

Build Guide - Model 8: Buggster

3D printed radio controlled
2WD scale model.

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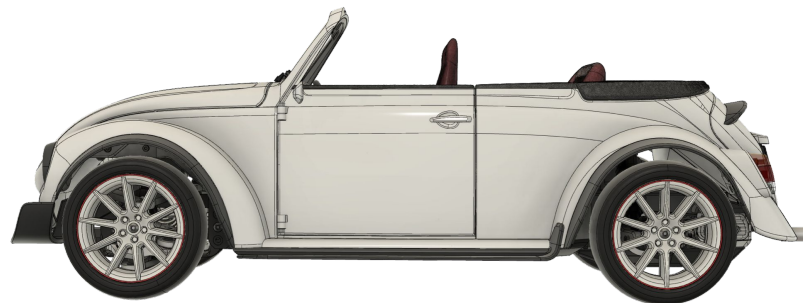


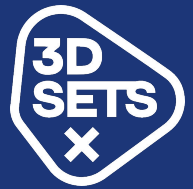
Version 1.0



Buggster – version 1.0 technical specs.

- Dimensions: 49 cm length, 24.5 cm width, 17.5 cm height
- Model weights roughly 2,65 kg (including battery)
- Permanent rear wheel drive with opened differential (locked differential alternatively)
- Remote controlled steering and speed control
- Suspension with real springs and dampers for good on-road capabilities
- Reduction BeltDrive gearbox with 1:10 gear ratio
- Doors, hood and trunk can be manually opened





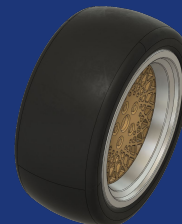
Before you start

- Get ready all tools.
- Buy necessary parts that cannot be printed (screws, bearings, motor etc.), these parts are listed on next page.
- Make sure that your **printer is calibrated** well – print our “calibration part” to ensure that you can fit bearings on shafts properly! Calibration part is located on “Print 0 - Calibration”.
- Use **higher printing temperatures** – use about 210-215°C for PLA to have firm layer adhesion!
- Use some **heat-resistant filament** (PC Blend) for specific drive train parts noted later in this Guide!
- Build guide is divided on steps and subassemblies. Subassembly is a sequence, where you will make some independent sub-part like gearbox, axles etc. Later you will install subassembly in the car.
- Model 8: Buggster includes 2 different wheel designs. Both designs shares the same tire dimension, so feel free to choose the right design for you:

- For “Wheel C”, print plates with “Wheel C” in name.



- For “Wheel D”, print plates with “Wheel D” in name.





Are you **new** to the Radio Controlled models?

Don't worry, Radio Controlled (RC) models are not as complicated as they can look! However, it's a good to know some basics before you will start buying parts.

Most mechanical parts in our products will be 3d printed on your own printer, so we will focus here on RC electronics.

On-line beginners guides:

- [Steemit.com](https://www.steemit.com) – a basic introduction to RC car models
- [Instructables.com](https://www.instructables.com) – another beginners guide, general (not focused on car models)
- [Youtube](#) – a nice video showing RC electronic basics

If you have any questions regarding our models, feel free to ask us (or other 3dsets builders) on our Facebook discussion group, available here: [Facebook – 3dsets](#)





Buggster – version 1.0: What do you need?

- **LINKS for PARTS PURCHASE!** ➔ list of required non-printed parts is here (continuously updated): [click for non-printed parts spreadsheet](#)
- Print Filament: To print this model you will need around 3000 g of print filament in total. We print our models from PLA material. If you will use a 540DC motor, you should use **ASA/Prusament PC Blend filament for Motor Pulley, Motor Frame**, as it has better temperature resistance. **For the differential gears its recommended to use Prusament PC Blend.** You can use variable color for chassis and body. Tested and recommended filament: [Fillamentum PLA Extrafill](#) or [Prusament PLA](#).
- The recommended drive is a brushless motor (with \varnothing 35 mm diameter and 29 mm maximum(!) length). Alternatively you can use 540 DC motor (min. 55T), however it is much slower (e.g. better for kids), but requires frequent cool downs – the 540 motor is not suitable for permanent extreme load. The Brushless motors are way more powerful and efficient, and can withstand longer continuous driving. **For 540DC motor you will also need to buy a metal pinion gear “14T with 0.6 Module”** (you don’t need this gear for the Brushless motor!).
- **Timing belts** for belted gearbox (1/10 ratio):
 - **60XL 0.25 – 2 pcs**; standard toothed belt 6,35 mm wide, 30 teeth
 - **80XL 0.25 – 2 pcs**; standard toothed belt 6,35 mm wide, 40 teeth
- Passive heatsink – only for 540DC motor – buy small one, with short ribs
- Steering servo in standard size (39x19,5x38,5mm) & **Servo extension cable (~20 cm long)**
- Speed controller (ESC) max size 40x30x25mm
- Ball Bearing 10x15x4 mm - 6700ZZ: 20 pcs. (- 4 pcs. with no-differential)
- Shock - Coil springs for road RC models, length 50-65mm with short travel: 4 pcs.
- Tires – you can use these tyres sizes on Model 8: Buggster (**Please follow these dimensions**, otherwise the tyres could collide with fenders):
 - Front Wheels – **outer diameter 85-90 mm, maximum width 31 mm**, rim diameter 2.2 inches
 - Rear Wheels – **outer diameter 85-90 mm, maximum width 46 mm**, rim diameter 2.2 inches
- 7.2V (2S) Battery with dimensions max 138x48x26mm
- Electric connectors: 2 pairs (battery connectors, motor <-> ESC connectors)
- Twin cable & soldering equipment
- Clear Binding Covers, or any transparent foil up to 0,5 mm thick – material for “Glass”.
- Grease and Thread Locker for securing fasteners on moving parts

Buggster – version 1.0: Required hardware

Screws and nuts (in metric size):

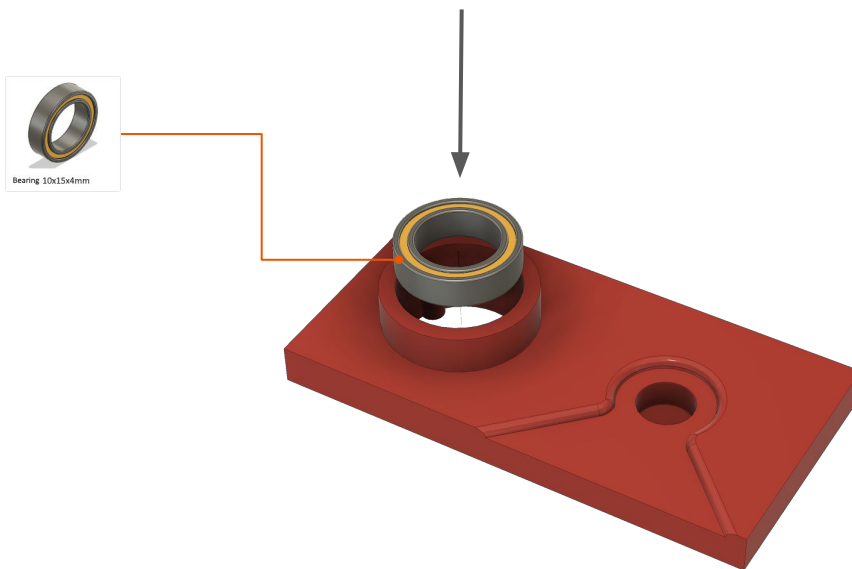
- M2x6: 65 or 45 pcs.
- M2x8: 67 pcs.
- M2x10: 36 pcs.
- M2x12: 16 pcs.
- M2x16: 6 pcs.
- M3x6: 8 pcs.
- M3x8: 23 pcs.
- M3x10: 20 pcs.
- M3x12: 27 pcs
- M3x14: 9 pcs.
- M3x16: 22 pcs.
- M3x20: 4 pcs.
- M3 nuts: 30 pcs.
- M3 locknuts: 4 pcs.
- M3x8 **Socket(!)** Head : 3 pcs.



with wheels C - 65 pcs., with wheels D - 45 pcs.

Check 3d printer calibration!

Please at first test whether the bearing can be inserted into the calibration part. If you have problems or the bearing fits too loose, please make sure that the printer is properly calibrated. Dimensions of the printed parts should match dimensions of the 3d model.



Buggster – Bodywork

In this procedure you will assemble the front bodywork of the car and Interior.

Required print plates:

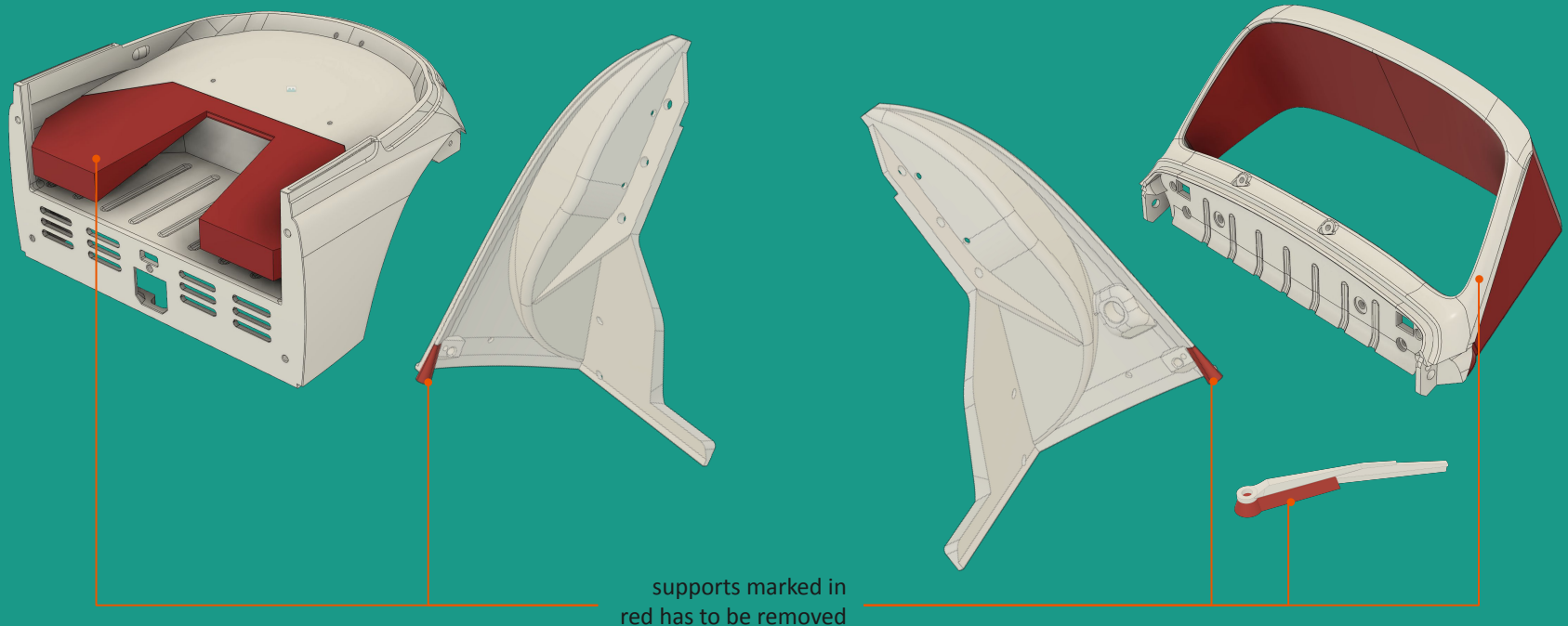
- “Print 0 - Calibration”
- “Print 1 - Body 1 - Body Front”
- “Print 2 - Body 2 - Body Rear”
- “Print 3 - Hinges + Accessories”
- “Print 4 - Interior - 1”
- “Print 5 - Interior - 2 - Dashboard Speed Dial”
- “Print 6 - Interior - 3”
- “Print 7 - Floor - 1”
- “Print 8 - Floor - 2”
- “Print 9 - Floor - 3”
- “Print 10 - Lights - 1 + Fuel Tank”
- “Print 11 - Lights - 2 + Wiper + Exhaust”
- “Print 12 - Windows - 1”
- “Print 13 - Windows - 2”
- “Print 14 - Body - 3”
- “Print 15 - Body - 4”

Non-printed parts:

- Screw M2x6: 4 pcs.
- Screw M2x8: 6 pcs.
- Screw M2x10: 2 pcs.
- Screw M2x12: 4 pcs.
- Screw M2x16: 1 pcs.
- Screw M3x6: 1 pcs.
- Screw M3x8 socket head: 2 pcs.
- Screw M3x10: 10 pcs.
- Screw M3x12: 2 pcs.
- Screw M3x14: 2 pcs.
- Screw M3x14: 2 pcs.
- Screw M3x20: 3 pcs.
- Nuts M3: 7 pcs.

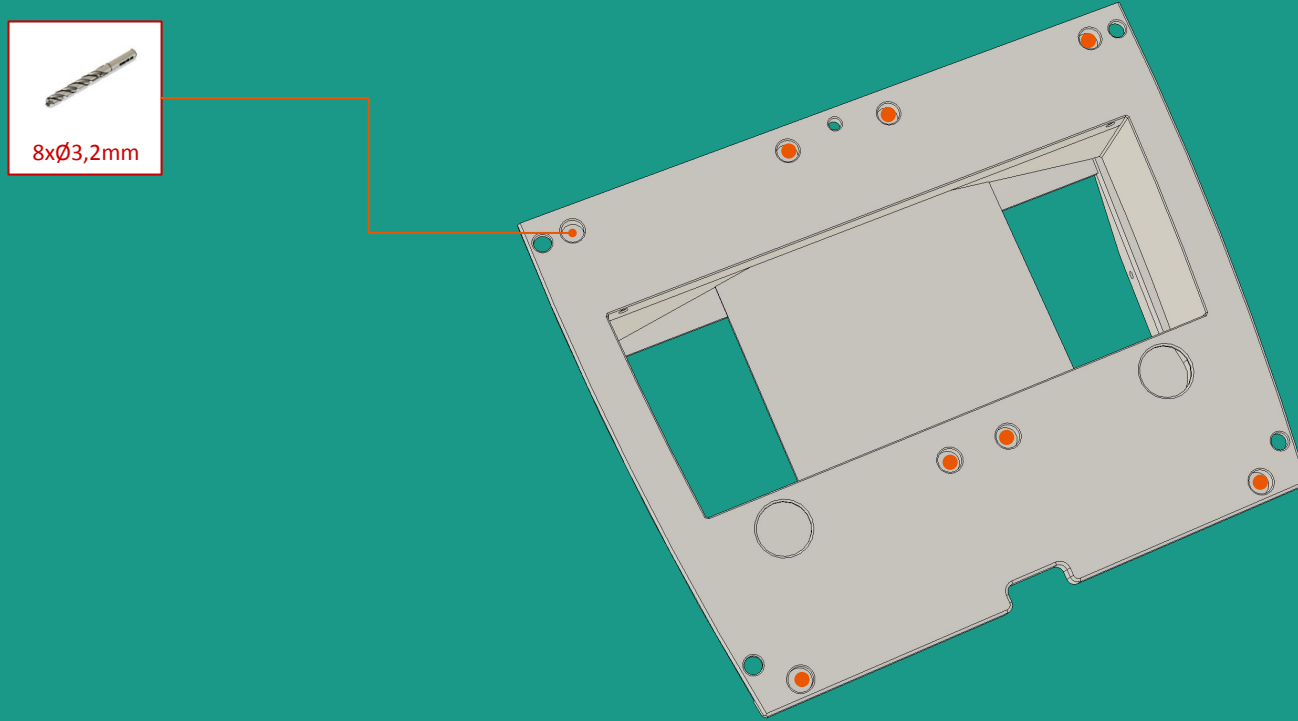
Postprocessing – removing supports

Before you start building, carefully remove printing supports (marked red) integrated to specific parts rendered below. You can use pliers and sharp knife to make the procedure easier. Be very careful as you can harm yourself!



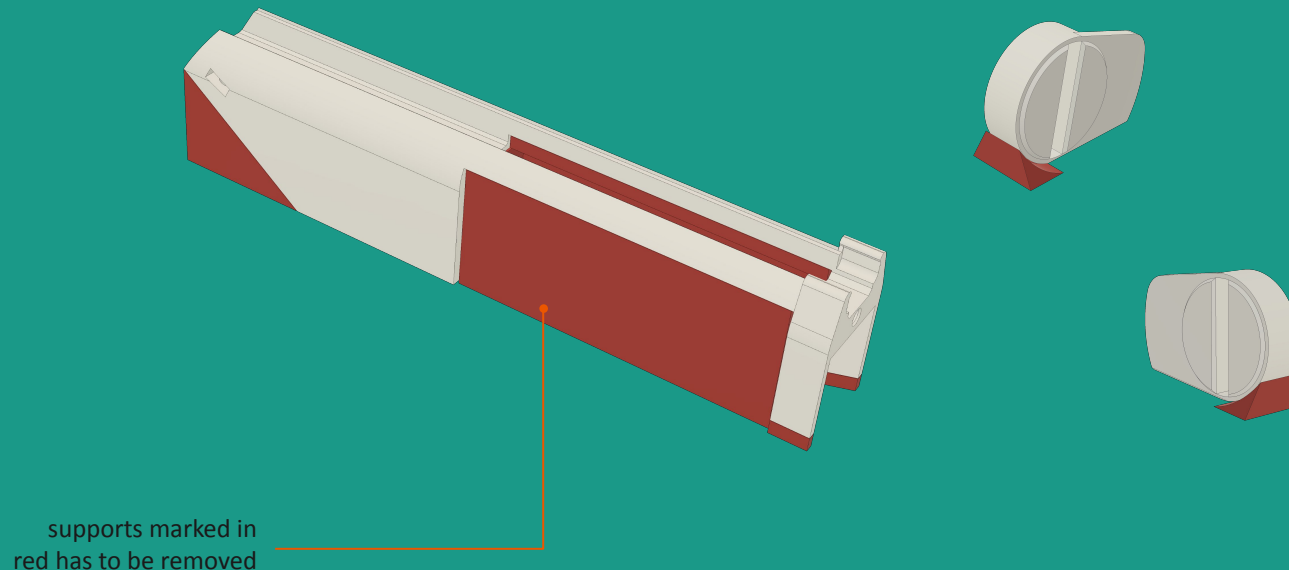
Postprocessing – drilling holes

Please carefully drill through the marked holes that have not been printed through to make printing easier.



Postprocessing – removing supports

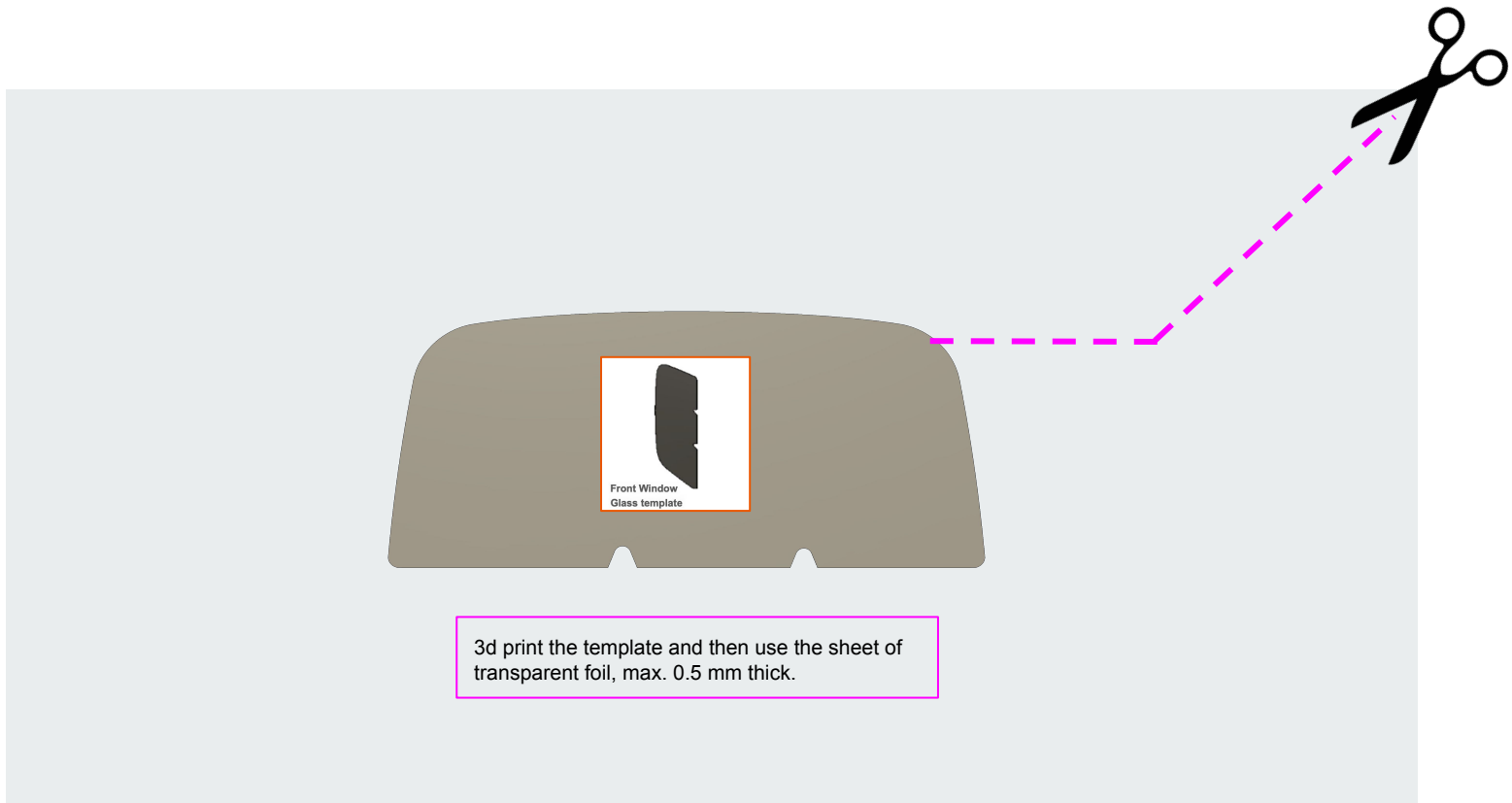
Before you start building, carefully remove printing supports (marked red) integrated to specific parts rendered below. You can use pliers and sharp knife to make the procedure easier. Be very careful as you can harm yourself!



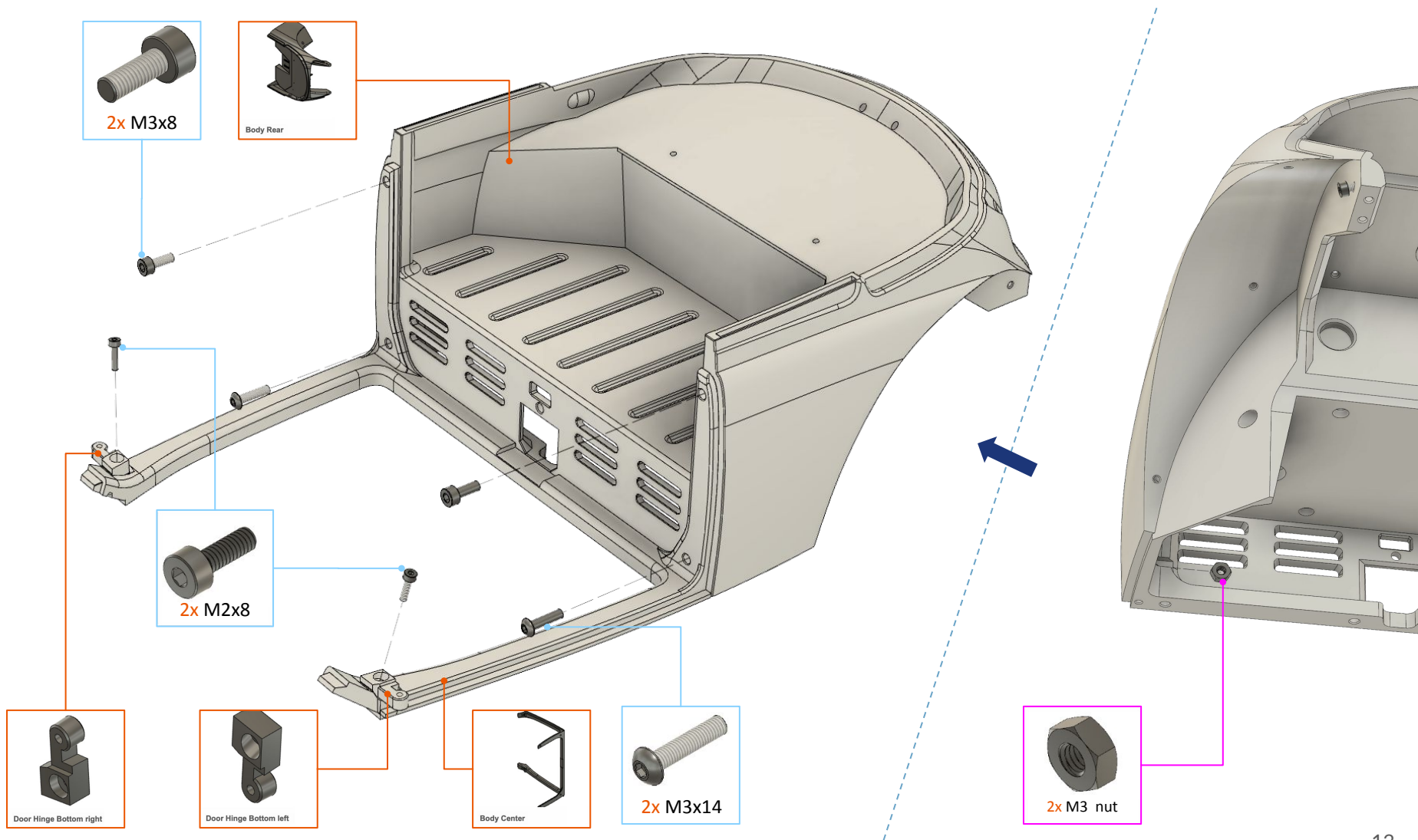
Glass

At first, you will make a “glass” from any transparent foil up to 0.5 mm thick. Thicker material is more durable than thinner, but we found that “Clear Binding Covers” are OK.

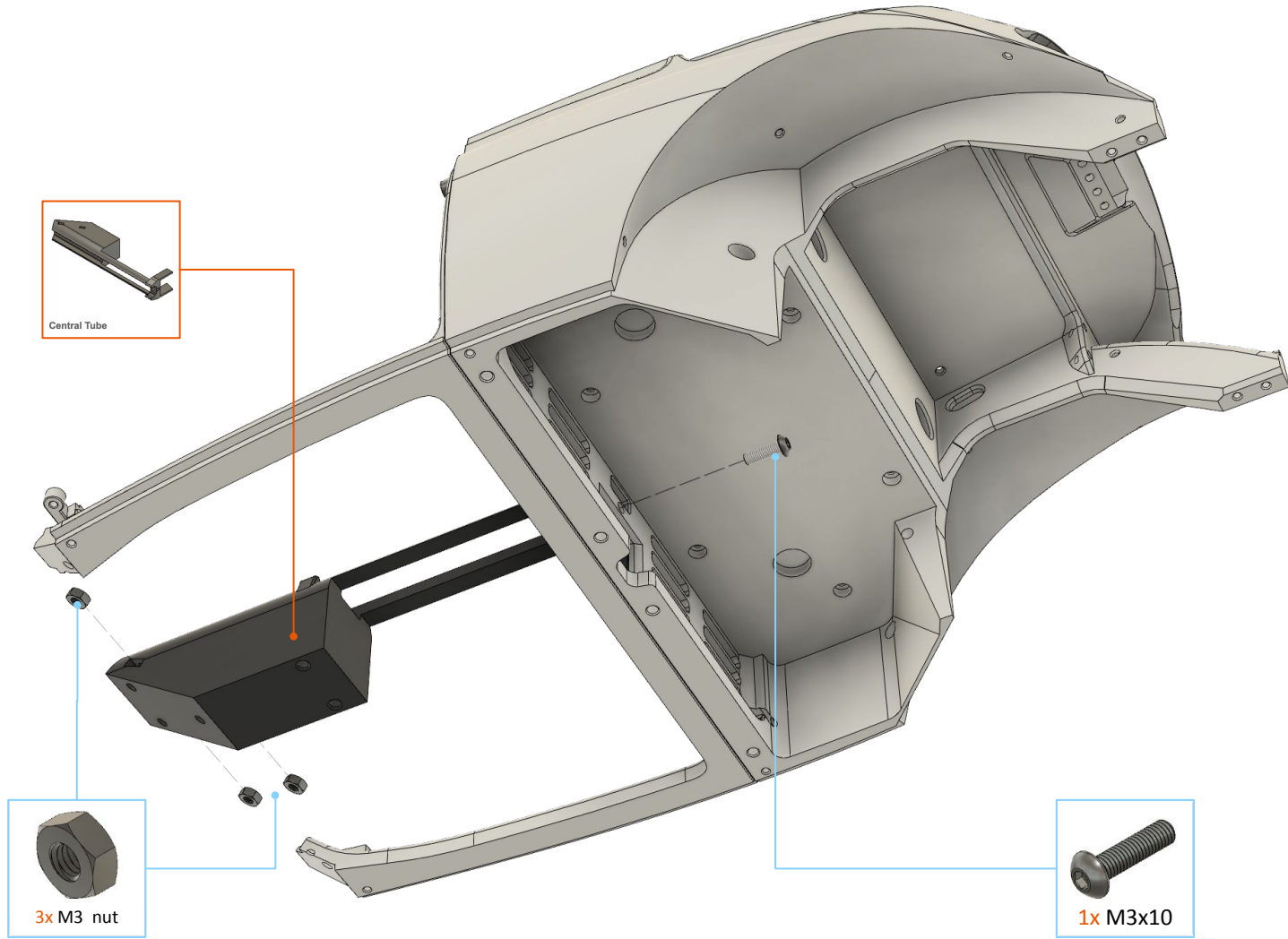
Place the printed template on the foil, sketch the shape to foil and then cut the foil by scissors or sharp knife.



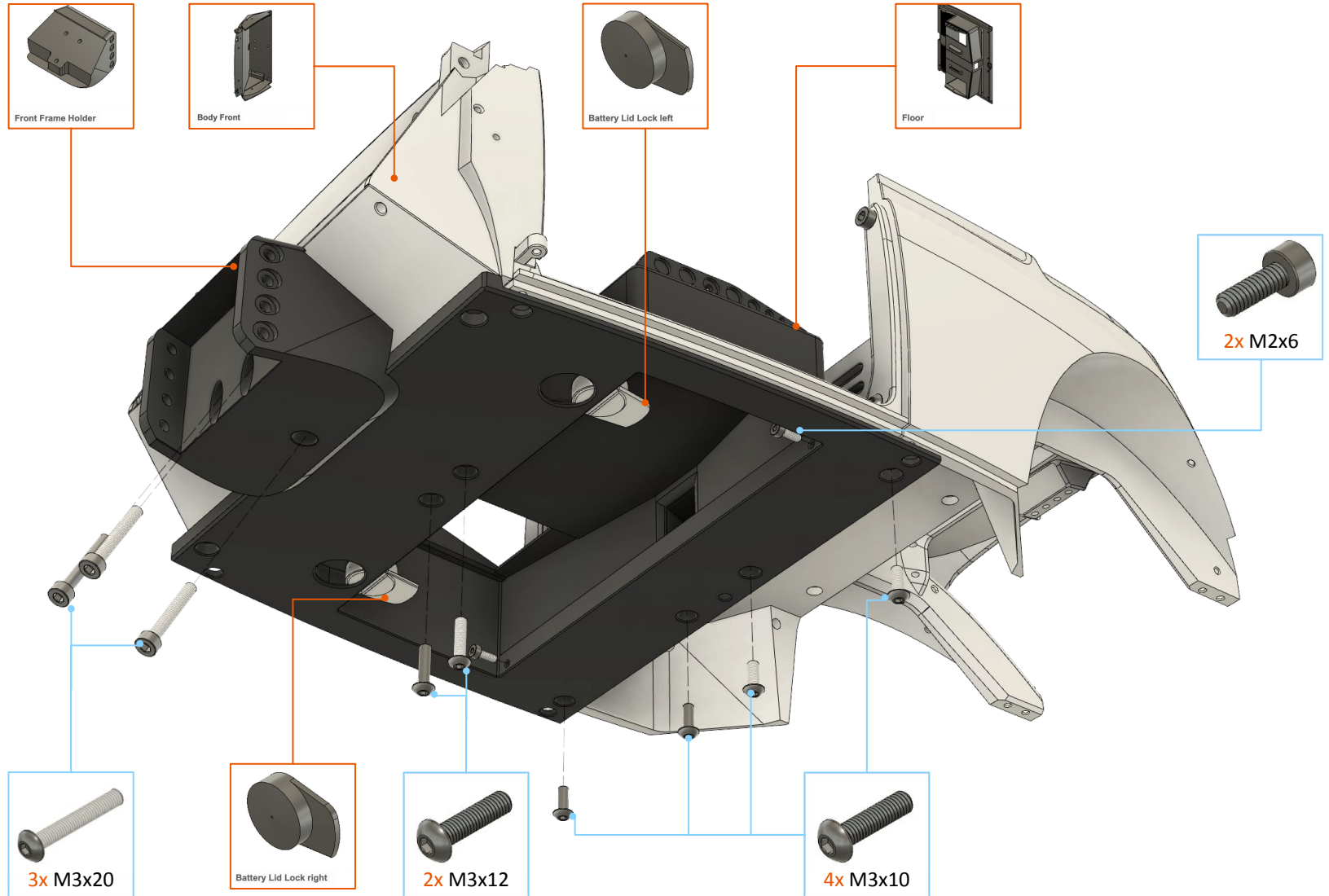
Rear Bodywork



Central Tube

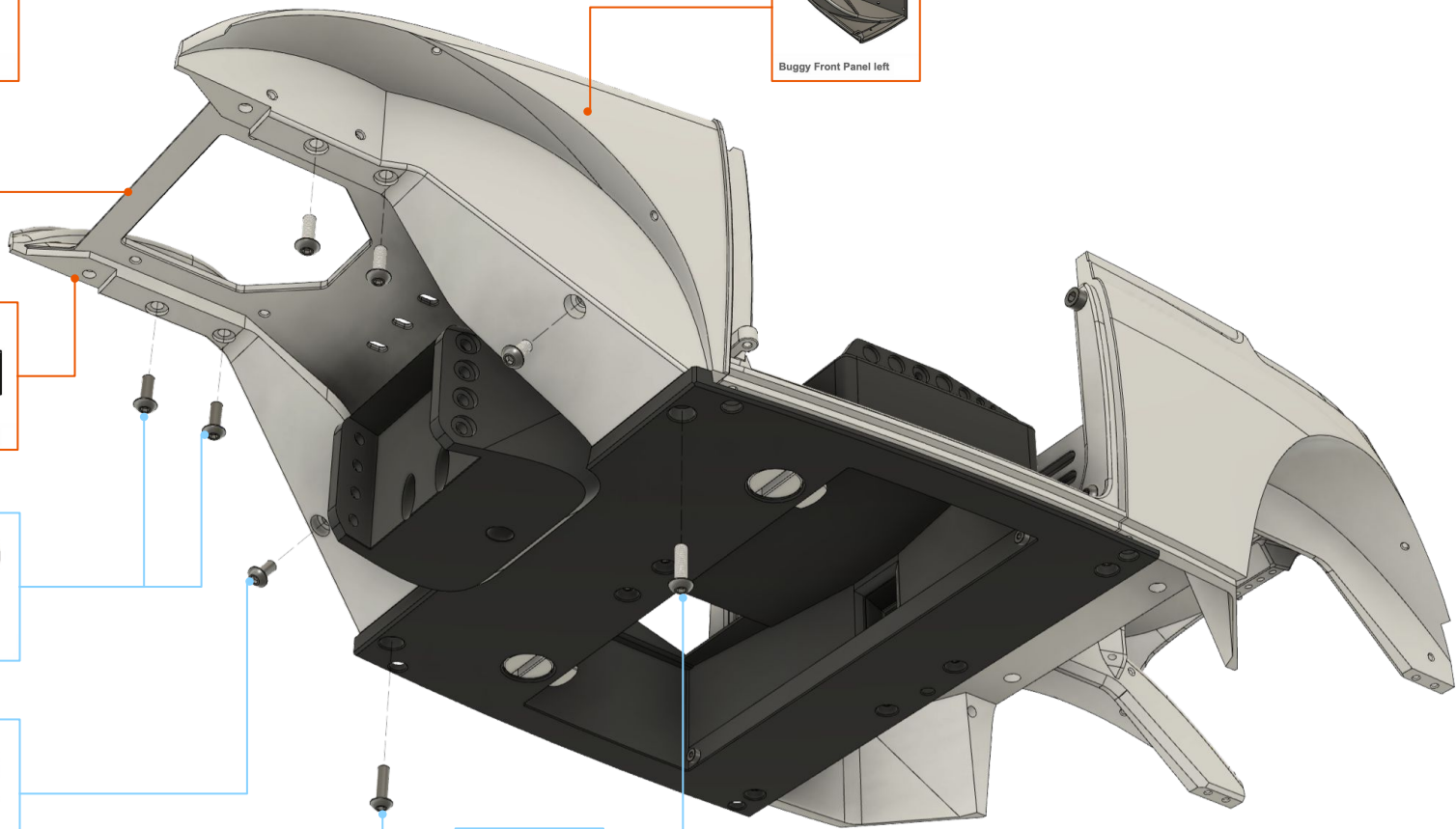


Floor

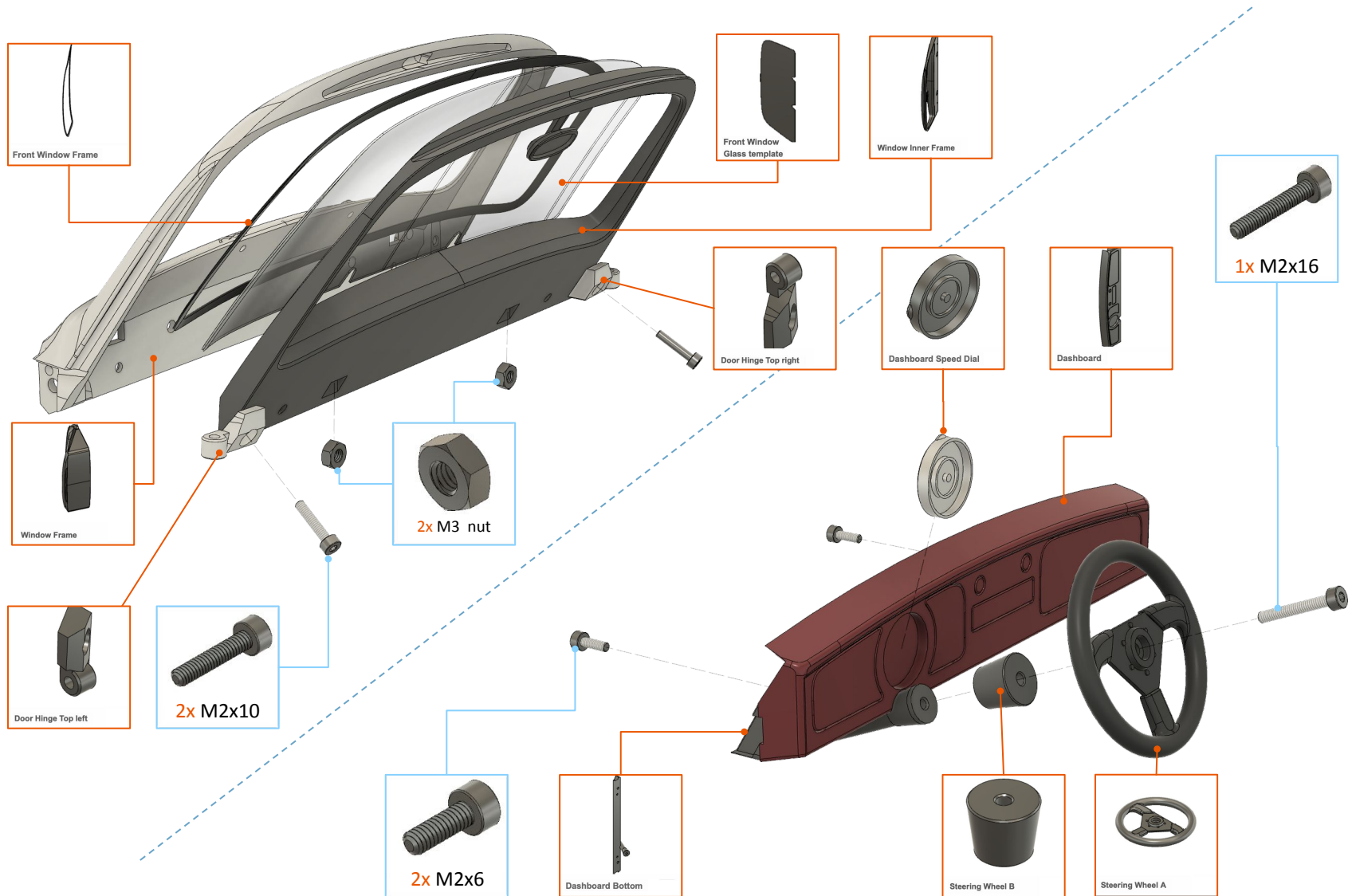




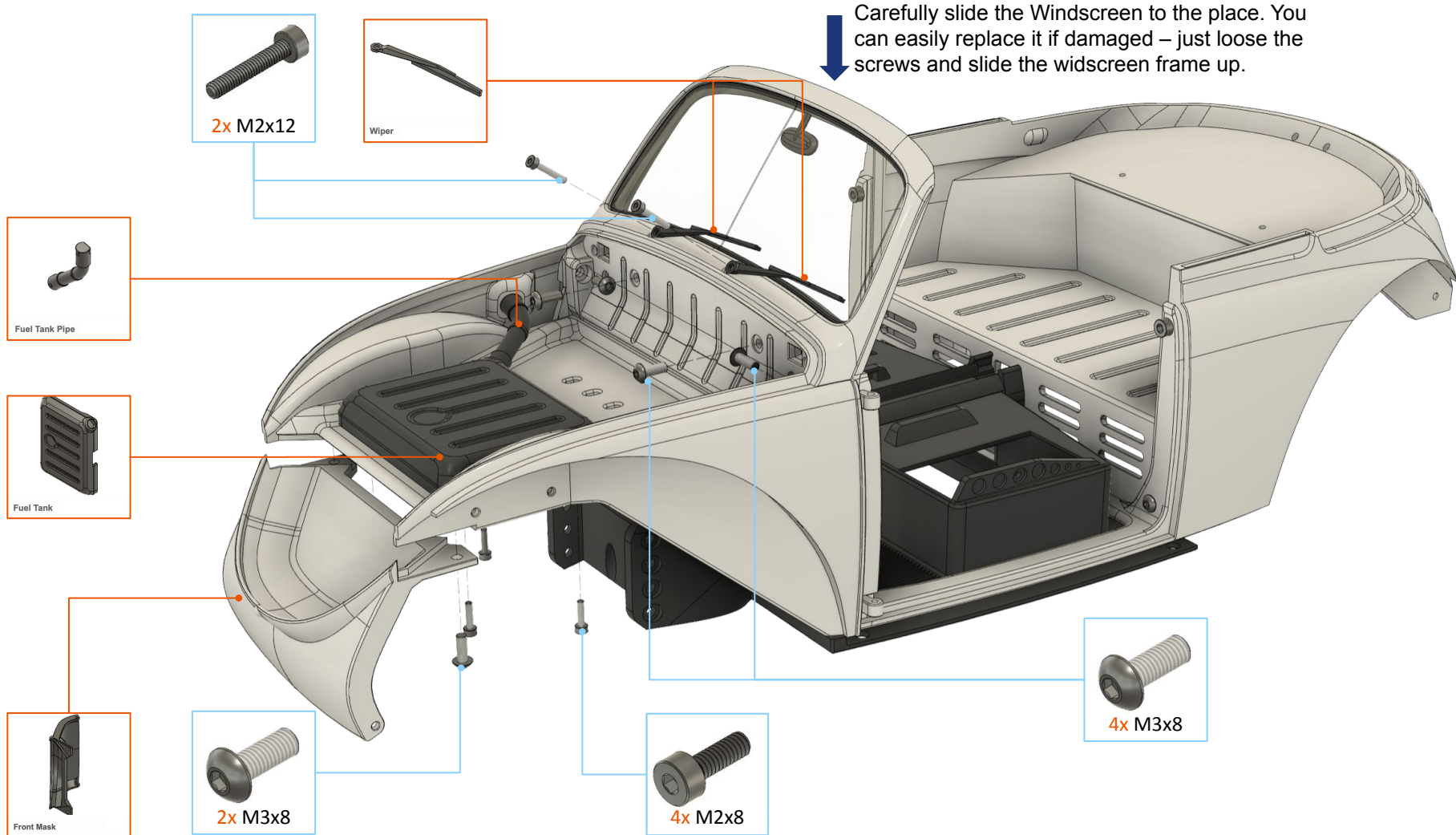
Trunk



Windscreen & Dashboard

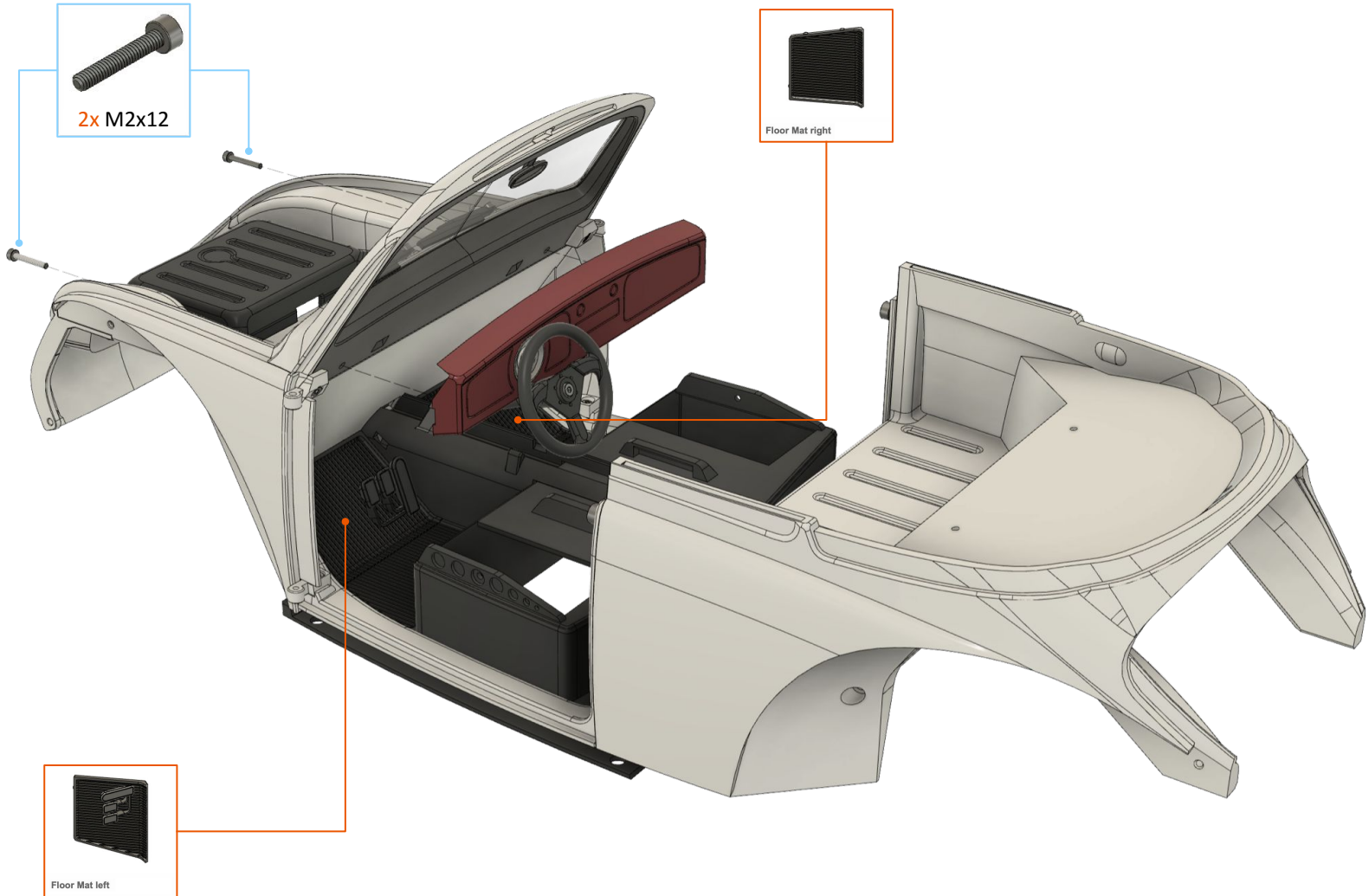


Windscreen installation





Dashboard installation



Buggster – Rear End, Hoods & Rear Seats

In this procedure you will assemble the Rear End, Hoods and Rear Seats.

Required print plates:

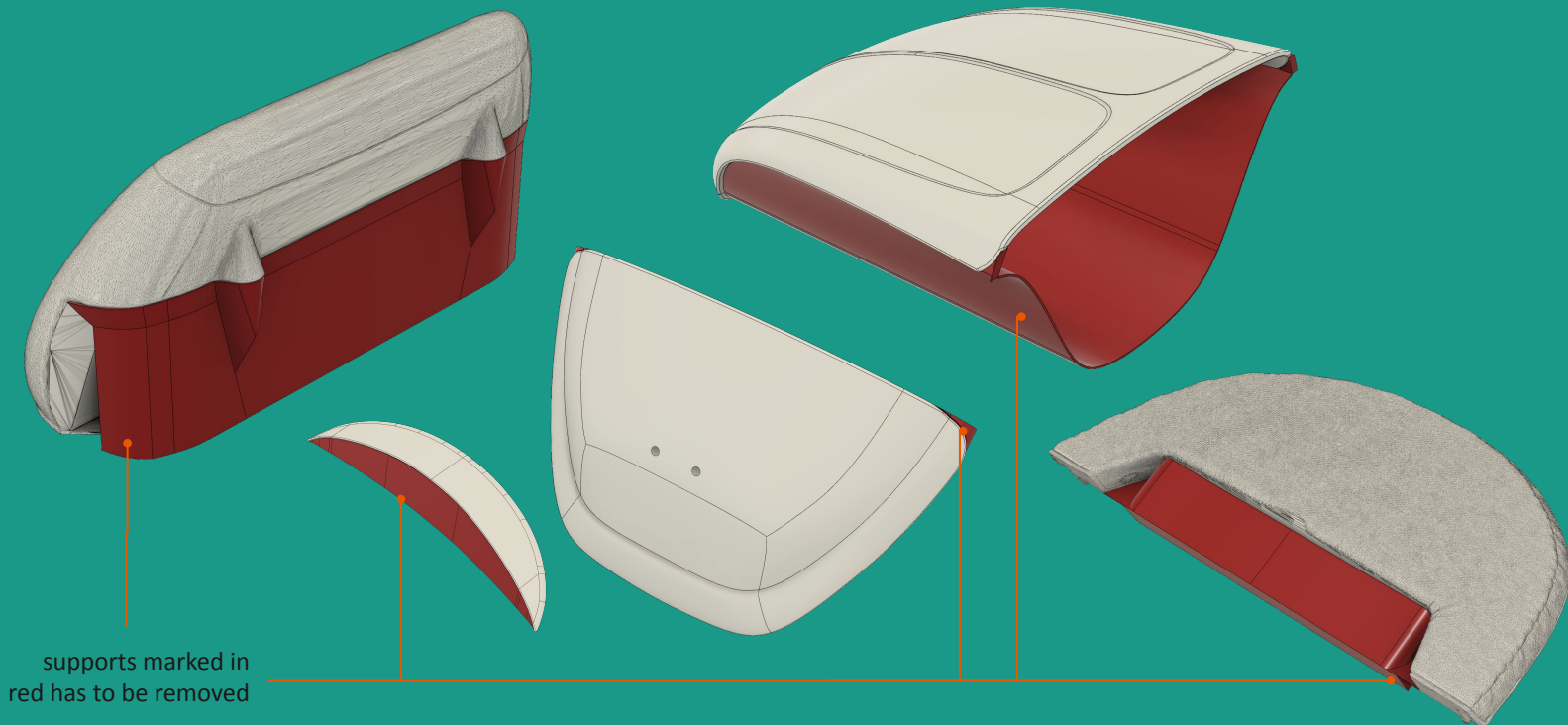
- “Print 3 - Hinges + Accessories”
- “Print 16 - Body 5 - Hoods + Rear Wing”
- “Print 17 - Folder Roof”
- “Print 18 - Licence Plate”
- “Print 19 - Interior - 4 - Seats”

Non-printed parts:

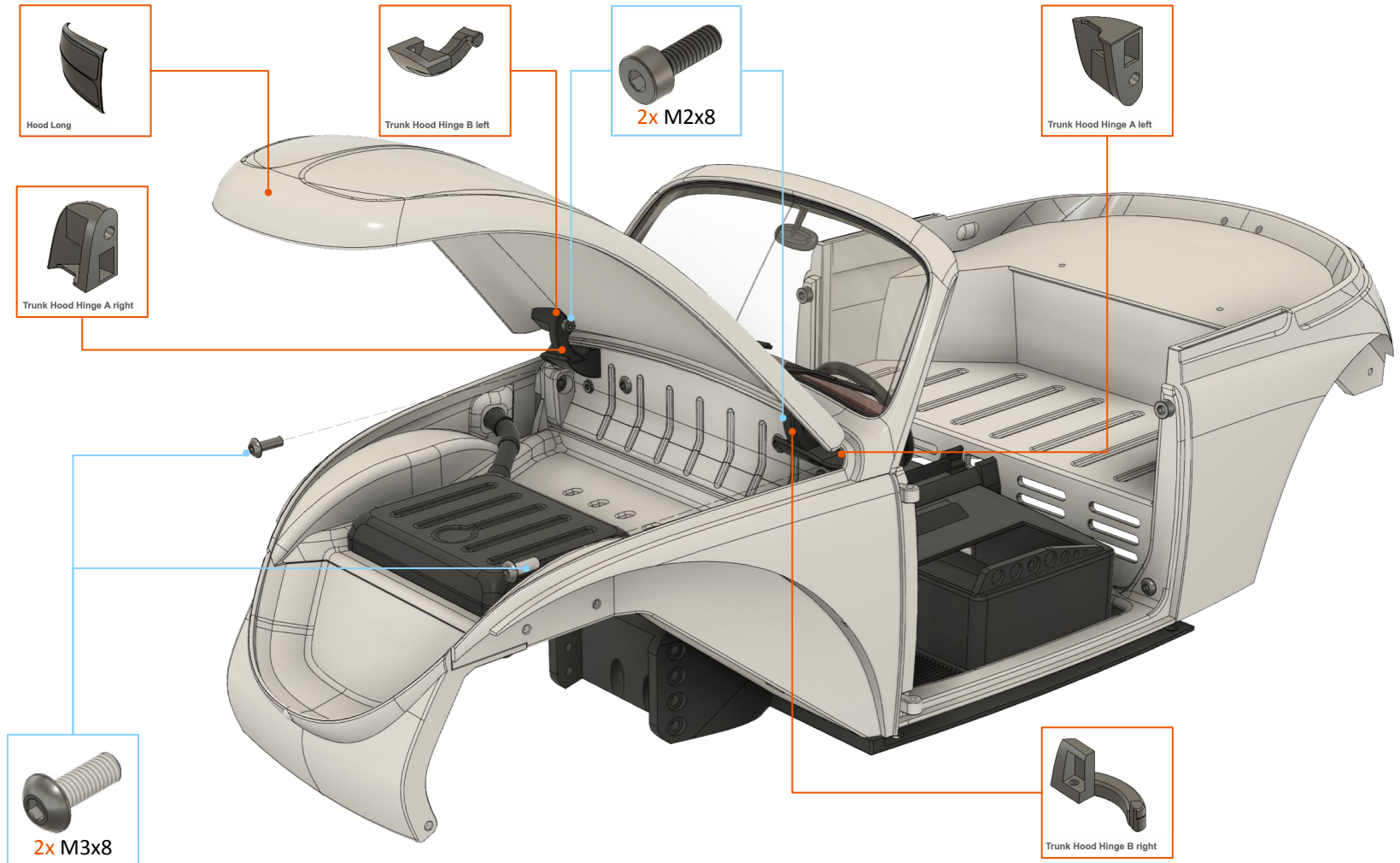
- Screw M2x6: 10 pcs.
- Screw M2x8: 9 pcs.
- Screw M2x12: 8 pcs.
- Screw M3x8 Socket Head: 1 pcs.
- Screw M3x8: 2 pcs.

Postprocessing – removing supports & drilling holes

Before you start building, carefully remove printing supports (marked red) integrated to specific parts rendered below. You can use pliers and sharp knife to make the procedure easier. Be very careful as you can harm yourself!



Trunk Hood installation



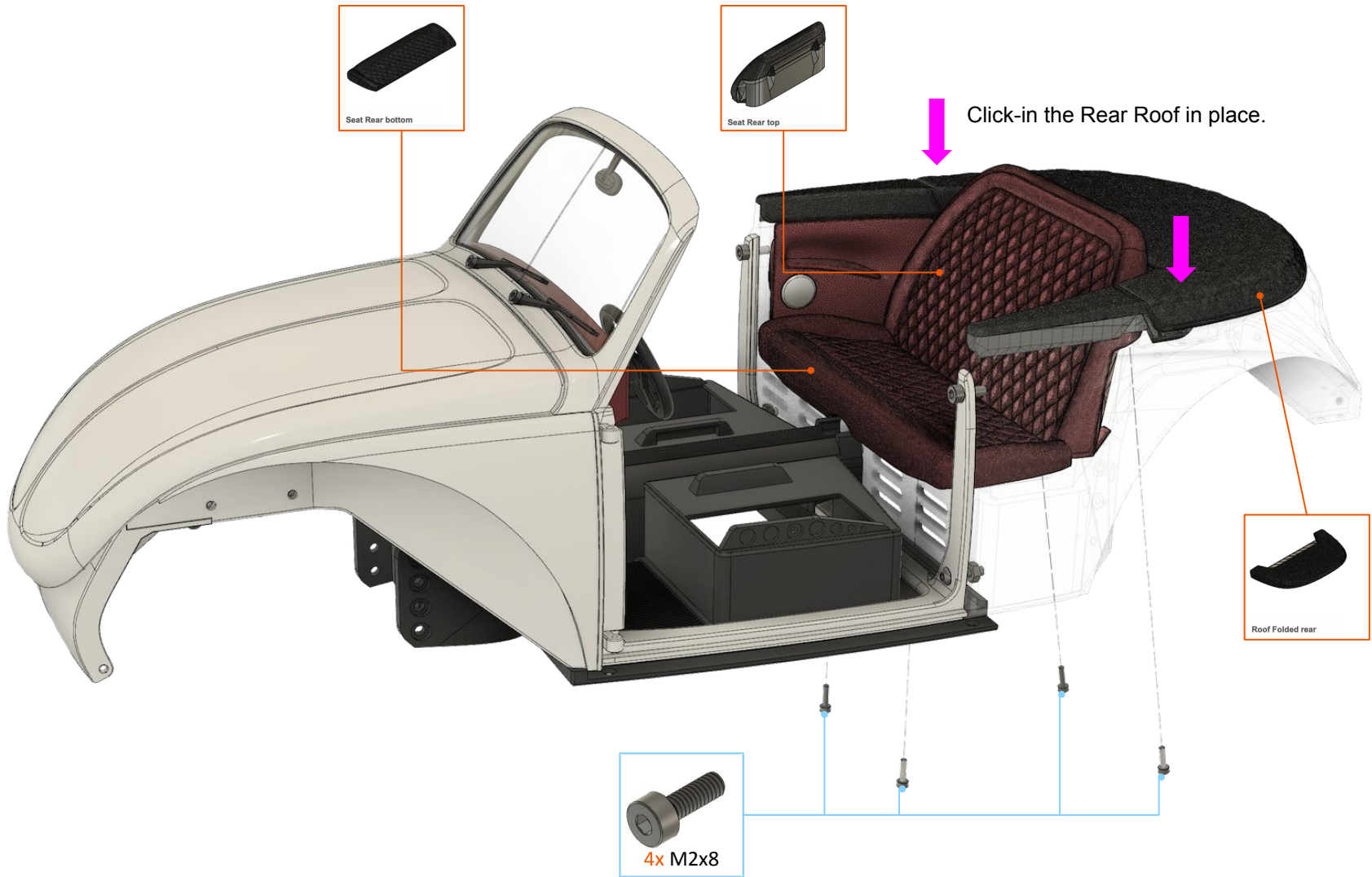


Folded Roof & Rear Seats 1/2

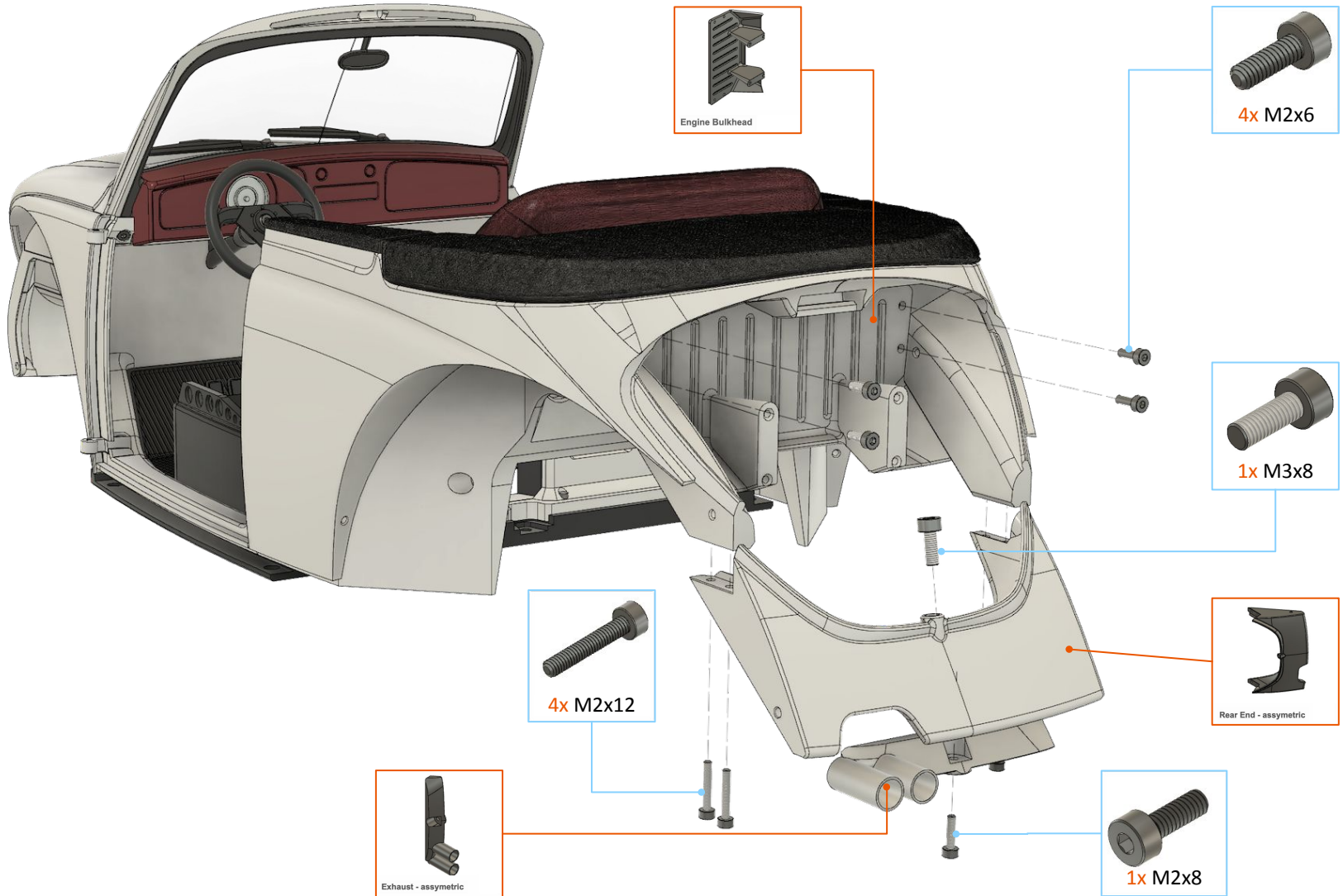




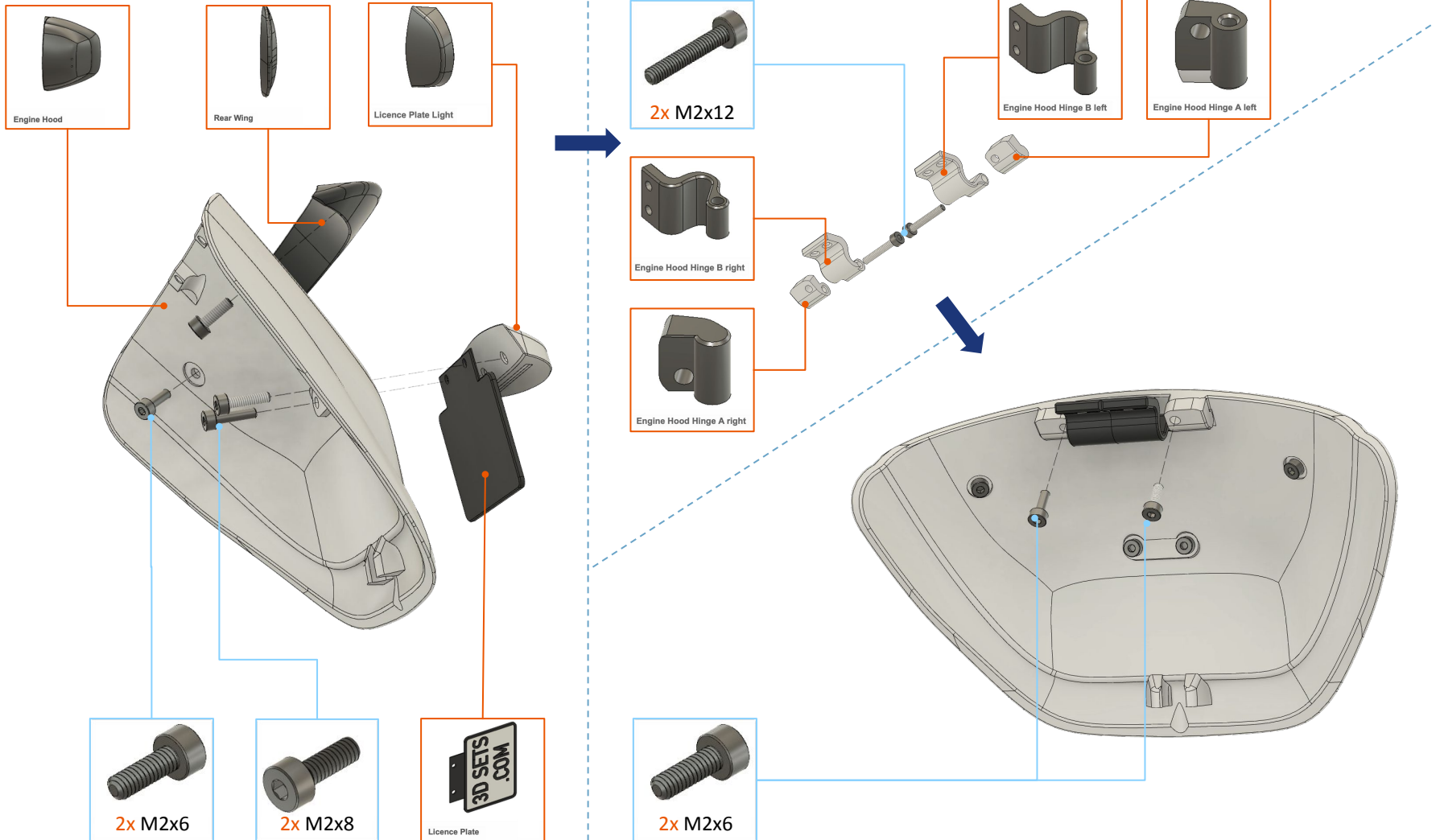
Folded Roof & Rear Seats 2/2



Engine Bulkhead & Rear End



Engine Hood





Engine Hood installation



2x M2x6



2x M2x12

M2x12 screws goes through the Rear Bodywork into the holes in the Folded Roof.

Subassembly – Doors

In this procedure you will assemble doors. To complete this task, get ready all necessary parts:

Required print plates:

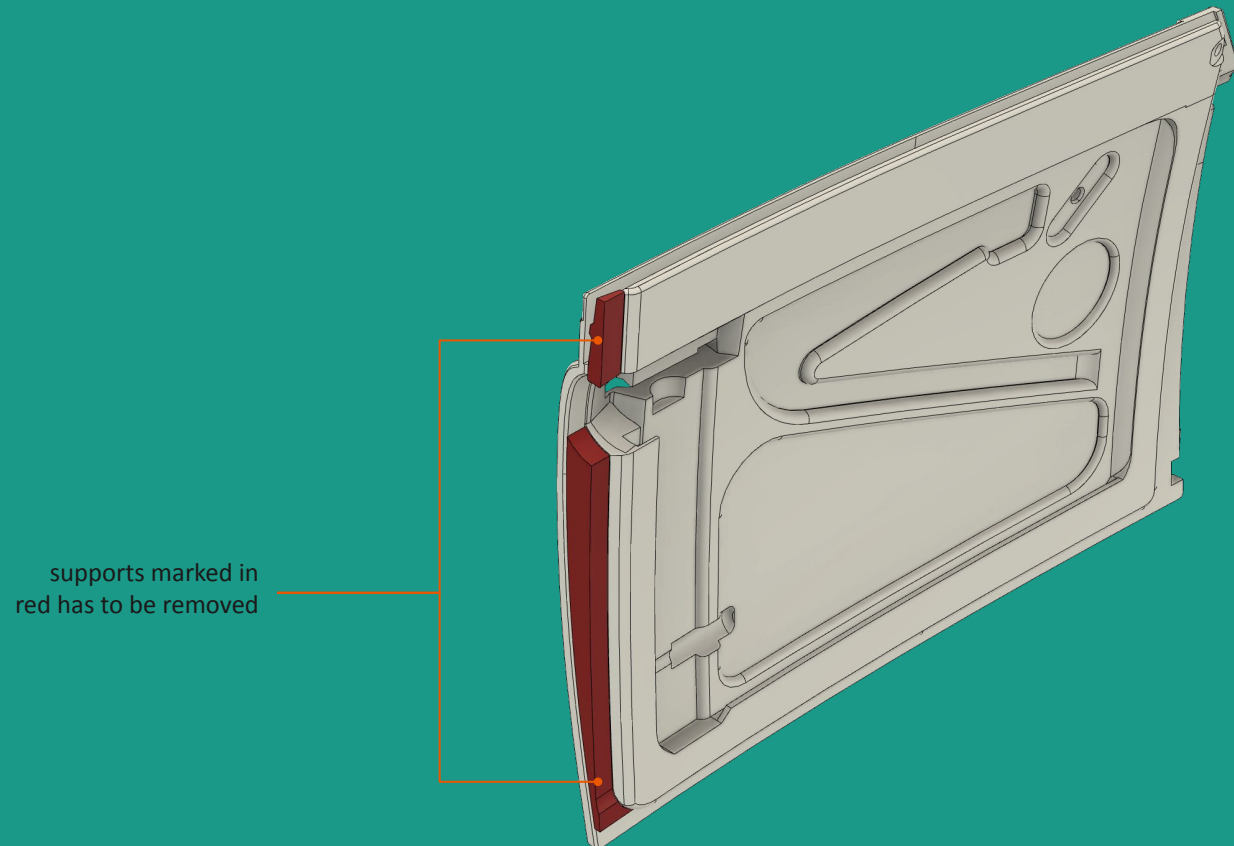
- “Print 3 - Hinges + Accessories”
- “Print 21 - Door”
- “Print 22 - Door Side Panel”

Non-printed parts:

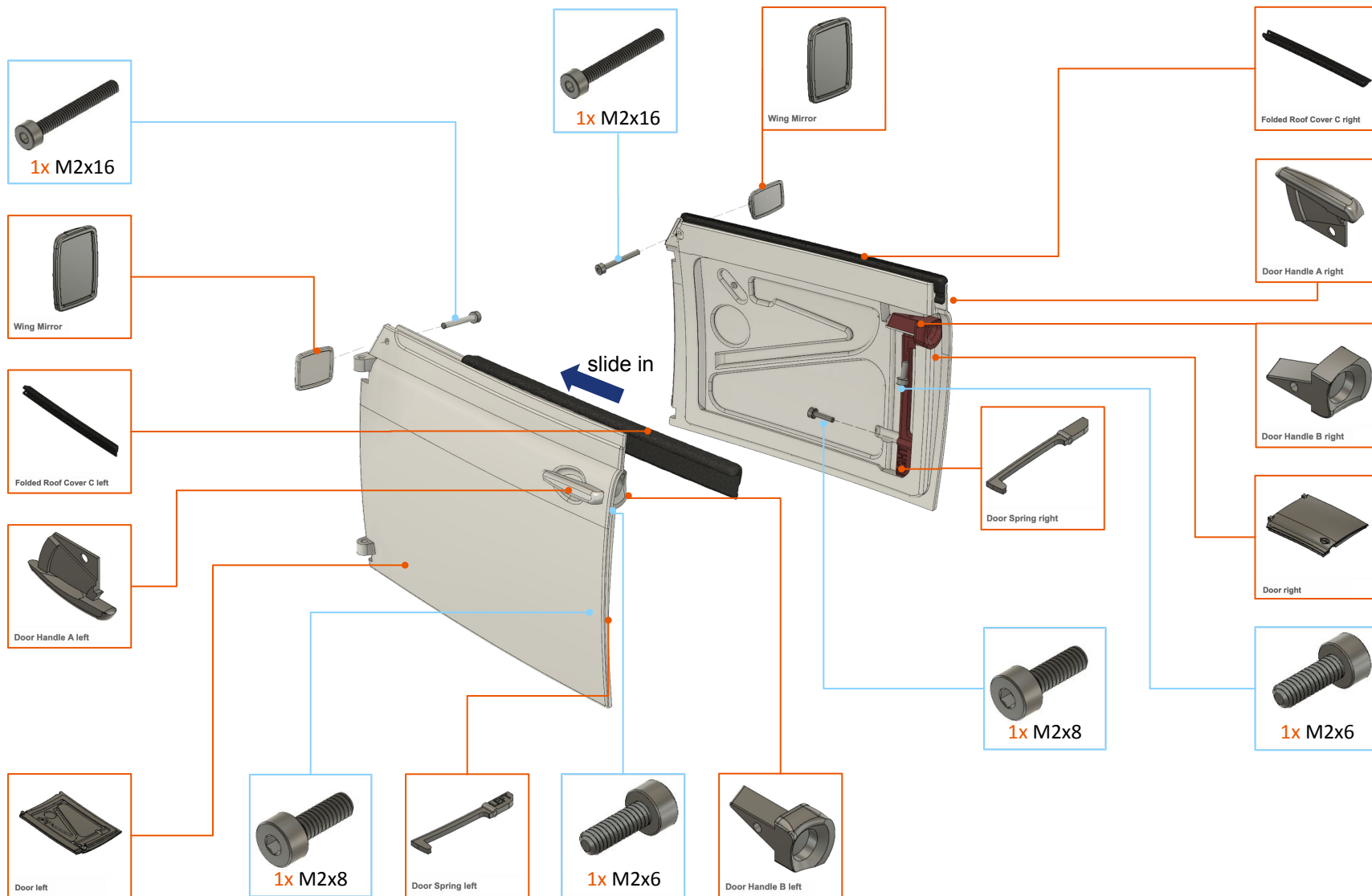
- Screw M2x6: 2 pcs.
- Screw M2x8: 10 pcs.
- Screw M2x10: 2 pcs.
- Screw M2x16: 2 pcs.

Postprocessing – removing supports

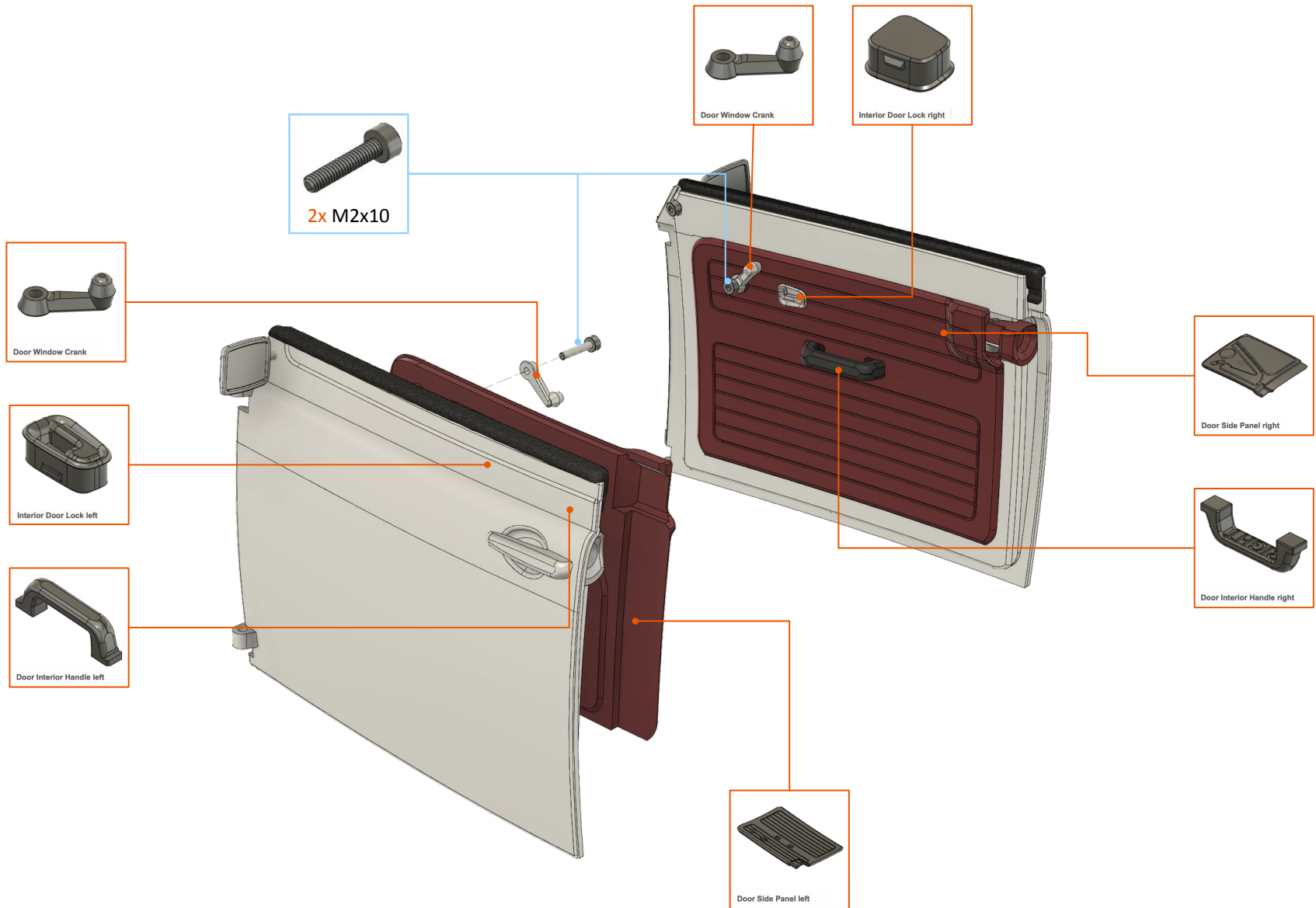
Before you start building Doors subassembly, carefully remove printing supports (marked red) integrated to specific parts rendered below. You can use pliers and sharp knife to make the procedure easier. Be very careful as you can harm yourself!



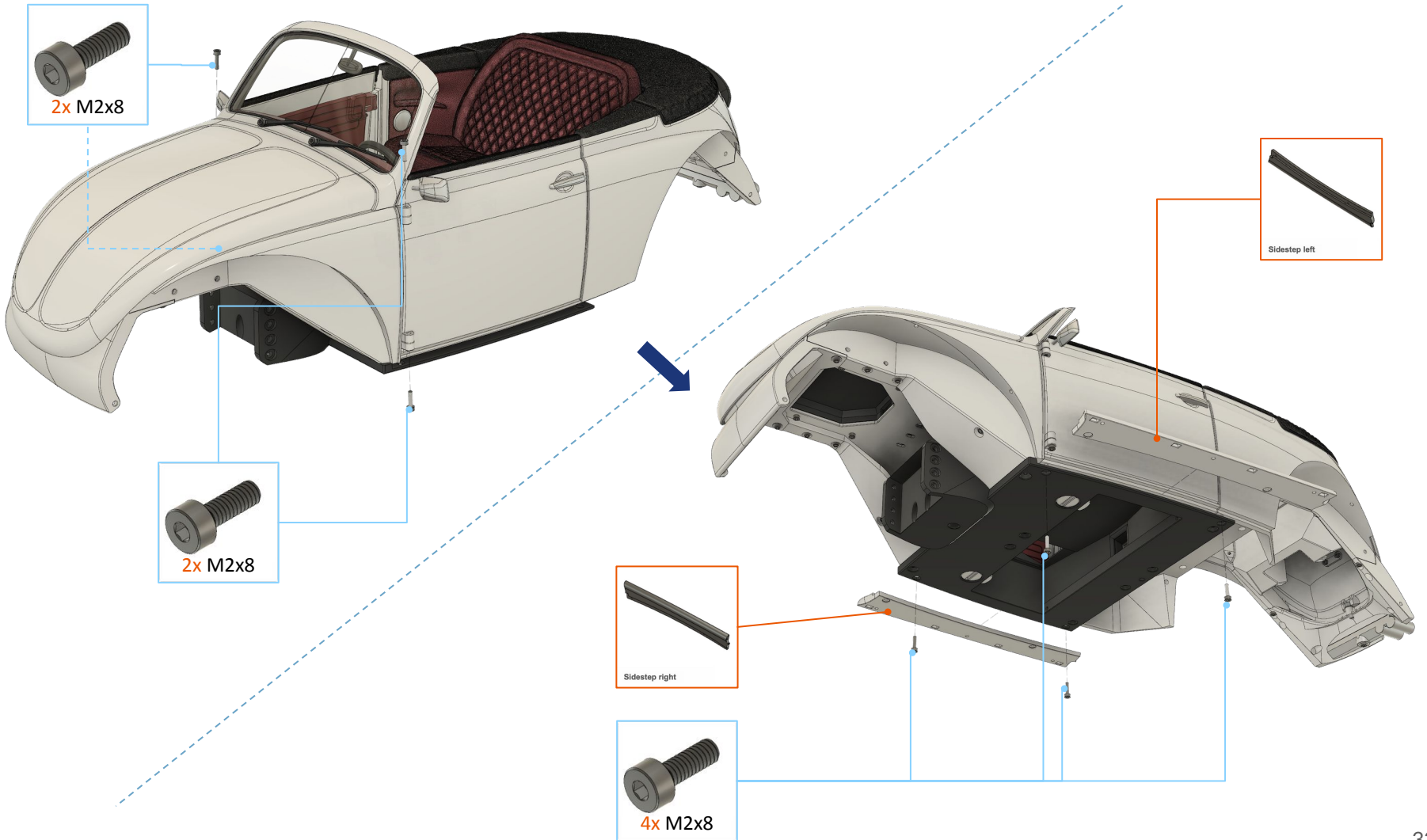
Doors



Doors Interior Panels



Doors installation



Fenders, Lights and Fender Flares

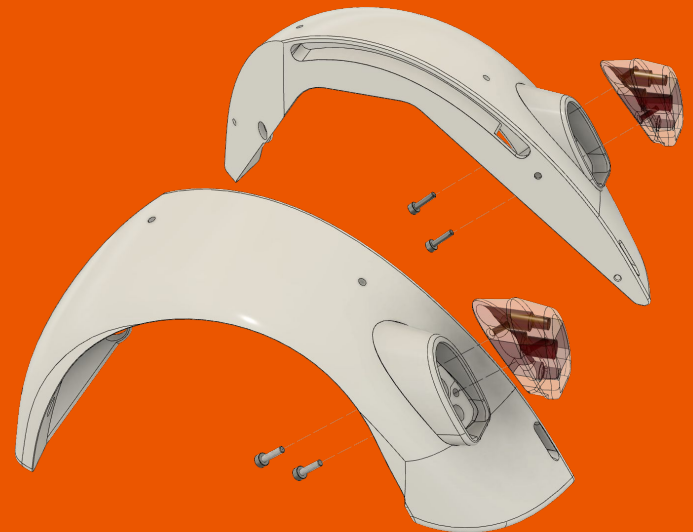
In this procedure you will assemble the fenders and lights. To complete this task, get ready all necessary parts:

Required print plates:

- “Print 22 - Lights - 3 - Tail Light”
- “Print 23 - Front Fender”
- “Print 24 - Rear Fender”
- “Print 25 - Fender Flare”
- “Print 26 - Sidestep Deflector”

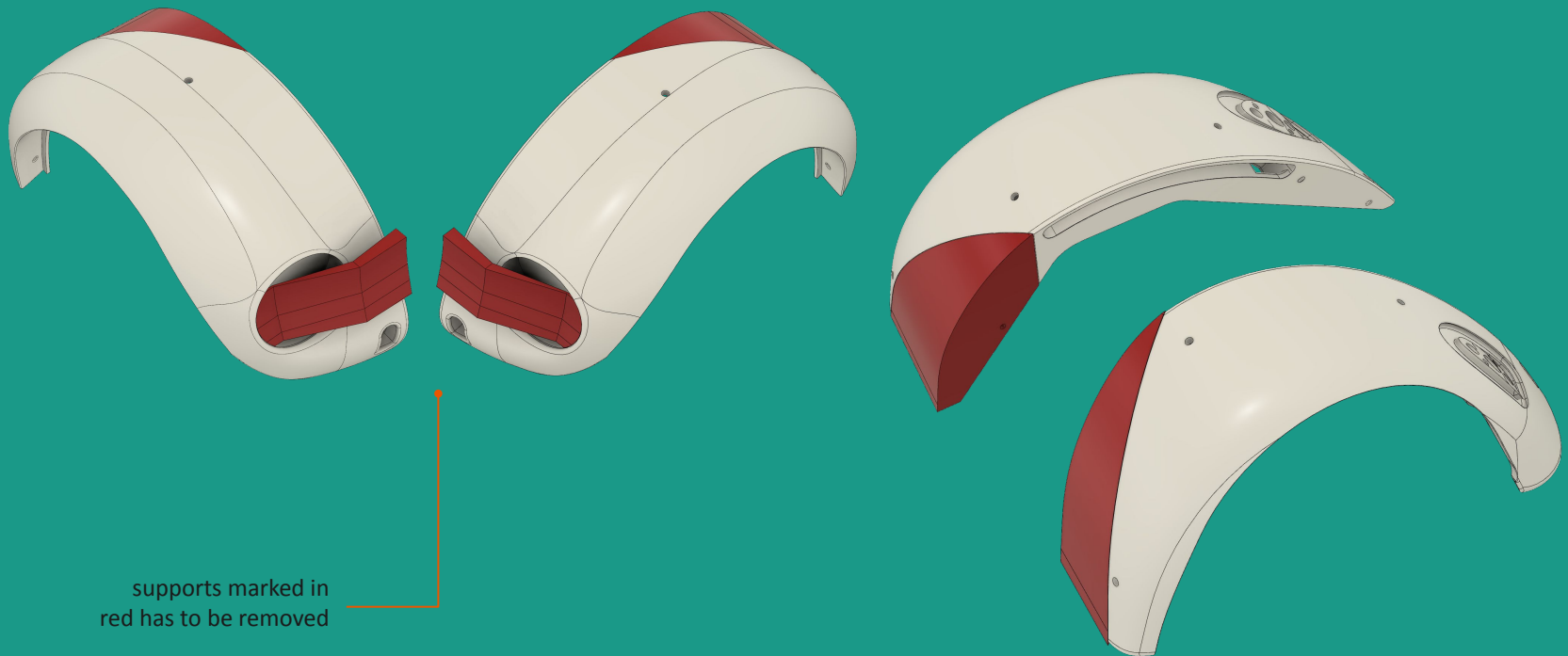
Non-printed parts:

- Screw M2x6: 26 pcs.
- Screw M2x8: 10 pcs.
- Screw M2x10: 4 pcs.

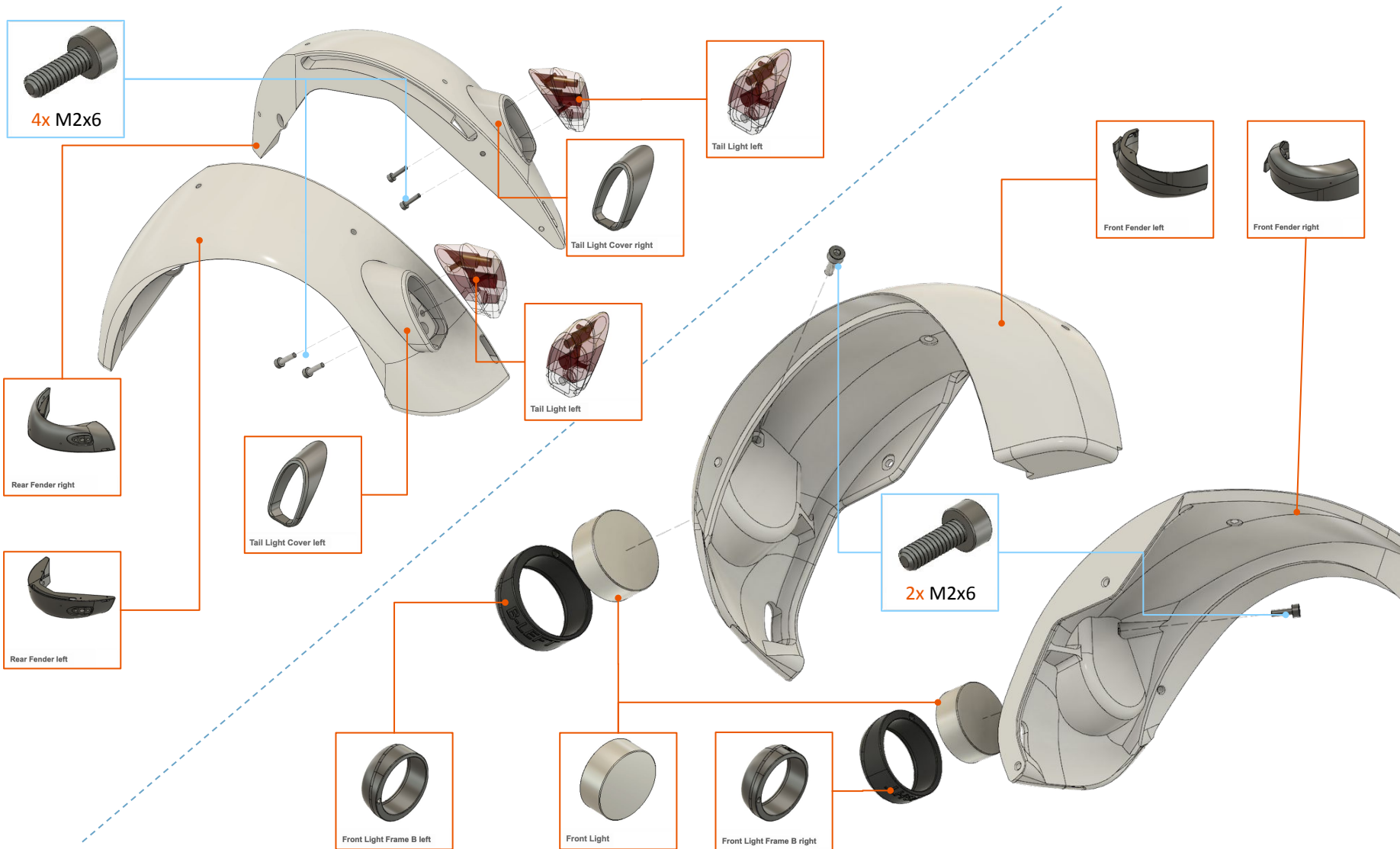


Postprocessing – removing supports

Before you start mounting the Fenders, carefully remove printing supports (marked red) integrated to specific parts rendered below. You can use pliers and sharp knife to make the procedure easier. Be very careful as you can harm yourself!

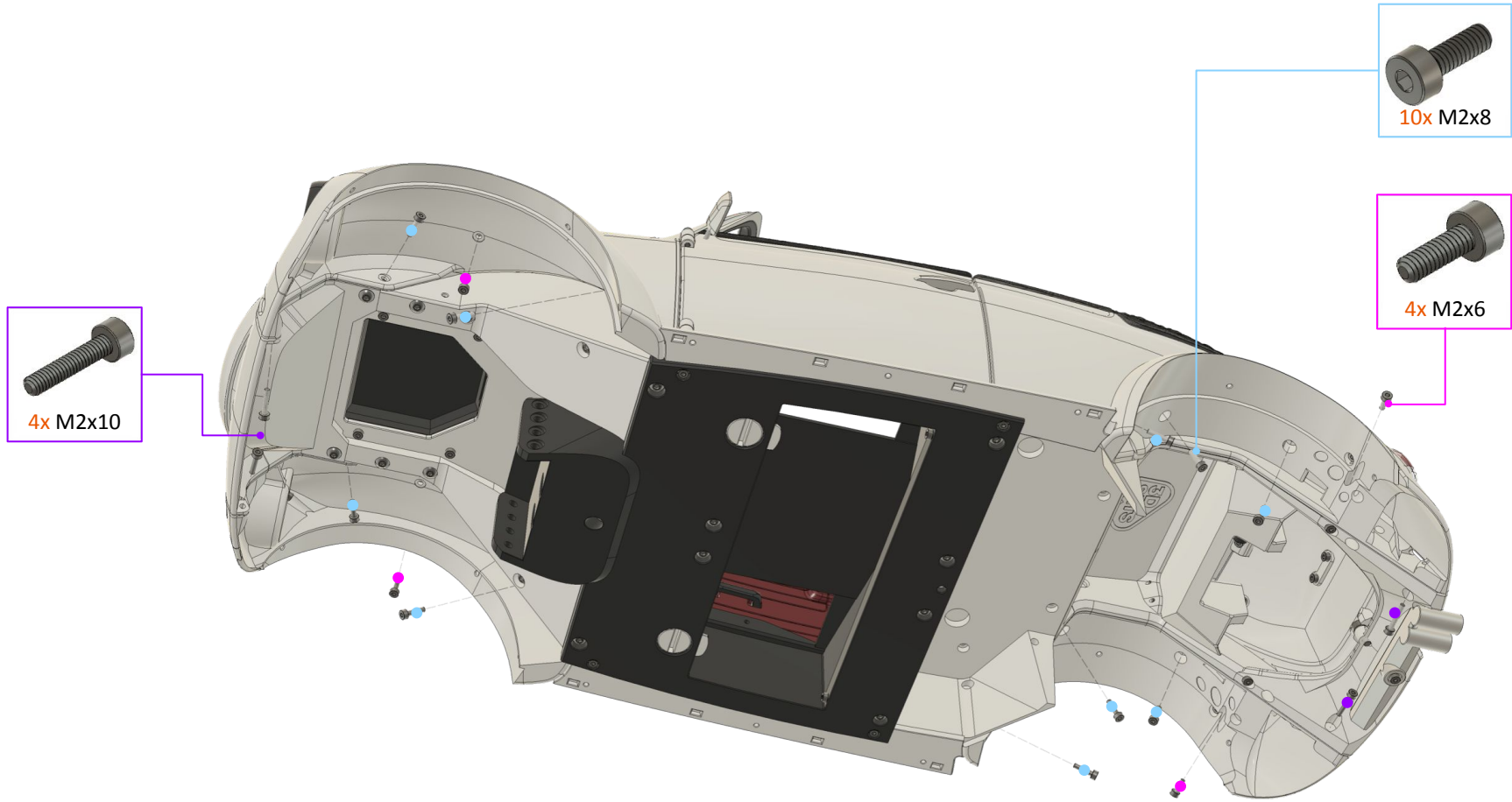


Rear & Front Fenders, Lights

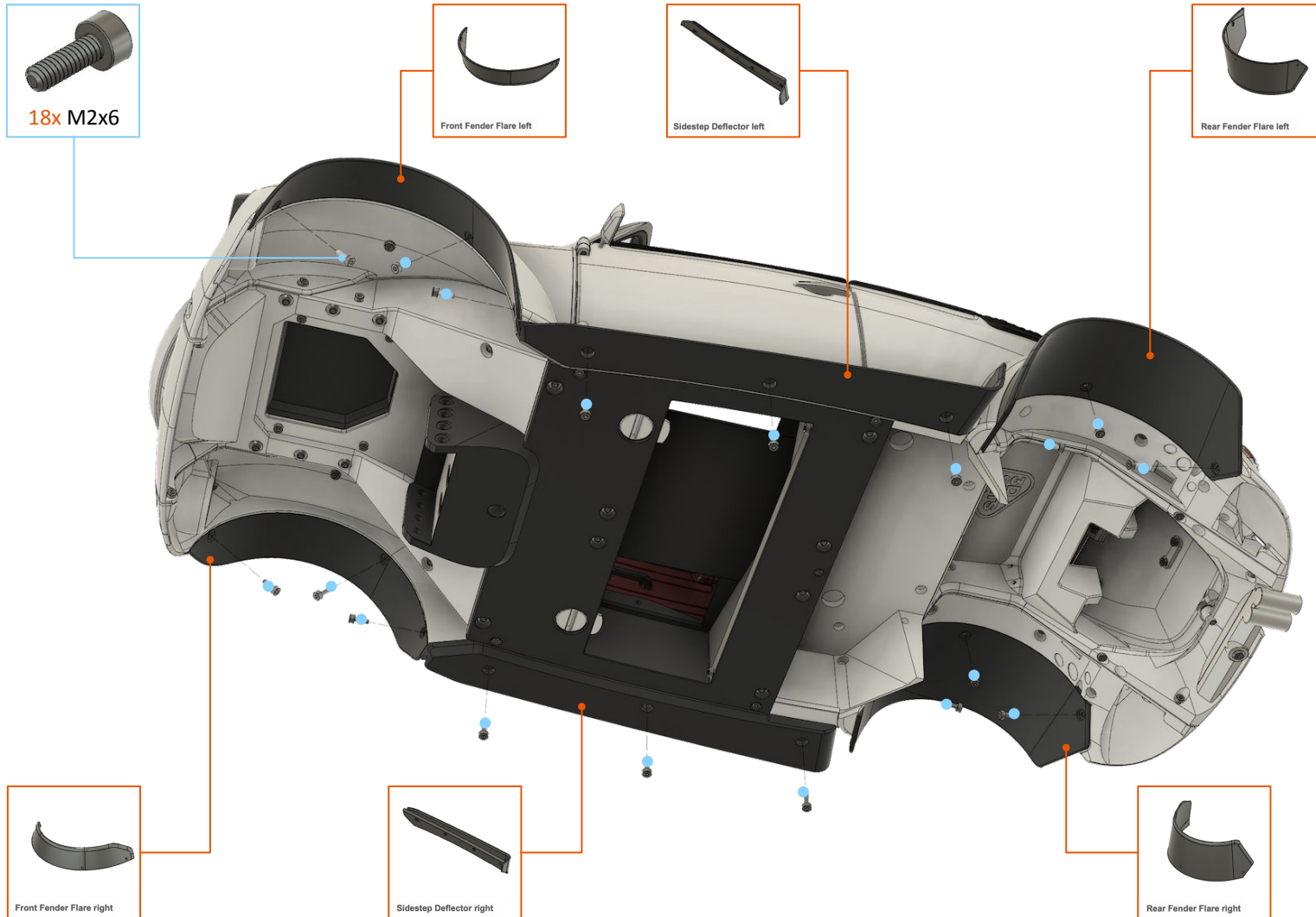




Rear & Front Fenders installation



Fender Flares & Sidestep Deflectors installation



Engine

In this procedure you will assemble the Engine. To complete this task, get ready all necessary parts:

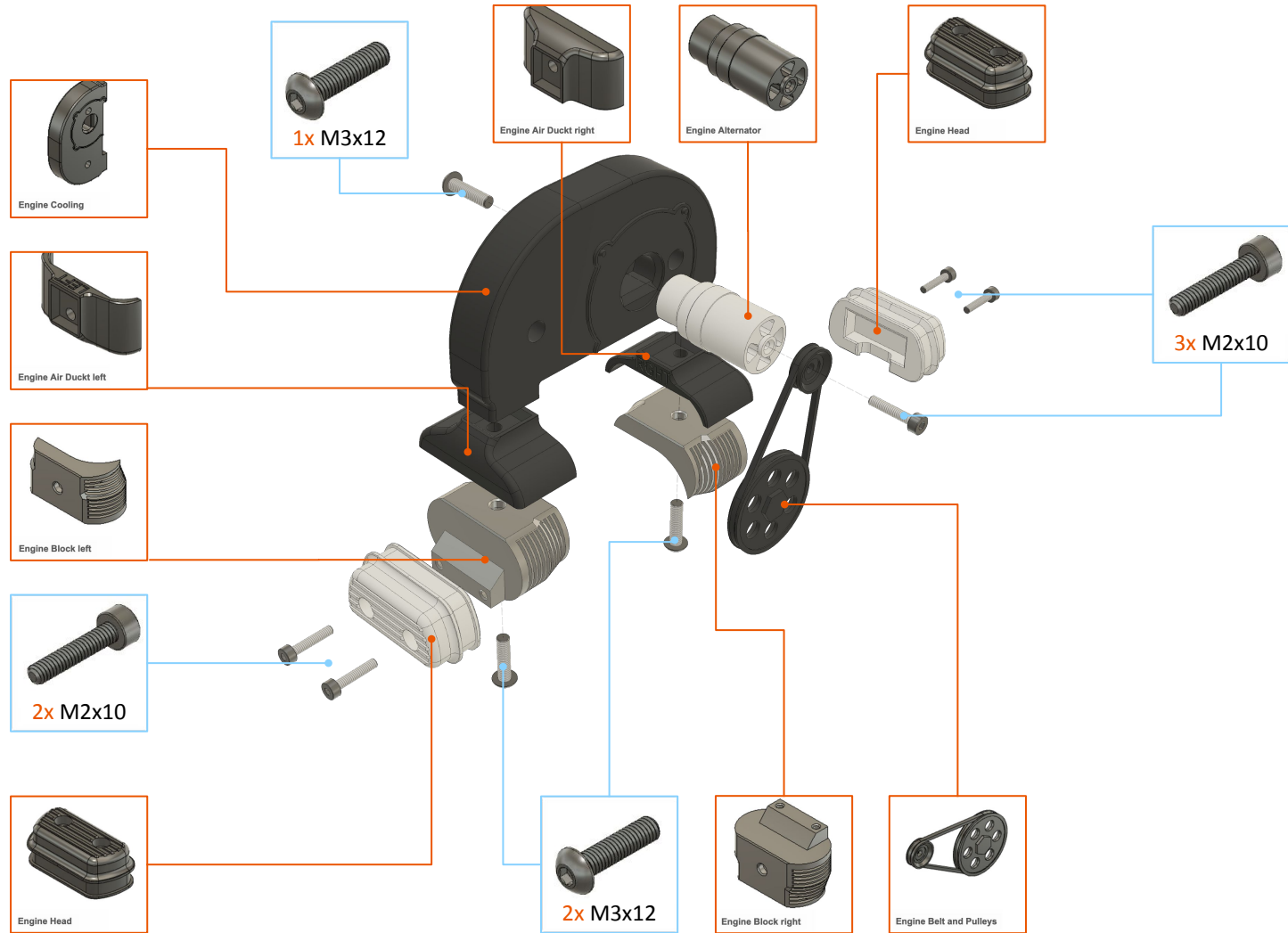
Required print plates:

- “Print 27 - Engine - 1 - Engine Block”
- “Print 28 - Engine - 2”
- “Print 29 - Engine - 3 - Engine Belt and Pulleys”

Non-printed parts:

- Screw M2x8: 10 pcs.
- Screw M2x10: 7 pcs.
- Screw M2x12: 4 pcs.
- Screw M2x16: 2 pcs.
- Screw M3x12: 3 pcs.

Engine



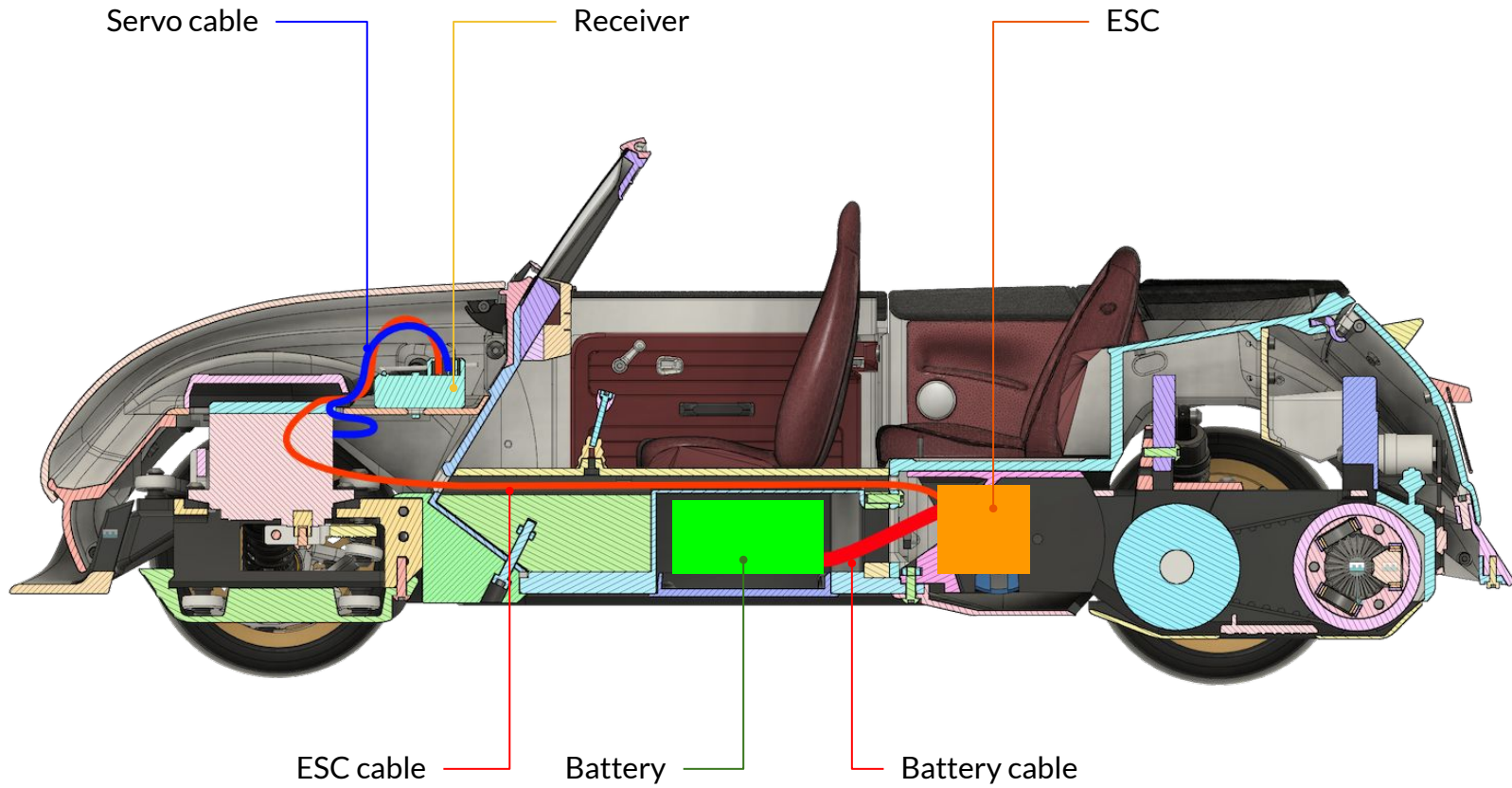


Engine installation





Cable management



Axle Arms

In this procedure you will assemble the Axle Arms and Steering Rods. These parts consists of “arms” and “ball joints” and they need to be pressed together.

Required print plates:

- “Print 0 - Calibration”
- “Print 30 - Rear Axle - 1”
- “Print 31 - Rear Axle - 2”
- “Print 36 - Front Axle - 1”
- “Print 37 - Front Axle - 2”

Non-printed parts:

- Grease
- Any Hammer or Vise (for pressing)

Arms + Ball joints

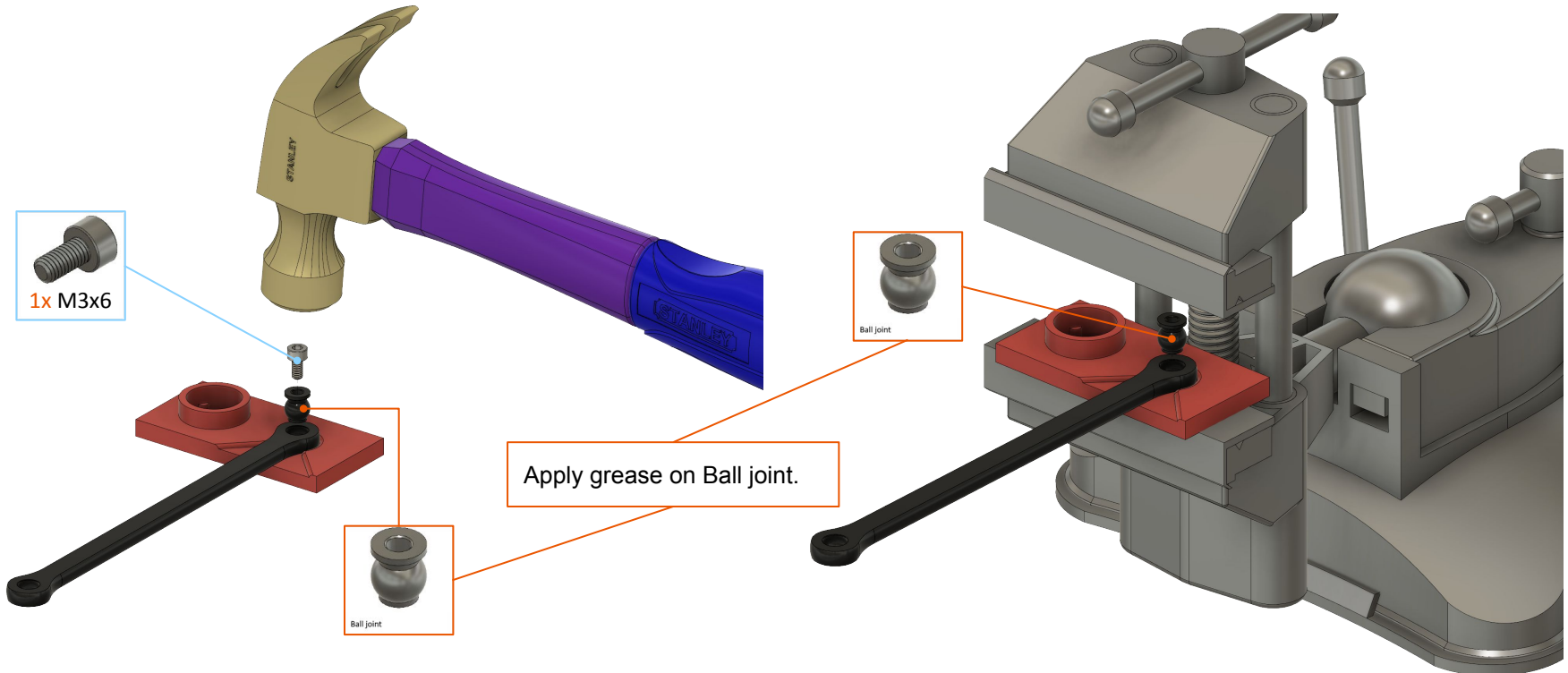
Press Ball joints in arm ends. Pay attention to combine parts correctly!
Ball joints requires correct orientation on specific arms – check next page!

Option A: use a hammer

Be careful as you can break the arm if you use too much force!

Option B: use a Vise

This is a preferred method as you can proceed slowly.

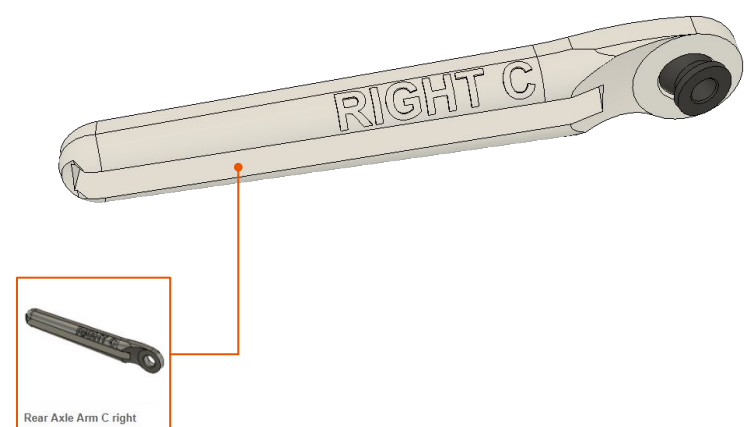
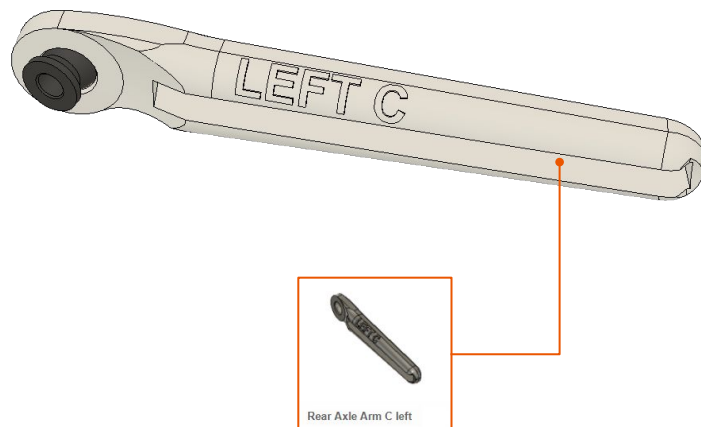
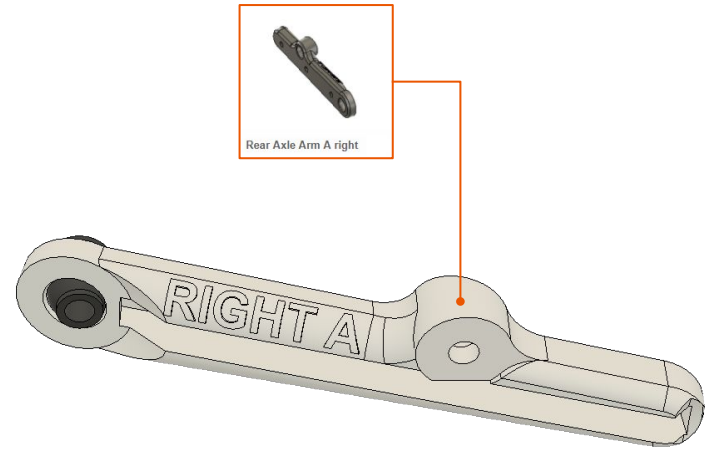
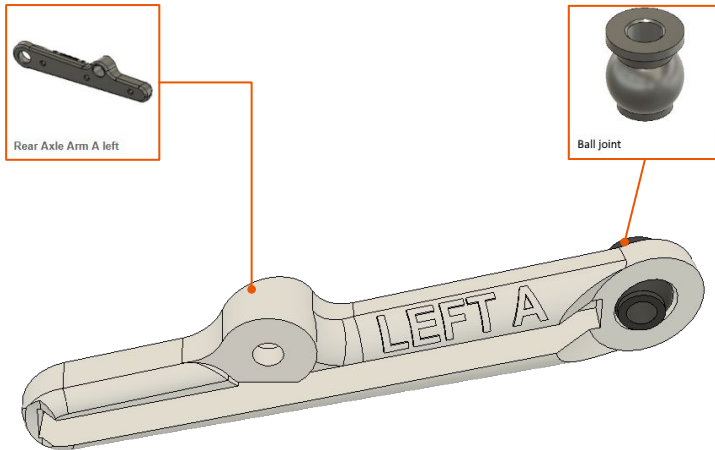


[See this step on YouTube video](#)



Rear Arms + ball joints

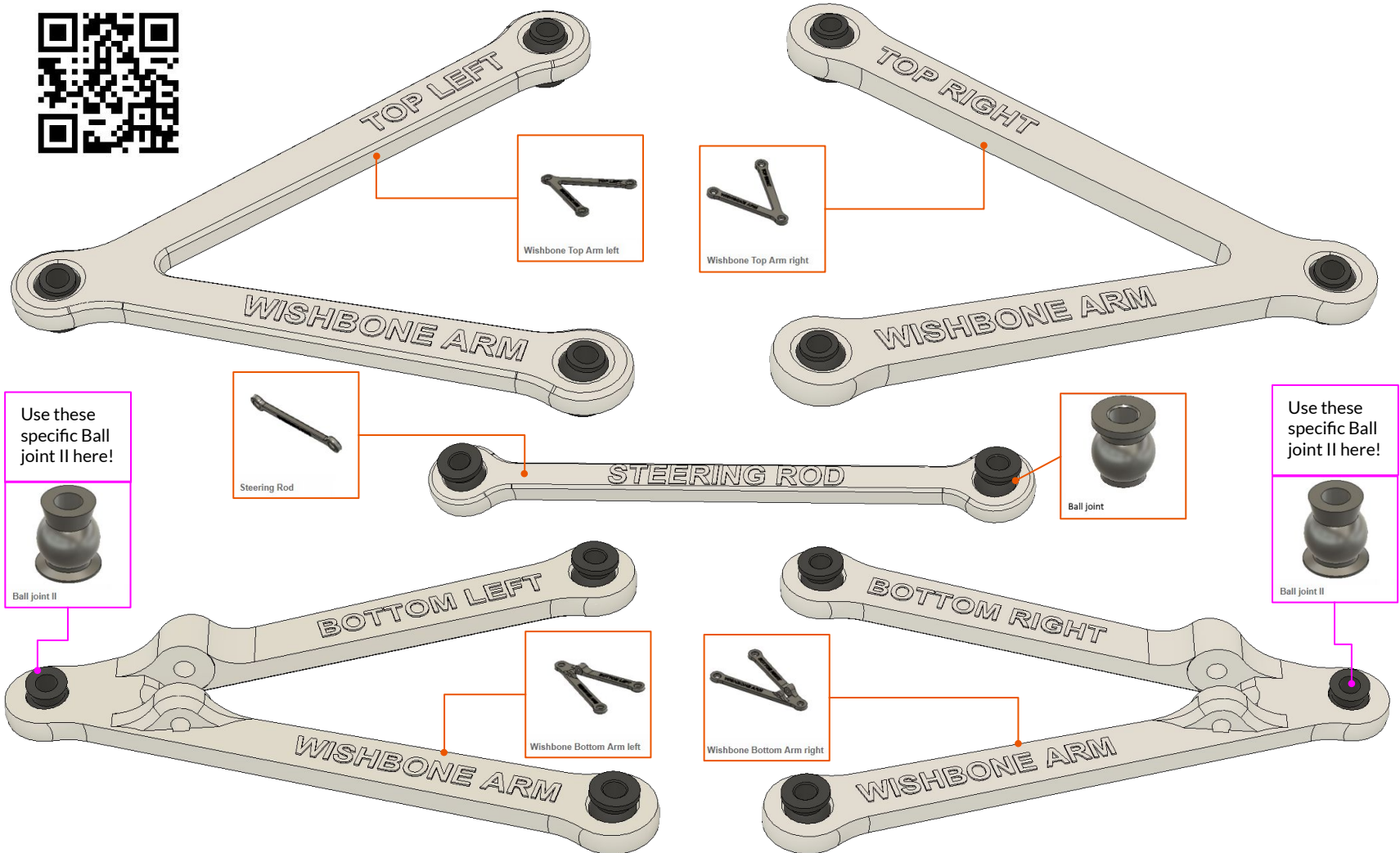
On the pictures below are rendered final Rear Arms assemblies. Please note that some Rear Arms requires opposite Ball joint orientation!





Front Arms + ball joints

On the pictures below are rendered final Front Arms assemblies. Please note that some Front Arms requires opposite Ball joint orientation!
See 3D view for better readability: [click to 3D view](#)



Rear Axle – use differential or not?

Differential variant (recommended option) – skip slide 51:

Pros:

- Perfect handling on hard, paved surfaces (roads)
- Easy, precise cornering
- Realistic ride behavior

Cons:

- Differential gears is recommended to print from PC Blend filament
- More parts than no-differential variant

No-differential variant – jump to Page Y - skip slide 49 and 50:

Pros:

- Easier-to-print parts, easy to assemble
- More durable in extreme conditions
- Easy to drift, easy “donuts”

Cons:

- Poor handling on hard, paved surfaces (roads) in higher speeds
- Easy to roll-over

We recommend to build the Differential variant. In case of any struggles you can always switch to no-differential variant.



Subassembly #3 – Rear axle (with differential)

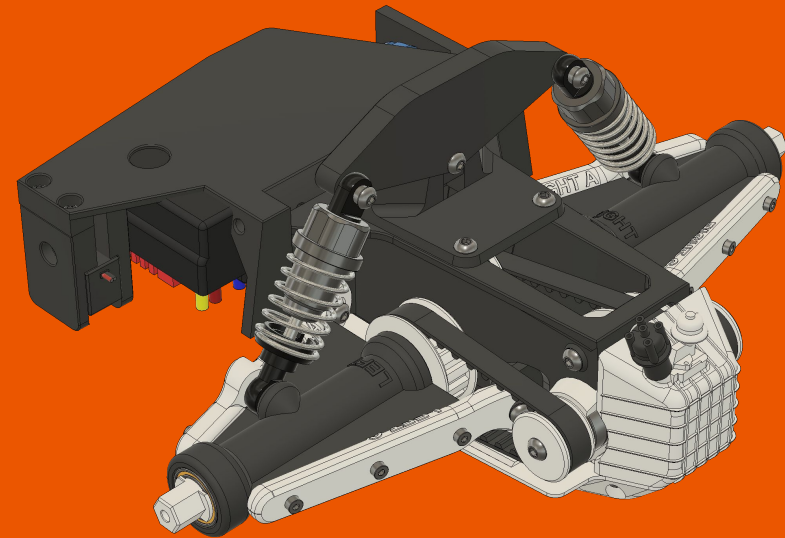
In this 11-step procedure you will assemble the Rear Axle. The axle assembly includes half-axles, differential, transmission belts and engine mount.

Required print plates:

- “Print 30 - Rear Axle - 1 - differential (or no differential)”
- “Print 31 - Rear Axle - 2 - differential (or no differential)”
- “Print 31b - Rear Axle - Brushless Motor 35x29mm”
- “Print 32A - Rear Axle - 3” (versions for various filaments)
- “Print 33A - Rear Axle - 4” (version for various filaments)
- “Print 34 - Rear Axle - 5”

Non-printed parts:

- Screw M2x6: 2 pcs.
- Screw M2x8: 12 pcs.
- Screw M2x10: 1 pcs.
- Screw M3x6: 5 pcs. (-2 pcs. with brushless motor)
- Screw M3x8: 7 pcs. (+4 pcs. with brushless motor)
- Screw M3x10: 4 pcs.
- Screw M3x12: 8 pcs. (+1 pcs. with brushless motor)
- Screw M3x14: 3 pcs.
- Screw M3x16: 4 pcs.
- Screw M3x20: (+1 pcs. with brushless motor)
- Nut M3: 2 pcs. (+1 pcs. with brushless motor)
- Bearing: 16 pcs. (-5 pcs. with no-differential)
- Belt 80XL: 2 pcs.
- Belt 60XL: 2 pcs.
- Grease

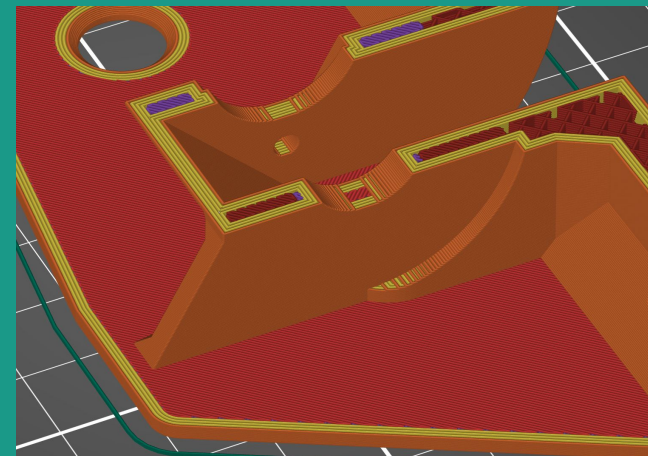
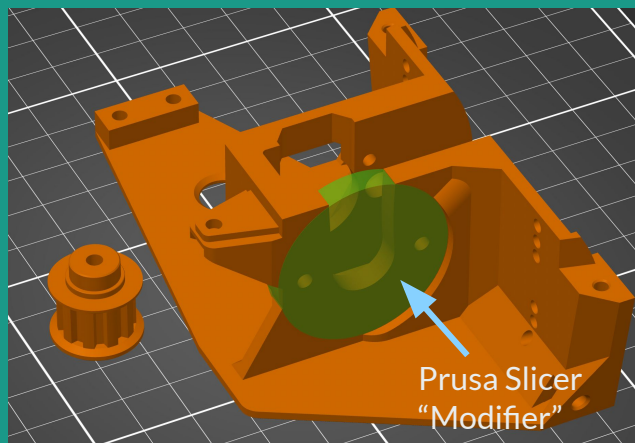


Rear Axle: important – heat resistant filament requirements

When using the 540 motor, a “heat resistant” material, such as ASA or PC Blend, must be used to print “X” and “Y” parts. ASA is easy to print and affordable, PC Blend is a high performance filament but more difficult to print.

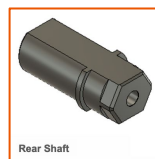
We also recommend using a modifier that sets 100% infill in the engine compartment - eg as shown in the figure. You can find more about modifiers here: https://help.prusa3d.com/en/article/modifiers_1767. This modifier is used in the supplied .3mf files. Other settings for these parts are:

- ASA or PC Blend
- Use “Brim”
- Perimeters: 4
- Infill density: 20%
- Infill type: grid



Rear Axle (with differential) – step 1-2/12

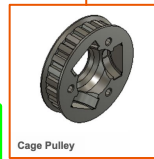
It is recommended to print these specific parts from high-strength material like **Prusament PC Blend**: specifically the **Axle Gears** and **Differential Pinions**. Do not use ABS or PETG for gears, as they are weaker even than PLA!



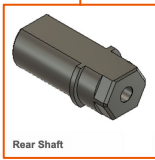
Use screw ISO 7380 or screw with max height head 2mm!



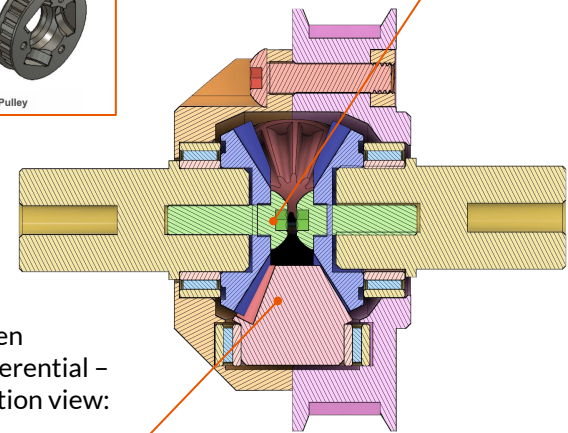
Use screw ISO 7380 or screw with max height head 2mm!



Prusament PC Blend

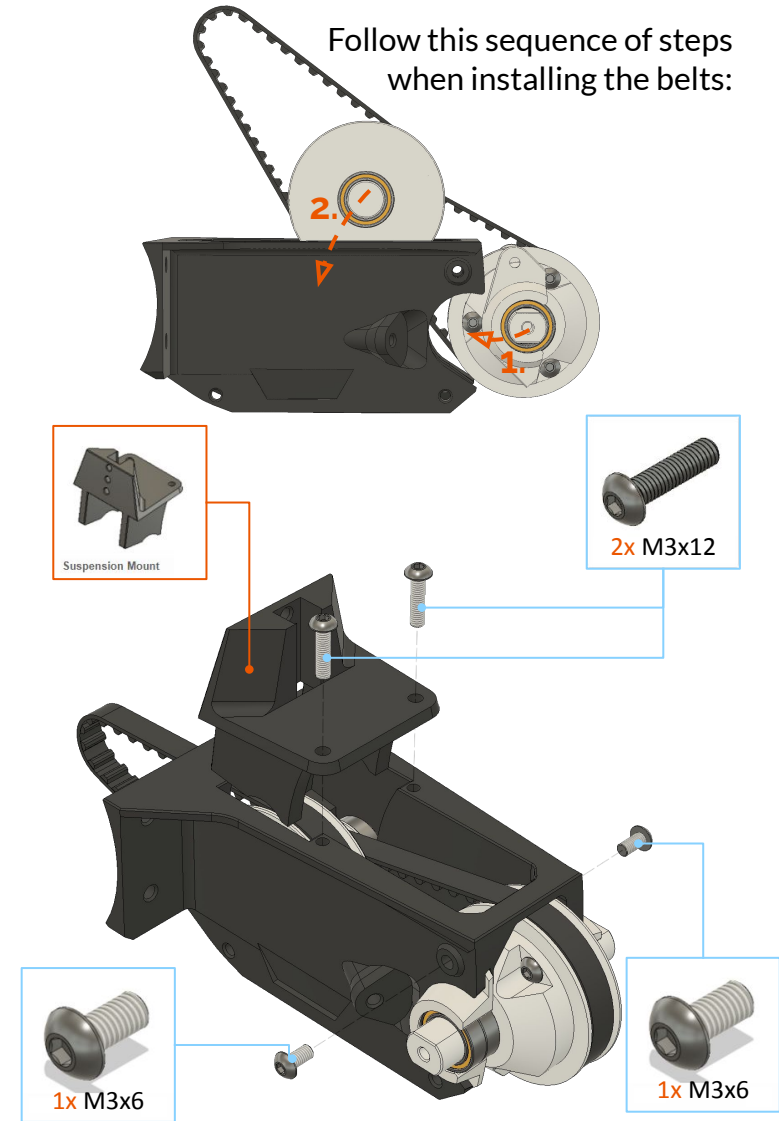


Prusament PC Blend

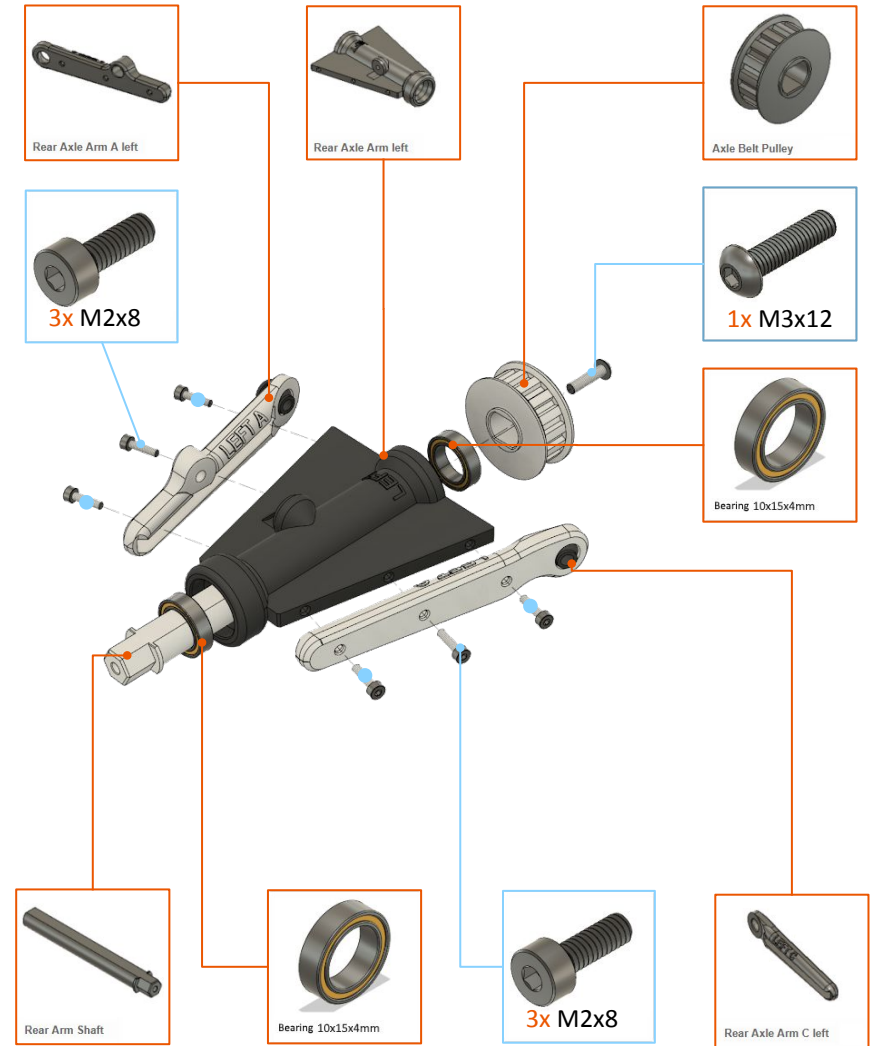
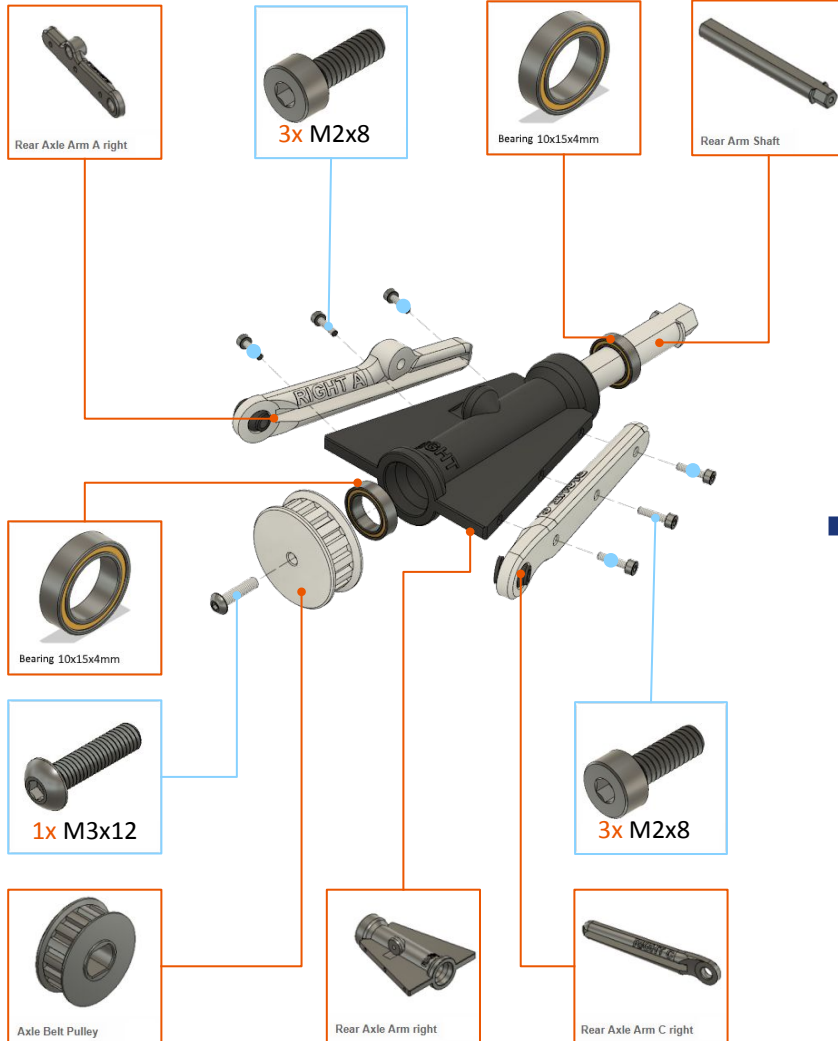


Apply grease on gear teeth.

Rear Axle (opened differential) – step 2-3/12



Rear Axle – step 4-5/12



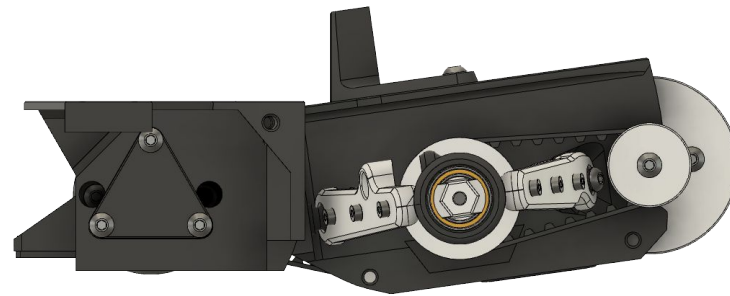
Rear Axle – step 6/12 - height position adjustment

In the following steps, please pay attention to the mutual assembly of the "Motor Frame" and "Axle Frame" parts.

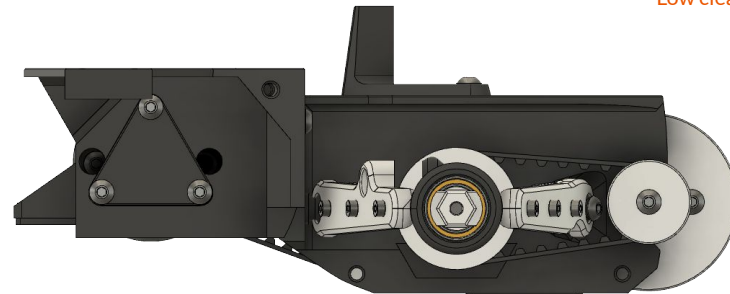
The parts can be bolted together in **three different positions** (or angles), the choice of which **affects the position (height) of the rear wheel axles** relative to the body.

The middle (horizontal) position is the recommended road setup, the upper position is determined as very low-clearance setup. The lower position as the "offroad" setup and it's not usable for the Buggster model. The resulting height differs by **+8 mm or -8 mm**.

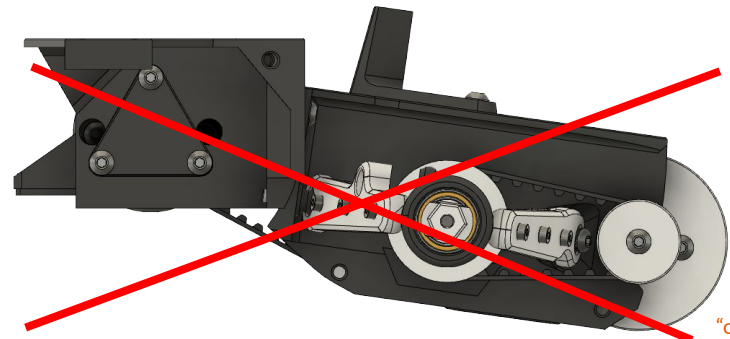
Warning - the motor hood cannot be installed in case of the highest (road) position!



↑
"Low clearance" setup: +8 mm

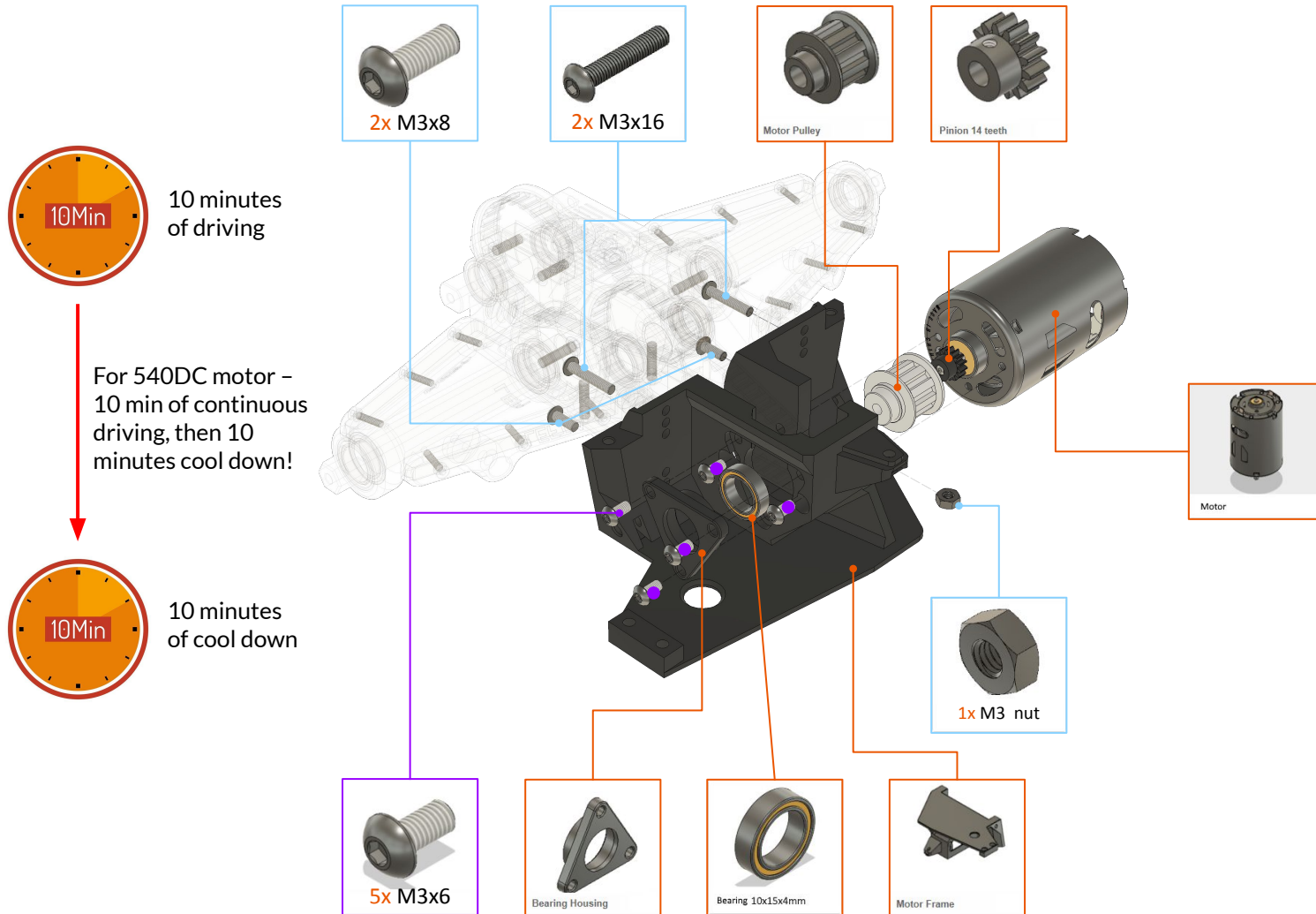


Recommended "road" setup: 0 mm

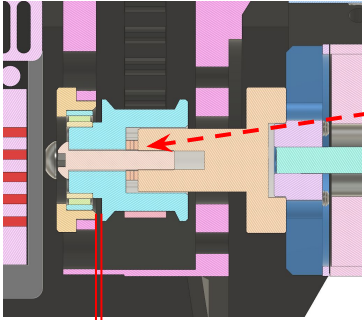


↓
"offroad" setup: -8 mm

Rear Axle – step 6/12 – brushed motor

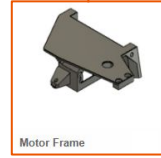
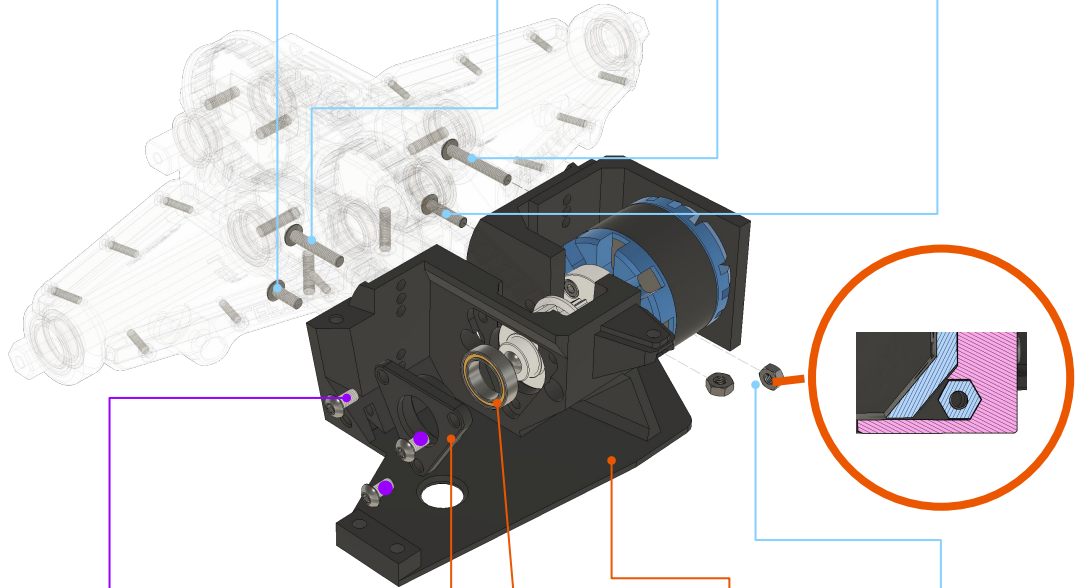
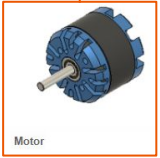
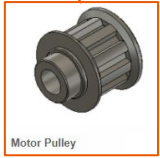
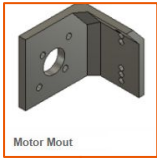


Rear Axle – step 6/12 - brushless motor

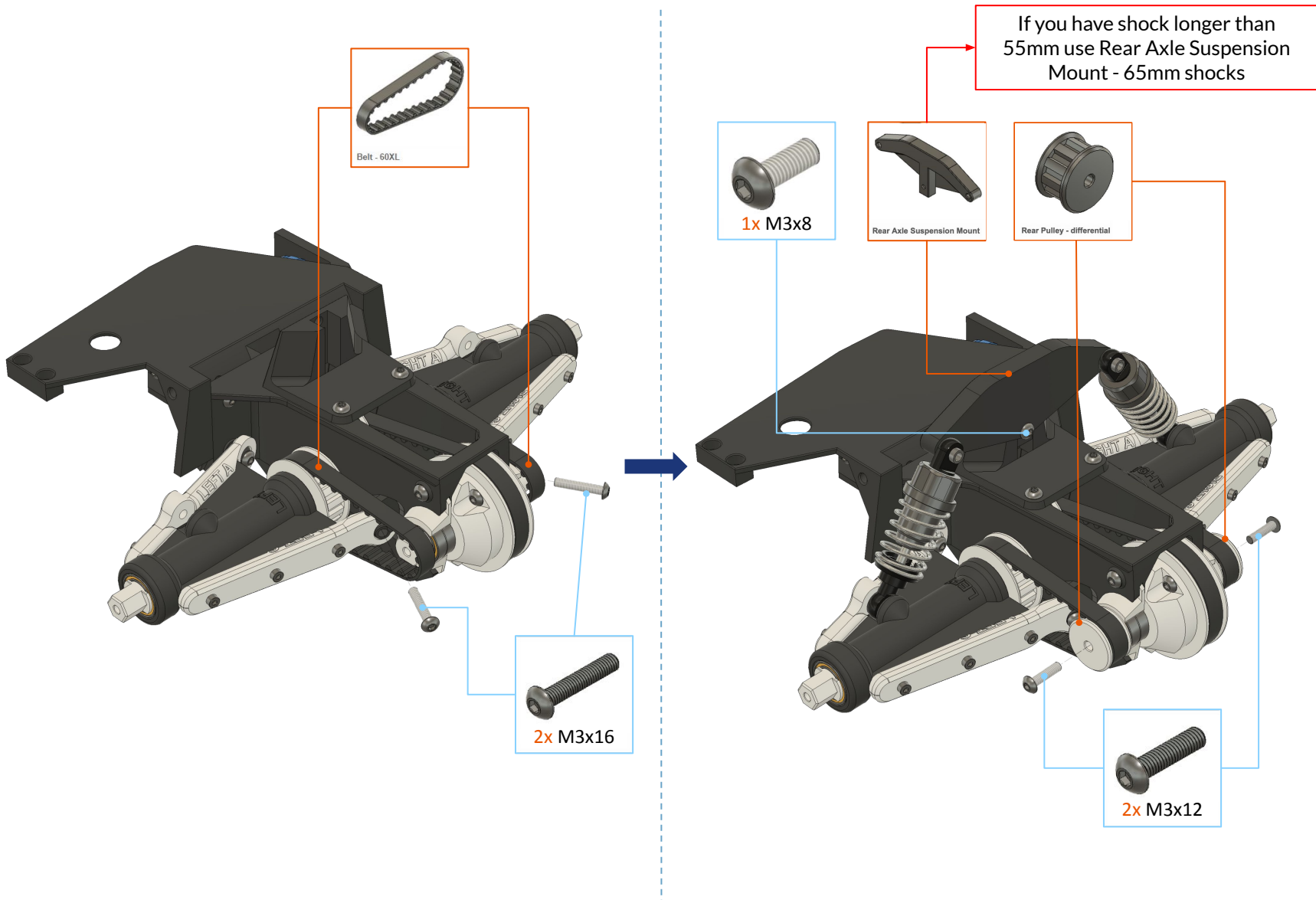


If you use motor shorter than 29mm, use washers for centering the Motor Pulley.

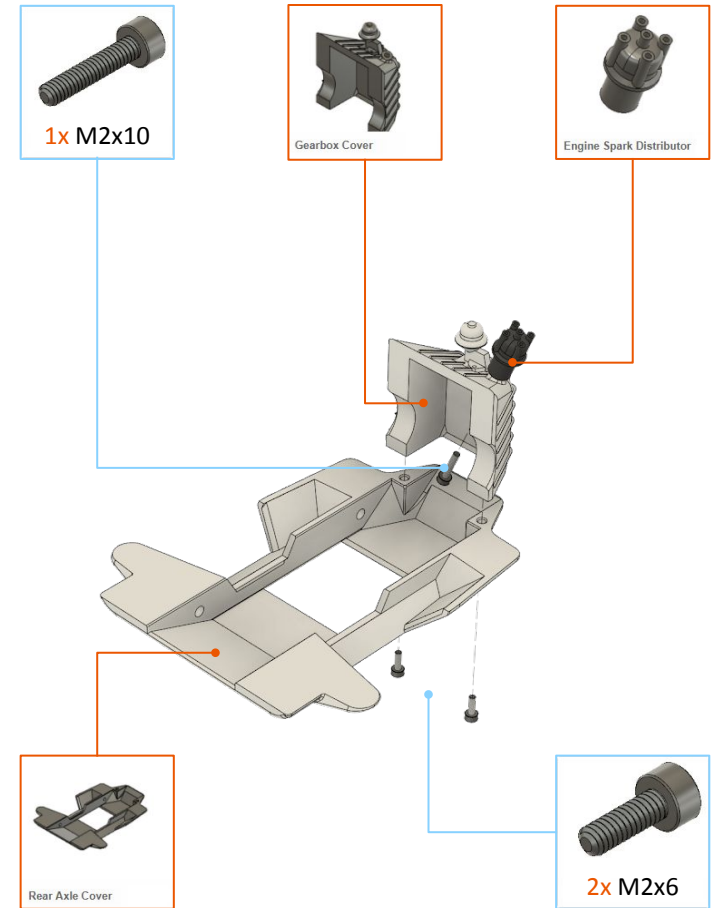
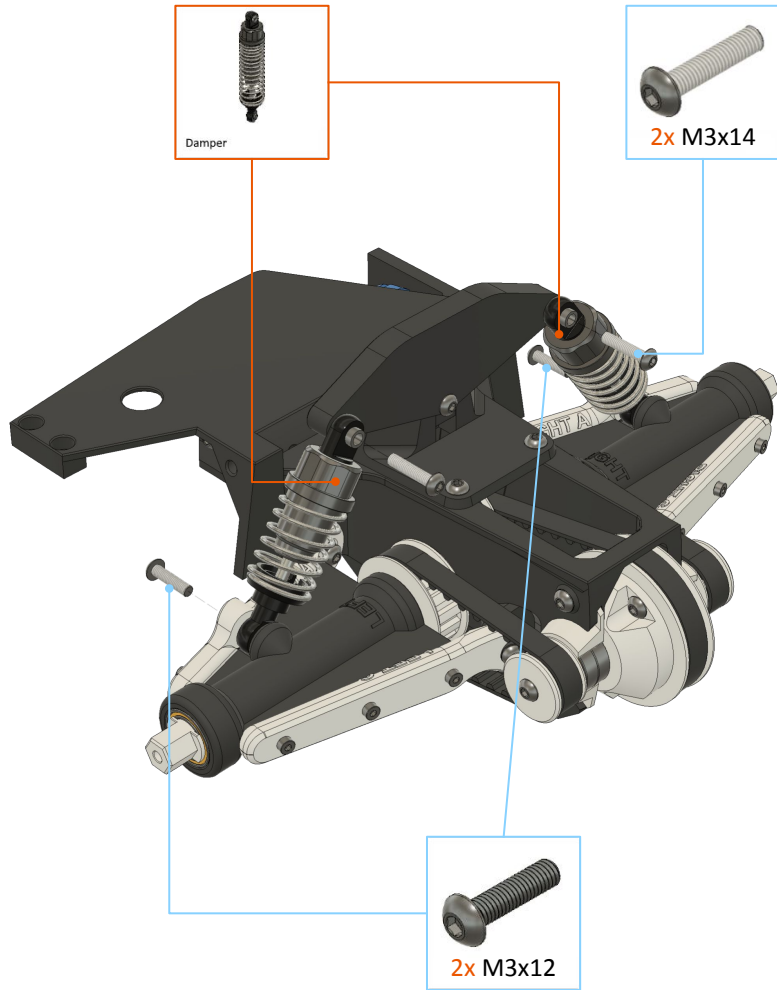
Clearance 1 mm max.!



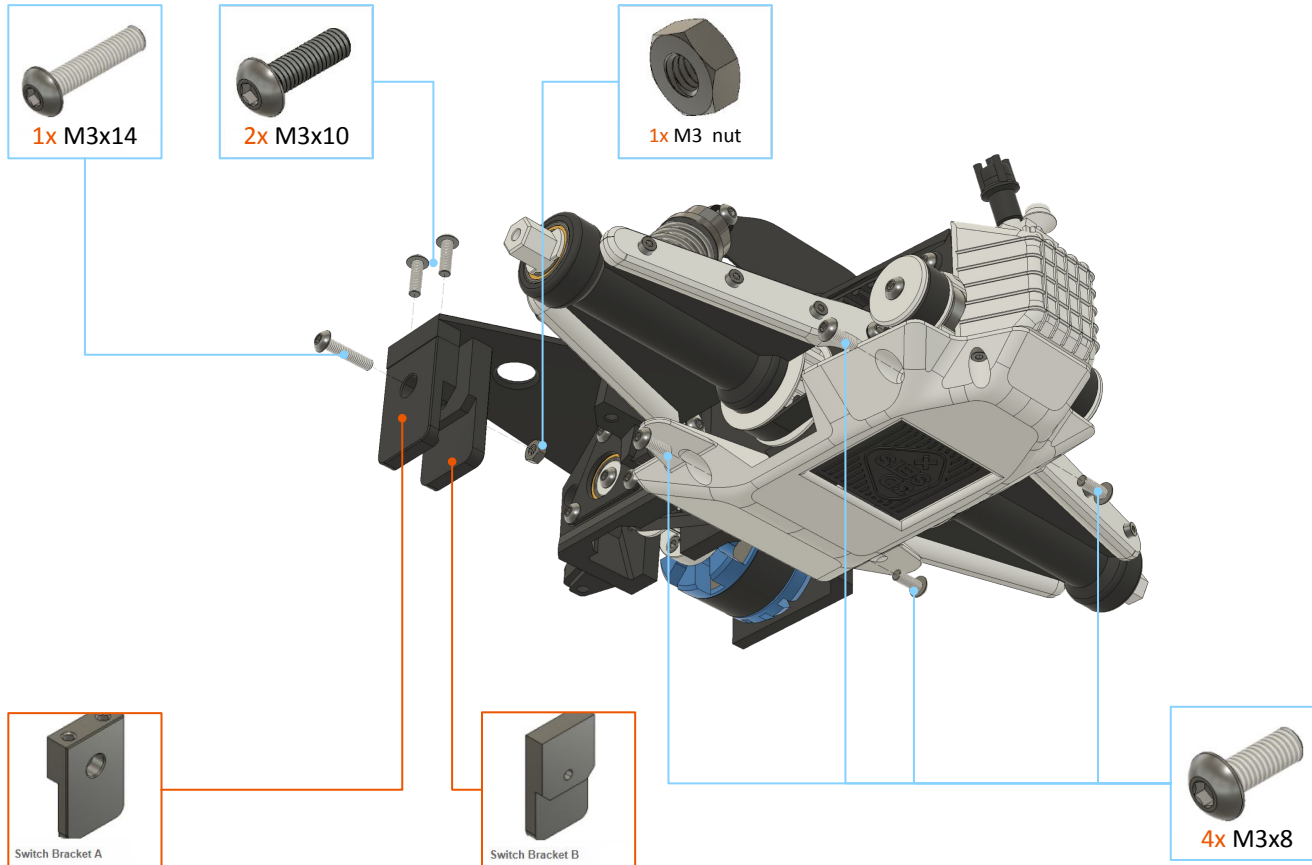
Rear Axle – step 7-8/12



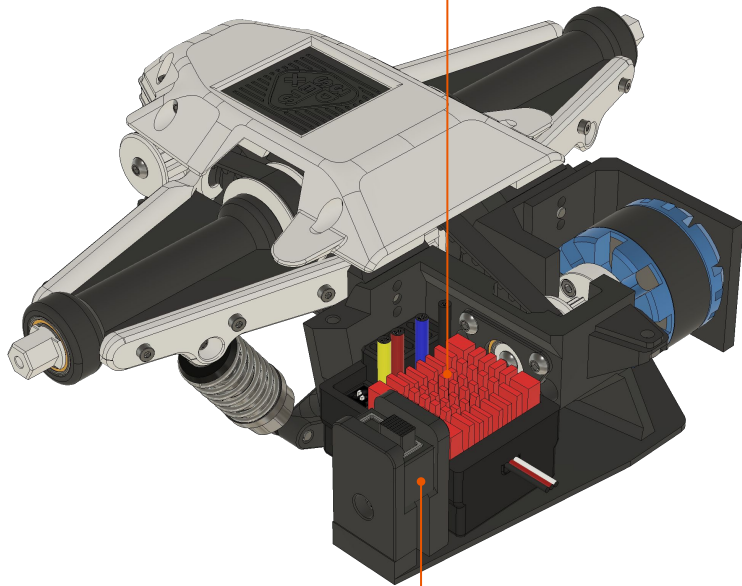
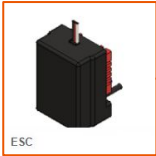
Rear Axle – step 9-10/12



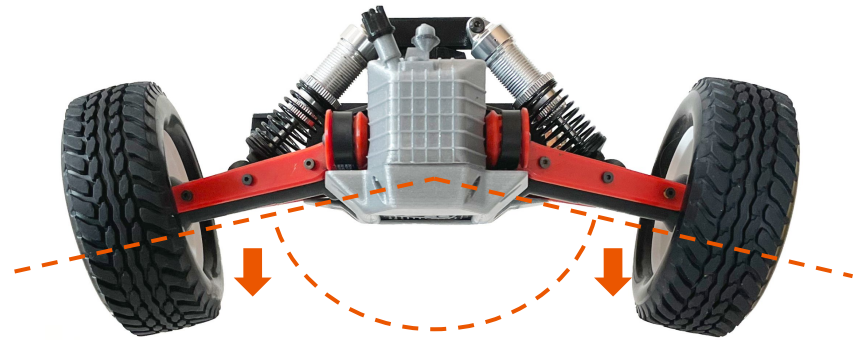
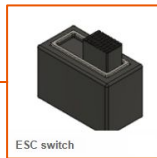
Rear Axle – step 11/12



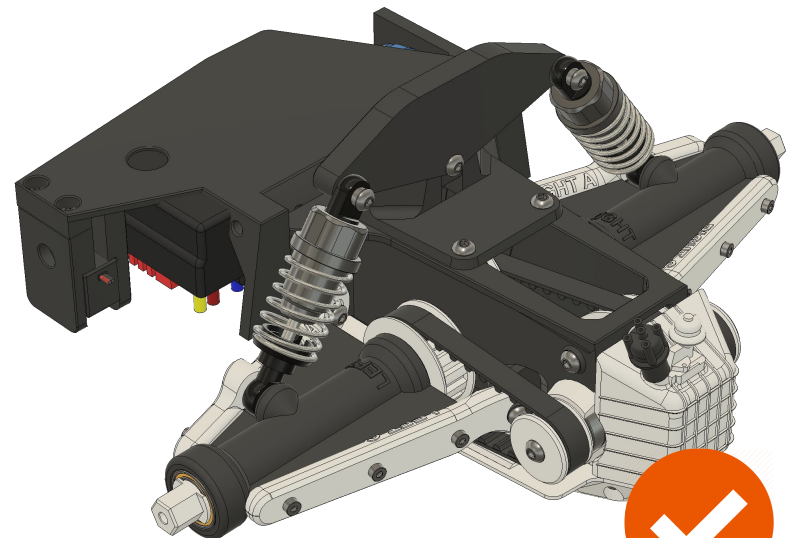
Rear Axle – step 12/12



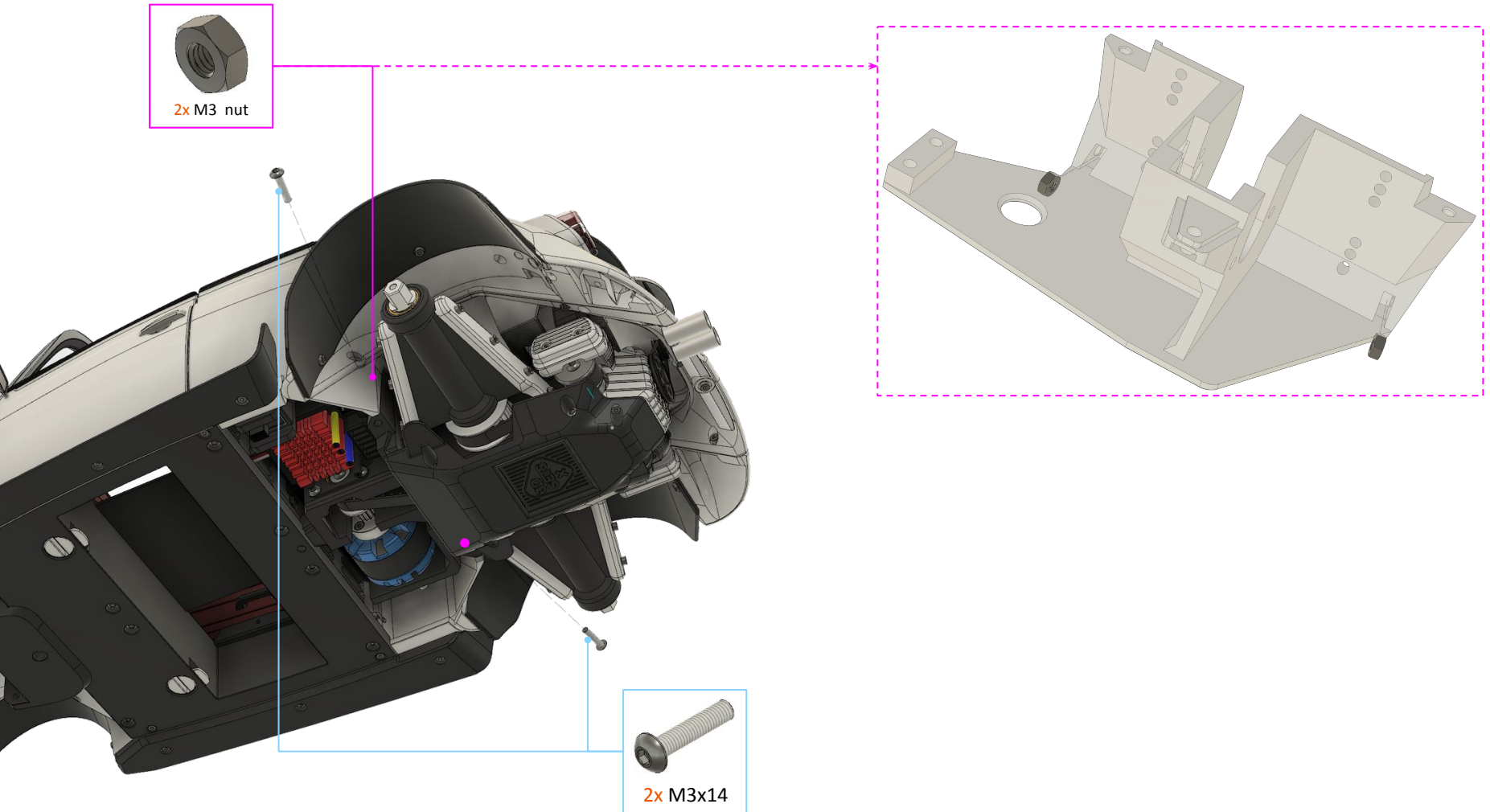
Secure the switch by clamping it inside the holder.



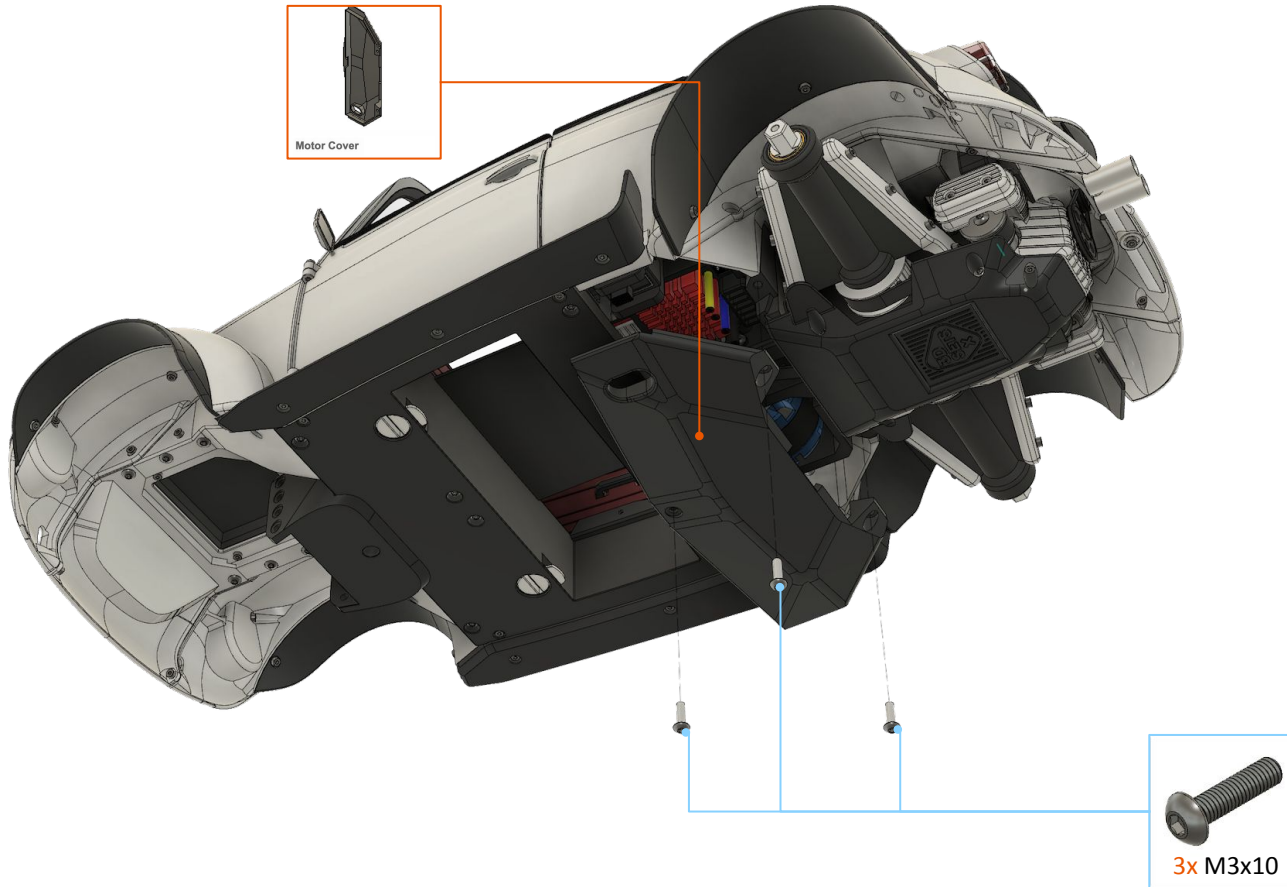
The axle arms must be completely lowered in the unloaded position – adjust the height of the Shock Mount.



Installation of the Rear Axle in the body 1/2



Installation of the Rear Axle in the body 2/2



Subassembly – Front Spoiler

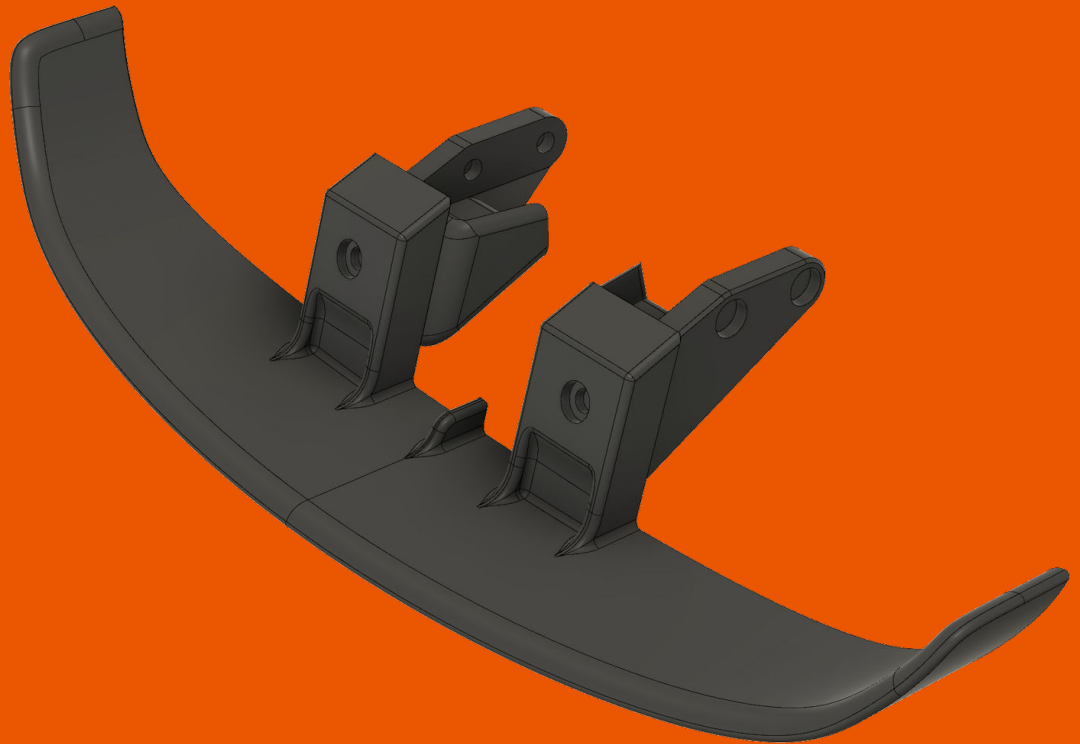
In this procedure you will assemble the Front Spoiler.

Required print plates:

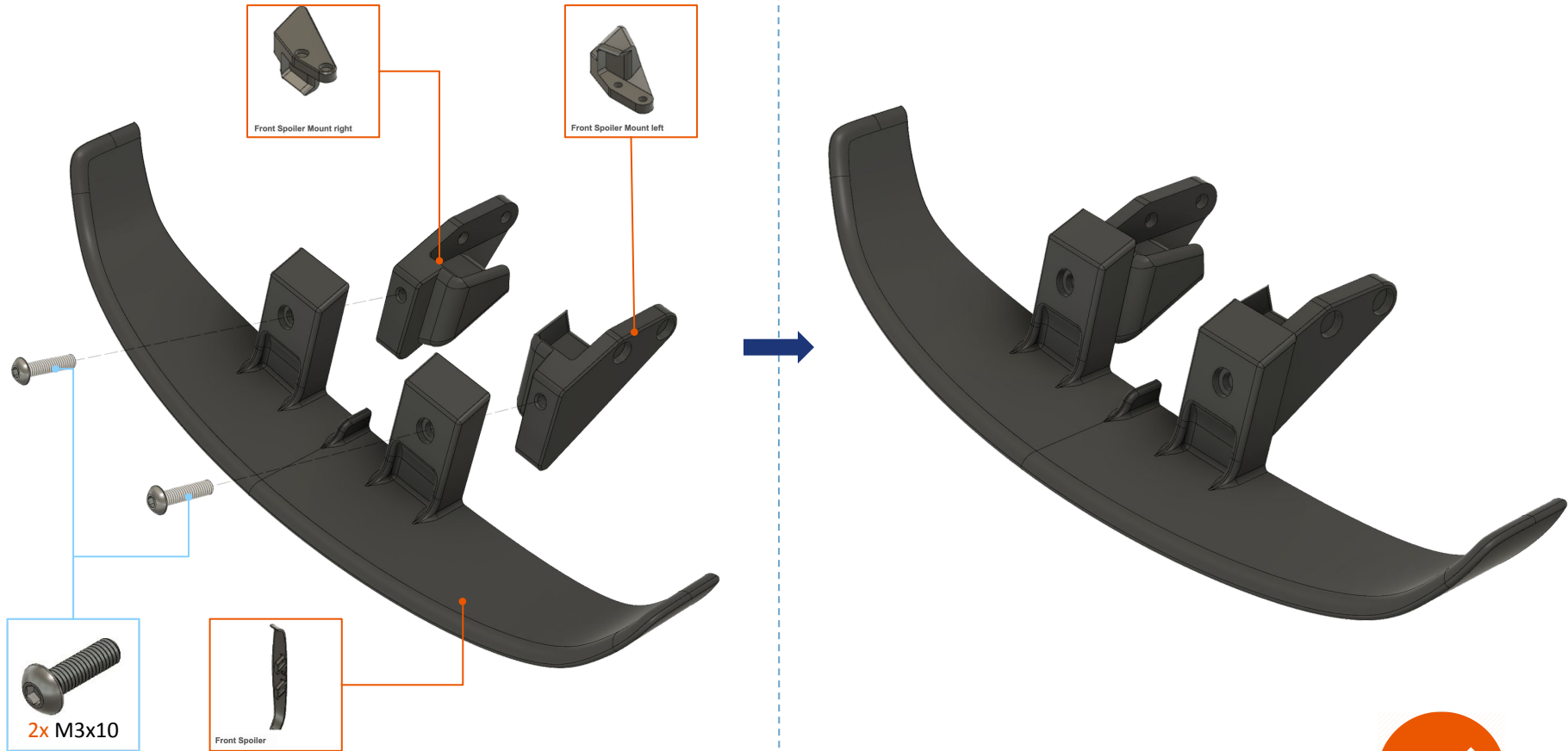
- “Print 35 - Front Spoiler”

Non-printed parts:

- Screw M3x10: 2 pcs.



Front Spoiler



Subassembly #3 – Front axle

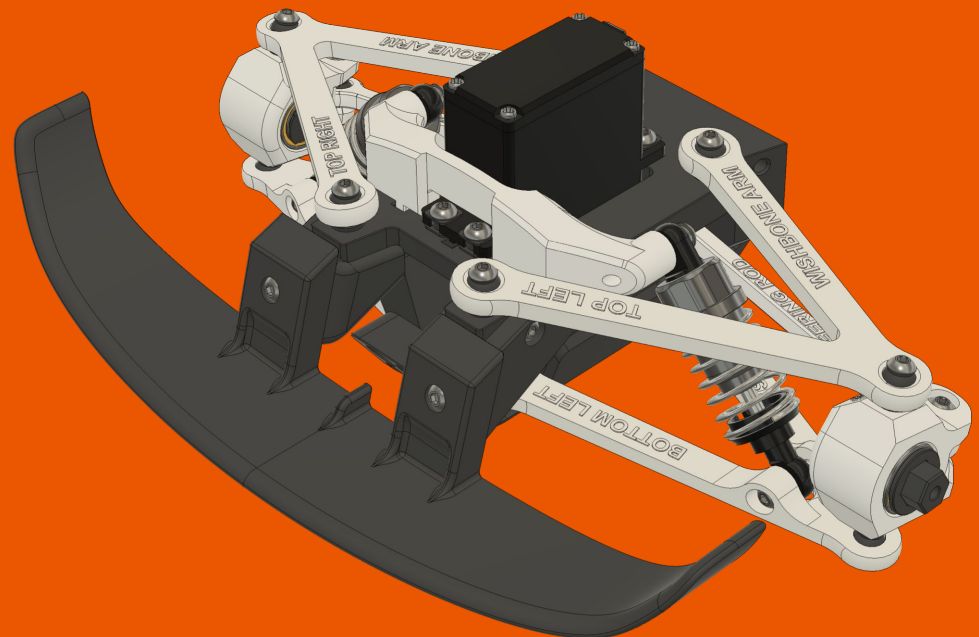
In this 13-step procedure you will assemble the front axle. The axle assembly includes an independent suspension system, steering servo and front bumper.

Required print plates:

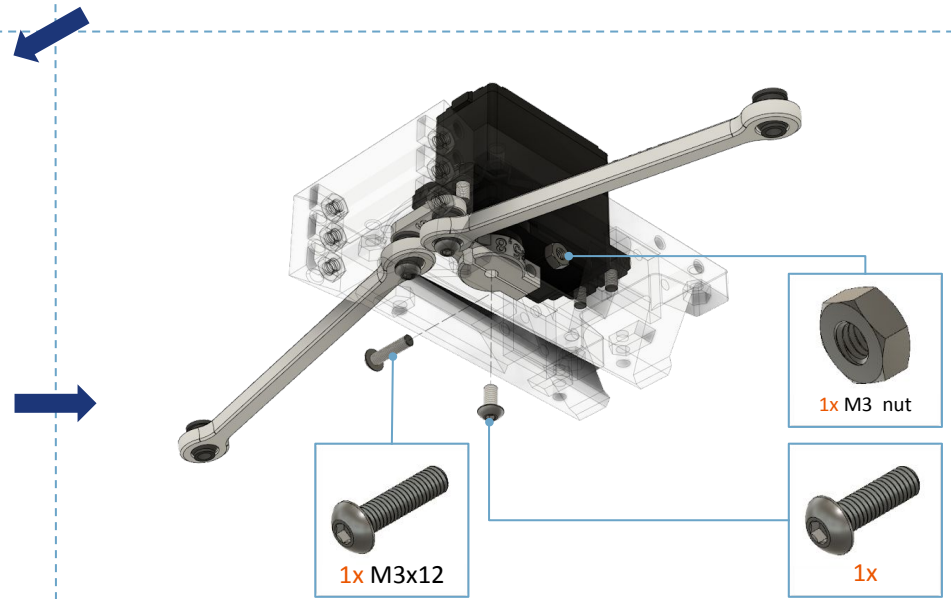
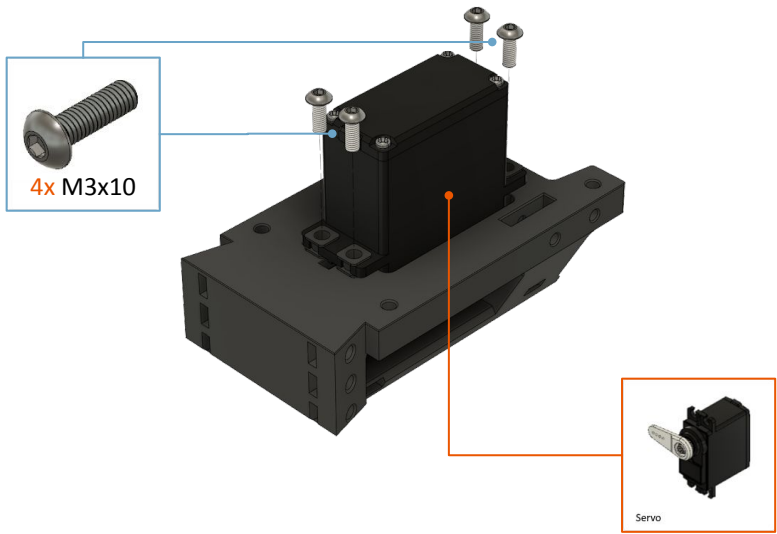
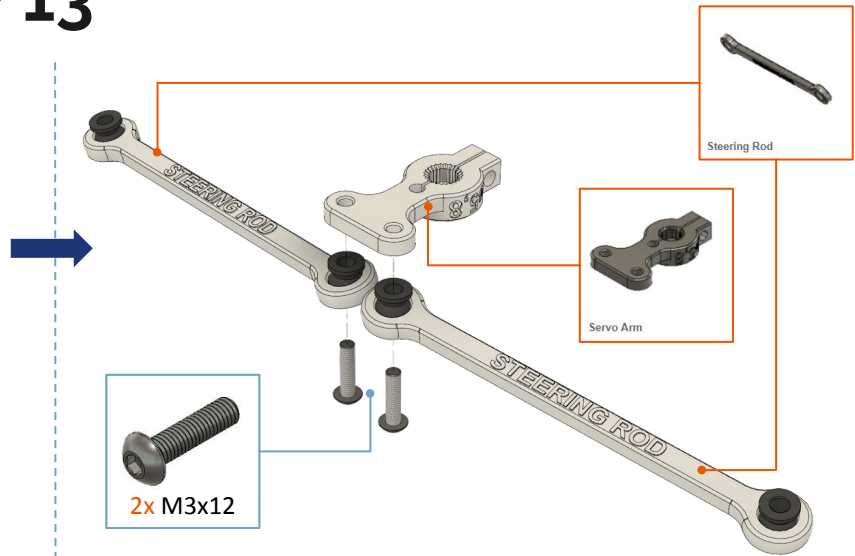
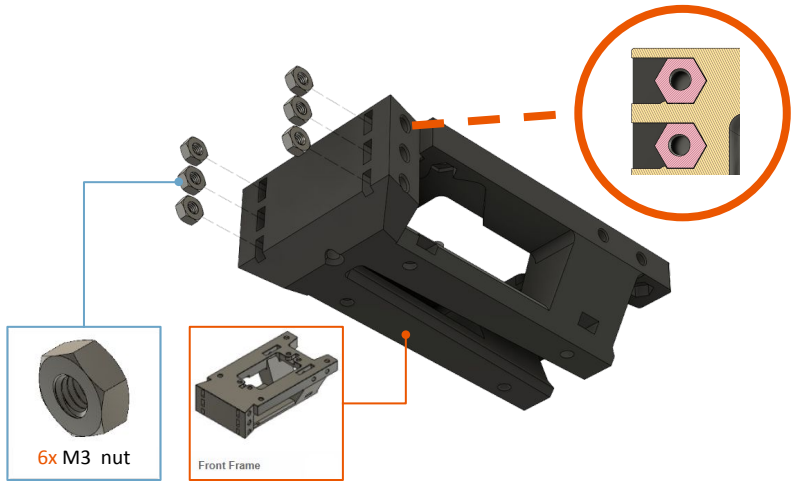
- “Print 36 - Front Axle - 1”
- “Print 37 - Front Axle - 2”

Non-printed parts:

- Screw M3x10: 4 pcs.
- Screw M3x12: 10 pcs.
- Screw M3x14: 2 pcs.
- Screw M3x16: 14 pcs.
- Nut M3: 15 pcs.
- Locknut M3: 4 pcs.
- Bearing: 4 pcs.
- Grease

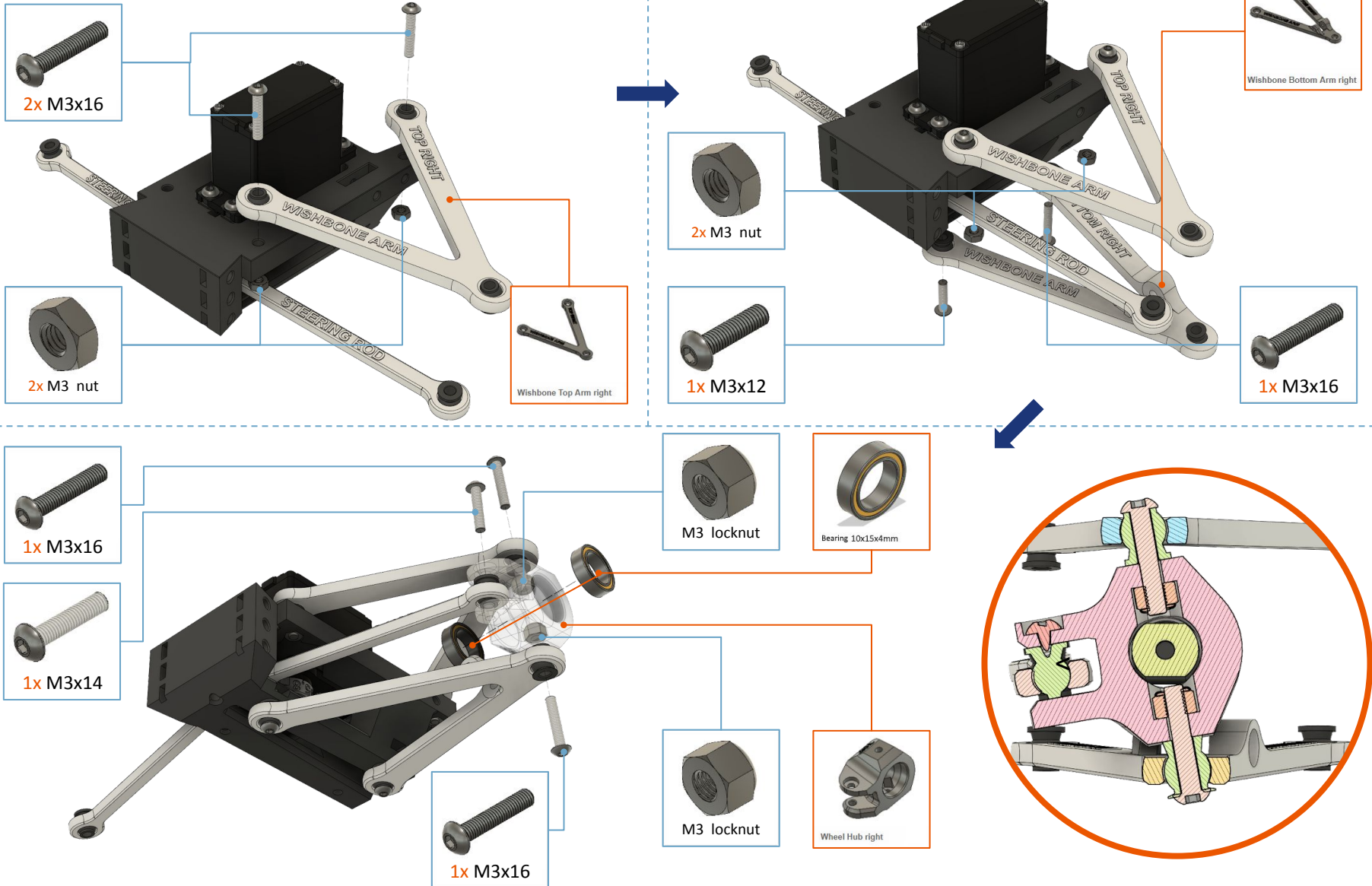


Front Axle – step 1-4/13

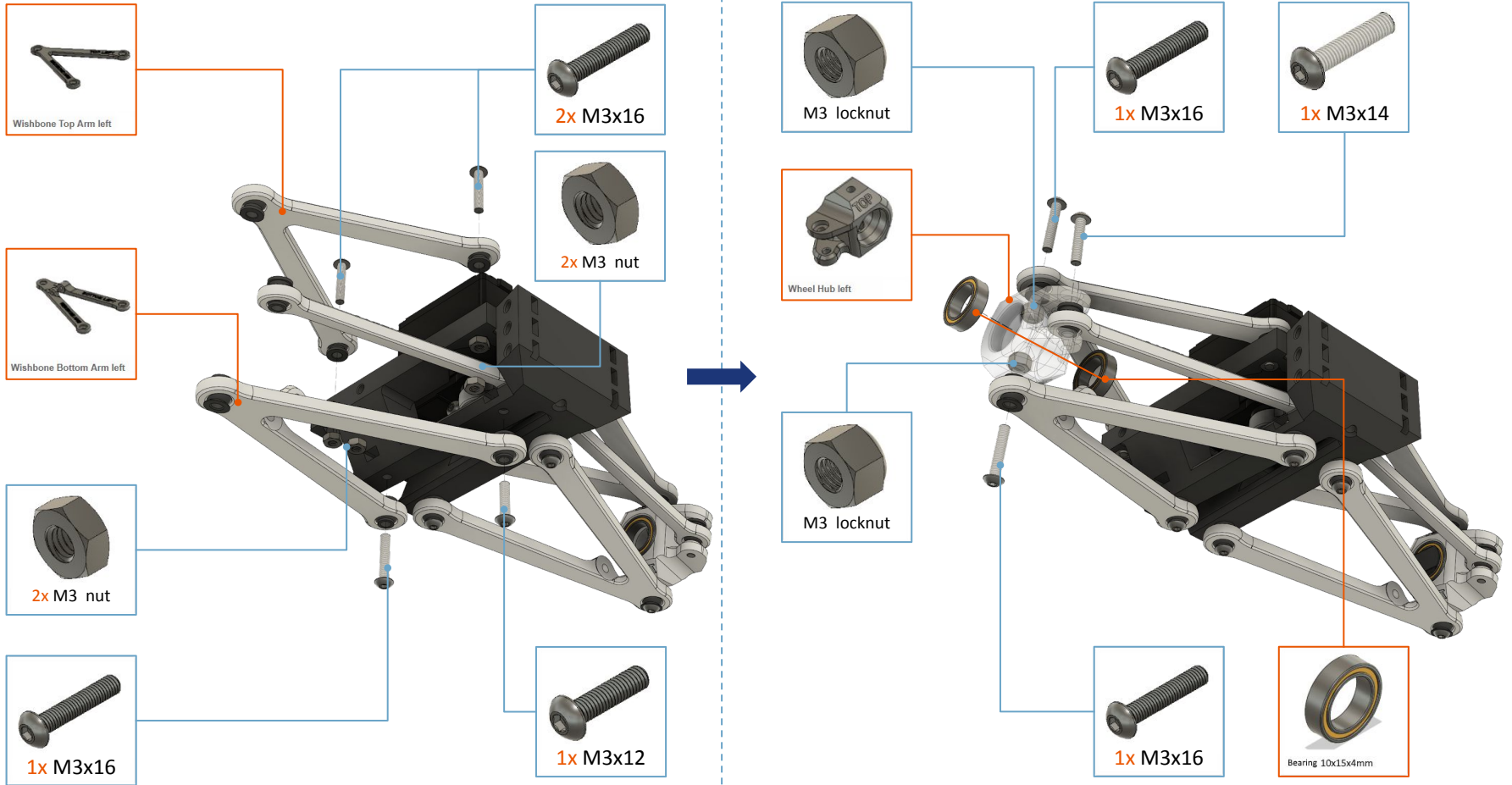


Front Axle – step 5-7/13

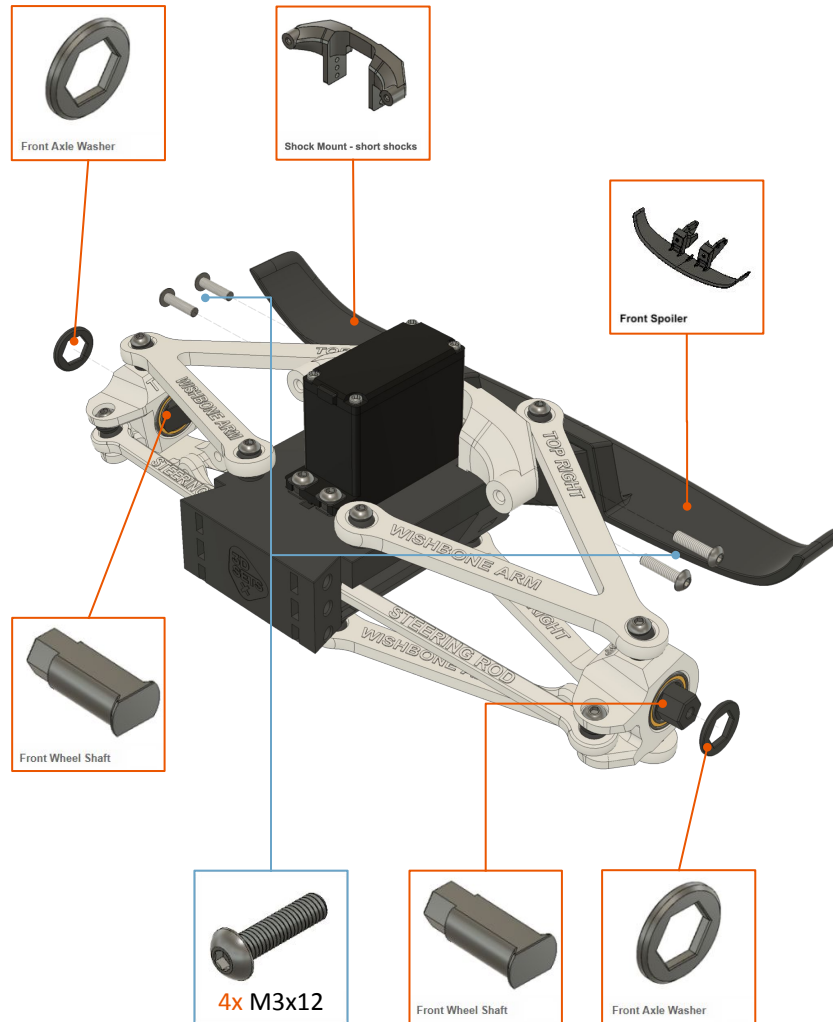
Please make sure that the parts are oriented correctly!



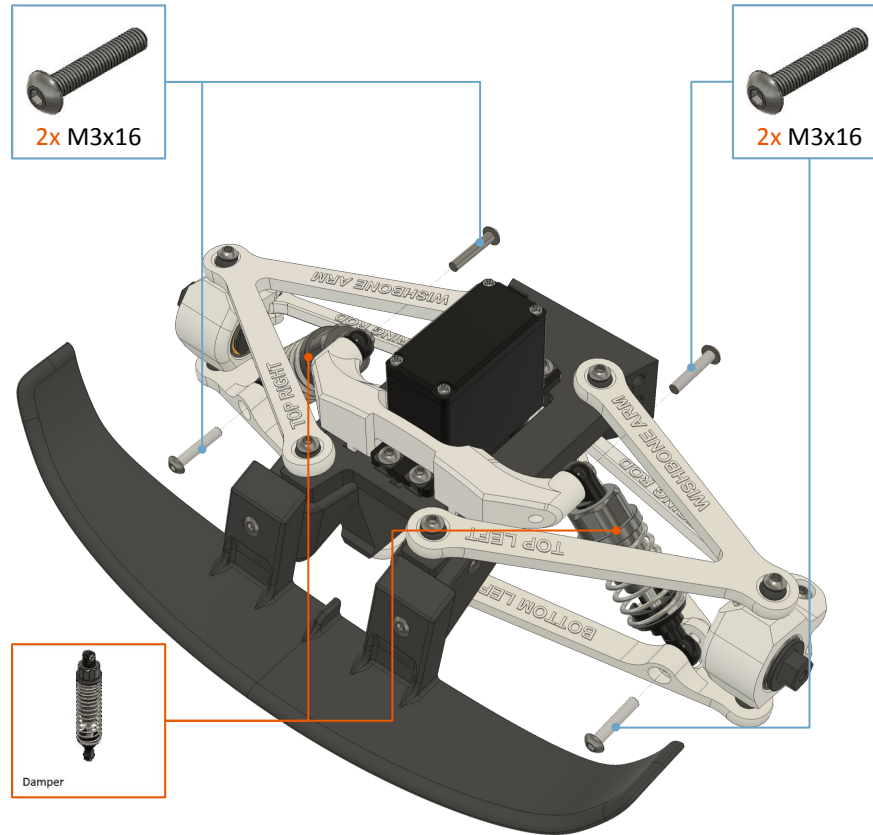
Front Axle – step 8-9/13



Front Axle – step 10/13

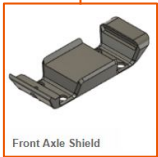
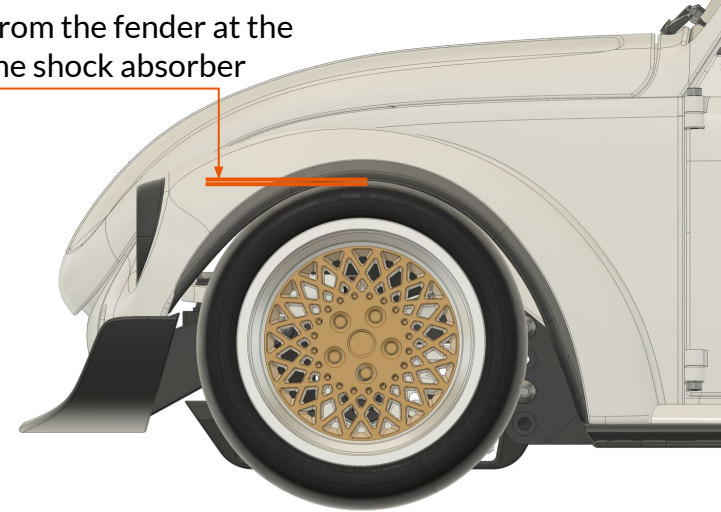
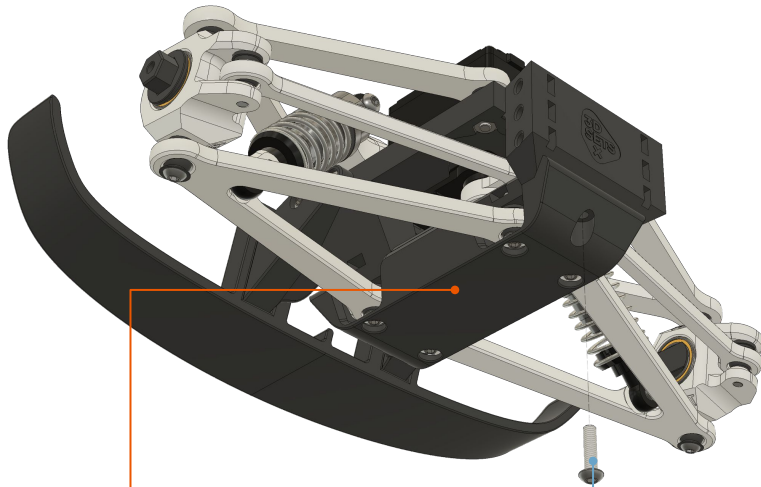


Front Axle – step 11/13



Front Axle – step 12-13/13

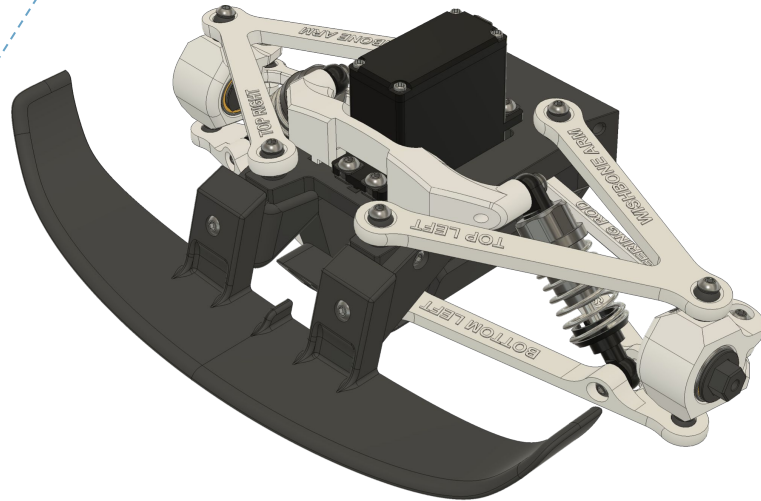
1 mm min. distance of the tire from the fender at the maximum compression of the shock absorber



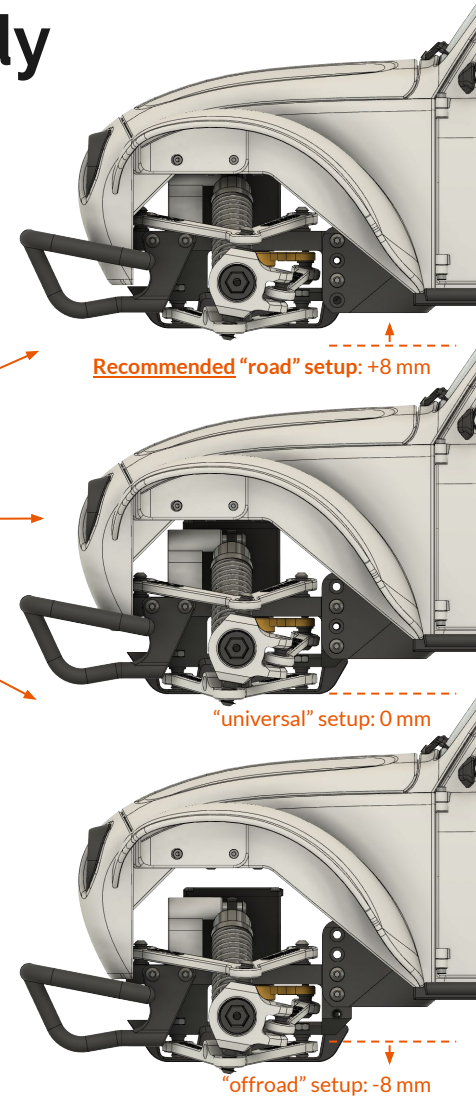
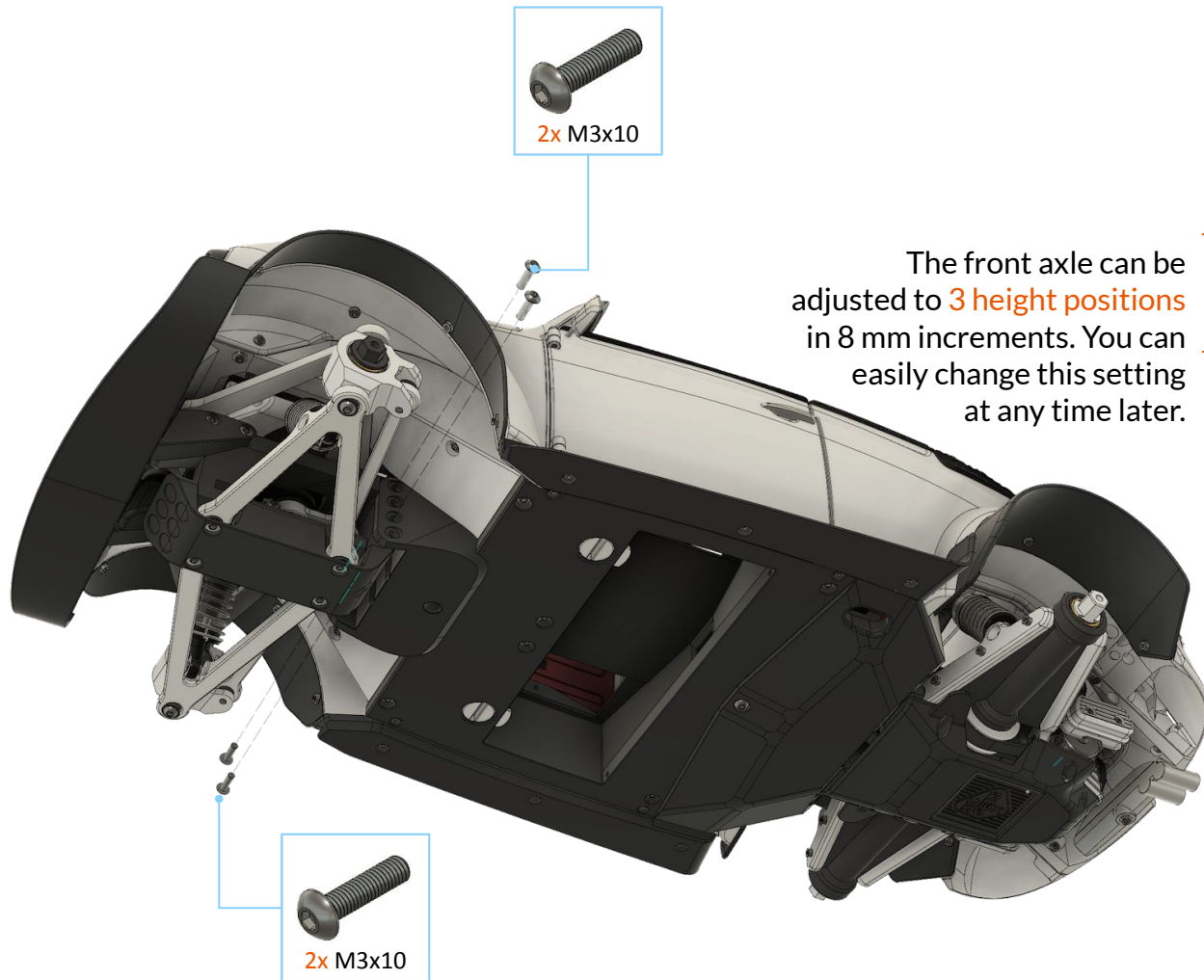
Front Axle Shield



1x M3x12



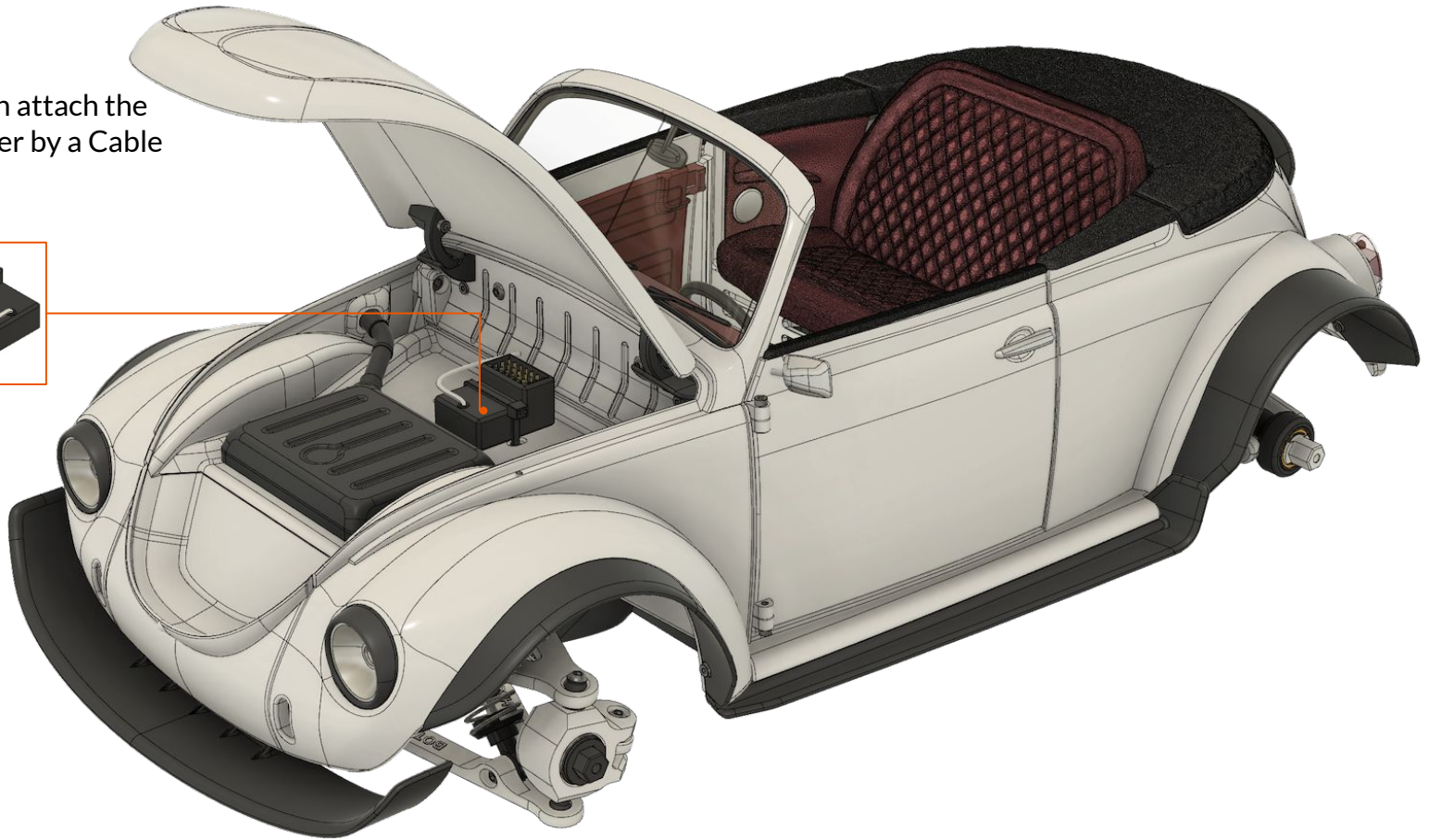
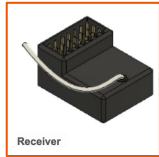
Installation of the Front Axle in the body





Receiver Installation

You can attach the Receiver by a Cable Tie.



Front Seats & Gear Shift

In this procedure you will assemble the Front Seats and Gear Shift. To complete this task, get ready all necessary parts:

Required print plates:

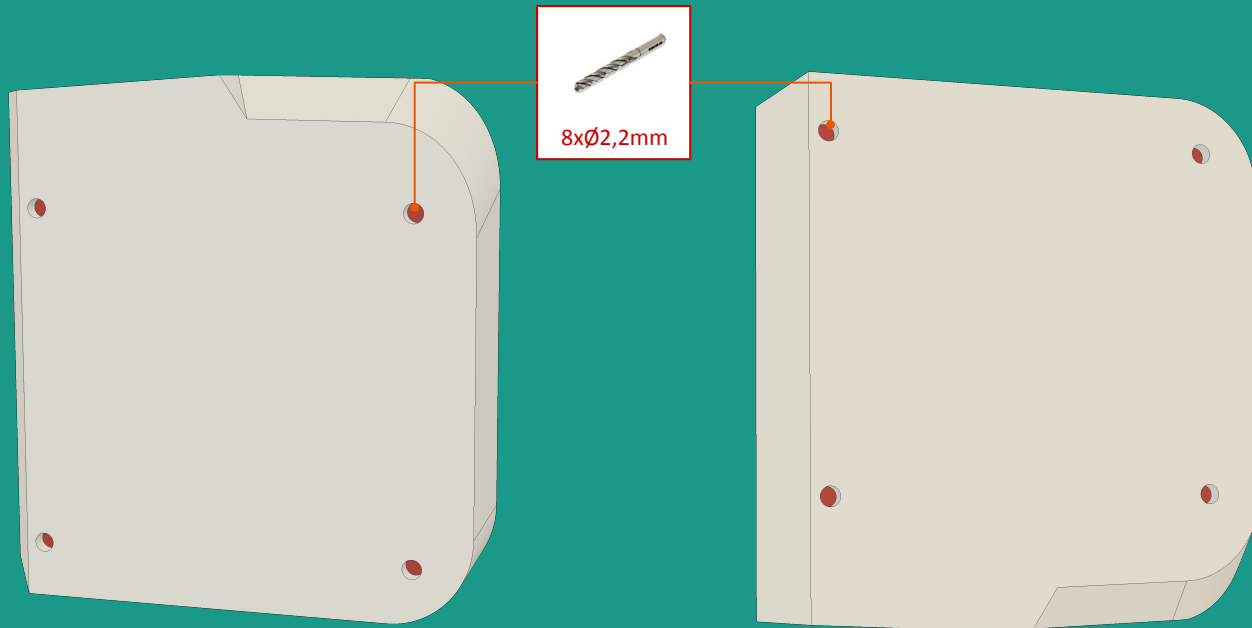
- “Print 6 - Interior - 3”
- “Print 19 - Interior - 4 - Seats”

Non-printed parts:

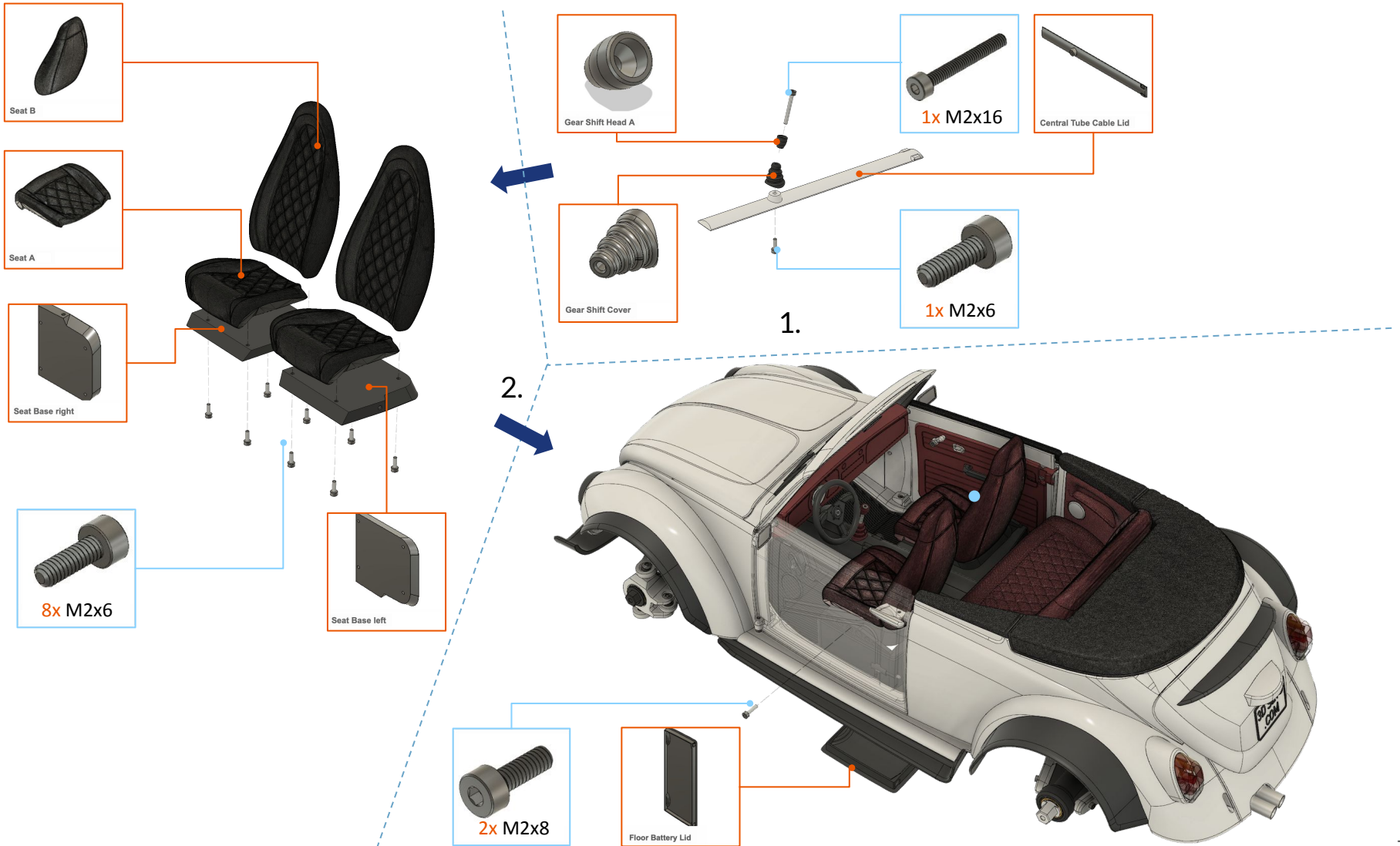
- Screw M2x6: 1 pcs.
- Screw M2x8: 10 pcs.
- Screw M2x16: 1 pcs.

Postprocessing – drilling holes

Please carefully drill through the marked holes that have not been printed through to make printing easier.



Front Seats & Gear Shift



Subassembly – Wheels

Now you will assemble wheels. You can choose between two different wheel designs:

Wheel C – modern style casted 10 spoke wheel:



Wheel D – classic style casted wheels:





Subassembly – Wheel C

- Front Wheel Tyres – outer diameter 80-90 mm, maximum width 35 mm, rim diameter 2.2 inches
- Rear Wheel Tyres – outer diameter 80-90 mm, maximum width 46 mm, rim diameter 2.2 inches

Wheel C:

Required print plates for Tyre 2.2 - Narrow:

- Print 38 - Buggy Wheel A - Front - tyre 2.2 narrow

Required print plates for Tyre 2.2 - Normal:

- Print 39 - Buggy Wheel A - Front - tyre 2.2 normal

Required print plates for Tyre 2.2 - Wide:

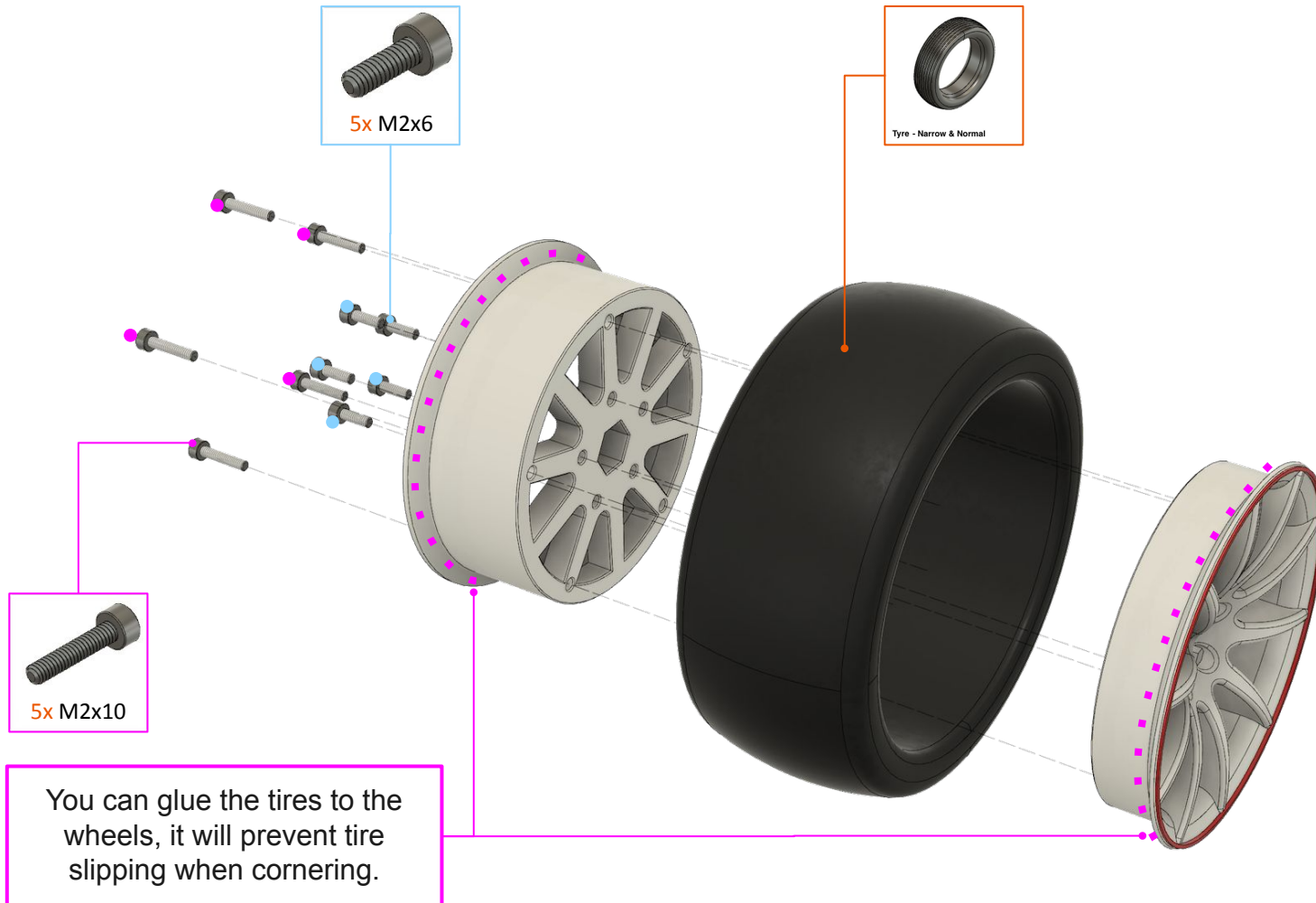
- Print 40 - Buggy Wheel A - Rear - tyre 2.2 wide

Non-printed parts:

- Screw M2x6: 20 pcs.
- Screw M2x10: 20 pcs.



Wheel C - Narrow, Normal & Wide





Subassembly – Wheel D

- Front Wheel Tyres – maximum outer diameter 90 mm, maximum width 31 mm, rim diameter 1.9 or 2.2 inches
- Rear Wheel Tyres – maximum outer diameter 100 mm, maximum width 46 mm, rim diameter 1.9 or 2.2 inches

Wheel D:

Required print plates for Tyre 2.2 - Narrow:

- Print 42 - Buggy Wheel B - Front - tyre 1.9 narrow

Required print plates for Tyre 2.2 - Normal:

- Print 43 - Buggy Wheel B - Front - tyre 2.2 normal

Required print plates for Tyre 2.2 - Wide:

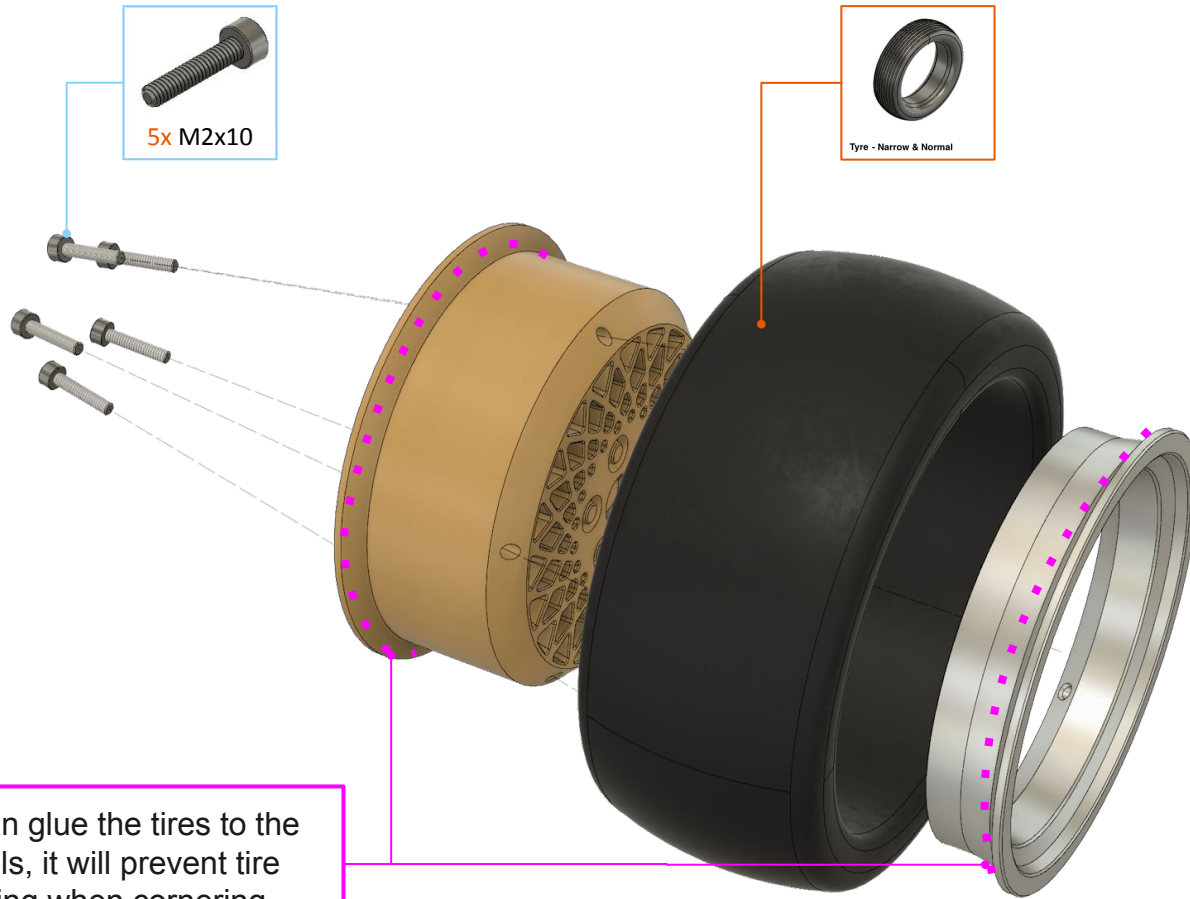
- Print 44 - Buggy Wheel B - Rear - tyre 2.2 wide

Non-printed parts:

- Screw M2x10: 20 pcs.



Wheel D - Narrow, Normal & Wide



You can glue the tires to the wheels, it will prevent tire slipping when cornering.

Mounting the Wheels

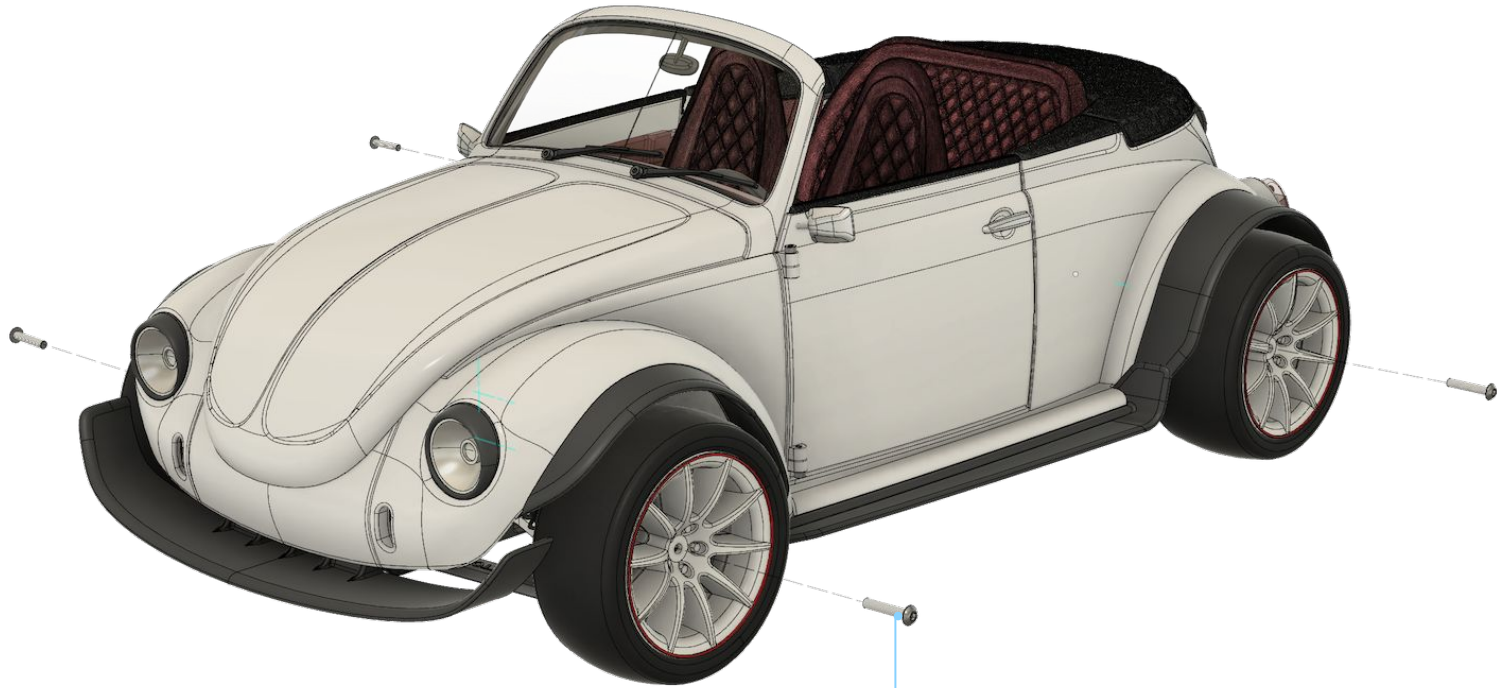
In this procedure you will mount the Wheels. To complete this task, get ready all necessary parts:

Non-printed parts:

- Screw M3x16: 4 pcs.



Buggster: Wheels C



4x M3x16



Buggster: Wheels C





Buggster: Wheels D



4x M3x16



Buggster: Wheels D





Buggster - general tips

- Always use a proper battery charger. Bad charging of the Li-Pol battery may lead to a risk of fire!
- Disconnect the battery when the model is not used. The small switch on the ESC doesn't disconnect the battery and the ESC may draw a small amount of current even in OFF-state.
- Do not go into water unless you have waterproof electronics!