

Actuators & Positioners BROCHURE

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Measurement Products | Measurement made easy

Efficient actuators and positioners

First class valve automation control

Power and productivity
for a better world™



Expertise in technology

More than a century of experience

To operate any process efficiently, it is essential to measure, actuate, record and control. With ABB's measurement products and solutions, you are receiving the best technology combined with the most reliable products available on the market.

ABB offers a broad range of life cycle services for optimum product performance. A global network of measurement products specialists delivers local service and support.

Research and development is a vital source of ABB's technology leadership. It builds on the foundation of existing technologies for new applications, and continues to develop the breakthrough technologies needed to meet the challenges of the future.

ABB and its heritage companies have been leaders in innovation and technology for more than 100 years.

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BOMEM

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& PORTER **F**

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K-TEK

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Pressductor®

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FLOWMETERS LTD

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MEASUREMENT & CONTROL SYSTEMS

Comprehensive measurement solutions

Serving any industry

World-class measurement solutions

ABB measurement products provide world-class measurement solutions for any industry, utility or municipality. Latest innovations deliver technological solutions to make it easier for customers to run their plants. ABB's measurement products are based on common technology, providing a common look and feel and method of operation. This results in products, that are easy to configure, easy to integrate, and easy to maintain.

For more information please visit:
www.abb.com/measurement

ABB's measurement products portfolio:

- Analytical measurement
- Flow measurement
- Natural gas measurement
- Valve automation
- Pressure measurement
- Temperature measurement
- Recorders and controllers
- Level measurement
- Device management
- Force measurement
- Service

1 Water and waste water | 2 Power and industrial steam | 3 Chemical and petrochemical | 4 Oil and gas | 5 Pulp and paper | 6 Minerals | 7 Metals
8 Food and beverage | 9 Pharmaceuticals



Global availability

A partner to rely on, wherever you are

Wherever you are, whatever you need – you can rely on ABB service

ABB's vast base of globally installed products and systems is coupled with technical and process expertise, backed up by a broad scope of services that lay the foundation for end-to-end support for your enterprise. ABB's automated monitoring and reporting products are simple and accurate, so critical information is always readily accessible.

ABB's full scope of measurement products services cover everything from start-up and commissioning through to lifecycle support, giving you all you need to maximize the reliability and accuracy of your assets. Furthermore, the global strength of ABB means that service and support are available wherever and whenever help is needed.

Information whenever you need it – Device management, fieldbus and wireless

ABB's instrumentation devices feature the latest in onboard diagnostics and intelligence to help you run your business more effectively. Just as important, ABB gives you the choice to decide which communication protocols you want to use to access this information. You can choose from a family of tools and from different ways to manage the lifecycle of the devices in order to get the most out of your investment.

ABB's device management product range includes

- Fieldbus and wireless solutions
- Mobility handhelds
- Asset vision software
- Scalable service management

ABB service: Available wherever you are



Device management, fieldbus and wireless from ABB



ABB actuators and positioners

Meeting your valve control needs

Valves, dampers and butterflies are essential components in the process industry. With expertise and experience built up over 100 years and countless applications worldwide, ABB provides a wide range of products to position and actuate any final control element, delivering best in class performance for every industrial process.

Meeting your valve control needs

From electrical and pneumatic actuators and state-of-the-art digital and conventional positioners to I/P Converters, ABB provides a comprehensive range of products, designed, engineered and manufactured to deliver first class performance in your process.

ABB's extensive portfolio of actuators and positioners provides highly accurate and stable positioning of your control valves, crucial to achieve your operational targets:

- Energy efficiency processes
- High production quality
- Reliable performance
- Maximized output at lowest expense

How ABB can help you?

ABB provides you everything needed to get the most out of final control elements, including:

- Continuous electrical actuators and pneumatic actuators
- Electro-pneumatic, pneumatic, and digital positioners
- I/P signal converters
- Tools to select the optimum kind of actuation technology for your process
- Technical support and service

See how you can benefit!

The following pages show some of the ways in which ABB's valve automation products are being used to bring benefits in a range of different applications. To find out more, visit www.abb.com/measurement.



Electrical actuators

Longest maintenance-free operation

Efficient control in steam boiler applications

Superheaters are widely used to help boost the temperature of steam in boiler applications. Spraywater valves control the supply of cooling water that is injected into the superheated steam in the superheater and reheater. Close control of the cooling water supply helps to achieve the optimum steam temperature inside and at the output of the superheater.

The challenge – precise mass flow control of cooling water

To achieve a process with minimum steam cooling, yet at the same time, with a maximum permissible steam temperature requires continuous and precise control of the mass flow of the injected cooling water in the superheater and the reheater. Injecting too much water will cause the steam to over-cool, reducing boiler efficiency. Injecting too little will result in excessively high steam temperatures and pressures, posing the risk of damage to the superheater, turbine and downstream components. In order to correct the smallest of changes in temperature, the smallest of changes to the water quantity must also be implemented in the valve's disproportionate zone. Any equipment used must be able to withstand the tough operating environment and high ambient temperatures associated with superheater applications.

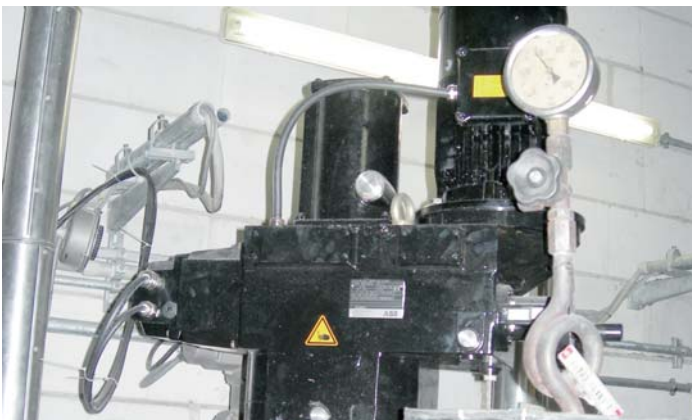
The solution – highly precise, continuous positioning of spraywater valves

ABB's Contrac continuous electrical linear actuators provide an ideal solution for spraywater valve control applications. Capable of providing full S9-100%ED operation according to IEC 60034-1, even in ambient temperatures up to 85 °C (185 °F), Contrac actuators enable highly precise, continuous positioning of spraywater valves.

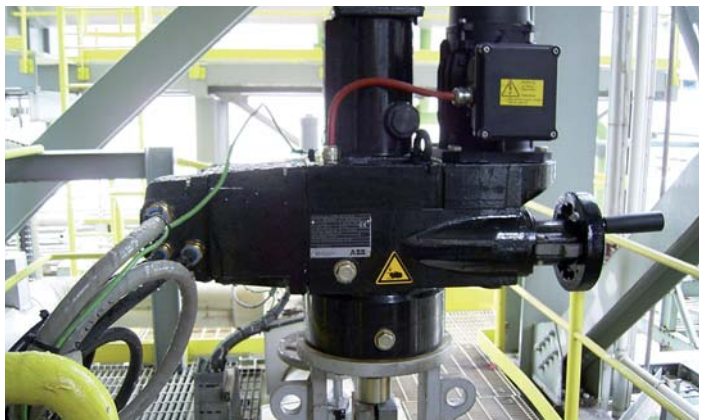
Contrac actuators feature an oil-lubricated spur gear with drive shafts supported by ball bearings. Rotary motion is converted to linear motion in the linear actuator by means of a highly efficient ball screw spindle. Contrac actuators are wear-free and are characterized by a deadband of just $\pm 0.05\%$, providing high-accuracy positioning for all valve types. With their robust design and IP66/NEMA 4X protection, Contrac actuators withstand even the most arduous operating conditions.



Actuator in high pressure desuperheater control



Actuator in a feedwater control application



Greatly reducing your actuator lifecycle cost

The issue of service and maintenance is a controversial subject within industry. Manufacturer advice and guidance on routine maintenance often tends to be overlooked and products are run until they fail. This risky approach is not an option in hazardous area applications. Failure to service and maintain an Ex product to the manufacturer's specifications will result in its certification being invalidated.

The challenge – keeping maintenance costs under control

In many cases, the maintenance intervals for electrical actuators are specified according to load, actuator size and the average number of operating cycles per hour. For control loops averaging less than 700 operating cycles per hour, maintenance is advised every seven months. When longer maintenance intervals are required, for example every two years, the permissible number of operating cycles is reduced to 125 to 250 cycles per hour. The control algorithms of many process control systems take this into account, being designed around the permissible number of operating cycles of the used actuator technology. This can cause maintenance costs to far exceed the cost of the actuator itself.

The solution – up to ten years of maintenance-free operation

Contrac electrical actuators are designed for up to ten years of maintenance-free operation, ideal for demanding applications requiring high plant availability. By using oil-lubricated spur gears rather than the worm gear pairs, where repetitive sliding movements cause greater wearing over a shorter period of time, Contrac actuators can handle more than 3600 operating cycles per hour, without significant reduction in their lifetime. Contrac offers the lowest cost of ownership of electrical actuators available on the market. Maintenance work typically requires just changing the gear oil and replacing the shaft seals and gaskets, a quick and easy process that can be performed with little cost.

Additional features & benefits:

- Self-diagnostics for optimum maintenance interval
- Choice of integrated, field or rack mounting options for power electronics units
- Part-turn and linear actuator options



Actuator in burner air control



Actuator in forced draft fan control



Digital positioners

Performance for harshest environments

The TZIDC series digital positioners provide flexible and cost-effective valve management and control. Their durability and unmatched shock and vibration immunity up to 10 g and 80 Hz means that they are suitable for use even under harsh conditions.

The challenge – handling over 100,000 strokes a year

Most control valves in many processes will rarely have to move, commonly enabling operators to opt for positioners with lifetimes of less than 100,000 strokes. However, there are some applications where valves will need to handle frequent changes in process conditions. In such applications, where 100,000 strokes may occur in a single year alone, there is a need for a positioner that can handle these changes with minimal need for maintenance.

The solution – unrivalled performance performing 1,000,000 strokes

The answer is ABB's TZIDC positioner. In a four month trial, an ABB TZIDC positioner underwent a customer durability test which saw it perform 1,000,000 strokes without any deterioration in performance or fault or interruption.

Offering remote communication via 4...20 mA HART, PROFIBUS PA or FOUNDATION fieldbus, the TZIDC sets the standard for safe and economic control of industrial processes. Its in-built intelligence enables it to adapt itself to any control valve at the push of a button, while a host of service, diagnostic and safety functions, including fail-freeze and fail-safe, help to provide a high level of operational performance.

The TZIDC/EDP300 is suitable for use with linear, part-turn and single or double-acting actuators and is protected to IP65/NEMA 4X, making it ideal for harsh environments. You can rely on the TZIDC/EDP300 to provide the highest levels of availability, enabling you to maximize the profitability of your process through improved plant uptime.



Digital positioners in a gas distribution station



TZIDC in a hygienic application



The EDP300 series digital positioners feature a high air capacity of 50 kg/h at 10 bar and are equipped with an advanced pressure-based diagnostics function.

The challenge – achieving accurate process control

In any production process, it is critical to ensure stable and constant process conditions to achieve optimum product quality and process efficiency. Any control equipment must be capable of eliminating any variations in the process variables that could cause the process to consume both more energy and consumables than normal, pushing up production costs. The stability of the downstream control loop may also be affected, impacting on both product quantity and quality. With the compressed air used by valve positioners being around ten times more expensive than electricity, accurate control is essential to minimizing plant overheads as well as eliminating potential problems in the downstream process.

The solution – accurate measurements for maximum energy efficiency

Thanks to an innovative control algorithm taken from the field of robotics, the EDP300 positioner stands out thanks to its speed and accuracy. Overshooting and recovery times are both prevented, allowing the EDP300 to significantly optimize compressed air consumption, energy efficiency and the "ecological footprint" of pneumatic control circuits. Subsequently, the EDP300 is able to help reduce costs, as compressed air is about ten times as expensive as electricity.

ABB is the only supplier able to offer customers a premium positioner that features these pneumatic properties.

Remote sensor installation

The challenge: applications where there is poor accessibility, increased vibrational loading or particularly harsh environmental conditions

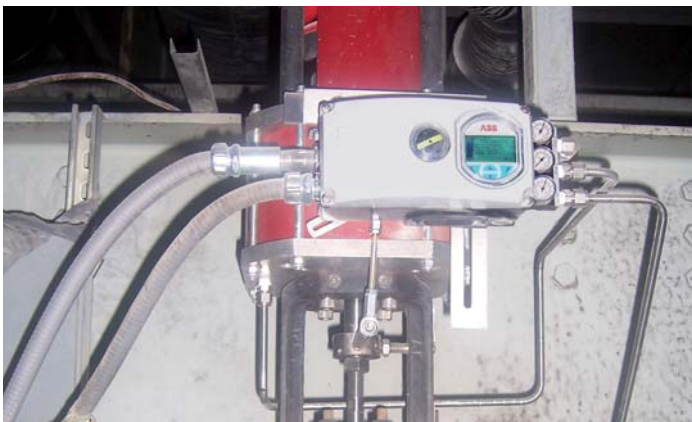
These kinds of applications often involve higher costs due to gaining access and unexpected failures.

The solution: Using TZIDC or EDP300 positioners featuring a separate position sensor housing, which can be up to 10 m away from the device

Easier and safer access to the positioner in hard-to-reach valve installations. Available as options:

- Enhanced vibration immunity up to 2 g at 300 Hz for higher frequency applications
- Advanced IP67 protection class for challenging applications
- Optional modules and mechanical feedback for the valve position
- Stainless steel housing for offshore use
- Increased temperature resistance of up to 100°C (212°F)

The EDP300 on a linear actuator



The EDP300 in a remote sensor installation



Pneumatics

Proven technology for all-round solutions

Effective control for damper applications

Boiler designs vary based on energy type and engineered technology. In all cases the combustion process requires precise and repeatable positioning of the dampers, diverters and louvers to control the air to different elevations within the furnace for efficient combustion, with the goal of producing the highest possible heat rate while maintaining lowest emissions.

The challenge – providing universal pneumatic damper actuation solutions

Damper actuation may require rotary as well as linear type actuators depending on the application and damper location. The actuators used on the combustion process have to fulfill and comply to the control loop safety of the boiler in the event of power and/or signal loss, to position the damper to either the closed, open, or last position. The dynamics of the process demands high continuous duty cycle of the damper actuators with high positioning accuracy for precise control.

The solution – UP universal pneumatic rotary and LP linear pneumatic actuators

ABB's comprehensive range of linear and rotary pneumatic damper actuators fulfills and exceeds the requirement for these challenges. For over 60 years, ABB's pneumatic actuators have established a reputation in damper drive applications for their high performance and durability.

UP series rotary actuators and LP series linear actuators are sized according to the application torque and available instrument supply pressure and incorporate all the damper control functions required by boiler applications, such as fast travel, safe control functions and manual override for the rotary actuators. These options allow boiler design engineers to select the appropriate safety control philosophy according to the combustion loop. The use of ABB's TZIDC digital positioner technology gives accurate damper positioning as well as providing advanced diagnostics to equip the user with real time positioning data with predictive maintenance information for reliable damper control.



UP4 pneumatic rotary actuator on induced draft fan damper control



LP20 linear pneumatic actuator with AV positioner on a damper



Improved process control with I/P converters

The challenge – dealing with particles blocking a valve

Certain types of enzyme production processes have traditionally posed a problem for accurate valve control where particles of a certain size can cause valves to become blocked, resulting in unplanned downtime to trace and rectify the problem.

In the enzyme production processes, problems can arise from the presence of larger cellulose particles in the process fluids. Planned downtime can arise as a result of troubleshooting and correcting the faults.

The solution – using I/P signal converters for valve position control

The solution to this problem is to use an I/P signal converter as part of an open loop control system. The converter regulates the position of a small diaphragm valve with a 15 mm (0.59055 in) stroke. The valve controls the flow over a range of 50 to 2,000 l/h (13.2086 to 528.3441 gph), with an accuracy of ± 3 to 5 l/h (± 0.7925 to 1.3209 gph).

By responding less quickly to changes on the process side of the valve, the signal converter introduces a delay in the valve response so that it effectively ignores any short term deviations caused by cellulose particles passing the valve.

This helps to prevent the valve from becoming blocked, even when it is only slightly open. The consequent reduction in unplanned plant downtime and associated production disruption help boost profitability and increase plant availability.

Key features & benefits:

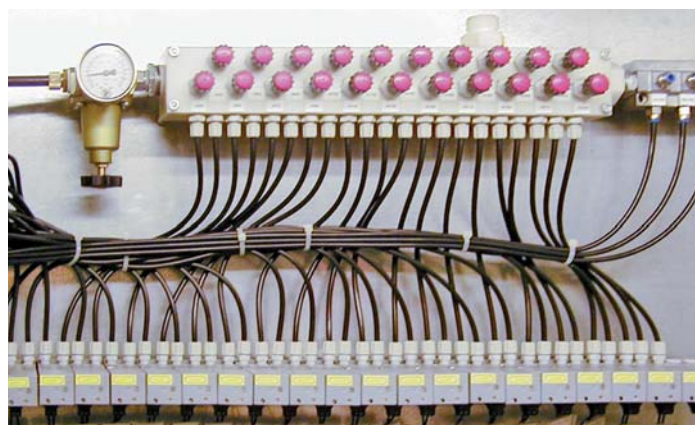
- Compact design and variable mounting positions for maximum installation flexibility
- Output signal from 0.2 to 1 bar (3 to 15 psi)
- Robust design with IP65 field housing enables use in arduous and hostile environments
- High functional stability helps maximize control accuracy



Robust field mount I/P converters for valve position control



Compact panel mount I/P converters



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