

Dear customer,

The project of the front-wheel-drive buggy is very close to my heart. I was interested to find out what a FWD buggy is like to drive. Without modern production cars out there, I decided to design my own car and shared my project on oOple. The response from fellow members sparked my enthusiasm and first driving impressions hit off a project that now has lasted over 7 years that has resulted in the ORB FF210, and now the ORB Forward.

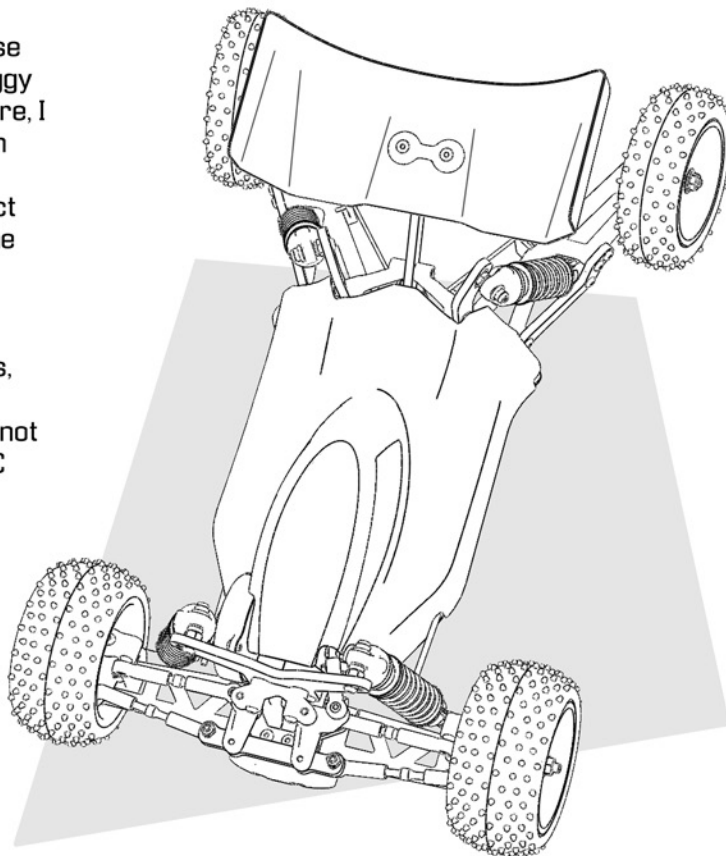
Along the way, many people supported my efforts with kind words, ideas, feedback, lessons in vehicle dynamics, media exposure, parts and sponsorships. I am very thankful to the people who helped me, the project would not be where it is now without them, nor would I enjoy the RC hobby as much as I do.

Hereby I would also like to thank you for purchasing the ORB Forward. May it bring you lots of joy!

Sincerely,



Paul Dijkstra
Designer at ORB Racing



1/10 MID MOTOR FRONT-WHEEL-DRIVE BUGGY

FORWARD

Required parts

The ORB Forward is a conversion kit, meaning you will need a donor car. The conversion is compatible with:

- **#90021** - RC10 B6.1D
- **#90021L** - RC10 B6.1DL
(with addition of **#91717** idler)

Tires, rims, electronics and tools are not included and must be bought separately.

Customer support

For information on our products, placing orders, questions, advice (for example on car setup) or to provide us feedback, you can contact us at:

orbracing@gmail.com
www.facebook.com/orbracing

On our facebook page you will also find the latest updates, news and product releases.

Spare parts

7100	Aluminium chassis	7125	C-hubs (L+R)
7101	Rear wishbone	7126	Front wishbone
7102	Rear wishbone brace	7127	Front inner hinge pins (x2)
7103	Rear axle holders (L+R)	7128	Front outer hinge pins (x2)
7104	Rear stabilizer (kit version)	7129	Front hanger
7105	Rear hinge pins (x2)	7130	Front hanger braces (x2)
7106	Rear hanger (set)	7131	3x35mm grub screw (x3)
7107	Suspension pillow balls (x4)	7132	Spur gear cover
7108	Wing mount (set)	7133	Sidepods (set)
7109	Rear bulkhead (L+R)	7134	ESC Capacitor mount
7110	Wing mount plate	7135	Steering rod
7111	Rear shock tower	7136	Front spring cups and limiters (set)
7112	Battery plate	7137	Bodysell
7113	Battery post + transmission brace eyelet	7138	Instruction manual
7114	Transmission case (set)	7139	Sticker set (tentative)
7115	Motor plate		
7116	Front shock tower		
7117	Camber link plate		
7118	Steering plate		
7119	Steering bellcranks (L+R)		
7120	Steering rack brace		
7121	Front inboard hangers (x2)		
7122	Kickup plate		
7123	Chassis connector plate		
7124	Steering knuckles (L+R)		

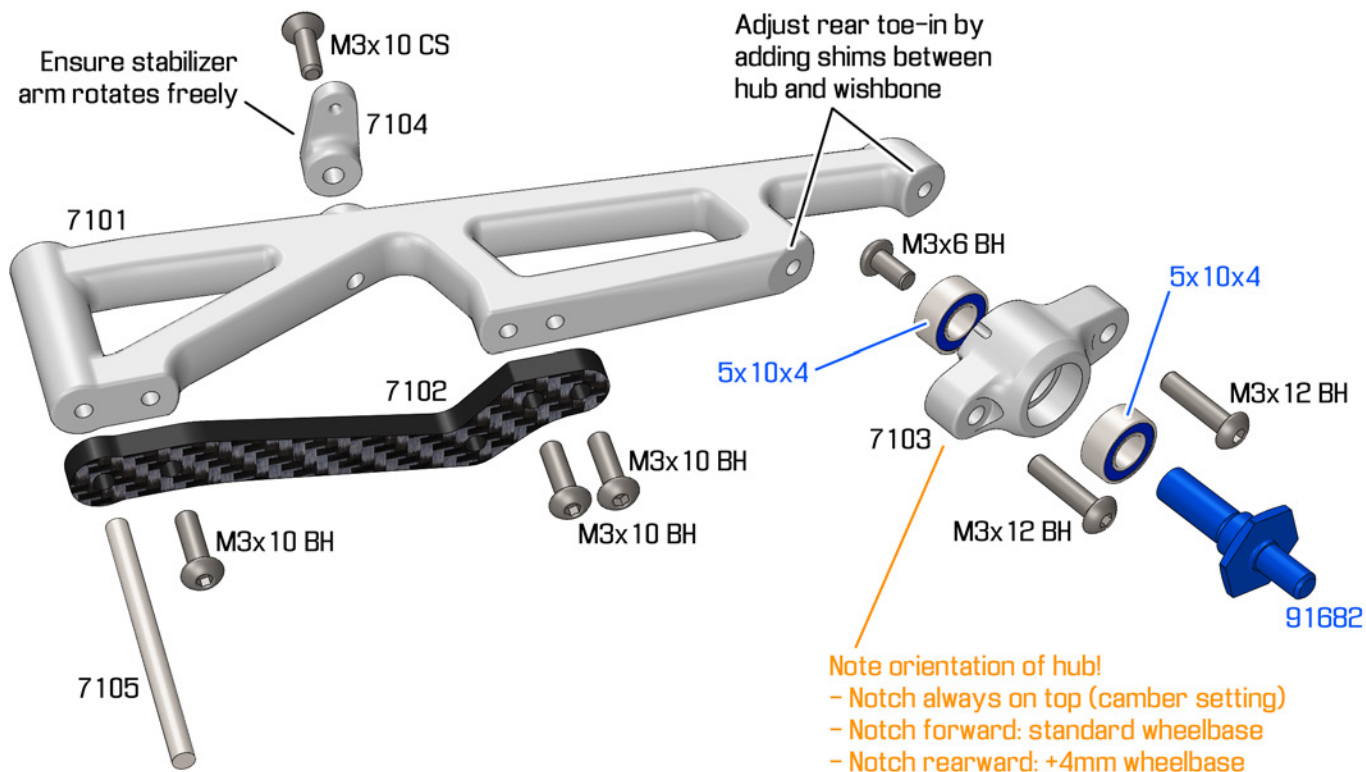
Option parts

7200	Carbon fibre chassis
7201	Front stabilizers (set)
7202	Rear stabilizer (set)
7203	Short front shock tower

STEP 1

REAR WISHBONES

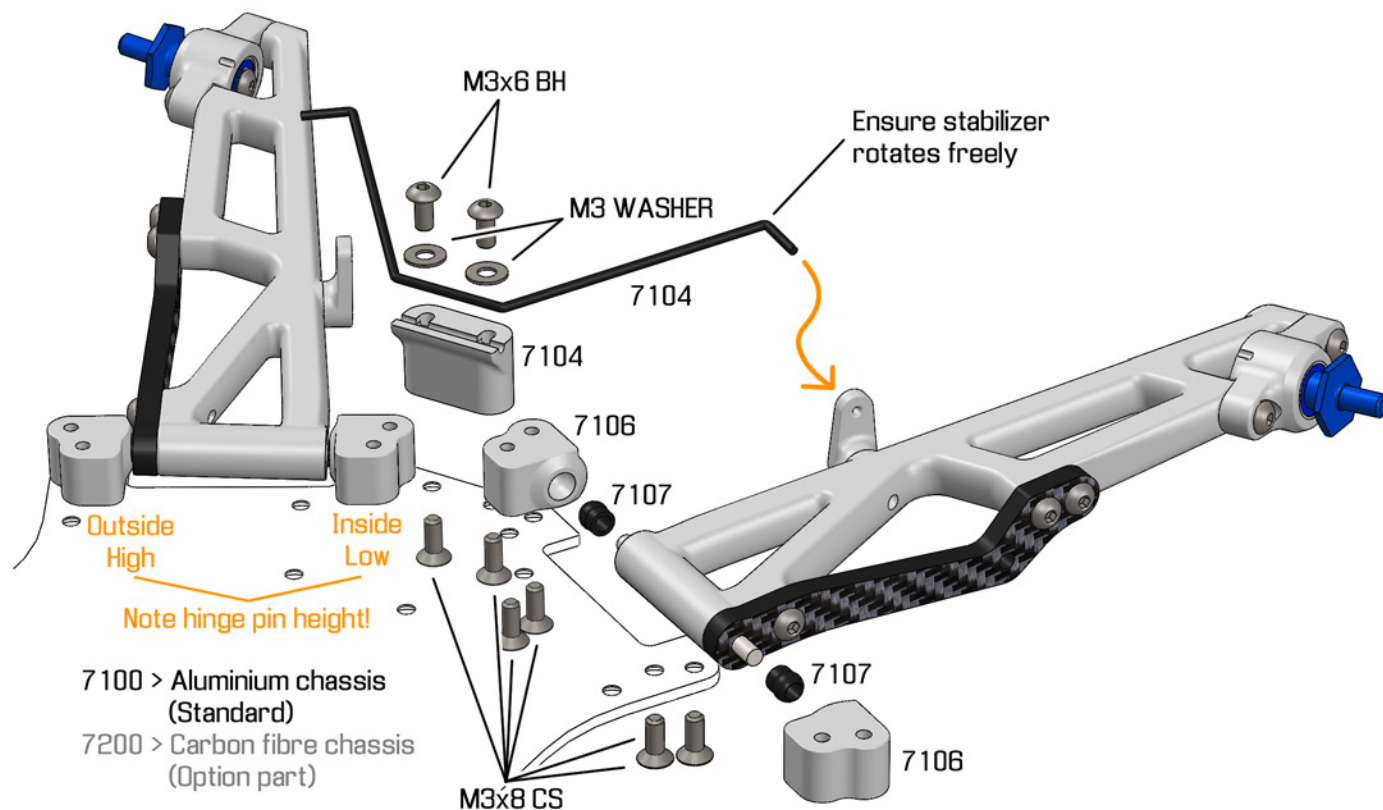
Build left and right side (left wishbone shown)



REAR SUSPENSION MOUNTS AND STABILIZER

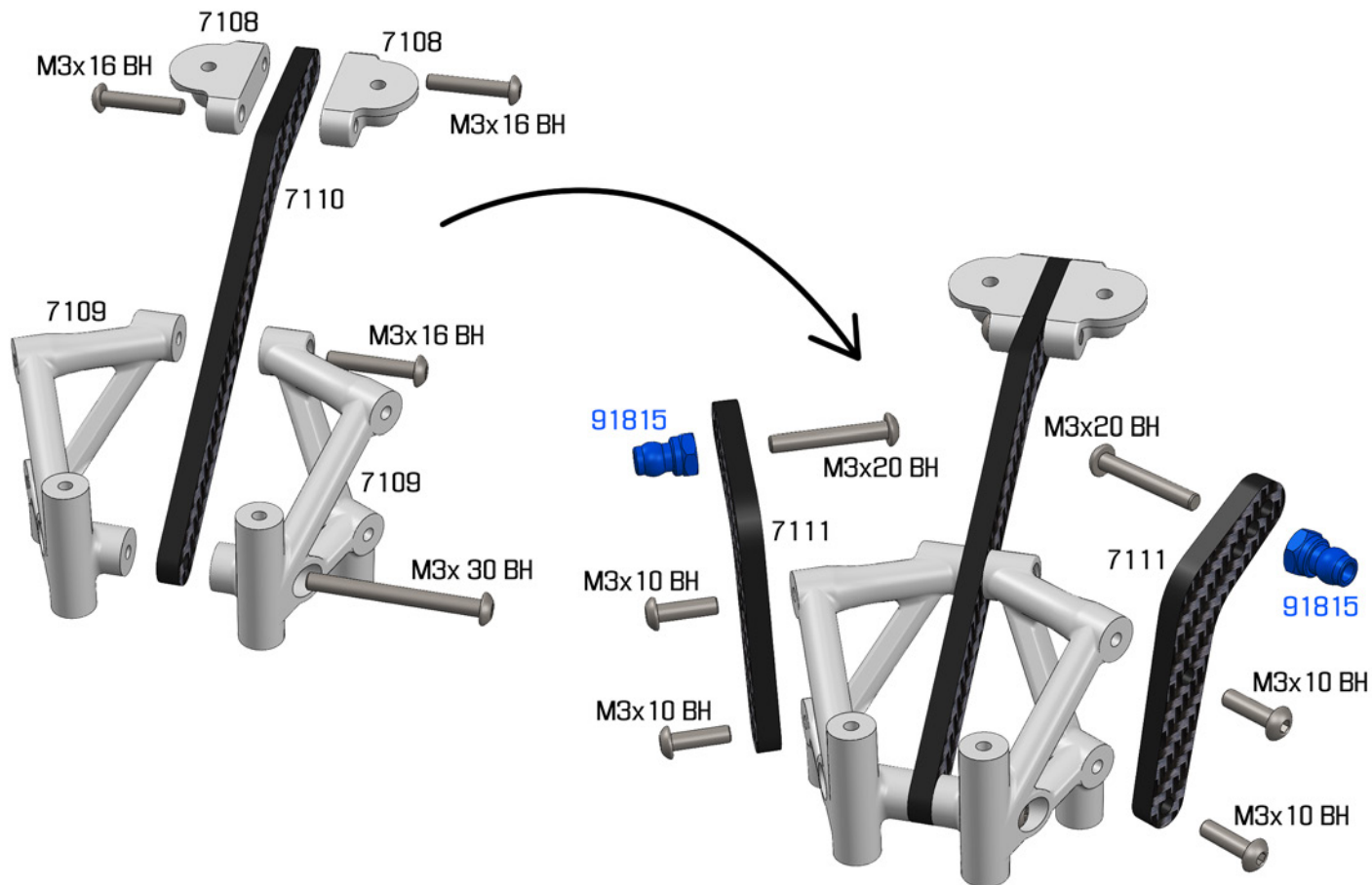
STEP 2

Mount right side (shown assembled) in the same way as the left side



STEP 3

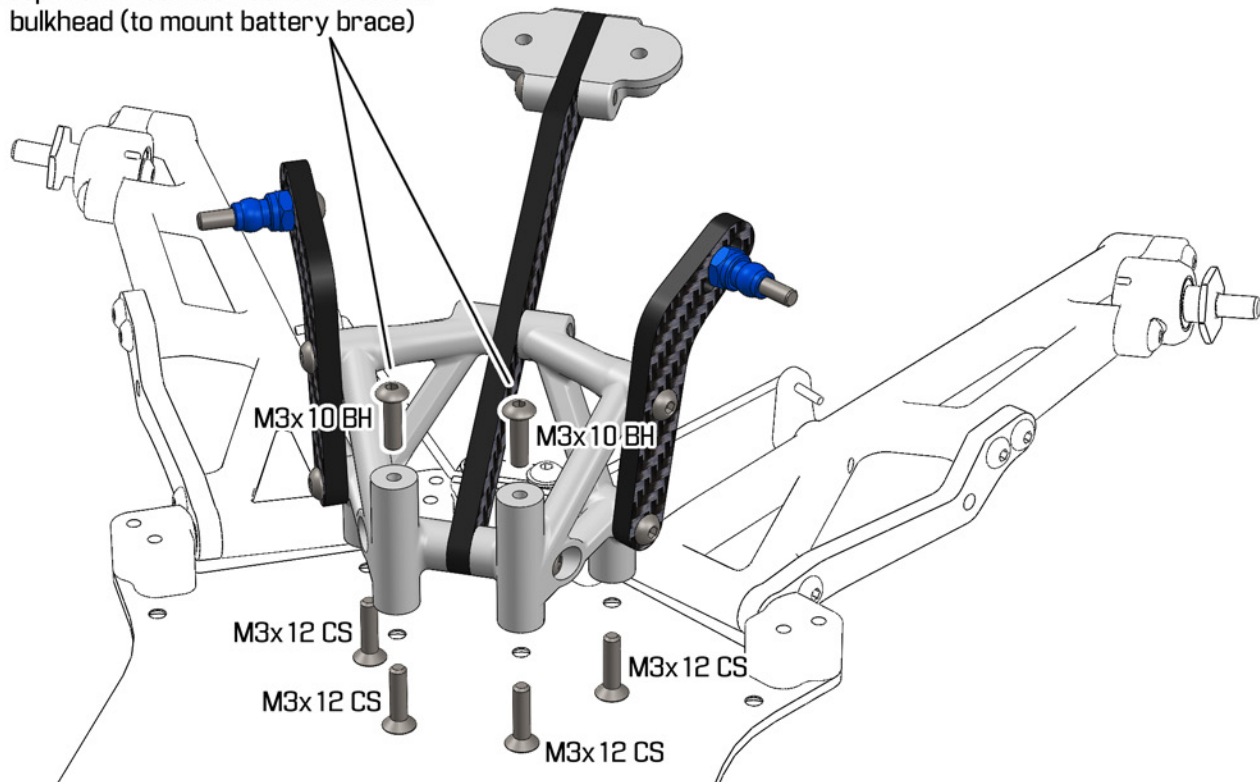
REAR BULKHEAD



MOUNTING OF REAR BULKHEAD

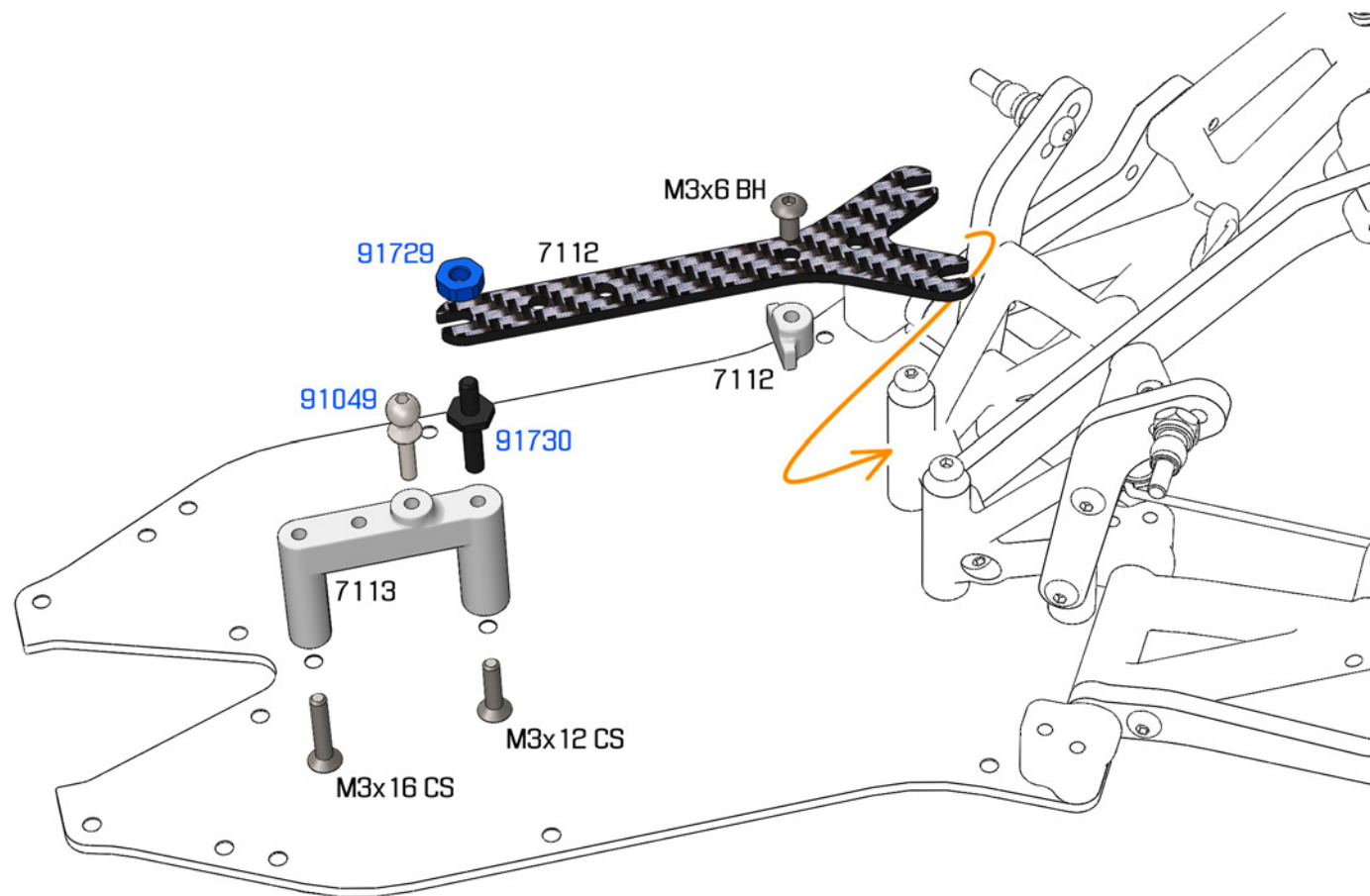
STEP 4

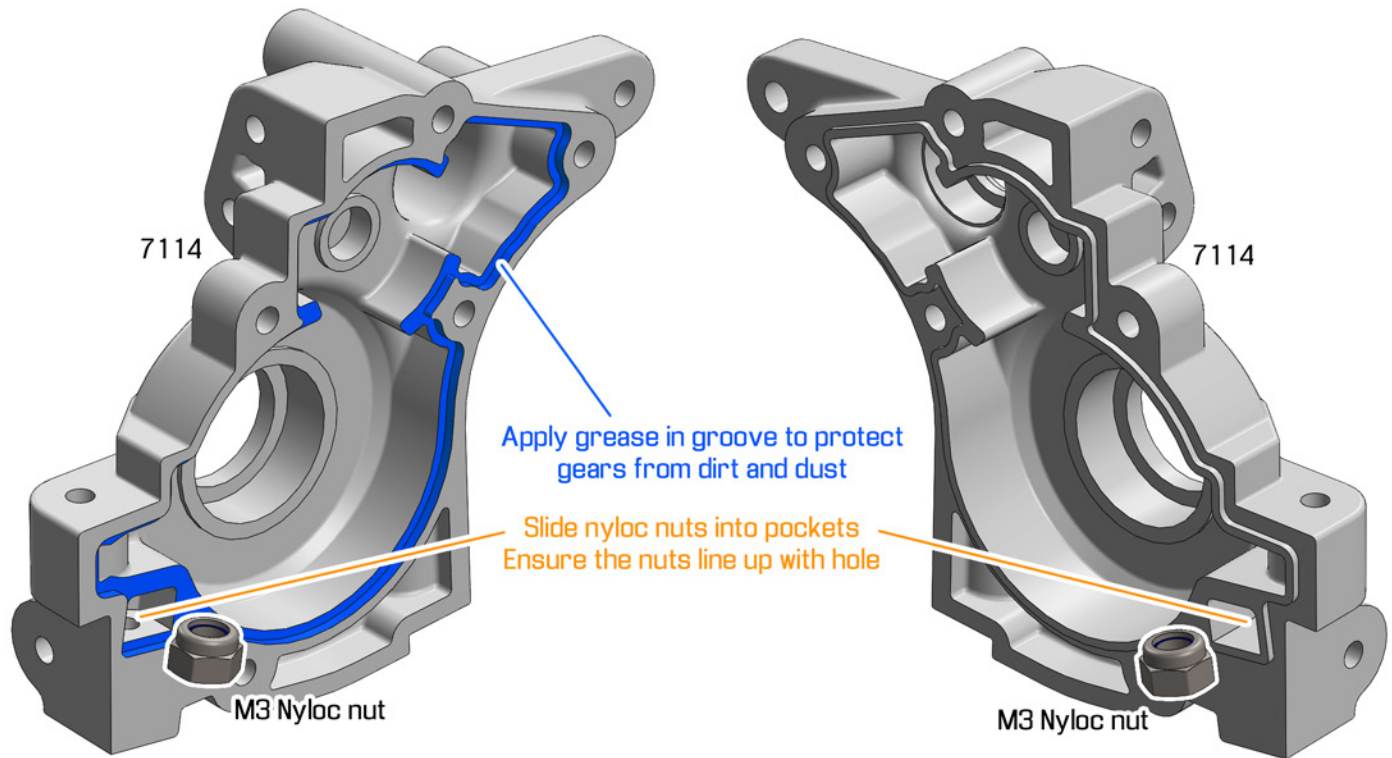
Keep 2.5mm between screw head and bulkhead (to mount battery brace)



STEP 5

BATTERY MOUNT





STEP 7

DIFFERENTIAL, IDLER AND TOPSHAFT

Read the text carefully before continuing to the next step!

For best performance, a ball differential is recommended. Best results are achieved with the differential set slightly tighter than in a RWD buggy.

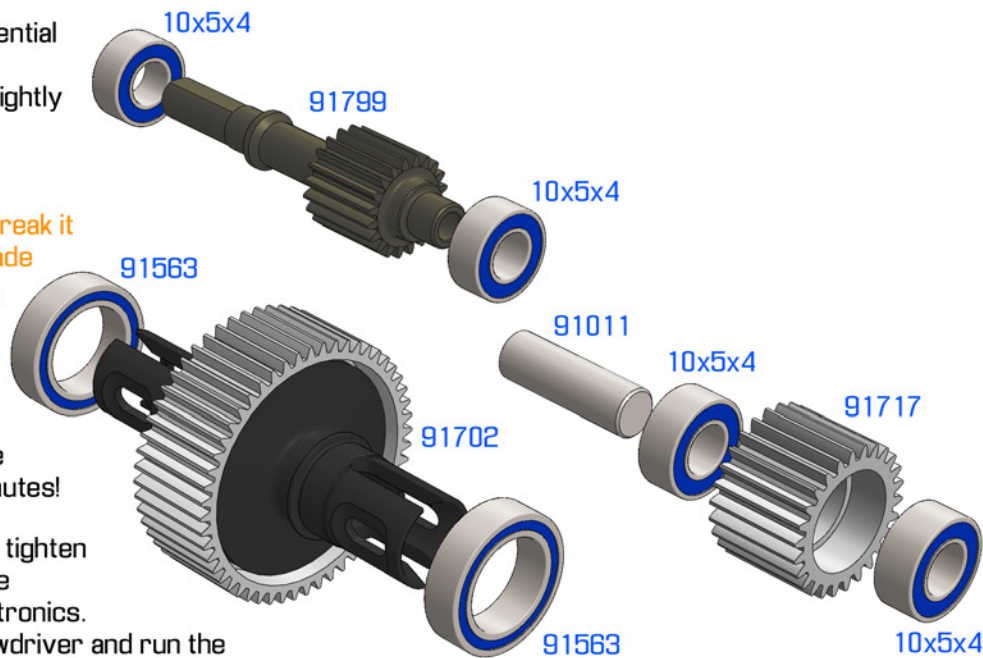
To maximize the life-time of your differential, it is recommended to break it in. It is also recommended to upgrade to a ceramic caged thrust bearing.

Breaking in your differential

A well prepared differential makes the difference between lasting a few batteries or the entire season, and costs less than 30 minutes!

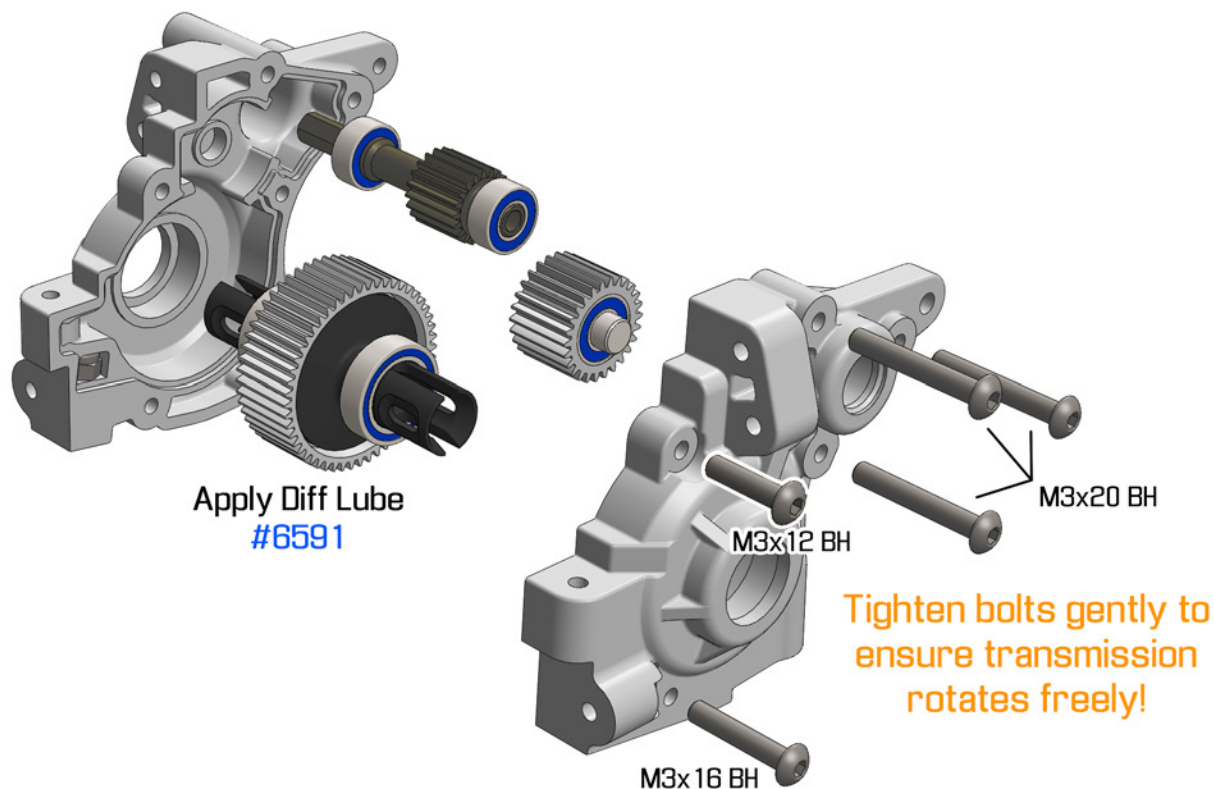
When assembling your differential, tighten it only loosely initially. Assemble the transmission and connect the electronics. Lock the left outdrives with a screwdriver and run the motor at low RPM for 8 minutes. After this, unlock the left outdrive, lock the right and run for another 8 minutes. Next, tighten the differential to its final setting and run it at low RPM for 2 more minutes for each side. Your differential is now ready to race!

Video: <https://www.youtube.com/watch?v=GF0vSoIG5X0>



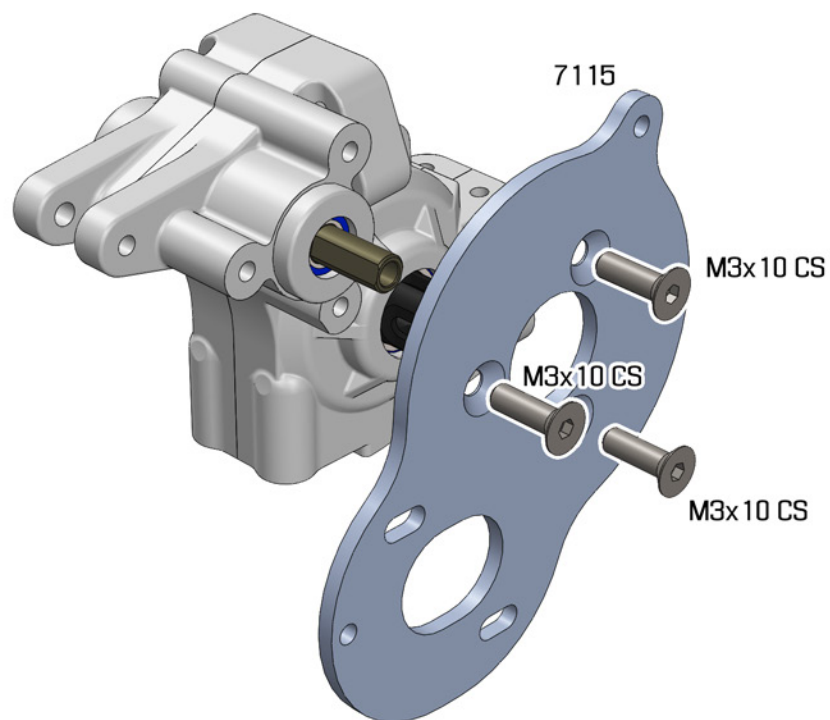
Upgrade to ceramic caged thrust bearing

The best \$10 upgrade you can give your car; it will outlast your outdrives! Companies like Avid RC, Schelle Racing, ProTek and Revolution Design offer 2.5x6x3mm thrust bearings with Tungsten Carbide and/or Silicon Nitride (Ceramic) balls.



STEP 9

MOTOR PLATE

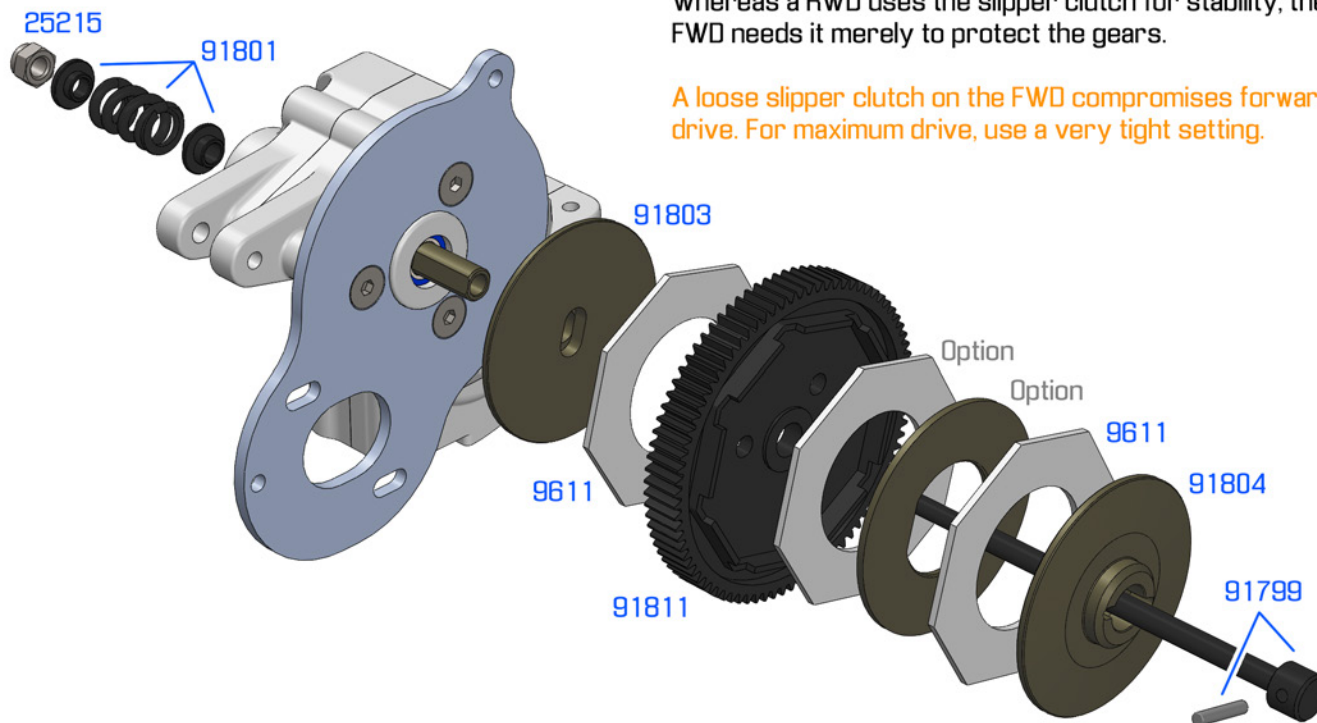


SLIPPER CLUTCH

STEP 10

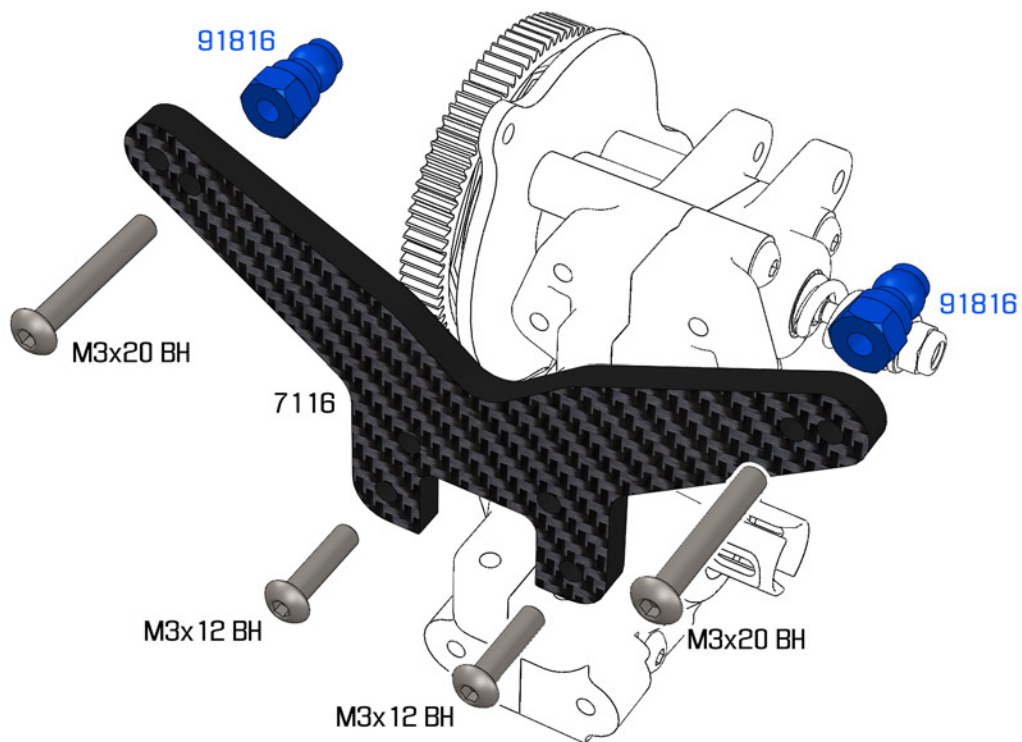
Whereas a RWD uses the slipper clutch for stability, the FWD needs it merely to protect the gears.

A loose slipper clutch on the FWD compromises forward drive. For maximum drive, use a very tight setting.



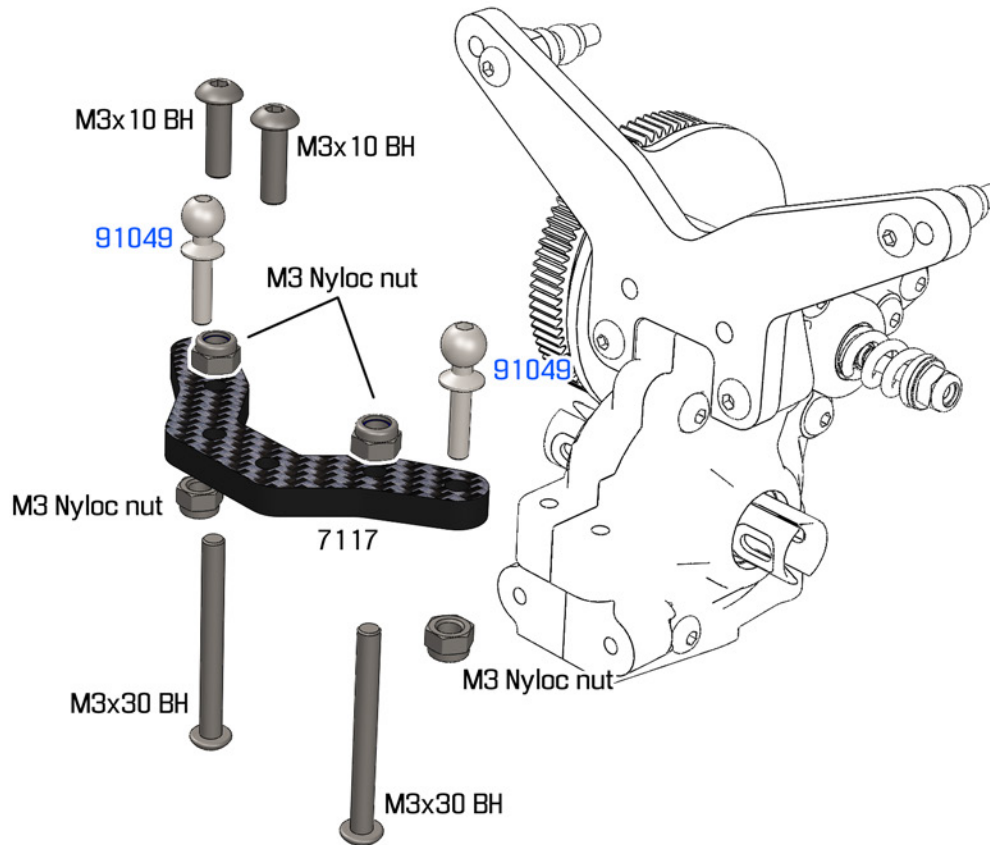
STEP 11

FRONT SHOCK TOWER



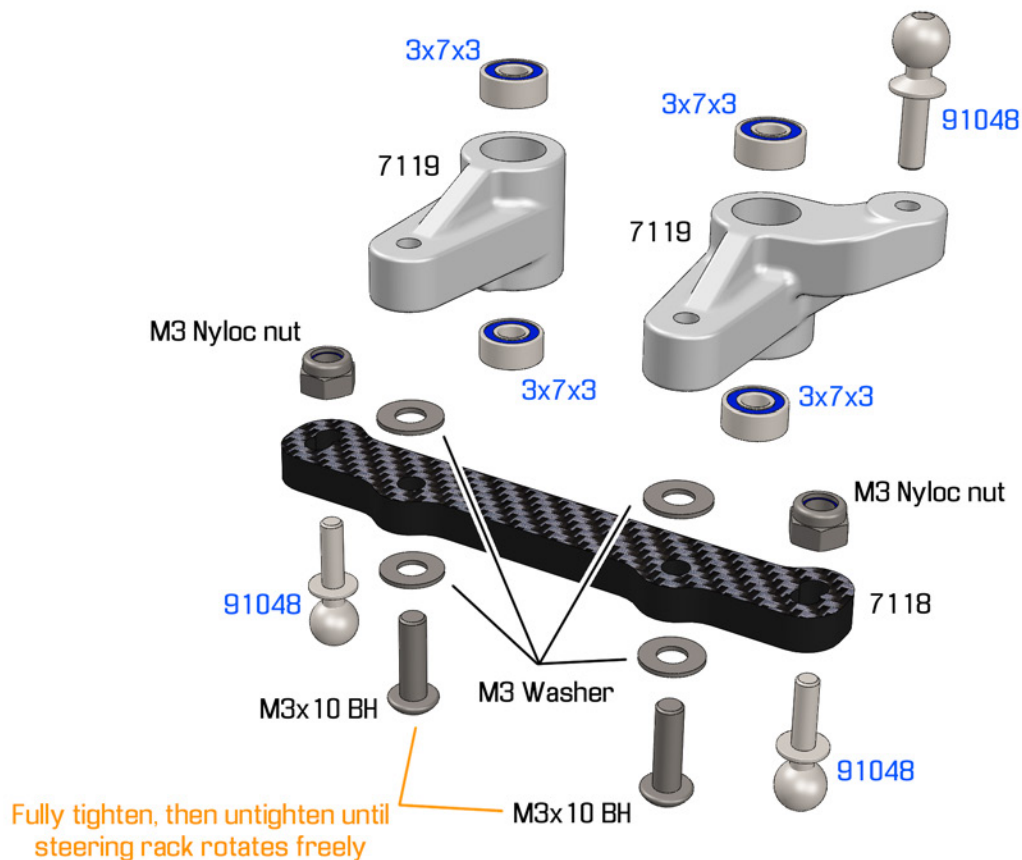
CAMBER LINK PLATE

STEP 12



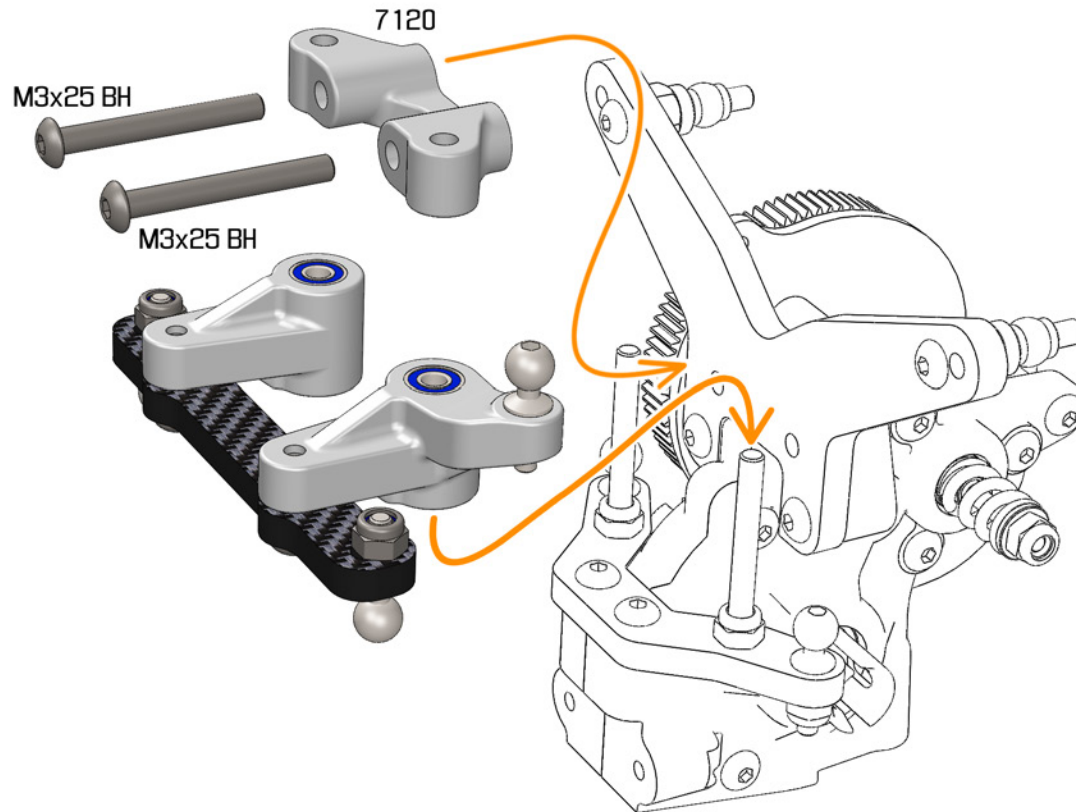
STEP 13

STEERING RACK



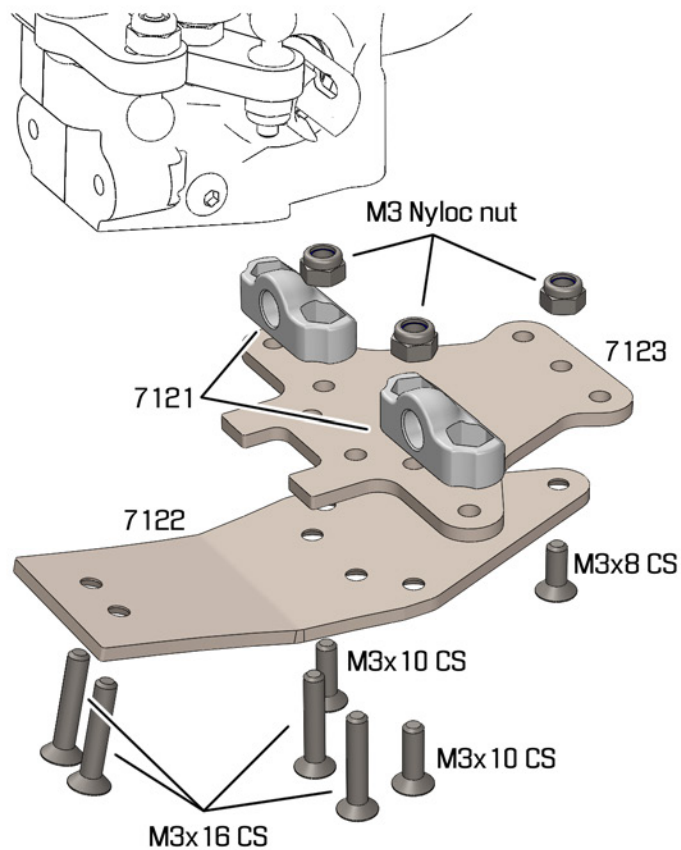
MOUNTING OF STEERING RACK

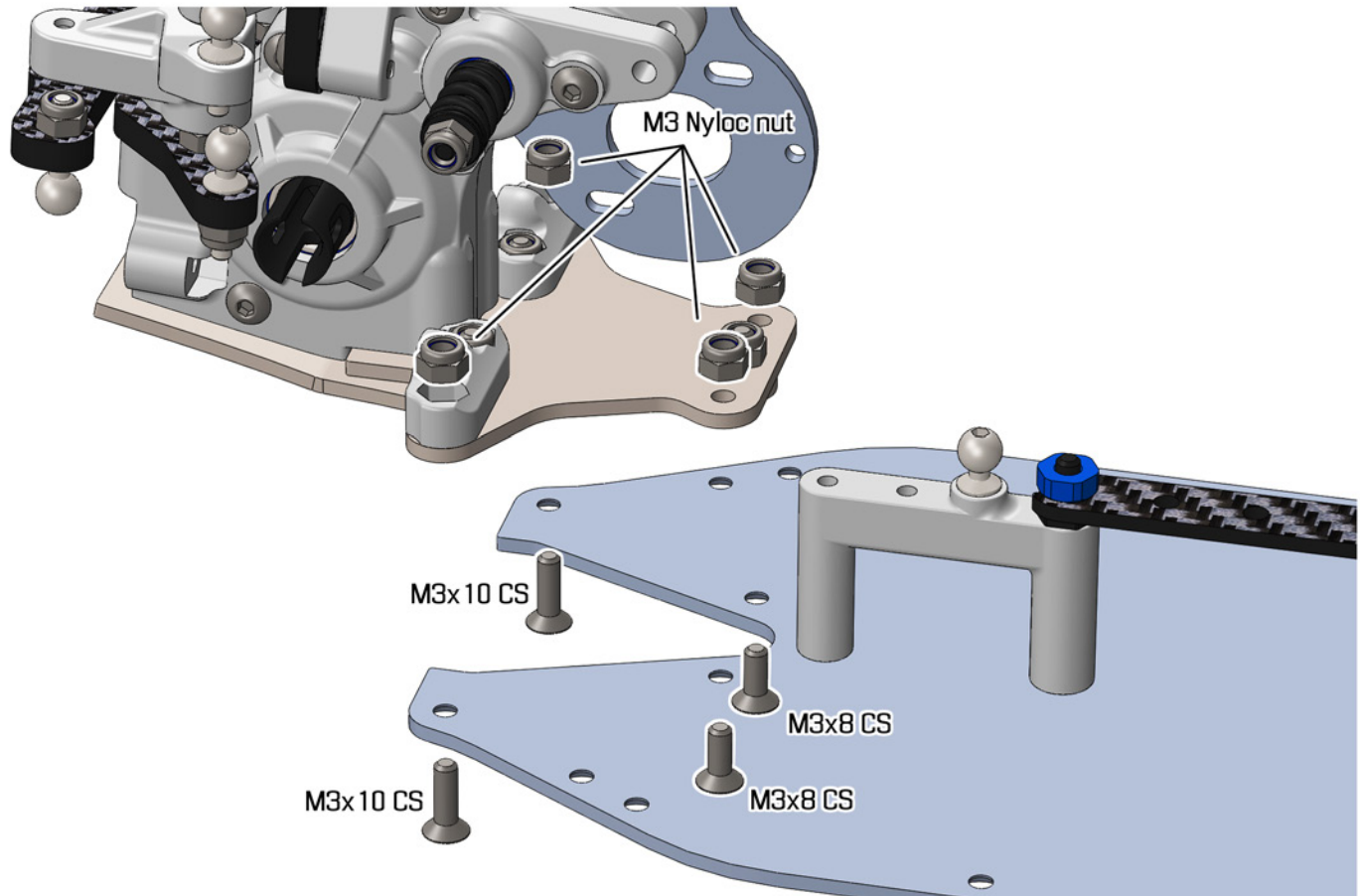
STEP 14



STEP 15

KICKUP PLATE

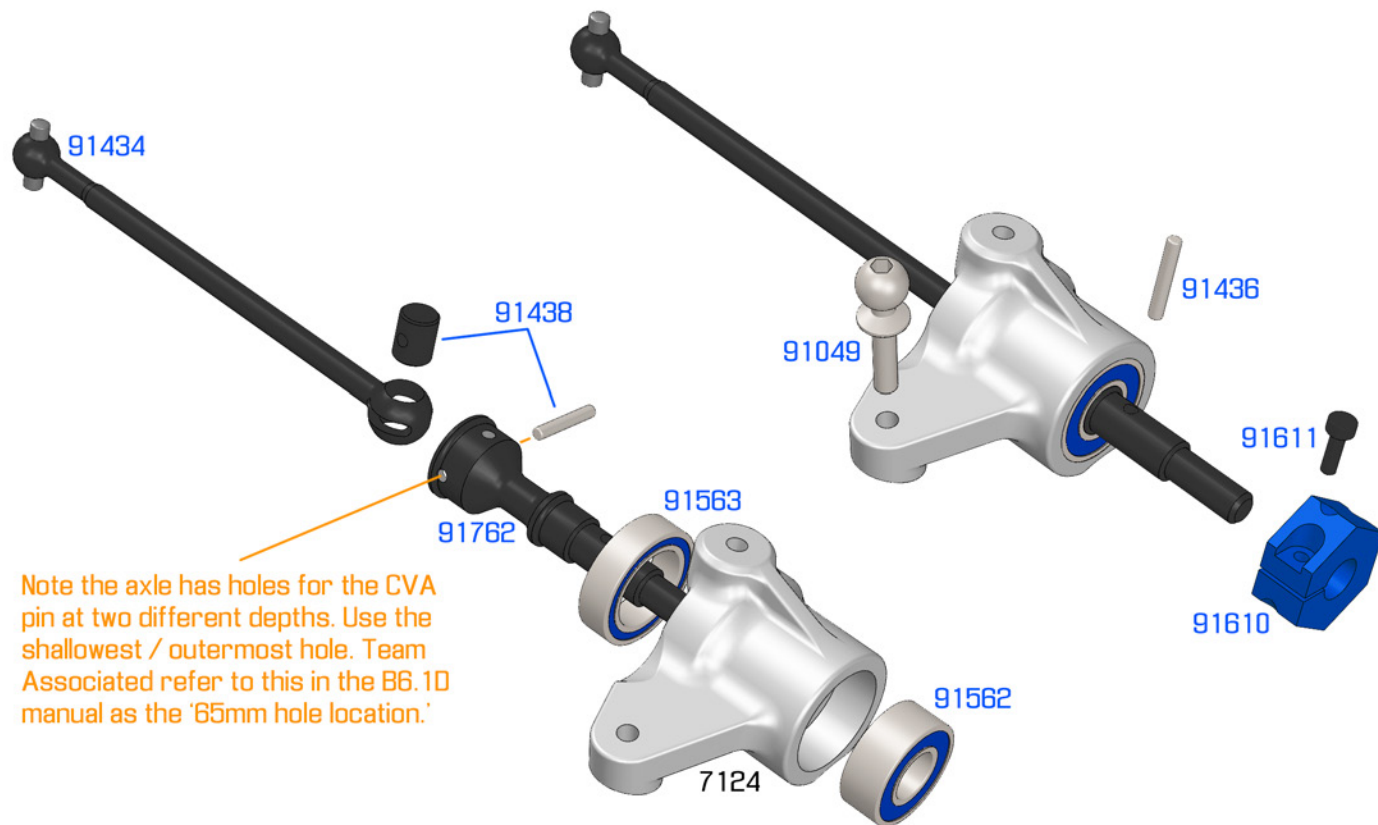




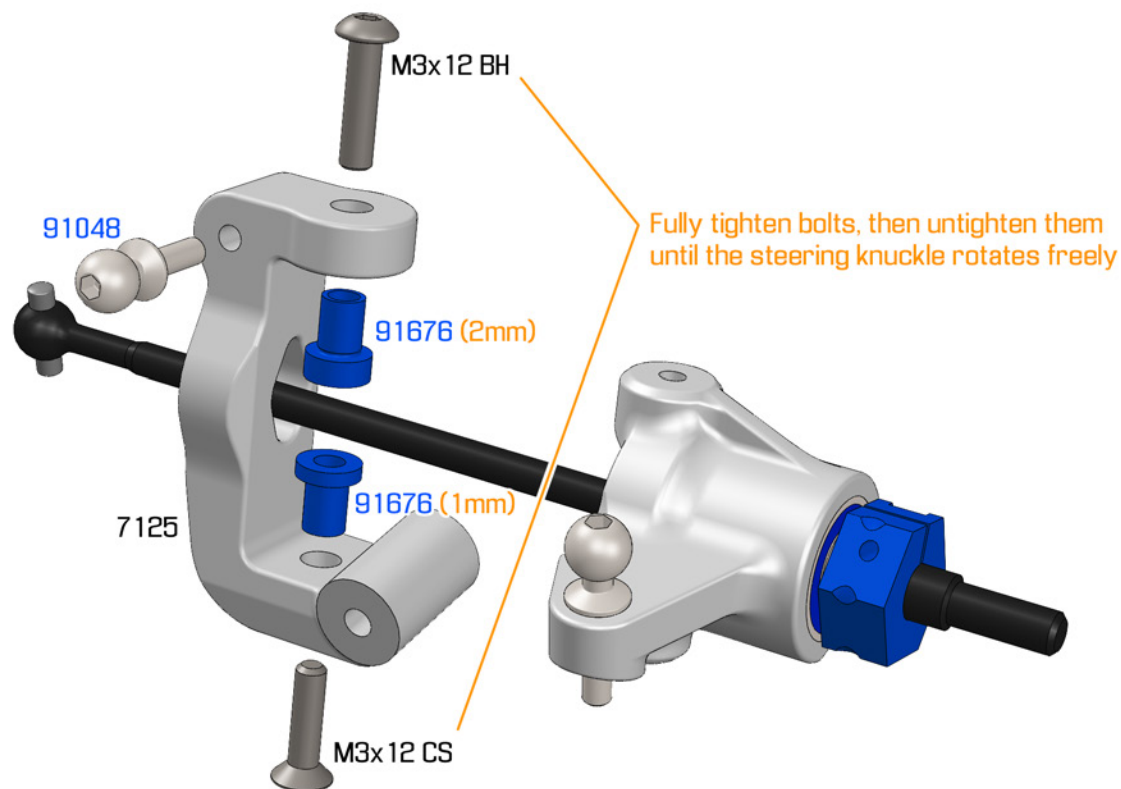
STEP 17

DRIVESHAFTS

Build left and right side (left driveshaft shown)



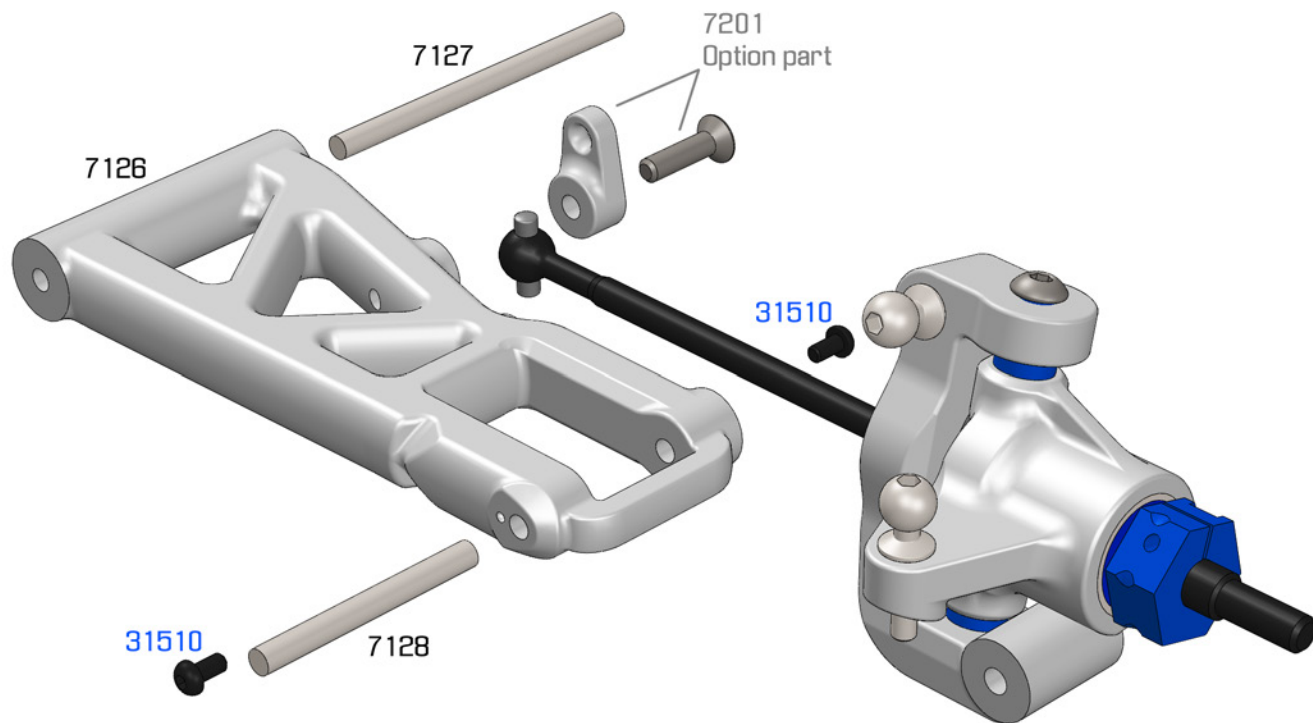
Build left and right side (left C-hub shown)



STEP 19

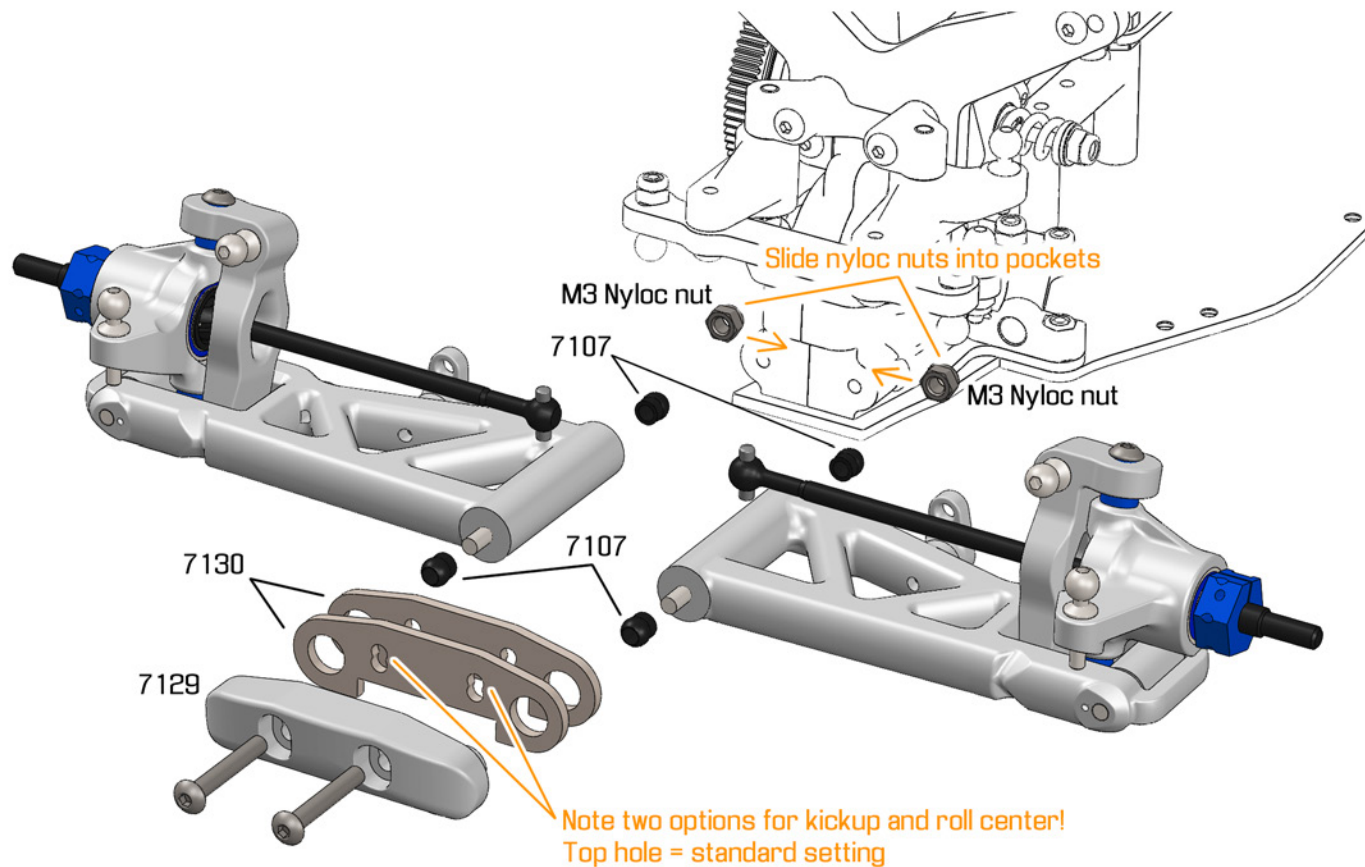
FRONT WISHBONES

Build left and right side (left wishbone shown)



FRONT SUSPENSION BRACE

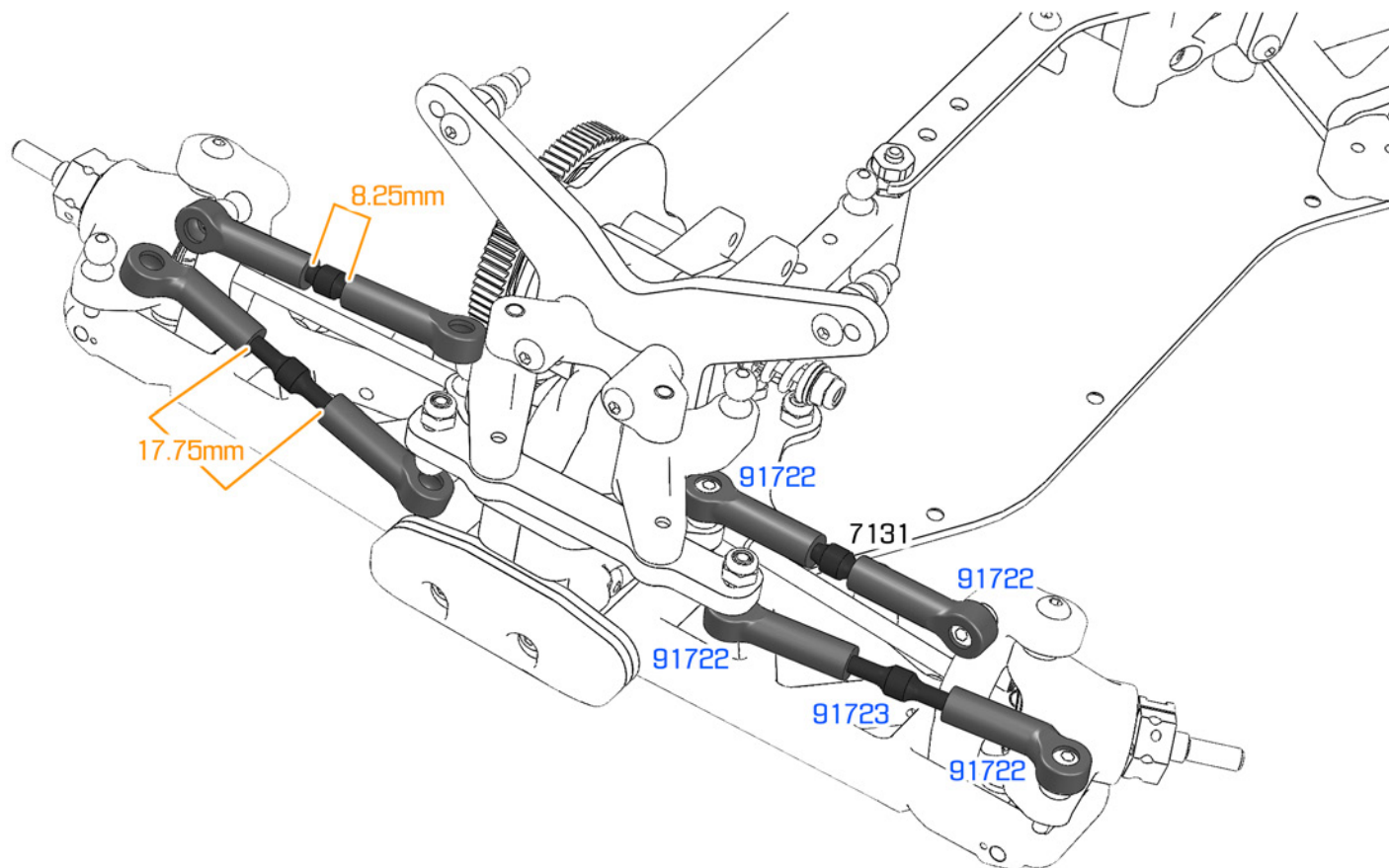
STEP 20



STEP 21

CAMBER LINKS AND TIE-RODS

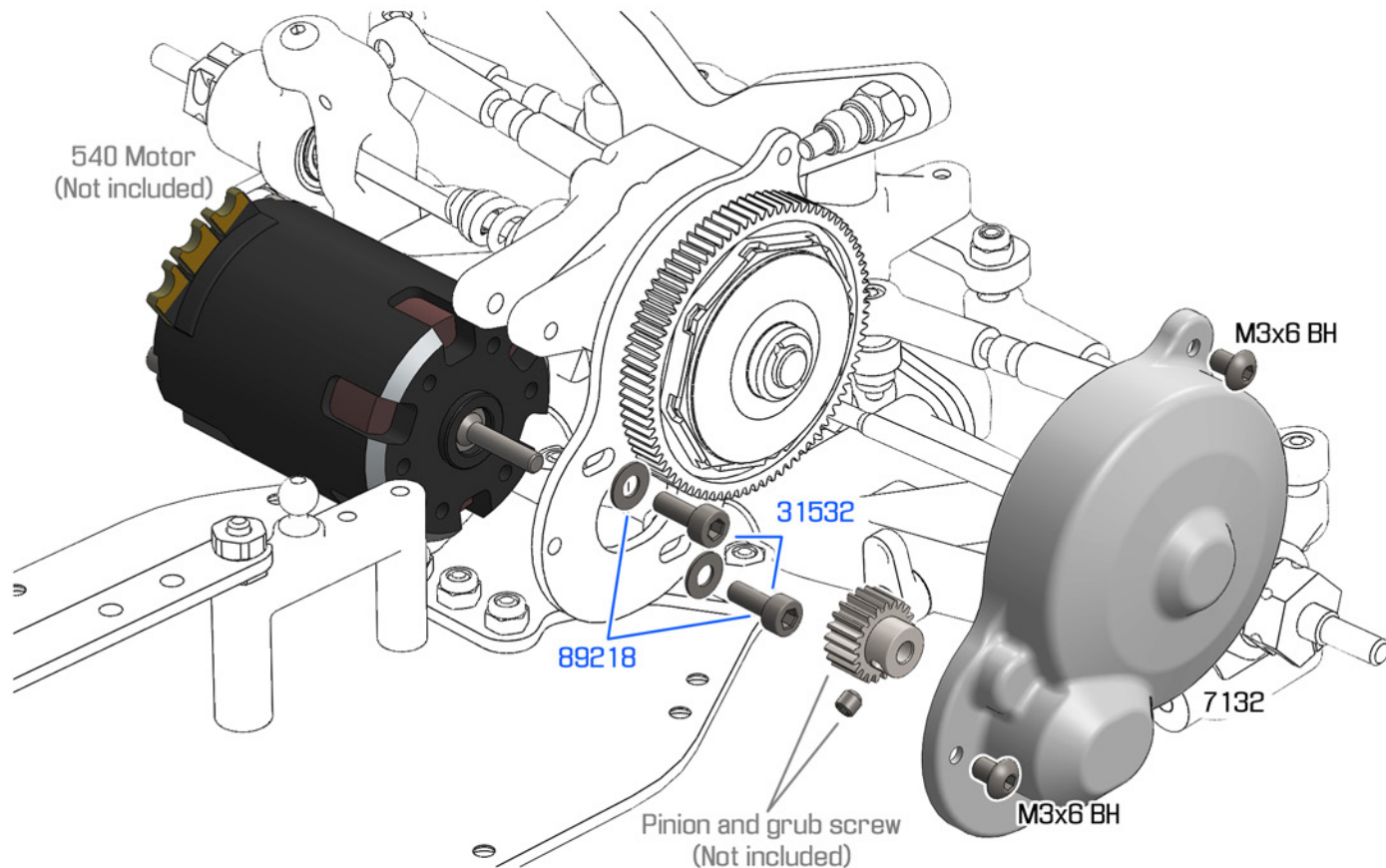
Build left and right side (left side shown mounted)



MOTOR AND GEAR COVER

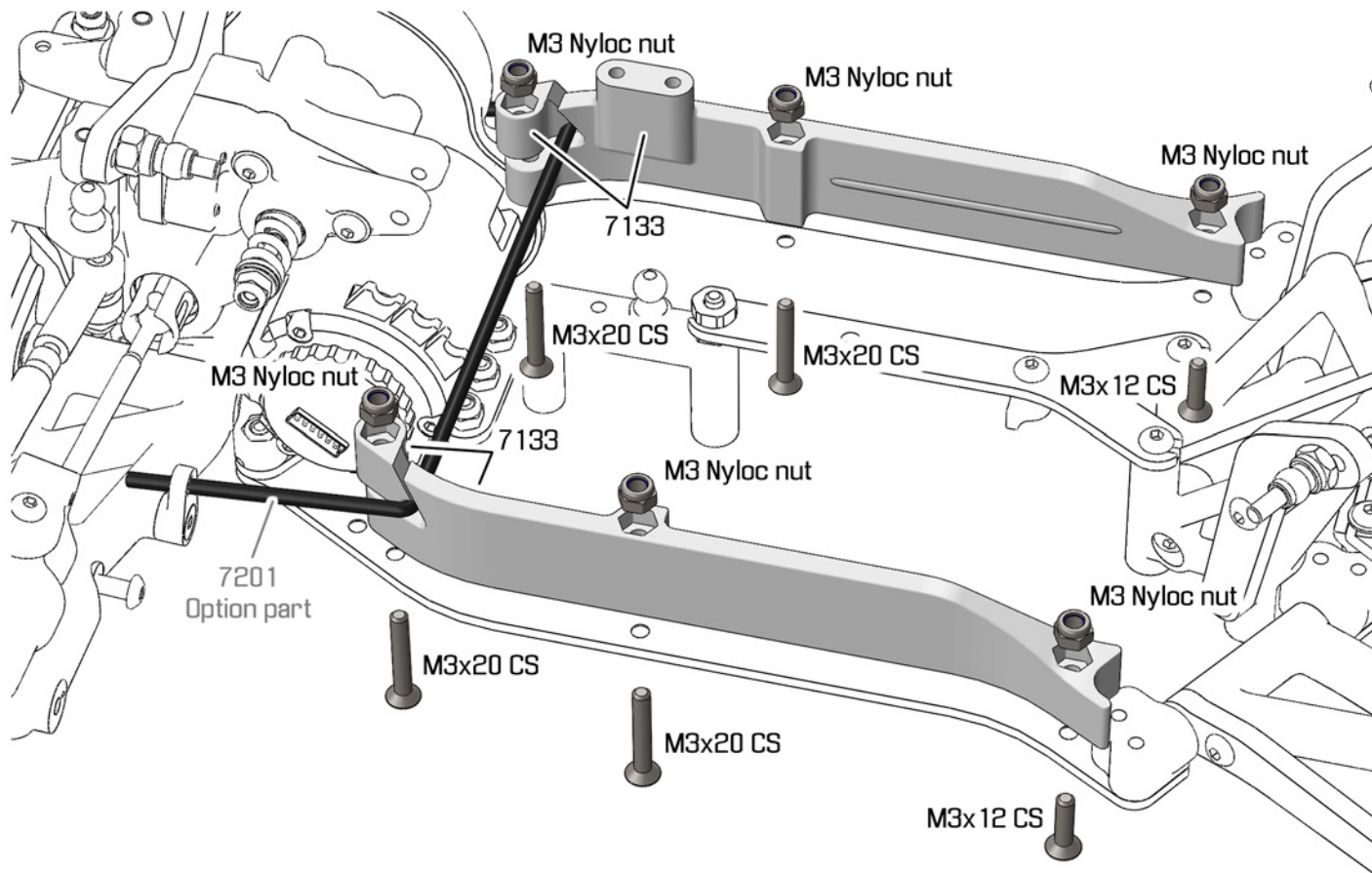
STEP 22

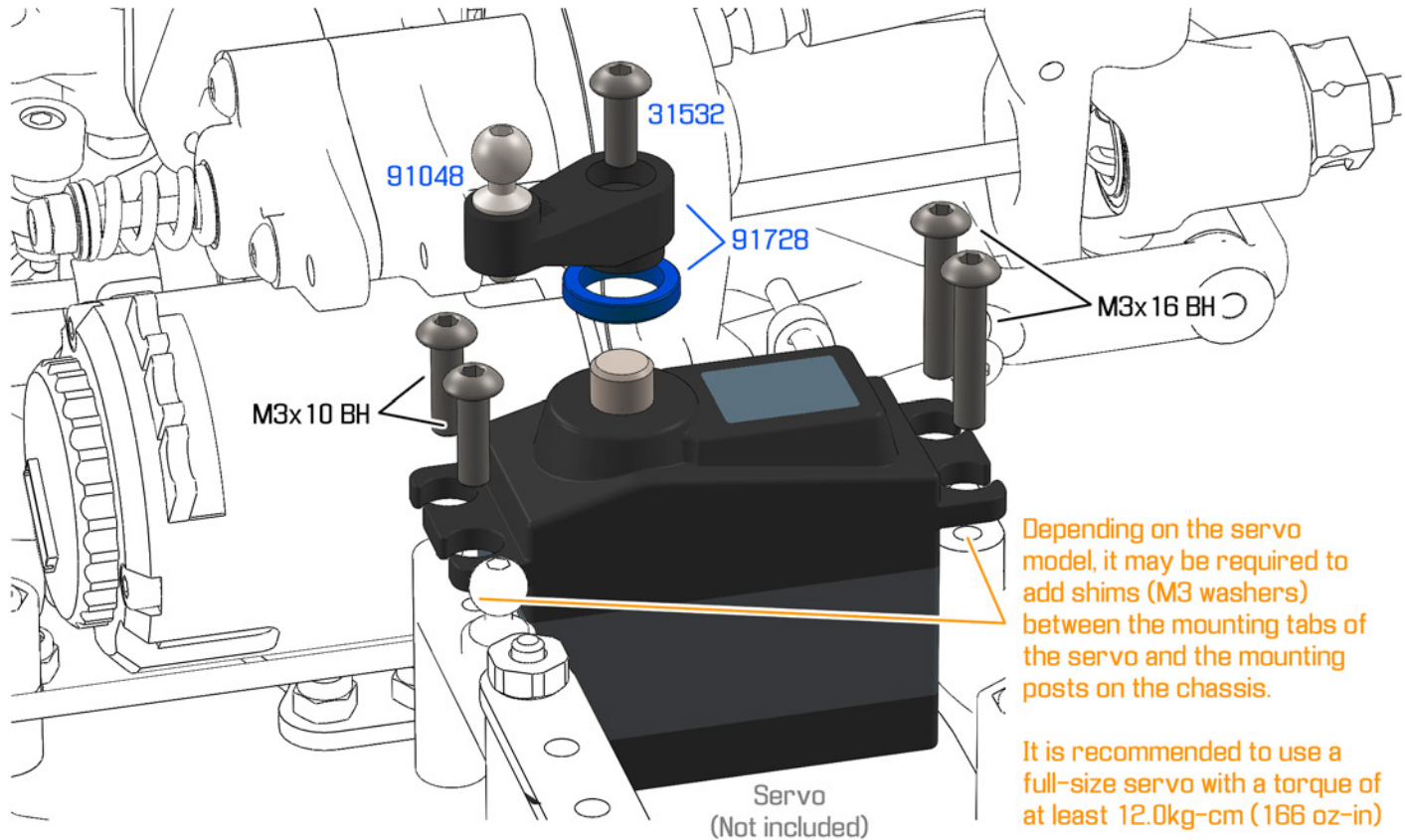
Ensure the pinion and spur gear mesh correctly



STEP 23

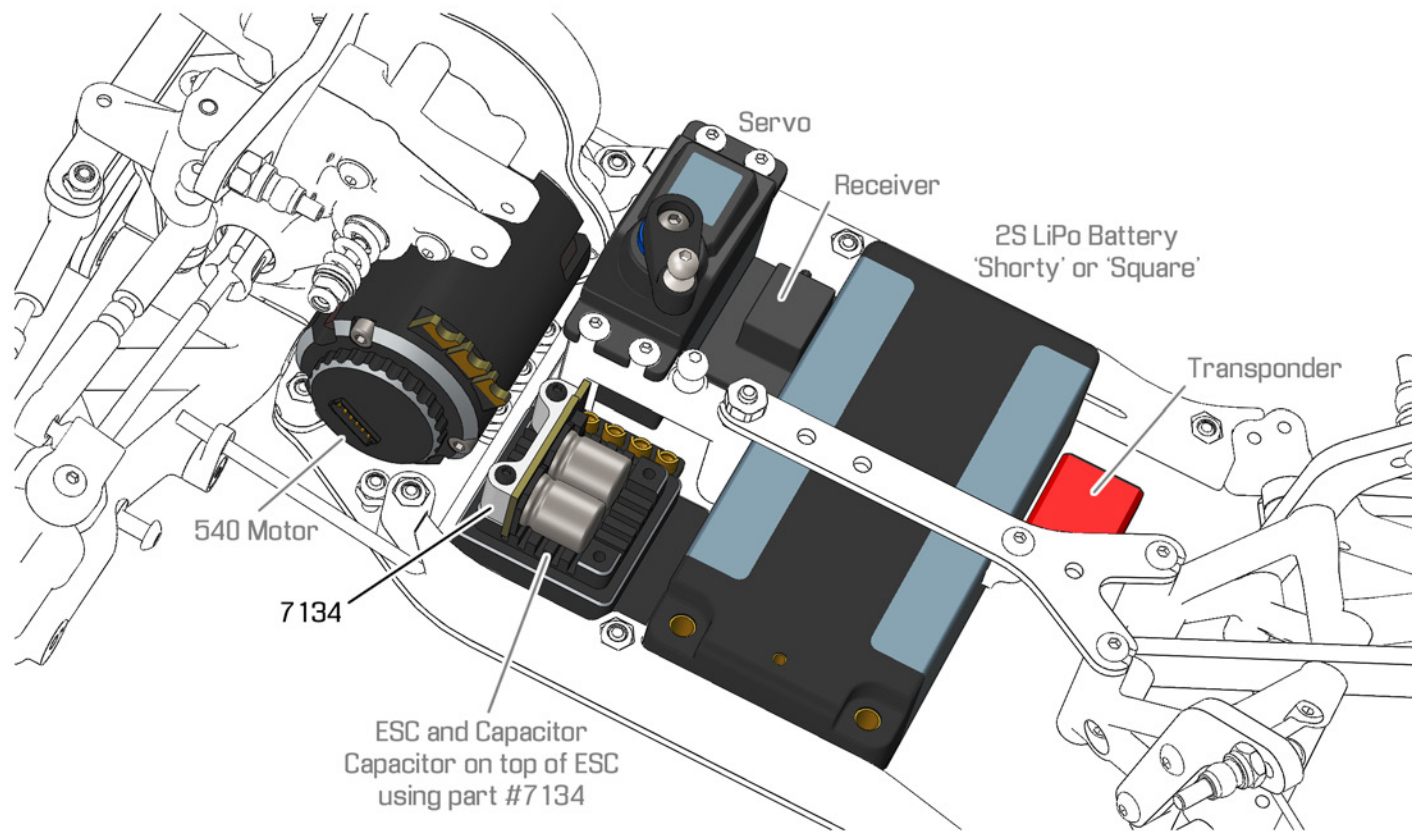
CHASSIS SIDEPODS





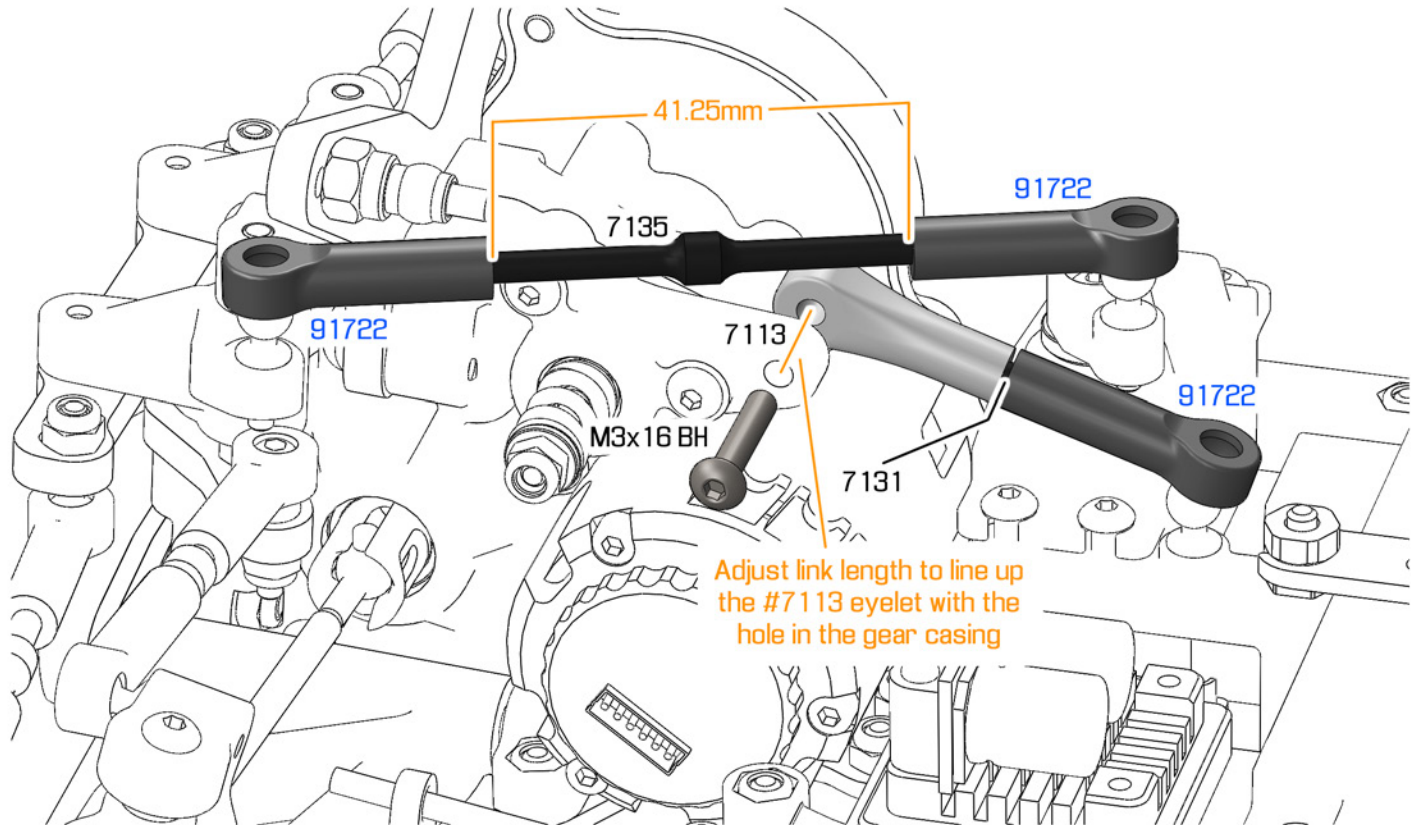
STEP 25

ELECTRONICS LAYOUT



TRANSMISSION BRACE AND STEERING LINK

STEP 26



STEP 27

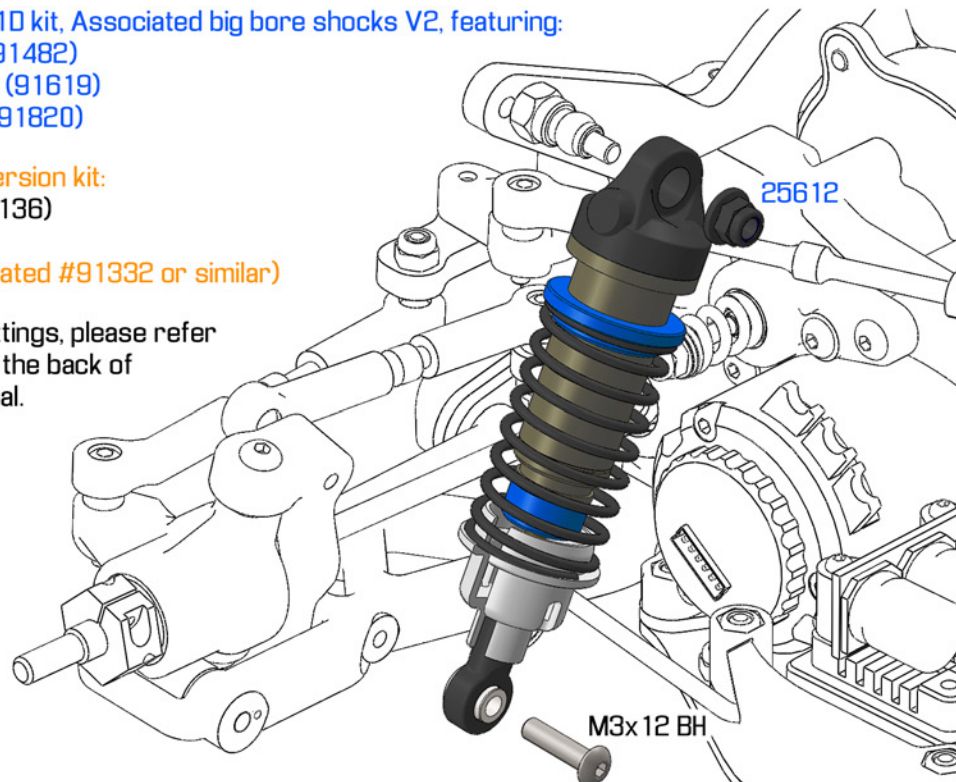
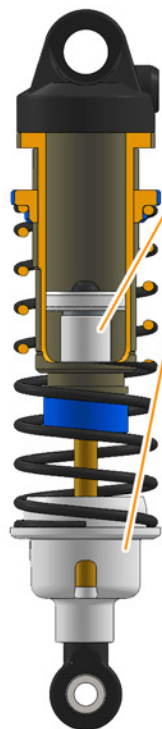
FRONT SHOCKS

Build left and right side (left side shown)

Supplied in RC10 B6.1D kit, Associated big bore shocks V2, featuring:
31mm Shock body (91482)
27.5mm Shock shaft (91619)
Short shock eyelet (91820)

Supplied in the conversion kit:
Front limiter 6mm (7136)
Spring cup (7136)
Front spring (Associated #91332 or similar)

For oil and piston settings, please refer to the setup guide in the back of the instruction manual.

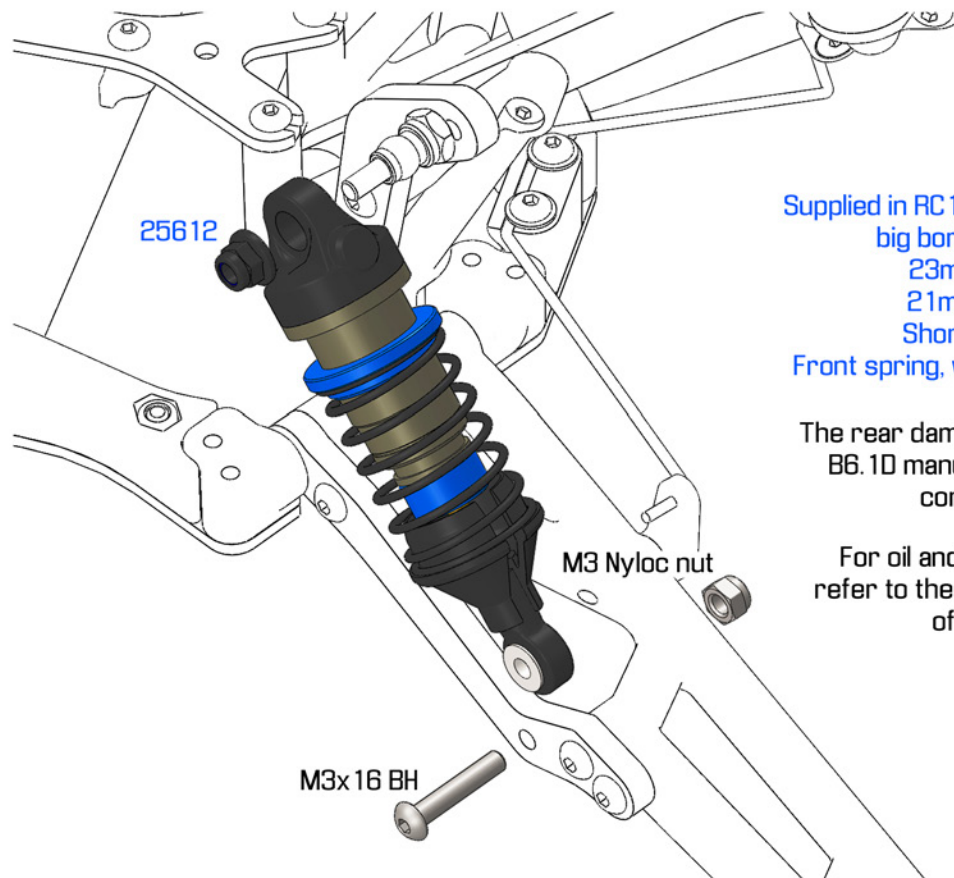


For best performance at elevated grip levels, the car may be upgraded with shorter shock bodies (#91480), shock shafts (#91615) and optional short shock tower (#7202).

REAR SHOCKS

STEP 28

Build left and right side (left side shown)



Supplied in RC 10 B6.1D kit, Associated big bore shocks V2, featuring:
23mm Shock body (91480)
21mm Shock shaft (91615)
Short shock eyelet (91820)
Front spring, white, 3.40lb/in (91831)

The rear dampers are built as in the B6.1D manual, without additional or conversion-specific parts

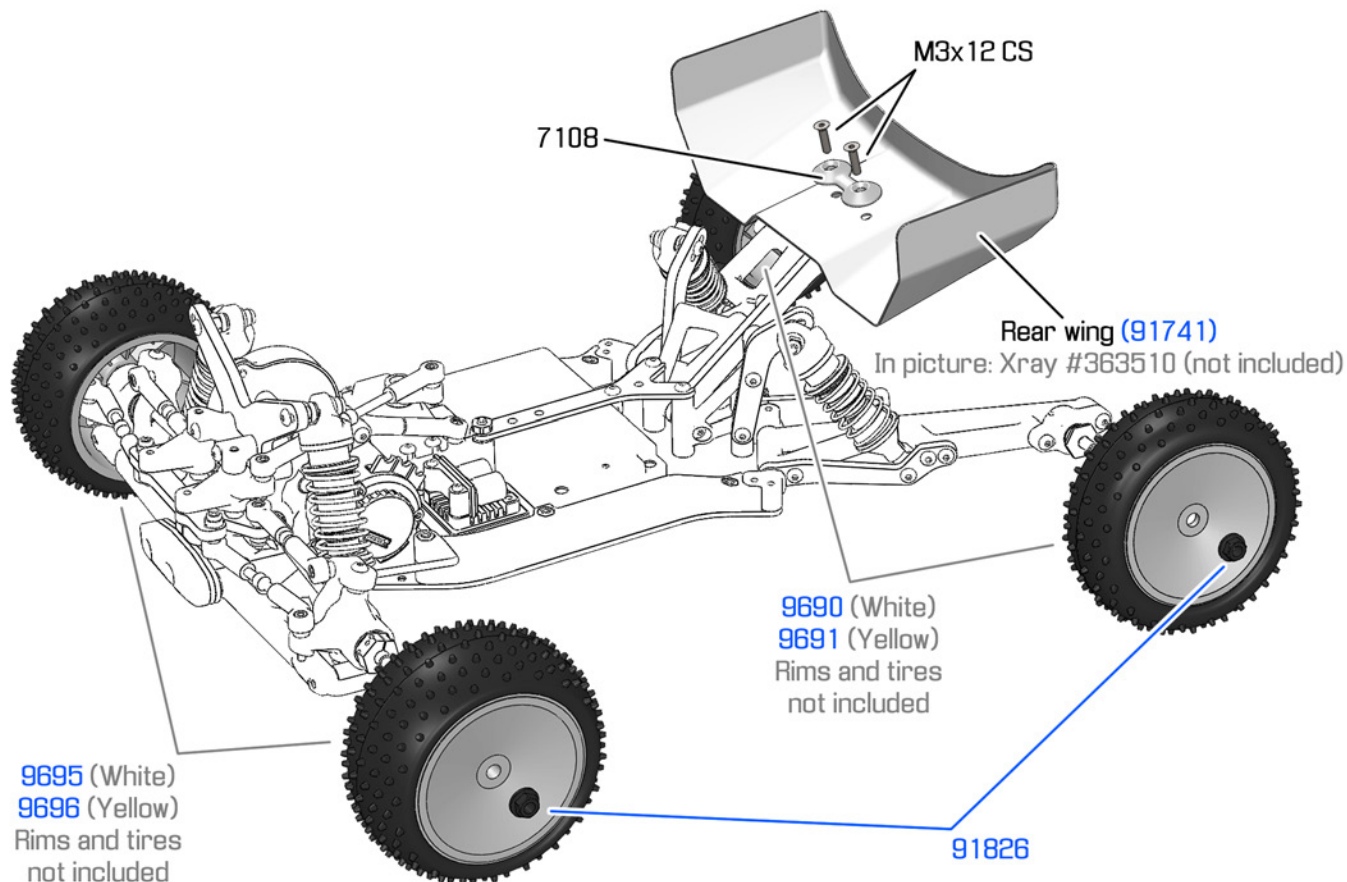
For oil and piston settings, please refer to the setup guide in the back of the instruction manual.



STEP 29

WING + WHEELS

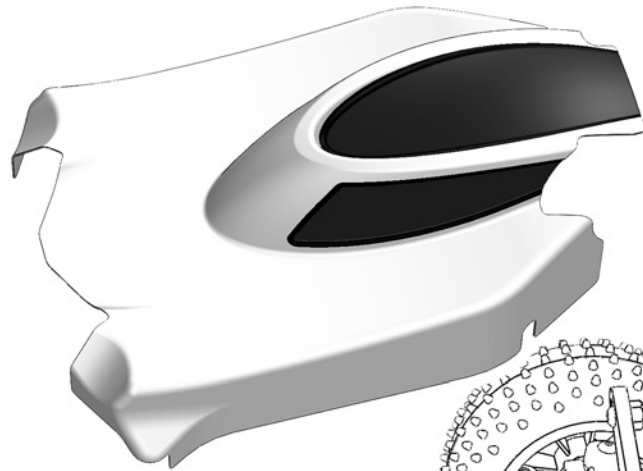
Build left and right side (left side shown assembled)



BODYSHELL AND VELCRO

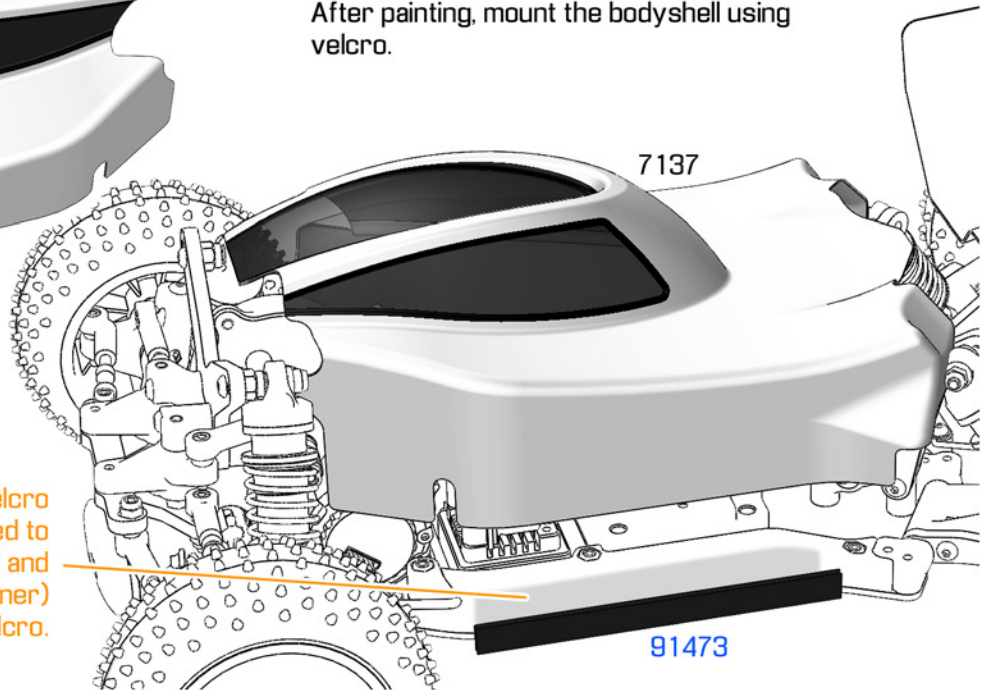
STEP 30

Build left and right side (left side shown)



Cut bodyshell as shown in the pictures, with cutouts for the rear bulkhead, gear cover, steering link and front stabilizer. After painting, mount the bodyshell using velcro.

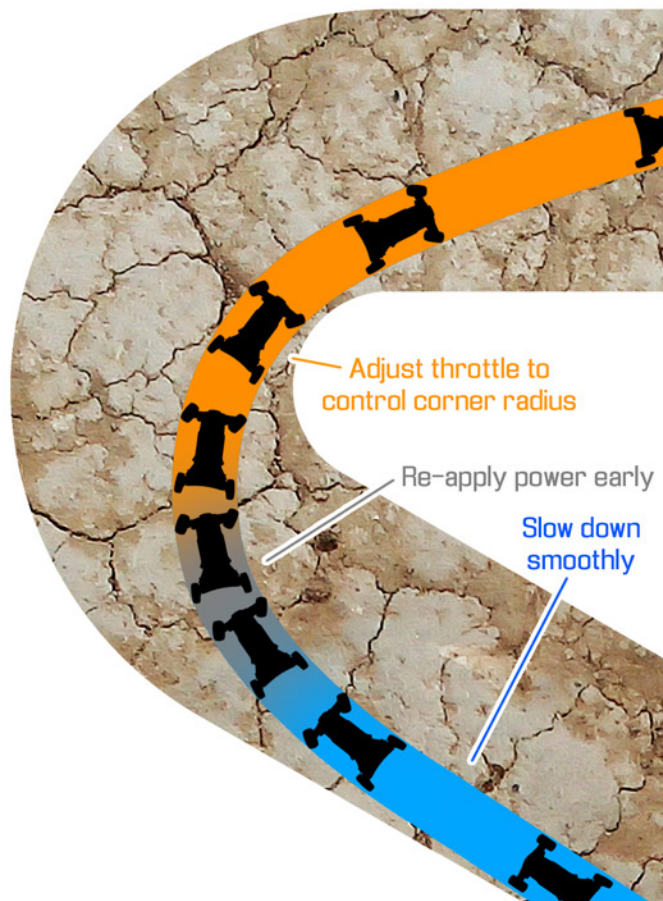
For the best adhesion of the velcro on the sidepod, it is recommended to sand the surface of the sidepod and degrease (with brake cleaner) before applying the velcro.



Driving style

The car drives very different from a RWD or 4WD. Adjust your driving style to get the best results. FWD has slower acceleration, but higher cornering speeds than RWD. In addition, FWD is naturally stable on-power, which allows you to apply throttle through most of your lap. Here is some advice for the FWD driving style:

- Driving smoothly is key to good lap times. Avoid over-steer particularly: it is detrimental to corner speed;
- Upon approaching a corner, slow down by coasting and turning in or gentle braking. Too much weight transfer to the front makes the car unstable;
- When you are at 1/4 into the corner, start re-applying power and gently increase it. Use the amount of power / throttle to control your corner radius;
- A slightly wider line into the corner retains speed and a (relatively) straight exit enables harder acceleration;
- When jumping, use the throttle to adjust the car's pitch. NEVER touch the brakes as this can turn the car upside down mid-air;
- Avoid (large amounts of) wheelspin off the ramp. It can cause the car to jump with the nose down and you end up with too little throttle available to adjust the pitch.



1/10 MID MOTOR FRONT-WHEEL-DRIVE BUGGY

FORWARD

Setup Guide (1 of 3)

We have highlighted some important setup aspects for you to help you get the best performance from your car.

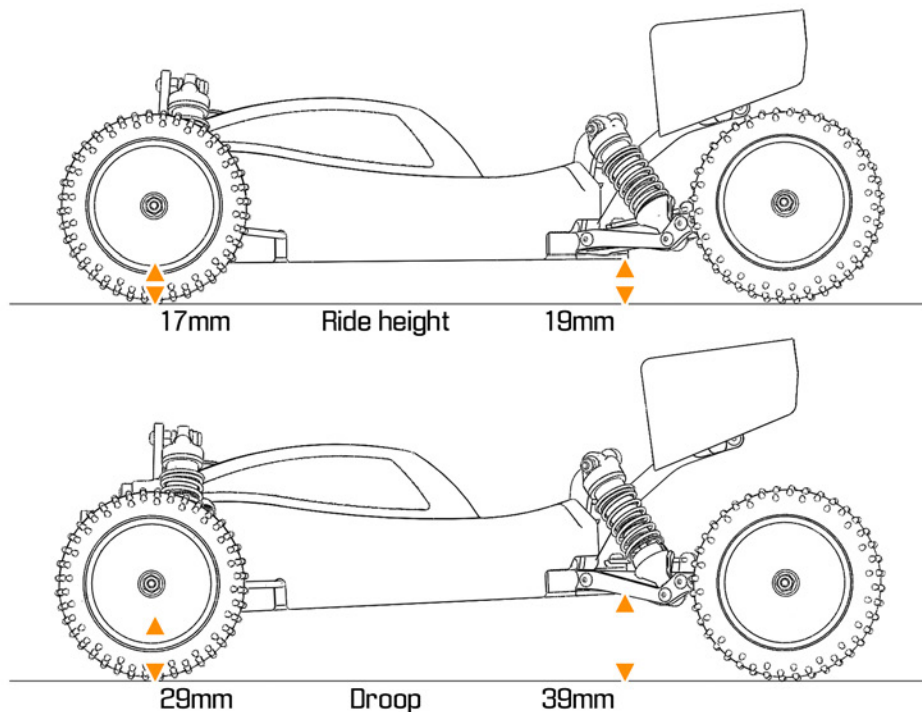
Wheels / tires

The front end uses rear / wide tires, which provides a lot of sideways grip. It is advised to fit 4WD front tires on the rear end of the same tread / type as the front end. Moulded inserts up front can reduce tire ballooning and increase stability.

Ride height & droop

Ride height is measured below the differential and at the rear tip of the chassis. Measure the car ready-to-run. The standard ride height is 17mm front, 19mm rear.

Measure droop by lifting the car until the wheels touch the ground ever so slightly. A good starting point for droop is 29mm front, 39mm rear. Adjust shock length to reach this droop setting.



Setup Guide (2 of 3)

We have highlighted some important setup aspects for you to help you get the best performance from your car.

Shocks

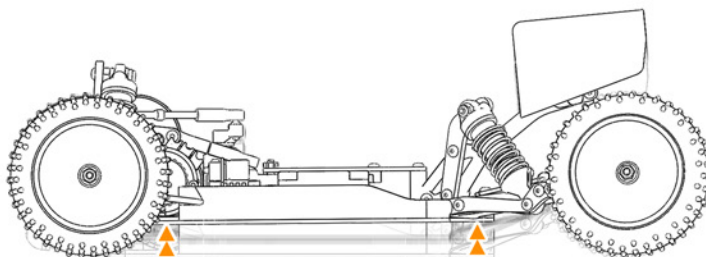
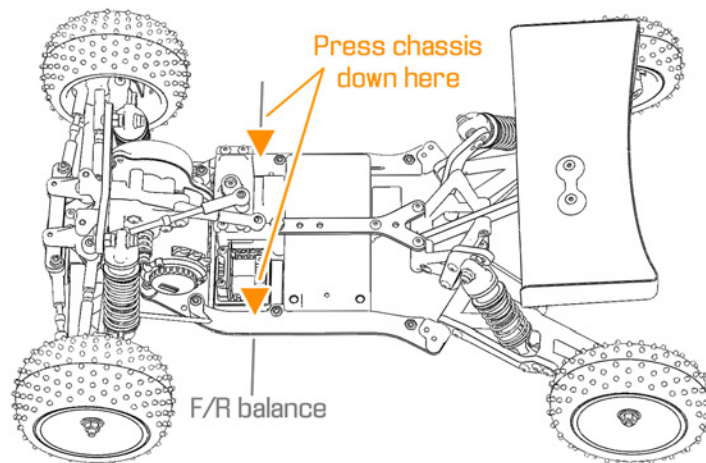
For a balanced car **it is extremely important that the front and rear of the car respond equally quick.**

To test shock response speed, push down on the sidepods near the servo and ESC (the front-to-rear centre of gravity) until the chassis hits the ground. Let go of the car and let the chassis rise up on its own. The front and rear ride height should be reached simultaneously. A slower front reduces grip and causes understeer. A slower rear causes an unstable car and unpredictable oversteer.

The following start setup for the shocks is advised:

	Front	Rear
Spring	3.90 lb/in (91332)	3.40 lb/in (91831)
Shock oil	250 cst	450 cst
Piston	3 x 1.2mm*	2 x 1.6mm (91626)

*Drill from piston blanks (not included).
The 3 x 1.2mm pistons increase pack, which reduces bottoming out when landing jumps.



Front and rear should rise back up to ride height simultaneously

Setup Guide (3 of 3)

We have highlighted some important setup aspects for you to help you get the best performance from your car.

Front and rear toe

Front toe should have a neutral to slightly toe-out setting.

[Rear toe is a very powerful tool to tune the car balance.](#)

The rear end should have just enough grip to prevent it from sliding out. If the car understeers, reduce rear toe-in. If the rear is loose, increase rear toe-in. See step 1 of the manual for rear toe adjustment.

Weight & balance

With RWD and 4WD, normally there is a trade-off between a light car (quick but easily unsettled) and a heavy car (slow but stable). [With the superior stability of FWD, it is possible to minimize the weight of the car without major stability drawbacks.](#) Using a shorty is therefore advised.

When using a shorty LiPo, it is also possible to choose three different battery positions. It is advised to run the battery in the most forward position for maximum forward drive. If grip is high, a rearward battery position may provide more stability into corners at the cost of some forward drive.

Rear hinge pin inclination

The rear hinge pins are inclined (low on the inside, high on the outside). [The inclined rear hinge pins provide extra sideways grip, but requires a rear stabilizer at all times.](#)

For very bumpy tracks, the rear end may 'fishtail' (bounce from left to right) on throttle. You can swap the outside left and right hangers around so the hinge pins sit horizontal (no hinge pin inclination) and the rear stabilizer may also be detached. At the cost of some sideways grip on the rear, the car will handle more neutrally over bumpy terrain.

Differential & slipper clutch

A ball differential is advised for the most consistent and smooth response. A slightly tighter setting than a RWD buggy is preferred.

The slipper clutch is not necessary for stability. It should be set very tight to maximize forward drive. It may even be replaced by a slipper eliminator / direct drive kit.

Notes

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

FORWARD

[illegible]

