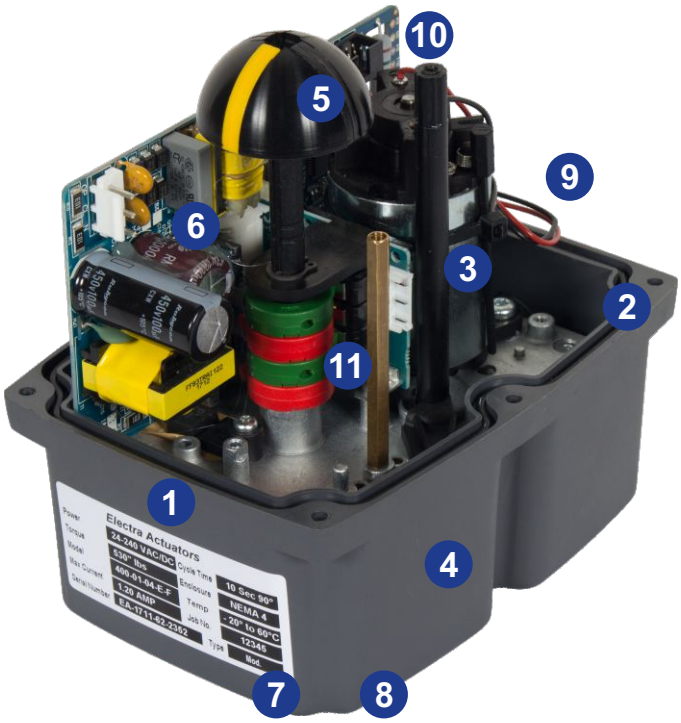
Construction



1. Enclosure
Polyamide composite housing is light, compact, and durable. The polyamide housing is weatherproof, corrosion resistant, and UV protected for operation in all types of environments. The polyamide housing is engineered with a lip where the actuator is joined to allow water to shed off the actuator and not enter the housing. The rugged, sealed watertight enclosure is rated NEMA 4, protected from ingress of any dirt or moisture.

2. Weather Seal
Seals the housing against water ingress and debris.

3. Motor
Motors are engineered for high-torque, low current amp draw and high duty cycle ratings. Motors are single phase, B class insulated and protected from overload by a thermostat with automatic reset.

4. Self Locking Gearing
Precision machined cut alloy gearing is self locking and will not back drive. All gearing is greased and lubricated for the service life of the actuator.

5. Position Indicator
The position indicator is mechanically driven by the output drive shaft for reliable opening and closing status of the valve. The movement of the valve can be easily viewed with the extending viewing angle available with the dome indicator.

6. Heater
The pre-wired space heater is installed in every actuator to prevent condensation from collecting inside of the actuator and causing irreparable damage to the internal components of the actuator. The heater is equipped with a thermostat to prevent overheating.

7. Actuator Mounting
Drilling is in accordance with the ISO 5211 standard, allowing easy installation of the actuator directly to small ISO ball and butterfly valves.

8. Output Drive
The female output drive allows for direct mounting to the shaft of small ball and butterfly valves. The star drive is machined to conform to DIN 3337 standards.

9. Dual Conduit Entrance
All electrical connections are terminated in the external conduit connection plugs.
(See page 4 for additional details)

10. Manual Override
For manual cycling of the valve with or without power.
(See page 4 for additional details)

11. Travel Limit Switch
SPDT switches with adjustable, mechanical cams.
(See page 5 for additional details)

Design Features

Multi-Voltage (Auto Sensing)

The Models 400 / FS440 are standard with multi-voltage, auto sensing technology. The actuator can receive any input voltage between 24-240 VAC or DC. The actuator will automatically detect the supply voltage and operate accordingly. There are no internal dip switches. All of the electrical conversions are made internally by the “smart” electronic PCB included with each actuator.

Manual Operation

The Models 400 / FS440 are standard with integral manual override, which allows the valve to be operated locally. The manual override can be engaged with or without power. The valve can be rotated to the closed position by operating the handwheel clockwise and it can be rotated to the open position by operating the handwheel counterclockwise. Using the external position indicator, the valve can be accurately repositioned manually. The manual override is easy to turn and requires low effort to operate.

Multi-Color LED Indicator

The Models 400 / FS440 have a multi-colored LED indicator installed in every actuator to allow for constant visual status feedback. Once power is applied the multi-color LED will give the user advanced diagnostics regarding the actuator’s current position, the direction the actuator is rotating, if the manual override is engaged, and if there are any issues that may be preventing the actuator from operation.

External Electrical Connections

The Models 400 / FS440 feature external DIN connector plugs with ½” conduit connection adapters. The external plugs allow for quick installation as the cover does not need to be removed during the install since all of customer’s wiring can terminate into the exterior plugs. In addition, the ½” conduit connection allows for hard conduit to be installed to the actuator’s external connections. This provides a safe and secure connection while also cutting down on installation time and cost.

Performance

Sample model number: 400-03 (24-240 VAC/DC Electric, Output Torque of 530 IN-LB)

Torque		Model / Amp Draw				Size of Actuator	Speed of Actuator 60Hz	Number of Handwheel Turns 90°	Duty Cycle 30 min. Thermal Protection	Weight (LB)
		Single Phase								
IN-LB	NM	120 VAC Voltage	220 VAC Voltage	24 VDC Voltage	24 VAC Voltage					
221	25	0.30	0.20	0.80	1.20	01	10	8	75%	5
530	60	0.37	0.25	1.25	1.73	03	15	8	75%	7
796	90	0.27	0.16	0.90	1.17	04	29	8	75%	7

Specification

Enclosure	Weatherproof enclosure rated NEMA 4, (IP67)
Power supply	24-240 VAC/DC (Auto Sensing), Single phase 50 / 60 Hertz, + 10%
Duty cycle	75%
Motor	Reversible motor
Limit switches	2 SPDT open and closed, 250 VAC 3 Amp rating
Auxiliary switches	2 SPDT open and closed, 250 VAC 3 Amp rating (On/Off actuators only)
Space heater	3.5 Watt, anti-condensation
Manual override	Toggleable, handwheel operator design
Conduit entries	2 External ISO DIN plugs with 1/2” conduit connections
Rotation	90° ±5° (0°-95°)
Operating temperature	-4°F to 158°F (Operating, ambient temperature range)
Enclosure material	Polyamide Composite
Mounting orientation	Possible mounting configurations shown below

Modulating (DPS Kit) Specification

Control Signal options	0-10 VDC, 1-10 VDC, 0-20 mA, 4-20 mA - Input / Output
Output shaft feedback system	Magnetic, Digital
Accuracy, Hysteresis, Repeatability	Better than 1%

Fail-Safe (BSR Kit) Specification

Initial charge time **before** operation	36 Hours
Max movements with full charge	5 Full cycles
Minimum recharge after movement	20 minutes

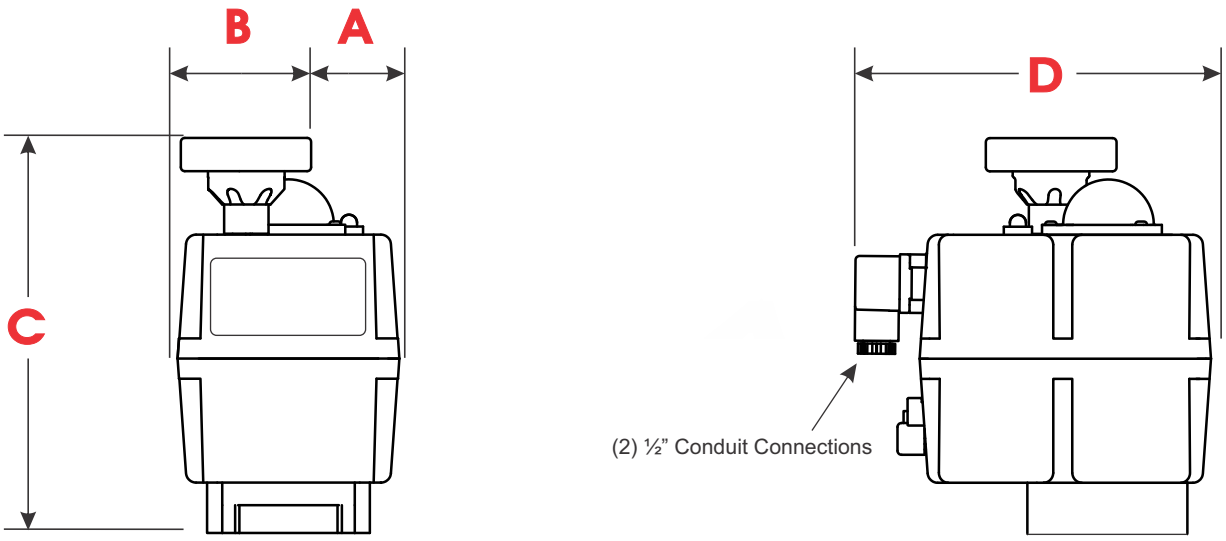
Mounting Orientation

OK

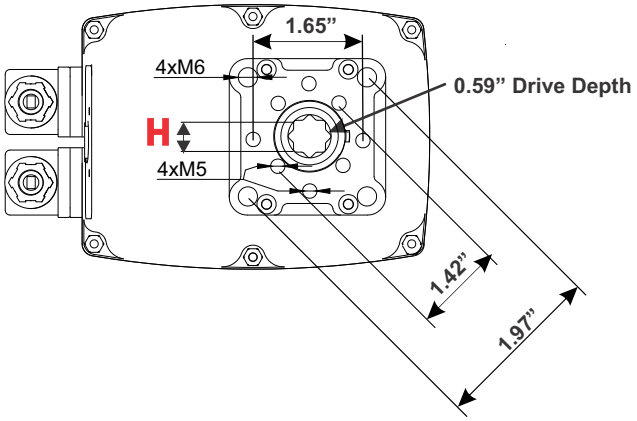
OK

PROHIBITED

Dimensions

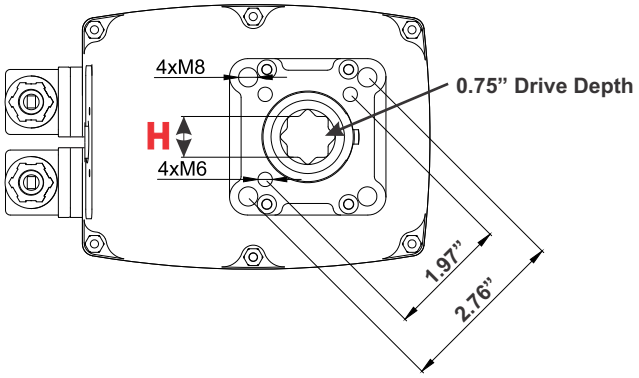


Size: "01"



Size: "03 & 04"

* 0.669" (17 mm) Drive Available



Actuator Specification									
Non-Spring Return Type		Electric Fail Safe Type		ISO 5211 Bolt Circle	Assembly Dimensions (in)				
On/Off Model Number	Modulating Model Number	On/Off Model Number	Modulating Model Number		A	B	C	D	H
EA-400-01-04-O	EA-400-01-04-E	EA-FS440-01-04-O	EA-FS440-01-04-E	F03/F04/F05	1.72	2.62	6.73	7.13	0.551
EA-400-03-04-O	EA-400-03-04-E	EA-FS440-03-04-O	EA-FS440-03-04-E	F05/F07	1.72	2.62	7.72	7.13	*0.551
EA-400-04-04-O	EA-400-04-04-E	EA-FS440-04-04-O	EA-FS440-04-04-E	F05/F07	1.72	2.62	7.72	7.13	*0.551

NOTE: (A) For mm multiply: Inch X 25.4=(mm)

Model 400 / FS440
Part Numbers

400	–	03	–	04	–	E
1 Model		2 Size		3 Enclosure		4 Control

Item	Code	Description
1 Model No.	400 FS440	Non-Spring Return Type Electric Fail-Safe Type
2 Size	01 03 04	221 In-Lb Torque 530 In-Lb Torque 795 In-Lb Torque

Item	Code	Description
3 Enclosure	04	NEMA 4, (IP67) Housing “Weatherproof” Type
4 Control	O E	On/Off (Open/Close) Operation Modulating Digital Board

A. Warranty

The seller warrants its product against defects in material or workmanship, under normal conditions of use, for a period of one year from the date of original shipment. The seller’s obligation under this warranty is limited to repair or replacement at seller’s option. Shipping charges are prepaid to factory and all goods must have a return authorization number.

B. **Storage**

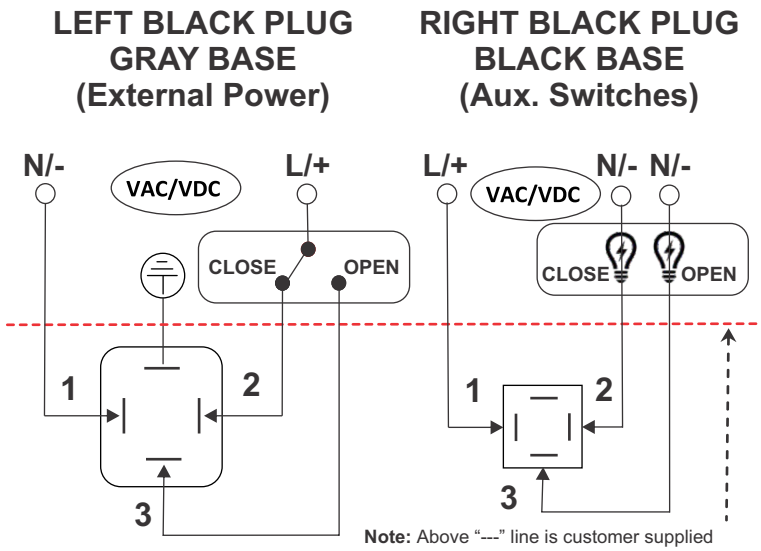
The actuator must be stored in a clean, dry, temperature controlled area. The unit shall be stored with the cover installed and with the conduit openings sealed. Storage must be off the floor, covered with an unsealed dust protector that will allow side and bottom ventilation. Care must be taken to guard the actuator from condensation in extreme temperature variations. If actuators sit for an extended period of time it is recommended that the heaters be hooked up.

C. **Moisture Warning**

Actuators are rated NEMA 4. The only way moisture can enter the actuator is through the conduit entrance. Extra precaution should be used to stop moisture from entering the actuator. Seal tight fittings as well as drip legs and pot ting compounds should be installed to protect the actuator against condensation. If moisture migrates up the conduit entrance and damages components, the parts are not covered under warranty.

On/Off - Modulating

24 - 240 VAC/DC



Note: Above "---" line is customer supplied

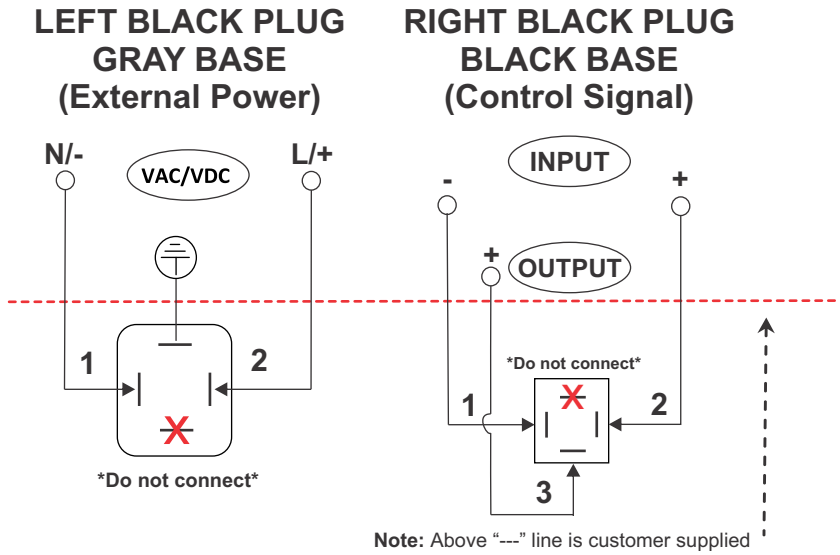
NOTES

1. Field Wiring is shown as reference and not supplied with the actuator.
2. Always verify specific actuator model to correct wiring diagram.
3. Wiring as shown in full counterclockwise position. (CCW)
4. Each actuator must be powered through its own individual switch or relay contacts, to prevent cross electrical bleed. Actuators could be damaged if parallel wired ,thus voiding the manufacturers warranty.
5. Seal tight water tight conduit connectors must be used to maintain NEMA 4 rating
6. All grounds must be isolated from each other in the customers equipment.
7. Take care in selecting the correct gauge wire, based on actuator AMP draw and the run on the line.

On/Off

DRAWING NO.
EA-400/FS440-OA

24 - 240 VAC/DC



Note: Above "---" line is customer supplied

***Input Control Signal is Preset at the Factory (0-10 VDC or 4-20 mA)**

NOTES

1. Field Wiring is shown as reference and not supplied with the actuator.
2. Always verify specific actuator model to correct wiring diagram.
3. Wiring as shown in full counterclockwise position. (CCW)
4. Each actuator must be powered through its own individual switch or relay contacts, to prevent cross electrical bleed. Actuators could be damaged if parallel wired ,thus voiding the manufacturers warranty.
5. Seal tight water tight conduit connectors must be used to maintain NEMA 4 rating
6. All grounds must be isolated from each other in the customers equipment.
7. Take care in selecting the correct gauge wire, based on actuator AMP draw and the run on the line.

Modulating

DRAWING NO.
EA-400/FS440-E

Multi-color LED Status Light

On/Off - LED Operation

No	Actuator Status	Time LED is lit	On/Off LED Sequence
1	Actuator without external power	Continuous	OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF
2	Actuator in manual mode	200 mSecs	AMBER OFF AMBER OFF AMBER OFF AMBER OFF AMBER OFF
3	Actuator opening under external power	200 mSecs	AMBER GREEN AMBER GREEN AMBER GREEN AMBER GREEN GREEN GREEN (OPEN)
4	Actuator closing under external power	200 mSecs	AMBER RED AMBER RED AMBER RED AMBER RED RED RED (CLOSED)
5	Torque limiter activated when opening	200 mSecs	OFF GREEN OFF GREEN OFF GREEN OFF GREEN OFF GREEN
6	Torque limiter activated when closing	200 mSecs	OFF RED OFF RED OFF RED OFF RED OFF RED
7	Actuator closing under battery power (Model FS440 Only)	200mSecs	OFF OFF OFF RED OFF OFF OFF RED OFF OFF
8	Actuator opening under battery power (Model FS440 Only)	200mSecs	OFF OFF OFF GREEN OFF OFF OFF GREEN OFF OFF
9	Battery power low, needs re-charging (Model FS440 Only)	200mSecs	AMBER AMBER AMBER OFF OFF OFF OFF AMBER AMBER AMBER

FLASH
SOLID
OFF

Note: A PINK LED indicates a connectivity issue. Typically the cause is incorrect wiring or a polarity issue

Modulating - LED Operation

No	Actuator Status	Time LED is lit	Modulating LED Sequence
1	Actuator without external power	Continuous	OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF
2	Actuator in manual mode	200 mSecs	AMBER OFF AMBER OFF AMBER OFF AMBER OFF AMBER OFF
3	Actuator opening under external power	200 mSecs	BLUE GREEN BLUE GREEN BLUE GREEN BLUE (STOP POSITION BETWEEN 0° & 90°) BLUE BLUE (OPEN 90°)
4	Actuator closing under external power	200 mSecs	BLUE RED BLUE RED BLUE RED BLUE (STOP POSITION BETWEEN 0° & 90°) BLUE BLUE (CLOSED 0°)
5	Torque limiter activated when opening	200 mSecs	OFF GREEN OFF GREEN OFF GREEN OFF GREEN OFF GREEN
6	Torque limiter activated when closing	200 mSecs	OFF RED OFF RED OFF RED OFF RED OFF RED
7	Actuator closing under battery power (Model FS440 Only)	200mSecs	OFF OFF OFF RED OFF OFF OFF RED OFF OFF
8	Actuator opening under battery power (Model FS440 Only)	200mSecs	OFF OFF OFF GREEN OFF OFF OFF GREEN OFF OFF
9	Battery power low, needs re-charging (Model FS440 Only)	200mSecs	AMBER AMBER AMBER OFF OFF OFF OFF AMBER AMBER AMBER

FLASH
SOLID
OFF

Note: A PINK LED indicates a connectivity issue. Typically the cause is incorrect wiring or a polarity issue