General information

AC 01.2 actuator controls for controlling multi-turn actuators of the SA/SAR .1, SA/SAR .2 type range and part-turn actuators of the SQ/SQR .2 type range with Profinet interface.

Features and functions

Power supply

Standard voltages AC:

3-phase AC Voltages/frequencies											
Volt	220	230	380	380	400	400	415	440	460	480	500
Hz	60	50	50	60	50	60	50	60	60	60	50

1-phase AC Voltages/frequencies				
Volt	110 – 120	110 – 120	220 – 240	220 – 240
Hz	50	60	50	60

Special voltages AC:

3-phase AC Voltages/frequencies								
Volt	220	240	525	575	575	600	660	690
Hz	50	50	50	50	60	60	50	50

1-phase AC Voltages/frequencies	
Volt	208
Hz	60

Permissible variation of mains voltage: ±10 %; at 600 V AC: ±5 %
Permissible variation of mains frequency: ±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
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.

Current consumption

Current consumption of the actuator controls depending on mains voltage:
For permissible variation of mains voltage of ±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 V AC = max. 200 mA

Overvoltage category

Category III according to IEC 60364-4-443

Rated power

Actuator controls are designed for nominal motor power, refer to Electrical data pertaining to the actuator

Control and feedback signals

Via Profinet interface

Control voltage/current consumption for control 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 100 – 125 V DC, current consumption : approx. 15 mA per input 100 – 120 V AC, current consumption : approx. 15 mA per input

All input signals must be supplied with the same potential.

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)

Features and functions		
Local controls	Standard:	• Selector switch: LOCAL - OFF - REMOTE (lockable in all three positions) • Push buttons OPEN, STOP, CLOSE, RESET - 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: - End position 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:	• Special colours for the indication lights: - End position CLOSED (green), torque fault CLOSE (blue), torque fault OPEN (yellow), motor protection tripped (violet), end position OPEN (red)
Bluetooth Communication interface	Bluetooth class II chip, version 2.1: With a range up to 10 m in industrial environments, supports the SPP Bluetooth profile (Serial Port Profile). Required accessories: • AUMA CDT (Commissioning and Diagnostic Tool for Windows-based PC) • AUMA Assistant App (Commissioning and Diagnostic Tool for Android devices)	
Profinet acyclic services (option)	Access to parameters, the electronic name plate and the operating and diagnostic data with acyclic write/read services Integration in configuration tools and asset management systems via FDI package.	
Application functions	Standard:	• Selectable type of seating, limit or torque seating for end position OPEN and end position CLOSED • Torque by-pass: Adjustable duration (with adjustable peak torque during start-up time) • Start and end of stepping mode as well as ON and OFF times can be set individually for directions OPEN and CLOSE, 1 to 1,800 seconds • Any 8 intermediate positions: can be set between 0 and 100 %, reaction and signal behaviour programmable • Running indication blinking: can be set • Positioner - Position setpoint via Profinet interface - Programmable behaviour on loss of signal - Automatic adaptation of dead band (adaptive behaviour selectable) - Split range operation - Change-over between OPEN-CLOSE control and setpoint control possible via Profinet interface
	Options:	• PID process controller: with adaptive positioner, via 0/4 – 20 mA analogue inputs for process setpoint and actual process value • Automatic deblocking: Up to 5 operation trials, travel time in opposite direction can be set • Static and dynamic torque recording for both rotation directions with torque measurement flange as additional accessory
Safety functions	Standard:	• EMERGENCY operation (programmable behaviour) - Via additional input (option, low active) or via Profinet 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 thermoswitch within actuator, not with PTC thermistor).
	Options:	• Release of local controls via Profinet interface. Thus, actuator operation can be enabled or disabled via push buttons on local controls. • 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.) • Interlock for main/by-pass valve: Enabling the operation commands OPEN or CLOSE via Profinet interface • PVST (Partial Valve Stroke Test): programmable to check the function of both actuator and actuator controls: Direction, stroke, operation time, reversing time

Features and functions		
Monitoring functions	• 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)	
Diagnostic functions	• Electronic device ID with order and product data • Logging of operating data: A resettable counter and a lifetime counter each for: - 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 characteristics (for version with MWG in actuator): - 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:	Monitoring the motor temperature in combination with thermoswitches within actuator motor
	Option:	PTC tripping device in combination with PTC thermistors within actuator motor
Electrical connection	Standard:	AUMA plug/socket connector with screw-type connection
	Option:	Gold-plated control plug (sockets and plugs)
Threads for cable entries	Standard:	Metric threads
	Options:	• Pg-threads, NPT-threads, G-threads • Terminals or crimp-type connection
Wiring diagram (basic version)	RJ45 connection: TPCAN000K1A2-A000 TPA00R1AA-0A1-000 Ethernet connection terminals: TPCAN000K1A2-A000 TPA00R1AA-0A1-000	

Further options for Non-intrusive version with MWG in the actuator	
Setting of limit and torque switching via local controls	
Torque feedback signal	RJ45 connection: TPCAN000K1A2-A000 TPA00R100-0I1-000 Ethernet connection terminals: TPCAN000N1A2-A000 TPA00R100-0I1-000 Galvanically isolated analogue output 0/4 – 20 mA (load max. 500 Ω). Option, only possible in combination with output contacts.
Wiring diagram (basic version)	TPCAN000K1A2-A000 TPA00R100-0I1-000

Settings/programming the Profinet interface
The Profinet interface is set (assignment of device name as well as assignment of the IP address) using the Profinet engineering tools of the DCS.

General data of the Profinet interface	
Communication protocol	Profinet according to IEC 61158 and IEC 61784
Network topology	Star topology, point-to-point wiring Due to the switch function integrated within the AC 01.2, both line topology and redundant ring topology (MRP) are available.
Connection	Ethernet IEEE 802.3 2-pair cabling in compliance with IEC 61784-5-3 Auto Polarity Exchange, Auto Negotiation and Auto Crossover are supported.
Profinet connection	2 x Ethernet connection terminals with insulation displacement connection, integral screen with strain relief, suitable for all Ethernet cable types or 2 x RJ-45 Connection via connector for field assembly, one RJ-45 connector for Cat.5 (K009.706) is included in the scope of supply of the electrical connection.
Transmission rate	100 Mbits/s (100BASE-TX), full duplex
Cable length	Max. 100 m

General data of the Profinet interface		
Device classes	I/O controller (usually the PLC/DCS) I/O devices (field devices) I/O supervisor (programming device, PC or HMI for diagnostics/commissioning)	
Fieldbus access	Provider - consumer model	
Supported Profinet specification	Version V2.32	
Supported Profinet functions	Cyclic Profinet communication (RT) Acyclic Profinet communication (Read/Write Record)	
Supported Profinet alarms	Status Alarm Update Alarm Port Data Change Notification Alarm Sync Data Change Notification Alarm	
Supported network diagnostic and management protocols	ACD (Address Conflict Detection) ARP (Address Resolution Protocol) DCP (Discovery and Basic Configuration Protocol) SNMP (Simple Network Management Protocol) LLDP (Link Layer Discovery Protocol) in accordance with IEEE 802.1AB These functions allow assignment of the Profinet device name, a graphic representation of the plant topology, port-granular diagnostics as well as neighbourhood detection as the basis for quick commissioning and easy device replacement.	
Profinet redundancy	Standard:	Media Redundancy Protocol in compliance with IEC 62439 (switch function integrated within AC 01.2)
	Option:	System redundancy S2 Single NAP
Vendor ID	319	
Ident Code	1	
Profinet device type	AUMA-Actuator-AC01-2	
Identification & Maintenance properties	I&M0 Profile ID:	62976
	I&M0 Profile Specification Type:	4
	I&M0 Version:	257
	I&M0 Supported:	30
Profinet Ident Nr.	0x013F; 0x0001	
DAP (Device Access Point)	0x80010000	
Conformance class	CC-B (Conformance Class B) for the Profinet application of the AC actuator controls CC-C (Conformance Class C) for the integral switch function	
Netload Class	III	
Device diagnostics via Ethernet	Via TCP/IP and integral web server possible Via FDI package & software for diagnostics/commissioning (e. g. Siemens PDM, Emerson AMS)	
Device integration	Via GSD (ml) file (available for download at www.auma.com)	

Commands and signals of the Profinet interface	
Process representation output (command signals)	OPEN, STOP, CLOSE, position setpoint, RESET, EMERGENCY operation command, enable local controls, Interlock OPEN/CLOSE, PVST
Process representation input (feedback signals)	End positions OPEN, CLOSED Actual position value Actual torque value, requires MWG in actuator Selector switch in position LOCAL/REMOTE Running indication (directional) Torque switches OPEN, CLOSED Limit switches OPEN, CLOSED Manual operation by handwheel or via local controls Analogue (2) and digital (4) customer inputs
Process representation input (fault signals)	Motor protection tripped Torque switch tripped in mid-travel One phase missing Failure of analogue customer inputs
Behaviour on loss of communication	The behaviour of the actuator is programmable: • Stop in current position • Travel to end position OPEN or CLOSED • Travel to any intermediate position • Execute last received operation command

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 +70 °C
Humidity	Up to 100 % relative humidity across the entire permissible temperature range	
Enclosure protection according to EN 60529	Standard:	IP68
	Option:	Terminal compartment additionally sealed against interior of actuator controls (double sealed)
	According to AUMA definition, enclosure protection IP68 meets the following requirements: • Depth of water: Maximum 8 m head of water • Duration of continuous immersion in water: Maximum 96 hours • Up to 10 operations during continuous immersion • Modulating duty is not possible during continuous 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	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)	
Corrosion protection	Standard:	KS: Suitable for use in areas with high salinity, almost permanent condensation, and high pollution.
	Option:	KX: 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

Accessories	
Wall bracket	For actuator controls 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 actuator controls is max. 100 m (not suitable for version with potentiometer in the actuator). Instead of the potentiometer, an MWG has to be used. (MWG requires separate data cable.)
Programming software	AUMA CDT (Commissioning and Diagnostic Tool for Windows-based PC) AUMA Assistant App (Commissioning and Diagnostic Tool for Android devices)
Torque measurement flange DMF	Accessory for torque measurement for SA/SAR 07.2 – SA/SAR 16.2

Further information	
Weight	Approx. 7 kg (with AUMA plug/socket connector)
EU Directives	Electromagnetic Compatibility (EMC): (2014/30/EU) Low Voltage Directive: (2014/35/EU) Machinery Directive: (2006/42/EC)
Reference documents	Brochure Electric actuators for industrial valve automation Dimensions Multi-turn actuators with AUMATIC integral controls Dimensions Part-turn actuators with AUMATIC integral controls