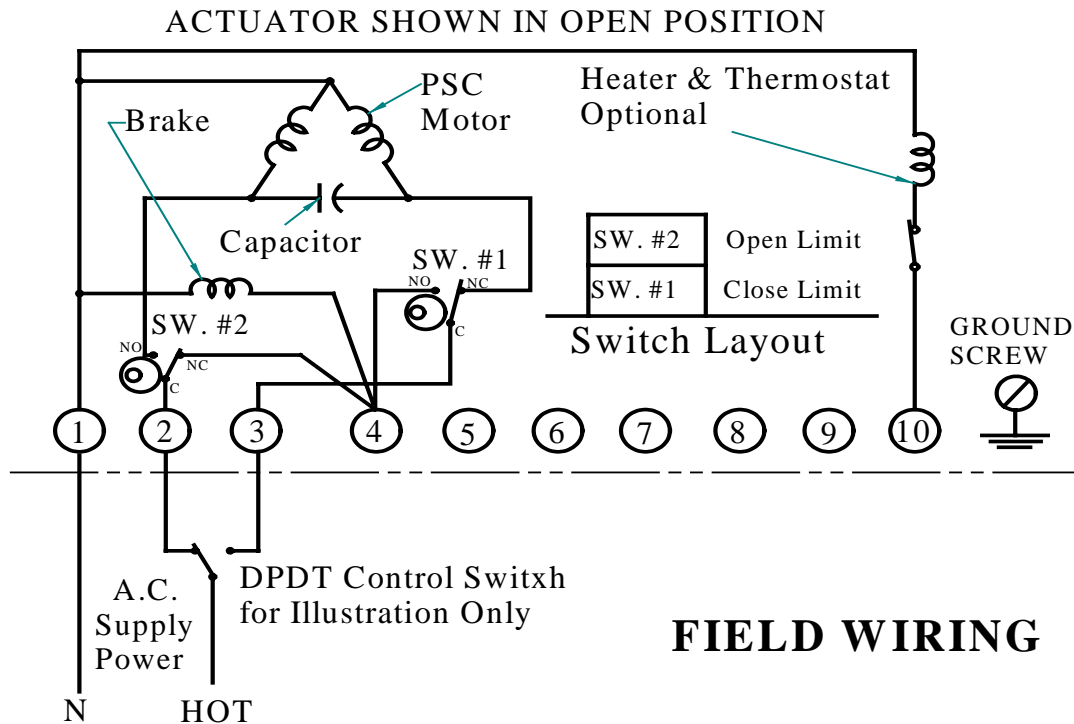


DIMENSIONS IN INCHES

MODEL	A	B	C	D	E	F	G	H
AS4 & 6	14.69	4.69	.75	15.66	5.06	2.0	.660	5.0
AS10	15.06	4.88	1.0	17.0	5.88	2.5	1.00	6.0

AS4 & 6.....4, 5/16-18 X 5/8" DP., 2.756 B.C.
 AS10.....4, 1/2-13 X 5/8" DP., 4.010 B.C.

IC Indelac Controls, Inc.
 Florence, Ky. 41042
 AS SERIES ELECTRIC SPRING
 RETURN ACTUATOR
 7-19-2004 1" = 1"
 JLR 071904A



NOTES:

- Power to 1 & 2 opens the valve (CCW Rotation)
- Power to 1 & 3 closes the valve (CW Rotation)

Loss of power causes actuator to drive to the fail position. With the return of power the actuator will travel to the position designated by the control switch.

DO NOT power actuator into mechanical stops, OUTPUT PINION WILL BE DAMAGED.

TYPICAL WIRING DIAGRAM

DUTY CYCLE:

ICI spring return actuators motors 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:

STALL LOAD All ICI actuators are designed to with stand stall conditions. It is not recommended to subject the unit to repeated stall conditions, as the gears will eventually fail.

SHOCK LOAD Shock loads shorten gear life dramatically. To prevent premature gear failure the actuator must be powered to the open and close position, allowing the spring to take over only in the event of a power failure.

NEMA 7 ENCLOSURE:

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** under any circumstances remove the cover to the actuator while in a hazardous location, this 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. The actuator is clearly tagged with the NEMA classification it was designed for.
3. Mount, test and calibrate actuator on valve in non-hazardous location.
4. 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.
5. 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".
6. All electrical connections must be to state and local codes and in accordance with the specifications for which the unit is being used.

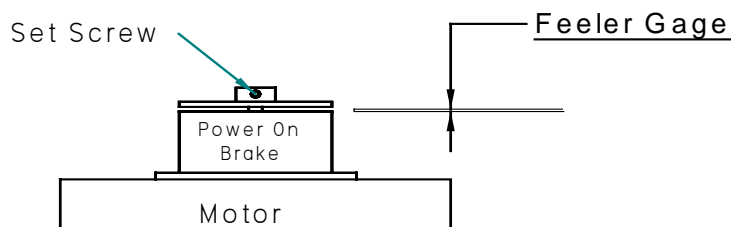
After proper installation your ICI actuator will require little or no maintenance. In the event the unit requires some type of maintenance remove it from the hazardous location before attempting to work on it. If the actuator is in a critical application and down time is not permitted it may be advisable to have a spare actuator in stock.

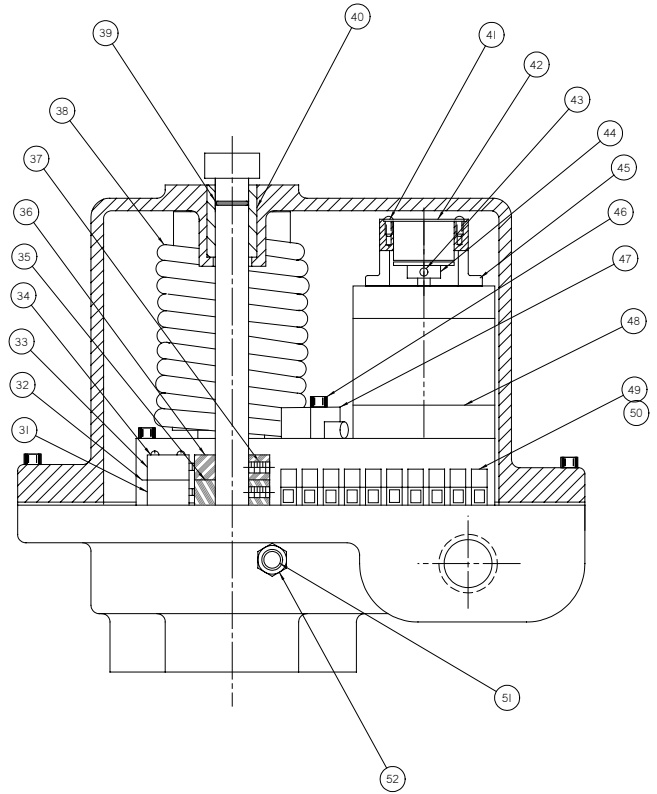
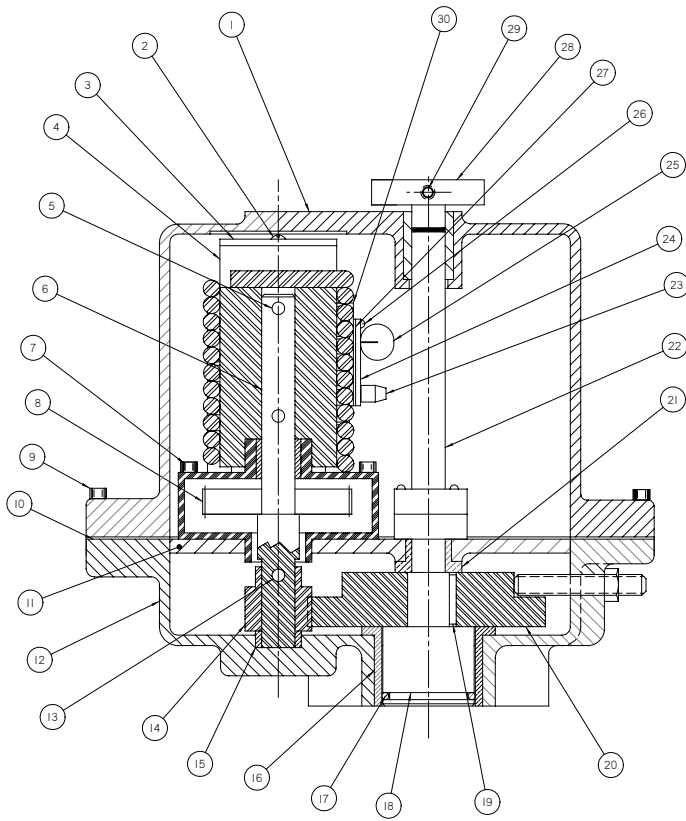
MAINTENANCE:

After your ICI spring return 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 Shell Darina #2 grease.

TO SET BRAKE:

If it is ever becomes necessary to set the brake 1) using a .050" Allen wrench loosen the two setscrews in the brake disk hub, 2) using a feeler gage set the gap between the disk and stationary coil & field assembly to .015" +/- 0.005", 3) secure the 2 set screws in the hub.

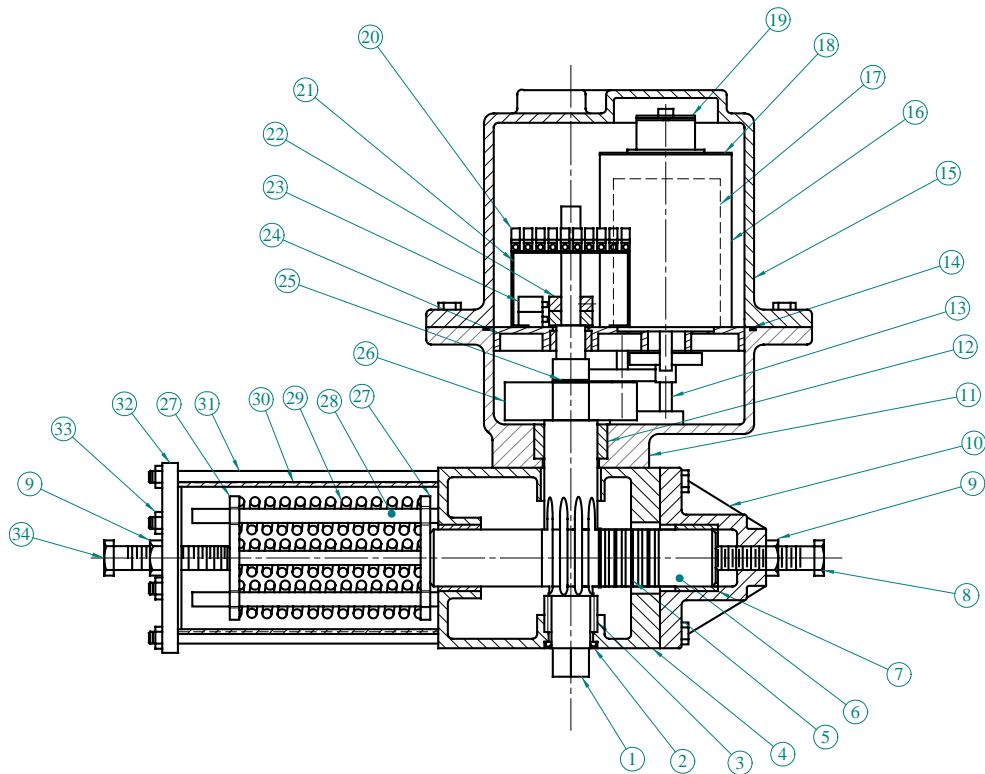




Model ES2 Parts List

NO.	DESCRIPTION	MATERIAL	QTY	PART NO.
1	COVER	A356-T6	1	4002N7
2	SCREW, ROUND HD.	SS	1	47003
3	CAP	STL	2	19026C
4	MANDRAL	STL	1	19026M
5	ROLL PIN	STL	2	43000
6	SHAFT	STL	1	4062
7	CAP SCREW	SS	3	47024
8	GEAR (comes with gear motor)	STL	1	21019
9	CAP SCREW	SS	12	47053
10	GASKET	BUNA-N	1	3002N4/7
11	BASE	AL.	1	7008
12	GEARBOX (fail close)	A356-T6	1	6008ES2FC
	GEARBOX (fail open)	A356-T6	1	6008ES2FO
13	ROLL PIN	STL	1	43000
14	PINION	STL	1	GS241666PF
15	BEARING	BRONZE	1	35000
16	BEARING	BRONZE	1	35010
17	O-RING	BUNA-N	1	10006
18	DRIVE	SS	1	4002F07
19	KEY	STL	1	11002
20	OUTPUT GEAR	STL	1	GS481666PF
21	BEARING	BRONZE	1	35012
22	OUTPUT SHAFT	STL	1	4008B
23	TERMINAL STRIP	Phrenal PA66	2	29006
24	PRINTED CIRCUIT BOARD	-----	1	22037
25	CAPACITOR	-----	1	30003
26	RIVET	STL	3	47500
27	INSULATOR	FISH PAPER	1	22037FP
28	POSITION INDICATOR	STL	1	9011
29	SET SCREW	STL	1	47015

NO.	DESCRIPTION	MATERIAL	QTY	PART NO.
30	BRACKET	STL	1	39033
31	LIMIT SWITCH, CLOSE	-----	1	24000-C
32	INSULATOR	FISH PAPER	2	24000FP
33	LIMIT SCITCH, OPEN	-----	1	24000-O
34	SCREW, ROUND HD.	STL	2	47000
35	CAM, CLOSE	AL	1	38012
36	CAM, OPEN	AL	1	38004
37	SET SCREW	STL	2	47015
38	SPRING (fail close)	STL	1	19026
	SPRING (fail open)	STL	1	19026
39	O-RING	BUNA-N	1	10000
40	BEARING	BRONZE	1	35011
41	SCREW, ROUND HD.	SS	3	47001
42	BRAKE	-----	1	45005
43	SET SCREW #5	STL	1	45005
44	BRAKE DISC	STL	1	45005
45	BRAKE ADAPTER	AL.	1	53001
46	CAP SCREW	SS	1	47026
47	SPRING RETAINER	STL	1	11026
48	GEAR MOTOR	-----	1	21019
49	TERMINAL STRIP	-----	1	29010N
50	SCREW, ROUND HD.	SS	2	47001A
51	STOP	STL	1	47079
52	JAM NUT	STL	1	47076



Model AS4, AS6 & AS10 Parts List

NO.	DESCRIPTION	MAT'L	QTY	AS4	AS6	AS10
1	OUTPUT SHAFT	ETD150	1	4061	4063	4076
2	OIL SEAL	BUNA-N	1	17015	17015	17015
3	NEEDLE BEARING	STEEL	1	36020	36020	36020
4	RACK HOUSING	AL.	1	6007	6007	6001
5	RACK	STEEL	1	RS228-16	RS228-16	RS228-16
6	RACK SHAFT	1144 TGP	1	4029	4029A	4026
7	RACK SHAFT BEARING	BRONZE	2	35015	35015	35015
8	CLOSE ADJUSTING SCREW	STEEL	1	47150AS	47150AS	47150AS
9	LOCK NUT	STEEL	2	47150	47150	47150
10	END CAP	A356-T6	1	56007	56007	56004
11	GEAR BOX	AL.	1	6004AS4	6004AS6	6004AS
12	BEARING, OUTPUT	BRONZE	1	35010	35010	35010
	BEARING, 4 TH STAGE	BRONZE	1	35006	35006	35006
	BEARING, 3 RD STAGE	BRONZE	1	35000	35000	35000
	BEARING, 1 ST & 2 ND STAGE	BRONZE	lea.	35005	35005	35005
13	PINION, 1 ST STAGE	STEEL	1	41005	41005	41005
	PINION, 2 ND STAGE	STEEL	1	41006	41006	41006
	PINION, 3 RD STAGE	STEEL	1	41003	41003	41003
	PINION, 4 TH STAGE	STEEL	1	41004LH	41004LH	41004LH
14	GASKET	BUNA-N	1	10012	10012	10012
15	COVER	AL.	1	2004AS	2004AS	2004AS
16	MOTOR	-----	1	20005	20005	20005
17	CAPACITOR	-----	1	30017	30017	30017
18	BRACKET	STEEL	1	39014	39014	39014
19	BRAKE	-----	1	45004	45004	45004
20	TERMINAL STRIP	-----	1	29010N	29010N	29010N
21	BRACKET	STEEL	1	39000	39000	39000
22	CAM, OPEN	ZYTEL	1	38004ZY	38004ZY	38004ZY
	CAM, CLOSE	ZYTEL	1	38012	38012	38012

NO.	DESCRIPTION	MAT'L	QTY	AS4	AS6	AS10
23	LIMIT SWITCH, OPEN	-----	1	24000-O	24000-O	24000-O
	LIMIT SWITCH, CLOSE	-----	1	24000-C	24000-C	24000-C
24	BASE (when purchased includes bearings)	AL.	1	7004	7004	7004
25	RETAINING RING, OUTPUT GEAR	STEEL	1	11003	11003	11003
	RETAINING RING, 4 TH STAGE GEAR	STEEL	1	11002	11002	11002
	RETAINING RING, 3 RD STAGE GESR	STEEL	1	11000	11000	11000
	RETAINING RING, 1 ST & 2 ND STAGE	STEEL	1 ea.	11001	11001	11001
26	GEAR, OUTPUT	STEEL	1	GS4212-1111	GS4212-1111	GS4212-1111
	GS4212-1111					
	GEAR, 4 TH STAGE	STEEL	1	GS5318-0908	GS5318-0908	GS5318-0908
	GEAR, 3 RD STAGE	STEEL	1	GS6628-0804	GS6628-0804	GS6628-0804
	GEAR, 2 ND & 1 ST STAGE	STEEL	1	GS6032-0202	GS6032-0202	GS6032-0202
27	COMPRESSION PLATE	STEEL	2	56008	56008	56005
28	SPRING ROD	STEEL	6	47109	47109	47110
29	SPRING	STEEL	6	19023	19023	19009
30	HOUSING, SPRING	AL.	1	55009	55009	55004
31	STUD	STEEL	6	47079-8	47079-8	47099
32	END CAP	STEEL	1	61001	61001	61000
33	NUT	STEEL	6	47100S	47100S	47100S
34	SPRING ADJUSTING SCREW	STEEL	1	47150AS	47150AS	47150AS

RECOMMENDED SPARE PARTS:

Two Position Actuators;
Set of cams and switches.

ORDERING PARTS:

When ordering parts please specify:
Actuator model number, serial number, part number and part description.

TROUBLE SHOOTING:

SYMPTOM	PROBLEM	SOLUTION
Actuator does not respond.	Power not on.	Turn on power.
	Actuator wired wrong .	Check wiring diagram & rewire.
	Wrong voltage.	Check power supply & make appropriate changes.
	Thermal overload activated.	Allow motor to cool, actuator will automatically reset.
Actuator will not open or close completely.	Actuator and valve in opposite positions when actuator was mounted.	Remove actuator and rotate 90 degrees & remount.
	Travel limits set wrong.	Reset cams, see Pgs. 3 & 4.
Does not open Does not close	Valve torque too high for actuator.	Install correct size actuator.
	Mechanical stops not removed.	Remove stops, CAUTION: Do not remove any part required for proper operation.
	Spring torque set too high.	Adjust spring torque (see Fig.1).
	Spring torque set too low.	Adjust spring torque (see Fig. 1).
	Adjusting screw hitting mechanical stop.	Adjust end position adjusting Screw (see Fig. 1).

TROUBLE SHOOTING:

SYMPTOM	PROBLEM	SOLUTION
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 (see pg. 5). Adjust brake and tighten set screw (see pg. 5).
Motor runs but output shaft does not rotate.	Gear damage or sheared pin.	Contact ICI or nearest distributor.

WARRANTY:

Indelac Controls, Inc. (ICI) warrants that for a period of twelve months from the date of manufacture 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 acquire a return authorization from ICI. Products must be returned to ICI freight prepaid.

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.