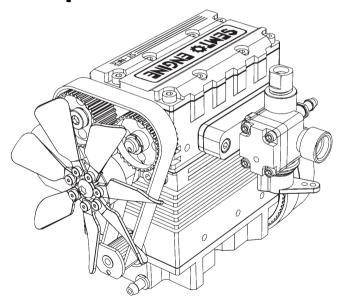
(Semto Engine)

ST-NF2 Operation Manual



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Thank you for choosing our product. The ST-NF2 is a precision inline twin-cylinder four-stroke methanol engine model kit. Before assembling and operating your engine, please read the "Safety Guidelines and Warnings" section on page 1 of this manual, as well as the assembly instructions for the accessories, and strictly follow the recommendations.

In addition, please study the entire content of this manual to become familiar with the engine controls and other features.

Furthermore, please keep these instructions in a safe place so that you can refer to them at any time when necessary.

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Safety Guidelines and Warnings

Please remember that your engine is not a "toy," but a high-efficiency internal combustion engine. The output power can cause harm or other impacts. Do not modify or dismantle it. As a professional user, please ensure safe and cautious operation of the engine. If your SEMTO engine is acquired by someone else in the future, we kindly ask you to pass these instructions on to the new owner.

The following recommendations apply to all produced engines. Improper operation or neglecting safety may result in engine damage or danger.

Translation: Warning: These events may involve serious (in extreme cases, even fatal) injury.

Model engine fuel is toxic. Do not let it come into contact with your eyes or mouth. Always store it in the designated container and keep it away from children.

Model engine fuel is also highly flammable. Please keep away from open flames, overheating, sparks, or any item that may cause ignition. Do not smoke or allow anyone else to smoke near it.

Never operate your engine in an enclosed space. Model engines, like car engines, produce deadly carbon monoxide. Only run your engine in an open area.

Model engines generate a considerable amount of heat. Do not touch any part of the engine before it has cooled down. In particular, touching the muffler, cylinder head, or exhaust manifold may result in severe burns.

Attention:

This engine is designed for scientific experiments, model demonstrations, and model car driving. Do not attempt to use it for any other purpose.

Follow the manufacturer's recommendations and install the engine in your model using appropriate screws and locking nuts.

Some noise will be emitted during start-up. To alleviate this, you can purchase a compatible muffler exhaust pipe from us or place the engine away from any residential area, as operating noise may disturb others.

It is strongly recommended to wear safety glasses. Note that the electrical plug or battery wire should not come into contact with rotating parts. Also, ensure the connection of the throttle arm is secure.

To ensure safety, keep all spectators, especially children, at least 3 meters away when starting the engine.

Product Introduction

SEMTO ENGINE is an engine model brand deeply rooted in the fields of science and education. The SEMTO brand name is derived from the abbreviation of "Science Education. Model To Everyone". Our philosophy is to provide science education model products for everyone who loves DIY mechanical assembly. We constantly collaborate with experts in the science and education field globally. accumulate and precipitate many excellent experiences, Meanwhile, our high-precision research and development team has continuously refined and researched, creating professional assembly drawings and exquisite high-quality model parts. We aim to provide every user who purchases our engine model products with the essence and origin of the mysteries of mechanical operation. We always uphold the spirit of scientific rigor to create various high-quality engine models, keeping the industrial age's mechanical operation model alive and passed down from generation to generation.

The SEMTO team has launched a brand new design of a miniature inline twin-cylinder four-stroke engine model, targeting players with a KIT version, bringing a more ultimate DIY assembly experience and feelings of the charm of hardcore industrial machinery. We have put a lot of effort and sincerity into this engine, believing that it will be welcomed and loved by a large number of engine model enthusiasts.

Basic Parameters

Brand: SEMTO ENGINE

Model: ST-NF2

Type: KIT version with separate parts

Size: 112.0*90.0*92.0mm Color: Red and black Material: Metal

Weight: 535g

Engine Type: Nitro Engine Valve Mechanism Type: SOHC Displacement: 7.0 (3.5*2) cc Cylinder: Inline Twin-cylinder

Stroke: Four-stroke Bore: 16.6mm Stroke: 17.0mm RPM: 4000-16000 rpm Power: 0.6 ps

Cooling System: Air-cooled

Lubrication Method: Splash Lubrication

(apply grease to moving parts)

Starting Method: Electric Starter

Ignition Method: Ignition Module Control (Not Included)

Glow Plug Type: Four-stroke F-type Glow

Plug (Not Included)

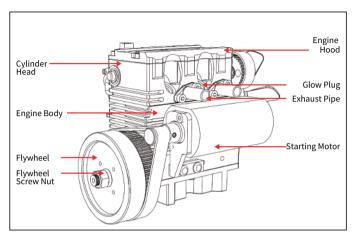
Starting Power Supply: 7.4V 2S Lithium

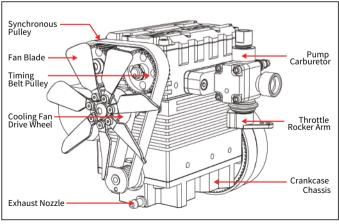
Battery (Not Included) Fuel: 20-25% Nitro Fuel **Suitable Ages:** 14+

Packaging: Graphic Carton

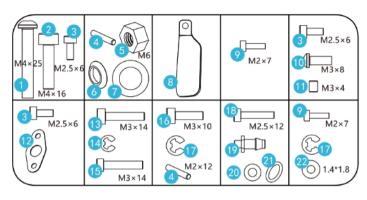
Package List:
Engine Parts*1set
Installation Tools,*1set
Instruction Manual*1set

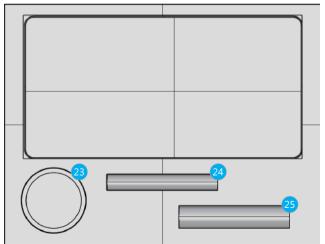
Structure And Parts

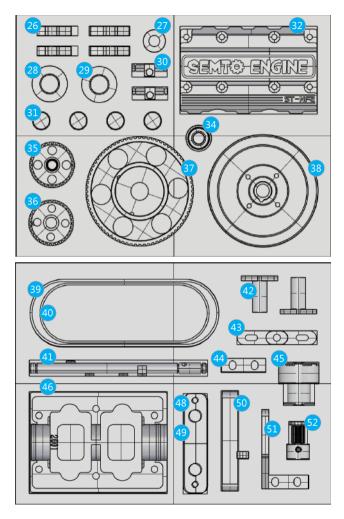


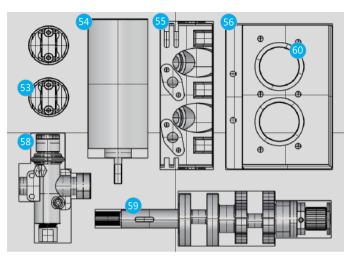


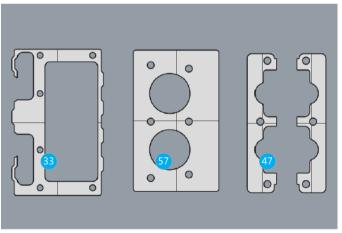
Parts Distribution Diagram



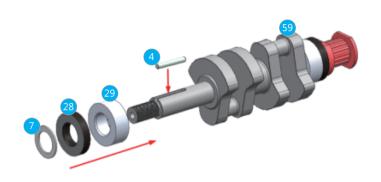


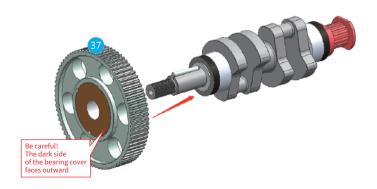


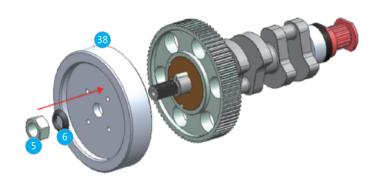


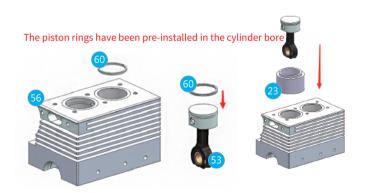


Assembly Steps





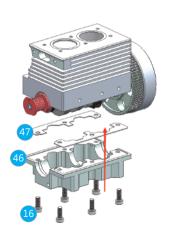


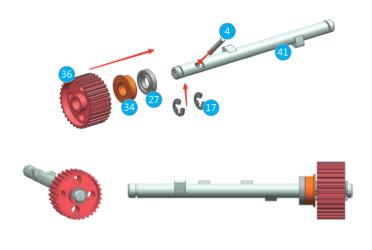


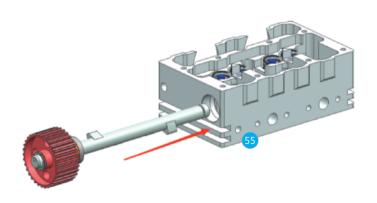


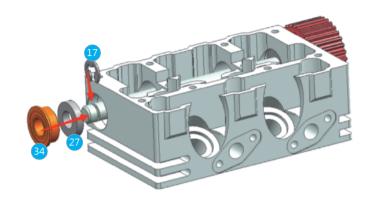


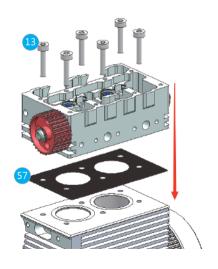
Be careful!
The original pairing shall be kept during disassembly and shall not be confused.
During installation, the concave point at the arrow shall also be kept corresponding

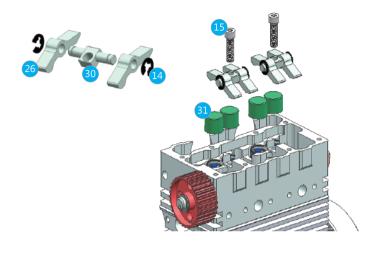


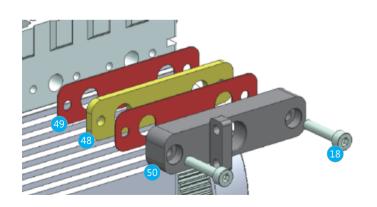


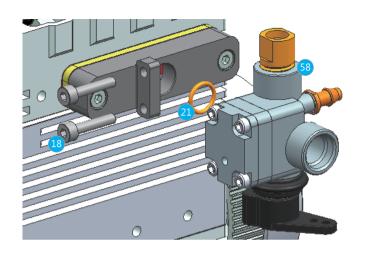


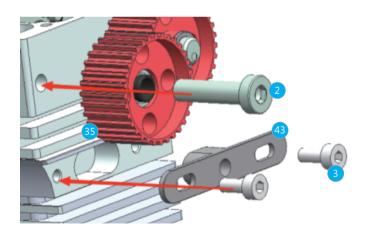


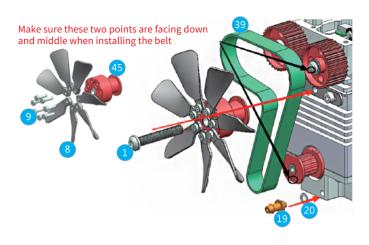


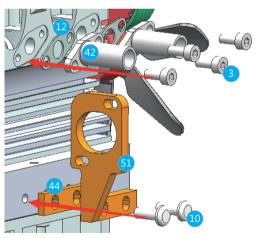


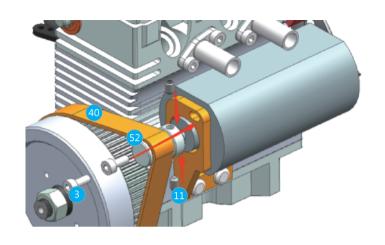


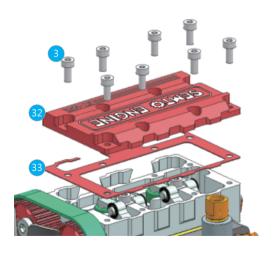


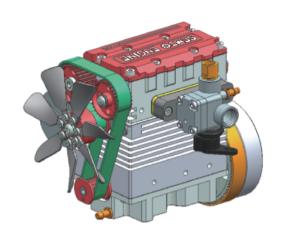


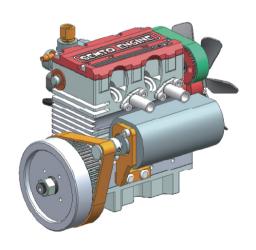












Startup Precautions

Base Installation

Please ensure that the engine mounting surface is level and on the same plane. Improper installation may cause deformation of the crankcase, bearings, etc., resulting in unstable operation and reduced performance. It is recommended to use a 3.0mm hexagonal socket screws for fixing the engine. If the existing holes on the engine bracket cannot be aligned perfectly with the engine mounting holes, do not force the installation to avoid compressing the screws. If installed on other engine platforms, it is recommended to purchase adjustment pads and install them between the engine bracket and the engine.

Electric Glow Plug

The ST-NF2 requires two special electric glow plugs for use with four-stroke methanol engines. The electric glow plug is started by using a 1.5V power source for ignition. When the battery is disconnected, the heat retained in the combustion chamber is still sufficient to keep the filament hot and thus continue to keep the engine running. When the compression reaches the top dead center, an "automatic" ignition burst will be realized while the electric glow plug remains in a high-temperature state, allowing for higher speeds under reduced load, Conversely, as the speed decreases, the electric glow plug will cool down, and if the speed is too low, ignition will stop, causing the engine to shut down. Therefore, you can control the engine speed to achieve the desired effect by adjusting the throttle.

Fuel

Please use a high-quality methanol model engine fuel with guaranteed quality. Self-mixing or using counterfeit fuel will greatly reduce the performance and lifespan of the engine. As it is a four-stroke engine, we require the use of fuel containing 20-25% nitromethane to ensure proper engine operation. Using high nitromethane fuel will

have a significant impact on ignition timing and cylinder pressure, making it impossible to maintain stable operation. When the nitro content of the fuel increases or the fuel brand changes, it is recommended to use a richer needle setting to run the engine so that the optimal setting of the new fuel can be rechecked. (For gasoline fuel, please adjust the ratio within the range of 1:25 to 1:30, and use 2-stroke engine oil.)

Reminder!

When the engine runs at very high speeds and with high-nitro fuel, the lifespan of the glow plug will not last long. Please be reminded that the model engine fuel is toxic. Do not let it come in contact with your eyes or mouth. Always store it in a clearly marked container and keep it out of reach of children. Also, it is highly flammable and must be kept away from open flames, overheating, or any potential ignition sources.

Fuel Tank

It is recommended to use a 100cc fuel tank, which should be installed on the same level as the engine. The distance between the fuel inlet and outlet of the fuel tank and the carburetor should be kept within 1 cm, and the carburetor should be higher than the fuel inlet and outlet. If the gap is too large, the efficiency of the carburetor will be reduced and starting the engine will become difficult. To ensure a clean fuel supply, please use standard 5mm silicone tubing and install an oil filter properly.

Since the engine relies on negative pressure to suck fuel, it is recommended to pressurize the fuel tank with a muffler exhaust pipe.

Starter Power

ST-NF2 requires the purchase of a standard 7.4V 25C lithium battery. Once connected, it can achieve a quick start. Starting batteries with voltages that are too low or too high will not ensure the lifespan of the starter motor.

Starting Environment

Please start the engine in a well-ventilated area to avoid inhaling harmful gases.

Starting Platform

After starting the engine, some vibration may occur, so be sure to place it on a stable level surface.

Cooling

The engine is cooled by a fan, so be careful not to touch the rapidly rotating fan blades, as they may be dangerous. If you notice any cracks in the blades during use, please replace them promptly.

Note!

Before starting the engine every time, please thoroughly check the blades for any cracks. If any cracks are found, it is necessary to replace them to prevent the danger of blade breakage during high-speed operation.

Operation And Adjustment

Notes:

The torque of a four-stroke engine is stronger than that of a two-stroke engine, so appropriate measures should be taken during operation.

To extend the service life and improve performance, each engine undergoes testing before leaving the factory. After receiving the engine, it is important to operate and clean it correctly. As the engine runs continuously, cylinder pressure will gradually increase. Due to the high degree of simulation and the many parts of this engine, we do not recommend complete disassembly. Instead, we will provide effective sales support to assist with maintenance and stable use.

Check the Timing Belt and Camshaft

Make sure the marks on both pulleys are aligned simultaneously. To do this, open the hood and follow the instructions on page 14 to add lubricant. Since the camshaft is pre-installed, be sure to use a solid lubricant to ensure stable operation and prevent dry friction of the camshaft.

Check power supply

Confirm that the 7.4V universal power supply voltage is normal and fully charged.

Initial needle valve setting

This is based on sufficient lubrication and cooling. The engine runs through a very important needle valve setting: the excess oil not only provides rich lubrication but also conducts heat from the surrounding metal and further assists through nitromethane in the fuel. In four-stroke engines, the intake pipe and carburetor are installed high on the cylinder head, which means that each rich cooling fuel mixed with air will enter the cylinder directly instead of being preheated through the crankcase in a longer stroke, as is typical of two-stroke model engines. With the assistance of fan cooling, it provides excellent operating experience for every enthusiast. You

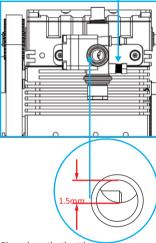
can also purchase SEMTO series water-cooled heat dissipation accessories to keep your engine working stably for a long time.

Reminder!

Each engine has completed the needle valve setting at the factory. If you have messed up the needle valve during use, it is recommended to adjust the main needle valve to 2.0 turns and the auxiliary needle valve to 1.5 turns. Methanol engines need to maintain the temperature of the electric heating plug filament to achieve ignition. When the engine is in a rich fuel state for a long time at low speed, the filament temperature will gradually decrease, causing difficulty in ignition. Therefore, it is necessary to increase the speed periodically to clear the oil and avoid rich fuel at low speed.

In four-stroke engines, a large amount of intake is crucial, so properly setting the throttle screw is important. For all types of engine enthusiasts, the minimum throttle opening (idle setting) should be around 1.5 mm. When adjusting the size of the throttle opening, do not use excessive force to twist the throttle screw. Instead, loosen the valve screw to adjust the throttle lever, as shown in the figure.

Loosen the throttle screw and adjust the size of the throttle.



Please keep the throttle opening greater than 1.5 millimeters.

Start

It is very important to set the throttle in the correct position before attempting to start the engine. It is recommended to set the throttle at 30% open for starting. It is not allowed to open the throttle too much under "no load" conditions, as this will quickly overheat the engine and may cause serious damage to the piston rings and cylinder sleeves.

Connect the electric heating plug battery and press the start button. Once the engine starts, disconnect the electric heating plug battery and keep the engine running slowly under the rich fuel needle setting. (If necessary, gently

adjust the throttle lever to keep the engine idling stably.) If the engine stops, let it cool for 15 seconds before restarting. Each time you start, keep the time for pressing the start button within 5 seconds to protect the life of the starter motor. After the engine starts, let it preheat for 30 seconds before operating, so that the lubricating oil in the fuel can fully lubricate each operating component. When the engine goes from high speed to low speed or from low speed to high speed quickly, and the engine is unstable or the throttle response is slow or the engine stalls, please confirm the working condition of the carburetor:

Rich Fuel

When the engine emits excessive fuel or smoke or accelerates slowly, it indicates that the engine is over-rich. Please rotate the main fuel needle clockwise in 15-degree increments to gradually reduce the main fuel needle until the engine exhaust sound is soft and powerful, and the exhaust pipe has a slight smoke and lubricating fuel spray.

Lean Fuel

If the engine sounds too sharp, like metal-to-metal friction, the temperature rises rapidly, and it stalls immediately after accelerating, it indicates that the engine is lean. Please rotate the main fuel needle counterclockwise in 15-degree increments to gradually enlarge the main fuel needle until the engine sounds low and soft, accelerates powerfully, and the exhaust pipe has a slight smoke and lubricating fuel spray.

Idle Stall

When the engine speed changes rapidly, from high speed to low speed, and it stalls, please confirm whether the throttle is closed to less than 1.5mm or gradually reduce the idle needle (clockwise rotation) in 20-degree increments, and gradually adjust the idle needle until the engine maintains idle stability. During the debugging process, the idle needle should not be reduced too much

to avoid causing the engine to run lean. We recommend that the minimum value of the idle needle should not be less than 1 turn.

Care And Maintenance

ST-NF2 is a highly sophisticated machine that requires regular cleaning due to the wear and corrosion of its engine parts caused by the environment and fuel used during operation. SEMTO can provide long-term maintenance assistance, but basic cleaning and maintenance can also be performed by the user.

Be cautious when cleaning the carburetor and remove any dust and oil residue that may have accumulated outside the air intake.

If an air filter is used, make sure it is clean and not blocked. It is recommended to replace an air filter that has been used for more than an hour.

Carefully clean contaminated filter elements to ensure that dirt does not enter the carburetor.

Do not dismantle the timing belt. Instead, wipe it with alcohol as a cleaning agent. Do not use corrosive cleaning agents to clean the timing belt to avoid damage.

The electric heater plug must be considered a consumable item. Running it for an extended period can compromise the engine's normal operation. However, careful use can extend its life and maintain engine performance by:

- Using appropriate tools for disassembly and assembly:
- Using fuel containing a moderate percentage of nitromethane:
- Not tilting the engine excessively and avoiding battery connections during adjustments.

Replace the electric heater plug under the following conditions, in addition to burnout, as it no longer provides optimal performance:

- a. The filament surface becomes rough and white.
- b. The filament is twisted or deformed.
- c. Foreign matter adheres to the filament or plug body, causing corrosion.
- d. The engine stalls at idle.
- e. The engine shuts off after starting.

After each operation, empty the fuel tank and apply power to the electric heater plug to try restarting the engine until the remaining fuel in the tank is burned out. Repeat this process until the fuel inside the engine is cleared.

Inject a small amount of anti-corrosion lubricating oil and briefly start the motor to distribute the oil to various working components. Do not inject this oil into the carburetor nozzle as it may cause the carburetor's O-ring seal to deteriorate.

Add solid lubricating grease to the camshaft and valve tappets to ensure that the camshaft housing has sufficient lubricant every time it runs.

Note: These maintenance procedures should be performed regularly to avoid the risk of corrosion or difficulty in starting the engine after some time. If you need assistance, please contact us.

Replacement Of Running Parts

After long-term operation, the friction between the engine components will cause wear and excessive clearance. Replacing the relevant parts will better maintain the stable operation of the engine.

If you encounter problems such as difficult starting, reduced power, and unstable idle during use, please provide feedback on your use process and engine performance to your local dealer or SEMTO. We will be happy to serve you.

For parts replacement, we will provide professional equipment and an experienced team to complete the task. Please do not disassemble the engine without professional tools to avoid uncontrollable damage to the engine.

Bug Checking

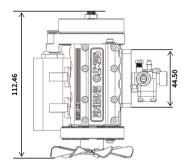
If the engine cannot start, please carefully check the following:

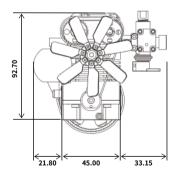
- a. Check if the battery voltage is normal and fully charged.
- b. Check if the glow plug is malfunctioning.
- c. Check the fuel supply. Make sure the fuel can smoothly reach the carburetor.
- d. Check the needle valve. If the needle valve is set incorrectly, restore it to the factory setting and adjust it according to the actual running condition of the engine. Different regions, altitudes, temperatures, and humidity levels can affect the needle valve setting. Please adjust it patiently according to the local conditions.

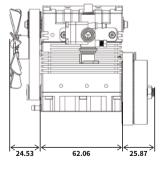
- e. If the engine is flooded, do not force it to start. Remove the glow plug, close the oil needle, and press the start button to discharge excess fuel (cover the spark plug hole with a piece of cloth so that the fuel does not splash on you). If you force the engine to start without removing excess fuel, it may cause irreparable damage to the starting system and also cause pulling and deformation to the connecting rod and crankshaft.
- f. Stalling at low speed. Do not maintain low RPM for a long time. The engine needs the glow plug to maintain its temperature for ignition. When the engine runs at low speed for a long time, it will enter a surplus state, causing the temperature of the glow plug filament to gradually decrease, resulting in stalling. To prevent this situation, it is necessary to regularly increase the speed to remove oil stains and maintain the temperature of the filament.
- g. Damage check. Check if all parts are damaged or worn. If any component is found to be damaged or worn, purchase new parts immediately and replace them (it is recommended not to disassemble the engine without professional guidance or assistance).

Engine View

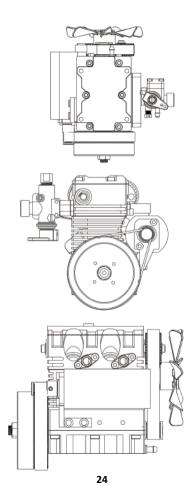
Three Views



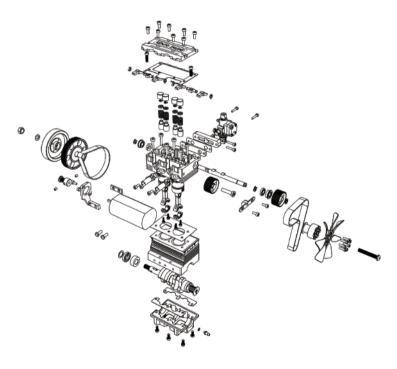




Multi-View



Exploded Diagram



Bom List

Number	Part Name	Quantity
01	Screw (M4X25)	1
02	Screw (M4X16)	1
03	Screw (M2.5X6)	12
04	Round pin (φ2X12)	2
05	Nut(M6)	1
06	Gasket	1
07	Flat gasket	1
08	Fan blade	7
09	Screw (M2X7)	11
10	Screw (M3X8)	2
11	Screw (M3X4)	2
12	Exhaust pipe gasket	2
13	Screw (M3X14)	6
14	Jump spring (φ2.5)	4
15	Screw (M3X14)	2
16	Screw (M3X10)	6
17	Jump spring (φ3.5)	6
18	Screw (M2.5X12)	4
19	Lubricating nipple	1
20	Flat gasket(φ6)	1
21	O ring(8*1)	1
22	O ring(1.4*1.8)	2
23	Piston ring sleeve	1
24	5.1 aluminium sleeve	1
25	8.1 aluminium sleeve	1
26	Rocker arm	4
27	oil seal	2
28	oil seal	1
29	Bearing	1
30	Rocker arm frame	2
31	Valve cover	4
32	Engine hood	1
33	Engine hood gasket	1
34	Flanschlager	2
35	guide pulley	1
36	A pulley	1
37	Start belt pulley component	1

umber	Part Name	Quantity
38	Flywheel	1
39	Synchronous belt (88)	1
40	Synchronous belt (101)	1
41	Camshaft	1
42	Exhaust siphunculus	2
43	Belt fastener	1
44	Motor bracket gasket	1
45	Mini belt roller	1
46	Bottom of the casing	1
47	Bottom gasket of casing	2
48	Intake gasket	1
49	Intake gasket (red paper)	2
50	intake-tube	1
51	Motor bracket	1
52	Ten -tooth adapter	1
53	piston	2
54	EG start	1
55	Cylinder cap	1
56	Cylinder block	1
57	Cylinder head gasket	2
58	Pump carburetor	1
59	Crankshaft component	1
60	Piston ring	2

After-Sales Service

Thank you for choosing our company's product. We will provide you with satisfactory after-sales technical support.

We recommend that you carefully read the assembly instructions, operation manual, relevant precautions, etc. before making the model, which we believe will be very helpful for you. If you need technical support, you can contact our store staff.

After-sales service standards

Due to differences in photography techniques and computer color deviation, the color of the actual product should prevail over the images.

Due to the continuous improvement and upgrading of product performance by manufacturers, product parameters and structures may be changed without prior notice. Please refer to the actual product.

Before the kit is shipped, a special person from our company will do a detailed inspection and test each item to ensure that it functions properly. When the delivery company delivers the goods, please be sure to check the integrity of the goods in detail in person. If any damage to the goods is found during the transportation process, the logistics company should provide relevant evidence or reject them on the spot, and send relevant photos to our company's customer service email within 24 hours. Otherwise, the related losses and responsibilities shall be borne by the buyer. If the model has other problems, you should also contact our company within 7 days.

Before using the model product, you must carefully read the product operation manual and comply with the manufacturer's instructions for use, maintenance, and care. Our company does not assume any responsibility for losses or injuries caused by improper use of the product, such as water ingress, fire, disassembly, modification, etc., nor does it assume responsibility for product damage caused by intentional or unintentional destruction, drops, or impacts.

Model products are definitely fragile, especially for beginners who are more likely to damage them (perhaps due to unfamiliarity with the parts). We ensure that every part is tested before being sent out. Therefore, the company does not provide any refund or compensation services for parts damaged in a short period of time, unless they are unused and absolutely new, and provide corresponding evidence verified by our staff. In this case, the entire set can be sent back to the manufacturer for repair, and the shipping fee will be borne by us. For other repair processing, the shipping fee will be borne by the buyer.

If the customer raises the issue that the product cannot meet the product description function within three days after receiving the goods, and it is proven true by a government-recognized third-party organization (or recognized by our company), our

company will provide free maintenance or replacement of parts. Customers cannot request a return or exchange due to personal perception of product performance differences (such as novice cannot operate), material manufacturing differences, and other differences.

When non-company product quality issues cause product damage and require repair, our company can provide repair services, but parts and labor costs will be charged. The transportation and postage fees incurred during the repair will be borne by the customer.

Model products must be used under the conditions or requirements allowed and regulated by the local government. Our company does not assume any liability for compensation for losses or injuries caused by improper use of the product or accessories by the user or third parties.

For some common sense and precautions when using model products, please refer to the product manual.

The final interpretation right belongs to our company.

User Feedback and Support

Dear buyer, we promise to provide you with high-quality and reliable service for the product you purchased, and to offer any assistance you may need. In the actual use of the product, if you encounter any technical or usage problems, our professional technical team will provide free online assistance. You can also consult with the merchant for detailed information about the product, and to obtain various parts and full-service solutions. Please contact the seller who sold you the product in a timely manner, and you can contact them through the internet or email.



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