



TRAXXAS

**NITRO
SPORT**

OPERATING INSTRUCTIONS

COVERS MODEL 45104

WARNING!

Carefully read and follow all instructions in this and any accompanying materials to prevent serious damage to your model. Failure to follow these instructions will be considered abuse and/or neglect.

Introduction

Thank you for purchasing the Traxxas Nitro Sport. This manual contains the instructions you will need to operate and maintain your Nitro Sport. **Look over the manual and examine the Nitro Sport carefully before running it.** If for some reason you think the Nitro Sport is not what you wanted, then do not continue any further. **Your hobby dealer absolutely cannot accept a Nitro Sport for return or exchange after it has been run.**

Please read **ALL** of the operating instructions and precautions before attempting to drive the Nitro Sport. Even if you are an experienced R/C enthusiast, continue reading to learn about Nitro Sport's unique features. Pay special attention to the mechanical and safety precautions outlined in the manual.

If you have any questions about your model, or its operation, call the Traxxas Technical Support Line toll-free at 1-888-TRAXXAS (1-888-872-9927); outside the U.S., call 972-265-8000. Technical support is available Monday through Friday, from 8:30am to 9:00pm Central Standard Time. Technical assistance is also available through our website at Traxxas.com (e-mail us at support@Traxxas.com). We hope that you will enjoy many hours of fun with your new Nitro Sport.

Fuel

It's imperative that you use the correct fuel in your Pro.15 engine for maximum performance and engine life. Traxxas Top Fuel® Power Plus™ should be used to ensure correct engine lubrication, performance, and ease of tuning.

- Top Fuel is the only fuel which is 100% certified for use in Traxxas engines.
- Traxxas Top Fuel is made with just the right balance of natural and synthetic lubricants to allow excellent throttle response and the best top-end performance, without sacrificing long-term durability.



You may use 10% or 20% nitro-content fuel. Try to use the same percentage all the time. Avoid switching back and forth between fuels. We recommend that if you break in your engine on 20% fuel that you stick with that percentage. If you do move to a higher or lower percentage, make sure you readjust your fuel mixture to compensate.

Can other brands of fuel be used besides Top Fuel? There are other fuels that can provide satisfactory performance; however, there could be long-term costs in the form of decreased engine performance, loss of tuning ease, and shorter engine life. Only use fuels that contain both castor and synthetic oil.

Everyone has an opinion or a claim to make about fuel. The engineering team at Traxxas has spent years developing Traxxas engines. No one knows more about the specific fuel requirements of Traxxas engines than Traxxas engineers. We strongly urge you not to take chances with your engine investment and use the Traxxas fuel made for Traxxas engines.

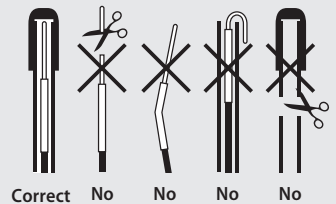
PERSONAL SAFETY PRECAUTIONS

Every precaution outlined in this manual needs to be followed to help ensure safe operation. Operate your model sensibly and with care and it will be exciting, safe, and fun for you and your spectators. Failure to operate your model in a safe and responsible manner could result in property damage and serious injury. You alone must see to it that the instructions are followed and the precautions are adhered to.

The Nitro Sport is not intended for use by children without the supervision of a responsible adult. Traxxas shall not be liable for any loss or damages, whether direct, indirect, special, incidental, or consequential, arising from the use, misuse, or abuse of this product and any chemical or accessory required to operate this product.

- Nitro Sport is very fast! Children under 16 years of age and inexperienced drivers should not operate the Nitro Sport without the supervision of a responsible and knowledgeable (experienced) adult.
- **Model engine fuel is dangerous and highly poisonous.** Always follow all directions and precautions printed on the fuel container. Model engine fuel is poisonous to humans and animals. Drinking the fuel can cause blindness and death. Handle with care and respect.
- Model engine fuel, especially when in a fuel dispensing bottle, may look like a cool drink to a child. **Keep all fuel out of the reach of children at all times. Do not place fuel containers on the ground where children can reach them while you are driving.**
- Model engine fuel is flammable. Never allow smoking, sparks, heat, or flame in the presence of fuel or fuel vapors.
- The engine, brakes, and exhaust system may become extremely hot during use. Be careful not to touch these parts, especially when refueling or stopping the engine.
- Prolonged exposure to the engine exhaust can be harmful. Avoid breathing the engine exhaust. Always run your Nitro Sport outdoors, in a well-ventilated area. Never run the engine indoors.
- Do not operate your Nitro Sport at night or anytime your line of sight to the model may be obstructed or impaired in any way.
- Never operate your Nitro Sport in crowds of people or busy pedestrian areas. Nitro Sport is very fast and could cause injury to those unaware of its presence. Keep small children at a safe distance away from the operating area.
- Because Nitro Sport is controlled by radio, it is subject to radio interference from many sources beyond your control. Since radio interference can cause momentary loss of control, always allow a safety margin in all directions around your model to prevent collisions.
- The engine can be loud. If the noise makes you uncomfortable, wear ear protection. Be considerate of your neighbors by not running your model early in the morning or late in the evening.
- Do not kink the antenna wire. Kinks in the antenna wire will reduce range.
- Do not cut the antenna "stinger" or any other part of the antenna wire. Cutting the antenna will reduce range.

- You must extend the antenna wire in the model as far as possible for maximum range. In doing so, the antenna wire will be extended outside of the vehicle body. Do not wrap or coil the antenna wire to keep it from extending out of the body.
- Do not allow the antenna wire to extend outside the body without the protection of an antenna tube, or the antenna wire may incur crash damage that could reduce range.
- **Most importantly, use good common sense at all times.**



Batteries and Battery Charging

Your model uses rechargeable batteries that must be handled with care for safety and long battery life. Make sure to read and follow all instructions and precautions that were provided with the battery packs and your charger. It is your responsibility to charge and care for the battery packs properly. In addition to your battery and charger instructions, here are some more tips to keep in mind.

- Use the supplied charger to charge the included battery. See "Charging the EZ-Start Battery" on page 6.
- Never leave batteries to charge unattended.
- Allow the battery pack to cool off before charging.
- Do not use battery packs that have been damaged in any way.
- Do not use battery packs that have damaged wiring, exposed wiring, or a damaged connector.
- Children should have responsible adult supervision when charging and handling batteries.
- Only use approved chargers for NiMH battery packs (such as Part #2921 or the Traxxas EZ-Peak Plus, Part #2933). Do not exceed the maximum charge rate of 1 amp.
- Do not short-circuit the battery pack. This may cause burns and severe damage to the battery pack.
- Do not burn or puncture the batteries. Toxic materials could be released. If eye or skin contact occurs, flush with water.
- Store the battery pack in a dry location, away from heat sources and direct sunlight.
- Nickel-metal hydride (NiMH) batteries must be recycled or disposed of properly.

Recycling Your Traxxas Power Cell NiMH Battery

Traxxas strongly encourages you to recycle your Power Cell battery when it has reached the end of its useful life. Do not throw your battery in the trash. All Power Cell battery packs display the RBRC (Rechargeable Battery Recycling Corporation) icon, indicating they are recyclable. To find a recycling center near you, ask your local hobby dealer or visit www.call2recycle.org.

Fuel Bottle

Fuel is usually purchased by the gallon or quart, so a smaller bottle with a dispensing tube is required to fill the fuel tank. The fuel tank in the Nitro Sport has a capacity of 75cc. The fuel bottle should always be capped to prevent the fuel from evaporating and becoming contaminated with debris or moisture. The alcohol and nitro contents of the fuel will evaporate, thus upsetting the fuel balance and spoiling the fuel. Do not use old or dirty fuel!



Included Fuel Bottle
(Part #5001)

Other Required Equipment

To operate the Nitro Sport, you will need these additional items. All of these items should be available from your hobby shop.

1. 8 AA batteries: 4 in the transmitter and 4 for the receiver
2. Small Phillips-head and flat-head screwdrivers (for adjustments)
3. After-run oil (to protect the engine from corrosion)

The TQ 2.4GHz Radio System

Your Nitro Sport Model 45104 is equipped with the Traxxas TQ 2.4GHz transmitter. The transmitter has two channels: channel one operates the steering, and channel two operates the throttle. The receiver inside the model has three output channels. Your model is equipped with two servos and a receiver.

2.4GHz Spread Spectrum – This model is equipped with the latest R/C technology. Unlike AM and FM systems that require frequency crystals and are prone to frequency conflicts, the TQ 2.4GHz system automatically selects and locks onto an open frequency, and offers superior resistance to interference and “glitching.”

Current – Current is a measure of power flow through the electronics, usually measured in amps. If you think of a wire as a garden hose, current is a measure of how much water is flowing through the hose.

Frequency band – The radio frequency used by the transmitter to send signals to your model. This model operates on the 2.4GHz direct-sequence spread spectrum.

mAh – Abbreviation for milliamp hour, a measure of the capacity of the battery pack. The higher the number, the longer the battery will last between recharges.

Neutral position – The standing position that the servos seek when the transmitter controls are at the neutral setting.

NiCad – Abbreviation for nickel-cadmium. The original rechargeable hobby pack, NiCad batteries have very high current handling, high capacity, and can last up to 1000 charging cycles. Good charging procedures are required to reduce the possibility of developing a “memory” effect and shortened run times.

NiMH – Abbreviation for nickel-metal hydride. Rechargeable NiMH batteries offer high-current handling and much greater resistance to the “memory” effect. NiMH batteries generally allow higher capacity than NiCad batteries. They can last up to 500 charge cycles. A peak charger designed for NiMH batteries is required for optimal performance.

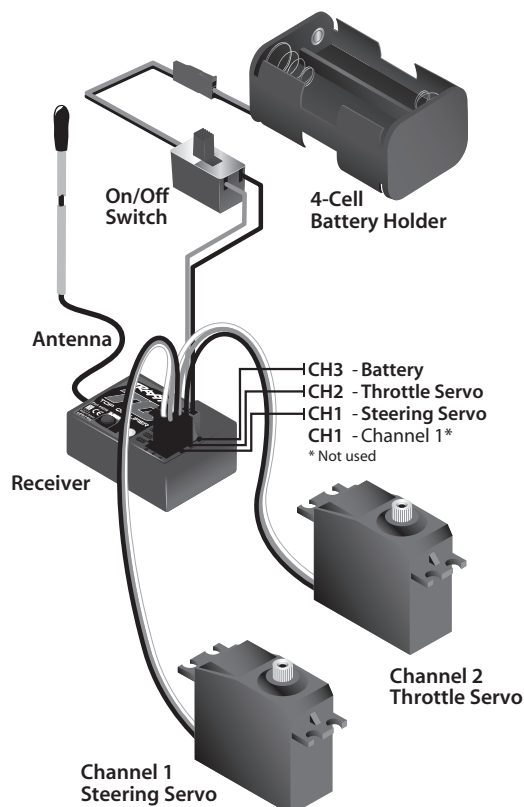
Receiver – The radio unit inside your model that receives signals from the transmitter and relays them to the servos.

Servo – Small motor units in your model that operates the steering and throttle mechanisms.

Transmitter – The hand-held radio unit that sends throttle and steering instructions to your model.

Trim – The fine-tuning adjustment of the neutral position of the servos, made by adjusting the steering trim knob on the face of the transmitter.

2-channel radio system – The TQ radio system, consisting of the receiver, the transmitter, and the servos. The system uses two channels: one to operate the throttle and one to operate the steering.

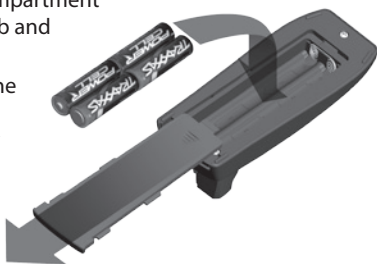


Installing Transmitter Batteries

Your TQ 2.4GHz transmitter uses 4 AA batteries. The battery compartment is located in the base of the transmitter.

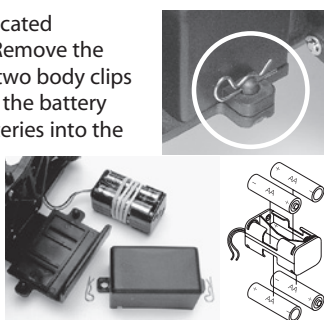
1. Remove the battery compartment door by pressing the tab and lifting the door up.
2. Install the batteries in the correct orientation as indicated in the battery compartment.
3. Reinstall the battery compartment door and snap it closed.
4. Turn on the transmitter and check the status LED for a solid green light.

If the status LED flashes red, the transmitter batteries may be weak, discharged, or possibly installed incorrectly. Replace with new or freshly charged batteries. The power indicator light does not indicate the charge level of the battery pack installed in the model. Refer to the LED Codes section on page 5 for more information on the transmitter's status LED codes.



Installing Receiver Batteries

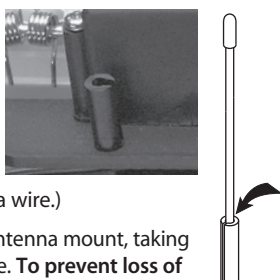
The receiver battery holder is located underneath the battery cover. Remove the battery cover by removing the two body clips from the posts on both sides of the battery holder. Install 4 AA alkaline batteries into the battery holder. Place the battery holder into the battery cover with the cushioning foam. Secure the battery cover to the chassis using the two body clips as shown.



Antenna Setup

The receiver antenna and antenna tube must be properly installed before operating your model. The antenna tube has been precisely cut to match the length of the antenna wire. Follow these steps to install the antenna and antenna tube:

1. Locate the plastic antenna tube supplied with the model. Slide the antenna wire into the antenna tube to its full extent. (When fully inserted, the wire should reach to approximately 1/2 inch below the tube cap. Do not leave any slack in the antenna wire.)
2. Insert the antenna tube into the antenna mount, taking care not to crimp the antenna wire. **To prevent loss of radio range, do not kink or cut the black wire, do not bend or cut the metal tip, and do not bend or cut the white wire at the end of the metal tip. Do not shorten the antenna tube.**



Radio System Rules

- Always turn your TQ 2.4GHz transmitter on first and off last. This procedure will help to prevent your model from receiving stray signals from another transmitter, or other source, and running out of control. Your model has electronic fail-safes to prevent this type of malfunction, but the first, best defense against a runaway model is to always turn the transmitter on first and off last.
- In order for the transmitter and receiver to bind to one another, the receiver in the model must be turned on within 20 seconds of turning on the transmitter. The transmitter LED will flash fast red, indicating a failure to link. If you miss it, simply turn off the transmitter and start over.

- Always have the transmitter and receiver turned on before you start the engine. Never turn the radio system off while the engine is running. The on/off switch in the model only turns the receiver on and off. It does not turn off the engine.
- Always use new or freshly charged batteries for the radio system. Weak batteries will limit the radio signal between the receiver and the transmitter. Loss of the radio signal can cause you to lose control of your model.



Radio Basic Adjustments



Steering Trim

The steering trim knob located on the face of the transmitter adjusts the neutral (center) point of the steering channel. If your model pulls to the right or left when the steering wheel is centered, turn the knob until the model drives straight when the steering wheel is centered.

Servo Reversing

The TQ transmitter has been programmed with the correct servo direction settings for your model and should not require adjustment. *These instructions are for reference and troubleshooting only.*

Reversing a channel reverses the direction of the corresponding servo. For example, if you turn the steering wheel to the right and the model turns left, Channel 1 would need to be reversed to correct the servo direction. Use the following procedures to reverse the steering or throttle channel if necessary. *Servo reversing should only be required if you accidentally reset the direction of a channel. Do not reverse the throttle or steering channels unless necessary.*

Note: Before performing these procedures, make sure that both the transmitter and receiver are powered on.

Steering reversing procedure:

1. Press and hold the SET button on the transmitter for two seconds. The status LED will flash green.
2. Turn and hold the steering wheel to the full left or full right position (it does not matter which position you choose).
3. While holding the steering wheel in position, press the SET button to reverse the channel.
4. The channel is now reversed. Confirm correct servo operation before running your model.

Throttle reversing procedure:

1. Press and hold the SET button on the transmitter for two seconds. The status LED will flash green.
2. Move and hold the throttle trigger to the full forward or full brake position.
3. While holding the throttle trigger in position, press the SET button to reverse the channel.
4. The channel is now reversed. Confirm correct servo operation before running your model.



Warning: Changing the direction of the throttle servo will also change its neutral position. Be certain to confirm the throttle servo properly closes the engine's throttle opening when the transmitter's trigger is at neutral.

Using the Radio System

The TQ 2.4GHz Radio System has been adjusted at the factory for correct operation with your model. The adjustment should be checked before running the model, in case of movement during shipping. Follow these steps:

1. Turn the transmitter switch on. The status LED on the transmitter should be solid green (not flashing).
2. Turn on the receiver switch in the model. The switch is located on the rear shock tower.
3. Position the model so that its front wheels are off the ground.
4. Turn the steering wheel on the transmitter back and forth and check for rapid operation of the steering servo. Also, check that the steering mechanism is not loose or binding. If the steering operates slowly, check for weak receiver batteries.
5. When looking down at the model, the front wheels should be pointing straight ahead. If the wheels are turned slightly to the left or right, slowly adjust the steering trim control on the transmitter until they are pointing straight ahead.
6. Operate the throttle trigger on the transmitter and check for rapid operation of the throttle servo. When the throttle trigger is pulled back, the carburetor should open. When the throttle trigger is pushed all the way forward, the brake should lock.
7. Once adjustments are made, turn off the receiver on your model, followed by the hand-held transmitter.



The TQ 2.4GHz transmitter has a directional antenna. For maximum range, hold the antenna upright and pointed in the direction of the model. Pointing the transmitter away from the model will reduce radio range.



Range-Testing the Radio System

Before each running session with your model, you should range-test your radio system to ensure that it operates properly.

1. Turn on the radio system and check its operation as described in the previous section.
2. Have a friend hold the model with the engine off.
3. Walk away from the model with the transmitter until you reach the farthest distance you plan to operate the model.
4. Operate the controls on the transmitter once again to be sure that the model responds correctly.
5. Do not attempt to operate the model if there is any problem with the radio system or any external interference with your radio signal at your location.

Higher Speeds Require Greater Distance

The faster you drive your model, the more quickly it will near the limit of radio range. At 50mph, a model can cover 73 feet every second! It's a thrill, but use caution to keep your model in range. If you want to see your model achieve its maximum speed, it is best to position yourself in the middle of its running area, not the far end, so you drive the model toward and past your position. In addition to maximizing the radio's range, this technique will keep your model closer to you, making it easier to see and control.

No matter how fast or far you drive your model, always leave adequate space between you, the model, and others. Never drive directly toward yourself or others.

TQ 2.4GHz Binding Instructions

For proper operation, the transmitter and receiver must be electronically 'bound.' **This has been done for you at the factory.** Should you ever need to re-bind the system or bind to an additional transmitter or receiver, follow these instructions. Note: the receiver must be connected to a 4.8-6.0v (nominal) power source for binding and the transmitter and receiver must be within 5 feet of each other.

1. Press and hold the SET button on the transmitter.
2. Turn on the transmitter and release the SET button. The status LED will flash red slowly, indicating that the transmitter is in bind mode.
3. Press and hold the LINK button on the receiver.
4. Turn on the vehicle and release the LINK button. The LED on the receiver will flash red, indicating that the receiver is in bind mode.
5. When the LEDs on both the transmitter and the receiver turn solid green, the system is bound and ready for use. Confirm that the steering and throttle operate properly before driving your model.

Transmitter LED Codes

LED Color / Pattern	Name	Notes
Solid green	Normal Driving Mode	See page 4 for information on how to use the transmitter controls.
Slow red (0.5 sec on / 0.5 sec off)	Binding	See this page for more information on binding.
Flashing medium red (0.25 sec on / 0.25 sec off)	Low Battery Alarm	Put new batteries in the transmitter. See page 4 for more information.
Flashing fast red (0.125 sec on / 0.125 sec off)	Link Failure / Error	Transmitter and receiver are no longer bound. Turn the system off and then back on to resume normal operation. Find source of the link failure (i.e., out of range, low batteries, damaged antenna).

Receiver LED Codes

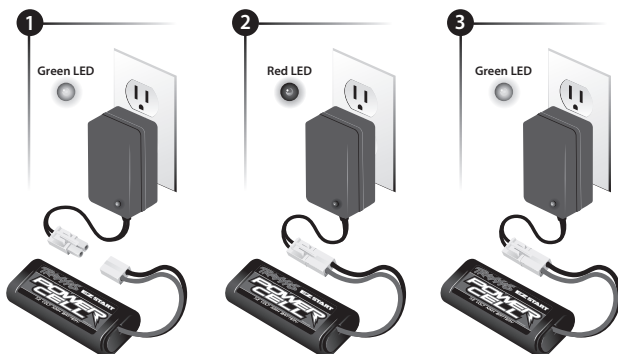
LED Color / Pattern	Name	Notes
Solid green	Normal Driving Mode	See page 4 for information on how to use your transmitter controls.
Slow red (0.5 sec on / 0.5 sec off)	Binding	See this page for more information on binding.
Flashing fast red (0.125 sec on / 0.125 sec off)	Fail-Safe / Low-Voltage Detect	Consistent low voltage in the receiver triggers Fail Safe so that there is enough power to center the throttle servo before it completely loses power.

Preparing to Run

Charging the EZ-Start® battery

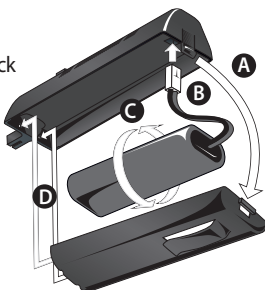
The included charger can be used to charge the included battery pack. Do not leave the battery unattended while charging.

1. Plug the charger into the wall. The LED on the charger should glow green.
2. Connect the included EZ-Start battery pack to the charger output cord. The LED will glow red, indicating the battery is charging.
3. The battery should charge for approximately 4 ½ hours. The LED will turn green when the battery is fully charged.



Installing the EZ-Start® battery

1. Press the tab in the end of the battery compartment door to open. (A)
2. Plug a fully charged 7.2-volt battery pack into the connector inside. (B)
3. Twist the battery 2 or 3 times to twist the battery plug wires. This helps hold the wire and battery in place when the battery is installed in the compartment. (C)
4. Install the battery into the compartment and press the wires securely into place.
5. Snap the battery compartment door back on and lock the end tab. (D)



Using the EZ-Start

Your EZ-Start controller plugs into a 4-prong receptacle on the battery cover of your Nitro Sport. When the red button on the controller is pressed, the EZ-Start motor begins to spin the engine, and power from the control unit heats the glow plug. Assuming all settings and preparations are correct, the engine should start almost immediately.

Each of the two status indicator LEDs on the handheld control unit, the Motor LED and the Glow Plug LED, should light green while starting. If either LED fails to light while starting, there is a fault indicated with that function.

If the Glow Plug LED fails to light, the glow plug may be bad, or the glow plug wire may be damaged or disconnected.

If the Motor LED fails to light and the starter fails to operate, then the EZ-Start is in protection mode.

Protection Mode

The EZ-Start uses Smart Start™ technology to monitor the condition of the system and detect failures. The controller monitors the load being placed on the EZ-Start motor. If the load becomes excessive, the system shuts off power to the motor to prevent costly damage to the motor and the controller. This may occur, for example, if the engine floods with fuel during starting. The starter spins at first, but when excessive fuel in

the combustion chamber begins to lock up the engine, the starter motor slows under the heavier load. This causes the protection circuit to shut off the power to the motor. Allow at least three minutes for the starter motor to cool and the circuit to automatically reset before continuing. Use the time to find and eliminate the condition that caused the excessive load on the starter motor.

Use a Strong Starter Battery

A weak starter battery, or one that has not been fully charged, may not deliver enough power to crank the engine over at the appropriate rpm to keep the piston from sticking at top dead center (TDC). A new engine will typically have a tight fit between the piston and the top of the sleeve. This is a tapered fit, and a tight piston sleeve fit on initial start-up is desirable for those who want the best-performing engine. Make sure you are using a good quality battery pack that is fully charged (new batteries usually require several charge cycles to reach peak voltage and full capacity). This is especially important with a new engine that needs to be broken in.

Starting the Engine

Installing the Air Filter

Remove the protective cap from the carburetor air intake. Install the rubber air filter base and pre-lubed foam element onto the carburetor intake. The foam air filter element may be cleaned and reused. **Always be sure the filter element is oiled properly before running the engine.** For the best filtration, use the type of oil made for foam air filters. Traxxas air filter oil is recommended (part #5263). Lightweight motor oil or after-run oil may also be substituted. When the element gets dirty, clean it with dish soap and rinse. Next, saturate it with oil and then squeeze out the excess oil. For extremely dusty conditions, special two or three-stage, pre-lubed filters are available from Traxxas (part #4062 and #4063).



Filling the Fuel Tank

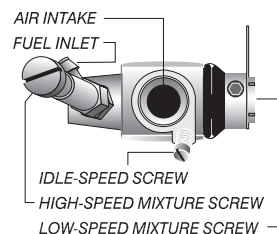
Use a small fuel bottle or bulb, such as the included fuel bottle (Part #5001), to put fuel into the tank. Only fill the tank to the bottom of the fill neck. The Nitro Sport can be carefully refueled while the engine is running.

NOTE:

Your carburetor has been factory preset for break-in. Do not re-adjust your carburetor settings unless you suspect a problem. The following steps are for reference only.

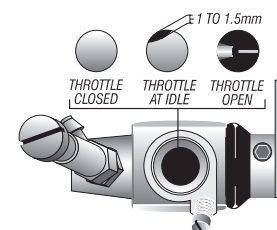
High-Speed Mixture Setting

The high-speed mixture screw controls how much fuel enters the engine during mid and high-speed operation. Turn the high-speed mixture screw clockwise by hand until it stops (**do not tighten or the needle may be damaged**). Then, turn the mixture screw counterclockwise 2½ turns.



Setting the Idle Speed

The idle screw regulates the throttle opening to control the idle speed. The throttle opening at idle should be set as shown in the drawing. The opening should be 1 to 1½ millimeters at the widest point in the opening. The engine may not idle well until it is warmed. Always use the idle speed adjustment screw to control engine idle.



Low-Speed Mixture Setting

This screw meters the fuel at low speeds. The low-speed mixture screw is located in the end of the carburetor, inside the throttle arm. This screw controls how much fuel enters the engine at idle

and low throttle. This adjustment will smooth the idle and improve acceleration to mid-speed. Make this adjustment with the throttle closed, after setting the idle. **Gently** turn this screw clockwise until it stops against the needle seat. Be very careful. It's difficult to know when the needle has seated due to the thread-holding material on the needle's thread. **Overtightening of the screw may result in damage to the needle seat.** Now turn the low-speed mixture screw counterclockwise 1¾ turns.

Shutting Off the Engine

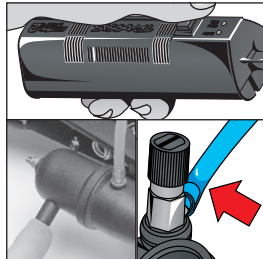
Before starting the engine, it is important to know how to shut it off. The correct method is to pinch and hold the carburetor's fuel line at idle speed, until the engine dies.

Starting the Engine

Before you start your engine for the first time, make sure you have read all instructions and precautions in this manual. Pay close attention to the break-in instructions in the next section, and make sure you have read and understood them before you run your engine.

Your engine must be at room temperature (70°F) or above the first time you start it. If it's cooler than room temperature outside, remove all fuel and keep your model indoors until you're ready to start it and then take it outside. We do not recommend running the model in temperatures below 35°F.

1. Turn on the radio system.
2. Make sure the throttle trigger on the transmitter is in the idle (neutral) position.
3. Connect the EZ-Start controller.
4. Press the starter button in short two-second bursts and watch for fuel moving through the fuel line up to the carburetor. Watch closely! The fuel moves very fast. If the fuel doesn't move through the line within 5 seconds, prime the engine by briefly (one or two seconds) covering the exhaust outlet with your finger until the fuel is just visible in the carburetor fuel line. Watch carefully! If the engine is primed too long, it will flood with fuel and stop turning.
5. Once fuel reaches the carburetor, the engine should quickly start and idle.
6. Disconnect the EZ-Start controller from the model.
7. Proceed with the engine break-in.
8. Do not rev your engine with no load (wheels off the ground).



Breaking-in the Engine (Very Important!)

Once your engine is running, it must be broken-in. The key to breaking-in your engine is patience. **The break-in time will take about 1 to 1½ hours.** During the break-in period, your engine may appear to malfunction with symptoms such as stalling, inconsistent performance, and fouled glow plugs. Don't give up on it! These are just "break-in pains" that every new engine has to go through. They will disappear once you get through the break-in period. **Just keep it running, and throttle on and off as smoothly as you can. Sudden bursts or releases of the throttle can stall your engine.** Resist the temptation to tune the engine for performance and/or run for extended times at wide open throttle. Soon, after about the fourth tank of fuel, your patience will pay off with solid, consistent performance.

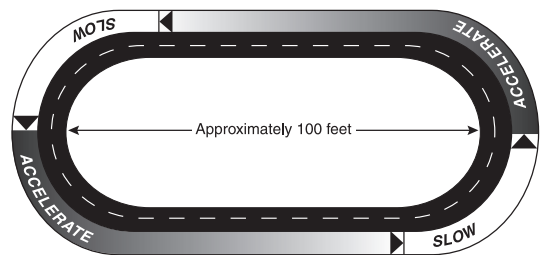
During Break-in...

- Special break-in fuels are not required.
- Drive the model on a smooth hard surface.
- If possible, avoid running on very hot, humid days.
- Run with the body off for extra engine cooling.
- Turn the mixture screw (needle) clockwise (in) to lean the mixture and counterclockwise (out) to richen the mixture.
- Do not allow the fuel tank to run completely empty, possibly leading to a burned plug. An extremely low fuel level causes the fuel mixture to be too lean.
- Keep extra glow plugs handy. The break-in process, because of the engine running rich, can cause deposits to form on the glow plug, leading to failure.

The First Tank of Fuel

Drive the Nitro Sport on a flat, paved surface in an oval configuration. This will cause you to naturally vary your speed over the entire rpm range. During this break-in time, ease in and out on the throttle slowly to avoid stalling the engine. The goal is to simply keep it running. The fuel mixture setting may require slight adjustment to correct for different altitudes and temperature. To tell if the engine is running rich (high volume of fuel flowing through the engine), look for the following conditions:

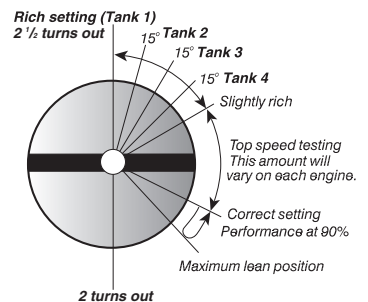
1. The engine should accelerate sluggishly.
2. There should be a thick trail of blue smoke coming from the exhaust.
3. If you do not observe the conditions above, then turn the high-speed needle out 15° (counterclockwise) and retest.
4. Do not rev the engine with the wheels off the ground. High, no-load rpms can damage the engine, usually resulting in a broken connecting rod. At the end of the first tank of fuel, stop the engine and allow it to cool for 5-10 minutes before proceeding.



Tanks Two Through Four:

Shut off the engine and allow it to cool for 5-10 minutes, then refuel. Turn the high-speed needle in 15° (clockwise). Turn on the radio system and restart the engine. Continue driving on your oval course, varying your throttle, until the second tank of fuel is used up. Repeat this process for tanks 3 and 4.

Important: Do not lean the high-speed mixture less than 2 turns out from closed (see illustration). Also, be sure to allow the engine to cool between each run.



DRIVING PRECAUTIONS

- The radio system is not waterproof. Avoid driving through puddles, wet grass, or mud. Water could damage the electronics.
- Do not continue to operate the Nitro Sport with low batteries. After the battery power drops below a certain point, the model will continue with the last command it had from the transmitter. Indications of low battery power include slow operation and sluggish servos. On the transmitter, a flashing red light indicates low transmitter batteries.
- Do not drive the Nitro Sport at night, on public streets, or in large crowds of people.
- If the truck becomes stuck, do not continue to run the engine. Remove the obstruction before continuing to drive.
- Do not attempt to push or tow objects with the Nitro Sport.
- The model is controlled by radio. It is subject to radio interference from many sources beyond your control. Since radio interference can cause momentary loss of control, allow a safety margin around the truck in order to prevent collisions.
- Use common sense whenever you are driving your model. **Intentionally driving in an abusive and rough manner will only result in poor performance and broken parts.**

Tuning Your Engine for Best Performance

The engine's performance depends on the fuel mixture. Turn the mixture needles clockwise to lean the fuel mixture and counterclockwise to richen it. Leaning the fuel mixture will increase engine power up to the engine's mechanical limits. **Never run the engine too lean (not enough fuel flow). Leaning the engine beyond the safe allowable limits will result in poor performance and engine damage.** Indications of an overly lean mixture include:

- Cutting out or sudden loss of power during acceleration.
- Overheating (temperature beyond 300°F at the glow plug).
- Little or no blue smoke coming from the exhaust.

If any of these conditions are present, stop immediately and richen the high-speed mixture 1/4 turn. The engine will probably be slightly rich at that setting and you can then re-tune for performance. Always tune for performance by starting rich and moving toward the ideal setting. Never try to tune from the lean side. There should always be a light stream of blue smoke coming from the exhaust.

Before you begin tuning, the engine should be warmed up to its normal operating temperature and running slightly rich. All final tuning adjustments must be made to the engine at its normal operating temperature. You can tell the engine is running rich by noting any of the following:

- Sluggish acceleration with blue smoke coming from the exhaust.
- There is unburned fuel spraying from the exhaust tip.
- Leaning the high-speed fuel mixture increases performance.

High-Speed Fuel Mixture Adjustment

With the engine warm and running at a rich setting, gradually lean the high-speed fuel mixture in 1/16-turn increments. Make several high-speed passes with the Nitro Sport after each adjustment to clear out the engine and note any change in performance. Continue this procedure until one of the following conditions exists:

1. There is no longer any performance improvement.
2. The engine begins to cut out at high-speed.
3. There is a sudden loss of power during acceleration.
4. The engine begins to overheat. Symptoms of overheating include:
 - Steam or smoke coming from the engine (not exhaust)
 - Hesitation or stalling during acceleration
 - Popping or clattering sound when decelerating (detonation)
 - Fluctuating idle speed
 - Temperature measurement above 300° at the glow plug

If any one of the above conditions occurs, the fuel mixture is already past the maximum safe lean setting. Richen the fuel mixture to the optimum setting by richening the high-speed needle at least 1/8 turn counterclockwise and retest. This setting will extend engine component life.

Low-Speed Fuel Mixture Adjustment

The low-speed mixture is always set after the high-speed needle is correctly adjusted. The low-speed mixture will be set using the pinch test.

1. Once the engine is warm, do several high-speed runs to confirm that the high-speed needle is set correctly.
2. Bring the vehicle in and pinch closed the fuel line going into the carburetor. The engine should run for 2-3 seconds, speed up, and then die.
3. It is very important to make several high-speed runs with the Nitro Sport between adjustments to clear out any excess fuel. Perform the pinch test immediately after. If the engine is allowed to idle for a long period of time, it could "load up" with fuel and give you an inaccurate measurement from your pinch test.
4. If the engine runs longer than 3 seconds, then lean the low-speed needle 1/16 turn, make several more high-speed runs, and retest.
5. If the engine dies immediately without speeding up, then richen the low-speed needle 1/8 turn, make several more high-speed runs, and retest.

6. If the engine dies when you try to accelerate abruptly, then the low-speed needle is probably set too lean. Richen the low-speed needle 1/8 turn, make several more high-speed runs, and retest.
7. When the low-speed needle is set correctly, the engine's throttle response should be very quick.

Idle Speed Adjustment

Once the high- and low-speed mixtures have been set, reduce the idle speed to the minimum reliable idle speed. Remember, this adjustment should be made while the engine is running at normal operating temperature. Always use the idle speed adjustment screw to control engine idle.

1. When the throttle servo is in its neutral position, the throttle slide should be stopped against the idle speed adjustment screw.
2. Turn the screw clockwise to reduce the idle speed or counterclockwise to increase it. The idle speed should be set as low as possible while still maintaining reliable running characteristics.

Fine-Tuning the Carburetor

After fine-tuning your engine at the end of the break-in procedure, no major adjustments to the fuel mixture are usually necessary. Make note of the temperature, humidity, and barometric pressure at the time you finished fine tuning your carburetor. Current weather conditions can be found online from national websites, local TV news websites, and television. This information will be considered your baseline setting. You may need to adjust your carburetor needles to compensate for changes in temperature and barometric pressure (air density) from day to day. Generally, you'll need to richen the fuel mixture when the weather is colder than your baseline temperature and the air density is higher. Lean the fuel mixture when the temperature is warmer than your baseline temperature and the air density is lower. The chart below provides general guidelines on how weather conditions affect air density when they move higher or lower than your baseline setting.

If the...	is...	then the air density is...	the overall mixture should be...
Humidity	Lower	Slightly more dense	Slightly richer
	Higher	Slightly less dense	Slightly leaner
Pressure (barometer)	Lower	Less dense	Leaner
	Higher	More dense	Richer
Temperature	Lower	More dense	Richer
	Higher	Less dense	Leaner
Altitude	Lower	More dense	Richer
	Higher	Less dense	Leaner
Nitro %	Lower		Richer
	Higher		Leaner

Tuning the Engine by Temperature

The following procedures require an optional infrared temperature probe or on-board temperature gauge (such as the Traxxas on-board temperature gauge, part #4091). The engine can be used as an effective tuning aid when you understand the relationship between engine temperature and ambient temperature.



The engine operating temperature, when tuned for maximum performance, will vary according to atmospheric conditions. The atmospheric condition that has the most influence on engine temperature is air temperature. Expect the engine temperature to vary almost in direct proportion to atmospheric temperature. Assuming you tuned the engine for the same maximum performance each day, the engine will run about twenty degrees hotter when it's ninety degrees outside than it would in seventy-degree weather. For this reason, we cannot give you a definitive temperature range that indicates the best possible engine tuning.

The temperature gauge can aid you in tuning by giving you a relative indication of how your adjustments are affecting the engine and by preventing you from exceeding maximum engine temperature. For example, as you lean the fuel mixture, the engine performance will increase along with the temperature. If you continue to lean the fuel mixture and the temperature increases but

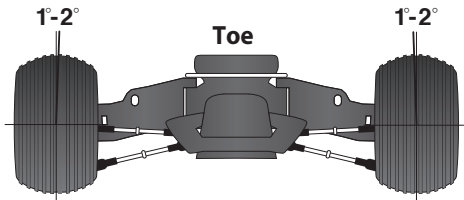
the engine performance does not change, then you have exceeded the maximum safe lean setting.

If tuning for maximum performance results in engine temperature exceeding 300°F, try to increase airflow to the engine by cutting out the rear of the body, windshield, and front valance. If the engine temperature still cannot be kept in check, richen the high-speed needle slightly.

Adjustments

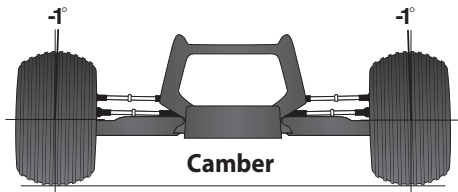
Toe-in

Geometry and alignment specifications play an important role in your truck's handling, so take the time to set them correctly. Set the steering trim on your transmitter to neutral. Now, adjust your tie rods so that both wheels are pointing straight ahead and are parallel to each other (0° toe-in). This will ensure the same amount of steering in both directions. If you run out of adjustment, then the steering servo will have to be re-centered (see "Centering your Servos" on page 10). For increased stability add 1°- 2° of toe-in to each front wheel. Use the turnbuckles to adjust the alignment.



Camber

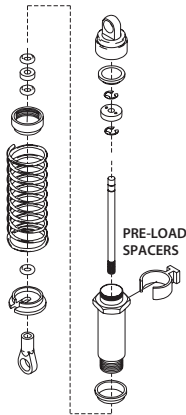
The camber angle of both the front and rear wheels can be adjusted with the camber rods (upper turnbuckles). Use a square or right-angle triangle to set the camber accurately. Adjust the front wheels to 0° of camber (wheel perpendicular to the ground). In the rear, adjust the wheels to 1° to 2° of negative camber. These adjustments should be set with the truck positioned at its normal ride height.



Shocks

The four shocks on Nitro Sport have the most influence on its handling. Whenever you rebuild your shocks or make any changes to the pistons, springs or oil, always do it carefully and in pairs (front or rear). Piston selection depends on the range of oil viscosities that you have available. For example, using a two-hole piston with a lightweight oil will, at one point, give you the same damping as a three-hole piston with heavier oil. We recommend using the two-hole pistons with a range of oil viscosities from 10W to 50W (available from your hobby shop). The thinner viscosity oils (30W or less) flow more smoothly and are more consistent, while thicker oils provide more damping. Use only 100% pure silicone shock oil to prolong seal life.

The ride height for Nitro Sport can be adjusted by adding or removing the clip-on spring pre-load spacers. Instead of adding spacers to increase stiffness, use stiffer springs. Adjust the ride height so that the suspension arms are slightly above being parallel to the ground. Observe how the Nitro Sport handles in turns. If it is picking up the inside rear wheel in hard turns, then stiffen the front



suspension. If it is picking up the inside front wheel in hard turns, then stiffen the rear suspension. Proper set-up will add stability and help prevent roll-overs.

Gear Ratios

A unique Nitro Sport feature is the ability to change the gear ratios. The final drive ratio of the gearbox is 2.81 to 1. Use the following formula to calculate the overall ratio:

Number of Spur Gear Teeth / Number of Clutch Bell Gear Teeth x 2.81 = Final Drive Ratio

Nitro Sport comes with a 70-tooth spur gear and a 20-tooth pinion (clutch bell) gear. This combination will provide the best overall acceleration and top speed. If you want more acceleration and less top speed, then use a smaller clutch bell gear (fewer teeth). For more top speed, use a larger clutch bell gear.

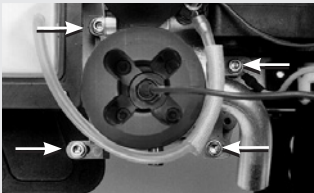
Pinion	Spur Gear	Final Drive	
22	66	8.43:1	TOP SPEED ↑ ↓ ACCELERATION
22	70	8.94:1	
22	72	9.19:1	
20	70	9.83:1	
20	72	10.11:1	
18	70	10.92:1	
18	72	11.24:1	
16	70	12.27:1	
16	72	12.64:1	

Adjusting the Slipper Clutch

The Nitro Sport features an adjustable slipper clutch on the spur gear to protect the drivetrain from sudden shock loads (such as landing off of jumps with the engine at full throttle). Under normal conditions, the slipper clutch should not slip. Before adjusting the slipper clutch, turn the model off. Do not adjust the slipper clutch while the engine is running.

Use the supplied wrench to tighten the slipper nut (clockwise) until it stops, and then back the nut out 1/4 of a turn. If you notice any decrease in performance after making changes to the slipper clutch adjustment, then it may be too loose. The slipper must not be allowed to slip during normal acceleration or the slipper could be damaged.

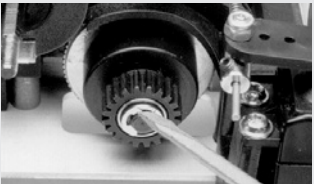
Changing the Clutch Bell and Spur Gears



Remove the rubber exhaust pipe and the tuned pipe. Remove the electric starter drive. Loosen the four 3x8mm cap-head screws, that hold the slotted adjusting plates to the engine mount.



Remove the 4mm nylon locknut and the spring from the slipper clutch. Try to remove the slipper clutch as one assembly by holding the pressure plates together with your thumb and index finger.



Remove the large E-clip on the clutch shaft and the clutch bell gear. Remove the ball bearings and install them in the new clutch bell gear. Reinstall the clutch bell gear and E-clip. Note: Smaller clutch bell gears use smaller ball bearings. Refer to your parts list for the correct bearings. Reinstall the spur gear on the top shaft and secure it with the 4mm locknut.



Slide a strip of thin note paper between the spur gear and the clutch bell gear. Push the clutch bell gear against the spur gear and tighten the 3x8mm adjusting plate screws. Remove the paper; the gear mesh should be correctly adjusted.

Centering your Servos

Whenever your radio system has been removed for service or cleaning, the servos must be re-centered prior to installing the radio system in the model. If the radio system is installed in the truck, disconnect the servo horns from the servos.

Connect the steering servo to channel 1 on your receiver and the throttle servo to channel 2. The white wire on each servo cable is positioned towards the center. Connect the red and black cable from the battery holder to the "batt" terminal on the receiver. The red wire is positive and the black wire is negative.

Place fresh AA batteries in the transmitter and turn the power switch on. Turn the Steering Trim knob to the center position. Now install fresh AA batteries into the battery holder and turn the power switch to the "on" position. The servos will automatically jump to their center positions. Turn off the battery holder switch followed by the transmitter. The servos are now ready to be installed. Be careful not to move the servo shaft when reinstalling the servo horns.

After-Run Procedure

You must perform after-run maintenance on your engine whenever the model will be stored for longer than a few hours. Taking the time to prepare your engine for storage will reward you with longer engine life, easier starting, and better performance.

When a nitro engine is shut off, some excess unburned fuel remains in the engine. The methanol in model engine fuel is hygroscopic, which means it easily attracts and absorbs moisture. This moisture can cause rust and corrosion on the steel engine parts (crankshaft, bearings, wrist pin, and starter shaft) if the fuel is not removed from the engine. There are after-run oil products available from your hobby dealer or you can use WD-40™, a common household lubricant. To ensure your engine is protected from internal corrosion, use the following procedure:

1. Shut off the engine by pinching the fuel line closed. This allows most of the excess fuel to be consumed by the engine. Be sure the throttle is in the idle position. You may have to pinch the fuel line closed for several seconds before the engine stops.
2. Completely empty the fuel tank. Use your fuel-dispensing bottle to suck out the old fuel. Do not mix the old fuel with your fresh fuel supply. If you leave fuel in the tank, transporting or handling your model may cause fuel to run into the engine.
3. With the fuel tank empty and the throttle at the idle position, try to start the engine. The engine will most likely start and run for a few seconds as it uses up any fuel remaining in the engine and fuel lines.
4. Once the engine stops, clean the outside of the engine with compressed air or spray motor cleaner. Once the engine is clean and dry, remove the glow plug power wire, glow plug, and air filter.
5. Open the throttle fully and spray a one-second burst of WD-40 into the carburetor and into the glow plug hole (**Caution!** Wear safety glasses to prevent spray from getting into your eyes). If you are using after-run oil, follow the manufacturer's instructions.
6. Place a rag or paper towel over the engine to catch any WD-40 or after-run oil that may come out of the carburetor or glow plug hole.
7. Connect the EZ-Start™ controller to the model and spin the engine for 10 seconds.
8. Remove the rag or paper towel and repeat steps 5–7 two more times.
9. Clean and re-oil the air filter so it will be ready for use next time.
10. Replace the glow plug, reconnect the glow plug power wire, and reinstall the air filter.

Maintenance

Nitro Sport requires timely maintenance in order to stay in top running condition. **Neglecting the maintenance could allow dirt, deposits, and moisture to build up inside the engine, leading to internal engine failure.** The following procedures should be taken very seriously.

After each hour of running:

- Clean and re-oil the air filter. The instructions for this procedure are on page 6. **We cannot stress enough the value of cleaning your air filter at the scheduled intervals.** The cleanliness and condition of your air filter directly influences the running life span of your engine. **Do not skip air filter maintenance!**

- Clean the outside of the engine of accumulated dirt, oil, and grime. Accumulated grime will decrease the engine's ability to cool itself.
- Tighten the wheel nuts (especially on the left side).

After each running session:

- Perform after-run maintenance on the engine. This clears the engine of destructive moisture and other corrosive deposits. **This is extremely important for the life of the engine.**
- Inspect the gears for wear, broken teeth, or debris lodged between the teeth.
- Inspect the vehicle for obvious damage or wear. Look for:
 1. Loose or missing screws
 2. Cracked, bent, or damaged parts
 3. Cut or loose wiring
 4. Cut or kinked fuel lines
 5. Signs of fuel leakage

Other periodic maintenance:

- **Connecting rod:** The connecting rod should be replaced when the piston and sleeve are replaced. Also replace the piston wrist pin and G-clip whenever the connecting rod is replaced. As with other internal engine components, connecting rod life depends on engine usage and the quality and frequency of engine maintenance. Inspect the connecting rod after three gallons of fuel have been used.
- **Slipper clutch pegs** (friction material): The slipper clutch pegs will wear over time and require replacement. The life of the pegs depends on how the slipper clutch was adjusted and how the Nitro Sport was used. If the slipper will not tighten or you are seeing signs of wear on the face of the gear, then the pegs should be replaced.
- **Piston/sleeve:** The life of the piston and sleeve will vary greatly with how the engine was used and maintained. The piston and sleeve should be replaced when they no longer seal effectively (loss of compression). Symptoms include the engine being difficult to start when warm, stalling when warm, and stalling when throttle is suddenly closed to idle. Replace the wrist pin and G-clip whenever the piston and sleeve are replaced.

Engine Troubleshooting

The troubleshooting guide on the following page has been provided to help you in diagnosing and repairing common engine problems. Most difficulties with engines can be traced back to problems with adjustment, fuel quality, dirt blockage, or common parts that wear with everyday use.

Flooded Engine

The engine can become flooded if it is primed too many times during the course of a routine start up. When the engine is flooded, the EZ-Start® cannot turn the engine and it will appear to be locked. Use the following procedure to clear a flooded engine.

1. Remove the blue glow plug wire.
2. Remove the glow plug with the glow plug wrench supplied with your model. A 8mm (5/16") nut driver will also work.
3. Plug in the EZ-Start and turn the truck upside down.
4. Push the EZ-Start button for several seconds to clear the excess fuel from the combustion chamber.
5. Turn the truck over and re-install the glow plug with gasket
6. Reconnect the blue glow plug wire.
7. Remove one of the motor wires from the EZ-Start motor.
8. Push the EZ-Start button for several seconds. This lights the glow plug and burns off any remaining fuel.
9. Reconnect the EZ-Start motor.
10. Do not prime the engine. Partially open the throttle and press the EZ-Start button. The engine should start immediately.

Glow Plugs

The glow plug in your engine is a consumable item which must be replaced periodically to maintain peak performance and starting ease. To test for a leaking glow plug, place a few drops of fuel around the base of the glow plug when the engine is cool. With the engine running, look for bubbles around the glow plug. If the gasket is leaking, tighten the plug or replace the gasket.

If the "Glow Plug" LED fails to light, the glow plug may be bad or broken. However, glow plug performance can deteriorate significantly before the element actually burns in two. **The only sure way to test for a faulty glow plug is to replace it with a new**

one to see if the problem goes away. You can view the glow plug element by removing it and touching it against the engine head while pressing the EZ-Start button. The glow plug will not light unless it is grounded against the engine. Glow plugs can be damaged by particles in the combustion chamber or by running the fuel mixture excessively lean.

Traxxas makes three glow plugs. The standard hot plug (part #3230) is the stock replacement plug for Pro.15 engines. The optional super-duty (part #3232) plugs will last longer in most cases; however, it is a medium temperature plug so performance may be reduced slightly. Do not use plugs with idle bars!

Carburetor

Dirt is the main enemy to your carburetor. If you notice a sudden change in the fuel mixture (lean) and performance of your model, you may have dirt lodged in the carburetor. To dislodge a dirt particle in your carburetor, try screwing the high-speed needle all the way in and then back out to its original settings. If the engine doesn't return to normal operation, then try backing the mixture screw out and priming the engine to force fuel through the carburetor. Return the mixture screw back to its original setting. The engine will be flooded at this point, so follow the directions for relieving a flooded engine. If this fails, then the carburetor will need to be removed and cleaned with denatured alcohol. Do not blow on carburetor passages or fuel lines with your mouth. Fuel and solvents are extremely poisonous.

ENGINE TROUBLESHOOTING GUIDE

Engine will not start	1	3	7	25	8	16	13	14	21	26	19	35	36	32	
EZ-Start® motor will not turn	8	10	17												
EZ-Start® turns but engine does not	11	12	37												
Engine starts and then stalls	16	21	24		26	25	27	32							
Engine sluggish, poor performance	3	6	16	15	21			22	20		30	29	38	31	32
Engine overheats	3	4	5	6	21		23	25	26	33	34	31			
Engine chokes/hesitates at speed	1	2	16	21	23	25	26	27	20	28					
Engine stalls under hard acceleration	1	2	16	21				24	25	26					
Engine stalls around turns	1	2	27												
Engine stalls during normal driving	1	2	3	16	25	26	27	21	20	32					

1. Out of fuel.....Fill fuel tank
2. Fuel level is lowRefill fuel tank
3. Improper or contaminated fuelReplace fuel
4. Excessive nitro in the fuelUse fuel with a lower nitro content (page 2)
5. Incorrect oil content in the fuel.....Switch to a recommended brand of fuel (page 2)
6. Poor quality fuel.....Switch to a recommended brand of fuel (page 2)
7. Engine not primed.....Prime engine (page 7)
8. EZ-Start battery not charged.....Use a freshly-charged battery (page 6)
9. EZ-Start ground wire (yellow) faulty.....Clean, tighten, or replace ground wire
10. EZ-Start motor wire loose.....Check motor connections on the EZ-Start motor
11. One-way starter bearing slippingRemove EZ-Start/ Clean or replace bearing (page 12)
12. EZ-Start gears damaged.....Listen for excessive gear noise/ Replace gears/motor
13. Glow plug wire loose from glow plug.....Crimp the connector on the glow plug wire
14. Glow plug wire damaged.....Replace or repair glow plug wire
15. Leaking glow plug gasket.....Check glow plug gasket/ tighten glow plug
16. Glow plug fouled or weakCheck for two solid green lights when the EZ-Start button is pressed/ No glow plug light indicates a faulty plug/ Replace with a Traxxas part #3230, #3232, or #3232X glow plug (page 10)
17. Engine floodedClear the engine of excess fuel (page 10)
18. Engine overheated.....Allow engine to cool - find cause for overheating
19. Exhaust blocked.....Clear any obstructions

To prevent this from occurring again, insert a fuel filter in the line between the tank and the carburetor.

Piston stuck at “top dead center” (TDC)

“Top dead center” is the position where the piston is at the very top of the tapered sleeve. Occasionally, an engine can get “stuck” at this position. This is most likely to happen on new engines during break-in, but can also happen at other times. If the engine is stuck at TDC, use the following procedure to release the piston from the sleeve:

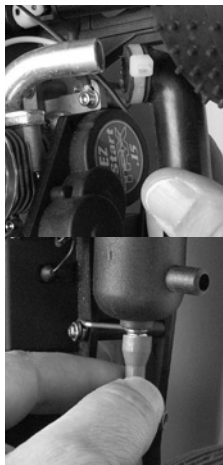
1. Remove the glow plug using the included tool or 8mm (5/16”) nut driver, and verify that the piston is at the top of its stroke.
2. Use a flat blade screwdriver to rotate the flywheel. Place the blade of the driver into one of the grooves of the flywheel and push down, turning the flywheel counterclockwise when viewed from the front. The flywheel should turn, unsticking the piston from the sleeve.
3. Put two or three drops of light machine oil into the glow plug hole to lubricate the piston and sleeve. Do not use too much oil—it will hydro-lock the engine. Verify the starter will spin the engine with the glow plug out.
4. Rotate the flywheel so the piston is at bottom dead center and replace the glow plug with the gasket. Reconnect the blue glow plug wire.
5. You should now be able to start the engine with the EZ-Start.

20. Air cleaner pluggedClean and replace air cleaner element (page 6)
21. Carburetor incorrectly adjustedReadjust carburetor to factory break-in settings (page 6)
22. High-speed fuel mixture is too rich.....Lean the high-speed mixture (page 8)
23. High-speed fuel mixture is too lean.....Richen the high-speed mixture (page 8)
24. Idle speed set too low.....Increase idle speed (page 8)
25. Fuel flow blockedCheck that all fuel lines are clear with no pin-hole leaks. Check for dirt blockage in the carburetor fuel inlet and high-speed needle seat/ Install inline fuel filter
26. Air bubble in the fuel linePrime the engine to force the air through/ Check for pinhole leaks in the fuel line
27. Insufficient fuel tank pressureReplace the pressure hose (between pipe and fuel tank)/ Clear blockage in the tuned pipe hose fitting/ Check flow to and from tank/ Check fuel tank cap seal
28. Engine overheated.....Allow engine to cool/ Find cause for overheating
29. Engine over geared for application.....Use a lower gear ratio (page 8)
30. Engine clutch slipping.....Replace clutch shoes (see engine repair section, page 13)
31. Drive system is bound.....Locate the bound item and repair
32. Engine excessively wornRepair or replace engine (page 12)
33. Cooling air to the head is blockedCut ventilation holes in the body (windshield)
34. Excessive load on the engineCheck for bound drivetrain
35. Broken clutch shoe spring.....Replace clutch shoe spring (page 13)
36. Loose flywheel.....Replace flywheel nut (page 13)
37. EZ-Start motor pinion stripped.....Replace EZ-Start motor

Rebuilding the Engine

STEP 1:

Remove the 4mm locknut from the front pipe hanger. Pull the pipe from the rear exhaust header.



STEP 2:

Unplug the blue wire from the glow plug. Remove the fuel line from the carburetor inlet and from the exhaust header pressure fitting. Disconnect the red and black wires from the EZ-Start® motor.



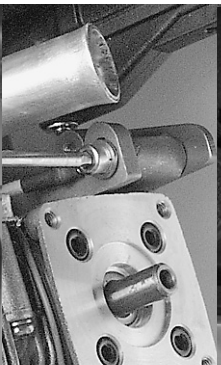
STEP 3:

Remove the EZ-Start gearbox by removing the three 3x8mm round-head machine screws.



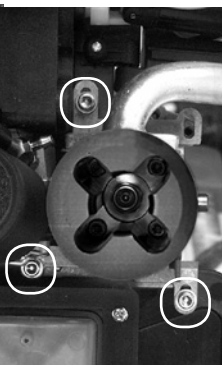
STEP 4:

Use a 2.5mm hex driver to remove the yellow ground wire from the engine mount. Move the EZ-Start wiring harness out of the way.



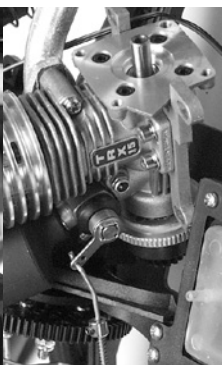
STEP 5:

Use a 2.5mm hex driver to remove the three remaining 3x10mm cap-head machine screws from the engine mount.



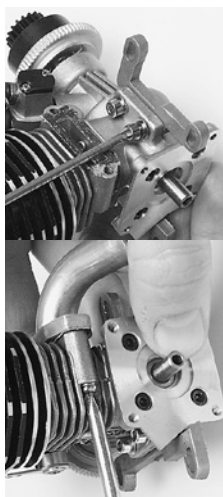
STEP 6:

Pull the engine from the chassis. Turn the engine so that the throttle linkage to the carburetor will come out.



STEP 7:

Remove the 3x23mm cap-head machine screws that fasten the header to the engine. Carefully remove the header to avoid damaging the gasket. To separate the engine from the engine mount, remove the four 3x8mm cap-head machine screws.



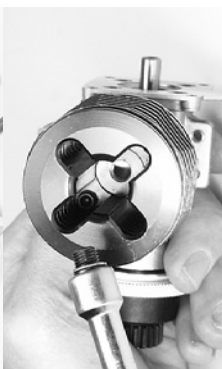
STEP 8:

Removing the carburetor is not necessary to rebuild the engine, unless you intend to replace the internal bearings of the engine. Remove the carburetor by loosening the 3mm locknut and pulling the carburetor straight up.



Changing the piston and sleeve assembly

STEP 9: Use a 5/16-inch nut driver to remove the glow plug and copper gasket.



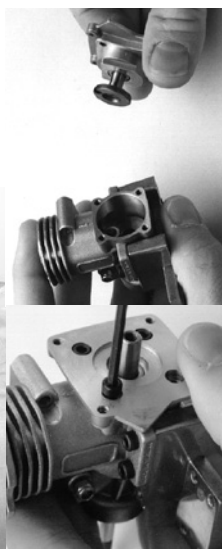
STEP 10:

Use a 2.5mm allen wrench to remove the four 3x12mm cap-head screws that fasten the cylinder head. Rock the cylinder head gently from side to side to release it from the sleeve. Note the thin aluminum head gaskets. We recommend that you replace these gaskets with new ones upon reassembly.



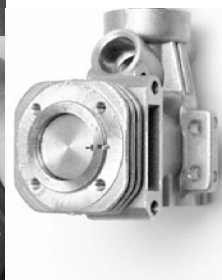
STEP 11:

Remove the backplate and the starter shaft. Replace the backplate gasket with a new one during assembly.



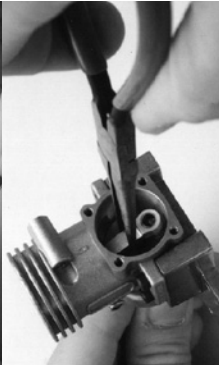
STEP 12:

The piston and sleeve are a matched set. When the piston and sleeve are disassembled, they must be reassembled in the same orientation. Use a hobby knife to scratch a mark to indicate the location of the piston in relation to the pinning of the sleeve.

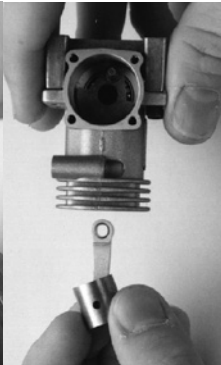




STEP 13:
Pull the sleeve straight up and out of the crankcase. If the sleeve will not move, rotate the crankshaft until the sleeve pushes up.



STEP 14:
Rotate the crankshaft to bottom dead center. Lightly grab the connecting rod with a pair of needlenose pliers and gently pull it off of the crankshaft journal.

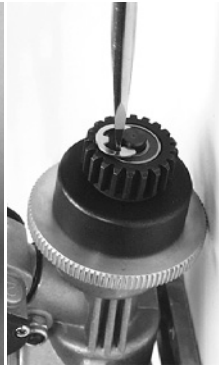


STEP 15:
Remove the connecting rod and piston through the top of the crankcase.



STEP 16:
To remove the connecting rod from the piston, use a sharp-pointed tool to remove the small metal G-clip in the side of the piston. Do not re-use the old G-clip. When installing a new connecting rod, use the supplied new G-clip.

Removing the clutch and flywheel



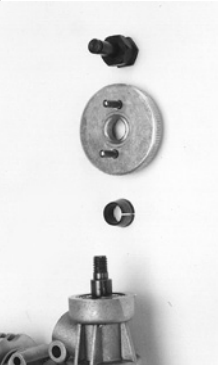
STEP 17:
It is not necessary to remove the clutch assembly unless you are servicing the clutch, crankshaft, or engine bearings. Use the tip of a small screwdriver to remove the E-clip that holds the clutch bell gear.



STEP 18:
Remove the clutch bell gear and the clutch shoes. Note that there are two 5x8mm PTFE washers, one on each side of the clutch bell gear. Check the clutch shoes for excessive wear or cracking around the pin holes. If the clutch shoes are worn to the point that the clutch spring contacts the clutch bell, then the shoes must be replaced.



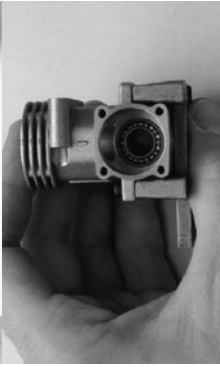
STEP 19:
Grip the flywheel with a pair of pliers (locking pliers work best). Remove the clutch adapter nut with a 10mm deep socket. Hold the engine just above your workbench and tap the flywheel from behind with a non-marring hammer (plastic or wood). Several easy blows may be necessary to release the flywheel and split beveled cone.



STEP 20:
The flywheel and the split-beveled cone should pull smoothly off of the crankshaft.



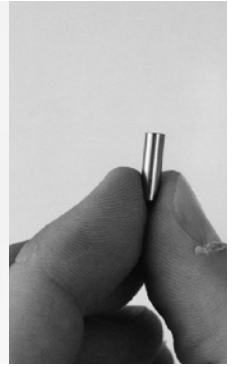
STEP 21:
Remove the crankshaft by pulling it straight out of the crankcase.



STEP 22:
The bearings are press-fit into the crankcase. To remove them, the crankcase must be heated with a heat gun or torch. The crankcase will expand with heat and release the bearings. To avoid the possibility of burns or other damage, do not attempt to remove the bearings. Clean the bearings by flushing them with denatured alcohol and then place one or two drops of after-run oil on the races.



STEP 23:
Before installing a new connecting rod, you can increase connecting rod life by polishing the crankshaft journal. Use 1200 grit sandpaper to remove the surface scratches followed by liquid metal polish to buff the crankshaft journal to a bright, smooth shine. Rinse thoroughly with denatured alcohol. Lube with after-run oil.



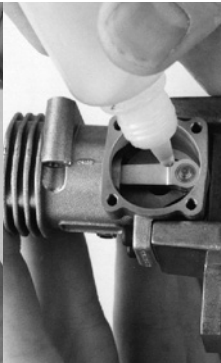
STEP 24:
Use the 1200 grit sandpaper and the liquid metal polish on the wrist pin also. Rinse thoroughly with denatured alcohol and lube with after-run oil.



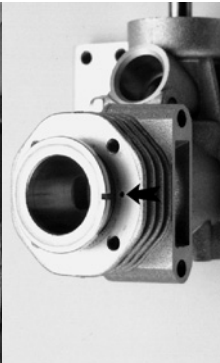
STEP 25:
To assemble the connecting rod and piston, place a drop of castor oil in the top end of the connecting rod. Insert the wrist pin through the piston and the top of the connecting rod. Secure the wrist pin with the G-clip. Make sure the G-clip fits securely into the groove machined in the piston. Be careful not to scratch the sides of the piston.



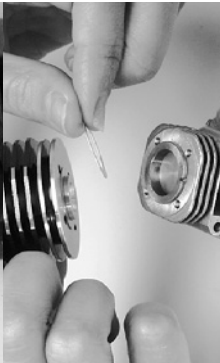
STEP 26:
Reinstall the crankshaft into the engine and make sure that it spins freely. Insert the connecting rod and piston assembly through the top of the crankcase. The G-clip should face the carburetor. Put a drop of castor oil in the bottom end of the connecting rod. Use your fingers to gently push the end of the connecting rod over the crankshaft journal.



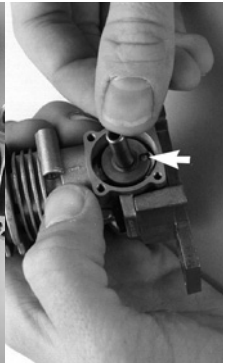
STEP 27:
Place another drop of oil on the connecting rod bushing. Rotate the crankshaft several times to distribute the oil.



STEP 28:
Insert the sleeve into the top of the crankcase. Rotate the sleeve so that the notch in the sleeve will line up with the pin in the crankcase. Holding the engine upside down will make it easier for the sleeve to go over the piston.



STEP 29:
Install new head gaskets on the head. Use one thick and one thin gasket. Reinstall the head using the 3x12mm cap-head machine screws. Tighten the screws in small increments, in a criss-cross pattern, until all the screws are tight.



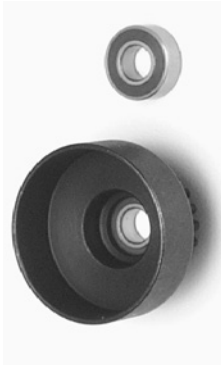
STEP 30:
Reinstall the starter shaft. Align the notch in the starter shaft with the crankshaft journal pin (arrow).



STEP 31:
Reinstall the backplate and a new backplate gasket with the 3x8mm cap-head machine screws. Tighten the screws in small increments in a criss-cross pattern until all the screws are tight.



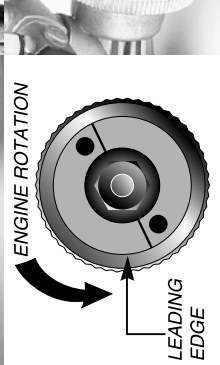
STEP 32:
Install the appropriate size ball bearing into one side of the clutch bell gear. The Nitro Sport comes stock with an 18-tooth clutch bell gear that requires 5x11mm ball bearings.



STEP 33:
Turn the gear over and install the other ball bearing.



STEP 34:
Install the split-beveled cone onto the crankshaft. Next, install the flywheel. Install the clutch adapter nut with a 10mm deep socket. Grip the flywheel with pliers while tightening the adapter nut.



STEP 35:
Install the clutch shoes exactly as shown in the drawing (leading edge engagement). Next, install a 5x8mm PTFE washer followed by the clutch bell gear (with bearings installed). Install the remaining 5x8mm PTFE washer followed by the E-clip (see step 14).



STEP 36:
Reinstall the carburetor with a new o-ring, header, a NEW glow plug, and engine mount. Use a new header gasket when reinstalling the header on the engine. Reinstall the engine in the truck in the reverse order of removal. Don't forget to reconnect the yellow grounding wire to the engine mount. The rebuilt engine must now be broken in.

[illegible]

