ABB MEASUREMENT & ANALYTICS

Efficient actuators

First class valve automation control

Measurement made easy

To operate any process efficiently, it is essential to measure, actuate, record and control. In selecting ABB you are choosing a partner who is offering the best measurement and analytical solution for your needs, enabling maximum return on your investment. When investing in ABB's measurement and analytical solutions you are receiving the best technology, reliability and service in the business.

Research and development is a vital source of ABB's technology leadership. ABB constantly 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.

Comprehensive measurement solutions
Tailor-made for every industry

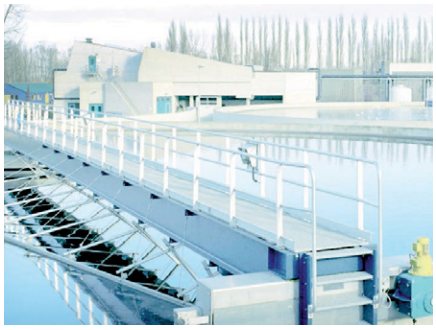
01 Water and waste water
02 Power and steam generation
03 Chemical and petrochemical
04 Oil and gas
05 Pulp and paper
06 Minerals
07 Metals
08 Food and beverages
09 Marine

ABB's measurement and analytical products provide world-class measurement solutions for any industry, utility or municipality. Latest innovations deliver technological solutions to make it easier for you to run your plant. ABB's measurement and analytics 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:
abb.com/measurement

ABB's measurement and analytics product portfolio

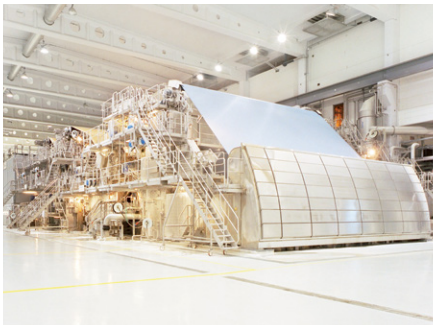
- Analytical measurement
- Flow measurement
- Pressure measurement
- Temperature measurement
- Level measurement
- Actuators and positioners
- Recorders and controllers
- Device management, Fieldbus and Wireless
- Force measurement
- Service

01


02


03


04


05


06


07


08


09


ABB actuators
Meeting your valve control needs

01 Rotary actuator with butterfly damper

02 Linear actuator with control valve

ABB's broad damper actuator line delivers quality, power and performance to a wide range of industries, especially power utility plants. They excel in applications where exact control and speed can save fuel costs or improve efficiency for example forced draft and induced draft dampers. They utilize the power of digital technology to provide exact control and built-in diagnostics.

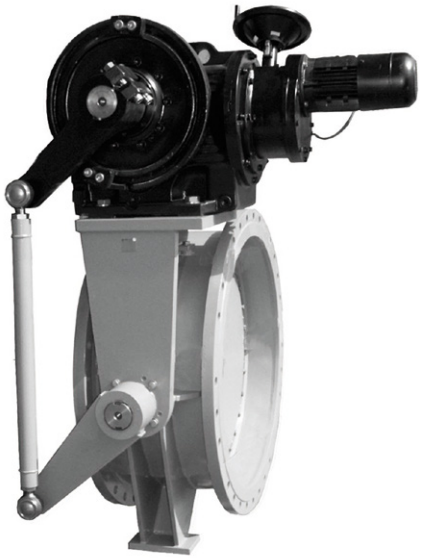
Meeting your valve control needs
From electrical actuators, ABB provides a comprehensive range of products, designed, engineered and manufactured to deliver first class performance in your process.

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
- 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.

For more information please visit:
abb.com/measurement



01

02

Electrical actuators
Consideration of the lifecycle cost

— 03 Estimated lifecycle cost of electrical line actuators

— 04+05 Examples of Contrac applications under harsh environments

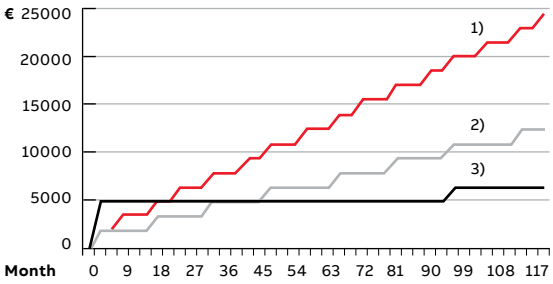
The solution

Contrac electrical actuators are designed for 10 years of maintenance-free operation. Special operating conditions like extreme ambient temperatures, however, may limit the service life of elastomers and lubricants. As a result, the integrated maintenance microprocessor may in some cases recommend a maintenance operation after less than 10 years.

Comparison required maintenance instance of one electrical actuator in 10 years operating time

	Competitor			Contrac		
Demand control	simple	medium	high	simple	medium	high
Switching rate in c/h	300	700	> 1200	300	700	> 1200
Required maintenance instance[1]	7.2	15.4	not possible	1	1	2

[1] according to competitor datasheet

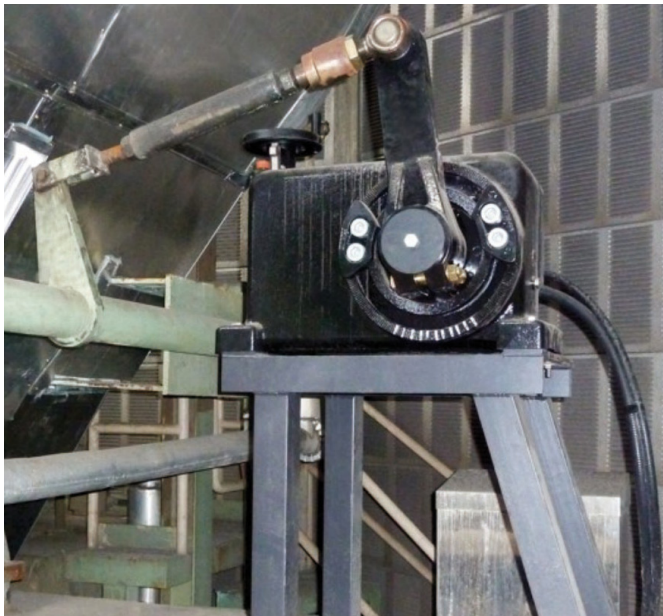


[1)] at > 700 cycles/h [2)] at > 300 cycles/h [3)] Contrac > 1200 cycles/h

— 03

— 04

— 05



Electrical actuators
Longest maintenance-free operation

01 Actuator in high pressure desuperheater control

02 Actuator in a feedwater control application

Longest maintenance-free operation

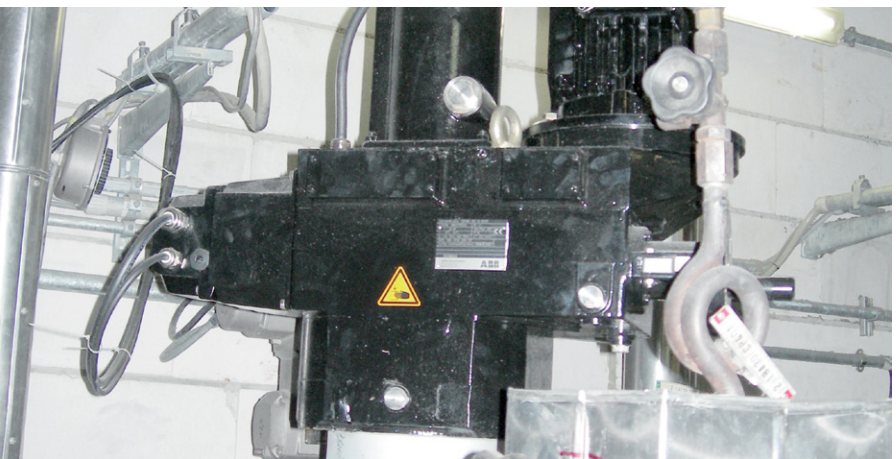
Superheaters are widely used to help boost the temperature of steam in boiler applications. Spraywater valves control the supply of cooling water that is injected into the superheated steam in the superheater and reheater. Close control of the cooling water supply helps to achieve the optimum steam temperature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

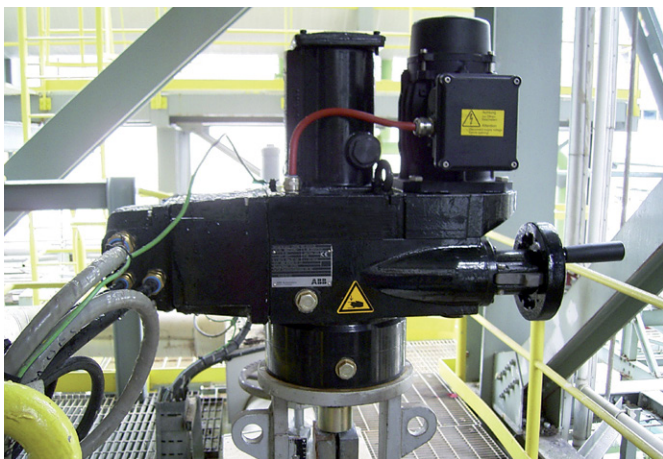
The solution – highly precise, continuous positioning of spraywater valves
ABB's Contrac continuous electrical linear actuators provide an ideal solution for spraywater valve control applications. Capable of providing full S9-100%ED operation according to IEC 60034-1, even in ambient temperatures up 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 ± 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.

01



02



—
03 Actuator in burner air control
—
04 Actuator in forced draft van control

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

—
03

—
04

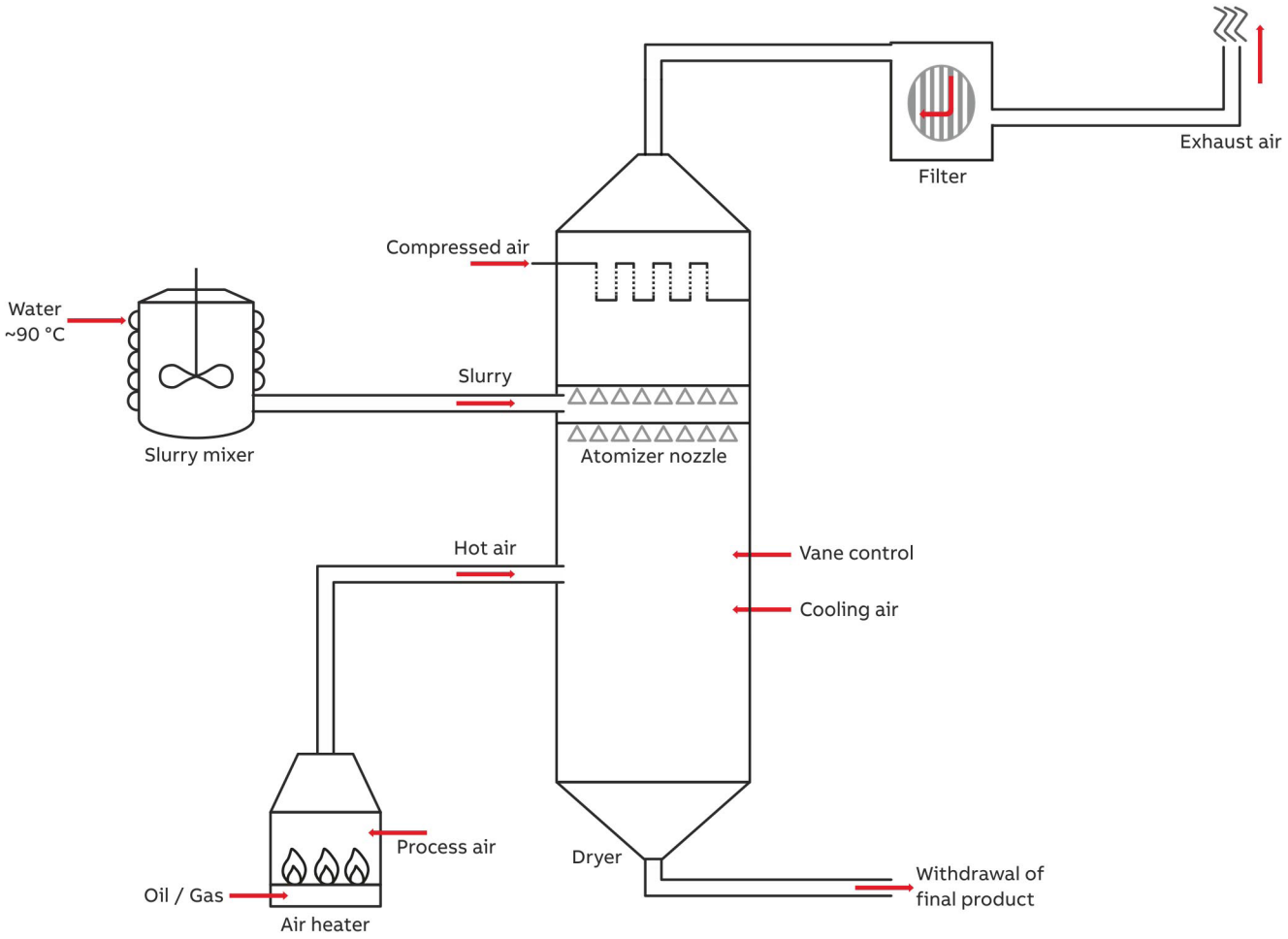
Electrical actuators applications
Spray drying in the food industry

—
01 Contact spray drying shema

Technical description for spray drying

- Spray drying is commonly used for the production of various powders such as powdered milk, instant coffee… etc.
- The process starts with a paste-like substance (slurry)
- Pumps transport the slurry into the dryer where hot air reduces the liquid content down to 1 to 2%
- The slurry dries rapidly and leaves the dryer as a pulverulent end product
- The air temperature requires precise control and it depends on the quantity and the water percentage of the slurry
- The pressure inside the dryer is another crucial factor which influences the powder quality
- These are the requirements which Contrac actuators perfectly meet
- Regardless whether the pressure is controlled via vane control or butterfly valves – Contrac actuators with an accuracy of ± 0.05%, 100% duty cycle and a positioning time of up to 10s/90° are the perfect solution

—
01



Electrical actuators
Product overview

Rotary actuators

Model	Rated torque	Rated speed	Model	Rated torque	Rated speed
PME120-AI/-AN	100 Nm (74 lbf.ft)	4.5°/s	**RHD2500-25**	2500 Nm (1844 lbf.ft)	3.6°/s
RHD250-10	250 Nm (184 lbf.ft)	9.0°/s	**RHD4000-10**	4000 Nm (2950 lbf.ft)	9.0°/s
RHD500-10	500 Nm (367 lbf.ft)	9.0°/s	**RHD4000-40**	4000 Nm (2950 lbf.ft)	2.25°/s
RHD800-10	800 Nm (590 lbf.ft)	9.0°/s	**RHD8000-12**	8000 Nm (5900 lbf.ft)	7.5°/s
RHD1250-12	1250 Nm (922 lbf.ft)	7.5°/s	**RHD8000-80**	8000 Nm (5900 lbf.ft)	1.12°/s
RHD2500-10	2500 Nm (1844 lbf.ft)	9.0°/s			

Linear actuators standard

Model	Rated force	Rated speed	Model	Rated force	Rated speed
LME620-AI/-AN	4 kN (899 lbf)	4.5°/s	**RSD50-3.0**	50 kN (11240 lbf)	9.0°/s
RSD10-5.0	10 kN (2248 lbf)	9.0°/s	**RSD50-10.0**	50 kN (11240 lbf)	3.6°/s
RSD10-10.0	10 kN (2248 lbf)	9.0°/s	**RSD100-1.5**	100 kN (22480 lbf)	9.0°/s
RSD20-5.0	20 kN (4496 lbf)	9.0°/s	**RSD100-10.0**	100 kN (22480 lbf)	2.25°/s
RSD20-7.5	20 kN (4496 lbf)	7.5°/s			

Rotary actuators in explosion proof design

Model	Rated torque	Rated speed	Model	Rated torque	Rated speed
RHDE250-10	250 Nm (184 lbf.ft)	9.0°/s	**RHDE4000-10**	4000 Nm (2950 lbf.ft)	9.0°/s
RHDE500-10	500 Nm (367 lbf.ft)	9.0°/s	**RHDE4000-40**	4000 Nm (2950 lbf.ft)	2.25°/s
RHDE800-10	800 Nm (590 lbf.ft)	9.0°/s	**RHDE8000-15**	8000 Nm (5900 lbf.ft)	6.0°/s
RHDE1250-12	1250 Nm (922 lbf.ft)	7.5°/s	**RHDE8000-80**	8000 Nm (5900 lbf.ft)	1.12°/s
RHDE2500-10	2500 Nm (1844 lbf.ft)	9.0°/s	**RHDE16000-30**	16000 Nm (11801 lbf.ft)	3.0°/s
RHDE2500-25	2500 Nm (1844 lbf.ft)	3.6°/s			

Linear actuators in explosion proof design

Model	Rated force	Rated speed	Model	Rated force	Rated speed
RSDE10-5.0	10 kN (2248 lbf)	5°/s	**RSDE50-3.0**	50 kN (11240 lbf)	3°/s
RSDE10-10.0	10 kN (2248 lbf)	10°/s	**RSDE50-10.0**	50 kN (11240 lbf)	10°/s
RSDE20-5.0	20 kN (4496 lbf)	5°/s			
RSDE20-7.5	20 kN (4496 lbf)	7.5°/s			

Electronic units for standard and explosion-proof actuators

Integrated	EAI823	For PME 120 AI and LME 620 AI (not für explosion-proof applications)
Field mounted	EAN823	Lower power range
	EBN853	Medium power range
	EBN861	Upper power range
Rack mounted	EAS822	Lower power range
	EBS852	Medium power range
	EBS862	Upper power range

Pneumatic actuators
Proven technology for all-round solutions

—
01 UP4 pneumatic rotary actuator on induced draft fan damper control
—
02 LP20 linear pneumatic actuator with AV positioner on a damper

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.

—
01

Pneumatic actuators
Product overview

LP – Linear pneumatic actuators

Model	Force*	Cylinder size**
LP10	1.7 kN (382 lbf)	63 x 127mm (2.5 x 5 in.)
LP20	4.0 kN (907 lbf)	101 x 101mm (4 x 4 in.)
LP30	9.6 kN (2171 lbf)	152 x 2013 mm (6 x 8 in.)
LP32	9.6 kN (2171 lbf)	152 x 406 mm (6 x 16 in.)
LP40	17.5 kN (3953 lbf)	203 x 203 mm (8 x 8 in.)
LP50	17.5 kN (3553 lbf)	203 x 406 mm (8 x 16 in.)
LP60	27.4 kN (6164 lbf)	9.0°/s

*Force calculation at 6 bar (90psig)
**Cylinder dimensions = diameter x stroke

UP – Universal pneumatic actuators

Model	Force*	Speed 5 to 95% travel**	Part turn angle
UP1	122 Nm (90 lbf.ft)	2 s	90 °
UP2	610 Nm (450 lbf.ft)	10 s	90 °
UP3	1085 Nm (800 lbf.ft)	12 s	90 °
UP4	1866 Nm (1450 lbf.ft)	10 s	90 °
UP5	3796 Nm (2800 lbf.ft)	16 s	90 °
UP6	6372 Nm (4700 lbf.ft)	20 s	90 °
UP7	7326 Nm (5403 lbf.ft)	25 s	90 °

*Torque calculation at 6.9bar (100psig)
**Stroke speed with AV positioner

—
02

—
ABB Limited
Measurement & Analytics
Howard Road, St. Neots
Cambridgeshire, PE19 8EU, UK
Tel: +44 870 600 6122
Fax: +44 1480 213 339
Email: enquiries.mp.uk@gb.abb.com

ABB Inc.
Measurement & Analytics
125 E. County Line Road
Warminster, PA 18974, USA
Tel: +1 215 674 6000
Fax: +1 215 674 7183
Email: enquiries.mp.uk@gb.abb.com

ABB Automation Products GmbH
Measurement & Analytics
Schillerstr. 72
32425 Minden, Germany
Tel: +49 571 830-0
Fax: +49 571 830-1806

abb.com/measurement

PB/ACTUATORS-EN Rev. A 06.2018