bürkert
FLUID CONTROL SYSTEMS

Type 3003

Electrical rotary OPEN/CLOSE actuator
Elektromotorischer Drehantrieb AUF/ZU
Actionneurs électriques OUVERT/FERMÉ

Quickstart

English Deutsch Français

MAN 1000280896 EN Version: AStatus: RL (released | freigegeben) printed: 22.09.2017

Operating Instructions 1707/02_EU-EN_00809485 / Original DE

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1 QUICKSTART

The operating instructions describe the entire life cycle of the device. Keep these instructions in a location which is easily accessible to every user and make these instructions available to every new owner of the device.

Important Safety Information!

Read Quickstart carefully and thoroughly. Study in particular the chapters entitled "General safety information" and "Intended use".

- Quickstart must be read and understood.

The Quickstart explains, for example, how to install and start-up the device.

A detailed description of the device can be found in the operating instructions for Type 3003.

1.1 Definition of the term "device"

In these instructions, the term device always refers to the electrical rotary actuator Type 3003.

2 SYMBOLS

The following symbols are used in these instructions.

DANGER!

Warns of an immediate danger!

- Failure to observe the warning may result in a fatal or serious injury

WARNING!

Warns of a potentially dangerous situation!

- Failure to observe the warning may result in serious injuries or death.

CAUTION!

Warns of a possible danger!

- Failure to observe this warning may result in a moderately severe or minor injury.

NOTE!

Warns of damage to property!

Important tips and recommendations.

Refers to information in these operating instructions or in other documentation.

→ designates a procedure which you must carry out.

3 INTENDED USE

Non-authorized use of the electromotive rotary actuator type 3003 may be dangerous to people, nearby equipment and the environment.

- The device may be used outside.
- During use observe the authorized data, the operating conditions and conditions of use specified in the contract documents and in the operating instructions. These are described in the chapter entitled "Technical data".
- The device may only be used in connection with third-party devices and components recommended or approved by Bürkert.
- Requirements for safe and proper operation are proper transport, storage and installation as well as careful operation and maintenance.
- Only use the device as intended.

3.1 Restrictions

Observe any existing restrictions that apply to the device to be exported.

4 GENERAL SAFETY INFORMATION

This safety information does not cover:

- Haphazard situations that can arise during installation, operation and maintenance of the use.
- Locally applicable safety regulations which the operator and installation personnel are obligated to follow.

Hazard due to electrical voltage!

Intervention in the device poses an acute risk of injury.

- Before starting work, be sure to switch off the supply voltage and secure it to prevent restarting.
- Always connect **multiple electrical rotary OPEN/CLOSED actuators with phase isolation via a switch**.
- Observe all applicable accident protection and safety guidelines for electrical equipment.

Unintentional operation or impermissible damage can lead to generally dangerous situations as well as physical injury!

- Take appropriate measures to prevent the possibility of unintentional activation of the device!

The general rules of technology apply to the planning and operation of the device!

- Observe the general rules of technology!

General hazardous situations.

To prevent injury, ensure:

- The electrical rotary actuator Type 3003 may not be used in potentially explosive atmospheres (in this case please use type 3004).
- ▸ Do not put any loads on the body (e.g. by placing objects on it or standing on it).
- ▸ Do not make any external modifications to the device body. Do not paint the body parts or screws.
- ▸ Do not install the actuator with the cover facing down (head first).
- When installing the actuator, observe a minimum distance of 30 cm to electromagnetic sources of interference.
- ▸ Installation and repair work may be carried out by authorized technicians only and with the appropriate tools.
- ▸ After an interruption in the power supply or pneumatic supply, ensure that the process is restarted in a defined or controlled manner.
- ▸ The device may be operated only when in perfect condition and in consideration of the operating instructions.
- ▸ The general rules of technology apply to application planning and operation of the device.

NOTE!

Electrostatically sensitive components / modules!

The device contains electronic components that react sensitively to electrostatic discharge (ESD). Contact with electrostatically charged persons or objects will endanger these components. In the worst case, they will be immediately destroyed or will fail after commissioning.

- ▸ Observe the requirements according to EN 61340-5-1 in order to minimise or avoid the possibility of damage through sudden electrostatic discharge.
- You should also ensure that the electronic components do not come into contact with nearby operating voltage.

5 GENERAL INFORMATION

5.1 Contact address

Germany

Bürkert Fluid Control Systems
Sales Center
Christian-Bürkert-Str. 13-17
D-74653 Ingelfingen
Tel. + 49 (0) 7940 - 10-91 111
Fax + 49 (0) 7940 - 10-91 448
E-mail: info@de.buerkert.com

International

Contact addresses are found on the final pages of this operating manual.

And also on the Internet under: www.burkert.com

5.2 Warranty

The warranty is only valid if the electromotive rotary actuator type 3003 is used as intended in accordance with the specified application conditions.

5.3 Informations in the Internet

The operating manual and the data sheets on Type 3003 can be found on the Internet under: www.burkert.com

6 SYSTEM DESCRIPTION

6.1 Intended area of application

The electrical rotary OPEN/CLOSED actuator type 3003 (referred to as rotary actuator in the following) is designed for ball or flap valves.

6.2 General description

Due to its modular construction, the basic device can be extended with many options.

Options for expanding the basis device are found in the operating manual.

The rotary actuator is designed for direct or alternating current with a varied rating and available for torques of 20, 35, 60 or 100 Nm. The materials used guarantee maintenance-free operation and ensure a low thermal load.

All rotary actuators are equipped with a standard emergency manual control and two additional limit switches and are tested by the manufacturer. The limit switches are set for a 0 ... 90° operating range.

6.3 Marking

The rotary actuator is fitted with a type label which enables clear identification and provides the most important technical data.

Do not remove the type label from the rotary actuator!
It is extremely important for identification during installation and maintenance.
The warranty is void without the type label.

6.4 Type label

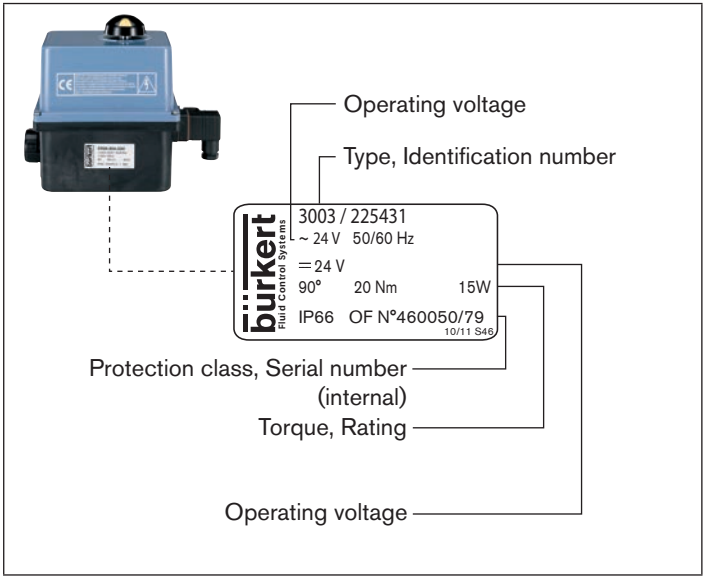


Fig. 1: Location and description of the type label

7 TECHNICAL DATA

7.1 Conformity

The electromotive rotary actuator Type 3003 conforms to the EC Directives according to the Declaration of Conformity.

7.2 Standards

The applied standards, which verify conformity with the EC Directives, can be found on the EC Type Examination Certificate and/or the EC Declaration of Conformity.

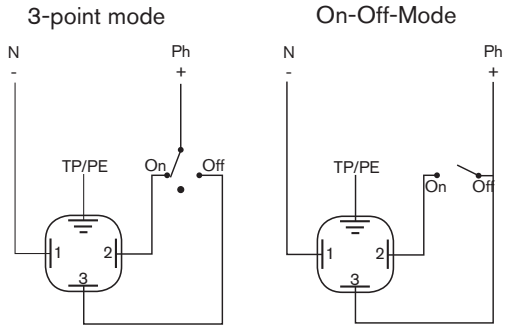
7.3 Operating conditions

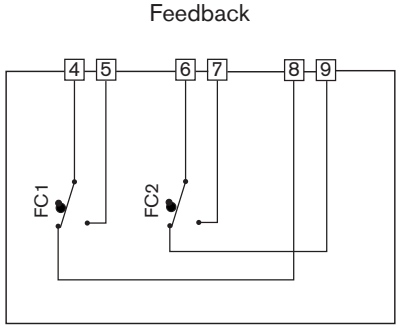
Ambient temperature:	-10 ... +55 °C -10 °C ... +40 °C (Emergency reset)
Permissible areas of application:	0 ... 2000 m altitude
Permissible humidity:	< 81 % to 31 °C (88 °F) with linear decrease as far as 50 % at 40 °C (according to EN 61010-1)
Protection class:	IP66 with cable plug

7.4 Electrical data

Electrical connections:	Cable plug according to EN 175301-803 Cable gland ISO M20
Limit switches:	4 adjustable (2 for the motor and 2 additional ones for feedback signal) - max. 250 V AC / 5 A
Range of movement:	90° ± 5° (optional 180°, 270°)
Duty rating:	50 % at max. torque

7.5 Electrical circuit diagrams





Symbol	Description
FCO	Limit switch ON
FCF	Limit switch OFF
FC1	Additional limit switch 1
FC2	Additional limit switch 2

Fig. 2: Open/Closed version

If voltage is applied simultaneously to terminals 2 and 3, terminal 2 is the leading one and the actuator moves to the OPEN position.

NOTE!

Make certain in 3-point mode that the pulse duration of a controller lasts for at least 1 second. A pause time of at least 500 ms is required before controller activation is repeated. Observe the duty cycle specified on the type label.

Please note the circuit board must remain power supplied to allow heating resistances working.

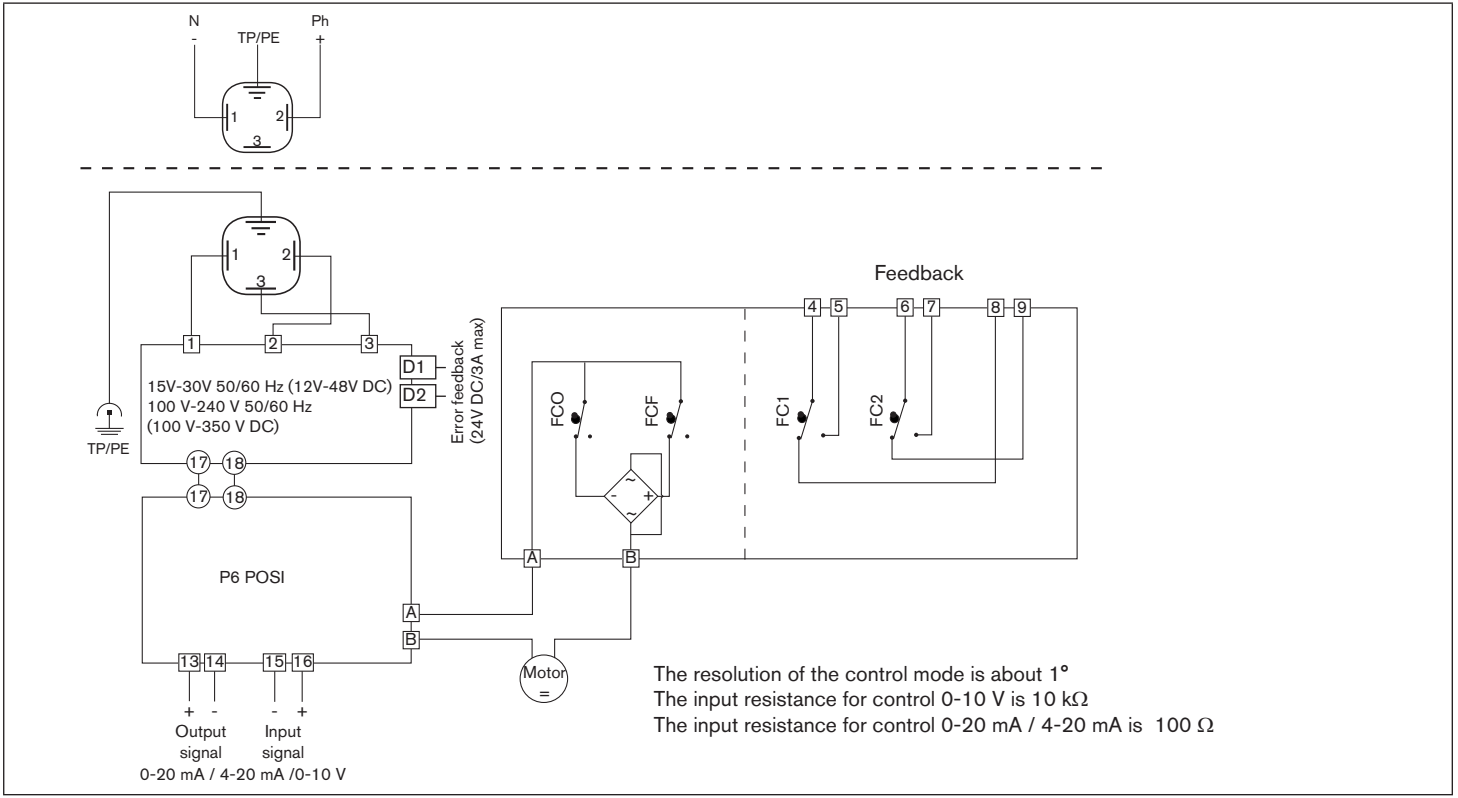


Fig. 3: Version with analog signal input

8 INSTALLATION

8.1 Safety information

DANGER!

Hazard due to electrical voltage!

- Always switch off the power and secure it to prevent restarting before removing the cover, or using the lever.
- Always connect multiple rotary actuators with phase isolation via a switch!
- Protect electrical rotary actuators by using a mains-dependent safety!
- Observe all applicable accident protection and safety guidelines for electrical equipment!

WARNING!

Hazard due to improper installation!

- Installation may only be carried out by authorised technicians using appropriate tools!
- Before installation, ensure that the manual lever can move freely.

Danger due to unintentional activation of the device!

Unintended actuation of the device during installation can lead to injury and damage to property.

- Take appropriate measures to prevent the possibility of unintentional activation of the device.

8.2 Power and control connections

Procedure:

→ Disconnect the rotary actuator from the power supply.

→ Remove the position indicator from the axis.

→ Loosen the cover screws with a screwdriver and lift the cover off.

→ Disconnect the cable connector ISO20 and insert the cable.

→ Wire the connections according to the circuit diagram figures (see “7.5 Electrical circuit diagrams”).

Use cables with a diameter of 7 ... 12 mm for the ISO20 cable fitting.

→ Set the cover in place and screw it tight.

→ Reinstall the position indicator.

8.3 Connecting the additional limit switches (optional)

In the standard variant, the rotary actuator has 2 additional limit switches (for 90° range of motion). Connect these as follows.

Procedure:

→ Disconnect the rotary actuator from the power supply.

→ Remove the position indicator from the axis.

→ Use a screwdriver to loosen the cover screws.

→ Lift the cover off.

→ Wire the connections of the additional limit switches (FC1 and FC2) according to the circuit diagram figures (see "Fig. 2" and "Fig. 3").

→ Tighten the cable gland after connecting the terminals.

→ Set the cover in place and screw it tight.

→ Reinstall the position indicator.

Only use 4 or 6 conductor cable with a diameter of 7 ... 12 mm for the ISO20 cable fitting.

Ensure that the cable in the ISO20 cable fitting is completely sealed when tightening the union nut.

8.4 Setting the limit switches

The rotary actuator is supplied with the following factory settings:

- The CLOSED limit switches are activated with the cams 2 and 4 (closed position).
- The OPEN limit switches are preset at a 90° rotation angle.

The procedure for setting the limit switches is shown in "Fig. 4" and "Fig. 5".

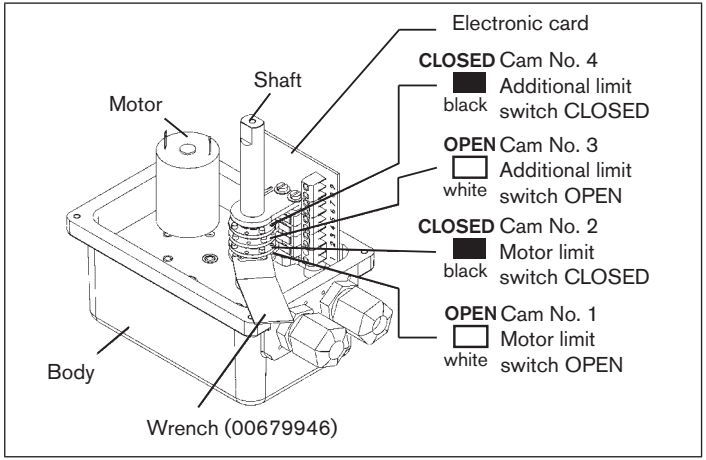


Fig. 4: Setting the limit switches. Limit switches max. 250 V / 5 A

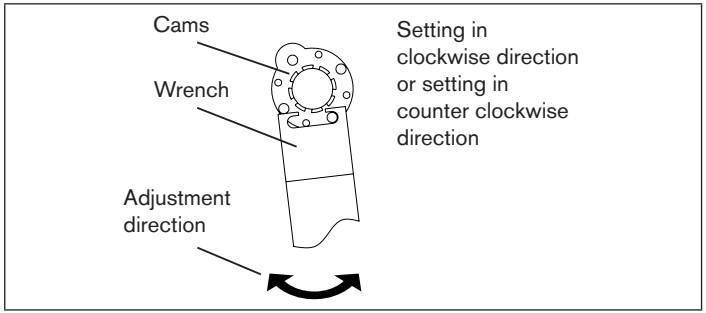


Fig. 5: Setting limit switches in counter clockwise and clockwise directions

8.5 Circuit board for actuator with standard signal input

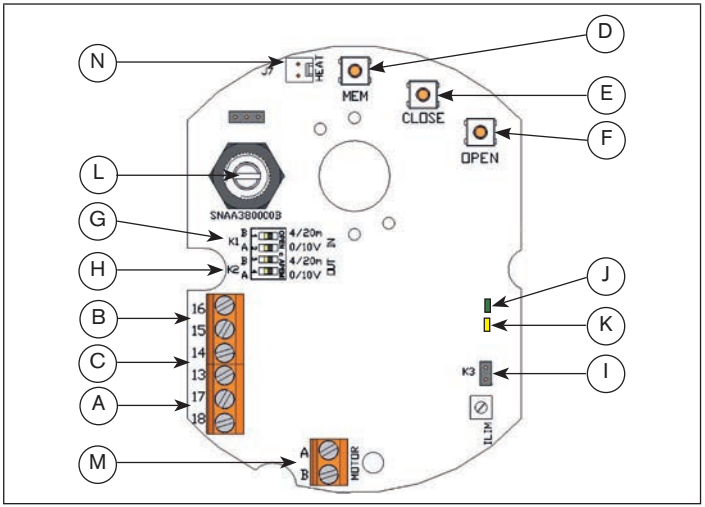


Fig. 6: Circuit board

A	Electrical power supply 24 V AC/DC	H	K2 plug-in jumper
B	Connection terminals of the input signal	I	K3 plug-in jumper
C	Connection terminals of the feedback	J	Green and red LED
D	MEM push-button	K	LED yellow: Indicates the power supply
E	CLOSE push-button	L	Potentiometer
F	OPEN push-button	M	Motor connection
G	K1 plug-in jumper	N	Heat resistor connection

To prevent electromagnetic interference, shielded cables must be used.

Procedure:

→ Loosen the cable gland and feed the cable through.

→ Wire the signal transducer between terminals 15 and 16. Terminal 15 is the negative pole (-) and terminal 16 the positive pole (+).

→ Wire the position feedback sensor between terminals 13 and 14. Terminal 13 is the positive pole (+) and terminal 14 the negative pole (-).

→ Re-attach the cable gland.

If the connection voltage is 100 V to 240 V, a fuse must be provided in the power supply.

8.6 Specify position of the plug-in jumpers

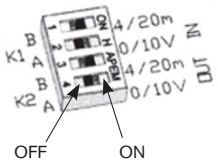


Fig. 7: Plug-in jumper K1 / K2

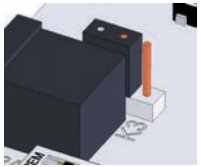


Fig. 8: Plug-in jumper K3 OFF

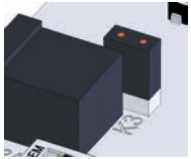
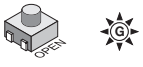


Fig. 9: Plug-in jumper K3 ON

Signal transducer	Feedback	Plug-in jumper K1		Plug-in jumper K2		Plug-in jumper K3
		A	B	A	B	
0-10 V	0-10 V	ON	OFF	ON	OFF	OFF
0-10 V	0-20 mA	ON	OFF	OFF	ON	OFF
0-10 V	4-20 mA	ON	OFF	OFF	ON	ON
0-20 mA	0-10 V	OFF	ON	ON	OFF	OFF
0-20 mA	0-20 mA	OFF	ON	OFF	ON	OFF
0-20 mA	4-20 mA	OFF	ON	OFF	ON	ON
4-20 mA	0-10 V	OFF	ON	ON	OFF	OFF
4-20 mA	0-20 mA	OFF	ON	OFF	ON	OFF
4-20 mA	4-20 mA	OFF	ON	OFF	ON	ON

8.7 Parameterization steps

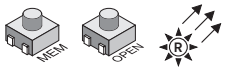
Specify direction of rotation of the shut-off valve

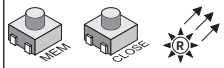
Normal direction of rotation (preset)	
	→ Press <OPEN> push-button and switch on the card (hold down push-button). The GREEN LED lights up. → Release <OPEN> push-button and disconnect the card from the power supply.

Reverse direction of rotation	
	→ Press <CLOSE> push-button and switch on the card (hold down push-button). The RED LED lights up. → Release <CLOSE> push-button and disconnect the card from the power supply.

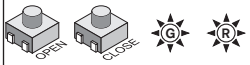
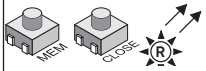
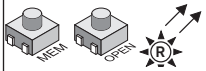
Specify control signal type

Control signal when voltage 0 – 10 V	
	→ Press <MEM> push-button and switch on the card (hold down push-button). The RED LED lights up **3x**. → Release <MEM> push-button and disconnect the card from the power supply.

Control signal when current 0 – 20 mA	
	→ Press <MEM> and <OPEN> push-button and switch on the card (hold down push-button). The RED LED lights up **3x**. → Release <MEM> and <OPEN> push-button and disconnect the card from the power supply.

Control signal when current 4 – 20 mA (preset)	
	→ Press <MEM> and <CLOSE> push-button and switch on the card (hold down push-button). The RED LED lights up **3x**. → Release <MEM> and <CLOSE> push-button and disconnect the card from the power supply.

Learning mode

Specify end positions	
	→ Press <OPEN> and <CLOSE> push-button and switch on the card (hold down push-button). The RED and the GREEN LEDs light up. → Release <OPEN> and <CLOSE> push-button. Both LEDs go out. Learning mode is selected.
	→ Press <CLOSE> push-button to move the shut-off valve into the closed position. The RED LED lights up.
	→ Press <MEM> and <CLOSE> push-button to save the closed position. The RED LED lights up **2x**.
	→ Press <OPEN> push-button to move the shut-off valve into the open position. The GREEN LED lights up.
	→ Press <MEM> and <OPEN> push-button to save the open position. The GREEN LED lights up **2x**.

Specify end positions	
	All positions are now saved. → Disconnect the card from the power supply.

8.8 Normal operation

Display normal operation	
	→ Switch on card. The GREEN LED lights up **3x** to indicate that the start process has been implemented correctly.
	In normal operation the GREEN LED lights up when the rotary actuator opens the shut-off valve.
	The RED LED lights up when the rotary actuator closes the shut-off valve.
Ⓖ Ⓡ	If neither of the LEDs is lit, the actuator is not actuated.
	The RED and the GREEN LEDs light up if the torque is too high and the rotary actuator stops. → Change direction of rotation of the rotary actuator or switch over the voltage OPEN/ CLOSED to restart the rotary actuator!

9 ROTARY ACTUATORS WITH INTEGRATED EMERGENCY RESET

9.1 Technical data

Voltage	18 V DC
Currant nominal	0.8 A
Max. current	2.4 A
Charging time	max. 14 h
Feedback relay for charge state	24 V DC - 1 A max
Permitted ambient temperature	-10 °C - +40 °C

9.2 Electric wiring

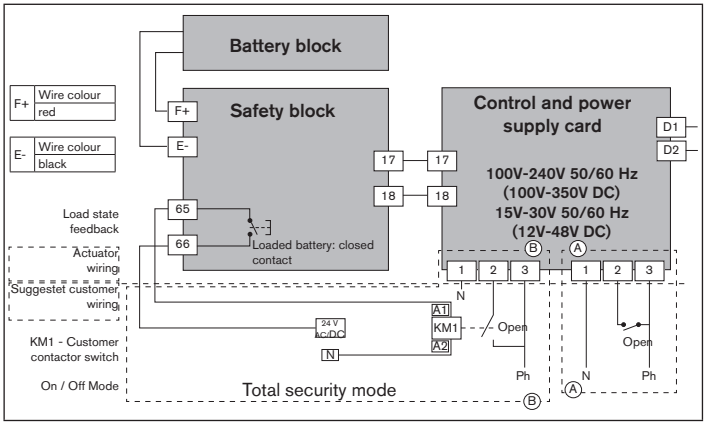


Fig. 10: Electric wiring

Configuration A or B

A-standard mode: If the actuator is controlled with a programmable controller, the feedback of the charge state can be connected to it.

B-mode - increased safety (if the feedback relay is used, terminals 65 and 66): The actuator does not actuate the valve unless the safety block is loaded.

9.3 Circuit board

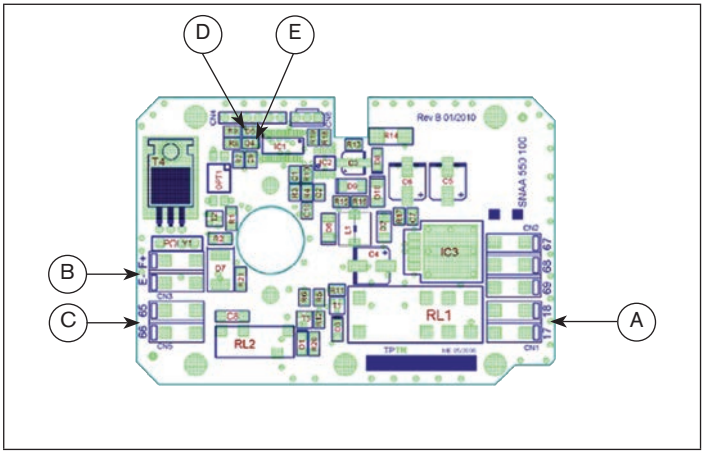


Fig. 11: Diagram: Circuit board

A	18 V DC connection
B	Battery block connection
C	Connection for feedback (charge state)

D	Green LED*
E	Red LED **

Description of the LED:

Green LED	Red LED	Description
Off	Blinks / Off / Blinks	Battery off or out of service
On	Blinks	Battery loading cycle in progress (max. 14 h)
On	Off	Battery loading cycle finished
Blinks rapidly	Off	Actuator electrical supply during 3 min. (failure mode)
Off	Blinks rapidly	Microcontroller failure

10 OPERATING

10.1 Safety information

DANGER!

Hazard due to electrical voltage!

Intervention in the device poses an acute risk of injury.

- Turn off the power before manually servicing the rotary actuator.

WARNING!

Hazard due to improper servicing!

Improper servicing can result in personal injury and in damage to the device and its surroundings.

- The operating personnel must be aware of and fully understand the operating instructions.
- Pay attention in particular to the safety information and the intended use.
- The device may only be serviced by properly trained personnel.

Hazardous situation due to manual intervention!

During manual intervention the process can change into an undefined state which can lead to hazardous situations.

- Ensure a defined and controlled restarting of the process following manual intervention!

10.2 Manual operation of the rotary actuator

The rotary actuator can be operated manually if there is a power failure. To do this, the hand wheel must be turned to „MAN“ (see “Fig. 12”).

Procedure:

→ During manual operation ensure that the rotary actuator is not activated in automatic mode.

→ Remove the position indicator from the axle.

→ Turn the hand wheel from “AUTO” to “MAN”.

→ Using a wrench, turn the actuator shaft into the required position. In doing so, hold the hand wheel.

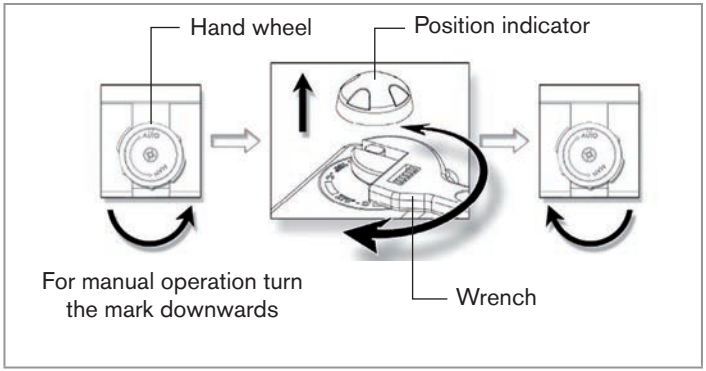


Fig. 12: Switching the rotary actuator from automatic to manual operation

10.3 Returning from manual to automatic operation

Returning to automatic operation:

→ Let go off the hand wheel to switch back into automatic operation. The spring force automatically resets it to the „AUTO“ position.

→ Replace the position indicator. The marking should now show the set position.

11 TRANSPORT, STORAGE, DISPOSAL

NOTE!

Transport damages!

Inadequately protected equipment may be damaged during transport.

- During transportation protect the device against wet and dirt in shock-resistant packaging.
- Avoid exceeding or dropping below the permitted storage temperature.

Incorrect storage may damage the device!

- Store the device in a dry and dust-free location!
- Storage temperature: -10 … +55 °C.

Damage to the environment caused by device components contaminated with media!

- Observe applicable regulations on disposal and the environment!
- Observe national waste disposal regulations.

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