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# **FLAT-HEAD** *ENGINE*

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## **Operating manual**



First of all, thank you for purchasing our product. This is a very precise single-cylinder four-stroke model engine. Before operating your engine, please read the "Startup Precautions" section of this manual and strictly abide by all the instructions in this manual. content to familiarize yourself with the controls and other features of the engine. Also, keep this manual in a safe place so that you can refer to it whenever necessary. When using the radio control equipment to control, please check the radio equipment at the same time.

### **About your engine**

Please keep in mind that your engine is not a "toy", but a high-efficiency internal combustion engine, and its output power may cause injury or other effects to you, please do not modify or disassemble it without authorization.

As a professional user, please be responsible for the safe operation of the engine and be cautious at all times.

If at some point in the future, your engine is acquired by another enthusiast, we will respectfully ask you to hand over this manual to its new owner as well.

The following recommendations are basically applicable to all production engines.

If wrong operation occurs, or safety is ignored, it will cause engine damage or danger.

**WARNING: These events may involve serious (extreme, even fatal) injuries.** Engine fuel is toxic. Do not allow it to come into contact with eyes or mouth, and always store in a clearly marked container out of the reach of children. Engine fuel is highly flammable. Keep away from open flames, excessive heat or any possible ignition source. Don't smoke and don't let anyone smoke nearby. Do not start the engine in an enclosed space. Model engines produce the same deadly carbon monoxide as car engines. Only running your engine in the open will keep you safe.

The model engine will generate considerable heat when it is running, do not touch any part of the engine immediately after the engine has been stopped. Especially the exhaust pipe or cylinder head, improper contact can cause serious burns.

### **Notice**

This engine is suitable for desktop power, popular science experiments, model display, model boat drive, please do not try to use it for any other purposes beyond the scope of use.

Follow our recommendations and use the correct screws and nuts to securely mount the engine to your starter.

There will be noise when the engine starts, please buy our matching muffler exhaust pipe or run it in an environment far away from residents, because the noise of the engine running may make other people feel annoyed.

Safety glasses are strongly recommended.

Take care that the spark plug clips or battery leads do not touch rotating parts. Also check whether the connection of the throttle rocker arm is firm.

For safety, keep all bystanders (especially children) at least 3 meters away when preparing to start the engine.

To stop the engine, close the throttle completely; in an emergency, clamp the fuel delivery line in front of the carburetor to cut off the fuel supply.

Do not attempt to disassemble the flywheel and start the timing pulley.

Do not extend the starter battery cable more than 20 cm. Otherwise, the starting current will be insufficient due to the voltage drop in the internal resistance of the battery wire.

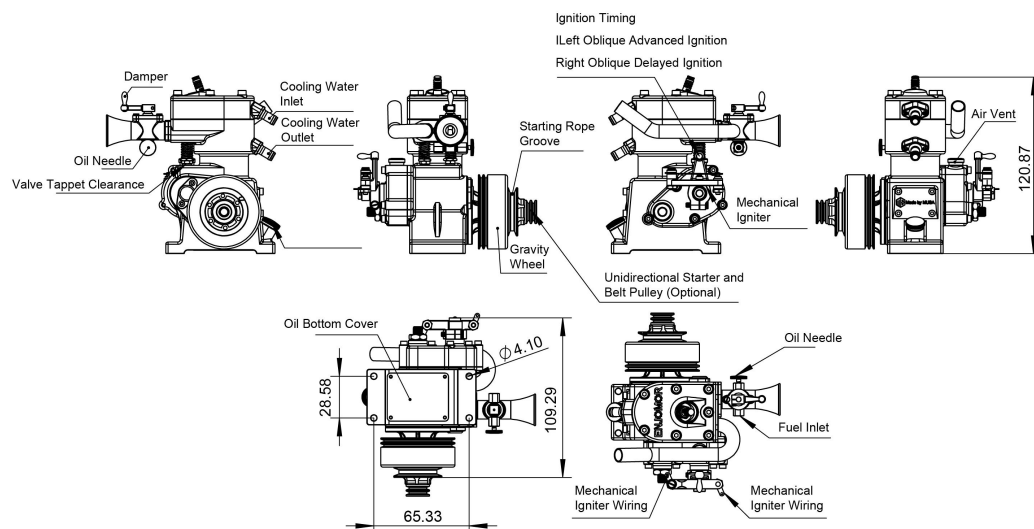
When starting the engine, do not press the start button for a long time. The maximum time to activate each button is 5 seconds. If it does not start, please stop the interval for 15 seconds, and then press the start button to start, so as not to burn the starter motor and ignition wire after starting the line for a long time.

### **Product description**

We will use the Whippet engine designed by Edgar T. Westbury (ETW) in 1963 as a prototype and combine new design concepts to create this retro flat head engine (L-head engine). It's the simplest small engine in the powerplant, but you'll be complimented by how well it works.

Name: Flat-head single-cylinder four-stroke water-cooled gasoline engine  
 Form: Finished product (90% assembled)  
 Weight: About 1.1kg  
 Displacement: About 10cc  
 Bore: 25mm  
 Stroke: 19mm  
 Speed: 2000-6000rpm  
 Power: About 0.5ps  
 Cooling method: Water cooling  
 Start mode: Hand pull / Electric drill start  
 Ignition method: Mechanical ignition (CDI high voltage ignition module)  
 Spark plug: ME-8 1/4-32 spark plug  
 Fuel: 92# and above gasoline (mixed with 15%-20% special oil for two strokes)  
 Oil: 4T oil (5w-20/5w-30/5w-40)  
 Start battery: 7.4V 2S Lipo battery

## Engine structure and components



## Start-up precautions: (the following accessories need to be prepared by yourself)

1. Prepare a MINI water pump and a silicone tube with an inner diameter of 5mm for cooling the engine.
2. Add 15cc-20cc oil (w5-20/w5-30/w5-40) to the engine oil injection port
3. A high-voltage ignition module CDI is required (It is recommended to use RCEXL automatic angle CDI igniter (HV high voltage version)), remove the induction head and weld the positive and negative wires to the left and right antennae on both sides of the mechanical ignition device (do not touch the fuselage to avoid short circuit).

The high voltage wire is connected to the spark plug.

4. Connect the mixed gasoline to the oil inlet of the carburetor of the engine, lock the oil needle clockwise and then back it 2-3 turns. Open the air door to 1/2, block the air door with your fingers and turn the flywheel until you see the fuel entering the carburetor.
5. Set the starter rope (standard) on the starter groove of the flywheel, turn on the power of the ignition module, and start it. (Limited to the shortcomings of mechanical ignition, it needs to be pulled several times)
6. The new machine needs to be run-in, please change the oil after running-in. (Check the oil level at any time to ensure sufficient lubrication)

### **Debugging:**

In order to prolong the service life and improve the performance, we have completed the inspection of each engine at the factory. After receiving the engine, you need to do the correct running-in and cleaning work. After continuous running-in, the cylinder pressure will gradually increase. Due to the high degree of simulation of this engine and many various parts, we do not recommend you to disassemble the engine completely. We will provide various effective after-sales services to help you maintain and use it stably.

When leaving the factory, each engine has completed the oil needle setting. If you have adjusted the oil needle during use, it is recommended to adjust the oil needle to 2.0 turns. Since gasoline engines need to maintain the temperature of the spark plug filament to achieve ignition, when the engine is in a rich state when the engine is in a low speed for a long time, the temperature of the filament will gradually decrease, resulting in difficulty in ignition.

1. The mechanical ignition device tilts to the left to advance the ignition, and tilts to the right to delay the ignition.
2. There should be a clearance of 0.1-0.2mm between the inlet and outlet valves and the ejector rod.

### **Our commitment**

If you have any questions about the product, please contact us in time, we will provide you with a full range of high-quality services.

For product description or detailed information about each part, you can consult us or ask for it.

In the process of use, if there are technical or use problems, we have a professional team to answer you online for free.