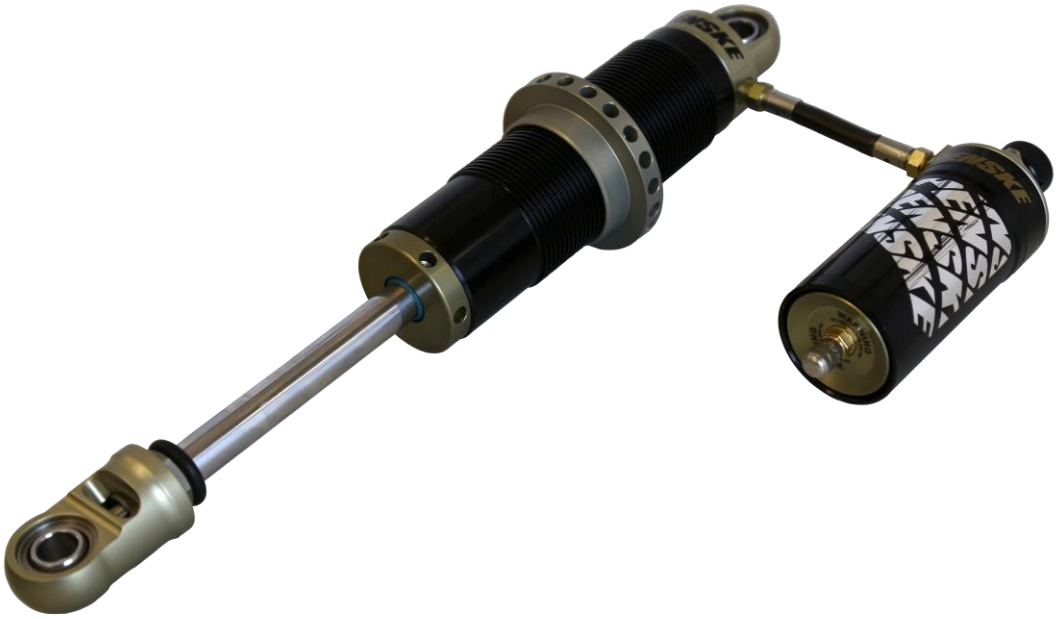
PENSKE
RACING SHOCKS®
UK

SPA TECHNIQUE UK



8300 Series Damper

Technical Manual

E-mail: sales@penskeshocks.co.uk
Tel: 01543 434 580
Penske Racing Shocks-The Mill House, Packington Hayes, Litchfield,
Staffordshire WS14 9PN

Introduction

Thank you for choosing Penske Racing Shocks for your suspension needs!
Every Penske Racing Shock is 100% hand built and dyno tested for the best performance and customer satisfaction. We stand by our products and routinely assist customers in getting the best performance from their shocks.

Contents

Address: Penske Racing Shocks-The Mill House, Packington Hayes, Litchfield, Staffordshire. WS14 9PN
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The 8300 Series

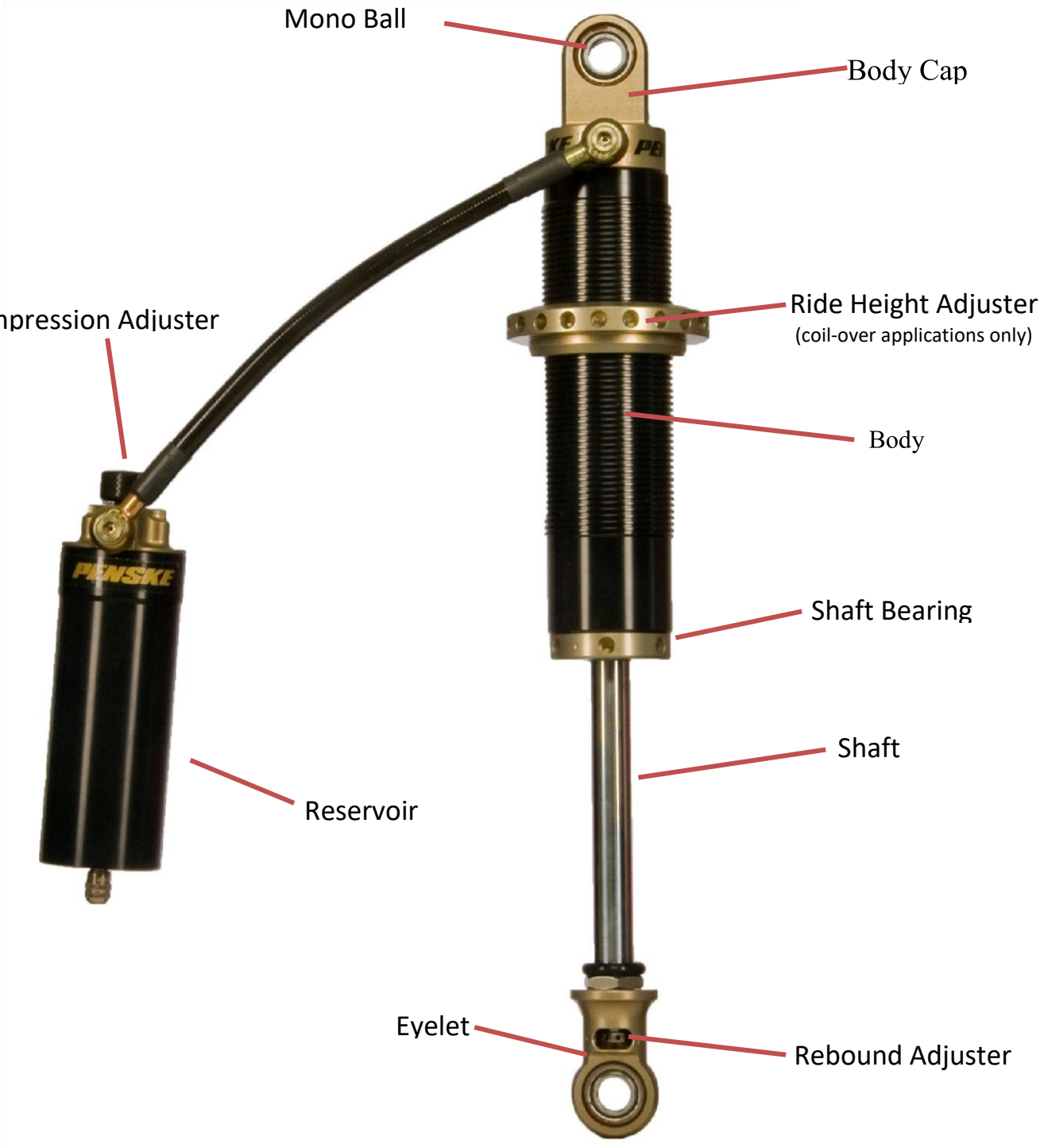
Thank you for your purchase of your new Penske Racing Shocks 8300 series double adjustable shocks

The 8300 is our latest offering in two way adjustable configuration. This design has superseded our original 8100 design. As you will see in the following pages, major upgrades to performance and reliability have been added to make this the best two way adjustable shock on the market.

All of the fundamental attributes found in any Penske Racing Shock have been incorporated into the 8300

- Low-friction shaft and piston seals
- Separate compression and rebound adjustment
- Hard anodized, 7000 series aluminium bodies and components for superior durability and performance
- Hard-chromed 4130 main shaft for strength, durability, and low breakaway friction
- Durable ACME thread body that allows quick adjustment of spring preload (.100" per turn)
- Winning heritage – Penske Racing Shocks continue to help our customers win races and championships in all forms of Motorsport.
- Hand Made bespoke to your requirements. Designed, machined in the USA, Hand assembled, tested and tuned for quality in the United Kingdom.

Terminology



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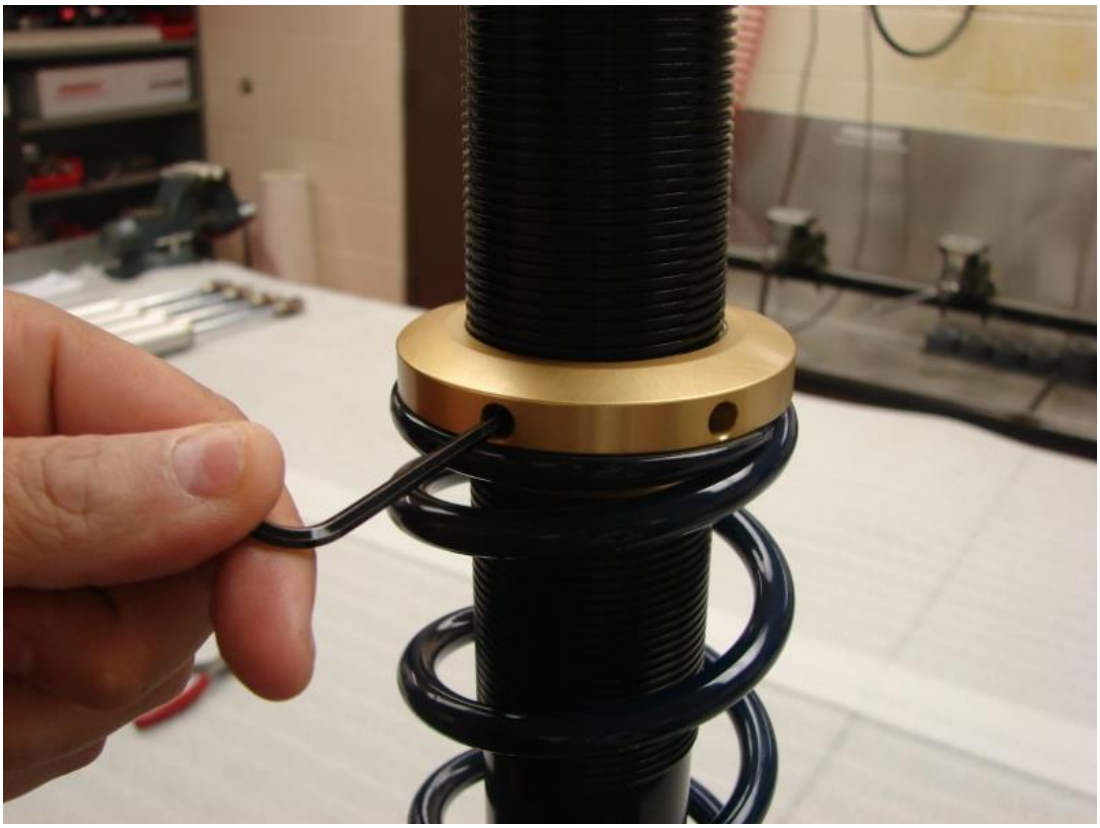
To Set Ride Height

For coil over applications

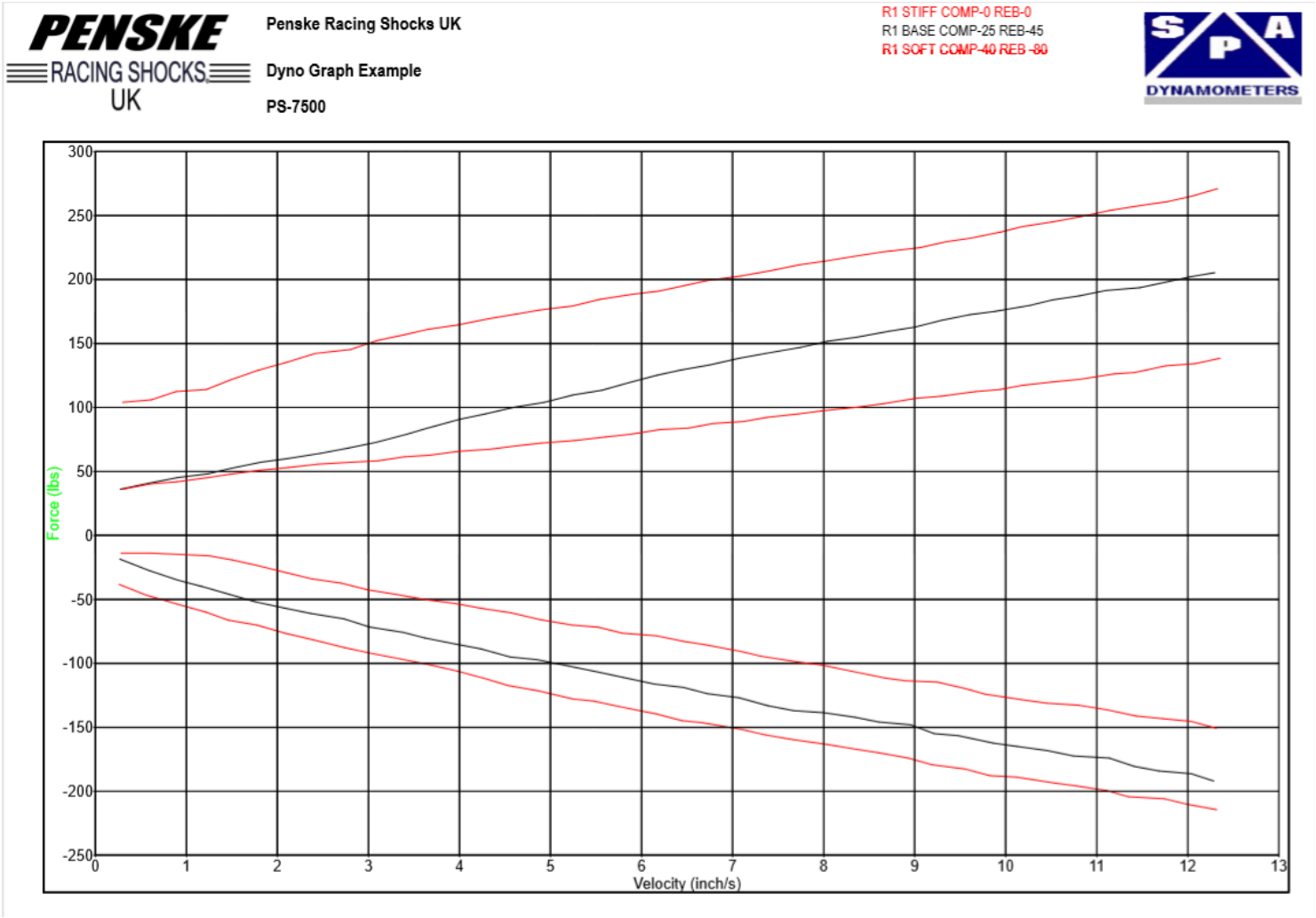
Penske Racing Shocks does not set the spring preload on shocks that include coil-over springs. You must set your ride height AFTER installing the shocks on the car. After your ride height is set, tighten the 2 Allen screws (3mm Allen) in the spring perch to prevent loosening. This does not need to be tightened too much – just nip up to prevent damage to the body threads.



Dyno Graph Overview

When you receive a dyno sheet, it will display your damping curve in “Full Stiff”, “Full Soft”, and shipped settings “Base Line”. You will notice the (-) before the setting; this identifies how many clicks off of full hard the adjuster was set to achieve this curve.
For 2-way adjustable dampers the graph will have a “COMP” for compression and “REB” for rebound before the setting. For 3-Way dampers Comp will be split into “LSC” Low speed Compression and “HSC” High Speed Compression. High speed will show a (+) this denotes how many clicks off of full soft the adjuster is set at.

Blow the 2-Way and 3-Way adjustable dyno graph show force against velocity average, this give a good general view of shocks performance. The top section represents Compression and the lower negative section represents rebound.



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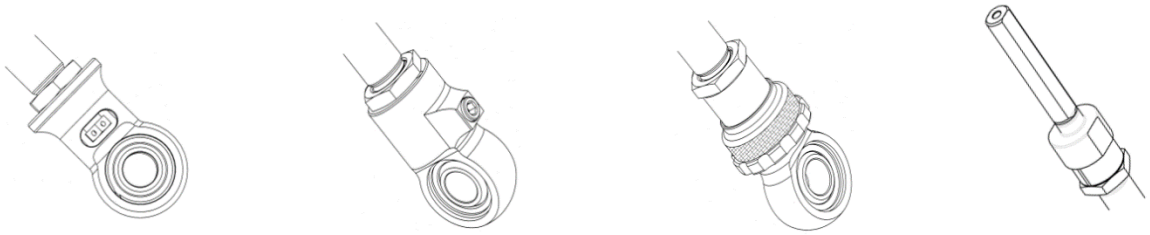
Damper Adjuster Guide

Do not over-tighten the adjusters. When making adjustments, they will have a positive stop. In order to close off the bleed, you do not need to continue to turn the knob for it to seal.



A *B* *C* *D*

Eyelet Adjuster – There are several options for the eyelet adjuster as displayed above. This adjusted can be used for a 1-way rebound, compression and a combined rebound compression adjuster. This eyelet adjuster is used for rebound as stander across most shock models. It will be specified to you if this eyelet adjuster changes other damping characterises

Turn the adjuster Clockwise will increase damping/ Stiffer, Turning it Counter-clockwise will reduce damping softer. (Clockwise = stiffer, Counter-clockwise = softer)

A. Sweep Adjuster, operated by pick or pin. - 20 sweeps of adjustment. A sweep is one radial movement of a pick or pin engaged in the adjuster the full throw of the window

B. Hex Adjuster, operated by 4mm or 5/32 Alan-key. 48 “clicks” of adjustment.

C. Knob Adjuster, hand operation. 2 options 35 or 80 “clicks” of adjustment.

D. Stud eyelet / Shaft pin Alan-key fitting 3/32 Allen-key – 4 ½ “revolutions” of adjustment. We recommend making adjustments using ¼ turns. This is done by inserting a 3/32 Allen Wrench down the centre of the shaft mount

Sweep Style Eyelet Adjuster

1.) Turn knob or screw clockwise to full stiff.

2.) Turn adjuster back “counter clockwise” to desired settings. Typically this is shown as a negative (-) settings. Example: Compression -5 clicks, Rebound -10 clicks/sweeps.

3.) During discussions on handling, if you were to be instructed to “soften rebound by 5 clicks” it would mean to adjust your rebound counterclockwise by 5 clicks or sweeps, depending on your adjuster.

Knob Style Eyelet Adjuster

This knob adjuster is hand operated, tuning it “clockwise like tightening a nut” to (+) making will increase damping making it stiffer. Twisting it to (-) marking “counter clockwise” will reduce damping making it softer.

Compression Adjuster

Adjusters: Compression Adjuster- This is the knob that is located on the remote or piggy back canister. This will generally have 20-22 clicks of compression. If instead of a knob, you have a ½” hex head, you will have 20 clicks of compression adjustment. On your dyno sheet, you should see about 175lbs-200lbs of total compression adjustment. On both adjuster types, clockwise is stiffer, counter clockwise is softer.

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Damper Track Tuning

Compression Adjuster

This adjuster is typically used when looking to improve the car over bumps. If your vehicle is hitting a certain bump that is causing the vehicle to “unload” the tire, simply soften the compression adjustment. This will allow the shock to absorb the bump, there keeping the vehicle more stable and making the car more controllable.
You can also use this adjuster to help in controlling the “platform” of the car, or the body roll. Example- If you are entering a corner and under braking the front of the car is diving to quickly or the weight being transferred from the back to the front is too much, simply close the compression adjuster on the front to slow that weight transfer down.

Rebound Adjuster

The rebound adjuster is a great tool for tuning body roll. This is a much more driver sensitive adjustment than the compression. If you want to slow the pitch of your car from the back to the front, simply close the rebound off, this will slow the weight transfer.
When you are accelerating off a corner, getting weight transfer to the rear tires is very important for grip or “forward bite” as its referred to sometime. By softening the front rebound, this will allow for quicker weight transfer to the rear tires, resulting is better rear grip. Be careful though, by allowing to much weight transfer to the rear, you may cause a loss of front grip, resulting in an “under steer” or “tight” condition.
Important!! You can over adjust. Always have a baseline to go back to!!!

Tuning Symptoms & Suggestions

Corner Entry Under Steer/Push

This typically is a result of too much front compression. Soften compression -5 clicks. Soften the compression until you lose platform in the front of the car, or the front feels under supported, then go back +2 clicks.
b. Soften rear rebound. Sometimes too much rear rebound will not allow weight to transfer to the front which can cause and under steer condition.

Corner Entry Over Steer/Loose

Add rear rebound. You don’t want to take grip away from the front if you don’t have to. So first work on the end of the car with the grip issue, in this case is the rear. Stiffen rear rebound, if the rear is too soft, it will allow too much weight to transfer to the front too quickly. By slow this, you will keep more weight on the rear, generating more grip, longer into the corner.

Mid Corner Under Steer/Push
First try and determine if the chassis is taking a set, then going into under steer, or if it under steers before taking a set.
i. If it takes a set, then under steers, add compression to the front. This will support and slow the weight transfer just enough to eliminate or help the condition.
ii. If the chassis doesn't feel like it is taking a set, or feels like you not into the track, soften the compression, this will make the chassis more compliant, allow weight transfer a little quicker to the front tires and help increase grip.

Mid Corner Over Steer/Loose
a. Determine if it's off throttle or on throttle. If over steer is induced when getting back to throttle, soften rear rebound.
b. If over steer is coming off throttle, add rear rebound.

Corner Exit Under Steer/Push
a. Add front rebound, try and hold weight on the front tires longer increasing grip.
b. If it is still over steering, increase rear compression. This will balance out the chassis by taking some grip away from the rear.

Corner Exit Over Steer/Loose
a. Reduce rear compression. This will allow quicker weight transfer to the rear tires, creating more grip.
b. Reduce front rebound. This again will transfer more weight to the rear tires resulting in more grip

Gas Pressure
Gas pressure is like spring rate. This is more used for a fine tuning adjustment. 50psi is similar to 5-10lbs of spring rate. Adding more gas pressure is a common adjustment for qualifying, when you need to get your tires to max operating temp very quickly. If you do this, remember to reduce PSI before racing or shortened tire life may result.

Drag Racing Track Tuning

Normal adjustment steps for Drag Racing: Compression: Adjust 5 clicks at a time. Rebound: Adjust 2 sweeps at time.
To Increase Bite: Soften compression or stiffen rebound. Example: hot and greasy track / bald spots on starting line.
To Decrease Bite: Stiffen compression or soften rebound. Example: Track conditions are at their best / starting line is covered with good rubber.

Troubleshooting

Warning

Penske Racing Shocks **recommends running no lower than 50 psi** depending on piston and shims being used. Lack of nitrogen pressure could result in "cavitation" which can result in loss of immediate damping and rider feel.
We also **do not recommend using pressure higher than 300 psi**. This could result in stress fractures in main mounting components which may lead to seal or other failures.
Always check with Penske Racing Shocks technicians on recommended pressures for your application and use.

Signs of Fluid

If the area around the shaft bearing and shaft exhibits a small amount of moisture, this is normal. In order to reduce friction in the system, seal squeezes are slightly relaxed which serves the purpose to allow a small amount of fluid to be wicked onto the shaft when the shock operates. If you see excessive amount of fluid that may "pool" on the top of the shaft bearing, you may have a seal problem. Contact Penske Racing Shocks UK representative at once.

Loss of Gas Pressure

If the shock for some reason loses its gas charge, a tell-tale sign of reduced or no gas pressure is that the shock (without a spring) when compressed, will not return to its fully extended position, or gradually gets much slower when reaching full extension. If you have experienced a loss of gas pressure, Contact Penske Racing Shocks UK representative at once.

Service Recommendation

Pre-Race – Inspect for oil leak, Check nitrogen pressure
30 Hours of Track Time or Yearly - Change oil, Replace O-rings, seals and valve shims.

Technical Support

E-mail:
sales@penskeshocks.co.uk

Open:
7:30 AM – 4:30 PM Monday –Thursday
7:30 AM – 1:30 PM Friday

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