



MOTORCYCLE MANUAL

Installation

Spears Racing Shocks come set to a pre-adjusted baseline. This setting is based on testing and rider feedback, but to achieve the maximum benefit of a Spears Shock you must set your sag.

Setting the Sag

STEP 1

- 1) Mark a spot at a convenient location on the rear subframe to use as a measuring point. Then extend the rear of the motorcycle until the rear wheel is barely off the ground.
- 2) Measure the distance from the center of the rear axle to the point marked on the subframe in step 1
- 3) Record this measurement as "A".

STEP 2

- 1) Have the rider, with all their gear sit on the bike in the tuck position.
- 2) Measure the distance from the center of the rear axle to the point marked on the Subframe in step 1.
- 3) Record this measurement as "B".

STEP 3

- 1) Let the motorcycle sit under its own weight with no one on it and measure from the center of the rear axle to the spot marked in Step 1.
- 2) Record this measurement as "C"

STEP 4

- 1) Subtract measurement "B" from measurement "A". This number is your total sag.
1a) Typical total sag numbers are 25mm-30mm.
- 2) Subtract measurement "B" from measurement "C" This number is rider sag.
2a) Typical rider sag numbers are 1Smm-20mm.
- 3) Subtract measurement "C" from measurement "A" This number is static sag.
3a) Typical static sag numbers are Smm-10mm.

The amount of sag required can vary from rider to rider and from track to track.

If the sag is greater than 30mm, preload the spring by turning the adjustable spring collar.

If the sag is less than 25mm, remove preload by turning the adjustable spring collar.

Ride Height Adjustment

SPEARS Shocks have adjustable ride height. List below is the proper way to adjust your shock.
(CAUTION!!! DO NOT EXCEED 12mm of exposed thread)

Adjusting the ride height SHORTER with the rear shock length

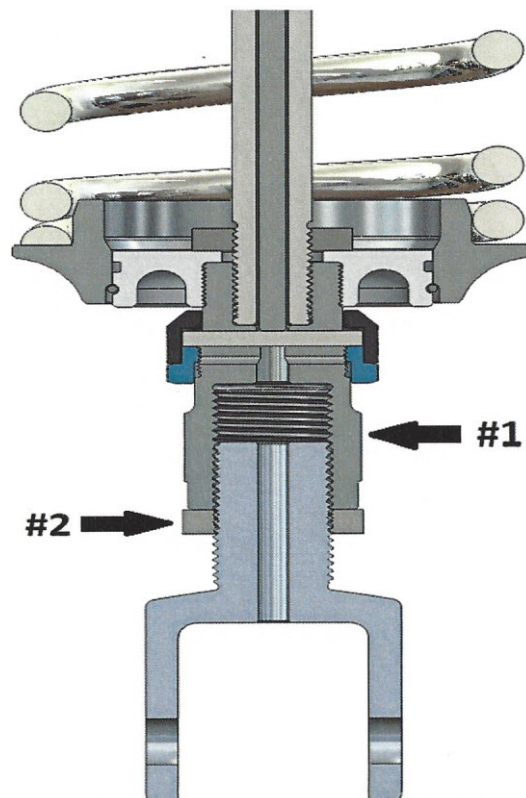
1. Lowers the rear ride height.
2. Transfers more weight to the rear wheel.
3. Makes the front turn in slower.
4. Lengthens wheel base
5. Increase chain pull to the rear wheel.

Adjusting the ride height LONGER with the rear shock lengths

2. Raises the rear ride height.
3. Transfers more weight from the rear wheel to the front wheel.
4. Make the front turn in quicker.
5. Shortens wheel base
4. Reduce chain pull to the rear wheel.

Adjusting Rear Ride Height

1. Loosen the jam nut with 1-1/8" wrench. See #2 below
2. Adjust the eyelet length (shorter or longer). See #1 below.
3. Tighten the jam nut. See #2 below.



Adjustment Recommendations

Road Race Track Tuning:

- A. Change one adjustment at a time, write that change down, and send the rider out to evaluate the change and give feedback.
- B. Take detailed notes of rider comments, lap times, tire conditions, track conditions, and current weather conditions.
- C. If you find yourself lost on the adjustments return to the original settings on the shock.

Tuning List:

Wheel spin on corner exit:

1. Soften low speed compression, several clicks at a time. 4mm Allen screw (counter clockwise)
2. Soften high speed compression, 2 clicks at a time. 10mm wrench (counter clockwise)
3. Stiffen rebound, 2 clicks at a time. (clockwise)
4. Reduce spring preload, or reduce spring rate.

Harshness over bumps:

1. Soften low speed compression, several clicks at a time. 4mm Allen screw (counter clockwise)
2. Soften high speed compression, 2 clicks at a time. 10mm wrench (counter clockwise)
3. Stiffen rebound, 2 clicks at a time. (clockwise)
4. Reduce spring preload, or reduce spring rate.

**Note: Too soft on compression can bring about a harsh feeling by allowing too much shock travel.

Wallowing or pumping exiting corner:

1. Stiffen low speed compression, several clicks at a time. 4mm Allen screw (clockwise)
2. Stiffen high speed compression, 1 to 2 clicks at a time. 10mm wrench (clockwise)
3. Increase spring preload, or increase spring rate.
4. Slow down rebound, 1 to 2 clicks at a time. (clockwise)

Slow turn-in:

1. Raise fork legs in triple clamps
2. Increase rear eyelet length, 1/2 to 1 turn at a time. (do not exceed 12mm of exposed thread)
3. Soften fork compression
4. Increase front fork sag
5. Speed-up rear rebound. (counter clockwise)

Disassembly / Assembly Instructions

Disassembly Instructions

1. Back the rebound adjuster and compression adjuster to full soft and depressurize the reservoir.
2. Clamp the body cap eyelet in a vise with the shaft pointing up. (Soft jaw vise is recommended)
3. Unscrew the shaft bearing assembly and remove the shaft assembly.
4. Drain the oil.
5. Push the reservoir end cap up into the reservoir body, and remove wire retaining ring.
6. Remove the reservoir end cap.
7. Use an 8-32 threaded rod or a Spears floating piston tool to remove the floating piston from the reservoir. Drain remaining oil out of shock.
8. Use solvent to clean all parts, try to reduce amount of solvent that makes contact with seals. Dry the parts and inspect them replacing any o-rings or shims as needed.
9. If there is a need to replace or revalve the shock place the shaft assembly in a vise and use a wrench to remove the ring nut. This will give you access to the piston assembly.

Assembly Instructions

1. Reassemble the shaft and piston assembly, and install the ring nut. Be sure to add sufficient constants to be able to properly torque the ring nut to 25 foot pounds (300 inch pounds).
2. With the shock returned to the vise with what would be the shaft facing up. Fill the reservoir three quarters of the way full with oil.
3. Insert the floating piston into the reservoir using the 8-32 threaded rod or Spears floating piston tool, and push it until it bottoms out inside the reservoir.
4. Fill the shock body with oil up to the threads where the shaft bearing (seal head) screws in.
5. Slowly push the floating piston back and forth several times until all air bubbles are seen.
6. Replace the reservoir end cap and snap ring.
7. Pressurize the reservoir to reposition the floating piston (approx. 150 psi).
8. Insert the shaft assembly with the piston band into the shock body, push the piston just below the surface of the oil, until the 2 shaft bleed hole ports are covered.
9. Bleed the air out of the shaft assembly by moving the shaft up slowly and pushing down a few times using a 1" - 2" stroke, being sure to keep the two ports in the shaft below the surface of the oil. If the ports come out of the oil air will be sucked back into the piston assembly. Lightly tap the eyelet a few times with a rubber mallet to make sure that all the air is released from the piston.
NOTE: this step is very important; take your time, repeat as needed.
10. Pull up on the shaft assembly until the two ports are just below the surface of the oil. Top off with oil to fill the shock body.
11. Slide the shaft bearing down without moving the shaft until the o-ring contacts the body. Thread the shaft bearing in .250- .375 and depressurize the reservoir, tighten the shaft bearing. Do not over tighten the shaft bearing.
12. Pressurize the shock to approximately 125 psi. (drag shocks from 150-175psi)
Please call if you have any questions on specific pressures.

NOTES

- 1) IMPORTANT: Reservoir floating piston must be repositioned before the shaft is inserted into The shock body (refer to step #7).
- 2) Spears Shocks recommends Maxima 3 wt. oil in all Spears products.

Suggested Maintenance

EVERY 40 HOURS OF TRACK TIME OR YEARLYChange oil. Replace the seals and shims.

Trouble Shooting

LOSS OF NITROGEN PRESSURE Valve core is not tight or needs replacing, a-ring on air valve needs replacing, reservoir cap a-ring needs replacing, leaking floating piston a-ring.

SHAFT WILL NOT FULLY EXTEND Check for bent shaft, low nitrogen pressure. low oil level.

OIL LEAK AROUND SHAFT Shaft seal a-ring or wiper needs replacing.
** *minimal oil seepage is normal.*

OIL LEAK AT RESERVOIR O-ring on hose needs replacing, reservoir cap or CD housing a-ring needs replacing.

OIL LEAK BETWEEN SHAFT BEARING AND BODY Shaft bearing a-ring needs replacing

Damper Tuning

The main purpose of a shock is to control the spring to keep maximum traction between the tire and the race track. When a shock is in compression it is used to help control the movements of the wheel. When the shock is in rebound it is controlling the stored energy of the spring as it reaches out to the racetrack.

Conditions of the racetrack can require very different damping characteristics. A dry race track with a high level of available grip will allow you to tune in more low speed damping loading the tire sooner and increasing chassis platform. This can be done by reducing the amount of bleed with the low speed adjuster or with less internal bleed. With that being said a motorcycle with too much low speed damping will have wheel spin or lack of traction in exiting slow corners, and on heavy braking and initial turn in. It may also show a lack of grip on quick transitions back and forth. In a low grip situation like a wet track you would want to tune out low speed damping allowing more chassis movement, (weight transfer) delays the loading of the tire. This can be done by increasing the amount of bleed with the low speed adjuster or with more internal bleed. An example of a motorcycle with too little low speed damping would be coming through high speed corners where the bike will not hold its line, will not finish the corner.

Rebound damping can also effect weight transfer, cornering, and feel of the motorcycle. The lighter the amount of rebound damping front or rear will greatly affect your weight transfer of the motorcycle. If you lessen the rebound damping in the front forks of the motorcycle it will transfer weight quicker to the rear of the motorcycle as the brakes are released or under acceleration. The same goes for the rear shock, if you lessen the rebound damping in the rear it will quicken the weight transfer to the front of the motorcycle especially as you apply the front brakes, and on turn in.

When there is a lack of rebound damping the bike can feel like it wants to over extend on hard acceleration on corner exit. It can also make the bike feel harsh over bumps, especially if the bike is leaned over. When a motorcycle is over damped in rebound it can cause the bike to "pack" down in a series of bumps and a rider can recognize this as being too stiff. Too much rebound can cause lack of grip on cornering, and not allow the bike to finish the corner or compress and spin coming out of the corner. When making a spring change by adding rate or taking it away you should note where the location of the rebound adjuster is and make changes accordingly. Sometimes a spring change will bring a better balance to the damping values after the spring change. If the spring/shock combination is totally balanced, the rule of thumb is a stiffer spring requires lower compression and higher rebound damping. Where as a softer spring requires higher compression and less rebound damping.



Compression



Rebound