TTECH RACING CONCEPTS

Predator X10

Manual

Rev 1.5



The unfair advantage

Predator X10 Welcome

Thank you for buying our Predator X10 kit. Please follow the instructions carefully as this kit you are about to build is very different to all other RC cars available and needs very careful attention to detail to make a competitive reliable race car.
I would also like to thank Richard Weatherly, for this is his genius design, and for all his help to me over the many years I have ran the unfair advantage.

Additional items required

- Radio equipment
- Motor and 48dp pinion
- 2S LCG shorty LIPO (recommended)
- Battery charger
- Steering servo
- Electronic speed controller
- Transponder (optional)
- Front and Rear tyres + inserts
- Super glue
- Polycarbonate paint
- Silicone oil for shocks
- Arrowmax silicone grease
- Loctite 542 thread sealant (Important)
- Tamiya Cera grease HG

Tools required

- 1.5mm hex driver
- 2.0mm hex driver
- 2.5mm hex driver
- 5.5mm nut driver
- 7mm nut driver
- 10mm spanner
- Pilers
- Side cutters
- Stanley knife
- Soldering iron (and solder)
- Curved scissors
- 4mm Spanner

Additional items included in the kit

To help you build the kit we've included the following additional items:

- 0.9mm Allen key
- TTech Red drive shaft grease

During the build of the X10 we strongly recommend that you use Loctite 542 Thread sealant on ALL bolts that go into any metallic part. Failure to do so will result in bolts coming loose when racing and will cause damage to the threads. Do not use a thread locker or anything else.
We have indicated all the parts that require the sealant with an ORANGE oval around the bolt size.

Important safety information

- This product is not suitable for children under the age of 14, without supervision of an adult
- The kit contains small parts that could be swallowed by children causing choking and possible internal injuries
- Select an area for assembly that is away from the reach of young children
- Exercise care when using hand tools and sharp instruments
- The kit has exposed moving parts – Do not put fingers near any of these parts without first Disconnecting and removing the battery
- Do not use the car on public roads or in places where it can interfere with traffic, people or animals
- Always follow all safety and operating instructions of the electrical items to be used in the kit
- The motor and speed controller can become very hot during use – Do not touch them until they have cooled down.
- Always store and charge LIPO batteries in fireproof containers / or LIPO bags

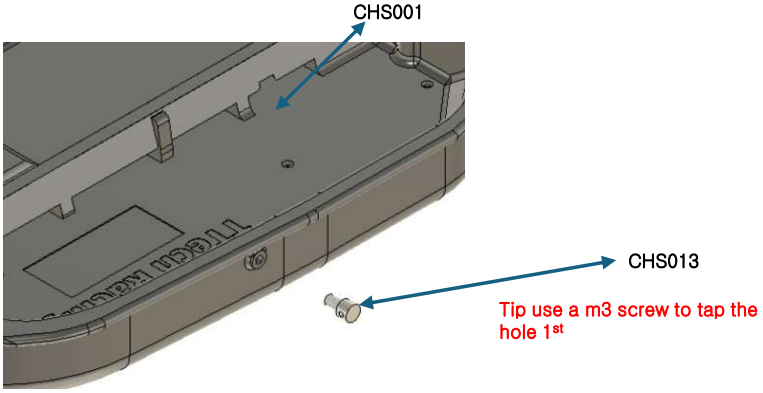
PARTS BAG 1

CHS001 X 1
CHS013 X 2

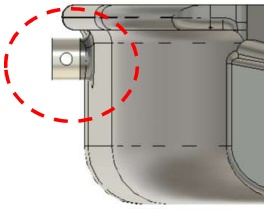


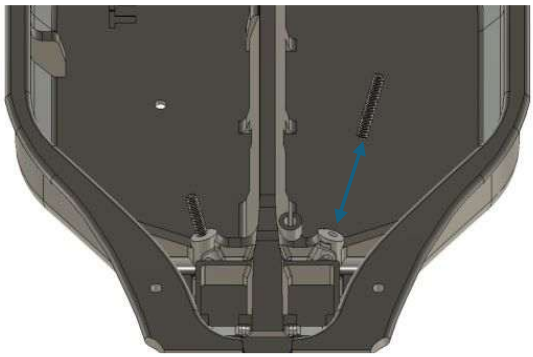
M3 X 20MM X 2

Chassis part 1

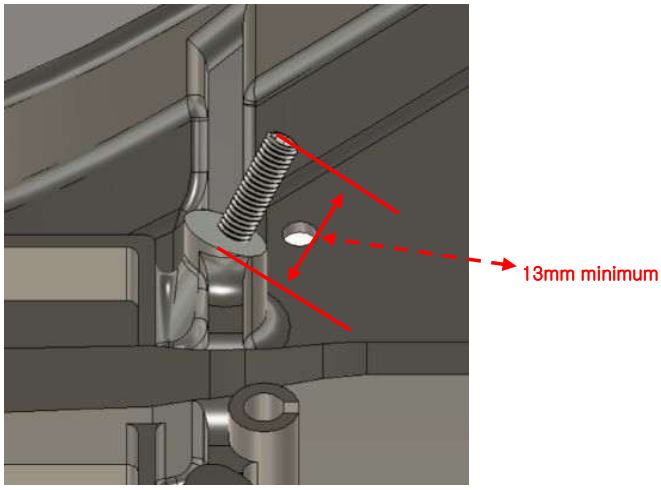


Please note the orientation of the body mount





Screw in at the angle of the boss not vertical.



Predator X10 Transmission

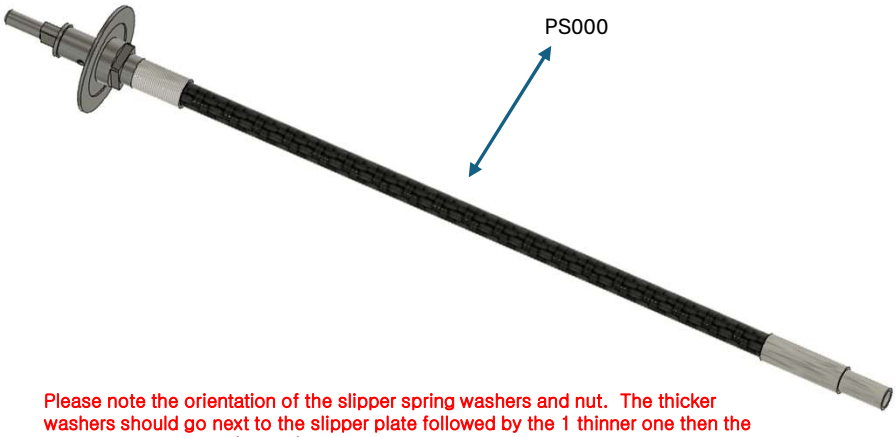
PARTS BAG 2

PS000 X 1
PS001 X 1
PS002 X 1
PS003 X 1
PS006 X 1
PS010 X 2
PS011 X 1
PS013 X 5
PS014 X 2

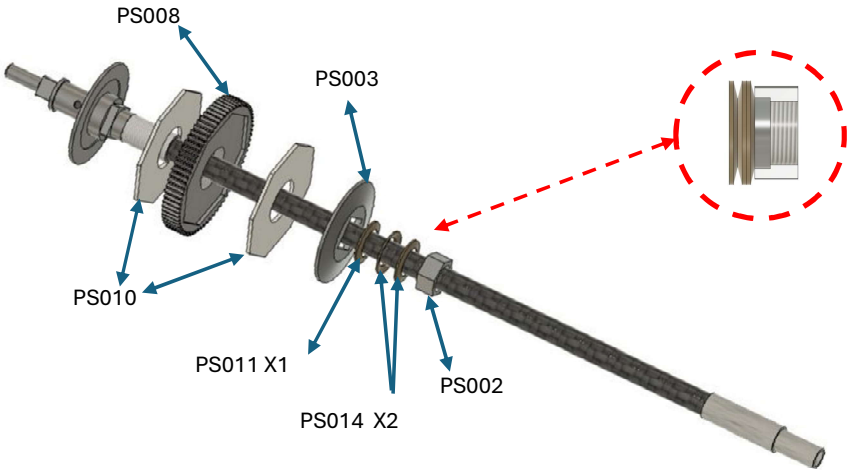


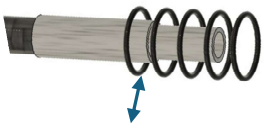
Dowel 1.5mm x 12 x1

Prop-shaft assembly

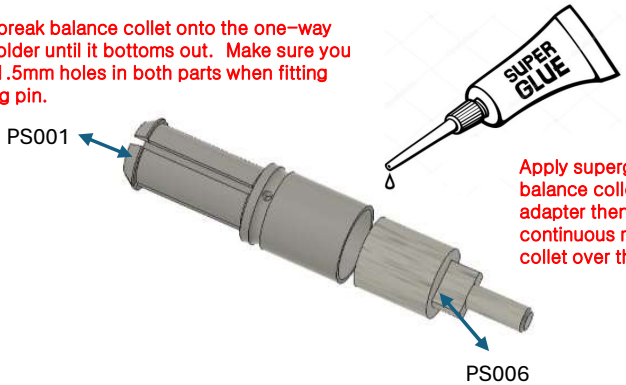


Please note the orientation of the slipper spring washers and nut. The thicker washers should go next to the slipper plate followed by the 1 thinner one then the nut. The slipper plate (PS003) needs to clip into the square hole under the springs before adjusting the nut. The nut should not be over tightened as it has a short and very fine thread for small very precise adjustments.





Push the break balance collet onto the one-way bearing holder until it bottoms out. Make sure you align the 1.5mm holes in both parts when fitting the locking pin.



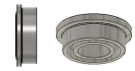
Apply superglue to the break balance collet and one-way adapter then with one continuous motion slide the collet over the one way.

You have the ability to lock the slipper shaft to the brake balance collet using the 1.5mm X 12 mm dowel included. Use the larger of the orings to secure the dowel in place. This gives full front wheel breaking when fitted

The unfair advantage

PARTS BAG 2

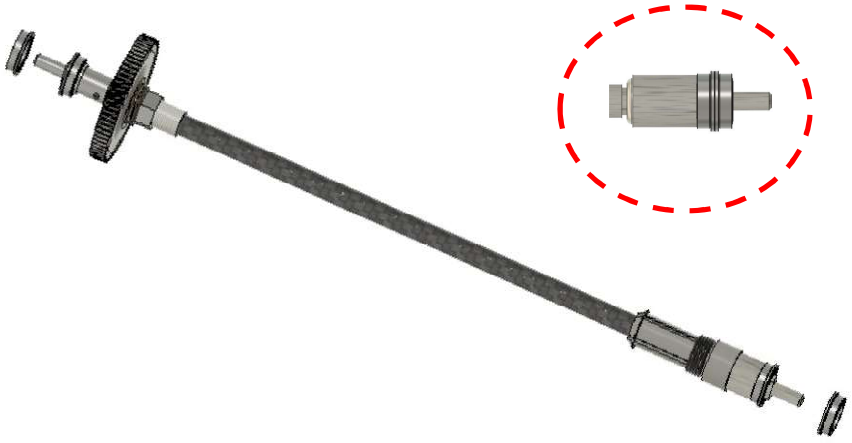
PS009 X 2



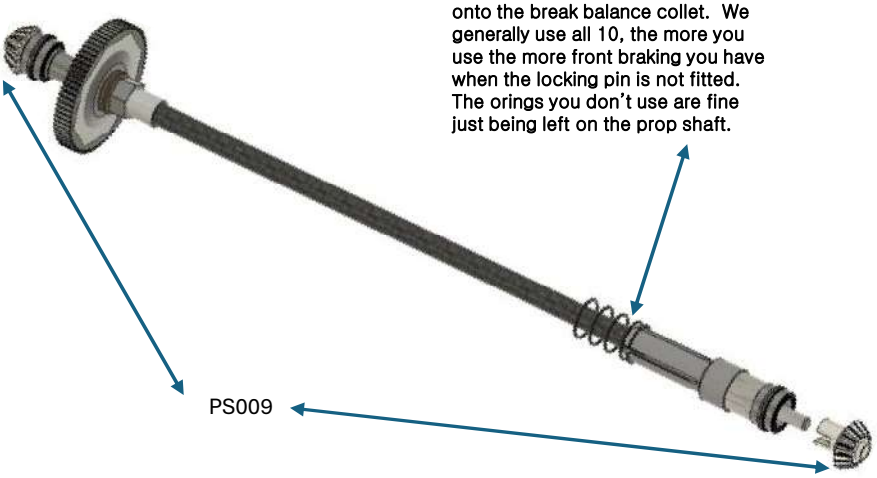
FB 8 X 12 X 2.5 X4

Prop-shaft assembly

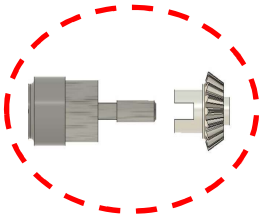
Please note the orientation of the bearings, both flanges should face each other.



Slide the required number of orings onto the break balance collet. We generally use all 10, the more you use the more front braking you have when the locking pin is not fitted. The orings you don't use are fine just being left on the prop shaft.



Please note the orientation of the bevel gear and one-way adapter and use grease on the mating surface this should move freely in and out on the front bevel gear. There should be a 1-2mm gap of end float when it's fitted to the car to allow for chassis flex.



Predator X10 Transmission

Differentials (Build 2)

PARTS BAG 3

DF001 X 2
DF002 X 2
DF003 X 2
DF006 X 2
DF013 X 1
DF014 X 3



TB 2.5 X 6 X2



5 X 8 X 3.5 X4



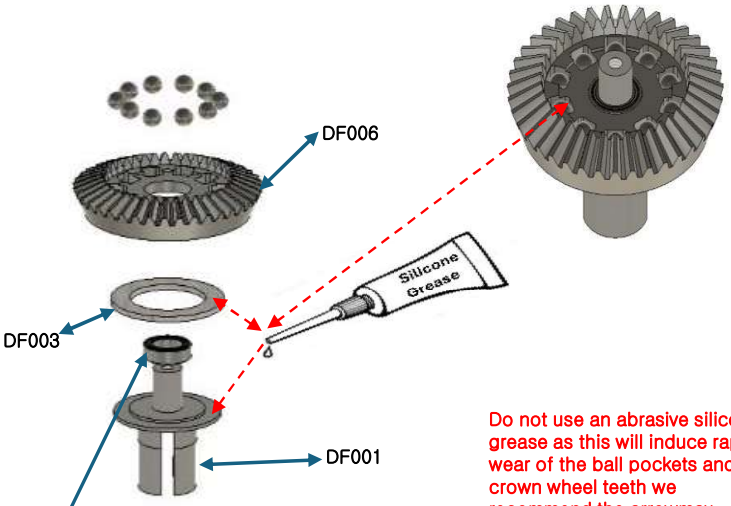
Spring Washer x2



CH 2.5 X 12 X2

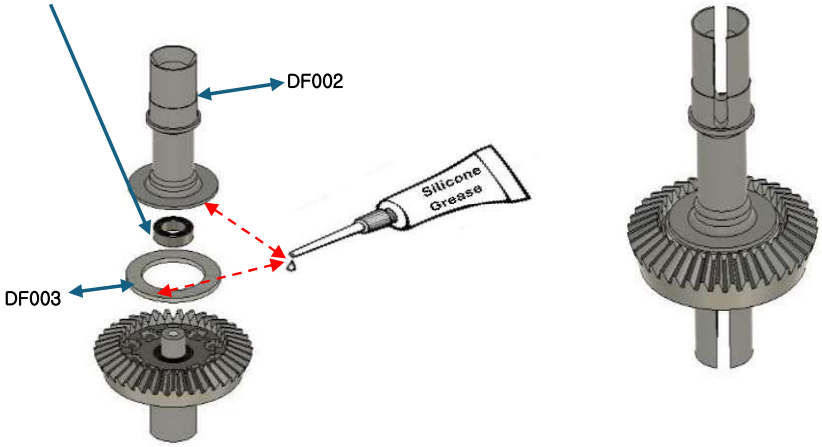


1/8 Diff Ball x 20



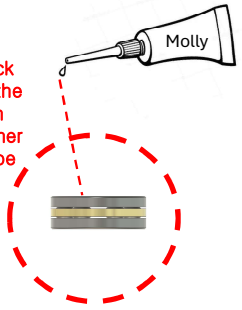
Do not use an abrasive silicone grease as this will induce rapid wear of the ball pockets and crown wheel teeth we recommend the arrowmax grease.

Bearing 5 X 8 X 3.5 X2





Assemble the thrust race on the diff screw and apply black molly grease to one side of the bearing cage before fitting in the diff. Note the thrust washer with the smallest hole must be at the spring washer end.



Be careful not get any grease on the 2.5mm diff screw as the Loctite 542 thread sealant will not hold and the diff will unscrew randomly when used. Adjust the diff screw up in small increments until it only just doesn't slip when the diff half's are held tight. The diffs are designed to slip under periodic high loads like landing form a jump on one wheel at full throttle. This helps the drive systems durability. So when the diff is bedded in, a very tiny bit of slip is acceptable.

Predator X10 Transmission

PARTS BAG 3

DF007 X 4



10 X 15 X 4 X4



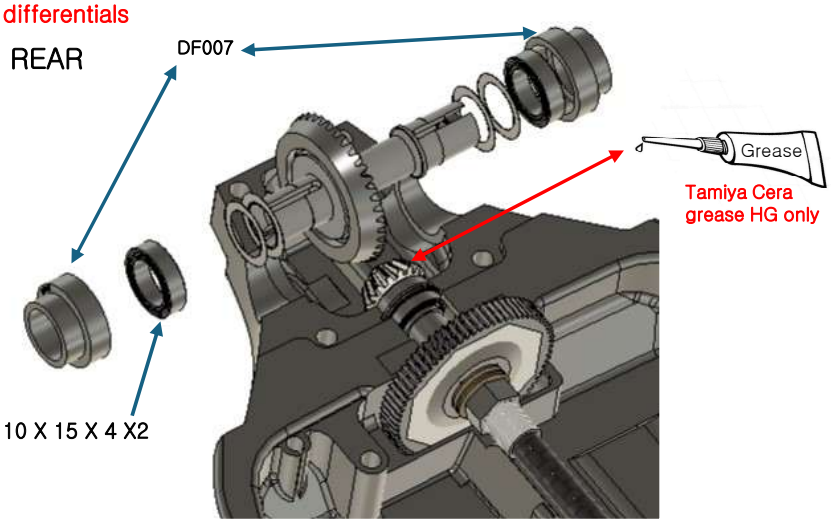
Shim 10 X 14 X 0.5 X 8

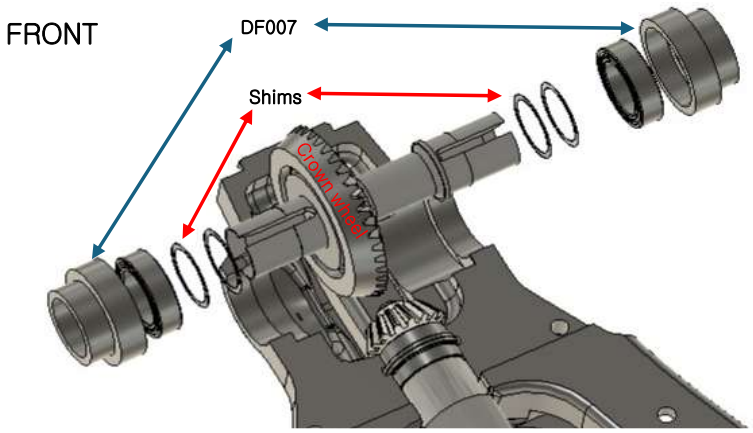


Shim 10 X 14 X 0.1 X 12

Transmission Installation

Please note the orientation of both the front and rear differentials





Differential shimming

Once the differentials have been built up, please follow these steps precisely to make sure the differentials are shimmed correctly. We find it easier to do one differential at a time.

Stage one : Fitting the diffs

Using the 0.5mm shim, stack one on each side then place a couple of thinner ones on the outside, place the diff (without the prop shaft installed) into the chassis with the bearing carriers on. Make sure its firmly in position, check for any left to right play and that the differential can rotate freely. If it's too tight, remove shims. Too loose add thin shims. When perfect, the diff should have no sideways movement yet turn freely without binding. Repeat the same process with the other differential.

With the Differential's now shimmed we can now set the mesh to the prop shaft. We recommend doing one differential at a time.

Stage two : Setting the mesh

Fit the 1st differential and prop shaft into the chassis making sure they're both firmly in position. Whilst holding down the pinion on the prop shaft and biasing it to the center of the chassis, slowly rock the differential forwards and backwards to see if there's any backlash. If there's no backlash remove a shim from the crown wheel side and put it on the opposite side. If there's too much backlash remove a shim from the non-crown wheel side and put it on the opposite side. Repeat this process until you have a very very small degree of backlash (Almost none). It's normal to have a different shim stack from left to right, also both front and rear differential's might be shimmed differently so make sure not to mix them up. Once both differentials have been shimmed correctly check the prop shaft turns freely, you can trial fit the gearbox tops and then recheck, remove the gearbox tops again and if it still turns freely use Tamiya Cera grease HG on the crown and pinion gears, a nice thin even coating, failure to do so will result in rapid damage to the gears.

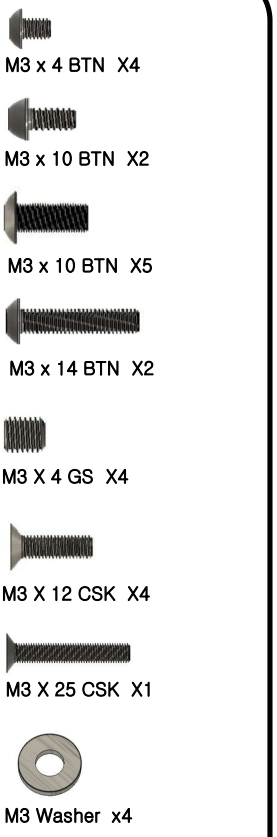
Stage 3

Once the gearbox tops are fitted, again spin the prop-shaft to make sure it spins freely, if not please re-shim as necessary.

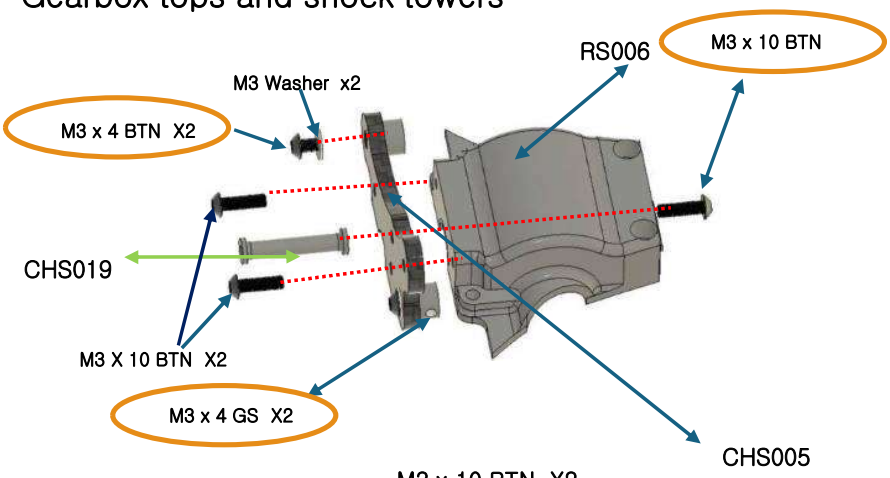
Predator X10 Transmission

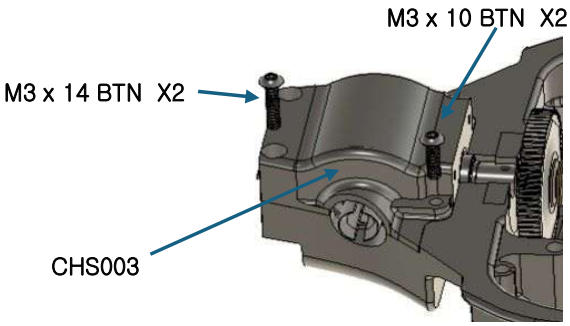
PARTS BAG 4

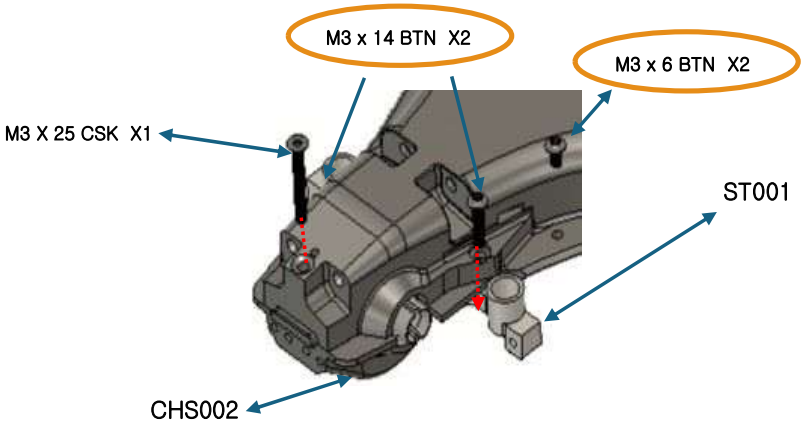
CHS002
CHS003
CHS005
CHS006
CHS007
CHS019
RS006
ST001



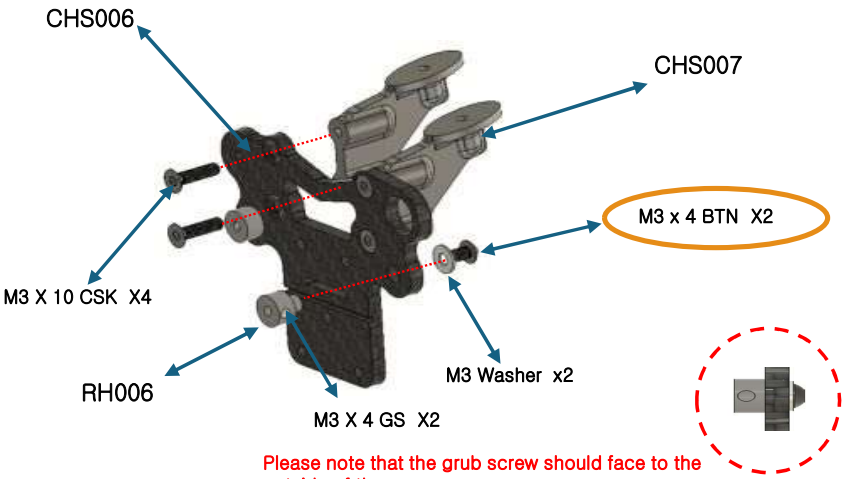
Gearbox tops and shock towers







Now check again the prop turns freely. Pre-build the rear shock tower assembly but do not fit at this stage



Please note that the grub screw should face to the outside of the car

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Predator X10 Transmission

Driveshaft and uprights (Assemble 2)

PARTS BAG 5

FS003 X2
RS002 X2
DS001 X2
DS002 X2
DS003 X2
DS004 X2
DS005 X4
DS007 X7


M2 X 10 DOWEL X4

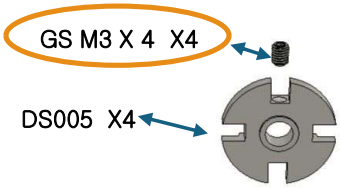

GS M3 X 4 X4

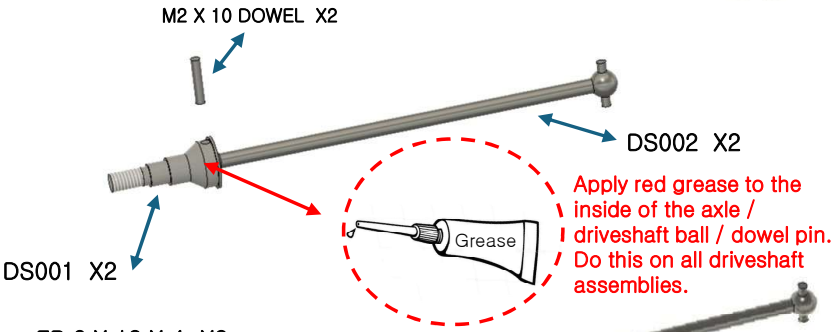

10 X 15 X 4 X4

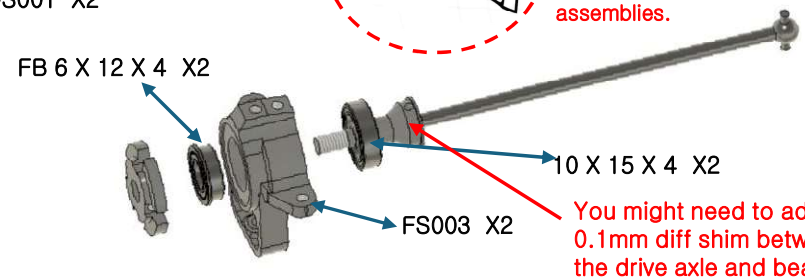

FB 6 X 12 X 4 X4

Please note the Driveshaft length and drive axle orientation

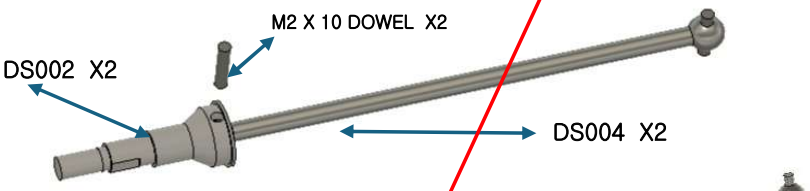


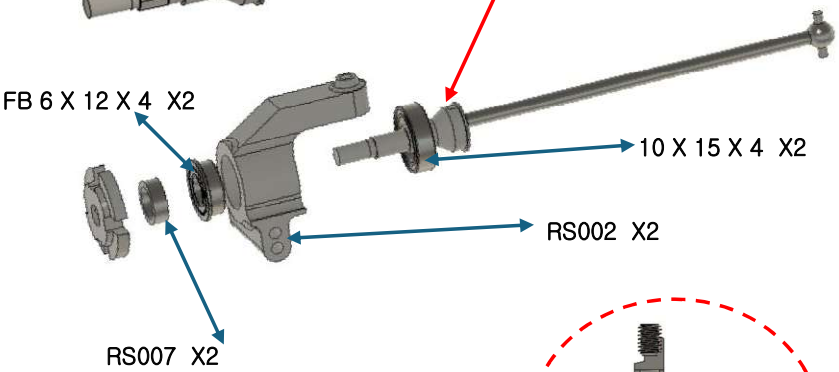




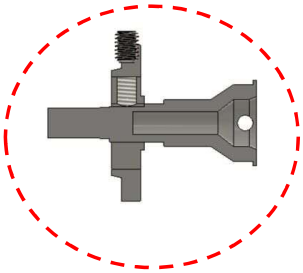


You might need to add a 0.1mm diff shim between the drive axle and bearing if you notice any in / out movement





Please note that the grubscrew in the drive adapter must align with the flat on the drive axle



The unfair advantage

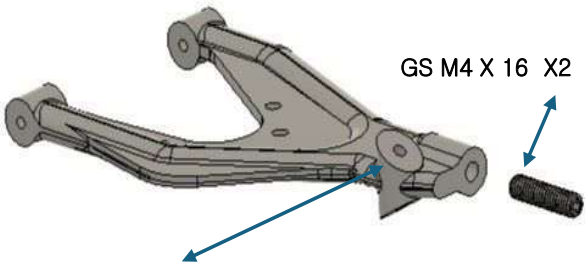
PARTS BAG 6

FS001 X2
FS002 X2
TB008 X2
TB009 X2
TB003 X2
TB005 X2



GS M4 X 16 X2

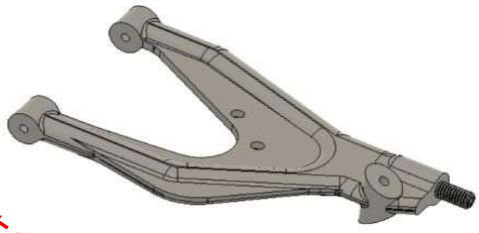
Front Wishbones (Assemble 2)



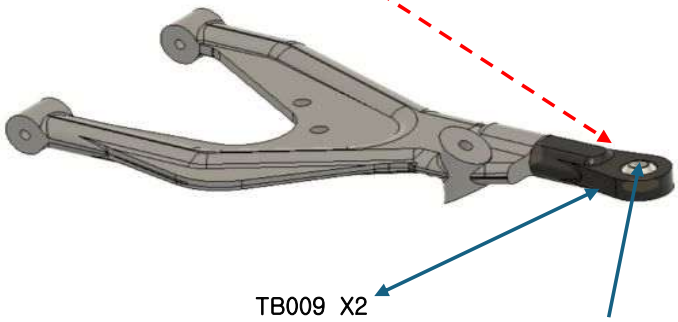
GS M4 X 16 X2

Screw in the M4 grub screw so 8mm of thread protrudes

FS001 X2



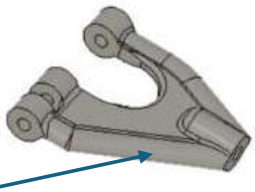
Please note. TB009 is the shorter of the two types of M4 ball joints supplied



TB009 X2

TB005 X2

Please note. Always fit the balls into the joints in the shiny side hole.

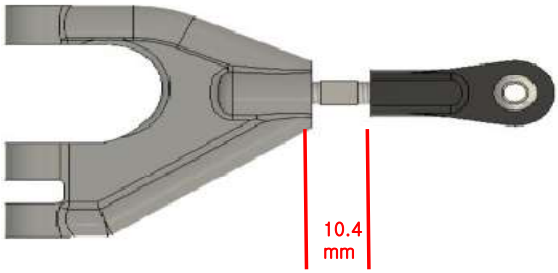


TB003 X2 24mm

FS002 X2



TB008 X2



10.4 mm

PARTS BAG 6

RS001 X2
RS003 X2
RS004 X2
TB008 X2
TB009 X2
TB003 X2
TB005 X2



GS M4 X 16 X2



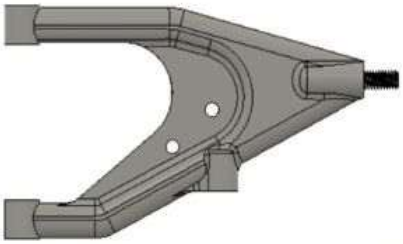
M3 X 10 BTN X4

Rear wishbone (Assemble 2)

RS001 X2

GS M4 X 20 X2

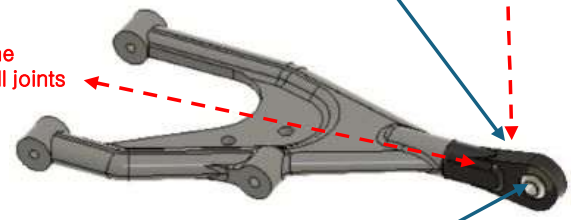




Please note the orientation of the ball joint

TB009 X2

Please note. TB009 is the shorter of the two M4 ball joints supplied



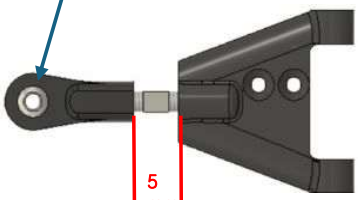
TB005 X2

TB003 X2 Short 20mm

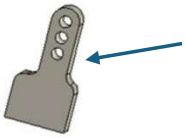


RS002 X2

TB008 X2



5 mm

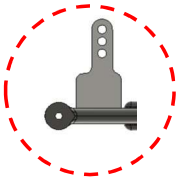


RS004 X2

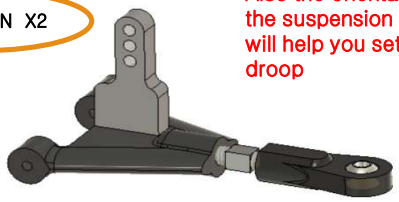
Please note orientation of the suspension mount. The opposite side should be a mirror of the below.



M3 X 10 BTN X2



Also the orientation of the suspension mount will help you set the rear droop



PARTS BAG 6

CHS011 X2
CHS023 X1

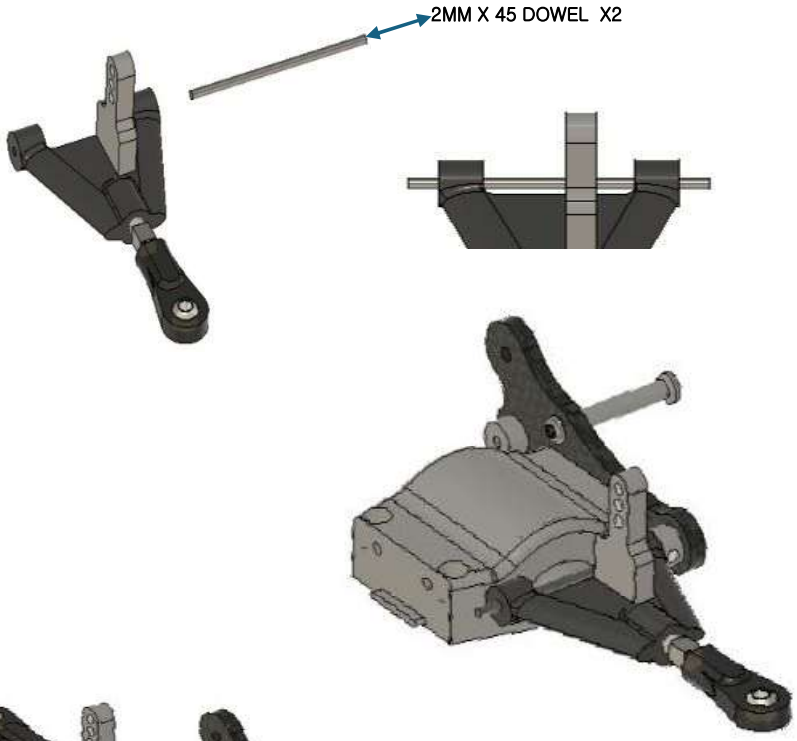


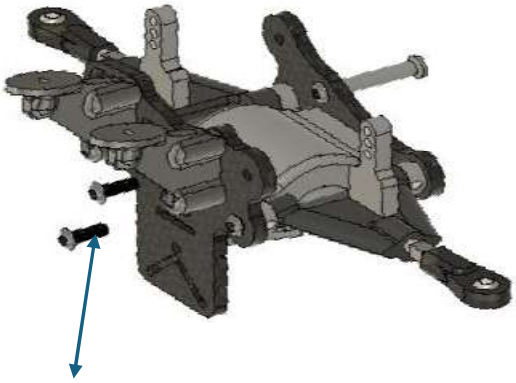
M3 X 10 BTN X3



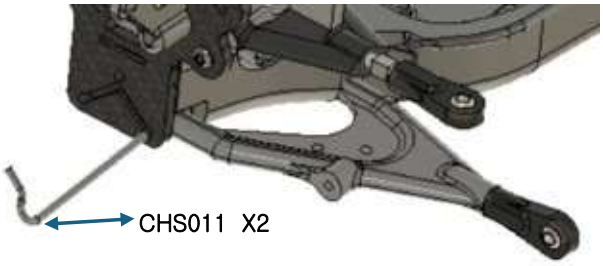
2MM X 45 DOWEL X2

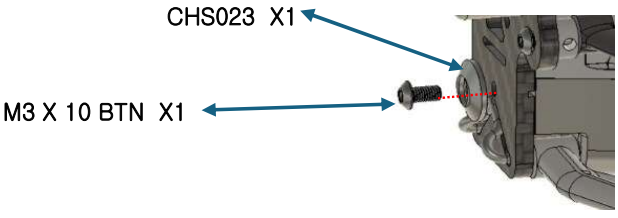
Wishbone fitment Rear (Assemble 2)





M3 X 10 BTN X2





PARTS BAG 6

CHS012 X2
CHS008 X1
CHS004 X1


M3 plain nut x2


M3 X 16 CSK X2


M3 X 10 CSK X2

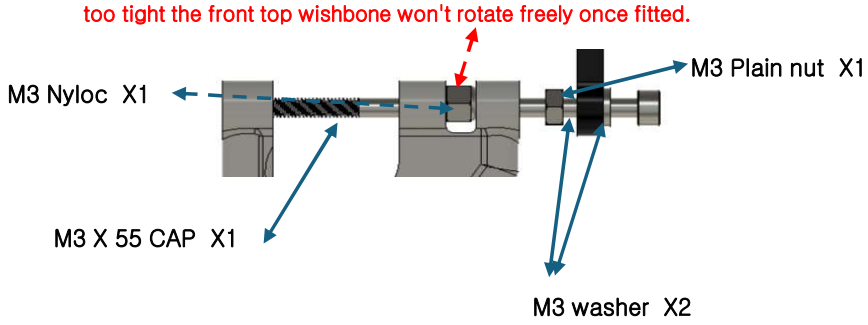

M3 washer x4

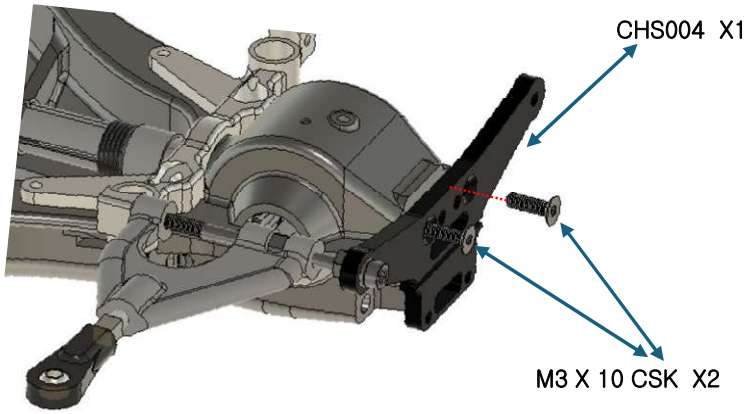

M3 Nyloc nut x2

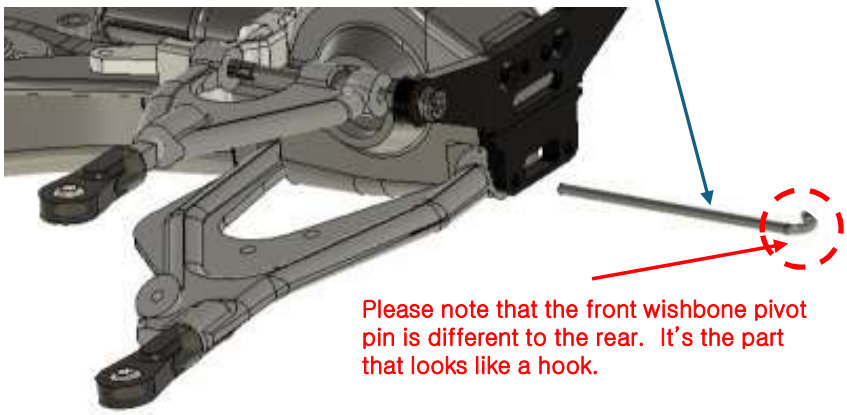

M3 X 55 CAP x2

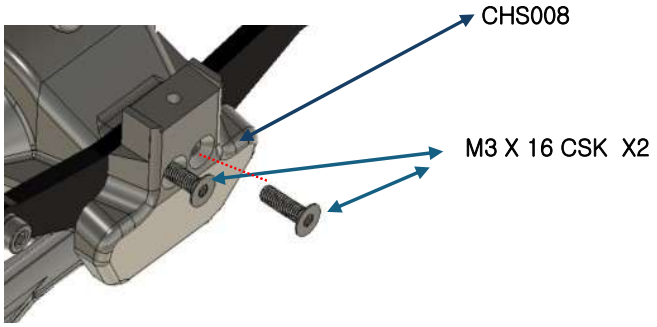
Wishbone fitment Front, (Assemble 2)

Please make sure that the M3 nyloc nut fits freely into the pocket, if it's too tight the front top wishbone won't rotate freely once fitted.









Predator X10 Suspension

PARTS BAG 6

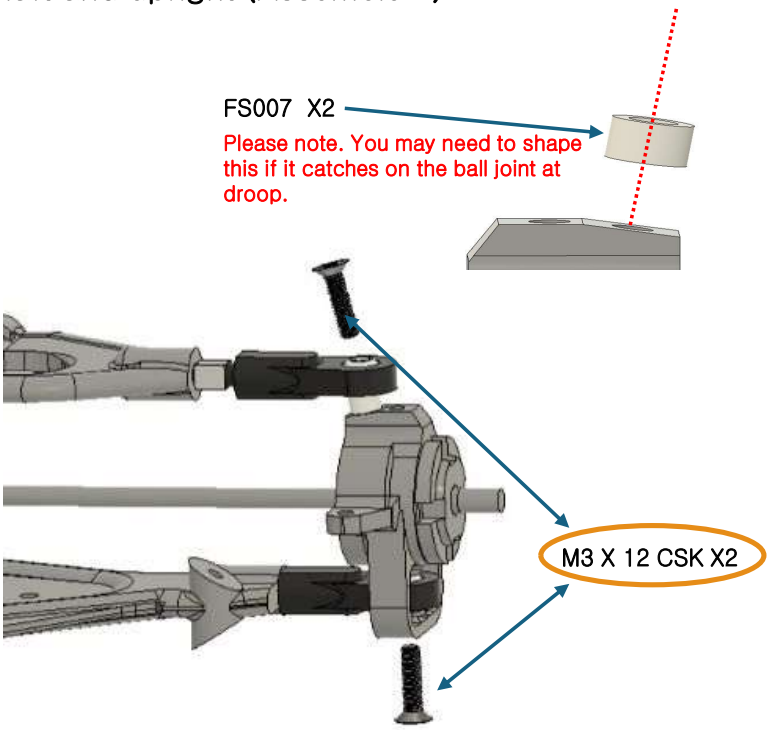
FS007 X2

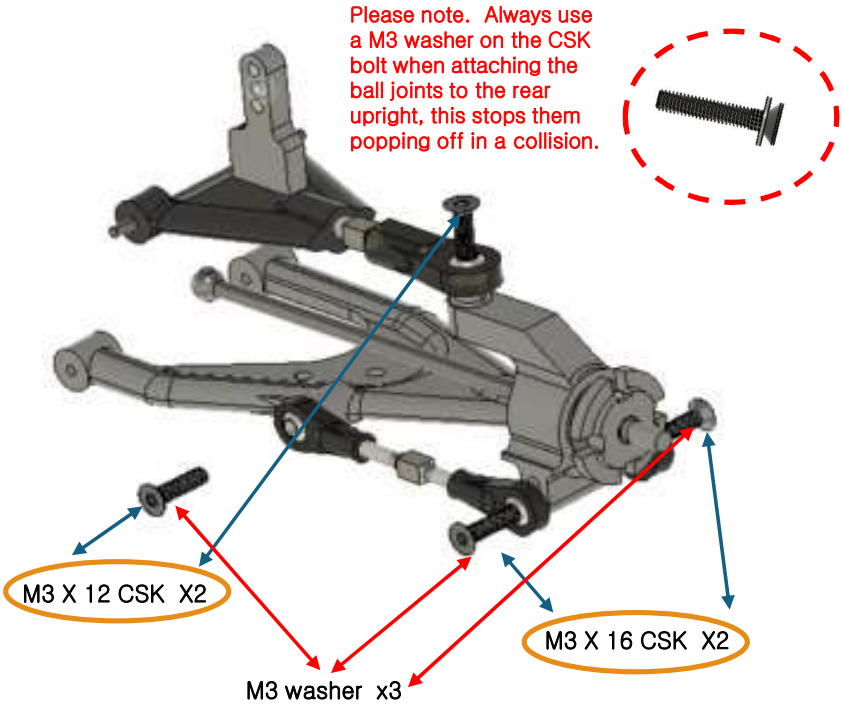

M3 Washer x6

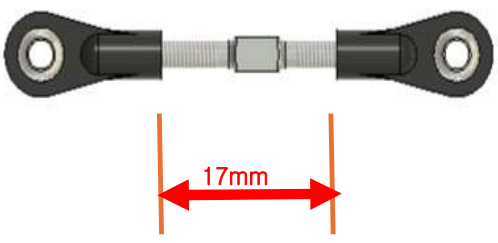

M3 X 16 CSK X4


M3 X 12 CSK X8

Driveshaft and upright (Assemble 2)







The unfair advantage

PARTS BAG 7

ST004 X1
ST005 X1
ST008 X1
TB010 X3

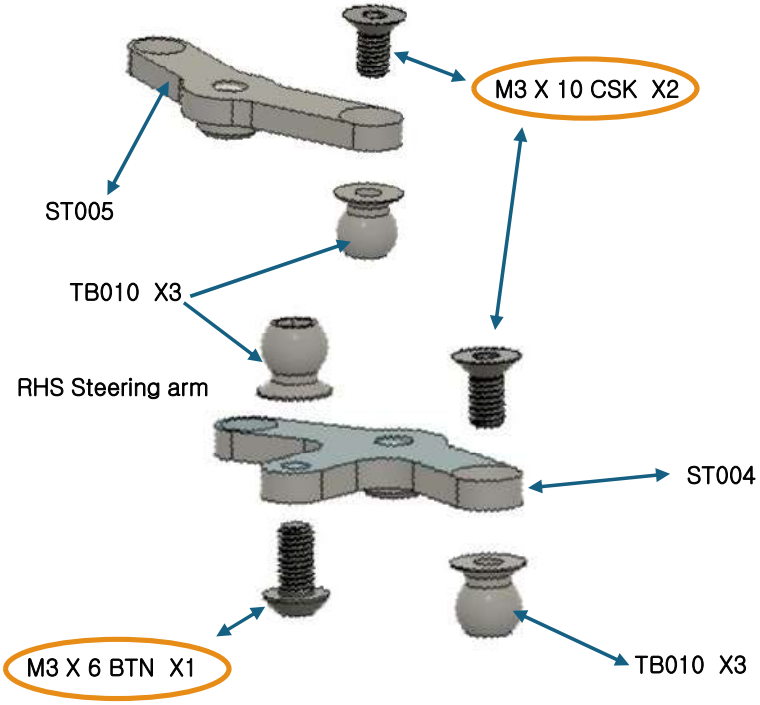

M3 X 6 BTN X1

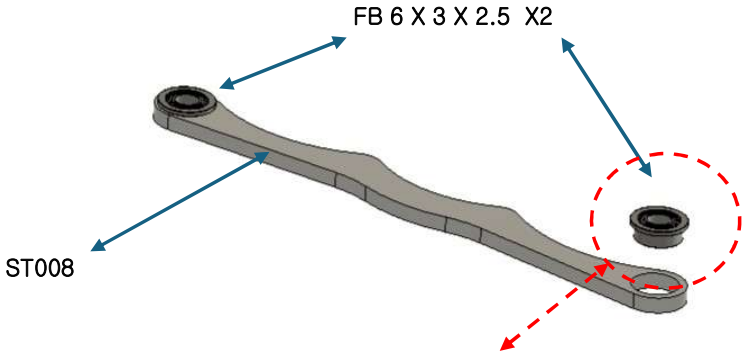

M3 X 6 CSK X2


FB 6 X 3 X 2.5 X2

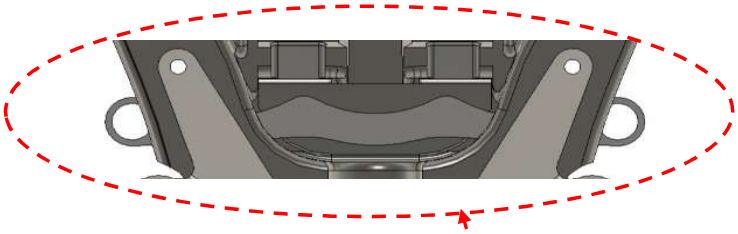
Steering / Front suspension

LHS Steering arm





Please note. Only fit one bearing into the steering link in this step otherwise the assembly won't fit through the slot in the chassis



Please note the orientation of the steering link when fitted into the chassis. The 2 points should face rearwards

PARTS BAG 7

ST007 X2
ST008 X2



FB 4 X 8 X 3 X4



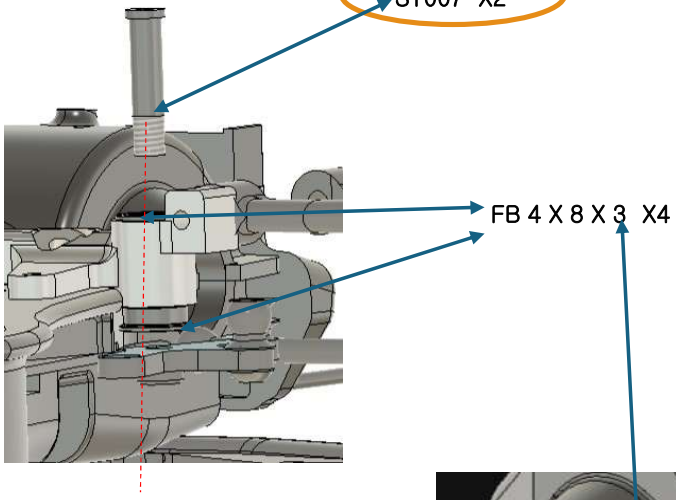
FB 3 X 6 X 2.5 X2



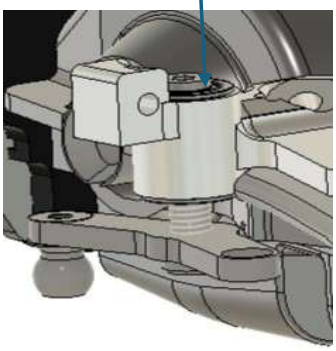
M.5 X 6 CSK X2

Steering / Front suspension

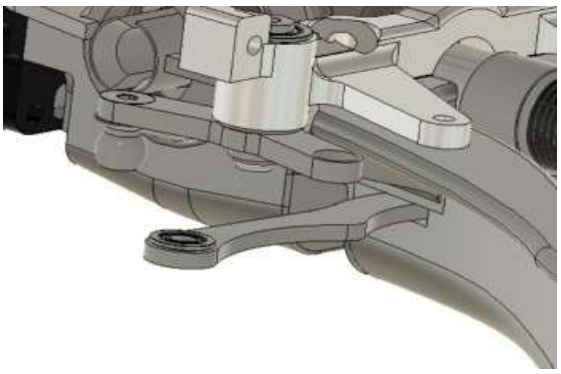
LHS Steering assembly



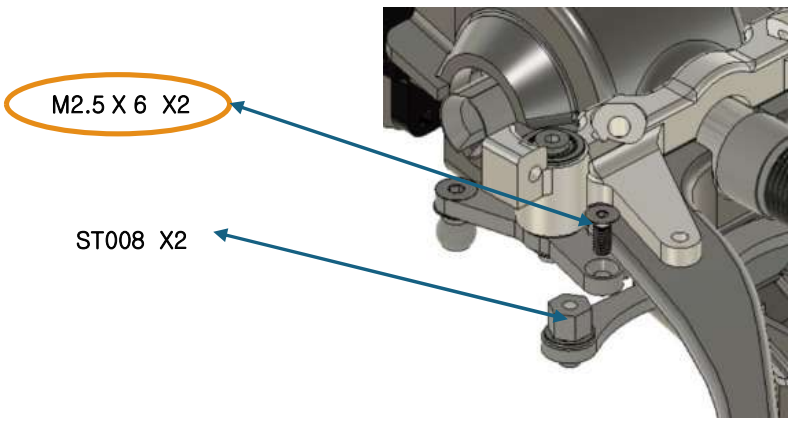
Please note. If the steering arm does not move freely, fit a small shim on the steering pin thread before the arm is fitted.



RHS Steering assembly



Slide the steering link assembly part way through the slot in the chassis. Fit ST008 steering boss into the bearing and attach to the steering arm using the M2.5 x 6 CSK.
Once you've done this step, push the steering link fully through the slot not forgetting to fit the remaining FB 6 X 3 X 2.5 and repeat the process on the other side



Steering / Front suspension

PARTS BAG 7

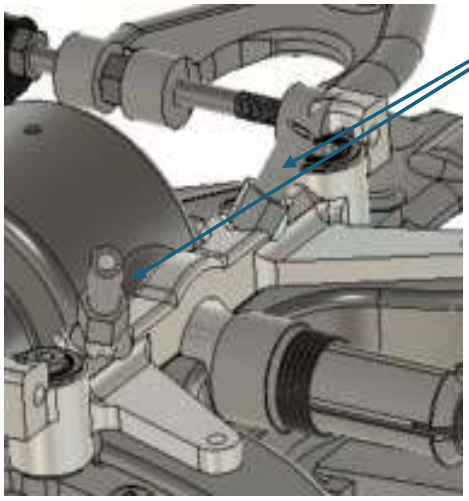
ST006 X2
ST003 X2

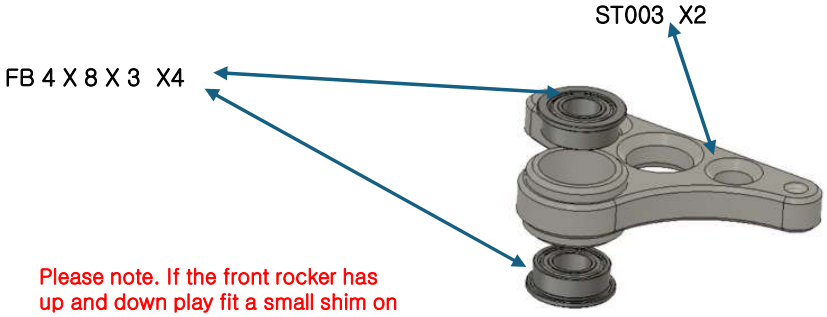


FB 4 X 8 X 3 X4

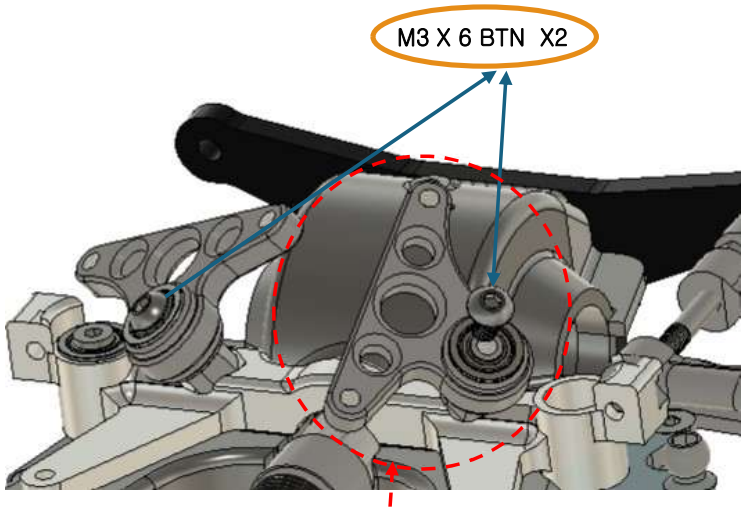


M3 X 6 BTN X2





Please note. If the front rocker has up and down play fit a small shim on the pin before the rocker is finally fitted.



Please note the orientation of the rocker

Predator X10 Suspension

PARTS BAG 7

TB001 X4
TB006 X6
TB007 X8

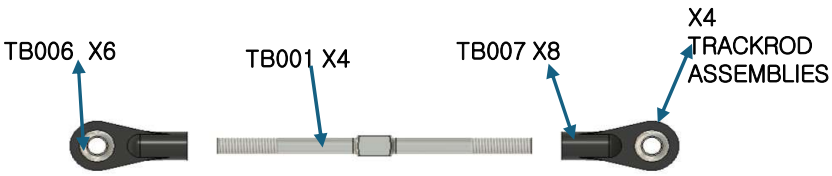


M3 X 14 CSK X2



M3 X 12 CSK X6

Steering / Front suspension



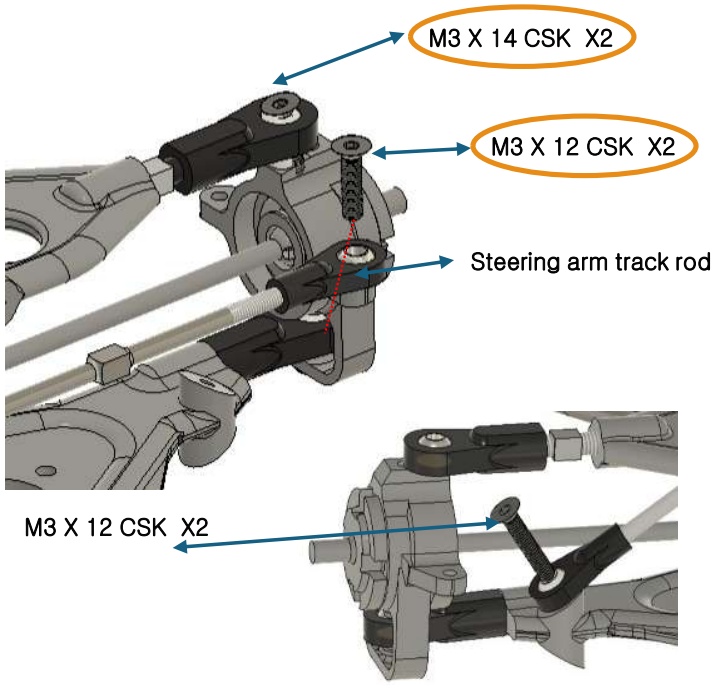


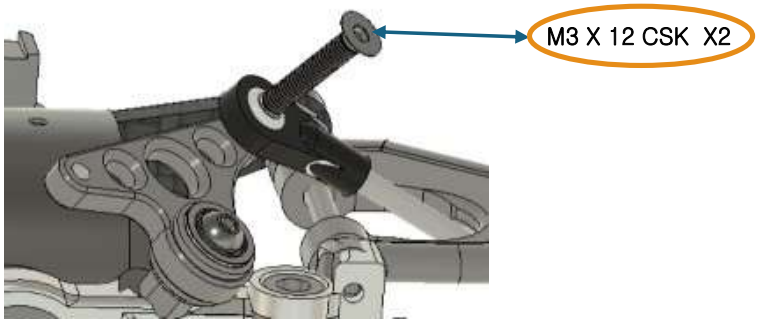
STEERING ARM



PUSH ROD

Please note that the steering arms and push rods use the same 53mm long turnbuckle. The lengths will be different for the steering arm and push rod.





The unfair advantage

Predator X10 — Chassis

PARTS BAG 8

CHS014
CHS015


GS M3 X 8 X1


M3 X 10 BTN X2


M3 X 8 CSK X1


M3 X 6 CSK X2


M3 X 40 CSK X1


M3 NYLOC X1

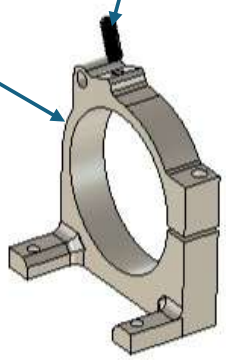

M3 X 14 BTN X1

Chassis / motor mount

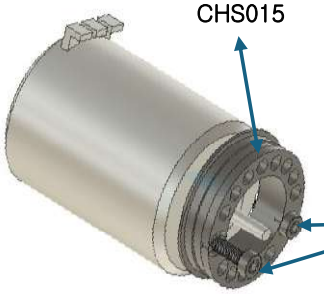
GS M3 X 8 X1

CHS014

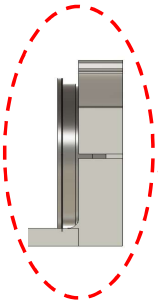
The motor should be off center to the motor disc and the motor fixing bolts at the bottom. The motor terminals are best between the top and the prop shaft, depending on your pinion size.



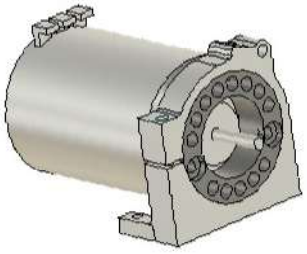
CHS015

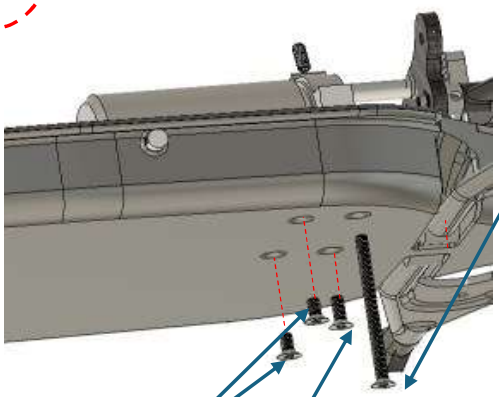


M3 X 10 BTN X2



Please note the orientation of the motor disc.
The flanged section should be on the motor side



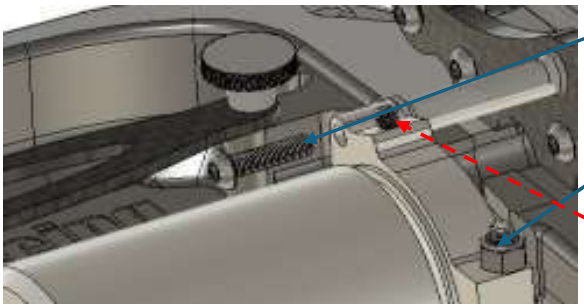


M3 X 40 CSK X1

To set the gear mesh you need minimal backlash between the spur and pinion gear. When the mesh is set correctly, you'll have one small tight spot on a full rotation of the spur gear, this is normal and correct for a Predator as the prop shaft is very long and flexes away on motor power.

M3 X 6 CSK X2

M3 X 8 CSK X1



M3 X 14 BTN X1

M3 NYLOC X1

The grub screw is used to keep the motor disc in position, after the motor pinion / spur gear mesh has been set and locked in position using the M3 nyloc.

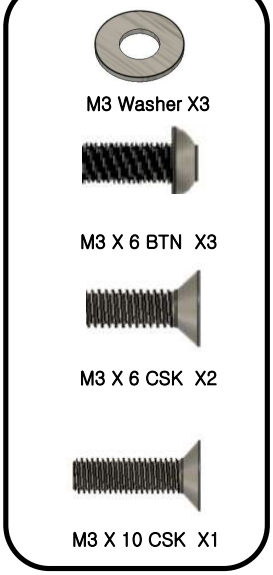
The unfair advantage

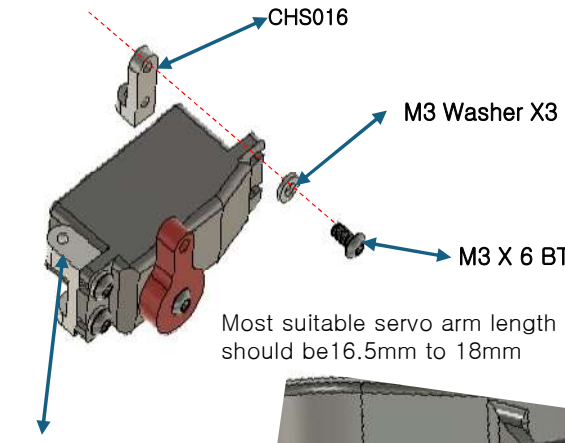
Predator X10 — Chassis

Chassis/ Servo

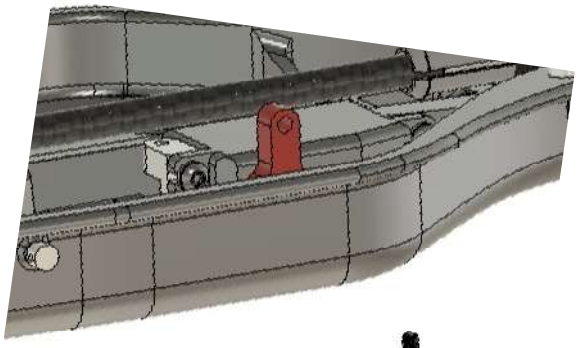
PARTS BAG 8

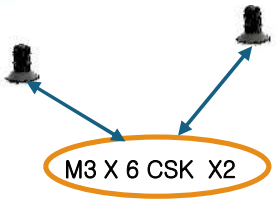
CHS016
CHS017
TB004
TB006
TB007 X2

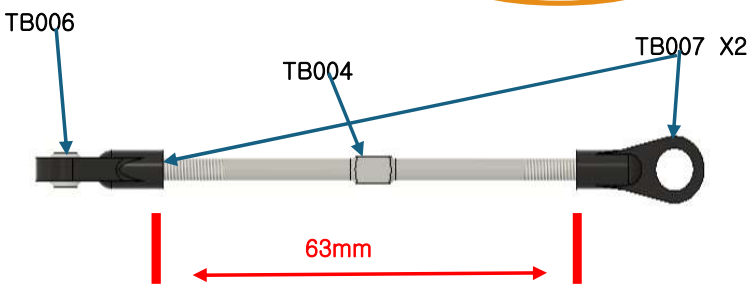




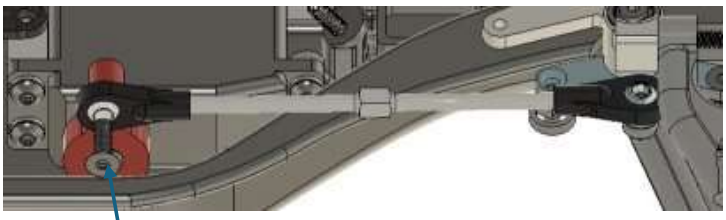
Most suitable servo arm length (screw to screw) should be16.5mm to 18mm







Please note that the ball joint without the ball goes onto the steering arm and also the orientation of the ball joints. Note you may have to put a small bend in this shaft to clear the chassis depending on your servo arm choice.



PARTS BAG 9

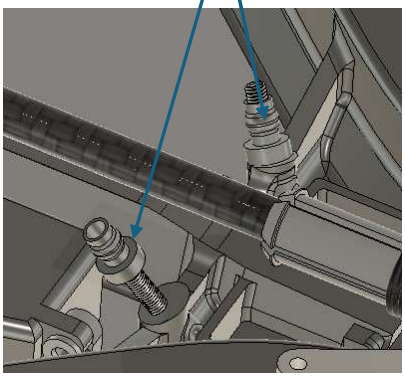
RS005 X2
SHK001 X2
SHK002 X2



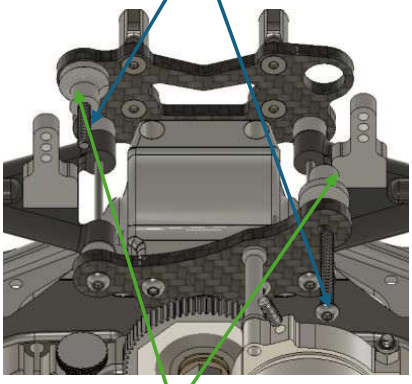
M3 X 25 BTN X2

Front / Rear Shocks

SHK001 X2

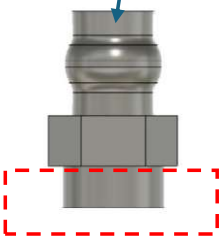


M3 X 25 BTN X2



RS005

SHK002 X2



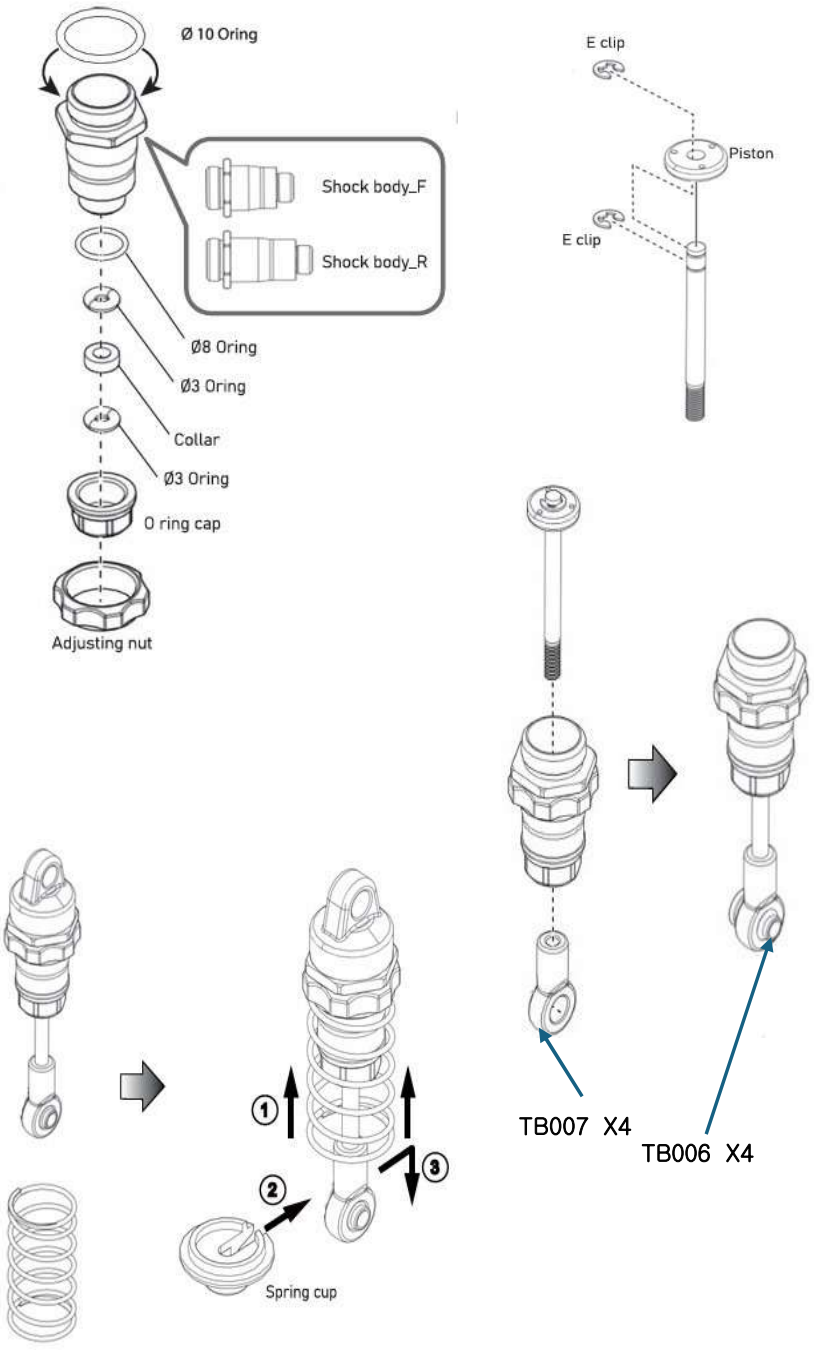
Remove the lower section of the supplied shock bush X2

Please note that we have 2 different shock bushes. The one with the hex on the bottom is for the rear suspension only

PARTS BAG 9

TB006 X4
TB007 X4
YZ S4AJ X2
YZ S4C
YZ S4F X2
YZ S4R X2
YZ S3OS X2
YZ SSF
YZ S8A X2
YZ S5F X2
YZ S7

Shocks Assemble 4



For the moment the kit comes with Yokomo shocks, with the long bodies used on the rear and short on the front. All the shocks use the same front shock shafts as standard. The kit comes with 3 hole pistons and we often epoxy extra holes up and then push them out as needed.

Please remember to use the correct shock bushes on the front/rear

Our Baseline shock set-up for astro is:

45 weight oil with Orange springs on the rear 2 hole
40 weight oil with Green springs on the front 2 hole

Shocks

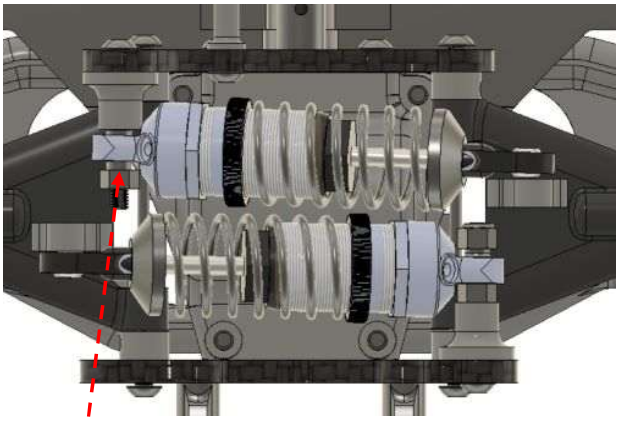
PARTS BAG 9

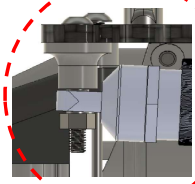


M3 X 12 CSK X4



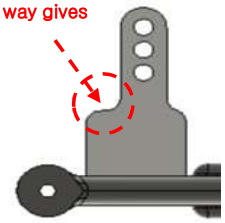
M3 NYLOC X4





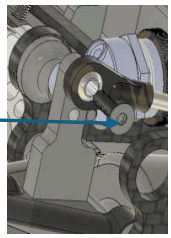
Please note the orientation of the rear shock bush. Failure to do this will result in the shocks fouling each other and restrict suspension movement

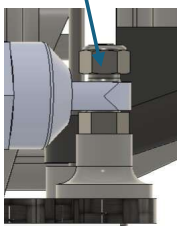
Note orientation as one way gives more droop



M3 X 12 CSK X2

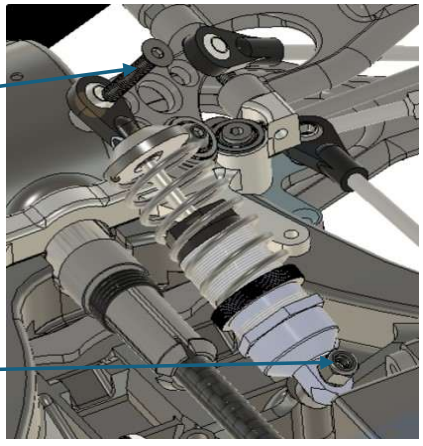
M3 NYLOC X2





M3 X 12 CSK X2

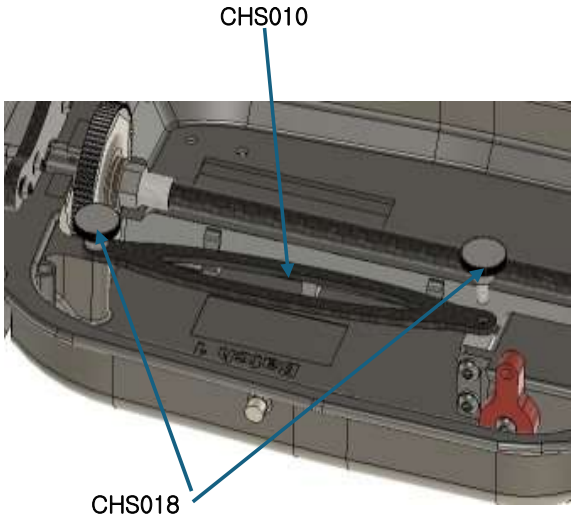
M3 NYLOC X2



PARTS BAG 10

CHS010
CHS018 X2

Battery Strap / Electronics lay-out





Recommended electronics installation layout for the car

PARTS BAG 10

RS007 X4
FS006 X2



M3 Washer X4



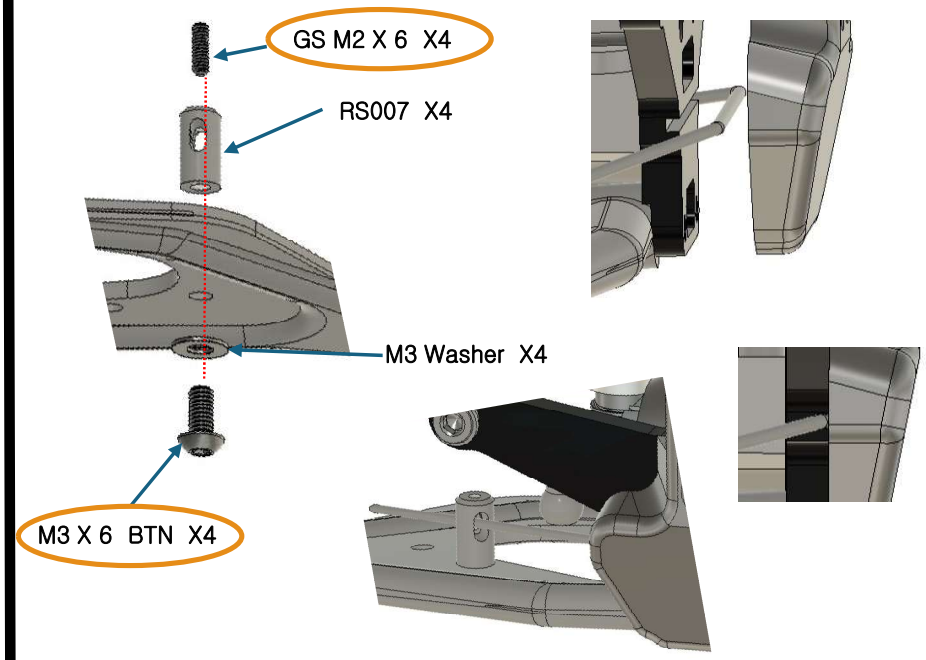
M3 X 6 BTN X4



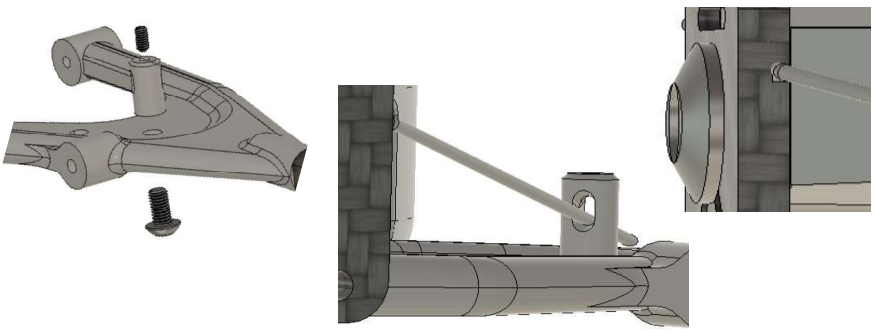
GS M2 X 6 X4

Roll bar

The X10 kit comes with the option to run a front and rear roll bar.
The standard thickness is 1.2mm for both the front / rear and the roll bar is the same front to rear.
You have 2 wishbone mounting options either inner most or outer most, The inner hole is softer whilst the outer hole is harder. Only fit the grubscrew when you are experiencing excessive wear in the roll bar boss.



To fit the front anti-roll bar you'll need to remove the front wing and bumper. Fit the anti-roll bar bosses onto the wishbone using the desired position, Leave these loose as you'll have to align them to the roll bar. Slide the roll bar through the slots in the roll bar bosses and place the roll bar into the slot in the front shock tower and re-fit the bumper. You can now tighten the fixing screws in the roll bar bosses making sure the bosses are aligned to the roll bar and the wishbones still move freely.



To fit the rear anti-roll bar loosen the new anti-roll bar mount, slide the roll bar through the slots in the loose roll bar wishbone bosses then into the rear mount, adjust the grub screws so there is no slop but free movement on the roll bar. You can now tighten the fixing screws in the roll bar bosses making sure the bosses are aligned to the roll bar and the wishbones still move freely.

The chassis is made from a blend of composite materials and is designed to flex. This gives a wider setup window and is easer to drive, this was not the case on the original car probably due to the lack of technology and materials available at the time. The shocks we have chosen are the same bore size as the originals and are the aeration type like more modern shocks, these conform to all class rules at the time of writing.

The cars geometry is identical to the original X10 so all pickup points and shaft/ bearing positions match.

Adjusting The Slipper Clutch
The slipper clutch is often overlooked when setting up your car – once it is set, it is often forgotten as it does it's job so well. However the slipper clutch is vital to the longevity of your transmission, and a correctly set slipper clutch will ensure that the spur gear does not break, it absorbs the shocks to the transmission as the car lands from jumps and bumps whilst racing.
There are a number of ways to do this, but by far the easiest way to adjust your slipper clutch is to simply place the car on the ground (with it's wheels and tyres on), hold the slipper adjusting nut with a small 10mm spanner, to tighten the slipper, roll the car very slowly and gently forwards only a few centimetres, and to loosen the slipper roll the car backwards. Remember do not over tighten the nut or you will strip its tiny very fine threads.
Please remember – it's a fine line between having your slipper just right, and having it too tight. Too tight and you will strip teeth off your spur gear to loose and it will melt the spur !

The spur gear to pinion, must be set so there is one spot without backlash. This is because the prop shaft is long on a Predator and has no mid steady bearings, the power from the motor pushes the spur gear away slightly, so the setting of a minimal tight spot is preferred for spur life.

Slots are visible in the chassis they are for adding weight to the car and in the preferred positions. You can add four (or more if fitted sideways) in the centre of the chassis and four under the front shocks. You will find putting weight in the front really helps calm the front down and gives more consistent grip on slippery surfaces.

Remember to maintain your gearbox gears to keep the cars performance high. After the first run check the gearboxes backlash, and shim and re-grease as necessary. Periodically the diffs and gears should be inspected and maintained accordingly.

Predator X10 Setup Tips

Taken from an article written by Richard Weatherley. The genius who designed the original car

Camber, front On a Predator this is critical for fast lap times. For extremely high grip (Astroturf, Carpet, fresh grass) you can run as much as 3 deg per side. In reduced grip such as loose clay or very worn grass, the front wheels must be stood upright or even 0.5 deg positive. Mid corner steering and lots of time can be lost if too much front neg camber is set. For medium grip, start with 1 deg per side. Front Camber is adjusted by adjusting the turnbuckle between the upper front wishbone and the Ball joint.
Camber, rear Not as critical as the front, but can be run between 0 – 2.5 deg. Run more upright for increased traction. Adjusted using the turnbuckle at the top wishbone to the upright
Toe-in/out, front Run parallel most of the time. In slippery conditions, run up to 1.5deg toe out per side, to increase the general steering response and front end grip. Adjustment. Whilst adjusting the track rod turnbuckle, hold the inner ball joint in place with your thumb, to prevent it twisting itself off of the steering arm. (This can be popped on and off easily, but doesn't come off on the track)
Toe-in/out, rear This is a really useful adjustment on the X10, because the car is very sensitive to rear toe in angles. Due to the quick and easy nature of adjusting the rear toe in, it can be done mid-run track side if required for fine tuning. You will be able to tell the difference in handling with just 1/4 turn adjustment to the rear toe links. Its setting range is 1 to 2 degs per side. Use more toe-in for more slippery conditions, to gain traction and general rear end grip. If you have too much toe in for the grip available, you may have mid corner understeer and in a straight line over bumps, you may notice the rear end of the car hopping from side to side. If so just reduce it a little (1/4 turn) and you will notice the instant response.
Shock Oil, front Use this to adjust the general front end grip (also in combination with the springs). The lighter the front oil, the more general steering you will have. Normal working range is 25-35 wt. The front shocks may have rebound valves fitted. This causes the bump rate to be 30% softer than the rebound rate. This has proven very successful, as it keeps the front of the car more level under acceleration, and also enables softer oils to be used without loss of stability.
Shock Oil, rear On the X10, adjust this mainly to suit the jump and bump handling you require. Thickening the rear oil will also promote more steering.
Springs, front 90% of the time you will require the Black (1.3 dia wire) 6.0 turn now orange or 6.5 turn springs now green. Only in very high grip would you need to consider opting for the Black 5.5 turn on the front. The Silver (1.4 dia wire) 6.5 turn are very stiff and only useful on flat track carpet. The softer 6.5 turn spring can be useful in very low grip, for gaining more steering. but for most general running on medium grip, run the 6.0 turn black. **Springs, rea**r Always use the small Gold "Pre- compression" ("P") springs, which give the ultimate control of small holes and bumps in the surface, whilst allowing fantastic stability. In combination with the "P" springs use the 6.5 turn silvers or 5.5 turn blacks. The silvers are a little stiffer and give more stability and more front-end grip. Generally for rutted tracks use the softer 5.5 turn black.
Spring position, rear Use the middle hole in the rear rocker for most conditions. Occasionally the bottom hole can be used with thick rear shock oil (60wt) for very rutted tracks.
Upright pick up point, rear This is where the rear wishbone and toe link connect to the rear upright. Use the upper hole for medium to high grip. This gives a higher roll centre and gives incredible power on stability through fast corners. Use the lower hole for medium to low grip. This lowers the rear roll centre and causes more pivoting action mid corner, and therefore useful extra steering for lower grip.
Caster, front This is adjusted by moving the upper front wishbone backwards or forwards using M3 nut. For 95% of tracks use in the maximum (right back) position. Reduce the caster for very high grip tracks, to give more predictable mid corner front end grip.
Anti Roll Bar (Sway Bar), front The stiffness of the roll bars can be adjusted by moving the pick up points in the lower wishbones. The shorter positions create a stiffer roll bar and the longer positions a softer one. Use the front roll bar only for exceptionally high grip tracks such as Astroturf in mid summer, or flat track carpet.
Anti Roll Bar (Sway Bar), rear The stiffness of the roll bars can be adjusted by moving the pick up points in the lower wishbones. The shorter positions create a stiffer roll bar and the longer positions a softer one. Use the rear roll bar set in the softer (longer) position 90% of the time. The stiffer position is useful particularly for rutted loose surfaces. It creates more consistent grip at the back, by preventing the rear wheels dropping into holes in the track surface and gives extra mid corner steering.
Wing, front The front wing makes a useful difference, even at fairly low speeds. To increase front end grip, particularly in high speed corners, you can adjust the front wing angle, by placing a spacer between the gearbox top and the front wing. Use spacing of between 0 – 2.0mm. More than this is counter productive because it would cause air to be tipped over the top of the rear wing and will bring the front wing close to its stalling angle. Your front wing has been carefully developed to create downforce mainly from its outer edges. The central air stream is only minimally effected and is allowed to pass cleanly onto the rear wing.
Wing, rear The rear wing's effect can also be subtly adjusted by moving it backwards or forwards. Use the standard marked position for most tracks and conditions. For very high grip tracks, the rear wing may be moved backwards. This places the rear wing into cleaner air at high speed, and moves the centre of effort backwards which gives great high speed stability and progressive steering. Move the rear wing back 6 – 8mm by making two new holes in the wing.
SUMMARY
Very high grip – Reduced front caster, lots of negative camber, stiffer front oil & springs, use upper holes on rear upright, minimal rear toe in, rear wing back.
Medium grip – Maximum caster, less negative camber, medium shock oil with 6.0t black front springs medium rear toe in.
Low grip – Maximum Caster, soft front oil and springs, no neg camber, slight front toe out, use lower holes on rear upright, increased rear toe in, 6.5t front springs, increased front wing angle.

Richard Weatherley

The unfair advantage

Predator X10 — 93 Chassis

Chassis assembly

93CCHS001
98CCHS002
93CCHS003
93CCHS004

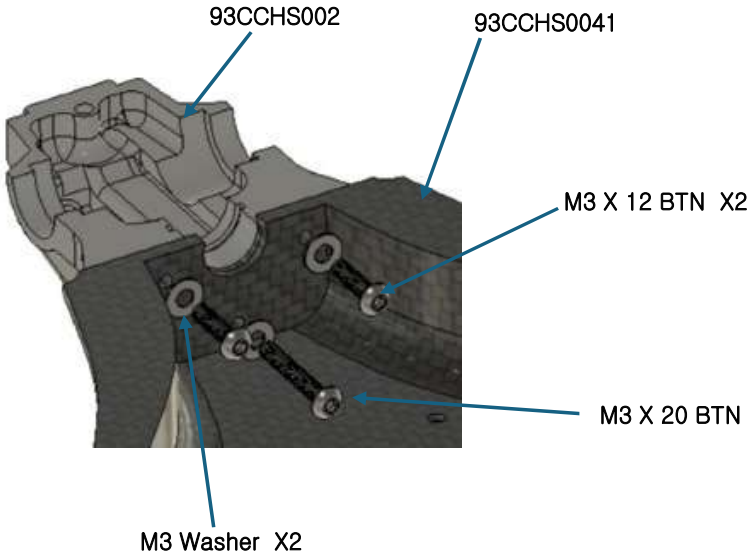

M3 Washer X 8

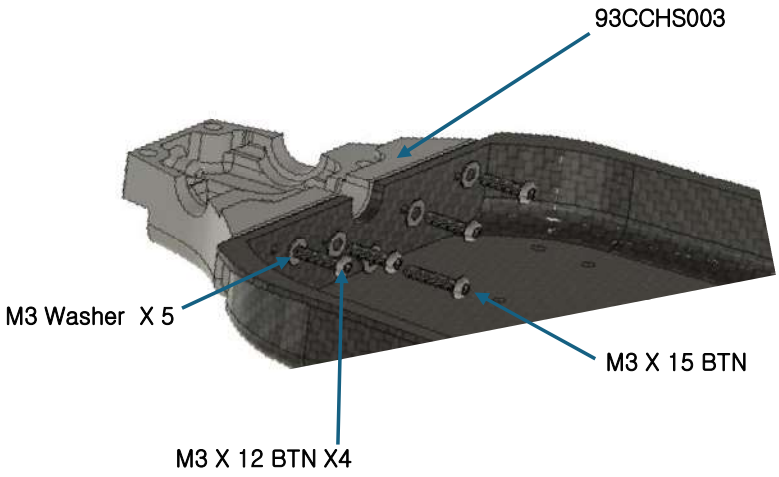

M3 X 6 CSK X3

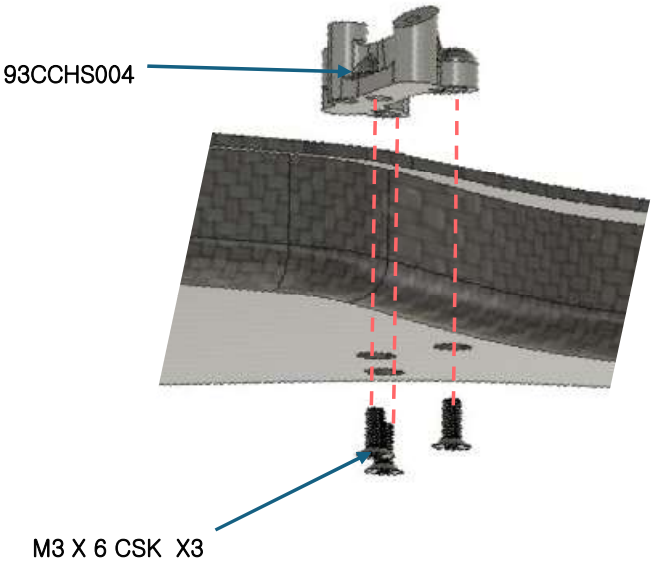

M3 X 20 BTN X1


M3 X 15 BTN X1


M3 X 12 BTN X6







The unfair advantage

Chassis

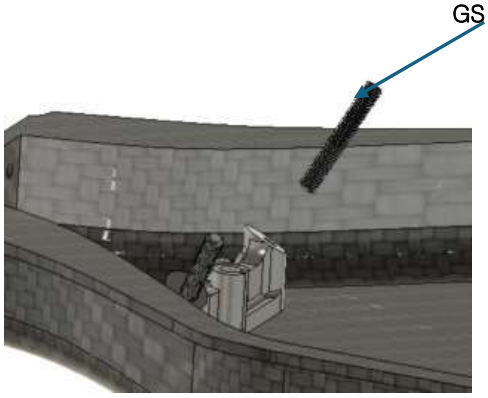
CHS013 X2



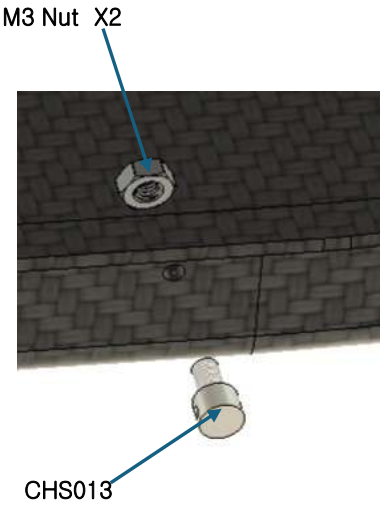
M3 Nut X2

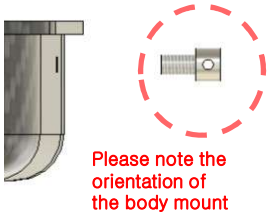


GS M3 X 20 X2



Screw in at the angle of the boss not vertical. You should have 13mm of the grubscrew protruding from the suspension mount.

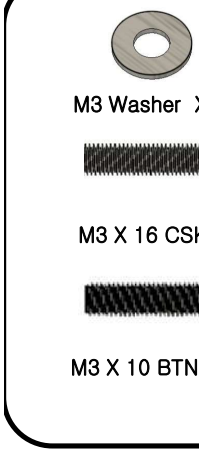


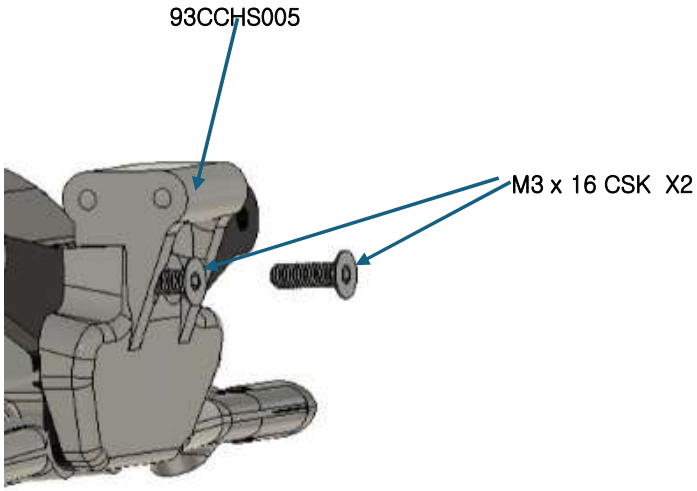


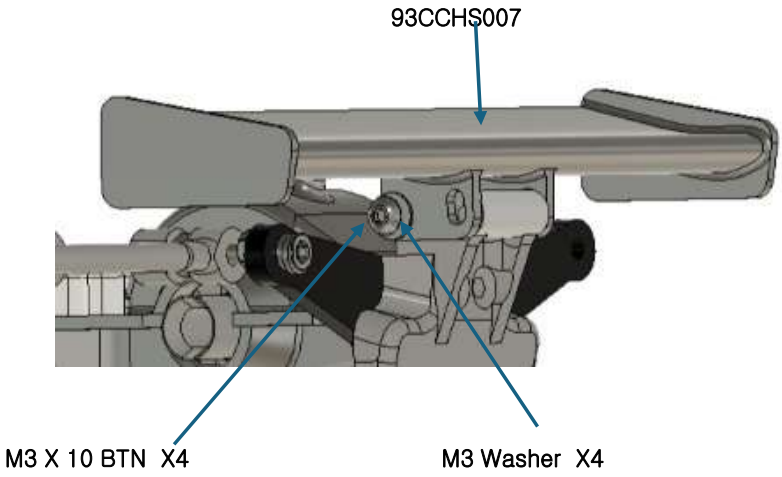
Please note the orientation of the body mount

Front wing

93CCHS005
93CCHS007







It is possible to alter the pitch of the front wing. To do this back off all 4 BTN screws so that the front wing can move and rotate the wing to the desired angle and then re-tighten the bolts.

Predator X10

"PREDATOR"

Driver: _____

Date: _____

Track: _____

❑ Indoor ❑ Outdoor	❑ Slick ❑ Loose Dirt ❑ Blue-Groove	❑ Smooth ❑ Rough ❑ Extra-Rough
❑ Tight / ❑ Open		

Weights and Position : _____



FRONT SUSPENSION

Toe ❑ In / ❑ Out ____ °

Caster ❑ Stock / ❑ Other ____ °

Ride Height _____

Sway Bar ❑ No / ❑ Yes size____

Camber _____ ° ❑ - / ❑ + ____ °

Position: ____ mm



Front Drive:

❑ LOCKED 1 WAY
❑ DIFF. ONLY
❑ FRICTION RINGS



Front Shocks

Oil: _____ Shock Oil Brand: _____

Piston: _____ ❑ Standard / ❑ Drilled _____ Hole

Spring: _____ Stroke length _____

Internal Spring: _____

Limiters: ❑ Inside- _____ ❑ Outside-_____

Notes: _____

REAR SUSPENSION

Toe-In ❑ Inside ____ ° / ❑ Outside ____ °

Camber ❑ - / ❑ + ____ °

Ride Height _____

❑ No
Sway Bar ❑ Yes size____



Shoulder Location

❑UPPER
❑MIDDLE
❑LOWER



Rear Shocks

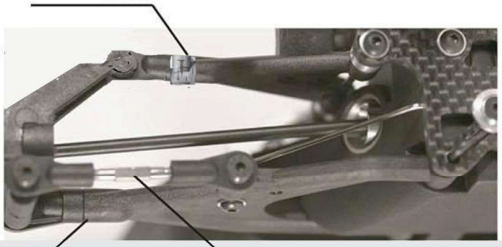
Oil: _____

Piston: _____ ❑ Standard / ❑ Drilled

Spring: _____ Stroke length _____

Pre-Compensation Spring: _____

Limiters: ❑ Inside _____ ❑ Outside- _____



Notes: _____

Tires: Compound Insert

Front: _____ _____ _____

Rear: _____ _____ _____

Wing Setup: _____

Motor: _____

Pinion: _____

Spur: _____

Notes: _____

Diff half lhs	DF001	2
Diff half rhs	DF002	2
diff ring 13x19 A164	DF003	4
diff ball 1/8	DF004	20
Thrust bearing 2.5x6x3	DF005	2
Crown gear	DF006	2
Diff insert	DF007	4
Diff shim 0.1mm	DF009	12
Diff shim 0.2mm	DF010	8
Bearing 10x15x4	DF011	4
Bearing 5x8x2.5	DF012	4
X Brace	ST001	1
Steering link	ST002	1
Rocker	ST003	2
steering arm LHS	ST004	1
Steering arm RHS	ST005	1
Rocker pivot pin	ST006	2
steering arm pivot pin	ST007	2
steering link spacer	ST008	2
Rocker flanged bearing 4x8x3	ST009	4
XB steering flanged bearing 5x8x3	ST010	4
Steering link bearing 3x6x2.5	ST011	2
front wheel,white	WWHL001	2
rear wheel, white	WWHL002	2
front trackrod / pushrod turnbuckle 53mm	TB001	4
trackrod turnbuckle 30mm	TB002	2
Top front/rear trackrod turnbuckle 24mm	TB003	2
servo steering arm turnbuckle 76mm	TB004	1
6.8mm Ball	TB005	8
5.8mm Ball	TB006	13
M3 Ball joint	TB007	16
M4 ball joint long	TB008	4
M 4 ball joint short	TB009	4
Threaded pivot ball	TB010	3

Predator X10 Parts list

Prt description	Part number	No. per car
Rear wishbone	RS001	2
Rear upright	RS002	2
Rear top WB	RS003	2
Rear suspension mount	RS004	2
Rear shock tower spacer	RS005	2
Rear top wishbone spacer	RS006	4
Roll bar boss	RS007	4
Flanged bearing 6x12x4	RS008	2
Bearing 10x15x4	RS009	2
Slipper assy	PS000	1
Slipper reducer	PS001	1
Slipper nut	PS002	1
Slipper disc	PS003	1
Slipper body	PS004	1
Oneway bearing shaft	PS005	1
oneway adaptor	PS006	1
Carbon shaft	PS007	1
72T spur gear	PS008	1
Bevel gear	PS009	2
slipper pads	PS010	2
Belleville washer for slipper	PS011	3
Flanged bearing 8x12x3.5	PS012	4
O-ring 6mm	PS013	1
O-ring 9mm	PS014	10
front drive axle	DS001	2
rear drive axle	DS003	2
rear drive bud	DS004	2
front drive dud	DS002	2
wheel adaptor	DS005	4
M2 X 10mm dowel pin	DS006	8
Rear wheel disk spacer	DS007	2

Predator X10 Parts list

Part description	Part number	No. per car
Carbon fiber tub chassis assembly (93 only)	CCH001	0
Composite chassis	CHS001	1
front gearbox top	CHS002	1
Rear gearbox top	CHS003	1
Front shock tower	CHS004	1
mid shock tower	CHS005	1
Rear shock tower	CHS006	1
Low rear wing mount	CHS007	2
Front wing nose cone	CHS008	1
battery strap	CHS010	1
WB pivot pin Front	CHS011F	2
WB pivot pin Rear	CHS011R	2
rear pivot pin clamp	CHS012	1
Body mount	CHS013	2
Motor mount	CHS014	1
Motor disc	CHS015	1
Servo mount	CHS016	1
servo / battery mount	CHS017	1
Battery thumb screw	CHS018	2
Motor Brace	CHS019	1
Rear wing button	CHS020	1
+4mm rear wing spacer	CHS021	2
+6mm rear wing spacer	CHS022	2
Front wishbone	FS001	2
Front top WB	FS002	2
Front upright	FS003	2
Flanged bearing 6x12x4	FS004	2
Bearing 10x15x4	FS005	2
1.2 mm roll bar	FS006	2

Front shock bush	SHK001	2
Rear shock bush	SHK002	2
93 Body	BD004	0
X10 Body	BD001	1
front wing	BD002	1
rear wing	BD003	1
93 Wing kit	BD005	0