

Energy Sources

Perhaps the most common type of actuator is powered by air and is called a pneumatic cylinder or air cylinder. This type of actuator is an air-tight cylinder, typically made from metal that uses the stored energy of compressed air to move a piston when the air is released or uncompressed. These actuators are most commonly used in manufacturing and assembly processes. Grippers, which are used in robotics, use actuators that are driven by compressed air to work much like human fingers. An actuator also can be powered by electricity or hydraulics. Much like there are air cylinders, there also are electric cylinders and hydraulic cylinders in which the cylinder converts electricity or hydraulics into motion. Hydraulic cylinders, which use liquids, are often found in certain types of vehicles.

Electrical Actuators



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Electrical Actuator is an electromechanical device that converts electrical energy into mechanical energy. Most electric actuators operate through the interaction of magnetic fields and current-carrying conductors to generate force. The reverse process, producing electrical energy from mechanical energy, is done by generators such as an alternator or a dynamo; some electric actuators can also be used as generators, for example, a traction motor on a vehicle may perform both tasks. Electric actuators and generators are commonly referred to as electric machines.

Applications

Electric actuators are found in applications as diverse as industrial fans, blowers and pumps, machine tools, household appliances, power tools, and disk drives. They may be powered by direct current, e.g., a battery powered portable device or motor vehicle, or by alternating current from a central electrical distribution grid or inverter. Small actuators may be found in electric wristwatches. Medium-size motors of highly standardized dimensions and characteristics provide convenient mechanical power for industrial uses.

The very largest electric actuators are used for propulsion of ships, pipeline compressors, and water pumps with ratings in the millions of watts. Electric actuators may be classified by the source of electric power, by their internal construction, by their application, or by the type of motion they give.

Fail Safe Actuators



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Fail Safe Actuator is for larger valves with higher torque requirements, requiring reliable fail safe operation utilizing a unique in-built air reservoir giving fail safe action without the torque losses inherent of spring designs. By using the time proven air accumulator system, and modern design techniques, produces air chamber modules with all the pneumatic circuitry safety protected within.

Fail safe actuators maintains the highest seen air supply pressure within the chamber modules, to be released upon control demand.

This design also prevents closure creeping when air supply pressures drop, which occurs with all spring return designs. Torque output is constant in the powered stroke with only a small drop off on the fail stroke. The available torques are proportional to the air supply pressure. Spring changes for various air supply pressures need not be made.

The fail safe actuator operates as a double acting actuator in both directions until there is a loss of supply pressure. When this loss occurs, the compressed air stored in the chambers powers the actuator to close the valve. This makes the fail safe actuator series suitable for use in ON/OFF and modulating control situations while still providing the fail safe requirement.

Applications

- Wellhead
- Flowline
- Header
- Pipeline system
- Casing relief blowdown valve.

Source: <http://solidswiki.com/index.php?title=Actuators>