



ELECTRIC MULTI-TURN ACTUATORS

for the automation of industrial and special valves with torque requirements up to 120,000 Nm



Offering the perfect actuator automating any valve – this is the milestone defined by AUMA. The new sizes of the GHT gearbox type range play a key role within AUMA's modular product portfolio. The abbreviation "HT" of the gearbox name GHT stands for "High Torque".

The torque ranges of SA multi-turn actuators are between 10 Nm and 32,000 Nm. When combined with a GHT worm gearbox, the maximum output torque is multiplied. Up to 120,000 Nm can be achieved.

Wide application range

SA multi-turn actuators and GHT gearboxes are available for both open-close and modulating duties and are also approved for use in potentially explosive atmospheres. The combinations can thus be used in technical process plants of the most different sectors – from water management and power plant sector right through to the petrochemical industry.

High enclosure protection

Multi-turn actuator/gearbox combinations are supplied with improved enclosure protection IP68 according to EN 60529. The permissible immersion height of 8 m head of water for max. 96 hours results from enclosure protection IP68 of the multi-turn actuator. During continuous immersion, the actuator can perform up to ten operations.

High corrosion protection

Classified in corrosivity categories C5-I and C5-M, SA multi-turn actuators and GHT gearboxes meet the highest requirements defined in EN ISO 12944-2. They are therefore suitable for use in areas with high salinity, almost permanent condensation, and high pollution.

Colour

The standard colour is silver-grey (similar to RAL 7037). Other colours are available.

MULTI-TURN ACTUATOR-GEARBOX COMBINATIONS SA/GHT

SA 25.1 COMBINED WITH GHT 320.3

> Torques up to 32,000 Nm



SA 30.1 COMBINED WITH GHT 500.3

> Torques up to 50,000 Nm



Explosion protection

Both multi-turn actuators and gearboxes were tested and certified in close collaboration with national and international certification bodies. Approvals have been obtained from authorities worldwide, including ATEX (Europe), IEC (international), FM (USA) and ROSTECHNADSOR/EAC (TR-CU) for Russia.

The combinations are also available in fireproof version and will remain fully operable for 30 minutes at temperatures up to 1,100 °C.

Ambient temperatures

- > -40 °C to +120 °C
- > -40 °C to +60 °C for explosion-proof devices

Technical data

Type	Output mounting flange	Max. output torque	Total reduction ratio	Factor	Suitable multi-turn actuator for max. input torque	Output speed range at 50°Hz
	EN ISO 5211	[Nm]				[rpm]
GHT 320.3	F48	32,000	10:1	8	SA 30.1	0.4 – 9.0
			15.5:1	12.4	SA 25.1	0.4 – 5.8
			20:1	16	SA 25.1	0.4 – 4.5
GHT 500.3	F 60	50,000	10.25:1	8.2	SA 35.1	0.4 – 4.4
			15:1	12	SA 30.1	0.4 – 3.0
			20.5:1	16.4	SA 30.1	0.4 – 4.4
GHT 800.3	F60	80,000	12:1	9.6	SA 35.1	0.5 – 1.8
			15:1	12	SA 35.1	0.4 – 3.0
GHT 1200.3	F60	120,000	10.25:1	8.2	SA 40.1	0.4 – 2.1
			20.5:1	16.4	SA 35.1	0.4 – 2.2

The multi-turn actuator/gearbox combinations listed above are merely a small selection of all possible arrangements. When defining a device configuration, other criteria have to be considered, such as requirements on the self-locking function of the combination. Comprehensive data sheets are available for all sizes. AUMA will actively support you in choosing your perfect configuration.

SA 35.1 COMBINED WITH GHT 800.3

- > Torques up to 80,000 Nm



SA 35.1 COMBINED WITH GHT 1200.3

- > Torques up to 120,000 Nm



SA/GHT combinations can be used for all valves requiring a rotary movement for automation, including gate valves, globe valves or special valves such as double block and bleed valves.

No matter whether standard valve design or special valves are involved: there is no standard solution for valve automation. The valve requires the actuator to provide either torque or thrust at defined running speed via a certain period in compliance with the respective type of duty. On the other hand, the actuator has to be integrated into an existing distributed control system with various functional requirements. Each AUMA actuator has been configured for the specific application.

This applies to the smallest multi-turn actuator with 30 Nm output torque to the large SA/GHT combination with 120,000 Nm. AUMA continuously confirm their capability of providing ideal automation solutions for all types of industrial valves, even for the high torque ranges. Here, we would like to present some examples.

WEIR PENSTOCKS

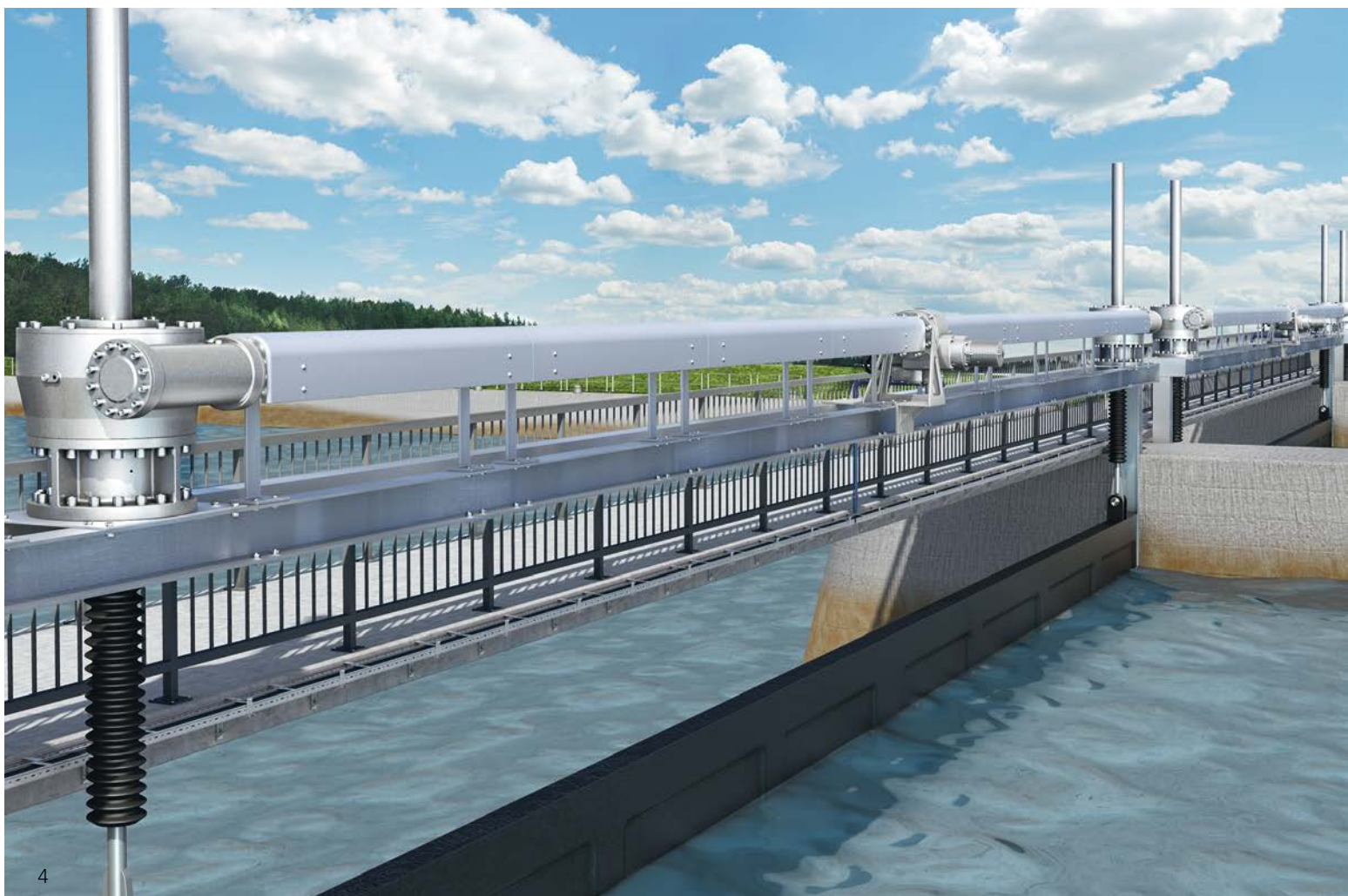
Weirs are installed for water level control of different water bodies and to ensure navigability of rivers and channels. Demands on reliability are extremely high.

Actual level control is executed by positioning the weir penstocks. As a general rule, electric actuators are used for automation.

Due to most varied ambient conditions, dams and weirs nearly always require special solutions. Marginal conditions are the key factors for sizing the actuators used. Do reserves for ice and wind load have to be considered and how does drift material deposit at the weir influence load over time?

The large variety of combination options for SA actuators and GHT gearboxes allow for configuration of actuator solutions working reliably even under the most adverse conditions.

ON MISSION



AUTOMATION OF COKER VALVES

Delayed coking systems transform the residual oil generated when refining crude oil and crack it into gas oil and petroleum coke. The heart of the plant is a coke drum with a height of more than 40 metres where the conversion processes take place at high temperatures. Once the process is finished, both ends of the drum have to be opened to discharge the coke. By using automated special valves, manual opening, which is both dangerous and time-consuming while requiring large numbers of personnel, becomes obsolete.

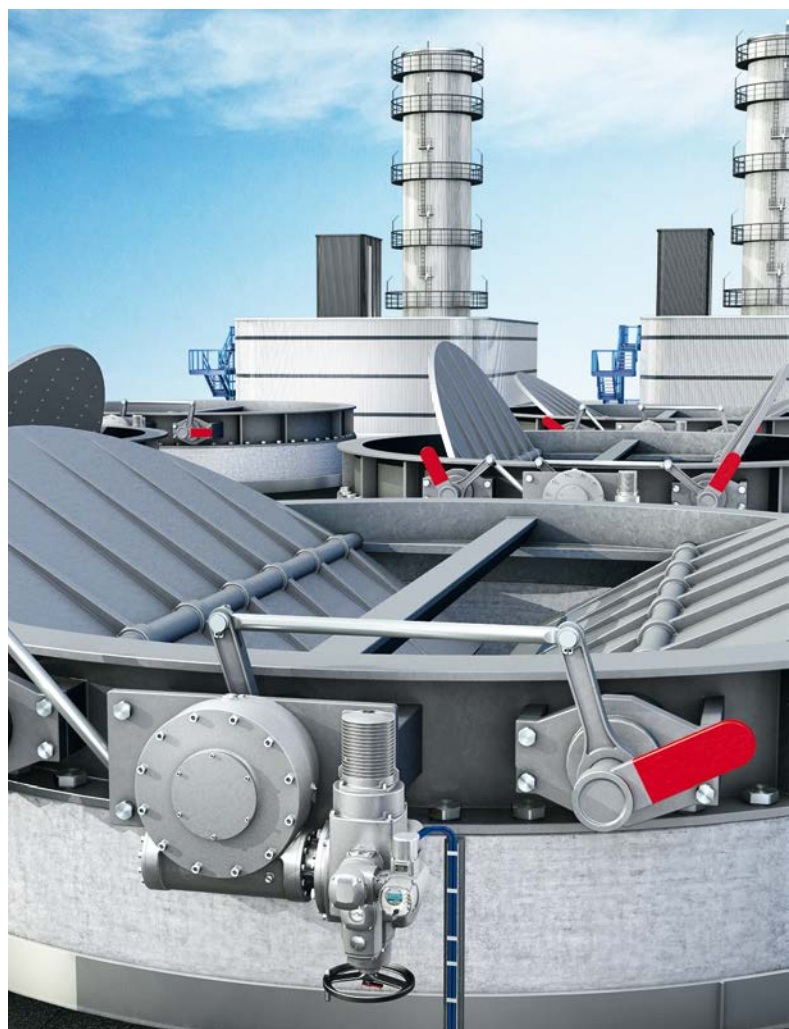
The double-stem gate valves used weigh up to 60 tons, with diameters up to 1,800 mm, and require thrusts of 2,800 kN.

Automation can be assured by means of two GHT gearboxes which are operated simultaneously by an explosion-proof SAEx multi-turn actuator.

DAMPER AUTOMATION

Large dimension dampers in various designs are used for controlling incoming air and exhaust gas flows within thermal power plants. Whether used with high pressure dampers, louvre dampers, guillotine isolators or diverters, SA/GHT combinations will supply sufficient torque so that the number of drive units can be kept at a minimum.

Furthermore, many different conventional valves are used within power plants which can all be automated using AUMA actuators. This allows for uniform integration of all valves including dampers into the DCS.



GHT worm gearboxes

The hardened and ground tooth flanks of the worm shaft combined with the worm wheel made of bronze ensure low wear and guarantee an exceptionally long lifetime of these gearboxes. The worm shaft with anti-friction bearing ensures high efficiency and prevents critical warming of the gearboxes for long operating times. Optimised housing design reduces weight and consequently the load to be borne by the valve. Housing parts are made of lamellar graphite cast iron (GJL). On request they are available in spherulitic graphite cast iron (GJS).

As an option, the GHT is also available as reversing version. Clockwise actuator rotation at the gearbox input will be converted into counterclockwise rotation at the gearbox output.

1 Valve attachment

The mechanical interface to the valve is standardised. Flange dimensions were adopted from EN ISO 5211 standard.

The standard output drive is a bore with keyway, which is mainly based on output drive types B defined in EN ISO 5210. However, the standard does not fully cover the dimensions of the GHT gearboxes.

2 Output drive type A

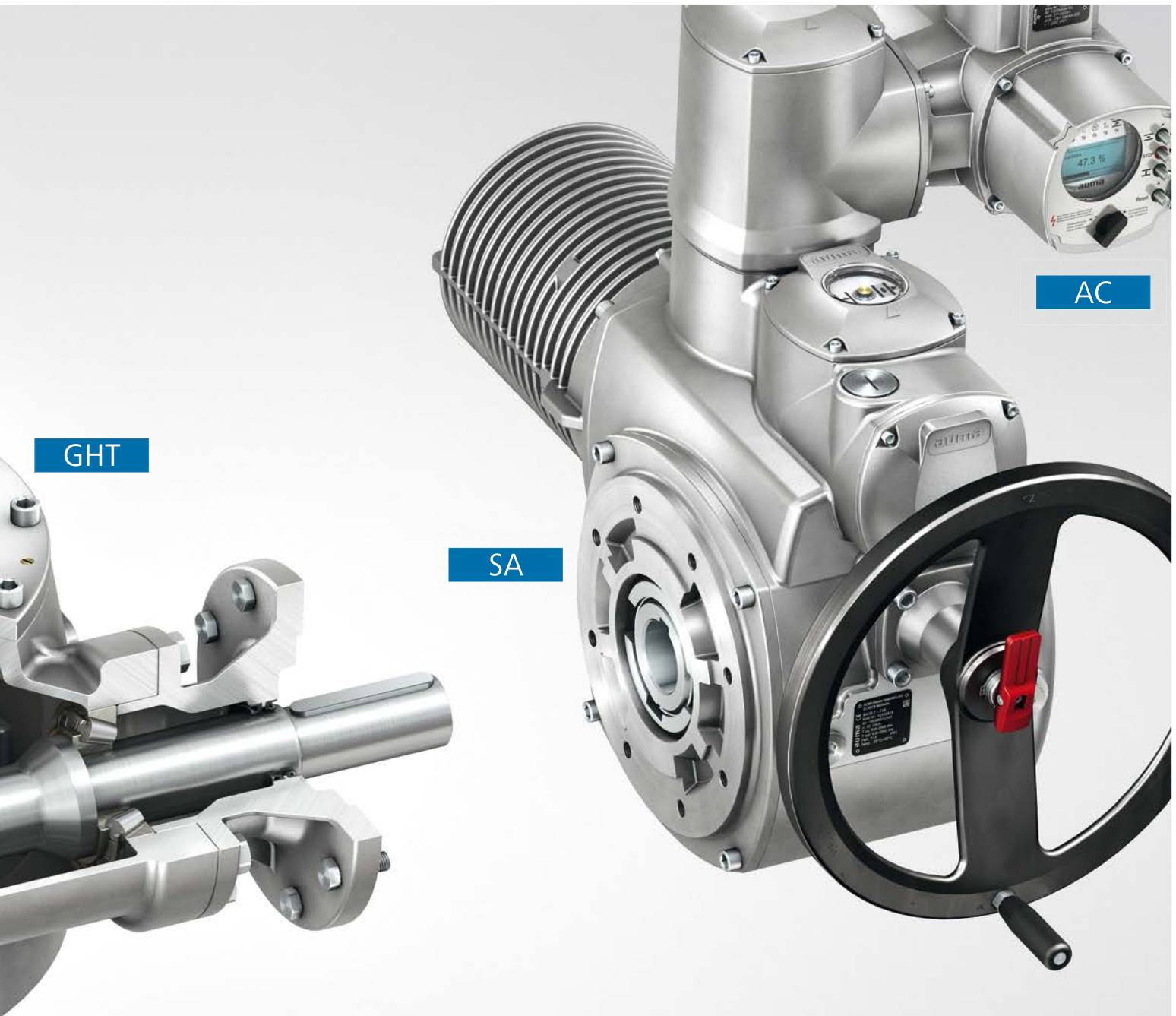
Stem nut for rising, non-rotating stems. The mounting flange together with the stem nut and axial bearings form a unit suitable for accepting thrust. The stem is then led through the hollow shaft of the gearbox. A protection tube **3** protects both the user against injuries and the stem against contamination.

As an alternative to output drive type A, the spring-loaded output drive type AF can be used. The springs compensate for dynamic axial forces when operating at high speeds and even for thermal expansion of the valve stem.

Output drive type C

Dog coupling. Dimensions are based on DIN 3338. However, the standard does not fully cover the dimensions of the GHT gearboxes.





GHT

SA

AC

Integral actuator controls (option)

Controls, in our example the microprocessor controlled AC, are available with different interfaces to the DCS – either for parallel signal transmission or fieldbus communication. Profibus DP, Modbus RTU, DeviceNet as well as Foundation Fieldbus are supported. DCS connection using HART or wireless HART is also possible.

Advanced diagnostic functions enable preventive maintenance and integration of actuators into asset management systems.

The integral local controls allow for local actuator operation.

Electric SA multi-turn actuator

The torque of the electric motor is transmitted to the hollow shaft via a self-locking worm gearing. Sensor technology for limit and torque seating is integrated within the actuator.

Multi-turn actuators are available in four versions:

- > SA for open-close duty
- > SAR for modulating duty
- > SAEx for open-close duty in potentially explosive atmospheres
- > SAREx for modulating duty in potentially explosive atmospheres



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