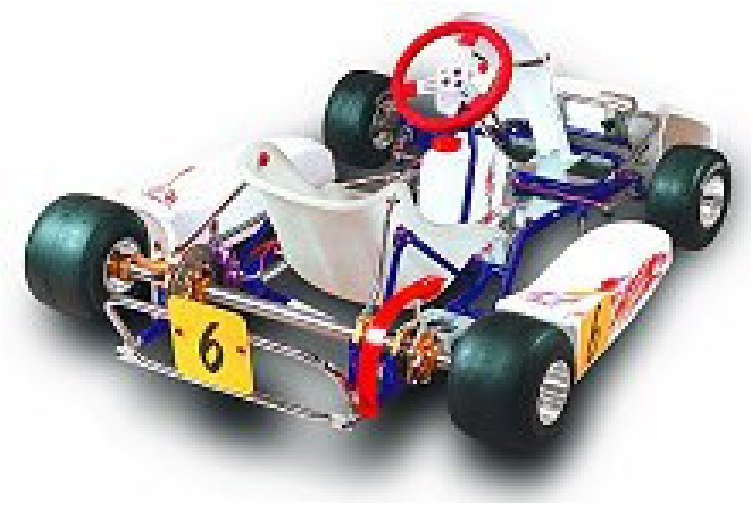
BASIC CHASSIS SETUP



1. BASIC CHASSIS SETUP 3
2. FRONT END ADJUSTMENTS 3
3. ACKERMAN 3
4. CASTER 3
5. CAMBER 4
6. FRONT WIDTH 4
7. REAR END ADJUSTMENTS 4
8. WHEEL HUB LENGTH 4
9. REAR TRACK 5
10. REAR RIDE HEIGHT 5
11. AXLE STIFFNESS 5
12. PINCH BOLTS 5
13. SEAT STRUTS 5
14. REAR TORSION BAR 6
15. FRONT BUMPER 6
16. REAR BUMPER 6
17. TIRE PRESSURES 6
18. NERF BARS 6

1. Basic Chassis Setup

Chassis setup can be one of the more daunting tasks facing both the beginning and experienced karters alike. And while veterans of the sport are familiar with the terms and knowledge that aids them in tuning a chassis, certainly there are newcomers to the sport who will benefit from the following article, contributed by Century Performance Products.

2. Front End Adjustments

Some of the most important handling adjustments are usually made to the front end of a kart. Most handling problems that occur when entering a corner are frequently due to an improperly adjusted front end. Front-end bite and steering response can be corrected by simple adjustments, and the toe setting is a good place to start. Toe settings will effect weight distribution, top speed, and cornering response. The more toe in or toe out, the slower the top speed becomes due to excessive drag by the tires. Despite this negative effect, increasing the toe out can have some benefits. For example, increasing toe out will increase initial cornering response, thus giving the driver a better turn into the corner. However, if the kart is overly sensitive to steering wheel movement at the point of turn in and begins to over steer, the tow out settings may be too high. On a dry surface, a toe setting of 0 to 2mm out is recommended by a few leading kart manufacturers. For rainy conditions, one might try increasing the toe out even further. It is important to note that the toe should only be changed as a last resort. Look to other adjustments first to correct handling problems before changing your toe settings. As well, when setting the amount of toe, make sure that the toe is equal on each side.

3. Ackerman

Ackerman steering makes the front tires turn at a different rate. For example, the front inside tire will turn faster than the outside tire when turning into a corner. This creates a faster steering response, thus causing flex through the chassis when turning. Adding ackerman makes the kart steer more positively. At the same time, the driver will notice a decreased amount of steering input needed to turn the kart. As a result, the kart becomes more sensitive to the driver's input. In contrast, decreasing ackerman makes the kart steer more lethargic, and the amount of steering needed to corner will increase. Ackerman steering is standard on most chassis. The spindles will usually have 2 tie rod hole locations; the inside hole increases ackerman, while the outside hole decreases ackerman. The tie rods can be lengthened or shortened to fit either hole.

4. Caster

Caster affects the grip of both the front and rear of a kart. It does this by transferring weight to the opposite rear wheel during cornering. Although it may seem complicated, there are a few simple rules to follow concerning caster. If one decreases the caster, the kart will be easier to steer. Some drivers have noted that it adds feel to the kart and increases bite on the front end. A driver may want

to decrease the castor setting if the track conditions are too grippy. The kart will free up and be more drivable if castor is removed. The driver may want to add castor if the conditions are cold, or if the class requires hard compound tires. This will offer more grip and help eliminate under-steer. Many manufacturers offer 3 different caster pills for their karts. The standard or neutral pill is most widely used. For most applications, use the neutral castor pill. The remaining two pills will allow the driver to increase or decrease the amount of caster. Some manufacturers have recommended that smaller drivers should decrease their caster, while larger drivers should increase their caster.

5. Camber

Camber is measured by how far the front tires are leaning in or out as viewed from the front of the kart. If the tire is leaning in the kart has negative camber. If the tire is leaning out, the kart has positive camber. Many karts are built with 1/2-degree negative camber and are designed to work with that. Camber is usually adjusted when the track surface is wet. In these conditions, the driver can negatively adjust the camber to find more grip. Manufacturers sometimes offer a centric king pin bolt that allows for adjusting camber independent of the caster setting. With the use of this centric king pin bolt one can get even more caster adjustment.

6. Front Width

The most common adjustment made to change the handling of a kart is by working with its front track, or front-end width. Widening the front track will create more of a jacking effect when the wheels are turned. This will result in more front-end grip and quicker turn in. Narrowing the front track will have the opposite effect. This will result in slower turn in and less front-end bite.

7. Rear End Adjustments

The rear end of a kart begins from the back of the seat. Some adjustments include wheel hub length, track, rear ride height, axle stiffness, and seat struts. Changes to these settings are usually made when handling problems occur on the exit of the corner.

8. Wheel Hub Length

Kart manufacturers make three different wheel hub lengths for their chassis. It's highly recommended that a karter purchase all three of these sizes, as they are the most commonly adjusted setting on the kart. Longer hubs provide more rear grip. So if the kart over steers as it exits a corner, a longer hub may be desirable. Short hubs are used when the kart under steers at the exit of the corner. If the driver runs out of track surface as he/she exits the corner, perhaps they are experiencing under steer. Switching to shorter hubs may be desirable in a situation like this.

9. Rear Track

For American sprint racing, most rules dictate a maximum rear track of either 52 or 55 inches. Most chassis are designed for rules allowing a 55-inch rear track. Therefore, it is important to set the kart's rear track to the maximum that the rules allow. It becomes necessary to narrow the track when the rear of the kart has too mush grip. However, this adjustment is made as a last resort. The driver should always change to short wheel hubs before decreasing rear track. Narrow the rear track in 1/8-inch increments, as most chassis are very responsive to minor changes.

10. Rear Ride Height

Most chassis have two settings for the rear ride height. The chassis should be run with the higher ride height for better grip. The higher ride height creates more leverage, which gives more weight transfer to the outside tires. The result of this is increased grip for the driver. Lowering the ride height will have the opposite effect and cause the kart to over steer. Only in cases where there are very tacky track conditions should the ride height be decreased.

11. Axle Stiffness

Kart manufacturers make three types of axles for American Sprint Racing. There are type A (soft), type B (medium), and type C (hard) axles. In almost all cases you will use the type B axle. The type C axle is used when the weather is cold, in slippery track conditions, or when rules mandate the use of harder compound tires. The type A axle is used if conditions are extremely grippy, or where there is excess rubber build up.

12. Pinch Bolts

Many chassis are double railed, where on the left side two rails come together and are pinched by tow bolts. When the bolts are tight, the chassis is more rigid and therefore allows for more weight transfer through the chassis. This is effective in creating more side bite. When the bolts are loose or removed, the opposite happens.

13. Seat Struts

Most conditions will call for two seat struts on each side of the seat. These struts should run from the very top of the seat to the two outer bearing cassettes. On the motor side it may only be possible to use one strut. The seat struts allow the high leverage point of the driver to transfer load to the rear tires. This essentially creates more rear end bite. When seat struts are removed, the driver's high leverage point is not taken advantage of and minimal load is transferred to the rear tires. Usually, one would want to remove or loosen seat struts if trying to reduce rear grip.

14. Rear Torsion Bar

The rear torsion bar can be left out when you want to reduce rear grip. However, if you want to increase rear grip, place the torsion bar in flat. Even more rear grip can be achieved if the torsion bar is placed vertically.

15. Front Bumper

The front bumper should remain tight at most times. The exception would be on a very high grip track with rubber build up.

16. Rear Bumper

The rear bumper should be kept tight at most times. Loosening the rear bumper will reduce rear grip.

17. Tire Pressures

Tire pressures can range from as low as 6 psi up to around 30psi depending on the compound of the tire, temperature, surface of the track, and overall chassis set-up. For most applications you should stay between 10psi and 14psi. For SL tires, like a Bridgestone YGC, one can go as high as 16psi. With Dunlop SL4's you can go as high as 18psi. For extremely hard tires, such as Bridgestone YBN's, one will need to run tire pressures as high as 30psi. All tires have a range in which they work the best. In general, the higher the tire pressure, the faster the tires will come up to temperature and the more grip one will have. However, if too much air pressure is put in the tires, the contact patch with the track surface will be reduced, and as a result adhesion will be lost.

18. Nerf Bars

In normal circumstances you will want to leave the nerf bars tight. Loosening the nerf bars will give the kart more side bite and disallow the kart to drift.