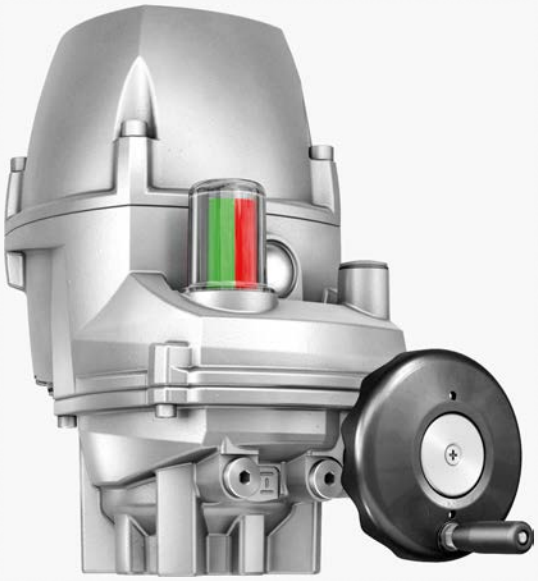
auma®
Solutions for a world in motion

Part-turn actuators

PROFOX

PF-Q80 – PF-Q600



Operation instructions

Assembly and commissioning

**Read operation instructions first.**

- Observe safety instructions.
- These operation instructions are part of the product.
- Store operation instructions during product life.
- Pass on instructions to any subsequent user or owner of the product.

**Target group:**

This document contains information for assembly, commissioning and maintenance staff.

## Table of contents

# 1. Safety instructions

## 1.1. Prerequisites for the safe handling of the product

**Standards/directives**

The end user or the contractor must ensure that all legal requirements, directives, guidelines, national regulations and recommendations with respect to assembly, electrical connection, commissioning and operation are met at the place of installation.

Depending on the actuator version, this includes:

- Applicable configuration guidelines for fieldbus applications.
- Applicable configuration guidelines for network applications.

**Safety instructions/ warnings**

All personnel working with this device must be familiar with the safety and warning instructions in this manual and observe the instructions given. Safety instructions and warning signs on the device must be observed to avoid personal injury or property damage.

**Qualification of staff**

Assembly, electrical connection, commissioning, operation, and maintenance must be carried out by suitably qualified personnel authorised by the end user or contractor of the plant only.

Prior to working on this product, the staff must have thoroughly read and understood these instructions and, furthermore, know and observe officially recognised rules regarding occupational health and safety.

**Commissioning**

Prior to commissioning, imperatively check that all settings meet the requirements of the application. Incorrect settings might present a danger to the application, e.g. cause damage to the valve or the installation. The manufacturer will not be held liable for any consequential damage. Such risk lies entirely with the user.

**Operation**

Prerequisites for safe and smooth operation:

- Correct transport, proper storage, mounting and installation, as well as careful commissioning.
- Only operate the device if it is in perfect condition while observing these instructions.
- Immediately report any faults and damage and allow for corrective measures.
- Observe recognised rules for occupational health and safety.
- Observe national regulations.
- During operation, the housing warms up and surface temperatures > 60 °C may occur. To prevent possible burns, we recommend checking the surface temperature prior to working on the device using an appropriate thermometer and wearing protective gloves.
- During operation, accelerating loads up to maximum 15 % of the maximum torque may occur. Higher values might damage the electronics.

**Protective measures**

The end user or the contractor are responsible for implementing required protective measures on site, such as enclosures, barriers, or personal protective equipment for the staff.

**Maintenance**

To ensure safe device operation, the maintenance instructions included in this manual must be observed.

Any device modification requires prior written consent of the manufacturer.

## 1.2. Range of application

AUMA part-turn actuators are designed for the operation of industrial valves, e.g. butterfly valves and ball valves.

Other applications require explicit (written) confirmation by the manufacturer.

The following applications are not permitted, e.g.:

- Industrial trucks according to EN ISO 3691

- Lifting appliances according to EN 14502
- Passenger lifts according to DIN 15306 and 15309
- Service lifts according to EN 81-1/A1
- Escalators
- Continuous duty
- Buried service
- Continuous underwater use (observe enclosure protection)
- Potentially explosive atmospheres
- Radiation exposed areas in nuclear power plants

No liability can be assumed for inappropriate or unintended use.

Observance of these operation instructions is considered as part of the device's designated use.

**Information** These operation instructions are only valid for the "clockwise closing" standard version, i.e. driven shaft turns clockwise to close the valve.

## 1.3. Warnings and notes

The following warnings draw special attention to safety-relevant procedures in these operation instructions, each marked by the appropriate signal word (DANGER, WARNING, CAUTION, NOTICE).

**DANGER** **Indicates an imminently hazardous situation with a high level of risk. Failure to observe this warning results in death or serious injury.**

**WARNING** **Indicates a potentially hazardous situation with a medium level of risk. Failure to observe this warning could result in death or serious injury.**

**CAUTION** **Indicates a potentially hazardous situation with a low level of risk. Failure to observe this warning could result in minor or moderate injury. May also be used with property damage.**

**NOTICE** **Potentially hazardous situation. Failure to observe this warning could result in property damage. Is not used for personal injury.**

Safety alert symbol ⚠ warns of a potential personal injury hazard.

The signal word (here: DANGER) indicates the level of hazard.

## 1.4. References and symbols

The following references and symbols are used in these instructions:

**Information** The term **Information** preceding the text indicates important notes and information.

Symbol for CLOSED (valve closed)

Symbol for OPEN (valve open)

M ▷ **Via the menu to parameter**

Describes the menu path of AUMA Assistant App or the AUMA CDT software to the parameter/process data on the basis of the display texts. Display texts, parameter and process data are highlighted in grey: Example. In addition, in most cases, the ID of the display text(**DIS**), of the parameter (**PRM**) or the process date (**PZD**) is indicated. The search function of AUMA CDT software (Strg + F) can be used to quickly find the display texts, parameters and process data.

➥ **Result of a process step**
Describes the result of a preceding process step.

# 2. Short description

**Part-turn actuator**

AUMA part-turn actuators PF-Q80 – PF-Q600 are driven by an electric motor. For control in motor operation and for processing the actuator signals, controls are integrated within the housing. Push buttons allow for local actuator operation. A handwheel is provided for occasional manual operation. Manual operation is possible without change-over.

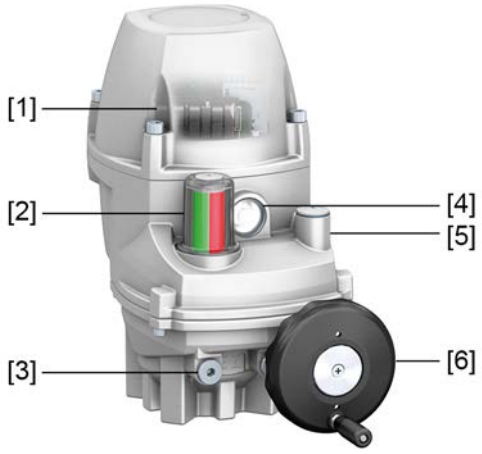
The swing angle is limited by internal end stops. Switching off in end positions may be either by limit or torque seating.

The self-locking of the actuator is ensured by means of the braking function. As soon as the actuator is at standstill, the motor takes over the brake function for the first 20 seconds. This period is defined through a parameter which can be set via Bluetooth. After this, the locking brake takes over the brake function by disconnection from power and renewed engagement. Brake engagement generates a clicking noise and is part of the standard operational behaviour.

The actuator performs a torque measurement. The measured values can be read by means of the AUMA Assistant App or AUMA CDT. Measured values are only generated during motor operation. No measured value is generated during manual operation. The last measured value remains frozen and is displayed. This is not the case when starting from the torque seating end position. In this case, the value is set to zero and also displayed as zero.

**AUMA part-turn actuator PROFOX PF-Q150**

Figure 1: PF-Q150




[1] Push buttons
[2] Position indicator
[3] Screw plug for end stop
[4] FOX-EYE (indication LED)
[5] Screw plug for manual emergency operation
[6] Handwheel

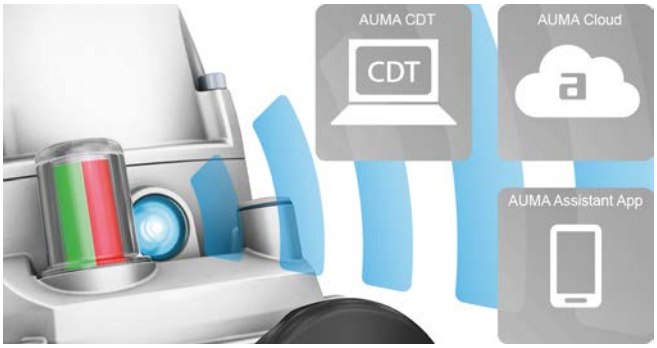
**Information**

Only smaller sizes without handwheel function are equipped with a manual drive option via Allen key, located below the screw plug for manual emergency operation [5].

## App and software

Using the **AUMA CDT** software for Windows-based computers (notebooks or tablets) and the **AUMA Assistant App**, actuator data can be uploaded and read, settings can be modified and stored. The connection between computer and AUMA actuator is established wireless via Bluetooth interface. With the **AUMA Cloud**, we provide an interactive platform to collect and assess e.g. detailed device data of all actuators within a plant.

Figure 2: Communication via Bluetooth




**AUMA CDT**

AUMA CDT is a user-friendly setting and operation program for AUMA actuators.

Connection between computer (notebook, tablet) and actuator is wireless via Bluetooth interface.

AUMA CDT software can be downloaded free of charge from our website www.auma.com.

**AUMA Cloud**

The AUMA Cloud is the driving element of the digital AUMA world, acting as interactive platform for efficient maintenance of AUMA actuators at moderate cost. The AUMA Cloud collects all device data of all actuators within one site and provides a clear overview at a glance. Detailed analysis provides valuable information on potential maintenance requirements. Additional functions foster smooth asset management.

**AUMA Assistant App**

The AUMA Assistant App enables commissioning, configuration and diagnostics of AUMA actuators via Bluetooth using either smartphone or tablet.

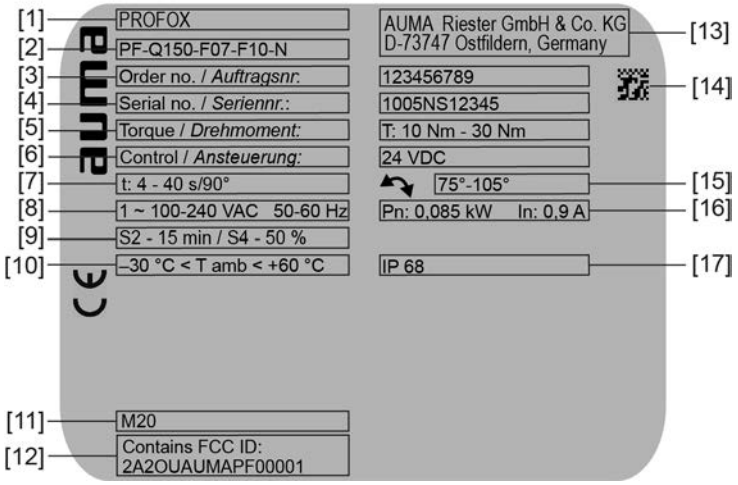
The AUMA Assistant App can be downloaded free of charge from the Play Store (Android) or App Store (iOS).

Figure 3: Link to AUMA Assistant App

# 3. Name plate

Figure 4: Name plate arrangement

Figure 5: PROFOX name plate (example of I/O interface)




[1] Product name
[2] **Type designation**
[3] **Order number**
[4] **Actuator serial number**
[5] Torque range in direction OPEN/CLOSE
[6] Control
[7] Operating time range in [s] for a part-turn movement of 90°
[8] Current type, mains voltage, mains frequency
[9] Type of duty
[10] Permissible ambient temperature
[11] Threads for cable entries at electrical connection
[12] FCC ID
[13] Name and address of manufacturer (manufacturer logo: auma)
[14] **Data Matrix code**
[15] Swing angle
[16] Nominal power and nominal current
[17] Enclosure protection

## Descriptions referring to name plate indications

### Type designation

Table 1:

| Description of type designation (with the example of PROFOX PF-Q150-F07-F10-N) | | | | | | |
|---|---|---|---|---|---|---|
| PROFOX | PF | Q | 150 | F07 – F10 | N | |
| PROFOX | | | | | | Product name |
| | PF | | | | | Type (abbreviation **P**RO**F**OX) |
| | | Q | | | | Type of movement: Part-turn actuator |
| | | | 150 | | | Size (max. torque in Nm) |
| | | | | F07 – F10 | | Flange sizes |
| | | | | | N | Flange surface flat, without spigot |

### Order number

The product can be identified using this number and the technical data as well as order-related data pertaining to the device can be requested.

Please always state this number for any product inquiries.

On the Internet at **http://www.auma.com** > Service & Support >myAUMA, we offer a service allowing authorised users to download order-related documents such as wiring diagrams and technical data (both in German and English), inspection certificate and the operation instructions when entering the order number.

### Serial number Actuator

Table 2:

| Description of serial number (example of 0520NS12345) | | | |
|---|---|---|---|
| 05 | 20 | NS12345 | |
| 05 | Positions 1+2: Assembly in week = week 05 | | |
| | 20 | Positions 3+4: Year of manufacture = 2020 | |
| | | NS12345 | Internal number for unambiguous product identification |

### Data Matrix code

When registered as authorised user, you may use our **AUMA Assistant App** to scan the Data Matrix code and directly access the order-related product documents without having to enter order number or serial number.

Figure 6: Link to AUMA Assistant App:

For further Service & Support, Software/Apps/... refer to www.auma.com

# 4. Transport and storage

## 4.1. Transport

For transport to place of installation, use sturdy packaging.

DANGER

**Suspended load!**

*Death or serious injury.*

→ Do NOT stand below suspended load.

→ Attach ropes or hooks for the purpose of lifting by hoist only to housing and NOT to handwheel.

→ Actuators mounted on valves: Attach ropes or hooks for the purpose of lifting by hoist to valve and NOT to actuator.

→ Actuators mounted to gearboxes: Attach ropes or hooks for the purpose of lifting by hoist only to the gearbox using eyebolts and NOT to the actuator.

→ Respect total weight of combination (actuator, gearbox, valve)

→ Secure load against falling down, sliding or tilting.

→ Perform lift trial at low height to eliminate any potential danger e.g. by tilting.

**Information**

Please refer to the technical data sheet for actuator weights.

## 4.2. Storage

NOTICE

**Risk of corrosion due to inappropriate storage!**

→ Store in a well-ventilated, dry room.

→ Protect against floor dampness by storage on a shelf or on a wooden pallet.

→ Cover to protect against dust and dirt.

→ Apply suitable corrosion protection agent to uncoated surfaces.

**Long-term storage**

For long-term storage (more than 6 months), observe the following points:

1. Prior to storage:
   Protect uncoated surfaces, in particular the output drive parts and mounting surface, with long-term corrosion protection agent.
2. At an interval of approx. 6 months:
   Check for corrosion. If first signs of corrosion show, apply new corrosion protection.

# 5. Assembly

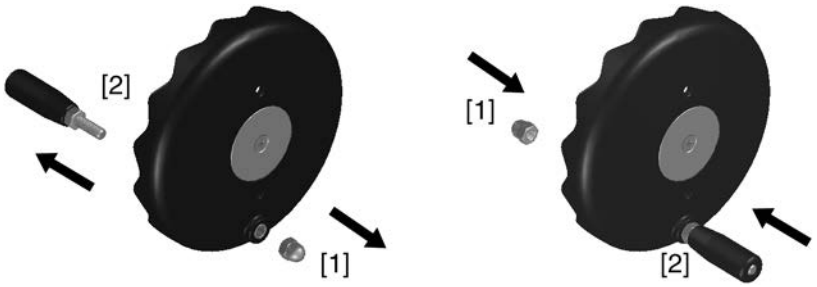
## 5.1. Mounting position

The product described in this document can be operated without restriction in any mounting position.

## 5.2. Fit ball handle to handwheel

To avoid damage during transport, the ball handle is fitted at the rear of the handwheel.

Prior to commissioning, mount the ball handle into correct position:




1. Remove cap nut [1] and pull out ball handle [2].
2. Insert ball handle [2] in correct position and fasten with cap nut [1].

## 5.3. Mount actuator to valve

The actuator is mounted to the valve using a coupling.

**NOTICE**

**Corrosion due to damage to paint finish and condensation!**

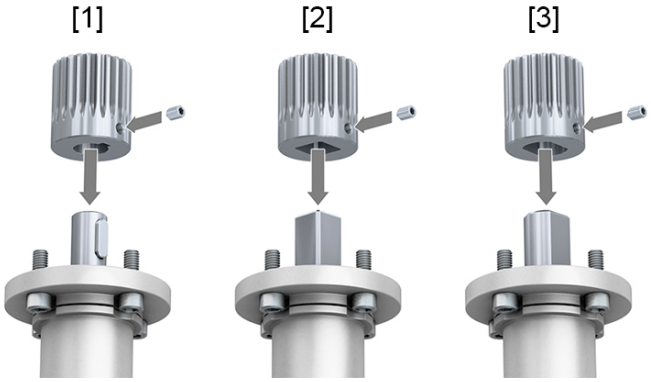
→ Touch up damage to paint finish after work on the device.

→ After mounting, immediately perform electrical connection of the device to minimise condensation cause by standby current.

### 5.3.1. Overview on coupling variants

**Design**

Figure 7: Coupling variants




[1] Bore with keyway
[2] Square bore
[3] Bore with two-flats

**Application**

- For valve attachments according to EN ISO 5211
- For rotating, non-rising valve stem

### 5.3.2. Mount actuator (with coupling)

Unbored couplings or couplings with pilot bore must be machined to match the valve shaft prior to mounting the actuator to the valve (e.g. with bore and keyway, two-flat or square bore).

**Assemble valve and actuator in the same end position. As standard, the actuator is supplied in end position CLOSED.**

→ Recommended mounting position for **butterfly valves**: End position CLOSED.

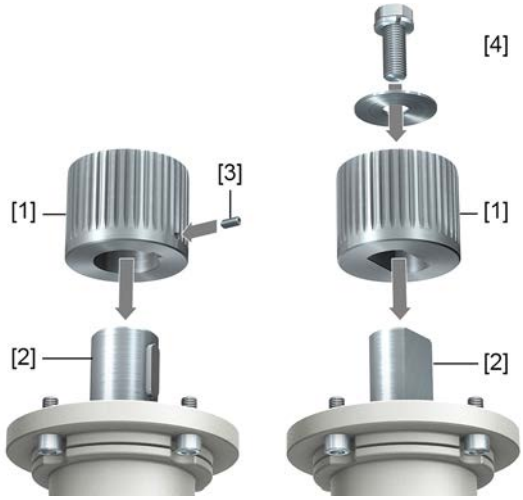
→ Recommended mounting position for **ball valves**: End position OPEN.

**Assembly steps**

1. If required, move actuator in same end position as valve using the handwheel.
2. Clean mounting faces, thoroughly degrease uncoated mounting surfaces.
3. Apply a small quantity of grease to the valve shaft [2].

4. Place coupling [1] onto valve shaft [2] and secure against axial slipping by using a grub screw [3] or a clamping washer and a screw with curved spring lock washer [4]. Thereby, ensure that dimensions X, Y or L are observed (refer to figure and table <Mounting positions for coupling>).

Figure 8: Examples: Fit coupling




[1] Coupling
[2] Valve shaft
[3] Grub screw
[4] Clamping washer and screw with curved spring lock washer

Figure 9: Mounting positions for coupling

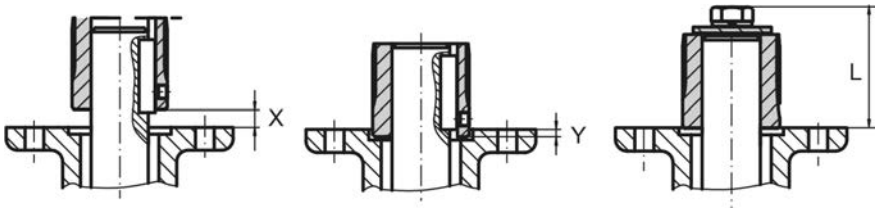



Table 3:

| **Mounting position of the coupling within fitting dimensions according to AUMA definition** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Dimensions [mm] | Q80 | | | Q150 | | | Q300 | | Q600 | |
| EN ISO 5211 | F05 | F07 | F10 | F05 | F07 | F10 | F07 | F10 | F07 | F10 |
| X max. | 3 | 3 | 3 | 3 | 3 | 3 | 4.5 | 4.5 | 4.5 | 4.5 |
| Y max. | 2 | 2 | 2 | 2 | 2 | 2 | 4.5 | 4.5 | 4.5 | 4.5 |
| L max. | 38[1)]/40 | 38[1)]/40 | 38[1)]/40 | 38[1)]/40 | 38[1)]/40 | 38[1)]/40 | 50 | 50 | 50 | 50 |

1) Thread with grub screw

5. Apply non-acidic grease at splines of coupling (e.g. Gleitmo by Fuchs).

6. Fit actuator. If required, slightly turn actuator until splines of coupling engage.

Figure 10: Mounting the actuator onto valve

**Information** Ensure complete contact of flanges.

7. If flange bores do not match thread:
   7.1 Slightly rotate handwheel until bores line up.
   7.2 If required, shift actuator by one tooth on the coupling.
8. Fasten actuator with screws.
   **Information:** We recommend applying liquid thread sealing material to the screws to avoid contact corrosion.
9. Fasten screws crosswise to a torque according to table.

Table 4:

| **Tightening torques for screws** | |
|---|---|
| Threads | Tightening torque [Nm] |
| | Strength class A2-80/A4–80 |
| M6 | 10 |
| M8 | 24 |
| M10 | 48 |
| M12 | 82 |
| M16 | 200 |
| M20 | 392 |

# 6. Electrical connection

## 6.1. Basic information

WARNING

**Electric shock due to presence of hazardous voltage!**

*Risk of death or serious injury!*

→ The electrical connection must be carried out exclusively by suitably qualified personnel.

→ Prior to connection, observe basic information contained in this chapter.

CAUTION

**Risk of immediate actuator operation when connecting to mains!**

*Risk of death, severe injury or damage to valve.*

→ Check operation signals and operation behaviour prior to switching on the mains voltage.

→ Ensure that the tripping conditions for the failure behaviour are not fulfilled when switching on.

→ Ensure that the tripping conditions for the EMERGENCY behaviour are not fulfilled when switching on.

Reasons for immediate operation:

- The signal and fieldbus cables are connected and a respective operation command has been issued.
- The “Failure behaviour” function was configured as to ensure that this state results in an operation once the mains voltage is applied. Factory setting parameter Failure operation: STOP (the actuator stops).
- The “EMERGENCY behaviour” function was configured as to ensure that this state results in an operation once the mains voltage is applied. Factory setting function EMERGENCY behaviour: Function not activated.

**Wiring diagram/terminal plan**

The pertaining wiring diagram/terminal plan (in German or English) is attached to the device in a weather-proof bag, together with these operation instructions. It can also be requested from AUMA (state order number, refer to name plate) or downloaded directly from the Internet (http://www.auma.com).

**Permissible networks (supply networks)**

The actuators are suitable for use in TN and TT networks. For IT network, a suitable, approved insulation monitor measuring the pulse code is required.

**Current type, mains voltage, mains frequency**

Type of current, mains voltage and mains frequency must match the data on the name plate.

For short-circuit protection and for disconnecting the actuator from the mains, fuses and disconnect switches or circuit breakers have to be provided by the customer. For circuit breakers, the following sizing/characteristics are recommended:

| Number of actuators | Sizing/ characteristics |
|---|---|
| 1 | B06 |
| 2 | B10 |
| 4 | C13 |
| 10 | D16 |

Refer to electric data for the maximum current values of individual models and versions.

**Potential of customer connections**

Refer to Technical data for options of isolated potentials.

**Safety standards**

Safety measures and safety equipment must comply with the respectively valid national on site specifications. All externally connected devices shall comply with the relevant safety standards applicable for the place of installation.

**Connecting cables, cable glands, reducers, blanking plugs**

- We recommend using connecting cables and connecting terminals according to rated current ($I_N$) (refer to motor or electrical data sheet).
- For device insulation, appropriate (voltage-proof) cables must be used. Specify cables for the highest occurring rated voltage.
- To avoid contact corrosion, we recommend the use of sealing agents for cable glands and blanking plugs made of metal.
- Use connecting cable with appropriate minimum rated temperature.
- For connecting cables exposed to UV radiation (outdoor installation), use UV resistant cables.
- For the connection of position transmitters, screened cables must be used.

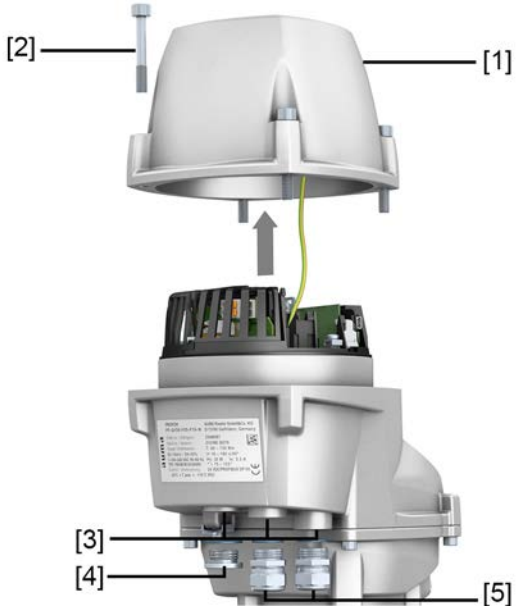
**Cable installation in accordance with EMC**

Signal and fieldbus cables are susceptible to interference. Motor cables are interference sources.

- Lay cables being susceptible to interference or sources of interference at the highest possible distance from each other.
- The interference immunity of signal and fieldbus cables increases if the cables are laid close to the earth potential.
- If possible, avoid laying long cables and make sure that they are installed in areas being subject to low interference.
- Avoid parallel paths with little cable distance of cables being either susceptible to interference or interference sources.

## 6.2. Open terminal compartment

Figure 11: Open terminal compartment (example of I/O interface)




[1] Cover
[2] Screws
[3] Cable entry
[4] Blanking plug
[5] Cable gland (not included in scope of delivery)

**DANGER**

**Electric shock due to presence of hazardous voltage!**

*Death or serious injury.*

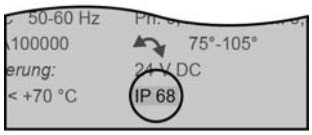
→ Disconnect device from the mains before opening.

→ Wait for 60 seconds after power cut-off prior to opening the housing.

1. Loosen screws [2] and remove cover [1].
2. Insert cable glands [5].

➥ The enclosure protection IP… stated on the name plate is only ensured if suitable cable glands are used.

Figure 12: Example: Name plate for enclosure protection IP68




3. Tighten cable glands and blanking plugs with the appropriate torque in compliance with the manufacturer's specifications.

## 6.3. Cable connection

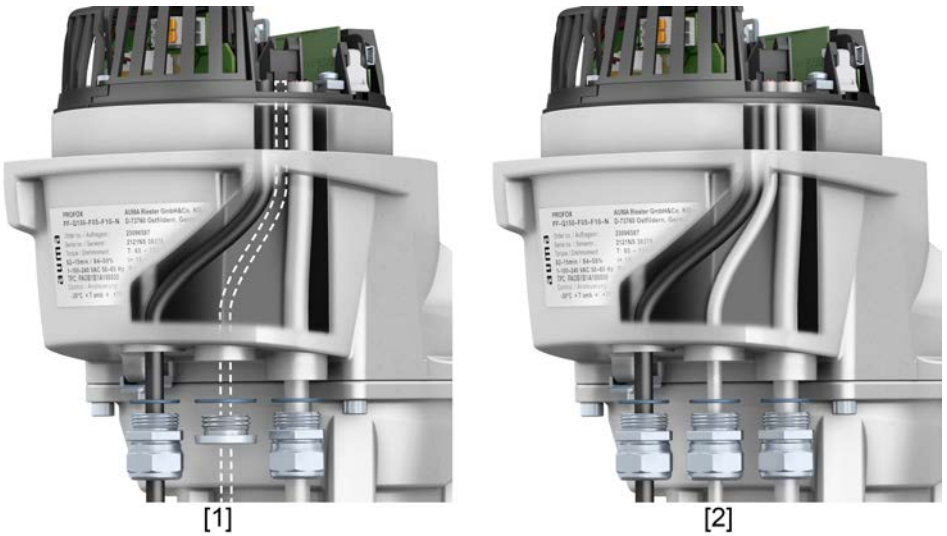
### Cable arrangement

**The shown cable arrangement is only applicable for actuators with I/O interface!**

*For actuators with fieldbus interface, please refer to appropriate short instructions (if available).*

Cable arrangement depends on the number of cables connected in addition to the mains cable. There are two options:

Figure 13: Cable arrangement




[1] Cable arrangement for one mains cable and one signal cable

[2] Cable arrangement for one mains cable and two additional cables

**For better accessibility, we recommend heeding the following order.**

1. Insert signal cable into cable gland on the right and push upward until the cable is visible.

2. In case a further signal cable is connected: Insert second signal cable into middle cable gland and push upward until the cable is visible.
3. Insert mains cable into left cable gland and also push upward until the cable is visible.
4. Remove cable sheathing.
5. Strip wires.
   → Controls approx. 6 mm, power supply unit approx. 10 mm
6. For flexible cables: Use wire end sleeves according to DIN 46228.

**PE connection**

⚠ WARNING

**In case of a fault, electric shock due to presence of hazardous voltage if the PE conductor is NOT connected!**

*Risk of death or serious injury!*

→ Connect all protective earth conductors.

→ Connect PE connection to external protective earth conductor of connecting cables.

→ Start running the device only after having connected the protective earth conductor.

7. Fasten PE using spade lugs or wire end sleeves at protective earth connection (⏚) as shown. Do not completely loosen screw!

   Figure 14: Protective earth connection (example)

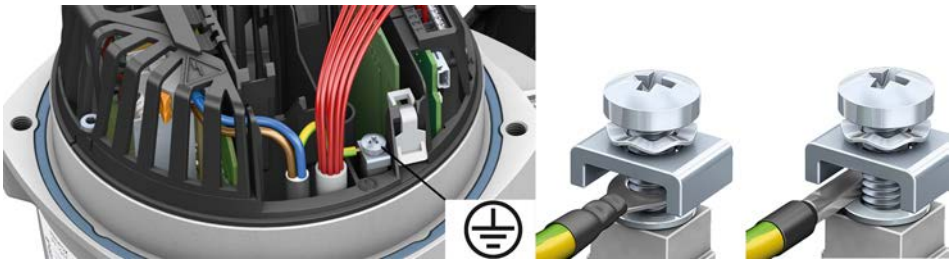


Table 5:

| **Terminal cross sections and tightening torques of PE connection** | | |
|---|---|---|
| Designation | Terminal cross sections | Tightening torques |
| Protective earth connection ⏚ (PE) | 1.0 – 6 $mm^2$ (flexible) via spade lug or wire end sleeve<br>1.5 – 2.5 $mm^2$ (flexible) directly<br>1.5 – 6 $mm^2$ (rigid) directly | 3 – 4 Nm |

**Connection of mains and signal cables**

8. Connect mains cable according to order-related wiring diagram.

Table 6:

| **Terminal cross sections** | | | |
|---|---|---|---|
| Designation | Wire type | Cross section | |
| | | min. [$mm^2$] | max. [$mm^2$] |
| Mains cable | rigid/flexible | 0.08 | 2.5 |
| | AWG | AWG 28 | AWG 12 |

9. Connect signal cables in push-in technology according to order-related wiring diagram.

NOTICE

**Damage to push-in terminals by jamming of wire end sleeves with the housing!**

*Replacement of the complete component is required.*

→ Use wire end sleeves with smooth surface.

→ Always press the push-in terminals completely down using a screwdriver and always carefully remove signal cables.

→ It must be possible to pull out the signal cable without resistance when the push-in terminal held down.

**Information:** To avoid unevenness at wire end sleeve, AUMA recommends using the Crimpfox 6 model by Phoenix Contact as suitable crimping pliers.

Figure 15: Connect signal cables

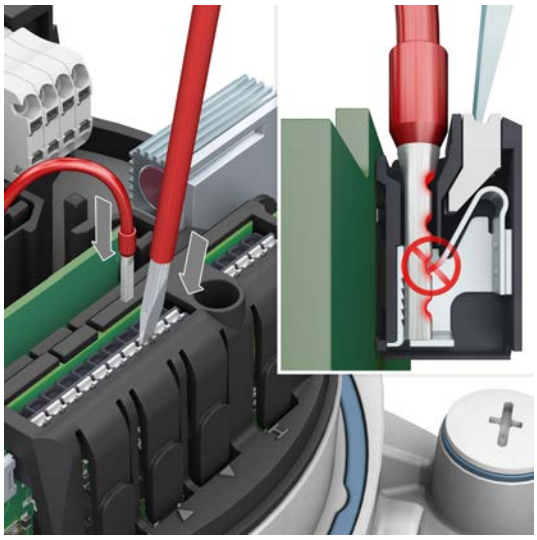


Table 7:

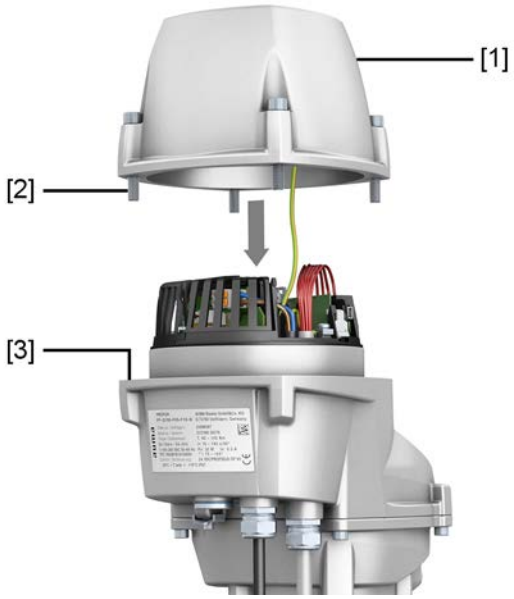
| **Terminal cross sections** | | | |
|---|---|---|---|
| Designation | Wire type | Cross section | |
| | | min. [mm²] | max. [mm²] |
| I/O signal cable | solid | 0.2 | 1.5 |
| | flexible | 0.2 | 1.5 |
| | flexible with wire end sleeve without plastic sleeve | 0.2 | 1.5 |
| | AWG | AWG 24 | AWG 16 |

10. For shielded cables: Link the cable shield end via the cable gland to the housing (earthing).
11. If the PE conductor has been removed from the cover, it must be tightened applying 2.2 Nm tightening torque prior to re-placing the cover.
12. Fasten cable glands with the torque as specified by the manufacturer to ensure respect of required enclosure protection.
13. Connect power supply.

**If the end position setting is carried out with the internal operation buttons following the connection to the power supply: Do not close cover!**

## 6.4. Close terminal compartment

Figure 16: Close terminal compartment (example of I/O interface)




[1] Cover
[2] Screws
[3] O-ring

⚠ WARNING

**Short-circuit and electric shock due to pinching of cables!**

*Risk of death or serious injury!*

→ Carefully assemble cover to avoid pinching the cables.

1. Clean sealing faces of cover [1] and housing.
2. Check whether O-ring [3] is mounted in the provided groove.
3. Fit cover [1] and fasten screws [2] evenly crosswise at 24 Nm (M8).

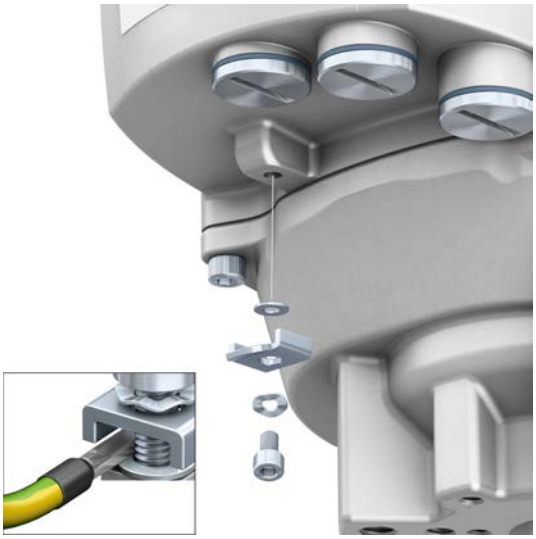
   **Information:** The PE conductor must be correctly connected to the cover housing. If the cable has been removed from the cover, it must be tightened applying 2.2 Nm tightening torque prior to re-placing the cover.

## 6.5. External earth connection

**Standard version:** Without earth connection, with plastic plate and screw only.

**Option:** With earth connection consisting of metal plate and hex. socket cap head screw with shaft bearing race.

Figure 17: Earth connection



**Application** External earth connection (U-bracket) for connection to equipotential compensation.

**Information** The earthing cable must be attached between the U-bracket and the metal washer resting on the housing.

**Information** Strip powder from actuator surface below the U-bracket (file down).

Table 8:

| **Terminal cross sections and earth connection tightening torques** | | |
|---|---|---|
| Conductor type | Terminal cross sections | Tightening torques |
| solid | 2.5 mm² to 6 mm² | 3 – 4 Nm |
| flexible | 1.5 mm² to 4 mm² | 3 – 4 Nm |
| For fine stranded (flexible) wires, connection is made via cable lugs/ring terminals. When connecting two individual wires with a U-bracket, cross sections have to be identical. | | |

# 7. Commissioning

Commissioning is made in four steps:

1. End stop setting
2. End position setting
3. Position indicator setting
4. Configuration of further parameters

**Besides end position settings, all other settings have already been made in the factory in compliance with the order.**

*If correctly ordered, only end position setting is required.*

The following table shows the most important parameters and how they can be configured.

| Step | Setting | Parameter/designation | At the actuator | AUMA Assistant App | AUMA CDT | Page |
|---|---|---|---|---|---|---|
| End stop setting | Swing angle limitation | End stop CLOSED | Yes | No | No | page 24, Set end stop CLOSED |
| | | End stop OPEN | Yes | No | No | page 25, Set end stop OPEN |
| End position setting | Positions | End position CLOSED setting | Yes | Yes | Yes | page 26, Set end position CLOSED |
| | | End position OPEN setting | Yes | Yes | Yes | page 27, Set end position OPEN |
| Position indicator setting | Indication for the end positions | Indication end position CLOSED | Yes | No | No | page 28, Position indicator setting |
| | | Indication end position OPEN | Yes | No | No | |
| Configuration of further parameters | Type of seating | End position CLOSED | No | Yes | Yes | — |
| | | End position OPEN | No | Yes | Yes | |
| | Torque switching | Tripping torque CLOSE | No | Yes | Yes | |
| | | Tripping torque OPEN | No | Yes | Yes | |
| | Speeds | Operating time | No | Yes | Yes | page 31, Speed setting |
| | I/O signals (binary/analogue) | Type and assignment | No | Yes | Yes | — |
| | Positioner | Various parameters | No | Yes | Yes | — |

Many further parameters can be configured using the AUMA Assistant App or AUMA CDT. Refer to Manual (Operation & Setting ) PROFOX.

## 7.1. End stops in part-turn actuator

**The following description applies for clockwise closing standard version.**

*Separate instructions are available for counterclockwise special version.*

The internal end stops limit the swing angle. They protect the valve in case of limit switching failure during motor operation and serve the purpose as limitation for

manual operation via handwheel. They may not be used for torque tripping in end positions during standard operation.

End stop setting is generally performed by the valve manufacturer **prior** to installing the valve into the pipework.

CAUTION

**Exposed, rotating parts (discs/balls) at the valve!**

*Pinching and damage by valve or actuator.*

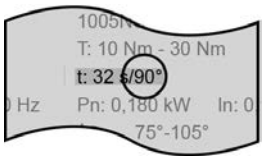
→ End stops should be set by suitably qualified personnel only.

→ Never completely remove the setting screws [2] and [4] to avoid grease leakage.

→ Observe dimension $T_{min.}$

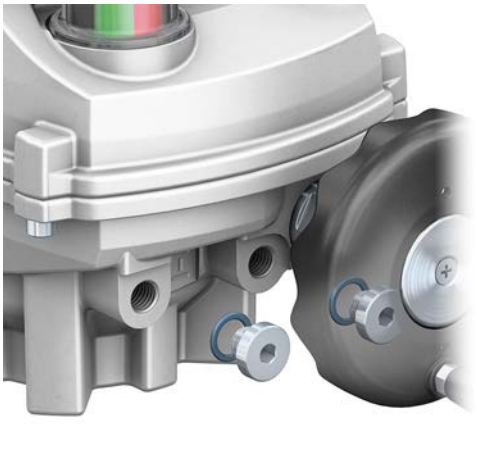
**Information**

- The swing angle set in the factory is indicated on the name plate:




- The setting sequence depends on the valve:
  - Recommendation for **butterfly valves**: Set end stop CLOSED first.
  - Recommendation for **ball valves**: Set end stop OPEN first.

Figure 18: End stops




[1] Screw plug for end stop OPEN
[2] Setting screw for end stop OPEN
[3] Screw plug for end stop CLOSED
[4] Setting screw for end stop CLOSED

| Dimensions/sizes | Q80 | Q150 | Q300 | Q600 |
|---|---|---|---|---|
| T (for 90°) | 14.5 | 14.5 | 18.5 | 18.5 |
| $T_{min.}$ | 9 | 9 | 11 | 11 |

## 7.1.1. Set end stop CLOSED

**With fitted handwheel: Dismantle handwheel prior to end stop CLOSED setting!**

1. Remove screw plug [3].
2. Move valve to end position CLOSED with handwheel.

3. If the valve end position is not reached:
   → Slightly turn setting screw [4] counterclockwise until valve end position CLOSED can be safely set.
   ➥ Turning the setting screw [4] clockwise results in a smaller swing angle.
   ➥ Turning the setting screw [4] counterclockwise results in a larger swing angle.

4. Turn setting screw [4] clockwise to the stop.

➥ This completes the setting of end stop CLOSED.

5. Check O-ring of screw plug for seat and condition, replace if damaged.
6. Screw in screw plug [1] and fasten while applying the following torque:

➥ **PF-Q80X – PF-Q150X:** 13 Nm (M12)

➥ **PF-Q300X – PF-Q600X:** 13 Nm (M16)

Having completed this procedure, the end position detection CLOSED can be set immediately.

### 7.1.2. Set end stop OPEN

**Information** In general, the end stop OPEN does not have to be set.

1. Remove screw plug [1].
2. Move valve to end position OPEN with handwheel.
3. If the valve end position is not reached:
   → Slightly turn setting screw [2] counterclockwise until valve end position OPEN can be safely set.
   ➥ Turning the setting screw [2] clockwise results in a smaller swing angle.
   ➥ Turning the setting screw [2] counterclockwise results in a larger swing angle.

4. Turn setting screw [2] clockwise to the stop.

➥ This completes the setting of end stop OPEN.

5. Check O-ring of screw plug for seat and condition, replace if damaged.
6. Screw in screw plug [1] and fasten while applying the following torque:

➥ **PF-Q80X – PF-Q150X:** 13 Nm (M12)

➥ **PF-Q300X – PF-Q600X:** 13 Nm (M16)

Having completed this procedure, the end position detection OPEN can be set immediately.

## 7.2. End position setting (via push buttons)

When setting the end positions, the actuator acts in accordance with the selected type of seating:

**Limit seating**

The final position of the end position is set to the exact current position. Once the final position is reached, the actuator switches off.

**Torque seating**

The final position of the end position is set to <1 % before the current position. Once the torque is reached, the actuator switches off.

**In case of torque seating: Check factory torque setting!**

**The end positions may also be set using the AUMA Assistant App or the AUMA CDT software.**

NOTICE

**Valve damage at valve/gearbox due to incorrect setting!**

→ When setting with motor operation: Interrupt operation in time **prior** to reaching the end stop.

→ Heed overrun when selecting actuator seating via positions.

## 7.2.1. Set end position CLOSED

DANGER

**Electric shock due to presence of hazardous voltage!**

*Failure to observe this warning results in death or serious injury.*

→ Electrical connection and commissioning must be carried out exclusively by suitably qualified personnel if circuit is live.

→ Do not touch any cables.

1. Remove cover from actuator.
2. Operate in direction CLOSE via push button ▼ until complete valve closing.

**Risk of passing set end positions!**

→ During operation in directions OPEN/CLOSE, the actuator stops when reaching the set end position. When pressing again the push button, the actuator runs until reaching a mechanical stop (end stop of the actuator or the valve) or passes the end position when releasing the push button.

➥ The operation in direction CLOSE is signalled by the LED flashing in red.

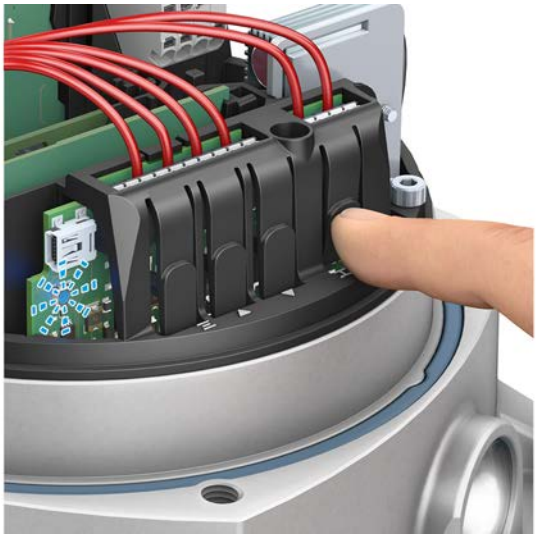
Figure 19: Example with I/O interface

3. Once the desired end position CLOSED has been reached, release the push button ▼.

➥ The LED continues flashing in blue for approx. 10 seconds. This time span allows for end position setting.

4. While LED is flashing in blue, hold down push button for at least two seconds until the LED is illuminated in red.

Figure 20: Example with I/O interface



➥ The end position CLOSED setting has been successfully completed.

### 7.2.2. Set end position OPEN

**DANGER**

**Electric shock due to presence of hazardous voltage!**

*Failure to observe this warning results in death or serious injury.*

→ Electrical connection and commissioning must be carried out exclusively by suitably qualified personnel if circuit is live.

→ Do not touch any cables.

1. Remove cover from actuator.

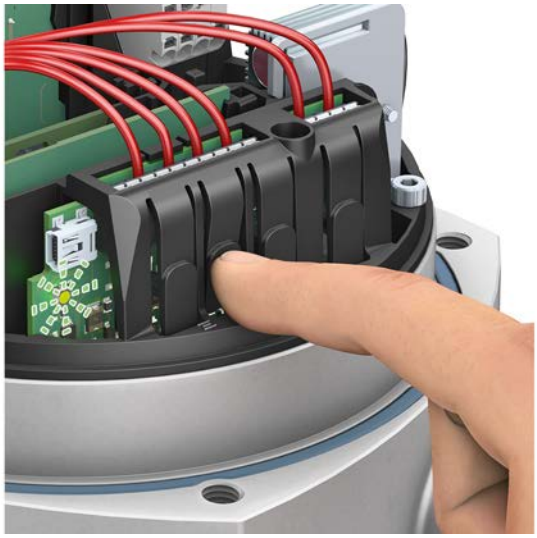
2. Operate in direction OPEN via push button ▲ until complete valve opening.

**Risk of passing set end positions!**

→ During operation in directions OPEN/CLOSE, the actuator stops when reaching the set end position. When pressing again the push button, the actuator runs until reaching a mechanical stop (end stop of the actuator or the valve) or passes the end position when releasing the push button.

➥ The operation in direction OPEN is signalled by the LED flashing in green.

Figure 21: Example with I/O interface



3. Once the desired end position OPEN has been reached, release the push button ▲.

➥ The LED continues flashing in blue for approx. 10 seconds. This time span allows for end position setting.

4. While LED is flashing in blue, hold down push button for at least two seconds until the LED is illuminated in green.

Figure 22: Example with I/O interface

➥ The end position OPEN setting has been successfully completed.

## 7.3. Position indicator setting

The position indicator shows the valve position through its rotating indication. If correctly set, the position indicator shows the colour red when in end position CLOSED and green when in end position OPEN.

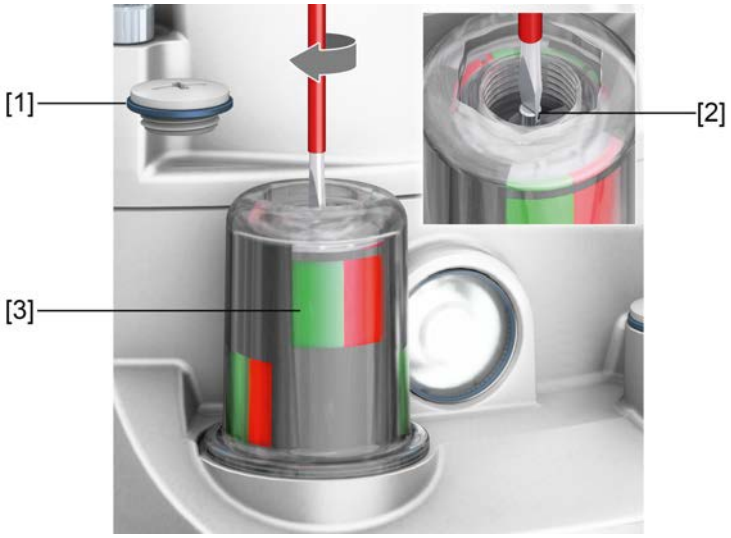
The following table provides an overview of the different positions indications and refers to the chapter describing the respective setting.

Table 9: Position indications

| Figure | Indication range | Page |
|---|---|---|
|  | 90° | page 29, Position indication for 90° |
|  | 120° | page 30, Position indication for 120° |
|  | 45° – 360° | page 30, Position indication for 45° – 360° |

## 7.3.1. Position indication for 90°

Figure 23: Position indicator

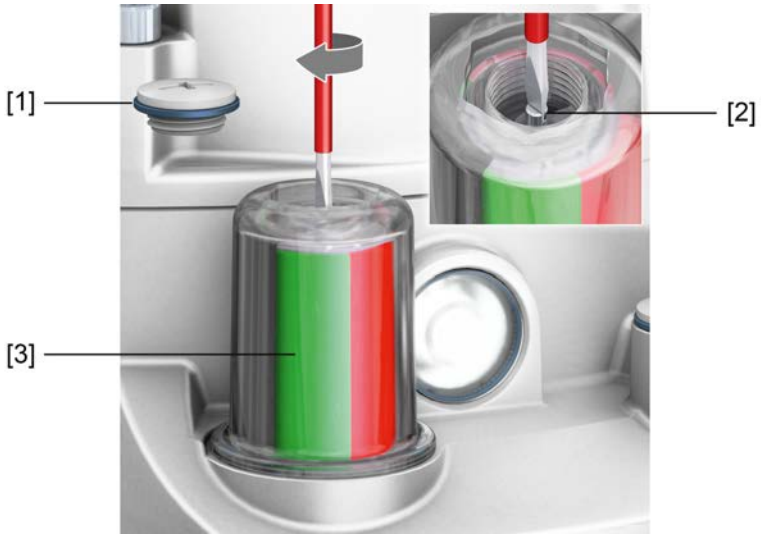



1. Remove screw plug [1].
2. Operate actuator to end position CLOSED.
3. Turn inner shaft [2] using a suitable screwdriver until the display windows of position indicator [3] are red.
4. Operate actuator to end position OPEN.
5. Check whether the windows of the position indicator [3] are completely green.

➥ If yes: Position indicator has been correctly set. If no: Resume as of step 1.

### 7.3.2. Position indication for 120°

Figure 24: Position indicator




1. Remove screw plug [1].
2. Operate actuator to end position CLOSED.
3. Turn inner shaft [2] using a suitable screwdriver until the complete display window of position indicator [3] is red.
4. Operate actuator to end position OPEN.
5. Check whether the window of the position indicator [3] is completely green.

➥ If yes: Position indicator has been correctly set. If no: Resume as of step 1.

### 7.3.3. Position indication for 45° – 360°

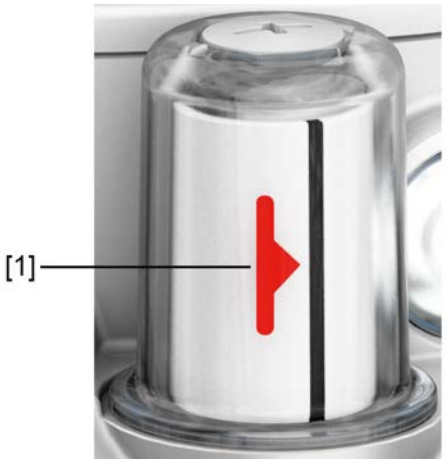
After successful setting, the black line of the position indicator should move across range indicated by the red and green labels.

1. Operate actuator to end position CLOSED.

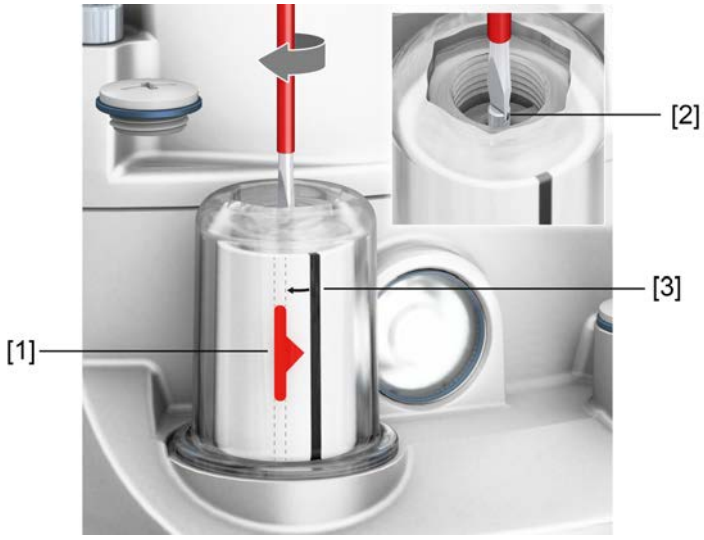
**Wide swing angle range**

*Depending on the position of the first label, the second label will be on the back of the position indicator.*

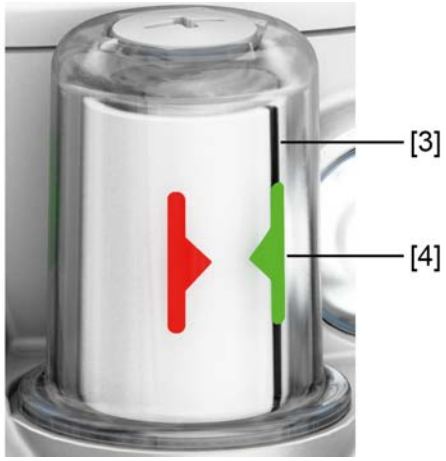
→ Check swing angle range and possible label position prior to actually sticking the label onto the position indicator.




2. Stick the red label [1] included in the scope of supply at any position of the position indicator.




3. Turn inside shaft [2] using an appropriate screwdriver until the black strip [3] is at the same position as the red label [1].
4. Operate actuator to end position OPEN.




5. Stick the green label [3] onto the black strip [3] and make sure that they completely overlap.

## 7.4. Configuration of further parameters

Either the AUMA Assistant App or AUMA CDT software is required to use the complete range of configuration options.

The user level defines which parameters are displayed or can be changed.

**Information** For further information relating to user levels and passwords, please refer to page 37, Table 19

### 7.4.1. Speed setting

The speeds are determined by the motor speed. The motor speed and thus the actuator speed can be modified using the AUMA Assistant App or AUMA CDT.

Setting is made using a percentage value within the range of 10 % and 100 %. Thereby, 100 % corresponds to the maximum motor speed and thus to the maximum actuator speed.

Table 10: Assignment of power levels to the motors and power supply units used

| Power level | Motor | Power supply unit |
|---|---|---|
| V1 | 18 W | 65 W |
| V2 | 25 W | 65 W |
| V3 | 50 W | 85 W |

**The speeds can be individually set for the following functions:**

- Standard speed for operations in directions OPEN and CLOSE and back (parameter: PRM_5587 Motor speed 1).
- Alternative standard speed if different speeds are required for operations in directions OPEN and CLOSE or if continuous changes between two specified speeds via a digital input are required (parameter: PRM_5588 Motor speed 2).
- Speeds for “Failure behaviour” and “EMERGENCY behaviour” functions:
  - For operation in direction CLOSE (parameter: PRM_5592 Motor speed for failure behaviour CLOSE and emergency operation CLOSE)
  - For operation in direction OPEN (parameter: PRM_5591 Motor speed for failure behaviour OPEN and emergency operation OPEN)

**Variable speeds**

For operations between OPEN and CLOSE, the speed can be specified via an analogue input or the fieldbus. The analogue input must be configured to interpret this signal.

The speed can be set within the range of 10 % and 100 % of the maximum motor speed:

0/4 mA = 10 % of the maximum motor speed

20 mA = 100 % of the maximum motor speed

The applicable scaling limits are identical for the fieldbus. A respective field within the process representation is available.

Table 11: Example values for Q80 size setting

| | **Speed in % of the maximum motor speed** | | |
|---|---|---|---|
| **Operating time Output drive** | V3<br>4 s – 40 s | V2<br>8 s – 80 s | V1<br>16 s – 160 s |
| 4 s | 100 % | — | — |
| 5.6 s | 71 % | — | — |
| 8 s | 50 % | 100 % | — |
| 11 s | 36 % | 73 % | — |
| 16 s | 25 % | 50 % | 100 % |
| 22 s | 18 % | 36 % | 72 % |
| 32 s | 13 % | 25 % | 50 % |
| 40 s | 10 % | 20% | 40 % |
| 45 s | — | 18 % | 35 % |
| 63 s | — | 13 % | 25 % |
| 72 s | — | 11 % | 22 % |
| 80 s | — | 10 % | 20 % |
| 90 s | — | — | 18 % |
| 125 s | — | — | 13 % |
| 150 s | — | — | 11 % |
| 160 s | — | — | 10 % |

Table 12: Example values for Q150 size setting

| | **Speed in % of the maximum motor speed** | | |
|---|---|---|---|
| **Operating time Output drive** | V3<br>8 s – 80 s | V2<br>16 s – 160 s | V1<br>32 s – 320 s |
| 8 s | 100 % | — | — |
| 11 s | 73 % | — | — |
| 16 s | 50 % | 100 % | — |
| 22 s | 36 % | 73 % | — |
| 32 s | 25 % | 50 % | 100 % |

| | Speed in % of the maximum motor speed | | |
|---|---|---|---|
| **Operating time Output drive** | V3 8 s – 80 s | V2 16 s – 160 s | V1 32 s – 320 s |
| 45 s | 18 % | 36 % | 71 % |
| 63 s | 13 % | 25 % | 51 % |
| 72 s | 11 % | 22 % | 44 % |
| 80 s | 10 % | 20 % | 40 % |
| 90 s | — | 18 % | 36 % |
| 125 s | — | 13 % | 26 % |
| 150 s | — | 11 % | 21 % |
| 160 s | — | 10 % | 20 % |
| 180 s | — | — | 18 % |
| 210 s | — | — | 15 % |
| 250 s | — | — | 13 % |
| 320 s | — | — | 10 % |

Table 13: Example values for Q300 size setting

| | Speed in % of the maximum motor speed | | |
|---|---|---|---|
| **Operating time Output drive** | V3 22 s – 220 s | V2 45 s – 450 s | V1 63 s – 630 s |
| 22 s | 100 % | — | — |
| 32 s | 69 % | — | — |
| 45 s | 50 % | 100 % | — |
| 63 s | 35 % | 71 % | 100 % |
| 72 s | 31 % | 63 % | 88 % |
| 90 s | 24 % | 50 % | 70 % |
| 125 s | 18 % | 36 % | 50 % |
| 150 s | 15 % | 30 % | 42 % |
| 180 s | 12 % | 25 % | 35 % |
| 210 s | 10 % | 21 % | 30 % |
| 220 s | 10 % | 20 % | 29 % |
| 250 s | — | 18 % | 25 % |
| 320 s | — | 14 % | 20 % |
| 450 s | — | 10 % | 14 % |
| 630 s | — | — | 10 % |

Table 14: Example values for Q600 size setting

| | Speed in % of the maximum motor speed | |
|---|---|---|
| **Operating time Output drive** | V3 45 s – 450 s | V2 90 s – 750 s |
| 45 s | 100 % | — |
| 63 s | 71 % | — |
| 72 s | 63 % | — |
| 75 s | 60 % | 100 % |
| 90 s | 50 % | 83 % |
| 125 s | 36 % | 60 % |
| 150 s | 30 % | 50 % |
| 180 s | 25 % | 42 % |
| 210 s | 21 % | 36 % |
| 250 s | 18 % | 30 % |

| | Speed in % of the maximum motor speed | |
|---|---|---|
| **Operating time**<br>**Output drive** | V3<br>45 s – 450 s | V2<br>90 s – 750 s |
| 320 s | 14 % | 23 % |
| 450 s | 10 % | 17 % |
| 750 s | — | 10 % |

# 8. Operation

## 8.1. Manual operation

**The following description applies for clockwise closing standard version.**

*Separate instructions are available for counterclockwise special version.*

The handwheel allows actuator operation even in case of power failure. Handwheel operation is only provided for occasional manual valve operation.

The handwheel does not rotate during motor operation. Change-over from motor operation to manual operation is not required.

1. Close valve: Turn handwheel clockwise.

➥ Drive shaft (valve) turns clockwise in direction CLOSE.

2. Open valve: Turn handwheel counterclockwise.

➥ Drive shaft (valve) turns counterclockwise in direction OPEN.

**Information**

Turning the handwheel during motor operation extends or reduces the operating time, depending on the direction of rotation.

## 8.2. Motor operation

NOTICE

**Valve damage due to incorrect settings!**

→ Check the parameters configured in the factory prior to electrical actuator operation.

→ In case of deviations, adapt the parameters according to the valve and application requirements.

**Frozen valves when used in low temperatures below –15 °C**

→ Recommendation: Activate excessive torque (parameter PRM_5718 ) to allow using a peak torque of up to 127 % of the max. tripping torque when leaving the end position.

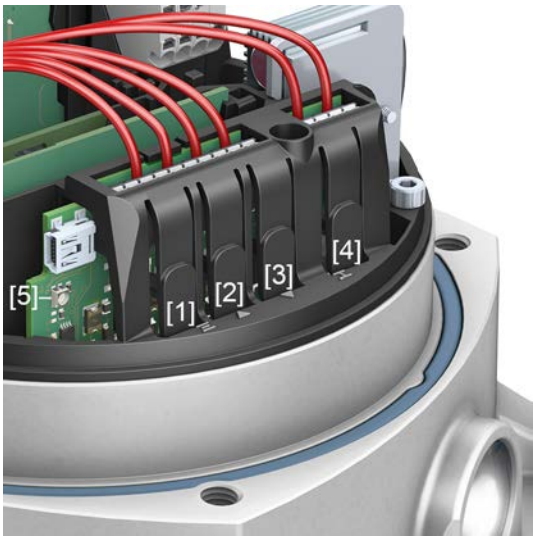
### 8.2.1. Actuator operation via push buttons

The actuator can be locally operated by means of four push buttons.

**Information**

To perform actuator operation via push buttons, please connect to power supply.

Figure 25: Push button (example of I/O interface)




[1] Set end position OPEN ⎺ push button
[2] Set operation in direction OPEN ▲ push button
[3] Set operation in direction CLOSE ▼ push button
[4] Set end position CLOSED ⎽ push button
[5] LED

**Risk of passing set end positions!**

→ During operation in directions OPEN/CLOSE, the actuator stops when reaching the set end position. When pressing again the push button, the actuator runs until reaching a mechanical stop (end stop of the actuator or the valve) or passes the end position when releasing the push button.

1. Run actuator in direction OPEN: Hold down button [2].
➥ The LED flashes in green during operation in direction OPEN.
2. Run actuator in direction CLOSE: Hold down button [3].
➥ The LED flashes in red during operation in direction CLOSE.

## 8.2.2. Actuator operation via AUMA Assistant App

**Functions**

Alternatively, actuator operation is possible using the “AUMA Assistant” smartphone App or the AUMA CDT software. The following table shows an overview of the menus of the AUMA Assistant App and the AUMA CDT software.

| Menu | Description |
|---|---|
| Diagnostics | Display of all available warnings and faults including respective details.<br>Actuator diagnostics and detailed diagnostics |
| Operation function | Operation in direction of end positions<br>Resetting the fault log |
| Setting end positions | Setting the positions for end positions CLOSED and OPEN |
| Device ID | Device designation<br>Order number, serial number |
| Configuration | Configuration of all parameters |
| Service functions | Factory settings<br>Rebooting the actuator |

**User level**

User level (1), (2), (3), ... defines which menu items or parameters can be displayed or modified by the active user.

6 different users/user levels are available. User level (1), (2), (3), ... is indicated in the top display row.

Figure 26: User level display (example user level 4)

**Password**

A specific password is assigned to each user level and allows different actions. The password must comprise 6 characters.

Table 15: User level and password

| **User levels and authorisations** | |
|---|---|
| User (user level) | Authorisation/password |
| Observer (1) | Verify settings<br>No password required |
| Operator (2) | Change configuration parameters (low level)<br>Factory password: 000000 |
| Maintenance (3) | Reserved for future use |
| Specialist (4) | Change configuration parameters (high level)<br>e.g. type of seating, assignment of output contacts<br>Factory password: 000000 |
| Service (5) | Service staff<br>Change configuration parameters (service level) |
| AUMA (6) | AUMA administrator |

**Unauthorised access due to insecure password!**

→ We recommend changing the password during initial commissioning.

## 8.2.3. Actuator operation from Remote

CAUTION

**Risk of immediate actuator operation when connecting to mains!**

*Risk of death, severe injury or damage to valve.*

→ Check operation signals and operation behaviour prior to switching on the mains voltage.

→ Ensure that the tripping conditions for the failure behaviour are not fulfilled when switching on.

→ Ensure that the tripping conditions for the EMERGENCY behaviour are not fulfilled when switching on.

### Operation mode REMOTE setting

Operation mode REMOTE is the preliminary condition for actuator control via binary signals, analogue signals or via fieldbus.

The operation mode can be activated via AUMA Assistant App or AUMA CDT software:

**AUMA Assistant App**
M ▷

DIS_53 Configuration
DIS_2919 Operation mode
PRM_5535 Selector

Or directly via the Remote operation menu in DIS_2250 Operation function.

Default setting: Operation mode = REMOTE

**AUMA CDT**
M ▷

DIS_53 Configuration
DIS_2919 Operation mode

PRM_5535 Selector

Or directly via the tool bar in the “Device” tab in PRM_5535 Selector or Remote control.

Default setting: Operation mode = REMOTE

**Information** The actuator only reacts to the currently selected command source. However, the command source can be changed during running operation. The OPEN/CLOSE operation is usually performed via the digital inputs. The setpoint control (e.g. for modulating duty) can only be performed via the analogue inputs or the fieldbus.

### Change-over between OPEN-CLOSE control and setpoint control

For PROFOX actuators, it is possible to select between **OPEN - CLOSE control** (REMOTE OPEN-CLOSE) and **setpoint control** (REMOTE SETPOINT).

For the change-over, a digital input must be available and configured for the PZD_22 MODE signal.

- PZD_22 MODE input = high level (default: + 24 V DC) = Remote OPEN-CLOSE Control is made via binary OPEN, STOP, CLOSE commands.
- PZD_22 MODE input = low level (0 V or input open) = REMOTE SETPOINT Control takes place via an analogue signal (e.g. 0/4 – 20 mA).

### Configuration of digital input

Required user level: Specialist (4).

M ▷ DIS_53 Configuration
DIS_139 I/O interface
DIS_116 Digital inputs

Example: Use Signal DIN 1 input for change-over:

Parameters: PRM_873 Signal DIN 1

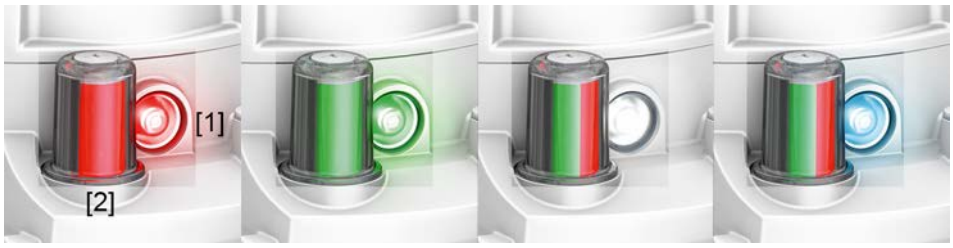
Setting value: MODE

### EMERGENCY operation

An EMERGENCY operation is triggered by a signal at EMERGENCY input or the Fieldbus EMERGENCY command bit. The actuator moves to a predefined EMERGENCY position (i.e. end position OPEN or end position CLOSED). During EMERGENCY operation, the actuator does not react to other operation commands such as Remote OPEN/Remote CLOSE, Remote SETPOINT, Fieldbus OPEN/Fieldbus/CLOSE or Fieldbus SETPOINT.

# 9. FOX-EYE indication light and status indication

Figure 27: FOX-EYE LED colours (PF-Q)




[1] FOX-EYE indication light
[2] Position indicator

## FOX-EYE indication light

Various profiles can be selected for the FOX-EYE indication light. Depending on the profile, colours and states of the indication light provide a different signal.

Use the following menu for active profile setting:

M ▷ DIS_53 Configuration
DIS_2269 Indication
DIS_2684 Actuator internal control unit
PRM_5506 Configuration FOX-EYE (blinking behaviour/colours)

The following profiles can be selected by means of the AUMA Assistant App or AUMA CDT:

**Default value:** CUSTOMER

**Setting values:** CUSTOMER, AUMA, NAMUR, FLEXIBLE

**Information** The “Flexible” profile allows setting of colours and states of the signals as required. Most signals can be activated and deactivated. Also refer to the table at the end of the section.

Table 16: Customer profile

| Colour/state | Signal | Description |
|---|---|---|
| Illuminated in white | Ready for operation (REMOTE) | The actuator:<br>• is in operation mode REMOTE.<br>• is ready for operation.<br>• is not in any end position. |
| blinking in white (double flash) | Ready for operation (LOCAL/OFF) | The actuator:<br>• is in operation mode LOCAL or OFF.<br>• is ready for operation.<br>**Information:** In the Ready for operation LOCAL/OFF mode, the FOX-EYE indication light also blinks in end positions and for operations in directions CLOSE/OPEN. |
| Illuminated in blue | Bluetooth active | The actuator is connected via Bluetooth. |
| illuminated in red | End position CLOSED | The actuator is in end position CLOSED. |
| illuminated in green | End position OPEN | The actuator is in end position OPEN. |
| blinking in blue | Bluetooth interface ready for reception | The Bluetooth interface is provisionally activated.<br>Safety function: refer to Manual “PROFOX Parameters and functions”. |
| blinking in red | Operation in direction CLOSE | The actuator runs in direction CLOSE. |

| Colour/state | Signal | Description |
|---|---|---|
| flashing in red (fast) | Fault | Refer to Corrective action chapter. |
| blinking in green | Operation in direction OPEN | The actuator runs in direction OPEN. |
| blinking in orange (fast) | Ping | Blinking function |

Table 17: AUMA profile

| Colour/state | Signal | Description |
|---|---|---|
| Illuminated in white | Ready for operation (REMOTE) | The actuator:<br>• is in operation mode REMOTE.<br>• is ready for operation.<br>• is not in any end position. |
| blinking in white (double flash) | Ready for operation (LOCAL/OFF) | The actuator:<br>• is in operation mode LOCAL or OFF.<br>• is ready for operation. |
| Illuminated in blue | Bluetooth active | The actuator is connected via Bluetooth. |
| blinking in blue | Bluetooth interface ready for reception | The Bluetooth interface is provisionally activated.<br>Safety function: refer to Manual “PROFOX Parameters and functions”. |
| flashing in red (fast) | Fault | Refer to Corrective action chapter. |
| blinking in red (double flash) | Warning | Refer to Corrective action chapter. |
| blinking in orange (fast) | Ping | Blinking function |

Table 18: NAMUR profile

| Colour/state | Signal | Description |
|---|---|---|
| Illuminated in blue | Bluetooth active | The actuator is connected via Bluetooth. |
| illuminated in red | Failure | Refer to Corrective action chapter. |
| illuminated in green | Ready for operation (REMOTE) | The actuator:<br>• is in operation mode REMOTE.<br>• is ready for operation. |
| blinking in blue | Bluetooth interface ready for reception | The Bluetooth interface is provisionally activated.<br>Safety function: refer to Manual “PROFOX Parameters and functions”. |
| blinking in red | Function check<br>or<br>Out of specification | Refer to Corrective action chapter. |
| blinking in green | Maintenance required | Maintenance is required. |
| blinking in orange (fast) | Ping | Blinking function |

Table 19: Flexible profile: Default values and options

| Signal | Default value | Options |
|---|---|---|
| Ready for operation (REMOTE) | Illuminated in white | illuminated in green |
| Ready for operation (LOCAL/OFF) | blinking in white (double flash) | blinking in red<br>blinking in red (double flash)<br>blinking in orange |
| Bluetooth active | Illuminated in blue | — |
| Bluetooth interface ready for reception | blinking in blue | — |
| End position CLOSED | illuminated in orange | illuminated in red<br>illuminated in green<br>illuminated in magenta |

| Signal | Default value | Options |
|---|---|---|
| End position OPEN | illuminated in green | illuminated in orange<br>illuminated in red<br>illuminated in magenta |
| Operation in direction CLOSE | blinking in orange | blinking in red<br>blinking in green<br>blinking in magenta |
| Operation in direction OPEN | blinking in green | blinking in orange<br>blinking in red<br>blinking in magenta |
| Fault | flashing in red (fast) | illuminated in red |
| Warning | blinking in red (double flash) | blinking in red<br>blinking in orange |
| Blinking function (Ping) (default value) | blinking in orange (fast) | — |

## Position indicator

Mechanical position indicator:

- Independent of power supply
- continuously indicates the valve position
- indicates whether the actuator is moving (running indication)
- indicates that end positions have been reached

**First, perform the position indicator setting to match the valve!**

*Refer to the Commissioning chapter.*

Table 20: Position indicator

| Colour/state | Signification | Description |
|---|---|---|
| completely red | CLOSED | The actuator is in end position CLOSED. |
| completely green | OPEN | The actuator is in end position OPEN. |
| red/green | Intermediate position | The actuator is not in any of the end positions. |

# 10. Corrective actions

## 10.1. Faults during commissioning

Table 21:

| Faults during operation/commissioning | | |
|---|---|---|
| Faults | Description/cause | Remedy |
| Actuator operation is either too fast or to slow. | Operating time setting is incorrect. | Modify operating time. |
| Actuator suddenly stops in end positions. | Speed reduction switched off or incorrectly set before reaching end positions. | Set speed reduction and/or adapt parameter. |
| Actuator exceeds the end position. | Overrun due to excessive speed. | Advance electronic end position switch by the overrun margin or adapt the parameters to an extended speed reduction curve in the “Speed red.pr.end pos.” [speed reduction prior to end position] section. |
| Actuator repeatedly corrects the setpoint position during positioning. | Overrun due to excessive speed. | Adapt the speed reduction prior to setpoint position parameters to an extended speed reduction curve in the positioner menu or adjust optimally the parameters for the positioner. |

## 10.2. Fault indications and warning indications

**Faults** interrupt or prevent the electrical actuator operation. If a fault occurs, the FOX-EYE indication light is quickly flashing in red.

**Warnings** have no influence on the electrical actuator operation. They only serve for information purposes. The FOX-EYE remains white.

Further signals are comprised in **collective signals**. The FOX-EYE remains white. For the content of the respective collective signals, refer to the Manual PROFOX “Parameters and functions”.

**Faults and warnings may exclusively be read via AUMA Assistant App or AUMA CDT software.**

The individual signals are listed in the subsequent tables.

Table 22:

| Fault / NAMUR failure | | |
|---|---|---|
| Display (App or CDT) | Description/cause | Remedy |
| Torque fault CLOSE | The actuator has reached the preset tripping torque in direction CLOSE. | Perform one of the following measures:<br>• Issue operation command in direction OPEN.<br>• Reset the fault signal either via AUMA Assistant App or AUMA CDT software.<br>• For control via fieldbus: Execute reset command via fieldbus. |
| Torque fault OPEN | The actuator has reached the preset tripping torque in direction OPEN. | Perform one of the following measures:<br>• Issue operation command in direction CLOSE.<br>• Reset the fault signal either via AUMA Assistant App or AUMA CDT software.<br>• For control via fieldbus: Execute reset command via fieldbus. |
| Thermal fault | Motor protection tripped. | Perform one of the following measures:<br>• Cool down, wait.<br>• If the fault indication display persists after cooling down:<br>- Reset the fault signal either via AUMA Assistant App or AUMA CDT software<br>- For control via fieldbus: Execute reset command via fieldbus<br>• Check fuses. |
| Fault no reaction | No actuator reaction to operation commands within the set reaction time. | Check movement at actuator. |
| Incorrect rotary direction | Contrary to the configured direction of rotation and the active operation command, the motor turns into the wrong direction. | • Check operation command control.<br>• Check the parameter PRM_5515 Rot. dir. motor, whether it is suitable for the gearbox. The fault may only occur after modification of the actuator/gearbox.<br>• Check the parameter PRM_79 Closing rotation.<br>For a 1-phase AC motor, this can be caused by a defective auxiliary capacitor. |
| Internal error | Collective signal 14:<br>Internal error has occurred.<br>Different causes can be the reason: Memory overflow in firmware, firmware error, electronic sub-assembly defective. | Use AUMA Assistant App or AUMA CDT to visualise the individual signals by means of the Diagnostics menu.<br>If a memory overflow occurs, reboot the actuator.<br>In case the problem persists: Contact AUMA Service. |
| | IE logic | Check logic. |
| | IE fieldbus | Check fieldbus interface. |
| | IE MWG | Check MWG. |
| | IE version | Check configuration. |
| | IE EEPROM | Check configuration. |
| | IE parameter | Check configuration. |
| | IE file access | Check configuration. |
| | IE registration | Check configuration. |
| | IE startup FB | Check configuration. |
| | IE CAN Overflow | Check configuration. |
| | IE MWG measurement system defective | Check configuration. |
| | Wrn signal loss actual position | Check configuration. |
| Configuration error | Collective signal 11:<br>A configuration fault has occurred preventing actuator operation. | Use AUMA Assistant App or AUMA CDT to visualise the individual signals by means of the Diagnostics menu.<br>Check the applicable configuration parameters.<br>In case the problem persists: Contact AUMA Service. |
| | IE parameter configuration | Check position transmitter parameters. |

| Fault / NAMUR failure | | |
|---|---|---|
| Display (App or CDT) | Description/cause | Remedy |
| Configuration error REMOTE | Collective signal 22:<br>Configuration error has occurred.<br>The fieldbus or I/O board fails either due to incorrectly set configuration parameters or caused by defective hardware | Use AUMA Assistant App or AUMA CDT to visualise the individual signals by means of the Diagnostics menu.<br>Check the configuration parameters for the sub-assembly.<br>In case the problem persists: Contact AUMA Service. |
| | IE remote parameter configuration | Check configuration. |
| | IE fieldbus | Check configuration. |
| Fault motor controls | Collective signal 28:<br>Hardware or software faults of motor or motor controls | Contact AUMA service. |
| | Motor shutdown | Contact AUMA service. |
| | Motor overvoltage | Contact AUMA service. |
| | Motor overcurrent | Contact AUMA service. |
| | Motor overtemp. | Contact AUMA service. |
| | MotCtrl Fault control | Contact AUMA service. |

Table 23:

| Warning / NAMUR out of specification | | |
|---|---|---|
| Display (App or CDT) | Description/cause | Remedy |
| Internal warning | Collective signal 15:<br>Device warnings.<br>The device can still be operated with restrictions. | Use AUMA Assistant App or AUMA CDT to visualise the individual signals by means of the Diagnostics menu. |
| 24 V DC customer | Part of collective signal 15:<br>The 24 V DC customer auxiliary supply (to control the digital inputs) has failed. | Check 24 V DC inputs (DIN). |
| 24 V DC internal | Part of collective signal 15:<br>The internal 24 V DC supply voltage of the controls for supply of the electronic components is outside the supply voltage limits. | Check internal 24 V DC voltage supply. |
| Configuration warning | Collective signal 06:<br>Faulty configuration.<br>The device can still be operated with restrictions. | Use AUMA Assistant App or AUMA CDT to visualise the individual signals by means of the Diagnostics menu. |
| | Wrn Setpoint Source | Configure analogue inputs AIN 1 or AIN 2. |
| | Wrn dead bands | Check positioner setting. |
| | Wrn Fieldbus configuration | Check fieldbus interface configuration. |
| | Torque configuration CLOSE | Verify torque switching setting. |
| | Torque configuration OPEN | Verify torque switching setting. |
| | Configuration EMERGENCY | Check EMERGENCY configuration. |
| | Configuration reaction monitoring | Check configuration of reaction monitoring. |
| Wrn operation mode run time | Warning on time max. running time/h exceeded. | • Check modulating behaviour of actuator.<br>• Check parameter PRM_2122 Permissible run time, set again if required. |
| Wrn operation mode starts | Warning on time max. number of motor starts (starts) exceeded. | • Check modulating behaviour of actuator.<br>• Check parameter PRM_2123 Permissible starts, set again if required. |
| Failure behaviour active | The failure behaviour is active since all required setpoints and actual values are incorrect. | Check signals:<br>• Setpoint E1<br>• Actual value E2<br>• Actual process value E4<br>• Check connection to master.<br>• For Profibus or Profinet: Check (clear) status of master. |
| Wrn input AIN 1 | Warning: Loss of signal analogue input 1 | Check wiring. |

| Warning / NAMUR out of specification | | |
|---|---|---|
| Display (App or CDT) | Description/cause | Remedy |
| Wrn setpoint position | Warning: Loss of signal setpoint position<br>Possible causes:<br>For an adjusted setpoint range of e.g. 4 – 20 mA, the input signal is 0 (signal loss)<br>For a setpoint range of 0 – 20 mA , monitoring is not possible. | Check setpoint signal. |
| Operating time warning | The set time has been exceeded. The preset operating time is exceeded for a complete travel from end position OPEN to end position CLOSED. | The warning is automatically cleared once a new operation command is executed.<br>• Check valve.<br>• Check parameter PRM_2547 Permissible operating time, manual. |
| Time not set | Real time clock has not yet been set. | Set time. |
| RTC voltage | Voltage of RTC button cell too low. | Replace button cell. |
| Warning, no reaction | No actuator reaction to operation commands within the set reaction time. | • Check movement at actuator.<br>• Check parameter PRM_3158 Reaction time. |
| Maintenance required | Maintenance is due. | Perform maintenance. |
| WarnTempControlsHi | | |
| WarnTempControlsLo | | |
| Wrn motor temperature high | | |
| Wrn motor temperature low | | |
| Torque warning OPEN | Limit value for torque warning in direction OPEN exceeded. | Check parameter PRM_3657 Warning torque OPEN, set again if required. |
| Torque warning CLOSE | Limit value for torque warning in direction CLOSE exceeded. | Check parameter PRM_3667 Warning torque CLOSE, set again if required. |
| Torque prof. 1 high | | |
| Torque prof. 2 high | | |
| Warning counter for excessive torque | | |

## 10.3. Not ready REMOTE

Table 24:

| Not ready REMOTE / NAMUR function check | | |
|---|---|---|
| Display (App or CDT) | Description/cause | Remedy |
| OFF active | The actuator is in operation mode OFF. | Change operation mode. |
| Operation mode Local | The actuator is in operation mode LOCAL. | Change operation mode. |
| Operating mode Commissioning | The actuator is in operation mode Commissioning. | End commissioning and change the operation mode. |
| EMCY behav. active | Operation mode EMERGENCY is active (EMERGENCY signal was sent).<br>0 V are applied at the EMERGENCY input. | • Detect cause for the EMERGENCY signal.<br>• Verify failure source.<br>• Apply +24 V DC at EMERGENCY input. |
| Service active | Operation via service interface (Bluetooth) and AUMA CDT service software. | Exit service software. |
| Disabled | The actuator is in operation mode Disabled. | Check configuration. |
| I/O interface | The actuator is controlled via the I/O interface | Check I/O interface. |
| FailState fieldbus | Fieldbus connection available, however no process data transmission by the master. | Verify master configuration. |

| Not ready REMOTE / NAMUR function check | | |
|---|---|---|
| Display (App or CDT) | Description/cause | Remedy |
| Wrong operation cmd | Collective signal 13:<br>Possible causes:<br>• Several operation commands (e.g. OPEN and CLOSE simultaneously, or OPEN and SET-POINT operation simultaneously)<br>• A setpoint is present and the positioner is not active | Use AUMA Assistant App or AUMA CDT to visualise the individual signals by means of the Diagnostics menu.<br>• Check operation commands (reset/clear all operation commands and send one operation command only).<br>• Activate parameter PRM_1169 Positioner.<br>• Check setpoint. |
| | Incorrect operation command REMOTE1I | Correct operation command, i.e. delete and set anew. |
| | Wrong operation command fieldbus | Correct operation command. |
| | Setpoint position disabled | Check availability of the function (menu Activation) |

# 11. Servicing and maintenance

⚠ CAUTION

**Damage caused by inappropriate maintenance!**

→ Servicing and maintenance must be carried out exclusively by suitably qualified personnel having been authorised by the end user or the contractor of the plant. We recommend contacting our service for any interventions.

→ Only perform servicing and maintenance tasks when the device is switched off.

**AUMA Service & Support**

AUMA offers extensive service such as servicing and maintenance as well as customer product training. For the contact addresses, refer to our website (www.auma.com).

The following actions are at least required to ensure safe device function during operation:

## Enclosure protection IP68

After submersion:

- Check actuator.
- In case of ingress of water, locate leaks and repair. Dry device correctly and check for proper function.

## 6 months after commissioning and then once a year

- Carry out visual inspection:
  Cable entries, cable glands, blanking plugs, etc. have to be checked for correct tightness and sealing. If required, tighten cable glands and blanking plugs with torque in compliance with the manufacturer's specifications.
- Check fastening screws between actuator and gearbox/valve for tightness. If required, fasten screws while applying the tightening torques as indicated in chapter <Assembly>.
- When rarely operated: Perform test run.

## Seals

Preventive actions to ensure the IP protection degree. The seals of seal kit S1 should be replaced within a period of 4 – 8 years:

**After 4 years:** In case of outdoor installation (frequent changes of temperature and humidity, extreme weathers)

**After 8 years:** In case of indoor installation (constant or virtually constant environmental conditions)

If original AUMA screw plugs are used, original AUMA seals must also be used. They are included with the AUMA seal kit S1. The seal kit can be ordered with AUMA.

## Lubrication

- Within the device lifetime, no additional lubrication of the gear housing is required during operation.

## Lifetime

The maximum lifetime depends on the number of operating cycles or the number of starts (refer to technical data) as well as the respectively applicable AUMA load profiles. Distinction is made between actuators in open-close or modulating duty:

**Open-close duty (OPEN/CLOSE)**

The load is measured by means of the number of operating cycles at a defined torque characteristics, the AUMA load profile.

An operating cycle corresponds to an angular stroke of 90° in both directions (e.g. OPEN - CLOSE - OPEN).

AUMA load profile:

10 % of the travel at 100 % of maximum torque.

90 % of the travel at 35 % of maximum torque.

**Modulating duty**

The load is measured by means of the switching frequency, e.g. the number of starts/hour at a defined torque, the AUMA load profile.

One start corresponds to a movement of 1° in both directions.

AUMA load profile:

35 % of maximum actuator torque.

**Determination Key figures**

Operating cycles and number of starts for PROFOX actuators can be determined using the AUMA CDT software.

**Operating cycles**

The number of operating cycles can be further determined using the AUMA CDT software and the AUMA Cloud. For this, create an actuator snapshot and upload it to the AUMA Cloud. The AUMA Cloud menu “My devices” indicates the value for “Number of Full Stroke Equivalent” for the actuator.

**Number of starts**

The number of starts in indicated in starts/h. The exact sum of this key figure is made in the actuator and can be read via AUMA Assistant App or the AUMA CDT software in “Operational info”.

**AUMA recommendation**

We recommend contacting the AUMA Service for an inspection of the actuator if one of the following conditions is reached:

- The actuator life is more than 12 years
- The maximum number of operating cycles has been reached at a lower load profile than specified by AUMA (for open-close duty).
- The maximum number of starts has been reached at a lower load profile than specified by AUMA (for modulating duty).

An inspection by the AUMA Service can also be carried out using digital snapshots from the AUMA Assistant App or the AUMA CDT software.

## Mechanical position indicator

Both indicator glass and screw plug of mechanical position indicator are made of plastic. To ensure enclosure protection and a long lifetime, both components must be fastened at a defined torque:

Indicator glass cover: 6 Nm (special tool art. no. V004.027-02, available with AUMA)

Screw plug: 1.6 Nm

# 12. Disposal and recycling

Our devices have a long lifetime. However, they have to be replaced at one point in time. The devices have a modular design and may, therefore, easily be separated and sorted according to materials used, i.e.:

- Electronic scrap
- Various metals
- Plastic materials
- Greases and oils

The following generally applies:

- Greases and oils are hazardous to water and must not be released into the environment.
- Arrange for controlled waste disposal of the disassembled material or for separate recycling according to materials.
- Observe the national regulations for waste disposal.

# 13. Technical data

**Information** The following tables include standard and optional features. For detailed information on the customer-specific version, refer to the order-related data sheet. The technical data sheet can be downloaded from the Internet in both German and English at **http://www.auma.com** (please state the order number).

## 13.1. Technical data Part-turn actuator with integral controls for open-close and modulating duty

| **Features and functions** | | |
|---|---|---|
| Type of duty | Open-close duty: | Classes A and B according to ISO 22153, short-time duty S2 - 15 min |
| | Modulating duty: | Class C according to ISO 22153, intermittent duty S4 - 50 % with maximum number of 1,200 starts/h |
| | For nominal voltage and +40 °C ambient temperature and at load with 35 % of the maximum torque. The type of duty must not be exceeded. | |
| Motor | Variable speed, brushless motor<br>Soft start/soft stop. The progress characteristics can be configured as requested. | |
| Insulation class | F (motor winding) | |
| Motor protection | Via short-circuit protection and current measurement | |
| Self-locking | At standstill with spring-applied brake | |
| Swing angle | Standard: | 90° ±15° adjustable between min. and max. values (with mechanical end stops) |
| | Option: | 120° ±15° adjustable between min. and max. values (with mechanical end stops) |
| | | 45° – 360° adjustable between min. and max. values (without mechanical end stops) |
| Limit switching | Via hall sensors | |
| Torque switching | Via electronic current measurement. Tripping torques infinitely adjustable via Bluetooth. 8 levels can be selected when placing the order. | |
| Mechanical position indicator | Standard: | Continuous indication, for 90° or 120°<br>Via own markings at indication 45° – 360° |
| | Option: | Without mechanical position indicator |
| Manual operation<br>PF-Q80 – PF-Q600 | Standard: | Manual drive for setting and emergency operation, handwheel does not rotate during electrical operation |
| | Option: | Without manual operation, this means handwheel and handwheel shaft are obsolete. The end stops are included except version with swing angle 45° – 360°. |
| Coupling | Standard: | Coupling unbored |
| | Options: | • Coupling unbored extended<br>• Finish machining of coupling (standard or extended)<br>- Bore according to EN ISO 5211 with 1 keyway according to DIN 6885-1<br>- Square bore according to EN ISO 5211<br>- Two-flat according to EN ISO 5211 |
| Valve attachment | Dimensions according to EN ISO 5211 | |

| **Features and functions** | |
|---|---|
| Power supply | Standard voltages:<br>1-phase AC current:<br>100 – 240 V / 50 – 60 Hz<br>The voltage range may be exceeded or undercut by max. 10 %<br>The frequency range may be exceeded or undercut by max. 5 %<br>Option:<br>DC current: 24 V DC ±10 %<br>For current consumption, refer to Electrical data PROFOX Part-turn actuators |
| Overvoltage category | Category III according to IEC 60364-4-443<br>Category II in compliance with IEC 60364-4-443 (according to cDEKRAus for the North American market) |
| Power electronics | With integral motor controller (current consumption in standby mode < 3 W) |
| Fieldbus interface | Access to parameters, the electronic name plate and the operating and diagnostic services with acyclic write/read services<br>Galvanically isolated towards I/O interfaces. |

| **Features and functions** | | |
|---|---|---|
| Control fieldbus<br>(input signals) | Operation commands and setpoint via fieldbus interface | |
| I/O interface control<br>(input signals) | 3 digital inputs: | • Via opto-isolator, with one common<br>• Control voltage 24 V DC, current consumption: approx. 15 mA per input<br>• Minimum pulse duration for shortest operation pulse: 100 ms<br>• All digital inputs must be supplied with the same potential.<br>• All inputs can be configured as required<br>• Standard assignment (without positions and without fieldbus interface):<br>CLOSE, OPEN, STOP<br>• Assignment for option with positioner:<br>MODE, CLOSE, OPEN<br>• Assignment for option with fieldbus interface:<br>OPEN, CLOSE, I/O interface<br>I/O interface: Selection of the control source (fieldbus interface or I/O input signals)<br>Factory setting of “I/O Interface” signal: Input signal 0 V = fieldbus interface is active |
| | Analogue input<br>(option) | • 0/4 – 20 mA or 0 – 10 V<br>• No galvanic isolation<br>• For option with positioner: Used as input signal for position setpoint or as input signal for motor speed<br>• For option with fieldbus interface: Used as input for the position setpoint (definition via 2 digital inputs which command source is active for the positioning: fieldbus or analogue input) or for a sensor signal which can be further transmitted via fieldbus. |
| Status signals fieldbus<br>(output signals) | Via fieldbus interface | |
| Status signals of I/O interface<br>(output signals) | 3 digital outputs: | • Freely configurable semi-conductor output contacts, per contact max. 24 V DC, 100 mA (resistive load)<br>• Outputs can be configured as required<br>• Standard assignment:<br>End position CLOSED (high active), end position OPEN (high active), collective fault signal (low active) |
| | Analogue output: | • Position feedback signal 0/4 – 20 mA (load maximum 500 Ω) or 0 – 10 V<br>• No galvanic isolation |
| Voltage output (option) | Auxiliary voltage 24 V DC, max. 80 mA for supply of control inputs, without galvanic isolation. | |
| Functions (actuators with fieldbus interface) | Standard: | • Switch-off mode adjustable:<br>Limit or torque seating for end positions OPEN and CLOSED<br>• Torque monitoring across the whole travel<br>• Torque by-pass<br>• Programmable EMERGENCY behaviour<br>- Digital input low active,<br>- Reaction can be selected: Stop, run to end position CLOSED, run to end position OPEN<br>• Speed control<br>- Ramps<br>- Program operation profiles<br>- Programming specific speed for OPEN and CLOSE operations or one digital input<br>• Positioner<br>- Automatic adaptation of dead band (adaptive behaviour selectable) |

| **Features and functions** | | |
|---|---|---|
| Functions (actuators with I/O interface) | Standard: | • Switch-off mode adjustable:<br>Limit or torque seating for end positions OPEN and CLOSED<br>• Torque monitoring across the whole travel<br>• Torque by-pass<br>• Programmable EMERGENCY behaviour<br>- Digital input low active,<br>- Reaction can be selected: Stop, run to end position CLOSED, run to end position OPEN<br>• Speed control<br>- Ramps<br>- Program operation profiles<br>- Program either specific speed for OPEN and CLOSE operations or one digital input |
| | Option: | • Positioner<br>- Position setpoint via analogue input E1 = 0/4 – 20 mA or 0 – 10 V<br>- Programmable behaviour on loss of signal<br>- Automatic adaptation of dead band (adaptive behaviour selectable)<br>- Selection between open-close duty and modulating duty via digital MODE input |
| Bluetooth<br>Communication interface | Bluetooth class II chip, with a range of min. 3 m in industrial environments.<br>Required accessories:<br>• AUMA CDT (Commissioning and Diagnostic Tool for Windows-based PC)<br>• AUMA Assistant App (Commissioning and Diagnostic Tool for Android and iOS devices) | |
| Electrical connection | Cable entry: 3 x M20x1.5 threads for cable glands.<br>Inside rail with spring clamp terminals for wire connection. | |
| Wiring diagram (basic version) | Refer to name plate | |

| **With base and lever (option)** | |
|---|---|
| Swing lever | Made of spheroidal cast iron with two or three bores for fixing a lever arrangement. Considering the installation conditions, the lever may be mounted to the output shaft in any desired position. |
| Ball joints (option) | Two ball joints matching the lever, including lock nuts and two welding nuts, suitable for pipe according to dimension sheet |
| Fixing | Base with four holes for fastening screws |

| **Operation and display** | | | |
|---|---|---|---|
| Basic<br>at the actuator | Status indication | FOX-EYE (indication LED)<br>Status indications: OK, end positions, faults and “Bluetooth connection active” | |
| | End position setting | 4 push buttons and 1 LED are located below the hood.<br>Run actuator in directions OPEN and CLOSE. Set end position once mounted to the valve. | |
| Smart<br>via Bluetooth using AUMA Assistant App or AUMA CDT software | End position setting | Run actuator in directions OPEN and CLOSE. Set end position once mounted to the valve. | |
| | Configuration | Basic settings for operation: | • Rotation speed<br>• Type of seating for end positions, torque switching<br>• Assignment of signal inputs and outputs<br>• Fieldbus parameter (if fieldbus option has been selected) |
| | | Additional functions: | For applications, safety and service, e.g.:<br>• Positioner<br>• EMERGENCY behaviour<br>• Torque by-pass<br>• Failure behaviour<br>• Signal configuration |
| | Diagnostics | Monitoring key figures and measured values for preventive maintenance and consequently increasing process safety. Limit values can be set. Deviations generate warning signals which can be transmitted to the DCS via binary outputs or fieldbus. | |
| | | Actuator: | Temperature value within actuator<br>Key figures regarding lifetime of electronics, brake, gearbox and seals. |
| | | Actuator and valve: | Method for identifying changes in torque requirement: Perform reference operation and save torque as reference profile. Define tolerance range. Perform comparison operation if required. Values outside tolerance initiate a signal which is communicated as described above. |
| | | Further key figures: | Furthermore, the actuator monitors and records further figures and conditions. The generated fault and warning signals are saved within the event log. These signals can be configured as requested. An overview in the AUMA Assistant App or the CDT software shows all available fault/warning signals with option to enter the details. |

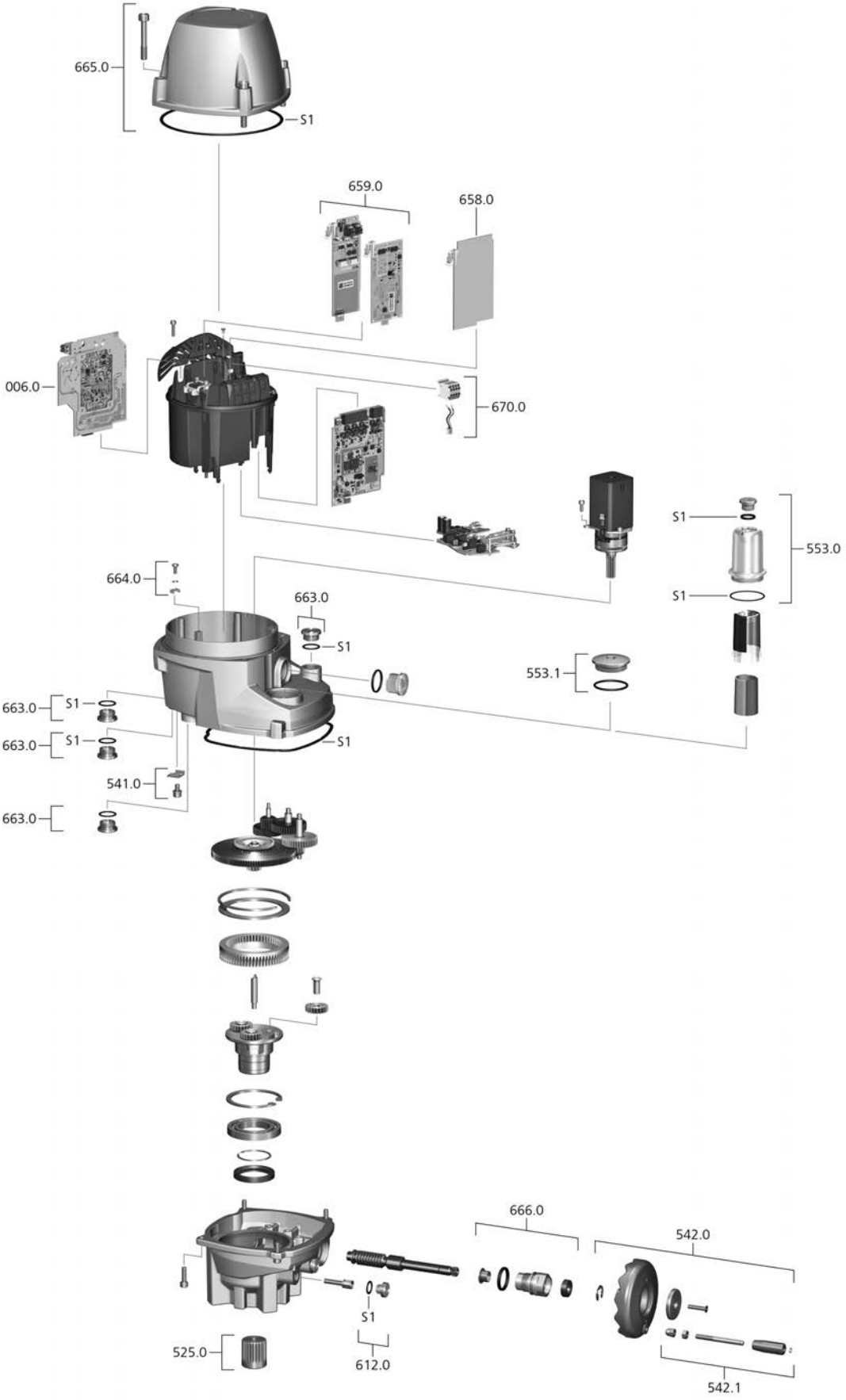
| **Service conditions** | | |
|---|---|---|
| Mounting position | Any position | |
| Installation altitude | ≤ 2,000 m above sea level<br>> 2 000 m above sea level on request | |
| Ambient temperature | –30 °C to +70 °C | |
| Humidity | Up to 100 % relative humidity across the entire permissible temperature range | |
| Enclosure protection in accordance with IEC 60529 | Standard | IP67 |
| | Option: | According to AUMA definition, enclosure protection IP68 meets the following requirements:<br>• Depth of water: maximum 8 m head of water<br>• Continuous immersion in water: maximal 96 hours<br>• Up to 10 operations during immersion<br>• Modulating duty is not possible during immersion |
| Pollution degree according to IEC 60664-1 | Pollution degree 4 (when closed), pollution degree 2 (internal) | |
| Vibration resistance according to IEC 60068-2-6 | 2 g, from 10 Hz to 200 Hz<br>Resistant to vibration during start-up or for failures of the plant. However, a fatigue strength may not be derived from this. Not valid in combination with gearboxes. | |
| Seismic resistance according to IEC 60068-3-3 | Test proof for application class 3 | |

| **Service conditions** | | |
|---|---|---|
| Corrosion protection | Standard: | KS<br>Suitable for use in areas with high salinity, almost permanent condensation, and high pollution. |
| | Option: | KX (upon request)<br>Suitable for use in areas with extremely high salinity, permanent condensation, and high pollution. |
| Coating | Double layer powder coating<br>Two-component iron-mica combination | |
| Colour | Standard: | AUMA silver-grey (similar to RAL 7037) |
| | Option: | Available colours on request |
| Driving load | During operation, accelerating loads up to 15 % of the max. torque may occur. | |
| Lifetime | Open-close duty: | 10,000 operating cycles OPEN - CLOSE - OPEN<br>An operating cycle is based on an operation from CLOSED to OPEN and back to CLOSED, at a respective rotary movement of 90°. |
| | Modulating duty: | 1.8 million modulating steps |
| | The lifetime depends on the load and the number of starts. A high starting frequency will rarely improve the modulating accuracy. To reach the longest possible maintenance and fault-free operating time, the number of starts per hour chosen should be as low as permissible for the process. | |

| **Further information** | |
|---|---|
| EU Directives | Machinery Directive 2006/42/EC<br>Low Voltage Directive 2014/35/EU<br>EMC Directive 2014/30/EU<br>RoHS Directive 2011/65/EU |

# 14. Spare parts

## 14.1. Part-turn actuators PF-Q80 – PF-Q600



# Spare parts

Please state device type and our order number (see name plate) when ordering spare parts. Only original AUMA spare parts should be used. Failure to use original spare parts voids the warranty and exempts AUMA from any liability. Only the designated spare parts with reference numbers or spare parts sets for replacement are available for the customer. The are specified in the following list. The parts shown in the exploded view without reference numbers may only be replaced by AUMA. Representation of spare parts may slightly vary from actual delivery.

| Ref. no. | Designation | Type |
|---|---|---|
| 006.0 | Power supply unit | |
| 525.0 | Coupling | |
| 541.0 | Earth connection | Sub-assembly |
| 542.0 | Handwheel with ball handle | Sub-assembly |
| 542.1 | Ball handle | Sub-assembly |
| 553.0 | Mechanical position indicator[1)] | Sub-assembly |
| 553.1 | Screw plug M40 | Sub-assembly |
| 612.0 | Screw plug for end stop | Sub-assembly |
| 658.0 | I/O board as option | |
| 659.0 | Fieldbus boards (fieldbus and connection board) | Sub-assembly |
| 663.0 | Screw plug for manual emergency operation[2)] | Sub-assembly |
| 663.0 | Screw plug for cable gland | Sub-assembly |
| 664.0 | Protective earth connection | Sub-assembly |
| 665.0 | Cover for electronics housing | Sub-assembly |
| 666.0 | Handwheel bearing flange | Sub-assembly |
| 670.0 | Auxiliary voltage output 24 V DC | Sub-assembly |
| S1 | Seal kit | Set |

1) A special tool is required for disassembly/assembly of mechanical position indicator. This can be ordered from AUMA (parts number: V004.027-02).
2) The manual emergency operation is only available for models PF-Q20 and PF-Q40, which are not equipped with a handwheel.

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