

GF38 4-Stroke RC Gasoline Engines

Owner's Operating Instruction Manual

Dear customer:

Thank you for purchasing NGH GF38 4-stroke gasoline engine. The engine has been developed by NGH engineers to offer all hobbyists a new 4-stroke engine. You will be delighted with stability, fuel economy, energy saving, environmental protection, low noise, large torque output of your NGH GF38. We hope that you will enjoy with your the engine, and have many fun and safe flying experiences with its use.

Safety Instruction and WARNINGS!

Please read the instruction manual to become familiar with the features of the product before operating. Failure to operate the product correctly can result in damage to the product, personal property and cause serious injury.

GF38 engine is NGH R&D manufacturing precision products. It must be operated with caution and common sense and requires some basic mechanical ability. This product is not intended for use by children without direct adult supervision. Don't attempt disassembly, use with incompatible components or augment product in any way without the approval of our company. It is to read and follow all the instructions and warnings in the manual, prior to assembly, setup or use, in order to operate correctly and avoid damage or serious injury.

Age Recommendation: RC engine is not a toy! Not for children under 15 years.

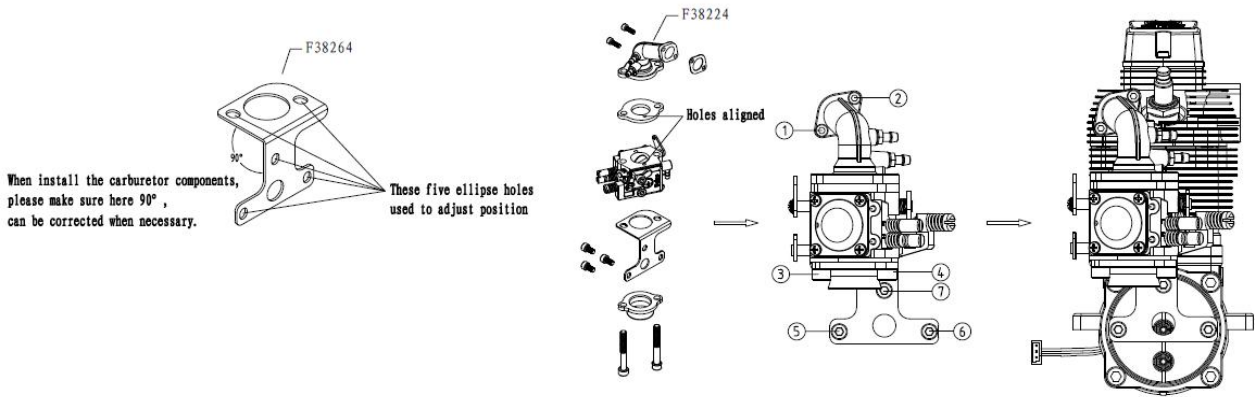
The engine is designed for use on a model radio control airplane. If it is used for any purpose, we cannot be responsible for its reliability of safety.

- NGH or their dealers aren't responsible for any loss, injury or damage resulting from the miss-use of RC engine.
- Keep away from the rotating propeller area while operating the engine.
- Do not wear loose clothing near the engine or the propeller.
- Do not operate the engine near loose material such as dirt, gravel, ropes, sand, etc.
- Always run your model engine in a well-ventilated area. Model engines produce possibly harmful carbon monoxide fumes.
- Always ensure that the propeller is securely attached to the engine shaft and all retaining fasteners are tightened properly before each flight.
- Always stand clear of and behind the propeller, ensure the face and body are far away from the propeller blade after trajectory. Never allow anyone, to be in front of or to the sides of the propeller when starting or running the engine.
- Always ensure that small parts in the children can't touch place to prevent children from swallowing parts;
- Always check the propeller nut tightening.
- Gasoline is extremely flammable. Be careful of any sparks from electrical contacts such as fuel pumps, battery charger, etc.
- Allow your engine stop and cool before touching or fueling. The running engine of the surface temperature is high, easy to cause burns and other personal injury.
- Be sure to check whether there are loose bolts before flying. When install a muffler, the muffler in the threads of the screw into the engine exhaust, until twist fixed, it is recommended to use screw glue.
- Ensure the engine and muffler in aircraft fairing environment with cold air, make sure the engine cooling.

Product Specifications:

Type: 4 - stroke air cooled gasoline engine (Only used for fixed-wing aircraft model)	
Bore: 39mm	Stroke: 31.8mm
Volume: 37.97cc	Carburetor: Walbro WT962
Mix Output: 3.58 HP/6800rpm	RPM Range: 1800-6800rpm
Ignition: NGH Automatic advancing angle ignition (RoHS and CE Certified; Rcexl Manufactured)	
Ignition Power: DC 4.8V - 8.4V 1000MAH	Spark plug type: CM6
Fuel: 92# Unleaded gasoline + Fully synthetic lubricants (Non-4-stroke lubricants)	Mixing ratio: oil :Lubrication = 35:1
Recommended propeller: 18×8-10, 19x8-10, 20×8 (Two blades)	Weight: engine 1310g, ignition 100g

Installation of carburetor components:



Following the above pictures connect the carburetor. Please attention the five ellipse holes and 90° of the mounting bracket (F38264), and these five ellipse holes used to adjust position. Mounting bracket at 90 degrees can be intake manifold (F38224) and the mounting surface integrity (If not 90°, it must be to adjust). Make sure the intake manifold (F38224) will not rupture by pull down and up compressions. Above pictures ①-⑦ are fastening screws. Please don't take them all tighten at a time. You should adjust the mounting bracket position and make sure the intake manifold is not subject to tension and extrusion, and then tight the fastening screws one by one (according the situation ⑦ cannot install).

Carburetor setup, adjust; Lubricated tube and pulse tube connection:

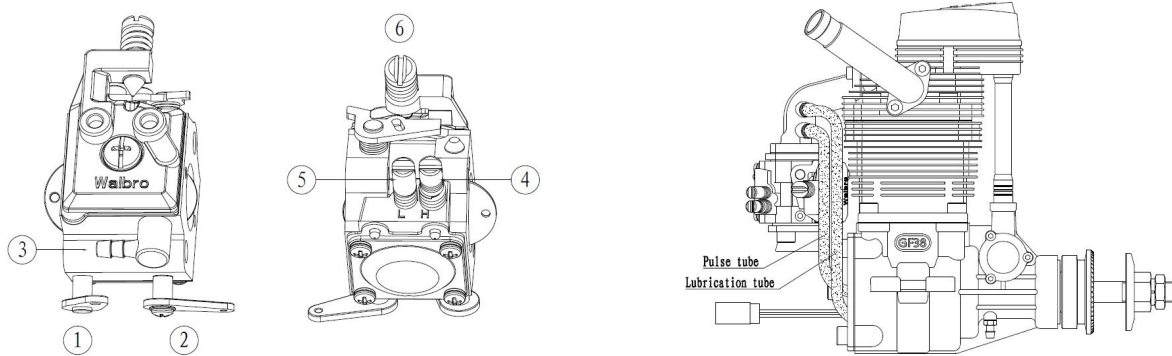


FIG. 1

FIG. 2

NGH-GF38 four-stroke gasoline engine used Walbro WT carburetor is designed for NGH unique. It has the perfect stability of idle speed and acceleration sensitivity.

Always remove fuel from the carburetor after flight. Not doing so will result in rubber carburetor is components deteriorating over time, causing loss of engine performance.

Methods: Start the engine without connecting the fuel pipe until we run out of fuel in the carburetor.

Setup Carburetor:

As shown in FIG. 1,

- ①—Choke: Close it before the first start the engine, and quickly rotating propeller, the fuel oil suction within the tank into the carburetor, when you start the engine should be open it.
- ②—The throttle control arm: Infinitely adjustable-speed device, control the turning speed of the engine.
- ③—Nozzle: Connect the oil tank and supply the fuel to engine.
- ④—High speed needle.: After fully open the throttle control arm ②, adjust the high speed needle can get the best high speed.
- ⑤—Idling speed needle: Put ② return to the initial position, adjust the idling speed needle can obtain satisfactory low speed.
- ⑥—Idle mixture adjustment screw: Adjusting the fuel and air mixing ratio at idle, it actually control the initial position of ②, adjust ⑥ and ⑤ will obtain the better idling speed.

The initial setup of the carburetor is factory settings, the engine first start don't need to adjust.

The factory setting status:

- ④—High speed needle, Fully closed (clockwise) before exiting(anticlockwise) 1.5-1.75 times;
- ⑤—Idle speed needle, Fully closed (clockwise) before exiting(anticlockwise) 1.5-1.75 times;
- ⑥—Idle mixture adjustment screw, The throttle control arm at the other end of the limit pawl near the screw cone about 1mm.

Adjust Carburetor:

When the engine running, you want to adjust the carburetor, please adjust it based on factory Settings:

In the process of adjusting the carburetor, please use a high-quality tachometer to determine your adjusted results, the tachometer you need to buy one.

First adjust the high speed needle: Engine run time will be turned on at full throttle position, adjust the high needle and watch the change of the tachometer, make the engine rpm reach the max per minute. Engine work in a stable high speed (**please note:** do not let the engine run boundary for a long time, this is a big damage for engine). Adjust the idle speed needle: The throttle return to the idle position, adjust the idle speed needle and watch the change of the tachometer. Let the engine run in a stable state of idle speed (Advice 19x8 wooden propeller idle speed at 1800rpm).

When necessary and idle mixture adjustment screw joint adjustments to ensure the engine idle speed stability, smooth acceleration; If the engine is idling start difficult (Exclude CDI ignition power shortage, excessive fuel combustion chamber, spark plug problems and so on). This shows that air-fuel ratio (A/F) is low at idling, please adjust idle mixture adjustment screw, increase air ratio, or adjust idling needle to reduce the amount of fuel, A/F ratio to achieve appropriate proportion. (**Tip:** The larger engine propeller, the more perfect lower idle speed you will get.)

When the engine high speed and idle speed adjustment is completed, try to run the engine acceleration performance. First let the engine to run 10 seconds at idling and the quickly move the throttle control arm at full throttle position, there will be the following three situations:

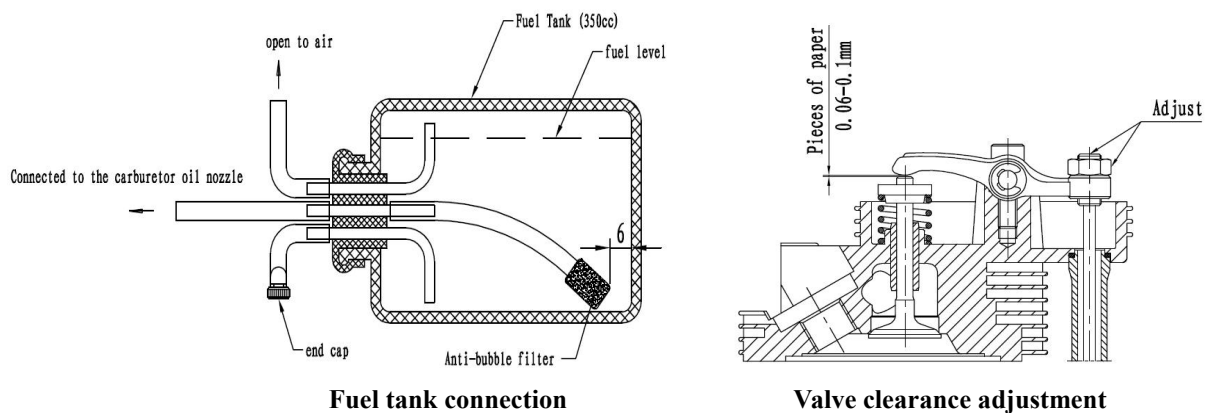
- A. Engine speed is responsive and smooth transition to the highest speed, instructions for the adjustment of the engine is very good.
- B. Engine acceleration has a cough performance, gradually transition to the highest speed, illustrate the idle speed needle set relatively rich oil, the idle speed needle to make a small adjustment (clockwise rotation), and then try again, try to accelerate the reaction constant adjustment until the engine reaches your request.
- C. Rapid throttle when the engine suddenly stopped running, this shows that the idle speed needle set relatively lean oil, the idle speed needle to make a small adjustment (anticlockwise rotation), and then try again, try to accelerate the reaction constant adjustment until the engine reaches your request.

Lubricated tube and Pulse tube connection:

Please according to as shown in FIG. 2 motioned connect, maintain the proper length of the tube, cut off the excess part.

The Fuel Tank Connecting:

As shown in figure



Valve clearance Adjustment:

After approximately 2 hours flight, valve clearance adjustment may be necessary. Before adjusting valve clearance, should check valve body to move freely, no clamping stagnation phenomenon. Due to the thermal expansion of metal materials, valve clearance adjustment should be carried out after engine has cooled completely. Adjust the valves must be in the engine's compression stroke (Intake and exhaust valves in a fully closed position). When adjustment is completed, make sure you tighten the hexagonal nut.

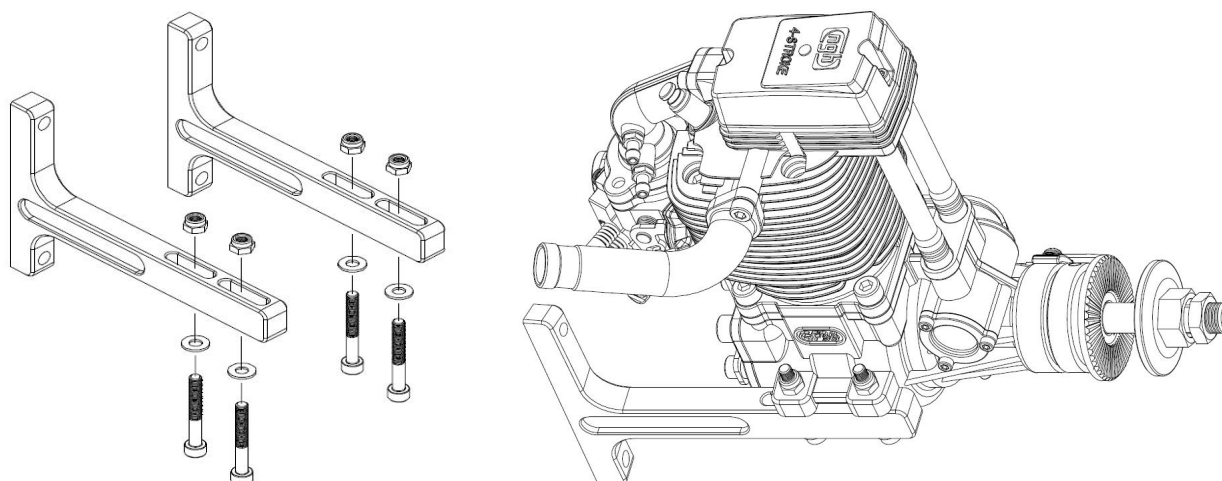
How to adjust the valve clearance:

Remove the rocker arm cover and revolve the propeller slowly clockwise by hand. The intake side rocker arm stops, and by turning it, the piston reaches the compression top dead center (TDC). In this position, take a small piece of paper (thickness 0.06 - 0.1mm) into between rocker and valve. With a hexagonal wrench adjustment, after that, tighten the hex nut (note the hexagonal nut should not be screwed too tight), as shown in the figure below.

The valve clearance is the most important factor in the maintenance of four-stroke engines, and operation with an excess clearance will degrade performance. In particular, a large gap aggravates abrasion of the tappet and the cam and also increases the unusual sound; a small gap (or no gap) is also influence the performance of the engine, so that the valve does not close tightly resulting the compression stroke air leaks.

Engine installation:

NGH-GF38 4-stroke engine need to use rail bracket mount on a suitable RC aircraft. It can effectively reduce the high frequency vibration of four-stroke engine running at a high speed. As shown below:



Notice: Please make sure to install a firewall on the back of RC aircraft using metal flat washer or ratchet nut to prevent the pawl bolt into plywood. Be sure to check before you fly if there are loose bolts.

Starting the engine:

1. According the engine connection method, install the engine on RC airplane and lock propellers.
Made the carburetor initial setup and connect the spark plug, electronic ignition and sensors, put the fuel into the oil tank, connect the power and radio control equipment.
2. Will power off the electronic igniter at this time, make the carburetor inlet port in a fully closed position. Through the motor starter rapidly rotating propeller engine make the fuel in the tank inhalation of carburetor, please pay attention to the suction of fuel should not be too much, otherwise will drown the spark plug, the engine start difficult.
3. Please open the carburetor throttle air inlet, power on the electronic igniter, then start the engine using the motor starter, the engine will begin to work, the fans will adjust the carburetor according to your own need. According to the above steps to adjust the carburetor adjustment.

Warning: Make sure all bystanders, especially children, at least 30 feet away from rotating engine.

Engine Break-in:

Please use the high quality synthetic oils, gasoline and machine oil's mixing ratio is 35:1. NGH is recommended to use smaller size propellers at first break-in and follow-up about 10 times in flight. Keep medium speed running for 15 minutes (no more than 4000rpm) after started engine, then high speed running (6500 rpm) for 3 minutes, again medium speed running for 5 minutes, high speed running for 3 minutes, reciprocating 3-5 times complete break-in. Breaking in engine carefully will increase its life. Please make sure the engine got the complete break-in before you use the larger load propeller.

Engine cooling:

If your engine is installed in the fairing, there must be air entering to cool the engine and ensure enough air flowing in the faring. Reference data: Outlet area should be 3-5 times than the entrance area to ensure adequate cooling.

Engine Failure Removal:

If the engine is difficult to start, idle speed and high speed unstable. Please check: whether the electric circuit and oil line of engine is trouble, whether the engine leaks air, whether the electronic ignition works or its power supply is adequate, whether the spark plug flame out. If necessary, replace with a new spark plug.

Engine Maintenance:

To reduce the fuel consumption, extend engine's life, please adjust the engine's highest speed and make engine run in the output maximum speed of 90% once the gas pedal full opened. If the load is large (Propeller's diameter and screw pitch are big), the fuel must be adequate. If the load is small, the speed will be high while the fuel consumption will be less; Please make sure to empty the carburetor after each flight, otherwise it'll cause the rubber of carburetor aging to affect the engine performance; Please clean the carbon deposition on the spark plug and keep the gap from 0.7mm to

0.8mm between the electrodes; If it's difficult to start the engine, idle speed unstable or when high speed operation flameout, please replace the spark plugs; Please clean the engine surface after used each time, it can make the engine get better cooling; The carburetor may be blocked seriously if you use different brands or types of lubricating oil together, you need select a better fuel filter; If the engine low speed work for a long time, can lead to spark plug carbon deposition; Regularly check the fuel system, make sure do not leak fuel, do not leak air.

Engine Guarantee:

If the NGH engine has performance defects caused by the defects of process, material and manufacturing, we certify that: Change for free within one year and Guarantee within two years since the date you purchased. Please note the guarantee is only for the original purchaser, not including: Normal wear for engine; damage caused by the failure of maintenance; damage for engine over speed operation caused by using small propeller; Bearing rust; Crash; Use inappropriate fuel; Damage caused by foreign bodies; Damage caused by unreasonable installation or operating environment; Damage caused by improper dismantle; Damage caused by any modification.

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