

Technical Data Actuator controls

General information

AC 01.2 actuator controls for controlling multi-turn actuators of the SA/SAR .2 type range and part-turn actuators of the SG/SGR type range with Profibus DP interface.

Features and functions

Power supply

Standard voltages:

3-phase AC current voltages/frequencies								1-phase AC current voltages/frequencies		
Volt	380	400	415	440	460	480	500	Volt	110, 115, 120	220, 230, 240
Hz	50	50	50	60	60	60	50	Hz	60	50

Special voltages:

3-phase AC current voltages/frequencies					1-phase AC current voltages/frequencies	
Volt	525	575	660	690	Volt	208
Hz	50	50	50	50	Hz	60

Permissible variation of mains voltage: $\pm 10\%$

Permissible variation of mains voltage: $\pm 30\%$ (option)

Permissible variation of mains frequency: $\pm 5\%$

External supply of the electronics (option)

24 V DC $+20\%$ / -15% ,

Current consumption: Basic version approx. 250 mA, with options up to 500 mA

External power supply must have reinforced insulation against mains voltage in accordance with IEC 61010-1 and may only be supplied by a circuit limited to 150 VA in accordance with IEC 61010-1.

Current consumption

Current consumption of controls depending on mains voltage:

For permissible variation of the mains voltage $\pm 10\%$:

- 100 to 120 V AC = max. 740 mA
- 208 to 240 V AC = max. 400 mA
- 380 to 500 V AC = max. 250 mA
- 515 to 690 V AC = max. 200 mA

For permissible variation of the mains voltage $\pm 30\%$:

- 100 to 120 V AC = max. 1,200 mA
- 208 to 240 V AC = max. 750 mA
- 380 to 500 V AC = max. 400 mA
- 515 to 690 V AC = max. 400 mA

Overvoltage category

Category III according to IEC 60364-4-443

Rated power

Controls are designed for rated motor power, refer to Electrical Data Multi-turn actuators or Part-turn actuators

Switchgear

Standard: Reversing contactors (mechanically and electrically interlocked) for AUMA power classes A1/A2

Options: Reversing contactors (mechanically and electrically interlocked) for AUMA power class A3
Thyristor unit for mains voltage up to 500 V AC (recommended for modulating actuators) for AUMA power classes B1, B2 and B3

The reversing contactors are designed for a lifetime of 2 million starts. For applications requiring a high number of starts, we recommend the use of thyristor units.

For AUMA power class assignment, refer to Electrical data Multi-turn actuators or Part-turn actuators.

Control and feedback signals

Via Profibus DP interface

Fieldbus interface with additional input signals (options)

- 2 free analogue inputs (0/4 – 20 mA), 4 free digital inputs
 - Signal transmission is made via fieldbus interface
- MODE, CLOSE, OPEN, STOP, EMERGENCY inputs, I/O interface with 0/4 – 20 mA input for position setpoint
 - Control inputs OPEN, STOP, CLOSE, EMERGENCY
 - I/O interface for selecting the control type (fieldbus or additional input signals)
 - MODE for selecting between open-close duty (OPEN, STOP, CLOSE) and modulating duty (0/4 – 20 mA position setpoint)

Technical Data Actuator controls

Voltage and current values of the optional additional inputs	Standard:	24 V DC, current consumption: approx. 10 mA per input
	Options:	48 V DC, current consumption: approx. 7 mA per input 60 V DC, current consumption: approx. 9 mA per input 115 V DC, current consumption: approx. 15 mA per input 115 V AC, current consumption: approx. 15 mA per input
	All input signals must be supplied with the same potential.	
Status signals	Via Profibus DP interface	
Fieldbus interface with additional output signals (options)	<p>Additional output signals (only available in combination with additional input signals)</p> <p>Binary output signals</p> <ul style="list-style-type: none"> • 6 programmable output contacts <ul style="list-style-type: none"> - 5 potential-free NO contacts with one common, max. 250 V AC, 1 A (resistive load), default configuration: End position CLOSED, end position OPEN, selector switch REMOTE, torque fault CLOSE, torque fault OPEN - 1 potential-free change-over contact, max. 250 V AC, 5 A (resistive load), default configuration: Collective fault signal (torque fault, phase failure, motor protection tripped) • 6 programmable output contacts <ul style="list-style-type: none"> - 5 potential-free change-over contacts with one common, max. 250 V AC, 1 A (resistive load) - 1 potential-free change-over contact (max. 250 V AC, 5 A) • 6 programmable output contacts <ul style="list-style-type: none"> - 6 potential-free change-over contacts without one common, max. 250 V AC, 5 A (resistive load) <p>All binary output signals must be supplied with the same potential.</p> <p>Analogue output signal for position feedback</p> <ul style="list-style-type: none"> • Galvanically isolated position feedback 0/4 – 20 mA (load max. 500 Ω) 	
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 Not possible in combination with PTC tripping device
Profibus DP-V1 (option)	Access to parameters, the electronic name plate and the operating and diagnostic data with acyclic write/read services	
Profibus DP-V2 (option)	Redundancy behaviour according to Profibus DP-V2 specification no. 2.212 (Primary and Backup with RedCom) Synchronisation of time between AUMATIC and Profibus master with subsequent time stamp of the most important events such as faults, end position and torque signals from the AUMATIC	
Redundancy (option)	Redundant line topology with universal redundancy behaviour according to AUMA redundancy I or II Redundant line topology and redundancy behaviour according to Profibus DP-V2 specification no. 2.212 (Primary and Backup with RedCom), requires Profibus DP-V2	
FO cable connection (option)	<ul style="list-style-type: none"> • Connector types: ST or SC connector • FO cables <ul style="list-style-type: none"> - Multi-mode: 62,5(50)/125 µm, range approx. 2.5 km (max. 2.0 dB/km) - Single-mode: 9/125 µm, range approx. 15 km (max. 0.4 dB/km) • Topologies: Line, star and redundant loop (with single-channel Profibus DP interface) • Baud rate: up to 1.5 Mbit/s • Optical budget: <ul style="list-style-type: none"> - Multi-mode: 13 dB - Single-mode: 17 dB • Wave length: 1,310 nm • FO coupler by EKS required at DCS, reference addresses: AUMA or www.eks-engel.com 	

Technical Data Actuator controls

Local controls	Standard:	<ul style="list-style-type: none"> • Selector switch LOCAL - OFF - REMOTE (lockable in all three positions) • Push buttons OPEN, STOP, CLOSE, RESET <ul style="list-style-type: none"> - Local Stop The actuator can be stopped via push button Stop of local controls if the selector switch is in position REMOTE. Not activated when leaving the factory. • 6 indication lights: <ul style="list-style-type: none"> - End positions and running indication CLOSED (yellow), torque fault CLOSE (red), motor protection tripped (red), torque fault OPEN (red), end position and running indication OPEN (green), Bluetooth (blue) • Graphic LC display, illuminated
	Option:	<ul style="list-style-type: none"> • Special colours for the indication lights: <ul style="list-style-type: none"> - End position CLOSED (green), torque fault CLOSE (blue), torque fault OPEN (yellow), motor protection tripped (white), end position OPEN (red)
Bluetooth communication interface	<p>Bluetooth class II chip, version 2.0 with a range up to 10 m in industrial environments. Supports the SPP Bluetooth profile (Serial Port Profile).</p> <p>Programming software: AUMA ToolSuite, commissioning and diagnostic tool for Windows-based PCs, PDAs and smartphones</p>	
Application functions	Standard:	<ul style="list-style-type: none"> • Switch-off mode adjustable <ul style="list-style-type: none"> - Limit or torque seating for end position OPEN and end position CLOSED • Torque by-pass, adjustable up to 5 seconds (no torque monitoring during start-up time) • Start and end of stepping mode as well as ON and OFF times (1 to 1,800 seconds) can be set individually for directions OPEN and CLOSE. • Any 8 intermediate positions between 0 and 100 %, reaction and signal behaviour programmable • Positioner: <ul style="list-style-type: none"> - Position setpoint via fieldbus interface - Automatic adaptation of the dead band (adaptive behaviour selectable) - Selection between open-close duty and modulating duty via Profibus DP
	Option:	<ul style="list-style-type: none"> • PID controller with adaptive positioner, 0/4 – 20 mA inputs for process setpoint and actual process value
Safety functions	<ul style="list-style-type: none"> • EMERGENCY operation, behaviour programmable <ul style="list-style-type: none"> - Digital input low active (option), or via fieldbus interface - Reaction can be selected: Stop, run to end position CLOSED, run to end position OPEN, run to intermediate position - Torque monitoring can be by-passed during EMERGENCY operation. - Thermal protection can be by-passed during EMERGENCY operation (only in combination with thermostat within actuator, not with PTC thermistor). • Release of local controls via fieldbus interface Thus, actuator operation can be enabled or disabled via push buttons on the local controls. • Local Stop <ul style="list-style-type: none"> - The actuator can be stopped via push button Stop of local controls if the selector switch is in position REMOTE. Not activated when leaving the factory. • EMERGENCY Stop push button (latching) interrupts electrical operation, irrespective of the selector switch position • Interlock, enabling the operation commands OPEN or CLOSE via fieldbus interface 	
Monitoring function	<ul style="list-style-type: none"> • Valve overload protection (adjustable), results in switching off and generates fault signal • Motor temperature monitoring (thermal monitoring), results in switching off and generates fault indication • Monitoring the heater within actuator, generates warning signal • Monitoring of permissible on-time and number of starts (adjustable), generates warning signal • Operation time monitoring (adjustable), generates warning signal • Phase failure monitoring, results in switching off and generates fault signal • Automatic correction of rotation direction upon wrong phase sequence (3-ph AC current) 	

Technical Data Actuator controls

Diagnostic function	<ul style="list-style-type: none"> • Electronic device ID with order and product data • Logging of operating data: A resettable counter and a lifetime counter each for: <ul style="list-style-type: none"> - 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: <ul style="list-style-type: none"> - Status signals according to NAMUR recommendation NE 107: "Failure", "Function check", "Out of specification", "Maintenance required" • Torque characteristics <ul style="list-style-type: none"> - 3 torque characteristics (torque-travel characteristic) for opening and closing directions, can be saved separately. Torque characteristics stored can be shown on the display. 	
Motor protection evaluation	Standard:	<ul style="list-style-type: none"> • Monitoring the motor temperature in combination with thermoswitches within actuator motor
	Options:	<ul style="list-style-type: none"> • Thermal overload relay in controls combined with thermoswitches within actuator motor • PTC tripping device in combination with PTC thermistors within actuator motor
Overvoltage protection (option)	Protection of the actuator and control electronics against overvoltages on the fieldbus cables of up to 4 kV	
Electrical connection	Standard:	AUMA plug/socket connector with screw-type connection
	Options:	<ul style="list-style-type: none"> • Terminals or crimp connection • Gold-plated control plug (sockets and plugs)
Threads for cable entries	Standard:	Metric threads
	Options:	Pg-threads, NPT-threads, G-threads
Wiring diagram (basic version)	TPCAA000-1A1-A000 TPA00R1AA-0A1-000	

Further options for version with MWG in actuator

Setting of limit and torque switching via local controls

Torque feedback signal	Via Profibus DP Galvanically isolated analogue output 0/4 – 20 mA (load max. 500 Ω), option, only possible in combination with output contact
------------------------	--

Setting/programming the Profibus DP interface

Baud rate setting	Automatic baud rate recognition
Setting the Profibus DP interface	The Profibus DP address is set via the AC 01.2 display.
Configurable process representation via GSD file	For optimum adaptation to the process control system, the process representation input (feedback) can be freely programmed.

Commands and signals of the Profibus DP interface

Process representation output (command signals)	OPEN, STOP, CLOSE, position setpoint, RESET, EMERGENCY operation command, enable LOCAL, Interlock OPEN/CLOSE
Process representation input (feedback signals)	<p>End positions OPEN, CLOSED</p> <p>Actual position value</p> <p>Actual torque value, requires magnetic limit and torque transmitter (MWG) in actuator</p> <p>Selector switch in position LOCAL/REMOTE</p> <p>Running indication (directional)</p> <p>Torque switches OPEN, CLOSED</p> <p>Limit switches OPEN, CLOSED</p> <p>Manual operation by handwheel or via local controls</p> <p>Analog (2) and digital (4) customer inputs</p>
Process representation input (fault signals)	<p>Motor protection tripped</p> <p>Torque switch tripped in mid-travel</p> <p>One phase missing</p> <p>Failure of analogue customer inputs</p>

Technical Data Actuator controls

Behaviour on loss of communication	The behaviour of the actuator is programmable: <ul style="list-style-type: none"> • Stop in current position • Travel to end position OPEN or CLOSED • Travel to any intermediate position • Execute last received operation command
------------------------------------	--

General data Profibus DP			
Communication protocol	Profibus DP according to IEC 61158 and IEC 61784		
Network topology	Line (bus) structure. With repeaters, tree structures can also be implemented. Coupling and uncoupling of devices during operation without affecting other devices is possible.		
Transmission medium	Twisted, screened copper cable according to IEC 61158		
Profibus DP interface	EIA-485 (RS-485)		
Transmission rate/cable length	Baud rate (kbit/s)	Max. cable length (segment length) without repeater	Possible cable length with repeater (total network cable length):
	9.6 – 93.75	1,200 m	approx. 10 km
	187.5	1,000 m	approx. 10 km
	500	400 m	approx. 4 km
	1,500	200 m	approx. 2 km
Device types	DP master class 1, e.g. central controllers such as PLC, PC, ... DP master class 2, e.g. programming/configuration tools DP slave, e.g. devices with digital and/or analogue inputs/outputs such as actuators, sensors		
Number of devices	32 devices without repeater, with repeater expandable to 126		
Bus access	Token-passing between masters and polling for slaves Mono-master or multi-master systems are possible.		
Supported Profibus DP functions	Cyclic data exchange, sync mode, freeze mode, fail-safe mode		
Profibus DP ident no.	0x0C4F:	Standard applications with Profibus DP-V0 and DP-V1	
	0x0CBD:	Applications with Profibus DP-V2	

Service conditions	
Use	Indoor and outdoor use permissible
Mounting position	Any position
Installation altitude	Standard: ≤ 2,000 m above sea level
	Option: > 2,000 m above sea level, please contact AUMA
Ambient temperature	Standard: -25 °C to +70 °C
	Options: -60 °C to +60 °C, extreme low temperature version incl. heating system
	Low temperature versions incl. heating system for connection to external power supply 230 V AC or 115 V AC.
Humidity	Up to 100 % relative humidity across the entire permissible temperature range
Enclosure protection according to EN 60529	Standard: IP 68 with AUMA 3-phase AC motor/1-phase AC motor For special motors differing enclosure protection: refer to name plate
	Option: Terminal compartment additionally sealed against interior (double sealed)
	According to AUMA definition, enclosure protection IP 68 meets the following requirements: <ul style="list-style-type: none"> • Depth of water: maximum 8 m head of water • Duration of continuous immersion in water: Max. 96 hours • Up to 10 operations during continuous immersion Modulating duty is not possible during continuous immersion.
Pollution degree	Pollution degree 4 (when closed)
Vibration resistance according to IEC 60068-2-6	1 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.

Technical Data Actuator controls

Corrosion protection	Standard:	KS	Suitable for installation in industrial units, in water or power plants with a low pollutant concentration as well as for installation in occasionally or permanently aggressive atmosphere with a moderate pollutant concentration (e.g. wastewater treatments plants, chemical industry)
	Options:	KX	Suitable for installation in extremely aggressive atmospheres with high humidity and high pollutant concentration
Finish coating	Powder paint Two-component iron-mica combination		
Colour	Standard:	AUMA silver-grey (similar to RAL 7037)	
	Option:	Other colours are possible on request.	

Accessories			
Wall bracket	AC 01.2 mounted separately from the actuator, including plug/socket connector. Connecting cable on request. Recommended for high ambient temperatures, difficult access, or in case of heavy vibration during service. Cable length between actuator and AC 01.2 max. 100 m. Not suitable for version with potentiometer in the actuator. Instead of the potentiometer, the actuator has to be provided with RWG. Cable length for Non-intrusive version with MWG in the actuator max. 100 m. Requires separate data cable for MWG.		
Programming software for PC	AUMA ToolSuite		

Further information			
Weight	Approx. 7 kg (with AUMA plug/socket connector)		
EU Directives	Electromagnetic Compatibility (EMC): (2004/108/EC) Low Voltage Directive: (2006/95/EC) Machinery Directive: (2006/42/EC)		
Reference documents	Product description Electric multi-turn actuators with integral controls SA 07.2 – SA 16.2/SA 25.1 – SA 48.1 with AM 01.1/2.1 and AC 01.2 Product description Electric part-turn actuators with integral controls SG 05.1 – SG12.1 with AM 01.1 – AM 02.1 and AC 01.2 Dimensions Multi-turn actuators with integral controls AUMATIC Dimensions Part-turn actuators with integral controls AUMATIC		