



The best place to start any fine-tuning process is literally “by the seat of your pants”. Drivers have different styles and preferences so the set-up that your buddy likes may feel terrible to you. If the car feels uncomfortable to you, then it will probably not be the fastest set-up. You should begin by experimenting with different shock and spring combinations until you find a good overall baseline set-up that works for the widest range of conditions. Once you have a good overall baseline set-up, then you can adjust for different track conditions.

In order to make the correct adjustments, you first need to consider the function of a race car’s springs. The springs are there to insulate the chassis from forces applied through the wheel by irregularities in the track surface. A spring that is too stiff can allow the chassis to accept too much of the force, as too much rate typically causes the car to “skate up” the track with little “sidebite”. Springs that are too soft cause the chassis to use up too much of the suspension travel. Once you have narrowed your spring selection to a good baseline set-up, you can then start realizing the most important tuning function of springs on a race car. When the correct range of spring rate is established, the spring can then begin its job of assisting in the control of weight transfer. The spring determines how much weight is received at each wheel during cornering, braking, or accelerating. It is at this point that the driver’s “feel” starts coming into the equation. You can now adjust the spring rates to loosen or tighten the car as needed to arrive at the set-up that feels best to you and achieves the results you are looking for – whether it be loose, tight or neutral. When you have arrived at the proper baseline spring set-up, you should then try to fine-tune the handling at the track with shocks and adjustments rather than spring changes. It is best to change springs at the track only as a last resort, but sometimes it has to be done in a situation such as traveling to a high-banked track when your baseline was set for a semi-banked track. In that case, you may need to change to a stiffer spring rate to compensate for the increased loading in the turns. If you are in this situation, pay close attention to your wheel travel making sure that the travel is in the same range as your baseline set-up. The travel can be checked with the travel indicator ring on the shock rod and then compared with the records from testing sessions on your baseline set-up.

When checking shock travel, always be careful to avoid bumps on the way into the pits that could give false readings. Also, be certain that your ride height is the same as before. Find level ground and measure the distance between the shock bearings then, once the new spring is on, adjust the spring to yield the exact same measurement. A quicker way to measure the ride height is to make check gauges when you have the correct ride height set. A piece of small diameter tubing can be used to make the gauges in the shop. With the car on a level floor, cut the tubing to fit exactly in the space between the lower control arm and the bottom of the chassis. The rear gauges can be made to fit between the top of the differential housing and the bottom of the chassis. Label the gauges according to the respective corners they have been cut for to ensure accuracy. The gauges can then be taken to the racetrack in case you need to make a spring change. Remember to always use them in the exact same spot on the chassis.

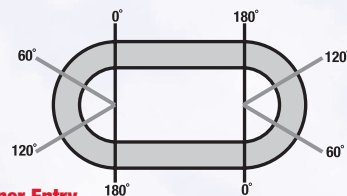
Now let’s move on to the shock’s role in chassis tuning. One of the functions of the shock is to control the kinetic energy stored in the spring as the spring compresses and rebounds. That is a very simple statement but it is, in fact, one of the shock’s functions. The other, and most important shock function in a race car, is controlling when weight is transferred while turning, braking, or accelerating. The different valving options offered in a racing shock allow you to speed up or slow down weight transfer depending on what the car needs. Fine-tuning can be done by using a different straight valve shock on one or more corners or by using split valve shocks. An example of a straight valve shock is QA1 part #5074, which is a 7” shock with 4 valving in compression and 4 valving in rebound. An example of a split valve shock is QA1 part #5074-6, which is

a 7” shock with 4 valving in compression and 6 valving in rebound. This is typically called a “tie-down shock,” since the heavier rebound valving will keep weight at that corner longer. A QA1 part #5076-2 is an example of an “easy-up shock” with 6 valving in compression and 2 valving in rebound. The “easy-up shock” is used to transfer weight off of that corner of the car quicker. The split valve shocks are offered with several different valving options. A huge benefit of the QA1 shocks is that you can custom valve your shocks if you need a valving that is not offered in an off-the-shelf configuration.

TUNING TIPS

QA1 revalveable shocks are unique in that you can custom valve your shocks for your particular application. QA1 valving is predictably spaced from one valving to the next, so you can be certain that when you make a change it is going to be correctly reflected in the performance of the shock. QA1 tuning kits come with pistons (large body), seals, base valves (large body), drill bits, a wide assortment of deflective discs, and easy-to-follow instructions. Best of all, they are so simple to use that you can often change your valving in less than ten minutes per shock! See page 25 for more information on the QA1 tuning kits.

The following template was designed to assist you in breaking down the corner into three main areas. First, establish what handling characteristic your car possesses, then, using the template, determine in what area of the corner you are experiencing the problem. Follow the recommended adjustments in order to optimize your vehicle’s cornering potential.



0° thru 60° Corner Entry

Problem: Loose at turn entry

- Increase compression on front or right front
- Decrease rebound in left rear

Problem: Tight at turn entry

- Decrease compression on front or right front
- Increase rebound in left rear

60° thru 120° Mid Corner

At most tracks this part of the corner is where the car has taken a set. Your braking is already done, your steering angle is constant and you are getting ready to pick up the throttle. Typically, your car’s handling characteristics are influenced by vehicle geometry and roll centers at this part of the track and less likely affected by shock valving.

120° thru 180° Corner Exit

Problem: Loose at turn exit

- Decrease rebound in right front
- Decrease compression in left rear

Problem: Tight at turn exit

- Increase rebound on right front
- Increase compression on rear or right rear only

Always start tuning by concentrating on the problem that happens first in the turn. For example, if you are loose exiting the turn, it is possible that it is happening because you are tight entering the turn. The extra steering input from trying to “drive through the push” could cause the car to seem loose at mid-corner and at exit. Once the “push” entering is fixed, the loose condition exiting the corner could go away.

Technical Information

QUICK TIPS

SUSPENSION CLEARANCE

Always check the clearance on all suspension arms, shocks and springs through the entire range of travel. The extra clearance through the entire range of travel could mean the difference in being competitive after contact with another car or a DNF due to a bent suspension component.

SPACING

In the event that you need to space the shock away from the mounting bracket to gain clearance, then use a small diameter spacer. If you space the shock with a nut or washers, they could hit the shock bearing or loop as it goes through suspension travel.

BEARING MAINTENANCE

The shock bearings that do not have a nylon race should have penetrating oil applied and then worked by hand for regular maintenance. Wipe the excess oil from the bearing when you are finished so that it does not collect dirt.

BINDING

Check the entire suspension without springs and shocks for binding or tight rod ends or bushings. If the suspension is tight, the chassis will see it as additional spring rate. Binding and then freeing-up in the typical suspension travel range is an even worse condition. It will be adding spring rate at times and not adding it at others, thereby making the chassis inconsistent.

STUD MOUNT

Always check for binding when you mount a stock-type stud mount shock. The mount opposite the stud mount should be installed first and tightened. If the stud mount is contacting the side of the mounting hole, then you will need to elongate the hole. The stud should not be hitting any part of the upper mounting hole. This would cause it to bind in the mounting.

DENTED BODIES

QA1 twin tube shocks are designed to function even if the body is dented, unless the damage is severe enough to reach the inner tube. Any dented shock should be checked for internal damage. In the "old days", a sealed shock could not be easily checked for damage, but our design allows you to be certain that the shock is operating at 100% efficiency. First, visually check the inner tube for any signs of damage. Next, work the piston rod into the inner tube to check for any tight spots and/or check the inside diameter with a dial gauge.

GENERAL MAINTENANCE

Some QA1 shocks are designed to be repairable, rebuildable and revalveable by the racer, while others are designed to be serviced by QA1 authorized service centers. While QA1 shocks are designed to be run on dirt or asphalt, it is still important to keep dirt and debris out of the shock absorber as much as possible. To do so, wipe down the piston rod regularly and, if needed, cover the shock with tubing (see frequently asked questions). QA1 shocks are also designed to be and will need to be checked and replaced or repaired as needed. Please contact QA1 for parts prices.

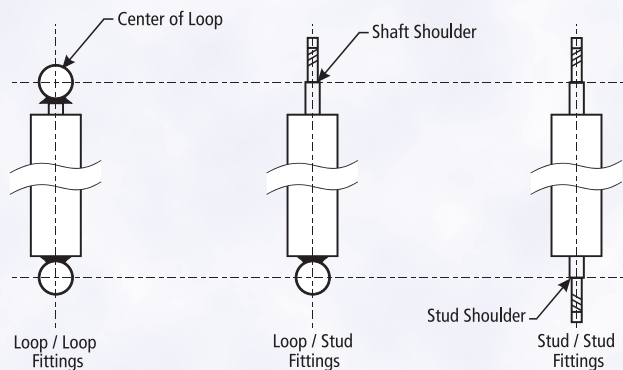
LIMIT STRAPS

The modern dirt track car relies on large amounts of extension travel on the left side of the car. Using the shock as a travel limiter can be extremely hard on the internal components of the shock. Adding a simple limit strap can significantly reduce the wear and tear on your shock absorbers.

MEASURING RIDE HEIGHT

Compressed and extended mounting lengths are measured from the center of loops and/or shock shaft/stud shoulders. If the measurements are taken from mounting surface to mounting surface, subtract 5/8" for each shaft/stud end. The preferred measurement in most cases is taken with the car sitting on the ground as ready to go. If initially setting up the chassis, simulate the approximate ride height (stance) before measuring.

FLAT TRACKS



When changing to a more flat track, utilizing slightly stiffer rebound on the left side, while softening the rebound on the right side, will generally enhance the handling of the car.

SHORT TRACKS

When changing to a shorter track, softer valving all around usually will improve handling.

HIGH BANKED TRACKS

When changing to a track with a higher degree of banking, stiffer valving should improve handling.

We hope that this information will get you on your way to quicker lap times and a winning season!

**Don't forget springs and rod ends!
See pages 100-123.**



Frequently Asked Questions

In the QA1 part numbers, which is first - compression or rebound?

Compression first, then rebound.

If I have a split rate shock such as a 3-5 and I turn the shock 180 degrees, will the shock then be a 5-3?

No, it makes no difference if the shock is mounted upright or upside down. The only way you can change your valving is through internally changing the deflective discs or otherwise physically adjusting the valving.

Are QA1 shocks gas charged?

The QA1 monotube shocks are gas charged. Other series utilize either a gas bag or foam cells.

What is the difference between a monotube and twin tube shock?

Monotube shocks utilize a single tube cylinder, with the piston rod moving through it. With this design, the cylinder surrounding the piston rod is completely submerged with oil. At the base of the cylinder, a dividing piston separates high pressure nitrogen gas from the oil. The small chamber of gas under the dividing piston keeps a positive pressure on the oil, forcing the piston rod to full extension.

A twin tube shock utilizes two tube cylinders. The outer tube is the body of the shock. The inner tube, also known as the compression tube, supports the piston assembly. Throughout the compression stroke, some oil is forced through the base valve out into the outer chamber. The gas bag is compressed through the compression stroke. During rebound, oil is replenished back into the compression tube from the outer chamber. This design can withstand some body damage and still function properly. This design is user friendly to rebuild, because there is no high gas pressure.

Can service parts be purchased from QA1?

Yes. Service parts for racer revalveable and rebuildable shocks are available at reasonable prices.

Can QA1 shocks be run upside down?

Yes. All QA1 circle track shocks, except for stock mount, can be run upside down, upright and at all angles in between.

What valvings are available with the tuning kit?

For QA1 revalveable large body shocks, you can choose any valving between 0 and 13. For QA1 revalveable small body shocks, any valving combination between 0.5 and 8 is available.

What valving would I have to order so that the shock will be easily revalveable when I get it into my own hands?

With revalveable QA1 circle track shocks, you can purchase any of the valving codes and revalve them as you please with the QA1 Tuning Kit. The Tuning Kit allows you to change your valvings for both compression and rebound.

Is it really reasonable to revalve shocks between qualifying and running my heat or feature races?

You bet it is. Once you have revalved the shocks a couple of times you will have no problem changing your valving in 10 minutes or less.

What can a driver do to keep the dirt and debris out of the shocks?

Most QA1 shocks include a wiper to help prevent most dirt and debris from entering the shock. If needed, you can also purchase either a cloth cover that almost looks like a sock, or some accordion-style tubing and zip tie it to the shock right by each eyelet. These steps will further assist in keeping the dirt and other debris away from the piston rod.

Can I evaluate a shock by hand, or is a dyno required?

It is impossible to accurately evaluate a shock through stroking it by hand. The shocks perform much differently on a race car when the piston velocity is much quicker than they do when you are stroking them by hand. It is important to evaluate the shocks at low, medium and high piston velocities to have an indication of how the shocks will affect handling. Therefore, a dynamometer is necessary for any evaluation.

Will QA1 assist me in determining which product to use for my application?

We are always glad to assist you in making your product selection. QA1 technical support staff is very experienced and knowledgeable about QA1 products and their use. When requested, we will use information supplied by you to assist you in determining which QA1 product is best suited to your application. However, **the final decision as to part selection and the correct installation and usage of the product is yours.** Please call for assistance if a QA1 product does not appear to fit your application – there is always the possibility that another part will work better. Parts that have been installed, damaged, altered or forced in any way are not eligible for return.

Technical support and order lines
are open Monday - Friday
8 a.m. to 5 p.m. CST.