

Mastering desalination challenges

Carlsbad Desalination Plant, San Diego, California, USA



WATER

APPLICATION

Seawater desalination

AUMA SOLUTION

- > SA / SAR actuators with AC 01.2 actuator controls
- > GS part-turn gearboxes
- > Profibus DP
- > Separately mounted actuator controls
- > Interlock function for bypass

CUSTOMER BENEFITS

- > High reliability
- > Maximum corrosion resistance
- > Uniform, easy-to-use operational concept across the entire plant
- > Strong vibration solutions
- > High pressure solutions

High salt content in the air, strong sunlight, aggressive media, strong vibrations from high-pressure pumps – about 500 AUMA electric actuators meet the extreme conditions at Carlsbad Desalination Plant.

Carlsbad Desalination Plant is currently the largest reverse osmosis plant in the Western hemisphere. The plant near San Diego, California, which is exemplary in terms of environmental protection and energy efficiency, has been in operation since 2016 and delivers approximately 200,000 cubic metres of high-quality drinking water per day.

PREFERENCE FOR ELECTRIC ACTUATORS

As for valve automation in this state-of-the-art plant, electric actuation technology was given preference because of its simple installation, high reliability in virtually maintenance-free operation, and low operating costs.

VERSATILE, HIGH-PERFORMANCE ACTUATION SOLUTIONS

About 500 AUMA electric actuators are used throughout the entire plant. The modular product design with robust SA actuators for open-close duty, SAR actuators for modulating duty, powerful GS part-turn gearboxes and intelligent AC 01.2 actuator controls enables comprehensive single-source solutions for all seawater desalination tasks.

The actuators operate a wide variety of gate, butterfly and ball valves in all process steps, from seawater extraction, via sand filtration, micro-filtration, RO unit and remineralisation, to feeding into the drinking water network. During the periodic cleaning processes they automate the supply of rinsing and cleaning solutions and rinsing air as well as the recycling of residual materials.

All actuators are integrated into the control system via Profibus DP, contributing to the consistently high degree of automation in the flagship plant.

Project responsibility:
AUMA USA, Inc.

www.auma.com



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No trace of corrosion: Thanks to their TÜV-certified corrosion protection AUMA actuators withstand the salty sea air at Carlsbad.

UNEQUALLED CORROSION RESISTANCE

Salt is omnipresent in Carlsbad. The actuators are constantly exposed to the salty sea air blowing over from the Pacific. The media in the pipelines are also aggressive – not just the seawater, but also and in particular the concentrated brine which is a by-product of reverse osmosis. These media are not just a challenge for pipelines and valves; potential leaks may also cause actuators to come into direct contact with seawater or highly corrosive brine.

Excellent corrosion resistance is essential to withstand the saline atmosphere and the aggressive media. Here, the AUMA actuators prove their worth with their corrosion protection, certified by TÜV Rheinland. Thanks to the extremely robust two-layer AUMA powder coating, all AUMA actuators, even in standard versions, meet the requirements of the highest C5-M corrosion category for highly saline atmospheres and almost constant condensation in accordance with ISO 12944-6.



In places where high-performance pumps cause strong vibration, the actuator controls are mounted separately from the actuators.

SOLUTIONS FOR STRONG VIBRATION

The high pressure at which the seawater is forced through the membranes also places high demands on the actuators. For example, strong vibration often occurs in the vicinity of the high-performance pumps. Here, the modular AUMA actuators offer the benefit that the actuator controls with electronics can be mounted separately from the actuator, at distances up to 100 metres.

AVOIDING PRESSURE SURGES

Since there is a risk of pressure surges due to the high pressure in the pipeline, bypass lines are installed in the seawater supply system at Carlsbad. The AC actuator controls contain an interlock function that ensures that the main valve is only closed if the valve in the bypass is fully open.



AUMA actuators ensure reliable valve automation throughout all process steps.

PRECISE FLOW RATE AND PRESSURE CONTROL

For fine adjustment of flow rate and pressure, AUMA SAR modulating actuators are used, for example, on the high-pressure pumps upstream of the RO unit and on the feed pumps for the treated drinking water, each combined with a GS part-turn gearbox. These actuators are specially designed for frequent operation and high positioning accuracy, and meet the requirements for Class C modulating duty according to EN 15714-2. In the GS part-turn gearbox, a bronze worm gear provides the high wear resistance required for modulating duty.