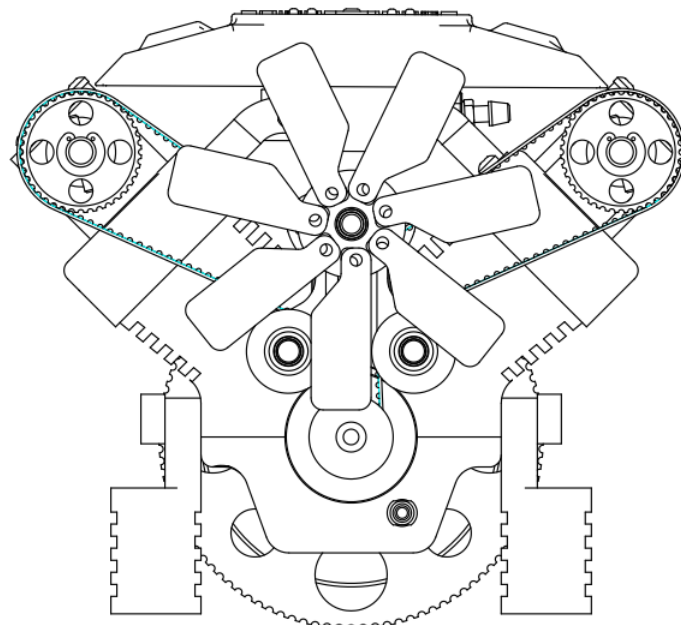

TOYAN *ENGINE* ***FS-V400A & FS-V400GA***

OWNER' S INSTRUCTION MANUAL



First of all, thank you for choosing our products. The **FS-V400x** series is a very sophisticated V-type four-cylinder four-stroke model engine. It is of vital importance, before attempting to operate your engine, to read the general 'SAFETY INSTRUCTIONS AND WARNINGS' section on pages 3-5 of this booklet and to strictly adhere to the advice contained therein.

Also, please study the entire contents of this instruction manual, so as to familiarize yourself with the controls and other features of the engine.

Keep these instructions in a safe place so that you may readily refer to them whenever necessary.

It is suggested that any instructions supplied with the vehicle, radio control equipment, etc., are accessible for checking at the same time.

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ABOUT YOUR TOYAN ENGINE

Remember that your engine is not a “toy” , but a highly efficient internal-combustion machine whose power is capable of harming you, or others, if it is misused.

As owner, you, alone, are responsible for the safe operation of your engine, so act with discretion and care at all times.

If at some future date, your Toyon engine is acquired by another person, we would respectfully request that these instructions are also passed on to its new owner.

■The advice which follows applies basically to ALL MODEL ENGINES and is grouped under two headings according to the degree of damage or danger which might arise through misuse or neglect.

WARNING: These cover events which might involve serious (in extreme circumstances, even fatal) injury.

●Model engine fuel is poisonous. Do not allow it to come into contact with the eyes or mouth.

Always store it in a clearly marked container and out of the reach of children.

- Model engine fuel is also highly flammable. Keep it away from open flame, excessive heat, sources of sparks, or anything else which might ignite it. Do not smoke or allow anyone else to smoke, near to it.
- Never operate your engine in an enclosed space. Model engines, like automobile engines, exhaust deadly carbon-monoxide. Run your engine only in an open area.
- Model engines generate considerable heat. Do not touch any part of your engine until it has cooled. Contact with the muffler (silencer), cylinder head or exhaust header pipe, in particular, may result in a serious burn.

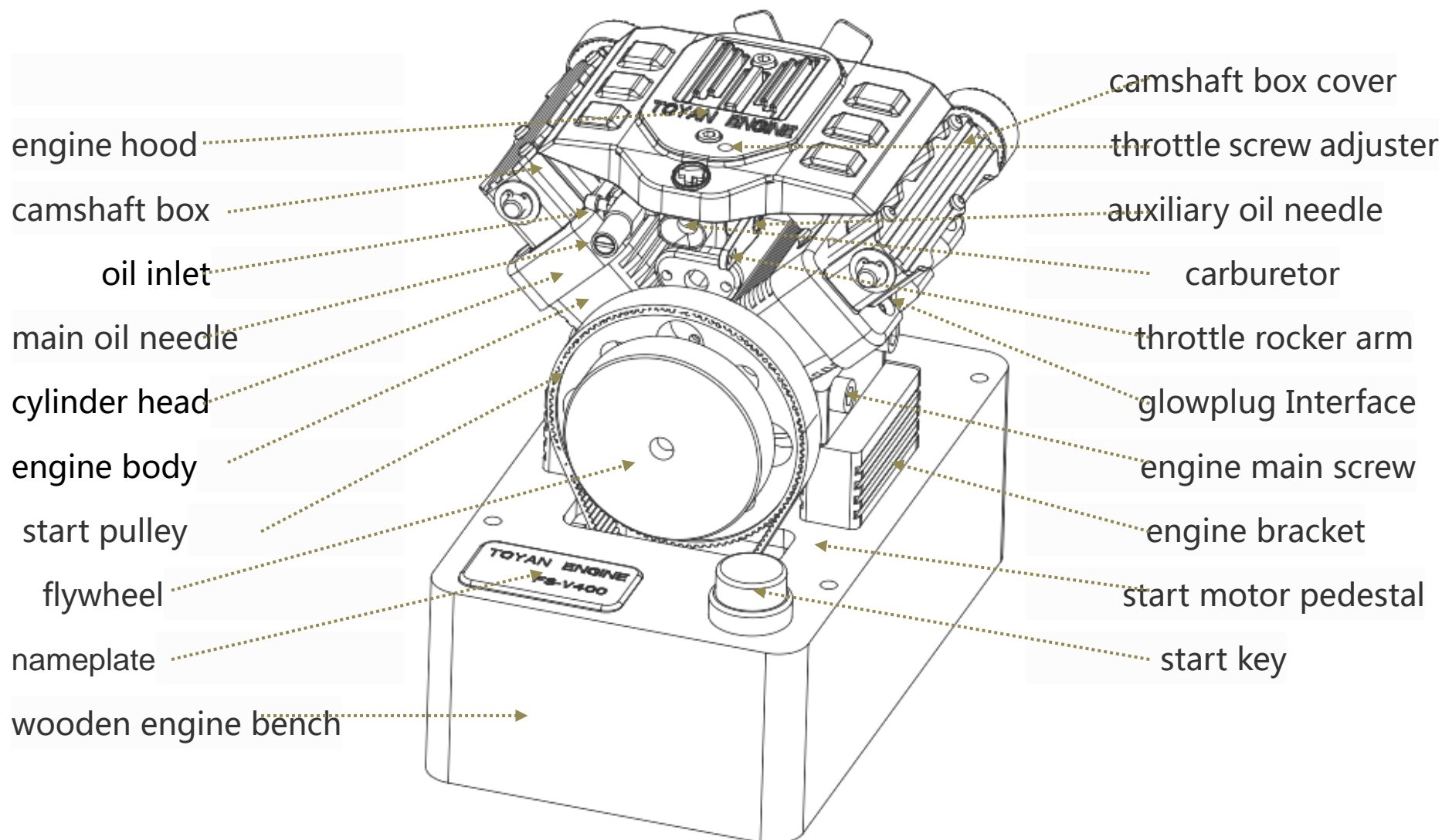
NOTES

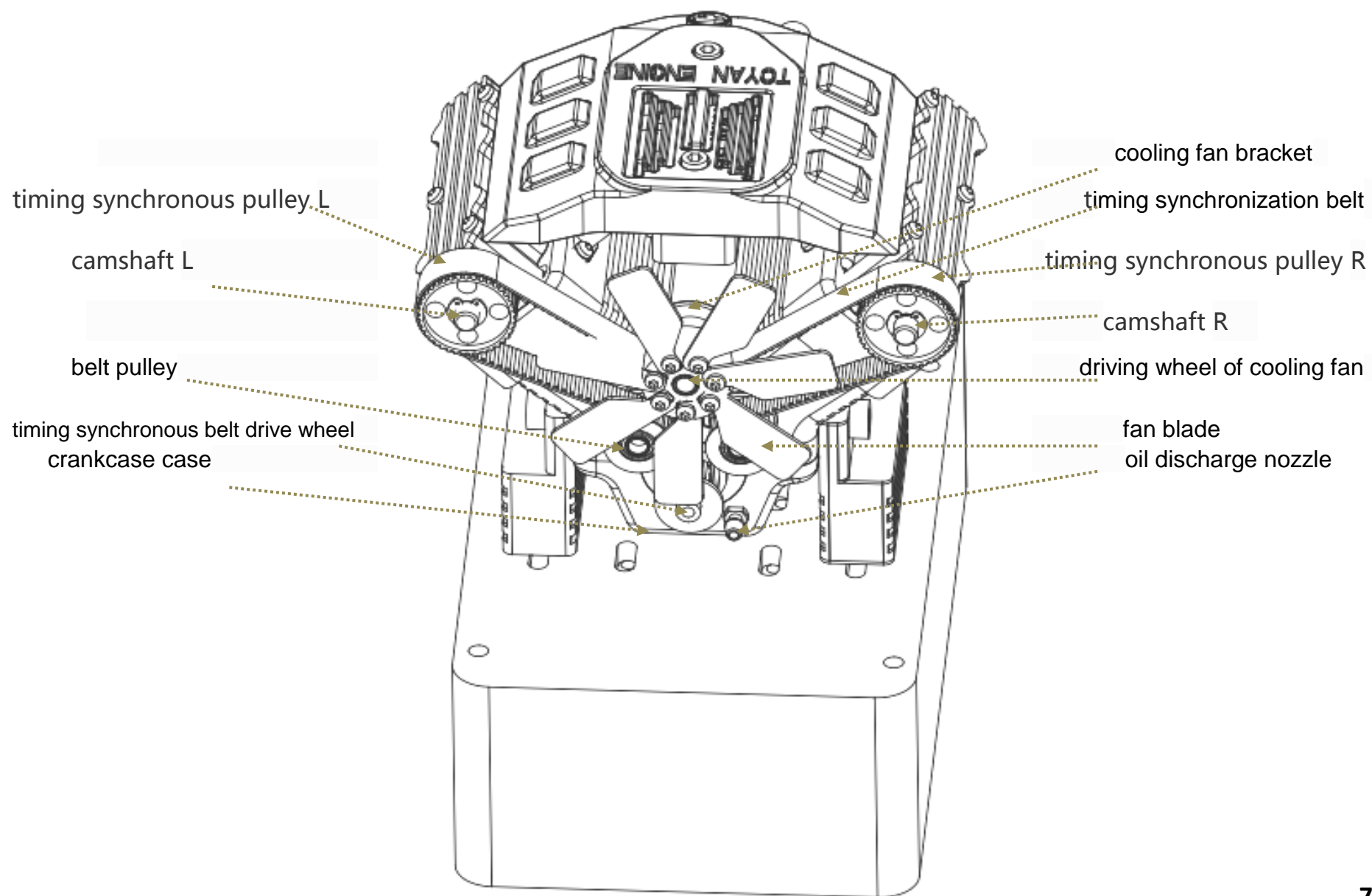
- This engine is intended for model cars. Do not attempt to use it for any other purpose.
- Mount the engine in your model securely, following the manufacturers' recommendations, using appropriate screws and locknuts.
- Fit an effective silencer (muffler). Frequent close exposure to a noisy exhaust (especially in the

case of the most powerful high speed engines) may eventually impair your hearing and such noise is also likely to cause annoyance to others over a wide area.

- The wearing of safety glasses is also strongly recommended.
- Take care that the glowplug clip or battery leads do not come into contact with rotating parts. Also check that the linkage to the throttle arm is secure.
- For their safety, keep all onlookers (especially small children) well back (at least 10 feet or 3 meters) when preparing your model for running.
- To stop the engine, fully retard the throttle stick and trim lever on the transmitter, or in an emergency, cut off the fuel supply by pinching the fuel delivery tube from the tank.
- Do not attempt to disassemble the recoil starter.
- Do not extend the starter cord more than 20cm (8").
- When starting the engine, please do not press the startup key for a long time. The maximum time for each key to start is 5 seconds. If not, Please stop for 15 second, then press the start key to start, so as not to burn the start motor and ignition circuit for a long time.

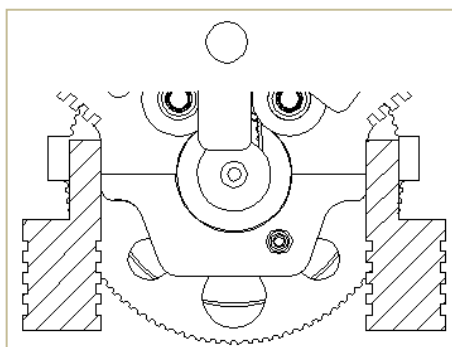
BASIC STRUCTURE AND PARTS



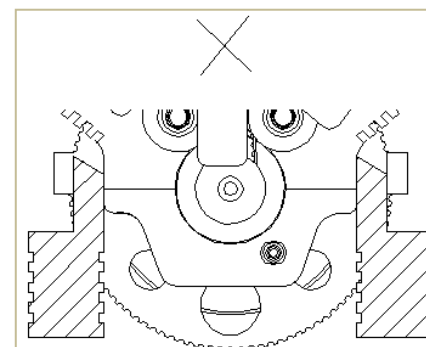


ENGINE INSTALLATION

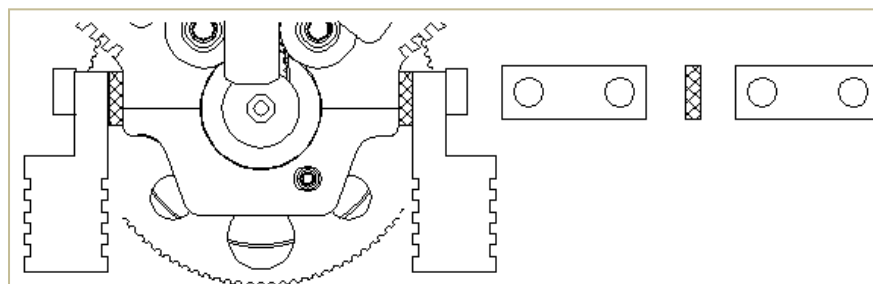
Make sure that the vehicle's engine mounting surfaces are level and in the same plane. Poor installation may cause distortion of the crankcase, bearings, etc., resulting in erratic running and loss of performance. The recommended screws for securing the engine are 4.0mm inner hexagonal socket type. If existing holes in the engine mount do not align perfectly with engine installation hole. Do not force installation to avoid pressing the screws. If installed on other engine platforms, it is recommended to purchase adjustment pads and install them between engine mount and engine.



Please select the correct and stable engine mount



Do not use unstable or defective engine mount



If the width of engine mount needs to be adjusted, please purchase TOYAN special adjustment pad.

NOTES ON ENGINE START

For personal safety, it is strongly recommended not to disassemble the engine and start-up mechanism. If you encounter start-up problems, you can contact local distributors or TOYAN technicians to solve them. If you need to return to the factory for testing, TOYAN will provide you with high-quality after-sales service. If there is a bad situation caused by private disassembly, you will bear the corresponding responsibilities and costs.

1. GLOWPLUG:

The FS-V400x series requires 4 glowplug, specially designed for four-stroke methanol engines. With a glowplug engine, ignition is initiated by the application of a 1.5-volt power source. When the battery is disconnected, the heat retained within the combustion chamber remains sufficient to keep the plug filament glowing, thereby continuing to keep the engine running. When the top dead point of compression is reached, the "automatic" ignition explosion will be realized, while the electric heat plug remains in a high temperature state, under reduced load, allowing higher rpm. Conversely, at reduced rpm, the plug becomes cooler. If the speed is too low, the ignition

will stop and the engine will stop, so you can control the engine speed by adjusting the Throttle to achieve the best effect you want.

2. FUEL:

Use only top quality methanol-based model engine fuel. Self-made or counterfeit or inferior fuel will greatly reduce the performance and life of the engine. As it is a four-stroke engine, in order to ensure the normal operation of the engine, we recommend a fuel containing **15-20%** nitromethane , If the high nitro fuel is used, the ignition time and cylinder pressure of the engine will be greatly affected and the normal and stable operation will not be maintained. When the nitro content of the fuel increases or the fuel brand changes, it is recommended to use oil-rich needle adjustments to run the engine so that the optimum setting of the new fuel can be re-examined.

Reminder!

When engines are run at very high speeds and on high-nitro fuels, glowplug elements will not last as long. Please pay attention again, model engine fuel is poisonous. Do not allow it to come into

contact with the eyes or mouth. Always store it in a clearly marked container and out of the reach of children, Model engine fuel is also highly flammable. Keep it away from open flame, excessive heat, sources of sparks, or anything else which might ignite it

3. FUEL TANK:

It is suggested to use a 100 cc tank. The installation of the tank should be kept on the same plane as the engine. The difference between the fuel output port of the tank and the fuel input port of the carburetor should be kept within **3 cm** (only the carburetor is higher than the fuel output port of the tank). Excessive drop will reduce the working efficiency of the carburetor and have adverse effects on the start-up of the engine. In order to ensure clean fuel supply, please use standard 5 mm silicone tubing and install oil filter correctly. Since the engine itself can produce enough negative pressure oil absorption, it is recommended that the fuel supply nozzle should not be pressurized by the muffled exhaust pipe, and the fuel output port of the tank should be directly connected to the fuel input port of the carburetor.

4. START-UP POWER SUPPLY:

FS-V400x series has been installed starting motor, can achieve a one-click start, you only need to buy standard **11.1V 30C** lithium battery to achieve rapid start-up. Starting batteries with too low or too high voltage will not guarantee the service life of starter motor. Do not use starter batteries with incorrect voltage.

5. START-UP ENVIRONMENT:

Start the engine in an open, airy environment to avoid discomfort caused by burnt gases.

6. START-UP PLATFORM:

Since the engine will generate some vibration after starting, please place it on a stable and flat platform to start.

7. HEAT DISSIPATION:

As the engine has been forced to dissipate heat by fans, high-speed rotating fan blades will be dangerous. Do not touch them with your hands. Due to the use of aluminium blades, each blade has been balanced. Do not change the position of the blade and twist the blade at will, in order to avoid metal fatigue fracture. If cracks are found in the blades during use, please purchase and

replace them in time. We will also attach spare blades to the packing box for your replacement.

Reminder!

Every time when starting the engine, please carefully check whether the blades have cracks. If cracks have occurred, they must be replaced to avoid the danger of blade ejection in high-speed operation.

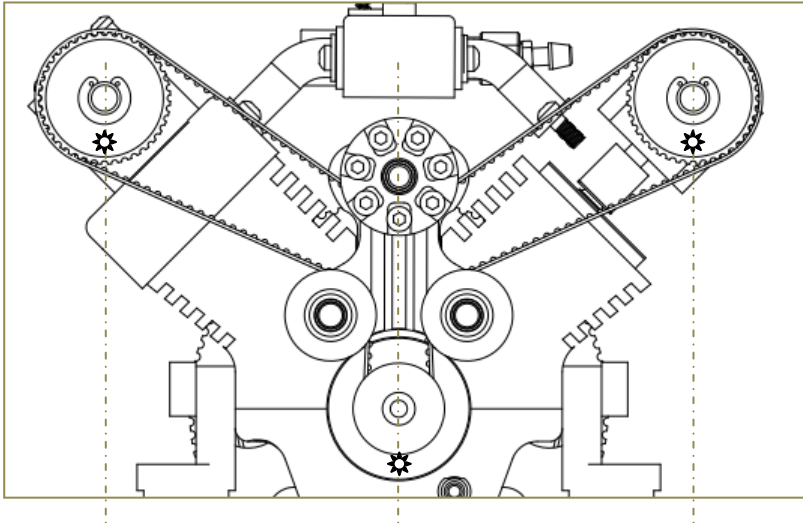
STABLE RUNNING AND ADJUSTMENT

NOTES!

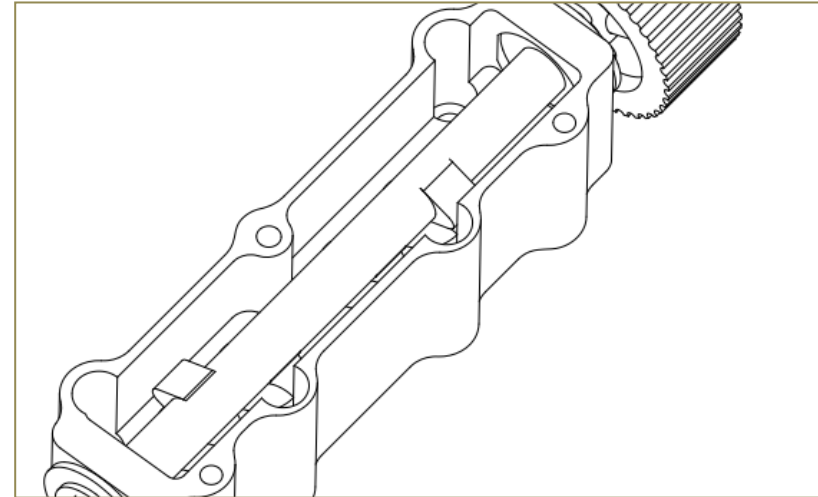
Four-stroke engine has stronger torque output than two-stroke engine, so corresponding measures should be taken in operation.

In the interests of a long working life and high performance, every engine has been “run-in” and test at the factory. You don't need to do running-in and disassembly cleaning. Because of its high simulation and many parts, we do not recommend that you disassemble the engine. We will provide a variety of effective aftersales to help you maintain and stable use.

1. Timing Synchronization Belt and Camshaft Box Inspection :



Timing synchronization belt sequence diagram, please make sure that the marker points are in the same position.



Make sure that lubricating paste has been added to the camshaft box, and it can not run without lubrication.

2. Power Inspection:

- Make sure that the voltage of 1.5V universal ignition power supply is normal and the storage power is full.
- Make sure that the 11.1V start-up battery voltage is normal and the storage capacity is full.

3.Initial needle setting:

The prerequisites here are ample lubrication and cooling. Such a condition is achieved by having the engine operate on an extremely rich needle-valve setting: the excess oil not only provides an abundance of lubrication; it also conducts away heat from the surrounding metal and this is further assisted by the partial evaporation of the alcohol content of the fuel. it is a four-stroke engine with inlet pipe and carburetor mounted high on the cylinder-head, means that each charge of rich, cooling, fuel-air mixture is admitted directly into the cylinder, instead of being pre-heated in a lengthy journey via the crankcase, as in the usual two-stroke model car unit.

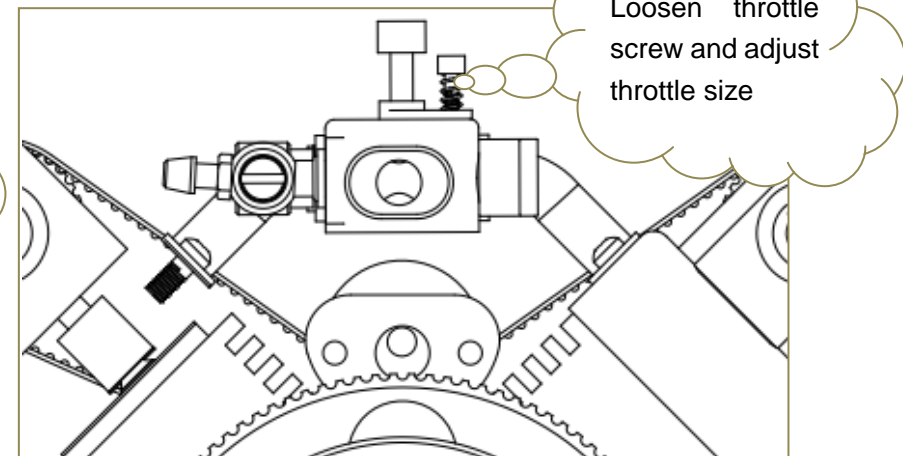
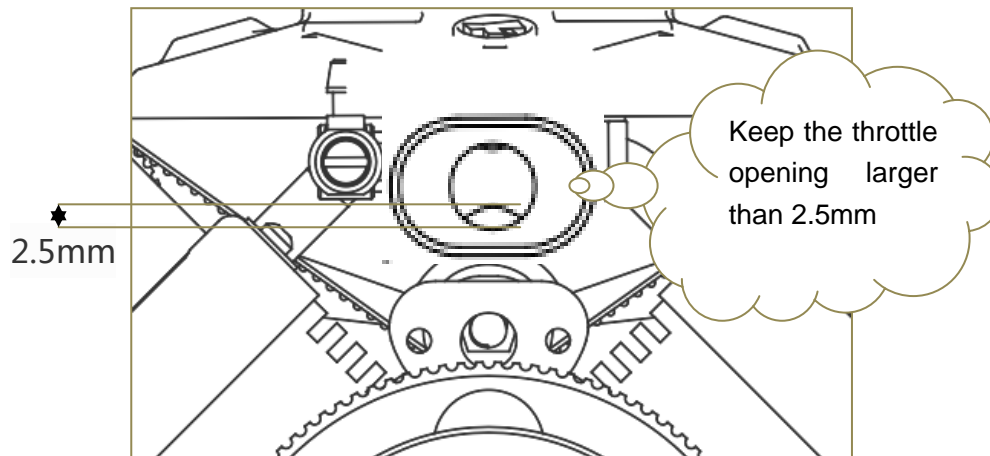
With the help of fan cooling, it can provide excellent operation experience for every enthusiast. You can also purchase TOYAN series of water-cooled heat dissipation accessories, so that your engine will be able to maintain long-term stable work.

Reminder!

When leaving the factory, each engine has completed the needle setting. If you have adjusted the

needle during use, it is recommended that the main needle be adjusted to **3 laps** and the auxiliary needle to **3.5 laps**. Since the methanol engine needs to keep the filament temperature of the electric plug in order to realize ignition, when the engine is in the oil-rich state for a long time at low speed, the filament temperature will gradually decrease, resulting in ignition difficulties, so it is necessary to pull high speed oil at intervals to avoid oil-rich at low speed

Since the four-cylinder four-stroke engine requires a large amount of air intake, it is very important to set the throttle upsetting wire, so that the minimum throttle opening (idle speed setting) is about **2.5mm**. Because the throttle upsetting wire is designed to be self-locking mode for all kinds of engine enthusiasts, it is not necessary to twist the throttle upsetting wire to adjust the size of the throttle opening, but to relax the throttle upsetting wire. Wire, then pull the valve rocker arm to adjust. As shown in the figure:



4.STARTING

Reminder!

It is very important to set the throttle in the right position before attempting to start the engine. The engine is not allowed to open too much throttle under "no load" conditions, which will quickly overheat and may seriously damage the engine piston ring and cylinder liner.

Connect the glowplug battery and apply the electric starter. As soon as the engine starts, disconnect the glowplug battery, keeping the engine running slowly on the rich needle setting. (If necessary, make a slight readjustment to the throttle stick to keep the engine idling steadily.) If the engine stops, allow it to cool for 15 seconds before restarting it. In fact, short runs interrupted by brief cooling-off periods is good practice during running-in. Every time you start, please keep pressing the start button for 5 seconds to protect the starter motor life. After starting the engine, let it warm up for 30 seconds before operating, so that the oil in the fuel can be fully lubricated to each moving part. When the engine quickly drops from high speed to low speed, or when the speed rises to high speed at low speed, the engine is unstable or the throttle control is slow or flameout. Please confirm the working status of the carburetor:

●Oil-rich

When the engine has more fuel or smoke ejection or slow acceleration, indicating that the engine is excessively rich in oil, please rotate the main needle clockwise, with 15 degrees as a unit, gradually reduce the main needle until the engine exhaust sound is soft and powerful, and the

exhaust pipe has a slight smoke and lubricating fuel ejection.

●Oil-poor

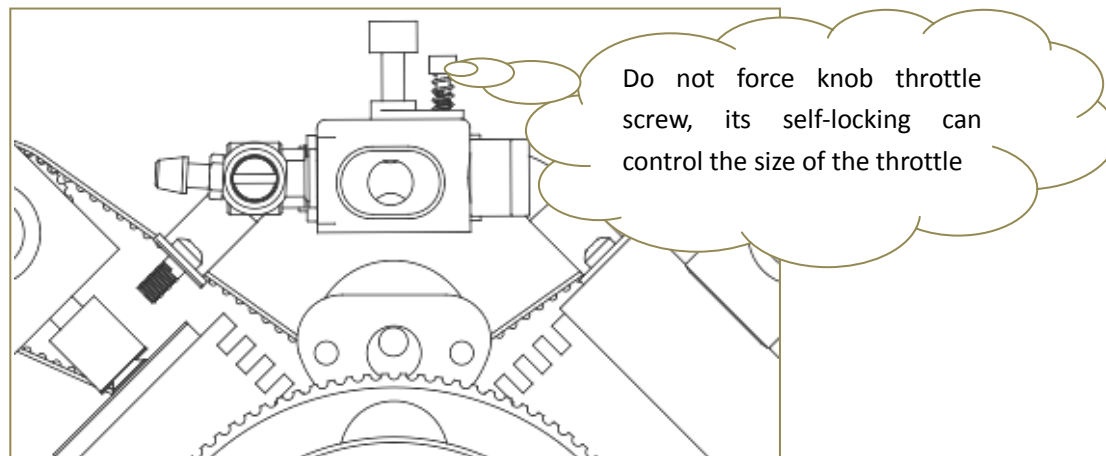
If the engine sound is too sharp, like the sound of dry friction between metals, the temperature rises sharply and the engine goes out quickly, indicating that the engine is poor in oil, please rotate the main needle counter-clockwise and gradually enlarge the main needle in 15 degrees until the engine sound is low and soft, the acceleration is strong, and the exhaust pipe emits a little smoke and lubricating fuel.

●Idling Stop

When the engine speed changes rapidly, it suddenly adjusts from high speed to low speed. When the engine stalls, please make sure that the throttle is closed less than 2.5mm, or that the auxiliary oil needle is gradually reduced (clockwise rotation) by 20 degrees, gradually adjusting the auxiliary oil needle until the engine remains idle stable. In the process of debugging, the auxiliary oil needle should not be reduced excessively, so as to avoid the poor oil of the auxiliary oil needle. We suggest that the minimum value of the auxiliary oil needle should not be less than 2 laps.

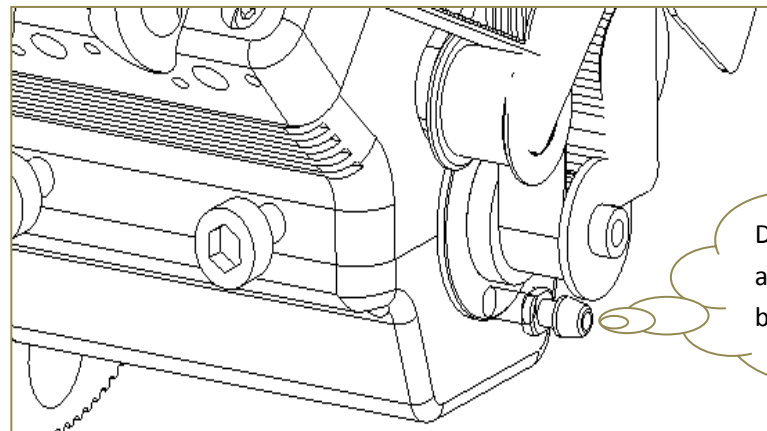
5. Speed Control

If the speed is fixed and the throttle screw is tightened slightly, the size of the throttle opening will be fixed and the engine speed will remain constant. If the throttle screw is relaxed, the throttle can be adjusted freely, and the engine speed can be adjusted. At the same time, the maximum speed can be adjusted by the throttle screw.



6. Waste oil removal

FS-V4XX series, because of the use of four-cylinder technology, crankshaft in the crankcase needs stable lubrication to achieve long-term work, so we designed a fuel lubrication tank structure, which can lubricate crankshaft and connecting rod. The collected oil will be discharged from the exhaust nozzle of the engine chassis. Please connect the silicone hose to drain oil, so as to avoid contaminating the worktable surface.



Do not plug the outlet
and do not access the
booster outlet of the tank.

REGULAR CARE & MAINTENANCE

FS-V400x series is a very sophisticated machine, you need to regularly clean it; mainly due to the impact of the environment and fuel in the use process, the engine parts have a certain degree of wear and corrosion, so we TOYAN will also provide you with long-term maintenance services.

You can also finish the basic cleaning and maintenance by yourself.

- Carburetor should be carefully cleaned to remove dust and grease from the previous intake.
- If air filters are used, make sure they are clean and free of clogging.
- It is suggested that the air core should be replaced in time when it is used for more than one hour. Carefully remove contaminated filter elements to ensure that dirt does not enter the carburetor.
- Do not dismantle timing synchronous belt. Alcohol can be used as a cleaning agent to wipe the belt. Do not use corrosive cleaning agent to clean synchronous belt to avoid damage.

- Electric plugs (spark plugs) must be regarded as consumables. Long-term running electric plugs will not guarantee the normal operation of the engine. However, careful use can prolong its life and maintain engine performance, that is:
 - ◆ Use appropriate tools for disassembly and assembly;
 - ◆ Use fuel containing medium percentage of nitromethane;
 - ◆ Do not overtilt the engine, and do not connect the battery when adjusting.
- When to replace the electric plug (spark plug), in addition to burning, these situations also need to be replaced, because it no longer provides the best performance, such as:
 - a. Roughening and whitening of filament surface (spark plug carbon deposition)
 - b. Filament crimping deformation (spark plug electrode deformation)
 - c. External objects adhere to filaments or plug corrosion (spark plug electrode corrosion)
 - d. The engine stalls at idle speed
 - e. When the engine starts, it stalls due to power failure
- At the end of each operating session, drain the fuel tank, then energize the glowplug and try to

re-start the engine to burn off any fuel that may remain inside. Repeat this procedure until the engine oil is removed.

- Inject some corrosion-inhibiting after-run oil and rotate the crankshaft to distribute oil to the working parts. Do not inject such oil into the carburettor, however, as it may cause deterioration of the carburetor' s O-ring seals.

- Apply some solid lubricant to the camshaft and valve tappet , and ensure that the camshaft box has enough lubricant for each operation.

Notes!

These maintenance programs will be stored for a period of time, resulting in corrosion risk or start-up difficulties, if necessary , you can contact us to deal with.

PARTS REPLACEMENT

Over a long period, depending on how well your engine has been protected from the ingress of dust and grit and other causes of wear and tear, loss of performance may eventually occur in the form of reduced power, reluctant starting, unstable idling, etc. Please feedback your use process and engine performance to local distributors or TOYAN, we will serve you wholeheartedly. For the replacement of parts, we will provide professional equipment and experienced team to complete. Please do not disassemble the engine without professional tools, in order to avoid the risk of uncontrollable damage to the engine.

INVESTIGATION METHOD OF ENGINE FAILURE TO START

If the engine fails to start, please carefully check the following:

- Whether the battery voltage is normal and the battery capacity is full or not
- Whether the glowplug has failed (spark plug electrode does not discharge)
- Fuel not reaching carburetor.
- Engine flooded, and do not force startup at this time. Remove glowplug, close needle-valve and apply starter to pump out surplus fuel. (Cover the plug hole with a folded cloth, so that fuel cannot splash into your body.) If it is forced to start without eliminating excess fuel, it may cause irreparable damage to the starting system, as well as tension damage and deformation of the connecting rod and crankshaft.
- Timing synchronous belt adjustment

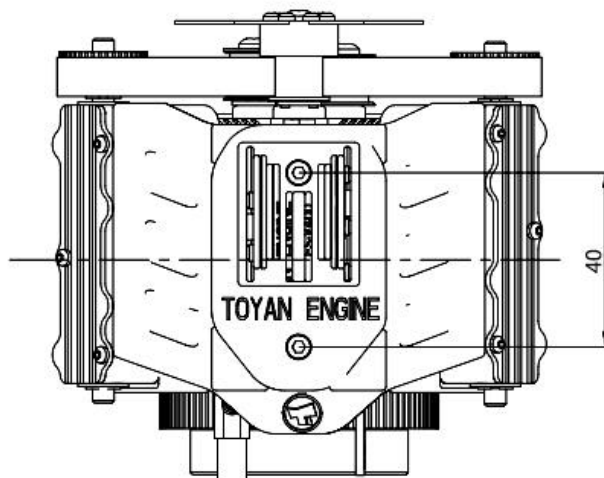
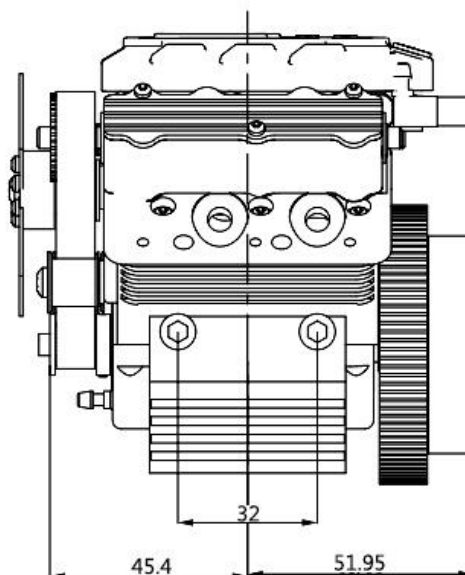
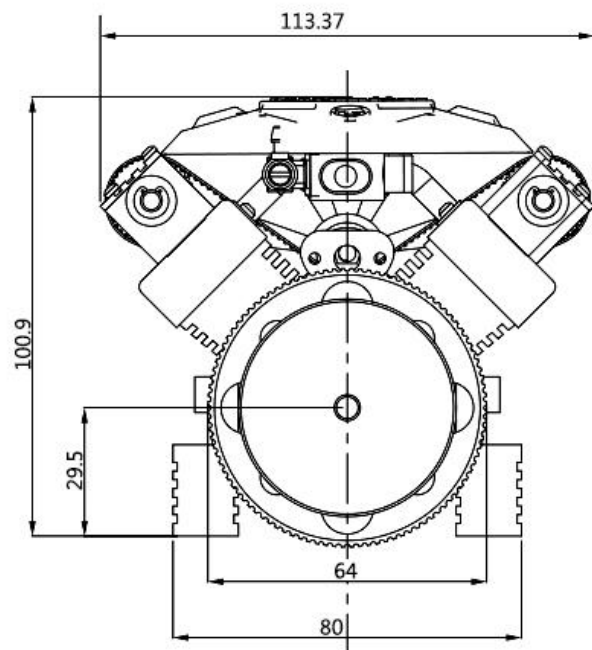
All TOYAN engines have checked the location of timing belt before they leave the factory. If power loss or unstable engine operation is found after several hours of execution time, the timing belt needs to be checked and debugged to get the correct ignition information for the engine.

Please check with page 16 "Timing Synchronization Belt Sequence Diagram".

- When one of the cylinders goes out at a low speed, do not keep it for too long at a low speed.

Since the methanol engine needs to keep the filament temperature of the electric plug to ignite, when the engine is in a rich state for a long time at a low speed, the filament temperature will gradually decrease, leading to the extinction. Therefore, it is necessary to pull the high speed oil at intervals to keep the filament temperature.

THREE VIEW DRAWING

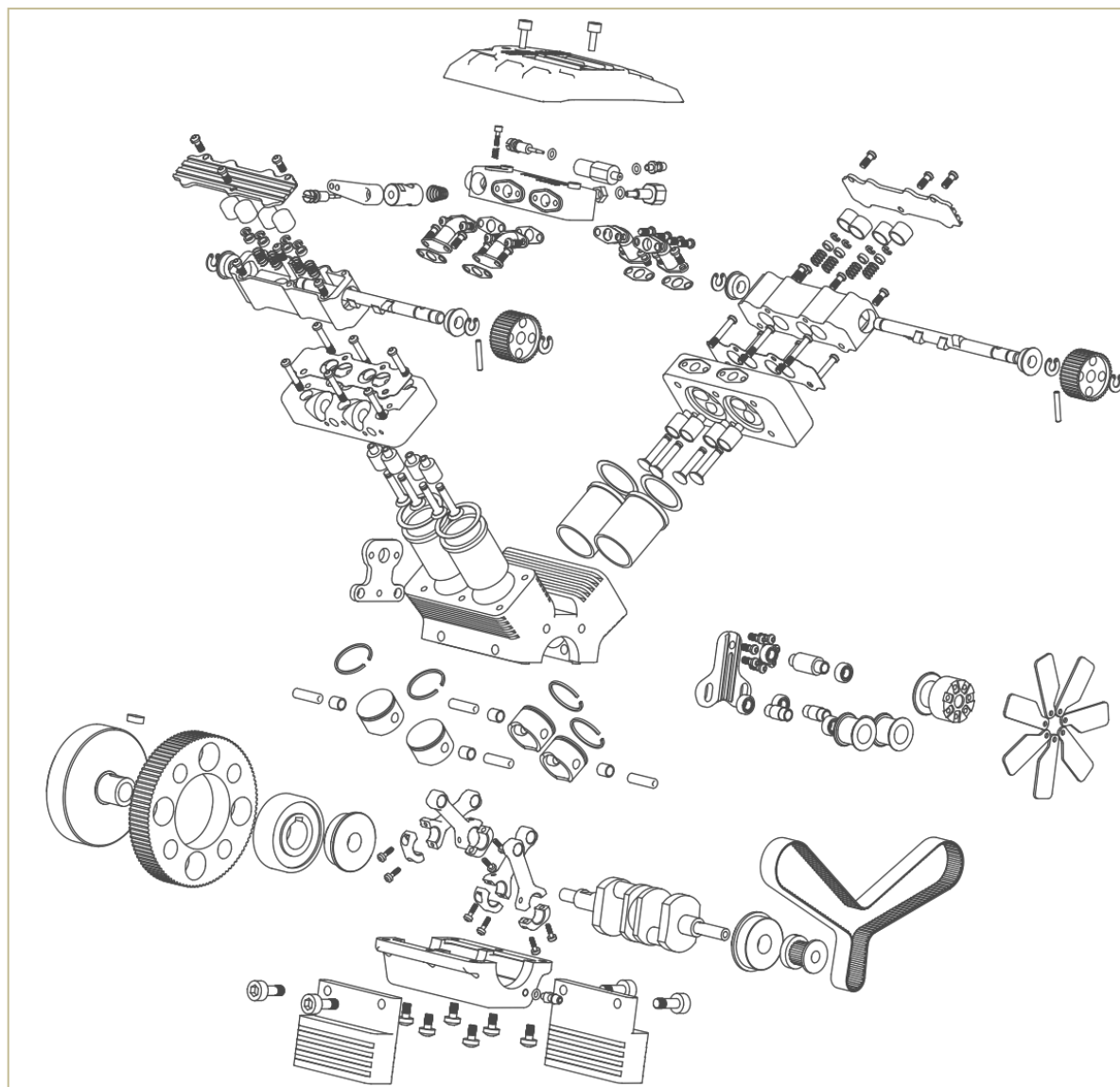


FS-V400 THREE VIEW DRAWING Dimension(mm)

Specification

- Displacement: 3.5cc × 4
- Bore: 16.67
- Stroke: 15.4
- Practical rpm: 2,500-9,600
- Output: 3.2ps @ 8,200 rpm
- Weight: 1.15kg

EXPLODED VIEW DRAWING



OUR COMMITMENT

- Please contact the TOYAN distributor in your country or location. If you buy it through the internet, you can also get various parts and services through the internet. For detailed information about each part, you can ask the distributor for it.
- If you have technical or usage problems in the process of using, we have a professional team to answer them online free of charge.
- Since you purchase our products, we will include you in our membership system, you can enjoy a year of free maintenance services. If the product becomes defective, we will replace the new parts for you.
- If the distributor can't fulfill its technical service, we will provide technical support to you directly.



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