

3003 PS (On/Off Version)

Operation Instructions



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Technical data

The technical data of the actuators is specified on the name plate and the data sheets for further information.

1. Symbols and safety

Danger signs

The following danger signs are used in this operating manual:



Caution! There is a general risk of damage related to health and/or properties.



Danger! Electrical voltages are present that may lead to death. Life threatening risks may occur due to electrical voltages! Avoid personal or material damages by observing applicable regulations and safety standards!

Other notes

- The motor surface temperature may rise when maintaining, inspecting and repairing the actuator immediately after the operation. There is a danger of burning the skin!
- Always consult the relevant operating instructions when mounting accessories or operating the actuator with accessories.
- Connections for signal in- and output are double isolated from circuits that can be under dangerous voltage.

General dangers of non-compliance with safety regulations

3003 PS actuators are built at state-of the art technology and are safe to operate. Despite of this, the actuators may be hazardous if operated by personnel that has not been sufficiently trained or at least instructed, and if the actuators are handled improperly, or not used as per specification.

This may

- cause danger to life and limb of the user or a third party,
- damage the actuator and other property belonging to the owner,
- reduce safety and function of the actuator.

To prevent such problems, please ensure that these operating instructions and the safety regulations in particular have been read and understood by all personnel involved in the installation, commissioning, operation, maintenance and repair of the actuators.

Basic safety notes

- The actuators may only be operated by skilled and authorized operating personnel.
- Make sure to follow all security advices mentioned in this manual, any national rules for accident prevention, as well as the owner's instructions for work, operation and safety.
- The isolating procedures specified in these Operating Instructions must be followed for all work pertaining to the installation, commissioning, operation, change of operating conditions and modes, maintenance, inspection, repair and installation of accessories

- Before opening the actuator cover, ensure that mains supply is isolated and prevented from unintended re-connection.
- Areas that can be under voltage have to be isolated before working on them.
- Ensure that the actuators are always operated in faultless condition. Any damage or faults, and changes in the operational characteristics that may affect safety, must be reported at once.

2. Usage as per specification

- 3003 PS quarter turn actuators are exclusively designed to be used as electric valve actuators. They are meant to be mounted on valves in order to run their motors.
- Any other use is considered to be non-compliant and the manufacturer cannot be held liable for any damage resulting from it.
- The actuators can only be used within the limits laid out in the data sheets, catalogues and other documents. Otherwise, the manufacturer cannot be held liable for any resulting damage.
- Usage as per specification includes the observance of the operating, service and maintenance conditions laid down by the manufacturer.
- Not to be regarded as usage as per specification are mounting and adjusting the actuator as well as servicing. Special precautions have to be taken while doing this!
- The actuators may only be used, serviced and repaired by personnel that is familiar with them and informed about potential hazards. The specific regulations for the prevention of accidents have to be observed.
- Damages caused by unauthorized modifications carried out on the actuators are excluded from the manufacturer's liability.
- Supply voltage may only be switched on after the proper closure of the main cover or terminal box.
- Electrical wiring is done to a terminal block under the actuator cover.

3. Storage

For appropriate storage, the following instructions have to be met:

- Only store the actuators in ventilated, dry rooms.
- Store the actuators on shelves, wooden boards, etc., to protect them from floor moisture.
- Cover the actuators with plastic foil to protect them from dust and dirt.
- Protect the actuators against mechanical damage.

4. Operating conditions

- Standard actuators may be operated at ambient temperatures from -25°C to +70°C.
- Operating modes correspond to IEC 60034-1, 8: S2 for short cycle 20 min. S3/S4 control operation 1200 c/h – 25% ED at 25°C.
- For protection against moisture and dust, enclosure rating is IP65 (optionally IP67) according to EN 60529. To ensure this enclosure, the cover must be fitted correctly and the screws tightened cross wise after opening. The hand wheel must be fitted to the hand wheel shaft. The cable glands must be suitable for the wiring and correctly fitted to the actuator. To maintain the degree of protection IP65 (resp. IP67), cable glands M20x1,5 must be used which are suitable for the cable diameter.
- Space needed to remove the cover: 100 mm above the actuator

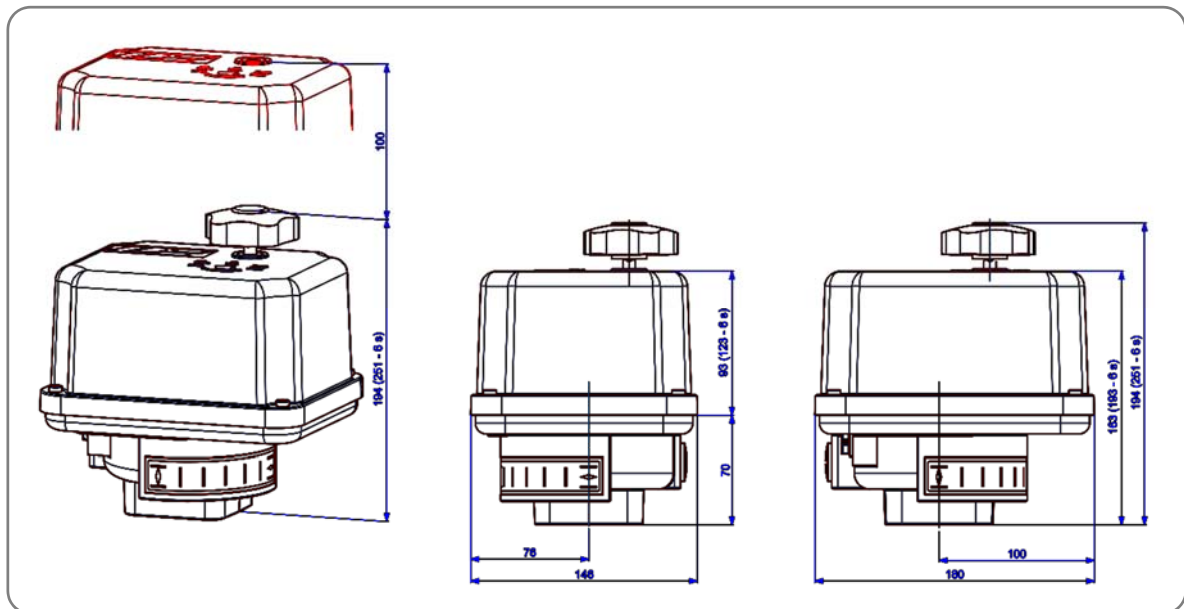


Figure 1: Installation dimensions

Outdoor usage:

When using actuators in environments with high temperature fluctuations or high humidity, we suggest a heating resistor to be fitted to prevent the build-up of condensation within the enclosure.



4.1 Installation position

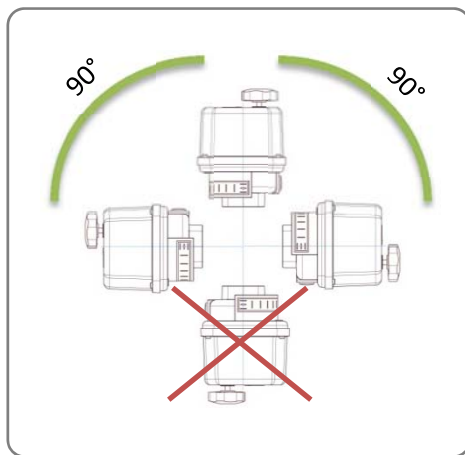


Figure 2: Installation positions

The actuator can be installed vertically or horizontally or any position in between. The actuator must not be installed with the cover pointing downwards.

5. Function

The electric quarter-turn actuators Series 3003 PS are designed to operate valves with 90° angular motion using the ON/ OFF mode. The 3003 PS actuators are provided with a mechanical interface according to ISO 5211 for valve mounting. The motor torque is transmitted via spur gear, indirectly transmitted onto a double square drive bush. This drive bush is used as a connecting piece between actuator and valve shaft.

The 90° rotation is adjustable mechanically $\pm 5^\circ$ in one end position. Two adjustable switches limit the rotation in both directions, interrupting the motor current when reaching the adjusted end position.

The hand wheel allows manual operation in case of power failure and during adjustment (See pt. 6).

6. Manual operation

The hand wheel allows manual operation in case of power failure or during adjustments (Mounting or positioning the valve). For manual operation, the hand wheel has to be pushed down against a spring.

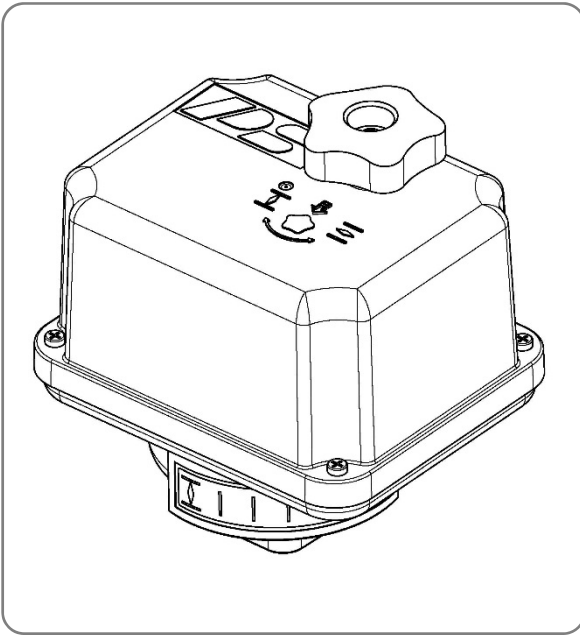


Figure 3: Manual operation



Do not exceed the adjusted electrical stroke limits by using the hand wheel.

The mechanical stop must be set accordingly to protect the valve.

If you don't observe this warning, the electrical feedback setting will change!

7. Valve mounting

The 3003 PS actuators are designed with a mechanical interface according to ISO 5211 for valve mounting. The gear contains an exchangeable drive bush to connect the actuator to the valve shaft.

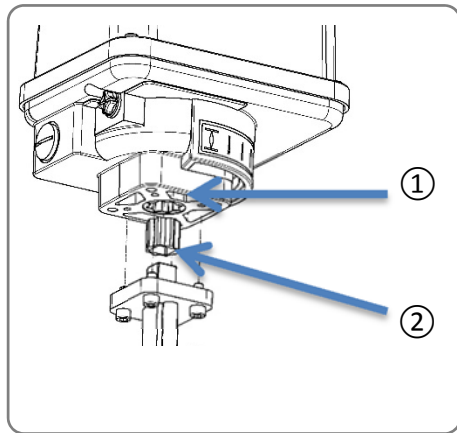


Figure 4: Actuator flange

- Check if the actuator flange suits the valve flange
- Use standard adapters to adapt to the valve shaft
- Clean the surface of the connection components, lubricate valve shaft slightly
- Position the actuator on the valve
- Tighten the screws in a diagonal sequence according to the required torque

① Actuator flange

② Adapter for valve spindle

8. Setting of the mechanical stop

There is one adjustable screw available for setting the mechanical limit of the 90° angular stroke.



When setting the mechanical end positions, only the hand wheel may be used. Do not operate the actuator electrically!

- Remove the protection cap (Figure 5; Pos. 2) from the stop screw.
- Back off the stop screw counter-clockwise approx. 5 turns.
- Move the actuator to the closed position by turning the hand wheel clockwise.
- Turn stop screw for closed position (Figure 5, Pos. 1) finger tight, then a half turn back.
- Screw on the protection cap onto the stop screw.

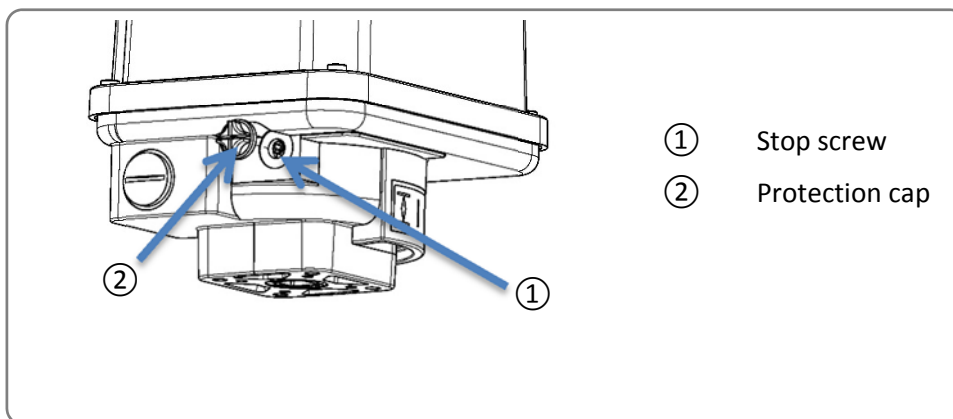


Figure 5: Mechanical stop

9. Setting of the position switches / limit switches

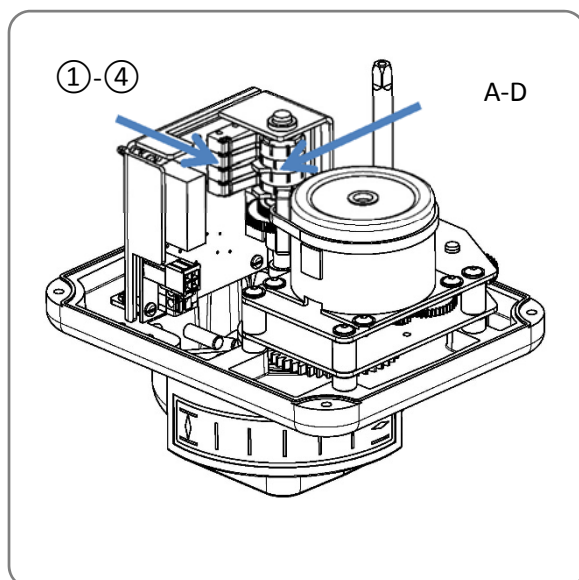


Figure 6: Limit switches/ position switches

The limit switches are pre-adjusted in the factory.

These standard limit switches serve to switch off the motor when the end positions are reached.

Additional position switches are free of voltage and serve to indicate the valve position.

- ① Position switch OPEN
- ② Position switch CLOSE
- ③ Limit switch OPEN
- ④ Limit switch CLOSE

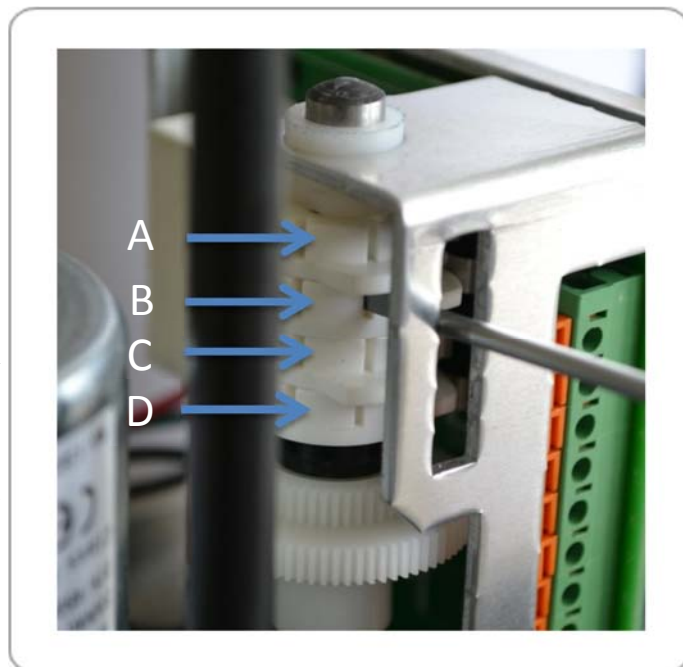
A-D Switching cams

9.1 Setting of the internal limit switches



Ensure that the mains supply is secured against accidental switching-on!

- The limit switches are pre-adjusted in the factory. An additional adjustment of the two lower switching cams is normally not necessary. If you wish to adjust the limit switches yourself, please follow the these instructions:
- Run the actuator by using the hand wheel in direction to the closed position until the required position is reached.
- Turn the cam of the CLOSE limit switch (Figure 7, Pos. D) with a suitable screw driver (4 mm blade width) clockwise until you hear the micro switch click.
- Run the actuator by using the hand wheel in direction to the open position until the required position is reached.
- Turn the cam of the OPEN limit switch (Figure 7, Pos. C) with a suitable screw driver (4 mm blade width) counter-clockwise until the micro switch is heard to click.
- Check the switching position and repeat the adjustment if necessary.



- A Switching cam for ① position switch OPEN/ Feedback signal
- B Switching cam for ② position switch CLOSE/ Feedback signal
- C Switching cam for ③ limit switch OPEN/ Motor cut-off
- D Switching cam for ④ limit switch CLOSE/ Motor cut-off
- E Supporting bridge for screwdriver

Figure 7: Setting the switching cams for the limit switches

NOTE:

Use the bridge (Figure 7, Pos. E) as support for the screw driver when adjusting the cams.

9.2 Setting of the additional position switches

- Run the actuator by using the hand wheel in direction to the CLOSE position until the required position is reached.
- Turn the cam of the the CLOSE limit switch (Figure 7, Pos. B) with a suitable screw driver (4 mm blade width) clockwise until the micro switch is heard to click.
- Run the actuator by using the hand wheel in direction to the OPEN position until the required position is reached.
- Turn the cam of the OPEN limit switch (Figure 7, Pos. A) with a suitable screw driver (4 mm blade width) counter-clockwise until the micro switch is heard to click.
- Check the switching position and repeat the adjustment if necessary.

10. Electric supply



Switch mains off before starting to work!

Connect acc. to wiring diagram on the main frame.

Mains connection cables must be dimensioned suitably to accept the maximum current requirement of the actuator and correspond to IEC 227 and IEC 245.

The yellow-green coloured cables may be used only for connecting to earth.

When you insert cables through the cable connector, ensure that the maximum bending radius for the cables is observed.

3003 PS electric actuators do not have an internal electrical power switch. A switch or power mains switch has to be provided therefore in plant installation. This should be positioned close to the device and easily accessible to the user; it shall be labelled as the mains isolator switch for the actuator.

Plant installation must also provide power surge trips or fuses corresponding to standard IEC 364-4-41/ DIN VDE 0100-410 with protection class 1 for the actuator connections.



With protective low voltage 24 VAC the open motor phase can produce voltages between 30-35 V due to motor generated induction voltage.

10.1 Wiring diagram

Figure 8 shows the standard electrical connections. However, the wiring diagram inside the actuator hood is valid for the specific actuator. For any optional extras see the individual wiring diagram in the related service instructions.

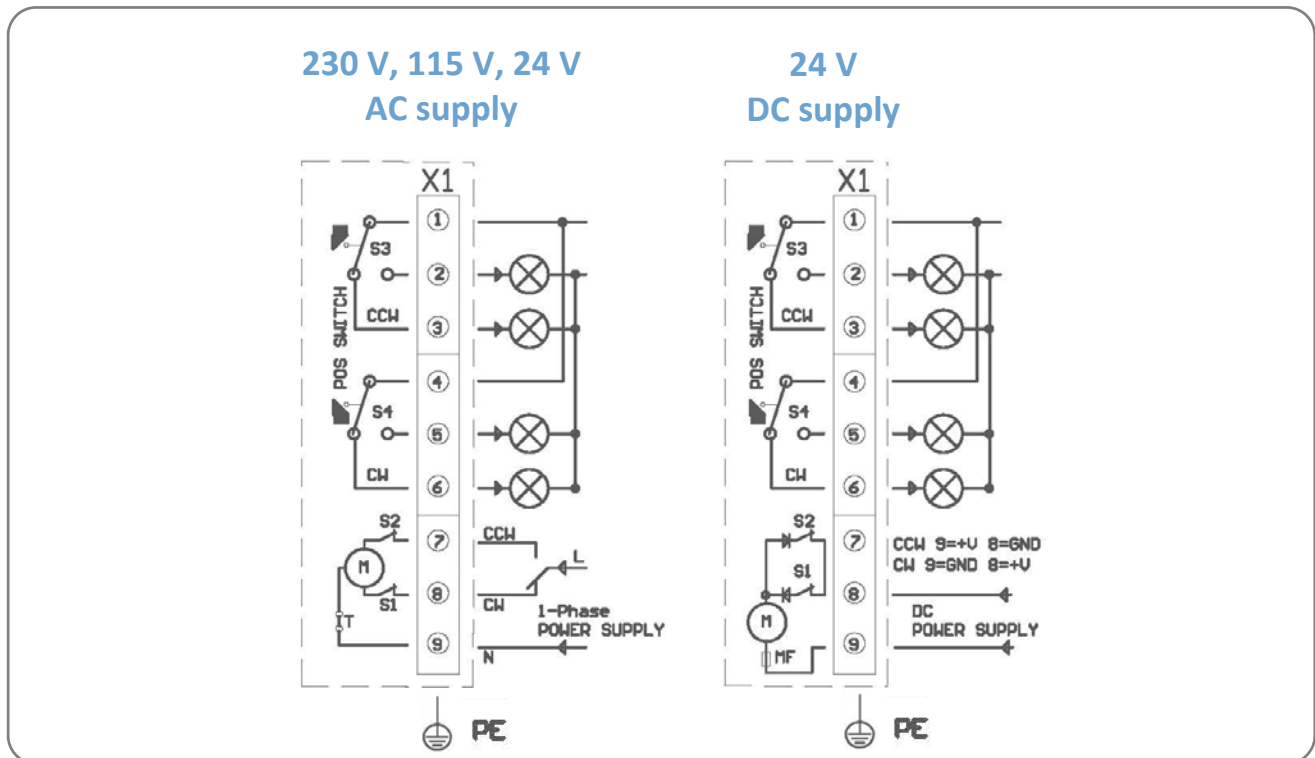


Figure 8: Wiring diagram

Two adjustable limit switches are installed to limit the stroke of the actuator, and cut-off the motor current in the relative direction.



PE Earth connection on housing plate has to be connected!



11. Commissioning

- Drive the actuator into an intermediate stroke position using the hand wheel.
- Switch the setting signal briefly between OPEN and CLOSE and ensure that the actuator operates in the correct direction. If necessary, reverse the setting signal for OPEN / CLOSE.
- Drive the actuator, in both directions, using the setting signal until the limit switch cuts-off. Ensure that the limit switch position is correct. If necessary re-adjust the limit switches.

12. Service/ Maintenance

The actuators are maintenance-free if used under the operating conditions as stated in the data sheet. The gearboxes are lubricated for lifetime and do not require further lubrication.

12.1 Cleaning

The actuators should be cleaned dryly.

12.2 Spare Parts

Defective actuators should be returned to Buerkert, to be checked for damages and their possible causes.

13. Appendix

Various options are available in order to adapt the actuators to the various service conditions. A list of accessories for each actuator type is shown on the actuator data sheet.

Accessories / Options	230 VAC 1~	115 VAC 1~	24 VAC	24 VDC
Heating	ID 774106		ID 774123	
Potentiometer	100Ω: ID 774109; 200Ω: ID 774110; 500Ω: ID 774111; 1000Ω: ID 774112; 2000Ω: ID 774113			
Position Transmitter	ID 774107: 2-wire technology; ID 774108: 3-wire technology			
Increased Enclosure	upon request			