

OTK CHASSIS- SET UP GUIDE

Introduction

This setup guide is created to facilitate a user of OTK equipment to reach an optimal chassis setup and on-track performance. The different tuning possibilities and parts will be explained to give necessary information to set up a chassis in the best way. Note that this is a general guide which gives a rough overview of the adjustment effects on the chassis. The setup effect can vary depending on track layout, asphalt, weather and track grip conditions.



In order to understand how the chassis will be affected by a change it is suggested to try different tuning adjustments in practice sessions. Then any adverse reaction caused by the adjustment will be avoided at a race event.

The standard setup for the OTK chassis is a very good base setting and works well in most conditions. A recommendation when coming to a new track is to always start with the base set up and then make any adjustment needed from there. If you get lost with your chassis setup, then just return to standard setup and the kart will work again. The set up guide has several chapters where different possibilities are described.

- 1) Seat position
- 2) Rear end adjustments
- 3) Front end adjustments
- 4) Wheels
- 5) Weights
- 6) Other tuning possibilities
- 7) Standard Set-up Dry & Wet conditions

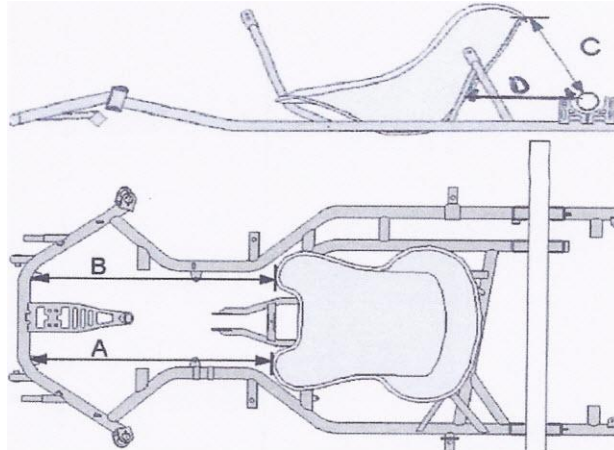
1) *Seat Position*

Depending on size of the driver the seat must be mounted differently. The recommended seat position is summarized in the table and illustrated in the picture below. The measurements will give a good basic seat position and are also the seat positions that have been tested and used in our racing team.

The seat measurements below are recommended start settings and what works best in your particular "race condition" can vary depending on track grip level. The table below is based on a Tillett T11 sml or Std Tonykart size 1 seat with Mojo tyres: An option for small drivers is a T5 reverse or a T10 xsd.

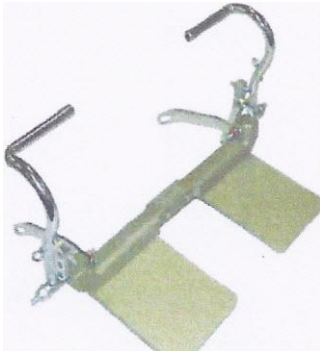
FULL SIZE KART (1040mm wheel base)				
Driver size	150/160	160/170	170/180	180/190
	cm	cm	cm	cm
A	605mm	615 mm	625mm	635mm
B	600mm	620mm	630mm	640mm
C	240mm	230mm	200mm	205mm

If fitting a different seat then a good starting point is measurement 0 on the diagram. Taken from the front edge of the axle to the back of the seat horizontally, starting at 170mm.



Looking at the seat height, the bottom of the seat should be around 10mm lower than the bottom of the frame. For taller drivers a recommendation is to keep the seat as low as possible, almost until the seat touches the ground. For short drivers a suggestion is to have the seat bottom in level with top of the frame rail. This is around 40mm higher than the standard seat position.

For short drivers, in order to move the pedals backwards, OTK offers a high quality pedal adjuster. Then the seat position can still be according to the recommended measurements. An option to mount the seat far forward is the "L- extension plate".



Complete rudder pedals: OOIO.OOCKIT



seat extension L plate 0239.0A

Generally with harder tyres, more rear grip is needed to improve acceleration and grip through the corner. Then a recommendation is to move the seat backwards 10-20mm. The same thing is valid for a gearbox kart, where lots of rear traction on acceleration is needed. The seat can then be placed 10-20mm more to the rear than a direct drive kart.

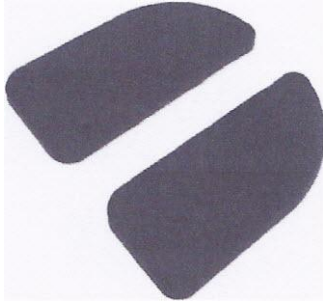
Going the opposite direction, moving the seat forward, will give some more front grip instead. A simple rule of thumb is if no other setting is improving the grip in the front/rear of the kart, a seat adjustment could be a solution.

To facilitate the mounting of the seat, OTK offers a mounting kit with necessary supports to keep the seat in place when mounting.



Seat mounting Kit: 0261.00

It is also important that the seat fits the driver. OTK makes 4 different senior sizes (1,2,3,4) and 2 cadet sizes (1,2). If the seat is not 100% perfect it can be filled with some foam. Besides the hard foam, OTK offers an air filled rib protection cushion "Kart Bags" that are mounted on the seat and makes the seat fit the driver perfectly.



Body rubber buffer stickers: E0800371 N

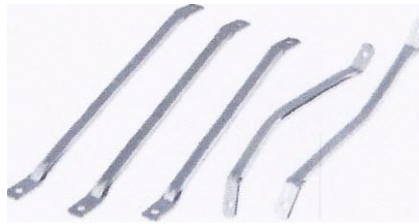


Air Bag - couple: 0173.BOB/R

1 b) Seat Stays

Supplementary seat supports connect seat and rear axle bearing carriers and transfer the weight/leverage from the driver to the rear wheel and increases grip.

The supplementary seat supports are mounted on the top of the rear axle bearing carrier. The picture below illustrates how they are mounted. OTK has several different lengths of seat supports available, both straight and bent ones to fit all possible seat positions. A recommended start setup is one seat support on each side.



011< supplementary seat support, various sizes 006.280, . 300

If additional rear grip is needed out of the corner or in high speed corners, additional seat stays can be mounted. Driving without any additional seat supports could give less weight transfer on the rear axle and the result can be an unstable and slippery rear.

OTK has developed an adjustable seat stay which is very stiff. This seat stay will increase the grip more than a standard seat stay. It is also easy to mount on the engine side.



Complete right supplementary adjustable seat support: 0006.BODXKIT

2) REAR END Adjustments

2a) Rear Axles

Depending on the material of an axle, the handling of the kart will change. Which axle to use to give optimal results depends on the track condition, but things like driving style and tyre construction also affect the selection of an axle. The OTK range is listed in the table below.

Type	Size	Model	SOFT	HARDNESS	HARD	Code
E	50x1030	DD				0054.G0E
U	50x1030	DD				0054.G0U
Q	50x1030	DD				0054.G0Q
N	50x1030	DD				0054.G0N
H	50x1030	DD				0054.G0H
HH	50x1030	DD				0054.G0HH
U	50x1030	GB				0054.H0U
Q	50x1030	GB				0054.H0Q
N	50x1030	GB				0054.H0N
H	50x1030	GB				0054.H0H
HH	50x1030	GB				0054.H0HH

The standard OTK axle is type "N and is an axle suitable for most conditions. The type N axle keeps the kart free and works well in long races and is often used in race conditions. For high grip settings this axle is also preferred. The hardness of this axle is medium and a suggestion is to start up with this axle and use it as a reference. From this standard set up axle you can then move to other axle types.

In order to get grip earlier in a race the axle type Q or type U is preferred. This axle type will deliver more grip quickly but could be less consistent in the long run. This option could be a solution for a short heat race. The softer axles like type U can also be an improvement for small drivers that have no leverage over the rear axle. Then they are unable to get the axle to flex like a large driver and in that case the softer axle could be a solution.

In a high grip condition it is not optimal to use a too soft axle, since it will flex too much. The high grip situation will increase the corner speed and therefore also the load on the rear axle. A too soft axle would in this condition flex too much and spring back, which would drop the inner rear tyre on the asphalt and bind up the kart. Then a harder axle would be better, like type N.

The harder axle H or HH can be used if the track condition is slippery in order to improve the grip of the kart. Then the harder axle will deliver additional grip compared to the soft axle. But the use of type H or HH can result in a longer time for the necessary grip to arrive than with type U or Q. Especially if the track temperature is low. For KZ categories when the track is slippery and rear grip is needed the stiffer axle can be used.

An option to free up the rear of the kart without changing the axle is to remove the bolts fixing the third bearing. That is a minor adjustment that will make the kart free in the rear.

In order to get the kart to turn better and free up through the corner a **short rear axle** can also be used, this is 1000mm instead of the standard 1030mm. This can be a solution if you have understeer in the corner. The short axle is available in stiffness type N and HH.

A recommendation is to test the different types of axles in advance so you are aware of its *effect* on the kart. The effect and performance of an axle change depends on many different factors, for example: driving style, tyre construction and track conditions. To find the optimum axle for the specific condition can sometimes be hard and requires good input from the driver. In general type N is the axle that is mostly used since it has a wide performance range and works well in most conditions.

2b) Rear Axle Hubs

By using different types of hubs the rear grip will be affected and obviously the performance of the chassis. OTK has several different hubs available.

The 0.50 hubs are available in Aluminium and Magnesium in different sizes:

Aluminium
short (56mm) , medium (92mm)

Magnesium
short (56mm), Standard (92mm) Medium (115mm), long (145mm)



The long hubs generally give increased stability but could on the other hand also make the kart bind up in the long race. A shorter hub gives less grip and makes the kart free up. This could be a solution in a longer race.

Considering the material, aluminium hubs generally provides earlier and slightly more grip but is less consistent than the Mag hub in the long run.

2c) Rear Ride height

The OTK chassis have multi position rear ride height adjustment. The standard setup is with the axle in the middle position and a recommendation is to always start from standard setup.

In order to give more on-power grip off the corner the chassis can be lowered in the rear. The kart then will plant the grip out from the corner. This set up is in many cases used with the gearbox categories. The risk with this setup is that the kart becomes flat in the rear and does not flex (lift the inner wheel) as easily.

2d) Rear Track Width

The optimal width depends on many factors like e.g. track grip level and driving style.

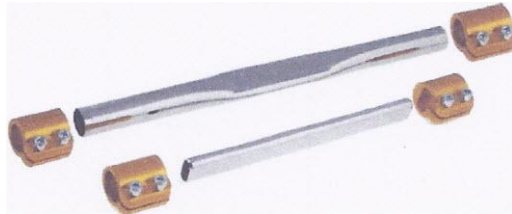
Generally a narrower width in the rear will give more side grip and is preferred in low grip conditions.

One important drawback is that a narrow rear width makes the kart more unstable. Then the rear end slide comes suddenly. Wider rear width makes the kart more balanced but gives less maximum grip level.

In categories with medium to soft tyres and where the maximum width is 1400mm, a recommendation is to start around 1380mm. For categories with the max rear width of 1360mm the start width could be around 1340-1350mm.

2e) Rear Torsion Bar

There is one type of adjustable rear torsion bar. It can be used when an improved rear grip is necessary in the exit of a corner.



The negative with the rear bar is that it hinders the chassis to flex and lift the inner wheel. The kart will stay flat in the rear.

When the track grip increases, a recommendation is to remove the rear torsion bar to free up the kart through the corner. Most often the chassis are run without the rear bar.

3) FRONT END Adjustments

3a) Front Width - Track

The front width or track is an easy and minor adjustment that *affects* the front grip. Depending on the width the front grip will be affected differently in various stages through the corner.

Generally the wider front width will give the front an improved grip at initial turn in (first part of the corner). The load on the wide inner front wheel is helping to flip the kart and lift the rear tyre. Then the kart will get a better grip in the initial turn in.

In the middle of the corner, when the pressure is on the outer front tyre a narrower front track will give more leverage and load on the outer tyre, which gives some more grip.

Recommended track width is shown in the picture below, with one large spacer.

Standard track width

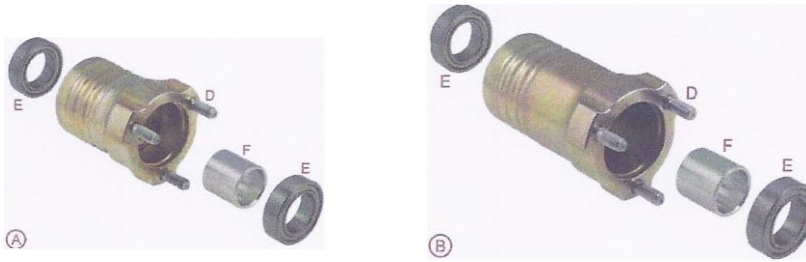


25mm Stub Axle

In rainy conditions a lot of grip on initial turn in is required and a very wide front set up is suggested. Extra long front hubs will help to get the front even wider out.

3b) FRONT HUBS

Depending on the chassis, OTK has different types and width of front hubs available in the range, for example: 80mm, 95mm and 110mm.



The wide OTK front hub gives some more front grip turning into the corner. It is suggested you use the standard hubs that come delivered with the chassis in dry conditions. Rainy conditions could on the other hand require the extra long front hubs in order to improve the front grip.

3c) Front Ride Height

The chassis are equipped with 2 washers, one above and one below the king pin. See pictures below. These washers can be moved in order to adjust the ride height.

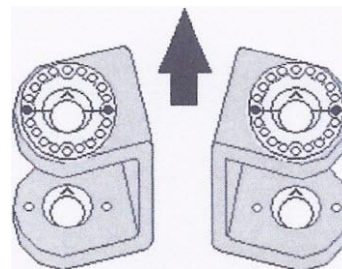


By lifting the chassis in the front the kart will get more front grip in the initial part of the turn. On the other hand it will get reduced in the middle and out of the corner. Lower front height on the other hand will give a less responsive front.

On bumpy tracks the bottom of the frame can flex and touch the ground in the corner which makes you loose front grip in the corner. To check if it is touching the ground, attach some adhesive tape under the frame tube in the front and see how much the frame touches the asphalt. If it is touching the ground, a solution is to lift the ride height.

3d) Camber angle

The OTK equipped chassis are supplied with multi-positional eccentric king pin washers that can be rotated to adjust the camber and castor angle.

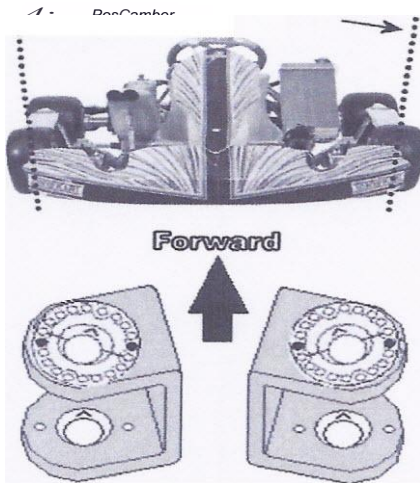


Neutral camber/caster setting

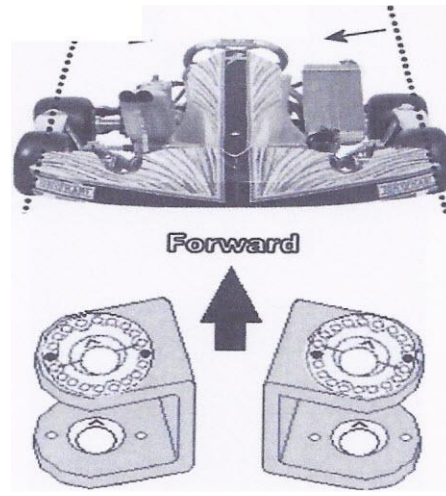
A recommended setup and the standard camber setup (neutral position) is both upper and lower arrow on the eccentric washer pointing forward. Note: that by adjusting the camber, the castor angle will also be slightly changed.

The camber is the angle of the tyres, looking from the front of the kart. A camber adjustment affects the front grip in the middle of the corner and out. See picture describing positive and negative camber.

8)



Picture: Positive camber setting



Neg/Csmbllr

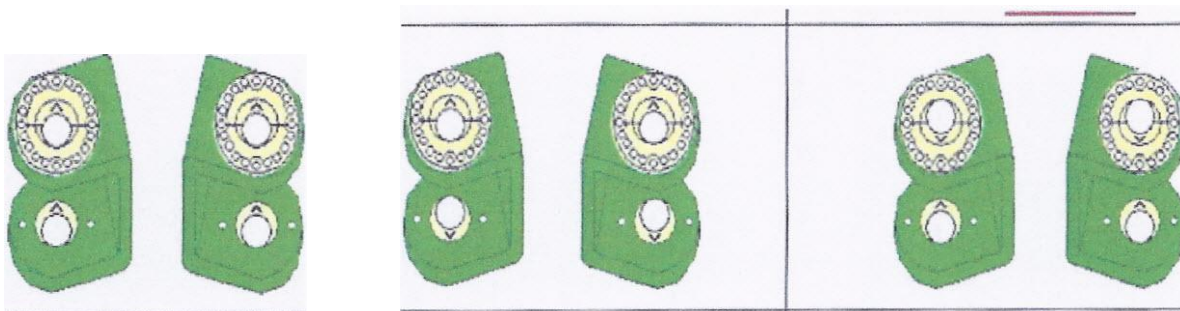
Picture: Negative camber Setting

Positive camber angle adds mid corner front grip. When using positive camber the amount needed is normally 1 or 2 steps with the multiple adjustment eccentric washer. Too much positive camber will make the steering very nervous and unstable.

Negative camber removes mid corner grip and can create some front end slide. This set up can be used when the front is too responsive and causes the rear to slide in mid and exit corner. On some high speed corner tracks this can be preferable. Aggressive driving styles can require this set up in order not to slide in the rear.

3e) Caster angle

Caster is adjusted by rotating the eccentric washer. This adjustment has a major effect on the steering input (the moment in which you enter the corner).



NEUTRAL POSITION

TO INCREASE THE CASTER

UPPER ARROW
TO THE FRONT
LOWER ARROW
TO THE BACK

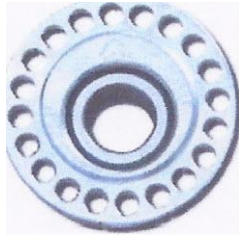
TO DECREASE THE CASTER

UPPER ARROW
TO THE BACK
LOWER ARROW
TO THE FRONT

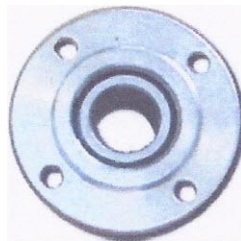
An increased caster angle affects the front grip in the initial turn of the corner. It creates a lot of pressure on the inner front wheel and creates the inner rear wheel to lift with just a small steering input. It simply makes the kart turn more easily. One drawback is that the steering will get heavier.

A risk with too much caster is that the rear end will start sliding easily. Therefore it requires attention and careful steering input from the driver. If the rear is sliding in the initial turn and in the centre of the corner, the caster angle should be reduced. This is sometimes the case in slippery conditions where rear grip is needed to keep the kart stable.

Often when there is high grip on the track an increased caster is used to get the kart to lift the inner rear tyre easily and turn. This set up requires smooth driving. When fine tuning the kart, a 180 degree turn of the eccentric washer might change the caster angle too much. Then it is possible to go half way with a concentric (centre hole) washer instead. One standard eccentric washer and one concentric washer should then be mounted on the spindle.



Multi-position Eccentric Washer



Concentric Washer

1(0)

3t) Steering column

With increased caster in the kart the steering can feel heavy and affect the consistency of the driving. A standard OTK steering column has two possible settings for the fixing of the tie rod onto the steering column support.

Bolting the tie rods to the steering column will also make the and you have to turn order

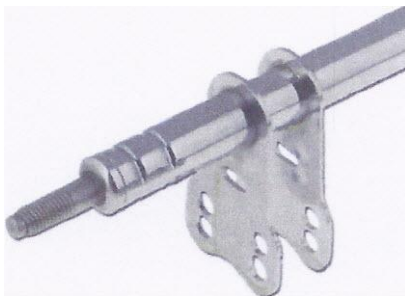


the holes on the fixing plate close will lighten the steering. It steering less responsive/direct the steering wheel further in to turn the same amount.

OTK makes an that has a fixing plate the two standard column. This used by the official drivers

optional steering column with the holes in between possibilities in the is fine tuning that is often racing team

In order to make the driving and steering easier and more comfortable some drivers prefer to use an inclined steering hub that makes the steering wheel straighter. This is often used by small drivers



3g) Front Torsion Bar

The front torsion bar affects the chassis front grip in the corner where the load on the inner front wheel is high. This is the moment in the corner where you turn the wheel the most. Without the front torsion bar the chassis will flex more at this point and will not help lift the inner rear tyre.

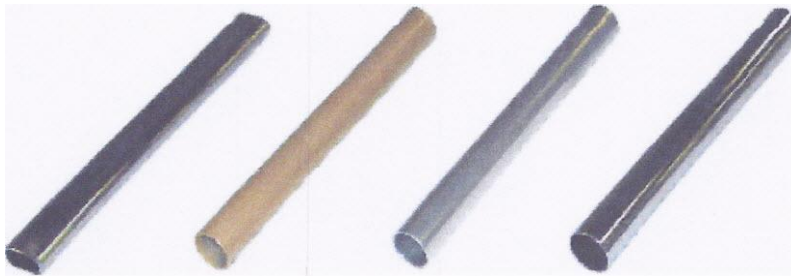
The stiffer bar will give more front grip and a more reactive/reactive kart in the middle of the corner. The stiffer bar can therefore create rear end slide. If that is the case a softer bar or a complete removal of the torsion bar is suggested.

By removing the front torsion bar the steering will be much less responsive and the kart more balanced. This is recommended if you have a really loose rear end. The risk going without the front bar in a long race is that the front tyres will get more wear which can lead to an understeer (front slide) and a flat rear end that is not free.

OTK has 4 different bars available:

- Flat bar adjustable: horizontal position "standard": Vertical = very stiff
- Round bar, Chrome = Soft
- Round bar, Silver = Medium
- Round bar, Gold/Brown = Hard

Flat Gold Silver Chrome

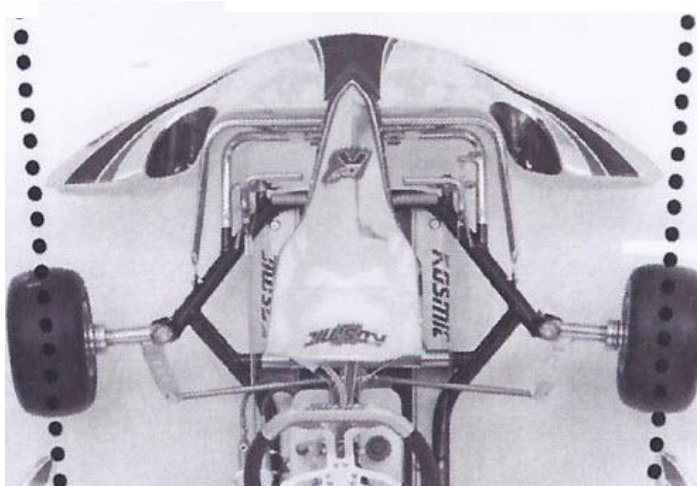


The standard setup is the flat bar in horizontal position. The flat bar is the stiffest of all torsion bars. Note that the round torsion bars requires round fixing clamps.

3h) Toe In/Out

A standard set up is to use 1-2mm toe out on the chassis. The only time this is adjusted is in rainy conditions where 5-8 mm toe out is suggested.

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4) Wheels

Different wheel material and design affect the chassis performance on the track. OTK offers 3 different models of wheels, AXP (Aluminium), MXP (Magnesium) and MXC (Magnesium).

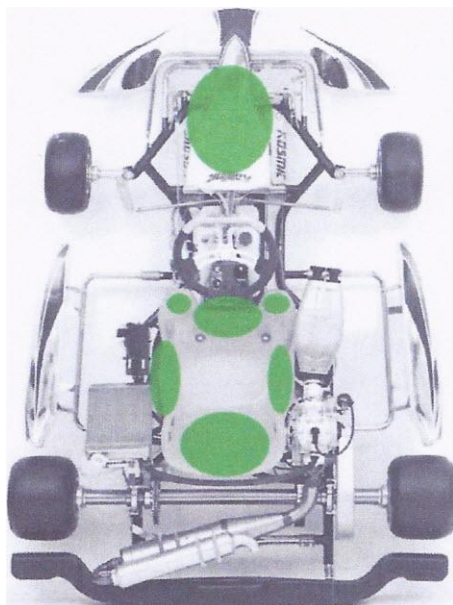


AXP is a stiff wheel and creates a high grip after just a couple of laps. The drawback of the Aluminium wheel is that it is heavier than the Magnesium wheels and that the tyres heat up quickly. The tyre can overheat and make the kart lose grip in a longer race.

The MXP model is supplied with the chassis and is a magnesium wheel slightly softer than the MXC. The difference between the two Magnesium wheels is the production process. The MXC wheel makes a difference in a long race through its consistency. It takes some additional laps for the grip to arrive but then it keeps the temperature in the tyre lower than the other wheels. The advantage is in high grip conditions where it makes the chassis free.

5) Weights

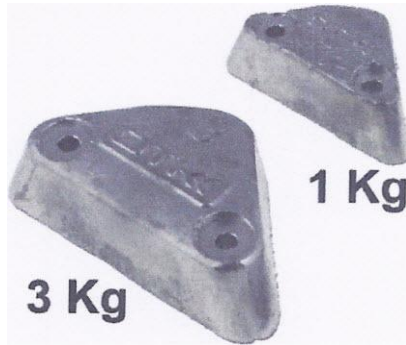
The weights should to start with preferably be attached to the seat. Place the weights under the seat, in the back of the seat and on the left side of the seat (opposite side of the engine). If several kilos are needed some weight can be attached in the front of the frame too. In the picture you will see the areas to mount the weights.



Example if 8 kg is required a suggestion on position could be:

- 3 kilo weight on the left side
- 1 + 3 kilo in the back of the kart
- 1 kilo in the bottom of the seat

For low grip condition the weights could be mounted higher in the back of the seat. OTK have 1 kilo and 3 kilo weights available with two mounting holes that should be used to bolts on the weights.



OTK Weight Kg3: 0275.03

OTK Weight Kg1: 0275.01

6) Other tuning possibilities

Besides the general set up options on the kart described above there are also some possibilities to fine tune the kart with adjustments that could be hard to notice when driving but affects the handling and performance of the kart.

6a) Bodywork

The bodywork has been developed and tested in a wind tunnel and with the homologated optional OTK front spoiler wing let there is a significant improvement of the aerodynamics.

On tracks with high speed corners it could be necessary to add some front grip without adding caster, since increased caster affects the rear grip.

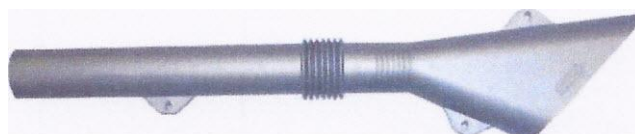
Then the homologated optional OTK front spoiler wing could help the front grip through a small increase in pressure on the front tyre. See picture right:



6b) Brake disc & air duct

The BS6 self adjusting brake system have 2 diameters available on the brake disc, 180mm and 206mm. In a heavy category with only rear brakes, a small brake disc could overheat and loose some brake power. This could cause an initial oversteer of the kart into the corner if the speed is too high. A large 206 brake disc will improve the brake power and could help the front to turn in better.

The brake cooling duct is a good solution to avoid the brakes overheating.



12)

STANDARD DRY AND WET SET-UP

	DRY SET UP	WET SETUP
FRONT WIDTH	1 large washers 15mm Std hubs	15mm -long hubs
FRONT RIDE HEIGHT	Middle position	Middle position
FRONT TORSION BAR	Flat bar - horizontal	Brown bar
FRONT TOE-OUT	1mm toe-out	4mm each side
CAMBER	Both arrows forward (upper & lower)	1 click of positive on top
CASTER	Both arrows forward (upper & lower)	Top arrow forward, bottom arrow back
REARWIDTH	1390mm	1340mm
REAR HUBS	Standard	Standard
REAR RIDE HEIGHT	Middle position	Middle position
REAR TORSION BAR	No rear bar	No rear bar
SEAT STAYS	One extra on each side	One extra on each side
WHEELS	MXP 130/210	AXP 1201180

