



Arrow Karts Owner's Manual



KART SETUP

GUIDE



This guide is intended as a general handling and setup guide for all karts, as well as being an Owner's Manual for the Arrow range of karts. For more information on Arrow karts, visit the web site at ***www.arrowkarts.com***

Your Arrow Karts dealer is:

www.arrowkarts.com

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PLEASE TAKE NOTE...

*Before making any adjustments be sure to test your Arrow in its recommended standard setup. **It is essential to make only one adjustment at a time** to get a true indication of what effect each change has.*

GENERAL USE AND SAFETY GUIDE

PLEASE READ CAREFULLY

Congratulations on choosing an Arrow Kart.

Since 1973, we have been 100% committed to the Kart Industry. It's our life, our passion and our livelihood, so you can count on us being there when you need us.

In producing your kart, we have used only the best and highest quality materials and components, and all possible care has been taken. However you must be aware that this is a high performance racing / competition vehicle designed for use only on closed racing circuits. As such it is subject to very high levels of stress and strain, therefore it requires constant inspection, maintenance and replacement of components. FAILURE to carry out the above may result in severe injury, perhaps even death.

It is your responsibility as the Owner/Operator/Driver to carry out this regular inspection and a maintenance schedule is offered to you for your guidance. Please be aware that in providing these guidelines we make no indication that these items are the only maintenance or inspection required, merely that they are important elements in the maintenance of your kart/s.

To carry out these inspections, a basic level of mechanical knowledge is required. If you are unsure or do not possess the basic level of mechanical knowledge required, then you must have this work carried out by a suitably qualified person. Contact your local Kart Distributor/Dealer for further information.

As this is a racing vehicle it is possible a collision may occur. If a collision occurs which results in damage to any of the following assemblies or any of their components, then the damaged component/s must be replaced and not repaired.

- Steering Assembly including Stub Axles, King Pins, King Pin bearings and Tie Rods
- Brake Assembly including pedal and cables
- Side Pods including Side Pod Bars

All items should be constantly inspected for possibilities such as cracks from fatigue or crash contact, bending, seizing up, lubrication, normal wear and tear. Ensure all fasteners are tight and securely fastened. Items showing damage or wear must be replaced.

MODIFICATION

Please note that under no circumstances does our Company authorise or recommend modifications of any type whatsoever to Go Karts or components we produce. This includes any alternative methods of assembly of any components. Any such alteration or modification performed is totally and solely the responsibility of the person/persons carrying out the same.

Arrow Karts are designed strictly for racing purposes only, and not for any type of commercial and/or rental use.

PROTECTIVE CLOTHING

For your protection and safety when driving a Kart you must always wear the following:

- Approved Safety Helmet
- Driving Suit
- Driving Gloves
- Driving Boots
- Ear Plugs
- Also a neck brace is highly recommended

NEVER wear loose fitting clothes or scarves. If you have long hair, it must be contained in a hair net to prevent being entangled in any moving parts.

WARRANTY/GUARANTEE

As this is a racing/competition vehicle no Warranty or Guarantee, either written or implied, exists.

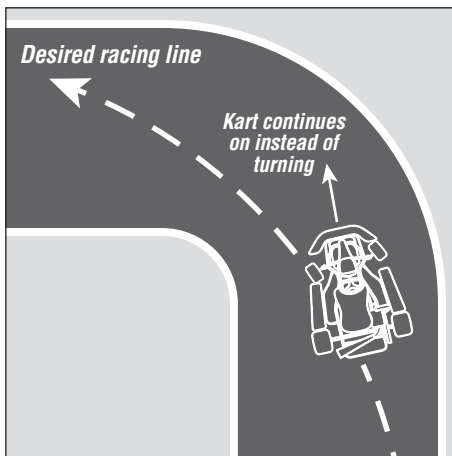
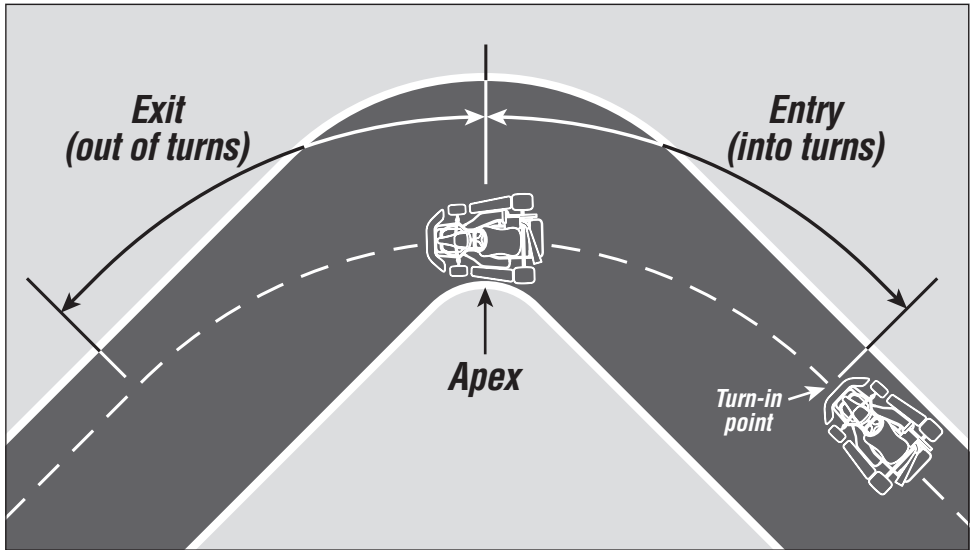
NEVER drive your Kart on any public highway, freeway, street or road. Doing this is illegal and extremely dangerous. If you decide to resell or pass on your Arrow Kart, it is your responsibility to pass on all the Safety maintenance information to the next owner/operator. In the event of an accident, failure to pass on this information may mean you are held legally responsible.

Finally, we wish you many hours of fun, excitement and enjoyable racing. These guidelines are to help you make it as safe as possible.

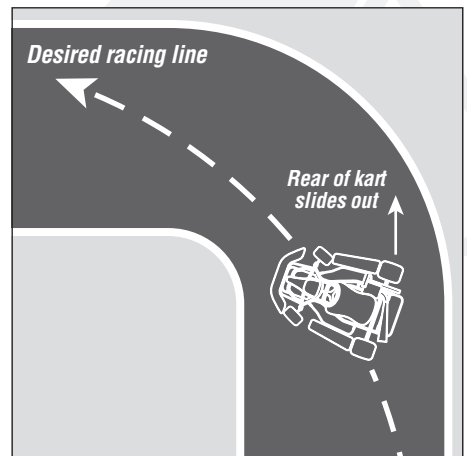


CORNERING DIAGRAMS

Many of the problems and kart behaviours mentioned in this Guide refer to the kart 'understeering' or 'oversteering', and also to the different parts of a corner where the behaviour occurs. The diagrams below graphically explain these terms and behaviours.



UNDERSTEER is when the front of the kart slides more than the rear, making the kart 'push' straight ahead instead of turning.



OVERSTEER is when the rear of the kart slides more than the front, requiring more steering input to avoid the kart spinning out.

REAR TRACK

PROBLEM: "There's no traction/the kart is oversteering coming from the apex out of a corner"

Solution: Reduce the rear track width by 3mm on both sides at a time.

PROBLEM: "The back slides/the kart oversteers going into the turns"

Solution: Increase the rear track width by 3mm on both sides at a time, being careful not to exceed the maximum regulation width overall of 1400mm.

PROBLEM: "There is understeer all the way through the turn"

Solution: Increase the rear track width by 3mm on both sides at a time, being careful not to exceed the maximum regulation width overall of 1400mm.

PROBLEM: "There is bounce in the rear"

Solution: Increase the rear track width by 3mm on both sides at a time, being careful not to exceed the maximum regulation width overall of 1400mm.

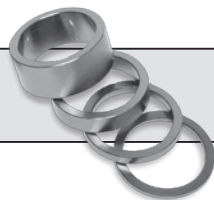
PROBLEM: "The track is very bumpy giving the kart a lot of bounce"

Solution: Increase the rear track width by 3mm on both sides at a time, being careful not to exceed the maximum regulation width overall of 1400mm.

PROBLEM: "The kart has a tendency to lift up on two wheels through the corners"

Solution: Increase the rear track width by 3mm on both sides at a time, being careful not to exceed the maximum regulation width overall of 1400mm.

NOTE: 3mm is the easiest jump to make as most wheel hub spacers (shown at right) have a minimum of 3mm.



Why?

Narrowing the rear track will make the rear bite into the track and sometimes provide more rear grip. However, avoid continually narrowing the rear track to obtain more grip as you will find that only so much grip can be obtained and you will then be upsetting the balance of the kart making it much more unstable and difficult to drive. The same applies when increasing rear track.

REAR TRACK (continued)



IMPORTANT: *Rear track is one of the most important single variables on a kart chassis. Different driving styles and different tracks will require different settings. The standard setting is the best starting point and we suggest you vary the rear track by no more than 5mm each side per change.*

It is a weird karting phenomenon, but nevertheless a fact that in certain conditions a wider rear track will provide more grip and, in contrast, different conditions may see a narrower rear track provide more grip. We believe rear track is more an aid in balancing the kart and suggest you be prepared to experiment to search for your own best setting.

NOTE: *There is a pattern that shows taller drivers require wider rear track, and shorter drivers narrower.*

Rear track measurement – Overall width to outside edge of rear wheels...

‘Open’ type tyres (e.g. Bridgestone YGA)	1395-1400mm
‘High grip’ SL type tyres (e.g. MG Yellow)	1390-95mm
‘SL’ tyres (e.g. Bridgestone YJC, MG Red)	1375-85mm
Low grip ‘SL’ tyres (e.g. Bridgestone YDS, Dunlop SL1)	1330mm
Midget/Rookie (e.g. Bridgestone YEQ, YDS, Dunlop SL1)	1115mm

NOTE: *The above settings are to give you a suggested starting point*

FRONT TRACK

PROBLEM: “Understeer on turn-in to the apex of the corner”

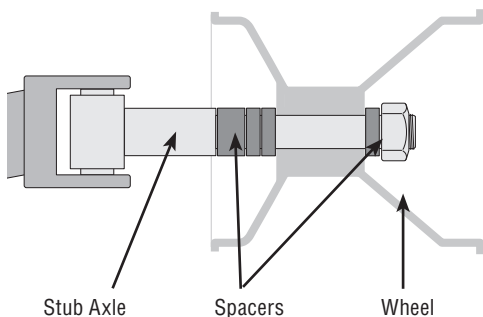
Solution: Widen the front track by a 5mm wheel spacer at a time.

PROBLEM: “Oversteer or very sensitive front steering causing the rear to slide.”

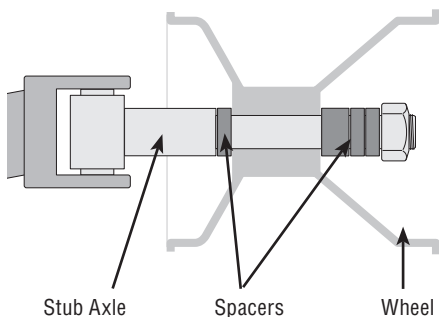
Solution: Narrow the front track width by a 5mm wheel spacer at a time.

FRONT WHEEL SPACER ADJUSTMENT

Wheel Further Out (more spacers inside wheel)



Wheel Further In (less spacers inside wheel)



For setting the front track width, a good starting point is...

‘Open’ type tyres – One 20mm spacer and one 5mm spacer on the inside of each front wheel.

‘High grip’ SL type tyres – One 20mm spacer on the inside of each front wheel.

‘SL’ tyres – One 10mm spacer and one 5mm spacer on the inside of each front wheel.

Junior kart on ‘SL’ tyres – One 10mm spacer and one 5mm spacer on the inside of each front wheel.

Midget/Rookie – One 10mm spacer and one 5mm spacer on the inside of each front wheel.

NOTE: When tightening the front wheels, you should tighten the nut just enough so that there is no lateral movement of the wheel or wheel spacers on the stub axle shaft, though the wheel spacers should still be able to spin using your fingers.

TYRE PRESSURES

It is imperative that your tyres do not overheat during a race, as they will lose grip and you will lose speed!

We recommend that you 'Hot Pressure' your tyres at the end of each session (i.e check the tyre pressure immediately at the end of a session) then adjust all of the tyres to the working hot pressure.

Below is an approximate cold & hot pressure guide. For specifics, contact your local dealer.

'Open' tyres – Cold 9-10 PSI – Hot 12 PSI

'SL' type tyres – Cold 12-14 PSI – Hot 15-16 PSI

'Low Grip SL' tyres – Cold 22-24 PSI – Hot 26-27 PSI

NOTE: *Due to the many specifications and compounds of kart tyres on the market today, we suggest you seek information from your kart dealer or the particular tyre distributor.*

REAR WHEEL HUBS

PROBLEM: *"Understeer from the apex and out of the corner and/or the rear of the kart feels stuck to the track, making it slow off corners"*

Solution: *Replace the rear wheel hubs with shorter units.*

PROBLEM: *"There's no traction and/or the rear of the kart is sliding out under heavy braking and/or oversteering coming from the apex out of a corner"*

Solution: *Replace the rear wheel hubs with longer units.*

Why?

By increasing or decreasing the distance between the outside of the rear axle outer bearings and the inside face of the rear wheel hub you are in fact increasing or decreasing the amount of "working" axle. In other words, the length of axle between the kart's main chassis rails and the wheel assembly that is left clear to flex unhindered.

In the same way as altering the rear track width, reducing the amount of "working" axle will make the rear bite into the track and sometimes provide more rear grip. Instead of narrowing or widening the rear track, the ability of changing to longer or shorter hubs is a major advantage in trying to obtain the ultimate kart balance. Different length wheel hubs are available and these can be utilised to further fine-tune your kart's handling to your individual liking.



REAR WHEEL HUBS (continued)

NOTE: If your Arrow is fitted with a 40mm axle the wheel hubs incorporate a unique design with a wheel-locating insert. Fit the insert if you have your wheel hubs over the end of the axle and remove the insert if you want to slide your wheel hubs further inwards for a narrower rear track. Important: To remove the insert slide your wheel hub onto the axle and tap the hub against the end of the axle until the insert falls out. When the insert is fitted ensure it is fitted fully into the hub before fitting your wheel. If the insert is sitting against the end of the axle and protruding from the wheel hub this will stop your wheel from fitting correctly and will cause the wheel to come loose.

CRASH & SIDEPOD BAR ADJUSTMENT

PROBLEM: “Understeer from the apex and out of the corner and/or the rear of the kart feels stuck to the track, making it slow off corners”

Solution: Loosen, but do not remove the bolt at the front mounting point of both side-pod supporting bars to the chassis.

PROBLEM: “Lacking all round grip/bite into the track”

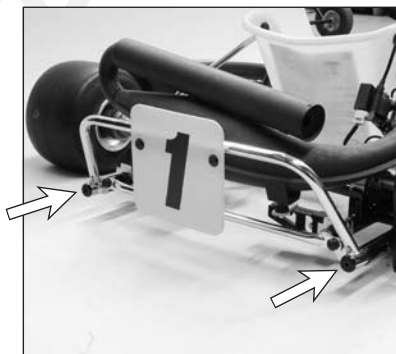
Solution: Tighten side-pod mounting bolts.

Side Pod Bars:

Have these tightened for most conditions. Loosening these will reduce grip and can also assist in reducing understeer.

Rear Crash Bar:

The rear crash bar must always be kept securely tightened.



CRASH & SIDEPOD BARS (cont)

Front Crash Bar:

The bolts securing the front bar are best left firmly tightened but do not over tighten. Loosening the front bar will reduce the front steering/grip.

NOTE: If your kart has a front crash bar that also has two vertical bolts holding it to the front pedal bar, then be sure that these remain firmly fastened at all times.



FRONT END ALIGNMENT

It is important to remember that all karts need to have a wheel alignment done prior to each new day on the track.

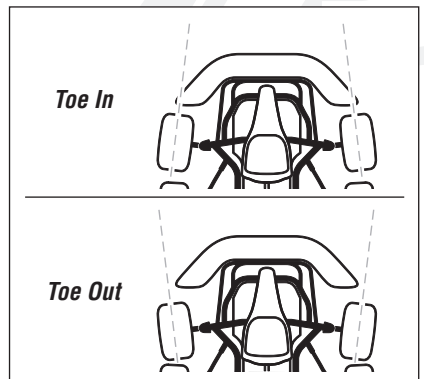
The first stage to doing a front wheel alignment is making sure you've set the height of your kart's steering wheel to where you find it will be most comfortable. On Arrow karts, the upper plastic bush on the steering shaft is height adjustable by the two holes at the top of the chassis steering shaft support uprights and the two holes on the steering shaft bush. It can also be adjusted by rotating the plastic bush upside-down.

Once you've done that, make sure the steering spade at the bottom of the steering shaft (where the two steering tie rods are bolted on) is completely vertical. Now you are ready to do a front wheel alignment, using either a 'Sniper' laser aligner or alignment bars.

1. TOE IN/OUT

Toe in/out refers to the front wheels pointing in towards each other (toe in) or outwards away from each other (toe out) when viewed from above. Refer to your kart setup specifications for the suggested starting settings.

NOTE: Excessive toe in or out may significantly affect your kart's top speed, as the tyres will 'drag', acting like brakes.



FRONT END ALIGNMENT (cont)

2. ADJUSTABLE ACKERMAN

PROBLEM: “The kart lacks steering into and through the middle of a corner”
(i.e. I need to turn the wheel excessively to steer through the corner)

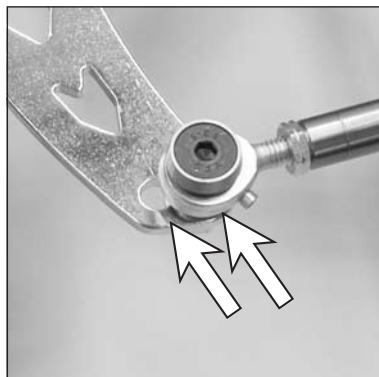
Solution: Increase the amount of Ackerman by moving the tie rods to the inner mounting holes on the stub axles. **See Note below!**

PROBLEM: “The back slides/the kart oversteers from the middle to the exit of turns (especially fast turns)”

Solution: Reduce the Ackerman setting by moving the tie rods to the outer mounting holes on the stub axles. **See Note below!**

PROBLEM: “There is too much steering or bite on turn-in”

Solution: Reduce the Ackerman setting by moving the tie rods to the outer mounting holes on the stub axles. **See Note below!**



NOTE: You must check and reset the front end alignment after any adjustment to the Ackerman.

Why?

Adjustable Ackerman on the Stub Axles' Steering Arms and Steering Column

Arrow karts are supplied with stub axle steering arms that offer two settings as to where the tie rods can be bolted. These bolt holes set the amount of Ackerman being run on the kart.

Firstly, let's explain how Ackerman works. If you take a piece of string 30cm long, and fix one end to a table, at the free end make a mark at the tip then a second mark 5cm further in, 25cm from where the string is fixed. The first mark you made represents the outside front tyre of your kart, the second mark being the inside front tyre and the fixed end on the string being the fulcrum of the arc the kart is going through in a corner. Keeping it tight, when you move the string straight off you'll notice that the inside front tyre is going through a smaller diameter arc than the outside tyre. All things being equal, the inside front tyre needs to be turned more into the corner than the outside front, the principle used to achieve this in a car or, in our case, kart is called Ackerman. The outside holes give almost parallel steering meaning front wheels turn at almost the same rate one to the other. In using the inner hole

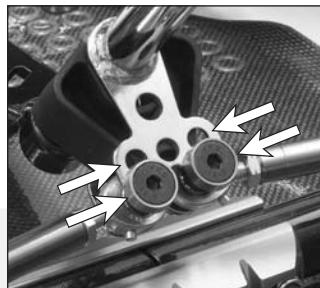
FRONT END ALIGNMENT (cont)

offered on each stub axle, the kart will have more Ackerman or, in other words, the more the inner stub axle will turn in ratio to the outer stub, (or, if you like, the more the toe-out increases as the steering wheel is turned.)

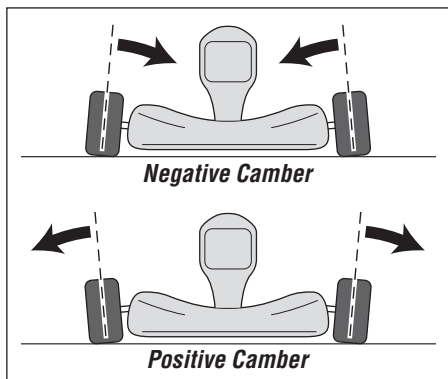
On the track increasing Ackerman has the effect of increasing 'turn-in' of your kart. It forces the inside front tyres to work more as well as increasing the mechanical chassis jack effect, or in other words will increase the amount of lift off the track you'll get with the inside back tyre through a corner while at the same time increasing the mechanical grip of the outside back tyre. This is all good stuff but like all good things in life too much can be bad!

On a track which offers a lot of fast sweeping corners with a fast corner leading onto the longest straight, running a lot of Ackerman can reduce your top end speed. It's like setting the kart with toe-out where the front tyres become dragging front brakes. On a track with lots of 'stop, turn, go' 180° type corners, lots of Ackerman will really help. The kart will change direction quickly without overworking the outside front tyre while the engine will be helped on acceleration out of the corner with the added chassis jacking offering a greater differential effect (see 'Height Adjustable Front Stub Axles').

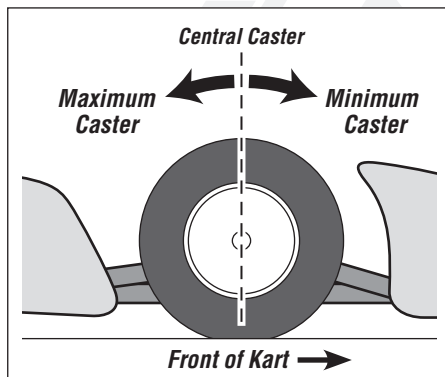
All Arrow karts offer adjustable Ackerman on the steering column where the tie rods are bolted to the steering column 'spade'. When supplied from the factory, the tie rods will be bolted on at the bottom two holes of the spade. Bolting both links into the upper holes will lighten the steering N.B. It will very slightly make the steering less responsive and will need a little more lock to achieve the same amount of steer.



3. ADJUSTABLE CAMBER AND CASTER



CAMBER



CASTER

FRONT END ALIGNMENT (cont)

PROBLEM: “The back slides/the kart oversteers going into the turns”

Solution: If camber/caster adjusters are fitted on the kart, reduce the caster setting.

PROBLEM: “There is too much steering or front end bite on turn-in”

Solution: If there are camber/caster adjusters in the kart, reduce the caster.

PROBLEM: “There is understeer all the way through the turn”

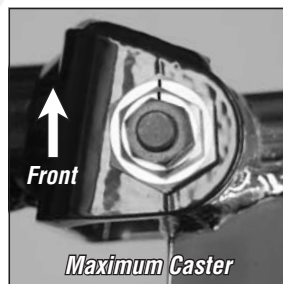
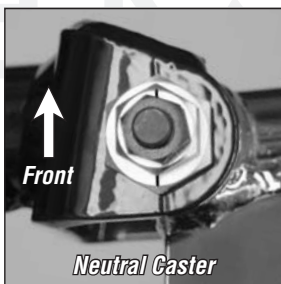
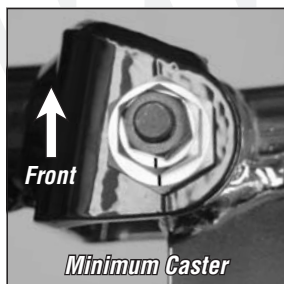
Solution: If there are camber/caster adjusters in the kart, increase the caster.

Why?

Arrow karts are all supplied with camber/caster adjusting concentric king-pin locating washers as standard. They come from the factory with the camber/caster set in the neutral position. By increasing caster you increase front ‘turn-in’ grip, increasing steering response. Running full caster in the wet is a must. In the dry, when looking for better steering response and turn-in into corners, increasing caster is okay. But note, too much caster will make for a very nervous kart on entry to corners followed by power on understeer from the apex of the corner and out.

On most Arrow kart models there are three possible caster settings while retaining the kart’s standard camber setting (see images below):

- **Minimum Caster** – Both indicator lines facing to the back of the kart;
- **Maximum Caster** – Both indicator lines facing to the front of the kart;
- **Central or Neutral Caster** – Top indicator line pointing to the back with the bottom indicator line pointing to the front of the kart.



FRONT END ALIGNMENT (cont)

NOTE: Some Arrow kart models have only two caster settings:

Backward = Minimum & **Forward = Maximum** (see below)

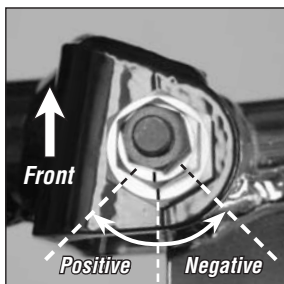


Negative/Positive Camber

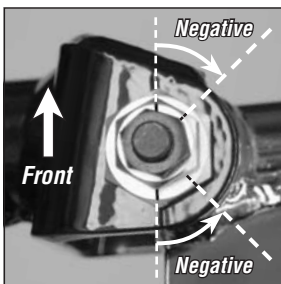
Negative camber is when the top of the tyre leans towards the centre of the kart. Using negative camber will reduce the amount of steering response the kart has, and will give more rear grip.

Positive camber is when the top of the tyre leans away from the centre of the kart. Using positive camber will help to give the kart more direct steering feel, and will also help to give the kart more mechanical 'jacking' of the inside rear wheel.

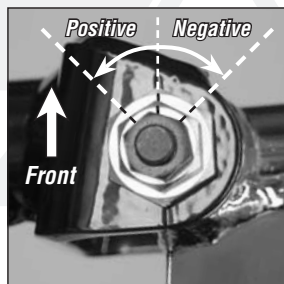
By rotating the indicator lines towards the centre of the kart you will introduce increased positive camber on the attached relevant front wheel, conversely by moving them away from the centre of the kart you will increase negative camber (see below).



Minimum Caster



Neutral Caster



Maximum Caster

Using Sniper alignment bars, the camber setting we recommend should be:

'SL' tyres: 0-2mm positive per side (meaning both front tyres should be the same top to bottom, or leaning out slightly at the top).

'Open' CIK Homologated tyres: 0-6mm negative per side (meaning both front tyres should be straight up and down or up to a maximum of 6mm narrower at their tops than their bottoms).

HEIGHT ADJUSTABLE FRONT STUB AXLES

PROBLEM: “The front understeers on entry to 180° turns”

Solution: Raise the front ride height i.e. lower the front stub axles in the chassis by one spacer at a time

PROBLEM: “The front understeers from the middle to the exit of fast turns”

Solution: Lower the front ride height i.e. raise the front stub axles in the chassis by one spacer at a time.



Why?

Height adjustable front stub axles are an aid to achieving that ‘perfect’ kart set-up. What is being achieved when the front stub axles are lowered or raised is raising and moving back or lowering and moving forward the kart’s “centre of gravity” (c.o.g.).

When you lower the stubs in the frame you raise the kart’s front ride height. This raises the karts c.o.g. as well as moving it further back. The effect on the kart will be to make it a little slower with its immediate reaction on initial steering wheel input but from then on in the front will have more grip into a corner’s apex. The effect of having moved the c.o.g. back will be to create more rear end grip throughout the whole corner as well as making the rear of the kart sit flatter, especially from the corner’s apex.

Be careful not to go too far when raising the front ride height. You might start feeling that your engine is ‘going off’, losing mid-range pull out of the turns however the kart itself feels great. Wrong! What is actually happening is that by going too high with the front ride height, the c.o.g. has been moved too far back and is now making the kart sit too flat through the corner. By doing so, the kart is not allowing any ‘chassis jacking’ or ‘differential effect’ i.e. not allowing the inside (unloaded) back wheel to lift off the track through the corner’s apex, pulling the engine down as it tries to drive both the back tyres which are mounted on a fixed axle yet are each trying to go through the corner at a different arc to one other.

NOTE: By raising the stub axle in the chassis you lower the kart’s front ride height achieving the reverse of the above.

At least one spacer must always remain above and below the stub axle.

SEAT STAYS

PROBLEM: “There’s no traction/the kart is oversteering coming from the apex out of a corner”

Solution: Mount seat stays on either side of the seat. In certain applications 2 sets of seat stays can be fitted.

PROBLEM: “The kart is unsettled over bumps”

Solution: Remove the seat stays.

PROBLEM: “The kart is slow coming off corners, and is pushing from the rear”

Solution: Remove the seat stays.

NOTE: Additional seat stays are available which fix to the axle bearing flanges and the top section of the seat. Running four seat stays will significantly obtain a lot more rear grip.



ADJUSTABLE/REMOVABLE TORSION BARS AND CLAMPS

PROBLEM: “There’s no traction/the kart is oversteering coming from the apex out of a corner & also on the entry into a corner”

Solution:

1. Running the rear torsion bar ‘full stiff’ (i.e. with the blade of the torsion bar set vertically to the track’s surface) will maximize rear mechanical grip as well as reducing rear chassis roll.
2. When karts are fitted with a removable side torsion bar or are equipped with tensioning bolts on the fourth rail, tighten the tensioning bolts completely.

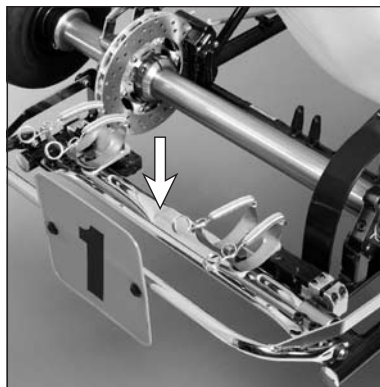


ADJUSTABLE/REMOVABLE TORSION BARS AND CLAMPS (cont)

PROBLEM: “There is understeer all the way through the turn”

Solution:

1. Turning the rear torsion blade bar towards the horizontal position will reduce rear mechanical grip while increasing rear chassis roll. If the rear torsion bar is already ‘full soft’, remove the bar completely.
2. In the case that they are fitted, remove the tensioning bolts from the side torsion bar/fourth rail. If the tensioning bolts are already removed from the side torsion bar then remove the torsion bar altogether from the kart.



NOTE: We recommend that you do not use the rear or side torsion bars at all, unless all other options have been attempted. The exception is the 125 Shifter Kart, in which case the rear bar should almost always be kept in and ‘flat’.

PROBLEM: “The kart oversteers, is too direct in the steering when entering corners”

Solution: Remove front clamp or torsion bar.

PROBLEM: “The kart lacks initial steering and feels vague in the front”

Solution: Tighten front clamp and/or insert front torsion bar.



NOTE: As a general rule, fitting and/or tightening torsion bars or clamps will increase mechanical grip, while removing and/or loosening them will reduce mechanical grip.

ADJUSTABLE/REMOVABLE TORSION BARS AND CLAMPS (cont)

Why?

1. *Removable Front Torsion Bars & Clamps*

Removable front torsion bars and clamps affect the mechanical grip of the front tyres. Removing the front torsion bar in your kart will decrease front-end mechanical grip.

2. *Adjustable/Removable Side Torsion Bar (chassis fourth rail)*

The tension bolts on the fourth rail on some karts are designed to allow adjustment to the stiffness of the centre section of these chassis rails. Under normal track conditions this bolt should be left in and done up tight. As a track offers more grip or as rubber goes down on the driving line, then the bolt should be loosened until the point you can turn it freely with your fingers. If the track has good grip with a lot of rubber on the driving line or if the track is very bumpy then the bolt and its spacer should be removed from the kart altogether.

Some Arrow karts also provide the ability to remove the fourth rail/side torsion bar completely. Having the side bar fitted in your Kart will normally provide more grip. Conversely, removing this torsion bar will reduce grip.

3. *Adjustable/Removable Rear Torsion Bar*

The adjustable/removable rear torsion bar is a good tool in helping to create more grip in the back of your kart. Some Arrow karts are supplied with this chassis-tuning feature. This allows you to fine tune the chassis by increasing or decreasing rear end grip. Running the bar “full stiff” (i.e. with the blade of the torsion bar set vertically to the track’s surface,) will maximize rear mechanical grip as well as reducing rear chassis roll. Turning the bar towards the horizontal position will reduce rear mechanical grip while increasing rear chassis roll. Removing the rear torsion bar completely is the ‘free-est’ setting.

4. *Centre Rail Torsion Clamp*

In low to standard grip levels, removing the clamp will allow the kart to release better off the turn and keep engine momentum up, but the kart will slide more. Fitting the clamp will provide more all round grip to the kart, but exit speed off tighter turns will be lower.

In high grip conditions the chassis will already be flexing a lot more, therefore we recommend fitting the clamp as it will provide more steering, better balance and the engine speed off the tighter turns will be higher.

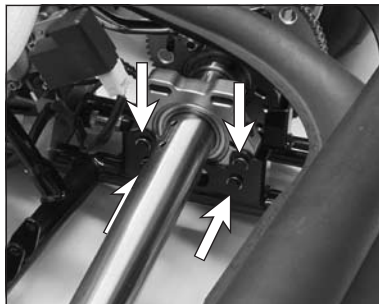
AXLE BEARING ADJUSTMENT

1. AXLE BEARING ADJUSTMENT

PROBLEM: "The kart sits 'flat' on the exit of turns"

Solution: On Arrow karts using a 3 bearing rear axle design, under certain conditions where grip level is high, less grip may be achieved by loosening the centre bearing. Remove the bolts from the alloy bearing flange and loosely fit cable ties through these holes.

NOTE: The results of this will change dependent on the tyre you are running.



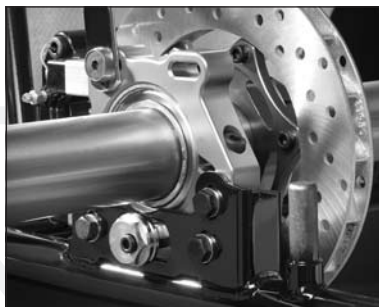
2. HEIGHT ADJUSTMENT OF THE REAR AXLE

PROBLEM: "The kart is two wheeling excessively through corners" (i.e. both inside wheels are 10cm off the track surface)

Solution: Raise axle in chassis.

PROBLEM: "The back slides/the kart oversteers going into the turns"

Solution: Make sure the back axle is located full down in the chassis (i.e. the kart with maximum rear ride height)



Why?

With the Arrow karts that allow height adjustment of the rear axle, by raising the height of the rear axle in the chassis you are lowering the rear ride height. In effect, this changes the 'centre of gravity' (c.o.g.) of your kart, which is lowered and moved back compared to when the axle is in its normal full down position in the chassis.

NOTE: As a general rule the axle should always be left fully down in the chassis (if 2 positions are available) or in the middle (if 3 positions are available) as the kart's normal setting. Only when track conditions start making the kart two-wheel excessively through corners, or other options have been exhausted, should the axle be raised in the chassis.

HEIGHT ADJUSTMENT OF THE REAR AXLE

AX9 125, CIK & B-MAX:

These karts feature Arrow's unique cam adjusting ride-height adjustment system. Its user friendly design makes it easy to set the ride-height for all conditions – here's how...

1. Loosen engine clamp bolts, but do not remove the chain.
2. Loosen the seat stay bolts both at the top and the bottom.
3. Loosen all four bearing flange bolts on all three flanges.

Now you're ready to adjust the ride-height. The AX9 Arrow range of karts comes standard in the central ride-height position. This means that both of the cam-adjuster's lines will be facing forward.

4. Take the Ride-height spanner.
5. To achieve 'HIGH' ride-height simply rotate the cam-adjusters so that both lines are facing upward. To achieve 'LOW' ride-height, continue the rotation until the lines are facing downward.



NOTE: When the cam adjuster line is pointing fully down it will hit a stopper. This will indicate that it has reached its lowest ride-height point. The same will occur when the adjuster is turned fully toward the front, this indicates that the axle is in the 'true' central position.

6. Tighten all axle flange bolts, leaving the centre bearing to last.
7. Tighten all of your seat stay bolts, beginning with the lower one's.
8. Adjust your chain tension & then tighten the engine clamp bolts.

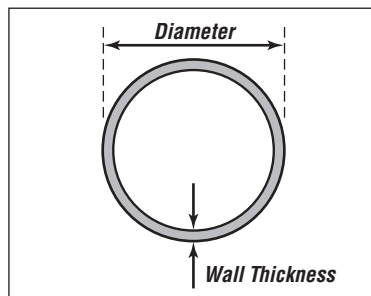
NOTE: The cam-adjuster bolt should remain tight enough not to move, yet loose enough so that with the ride-height spanner you can still rotate the adjuster. This bolt has no effect on retaining the bearing flange in the hanger.

AXLES & WHEELS

AXLES

There are many different types of axles available for your Arrow kart. Each of these will cause a different sensation and will affect the way the kart handles on entry, in the middle and on the exit of a turn. Your job, depending on the track conditions, will be to decipher which axle suits both your driving and the track conditions.

Below are some examples of what they will do. Keep in mind that starting in the middle or 'medium' is often the best place.



50mm

HARD – Best suited to cold, low grip situations.

MEDIUM – Workable in most racing conditions.

SOFT – Provides less grip than the above two, although can be beneficial if the kart is slow exiting corners due to excessive grip.

EXTREME SOFT – This is an axle which is 'way off the scale'. Be careful not to drive your grub screws through it when installing! This axle is best suited to high grip tyres, though some independent testing should be carried out to see how it works for you.

NOTE: Always check the grub screws after each session

40mm

HARD – Best suited to cold, low grip situations.

MEDIUM – Workable in most racing conditions.

SOFT – Provides less grip than the above two, although can be beneficial if the kart is slow exiting corners due to excessive grip.

EXTRA SOFT (2mm) – This axle has a 2mm wall thickness and, although it is next in the line of axles, it can have varied effects depending on track condition due to its wall thickness. It can be a very good axle in high grip SL racing situations.

EXTREME SOFT – This is not as 'extreme' as the 50mm version. It has limited uses, though high grip situations are where it will work best. Some independent testing should be carried out to see how it works for you.

AXLES & WHEELS (cont)

30mm

SOLID – Mainly used in Hire Kart applications, this axle will make the kart extremely stiff, possibly generating a lot more grip and is generally not very user friendly.

THICKWALL – Mainly used in cold, slippery conditions, it offers more rear grip than the thinwall version.

THINWALL – This is the standard 30mm axle. It suits most racing conditions and generally makes setup of the rest of the kart quite easy.

EXTREME SOFT – This is a good axle for relieving the rear of the kart of grip. It allows the kart to release off of corners better.

25mm

SOLID – This axle is rarely used (unless it is mandatory in Cadet racing under some associations), through advances in technology, the 30mm thinwall axle has basically taken over its place.

MAGNESIUM VS ALLOY WHEELS

Alloy wheels are stiffer than magnesium wheels and because of this they tend to generate more mechanical grip. For instance, if you had four alloy wheels fitted and the back of the kart had too much grip and was starting to overpower the front, then fitting magnesium wheels on the rear only would be a viable option to reduce rear end grip.

SOFT TYRES AND/OR HOT WEATHER: Generally use magnesium wheels.

HARD TYRES AND/OR COLD WEATHER: Generally use alloy wheels.

SEAT - FIT AND POSITION

How to fit a seat correctly...

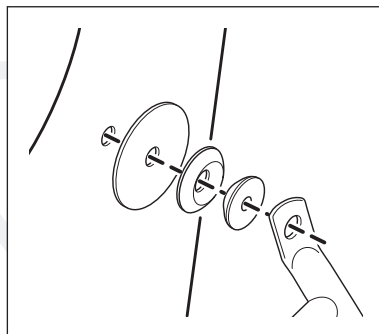
Picking a seat that fits you correctly and fitting it into your kart are two very important operations that will affect the performance of the kart. Firstly, make sure the seat fits you well. We recommend the Kartech RT (for 'SL' type tyres) or Kartech RT Stiff (for high grip 'SL' or 'Open' type tyre) seats. Place the chosen seat on the floor and sit in it with your legs out flat and arms held out as if you were in your kart and driving it. You should fit all the way down into the seat. The seat should firmly hold your hips, while you must be able to place your flat hand in between the seat and your rib cage without using force. With an Arrow kart, once you've got the correct seat, depending on its size and the model Arrow kart you're fitting it in to, the Seat Position diagram and chart included with this Manual (if buying a new kart) will help you ascertain the correct measurements you'll need, or refer to our website at www.arrowkarts.com.

When fitting a seat in your kart, it is essential that the frame is not stressed or forced in order to tighten up the seat fixing bolts. Arrow offers a range of seat spacers that help making the job of fitting a seat easy. Make sure you use a large diameter seat washer against each side of the seat; a very important must in spreading cornering loads. Using Arrow spacers, we suggest using the Arrow self aligning seat spacers combined with a mixture of the 7mm plastic spacer with the 7mm & 12mm aluminium seat washers, as needed, plus the Arrow plastic seat "wedge". It is important that only a maximum of one plastic 7mm seat spacer plus the plastic seat wedge is used on each side of the seat. The plastic seat wedge, once fitted, should be rotated to provide good alignment between the seat and seat bracket surfaces.

As an example, on an Arrow kart we recommend:

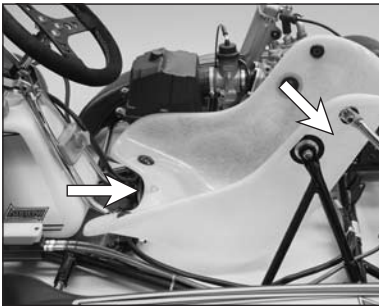
Against the seat: Large o.d. washer
Next: Arrow self aligning seat washers (aluminium).
Next: 7 or 12mm alum. spacer as required*,
Next: 1 x 7mm plastic spacer if required*,
Next: plastic seat wedge.

Under the front of the seat only plastic seat spacers should be used as packing between the seat and the welded chassis mounting tabs in obtaining the correct relevant measurements.



WEIGHTING THE KART

Lead ballast should be securely fastened to the sides, rear or underneath of the seat. The best place for the majority of your lead ballast is underneath the seat at the front (Crotch area). Do not add ballast to any other part of the kart chassis. A driver with a light body weight may achieve better handling by fastening ballast as high as possible on the seat. Adding a significant amount of ballast can have a marked affect on the handling of the kart. It may be necessary to test different mounting positions for the ballast.



NOTE: Try not to mount lead on the rear of the seat as it gives the effect of moving the seat back

WET WEATHER

Wet Tyres (hard compound SL):

- **Front Track:** Move front wheels out as far as possible.
- **Rear Track:** Leave as per your dry setting or move hubs inwards 10mm each side. Narrowing the rear track too much will result in front understeer.
- **Caster Adjustment:** If time permits, adjusting to maximum caster (indicator lines to front of kart) will reduce understeer.
- **Tyre Pressure:**

Extreme wet conditions:	25–30psi	1.70–2.05kg/cm ²
Moderate wet conditions:	20–25psi	1.35–1.70kg/cm ²
Drying conditions:	15–20psi	1.00–1.35kg/cm ²

Wet Tyres (soft compound):

- **Front Track:** Move front wheels out as far as possible.
- **Rear Track:** Leave as per your dry setting or move hubs inwards 10mm each side. Narrowing the rear track too much will result in front understeer.
- **Caster Adjustment:** If time permits, adjusting to maximum caster (indicator lines to front of kart) will reduce understeer.
- **Tyre Pressure:**

Front:	12psi	0.80 kg/cm ²
Rear:	14psi	0.95 kg/cm ²

BRAKE ADJUSTMENT

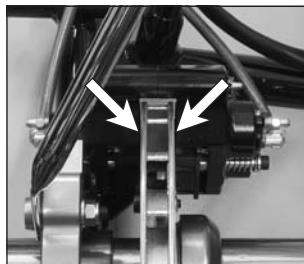
1. PAD WEAR ADJUSTMENT

PROBLEM: “The engine has no top end speed”

Solution: Verify the brakes are not dragging. If needed, increase the gap between the rear brake pads and the disc by removing shims between the caliper piston and the brake pad.

PROBLEM: “Excessive pad clearance between each pad and the disc” (Pad adjustment is necessary when the clearance between each pad and the disc exceeds 3mm)

Solution: Reduce the gap between the rear brake pads and the disc by fitting a shim between the caliper piston and brake pad. You must do this on both sides to ensure pad clearance to the disc is equal. Remove the pad safety pins and fit a shim between the caliper piston and the brake pad. Refit the safety pins. You can fit additional shims as the pads wear more, however, ensure you do not fit too many shims as this could cause the pad return springs to spring bind and this will seriously affect your brake performance. Should you encounter difficulty fitting the shims then remove the four pad return bolt/springs, fit the shim and refit the return bolt/springs.

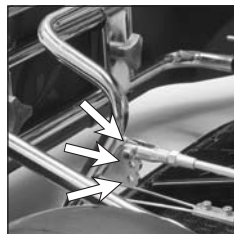


NOTE: The minimum clearance between each pad and the disc should be 1.5mm. Arrow karts brakes are supplied with 4 adjustment shims (2 x 0.5mm thick and 2 x 1.0mm thick) making adjustment simple.

2. PEDAL PRESSURE ADJUSTMENT

PROBLEM: “Brake pedal pressure does not suit my driving style”

Solution: On the pedal there are three positions available for the brake actuating linkage. The higher up the brake pedal you mount the actuation linkage, the more pedal pressure that will be required. The lower the linkage is mounted on the brake pedal, the more sensitive the brakes become with less pedal pressure being required. On the master cylinder there are two positions available for mounting the brake actuation linkage. The higher the linkage is mounted, the more sensitive the brakes will be, while requiring less pedal pressure.



ADJUSTABLE BRAKE BALANCE BAR

(as fitted on kart models with front brakes)

PROBLEM: *"Too much front end bite on turn-in" (steering wheel tries to rip from your hands)*

Solution: *On karts fitted with front brakes, adjust the brake bias to increase rear braking.*

The brake balance bar on karts with front brakes allows you to regulate the percentage of braking done between the front and rear wheels. The balance bar distributes the brake pedal movement transmitted to the front brake's and the rear brake's master cylinder pumps. The first way of adjusting the brake bias is to do it when the kart is on the kart stand. Adjust the brake balance bar into a position where, with pressure applied on the brake pedal, both front and rear wheels can just be turned by hand.

NOTE: *We recommend turning the knob right in and then back out six whole turns.*

BRAKE MAINTENANCE

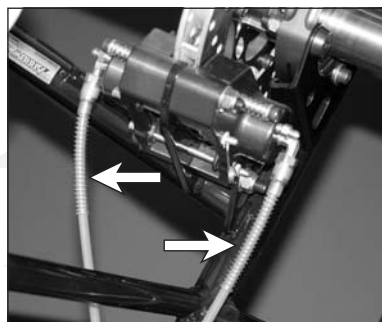
1. **On Arrow karts fitted with nylon hydraulic brake lines, always check that the spring nut brake line protection fitting is done up tight.**

These Spring nuts are fitted at both ends of each brake line to help protect the tubing from accidental crimping. To do their job properly they must always be done up tight. It is therefore essential that they are checked each day before using your Arrow. They have left hand threads so must be turned anti-clockwise to be tightened.

2. **Always check the feel of the brake pedal making sure it feels hard without any sponginess.**

If the pedal does feel a little spongy, bleed the system only using racing Dot-4 grade hydraulic brake fluid. Before attempting to bleed the brake, retract the dust boot on master cylinder to check if the piston is against the circlip (adjust the pushrod if necessary). To bleed the brake, depress master cylinder lever. Whilst keeping pressure on the lever, open the bleed screw in the brake caliper. Keep pressure on the master cylinder lever until the bleed screw is tightened. Release the lever. Repeat this process while maintaining the reservoir fluid level, until the new fluid has been flushed through the system. Repeat for other side of the caliper. If, having done this, the brake pedal still feels spongy, check for leaks. As a safety check, make sure the pad retaining bolts are tight. We do check them at the factory but double-checking never hurt anyone. Not checking might!

NOTE: *Do not use Silicon brake fluid!*



BRAKE MAINTENANCE (cont)

NOTE: After a period of 3 months it is recommended you replace the brake fluid by re-bleeding. Whilst bleeding the brake, ensure the fluid level does not drop. Ensure pad adjustment is kept within tolerance given. Lack of adjustment will result in calliper piston and bore wear becoming excessive, and leakage occurring.

3. *Ensure the master cylinder lever always has free play. If the brake rod is adjusted in such a way that no free play exists and the master cylinder lever has pressure on it (preventing the master cylinder from returning) adjust either your pedal stop or brake rod length.*
4. *Your brake system should be overhauled every 6 months. The system should be stripped, washed in water or methylated spirits, new seals fitted and re-bled. Your kart dealer can overhaul your brake if you are unable. “Don’t wait for a failure – preventative maintenance is much wiser.”*
5. *Arrow karts are supplied with brake pads developed over many years of extensive testing. Don’t use substitutes as they could affect your brake disc and result in poor braking performance. The correct part numbers are BDHL7, BDHL7X or BDHL5.*
6. *When your kart is new or whenever you fit new brake pads ensure you follow this ‘bedding-in’ procedure. Correct bedding-in improves pad life and braking performance.*

Drive kart slowly for 2-3 laps dragging the brake until they are extremely hot and are about to fade. Now continue driving slowly, without touching the brakes, allowing them to cool.

After this you can drive at race pace.

ARROW

'BLUE PRINTING' YOUR ARROW RACING KART

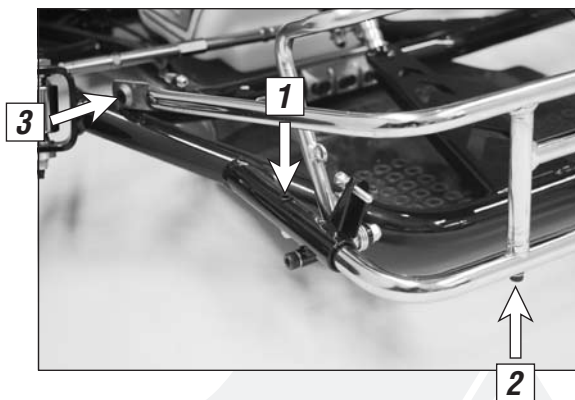
Arrow karts are highly sensitive machines. As you will soon find out, even the slightest of adjustments can make the biggest of differences to the way the kart handles. These adjustments will have a very large impact on the final results of your race weekend.

It is because of these factors that we have taken it upon ourselves to search for anything that could contribute to making our karts and you both faster and more user friendly, we are hopeful that because of this attention to detail that you ultimately get the results that you deserve.

REDUCING UNNECESSARY STRAIN ON COMPONENTS

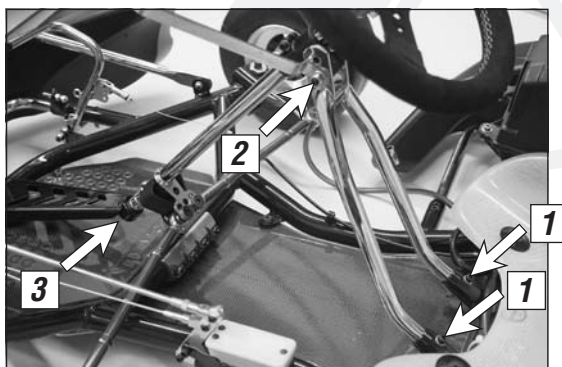
Affixing Front Crash Bar

1. Tighten 'lower' bolts through chassis on both sides.
2. Tighten bolts in upright of front crash bar.
3. Tighten 'upper' bolts to tabs on chassis on both sides.



Affixing Steering Upright & Column

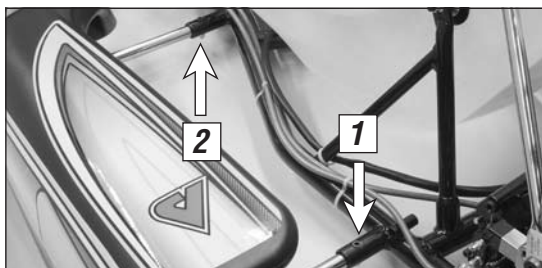
1. Tighten the steering upright's bottom two bolts.
2. Tighten the steering bush bolt.
3. Tighten nyloc nut at the bottom of the steering column (from underneath).



'BLUE PRINTING' YOUR ARROW RACING KART (cont)

Affixing Side Pod Bars

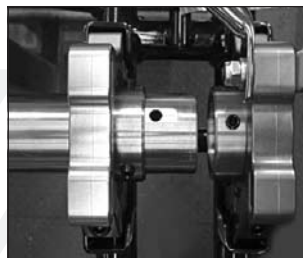
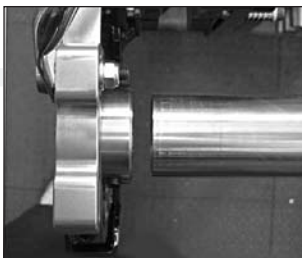
Always tighten the rear bolt first as the front hole is slotted.



Proper fitment & Alignment of Rear Axle Flanges & Axle

1. Firmly tighten both the far left & far right bearing flanges into their respective bearing hangers.
2. Slide axle through L/H flange, right up to the face of R/H bearing. Now wiggle axle front to back & left too right, for proper alignment, it should move in each direction equally, relative to the bearing. Now remove axle & repeat from the opposite side. You should now be able to slide the axle freely between the two bearings.
3. Loosely put the third bearing into position and do the bolts up only finger tight. Now slightly knock the top of the flange towards the left hand side of the kart.

4. Tighten the **TOP** two bolts of the flange first, followed by the bottom bolt/s. Now back each bolt off slightly so as you can spin them with the spanner, but leave them tight enough so

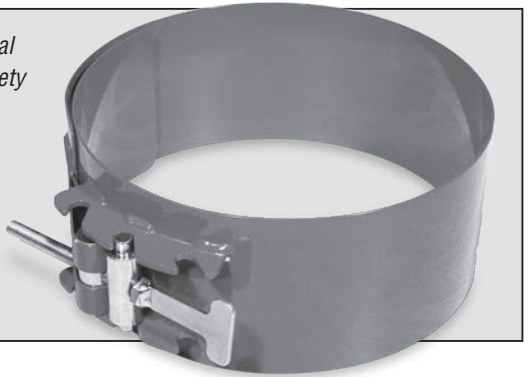


- that they **DO NOT MOVE** left to right. Lightly tap the top of the bearing flange back towards the right hand side of the kart. Whilst you are doing this you must continuously try to push the axle through the flanges. Soon the axle will move freely, but if you hit the flange too hard it may bind up again, in which case you will have to knock it back to the left again.
5. Now that the axle moves freely between all three flanges you can tighten the third bearing firmly.
 6. Be sure when inserting axle that both ends protrude from the bearing by exactly the same amount.

FITTING TYRES

Fitting tyres will depend upon the class the kart is being assembled for. When inflating the tyre to seat the bead, do not over inflate. There is a very real risk of serious injury if the manufacturer's advice printed on the sidewall of all tyres is not followed. To aid the seating of the bead a light coating of soap applied before inflation and using external steel tyre rings around the tyre will help. Ensure all tyres are wiped after this process and check for any damage or defects before placing the tyre on the kart.

NOTE: Using the Kartech Adjustable External Steel Tyre Ring is important as a safety issue as well as for performance. It reduces the amount of pressure required to seat the tyre's bead onto the rim. Apart from the obvious safety advantage, this stops the tyre from being stretched out of circumference or shape.



OWNER REGISTRATION CARD

Important: This card must be filled out by the Kart Dealer selling the kart and forwarded to Arrow Karts Pty Ltd.

It is essential this registration card is on file should any queries require future attention by Arrow Karts.

Kart Dealer Name _____

Owners Name _____

Address _____

Owner's Phone Number Business (_____) _____

A/Hours (_____) _____

Age of owner ☐ 7-15 ☐ 16-20
☐ 21-25 ☐ 26-30
☐ 31-35 ☐ 36+

Number of years karting _____

Date Kart Purchased _____ Chassis Number _____

Class in which the kart will be raced _____

Has the purchaser owned an Arrow Kart previously _____

(If so, which model/s)

What other brand of kart has the owner previously owned _____

**Please remove this card and return to: Arrow Karts
PO Box 4105
Mulgrave VIC 3170 Australia**

GEAR RATIO CHART

	9	10	11	12	13	14
64	7.11	6.40	5.81	5.33	4.92	4.57
65	7.22	6.50	5.90	5.41	5.00	4.64
66	7.33	6.60	6.00	5.55	5.07	4.71
67	7.44	6.70	6.09	5.58	5.15	4.78
68	7.55	6.80	6.18	5.66	5.23	4.85
69	7.66	6.90	6.27	5.75	5.30	4.92
70	7.77	7.00	6.36	5.83	5.38	5.00
71	7.88	7.10	6.45	5.91	5.46	5.07
72	8.00	7.20	6.54	6.00	5.54	5.14
73	8.11	7.30	6.63	6.08	5.62	5.21
74	8.22	7.40	6.73	6.16	5.69	5.28
75	8.33	7.50	6.82	6.25	5.77	5.35
76	8.44	7.60	6.91	6.33	5.85	5.42
77	8.55	7.70	7.00	6.42	5.92	5.50
78	8.66	7.80	7.09	6.50	6.00	5.57
79	8.77	7.90	7.18	6.58	6.08	5.64
80	8.88	8.00	7.27	6.66	6.15	5.71
81	9.00	8.10	7.36	6.75	6.23	5.78
82	9.11	8.20	7.45	6.83	6.31	5.85
83	9.22	8.30	7.54	6.92	6.38	5.92
84	9.33	8.40	7.64	7.00	6.46	6.00
85	9.44	8.50	7.73	7.08	6.54	6.07
86	9.55	8.60	7.82	7.17	6.62	6.14
87	9.66	8.70	7.91	7.25	6.69	6.21
88	9.77	8.80	8.00	7.33	6.77	6.28
89	9.88	8.90	8.09	7.42	6.85	6.35
90	10.00	9.00	8.18	7.5	6.92	6.42
91	10.11	9.10	8.28	7.58	7.00	6.50
92	10.22	9.20	8.36	7.66	7.07	6.57
93	10.33	9.30	8.50	7.55	7.15	6.64

SUGGESTED MAINTENANCE SCHEDULE

ITEM	AFTER RUNNING IN	AFTER EVERY RUN	EVERY RACE MEETING			AS REQ'D	AFTER 1 SEASON or 1,000km	REMARKS
			1 MEET or 100km	3 MEETS or 300km	5 MEETS or 500km			
Axle Inspection	•		•					
Axle Bearing:								
Inspection	•		•					
Retighten	•		•					
Replacement						•		
Bearing Grub Screws:								
Inspection	•		•					
Retighten	•		•					Torque: 5Nm (0.5m.kg, 3.6ft.lb)
Bolts & Nuts:								
Retighten	•		•					
Brakes:								
Retighten (spring nut brake line protection)	•							Refer to brake maintenance section on page 19
Inspection (disc)	•		•					Runout Limit 1mm (0.04")
Inspection (pad clearance)	•		•					Clearance to disc 2.0mm maximum
Inspection (fluid leaks)	•		•					
Inspection (brake fluid level)	•			•				
Inspection (brake response)	•	•						
Retighten	•		•					
Replacement (brake pads)						•		Refer to Brake section. Max. pad wear before replacement 4mm
Replacement (brake fluid)					•			
Brake Disc Hub	•		•					Lubricate threads
Cables:								
Inspection (brake cable)	•		•					
Inspection (throttle cable)	•		•					
Replacement						•		
Chain:								
Inspection	•	•						
Lubricate	•	•						
Replacement						•		
Chain Guard:								
Inspection	•		•					
Replacement						•		

ITEM	AFTER RUNNING IN	AFTER EVERY RUN	EVERY RACE MEETING			AS REQ'D	AFTER 1 SEASON or 1,000km	REMARKS
			1 MEET or 100km	3 MEETS or 300km	5 MEETS or 500km			
Chassis, including all welds:								
Inspection	•		•					Immediately following any crash/contact
Cleaning	•		•					
Drive Sprockets:								
Inspection	•		•					
Replacement						•		
Engine:	Refer to Owners Manual Maintenance Schedule							
Engine Mount Clamps:								
Retighten	•		•					
Inspection (red nylon inserts)					•			Replace after 5 race meetings
Fuel line/Fuel tank:								
Inspection (tank)	•		•					Check inside tank that fuel pickup has not come adrift from the outlet fitting
Inspection (hose)	•		•					
Cleaning (tank)	•			•				
Replacement (hose)	•				•			
Sprocket Hub:	•		•					Lubricate threads
Steering System:								
Inspection 1 (movement)	•		•					
Inspection 2 (damage)	•					•		Immediately following any crash/contact
Retighten	•		•					
King Pins	•		•					Must be tight, but do not overtighten. Replace if movement of stub on king pin is evident
Inspection (tie rod ends)				•				Replace if worn
Rear Bumper:								
Inspection	•		•					
Retighten	•		•					
Wheels/Tyres:								
Air pressure	•	•						
Inspection (wheels, inc. bearings)	•		•					
Inspection (rear wheel hubs)	•		•					Lubricate threads
Retighten (wheels)	•		•					
Replace (wheels)						•		
Replace (tyres)						•		

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This guide is intended as a general handling and setup guide for all karts, as well as being an Owner's Manual for the Arrow range of karts. For more information on Arrow karts, visit the web site at ***www.arrowkarts.com***

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