

Technical data Actuator controls in SIL version

General information

ACExC 01.2 actuator controls in SIL version for controlling multi-turn actuators of the SAEx/SAREx .2 type range and part-turn actuators of the SQEx/SQREx .2 type range.

Information on SIL features of ACExC 01.2 – SIL actuator controls

Features and functions

SIL control	Via digital inputs Safe ESD a,b and/or Safe STOP OPEN/CLOSE	
Control voltage/current consumption for inputs of the SIL functions	24 V DC, current consumption: approx. 10 mA per input	
SIL status signal	1 potential-free change-over contact (max. 24 V DC/1 A) for SIL collective failure signal	
SIL functions - safety functions	Standard:	• Safe ESD - Digital inputs (redundant inputs) low active - Reaction can be selected: Run to end position CLOSED (Safe ESD CLOSE, CLOSE), run to end position OPEN (Safe ESD OPEN, OPEN) - Torque monitoring and forced limit seating (OPEN and CLOSE) for Safe ESD can be by-passed - Thermal protection for Safe ESD can be by-passed • Seating types can be set - Forced limit seating in end position (Actuator only stops once end positions OPEN or CLOSED are reached irrespective of the torque applied.) - Limit seating with overload protection (Once the set tripping point in end positions OPEN or CLOSED has been reached, the actuator will be switched off. If excessive torque is applied during travel, the actuator is already switched off prior to reaching the end position.) - Forced torque seating (Actuator only stops when reaching the set end position torque.)
	Options:	• Safe STOP - 2 digital inputs (OPEN and CLOSE) low active - Reaction can be selected: STOP in direction OPEN (Safe STOP OPEN) and/or STOP in direction CLOSE (Safe STOP CLOSE) • Combination of Safe ESD and Safe STOP (in this case, Safe ESD has priority)
Local controls	Safety functions are executed irrespective of selector switch position LOCAL - OFF - REMOTE.	
SIL monitoring functions	Standard:	• Actuator operation monitoring, generates SIL fault signal • Monitoring of redundant wiring Safe ESD: In case of incorrect wiring, a SIL fault signal is generated • Internal monitoring of the SIL components of the controls. In case of a fault, a SIL fault signal is generated.
	Option:	• Safe end position feedback
Configuration	Due to the requirements on functional safety, other restrictions with regard to configuration options of the actuator and the actuator controls not listed here do apply.	
Actuator version in combination with ACExC .2-SIL	• The actuator must be equipped with a blinker transmitter • The actuator is supplied with the motor locked in disengaged position. Motor operation will only be possible once the lock is disabled	

Further options for version with MWG in actuator

SIL limit switches	Forced seating type in end position
Actuator version in combination with ACExC .2-SIL	Only actuators in clockwise closing version may be used.

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Information on general features of ACExC 01.2-SIL actuator controls

Features and functions												
Explosion protection	Standard:	II2G Ex de IIC T4 or T3 II2D Ex tb IIIC T130 °C or T190 °C Db IP6x										
	Option:	II2G Ex d IIC T4 or T3										
EC type test certificate	In combination with SAEx:	DEKRA 11ATEX0008 X										
	In combination with SQEx:	DEKRA 13ATEX00016 X										
Power supply	Standard voltages AC:											
	3-phase AC current 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
	Special voltages AC:											
	3-phase AC current Voltages/frequencies											
	Volt	220	440	525	575	600	660	690				
	Hz	50	50	50	60	60	50	50				
	Permissible variation of mains voltage: ±10 %											
	Permissible variation of mains frequency: ±5 %											
660 V and 690 V not permissible in combination with thyristors												
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. The "external supply of electronics" option refers to the components of the standard actuator controls. However, the SIL components of the actuators controls are not supplied.											
Current consumption	Current consumption of controls depending on mains voltage: For permissible variation of mains voltage of ±10 %: 208 to 240 V AC = max. 400 mA 380 to 500 V AC = max. 250 mA 515 to 690 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											
Switchgear	Open-close duty:	Reversing contactors (mechanically and electrically interlocked) for AUMA power classes A1/A2										
	Modulating duty:	Thyristor unit for mains voltage up to 600 V AC (required to meet the safety figures for modulating actuators) for AUMA power classes B1 and B2										
	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 the assignment of AUMA power classes, please refer to electrical data on actuator.											
Control	6 digital inputs: OPEN, STOP, CLOSE, EMERGENCY (via opto-isolator, thereof OPEN, STOP, CLOSE with one common and EMERGENCY without common, respect minimum pulse duration for modulating actuators).											
Control voltage/current consumption for control inputs (standard controls)	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										
		100 – 120 V AC, current consumption : approx. 15 mA per input										
	All input signals must be supplied with the same potential.											

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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) Default configuration: End position CLOSED, end position OPEN, selector switch REMOTE, SIL function active, SIL fault 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) - Analogue output signal for position feedback - Galvanically isolated position feedback 0/4 – 20 mA (load max. 500 Ω)
	Options:	6 programmable output contacts: 5 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 (resistive load) 6 programmable output contacts: 6 potential-free change-over contacts without one common, per contact max. 250 V AC, 5 A (resistive load) All output signals must be supplied with the same potential.
Analogue output	Option:	2 analogue outputs: With position transmitter option: Output of travel and torque as continuous values between 0/4 and 20 mA
Analogue input	Option:	2 analogue inputs: With positioner/process controller option: Input of actual position value/actual process value as continuous values between 0/4 and 20 mA
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)	
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
	Options:	- Positioner: - Position setpoint via analogue inputs 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 - PID process controller: with adaptive positioner, via 0/4 – 20 mA analogue inputs for process setpoint and actual process value

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Monitoring function	• 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	
Diagnostic function	• Electronic device ID with order and product data • Logging of operating data: A resettable counter and a lifetime counter each • 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"	
Motor protection evaluation	Standard:	PTC tripping device in combination with PTC thermistors within actuator motor
	Option:	Thermal overload relay in controls combined with thermoswitches within actuator
Electrical connection	Standard:	AUMA Ex plug/socket connector with screw-type terminals (KP)
	Options:	• AUMA Ex plug/socket connector with terminal blocks (KES), increased safety Ex e • AUMA Ex plug/socket connector with terminal blocks (KES), flameproof enclosure Ex d
Threads for cable entries	Standard:	Metric threads
	Options:	Pg-threads, NPT-threads, G-threads
Wiring diagram (basic version)	TPCC-0A1-1A1-AA20 TPA00R2AA-1A1-AB0	

Further options for version with MWG in actuator

Setting of limit and torque switching via local controls

Torque feedback signal	Galvanically isolated analogue output 0/4 – 20 mA (load max. 500 Ω)
Diagnostic function	- Torque characteristics 3 torque characteristics (torque-travel characteristic) for opening and closing directions can be saved separately. Torque characteristics stored can be shown on the display.
Wiring diagram (basic version)	TPCC-0A1-1A1-AA20 TPA00R20A-111-AB0

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:	–25 °C to +40 °C/+60 °C
	Options:	–60 °C to +40 °C/+60 °C, extreme low temperature version
		Low temperature versions with heating system only.
Humidity	Up to 100 % relative humidity across the entire permissible temperature range	
Enclosure protection according to EN 60529	IP68	
	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: Max. 96 hours	
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.
	Options:	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

We reserve the right to alter data according to improvements made. Previous documents become invalid with the issue of this document.

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Accessories	
Wall bracket	Actuator controls separately mounted 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, the actuator has to be equipped with an electronic position transmitter. (MWG requires a 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)
Further information	
Weight	Approx. 12 kg (including Ex-plug/socket connector with screw-type terminals)
Directives	Functional safety of electrical/electronic/programmable electronic safety-related systems: (IEC 61508) ATEX Directive: (2014/34/EU) Electromagnetic Compatibility (EMC): (2014/30/EU) Low Voltage Directive: (2014/35/EU) Machinery Directive: (2006/42/EC)
Reference documents	Brochure Electric actuators for the automation of valves in the oil and gas industry Dimensions Multi-turn actuators with AUMATIC integral controls Dimensions Part-turn actuators with AUMATIC integral controls Manual Functional Safety Actuators SA 07.2 – SA 16.2/SAR 07.2 – SAR 16.2/SAEx 07.2 – SAEx 16.2/SAREx 07.2 – SAREx 16.2, SQ 05.2 – SQ 14.2/ SQR 05.2 – SQR 14.2/ SQEx 05.2 – SQEx 14.2/ SQREx 05.2 – SQREx 14.2 with actuator controls AC 01.2/ACExC 01.2 in SIL version