

# Market Leading Portfolio of Actuation Technologies



**Product Selection Guide**  
Pneumatic, Hydraulic, and Electric Actuators, and Gearboxes





## Delivering market leading valve automation for flow control's toughest automation, safety and productivity challenges

Actuation Technologies is an important part of Emerson Automation Solutions. We are known for reliable, durable, smart and high performing actuators that suit many types of applications and specifications. To reduce plant downtime and improve plant productivity, the right Valve Operating System™ (VOS) and actuator should be selected and our team of experts can guide you in the selection process.

Our actuation product brands include Bettis™, Biffi™, EL-O-Matic™, EIM™, Hytork™, Shafer™ and Dantorque™. These brands are known for their compact, lightweight, modular, corrosion resistant, robust, responsive, repeatable on/off capabilities. We also offer controls and gears.

For decades, we continue to be a single-source provider of field-proven, reliable and safe valve automation solutions. Helping companies all over the world in oil and gas, power, chemical, water and wastewater, marine, and subsea, our mission is to protect plant assets, personnel and the environment.

**We are 1 FORCE Driving All Valves Everywhere!**

# Safe, Reliable and Field Proven Actuation Technologies

## Pneumatic

### Bettis G-Series Scotch Yoke Valve Actuator

A scotch yoke valve actuator for operating ball, butterfly or plug valves along with louvres, dampers and other 90 degree rotating mechanisms. Suitable for demanding SIL-required applications.



- Modular design improves efficiency, reduces wear, and extends life
- Patented Tension-Lok™ device positively locks the spring module allowing safe removal and installation, eliminating accidental release of the spring force
- PED 97/23/EC compliant meeting stringent requirements of pressure mounting vessels
- Meets both IP66 and IP67M specifications for submergence and high pressure water deluge test and offers superior water ingress and corrosion protection

**Torque/Thrust** Spring-return models in excess of 339,000 Nm (3,000,000 in-lbs)  
Double-acting 1420 to 678,000 Nm (12,581 to 6,000,000 in-lbs)

**Operating Pressure** Pneumatic 3 to 14 bar (40 to 200 psig)  
Hydraulic up to 345 bar (5,000 psig)

**Operating Temperature** -29°C to +93°C (-20°F to +200°F)  
Optional high and low temperature trims available

### Bettis CBA300 Scotch Yoke Valve Actuator

A scotch yoke actuator that combines the strengths of the G-Series actuator and is compact, lightweight, efficient and very cost-effective.



- Economical jackscrew manual override available to ensure reliable valve control in the event of the power loss
- ISO/DIN bottom mounting for close or direct coupling to the valve Topworx
- NAMUR standardization allows direct or close coupling of accessory hardware

**Torque/Thrust** Double-acting 835 to 2,492 Nm (7,388 to 22,055 in-lbs)  
Spring-return 286 to 1,182 Nm (2,532 to 10,457 in-lbs)

**Operating Pressure** 3 to 10 bar (40 to 150 psig)

**Operating Temperature** Standard -30°C to +95°C (-20°F to +200°F)  
High -18°C to +177°C (0°F to +350°F)

### Bettis CBB-Series Scotch Yoke Valve Actuator

A scotch yoke actuator that is economical, low maintenance and independently certified to IEC 60529 IP66 and IP67M for water ingress protection.



- Symmetrical mounting pads allows field reversal of spring-return actuator failure mode with no disassembly required (CW or CCW)
- Compact and lightweight

**Torque/Thrust** Double-acting 1,384 Nm (12,245 in-lbs)  
Spring-return up to 562 Nm (4,971 in-lbs)

**Operating Pressure** 3 to 10 bar (40 to 150 psig)

**Operating Temperature** Standard -30°C to +95°C (-20°F to +200°F)  
High -18°C to +177°C (0°F to +350°F)

### Bettis RGS Rack and Pinion Valve Actuator

Quarter-turn, spring-return and double-acting pneumatic actuator available in ductile iron or stainless-steel construction, designed and built for high performance in severe vibration and corrosive environments.



- Operate with instrument air, hydraulic fluid, water, or other power gases and fluids
- Mode of operation may be reversed in the field simply by turning the actuator top-side down
- High cycle: 15 million and still going
- High speed/fast acting: less than 100ms

**Torque/Thrust** F-Series unlimited  
Q-Series up to 2,373Nm (21,000 in-lbs)

**Operating Pressure** F-Series 8.3 Bar (120 psig)  
Q-Series 10 Bar (150 psig)

**Operating Temperature** -51°C to 200°C (60°F to +400°F)

### Bettis GVO-C Series Linear Valve Actuator

A linear valve actuator designed for shutdown and control applications. Proven suitable for automating most types of rising stem valves.



- Full stainless steel construction and standard carbon-fiber material for lightweight durability and low friction (steel, stainless steel, aluminum and brass optional)
- Suitable for dirty environments; scale build-up on the piston rod will not affect the cylinder performance
- Conventional linkage arms replace a fully-enclosed transducer, which is a major design innovation

**Thrust** Up to 56,492 Nm (500,000 in-lbs)

**Operating Pressure** Up to 200 bar (3,000 psig)

**Operating Temperature** -54°C to +204°C (-65°F to +400°F)

### Bettis RPE-Series Rack and Pinion Valve Actuator

A rugged, reliable rack and pinion actuator for countless process applications. Compact and lightweight, suitable for tight piping configurations. Available in 13 sizes.



- Electrophoretic finish on springs protects from corrosion, and good chemical resistance against acids, solvents, alkalis and oils at normal temperatures
- Housing and end caps have anodizing, chromate pretreatment prior to painting
- Excellent exterior and mechanical durability
- High grade and hard anodized aluminum pinions, passed a 1,000 hours salt spray test

**Torque/Thrust** Double-acting: ranging up to 4,537 Nm at 5.5 barg (40,293 in-lbs at 80 psig)  
Spring-end for Spring-return: 1,958 Nm (17,333 in-lbs)

**Operating Pressure** Up to 8.3 bar (120 psig)

**Operating Temperature** -20°C to +80°C (-4°F to +176°F)  
Optional high or low temperature trims available

### EL-O-Matic F-Series Rack and Pinion Valve Actuator

Provides an on/off "Fit and Forget" performance, dependability and low maintenance across the widest range of applications requiring ½" through 30" valves.



- Aluminum actuator with standard NAMUR interface and dual ISO 5211 valve flanges
- Excellent corrosion protection powder coating, hard anodized high grade aluminum pinion and stainless steel fasteners
- Cycle speeds are maximized using large internal air ports
- Blowout proof pinion design improves safe maintenance by ensuring the pinion remains in the housing

**Torque/Thrust** Double-acting up to 4,537 Nm at 5.5 barg (40,293 in-lbs at 80 psig)  
Spring-end for Spring-return: 1,958 Nm (17,333 in-lbs)

**Operating Pressure** Up to 8.3 bar (120 psig)

**Operating Temperature** -20°C to +80°C (-4°F to +176°F)  
Optional high or low temperature trims available

### Hytork XL-Series Rack and Pinion Valve Actuator

A heavy duty actuator with modular design, allowing many different functional features to be assembled from a series of modules at the factory or on site.



- Patented safe key provides a quick and reliable method of spring change and maintenance of seals to the whole range of sizes
- "CERAMIGARD" surface finish of di-aluminum trioxide protects all body parts against wear and corrosion
- Hytork Evolution Valve Protection System available to provide protection against water hammer pressure surges and pipeline vibration

**Torque/Thrust** Double-acting up to 3,232 Nm at 5.5 barg (28,500 in-lbs at 80 psig)  
Spring-end for Spring-return: 1,525 Nm (13,500 in-lbs)  
\* A range of 12 actuator sizes with output torques

**Operating Pressure** Up to 8.3 bar (120 psig)

**Operating Temperature** -20°C to +100°C (-4°F to +212°F)  
Optional high or low temperature trims available

# Reliable Performance in Critical Applications

## ■ Bettis Q / FieldQ Valve Operating System™ (VOS)

A turnkey actuation solution combining a field-proven rack and pinion pneumatic actuator with controls in an integrated modular package. The solution offers up to 20% reduction in installation and commissioning time and provides flexibility for retrofitting into existing pipe runs.

- Dual travel stop, heavy duty aluminum actuators with dual ISO 5211 valve flanges
- Excellent corrosion protection from anodized and powder coated body, hard anodized high grade aluminum pinion and stainless steel fasteners
- Intelligent controls include IPT technology and are available with a range of fieldbus communication protocols
- Available options with FOUNDATION™ Fieldbus, include diagnostics and alerts meeting Emerson PlantWeb® alerts standard



**Torque/Thrust** Up to 1,676 Nm at 5.5 barg (14,874 in-lbs at 80 psig) for models and 897 Nm (7,939 in-lbs) spring end for spring-return models  
\* A range of actuator sizes with output torques

**Operating Pressure** Up to 8.3 bar (120 psig)

**Operating Temperature** -20°C to +80°C (-4°F to +176°F)  
Optional high and low temperature trims available

## ■ Hydraulic

### ■ Bettis EHO Electro-Hydraulic Operator (Smart)

A smart, self-contained, electro-hydraulic, quarter-turn, valve actuator, combining field-proven technologies, designed for reliable, critical shutdown applications.

- Utilizes a dependable spring-return actuator for the fail-safe stroke combined with an integral hydraulic power pack and electronic control module
- Designed as an emergency shutdown actuation solution to stop process flow upon the detection of a command signal or loss of power, protecting personnel, equipment, and the environment
- Consistently operates in challenging, hostile and remote environments, and even when the power source is challenged
- Over fifteen system alerts and alarms



**Torque/Thrust** 143 to 79,959 Nm (1,264 to 707,696 in-lbs)

**Operating Pressure** Up to 207 bar (3,000 psi)

**Operating Temperature** Standard -29°C to +60°C (-20°F to +140°F)  
Optional temperature -40°C to +60°C (-40°F to +140°F)

### ■ Bettis BHH Series Helical Spline Valve Actuator

This is a compact, rugged, hydraulic helical valve actuator ideal for most severe conditions.

- Using the multiple helical spline engagement with reciprocal splines on the piston, the high torque output is constant throughout the 90 degree rotations
- Mounting positions are numerous, with the models ready for direct mount modular control functions
- Compact and concentric - small footprint to torque ratio
- High water ingress protection IP68



**Torque/Thrust** 113 to 16,043 Nm (1,000 to 142,000 in-lbs at 2,000 psi)

**Operating Pressure** 40 to 207 bar (580 to 3,000 psi)

**Operating Temperature** -20°C to +80°C (-5°F to +180°F)  
Optional high or low temperature trims available

### ■ Bettis GH, Gas/Hydraulic Valve Actuator

- Uses high pressure gas (typically from a natural gas pipeline) as the power source for the actuator
- All models have zero leak pistons and rod seals
- Aluminum alloy actuator body and controls for exceptional corrosion resistance and low temperature applications
- Many control options including remote control, high/low shutoff and linebreak
- Pressure vessels certified (U Stamp) to ASME Section VIII as standard



**Torque/Thrust** Quarter turn models up to 678,000 Nm (6,000,000 in-lbs) and linear models with thrusts up to 2,891,200 N (650,000 lbs)

**Operating Pressure** 20.6 bar to 102.0 bar (300 to 1,480 psig)

**Operating Temperature** -46°C to +66°C (-50°F to 150°F)

### ■ Shafer RV-Series Rotary Vane Valve Actuator

Considered to be the “guardian of the pipeline”, the rotary vane actuator is specifically designed for pipeline applications and typically powered by natural gas using gas-over-oil technology.

- Built for safe control of ball valves or plug valves in all types of severe climatic conditions
- Proven reliability when powered by natural gas using gas-over-oil technology
- Rugged for high vibration environments like slurry pipelines, pumps and compressor stations
- Precise control of the stroking speed for applications like crude oil or refined product pipelines



**Torque/Thrust** 113 to 2,015,603 Nm (1,000 to 17,839,600 in-lbs)

**Operating Pressure** 6.9 to 206.8 bar (100 to 3,000 psig)

**Operating Temperature** -29°C to +121°C (-20 °F to +250°F)  
Optional low temperature trims available

### ■ Shafer SH-Series Gas Over Oil Helical Spline Valve Actuator

Ideal for a variety of small valve (2' to 8') pipeline applications including transmission, meter stations, city gates, gas storage facilities, gas processing plants, pipeline hubs, and gathering stations.

- Gas hydraulic tanks prevent gas contaminants from entering the actuator
- No internal corrosion problems, and no power gas regulators and relief valves required
- Precise speed control with zero leakage piston and no valve stem side loading
- Ideal for fuel gas valves, blow down valves, and small ESD valves
- Extended seal life and low maintenance



**Torque/Thrust** 254 to 2,034 Nm (2,250 to 18,000 in-lbs)

**Operating Pressure** 28 to 103 bar (400 to 1,500 psig)

**Operating Temperature** -29°C to +49°C (-20°F to +120°F)

### ■ Dantorque R-Series Helical Spline Valve Actuator

A subsea, helical spline, hydraulic valve actuator that is very compact and fully concentric with helical spline drive mechanism and disk springs.

- Ideal for shallow and deep water subsea and marine applications
- Double-acting and spring-return operation with ROV override capability
- Can be used with any quarter-turn valve, including ball, butterfly, plug and check valves



**Torque/Thrust** Up to 406,000 Nm (up to 3,595,000 in-lbs)

**Operating Pressure** 103 or 207 bar (1,500 to 3,000 psig)

**Operating Temperature** -20°C to +80°C (-4°F to +176°F)

For Biffi product selection, please visit [www.biffi.it](http://www.biffi.it)

# Dependable Performance for Tough Environments

## ■ Bettis Subsea GS-Series Actuator

Symmetrical scotch yoke mechanism, with a 40 year design history, provides quarter-turn rotation with a safety feature, positively locking the spring module in place under load.



- Rated up to 5,000 psi operating pressure
- Designed for depths in excess of 10,000 feet
- Capable of 6MM in-lbs in dual acting and 3MM in-lbs for spring-return torques

## ■ Shafer Subsea Rotary Vane Actuators

Available in double acting and balanced quarter-turn torque without the need for any internal gearing or power conversion mechanism. This subsea actuator is extremely efficient and compact, and does not require pressure compensation.



- Rated up to 3,000 psi operating pressures
- Qualified to depths of 3,000 feet
- Capable of up to 5MM in-lbs of torque (dual acting only)

## ■ Bettis Pressure Guard with G-Series Hydraulic

Reliable valve shutdown capability when an external power source is either not available or not dependable. They can be used with rotary hydraulic operators to provide a fail-safe system for use with ball, plug and other quarter-turn valves, as well as non 6A linear operated valves.



- Standard hydraulic model available for all valve sizes and configurations
- Modular design to simplify maintenance
- Eliminates need for plant air, fuel gas, electricity or nitrogen backup
- Adaptable for use with SCADA systems or remote signals

## ■ Controlinc Network Control

Capable of controlling up to 124 valve actuators and provides the security of built-in redundancy for uninterrupted operation and reliability.



- Common valve actuator control functions are pre-configured and ready to monitor and control valves from the LCD panel or host computer
- Supports Modbus network ports for networking with DCS SCADA / PLCs for total plant control
- Supports network including ring topology with up to 124 valve actuators per master
- Network multiples up to 124 masters to the host to automate thousands of actuators, and tens of thousands auxiliary discrete and analog I/O points

## ■ HQ-Series Quarter-Turn Electric Valve Actuator

A compact, easy to use, durable electric quarter-turn actuator suitable for butterfly, ball, and plug valves. Ideal for marine applications.



- All come standard with IP67 weatherproof enclosure rating
- Submersible and hazardous location service options are available
- Enclosure comes standard with lightweight, compact high grade aluminum alloy housing, highly corrosion resistant polyester coating, and internal/external castings are fully anodized
- Simple and color-coded electrical and mechanical design makes maintenance quick and easy and limit switch settings can be adjusted without disturbing other switch settings
- Includes local control station providing quick and easy way to check actuator status and control operation

## ■ M2CP Quarter-turn/Multi-turn Electric Valve Actuator

M2CP (formerly the 2000 Series) is ideal for a broad applications including marine and military. Field service can be performed quickly and easily.



- Robust mechanical design with ductile iron gear case, bronze worm gear, and heat-treated alloy steel worm makes the M2CP rugged, durable and ideal for military and commercial marine applications
- Meets high shock and vibration US DOD Navy Standards DOD-V-24657(SH), MIL-S-901, MIL-E-917, MIL-E-2036, and shock and vibration (MIL-STD-167-1, MIL-STD-901D), mechanical vibrations of shipboard equipment
- Incorporates a heat-treated alloy steel worm, as well as a cast-bronze worm gear drive sleeve, supported by tapered roller bearings to maximize thrust load support
- Meets NEMA 6-Submersible and NEMA 7, hazardous and cold temperature requirements for the Russian Marine Register of Shipping (RMRS) approval

## ■ Multiport Valve Actuator (MPA)

The Multiport actuator (MPA) is a single turn actuator for control of Multiport Flow Selector (MPFS) manifold. This application for oil/gas well production testing includes the MPFS which can support up to 8 flow lines.



- Allows the diversion of fluids from a single flow line to a test outlet or a sampling device
- Includes rugged I/O and alarm monitoring, integral circuit breaker/disconnect, motor overload and motor thermal, loss of control voltage, encoder failure, stall detection and alarming (for mechanical fault detection), 3-phase monitoring and phase correction insuring correct motor rotation
- A rugged, high visibility LED display for port number, torque, and alarms (also displays setup menus and setup parameters), multiple color LEDs display
- Includes local off remote selector switch and local control knob for port selection, and jog control when enabled by user

## ■ RTS Compact Fail-Safe Electric Valve Actuators

The compact fail-safe electric actuators with mechanical spring based fail positioning are designed to provide reliable shutdown and precise control.

Field proven RTS Series fail-safe actuators meet critical shutdown and control needs while lowering operational costs, downtime and mitigate risk. With the ability to independently adjust motor speed and fail safe shut down time, these explosion proof actuators provide operators the flexibility to meet a wide range of challenges. The RTS Series with integrated smart controls opens up new possibilities in a wide variety of process applications requiring emergency shut down and precise process control.

- A non-intrusive with absolute position detection with configurable speed options
- For on/off (S2) and modulating (S4) control
- Rotatable in 90 degree steps with remote mounting available
- Adjustable speed and positioning time

## ■ Electric

### ■ Bettis TorqPlus Electric Actuator

TorqPlus electric actuators are specifically designed for quarter-turn applications for ball, butterfly and plug valves, and dampers and vents.



- Compact design provides maximum torque output relative to its small design housing
- Custom control standards offers an endless number of control and accessory combinations
- Modular construction allows for easy field service

**Torque/Thrust** From 11 to 2,260 Nm ( 100 to 20,000 in-lbs )

**Operating Temperature** 0°C to 70°C (+32°F to +158°F)

### ■ EL-O-Matic EL-Series Electric Valve Actuator

Provides an extended series of electric actuators that have been field proven over a wide range of process applications. Uses high quality, corrosion-resistant aluminum alloy, stainless steel, and bronze materials for internal components and housings.



- Utilizes self-locking multiple reduction worm gear system for tight quarter turn positioning control
- Hazardous and non-hazardous housings, including ATEX or FM certified enclosures
- Low-noise with the use of high ratio worm and wheel reduction
- Feature a 30% duty cycle

**Torque/Thrust** 800 Nm (7,080 in-lbs)

**Operating Pressure** 90° models 40 to 120 psig (spring-return) and 20 to 120 psig (double-acting)  
180° models: 80 psig max. pressure (except E12)

**Operating Temperature** Standard -20 to 80°C (-4 to 175°F)  
Optional -20 to 121°C (-4 to 250°F)

# Smart Actuation Technologies and Controls

## RTS CM Compact Multi-Turn Valve Actuator

**Torque/Thrust** Up to 25 kN and 100 mm stroke



## RTS CL Linear Electric Valve Actuator

**Torque/Thrust** Up to 64 Nm



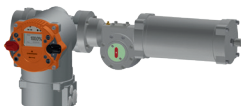
## RTS FL Linear Fail-Safe Electric Valve Actuator

**Torque/Thrust** 25kN (5,620 ft-lbs)



## RTS FQ Fail-Safe Quarter-Turn Electric Valve Actuator

**Torque/Thrust** 25kN (5,620 ft-lbs)



## TEC2 Electric Valve Actuator

With improved serviceability, records over 4,800 events and monitors over 60 actuator functions. Robust and compact design makes this actuator ideal for marine, oil and gas, chemical, power, and water and wastewater applications.



- Superior corrosion protection polyester powder-coating, inside and out, for all environments, 316 stainless steel cover screws, marine-grade, low copper content, aluminum provides compartment and covers with extra corrosion protection
- Separately Sealed Terminal Chamber (STC), dual sealed, allows installation wiring to be performed without exposing electronic control components
- Anti-condensation space heater thermostat prevents internal condensation due to temperature cycling with solid-state thermo-statically controlled to turn heater off
- Explosion-proof, weather-proof, and corrosion control, certified by F.M., C.S.A., Cenelec, and TSA for all gas groups in explosion-proof environments, and Russia Marine standards

Actuator Type	Torque Range	Mounting Options	Bus Options
Quarter Turn	68 to 542,300 Nm (50 to 400,000 ft-lbs)	Direct Mounted, Side Mounted	Modbus RTU DeviceNet FOUNDATION™ Fieldbus PROFIBUS HART Ethernet
Multi-Turn	6 to 21,693 Nm (4 to 16,000 ft-lbs)	Direct Mounted, Side Mounted	
Multi-Turn (Thrust)	5 to 4,700 kN (1 to 1,056 klbs)	Direct Mounted / Rising Stem	

## DCmlink Software - Electric Actuator Asset Manager

DCmlink™ is an innovative software platform that will enhance plant productivity by unifying all electric actuators on a common platform while allowing plant operators to gain deep insights into asset status and performance. Plant operators will benefit from improved productivity reduced down time and increased asset reliability.



- The software extends the useful life of field assets by providing actuator data gathering, condition monitoring, events log and prioritization of actuator alarms in a unified and consistent user interface
- Real-time diagnose, configure, calibrate, and monitor all electric actuator from a central location, independent of the protocol, actuator or host system
- Real-time monitoring and control of asset data, profiles, alarm and event logs
- Integrates with Emerson PlantWeb, AMS Snap-On and Bluetooth

## Gears and Manual Overrides

Explore a high performing and cost effective multi-turn bevel and quarter-turn worm gear operators, and declutchable manual overrides for manually operated valves. Our gears are suitable for oil and gas, chemical, refining, food processing, mining and water/wastewater industries. Custom engineered gears are also available.

### AMO-Series Quarter-Turn Manual Override

Lightweight declutchable quarter-turn manual override specifically designed for use with all types pneumatic rack and pinion actuator.



- 4 models available and greased for life
- Enclosure sealed to IP54
- For use with all types pneumatic rack and pinion actuator
- Integral top flange (available ISO drive with powder coated gearbox and handwheel)

**Torque/Thrust** Up to 3,500 Nm torque

**Operating Temperature** High up to +200°C (+392°F). Low up to -52°C (-62°F)

### ATB-Series Multi-Turn Bevel Gear Operator

Multi-turn bevel gear operators for manual operation and electrical actuation. Robust and compact design that are widely used on valves for oil and gas, chemical, power, and water and wastewater applications.



- 12 models available and greased for life
- Epoxy primer coating with ductile iron casing for higher strength and alloy steel pinions
- Fully sealed gearbox and completely enclosed gearing

**Torque/Thrust** Up to a torque of 18,000 Nm and thrust of 2,600 kN and F-48 mounting base

**Operating Temperature** High up to +200°C (+392°F). Low up to -52°C (-62°F)

### AT-IS Series Quarter-Turn Worm Gear Operator

Quarter-turn worm gear operators for manual operation. Widely used on valves for oil and gas, chemical, power, water and wastewater, pipelines, and HVAC applications.



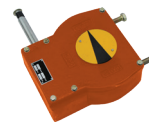
- 27 models available and greased for life
- Epoxy primer coating with NAMUR mounting available for limit switch box fitting
- New ratios can be designed to meet any requirement

**Torque/Thrust** Up to 350,000 Nm torque and F-60 mounting base

**Operating Temperature** High up to +200°C (+392°F). Low up to -52°C (-62°F)

### AT-Series Quarter-Turn Worm Gear Operator

Quarter-turn worm gear operators for manual operation. A compact design used in less critical applications.



- 27 models available and greased for life
- Epoxy primer coating with NAMUR mounting available for limit switch box fitting, enclosure sealed IP67 (IP68 available upon request)
- New ratios can be designed to meet any requirement

**Torque/Thrust** Up to 350,000 Nm torque and F-60 mounting base

**Operating Temperature** High up to +200°C (+392°F). Low up to -52°C (-62°F)

### CW-Series Quarter-Turn Worm Gear Operator

Quarter-turn worm gear designed for chainwheel operation. Robust and compact design that are widely used on valves for marine, oil and gas, chemical, power, and water and wastewater applications.



- 21 models available and greased for life
- Epoxy primer coating with NAMUR mounting available for limit switch box fitting, enclosure sealed IP67 (IP68 available upon request)
- New ratios can be designed to meet any requirement

**Torque/Thrust** Up to 100,000 Nm torque and F-48 mounting base

**Operating Temperature** High temperature variant up to +200°C (+392°F) and low temperature variant up to -52°C (-62°F) available

### IS-EA Series Quarter-Turn Worm Gear Operator

A robust, heavy-duty quarter-turn worm gear designed for on/off electrical actuation. This design is based on the AT-IS Series with ductile iron casing and alloy steel worm shafts.



- 27 models available and greased for life
- Epoxy primer coating with NAMUR mounting available for limit switch box fitting
- Corrosion-resistant stainless steel 316 option ideal for marine and highly corrosive environments, food and beverage applications, pharmaceutical, and sanitation facilities

**Torque/Thrust** Up to 325,000 Nm torque and F-60 mounting base

**Operating Temperature** High temperature variant up to +200°C (+392°F) and low temperature variant up to -52°C (-62°F) available

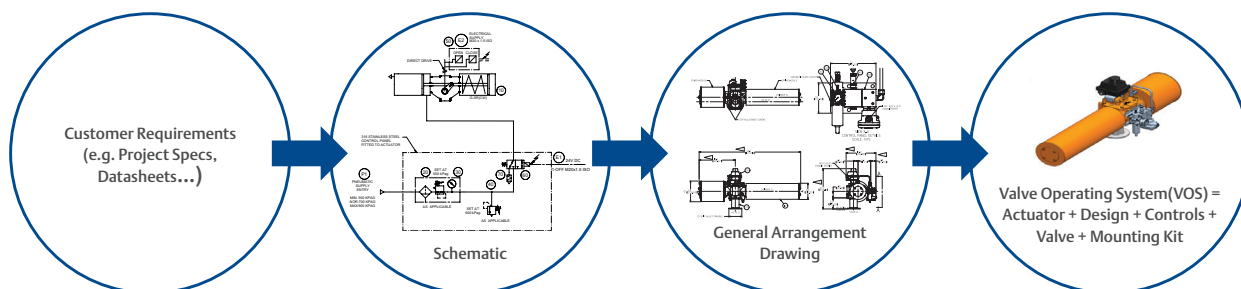
# Decades of Innovation and Field Proven Actuation Technology

## Valve Operating System™ (VOS)

We know it's just easier to do business with one supplier. This is why Emerson created the Valve Operating System (VOS).

The VOS is a turnkey solution which includes a valve automation engineering solution based on an end-user's specific application. VOS comprises of an actuator, control accessories (filter regulator, solenoid valve, positioner) and appropriate valve mounting kit to mount the VOS on to the valve. Additionally, every VOS comes with supportive documentation including installation manuals, quick service guides, drawings, warranty certificate and maintenance schedules. Everything the end-user needs to maintain and operate their valve actuation.

VOS is only available from Emerson as a complete system engineered, built and backed by Bettis.



### VOS can include:

- Specification review
- Optimized actuator sizing
- Stroke speed calcs
- Optimized air tank sizing
- Material of construction of control accessories
- Controls layout – Modular versus Non Modular

**Non Modular**

- 8 Fittings
- 3 Tubes
- 2 Accessory Brackets
- 16 Fasteners
- 1 Panel

**Modular**

- 2 Fittings
- 2 Tubes
- 4 Fasteners

### The Advantages of VOS Modular

- Pre-Engineered Solution
- Single supplier to manage; 3-4 weeks lead time for entire controls
- Pre-assembled ready-to-use system, labor reduction
- Elimination of fittings and tubing within the control system; optimized flow path, better stroking times
- Optimization of mounting panel and kits

### Types of VOS

Bettis Q-Series VOS	Bettis CBB-Series VOS	Bettis G-Series VOS	Bettis EHO Electro-Hydraulic Operator VOS
<ul style="list-style-type: none"> <li>• Rack &amp; Pinion Pneumatic Actuator with controls in an integrated modular package</li> <li>• Automates valves with small VOS footprint</li> <li>• Offers flexibility for retrofitting into existing installation</li> <li>• Torque Range: ~ 300 to 11,000 in-lbs</li> <li>• Capability to interface with BUS Systems</li> </ul>	<ul style="list-style-type: none"> <li>• Scotch &amp; Yoke Design</li> <li>• Compact Pneumatic Actuator</li> <li>• Torque Range: ~ up to 22,000 in-lbs</li> <li>• Suitable for on/off and shutdown applications</li> <li>• Capability of partial stroke test</li> </ul>	<ul style="list-style-type: none"> <li>• Scotch &amp; Yoke Design</li> <li>• Torque Range: ~ 3,000,000 in-lbs in single acting design</li> <li>• Suitable for on/off and shutdown applications</li> <li>• Control accessories fully integrated into a modular solution – eliminates fittings and tubings</li> </ul>	<ul style="list-style-type: none"> <li>• Scotch &amp; Yoke design hydraulic actuator</li> <li>• Torque Range: ~ 2,400,000 in-lbs in double acting design</li> <li>• 800,000 in-lbs in single acting design</li> <li>• Self contained hydraulic actuator solution for ESD valves</li> </ul>

### Benefits of VOS



Reduces costs for additional third party consultants, bidding and testing



Optimizes customer service level



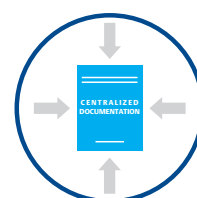
Deal with a proven market leader - one phone number and one contact



Easier ordering, faster configuration, procurement, and deployment



Dealing with one supplier reduces decision process, saves time and money



Centralized documentation for VOS components

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