ECON ELECTRIC ACTUATOR
Fig. 7907, type ELA80 - 3000

Compact quarter turn actuator
Mechanical position indicator
High output torque
Multi mounting base
Manual override

Operating and Instruction Manual for actuator type:
ELA80, 100, 150, 200, 300, 500, 600, 800, 1200, 2000 & 3000
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1 INTRODUCTION

1.1 Purpose
The purpose of this manual is to introduce and explain the installation, operation and maintenance of ELA-series electric actuators.

1.2 Safety Notices
This manual contains safety notices and precautions the user must take to reduce the risk of personal injury and damage to the equipment. The user(s) must read these instructions before the installation, operation or maintenance of the ELA-series electric actuators.

⚠️ DANGER: Refers to personal safety and alerts the user for danger and/or injury. Hazardous or unsafe practice may result in severe injury or death.

⚠️ WARNING: Refers to personal safety. Alerts the user for potential danger. Not following warning notices could result in personal injury or death.

⚠️ CAUTION: Directs the user’s attention to general precautions that, if not followed, could result in personal injury and/or equipment damage.

Note: Information in this manual is critical to the user’s understanding of the actuator’s installation and operation.
2 PRODUCT IDENTIFICATION

2.1 Product Identification

The actuator name plate is located on the opposite side of the conduit entry. The name plate contains the following:

2.1.1 Marking

A) General

- ELA logo (trade mark)
- Electrical power supply
- Model
- Type
- Rated current
- Torque
- Operation time (seconds)
- Serial No.
- Options

B) Explosion proof

- ELA logo (trade mark)
- CE ATEX mark
- Model
- Motor specification
- Ambient temperature
- Serial number
- Manufacturer’s address
- Warning
2.1.2 Certification

a) EX II2g Ex d IIB T4 Gb

2.2 Initial Inspection

Upon receipt of the actuator, the user should inspect the condition of the product and ensure that the product specification stated on the name plate matches with the order sheet.

- Remove the packing wrap or wooden box carefully. Inspect the product for any physical damage that may have occurred during shipment.
- Check the product specification of the received product. If a wrong product has been supplied, please immediately report this to the distributing company.

2.3 Storage

Actuators must be stored in a clean, cool and dry area. The unit should be stored with the cover installed and the conduit openings sealed. Storage must be off the floor, covered with a sealed dust protector.
3 GENERAL INFORMATION AND FEATURES

3.1 General Information
ECON ELA-series electric actuators are designed for the operation of industrial valves; e.g. butterfly valves and ball valves.

The actuator has a torque output range from 80 Nm to 3,000 Nm (690 In-Lbs to 25,900 in-Lbs).

3.1.1 Standard technical data

| Enclosure Rated | Weatherproof IP67, NEMA 4 & 6 |
| Enclosure       | High grade aluminum alloy, corrosion coated |
| Power Supply    | 110 / 220V AC 1 Ph 50/60Hz |
|                 | 12 / 24V DC 50/60Hz |
| Duty Type       | S4 70% / S2 30min (IEC 60034) |
| Motor           | Squirrel caged induction motor |
| Limit Switches  | 2 x open/close SPDT, 250V AC 16A rating |
| Auxiliary Limit Switches | 2 x open/close SPDT, 250V AC 16A rating |
| Torque Switches | Open/close SPDT, 250VAC 10A Rating |
| Stall Protection| Built-in thermal protection |
| Travel Angle    | 90 degree +/- 10% |
| Indicator       | Continuous position indicator |
| Manual Override | Dechattering manual override |
| Self Locking    | By means of worm gear |
| Mechanical Travel Stops | 2 x external adjustable mechanical travel stops |
| Space Heater    | 10W ceramic housed |
| Conduit Entries | 2 x PF3/4”, 2x M25x1.5 or 2x NPT 3/4 (USA versions) |
| Lubrication     | Grease moly EP |
| Ambient Temperature | -20 °C ~ + 60 °C (except on CPT & PCU board) |
| External Coating| Dry powder polyester, thickness Max. of 2mm |

3.1.2 ELA Actuator versions and additional technical data

<table>
<thead>
<tr>
<th>Fig 7907 Type</th>
<th>Max. output TorqueNm</th>
<th>Operating time sec/90° (50/60Hz)</th>
<th>Duty Time According IEC 60034-1 S2 (Open/Close)</th>
<th>Duty Time According IEC 60034-1 S4 (Modulating)</th>
<th>Connection According ISO 5211</th>
<th>Rated current (A) 50/60Hz (230VAC)</th>
<th>Rated current (A) 50/60Hz (110VAC)</th>
<th>Rated current (A) 50/60Hz (24VDC)</th>
<th>Weight KG</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELA80 80</td>
<td>80</td>
<td>16/13</td>
<td>100%, 30 min.</td>
<td>70%</td>
<td>F07, V17</td>
<td>0.56/0.69</td>
<td>0.96/0.97</td>
<td>2.37/10.00</td>
<td>7.4</td>
</tr>
<tr>
<td>ELA100 100</td>
<td>100</td>
<td>20/15</td>
<td>100%, 30 min.</td>
<td>70%</td>
<td>F07, V17</td>
<td>0.56/0.69</td>
<td>0.96/0.97</td>
<td>2.37/10.00</td>
<td>7.4</td>
</tr>
<tr>
<td>ELA150 150</td>
<td>150</td>
<td>25/21</td>
<td>100%, 30 min.</td>
<td>70%</td>
<td>F07, V17</td>
<td>0.69/0.99</td>
<td>1.08/1.10</td>
<td>5.57/24.00</td>
<td>7.4</td>
</tr>
<tr>
<td>ELA200 200</td>
<td>200</td>
<td>25/21</td>
<td>100%, 30 min.</td>
<td>70%</td>
<td>F07, V17</td>
<td>0.73/0.99</td>
<td>1.17/1.22</td>
<td>4.21/18.00</td>
<td>16.6</td>
</tr>
<tr>
<td>ELA300 300</td>
<td>300</td>
<td>31/26</td>
<td>100%, 30 min.</td>
<td>70%</td>
<td>F07, V17</td>
<td>0.88/1.24</td>
<td>1.38/1.50</td>
<td>4.27/18.00</td>
<td>22.2</td>
</tr>
<tr>
<td>ELA500 500</td>
<td>500</td>
<td>31/26</td>
<td>100%, 30 min.</td>
<td>70%</td>
<td>F07, V17</td>
<td>1.02/1.38</td>
<td>1.47/1.76</td>
<td>4.37/18.00</td>
<td>22.2</td>
</tr>
<tr>
<td>ELA600 600</td>
<td>600</td>
<td>31/26</td>
<td>100%, 30 min.</td>
<td>70%</td>
<td>F07, V17</td>
<td>1.16/1.59</td>
<td>1.67/1.96</td>
<td>4.47/18.00</td>
<td>22.2</td>
</tr>
<tr>
<td>ELA800 800</td>
<td>800</td>
<td>31/26</td>
<td>100%, 30 min.</td>
<td>70%</td>
<td>F07, V17</td>
<td>1.51/1.83</td>
<td>1.94/2.25</td>
<td>4.67/18.00</td>
<td>22.2</td>
</tr>
<tr>
<td>ELA1200 1200</td>
<td>1200</td>
<td>37/31</td>
<td>100%, 30 min.</td>
<td>70%</td>
<td>F12, V14, V27</td>
<td>1.81/2.14</td>
<td>2.18/2.57</td>
<td>4.97/20.00</td>
<td>29.6</td>
</tr>
<tr>
<td>ELA2000 2000</td>
<td>2000</td>
<td>31/26</td>
<td>100%, 30 min.</td>
<td>70%</td>
<td>F16, V26</td>
<td>1.81/2.14</td>
<td>2.18/2.57</td>
<td>4.97/20.00</td>
<td>29.6</td>
</tr>
</tbody>
</table>

3.1.3 ELA-Series Options

| EXA  | Explosion proof enclosure (Ex d II B T4 Gb IP67) |
| WTA  | Watertight enclosure (IP68 10m / 72hr) |
| PIU  | Potentiometer unit (0~1KΩ) |
| PCU  | Proportional control unit (input, output 0~10 VDC, 4~20mA DC) |
| CPT  | Current position transmitter (output 4~20mA DC) |
3.1.4 Duty Cycle

Duty cycle rated IEC60034 – S4 70% / S2 30 min

Exceeding the actuator’s rated duty cycle may cause thermal overload.

**Note:** Type of duty according to VDE 0530 / IEC 60034-1

<table>
<thead>
<tr>
<th>Short – time duty S2</th>
<th>Intermittent duty S4</th>
</tr>
</thead>
<tbody>
<tr>
<td>The operation time at a constant load is short, so that thermal equilibrium is not reached. The pause is long enough for the machine to cool down to ambient temperature. The duration of the short –time operation is limited to 15min (10min, 30min)</td>
<td>The duty is a sequence of identical cycles which consist of starting time, operation time with constant load and rest period. The rest period allows the machine to cool down so that thermal equilibrium is not reached. The relative on-time at S4-25% or S4-50% is limited to 25% and 50% respectively.</td>
</tr>
</tbody>
</table>

3.1.5 Heater

Condensation in the actuator is possible due to wide fluctuation of the ambient temperature. The heater integrated in the control unit prevents this in general.

Ceramic housing with thermostat to prevent over heating with 60°C set temperature.

<table>
<thead>
<tr>
<th>Heating Element</th>
<th>Self-regulating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage Range (ELA80-100) (based on the control power)</td>
<td></td>
</tr>
<tr>
<td>110V</td>
<td>5W 4.5KΩJ</td>
</tr>
<tr>
<td>220V</td>
<td>5W 18KΩJ</td>
</tr>
<tr>
<td>24V DC</td>
<td>5W 200ΩJ</td>
</tr>
<tr>
<td>12V DC</td>
<td>5W 47ΩJ</td>
</tr>
<tr>
<td>Voltage Range (ELA-150-3000) (based on the control power)</td>
<td></td>
</tr>
<tr>
<td>110V</td>
<td>10W 2KΩJ</td>
</tr>
<tr>
<td>220V</td>
<td>10W 8KΩJ</td>
</tr>
<tr>
<td>24V DC</td>
<td>10W 100ΩJ</td>
</tr>
<tr>
<td>12V DC</td>
<td>10W 27ΩJ</td>
</tr>
</tbody>
</table>

3.1.6 Hand Wheel and Declutching

ELA-series actuators are provided with a declutchable manual override system.

- In order to manually operate the actuator, pull the manual override lever towards the hand-wheel until. It will remain in position.
- Turn the hand-wheel until the valve reaches the required position.
- Turn clockwise to close and counter-clockwise to open.

**Note:** The manual override lever returns automatically to auto-position when the actuator is operated electrically.

3.1.7 Lubrication

ELA-series are totally enclosed units with a permanent lubricated gear train (Moly EP Grease). Once installed, lubricating the actuator should not be required. However, periodic preventative maintenance will extend the operating life time of the actuator.
3.2 External Parts for Standard Models

3.2.1 ELA80 - 1200

Window & Indicator

3.2.2 ELA2000 - 3000 (Actuator + Gear Box)

External Parts

<table>
<thead>
<tr>
<th>ELA2000 - 3000</th>
<th>1 Top Cover</th>
<th>2 Body</th>
<th>3 Lever</th>
<th>4 Hand wheel</th>
<th>5 Mechanical Travel Stops</th>
<th>6 Window &amp; Indicator</th>
<th>7 Conduit Entries</th>
<th>8 Base</th>
<th>9 Driving Bushing</th>
<th>10 Gear Box</th>
</tr>
</thead>
</table>
3.3 Internal Parts for Standard Models

3.3.1 ELA80 - 3000

*Note:* ELA80 and ELA100 do not have a torque switch assembly
4 INSTALLATION

4.1 Pre-installation

4.1.1 Use in general service

Verify the actuator’s nameplate to ensure that model number, torque output, operating speed, voltage and enclosure type are correct before installation or use.

It is important to verify that the torque output of the actuator is appropriate for the torque requirements of the valve and that the duty cycle of the actuator is appropriate for the intended application.

4.1.2 Use in potentially explosive atmosphere

Model ELA80 - ELA3000
Type of Enclosure II 2G Ex d IIB T4
Ambient Temperature -20°C +60°C

Installation, commissioning, maintenance, repairs and modification work may only be performed by qualified personnel with extensive knowledge on how to work on explosion-proof electrical equipment.

⚠️ WARNING:

Read this installation, operation and maintenance manual carefully and completely before attempting to install, operate, or troubleshoot the ELA actuator.

4.2 Actuator Mounting

Note: Prior to mounting, the part-turn actuator must be checked for any damage

Damaged parts must be replaced by original spare parts

Mounting is most easily done with the valve shaft pointing vertically upwards. But mounting is also possible in any other position.

The ELA-series electric actuators are supplied with a female double square drive output. The ISO5211 bolt patterns are provided for actuator mounting. The actuator drive bush can be replaced or removed for machining easily.

It is mandatory for the actuator to be firmly secured to a robust mounting bracket or to be mounted directly to the valves’ ISO mounting pad. High tensile bolts or studs with spring locking washers must be used.

The valve stem must be in line with the actuator output drive to avoid side loads to the shaft. To avoid backlash play between the actuator, mounting bracket and valve is not allowed.

⚠️ CAUTION:

Do not attempt to work on your ECON actuator without first shutting off the power supply

Do not attach ropes or hooks to the hand wheel for lifting purposes
### 4.2.1 Actuator Mounting Base Details (ISO 5211)

- **ELA80/100**
  - 4-M8TAP D.P12 P.C.D Ø 70 (ISO 5211 F07)

- **ELA150/200**
  - 4-M10TAP D.P15 P.C.D Ø 102 (ISO 5211 F10)
  - 4-M8TAP D.P12 P.C.D Ø 70 (ISO 5211 F07)

- **ELA300/500/600**
  - 4-M12TAP D.P18 P.C.D Ø 125 (ISO 5211 F12)
  - 4-M10TAP D.P15 P.C.D Ø 102 (ISO 5211 F10)

- **ELA800/1200**
  - 4-M16TAP D.P24 P.C.D Ø 140 (ISO 5211 F14)

- **ELA2000/3000**
  - 4-M20TAP D.P30 P.C.D Ø 165 (ISO 5211 F16)

### 4.2.2 Actuator Drive Bushing

ELA actuators have a Double Square (star) driving bush. This means that the actuators are suitable for valves with a parallel or diagonal stem connection. Hereunder the ELA-versions with standard connection and possible options can be found:

<table>
<thead>
<tr>
<th>ELA Code</th>
<th>Standard Diameter</th>
<th>Optional Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELA80</td>
<td>DS 17mm</td>
<td>DS 9-11-14-16mm</td>
</tr>
<tr>
<td>ELA100</td>
<td>DS 17mm</td>
<td>DS 9-11-14-16mm</td>
</tr>
<tr>
<td>ELA150</td>
<td>DS 17mm</td>
<td>DS 11-14-19-22mm</td>
</tr>
<tr>
<td>ELA200</td>
<td>DS 17mm</td>
<td>DS 11-14-19-22mm</td>
</tr>
<tr>
<td>ELA300</td>
<td>DS 22mm</td>
<td>DS 14-17-19-27mm</td>
</tr>
<tr>
<td>ELA500</td>
<td>DS 27mm</td>
<td>DS 14-17-19-27mm</td>
</tr>
<tr>
<td>ELA600</td>
<td>DS 27mm</td>
<td>DS 14-17-19-27mm</td>
</tr>
<tr>
<td>ELA800</td>
<td>DS 27mm</td>
<td>DS 22mm</td>
</tr>
<tr>
<td>ELA1200</td>
<td>DS 27mm</td>
<td>DS 22-30mm</td>
</tr>
<tr>
<td>ELA2000</td>
<td>DS 36mm</td>
<td>DS 27-46-55mm</td>
</tr>
<tr>
<td>ELA3000</td>
<td>DS 46mm</td>
<td>DS 27-36-55mm</td>
</tr>
</tbody>
</table>
4.3 Limit Switch Setting

- Rotate the hand wheel of the actuator manually to the fully closed position of the valve.
- Use an Allen key, loosen the set screw of the CLOSE limit switch cam
- Rotate the CLOSE cam CW until the limit switch ‘clicks’ (see Figure 1)
- Tighten the set screw with the Allen key
- Manually rotate the hand wheel of the actuator to the fully opened position of the valve
- Use an Allen key to loosen the set screw of the OPEN limit switch cam
- Rotate the OPEN cam CCW until the limit switch ‘clicks’ (see Figure 2)
- Tighten the set screw with the Allen key.

DANGER: HAZARDOUS VOLTAGE.
Make sure all incoming power is disconnected before setting the limit switches

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Figure 1: Close Cam Setting

Figure 2: Open Cam Setting
4.4 Torque Switch Setting

The torque spring, which detects the variation of torque during the operation, is installed to prevent damaging the valve and actuator under overload conditions. If an overload of the actuator occurs, the torque switch will be activated and the actuator stops immediately.

The torque switches are set by manufacturer on the production site. If re-setting is necessary, please contact the ECON actuator distributer before setting the torque switch.

---

CAUTION:

Do not reset the torque switch to a setting higher than the maximum setting stated by the manufacturer.

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4.5 Counter-Clockwise to Close Setting

Standard actuators are normally set to clockwise rotation to close. However, the rotation can be reversed to counter-clockwise to close by simply reconfiguring the wiring as follows:

- Reverse wiring on the main terminal block: 9 & 10 as well as 11 & 12.
- Adjust the visual indicator to suit the counter-clockwise rotation.
  - If a PCU card is installed:
    - Reverse P1 (orange) and P3 (grey) on the PCU board.
    - Move the actuator manually to the half-open position and push the auto-reset button once.

4.6 Mechanical Travel Stop Adjustment

- Loosen both (open and close) travel stopper bolt nuts.
- Operate the actuator manually by turning the hand wheel (the clutch lever must be switched to “manual” first) to the closed position until the “close” open limit switch is being activated.
- Tighten the close travel stopper bolt until resistance is felt. (in this position the close travel stopper bolt should not be able to travel any further).
- Loosen back the close travel stopper bolt by only one turn and tighten the close travel stopper bolt nut.
- Repeat the same operation for setting of the open travel stopper bolt.
4.7 Setting Potentiometer (Optional)

The potentiometer has been calibrated at the factory. However, if re-calibration is required, proceed as follows:

- Manually rotate the hand wheel of the actuator to the fully closed position.
- Loosen the locking bolts of the Potentiometer Gear by using an Allen key.
- While measuring the resistance between P1 (orange) and P2 (grey), gently rotate the Potentiometer Gear until it reaches between 80 - 120 Ω (100 Ω preferred), by using a flat head screw driver.
- Fasten the locking bolts of the Potentiometer Gear by using an Allen key.

⚠️ DANGER: HAZARDOUS VOLTAGE.
Make sure all incoming power is disconnected before setting the potentiometer.

4.8 Current Position Transmitter – CPT (Optional)

The potentiometer is used for the actuator signal feedback. It reads a resistance value which corresponds with the current position of the actuator and transfers it to the CPT card. The CPT indicates the current position of the actuator throughout the complete stroke by a 4 – 20mA output signal.

4.8.1 Standard Features

- **Model**: CPT
- **Power**: 230(110)V AC, 50/60Hz 2VA Max
- **Output Signal**: 4~20mA DC
- **Output Impedance**: 750Ω Max
- **Resolution**: Min 1/1000
- **Position Conversion Accuracy**: ±0.5 ~ ±1.5%
- **Ambient Temperature**: -20 °C to +70 °C
- **Ambient Humidity**: 90% RH Max (Non-condensing)
- **Dielectric Strength**: 1500V AC 1 min (Input to output to power ground)
- **Insulation Resistance**: Above 500V DC 30MΩ
- **Vibration**: 10g, 0~34Hz
4.8.2 Calibration of Zero and Span - CPT

The settings of Zero and Span have been calibrated at the factory. However, if re-calibration is required, proceed as follows:

- Use the manual override to put the actuator in the half open position.
- Apply power (or use the manual override) to move the actuator to its fully closed position (clockwise rotation).
- When the actuator is in the fully closed position, adjust the ZERO close setting on the CPT board until an output value of 4mA is achieved.
- Apply power (or use the manual override) to move the actuator to its fully open position (counter-clockwise rotation).
- When the actuator is in the fully open position, adjust the SPAN open setting on the CPT board until an output value of 20mA is achieved.
### 4.9 PCU-A – Proportional Control Unit Alternating Current (Optional)

PCU-Rev-4 High Performance Controller, using 10 bit A/D converter and 8bit microprocessor technology

<table>
<thead>
<tr>
<th>PCU-Rev-4 Features</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model</strong></td>
</tr>
<tr>
<td><strong>Power</strong></td>
</tr>
<tr>
<td><strong>Input Signal</strong></td>
</tr>
<tr>
<td><strong>Input Impedance</strong></td>
</tr>
<tr>
<td><strong>Output Signal</strong></td>
</tr>
<tr>
<td><strong>Output Impedance</strong></td>
</tr>
<tr>
<td><strong>Output Contact</strong></td>
</tr>
<tr>
<td><strong>Delay Time Adjustment</strong></td>
</tr>
<tr>
<td><strong>Deadband Adjustment</strong></td>
</tr>
<tr>
<td><strong>Resolution Adjustment</strong></td>
</tr>
<tr>
<td><strong>Ambient Temperature</strong></td>
</tr>
<tr>
<td><strong>Ambient Humidity</strong></td>
</tr>
<tr>
<td><strong>Dielectric Strength</strong></td>
</tr>
<tr>
<td><strong>Insulation Resistance</strong></td>
</tr>
</tbody>
</table>

The factory settings of the PCU card are normally set according to the customer requirements at the time of order. However, we strongly recommend that input power, signal input selection and dip switches are to be verified prior to the actuator start up.

**CAUTION: HAZARDOUS VOLTAGE.**

*Turn off all power before setting the actuator.*
4.10 PCU-D – Proportional Control Unit Direct Current (Optional)

PCU-Rev-D1 High Performance Controller, using 10 bit A/D converter and 8bit microprocessor technology

<table>
<thead>
<tr>
<th>PCU-Rev-D1 Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>Power</td>
</tr>
<tr>
<td>Input Signal</td>
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<tr>
<td>Input Impedance</td>
</tr>
<tr>
<td>Output Signal</td>
</tr>
<tr>
<td>Output Impedance</td>
</tr>
<tr>
<td>Output Contact</td>
</tr>
<tr>
<td>Delay Time Adjustment</td>
</tr>
<tr>
<td>Deadband Adjustment</td>
</tr>
<tr>
<td>Resolution Adjustment</td>
</tr>
<tr>
<td>Ambient Temperature</td>
</tr>
<tr>
<td>Ambient Humidity</td>
</tr>
<tr>
<td>Dielectric Strength</td>
</tr>
<tr>
<td>Insulation Resistance</td>
</tr>
</tbody>
</table>

The factory settings of the PCU card are normally set according to the customer requirements at the time of order. However, we strongly recommend that input power, signal input selection and dip switches are to be verified prior to the actuator start up.

**CAUTION: HAZARDOUS VOLTAGE.**

*Turn off all power before setting the actuator.*
4.10.1 LED Signal Indication

<table>
<thead>
<tr>
<th>LED</th>
<th>State</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
<td>On</td>
<td>Power on (auto) Auto calibrating</td>
</tr>
<tr>
<td></td>
<td>Flickering</td>
<td></td>
</tr>
<tr>
<td>Green</td>
<td>On</td>
<td>Fully closed Closing</td>
</tr>
<tr>
<td></td>
<td>Flickering</td>
<td></td>
</tr>
<tr>
<td>Red</td>
<td>On</td>
<td>Fully open Opening</td>
</tr>
<tr>
<td></td>
<td>Flickering</td>
<td></td>
</tr>
<tr>
<td>Yellow</td>
<td>On Flickering</td>
<td>Manual mode Fault indication, either:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- no input signal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- wrong input wiring</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- wrong PIU setting</td>
</tr>
</tbody>
</table>

4.10.2 Setting PCU Functions

A) Selecting Input Signal

User can select different types of input signal by adjusting the DIP switches as follows:

- **4 - 20mA DC**
- **1 - 5V DC**
- **2 - 10V DC**
- **0 - 5V DC**
- **0 - 10V DC**
- **60 Hz**
- **50 Hz**

**Input Signal Switch**

*Note: If not specified, the factory setting of the input signal is 4 - 20mA.*
B) Selecting Output Signal

User can select different types of output signal by adjusting the DIP switch as follows:

- 4 - 20mA DC
- 0 – 10V DC
- 2 – 10V DC
- 0 – 5V DC
- 1 – 5V DC

Note:
*If not specified, the factory setting of the output signal is 4 - 20mA.*

C) Fail Position Setting

User can select the fail position of the actuator in case of control signal failure by adjusting the DIP switches as follows:

- Fail Close
- Fail Open
- Fail Last Position

Fail Close Switch
- Fail Open Switch
- Auto-Full Switch
- CH 1 Switch
- CH 2 Switch
D) Special Signal Setting for Fully Open and Fully Closed

Auto-Full Switch (Switch 3) On (up)
- Signal: 4.3mA  Fully Closed
- Signal: 19.7mA  Fully Open

Auto-Full Switch (Switch 3) Off (down)
- Signal: 4mA  Fully Closed
- Signal: 20mA  Fully Open

E) Auto Setting

This function is used for automatic setting of the PCU card to the predefined limits. First make sure that the actuator has been mounted correctly on the valve. Secondly check the input power and also the input and output signals. Press the ASCAN button once. Regardless the position of the actuator, the actuator will now perform the Auto Setting motion:

1) The blue LED starts flickering
2) The red LED starts flickering for 5 seconds indicating that the actuator is moving to the open position
3) Pause for 2 seconds
4) The green LED starts flickering, indicating that the actuator is moving to the fully closed position
5) Pause (the green LED on) for 3 seconds
6) The red LED starts flickering, indicating that the actuator is moving to the fully open position
7) Pause (the red LED on) for 3 seconds
8) Moving back to the previous position

Note: Since the actuator is already set at the factory, no further settings are required unless the user has made adjustments to the Limit Switch or the Potentiometer settings.

F) Manual Operation

- This function allows the user to manually operate the actuator.
- To access this function, press the ZERO (black) and SPAN (white) buttons simultaneously for 2 seconds and the yellow LED will be lit to indicate that the actuator is in Manual Operation mode.
- Pressing the ZERO button will move the actuator to the close position and pressing the SPAN button will move the actuator to the open position.
- If no operation occurs within 5 seconds, the PCU automatically terminates the Manual Operation mode or alternatively press the ZERO and SPAN buttons simultaneously for 2 seconds. In both cases, the yellow LED will be lit off to indicate the termination of the Manual Operation Mode.
**Note:** During the Manual Operation mode, the input signal is ignored.

G) Customizing Set-points (CH 1 Switch)

- This function is used when the user wants to set different set-points for fully open and fully closed positions.
- For example, if the user wants to assign 5mA as the set-point for the fully closed position, first of all switch-on (move up) the CH1 switch (switch 4). Supply a 5mA signal and push the ZERO button once. Hereafter, the actuator will acknowledge the 5mA signal as the set-point for the fully closed position and transmits a 4mA feedback signal. Similarly, for setting the set-point for the fully open position, supply the desired signal (for example, 19mA) and push the SPAN button once. Switch-off (move down) the CH1 switch to complete the setting.

H) Reversal Acting (CH 2 Switch)

- This function allows the user to reverse the input and output signals for the operation of the actuator.
- For standard operation (CH 2 switch down), the input signal of 4mA operates the actuator to the fully closed position and the actuator transmits the output signal of 4mA. However, if the CH 2 switch is on (up) the input signal of 4mA operates the actuator to the fully open position and still transmits a 4mA output signal.
- Manually move the actuator to the half-open position and push the ASCAN button once to execute the Auto Setting (see 4.8.2 E). Supply signal and check the operation.

I) Delay Time

- The actuator will only start to move if the change of the input signal value is greater than the resolution set value (see 4.8.2 J) and when the signal value is maintained for the duration of the delay time.
- This prevents malfunction of the actuator caused by unwanted signals in the input signal such as noise and interferences.
- Turning the Delay Time Dial in clockwise direction will increase the delay time (Range 0.05 to 7.5 seconds).

<table>
<thead>
<tr>
<th>Dial</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>sec</td>
<td>0.05</td>
<td>0.2</td>
<td>0.4</td>
<td>0.6</td>
<td>0.8</td>
<td>2.5</td>
<td>3.0</td>
<td>3.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dial</th>
<th>8</th>
<th>9</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>sec</td>
<td>4.0</td>
<td>4.5</td>
<td>5.0</td>
<td>5.5</td>
<td>6.0</td>
<td>6.5</td>
<td>7.0</td>
<td>7.5</td>
</tr>
</tbody>
</table>
J) Resolution

- The deadband adjusts the limits of the valve’s deviation between an actual position and a target position. The deadband is set to 0.12mA DC Max.
- Resolution indicates the extent of the reaction on the input signal.
- Low resolution setting may cause the actuator to hunt or to unnecessarily respond to a fluctuating input signal. If so, the resolution must be increased.
- Turning the Resolution Dial in clockwise direction will increase the resolution (Range 0.0625mA to 1mA).

<table>
<thead>
<tr>
<th>Dial</th>
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<tbody>
<tr>
<td>0</td>
<td>0.0625</td>
</tr>
<tr>
<td>1</td>
<td>0.125</td>
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<tr>
<td>2</td>
<td>0.1875</td>
</tr>
<tr>
<td>3</td>
<td>0.25</td>
</tr>
<tr>
<td>4</td>
<td>0.3125</td>
</tr>
<tr>
<td>5</td>
<td>0.375</td>
</tr>
<tr>
<td>6</td>
<td>0.4375</td>
</tr>
<tr>
<td>7</td>
<td>0.5</td>
</tr>
<tr>
<td>8</td>
<td>0.5625</td>
</tr>
<tr>
<td>9</td>
<td>0.625</td>
</tr>
<tr>
<td>A</td>
<td>0.6875</td>
</tr>
<tr>
<td>B</td>
<td>0.75</td>
</tr>
<tr>
<td>C</td>
<td>0.8125</td>
</tr>
<tr>
<td>D</td>
<td>0.875</td>
</tr>
<tr>
<td>E</td>
<td>0.9375</td>
</tr>
<tr>
<td>F</td>
<td>1</td>
</tr>
</tbody>
</table>
4.11 AC/DC Multi-Board (Optional)

A) Terminal block
1. Power 24V AC/DC (DC + signal block)
2. None
3. None
4. Open signal
5. Close signal
6. Power 24V AC/DC (DC – signal block)

B) Power input switch

For AC Mode, #1 switch turn “ON” and #2 switch turn “OFF”

For DC Mode, #1 switch turn “OFF” and #2 switch turn “ON”

* NOTICE: Don’t operate both switch #1 and #2 at the same time. It may damaged the board

C) Motor connect Block

- Red motor wire must be connected to block # 1
- Black motor wire must be connected to block # 2
5  OPERATION

5.1  Electrical Connections and Preliminary Test

⚠️ WARNING:

If working in potentially explosive areas, observe the European Standards EN 60079-14 “Electrical Installation in Hazardous Areas” and EN 60079-17 “Inspection and Maintenance of Electrical Installations in Hazardous Areas”. Work on the electrical system or equipment must only be carried out by a skilled electrician himself or by specially instructed personnel under the control and supervision of such an electrician and in accordance with the applicable electrical engineering rules.

For cable gland or conduit entries that are not used, user or installer shall close those entries by certified blanking elements in order to maintain the flameproof properties of the enclosure.

Flameproof enclosure! Treat cover with care. Seals and sealing surfaces may not be damaged in any way.

- For testing purposes, loosen the bolts of the actuator cover and remove the cover.
- Make sure that the power supply voltage is in accordance with the information on the nameplate of the actuator.
- Put the cables through the cable glands: M25x1,5 – NPT ¾ (USA versions) –G3/4” (Exed versions)
- Connect wires according to the enclosed wiring diagram (See Appendix I)
- Manually move the valve to the half-open position. Then electrically operate the actuator to the fully open position and check if the motor rotates in the correct direction. According to the applicable standards, the actuator must be closing in counter-clockwise direction.
- Test the actuator and check whether the limit switches work correctly
- After testing, check if all cable glands are correctly tightened. Applicable cable glands must be selected to meet the application’s condition. It is recommended to use at least IP67 cable glands.
- Put the cover back on the actuator and tighten the bolts.

⚠️ DANGER:

HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed. Once the power is supplied to the actuator, precautions must be taken if the cover is not mounted.

Note: For more information, refer to Appendix II
6 MAINTENANCE

6.1 Maintenance

CAUTION:

*Turn off all power before performing maintenance on the actuator.*

*POTENTIALLY HIGH PRESSURE VESSEL. Before removing or disassembling your actuator, ensure that the valve or other actuated device is isolated and not under pressure.*

Under normal conditions, maintenance should be carried out at six month intervals. But when the conditions are more severe, more frequent inspections may be advisable.

- Ensure that the actuator is properly aligned with the valve (stem) or other actuated device
- Ensure that all wires are insulated and connected properly
- Ensure that all screws are present and tightened
- Ensure that all internal electrical devices are clean (dry and free of dust)
- Ensure that conduit connections are properly installed and are dry
- Check the internal devices for any condensation
- Check the power supply of the internal heater
- Check the enclosure O-ring seals and verify that the O-rings are not pinched
- Check the declutch mechanism
- Visually inspect the open/close cycle
- Inspect the identification labels for wear and replace it if necessary

⚠️ WARNING:

*Flameproof Enclosure! Before opening, ensure the absence of any gas and voltage*

*Treat cover with care. Seals and sealing surfaces may not be damaged or dirty in any. Do not jam the cover during mounting.*

6.2 Tools

- Metric Allen Key (Hex Wrench) × 1
- Screw Driver × 1
- Metric Spanner × 1
- Wrench 200mm × 1
- Wrench 300mm × 1
- Wire Stripper Long Nose × 1
- Multi-meter (AC, DC, Resistance) × 1
- PCU Board Option: DC Signal Generator (4 – 20mA DC) × 1
7 TROUBLE SHOOTING

The following instructions are listed in the order of the most common difficulties encountered during the installation and start-up.

! The actuator does not respond
- Visually inspect the actuator and check if no damage has occurred during shipping and handling of the actuator.
- Verify the line voltage supplied to the actuator; it must match with the rating on the actuator’s nameplate.
- Compare and check the internal wiring with the supplied wiring diagram of the actuator
- Check the limit switch cams

! The actuator is supplied with power but does not operate
- Verify the line voltage supplied to the actuator; it must match with the rating on the actuator’s nameplate.
- Check if the actuator torque is greater than the valve torque
- Check the limit switch cams
- Check if the torque switches have not been tripped
- Check the mechanical travel stop adjustment
- Check if the rotating direction matches (According to the applicable standards, valves and actuators must open in counter-clockwise direction)
- Check for any corrosion and condensation. Electrical or mechanical devices may have been affected
- Verify if coupler/bracket is correctly installed and may not block the actuator rotation

! Actuator runs erratically
- Check the ambient temperature
- Verify that the duty cycle has not been exceeded
- Check the position of the manual override lever

! Optional Equipment(s)

1) Potentiometer Current Position Transmitter
- Check the resistance value
- Check the potentiometer gear for jamming
- Check the ZERO and SPAN calibration
- Check the board for any damage

2) Current Position Transmitter
- Verify the input signal
- Check the configuration of the dip switches
- Check the board for any damage
8 INSTALLATION AND MAINTENANCE TIPS

CAUTION:

Regular inspection and maintenance should be performed by qualified and trained personnel

If working in potentially explosive areas, be sure to comply with the standard EN 60079-14 “Electrical Installations in Hazardous Areas”.

Working on the actuator that is in open position and under voltage must only be performed if it is assured that there is no danger of explosion for the duration of the work.

Pay attention to national regulations

For any installation and maintenance work, the followings should be noted:

- Check the actuator visually. Ensure that no external damage or changes are visible. The electrical cables must not be damaged and wired correctly.
- Cable entries, cable glands, plugs, etc. have to be checked whether they are correctly tightened and sealed.
- Check if the Ex-connections are correctly fastened.
- Check for possible discoloration of the terminal strip and wires as this may indicate an increased temperature.
- Check the flame path seals of the flameproof enclosures for any dirt and corrosion. Since the dimensions of all Ex seals are strictly defined and inspected, no mechanical work shall be performed on them.
- All cables and motor protection elements have to be checked.
- If any defects are detected during maintenance that may affect the safety, repair measures have to be taken immediately.
- Any kind of coating for sealing surfaces is not permitted.
- When replacing parts, seals, etc., only original spare ones must be used.

⚠️ WARNING:

Flameproof Enclosure! Before opening, ensure the absence of any gas and voltage

Treat cover with care. Seals and sealing surfaces may not be damaged or dirty in any way. Do not jam the cover during fitting
APPENDIX 1 : Wiring Diagrams

ELECTRIC WIRING DIAGRAM FOR ACTUATOR ELA80 AND 100
110 OR 230VAC 1PH STANDARD

--- Diagram ---

APPLENCE 1 : Wiring Diagrams

ECON actuator Fig 7907, type ELA80 – 3000
REV.2

www.eriks.com
ECON actuator Fig 7907, type ELA80 – 3000

ELECTRIC WIRING DIAGRAM FOR ACTUATOR ELA80 AND 100

24VDC STANDARD

INCOMING POWER

NO
K1–2
NO
K2–2/K1–3/K2–3

CLOSE LAMP
OPEN LAMP
OPEN
STOP
CLOSE

AUX. CONTACT
2 EXTRA SWITCHES
MAX. 250VAC 16A

SUGGESTED CUSTOMER’S WIRING

ACTUATOR WIRING

BASE
EARTH

1 2 3 4 5 6 7 8 9 10 11 12 13

M

HEATER
5W

CLS
CLOSE LIMIT SWITCH
250VAC 16A

OLS
OPEN LIMIT SWITCH
250VAC 16A

AGLS
AUX. CLOSED LIMIT SWITCH
250VAC 16A

AGLS
AUX. OPEN LIMIT SWITCH
250VAC 16A

TP
THERMAL PROTECTOR
250VAC 15A

*Each actuator should be powered through its own individual switch or relay contacts to prevent cross feed between two or more actuators.
ELECTRIC WIRING DIAGRAM FOR ACTUATOR ELABO AND 100

24VDC AC–DC CONTROL BOARD

DC (24 V)

DIP SWITCHES

ON ON

= DC MODE

OFF OFF

1 = OFF

2 = ON

AUX. CONTACT

2 EXTRA SWITCHES

MAX. 250VAC 16A

SUGGESTED CUSTOMER’S WIRING

ACTUATOR WIRING

1 2 3

4 5 6 7 8 9 10 11 12 13

AC/DC CONTROL BOARD

M

HEATER 5W

CLS CLOSE LIMIT SWITCH 250VAC 16A

OLS OPEN LIMIT SWITCH 250VAC 16A

TP TERMINAL PROTECTOR 250VAC 15A

* EACH ACTUATOR SHOULD BE POWERED THROUGH IT'S OWN INDIVIDUAL SWITCH OR RELAY CONTACTS TO PREVENT CROSS FEED BETWEEN TWO OR MORE ACTUATORS.

ECON actuator Fig 7907, type ELA80 – 3000

REV.2

www.eriks.com
ELECTRIC WIRING DIAGRAM FOR ACTUATOR ELABO AND 100

110 OR 230VAC 1PH CPT

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DESCRIPTION</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLS</td>
<td>CLOSE LIMIT SWITCH</td>
<td>250VAC 16A</td>
</tr>
<tr>
<td>OLS</td>
<td>OPEN LIMIT SWITCH</td>
<td>250VAC 16A</td>
</tr>
<tr>
<td>ACLS</td>
<td>AUX CLOSE LIMIT SWITCH</td>
<td>250VAC 16A</td>
</tr>
<tr>
<td>ADLS</td>
<td>AUX OPEN LIMIT SWITCH</td>
<td>250VAC 16A</td>
</tr>
<tr>
<td>TP</td>
<td>THERMAL PROTECTION</td>
<td>250VAC 15A</td>
</tr>
</tbody>
</table>

*Each actuator should be powered through its own individual switch or relay contacts to prevent cross feed between two or more actuators.*
ELECTRIC WIRING DIAGRAM FOR ACTUATOR
ELA150 TILL ELA3000, 110VAC OR 230VAC 1 PH STANDARD

INCOMING POWER

AUX. CONTACT
2 EXTRA SWITCHES
MAX. 250VAC 16A

SUGGESTED CUSTOMER'S WIRING
ACTUATOR WIRING

BASE EARTH

CONDENSER

T P

7777

TORQUE AND LIMIT SWITCH OPERATION

<table>
<thead>
<tr>
<th>CTS 1–3</th>
<th>&quot;CLOSING TORQUE SWITCHES INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS CLOSING CYCLE&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>OTS 1–3</td>
<td>&quot;OPENING TORQUE SWITCHES INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS OPENING CYCLE&quot;</td>
</tr>
</tbody>
</table>

SYMBOI | DESCRIPTION | RATING
-------|-------------|--------
CLS     | CLOSE LIMIT SWITCH | 250VAC 16A
OLS     | OPEN LIMIT SWITCH  | 250VAC 16A
CTS     | CLOSE TORQUE SWITCH | 250VAC 16A
OTS     | OPEN TORQUE SWITCH  | 250VAC 16A
ACLs    | AUX. CLOSE LIMIT SWITCH | 250VAC 16A
AOLs    | AUX. OPEN LIMIT SWITCH | 250VAC 16A
TP      | THERMAL PROTECTOR    | 250VAC 16A

*EACH ACTUATOR SHOULD BE Powered THROUGH IT'S OWN INDIVIDUAL SWITCH OR RELAY CONTACTS TO PREVENT CROSS FEED BETWEEN TWO OR MORE ACTUATORS.
ELEC TRIC WIRING DIAGRAM FOR ACTUATOR
ELA150, ELA200 AND ELA300 24VDC STANDARD

INCOMING POWER

NO K1–2
NO K2–2
K1–3
NO K2–2

A2
A1
A2
A1

CUT TORQUE AMP
CLOSE AMP
OPEN AMP

AUX. CONTACT
2 EXTRA SWITCHS
MAX. 250VAC 16A

SUGGESTED CUSTOMER'S WIRING
ACTUATOR WIRING

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

M

HEATER 10W

TP

CTS

ONES

Ols

CLS

COM

COM

Ols

CLS

COM

COM

COM

COM

COM

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CO
ELECTRIC WIRING DIAGRAM FOR ACTUATOR
ELA150, ELA200 AND ELA300 24VAC AC–DC CONTROL BOARD

INCOMING POWER
AC (24V)

DIP SWITCHES
1=ON
2=OFF

SUGGESTED CUSTOMER’S WIRING
ACTUATOR WIRING

TOURQUE AND LIMIT SWITCH OPERATION
CTS 1–3
*CLOSING TORQUE SWITCH INTERRUPTS CONTROL IF
MECHANICAL OVERLOAD OCCURS CLOSING CYCLE
OTS 1–3
*OPENING TORQUE SWITCH INTERRUPTS CONTROL IF
MECHANICAL OVERLOAD OCCURS OPENING CYCLE

SYMBOL
CLS
QLS
CTS
OTS
ACLS
AGLS
TP

DESCRIPTION
CLOSE LIMIT SWITCH
OPEN LIMIT SWITCH
CLOSE TORQUE SWITCH
OPEN TORQUE SWITCH
AUX. CLOSE LIMIT SWITCH
AUX. OPEN LIMIT SWITCH
TERMAL PROTECTOR

RATING
250VAC 16A
250VAC 16A
250VAC 16A
250VAC 16A
250VAC 16A
250VAC 16A
250VAC 15A

*EACH ACTUATOR SHOULD BE POWERED THROUGH ITS OWN
INDIVIDUAL SWITCH OR RELAY CONTACTS TO PREVENT CROSS
FEED BETWEEN TWO OR MORE ACTUATORS

ECON actuator Fig 7907, type ELA80 – 3000
www.eriks.com

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ELECTRIC WIRING DIAGRAM FOR ACTUATOR
ELA150, ELA200 AND ELA300 24VDC AC–DC CONTROL BOARD

TORQUE AND LIMIT SWITCH OPERATION

<table>
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<tbody>
<tr>
<td>CTS</td>
<td>CLOSE LIMIT SWITCH</td>
<td>250VAC 16A</td>
</tr>
<tr>
<td>OTS</td>
<td>OPEN LIMIT SWITCH</td>
<td>250VAC 16A</td>
</tr>
<tr>
<td>CTS</td>
<td>CLOSE TORQUE SWITCH</td>
<td>250VAC 16A</td>
</tr>
<tr>
<td>OTS</td>
<td>OPEN TORQUE SWITCH</td>
<td>250VAC 16A</td>
</tr>
<tr>
<td>ACLS</td>
<td>AUX CLOSE LIMIT SWITCH</td>
<td>250VAC 16A</td>
</tr>
<tr>
<td>AOLS</td>
<td>AUX OPEN LIMIT SWITCH</td>
<td>250VAC 16A</td>
</tr>
<tr>
<td>TP</td>
<td>TERMINAL PRODUCER</td>
<td>250VAC 16A</td>
</tr>
</tbody>
</table>

*Each actuator should be powered through its own individual switch or relay contacts to prevent cross feed between two or more actuators.
ECON actuator Fig 7907, type ELA80 – 3000

REV.2

www.eriks.com

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ECON actuator Fig 7907, type ELA80 – 3000
REV.2
www.eriks.com
ELECTRIC WIRING DIAGRAM FOR ACTUATOR
ELA150 TILL ELA3000, 110 OR 230VAC 1PH PCU

* ONLY AUTO *
13 14 (JUMP)

TORQUE AND LIMIT SWITCH OPERATION

<table>
<thead>
<tr>
<th>CTS 1-3</th>
<th>MECHANICAL OVERLOAD OCCURS CLOSING CYCLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>UTS 1-3</td>
<td>MECHANICAL OVERLOAD OCCURS OPENING CYCLE</td>
</tr>
</tbody>
</table>

**SYMBOL**

- CLS: CLOSE LIMIT SWITCH
- OLS: OPEN LIMIT SWITCH
- CTS: CLOSE TORQUE SWITCH
- OTS: OPEN TORQUE SWITCH
- ACS: AUX CLOSE LIMIT SWITCH
- AOLS: AUX OPEN LIMIT SWITCH
- TP: TERMINAL PROTECTOR

**RATING**

- 250VAC 16A

* EACH ACTUATOR SHOULD BE POWERED THROUGH IT’S OWN INDEPENDENT SWITCH OR RELAY CONTACTS TO PREVENT CROSS FEED BETWEEN TWO OR MORE ACTUATORS

ECON actuator Fig 7907, type ELA80 – 3000
REV.2

www.eriks.com
DANGER:

HAZARDOUS VOLTAGE. No electrical power should be connected until all wiring and limit switch adjustments have been completed.
APPENDIX II : Grounding

ELA80 - 100 Grounding

Terminal Block #1 should be used for internal ground

ELA150 - 3000 Grounding

Terminal Block #1 should be used for internal ground

⚠️ DANGER:

Flameproof Enclosure! Before opening, ensure that there is no explosive gas or voltage