

BASIC PRINCIPLE

An electric actuator in the valve automation field is a device that converts electrically generated high speed low rotary motor torque into low speed high rotary torque which, when coupled to a part-turn or multi-turn valve, drives the valve.

In basic mechanical electric valve actuators, the motor is stopped at the desired position when cams mounted to the actuator's output drive shaft make mechanical switches. In modern electronic valve actuators, digital position encoders and software stop the motor when a specific digital related angular position is reached.

The motor drives the output shaft and physical valve-to-actuator drive connection via most commonly, a planetary gear box, and the connection generally conforms to an international standard ISO5211.

Torque outputs vary from less than 5Nm for small bore domestic, light industrial and HVAC (Heating, Ventilation and Air Conditioning) applications to thousands of Nm for large diameter high pressure valves in the oil and gas sector.

BASIC FEATURES

The enclosure or housing that protects the motor, associated electrics/or electronics and gears, varies depending on the area of application of the electrical actuator. For internal domestic applications only a dustproof enclosure is needed, for valve actuators exposed to the elements a weatherproof housing is needed and motor actuators located in hazardous areas require an explosion proof housing.

Electrical connectivity can vary from traditional cable glands which require a cover to be removed and cables connected to an internal terminal strip, or external DIN connectors that eliminate the need to remove any covers to make the electrical connections.

Some actuators have a facility that enables it to be hand driven should external power be unavailable.

Most valve actuators have a visual position indicator to show if the electric actuator and attached valve is open, closed or part open, and many have internal electrical switches or relays that signal the open or closed positions.

BASIC ACTUATOR TYPES

There are two main electric rotary actuator types, part-turn and multi-turn.

Part-turn rotary valve actuators which are typically mounted to ball valves, butterfly valves, plug valves and dampers, all of which are usually quarter-turn with a 90 degree rotation from open to close .

Multi-turn rotary actuators are normally mounted to diaphragm valves, gate valves or globe valves that open and close linearly and their drive stem requires to be rotated multiple times to create the required linear movement.

BASIC FUNCTION OPTIONS

There are three main common electric rotary actuator functional types, on-off, failsafe and modulating.

On-off function drives the motorised valve from open to close in one continuous motor run.

Failsafe actuators provide a means of driving the valve actuator to a pre-determined failsafe position should external power be lost.

Modulating valves have their position controlled by a control input signal and the valve actuator positions the output shaft proportionally to the input signal. It achieves this by comparing the input signal to the physical position of the output drive shaft, and if a difference occurs, automatically drives the actuator to eliminate the difference.