Technical data Multi-turn actuators for open-close duty with 3-phase AC motor

General information

AUMA TR-M30X – TR-M1000X multi-turn actuators with integral controls for valve automation in potentially explosive atmospheres.

Type	Output speed rpm		Torque range[1]			Run torque[2]		Number of starts	Valve attachment[3]			Handwheel		Weight[4]
TR-M	50 Hz	60 Hz	Min. [Nm]	S2 - 15 min Max. [Nm]	S2 - 30 min Max. [Nm]	S2 - 15 min Max. [Nm]	S2 - 30 min Max. [Nm]	Starts Max. [1/h]	Standard EN ISO 5210	Option DIN 3210	Max. Ø rising stem [mm]	Ø [mm]	Reduc-tion ratio	approx. [kg]
30X	4	4.8	10	30	20	11	7	60	F07 F10	– G0	26 34	160	11:1	26
	5.6	6.7											8:1	
	8	9.6											11:1	
	11	13											8:1	
	16	19											11:1	
	22	26											8:1	
	32	38											11:1	27
	45	54											8:1	
	63	75											11:1	
	90	108											8:1	
	125	150											5.5:1	
	180	216		25	18	9	6						4:1	
60X	4	4.8	10	60	40	21	14	60	F07 F10	– G0	26 34	160	11: 1	27
	5.6	6.7											8 : 1	
	8	9.6											11 : 1	
	11	13											8 : 1	
	16	19											11 : 1	
	22	26											8 : 1	
	32	38											11 : 1	28
	45	54											8 : 1	
	63	75				18	11						11 : 1	
	90	108											8 : 1	
	125	150											5.5 : 1	
	180	216		50	30								4 : 1	
120X	4	4.8	12	120	90	42	21	60	F10	G0	40	200	11: 1	30
	5.6	6.7											8 : 1	
	8	9.6											11 : 1	
	11	13											8 : 1	
	16	19											11 : 1	
	22	26											8 : 1	
	32	38											11 : 1	32
	45	54											8 : 1	
	63	75											11 : 1	
	90	108				35	18						8 : 1	
	125	150											5.5 : 1	
	180	216		100	70								4 : 1	
250X	4	4.8	25	250	180	100	50	60	F14	G1/2	58	315	11: 1	48
	5.6	6.7											8 : 1	
	8	9.6											11 : 1	
	11	13											8 : 1	
	16	19											11 : 1	
	22	26											8 : 1	
	32	38											11 : 1	54
	45	54											8 : 1	
	63	75											11 : 1	
	90	108											8 : 1	
	125	150											5.5 : 1	
	180	216		200	140	80	40						4 : 1	

Technical data Multi-turn actuators for open-close duty with 3-phase AC motor

Type	Output speed rpm		Torque range[1]			Run torque[2]		Number of starts	Valve attachment[3]			Handwheel		Weight[4]
TR-M	50 Hz	60 Hz	Min. [Nm]	S2 - 15 min Max. [Nm]	S2 - 30 min Max. [Nm]	S2 - 15 min Max. [Nm]	S2 - 30 min Max. [Nm]	Starts Max. [1/h]	Standard EN ISO 5210	Option DIN 3210	Max. Ø rising stem [mm]	Ø [mm]	Reduc-tion ratio	approx. [kg]
500X	4	4.8	50	500	360	175	90	60	F14	G1/2	58	315	45 : 1	50
	5.6	6.7											33 : 1	
	8	9.6											45 : 1	
	11	13											33 : 1	
	16	19				150	75						45 : 1	
	22	26											33 : 1	
	32	38				125	65						45 : 1	56
	45	54											33 : 1	
	63	75				120	60						45 : 1	
	90	108											33 : 1	
	125	150				110	55						22 : 1	
	180	216		400	290	100	50						16 : 1	
1000X	4	4.8	100	1 000	710	330	170	60	F16	G3	77	315	45 : 1	66
	5.6	6.7											33 : 1	
	8	9.6											45 : 1	
	11	13											33 : 1	
	16	19				300	150						45 : 1	
	22	26											33 : 1	
	32	38				200	100						45 : 1	
	45	54											33 : 1	
	63	75				160	80						45 : 1	72
	90	108											33 : 1	
	125	150		800	570	150	75						22 : 1	
	180	216				140	70						16 : 1	

1) The tripping torque is adjustable for directions OPEN and CLOSE within the indicated torque range.
2) Max. permissible running torque (average torque across the complete travel) for 15 min or 30 m running time
3) Indicated flange sizes apply for output drive types A and B1.
4) Indicated weight includes multi-turn actuator with 3-phase AC motor, electrical connection in standard version, output drive type B1 and handwheel.

Features and functions		
Explosion protection	Standard:	II2G Ex db eb h IIC T4 or T3 Gb II2D Ex tb h IIIC T 130°C or T 190°C Db
	Options:	II2G Ex db h IIC T4 or T3 Gb
Product certificates	DEKRA 19 ATEX 0091 X IECEx DEK 19.0055 X	
Type of duty	Standard:	Short-time duty S2 - 15 min, classes A and B according to EN 15714-2
	Option:	Short-time duty S2 - 30 min, classes A and B according to EN 15714-2
	For nominal voltage and +40 °C ambient temperature and at run torque load.	
Motors	3-phase AC asynchronous squirrel-cage motor, type IM B9 according to IEC 60034-7, IC410 cooling procedure according to IEC 60034-6	

Technical data Multi-turn actuators for open-close duty with 3-phase AC motor

Features and functions		
Mains voltage, mains frequency	Standard voltages:	
	3-phase AC Voltages/frequencies	

Volt	380	380	400	400	415	440	440	460	480	500
Hz	50	60	50	60	50	50	60	60	60	50

Special voltages:

3-phase AC Voltages/frequencies							
Volt	220	220	230	525	575	600	660
Hz	50	60	50	50	60	60	50

Further voltages on request
Permissible variation of mains voltage: ±10 %
Permissible variation of mains frequency: ±5 %

Overvoltage category	Category III according to IEC 60364-4-443	
Insulation class	Standard:	F, tropicalized
	Option:	H, tropicalized
Motor protection	PTC thermistors (according to DIN 44082)	
Self-locking	Self-locking: Output speeds up to 90 rpm. (50 Hz) or 108 rpm (60 Hz) NOT self-locking: Output speeds from 125 rpm. (50 Hz) or 150 rpm (60 Hz) Multi-turn actuators are self-locking if the valve position cannot be changed from standstill while torque acts upon the output drive.	
Motor heater (option)	Voltages:	110 – 120 V AC, 220 – 240 V AC or 380 – 480 V AC
	Power depending on the size 12.5 – 25 W	
Manual operation	Manual drive for setting and emergency operation, handwheel does not rotate during electrical operation	
	Options:	Handwheel lockable Handwheel stem extension Power tool for emergency operation with square 30 mm or 50 mm
Indication for manual operation (option)	Signal for manual operation active/not active	
Electrical connection	Standard:	AUMA Ex plug/socket connector (KT, KM), screw-type motor terminals, push-in type control terminals
	Option:	AUMA Ex plug/socket connector (KT, KM), with additional support terminals in plug/socket connector
Threads for cable entries	Standard:	Metric threads
	Options:	NPT threads, G threads
Valve attachment	Standard:	B1 according to EN ISO 5210
	Options:	A, B2, B3, B4, C, D according to EN ISO 5210 A, B, D, E according to DIN 3210 C according to DIN 3338
	Special valve attachments: AF, AK, AG, B3D, ED, DD, IB1, IB3, A prepared for permanent lubrication of stem	
Position sensing	Absolute encoder, magnetic for position sensing (MWG) Turns per stroke: 2 to 500 (standard) or 20 to 5,000 (option)	
Torque sensing	AUMA torque sensor; resolution ± 2 %, referring to maximum adjustable torque.	
External supply of the electronics (option)	24 V DC: +20 %/–15 % For external electronics supply, the power supply of integral controls must have an enhanced isolation against mains voltage in compliance with IEC 61010-1 and the output power be limited to 150 VA.	
Rated power	The rated power is the nominal motor power, refer to Electrical data.	

Technical data Multi-turn actuators for open-close duty with 3-phase AC motor

Features and functions		
Switchgear	Standard:	Reversing contactors (mechanically and electrically interlocked) for AUMA power classes A1 and A2
	Options:	Thyristor unit for mains voltage up to 500 V AC for AUMA power classes B1, B2 and B3
	For the assignment of AUMA power classes, please refer to Electrical data.	
Digital input	Standard:	4 digital inputs: OPEN, STOP, CLOSE, EMERGENCY (via opto-coupler with one common).
	Option:	6 digital inputs, e.g. OPEN, STOP, CLOSE, EMERGENCY, MODE, Enable LOCAL
Analogue input	With positioner option: Input of actuator position setpoint as continuous value from 0/4 – 20 mA	
Control voltage/current consumption for digital control inputs	Standard:	24 V DC, current consumption: approx. 10 mA per input
	All input signals must be supplied with the same potential.	
Status signals (output signals)	Standard:	• 6 programmable output contacts: - 5 potential-free NO contacts with one common, max. 250 V AC, 1 A (resistive load) - 1 potential-free change-over contact, max. 250 V AC, 5 A (resistive load) • Analogue output signal for position feedback - Galvanically isolated position feedback 0/4 – 20 mA (load max. 500 Ohm)
	Options:	• 6 programmable output contacts: - 5 change-over contacts with separate common, max. 250 V AC, 1 A (resistive load), 1 potential-free change-over contact, max. 250 V AC, 5 A (resistive load) • 1 further analogue output, e.g. torque output as continuous value from 0/4 – 20 mA
Voltage output	Standard:	Auxiliary voltage 24 V DC: max. 100 mA for supply of control inputs, galvanically isolated from internal voltage supply.
	Option:	Auxiliary voltage 115 V AC: max. 30 mA for supply of control inputs, galvanically isolated from internal voltage supply
Local controls	Standard:	• Combi-Switch with the following functions: - Selector switch: LOCAL-OFF-REMOTE, ESC, ENTER, (RESET) - Shuttle dial: OPEN, CLOSE, (STOP) • Selector switch: lockable in all three positions • 6 indication lights: - End position and running indication OPEN (green), torque fault OPEN (red), motor protection tripped (red), torque fault CLOSE (red), end position and running indication CLOSE (yellow), Bluetooth communication (blue) • Graphic LC display: illuminated For display of all essential actuator data like travel position, torque, type of seating, etc.
	Option:	• Colours and functions of indication lights to be selected via the menu according to operation instructions
Bluetooth module	Deactivation/activation from remote	
Application functions	Standard:	• Type of seating: limit or torque seating respectively for end positions OPEN and CLOSED • Torque by-pass • Stepping mode • Any 8 intermediate positions: can be set between 0 and 100 %, reaction and signal behaviour programmable • Running indication blinking: adjustable
	Options:	• Positioner: - Position setpoint via analogue input 0/4 – 20 mA - Programmable behaviour on loss of signal - Automatic adaptation of dead band (adaptive behaviour selectable) - Split range operation - MODE input for selecting between OPEN-CLOSE and setpoint control

Technical data Multi-turn actuators for open-close duty with 3-phase AC motor

Features and functions		
Safety functions	Standard:	• EMERGENCY operation (behaviour to be selected) - Tripping: Digital input: Low active - Reaction: Stop, end position CLOSED, end position OPEN, setpoint position - Torque monitoring can be by-passed during EMERGENCY operation
	Options:	• Enabling local controls via digital input "Enable LOCAL": Actuator operation via local controls can be enabled or disabled • Interlock function: Enabling the operation commands OPEN or CLOSE from Remote via two digital inputs • PST (Partial Stroke Test): Programmable to check the function of the actuator
Monitoring function	• Valve overload protection: Torque limit value adjustable, results in switching off and generates fault signal • Motor temperature monitoring: results in switching off and generates fault signal • Monitoring the heater within actuator (if available): generates warning signal • Monitoring of permissible operation mode: adjustable, generates warning signal • Operation time monitoring: adjustable, generates warning signal • Phase failure monitoring: results in switching off and generates fault signal • Rotary direction monitoring: results in switching off and generates fault signal	
Diagnostic function	• Electronic device ID with order and product data • Logging of operating data: A resettable counter and a lifetime counter each for: - e.g. motor running time, number of starts, torque switch trippings in end position CLOSED, limit switch trippings in end position CLOSED, torque switch trippings in end position OPEN, limit switch trippings in end position OPEN, torque faults CLOSE, torque faults OPEN, motor protection trippings • Time-stamped event report with history for setting, operation and faults • Status signals according to NAMUR recommendation NE 107: “Failure", "Function check", "Out of specification", "Maintenance required" • Torque profile: - Various reference operations can be executed (e.g. for commissioning) - Torque values can be stored as reference profile. - Comparison operation can be executed at any time (e.g. for plant control). - Tolerance values can be flexibly defined for travel. - Values outside the permissible range generate configurable signals to the DCS.	
Wiring diagram (basic version)	TPC T-0A1AAB11-000	

Service conditions		
Use	Indoor and outdoor use permissible	
Mounting position	Any position	
Installation altitude	≤ 2,000 m above sea level	
	> 2 000 m above sea level on request	
Ambient temperature	Standard:	–30 °C to +60°C
	Options:	–30 °C to +70°C –40 °C to +60 °C –50 °C to +60 °C (on request) –65 °C to +60 °C (on request)
	For ambient temperatures ≤ –40 °C including heater or heating system	
Humidity	Up to 100 % relative humidity across the entire permissible temperature range	
Enclosure protection in accordance with IEC 60529	IP68 with AUMA 3-phase AC motor Terminal compartment additionally sealed against interior of actuator (double sealed)	
	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	
Pollution degree according to IEC 60664-1	Pollution degree 4 (when closed), pollution degree 2 (internal)	

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Vibration resistance according to IEC 60068-2-6	2 g, 5 to 200 Hz Resistant up to maximum 2g to vibration during start-up or for failures of the plant. Resistance against frequent or continuously occurring vibration cannot be derived from this. Not valid in combination with gearboxes. Detailed information on request.	
Corrosion protection	Standard:	KS: Suitable for use in areas with high salinity, almost permanent condensation, and high pollution.
	Options:	KX: 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)
	Options:	Available colours on request
Lifetime	AUMA multi-turn actuators meet or exceed the lifetime requirements of EN 15714-2. Detailed information can be provided on request.	
Sound pressure level	< 72 dB (A)	

Accessories	
Wall mount controls (wall mounted version)	Wall mount controls including local controls separately mounted from actuator, connecting cables on request. Recommended when difficult to access or heavy operational vibration occurring on site. Cable length between actuator and separately mounted local controls amounts to max. 100 m.
Software tool (via Bluetooth connection)	AUMA CDT (Commissioning and Diagnostic Tool for Windows-based PC/notebook)

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 Multi-turn actuators TR-M30X – TR-M1000X Electrical data Multi-turn actuators TR-M30X – TR-M1000X