TECHNICAL DATA SHEET
76 Series Ball Valves

2 Otter Court, Raymond, New Hampshire 03077 •Tel. (603) 895-4761 •FAX (603) 895-6785 • www.geminivalve.com

DESCRIPTION

76 Series, one-piece bar stock body style valve offering broad applicability. Easily adaptable to pneumatic or electric automation.

MATERIALS OF CONSTRUCTION

BODY: Brass - ASTM B-16, Carbon Steel - ASTM A108, 316 Stainless Steel ASTM A276, Alloy 20 - ASTM - B473, Monel - ASTM B164-75

BALL AND STEM: 316 Stainless Steel - ASTM A276 (standard except Alloy 20 & Monel)

SEATS AND STEM SEAL: Glass Reinforced P.T.F.E. (Teflon ®)

CONNECTION / STYLE — SIZES

Pipe / N.P.T.F. (Dryseal National Pipe Taper)	1/2" - 2"
Pipe / B.S.P.T. (British Standard Pipe Taper)	1/2" - 2"
Pipe / J.I.S. (Japanese Imperial Standard)	1/2" - 2"

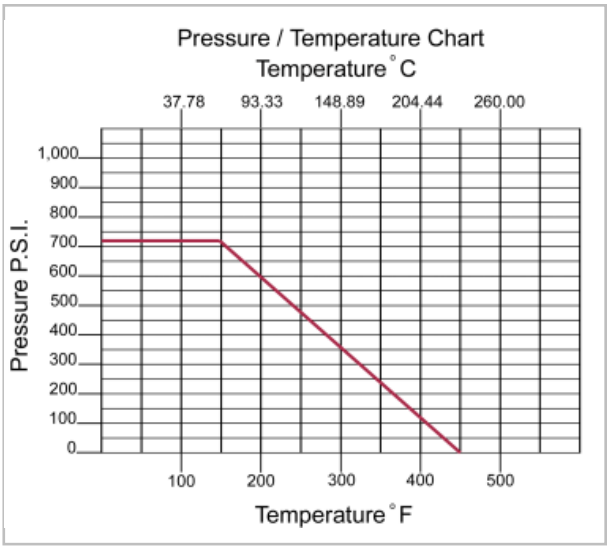
RATINGS

TEMPERATURE: -50°F to 450°F
(also see Pressure Temperature Chart)

PRESSURE: 720 p.s.i. C.W.P. (Cold Working Pressure to 150 F)
(also see Pressure Temperature Chart)

VACUUM: 20 Micron

SATURATED STEAM: 150 p.s.i.



RATINGS (continued)

FLOW CHARACTERISTICS

The approximate flow rate through a valve can be calculated as follows:

$$Q = Cv\sqrt{\frac{\Delta P}{G}}$$

where; Q = flow rate in gallons (U.S. Std.) per minute
Cv = valve constant
P = pressure drop across the valve in pounds per square inch
G = specific gravity of the media of relative to water

Note: The values derived from the flow equation are for estimating purposes only. Product variances or systemic factors may alter actual performance.

Size	1/2	3/4	1	1-1/4	1-1/2	2
Cv	5.5	10	15.5	20	37	60

INSTALLATION INSTRUCTIONS

The following serves as a guideline for those experienced in pipe joint makeup. Otherwise, services of a certified pipe fitter should be utilized for installation.

1. Ensure that both the male pipe and female valve threads are free from dirt, debris and corrosion. Wire brushing of the male pipe threads is recommended to ensure a good metal-to-metal joint.

2. Apply a good quality thread lubricant (pipe dope) on the male threads. Lubricant reduces friction when pulling up the pipe joint. Note, thread lubricant is not intended to seal the joint and will not compensate for poor quality male pipe or fitting threads.

3. Turn the female valve threads onto the male pipe threads by hand. Upon free engagement of the threads, continue to turn the valve as far up as it will go (by hand). With the use of a wrench continue to tighten the valve onto the pipe. The pipe joint seal should occur within 1 to 3 turns after wrenching begins. Care should be taken not to exceed 3 turns in which damage to the threads can occur.

4. The pipe joint should be tested for leakage to ensure the pipe joint has been achieved.

MAINTENANCE

Like all Gemini Valves, the 76 Series utilizes our self compensating stem seal design. This design automatically compensates for wear as well as thermal expansion and contraction resulting in a leak tight, maintenance free, service life.

Once the stem seal has worn beyond the compensation afforded by the Belleville springs adjustment of the stem nut may enable valve to be returned to service. Holding the 'flats' of the stem, tighten the stem nut until Belleville springs become fully compressed (flattened); the torque required to tighten the nut further increases sharply when this point is reached. Do not tighten the stem nut beyond this point to avoid damage of the stem seal.

The Gemini Series 76, one piece body design, is not regarded as a maintainable product by Gemini Valve. Series 76 valves which have become worn out are ordinarily replaced. Additionally, the use of a special tool is necessary in dismantling and reassembling the valve. This tool is not available from Gemini Valve. Note that the price of a seat and seal kit may approach 60% of the cost of a new valve and does not include labor and any safety related issues should the valve be incorrectly repaired.

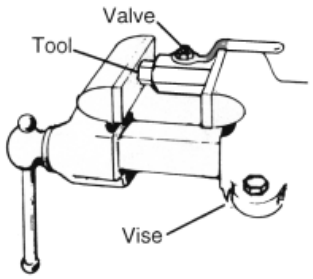
For those customers who desire to attempt repair a VRK (Valve Repair Kit) kit is available from Gemini Valve. Please see the following procedure;

MAINTENANCE (continued)

The use of a tool is necessary in dismantling and reassembling the valve. A design is suggestion is offered below. These instructions deal with valves which are equipped with lever handles. If your valve has another style handle or is equipped with an actuator, the steps required to complete the stem assembly will differ somewhat for those referred to in this instruction sheet. When the repaired valve is reinstalled, the insert should face upstream.

Procedure

1. Place tool in wrenching slots of insert. Place valve with the inserted tool in vise lengthwise.



2. Break insert loose by turning tool with a wrench while holding valve body with a second wrench. Remove valve from vise, unscrew insert, remove seat from insert and discard.

3. Turn handle to "closed" position, remove ball. Remove seat from body and discard. Remove stem nut, handle grounding spring, Belleville springs, follower, and thrustwasher. Remove stem by pushing into valve. Discard thrustwasher. Make sure stem seal is removed when stem is withdrawn from valve body; discard stem seal.

4. Clean all parts. The use of a lubricant is recommended on all parts.

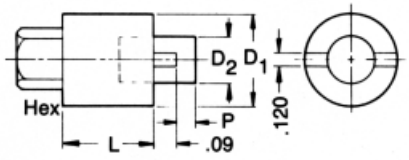
5. Place new stem seal on stem, position stem in body, place new thrustwasher over stem, install follower (flat metal washer) over stem. Position two Belleville springs (cupped) on stem with concave surfaces facing one another, put grounding spring over stem, position handle on stem atop Belleville springs. Secure assembly with stem nut. Tighten stem nut until Belleville springs become fully compressed (flattened); the torque required to tighten the nut further increases sharply when this point is reached. Do not tighten the stem nut beyond this point.

6. Position new seat in valve. Place new seat in loose insert. With handle in "closed" position, insert ball, making sure that the lower end of the stem engages the slot in ball. Turn handle to "open" position. Reassemble insert to body hand tight using assembly tool. Place valve and tool in vise as in Step 1, tighten insert to torque value given in chart.

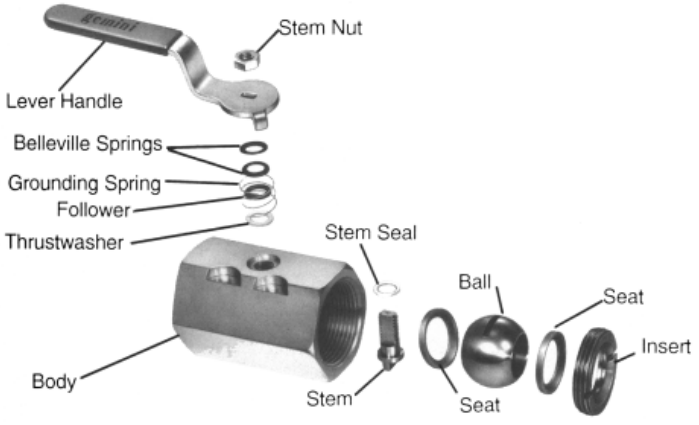
Assembly Torque Specifications			
Valve Size	Foot - Pounds Values for Inserts		
	Brass	Carbon	Stainless
1/2	18	28	40
3/4	30	40	80
1	50	70	120
1-1/4	60	120	150
1-1/2	100	150	225
2	180	250	295

7. Test valve for leak tightness in upstream-to-downstream direction. If leaks appear through valve, retighten the insert. if valve leaks through stem, increase torque on

Suggested Tool Design



Tool Dimensions - Inches				
Valve Size	D1	D2	L	P
1/2	.62	.355	1.00	5/32
3/4	.87	.485	1.00	5/32
1	1.12	.610	1.00	5/32
1-1/4	1.42	.790	1.12	3/16
1-1/2	1.66	.960	1.12	3/16
2	2.12	1.24	1.25	3/16



CONVERSION INSTRUCTIONS; MANUAL TO AUTOMATED

These instructions cover the conversion of manual (handle-operated) valves for actuated operation. In addition to the valve and actuator, a mounting kit is also necessary to complete the installation.

1. With the valve in the 'open' position remove, and put aside, the handle nut, handle and grounding spring from the valve on which the actuator will be mounted. Leave the thrustwasher, follower and Belleville springs on the valve stem.

2. Assemble the drive key follower or spacer (if required, see the chart below), drive key, and stem nut from the kit. Do not reuse the handle nut from the manual valve assembly. Prevent the stem from turning as the nut is tightened by inserting a wooden or plastic dowel through the valve, then tighten the stem nut until the Belleville springs have just become fully compressed (flattened). Although the nut spins freely when first run onto the stem, the torque needed to continue tightening will increase progressively after the stem nut contacts the drive key and the Belleville springs begin to deflect. The torque required to tighten further will increase sharply once the Belleville springs have become fully flattened. Tightening beyond this point should not be attempted as damage to the stem seal may result.

3. The correct orientation of the stem nut to the drive key is shown in Figure 3; this orientation is necessary to permit engagement with the twelve-point socket in the actuator pinion driver. In order to achieve the desired orientation, loosen the stem nut until the nut / drive key relationship corresponds to either 'A' or 'B' in Figure 3. This adjustment should require less than one-twelfth (1/12) turn of the nut.

Figure 1

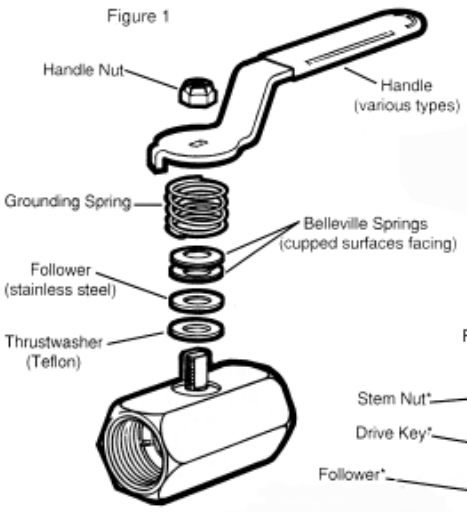


Figure 2

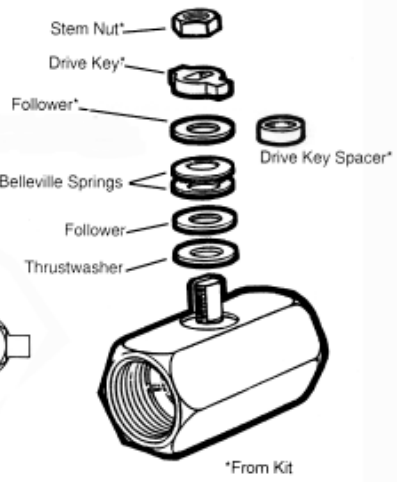
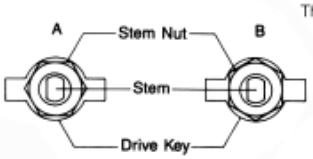
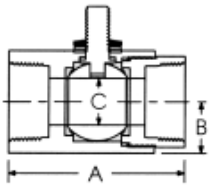


Figure 3

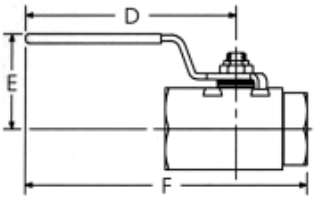


For Mounting To						
B410 & A420 Series				A500 Series		
Size	76 Series	86 Series	96 Series	76 Series	86 Series	96 Series
1/4	N/A	Follower	N/A	N/A	Follower	N/A
3/8	N/A	Follower	N/A	N/A	Follower	N/A
1/2	Follower	Follower	None	Follower	Follower	None
3/4	Follower	None	Spacer	Follower	None	None
1	None	Spacer	Spacer	None	None	Spacer
1-1/4	Spacer	Spacer	Spacer	None	Spacer	Spacer
1-1/2	Spacer	Spacer	Spacer	Spacer	Spacer	Spacer
2	Spacer	Spacer	N/A	Spacer	Spacer	N/A

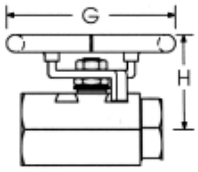
DIMENSIONS



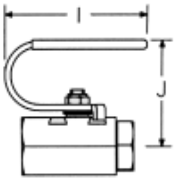
Valve



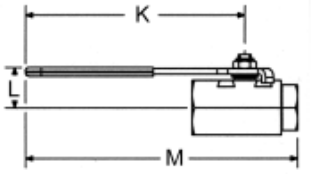
Valve with Lever Handle



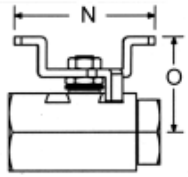
Valve with Oval Handle



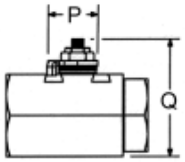
Valve with 'C' Handle



Valve with Flat Handle



Valve with Wing Handle



Valve with Handle Stop

Size	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1/2	2.18	0.50	0.36	4.00	1.75	5.09	2.31	1.58	2.72	2.03	4.64	0.77	5.73	2.15	1.37	.87	1.58
3/4	2.22	0.59	0.49	4.00	1.80	5.11	2.31	1.67	2.72	2.12	4.64	0.88	5.75	2.15	1.46	.87	1.77
1	2.76	0.75	0.62	5.38	2.00	6.76	3.41	1.91	3.50	2.96	5.95	1.08	7.33	2.73	1.89	1.18	2.22
1-1/4	3.02	1.00	0.80	5.38	2.24	6.87	3.41	2.13	3.50	3.18	5.95	1.30	7.46	2.73	2.10	1.18	2.62
1-1/2	3.45	1.06	0.97	6.75	2.93	8.35	3.41	2.42	4.24	3.88	7.65	1.44	9.37	3.16	2.14	1.33	3.04
2	4.04	1.31	1.25	6.75	3.18	8.69	3.41	2.67	4.24	4.13	7.65	1.69	9.67	3.16	2.39	1.33	3.93

A500 Series Pneumatic Actuators for Gemini 76, 86, 96 & 309 Series Ball Valves

2 Otter Court, Raymond, New Hampshire 03077 • Tel. (603) 895-4761 • FAX (603) 895-6785

Spring-Return

Double-Acting

FEATURES

- **Compact, Lightweight Aluminum Body and Bracket featuring Teflon® Impregnated Hard Anodized Surfaces**
- **Standard 'In Line' or 'Cross Mount' Valve to Actuator Configurations**
- **Spring-Return Design Accommodates Air Supply as Low as 50 psi**
- **Stainless Steel External Trim & Viton® O-rings Standard**
- **Direct Valve Stem Coupling to Actuator Shaft Minimizes Backlash**
- **Manual Override**
- **Available with Integral NAMUR Pilot Valve or can be Remotely Piloted**
- **Available with Limit Switches**
- **Optional ISO 5211.2 FO3 & F05 Valve & NAMUR Accessory Mounting Brackets Available**

Product Information

The A500 Series pneumatic actuators offer the latest technology from Gemini Valve for pneumatically actuating our 76, 86, 96 & 309 Series ball valves.

Again, we are combining the three key elements for long, reliable, trouble free life - a premium quality ball valve, a quality actuator designed to meet the torque requirements of the valve, and a mounting system which assures alignment and rigidity.

Gemini Ball Valves' low operating torque makes possible a compact actuator which is both economical to install and operate. Precise machining of all the valve components, including the seats, controls the sealing preload. This assures bubble-tight sealing, minimizes the operating torque and optimizes the valve life.

The A500 Series Actuators represents the combination of the latest in machining technology and our more than twenty five years experience in producing high performance pneumatic actuators. The simplicity of our rack and pinion design is made possible though our unique manufacturing techniques. The results - a compact, ball valve actuator which is efficient and trouble free.

Our mounting system precisely couples the actuator drive shaft to the valve stem. Additionally, the valve stem nut is fixed within the actuator shaft. These features combined with a rigid mounting bracket, results in a pneumatically actuated ball valve which minimizes backlash, assures optimum stem seal life and prevents any possibility of stem nut back off.

All 500 Series are designed to operate using an air supply of 50 - 125 psi. The air can be delivered by direct mounting pilot valves having NAMUR interfaces or from remote pilot valves connected via means of 1/8" NPT female threaded orifices in the actuator face plates. Gemini Valve 4GP Series four way solenoid operated pilot valves are available for NAMUR interface mounting.

Special brackets and pinion shaft extensions are available for mounting the Gemini Valve LS-1 limit switch assemblies, as well as, auxiliary equipment, such as positioners and signal transmitters, requiring NAMUR standard interface mounting compatibility.

A500 Series Actuators are also available with ISO 5211.2 F03 (9mm female square driver) and F07 (14mm female square driver) mounting configurations. Actuators with ISO 5211 mounting configurations have special pinion shafts installed at the factory and therefor, are not interchangeable with units mounting onto our ball valves.

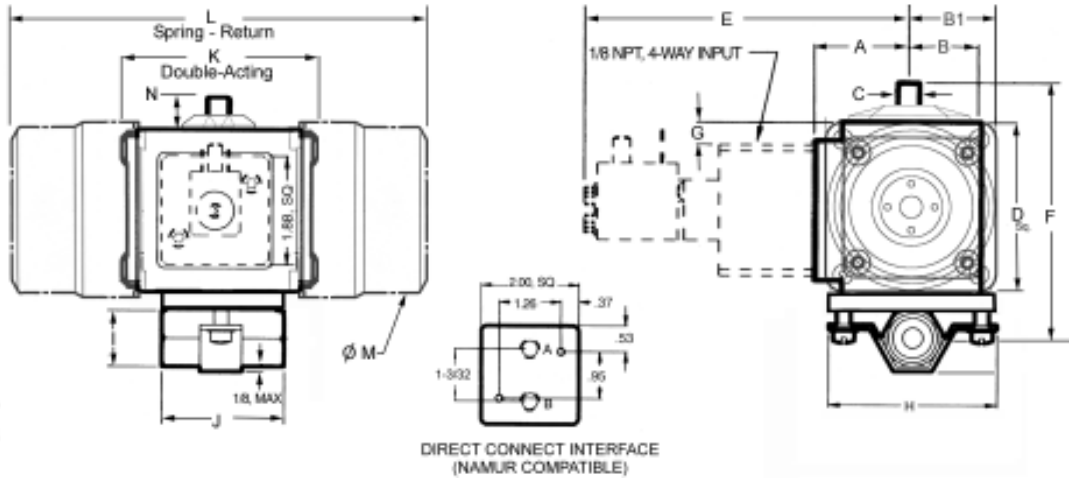
Caution: Care must be taken to assure that the output torque of the A500 Series Actuator selected is adequate to turn the valve or device to be operated.

Need further information?
Have questions?
Want to place an order?

Please call us @ 603 895-4761 now and tell us how we can be of service!

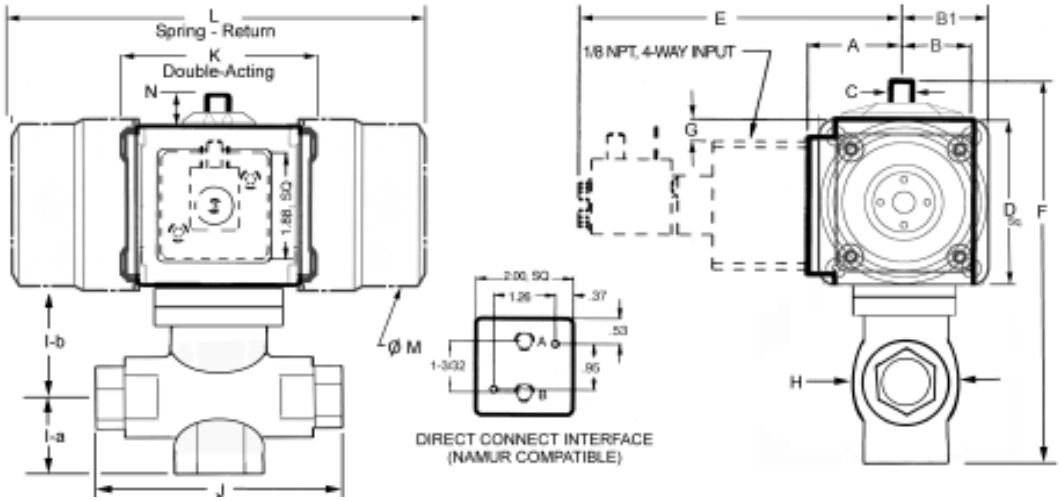
Dimensions

A500 with 76, 86 & 96 Series Valves



Valve Size & Series			Actuator Model		Approximate Dimensions, Inches														
76	86	96	Spring Return	Double Acting	A	B	B1	C	D	E	F	G	H	I	J		K	L	M	N
															76	86/96				
1/2	1/4 & 3/8	-	A512SR	A512D	1.36	1.00	1.53	.31	3.06	4.67	3.88	.32	3.00	1.00	2.18	2.18	3.62	8.31	2.81	.57
3/4	1/2	-									4.06			1.18	2.22	2.61				
1	3/4	1/2									4.38			1.50	2.76	2.94				
1-1/4	1	3/4									6.44			2.00	3.02	3.32				
1-1/2	1-1/4	1	A522SR	A522D	1.87	1.55	2.25	.50	4.50	5.18	7.59	1.10	4.75	2.12	3.45	3.70	5.28	11.23	3.50	.82
2	1-1/2	1-1/4									8.09			2.62	4.04	4.25				
-	2	1-1/2									8.47			3.00	-	4.57				

A500 with 309 Series Valves



Valve Size & Series	Actuator Model		Approximate Dimensions, Inches														
309	Spring Return	Double Acting	A	B	B1	C	D	E	F	G	H	l-a	l-b	J	K	L	M	N
1/2	A512SR	A512D	1.36	1.00	1.53	.31	3.06	4.67	5.77	.32	1.63	1.55	2.00	3.85	3.62	8.31	2.81	.57
3/4																		

Specifications

Air Supply

An air supply pressure of 50 - 125 psi. Sufficient air delivery must be available at the actuator to ensure dependable operation. The following precautions should be observed:

Air supply should be clean and free of moisture. When dirty or wet air is a problem; a filter / separator should be specified; these units are most effective when installed as closely as possible to the actuator. A filter, when used, should permit a minimum flow of 4 scfm at an upstream pressure of 60 psi.

Eliminate severe restrictions to air flow (certain solenoid valves & fittings). The most restricted passage must have an area no smaller than .012 inches square, the area of 1/8" diameter orifice. If more than a single actuator is to be supplied by an individual pilot, the minimum passage requirement applies per actuator.

Tubing: For short runs up to 5 feet 5/32" I.D. is suitable, 1/4" I.D. will serve up to 30 feet. For longer runs, use 3/8" I.D. or larger.

Temperature

Pneumatic Actuators are designed to operate in ambient temperatures between -20˚F (-28.0˚C) and +350˚F (+175˚C). Care must be taken to assure that the moisture content of the air supply is sufficiently low to prevent icing within the actuator.

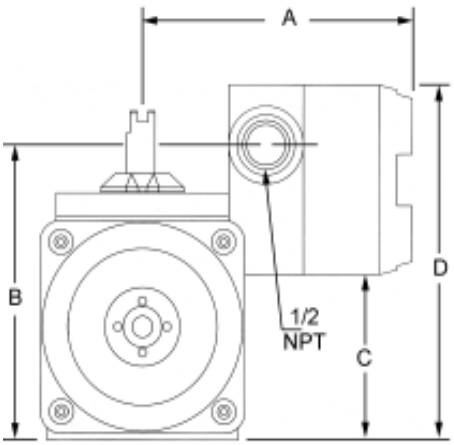
Port Connections: 1/8" NPT

Accessories

Solenoid pilot valves and limit switches are available. Please see our literature or contact us direct.

Dimensions

A500 with LS-1 Limit Switch



Actuator	A	B	C	D
A512D, A512SR	3.97	4.23	2.37	5.10
A522D, A522SR	4.24	5.91	4.05	6.78

Torque Output

Torque Output - in. - lbs.*

Model	50 psi	60 psi	70 psi	80 psi	90 psi	100 psi	Spring Stroke	
							Start	End
A512D	56	67	78	90	101	112	N/A	N/A
A512SR	50	60	70	82	94	105	100	56
A522D	180	225	270	360	405	450	N/A	N/A
A522SR	180	225	270	360	405	450	360	255

CAUTION: Care must be taken to assure the output torque of the A500 Series Actuator selected is adequate to turn the valve or device to be operated. Note: Does not apply for mounting of Gemini Valves to A500 Series Actuators. Gemini Valve offers a selection chart for your convenience. See our literature for details. Note also; special sizing considerations should be given when a valve is handling suspended solids, abrasives, dirty media, oxygen and dry gasses.

* - Approximate

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