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PRECISION PRODUCTS

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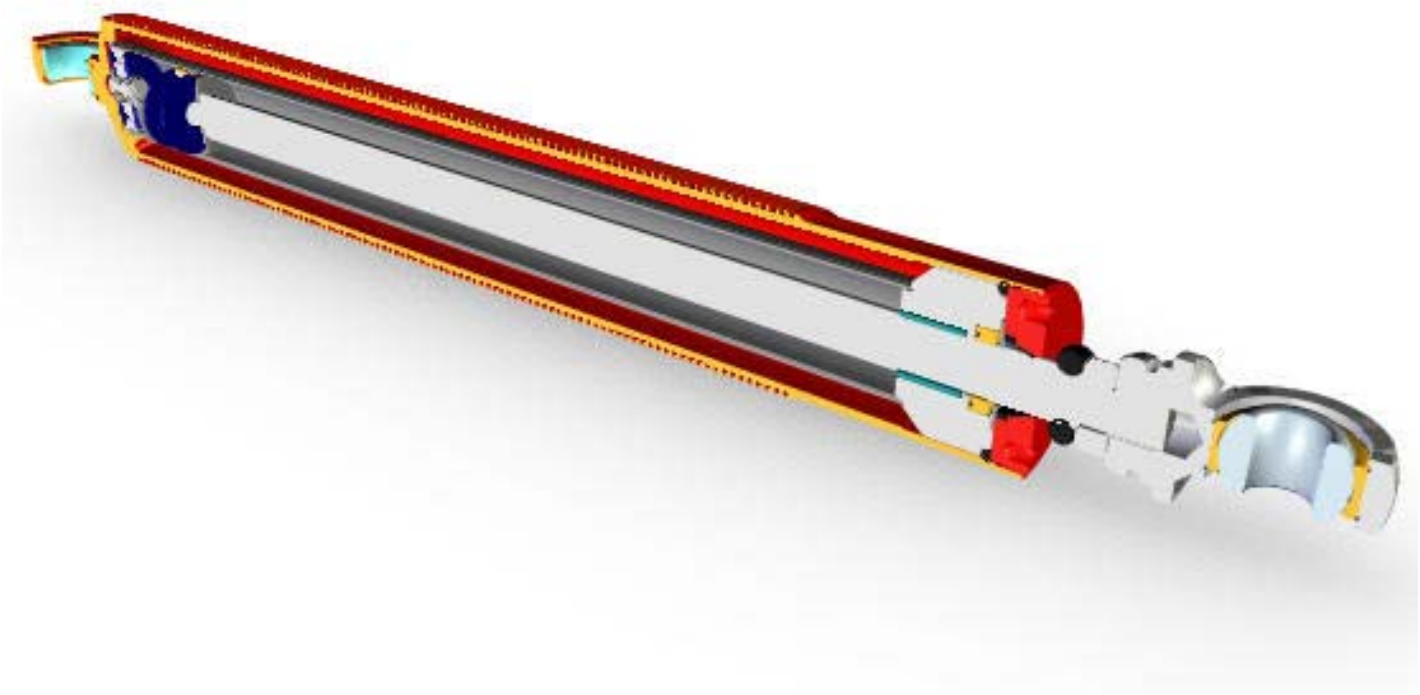
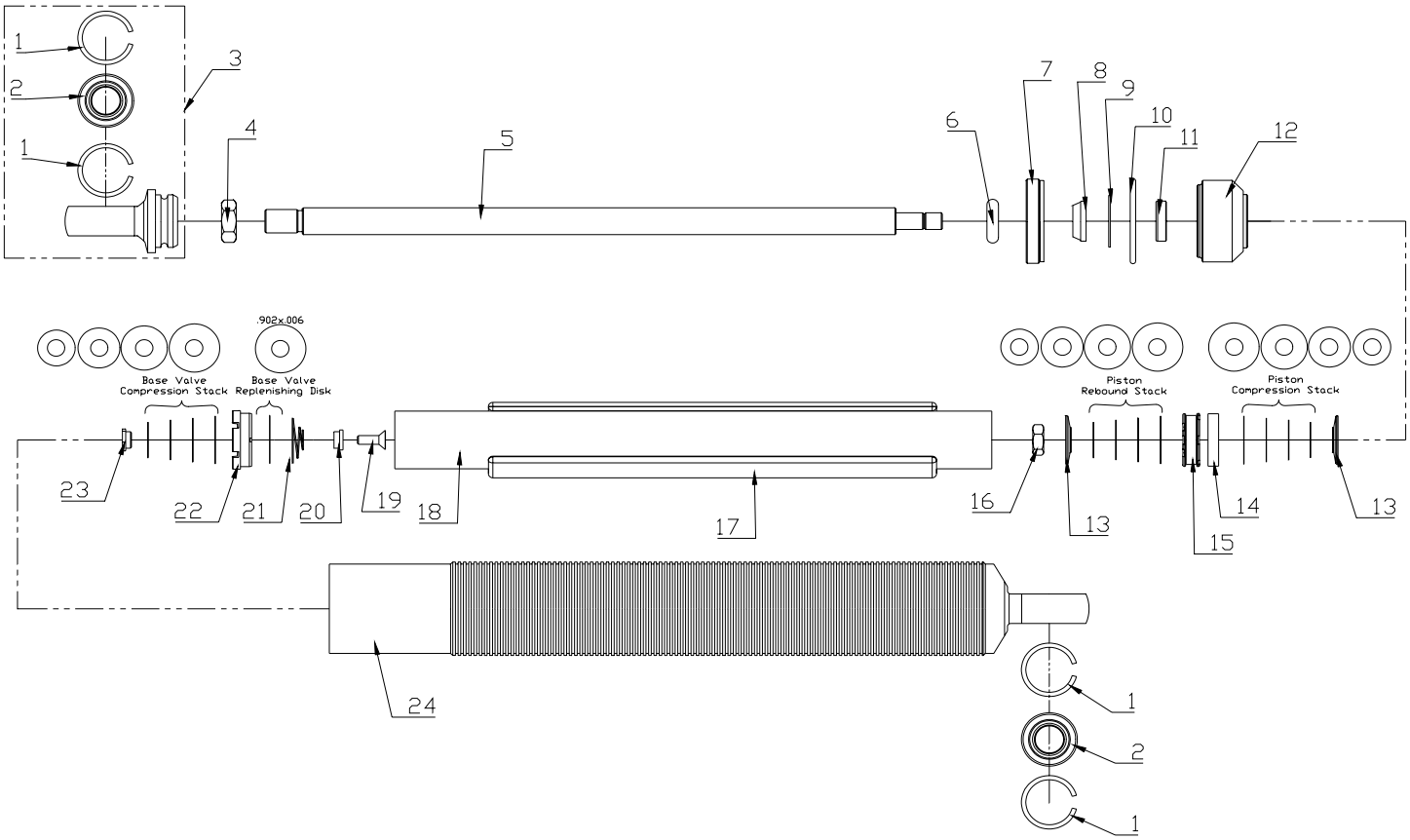


8000 SERIES SHOCK TECHNICAL MANUAL

Revised 5/24/04

8200 Series Parts List

Threaded Aluminum Small Body



Item No.	Part No.	DESCRIPTION
1	**9007-106**	Ring, Internal
2	**SIB8-101**	Bearing, Spherical-1/2" ID
3	**9036-105**	Loop, Alum-Assy 7/16"-20
4	**JNR7A**	Nut, Jam 7/16-20 ALUM
5	**9028-131**	Rod, Piston - 3"
5	**9028-132**	Rod, Piston - 4"
5	**9028-133**	Rod, Piston - 5"
5	**9028-134**	Rod, Piston - 6"
5	**9028-135**	Rod, Piston - 7"
5	**9028-136**	Rod, Piston - 8"
5	**9028-137**	Rod, Piston - 9"
6	**9044-115**	O-Ring, -309 70 Neoprene
7	**9014-153**	Closure Nut, SB Red Anodize
8	**9046-103**	Wiper, Piston Rod
9	**9005-103**	Washer, Seal Retaining SS
10	**9044-114**	O-Ring, 34x2.5MM 70 Buna-N
11	**9042-113**	Seal, Piston Rod
12	**9054-114**	Assy, Gland SB
13	**9027-112**	Plate, Valve Stack
14	**9042-114**	Seal, Piston
15	**9057-116**	Piston , Small Body
16	**9014-111**	Nut, Jam Stover
17	**9052-105**	Bag, Gas 3" SB
17	**9052-106**	Bag, Gas 4-5" SB
17	**9052-107**	Bag, Gas 6-7" SB
17	**9052-108**	Bag, Gas 8-9" SB
18	**9053-132**	Tube, Compression SB 3"
18	**9053-131**	Tube, Compression SB 4"
18	**9053-114**	Tube, Compression SB 5"
18	**9053-120**	Tube, Compression SB 6"
18	**9053-115**	Tube, Compression SB 7"
18	**9053-130**	Tube, Compression SB 8"
18	**9053-129**	Tube, Compression SB 9"

Item No.	Part No.	DESCRIPTION
19	**9012-120**	Bolt, SB Base Valve
20	**9014-155**	Bolt Seat, SB Base Valve
21	**9015-107**	Spring, SB Base Valve Replenish
22	**9055-151**	Housing, Base Valve SB
23	**9014-154**	Nut, SB Base Valve
24	**9782-116**	Body, SB 3" CT Threaded
24	**9782-118**	Body, SB 4" CT Threaded
24	**9782-103**	Body, SB 5" CT Threaded
24	**9782-109**	Body, SB 6" CT Threaded
24	**9782-114**	Body, SB 7" CT Threaded
24	**9782-111**	Body, SB 8" CT Threaded
24	**9782-113**	Body, SB 9" CT Threaded
	9055-129	Disk Valve-.670"x.317"x0.006
	9055-130	Disk Valve-.670"x.317"x0.008
	9055-131	Disk Valve-.670"x.317"x0.010
	9055-132	Disk Valve-.670"x.317"x0.012
	9055-134	Disk Valve-.750"x.317"x0.006
	9055-135	Disk Valve-.750"x.317"x0.008
	9055-136	Disk Valve-.750"x.317"x0.010
	9055-137	Disk Valve-.750"x.317"x0.012
	9055-139	Disk Valve-.827"x.317"x0.006
	9055-140	Disk Valve-.827"x.317"x0.008
	9055-141	Disk Valve-.827"x.317"x0.010
	9055-142	Disk Valve-.827"x.317"x0.012
	9055-154	Disk Valve-.902"x.317"x0.004
	9055-144	Disk Valve-.902"x.317"x0.006
	9055-145	Disk Valve-.902"x.317"x0.008
	9055-146	Disk Valve-.902"x.317"x0.010
	9055-147	Disk Valve-.902"x.317"x0.012

NOTE: Before rebuilding or revalving your QA1 shock absorbers, your work area must be clean. Shock absorber performance is greatly affected by any contamination (i.e. dirt, dust, rag lint, etc).

TOOLS NEEDED FOR REBUILDING AND REVALVING

- Vise with soft jaws (aluminum or plastic)
- Spanner wrench (Available from QA1)
- Torque wrench with 1/2" socket
- 3/8" wrench or socket
- Pick set
- QA1 Shock oil
- Rebuild kit and/or revalving kit
- Blue Loctite (242/243)

DISASSEMBLY

1. Check shock mount bearings for excessive play, replace as needed.
2. Clamp shock body eyelet in a vise, with shaft pointing up.
3. Fully extend shock rod from body.
4. Using a spanner wrench, unscrew the shock closure nut. (Shock is not pressurized!)
5. Use a pick tool to remove closure nut o-ring.
6. Remove shock rod assembly, gland, and compression (inner) tube by pulling up on shock rod.
7. Remove gas bag from shock and set aside in area where it will not collect debris.
8. Pour oil from shock body and compression tube, watch for any debris in the used oil.
9. The base valve can be left in the compression tube and disassembled from the outside. Use a 3/8" wrench or socket to remove the disk retaining nut. The bolt is threaded into the base valve body from the inside so it will be retained. The internal disk and spring need not be removed.
10. Clean the parts with mild solvent as necessary and set aside.
11. Clamp piston-rod eyelet in a vise with the piston pointing up.
12. Remove ½" lock nut to access piston valving. Remove piston and valving.
13. If not revalving, the rebound stack, piston, and compression stack need to be kept in its original order for re-assembly.
14. Remove the gland assembly, and piston-rod seal from the rod.

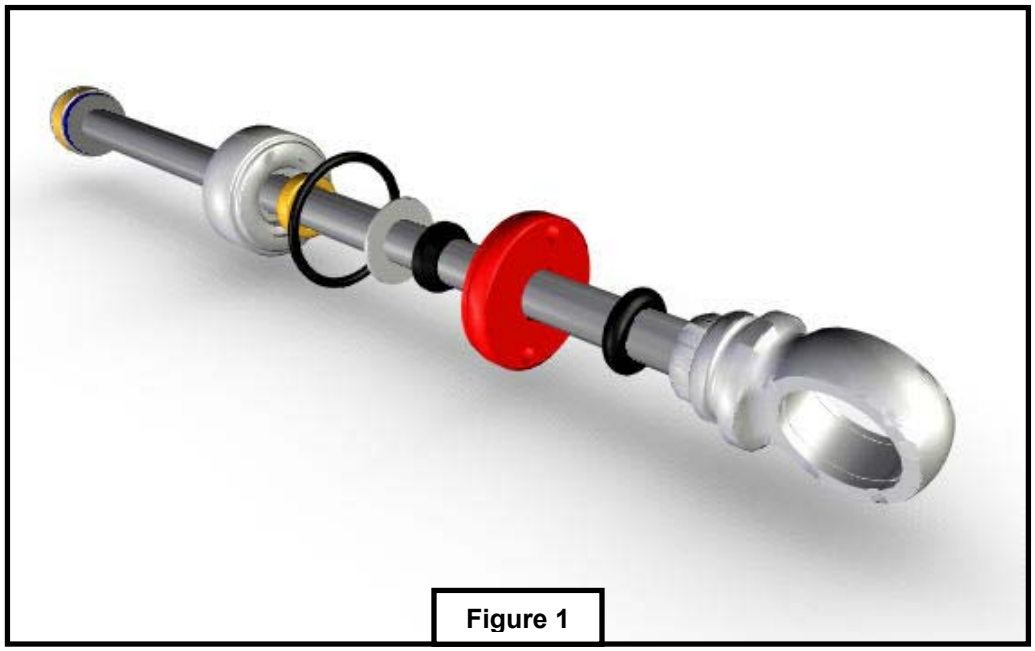


Figure 1

ASSEMBLY

1. Inspect bushing for wear, and replace gland assembly if bushing is loose on shaft.
2. Reassemble shaft with travel indicator, closure nut, piston rod wiper, seal retaining washer, gland o-ring, piston rod seal, and gland assembly. (See figure 1)
3. If revalving, read revalving instruction section first.
4. Place the valve plate onto the shaft with the small side facing up.
5. With shaft still in the vise, assemble the compression valving, piston, and rebound valving. The compression valve stack is on the bottom of piston and the rebound valve stack on top. It's important that the piston is positioned with the dimpled side up facing up. (See figures 2,3)

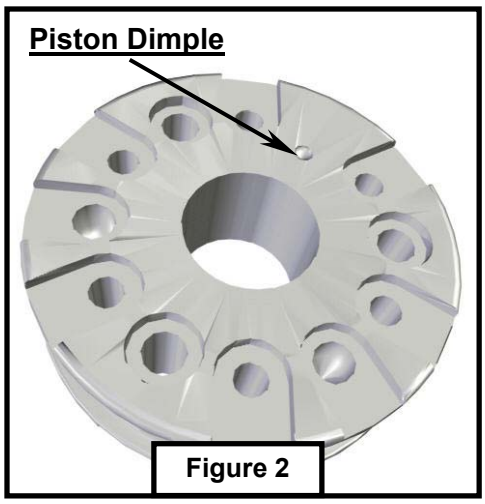


Figure 2

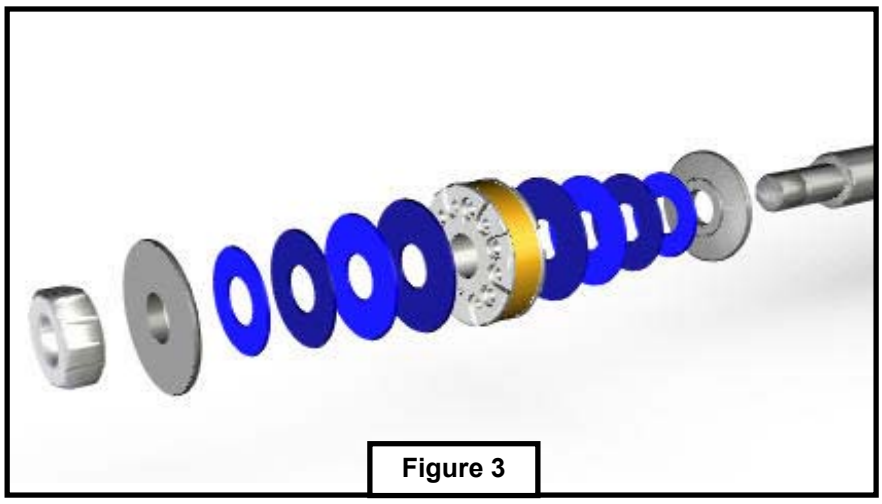


Figure 3

6. Place the second valve plate onto the shaft with the small side down.

7. Torque ½” lock nut to 12.5 ft/lbs (150 in/lbs). Check lock nut for any loose burrs and remove as necessary. Set piston rod assembly aside.
8. Reassemble base valve with the appropriate compression disks as determined in the revalving instructions. Apply blue Loctite (242/243) to the retaining nut threads. Torque retaining nut to 15 in/lbs. (See figure 4)

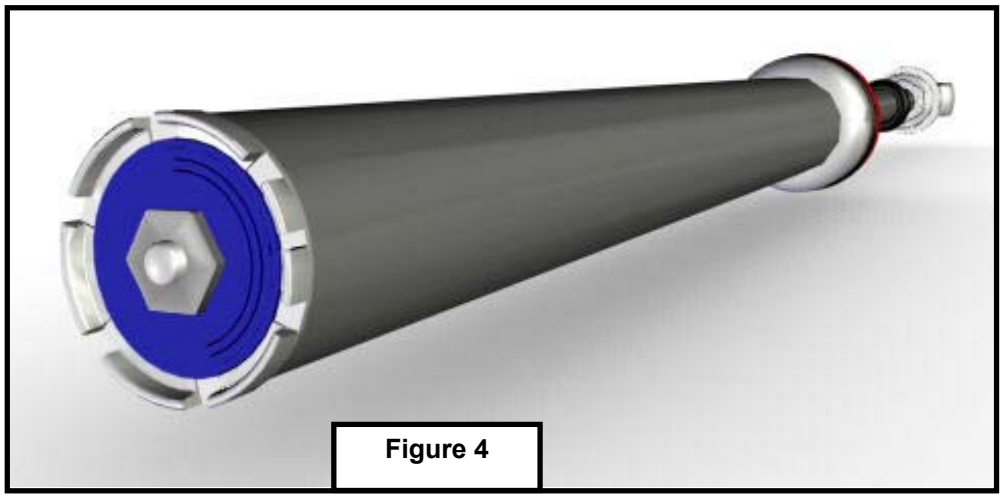


Figure 4

9. Place the shock body in the vise, holding it by the lower mount.
10. Pour ~1/4 cup of oil into the shock body.
11. Gently insert the compression tube and gas bag into shock body, base valve first. Verify that the base valve has seated into base of the shock body properly.
12. IMPORTANT! Do not tear the gas bag or pinch it under the base valve.
13. Fill shock body and compression tube with shock oil to just above (1/16”) the top of the compression tube.
14. Move compression tube around to free any trapped air bubbles.
15. Insert the piston-rod assembly, with piston wrap, into compression tube.
16. With the piston assembly submerged approximately 1”, tap shock rod eyelet with a soft mallet. This opens the compression valve stack to release any air trapped inside the piston.
17. Slowly cycle the piston rod up and down while holding the compression tube down with your fingers. Continue this process until no air is present in the oil.
18. Use your fingers to hold the compression tube down and raise the shock shaft until the piston is at the top of the compression tube.
19. Hold shock shaft near the top of the compression tube and slide the gland into the shock body. Oil should come up around the outside of the gland.
    NOTE: Remember we are attempting to build a shock without any air trapped inside.
20. Keep shock fully extended. Push the closure nut o-ring into the outer groove of the gland.
21. Install and tighten the closure nut.
22. Invert the shock and wipe off any oil over-flow.
23. Stroke the shock and check for smooth operation. Rough or jerky movement indicates that air is trapped inside - repeat the steps above.

REVALVE INSTRUCTIONS

VALVING CHARACTERISTICS

Shock absorbers create dampening by flowing oil through restrictive paths - the more restricted the flow, the higher the dampening force. Nearly all shocks use a combination of “bleed passages” and “blow-off valves” to control the oil flow in both compression and rebound separately.

Bleed is typically controlled by the size of a small hole(s) or slit(s). The oil can flow easily at low shaft velocities, but as velocity increases, the resistance rises progressively. QA1 shocks use a single bleed hole in the piston, which is .020”. Smaller or larger bleed holes may be used to raise or lower low-speed dampening, but be very cautious in tuning with bleed as this shock is very sensitive to bleed changes. Unless you have access to a shock dyno it is best to stay with the standard bleed.

Blow-off is typically controlled by either a spring pushing on a valve, or a set of disk valves covering a set of larger holes. Once the shaft reaches a certain velocity, the valves will open – allowing a linear or digressive dampening curve. QA1 shocks utilize three sets of disk valves, two for compression and one for rebound. One rebound valve-stack and one compression valve-stack are on either side of the piston; the other compression valve-set is in the base valve. For simplicity, the base valve stack is the same as the compression stack on the piston.

The following trends will help you tune your QA1 small body shocks:

LOW SPEED (0~1 in/sec):

The piston bleed hole size has the main effect. Larger bleed holes will lower the low-speed dampening and will delay the blow-off to occur at a higher velocity. Smaller bleed holes will raise the low-speed dampening – blow-off will tend to occur at lower velocities.

MEDIUM SPEED (1~10 in/sec):

Valve stack begins to open. The disk closest to the piston (.902” OD) will have the main effect. Valve stack thicknesses determine the blow-off velocity and the slope of the dampening curve. Bleed can affect the blow-off velocity, but the slope of the graph remains the same. The blow-off can be more or less distinct depending on the amount of bleed.

HIGH SPEED (>10 in/sec):

The shape of the valve stack has main effect. Thickness, outside diameters, and number of disks determine the shape of the valve stack. The smallest disk (.670” OD) acts as the pivot disk. The pivot disk has a large affect on the higher speed portion of the dampening curve as it controls the diameter where the rest of the disks start to bend.

You can use the graphs located at the end of this document to aid in selecting the proper valving for your application.

Table 1

Rebound \ Compression	0.5			1			2			3			4			5			6			7			8		
	C	R	BV	C	R	BV	C	R	BV	C	R	BV	C	R	BV	C	R	BV	C	R	BV	C	R	BV	C	R	BV
0.5	0.5	0.5	0.5	1	0.5	1	2	0.5	2	3	0.5	3	4	0.5	4	5	0.5	5	6	0.5	6	7	0.5	7	8	0.5	8
1	0.5	1	0.5	1	1	1	2	1	2	3	1	3	4	1	4	5	1	5	6	1	6	7	1	7	8	1	8
2	0.5	2	0.5	1	2	1	2	2	2	3	2	3	4	2	4	5	2	5	6	2	6	7	2	7	8	2	8
3	0.5	3	0.5	1	3	1	2	3	2	3	3	3	4	3	4	5	3	5	6	3	6	7	3	7	8	3	8
4	0.5	4	0.5	1	4	1	2	4	2	3	4	3	4	4	4	5	4	5	6	4	6	7	4	7	8	4	8
5	0.5	5	0.5	1	5	1	2	5	2	3	5	3	4	5	4	5	5	5	6	5	6	7	5	7	8	5	8
6	0.5	6	0.5	1	6	1	2	6	2	3	6	3	4	6	4	5	6	5	6	6	6	7	6	7	8	6	8
7	0.5	7	0.5	1	7	1	2	7	2	3	7	3	4	7	4	5	7	5	6	7	6	7	7	7	8	7	8
8	0.5	8	0.5	1	8	1	2	8	2	3	8	3	4	8	4	5	8	5	6	8	6	7	8	7	8	8	8
	Tie Down												Straight												Easy Up		

*Note: QA1 strongly recommends using QA1's 6000 series large body shocks when desired compression valving is 7 or greater.

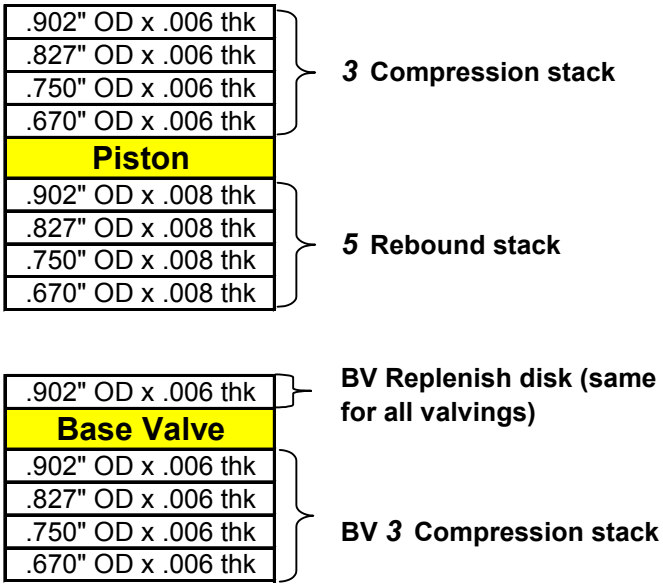
How to use:

1. Choose desired **compression** damping at the top of the table.
2. Choose desired **rebound** damping at the left of the table
3. Follow across and down from the selected values.
4. Read the values in the intersecting box. The values are as follows: Compression stack, Rebound stack, Base Valve Compression Stack.
5. Look up the components needed to make each stack in the Valving stack table (See Table 2)

Example:
You want to build a 3-5 (3 Compression, 5 Rebound) valved shock.

Follow these steps:

1. Using Table 1, determine what valve stacks are used to build the desired shock. In this case 3 comp., 5 reb., and 3 BV
2. Now look up the required valve stacks in Table 2 to determine what disks make up each stack
3. The components used in a 3-5 valved shock will be as follows:



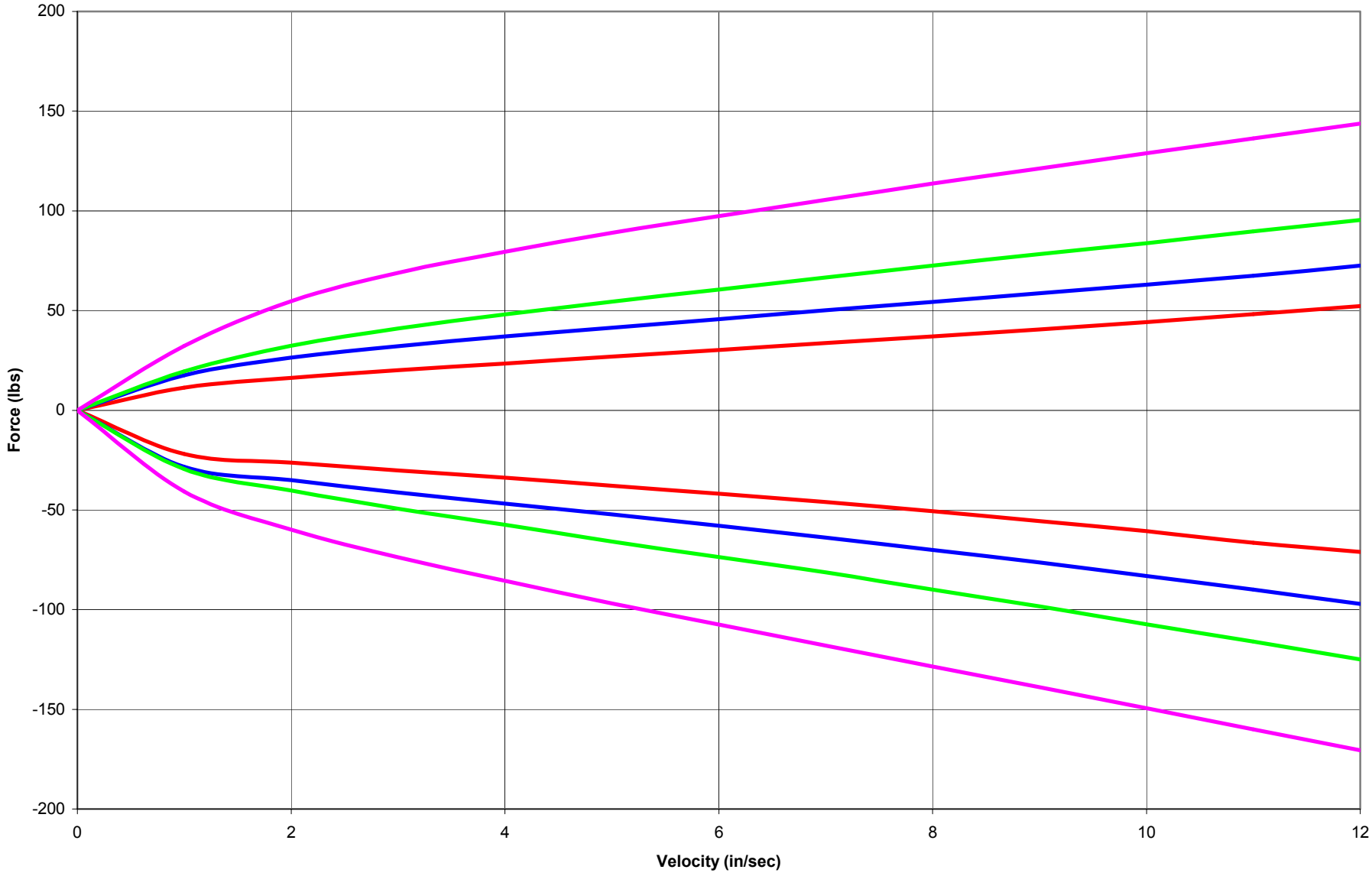
4. A few helpful hints:
   - The BV compression stack will always be the same as the piston compression stack
   - The BV replenish disk will be the same for any valving
   - The piston compression stack goes on first
   - The piston is installed dimpled side up
   - The piston rebound stack goes on last (closest to nut)

Table 2

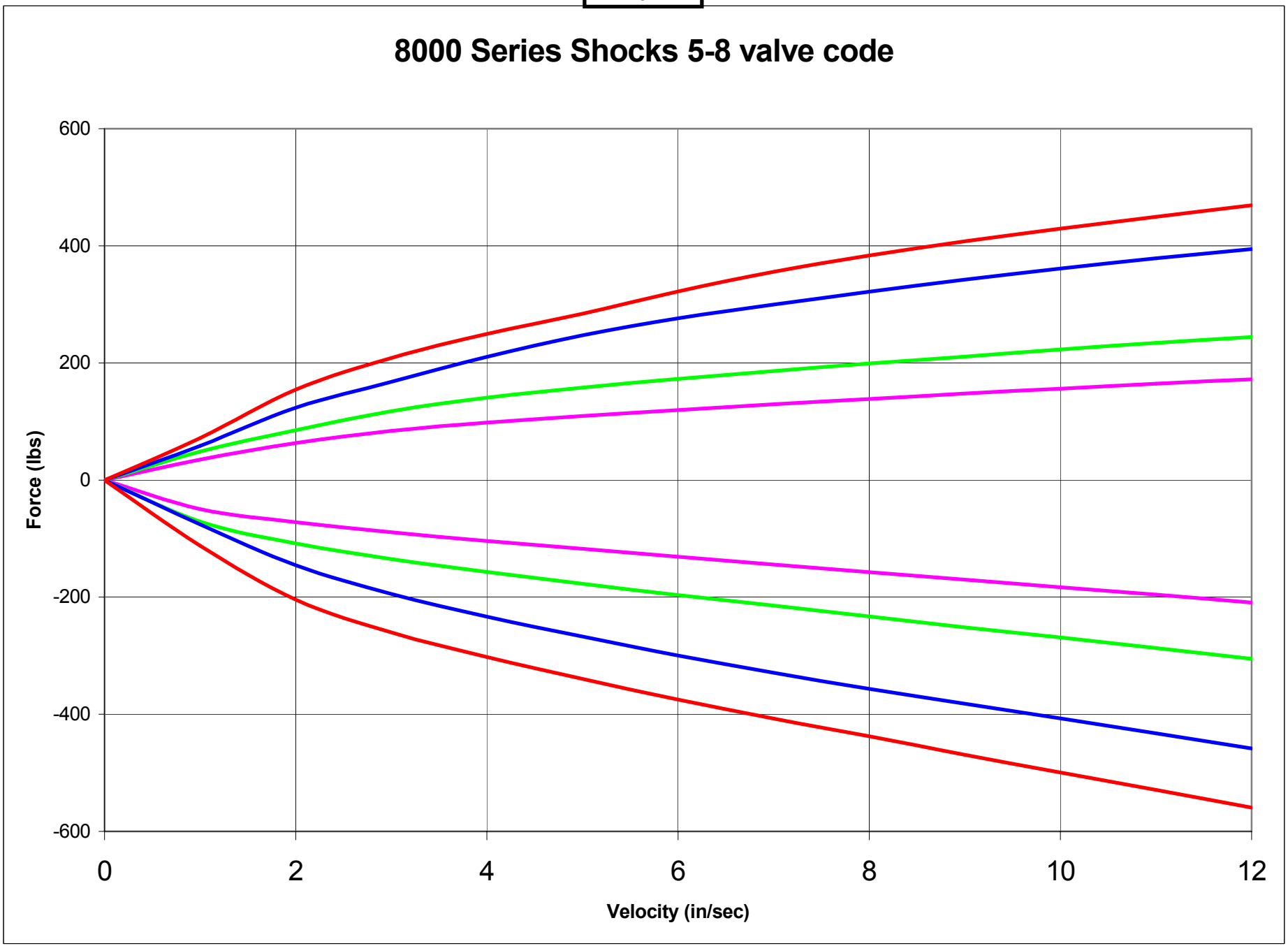
Valve #	Components
0.5	.902" OD x .004 thk
1	.902" OD x .006 thk
2	.902" OD x .006 thk .827" OD x .006 thk
3	.902" OD x .006 thk .827" OD x .006 thk .750" OD x .006 thk .670" OD x .006 thk
4	.902" OD x .008 thk .827" OD x .008 thk .750" OD x .008 thk
5	.902" OD x .008 thk .827" OD x .008 thk .750" OD x .008 thk .670" OD x .008 thk
6	.902" OD x .010 thk .827" OD x .010 thk .750" OD x .010 thk .670" OD x .010 thk
7	.902" OD x .012 thk .827" OD x .012 thk .750" OD x .012 thk .670" OD x .012 thk
8	.902" OD x .012 thk .827" OD x .012 thk .750" OD x .012 thk .670" OD x .012 thk .670" OD x .012 thk

Graph 1

8000 Series Shocks 1-4 valve code



Graph 2


8000 Series Shocks 5-8 valve code
600
400
200
0
-200
-400
-600
Force (lbs)
0
2
4
6
8
10
12
Velocity (in/sec)