ABB currently offers a comprehensive range of Part Turn and Linear Actuators in standard and Explosion-proof configurations.

In addition, ABB's electronic control units, with control panel, are available in integrated field installation and rack-mounting configurations.

For more information, please call **0870 600 6122** or visit **www.abb.co.uk/instrumentation**

PROFIT FROM OPTIMUM PLANT EFFICIENCY WITH ACTUATORS

- What are actuators?
- Why are they important?
- Where are they used?
- Achieving optimum efficiency in valves and dampeners

The quick ABB guide to choosing continuous electrical actuators

ABB

Reducing your Carbon Footprint

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What are actuators?

Actuators operate the valves and dampers which control liquid and gas flow in a wide variety of process and air handling plants. The precision control of flow is critical for plant efficiency, quality of product, maximum yield, reduced operating and maintenance costs and safety.

Electrical or pneumatic actuators respond to electrical or pneumatic signals from the plant's distributed control system (DCS) to operate a valve gate or damper which efficiently provides the required precision and control. Actuators are required to work reliably and durably in extreme conditions, both externally and internally, from the Arctic to the Sahara.

While immense investment may have gone into process plant and equipment to achieve optimum energy efficiency, low pollution emissions and a small carbon footprint, actuators are the final and critical control element, but are often under specified for the task. They are highly cost-effective as their purchase is small compared to the cost of the rest of the plant, yet all the rest of the process depends on their lifetime accuracy and reliability without degradation.

Why are they important?

As a result of the increasing economic, environmental, legislative and competitive pressures facing industry today, companies are investing in best available techniques in control instrumentation and systems, to provide them with the data they need to be profitable.

Yet, if the performance of the actuator as the final control element does not match the specifications of the rest of the plant, all this investment can be wasted. Actuators' critical role in fulfilling emission directives, improving plant efficiency and quality, optimising yield whilst reducing operating and maintenance costs will provide maximum return on investment.

Effective and timely control of liquid or gas flow through a plant maximises optimal process conditions. This improves yield while helping to minimise cost and waste through inefficiency. As part of this, actuators themselves must offer exceptional efficiency and low wear over a long reliable life. They also need to be easy to maintain.

ABB Contrac actuators are designed for precise control at S9 duty; 100% continuous modulating. The Contrac actuator system is developed from a family of conventional part-turn and linear actuators that are built on more than 50 years of success. Their specification eliminates the performance and control limitations of typical electric actuators.

Typical electric actuators have a life limited by their designed number of motor duty cycles, are less accurate in positioning so offer less precise process control and are less reliable, especially in the harsh operating conditions for which ABB Contrac actuators are designed.

Where are they used?

Valves and dampers are required anywhere that liquid and gas flow through pipelines or ducts is controlled.

E.g. Power generation:

- Dampers (Fan – ID, FD, Primary, Secondary and Overfire Air; Scrubbers; Baghouse; Furnace pressure control)
- Valves and Dampers (Process control; Feed water; Process steam; Boiler/furnace combustion air/fuel; Effluent; Cooling water)
- Fluid couplings for fans and pumps
- Turbine speed

Here are just some of the other industrial sectors where actuators are used:

Metal extraction and processing: Mining and working; smelting, processing, converting, casting, treatment and finishing

Minerals and glass: Extraction, cement, ceramics, glass processing, lime processing

Water and waste water treatment: Utilities and industrial processing

Food and beverage: Boilers and furnace control

Air handling: Heating; cooling; ventilation

Chemical, oil and gas: On- and offshore; extraction and refining; processing; supply and transport

Achieving optimum efficiency in valves and dampeners

Essential features to look for when selecting an actuator for your plant:

- ☐ **Optimum plant yield:** precise positioning and rapid reaction to commands will give accurate process control and optimum efficiency.
- ☐ **Minimal plant downtime:** minimal risk of malfunction is essential along with fail-safe back ups. Environmental protection against harsh external or industrial conditions is also a must.
- ☐ **Low maintenance costs:** longer maintenance intervals reduce ownership costs. Actuator design must limit wear on mechanical components whilst maintaining accuracy and efficiency.
- ☐ **Continuous availability:** most actuators require a cool down period and have built in controls (dead band) which limit their operational demand availability to avoid overheating and irreversible damage. These should be avoided as operation needs to be instant on command.
- ☐ **Low start-up current requirement:** if too much torque or force is required to start operation, a high start up current will need to be accommodated in the plant's electrical design.
- ☐ **Low operational costs:** efficient operation and low power off take should be combined with digital communication protocols to integrate with plant DCS. This provides fully automated control and, if accompanied by local control via a control panel, saves time on a large site.
- ☐ **Hazardous area certification:** to maximise plant safety.

Contrac ticks all the boxes and more

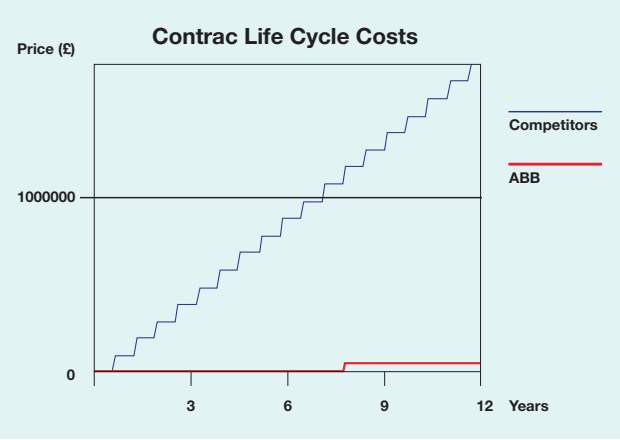
☑ **Optimum plant yield through greater accuracy**
Unique low friction, permanently lubricated gear design with a dead band of only ±0.05% (competitors anything from ±0.5% to ±5.0%). Repeatability of 0.1%.

☑ **Minimal plant downtime risk**
Oil-lubricated gear wheel and stall-proof electronic drive unit eliminates torque cut-out and thermal protection requirements. Low torque hand wheel for electrical failure operation, and IP66 environmental protection.

☑ **Reduced maintenance costs**
Maintenance costs can be over 50% lower than competitor products over a 10 year period. Advance diagnostics calculate maintenance intervals on actuator loading, not time, so intervals can be extended to 10 years as appropriate. Visit www12.de.abb.com/contrac/contraccalculator.aspx?language=EN to compare your costs.

For example:

Operation cycle 1200 or more cycles/hr	Typical Hourly Rate Maintenance Personnel	Typical Cost of Materials	10 Years Cost Typical Competitive Actuator	Contrac Actuator
100 actuators	£80 over 6 hours	£500	£1,4700,000	£52,000



N.B This does not allow for the cost of replacing failed actuators, where a competitive actuator may typically only have a design life of 20 million cycles, or c. 2 years' duty; 5 replacements (plus associated downtime costs) in a 10 year period.

All Contrac components are designed to provide smooth operation without peak loading and mechanical stress. This matches demand and speed of response requirements while eliminating fatigue. The Contrac drive panel allows constant energising of the motor without exceeding temperature limitations to give you combined availability and stall-free protection. By offering both part-turn and linear actuators, component linkage is optimised to each without compromise.



☑ **Continuous availability in operation**
With no requirement for cool down, the motor is permanently energised and Contrac actuators are always available for duty.

☑ **Low start-up current reduces electrical installation costs**
Contrac's low friction, lubricated, high efficiency gear wheels have low start-up torque requirements. So electrical circuits don't have to accommodate high-start current inrush.

☑ **Low operational and ownership costs with seamless DCS communication and without degradation over time**
Highly efficient operation and low power offtake along with long-term accuracy and reliability. All of this combined with low maintenance requirements give you an actuator that costs less than competitors over its lifetime. And all without compromising on durability in harsh conditions.

HART and PROFIBUS digital communications allow full integration with plant wide control systems. Local panel display enables convenient on-site parameter and adjustments, to save time.

☑ **Hazardous area certification:**
Explosion proof - ATEX: II 2 GD ck EEx de [ib] ib II B T4 bzw.IP6x T=130°C ZELM 04 ATEX 0209 X, for safe installation on most chemical and oil refining process plants.