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Rotary Valves and Actuators

The focus of this catalog is on quarter-turn products offered by Flowserve including:

• Atomac lined ball valves and related products
• Durco alloy and lined plug, ball and butterfly valves
• Durco Microfinish alloy ball valves
• Noble Alloy hardened metal ball valves
• Automax Valve Automation Systems, actuators and controls

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**Durco Sleeveline®**
Non-Lubricated Plug Valves for Chemical Service

**Features**
- Large PTFE sleeve seal area offers positive shut-off and extended service life
- Tapered plug reduces turning torque and seat wear
- In-line seal adjustment under pressure prevents thru-line leakage. Plug adjustment is independent of stem seals. With ± 3/16 in (5 mm) adjustment, plug cannot bottom out
- No cavities to accumulate product
- Sealing is both upstream and downstream
- TM/PFA reverse lip diaphragm provides static and dynamic self-adjusting stem seal
- Large port openings assure less pressure drop and higher CV (Kv)
- Double D plug stem accepts most standard actuation equipment
- Actuator mounting pads are on the flanges for solid support
- Lockout meets OSHA and plant safety requirements

**Applications**
- Chemical processing
- Process equipment isolation

**Sizes**
- 1/2 in (15 mm) thru 18 in (450 mm)

**Standards**
- ASME (ANSI) B16.34

**Other Configurations**
- G4Z fire sealed
- G4Z - HF alklation
- TSG4 severe service
- G4B Marathon

Get Bulletin DVENBR0024.

See page 2.
**Features**
- Stem seal consists of Grafoil packing, Monel diaphragm, TM/PFA diaphragm and Grafoil gasket
- Grafoil packing rings at the stem and Grafoil gaskets at the top cap reduce atmospheric leakage to a negligible amount should fire destroy the PTFE sleeve and diaphragm
- A Monel diaphragm keeps the Grafoil packing in place if the top seal is destroyed
- Non-lubricated design eliminates fouling of flow meter and instrumentation
- PTFE seats/seals provide positive shut-off – eliminate galling and seat relapping
- Vented plug accommodates the forces of fluid thermal expansion
- Quarter-turn operation can be cost - effectively actuated with rotary actuators

**Applications**
- HF alkylation
- Isomerization
- Blending
- Light ends
- Gas plant
- Sulfur plant
- Crude desalting

**Sizes**
- 1/2 in (15 mm) thru 18 in (450 mm)

**Standards**
- ASME (ANSI) B16.34
- API 607, latest revision
- Phillips Licensing Listed
- UOP Process Division Approved

**Other Configurations**
- G4BZ - HF alkylation
- G4Z fire sealed
- G4BZ Marathon

Get Bulletin DVENTB0025.

See page 2.

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**Features**
- It is specifically designed for reliable performance in high cycle on-off or modulating services
- Fugitive emissions containment often equals that of more expensive severe or toxic service valves
- Three-year performance guarantee provides valve repair or replacement if stem seal fails within three years after installation
- Unique stem-sealing design consists of the reverse lip TM/PFA diaphragm, an integral thrust collar/ alloy diaphragm and Viton O-rings with PTFE
  - Viton O-rings provide full pressure containment stem seal. Protects thrust collar from atmospheric corrosion.
  - Kalrez® and other elastomers available. PTFE backup rings help prevent extrusion of elastomer O-rings under pressure
  - Hastelloy® diaphragm is welded to an alloy thrust collar. This self-sealing, dynamic bellows-like diaphragm acts as an expansion joint by allowing the TM/PFA diaphragm to adjust to plug movement and pressure changes. The Hastelloy diaphragm provides an impenetrable barrier to chlorine and many other services
- Highly polished sealing surfaces eliminate wear and enhance seal integrity

**Applications**
- Chemical processing
- High cycle services

**Sizes**
- 1/2 in (15 mm) thru 18 in (450 mm)

**Standards**
- ASME (ANSI) B16.34
- API 607, latest revision

**Other Configurations**
- G4BZ - HF alkylation
- G4Z fire sealed

Get Bulletin DVENBR0024.

See page 2.

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**Features**
- Meets/exceeds CAA fugitive emissions regulations at one-third to one-half the cost of bellows sealed valves
- Triple-sealed valve for lethal, toxic and sub-zero fluid services where an absolute stem seal is required
  - Primary: PTFE sleeve provides large, static seal for positive shut-off and extended service life
  - Secondary: TM/PFA reverse lip diaphragm offers static and dynamic self-adjusting stem sealing assurance
  - Tertiary: live-loaded PTFE packing set further prevents potential emissions while addressing possible permeation related leakage
- Wide range of stuffing box options with independent plug and stem seal adjustments
- Belleville washers accommodate extreme temperature fluctuations
- Leak-off connections for continuous monitoring, inert gas pad or insertion of process compatible lubricants
- Drilled and vented plug balances pressure between plug port and body cavity

**Applications**
- Severe chemical processing
  - Chlorine
  - Hydrochloric acid
  - Hydrofluoric acid

**Sizes**
- 1/2 in (15 mm) thru 8 in (200 mm)

**Standards**
- ASME (ANSI) B16.34

**Other Configurations**
- G4 Sleeveine
- G4B Marathon

Get Bulletin DVENBR0024.

See page 2.
Durco Mach 1™ High Performance

Features
- Two-piece primary seal is PFA with encapsulated alloy inserts to provide:
  - Lower, constant turning torques comparable to ball valves and significantly lower than other plug valves
  - Higher temperature capability more comparable to gate and triple-offset butterfly valves - to 525°F (274°C)
  - Easy seat replacement with valve in-line; no special tooling required
- In-line plug adjustment under pressure stops thru-line leakage
- PFA reverse lip diaphragm provides dynamic and static, self-adjusting stem seal
- Alloy diaphragm provides stem seal reinforcement
- Lower turning torques result in smaller, less costly actuation packages
- ISO 5211 mounting pad is a universal flange for easy, low-cost actuation (optional flange flats mounting)
- PFA alloy encapsulated full sleeve is available

Applications
- Chemical processing
- On-off or modulating service

Sizes
- 1 in (25 mm) thru 6 in (150 mm)

Standards
- ASME (ANSI) B16.34
- API 607, latest revision
- ASME (ANSI) Class 150, 300 and 600 (derated flanges)

Other Configurations
- G4 Sleeveline
- G4B Marathon
- G4BZ Marathon

Get Bulletin DVENTB0030.

See page 2.

Durco EG4 V-Port Control

In addition to the features and benefits that have made Sleeveline the process industry’s premier plug valve, Flowserve offers the EG4 V-Port valve for precise modulating control services.

Durco EG4 V-Port control valves are available in a variety of trim configurations to satisfy a user’s exact flow control needs. Sizes include 1 in (25 mm) thru 6 in (150 mm) with full open Cv values of 3.0 to 400 (Kv of 2.6 to 345).

Characterized V-port Sleeveline control valves are available as follows:
- G4 - 1/2 in (15 mm) thru 6 in (150 mm)
- G4B - 1/2 in (15 mm) thru 6 in (150 mm)
- TSG4 - 1 in (25 mm) thru 3 in (80 mm)
- Mach 1 - 1 in (25 mm) thru 6 in (150 mm)

A Typical Characteristic Curve for EG4 V-Port Valves

Get Bulletin DVENBR0024.

See page 2.

Noble Alloy Check Valve

Condor™ Piston Check Valve

Design Features
- Patented constant area design for full bore flow area and assurance of low pressure loss through the valve
- Unique double guided piston for total stability even in dual phase conditions
- Installation in any position to optimize piping flexibility
- Replaceable metal or soft seats

Technical Data
- ASME Class 150 through 1500
- Sizes: 1/2 in (15 mm) to 8 in (200 mm) and 10 in (250 mm) for Class 150
- Materials: Carbon, 316SS (standard). Other materials include those for swing check valve plus ceramic for some applications

Swing Check Valve

Design Features
- Disc fully clears waterway for full flow capability
- No possibility of disc separation, loss of parts downstream with riveted disc assembly
- Disc hinge pin not in flow path and designed with no external leak path
  - Integral seats; no welded-in seal rings
  - Flat seats; no angles or radius sealing
- Only two internal parts to replace

Technical Data
- ASME Class 150 through 1500
- Full or regular port
- Raised face flanged, ring-type joint, buttweld, socketweld and threaded end connections, in any combination
- Sizes: 1/2 in (15 mm) to 8 in (200 mm) (larger sizes on application)
- Materials: 316SS, chrome, Hastelloy, Alloy 20, Inconel, titanium, zirconium and other alloys

Get Bulletin NAENTB0007.

See page 2.
Noble Alloy System II
Precision Cast Ball

Standards
- ASME (ANSI) B16.34
- API 607, latest revision

Features
- Fully interchangeable metal or soft seats and balls to accommodate changing service conditions
- Fully bi-directional seating
- Patented metal seal for dynamic line seal
- Patented live-loaded stem seal packing design with optional Fugitive Emission Monitor (FEM)
- Nobelized (i.e., hardened) internals
- Blow-out proof stem
- V-Port control valves may be specified in 30° and 45° configurations for either metal or soft seat valves – other configurations available
- Full port, raised flange faces
- Materials include:
  - 316 SS
  - Hastelloy
  - Inconel
  - Titanium
  - Zirconium
- Others
- Soft seat materials include: virgin or reinforced PTFE standard; other fluoropolymers, including high performance
- ASME (ANSI) Class 150 to 300

Applications
- High temperature, erosive/corrosive chemical processing
- High temperature, erosive/corrosive hydrocarbon processing

Sizes
- 1/2 in (15 mm) to 4 in (100 mm)

Other Configurations
- 3D ball
- Custom ball
- Multiport ball
- Check

Get Bulletin NAENTB0007.
See page 2.

Noble Alloy 3D Ball

Standards
- ASME (ANSI) B16.34
- API 607, latest revision

Features
- Designed for completely reliable performance in high pressure service with a choice of metal or soft seats
- Patented conical metal seating eliminates matched lapped sets, enabling virtually unlimited trim combinations including soft seats
- Bi-directional design allows easy reversal of flow direction
- Three-piece body construction simplifies in-line service or retrofit
- Nobelized (i.e., hardened) internals
- Patented live-loaded packing with back-up adjustment is standard
- V-port coated balls available
- High end alloy valves available in investment cast or forged/100% machined bodies
- ASME Class 150 thru 1500, full port

Small Bore and High End Alloy Valves
- Buttweld, socketweld and threaded end connections
- Small bore sizes: 1/4 in (6 mm), 3/8 in (10 mm), 1/2 in (15 mm), 3/4 in (20 mm) and 1 in (25 mm)
- Materials: Aluminum, Alloy 20, duplex SS, Hastelloy, Inconel, nickel, tantalum, zirconium and many others

Applications
- High pressure, high temperature, erosive/corrosive chemical processing
- High pressure, high temperature, erosive/corrosive hydrocarbon processing

Sizes
- 1/2 in (15 mm) to 18 in (450 mm)

Other Configurations
- System II
- Custom ball
- Multiport ball
- Check

Get Bulletin NAENTB0007.
See page 2.

Noble Alloy Custom Ball

Standards
- ASME (ANSI) B16.34
- API 607, latest revision

Features
- Made to customer specification with a virtually unlimited choice of materials and configurations
- Severe corrosive and erosive services
- Unlimited body and trim combinations
- End connections and flange sizes can be mixed
- Metal-to-metal or soft seats
- Ball and seats require no lapping/matched sets for easy field repair
- 100% machined from any forged material
- Composite flange for added strength in higher alloys
- Fugitive Emission Monitor (FEM) package available
- Nobelized (i.e., hardened) internals
- V-Port balls available
- Full or regular port
- Raised face flanged, ring-type joint, butt weld, socket weld and threaded and threaded end connections in any combination
- Materials include: aluminum, Alloy 20, duplex SS, Hastelloy, Inconel, nickel, Nitronic®, tantalum, titanium, Ultimet®, zirconium and many others
- ASME (ANSI) Class 150 thru 1500

Applications
- High pressure, high temperature, erosive/corrosive chemical processing
- High pressure, high temperature, erosive/corrosive hydrocarbon processing

Sizes
- 1/2 in (15 mm) to 18 in (450 mm)

Other Configurations
- System II
- 3D ball
- Multiport ball
- Check

Get Bulletin NAENTB0007.
See page 2.

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**Features**
- Positive stem seal even after extended cycles
  - PTFE cup and cone packing for unsurpassed seal life and cyclability
  - Smooth stem finish reduces torque and increases stem seal life
  - Glass filled PTFE thrust washer aids sealing while reducing torque
  - Belleville washers maintain constant “live” load on cup and cone packing
- Three-piece body, full bore or regular port, in WCB or CF8M
- Duracon TFM seat standard for higher pressure and temperature applications. Virgin PTFE or carbon reinforced PTFE options
- Minimum body cavity minimizes media retention and process contamination
- Large diameter, stainless blowout-proof stem
- Super smooth finish of stainless ball provides low torque and long seal life
- ISO 5211 mounting pad for easy, low cost actuation
- ASME (ANSI) Class 150 and Class 300

**Applications**
- Chemical processing
- Hydrocarbon processing
- General industrial

**Sizes**
- 1/2 in (15 mm) thru 8 in (200 mm)

**Standards**
- ASME (ANSI) B16.34
- API 607, latest revision
- PED

**Other Configurations**
- Fire sealed flanged ball
- Threaded ball
- Fire sealed threaded ball

Get Bulletin DVENTB0060.

See page 2.

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**Features**
- Positive stem seal even after extended cycles
  - PTFE cup and cone packing for unsurpassed seal life and cyclability
  - Smooth stem finish reduces torque and increases stem seal life
  - Glass filled PTFE thrust washer aids sealing while reducing torque
  - Belleville washers maintain constant “live” load on cup and cone packing
- Three-piece body, full bore or regular port, in WCB or CF8M
- Duracon TFM seat standard for higher pressure and temperature applications. Virgin PTFE or carbon reinforced PTFE options
- Minimum body cavity minimizes media retention and process contamination
- Large diameter, stainless blowout-proof stem
- Super smooth finish of stainless ball provides low torque and long seal life
- ASME (ANSI) Class 800

**Applications**
- Chemical processing
- Hydrocarbon processing
- General industrial

**Sizes**
- Full port - 1/2 in (15 mm), 3/4 in (20 mm), 1 in (25 mm), 1-3/4 in (40 mm)
- Regular port - 1/2 in (15 mm), 3/4 in (20 mm), 1 in (25 mm) 1-3/4 in (40 mm), 2 in (50 mm)

**Standards**
- ASME (ANSI) B16.34
- API 607, latest revision
- PED

**Other Configurations**
- Fire sealed threaded ball
- Flanged ball
- Fire sealed flanged ball

Get Bulletin DVENTB0065.

See page 2.
**Durco BX 2001 High Performance**

**Features**

- PFA/Viton® energized seat provides positive, bi-directional shut-off with long cycle life on low pressure and vacuum, and high ∆P services
- Double offset disc creates an eccentric seating action which eliminates seat wear, reduces torque and allows disc to “cam” into seat for tight shut-off
- Large diameter, one-piece high strength shaft reduces deflection for positive, repeatable shut-off at higher ∆P than similar valves
- PolyLube® bearings or optional severe service bearings both offer low torque and high-cycle life
- Wide choice of packing materials including adjustable and self-adjusting live-loaded with leak detection port or purge fittings for lethal, toxic or sub-zero services
- Independent packing set adjustment prevents stem seal emissions
- Blow-out proof stem complies with API 607
- Wide range of optional materials includes Alloy 20, Inconel, Monel, Hastelloy B and C and Nickel
- ASME Class 150 and Class 300; wafer and lug body designs

**Applications**

- Chemical processing
- Hydrocarbon processing

**Sizes**

- 2 in (50 mm) thru 36 in (900 mm)

**Standards**

- ASME (ANSI) B16.34
- API 607, latest revision
- ISO 5752

**Other Configurations**

- Fire sealed
- Apex™ metal seated
- TriFlex™ metal seated

Get Bulletin DVENTB0039.

See page 2.

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**Durco BX2001 Seat Design Options**

**UHMWPE Seats**

For abrasive services. BX valves with ultra high molecular weight polyethylene (UHMWPE) seats provide long-lasting performance in erosive/abrasive services. UHMWPE seats are rated for services to 200°F (93°C)

**Fire Sealed Valves**

The fire sealed version BX2001 meets API 607 requirements. If a fire destroys the PFA/Viton O-ring energized primary seat, the Inconel® X750 metal backup seat activates to provide positive sealing

**Apex Metal Seated Valves**

Inconel seat assures Class IV shut-off and abrasion resistance. Grafoil® gaskets provide secondary sealing. Viton ring locks retainer ring into valve body on designs to 400°F (205°C); Inconel lock wire >400°F (>205°C) to 600°F (315°C)

**TriFlex Metal Seated Valves**

TriFlex utilizes various seat designs including the sleeve and coil action of three individual springs and an Inconel spring. The metal seat plus the energizing force of process fluid pressure provide outstanding shut-off service. These highly resilient springs also offer excellent corrosion and abrasion resistance for extended service life to 1000°F (538°C)

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**Durco BX 2001 Stuffing Box Packing Options**

**Soft Seated Valves**

- Standard is single PTFE cup and cone (shown above)
- Double PTFE cup and cone with lantern ring
- Live loaded, single PTFE cup and cone (adjustable)

**Fire Sealed**

- Standard is single Grafoil
- Double Grafoil with lantern ring, purge ports optional (shown above)

---

**TriFlex and Apex BX2 Metal Seated**

- To 400°F (205°C) standard single PTFE cup and cone (adjustable). Optional live loading available
- To 400°F (205°C) double PTFE cup and cone with lantern ring (adjustable). Optional live loading available
- To 600°F (315°C) (TriFlex to 1000°F [538°C]) standard single Grafoil packing set
- To 600°F (315°C) (TriFlex to 1000°F [538°C]) double Grafoil with lantern ring (shown above)
Durco BTV-2000™ Lined Butterfly

Features
• Maintenance-free, live-loaded triple seal design assures bubble-tight shut-off and leak-tight stem seals
  – Primary seal is formed at the disc hub by the spherical ball and socket/disc liner seal for a 360° contact seal
  – Secondary seal of PTFE covered PFA convolutions create tortuous no-leak path on the disc stem
  – Tertiary seal is provided by O-rings in the gland follower
  – Fully compressed spring keep constant pre-load on PTFE stem seal
• Extra wide spheroidal seat design provides positive shut-off. Thick - 1/8 in (3 mm) - rigid machined PTFE or UHMWPE liner is recessed in body preventing cold flow. Live-loaded elastomer seat energizer enhances sealing
• Unequaled performance in high temperature/high cycle services

Wide Choice of Materials
• Liners
  – PTFE and UMPE
  – TFM - molecularly enhanced PTFE
• Discs
  – PFA encapsulated disc (with a DCI/ENC substrate) is standard
  – Optional UHMWPE encapsulated disc
  – Optional metallic discs in most alloys including light reactive
• Bodies
  – DCI standard; 316 SS optional

Applications
• Severely corrosive-erosive chemical processing
• Pulp & paper
• Mining & metal refining

Sizes
• 2 in (50 mm) thru 24 in (600 mm)

Get Bulletin DVENTB0020.
See page 2.

Durco T-Line® T-41 and T-43 Plug

Features
• Solid one-piece PTFE lining in the body and on flange faces plus a PFA encapsulated plug maximizes corrosion resistance and virtually eliminates leak paths
• A dynamic self-adjusting, self-energizing reverse lip PFA diaphragm seal prevents stem leakage
• Stem seal at top of plug provides double protection against external stem leakage
• In-line seal adjustment under pressure prevents thru-line leakage, assures even stem seal pressure
• One-piece ductile iron body is standard for ASME (ANSI) Class 150; carbon steel is standard for ASME (ANSI) Class 300. 316 SS and other alloys available for body armor and plug insert
• Large port areas assure low pressure drop and higher Cv (Kv)
• Corrosion-resistant coating is standard on body and top cap
• V-port plugs available for modulating control (1 in [25 mm] thru 3 in [80 mm])

Applications
• Chemical processing acids, waste acids, acid brines, bath solutions and other severe corrosives

Sizes
• T-41 ASME (ANSI) Class 150 - 1/2 in (15 mm) thru 12 in (300 mm)
• T-43 ASME (ANSI) Class 300 - 1 in (25 mm) thru 6 in (150 mm)

Ratings
• T-41 rated 180 psi (12.5 bar) @ 400°F (205°C); 250 psi (17 bar) @ 100°F (38°C)
• T-43 rated 320 psi (22 bar) @ 400°F (205°C); 740 psi (51 bar) @ 100°F (38°C)

Standards
• ASME (ANSI) B16.34

Other Configurations
• Atomac AKH3 lined ball
• Durco BTV-2000 lined butterfly

Get Bulletin DVENTB0017.
See page 2.
**Features**
- ANSI dimensional valves
  - AKH3 regular port
  - AKH2A full port
- Solid piece PFA or FEP lining in the body and on flange faces plus a PFA encapsulated ball maximizes corrosion resistance while eliminating potential leak paths
- Adjustable PTFE chevron packing provides stem seal integrity while maintaining low torque. Extended, live-loaded packing for additional fugitive emission protection available
- Graphite bearing prevents stem side loading and extends seal life
- Anti-blowout stem assembly even if top works disassembled
- Floating ball seat design for bubble-tight shut-off across the pressure range
- Separate ball/stem connection greatly reduces side loading to extend stem seal life
- Two-piece ductile iron body with B7 fasteners is both rugged and rigid. Optional Atostar AKH lined valves available in 316 SS bodies, stem and ball inserts. A variety of metallic and non-metallic ball material options are available
- Cavity space minimizes retention of process media
- V-port control balls available
- ISO 5211 mounting pad

**Applications**
- Severely corrosive chemical processing

**Sizes**
- AKH3 regular port - 1 in (25 mm) thru 12 in (300 mm)
- AKH2A full port - 1 in (25 mm) thru 6 in (150 mm)

**Standards**
- ASME (ANSI) B16.5
- ASME (ANSI) B16.10

**Other Configurations**
- AKH2 full port, DIN dimensional
- Atostar™ AKH 316 SS armor, stem and ball inserts

Get Bulletin ATENTB0010.

See page 2.

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**Atomac AKH3 and AKH2A Lined Ball**

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**Features**
- Five ball porting options available with 90° or 180° flow combinations. Optional flow arrangements upon request
- High flow capacity with minimal pressure loss through the valve, thereby reducing plant operating cost
- Compact design permits use wherever space is at a premium
- Lower cost than alloy valves with equal or superior corrosion resistance in difficult services
- PFA standard material for valve lining and encapsulated ball. Rated for services to 400°F (200°C) and ambient pressures to 285 psi (19.7 bar)
- Floating ball seat design for bubble-tight shut-off across the pressure range
- Separate ball/stem connection greatly reduces side loading to extend stem seal life
- Anti-blowout stem assembly even if top works disassembled
- Adjustable PTFE chevron packing provides stem seal integrity while maintaining low turning torque
- Graphite bearing prevents stem side loading and extends seal life
- ISO 5211 mounting pad

**Applications**
- Severely corrosive chemical processing

**Sizes**
- 1 in (25 mm)
- 1-1/2 in (40 mm)
- 2 in (50 mm)
- 3 in (80 mm)
- 4 in (100 mm)

**Standards**
- ASME (ANSI) B16.5
- ASME (ANSI) B16.10

**Other Configurations**
- AKH3 lined ball
- AKH2A lined ball
- AKH2 lined ball

Get Bulletin ATENTB0010.

See page 2.

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**Atomac AKH5 Ceramic Lined Ball**

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**Features**
- Lining, ball and stem are made of solid Mg-PSZ (transformation toughened magnesium partially stabilized zirconia) for superior abrasion resistance. Excellent strength and thermal shock resistance
- Wide selection of stem material options, including 316 SS, Hastelloy C-276 or Mg-PSZ ceramic
- Mg-PSZ ceramic can be applied in services to 660° F (350°C). Temperature shock resistant to +200° F (93°C). Its equal to the metal hardness of Rockwell 89
- PTFE chevron or graphite packing rings in the deep stuffing box protects against external leakage to atmosphere
- Stem sealing requires virtually no maintenance and provides low stem torque. Adjuster and packing gland feature a ball and socket fit for even stem sealing reliability
- Ball seals against machined seat area for bubble-tight shut-off
- Full port minimizes pressure loss and increases flow capacity to reduce energy and pumping costs
- V-port control balls available
- ISO 5211 mounting pad

**Applications**
- Severely abrasive/corrosive chemical processing at elevated temperatures

**Sizes**
- 1 in (25 mm)
- 1-1/2 in (40 mm)
- 2 in (50 mm)
- 3 in (80 mm)
- 4 in (100 mm)

**Standards**
- ASME (ANSI) B16.5
- ASME (ANSI) B16.10

**Other Configurations**
- AKH3 lined ball
- AKH2A lined ball
- AKH2 lined ball

Get Bulletin ATENTB0010.

See page 2.

www.flowserve.com
Features
- Primarily used for tank drainage. AKH6 valves are also commonly installed in place of reducing spools to downsize piping dimensions
- Designed with a larger inlet port, the valve’s full port design minimizes pressure loss and increases flow capacity to reduce energy and pumping costs
- FEP and PFA liners offer both long service life and superior corrosion resistance. Liner’s inert non-stick properties make it ideal for highly viscous or high purity services
- Positive stem seal with adjustable PTFE chevron packing
- Floating ball seat design for bubble-tight shut-off across the pressure range
- Anti-blowout stem assembly
- V-port control balls available
- ISO 5211 mounting pad

Applications
- Chemical processing
- Food and beverage

Sizes
- 1 in (25 mm) x 2 in (50 mm)
- 1-1/2 in (40 mm) x 3 in (80 mm)
- 2 in (50 mm) x 3 in (80 mm)
- 2 in (50 mm) x 4 in (100 mm)
- 3 in (80 mm) x 4 in (100 mm)
- 4 in (100 mm) x 6 in (150 mm)
- 6 in (150 mm) x 8 in (200 mm)

Standards
- ASME (ANSI) B16.5
- ASME (ANSI) B16.10

Other Configurations
- AKH3 lined ball
- AKH2A lined ball
- AKH2 lined ball

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Features
- Characterized ball options
  - V-port ball control valve available for throttling services in both fluoropolymer lined and ceramic lined models
  - C-ball eliminates media build-up in ball cavity
- Low, constant and predictable torque
- Thrust bearing supported stem to eliminate side-loading of packing and subsequent leakage during cycling
- Floating ball design for bubble-tight shut-off across the pressure range
- Long-life seats to minimize downtime and maintenance
- ISO 5211 mounting pads
- Characterized ball options are available on these valve models:
  - AKH2 full port
  - AKH2A ANSI full port
  - AKH3 ANSI standard port
  - AKH5 ceramic lined
  - AKH6 tank drain

Applications
- Modulating flow control

Sizes
- 1 in (25 mm)
- 1-1/2 in (40 mm)
- 2 in (50 mm)
- 3 in (80 mm)
- 4 in (100 mm)

Standards
- ASME (ANSI) B16.5
- ASME (ANSI) B16.10

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Features
- Designed for easy installation in glass systems with socket/ball or plane ends according to DIN/ISO 3587 and 4704
- Molded fluorocarbon resin liners are made of either FEP or PFA, depending upon application
- Long service life and high corrosion resistance due to uniform and blowhole-free thickness
- Non-stick properties ideal for handling highly viscous fluids or those process applications with high purity requirements
- Available with conductive materials for the linings, seals and gland packings
- Long-term protection against atmospheric leakage provided by adjustable PTFE chevron packing rings in the deep stuffing box and by the molded liner/seal
- Stem is internally assembled to eliminate possibility of blowout
- Floating ball seat design for bubble-tight shut-off across the pressure range
- Separate ball/stem connection greatly reduces side loading to extend stem seal life
- Anti-static device protects against potentially dangerous electrostatic discharge

Applications
- Chemical processing
- Food and beverage

Sizes
- 1 in (25 mm)
- 1-1/2 in (40 mm)
- 2 in (50 mm)
- 4 in (100 mm)

Standards
- ASME (ANSI) B16.5
- ASME (ANSI) B16.10

Other Configurations
- AKH7 - KPF for flange/glass end connections

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See page 2.
**Atomac APN Lined Sampling**

**Features**
- APN lined sampling valves available in two models:
  - APN/T lined sampling
  - APN/SG lined sampling with sight glass
- Provides safe sampling of toxic or highly corrosive media without interruption of process flow
- Manual or automatic operation for convenience or safety
- Horizontal or vertical piping installation
- FEP, PFA or conductive linings available
- Designed with a minimum of dead space
- Sample volumes between 25 and 100 ml
- Optional connections for sample bottles
- Maximum pressure to 85 psi (6 bar)
- APN/T - 180° turn of the handle captures, isolates and discharges a sample into the bottle. The process remains isolated at all times
- APN/SG - all the features of APN/T plus a borosilicate sight glass for visual monitoring of the process stream

**Applications**
- Chemical processing

**Sizes**
- APN/T - 1 in (25 mm), 2 in (50 mm), 3 in (80 mm)
- APN/SG - 1 in (25 mm), 1-1/2 in (40 mm), 2 in (50 mm), 2 and 3 in (50 and 80 mm)

**Standards**
- ASME (ANSI) B16.5
- ASME (ANSI) B16.10

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**Atomac ASG Lined Sight Glass**

**Features**
- Offers clear visual inspection from either side
- Integrated drip lip with cast core provides visual flow indication even at low velocity
- Highly corrosion resistant liniers
  - All internal components (other than the glass) have same molded fluorocarbon liniers
  - FEP or PFA, depending upon the application, offer long service life and high corrosion resistance due to thick, uniform blowhole-free liner
  - Non-stick and inert properties are ideal for highly viscous and high purity applications
- Borosilicate safety glass is utilized to withstand high temperatures, mechanical stress and corrosion

**Applications**
- Chemical processing

**Sizes**
- ASG
  - 1 in (25 mm)
  - 1-1/2 in (40 mm)
  - 2 in (50 mm)
  - 3 in (80 mm)
  - 4 in (100 mm)
  - 6 in (150 mm)
- ASG3 - 3-way
  - 1 in (25 mm)
  - 2 in (50 mm)
  - 3 in (80 mm)
  - 4 in (100 mm)
- ASG4 - 4-way
  - 1 in (25 mm)
  - 2 in (50 mm)

**Standards**
- ASME (ANSI) B16.5
- ASME (ANSI) B16.10

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**Atomac AR Lined Check Valves**

**Features**
- Three check valve configurations available
  - ARV2
  - ARV/SG with sight glass
  - ARL 45° (Y)
- Vertical or horizontal installation, depending upon application
- Solid PTFE ball has the same properties as the FEP or PFA lining material. Optional hollow PTFE ball
- Full port design offers excellent flow characteristics to minimize pressure loss
- Minimum opening pressure to unseat the ball in the vertical position is 1 psi (0.07 bar)
- Borosilicate safety glass, in accordance with DIN 7080, withstands high temperatures, mechanical stress and corrosion

**Applications**
- Chemical processing

**Sizes**
- ARV2 check valve - 1/2 in (15 mm) thru 8 in (200 mm); 10 in (250 mm) and 12 in (300 mm) valves available upon request
- ARV/SG check valve/sight glass - 1 in (25 mm) thru 4 in (100 mm)
- ARL 45° (Y) check valve - 1 in (25 mm) thru 3 in (80 mm)

**Standards**
- ASME (ANSI) B16.5
- ASME (ANSI) B16.10

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See page 2.
Atomac ASF Lined Strainer

**Features**
- Corrosion resistant filter insert
  - Consists of two perforated PTFE cylinders with an ETFE filter screen in between
- Same outstanding corrosion resistant properties as the FEP or PFA lining material
- Standard mesh is 60 (300 micron)
  
  Optional mesh:  
  - 169 (100 micron) 
  - 19 (1000 micron) 
  
  Other mesh openings on request
- Easy servicing and maintenance as the filter insert can be changed or cleaned with the strainer in-line
- Residual fluid in insert area can be evacuated by means of the PTFE drain plug prior to removal of the access flange
- Optional ball valve may be specified in place of PTFE plug for added operator safety and convenience
- Flowpath through the filter insert is a larger area than the original pipe cross-section. This minimizes pressure loss

**Applications**
- Chemical processing

**Sizes**
- 1 in (25 mm)
- 1-1/2 in (40 mm)
- 2 in (50 mm)
- 3 in (80 mm)
- 4 in (100 mm)
- 6 in (150 mm)
- 8 in (200 mm)

**Standards**
- ASME (ANSI) B16.5
- ASME (ANSI) B16.10

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See page 2.
SuperNova B-Series Actuators

**Features**
- Twin piston rack and pinion actuator
- Corrosion and wear resistant hard anodized aluminum housing
- Nitride chemical conversion process for pinion corrosion resistance
- Field convertible double acting and spring return models
- 180 degree double acting
- Compliance to NAMUR VDI/VDE 3845 mounting specifications for controls and accessories
- Compliance to ISO 5211 mounting specifications for actuator to valve interface
- Field reversible fail action
- Precision die cast pistons have full length gear engagement, large cylinder bearings, and piston guide bands to ensure long life
- Flats on pinion drive shaft for manual overrides and accessories
- Upper and lower pinion bearings to ensure long cycle life
- Integral bi-directional travel stops
- Concentric-nested spring design ensures extended spring life
- 11 standard sizes

**Torque Range**
Up to 58,232 in-lbs (67,077 cm-kg)

**Temperature Range**
-55 Deg F to 300 Deg F (-50 Deg C to +150 Deg C)

**Maximum Pressure**
150 psi (10 bar)

**Applications**
- HVAC, Mining, Water
- Chemical
- Petrochemical & Refining
- Process Industries

**Standards**
- ISO 5211
- NAMUR VDI/VDE 3845
- ATEX Directive 94/9/EC

Get more information:
Product catalog: AXENBR0005
Installation instructions: AXENIM0096

See page 2.

SuperNova Actuator NAMUR Accessories

**Features**
- S25N Directional Valve
  - Mounts directly to SuperNova series actuators which eliminates the cost of tubing and fittings. The high 1.8 C2 spool valves are available for double acting and spring return actuators with NEMA 4, 7 and 9 or intrinsically-safe and low power solenoid operators.
  - For more information see bulletins (AUTO-95) AXENBR0005 and (AUTO-12) AXENIM0012
- APS1 Air Purge Module
  - Provided with the S25N solenoid valve, the APS1 diverts instrument quality exhaust air from between the pistons into the spring chamber, preventing corrosive atmospheres from being pulled into the spring chamber.
  - For more information see bulletins (AUTO-95) AXENBR0005 and (AUTO-15) AXENIM0015
- APS2 Air Purge Module
  - Provided for remote/line mounted solenoid valves, the APS2 diverts instrument quality exhaust air from between the pistons into the spring chamber, preventing corrosive atmospheres from being pulled into the spring chamber.
  - For more information see bulletins (AUTO-95) AXENBR0005 and (AUTO-16) AXENIM0016
- LV1 Lockout & Vent Valve
  - May be used with a manual override to shut off supply air and to vent actuator. May also be used as a pneumatic lockout valve which, when properly implemented, will satisfy OSHA Standard 1910.47. May be sandwich mounted with other Automax NAMUR accessories or may be used with the NPT1 adaptor.
  - For more information see bulletins (AUTO-95) AXENBR0005 and (AUTO-17) AXENIM0017
- FC1, FCDA and FCSR
  - Flow control modules provide compact and precise adjustment of SuperNova actuator speeds. May be sandwich mounted with other Automax accessories or may be used with the NPT1 adaptor.
  - For more information see bulletins (AUTO-95) AXENBR0005 and AXENIM0018

Get Bulletins AXENBR0005
and AXENIM0018

See page 2.

SuperNova Actuator Accessories

**Features**
- Lockouts
  - Permits easy mechanical lockout of automated valves. Lockouts can be field retrofitted and are designed to withstand the rated output torque of the actuator, with the intent to meet the requirements of OSHA Standard 1910.47 (The Control of Hazardous Energy, Lockout / Tagout)
- Gear Overrides
  - Declutchable gear overrides are options that allow local manual control of actuated valves and dampers. The gear overrides are sized for easy operation and can be combined with other control accessories
- “Pharos” NAMUR Indicator
  - Provides an economical solution for positive visual indication of the actuator position. The Pharos NAMUR Indicator, constructed of tough industrial engineered resin, can be used on actuators that utilize a NAMUR mounting interface.
  - For more information see bulletins (AUTO-24) AXENBR0006 and (AUTO-22) AXENIM0022
- AutoBraks
  - Heavy-duty mounting kits are designed to close tolerances to assure consistency and proper alignment, which are essential to ensure maximum actuator and valve cycle life

Get Bulletin AXENBR0005

See page 2.
SXL Series Stainless Steel Actuators

Features
- Twin piston rack and pinion actuator
- Field convertible double acting and spring return models
- Compliance to NAMUR VDI/VDE 3845 mounting specifications for controls and accessories
- Compliance to ISO 5211 mounting specifications for actuator to valve interface
- Optional air purge modules available
- Flats on pinion drive shaft for manual overrides and accessories
- Upper and lower pinion bearings to ensure long cycle life
- Precision die cast pistons have full length gear engagement, large cylinder bearings, and piston guide bands to ensure long life
- Integral bi-directional travel stops
- Field reversible fail action
- Concentric-nested spring design ensures extended spring life
- Optional SST pistons and springs are available for optimum corrosion resistance
- Seven standard sizes
- Ideal for corrosive and sanitary environments

Torque Range
Up to 8,734 in-lbs (10,060 cm-kg)

Temperature Range
-55 Deg F to 300 Deg F
(-50 Deg C to +150 Deg C)

Maximum Pressure
120 psi (8 bar)

Applications
- HVAC, Mining, Water
- Chemical
- Petrochemical & Refining
- Process Industries

Standards
- ISO 5211
- NAMUR VDI/VDE 3845

Get more information:
Product catalog: AXENB0005
Installation instructions: AXENIM0009
Product specification sheet: AXENPS0003

See page 2.
Heavy-Duty R5 Scotch Yoke Actuators

**Features**
- Pneumatic, gas and hydraulic models
- Double acting, spring return and “fail-safe”
- On-off, multi-position and throttling
- Identical mounting pads provide easy change of fail direction
- Indicator/Output shaft has NAMUR slot and optional position indicator
- Spring module is an easily removable, welded cartridge
- Heavy-walled, hard chrome plated cylinders are honed to a micro finish

**Torque Range**
Up to 500,000 in-lbs (575,950 cm-kg)

**Temperature Range**
-55 Deg F to 300 Deg F
(-50 Deg C to +150 Deg C)

**Maximum Pressure**
2500 psi (172 bar)

**Applications**
- HVAC, Mining, Water
- Chemical
- Petrochemical & Refining
- Process Industries

**Standards**
Flowserve

Get more information:
Product catalog: AXENBR0005
Installation instructions: AXENIM0008

See page 2.

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Centura Series Electric Actuators

**Features**
- CE Series
  - Electrical cut-off switch; captive cover bolts; Quick-Set cams; simple mounting arrangements; heavy-duty brake option; 3/4 NPT conduits standard; massive gear train; rugged single phase permanent split capacitor gearmotor, NEMA 4, 4x, 7, 9
- CPL Series
  - Captive cover bolts; Quick-Set cams; simple mounting arrangements; 3/4 NPT conduits standard; enclosed, permanently lubricated gear train; rugged single phase permanent split capacitor gearmotor; corrosion resistant engineered resin housing, NEMA 4, 4x
- E Series
  - Captive cover bolts; Quick-Set cams; 1/2-inch NPT conduits standard; permanently lubricated, precision cut, heat treated alloy steel gear train; rugged single phase permanent split capacitor gearmotor; corrosion resistant housing; manual override standard, NEMA 4
- Control Boxes
  - Available for a variety of local and remote control options, Control Boxes are available in engineered resin, carbon steel, and stainless steel enclosures with weatherproof and explosion-proof approvals

**Temperature Range**
-40 Deg F (with heater) to 158 Deg F
(-40 Deg C to +70 Deg C) depending upon the model

**Supply Voltage**
- 115 VAC 50/60, 12 VDC, 24 VDC, 230 VAC 50/60, 24 VAC
- On-Off, 3-position control, and modulating options are available
- Fieldbus digital communications available in AS-i, FOUNDATION Fieldbus, and PROFIBUS DP protocols

**Applications**
- HVAC, Mining, Water
- Power Generation, Nuclear Service
- Oil & Gas

**Standards**
- NEMA 4, 4x, 7 and 9

Get more information:
Product catalog: AXENTB0035
Installation instructions: CE Series AXENIM0037; CPL Series AXENIM0039; E Series AXENIM0040

See page 2.
UltraSwitch GL Series

Features
• Pharos and UltraDome visual position indicators for high contrast, wide angle viewing
• Compliance to NAMUR VDI/VDE 3845 mounting specifications eliminates coupler and maximizes interchangeability
• Captive stainless steel cover screws
• Prewired multipoint terminal strip
• Quick-Set spring loaded cams are extra wide and splined to permit tool-free limit switch calibration
• Extensive switch offering for a wide range of applications including mechanical, proximity, solid state sensor options

Description
Provides a compact and economical package for NEMA 4 visual and remote electrical indication of valve position

Housing Material
Die cast aluminum; electrostatic powder coated

Standards
NEMA 4, 4x

Hazardous Area Classifications
Class 1, Division 2, Groups A, B, C, D approvals when supplied with hermetically sealed magnetic proximity switches

Get more information:
Product catalog: AXENBR0006
Installation instructions: AXENIM0031

See page 2.

UltraSwitch XCL Series

Features
• UltraDome visual position indicators for high contrast, wide angle viewing
• Compliance to NAMUR VDI/VDE 3845 mounting specifications eliminates coupler and maximizes interchangeability
• Captive stainless steel cover screws
• Prewired multipoint terminal strip
• Quick-Set spring loaded cams are extra wide and splined to permit tool-free limit switch calibration
• Extensive switch offering for a wide range of applications including mechanical, proximity, solid state, and analog feedback options

Description
Provides a heavy-duty and rugged globally-certified explosion-proof package for visual and remote electrical indication of valve position

Housing Material
Die cast aluminum; dichromate conversion undercoat; electrostatic powder top coat

Standards
NEMA 4, 4x, 7 and 9, IP65, IP67

Hazardous Area Classifications
• Explosion-Proof (UL/CSA/ATEX) mechanical switch options
• Class 1, Divisions 1 and 2, Groups C and D
• Class 2, Divisions 1 and 2, Groups E, F and G
• ATEX II 2 GD EEx d IIB T4-T6
• Explosion-Proof (UL/CSA/ATEX) proximity/ solid state switch options (except NJ)
• Class 1, Division 1 and 2, Groups C and D
• Class 1, Division 2 only, Groups A, B, C and D
• Class 2, Divisions 1 and 2, Groups E, F and G
• ATEX II 2 GD EEx d IIB T4-T6

Get more information:
Product catalog: AXENBR0006
Installation instructions: AXENIM0031
Product specification: AXENPS0120

See page 2.

UltraSwitch PL Series

Features
• Pharos and UltraDome visual position indicators for high contrast, wide angle viewing
• Compliance to NAMUR VDI/VDE 3845 mounting specifications eliminates coupler and maximizes interchangeability
• Captive stainless steel cover screws
• Prewired multipoint terminal strip
• Quick-Set spring loaded cams are extra wide and splined to permit tool-free limit switch calibration
• Extensive switch offering for a wide range of applications including mechanical, proximity, solid state, and analog feedback options

Description
Engineered resin enclosure provides excellent protection for harsh corrosive environments

Housing Material
Non-metallic engineered resin

Standards
NEMA 4, 4x

Hazardous Area Classifications
Class 1, Division 2, Groups A, B, C, D approvals when supplied with hermetically sealed magnetic proximity switches

Get more information:
Product catalog: AXENBR0006
Installation instructions: AXENIM0031

See page 2.
Aviator Integrated Valve Controller

**Description**
Designed for use with pneumatic rotary industrial valve actuators in hazardous locations. With the same features as the UltraSwitch, the Aviator provides actuator/valve control by receiving a direct solenoid voltage signal. Also provides remote indication of open and closed valve positions by completing separate electrical circuits.

**Housing Material**
- Aluminum (XV and CV models)
- Engineered Resin (WR model)

**Standards**
- NEMA 4, 4x, 7, 9 (XV model)
- ATEX EEx d IIB (CV model)
- NEMA 4, 4x (WR model)

**Hazardous Area Classifications**
- Class 1, Divisions 1 and 2, Groups C, D
- Class 2, Divisions 1 and 2, Groups E, F, G
- Class 1, Groups A and B
- Class 1, Division 2 only, Groups A, B, C and D when supplied with hermetically sealed magnetic proximity switches
- ATEX II 2 GD EEx d IIB T4-T6

Get more information:
Product catalog: AXENBR0006
Installation instructions: AXENIM0032 or for non-metallic AXENIM0097
Product specification: AXENPS0059 or for non-metallic AXENPS0098

See page 2.

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BUSwitch Integrated Valve Controller

**Description**
Designed for use with pneumatic rotary industrial valve actuators in hazardous locations with digital fieldbus communications. With the same features as the Aviator, the BUSwitch provides actuator/valve control by receiving a direct solenoid voltage signal. Also provides remote indication of open and closed valve positions by completing separate electrical circuits. Available in the following fieldbus protocols: AS-i, DeviceNet, FOUNDATION Fieldbus and PROFIBUS DP.

**Housing Material**
- Aluminum (XV and CV models)
- Engineered Resin (WR model)

**Standards**
- NEMA 4, 4x, 7, 9 (XV model)
- ATEX EEx d IIB (CV model)
- NEMA 4, 4x (WR model)

**Hazardous Area Classifications**
- Class 1, Divisions 1 and 2, Groups C, D
- Class 2, Divisions 1 and 2, Groups E, F, G
- Class 1, Groups A and B
- Class 1, Division 2 only, Groups A, B, C and D when supplied with hermetically sealed magnetic proximity switches
- Class 1, Divisions 1 and 2, Groups A, B, C and D Intrinsically safe for FOUNDATION Fieldbus protocol only
- ATEX II 2 GD EEx d IIB T4-T6

Get more information:
Product catalog: AXENBR0006
Installation instructions: AXENIM0032 or for non-metallic AXENIM0097
Product specification: AXENPS0059 or for non-metallic AXENPS0098
Installation instructions: AXENIM0087 for AS-i protocol
Installation instructions: AXENIM0048 for FOUNDATION Fieldbus protocol
Installation instructions: LML0012 for PROFIBUS DP protocol

See page 2.
**Description**
Compact, rugged design provides accurate valve positioning at a competitive price. Available with pneumatic and electro-pneumatic input options that can be field retrofitted.

**Housing Material**
Die cast aluminum; electrostatic powder coated

**Features**
- Low-profile visual indicator provides viewing of valve position
- Compliance to NAMUR VDI/VDE 3845 mounting specifications eliminates coupler and maximizes interchangeability
- Captive stainless steel cover screws
- Compact, rugged design has few moving parts adding to its reliability and performance
- Interchangeable I/P Modules allow positioner to be field converted for 3-15 psi or 4-20 mA input signals
- Multiple cam options allow configuration of positioner characteristics to match valve requirements
- Externally adjustable zero setting
- Gold-plated spool valves available in low or high flow versions to match actuator/valve load requirements

**Standards**
NEMA 4, 4x, 7 and 9

**Hazardous Area Classifications**
- Class 1, Divisions 1 and 2, Groups C and D
- Class 2, Groups E, F and G
- ATEX II 2 G Ex d IIC
- Intrinsically Safe ATEX II 2 G Ex ia IIC

**Get more information:**
- Product catalog: AXENBR0006
- Installation instructions: AXENIM0030 and AXENIM0066
- Product specification: AXENPS0229 and AXENPS0203

See page 2.
XL90 High Performance Positioner

Description
The XL90 positioner provides extremely precise control for a wide range of valve and damper applications. The two-stage pneumatic relay provides faster, more sensitive response characteristics to meet the most demanding control objectives. Pneumatic and electro-pneumatic input options available that can be field retrofitted. Also available with many advanced features such as limit switch feedback, analog feedback and UltraDome visual position indicators.

Housing Material
Die cast aluminum with electrostatic epoxy powder coat

Features
• Optional UltraDome visual position indicator for high contrast, wide-angle viewing of valve position
• Compliance to NAMUR VDI/VDE 3845 mounting specifications eliminates coupler and maximizes interchangeability
• Captive stainless steel cover screws
• Interchangeable I/P Modules allow positioner to be field converted for 3-15 psi or 4-20 mA input signals
• Multiple cam options allow configuration of positioner characteristics to match valve requirements
• Non-interactive zero and span adjustments with lockable rack and pinion reduces calibration time
• Adjustable gain permits positioner sensitivity adjustment without removing or replacing components
• Two-stage pneumatic relay permits fast and extremely precise response to input signals for optimum control
• Vibration resistance through high natural frequency and pneumatic dampening make the XL90 unaffected by vibrations with accelerations up to 2 G’s and frequencies to 500 Hz
• Optional limit switch and analog feedback options available

Standards
NEMA 4, 4x, 7 and 9

Hazardous Area Classifications
• Class 1, Divisions 1 and 2, Groups C and D
• Class 2, Divisions 1 and 2, Groups E, F and G
• Intrinsically Safe Class 1, Division 1, Groups A, B, C, D
• ATEX II 2 G EEx d IIC
• Intrinsically Safe ATEX II 2 G EEx ia IIC

Get more information:
Product catalog: AXENBR0006
Installation instructions: AXENIM0008
Product specification: AXENPS0029

See page 2.
Logix 500si Digital Positioner

**Description**
The Logix 500si digital positioner combines state-of-the-art piezo valve technology with inner-loop feedback for extremely precise control for a wide range of valve and damper applications. The cost competitive package is ideal for weatherproof, intrinsically safe and nonincendive digital positioner applications. The Logix 510si is available as an economical 4-20 mA digital positioner. The Logix 520si is available with the industry standard HART protocol with advanced features such as dual gain tuning, 21-point custom characterization, and signatures for advanced predictive/preventive maintenance diagnostics. Also available with many advanced features such as limit switch feedback, analog feedback and UltraDome visual position indicators.

**Housing Material**
Die cast aluminum with electrostatic epoxy powder coat

**Features**
- Optional UltraDome visual position indicator for high contrast, wide-angle viewing of valve position
- Compliance to NAMUR VDI/VDE 3845 mounting specifications eliminates coupler and maximizes interchangeability
- Captive stainless steel cover screws
- Quick-Cal function provides fast, push-button automatic calibration of positioner
- Direct User Interface permits local access to positioner control and quick commissioning independent of a handheld configurator or laptop/PC
- Two-Stage control utilizes piezo technology combined with inner-loop feedback for precise control
- Local Status LED’s provide instant information relating to internal diagnostic codes, indicating 36 different conditions
- 21-Point Custom Characterization permits the user to control the valve in virtually any position desired for a given input signal

- Jog Calibrate function allows users to easily calibrate the positioner on actuators without physical stroke stops
- AutoTune function and Gain Selector Switch ensures consistency and optimum performance for control applications
- Optional limit switch and analog feedback options available

**Standards**
NEMA 4, 4x

**Hazardous Area Classifications**
- Intrinsically Safe Class 1, Division 1, Groups A, B, C and D
- Nonincendive Class 1, Division 2, Groups A, B, C and D
- Intrinsically Safe ATEX II 2 G EEx ia IIC

Get more information:
Product catalog: AXENBR0006
Product specification: AXENPS0012
See page 2.

Logix 520Si/3200IQ Information Chart

The following information is accessible from the Logix Digital Valve Controller:

**Identification**
- Spool identification
- Air action
- Tag number
- Spring type
- Valve style
- Valve material
- Valve body size
- Valve serial number
- Valve manufacturer
- Valve pressure class

- Valve end connections
- Fail position
- Stroke length
- Flow direction
- Trim number/size
- Trim characteristic
- Stem/shaft diameter
- Trim type and material
- Leakage class
- Inlet/outlet pressure
- Actuator size and type
- Device name/description
- Embedded software version
- Electronic serial number
- Engineering units
- Message - up to 32 characters

**Calibration**
- Stroke
- 4-20 mA signal
- Pressure sensor
- Calibration date
- Calibrated by initials

**Data Acquisition**
- Valve position
- 4-20 mA signal
- Command signal
- Clockwise actuator pressure
- Counter clockwise actuator pressure

**Diagnostics and Signatures**
- Step test
- Ramp test
- Internal power test

**Preventive Maintenance**
- Actual travel
- Rated travel
- Travel alert
- Packing style
- Cycle counter
- Cycle alert
Logix 3200IQ Digital Positioner

Description
The Logix 3200IQ digital positioner combines state-of-the-art piezo valve technology with inner-loop feedback for extremely precise control for a wide range of valve and damper applications. The Logix 3200IQ is available in an explosion-proof and intrinsically safe enclosure for North American and European hazardous locations. With identical calibration features of the Logix 500si, the Logix 3200IQ utilizes a powerful 16-bit microprocessor and state-of-the-art piezo technology to deliver unparalleled performance. Available in the industry standard HART protocol, the Logix 3200IQ is available in the FOUNDATION Fieldbus protocol with advanced features such as dual gain tuning, 21-point custom characterization and signatures for advanced predictive/preventive maintenance diagnostics. Also available with many advanced features such as limit switch feedback, analog feedback and stainless steel enclosures.

Housing Material
Die cast aluminum with electrostatic epoxy powder coat. Optional 316 stainless steel enclosure

Features
• Compliance to NAMUR VDI/VDE 3845 mounting specifications eliminates coupler and maximizes interchangeability
• 16-Bit Microprocessor provides substantial increase in CPU speed, allowing greater onboard diagnostics and control capabilities
• Quick-Cal function provides fast, push-button automatic calibration of positioner
• Direct User Interface permits local access to positioner control and quick commissioning independent of a handheld configurator or laptop/PC
• Two-Stage control utilizes piezo technology combined with inner-loop feedback for precise control
• Local Status LED’s provide instant information relating to internal diagnostic codes, indicating 36 different conditions

• 21-Point Custom Characterization permits the user to control the valve in virtually any position desired for a given input signal
• Jog Calibrate function allows users to easily calibrate the positioner on actuators without physical stroke stops
• AutoTune function and Gain Selector Switch ensures consistency and optimum performance for control applications
• Optional limit switch and analog feedback options available

Standards
NEMA 4, 4x, 7, 9

Hazardous Area Classifications
• Class 1, Division 1, Groups B, C and D
• Intrinsically Safe Class 1, Division 1, Groups A, B, C and D
• ATEX II 2 G Ex d IIC
• Intrinsically Safe ATEX II 2 G Ex ia IIC

Get more information:
Product catalog: AXENBR0006
Installation instructions: AXENIM3200
Product specification: AXENPS3200
See page 2.

SoftTools Software Suite

Description
The SoftTools software package provides all of the tools necessary to establish communications with a Logix 520si or 3200IQ digital positioner using a personal computer via HART protocol. SoftTools introduces the most advanced and comprehensive set of valve and positioner diagnostics available today including:
• Valve/Package identification including tag number, valve specifications and actuator configuration
• 21-Point Custom Characterization allows the user to adjust a 21-point characterization curve to change the response of the positioner to meet process requirements
• Positioner performance tests measure hysteresis, deadband, linearity and repeatability
• Signature comparisons can be performed by evaluating a stored “installed” signature curve to current performance
• Dual gain tuning permits the user to make large step changes with minimum overshoot while achieving the resolution to respond to very small step changes

Get more information:
Product catalog: AXENBR0006
Product specification: AXENPS0028
See page 2.
Additional Information

Other Flowserve Products ........................................ 24-25

Global Engineered Services and Support .......................... 26

Reference Sources .................................................... 27

Heritage Names of Distinction

Flowserve Flow Control is comprised of the brands listed below. This is our heritage and the basis for the respect and trust that we enjoy in the global marketplace.

Accord®
Anchor Darling®
Argus®
Atomac®
Automax® Valve Automation Systems
Battig®
Durco®
Edward®
Gestra®
Kammer®
Limitorque®
McCANNA®
MARPAC®
NAF®
Naval
Noble Alloy®
Norbro®
Nordstrom Audco®
P & W
PMV®
Schmidt Armaturen®
Serck Audco®
Valtek®
Vogt®
Worcester Controls®
**Flowserve Seals**
Flowserve manufactures and markets highly engineered mechanical shaft seals for containing corrosive, volatile, abrasive, precious or flammable fluid. They are used on pumps and other rotating equipment.

The complete seal line includes cartridge, dry-running, metal or elastomer bellows, split and zero emission gas barrier seals. Offering innovative seal design and service on demand, Flowserve is committed to the development of new technologies to further reduce maintenance and operating costs for its customers.

**Flowserve Pumps**
Flowserve is the driving force in the global industrial pump marketplace. No other pump company in the world has the depth or breadth of expertise in successful application of pre-engineered, engineered and special purpose pumps and systems.

Flowserve pump product lines are extensive with more than 100 distinct models and thousands of optional configurations. These are largely complementary pump types built to global standards and customer specifications.

To learn more about Flowserve Pumps and Seals, visit www.flowserve.com.
Global Engineered Services and Support

Total Cost Reduction
Asset Management
Product Life Cycle
Performance Re-rates
Site Diagnostics
Repair Services
Energy Management
Spare Parts
Maintenance Contracts
Materials Upgrades
Turnkey Services
Field Repairs
Installation
Project Supervision
Commissioning
Equipment Upgrades
Condition Monitoring
Systems Analysis
Field Machining

Service Dedication
Flowserve Engineered Services is focused on providing customers with uncompromising service and support, where and when needed. Dedicated to delivering the highest quality support, Engineered Services integrates its extensive pump and materials engineering knowledge with creative service solutions. Engineered Services fully understands the business challenges facing customers and is prepared to manage solutions to succeed as a team.

A worldwide network of service and repair centers staffed by highly skilled engineers and technicians is available around the clock, seven days a week to respond to customer queries, to evaluate and troubleshoot problems and to provide reliable solutions.

Business Partner
Flowserve partners with customers to respond to the dynamic business conditions that affect them. Flowserve will work with customers to drive efficiency, maximize throughput and control process quality. Whether user needs involve on-site technical assistance or broader project planning with full turnkey responsibility, Flowserve Engineered Services will deliver professional, reliable results.
Valve Industry Standards

To learn about industry standards pertaining to the design and performance of pumps contact the following organizations:

- American Petroleum Institute (API) www.api.org
- American Society of Mechanical Engineers (ASME – ANSI) www.asme.org
- American Society of Testing and Materials (ASTM) www.astm.org
- Instrumentation, Systems and Automation Society (ISA) www.isa.org
- International Standards Organization (ISO) www.iso.ch/en/ISOonline.openpage

AutoSize Sizing and Selection Software Package

The AutoSize actuator sizing program offers a user friendly windows interface and features intelligent product selection screens suitable for global applications. Engineering calculations include:

- Actuator torque sizing
- Actuator torque curves
- Speed of operation (Cv, SCFM)
- Hot line distances
- Fail safe accumulator tank sizing

AutoSize is available from your local sales representative.

Flowserve Instrument Engineer’s Handbook

Flowserve Instrument Engineer’s Handbook for Durco Quarter-turn Control Valves is a publication devoted to the proper selection of Durco Valves for control valve applications. The formulae presented for liquids, gases, and steam are based on the ISA standard S75.01 and are divided into sections to simplify manual calculation for common sizing problems.

To obtain a copy of the Flowserve Instrument Engineer’s Handbook visit www.flowserve.com.

Automax Automated Drawing System (ADS)

The Automax Automated Drawing System will allow you to electronically submit assembly drawing requests to our server. Your submittal will create a customized drawing and return it to you via e-mail in a matter of minutes. There is no charge for the software, service, or completed drawings and the system is available 24 hours a day, 365 days a year.

The ADS web application allows drawings to be submitted directly through the Internet, does not require downloading of files and allows for simultaneous upgrades without affecting current users. To operate the system and submit drawing requests, simply access the website below and select the items that you require in the finished drawing. After the items are chosen, select the “Submit” button and the request is submitted to the ADS server. It takes the Automated Drawing System approximately three minutes per drawing request to process the request, create the finished drawing, and e-mail the drawing back to you. The finished drawing is returned as a .PDF Adobe Acrobat file. A .DXF file is also an option for CAD users.

ADS website: http://ads.flowserve.com

System Requirements:
- 386 or higher PC
- 4MB of RAM (8 recommended)
- Microsoft Windows 95, 98, NT or XP
- An Internet e-mail account

For technical assistance, please contact Mike Rusche (mrusche@flowserve.com).
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Flowserve Corporation has established industry leadership in the design and manufacture of its products. When properly selected, this Flowserve product is designed to perform its intended function safely during its useful life. However, the purchaser or user of Flowserve products should be aware that Flowserve products might be used in numerous applications under a wide variety of industrial service conditions. Although Flowserve can (and often does) provide general guidelines, it cannot provide specific data and warnings for all possible applications. The purchaser/user must therefore assume the ultimate responsibility for the proper rating and selection, installation, operation, and maintenance of Flowserve products. The purchaser/user should read and understand the Installation Operation Maintenance (IOM) instructions included with the product, and train its employees and contractors in the safe use of Flowserve products in connection with the specific application.

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