ECON ELECTRIC ACTUATOR
Fig. 7907, type ELA60

Fig. 7907 ELA60
IP67 (optionally IP68)

Fig. 7907 ELA60 Ex
EX II 2G Ex d IIB T4 Gb

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

Operating and Instruction Manual for actuator: ELA60
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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 ELA60 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 ELA60 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.
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

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

B) Explosion proof

- ECON logo (trade mark)
- CE ATEX mark
- Electrical power supply
- Model
- Torque
- Cable entry temperature limitation
- Cable entry size
- Enclosure
- Rated current
- Operating time (seconds)
- Options
- Serial No.

2.1.2 Certification

a) EX II 2G Ex d IIB T4 Gb

2.2 Initial Inspection

Upon on the receipt of the actuator, the user should inspect the condition of the product and ensure that 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 shipped, 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 ELA60 electric actuators are designed to provide reliable and efficient operation of 90 degree quarter turn valves, such as Ball and Butterfly valves, etc.

3.1.1 Standard Technical Data

<table>
<thead>
<tr>
<th>Description</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enclosure Rated</td>
<td>Weatherproof IP67, NEMA 4, 4x and 6</td>
</tr>
<tr>
<td>Enclosure</td>
<td>High grade aluminum alloy, corrosion coated</td>
</tr>
<tr>
<td>Power Supply</td>
<td>115 / 230VAC 1 Ph 60/50Hz, 4 VDC and 24VDC/DC</td>
</tr>
<tr>
<td>Duty Type</td>
<td>S4 35% (IEC 60034)</td>
</tr>
<tr>
<td>Motor</td>
<td>AC reversible motor</td>
</tr>
<tr>
<td>Limit Switches</td>
<td>2 x open/close SPDT, 250V AC 5A rating</td>
</tr>
<tr>
<td>Auxiliary Limit Switches</td>
<td>2 x open/close SPDT, 250V AC 5A rating</td>
</tr>
<tr>
<td>Torque Switches</td>
<td>N/A</td>
</tr>
<tr>
<td>Stall Protection</td>
<td>Built-in thermal protection</td>
</tr>
<tr>
<td>Indicator</td>
<td>Continuous position indicator</td>
</tr>
<tr>
<td>Manual Override</td>
<td>Manual handle</td>
</tr>
<tr>
<td>Space Heater</td>
<td>2W</td>
</tr>
<tr>
<td>Conduit Entries</td>
<td>2 x PG13.5 or 2x ½&quot; NPT (North American versions)</td>
</tr>
<tr>
<td></td>
<td>Explosion proof versions: 2x ½&quot; NPT, M20 or M25</td>
</tr>
<tr>
<td>Lubrication</td>
<td>Grease moly EP</td>
</tr>
<tr>
<td>Ambient Temperature</td>
<td>-20°C (-4°F) up to +80°C (176°F)</td>
</tr>
<tr>
<td></td>
<td>Explosion proof: -20°C (-4°F) up to +60°C (140°F)</td>
</tr>
<tr>
<td>External Coating</td>
<td>Dry powder polyester</td>
</tr>
</tbody>
</table>

3.1.2 ELA60 additional technical data

Power Supply 115 and 230VAC

<table>
<thead>
<tr>
<th>Type</th>
<th>Maximum torque in in-lb (Nm)</th>
<th>Operating time in s/° at 50/60Hz</th>
<th>Duty cycle according to IEC 60034-1-54</th>
<th>Valve top flange connection according to ISO 5211</th>
<th>115VAC Rated current in A</th>
<th>115VAC Stall current in A</th>
<th>115VAC Max. torque current in A</th>
<th>230VAC Rated current in A</th>
<th>230VAC Stall current in A</th>
<th>230VAC Max. torque current in A</th>
<th>Power in W</th>
<th>Weight in kg (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELA60</td>
<td>60 (531)</td>
<td>14/12</td>
<td>35%</td>
<td>F03-F05-F07, V14</td>
<td>0.35/0.35</td>
<td>0.39/0.39</td>
<td>0.47/0.49</td>
<td>0.18/0.17</td>
<td>0.21/0.20</td>
<td>0.24/0.25</td>
<td>36/37</td>
<td>3.6 (6.6)</td>
</tr>
</tbody>
</table>

Power Supply 24VDC

<table>
<thead>
<tr>
<th>Type</th>
<th>Maximum torque in in-lb (Nm)</th>
<th>Operating time in s/° at maximum torque*</th>
<th>Duty cycle according to IEC 60034-1-54</th>
<th>Valve top flange connection according to ISO 5211</th>
<th>Rated current in A</th>
<th>Max. torque current in A</th>
<th>Stall current in A</th>
<th>Power in W</th>
<th>Weight in kg (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELA60</td>
<td>60 (531)</td>
<td>15</td>
<td>35%</td>
<td>F03-F05-F07, V14</td>
<td>0.80</td>
<td>1.70</td>
<td>3.50</td>
<td>41</td>
<td>3.6 (6.6)</td>
</tr>
</tbody>
</table>

*The exact operating time for 24VDC actuators depends on the effective load.

3.1.3 Options

<table>
<thead>
<tr>
<th>Description</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXA</td>
<td>Explosion proof enclosure (Ex d II B T4 Gb IP67)</td>
</tr>
<tr>
<td>WTA</td>
<td>Watertight Enclosure IP68 (10m/24hr) / Nema 6P</td>
</tr>
<tr>
<td>PIU</td>
<td>Potentiometer Unit (0~1KΩ)</td>
</tr>
<tr>
<td>PCU</td>
<td>Proportional Control Unit (input, output 0<del>10V DC, 4</del>20mA DC)</td>
</tr>
<tr>
<td>CPT</td>
<td>Current Position Transmitter (output 4~20mA DC)</td>
</tr>
</tbody>
</table>
3.1.4 Duty Cycle ¹)

Duty cycle rated IEC60034 – S4 35%

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

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

<table>
<thead>
<tr>
<th>Intermittent duty S4</th>
</tr>
</thead>
<tbody>
<tr>
<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.

3.1.6 Manual Override

ELA60 actuators are provided with a manual override system. The standard ELA60 actuators are equipped with a manual override nut. This nut is located on the bottom of the unit and can be easily operated with a 5mm screwdriver. Turn the manual override nut until the valve reaches the required position (turn clockwise to fully open and counter-clockwise to fully close).

The manual override system of the ELA60-Ex d actuators can be operated by using a 4mm Allen key only. Turn the manual override (Allen key) until the valve reaches the required position (turn clockwise to fully open and counter-clockwise to fully close).
3.1.7 Lubrication

ELA60 electric actuator is a totally enclosed unit 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 lifetime of the actuator.

3.2 External Parts for Standard Models

<table>
<thead>
<tr>
<th>External Parts</th>
<th>ELA60</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Top Cover</td>
</tr>
<tr>
<td>2</td>
<td>Body</td>
</tr>
<tr>
<td>3</td>
<td>Cable Entry 2x PG 13.5 or 2x ½&quot;NPT (North American versions)</td>
</tr>
<tr>
<td>4</td>
<td>Drive Shaft (star 14mm)</td>
</tr>
<tr>
<td>5</td>
<td>Mounting Base (F03, F05, F07)</td>
</tr>
<tr>
<td>6</td>
<td>Hand Wheel</td>
</tr>
<tr>
<td>7</td>
<td>Name Plate</td>
</tr>
<tr>
<td>8</td>
<td>Cover Bolt</td>
</tr>
<tr>
<td>9</td>
<td>Indicator</td>
</tr>
</tbody>
</table>

3.3 Internal Parts for Standard Models

<table>
<thead>
<tr>
<th>Internal Parts</th>
<th>ELA60</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Motor</td>
</tr>
<tr>
<td>2</td>
<td>Indicator</td>
</tr>
<tr>
<td>3</td>
<td>Open Limit Switch</td>
</tr>
<tr>
<td>4</td>
<td>Close Limit Switch</td>
</tr>
<tr>
<td>5</td>
<td>Additional Open Limit Switch</td>
</tr>
<tr>
<td>6</td>
<td>Additional Close Limit Switch</td>
</tr>
<tr>
<td>7</td>
<td>Potentiometer Unit (Optional)</td>
</tr>
<tr>
<td>8</td>
<td>Terminal</td>
</tr>
<tr>
<td>9</td>
<td>Heater</td>
</tr>
<tr>
<td>10</td>
<td>Capacitor</td>
</tr>
</tbody>
</table>
4 INSTALLATION

4.1 Pre-installation

- Please check if the electric power supply corresponds with your specification and the information on the actuator type plate.
- Make sure the power supply has been switched off before you start wiring the actuator.

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.

Make sure the power supply has been switched off before you start wiring the actuator.

4.1.2 Use in potentially explosive atmosphere

Model: ELA60 Ex
Type of Enclosure: II 2G Ex d II B T4
Ambient Temperature: -20°C (-4°F) up to +60°C (140°F)

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:**

1. Prior to mounting, the part-turn actuator must be checked for any damage
2. 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 ELA60 series actuators are supplied with a female double square drive. The ISO5211 bolt patterns are provided for actuator mounting. The actuator drive bushing can be replaced or removed for machining easily.

**CAUTION:**

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

Do not attach ropes for lifting purposes to the manual override device.
4.2.1 Actuator Mounting Base Details

**Actuator: Fully Closed**

**Valve: Fully Closed**

**Direct Mounting (ISO Standard)**

**Bracket Mounting**

**Note:** Make sure both the actuator and valve are fully closed.

**Actuator Mounting Base: F03/F05 and F07**

**Square Adapter**
14mm → 11mm
11mm → 9mm

**Star Adapter**
14mm → 11mm
11mm → 9mm

**F03, F05, F07**

**Double square 14mm**

---

**DANGER:**
HAZARDOUS VOLTAGE. Make sure all incoming power is disconnected before mounting the actuator on the valve.
4.3 Limit Switch Setting

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

---

**DANGER:**

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

---

![Figure 1: Close Cam Setting](image1)

![Figure 2: Open Cam Setting](image2)
4.4 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.

---

4.5 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.

4.5.1 Standard Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>CPT</td>
</tr>
<tr>
<td>Power</td>
<td>230 or 115VAC, 50/60Hz 2VA Max</td>
</tr>
<tr>
<td>Output Signal</td>
<td>4–20mA DC</td>
</tr>
<tr>
<td>Output Impedance</td>
<td>750Ω Max</td>
</tr>
<tr>
<td>Resolution</td>
<td>Min 1/1000</td>
</tr>
<tr>
<td>Position Conversion Accuracy</td>
<td>±0,5 ~±1,5%</td>
</tr>
<tr>
<td>Ambient Temperature</td>
<td>-20°C (~-4°F) to 70°C (158°F)</td>
</tr>
<tr>
<td>Ambient Humidity</td>
<td>90% RH Max (Non-condensing)</td>
</tr>
<tr>
<td>Dielectric Strength</td>
<td>1500V AC 1 Min (Input to output to power ground)</td>
</tr>
<tr>
<td>Insulation Resistance</td>
<td>Above 500V DC 30MΩ</td>
</tr>
<tr>
<td>Vibration</td>
<td>10g, 0~34Hz</td>
</tr>
</tbody>
</table>
4.5.2 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 into 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 a reading of 20mA is achieved.
4.6 PCU-A 1P - Proportional Control Unit Alternating Current (Optional)

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

<table>
<thead>
<tr>
<th>PCU-A 1P Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>Power</td>
</tr>
<tr>
<td>Input Signal</td>
</tr>
<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.*
4.7 PCU-D - Proportional Control Unit Direct Current (Optional)

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.*
4.7.1 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)</td>
</tr>
<tr>
<td></td>
<td>Flickering</td>
<td>Auto calibrating</td>
</tr>
<tr>
<td>Green</td>
<td>On</td>
<td>Fully closed</td>
</tr>
<tr>
<td></td>
<td>Flickering</td>
<td>Closing</td>
</tr>
<tr>
<td>Red</td>
<td>On</td>
<td>Fully open</td>
</tr>
<tr>
<td></td>
<td>Flickering</td>
<td>Opening</td>
</tr>
<tr>
<td>Yellow</td>
<td>On</td>
<td>Manual mode</td>
</tr>
<tr>
<td></td>
<td>Flickering</td>
<td>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>

4.7.2 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  2  3

1 - 5V DC
1  2  3

2 - 10V DC
1  2  3

0 - 5V DC
1  2  3

0 - 10V DC
1  2  3

60 Hz
4

50 Hz
4
```

Note: specified, the factory setting of the input signal is 4 - 20mA.

If not
B) Selecting Output Signal

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

<table>
<thead>
<tr>
<th>DIP Switch Configuration</th>
<th>Output Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] [ ]</td>
<td>4 - 20mA DC</td>
</tr>
<tr>
<td>[ ] [ ]</td>
<td>0 – 10V DC</td>
</tr>
<tr>
<td>[ ] [ ]</td>
<td>2 – 10V DC</td>
</tr>
<tr>
<td>[ ] [ ]</td>
<td>0 – 5V DC</td>
</tr>
<tr>
<td>[ ] [ ]</td>
<td>1 – 5V DC</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>DIP Switch Configuration</th>
<th>Fail Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] [ ] [ ] [ ] [ ]</td>
<td>Fail Close</td>
</tr>
<tr>
<td>[ ] [ ] [ ] [ ] [ ]</td>
<td>Fail Open</td>
</tr>
<tr>
<td>[ ] [ ] [ ] [ ] [ ]</td>
<td>Fail Last Position</td>
</tr>
</tbody>
</table>

### CH2 Switch
- CH1 Switch
- Auto-Full Switch
- Fail Open Switch
- Fail Close Switch
D) **Special Signal Setting for Fully Open and Fully Closed**

![Signal Settings Diagram]

<table>
<thead>
<tr>
<th>Auto-Full Switch (Switch 3) On (up)</th>
<th>Auto-Full Switch (Switch 3) Off (down)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal: 4.3mA</td>
<td>Signal: 19.7mA</td>
</tr>
<tr>
<td>Fully Closed</td>
<td>Fully Open</td>
</tr>
<tr>
<td>Signal: 4mA</td>
<td>Signal: 20mA</td>
</tr>
<tr>
<td>Fully Closed</td>
<td>Fully Open</td>
</tr>
</tbody>
</table>

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. 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, indicating that the actuator is moving to the open position for 5 seconds
  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 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 closed 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 the 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 (moved 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 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).
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 mA DC</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0625</td>
<td>0.125</td>
<td>0.1875</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>0.3125</td>
<td>0.375</td>
<td>0.4375</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>0.5625</td>
<td>0.625</td>
<td>0.6875</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>0.8125</td>
<td>0.875</td>
<td>0.9375</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
4.8 AC/DC Multi-Board (Optional)

A) Terminal block

2 CLOSE LAMP
3 NONE
4 OPEN LAMP
5 NONE
6 LAMP COM
7 Power 24V AC/DC (DC + input terminal)
8 CLOSE signal
9 OPEN signal
10 NONE
11 NONE
12 Power 24V AC/DC (DC – input terminal)

B) Power in-put switch

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

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

NOTE: Don’t operate both switches #1 and #2 at the same time. It may damage the board
5 OPERATION

5.1 Electrical Connections and Preliminary Test

- 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: 2x PG13.5 or 2x ½"NPT (North American 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 to 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 unit, precautions must be taken if the cover is not mounted on the actuator.
6 MAINTENANCE

6.1 Maintenance

CAUTION:

Turn off all power before performing maintenance on the actuator.

POTENTIALY 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:

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

6.2 Tools

- Metric Allen key (Hex Wrench) x 1
- Screw driver x 1
- Metric Spanner x 1
- Wrench 200mm x 1
- Wrench 300 mm x 1
- Wire stripper Long Nose x 1
- Multi-meter (AC, DC, Resistance) x 1
- PCU Board option: DC Signal Generator (4 – 20mA DC) x 1
- PCU & CTU Board Option: 1mA Ammeter (0 – 25mA)
7 TROUBLESHOOTING

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

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Probable Cause</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor will not run</td>
<td>Open in control circuit</td>
<td>Consult the appropriate wiring diagram and check for continuity</td>
</tr>
<tr>
<td></td>
<td>Insulation resistance breakdown in motor</td>
<td>Perform megger Test</td>
</tr>
<tr>
<td>No power available to the actuator</td>
<td>Tripped circuit breaker</td>
<td>Reset circuit breaker</td>
</tr>
<tr>
<td>Manual Override Nut hard to turn</td>
<td>Valve stem improperly lubricated</td>
<td>Lubricate with grease</td>
</tr>
<tr>
<td></td>
<td>Actuator lubrication has broken down</td>
<td>Clean out old grease and replace with recommended lubricant</td>
</tr>
<tr>
<td></td>
<td>Valve packing gland too tight</td>
<td>Loosen packing gland nuts as far as necessary and possible</td>
</tr>
<tr>
<td></td>
<td>Jammed valve</td>
<td>Refer to valve maintenance manual</td>
</tr>
<tr>
<td>Valve only opens or closes partially</td>
<td>Limit switch improperly set</td>
<td>Check setting and reset if necessary</td>
</tr>
<tr>
<td>with motor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manual Override Nut does not</td>
<td>Stripped gearing</td>
<td>Replace as necessary</td>
</tr>
<tr>
<td>operate valve</td>
<td>Broken hand wheel shaft</td>
<td>Replace as necessary</td>
</tr>
<tr>
<td>Motor runs but will not operate valve</td>
<td>Broken valve stem</td>
<td>Repair or replace as necessary</td>
</tr>
<tr>
<td></td>
<td>Stripped gearing</td>
<td>Replace as necessary</td>
</tr>
</tbody>
</table>

! 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 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 with the rotating direction of the valve.
- Check for any corrosion and condensation. Electrical or mechanical devices may have been affected.
- Verify that 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 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 DIMENSIONS

8.1 ELA60 On/Off Type

ENCLOSURE: IP67
TORQUE: 60Nm (531 lb-in)
OPERATION TIME: 13 SEC
POSITION SWITCH: 4 SPOT SWITCH
CABLE ENTRY: 2x PG13.5 or 2x ½”
NPT (North American versions)
MOUNTING FLANGE: F03/F05/F07
ACC. TO DIN/ISO5211
8.2  ELA60 PCU Type (Optional)

NOTE: For more information regarding this product, please contact your nearest supplier on www.eriks.com
ELECTRIC WIRING DIAGRAM FOR ACTUATOR ELA60

115VAC OR 230VAC, 1PH STANDARD

<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 5A</td>
</tr>
<tr>
<td>OLS</td>
<td>OPEN LIMIT SWITCH</td>
<td>250VAC 5A</td>
</tr>
<tr>
<td>ACLS</td>
<td>AUX. CLOSE LIMIT SWITCH</td>
<td>250VAC 5A</td>
</tr>
<tr>
<td>AOLS</td>
<td>AUX. OPEN LIMIT SWITCH</td>
<td>250VAC 5A</td>
</tr>
<tr>
<td>C</td>
<td>CIRCUIT BREAKER</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>BASE EARTH</td>
<td></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 ELA60

Rev. 7  www.eriks.com

ECON actuator Fig 7907, type ELA60
Rev. 7  www.eriks.com
ECON actuator Fig 7907, type ELA60

**ELECTRIC WIRING DIAGRAM FOR ACTUATOR ELA60**

24VDC WITH AC-DC CONTROL BOARD

**INCOMING POWER**

DC (24V)

**DIP SWITCHES**

1. ON
2. OFF

1 - ON
2 - OFF

**SUGGESTED CUSTOMER’S WIRING**

**ACTUATOR WIRING**

**SYMBOL** | **DESCRIPTION** | **RATING**
---|---|---
CLS | CLOSE LIMIT SWITCH | 250VAC 5A
CLS | OPEN LIMIT SWITCH | 250VAC 5A
ACLs | AUX CLOSE LIMIT SWITCH | 250VAC 5A
AOLS | AUX OPEN LIMIT SWITCH | 250VAC 5A

*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 ELA60

115 OR 230VAC 1PH PCU

INCOMING POWER
AC 1PH (220V)

0-10V INPUT SIGNAL

CLOSED LOOP POSITION INDICATOR

CLOSED LOOP

SUGGESTED CUSTOMER'S WIRING
ACTUATOR WIRING

PROPORTIONAL CONTROL UNIT BOX

AUX. CONTACT
2 EXTRA SWITCHS
MAX. 250VAC 5A

<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 5A</td>
</tr>
<tr>
<td>OLS</td>
<td>OPEN LIMIT SWITCH</td>
<td>250VAC 5A</td>
</tr>
<tr>
<td>ACLS</td>
<td>AUX CLOSE LIMIT SWITCH</td>
<td>250VAC 5A</td>
</tr>
<tr>
<td>AOLS</td>
<td>AUX OPEN LIMIT SWITCH</td>
<td>250VAC 5A</td>
</tr>
<tr>
<td>TP</td>
<td>THERMAL PROTECTOR</td>
<td>250VAC 15A</td>
</tr>
</tbody>
</table>

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

DATE: 12-07-2014
REVISION DATE: 20-11-2014

ECON actuator Fig 7907, type ELA60 Rev. 7
ELECTRIC WIRING DIAGRAM FOR ACTUATOR ELA60

115 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 5A</td>
</tr>
<tr>
<td>OLS</td>
<td>OPEN LIMIT SWITCH</td>
<td>250VAC 5A</td>
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<tr>
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<td>AUX CLOSE LIMIT SWITCH</td>
<td>250VAC 5A</td>
</tr>
<tr>
<td>AOCLS</td>
<td>AUX OPEN LIMIT SWITCH</td>
<td>250VAC 5A</td>
</tr>
<tr>
<td>TP</td>
<td>THERMAL PROTECTOR</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.*
Danger:
Harzourdous Voltage. Electrical power must not be connected until all wiring and limit switch adjustments have been completed. Once the power is supplied to the unit, precautions must be taken if the cover is not mounted on the actuator.

If you have questions about this product, please contact your nearest supplier on www.eriks.com