



# TREA 40 ELECTRICAL ACTUATOR

## USER MANUAL



MAY / 2024  
PLEASE READ THE INSTRUCTIONS BEFORE USE



SIL 3

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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.

The resulting movement performs the on / off function of the valve assembled to the actuator.

### a. Intended Use of the Product

Electric actuators are the most commonly used control elements in valve control. Electric actuators can be used in different applications as ON / OFF. Electric actuators are used in the control of many valves such as ball valve, butterfly valve and plug valve.

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.
- High protection class.
- Wide power supply range.
- Wide turn angle range.

b. Product Coding System

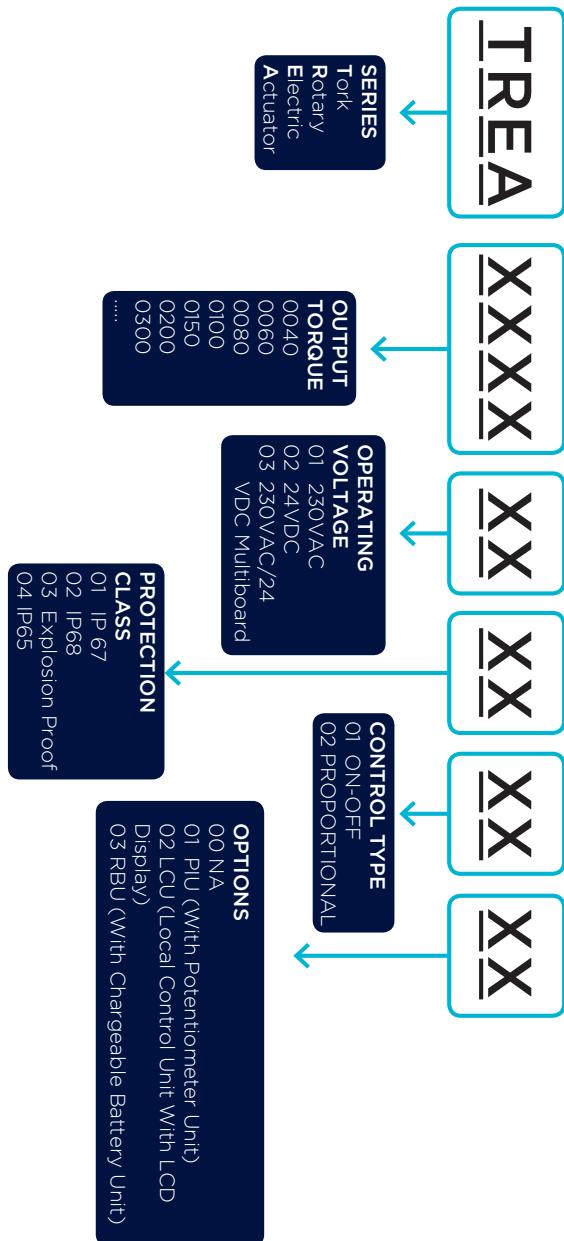


Table 1. Product Coding System

c. Product and Part Pictures

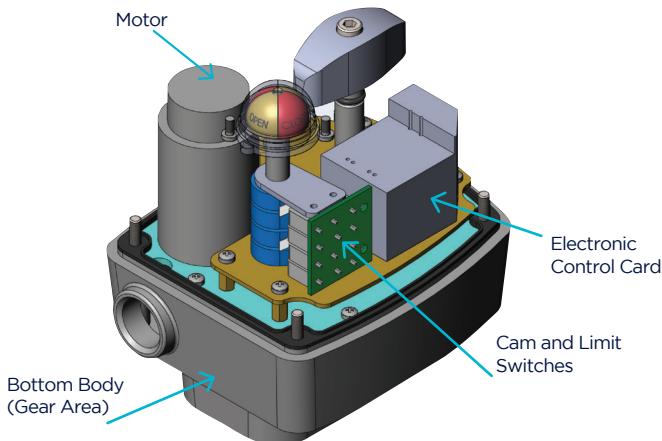


Fig 1. Electrical actuator inner parts

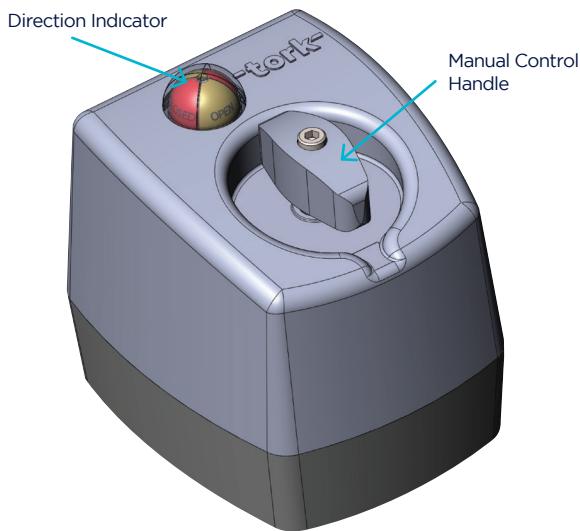


Fig 2. Electrical actuator outer parts

\* 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. Figure 3 shows the label of the 40 Nm electric actuator. 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

### 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	: 11 sec / 90 °
Body Ingress Protection	: IP65, IP67 (On Request)
Body Material	: Aluminum Die Cast
Body Coating	: Electrostatic Powder Coat
Power Source	: 85-265VAC, 24VDC
Motor	: DC Brushed Motor
Motor Duty Class	: S4 %70, 1000 Start/Hour
Limit Switches	: 2x On/Off SPDT, Max 250VAC 3A
Aux. Limit Switches	: 2x On/Off SPDT, Max 250VAC 3A (ON / OFF models only)
Position Indicator	: Continuous, as OPEN/CLOSE
Manuel Control	: Hand wheel
Cable Entrances	: M20x1,5
Greasing	: Gear Oil
Ambient Temperature	: From -20°C to + 60°C
Recommended Protection Fuse	: 2A Type B Automat Fuse
Clutch System	: The handle is pressed for manual control, The handle is pulled for automatic control.
Supply Cable Specifications	: 11x0.5 mm <sup>2</sup> color shielded cable (230VAC/24 VDC ON/OFF) 7x0.5 mm <sup>2</sup> color shielded cable (12 VDC ON/OFF) 5x0.5 mm <sup>2</sup> color shielded cable (12/24 VDC Proportional)

## 4. PRODUCT INSTALLATION

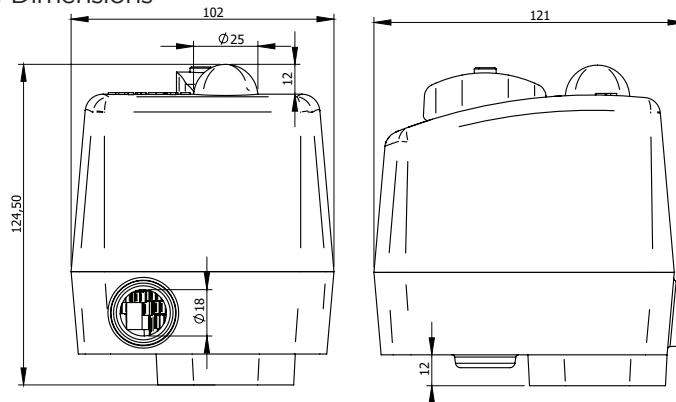
! Before installation, it must be checked if there is any damage on the product and there is any missing part. If there is any damage or missing part, product must not be accepted.

! 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.

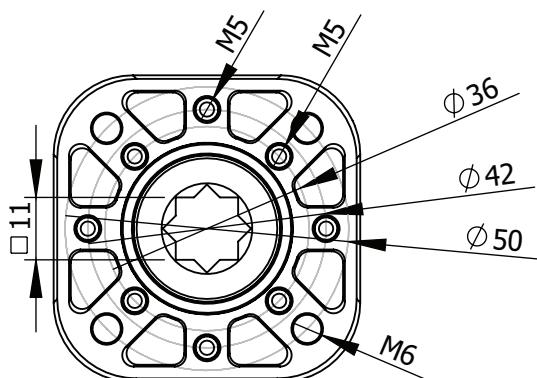
### a. Technical Dimensions



Şekil 4. TREA Electric Actuators ABC Measures

### b. Valve Mounting

Electrical actuators are manufactured so that the valve can be mounted according to ISO 5211 standard.



Şekil 5. ISO5211 Mounting Surface

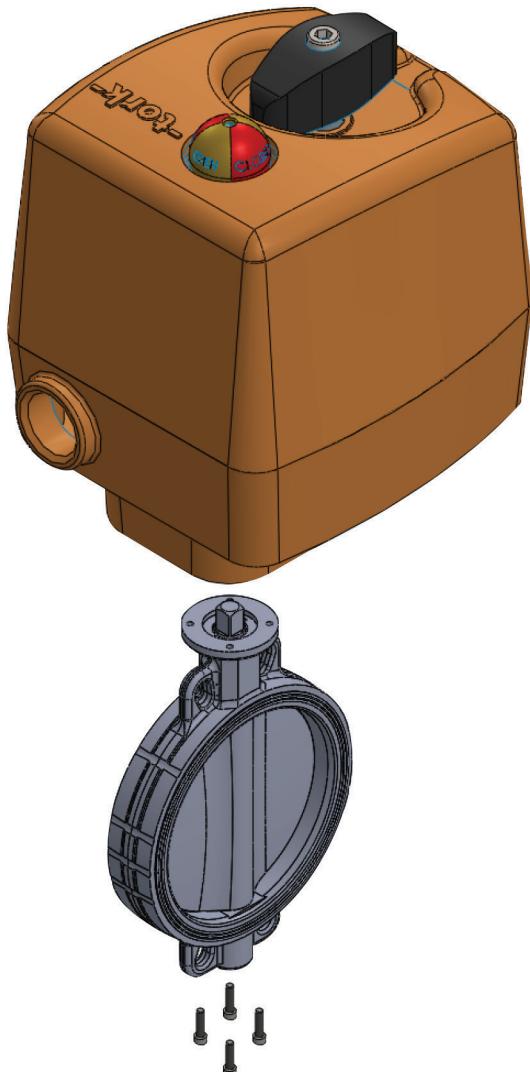


Fig 6. Valve mounting

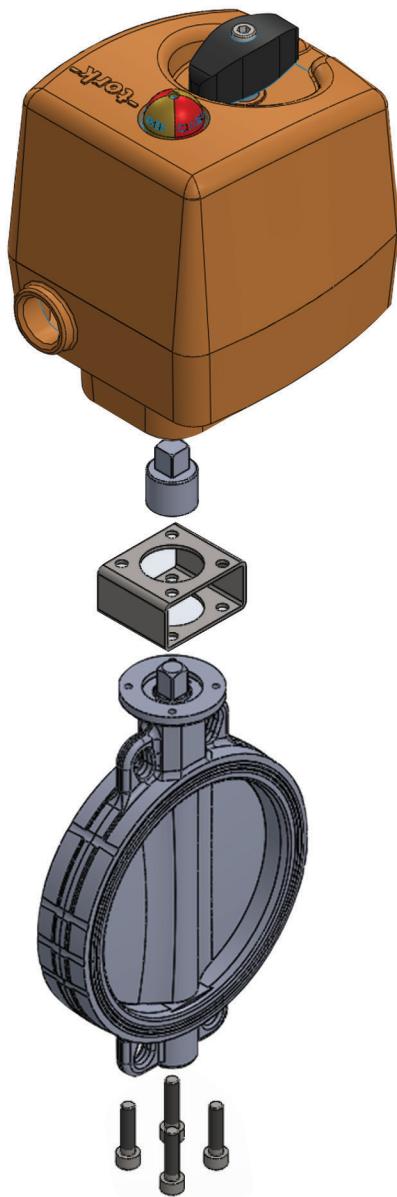


Fig 7. Valve mounting with bracket

### c. Manuel Control

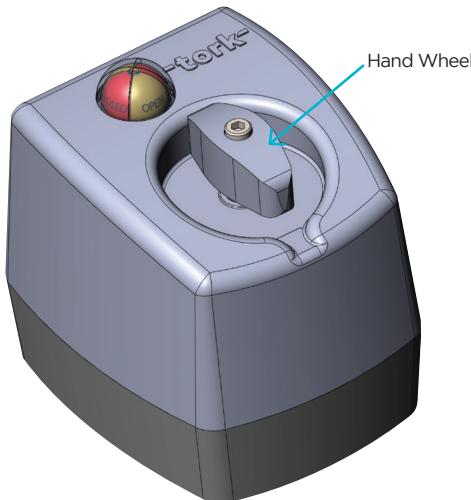


Fig 8. Manual working equipment

The handle on the actuator is pressed so that it fits into the slot. Thus, the actuator is taken into manual control. Manual handwheel is turned according to opening or closing direction. In order to switch from manual control to electrical control, it is pulled up manually by hand.

### d. Adjusting Cams and Limit Switches

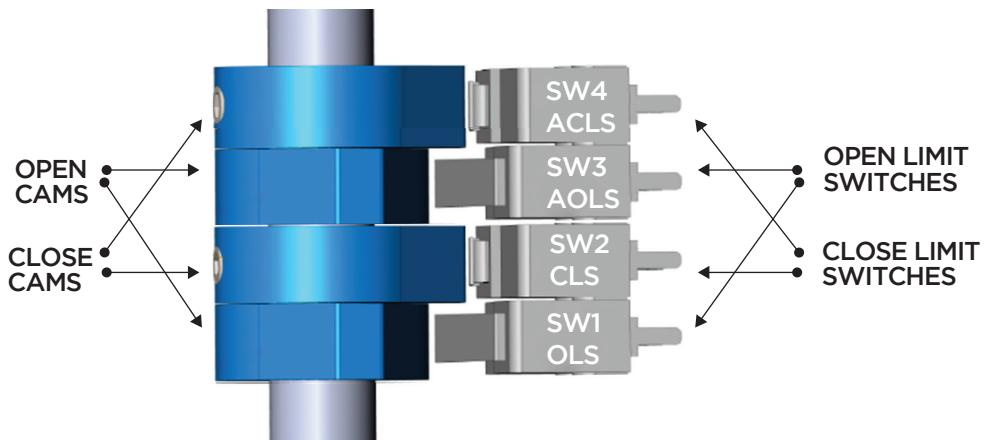


Fig 9. Cams and limit switches

**Note:** Actuators are produced with factory cam settings. In cases where adjustments are required at different angles or possible position shifts, make the following settings.

First, loosen the screws on the cams. The cams must be able to move freely regardless of the shaft. Manually move the actuator to the CLOSED position. Rotate the cams so that the Closing cam presses on the CLOSING LIMIT SWITCHES when in the CLOSED position. After pressing the CLOSE switches, tighten the screws of the CLS and ACLS cams and secure the cams. The same operations should be performed with OLS and AOLS switches for the OPEN position.

**Note:** CLS and ACLS cables should be set to press 5 degrees earlier than the OLS and AOLS cables.

### e. Control Switch Settings

The actuator can be controlled with 4-20 mA or 2-10 V signals.

The actuator is set to 4-20mA input by default.

For 2-10V input, the IN switch on the card is adjusted to the volt level as shown in Figure 9.

### f. Automatic Calibration

Calibrations of the products are sent according to 0-90° degree valves and 4-20mA control signals. If the user wants to change the valve opening - closing degree or control signal, he can perform automatic calibration after making the cam and limit switch settings. Calibration steps are listed below. Follow the steps below carefully to avoid damaging the card.

- 1) De-energize the card.
- 2) Loosen the set screw of the large gear on the valve shaft, the gear should be able to rotate easily.
- 3) Loosen the screws on the cam switches, adjust the limit switch settings by using the manual lever to open and close. Tighten the screws.
- 4) Energize the card. Press the calibration button for 3 seconds. The calibration start LED will flash.
- 5) The actuator will come to the fully closed position. The potentiometer will wait in this position for adjustment.
- 6) If the potentiometer setting is in the appropriate position, the LED will flash 500 ms slowly, otherwise it will flash 100 ms fast. If it flashes fast, turn the potentiometer to make it flash slowly.
- 5) If the LED flashes slowly, fix the gears by tightening the set screw on the large gear.
- 6) Continue calibration by pressing the calibration button again. The actuator will go to the fully open and fully closed positions, learn the limit values and complete the calibration.

After calibration is completed, automatic control can be made with the adjusted control signals. In cases where the control signal is lost, the valve will maintain its final position.

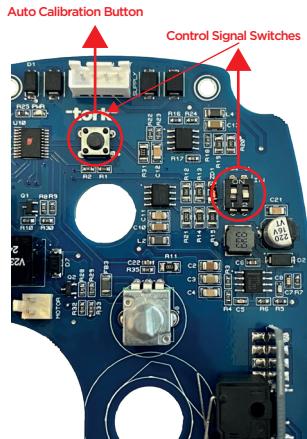


Figure 10.TREA Electric Actuators Calibration

TECHNICAL FEATURES	
<b>Body Ingress Protection</b>	IP65
<b>Body Material</b>	Aluminum Die Cast
<b>Body Coating</b>	Electrostatic Powder Coat
<b>Power Source</b>	85-265VAC, 24VDC, 12VDC
<b>Motor</b>	24V DC Brushed Motor, 12V DC Brushed motor
<b>Limit Switches</b>	2x Open/Close SPDT, Max 250VAC 3A
<b>Auxiliary Limit Switches (On/OFF models)</b>	2x Open/Close SPDT, Max 250VAC 3A
<b>Position Indicator</b>	Open/Close
<b>Manual Control</b>	With Handwheel
<b>Cable Entrances</b>	M20x1,5
<b>Ambient Temperature</b>	-20°C to +60°C
<b>Supply Cable Specifications</b>	11x0.5 mm <sup>2</sup> color shielded cable (230VAC/24 VDC ON/OFF) 7x0.5 mm <sup>2</sup> color shielded cable (12 VDC ON/OFF) 5x0.5 mm <sup>2</sup> color shielded cable (12/24 VDC Proportional)

Table 2. Technical Features

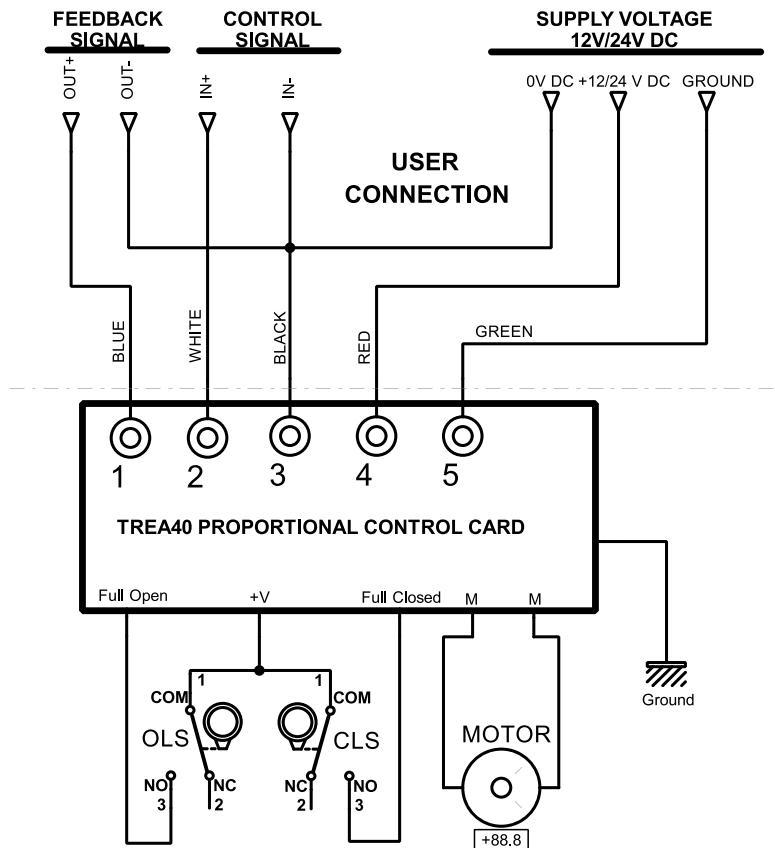
### g. Wiring Schemes

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

Cable Colors		Description
Orange		Live connection point on AC supply
Yellow		Neutral connection point on AC supply
Red		+24 V connection point on DC supply
Black		GND connection point on DC supply
Dark Blue		Open-close common control cable
Light Blue		Closing control cable
White		Opening control cable
Brown		COM, connection cable of the desired voltage to be taken from the contacts of the micro-switches
Grey		Micro switches' connector cable for giving closing information
Pink		Micro switches' connector cable for giving opening information
Green		Ground symbol Connection cable with ground connection to the device

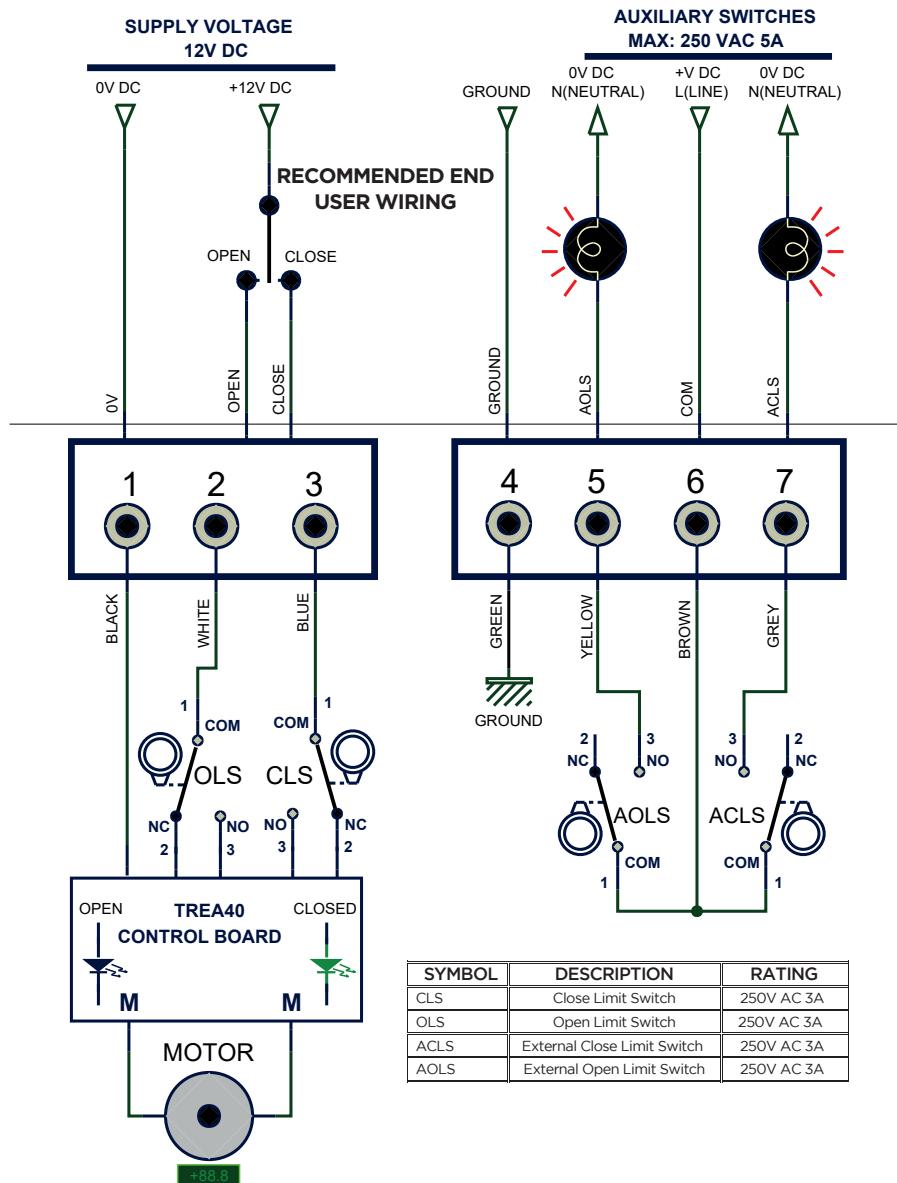
Table 3. Symbols and explanations on connection cards

12V DC - 24V DC PROPORTIONAL

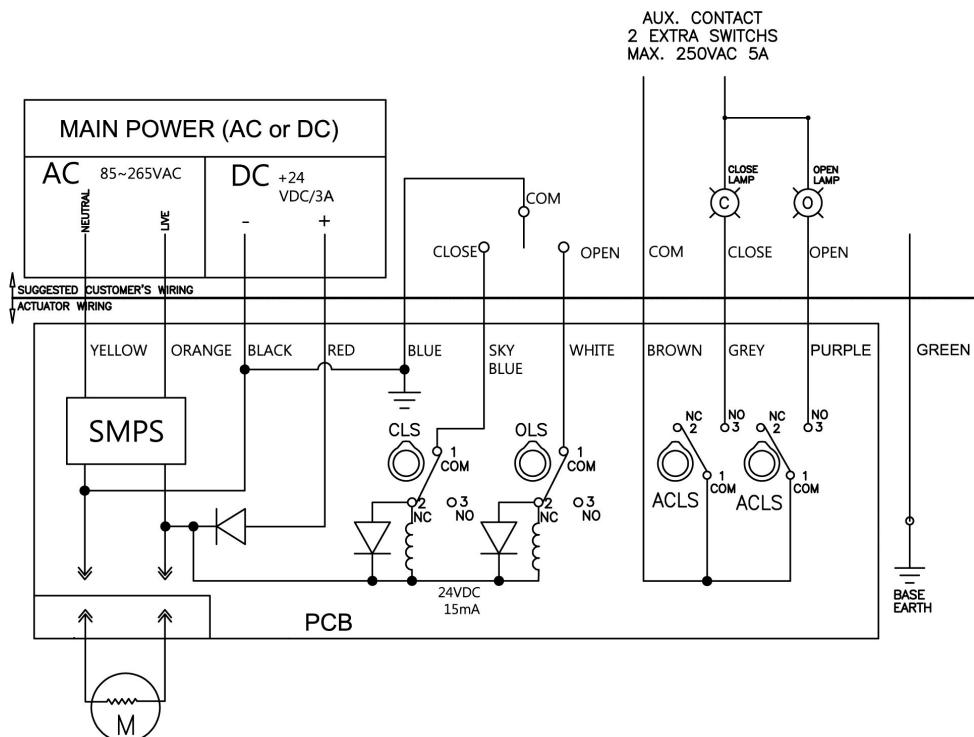


SYMBOL	DESCRIPTION	RATING
CLS	Close Limit Switch	250V AC 3A
OLS	Open Limit Switch	250V AC 3A

12V DC ON-OFF



24 VDC & 85-265 VAC ON-OFF



SYMBOL	DESCRIPTION	RATING
CLS	Close Limit Switch	250V AC 3A
OLS	Open Limit Switch	250V AC 3A
ACLS	External Close Limit Switch	250V AC 3A
AOLS	External Open Limit Switch	250V AC 3A

## h. 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 2A 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.

## 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 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 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.

Problem	Probably Case	Corrective/Preventive Action
The motor is not spinning.	There is an open in control circuit.	Wiring scheme must be checked.
	Motor isolatio is damaged.	Motor windings must be checked with Megger Test.
	There is no supply voltage	Supply voltage must be greased.
There is no energy on the product.	Valve shaft is not greased enough.	Valve shaft must be greased.
Valve only opens or closes.	Gearbox has a grease problem.	Gearbox and gears must be greased.
	Valve has jammed.	Valve maintenance must be repeated.
	Limit siwtch adjusting has gone off.	Limit switches must be checked and must be adjusted again if it necessary.
Manual on / off handle does not control the valve.	Gears turn useless.	Stripped gears must be changed with proper one.
	Manuel handwheel's shafta has broken down.	Broken shaft must be changed with proper one.
	Valve shaft has broken down.	Valve shaft must be changed.
The motor is turning but the valve is not opening / closing.	Gears turn useless.	Stripped gears must be changed with proper ones.

## 7. PRODUCT SPARE PARTS

Electrical actuators' spare parts are;

- Gears
- Motor
- Electronic Control Cards
  - On-Off Control Cards
- Position Indicator

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 Satış 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.





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**Fabrika** : Çerkeşli OSB Mah. İmes 2. Cad. No:5 41455 Dilovası / Kocaeli - Türkiye

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