Technical data Linear actuators for open-close and modulating duty

General information

AUMA PF-L linear actuators are equipped with integral controls.

Type	Thrust[1]		Modulating force[2]	Operating speed in mm/second[3] (selection of 9 levels)[4]			Valve attachment	Stem stroke	Thread of valve stem	Handwheel		Weight[5]
PF-L	Min. [kN]	Max. [kN]	Max. [kN]	V1	V2	V3	Standard ISO 5210	Max. [mm]		Ø [mm]	Turns per stroke of 10 mm	approx. [kg]
2	0.8	2.0	1.0	0.2 – 1.8	0.3 – 2.5	–	F05	60	M12 x 1.25	–[6]	30	8
3	1.4	3.5	1.7	0.2 – 1.2	0.3 – 2.3	–	F05	60	M12 x 1.25	–[6]	30	8
6	2.4	6.0	3.0	–	0.2 – 1.2	0.3 – 2.5	F05	60	M12 x 1.25	–[6]	30	8
10	4.0	10	5.0	–	0.1 – 0.6	0.2 – 1.2	F05/F07	80	M16 x 1.5	125	50	10
15	6.0	15	7.5	–	–	0.1 – 1.0	F05/F07	80	M16 x 1.5	125	50	10
18	7.2	18	9.0	–	–	0.1 – 1.0	F05/F07	80	M16 x 1.5	125	50	10

1) The thrust is adjustable for directions OPEN and CLOSE within the indicated range. Via the “torque bypass” function (can be activated), the set thrust can be increased to 127 % (unseating force). This increase only applies during actuator start for an adjustable time period. This allows unseating blocked valves.

2) Maximum permissible thrust in modulating duty. The values indicated in the “thrust” column are still considered as tripping forces.

3) The values for operating speed refer to an operation at a load of 70 %of the maximum thrust.

4) Operating speeds 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.

5) Specified weight includes linear actuator and handwheel without coupling.

6) 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 with 35 % of the maximum thrust. 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	
Limit switching	Via Hall sensors	
Thrust 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 via an indicator moving on an axis. Versions: • PF-L2 – PF-L6: 5 – 27 mm/stroke 28 – 40 mm/stroke 41 – 60 mm/stroke • PF-L10 – PF-L18: 20 – 36 mm/stroke 37 – 56 mm/stroke 57 – 80 mm/stroke
	Option:	Without mechanical position indicator
Manual operation	PF-L2 – PF-L6:	
	Manual emergency operation possible using additional tools: • Hexagon socket spanner AF10 (coupling change-over) • Allen key AF5 (for turning)	
	PF-L10 – PF-L18:	
	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.

Features and functions		
Coupling (option)	The following internal threads for connecting the valve shaft are available: • Unbored • M8 x 1.25 • M10 x 1.50 • M12 x 1.75 • M16 x 2.00 • M20 x 2.50	
Valve attachment	Standard:	Dimensions according to ISO 5210
	Option:	Prepared for fixing up to 4 pillars via an attachment frame. For bores, refer to table: Valve attachment (option) [▶ 2]

Table 1: Valve attachment (option)

Pitch circle [mm]	Bores
90	4 x M12
100	4 x M12
100	4 x M16
110	4 x M16
120	4 x M16

Features and functions		
Power supply	Standard voltages: 1-phase AC current: 100 – 240 V / 50 – 60 Hz Permissible variation of mains voltage ±10 % Permissible variation of mains frequency ±5 % Options: DC current: 24 V DC ±10 % DC current: 180 – 300 V DC ±10 % For current consumption, refer to Electrical data PROFOX	
Overvoltage category	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 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 positioner 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.

Features and functions		
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 • Default 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
Additional I/O signals for control and signalling (option)	2 digital inputs:	2 digital inputs (via opto-isolator, galvanically isolated) • Control voltage 115 V DC, current consumption: approx. 15 mA per input • Minimum pulse duration for shortest operation pulse: 100 ms • 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). • Assignment as specified in the order, e.g.: CLOSE, OPEN (push-to-run operation) or CLOSE/OPEN, EMERGENCY
	3 digital outputs:	Freely configurable output contacts, max. 240 V AC / 30 V DC, 1 A (resistive load) • 2 x type SPST NO, 1 type SPDT • Outputs can be configured as required • Default assignment: End position CLOSED (high active), end position OPEN (high active), collective fault signal (SPDT)
Voltage output (option)	Auxiliary voltage 24 V DC, max. 80 mA for supply of control inputs, without galvanic isolation.	
Local controls (external)	Standard:	Without
	Options:	• Push buttons OPEN, STOP (LOCAL - REMOTE), CLOSE • Signalling the operation via the FOX-EYE: – Change between the operation modes: REMOTE (OK), OFF, LOCAL and COMMISSIONING – End positions CLOSED and OPEN – Running CLOSE, running OPEN
Functions (actuators with I/O interface)	Standard:	• Switch-off mode adjustable: Limit or torque seating for end positions OPEN and CLOSED • Torque monitoring across the whole travel • Function for excessive torque in defined situations • 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 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	Permanently active/inactive, deactivation/activation from REMOTE. Required accessories: • AUMA Assistant App (Commissioning and Diagnostic Tool for Android and iOS devices) • AUMA RSTX 100 remote control • AUMA CDT (Commissioning and Diagnostic Tool for Windows-based PCs)	
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	

Operation and display		
At the actuator	Status indication:	FOX-EYE (indication LED) Display of operation modes and states: • REMOTE: System OK or not ready REMOTE LOCAL COMMISSIONING (only in combination with outside local controls) • End positions • Faults • Bluetooth connection active
	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.
Via Bluetooth using AUMA Assistant App or AUMA CDT software	Set end positions:	Operate the actuator in directions OPEN and CLOSE. Set end position once mounted to the valve.
	Configuration:	Basic settings for operation: • Operating speed • Type of seating for end positions, thrust switching • Assignment of signal inputs and signal outputs • Fieldbus parameters (if fieldbus option has been selected)
		Further functions: For applications, safety and service, e.g.: • Positioner • EMERGENCY behaviour • Torque bypass • Failure behaviour • Signal configuration
	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.
		Actuator: Temperature value within actuator Key indicators regarding lifetime of electronics, brake, gearbox and seals.
		Actuator and valve: Method for identifying changes in thrust requirement: Perform reference operation and save thrust as reference profile. Define tolerance range. Perform comparative operations if required. Values outside tolerance initiate a signal which is communicated as described above.
		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.

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	Standard:	IP67
	Option:	IP68 According to AUMA definition, enclosure protection IP68 meets the following requirements: • Depth of water: maximum 8 m head of water • Continuous immersion in water: maximum 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)	

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Service conditions		
Vibration resistance according to IEC 60068-2-6	1 g, for 10 to 200 Hz Refers to the fastening of the actuator to the valve (via flange F05 or F07). Resistant to vibration during start-up or for plant failures. However, a fatigue strength may not be derived from this.	
Corrosion protection	Housing:	KS Suitable for use in areas with high salinity, almost permanent condensation, and high pollution.
	Thrust rod:	Stainless steel, 1.4305
	Coupling (option):	Steel with zinc-nickel coating
Coating	Double layer powder coating	
Colour	Standard:	AUMA silver-grey (similar to RAL 7037)
	Option:	Available colours on request
Lifetime	Open-close duty:	10,000 operating cycles OPEN - CLOSE - OPEN One operating cycle consists of one stroke of 40 mm in both directions (OPEN - CLOSE - OPEN)
	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-L2 – PF-L18 Electrical data PF-L2 – PF-L18	