



INSTRUCTION MANUAL

CompetitionX
A WEB SITE FOR THE SERIOUS RACER



ELITE 1/8 SCALE RC RACING CAR





Congratulations and welcome to the Elite of Model Car racing. You now own the most sophisticated model-racing car ever made! Therefore we present to you what we feel is the best Instruction Manual ever made. We at Serpent have always prided ourselves on our detailed, well-illustrated instruction manuals and this "next generation" manual is no exception. Having consulted with many specialists, and more importantly many racers, we have come up with an entirely new format for this instruction manual which we feel will compliment our completely new chassis - the VETEIQ.

Within the pages of this manual, you will find that the car has been separated into different assemblies and sub-assemblies. At the start of each assembly you will find a detailed exploded view from which all non-relevant and previously assembled parts have been faded. This is so you can easily differentiate between what you need to assemble in the current step, and what you have already assembled in previous steps. We have also added part numbers to the exploded view and a name reference table from which you can easily refer to the parts used in the assembly process.

When you start an assembly, you may be presented with important notes about the assembly process that follows. You should proceed to step 1 and begin to assemble. You will notice that each step contains 2 boxes. In the left box you can easily refer to the hardware required to complete the step, whilst the right box contains an image representation of the assembly step accompanied by text explaining the process in detail. If necessary there will be a cut-away picture to explain a particularly tricky or difficult step.

At certain points throughout the assembly process you will be referred to the all-new VETEIQ Set-up Instructions from where you can find additional information and default settings for your VETEIQ.

If you have any questions or are encountering problems, we recommend that you visit www.myTSN.com where you will find, if available, supplemental assembly instructions, set-ups and useful tips and tricks. Or, feel free to contact us by mail, phone, fax or E-mail.

We would like to thank you for choosing the VETEIQ as the car to take you into the winner's circle, and we wish you every success in assembling and racing it.

CONTENTS

BUILDING INSTRUCTIONS

1	Shock absorbers	1
2	Rear transmission	4
3	Rear suspension part 1	7
4	Rear suspension part 2	9
5	Rear shock mounting	11
6	Rear body-mount	13
7	Front transmission	14
8	Front suspension part 1	16
9	Front suspension part 2	18
10	Front shock mounting	20
11	Centax 2-speed clutch	22
12	Chassis assembly part 1	25
13	Chassis assembly part 2	27
14	Radio plate assembly part 1	28
15	Radio plate assembly part 2	30
16	2 - Speed gearbox	31
17	Linkages	33
18	Final assembly	35

A WEB SITE FOR THE SERIOUS RACER



1. SHOCK ABSORBERS



Shocks are extremely important for the performance of your car. These unique 4-step adjustable shocks must be assembled with great precision. After removing the nylon parts from the frame, make sure to remove any excess plastic flash with a sharp knife.

Step 1.1

Open bag A (large box)

Cut all shockparts free from the shockparts frame. Remove any plastic reminders with a sharp knife. Press top piston into bottom piston



Step 1.2

Press clip R2 to shock-rod groove
Place washer N3 over shock-rod
Turn piston assembly onto shock-rod
Press clip R1 to shock-rod top groove

N3 3x6x0.3mm

R2 2.3mm

R1 1.9mm



COMPETITORX
A WEB SITE FOR THE SERIOUS RACER



Step 1.3

Insert shock-rod with piston into shock body.
- Long rod in long shock body (Rear)
- Short rod in short shock body (Front)



Y17
12.1x1.6mm

Step 1.4

Insert O-ring Y17 into adjusting nut.

Thread adjusting nut onto shock body.

Note: Apply little oil to the O-rings



Step 1.5

Cross view of assembled adjusting nut.



Y4 3.1x1.6mm

Step 1.6

Place O-ring Y4 over the shock rod.
Use some shock-oil to lubricate the O-ring.

Apply the end-cap to the bottom part of the shock body and slide it over the locking cams, turn to lock the end cap.



Step 1.7

Grip the top of the thread of the shock rod with pliers, and thread the ball-joint onto the shock rod.

Tip: Pre-thread the ball-joint using an M3 screw. This will make it easier to thread the ball-joint onto the shock rod.

Hold here



A WEB SITE FOR THE SERIOUS RACER

Step 1.8

Slide the piston rod out so that the piston is at the bottom of the shock body. Orient the shock straight up-and-down, and fill the shock body with shock oil.



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



Step 1.9

Glue the rubber compensation membrane to the top pivot-point with CA glue.



Step 1.10

Place the top pivot-point on the membrane.

Place the alum. collar over the top pivot-point, and thread all the way onto the shock body. Some excess oil may escape.

Check the well functioning of the shock absorber. The shock must move up and down freely with only "hydraulic" dampening. If any air is still in the shock, open it again and start the bleeding sequence again.

Dampening adjustment:

Pull the piston rod all the way out, and turn slightly to lock the piston in the shock body. Turning the shock rod fully **counter-clockwise** aligns 4 holes in the pistons (softest); turning the shock rod fully **clockwise** aligns 1 hole in the pistons (hardest). The shocks have 4 settings, which can be felt by a little click. Set the front shocks to position 3 (3 holes aligned - medium), rear shocks to position 4 (4 holes aligned - softest).



Step 1.11

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

Front choc: 67,5 mm

Rear shock: 77,5 mm

In fully extended, locked position.



Step 1.12

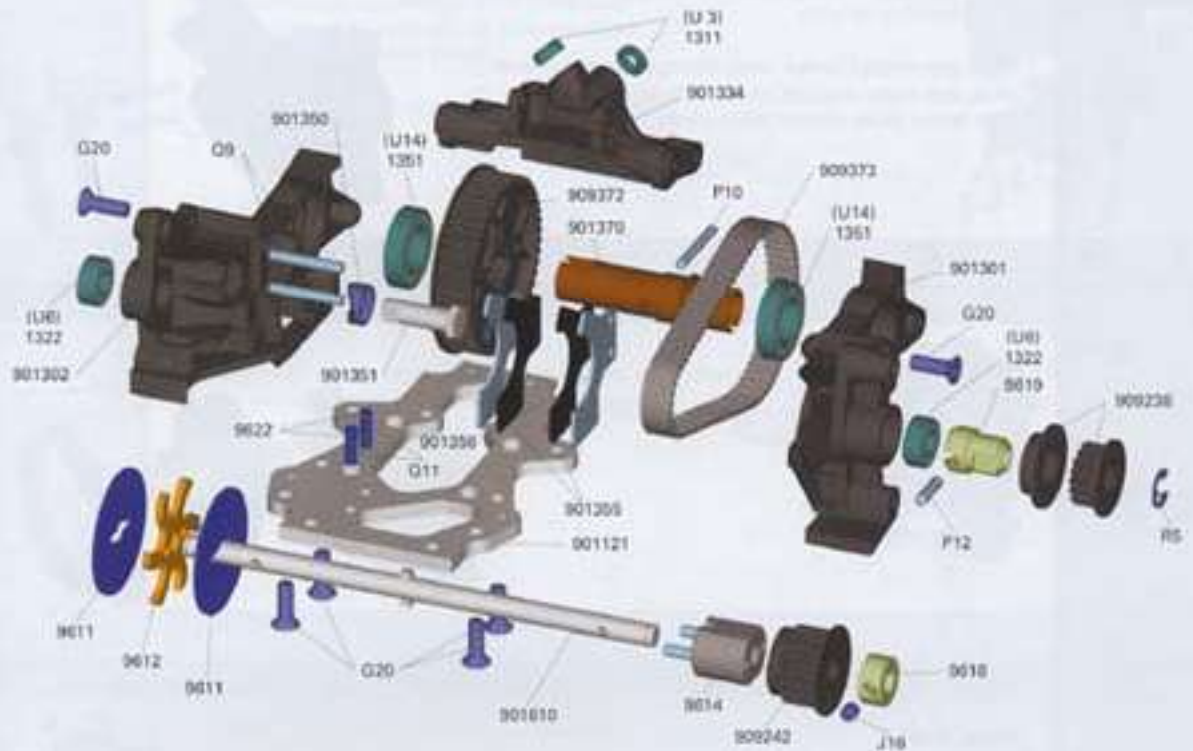
Apply the spring, short springs on short shocks (front) long springs on long shocks (rear).

Apply the spring support washer.

SAISON X
A WEB SITE FOR THE SERIOUS RACER



2. REAR TRANSMISSION



Step 2.1

Open: bag B, bag D=935 (tooling), bag U (bearings), bag G19 (screws), bag G20 (screws), EXTRA bag.

Assemble brakepads.

Roughen steel brakeplates with sandpaper.
Glue brakepads to the steel plates with CA glue.
(Note: brakepads must face each other, since brake disk goes in between).



Step 2.2

Assemble rear axle.

Insert pin P10 in the hole of the rear axle.
Slide rear pulley over axle and pin.
Place ball-bearings U14 on each end of the rear axle.



P10 2.5X22mm



U14
12x21mm

Step 2.3

Open bag C

Slide nylon brake-cam over alum. brake-actuator shaft, flat edges towards end of shaft. (The hex cavity in the brake-cam aligns to the hex end of the actuator shaft.)
Slide shaft through brake hole of right rear bearingblock.
Press ballbearing U6 into bearing cavity at front of bearingblock.



U6 6x13mm



Q9 2.5x20mm

Step 2.4

Press pins Q9 into right rear bearingblock until pins reach bottom of hole.

Slide assembled brake pads (linings together) over pins, and press against brake activator shaft. The brake pads should slide freely.



Step 2.5

Place rear axle into right rear bearingblock. Place belt over rear pulley.



U3 5x8mm

G20 4x12mm

Step 2.6

Open bag D

Press bearings U3 into lower rear rocker bracket. Mount lower rear rocker bracket to right rear bearing block, using only rear screw G20.

Place alum. brake disk spacer between the 2 steel brake disks, and align the holes. Place the brake disk assembly between the 2 brake pads.



J16 4x4mm

Step 2.7

Open bag E

Press alum. brake adapter into nylon pulley. Slide pulley/adaptor over layshaft, seating it over the 2 protrusions.

Slide alum. collar onto 2-speed layshaft, and press against pulley. Align hole in collar with flat on layshaft, then secure collar to layshaft with setscrew J16.



G20 4x12mm

U6 6x13mm

Step 2.8

Slide layshaft through free loop-end of rear belt, through brake disk assembly, and through bearing in right rear bearingblock. (Make sure that the pins of the brake adapter slide through the aligned holes of the assembled brake disk.) Slide left rear bearingblock over layshaft. Secure lower rear rocker bracket to the left bearingblock, using only rear screw G20. Slide ballbearing U6 over exposed end of layshaft, and press into cavity in left bearingblock.




Q11 3x10mm



G20 4x12mm

Step 2.9

Press brake-pad support pins Q11 into rear chassis plate until bottoms of pins are flush with bottom of chassis plate.

Mount rear bearingblocks to rear chassis plate with screws G20.




P12 3x12mm


R5 5mm

Step 2.10

Press pin P12 through hole in leftmost end of layshaft. Apply pulley adapter, support disc, and pulley. Secure parts with C-clip R5.



CompetitionX
A WEB SITE FOR THE SERIOUS RACER



G20 4x12mm



J16 4x4mm

Step 3.4

Open bag G

Mount rear suspension brackets to bearingblocks with screws G20.

Position the upper rear suspension arms in suspension brackets. Slide upper hinge pins (46mm) through aligned holes of brackets and arms. Secure hinge pins in upper arms with setscrews J16.

1:1



U5 5x10mm



R4 4mm



J16 4x4mm

Step 3.5

Open bag H

Position rear anti-roll bar torsion shaft vertically between rear bearingblocks. Slide alum. pivot shaft through hole in bearingblock, through end of torsion shaft, and through hole in other bearingblock. Slide ballbearings U5 over exposed ends of torsion shaft, and press into cavities in bearingblocks. Secure torsion shaft by applying C-clips R4.

Align torsion shaft with the groove in the center of the alum. pivot shaft. Secure torsion shaft with setscrew J16.



J16 4x4mm

Step 3.6

Slide rear anti-roll bar crossblade through the upper hole of the torsion shaft, and align it in the center. Secure crossblade with setscrew J16.

The orientation of the crossblade determines the stiffness of the rear anti-roll bar. A horizontal crossblade position is stiffest, while a vertical crossblade position is softest. Use the vertical blade position as a starting point.



U3 5x8mm



G20 4x12mm

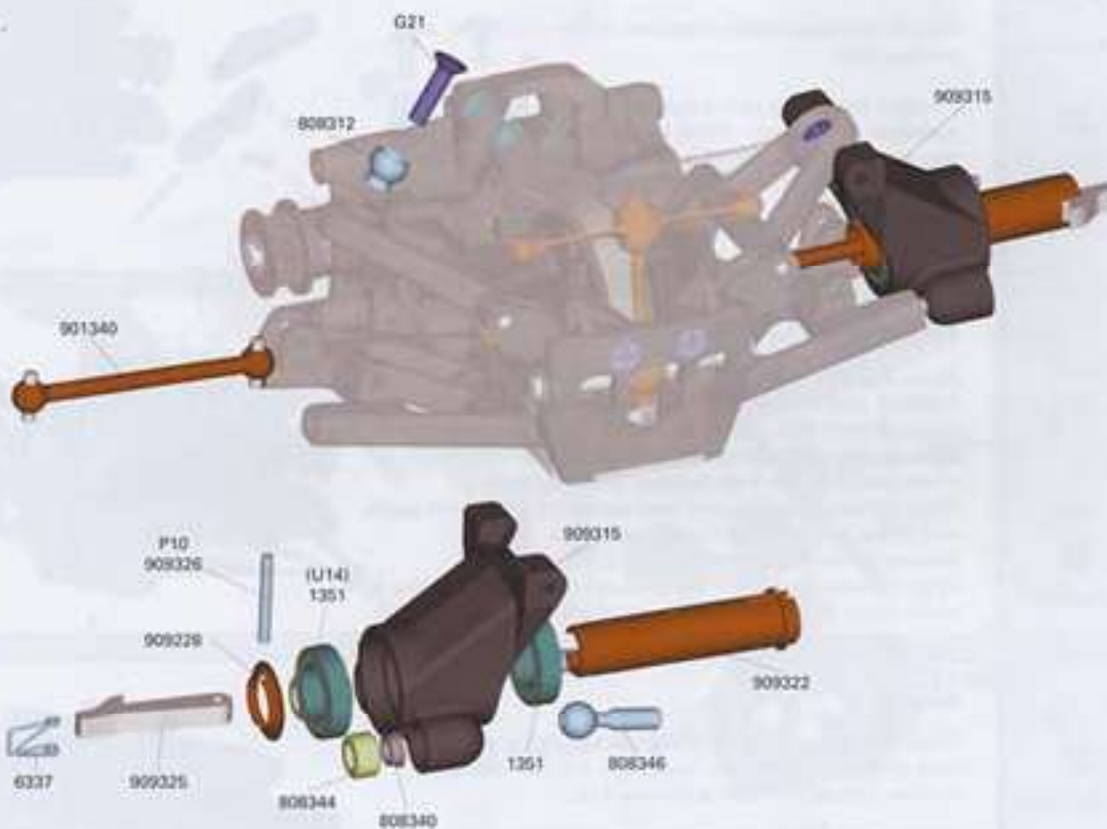
Step 3.7

Press bearings U3 into upper rear rocker bracket. Mount the upper rear rocker bracket to the lower bracket with screws G20.



CompetitionX
A WEB SITE FOR THE SERIOUS RACER

4. REAR SUSPENSION PART 2



Step 4.1 Open bag I

Push pivot balls into cavities in rear uprights. Place nylon rings atop pivot balls (curved sides against the pivot balls). Apply grease to threads of alum. plugs. Thread alum. plugs into cavities in rear uprights. Adjust alum. plugs to obtain the least possible play of the pivot balls, while still maintaining free movement of the pivot balls in the rear uprights.



Step 4.2 Open bag K

Press ballbearings U14 into rear uprights.

Slide rear wheelaxles through ballbearings until seated, then slide conical support washers over ends of axles; insert alum. quick-change levers into end of axles, and align with holes in axles. Press pins P10 through the axles and levers, making sure that the pins protrude equally on each side of the axles.



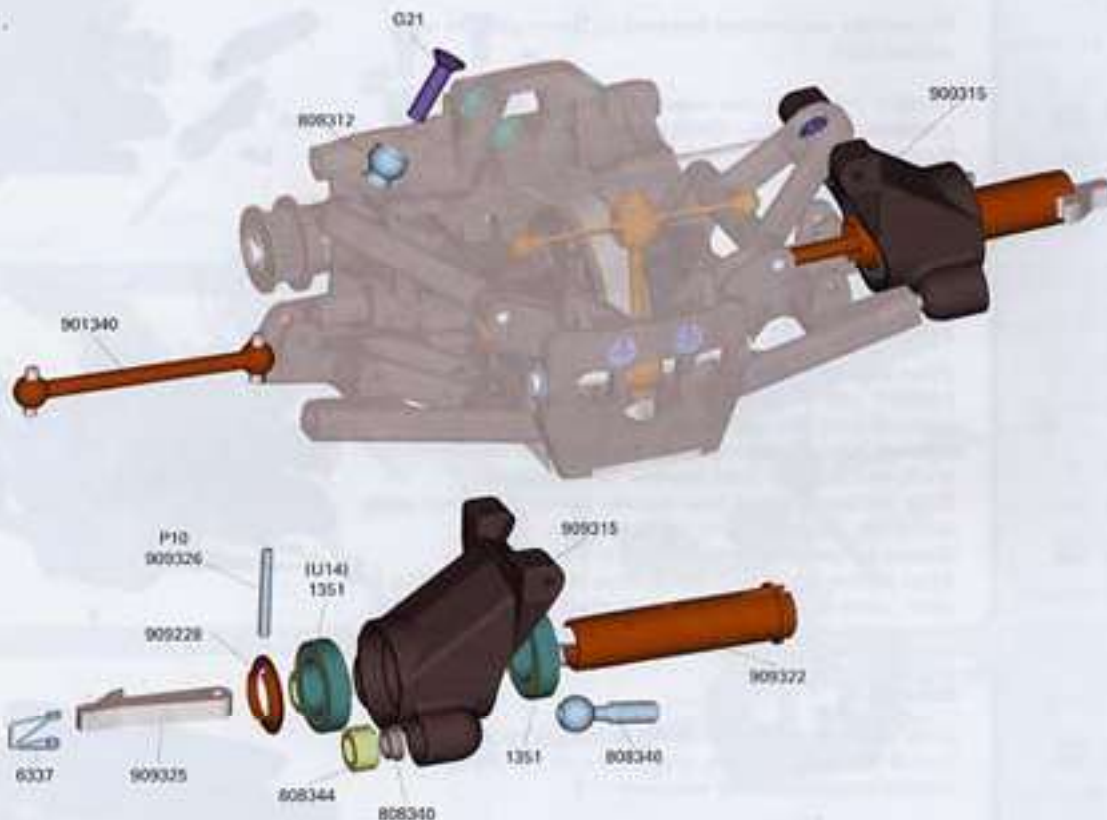
U14 12x21mm



P10
2.5x22mm



4. REAR SUSPENSION PART 2



Step 4.1 Open bag I

Push pivot balls into cavities in rear uprights. Place nylon rings atop pivot balls (curved sides against the pivot balls). Apply grease to threads of alum. plugs. Thread alum. plugs into cavities in rear uprights. Adjust alum. plugs to obtain the least possible play of the pivot balls, while still maintaining free movement of the pivot balls in the rear uprights.



U14 12x21mm



P10
2.5x22mm

Step 4.2 Open bag K

Press ballbearings U14 into rear uprights.

Slide rear wheelaxles through ballbearings until seated, then slide conical support washers over ends of axles. Insert alum. quick-change levers into end of axles, and align with holes in axles. Press pins P10 through the axles and levers, making sure that the pins protrude equally on each side of the axles.



Step 4.3

Push the quick-change lever springs through the open ends of the axles. (Tip: use a small screwdriver). Push the springs inwards until the 2 legs snap inside the ends of the axle cavities.



This cross-section shows the position of the quick-change lever spring. Note that the spring legs have snapped inside the outer edge of the wheel axle.

Step 4.4



G21 4x16mm



Position rear driveshafts in drive slots of rear axle, and in the rear axles.

NOTE: Lubricate the ends of the driveshafts with a heavy grease or graphite spray before inserting, repeat this after every 1 hour of usage. Thread the rear upright pivot balls into the ends of the suspension arms by approximately 4 turns. Turn each pivot ball only 1-2 turns at a time, checking that the driveshaft remains in place.



Place screw G21 through the steel pivot ball, then place pivot ball atop hole in upper rear suspension arm. Thread screw G21 into top of rear upright until pivot ball snaps into the upper suspension arm, then tighten against upright.

Step 4.5

Thread the lower pivot balls into the lower rear suspension arms until there is a 3mm gap between the upright and the ends of the suspension arm.



Check the rear suspension for freedom of movement.



A WEB SITE FOR THE SERIOUS RACER

Step 4.3

Push the quick-change lever springs through the open ends of the axles. (Tip: use a small screwdriver). Push the springs inwards until the 2 legs snap inside the ends of the axle cavities.



This cross-section shows the position of the quick-change lever spring. Note that the spring legs have snapped inside the outer edge of the wheel axle.



Step 4.4



Position rear driveshafts in drive slots of rear axle, and in the rear axles.

Place screw G21 through the steel pivot ball, then place pivot ball atop hole in upper rear suspension arm. Thread screw G21 into top of rear upright until pivot ball snaps into the upper suspension arm, then tighten against upright.

NOTE: Lubricate the ends of the driveshafts with a heavy grease or graphite spray before inserting, repeat this after every 1 hour of usage. Thread the rear upright pivot balls into the ends of the suspension arms by approximately 4 turns. Turn each pivot ball only 1-2 turns at a time, checking that the driveshaft remains in place.



G21 4x16mm

Step 4.5

Thread the lower pivot balls into the lower rear suspension arms until there is a 3mm gap between the upright and the ends of the suspension arm.

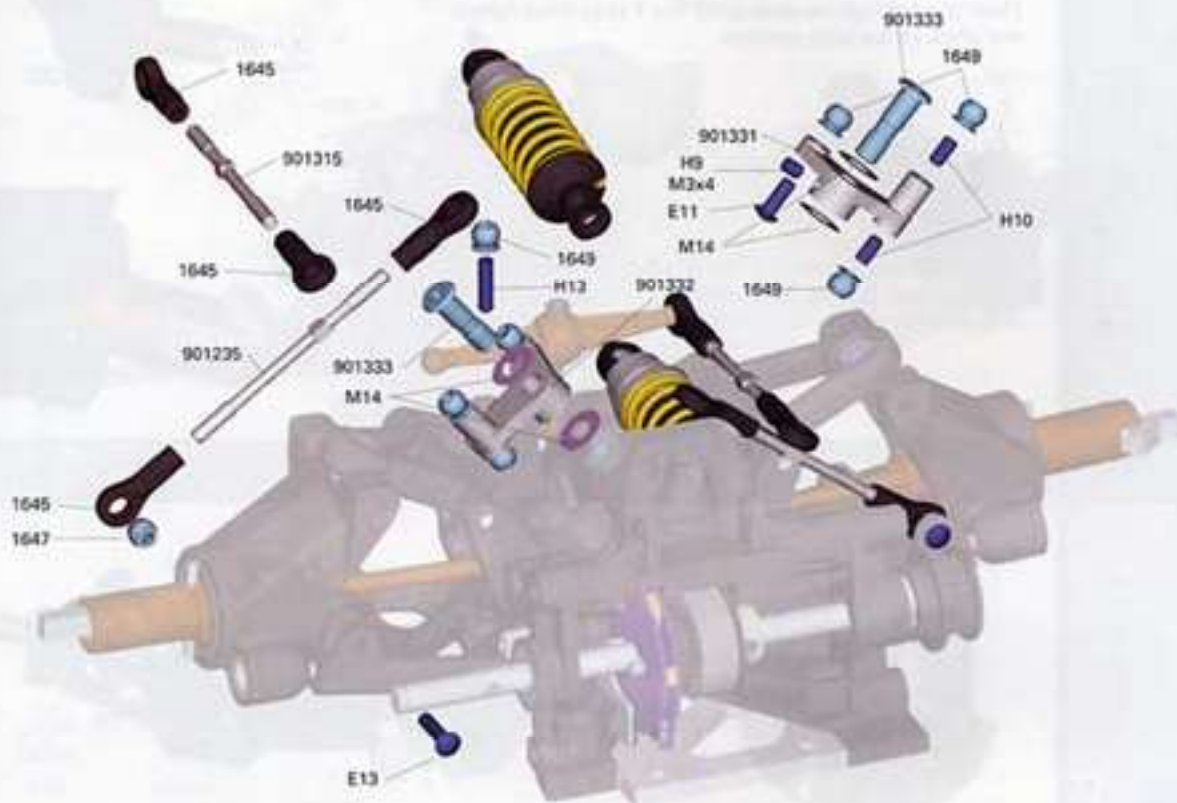



Check the rear suspension for freedom of movement.

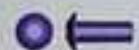


A WEB SITE FOR THE SERIOUS RACER

5. REAR SHOCK MOUNTING




H10 3x6mm



E11 3x8mm


Step 5.1

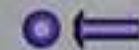
Open bag L

Apply medium-grade (blue) threadlock to setscrews H10, then thread setscrews into right rear rocker. Thread pivot balls onto setscrews until tight against rocker.

Mount third pivot ball to rocker with screw E11.




H10 3x6mm



E11 3x8mm

Step 5.2

Assemble left rear rocker as described in previous step.

NOTE: There is a difference between the right and left rear rockers.

CompetitionX
A WEB SITE FOR THE SERIOUS RACER



M14 5x10x0.1


 H9 3x4mm

Step 5.3

Open bag M

Apply shims M14 to both sides of rockers. Position rockers and shims between bearings in upper and lower rocker brackets, and align the holes. Insert special pivot pins through aligned holes in brackets and rockers. Secure the pivot pins in the rockers with setscrews H9.

Check the rear rockers for freedom of movement.



Step 5.4

Assemble rear shock pushrods by threading ball-joints onto each end of the metal tie-rod.


NOTE: The metal tie-rod has a CCW thread at the long end, and a CW thread at the short end.

Press a pivot ball into the ball-joint at the long end of the pushrod.

Adjust pushrods to a length of 76.5mm, measured end-to-end.

NOTE: The ball-joints should be perpendicular (90°) to each other.



E13 3x12mm


Step 5.5

Open bag N

Attach rear pushrods to lower suspension arms. Place the ball-joint pivot balls between the 2 brackets atop the lower suspension arm.

Use screw E13 to secure pushrod to lower suspension arm. Snap other end of pushrod onto indicated pivot ball on rear rocker.



H13 3x12mm


Step 5.6

Thread setscrews H13 into rear shock bracket until they stop. Thread graphite pivot balls onto setscrews until tight against shock bracket.

Mount rear shocks by pressing the ball-joints onto the pivot balls on rockers and shock bracket.



Step 5.7

Assemble anti-roll bar pushrods by threading ball-joints onto each end of the metal tie-rod.

NOTE: The metal tie-rod has a CCW thread at the long end, and a CW thread at the short end.

Adjust anti-roll bar pushrods to a length of 68mm, measured end-to-end.



Step 5.8

Mount anti-roll bar pushrods by snapping the ball-joints onto the pivot balls on the rocker and on the crossblade.

Refer to Set Up Book for adjustments.



6. REAR BODY MOUNT



Step 6.1

Open bag O

Attach rear bodymount arms to rear body mount with hinge pins (22mm). Secure pins with C-clips R2. Press small pivot ball into the center ball seat of the rear body mount, until it snaps into place.

Press long pin (66mm) into nylon T-bracket.



R2 2.3mm

Step 6.2

Mount T-bracket to lower rocker bracket with hinge pin (30mm). Secure pin with C-clips R2.



R2 2.3mm

Step 6.3

Open bag P

Slide T-bracket pin through pivot ball at center of body mount. Attach rear bodymount arms to rear uprights with screws E13 and bushings.

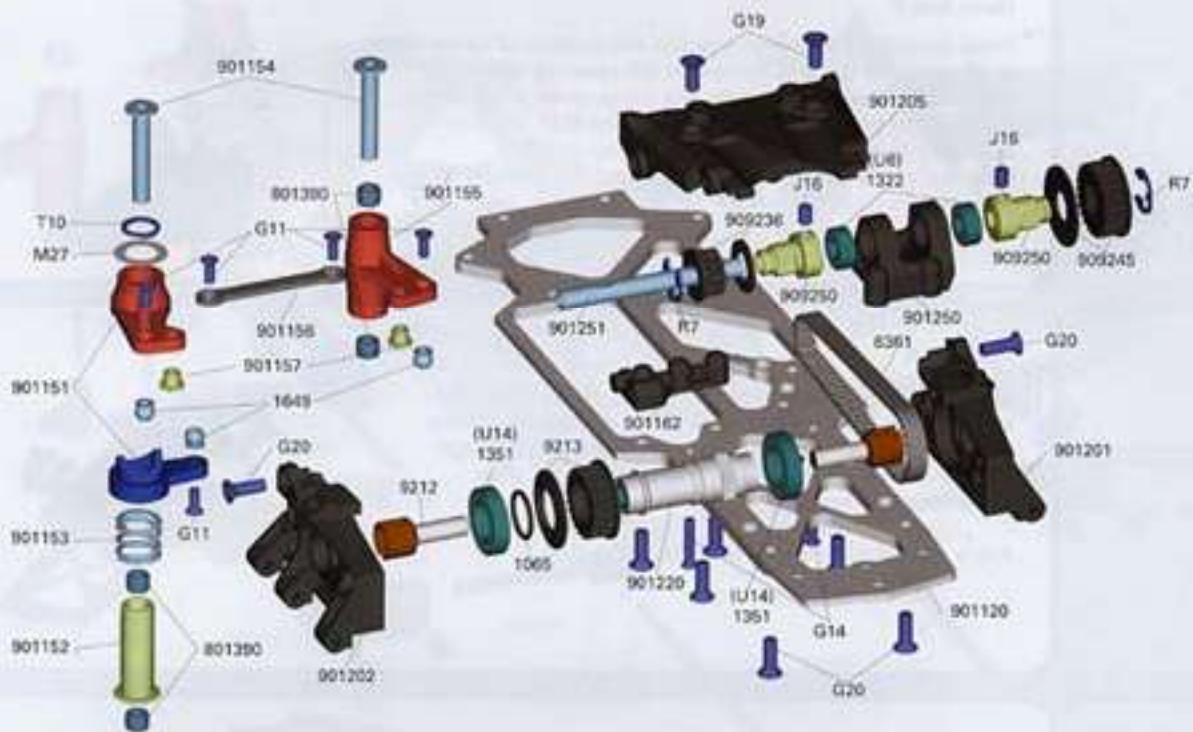
Do not overly tighten screws E13, since bodymount must not bind when operating.



E13 3x12mm



7. FRONT TRANSMISSION



Step 7.1 Open bag R

Mount 24T pulley and side disk on alum. front axle. Secure with O-ring Y13. Apply ballbearings U14 to front axle. Insert front drive adapters into ends of front axle.

NOTE: Use only One-Way-Lube #1680 to lubricate the one-way bearings in the front axle.



Step 7.2 Open bag S

Mount pulleys and side disks to alum. pulley adapters. Secure pulleys to adapters with C-clips R7. Press ballbearings U6 into bearing cavities in both sides of middle bracket. Slide middle shaft through bearings in middle bracket. Mount 16T pulley to middle shaft on the right side (inside) of the middle bracket. Mount 25T pulley to middle shaft on the left side (outside) of middle bracket. Secure both pulley adapters to middle shaft with setscrews J16.



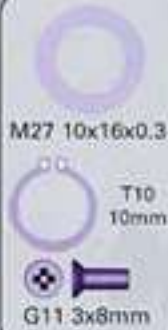
Step 7.3

Open bag V1 + V2

Mount completed middle bracket assembly to front chassis plate with screws G20.
Mount front battery mount to front chassis plate with screws G20.



A WEB SITE FOR THE SERIOUS RACER



Step 7.4

Open bag T

Press 5mm long bushings into top and bottom of servo-saver shaft, and into top and bottom of left steering lever. Slide the following parts onto the servo-saver shaft: spring, lower nylon part, upper nylon part, shim M27. Secure assembly to servo-saver shaft with snap ring T10. Mount graphite balls to servo-saver and left steering lever with screws G11.



Step 7.5

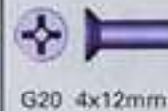
Slide pivot shafts downwards through servo-saver shaft and steering lever. Align servo-saver and steering lever on front chassis. Thread screws G14 upwards through bottom of front chassis plate into pivot shafts, then tighten screws securely.

Apply front timing belt over inner 16T pulley.



Step 7.6

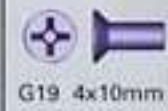
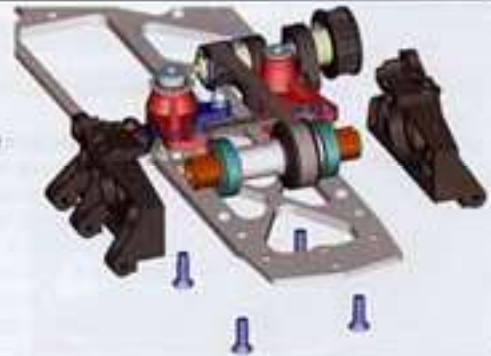
Press bushings upwards into servo saver and left steering lever. Pass graphite steering connector through front belt. Attach steering connector to servo-saver and steering lever with screws G11.



Step 7.7

Mount left front bearingblock to front chassis plate with screws G20. Insert front axle through free loop-end of front belt, and settle belt onto front axle pulley. Press front axle into left front bearingblock.

Place right front bearingblock over front axle, and mount to chassis plate with screws G20.





Step 7.8

Mount front shock support plate to front bearingblocks with top screws G19 and side screws G20.

Check the steering servo assembly for freedom of movement.



-  J16 4x4mm
-  H19 4x10mm

Step 8.4

Open bag X

1:1

Position front upper suspension arms in upper suspension brackets. Slide upper hinge-pins (54mm) through aligned holes in brackets and arms. Secure hinge-pins with setscrews J16. Apply caster spacers to upper hinge-pins, between arms and brackets.

Thread downstop setscrews H19 into front bearingblocks.



-  J17 4x6
-  D13 3x12mm

Step 8.5

Open bag Y

Press the male and female front anti-roll blades into the nylon brackets. Secure with setscrews J17.

Mount the front anti-roll bar blades to the lower front suspension arms, with the adjustment cam on the left lower arm. Secure with screws D13.

Refer to Set Up Book for adjustments.



SS 5. Steering knuckle rear

SS 5.1

Rear steering knuckle is adjusted with the pivot balls. In the lower part of the rear suspension. Adjust pivot ball pins. Each equally, otherwise the car will be pulled 'one way' (See also SS 3.1)



SS 5.2

Turning to the pivot balls will create positive steering. Turning them out will create negative steering.

SS 5.3

Steering (or knuckle angle) of the rear wheels, and adjust the rear steering knuckle to SS degree (less of car without steering knuckle).



SS 6. Driving knuckle

Driving knuckle is the angle of a wheel in a reference surface when the car is moving on the surface (with wheels and pivot also have to match). Zero degree (0°) of driving knuckle means that the wheel is perpendicular to the reference surface. Negative degree means that the top of the wheel is leaning forward, positive degree means that the top of the wheel is leaning backward. A special knuckle measuring tool is available from Boreas (part # 60001).

Knuckle affects the car's handling. In general, more negative knuckle means increased grip. Nevertheless, a slight wheel toe adjusted each side from zero must be set, since the car will 'steer' even slightly (called 'toe in').

Steer height also affects the car's traction as it moves the center of gravity and the roll angle of the car. (See Understanding Steer and Drive Setup for more info.)

Decreasing the side height increases steering to and gives you more grip. However, beware of the car's suspension geometry and steering geometry (steering that you also require compensation in driving etc).

Driving knuckle is adjusted by increasing or decreasing spring preload with the spring adjustment cam on the shock absorber. By increasing the preload on a particular spring, the corner of the car is lifted, and the car's weight will become more positive. By decreasing the preload on a particular spring, the corner of the car is lowered, and the car's weight will become less positive.

SS 6.1

Before measuring front driving knuckle (0°) and stop the front end of the car in a line with the suspension axis. Measure the positive angle of the front wheel with the knuckle gauge or use the set-up tool from SS.20.



SS 6.2

When the front driving knuckle is 0° adjust the top of front spring bearing mounts.



SS 7. Drilling knuckle rear

SS 7.1

Before measuring rear driving knuckle, lift and stop the rear end of the car in a line with the suspension axis. Measure the positive angle of the rear wheel with the knuckle gauge or use the set-up tool from SS.20.



SS 7.2

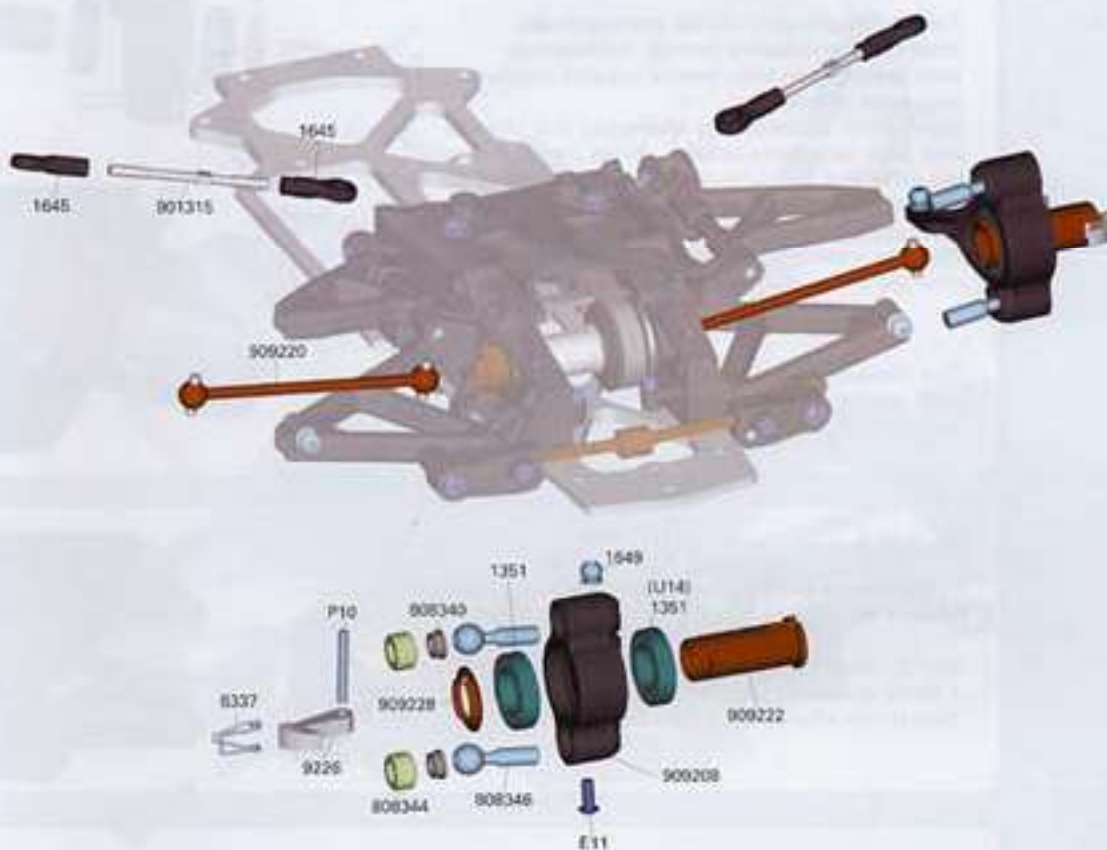
Adjust the rear driving knuckle to 0° adjust the top of rear spring bearing mounts.



Colt
A WEB SITE FOR THE SERIOUS RACER

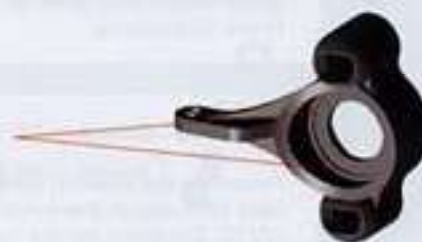


9. FRONT SUSPENSION PART 2



Open bag Z

The left steeringblock can be distinguished by 4 dots



Step 9.1

Push pivot balls into cavities in front steeringblocks. Place nylon rings atop pivot balls (curved sides against the pivot balls). Apply grease to threads of alum. plugs. Thread alum. plugs into cavities in steeringblocks. Adjust alum. plugs to obtain the least possible play of the pivot balls, while still maintaining free movement of the pivot balls in the steeringblocks. Mount steering pivot balls to the tops of the steering arms with screws E11.



E11 3x8



A WEB SITE FOR THE SERIOUS RACER



U14 12x21mm



P10
2.5x22mm

Step 9.2

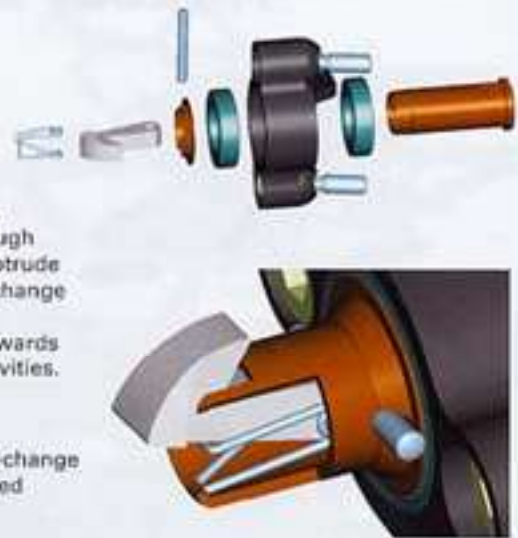
Open bag AA

Press ballbearings U14 into steeringblocks. Slide front wheelaxles through ballbearings until seated, then slide conical support washers over ends of axles.

Insert alum. quick-change levers into end of axles, and align with holes in axles. Press pins P10 through the axles and levers, making sure that the pins protrude equally on each side of the axles. Push the quick-change lever springs through the open ends of the axles.

(Tip: use a small screwdriver). Push the springs inwards until the 2 legs snap inside the ends of the axle cavities.

This cross-section shows the position of the quick-change lever spring. Note that the spring legs have snapped inside the outer edge of the wheelaxle.



Step 9.3

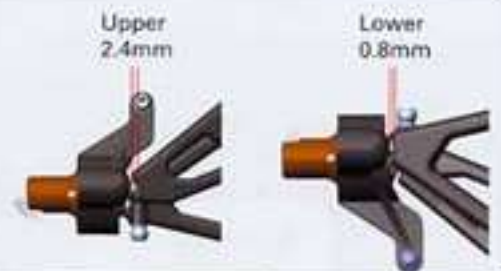
Position front driveshafts in front axle drivecups, and in front wheelaxles.

NOTE: Lubricate the ends of the driveshafts with a heavy grease or graphite spray before inserting. Repeat this after every 1 hour of usage.



Step 9.4

Thread the steeringblock pivot balls into the ends of the suspension arms. Turn each pivot ball only 1-2 turns at a time, checking that the driveshafts remain in place. Adjust the pivot balls until there is a gap between the steeringblocks and the ends of the suspension arms as indicated in the illustrations.



Step 9.5 Open bag AB

Assemble the steering trackrods by threading ball-joints onto each end of the metal tie-rod.

NOTE: The metal tie-rod has a CCW thread at the long end, and a CW thread at the short end.

Adjust trackrods to a length of 67.5mm, measured end-to-end.



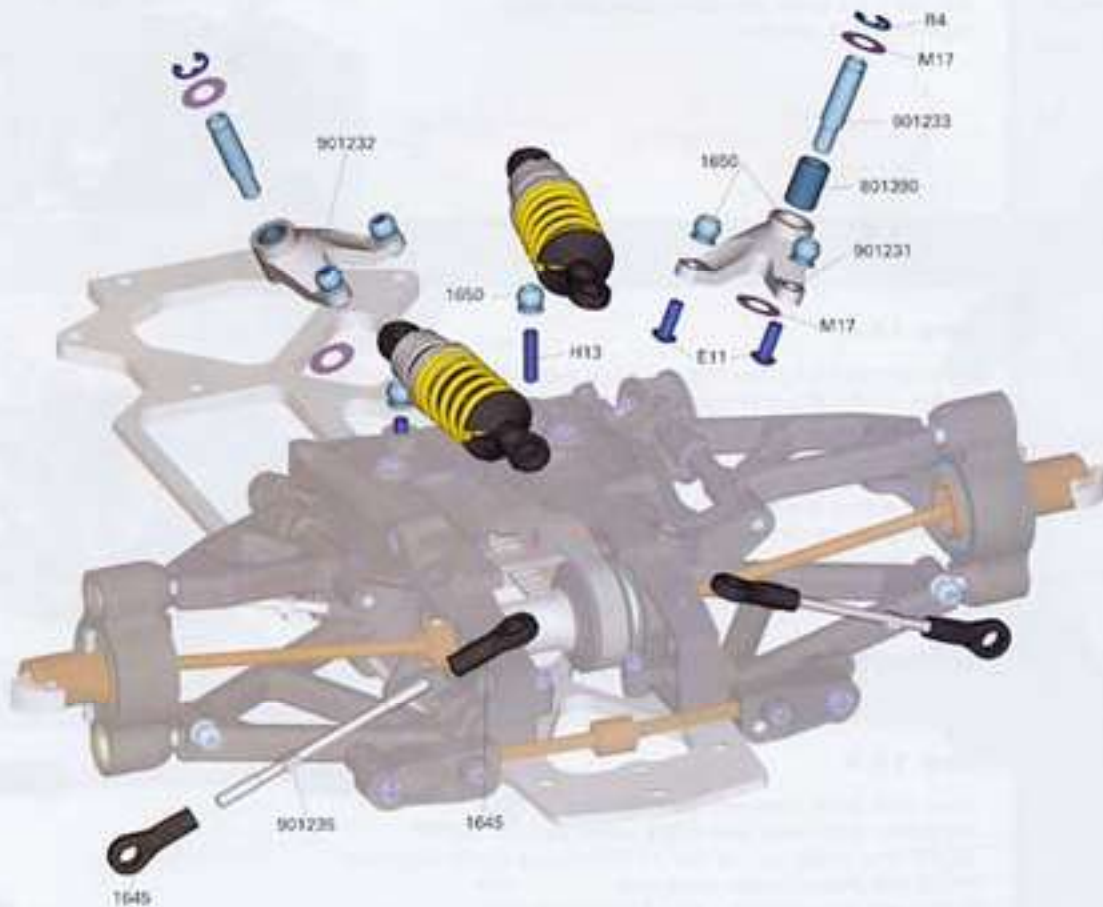
Step 9.6

Connect right trackrod to pivot balls on servo-saver and right steeringblock.

Connect left trackrod to pivot balls on steering lever and left steeringblock.



10. FRONT SHOCK MOUNTING



E11 3x8

Step 10.1

Open bag AC

Press 10mm bushings into front rockers. Mount pivot balls to rockers with screws E11.

NOTE: There is a difference between the right and left front rockers.




Step 10.2

Open bag AD

Thread rocker shafts into front bearing blocks. Rocker shafts should extend 12 mm out of the front bearing blocks.



A WEB SITE FOR THE RACING RACE



H13 3x12mm

Step 10.3

Thread setscrews H13 into front shock bracket. Thread pivot balls onto setscrews until tight against shock bracket.



M14 5x10x0.1



R4 4mm

Step 10.4

Place shims M14, then front rockers, over rocker shafts. Place remaining shims M14 over rocker shafts, then secure rockers to shafts with C-clips R4.

NOTE: Adjust the axial play of the rocker on the rocker shaft by threading the rocker shaft in or out of the bearingblocks. There should be minimal play, but the rocker must rotate freely.



Step 10.5

Assemble front pushrods by threading ball-joints onto each end of the metal tie-rod. *NOTE: The metal tie-rod has a CCW thread at the long end, and a CW thread at the short end.* Adjust the pushrods to a length of 75mm, measured end-to-end.

NOTE: The ball-joints should be perpendicular (90°) to each other.



Step 10.6

Mount front pushrods on the pivot balls on lower suspension arms and front rockers.

Check the front suspension for freedom of movement.



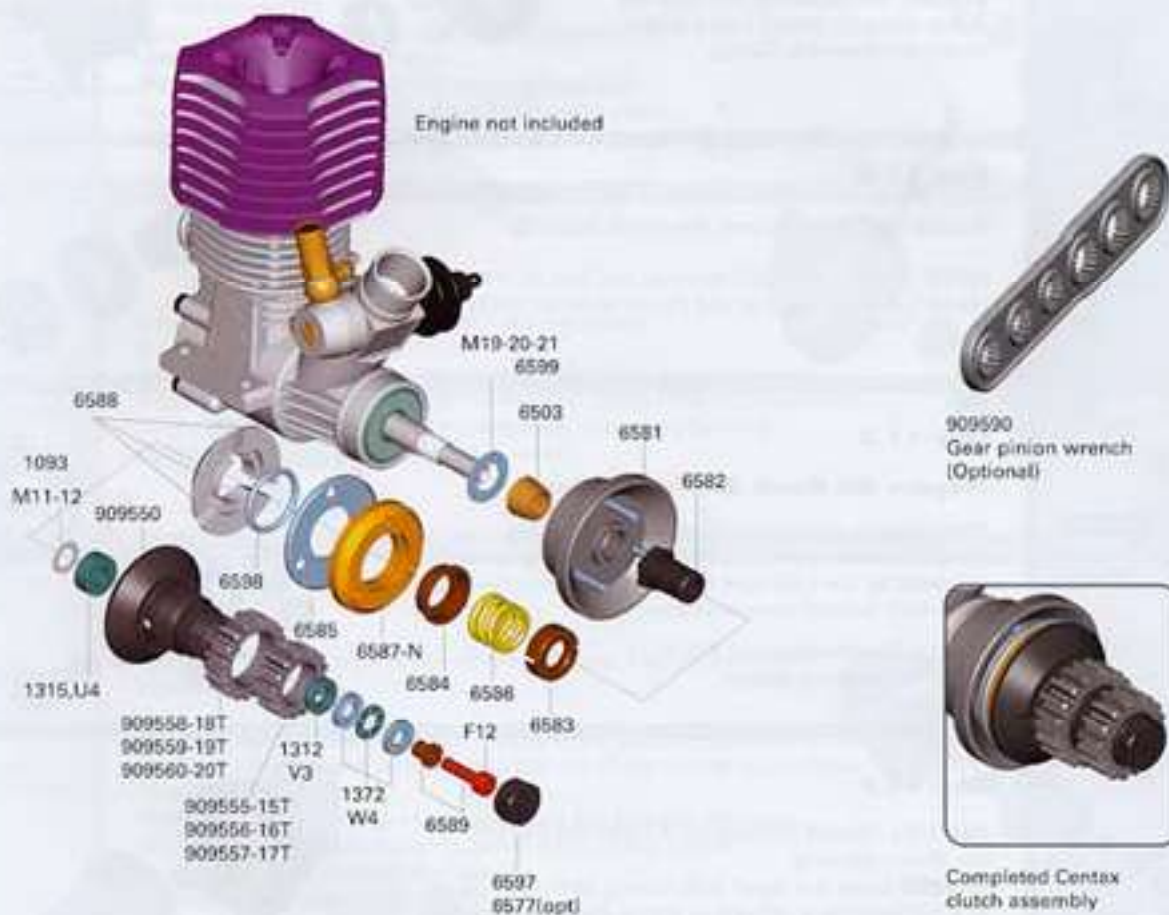
Step 10.7

Mount front shock absorbers by snapping ball-joints onto pivot balls on rockers and front shock bracket.

A WEB SITE FOR THE SERIOUS RACER



11. CENTAX 2-SPEED CLUTCH



Step 11.1

Open bag MC

Mount the 36 mm flywheel and the cone to the crankshaft with the clutch nut. Do NOT apply any shims behind the flywheel yet. Tighten the clutch nut, holding the flywheel by hand (not too tight as the flywheel needs to be disassembled later on to adjust the correct clutch shoe gap).



Step 11.2

Place the 3 fly-weights in the flywheel and apply the round spring.

Place the backing plate and the clutch shoe over the flywheel pins.



competitionX
A WEB SITE FOR THE SERIOUS RACER

Step 11.3

Apply the spring cup, the coil-spring and turn the adjusting nut onto the clutch nut until about 1 turn of the clutch nut thread is visible.



Step 11.4

Thread the 2 pinions onto the clutch housing.

NOTE: Insert a 2mm pin through the hole to hold the clutch housing, and use the Pinion Wrench #909550.

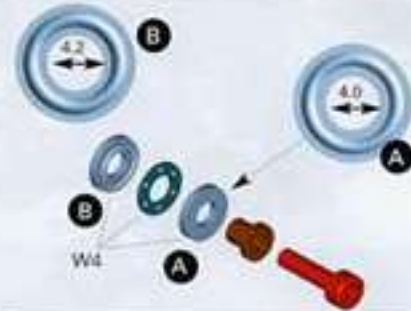


Step 11.5

Prepare the thrust-bearing package:

Place the thrust-bearing plate with the 5.0mm inner diameter on the Centax thrust bearing spacer, followed by the ball-cage and then the thrust-bearing plate with 5.3mm inner diameter.

Insert socket-head screw F12 in the thrust-bearing spacer.



F12: 3x10mm

Step 11.6

Insert the flanged ballbearing V3 into the end of the clutch housing.

Do **NOT** insert the inner ballbearing 5x10 (U4) yet as this ballbearing is left out to adjust the Centax clutch-shoe gap. Place the clutch housing over the crank-shaft and apply the thrust-bearing package. Thread screw F12 all the way in.



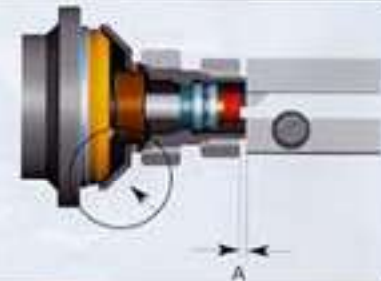
V3: 5x8mm

Step 11.7

Adjusting the clutch-shoe gap

Pull the clutch shoe out and measure the distance between the outer edge of the clutch housing and the top of the socket head screw.

This is measurement A.



Step 11.8

Push the clutch housing towards the clutch shoe and measure the distance between the outer edge of the clutch housing and the top of the socket head screw again.

This is measurement B.

Calculate the shim-thickness as follows:

Shim thickness = $A - B + 0.6$

For example: $A = 1.2\text{mm}$ and $B = 0.3\text{mm}$

Shim-Thickness = $1.2 - 0.3 + 0.6 = 0.3\text{mm}$

Select shims to make up the correct

shim thickness (in this example 1 of 0.1mm and 1 of 0.3mm (M19+M20)).



Step 11.9

Disassemble the Centax clutch and take the flywheel off the crankshaft.

Apply shims (M19-20-21) with a total thickness as determined by the calculation.

Mount the flywheel cone and the flywheel with the clutch nut. Grip the flywheel firmly with pliers and tighten the clutch nut thoroughly.



M19 7x13x0.1
M20 7x13x0.3
M21 7x13x0.5

Step 11.10

Repeat the steps 2-3-4 to re-assemble the clutch fly-weights and the clutch shoe.

Insert ballbearing U4 into the inside cavity of the clutch housing.
Apply the clutch housing with the flanged ballbearing on the outside.
Slide the clutch housing onto crankshaft, and apply flanged ballbearing V3 into end of clutch housing.



U4 5x10mm

V3 5x8mm

Step 11.11

To reduce the end play of the clutch housing, 2 measurements must be made:

Pull the clutch housing out and measure the distance between the edge of the clutch housing and the top of the socket head screw. This is measurement C.

Push the clutch housing in and measure the distance between the edge of the clutch housing and the top of the socket head screw. This is measurement D.

Calculate shim size = C - D - 0.1mm.

Remove the clutch housing. Apply shims (M11-12) with a total thickness as determined by the calculation. Re-mount the clutch housing.



M11 5x8x0.1
M12 5x8x0.3

Step 11.12

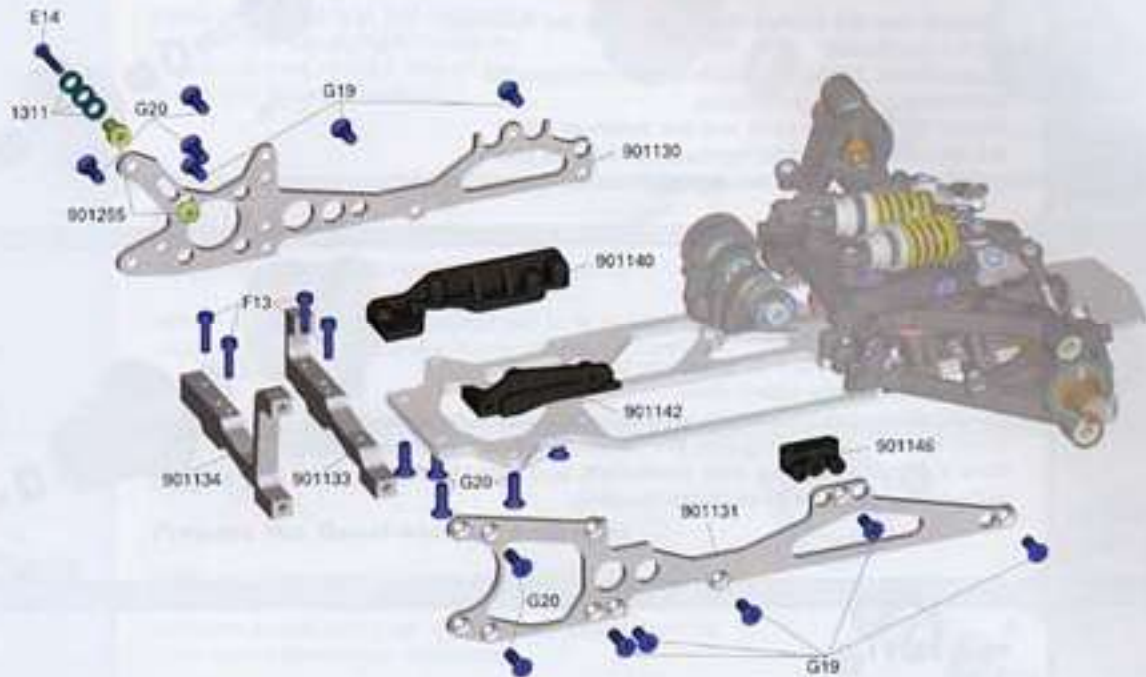
The point of engagement is adjusted with the adjusting nut. Tightening the clutch nut makes the Centax clutch engage at higher RPM, releasing the adjusting nut makes the Centax clutch engage earlier.

To adjust the adjusting nut, insert a 2mm pin in the lateral hole and turn the flywheel until the pin falls into one of the slots of the adjusting nut. This locks the adjusting nut and the clutch housing. While holding the pin in the slot, turn the flywheel counter-clockwise to tighten the adjusting nut (engaging at higher revs) or clockwise to loosen the adjusting nut (engaging at lower revs).



CompetitionX
A WEB SITE FOR THE SERIOUS RACER

12. CHASSIS ASSEMBLY PART 1



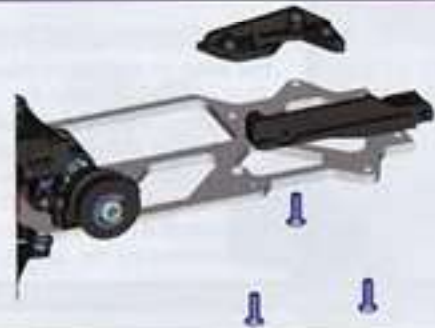
Step 12.1

Open bag AE1

Mount lower chassis connectors to front chassis plate with screws G20.



G20 4x12mm



Step 12.2

Open bag AE2

Mount left sideplate to middle bearing block and chassis connector with screws G19.



G19 4x10mm



Step 12.3

Mount engine mounting brackets to front chassis plate and left sideplate with screws G20.

Note: Please consider step 12.7 carefully.



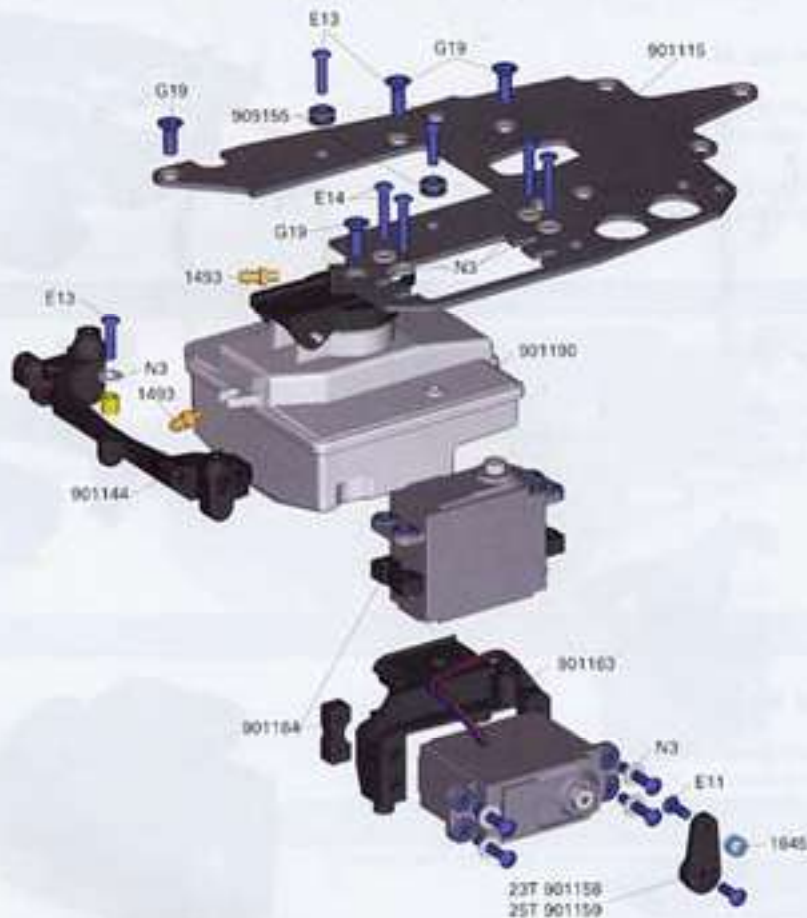
G20 4x12mm



CompetitionX
A WEB SITE FOR THE SERIOUS RACER



14. RADIOPLATE ASSEMBLY PART 1



Step 14.1

Open bag A1

Thread fuel nipple into fuel outlet. Thread pressure nipple into fuel tank cap.

Tip: Use an M3 screw (such as E13) to pre-thread the holes before screwing the nipples in.



Step 14.2

Open bag AK

Mount fuel tank to radioplate with rubber grommets and screws E13.

RACING TIP: Check the volume of the fuel tank before entering into a competition. Due to manufacturing tolerances, the volume may exceed the max. allowed 125cc.



E13 3x12mm

Step 14.3

Apply washer N3 and a 5mm piece of fuel-tubing to screw E13. Thread screw into middle hole of cross bracket. This screw will hold the fuel tank in place.

Mount cross bracket to radioplate with screws G19



N3 3.2mm



E13 3x12mm



G19 4x10mm



G20 4x12mm

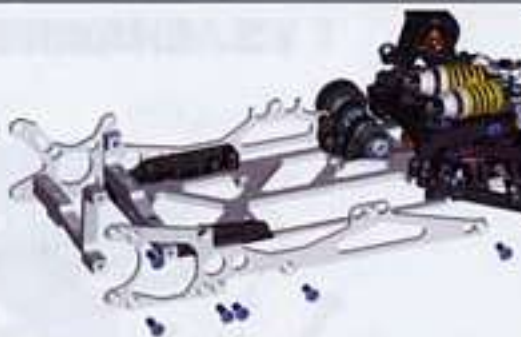


G19 4x10mm

Step 12.4

Open bag AE3

Mount right sideplate to engine mount brackets with screws G20, and to chassis connector and front battery holder with screws G19.



G19 4x10mm

Step 12.5

Mount right upper chassis connector to right sideplate with screw G19.



U3 5x8mm



E14 3x16mm

Step 12.6

Open bag AF

Apply 3 ballbearings U3 to belt tensioner shaft. Insert screw E14 through belt tensioner shaft. Place belt tensioner nut on inside of left sideplate, within elongated hole. Secure belt tensioner shaft to nut by tightening screw E14.



Adjust tension on the side belt by sliding the belt tensioner up and down its groove in the left sideplate.



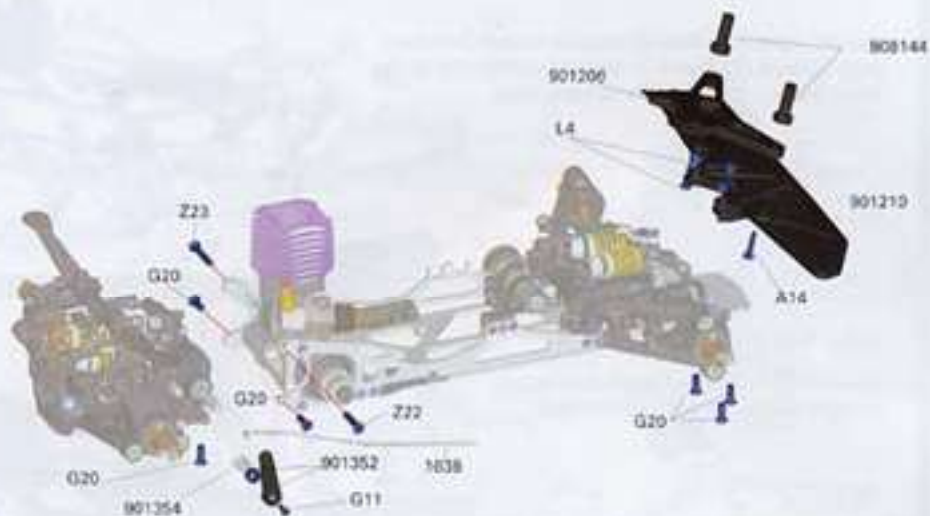
F13 3x12mm

Step 12.7

First mount both engine mounts into the chassis, do not tighten the screws G20 all the way. It is enough if the screws are just touching the countersunk surfaces in the side plates. In this way the engine mounts still can move a little. Next you mount the engine. Tighten the screws as you do normally. Loosen all the mounting screws of the engine mounts about 1 turn. Take out the screws one for one and put them back into place after adding some thread lock. Tighten the screws, as you would normally do. Take out the engine. The mounts should be flat now. If you want, you can flatten the blocks on top using a fine file. Be careful, because it is easy to file them "out of shape".



13. CHASSIS ASSEMBLY PART 2



Step 13.1

Open bag AG (Medium box)

Mount rear-end assembly to side plates and engine mounting brackets, using top left screw Z23, top right screw Z22, and remaining screws G20.



Step 13.2

Mount front bumper to chassis plate with screws G20 and nuts L4.



Step 13.3

Mount front body-plate to front bearingblocks with screws G20. Mount bodyposts to front body-plate with screws A14, which are inserted upward through the bottom of the bumper. Add the front body-post stops and pins.



Step 13.4

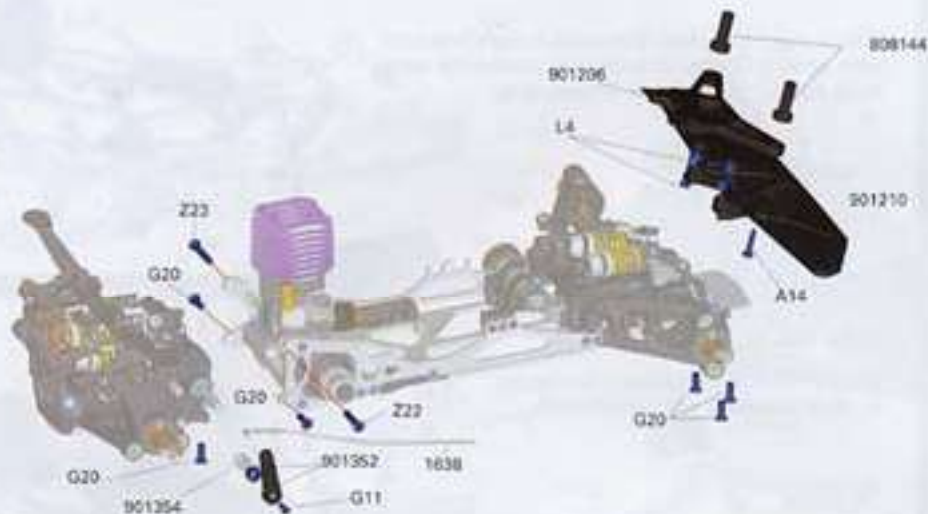
Open bag AH

Insert brake linkage rod through hole in brake lever. **NOTE: Brake rod should be on the inside of the brake lever.**

Apply return spring then splined adapter to brake shaft. Mount brake lever to brake shaft, and secure with screw G11. Bend brake linkage rod to clear other parts.



13. CHASSIS ASSEMBLY PART 2



Z23 4x25mm



Z22 4x20mm



G20 4x12mm

Step 13.1

Open bag AG (Medium box)

Mount rear-end assembly to side plates and engine mounting brackets, using top left screw Z23, top right screw Z22, and remaining screws G20.



G20 4x12mm



L4 M4

Step 13.2

Mount front bumper to chassis plate with screws G20 and nuts L4.



G20 4x12mm



A14 3.5x16mm

Step 13.3

Mount front body-plate to front bearingblocks with screws G20. Mount bodyposts to front body-plate with screws A14, which are inserted upward through the bottom of the bumper. Add the front body-post stops and pins.



G11 3x8mm

Step 13.4

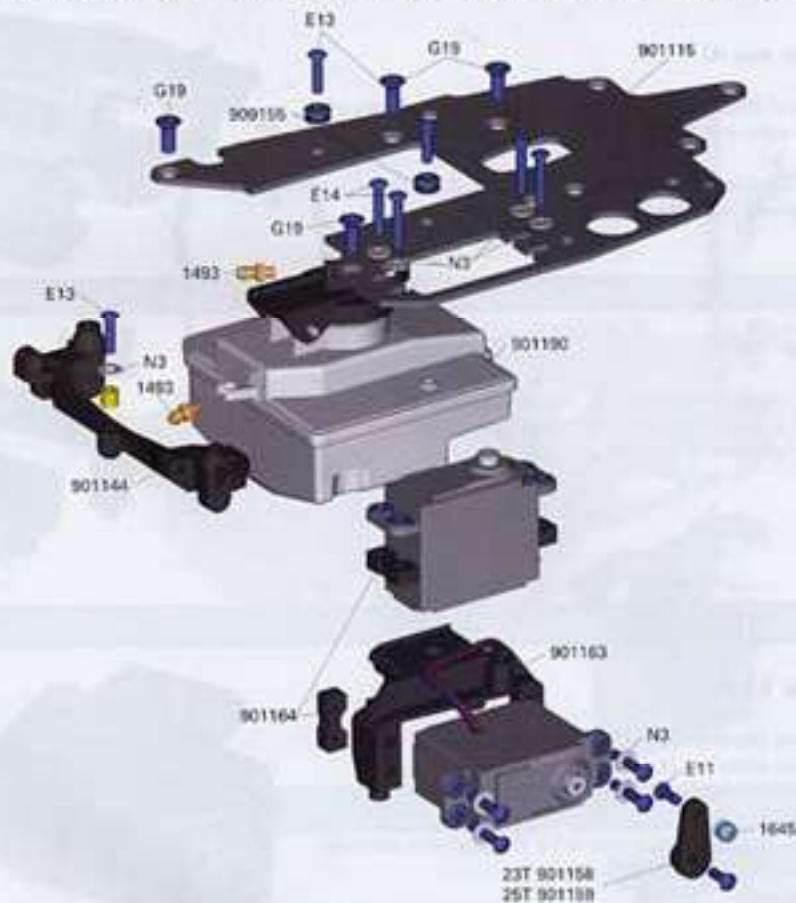
Open bag AH

Insert brake linkage rod through hole in brake lever. **NOTE: Brake rod should be on the inside of the brake lever.**

Apply return spring then splined adapter to brake shaft. Mount brake lever to brake shaft, and secure with screw G11. Bend brake linkage rod to clear other parts.



14. RADIOPLATE ASSEMBLY PART 1



Step 14.1

Open bag A1

Thread fuel nipple into fuel outlet. Thread pressure nipple into fuel tank cap.

Tip: Use an M3 screw (such as E13) to pre-thread the holes before screwing the nipples in.



Step 14.2

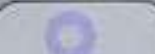
Open bag AK

Mount fuel tank to radioplate with rubber grommets and screws E13.

RACING TIP: Check the volume of the fuel tank before entering into a competition. Due to manufacturing tolerances, the volume may exceed the max. allowed 125cc.



E13 3x12mm



N3 3.2mm



E13 3x12mm



G19 4x10mm

Step 14.3

Apply washer N3 and a 5mm piece of fuel-tubing to screw E13. Thread screw into middle hole of cross bracket. This screw will hold the fuel tank in place.

Mount cross bracket to radioplate with screws G19.



N3-3.2mm



E14-3x16mm

Step 14.4

Open bag AL

Mount throttle servo to radioplate with screws E14 and washers N3.

NOTE: It is advisable to always use the rubber grommets supplied with the servo.



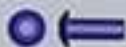
N3-3.2



E14-3x16mm

Step 14.5

Mount steering servo to mounting bracket with screws E14 and washers N3. Use spacers if needed.



E11-3x8mm

Step 14.6

Mount pivot ball to steering lever with screw E11. Mount steering lever to steering servo with the screw that is supplied with the servo.

Route the steering servo wire through the channel in the mounting bracket.



G19-4x10mm

Step 14.7

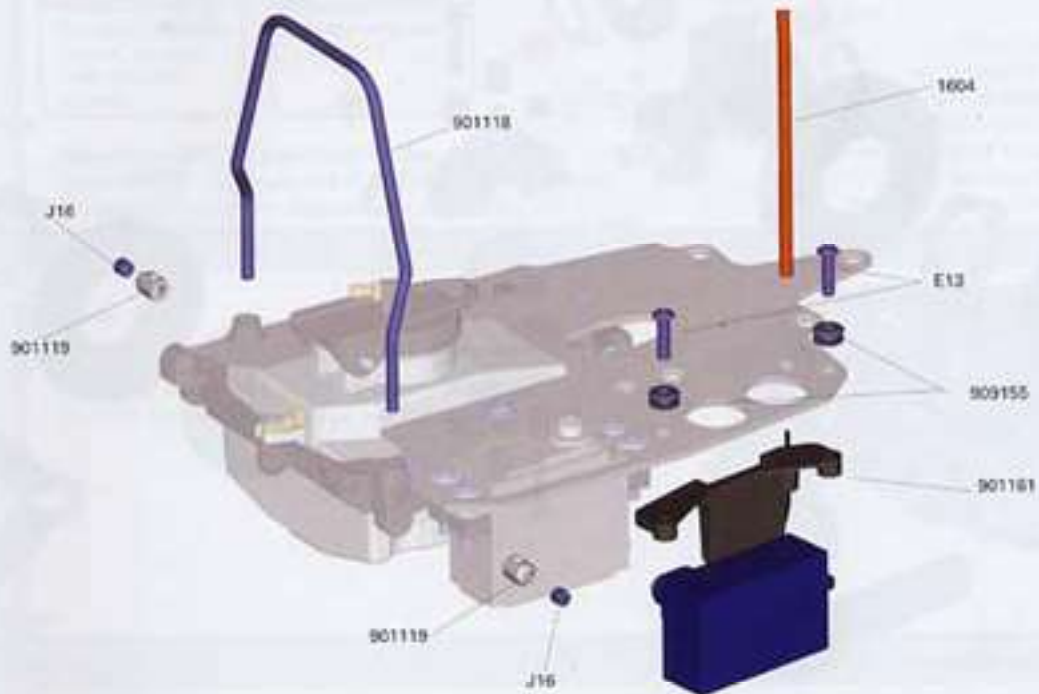
Mount steering servo assembly to radioplate with screws G19.



CompetitionX
A WEB SITE FOR THE SERIOUS RACER



15. RADIOTPLATE ASSEMBLY PART 2



E13 3x12mm

Step 15.1

Open bag AM

Mount receiver to receiver mount with tape.

RACING TIP: To protect the receiver against fuel and moisture, pack the receiver into a balloon before mounting it.

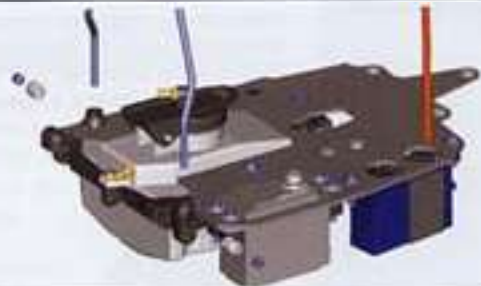
Attach receiver mount to radioplate with screws E13 and rubber grommets.



J16 4x4mm

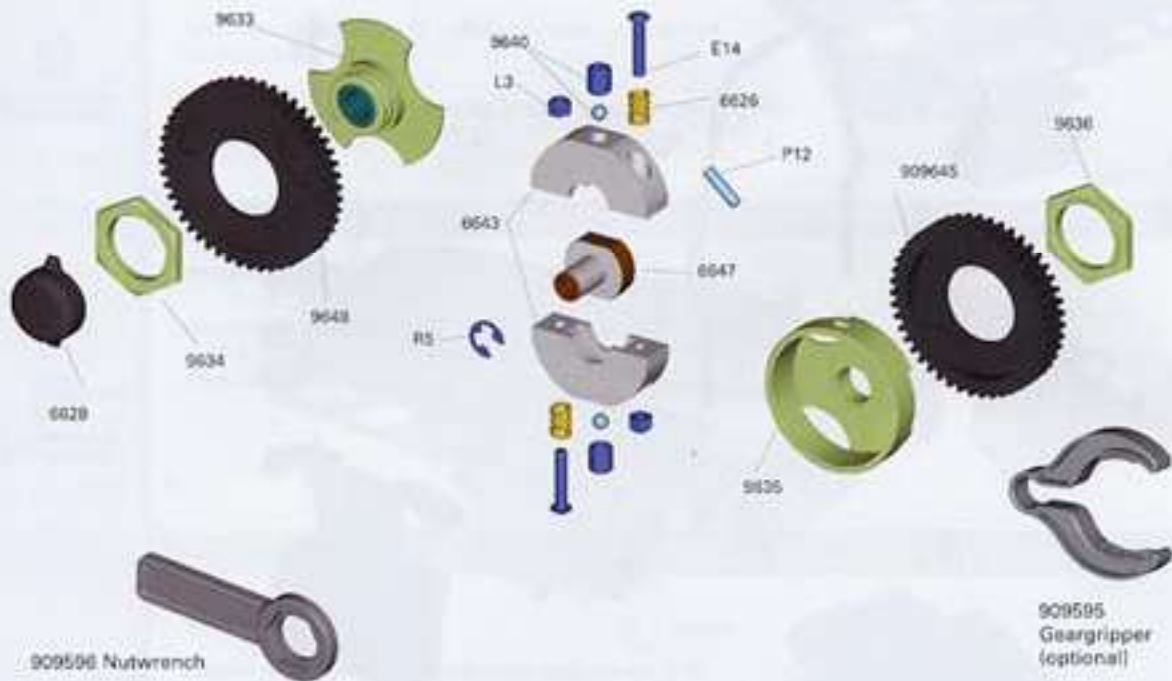
Step 15.2

Insert alum. collars into cross bracket, then insert roll-over bar into cross bracket and through the alum. collars. Secure the roll-over bar in the alum. collars with setscrews J16.



CompetitionX
A WEB SITE FOR THE SERIOUS RACER

16. 2-SPEED GEAR BOX



Step 16.1

Open bag AN

Place the 2 shoes on 2-speed drive adapter
Place the spring over screw E14 and apply lock-nut L3. Turn the screws in until the head is flush with the lower part of the hole. Position the shoes so that the larger holes are in line with the flats on the 2-speed drive adapter. Insert the balls and turn in the center adjusting screw until the shoes are just pushed off the 2-speed drive adapter.

Note: the position of the 2 spring loaded screws. They should be flush with the side of the hole. Final adjustment is made when the car is tested on the track. For an earlier shifting point, loosen the screws. For a later shifting point, tighten the screws.



Head is flush with side hole

Cut-away view



E14 3x16mm



L3 3mm





V5 6x10mm

Step 16.2



Counter clockwise thread, marked with the little groove



Clockwise thread



Mount the 48T 1st gear spur on the 48T 2-speed drive flange, using alu.nut A with counter-clockwise thread (turn counter-clockwise to tighten).

Note: Use the optional gear gripper #909595 and the special nut wrench #909596.

Mount the 45T second gear on the 2-speed clutch-bell, using the alu. nut B (turn clockwise to tighten). Apply ballbearings V5 to the 2-speed clutchbell.



P12 3x12mm

Step 16.3

Place the 2-speed clutch-bell over the lay-shaft and insert pin P12 through the hole of the 2-speed lay-shaft.



Step 16.4

Slide the assembled 2-speed clutch shoes onto the 2-speed layshaft and seat it over the pin. Now you can adjust the 2 center screws to set the shoe gap. First release both center screws to make sure that the shoes rest on the drive adapter.

Turn 1 center screw in until the clutch shoe touches the clutchbell. (This can be checked by spinning the clutchbell.) Then turn the center screw out half a turn, and the clutchbell should spin freely. Repeat the adjustment for the other center adjusting screw.



Cut-away view



R5 5mm

Step 16.5

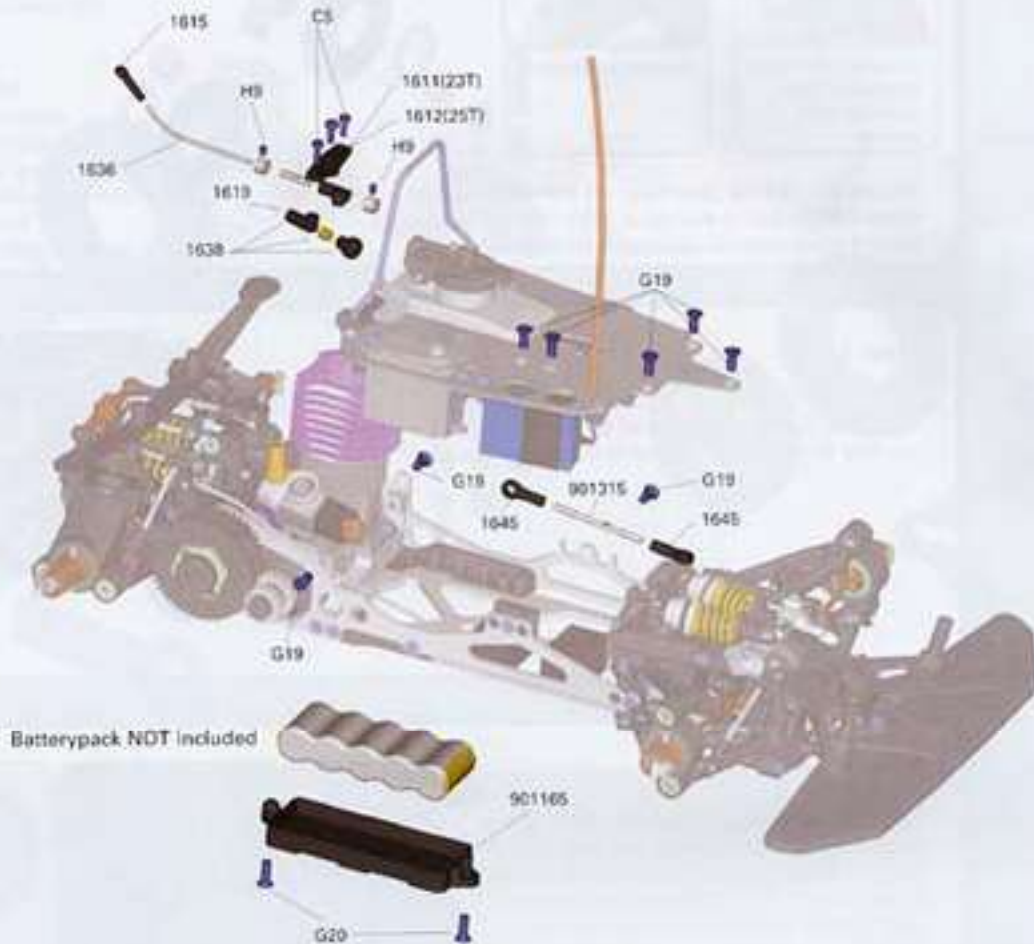
After you have adjusted the 2-speed clutch shoes, apply the 1st gear assembly and secure to layshaft with C-clip R5. Press the nylon dust-cap onto the 1st gear drive flange.

NOTE: The one-way bearing is very sensitive to lubrication. Use only Serpent One-way Lube #1680 (not included) for highest reliability.



CompetitionX
A WEB SITE FOR THE SERIOUS RACER

17. LINKAGES



Step 17.1

Open bag A0

Assemble the steering rod by threading ball-joints onto each end of the metal tie-rod.
NOTE: The metal tie-rod has a CW thread at the long end, and a CCW thread at the short end.
 Adjust steering-rod to a length of 68.5mm, measured end-to-end.
NOTE: The ball-joints should be perpendicular (90°) to each other.



Step 17.2

Press steering rod ball-joint onto servo-saver pivot ball.



Competitive
 A WEB SITE FOR THE SERVO RACING





G19 4x10mm

Step 17.3

Mount radioplate to chassis with screws G19.

Press free end of steering rod onto pivot ball on steering servo lever. (This can be done through the top hole in the radioplate.)



C5 2.5x8mm



H9 3x4mm

Step 17.4

Assemble throttle linkage. Cut throttle linkage wire at 70mm, measured from the threaded end. Mount throttle linkage lever to underside of servo arm with screw C5. Mount brake linkage lever to underside of servo arm with screw C5. Apply alu. collar and spring to throttle linkage wire, and insert wire in throttle linkage lever. Apply 2nd alu. collar to the end of the wire. Secure collars with setscrew H9. Use the alu. collars to adjust the throttle linkage to the correct length.

NOTE: Do not tighten screws C5 completely to allow linkage levers to turn.



Step 17.5

Insert brake linkage rod through brake linkage lever, apply 5mm of fuel-tubing over end of rod, then thread nylon brake adjusting nut onto linkage rod.

Mount throttle servo lever to throttle servo with the screw that is supplied with the servo.

Press ball-joint of throttle linkage onto carburetor ball.



Step 17.6

Open bag AP

Mount a 5-cell receiver battery pack to the battery holder.

Mounting of switch

Mount the switch by gluing it to the final battery cell (nearest to the front of the car), with the lever of the switch facing towards the side plate. It can now be accessed through the side plate.



G20 4x12mm

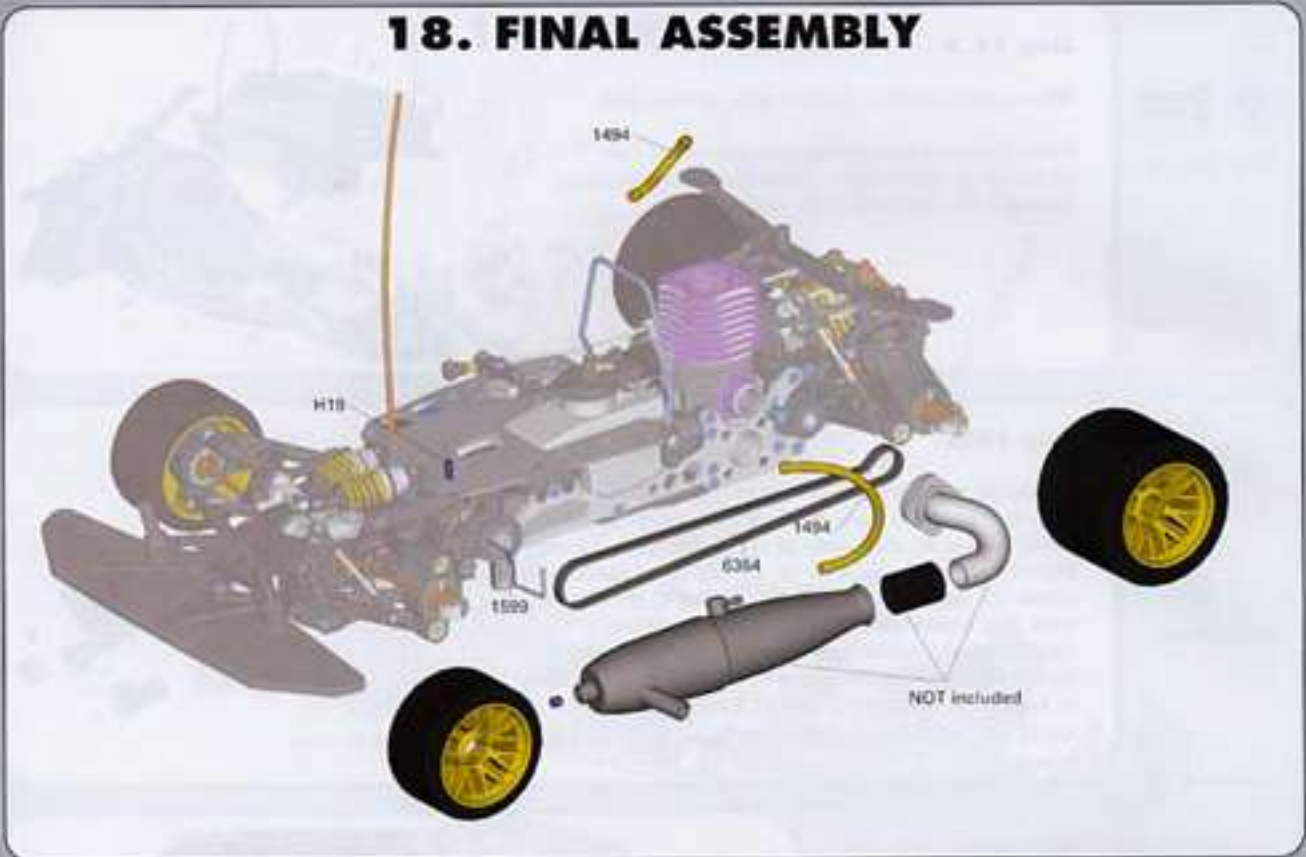
Step 17.7

Mount battery pack from the bottom of the chassis, first hooking in the rear part. Secure battery mount to chassis with screws G20.



Competition
A WEB SITE FOR THE SERIOUS RACER

18. FINAL ASSEMBLY



Step 18.1

Apply side belt over side pulleys, and adjust belt tension with the belt tensioner.



Step 18.2

Adjust the gear-mesh between the clutch pinion and the gearbox gears, then tighten the engine mounting screws firmly.



Step 18.3

Insert exhaust mounting wire into hole in left front suspension bracket, and secure with setscrew H19.

H19 4x10mm



A WEB SITE FOR THE SERIOUS RACER



Step 18.4

Attach exhaust header to engine with the spring supplied with the exhaust system. Attach the exhaust pipe to the header with the rubber coupler, securing the coupler with pull-ties. Mount exhaust pipe on mounting wire and secure with setscrew that comes with exhaust.



Step 18.5

Connect fuel line between fuel tank outlet and carburetor.

Connect fuel line (pressure line) between exhaust pipe nipple and fuel tank cap nipple.



Step 18.6

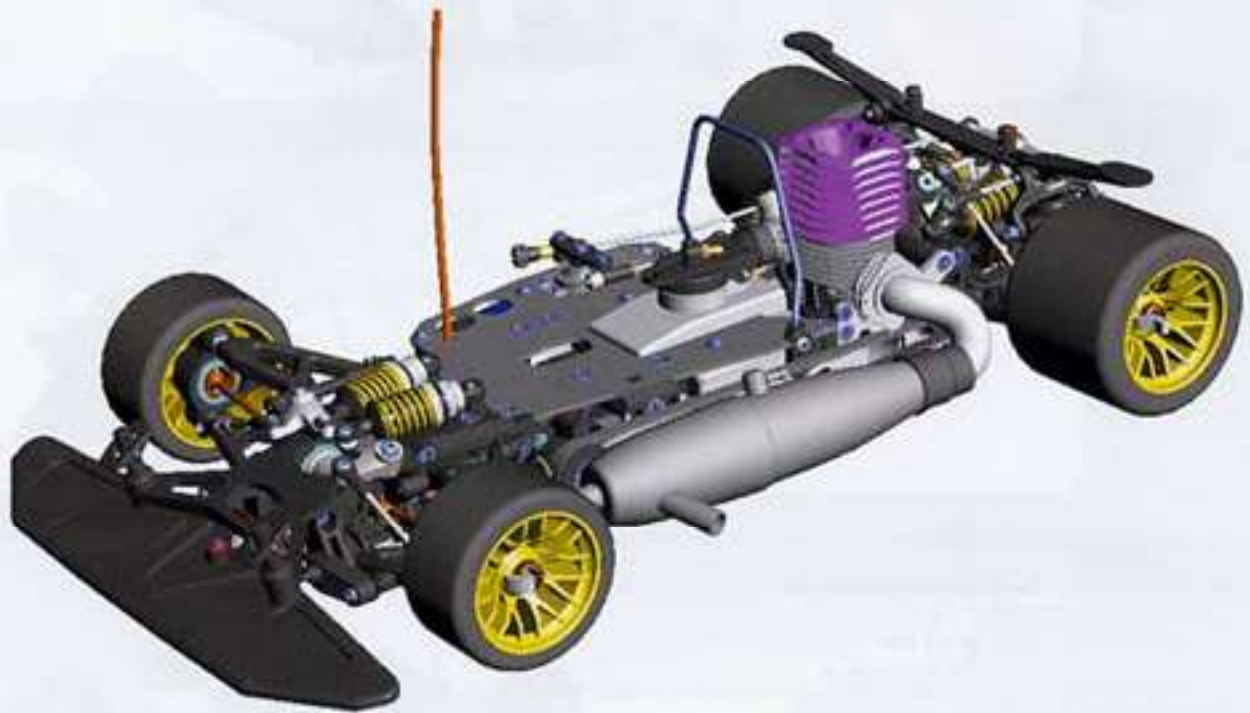
Open small box

Apply the front and rear wheels.



CompetitionX
A WEB SITE FOR THE SERIOUS RACER

Congratulations, your new model racecar is now finished!



CompetitorX
A WEB SITE FOR THE SERIOUS RACER

