MARGAY racing

BRAVA 100 SET-UP GUIDE

BRIDGESTONE

SNIPER

KG

DWT

2018 BRAVA 100 SET-UP

BASELINE SET-UP INFORMATION FOR THE BRAVA 100

CONTENTS

SAFETY GUIDE

Always wear a helmet, neck support, driving suit and gloves while operating. Never drive on public roads, highways or any place other than a sanctioned racing facility. Karts can cause severe injuries, paralysis or death to the operator or others. Owner assumes all responsibility for safe operation of the vehicle.

KART INSPECTION

It is the owner's responsibility to carry out regular inspection of the kart components, brakes, steering, etc. All steering components should be properly fastened and safety clipped: steering shaft, tie rods, spindles and kingpins. All braking components should be properly fastened and safety clipped: master cylinder, brake rod, brake caliper and brake rotor. All nuts holding on wheels should be locking nuts. All nuts holding on bodywork components should be locking nuts: front bumper, nerf bars and rear bumper brackets.

KART MODIFICATIONS

Under no circumstances does Margay Racing authorize or recommend modifications of any type to the chassis or components we manufacture and distribute. This includes alternative methods of component assembly, chassis manufacturing, etc. Altering the chassis or components is solely the responsibility of the owner.

QUICK START GUIDE

	Bridgestone YLC	Bridgestone YLM
Tire Pressure	12 - 14 PSI	8 - 10 PSI
Wheels	M-Series 130mm / 210mm	M-Series 130mm / 210mm
Front Width	10mm inside hub	15mm inside wheel
Front Torsion Bar	soft position	soft position
Front Ride Height	neutral	neutral
Caster	neutral	neutral
Camber	-2mm / side	-2mm / side
Toe	+1mm / side	+1mm / side
Rear Width	54" outside / outside	55" outside / outside
Rear Hubs	50mm x 95mm	50mm x 95mm
Rear Axle	standard – 'B'	soft – 'A'
Rear Ride Height	axle in upper position	axle in lower position
Seat Struts	2 supplemental seat struts	2 supplemental seat struts

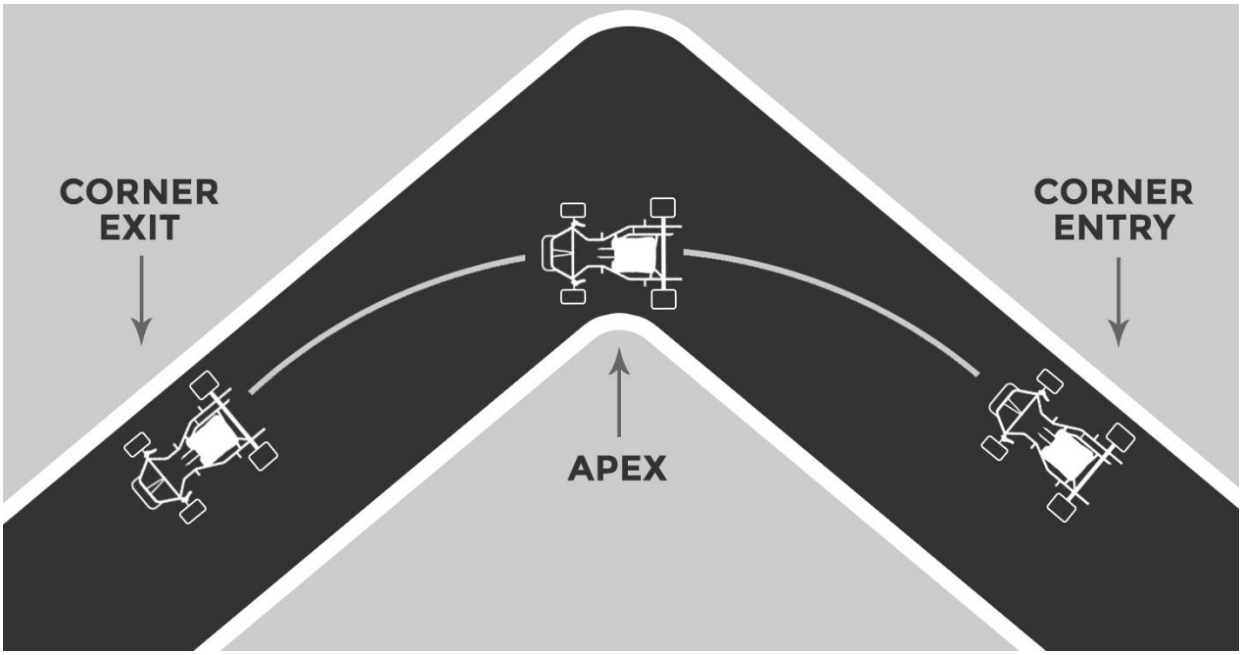
** Numbers are assuming a senior driver with 7.1 rear tires.

SCALING START GUIDE

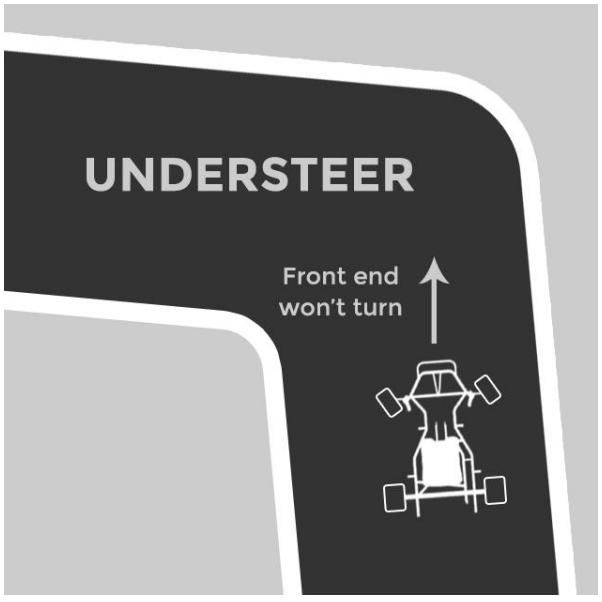
- **Front Percentage**: +/- 43%
- **Left Percentage**: +/- 49%
- **Cross Percentage**: +/- 50%

  (cross percentage refers to RF and LR as a percentage of the total weight)

DRIVING LINE AND TERMS



Oversteer is when the rear of the kart slides more than the front, causing the driver to counter steer to avoid spinning.



Understeer is when the front slides more than the rear, causing the kart to 'push' forward instead of turning.

TIRE PRESSURES

Tire pressure starting points (set before going on track):

- **Bridgestone YLM**: 8 – 10 PSI
- **Bridgestone YLC**: 12 – 14 PSI

Setting tire pressures for a cold tires is done so the tire can reach maximum temperature near the last 25% of the race. It is important that you set tire pressures cold with values that discourage them from becoming too hot during the session. Using air, each tire should not rise more than 4 PSI during a normal session. We recommend you check your tires after each session to ensure that they are not overheating.

PROBLEM: The kart gets better as the race goes on, but by then it's too late.

SOLUTION: Increase the tire pressures by 1 PSI per session. This will help get the tires to temperature faster.

PROBLEM: The kart is really good in the first 3 laps, but gets slower from there.

SOLUTION: Decrease the starting tire pressures by 1 PSI per session. Your tires are getting to temperature too quickly and are likely overheating from there. Decreasing the starting pressures will allow them to heat slightly slower, making the kart become progressively better instead of progressively worse.

Tire pressures can vary based on ambient temperature. On a cold day, increase starting tire pressures. On a hot day, decrease starting tire pressures.

WHEELS AND TIRES

The relationship between wheels and tires is an important one, both for handling and overall performance. The recommended wheels for the Brava 100 are:

- #725131 – DWT M-Series 5" x 130mm Euro mount front wheel / for 4.5 front tires
- #725180 – DWT M-Series 5" x 180mm Euro mount wheel / for 6.0 rear tires
- #725210 – DWT M-Series 5" x 210mm Euro mount wheel / for 7.1 rear tires

There are also AlumiLite aluminum wheels available which are stiffer than the M-Series magnesium wheels. Because the AlumiLite wheels are stiffer, they provide more overall grip.

Balancing tires each time they are mounted on the rim is important to ensure that all rotational mass is properly distributed.

PROBLEM: The front tires are shaking at the end of the straight sections.

SOLUTION: Your front tires likely need to be balanced. Use stick on wheel weights to ensure that the wheel/tire combination is properly balanced.

PROBLEM: The kart is too loose, not enough grip.

SOLUTION: Switching to the AlumiLite aluminum wheel set will help the kart gain some mechanical grip. Maintain the same wheel widths will ensure a true back to back comparison.

FRONT TRACK WIDTH

Front track width can be adjusted by moving spacers to the inside or outside of the wheel. Adjusting front track width can adjust the front responsiveness on turn-in and also the resulting inside rear tire lift. Margay karts come with two spacer sizes: 5mm (small) and 15mm (large).

Baseline front track width settings:

- **Bridgestone YLM**: 15mm inside the 95mm wheel hub
- **Bridgestone YLC**: 10mm inside the 95mm wheel hub

PROBLEM: The front end understeers on corner entry.

SOLUTION: Widen the front track width by 5mm per side, per session. This will increase front end weight transfer and grip levels on corner entry.

PROBLEM: The front grips too much and causes the rear end to slide on entry.

SOLUTION: Narrow the front track width by 5mm per side, per session. This will decrease the front end transfer on corner entry.

NOTE: Tighten the castle nut just enough so there is no lateral movement of the wheel or spacers. Over-tightening will result in pressure being put on the wheel bearings, causing them to not spin freely.

FRONT TORSION BAR

Front torsion bars allow you to adjust the front end rigidity of your kart. Adjusting the rigidity of the front end allows you to control the stability and responsiveness on corner entry and exit. A stiff front end will increase turn in responsiveness and a soft front end will cause the front end to be slightly lazier.

NOTE: A softer front end will also help create a more stable straight line braking feel, but at the expense of front end grip.

PROBLEM: The inside rear lifts too much, causing understeering in the front end.

SOLUTION: Use the adjustable torsion bar and set it in the stiff position (shown above). This will increase front grip levels and reduce the rotation of the inside rear wheel.

PROBLEM: The front end is too "darty".

SOLUTION: Move the front bar to the soft position, or if already in the soft position, remove it entirely. This will help create more chassis flex in the front and reduce the aggressive turn in response.

FRONT RIDE HEIGHT

Front ride height can be adjusted for two reasons: to adjust cross weight percentages and to adjust front end responsiveness. A standard Brava 100 has two adjustment shims on top of the spindle, and two adjustment shims on the bottom of the spindle. Shims can be moved and adjusted accordingly.

PROBLEM: The front end grips too much, creating oversteer through the corner.

SOLUTION: Dropping the spindle down 1 shim will help move the center of gravity (C.O.G.) to the rear of the kart, reducing the front end responsiveness and increasing rear end grip levels.

PROBLEM: I can't get the front end to be as responsive as I want it to be.

SOLUTION: Raise the spindle 1 shim at a time. This will move the C.O.G. to the front of the kart and increase your front weight percentage, resulting in an increase in front end grip levels.

PROBLEM: While scaling, the front weights are off 10lbs from RF to LF.

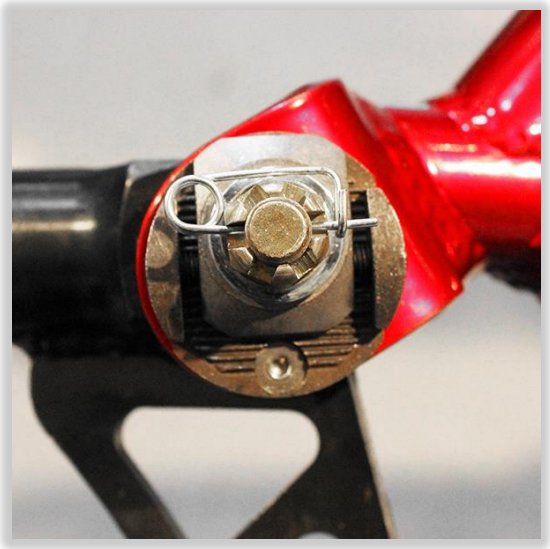
SOLUTION: Drop the spindle 1 shim on the light side. This will raise that corner and create a shift of an average of 6lbs and help balance out the front weight transfer.

CASTER / CAMBER / TOE

Front end geometry is crucial in creating the perfect handling kart. Caster, camber and toe can be adjusted to achieve almost any desired handling characteristic. Standard settings are:

- **Caster**: Neutral (15 degrees)
- **Camber**: -2mm per side
- **Toe**: 1mm toe out per side

POSITIVE CASTER



NEGATIVE CASTER

PROBLEM: The kart sits flat and slides. The inside rear does not pick up on entry.

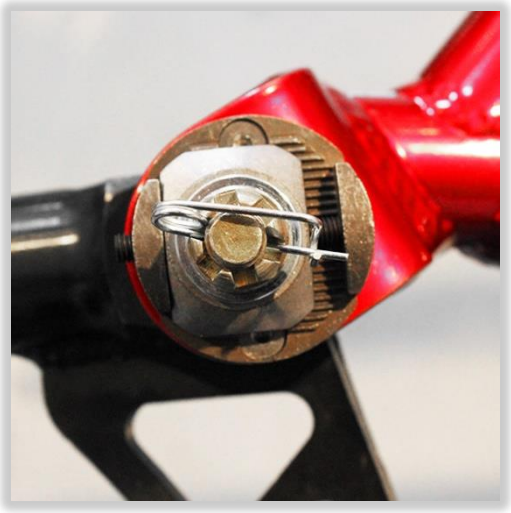
SOLUTION: Add positive caster using the adjustable caster/camber pills. Rolling the top of the kingpin towards the rear of the kart increases the caster angle and increases weight transfer and grip levels.

CASTER / CAMBER / TOE (CONT)

PROBLEM: The kart is hopping through the center of the corner.

SOLUTION: The kart is trying to transfer more weight than the flex in the chassis will allow. Decrease the caster angle to help settle the weight transfer down through the middle of the corner.

NOTE: Increasing the caster will always help the kart turn better, but at the expense of corner exit speed. Increasing the vertical weight transfer puts a larger burden on the engine. An ideal caster setting would be as little as possible so that the inside rear wheel lifts on entry but does not lift so much that the kart over-grips.



POSITIVE CAMBER

NEGATIVE CAMBER

PROBLEM: The kart understeers on entry, then grabs and becomes loose in the rear.

SOLUTION: Increase the positive camber in the kart. Standing the kingpin upright will increase the contact patch of the tire and result in more front end grip.

CASTER / CAMBER / TOE (CONT)

PROBLEM: The kart is "darty" and too responsive in the front end.

SOLUTION: Decrease the camber (increase the negative camber). This will reduce the contact patch and reduce front end grip levels.

NOTE: While camber is generally used to adjust front end grip, it does effect the rear end as well. Negative camber will encourage the inside rear tire to lift.

Steering Ackerman can be adjusted to better suit a drivers required steering input levels. There are two adjustment holes on each spindle, and a center adjustment on the steering shaft. Recommended starting positions:

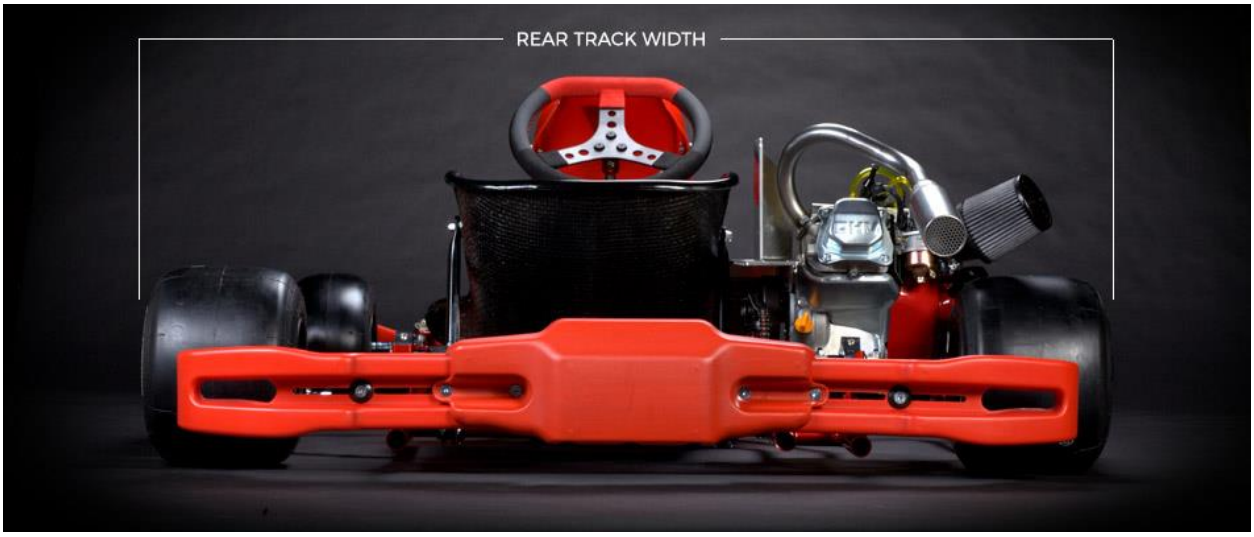
- **Steering shaft**: outer holes
- **Spindles**: inner holes

PROBLEM: The kart lacks steering responsiveness through the corner.

SOLUTION: Increase the amount of Ackerman by moving the tie rods into the inner holes on the spindle control arm.

NOTE: Any changes in caster, camber, toe or Ackerman will require a realignment of the front end. The toe generally changes with every adjustment.

REAR TRACK WIDTH



Rear track width is described as the measurement of the rear width, from the outside edge of the LR wheel to the outside edge of the RR wheel. Adjusting the rear track width helps determine the rear weight transfer of the kart. This can be adjusted by loosening the rear hubs and sliding them in and out to meet your desired width. Recommended starting positions are:

- **Bridgestone YLM**: 55" outside to outside
- **Bridgestone YLC**: 54" outside to outside

PROBLEM: The rear end of the kart keeps sliding around, forcing oversteer.

SOLUTION: Narrow the rear track width by .25" per side, creating a .5" adjustment overall. This will stiffen the rear end, and work the outside tire harder.

PROBLEM: The kart is hopping through the middle of the corner.

SOLUTION: Widen the rear track by .25" per side, creating a .5" adjustment overall. This will soften the rear axle, creating a wider base for the kart through the corner.

REAR WHEEL HUBS

Rear hubs come in variable lengths, which can be used to adjust rear end stiffness and rear track width. If rear track width remains the same, and a longer hub is installed, the leverage point on the axle decreases, causing it to become stiffer and thus working the outside rear tire harder. Wider hubs can also be used to achieve a wider track width, because part of the hub can extrude beyond the end of the axle.

PROBLEM: The rear end of the kart keeps sliding around, forcing oversteer.

SOLUTION: Add a longer hub while maintaining the same rear track width. This will narrow the leverage point of the axle and create a stiffer rear end. A stiff rear end will ultimately produce more rear grip.

NOTE: Rear hub pinch bolts must remain overlapped with the axle itself. Having pinch bolts extend beyond the end of the axle can cause them to come off during a session. Always make sure pinch bolts are tight. If hubs slide in, locking collars can be added to prevent future movement.

REAR AXLE

Rear axle stiffness can be adjusted to create more or less flex in the rear end. Ultimately, the rule of thumb is: softer axles create less grip and stiffer axles create more grip. There are three axle options available in the 50mm:

- 50mm 'A' Soft
- 50mm 'B' Medium (standard)
- 50mm 'C' Hard

PROBLEM: The rear end of the kart is loose through the middle of the corner.

SOLUTION: Change to a stiffer rear axle. This will direct more weight transfer to the rear end of the kart, and provide more rear end grip.

PROBLEM: The kart lays flat though the corner with little to no inside rear lift.

SOLUTION: Change to a softer rear axle. This will encourage flex through the rear end and result in the inside rear lifting easier and with less effort.

PROBLEM: The kart hops through the middle of the corner.

SOLUTION: Change to a stiffer rear axle. This will help keep the kart from flexing too much through the center, and provide a more stable base throughout the corner.

NOTE: Always tighten axle set screws when changing axles. If needed, use blue LocTite on each set screw before tightening.

REAR RIDE HEIGHT

Rear ride height can be adjusted to raise or lower the center of gravity toward the rear end of the kart. The Brava 100 comes with two vertically adjustable axle positions. The standard placement is with the axle in the highest position, which keeps the rear end of the frame low.

NOTE: Rear ride height positions must be the same for both of the bearing cassettes to ensure proper alignment of the axle.

PROBLEM: The kart hops through the middle of the corner.

SOLUTION: Drop the rear axle down to the lower ride height holes. This will move the C.O.G. towards the front of the kart, giving the front end more weight percentage.

PROBLEM: The kart understeers through the center of the corner.

SOLUTION: Make sure your axle is in the upper mounting holes, which will push the C.O.G. toward the rear of the kart, creating an increase in rear grip.

NOTE: Before changing the axle ride height positions, loosen the bearing set screws. Occasionally, if left tight, the set screws will cause the axle to bind.

NOTE: Always tighten axle set screws when changing axles. If needed, use blue LocTite on each set screw before tightening.

SUPPLEMENTAL SEAT STRUTS

Adding additional seat struts to a kart can help a driver dictate rigidity towards the rear of the kart. Much like a torsion bar in the front, rear seat struts help direct energy towards the rear of the kart. Stiffening the rear end up will ultimately work the tire harder and create more rear grip.

PROBLEM: The rear end of the kart slides through the corner.

SOLUTION: Add an additional seat strut to each side of the kart. This will stiffen up the rear end and provide the kart with a more stable feel through the center of the corner.

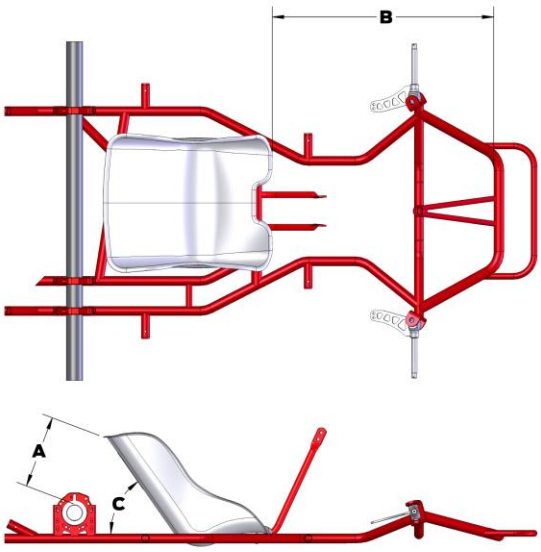
PROBLEM: The kart hops through the middle of the corner.

SOLUTION: Add an additional seat strut to each side of the kart. If the rear end of the kart is hopping, it is flexing too much through the corner. Adding a pair of seat struts will help improve the karts rigidity and stability.

PROBLEM: The kart feels great turning left, but oversteers turning right.

SOLUTION: Add an additional seat strut to the left hand side of the kart. Adding a seat strut to the left will work the outside rear tire (in this case, the LR) when turning right, providing an increase in rear grip only when turning right.

SEAT STYLE AND POSITIONING



DRIVER HEIGHT	A	B	C
4′ 9″ – 4′ 11″	9.25″	22.75″	58°
5′ 0″ – 5′ 2″	9.00″	23.25″	57°
5′ 3″ – 5′ 7″	8.50″	23.75″	56°
5′ 8″ – 5′ 10″	8.25″	24.50″	55°
5′ 11″ +	8.00″	25.00″	54°

NOTE: Sizes are based on the G-Seat ES1 shell seat. Measurements may vary up to .5″ when using other seat styles or manufacturers.

HORIZONTAL ALIGNMENT

In most cases, to offset both the weight and position of the engine, you will want to measure the right side lip of the seat a quarter inch longer to the front axle than the 'B' measurement shown.

VERTICAL ALIGNMENT

A driver with average body mass will want their seat mounted around 0.25″ below the chassis frame rails. If a driver's body mass is less than average, raise the seat in 0.25″ increments accordingly.

SEAT STIFFNESS

The rigidity of a seat can play a big part in the overall handling of the kart. A general rule of thumb is: stiffer kart and stiffer tires require a stiffer seat, softer kart and softer tires require a softer seat. A softer seat will generally increase the amount of wheel lift through the corner and decrease the amount of lag on the exit of the corner.

SEAT STYLE AND POSITIONING (CONT)

PROBLEM: The kart slides through the corner and oversteers on exit.

SOLUTION: Although there are plenty of chassis adjustments to help solve this issue, adjusting the seat can correct the problem as well. Moving the entire seat backwards (or simply tilting the seat backwards) in 0.25" increments will provide the rear end of the kart with an increase in overall weight percentage, which will make the front end less reactive and the rear end more stable. Another option is to change to a softer seat. A softer seat will provide more side bite than a stiffer seat.

PROBLEM: The kart understeers on corner entry, then snaps loose on exit.

SOLUTION: Moving the seat forward (or tilting the seat up) in 0.25" increments will help provide the front end with more weight percentage, thus helping balance front end grip. This change will also encourage increase weight transfer from the chassis. Consequently, moving the seat forward will decrease the chassis stability under heavy, high-speed braking.

NOTE: It is very important that the seat does not get bound up during installation. If the seat is bound up when mounted, the rest of the kart will be bound up too. Make sure not to fill any gaps between mount and seat by tightening the mounting bolts during installation. Shim the seat accordingly. It is better to have an out of round mounting hole in the seat than it is to have a seat be forced into position due to poor alignment in the mounting holes.

NOTE: Seat position does effect high speed braking. Having the seat further forward will make the kart slightly less stable under heavy, straight-line braking.

CHASSIS SCALING

It is important to scale your chassis when you first purchase it, along with a few other scaling sessions throughout the year. Scaling the kart helps you determine if the kart is mathematically balanced in its neutral position. If a kart is not balanced, it may behave differently in right and left hand turns, under braking, high and low speed turns, etc. A balanced kart helps ensure predictability for the driver. Physical pad numbers are subjective to each kart, class weight, driver, etc. A good place to start is:

- **Front Percentage**: +/- 43%
- **Left Percentage**: +/- 49%
- **Cross Percentage**: +/- 50% (refers to RF and LR as a percentage of the total weight)

NOTE: Before adjusting to make sure your scale numbers are accurate, make sure that the seat is mounted correctly in the kart: square, level, etc.

PROBLEM: My front weight percentage is too low.

SOLUTION: The easy option is to add weight towards the front of the kart. You can mount weight on the lower steering uprights and in front of the gas tank, directly on the floor pan. If you are already over the weight limit, you can raise the front spindles by adjusting the shims (see page 8) or lower the rear axle (see page 15) to meet the recommended front weight percentage.

PROBLEM: My front tires have a differential of 5+ lbs.

SOLUTION: There are several solutions here. The easiest would be to stagger the front spindle shim heights (see page 8) so that the light corner of the kart has a lower spindle height. Another alternative is to install an adjustable rear bearing cassette, which does the same thing, only to the rear end.

WET CONDITIONS

CONDITIONS

Track conditions play a major role in how you should set your kart up for rain. It is important to note if the track is merely damp, retaining water, or entirely submerged. Typically, the wetter the track becomes, the further you will deviate from your normal dry set-up.

FRONT WIDTH

Generally under increasingly wet conditions, you will want to achieve maximum front track width. You can achieve greater front width by utilizing a front hub and hub mount wheels. A safety tip: wire tie the spindle castle nut instead of using the standard issue voltz clip when running a wide front track.

REAR WIDTH

The idea in wet conditions is to get the front and rear tracks widths as close to equal as possible. Generally this will result in utilizing smaller rear hubs, and pushing them in as far as possible. Cutting the rear axle will also allow you to achieve a narrower rear track.

AXLE

As conditions become increasingly wet, you generally want to soften the rear end of the kart, allowing it to flex. In wet conditions, the kart is not able to 'bite' like it would in dry conditions. Softening the rear axle decreases the load the chassis tries to put on the outside tires.

WET CONDITIONS (CONT)

TIRE PRESSURE

Bridgestone YLP: 18-22 PSI cold. Track conditions and ambient temperature play a big part in determining the correct tire pressures for any given run. As the track gets increasingly wet, you will generally increase tire pressures to ensure the tires get to temperature. The wetter the track, the less friction the tire is facing, therefore the less heat it is generating. If you find yourself preparing for a track that does not appear to be significantly wet, decrease tire pressures to 12-14 PSI in an effort not to over-cook the tires during the run.

For short qualifying sessions, increase all pressures by 1-3 PSI in an effort to get the tires to temperature sooner. For long races, start with lower pressures to keep the kart from tightening up as the laps increase.

CASTER

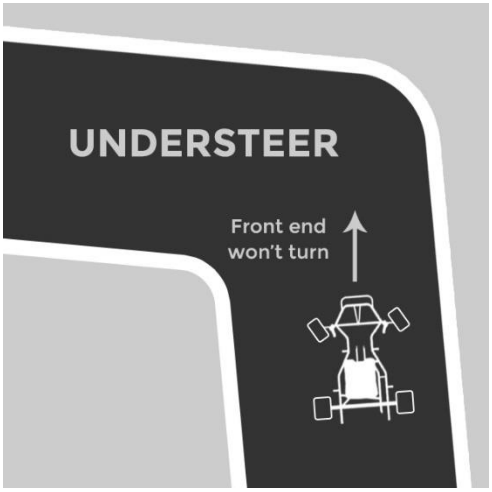
Caster is another conditional tuning option that depends on the amount of rain the track is retaining. Generally, you will want to increase the amount of caster you put into the kart, as the track gets increasingly wet. You can utilize caster adjustments in both the top and bottom of the spindle yolk to achieve the highest possible caster levels. Be careful not to load too much caster if the track is merely damp, as you do not want to put too much load on the tires and overcook them.

CAMBER

There is a delicate balance between front and rear grip levels during wet conditions. You want the front to have more grip that usual, but not so much that it 'overpowers' the rear end of the kart. Generally, you will start a rain set up with more positive camber than your usual setting, thus increasing turn-in grip levels.

ADJUSTING FOR UNDERSTEER

Understeer can cause many reciprocating effects on chassis handling. It is important to notice where in the corner the understeer is taking place. Most often, a kart will understeer on entry, the driver will put in more steering input, and once the kart grabs become loose on exit.



PROBLEM: The front end understeers (pushes) on corner entry.

A list of potential fixes, in order of severity include:

- Widen the front track width
- Increase front tire air pressures
- Insert the front torsion bar
- Increase the amount of camber
- Increase the amount of caster
- Raise the front spindle (lowering the front ride height)
- Move your seat forward, increasing front weight percentage
- Increase the Ackerman

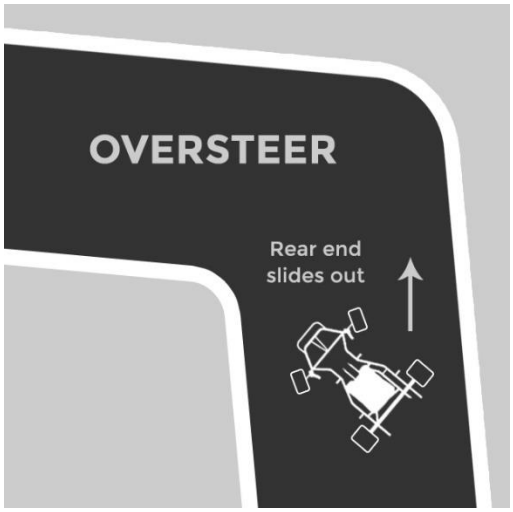
PROBLEM: The front end understeers (pushes) on corner exit.

A list of potential fixes, in order of severity include:

- Decrease the amount of camber
- Soften the rear axle
- Soften or remove the front torsion bar
- Increase the Ackerman

ADJUSTING FOR OVERSTEER

Oversteering, or the rear end being 'loose', is when the rear end of the kart has less grip than the front, causing the kart to slide around or through the corner. Although oversteer might feel fast, it often results in slow corner exits making it tougher on the engine to power off the corner.



PROBLEM: The kart oversteers on corner entry.

A list of possible fixes, in order of severity include:

- Narrow the rear track
- Narrow the front track
- Increase rear tire air pressures
- Remove the torsion bar
- Decrease the amount of camber
- Increase the amount of caster
- Change to a stiffer rear axle
- Add a pair of seat struts
- Raise the rear axle position (lowering the rear ride height)
- Move your seat backward, increasing rear weight percentage

NOTE: Before making any changes to correct oversteer, ensure that the driver is executing the proper racing line, and not carrying too much speed on corner entry.

ADJUSTING FOR HOPPING

A driver may feel the kart hop through the middle of the corner, all the way to the exit. This is usually a result of the chassis binding up through the corner. This happens when the chassis does not flex properly through the center of the kart. Hopping is most common under high grip conditions. Basic theory would mandate that if there is more grip on the track, the chassis needs less mechanical grip.

NOTE: Before making any changes to correct a hop, ensure that the driver is not trying to use both pedals at the same time, or trail braking, through the corner and is not trying to slide the kart through the corner. Minimal wheel input is key to a balanced handling kart.

PROBLEM: The kart hops through the center of the corner.

A list of possible fixes, in order of severity include:

- Narrow the front track width
- Widen the rear track width
- Remove the front torsion tube or adjustable bar
- Decrease the caster angle
- Change to a stiffer rear axle
- Add a pair of seat struts
- Raise the front spindle height (lowering the front ride height)
- Lower the rear axle height (raising the rear ride height)
- Lower the seat, vertically, as much as possible

ADJUSTING FOR FLAT TIGHT

There are different kinds of tight that a driver will need to communicate. Flat tight is when a driver cannot feel the inside rear tire pick up on the entry to a corner, and as a result, the inside rear drags along the racing surface and causes the kart to lose momentum on exit. This generally happens when the rear of the kart is too stiff or maintains too large of a percentage in the overall weight distribution.

PROBLEM: The kart is flat tight through the corner.

A list of possible fixes, in order of severity include:

- Widen the front track width
- Widen the rear track width
- Increase the caster angle
- Change to a softer rear axle
- Raise the front spindle height (lowering the front ride height)
- Lower the rear axle height (raising the rear ride height)
- Move the seat forward to increase the front weight percentage
- Raise the seat, vertically, in 1" increments

NOTE: Softening the axle can seem contradictory to fixing a flat situation. When an inside rear tire lifts and rotates through the corner, the axle is flexing. When the tire remains flat through the corner, the axle is not flexing enough. Changing to a softer axle will help encourage the kart to rotate more through the corner.