

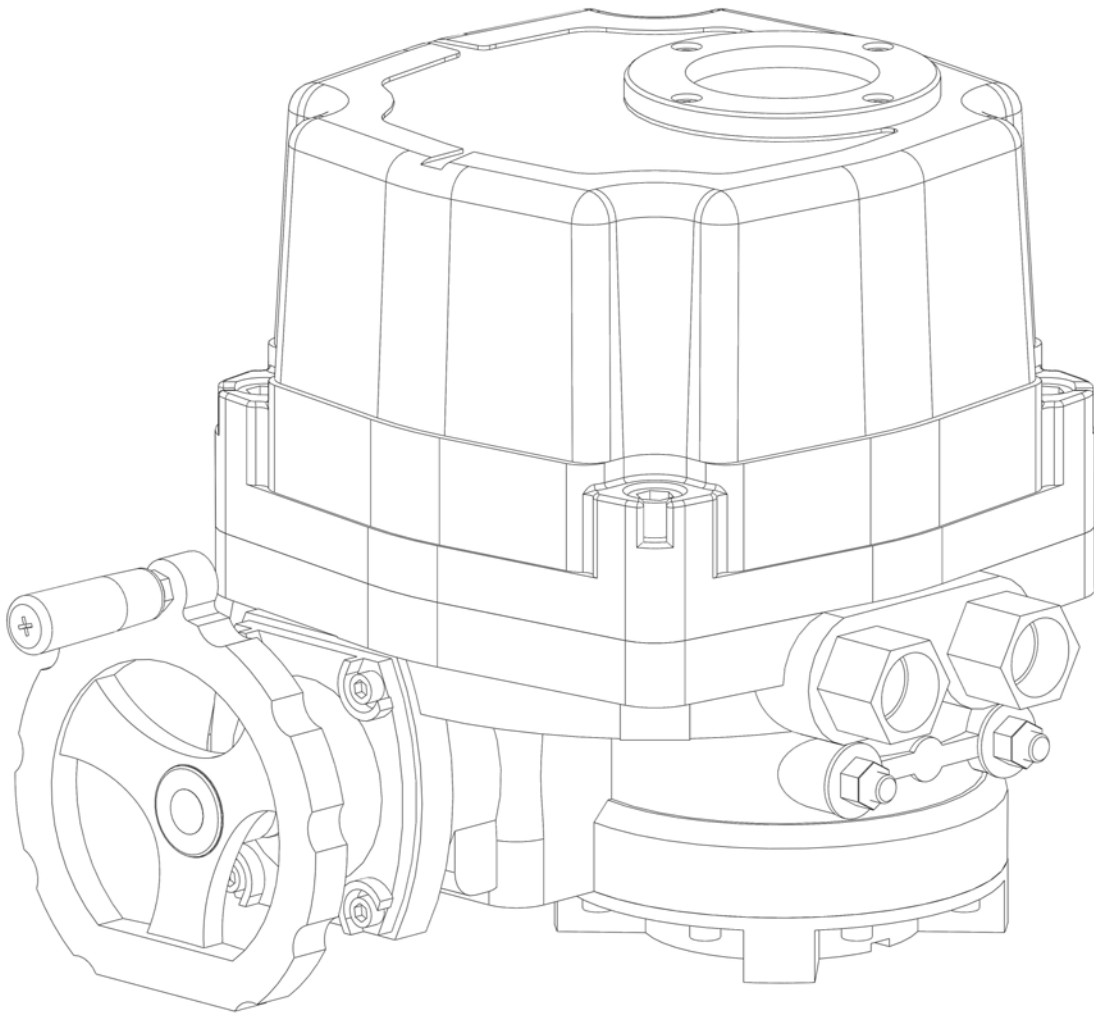


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## INSTALLATION & MAINTENANCE MANUAL

WE / XE Series Electric Actuator

# Installation and Operating Manual



**WE/XE-690, 1350, 1700, 2640, 4400, 5200, 6900, 10500  
17500, 25690**



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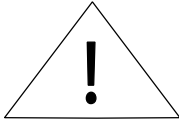
**INSTALLATION & MAINTENANCE  
 MANUAL**

**WE / XE Series Electric Actuator**

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## Safety Instructions



WARNING

This warning indicates a potentially hazardous situation.

This device was shipped from the factory in a proper condition to be safely installed and operated in a hazard-free manner. The notes and warnings in this document and on the actuator should be maintained to insure safe operation of the device.

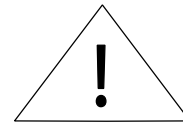
Take all necessary precautions to prevent damage to the actuator due to rough handling, impact, or improper storage. Do not use abrasive compounds to clean the actuator, or scrape metal surfaces with any objects.

The system controlling the actuator must have proper safeguards to prevent damage to equipment, or injury to personnel should failure of system components occur.

A qualified person in terms of this document is one who is familiar with the installation, commissioning and operation of the electric actuator and who has appropriate qualifications, such as:

- Is trained in the operation and maintenance of electric equipment and system in accordance with established safety practices.
- Is trained or authorized to energize, de-energize, ground, tag and lock electric circuits and equipment in accordance with established safety practices.

- Is case where the actuator is installed in a potentially explosive (hazardous) location – is trained in the operation, commissioning, operation and maintenance of equipment in hazardous locations.



WARNING

The actuator must be installed, commissioned, operated and repaired by qualified personnel.

The actuator generates a large mechanical force during normal operation.

All installation, commissioning, operation and maintenance must be performed under strict observation of all applicable codes, standards and safety regulations.

Reference is specifically made here to observe all applicable safety regulations for actuators installed in potentially explosive (hazardous) locations



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### WE / XE Series Electric Actuator

#### Introduction

The WE/XE Series electric actuators with manual override are for use on quarter turn valve and dampers requiring 690 In-Lbs to 25900 In-Lbs of torque. The WE series actuators are weather proof, IP67, CSA approved for NEMA 4, 4X. The XE series is ATEX certified to Eexd IIB T4, IP67

The WE/ XE Series actuators have fan cooled class F induction motors, double reduction worm drives and lockable manual handwheels. The body is anodized aluminum with polyester powder coating for an exceptional UV and chemical resistance.

The WE/XE series with worm drive is available from 690 in-lbs up to 25900 in-lbs. The WE/XE Series is available with an optional servo card for modulating service. Please see the TMC3 & TDC manual for instruction on the servo card.

Travel limit switches are mechanical form (SPDT) with contacts rated at 15amps, 1/2" HP 125/250 VAC. A thermal protector switch is built into the motor windings and will automatically disconnect the motor power if the motor temperature exceeds the maximum motor rating. Torque switches are included in all sizes (except 690) to prevent the possibility of stalling the motor. The torque switches are set by the factory for rated torque output. Adjustments to the torque switches can cause damage to the motor and gears and warranty will be void.

Mechanically, the ratio of the gearmotor determines the speed of the actuator. The gearmotor utilizes two non-backdriveable worm gear sets to transfer the torque to the output shaft. Positioning is

determined by a cam shaft directly connected to the output shaft. In the declutchable condition the manual override drives the worm shaft when engaged.

#### Pre-Installation Storage

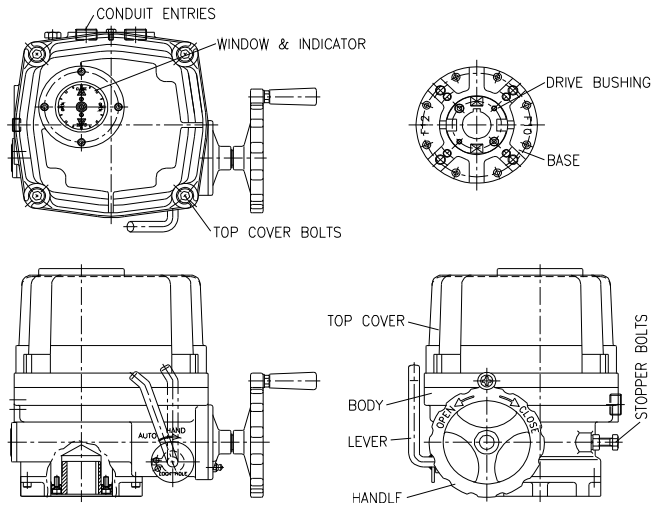
The actuators are shipped with metal screw-in plugs in order to prevent foreign matter and moisture from entering the unit. The actuator should be stored in a dry environment.

#### Prior to use

Please perform a visual check of the actuator for any damage that might have occurred during shipment. Please check nameplate and wiring diagram to make sure electrical specification is correct for your application. If there are any discrepancies, please contact your Triac distributor to solve the problem immediately.

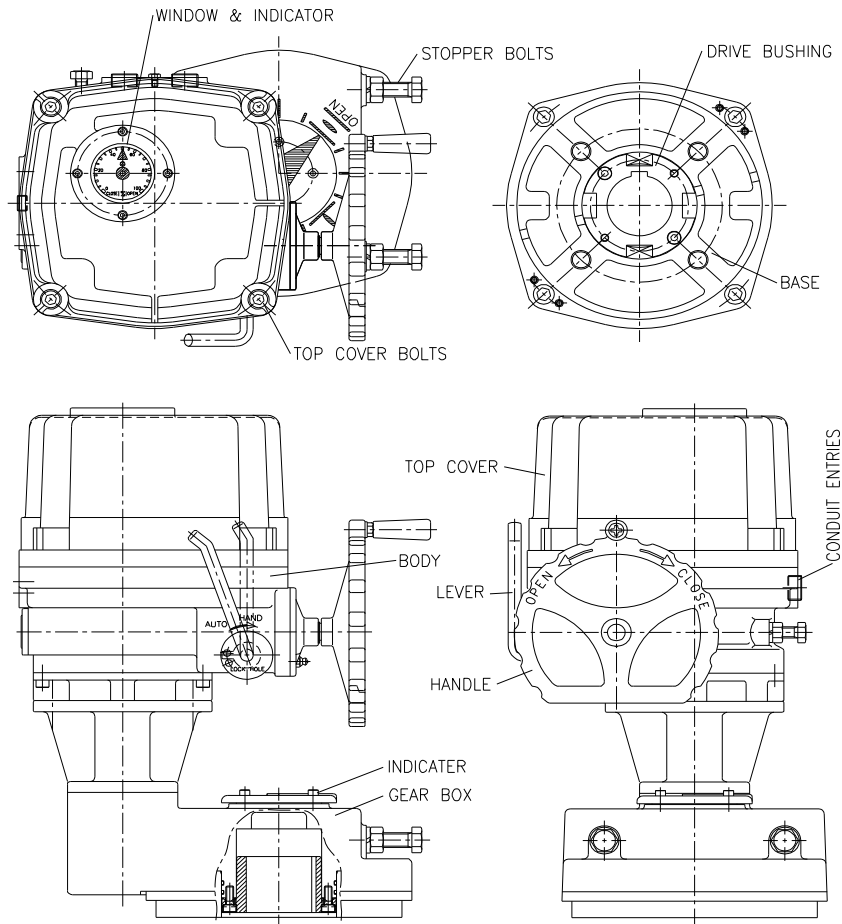
**External components**

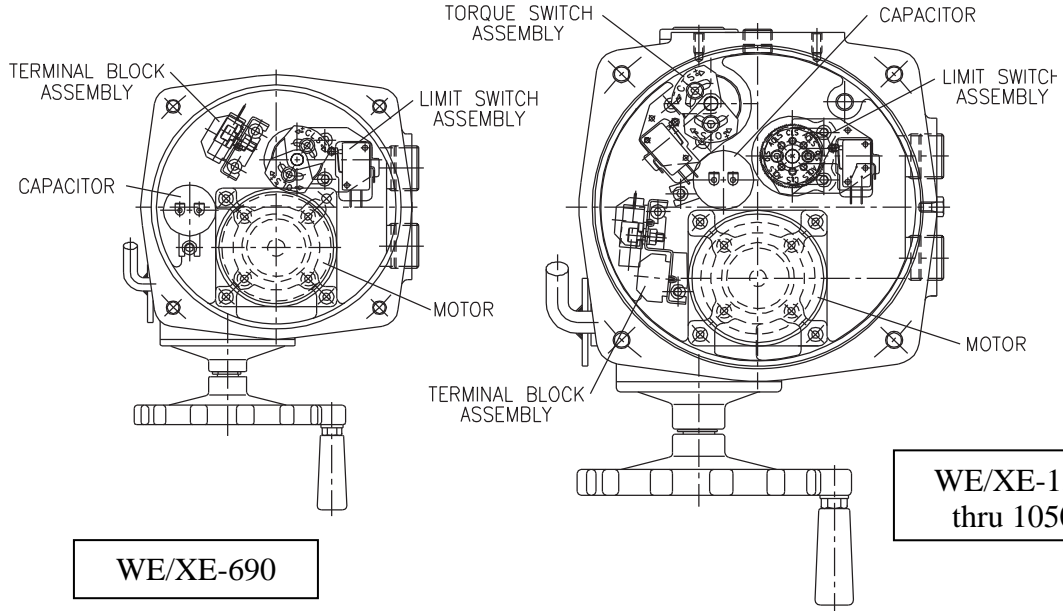
WE/XE 690 thru  
10500



**Internal Components**

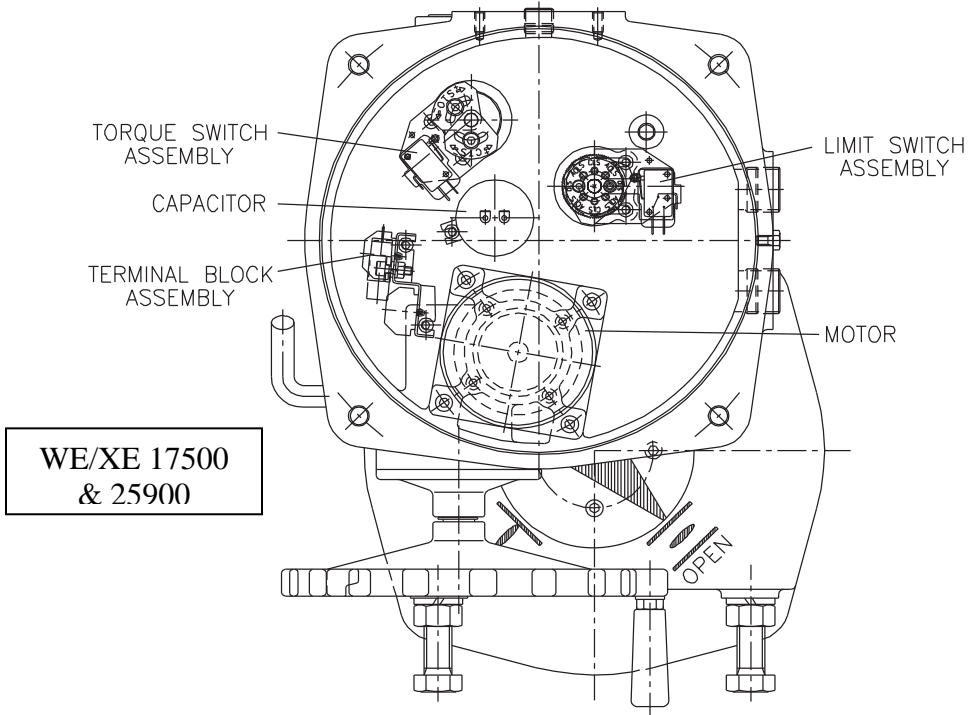
WE/XE 17500 &  
25900





**WE/XE-690**

**WE/XE-1350  
thru 10500**



**WE/XE 17500  
& 25900**



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### WE / XE Series Electric Actuator

#### Performance (See updated specs on pg 8 of Electric Actuator Brochure)

Acuator Model	Output Torque	90° Cycle Time (sec)	Motor Size	Full Load Amps					Locked Rotor Amps					Handwheel Turns	Weight
				AC/DC	1 Phase		3 Phase		AC/DC	1 Phase		3 Phase			
WE / XE	In-Lbs.	60 / 50 Hz	Watts	24V	110V/60Hz	220V/60Hz	380V	440V	24V	110V/60Hz	220V/60Hz	380V	440V	N	Lbs.
-690	690	13 / 16	15	5	1.2	0.6	N/A	N/A	12.8	1.4	0.7	N/A	N/A	10	16.4
-1350	1350	21 / 25	40	6	2	1	0.28	0.36	16.9	2.5	1.2	0.75	0.66	11	36.7
-1700	1700	21 / 25	40	7.4	2.3	1.1	0.28	0.36	16.9	2.5	1.2	0.75	0.66	11	36.7
-2640	2640	26 / 31	40	8.9	2.3	1.3	0.27	0.34	30.8	2.9	1.4	1	0.87	13.5	48.6
-4400	4400	26 / 31	90	N/A	4.5	1.9	0.42	0.47	N/A	5	2.4	1.73	1.5	13.5	50.8
-5200	5200	26 / 31	90	N/A	4.5	2	0.42	0.47	N/A	5	2.4	1.73	1.5	13.5	50.8
-6900	6900	31 / 37	180	N/A	5.1	2.4	0.61	0.67	N/A	7.3	3.8	2.73	2.38	16.5	64
-10500	10500	31 / 37	180	N/A	5.4	3.4	0.61	0.67	N/A	7.3	3.8	2.73	2.38	16.5	64
-17500	17500	95 / 112	180	N/A	5.8	2.4	0.61	0.67	N/A	7.3	3.8	2.73	2.38	49.5	167
-25900	25900	95 / 112	180	N/A	6.3	3.4	0.61	0.67	N/A	7.3	3.8	2.73	2.38	49.5	167

Rev.20130924

#### Standard Specification

Motor	Class F Reversible Induction motor
Limit Switches	Open / Close, SPDT, 16A 1/2HP 125/250VAC, 0.6A 125VDC, 0.3A 250VDC
Additional Limit Switches	Open / Close, SPDT, 16A 1/2HP 125/250VAC, 0.6A 125VDC, 0.3A 250VDC
Torque Switches	Open / Close, SPDT, 16A 1/2HP 125/250VAC, 0.6A 125VDC, 0.3A 250VDC
Stall Protection / Operating Temp	Built-in thermal protection, open 150°C ±5 °C / close 97 °C±1.5°C
Travel Angle	90°± 1 0° (0°~110°)
Indicator	Continuous position indicator
Manual Override	Declutching mechanism
Self Locking	Provided by double worm gearing
Travel Stops	2 × external adjustable screws
Space Heater	10W(110/220V AC) Anti-condensation
Conduit entries	Two 3/4" NPT
Lubrication	Grease moly (EP type)
Terminal Block	Spring loaded lever push type
Materials	Steel, Aluminium alloy, Al bronze, Polycarbonate
Ambient Temperature	-20°C to +70°C (-40°C available with low temp option)
Ambient Humidity	90% RH Max.(non-condensing)
Vibration	X Y Z 10g, 0.2~34Hz, 30minute
External Coating	Anodizing treatment before dry powder, Polyester, Munsell no. 5R 3.5/12

#### Optional features

Explosion-proof enclosure II 2 G, EEx d IIB T4, IP67	XE Series only
Watertight enclosure (IP68 10M 72HR)	WE/XE Series
Potentiometer unit (1K ~10K)	WE/XE Series
Proportional /Modulating control - See TMC3 or TDC servo cards	WE/XE Series
Additional Aux switches (SPDT x 2EA 250V AC 10A Rating)	WE/XE Series
SICU Semi-integral control unit (Local/Remote Selector Switches)	except 690
ICU Intelligent Digital control unit (Local/Remote Selector Switches)	except 690
Current position transmitter (output 4-20mA DC)	WE/XE Series
Extended Rotation 120°, 180°, 270° turn	except 10500 & 25900
Signal lamp unit (white-power on, red-close, green-open, yellow-over torque)	WE/XE Series
Fire Proofing Actuator 1050 ±5°C/50 min	consult factory
Fire Proofing Actuator 250 ±5°C/150 min	consult factory

**WARNING**

*Please do not try to pull or force the lever to disengage the manual override; this can damage the lever shear pin.*

*Please do not use excessive amount of rim pull force when turning the handwheel.*

**Manual Operation**

Pull the lever towards the handwheel to engage the manual override. If the lever does not stay engaged, pull the lever again and rotate the handwheel at the same time. The direction of output is casted on the handwheel. Clockwise is closed and counter clockwise is open. The manual override will automatically disengage when the electric power is turned on and the motor starts to turn.

**WARNING**

Turn off all power and lock out service panel before installing or modifying any electrical wiring.

**Field Wiring**

Each actuator is supplied with two conduit entries, one is for power and the other is for control signal. The nameplate on each actuator will state the voltage and full load current. A minimum of 18 AWG wiring is recommended for all field wiring. The wire terminations are per the wiring diagram included with each package. The actuator should be wired and grounded in accordance with local and national electrical codes.

Conduit should be sealed at the actuator housing to keep water and moisture from entering the actuator. The compartment heater should be energized continuously to reduce moisture buildup.

**Multiple Actuator Wiring**

Do not connect more than one WE/XE series actuator to a single SPDT switch or output card. The voltage from the unused winding will interfere with the operation of the other actuators. It is recommend to use multiple pole switch or independent output cards.

**3 Phase Wiring**

A 3 phase electric actuator requires the operator to check the phase connection prior to operation. Manually operate the actuator to the 50% open position and apply power to the actuator. Check the functionality of the open and close switch before actuator reaches the end of travel. To reverse the functionality of the end of travel switches, exchange wires 1 with wire 2 on the 3 phase incoming power. If the 3 phase actuator includes the SICU or ICU module, then please see SICU or ICU operating manual.

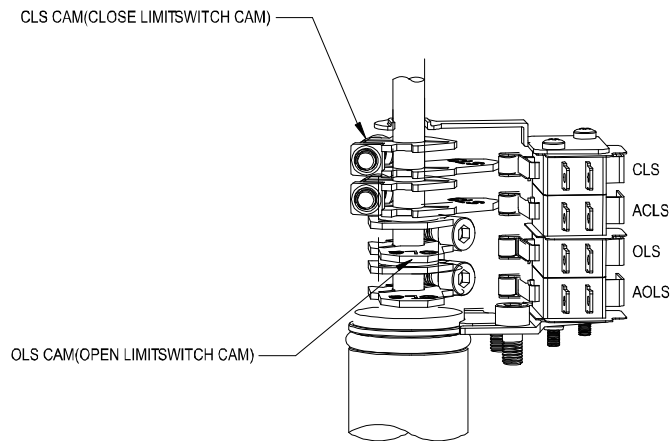
**WARNING**

Do not reverse motor instantaneously. Reversing the actuator motor when still spinning can cause damage to the capacitor and motor. It is recommend to use a 1 second delay before reversing motor.

**Limit Switch Setting**



The motor control limit switch and the auxiliary limit switch have independent cams. The top cam is for the motor control closed limit switch (CLS). The next switch down is the auxiliary closed limit switch (ACLS). The next switch down is the motor control open limit switch (OLS). The bottom switch is the auxiliary open limit switch (AOLS).



The limit switches can be set by rotating the actuator to the closed position with the manual handwheel and rotating the CLS clockwise until the switches just trips. The cams clamp to the cam shaft with a 4MM Allen head screw.

To adjust the open position, manually rotate the actuator to the desired open position and rotate the OLS cam counter clockwise until the switches just trips. Make sure you tighten the 4MM Allen head screw holding the cam after making adjustments. Drive the actuator to end of travel making sure the limit switches stop the actuator and de-energize the motor.

**! WARNING**

If the limit switches are incorrectly adjusted and the actuator is stopped by the mechanical travel stops the worm gear will jam, the motor will overheat and go into thermal overload. The motor will eventually fail if repeatedly overheated.

**Torque Switches**

The torque switches are set by the factory for rated torque output. Adjustments to the torque switches can cause damage to the motor and gears and warranty will be void



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WE / XE Series Electric Actuator

### Mechanical Stops

The mechanical travel stops are for proper positioning during manual operation and for valve / damper protection.

Loosen jam nuts for both the CW and CCW travel stops. Manually operate the actuator CW until the CW limit switch trips. Then turn the CW travel stop bolt clockwise until the bolt touches the worm gear. Turn the travel stop bolt counter clockwise three turns and tighten the jam nut.

Manually operate the actuator CCW until the CCW limit switch trips. Then turn the CCW travel stop bolt clockwise until the bolt touches the worm gear. Turn the travel stop bolt counter clockwise three turns and tighten the jam nut.

Drive the actuator to end of travel making sure the limit switches stop the actuator and de-energize the motor. If the limit switches are incorrectly adjusted and the actuator is stopped by the mechanical travel stops the worm gear will jam, the motor will overheat and go into thermal overload. The motor will eventually fail if repeatedly overheated.

### Actuator Orientation

The actuator can be installed in any orientation (except upside down). Please make sure to allow enough room to easily remove housing cover for maintenance.

### Commissioning

Manual operate the actuator to the mid position. Electrically operate the actuator and check the direction of rotation. Drive the actuator to end of travel making sure the limit switches stop the actuator and de-energize the motor. If the limit switches are incorrectly adjusted and the actuator is stopped by the mechanical travel stops the worm gear will jam, the motor will overheat and go into thermal overload. The motor will eventually fail if repeatedly overheated.

### Jamming

If the actuator travels into a mechanical travel stop, the worm gear will jam. The actuator cannot be reversed electrically or manually until the mechanical travel stop bolt is loosened. Loosen the jam nut on the mechanical travel stop bolt, and then turn the bolt counterclockwise three turns. The actuator now can be manually operated once the pressure is off the worm gear. The limit switches and mechanical travel stops should be recalibrated per the instruction manual if jamming occurred.



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WE / XE Series Electric Actuator

### Trouble Shooting

Trouble	Cause	Solution
Actuator does not work at all	No power to actuator	Turn power on
	Low voltage to actuator	Check power supply and wire gage
	Motor and supplied voltage is different	Check nameplate
	Wires are loose	Check connection to terminal strip
	Limit switch or torque switches tripped	Manually operate to mid position
	Worm gear is jammed	See section on jamming
Torque switch opens	Mechanical travel stop set prior to limit switch	Reset travel stops
	Foreign object between valve seat and ball / disc	Clear objects
	Actuator is undersized	Check torques
Switching to manual operation is not possible	Lever is not fully engaged	Turn handle slowly, pull lever
	Worm gear is jammed	See section on jamming
	Power is still on	Turn power off
Actuator performs erratically	Motor is over heating and thermal overloading	Check duty cycle - tune loop
	Motor is over heating and thermal overloading	Check ambient temperature

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*While the information and specifications contained in this literature are believed to be accurate, they are supplied for informative purposes only. Because A-T Controls is continually improving and upgrading its product design, the specifications, dimensions and information contained in this literature are subject to change without notice. Should any question arise concerning these specifications, the purchaser/user should contact A-T Controls.*

For product specifications go to <http://download.a-tcontrols.com/>

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