



Part-turn actuators

PROFOX

PF-Q80X - PF-Q600X



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.

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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:

- Standards and directives such as IEC 60079 "Explosive atmospheres":
 - Part 14: Electrical installations design, selection and erection.
 - Part 17: Electrical installations inspection and maintenance.
- 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.

Work performed in potentially explosive atmospheres is subject to special regulations which have to be observed. The end user or contractor of the plant is responsible for respect and control of these regulations, standards, and laws.

Electrostatic charging

Strong charge-generating processes (processes stronger than manual friction) must be excluded on the surface of the unit, as these can lead to ignitable propagating brush discharges. This also applies to fireproof coatings or covers available as an option.

Any kind of charge-generating processes on the handwheel must be excluded (e.g. only wipe with a damp cloth), as they can lead to ignitable electrostatic discharges.

Ignition dangers

Gearboxes were subjected to an ignition hazard assessment in compliance with the currently applicable standard according to ISO 80079-36/-37. Hot surfaces, mechanically generated sparks as well as static electricity and stray electric currents were identified and assessed as major potential ignition sources. Protective measures to prevent the likelihood that ignition sources arise were applied to the gearboxes. This includes in particular lubrication of the gearbox, the IP protection codes and the warnings and notes contained in these operation instructions.

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.

The devices described below are approved for use in the potentially explosive atmospheres of zones 1, 2, 21, and 22.

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 areas of zones 0 and 20
- Potentially explosive areas of group I (mining)
- 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.

Particular conditions of use

The particular conditions of use are listed on the certificates supplied. Among others, this includes the following conditions:

- For information regarding the dimensions of the flameproof joints, contact the manufacturer.
- The risk of external electrostatic discharges shall be minimised, also refer to page 4, Prerequisites for the safe handling of the product.
- The "FOX-EYE" and position indicator, which are both made of plastic, are submitted to tests corresponding to the low risk of mechanical danger and shall be protected from high impact.
- Special fasteners according to IEC 60079-0 for sealing flameproof enclosures must at least have a strength class of A*-80.
- The maximum capacitance of the unearthed metal parts on the handwheel is 5.7 pF.

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.

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 \triangle 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-Q80X – PF-Q600X 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.

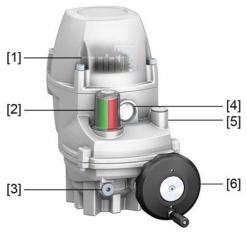
The swing angle is limited by internal end stops. Switching off in end positions may be either by limit or torque seating.

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-Q150X

Figure 1: PF-Q150X



- [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



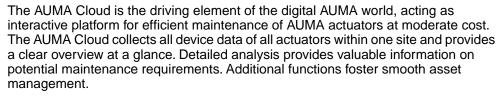
AUMA CDT

AUMA Cloud

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.



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).

AUMA Assistant App



a

Figure 3: Link to AUMA Assistant App



3. Name plate

Figure 4: Name plate arrangement



AUMA Riester GmbH & Co. KG D-73747 Ostfildern, Germany -[18] PF-Q150X-F07-F10-N [2] Order no. / Auftragsnr.
Serial no. / Seriennr.: [3] 123456789 [19] [4] 1005NS12345 [5] Torque / Drehmoment T: 10 Nm - 30 Nm [6] Control / Ansteuerung 24 VDC [20] [7] t: 4 - 40 s/90° 75°-105° [8] 1 ~ 100-240 VAC 50-60 Hz [21] Pn: 0,085 kW In: 0,9 A [9] S2 - 15 min / S4 - 50 % [22] -30 °C < T amb < +60 °C [10] WARNING Do not open when energized Ex II 2 GD [11] #Ex0900 12 DEKRA 21 ATEX 0092 X 13 IECEx DEK 21.0058X 14 Ex db h IIC T4 Gb 15 Ex h tb IIIC T130 °C Db [16] M20 Contains FCC ID: 2A2OUAUMAPF00001 [17]

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] Number of test authority
- [10] Permissible ambient temperature
- [11] Ex symbol, device group and category, internal marking
- [12] CE mark (C€)
- [13-15]Data relevant to explosion protection (for example: ATEX / IECEx version)
- [16] Threads for cable entries at electrical connection
- [17] FCC ID
- [18] Name and address of manufacturer (manufacturer logo: **auma**)
- [19] Data Matrix code
- [20] Swing angle
- [21] Nominal power and nominal current
- [22] Type of duty
- [23] Enclosure protection

Descriptions referring to name plate indications

Type designation

Table 1:

Description of type designation (with the example of PROFOX PF-Q150X-F07-F10-N)								
PROFOX	PF	Q	150	Χ	F07 – F10	N		
PROFOX							Product name	
	PF						Type (abbreviation PROFOX)	
		Q					Type of movement: Part-turn actuator	
			150				Size (max. torque in Nm)	
				X			Explosion-proof version	
					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:

Des	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.

- \rightarrow 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.
- At an interval of approx. 6 months: 2. Check for corrosion. If first signs of corrosion show, apply new corrosion protection.

5. Assembly

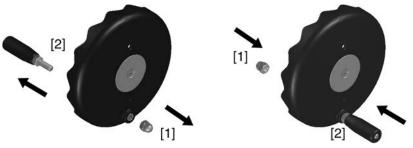
5.1. Mounting position

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.

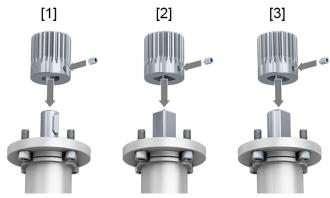
NOTICE

Corrosion due to damage to paint finish and condensation!

- \rightarrow 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.

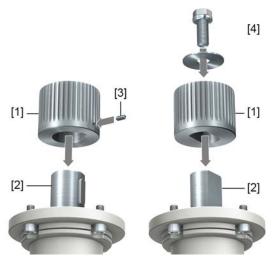
- → Recommended mounting position for butterfly valves: End position CLOSED.
- → Recommended mounting position for **ball valves**: End position OPEN.

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

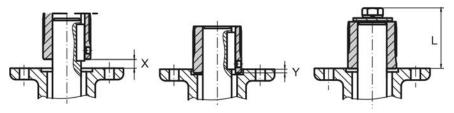


Table 3:

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	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.
- ightarrow 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.
- Use connecting cables, cable glands, reducers, blanking plugs with a minimum temperature range of +80 °C.
- To avoid contact corrosion, we recommend the use of sealing agents for cable glands and blanking plugs made of metal.
- For connecting cables exposed to UV radiation (outdoor installation), use UV resistant cables.
- For the connection of position transmitters, screened cables must be used.

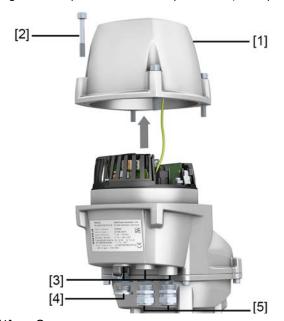
Cable installation in accordance with EMC

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].

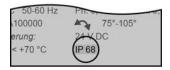
⚠ WARNING

Risk of explosion in case of non-respect of the protection type!

Risk of death or serious injury!

- → During commissioning, replace supplied blanking plugs by cable glands or blanking plugs with appropriate Ex approval.
- ightarrow Use maximum one thread reduction, extension or adapter with the appropriate Ex approval per cable entry.
- 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

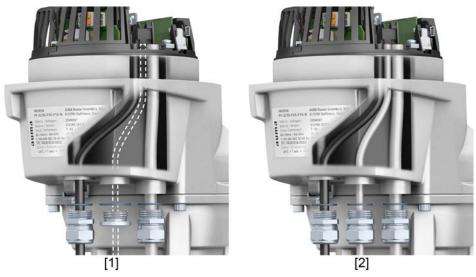


The shown cable arrangement is only applicable for actuators with I/O interface!

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



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.
- $\rightarrow\,$ Connect PE connection to external protective earth conductor of connecting cables.
- ightarrow 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)

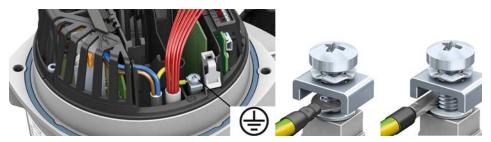


Table 5:

Terminal cross sections and tightening torques of PE connection							
Designation	Terminal cross sections	Tightening torques					
Protective earth connection	$1.0 - 2.5 \text{ mm}^2$ (flexible) via spade lug or wire end sleeve $1.5 - 2.5 \text{ mm}^2$ (flexible) directly $1.5 - 2.5 \text{ mm}^2$ (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. [mm²]	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 pushin 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

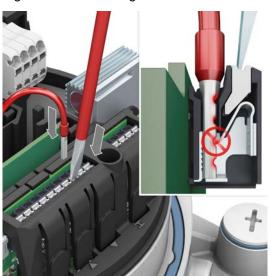


Table 7:

140.0							
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

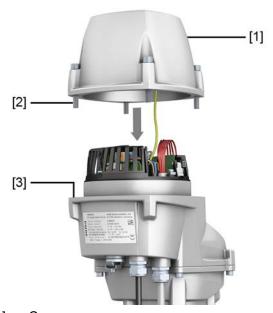
⚠ WARNING

Explosion due to damaged flameproof enclosure!

Risk of death or serious injury!

- → Handle cover and housing parts with care.
- → Joint surfaces must not be damaged or soiled in any way.
- → Do not jam cover during fitting.

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



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



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.
- 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

The actuator is equipped with an earth connection.

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 mm ² to 6 mm ²	3 – 4 Nm					
flexible	1.5 mm ² to 4 mm ²	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 27, Set end stop CLOSED	
		End stop OPEN	Yes	No	No	page 27, Set end stop OPEN	
End position set- ting	Positions	End position CLOSED setting	Yes	Yes	Yes	page 28, Set end position CLOSED	
		End position OPEN setting	Yes	Yes	Yes	page 30, Set end position OPEN	
Position indicator setting	Indication for the end positions	Indication end position CLOSED	Yes	No	No	page 31, 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 34, Speed setting	
	I/O signals (bin- ary/analogue)	Type and assign- ment	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.}

⚠ WARNING

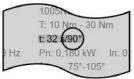
Version with 45° – 360° swing angle (without internal end stops): Danger of explosion when removing the screw plugs!

Risk of death or serious injury!

→ The screw plugs [1] and [3] may not be opened.

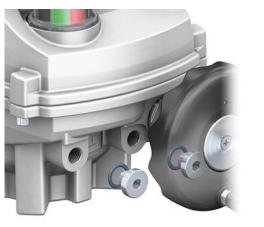
Information

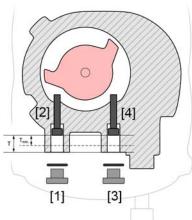
• The swing angle set in the factory is indicated on the name plate:



- 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.
- Only AUMA approved O-rings may be used. In case of loss, the spare parts kit consisting of a screw plug and an O-ring must be ordered with AUMA.
- 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.
- Only AUMA approved O-rings may be used. In case of loss, the spare parts kit consisting of a screw plug and an O-ring must be ordered with AUMA.
- 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)

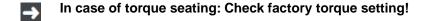
When setting the end positions, the actuator acts in accordance with the selected type of seating:

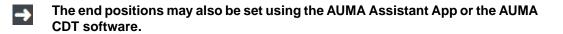
Limit seating

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.





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 **I** 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.
- \rightarrow 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



- → 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.

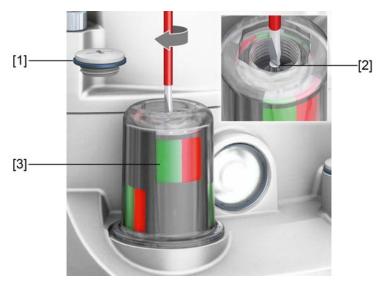
The following table provides an overview of the different positions indications and refers to the chapter describing the respective setting.

Table 9: Position indications

Figure	Indication range	Page
	90°	page 32, Position indication for 90°
	120°	page 32, Position indication for 120°
	45° – 360°	page 33, Position indication for 45° – 360°

7.3.1. Position indication for 90°

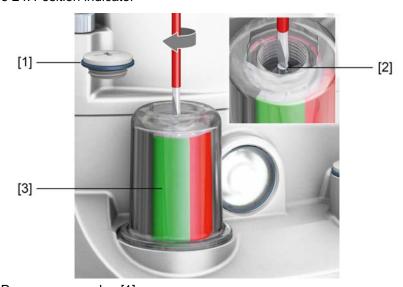
Figure 23: Position indicator



- 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.

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.

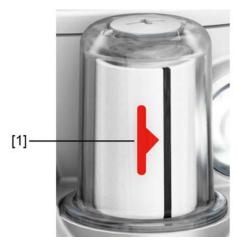
1. Operate actuator to end position CLOSED.



Wide swing angle range

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

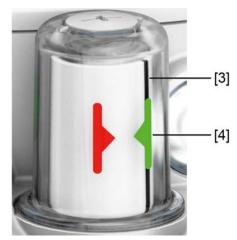
ightarrow Check swing angle range and possible label position prior to actually sticking the label onto the position indicator.



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 39, 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	85 W
V2	25 W	85 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 4 s – 40 s	V2 8 s – 80 s	V1 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 8 s – 80 s	V2 16 s – 160 s	V1 32 s – 320 s
8 s	100 %	_	_
11 s	73 %	_	_
16 s	50 %	100 %	_
22 s	36 %	73 %	_
32 s	25 %	50 %	100 %
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 %	
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.

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.
- ightarrow 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.

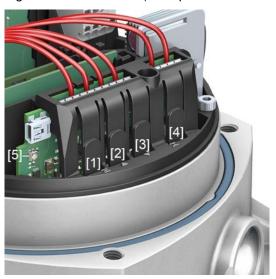


Figure 25: Push button (example of I/O interface)

- [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 **I** 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. Actuator diagnostics and detailed diagnostics
Operation function	Operation in direction of end positions Resetting the fault log
Setting end positions	Setting the positions for end positions CLOSED and OPEN
Device ID	Device designation Order number, serial number
Configuration	Configuration of all parameters
Service functions	Factory settings 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 No password required	
Operator (2)	Change configuration parameters (low level) Factory password: 000000	
Maintenance (3)	Reserved for future use	
Specialist (4)	Change configuration parameters (high level) e.g. type of seating, assignment of output contacts Factory password: 000000	
Service (5)	Service staff 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



Risk of immediate actuator operation when connecting to mains!

Risk of death, severe injury or damage to valve.

- ightarrow 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

pp DIS_53 Configuration

 $M \triangleright$

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 DIS_53 Configuration

M 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	- C	•
blinking in white (double flash)	Ready for operation (LOC-AL/OFF)	The actuator: • is in operation mode LOCAL or OFF. • is ready for operation. 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 inter- face ready for re- ception	The Bluetooth interface is provisionally activated. 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
Coloui/State	Signal	Description
Illuminated in white	Ready for operation (REMOTE)	The actuator: is in operation mode REMOTE. is ready for operation. is not in any end position.
blinking in white (double flash)	Ready for operation (LOC-AL/OFF)	The actuator: is in operation mode LOCAL or OFF. is ready for operation.
Illuminated in blue	Bluetooth active	The actuator is connected via Bluetooth.
blinking in blue	Bluetooth inter- face ready for re- ception	The Bluetooth interface is provisionally activated. 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

Onie	
Signal	Description
Bluetooth active	The actuator is connected via Bluetooth.
Failure	Refer to Corrective action chapter.
Ready for operation (REMOTE)	The actuator: is in operation mode REMOTE. is ready for operation.
Bluetooth inter- face ready for re- ception	The Bluetooth interface is provisionally activated. Safety function: refer to Manual "PROFOX Parameters and functions".
Function check or Out of specifica- tion	Refer to Corrective action chapter.
Maintenance required	Maintenance is required.
Ping	Blinking function
	Signal Bluetooth active Failure Ready for operation (REMOTE) Bluetooth interface ready for reception Function check or Out of specification Maintenance required

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 blinking in red (double flash) blinking in orange
Bluetooth active	Illuminated in blue	_
Bluetooth interface ready for reception	blinking in blue	_
End position CLOSED	illuminated in or- ange	illuminated in red illuminated in green illuminated in magenta

Signal	Default value	Options
End position OPEN	illuminated in green	illuminated in orange illuminated in red illuminated in magenta
Operation in direction CLOSE	blinking in orange	blinking in red blinking in green blinking in magenta
Operation in direction OPEN	blinking in green	blinking in orange blinking in red blinking in magenta
Fault	flashing in red (fast)	illuminated in red
Warning	blinking in red (double flash)	blinking in red 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 set- point 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.

⊤೧	h	\sim	22:
ıa	U	ı	~~.

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: Issue operation command in direction OF Reset the fault signal either via AUMA Ass App or AUMA CDT software. For control via fieldbus: Execute reset com via fieldbus.		
Torque fault OPEN	The actuator has reached the preset tripping torque in direction OPEN. Perform one of the following measures: Issue operation command in direction Ci Reset the fault signal either via AUMA As App or AUMA CDT software. For control via fieldbus: Execute reset con via fieldbus.		
Thermal fault	Motor protection tripped. Perform one of the following measure Cool down, wait. If the fault indication display persisting down: Reset the fault signal either visistant App or AUMA CDT so For control via fieldbus: Execu		
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.		
Internal error	Collective signal 14: Internal error has occurred. 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. If a memory overflow occurs, reboot the actuator. 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: 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. Check the applicable configuration parameters. In case the problem persists: Contact AUMA Service.	
	IE parameter configuration	Check position transmitter parameters.	
	,	, some parameters	

Fault / NAMUR failure				
Display (App or CDT)	Description/cause	Remedy		
Configuration error REMOTE	Collective signal 22: Configuration error has occurred. 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. Check the configuration parameters for the sub-assembly. In case the problem persists: Contact AUMA Service.		
	IE remote parameter configuration	Check configuration.		
	IE fieldbus	Check configuration.		
Fault motor controls	Collective signal 28: 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:

Table 23:			
Warning / NAMUR out of specifica	ition		
Display (App or CDT)	Description/cause	Remedy	
Internal warning	Collective signal 15: Device warnings. The device can still be operated with restrictions. Use AUMA Assistant App or AUMA CDT to the individual signals by means of the Diagramenu.		
24 V DC customer	Part of collective signal 15: Check 24 V DC inputs (DIN). The 24 V DC customer auxiliary supply (to control the digital inputs) has failed.		
24 V DC internal	Part of collective signal 15: 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: Faulty configuration. 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. 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. 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: Setpoint E1 Actual value E2 Actual process value E4 Check connection to master. For Profibus or Profinet: Check (master.		
Wrn input AIN 1	Warning: Loss of signal analogue input 1	Check wiring.	

Warning / NAMUR out of specificati	on	
Display (App or CDT)	Description/cause	Remedy
Wrn setpoint position	Warning: Loss of signal setpoint position Possible causes: For an adjusted setpoint range of e.g. 4 – 20 mA, the input signal is 0 (signal loss) For a setpoint range of 0 – 20 mA, monitoring is not possible.	
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. Check valve. 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.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.	$\label{prop:eq:end} \mbox{End commissioning and change the operation mode.}$		
EMCY behav. active	Operation mode EMERGENCY is active (EMER-GENCY signal was sent). 0 V are applied at the EMERGENCY input.	 Detect cause for the EMERGENCY signal. Verify failure source. 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			
	Collective signal 13: Possible causes: Several operation commands (e.g. OPEN and CLOSE simultaneously, or OPEN and SET-POINT operation simultaneously) 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. Check operation commands (reset/clear all operation commands and send one operation command only). Activate parameter PRM_1169 Positioner. 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 $\underline{\textbf{Activation}})$			

11. Thermal fuse

To protect against overheating and impermissibly high surface temperatures at the actuator, a non self-resetting thermal fuse is integrated within the electronics compartment. The thermal fuse trips when reaching a certain rated temperature and must subsequently be replaced together with the power supply unit.

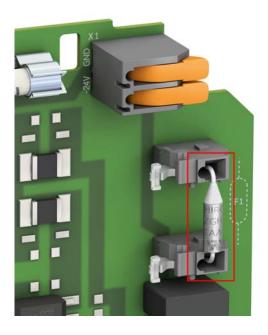
Danger of explosion due to impermissibly high device temperatures!

Risk of death or serious injury.

ightarrow Prior to replacing a previously tripped thermal fuse, determine the cause for fuse tripping and remedy.

Tripped thermal fuses must be replaced including the power supply unit. A new thermal fuse with power supply unit can be ordered as sub-assembly from AUMA, indicating the respective reference number. Refer to the actuator spare parts list for the applicable reference number.

Figure 28: Position of the thermal fuse on the power supply unit



12. Servicing and maintenance

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:

Maintenance specifications for Ex certified products

 Maintenance interventions must be performed in compliance with IEC 60079-17. The standard defines the intervals and test depths for the mandatory tests.

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.
- When deployed in areas where dust formation represents a potential explosion hazard, perform visual inspection for deposit of dirt or dust on a regular basis. Clean devices if required.
- 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)

Only screw plugs approved for the protection type may be used which also ensure the required IP protection. Type of protection and IP protection and indicated on the name plate.

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.

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

Notes relating to maintenance

- Perform visual inspection of actuator and mounted accessories. Ensure that no outside damage, changes or leakage of grease and oil are visible.
- Check actuator for unusual running or grinding noise or vibration which might be an indication of bearing or gear damage.
- Electrical connection cables must be placed properly and in perfect condition.
- Thoroughly touch up any possible damage to painting to prevent corrosion. Original paint in small quantities can be supplied by AUMA.
- Cables and wire entries, blanking plug, cable glands, plugs etc. have to be checked for correct tightness and sealing. Consider torques according to manufacturer's details. If required, replace the components. Only use components with appropriate Ex approval.
- Check whether Ex connections are fastened correctly.

- Take care of possible discolouration of the terminals and wires. This would indicate an increased temperature.
- For Ex housings, pay special attention to a possible collection of water. This
 may originate from "breathing" due to severe temperature variations (e. g.
 change of night and day), from damaged seals etc. Remove any water immediately.
- The process temperature range must be within the range of the specified ambient temperature.
- Check the flame path gaps of flameproof enclosures for dirt and corrosion.
- Since the dimensions of all flameproof joints are strictly defined and inspected, no mechanical work (such as grinding) shall be performed on them. The joint surfaces have to be cleaned chemically (e. g. with Esso-Varsol).
- Consult manufacturer for indications regarding flameproof joints.
- Repair interventions on flameproof joints is not permitted.
- Prior to fitting, preserve joint surfaces with an acid-free corrosion protection agent (e. g. Esso Rust-BAN 397).
- Ensure that all housing covers are handled carefully and that the seals are checked.
- All cable and motor protection components have to be checked.
- If defects impairing the safety are detected during maintenance, repair measures have to be initiated without delay.
- Any kind of surface coating for the joint surfaces is not permitted.
- When replacing parts, sealing elements, etc. only original spare parts shall be used.

13. 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.

14. 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.

14.1. Technical data Part-turn actuators with integral controls for open-close and modulating duty

Features and functions				
Explosion protection		Ex db h IIC T4 Gb Ex h tb IIIC T130°C Db		
Product certificates		DEKRA 21ATEX0092 X IECEx DEK 21.0058X		
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 $$		
		voltage and +40 $^{\circ}\text{C}$ ambient temperature and at load of 35 % of the maximum torque. The must not be exceeded.		
Motor		ed, brushless motor t stop. The progress characteristics can be configured as requested.		
Insulation class	F (motor wind	ding)		
Motor protection	Via short-circ	cuit protection and current measurement		
Self-locking	At standstill v	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 sense	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° Via own markings at indication 45° – 360°		
	Option:	Without mechanical position indicator		
Manual operation PF-Q80X – PF-Q600X	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 $45^\circ-360^\circ.$		
Coupling	Standard:	Coupling unbored		
	Options:	 Coupling unbored extended Finish machining of coupling (standard or extended) Bore according to EN ISO 5211 with 1 keyway according to DIN 6885-1 Square bore according to EN ISO 5211 Two-flat according to EN ISO 5211 		
Valve attachment	Dimensions a	according to EN ISO 5211		

Features and functions	
Power supply	Nominal voltages: 1-phase AC current: 100 – 240 V / 50 – 60 Hz
Overvoltage category	Category II in compliance with IEC 60364-4-443
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 Galvanically isolated towards I/O interfaces.
Fieldbus control (input signals)	Operation commands and setpoint via fieldbus interface

Features and functions		
I/O interface control (input signals)	3 digital inputs:	Via opto-isolator, with one common Control voltage 24 V DC, current consumption: approx. 15 mA per input Minimum pulse duration for shortest operation pulse: 100 ms All digital inputs must be supplied with the same potential All inputs can be configured as required Standard assignment (without positions and without fieldbus interface): CLOSE, OPEN, STOP Assignment for option with positioner: MODE, OPEN, CLOSE Assignment for option with fieldbus interface: OPEN, CLOSE, I/O interface I/O interface: Selection of the control source (fieldbus interface or I/O input signals) Factory setting of "I/O Interface" signal: Input signal 0 V = fieldbus interface is active
	Analogue input (option)	0/4 – 20 mA or 0 – 10 V No galvanic isolation For option with positioner: Used as input signal for position setpoint or as input signal for motor speed 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.
Fieldbus status signals (output signals)	Via fieldbus inter	face
Status signals of I/O interface (output signals)	3 digital outputs:	Freely configurable semi-conductor output contacts, per contact max. 24 V DC, 100 mA (resistive load) Outputs can be configured as required Standard assignment: 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 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: Limit or torque seating for end positions OPEN and CLOSED Torque monitoring across the whole travel Torque by-pass Programmable EMERGENCY behaviour: Digital input low active, Reaction can be selected: Stop, run to end position CLOSED, run to end position OPEN Speed control Ramps Program operation profiles Programming specific speed for OPEN and CLOSE operations or one digital input Positioner Automatic adaptation of dead band (adaptive behaviour selectable)

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

Operation and display			
Basic at the actuator	Status indication	FOX-EYE (indication LED) Status indications: OK, end positions, faults and "Bluetooth connection active"	
	Set end positions	4 push buttons and 1 LED are located below the hood. Run actuator in directions OPEN and CLOSE. Set end position once mounted to the valve.	
Smart Via Bluetooth using AUMA Assistant	Set end positions	Run actuator in directions	OPEN and CLOSE. Set end position once mounted to the valve.
App or AUMA CDT software	Configura- tion	Basic settings for operation:	 Rotation speed Type of seating for end positions, Torque switching Assignment of signal inputs and signal outputs Fieldbus parameter (if fieldbus option has been selected)
		Additional functions:	For applications, safety and service, e.g.: Positioner EMERGENCY behaviour Torque by-pass Failure behaviour Signal configuration
	Diagnostics	increasing process safety	I measured values for preventive maintenance and consequently Limit values can be set. Deviations generate warning signals to the DCS via binary outputs or fieldbus.
		Actuator:	Temperature value within actuator 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 comparative 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.

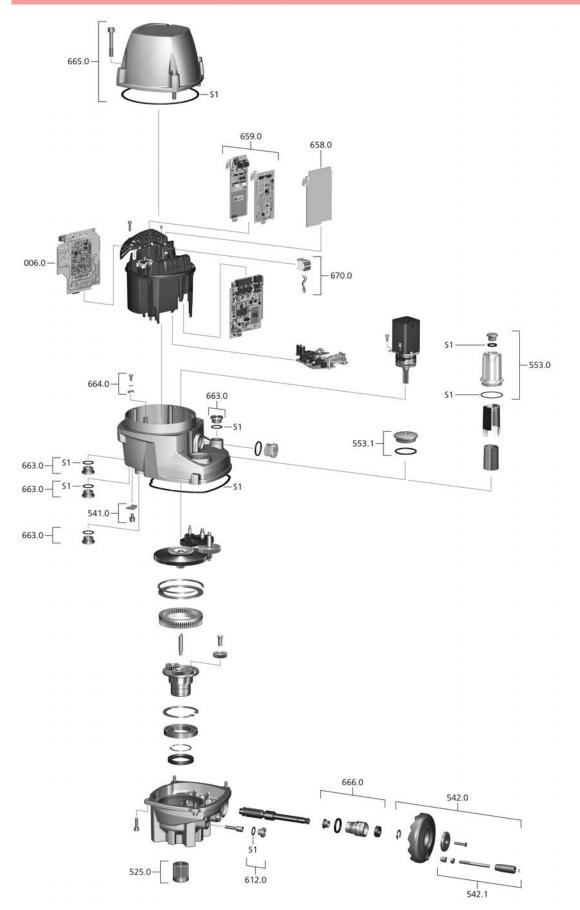
Service conditions				
Mounting position	Any position	Any position		
Installation altitude	≤ 2,000 m abo	ove sea level ove sea level on request		
Ambient temperature	Standard:	−30 °C to +60 °C		
	Option:	-30 °C to +65 °C		
Humidity	Up to 100 % r	relative humidity across the entire permissible temperature range		
Enclosure protection in accordance	Standard:	IP67		
with IEC 60529	Option:	According to AUMA definition, enclosure protection IP68 meets the following requirements: Depth of water: maximum 8 m head of water Continuous immersion in water: maximal 96 hours Up to 10 operations during immersion 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 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 Suitable for use in areas with high salinity, almost permanent condensation, and high pollution.		
	Option:	KX (upon request) Suitable for use in areas with extremely high salinity, permanent condensation, and high pollution.		
Coating	Double layer powder coating 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 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.			
Sound pressure level	< 70 db (A)			

Further information					
EU Directives	ATEX Directive 2014/34/EU Machinery Directive 2006/42/EC Low Voltage Directive 2014/35/EU EMC Directive 2014/30/EU RoHS Directive 2011/65/EU				
Reference documents	Dimensions PF-Q80X – PF-Q600X Electrical data PF-Q80X – PF-Q600X				

15. Spare parts

15.1. Part-turn actuators PF-Q80 – PF-Q600



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	Туре
0.600	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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