Shock Manual

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DynAccess Ltd

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1. Overview

Custom monoski shock built by Penske Racing Shocks

Congratulations on your new purchase of a Monoski Coil-over shock absorber. Your shock absorber is specially built by **Penske Racing Shock** for DynAccess monoski applications. DynAccess is the sole source for these monoski shocks.

Please read the following information to understand how to adjust the shock to your riding style and your preferences. There is quite a range of adjustment possibilities. Some people prefer a smooth and soft ride, as in a "cruiser", while others want to shred the mountain with a stiff and responsive feel. Dialing in the shock to your liking is a very rewarding exercise.

Your shock is equipped with either a single coil spring or dual coil springs. Your springs have been carefully selected by DynAccess based on the information provided by you. You can easily adjust preload, rebound damping and high/low speed compression damping of your shock. With some more effort you can change spring rate(s) and crossover point of a dual rate spring setup.

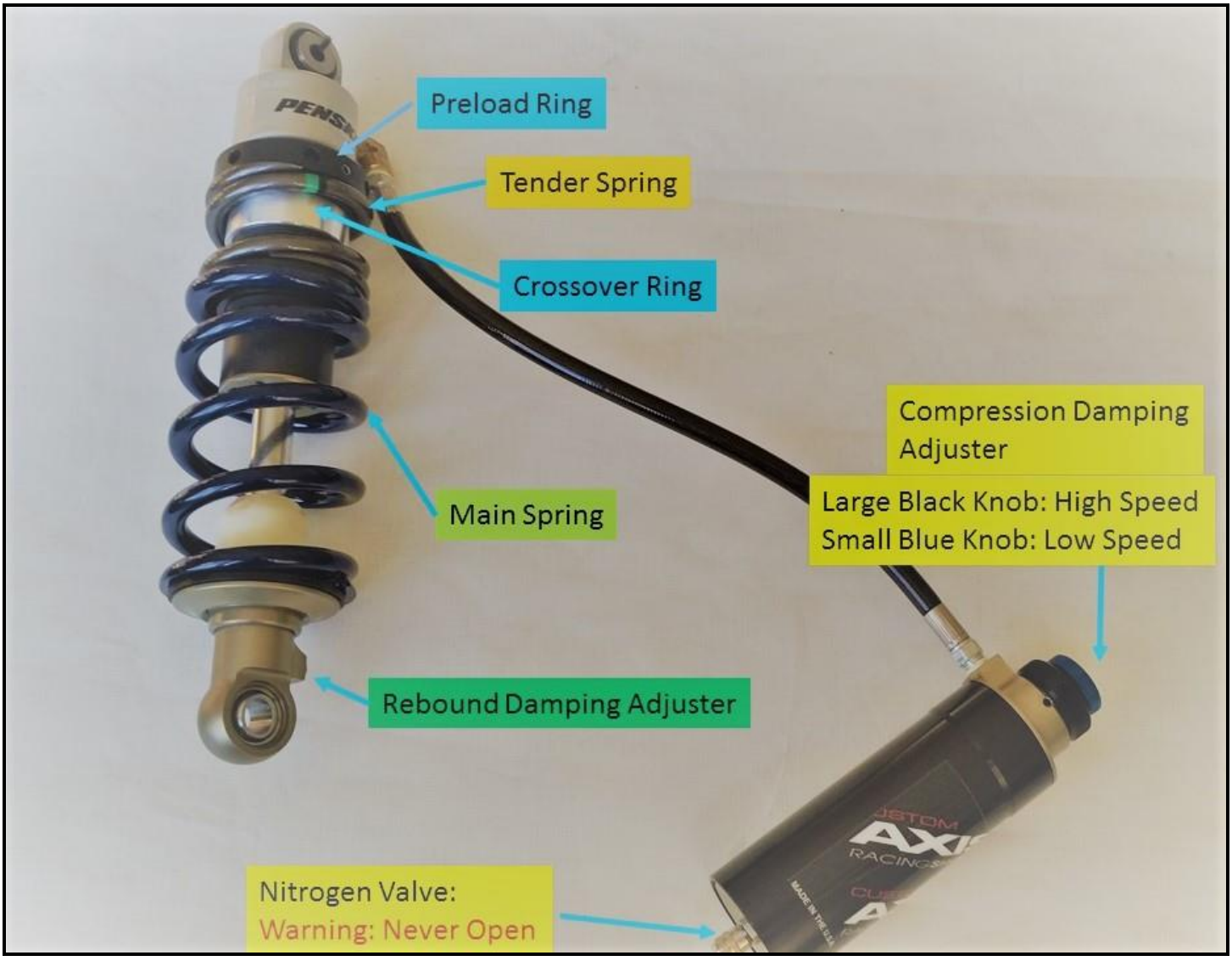

Fig. 1 Locations of shock adjusters (Hydra Shock: Dual rate set up)

2. Shock set up

2.1 Spring Selection

Having the right spring(s) is critical for any suspension system. Spring rate can be simply stated as the amount of force required for a certain deflection of a spring. The lower the rate, the softer the spring. The softer the spring, the smoother the ride; however, the more likely it is to bottom out. A single or dual rate springs is/are already installed on your shock. Your spring(s) were selected based on body weight, ride style, personal preference, disability, etc. Heavy riders need stiffer springs than light riders. Stiff springs are generally preferred for technical events such as slalom and giant slalom, while softer springs are preferred for speed events such as downhill and super G.

2.2 Static Preload Set-up

The black ring located on the top of the spring controls compression on the main spring. If you turn the ring down to compress the spring, it increases the preload of the spring. Static preload is the amount of spring force your shock has in an unloaded, fully extended condition. Basically it is how much the spring(s) are compressed when installed on the shock. The main purpose of preload is to raise or lower the monoski's ride height.

2.3 Single Rate vs. Dual Rate Set-up

If you choose a single rate setup, your shock comes with a single spring based on your body weight, ride style, and personal preference. For adjusting your rebound and compression damping, please read the next sections.

With a dual rate spring setup, you have two springs stacked on top of each other and they are compressed simultaneously. It uses a short (1.75" -2.50") tender spring and a long main spring (8" for the Tensor, 6" for the aftermarket Nissin, and 5" for the Hydra).

The main purpose for using a dual rate spring setup is to achieve a tunable progressive rate system. This produces a lighter initial spring rate providing a smooth, supple ride over small surface irregularities. Then at a determined point in the shaft travel, tunable via the crossover ring's height, the tender spring stops compressing and it crosses over to the stiffer main spring. This progression to the stiffer rates is used to prevent harsh bottoming during jumps or whoops. This allows for more adjustments in the spring, with a tender spring to handle micro-terrain when you go straight (makes in particular high-speed runs smoother) and a main spring to handle hard cornering and landing from jumps.

The silver colored crossover ring is mounted inside the tender spring. There are many crossover rings with different heights available. The height of the crossover ring determines the "crossover" point from the initial spring rate (which is a combination of the rates of the tender and main springs), to the main spring rate. Using a high (thick) crossover ring decreases tender spring travel, making the main spring crossover sooner and the setup feel harder.

Fig.2 Dual-rate Spring

<u>Using a low (thin) crossover rings increases tender spring travel, making the main spring crossover later in the travel and the setup feel smoother (unless bottoming out).</u>

2.4 Rebound Damping

The next parameter to set is the rebound damping. Rebound adjustment controls how quickly a shock extends after being compressed. When the spring is compressed it stores energy. If there is no rebound damping the shock will quickly extend after a bump, releasing its stored energy and it may throw the rider "over the handlebars". In less extreme situations the shock may just extend too quickly, possibly bouncing the ski off the ground, throwing the skier off balance, providing poor traction, and/or leading to a few oscillations after hitting a single bump.

On the other hand, very high rebound damping leads to a slower response, and if running over many successive bumps the shock may not extend fast enough to respond to the next impact which will give a harsh ride. It may further lead to the shock "packing". Packing is when the shock gets shorter and shorter, resulting in lower and lower ride height. The shock does not have time to extend much between successive bumps. Edge grip also suffers with too high rebound damping.

You can get a starting point for rebound damping by strapping into the monoski, lifting yourself and the ski off the ground (perhaps 3"-6") using outriggers, and dropping down. **The response should be that the shock is compressed and then partially extend.** With too low rebound damping (too fast response) the shock will extend quickly and the monoski may oscillate one or a few times before it settles. With too much rebound damping the shock may feel "dead" and hardly extend at all after the initial compression. It is often a good idea to start with fairly slow rebound and gradually make it faster.

The rebound damping can be adjusted with the rider strapped in the monoski.

During successive runs, **you may want to adjust the rebound knob so that the rebound is as fast as possible (low rebound damping) without feeling uncontrolled.** Further, you may want an assistant to watch you riding off a 4"-6" jump and adjust the rebound so that the monoski bounces no more than once.

Fig.3. Rebound damping adjuster (needing a 5/32 ball hex wrench)

Turning it clockwise (+) will increase damping and make the response slower.

 Warning!

Never use any tools other than a 5/32 ball hex wrench on the rebound adjuster. Never back out the knob more than 45 clicks.

When a tool is used on the rebound knob, for example, it can be backed out too far, which would allow the metering rod to slide down and block the rebound adjuster from threading back in. If the O-ring on the rebound adjuster is seen, that is beyond the maximum that it should be turned out (at that point you will feel it getting harder to turn). If the rebound adjuster is turned out too far the shock may need to be serviced. The shock should only be serviced by Penske Racing Shocks, or Penske approved shops.

2.5 Compression Damping

The last shock parameter to adjust is compression damping. Compression damping controls shock resistance to impacts. Too little compression damping and the shock may go through all its travel on smaller sized bumps and bottom out. Too much compression damping and the shock may feel harsh and not achieve full travel.

Compression damping needs to be adjusted on the snow while paying attention to the response to bumps. The general principle is that mentioned above: too little compression damping and the shock may go through all its travel on smaller sized bumps; too much compression damping and the shock may feel harsh and not achieve full travel. Test different settings in different terrain and try to develop a feel for the effect of different compression damping.

DynAccess shocks have either a single compression knob, or two knobs. The latter allows the high-speed and the low-speed compression to be essentially independently adjusted. In either case the shocks have regressive compression response.

How to Adjust Compression Damping with a Single Compression Knob:

A double adjustable shock is equipped with a rebound adjuster and a single compression adjuster. For adjusting compression, turn the (blue) knob all the way clockwise, then count the clicks coming out. There are about 25 clicks in total. Never click it out too far or the shock will be damaged (it will need to be sent in for a rebuild). The more the knob is turned counter-clockwise, the less the damping and the faster the response.

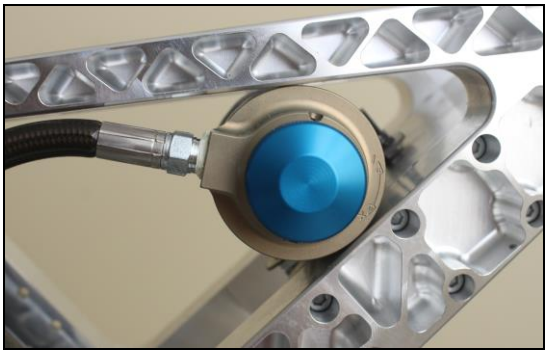

Fig. 4 The blue knob for adjusting compression damping is located on the remote reservoir.

Warning!

There is a Schrader valve on the opposite side of the remote reservoir. Best is to never touch this valve. The remote reservoir is charged with dry nitrogen that could leak out. This pressurizes the hydraulic oil to prevent cavitation. If you do, you will release some nitrogen from the reservoir. If so, take the shock to a shock rebuild place (e.g., motorcycle shop) and have them re-charge the shock with pure nitrogen **at 125-150 psi for the Tensor and Nissin shocks and 200~300 psi for the Hydra shock (depending on your model).** In an emergency situation you could use a shock pump and pump air to 125-150 psi for the Tensor/Nissin and 300 psi for the Hydra in remote reservoir; however, **you should then take the shock and have it bled and re-charged as soon as possible.** Tell the tech that you pumped air into the remote reservoir and make sure that he will get all air and humidity out.

How to Adjust Compression Damping with Two Compression Knobs

Fig. 5 The knobs for adjusting high speed and low speed compression damping are located on the remote reservoir. The big black knob is for adjusting high speed compression damping and the small blue one is for low speed compression damping

A triple adjustable shock is equipped with a rebound adjuster plus a high speed and a low speed compression knob. **The large black knob is for adjusting high speed compression damping (HSC) and the smaller blue one is for low speed compression damping (LSC).** High and low speed here means “shaft speed”, i.e., how fast the shock is compressed. It has nothing to do with how fast you ski. For example, landing after a jump compresses

the shock quickly and the response will be governed by the high speed compression knob. Skiing at high speed over “rollers” compresses the shock slowly and the low speed compression knob governs this range.

There are no numbers on the compression knobs of a triple adjustable shock. Rather, you count clicks as you turn the knobs.

Turning the compressions knobs may appear confusing but there is a reason for it. This is the right way to do it:

For low speed compression, turn the blue knob clockwise, then count the clicks coming out. There are about 25 clicks in total. Never click it out too far or the shock will be damaged (it will need to be sent in for a rebuild). The more the knob is turned counter-clockwise, the less the damping and the faster the response.

For high speed compression, turn the black knob counter-clockwise, then count clicks going in. There are about 17 clicks in total. The more the knob is turned clockwise, the higher the damping and the slower the response. A good starting point is 2-4 clicks in.

Your rebound and compression damping are usually preset by DynAccess as a suggested setup values, which are written like “HSC +4, LSC -20, REB -8”. This means that the High Speed Compression was turned all the way OUT (counter-clockwise) and then turned 4 clicks IN (clockwise), that the Low Speed Compression was turned all the way IN and then turned 20 clicks OUT, and that the rebound was turned all the way IN and then turned 8 clicks OUT. Confusing? Perhaps, but this way of counting clicks leads to the most consistent settings, and it is the standard practice of any professional race team (including monoskis). However, **all dampings (high speed compression, low speed compression, and rebound) always INCREASE when you turn the knob CLOCKWISE**.

NOTE: When turning the HSC (black knob located on the reservoir), the LSC (blue knob located on the reservoir), will also turn. This is NORMAL and does not affect the LSC setting, You DO NOT need to hold the LSC knob stationary when you adjust HSC.

2.6 Further Adjustments, Fine Tuning

As mentioned previously, it is impossible to give exact spring rates and damping settings. Learning to tune the shock to your preference is a challenging and very rewarding process. With a well tuned shock you can smoothly "fly" over somewhat rough terrain, hang on to your ski's edge in long carving turns over bumps, and retain control in a wide range of situations.

By all means **experiment with many different shock settings, but do it slowly and carefully.**

If you have any questions about shock settings, please feel free to contact DynAccess. DynAccess engineers are very often on snow and are always glad to help.

3. Lock-Out Mechanism

DynAccess has a patent pending system to hydraulically lock out the shock when getting on the chair lift. This mechanism is available as a special order. You can locate the red knob for the lock-out function on the remote reservoir. The blue knob is for adjusting compression damping.

You can lock your position by turning the red lock-out knob clockwise by the fingers ¼ turn (see Fig. 6) and lift up using outriggers (or by your ski buddy). The sled then stops at the top position.

Fig. 6 Lock-out (Lift riding) position

Fig.7 Up and Go (skiing) Position

When on the lift the red knob can be turned back (up –counterclockwise) ¼ turn. In case the skier forgets, there is a blow-off bypass valve to reduce the pressure if you jump off the lift. However, make sure to turn the knob to the skiing position before you ski.

Compared to mechanical lock-out systems available on the market, our hydraulic system is more reliable. This lightweight system is quite fail-safe and hardly affected by snow and ice.

4. Maintenance and Service

DynAccess recommends having your shock professionally serviced once a year, as well as after any hard impact or other issue.

Penske Racing Shocks services and rebuilds the shocks for DynAccess customers. This includes completely disassembling the shock, cleaning and checking all parts, replacing ice scrapers, seals, O-rings, worn valves, etc., re-assembling the shock, filling new oil and vacuum degassing it. If desired the shock can be re-valved (for example, if you're skiing with the rebound almost all the way in, then the shock can be re-valved such that your desired setting is near the middle of the range of the rebound adjuster).

If you live outside the United States, please contact DynAccess for service information in your area.