

CARNAGE NT

**1/10 SCALE 4WD READY-TO-RUN NITRO ENGINE
POWERED RACING TRUGGY**



**SET-UP GUIDE, PARTS
AND COMPONENT LISTING**

www.ftx-rc.com





Items not included but required for use.



12 x AA batteries



Air Filter Oil



Fuel Bottle



Glow Igniter



Nitro Fuel

Recommended Tools

**FAST615
Fastrax 7-Piece Tool Set**



Includes 1.5mm, 2.0mm, 2.5mm, 3.0mm hex wrenches, slotted and phillips screwdriver.



FAST625 Cross Wrench
Five different hex sizes 7mm, 8mm, 10mm, 12mm & 17mm meet a variety of tightening and loosening applications for glow plugs, wheel nuts and bolts. Can also store 4 glow plugs, in centre section.



FAST691 Nitro Starter Set
The perfect set up pack includes glow starter and charger, fuel bottle, screwdrivers and cross wrenches.





Quick Start Guide



STEP 1

Install 8 "AA" batteries into the transmitter as per the Etronix instruction booklet noting the proper direction of each cell.



STEP 2

Open the radio box and Install 4 "AA" batteries in the battery holder noting the proper direction of each cell.



STEP 3

Insert the antenna tube in the top of the radio box. Feed the receiver antenna through the tube until several inches extend out the top. Install the antenna tip. If you choose to cut the tube down to size, do so without the antenna installed.

STEP 4

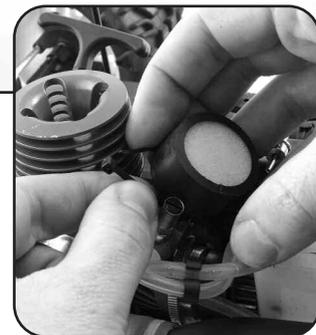
Turn on the transmitter and then the receiver. Check to make sure that the servos are operating correctly and that the carburetor closes when the throttle trigger is released.

AT THIS POINT PLEASE FOLLOW THE SEPARATE ETRONIX RADIO INSTRUCTION BOOKLET FOR RADIO SET-UP. MAKE SURE THAT YOU SET THE FAILSAFE FEATURE ON THE TRANSMITTER.



STEP 5

Apply air filter oil to help keep the dirt out. The best method is to remove the end cap (keep the filter connected to the carb) and remove the foam element. Dab the treatment all around the filter, put the filter in a plastic sandwich bag, and knead it until the filter is saturated, but not soaked.



STEP 6

STARTING THE ENGINE

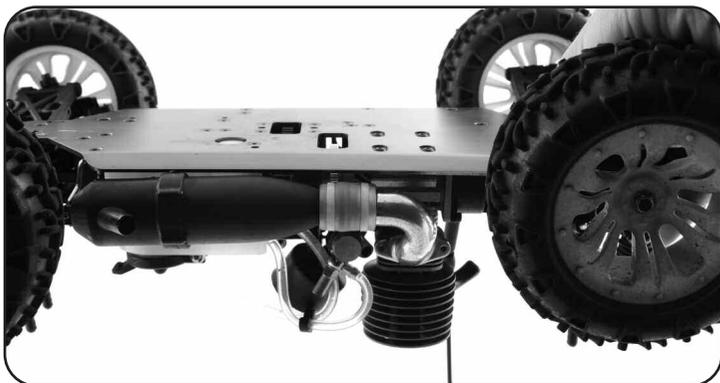
You MUST read the engine running in guidelines and set-up on pages 9-12 before trying to start your engine. Below is a quick overview of the starting procedure once the engine is RUN-IN.

1. Before attempting to start the engine from cold, remove the glowplug with an 8mm nut driver prime the engine with fuel pull the pullstarter rapidly with your finger over the exhaust pipe outlet (IMPORTANT- only when cold!) until the fuel has travelled to the carb, and then a further 10-20 times to lube the engine.



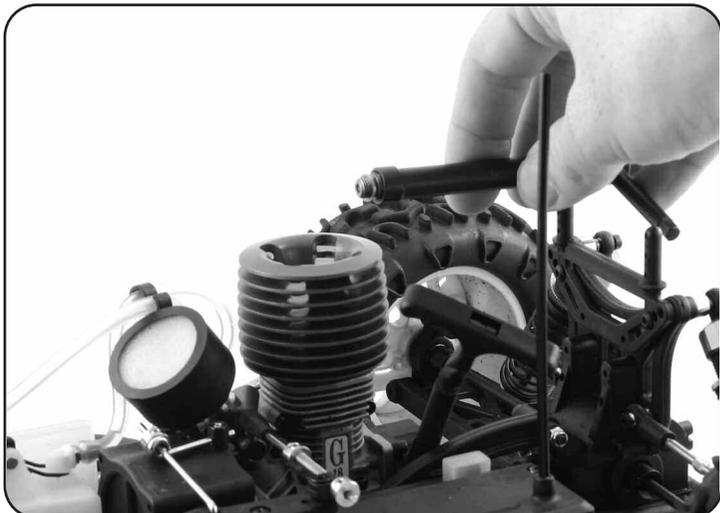
Do not extend fully the pull start beyond. Keep the extension to around 20cm with short sharp pulls.

Do not extend fully the pull start beyond.

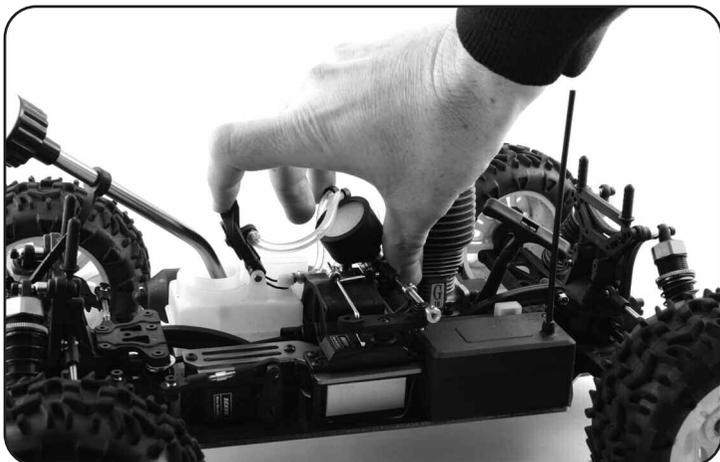


2. Then turn the car upside down and pull the pullstarter rapidly until all the excess fuel has emptied onto the floor through the glowplug hole. Make sure you do this outside safely. This process is really only necessary when the engine is cold or brand new and tight.

Refit the plug ensuring the copper gasket washer is also refitted. Wind it all the way in and then re-wind 1 to 1.5 turns. This allows gases to escape thus lowering the engines initial compression.



3. Start engine. Add fuel to the fuel tank using a suitable fuel bottle. Use a glow plug heater to ignite the engine plug as illustrated and start to pull the the pull starter (be careful not to extend too far as mentioned previously). Ensure you have a small amount of carburetor open (around 2mm) to allow for air intake to help starting.



IMPORTANT – make sure the car is secured or off the ground while attempting to start.



The engine will run “lumpily” or stop after a few seconds so try and keep it running by blipping the throttle. Tighten the glowplug while the engine is running if possible. If the engine has stalled restart with the plug tightened. The above procedure should always be followed from cold or if difficulty with starting is being experienced.

4. Stopping the engine. To stop the engine either use a stop tool to cover the exhaust outlet or use a flywheel stop tool.

IMPORTANT – Do not use fingers as the exhaust will be HOT and the flywheel ROTATING!



Warning! Flooding of the Engine

The most common cause of engine and pullstarter damage is from the “flooding” of the engine or a hydro-lock. More accurately this is too much fuel inside the engines crankcase causing the piston to lock. The piston rises to the top of the combustion chamber and instead of compressing a gas i.e. fuel/air mixture it has to try and compress a liquid, fuel only, which isn't possible. This puts massive strain on the piston, conrod and crankshaft as well as the starter. Invariably one component will fail, usually the conrod causing massive damage to the engines internals.

To avoid flooding the engine, always start the engine from cold using the methods mentioned above and if at any time the engine becomes difficult to turn over with the pullstarter, then remove the glowplug and empty all excess fuel out and start again. The pullstarter assembly can only be damaged by either over extension or a flooded engine. So if you break a pull start this is possible warning of a flooded engine.





2.4GHZ RADIO SET-UP

Etronix Pulse EX2 Sport

2 Channel 2.4GHz Steer Wheel Transmitter

1) INTRODUCTION.

Thank you for choosing this Etronix 2.4GHz radio system, it has been designed for land use but could also suit any 2 channel boat. If you are using this type of product for the very first time, please make sure you read all the information provided before installing in your vehicle. Please take special care of any warning notices to ensure safe operation.

2) SERVICE.

If you experience any difficulties please refer back to the manual, and if problems persist contact your retailer or distributor for further assistance.

3) SAFETY.

If you do not read, fully understand, then follow the advice and instructions in this manual properly, you risk damaging your radio or your model irreparably, even injury, or causing harm to another person or their property.

4) USER GUIDES.

Do Not drive at night, in bad weather, thunder and lightning, during rain, or on wet roads.

Do Not drive in the street between parked cars, near people or children, or dog walkers.

Always check the proper operation of your model. If it does not respond properly or reacts unpredictably please check the installation and condition of your equipment.

Ensure the throttle trigger is at the neutral position before powering up, to avoid your model running away before you get proper control.

Never turn off the transmitter before the receiver, although fitted with a failsafe device, it is good practice to keep the model under control at all times.

Remember :- Transmitter on first. Receiver off first!

5) BATTERY CARE.

If your transmitter or receiver is being power by rechargeable Nickel Cadmium or Nickel Hydride batteries, be sure to always check they are fully charged and in good condition before use. Loss of control could soon result if part charged, discharged or damaged batteries are installed. When charging NiCd or NiMH batteries always use a dedicated charger, never try to recharge dry cells. If at any time during use or charging your transmitter or receiver batteries show signs of severely over heating, swelling or leaking, disconnect immediately, dispose of properly and replace!



6) TRANSMITTER CHARGING.

Connect a dedicated transmitter charger to the power supply.

Connect the charger to the charging socket on the rear of the handset.

When charging is complete, disconnect.

If using dry (alkaline) cells do not attempt to connect a charger to the transmitter!



Install eight 1.5V (AA size) rechargeable batteries in the transmitter base and re-fit the bottom cover.

7) TRANSMITTER SPECIFICATION.

Channels :	2
Frequency:	2.4GHz
RF Power :	<20 dbm
Modulation:	GFSK
Code Type:	Digital
Sensitivity:	1024
Power:	12V DC (8 x 1.5V AA)
Low Voltage Warning:	<9V DC
Charger Port:	5mm Centre Positive (Charger Not Included)
DSC Port:	3.5mm (for Optional USB Game Interface – NOT USED/SUPPORTED)
Antenna Length:	120mm
Weight:	328g
Size:	159 x 99 x 315mm
Colour:	Black
Certification:	CE, FCC.



9) TRANSMITTER FUNCTIONS.

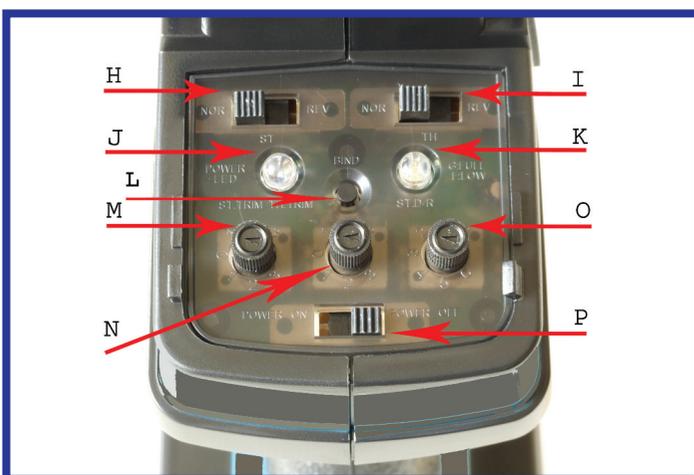
A vertical aerial achieves maximum range, so the short 2.4GHz aerial (A) can be folded and rotated to achieve the most vertical position once you are holding the handset comfortably. Then it allows you to fold the aerial away for safe storage.



8) KEY TO TRANSMITTER FEATURES.

- A- Folding/Rotating 2.4GHz Aerial
- B- Steering Wheel
- C- Throttle Trigger
- D- Control Panel Cover
- E- Battery Box
- F- DSC (Simulator) Port (NOT USED/SUPPORTED)
- G- Charger Port
- H- Steering Reverse Switch
- I- Throttle Reverse Switch
- J- Power (RED) LED
- K- Bind/Battery Condition (Green) LED
- L- 'Bind' Button
- M- Steering Trim Dial
- N- Throttle Trim Dial
- O- Steering Dual Rate Dial (D/R)
- P- Power On/Off Switch

The Steering Wheel (B) operates Channel 1 and when turned anti clockwise the model should steer to the left and vice versa. If not, simply flick the Steering Reverse Switch (H) to the "Rev" position. The Throttle Trigger (C) operates Channel 2 and when pulled towards the handset the model should move forwards, when pushed away it





When at the mid position the model should remain stationary, if it creeps slightly adjust the throttle neutral dial accordingly.



When pulled back to the handset the model should move forwards, if not flick the Throttle switch to the 'Rev' position.



When pushed away the model should brake (and then move in reverse if applicable) if not simply flick the throttle switch to the 'Rev' position.

should brake (and then reverse if available), otherwise simply flick the Throttle Reverse switch (I) to the "Rev" position.

Beneath the folding Control Panel Cover (D) you will find an array of useful adjustments, plus the Power Switch (P).

When the Power Switch (P) is moved left to the 'On' position, the RED LED (J) lights up, as does the Green LED (K), this shows a good battery condition.



far that you struggle to negotiate the tightest corner on the course. If the servo is connected to the receiver correctly but the model does not steer at all, double check the Steering Dual Rate Dial is not at Zero, before checking for any more serious faults!

10) RECEIVER SPECIFICATION.

Channels: 3

Failsafe: Throttle Set Point Adjustable.

Frequency: 2.4GHz

Modulation: GFSK

Sensitivity: 1024

RF receiver sensitivity: -100dbm

Power: 4.5 to 6V DC

Weight: 5g

Antenna Length: 176mm

Size: 37.6 x 22.3 x 13mm

Colour: Black

Certification: CE, FCC.



11) RECEIVER INSTALLATION.

The receiver should be securely mounted flat and level in your model, within the receiver box if available to protect it from moisture and dust. When routing the aerial keep it as far

If the transmitter batteries are weak and the voltage drops below 9V DC, the green LED flashes to alert you to the possibility that range will be limited and control might be lost, so new batteries (or a recharge) are advisable.

If the model does not track straight, adjust the Steering Trim Dial (M).

If the model creeps forwards or doesn't sit at Neutral, adjust the Throttle Trim Dial (N).

The Steering Dual Rate Dial (O) controls the total amount of steering available. If the servo is straining against the steering end stops, turn it down (clockwise) until it only just achieves maximum steering lock. If the vehicle exhibits excess steering, or when at high speed you feel it over reacts to the slightest adjustments, turn the Steering Dual Rate Dial down yet further until the model becomes more controllable, but not so

away from any electronic devices and metal work as reasonably possible, with at least the last half of the aerial wire in a vertical aerial tube to maximise control and range.

For Nitro or Petrol powered models connect the receiver battery (noting correct polarity) into the socket marked "VCC" or via a suitable power switch.

Electric vehicles equipped with an ESC should power the radio (via the BEC) when plugged into channel 2, and receiver power is usually controlled by the ESC switch.

The third channel is not used on this transmitter, so the third (bind) socket can be used to power a cooling fan or Personal Transponder (PT).



12) MATCHING THE RECEIVER TO THE TRANSMITTER. (BINDING)

To make sure only one transmitter can control the receiver they need to be matched, and to do so you need to "Bind" them together so they only recognise each others signature code. There is a 'Bind' plug included with the receiver, and this is inserted in the third channel (Bind socket) before power is supplied to the receiver for the first time. The red LED on the receiver will begin to blink to indicate the bind process has begun. Now hold down the transmitter bind button (L) before it is switched on. The transmitter's green LED (K) begins to blink and the receivers red LED stops flashing and turns solid red to indicate the bind process has been achieved. Before you can operate the model, both the receiver and transmitter should be switched off and the bind plug removed from the receiver for safe keeping. Now switch on the transmitter before the receiver and the model should respond normally. If the receivers red LED does not go solid when it is powered up and the transmitter is on, then 'Binding' has failed, so begin the matching process again.

Remember if this is the first time you have set up the radio in your model, the steering and throttle will need correctly adjusted neutral positions before you will have proper control, and the throttle failsafe position should also be set before your first run.

13) RECEIVER FAILSAFE OPERATION.

This Etronix receiver incorporates a digital protection system known as a failsafe. If the model goes beyond the usable range, or the signal is interrupted, the failsafe will automatically set the



Hold down the transmitter "Bind" button before switching the power on.



With the power on you can release the bind button once the green LED begins to flash to indicate the "Bind" process has initiated.

throttle (channel 2) to a preset position so long as power is still supplied to it. Set up the failsafe before first use, by turning on the transmitter, then supplying power to the receiver. A pointer is supplied (on the bind Plug) which can be used to hold down the failsafe button on the receiver for three seconds until the red LED flashes several times to indicate successful setting of the failsafe position. Now, wherever the throttle channel was positioned, will be the throttle servo failsafe set point.

To test the failsafe, hold the model clear of the ground and apply a little throttle before turning the transmitter off. Within a second, the throttle servo (or speed controller) should have repositioned to the failsafe position, which is typically throttle neutral position so the vehicle just rolls safely to a halt if the signal is lost. Note:- if the receiver is re-matched to the transmitter for any reason (See 'Binding' as above) the failsafe position is lost so it will need to be reset again.

Thank you for choosing Etronix, used properly and observing the information in this manual we believe the Pulse EX2 Sport will achieve a strong connection with your model, utilising all the benefits of crystal free 2.4GHz technology for exceptional control and interference free operation.



Unless a battery powered model using an ESC with BEC, a receiver pack should be plugged into the VCC socket via a suitable power switch, making sure to check for correct polarity.



To 'Bind' the receiver to the transmitter the supplied Bind Plug should be installed channel 3/bind socket before power is applied. The red LED should begin to flash to indicate the 'Bind' process has begun, and go solid red once 'Bind' is complete. Now remove the 'Bind' plug and restart the power up procedure.



Once the 'Bind' process is complete, the throttle failsafe position can be set by pressing the button using the pointer provided.



Force 18 Nitro Engine Information

IMPORTANT - READ THIS BEFORE STARTING YOUR ENGINE!

For your safety - Your engine is not a toy!

- You will be working with highly flammable fuel, so keep it away from exposed flames or any thing which might ignite it. Read the safety info on the fuel container.
- Do not use fuels that were not designed for glow plug engines.
- Keep the fuel out of reach of children!
- Deadly carbon monoxide gas will be released, so do not operate the engine in an enclosed area where exposed flames or sparks can ignite it, or where it causes you to inhale it for prolonged periods.
- During operation, the engine may be dangerously hot to the touch
- Do not use the engine for purposes other than in model cars designed for them.
- Mount the engine securely.



Before Starting Your Engine

Oiling the filter

The air filter is essential for keeping dirt out of the engine. A foam filter must be oiled before running the engine. We recommend using Fastrax FAST63 Filter Oil treatment. Dab the treatment all around the filter, put the filter in a plastic bag and knead it until the filter is saturated, but not soaked. NEVER RUN YOUR VEHICLE WITHOUT THE AIR FILTER.

Adjustments

Your engine has come factory set to allow for an easy start and rich running. DO NOT alter any of the settings until the running in period has been completed.

Putting fuel in the fuel tank

Squeeze the fuel bottle, put the bottle's tube into your fuel container, and draw out some fuel. Lift up the lid on the fuel tank, and slowly squeeze the fuel bottle until the tank is full. Be careful here. If you overflow the tank it might get on your radio gear or on your brakes and you may create an unsafe driving situation. Always keep your fuel bottle closed when not in use.

Understanding the engine terms "rich" and "lean"

Your carburettor has screws that regulate how much air and fuel enter the engine together, the air/fuel mixture. An air/fuel mixture that is too "rich" means there is too much fuel, and a mixture that is too "lean" means that there is not enough fuel for the given amount of air. When the mixture is too rich, performance will be sluggish (one symptom of this, is excessive amounts of smoke from the exhaust). There is also a potential to foul the glow plug when the mixture is too rich. When the mixture is too lean, there is not enough fuel to cool or lubricate the internal engine components, and damage to the engine and/or glow plug is almost certain.

CAUTION:

If, while you are driving, the engine stalls because of an overheating condition, severe damage may have already occurred. Overheating is caused by the following conditions.

- Fuel mixture is set too lean
- Air leak around carb
- Loss of muffler pressure (line falls off)
- Excessive nitro content in the fuel
- Incorrect oil content in the fuel
- No air filter
- Poor quality of fuel
- Contaminated fuel
- Excessive loads on the engine (locked drivetrain)

Your engine will be short-lived if any of the above conditions are allowed to exist for any length of time. During the first few tanks watch closely for any signs of overheating. These will include:

- Steam or smoke coming from the engine surfaces
- Cleaning out and then lagging during high-speed acceleration, as if it is

running out of fuel.

- Popping or clattering sound when slowing down.
Idle speed will surge or possibly diminish to the point of stalling.

To Test For Overheating

It's important to check the head temperature during the operation of the engine. The best method for checking the head temperature is to use a head temperature gauge. There are several head temperature gauges available, and the temperature readings between these different brands of gauges vary. Due to this variance, the temperature readings will range between approximately 185 degrees and 225 degrees. About 185 degrees is the normal for the Force 18. If you don't have access to a head temperature gauge, you can use water to check the head temperature. Place a drop of water on top of the cylinder head. If it sizzles away immediately, shut down your engine. If it takes approximately 3-5 seconds for the water drop to boil away, then the engine is running within a normal temperature range.

Start Your Engines

Running-In

The modern model car engine requires relatively little running in, due to the use of ABC piston and liner assembly. The engine should be run on a rich setting for approximately 6-8 tanks of fuel, with another 6-8 at a slightly less rich setting. Once this has been completed, the internal engine components should be properly seated and a normal setting can be used. A good idea is to use a running in fuel as it is especially designed for breaking in new engines without damage.

The best methods of checking on the running setting of the engine, is to first check the smoke trail coming out of the exhaust with the car is running. A very rich setting would allow the car to pull away slowly or sluggish with a momentary hesitation and lots of smoke from a standing start. When the car is accelerating at full throttle, the engine will never "Clean Out". When an engine cleans out, the speed and the rpms will increase suddenly and dramatically, as if the engine has switched to second gear. Also, the amount of smoke that comes from the exhaust will decrease. Cleaning Out is a desirable characteristic once the engine is fully broken in.

As the engine reaches normal operating temperature, it will speed up and performance will increase. This occurs because the fuel mixture is becoming leaner with the increased temperature. You will need to richen the fuel mixture so that the engine continues to run as described above.

When the first tank is almost gone, bring the car in and shut off the engine. Allow the engine to cool for 8 to 10 minutes before starting the engine up again. Add more fuel. Start it back up and run the second tank of fuel. Again allow the engine to cool before starting it up again.

The key to breaking in your engine is patience. During the break in period, your engine may appear to malfunction with problems such as stalling, inconsistent performance, and fouling out glow plugs. Don't give up. These are just a few things you may go through during the break in period. Just keep it



running, apply the throttle on and off as smoothly as you can. Sudden bursts or quick releases of the throttle can stall your engine. Soon after break in your patience will pay off with a well running engine. The performance level of the engine will be limited by the "rich" fuel mixture which you will use all during the break-in process. Once the engine is fully broken-in the mixture can be "leaned out," and speed and acceleration will increase. Because of the rich fuel mixture and the wearing of the new parts, deposits will form on the glow plug causing it to fail. Expect to replace the glow plug during the break in period, and definitely when the engine is fully broken in and the fuel mixture is leaned out.

Setting Engine for Normal

Tuning High Speed

As you approach the first 6-8 tanks running you can start to GRADUALLY adjust your engine for normal performance. PLEASE NOTE any adjustments need to be very small at 1/8th turn increments. You can then begin adjusting the fuel mixture to maximize performance for your driving needs. To lean turn the main fuel control needle in a clockwise direction. This will allow the car to pull away faster and more cleanly, without hesitation and increase the top speed. There should however still be a noticeable smoke trail.

If the main needle is screwed in too far thus allowing the engine to run too lean, it will seem to run strong at first, but will bog, hesitate, or stall when running at high speed. The engine will also rapidly overheat when the setting is too lean. This is because fuel includes lubrication, and that lubrication is inadequate when the setting is too lean. CHECK THE ENGINE TEMPERATURE OFTEN AS YOU LEAN THE MIXTURE. DO NOT LET THE ENGINE OVERHEAT. You should always see smoke coming from the exhaust.

At the optimum setting, the engine will clean out; have a strong-sounding, high-pitched whine at full speed; and there will be a thin trail of whitish smoke coming from the exhaust. It is always better to set the engine a little rich rather than too lean.

If the engine stalls on acceleration, begins to bog or slow down at full throttle, or if there is a reduction in exhaust smoke, then the engine is running too lean. Immediately turn the high speed mixture screw counterclockwise 1/4 of a turn and operate the car at medium speeds for 1 to 2 minutes to allow the engine to cool.

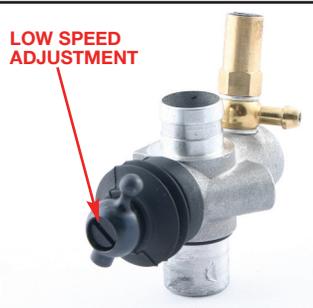
Tuning Low Speed

The low-speed mixture affects how the engine will perform in the low to mid range rpms. Turning the low-speed needle clockwise will lean the mixture. As with the high-speed mixture, leaning the low-speed mixture increases performance. Again, if the mixture here is set too lean, the engine may be starved for lubrication in the low and mid-rpm ranges, thus causing overheating and excessive engine wear.

Perform the following test to determine if the low speed mixture is set correctly. With the engine warm and running, allow it to idle for approximately 15 seconds. Now quickly apply throttle and note the performance. If the engine bogs, accelerates erratically, and a large puff of blue smokes emitted, then the low speed mixture is too rich. Turn the low-speed screw clockwise 1/8 of a turn. If the engine speeds up for a moment then bogs, hesitates, or stalls, then the low speed mixture is too lean. Turn the screw counterclockwise 1/8 of a turn. Adjust the mixture screws in 1/8 of a turn increments, wait 15 seconds, and retest after each change. Adjust for the best acceleration without the car stalling.

Care and Maintenance

When you are finished racing for the day, drain the fuel tank. Afterwards, energize the glow plug with your glow plug starter and try to restart the engine in order to burn off any fuel that may remain inside the engine. Repeat this procedure until the engine fails to fire. Try to eject residue while the engine is still warm. Finally, inject some corrosion inhibiting oil, and rotate the engine to distribute the oil to all the working parts.



Do not, however, inject the oil into the carburetor, for it may cause the O-rings inside to deteriorate. When cleaning the exterior of the engine, use WD-40. Do not use gasoline or any solvents that might damage the silicone fuel tubing.

Cleaning the air filter. When the air filter starts to get dirty, do the following steps:

- Step 1. Clean the foam with fuel. Do this by pouring a little fuel in a small can and kneading the filter in the fuel. When it looks cleaner, then dispose of the fuel.
- Step 2. Dry the filter. Squeeze out the fuel with a paper towel until it's dry.
- Step 3. Fastrax Fast63 Filer Oil to help keep the dirt out. Dab the treatment all around the filter, put the filter in a plastic sandwich bag, and knead it until the filter is saturated, but not soaked.



Troubleshooting

Glow Plug Problems

The glow plug in your engine is an inexpensive consumable item which must be replaced periodically to maintain peak performance and starting ease. Most often, any starting problems or erratic performance can be traced back to the glow plug. The glow plug should also be checked if the engine's acceleration and top speed performance suddenly becomes flat. The only sure way to test for a faulty glow plug is simply install a new one to see if the problem goes away. Remove the plug from the cylinder head with a 8mm nut driver. Make sure there is no dirt or debris on top of the head which could fall into the engine. Do not loose the copper gasket which seals the glow plug. Touch the glow plug to the contacts of the glow plug starter. All of the coils should glow white. Sometimes the first few coils will not glow while the rest are bright, most likely indicating a bad plug. If the glow is dim orange, then the glow starter battery should be replaced or recharged.

At the high rpm that the engines operate only a top quality plug will cut the mustard. Therefore we recommend the use of the Fastrax Platinum No.4 glowplug (FAST760-4).

Fuel Mixture

The fuel mixture is the largest variable you have to control while operating your engine.

Fuel brand, ambient temperature, and humidity all effect how your mixture should be set. If the engine runs great one day but runs rich or lean the next day, it is probably the result of a change in the air quality and temperature. This should be expected and adjusted for.

Although there are many fuels on the market, very few are designed to perform and protect your engine at the likes of 35,000rpm that some of our engines can attain. It is with this fact in mind, and our own in house testing that we **ONLY RECOMMEND** the following fuels:

Byron RACE Gen2, Byron RACE Gen2 RTR and Model Technics Dynaglow.

Keep between 16-20% nitromethane content for running and first use. The single most popular reason for engine failure or unreliability is poor or wrong fuel. These fuels have been tested with our engines and we are confident of their performance.

OTHER FUELS MAY WORK WITH OTHER ENGINES BUT THE FUELS LISTED WORK BEST WITH THESE ENGINES. FAILURE TO KEEP TO THESE FUELS MAY RESULT IN DAMAGE OR REDUCED PERFORMANCE AND VOID ANY WARRANTY CLAIMS.





Pull Starter Hints

The pull starter as fitted to most of the entry level engines is, if treated correctly, the easiest and most cost effective method of starting an engine. As with every silver lining, there is a cloud. The pullstart system is similar to that of a lawnmower to look at, but that is where the similarity ends. The pullstarter is susceptible to breaking if the engine is flooded or not lubricated enough. To ensure this does not happen, a few simple rules should be followed.

1. Before attempting to start the engine from cold, remove the glowplug and then prime the engine with fuel. For cars with a primer button on the tank, press this until the fuel has travelled along the fuel pipe to the carburettor and then a further 10-20 presses. For cars without a primer on the tank, pull the pullstarter rapidly with your finger over the exhaust pipe outlet until the fuel has travelled to the carb, and then a further 10-20 times to lube the engine.

2. Then turn the car upside down and pull the pullstarter rapidly until all the excess fuel has emptied onto the floor through the glowplug hole. Refit the plug ensuring the copper gasket washer is also refitted. Wind it all the way in and then re-wind 1 to 1.5 turns. This allows gases to escape thus lowering the engines initial compression.

3. Start engine. The engine will run "lumpily" or stop after a few seconds so try and keep it running by blipping the throttle. Tighten the glowplug while the engine is running if possible. If the engine has stalled restart with the plug

tightened.

The above procedure should always be followed from cold or if difficulty with starting is being experienced.

Flooding of the Engine

The most common cause of engine and pullstarter damage is from the "flooding" of the engine or a hydro-locked. More accurately this is too much fuel inside the engines crankcase causing the piston to lock. The piston rises to the top of the combustion chamber and instead of compressing a gas i.e. fuel/air mixture it has to try and compress a liquid, fuel only, which isn't possible. This puts massive strain on the piston, conrod and crankshaft as well as the starter. Invariably one component will fail, usually the conrod causing massive damage to the engines internals.

To avoid flooding the engine, always start the engine from cold using the methods mentioned above and if at any time the engine becomes difficult to turn over with the pullstarter, then remove the glowplug and empty all excess fuel out and start again. The pullstarter assembly can only be damaged by either over extension or a flooded engine. So if you break a pull start this is possible warning of a flooded engine.

Cooling Problems

Engine overheating is most often caused by running the engine too lean or

Troubleshooting Quick Glance

Description	Problem	Solution
Engine will not start	Out of fuel Improper or contaminated fuel Glow starter not charged Glow plug bad Engine flooded Engine overheating Carburetor incorrectly adjusted Exhaust blocked Air cleaner blocked	Fill fuel tank Replace fuel Charge glow starter Replace glow plug, see "Glow Plug Problems" See "flooding" section. Allow engine to cool, richen fuel mixture, check airflow Readjust carburetor Clean exhaust system Clean air filter
Starter will not pull	Engine is flooded Rope is jammed Engine seized	Clear excess fuel, see "flooding" Section. Repair starter. Examine engine for damage.
Engine starts and then stalls	Idle speed set too low Air bubbles in fuel line Glow plug is fouled Engine is overheated Insufficient fuel tank pressure Blockage at exhaust header fitting	Increase idle speed. Check for holes in the fuel line. Replace glow plug, see "Glow Plug Problem" section. Allow engine to cool, richen fuel Mixture, check airflow Replace pressure hose- clear Check flow to and from the tank.
Engine sluggish / poor performance	High-speed fuel mixture is too rich Leaking glow plug Fuel bad or contaminated Carburetor dirty or blocked Engine overheating Engine over geared for application Clutch slipping Bound up drive train	Set high-speed mixture to a leaner setting Check glow plug gasket Replace fuel Clean Carburetor Stop the engine- find the cause Use a lower gear ratio Replace clutch shoes Find the bound item and repair
Engine overheats	High-speed fuel mixture is too lean Cooling air is being blocked Excessive nitro in the fuel Excessive load on the engine Low-speed mixture too lean	Richen high-speed mixture Get air to the head Use fuel with lower nitro Check for bound up drive train Richen low-speed mixture
Engine hesitates or stumbles	High-speed mixture too lean Low-speed mixture too rich Engine overheated Air bubbles in fuel line Glow plug fouled	Richen high-speed mixture. Lean low-speed mixture. Stop the engine and find the cause. Check for holes in fuel line. Test or replace plug
Engine stalls instantly when throttle is fully opened from idle	Glow plug fouled Low-speed mixture too lean High-speed mixture too rich	Replace glow plug. Richen low-speed mixture. Lean high-speed mixture.
Engine stalls while driving around turns	Fuel level is low Idle speed set too low	Add fuel Increase idle speed.



because the cooling air for the cylinder head is blocked. If the mixture is too lean, simply allow the engine to cool, richen the mixture and try it again. Bodies must have holes cut in them to allow for cooling air to circulate over the surface of the cylinder head. On most bodies, it is a good idea to cut part of the wind-shield out and part of the back window to allow for additional cooling.

Factory Settings for Force 18

All new engines are assembled with what we will term 'factory settings'. These settings should allow almost all engines to be started up and allow for minimal adjustment for running in purposes.

Bearing this in mind, we are offering you the opportunity of re-adjusting to the 'factory settings' based on engines currently held in stock.

Main Needle Valve – High Speed Adjustment (HSA)

Screw down until resistance is met, and no further movement is apparent. RE-OPEN 3 TURNS.

Throttle Adjustment Screw – Idle Adjustment (IA)

Gently shut off carburettor sliding body and slowly re-open by means of adjusting screw.

ADJUST SCREW UNTIL APPROX 1 or 1 1/4mm OF APERTURE APPEARS BETWEEN THE END OF THE THROTTLE BODY AND AIR INTAKE APERTURE.

Sub Throttle Needle Valve – Low Speed Adjustment (LSA)

With adjustment screw setting in place, close off the throttle body against the screw. Very gently screw in the needle valve until it closes off the supply fuel nozzle and is prevented from re-opening by the entry of the needle valve into the centre hole of the fuel nozzle (work with great care with this one - we are only looking for minimal frictional contact between both parts). RE-OPEN VALVE 3 TURNS.

Glossary of Carburettor Functions

Main Needle Valve (High Speed)

The main needle mixture screw controls how much fuel enters the engine during mid- to high-speed operation. The screw is turned clockwise to lean (less fuel) and anti-clockwise to richen (more fuel)

Sub Throttle Valve (Low Speed)

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.

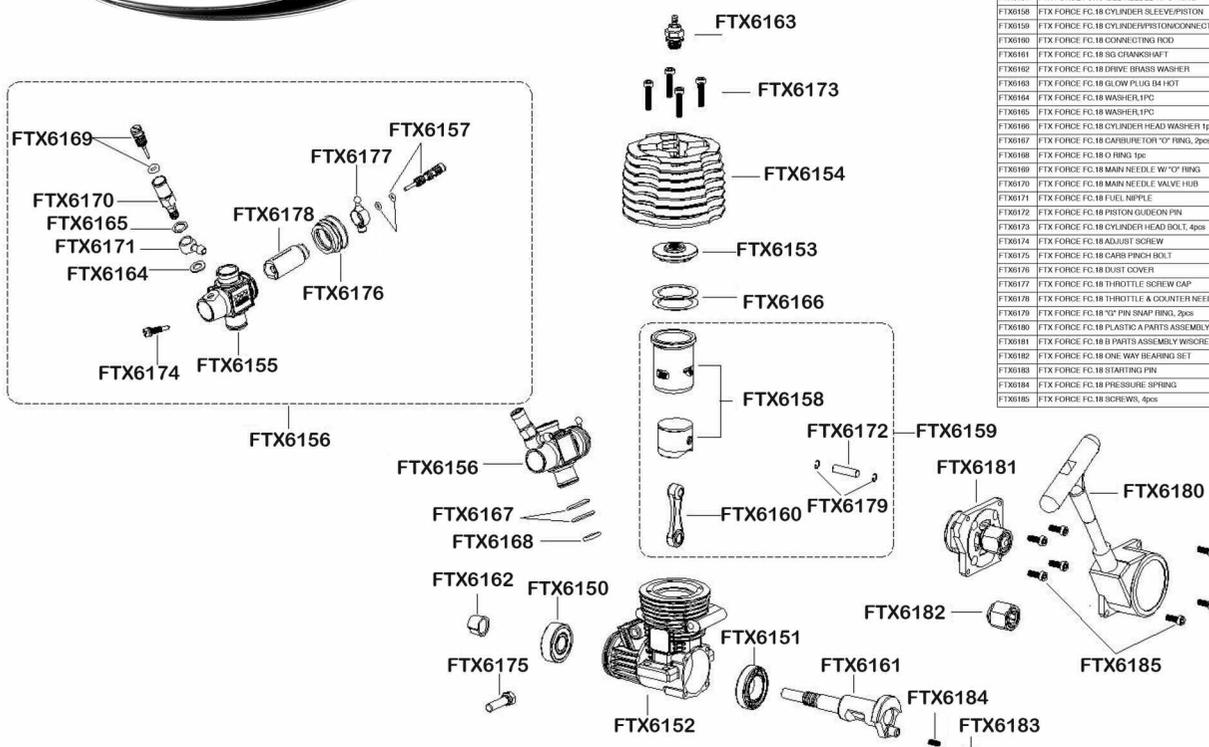
This screw controls how much fuel enters the engine at idle and low throttle. This adjustment will smooth the idle and improve the acceleration to mid speed. Make this adjustment with the throttle closed, after setting the idle. The screw is turned clockwise to lean (less fuel) and anti-clockwise to richen (more fuel)

Throttle Adjustment Screw

The throttle adjustment screw regulates the throttle opening to control the idle speed. The screw is turned clockwise for a higher idle speed and anti-clockwise for a lower idle speed.



FORCE .18 PULL START ENGINE

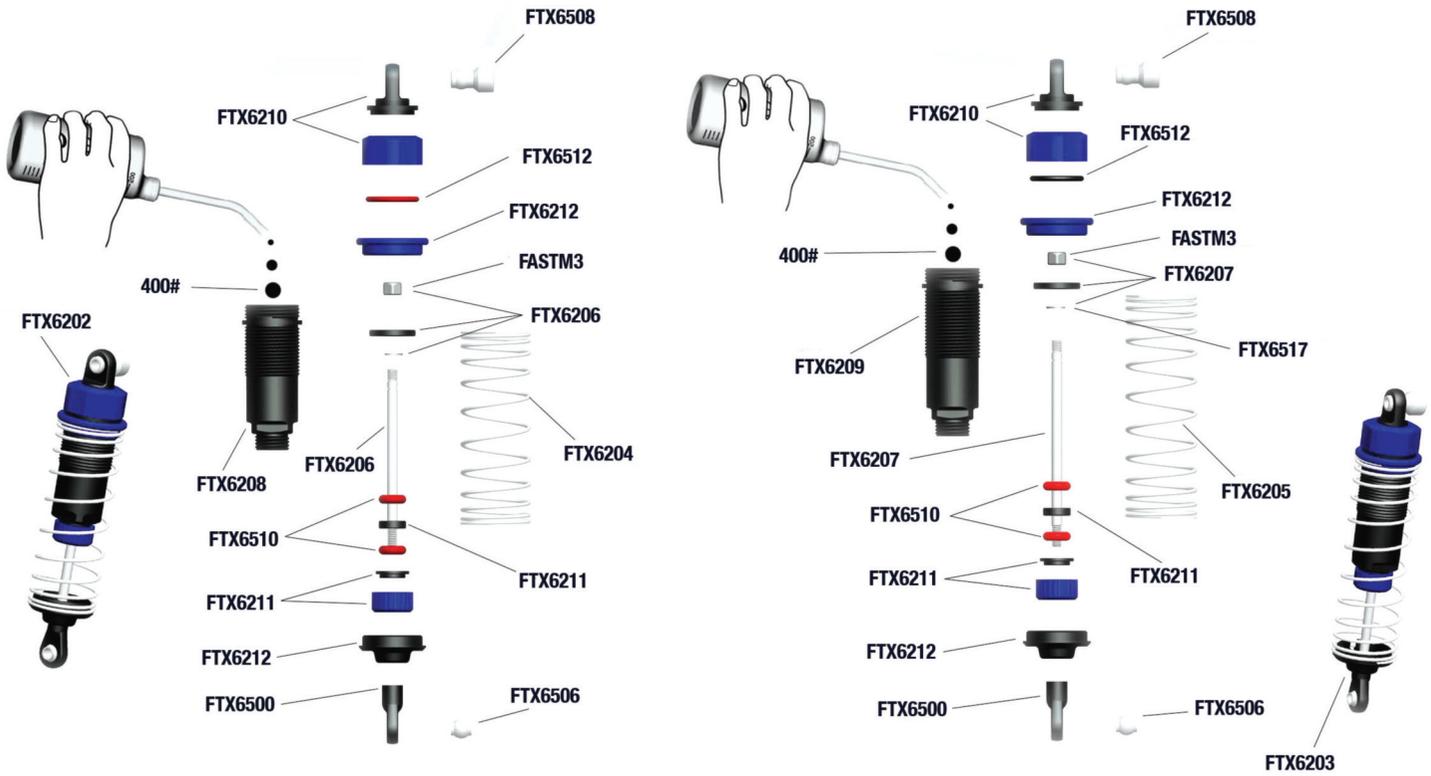


FTX0150	FTX FORCE FC.18 BALL BEARING
FTX0151	FTX FORCE FC.18 BALL BEARING
FTX0152	FTX FORCE FC.18 CRANKCASE
FTX0153	FTX FORCE FC.18 BURN ROOM(UNDER HEAD)
FTX0154	FTX FORCE FC.18 CASTING CYLINDER HEAD
FTX0155	FTX FORCE FC.18 COMPOSITE CARB MAIN BODY
FTX0156	FTX FORCE FC.18 COMPOSITE CARB COMPLETELY SET
FTX0157	FTX FORCE FC.18 IDLE NEEDLE W/ O'F RING
FTX0158	FTX FORCE FC.18 CYLINDER SLEEVE/PISTON
FTX0159	FTX FORCE FC.18 CYLINDER/PISTON/CONNECTING ROD SET
FTX0160	FTX FORCE FC.18 CONNECTING ROD
FTX0161	FTX FORCE FC.18 SG CRANKSHAFT
FTX0162	FTX FORCE FC.18 DRIVE BRASS WASHER
FTX0163	FTX FORCE FC.18 GLOW PLUG B4 HOT
FTX0164	FTX FORCE FC.18 WASHER,1PC
FTX0165	FTX FORCE FC.18 WASHER,1PC
FTX0166	FTX FORCE FC.18 CYLINDER HEAD WASHER 1pc
FTX0167	FTX FORCE FC.18 CARBURETOR O'F RING, 2pcss
FTX0168	FTX FORCE FC.18 O'F RING 1pc
FTX0169	FTX FORCE FC.18 MAIN NEEDLE W/ O'F RING
FTX0170	FTX FORCE FC.18 MAIN NEEDLE VALVE HUB
FTX0171	FTX FORCE FC.18 FUEL NIPPLE
FTX0172	FTX FORCE FC.18 PISTON GUIDE ON PIN
FTX0173	FTX FORCE FC.18 CYLINDER HEAD BOLT, 4pcss
FTX0174	FTX FORCE FC.18 ADJUST SCREW
FTX0175	FTX FORCE FC.18 CARB FINCH BOLT
FTX0176	FTX FORCE FC.18 DUST COVER
FTX0177	FTX FORCE FC.18 THROTTLE SCREW CAP
FTX0178	FTX FORCE FC.18 THROTTLE & GOVERNOR NEEDLE VALVE
FTX0179	FTX FORCE FC.18 1/2" PIN SNAP FINGL, 2pcss
FTX0180	FTX FORCE FC.18 PLASTIC PARTS ASSEMBLY W/SCREWS
FTX0181	FTX FORCE FC.18 B PARTS ASSEMBLY W/SCREWS
FTX0182	FTX FORCE FC.18 ONE WAY BEARING SET
FTX0183	FTX FORCE FC.18 STARTING PIN
FTX0184	FTX FORCE FC.18 PRESSURE SPRING
FTX0185	FTX FORCE FC.18 SCREWS, 4pcss

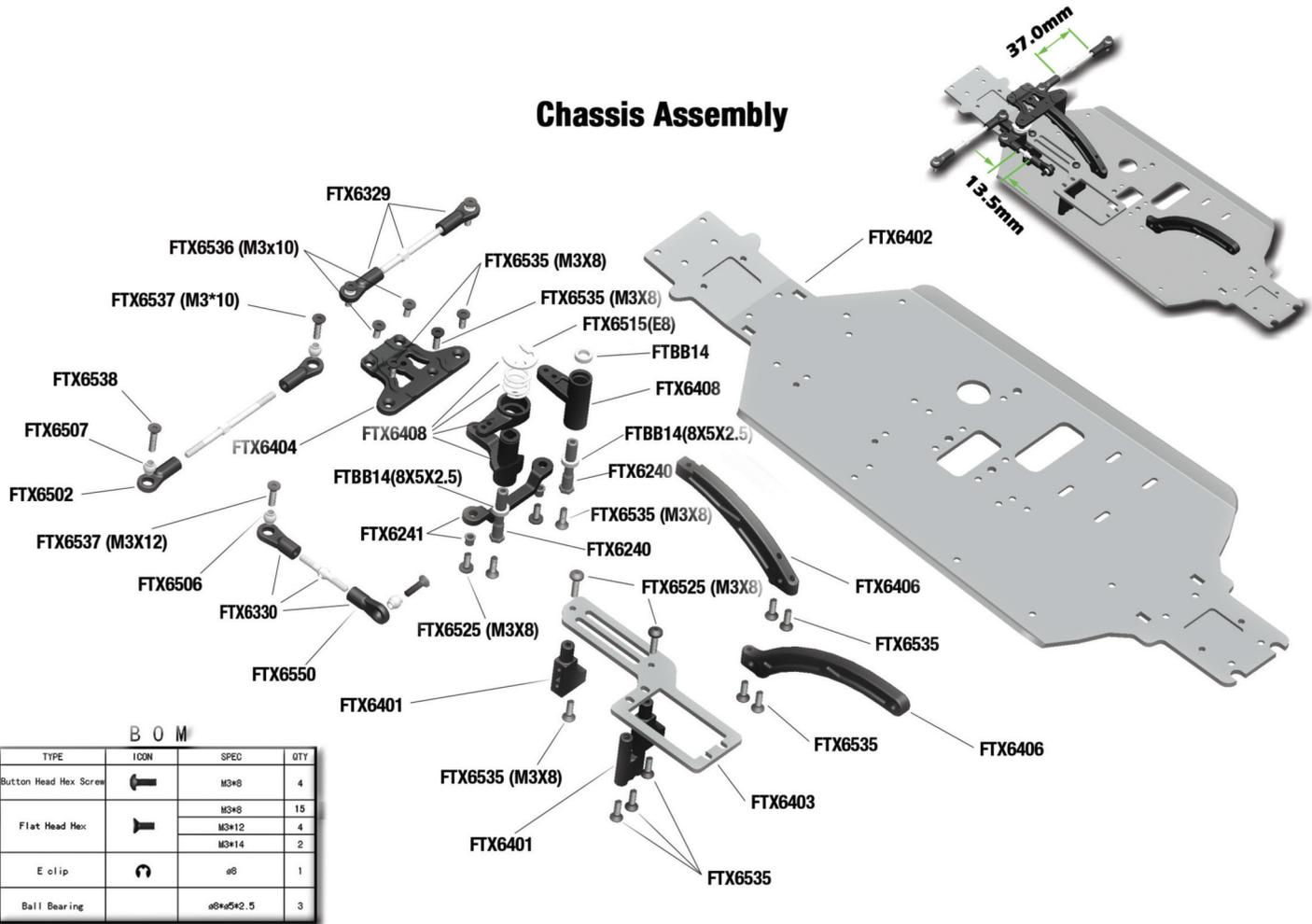




Shock Absorber Assembly



Chassis Assembly



B O M

TYPE	ICON	SPEC	QTY
Button Head Hex Screw		M3*8	4
Flat Head Hex		M3*8	15
		M3*12	4
		M3*14	2
E clip		#6	1
Ball Bearing		#8*#5*2.5	3





PARTS LIST

<p>Front Shock Tower 1pc</p>  <p>FTX6200</p>	<p>Rear Shock Tower 1pc</p>  <p>FTX6201</p>	<p>Front Shocks 2pc</p>  <p>FTX6202</p>	<p>Rear Shock Tower 2pc</p>  <p>FTX6203</p>
<p>Front Shock Spring 2pc</p>  <p>FTX6204</p>	<p>Rear Shock Spring 2pc</p>  <p>FTX6205</p>	<p>Front Shock Shaft & Piston Set 2sets</p>  <p>FTX6206</p>	<p>Rear Shock Shaft & Piston Set 2sets</p>  <p>FTX6207</p>
<p>Front Shock Body 2pc</p>  <p>FTX6208</p>	<p>Rear Shock body 2pc</p>  <p>FTX6209</p>	<p>Shock Upper Cap 2sets</p>  <p>FTX6210</p>	<p>Shock Lower Caps 2sets</p>  <p>FTX6211</p>
<p>Shock Lower holder & Adjust Ring 2sets</p>  <p>FTX6212</p>	<p>Front Lower Susp. Arm 2pc</p>  <p>FTX6320</p>	<p>Rear Lower Susp. Arm 2pc</p>  <p>FTX6321</p>	<p>Steering Knuckle Arm 1set</p>  <p>FTX6215</p>
<p>Uprights 2pc</p>  <p>FTX6216</p>	<p>Front CVD 2pc</p>  <p>FTX6322</p>	<p>Rear Hub Carrier 2pc</p>  <p>FTX6217</p>	<p>Rear Drive Shaft 2pc</p>  <p>FTX6213</p>
<p>Rear Dogbones 2pc</p>  <p>FTX6323</p>	<p>Front Susp. Holders 2pc</p>  <p>FTX6220</p>	<p>Rear Susp. Holders 2pc</p>  <p>FTX6221</p>	<p>Bumper 1Set</p>  <p>FTX6324</p>





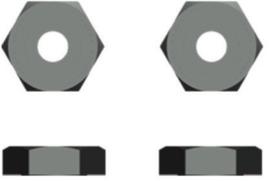
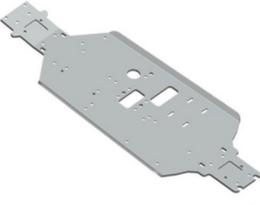
PARTS LIST

<p>Gearbox Housing Set 2pcs</p>  <p>FTX6225</p>	<p>Diff 16T Gear Washer 6pcs</p>  <p>FTX6226</p>	<p>Diff Drive Gear w/pin 2sets</p>  <p>FTX6227</p>	<p>Diff Gearbox Set 1set</p>  <p>FTX6236</p>
<p>Diff Case 2pcs</p>  <p>FTX6228</p>	<p>Diff Drive Spur Gear 2pcs</p>  <p>FTX6229</p>	<p>Diff Drive Gear 2pcs</p>  <p>FTX6230</p>	<p>Diff Bevel Gear S. 4pcs</p>  <p>FTX6231</p>
<p>Diff Bevel Gear B. 4pcs</p>  <p>FTX6232</p>	<p>Diff Pin 2pcs</p>  <p>FTX6233</p>	<p>Washer 6pcs</p>  <p>FTX6234</p>	<p>Diff Drive Cup 4pcs</p>  <p>FTX6235</p>
<p>Center Coupler 3pcs</p>  <p>FTX6237</p>	<p>Body Post 2pcs</p>  <p>FTX6325</p>	<p>Servo Saver 1set</p>  <p>FTX6626</p>	<p>Servo Saver Post 2pcs</p>  <p>FTX6240</p>
<p>Steering Ackerman</p>  <p>FTX6241</p>	<p>Wheel Complete 2sets</p>  <p>FTX6310W FTX6310B</p>	<p>Rim 2pcs</p>  <p>FTX6315W FTX6315B</p>	<p>Front Upper Susp. Arm 2sets</p>  <p>FTX6327</p>
<p>Rear Upper Susp. Arm 2sets</p>  <p>FTX6328</p>	<p>Steering Arm 2sets</p>  <p>FTX6329</p>	<p>Servo Linkage 1pc</p>  <p>FTX6330</p>	<p>Wheel Hub 4 pcs</p>  <p>FTX6224</p>



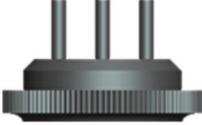
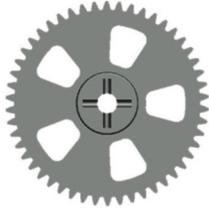
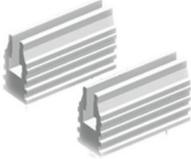
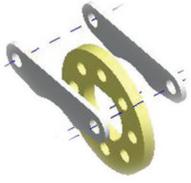
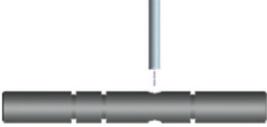


PARTS LIST

<p>FTX6224 - Wheel Hub 4pcs</p> 	<p>FAST123 - Antenna Pipe Set 2sets</p> 	<p>FTX6408 - Servo Saver (EP) 1set</p> 	<p>FTX6419 - Manifold Gasket 6pc</p> 
<p>FTX6401 - Servo & Upper Plate Mounts 1set</p> 	<p>FTX6402 - Chassis Plate 1pc</p> 	<p>FTX6403 - Upper Plate 1pc</p> 	<p>FTX6404 - Upper Steering Plate</p> 
<p>FTX6405 - Fuel tank Set 1set</p> 	<p>FAST940 - Fuel Line 2pcs</p> 	<p>FTX6406 - Front/Rear Chassis Brace</p> 	<p>FTX6407 - Receiver Box 1set</p> 
<p>FAST88 - Switch Cover 2pcs</p> 	<p>FTX6247 - Servo Horns</p> 	<p>FTX6409 - Chassis Brace mount 1pc</p> 	<p>FTX6410 - Stopper 6pcs</p> 
<p>FTX6411 - Throttle Linkage 1set</p> 	<p>FTX6412 - Central Dongbone F. 1pc</p> 	<p>FTX6413 - Central Dongbone R. 1pc</p> 	



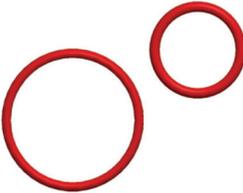
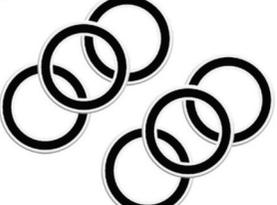
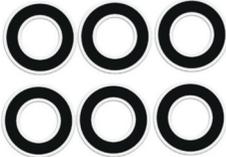
PARTS LIST

<p>FTX6149 Force 18 Pull Start Engine</p> 	<p>FTX6414 - Air filter 1Set</p> 	<p>FTX6415 - Tuned Pipe 1Set</p> 	<p>FTX6416 - Silicone Coupler 1Set</p> 
<p>FTX6417 - Zip Tie 6pcs</p> 	<p>FTX6418 - Manifold 1Set</p> 	<p>FTX6420 - Flywheel 1pc</p> 	<p>FTX6421 - Clutch Nut 2pcs</p> 
<p>FTX6422 - Clutch Shoes & Springs</p> 	<p>FTX6423 - Clutch Bell(14T) 1pc</p> 	<p>FTX6424 - 50T Gear (Single Speed)1pc</p> 	<p>FTX6425 - Engine mount 2pcs</p> 
<p>FTX6426 - Central Transmission Complete 1Set (Single Speed)</p> 	<p>FTX6427 - Central Transmission Bulkheads 2pcs</p> 	<p>FTX6428 - Brake Post 1Set</p> 	<p>FTX6429 - Brake Set 1set</p> 
<p>FTX6430 - Brake Cup 2pcs</p> 	<p>FTX6431 - Single Speed Shaft w/pin</p> 	<p>FTX6436 - Clutch Bell (2 speed) 1pc (option)</p> 	<p>FTX6435 - Central Transmission Complete 1Set (two Speed) (option)</p> 
<p>FTX6437 -Two Speed Clutch 1Set (option)</p> 	<p>FTX6224 - Two Speed Shaft 1pc (option)</p> 	<p>FTX6439 - 50T Two Speed Gear 1pc (option)</p> 	<p>FTX6440 - 45T Two Speed Gear 1pc (option)</p> 





PARTS LIST

<p>FTX6550 - Body Clip (Medium Size) 6pcs</p> 	<p>FTX6551 - Body Clip(Small Size) 6pcs</p> 	<p>FTX6500 - Shock Ball End 6pcs</p> 	<p>FTX6501- Servo Link Ball End 6pcs</p> 
<p>FTX6502 - Steering Linkage Ball End 6pcs</p> 	<p>FTX6503 - Rear Upper Linkage Ball End 6pcs</p> 	<p>FTX6504 - Sway Bar Fix Plate 6pcs</p> 	<p>FTX6505 - Sway Bar Holders 6pcs</p> 
<p>FTX6506 - Ball A 6pcs</p> 	<p>FTX6507 - Ball B 6pcs</p> 	<p>FTX6508 -Ball C 6pcs</p> 	<p>FTX6509 - Ball D 6pcs</p> 
<p>FTX6210 - Shock O-ring (Lower) 6pcs</p> 	<p>FTX6511 - Diff O-ring Seal 6pcs</p> 	<p>FTX6512 - O-ring (Upper) - 6pcs</p> 	<p>FTX6441 - Tuned Pipe Seal & Fuel Tank Seal 1 set</p> 
<p>FTX6513 - Pin 2x10 6pcs</p> 	<p>FTX6514 - Pin 2x11 6pcs</p> 	<p>FTX6336 - Hinge Pins(long & short) 2 sets</p> 	<p>FTX6442 - One Way Bearing 1pc</p> 
<p>FTBB10 - Ball Bearing 15x10x4 6pcs</p> 	<p>FTBB16 - Ball Bearing 10x5x4 6pcs</p> 	<p>FTBB14 - Ball Bearing 8X5X2.5 6pcs</p> 	





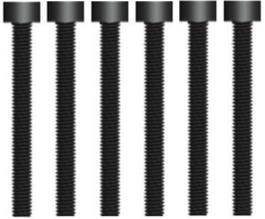
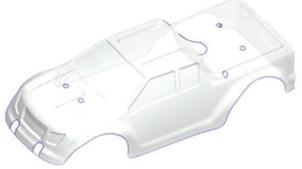
PARTS LIST

<p>FTX6515 - E clip-8mm 4pc</p> 	<p>FTX6516 -E clip-4mm 6pc</p> 	<p>FTX6517 -E clip-2.5mm 6pc</p> 	<p>FASTM3 - Nylon Lock Nut M3 6pc</p> 
<p>FASTM4 - Nylon Lock Nut-M4 6pc</p> 	<p>FTX6518 - Round Head Self Tapping Hex Screw 2x6 4pcs</p> 	<p>FTX6519 - Round Head Self Tapping Hex Screw 2x10 6pc</p> 	<p>FTX6520 - Round Head Self Tapping Hex Screw 3x15 8pc</p> 
<p>FTX6522 - Round Head Self Tapping Hex Screw M3x6 6pc</p> 	<p>FTX6525 - Button Head Hex Screw M3x8 6pc</p> 	<p>FTX6526 - Button Head Hex Screw M3x10 6pc</p> 	<p>FTX6527 - Button Head Hex Screw M3x12 6pc</p> 
<p>FTX6528 - Button Head Hex Screw M3x14 6pc</p> 	<p>FTX6530 - Ring Self Tapping Screw 3x4 4pc FTX6531 - Ring Self Tapping Screw 3x6 6pc</p> 	<p>FAST122 - Set Screw M3x3 6pc</p> 	<p>FAST123 - Set Screw M4x4 6pc</p> 
<p>FTX6543 - Button Head Hex Screw M4x10 6pc</p> 	<p>FAST114 - Cap Head Hex Screw M3x8 6pc</p> 	<p>FTX6542 - Cap Head Hex Screw M3x10 6pc</p> 	<p>FAST115 - Cap Head Hex Screw M3x10 6pc</p> 
<p>FTX6532 - Cap Head Hex Screw M3x14 6pc</p> 	<p>FAST117 - Cap Head Hex Screw M3x15 6pc</p> 	<p>FAST118 - Cap Head Hex Screw M3x18 6pc</p> 	<p>FAST119 - Cap Head Hex Screw M3x25 6pc</p> 





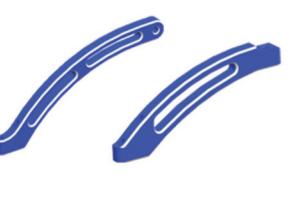
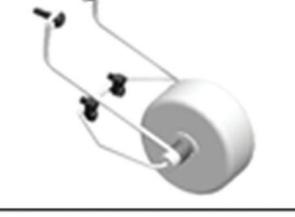
PARTS LIST

<p>FTX6533 - Cap Head Hex Screw M3x28 6p</p> 	<p>FTX6535 - Flat Head Hex M3x8 6pc</p> 	<p>FTX6536 - Flat Head Hex Screw M3x10 8p</p> 	<p>FTX6537 - Flat Head Hex Screw M3x12 6p</p> 
<p>FTX6538 - Flat Head Hex Screw M3x14 6p</p> 	<p>FTX6539 - Flat Head Hex Screw M3x18 3p</p> 	<p>FTX6540 - Flat Head Hex Screw M3x20 6p</p> 	<p>FTX6541 - Flat Head Hex Screw M3x36 6p</p> 
<p>ET1060 - 2.4GHz Transmitter 1pc</p>  <p>ET1095 - 2.4GHz Receiver 1pc</p> 	<p>ET0255 - Battery Case 1pc</p>  <p>ET0783 - switch 1pc</p> 	<p>FTX6559 - 3kg/cm Servo 1pc</p> 	<p>FTX6340 - MT Clear Body 1pc</p> 
<p>FTX6342 - ST Printed Body 1pc (Option)</p> 	<p>FTX6341 - ST Printed Body 1pc</p> 	<p>FOR ENGINE PARTS LIST PLEASE REFER TO DRAWING ON PAGE 12</p>	





UPGRADE PARTS LIST

<p>FTX6351 - Front Shock Plate (Carbon) 1 set</p> 	<p>FTX6352 - Rear Shock Plate (Carbon) 1 Set</p> 	<p>FTX6355 - Body Post (AL) 2pc</p> 	<p>FTX6356 - Front Shocks (AL) 2pc</p> 
<p>FTX6357 - Rear Shocks (AL) 2pc</p> 	<p>FTX6358 - Front Lower Susp. Arm (AL) 2pc</p> 	<p>FTX6359 - Rear Lower Susp. Arm (AL) 2pc</p> 	<p>FTX6360 - Steering Ackerman (AL) 1pc</p> 
<p>FTX6361 - Front Susp. Holders (AL) 1Set</p> 	<p>FTX6378 - Front & Rear Brace (AL) 1Set</p> 	<p>FTX6362 - Rear Susp. Holders (AL) 1Set</p> 	<p>FTX6363 - Rear Hub Carrier (AL) 2pc</p> 
<p>FTX6379 - Front Top Plate (Carbon) 1pc</p> 	<p>FTX6364 - Steering Knuckle Arm (AL) 2 Set</p> 	<p>FTX6365 - Wheel Hub (AL) 4pc</p> 	<p>FTX6380 - Upper Plate (AL) 1pc</p> 
<p>FTX6381 - Tuned Pipe (AL) 1Set</p> 	<p>FTX6382 - Chassis Brace mount (AL) 1pc</p> 	<p>FTX6366 - Wheelie Set 1Set</p> 	<p>FTX6367 - Alum Steering Arm 2pc</p> 
<p>FTX6368 - Alum Knuckle Arm 2pc</p> 			



CARNAGENT



www.ftx-rc.com



FTX is an exclusive brand of CML Distribution, Saxon House, Saxon Business Park,
Hanbury Road, Bromsgrove, Worcestershire, B60 4AD England.
E-mail: info@ftx-rc.com