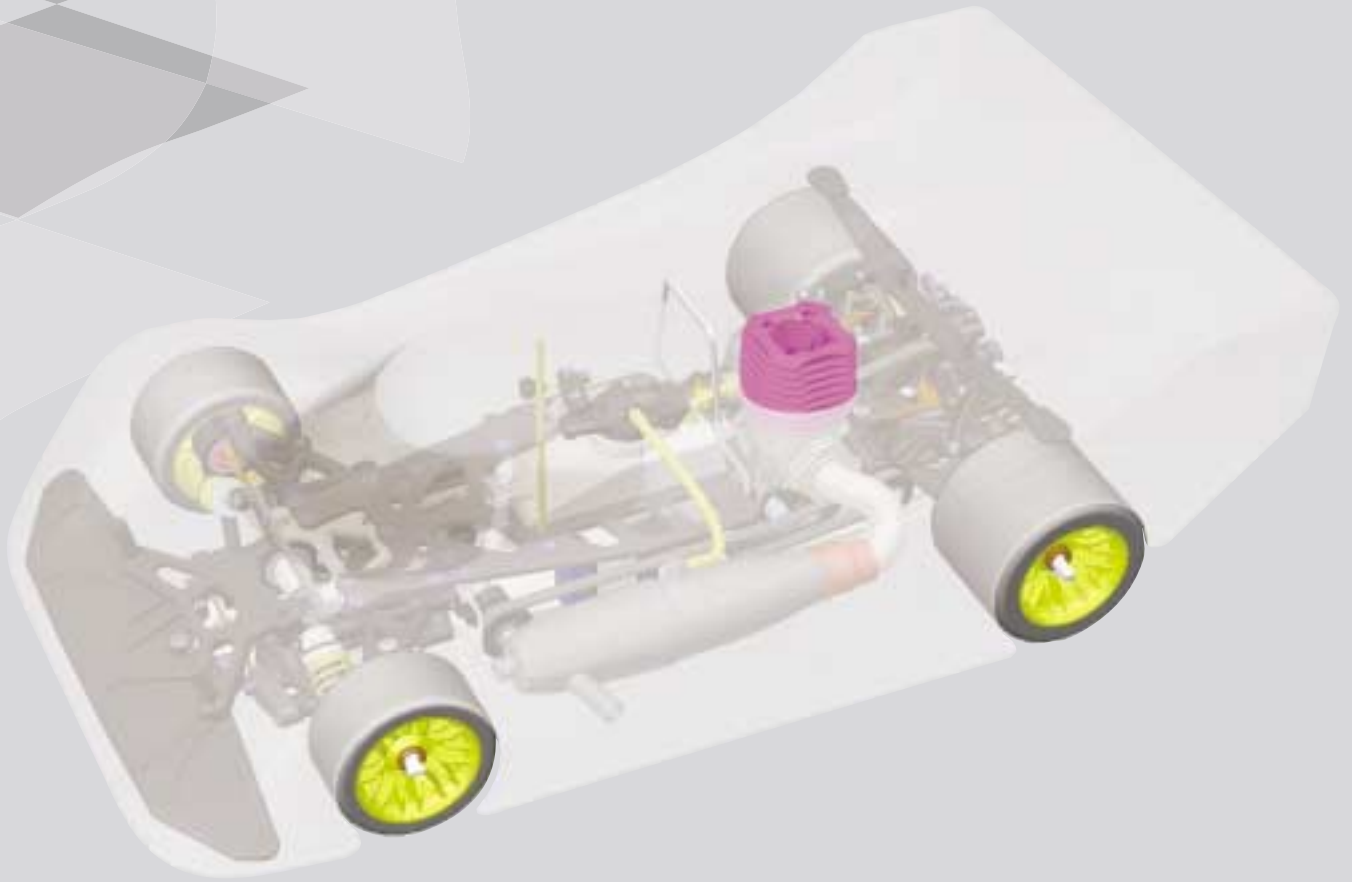


# ***SERPENT*** 950

1:8 SCALE 4WD GAS ON-ROAD COMPETITION



## *Instruction Manual*

# SERPENT 950

## Introduction

### Overview

Congratulations with your newly acquired Serpent 950. You have chosen for the highest quality and ultimate performance combined with ease of use in assembling and set-up as well as superior technical support.

Serpent has a tradition with instruction manuals, and with the new Serpent 950 manual we have yet again gone a step further. The new lay-out has easy to follow step-by-step assembly instructions and building tips, richly illustrated with 3-D rendered images and printed in full color. Following the steps in the manual will result in a well built high performance racing car that will soon be able to unleash its full potential on the racing track.

### Instructions

This manual has 9 sections that will lead you through the assembly process of each of the sections of your Serpent 950. Following this order will ensure that no problems occur during assembly.

Each of the steps includes an area where all the screws, fasteners and ball bearings are shown which are used in that particular step. When a bag number is shown at the top of the left box, you will need to open the bag that is labeled with that number.

### Set-up

In certain assembly steps you need to make basic adjustments. These basic adjustments will give you a

good rough set-up for your Serpent 950 once the car is completed. Fine-tuning the basic set-up is necessary however, this is an essential part of the process of building a high performance mode racing car like the Serpent 950.

The Set-up Guidelines in section 9 of this manual help you to adjust your Serpent 950. It is very important to follow this procedure and to be accurate with your adjustments, not only now, but every time you are preparing the car to go practicing or racing. This is how the best drivers in the world do it, simple, straight forward and accurate!

### Exploded views and parts list

The parts list and the exploded views for the Serpent 950 are separate from the Instruction manual. The exploded views show all the parts for a particular assembly step, together with the Serpent part number. In the parts list at the back of the Reference Guide you will find, with the part number, the name of the part for easy reference when re-ordering.

### Safety precautions

We have enclosed a document with safety precautions concerning the assembly and use of this product, named 'Read this first'. In your own interest, read this document and follow the precautions.

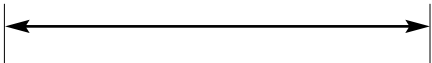











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# PERFORMANCE THROUGH EVOLUTION

# How to use

In every step you will see a selection of lines and numbers. The numbers represent the order in which the step should be assembled. The lines and symbols are listed below each with their own explanation as to their use.

Key	Description
	Length measured after assembling between the two black lines.
	To display the path of one element into another.
	The parts within the lines should be assembled first.
	The direction the item should be moved.
	Shows where one element should be glued to another.
	Shows where one part should be pressed / inserted into another.
	Displays where two elements should be connected to each other.
	The gap between two elements.
   	Displays where either CA glue / Graphite Grease / Thread Lock / or Serpent's Oneway lube should be applied (items not included).

## myTSN.com

The manual that comes with your Serpent 950 is very complete. However, as development is a continuous process, up-to-date information about the Serpent 950 is provided on our web portal: myTSN.com, the state-of-the-art r/c technology portal where Serpent racers from all over the world meet and exchange their ideas and share useful information about, and experiences with, their Serpent cars.

All information about the Serpent 950 is grouped around the product page on myTSN.com. This page can be accessed directly by going to the Products section and type Serpent 950 in the product search box.

Here you will find the very latest information about your Serpent 950: reports by Team racers and other experts with the latest tips and tricks, FAQ,

forums, set-ups, image gallery, downloadable files, and even streaming video about the Serpent 950 on how to further improve the car. The latest version of the manual including team and racer tips, as well as part lists and option lists will be made available as both downloadable PDF-files and viewable online under **i-Manual** in the Serpent 950 product page.

So make sure to visit myTSN and the Serpent 950 page. There is a world of up-to-date information about your 950 waiting for you, and it is just a few mouse clicks away... If not yet a member of myTSN, we strongly suggest to sign up as a member immediately so you can experience and enjoy an even wider range of services from Serpent and other myTSN partners.

[www.myTSN.com/Serpent950](http://www.myTSN.com/Serpent950)

# 1.0 Shock Assembly

## Step 1.1

Bag 01

Shock Assembly



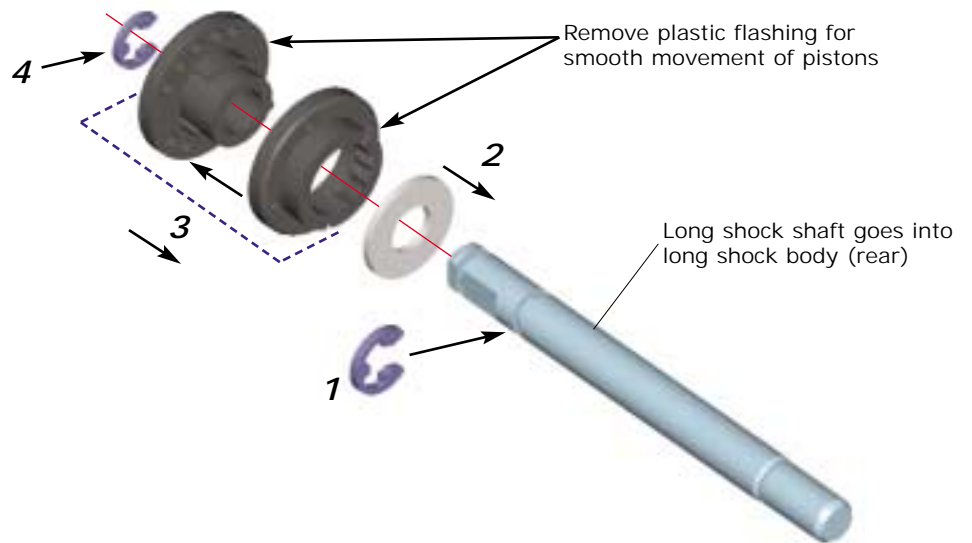
**N3**  
3x6x0.3mm



**R2**  
2.3mm

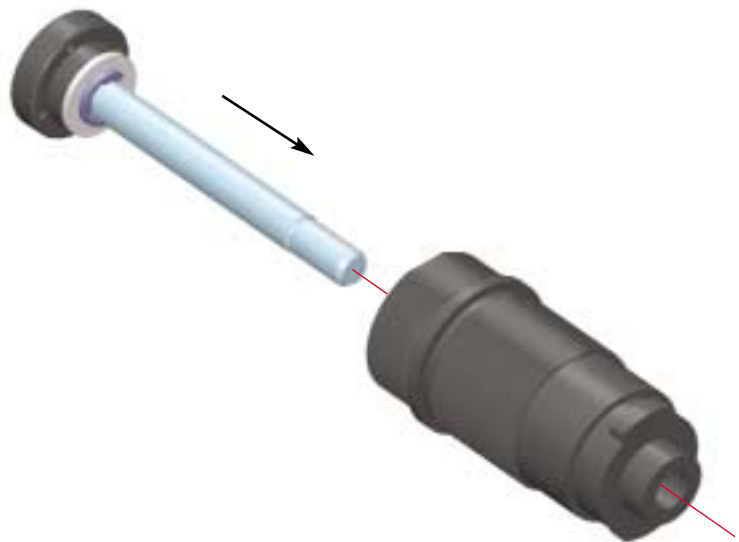


**R1**  
1.9mm



## Step 1.2

Shock Assembly

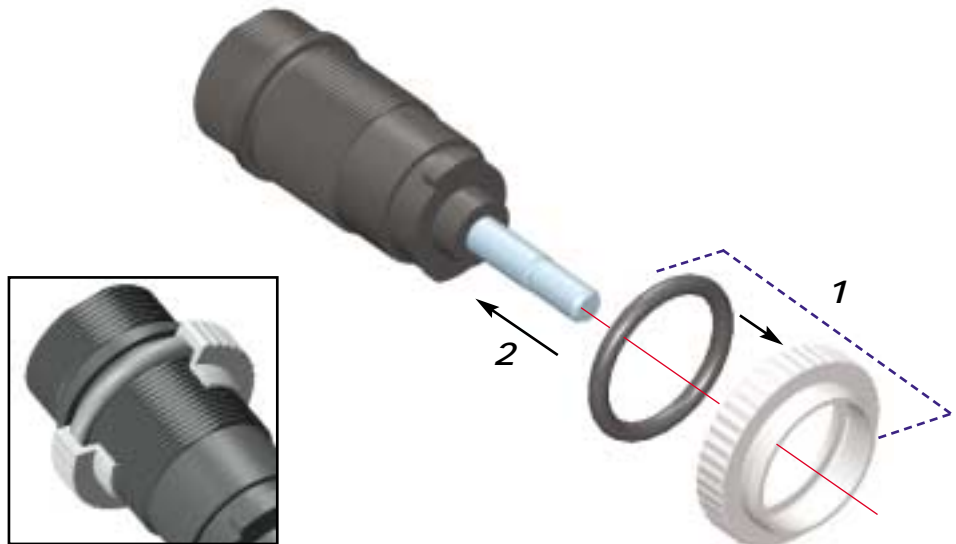


## Step 1.3

Shock Assembly



**Y17**  
12.1x1.6mm

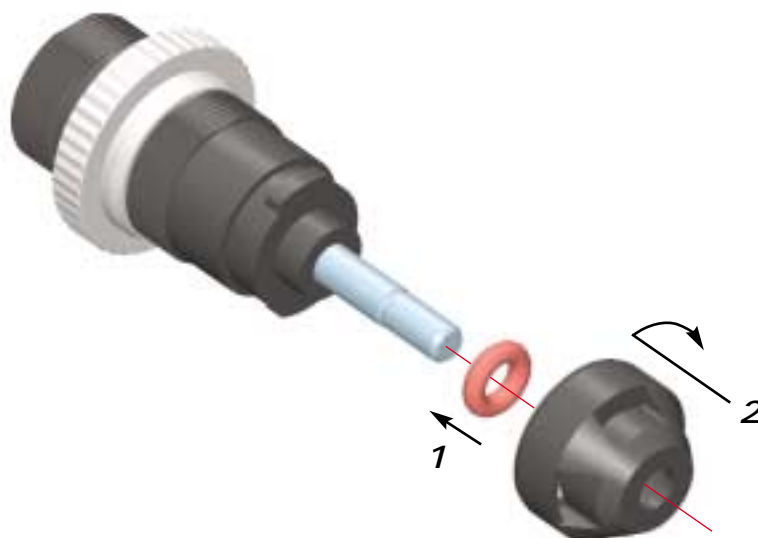


## Step 1.4



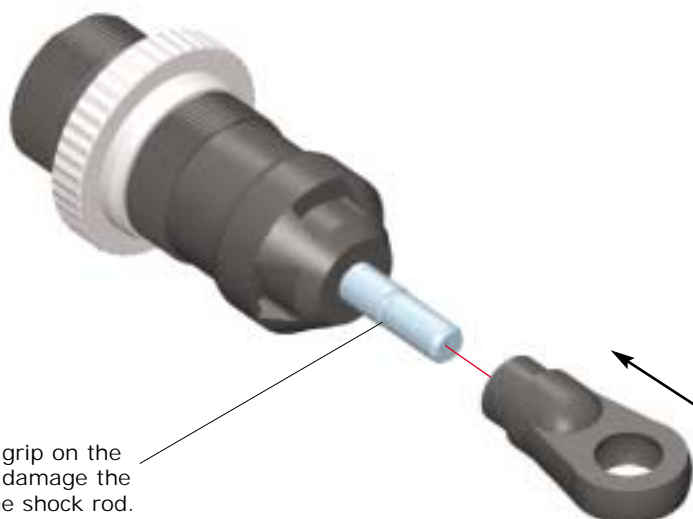
**Y4**  
3.1x1.6mm

Shock Assembly



## Step 1.5

Shock Assembly



Hold the shock rod firm using plyers, grip on the part where the thread begins, do not damage the shock rod. Turn the ball-joint on to the shock rod.

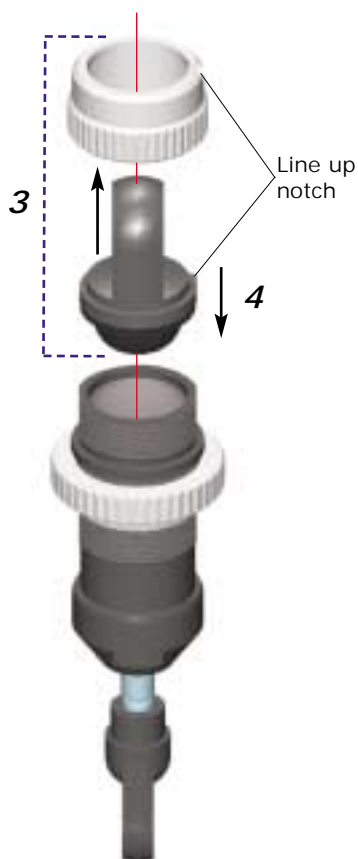
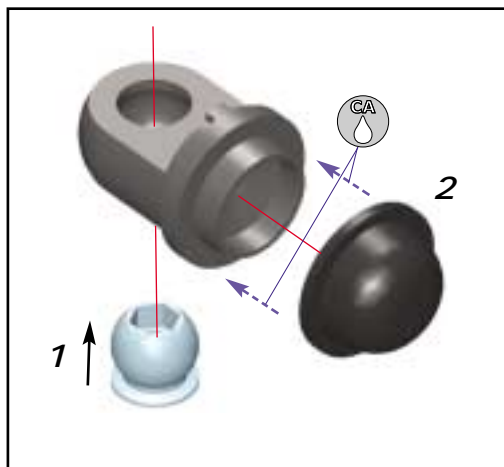
## Step 1.6

Shock Assembly

Fill the cylinder with shock oil, with the piston in the bottom position.

Bleeding sequence: Let the oil settle and allow the air to escape. Slowly move the piston up and down until no more bubbles appear.



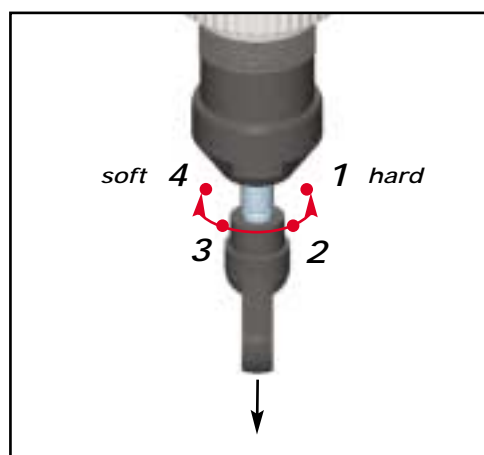


## Shock length adjustment

Check the length of the shocks, adjust with the ball-joint.

Shock Front: 67,5mm  
Shock Rear: 76,5mm

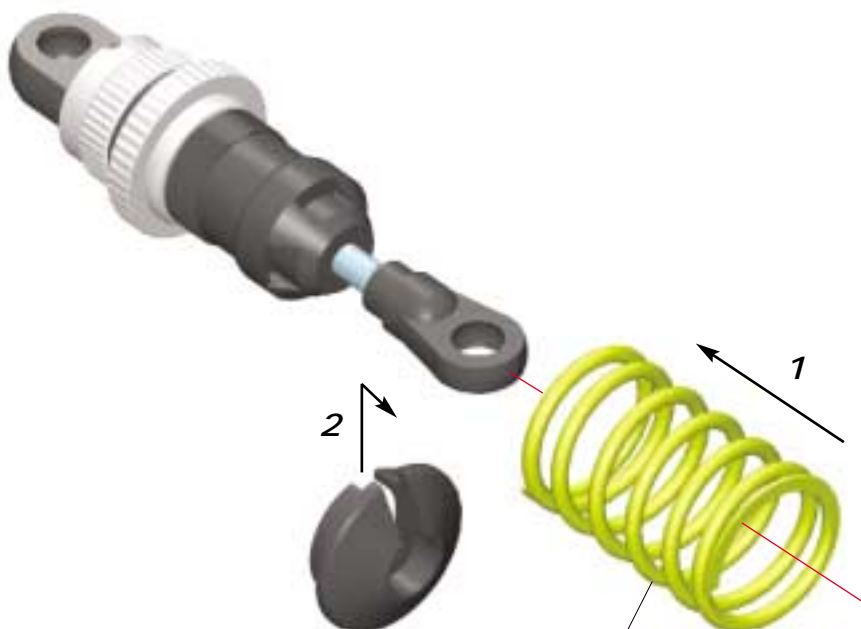
In full extended, locked position.



## Dampening adjustment

Pull the piston rod all the way down, turn slightly to lock the position of the cylinder.

You can then adjust the shocks by rotating the shaft in clockwise and counter clockwise clicks from position 1-4.



Short Springs (on short shock)- Front  
Long Springs (on long shock)- Rear

# 2.0 Front Assembly

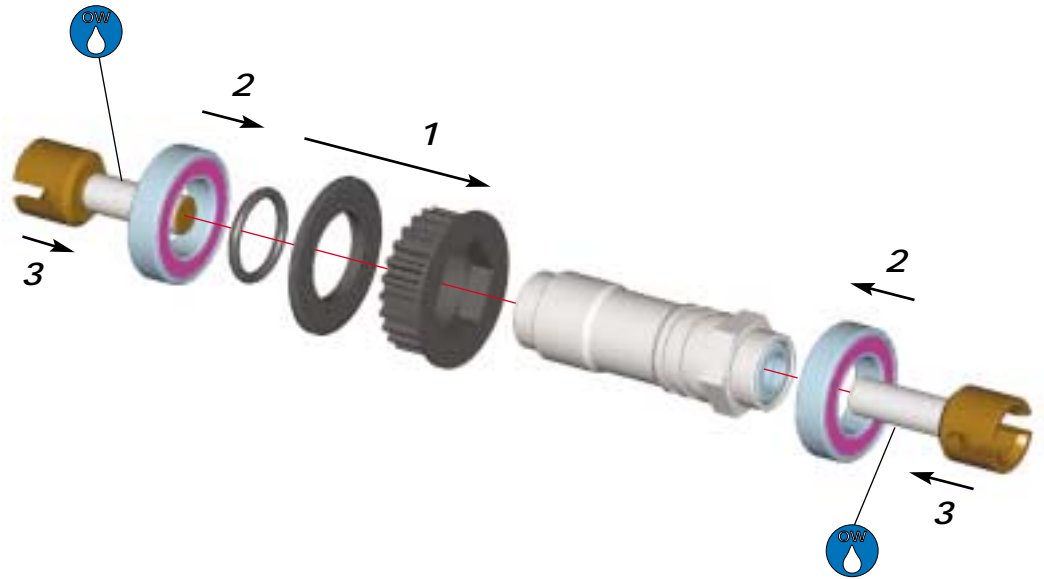
## Step 2.1

Bag 02,U



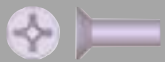
**Y12**  
10.3x1.8mm

**U14**  
12x21mm

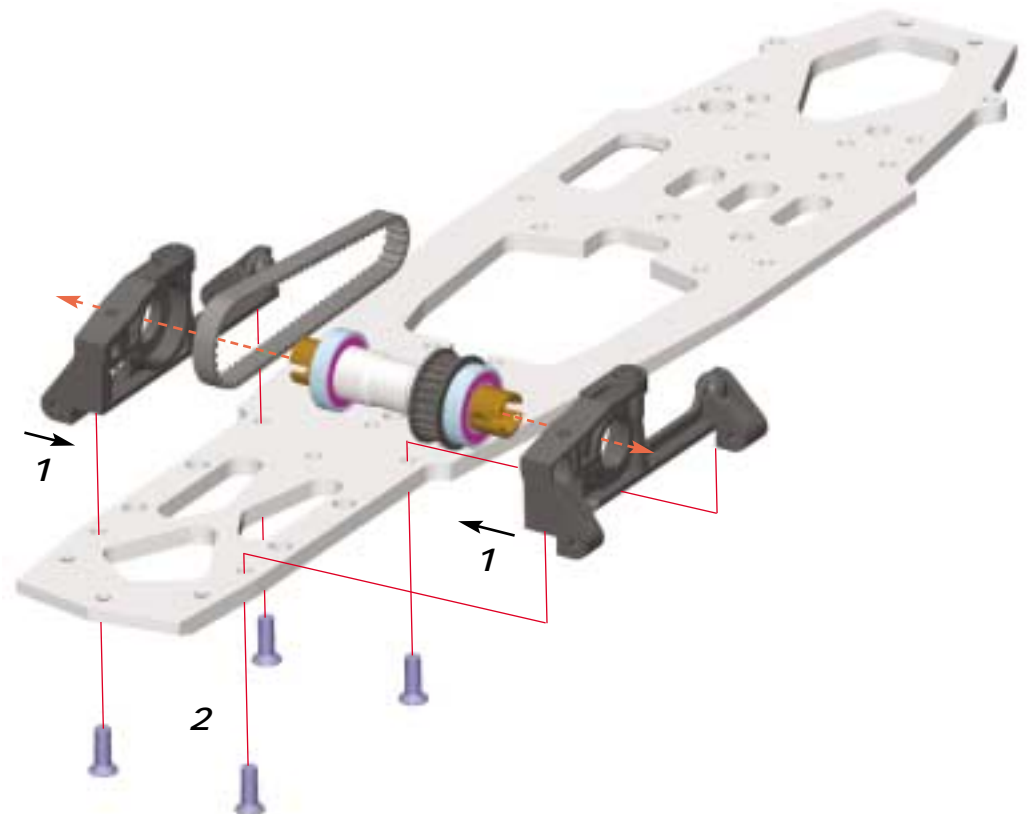


## Step 2.2

Bag 03,G20



**G20**  
M4x12mm



## Step 2.3

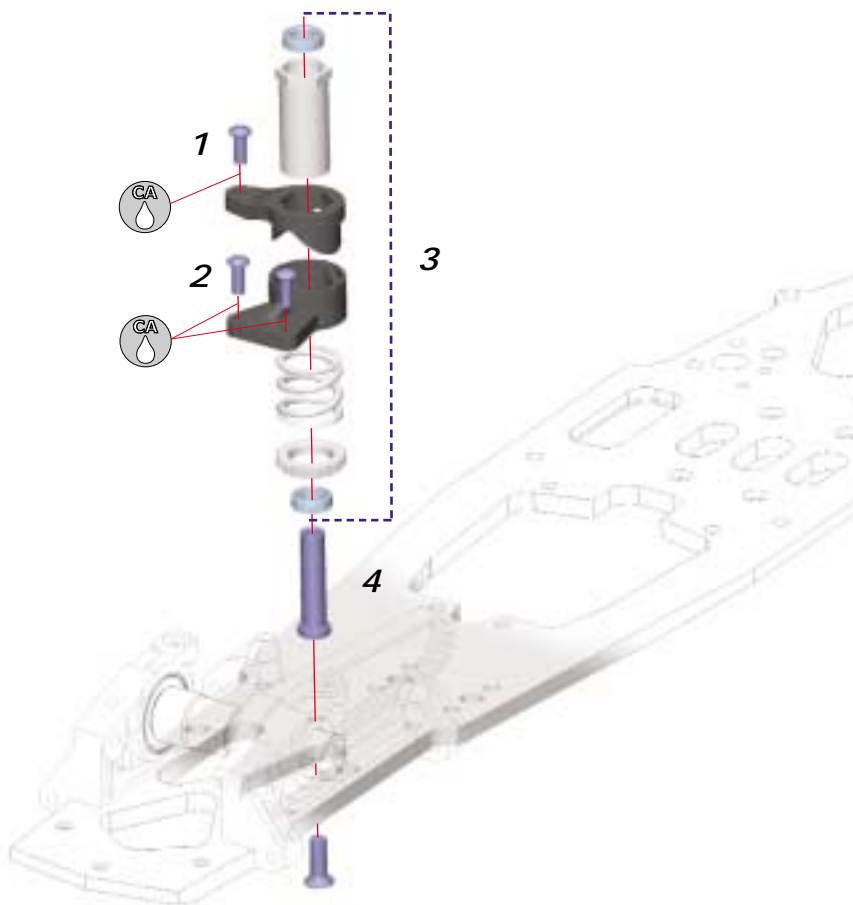
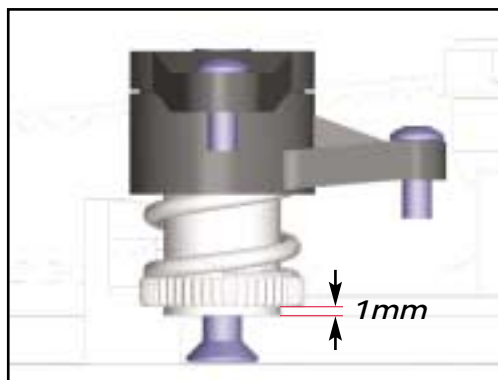
Bag 04



**G20**  
M4x12mm



**E11**  
M3x8mm



## Step 2.4

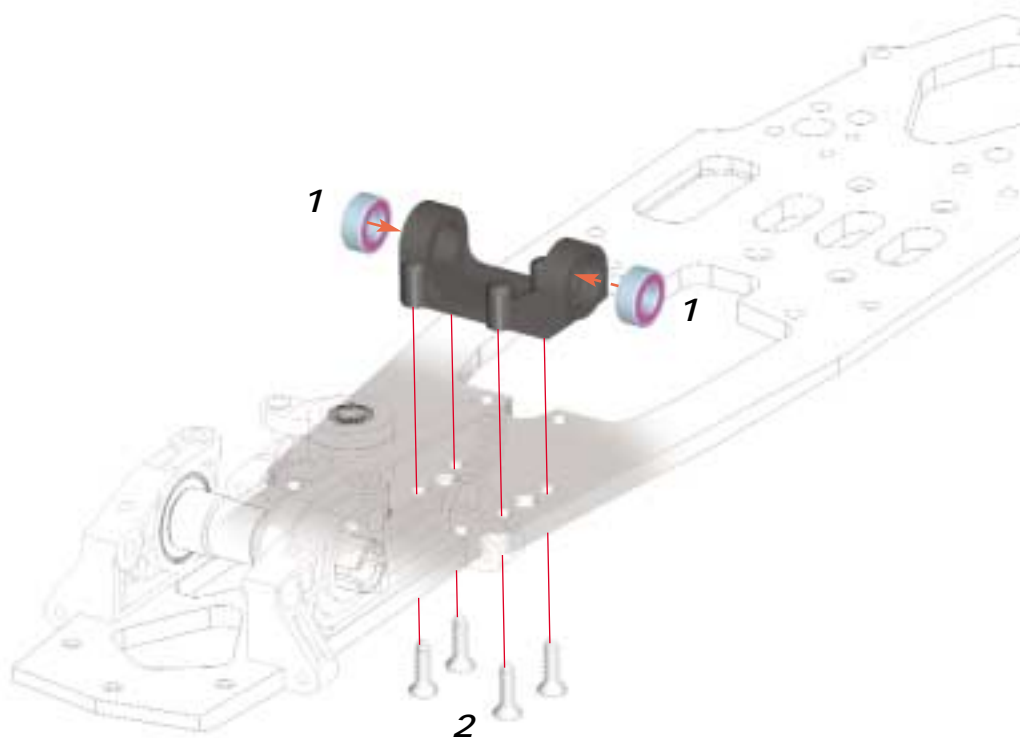
Bag B13,05



**B13**  
3.5x13mm



**U6**  
6x13mm



## Step 2.5

950 Front Assembly



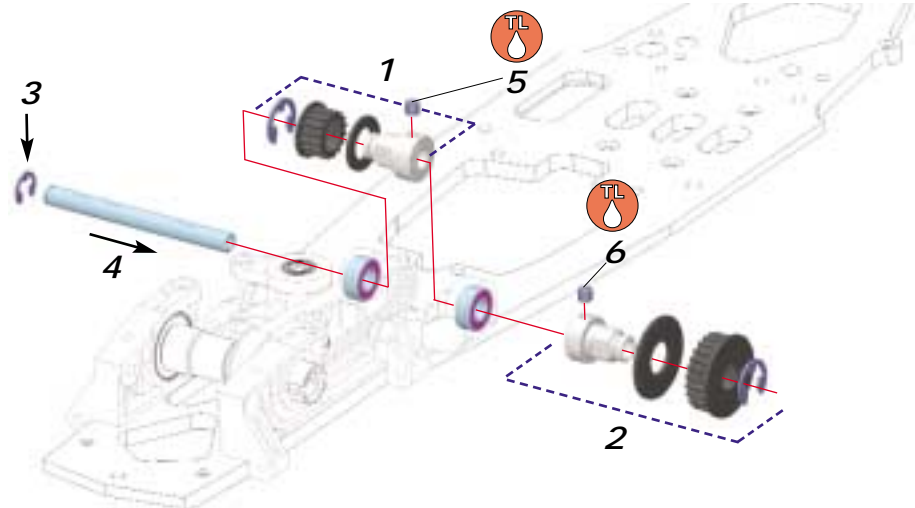
**J16**  
4x4mm



**R5**  
5mm



**R7**  
7mm



## Step 2.6

Bag 06

950 Front Assembly



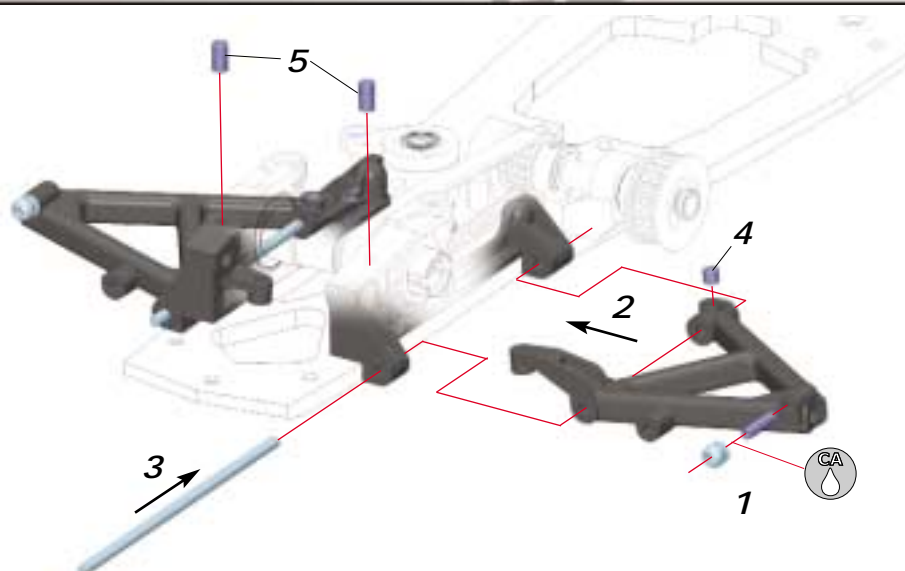
**H13**  
3x12mm



**H19**  
4x10mm



**J16**  
4x4mm



## Step 2.7

Bag 07

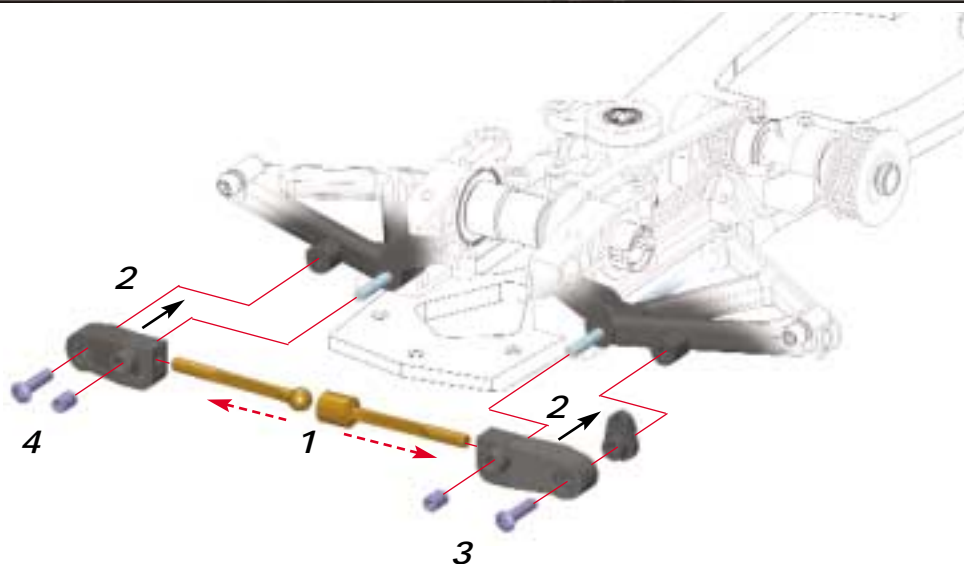
950 Front Assembly



**E13**  
3x12mm



**H17**  
4x6mm



# 3.0 Rear Assembly

## Step 3.1

Bag 08,09



**G20**  
M4x12mm



**P9**  
2.5x20mm



**P10**  
2.5x22mm



**Q14**  
3x16mm



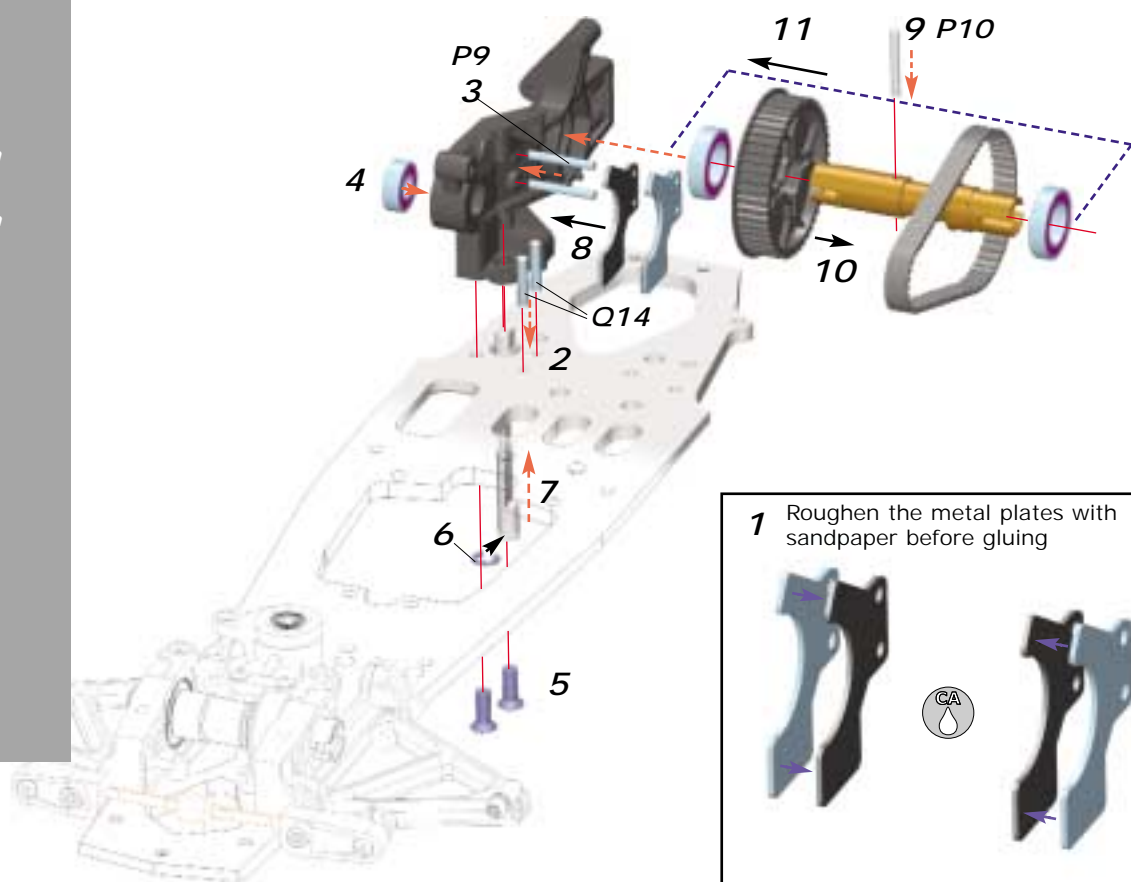
**R5**  
5mm



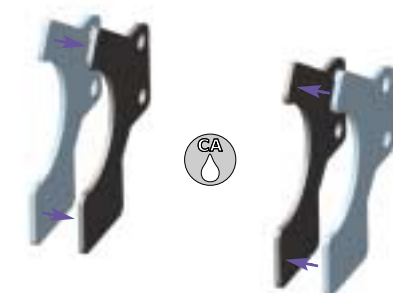
**U8**  
6x15mm



**U14**  
12x21mm



1 Roughen the metal plates with sandpaper before gluing



## Step 3.2

Bag 10,11



**B13**  
3.5x13mm



**G20**  
M4x12mm



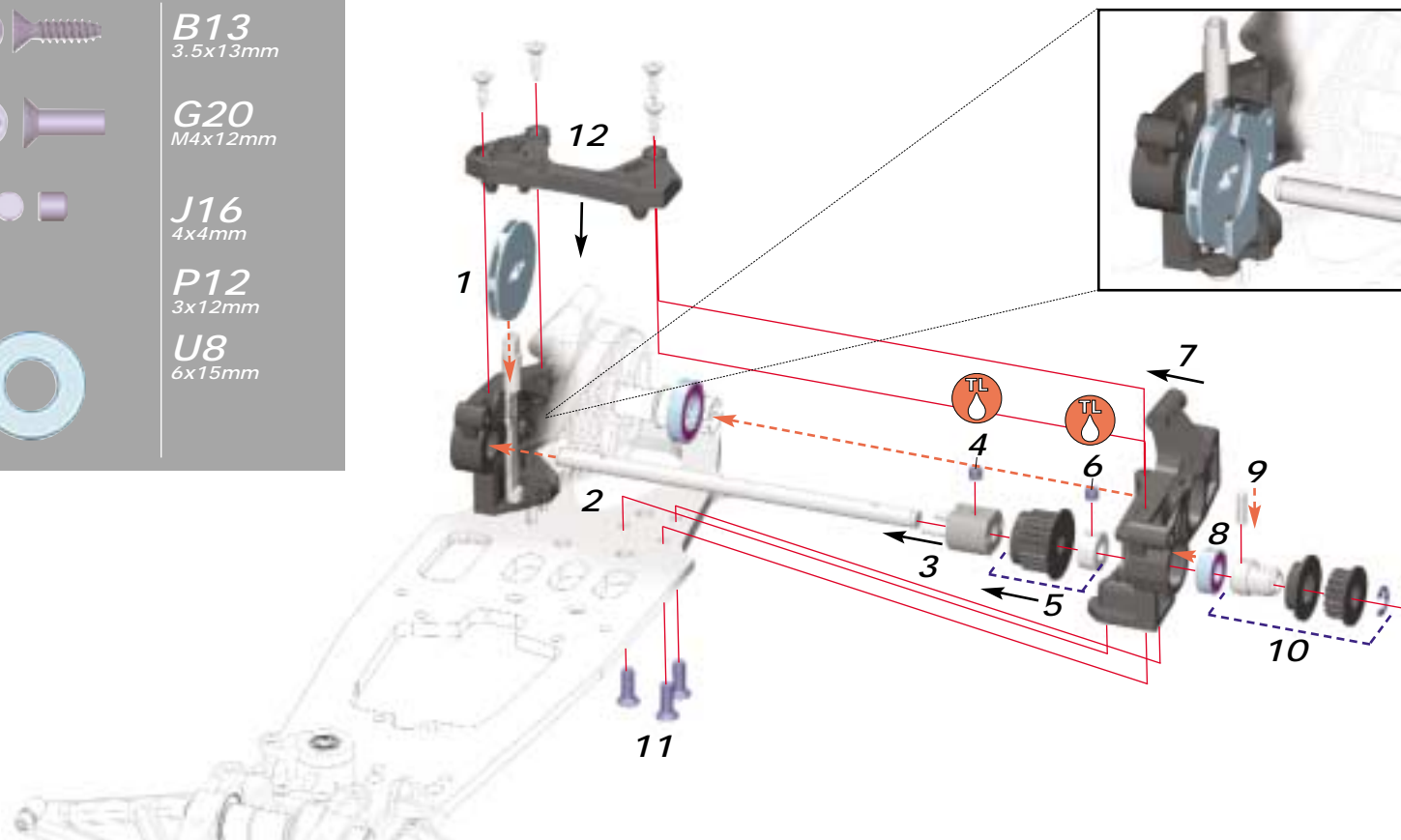
**J16**  
4x4mm



**P12**  
3x12mm



**U8**  
6x15mm



## Step 3.3

Bag 12,13

950

Rear Assembly



**B13**  
3.5x13mm



**E11**  
3x8mm



**E18**  
4x8mm



**G20**  
M4x12mm



**H13**  
3x12mm



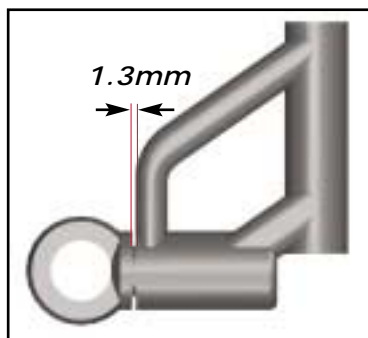
**H19**  
4x10mm



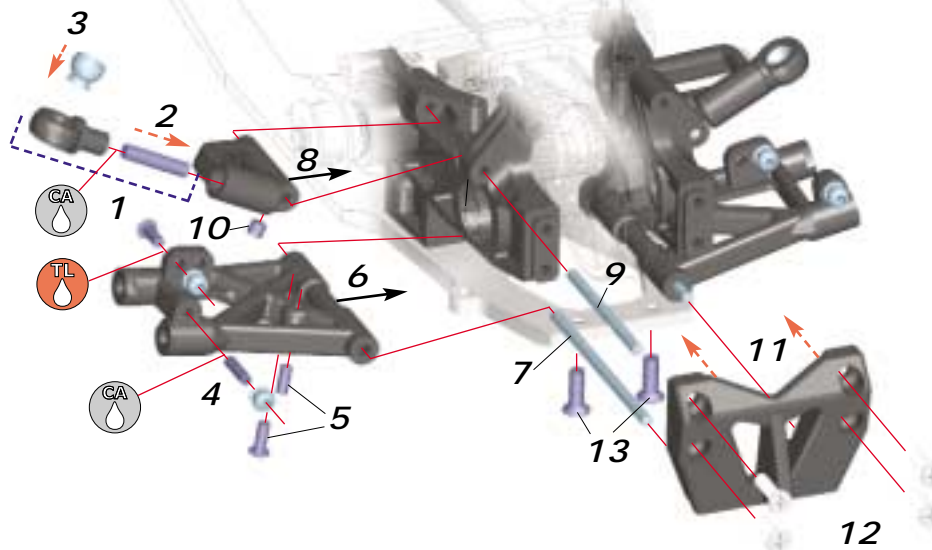
**H22**  
4x20mm



**J16**  
4x4mm



Use the special tool to aid you in placing the steel pivot ball into the wishbone end point.

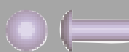


## Step 3.4

Bag 14

950

Rear Assembly

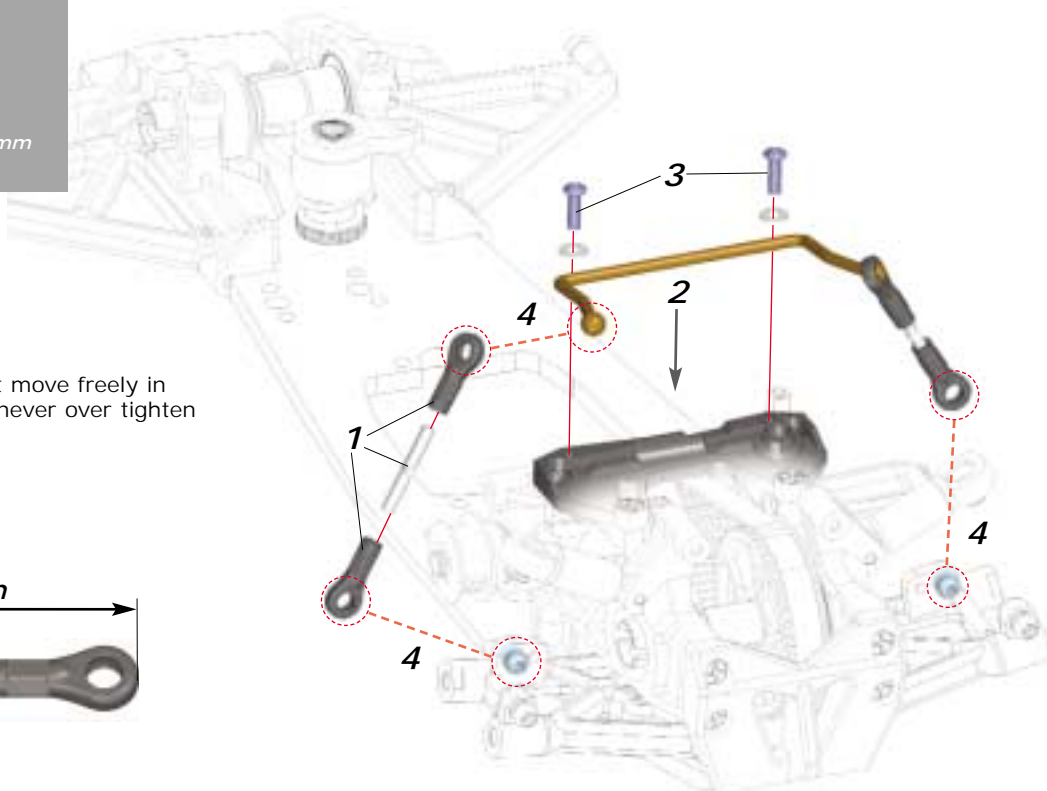
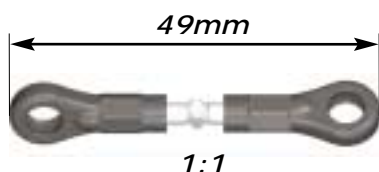


**E11**  
3x8mm



**NN4**  
3.2x9x0.1mm

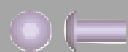
**Note:** The anti-roll bar must move freely in order to operate correctly - never over tighten the mounting screws.





## Step 3.7

Bag 17



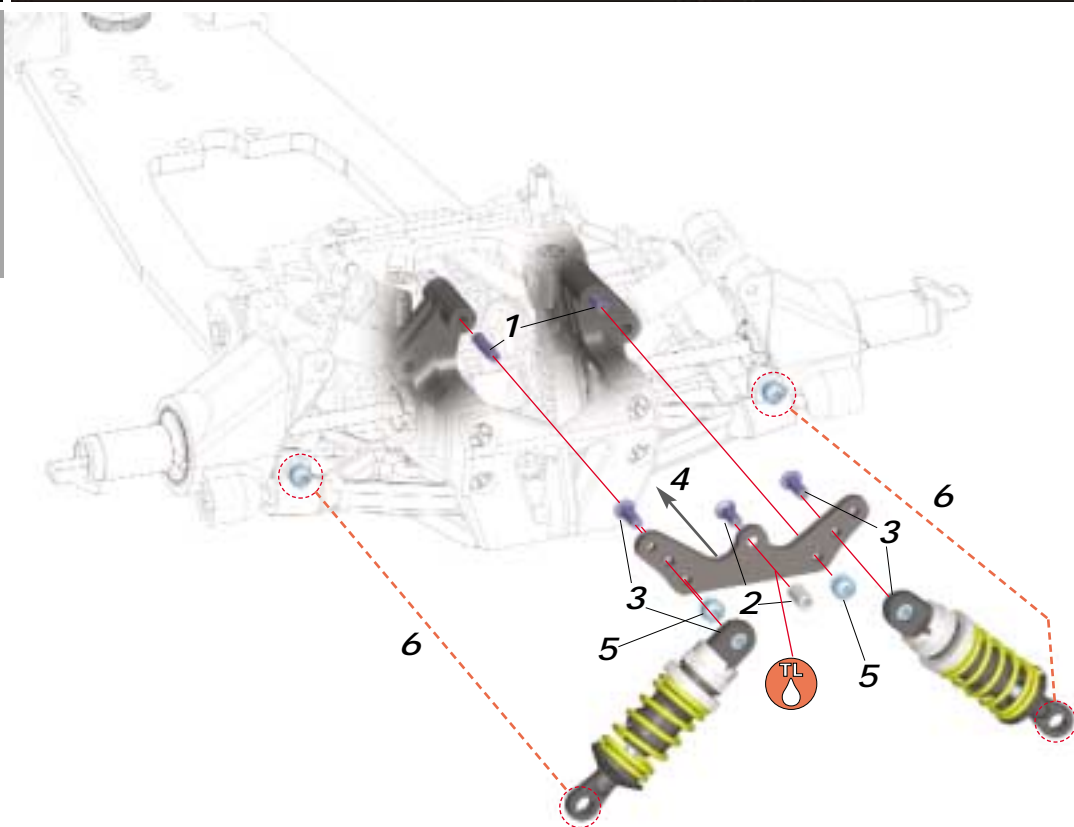
**E10**  
3x6mm



**G11**  
3x8mm



**H13**  
3x12mm



## Step 3.8

Bag 18



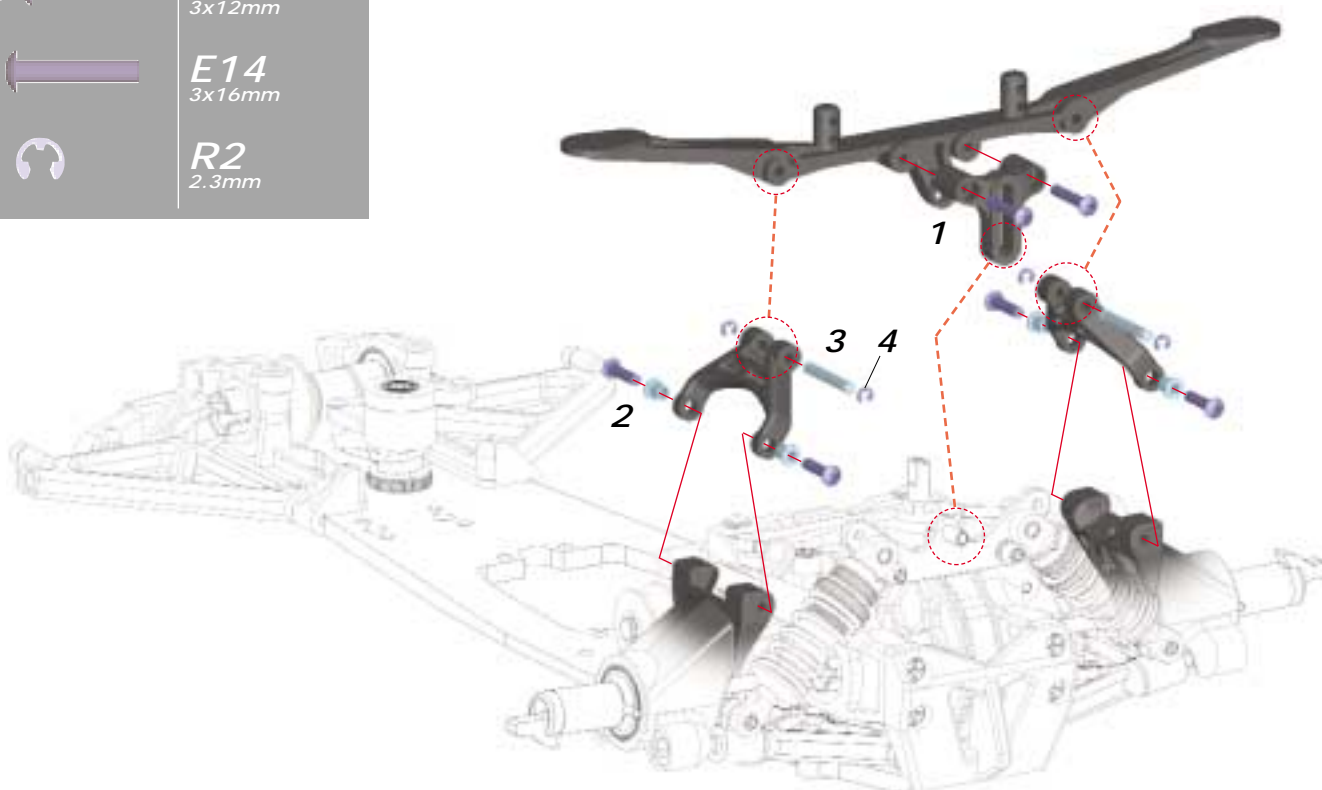
**E13**  
3x12mm



**E14**  
3x16mm



**R2**  
2.3mm

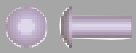


# 4.0 Radio Plate Assembly

## Step 4.1

Bag 19,20

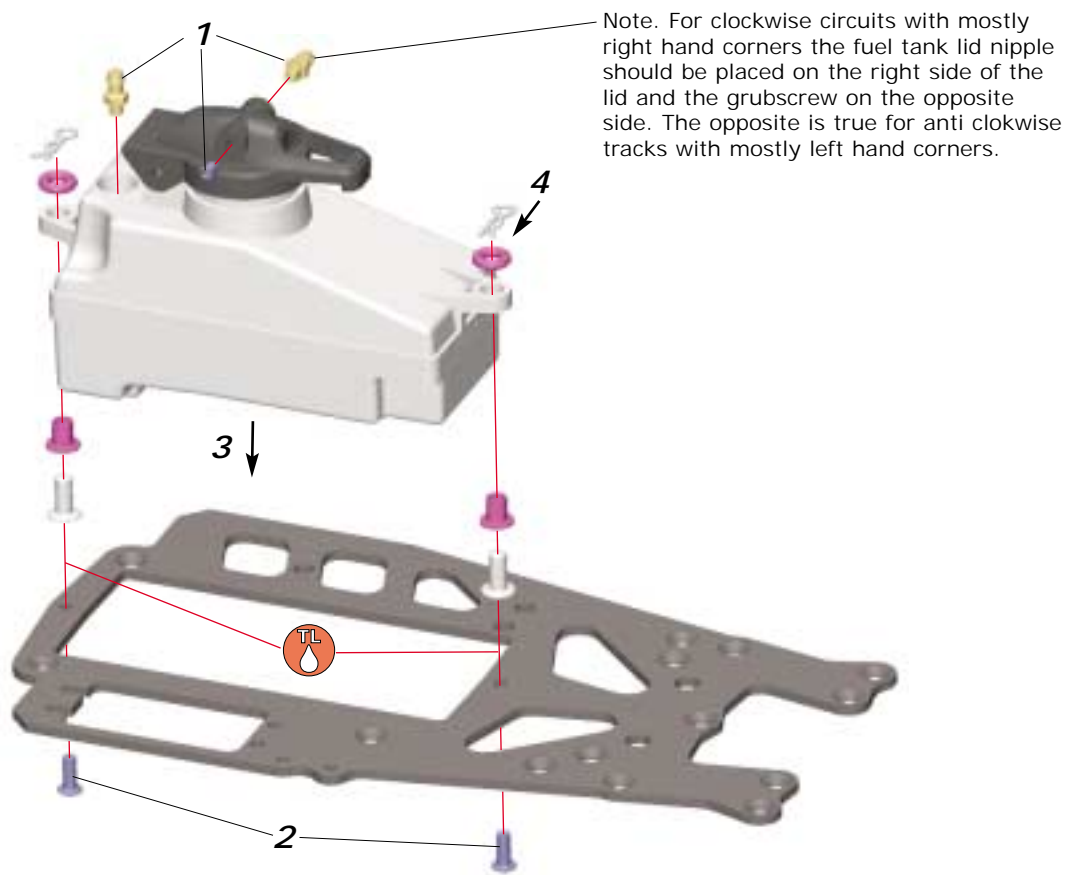
Radio Plate Assembly



**E11**  
3x8mm



**H9**  
3x4mm

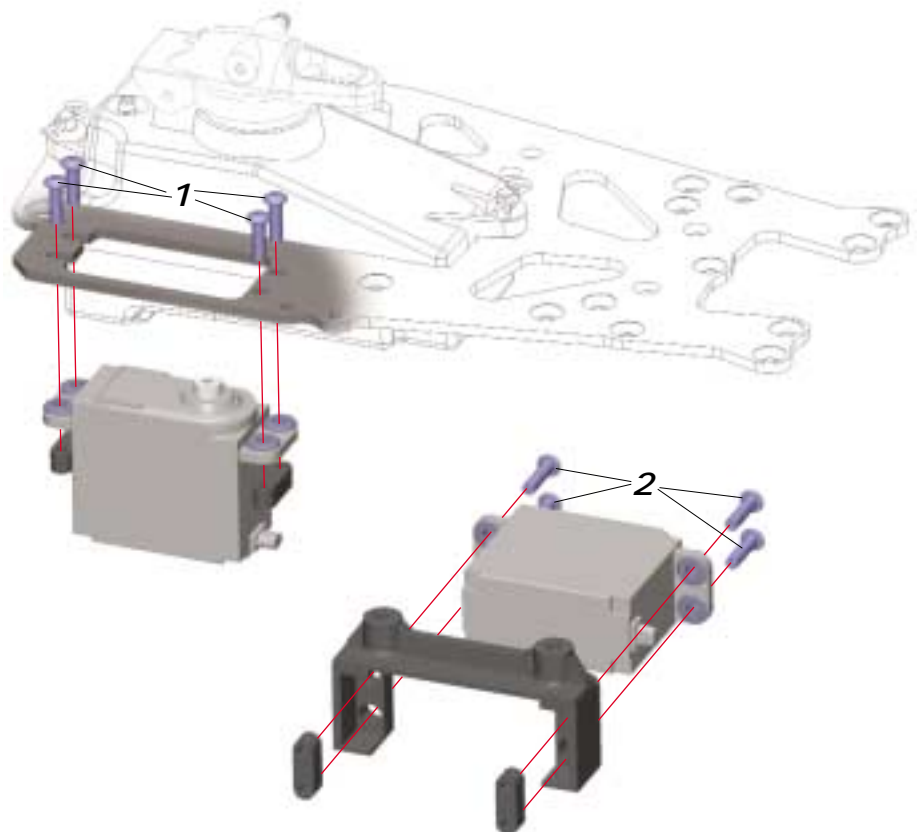


## Step 4.2

Radio Plate Assembly



**E135**  
3x14mm



## Step 4.3

Bag 21

Radio Plate Assembly

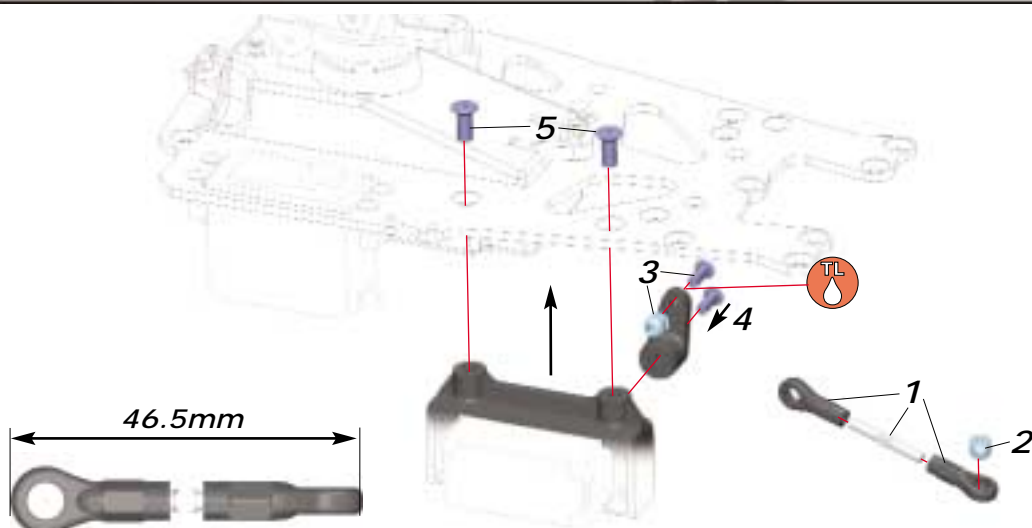
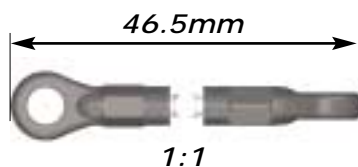


**E11**  
3x8mm



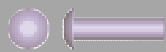
**G19**  
M4x10mm

On the servo arm is a number that corresponds to the amount of teeth.  
23 - Sanwa / KO / JR  
24 - Hitec  
25 - Futaba

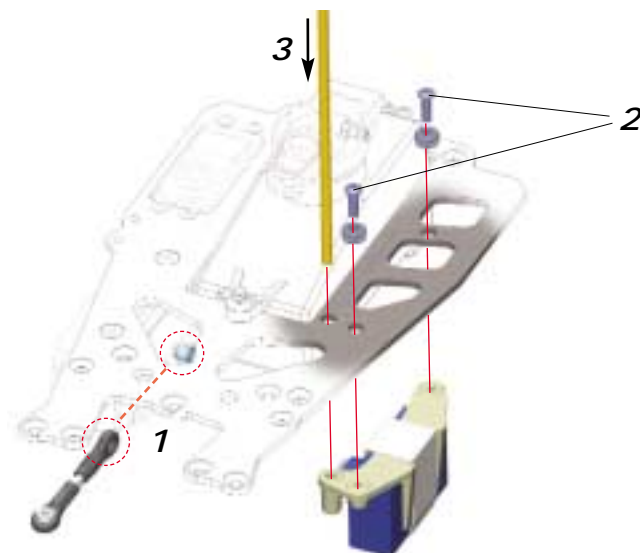


## Step 4.4

Radio Plate Assembly



**E13**  
3x12mm



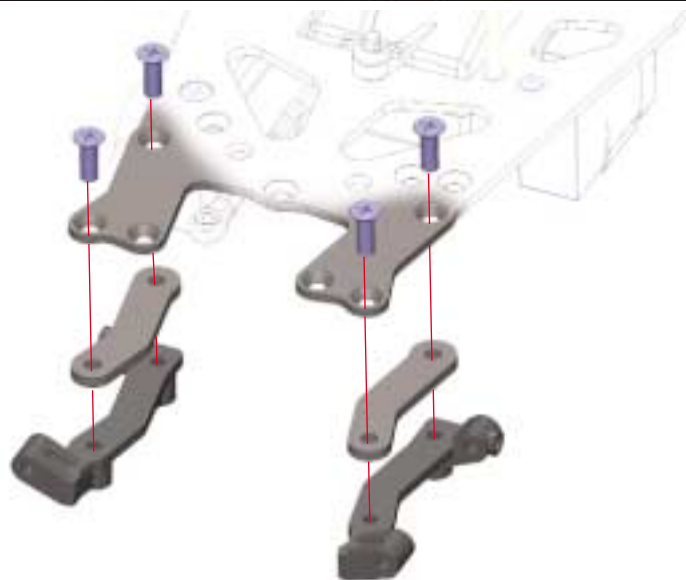
## Step 4.5

Bag 22

Radio Plate Assembly



**G20**  
M4x12mm

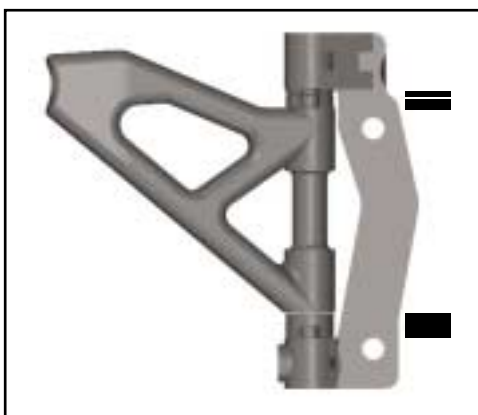
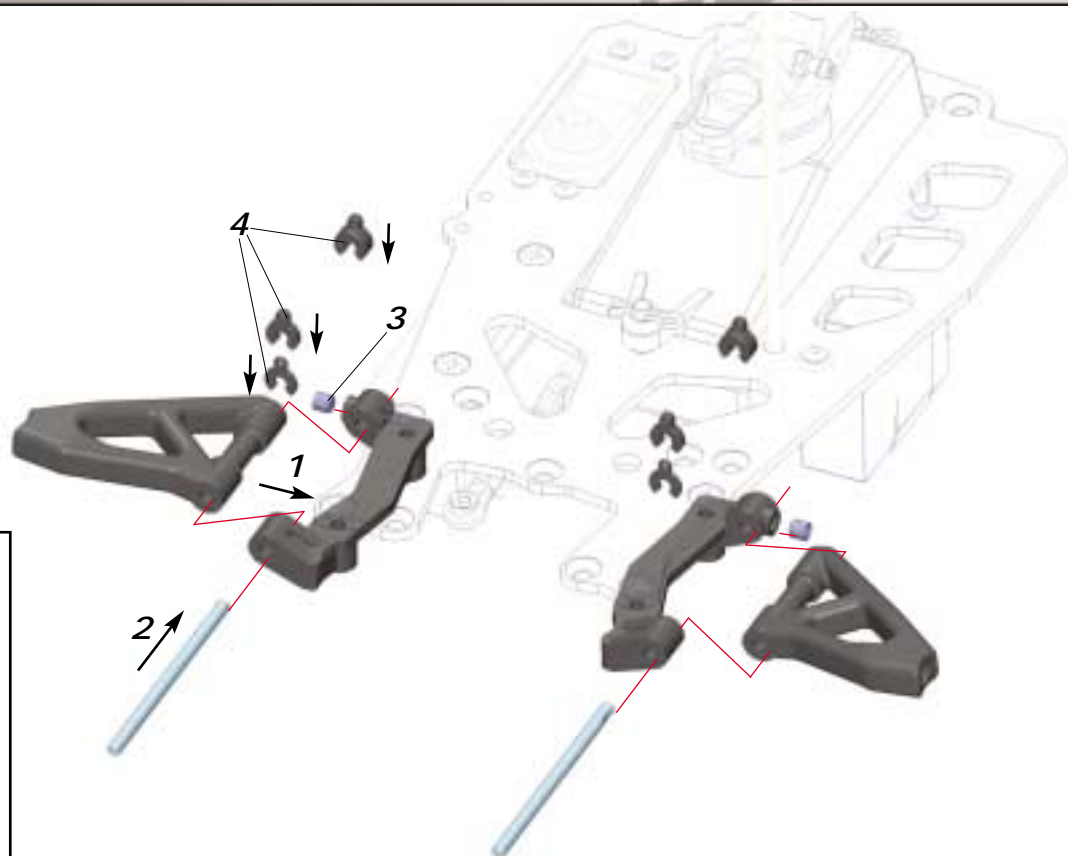


## Step 4.6

## Radio Plate Assembly



**J16**  
4x4mm



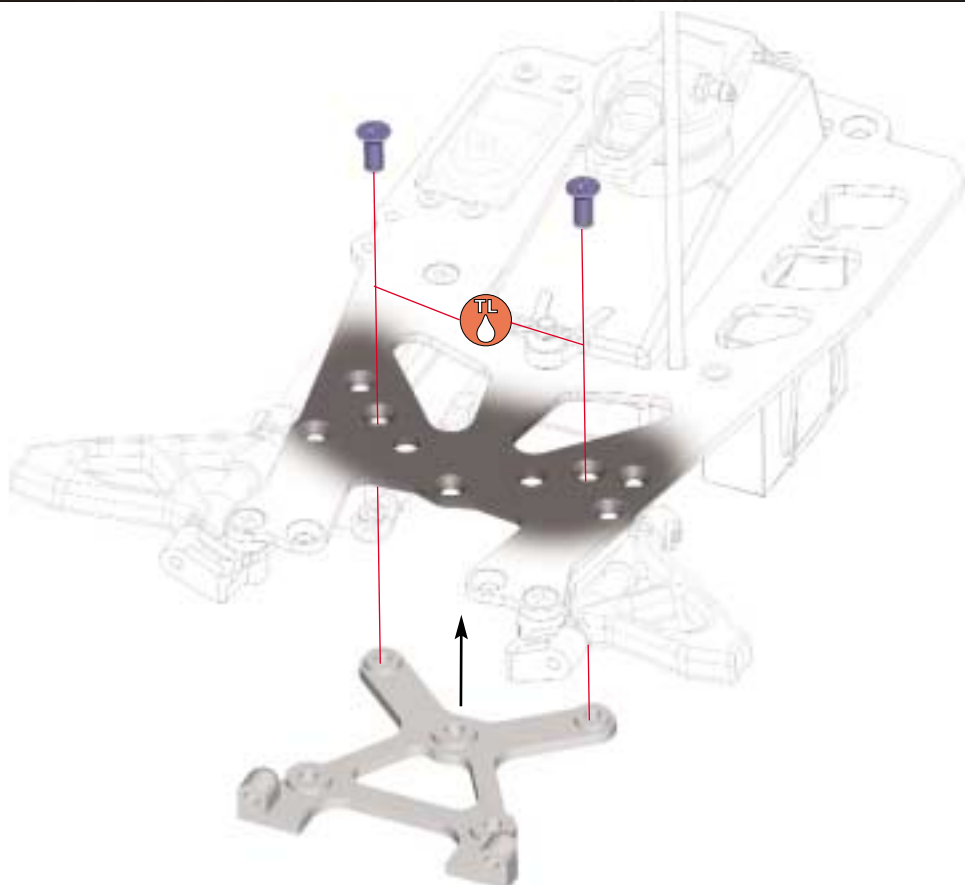
## Step 4.7

Bag 23

## Radio Plate Assembly



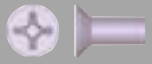
**G18**  
M4x8mm



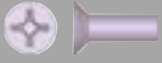
# 5.0 Radio Plate Mounting

## Step 5.1

## Radio Plate Mounting

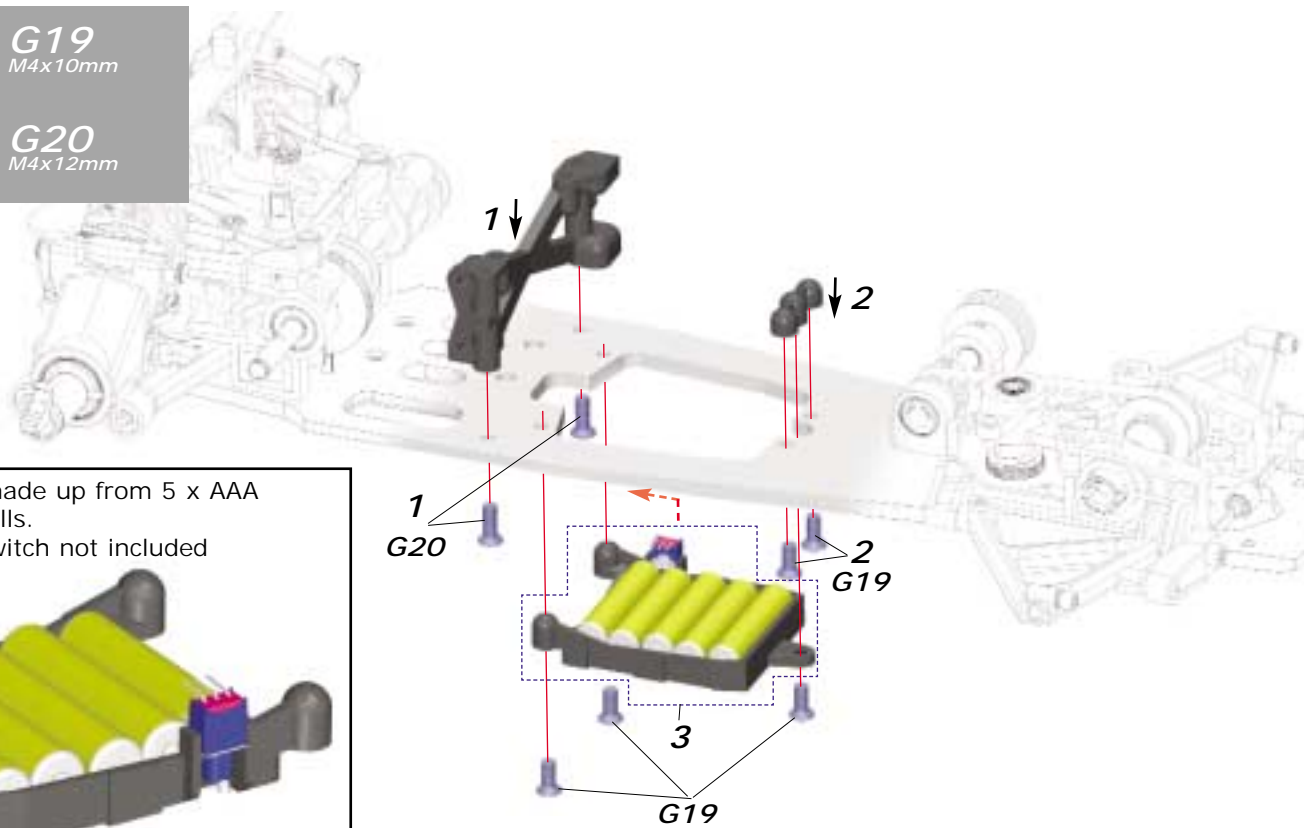
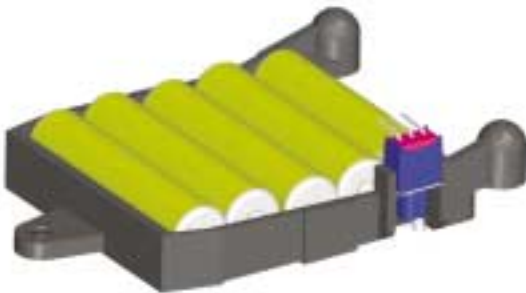


**G19**  
M4x10mm



**G20**  
M4x12mm

Battery pack is made up from 5 x AAA  
750MAH NIMH cells.  
\*Batteries and switch not included

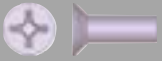


## Step 5.2

## Radio Plate Mounting



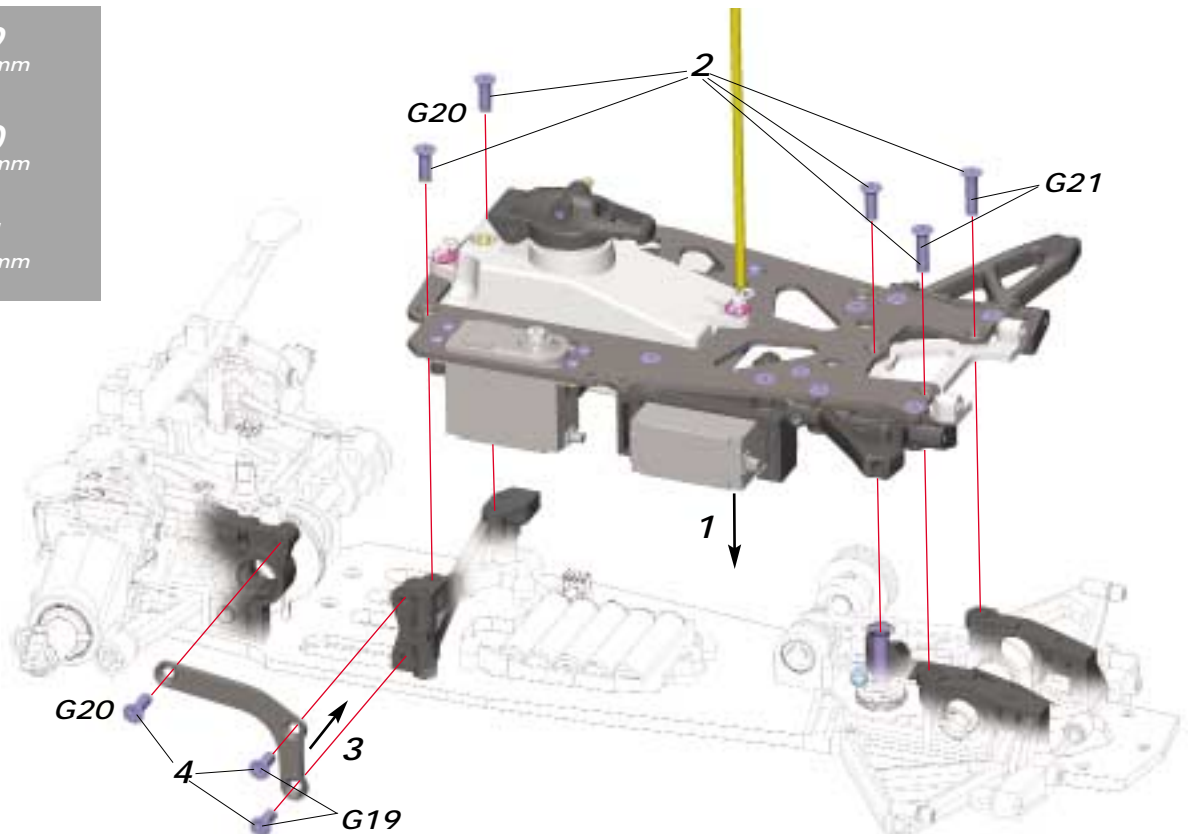
**G19**  
M4x10mm



**G20**  
M4x12mm



**G21**  
M4x16mm



## Step 5.3

Bag 24,25

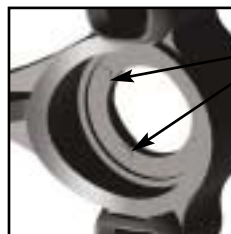
Radio Plate Mounting



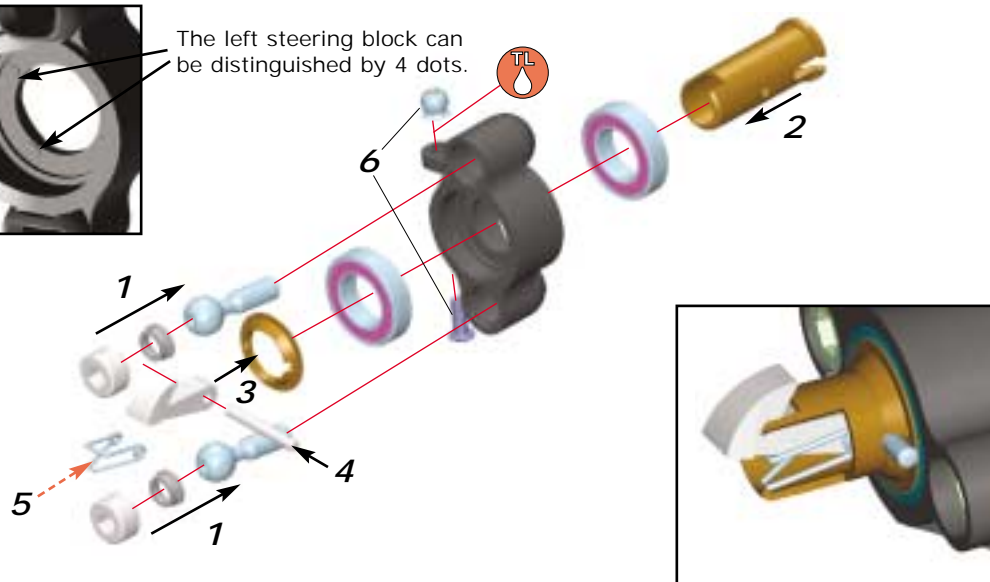
**E10**  
3x6mm

**P10**  
2.5x22mm

**U14**  
12x21mm

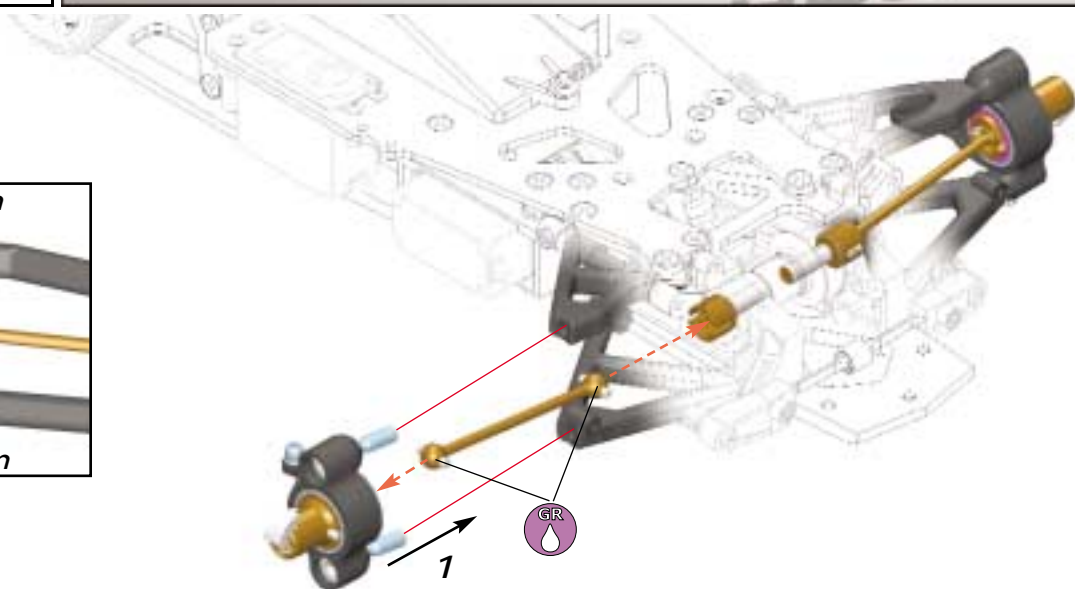
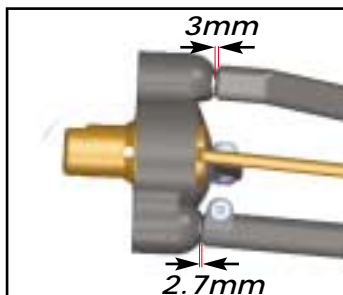


The left steering block can be distinguished by 4 dots.



## Step 5.4

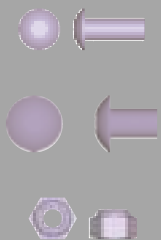
Radio Plate Mounting



## Step 5.5

Bag 26

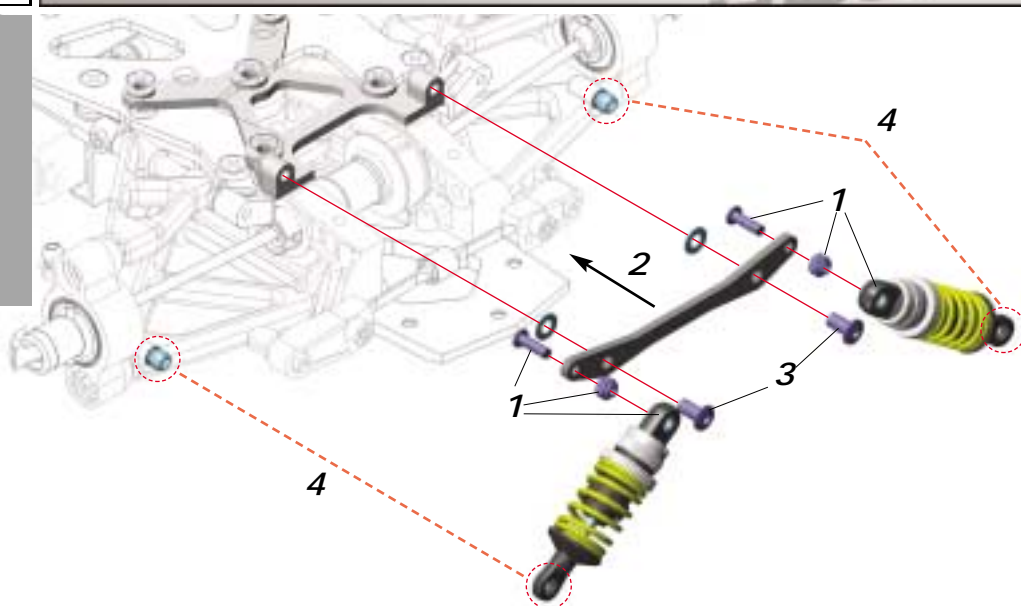
Radio Plate Mounting

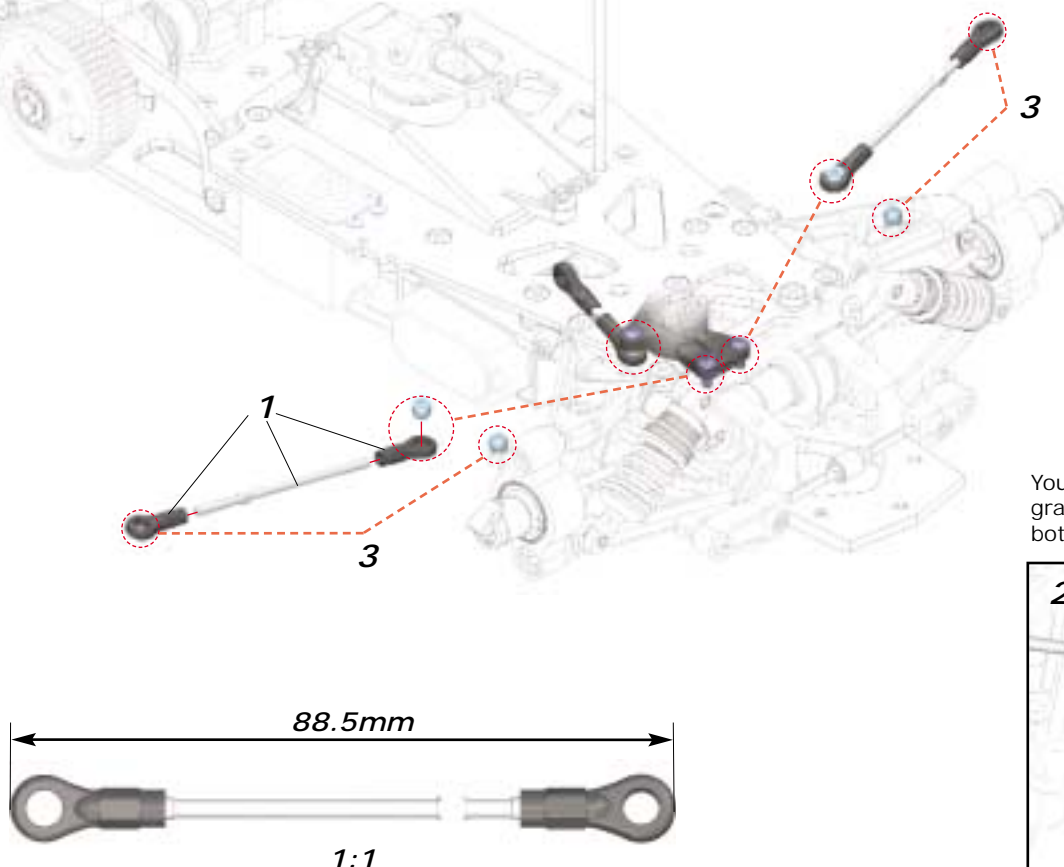


**E11**  
3x8mm

**E17**  
4x6mm

**L3**  
M3

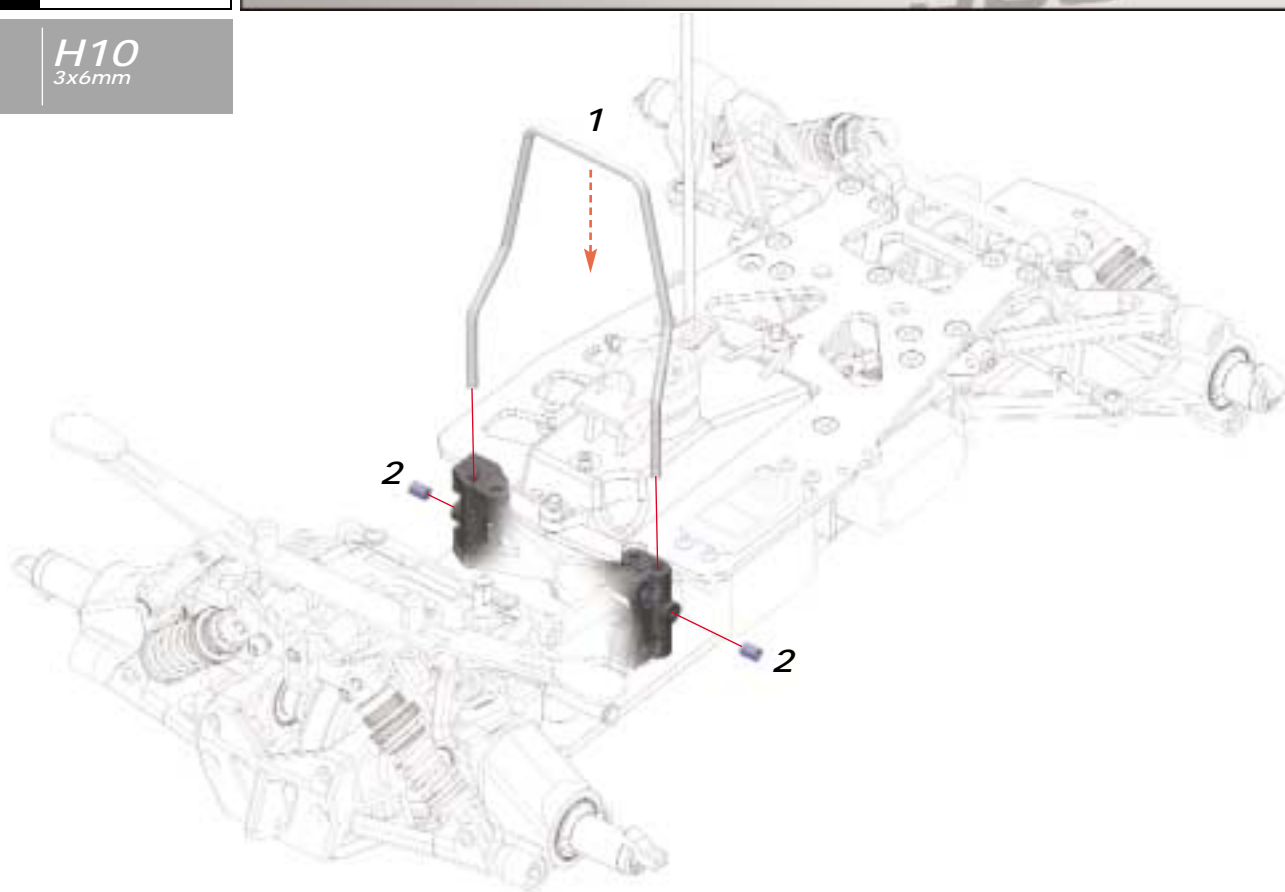




You can screw the hex head graphite balls into place from the bottom of the chassis.



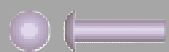
**H10**  
3x6mm



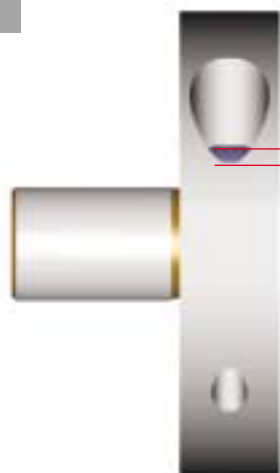
# 6.0 Gearbox Assembly

## Step 6.1

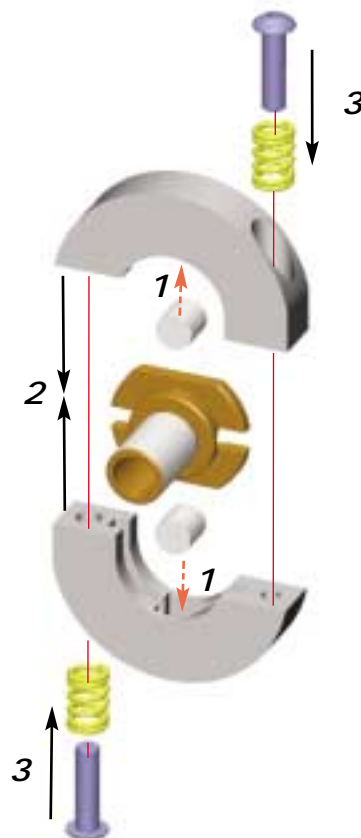
Bag 27



**E13**  
3x12mm



**Note:** A good starting point is to have the screw head flush with the shoe. Ensure that both sides are set equally.



Screw IN both adjusting screws to shift LATER.



Screw OUT both adjusting screws to shift EARLIER.

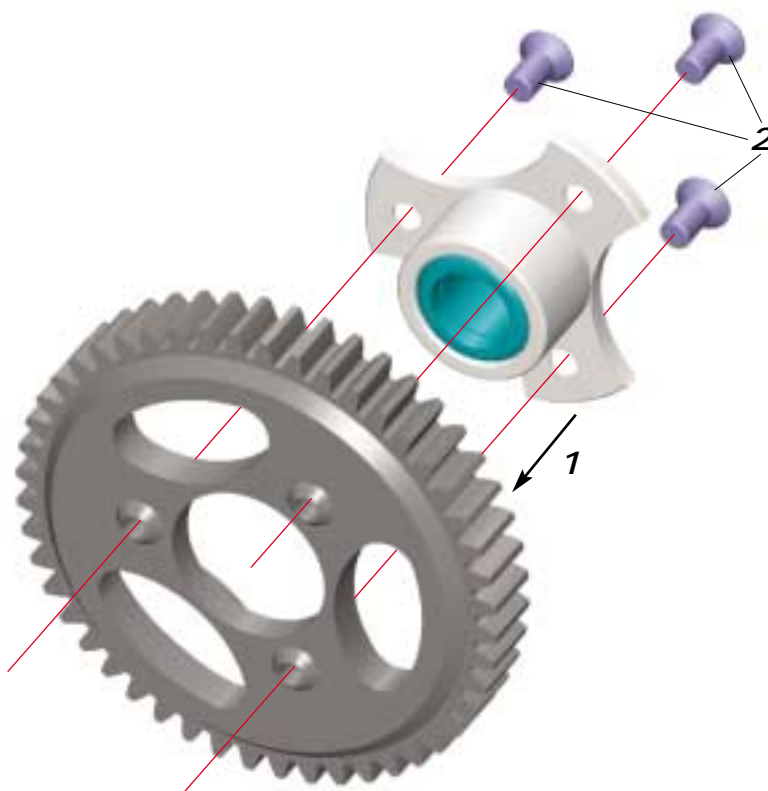


## Step 6.2

Bag 28



**G10**  
M3x6mm



## Step 6.3

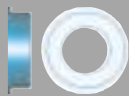
## Gearbox Assembly



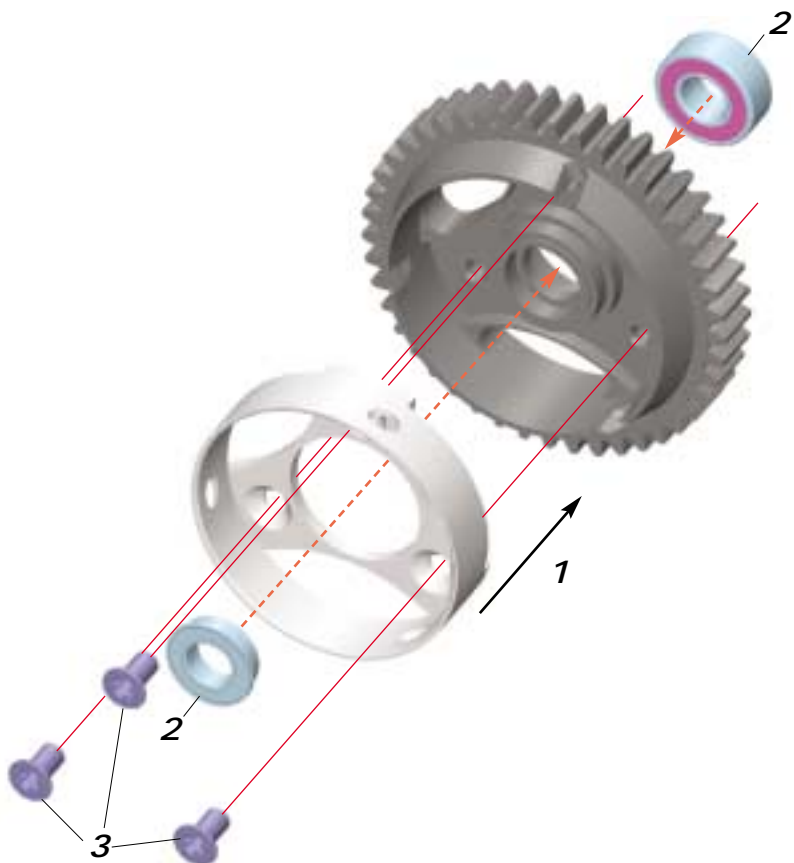
**G10**  
M3x6mm



**U6**  
6x13mm



**V5**  
6x10mm



## Step 6.4

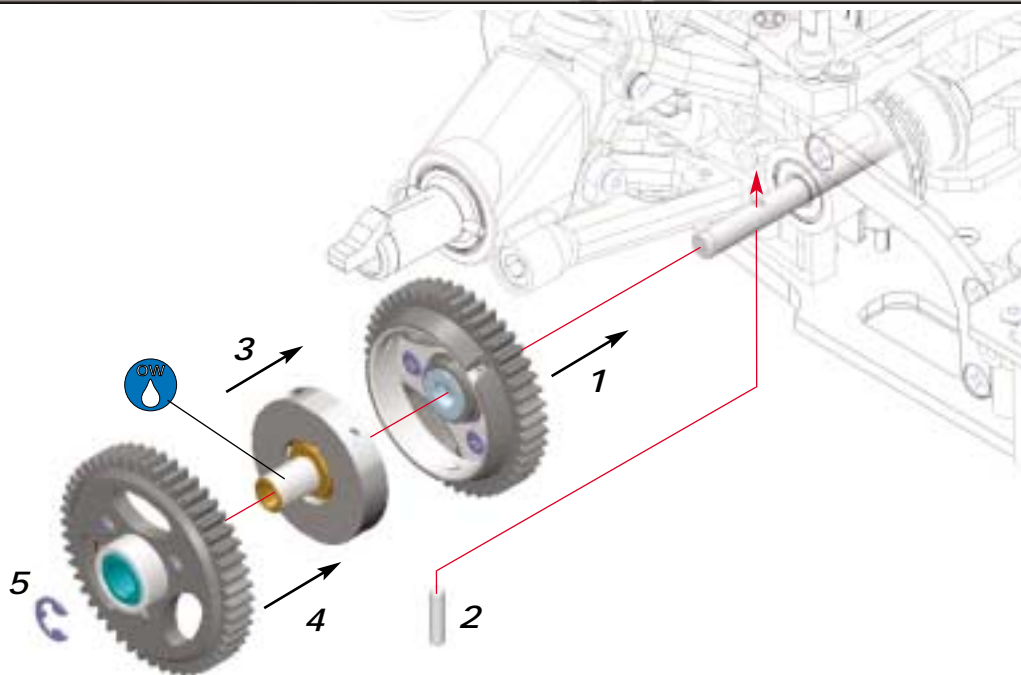
## Gearbox Assembly



**P13**  
3x13.8mm



**R5**  
5mm



# 7.0 Centax Assembly

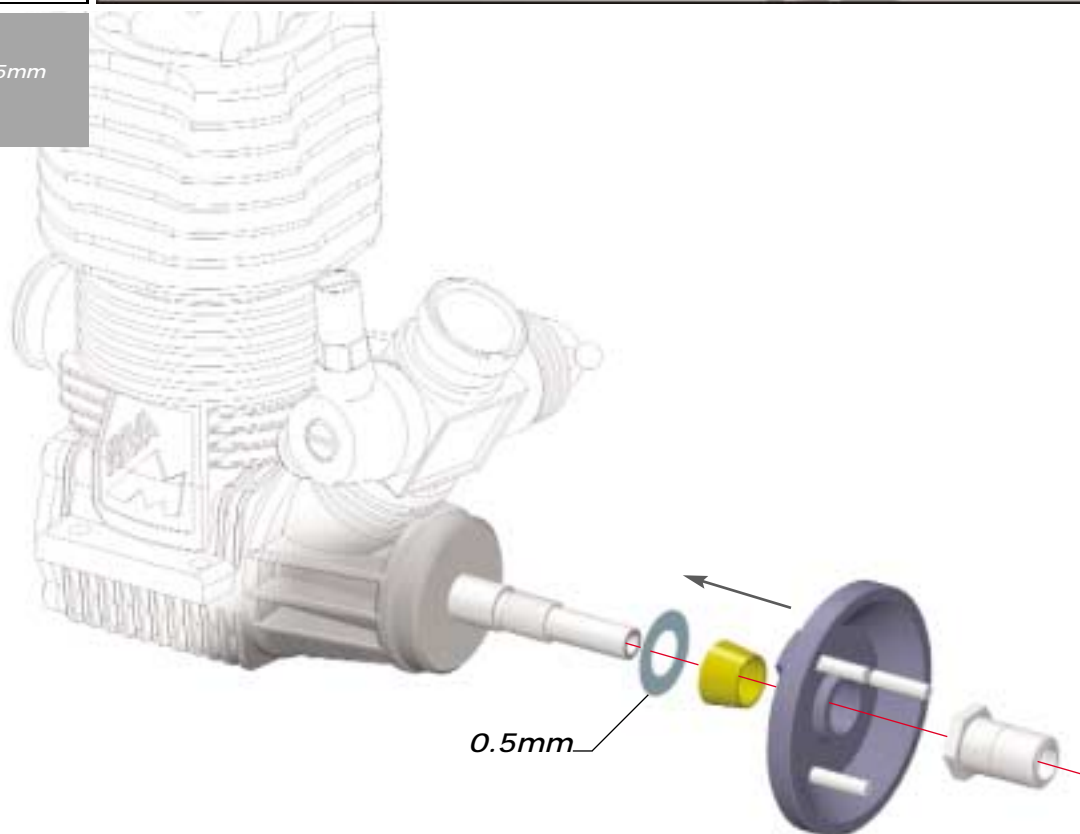
Step 7.1

Bag 29

Centax Assembly

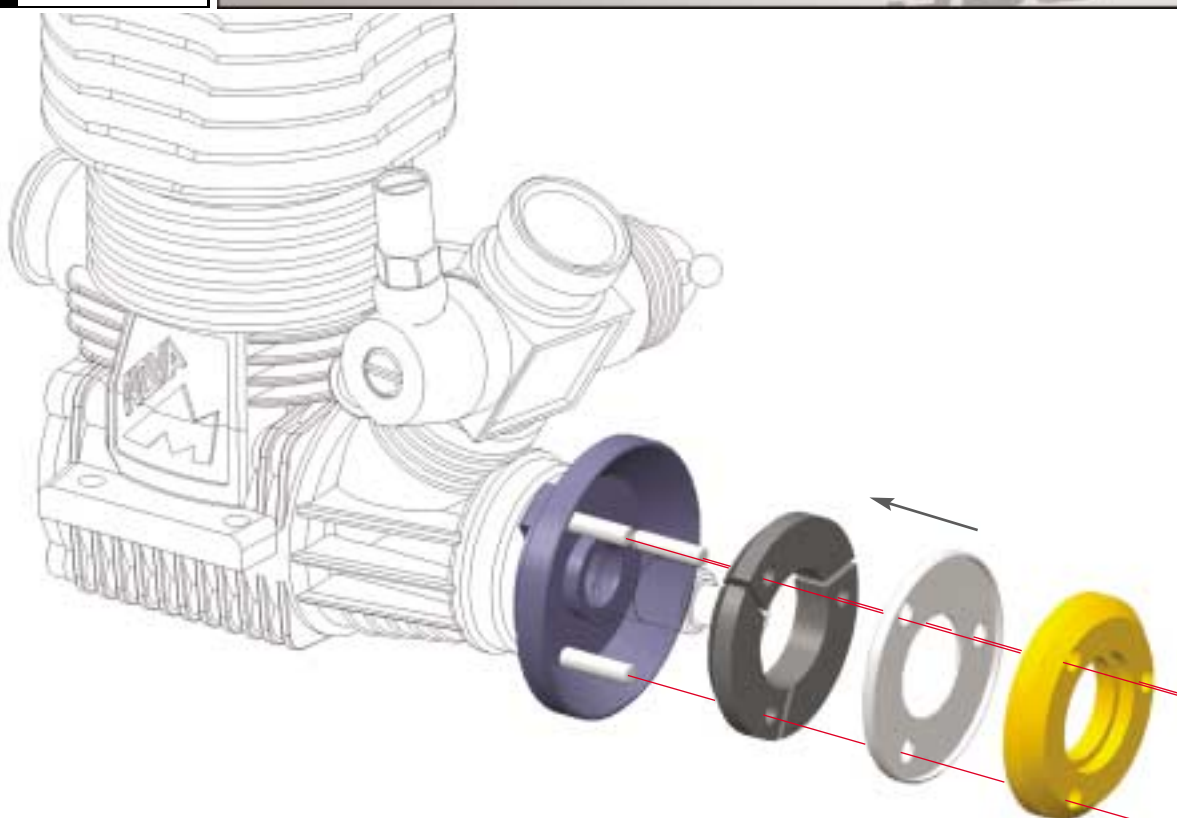


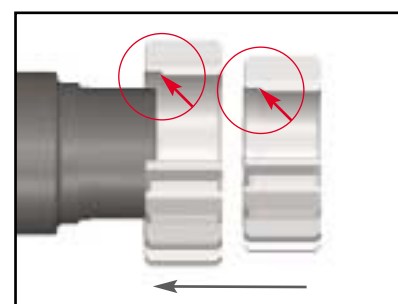
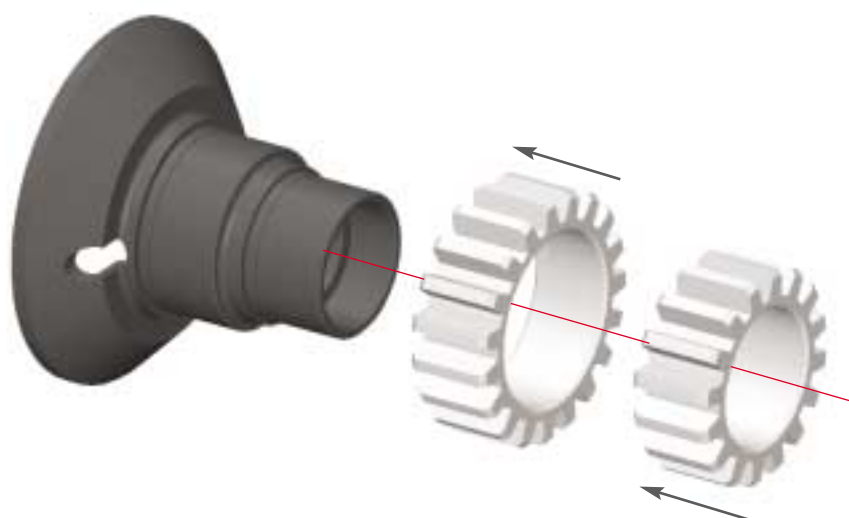
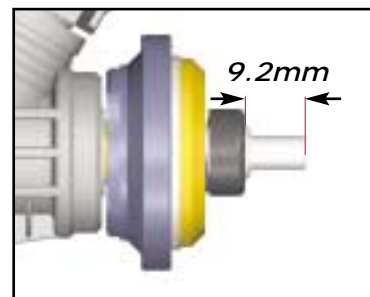
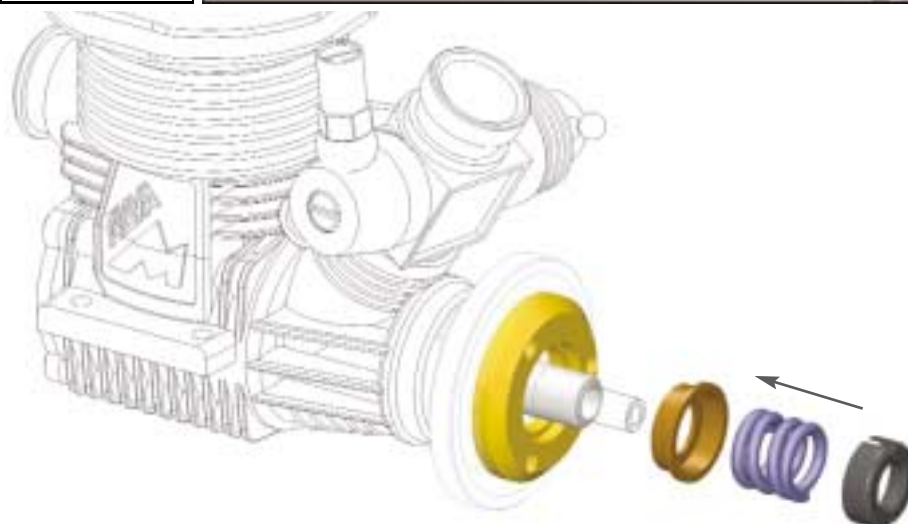
M21  
7x13x0.5mm



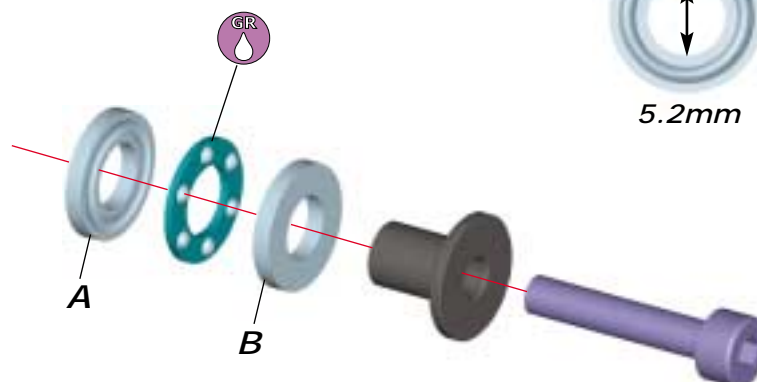
Step 7.2

Centax Assembly

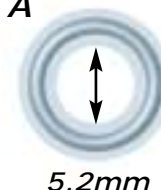




F14  
3x16mm

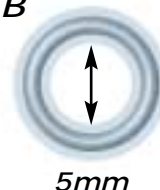


A

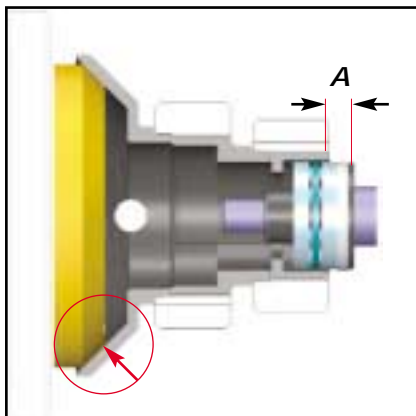


5.2mm

B



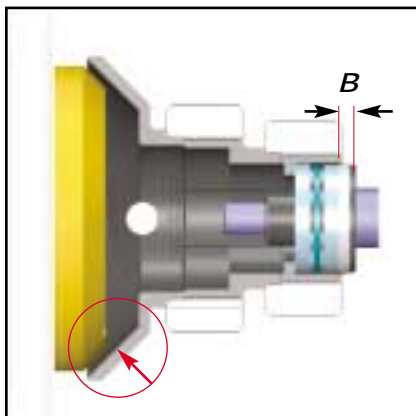
5mm



### Adjusting the Clutch Gap

With only the thrust bearing installed push the bell housing in, and on to the clutch shoe and measure the distance between the outer edge of the black thrust bearing carrier and the top of the bell housing.

This is measurement **A**



Now pull the clutch housing away from the clutch shoe and against the thrust bearing. Measure the distance between the outer edge of the black thrust bearing carrier and the top of the bell housing again.

This is measurement **B**

The correct clutch spacing is 0.7mm

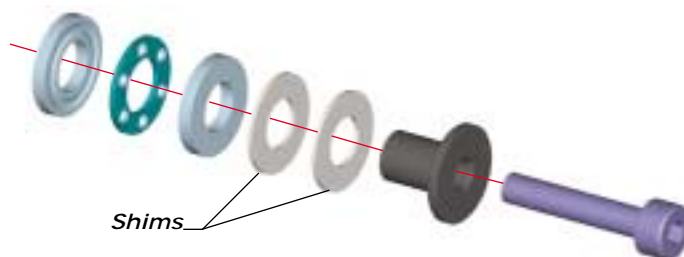
Calculate the thickness of the required shims as follows:

$A - B - 0.7\text{mm} = \text{Thickness of shims required}$

For example:  $A = 1.3\text{mm}$  and  $B = 0.3\text{mm}$

Shim thickness =  $1.3 - 0.3 - 0.7 = 0.3\text{mm}$

These shims should be placed before the thrust bearing on the thrust bearing carrier as shown.



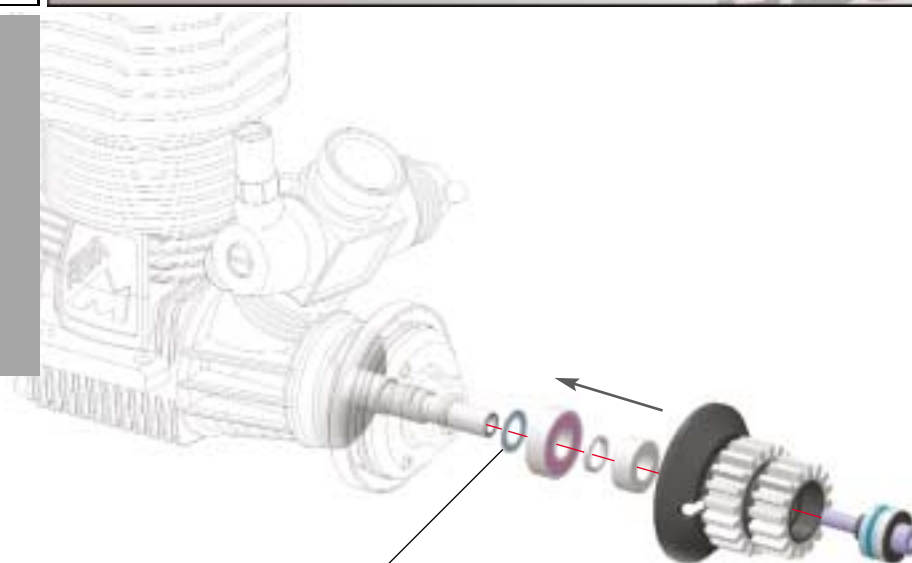
**M14**  
5x10x0.1mm  
5x10x0.3mm



**U4**  
5x10mm



**U45**  
5x13mm



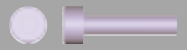
Place small shims to remove all but a small amount of end play

# 8.0 Final Assembly

## Step 8.1

Bag 31

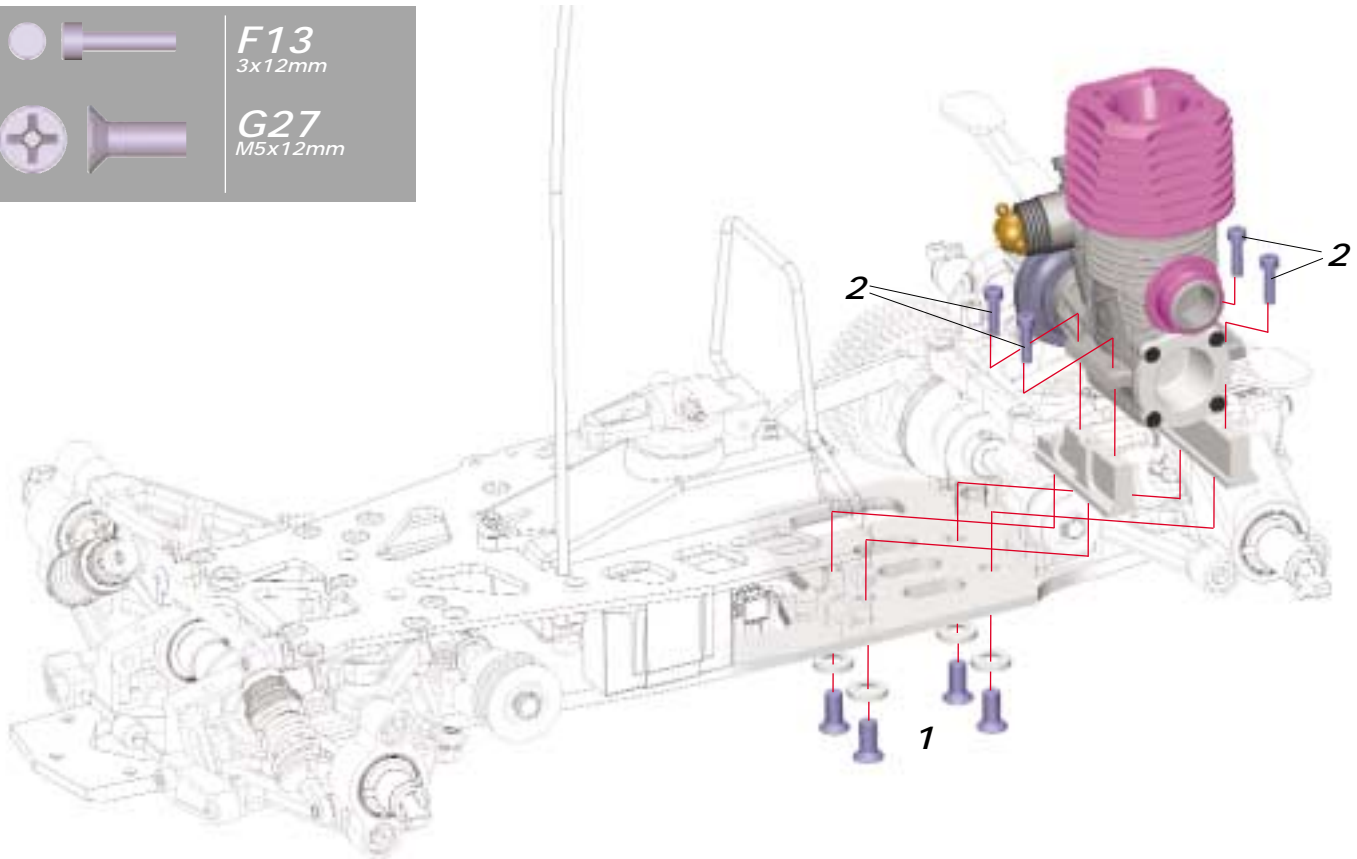
950 Final Assembly



**F13**  
3x12mm



**G27**  
M5x12mm



## Step 8.2

Bag 32

950 Final Assembly



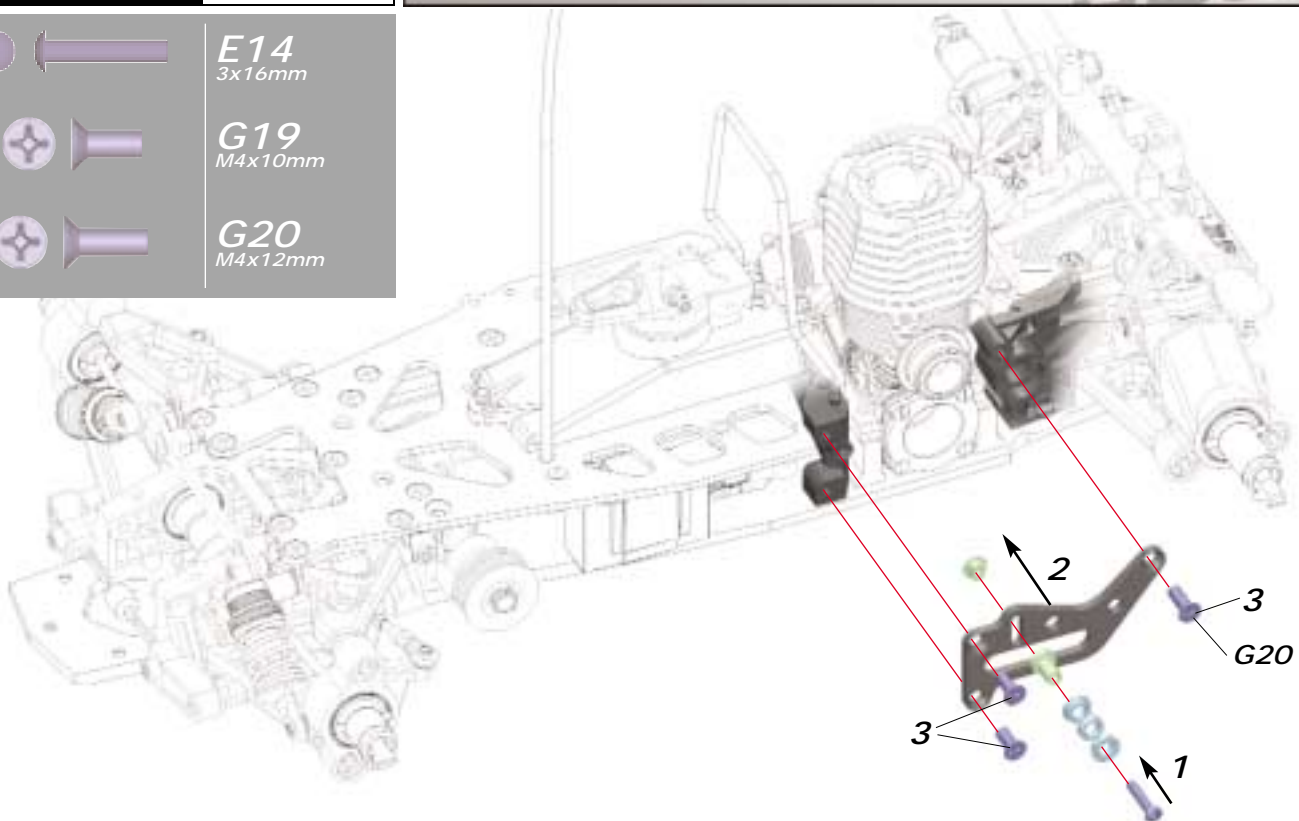
**E14**  
3x16mm



**G19**  
M4x10mm



**G20**  
M4x12mm



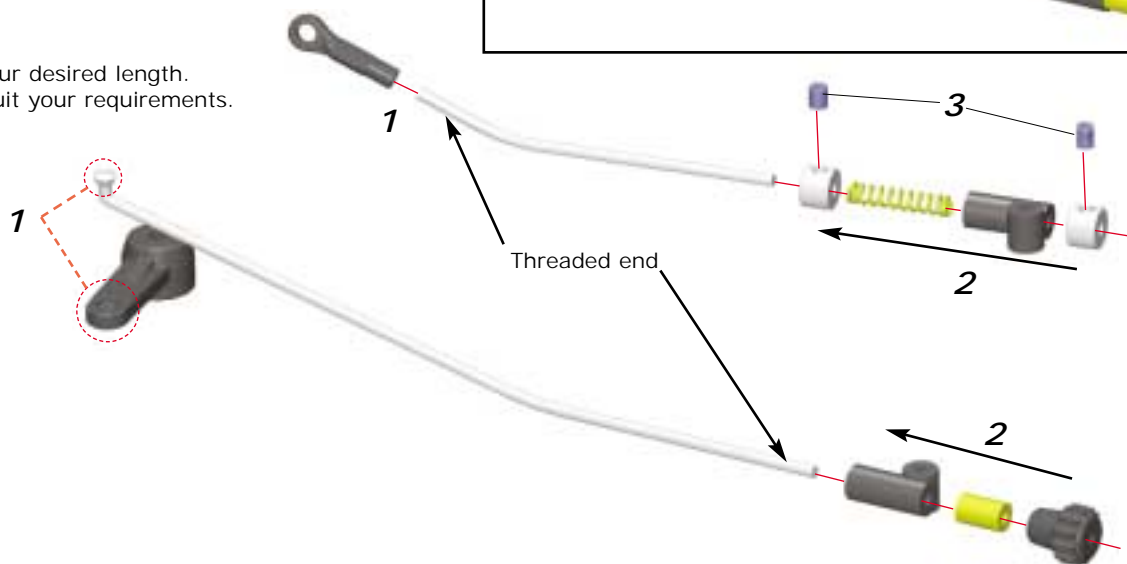
## Step 8.3

Bag 33



**H9**  
3x4mm

Cut the throttle rod to your desired length.  
Bend both rods to best suit your requirements.



## Step 8.4

Bag 34

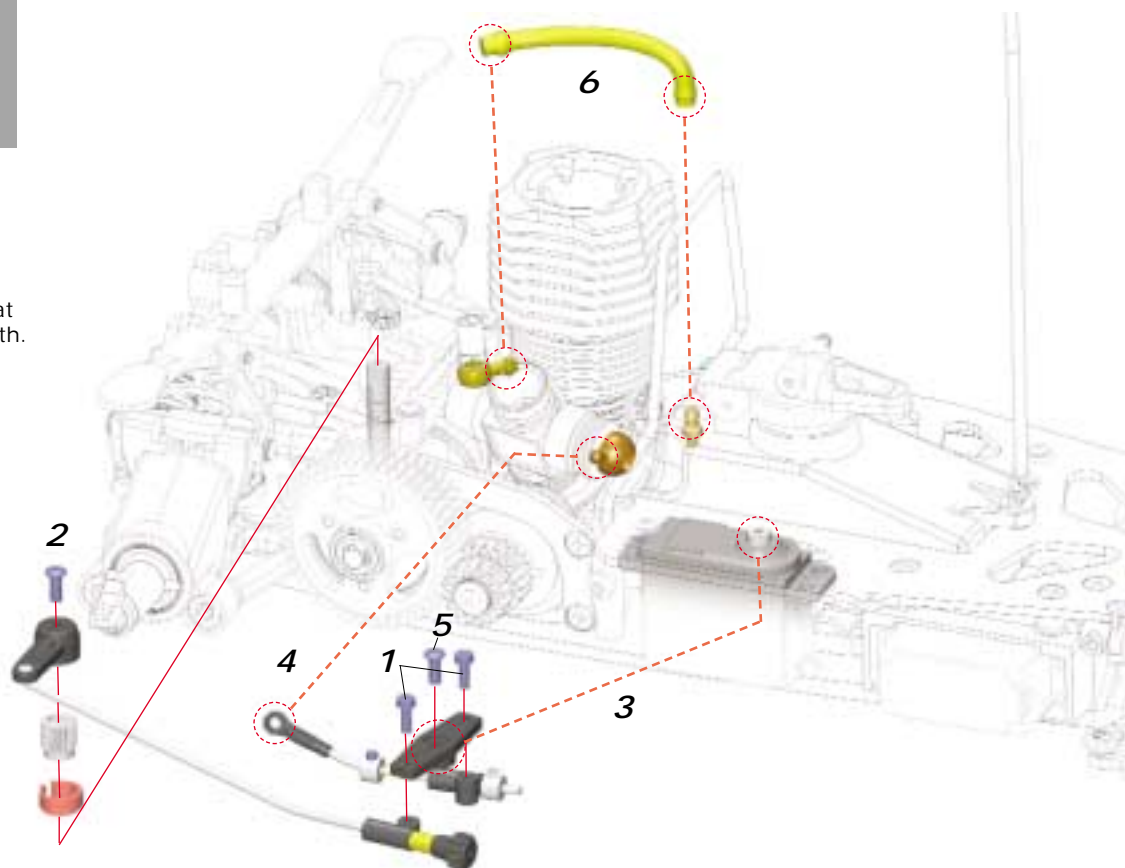


**C5**  
2.5x8mm



**E11**  
3x8mm

On the servo arm is a number that corresponds to the amount of teeth.  
23 - Sanwa / KO / JR  
24 - Hitec  
25 - Futaba

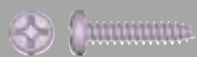


## Step 8.5

Bag 35

950

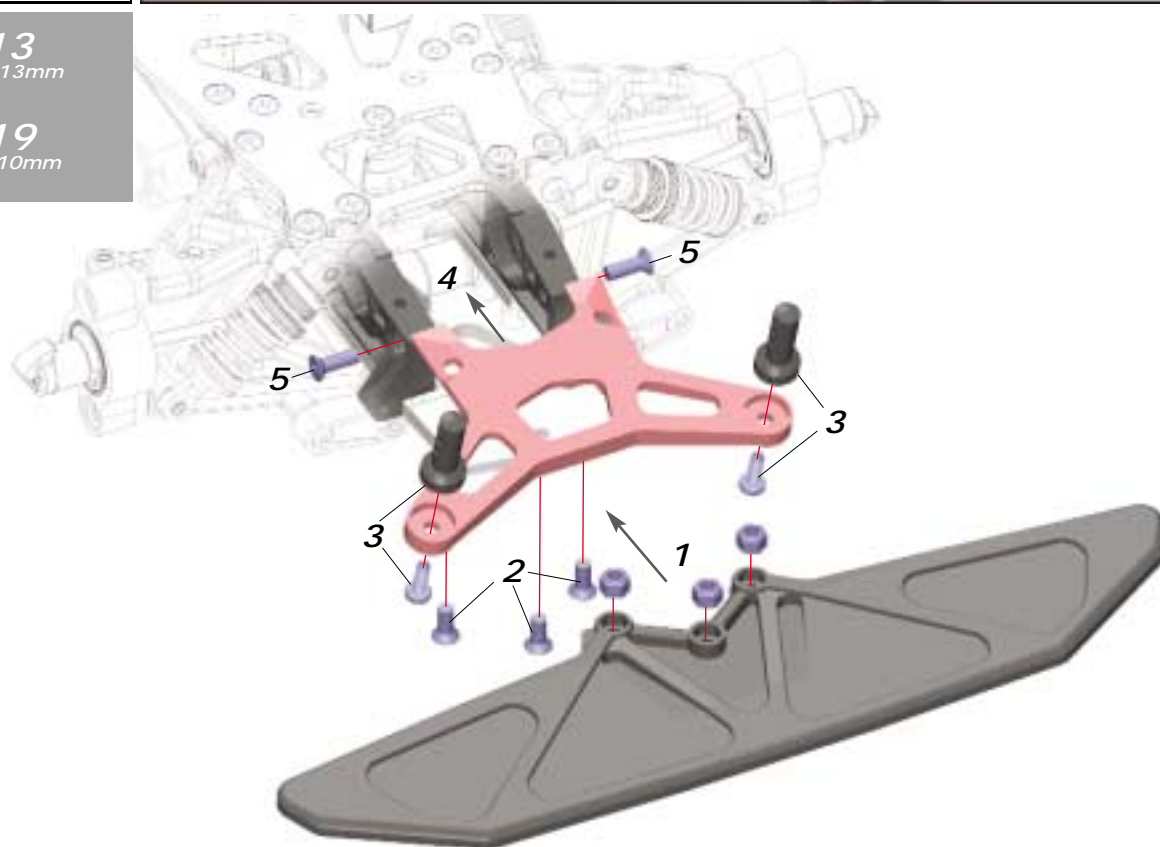
Final Assembly



**A13**  
3.5x13mm



**G19**  
M4x10mm



## Step 8.6

Bag 36

950

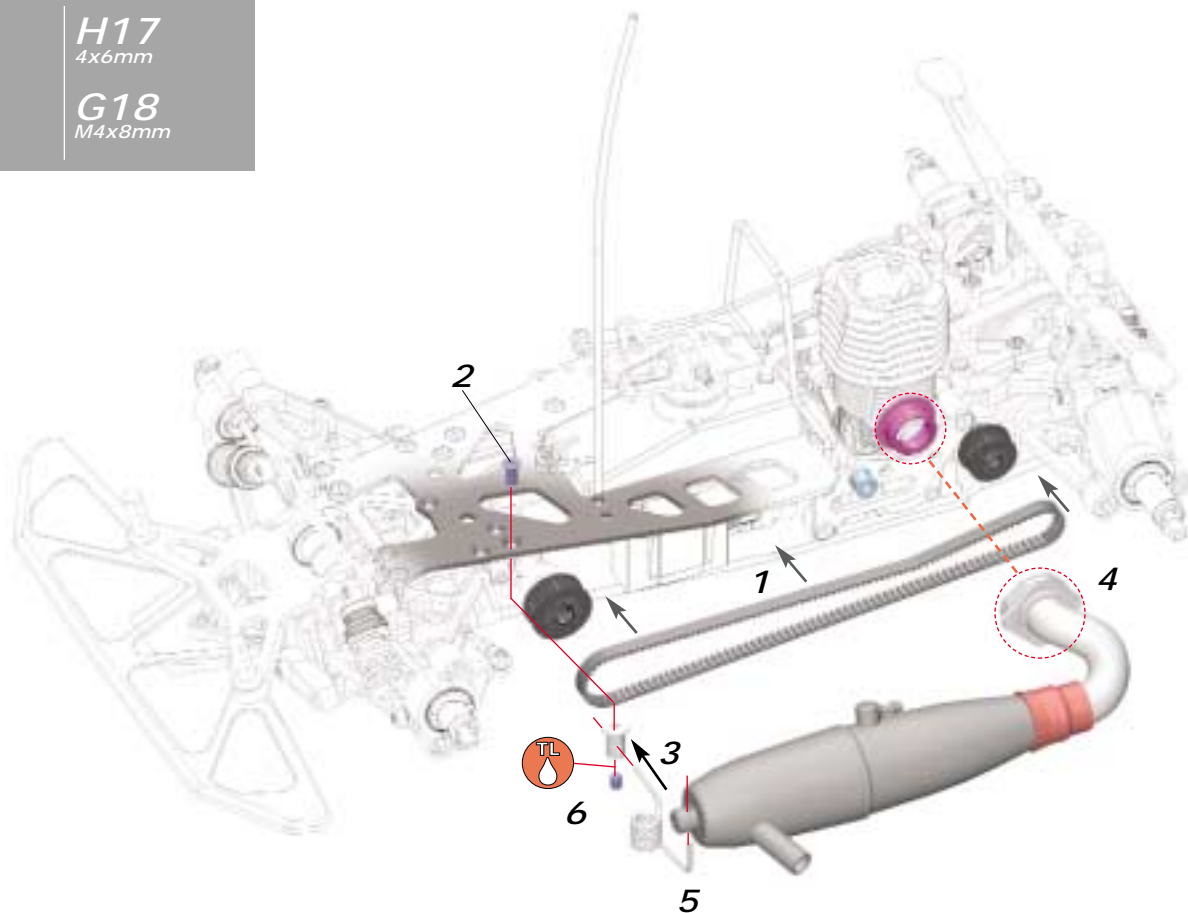
Final Assembly

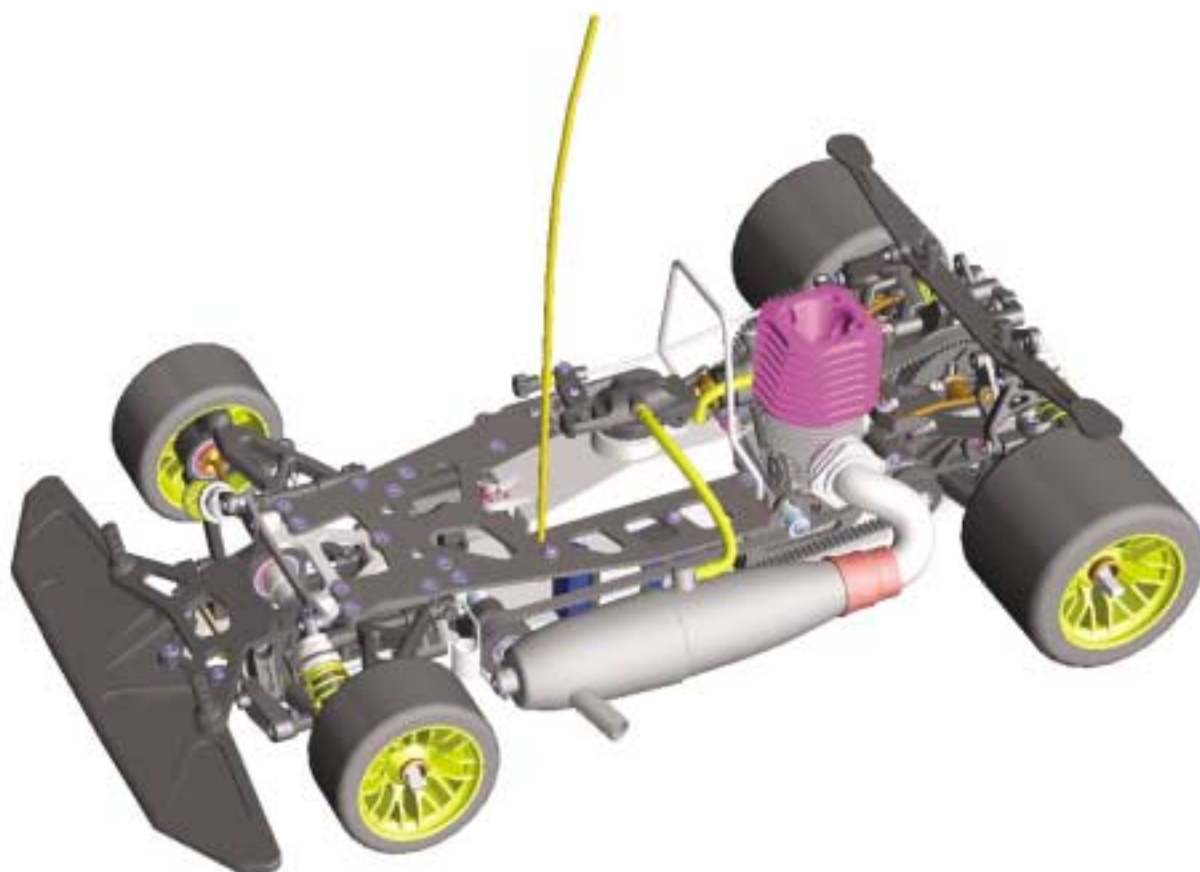
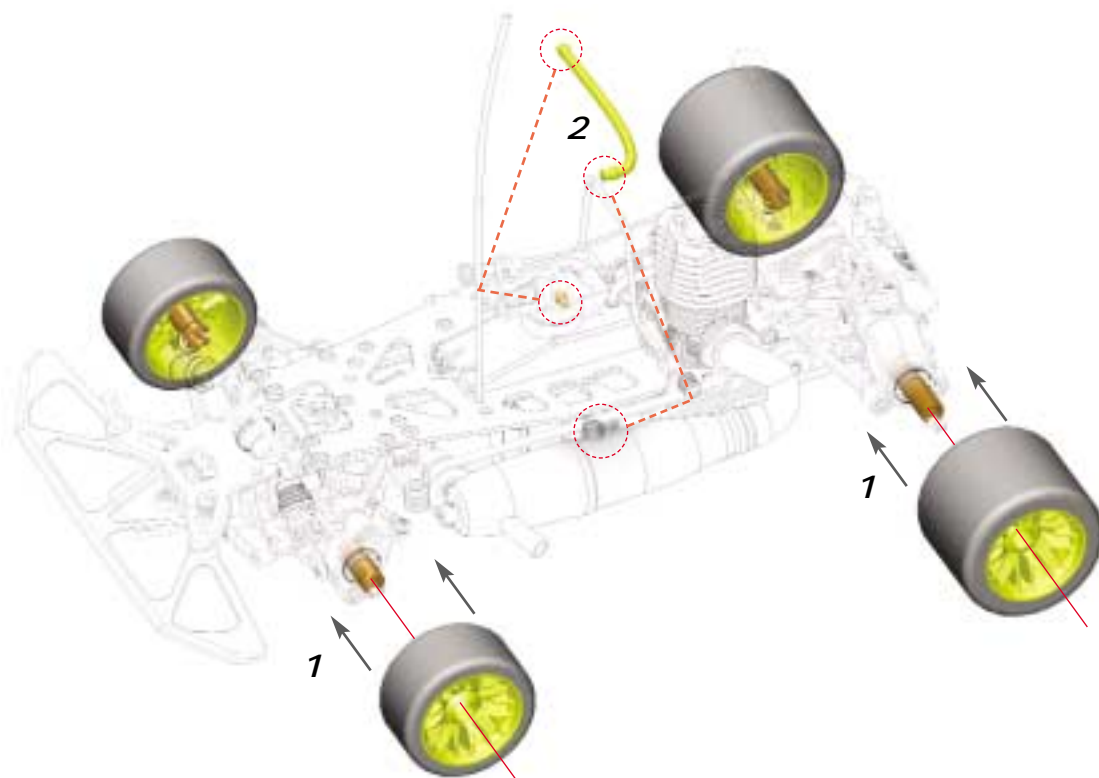


**H17**  
4x6mm



**G18**  
M4x8mm





# 9.0 Setup Guidelines

Setting up a racecar with fully independent suspension, like your Serpent 950, is necessary to make the car perform well. We have developed these straightforward procedures to help you set up your car properly and easily. Always follow these procedures step-by-step, in the order presented, and always make sure that you make equal adjustments on both left and right sides of the car.

The set-up described here is a good starting point, but you may adjust the settings to better suit different track conditions. Make only small adjustments at a time, and see if you find any improvement in handling with each adjustment. We advise you to keep track of your set-up changes, and record which set-ups work best at different racetracks under various conditions. After rebuilding the chassis, or in case you are lost with your set-up, always return to the set-up described here.

## 1 Shock absorbers

Shock absorber dampening influences the responsiveness of the chassis during cornering (chassis roll), and helps to maintain proper contact between the tire and the road surface during vertical movement. Setting the right dampening is therefore always a compromise and requires a lot of "hands on" experience.

No dampening means that the spring rate determines how long it takes for the spring to compress and the suspension to reach a stable position. Dampening only comes into play when the suspension is moving (either vertical chassis movement or because of chassis roll), and loses its effect when the suspension has reached a stable position. When the spring is compressed or decompressed, the shock absorber oil resists this movement. How much it resists depends on the thickness of the oil and how much the flow is restricted (the number of holes in the shock piston) and of the velocity of the piston.

### How to measure and adjust

The Serpent shock absorbers are adjustable from the outside. Pull out the pistonrod and turn it slightly until it locks in the shock-cylinder. By turning the pistonrod clockwise until the end you reach the hardest position (1 hole). Turning it from here anti-clockwise means opening more holes. By feeling the "clicks" you can determine the number of holes in the piston.



### 1.1 Front shock absorber setting

Adjust the front shocks to 2 holes (complete turn clockwise, then 1 click back)

### 1.2 Rear shock absorber setting

Adjust the rear shocks to 2 holes (complete turn clockwise, then 1 clicks back)

## 2 Track-width

Track-width affects the car's handling and steering response. Increasing front track-width will result in more understeer, while decreasing it will result in less understeer and faster steering response.

Increasing rear track-width creates more rear traction, as long as the car has a solid rear axle as it is in the 950. It may also help in case of traction rolling.



## 2.1 Front track-width - Setting

Front track-width is measured on the outside of the wheels. It is important that the front track-width is adjusted symmetrically, meaning that the right and left wheels must be the same distance from the center-line of the chassis.



Set the front track-width to 254mm. Turn both pivot balls IN equally to reduce track-width, turn them both OUT equally to increase track-width.

## 2.2 Rear track-width - Setting

Rear track-width is measured also on the outside of the wheels. As in the front it is important that the rear track-width is adjusted symmetrically, meaning that the right and left wheels must be the same distance from the center-line of the chassis.



Set the rear track-width to 262mm. This is achieved by first removing both rear upper wishbone mounting points from the rear upright. Unscrew both sides, together with the two lower pivot balls, out to make wider and in to make narrower.

## 3 Downstops

Downstops limit how far the suspension arms travel downward (which determines how far upwards the chassis travels). The amount of downward suspension travel affects the car's handling, and the effect may change with the type of track and/or amount of grip available. In general, more suspension travel (less downstop) makes the car more responsive but less stable. It is also better on a bumpy track.

**It is very important to adjust the downstops such that left and right sides are equal.**

### How to measure

You check the downstops with the chassis elevated above a reference surface. A special, flat reference board is available from HUDY (#108200 Flat Set-up Board). We also advise you to use the downstop measuring set from HUDY.



Using the measuring gauge, measure the distance from the reference surface to the bottoms of the rear uprights / front steering blocks. Positive numbers indicate the distance (in mm) ABOVE the level of the elevating blocks (or, above the bottom of the chassis). Negative numbers indicate the distance (in mm) BELOW the level of the elevating blocks (or, below the bottom of the chassis).

### Perform these initial steps

**A** Remove the wheels from the car.

**B** Front anti-roll bar: Remove screw from the right front anti-roll bar mount to disconnect it.

**C** Rear anti-roll bar: Disconnect one ball-joint from rear anti-roll bar.



**Remark:** it is not necessary to remove the shocks, however you must be sure that they are long enough not to limit the suspension. Be sure the suspension is reaching the downstop limits, before the shocks do.

### 3.1 Downstops front

Adjust the front downstop screws so that the bottoms of the steering blocks are at 0mm on the gauge. (Actual measurement = 0 mm above level of elevating blocks, or level with the bottom of the chassis).



### 3.2 Downstops rear

Adjust the rear downstop screws so that the bottoms of the rear uprights are at +9mm on the gauge. (Actual measurement = 9mm above level of elevating blocks, or above the bottom of the chassis).



### 4 Roll Centers

The "roll-center" is the theoretical point around which the chassis rolls, and is determined by the design of the suspension. Front and rear suspension normally have different roll-centers. The "roll-axis" is the imaginary line between the front and rear roll-centers. How much a chassis rolls in a corner depends on the relative position of the roll-axis to the center of gravity of the car. The closer the center of gravity is to the roll-axis, the less roll the chassis has and the less camber change there will be as a result of the chassis rolling.

#### How to adjust

Front and rear roll centers are both adjusted by inserting spacers. For the front you can add (rise the roll center) or remove (lower the roll center) carbon spacers above the front upper wishbone pivot point-bracket. For the rear you can place a spacer above the rear upright beneath the rear upper wishbone (rise the roll center).



#### 4.1 Front roll center - Setting

Set the front roll center to its default setting of 3mm.



#### 4.2 Rear roll center - Setting

Set the rear roll center to 0 mm (no spacer)

### 5 Ride Height

Ride-height also affects the car's traction as it moves the center of gravity and the roll-center of the car. Decreasing the ride-height (lowering the car) gives you more grip. However, because of changes in suspension geometry and decreasing ground clearance, there are also negative consequences to doing this.

#### How to measure

The car's ride height is measured when mounted on the HUDY setup system or using a set of 76mm rear / 70mm front tires. Measure using a HUDY ride height gauge or a calipers from the very end point at both the front and rear of the car.



#### 5.1 Front ride height - Setting

Set the front ride height to 7mm. This is done by adding or removing pressure on both front springs pre-tension and therefore raising or lowering the ride height.



#### 5.2 Rear ride height - Setting

Set the rear ride height to 7mm. This is done by adding or removing pressure on both rear springs pre-tension and therefore raising or lowering the ride height.



### 6.0 Camber

Camber is the angle of a wheel to the surface when the car is resting on the surface (with wheels and shock absorbers mounted). Zero degrees (0°) of driving camber means that the wheel is per-

pendicular to the reference surface; negative degrees means that the top of the wheel is leaning inwards; positive degrees means that the top of the wheel is leaning outwards.

Camber affects the car's traction. In general, more negative camber means increased grip. Nevertheless, it should always be adjusted such that the front tires wear flat, while the rear tires should wear slightly conical to the inside.

#### 6.1 Front driving camber - Setting

Adjust the front driving camber to -1.5 degrees (tops of front wheels leaning inwards).



#### How to measure

Before measuring front driving camber, lift and drop the front end of the car a few cm's to let the suspension settle. Measure the camber using the Hudy set-up system which you already used to adjust ride height.

*Notice:* using wheels together with a camber gauge may result in noticeable different camber readings. The reason is that especially the rear tire has a tendency to lay flat on the surface. If then i.e. the tire is not pre-coned, the camber reading may differ up to 1 degree less camber to the reading you get with the Hudy system.

#### How to adjust

Camber is adjusted by turning the pivot-balls in or out. Turning the upper pivotball in while turning the lower one out gives more negative camber. Always turn one pivotball in and the other one out, otherwise you will change toe-in.



#### 6.2 Rear driving camber - Setting

Adjust the rear driving camber to -3 degrees (tops of rear wheels leaning inwards).



#### How to measure

The measuring is similar to the front camber.

#### How to adjust

Camber is adjusted by turning the pivot-balls in or out. Turning the (lower) pivot-balls out gives more negative camber. Always turn both pivotballs in or out, otherwise you will change toe-in.



### 7 Toe-in

Toe-in is the angle of the wheels when looked at from above. When the wheels are parallel, the toe-in is 0 degrees. When the wheels are open towards the front, this is called toe-out (or negative toe-in). When the wheels are closed towards the front, this is called (positive) toe-in.

Toe-in is used to stabilize the car. In the case of oversteer (the rear end losing traction before the front), adding extra rear toe-in may help, but this makes on-power cornering a little more difficult. If the car is too stable and pushing (understeering), removing some front toe-in will remedy this.

#### How to adjust

Front toe-in is adjusted with the track-rods that connect the servo-savers to the steering blocks. Making the track-rods longer will create more toe-in, while making them shorter will create less toe-in.

To create more rear toe-in, turn in the front pivot ball and turn out the rear pivot ball. To create less rear toe-in, turn out the front pivot ball and turn in the rear pivot ball. Remember to make equal (but opposite) adjustments to the pivot balls.

## How to measure

Measure both the front and rear toe-in using the set-up tool from HUDY



### 7.1 Front Toe-in - Setting

Adjust the front toe-in to -0.5 degrees (fronts of front wheels pointing slightly outwards).



### 7.2 Rear Toe-in - Setting

Adjust the rear toe-in to +2 degrees (fronts of rear wheels pointing inwards).



## 8 Caster angle

Caster angle is the angle of an imaginary line between the top pivot ball and the bottom pivot ball of the steering block, with respect to a line perpendicular to the ground. Caster angle affects on- and off-power steering, as it will tilt the chassis more or less depending on how much caster is applied.

In general changing caster has an effect on on-throttle handling. Giving more caster results in more on-throttle oversteer (or less understeer). Effects on off-throttle balance is quite little and difficult to predict.

## How to adjust

The caster angle is adjusted with nylon spacers which are inserted either in front of or behind the upper front suspension arm. More spacers in front of the arm will increase the caster angle. More spacers behind the arm will decrease the caster angle.



### 8.1 Caster - Setting

Set the front caster gap to 2mm (2mm shim in front of the upper arm, 1+4mm shims behind).

## 9 Checking for suspension tweak

A "tweaked" car is an unbalanced car, and has a tendency to pull to one side under acceleration or braking. Tweak is caused by an uneven wheel-load on one particular axle. Now that the suspension geometry set-up has been completed, you must check for suspension tweak before you reconnect the anti-roll bars.

### Perform these initial steps:

**A** Place the car on a flat reference surface.

**B** Make sure that both front and rear anti-roll bars are disconnected.

**C** Put a set of good tires on the car, important is that the left wheels have the same size than the right ones

**9.1** Checking for tweak from the front of the car. Lift and drop the front end of the car a few cm's to let the suspension settle. Place a sharp tool underneath the chassis at its middle point, and lift the front end. If one front wheel lifts before the other, the rear of the car is tweaked.



**9.2** Adjust the preload on the rear springs until both front wheels lift at the same time. If, for example, the front right wheel lifts earlier, you must increase the preload on the rear left spring, and decrease the preload on the rear right spring. You must adjust both rear springs, otherwise you will change the ride height.



**9.3** Reconnect the rear anti-roll bar, and check for tweak again by lifting the front end of the car. If again one front wheel lifts before the other, the rear anti-roll bar is tweaked. Adjust the length of one or both rear anti-roll bar pushrods until both front wheels lift at the same time.



**9.4** Checking for tweak from the rear of the car. Lift and drop the rear end of the car a few cm's to let the suspension settle. Place a sharp tool underneath the chassis at its middle point, and lift the rear end. If one rear wheel lifts before the other, the front of the car is tweaked.



**9.5** Adjust the preload on the front springs until both rear wheels lift at the same time. If, for example, the rear right wheel lifts earlier, you must increase the preload on the front left spring, and decrease the preload on the front right spring. You must adjust both front springs, otherwise you will change the ride height.



**9.6** Reconnect the front anti-roll bar, and check for tweak again by lifting the rear end of the car. If again one rear wheel lifts before the other, the front anti-roll bar is tweaked. Loosen the screw on the left front anti-roll bar mount. Adjust the eccentric cam until both rear wheels lift from the ground at the same time. Tighten the screw to secure the adjusting cam.



## 10 Anti-roll bars

Anti-roll bars are used to adjust the car's side-traction. In general, increasing the hardness of an anti-roll bar on one particular axle decreases the side-traction of that axle and increases the side-traction of the other axle. For example, if you make the front anti-roll bar harder, you decrease the side-traction of the front and increase the side-traction of the rear. This will result in less steering (more understeer).

Changing the front anti-roll bar has more effect on turning-in (entering a turn, decelerating, off-power).

Changing the rear anti-roll bar has more effect on powering-out (exiting a turn, accelerating, on-power).



### How to adjust

You adjust the front anti-roll bar by turning both blades to an equal angle. The flat of the blade in a horizontal position is the softest position; the vertical position is the hardest position.

### 10.1 Front anti-roll bar - Setting

Adjust the front anti-roll bar to the (softest) horizontal position.

**10.2** The rear anti-roll bar is non-adjustable unless you obtain the optional adjustable anti-roll bar (#909335). This can be adjusted the same as the front.

By changing which anti-roll bar mounting hole on the lower arm you use changes the effect of the anti-roll bar. The inner hole gives a softer setting were the outer holes give a harder setting (standard).

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