ELECTRICAL ACTUATOR
USER MANUAL

NOVEMBER/ 2018
PLEASE READ THE INSTRUCTIONS BEFORE USE

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1. PURPOSE OF DOCUMENT

This document is prepared for showing TORK brand named electrical actuators’ installation, operation and maintenance information.

Security Notifications:

**Warning:** This sign Show personal and product’s security notifications. It warns user about probably dangers. If cautions are not regarded personal injuring or product damaged is become unavoidable.

2. PRODUCT OVERVIEW

Electrical actuators are equipment converting electrical power to mechanical power used for valve control. Electric motor’s torque is transmitted to valve shaft through the electrical actuator gearbox. This torque makes the valve open or close. Gearbox provides a steady torque while turning.

**a. Intended Use of the Product**

Electrical actuator is one the most used valve control equipment. The purpose of an electrical actuator is poening or closing the valve. This opening or closing can be full open/close or proportional open/close. This can be changed according to process application. Electrical actuators can be used on ball valve, butterfly valve, plug valve and other proper valve types.

Advantages of electrical actuators are,

- Electric power is accessible.
- High output torque can be produced with low energy.
- Products have longer life.
- Products are compact and have light weight.
- Sensitive control.
- High protection class.
- Wide power supply range.
- Wide turn angle range.
b. Product Coding System

Table 1. Product Coding System

<table>
<thead>
<tr>
<th>OPTIONS</th>
<th>PROTECTION</th>
<th>OUTPUT TORQUE</th>
<th>CONTROL TYPE</th>
<th>SERIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>00 NA</td>
<td>01 IP 67</td>
<td>01 ON-OFF</td>
<td>01 Tork</td>
<td>TREA XXXX XX XX XX XX</td>
</tr>
<tr>
<td>01 PIU (With Potentiometer Unit)</td>
<td>02 IP 68</td>
<td>02 PROPORTIONAL</td>
<td>02 Rotary</td>
<td></td>
</tr>
<tr>
<td>02 LCU (Local Control Unit With LCD Display)</td>
<td>03 IP 65</td>
<td></td>
<td>03 Electric</td>
<td></td>
</tr>
<tr>
<td>03 RBU (With Chargeable Battery Unit)</td>
<td></td>
<td></td>
<td>04 Actuator</td>
<td></td>
</tr>
<tr>
<td></td>
<td>04 Explosion Proof</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OPERATING VOLTAGE</th>
<th>TORQUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 230VAC</td>
<td>0040</td>
</tr>
<tr>
<td>02 24VDC</td>
<td>0060</td>
</tr>
<tr>
<td>03 230VAC/24VDC</td>
<td>0080</td>
</tr>
</tbody>
</table>

| TABLE 1. Product Coding System |
c. Product and Part Pictures

Fig 1. Electrical actuator inner parts

Fig 2. Electrical actuator outer parts

* TORK electrical actuators don’t contain no asbestos, quicksilver, PCB and other prohibited chemicals.
d. Labeling Details

Electrical actuators’ general information must be written on their labels. Fig 3 shows a sample label and the information it contains. For more detailed information, the user manual, technical support department or sales department can be helpful.

Electrical actuator label contains these informations:

- Model
- Type
- Serial No
- Protection Class
- Ambient Temperature
- Output Torque
- Operation Voltage
- Power
- Operation Time
- Optional Units

**Fig 3. Label**

Manufactured By Sms-tork Co. Inc.

- Model: TREA008001010101
- Type: ON - OFF
- Serial No: TREA80-17-0001
- Protection Class: IP67
- Ambient Temperature: -20°C, +60°C

- Output Torque: 80Nm
- Operating Voltage: 230V AC 50Hz
- Power: 105 W
- Operation Time: 18 SEC / 90°
- Option: PIU

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3. PRODUCT OPERATION

When supply voltage (85-265VAC or 24VDC) applied to the electrical actuator, motor and gearbox produce a rotary force. This force makes the valve acting. According to this act valve is opened or closed.

a. Storage Conditions

Electrical actuators must be stored in clean, dry and cool ambient. Electrical actuators’ cover screws must be tightened up and cable entries must be closed. When electrical actuators are stored in an open ambient, they must be protected from weather conditions.

b. Operation Conditions

Operation time : 18 sec / 90°
Body Ingress Protection : IP67, IP68 (On Request)
Body Material : Aluminum Die Cast
Body Coating : Electrostatic Powder Coat
Power Source : 85-265VAC, 24VDC
Motor : AC Reversible Motor, DC Brushed Motor
Motor Duty Class : S4 %70, 1000 Start/Hour
Atex Protection Class : Ex II 2G Ex IIC T4 Gb (For Atex Models)
Limit Switches : 2x OPEN/CLOSE SPDT, Max 250VAC 5A
Aux. Limit Switches : 2x OPEN/CLOSE SPDT, Max 250VAC 5A
Position Indicator : Continuous, as OPEN/CLOSE
Manuel Control : Hand wheel
Inner Heater : 5W
Cable Entrances : M20x1,5
Greasing : Gear Oil
Ambient Temperature : From -20°C to + 60°C
Recommended Protection Fuse : 4A Type B Automat Fuse
Clutch System : with handwheel for using manual control, automatically exit from manual control
Supply Cable Specifications : Tinned copper braided, stranded, shielded, 0.75 mm² cable

c. Protection Measures

Our proportional electrical actuators have high current protection, high voltage protection, power card protection, overtemperature protection and delay time protection against sudden reverse operation. If the product enters any of these protections, determine the reasons for the protection before restarting, and perform work that will prevent it from reoccurring.
d. Options

- Position indicator LEDs
- Proportional Control Unit
- Rechargeable Battery Unit
- IP68, Working Underwater Conditions (Up to 96 hours at a depth of 10 meters)
- ATEX Certificated Body (Ex d IIB T4)
- LCA Local Control Unit with LCD Screen

4. PRODUCT INSTALLATION

⚠ Before installation, it must be checked if there is any damage on the product and there is any missing part. If there is any damage or missing part, product must not be accepted.

⚠ Before the installation inform on the labels and the boxes must be checked.

⚠ Before the installation, line voltage and voltage written on the label must be checked if they are in the same range. Before the installation product’s suitability to the system must be checked.

⚠ Before the installation, the line voltage must be switched OFF. Be careful about during the installation if anybody can switch it ON. This probability must be prevented and must be sure about it.

a. Valve Mounting

Electrical actuators are manufactured so that the valve can be mounted according to ISO 5211 standard.
Fig 5. Valve mounting
Fig 6. Valve mounting with bracket
b. Manuel Control

Clutching star knob is pulled back actuator goes to manual working mode. Then, with manual handwheel valve can be open or close. To go back to the auto mode, it is necessary energizing the motor.

c. Adjusting Cams and Limit Switches
Firstly, loosen the setscrew on cams, so they can move easily. Bring the valve to CLOSE position manually. While it is in CLOSE position adjust the CLOSE cams and fix it.

Follow same instructions for OPEN position.

d. Technical Dimensions

![Fig 9. TREA Electric Actuators ABC Measures](image)

e. Atex (2014 / 34 / EU)

Atex electrical actuators are the products that are used in potentially explosive or hazardous environments. There are important requirements to be aware of when using these products. In the event that one or more of these conditions are not met, the user is liable. Atex products:

- must be used with Atex certified appropriate coupling,
- must be used with Atex certified appropriate cable.
- The product cover should never be opened when actuator is in energy.
- Grounding must be done.
- Use for grounding min 4 mm² cable produced in HD21 or HD22 standards .
- It is suitable for use in ZONE 1 and ZONE 2 environments.
- Our actuators are manufactured according to LVD and EMC directives.
f. Proportional Control Unit

Proportional control unit is a control unit on electric actuator to provide turning the valve on/off in desired angle between 0 - 90° degree.

The sent analog signal, proportionally provides motor to turn on/off the valve in a certain rate. Detects the information of current position of the valve and gives a proportional analog signal output.

<table>
<thead>
<tr>
<th>TECHNICAL FEATURES</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Body Ingress Protection</td>
<td>IP67</td>
</tr>
<tr>
<td>Body Material</td>
<td>Aluminum Die Cast</td>
</tr>
<tr>
<td>Body Coating</td>
<td>Electrostatic Powder Coat</td>
</tr>
<tr>
<td>Power Source</td>
<td>85-265VAC, 24VDC</td>
</tr>
<tr>
<td>Control Signal</td>
<td>0/4 - 20 mA, 2 - 10V DC, 1 - 5V DC, 0 - 10V DC, 0 - 5V DC</td>
</tr>
<tr>
<td>Output Signal</td>
<td>4 - 20 mA, 2 - 10V DC, 1 - 5V DC</td>
</tr>
<tr>
<td>Reversible Control Signal</td>
<td>With the changing switch control signal can be reversed</td>
</tr>
<tr>
<td>Reversible Output Signal</td>
<td>With the changing switch control signal can be reversed</td>
</tr>
<tr>
<td>Automatic Calibration</td>
<td>Might be done with the buttons on the control card</td>
</tr>
<tr>
<td>Fail Positions</td>
<td>Stay still, Turns the valve on, Turns the valve off</td>
</tr>
<tr>
<td>Adjustable Max. Valve Degree</td>
<td>Between 0° - X° adjustable special valve degree</td>
</tr>
<tr>
<td>Self Protection</td>
<td>Current protection, Voltage protection, Power card protection, Temperature protection, Rapid reverse working delay for PCB protection,</td>
</tr>
<tr>
<td>Motor</td>
<td>24V DC Brushed Motor</td>
</tr>
<tr>
<td>Limit Switches</td>
<td>2x Open/Close SPDT, Max 250VAC 5A</td>
</tr>
<tr>
<td>Aux. Limit Switches</td>
<td>2x Open/Close SPDT, Max 250VAC 5A</td>
</tr>
<tr>
<td>Position Indicator</td>
<td>Open/Close</td>
</tr>
<tr>
<td>Manuel Control</td>
<td>With Handwheel &amp; With PCB</td>
</tr>
<tr>
<td>Inner Heater</td>
<td>5W</td>
</tr>
<tr>
<td>Cable Entrances</td>
<td>M20x1,5</td>
</tr>
<tr>
<td>Ambient Temperature</td>
<td>-20°C to +60°C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OPTIONAL FEATURES</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LED Indicator</td>
<td></td>
</tr>
<tr>
<td>RBA - Rechargeable Battery</td>
<td></td>
</tr>
<tr>
<td>IP68 Protection Class</td>
<td></td>
</tr>
<tr>
<td>ATEX Certificated Electric Actuator (Ex d IIB T4)</td>
<td></td>
</tr>
<tr>
<td>LCA: Local Control Unit with LCD</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Technical Features
LED Meanings

<table>
<thead>
<tr>
<th>Power</th>
<th>Input</th>
<th>Output</th>
<th>St1</th>
<th>St2</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>No Energy</td>
</tr>
<tr>
<td>On</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Input Control Signal Have</td>
</tr>
<tr>
<td>On</td>
<td>On</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>No Input Control Signal</td>
</tr>
<tr>
<td>On</td>
<td>Off</td>
<td>On</td>
<td>Off</td>
<td>Off</td>
<td>No Output Control Signal</td>
</tr>
<tr>
<td>On</td>
<td>On</td>
<td>On</td>
<td>Off</td>
<td>Off</td>
<td>No Input and Output Control Signal</td>
</tr>
<tr>
<td>On</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>On</td>
<td>High Heat Protection Enabled</td>
</tr>
<tr>
<td>On</td>
<td>Off</td>
<td>On</td>
<td>On</td>
<td>On</td>
<td>High Voltage Protection Enabled</td>
</tr>
<tr>
<td>On</td>
<td>Off</td>
<td>On</td>
<td>On</td>
<td>On</td>
<td>High Current Protection Enabled</td>
</tr>
<tr>
<td>On</td>
<td>On</td>
<td>On</td>
<td>On</td>
<td>On</td>
<td>High Power Protection Enabled</td>
</tr>
</tbody>
</table>

There are two ways to control TREA proportional electric actuator in manual form:

1. **Controlling with Handwheel**

   This controlling method is necessary for both on-off and proportional electric actuator. On Proportional electric actuator, handwheel is only recommended to use in case of emergency as power failure or interruption of the control signal. The reason for this is, even the valve’s position changed with handwheel while there is control signal on electric actuator, electric actuator will change it to the proper position according to applied control signal.
2. Manuel Control on PCB Card

Figure 2 illustrates switch SW1's number 6 pin end, when it is ON, electric acuator’s connection cut with control signal and electric acuator can control by OPEN and CLOSE buttons.

⚠️ To control electric acuator with control signal, switch SW1’s pin number 6 must be OFF.

Automatic/Manual Usage

Restart in Protection Mode

Proportional electric actuators automatically protect themselves when exposed to overcurrent, overvoltage or high temperature. When the actuator takes self-protection, it turn on the LEDs on it for showing the overcurrent protection, overvoltage protection, power card protection or over-temperature protection. After the relevant faults have been cleared, the actuator can be restarted by following the steps below:

1) Manual control on the PCB board is switched.
2) By OPEN, CLOSE keys or by “manual control with handwheel”, if any strain, the valve must released.
3) Press SET button for 10 seconds to exit protection.
4) Automatic calibration is performed by pressing SET, OPEN keys at the same time.
Proportional Control Card Settings
Control Signal Selection

Control signals can select with SW2 switch as it is in the Figure 12. Proportional electric actuators are set 4-20mA control signal in the factory. Selection of control signal can be made according to the following table.

![Fig 12. Control Signal Setting SW2 DIP Switch](image)

### Table 4. Electric Actuator’s Control Signal Selection

<table>
<thead>
<tr>
<th>Control Signal</th>
<th>Pin Positions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>4 - 20mA</td>
<td>OFF</td>
</tr>
<tr>
<td>0 - 20mA</td>
<td>ON</td>
</tr>
<tr>
<td>1 - 5V DC</td>
<td>OFF</td>
</tr>
<tr>
<td>2 - 10V DC</td>
<td>OFF</td>
</tr>
<tr>
<td>0 - 5V DC</td>
<td>ON</td>
</tr>
<tr>
<td>0 - 10V DC</td>
<td>ON</td>
</tr>
</tbody>
</table>
Output Signal (Feedback) Selection

Output signals can select with DIP switch as it is in the Figure 13. Proportional electric actuators are set 4-20mA output signal in the factory. Selection of output signal can be made according to the following table.

### Table 5. Electric Actuator’s Output Signal Selection

<table>
<thead>
<tr>
<th>Output Signal</th>
<th>Pin Positions</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 - 20 mA</td>
<td>OFF OFF</td>
</tr>
<tr>
<td>1 - 5 V DC</td>
<td>OFF ON</td>
</tr>
<tr>
<td>2 - 10 V DC</td>
<td>ON OFF</td>
</tr>
</tbody>
</table>

Fail Positions

When the input control signal, which is connected to the Proportional electric actuator, is interrupted for any reason, actuator will act according to its previous setting. In case of signal loss there are 3 different settings as; remain the valve in the same position, turn on the valve, turn off the valve. By default, the valve is set to remain in the same position. Setting positions made with SW1 switch’s pins number 4 and 5 on the figure number 14 are shown on the table number 6.

### Table 6. Choosing Proportional Electric Actuator’s Fail Positions

<table>
<thead>
<tr>
<th>No</th>
<th>Fail Position</th>
<th>Pin 4</th>
<th>Pin 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stay Still</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>2</td>
<td>Turns the valve on</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>3</td>
<td>Turns the valve off</td>
<td>OFF</td>
<td>ON</td>
</tr>
</tbody>
</table>
Reverse Control Signal

If the user wants to control the actuator by giving reverse control signal, it is possible to make it by turning ON the SW1 switch’s pin number 3. For example;
While the switch number 3 on the position ‘ON’

4 mA : Fully Open
20 mA : Fully Closed

While the switch number 3 on the position ‘OFF’

4 mA : Fully Closed
20 mA : Fully Open

By giving control signal, valve manually brought to 50% open position and it is controlled according to the rotation made by the correct settings.

Reverse Output Signal

User can reverse the input signal as well as the output signal (feedback). This setting can be positioned by switching SW1 switch’s pin number 2 to ON (up). Judging from the examples given in the input signal, normally electric actuator valve giving 4mA output while on fully closed position, after output reversion setting, it will give 20mA output. This setting is valid for all types of output signal.

Automatic Calibration

If electric connections and cam settings are made correctly, hold down SET and OPEN button as in the Figure 16. In condition that D2 Power led continuously lit, respectively, D3, D4, D5 and D6 slidingly lit and eventually D2, D5 and D6 leds will remain lit and electric actuator will start the automatic calibration. When the automatic calibration start, electric actuator turns the valve fully open, then D3 (Input) and D5 (ST1) LEDs will lit. In this case, the SET key is pressed by giving 20 mA (or full open signal). Then the electric actuator closes the valve until the end and when valve is fully closed, than D3 (Input) and D6 (ST2) LED will lit. In this case, the SET button is pressed by giving 4 mA (or full closed signal). D5 (ST1) and D6 (ST2) leds will also go off. Thus, realising electric actuator operating range when the control signal is given, this range provides a proper control. If the automatic calibration is left half finished for any reason please recalibrate it.
To be able to make auto calibration, cams need to press to the limit switches fully open/fully closed position.

Sensitive Adjustment

With Zero-span potentiometers, there can be delicate changes on the upper and lower limits of the output signal. For example, with the SPAN potentiometer a 4-20 mA output signal with 20mA upper echelons can be adjusted to precise values such as 19.7 mA. Thus, the electric actuator sends 19.7 mA analog signal in the fully open position.
g. PIU

Adding the PIU (potentiometer unit) on the TREA series on-off electric actuator allows the instant position information of the valve to be reached and keeping and controlling the valve in the desired position. By managing the relay with the PLC, the actuator can be operated at the desired angle ($0^\circ - X^\circ$).

A typical connection diagram is shown in figure 17 and the position of the PIU on the product is shown in figure 18.

![Figure 17. On-off electric actuator PIU connection](image)

![Figure 18. Electric actuator with PIU](image)
h. Wiring Schemes

The meaning of the markings on the connection cards used in the electric actuators is as follows:

<table>
<thead>
<tr>
<th>Symbols</th>
<th>Explanations</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>Live connection point on AC supply,</td>
</tr>
<tr>
<td>N</td>
<td>Neutral connection point on AC supply</td>
</tr>
<tr>
<td>24V</td>
<td>+24 V connection point on DC supply,</td>
</tr>
<tr>
<td>GND</td>
<td>-24 V connection point on DC supply,</td>
</tr>
<tr>
<td>+ IN</td>
<td>Positive (+) voltage or current pin connection point to be controlled in proportional controls</td>
</tr>
<tr>
<td>- IN</td>
<td>Negative (-) voltage or current pin connection point to be checked in proportional controls</td>
</tr>
<tr>
<td>+ OUT</td>
<td>Positive (+) voltage or current pin connection point where position information is to be taken in proportional controls</td>
</tr>
<tr>
<td>- OUT</td>
<td>Negative (-) voltage or current pin connection point where ground information is to be taken in proportional controls</td>
</tr>
<tr>
<td>COM</td>
<td>The connection point of the desired voltage to be taken from the contacts of the micro switches,</td>
</tr>
<tr>
<td>NO</td>
<td>Normally open connection point for micro switches,</td>
</tr>
<tr>
<td>NC</td>
<td>Normally closed connection point for micro switches,</td>
</tr>
<tr>
<td>Ground Symbol</td>
<td>The connection point of the device ground connection,</td>
</tr>
</tbody>
</table>

Table 7. Symbols and explanations on connection cards
230VAC On-Off Wiring Scheme
24VDC On-Off Wiring Scheme
85 – 265 VAC Proportional Electric Actuator Wiring Scheme

---

**ACTUATOR WIRING**

**LIMIT SWITCH TO CONTROL BOARD**

**SUGGESTED CUSTOMER’S WIRING**

**AC (85 to 265 V ) INCOMING POWER**

**EXTERNAL SWITCH MAX 250VAC 3A**

**SIGNAL_IN**

**SIGNAL_OUT**

**EARTH**

**LIVE**

**NEUTRAL**

**IN/OUT_TO_CONTROL_BOARD**

**230V AC TO CONTROL BOARD**

**SMS-TORK**

**rev2.1**

**STPR502014**

---

**SYMBOL** | **DESCRIPTION** | **RATING**
---|---|---
CLS | CLOSE LIMIT SWITCH | 250V AC 3A
OLS | OPEN LIMIT SWITCH | 250V AC 3A
ECLS | EXTERNAL CLOSE LIMIT SWITCH | 250V AC 3A
EOLS | EXTERNAL OPEN LIMIT SWITCH | 250V AC 3A

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**Using Recommended Products**

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**WARNING!**

Each actuator should be powered through its own individual switch or relay contacts to prevent cross feed between two or more actuators.
24 VDC Proportional Electric Actuator Wiring Scheme

**SUGGESTED CUSTOMER'S Wiring**

**ACTUATOR WIRING**

**LIMIT_SWITCH_TO_CONTROL_BOARD**

**IN/OUT_TO_CONTROL_BOARD**

**24V DC INCOMING POWER**

**24V DC POWER_BOARD**

**SMS-TORK rev2.1**
**STPR502014**

<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>250V AC 3A</td>
</tr>
<tr>
<td>OLS</td>
<td>OPEN LIMIT SWITCH</td>
<td>250V AC 3A</td>
</tr>
<tr>
<td>ECLS</td>
<td>EXTERNAL CLOSE LIMIT SWITCH</td>
<td>250V AC 3A</td>
</tr>
<tr>
<td>EOLS</td>
<td>EXTERNAL OPEN LIMIT SWITCH</td>
<td>250V AC 3A</td>
</tr>
</tbody>
</table>

**WARNING!**

*Each actuator should be powered through its own individual switch or relay contacts to prevent cross feed between two or more actuators.*

**DRAW/DESIGN:** M. AKBAL
**DATE:** MAY 2017

**VOLTAGE:** 24V DC
**TYPE:** PROPORTIONAL

**SUGGESTED CUSTOMER'S WIRING**

- **EXTERNAL_SWITCH MAX.250VAC 3A**
- **CLOSE LAMP**
- **OPEN LAMP**
- **SW1 (NC) **
- **SW2 (NC NO)**
- **ECLS**
- **EOLS**
- **C1**
- **+IN**
- **-IN**
- **+OUT**
- **-OUT**
- **GND**
- **+V**
- **-V**
- **VIN+**
- **VIN-**

**LIMIT SWITCH TO CONTROL BOARD**

- **SW4 (OLS)**
- **SW3 (CLS)**

**IN/OUT TO CONTROL BOARD**

**ACTUATOR WIRING**

- **C1**
- **C2**
- **C3**
- **C4**
- **C5**

**24V DC POWER BOARD**

- **GND**
- **(L)**
- **(N)**

**STPR502014**

SMS Sanayi Mağazaları Satış ve Üretim A.Ş.
i. Warnings

⚠️ If electrical actuator’s wiring is damaged, it must be changed by producer company, certificated service or someone having technical qualification, for preventing any dangerous conditions,

⚠️ If the product is to be used in outdoor, explosive or in environments where harmful animals such as mice live, It is necessary that the supply cables and the connection materials have the appropriate specifications (armor-plated, atex, etc.).

⚠️ Preventing from any short circuit fault, a 4A B type automat fuse must be used in the power line that electrical actuator connected.

⚠️ Every electrical actuator must be supplied with voltage written on it. Every electrical actuator must be mounted the proper valve according the output torque written on it.

⚠️ When it is necessary in some fluid applications, a filter must be used. Because, some sediments gathered in the valve cause corrosion and forcing the electrical actuator. This forcing makes difficult to open or close the valve and can damage the electrical actuator.

⚠️ When manual hand wheel has traced to its limits, it must not be turned over more.

⚠️ Preventing from any short circuit or open circuit fault, the electrical actuator cables must not have any damage(twisting, smashing) on them.Moreover, the cable twisting on the cable entries can cause to moisture or water entrance to the body. To prevent from this, proper cable diameter must be selected according to the cable entries.

⚠️ Used cable must have minimum 3x 0.75 mm² section.

5. PRODUCT LIFE

Electrical actuators’ operating times change according to their models. Product’s life changes according to application and ambient conditions. Periodic preventative maintenance extends the product’s operating life.

The duty class level of the motors used in our electric actuators is S2. Therefore, in AC ON-OFF electrical actuators, the motors can be operated continuously for up to 30 minutes, then the motor must not run until the motor temperature is equal to ambient temperature.
6. PRODUCT CARE AND MAINTENANCE

Under normal conditions, the electrical actuator must be checked in every 6 months. For more hazardous conditions, it must be checked more frequently.

Before electrical actuator displaced from the system, the power on the electrical actuator must be switched OFF and pressure in the pipe must be zero.

- Be sure about valve and actuator mounting is right.
- Be sure about all electrical wiring is isolated and wired regularly.
- Be sure about all screws are mounted and tightened up.
- Be sure about the parts in the electrical actuator is clean.
- Be sure about cable glands and blind plugs are mounted and dry.
- Be sure about if there is no humidity in actuator.
- Be sure about inner heater is working. The internal heater prevents the formation of moisture inside the actuator and prevents the electronic parts from breaking down.
- Be sure about is manual hand wheel is operating.
- Be sure about actuator’s position indicator and valve position are correlate.
- Be sure about label is readable. If it is necessary request to change the label with more readable one.

⚠️ During both installation and maintenance be careful about sensitive inner parts. They must not be damaged. Before and after any maintenance electrical wirings must be controlled, electrical precautions must be taken; valve must be tested if it is working proper with actuator.
<table>
<thead>
<tr>
<th>Problem</th>
<th>Probably Case</th>
<th>Corrective/Preventive Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>The motor is not spinning.</td>
<td>There is an open in control circuit.</td>
<td>Wiring scheme must be checked.</td>
</tr>
<tr>
<td></td>
<td>Motor isolatio is damaged.</td>
<td>Motor windings must be checked with Megger Test.</td>
</tr>
<tr>
<td></td>
<td>There is no supply voltage</td>
<td>Supply voltage must be greased.</td>
</tr>
<tr>
<td>There is no energy on the product.</td>
<td>Valve shaft is not greased enough.</td>
<td>Valve shaft must be greased.</td>
</tr>
<tr>
<td>Valve only opens or closes.</td>
<td>Gearbox has a grease problem.</td>
<td>Gearbox and gears must be greased.</td>
</tr>
<tr>
<td></td>
<td>Valve has jammed.</td>
<td>Valve maintenance must be repeated.</td>
</tr>
<tr>
<td></td>
<td>Limit swtch adjusting has gone off.</td>
<td>Limit switches must be checked and must be adjusted again if necessary.</td>
</tr>
<tr>
<td>Manual on / off handle does not control the valve.</td>
<td>Gears turn useless.</td>
<td>Stripped gears must be changed with proper one.</td>
</tr>
<tr>
<td></td>
<td>Manuel handwheel's shafta has broken down.</td>
<td>Broken shaft must be changed with proper one.</td>
</tr>
<tr>
<td></td>
<td>Valve shaft has broken down.</td>
<td>Valve shaft must be changed.</td>
</tr>
<tr>
<td>The motor is turning but the valve is not opening / closing.</td>
<td>Gears turn useless.</td>
<td>Stripped gears must be changed with proper ones.</td>
</tr>
<tr>
<td></td>
<td>Potantiometer gears turn useless.</td>
<td>Gear must be tighten up with setscrew.</td>
</tr>
<tr>
<td></td>
<td>Proper signal is not selected with DIP switches.</td>
<td>Signal adjusting must be done with DIP switches according to wanted signal type.</td>
</tr>
<tr>
<td></td>
<td>Zero/Span calibration has gone off.</td>
<td>Calibration must be done via Zero/Span potentiometers.</td>
</tr>
<tr>
<td></td>
<td>Electronic cards has damaged.</td>
<td>Electronic card must be changed.</td>
</tr>
<tr>
<td>The proportional actuator does not give position information.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The proportional actuator could not turn on / off the valve at the desired value.</td>
<td>There is no inout signal.</td>
<td>Warning LEDs and input/output signal wirings must be checked.</td>
</tr>
<tr>
<td></td>
<td>Potentiometer gears turn useless.</td>
<td>Gear must be tighten up with setscrew.</td>
</tr>
<tr>
<td></td>
<td>Zero/Span calibration has gone off.</td>
<td>Calibration must be done via Zero/Span potentiometers.</td>
</tr>
<tr>
<td></td>
<td>Electronic card has damaged.</td>
<td>Electronic card must be changed.</td>
</tr>
</tbody>
</table>
7. PRODUCT SPARE PARTS

Electrical actuators’ spare parts are:
• Gears
• Motor
• Electronic Control Cards
  • On-Off Control Cards
  • Proportional Control Cards
• Position Indicator
• Potantiometer Unit

You must choose spare parts according to your actuator model. For supplying spare parts and detailed information please contact to SMS TORK.

8. PRODUCT SHIPMENT

During transportation be careful about electrical actuator’s not falling down and not being subjected hard knocks. Don’t put any weight damaging the product on electrical actuator boxes. Electrical actuators must be carried on their carton boxes.

9. WARRANTY CONDITIONS

1) The period of warranty shall start from the date of delivery of the product to the customer and shall cover a period of 2 years.
2) Every and all parts of the product are under SMS Sanayi Malzemeleri Üretim ve Satışı A.Ş. warranty coverage. (against any defect that may occur during production, assembly and/or defective parts)
3) In the case that the product fails within warranty period, the time spent on the repair work is added to the warranty period. Repair time of the product is maximum 20 (twenty) working days. This time starts from the date on which the failure concerning the product is notified to the service station and to seller of the product, dealer, agency, representative, importer or producer. It is possible to make the consumer failure notification by telephone, fax, e-mail, registered mail or similar. However, in case of disagreement, the obligation of proof belongs to the consumer.
4) Product replacement or refund is mandatory depending on the choice of the consumer in case one of the conditions below:
   a) If failure occurs in the product at least four times in one year or six times with the condition of being within the warranty period.
   b) If the maximum time for its repair is exceeded.
c) In case a service station is not exist by a report issued by seller, dealer, agency, representative, importer or producer respectively that, repair of the failure is not possible, exchange process will be carried out free of charge.

d) The warranty period of the products changed during the warranty condition is limited to the remaining warranty period of the purchased products.

5) Free repair and product exchange obligations will be annulled under the following conditions:
   a) If the product becomes faulty due to use contrary to the terms or conditions stated in the user guide,
   b) If the product serial number has been altered or removed
   c) The warranty labels have been destroyed,
   d) If the product has been opened, used, or previously repaired by unauthorized persons,
   e) Use of the product by plugging into inappropriate voltages or with faulty electric installation without the prior knowledge of our authorized services,
   f) If the fault or damage to the product occurred during the transportation outside of the responsibility of SMS Sanayi Malzemeleri Üretim ve Satışı A.Ş.,
   g) When our product is damaged due to use with accessories or devices purchased from other firms or unauthorized services,
   h) Those damages caused by natural disasters such as fire, lightning, flood, earthquake, etc.

6) A report prepared by the SMS Sanayi Malzemeleri Üretim ve Satışı A.Ş. will determine whether the damage was caused by improper use.

7) The warranty certificate should be kept throughout the warranty period. The customer must provide the warranty certificate during request for repair. Otherwise, the cost of repair will be charged.

8) The warranty certificate attached to the product during sale should be fully completed by the retailer and customer, signed and stamped. The customer copy must be immediately provided to the customer, followed by the other piece to be mailed out to SMS Sanayi Malzemeleri Üretim ve Satışı A.Ş. by the retailer.

9) In the case when you send the product via courier, please remember to add a description your complaint, the photocopy of your warranty certificate, your address and telephone number.

10) For possible problems which may arise concerning the warranty certificate, it can be applied to the Ministry of Customs and Trade, Directorate General of Consumer Protection and Market Surveillance.