PENSKE RACING SHOCKS®

Technical Manual

7000 Series Shocks

(700, 7100, 7300, 7400, 7500 Series)

Main Office
150 Franklin St.
P.O. Box 1056
Reading, PA 19603
(610) 375-6180 • (610) 375-6190 Fax

Midwest
12666 US-12
P.O. Box 666
Brooklyn, MI 49230
(517) 592-6681 • (517) 592-3696 Fax

West
2499 S. Stockton St.
Unit #1
Lodi, CA 95240
(209) 368-5040 • (209) 368-5119 Fax

www.penskeshocks.com

Authorized Penske Racing Shocks Worldwide Distributors

PRS - AUSTRALIA
NTT Racing
(618) 8362-2113
(618) 8362-8811 Fax

PRS - CANADA
Competition Tire Canada
(905) 684-7418
(905) 684-1774 Fax

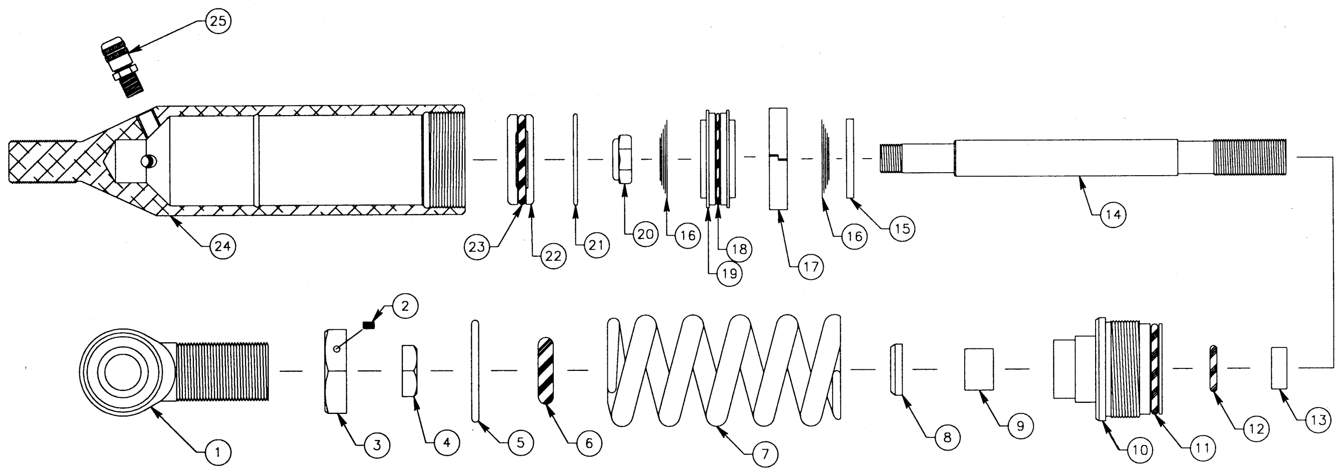
PRS - U.K./EUROPE
SPA Design
44 1 827 288 328
44 1 827 260 528 Fax

PRS - SOUTH AMERICA
Saenz Hnos.
54 114 669-0956
54 114 485-3028 Fax

Table of Contents

REV: 3/19/01
#4

Hydraulic Tracking Damper (HTD)



ITEM NO.	PART NO.	DESCRIPTION
		Hydraulic Tracking Damper
1	MO-01	Rod End, .625
	MO-03	Rod End, .750
2	SC-01	Screw, Socket Set, 1/4" -20 x 1/4"
3	NT-01J	Jam Nut, 1" - 14
	NT-07J	Jam Nut, 1 1/8" - 12
4	NT-04J	Jam Nut, 5/8" - 18
5	VW-13	Washer, Flat, .925 ID
6	OR-2312-B	O_Ring, 2-312, Buna 70 Duro
7	SP-HTD600	Spring, 4.5" x 1.125 ID x 600 LB (Optional)
	SP-HTD900	Spring, 4.5" x 1.125 ID x 900 LB (Optional)
8	SL-09	Shaft Wiper, .625, Poly (Blue)
9	BU-10DU08	Bushing, DU .625 x .500
10	SB-HTD	Shaft Bearing, HTD
11	OR-2219-B	O-Ring, 2-219, Buna 70 Duro
12	OR-2114-V	O-Ring, 2-114, Viton 90 Duro

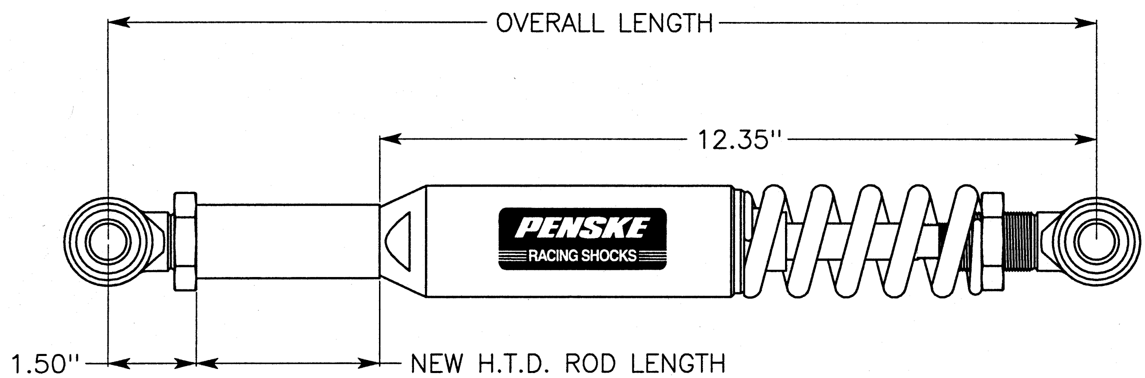
ITEM NO.	PART NO.	DESCRIPTION
13	BU-10DU04	Bushing, DU .625 x .250
14	SH-HTD	Shaft, HTD
15	VW-99	Top Out Plate, 1.375 x .504
16	VS-__	Valve Stack
17	PB-HTD	Piston Band, HTD
18	OR-2025-B	O-Ring, 2-025, Buna 70 Duro
19	PI-11004T	Piston, 1°/1°, .020 Bld 45mm, thin
20	NT-05R	Ring Nut, 1/2" - 18 (Nyloc)
21	RR-06	Wire Ring, .0625 Wire Diam x 1.900
22	PI-HTDR	Piston, Reservoir, HTD
23	OR-4219-B	Quad Ring, 4-219, Buna 70 Duro
24	BD-HTD	Body, HTD
25	IU-02	Air Valve, 1/8 NPT
	IU-04	Valve Core, 2000 psi
	IU-06	Valve Cap, High Temperature

HTD Specifications

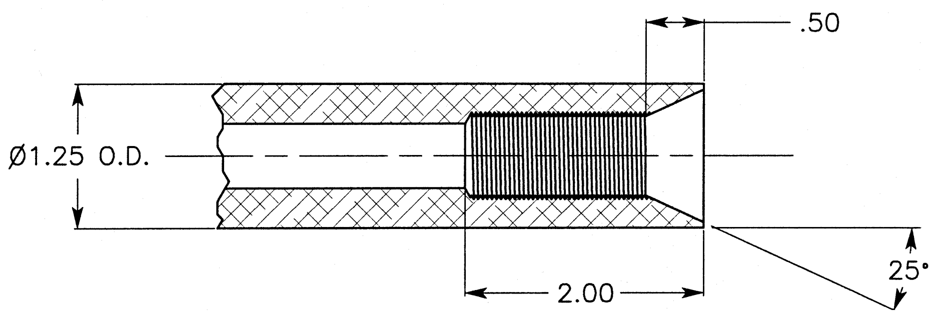
Type	Shock Series	Extended Length	Compressed Length	Shaft Travel	Spherical Bearing	Weight
HTD	7000	13.75"	12.5"	1.25"	.625"	2.5 lbs.

Installation Instructions

To ensure correct operation of the unit, please follow the instructions shown below carefully.



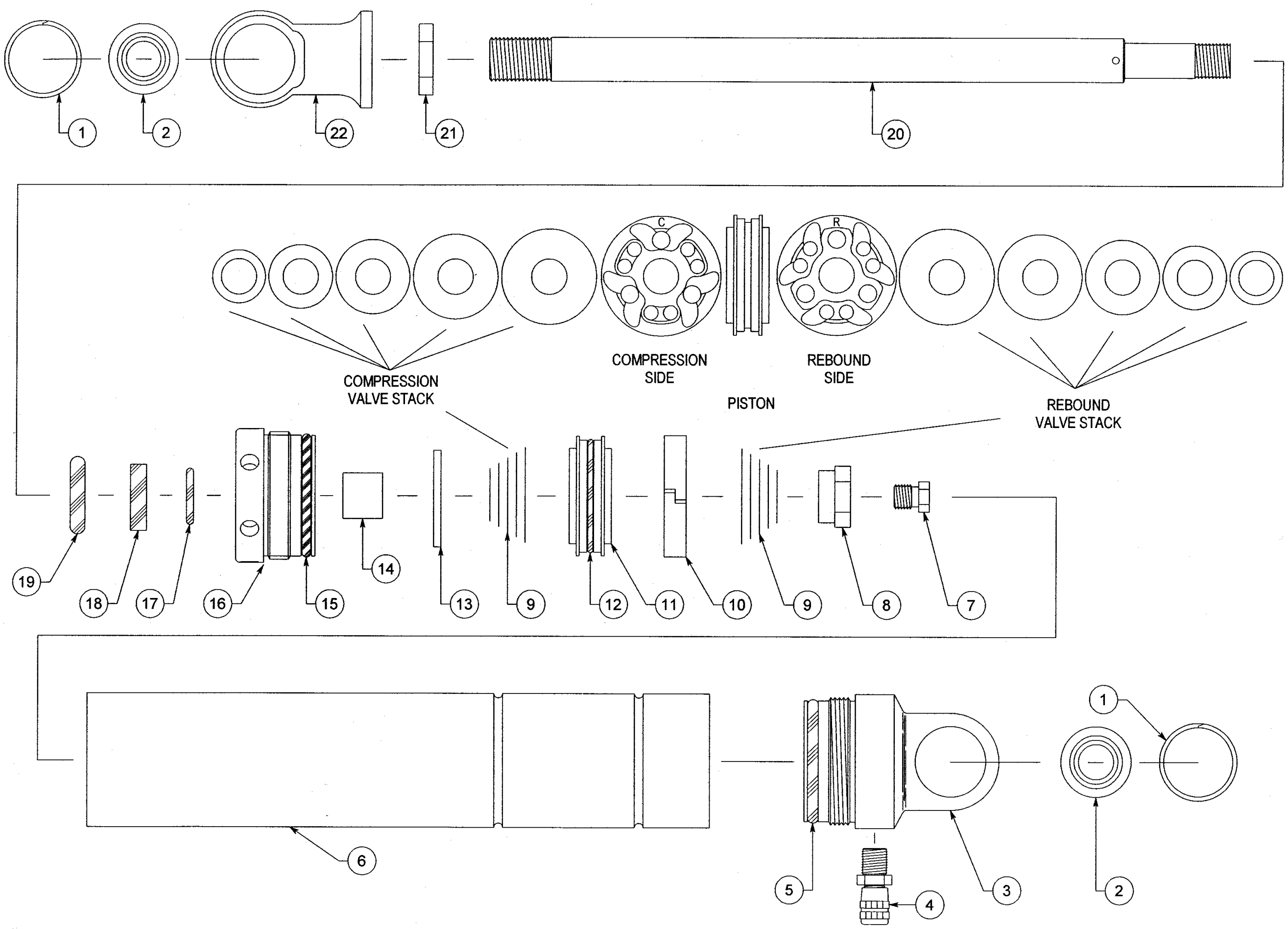
Existing Overall Length	New HTD Rod Length
26"	12.125"
27"	13.125"
28"	14.125"
29"	15.125"
30"	16.125"
31"	17.125"
32"	18.125"
33"	19.125"



1. Cut radius rod to correct length.
2. Drill 11/16" hole, 2" deep.
3. Cut 25° chamfer .500" long.
4. Tap 3/4" - 16 UNF to bottom of 11/16" hole.
5. Make sure threads are straight and concentric.
6. Screw track rod firmly up against the body of the damper.

7100 Series Parts List

STANDARD STEEL BODY



ITEM NO.	PART NO.	DESCRIPTION
		Standard Steel (5", 7", 8", and 9" Travel)
1	RR-16	Retaining Ring, 1.025 Spiroloc
2	MO-09	Monoball, .500 ID x 1.00 OD x .625W
3	BC-81__*	Body Cap, 8100, (0° or 90°)
4	IU-02	Air Valve, 1/8 NPT
	IU-04	Valve Core, 2000 psi
	IU-06	Valve Cap, High Temperature
5	OR-2221-B	O-Ring, 2-221, Buna 70
6	BD-71__*	Body, Steel, 7100, (5", 7", 8", or 9")
7	JT-0__*	Jet, (.000, .020, .040, .070, or .086 Bleed)
8	NT-02R	Ring Nut, .500 x 20
9	VS-___*	Valve Stack
10	PB-55	Piston Band, 55mm

ITEM NO.	PART NO.	DESCRIPTION
11	PI-_______*	Piston
12	OR-2028-B	O-Ring, 2-028, Buna 70
13	VW-99	Top Out Plate, 1.375 x .500
	AS-76SB	**Assembly, Shaft Bearing Complete (Includes Items 14-18)**
14	BU-10DU10	Bushing, DU .625 x .625
15	OR-2221-B	O-Ring, 2-221, Buna 70
16	SB-765	Shaft Bearing, 55mm
17	OR-2114-V	O-Ring, 2-114, Viton 75
18	SL-09	Shaft Wiper, .625 Poly (Blue)
19	OR-2312-B	O-Ring, 2-312, Buna 70
20	SH-NA__*	Shaft, Non Adjustable, (5", 7", 8", or 9")
21	NT-04J	Jam Nut, .625 x 18
22	EY-70NA	Eyelet, Non Adjustable

See page 10 for Rebound Adjuster Option.

*** Incomplete Part Number**

NOTE: 7100 Series accepts a Coil-over Kit.

7100 Series Specifications

Type	Shock Series	Extended Length	Compressed Length	Shaft Travel	Spherical Bearing	Weight
Standard Steel	7105	15.75"	10.75"	5"	.5"	3.25 lbs.
Standard Steel	7107	19.75"	12.75"	7"	.5"	3.75 lbs.
Standard Steel	7108	21.75"	13.75"	8"	.5"	4 lbs.
Standard Steel	7109	23.75"	14.75"	9"	.5"	4.25 lbs.
Standard Steel Single Adjustable	710_-SA	+ .25"	+ .25"	5", 7", 8", 9"	.5"	Same as Above Weights

Disassembly/Assembly Instructions

Disassembly Instructions

1. **Depressurize** the shock, with the shaft pointing down.
2. Clamp the body cap eyelet in the vise with the shaft pointing up.
3. Unscrew the shaft bearing assembly from the shock body and remove the shaft assembly.
4. Drain the oil, when needed. Please dispose of properly.
5. Clamp the shaft eyelet in the vise with the piston pointing up.
6. Remove the 3/4" ring nut to access valving or to change the seals in the shaft bearing.
7. Inspect and replace the damaged o-rings and wiper if needed.

Assembly Instructions

1. For revalving, refer to page 16 for additional information.
2. Reassemble the shaft, be sure that the piston is properly positioned. With the shaft still in the vise, the compression valve stack is on the bottom of the piston and the rebound on the top. It is very important that the piston is positioned with the (6) concave ports facing up on the rebound side and the (3) concave ports facing down on the compression side, see the following page.
3. Torque 3/4" ring nut to 25 ft•lbs (300 in•lbs).
4. If the jet was removed, torque to 100 in•lbs.
5. Fill the shock body with oil* as follows, see figure 1:

   Oil level is from the open end edge of shock for specified travel lengths.

   5" SHOCK - Oil level should be 2.30" from the bottom of shock body

   7" SHOCK - Oil level should be 2.60" from the bottom of shock body

   8" SHOCK - Oil level should be 2.80" from the bottom of shock body

   9" SHOCK - Oil level should be 2.90" from the bottom of shock body

   9" SHOCK (8" shaft)-Oil level should be 3.35" from the bottom of shock body

   ***NOTE:** Penske Suspension Fluid (Silkolene Pro RSF 5 wt.) is recommended. Use of alternate fluids may have an adverse effect on the damper's internal sealing components. (ie: o-rings)*
6. With the shock in the vise, thread the shaft bearing into the shock body and tighten. Not too tight.
7. With the shaft pointing down, pressurize to 100 psi (or to recommended psi for a specific track).

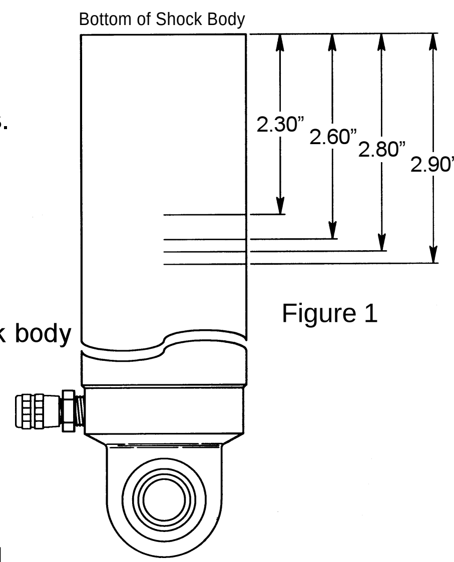
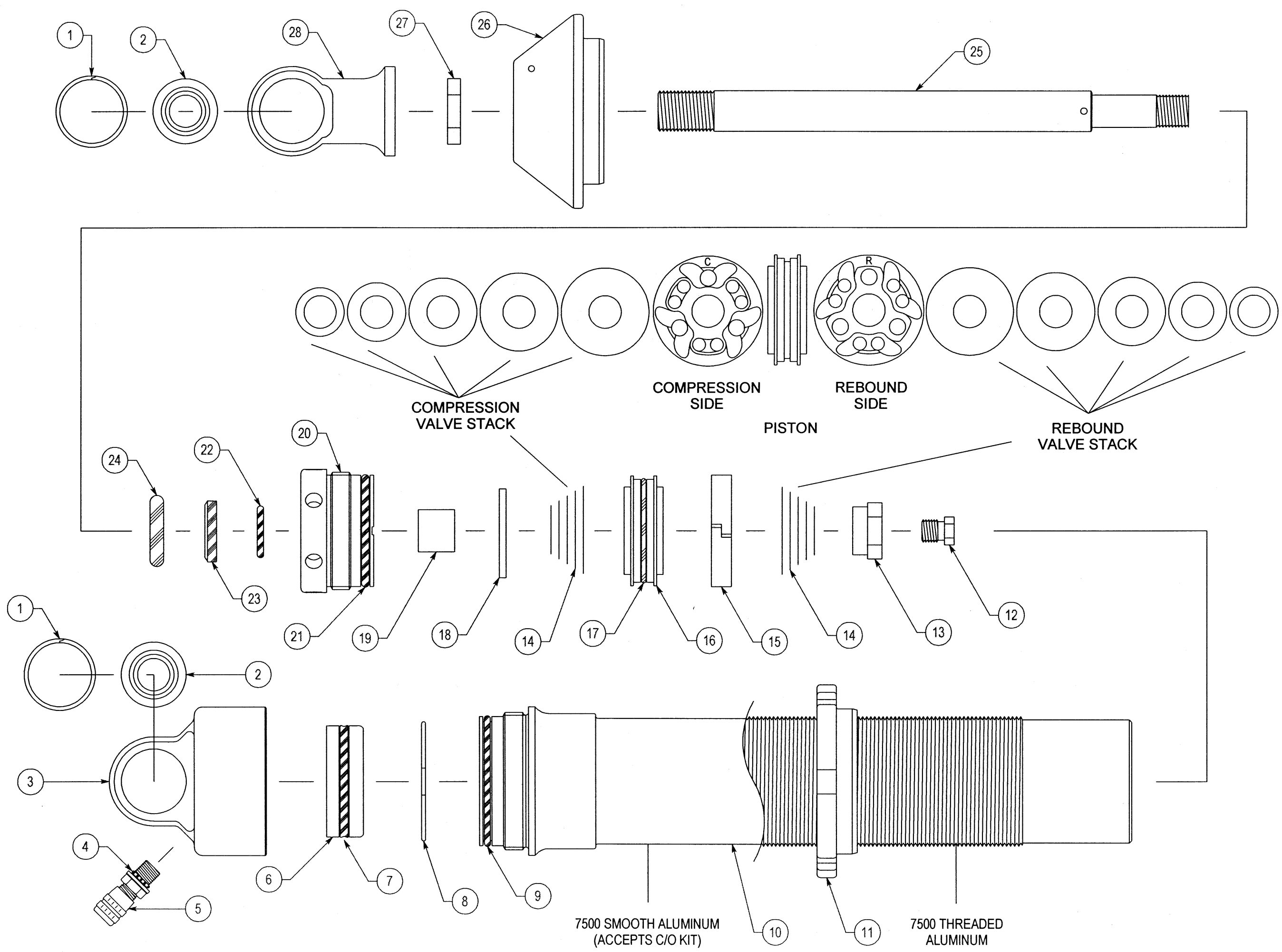


Figure 1

7500 Series Parts List



ITEM NO.	PART NO.	DESCRIPTION
		Short Track Special 5", 6", 7", 8", and 9" Travel (Rebuildable or Sealed)
1	RR-16	Retaining Ring,1.025 Spiroloc
2	MO-09	Monoball, .500 ID x 1.00 OD x .625W
3	BC-75NV	Body Cap, 7500, No Valve, Sealed
	BC-75TV	Body Cap, 7500, With Tank Valve
4	OR-2010-B	O-Ring, 2-010, Buna 70
5	IU-22-S	Air Valve, Port O-Ring, S.S.
	IU-04	Valve Core, 2000 psi
	IU-06	Valve Cap, High Temperature
6	PI-75	Piston, Floating, 7500 Series
7	OR-4221-B	Quad Ring, 4-221, Buna 70
8	RR-06	Wire Ring, .0625 Wire Diameter x 1.900
9	OR-2133-B	O-Ring, 2-133, Buna 70
10	BD-75__*	Body, 7500, (5", 6", 7", 8", or 9")
	BD-75__CO	Body, 7500, Coil-over, (5", 6", 7", 8", or 9")
11	RH-752__*	Ride Height Adjuster, 7500, (2.25" or 2.50")
12	JT-0__*	Jet, (.000, .020, .040, .070 or .086 Bleed)

ITEM NO.	PART NO.	DESCRIPTION
13	NT-02R	Ring Nut, .500 x 20
14	VS-___*	Valve Stack
15	PB-55	Piston Band, 55mm
16	PI-_______*	Piston
17	OR-2028-B	O-Ring, 2-028, Buna 70
18	WW-99	Top Out Plate, 1.375 x .500
	AS-75THSB	**Assembly, 7500 Threaded Shaft Bearing (Includes Items 19-23)**
19	BU-10DU10	Bushing, DU .625 x .625
20	SB-75TH	Shaft Bearing, Threaded, 7500
21	OR-2221-B	O-Ring, 2-221, Buna 70
22	OR-2114-V	O-Ring, 2-114, Viton 75
23	SL-09	Shaft Wiper, .625 Poly (Blue)
24	OR-2312-B	O-Ring, 2-312, Buna 70
25	SH-75NA__*	Shaft, 7500 Non Adjustable, (5", 6", 7", 8", or 9")
26	SR-752___*	Spring Retainer, 7500, (2.25" or 2.50")
27	NT-04J	Jam Nut, .625 x 18
28	EY-75NA	Eyelet, Non Adjustable

*** Incomplete Part Number**

See page 10 for Adjuster Option.

NOTE: 7500 Series Smooth Body accepts a Coil-over Kit.

7500 Series Specifications

Type	Shock Series	Extended Length	Compressed Length	Shaft Travel	Spherical Bearing	Weight
Short Track Owner Rebuildable	7505 Smooth Body 7545 Coil-over Body	15.883"	11.178"	4.705"	.5", .625" w	2 lbs. 3 oz.
Short Track Owner Rebuildable	7506 Smooth Body 7546 Coil-over Body	17.816"	12.236"	5.580"	.5", .625" w	2 lbs. 8 oz.
Short Track Owner Rebuildable	7507 Smooth Body 7547 Coil-over Body	20.024"	13.444"	6.580"	.5", .625" w	2 lbs. 14 oz.
Short Track Owner Rebuildable	7508 Smooth Body 7548 Coil-over Body	21.957"	14.502"	7.455"	.5", .625" w	3 lbs. 2 oz.
Short Track Owner Rebuildable	7509 Smooth Body 7549 Coil-over Body	24.166"	15.711"	8.455"	.5", .625" w	3 lbs. 8 oz.
Short Track Owner Rebuildable Single Adjustable	750_-SA Smooth Body 754_-SA Coil-over Body	+.25"	+ .25"	5", 6", 7", 8" 9"	.5", .625" w	Same as Above Weights
Short Track Sealed Shock	7515 Smooth Body 7555 Coil-over Body	15.883"	11.178"	4.705"	.5", .625" w	2 lbs. 3 oz..
Short Track Sealed Shock	7516 Smooth Body 7556 Coil-over Body	17.816"	12.236"	5.580"	.5", .625" w	2 lbs. 8 oz.
Short Track Sealed Shock	7517 Smooth Body 7557 Coil-over Body	20.024"	13.444"	6.580"	.5", .625" w	2 lbs. 14 oz.
Short Track Sealed Shock	7518 Smooth Body 7558 Coil-over Body	21.957"	14.502"	7.455"	.5", .625" w	3 lbs. 2 oz.
Short Track Sealed Shock	7519 Smooth Body 7559 Coil-over Body	24.166"	15.711"	8.455"	.5", .625" w	3 lbs. 8 oz.

Disassembly/Assembly Instructions

***** For 7500 with Threaded Shaft Bearing Follow Instructions for 7300 on Page 9 *****

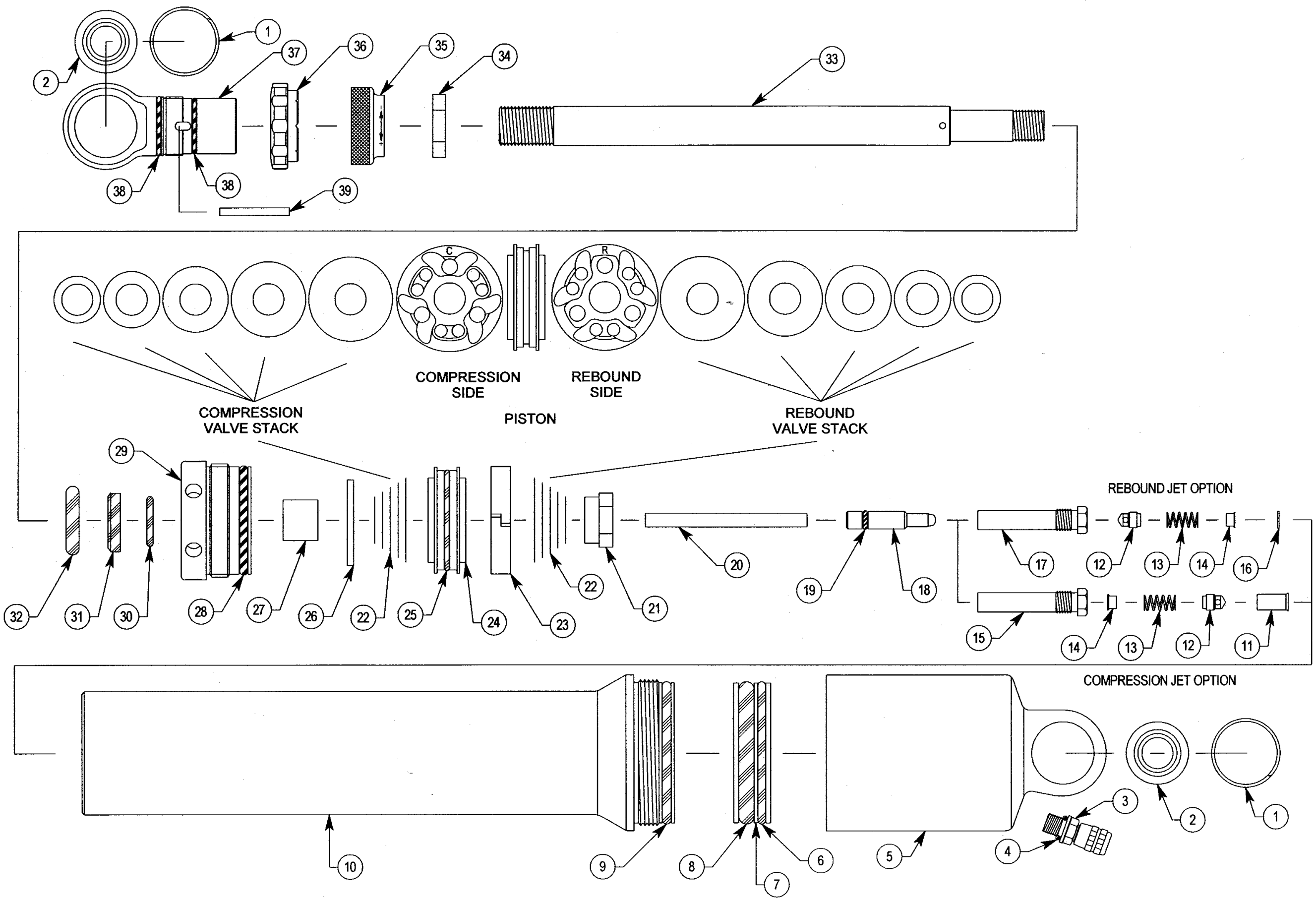
Disassembly Instructions

1. **Depressurize** the shock after backing the rebound adjuster to full soft.
2. Clamp the body cap eyelet in the vise with the shaft pointing up.
3. Push down on the shaft bearing. Remove the top wire retaining ring (1/2" from end gap with pointy scribe*). *Be careful not to scratch the inside of the body.
4. Pull up on the shaft, removing the shaft bearing.
5. Remove the second wire retaining ring (same procedure as #3). Pull the piston out of the shock body.
6. Drain the oil, when needed. Please dispose of properly.
7. Clamp the shaft eyelet in the vise with the piston pointing up.
8. Remove the 3/4" ring nut to access valving or to change the seals in the shaft bearing.
9. Inspect and replace the damaged o-rings and wiper if needed.

Assembly Instructions

1. For revalving, refer to page 16 for additional information.
2. Reassemble the shaft, **be sure that the piston is properly positioned**. With the shaft still in the vise, the compression valve stack is on the bottom and the rebound on top. It is very important that the piston is positioned with the (6) concave ports facing up on the rebound side and the (3) concave ports facing down on the compression side.
3. Torque the 3/4" ring nut to 25 ft•lbs (300 in•lbs).
4. If the jet was removed, torque to 100 in•lbs.
5. Pressurize the reservoir to reposition floating piston (approx. 150 lbs.). **This step is very important.**
6. Fill the shock body with oil* (1/4" from the top of the body). ***NOTE:** Penske Suspension Fluid (Silkolene Pro RSF 5 wt.) is recommended. Use of alternate fluids may have an adverse effect on the damper's internal sealing components. (ie: o-rings)*
7. Insert the shaft and piston assembly into the shock body and begin to work out the air bubbles trapped in the piston, by using 1"-2" strokes. Move the shaft up and down a few times, making sure the two port holes in the shaft always remain below the surface of the oil or air will be sucked back into the piston assembly. Lightly tap the eyelet with a mallet a few times to assure all the air bubbles are gone. Note: this step is very important, repeat as needed.
8. Insert the inner groove wire retaining ring.
9. Pull the shaft up until it hits the first snap ring. Make sure the two port holes in the shaft remain just below the surface of the oil.
10. Top off with oil and slide the shaft bearing down to seat the o-ring into the shock body without moving the shaft.
11. Push in the shaft bearing until the o-ring touches the body. While keeping pressure on the shaft bearing, depressurize the reservoir and insert the second wire retaining ring.
12. Pressurize to recommended nitrogen pressure for the specific track.

7300 Series Parts List



ITEM NO.	PART NO.	DESCRIPTION
		Winston Cup / BGN / Truck / Winston West (8" Travel) Complete
1	RR-16	Retaining Ring, 1.025 Spiroloc
2	MO-8T	Monoball, .500 ID, Teflon
	MO-15T	Monoball, 15mm ID, Teflon
	AS-73BA	**Assembly, 7300 Body Complete (No Monoball) (Includes Items 3-10)**
3	IU-22-S	Air Valve, Port O-Ring, S.S.
	IU-04	Valve Core, 2000 psi
	IU-06	Valve Cap, High Temperature
4	OR-2010-B	O-Ring, 2-010, Buna 70
5	BC-73	Body Cap, Winston Cup
6	OR-2137-B	O-Ring, 2-137, Buna 70
7	PI-73R	Piston, Reservoir, Winston Cup
8	OR-4328-B	Quad Ring, 4-328, Buna 70
9	OR-2137-V	O-Ring, 2-137, Viton 75
10	BD-73	Body, Winston Cup, 9.500"
	BD-739	Body, Winston Cup, 10.500"
11	JT-76SL	Jet, Compression Spring Sleeve
12	JT-76POP	Jet, Poppet
13	SP-15	Spring, (FF71)
14	JT-76HAT	Jet, Top Hat
15	JT-CDHSNG	Jet, Compression Housing
16	RR-05	Retaining Ring, .250 Internal
17	JT-RDHSNG	Jet, Rebound or Straight Thru
18	NE-76	Needle

ITEM NO.	PART NO.	DESCRIPTION
19	OR-2007	O-Ring, 2-007, Buna 70
20	MR-7318	Metering Rod, (7" = 7.775, 8" = 8.775, 9" = 9.775)
21	NT-02R	Ring Nut, .500 x 20
22	VS-___*	Valve Stack
23	PB-55	Piston Band, 55mm
24	PI-______*	Piston
25	OR-2028-B	O-Ring, 2-028, Buna 70
26	VW-99	Top Out Plate, 1.375 x .500
	AS-76SB	**Assembly, Shaft Bearing Complete (Includes Items 27-31)**
27	BU-10DU10	Bushing, DU .625 x .625
28	OR-2221-B	O-Ring, 2-221, Buna 70
29	SB-765	Shaft Bearing, 8760, 55mm
30	OR-2114-V	O-Ring, 2-114, Viton 75
31	SL-09	Shaft Wiper, .625 Poly (Blue)
32	OR-2312-B	O-Ring, 2-312, Buna 70
33	SH-____*	Shaft, Adjustable, (7", 8", or 9")
34	NT-04J	Jam Nut, .625 x 18
	AS-WCEYELET	**Assembly, Eyelet Complete (Includes Items 35-39)**
35	CP-76RD	Cap, Rebound Adjuster
36	KN-76RD	Knob, Rebound Adjuster
37	EY-70NA	Eyelet, Non Adjustable
38	OR-2017-B	O-Ring, 2-017 Buna 70
39	DO-09	Dowel Pin, 1/8" x 1 1/8"

*** Incomplete Part Number**

7300 Series Specifications

Type	Shock Series	Extended Length	Compressed Length	Shaft Travel	Spherical Bearing	Weight
Winston Cup	7308	22.25"	14.25"	8"	.5", 15mm	3.5 lbs.
Winston Cup Single Adjustable	7308-SA	22.8"	15"	8"	.5", 15mm	3.5 lbs.
Winston Cup Single Adjustable	7318-SA	23.35"	15.5"	8"	.5", 15mm	3.5 lbs.

Disassembly/Assembly Instructions

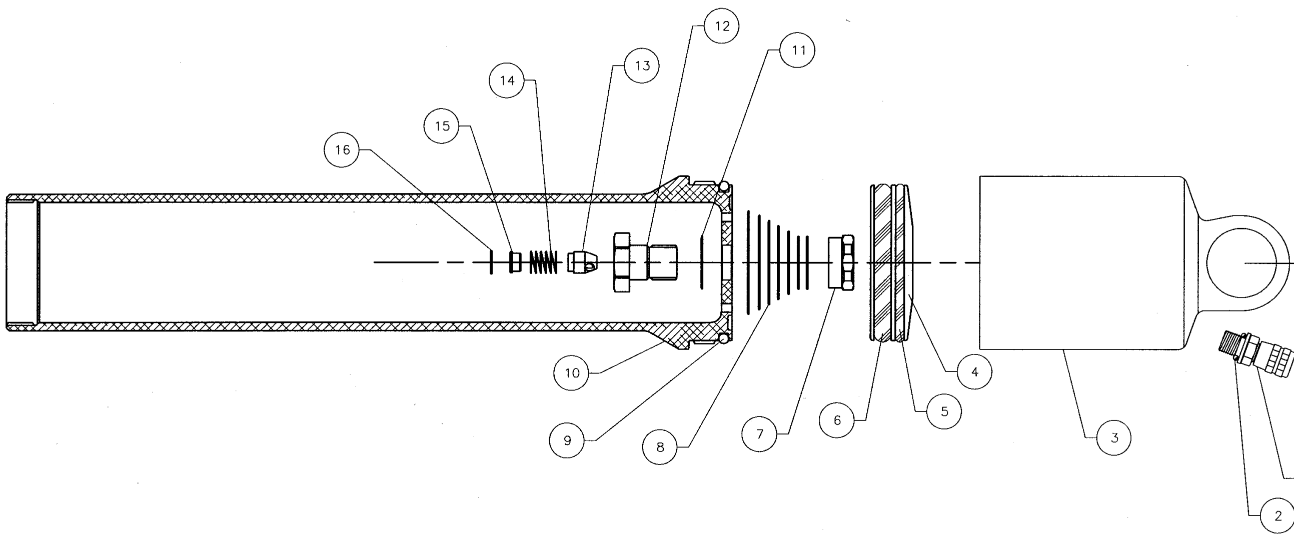
Disassembly Instructions

1. **Depressurize** the shock after backing the adjuster to full soft.
2. Clamp the body cap eyelet in the vise with the shaft pointing up. Place overflow ring on body.
3. Unscrew the shaft bearing assembly from the shock body and remove the shaft assembly.
4. Drain the oil, when needed (if it contains excessive air bubbles). Please dispose of properly.
5. Clamp the shaft eyelet in the vise with the piston pointing up.
6. Remove the 3/4" ring nut to access valving or to change the seals in the shaft bearing.
7. Inspect and replace the damaged o-rings and wiper if needed.

Assembly Instructions

1. For revalving, refer to page 16 for additional information.
2. Reassemble the shaft, be sure that the piston is properly positioned. With the shaft still in the vise, the compression valve stack is on the bottom and the rebound on top. It is very important that the piston is positioned with the (6) concave ports facing up on the rebound side and the (3) concave ports facing down on the compression side, see the following page.
3. Torque the 3/4" ring nut to 25 ft•lbs (300 in•lbs).
4. If the jet was removed, torque to 100 in•lbs.
5. Pressurize the reservoir to reposition floating piston (approx. 150 lbs.). **This step is very important.**
6. Fill the shock body with oil* to the bottom of the threads. (1/2" from the top of the body)
   ***NOTE:** Penske Suspension Fluid (Silkolene Pro RSF 5 wt.) is recommended. Use of alternate fluids may have an adverse effect on the damper's internal sealing components. (ie: o-rings)*
7. Insert the shaft and piston assembly into the shock body and begin to work out the air bubbles trapped in the piston, by using 1"-2" strokes. Move the shaft up and down a few times, making sure the two port holes in the shaft always remain below the surface of the oil or air will be sucked back into the piston assembly. Lightly tap the eyelet with a mallet a few times to assure all the air bubbles are gone.
   Note: this step is very important, repeat as needed.
8. Pull the shaft up until the two port holes in the shaft remain just below the surface of the oil.
9. Top off with oil and slide the shaft bearing down to seat the o-ring into the shock body without moving the shaft.
10. Depressurize the reservoir while asserting pressure to the shaft bearing and thread the shaft bearing into the shock body and tighten. Do not overtighten.
11. Pressurize to recommended nitrogen pressure for the specific track.

7300 WC Head Valve Body Assembly

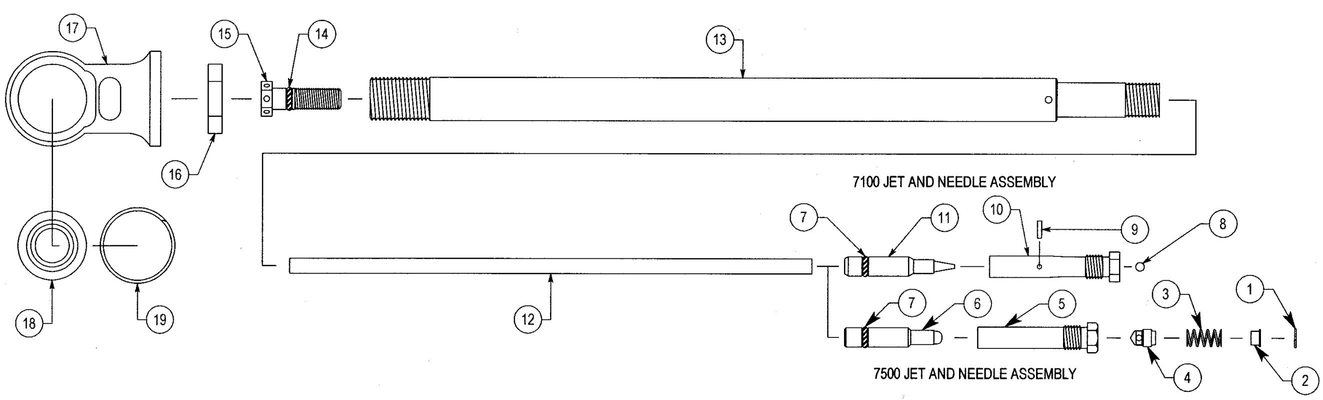


ITEM NO.	PART NO.	DESCRIPTION
	AS-73CDBD **AS-73CDBD8**	**Assembly, WC CD Plate Body** **Assembly, WC CD Plate Body (Short)**
1	IU-22-S	Air Valve, Port O-Ring, S.S.
	IU-04	Valve Core, 2000 psi
	IU-06	Valve Cap, High Temperature
2	OR-2010-B	O-Ring, 2-010, Buna 70
3	BC-73	Body Cap, Winston Cup
4	OR-4328-B	Quad Ring, 4-328, Buna 70 Duro
5	OR-2137-B	O-Ring, 2-137, Buna 70 Duro
6	PI-73SR	Piston, Winston Cup Secondary Valve
7	NT-73RDCLN	Nut, Winston Cup, R/D Check Locknut

ITEM NO.	PART NO.	DESCRIPTION
8	VW-___*	Washer, Valve Shims
9	OR-2137-V	O-Ring, 2-137, Viton 75 Duro
10	BD-73S	Body, WC Secondary Piston, Body 10.5”
	BD-73S8	Body, WC Secondary Piston, Body 9.5”
11	VW-00	Washer, .750 x .020, .500 ID
	AS-73POP	Assembly, WC Head Valve Poppet (Includes items 12-16)
12	HG-73RD	Housing, Winston Cup R/D Return Housing
13	JT-73POP	Jet, Winston Cup, R/D Check Poppet
14	SP-11	Spring, F-47
15	CA-91	Cage, Spring Platform, WC R/D Housing
16	RR-11	Retaining Ring, .312 Internal

*** Incomplete Part Number**

7100 and 7500 Single Adjustable Option



ITEM NO.	PART NO.	DESCRIPTION
	RF-602099	**Rebound Adjuster Option**
1	RR-05	Retaining Ring, .250 Internal
2	JT-76HAT	Jet, Top Hat
3	SP-15	Spring, (FF71)
4	JT-76POP	Jet, Poppet
5	JT-RDHSNG	Jet, Rebound, Straight Thru
6	NE-76	Needle
7	OR-2007-B	O-Ring,2-007, Buna 70
8	BA-125-ST	Ball, Steel - 1/8"
9	DO-02	Dowel Pin, 1/16" x 1/4"
10	JT-81RD	Jet, Rebound Adjustable
11	NE-10	Needle, Rebound, 10°

ITEM NO.	PART NO.	DESCRIPTION
12	MR-8100	Metering Rod
13	SH-____*	Shaft, Adjustable, (5", 7", 8", or 9")
	SH-75A__*	Shaft, 7500 Adjustable, (5", 6", 7", 8", or 9")
14	OR-2008-B	O-Ring, 2-008, Buna 70
15	RS-81	Rebound Screw, Adjustable Shaft
16	NT-04J	Jam Nut, .625 x 18
17	EY-81160	Eyelet, 1.60 Sweep, 0°
	EY-811690	Eyelet, 1.60 Sweep, 90°
	EY-75160	Eyelet, 7500, 1.60 Sweep, 0°
18	MO-09	Monoball, .500 ID x 1.00 OD x .625W
	MO-08	Monoball, .500 ID (7400 Series)
19	RR-16	Retaining Ring, 1.025 Spiroloc

*** Incomplete Part Number**

Damping Adjusters

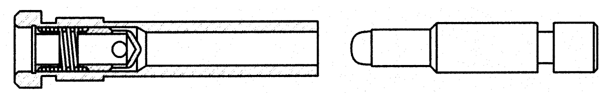
8760 Needle and Jet

The 8760 jet and needle combination have been designed to give the user a broader and more linear range of adjustment for bleed past the piston on rebound.

The 8760 jet utilizes a spring loaded poppet valve to check the flow. This gives a better seal against the flow and a quicker response time as the shaft changes direction.

This needle has a curved parabolic tip, which gives a very fine, linear adjustment in damping across the entire range provided by the jet. It can be thought of as a combination of the 10°, 5°, and 3° needles.

The 8760 needle and jet will fit any of our adjustable shafts, but they must be used together and cannot be interchanged with older style needles and jets.



The adjuster on the 8100 and 8760 Series shock absorber is located in the eyelet at the base of the main shaft. Inside the window is an adjustment screw, which serves as the control point for adjustments. (Figure 1)

The 8760 adjuster (red knob) is located at the base of the eyelet (Figure 2). During the compression or rebound stage of the shock movement, fluid is forced through two ports in the main shaft. Inside the main shaft is a needle and jet assembly, which adjusts the amount of fluid passing through the jet. By turning in the adjuster (clockwise), the needle is forced up into the jet, restricting the fluid, causing firmer damping forces. In reverse, by turning the adjuster out (counter clock-wise), more oil is allowed to pass through the jet causing lighter damping forces. The adjustment assembly, is a timed control for the shims located on the main piston to work.

Available Jets:

Rebound Jet

Compression Jet

Open Jet

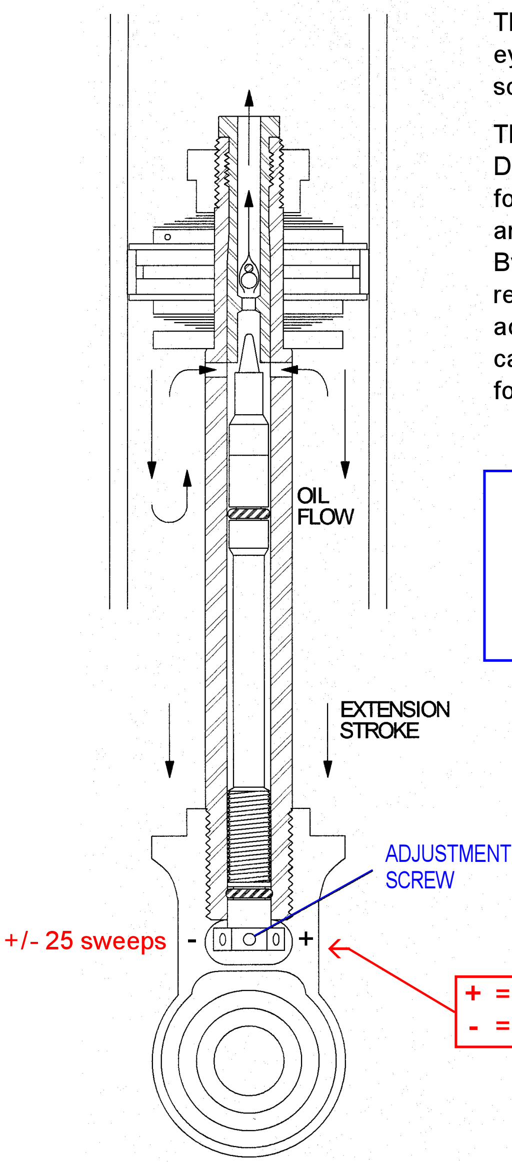


Figure 1

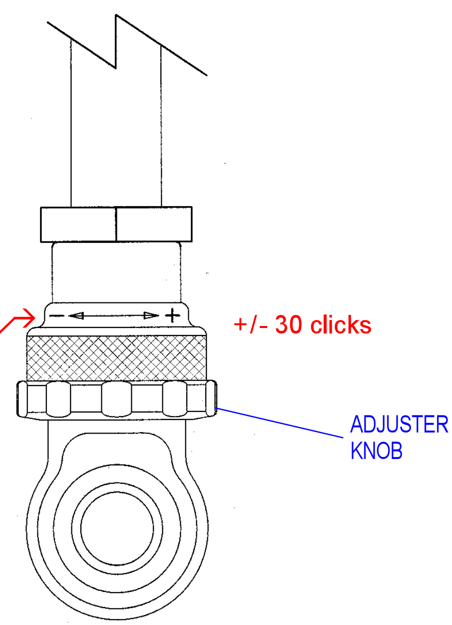


Figure 2

The range of adjustment is affected by the stiffness of the valve stack.

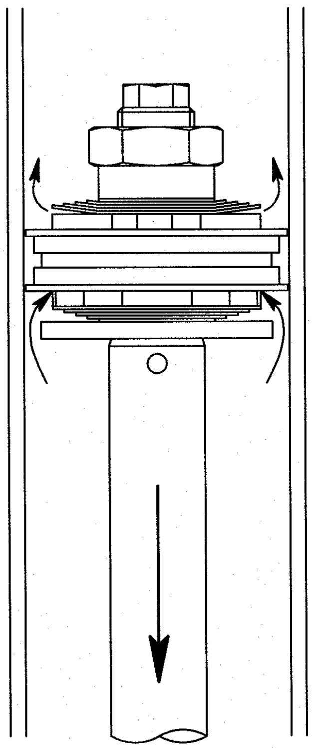
Suggested Maintenance

PRE RACE	Inspect for oil leakage. Check the nitrogen pressure.
EVERY 30 HOURS OF TRACK TIME OR YEARLY	Change oil. Replace the shaft seal o-ring, wiper, shaft bearing o-ring, reservoir cap o-ring and piston o-ring.

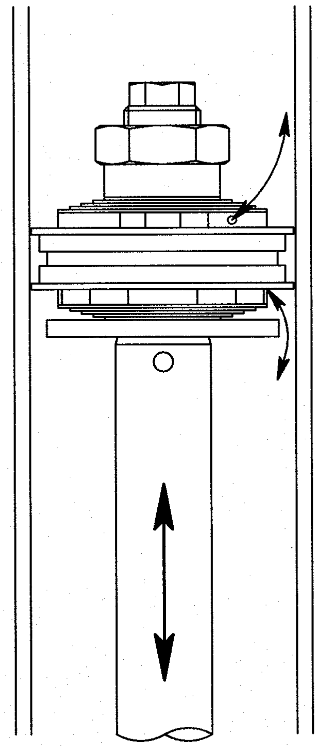
Trouble Shooting

LOSS OF NITROGEN PRESSURE	Valve core is not tight or needs replacing, teflon seal on air valve needs replacing, reservoir cap o-ring needs replacing.
OIL LEAK AROUND SHAFT	Shaft seal o-ring or wiper needs replacing. *Note: minimal oil seepage is normal.*
OIL LEAK BETWEEN SHAFT BEARING AND BODY	Shaft bearing o-ring needs replacing.
SHAFT WILL NOT FULLY EXTEND	Check for bent shaft, low nitrogen pressure, not enough oil. *Note: do not spray brake cleaner or solvent on the shaft wiper, it may cause it to swell and prevent proper movement.*
NO CLICKS ON 8760 ADJUSTER	No Nitrogen pressure or broken pin.

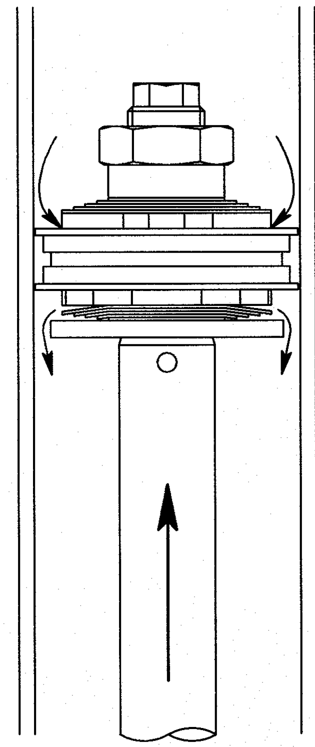
General Valving Characteristics



High Speed Rebound



Low Speed* Compression and Rebound



High Speed Compression

The damping characteristics of your shock are determined by the compression and rebound valve stacks located on the main piston.

The valve stacks are made up of a series of high quality shims, which are made to flex under the force of oil flowing through the piston ports and then return to their original state.

The thickness of the individual shims determines the amount of damping force the shock will produce. By changing the thickness of the individual shims, damping forces will be altered. For example, if you are running an “A” compression valving, where all the shims in the stack are .006 thick and you replace them with a “B” compression valving, which consists of all .008 thick shims, the compression damping will increase.

* When the shaft is moving very slowly oil passes through the bleed hole and/or shaft bleed, if there is one, before it passes to the shims.

A Guide To Damper Tuning

The ultimate purpose of a shock is to work together with the spring to keep the tire on the track. In compression (bump) to help control the movement of the wheel and in rebound to help absorb the stored energy of the compressed spring.

Breaking down the shaft speeds to chassis movement can be done from the data taken from on board acquisition and/or actual test sessions.

Where we find the biggest advantages with low speed adjusters is looking at the chassis in the plane of the four wheels in relation to chassis movement in roll and pitch and how quickly weight is transferred to each corner in order to load the tire sooner or later, depending on track conditions.

Usually in rain or low grip situations allowing more bleed or less low speed damping is desirable to delay tire loading upon initial roll.

In dry high grip conditions adding damping or restricting bleed will load the tire sooner upon initial roll increasing platform stability.

In pitch situations on smooth surfaces under braking, increasing low speed damping or restricting bleed will help load the tires for entry or mid corner. If the tire begins bouncing under braking usually an increase in high speed compression will calm this down.

If the chassis feels like it is moving around too much between the plane of the wheels, increasing low speed damping or restricting bleed, will overall, firm up the chassis and give it a crisp feel or a better sense of feel in the car. This is why most drivers like this adjustment; as increasing low speed compression seems to give the driver better or quicker feedback from the chassis, resulting in a higher confidence in the car.

A car with too much low speed damping will usually lack grip in change of directions, cannot put power down in slower corners (wheel spin) and lack overall grip after initial turn in.

If traction is a problem coming off corners, reducing low speed damping or more bleed will help weight transfer at the rear thus increasing traction.

The range of adjustments will have a relationship to high or low shaft velocity, depending on what main piston is being used:

1) Linear Piston 1° - adjustment through range

2) Linear Piston 2° - greater change in low speed adjustment

3) Velocity Dependent Piston - adjustment through range with greater change in low speed

3) Digressive Piston - range primarily in low speed

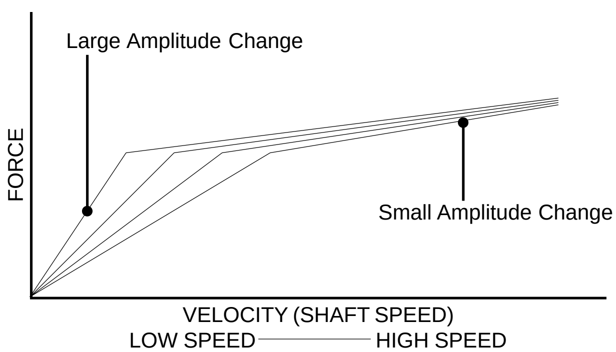
Also depending on valving, there will be an affect on adjustment range. The softer the valving (A - B), the less force range it will have. This is due to a lower pressure required to blow the valves on the main piston. Obviously the heavier the valving (C - E), the more effective the bleed becomes. On digressive pistons, pre-load also affects the range of adjustment.

Rebound adjustments are usually indicated by the driver asking for more stability. By increasing low speed damping, stability will be enhanced; decreasing damping will allow more movement in the car, but will result in a little better tire wear.

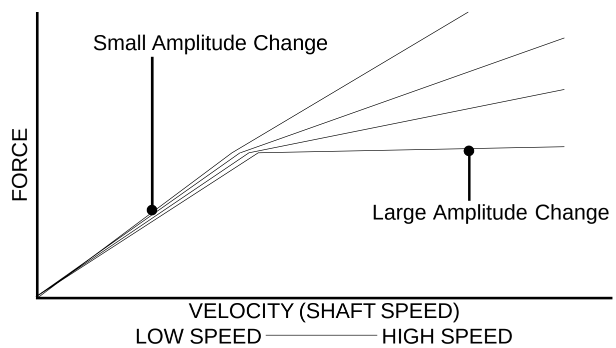
Also, the amount of rebound can have a great influence on weight transfer. Less front rebound allows weight transfer to the rear under acceleration. Less rebound in the rear allows for a greater amount of weight transfer to the front under braking and turn in.

When a car is over damped in rebound it can pack down in a series of bumps and a driver will recognize this as too stiff and usually will think it is compression damping. Too much rebound can cause lack of grip on cornering.

When making a large spring change keep in mind where the rebound adjuster is and do you have enough range to compensate. Sometimes a spring change will bring a better balance to the damping values after the spring change. If the spring/shock combination was balanced, the rule of thumb is a stiffer spring requires lower compression and higher rebound. A softer spring requires higher compression and lower rebound.



LOW SPEED ADJUSTMENT EXAMPLE (BLEED)



HIGH SPEED ADJUSTMENT EXAMPLE (SHIM)

General Oval Track Tuning Tips

Bump in Front Usually Effects:

1. Middle
2. Entry

Rebound in Rear Usually Effects:

1. Middle
2. Entry

Rebound in Front Usually Effects:

1. Middle
2. Exit

Bump in Rear Usually Effects:

1. Middle
2. Exit

Push Off Exit of Corners

1. Decrease Rebound RR
2. Increase Rebound RF
3. Increase Rebound LR
4. Decrease Rebound LF
5. Increase Compression RR

Loose Off Exit of Corners

1. Decrease Rebound RF
2. Increase Rebound RR
3. Decrease Compression RR
4. Increase Rebound LF
5. Decrease Rebound LR

Push in Middle of Corners

1. Decrease Rebound LF
2. Increase Compression RR
3. Increase Rebound RF
4. Decrease Compression LF

Loose in Middle of Corners

1. Decrease Compression RR
2. Decrease Rebound RF
3. Decrease Rebound LR

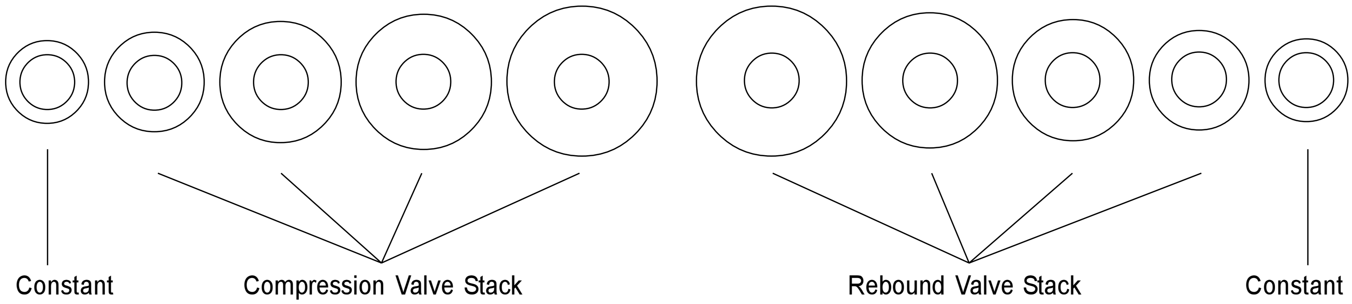
Push on Entry to Corners

1. Decrease Compression Both Front Shocks
2. Decrease Compression RF
3. Increase Rebound LR

Loose on Entry to Corners

1. Increase Compression Both Front Shocks
2. Increase Compression RF
3. Decrease Rebound LR

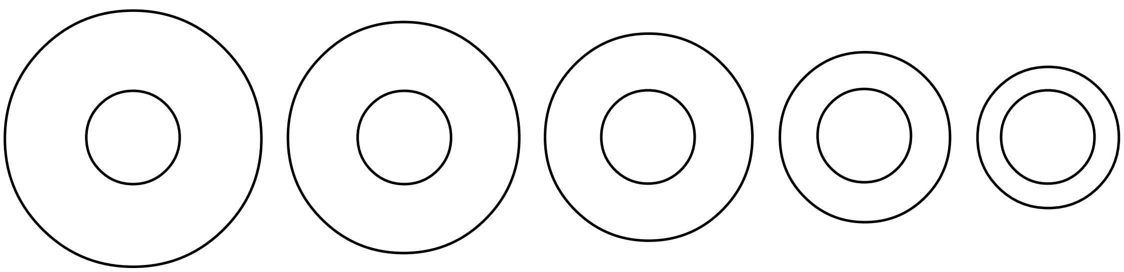
Valving



When refering to shock valving, (example: A/B), (A) refers to the compression valve stack and (B) refers to the rebound valve stack.

Valve Stacks

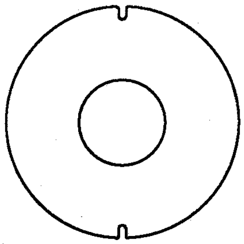
Standard Digressive Valve Stack



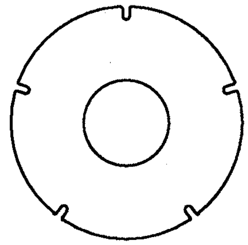
Part #		1.350 O.D.	1.200 O.D.	1.050 O.D.	.900 O.D.	.750 X .020
VS-AA	**AA**	.004	.004	.004	.004	Constant
VS-AAP	**AA+**	.004	.004	.006	.006	Constant
VS-AM	A-	.006	.006	.004	.004	Constant
VS-A	**A**	.006	.006	.006	.006	Constant
VS-AP	**A+**	.006	.006	.008	.008	Constant
VS-BM	B-	.008	.008	.006	.006	Constant
VS-B	**B**	.008	.008	.008	.008	Constant
VS-BP	**B+**	.008	.008	.010	.010	Constant
VS-CM	C-	.010	.010	.008	.008	Constant
VS-C	**C**	.010	.010	.010	.010	Constant
VS-CP	**C+**	.010	.010	.012	.012	Constant
VS-DM	D-	.012	.012	.010	.010	Constant
VS-D	**D**	.012	.012	.012	.012	Constant
VS-DP	**D+**	.012	.012	.015	.015	Constant
VS-EM	E-	.015	.015	.012	.012	Constant
VS-E	**E**	.015	.015	.015	.015	Constant
VS-EP	**E+**	.015	.015	.020	.020	Constant
VS-FM	F-	.020	.020	.015	.015	Constant
VS-F	**F**	.020	.020	.020	.020	Constant

1.350 O.D. and 1.200 O.D. primarily affects Low Speed
.900 O.D. and 1.050 O.D. primarily affects High Speed

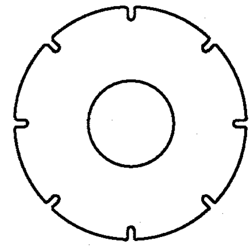
VDP and Digressive Valving Information Options



2 Notch
1.350 O.D.



5 Notch
1.350 O.D.



8 Notch
1.350 O.D.

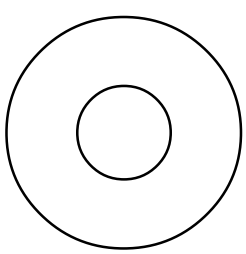
	Part #		Part #		Part#
.004	**VW-2NX.004**	.004	**VW-5NX.004**	.004	**VW-8NX.004**
.006	**VW-2NX.006**	.006	**VW-5NX.006**	.006	**VW-8NX.006**
.008	**VW-2NX.008**	.008	**VW-5NX.008**	.008	**VW-8NX.008**

Flow Rate Through Slotted Shims

Shim Thickness	Number of Notches	Relative Flow Rate	Equivalent Bleed Hole Ø (1) Hole
0.004	2	0.48	0.022
0.004	5	1.20	0.035
0.004	8	1.93	0.044
0.006	2	0.64	0.025
0.006	5	1.61	0.040
0.006	8	2.57	0.051
0.008	2	0.86	0.029
0.008	5	2.14	0.046
0.008	8	3.42	0.059

These flow rate values are dimensionless and have no real meaning by themselves. They are simply used to cross-reference the amount of flow between different bleed hole or slot combinations. For example, four Ø.010" holes would have the same flow rate as one Ø.020" hole (with a flow rate of 0.40). The flow rates can also be added, so a piston with three Ø.015" and three Ø.020" holes would have a total flow rate value of 0.68 + 1.20 = 1.88 which would be the same as three Ø.025" holes.

VDP 55mm Linear Base Shim



1.235 O.D.

	Part #
.004	**VS-37**
.006	**VS-39**
.008	**VS-41**
.010	**VS-43**
.012	**VS-45**
.015	**VS-47**

Preload Shim Spacers

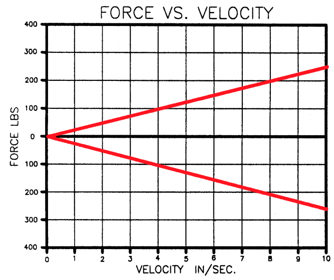
	Part#
.004 x .750	**VW-23**
.006 x .750	**VW-25**
.008 x .750	**VW-27**
.010 x .750	**VW-29**
.012 x .750	**VW-31**
.015 x .750	**VW-33**
.020 x .750	**VW-00**

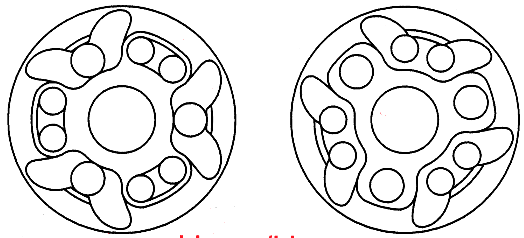
Flow Rate Through Multiple Bleed Holes

Hole Diameter	1 Hole	2 Holes	3 Holes	4 Holes	5 Holes	6 Holes	7 Holes	8 Holes	9 Holes
0.010	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90
0.012	0.14	0.29	0.43	0.58	0.72	0.86	1.01	1.15	1.30
0.015	0.23	0.45	0.68	0.90	1.13	1.35	1.58	1.80	2.03
0.018	0.32	0.65	0.97	1.30	1.62	1.94	2.27	2.59	2.92
0.020	0.40	0.80	1.20	1.60	2.00	2.40	2.80	3.20	3.60
0.022	0.48	0.97	1.45	1.94	2.42	2.90	3.39	3.87	4.36
0.024	0.58	1.15	1.73	2.30	2.88	3.46	4.03	4.61	5.18
0.025	0.63	1.25	1.88	2.50	3.13	3.75	4.38	5.00	5.63
0.026	0.68	1.35	2.03	2.70	3.38	4.06	4.73	5.41	6.08
0.028	0.78	1.57	2.35	3.14	3.92	4.70	5.49	6.27	7.06
0.030	0.90	1.80	2.70	3.60	4.50	5.40	6.30	7.20	8.10
0.032	1.02	2.05	3.07	4.10	5.12	6.14	7.17	8.19	9.22
0.034	1.16	2.31	3.47	4.62	5.78	6.94	8.09	9.25	10.40
0.035	1.23	2.45	3.68	4.90	6.13	7.35	8.58	9.80	11.03
0.036	1.30	2.59	3.89	5.18	6.48	7.78	9.07	10.37	11.66
0.038	1.44	2.89	4.33	5.78	7.22	8.66	10.11	11.55	13.00
0.040	1.60	3.20	4.80	6.40	8.00	9.60	11.20	12.80	14.40
0.045	2.03	4.05	6.08	8.10	10.13	12.15	14.18	16.20	18.23
0.050	2.50	5.00	7.50	10.00	12.50	15.00	17.50	20.00	22.50
0.055	3.03	6.05	9.08	12.10	15.13	18.15	21.18	24.20	27.23
0.060	3.60	7.20	10.80	14.40	18.00	21.60	25.20	28.80	32.40
0.062	3.84	7.69	11.53	15.38	19.22	23.06	26.91	30.75	34.60
0.064	4.10	8.19	12.29	16.38	20.48	24.58	28.67	32.77	36.86
0.066	4.36	8.71	13.07	17.42	21.78	26.14	30.49	34.85	39.20
0.068	4.62	9.25	13.87	18.50	23.12	27.74	32.37	36.99	41.62
0.070	4.90	9.80	14.70	19.60	24.50	29.40	34.30	39.20	44.10
0.072	5.18	10.37	15.55	20.74	25.92	31.10	36.29	41.47	46.66

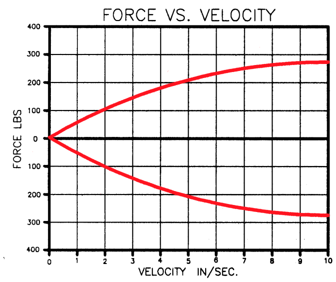
Piston Selection

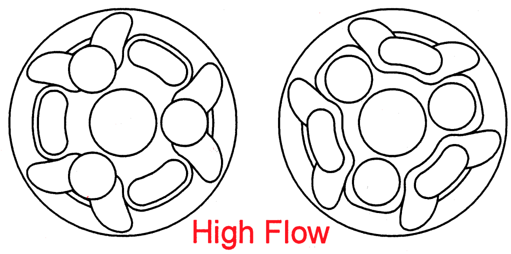
Compression Face | Rebound Face



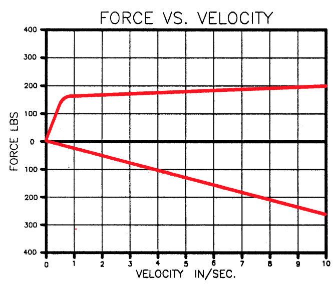


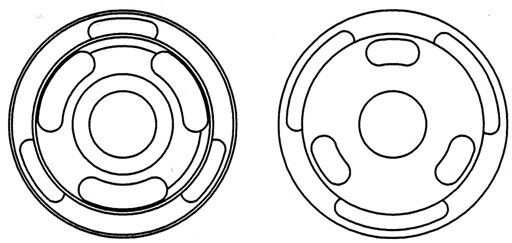
Linear/Linear



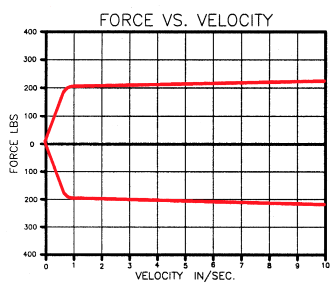


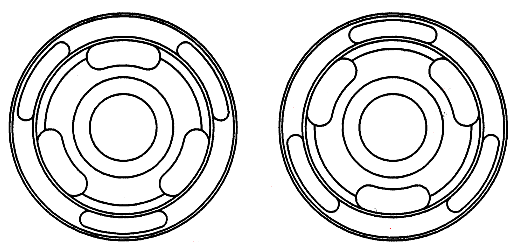
High Flow Linear/Linear



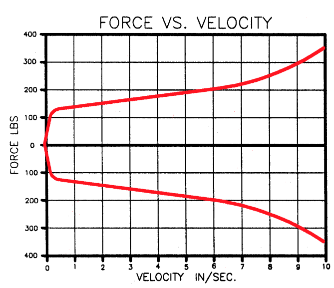


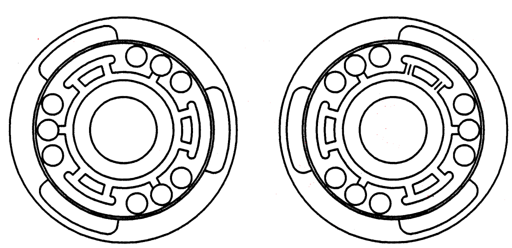
Digressive/Linear





Digressive/Digressive





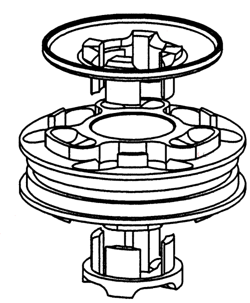
Velocity Dependent/Velocity Dependent

NEW

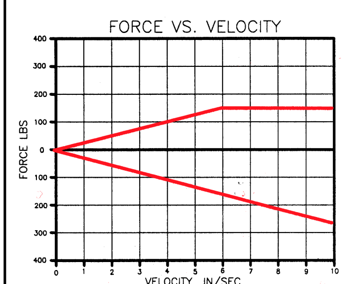
Digressive Blow Off

This two stage piston combines the low shaft speed characteristics of a linear piston with the blow off characteristic of a digressive piston at higher shaft speeds. Both parts of the curve are independently tunable.

COMPRESSION



REBOUND

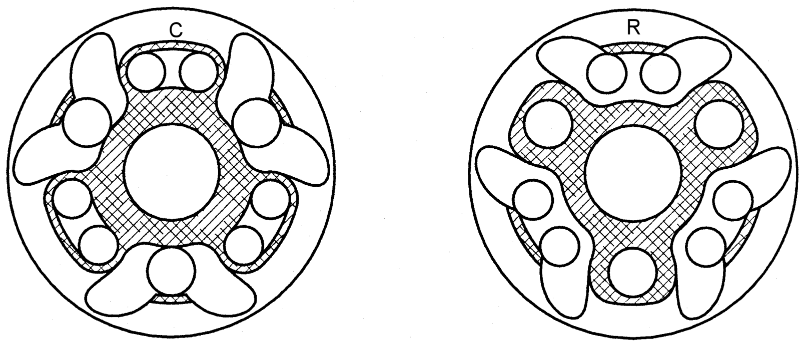


PART NO.	DESCRIPTION
PI-1100_*	Linear Piston, 1°/1°, (45mm or 55mm)
PI-1200_*	Linear Piston, 1°/2°, (45mm or 55mm)
PI-2100_*	Linear Piston, 2°/1°, (45mm or 55mm)
PI-2200_*	Linear Piston, 2°/2°, (45mm or 55mm)
PI-HF12005	High Flow Linear Piston, 1°/2°, 55mm
PI-HF14005	High Flow Linear Piston, 1°/4°, 55mm
PI-HF21005	High Flow Linear Piston, 2°/1°, 55mm
PI-HF22005	High Flow Linear Piston, 2°/2°, 55mm
PI-DL00_*	Digressive/Linear Piston, (45mm or 55mm)

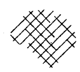
PART NO.	DESCRIPTION
PI-DL005-1DG	Digressive/Linear Piston, 1°, 55mm
PI-DD00_*	Double Digressive Piston, (45mm or 55mm)
PI-VDL45	VDP / Linear Piston, 45mm
PI-VDPL55	VDP / Linear Piston, 55mm
PI-VDPL55-1DEG	VDP / Linear Piston, 1°, 55mm
PI-VDP5	Double VDP Piston, 55mm
PI-BLOWOFF-11	Blowoff Piston Complete, 1°/1°
PI-BLOWOFF-12	Blowoff Piston Complete, 1°/2°
PI-BLOWOFF-21	Blowoff Piston Complete, 2°/1°

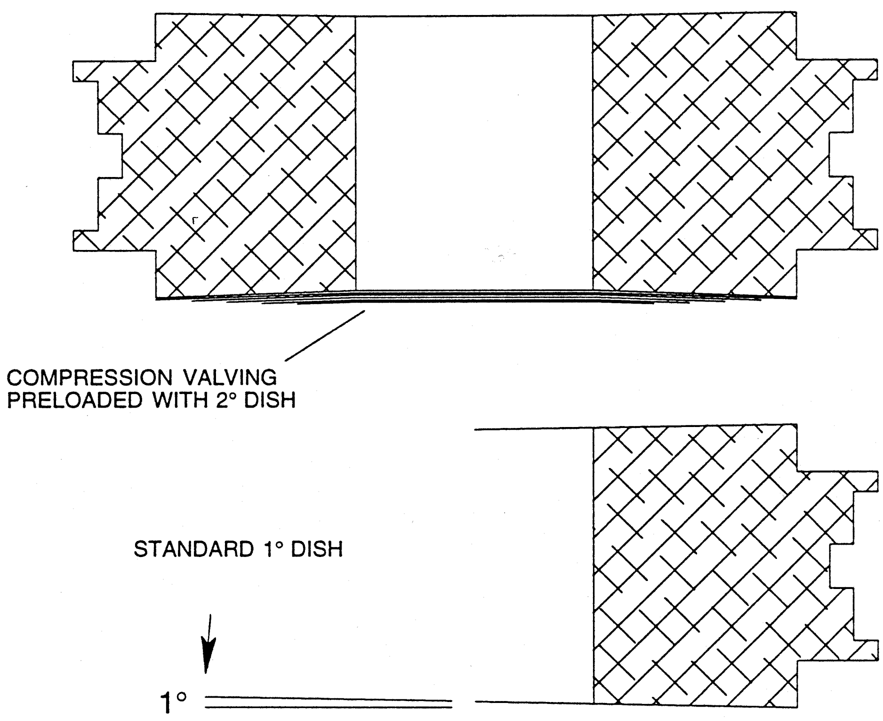
* Incomplete Part Number

Linear Piston



Compression Face   Rebound Face

 = Shim Sealing Surface



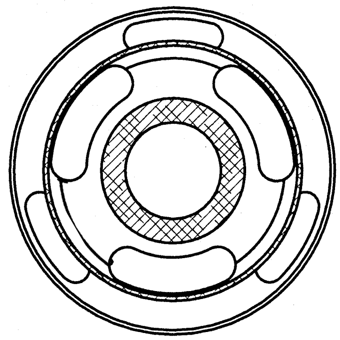
Each piston face has a dished surface, to preload the valve shims flat against the piston face. The standard dishing is 1° on both the compression and rebound sides of the piston. By increasing the compression side dishing to 2°, the shims become increasingly preloaded, causing a slight delay in opening during compression movement. The dishing causes the shims to "snap" open, in return giving the car a "snappier" feel as opposed to a smooth roll, once again this modification is for driver feel. Dishing increases low speed control. If you have questions on piston dishing, call our technical staff for information and recommendations.

Digressive Piston

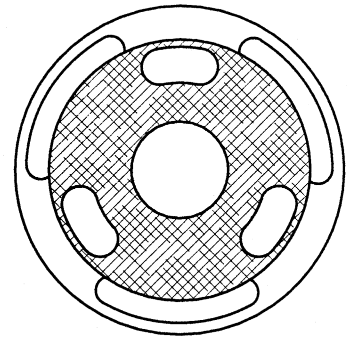
Digressive Piston

The digressive design incorporates larger ports on the face of the piston to increase the flow of oil throughout the shocks high speed action. When the shim stack opens, oil is "dumped" through the piston in large capacities. The increased flow of oil reduces the progressive damping characteristics of the linear side of the piston.

In addition to the larger ports, the face of the piston is designed to allow adjustments to the preload on the shim stack. Increased preload delays the opening of the shim stack, causing an increased damping force at low shaft speeds. When the shims crack open, oil is "dumped" at a high rate, reducing the progressive damping characteristics.



Digressive Face



Linear Face

To visually explain piston preload, Figure 3, shows a digressive/linear piston with zero preload on the shim stack. Figure 4, shows a digressive/linear piston with an exaggerated amount of preload. The preload cups the shim stack, energizing the shims until the instant high shaft velocity snaps them open. The preload may be varied by adding or subtracting a series of shims under the main shim stack.

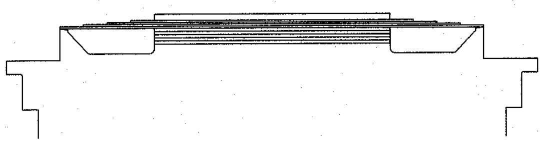


FIGURE 3
NON-PRELOADED
SHIM STACK

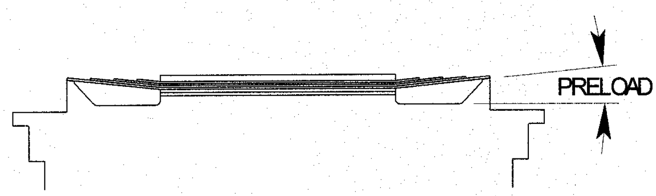


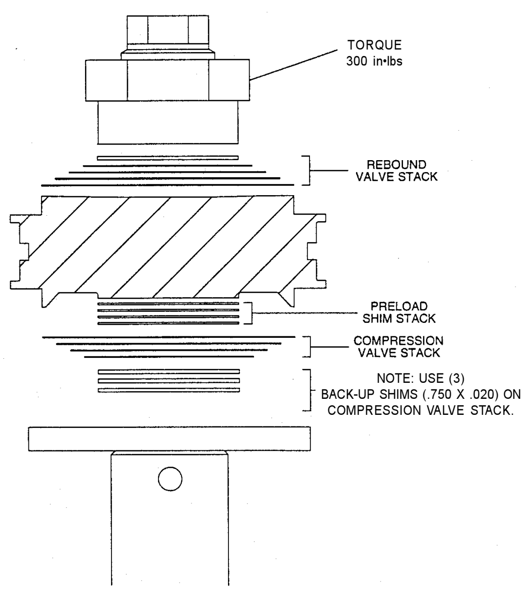
FIGURE 4
PRELOADED
SHIM STACK

The digressive piston design is offered in two variations. The double digressive piston is preload variable on both the compression and rebound sides. The digressive / linear piston is preload variable on the digressive side only, leaving the other side with linear characteristics. In most cases, the linear side of the piston would be rebound, however, it can be used either way.

Digressive/Digressive

The double digressive piston has .050 of available preload as shown in Figure 1. Stacking preload shims between the piston and the shim stack varies the amount of preload on the shim stack.

When referring to the amount of preload on a shim stack, you're referring to the amount of preload on the piston face of the shim stack. For example; .010 preload = .050 (total available preload) minus .040 (the combined thickness of the preload stack).



DIGRESSIVE/LINEAR
VALVING ILLUSTRATION

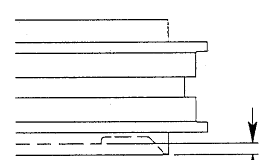
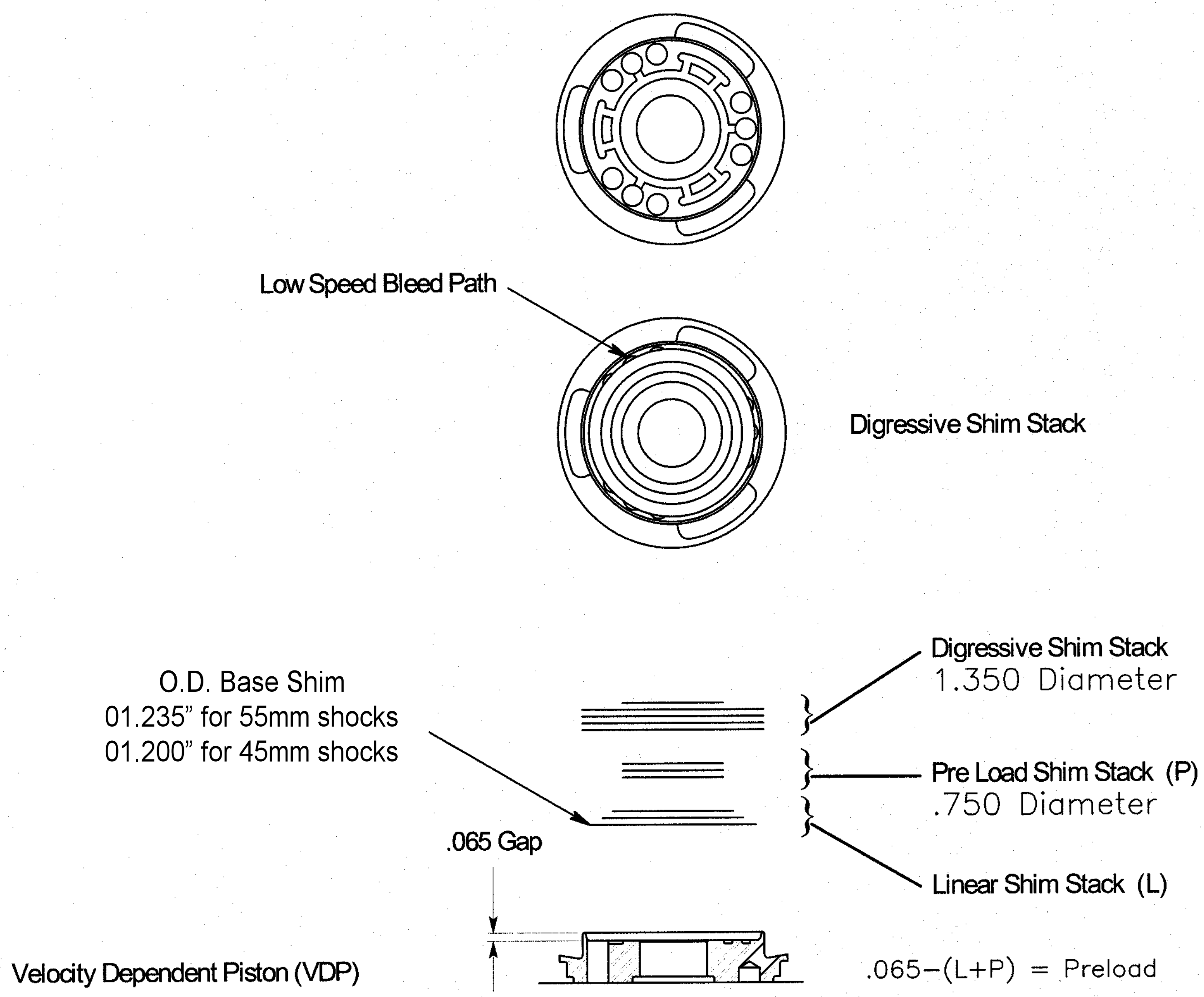


FIGURE 1

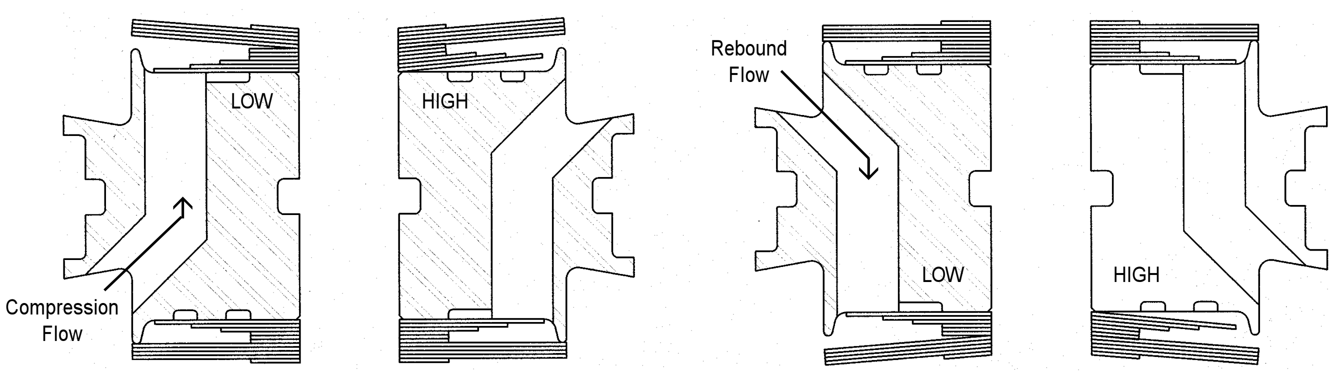
Digressive/Linear

The linear side of the digressive/linear piston is treated as a standard linear piston. Due to the higher flow when running the linear side on rebound, it is a rule of thumb to run (1) step stiffer on the rebound side than what was used on a standard linear piston (example: A up to B).

Velocity Dependent Piston (VDP)



Compression | Rebound



This graph illustrates the way in which the two different circuits operate on compression.

This graph illustrates the way in which the two different circuits operate on rebound side.

Low speed works the digressive stack and high speed works both.

Velocity Dependent Piston (VDP)

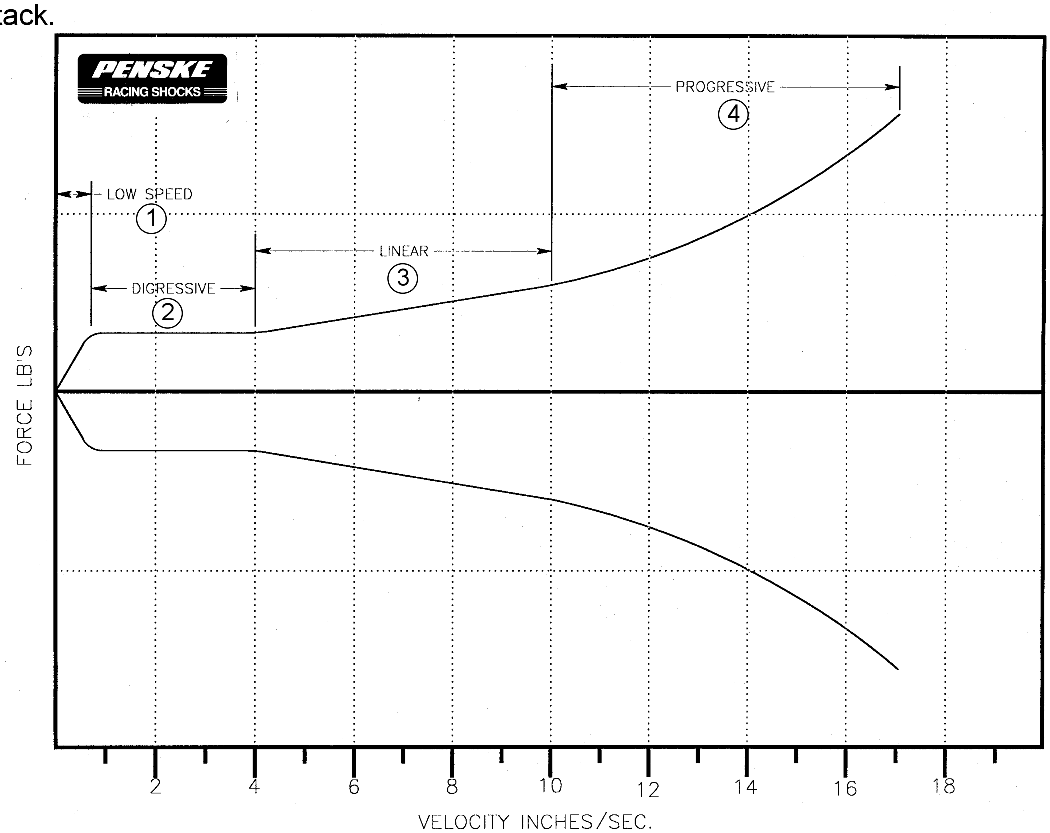
The Velocity Dependent Piston (VDP) has the unique ability to be valved to duplicate the curves of either linear or digressive pistons. Varying the inner, outer and preload stacks in conjunction with various bleed combinations can duplicate virtually any type of force value. Also the velocity where forces come in or out can be varied by altering the shims and preload/bleed combinations.
Note: On the VDP we have found that using all 1.350 shims for the digressive outer stack (primarily on compression) helps to seperate the high and low speed circuits in the piston resulting in more compliancy over bumps
and curbs. When running the linear side on rebound, it is a rule of thumb to run (1) step stiffer on the linear side than what was used on a standard linear piston.

1. The Low Speed section is controlled by the amount of bleed, the outer valve stack configuration and the amount of preload to determine the nose profile.

2. The Digressive profile is set by the thickness of the outer stack. The amount of time that the curve stays digressive is also influenced by the stiffness of the inner stack and when it is initiated is also controlled by the preload.

3. The Linear values and profile are set by the thickness of the inner stack.

4. The values and time of the progressive profile are determined by the orifice holes and the inner stack.



1. Low Speed - Bleed, Nose Profile
2. Digressive - Preload, Outer Stack
3. Linear - Inner Stack
4. Progressive - Orifice, Inner Stack

Damping Adjustments

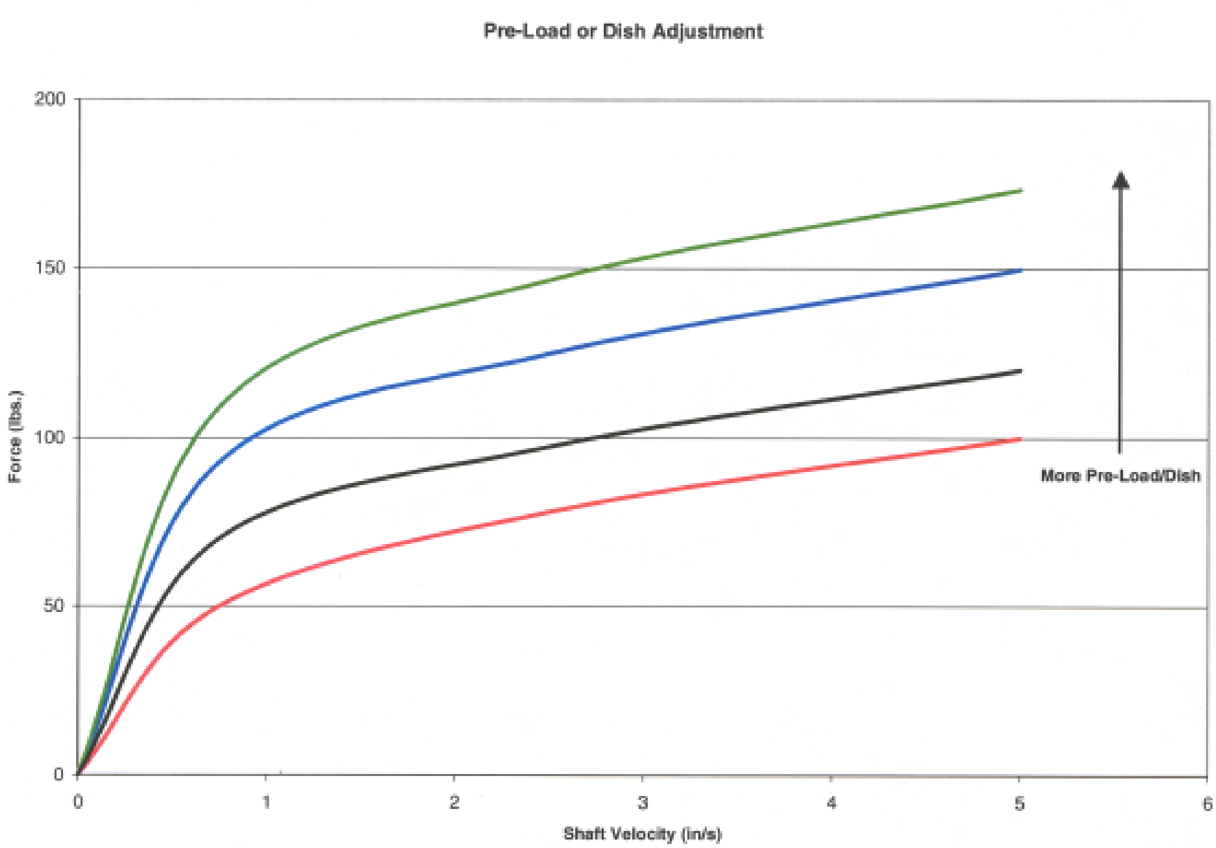
There are three major ways in which you can vary the damping produced by the main piston: Shim stiffness, shim pre-load and the amount of bleed past the shims. These graphs help to visualize the way in which the damping is affected by each of these changes.

Figure 1 shows the effect of changing the pre-load (on digressive or VDP pistons) or dish (on linear or high flow pistons). Adding pre-load or dish will create a lot more low speed damping. In compression, it will cause the tire to be loaded quicker and give a "snappy" feel. In rebound, it will help to tie the vehicle down and let it take a set quicker.

Figure 2 shows the effect of increasing the stiffness of the shim stack. Increasing the thickness of the shim stack (i.e., .004 to .010) stiffens the damping rate of the shock across the whole velocity range. While the other two adjustments only affect the lower shaft speeds, the shim stiffness is the best way to adjust damping at higher shaft speeds. The shims give the damping that chassis dynamics require.

Figure 3 shows the effect of adding bleed to the piston or through the shaft. Bleed is simply a low speed bypass for the shims and softens the shock at lower shaft speeds. This will improve the compliance of the chassis to the ground under low amplitude movements which can improve grip. It will give the driver a softer ride, but will let the chassis move more and take away support. (This is what the driver feels)

Figure 1



Damping Adjustments

Figure 2

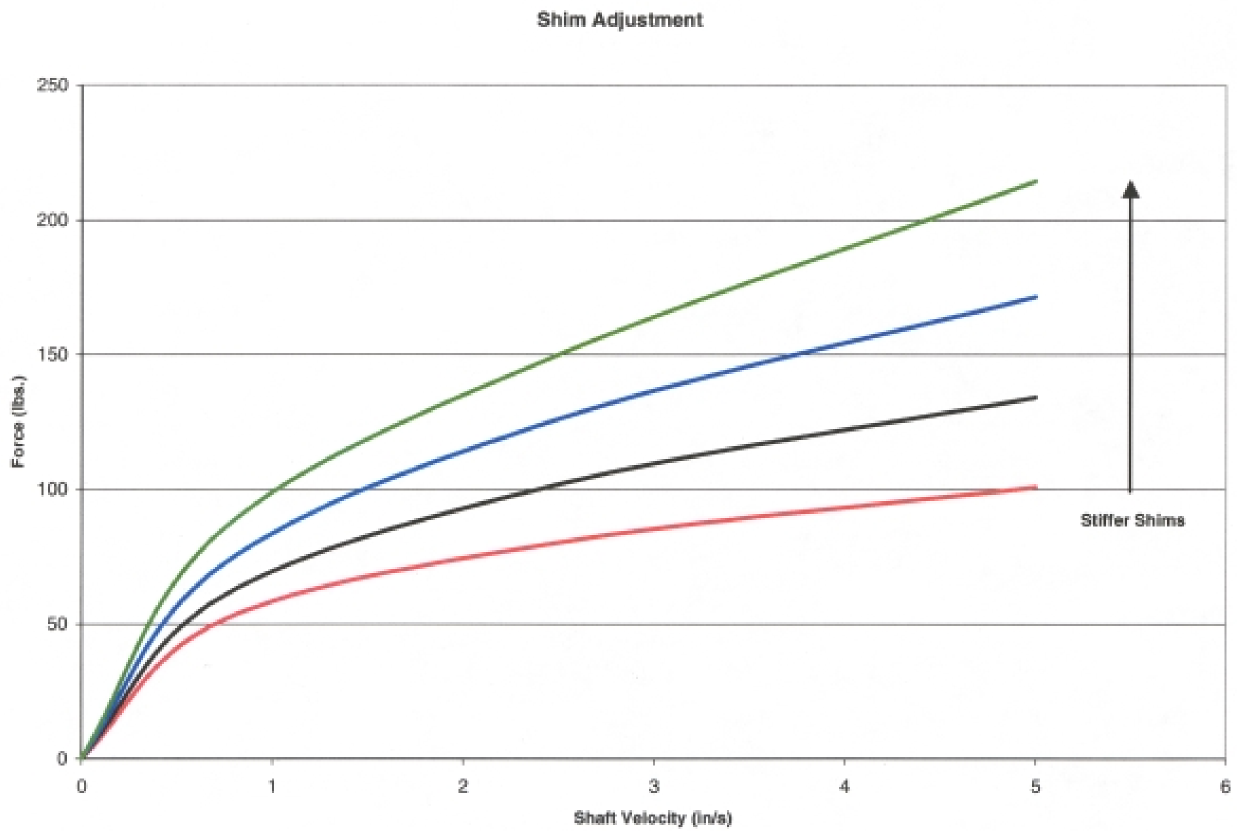
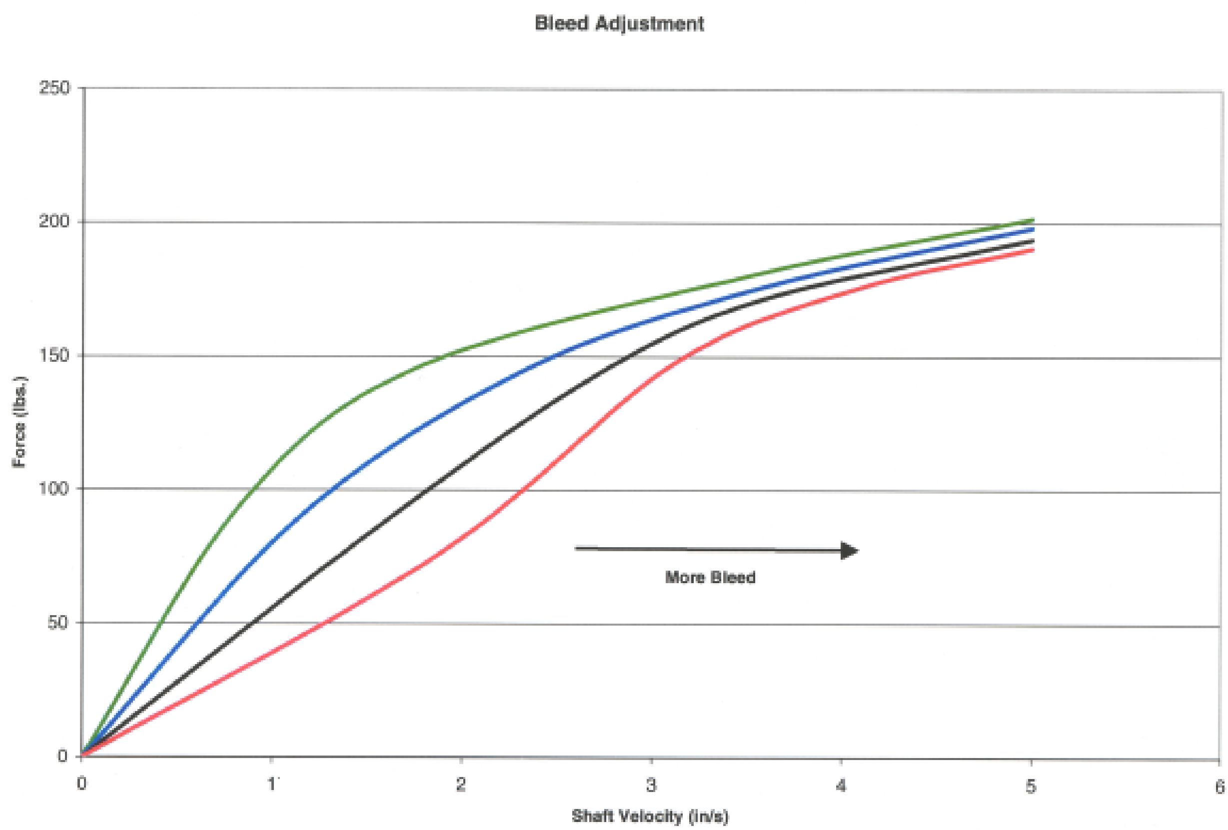
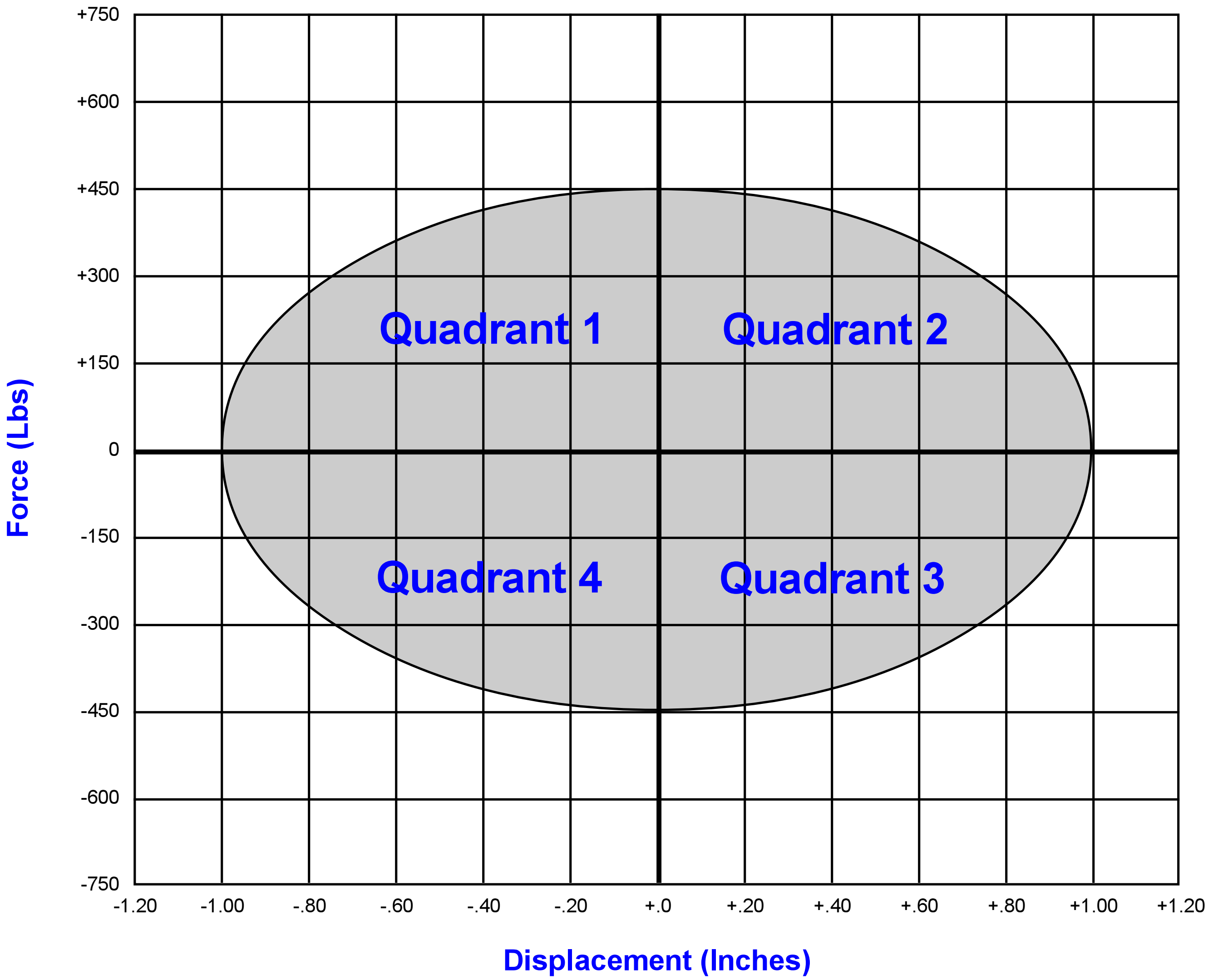


Figure 3

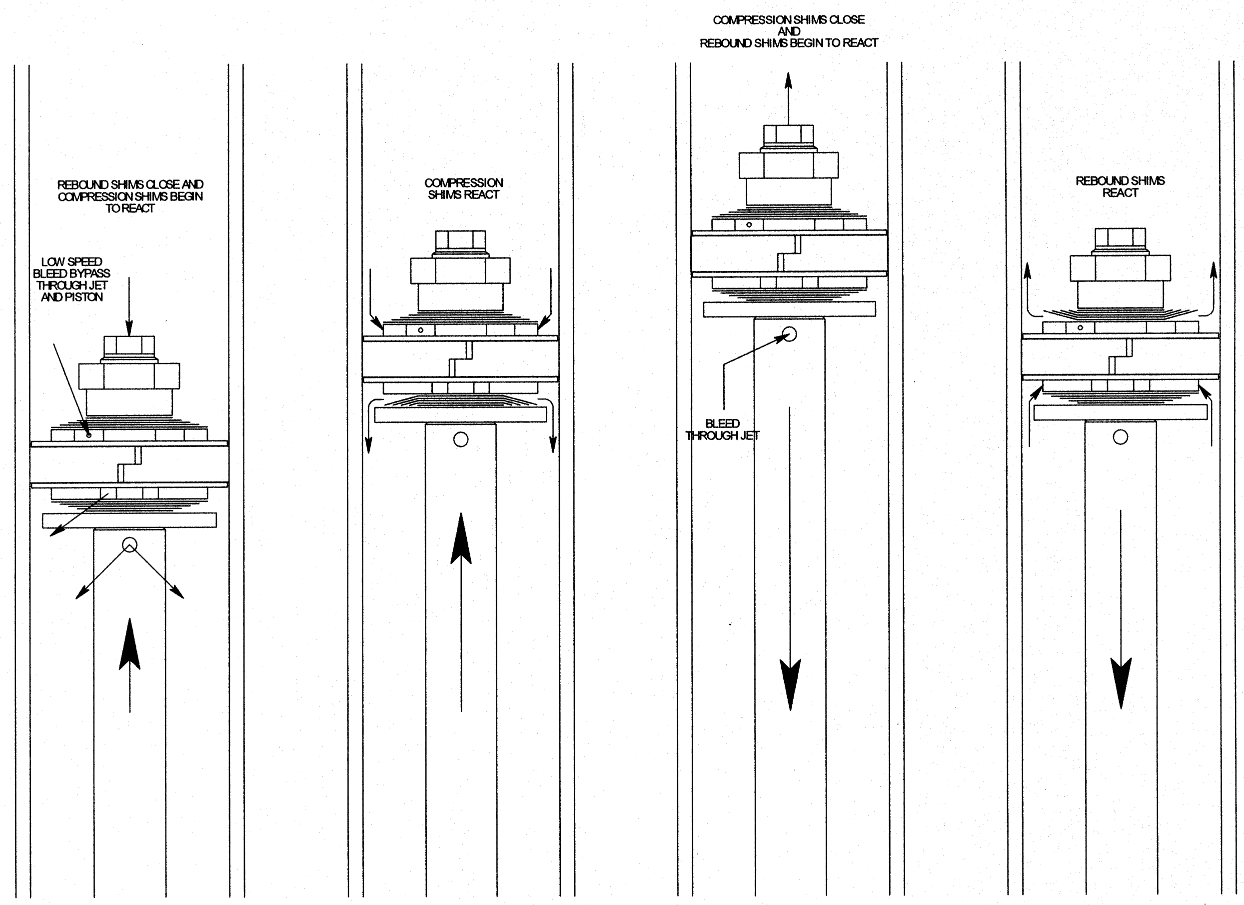


Dyno Graph Overview



This section of the manual illustrates different valving combinations in the form of graphs. The graph shown is force vs. displacement graph. The force vs. displacement graph is a very accurate and simple way to assess valving characteristics. If you are not familiar with this type of graph, it is explained on the following page along with the graph above, showing the four different quadrants.

Dyno Graph Overview



QUADRANT #1

This is the beginning of the compression stroke. Where the graph crosses the zero line (pounds) in quadrant #1 begins the compression stroke. Approximately the first 1/2" of displacement is formed with relation to the low speed bleed bypass. When the shaft reaches a certain velocity, the low speed bleed bypass shuts off and the compression valve stack begins to react.

QUADRANT #2

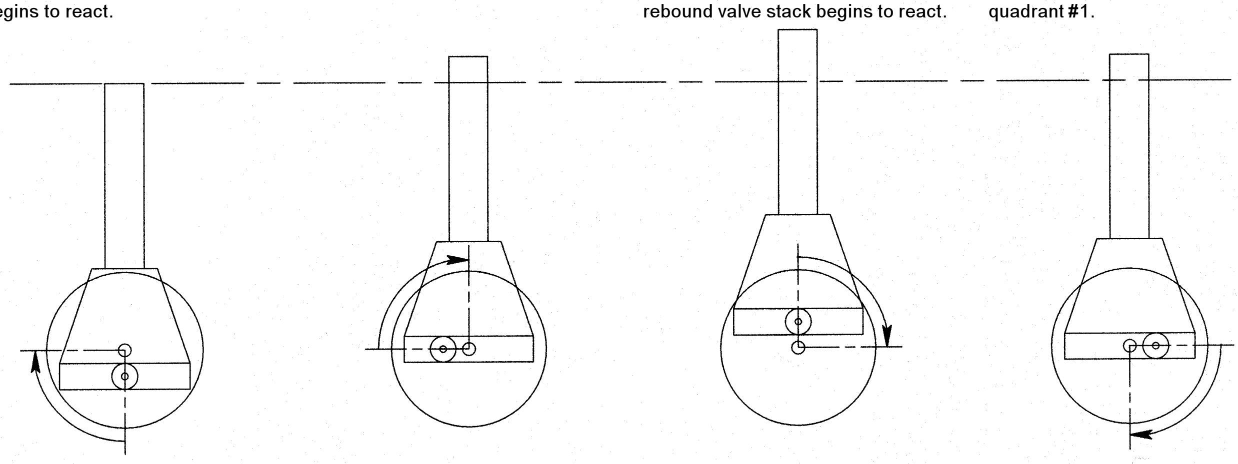
This quadrant begins with the compression valve stack open. Where the graph crosses the zero line (inches) in quadrant #2 is the maximum force produced by the compression valving. As the shock approaches the full compression point, the compression valve stack begins to close as it approaches the rebound movement.

QUADRANT #3

This quadrant begins with the shock at full compression and the compression valve stack closed. Where the graph crosses the zero line (pounds) in quadrant #3 begins the rebound stroke. Approximately the first 1/2" of displacement is formed with relation to the rebound bleed through the shaft and jet. When the shaft reaches a certain velocity, the bleed shuts off and the rebound valve stack begins to react.

QUADRANT #4

This quadrant begins with the rebound valve stack open. Where the graph crosses the zero line (inches) in quadrant #4 is the maximum force produced by the rebound valving. As the shock approaches the full extension point, the rebound valve stack begins to close as it approaches the compression movement. At this point the cycle starts over again in quadrant #1.



An easy way to help picture what is going on here is to relate the graph's shape to what the dyno is doing to the shock. The dyno uses a scotch yoke system (shown above), where the motor turns a crank and the sliding yoke allows the main dyno shaft to make the up and down movement at the preset stroke. The dyno software takes thousands of measurements throughout a single revolution of the crank. The sampled points are connected to form the graph. By relating the crank's position to the corresponding graph quadrant and the circular crank movement may help in reading the graphs.

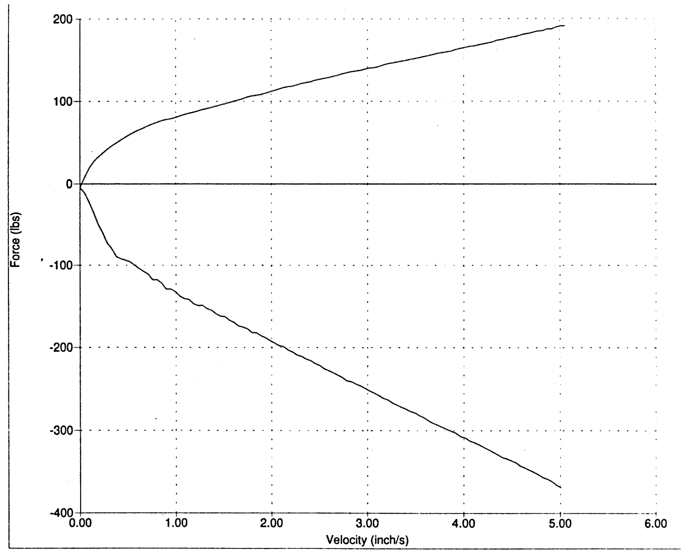
Dyno Graph Overview

Penske Racing Shocks uses SPA Dynamometers because of its versatility and low speed metering and sample rates. Penske Shocks primarily uses the Force Average display, but SPA offers Decelerating CD/Accelerating RD and Accelerating CD/Decelerating RD viewing options for all its graph displays.

SPA DYNAMOMETERS

Force / Velocity Average

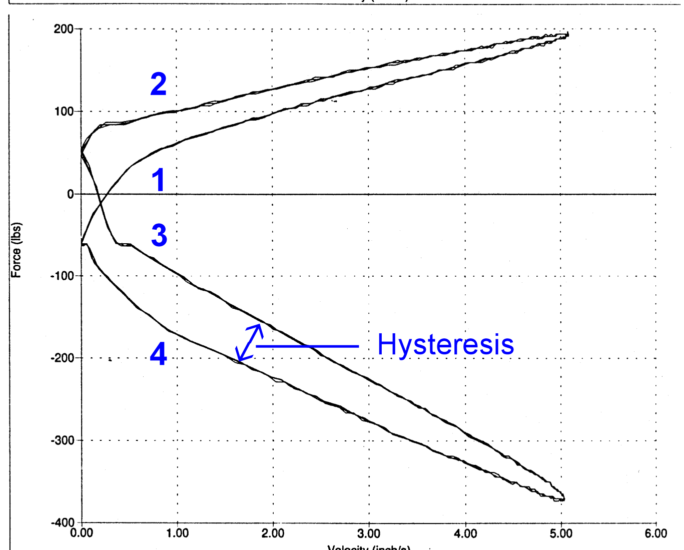
This graph shows the averages of the accelerating and decelerating compression and rebound forces. It is a good quick, general review of the shock curve, but is the least accurate of the options displayed.



Force / Velocity

This graph displays the accelerating and decelerating compression and rebound forces. Think of this graph as the Force / Displacement graph (below) folded in half.

* Hysteresis is the gap between accelerating and decelerating compression and rebound damping. It is affected by the type of piston, the shims used and the relative position of high and low speed adjusters. The bleed hole will close the gap or soften the low speed forces.



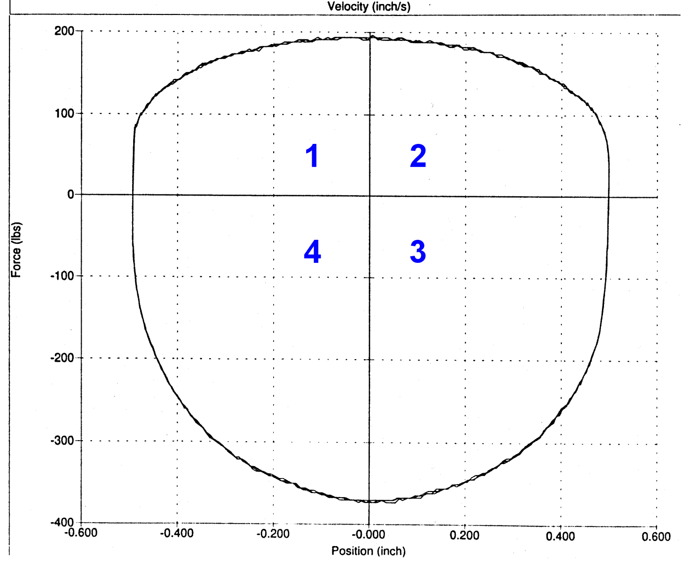
OVAL (Force / Displacement)

QUADRANT #1
This is the beginning of the compression stroke. Where the graph crosses the zero line (pounds) in quadrant #1 begins the compression stroke. Approximately the first 1/2" of displacement is formed with relation to the low speed bleed bypass. When the shaft reaches a certain velocity, the low speed bleed bypass chokes off and the compression valve stack begins to react.

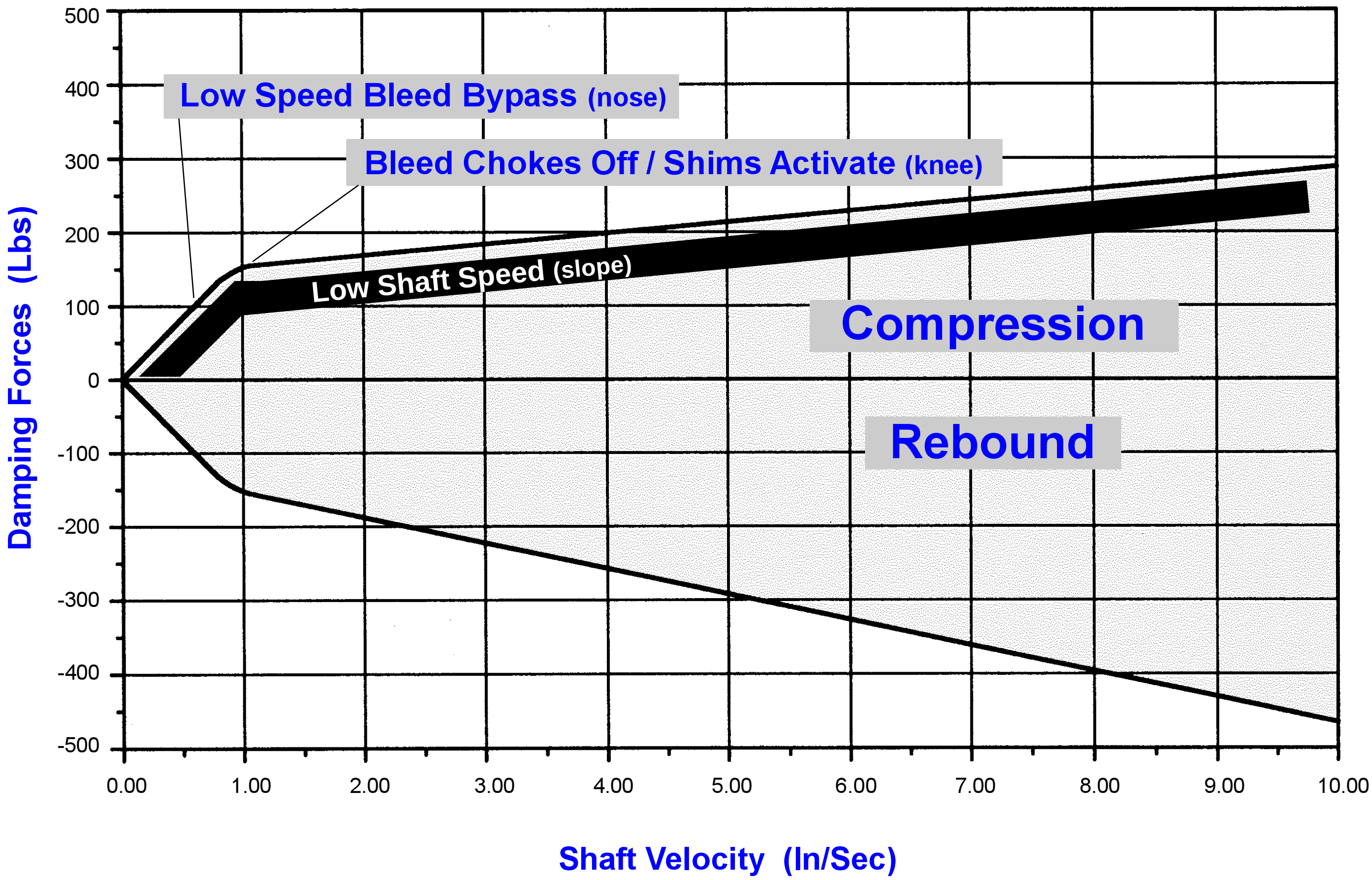
QUANDRANT #2
This quadrant begins with the compression valve stack open. Where the graph crosses the zero line (inches) in quadrant #2 is the maximum force produced by the compression valving. As the shock approaches the full compression point, the compression valve stack begins to close as it approaches the rebound movement.

QUADRANT #3
This quadrant begins with the shock at full compression and the compression valve stack closed. Where the graph crosses the zero line (pounds) in quadrant #3 begins the rebound stroke. Approximately the first 1/2" of displacement is formed with relation to the rebound bleed through the shaft and jet. When the shaft reaches a certain velocity, the bleed chokes off and the rebound valve stack begins to react.

QUADRANT #4
This quadrant begins with the rebound valve stack open. Where the graph crosses the zero line (inches) in quadrant #4 is the maximum force produced by the rebound valving. As the shock approaches the full extension point, the rebound valve stack begins to close as it approaches the compression movement. At this point the cycle starts over again in quadrant #1.



Dyno Graph Overview



Note: Remember that low speed damping characteristics are controlled by bleed through the adjuster and the bleed hole in the piston, not the valve stacks.

Notes

PENSKE RACING SHOCKS

VDP - D/D or D/L

LF

RF

Preload ____________ (LF)

Preload ____________ (RF)

________	1.350	________
________	1.350	________
________	1.350	________
________	1.350	________
________	.750	________
________	.750	________
________	.750	________
________	.900	________
________	1.050	________
________	1.235	________
________	1.235	________
________	1.050	________
________	.900	________
________	.750	________
________	.750	________
________	.750	________
________	Stack	________

Piston Bleed

Jet

Preload ____________ (LF)

Preload ____________ (RF)

LR

RR

Preload ____________ (LR)

Preload ____________ (RR)

________	1.350	________
________	1.350	________
________	1.350	________
________	1.350	________
________	.750	________
________	.750	________
________	.750	________
________	.900	________
________	1.050	________
________	1.235	________
________	1.235	________
________	1.050	________
________	.900	________
________	.750	________
________	.750	________
________	.750	________
________	Stack	________

Gas Pressure

Clicks

Preload ____________ (LR)

Preload ____________ (RR)

Notes: