CBB-Series Scotch-Yoke Pneumatic Actuators

Improved Design - Compact, Lightweight To Suit All Applications And Environment

BETTIS™

EMERSON™

Emerson is the global leader in providing safe, reliable, rugged actuators and automation solutions for the oil & gas, process, nuclear and other industries.

Improved design with many beneficial features for various industrial applications and conditions.

Improved torque shaft seal design is well suited for most environments.

Protects the environment with a leak protection, separate weather and pressure seal design that provides reliable dual redundancy in the actuator.

Improved travel stop design.

Enhanced performance and reliability suited for tough environments.

Easy field upgrade for high temperature trim with ductile iron piston as standard.

Design and Construction

Emerson, a leading pioneer in the valve automation and control industry for more than 55-years, has developed numerous innovations that have become today's industry standards. With continued focus on ingenuity, reliability, quality and product safety, our entire product offering is considered to be the global standard for automating valves in the oil & gas, power generation, pulp and paper, petrochemical, chemical, wastewater, and numerous other process industries. Performance has been the main differentiator. Emerson is recognized for effectiveness and reliability in some of the world's most difficult operating environments.

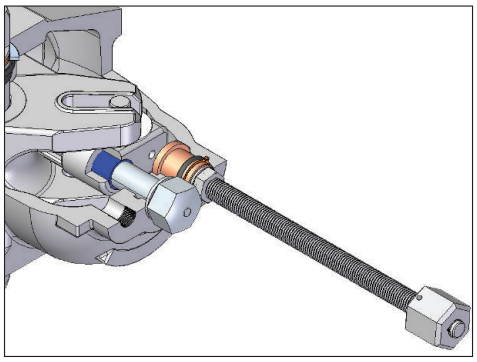
CBB-Series actuator represents the latest generation in pneumatic scotch yoke actuators from Emerson. The CBB draws from the best features of earlier versions – CB and CBA. Incorporating cutting edge features provides the CBB with a proven, rugged design that is dependable and reliable in the field. Because it has the same envelope dimensions and mounting interfaces as previous CB versions, the CBB allows for mounting interchangeability.

Compact, lightweight and ideally suited for automating ball, butterfly and non-lubricated plug valves, or any quarter-turn (90 degree) rotating mechanism, the CBB Series is also economical and low maintenance. Available in double-acting and spring-return models and are independently certified to IEC 60529 IP66 and IP67M for water ingress protection.

Emerson's quarter-turn rotary actuators utilize a ductile iron housing, advanced water ingress prevention design, and a two component polyurethane paint finish to ensure years of reliable performance in harsh environmental conditions. In addition to these standard features, CBB-Series actuators are available with optional accessories to meet the demanding requirements in valve automation.

CBB Series Application And Features

- For use with automating ball, butterfly and non-lubricated plug valves, or any quarter-turn (90 degree) rotating mechanism.
- PED 97/23/EC compliant to meet the stringent requirements of pressure retaining vessels.
- Compact, lightweight, and economical scotch-yoke design providing optimum torque curves for quarter-turn operation.
- Choice of 29 sizes with guaranteed minimum torque outputs up to 11,515 lb-in (1,301 Nm) for double -acting and 4,269 lb-in (482 Nm) spring-return configuration.
- Standard dual valve mounting interface provides flexibility for installation in a fail-open or fail-close application without the need of actuator disassembly. Installation is possible in any position, parallel or at right angles to the flow line, in the vertical or horizontal plane.
- Ductile iron housing and piston provide more strength per pound, increased durability and corrosion resistance.
- Increased actuator efficiency and corrosion resistance are possible with a Xylan fluoropolymer coating on the interior of the power cylinder. The permanently-bonded coating is highly resistant to abrasion, thermal shock and provides excellent lubricity and low friction properties.
- Close Loop Instrument System for actuators **should always be used** for the following applications: high humidity, salt air, corrosive dust, inks and dyes, and wash downs. The closed loop system routes the operating media being exhausted from the power side of the cylinder to the vented side of the cylinder. Maximum pressure on the vented side of the power cylinder is to be 5 to 8 psig.



Override options include a blowout proof jackscrew with hex nut or jackscrew with handwheel

Operating Principle

Both the double-acting and single-acting (spring-return) pneumatic actuators are designed with no moving parts on the outside (with the exception of the position indicator). This makes them safe, easy to install and virtually maintenance free.

Environmental Protection

Actuator reliability is crucial for the safety of a plant's automation process and personnel. The CBB-Series is independently certified to IEC 60529 IP66 and IP67M water ingress protection to prevent corrosion within the actuator. To help achieve this rating, CBB-Series incorporates a proven design for preventing water ingress on the torque shaft by using a separate pressure seal and weather resistance between the torque shaft and housing body.

Extreme temperatures require different solutions to maintain peak operational integrity and reliability. The CBB-Series is available in three different temperature trims:

- Standard trim is suitable for -20°F to +200°F (-29°C to +93°C)
- Optional high temperature trim +350°F (-18°C to +177°C)
- Cold temperature trim -40°F to +150°F (-40°C to +66°C)

Multiple Spring Packages

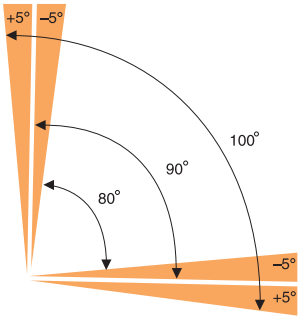
Spring-return, single-acting actuators are used mainly as a fail-safe method for closing or opening the valve. Their ability to automatically return the valve to its fail safe position upon air failure provides the vital link for ultimate system safety and shut down. CBB-Series spring-return actuators are available in 4-four-spring configurations fitting wide range of torque requirements under different supply pressures and operating parameters. Each of the carbon steel springs are protected by Tactyl 50, a pliable self-healing coating, for extending the CBB's life cycle.

Flexible Configurations

Requirements for process automation sometimes vary within a facility. To meet industry demands for product standardization with adaptability, Emerson offers many options for the CBB-Series:

- Override modules to reposition a valve in the event of a power loss can be supplied with a jackscrew and hex nut adaptor or a jackscrew with handwheel
- Optional temperature trims to meet harsh temperature extremes
- Extended and adjustable travel stops for each direction of travel
- Various spring configurations to meet torque and pressure requirements are some of most common options chosen

Travel Stops



Instrumentation for valve automation requires repeatable positioning and position indication. CBB-Series actuators include bidirectional travel stops as an integral part of the actuator. Travel stops are adjustable from 80° to 100° of total valve travel. This feature, with its unmatched travel range, assists in prolonging valve seat integrity. Applications requiring greater adjustment of valve travel can be supplied with the optional extended travel stops for full valve stroke travel adjustment.

Long Life Span

The rugged and dependable construction of the CBB actuator is backed with Emerson's industry leading five year warranty on materials and workmanship. With the use of superior design and materials throughout the construction, CBB spring-return actuators and double action actuators have a long cycle life when properly maintained and sized.

Safety Integrity Level (SIL)

CBB actuators are well suited for demanding SIL applications. These actuators have a Failure Modes and Effects Diagnostics Analysis (FMEDA) capability with reporting performed through Exida.com™ for SIL suitability. When a Fisher, TÜV-certified FIELDVUE® controller is added to the CBB, it is capable of partial stroke testing and providing continuous monitoring of supply pressure, valve position and pressure values to verify proper working condition. The CBB then becomes an integral component in controlling the final control element in SIL 1, 2 or 3 applications.

For more detailed technical information go to our online documentation at **www.bettis.com/technical-data**
Document number **[DOC.DSB.CBB.US]**

Product Offering

Emerson's Bettis product line is not limited in its technology offering for selecting the best configuration for use in automated service. With a wide range of hydraulic and pneumatic technologies for meeting critical customer requirements including:

- Scotch-Yoke
- Linear
- Rack & Pinion
- Direct Gas
- Gas Hydraulic
- Electric
- Self-Contained
- Multiport Flow Selector
- Controls
- Accessories
- Trims – include N(Nuclear) trim

Actuator / Accessory Interfaces

Bettis CBB with Topworx Positioner

Bettis CBB with Wireless Transmitter

Standards and Certifications

CBB-Series pneumatic actuators are manufactured to meet the following worldwide quality and safety standards:

ISO-9001

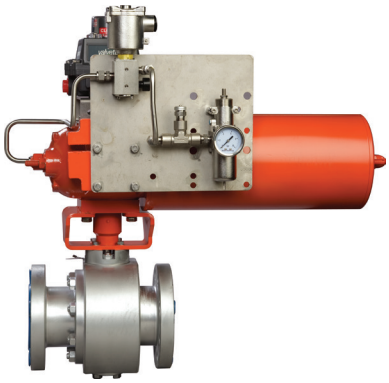
ABS

PED/97/23/EC – Pressure Equipment Directive

Valve Automated Packages

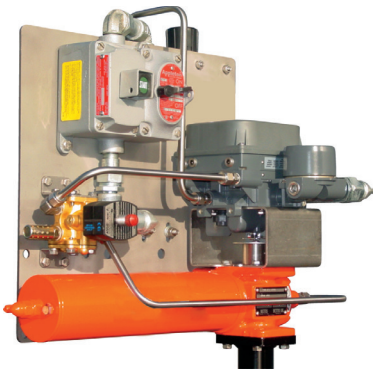
Emerson offers a complete valve operating system as a solution for final valve control.

Emerson's capability to combine the CBB actuator and controls with the selected valve into a single system at various international Actuation Technologies World Automation Configuration Centers (WACC) – makes them perfect for large international projects.



Supporting our valve automation solutions, Emerson has pre-engineered and documented a series of commonly required and approved control system that will reduce lead times, simplify purchasing, installation and start-up.

Please consult factory for additional information.



Other Emerson controls and accessories:

Fisher™

- Digital Valve Controllers
- Positioners
- Regulators

TopWorx™

- Switch Boxes
- Wireless Position Monitoring

ASCO Numatics™

- Solenoid Valves

This product is only intended for use in large-scale fixed installations excluded from the scope of Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS 2).

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