# MORIN

#### **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 product life with durable, cost effective operation.
- Output shaft made of high strength alloy steel or 17-4PH stainless transmits torque without fatigue.
- Sintered bronze bushings or Teflon<sup>®</sup> composite bearings on output shaft eliminate sideloading of valve stem to maximize stem packing performance.
- Chrome-plated steel piston rod provides strength and corrosion resistance for enduring high-cycle applications.
- Sintered bronze piston rod bushings provide low-friction support and precise alignment of the piston rod to increase efficiency, reduce maintenance and extend actuator life.
- Heat-treated stainless steel thrust pin and rollers transfer piston force to 17-4PH stainless steel or ductile iron yoke by rolling to reduce friction, for longer life and more efficient torque transmission.
- Teflon<sup>®</sup> guide bands ensure low-friction piston guidance during operation to protect cylinder walls from potential scoring and extend seal performance with a continuous cylinder wiping action.
- Bi-directional travel stops provide accurate valve rotation adjustment.
- ISO 5211 mounting promotes easier valve adaption by utilizing internationally recognized mounting patterns.
- NAMUR drive slot on output shaft enables accessory-driven components to maintain a compact, low profile assembly.

# 2,250 psig Operating Pressure Rating Direct Gas/Hydraulic Actuators Ductile Iron/Stainless Steel Quarter-turn Double Acting and Spring Return Models



- Tectyl-coated springs can be disarmed without special tools to safely and easily disassemble the actuator in the field, reducing down time and providing a "man-safe" spring.
- Easily removable housing cover provides effortless access for internal 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 2,250 psig (see torque chart, MORMC-0333)
Supply medium:	Any pneumatic or hydraulic fluid compatible with materials of construction.
Tomporaturo ratin	a

lemperature rating	9
Standard:	-20°F to 210°F
Optional:	-65°F to 300°F
Angular rotation:	90 degrees $\pm 8$ degrees

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# Morin has a Rugged Heart

#### **Morin Scotch Yoke**

The heart of any scotch yoke actuator is the yoke. Morin 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. Morin understands this and ensures that all our yoke designs meet this test.

#### **Principles of Construction**

Using high quality materials of construction and modern rugged design concepts Morin becomes the standard for low cost valve actuation while providing high quality performance.

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**

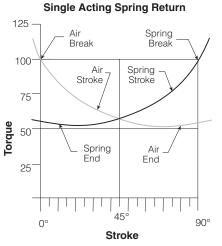
Adjustable stops on each end cap provide the flexibility of accurate valve rotation positioning at the end of the "open" and "close" stroke. Both stops are located on the cylinder centerline, the optimal position to maximize travel adjustment and eliminate any detrimental side loading on the travel stops.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

## Spring Designed for Safety

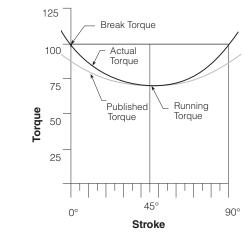
All spring return models incorporate a "man safe" spring design that allows the actuator to be safely assembled and disassembled in the field without the need for special tools. The integral tie rods are bored and tapped to provide a means of loading and unloading the spring in a safe and convenient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



## Scotch Yoke Torque Characteristics (symmetrical shown)

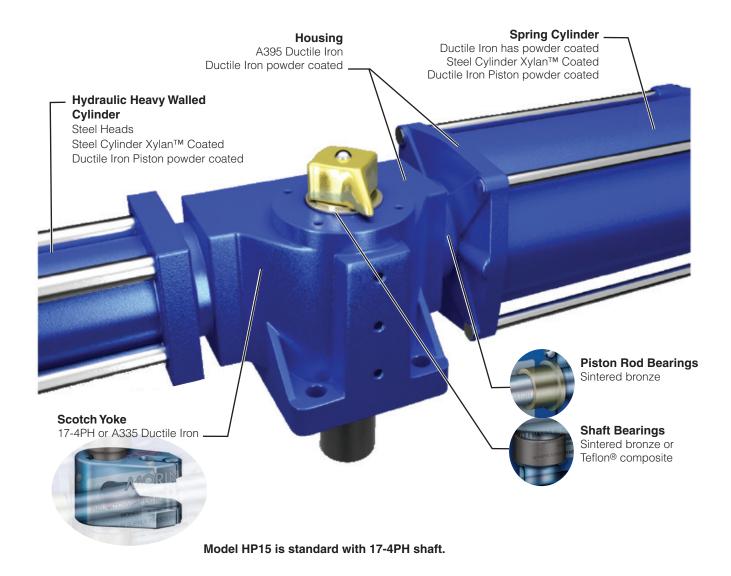


# Double Acting Air to Air



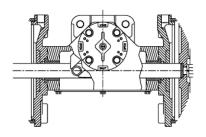
**Morin Series HP Actuator** 

## Superior materials of construction offer long life, and mean less downtime

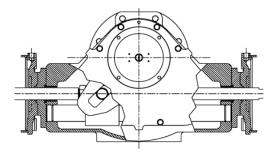


#### **Morin Understands Actuator Design**

Morin understands that the most efficient design for one torque range is not the most efficient for another. Morin uses 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 Morin Series HP IOM for a complete bill of materials.

## **Symmetrical and Canted Yokes**

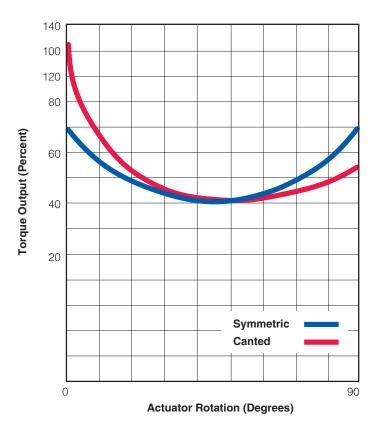
It's about fitting the torque curve of the actuator to the valve ... It's about lower cost, lighter weight, smaller actuators ... It's about Choice ...

#### 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 reseat 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.



# **Morin Series HP Actuator**

## **Mechanical Data**

#### 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.

Double Acting(inch)90° Stroke(ibs)(psi)(psi)(psi)(psi)(psi)PIF5-2DA2.133113015002250PIF5-3-DA3.25325487001500PIF5-3-DA3.2554111552000225015002250PIF5-3-DA3.25573186160022506002250PIP2-4-DA4.25573186160022506002250PIP2-4-DA4.25513319690022506002250PIP3-4-DA4.25615140120022506002250PIP3-4-DA4.25615140120022506002250PIP3-4-DA4.2561514012002501002250PIP3-4-DA4.2561514012001500400200PIP3-4-DA4.251217013152250225022502250PIP3-4-DA4.251217013152250225022502250PIP3-4-DA4.251269914411200150016002250PIP3-4-DA4.25162447154112001500200200PIP3-4-DA4.25162447154115001500200200PIP3-4-DA <t< th=""><th>Actuator</th><th>Cylinder</th><th></th><th>Volume</th><th></th><th>Symi</th><th>netric</th><th colspan="3">Canted</th></t<>	Actuator	Cylinder		Volume		Symi	netric	Canted		
P15-2-1DA         2.13         3         11         30         1900         2250         -         -           P15-2-2DA         2.13         3         19         43         1500         2250         -         -         -           P15-3-2DA         3.25         3         2.5         44         150         2250         1500         2250           P253-1DA         3.25         5         71         160         1100         2250         1500         2250           P254-4DA         4.25         5         71         160         1100         2250         1000         2250           P254-4DA         4.25         5         133         196         900         2250         2000         2250           P204-4DA         4.25         6         151         401         1000         2250         400         2000           P204-4DA         4.25         6         321         440         600         1500         100         200           P204-4DA         4.25         12         303         1351         2250         2250         2250         2250         2250         2250         2250         2250         2250					-			-	MAP** (psi)	
PIP IS-3-DA       2.13       3       19       43       1500       2250       -       -         PIP IS-3-DA       3.25       3       25       48       700       1500       -       -         PIP S-3-DA       3.25       5       41       155       2000       2250       1500       2250         PIP S-4-DA       4.25       5       71       160       1100       2250       800       2250         PIP S-4-DA       4.25       5       713       186       1900       2250       600       2250         PIP A-4-DA       4.25       6       151       401       2000       2250       800       2250         PIP A-4-DA       4.25       6       151       401       1000       2250       800       2250         PIP A-4-DA       4.25       6       321       400       600       1500       700       2250         PIP A-4-DA       4.25       12       170       1315       2250       2250       2250       2250       2250       2250       2250       2250       2250       2250       2250       2250       2250       2250       2250       2250       250	3	( )	. ,					(1)	(1)	
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PP25-31DA         3.25         5         41         155         2000         2260         1500         2260           PP25-41DA         4.25         5         71         186         160         2260         800         2260           P25-41DA         4.25         5         133         196         900         2250         2000         2250           P20-42DA         4.25         6         151         401         2000         2250         400         2250           P30-6-DA         6.25         6         151         401         100         2250         400         2000           P30-6-2DA         6.25         6         321         460         600         1500         400         200           P430-6-2DA         8.26         6         624         591         500         1600         200         2250										
P25-3-2DA         3.25         5         73         186         1600         2250         800         2250           P25-4-1DA         4.25         5         71         160         1100         2250         1100         2250           P25-4-2DA         4.25         6         85         365         2250         2250         2000         2250           P30-4-1DA         4.25         6         151         401         1100         2250         800         2250           P30-6-1DA         6.25         6         349         491         1000         2250         100         200         2250           P30-8-1DA         8.26         6         624         591         500         1500         400         2000           P456-4-DA         4.25         12         363         1351         2250         2250         1800         2250           P456-6-DA         6.25         12         368         1360         2250         2250         2250         2250         2250         2250         2250         2250         2250         2250         2250         2250         2250         2250         2250         2250         2250         225									- 2250	
P25-4-IDA         4.25         5         71         160         1100         2250         100         2250           P25-4-IDA         4.25         5         133         196         900         2250         600         2250           P30-4-IDA         4.25         6         151         401         2000         2250         400         2250           P30-6-IDA         6.25         6         184         410         1100         2250         400         2250           P30-6-IDA         6.25         6         349         401         1000         2250         400         2250           P30-6-IDA         8.26         6         624         591         500         1600         2250           P455-4-IDA         4.25         12         107         1315         2250         2250         2250         2250         2250         2250         2250           P456-4-IDA         6.25         12         669         1141         1200         1500         1600         2250         2250         2250         2250         2250         2250         2250         2250         2250         2250         2250         2250         2250										
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P30-4-2DA         4.25         6         151         401         2000         2250         800         2250           P30-6-1DA         6.25         6         184         410         1100         2250         1600         2250           P30-6-1DA         6.25         6         349         491         1000         2250         1600         2250           P30-8-1DA         8.26         6         321         460         600         1500         400         2000           PF80-8-1DA         8.25         12         303         1351         2250										
PR30-6-IDA         6.25         6         184         410         1100         2250         400         2000           PR30-6-IDA         6.25         6         349         491         1000         2250         100         2250           PR30-8-IDA         8.26         6         621         1500         1500         400         2000           PR54-4-IDA         4.25         12         1315         2250         225										
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HP80-4-2DA         4.25         16         404         2596         2250         2000										
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HP80-6-2DA         6.25         16         931         2686         2250         2250         2250         2250           HP80-8-2DA         8.26         16         1663         2786         1500         1500         2250         2250           Actuator Model         Cylinder Bore         Stroke (inch)         Volume (inch)         Weight 90° Stroke         Symmetric (lpsi)         MP** (psi)         MP**           HP15-2-1-023S         2.13         3         11         35         1900         2250         -         -           HP15-2-1-023S         2.13         3         11         75         1900         2250         -         -           HP15-2-1-100S         2.13         3         11         75         1900         2250         -         -           HP25-3-1-210S         3.25         5         41         260         2000 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>										
HPB0-8-1DA         8.26         16         857         2655         1500         1500         2250         2250           Actuator Model Double Acting         Cylinder (inch)         Stroke (inch)         Volume 0° Stroke         Veight (lbs)         MP**         MAP**         MOP*         MAP**         MAP**         MOP*         MAP**										
HPB0-8-2DA         8.26         16         1663         2786         1500         1500         1500         2000           Actuator Model Double Acting         Cylinder (inch)         Stroke (inch)         Volume 90° Stroke         Weight (lbs)         MOP* (psi)         MAP*** (psi)         Canted MOP* (psi)         MAP*** (psi)         Canted MOP* (psi)         MAP*** (psi)         Canted MOP*         MAP*** (psi)         Canted (psi)           HP15-2-1-023S         2.13         3         11         35         1900         2250         -         -           HP15-2-1-00S         2.13         3         11         45         1900         2250         -         -           HP15-2-1-00S         2.13         3         11         75         1900         2250         -         -           HP15-2-1-010S         3.25         5         41         260         2000         2250         2250         2250           HP25-3-1-20S         3.25         5         71         266         1400         2250         2250         2250           HP30-4-1-370S         4.25         6         85         600         2250         2250         2250         2250           HP30-4-1-400S         6.25										
Actuator Model Double Acting         Cylinder Bore (inch)         Stroke (inch)         Volume 90° Stroke         Weight (lbs)         MAP** (psi)         MAP** (psi)										
Model Double ActingBore (inch)Stroke (inch)Cubic In 90° StrokeWOP* (lbs)MOP* (psi)MAP** (psi)MOP* (psi)MAP** (psi)MOP* (psi)MAP** (psi)	HP80-8-2DA	8.26	16	1663	2786	1500	1500	1500	2000	
Double Acting         (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         55         1900         2250         -         -           HP15-2-1-072S         2.13         3         11         55         1900         2250         -         -           HP15-2-1-100S         2.13         3         11         75         1900         2250         -         -           HP15-2-1-100S         3.25         5         41         250         2000         2250         2250         2250           HP25-3-1-210S         3.25         5         41         260         2000         2250         2250         2250           HP25-4-1-210S         4.25         5         71         265         1400         2250         2250         2250         2250           HP30-4-1-740S         4.25         6         85         600         2250         2250         2250         2250           HP30-6-1-740S         6.25 <td< th=""><th>Actuator</th><th>Cylinder</th><th></th><th>Volume</th><th></th><th>Symi</th><th>netric</th><th>Cant</th><th>ed</th></td<>	Actuator	Cylinder		Volume		Symi	netric	Cant	ed	
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       260       2000       2250       2250       2250         HP25-41-210S       4.25       5       71       260       1400       2250       1400       2250         HP30-41-740S       4.25       6       85       440       2250       1400       2250         HP30-41-740S       4.25       6       85       400       2250       2250       2250         HP30-41-740S       6.25       6       184       1010       1500       2250       1500       2250         HP30-61-575S       6.25       6       184 <th>Model</th> <th>-</th> <th>01</th> <th>Cubie In</th> <th>Walaht</th> <th></th> <th></th> <th></th> <th></th>	Model	-	01	Cubie In	Walaht					
HP15-2-1-072S2.133115519002250HP15-2-1-100S2.133117519002250HP15-3-1-100S3.2532519010001500HP25-3-1-210S3.2554125020002250225022502250HP25-3-1-420S3.2554126020002250225022502250HP25-4-1-210S4.255712651400225014002250HP30-4-1-370S4.256854402250225022502250HP30-4-1-740S4.256856002250225022502250HP30-6-1-740S6.25618410101500225015002250HP30-6-1-140S6.25618411151500225015002250HP30-6-1-140S6.256321107590015009002000HP30-8-1-146SS6.251236817832250225022502250HP30-8-1-146SS6.251236817832250225022502250HP65-6-1-3731S6.251236817832250225022502250HP65-8-1-3731S8.261264233001500150015002000HP65-8-1-3731S8.261264	Double Acting							-		
HP15-2-1-072S2.133115519002250HP15-2-1-100S2.133117519002250HP15-3-1-100S3.2532519010001500HP25-3-1-210S3.2554125020002250225022502250HP25-3-1-420S3.2554126020002250225022502250HP25-4-1-210S4.255712651400225014002250HP30-4-1-370S4.256854402250225022502250HP30-4-1-740S4.256856002250225022502250HP30-6-1-740S6.25618410101500225015002250HP30-6-1-140S6.25618411151500225015002250HP30-6-1-140S6.256321107590015009002000HP30-8-1-146SS6.251236817832250225022502250HP30-8-1-146SS6.251236817832250225022502250HP65-6-1-3731S6.251236817832250225022502250HP65-8-1-3731S8.261264233001500150015002000HP65-8-1-3731S8.261264	Double Acting	(inch)	(inch)	90° Stroke	(lbs)	(psi)	(psi)	-		
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HP30-8-1-740S8.266321107590015009002000HP30-8-1-1150S8.266321116090015009002000HP65-6-1-1485S6.251236814352250225022502250HP65-6-1-2385S6.251236817832250225022502250HP65-6-1-3731S6.251236827212250225022502250HP65-8-1-1485S8.261264214851500150015002000HP65-8-1-3731S8.261264233001200150015002000HP65-8-1-5336S8.26126423903150015002000HP80-6-1-6044S6.251649155832250225022502250HP80-6-1-7114S6.251649162082250225022502250HP80-8-1-6044S8.261685756331500200015002000	Double Acting           HP15-2-1-023S           HP15-2-1-046S           HP15-2-1-072S           HP15-2-1-072S           HP15-2-1-072S           HP15-2-1-00S           HP15-3-1-100S           HP25-3-1-210S           HP25-3-1-420S           HP25-4-1-210S           HP25-4-1-210S           HP30-4-1-370S           HP30-6-1-575S	(inch) 2.13 2.13 2.13 3.25 3.25 3.25 4.25 4.25 4.25 4.25 4.25 4.25 6.25	(inch) 3 3 3 3 3 5 5 5 5 5 6 6 6 6 6 6	90° Stroke 11 11 11 11 25 41 41 41 71 71 85 85 85 184	(Ibs) 35 45 55 75 190 250 260 260 260 265 440 600 1010	(psi) 1900 1900 1900 1900 2000 2000 2000 1400 2250 2250 2250 1500	(psi) 2250 2250 2250 1500 2250 2250 2250 2250	(psi) - - - 2250 2250 1400 1400 2250 2250 2250 1400 2250 1400 2250 1500	(psi) 	
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HP65-6-1-1485S6.2512368143522502250225022502250HP65-6-1-2385S6.2512368178322502250225022502250HP65-6-1-3731S6.2512368272122502250225022502250HP65-8-1-1485S8.261264214851500150015002000HP65-8-1-3731S8.261264233001200150015002000HP65-8-1-5336S8.261264239031500150015002000HP80-6-1-6044S6.251649155832250225022502250HP80-6-1-7114S6.251649162082250225022502250HP80-8-1-6044S8.2616857563315002000150015002000	Double Acting           HP15-2-1-023S           HP15-2-1-046S           HP15-2-1-072S           HP15-2-1-072S           HP15-2-1-00S           HP15-2-1-100S           HP15-3-1-100S           HP25-3-1-210S           HP25-3-1-420S           HP25-4-1-210S           HP30-4-1-370S           HP30-4-1-740S           HP30-6-1-740S           HP30-6-1-1150S	(inch) 2.13 2.13 2.13 3.25 3.25 3.25 4.25 4.25 4.25 4.25 4.25 6.25 6.25 6.25	(inch) 3 3 3 3 3 5 5 5 5 5 6 6 6 6 6 6 6 6 6 6 6 6 6	90° Stroke	(Ibs) 35 45 55 75 190 250 260 260 265 440 600 1010 910 1115	(psi) 1900 1900 1900 1900 2000 2000 2000 1400 2250 2250 2250 1500 1500 1500	(psi) 2250 2250 2250 1500 2250 2250 2250 2250	(psi) - - - - 2250 2250 1400 1400 2250 2250 1500 1500 1500	(psi) 	
HP65-6-1-2385S6.251236817832250225022502250HP65-6-1-3731S6.251236827212250225022502250HP65-8-1-3731S6.251264214851500150015002000HP65-8-1-3731S8.261264233001200150015002000HP65-8-1-5336S8.261264239031500150015002000HP80-6-1-6044S6.251649155832250225022502250HP80-6-1-7114S6.251649162082250225022502250HP80-8-1-6044S8.261685756331500200015002000	Double Acting           HP15-2-1-023S           HP15-2-1-046S           HP15-2-1-072S           HP15-2-1-072S           HP15-2-1-072S           HP15-2-1-072S           HP15-2-1-072S           HP15-2-1-00S           HP15-3-1-100S           HP25-3-1-210S           HP25-3-1-420S           HP25-4-1-210S           HP25-4-1-420S           HP30-4-1-370S           HP30-6-1-575S           HP30-6-1-740S           HP30-6-1-1150S           HP30-8-1-740S	(inch) 2.13 2.13 2.13 3.25 3.25 3.25 4.25 4.25 4.25 4.25 6.25 6.25 6.25 8.26	(inch) 3 3 3 3 3 5 5 5 5 5 6 6 6 6 6 6 6 6 6 6 6 6 6	90° Stroke 11 11 11 11 25 41 41 41 71 71 85 85 184 184 184 184 321	(Ibs) 35 45 55 190 250 260 260 265 440 600 1010 910 1115 1075	(psi) 1900 1900 1900 2000 2000 2000 1400 1400 2250 2250 1500 1500 1500 900	(psi) 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250	(psi) - - - - 2250 2250 1400 1400 2250 2250 1500 1500 1500 900	(psi) 	
HP65-6-1-3731S6.251236827212250225022502250HP65-8-1-1485S8.261264214851500150015002000HP65-8-1-3731S8.261264233001200150015002000HP65-8-1-5336S8.261264239031500150015002000HP80-6-1-6044S6.251649155832250225022502250HP80-6-1-7114S6.251649162082250225022502250HP80-8-1-6044S8.261685756331500225015002000	Double Acting           HP15-2-1-023S           HP15-2-1-046S           HP15-2-1-072S           HP15-2-1-072S           HP15-2-1-072S           HP15-2-1-072S           HP15-2-1-072S           HP15-2-1-072S           HP15-2-1-00S           HP15-2-1-00S           HP25-3-1-210S           HP25-3-1-420S           HP25-4-1-210S           HP30-4-1-370S           HP30-6-1-57SS           HP30-6-1-1150S           HP30-8-1-740S           HP30-8-1-740S           HP30-8-1-1150S	(inch) 2.13 2.13 2.13 3.25 3.25 3.25 4.25 4.25 4.25 4.25 6.25 6.25 6.25 8.26 8.26	(inch) 3 3 3 3 3 5 5 5 5 5 6 6 6 6 6 6 6 6 6 6 6 6 6	90° Stroke 11 11 11 11 25 41 41 41 71 71 71 85 85 184 184 184 184 321 321	(Ibs) 35 45 55 190 250 260 260 265 440 600 1010 910 1115 1075 1160	(psi) 1900 1900 1900 1900 2000 2000 2000 1400 1400 2250 2250 1500 1500 1500 1500 900	(psi) 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 1500	(psi) - - - - 2250 2250 1400 1400 2250 2250 1500 1500 1500 1500 900	(psi) 	
HP65-8-1-1485S8.261264214851500150015002000HP65-8-1-3731S8.261264233001200150015002000HP65-8-1-5336S8.261264239031500150015002000HP80-6-1-6044S6.251649155832250225022502250HP80-6-1-7114S6.251649162082250225022502250HP80-8-1-6044S8.261685756331500225015002000	Double Acting           HP15-2-1-023S           HP15-2-1-046S           HP15-2-1-072S           HP15-2-1-072S           HP15-2-1-072S           HP15-2-1-072S           HP15-2-1-072S           HP15-2-1-072S           HP15-3-1-100S           HP25-3-1-210S           HP25-3-1-420S           HP25-4-1-210S           HP30-4-1-370S           HP30-6-1-575S           HP30-6-1-740S           HP30-6-1-740S           HP30-8-1-740S           HP30-8-1-740S           HP30-8-1-1150S           HP30-8-1-1150S           HP30-8-1-1485S	(inch) 2.13 2.13 2.13 3.25 3.25 3.25 4.25 4.25 4.25 6.25 6.25 6.25 6.25 8.26 8.26 8.26 8.26 6.25	(inch) 3 3 3 3 5 5 5 5 6 6 6 6 6 6 6 6 6 6 12	90° Stroke 11 11 11 11 25 41 41 41 71 71 85 85 184 184 184 184 321 321 321 368	(Ibs) 35 45 55 190 250 260 260 265 440 600 1010 910 1115 1075 1160 1435	(psi) 1900 1900 1900 2000 2000 2000 1400 2250 2250 1500 1500 1500 1500 900 2250	(psi) 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 1500 1500 1500	(psi) - - - - 2250 2250 1400 2250 1500 1500 1500 1500 900 900 2250	(psi) 	
HP65-8-1-3731S8.261264233001200150015002000HP65-8-1-5336S8.261264239031500150015002000HP80-6-1-6044S6.251649155832250225022502250HP80-6-1-7114S6.251649162082250225022502250HP80-8-1-6044S8.261685756331500225015002000	Double Acting           IP15-2-1-023S           IP15-2-1-046S           IP15-2-1-072S           IP15-2-1-072S           IP15-2-1-072S           IP15-2-1-072S           IP15-2-1-072S           IP15-2-1-072S           IP15-2-1-072S           IP15-2-1-072S           IP15-3-1-100S           IP25-3-1-210S           IP25-4-1-210S           IP25-4-1-210S           IP30-4-1-370S           IP30-6-1-575S           IP30-6-1-740S           IP30-6-1-740S           IP30-6-1-740S           IP30-8-1-740S           IP30-8-1-1150S           IP30-8-1-1150S           IP30-8-1-1485S           IP30-8-1-12385S	(inch) 2.13 2.13 2.13 3.25 3.25 3.25 4.25 4.25 4.25 4.25 6.25 6.25 6.25 8.26 8.26 8.26 6.25 6.25 6.25	(inch) 3 3 3 3 3 5 5 5 5 5 6 6 6 6 6 6 6 6 6 12 12	90° Stroke 11 11 11 11 25 41 41 41 71 71 71 85 85 184 184 184 184 321 321 321 368 368	(Ibs) 35 45 55 190 250 260 260 265 440 600 1010 910 1115 1075 1160 1435 1783	(psi) 1900 1900 1900 2000 2000 2000 1400 1400 2250 2250 1500 1500 1500 900 2250 2250 2250	(psi) 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 1500 1500 2250 2250	(psi) - - - - 2250 2250 1400 1400 2250 2250 1500 1500 1500 1500 900 2250 2250 2250	(psi) 	
HP65-8-1-5336S8.261264239031500150015002000HP80-6-1-6044S6.251649155832250225022502250HP80-6-1-7114S6.251649162082250225022502250HP80-8-1-6044S8.261685756331500225015002000	Double Acting           HP15-2-1-023S           HP15-2-1-046S           HP15-2-1-072S           HP15-2-1-072S           HP15-2-1-072S           HP15-2-1-072S           HP15-2-1-072S           HP15-2-1-072S           HP15-3-1-100S           HP25-3-1-210S           HP25-3-1-420S           HP25-4-1-210S           HP30-4-1-370S           HP30-6-1-575S           HP30-6-1-740S           HP30-6-1-140S           HP30-8-1-740S           HP30-8-1-740S           HP30-8-1-1150S           HP30-8-1-1485S           HP30-8-1-1373S	(inch) 2.13 2.13 2.13 3.25 3.25 3.25 4.25 4.25 4.25 4.25 6.25 6.25 6.25 8.26 8.26 6.25 6.25 6.25 6.25 6.25	(inch) 3 3 3 3 5 5 5 5 5 6 6 6 6 6 6 6 6 6 12 12 12	90° Stroke 11 11 11 11 25 41 41 41 71 71 71 85 85 184 184 184 184 184 184 321 321 321 368 368 368	(Ibs) 35 45 55 190 250 260 260 265 440 600 1010 910 1115 1075 1160 1435 1783 2721	(psi) 1900 1900 1900 2000 2000 2000 1400 1400 2250 2250 1500 1500 900 2250 2250 2250 2250	(psi) 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 1500 2250 1500 2250 2250 2250 2250 2250	(psi) - - - - 2250 2250 1400 1400 2250 2250 1500 1500 900 2250 2250 2250 2250 2250	(psi) 	
HP80-6-1-6044S6.2516491558322502250225022502250HP80-6-1-7114S6.2516491620822502250225022502250HP80-8-1-6044S8.261685756331500225015002000	Double Acting           IP15-2-1-023S           IP15-2-1-046S           IP15-2-1-072S           IP15-2-1-072S           IP15-2-1-072S           IP15-2-1-072S           IP15-2-1-072S           IP15-2-1-072S           IP15-3-1-100S           IP25-3-1-210S           IP25-3-1-420S           IP25-4-1-210S           IP25-4-1-420S           IP30-4-1-370S           IP30-6-1-575S           IP30-6-1-740S           IP30-6-1-140S           IP30-8-1-740S           IP30-8-1-740S           IP30-8-1-140S           IP30-8-1-740S           IP65-6-1-3731S           IP65-8-1-1485S	(inch) 2.13 2.13 2.13 3.25 3.25 3.25 4.25 4.25 4.25 4.25 6.25 6.25 6.25 8.26 6.25 6.25 6.25 6.25 8.26 6.25 6.25 6.25 8.26	(inch) 3 3 3 3 5 5 5 5 5 6 6 6 6 6 6 6 6 6 12 12 12 12	90° Stroke 11 11 11 11 25 41 41 41 41 71 71 85 85 184 184 184 184 184 184 321 321 368 368 368 368 368 642	(Ibs)         35         45         55         75         190         250         260         260         260         260         260         1010         910         1115         1075         1160         1435         1783         2721         1485	(psi) 1900 1900 1900 2000 2000 2000 1400 2250 2250 1500 1500 900 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250	(psi) 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 1500 1500 2250 2250 2250 1500 2250 2250 1500	(psi) - - - - 2250 2250 1400 1400 2250 2250 1500 1500 1500 900 2250 250	(psi) 	
HP80-6-1-7114S6.251649162082250225022502250HP80-8-1-6044S8.261685756331500225015002000	Double Acting           IP15-2-1-023S           IP15-2-1-046S           IP15-2-1-072S           IP15-2-1-072S           IP15-2-1-072S           IP15-2-1-072S           IP15-2-1-072S           IP15-2-1-00S           IP15-3-1-100S           IP25-3-1-210S           IP25-3-1-420S           IP25-4-1-420S           IP25-4-1-420S           IP30-4-1-740S           IP30-6-1-575S           IP30-6-1-740S           IP30-6-1-740S           IP30-8-1-1150S           IP30-8-1-1485S           IP65-6-1-2385S           IP65-6-1-3731S           IP65-8-1-1485S           IP65-8-1-1485S	(inch) 2.13 2.13 2.13 3.25 3.25 3.25 4.25 4.25 4.25 4.25 6.25 6.25 6.25 8.26 8.26 6.25 6.25 8.26 8.26 8.26	(inch)       3       3       3       3       3       3       5       5       5       6       6       6       6       6       12       12       12       12       12       12       12       12       12       12       12       12       12       12       12       12	90° Stroke 11 11 11 11 25 41 41 41 71 71 71 85 85 85 184 184 184 184 184 184 184 184 184 321 321 368 368 368 368 368 368 368 368	(Ibs)         35         45         55         75         190         250         260         260         260         260         1010         910         1115         1075         1160         1435         1783         2721         1485         3300	(psi) 1900 1900 1900 2000 2000 2000 1400 2250 2250 1500 1500 900 2250	(psi) 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 1500 1500 2250 2250 2250 1500 2250	(psi) - - - 2250 2250 1400 1400 2250 2250 1500 1500 900 2250 2250 2250 2250 2250 2250 2250 1500 900	(psi) 	
HP80-8-1-6044S         8.26         16         857         5633         1500         2250         1500         2000	Double Acting           IP15-2-1-023S           IP15-2-1-046S           IP15-2-1-072S           IP15-2-1-072S           IP15-2-1-072S           IP15-2-1-072S           IP15-2-1-072S           IP15-2-1-00S           IP15-3-1-100S           IP25-3-1-210S           IP25-3-1-420S           IP25-4-1-420S           IP30-4-1-370S           IP30-6-1-575S           IP30-6-1-740S           IP30-8-1-1150S           IP30-8-1-140S           IP30-8-1-1485S           IP65-6-1-3731S           IP65-8-1-4385S           IP65-8-1-3731S           IP65-8-1-3731S           IP65-8-1-3731S           IP65-8-1-3731S	(inch) 2.13 2.13 2.13 3.25 3.25 3.25 4.25 4.25 4.25 4.25 6.25	(inch) 3 3 3 3 5 5 5 5 5 6 6 6 6 6 6 6 6 6 6 12 12 12 12 12 12 12 12 12	90° Stroke 11 11 11 11 25 41 41 41 71 71 71 85 85 184 184 184 184 184 184 184 184 184 321 321 321 368 368 368 368 368 368 368 368 368 368	(Ibs)         35         45         55         75         190         250         260         260         260         260         1010         910         1115         1075         1160         1435         1783         2721         1485         3300         3903	(psi) 1900 1900 1900 2000 2000 2000 1400 2250 2250 1500 1500 900 2250 250	(psi) 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 1500 1500 1500 1500 1500 1500	(psi) - - - - 2250 2250 1400 2250 2250 1500 1500 900 2250 2250 2250 2250 1500 1500 2250 2250 1500 1500 2250	(psi) 	
	Double Acting           IP15-2-1-023S           IP15-2-1-046S           IP15-2-1-072S           IP15-2-1-072S           IP15-2-1-072S           IP15-2-1-072S           IP15-2-1-00S           IP15-2-1-100S           IP25-3-1-210S           IP25-3-1-420S           IP25-4-1-420S           IP30-4-1-370S           IP30-4-1-740S           IP30-6-1-157SS           IP30-6-1-170S           IP30-8-1-740S           IP30-8-1-1485S           IP65-6-1-3731S           IP65-8-1-3731S           IP65-8-1-3736S           IP65-8-1-5336S           IP65-8-1-5336S           IP65-8-1-5336S           IP65-8-1-5336S           IP65-8-1-5336S           IP65-8-1-5336S           IP65-8-1-6044S	(inch) 2.13 2.13 2.13 3.25 3.25 3.25 4.25 4.25 4.25 4.25 6.25 6.25 6.25 8.26 8.26 6.25 8.26 8.26 8.26 8.26 8.26 8.26	(inch) 3 3 3 3 5 5 5 5 6 6 6 6 6 6 6 6 6 12 12 12 12 12 12 12 12 12 12	90° Stroke 11 11 11 11 25 41 41 41 71 71 85 85 184 184 184 184 184 184 184 321 321 321 321 368 368 368 368 368 368 368 368 368 368	(Ibs)         35         45         55         75         190         250         260         260         260         265         440         600         1010         910         1115         1075         1160         1435         1783         2721         1485         3300         3903         5583	(psi) 1900 1900 1900 2000 2000 2000 1400 1400 2250 2250 1500 1500 900 2250 2250 2250 1500 1500 2250 2250 1500 1500 1500 1200 1500 1500 1500 2250	(psi) 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 1500 1500 1500 1500 1500 1500 1500	(psi) - - - - - - - - - - - - -	(psi) 	
HP80-8-1-7114S 8.26 16 857 6258 1500 2250 1500 2000	Double Acting           IP15-2-1-023S           IP15-2-1-046S           IP15-2-1-072S           IP15-2-1-072S           IP15-2-1-072S           IP15-2-1-072S           IP15-2-1-072S           IP15-2-1-00S           IP25-3-1-210S           IP25-3-1-420S           IP25-4-1-420S           IP25-4-1-420S           IP30-4-1-370S           IP30-6-1-575S           IP30-6-1-740S           IP30-6-1-140S           IP30-8-1-150S           IP30-8-1-140S           IP55-6-1-3731S           IP65-6-1-3731S           IP65-8-1-485S           IP65-8-1-5336S           IP65-8-1-5336S           IP65-8-1-5336S           IP65-8-1-6044S	(inch) 2.13 2.13 2.13 3.25 3.25 3.25 4.25 4.25 4.25 4.25 6.25 6.25 8.26 8.26 8.26 8.26 8.26 8.26 8.26 8.26 8.26 8.26 8.26	(inch) 3 3 3 3 5 5 5 5 6 6 6 6 6 6 6 6 6 12 12 12 12 12 12 12 12 12 12	90° Stroke 11 11 11 11 25 41 41 41 41 41 71 71 85 85 184 184 184 184 184 184 184 184 321 321 321 326 368 368 368 368 368 368 368 368 368 36	(Ibs)         35         45         55         75         190         250         260         260         260         265         440         600         1010         910         1115         1075         1160         1435         2721         1485         3300         3903         5583         6208	(psi) 1900 1900 1900 2000 2000 2000 1400 2250 2250 1500 1500 900 2250 2250 2250 1500 1500 1500 1200 1500 1200 1500 2250	(psi) 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 1500 1500 1500 1500 1500 1500 1500 2250	(psi) - - - - - - - - - - - - -	(psi) 	
	Double Acting           HP15-2-1-023S           HP15-2-1-046S           HP15-2-1-072S           HP15-2-1-072S           HP15-2-1-072S           HP15-2-1-00S           HP15-3-1-100S           HP25-3-1-210S           HP25-3-1-420S           HP25-4-1-210S           HP25-4-1-210S           HP30-4-1-370S           HP30-6-1-575S	(inch) 2.13 2.13 2.13 3.25 3.25 3.25 4.25 4.25 4.25 4.25 6.25 6.25 8.26 8.26 8.26 8.26 8.26 8.26 8.26 8.26 8.26 8.26 8.26	(inch) 3 3 3 3 5 5 5 5 6 6 6 6 6 6 6 6 6 12 12 12 12 12 12 12 12 12 12	90° Stroke 11 11 11 11 25 41 41 41 41 41 71 71 85 85 184 184 184 184 184 184 184 184 321 321 321 326 368 368 368 368 368 368 368 368 368 36	(Ibs)         35         45         55         75         190         250         260         260         260         265         440         600         1010         910         1115         1075         1160         1435         2721         1485         3300         3903         5583         6208	(psi) 1900 1900 1900 2000 2000 2000 1400 2250 2250 1500 1500 900 2250 2250 2250 1500 1500 1500 1200 1500 1200 1500 2250	(psi) 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 2250 1500 1500 1500 1500 1500 1500 1500 2250	(psi) - - - - - - - - - - - - -	(psi) 	

# **Dimensional Data (inches)**

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Double Acting	Α	В	<b>C</b> <sup>1</sup>	C <sup>2</sup>	<b>D</b> <sup>1</sup>	D <sup>2</sup>	E	F	G	J	K	L	М	Q	Ports	Ports	Flange
HP15U-2-1DA	20.25	11.38	3.50	-	5.50	-	3.06	1.75	-	2.18	4.34	6.69	2.25	1.25	3/8	1/8	F12
HP15U-2-2DA	22.75	11.38	3.50	-	5.50	-	3.06	-	-	2.18	4.34	6.69	2.25	-	3/8	-	F12
HP15U-3-1DA	23.06	14.19	5.50	-	6.50	-	3.06	1.75	-	2.18	4.34	6.69	2.25	1.25	1/2	3/8	F12
HP15U-3-2DA	28.37	14.19	5.50	-	6.50	-	3.06	-	-	2.18	4.34	6.69	2.25	-	1/2	-	F12
HP25U-3-1DA	35.54	19.66	5.50	-	8.44	-	5.62	2.75	-	4.38	8.13	11.81	3.19	2.12	1/2	3/8	F16
HP25U-3-2DA	39.33	19.66	5.50	-	8.44	-	5.62	-	-	4.38	8.13	11.81	3.19	_	1/2	-	F16
HP25U-4-1DA	38.16	22.28	7.00	-	9.19	-	5.62	2.75	-	4.38	8.13	11.81	3.19	2.12	1/2	3/8	F16
HP25U-4-2DA	44.57	22.28	7.00	-	9.19.	_	5.62	-	_	4.38	8.13	11.81	3.19	_	1/2	-	F16
HP30U-4-1DA	45.16	25.60	7.00	_	13.50	_	7.63	3.50	_	5.44	9.50	14.81	6.88	2.50	1/2	1/2	F30
HP30U-4-2DA	51.19	25.60	7.00	-	13.50	-	7.63	-	-	5.44	9.50	14.81	6.88	_	1/2	-	F30
HP30U-6-1DA	47.99	28.43	9.00	_	14.51	_	7.63	3.50	0.44	5.44	9.50	14.81	6.89	2.50	1/2	3/8	F30
HP30U-6-2DA	52.67	28.43	9.00	-	14.51	-	7.63	-	0.44	5.44	9.50	14.81	6.89	-	1/2	-	F30
HP30U-8-1DA	48.49	28.93	10.63	-	15.33	-	7.63	3.50	1.25	5.44	9.50	14.81	6.89	2.50	3/4	1/2	F30
HP30U-8-2DA	57.87	28.93	10.63	_	15.33	-	7.63	-	1.25	5.44	9.50	14.81	6.89	-	3/4	_	F30
HP65U-4-1DA	60.79	44.13	7.00	-	21.55	-	16.53	-	3.84	7.96	15.30	16.47	7.58	5.31	1/2	1/2	F35
HP65U-4-2DA	88.27	44.13	7.00	_	21.55	_	16.53	-	3.84	7.96	15.30	16.47	7.58	5.31	1/2	_	F35
HP65U-6-1DA	59.82	43.16	9.00	_	21.55	_	16.53	-	2.84	7.96	15.30	16.47	7.58	5.31	1/2	3/8	F35
HP65U-6-2DA	86.32	43.16	9.00	_	21.55	_	16.53	_	2.84	7.96	15.30	16.47	7.58	_	1/2	-	F35
HP65U-8-1DA	60.69	44.03	10.63	_	21.55	_	15.16	_	2.03	7.96	15.30	16.47	7.58	5.31	3/4	1/2	F35
HP65U-8-2DA	88.06	44.03	10.63	_	21.55	_	15.16	_	2.03	7.96	15.30	16.47	7.58	-	3/4	_	F35
HP80U-4-1DA	77.10	55.40	7.00	_	28.75	-	21.58	-	7.12	10.30	20.09	21.27	10.13	5.00	1/2	1/2	F48
HP80U-4-2DA	110.80	55.40	7.00	-	28.75	_	21.58	_	7.12	10.30		21.27	10.13	-	1/2	_	F48
HP80U-6-1DA	78.45	56.75	9.00	_	28.75	_	21.58	_	6.12		20.09	21.27	10.13	5.00	1/2	3/8	F48
HP80U-6-2DA	113.50	56.75	9.00	_	28.75	_	21.58	_	6.12	10.30	20.09	21.27	10.13	-	1/2	-	F48
HP80U-8-1DA	80.73	59.03	10.63	_	28.75	_	20.20	_	5.31	10.30	20.09	21.27	10.13	_	3/4	- 1/2	F48
HP80U-8-2DA	118.06	59.03	10.63	-	28.75	-	20.20	-	5.31	10.30	20.09	21.27	10.13	-	3/4	-	F48
Caria a Datum		Б	01	<b>C</b> 2	D1	<b>D</b> 2	-	-	0		V			0	NPT <sup>1</sup>	NPT <sup>2</sup>	ISO Flores
Spring Return	Α	В	<b>C</b> <sup>1</sup>	<b>C</b> <sup>2</sup>	D1	<b>D</b> <sup>2</sup>	E	F	G	J	К	L	М	Q	Ports	Ports	Flange
HP15U-2-1-023S	24.44	11.38	3.50	4.81	5.50	6.16	2.79	-	0.25	2.18	4.34	6.69	2.25	1.25	<b>Ports</b> 3/8		Flange F12
HP15U-2-1-023S HP15U-2-1-046S		11.38 11.38	3.50 3.50	4.81 4.81	5.50 5.50	6.16 6.16	2.79 2.79	-	0.25 0.25	2.18 2.18	4.34 4.34	6.69 6.69	2.25 2.25	1.25 1.25	<b>Ports</b> 3/8 3/8	Ports	Flange F12 F12
HP15U-2-1-023S	24.44	11.38	3.50	4.81	5.50	6.16	2.79	-	0.25	2.18	4.34	6.69	2.25	1.25	<b>Ports</b> 3/8	Ports	<b>Flange</b> F12 F12 F12 F12
HP15U-2-1-023S HP15U-2-1-046S	24.44 24.59	11.38 11.38	3.50 3.50	4.81 4.81	5.50 5.50	6.16 6.16	2.79 2.79	-	0.25 0.25	2.18 2.18	4.34 4.34	6.69 6.69	2.25 2.25	1.25 1.25	<b>Ports</b> 3/8 3/8	Ports –	Flange F12 F12
HP15U-2-1-023S HP15U-2-1-046S HP15U-2-1-072S	24.44 24.59 26.15	11.38 11.38 11.38	3.50 3.50 3.50	4.81 4.81 5.81	5.50 5.50 5.50	6.16 6.16 6.68	2.79 2.79 2.79	- - -	0.25 0.25 0.75	2.18 2.18 2.18	4.34 4.34 4.34	6.69 6.69 6.69	2.25 2.25 2.25	1.25 1.25 1.25	<b>Ports</b> 3/8 3/8 3/8	Ports	<b>Flange</b> F12 F12 F12 F12
HP15U-2-1-023S HP15U-2-1-046S HP15U-2-1-072S HP15U-2-1-100S	24.44 24.59 26.15 26.15	11.38 11.38 11.38 11.38	3.50 3.50 3.50 3.50	4.81 4.81 5.81 7.12	5.50 5.50 5.50 5.50	6.16 6.16 6.68 7.31	2.79 2.79 2.79 2.79 2.79		0.25 0.25 0.75 1.38	2.18 2.18 2.18 2.18 2.18	4.34 4.34 4.34 4.34	6.69 6.69 6.69 6.69	2.25 2.25 2.25 2.25	1.25 1.25 1.25 1.25	Ports 3/8 3/8 3/8 3/8	Ports	Flange F12 F12 F12 F12 F12
HP15U-2-1-023S HP15U-2-1-046S HP15U-2-1-072S HP15U-2-1-100S HP15U-2-1-100S	24.44 24.59 26.15 26.15 28.97	11.38 11.38 11.38 11.38 11.38 14.19	3.50 3.50 3.50 3.50 5.50	4.81 4.81 5.81 7.12 7.12	5.50 5.50 5.50 5.50 6.50	6.16 6.16 6.68 7.31 7.31	2.79 2.79 2.79 2.79 2.79 2.79		0.25 0.25 0.75 1.38 1.38	2.18 2.18 2.18 2.18 2.18 2.18	4.34 4.34 4.34 4.34 4.34	6.69 6.69 6.69 6.69 6.69	2.25 2.25 2.25 2.25 2.25 2.25	1.25 1.25 1.25 1.25 1.25 1.25	Ports 3/8 3/8 3/8 3/8 1/2	Ports	Flange F12 F12 F12 F12 F12 F12 F12
HP15U-2-1-023S HP15U-2-1-046S HP15U-2-1-072S HP15U-2-1-100S HP15U-3-1-100S HP25U-3-1-210S	24.44 24.59 26.15 26.15 28.97 46.45	11.38 11.38 11.38 11.38 14.19 19.66	3.50 3.50 3.50 3.50 5.50 5.50	4.81 4.81 5.81 7.12 7.12 11.50	5.50 5.50 5.50 5.50 6.50 8.44	6.16 6.68 7.31 7.31 11.44	2.79 2.79 2.79 2.79 2.79 2.79 4.75	- - - -	0.25 0.25 0.75 1.38 1.38 2.00	2.18 2.18 2.18 2.18 2.18 2.18 4.38	4.34 4.34 4.34 4.34 4.34 8.13	6.69 6.69 6.69 6.69 6.69 11.82	2.25 2.25 2.25 2.25 2.25 3.19	1.25 1.25 1.25 1.25 1.25 1.25 2.12	Ports 3/8 3/8 3/8 3/8 1/2 1/2	Ports	Flange           F12           F13           F14           F15
HP15U-2-1-023S HP15U-2-1-046S HP15U-2-1-072S HP15U-2-1-100S HP15U-3-1-100S HP25U-3-1-210S HP25U-3-1-420S	24.44 24.59 26.15 26.15 28.97 46.45 46.45	11.38 11.38 11.38 11.38 14.19 19.66 19.66	3.50 3.50 3.50 3.50 5.50 5.50 5.50	4.81 4.81 5.81 7.12 7.12 11.50 11.50	5.50 5.50 5.50 5.50 6.50 8.44 8.44	6.16 6.68 7.31 7.31 11.44 11.44	2.79 2.79 2.79 2.79 2.79 2.79 4.75 4.75	    	0.25 0.25 0.75 1.38 1.38 2.00 2.00	2.18 2.18 2.18 2.18 2.18 2.18 4.38 4.38	4.34 4.34 4.34 4.34 4.34 8.13 8.13	6.69 6.69 6.69 6.69 11.82 11.82	2.25 2.25 2.25 2.25 2.25 3.19 3.19	1.25 1.25 1.25 1.25 1.25 1.25 2.12 2.12	Ports 3/8 3/8 3/8 3/8 1/2 1/2 1/2 1/2	Ports	Flange F12 F12 F12 F12 F12 F12 F12 F16 F16
HP15U-2-1-023S HP15U-2-1-046S HP15U-2-1-072S HP15U-2-1-100S HP15U-3-1-100S HP25U-3-1-210S HP25U-3-1-420S HP25U-4-1-210S	24.44 24.59 26.15 26.15 28.97 46.45 46.45 49.08	11.38 11.38 11.38 11.38 14.19 19.66 19.66 22.28	3.50 3.50 3.50 3.50 5.50 5.50 5.50 7.00 7.00	4.81 4.81 5.81 7.12 7.12 11.50 11.50 11.50	5.50 5.50 5.50 5.50 6.50 8.44 8.44 9.19	6.16 6.68 7.31 7.31 11.44 11.44 11.44	2.79 2.79 2.79 2.79 2.79 4.75 4.75 4.75		0.25 0.25 0.75 1.38 1.38 2.00 2.00 2.00	2.18 2.18 2.18 2.18 2.18 4.38 4.38 4.38	4.34 4.34 4.34 4.34 4.34 8.13 8.13 8.13 8.13	6.69 6.69 6.69 6.69 11.82 11.82 11.82	2.25 2.25 2.25 2.25 2.25 3.19 3.19 3.19	1.25 1.25 1.25 1.25 1.25 2.12 2.12 2.12	Ports 3/8 3/8 3/8 3/8 1/2 1/2 1/2 1/2 1/2 1/2	Ports	Flange F12 F12 F12 F12 F12 F12 F12 F16 F16 F16
HP15U-2-1-023S HP15U-2-1-046S HP15U-2-1-072S HP15U-2-1-100S HP15U-3-1-100S HP25U-3-1-210S HP25U-3-1-420S HP25U-4-1-210S HP25U-4-1-420S	24.44 24.59 26.15 26.15 28.97 46.45 46.45 49.08 49.08	11.38 11.38 11.38 11.38 14.19 19.66 19.66 22.28 22.28	3.50 3.50 3.50 5.50 5.50 5.50 5.50 7.00 7.00 7.00	4.81 4.81 5.81 7.12 11.50 11.50 11.50 11.50	5.50 5.50 5.50 6.50 8.44 8.44 9.19 9.19	6.16 6.68 7.31 7.31 11.44 11.44 11.44	2.79 2.79 2.79 2.79 4.75 4.75 4.75 4.75		0.25 0.25 0.75 1.38 1.38 2.00 2.00 2.00 2.00	2.18 2.18 2.18 2.18 2.18 4.38 4.38 4.38 4.38	4.34 4.34 4.34 4.34 4.34 8.13 8.13 8.13 8.13	6.69 6.69 6.69 6.69 11.82 11.82 11.82 11.82	2.25 2.25 2.25 2.25 3.19 3.19 3.19 3.19	1.25 1.25 1.25 1.25 1.25 2.12 2.12 2.12	Ports 3/8 3/8 3/8 1/2 1/2 1/2 1/2 1/2	Ports	Flange F12 F12 F12 F12 F12 F12 F16 F16 F16 F16
HP15U-2-1-023S HP15U-2-1-046S HP15U-2-1-072S HP15U-2-1-100S HP15U-3-1-100S HP25U-3-1-210S HP25U-3-1-420S HP25U-4-1-210S HP25U-4-1-210S HP25U-4-1-370S	24.44 24.59 26.15 26.15 28.97 46.45 46.45 49.08 49.08 57.49	11.38 11.38 11.38 11.38 14.19 19.66 19.66 22.28 22.28 22.28 22.60	3.50 3.50 3.50 5.50 5.50 5.50 7.00 7.00 7.00 7.00	4.81 4.81 5.81 7.12 11.50 11.50 11.50 11.50 13.50	5.50 5.50 5.50 6.50 8.44 8.44 9.19 9.19 13.50	6.16 6.16 6.68 7.31 11.44 11.44 11.44 11.44 11.44	2.79 2.79 2.79 2.79 4.75 4.75 4.75 4.75 6.94	- - - - - - - - - - - -	0.25 0.25 0.75 1.38 2.00 2.00 2.00 2.00 2.69	2.18 2.18 2.18 2.18 4.38 4.38 4.38 4.38 4.38 5.44	4.34 4.34 4.34 4.34 8.13 8.13 8.13 8.13 8.13 9.50	6.69 6.69 6.69 6.69 11.82 11.82 11.82 11.82 11.82 11.82	2.25 2.25 2.25 2.25 3.19 3.19 3.19 3.19 6.88	1.25 1.25 1.25 1.25 2.12 2.12 2.12 2.12	Ports 3/8 3/8 3/8 1/2 1/2 1/2 1/2 1/2 1/2	Ports	Flange           F12           F16           F16           F16           F16           F16           F30
HP15U-2-1-023S HP15U-2-1-046S HP15U-2-1-072S HP15U-2-1-100S HP15U-3-1-100S HP25U-3-1-210S HP25U-3-1-420S HP25U-4-1-210S HP25U-4-1-420S HP25U-4-1-370S HP30U-4-1-740S	24.44 24.59 26.15 26.15 28.97 46.45 46.45 49.08 49.08 57.49 57.49	11.38 11.38 11.38 14.19 19.66 19.66 22.28 22.28 22.28 25.60 25.60	3.50 3.50 3.50 5.50 5.50 5.50 7.00 7.00 7.00 7.00 9.00	4.81 4.81 5.81 7.12 7.12 11.50 11.50 11.50 13.50 13.50	5.50 5.50 5.50 6.50 8.44 8.44 9.19 9.19 13.50 13.50	6.16 6.16 6.68 7.31 11.44 11.44 11.44 11.44 16.75 16.75	2.79 2.79 2.79 2.79 4.75 4.75 4.75 4.75 6.94 6.94		0.25 0.25 0.75 1.38 1.38 2.00 2.00 2.00 2.00 2.69 2.69	2.18 2.18 2.18 2.18 4.38 4.38 4.38 4.38 5.44 5.44	4.34 4.34 4.34 4.34 8.13 8.13 8.13 8.13 8.13 9.50 9.50	6.69 6.69 6.69 6.69 11.82 11.82 11.82 11.82 11.82 14.81 14.81	2.25 2.25 2.25 2.25 3.19 3.19 3.19 3.19 6.88 6.88	1.25 1.25 1.25 1.25 2.12 2.12 2.12 2.12	Ports 3/8 3/8 3/8 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2	Ports	Flange           F12           F16           F16           F16           F30           F30
HP15U-2-1-023S HP15U-2-1-046S HP15U-2-1-072S HP15U-2-1-100S HP15U-3-1-100S HP25U-3-1-210S HP25U-3-1-210S HP25U-4-1-210S HP25U-4-1-210S HP25U-4-1-370S HP30U-4-1-370S HP30U-6-1-575S	24.44 24.59 26.15 26.15 28.97 46.45 46.45 49.08 49.08 57.49 57.49 62.98	11.38 11.38 11.38 11.38 14.19 19.66 19.66 22.28 22.28 22.28 22.60 25.60 28.43	3.50 3.50 3.50 5.50 5.50 5.50 7.00 7.00 7.00 7.00 9.00 9.00	4.81 4.81 5.81 7.12 7.12 11.50 11.50 11.50 13.50 13.50 17.00	5.50 5.50 5.50 6.50 8.44 8.44 9.19 9.19 13.50 13.50 14.50	6.16 6.16 6.68 7.31 7.31 11.44 11.44 11.44 11.44 16.75 16.75 18.50	2.79 2.79 2.79 2.79 4.75 4.75 4.75 4.75 6.94 6.94 6.35		0.25 0.25 1.38 1.38 2.00 2.00 2.00 2.00 2.69 2.69 4.44	2.18 2.18 2.18 2.18 4.38 4.38 4.38 4.38 4.38 5.44 5.44 5.44	4.34 4.34 4.34 4.34 8.13 8.13 8.13 8.13 8.13 9.50 9.50 9.50	6.69 6.69 6.69 6.69 11.82 11.82 11.82 11.82 14.81 14.81	2.25 2.25 2.25 2.25 3.19 3.19 3.19 3.19 6.88 6.88 6.88	1.25 1.25 1.25 1.25 2.12 2.12 2.12 2.12	Ports 3/8 3/8 3/8 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2	Ports	Flange           F12           F130           F30           F30
HP15U-2-1-023S HP15U-2-1-046S HP15U-2-1-072S HP15U-2-1-00S HP15U-3-1-100S HP25U-3-1-210S HP25U-3-1-210S HP25U-4-1-210S HP25U-4-1-210S HP30U-4-1-370S HP30U-4-1-370S HP30U-4-1-740S HP30U-6-1-575S HP30U-6-1-740S	24.44 24.59 26.15 26.15 28.97 46.45 46.45 49.08 49.08 57.49 57.49 62.98 60.32	11.38 11.38 11.38 14.19 19.66 19.66 22.28 22.28 22.28 25.60 25.60 28.43 28.43	3.50 3.50 3.50 5.50 5.50 7.00 7.00 7.00 7.00 9.00 9.00 9.00	4.81 4.81 5.81 7.12 7.12 11.50 11.50 11.50 13.50 13.50 13.50 13.50	5.50 5.50 5.50 6.50 8.44 8.44 9.19 9.19 13.50 13.50 14.50 14.50	6.16 6.16 6.68 7.31 7.31 11.44 11.44 11.44 11.44 16.75 16.75 18.50 16.75	2.79 2.79 2.79 2.79 4.75 4.75 4.75 4.75 6.94 6.94 6.35 6.94		0.25 0.25 1.38 1.38 2.00 2.00 2.00 2.69 2.69 4.44 2.69	2.18 2.18 2.18 2.18 4.38 4.38 4.38 4.38 5.44 5.44 5.44	4.34 4.34 4.34 4.34 8.13 8.13 8.13 8.13 9.50 9.50 9.50 9.50	6.69 6.69 6.69 6.69 11.82 11.82 11.82 11.82 14.81 14.81 14.81	2.25 2.25 2.25 2.25 3.19 3.19 3.19 3.19 6.88 6.88 6.88 6.88 6.88	1.25 1.25 1.25 1.25 1.25 2.12 2.12 2.12	Ports 3/8 3/8 3/8 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2	Ports	Flange           F12           F130           F30           F30           F30           F30           F30
HP15U-2-1-023S HP15U-2-1-046S HP15U-2-1-072S HP15U-2-1-100S HP15U-3-1-100S HP25U-3-1-210S HP25U-3-1-210S HP25U-4-1-210S HP25U-4-1-210S HP30U-4-1-370S HP30U-4-1-370S HP30U-4-1-740S HP30U-6-1-575S HP30U-6-1-150S	24.44 24.59 26.15 26.15 28.97 46.45 46.45 49.08 49.08 57.49 57.49 57.49 62.98 60.32 62.98	11.38 11.38 11.38 14.19 19.66 19.66 22.28 22.28 22.28 22.60 25.60 28.43 28.43 28.43	3.50 3.50 3.50 5.50 5.50 7.00 7.00 7.00 7.00 9.00 9.00 9.00 10.63	4.81 4.81 5.81 7.12 7.12 11.50 11.50 11.50 13.50 13.50 13.50 13.50 13.50 17.00	5.50 5.50 5.50 6.50 8.44 8.44 9.19 9.19 13.50 13.50 14.50 14.50 14.50	6.16 6.16 6.68 7.31 7.31 11.44 11.44 11.44 11.44 16.75 16.75 18.50 16.75 18.50	2.79 2.79 2.79 2.79 4.75 4.75 4.75 4.75 6.94 6.35 6.94 6.35		0.25 0.25 1.38 1.38 2.00 2.00 2.00 2.00 2.69 2.69 4.44 2.69 4.44	2.18 2.18 2.18 2.18 4.38 4.38 4.38 4.38 4.38 5.44 5.44 5.44 5.44	4.34 4.34 4.34 4.34 8.13 8.13 8.13 8.13 9.50 9.50 9.50 9.50 9.50	6.69 6.69 6.69 6.69 11.82 11.82 11.82 11.82 14.81 14.81 14.81 14.81 14.81	2.25 2.25 2.25 3.19 3.19 3.19 3.19 6.88 6.88 6.88 6.88 6.88 6.88 6.88	1.25 1.25 1.25 1.25 1.25 2.12 2.12 2.12	Ports 3/8 3/8 3/8 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2	Ports	Flange           F12           F10           F30           F30           F30           F30           F30           F30           F30
HP15U-2-1-023S HP15U-2-1-046S HP15U-2-1-072S HP15U-2-1-100S HP15U-3-1-100S HP25U-3-1-210S HP25U-3-1-210S HP25U-4-1-210S HP25U-4-1-210S HP30U-4-1-370S HP30U-4-1-370S HP30U-4-1-575S HP30U-6-1-575S HP30U-6-1-150S HP30U-6-1-1150S HP30U-8-1-740S	24.44 24.59 26.15 26.15 28.97 46.45 46.45 49.08 49.08 57.49 57.49 62.98 60.32 62.98 60.82	11.38 11.38 11.38 14.19 19.66 19.66 22.28 22.28 22.28 22.60 25.60 25.60 28.43 28.43 28.43 28.43	3.50 3.50 3.50 5.50 5.50 7.00 7.00 7.00 7.00 9.00 9.00 9.00 10.63 10.63	4.81 4.81 5.81 7.12 7.12 11.50 11.50 11.50 13.50 13.50 13.50 17.00 13.50 17.00 13.50	5.50 5.50 5.50 6.50 8.44 8.44 9.19 9.19 13.50 13.50 14.50 14.50 14.50 15.33	6.16 6.16 6.68 7.31 7.31 11.44 11.44 11.44 11.44 16.75 16.75 18.50 16.75 18.50	2.79 2.79 2.79 2.79 4.75 4.75 4.75 4.75 6.94 6.94 6.35 6.94 6.35 6.94		0.25 0.25 1.38 1.38 2.00 2.00 2.00 2.00 2.69 2.69 4.44 2.69 4.44 2.69	2.18 2.18 2.18 2.18 4.38 4.38 4.38 4.38 4.38 5.44 5.44 5.44 5.44 5.44	4.34 4.34 4.34 4.34 8.13 8.13 8.13 8.13 9.50 9.50 9.50 9.50 9.50 9.50 9.50	6.69 6.69 6.69 11.82 11.82 11.82 11.82 14.81 14.81 14.81 14.81 14.81	2.25 2.25 2.25 3.19 3.19 3.19 3.19 6.88 6.88 6.88 6.88 6.88 6.88 6.88 6.8	1.25 1.25 1.25 1.25 1.25 2.12 2.12 2.12	Ports 3/8 3/8 3/8 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2	Ports	Flange           F12           F10           F16           F16           F30           F30           F30           F30           F30           F30           F30           F30           F30
HP15U-2-1-023S HP15U-2-1-046S HP15U-2-1-072S HP15U-2-1-100S HP15U-3-1-100S HP25U-3-1-210S HP25U-3-1-210S HP25U-4-1-210S HP25U-4-1-210S HP30U-4-1-370S HP30U-4-1-370S HP30U-4-1-740S HP30U-6-1-575S HP30U-6-1-740S HP30U-6-1-1150S HP30U-8-1-740S	24.44 24.59 26.15 28.97 46.45 46.45 49.08 49.08 57.49 57.49 62.98 60.32 62.98 60.82 63.49	11.38 11.38 11.38 14.19 19.66 19.66 22.28 22.28 22.28 22.28 25.60 25.60 25.60 28.43 28.43 28.43 28.93 28.93	3.50 3.50 3.50 5.50 5.50 7.00 7.00 7.00 7.00 9.00 9.00 9.00 10.63 10.63 9.00	4.81 4.81 5.81 7.12 7.12 11.50 11.50 11.50 13.50 13.50 13.50 17.00 13.50 17.00 13.50	5.50 5.50 5.50 6.50 8.44 8.44 9.19 9.19 9.19 13.50 13.50 14.50 14.50 14.50 14.53	6.16 6.16 6.68 7.31 7.31 11.44 11.44 11.44 16.75 16.75 18.50 16.75 18.50 16.75 18.50 21.55	2.79 2.79 2.79 2.79 4.75 4.75 4.75 4.75 6.94 6.35 6.94 6.35 6.94 6.35		0.25 0.25 1.38 1.38 2.00 2.00 2.00 2.00 2.69 2.69 4.44 2.69 4.44 2.69 4.44	2.18 2.18 2.18 2.18 4.38 4.38 4.38 4.38 4.38 5.44 5.44 5.44 5.44 5.44 5.44	4.34 4.34 4.34 4.34 8.13 8.13 8.13 8.13 9.50 9.50 9.50 9.50 9.50 9.50 9.50	6.69 6.69 6.69 11.82 11.82 11.82 11.82 14.81 14.81 14.81 14.81 14.81 14.81 14.81	2.25 2.25 2.25 3.19 3.19 3.19 3.19 6.88 6.88 6.88 6.88 6.88 6.88 6.88 6.8	1.25 1.25 1.25 1.25 1.25 2.12 2.12 2.12	Ports 3/8 3/8 3/8 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2	Ports	Flange           F12           F10           F30
HP15U-2-1-023S HP15U-2-1-046S HP15U-2-1-072S HP15U-2-1-00S HP15U-3-1-100S HP25U-3-1-210S HP25U-3-1-210S HP25U-4-1-210S HP25U-4-1-210S HP30U-4-1-740S HP30U-4-1-740S HP30U-6-1-575S HP30U-6-1-740S HP30U-6-1-1150S HP30U-8-1-1150S HP30U-8-1-1150S HP65U-6-1-1485S	24.44 24.59 26.15 28.97 46.45 46.45 49.08 49.08 57.49 57.49 62.98 60.32 62.98 60.32 62.98 60.82 63.49 98.10	11.38 11.38 11.38 14.19 19.66 19.66 22.28 22.28 25.60 25.60 28.43 28.43 28.43 28.43 28.93 28.93 43.16	3.50 3.50 3.50 5.50 5.50 7.00 7.00 7.00 7.00 9.00 9.00 9.00 10.63 10.63 9.00 9.00	4.81 4.81 5.81 7.12 7.12 11.50 11.50 11.50 13.50 13.50 13.50 17.00 13.50 17.00 13.50 17.00 13.50	5.50 5.50 5.50 6.50 8.44 8.44 9.19 9.19 13.50 13.50 14.50 14.50 14.50 14.50 14.50 15.33 21.55 21.55	6.16 6.16 6.68 7.31 7.31 11.44 11.44 11.44 11.44 16.75 16.75 18.50 16.75 18.50 16.75 18.50 21.55 22.09	2.79 2.79 2.79 2.79 4.75 4.75 4.75 4.75 6.94 6.35 6.94 6.35 6.94 6.35 6.94 6.35 15.89		0.25 0.25 1.38 1.38 2.00 2.00 2.00 2.00 2.69 2.69 4.44 2.69 4.44 2.69 4.44 0.59	2.18 2.18 2.18 2.18 4.38 4.38 4.38 4.38 5.44 5.44 5.44 5.44 5.44 5.44 5.44 5.4	4.34 4.34 4.34 8.13 8.13 8.13 8.13 9.50 9.50 9.50 9.50 9.50 9.50 9.50 9.50	6.69 6.69 6.69 11.82 11.82 11.82 11.82 11.82 14.81 14.81 14.81 14.81 14.81 14.81 14.81 14.81	2.25 2.25 2.25 3.19 3.19 3.19 3.19 6.88 6.88 6.88 6.88 6.88 6.88 6.88 6.8	1.25 1.25 1.25 1.25 1.25 2.12 2.12 2.12	Ports 3/8 3/8 3/8 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2	Ports	Flange           F12           F10           F30           F30
HP15U-2-1-023S HP15U-2-1-046S HP15U-2-1-072S HP15U-2-1-00S HP15U-3-1-100S HP25U-3-1-210S HP25U-3-1-420S HP25U-4-1-210S HP30U-4-1-370S HP30U-4-1-370S HP30U-6-1-575S HP30U-6-1-740S HP30U-6-1-150S HP30U-6-1-1150S HP30U-8-1-1150S HP30U-8-1-1150S HP65U-6-1-2385S HP65U-6-1-3731S	24.44 24.59 26.15 28.97 46.45 46.45 49.08 49.08 57.49 57.49 62.98 60.32 62.98 60.32 62.98 60.82 63.49 98.10 100.38 106.24	11.38 11.38 11.38 14.19 19.66 19.66 22.28 25.60 25.60 28.43 28.43 28.43 28.43 28.93 43.16 44.90	3.50 3.50 3.50 5.50 5.50 7.00 7.00 7.00 7.00 9.00 9.00 9.00 10.63 10.63 9.00 9.00 9.00	4.81 4.81 5.81 7.12 7.12 11.50 11.50 11.50 13.50 13.50 17.00 13.50 17.00 13.50 17.00 13.50 17.00 24.62*	5.50 5.50 5.50 6.50 8.44 8.44 9.19 9.19 13.50 13.50 13.50 14.50 14.50 14.50 15.33 21.55 21.55 21.55	6.16 6.16 6.68 7.31 7.31 11.44 11.44 11.44 11.44 16.75 16.75 18.50 16.75 18.50 16.75 18.50 21.55 22.09 25.90	2.79 2.79 2.79 2.79 4.75 4.75 4.75 6.94 6.94 6.35 6.94 6.35 6.94 6.35 15.89 15.26 14.61		0.25 0.25 1.38 1.38 2.00 2.00 2.00 2.00 2.69 4.44 2.69 4.44 2.69 4.44 0.59 1.19 4.98	2.18 2.18 2.18 2.18 4.38 4.38 4.38 4.38 5.44 5.44 5.44 5.44 5.44 5.44 5.44 7.96 7.96 7.96	4.34 4.34 4.34 8.13 8.13 8.13 8.13 9.50 9.50 9.50 9.50 9.50 9.50 9.50 15.30 15.30	6.69 6.69 6.69 11.82 11.82 11.82 11.82 11.82 14.81 14.81 14.81 14.81 14.81 14.81 14.81 14.81 14.81 14.81 14.81 16.47 16.47	2.25 2.25 2.25 3.19 3.19 3.19 3.19 6.88 6.88 6.88 6.88 6.88 6.88 6.88 6.8	1.25 1.25 1.25 1.25 1.25 2.12 2.12 2.12	Ports 3/8 3/8 3/8 1/2 1/2 1/2 1/2 1/2 1/2 1/2 3/4 3/4 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2	Ports	Flange           F12           F30           F35           F35           F35
HP15U-2-1-023S HP15U-2-1-046S HP15U-2-1-072S HP15U-2-1-00S HP15U-2-1-100S HP25U-3-1-210S HP25U-3-1-210S HP25U-4-1-210S HP25U-4-1-210S HP30U-4-1-370S HP30U-4-1-370S HP30U-6-1-575S HP30U-6-1-150S HP30U-6-1-1150S HP30U-8-1-740S HP30U-8-1-740S HP30U-8-1-1485S HP65U-6-1-3731S HP65U-6-1-3731S	24.44 24.59 26.15 28.97 46.45 46.45 49.08 49.08 57.49 62.98 60.32 62.98 60.32 62.98 60.82 63.49 98.10 100.38 106.24 98.89	11.38 11.38 11.38 14.19 19.66 19.66 22.28 22.28 25.60 25.60 28.43 28.43 28.43 28.43 28.43 28.93 43.16 44.90 44.92	3.50 3.50 3.50 5.50 5.50 7.00 7.00 7.00 9.00 9.00 9.00 9.00 10.63 9.00 9.00 9.00 9.00 10.63	4.81 4.81 5.81 7.12 7.12 11.50 11.50 11.50 13.50 13.50 17.00 13.50 17.00 13.50 17.00 24.62* 13.50	5.50 5.50 5.50 6.50 8.44 8.44 9.19 9.19 13.50 13.50 14.50 14.50 14.50 15.33 21.55 21.55 21.55 21.55	6.16 6.16 6.68 7.31 7.31 11.44 11.44 11.44 11.44 16.75 16.75 18.50 16.75 18.50 16.75 18.50 21.55 22.09 25.90 21.55	2.79 2.79 2.79 4.75 4.75 4.75 4.75 6.94 6.34 6.35 6.94 6.35 6.94 6.35 15.89 15.26 14.61 15.89		0.25 0.25 1.38 1.38 2.00 2.00 2.00 2.00 2.69 4.44 2.69 4.44 2.69 4.44 0.59 1.19 4.98 1.21	2.18 2.18 2.18 2.18 4.38 4.38 4.38 4.38 5.44 5.44 5.44 5.44 5.44 5.44 5.44 7.96 7.96 7.96 7.96	4.34 4.34 4.34 8.13 8.13 8.13 8.13 9.50 9.50 9.50 9.50 9.50 9.50 9.50 15.30 15.30 15.30	6.69 6.69 6.69 11.82 11.82 11.82 11.82 11.82 14.81	2.25 2.25 2.25 3.19 3.19 3.19 3.19 6.88 6.88 6.88 6.88 6.88 6.88 6.88 6.8	1.25 1.25 1.25 1.25 1.25 2.12 2.12 2.12	Ports 3/8 3/8 3/8 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2	Ports	Flange           F12           F30           F35           F35           F35           F35           F35
HP15U-2-1-023S HP15U-2-1-046S HP15U-2-1-072S HP15U-2-1-00S HP25U-3-1-100S HP25U-3-1-210S HP25U-3-1-210S HP25U-4-1-210S HP25U-4-1-210S HP30U-4-1-370S HP30U-4-1-370S HP30U-4-1-370S HP30U-6-1-575S HP30U-6-1-740S HP30U-6-1-740S HP30U-8-1-1485S HP65U-6-1-3731S HP65U-8-1-3731S HP65U-8-1-3731S	24.44 24.59 26.15 28.97 46.45 49.08 49.08 57.49 57.49 62.98 60.32 62.98 60.32 62.98 60.82 63.49 98.10 100.38 106.24 98.89 105.24	11.38 11.38 11.38 14.19 19.66 19.66 22.28 22.28 25.60 25.60 28.43 28.43 28.43 28.43 28.43 28.43 28.93 43.16 44.90 44.90 44.02 44.02	3.50 3.50 3.50 5.50 5.50 7.00 7.00 7.00 9.00 9.00 9.00 9.00 9.0	4.81 4.81 5.81 7.12 7.12 11.50 11.50 11.50 13.50 13.50 13.50 17.00 13.50 17.00 13.50 17.00 24.62*	5.50 5.50 5.50 6.50 8.44 8.44 9.19 9.19 13.50 13.50 14.50 14.50 14.50 15.33 21.55 21.55 21.55 21.55 21.55	6.16 6.16 6.68 7.31 7.31 11.44 11.44 11.44 11.44 11.44 16.75 16.75 18.50 16.75 18.50 16.75 18.50 21.55 22.09 25.90	2.79 2.79 2.79 4.75 4.75 4.75 6.94 6.94 6.35 6.94 6.35 6.94 6.35 15.89 15.26 14.61 15.89 14.61		0.25 0.25 1.38 1.38 2.00 2.00 2.00 2.69 4.44 2.69 4.44 2.69 4.44 2.69 4.44 0.59 1.19 4.98 1.21 4.98	2.18 2.18 2.18 2.18 4.38 4.38 4.38 4.38 5.44 5.44 5.44 5.44 5.44 5.44 5.44 5.4	4.34 4.34 4.34 8.13 8.13 8.13 9.50 9.50 9.50 9.50 9.50 9.50 15.30 15.30 15.30 15.30	6.69 6.69 6.69 11.82 11.82 11.82 11.82 11.82 14.81 14.81 14.81 14.81 14.81 14.81 14.81 14.81 16.47 16.47 16.47 16.47	2.25 2.25 2.25 3.19 3.19 3.19 3.19 6.88 6.88 6.88 6.88 6.88 6.88 6.88 6.8	1.25 1.25 1.25 1.25 2.12 2.12 2.12 2.12	Ports 3/8 3/8 3/8 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2	Ports	Flange           F12           F30           F30           F30           F30           F30           F30           F30           F35           F35           F35           F35           F35           F35           F35           F35           F35
HP15U-2-1-023S HP15U-2-1-046S HP15U-2-1-072S HP15U-2-1-00S HP25U-3-1-100S HP25U-3-1-210S HP25U-3-1-210S HP25U-4-1-210S HP25U-4-1-210S HP30U-4-1-370S HP30U-4-1-370S HP30U-4-1-370S HP30U-6-1-575S HP30U-6-1-740S HP30U-6-1-1150S HP30U-8-1-740S HP30U-8-1-1485S HP65U-6-1-3731S HP65U-8-1-3731S HP65U-8-1-3731S HP65U-8-1-3731S	24.44 24.59 26.15 28.97 46.45 49.08 49.08 49.08 57.49 57.49 62.98 60.32 62.98 60.32 62.98 60.32 62.98 100.38 106.24 98.89 105.24 110.19	11.38 11.38 11.38 11.38 14.19 19.66 22.28 22.28 22.28 22.28 22.60 25.60 28.43 28.43 28.43 28.43 28.43 28.93 28.93 43.16 44.90 44.02 44.02 44.02	3.50 3.50 3.50 5.50 5.50 7.00 7.00 7.00 9.00 9.00 9.00 9.00 9.0	4.81 4.81 5.81 7.12 7.12 11.50 11.50 11.50 13.50 13.50 13.50 17.00 13.50 17.00 13.50 17.00 24.62* 13.50 24.62* 29.00*	5.50 5.50 5.50 6.50 8.44 8.44 9.19 9.19 13.50 13.50 13.50 14.50 14.50 14.50 15.33 21.55 21.55 21.55 21.55 21.55 21.55	6.16 6.16 6.68 7.31 7.31 11.44 11.44 11.44 11.44 16.75 16.75 18.50 16.75 18.50 16.75 18.50 21.55 22.09 25.90 21.55 25.90 28.08	2.79 2.79 2.79 2.79 4.75 4.75 4.75 6.94 6.94 6.35 6.94 6.35 6.94 6.35 15.89 15.26 14.61 15.89 14.61 14.10		0.25 0.25 1.38 1.38 2.00 2.00 2.00 2.69 4.44 2.69 4.44 2.69 4.44 2.69 4.44 0.59 1.19 4.98 1.21 4.98 6.53	2.18 2.18 2.18 2.18 4.38 4.38 4.38 4.38 5.44 5.44 5.44 5.44 5.44 5.44 5.44 5.4	4.34 4.34 4.34 8.13 8.13 8.13 9.50 9.50 9.50 9.50 9.50 9.50 15.30 15.30 15.30 15.30 15.30	6.69 6.69 6.69 6.69 11.82 11.82 11.82 11.82 14.81 14.81 14.81 14.81 14.81 14.81 14.81 14.81 14.81 14.81 14.81 14.81 16.47 16.47 16.47 16.47	2.25 2.25 2.25 3.19 3.19 3.19 3.19 6.88 6.88 6.88 6.88 6.88 6.88 6.88 6.8	1.25 1.25 1.25 1.25 1.25 2.12 2.12 2.12	Ports 3/8 3/8 3/8 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2	Ports	Flange           F12           F30           F35           F35
HP15U-2-1-023S HP15U-2-1-046S HP15U-2-1-072S HP15U-2-1-100S HP25U-3-1-100S HP25U-3-1-210S HP25U-3-1-210S HP25U-4-1-210S HP25U-4-1-210S HP30U-4-1-370S HP30U-4-1-370S HP30U-6-1-575S HP30U-6-1-575S HP30U-6-1-740S HP30U-6-1-1150S HP30U-8-1-1150S HP65U-6-1-2385S HP65U-6-1-2385S HP65U-6-1-3731S HP65U-8-1-3731S HP65U-8-1-3731S HP65U-8-1-336S HP65U-8-1-6044S	24.44 24.59 26.15 28.97 46.45 46.45 49.08 49.08 57.49 57.49 62.98 60.32 62.98 60.32 62.98 60.32 62.98 105.24 100.38 106.24 98.89 105.24 110.19 138.39	11.38 11.38 11.38 11.38 14.19 19.66 22.28 22.28 22.28 22.28 22.28 22.60 25.60 28.43 28.43 28.43 28.43 28.43 28.93 28.93 43.16 44.90 44.02 44.02 44.02 56.75	3.50 3.50 3.50 5.50 5.50 7.00 7.00 7.00 9.00 9.00 9.00 9.00 10.63 9.00 9.00 9.00 10.63 10.63 9.00	4.81 4.81 5.81 7.12 7.12 11.50 11.50 11.50 13.50 13.50 13.50 13.50 13.50 13.50 13.50 13.50 13.50 24.62* 29.00* 24.62*	5.50 5.50 5.50 6.50 8.44 8.44 9.19 9.19 13.50 13.50 13.50 14.50 14.50 14.50 15.33 21.55 21.55 21.55 21.55 21.55 21.55 21.55 21.55 21.55 21.55	6.16 6.16 6.68 7.31 7.31 11.44 11.44 11.44 11.44 16.75 16.75 18.50 16.75 18.50 16.75 18.50 21.55 22.09 25.90 21.55 25.90 28.08 28.08	2.79 2.79 2.79 2.79 4.75 4.75 4.75 4.75 6.94 6.94 6.35 6.94 6.35 6.94 6.35 15.89 15.26 14.61 15.89 14.61 15.89 14.61 15.89		0.25 0.25 1.38 1.38 2.00 2.00 2.00 2.69 2.69 4.44 2.69 4.44 2.69 4.44 2.69 4.44 2.69 4.44 0.59 1.19 4.98 1.21 4.98 6.53 1.69	2.18 2.18 2.18 2.18 4.38 4.38 4.38 4.38 5.44 5.44 5.44 5.44 5.44 5.44 5.44 7.96 7.96 7.96 7.96 7.96 7.96 10.30	4.34 4.34 4.34 8.13 8.13 8.13 9.50 9.50 9.50 9.50 9.50 9.50 9.50 15.30 15.30 15.30 15.30 15.30 15.30	6.69 6.69 6.69 6.69 11.82 11.82 11.82 11.82 14.81 14.81 14.81 14.81 14.81 14.81 14.81 14.81 14.81 14.81 14.81 14.81 16.47 16.47 16.47 16.47 16.47 21.27	2.25 2.25 2.25 3.19 3.19 3.19 3.19 6.88 6.88 6.88 6.88 6.88 6.88 6.88 6.8	1.25 1.25 1.25 1.25 1.25 2.12 2.12 2.12	Ports 3/8 3/8 3/8 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2	Ports	Flange           F12           F30           F35           F35
HP15U-2-1-023S HP15U-2-1-046S HP15U-2-1-072S HP15U-2-1-00S HP25U-3-1-100S HP25U-3-1-210S HP25U-3-1-210S HP25U-4-1-210S HP25U-4-1-210S HP30U-4-1-370S HP30U-4-1-370S HP30U-4-1-740S HP30U-6-1-575S HP30U-6-1-740S HP30U-6-1-1150S HP30U-8-1-1485S HP65U-6-1-2385S HP65U-6-1-3731S HP65U-8-1-3731S HP65U-8-1-336S HP65U-8-1-5336S HP80U-6-1-7114S	24.44 24.59 26.15 28.97 46.45 46.45 49.08 49.08 57.49 57.49 62.98 60.32 62.98 60.32 62.98 60.32 63.49 98.10 100.38 106.24 98.89 105.24 110.19 138.39	11.38 11.38 11.38 14.19 19.66 22.28 22.28 22.28 22.60 25.60 28.43 28.43 28.43 28.43 28.43 28.93 43.16 44.90 44.02 44.02 44.02 56.75 56.75	3.50 3.50 3.50 5.50 5.50 7.00 7.00 7.00 9.00 9.00 9.00 9.00 10.63 10.63 9.00 9.00 10.63 10.63 10.63 9.00	4.81 4.81 5.81 7.12 7.12 11.50 11.50 11.50 13.50 13.50 13.50 13.50 13.50 13.50 13.50 13.50 13.50 13.50 13.50 13.50 24.62* 29.00*	5.50 5.50 5.50 6.50 8.44 8.44 9.19 9.19 13.50 13.50 13.50 14.50 14.50 14.50 15.33 21.55 21.55 21.55 21.55 21.55 21.55 21.55 21.55 21.55 21.55 21.55 21.55 21.55 21.55	6.16 6.16 6.68 7.31 7.31 11.44 11.44 11.44 11.44 16.75 16.75 18.50 16.75 18.50 16.75 18.50 21.55 22.09 25.90 21.55 25.90 28.08 28.08	2.79 2.79 2.79 2.79 4.75 4.75 4.75 4.75 6.94 6.94 6.35 6.94 6.35 6.94 6.35 15.89 15.26 14.61 15.89 14.61 15.89 14.61 15.89 14.61		0.25 0.25 1.38 1.38 2.00 2.00 2.00 2.69 2.69 4.44 2.69 4.44 2.69 4.44 2.69 4.44 0.59 1.19 4.98 1.21 4.98 1.21 4.98 1.69 3.88	2.18 2.18 2.18 2.18 4.38 4.38 4.38 4.38 5.44 5.44 5.44 5.44 5.44 5.44 5.44 5.4	4.34 4.34 4.34 8.13 8.13 8.13 9.50 9.50 9.50 9.50 9.50 9.50 9.50 15.30 15.30 15.30 15.30 15.30 15.30	6.69 6.69 6.69 6.69 11.82 11.82 11.82 11.82 14.81 14.81 14.81 14.81 14.81 14.81 14.81 14.81 14.81 14.81 14.81 14.81 16.47 16.47 16.47 16.47 16.47 21.27 21.27	2.25 2.25 2.25 3.19 3.19 3.19 3.19 6.88 6.88 6.88 6.88 6.88 6.88 6.88 6.8	1.25 1.25 1.25 1.25 1.25 2.12 2.12 2.12	Ports 3/8 3/8 3/8 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2	Ports	Flange           F12           F30           F30           F30           F30           F30           F30           F30           F30           F35           F35           F35           F35           F35           F35           F35           F35           F48           F48
HP15U-2-1-023S HP15U-2-1-046S HP15U-2-1-072S HP15U-2-1-100S HP25U-3-1-100S HP25U-3-1-210S HP25U-3-1-210S HP25U-4-1-210S HP25U-4-1-210S HP30U-4-1-370S HP30U-4-1-370S HP30U-6-1-575S HP30U-6-1-575S HP30U-6-1-740S HP30U-6-1-1150S HP30U-8-1-1150S HP65U-6-1-2385S HP65U-6-1-2385S HP65U-6-1-3731S HP65U-8-1-3731S HP65U-8-1-3731S HP65U-8-1-336S HP65U-8-1-6044S	24.44 24.59 26.15 28.97 46.45 46.45 49.08 49.08 57.49 57.49 62.98 60.32 62.98 60.32 62.98 60.32 62.98 105.24 100.38 106.24 98.89 105.24 110.19 138.39	11.38 11.38 11.38 11.38 14.19 19.66 22.28 22.28 22.28 22.28 22.28 22.60 25.60 28.43 28.43 28.43 28.43 28.43 28.93 28.93 43.16 44.90 44.02 44.02 44.02 56.75	3.50 3.50 3.50 5.50 5.50 7.00 7.00 7.00 9.00 9.00 9.00 10.63 10.63 9.00 9.00 10.63 10.63 10.63 9.00 9.00 10.63	4.81 4.81 5.81 7.12 7.12 11.50 11.50 11.50 13.50 13.50 13.50 13.50 13.50 13.50 13.50 13.50 13.50 24.62* 29.00* 24.62*	5.50 5.50 5.50 6.50 8.44 9.19 9.19 13.50 13.50 13.50 14.50 14.50 14.50 15.33 21.55 21.55 21.55 21.55 21.55 21.55 21.55 21.55 21.55 21.55 21.55 21.55 21.55 21.55 21.55 22.75 28.75 28.75	6.16 6.16 6.68 7.31 7.31 11.44 11.44 11.44 11.44 16.75 18.50 16.75 18.50 16.75 18.50 21.55 22.09 25.90 21.55 25.90 28.08 28.08 28.08	2.79 2.79 2.79 2.79 4.75 4.75 4.75 4.75 6.94 6.94 6.35 6.94 6.35 6.94 6.35 15.89 15.26 14.61 15.89 14.61 15.89 14.61 15.89		0.25 0.25 1.38 1.38 2.00 2.00 2.00 2.69 2.69 4.44 2.69 4.44 2.69 4.44 2.69 4.44 2.69 4.44 0.59 1.19 4.98 1.21 4.98 6.53 1.69	2.18 2.18 2.18 2.18 4.38 4.38 4.38 4.38 5.44 5.44 5.44 5.44 5.44 5.44 5.44 5.4	4.34 4.34 4.34 8.13 8.13 8.13 9.50 9.50 9.50 9.50 9.50 9.50 9.50 15.30 15.30 15.30 15.30 15.30 15.30	6.69 6.69 6.69 6.69 11.82 11.82 11.82 14.81 14.81 14.81 14.81 14.81 14.81 14.81 14.81 14.81 14.81 14.81 16.47 16.47 16.47 16.47 21.27 21.27 21.27	2.25 2.25 2.25 3.19 3.19 3.19 3.19 6.88 6.88 6.88 6.88 6.88 6.88 6.88 6.8	1.25 1.25 1.25 1.25 1.25 2.12 2.12 2.12	Ports 3/8 3/8 3/8 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2	Ports	Flange           F12           F30           F35           F35

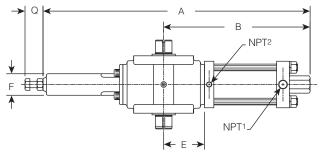
#### Notes:

For drawings containing C<sup>1</sup>, C<sup>2</sup>, D<sup>1</sup>, D<sup>2</sup>, NPT<sup>1</sup>, NPT<sup>2</sup> dimensions see pages 7 and 8.

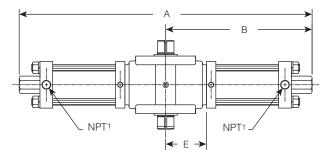
\* Diameter dimension.

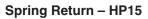
# **Dimensions**

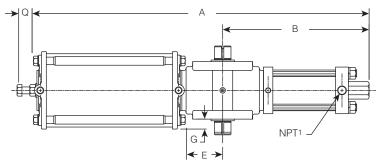
# Double Acting - HP15-2-1, HP15-3-1



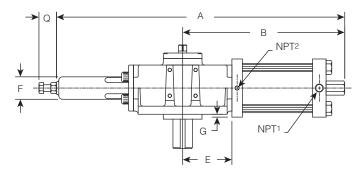
# Double Acting – HP15-2-2



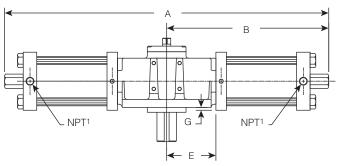


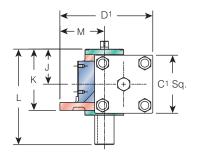


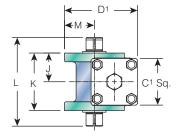
Double Acting - HP25-3-1, 4-1; HP30-4-1, -6-1, -8-1

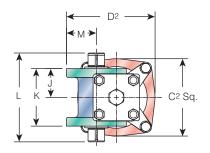


# Double Acting - HP25-3-2, -4-2; HP30-4-2, -6-2, -8-2



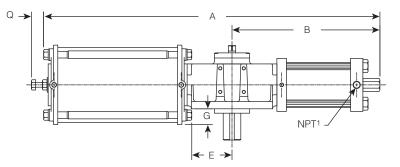


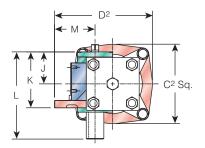




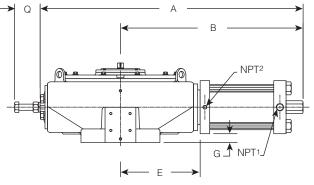
# **Dimensions**

## Spring Return – HP25 and HP30

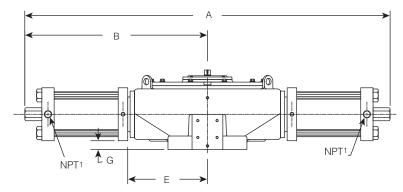


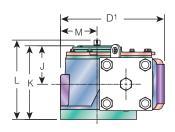


Double Acting - HP65-4-1, -6-1, -8-1 and HP80-4-1, -6-1, -8-1

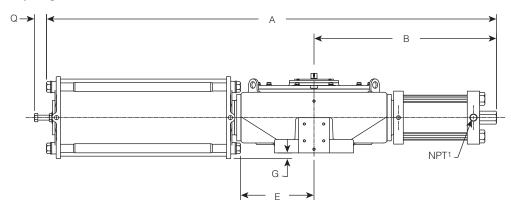


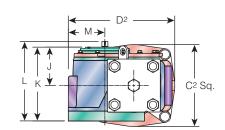
Double Acting – HP65-4-2, -6-2, -8-2 and HP80-4-2, -6-2, -8-2





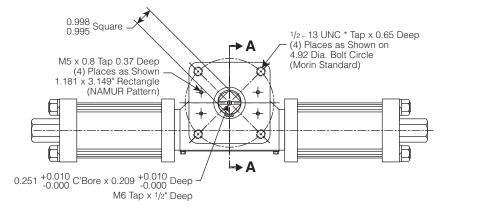
## Spring Return – HP65 and HP80

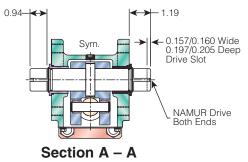




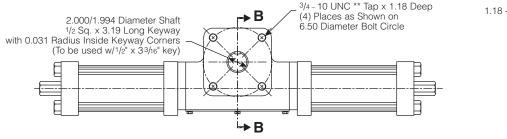
# **Mounting Details**

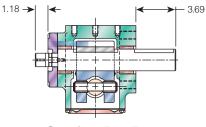
## Model HP15 – Top and bottom of housing (symmetrical) – ISO 5211-F12





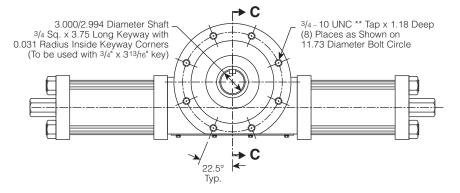
## Model HP25 – Bottom of housing – ISO 5211-F16

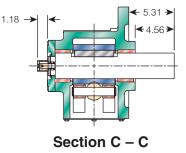




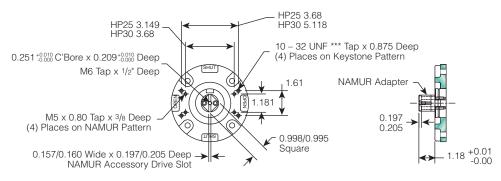


## Model HP30 – Bottom of housing – ISO 5211-F30



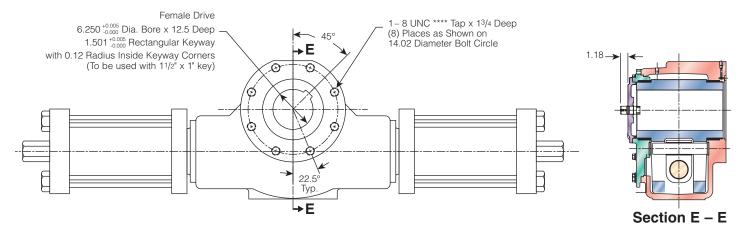


## Model HP25 and HP30 – Top of housing – mounting details

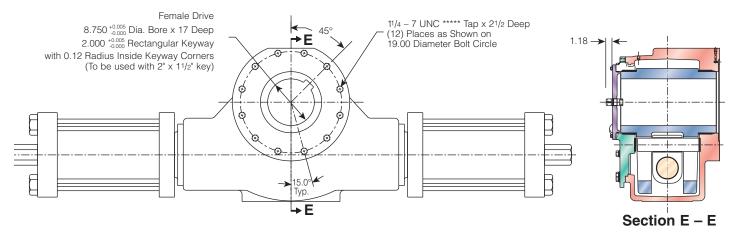


# **Mounting Details**

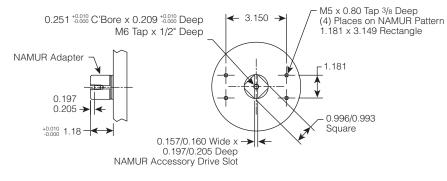
## Model HP65 – Bottom of housing – ISO 5211-F35



## Model HP80 – Bottom of housing – ISO 5211-F48



#### Model HP65 and HP80 – Top of housing – mounting details



Option
Model Number
HP15
HP25 and HP30
HP25 and HP30
HP65
HP80

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

### **Model Numbering**

	HP - 30	U	с -	4	- 1 -	37050	30 - MHP
Model							
<b>HP</b> – High Pressu hydraulic	ire Gas/						
Actuator Size							
<b>15</b> – 1.5" Momen <b>25</b> – 2.5" Momen <b>30</b> – 3.0" Momen <b>65</b> – 6.0" Momen <b>80</b> – 8.0" Momen	t Arm t Arm t Arm						
Mounting Inter	face Bolting						
<ul><li>U – UNC Mount</li><li>M – Metric Mourt</li></ul>	•						
Yoke Design							
(blank) – Symme C – Cantec							
Nominal Cylind	der Bore (incl	nes)					
Number of Act	ive Cylinders						
	aulic cylinder on lic cylinders on c			ng return			
Function							
Double Acting DA	Spring Return See code from Fail Closed (CW Fail Open (CCW	/) ends in "C	)" (i.e. 2188	S080)	333)		

#### Add on Option

- (blank) No options (standard configuration)
- DP1 Drain ports located 90 from std port
- DP2 Drain ports located 180 form std ports
- EX Epoxy paint
- **G** Grease fill 3/4 fill in housing
- V High temp seals (Viton®)
- **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

(Other options available - consult your sales representative)

- P1M Prox prep 5/8" w/Magnetic activator
- P1 Prox prep 5/8" 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** Teflon<sup>®</sup> bushing for output shaft and piston/rod
- TBO Teflon^{\tiny{(\!\!R\!)}} bushing for output shaft
- U U.H.M.W.P.E. Bushings

# Manual Options

To provide the actuation package best suited for your application, the Morin line offers a full range of manual accessories.

**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.



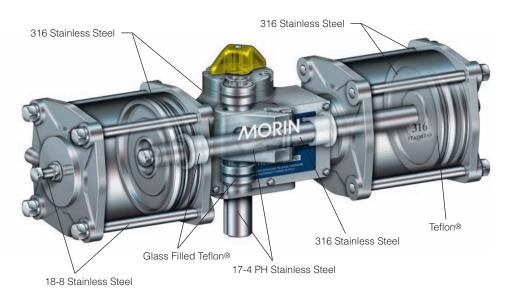
#### **High or Low Temperature Ratings**

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].



# Also Available

# The Series S Actuator (All Stainless)

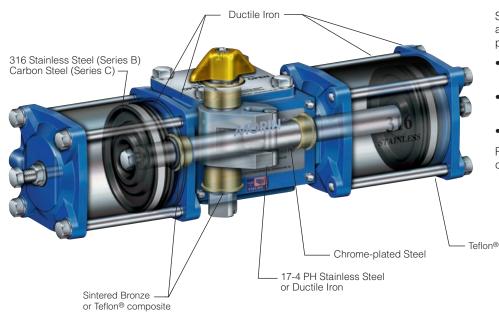


Setting an unrivaled standard in actuation at a price unexpectedly low for stainless steel.

- Up To 160 psig max operating pressure (see torque chart, MORMC-0333).
- Double acting break torques to 240,000 lb.in.
- Spring end torques to 104,125 lb.in.

For additional information, refer to datasheet MORMC-0024.

# The Series B and C Actuators



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

- Up To 160 psig max operating pressure (see torque chart, MORMC-0333).
- Double acting break torques to 1,400,000 lb.in.
- Spring end torques to 583,288 lb.in.

For additional information, refer to datasheet MORMC-0023.

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