

General information

ACV 01.2 actuator controls for controlling variable speed multi-turn actuators of the SAV/SARV .2 type range with HART interface.

Features and functions

Power supply	Standard voltages AC:									
	3-phase AC					1-phase AC				
	Voltages/frequencies					Voltages/frequencies				
	Volt	220 – 240		380 – 480		Volt	110 – 120		220 – 240	
	Hz	50	60	50	60	Hz	50	60	50	60
	Permissible variation of mains frequency: ±5 % Permissible variation of mains voltage: ±10 % –30 % for maximum 10 seconds within a range of 380 V – 480 V with the following restrictions: <ul style="list-style-type: none">• If required, the motor speed will be reduced down to nominal speed depending on the load of the actuators used• A low mains voltage increases the mains current consumption; a higher mains voltage reduces the mains current consumption• The torque limits of the actuators used might be decreased for a short time, if applicable									
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.									
Rated power	Actuator controls are designed for nominal motor power, refer to Electrical data pertaining to the actuator									
Control and feedback signals	Via HART interface Device category: Actuator Analogue 4 – 20 mA setpoint with digital HART communication									
Additional input signals for HART interface (option)	<ul style="list-style-type: none">• 2 free analogue inputs (0/4 – 20 mA), 4 free digital inputs<ul style="list-style-type: none">- Signal transmission is made via HART interface• Inputs OPEN, STOP, CLOSE, EMERGENCY, I/O interface, (via opto-isolator thereof OPEN, STOP, CLOSE with one common and EMERGENCY, I/O interface respectively without common)<ul style="list-style-type: none">- Control inputs: OPEN, STOP, CLOSE, EMERGENCY- I/O interface: Selection of control type (HART or additional input signals)									
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.									
Status signals	Via HART interface									

Technical data Actuator controls

Features and functions		
Additional output signals for HART interface (option, only available in combination with additional input signals)	<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 (resistive load) 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) 6 programmable output contacts: <ul style="list-style-type: none"> 4 mains failure proof potential-free NO contacts with one common, max. 250 V AC, 1 A (resistive load), 1 potential-free NO contact, 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: <ul style="list-style-type: none"> 4 mains failure proof potential-free NO contacts, max. 250 V AC, 5 A (resistive load), 2 potential-free change-over contacts, max. 250 V AC, 5 A (resistive load), <p>All binary output signals must be supplied with the same potential.</p> <ul style="list-style-type: none"> Analogue output signal for position feedback <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)
Analogue output	Standard:	2 analogue outputs: With position transmitter option: Output of travel, torque or output speed 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 of 0/4 – 20 mA
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. 6 indication lights: <ul style="list-style-type: none"> 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:	<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 (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 SSP Bluetooth profile (Serial Port Profile). Required accessories: <ul style="list-style-type: none"> AUMA CDT (Commissioning and Diagnostic Tool for Windows-based PC) AUMA Assistant App (Commissioning and Diagnostic Tool) 	

Features and functions		
Application functions	Standard:	<ul style="list-style-type: none"> • 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 • Operation profile with any 8 intermediate positions: Position can be set between 0 and 100 %, reaction and signal behaviour programmable • Velocity profile with up to 10 ranges, velocity can be individually adjusted for positions OPEN and CLOSED for each range • Running indication blinking: can be set • Speed/operating time source can be selected (REMOTE, LOCAL) • 4 internal nominal speeds or operating times can be programmed (and selected in LOCAL) • Nominal speed source can be selected for REMOTE (binary, analogue, fieldbus) • Soft start, soft stop with velocity reduction (adjustable) • Positioner: <ul style="list-style-type: none"> - Position setpoint via fieldbus interface - Programmable behaviour on loss of signal - Automatic adaptation of dead band (adaptive behaviour selectable) - Change-over between OPEN-CLOSE control and setpoint control via fieldbus - Modulating duty with proportional operation (2 % – 20 %) - Positioning accuracy <0.2 % (SAV/SARV .2 only)
	Options:	<ul style="list-style-type: none"> • PID process controller: with adaptive positioner, via 0/4 – 20 mA analogue inputs for process setpoint and actual process value • Multiport valve: Up to 16 positions, signals (pulse or edge) (SAV/SARV .2 only) • Lift Plug Valve: In combination with multiport valve (SAV/SARV .2 only) • 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:	<ul style="list-style-type: none"> • EMERGENCY operation (programmable behaviour) <ul style="list-style-type: none"> - Via additional input (option, low active) or via fieldbus interface - Reaction can be selected: STOP, run to end position (OPEN, CLOSED) or intermediate position at defined speed - 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:	<ul style="list-style-type: none"> • Enabling local controls via Enable LOCAL digital input: Thus, actuator operation can be are or disabled via push buttons on local controls. • Interlock for main/by-pass valve: Enabling the operation commands OPEN or CLOSE via two digital inputs • EMERGENCY Stop push button (latching): Interrupts electrical operation, irrespective of the selector switch position • PVST (Partial Valve Stroke Test): programmable to check the function of both actuator and actuator controls: Direction, stroke, operation time, reversing time
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 signal • Monitoring the heater within actuator: Generates warning signal • Monitoring of permissible on-time and number of starts: Adjustable, generates warning signal • Operating time monitoring: Adjustable, generates warning signal • Phase failure monitoring: Results in switching off and generates fault signal

Features and functions		
Diagnostic functions	<ul style="list-style-type: none"> Electronic device ID with order and product data Operating data logging: 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 (for version with MWG in actuator): <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:	Monitoring the motor temperature in combination with thermoswitches within actuator motor
	Option:	PTC tripping device (TMS module) in combination with PTC thermistors within actuator motor
ACV 01.2 heating system (option)	<p>Temperature version below –30 °C including heating system:</p> <ul style="list-style-type: none"> in version with internal power supply at 400 V AC, or in version with external power supply for 230 V AC or 115 V AC <p>For external power supply of the heating system, the minimum operational temperature may not fall below –40 °C in case of danger of disconnection of the mains voltage.</p>	
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 contacts (pins and sockets)
Threads for cable entries	Standard:	Metric threads
	Options:	Pg-threads, NPT-threads, G-threads

For version with MWG within actuator

Setting of limit and torque switching via local controls

Torque feedback signal	<p>Via HART interface</p> <p>Galvanically isolated analogue output 0/4 – 20 mA (load max. 500 Ω).</p>
Wiring diagram (basic version)	<p>Device category: "Actuator" TPCHI042-1AF-A000 TPA00R100-0I1-000, 3-phase AC current, 380 V – 480 V</p> <p>Device category: "Current Output": TPCHJ04E-1AF-A000 TPA00R100-0I1-000, 3-phase AC current, 380 V – 480 V</p> <p>Device category: "Actuator" TPCHI042-1AE-A000 TPA00R100-0I1-000, 1-phase AC current, 220 V – 240 V</p> <p>Device category: "Current Output": TPCHJ04E-1AE-A000 TPA00R100-0I1-000, 1-phase AC current, 220 V – 240 V</p>

Setting/programming the HART interface

Setting the HART address	The HART address is set via HART command 6 or alternatively via the actuator controls (default value: 0)
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General HART interface data	
Communication protocol	HART according to IEC 61158 and IEC 61784 (CPF 9)
Network topology	Point-to-point wiring
Communication signal	<p>HART, baud rate 1.2 kbit/s</p> <p>Device class: "Actuator"</p> <ul style="list-style-type: none"> • FSK (Frequency Shift Key) modulated to 4 – 20 mA setpoint signal • Input impedance: 250 Ω. The impedances of other HART devices connected (parallel or in series) must be within the HART specification • Point-to-point wiring • Signal range: 4 – 20 mA • Working range: 2 – 22 mA • Minimum operation voltage: 7 V (at 22 mA) • Integrated reverse polarity protection <p>Device category: "Current Output":</p> <ul style="list-style-type: none"> • FSK (Frequency Shift Key) modulated to 4 – 20 mA position feedback signal • Input impedance: 40 kΩ. The impedances of other HART devices connected (parallel or in series) must be within the HART specification • Point-to-point or multidrop wiring • Current output active, short-circuit proof. No further external power supply permitted
HART cable specification	Refer to HART specification
Power supply	Internal power supply of HART interface via actuator controls (apart from HART supply voltage, no other supply required)
Device identification	<p>Manufacturer name: AUMA</p> <p>Manufacturer ID: 0x607C</p> <p>HART protocol revision: 7.4</p> <p>Number of device variables: 12</p> <p>Model name: AUMATIC AC 01.2/ACExC 01.2</p> <p>Device type code: 0xE1FD</p>
Supported HART commands	<ul style="list-style-type: none"> • Universal Commands • Common Practice Commands: <ul style="list-style-type: none"> - Command 33 (Read Device Variables) - Command 40 (Enter/Exit Fixed Current Mode) - Command 42 (Perform Device Reset) - Command 45 (Trim Loop Current Zero) - Command 46 (Trim Loop Current Gain) - Command 50 (Read Dynamic Variable Assignments) - Command 79 (Write Device Variable) - Command 95 (Read Device Communication Statistics) • Device Specific Commands: <ul style="list-style-type: none"> - Command 128 (Write Operation Command) - Command 131 (Read Software Version) - Command 132 (Reset to Factory Default) - Command 133 (Reset Operational Data) - Command 134 (Reset HART Configuration) - Command 160 (Read Parameter) - Command 161 (Write Parameter) - Command 162 (Read Process Data)

Commands and signals of the HART interface

Output data	<p>Device class: "Actuator"</p> <p>Supported control types:</p> <ul style="list-style-type: none"> • Loop Current Mode activated: Analogue 4 – 20 mA control signal for position setpoint • Loop Current Mode deactivated: Digital HART commands for position setpoint (0 – 100.0 %) or for discrete operation in directions OPEN and CLOSE <p>Device category: "Current Output":</p> <ul style="list-style-type: none"> • Loop Current Mode activated: Analogue 4 – 20 mA output signal for position feedback signal (point-to-point wiring) Digital HART commands for position setpoint (0 – 100.0 %) or for discrete operation in directions OPEN and CLOSE • Loop Current Mode deactivated: Analogue output signal for position feedback fixed to 4 mA (multidrop wiring) Digital HART commands for position setpoint (0 – 100.0 %) or for discrete operation in directions OPEN and CLOSE
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>Analogue (2) and digital (4) customer inputs</p> <p>Device Status Informationen</p> <ul style="list-style-type: none"> • Field Device Status • Device Specific Status • Extended Device Status Information • Standardized Status • Analog Channel Saturated • Analog Channel Fixed
Fehlermeldungen	<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>

Service conditions

Use	Indoor and outdoor use permissible
Mounting position	Any position
Installation altitude	<p>≤ 2 000 m above sea level</p> <p>> 2,000 m above sea level on request</p>
Ambient temperature	<p>Standard: –30 °C to +70 °C</p> <p>Options: –40 °C to +70 °C –60 °C to +60 °C, extreme low temperature version</p> <p>Low temperature versions including heating system. For further options, refer to line "ACV 01.2 heating system (option)".</p>
Humidity	Up to 100 % relative humidity across the entire permissible temperature range
Enclosure protection in accordance with IEC 60529	<p>Standard: IP68</p> <p>Option: DS terminal compartment additionally sealed against interior of actuator controls (double sealed)</p> <p>According to AUMA definition, enclosure protection IP68 meets the following requirements:</p> <ul style="list-style-type: none"> • Depth of water: maximum 8 m head of water • Continuous immersion in water: maximal 96 hours • Up to 10 operations during immersion • Modulating duty is not possible during immersion.

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Service conditions	
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. 16 m.
Programming software	AUMA CDT (Commissioning and Diagnostic Tool for Windows-based PC) AUMA Assistant App (Commissioning and Diagnostic Tool)
Torque measurement flange DMF (SAV/SARV .2 only)	Accessory for torque measurement
Further information	
Weight	Approx. 7 kg (with AUMA plug/socket connector)
EU Directives	Machinery Directive 2006/42/EC Low Voltage Directive 2014/35/EU EMC Directive 2014/30/EU RoHS Directive 2011/65/EU RED Directive 2014/53/EU
Reference documents	Dimensions SAV 07.2 – SAV 16.2/SARV 07.2 – SARV 16.2 with ACV 01.2 Dimensions SQV 05.2 – SQV 14.2/SQVR 05.2 – SQVR 14.2 with ACV 01.2 Electrical data SAV 07.2 – SAV 16.2/SARV 07.2 – SARV 16.2 Electrical data SQV 05.2 – SQV 14.2/SQVR 05.2 – SQVR 14.2