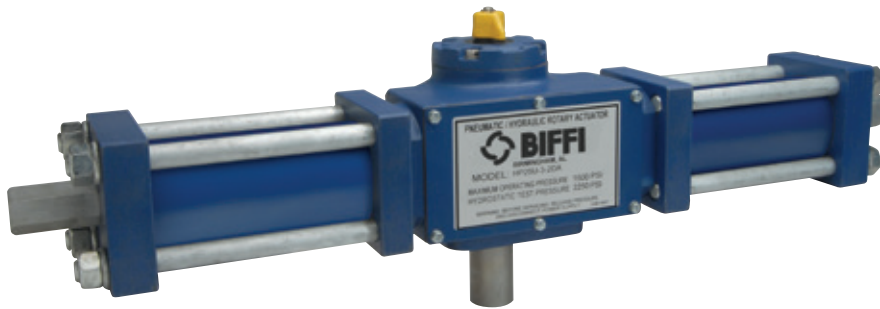


BIFFI MORIN HP SERIES ACTUATOR

HP series - Direct gas / hydraulic actuator with ductile iron housing and carbon steel cylinders
 Spring return and double acting actuators
 Quarter-turn output torques to 240,000 lb. in.



FEATURES AND BENEFITS

- High pressure construction eliminates undesirable regulators and relief valves for supply pressures.
- Hydraulic dampening provides smooth “open-close” operation to prevent detrimental valve slamming.
- Ductile iron housing provides long life and durable, cost effective operation.
- High strength alloy steel or 17-4PH stainless output shaft transmits torque without fatigue.
- Sintered bronze or PTFE composite output shaft bushings eliminate side loading of valve stem to maximize stem packing performance.
- Strong, corrosion-resistant chrome-plated steel piston rod for enduring high-cycle applications.
- Sintered bronze piston rod bushings provide low-friction support and precise alignment to increase efficiency, reduce maintenance and extend actuator life.
- Heat-treated stainless steel thrust pin and rollers transfer piston force to yoke to reduce friction, for longer life and more efficient torque transmission.
- PTFE guide bands ensure low-friction piston guidance protecting cylinder walls from potential scoring and extending seal performance with a continuous cylinder wiping action.
- Bi-directional travel stops provide accurate valve rotation adjustment.
- NAMUR drive slot maintains a compact assembly for accessory-driven components with no couplings necessary.
- Tectyl-coated springs need no special tools to be disarmed safely and easily, reducing down time.
- Easily removable housing cover provides easy access for yoke mechanism inspection.

GENERAL APPLICATIONS

Designed specifically for automating quarter-turn pipeline valves, providing control for any quarter-turn ball, plug or butterfly valve application.

TECHNICAL DATA

Supply pressure: Up to 2250 psig
 (see torque chart)

Supply medium: Any pneumatic or hydraulic fluid compatible with materials of construction.

Temperature rating
 Standard: -20°F to 210°F
 Optional: -65°F to 300°F

Angular rotation: 90 degrees (adjustable between 82 and 98 degrees)

Mounting pattern: ISO 5211

Protection: IP66

Certification: SIL3 rated

BIFFI MORIN HP SERIES ACTUATOR

DESIGNED WITH A RUGGED HEART

Scotch yoke design

The heart of any scotch yoke actuator is the yoke. The HP actuator uses either 17-4PH or ductile iron for this critical area as standard.

The yoke is the mechanism used to convert linear force to torque. The yoke is critical to actuator performance, it must be rugged, yet precisely machined to give long life at high efficiency - all our yoke designs meet this test.

Principles of Construction

Using high quality materials of construction and modern rugged design concepts provides the standard for high quality, low cost valve actuation.

The actuator housings are all machined from ductile iron castings. This produces a rugged, low cost product through reduced machining time and by eliminating wasteful excess material.

Housings are then epoxy electro-coated inside and out for corrosion resistance

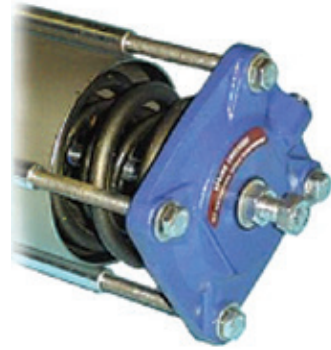
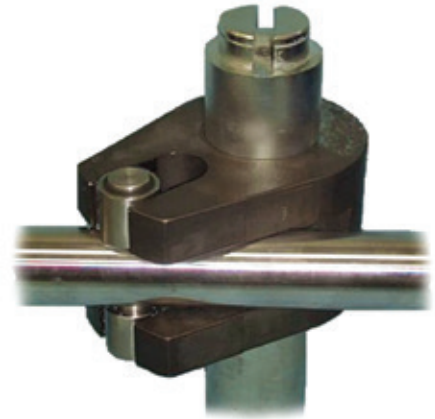
Any components that rotate or slide during operation, such as the high strength output shaft, chrome-plated piston rod, stainless steel thrust pin or the ductile iron piston, are all supported by replaceable friction reducing bearings.

Bi-directional Travel Stops

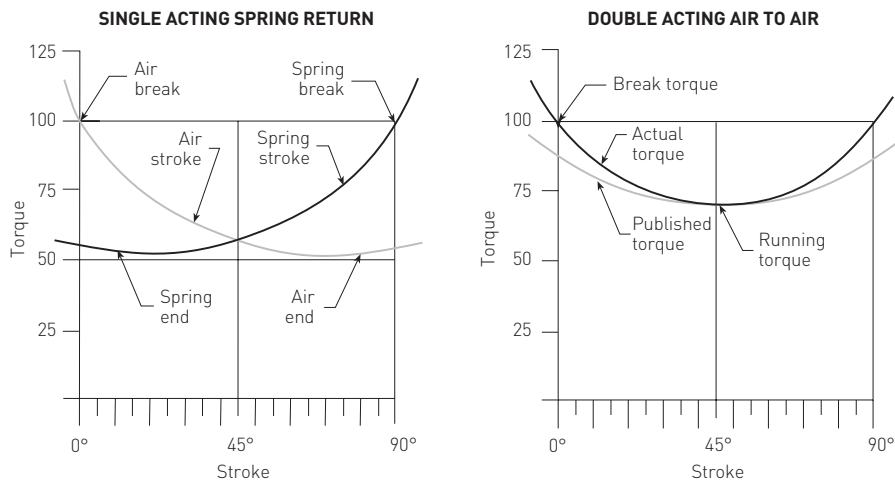
Adjustable stops on each end cap provide the flexibility of accurate valve rotation positioning at the end of the "open" and "close" stroke. Both stops are located on the cylinder centerline, the optimal position to maximize travel adjustment and eliminate any detrimental side loading on the travel stops. Adjustable from 82° to 98°.

Spring Designed for Safety

All spring return models incorporate a "man safe" spring design that allows the actuator to be safely assembled and disassembled in the field without the need for special tools. The integral tie rods are bored and tapped to provide a means of loading and unloading the spring in a safe and convenient manner.

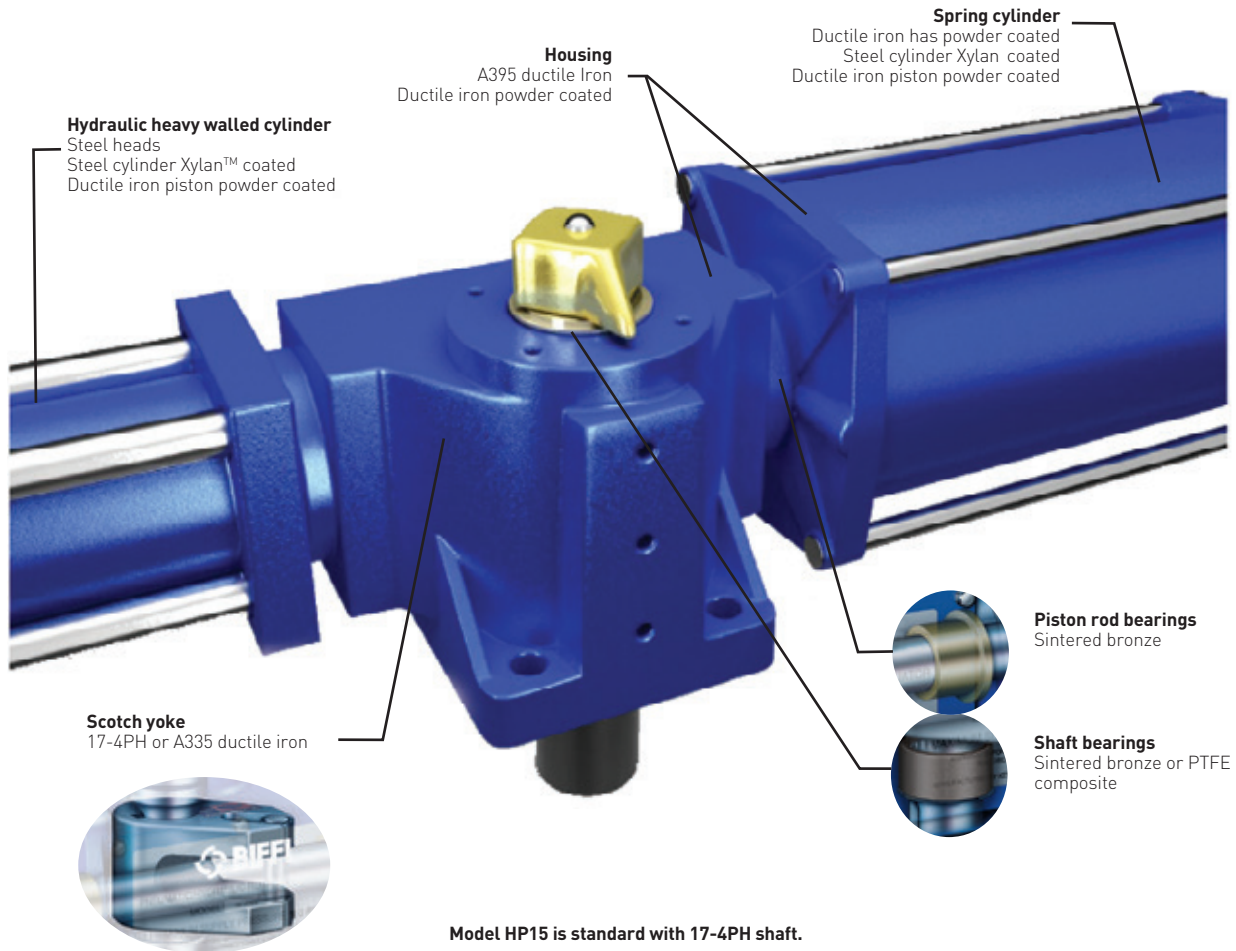


SCOTCH YOKE TORQUE CHARACTERISTICS (symmetrical shown)



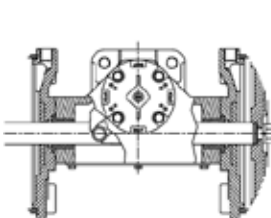
BIFFI MORIN HP SERIES ACTUATOR

SUPERIOR MATERIALS OF CONSTRUCTION OFFER LONG LIFE, AND MEAN LESS DOWNTIME

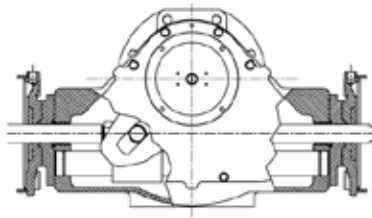


EXPERTS IN ACTUATOR DESIGN

We understand that the most efficient design for one torque range is not the most efficient for another. Our actuators use the standard scotch yoke design for lower torque ranges and a side bar design for the higher torque ranges. This gives a rugged design with economic cost.



Standard design, scotch yoke



Side bar design, scotch yoke

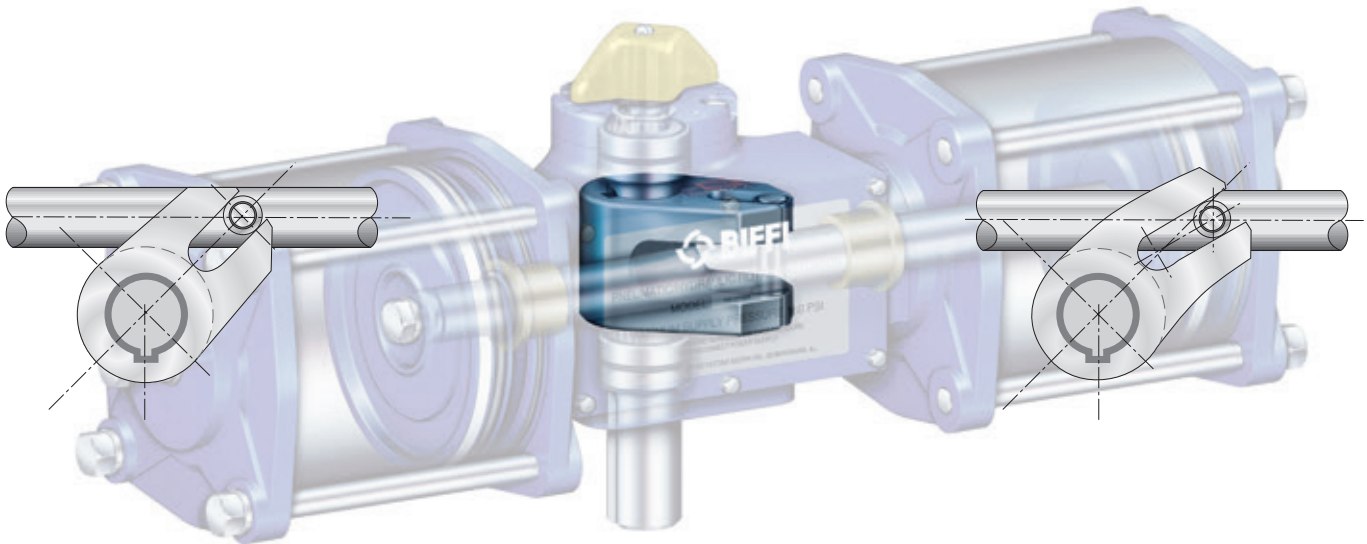
NOTE

See Series HP IOM for a complete bill of materials.

BIFFI MORIN HP SERIES ACTUATOR

SYMMETRICAL AND CANTED YOKES

It's about fitting the torque curve of the actuator to the valve . . .
It's about lower cost, lighter weight, smaller actuators . . .
It's about CHOICE . . .

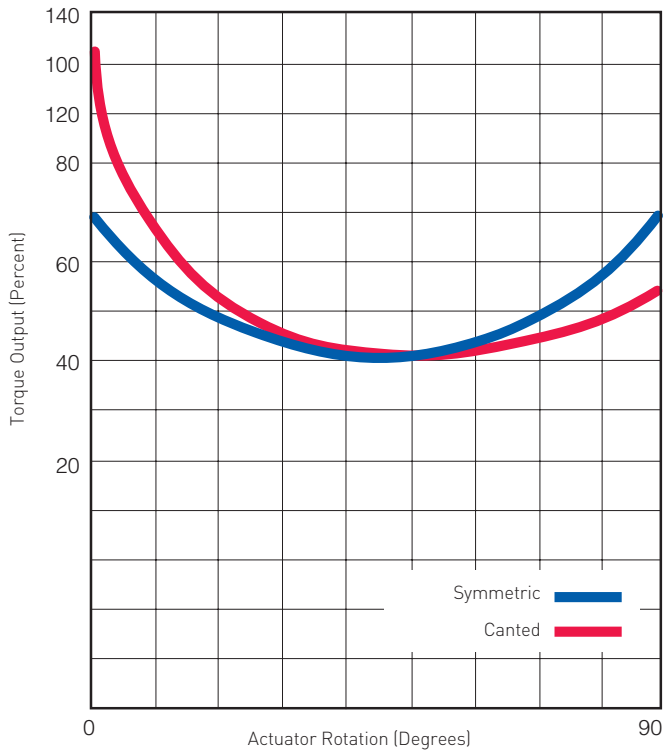


Symmetric

Symmetrical yoke design offers the standard torque curve seen most often in relation to scotch yoke actuators. It offers the increased torque advantage at both ends of the 90° stroke as shown on the blue curve below. This torque curve covers most quarter-turn applications.

Canted

Canted yoke design moves the torque curve to where it's needed most, gaining as much as 35% more break and reseal torque for the same size actuator. The canted yoke curve is shown in red below. Canted yoke actuators allow selection of smaller, lighter, and less expensive actuator packages.



BIFFI MORIN HP SERIES ACTUATOR

MECHANICAL DATA

| Actuator Model | Cylinder | Stroke | Volume | | Symmetric | | Canted | |
|----------------|-------------|--------|------------|--------|-----------|-------|--------|-------|
| | | | Cubic In | Weight | MOP* | MAP** | MOP* | MAP** |
| Double acting | Bore (inch) | (inch) | 90° Stroke | (lbs) | (psi) | (psi) | (psi) | (psi) |
| HP15-2-1DA | 2.13 | 3 | 11 | 30 | 1900 | 2250 | - | - |
| HP15-2-2DA | 2.13 | 3 | 19 | 43 | 1500 | 2250 | - | - |
| HP15-3-1DA | 3.25 | 3 | 25 | 48 | 700 | 1500 | - | - |
| HP15-3-2DA | 3.25 | 3 | 47 | 61 | 600 | 1500 | - | - |
| HP25-3-1DA | 3.25 | 5 | 41 | 155 | 2000 | 2250 | 1500 | 2250 |
| HP25-3-2DA | 3.25 | 5 | 73 | 186 | 1600 | 2250 | 800 | 2250 |
| HP25-4-1DA | 4.25 | 5 | 71 | 160 | 1100 | 2250 | 1100 | 2250 |
| HP25-4-2DA | 4.25 | 5 | 133 | 196 | 900 | 2250 | 600 | 2250 |
| HP30-4-1DA | 4.25 | 6 | 85 | 365 | 2250 | 2250 | 2000 | 2250 |
| HP30-4-2DA | 4.25 | 6 | 151 | 401 | 2000 | 2250 | 800 | 2250 |
| HP30-6-1DA | 6.25 | 6 | 184 | 410 | 1100 | 2250 | 400 | 2000 |
| HP30-6-2DA | 6.25 | 6 | 349 | 491 | 1000 | 2250 | 1600 | 2250 |
| HP30-8-1DA | 8.26 | 6 | 321 | 460 | 600 | 1500 | 700 | 1700 |
| HP30-8-2DA | 8.26 | 6 | 624 | 591 | 500 | 1500 | 400 | 1500 |
| HP65-4-1DA | 4.25 | 12 | 170 | 1315 | 2250 | 2250 | 2250 | 2250 |
| HP65-4-2DA | 4.25 | 12 | 303 | 1351 | 2250 | 2250 | 1800 | 2250 |
| HP65-6-1DA | 6.25 | 12 | 368 | 1360 | 2250 | 2250 | 900 | 2000 |
| HP65-6-2DA | 6.25 | 12 | 699 | 1441 | 2250 | 2250 | 2250 | 2250 |
| HP65-8-1DA | 8.26 | 12 | 642 | 1410 | 1300 | 1500 | 1600 | 1700 |
| HP65-8-2DA | 8.26 | 12 | 1247 | 1541 | 1200 | 1500 | 900 | 1500 |
| HP80-4-1DA | 4.25 | 16 | 227 | 2560 | 2250 | 2250 | 2250 | 2250 |
| HP80-4-2DA | 4.25 | 16 | 404 | 2596 | 2250 | 2250 | 2250 | 2250 |
| HP80-6-1DA | 6.25 | 16 | 491 | 2605 | 2250 | 2250 | 1500 | 2000 |
| HP80-6-2DA | 6.25 | 16 | 931 | 2686 | 2250 | 2250 | 2250 | 2250 |
| HP80-8-1DA | 8.26 | 16 | 857 | 2655 | 1500 | 1500 | 2250 | 1700 |
| HP80-8-2DA | 8.26 | 16 | 1663 | 2786 | 1500 | 1500 | 1500 | 1500 |

NOTES

- * Maximum Operating Pressure (MOP) = The maximum pressure under normal operation producing the maximum allowable output torque.
- ** Maximum Allowable Pressure (MAP) = The static pressure allowed under normal operating conditions for a fully stroked actuator against the travel stop.

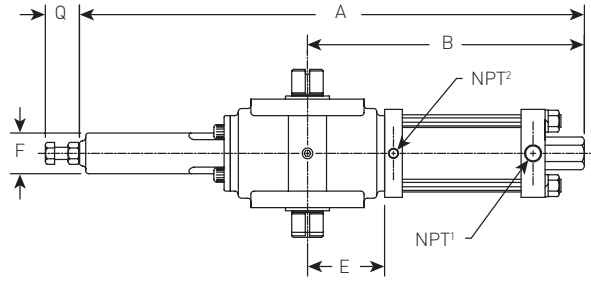
| Actuator Model | Cylinder | Stroke | Volume | | Symmetric | | Canted | |
|----------------|-------------|--------|------------|--------|-----------|-------|--------|-------|
| | | | Cubic In | Weight | MOP* | MAP** | MOP* | MAP** |
| Spring return | Bore (inch) | (inch) | 90° Stroke | (lbs) | (psi) | (psi) | (psi) | (psi) |
| HP15-2-1-023S | 2.13 | 3 | 11 | 35 | 1900 | 2250 | - | - |
| HP15-2-1-046S | 2.13 | 3 | 11 | 45 | 1900 | 2250 | - | - |
| HP15-2-1-072S | 2.13 | 3 | 11 | 55 | 1900 | 2250 | - | - |
| HP15-2-1-100S | 2.13 | 3 | 11 | 75 | 1900 | 2250 | - | - |
| HP15-3-1-100S | 3.25 | 3 | 25 | 190 | 1000 | 1500 | - | - |
| HP25-3-1-210S | 3.25 | 5 | 41 | 250 | 2000 | 2250 | 2250 | 2250 |
| HP25-3-1-420S | 3.25 | 5 | 41 | 260 | 2000 | 2250 | 2250 | 2250 |
| HP25-4-1-210S | 4.25 | 5 | 71 | 260 | 1400 | 2250 | 1400 | 2250 |
| HP25-4-1-420S | 4.25 | 5 | 71 | 265 | 1400 | 2250 | 1400 | 2250 |
| HP30-4-1-370S | 4.25 | 6 | 85 | 440 | 2250 | 2250 | 2250 | 2250 |
| HP30-4-1-740S | 4.25 | 6 | 85 | 600 | 2250 | 2250 | 2250 | 2250 |
| HP30-6-1-575S | 6.25 | 6 | 184 | 1010 | 1500 | 2250 | 1500 | 2250 |
| HP30-6-1-740S | 6.25 | 6 | 184 | 910 | 1500 | 2250 | 1500 | 2250 |
| HP30-6-1-1150S | 6.25 | 6 | 184 | 1115 | 1500 | 2250 | 1500 | 2250 |
| HP30-8-1-740S | 8.26 | 6 | 321 | 1075 | 900 | 1500 | 900 | 1700 |
| HP30-8-1-1150S | 8.26 | 6 | 321 | 1160 | 900 | 1500 | 900 | 1700 |
| HP65-6-1-1485S | 6.25 | 12 | 368 | 1435 | 2250 | 2250 | 2250 | 2250 |
| HP65-6-1-2385S | 6.25 | 12 | 368 | 1783 | 2250 | 2250 | 2250 | 2250 |
| HP65-6-1-3731S | 6.25 | 12 | 368 | 2721 | 2250 | 2250 | 2250 | 2250 |
| HP65-8-1-1485S | 8.26 | 12 | 642 | 1485 | 1500 | 1500 | 1500 | 1700 |
| HP65-8-1-3731S | 8.26 | 12 | 642 | 3300 | 1200 | 1500 | 1500 | 1700 |
| HP65-8-1-5336S | 8.26 | 12 | 642 | 3903 | 1500 | 1500 | 1500 | 1700 |
| HP80-6-1-6044S | 6.25 | 16 | 491 | 5583 | 2250 | 2250 | 2250 | 2250 |
| HP80-6-1-7114S | 6.25 | 16 | 491 | 6208 | 2250 | 2250 | 2250 | 2250 |
| HP80-8-1-6044S | 8.26 | 16 | 857 | 5633 | 1500 | 2250 | 1500 | 1700 |
| HP80-8-1-7114S | 8.26 | 16 | 857 | 6258 | 1500 | 2250 | 1500 | 1700 |

BIFFI MORIN HP SERIES ACTUATOR

DIMENSIONS

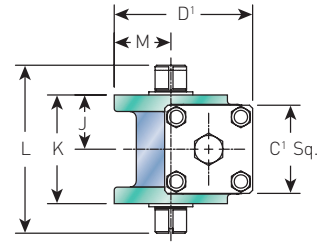
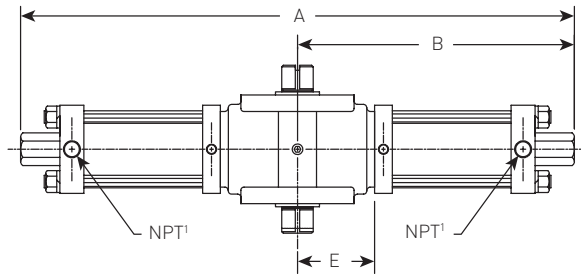
Double acting

HP15-2-1, HP15-3-1



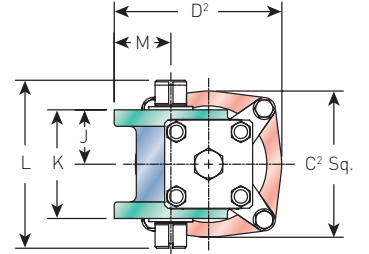
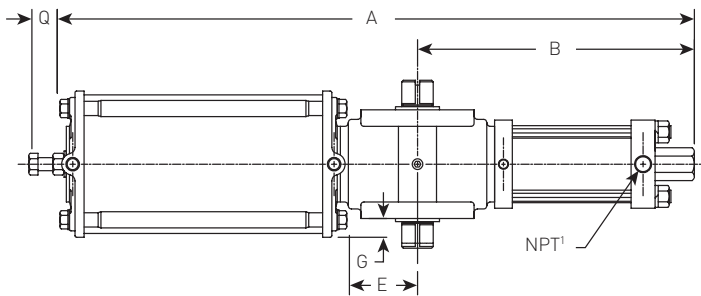
Double acting

HP15-2-2



Spring return

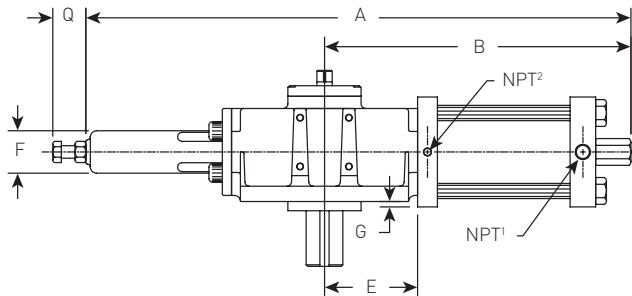
HP15



Double acting

HP25-3-1, 4-1;

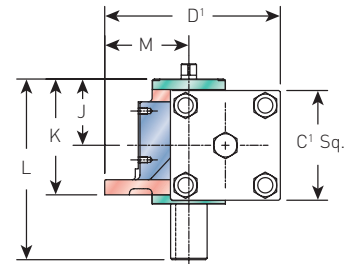
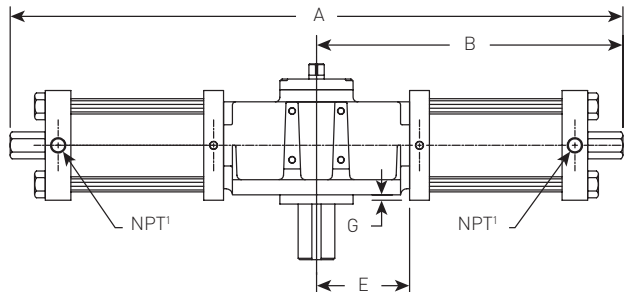
HP30-4-1, -6-1, -8-1



Double acting

HP25-3-2, -4-2;

HP30-4-2, -6-2, -8-2

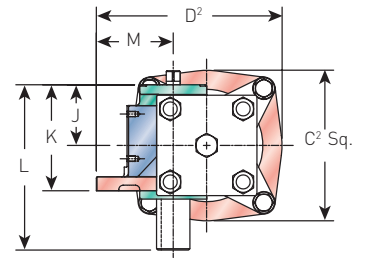
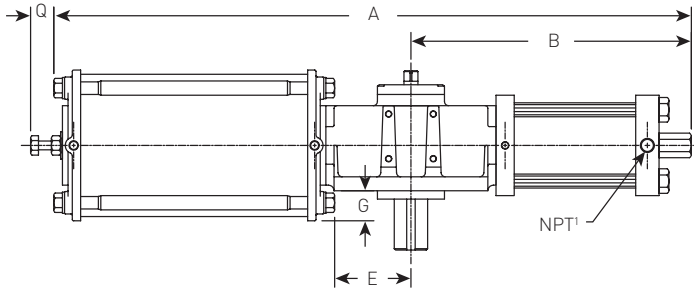


BIFFI MORIN HP SERIES ACTUATOR

DIMENSIONS

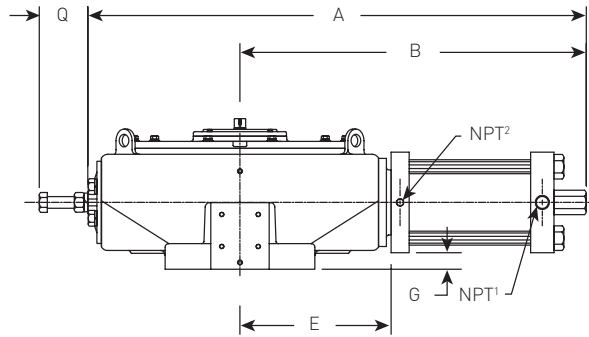
Spring Return

HP25 and HP30



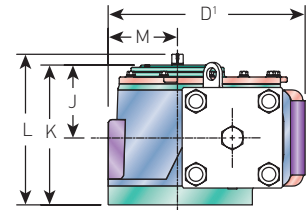
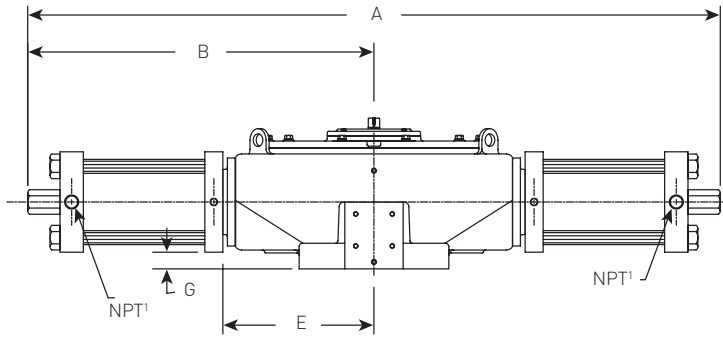
Double Acting

HP65-4-1, -6-1, -8-1 and
HP80-4-1, -6-1, -8-1



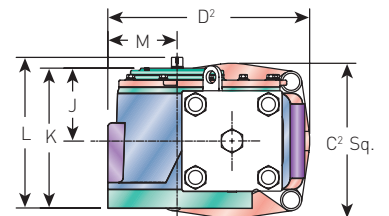
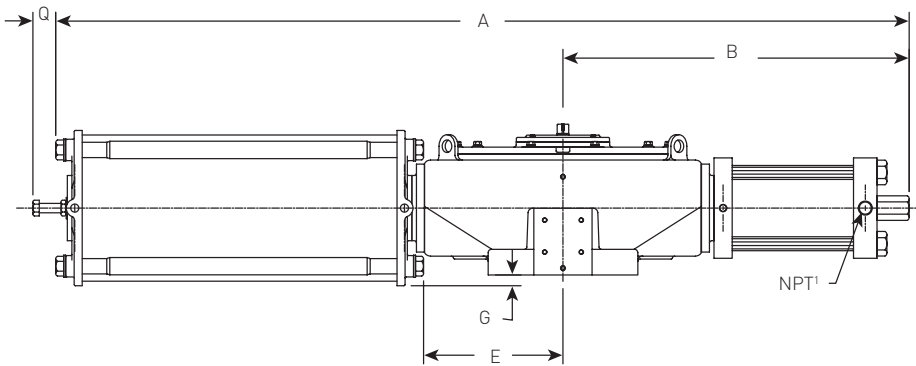
Double Acting

HP65-4-2, -6-2, -8-2 and
HP80-4-2, -6-2, -8-2



Spring Return

HP65 and HP80

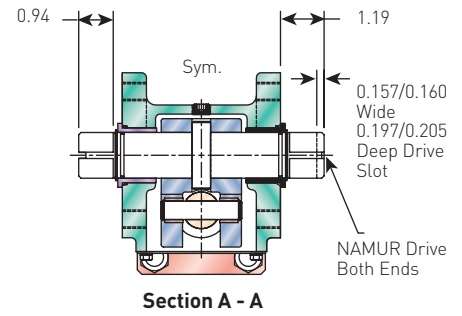
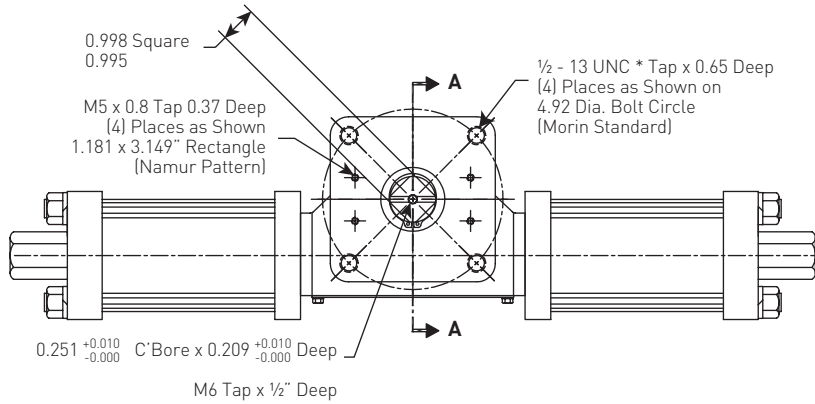


BIFFI MORIN HP SERIES ACTUATOR

MOUNTING DETAILS

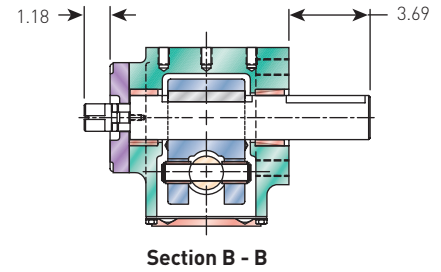
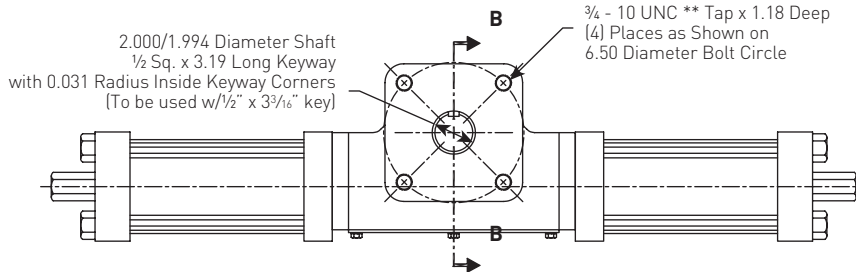
Model HP15

Top and bottom of housing (symmetrical) - ISO 5211-F12



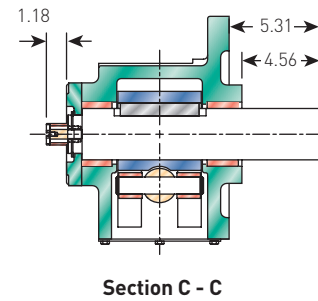
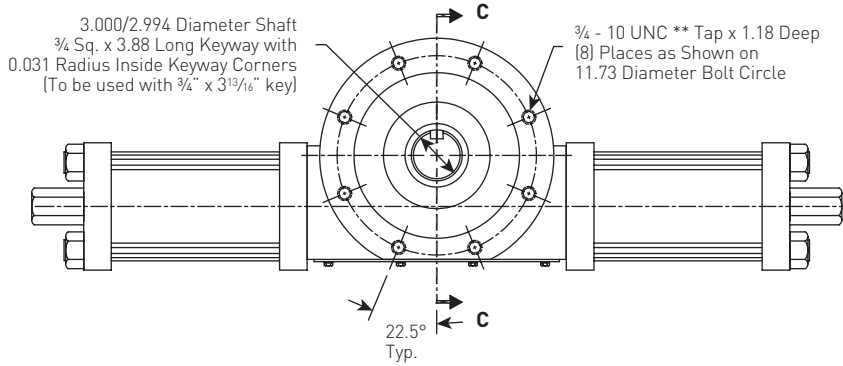
Model HP25

Bottom of housing - ISO 5211-F16



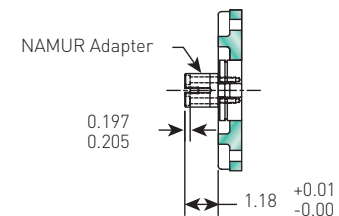
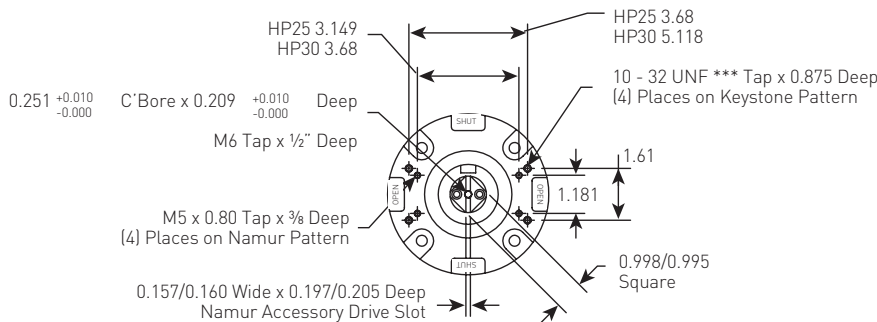
Model HP30

Bottom of housing - ISO 5211-F30



Model HP25 and HP30

Top of housing - mounting details

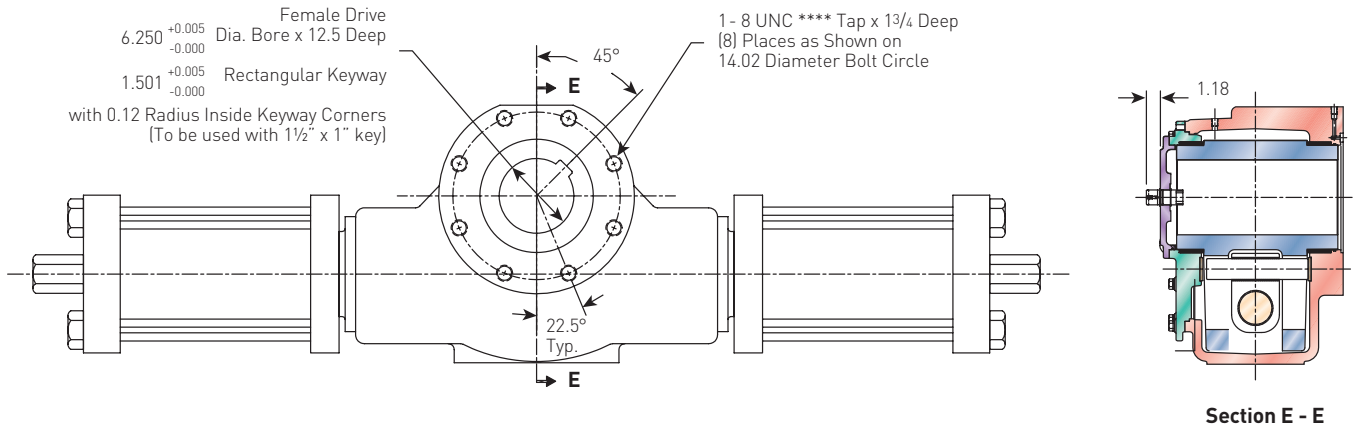


BIFFI MORIN HP SERIES ACTUATOR

MOUNTING DETAILS

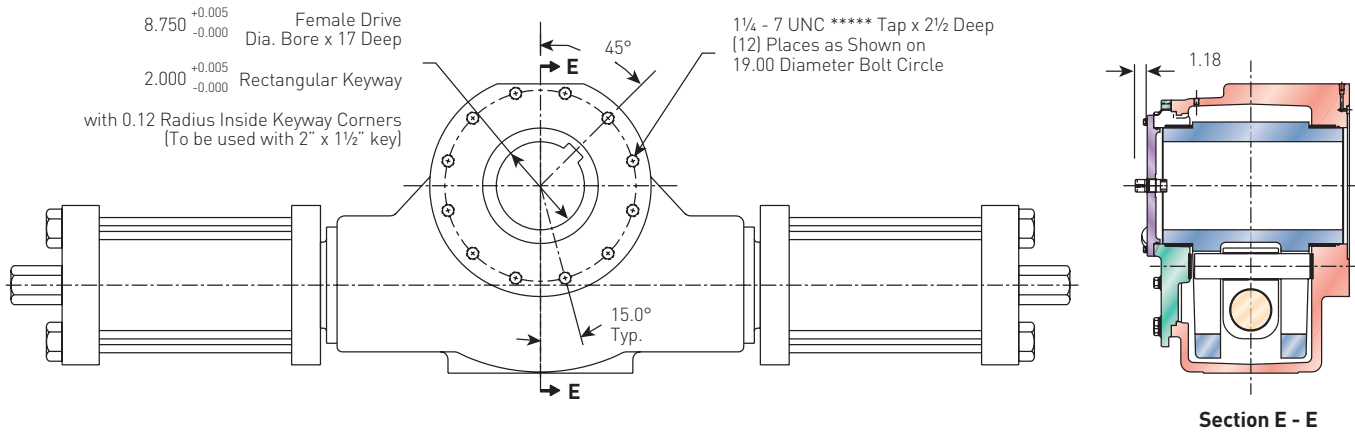
Model HP65

Bottom of housing - ISO 5211-F35



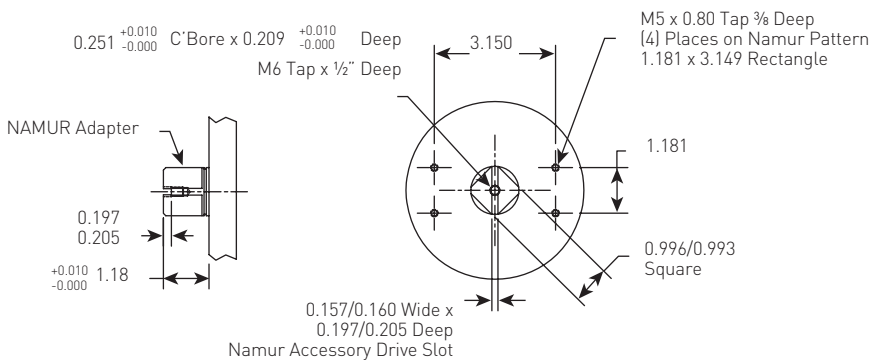
Model HP80

Bottom of housing - ISO 5211-F48



Model HP65 and HP80

Top of housing - mounting details



METRIC THREAD OPTION

| Metric Tap | Model Number |
|------------|---------------|
| M12* | HP15 |
| M20** | HP25 and HP30 |
| M5*** | HP25 and HP30 |
| M30**** | HP65 |
| M36***** | HP80 |

Replace "U" with "M" in order number designation.

SELECTION GUIDE

| | |
|---|--|
| Example: | HP - 30 U C - 4 - 1 - 370S080 - MHP |
| Model | |
| HP | High Pressure gas/hydraulic |
| Actuator Size | |
| 15 | 1.5" Moment Arm |
| 25 | 2.5" Moment Arm |
| 30 | 3.0" Moment Arm |
| 65 | 6.0" Moment Arm |
| 80 | 8.0" Moment Arm |
| Mounting Interface Bolting | |
| U | UNC Mounting Threads |
| M | Metric Mounting Threads |
| Yoke Design | |
| (blank) | Symmetrical Yoke |
| C | Canted Yoke |
| Nominal Cylinder Bore (inches) | |
| Number of Active Cylinders | |
| 1 | Single hydraulic cylinder on double acting or spring return |
| 2 | Two hydraulic cylinders on double acting |
| Function | |
| Double Acting | Spring Return |
| DA | See code from torque book |
| | Fail Closed (CW) ends in "0" (i.e. 218S080) |
| | Fail Open (CCW) ends in "1" (i.e. 218S081) |
| Add on Option | |
| (blank) | No options (standard configuration) |
| DP1 | Drain ports located 90 from std port |
| DP2 | Drain ports located 180 from std ports |
| EX | Epoxy paint |
| G | Grease fill - ¾ fill in housing |
| V | High temp seals (FKM) |
| HS | Hole through length of output shaft for grease fitting of output shaft |
| HD1 | Hydraulic damper/speed control - full stroke |
| MHP | Manual hydraulic override |
| K | K-Mass fire-proofing |
| LT | Low temp seals |
| P1M | Prox prep - ¾" w/Magnetic activator |
| P1 | Prox prep - ¾" w/Ferrous activator |
| P2 | Prox prep - 18 mm w/Ferrous activator |
| P3 | Prox prep - 12 mm w/Ferrous activator |
| SF | Stainless steel fasteners |
| SO | Stainless steel output shaft |
| SSP | Stainless steel springs |
| TB | PTFE bushing for output shaft and piston/rod |
| TBO | PTFE bushing for output shaft |
| U | U.H.M.W.P.E. Bushings |
| {Other options available - consult your sales representative} | |

Manual Options

A full range of manual accessories is available to provide the actuation package best suited for your application.



Epoxy Painting (EX) Offshore rated, three-part coating system for high level of environmental protection.



Hydraulic Override (MHP) Manual operation when power is lost. Includes speed controls.



Direct Mounting Cast Adapters

Many valve top works covered, including some ISO mounting. Assures economic but correct mounting alignment.

± °F/°C



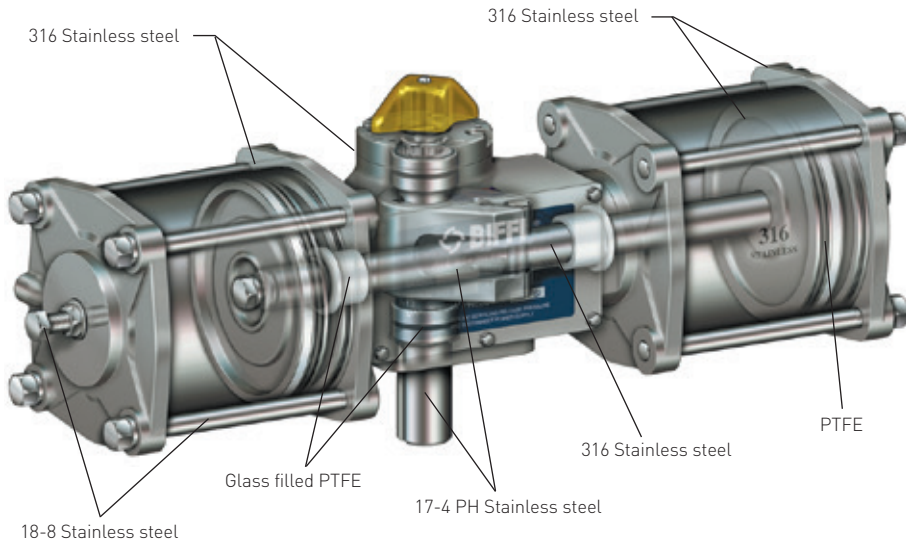
High or Low Temperature Ratings

Standard rating of -20°F to 210°F (-29°C to 99°C) covers most applications. Optional ratings down to -65°F (-54°C) and up to 300°F (149°C).

BIFFI MORIN HP SERIES ACTUATOR

ALSO AVAILABLE

THE S SERIES ACTUATOR (all stainless)

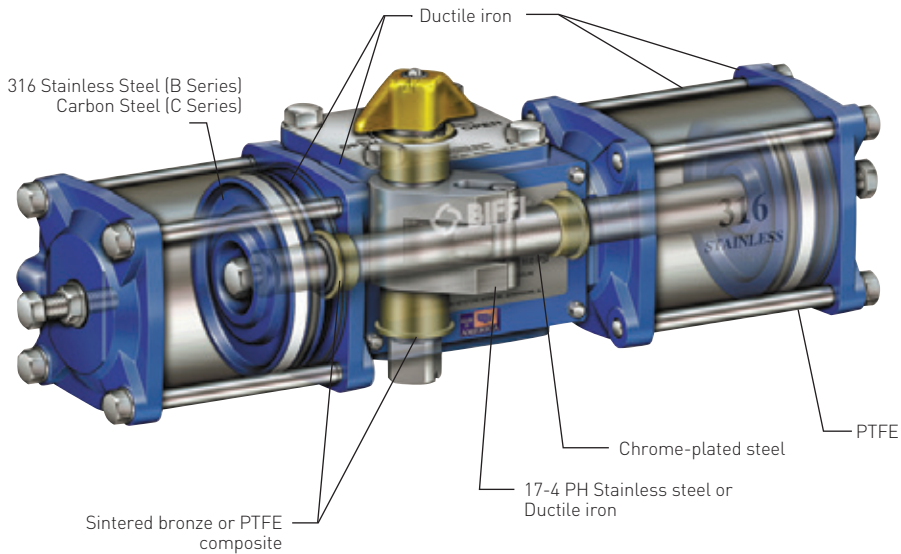


Setting an unrivaled standard in actuation at a price unexpectedly low for stainless steel.

- Up To 160 psig max operating pressure (see torque chart).
- Double acting break torques to 240,000 lb.in.
- Spring end torques to 104,125 lb.in.

For additional information, refer to S Series data sheet.

THE B AND C SERIES ACTUATORS



Setting a new standard in actuation at a price you would expect from a commodity product.

- Up To 160 psig max operating pressure (see torque chart).
- Double acting break torques to 1,400,000 lb.in.
- Spring end torques to 583,288 lb.in.

For additional information, refer to B and C Series data sheet.