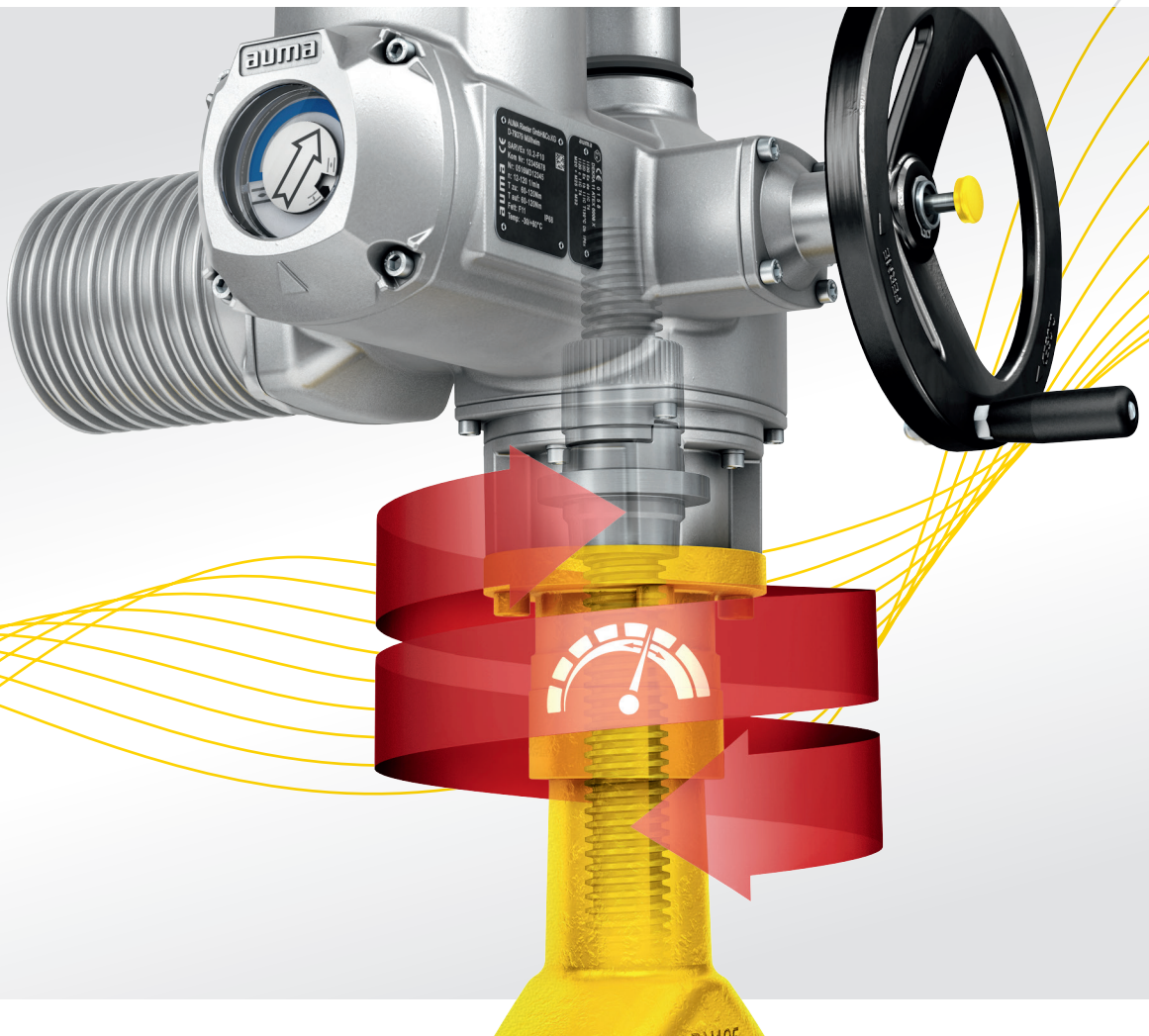


VARIABLE SPEED MULTI-TURN ACTUATORS

for sophisticated modulating and open-close operation of valves in the oil & gas industry



VARIABLE SPEED ELECTRIC MULTI-TURN ACTUATORS FOR OPEN-CLOSE AND MODULATING DUTY

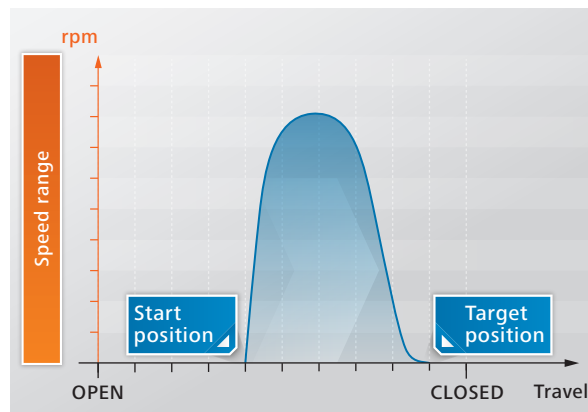
Multi-turn actuators SAVEx 07.2 – SAVEx 16.2 for open-close duty and SARVEx 07.2 – SARVEx 16.2 for modulating duty are paired with intelligent ACVExC 01.2 actuator controls. The proven AUMA SAEEx/SAREx range is enhanced by variable speed models. With a wide speed control ratio of 1:10, AUMA is spearheading market technology in providing variable speed actuators for use in potentially explosive atmospheres.

Variable speed offers significant advantages. For any change of valve position, the optimum operating speed can be adjusted. No need to compromise between application tasks which might require both: slow operating speeds and sometimes full speed.

To optimise this capability, new functions have been integrated into AUMA ACVExC actuator controls.

Higher positioning accuracy

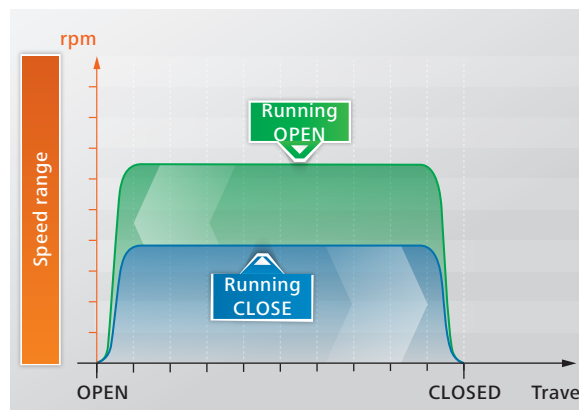
The actuator continuously decreases the operating speed when approaching the target valve position down to standstill. This allows for more accurate approach to the setpoint compared to the sudden tripping of a fixed speed actuator. This ability is particularly crucial for the SARVEx modulating duty model.



Fast approaching of setpoint at high speed while reducing the speed prior to reaching the target position. This behaviour combines speed with precision in closed-loop control.

Soft start and soft stop

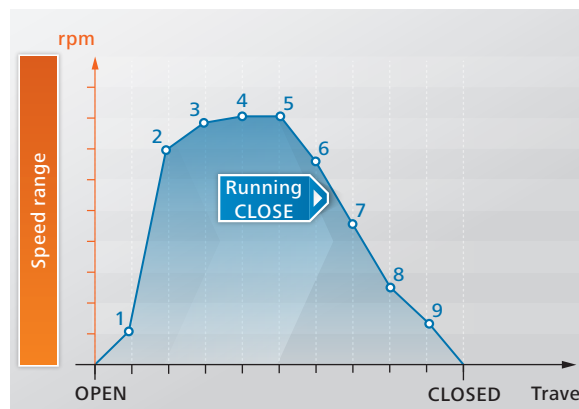
Operations out of an end position start at minimum operating speed which is continuously increased until the predefined maximum value is reached. Soft stop is the exact opposite: Prior to reaching the end position, the speed is decreased. The advantage is gentle operation for all valve and actuator components subject to wear.



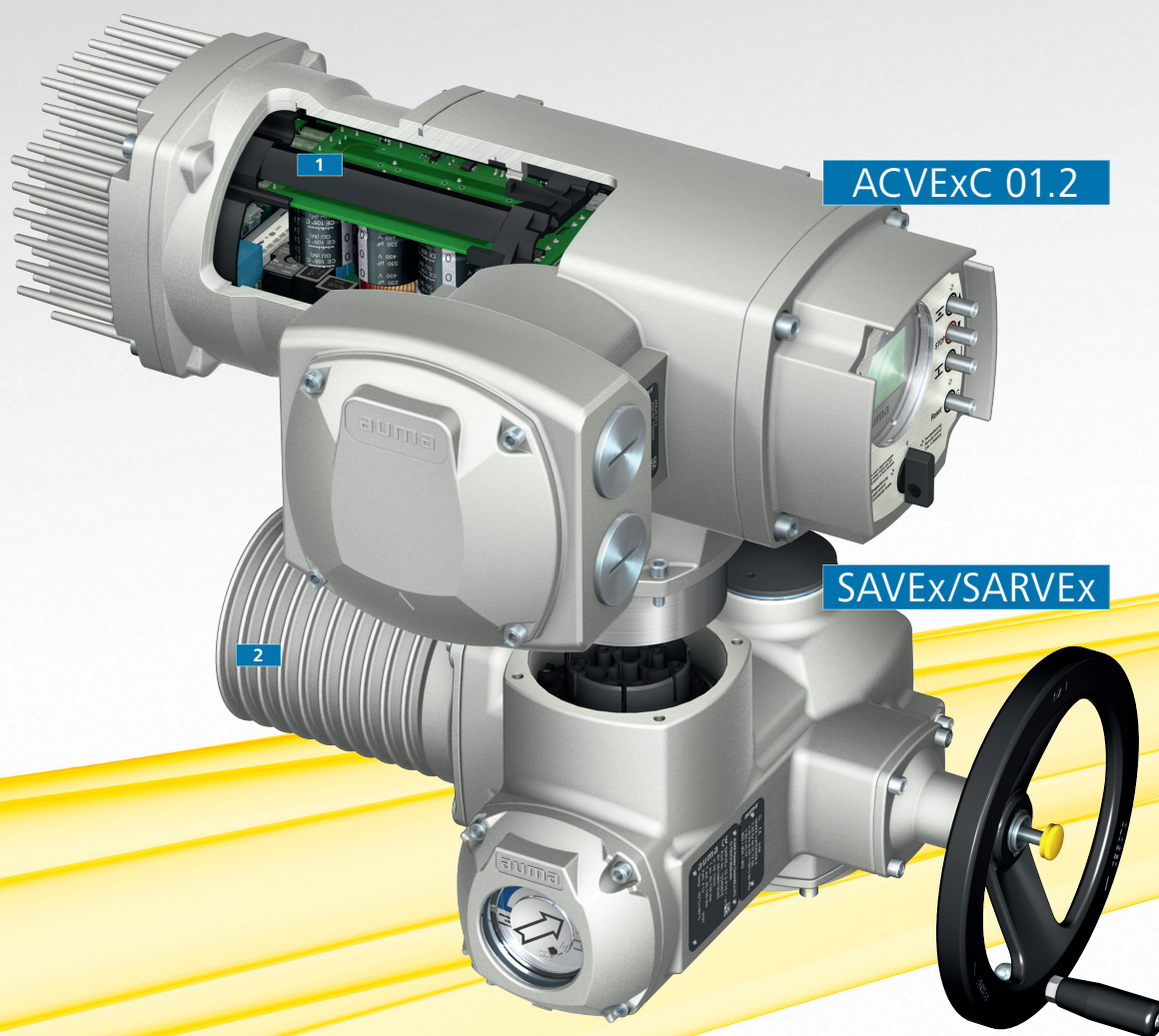
Soft start out of and gentle approaching of the end position. Different operating speeds for both directions can be defined due to variable speed functionality.

Avoiding pressure surges by speed profile

Closing at excessive speed results in pressure surges and might cause overloads in both valves and pipeline systems depending on flow conditions. If worst comes to worst, the pipe might burst. ACVExC speed profiles are the ideal solution for controlling closing procedures and maintaining loads within the permissible range. Speed values may be specified for up to ten sections of travel irrespective of the direction of operation. Thus, the operating speed profile can be tailored to the specific valve requirements.



Fast operating speed in mid-position while slowly approaching end position CLOSED. Requirements for both short closing times and avoiding of pressure surges can be combined.



AUMA variable speed multi-turn actuators are the combination of SAVEx/SARVEx actuators and ACVExC 01.2 actuator controls. Variable speed is achieved by the integral frequency converter within the actuator controls. ACVExC 01.2 are based on the intelligent ACExC 01.2 actuator controls. Operation and integration of ACVExC into the DCS is comparable to ACExC.

By their design, SAVEx and SARVEx differ on a few points from SAEEx and SAREx actuators. The renamed type designation identifies the use of actuators paired with ACVExC 01.2 actuator controls.

1 Frequency converter

Frequency converters are the perfect choice for providing 3-phase AC motors with variable speed. The converter specifically developed by AUMA excels by maintaining constant torque availability across a broad speed range.

The converter ensures that the actuator can be supplied with 1-phase AC voltage in spite of using a 3-phase AC motor. Voltage and frequency fluctuations are compensated by the converter. At the same time, the converter eliminates high start-up currents which are usually generated at actuator start.

2 3-phase AC motor

Irrespective of the type of power supply with 3-phase or 1-phase AC current, actuators are always equipped with a specially designed 3-phase AC motor. The frequency converter converts the supply voltage applied into an appropriate voltage for the 3-phase AC motor.



TECHNICAL DATA

The following technical data is for reference only. For detailed data, please refer to the separate technical data sheets.

Explosion protection classification

The actuators have been qualified in accordance with ATEX and IECEx.

	Certificate	Ambient temperature range		Marking
		min.	max.	
Europa ATEX	DEKRA 11 ATEX 008 X	–60 °C	+60 °C	II2G Ex de IIC T4/T3 or II2G Ex d IIC T4/T3
		–30 °C	+70 °C	II2G Ex de IIB T3 or II2G Ex d IIB T3
IECEx	IECEx DEK 12.0022x	–60 °C	+60 °C	Ex de IIC T4/T3 Gb or Ex d IIC T4/T3 Gb
		–30 °C	+70 °C	Ex de IIB T3 Gb or Ex d IIB T3 Gb

Certifications for Russia – EAC (TR-CU), USA – FM and Canada – CSA are in progress.

Supply voltages

- > 3-phase AC current 50/60 Hz
maximum mains voltage 480 V
- > 1-phase AC current 50/60 Hz
maximum mains voltage 240 V

Positioning accuracy

The actuators achieve a positioning accuracy of < 0.2 %.

Types of duty

The actuators are generally sized for duty types according to EN 15714-2:

- > SAVEx: Class A or open-close duty (S2 - 15min/30 min)
- > SAVEx: Class B or inching/positioning duty (S2 - 15 min/30 min)
- > SARVEx: Class C or modulating duty (S4 - 25 %/50 %)

The following table applies to actuators with 380 V – 480 V 3-phase AC supply in type of duty S2 - 15 min or S4 - 25 %.

Type	Speed ranges			Setting range for tripping torque			Maximum torque for modulating duty			Starting frequency for modulating duty max. number of starts		
	[rpm]			[Nm]			[Nm]			[1/h]		
SAVEx 07.2	6 – 60	12 – 108	24 – 216	10 – 30	10 – 30	10 – 25	–	–	–	–	–	–
SARVEx 07.2	6 – 60	12 – 108	24 – 216	15 – 30	15 – 30	15 – 25	15	15	15	1,200	900	900
SAVEx 07.6	6 – 60	12 – 108	24 – 216	20 – 60	20 – 60	20 – 50	–	–	–	–	–	–
SARVEx 07.6	6 – 60	12 – 108	24 – 216	30 – 60	30 – 60	30 – 50	30	20	20	1,200	1,200	900
SAVEx 10.2	6 – 60	12 – 108	24 – 216	40 – 120	40 – 120	40 – 100	–	–	–	–	–	–
SARVEx 10.2	6 – 60	12 – 108	24 – 216	60 – 120	60 – 120	60 – 100	60	50	40	1,000	800	800
SAVEx 14.2	6 – 60	12 – 108	24 – 216	100 – 250	100 – 250	100 – 200	–	–	–	–	–	–
SARVEx 14.2	6 – 60	12 – 108	24 – 216	120 – 250	120 – 250	120 – 200	120	100	80	600	600	200
SAVEx 14.6	6 – 60	12 – 108	24 – 216	200 – 500	200 – 500	200 – 400	–	–	–	–	–	–
SARVEx 14.6	6 – 60	12 – 108	24 – 216	250 – 500	250 – 500	250 – 400	150	120	100	600	600	200
SAVEx 16.2	6 – 60	–	–	400 – 1,000	–	–	–	–	–	–	–	–
SARVEx 16.2	6 – 60	–	–	500 – 1,000	–	–	250	–	–	200	–	–

Depending on the torque range, restrictions for the maximum ambient temperature will apply



Precise operation of multiport valves

Multiport valves combine output flow rates from different sources in oil & gas production as illustrated below. Any output flow can be diverted to a bypass for sampling when using these valves. Up to 16 defined positions can be directly approached via the AUMA actuator multiport valve function. Due to the increased positioning accuracy of the SARVEx actuators, these positions will be set with utmost precision.

The function has proved useful in other manifold valves, like for example, in 4-way valves used to fill coke drums.

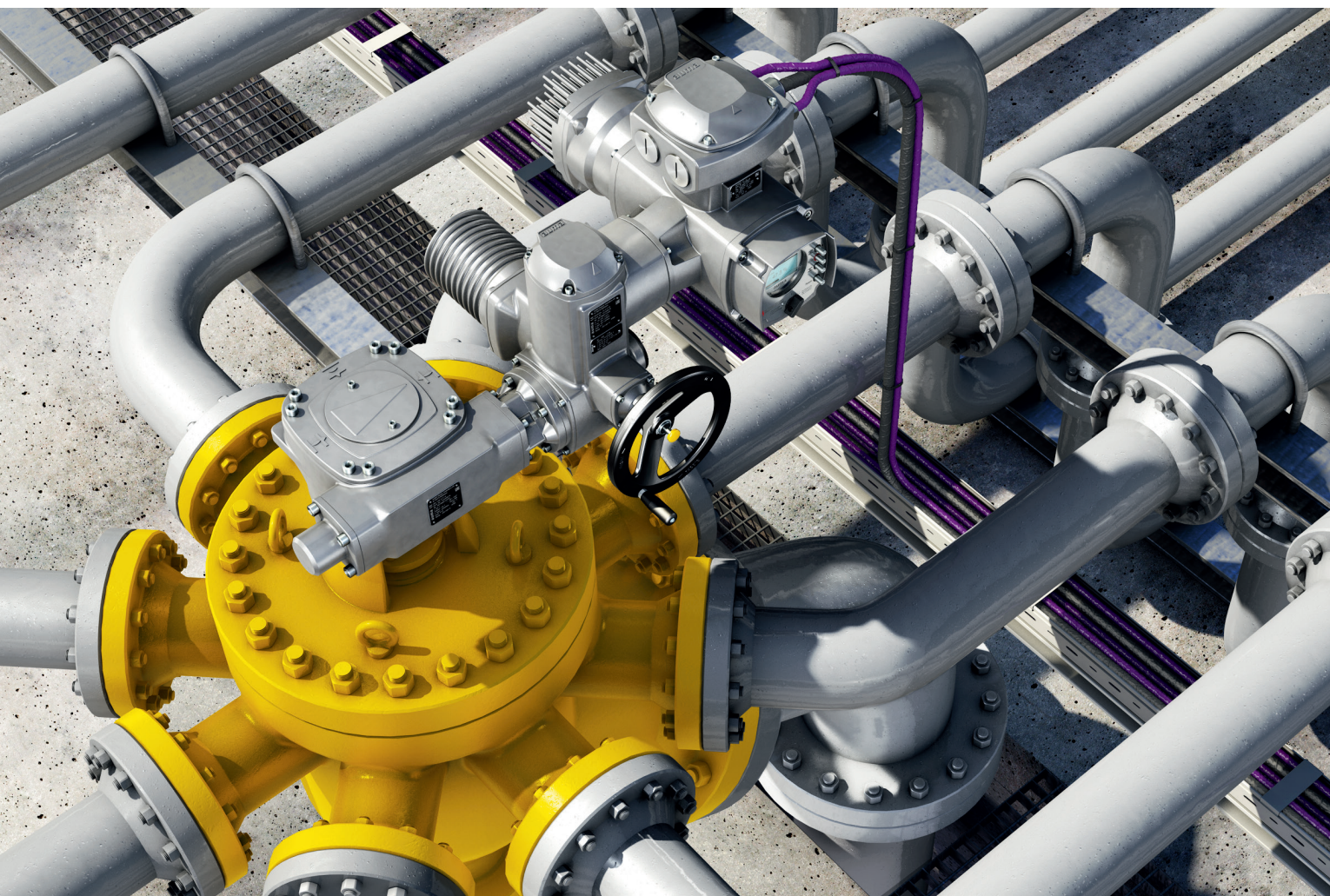
EMERGENCY operation at predefined speed

As an option, EMERGENCY and failure operations can be executed at a predefined speed to suit the particular event. The profile selected for standard operation will be deactivated; soft start and soft stop will, however, still be effective. By selecting a high speed still acceptable for the process, the safe state can be reached faster during EMERGENCY operation.

External impact on speed

The variable actuator speed is an additional variable to optimise a control process within the control system. To this end, the speed of the SARVEx can be adjusted by an external controller.

The adjustable speed setpoint by the DCS can be sent to the ACExC via different inputs e.g. as digital signal via fieldbus (0 – 100 %), or as analogue signal (4 – 20 mA).



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