

**Technical data Part-turn actuators for open-close and modulating duty**

**General information**

AUMA PF-Q part-turn actuators are equipped with integral controls.

Type	Operating times for 90° in seconds <sup>1)</sup> (selection of 9 levels) <sup>2)</sup>			Torque range <sup>3)</sup>	Modulating torque <sup>4)</sup>	Valve attachment	Valve shaft			Handwheel		Weight <sup>5)</sup>
	PF-Q	V1	V2	V3	Max. [Nm]	Max. [Nm]	Standard EN ISO 5211	Cylindrical Max. [mm]	Square Max. [mm]	Two-flat Max. [mm]	Ø [mm]	Turns for 90°
20	8 – 80 4 – 40	–	–	8 – 20	10	F03/F04/F05/F07 <sup>6)</sup>	15	14	14	– <sup>7)</sup>	8.7	6
40	8 – 80	4 – 30	–	16 – 40	20	F03/F04/F05/F07 <sup>6)</sup>	15	14	14	– <sup>7)</sup>	8.7	6
80	16 – 160	8 – 80	4 – 40	32 – 80	40	F05/F07/F10	20	17	17	100	20.2	8
150	32 – 320	16 – 160	8 – 80	60 – 150	75	F05/F07/F10	20	17	17	100	20.2	8
300	63 – 320	45 – 320	22 – 160	120 – 300	150	F07/F10	38	30	27	160	16.3	11
600	–	75 – 320	45 – 320	240 – 600	300	F07/F10	38	30	27	160	16.3	11

- 1) The values for operating times refer to an operation across 90° of travel at a load of 70 % of the maximum torque. Operating times without considering soft start/soft stop. Soft start/soft stop is preselected for the factory settings.
- 2) Operating times can be selected in 9 levels when placing the order. Otherwise, the fastest speed is selected as default value in the factory. Settable via Bluetooth in steps of 1 % within the range.
- 3) The tripping torque is adjustable for directions OPEN and CLOSE within the indicated torque range. The “Torque bypass” function (can be activated) allows increasing the pre-set tripping torque to 127 % (unseating torque). This increase only applies during actuator start for an adjustable time period. This allows unseating blocked valves.
- 4) Maximum permissible torque for modulating duty. The values from the “Torque range” column still apply as tripping torques.
- 5) Specified weight includes part-turn actuator, unbored coupling and handwheel.
- 6) F04 flange bores shifted by 45°
- 7) Manual emergency operation possible using additional tools.

**Features and functions**

Type of duty	Open-close duty:	Classes A and B according to ISO 22153, short-time duty S2 - 15 min
	Modulating duty:	Class C according to ISO 22153, intermittent duty S4 - 50 %, with maximum number of starts up to 1,200 starts/h
	For nominal voltage and +40 °C ambient temperature and at load of 35 % of the maximum torque. The type of duty must not be exceeded.	
Motor	Variable speed, brushless motor Soft start/soft stop. The progress characteristics can be configured as requested.	
Insulation class	F (motor winding)	
Motor protection	Via short-circuit protection and current measurement	
Self-locking	At standstill with spring-applied brake	
Swing angle	Standard:	90° ±15° adjustable between min. and max. values (with mechanical end stops)
	Options:	120° ±15° adjustable between min. and max. values (with mechanical end stops) 45° – 360° adjustable between min. and max. values (without mechanical end stops)
Limit switching	Via Hall sensors	
Torque switching	Via electronic current measurement. Tripping torques infinitely adjustable via Bluetooth. 8 levels can be selected when placing the order.	
Mechanical position indication	Standard:	Continuous indication, for 90° or 120° Via own markings at indication 45° – 360°
	Option:	Without mechanical position indication
Manual operation	PF-Q20 – PF-Q40:	
	Manual emergency operation possible using additional tools:	
	<ul style="list-style-type: none"> <li>• Hexagon socket spanner AF10 (coupling change-over)</li> <li>• Allen key AF5 (for turning)</li> </ul>	
	PF-Q80 – PF-Q600:	
Standard:	Manual drive for setting and emergency operation, handwheel does not rotate during electrical operation.	
Option:	Without handwheel, i.e. handwheel and handwheel shaft are obsolete. The end stops are included except for version with swing range 45° – 360°.	

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Coupling	Standard:	Coupling unbored
	Options:	<ul style="list-style-type: none"> <li>• Coupling unbored extended</li> <li>• Finish machining of coupling (standard or extended)                             <ul style="list-style-type: none"> <li>– Bore according to EN ISO 5211 with 1 keyway according to DIN 6885-1</li> <li>– Square bore according to EN ISO 5211</li> <li>– Two-flat according to EN ISO 5211</li> </ul> </li> </ul>
Valve attachment	Dimensions according to EN ISO 5211 without spigot	
Features and functions		
Power supply	Standard voltages: 1-phase AC current: 100 – 240 V / 50 – 60 Hz Permissible variation of mains voltage $\pm 10\%$ Permissible variation of mains frequency $\pm 5\%$ Options: DC current: 24 V DC $\pm 10\%$ DC current: 180 – 300 V DC $\pm 10\%$ For current consumption, refer to Electrical data PROFOX	
Overvoltage category (actuator)	Category III according to IEC 60364-4-44 Category II in compliance with IEC 60364-4-44 (according to cDEKRAus for the North American market)	
Power electronics	With integral motor controller (current consumption in standby mode < 3 W)	
I/O interface control (input signals)	3 digital in-puts:	<ul style="list-style-type: none"> <li>• Via opto-isolator, with one common</li> <li>• Control voltage 24 V DC, current consumption: approx. 15 mA per input</li> <li>• Minimum pulse duration for shortest operation pulse: 100 ms</li> <li>• All digital inputs must be supplied with the same potential</li> <li>• All inputs can be configured as required</li> <li>• Standard assignment (without positioner and without fieldbus interface): CLOSE, OPEN, STOP</li> <li>• Assignment for option with positioner: MODE, OPEN, CLOSE</li> <li>• 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</li> </ul>
	Analogue in-put: (option)	<ul style="list-style-type: none"> <li>• 0/4 – 20 mA or 0 – 10 V</li> <li>• No galvanic isolation</li> <li>• For option with positioner: Used as input signal for position setpoint or as input signal for motor speed</li> <li>• 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.</li> </ul>
Status signals of I/O interface (output signals)	3 digital out-puts:	<ul style="list-style-type: none"> <li>• Freely configurable semi-conductor output contacts, per contact max. 24 V DC, 100 mA (resistive load)</li> <li>• Outputs can be configured as required</li> <li>• Default assignment: End position CLOSED (high active), end position OPEN (high active), collective fault signal (low active)</li> </ul>
	Analogue output:	<ul style="list-style-type: none"> <li>• Position feedback signal 0/4 – 20 mA (load maximum 500 <math>\Omega</math>) or 0 – 10 V</li> <li>• No galvanic isolation</li> </ul>

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<b>Features and functions</b>		
Additional I/O signals for control and signalling (option)	2 digital inputs:	2 digital inputs (via opto-isolator, galvanically isolated) <ul style="list-style-type: none"> <li>Control voltage 115 V DC, current consumption: approx. 15 mA per input</li> <li>Minimum pulse duration for shortest operation pulse: 100 ms</li> <li>All inputs can be configured as required; however, a signal may only be assigned to maximum one input (irrespective of the type, 24 V DC or 115 V AC).</li> <li>Assignment via order e.g.: OPEN, CLOSE, (push-to-run operation) or CLOSE/OPEN, EMERGENCY</li> </ul>
	3 digital outputs:	Freely configurable output contacts, max. 240 V AC / 30 V DC, 1 A (resistive load) <ul style="list-style-type: none"> <li>2 x type SPST NO, 1 type SPDT</li> <li>Outputs can be configured as required</li> <li>Default assignment: End position CLOSED (high active), end position OPEN (high active), collective fault signal (SPDT)</li> </ul>
Voltage output (option)	Auxiliary voltage 24 V DC, max. 80 mA for supply of control inputs, without galvanic isolation.	
Functions (actuators with I/O interface)	Standard:	<ul style="list-style-type: none"> <li>Switch-off mode adjustable:                             <ul style="list-style-type: none"> <li>Limit or torque seating for end positions OPEN and CLOSED</li> </ul> </li> <li>Torque monitoring across the whole travel</li> <li>Function for excessive torque in defined situations</li> <li>Programmable EMERGENCY behaviour:                             <ul style="list-style-type: none"> <li>Digital input low active,</li> <li>Reaction can be selected: Stop, run to end position CLOSED, run to end position OPEN</li> </ul> </li> <li>Speed control                             <ul style="list-style-type: none"> <li>Ramps</li> <li>Program operation profiles</li> <li>Program specific speed for OPEN and CLOSE operations or one digital input</li> </ul> </li> </ul>
	Option:	<ul style="list-style-type: none"> <li>Positioner                             <ul style="list-style-type: none"> <li>Position setpoint via analogue input E1 = 0/4 – 20 mA or 0 – 10 V</li> <li>Programmable behaviour on loss of signal</li> <li>Automatic adaptation of dead band (adaptive behaviour selectable)</li> <li>Selection between open-close duty and modulating duty via digital MODE input</li> </ul> </li> </ul>
Local controls (external)	Standard:	Without
	Options:	<ul style="list-style-type: none"> <li>Push buttons OPEN, STOP (LOCAL - REMOTE), CLOSE</li> <li>Signalling the operation via the FOX-EYE:                             <ul style="list-style-type: none"> <li>Change between the operation modes: REMOTE (OK), OFF, LOCAL and COMMISSIONING</li> <li>End positions CLOSED and OPEN</li> <li>Running CLOSE, running OPEN</li> </ul> </li> </ul>
Bluetooth communication interface	BT 5.x version Min. range of 3 m in industrial environments. Required accessories: <ul style="list-style-type: none"> <li>AUMA CDT (Commissioning and Diagnostic Tool for Windows-based PCs)</li> <li>AUMA Assistant App (Commissioning and Diagnostic Tool for Android and iOS devices)</li> </ul>	
Electrical connection	Cable entry: 3 x M20x1.5 threads for cable glands. Inside rail with spring clamp terminals for wire connection.	
Wiring diagram (basic version)	TPC P00A1A1A100000, standard TPC P00A1B1A100000, version with positioner	
<b>With base and lever (option; only possible for PF-Q80 – PF-Q600)</b>		
Swing lever	Made of spheroidal cast iron with two or three bores for fixing a lever arrangement. Considering the installation conditions, the lever may be mounted to the output shaft in any desired position.	
Ball joints (option)	Two ball joints matching the lever, including lock nuts and two welding nuts, suitable for pipe according to dimension sheet.	
Fixing	Base and four holes for fastening screws	

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Operation and display	
At the actuator	<p>Status indication: FOX-EYE (indication LED) Display of operation modes and states:</p> <ul style="list-style-type: none"> <li>• REMOTE: System OK or not ready REMOTE LOCAL COMMISSIONING (only in combination with outside local controls)</li> <li>• End positions</li> <li>• Faults</li> <li>• Bluetooth connection active</li> </ul> <p>Set end positions: 4 buttons and 1 LED are located below the hood, as well as 3 external buttons for local controls (option) and signalling via FOX-EYE: Run actuator in directions OPEN and CLOSE. Set end position once mounted to the valve.</p>
Via Bluetooth using AUMA Assistant App or AUMA CDT software	<p>Set end positions: Operate the actuator in directions OPEN and CLOSE. Set end position once mounted to the valve.</p> <p>Configuration: Basic settings for operation:</p> <ul style="list-style-type: none"> <li>• Rotation speed</li> <li>• Type of seating for end positions, torque switching</li> <li>• Assignment of signal inputs and signal outputs</li> <li>• Fieldbus parameters (if fieldbus option has been selected)</li> </ul> <p>Further functions: For applications, safety and service, e.g.:</p> <ul style="list-style-type: none"> <li>• Positioner</li> <li>• EMERGENCY behaviour</li> <li>• Torque bypass</li> <li>• Failure behaviour</li> <li>• Signal configuration</li> </ul> <p>Diagnostics: Monitoring key indicators and measured values for preventive maintenance and consequently increasing process safety. Limit values can be set. Deviations generate warning signals which can be transmitted to the DCS via digital outputs or fieldbus.</p> <p>Actuator: Temperature value within actuator Key indicators regarding lifetime of electronics, brake, gearbox and seals.</p> <p>Actuator and valve: Method for identifying changes in torque requirement: Perform reference operation and save torque as reference profile. Define tolerance range. Perform comparative operations if required. Values outside tolerance initiate a signal which is communicated as described above.</p> <p>Further key indicators: Furthermore, the actuator monitors and records further indicators 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.</p>

Service conditions	
Mounting position	Any position
Installation altitude	≤ 2,000 m above sea level > 2,000 m above sea level on request
Ambient temperature	–30 °C to +70 °C
Humidity	Up to 100 % relative humidity across the entire permissible temperature range
Enclosure protection in accordance with IEC 60529	<p>Standard: IP67</p> <p>Option: IP68 According to AUMA definition, enclosure protection IP68 meets the following requirements:</p> <ul style="list-style-type: none"> <li>• Depth of water: maximum 8 m head of water</li> <li>• Continuous immersion in water: maximum 96 hours</li> <li>• Up to 10 operations during immersion</li> <li>• Modulating duty is not possible during immersion.</li> </ul>
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, for 10 to 200 Hz Resistant to vibration during start-up or for plant failures. However, a fatigue strength may not be derived from this.

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Seismic resistance according to IEC 60068-3-3	Test proof for application class 3
Electrical approval according to North American standards (option)	Approval according to cDEKRAus (CAN/CSA C22.2 No. 61010-1:2012 and UL 61010-1:2012) Restrictions for the following characteristics: <ul style="list-style-type: none"> <li>• Power supply: 100 – 240 V AC / 50 – 60 Hz</li> <li>• Temperature range: –30 °C to +65 °C (without RTC function within the event log)</li> <li>• Without local controls</li> <li>• Without emergency operation module</li> <li>• Not applicable for PF-Q20 – PF-Q40</li> </ul>
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
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	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-Q20 – PF-Q600 Electrical data PF-Q20 – PF-Q600