



RB7

RADIO CONTROLLED • BUILD IT YOURSELF • NITRO ENGINE

Pack 5



Stages 17-20



RB7



With this pack you will receive the Red Bull Racing RB7 exploded view leaflet showing all the components in detail. The build stages are referred to as issues.

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RED BULL RACING RB7 complies with CE regulations.

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THE SERVO SAVER: CONSTRUCTION AND FUNCTION

UNINTENTIONAL CONTACT WITH THE BOUNDARIES OF THE CIRCUIT OR WITH OTHER VEHICLES ARE PART OF EVERYDAY LIFE IN RC CAR RACING. THE SERVO SAVER ACTS AS A FLEXIBLE BUFFER TO ENSURE THAT KNOCKS ON THE WHEELS ARE NOT TRANSFERRED TO THE STEERING SERVO.

Using the components supplied with this pack, you will be able to assemble the part of the steering system that will convey the motion of the steering servo to the front wheels in order to change the car's direction.

A VITAL ROLE

The steering rod plays a vital role in the steering system by transferring the movements of the servo to the steering crank, which then engages with the steering

slider. This direct connection results in the wheels being turned immediately as the servo is activated by the remote control. This is ideal for the RC driver, who expects steering commands to be acted on as quickly and directly as possible.

There is, however, a drawback to this arrangement. As a result of the direct connection, any knock on the wheels of the front axle could jam the steering servo or damage its delicate inner mechanism. In order to prevent this from

The servo saver is a flexible joint that is integrated within the servo horn, the lever arm (seen here towards the left of the picture) that is mounted on top of the steering servo and which actuates the steering rod.





A cam-type servo saver for competition models. The force pressing the upper and lower parts together can be adjusted by tightening the coil spring. The steering linkage is connected to the short upper arm, while the longer lower arm moves the wheels.

happening, RC models are fitted with a device called a servo saver, which is a shock-absorbing element or buffer in the steering control linkage.

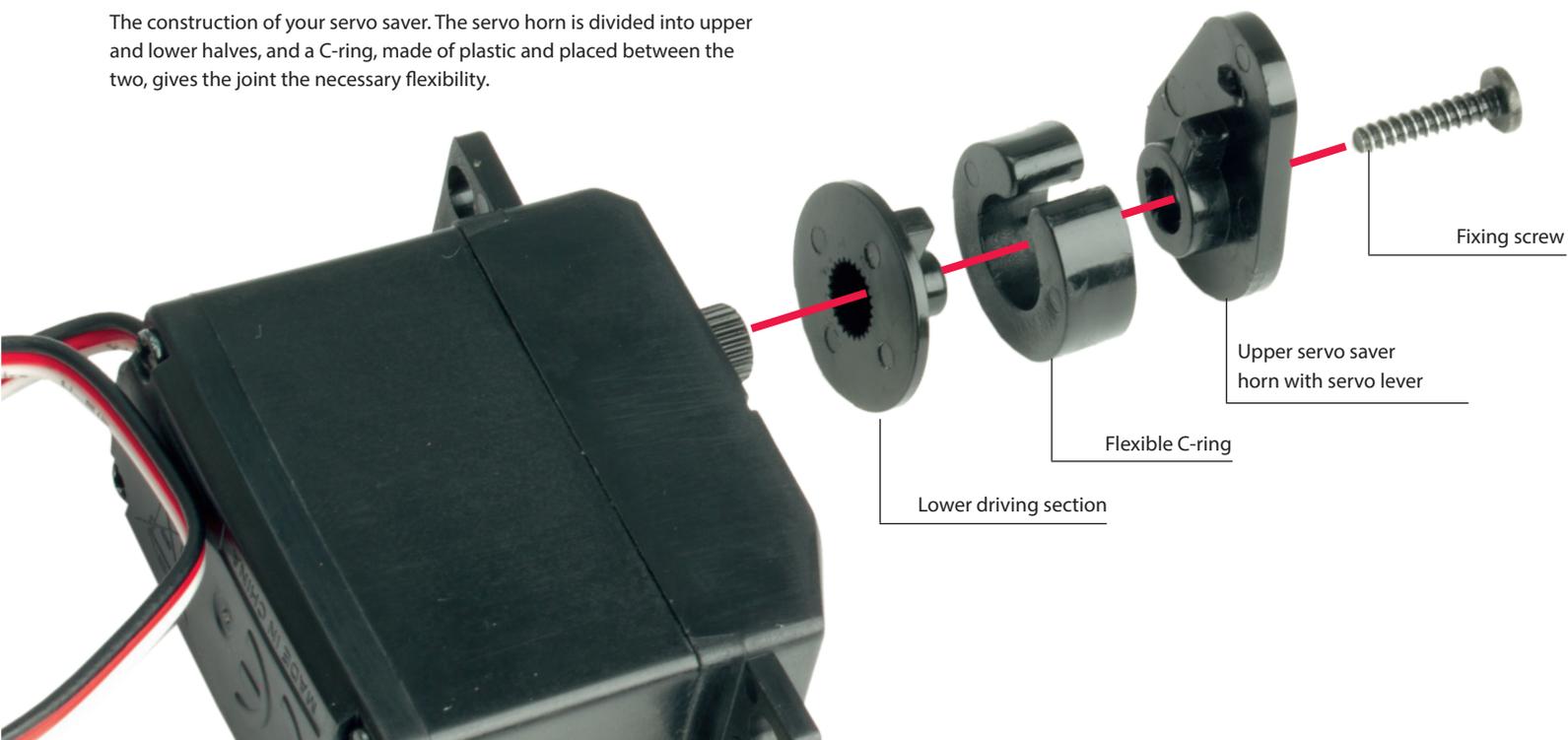
In principle, this buffer can be placed at various junction points of the steering mechanism, and on

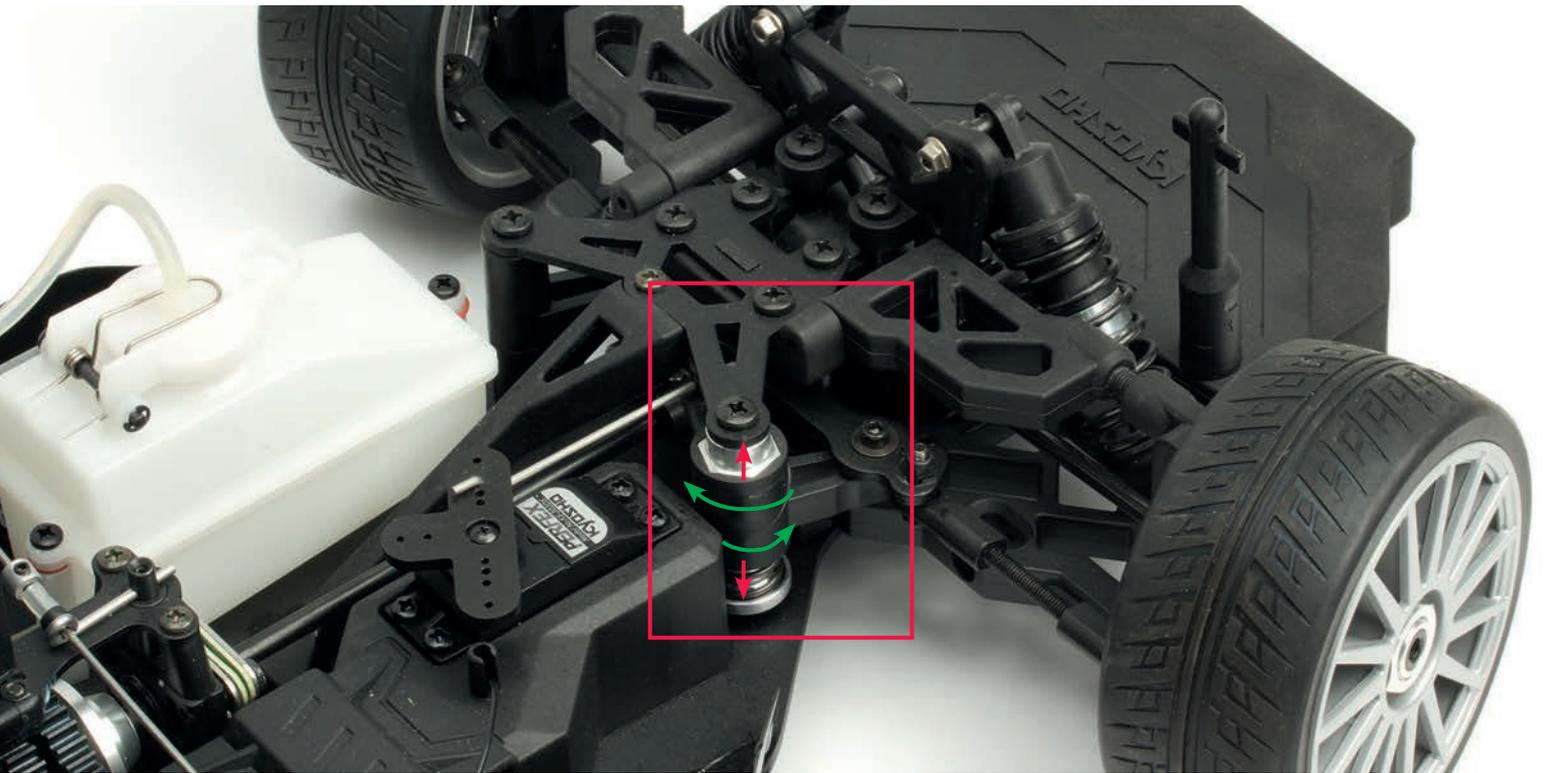
many competition models, it is placed at the front end of the steering rod near the front axle, if there is enough room to fit it there. This is not the case with your RB7 racer because, as on the real car, the nose of your model has been kept as flat and as slender as possible. That is why the servo saver has been installed near the other end of the steering rod, below where the rod is directly connected to the lever at the output point of the servo. This lever is also known as the servo horn.

SPLIT DRIVE

In order to achieve the necessary flexibility, servo savers usually have a split construction. The type used in your model is integrated into the servo horn, which is a very simple and extremely space-saving solution. The circular

The construction of your servo saver. The servo horn is divided into upper and lower halves, and a C-ring, made of plastic and placed between the two, gives the joint the necessary flexibility.





This shows how a cam-type servo saver reacts to a high-speed crash. In accidents, the front wheel often takes a severe knock. When this happens, the servo saver mitigates the effects by allowing its upper part to ride up over the lower part, compressing the spring instead of transferring the turning force to the servo.

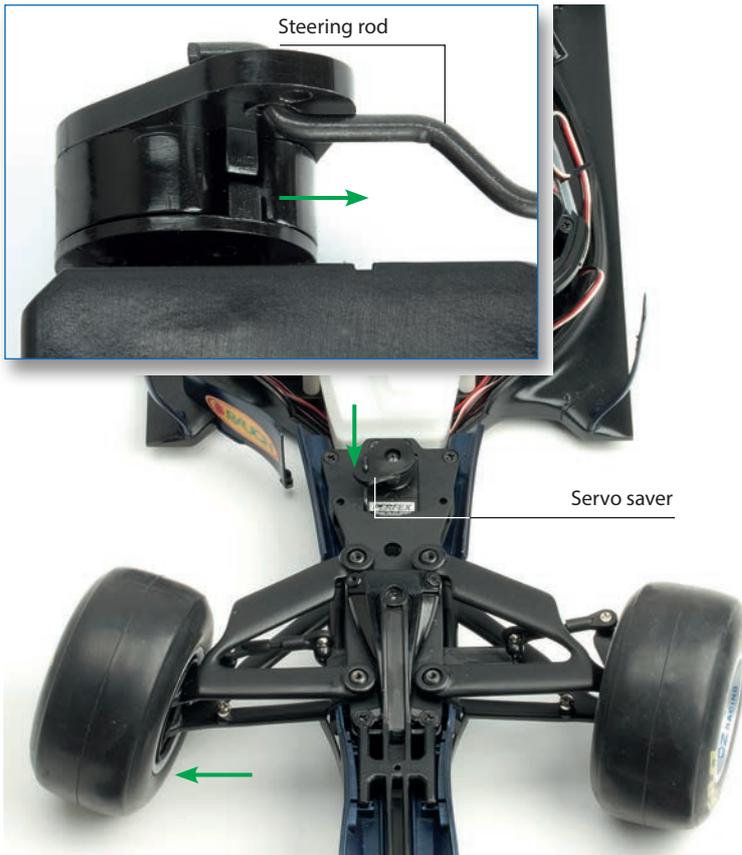
lower part of the servo horn is attached to the output pinion of the servo by a splined central hole. Mounted on top of it, but free to turn on the same axis, is the lever-shaped upper horn. The contact faces of both of the two components have a driving tab that fits into the gap of a C-ring made of flexible plastic. This normally links the two so that they turn together, but if excess force is applied, the C-ring will open out, allowing the horn to move without turning the server. The stiffness and thickness of the material of the C-ring determine the force that will cause it to 'break' the drive.

The construction of the cam-type servo saver used on competition models is more elaborate and slightly

bulkier, with an upper part, linked to the servo, and a lower part, linked to the steering rod. A camming surface between the two parts allows them to move relative to each other, and a coil spring with adjustable tension determines the contact pressure between them. By adjusting the spring tension, the slippage of the servo saver can be varied to suit both the particular circuit and the individual driving style of the owner. As with the C-ring type of servo saver, if the steering mechanism takes a knock, the upper part of the saver will turn without moving the lower part, to prevent the servo from being damaged.

THE SERVO SAVER IN ACTION

RC racing cars like your RB7 can reach speeds of 50km/h or more. In such circumstances, contact with the kerb is far from a gentle impact. However, the effect of centrifugal force in the corners means that the front axle is subjected to enormous stress even if no driving



Unless subjected to an external shock, an integral servo saver acts like a rigid lever and transfers the rotation of the servo to the steering rod (inset), which operates the steering linkages.

errors are made. The steering linkage needs to ensure that the desired direction is maintained, and the small electric motor inside the servo generates the power needed to achieve this by means of a train of small, fine-toothed gearwheels housed within it – a very delicate mechanism in view of the task that it has to perform.

If hitting a stone on the circuit, or a collision with another vehicle, were to transfer the force of the impact directly to the steering servo, it could have damaging consequences for the mechanism. Firstly, it could damage the gearwheels and bearings in the servo, and secondly, each impact on the steering could also change the position of the servo arm on the steering servo. Unlike the driver of a real car, the controller of an RC model doesn't receive feedback via his transmitter, so cannot feel the wheels being knocked off line and react by adjusting the steering.

DAMAGE LIMITATION

The servo saver integrated in the servo horn remedies this problem. When the servo itself moves, the stiffness of the C-ring in the saver is great enough to transfer the motion to the steering rod without loss. The driving tabs on the inner sides of the upper and lower parts of the servo saver stay in line. But when the steering is overstressed by an outside force, the stiffness of the C-ring is overcome, so that the tabs of the upper and lower parts move apart. After the impact, the servo saver snaps back into its initial position and so realigns the wheels correctly again.



If one of the front wheels is knocked out of its position, the impact is transferred through the steering rod to the servo horn (see red arrows). But when the upper part of the saver reacts to the shock, the C-ring distorts, allowing the driving tabs to move apart so that the lower part – and also the servo pinion – remains in its original position (see inset photograph).

Stage 17

FITTING THE STEERING SERVO

IN THIS SESSION YOU WILL BE FITTING THE STEERING SERVO TO THE FRONT CHASSIS ASSEMBLY. YOU WILL NEED THE SPACERS AND SERVO MOUNT SUPPLIED WITH PACK 3 TO COMPLETE THIS ASSEMBLY.



Tools & Materials

Phillips screwdriver (size 2)
Tape

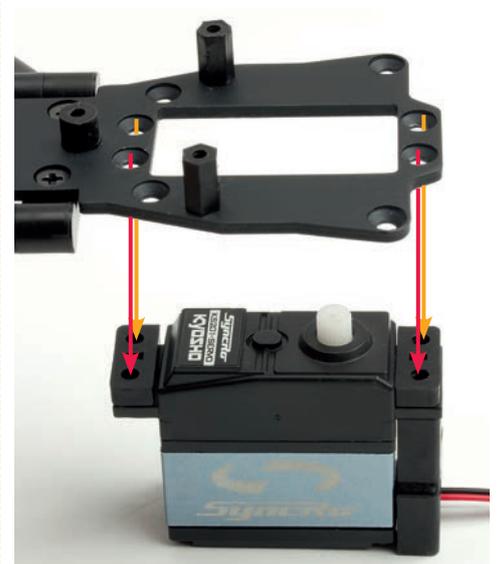
1 The steering servo



01 Place the steering servo as shown. Take the two spacers supplied with Pack 3 and place them on the tabs on either side of the servo, with the grooves facing down and the rounded corners positioned on the outside.



02 Now take the mount (Pack 3), position over the servo wires and slide it under the tab (see red arrow), with the rounded edges facing out.



03 Hold the lower front chassis as shown in the photo, so that the rectangular cutout surrounds the top of the servo housing and the holes are aligned (see arrows).



04 Take the Phillips screwdriver and screw two of the four 3 x 16mm screws (Pack 3) into the aligned holes on the right-hand side of the servo.



05 Place the remaining two 3 x 16mm screws into the two holes on the left-hand side of the servo (see arrow).

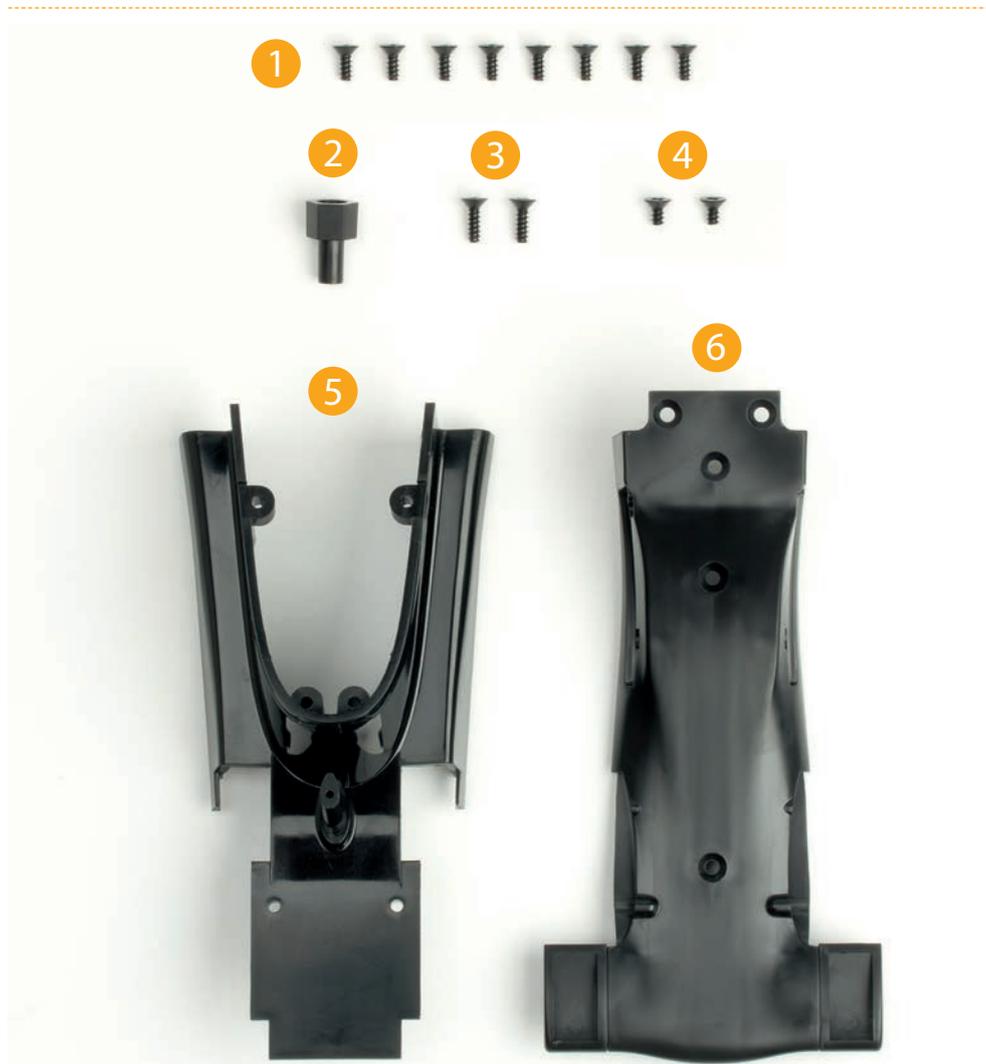


06 As the screws inserted in the previous step cannot be tightened, you will need to secure them with a strip of tape to prevent them falling out. Store the parts safely until the next issue.

Stage 18

FRONT BULKHEAD AND LOWER NOSE

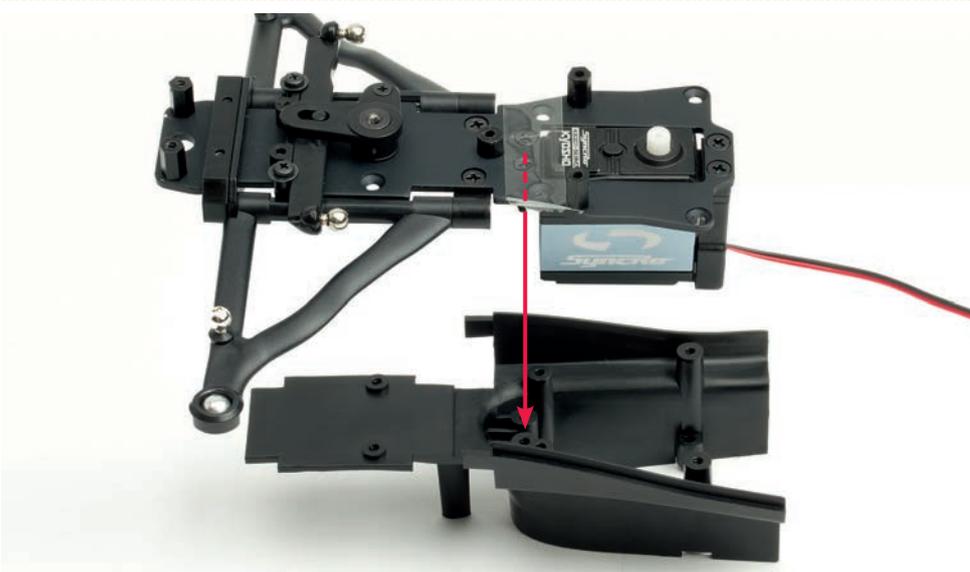
CONTINUE ASSEMBLING THE CHASSIS OF YOUR RB7 RACER BY FITTING THE FRONT BULKHEAD AND ADDING THE LOWER PART OF THE NOSE SECTION.



Tools & Materials

Phillips screwdriver (size 2)

- ① 8 countersunk screws 3 x 8mm
- ② Bearing insertion tool
- ③ 2 countersunk screws 3 x 10mm
- ④ 2 countersunk screws 3 x 6mm
- ⑤ Front bulkhead
- ⑥ Lower nose



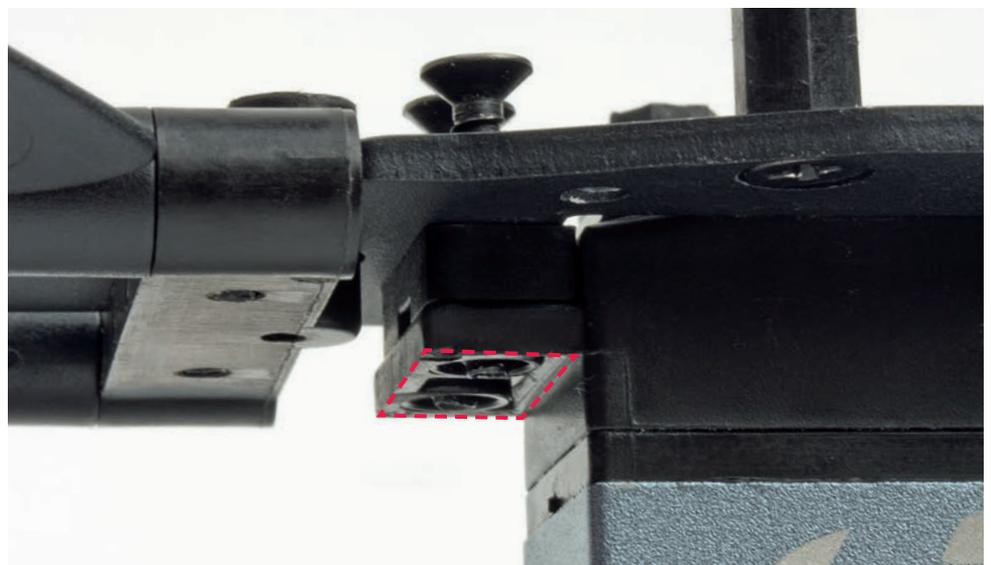
01 The photo above shows how you place the front lower chassis on the front bulkhead. The correct positioning is important because the holes in the two pieces must be exactly aligned. The red arrow indicates the area in which the first screws will be inserted.



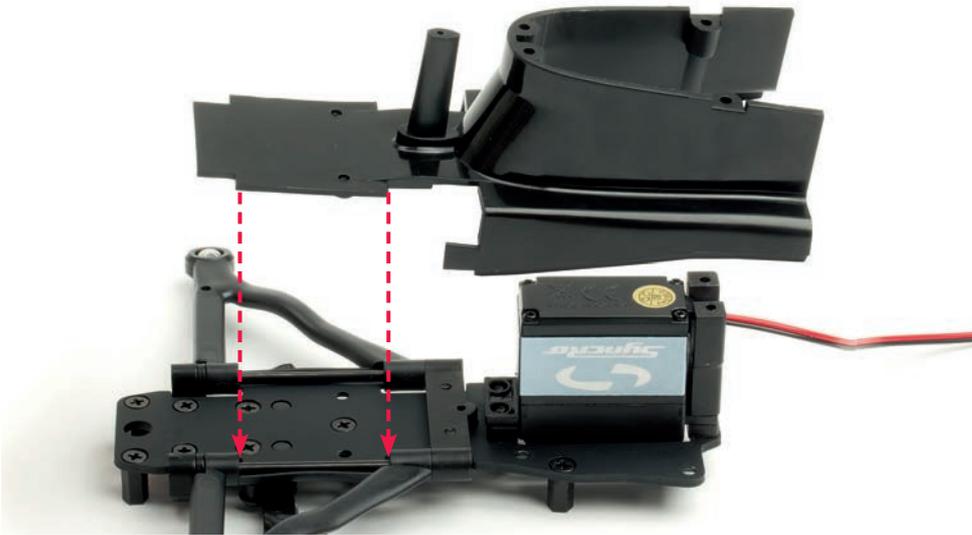
02 Remove the tape securing the two screws from Stage 17.



03 Use a size 2 Phillips screwdriver to loosen the two screws at the front of the servo.



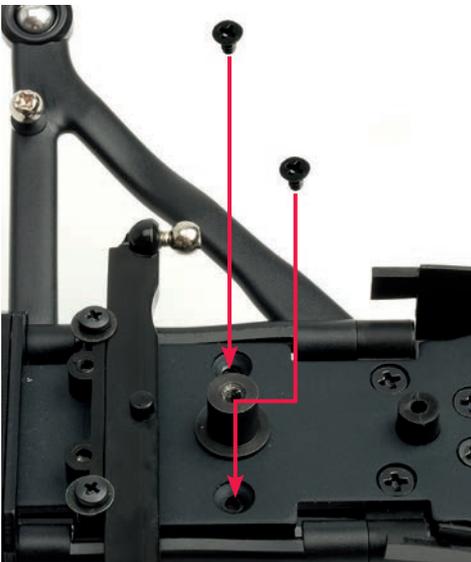
04 Undo the two screws until their shanks are not visible in the holes on the front of the servo, as indicated by the broken red lines. The bulkhead cannot be positioned accurately if the screws protrude from the holes.



05 Turn over the front lower chassis, as shown, then place the front bulkhead onto it. The two red arrows show you exactly how it should be positioned.



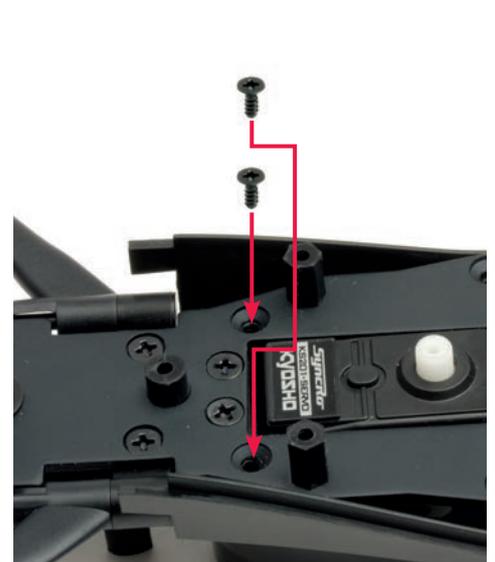
06 Holding both parts in that position, turn them over, as shown in the photo above, then tighten the two screws that you loosened in Step 03.



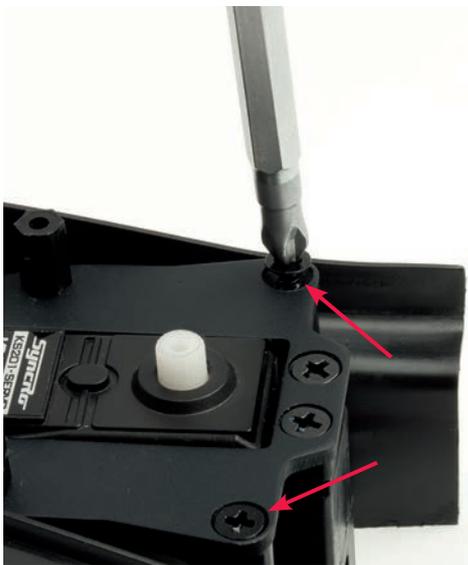
07 Take the two 3 x 6mm screws and place them into the two holes on either side of the steering crank collar.



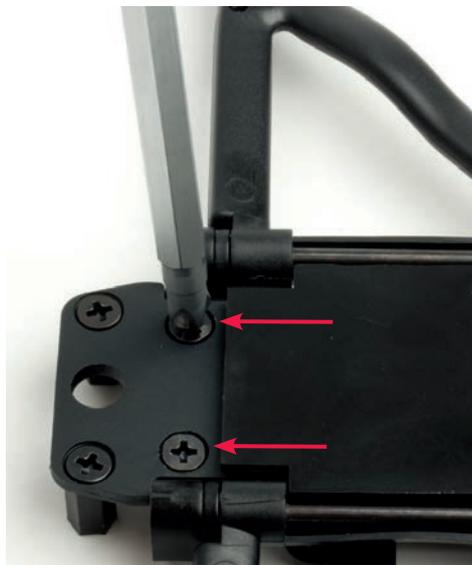
08 Using the Phillips screwdriver, tighten the screws into their holes.



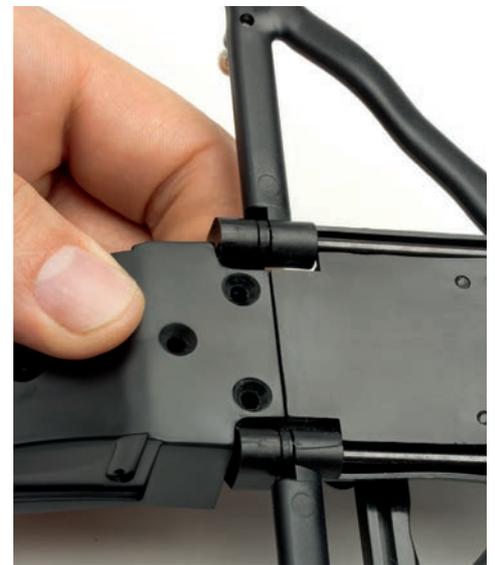
09 Tighten two of the 3 x 8mm screws all the way into the two holes indicated above.



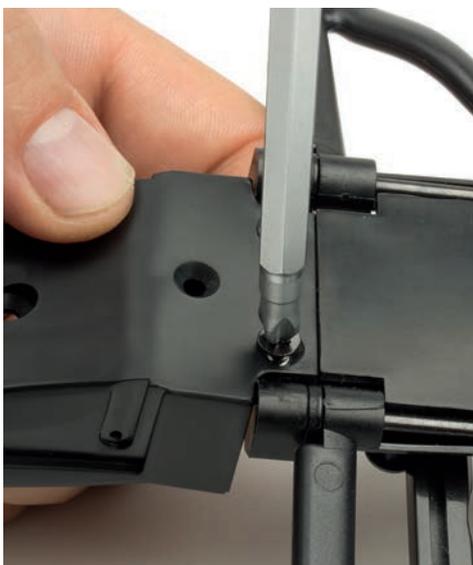
10 Screw two more 3 x 8mm screws into the two holes at the rear end of the front lower chassis.



11 Remove the two screws indicated from the front lower chassis and put them to one side.



12 Take the lower nose and place it at the front end of the assembly, aligning the holes of both parts.



13 Replace the two screws removed in Step 11 to fix the lower nose in place.

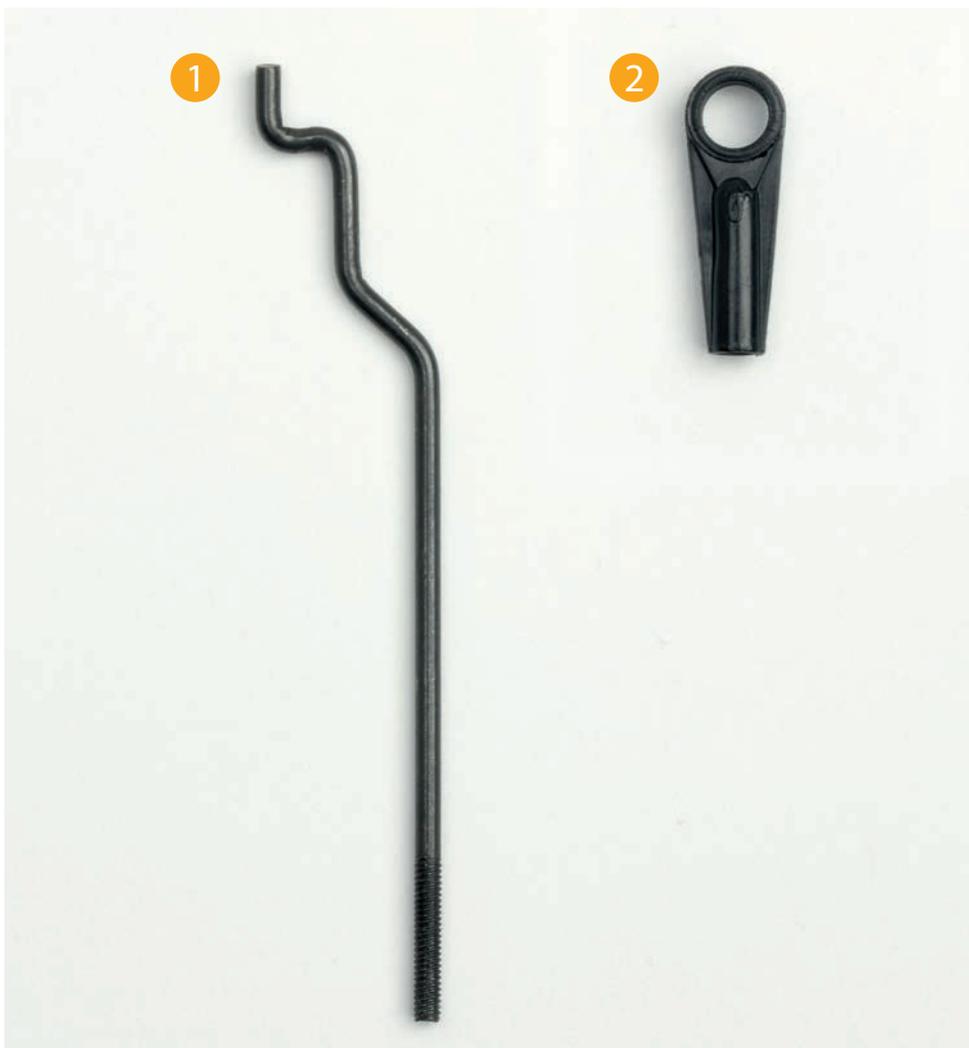


14 At the end of this stage of assembly, the front chassis of your RB7 should appear as in the above photo. Store it safely until it is needed again.

Stage 19

FRONT CHASSIS ASSEMBLY

DURING THIS STAGE, YOU WILL CONNECT THE STEERING ROD TO THE STEERING CRANK, THEN MOUNT THE FRONT UPPER WISHBONES ONTO THE FRONT CHASSIS.



Tools & Materials

Phillips screwdriver (size 2)
Angled needle-nose pliers (smooth)

- 1 Steering rod
- 2 4.8mm ball end



01 Take the steering rod and the ball end, and place the ball end onto the threaded end of the rod, as shown above.



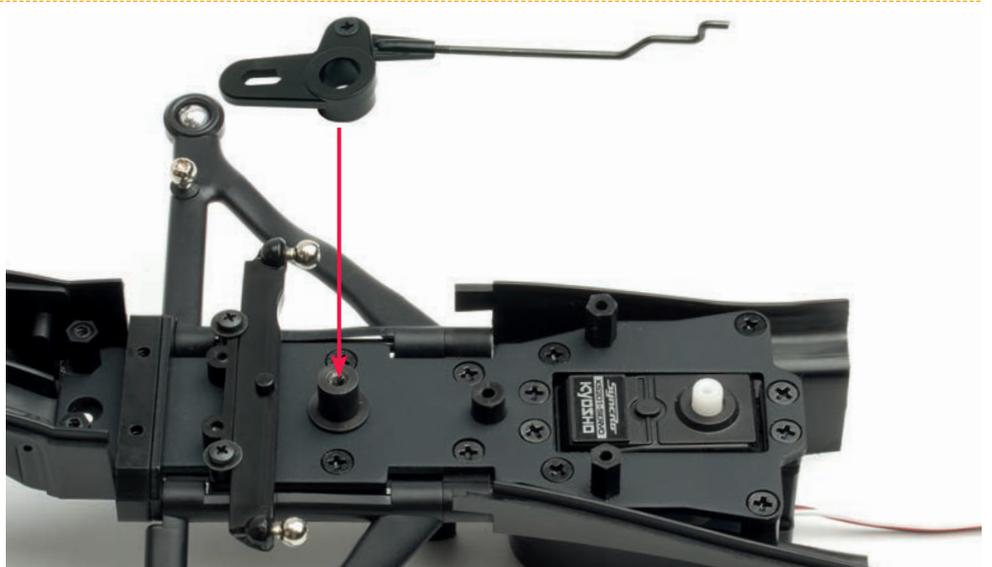
02 Turn the ball end clockwise to screw it fully onto the steering rod end, as shown in the lower photo.



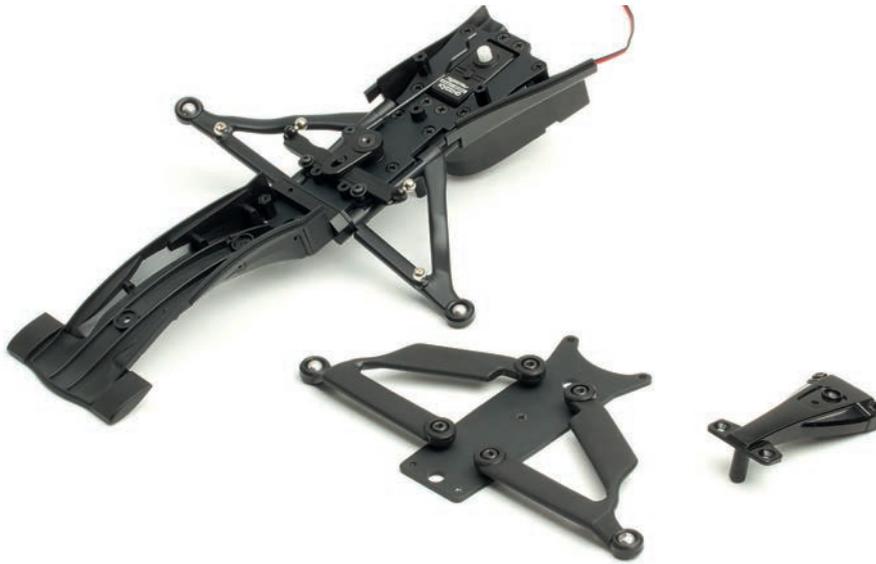
03 If the ball end cannot be turned by hand, use pliers to help.



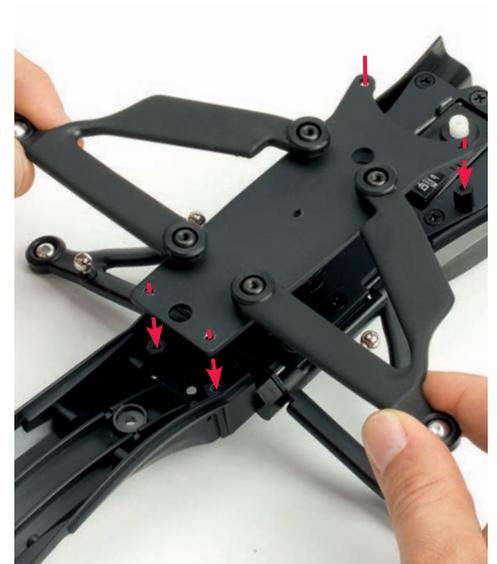
04 Hold the steering crank so that the bottom is facing up. Put the ball end on the ball nut on the steering crank, and use pliers to press the rod and ball end assembly into place.



05 Position the assembly with the cranked end of the steering rod pointing upwards, as shown. Place the steering crank onto the crank collar (red arrow).



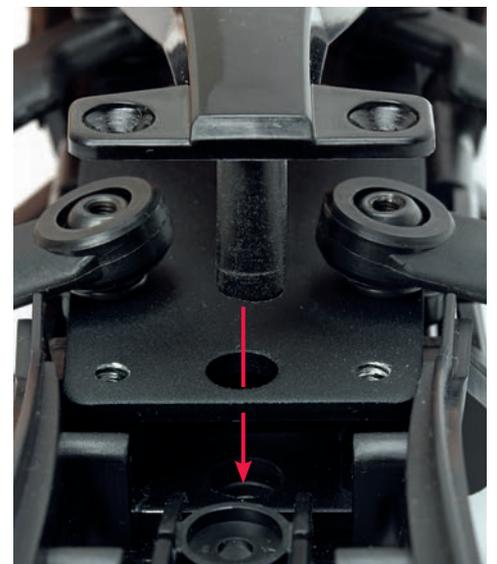
06 For the following assembly steps you need the front lower and upper chassis assemblies and the front pushrod mount.



07 Fit the front upper chassis onto the front lower chassis as shown, aligning the four holes in the corners of the upper chassis with the holes in the lower chassis, as indicated by the red arrows.



08 Position the front chassis assembly as above and hold the pushrod mount above it. Align the holes of both parts, as shown by the right arrow, and align the projection on the underside of the mount with the hole in the front upper chassis, as shown by the left arrow.



09 Place the pushrod mount flat on top of the front upper chassis, inserting the projection on the underside of the mount through the hole (see red arrow).



10 Take the two 3 x 10mm countersunk screws that you removed in Step 01 of Stage 15, insert them into the holes on the front end of the mount and screw them down.



11 Take the 3 x 14mm countersunk screw you removed in Step 01 of Stage 15 and place into the central hole in the rear of the mount (see red arrow).



12 Tighten the screw all the way into the hole to secure the two parts together, making sure that the mount is in the correct position as shown in the following step.



13 Make sure that the rear of the mount is sitting on the spacers, as in the lower photo, and not clear of them as in the upper picture.

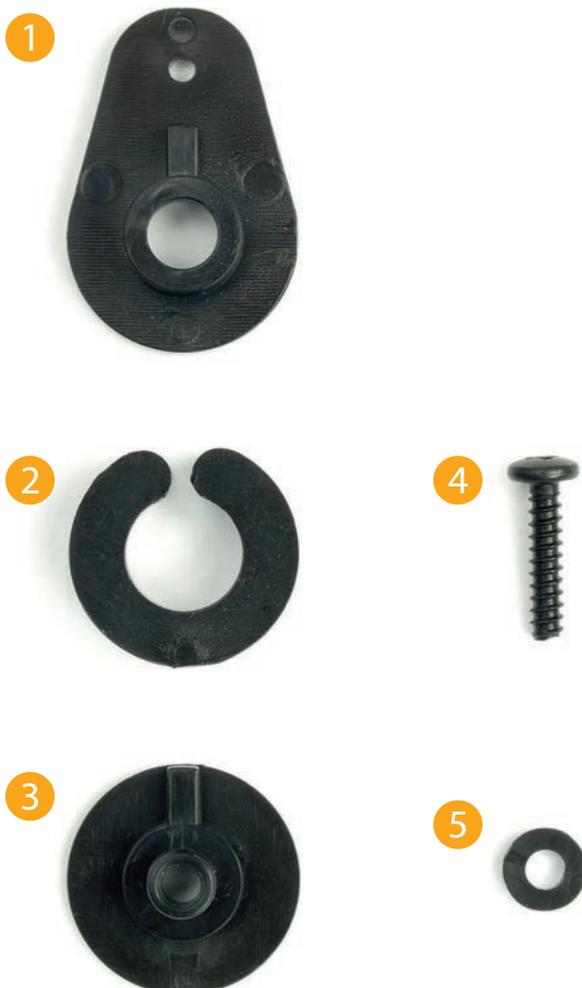


14 At the end of this stage of assembly, the front chassis of your model should appear as above. Store the entire assembly carefully until it is needed again.

Stage 20

FITTING THE SERVO SAVER

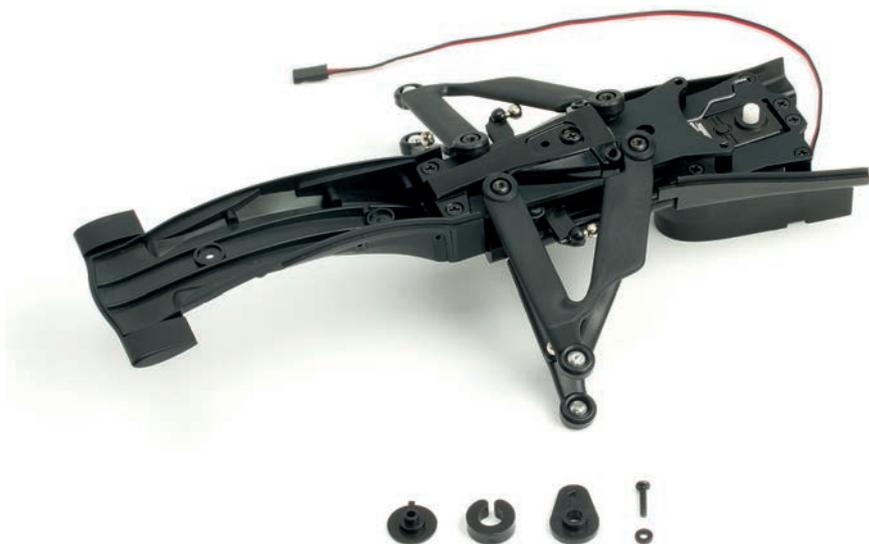
ASSEMBLE THE SERVO SAVER AND FIT IT INTO PLACE ON THE OUTPUT SHAFT OF YOUR MODEL'S STEERING SERVO.



Tools & Materials

Phillips screwdriver (size 1)

- 1 Upper servo saver horn
- 2 Servo saver C-ring
- 3 Lower servo saver horn
- 4 2.6 x 12mm self-tapping screw
- 5 Servo saver washer



01 The role of the servo saver is to protect the steering servo from damage if the front wheels hit an obstacle. It is made up of three components, which can rotate against each other and thus ensure that any external forces acting on the steering mechanism are prevented from damaging the steering servo. A screw and a spacer fix the servo saver to the servo horn.



02 First, take the lower servo saver horn and place the C-ring over it, as shown.



03 The gap of the C-ring should sit exactly over the raised area (red arrow).



04 Turn the lower horn and C-ring over and position them over the upper horn (red arrow).



05 Make sure that the raised areas of the upper and lower horns rest in the gap of the C-ring.



06 Your assembled servo saver should look like the one in this photo.



07 In this picture, you can see where the servo saver will be installed – on the output shaft of the steering servo (red arrow). Position the front chassis assembly as shown, prior to fitting the servo saver.



08 Identify the steering rod, fitted in Stage 19. This will help with the placement of the servo saver.



09 Take the servo saver and hold it as shown in the photo. In the next step, the hole in the saver will go over the end of the steering rod (see red arrow).



10 Place the servo saver onto the end of the steering rod, sliding it forward until it comes to the first bend.



11 Turn the servo saver through an angle of 90 degrees, following the bend in the steering rod.



12 Holding the servo saver as shown above, position it over the projecting steering servo output shaft (see red arrow). Then push the saver down onto the shaft.



13 Place the washer in the hole on the top of the servo saver. Then take the 2.6 x 12mm screw and place it through the washer and into the hole (see red arrows).



14 Turn the screw all the way into the hole with a size 1 Phillips screwdriver.



15 At the end of this stage your servo saver should appear, as shown, on the front chassis assembly.