INSTRUCTION MANUAL

1/8TH SCALE 4WD RADIO CONTROLLED NITRO POWERED OFF-ROAD BUGGY /OFF-ROAD TRUGGY

A. 1/8th scale off-road buggy
B. 1/8th scale off-road pro. buggy

Specifications:

Overall Length............................... 490mm
Overall Width.................................. 305mm
Height.......................................... 190mm
Wheelbase..................................... 320–325mm
Front Wheel Track......................... 258mm
Rear Wheel Track............................. 261mm
Weight......................................... 3.3kgs
Gear Ratio........................................ 1:9.6
Wheel Diameter............................... 115mm
Wheel Width.................................. 42mm
Ground Clearance............................ 30mm

C. 1/8th scale off-road truggy
D. 1/8th scale off-road pro.truggy

Specifications:

Overall Length............................... 550mm
Overall Width.................................. 440mm
Height.......................................... 190mm
Wheelbase..................................... 370mm
Front Wheel Track......................... 270mm
Rear Wheel Track............................. 274mm
Weight......................................... 4 kgs
Gear Ratio........................................ 1:13.02
Wheel Diameter............................... 130mm
Wheel Width................................. 85mm
Ground Clearance............................ 42mm

Notes:

⚠️ The radio controlled racing models is not toy. It is suited for experienced operators. Read and understand the instructions carefully before operating or assembling your racing model.

⚠️ Specifications are subject to change without prior notice, and actual received model may vary from the images and/or descriptions in this manual.
Introducing your model...

Congratulations on your purchase of this racing model. This model represents a new generation of 1/8 scale off-road buggy/off-road truck. The model brings together years of racing experience to provide the best handling, most durable, and easiest to drive off road Ready-To-Run.

This manual contains all the basic instructions for assembly, operation, and maintenance. Please read and understand all instructions thoroughly before operating and building your model.

Features:
- Easy changeable wheelbase and vehicle body width
- Suspensions provide quick multi-angle changes to permit the vehicle to perform on any racing surface.
- Easy and quick user serviceable installation
- Four disc brake system
- Powerful shock protection performance
- Solid steel gears and Differentials gears
- Three Differentials and four wheel drive system
- Blackened universal joint, chrome dogbones and ball head bearings
- Solid 6061/T6 anodised solid aluminium chassis
- Lightweight engine, flywheel & solid universal joint cups
- Good quality wheel rims & Cube-nailed tread tyres provides a long service period.
- Soft plastic parts & high foam element air filter sponge
- Front/rear metal sway bars
- Leak proof fuel tank with the long overflowed pipe.
- Oil filled shock absorbers

Before Starting Your Vehicle
- Verify that all retainer are well fastened (screws, nuts, bolts and clips)
- Verify proper function of steering, drive-line and engine/braking control.
- Lubricate appropriately all bearings, bushings and maintain proper shock performance.
- Always run engine with a clean oiled air filter.
- Inspect fuel tank for cracks and/or kinks in silicone tubing. Correct problem if required.
- Inspect tune-up for damage; make sure it is well fastened to engine/chassis.
- Operate radio system with fully charged batteries; perform radio frequency/range check.
- Inspect terrain for hard/nongradiable objects that may become a hazard for your vehicle.
- Provide adequate clearance between your vehicle and your observers.
- Do not operate in the presence of domestic animals (dogs and/or cats)
- Do not operate vehicle on public roads, or obtain adequate authorisation to permit usage.

Important Safety Precautions
- Replace the shield body after adjustment and before driving.
- Do not abruptly alter the speed during running.
- Carefully check whether all screws or nuts are loose or not after running.
- Handle the fuel ONLY OUTDOORS.
- Never measure the fuel close to open fire or any source of heat.
- Never run the vehicle without a clean air filter installed.
- Do not run the model lean and do not allow the engine to overheat.
- Use the special fuel for models.
- Do not drink fuel or allow it to get into your eyes.
- Store fuel in cool, dry, and dark places away from Children's reach.
- Tighten the cap of the fuel bottle when not used.
- Never throw the empty fuel bottle into fire! Otherwise, it may explode.
- Do not put your finger or any object into the rotating or moving parts.
- To avoid the danger of burns, do not touch the engine and muffler immediately after they have stopped running.
- Always check transmitter battery power. You may lose of control of your model due to low battery level.
- Never operate your model at the same frequency with someone else. Failure to do so will cause signal confusion or even accidents.
- In the event that the model behaves abnormally, stop running it and check.
- The model is not allowed to be used until all problems have been settled.
- Use a neutral cleaner and soft clothes to clean the model surface.

These are high performance radio controlled model which needs to be operated with caution and common sense. Failure to follow the safety instructions could result in personal injuries and/or property damage.
Before assembling or operating your model...

Carefully read and understand all instructions before operating the vehicle. Correct adjustment of high-speed needle and idle adjustment are required before operating your vehicle. Refer to carburetor adjustments before operating vehicle.

The following items (not included unless specified) are required to operate your vehicle and are available from your model dealer or the local hobby shop.

Additional Items for Running Your Model:
- Transmitter
- Battery Case
- Servo
- Receiver
- Charger
- Glow Plug Igniter
- Fuel Filter
- Fuel Bottle

Tools for Assembling Your Model:
- Screwdrivers
- 4-way Wrench (small)
- 4-way Wrench (large)
- Mini Screwdrivers
- Air Filter Oil
- Scissors
- Needle Nose Pliers
- Wire Cutters

The following accessories are optional purchase to facilitate your operation.

Use of transmitter to control your vehicle...

Install the batteries in the transmitter.

Insert the eight "AA" batteries into the battery compartment on the bottom of the transmitter.

Battery Precautions:
1. In order to keep continue better performance under operation, we strongly recommend you to use the 1.5V alkaline batteries instead of the 1.2V rechargeable batteries.
2. The batteries may leak in the event that they are installed with wrong polarities.
3. Do not mix old and new batteries.
4. Do not leave the batteries if not in use for long periods.

The function switches on the transmitter:

1. Antenna
2. Throttle Inching Control (Throttle Trim)
3. Steering Inching Control (Steering Trim)
4. Crystal
5. Throttle Trigger
6. Power Switch
7. Working Indicator
8. Steering Reverse Switch
9. Throttle Reverse Switch
10. Steering Wheel

Throttle Steering Trim Switch:

1. Push the trigger forwards to allow the vehicle to speed down to brake.
2. Pull the trigger backwards to allow the vehicle to go forward and speed up.

Turn the steering wheel to the left or right to let the vehicle turn left or right.

If you are a reverse operator, set the steering/throttle switch to REV. Position first.
2-Channel Radio System

Please read the following instructions before operating your vehicle. Servos must be centered before operating. Performance of vehicle will be affected if this procedure is not completed.

To perform initial servo adjustment, rotate both trim controls on transmitter to center position. Power on the transmitter then power on the receiver (switch is located on top cover). Servos are now centered, linkage adjustment can now be completed.

Steering linkage: With trim knob at center position front wheels should point in a straight ahead. If wheels point in either direction remove control horn from servo and center the wheels (along drive-line axis) replace control horn and observe corrections and re-adjust if necessary. Trim knob and servo are now centered, fine tuning of steering control can now be adjusted with steering trim knob on transmitter.

Throttle/Brake linkage: With trim knob at center position, throttle will be closed. If carburetor linkage is open at center position remove control horn from servo and center the linkage, replace control horn and observe corrections and re-adjust if necessary. Trim knob and servo are now centered, fine tuning of throttle control can now be adjusted with steering trim knob on transmitter.

Brake adjustment is performed via the thumb wheel on the end of the throttle linkage, brakes should not be applied at neutral position (vehicle must free-wheel when trigger is released)

Before operating your new engine please perform required break in procedure otherwise performance and durability of engine shall be compromised. See page 7 for complete procedure.

Pre-Run Check

Please check your model before each driving.

1. Transmitter Switches

   Caution!
   - Make sure antenna is properly inserted and screwed in on transmitter. Antenna should be fully extended. Performance and control range of transmitters may be affected.

2. Chassis Switch

3. Check Steering Performance

   Operate the steering wheel to check if the front wheels move correctly.

   - The front wheel movement is controlled by the steering wheel. For instance: When moving the steering wheel to the left, the vehicle front wheels will also turn left.
   - If the moving direction of the wheel is opposite to above mentioned, please change the Steering Reverse Switch position.

4. Steering Trim Setting

   Gently lift up the front wheels while adjusting the steering trim.

   Note: Adjust the steering trim to center the front wheels of the vehicle when the steering wheel is at center position.

5. Throttle Trim Setting
Engine View

Note: The actual received engine may vary from this image. The image is presented for your reference only.

Throttle Lever
Low and mixture screw: Measure low and mixture.
Carburetor: Mix air and fuel so the engine runs properly.
Idle Adjusting Screw: Adjust the engine when in Neutral (Idle) position.
Needle Valve: Measure the fuel mixture at high end mixture.
Glow Plug/Igniter: Glow plug igniter should be fully charged before use.
Heat Sink: Adjust the engine when in Neutral (Idle) position.
Recoil Starter: Start the engine.

Glow Plug: Ignite the compressed air and fuel mixture.

Note:
The engine includes many high-precision parts. The original performance may be reduced due to incorrect operation or assembly and disassembly.

Engine Break In

Many hobby type glow engines require a break in period to provide final adjustment of internal parts after manufacturing. This procedure is required and must be completed by you the user.

To prevent excessive initial wear on internal engine parts, a rich air/glow fuel mixture is required to perform your engine break in.

Very important procedure must be followed!!

Break-in period 2 and 1/2 turns from full closed position (4-5 tanks of 10-15% nitro/20% oil content) must be used to perform break in, do not run engine full throttle for long periods during break-in.

Once break-in has been performed lean out engine to best performance (2 turns to 1 and 1/2 turns from full closed position) you must always observe a trace amount of oil smoke from tune-up pipe, if you do not see any smoke stop immediately and re-adjust needle valve till smoke is observed.

Always perform needle valve adjustment first, and then perform idle adjustment on a warmed-up engine.

Environment conditions may require further adjustments.

Clean-out engine and exhaust system by applying high throttle (3/4 throttle) for 2 seconds after adjustment to permit effectiveness of adjustment to be observed.

We highly recommend replacing the engine *Glow Plug* (part # 20117) after you have completed the break-in.

It is of normal occurrence during the break-in that minute particles of metal sulfide to the glow element. The particles of metal isolate the glow element and affect overall engine performance or short engine service time.

You may also be required to replace your glow plug during your break in procedure.

Normal nitro content: Once break-in has been performed 20% - 25%

Lubrication: We highly recommend a Premium glow fuel with a Synthetic/Castor blend of 15% and maximum of 20% combined lubricant content.

Engine Adjustment/Maintenance

Engine Adjustment

1. Needle Valve Adjustment

   A. Start the engine to run your car.
   B. Keep an eye on the current running speed when the car is running straight with the throttle control set to High. The speed will go up when you screw in the needle valve at an angle of 10 or 20 degrees.
   C. When continuing to screw the needle valve further in, the engine will overheat and subject to damage. If this is the case, immediately unscrew the needle valve at an angle of 10 or 20 degrees to allow the engine to return to normal running.

   Acceleration from idle position.

   Verify engine performance after start-up. Pay close attention to exhaust smoke and engine sound.

   - Slow engine response is due to rich fuel condition. Care of mixture and proper tuning recommended.
   - Air fuel mixture is too light. Air and fuel mixture is too light. Lean mixture in the needle valve at the angle of 30 degrees. (Clockwise)
   - Air and fuel mixture is too heavy. Screw in the needle valve at the angle of 30 degrees. (Anti-clockwise)

2. Low end adjusting screw

   Low end adjusting screw is used to trim the air and fuel mixture to flow into the carburetor.

3. Idle adjusting screw

   Idle adjusting screw is used to measure the air and fuel mixture to flow into the carburetor when the engine is at idle position.

Engine Maintenance

1. Empty fuel tank and fuel lines before storing your vehicle.

2. Use premium "After Run Oil" (this lubricant is utilized for storing of your engine)

3. Remove all dirt and debris from vehicle with small brush (tooth brush) and/or with compressed air (observe proper personal security when operating air equipment)

4. Inspect and adjust all moving parts for excessive play, if adjustment cannot remove all excessive play, relocate part, integrity and replace if required.

5. Proper lubrication of all bearings and moving mechanism is necessary for proper operation.

6. Disconnect and inspect batteries for leakage, recharge as required, do not store vehicle with batteries in unit for prolonged periods.

7. Operating radio controlled devices in wet/damp conditions is not suggested, vehicle may lose traction abruptly, and vehicle may observe water infiltration in receiver compartment or in servos and loss of control of vehicle is imminent.
Starting your engine

1. Fill the fuel tank with fuel

2. Attach the air filter

3. Use the glow plug igniter to excite the engine

4. Hold the car securely while pulling the recoil starter cord.

Caution!

- To avoid engine damage, never force hard to crank engine, remove glow plug and oscillate engine by pulling the pull cord a few times. Install glow plug and try starting.

5. Switch on the transmitter, then the receiver.

6. Turn on the chassis switch of the receiver.

7. Remove the air filter.


9. Pull the trigger back to accelerate to the Full speed.

10. Plane fuel line with a peg to stop fuel from flowing into the engine.

11. Turn off the receiver then the transmitter.

STOP RUNNING THE ENGINE

1. Pinch fuel line with a peg to stop fuel from flowing into the engine.

2. Turn off the receiver then the transmitter.

WARNING

The engine, exhaust manifold and the run-out pipe are hot after running your vehicle and can burn your fingers. Do not touch any of these components immediately after running. Permit them to cool down first.
Troubleshooting no-start condition and engine performance.

**Possible causes**

- The engine is flooded.
- Engine can be cranked but will not start.
- Engine is overheating.
- Engine is flooded.
- Engine is overheating.
- Engine is flooded.
- Engine is flooded.

**Solutions**

1. Remove glow plug. Crank (stalled engine several times to evacuate excess fuel. Be sure not to get yourself over the glow plug holes. Fuel may splash or flow when cranking.
2. Add 2-3 drops of diesel fuel directly in carburetor.
3. Adjust idle speed with screwdriver. (1 turn or 8-33")
4. Replace air filter before starting.
5. If engine does not glow verify glow plug.
6. Screw in the needle valve at 60 degrees and warm up the engine.
7. Remove engine cover and gently unscrew the needle valve at 60 degrees and re-start up the engine.
8. Clean with automotive parts cleaner.
9. Clean air filter element or replace air filter element.
10. Verify fuel lines, glow plug, adjustment and correct.

**TROUBLESHOOTING LIST**

<table>
<thead>
<tr>
<th>ISSUES</th>
<th>REASONS</th>
<th>SOLUTIONS</th>
</tr>
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<tbody>
<tr>
<td>THE ENGINE FAILS TO START.</td>
<td>1. The fuel tank is empty or the carburetor is not primed properly. 2. The glow plug is bad or the batteries are dead. 3. The fuel lines, the air filter or the manifold is clogged. 4. The engine is flooded. 5. The carburetor is not adjusted properly. 6. The valve linkage is not adjusted properly.</td>
<td>1. Fill the fuel tank up or prime the carburetor. 2. Replace the glow plug or charge the batteries. 3. Clean or replace the clogged parts. 4. Remove the fuel tank and replace the fuel. 5. Adjust the needle valve and fuel mixture. 6. Adjust the carburetor. 7. Adjust the valve linkage.</td>
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<tr>
<td>THE ENGINE CAN START BUT STALL IMMEDIATELY.</td>
<td>1. The fuel tank is empty. 2. The fuel lines, the air filter or the manifold is clogged. 3. The carburetor is not adjusted properly. 4. The engine is flooded.</td>
<td>1. Fill the fuel tank. 2. Clean or replace the clogged parts. 3. Re-adjust the idle speed and the needle valve. 4. Allow the engine to be cooled down and then re-start up the engine.</td>
</tr>
<tr>
<td>POOR REACTION RESPONSE ON THE ENGINE.</td>
<td>1. The carburetor is not adjusted properly. 2. Low fuel pressure level was found on the manifold.</td>
<td>1. Re-adjust the needle valve. 2. Re-adjust the fuel mixture.</td>
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<tr>
<td>THE VEHICLE COMES DIFFICULT TO CONTROL.</td>
<td>1. The controller/motor is weak. 2. The receiver performs poorly. 3. The servo linkage is not adjusted properly.</td>
<td>1. Recharge the battery. 2. Re-bind the transmitter and receiver to obtain better reception. 3. Set the servo in Neutral then re-adjust it.</td>
</tr>
</tbody>
</table>

**Buggy/Truggy common parts**

- Front Shock Absorber
- Rear Shock Absorber
Centre Diff. Assembly Complete

Tail Wing Assembly

Front Unit. Complete

Note:
The front sway bar (86724) is for optional use.
### Off-road Buggy (A/B) / Off-road Truggy (C/D) Common Parts - 6

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<th>Part Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>0549</td>
<td>Button Head Hex, Mechanical Screw 3&quot;x24</td>
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<td>0550</td>
<td>Shock Insert Upper Cups</td>
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<tr>
<td>05801</td>
<td>Front Lower Link Inside Large Pin Set 6mm</td>
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<td>0707</td>
<td>Battery Compartment</td>
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<td>Servo Horns</td>
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<td>02073</td>
<td>Servo Unit</td>
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<td>Zip Ties</td>
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<td>02139</td>
<td>Bearings 10x5x4 (For Clutch Bell)</td>
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### Parts For your Buggy (A)

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<td>05722</td>
<td>Chassis</td>
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<td>05724</td>
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<td>05737</td>
<td>Tail Wing</td>
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<td>05743</td>
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<td>Rear Wheel Rims</td>
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<td>05744N</td>
<td>Wheels Complete</td>
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### Parts For your Truggy(C)

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<td>86703</td>
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<td>86704</td>
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<td>86705</td>
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<td>86706</td>
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<td>Transmission dogbones 2P</td>
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### Upgradable optional Buggy (B)/Truggy(D) Common Parts

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<td>Front Upper Suspension Holder (AL)</td>
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<td>86103</td>
<td>Alum. capped air filter cover</td>
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<tr>
<td>85911T</td>
<td>Wing Brace Mount (AL)</td>
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<tr>
<td>85913T</td>
<td>Center Diff. Mounts 2P (AL)</td>
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</tr>
<tr>
<td>85914T</td>
<td>Wing Mount Buttons 2P (AL)</td>
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<tr>
<td>85915T</td>
<td>Rear Uprights 2P (AL)</td>
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### Notes Optional Parts No with T stand for Titanic color.

### Upgradable optional Buggy (B) Parts

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<td>85904</td>
<td>Carbon Plate (Carbon Fiber)</td>
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<td>Rear Shock Plate (AL)</td>
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### Upgradable optional Buggy(B) Parts

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Section 1: Preparing the Vehicle

Step 1: The first thing you should do is unpack the box. Get everything together and out of the bags. You will want to get batteries for everything. You will need 12 AA batteries, 8 for the radio and 4 for the vehcile. If you purchased our Quick Start Kit, you will want to get the glow plug igniter out, and start charging it. You should charge the glow plug igniter for a minimum of 8 hours before use. Install the batteries into the radio. Install the batteries into the Vehicle. While doing this you will also want to install the antenna mast. Feed the receiver wire through the antenna tube and secure the tube into place before replacing the receiver box cover. When installing the batteries into the vehicle, it is helpful to tape them in place, or use a rubber band to hold them in place. If one should come loose while you are driving the vehicle, you could lose control!

Step 2: Next you will want to set your gear mesh. This is the play between the clutch bell on the motor and the spur gear. To set this you loosen the 4 motor mount screws (pictured in step 3) and slide the motor into the desired position. You want this to be as tight as possible, while still having a little bit of play between the two gears. Experienced R/C drivers can set this by feel, but if you are just starting you can use a trick to get it “just right.” Take a small piece of paper, and cut it into a ⅛ inch wide by 6 in long strip. With the engine mount screws loose, take this piece of paper and slide it between the spur gear and the clutch bell as shown below.

Push the engine into the clutch bell so that its tight against it and tighten the engine mount screws. When finished, pull the strip of paper out. To make sure your mesh is set properly, keep your finger on the spur gear and wiggle the clutch bell, there should be a little bit of play. If you roll the car on the ground, it should roll freely. If this is not the case, repeat the above steps.

Insert a ⅛ inch piece of paper between clutchbell and spur gear.

Push motor until two gears sit tightly together. Tighten the engine screws by following step 3 below with blue Loctite.

Remove the paper carefully and you should have very little play between the gears.

Note: The clearance between the clutch bell and the spur gear must be approx. 0.1mm if the clearance is more than 0.2mm, normal performance of your spur gear maybe affected.

Step 3: You should now inspect your vehicle and Loctite all screws that screw into metal. Nitro engines create a lot of vibrations, and any screws going into metal WILL vibrate loose! You can purchase Loctite from any hobby store, automotive store, or even any of the major chain discount stores. You want to use blue Loctite. It is colored based on strength, blue is not that strong, so you will be able to get screws out if need be. Do not use red Loctite! You want to pay extra attention to any of the screws related to the drive-train, such as the motor mount screws. These screws go through the most stress and will vibrate loose without Loctite. While you have your motor mount screws out/loose, you will want to set the gear mesh. This is described in step 2 above.

Engine screws. Use blue colored Loctite.

Please note that the bottom screw placement on your vehicle may be slightly different than pictured.

Bottom view of vehicle engine screws.
Locitite the grub screws (also known as set screws) as these are located on the center drive shaft on all Redcat vehicles.

Locate the center drive shaft and you will see a small screw. You should remove those screws and use blue locitite.

Not doing this can cause loss of the screw and the vehicle will not run as these grub screws keep the drive shafts in place.

Step 5: Some Redcat Racing vehicles are shipped with wheels that are not yet installed. You should install all four wheels using the supplied wheel wrench. Tighten the wheels by hand. Do not use a torque wrench or powered tool of any kind. For vehicles where the wheels are installed, make sure the wheel nuts are firmly tightened by hand.

Step 6: For the final step in this section, you will need to oil your foam air filter. Remove the air filter housing from the engine. Take the foam air filter out of the housing. There are several methods to oil an air filter, but this one is easiest, and the least messy: Take a small plastic bag, put some oil into it, add a few drops to the bag. Drop the filter in the bag and rub it around inside the oil. The air filter should be fairly dry but not dry to where the oil is concentrated in one spot. If it gets too oily, you can dab it with a paper towel. If you are unsure of how much oil to use, it is best to have enough oil on the air filter to where, by squeezing it with your hand, the oil will not drip. You can purchase air filter oil at most hobby shops. DO NOT WANT TO RUN THE VEHICLE WITHOUT THE FOAM AIR FILTER OILED as this can cause dirt to enter the carburetor which can cause engine failure.

Some Redcat Racing vehicles use different types of air filters. You can see them below for instructions which will be specific to your model.

The foam in this image needs to be removed which is easily done by hand. Simply remove both pieces of foam and all the filters and then insert the filters back into the plastic housing.

Pictured to the right is Redcat’s other air filter. Plastic cover installed

Under the plastic housing is a foam filter that is easily removable by sliding it off. Allow the filter and install the foam and replace the plastic cover.

Perform throttle trim adjustments to provide quick and smooth brake and running response.

Section 2: Check Radio Settings

Step 1: Redcat radio systems differ per vehicle. We have made an online guide that is available by going here: www.redcatracing.com/radioguide.html

The radio guides are specific per model so simply click on the image of the radio that you received with your vehicle if you are unsure of the controls. For the most part, though, most radios that Redcat ships are very straightforward and have only a few controls.

Step 2: Basic controls can be seen below.

Check Steering Performance

Operate the steering wheel to assure the front wheels move correctly.

The front wheel movement is controlled by the steering wheel on the remote control.

If the movement is opposite, you can switch the steering switch on the remote to the reverse mode position.

Gently lift up the front wheels while adjusting the steering trim.

Step 3: Perform a range test. With the engine off, power up the radio and vehicle. Have a friend hold the vehicle and walk as far away as you plan on driving the vehicle. Test the steering and throttle, to make sure both are responsive at this distance. It is important that you are using alkaline fully charged new batteries. If you find that your controls are not functioning properly while standing next to the vehicle or within a few feet, you should check all connections leading to the receiver box pictured below along with making sure your batteries are firmly seated in the remote control and the vehicle. It is a very good idea, if using standard double A batteries to either tape the batteries together or use a rubber band for the vehicle's batteries. It is very easy for the batteries to pop loose or lose connection while driving which could cause loss of control to the vehicle and cause damage.
IMPORTANT: There are multiple radio frequencies that are used on RC vehicles. Make 100% sure that before you switch on your radio, that there are no other RC vehicles being operated in the area. By switching on your radio while another vehicle is being operated on the same frequency can cause damage to that vehicle or injury to others in the area. When 2 radios are being operated on the same frequency and within range, the vehicle will not know which radio is controlling it and usually causes the vehicle to run out of control.

NOTE: Always turn the remote control power on before the vehicle.

The radio receiver is located in the receiver box on the car. There are usually 3 outlets that connections are plugged into. These are labeled as Channel 1, Channel 2 and Battery. Make sure all are seated correctly and firmly in place.

The receiver also houses a crystal. The crystal frequency will match to the crystal in your remote. You can always change these with another frequency if you have another car on the same one.

Precaution: If your vehicle glitches (a sporadic movement of the vehicle without any use of the remote control) you should first make sure that nobody else is on the same frequency as you. If no others were on the same frequency, you should take the vehicle to a clear area or field where there are no electrical power lines. Power lines, cell towers and other things can cause interference with your vehicle and you should always test your vehicle prior to running to make sure these things don’t exist.

Section 3: Getting to Know Your Engine

Before you fire up your vehicle and break in your motor, you should familiarize yourself with it. Understanding your motor and how it works, will make it much easier to tune, maintain, and keep it running at maximum efficiency for a long time.

Pictured below is a typical nitro racing engine. Your engine may be smaller or slightly different, but they all work in basically the same way.

Cylinder Head - This sits on top of the engine, and helps to dissipate heat.

Case - Houses all the internal components of the engine.

Connecting Rod - The connecting rod is connected to the connecting rod and piston, and gets spun by the up and down movement of the piston. The flywheel and clutch bell sit on the crankshaft and all of them spinning together is what turns the gears of the transmission.

Piston - The piston is precisely fitted with the sleeve of the motor to create compression needed for the fuel to combust. It moves up and down inside the sleeve, turning the crankshaft.

Connecting Rod - This is what connects the piston to the crankshaft.

Glow Plug - This is what is used to start the combustion process in your motor. It sits on top of the combustion chamber in the middle of the Head. An element inside of it glows red when a current is put through it, which sparks the fuel. This element is powered by your glow starter. If this element burns out, the engine will not start. This will be the most replaced part on your vehicle.

Carburetor. The carburetor is what controls the speed of your motor. It intake air and fuel into the engine. The carburetor’s main job is to control the mixture of air and fuel as it enters the engine. You control this mixture through the needle adjustments on the carburetor. The optimal air and fuel ratio varies with engine speed.

High Speed Needle (HSN) - The High Speed Needle is used to control the mixture of fuel and air when the carburetor is open from partial throttle to Full throttle.

Low Speed Needle (LSN) - The Low Speed Needle is used to control the mixture of fuel and air when the carburetor is at idle to partial throttle.

Idle Screw - The idle screw controls how much fuel and air the carburetor lets into the engine while you are in neutral. You want to set this as low as possible while still allowing the engine to idle for a good amount of time.

Air Filter Housing - This houses the air filter and funnels air into the carburetor.

Air Filter - This protects your engine from dust and harmful debris. It should be cleaned and oiled, or replaced when any dirt or fine dust enters the engine can cause irreversible damage. The air filter can look clean, but still contain harmful microscopic dust that can harm the engine. Be on the side caution when deciding when to clean your air filter. It can be oiled using air filter oil from a hobby shop. Air of filter oil for off-road motorcycles and ATVs will also work and can be purchased from most Motorcycle and ATV stores.
Adjusting your Needles

To adjust your needles you will need to know a few terms. If you want to lean your motor (lean = less fuel reaching the motor), you will need to adjust the needles clockwise. To Richen (rich = more fuel reaching the motor) or Fatten your motor you will want to turn the needles counterclockwise. Adjustments to your needles should be made in very fine increments. I would suggest thinking of your needle as a clock. There are 12 hours on your clock. For example if you want to lean your top needle one hour, you would turn the screw in, or clockwise, one twelfth of a turn. You should make adjustments in one hour increments and NO MORE!

Getting a nice long flat head screwdriver can go along way in making turning your engine easier.

Section 4: Breaking in your Engine

The break in process is fairly time consuming, but please make sure to follow all the steps carefully. Out of the box, the piston sits inside the sleeve very tightly. You need to break this in so that the piston and sleeve fit together perfectly. The only way to do this is to get the engine up to operating temperature, and allowing it to cool back down. These nitro motors run on compression, which requires a very precise fit between the piston and sleeve. The whole point of the break in process is to allow your piston and sleeve to seat together, reaching running temperature, with lots of lubrication, then allowing it to cool back down to room temperature. The piston and sleeve fit together best at around 260 degrees to 215 degrees Fahrenheit. It is not necessary but highly recommended to use a temperature gun during the break in process, but if you have one, by all means use it. You can use the “split method” if you don’t have a temperature gauge. To do the split method you take a deep split or cut and place it on top of the cooling head. The split/slot should evaporate in 3-5 seconds. It should not pop or sizzle. If it does, than your engine is running too hot. If it takes longer than 3-5 seconds, your engine is running too cold. You do not have to complete the break in process all in one session, but you must complete each individual step. Before you start, it is a good idea to take the glow plug out and pull the starter easily until the piston reaches the bottom of the stroke (place where piston is before it starts to return to the top) and make a mark on the flywheel so you know where top dead center (TDC) is because when you put the glow plug back into the engine you need a reference point. You will need something to place the car on during the break in process that allows the wheels to be off of the ground. You can use pretty much anything such as a cement block, toolbox or whatever you have around the garage.

Step 1: Get your fuel and glow igniter ready. We recommend using 20% nitro fuel. This can be purchased at any of the major hobby shops. Any brand will work, although I would suggest using one with a higher oil content if you want your engine to last the longest it possibly can. You will need to use a fuel bottle to fill the tank of your vehicle. Squeeze all of the air out of your fuel bottle and stick it in your gallon or quart of fuel. Release the fuel bottle and it will create a vacuum effect filling your fuel bottle. Now fill the tank of your vehicle. Your glow igniter should have been charging for at least 8-10 hours. To stop your engine, you should pinch the fuel line leading the carburetor until the engine is off.

Step 2: You must prime the fuel lines to get fuel into the carburetor. There are a number of different ways to do this, but the easiest way is as follows: Hold your finger on the exhaust pipe opening and pull the pull starter until you see fuel traveling through the fuel line. Stop when the fuel gets to the carburetor. Remove the air filter and put 2 drops of fuel in the carburetor to prime the engine.

Insert a few drops of fuel into the carburetor

Step 3: Turn on your radio and turn the switch to the vehicle to the on position. Re-Check the controls to make sure there is no interference. Put your glow plug igniter on the glow plug and pull the starter using a short quick motion. (Do not force or pull the pull cord all the way out as this can damage the engine and pull start mechanism).

The engine should start in a few pulls. If engine feels very hard to pull it may be hydro locked. This is when there is too much fuel in the engine meaning the engine is flooded. To fix this, take the glow plug out with a cross wrench, turn the car upside down and pull the starter a few times to get the excess fuel out of the engine. Put the glow plug back in, put the igniter back on the plug and try to start again. Once the engine fires up, you may need to adjust your idle screw. You do not want the tree to be spinning at this point, if they are, turn the idle down.

Insert a fully charged glow plug igniter into the top of the engine and attach it to the glow plug.

Make sure the igniter is firmly attached before starting the vehicle.

Make sure the vehicle is lifted off the ground and is sitting on a toolbox or other object so that the wheels can freely spin.

WARNING: DO NOT HAVE THE WHEELS TOUCHING THE GROUND. SOMETIMES THE CAR COULD BE SET INCORRECTLY AND CAUSE THE CAR TO MOVE ON ITS OWN WHEN FIRST STARTED.
Section 5: Troubleshooting

This section will go over some of the most common problems you may experience as a newcomer to the hobby, and some of the most common fixes for these problems.

Engine Starts, but immediately stalls:
1. Idle set too low – Adjust your idle screw so the engine idles higher.
2. Low Speed Needle needs Adjustment – The engine could be flooded with fuel, lean the low speed needle slightly.
3. Engine not getting fuel – Check to see if any of your fuel lines have holes in them.
4. Bad glow plug – If the engine dies right after you take the glow igniter off, it is possible it is the plug causing it. Try starting the car and leaving the glow igniter on for a moment. If the engine no longer stalls, the glow plug needs replacement.

Engine is slow, or has slow acceleration:
1. Clutch slipping – Replace clutch shoes
2. Engine not tuned properly – The engine could be running to lean or too rich. Return needles to factory settings and start over
3. Glow plug fouled or worn out – Replace the glow plug.

Engine stalls during normal driving:
1. Out of fuel, hole in fuel line – The engine could be running out of fuel. Refill the tank and check for holes in the fuel lines
2. Carburetor not adjusted properly – Return the needle settings to factory settings and start from scratch.
This could be from the high speed needle running to lean.

Engine is overheating, or blows little smoke from the exhaust:
1. The high speed needle is too lean, fatten this setting until you see smoke come from the exhaust under acceleration.
2. Engine is worn out – The engine will start to run hotter as it gets older.

Vehicle “Glitches” or has lack of control:
1. Batteries in radio dead – Replace radio batteries
2. Receiver batteries are low or loose – Replace the receiver pack batteries, or check to make sure they are in place. Using a rubber band or tape to hold the batteries in place will prevent them from getting knocked loose during running.
3. Crystals or Receiver damaged – Fuel getting on the receiver can damage it, and hard impacts can cause the crystals to be damaged.
4. Interference – Things such as chain link fences, electrical lines, and other people using r/c cars can cause conflicts, try a different area.

Section 6: Precautions
1. Never operate the vehicle in crowded areas.
2. Always operate the vehicle with the body on.
3. Do not handle the fuel near open flames.
4. Store fuel in a cool, dark place.
5. Keep fuel away from children.
6. Only run the engine in a well ventilated area.
7. When the engine, glow plug, or other moving parts of the vehicle get very hot.
8. Always check to make sure no one else is operating a R/C vehicle on the same frequency.
9. If the vehicle stops responding to you, discontinue use immediately, until you find the cause of the problem.