TECHNICAL DATA SHEET
76 Series Ball Valves

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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"

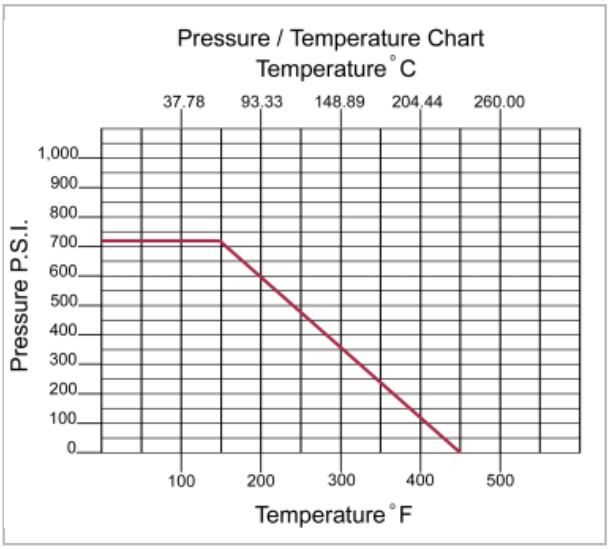
RATINGS

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.

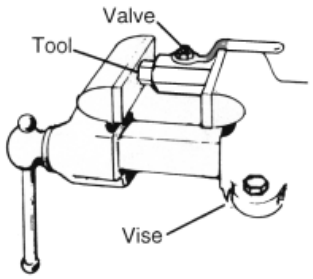
For those customers who desire to attempt repair a VRK (Valve Repair Kit) kit is available from Gemini Valve. Please see the following procedure;

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.

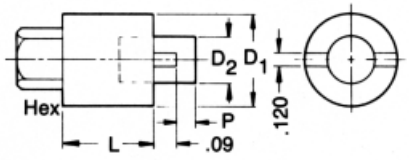
5. Place new stem seal on stem, position stem in body, place new thrustwasher over stem, install follower (flat metal washer) over stem. Position two Belleville springs (cupped) on stem with concave surfaces facing one another, put grounding spring over stem, position handle on stem atop Belleville springs. 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.

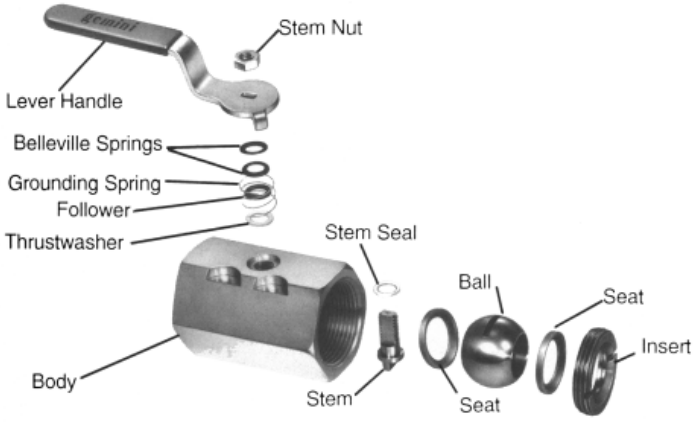
Assembly Torque Specifications			
Valve Size	Foot - Pounds Values for Inserts		
	Brass	Carbon	Stainless
1/2	18	28	40
3/4	30	40	80
1	50	70	120
1-1/4	60	120	150
1-1/2	100	150	225
2	180	250	295

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

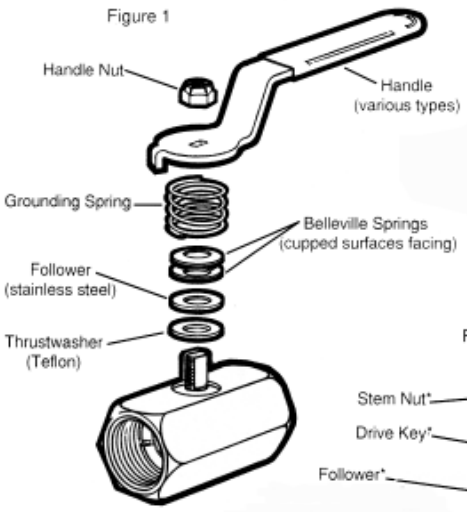


Figure 2

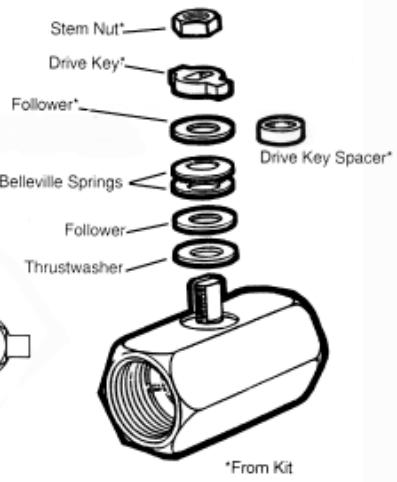
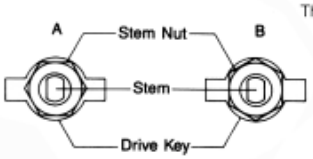
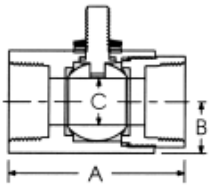


Figure 3

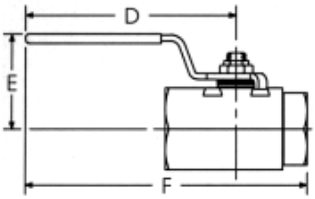


For Mounting To						
B410 & A420 Series				A500 Series		
Size	76 Series	86 Series	96 Series	76 Series	86 Series	96 Series
1/4	N/A	Follower	N/A	N/A	Follower	N/A
3/8	N/A	Follower	N/A	N/A	Follower	N/A
1/2	Follower	Follower	None	Follower	Follower	None
3/4	Follower	None	Spacer	Follower	None	None
1	None	Spacer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

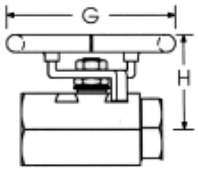
DIMENSIONS



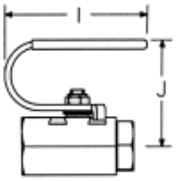
Valve



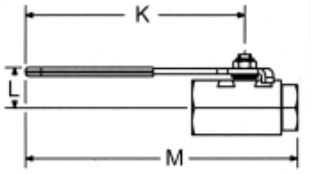
Valve with Lever Handle



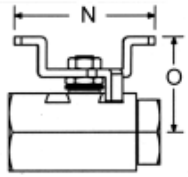
Valve with Oval Handle



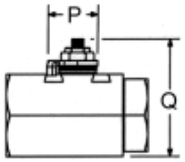
Valve with 'C' Handle



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