



**FAST AFFORDABLE FUN**



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MAN-NITRO-2016.02.02-V14

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[www.redcatracing.com/manuals/NITRO-MANUAL.pdf](http://www.redcatracing.com/manuals/NITRO-MANUAL.pdf)

# WARNING!

READ ALL INSTRUCTIONS INCLUDED WITH VEHICLE BEFORE OPERATING

**AGE WARNING!**

This radio controlled (RC) vehicle is not a toy! You must be 14 years of age or older to operate this vehicle. Adult supervision is required.

**RISK OF RUNAWAY VEHICLE OR INJURY!**

Never start the engine without first having the controller and receiver turned on, and having tested the controls to make sure everything is functioning properly.

**RISK OF FIRE! / RISK OF EXPLOSION!**

There is a risk of fire and explosion when dealing with fuel. Hobby fuels contain Nitromethane and Methyl alcohol which are highly flammable and combustible. Injury or death can occur if proper care is not followed.



Follow all precautions that go along with handling nitro fuel and never allow fuel to be near open sparks or flames of any kind. Only use fuel rated containers. Nitro fuel ignites quickly and emits fumes into the air. The entire area around the fuel may have combustible fumes in the air. This means the air around the fuel can flash ignite causing an explosion. Only use outdoors in a well ventilated area.

**POISONOUS!**

Fuels containing Nitromethane and Methyl alcohol are toxic. Injury or death can occur if swallowed. May irritate skin and cause injury if absorbed into the skin. Injury or death can occur from breathing the toxic fumes. The exhaust emitted from this Radio Control (RC) vehicle's muffler is toxic and can cause injury or death if inhaled. **KEEP AWAY FROM CHILDREN AND PETS!** Never start the engine indoors, not even in a closed garage. Always follow the appropriate nitro fuel safe handling practices.

**RISK OF BURNS!**

The engine, exhaust pipe, and other areas of the vehicle get hot. Burns can occur if touched after vehicle operation. Allow adequate time to cool before handling.

**RISK OF INJURY!**

Hobby grade RC vehicles can cause serious injury or death if not operated correctly. Never use this vehicle in crowds. Never chase people or animals. Drive in safe open areas only. Keep body parts away from moving parts.

**RISK OF DAMAGE!**

Never operate RC vehicles on public roads. Damage of vehicle and property can occur. Injury or death may also occur. Only operate on wide open private property.

**WARNING!**

Do not mix old and new batteries. Do not mix alkaline, lithium, standard (carbon zinc), or rechargeable (nickel cadmium) batteries. Do not change or charge batteries in a hazardous location.



**FCC Compliance Statement!** The radio included with your vehicle complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operations. Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

**WARNING:** Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

**WARNING:** While operating the Radio, a separation distance of at least 20 centimeters must be maintained between the radiating antenna and the body of the user or nearby persons in order to meet the FCC RF exposure guidelines.

# WELCOME TO HOBBY GRADE R/C VEHICLES

Recommended for ages 14+ (with adult supervision)

Congratulations on your new hobby grade radio control vehicle. Hobby grade Radio Control (RCs) offer many advantages over radio controlled vehicles sold in the toy department. One of the greatest advantages of hobby grade RC vehicles is the ability to set up the vehicle the way YOU want it. This includes changing gear ratios to better suit your terrain, tuning the many adjustable suspension components like ride height and geometry, as well as customizing the overall appearance of your vehicle. Redcat Racing hobby grade RC vehicles were designed with all these characteristics in mind to provide you with much fun and adjustability.

Redcat hobby grade RC vehicles are incredibly fast! While going fast is fun and exciting, it also comes with a great deal of responsibility. An RC vehicle traveling at full speed carries much momentum. Getting hit in the leg at high speeds hurts and serious injury may occur. Property damage, as well as damage to your RC vehicle, is also possible. Great care must be used while operating these vehicles.

Redcat radio controlled vehicles are engineered for performance as well as durability. This means shedding weight where ever possible and using complex suspension components that offer many tuning options. This allows the operator to make adjustments that will affect the way the vehicle responds to all aspects of the terrain. As you may know, any RC vehicle, whether it is hobby or toy grade, can break. How and when it breaks depends solely on your driving style. Unfortunately, breakage is unpredictable. While you may break parts on a small, gentle looking crash, those big crashes, where breakage is almost guaranteed, you may not break anything. Unlike toy grade RCs, hobby grade RCs are designed with parts replacement in mind. Spare parts are readily available from Redcat and more durable aluminum parts may be available as well. It is recommended to keep spare parts on hand so if you run into that oak tree at full speed, you will have the necessary replacement parts to get you up and running again quickly.

Appearance is just as important as speed and handling. Who wants to go fast and look good doing it? You do! That is why Redcat has also designed their vehicles to look as good as they perform. Accessories may also be added to your vehicle to customize its looks. As mentioned earlier, Redcat hobby grade RC vehicles are completely customizable and that is where all the fun is.

Imagine yourself being on the pit crew of a full scale race team, making suspension adjustments for better handling or changing the gearing to get that hole-shot from the start. That is the feeling you will get when adjusting the suspension on your new Redcat. Increase ride height so you can clear the driveway with a single jump or thicken the oil inside the oil filled shocks to make high speed laps around your front yard. The possibilities are endless with Redcat, so put on your favorite pit crew cap, grab your Redcat and have the time of your life!

## **WARNING**

This is not a toy and should not be treated as one. Nitro engines are highly tuned pieces of equipment and need to be used only as directed. Follow the included instructions closely and be sure to keep hands away from the hot surfaces of the engine and exhaust pipe. Make sure you read all manuals, including the online manual, completely before attempting to start your nitro vehicle.

The engine in this RC vehicle runs on a mixture of nitro methane, methanol, and special oil blends. This is referred to as hobby grade "nitro fuel." Only nitro fuel designed for RC cars and trucks should be used. Do not use gasoline in nitro powered engines as this will cause damage and potential injury to the operator. Nitro fuel is dangerous for many reasons. An invisible flame, explosive fumes, and poisonous chemicals are a few reasons nitro fuel should be handled with care. Nitro fuel should be used by an adult and only as intended by the manufacturer.

# REQUIRED EQUIPMENT

AA batteries for transmitter  
(Number of batteries may vary per vehicle)

After run oil

Air filter oil

Flat & Phillips screwdrivers

Hex wrenches  
1.5mm  
2.0mm  
2.5mm

4pcs. AA batteries for receiver

Hobby Nitro fuel

Filler bottle

Cyanoacrylate (CA) glue

Thread locking compound

Hobby knife

Glow plug igniter

Large & small cross wrenches

Needle nose pliers

**NOTE:**  
This vehicle requires AA batteries & high quality hobby grade nitro fuel to run. Only use nitro fuel designed for nitro cars and trucks. Do not use airplane fuel. Please read the entire manual before attempting to start the engine.

# RECOMMENDED EQUIPMENT

Nitro Starter Kit  
Nitro starter kit

Polycarbonate scissors

Body reamer

Silicone oil

Silicone Grease

Temperature gun

Spare Glow plug

Hex Drivers  
2.5mm  
2.0mm  
1.5mm

Socket Drivers  
5.5mm  
7mm

Wrench, 5.5mm

Precision ruler

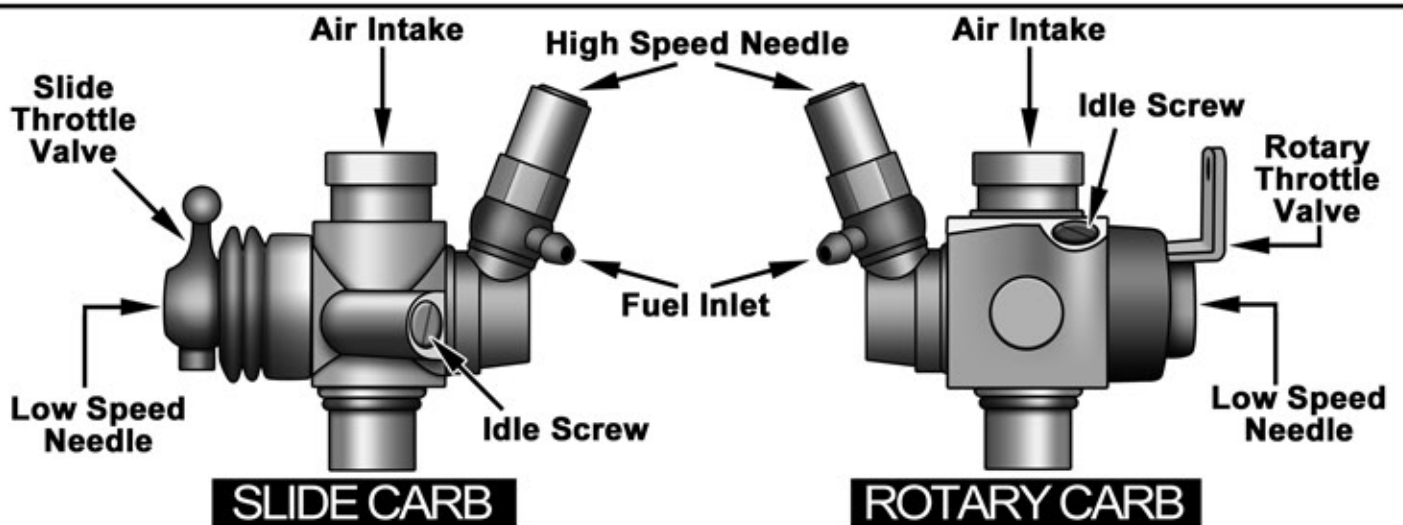
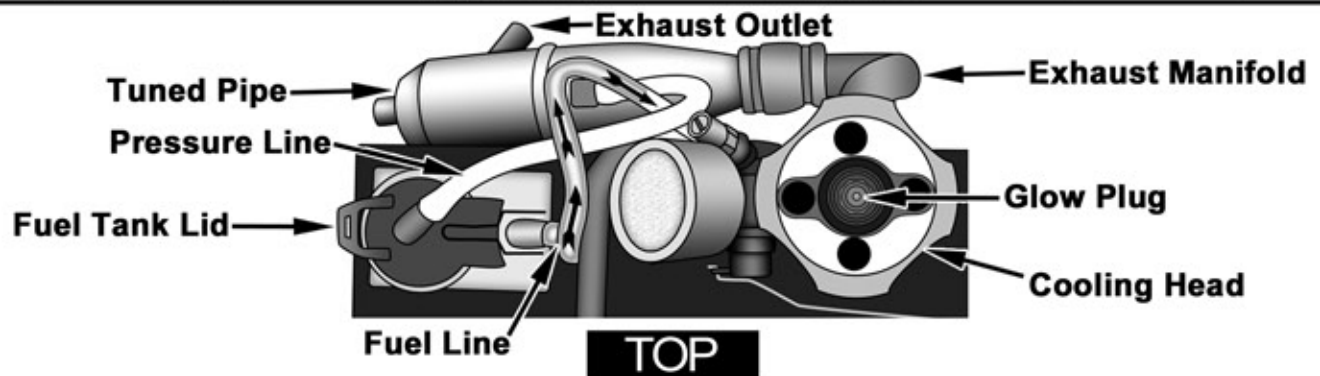
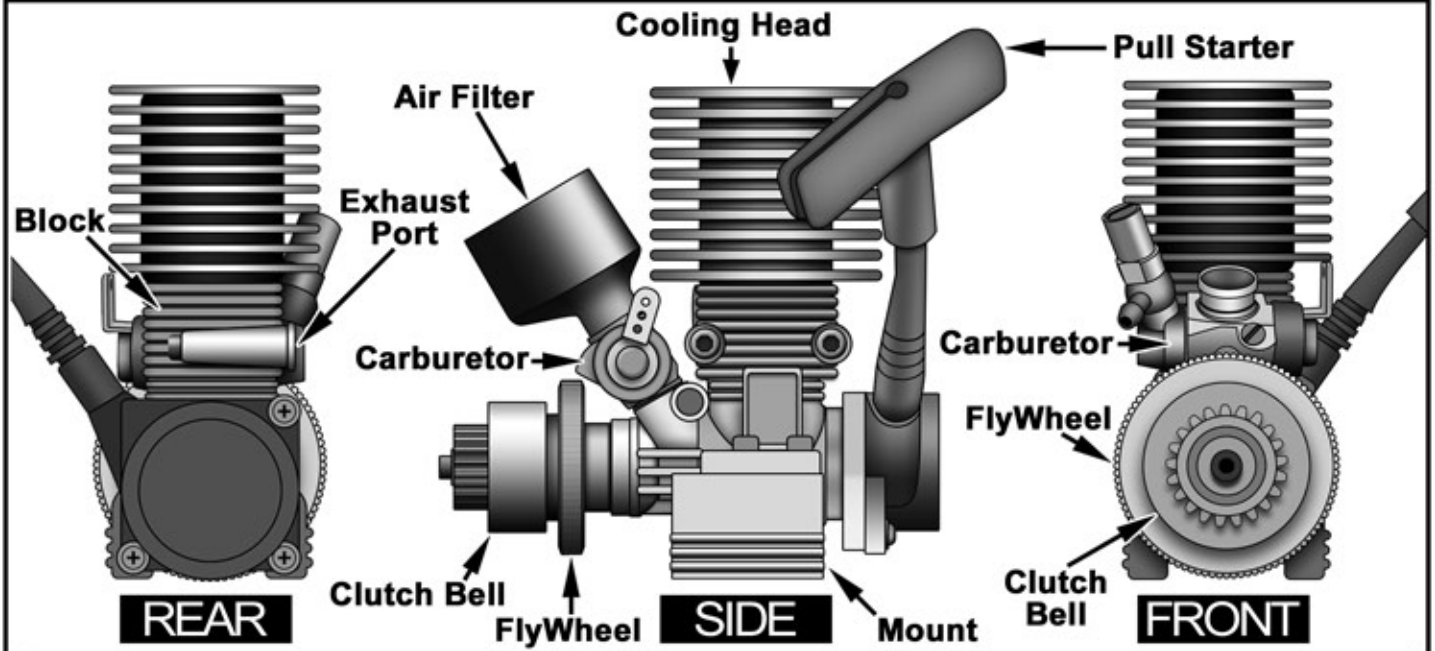
Wire cutters

**WARNING:**  
Never use a drill or powered screw driver while working on RC vehicles. The heat generated from fast turning screws can melt the threads inside the plastic. This can cause loose parts, resulting in poor performance, premature wear, and breakage.

# INTRO TO NITRO ENGINES

## Nitro Engines:

Knowing and understanding the different parts of your engine is important. Study the Images below and become familiar with the different engine parts. Knowing what each part is called and where it is located on the engine will help you understand break-in and tuning instructions.



# UNPACKING & SET-UP

## Unboxing your Redcat Racing RC vehicle:

Be sure you've removed all parts, equipment, tools, and documentation from the box. It's easy for small parts to get hidden in the packing materials and be overlooked.

Completely read all documents and instructions included with your Redcat Racing vehicle.

Acquire any necessary items such as transmitter batteries, receiver battery, nitro fuel, glow starter, after run oil, filter oil, and any additional tools needed that are not included with the kit.

## Looking Over Your New Redcat vehicle:

Be sure to look over your new Redcat RC. This will save you time and trouble in the future

Check all screws to make sure they are tight. Do not over tighten screws nested into plastic as this may damage the plastic threads. Avoid using power tools for this step.

Check all nuts, bolts, and clips to ensure they are tight and secure.

Add medium strength liquid thread lock (like blue Loctite) to any screws threaded into metal parts, especially the motor mounts. Do not apply threadlock to screws threaded into plastic parts; this may damage the plastic threads. Threadlock can be found at auto parts stores. **NEVER USE PERMANENT THREADLOCK!** Heat is necessary to remove parts secured with permanent threadlock (like red Loctite). This will damage your RC vehicle.

## Lube The Air Filter:

Lube and install the air filter onto the engine's carburetor if it is not already done. The air filter used on RC vehicles uses a sticky oil treatment to aid in filtration and keep damaging dust out of the combustion chamber. Failure to soak the filter in this oil will void the engine's warranty and possibly damage the motor. You can find air filter pre-treatment oil at a local hobby shop.

To apply the filter pretreatment oil, place the filter element in a sandwich bag. Add about a teaspoon of air filter oil into the bag. Using your fingers, work the oil into the filter. The plastic bag keeps your hands clean and allows you to see your progress. Add more oil if needed. If too much oil has been used, wrap the filter element in a paper towel and squeeze out the excess oil. Too much oil can restrict air flow.

## Perform A Radio Range Check:

Install new AA batteries into the bottom of the transmitter, as shown to the right.

Thread the vehicle's antenna through the plastic antenna tube and turn on the transmitter. Turn on the receiver switch, which is found in the vehicle. Check that the controls are working properly.



Keeping fingers away from potentially moving parts; hold the vehicle off the ground and turn on the Electronic Speed Controller (ESC) switch found in the vehicle. Always turn on the transmitter first to prevent runaways.

Check that the controls are working properly. The steering wheel should operate the steering and the trigger should operate the motor. Pulling the trigger should make the vehicle go forward pushing the trigger should apply the brake and reverse. You may need to adjust the throttle trim found on the transmitter to keep the wheels from spinning while the trigger is in the neutral position.

Have a buddy hold the vehicle and walk 50 yards away. You and your buddy should decide on a routine beforehand, since it will be difficult to communicate with each other while testing. An example would be . . . turn the steering wheel left and count to ten; turn the steering wheel right and count to ten; pull the trigger and count to ten, and push the brakes and count to ten. You will want to repeat these steps moving further out as you progress until you are beyond the maximum distance you plan to run the vehicle.

If the radio performed without any glitches or twitching at maximum distance, you are ready.

# ENGINE BREAK-IN

Breaking in your nitro engine properly is very important. When an engine is new, part's tolerances are tight and the piston isn't properly seated inside the cylinder wall yet. Without proper break in, the engine will be difficult to keep tuned, if you can tune it at all, and the life of the engine will be shortened. Follow these simple steps to ensure a strong running, long lasting engine.



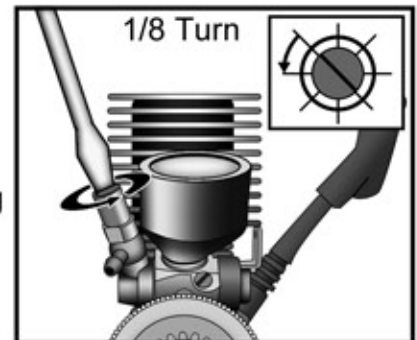
## BEFORE STARTING YOUR NITRO ENGINE!

1. Be sure both transmitter and receiver have new batteries in them.
2. A complete radio range check has been performed successfully.
3. The transmitter and the receiver are both turned on and working.
4. The air filter has been properly oiled using air filter treatment oil.



### New Engine Break-in:

- Find a safe and secure place outside to set the vehicle so the wheels are off the ground. A sturdy box may work well.
- Be sure the radio range check has been performed and both transmitter and receiver are on.
- Fill the fuel tank with nitro fuel designed for RC cars and trucks.
- Prime the engine. Cover the exhaust outlet and pull the starter cord a few times until you see fuel enter the carburetor through the fuel lines.
- Place a fully charged glow igniter onto the glow plug.
- Start the engine with the throttle in neutral position by pulling the pull chord. Short quick pulls are the best way to start the engine. Pulling the starter cord more than 10" may result in damage to the starting mechanism.
- If the engine does not start after ten pulls, remove the glow igniter and prime the engine again. Do not over do this step as it will result in a flooded engine.
- Place the glow igniter on the glow plug. Make sure it is well seated.
- Pull the pull chord with short quick pulls to start the engine. Once the engine starts, remove the glow igniter. (If the engine stalls, leave the glow starter connected for a few seconds, then remove.)
- Let the engine idle through two full tanks of fuel. Keep a close eye during this process as erratic performance may occur during these break-in stages. There should be moisture (unburned fuel and oil) coming out of the exhaust. This ensures there's enough lubricant flowing through the engine. The engine's factory needle settings should be fine for this. If there isn't any moisture and smoke coming out of the exhaust, you will need to richen the fuel mixture with the high speed needle. Turn the high speed needle counterclockwise 1/8 turn and check again. Repeat until a mist of unburned fuel/oil comes out of the exhaust outlet while running.



- You may need to restart the engine periodically. You should not have to re-prime in between starts as the engine stalls are most likely caused by flooding.
- After two full tanks have been idled through the engine, you may run the vehicle around the yard on the third tank. It is important not to go beyond 1/2 throttle during this third tank. The goal here is to allow the internals to wear in without overheating or stress.
- The fourth tank of fuel, you may run up to 3/4 throttle. The engine should still be running rich at this point, which means plenty of fuel. More fuel means more lubrication and cooler engine temperatures. You should see plenty of smoke coming out of the exhaust during running.
- After the fourth tank, you may begin tuning the engine for performance.

# ENGINE TUNING

Inside the combustion chamber, where the piston is found, three things are needed for an engine to run properly: fuel, air, and compression. Fuel is needed to burn, air is needed to make the fuel burn hotter, and compression is needed to make it burn even hotter resulting in an explosion.

## Fuel Mixture:

Fuel is mixed with air in the carburetor and the mixture is sent into the combustion chamber. This is where the piston pushes up on the fuel mixture compressing it tight. The fuel is then ignited by the red hot glow plug, which causes an explosion forcing the piston down to have it happen all over again.

When adjusting the carburetor, we refer to a rich fuel mixture and a lean fuel mixture. A rich mixture has a higher ratio of fuel-to-air than a lean mixture. To richen the mixture, adjust the carburetor needles to allow more fuel to enter the engine; to lean out the mixture, you allow less fuel. Oil is mixed into the fuel, so a rich mixture allows more oil into the engine than a lean mixture. Running your engine too lean will cause damage from friction and overheating! To control the amount of fuel in our fuel-to-air mixture, we use adjustment needles. There is a high speed needle and a low speed needle. We always start adjusting the high speed needle first.



## BEFORE STARTING YOUR NITRO ENGINE!

1. Be sure both transmitter and receiver have new batteries in them.
2. A complete radio range check has been performed successfully.
3. The transmitter and the receiver are both turned on and working.
4. The air filter has been properly oiled using air filter treatment oil.
5. Be sure proper break-in procedures have been completed.



## High Speed Needle:

After break-in has been completed, you may tune your engine for the best performance. The engine should always be at running temperature before making any adjustments. Never tune a cold engine!

Bring the engine up to running temperature by running the vehicle around for a few minutes.

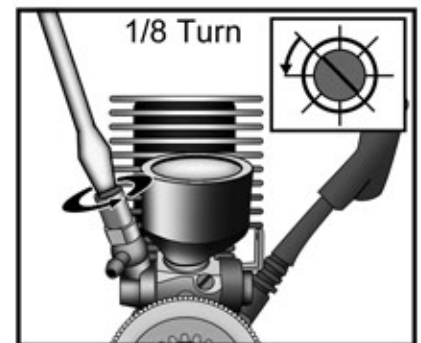
Always start tuning with the high speed needle first. The high speed needle controls the overall amount of fuel allowed into the engine, so changing the settings on the high speed needle will also affect the low speed needle settings.

Run the vehicle at full throttle. There should be a healthy amount of smoke exiting the exhaust pipe.

Making adjustments in 1/8 turn intervals; turn the high speed needle clockwise until maximum speed is obtained.

Once maximum speed and a smooth high pitch whine are obtained, turn the high speed needle counterclockwise 1/8 turn (refer to picture on the right). This is the optimal running zone.

Double check for smoke coming out of the exhaust. If there is NOT a healthy amount of smoke coming out of the exhaust, richen up the fuel mixture by turning the high speed needle counterclockwise another 1/8 turn until proper smoke is visible. Remember, if smoke is not visible, mixture is too lean and you are not lubricating your engine. Eventually, engine damage will occur.





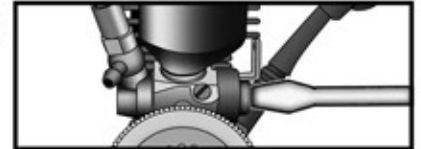
# ENGINE TUNING

## Low Speed Needle:

Now that the high speed needle is properly set, you may adjust the low speed needle. To do this, follow these steps. Remember! Never tune a cold engine!

Start by pinching the fuel line that goes into the carburetor while the engine is idling. The engine's RPM should rise for 4-5 seconds and then the engine should stall. This gives you an idea of what low speed fuel mixture you are currently running. When you pinch the needle, you cut off the fuel supply while allowing the air to still enter the engine. This leans out the mixture until the engine stalls. A leaner mixture will burn hotter, to a point, causing the engine to speed up until it starves for fuel.

While pinching the fuel line, if the engine ran less than 4-5 seconds, it is too lean. Turn the low speed needle counterclockwise 1/8 turn. If it ran much longer than 4-5 seconds before stalling, it is too rich and you need to turn the low speed needle clockwise 1/8 turn.



From a stopped position, quickly pull the trigger to full throttle. The engine should get to top speed smoothly and with minimal hesitation. If it does not, you may fine tune the low speed needle to ensure it does. Start by turning the low speed needle clockwise 1/16 turn. Notice the change and repeat this step as needed. Once optimal acceleration is reached, back the low speed needle out 1/16 turn.

If the engine's performance decreases, sputters, gurgles, and stalls with little to no smoke, it may be too lean. Turn the needle counterclockwise 1/16 turn until smoke is visible at 1/4 throttle.

## Idle Screw:

Idle has been set at the factory. The idle should not be changed unless the engine is properly tuned and is still having difficulty idling or wants to run away while idling.

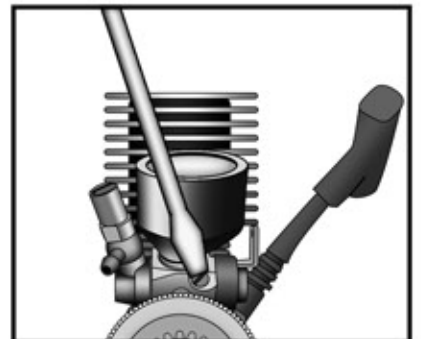
Attention! If the vehicle wants to run away while idling, check the throttle trim on the transmitter first. Be sure it is not set too high. If the brakes are fully applied and the engine is still idling too fast with the clutch engaging, you will need to adjust the idle screw.

Elevate the vehicle off the ground by placing it on a box, stand, or something sturdy allowing the wheels to spin freely without obstruction.

With the vehicle's engine NOT running, open the carburetor's venturi (throttle intake valve) by pulling the throttle trigger and tighten (if idle is too low) or loosen (if idle is too high) the idle screw 1/16 turn. Never tighten the idle screw while the carburetor's venturi is closed. This can cause damage to the idle screw and throttle valve.

Start the engine to check the idle speed and repeat, if necessary. The engine should idle as slow as possible without stalling.

If the Idle is set too high, it may cause erratic performance and excessive clutch wear.



Do not adjust the idle with the engine running as it may cause injury. Make sure both transmitter and receiver are turned on.

# MAINTENANCE

There is much fun to be had running RC vehicles. To ensure continued fun throughout the years, here are some maintenance tips to follow.

## Chassis Cleaning:

Many substances such as dirt, grass, & grime can find its way onto your RC chassis. It's a good idea to clean this off after each day's use. There are many ways to clean an RC vehicle. Here are a few examples.

One of the most effective ways to clean the chassis is with an old tooth brush, cotton swab, old paint brush, and rag. These four tools work well for removing dirt and debris.

Pay close attention to areas with moving parts such as suspension components, steering components, and drive train. It is important to get these areas clean to help prevent wear.

Unburned 2-stroke oil can easily be removed with nitro car cleaner, sold at hobby stores. Read the instructions on the can carefully before using.

## Bearings:

Running your vehicle through water is never recommended, but moisture may still make its way into the vehicles bearings. Here are some tips on drying, cleaning, and oiling the bearings.

Your Redcat Racing vehicle may have bearings in various locations like wheel hubs, steering linkages, gear supports, and drive shaft supports. First, you must have access to all the bearings. Remove all four wheels and any other parts blocking bearing access.

Spray the bearings with a water displacer such as WD40 or Wire Dryer. This will flush out moisture, dirt, and grime.

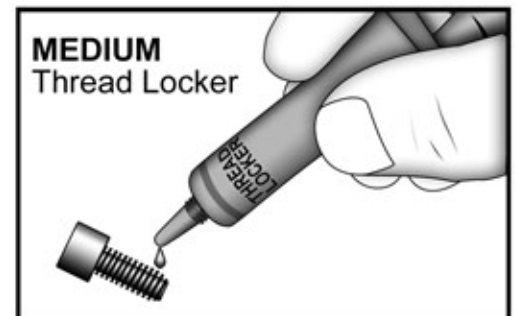
After a good spraying with a water displacer, the bearing will be in need of oil. Use a light bearing oil which can be purchased at the hobby shop or auto parts store. \*This step is important\* Failing to re-oil the bearing will cause them to wear prematurely and replacements will be necessary. A few drops of oil per bearing should be fine. Spin the bearing to work the oil throughout the bearing.

## Screws and Moving Parts:

It's a good idea to quickly go over the entire vehicle after each run to ensure all screws remain tight. Make sure there isn't any excess motion or "slop" in moving parts.

Medium thread lock (like blue Loctite) should be used on any screws that fasten into metal parts, especially the motor mount. Never use permanent thread locker on any part of your RC vehicle. Permanent thread locker (like red Loctite) can only be removed with heat, which will cause damage to the vehicle.

Checking for cracks and excess wear is also a good way to save yourself some headaches down the road.



# MAINTENANCE

## Engine Maintenance:

After a day of running your nitro vehicle, be sure the fuel tank is empty and all nitro fuel has been burned out of the engine. Methanol found in nitro fuel absorbs moisture which causes corrosion.

After emptying the fuel tank, restart the engine to use up any remaining fuel left in the fuel lines and engine. Cleaning off the engine with an old paint brush and/or some compressed air will help you to remove any excess dirt and debris. Debris left on the vehicle can hold moisture causing problems later on. If left on the engine while checking the glow plug, debris can fall into the cylinder causing damage to the piston and cylinder wall.

Next, remove the air filter, being careful not to let anything fall into the carburetor. Open the carburetor's venturi all the way by pulling the throttle trigger, or moving the linkage by hand, and add 3-4 drops of after run oil into the opening of the carburetor. Turn the engine over by hand a few times to disperse the oil. After run oil helps protect the inner components of the engine from rust and corrosion. After run oil can be found at your local hobby shop.

Install the air filter back onto the carburetor to keep debris from entering the engine. If the air filter is dirty, clean it with soap and water. A dirty air filter will cause the engine to starve for air resulting in a rich fuel mixture. Remember to let the air filter dry completely before re-oiling. Oil the air filter with "air filter pretreatment oil" after each cleaning. You can buy air filter oil at your local hobby shop.

It's a good idea to check the glow plug after every five tanks of fuel. After thoroughly cleaning the inside of the head (top of engine with cooling fins) with a cotton swab, remove the glow plug by unscrewing it. **\*\*CAUTION\*\*** keep fingers away from the coiled glow element for this next step. Holding the glow plug with pliers, connect it to the glow igniter. The coiled element should glow bright orange. Be careful, it will be hot! It is a good idea to compare it to a new glow plug until you become familiar with how it should look. Glow plugs will need replacing from time to time. If the engine won't start or if it runs erratic, this is the first thing to check. Reinstall or replace if needed.

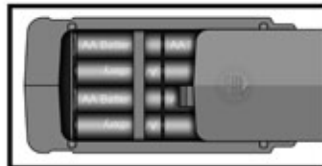
## Electronics:

Be sure to check your electronics after each use. The electronics are the life line of the vehicle and if they aren't working properly, a crash is almost certain.

Periodically range check your radio system to ensure proper operation.

Check batteries regularly. It is important to have fresh batteries in the transmitter.

Do not mix old and new batteries. Do not mix alkaline batteries, standard (carbon-zinc) or rechargeable (nickel-cadmium) batteries.



Check the antenna on both the receiver and the transmitter. Make sure there are no cuts or breaks in the receiver antenna. This will cause glitches and possible signal loss.

Using the transmitter, check the steering servo by turning the wheel back and forth. Check that it is operating smoothly and no clicking noises can be heard.

Make sure all electronics stay dry, even in waterproof vehicles. Water can short out the circuit boards inside the electronics causing failure.

# DRIVING TIPS

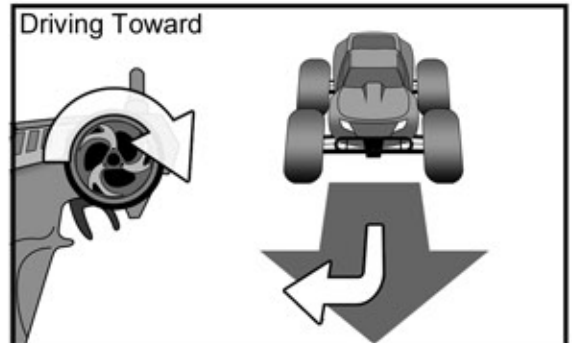
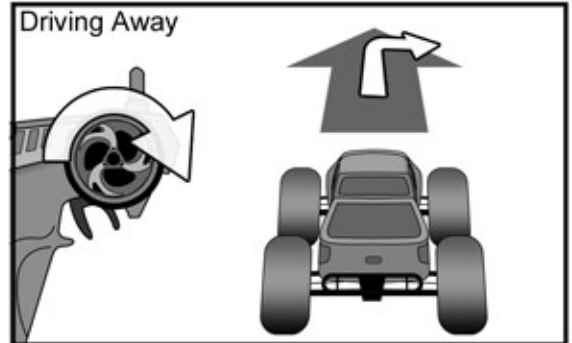
## Perspective:

The single most difficult aspect of driving RC vehicles is perspective. Perspective involves your relation to the vehicle. Are you behind the vehicle, in front of the vehicle, or beside it?

Driving an RC vehicle while standing behind it is like driving a full size car or go-cart. When you turn left, it goes to the left and when you turn right, it goes to the right. Simple.

What if the vehicle is coming toward you? When to turn the wheel to the left, will it go toward your left? No! Because the vehicle is coming toward you, the controls seem reversed. The controller doesn't actually change, it just seems like it does because of perspective.

Always imagine yourself sitting inside the vehicle, not standing outside with a remote. Imagine you are driving and the wheel on the remote is the actual steering wheel inside the car. Keeping this mind-set will help you make the correct steering decisions no matter which direction the RC vehicle is pointed.



## Steering and Throttle Control:

The steering and throttle inputs are both proportional. This means slightly pulling the trigger will make the RC vehicle move slowly. Pulling the trigger all the way back will cause the RC vehicle to go fast. The same applies to the steering.

The most common mistake with new RC enthusiasts is over correction. Over correction is when a slight amount of steering or throttle is needed and full throttle or steering is applied causing "crazy driving." It's a good time to learn how to control your movements. This may sound silly, but nerves and adrenaline have a lot to do with over correction. It is sometimes difficult to control our movements when we are over excited. I promise you, when your Redcat vehicle blasts across your yard and the grass starts flying, you will get excited.

As you become more familiar with your RC vehicle, you will tend to relax a little more making it easier to concentrate on small control inputs instead of great big ones.

## Look Ahead:

While controlling an RC vehicle it's important to look where it's going instead of where it's been. Looking a good five to fifteen feet in front of the vehicle will give you time to react to uncertain obstacles. It also prevents trees from jumping out in front of you.



## **STOP! BEFORE JUMPING YOUR VEHICLE READ THIS!**

Jumping RC vehicles does not usually yield the same results found in online videos. It may have taken many tries and broken parts to nail that huge jump on camera. You assume full responsibility for any damage that results from jumping your Redcat Racing RC vehicle. Redcat assumes no responsibility if you decide to jump or do

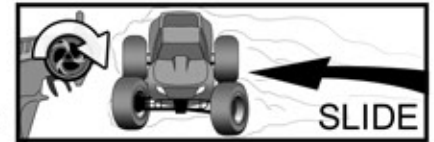
# ADVANCED DRIVING TIPS

As you become comfortable driving your Redcat RC vehicle, you may want to drive smoother and with more precision so you can go faster. Here are a few driving tips that are sure to add some excitement.

## Drifting:

Driving on loose surfaces like dirt or gravel can be fun, but how do you keep from spinning out? Counter steering is the answer to that question. Here is a rule of thumb. Always keep the front tires pointed in the direction you want the car to go. This is true regardless of which direction the vehicle itself is pointed.

Here is an example: Let's say you are driving in loose dirt. You are traveling at full speed and you want to make a left hand turn while maintaining most of your speed. You turn the wheel left and spinning the vehicle 360 degrees resulting in a complete loss of speed.



Try this! Get the RC up to full speed again, only this time, turn left and when the vehicle starts to spin, turn right keeping the front tires pointed where you want the car to go. When done correctly, the vehicle will enter into a slide or "drift" allowing you to turn while maintaining most of your speed. Practice this many times in both directions and you'll be drifting like a pro.

## STOP! BEFORE JUMPING YOUR VEHICLE READ THIS!

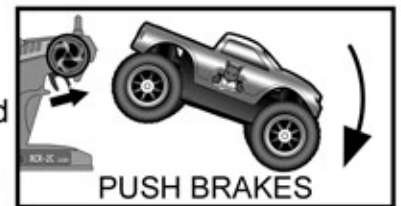


Jumping RC vehicles does not usually yield the same results found in online videos. It may have taken many tries and broken parts to nail that huge jump on camera. You assume full responsibility for any damage that results from jumping your Redcat Racing RC vehicle. Redcat assumes no responsibility if you decide to jump or do stunts with your Redcat RC vehicle.

## Jumping:

When done correctly, jumping is by far the most impressive maneuver done with RC vehicles. All RCs can go up, but how they land determines whether it was a successful jump. Anyone can hit a jump at full speed; I'm going to teach you how to land on all four tires. The wheels on an RC vehicle act as gyroscopes. This means you can drive the vehicle while it's in the air. The amount of throttle or brake applied while in mid flight will control whether the nose is up or down. Applying throttle will raise the nose and applying brake will lower the nose.

This is good to know if you hit a jump and your vehicle's nose is pointed at the ground. Hit the gas! Hitting the gas will raise the nose to help level out the landing. The amount of throttle used is in direct relation to the amount of correction needed. Be careful; landing while on the throttle can strip gears.



Adding steering input in conjunction with throttle inputs will cause a whole new outcome. Let's say you are in mid flight, your left front tire is closest to the ground, and you want to level the vehicle out. In this case you would steer left and apply throttle. This will raise the left front tire. Applying too much throttle will raise the left front tire too high. Here is a good rule of thumb. Steer into the front corner of the vehicle you want to correct and apply the appropriate trigger response. Remember, applying throttle raises the nose and applying the brake lowers it. This will take much practice so be sure to have some spare parts on hand. Bad landings can do lots of damage.

# TROUBLE SHOOTING NITRO

Engine won't start: Make sure you filled the fuel tank with the correct nitro fuel

1. Engine isn't primed. Place end of screwdriver over exhaust outlet and turn over the engine a few times, until you see fuel flow through the fuel line into the carburetor ( fig.1).
2. Igniter not charged. Using pliers, place a working (new) glow plug into the end of the igniter. If it doesn't glow bright orange, charge the igniter (if rechargeable). (fig.2)
3. Glow plug is bad. Check the glow plug by removing it from the engine. Holding the glow plug with a pair of pliers, place it into the end of a fully charged glow igniter. If it doesn't glow bright orange, replace the glow plug. (fig.2) The glow plug will get HOT! Use pliers to hold it.

fig.1

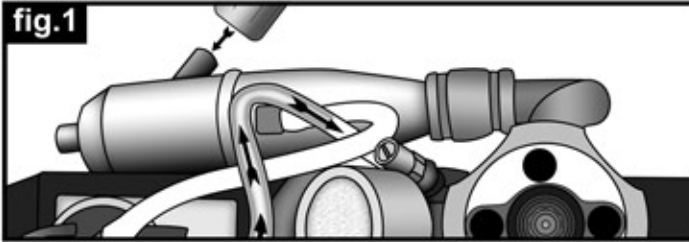
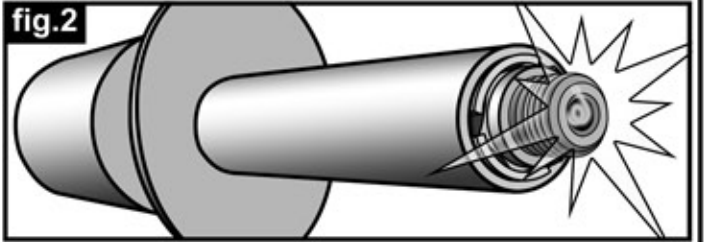


fig.2



Pull starter is slipping and not turning the engine over:

Dirty or bad one-way bearing. To check the one-way bearing, remove the pull starter and rear motor plate (fig.3). Spray out the one-way bearing with nitro cleaner (fig.4). Put it in the same way it came out as it will only work one way. If it still won't work, replace the one-way bearing.

fig.3

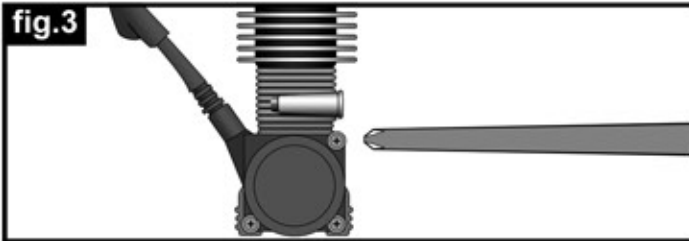
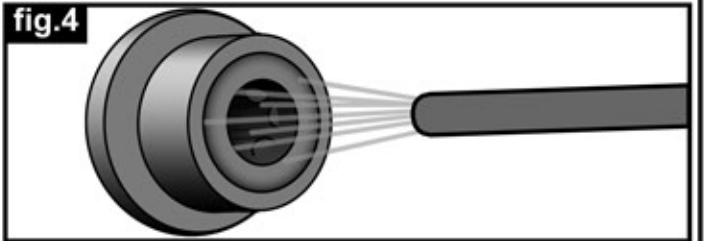


fig.4



Vehicle ran away with no control: Make sure you turned on the radio and receiver.

Batteries in the vehicle are dead or too low. Replace the batteries with new ones (fig.5).

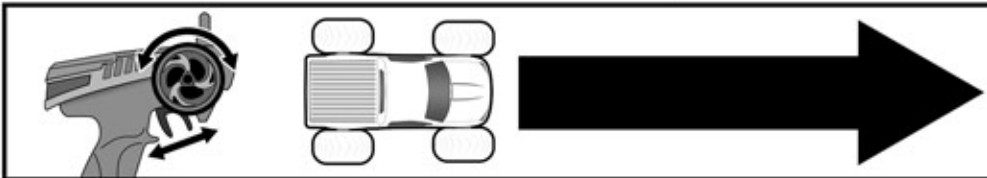
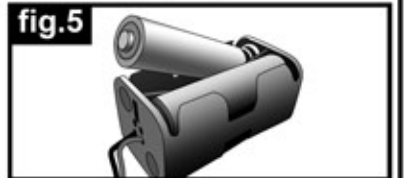
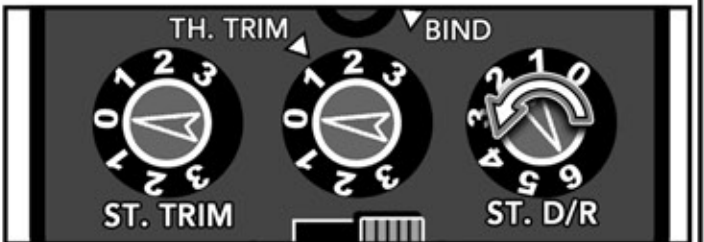
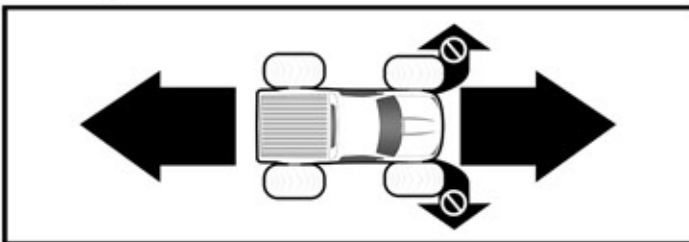


fig.5



Vehicle drives forward/backward but won't steer left/right:

Steering dual rate is set too low. Turn the steering dual rate knob counterclockwise.



# SETUP TIPS

Redcat Racing cars, trucks, and buggies offer many tuning options to help you achieve the exact feel you like in a vehicle. These tuning options include shock position, ride height, camber, toe in or out, shock stiffness, and over all suspension geometry.

## SHOCK POSITION:

Shock position plays a big role in how your vehicle handles bumps as well as turning stability. The effects of shock position affect the area of the vehicle you change. For instance, if you change the front shock positions, it will affect the traction and stiffness of the front tires.

### FRONT SHOCK POSITION:

#### POSITION: TOP=1 & BOTTOM=3:

The straighter up and down the shock is, the stiffer it will feel. This may also decrease bump handling stability as well as decrease traction. The benefit of this position is increased steering response.

#### POSITION: TOP=3 & BOTTOM=1:

Shocks in a more leaned position will give a softer feel. This increases bump stability and front traction, however, it decreases steering response.

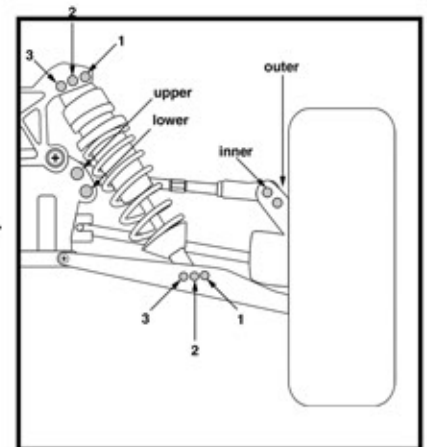
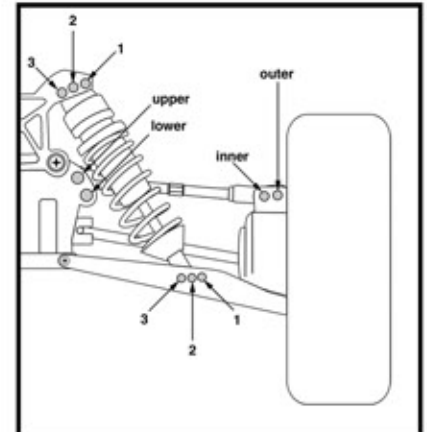
### REAR SHOCK POSITION:

#### POSITION: TOP=1 & BOTTOM=3:

The straighter up and down the rear shocks are, the stiffer the feel. This decreases rear traction which increases steering, but gives less stability over bumps.

#### POSITION: TOP=3 & BOTTOM=1:

Leaning the rear shocks in decreases steering by providing more rear traction and increases bump stability.



## RIDE HEIGHT:

Adjust ride height by moving the top spring collar up or down on the shock body. Increasing ride height allows you to drive over larger obstacles but also raises the vehicle's center over gravity (COG). A higher COG means less stability. Decreasing ride height increases stability but decreases the size of the obstacles you can maneuver over.

## SHOCK OIL:

Heavier weight shock oil (bigger number) will provide more dampening and slow down the speed at which the shock travels. This will reduce chassis roll for more stability.

Lighter weight shock oil (smaller number) will offer less dampening allowing the shock to recover quicker. This is better for rough terrain but offers less high speed stability from increased chassis roll.

# SETUP TIPS

## UPPER LINK ADJUSTMENTS:

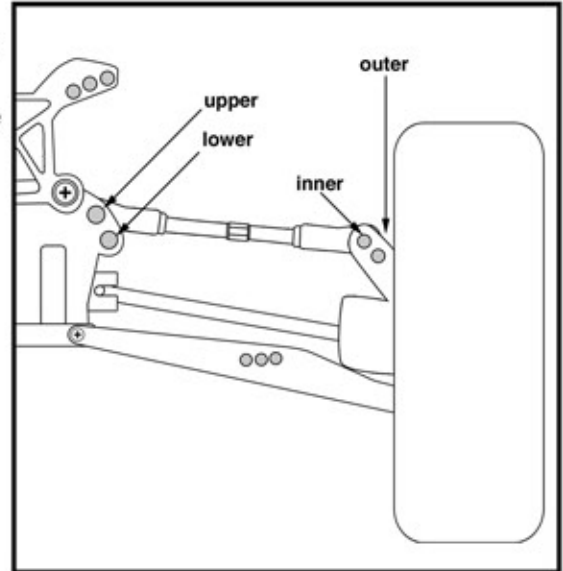
Adjusting the upper link affects the vehicle's "roll center." Adjusting "roll center" will affect the way the chassis rolls at its center of gravity. There are two mounting positions to choose from on the chassis side and hub carrier side of the upper link. Two things to watch for are upper link length and upper link angle.

## UPPER LINK LENGTH:

The longer the upper link, the more the chassis wants to roll in turns. While chassis roll may not seem good, it adds traction in the turns. This is good for a loose track where much traction is needed. The shorter the upper link, the less the chassis will roll. This is good for a high bite track where stability is needed.

## UPPER LINK ANGLE:

The angle of the upper links also affect chassis roll.



## PARALLEL UPPER LINK:

When the upper link is parallel (level) to the lower arm, the chassis has a tendency to roll more giving more cornering traction on low grip tracks.

## ANGLED UPPER LINK:

You must first understand, when I refer to an angled upper link, I'm referring to the inside of the link angling downward. This will give the vehicle a more stable feel with less overall traction. This is good for high bite tracks where stability is needed.

## FRONT OR REAR:

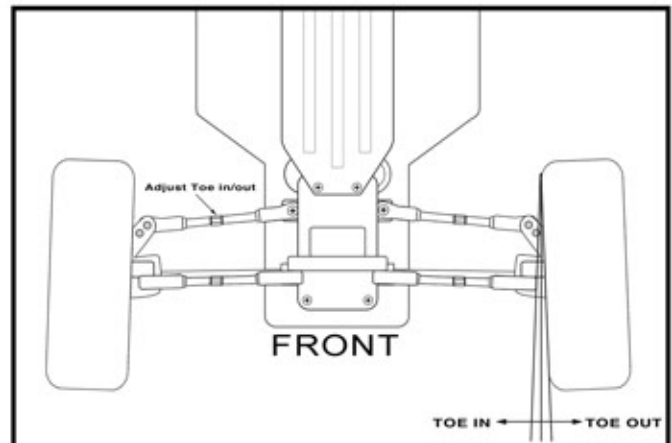
Keep in mind, changes made to the rear affect the rear and changes made to the front affect the front. Both front and rear traction affect the vehicle's turn ability. Less traction in the front will make the vehicle more difficult to steer, but less traction in the rear will make the vehicle steer more easily.

## TOE IN & OUT:

Toe in and out refers to whether the front of the tires are angled in or out.

**TOE OUT:** Toe out gives less straight line tracking and a "darty feel" (quick jerks side to side) but more steering. 2 degrees of toe out is usually good for the front.

**TOE IN:** Toe in gives less steering and more straight line tracking. 2 degrees of toe in is usually good for the rear.





# SETUP TIPS

## CAMBER:

Camber is the vertical angle at which the tires sit in relation to the ground.

## NEGATIVE CAMBER:

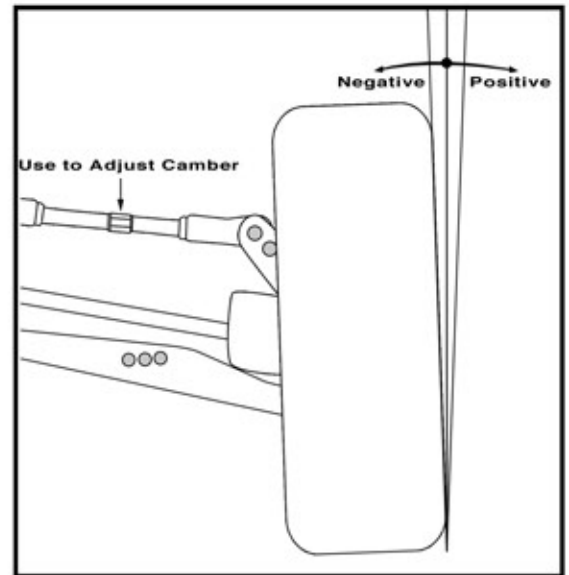
Adding little negative camber (1-2 deg.) will lean the tops of the tires inward providing more traction while cornering.

## POSITIVE CAMBER:

Adding little positive camber will lean the tops of the tires outward providing much less traction while cornering. Positive camber is usually not used.

## NEUTRAL CAMBER:

No camber added will set the tires straight up and down offering the most straight line traction but slightly decreased traction while cornering.



## CLUTCH ADJUSTMENTS (advanced tuning):

Redcat Racing gas vehicles are equipped with a centrifugal clutch system that engages as the engines RPMs are increased. This allows the vehicle to sit still while idling and provides full power to the wheels while the throttle is pulled. The clutch uses springs to regulate the point of engagement and can be adjusted if needed, though we recommend you use it with the factory set up.

## DELAYED ENGAGEMENT:

The spring in the centrifugal clutch can be replaced with a heavier one to delay the clutch engagement. This will require higher engine RPMs to engage the clutch, making initial take off more abrupt with increased wheel spin. This tends to jar the drive train and may cause breakage.

## EARLY ENGAGEMENT:

The spring in the centrifugal clutch can be replaced with a lighter one to allow quicker engagement. This will require less engine RPMs to engage the clutch, making initial take off more sluggish with decreased wheel spin. This may tend to bog the engine down some during initial take off.

## GEARING:

Gearing the vehicle down will provide more initial power and less top speed. Gearing the vehicle up will provide more top speed and less initial power.

## GEARING UP:

There are two ways you can rear up for more speed. Increase the size (more teeth) of the pinion gear (small gear attached to the motor) or decrease the size (less teeth) of the spur gear (large gear on the slipper clutch).

## GEARING DOWN:

There are two ways to gear the vehicle down for more power. Decrease the size (less teeth) of the pinion gear (small gear attached to motor) or increase the size (more teeth) of the spur gear (large gear on slipper clutch).

# GEAR RATIOS

Altering the speed and performance of Redcat Racing RC vehicles with different gearing ratios is easy. Two options are available for changing the gear ratios: replacing the spur gear and/or the pinion gear (clutch bell).

## Which Do I Change?

Which gear to change depends on availability and the amount of change desired. Changing the tooth count on the spur gear will offer smaller changes than changing the tooth count on the pinion gear. If a large change is desired, start with the pinion and then fine tune with the spur gear.



## Go Faster:

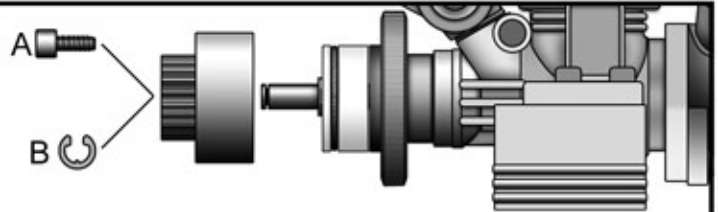
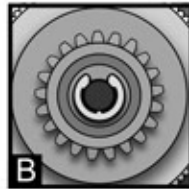
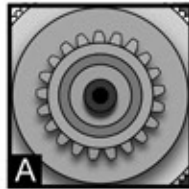
To make the vehicle go faster, replace the clutch bell with one that has more teeth. The more teeth, the faster it will go.

**WARNING:** The faster you gear your vehicle, the less low end torque it will have. Gearing too high may over stress the engine and clutch causing them to overheat with possible damage.

## More Power:

If more pulling power is needed, replace the clutch bell with one that has fewer teeth. This will increase power, but decrease top speed.

Some models use a screw (A) while others use an E-Clip (B) to secure the clutch bell / pinion.



## Changing The Spur Gear:

### Go Faster:

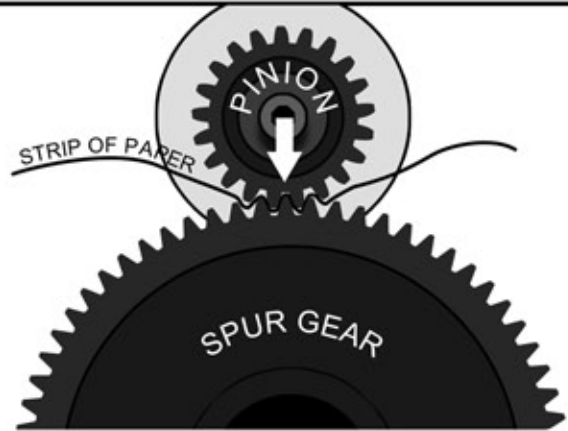
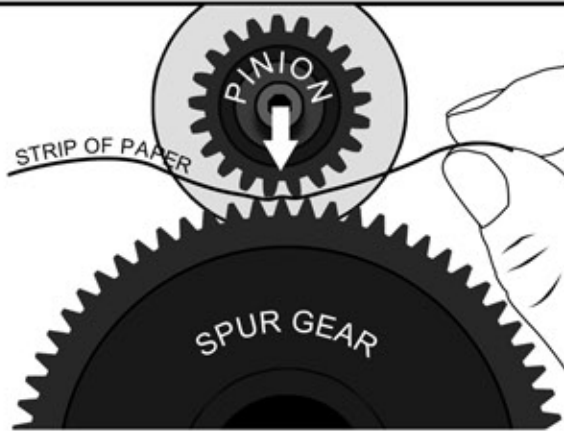
To add top speed, replace the spur gear with one that has fewer teeth. This will increase speed, but decrease bottom end torque.

**WARNING:** When gearing your vehicle for higher top speeds, overheating is likely and damage to the engine and/or clutch assemble is possible. Redcat is not responsible for damage caused by changes to the gear ratio.

### More Power:

For more power, install a spur gear with more teeth. This will increase power, but decreases the vehicles top speed.

# SETTING GEAR MESH



*Proper gear mesh is very important. Improperly meshed gears could result in gear, clutch, clutch-bearing, and/or engine failure.*

1. Loosen the engine mount screws, allowing the engine to slide, opening the gap between the pinion (clutch bell) and spur gear.
2. Place a strip of paper between the pinion and spur gears.

3. Firmly press the pinion to the spur gear.
4. Ensure blue thread lock is on the engine mounting screws & lightly tighten each screw.
5. Check for movement between the two gears (fig.1) (fig.2) (fig.3) and tighten the engine mount screws completely. Alternate between screws while tightening.
6. Remove paper and check gear mesh. See (fig.1) (fig.2) (fig.3) below.

# TESTING GEAR MESH

**TOO LOOSE**



Gears Are Too Loose:

There is too much movement between the two gears. (fig.1)

**RESULT:** Stripped gears.

**GOOD**



Gears Are Spaced Correctly:

**TEST:** Hold the pinion gear completely still. Place a finger nail on the spur gear and try to rock it back and forth. There should be a very small (almost no) amount of movement in the spur gear. (fig.2)

**TOO TIGHT**

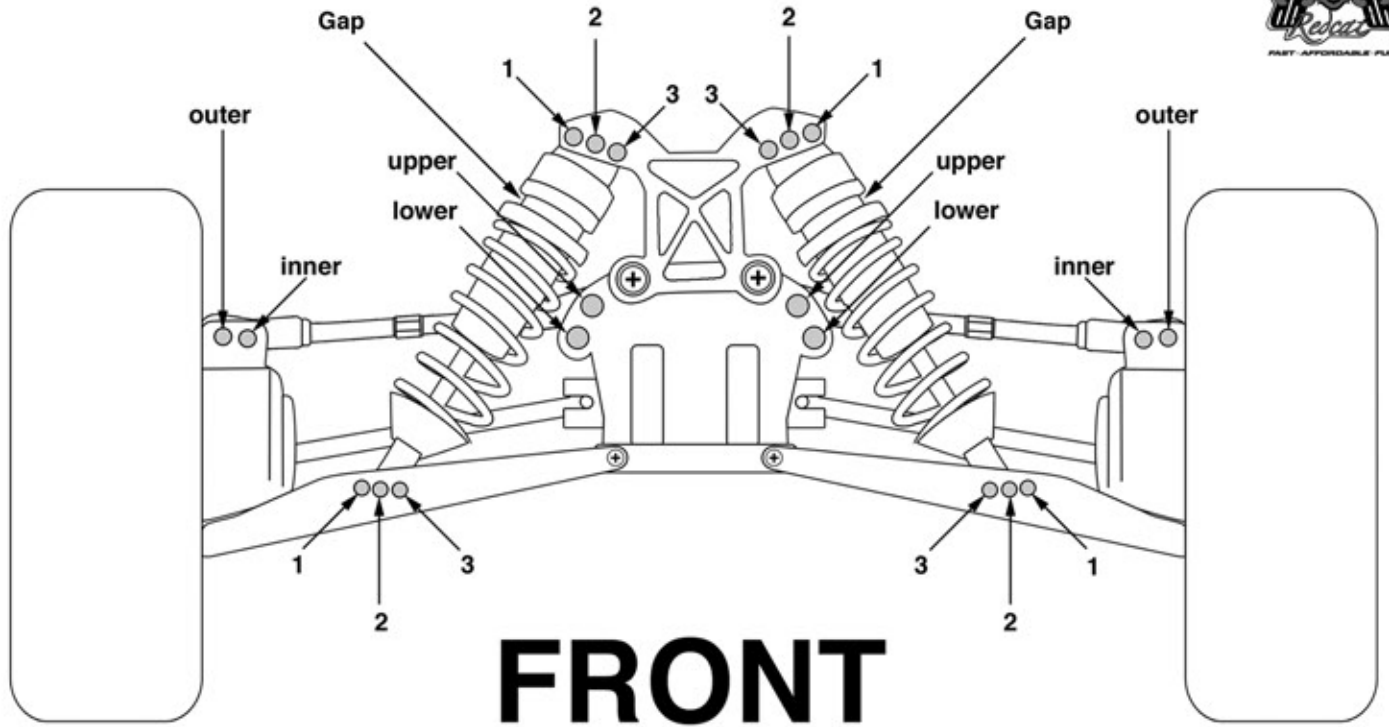


Gears Are Too Tight:

There is no movement between the pinion and spur gear. (fig.3)

**RESULT:** Overheated and damaged engine. Clutch bell bearing damage and premature wear is almost certain!

# SETUP SHEET



**Shock Position:**

Top: 1  2  3   
 Bottom: 1  2  3

**Upper Link Position:**

Inside: Upper  Lower   
 Outside: Inner  Outer

Shock oil: \_\_\_\_\_ wt.

Camber Deg:

Negative: \_\_\_\_\_ degrees  
 Positive: \_\_\_\_\_ degrees

Spring pre-load "Gap": \_\_\_\_\_ in.

Ride Height Rear: \_\_\_\_\_ in.

Toe:

In: \_\_\_\_\_ degrees  
 Out: \_\_\_\_\_ degrees

Piston inserts: \_\_\_\_\_ (1, 2, or 3 holes)

Front Diff Oil: \_\_\_\_\_ wt.

Additional notes: \_\_\_\_\_

Center Diff Oil: \_\_\_\_\_ wt.

Tires: \_\_\_\_\_

Inserts: \_\_\_\_\_

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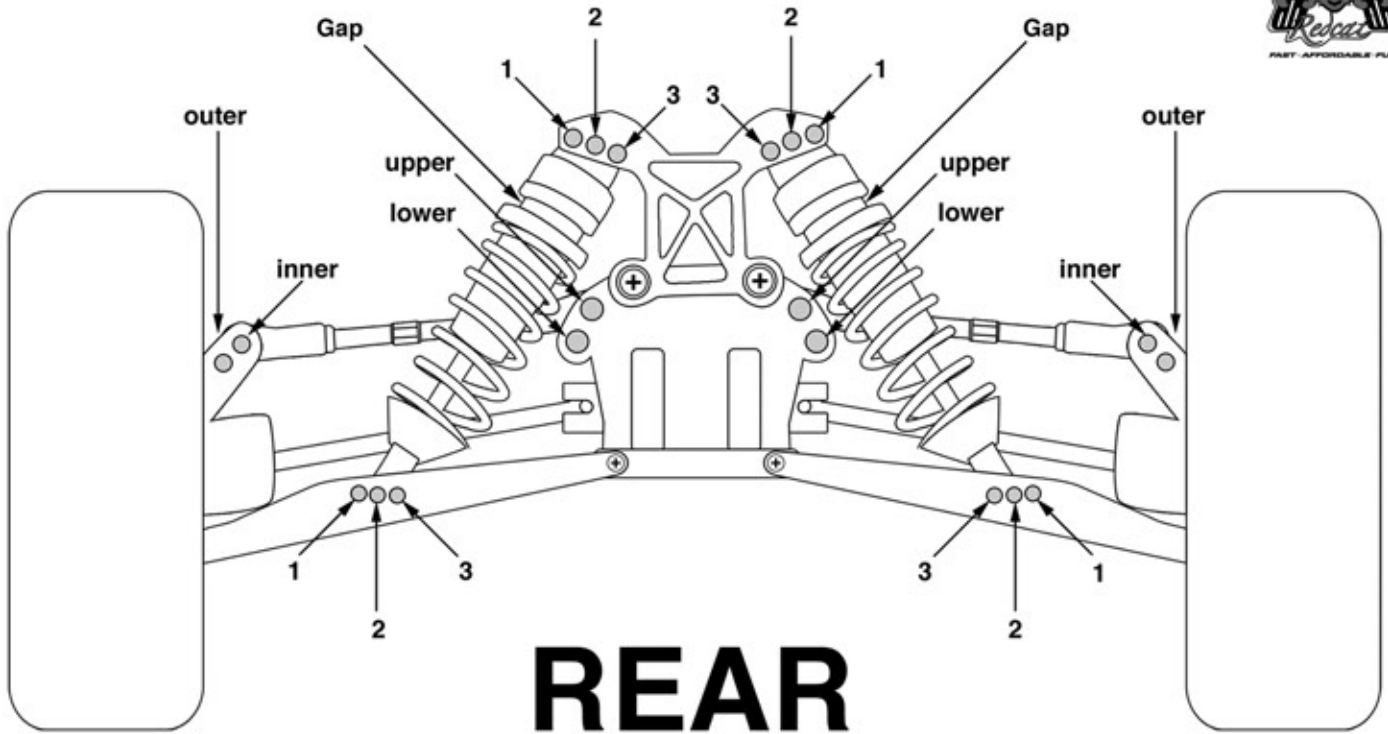
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# SETUP SHEET


**Shock Position:**

Top: 1  2  3   
 Bottom: 1  2  3

Shock oil: \_\_\_\_\_ wt.

Spring pre-load "Gap": \_\_\_\_\_ in.

Ride Height Front: \_\_\_\_\_ in.

Piston inserts: \_\_\_\_\_ (1, 2, or 3 holes)

Pinion Gear: \_\_\_\_\_ teeth

Spur Gear: \_\_\_\_\_ teeth

Spur Gear: metal  plastic

Rear Diff Oil: \_\_\_\_\_ wt.

**Upper Link Position:**

Inside: Upper  Lower   
 Outside: Inner  Outer

**Camber Deg:**

Negative: \_\_\_\_\_ degrees  
 Positive: \_\_\_\_\_ degrees

**Toe:**

In: \_\_\_\_\_ degrees  
 Out: \_\_\_\_\_ degrees

**Fuel:**

Brand: \_\_\_\_\_  
 Nitro content: \_\_\_\_\_ %  
 Oil content: \_\_\_\_\_ %

**Glow Plug: \_\_\_\_\_**

Hot  Medium  Cold

Tires: \_\_\_\_\_.

Inserts: \_\_\_\_\_.

# PERFORMANCE UPGRADES

Redcat Racing offers many parts upgrade options that are geared toward hardcore performance. Performance that makes your hair stand on end and your blood boil. Hardcore Redcat performance! Performance that allows you to blast around the back yard or track while leaving everyone else in the dust! Performance that allows you to take that big jump you USED TO break parts on! I'm talking about aluminum! Redcat offers many aluminum performance upgrades that not only add durability, but precision. The kind of precision, and added tune ability, impossible to achieve with stock plastic parts. I'm talking hardcore performance aluminum upgrades.

To see which performance upgrades are available for your model, go to: [www.redcatracing.com](http://www.redcatracing.com)



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