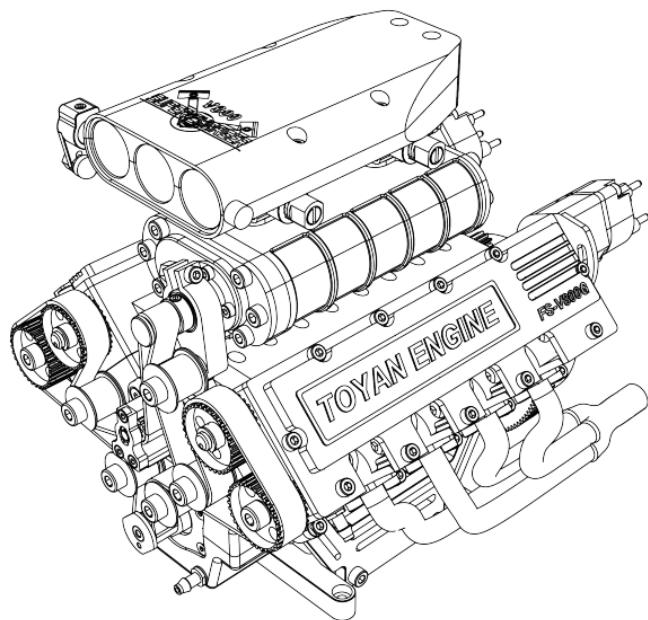

TOYAN ENGINE

FS-V800GCS

OPERATING MANUAL



Thank you for choosing our products, model FS-V800GCS is a DIY set with a precise V-shaped Eight Cylinder Four-stroke model engine. Before assembling and operating your engine, please read the “Safety Instructions and Warnings” section on pages 1-2 of this booklet and the contents of accessories assembly, to strictly adhere to the advice contained therein and familiarize engine controls and other functions. Furthermore, keep these instructions in a safe place so that you may readily refer to them whenever necessary.

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Safety Instructions and Warnings

Your Toyan engine is a high-efficiency internal combustion engine and should be handled with caution. The output power can cause harm or other adverse effects. Do not treat it as a toy. It is strictly prohibited to change or disassemble the engine. Only qualified professionals should perform any maintenance or repairs.

As a professional user, it is your responsibility to ensure the safe and careful operation of the engine.

In the event that you sell or transfer your Toyan engine to another person in the future, we kindly request that you pass these instructions on to the new owner.

■ Read these instructions carefully before operating the engine to ensure safe and optimal usage. Failure to follow these instructions may result in engine damage or danger.

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

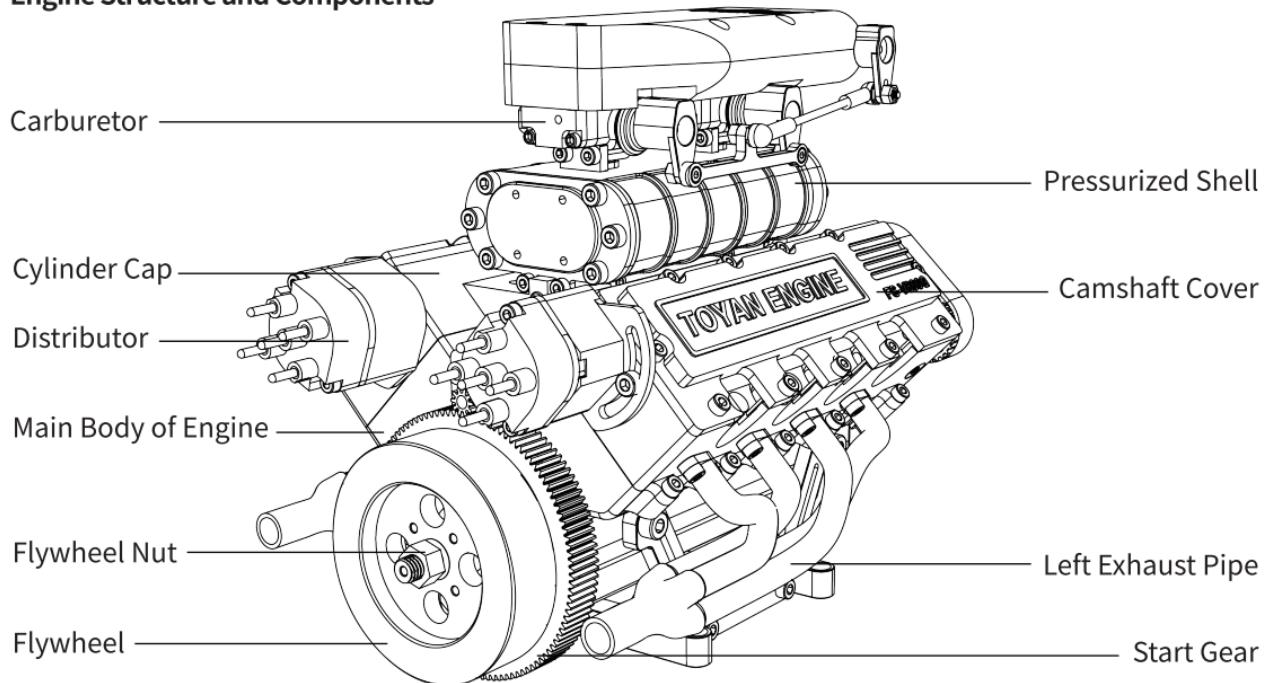
- Model engine fuel is poisonous. Keep it away from the eyes and mouth. Store it in a clearly marked container out of the reach of children.
- Model engine fuel is highly flammable. Keep it away from open flames, excessive heat, sparks, or anything that can ignite it. Smoking is strictly prohibited near the fuel.
- Do not operate the engine in an enclosed space to prevent carbon monoxide poisoning. Run the engine only in open areas.
- Model engines generate significant heat. Allow the engine to cool before touching any part. Touching the muffler, cylinder head, or exhaust header pipe can result in serious burns.

Notes

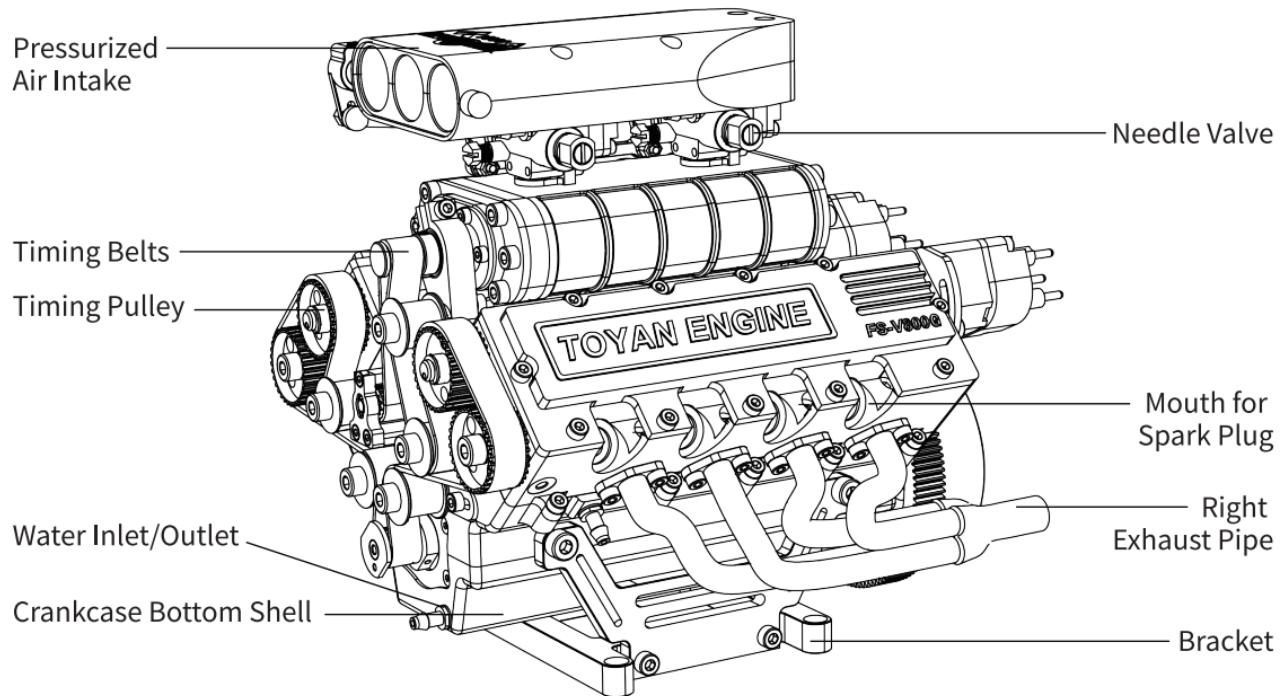
- This engine is designed for science experiments, model demonstrations, and model car drives. Do not attempt to use it for any other purpose.
- Securely mount the engine in your model following the manufacturer's recommendations. Use appropriate screws and lock nuts.
- Note that the engine may produce noise during operation. To reduce noise pollution, consider purchasing our matching muffler exhaust pipe or run the engine away from residential areas.
- Wear safety glasses while operating the engine.
- Ensure the spark plug or battery wire does not come into contact with the rotating parts. Check the firmness of the throttle rocker arm connection.
- Keep all spectators, especially children, at least 3 meters away from the engine during startup.
- To stop the engine, shut off the throttle completely. In case of an emergency, clamp the fuel line in front of the carburetor to cut off the fuel supply.
- Do not attempt to remove the flywheel or start the synchronous pulley.
- Do not extend the starting battery wire by more than 20cm to avoid insufficient starting current.
- When starting the engine, do not press the start button for more than 5 seconds. If it fails to start, wait for 15 seconds before attempting again to prevent damage to the starting motor and ignition circuit.

Introduction

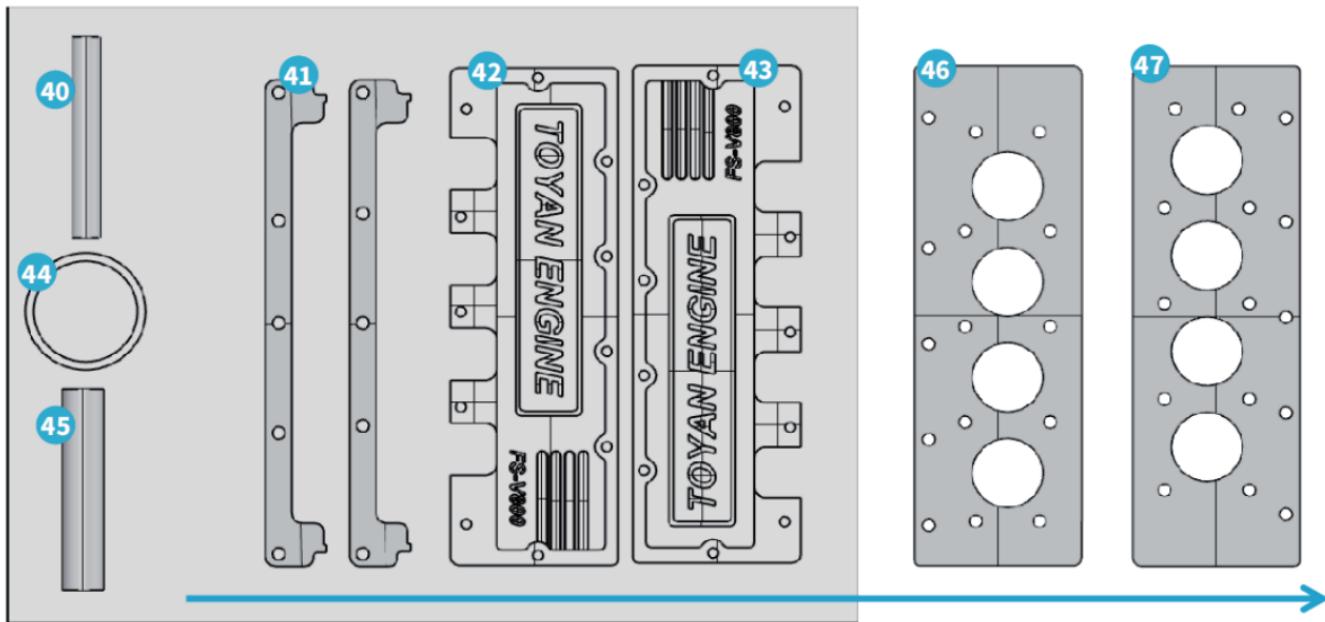
Engine Structure and Components



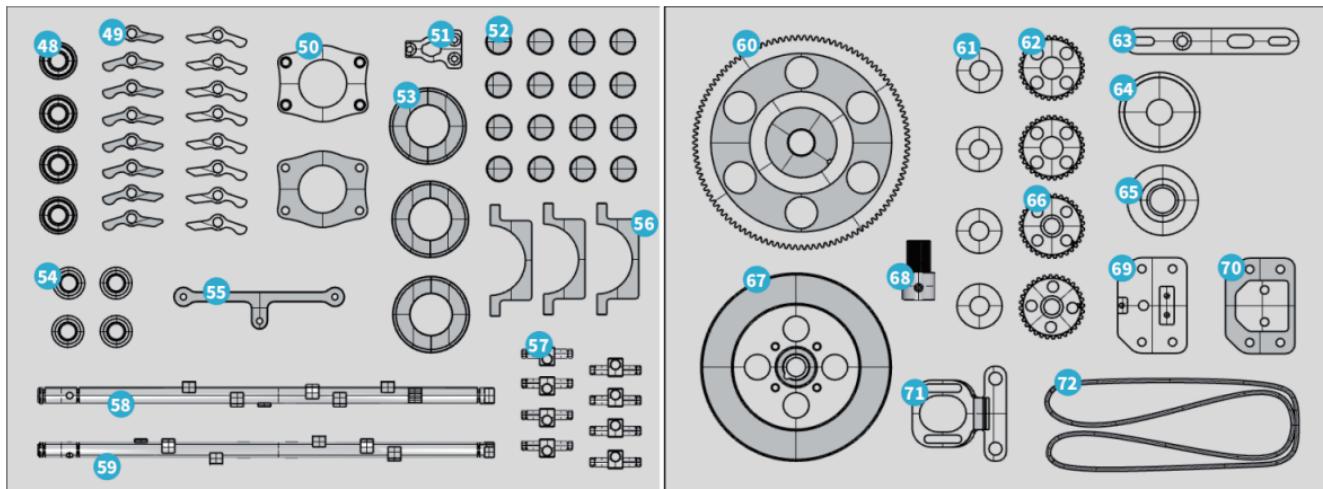
Engine Structure and Components



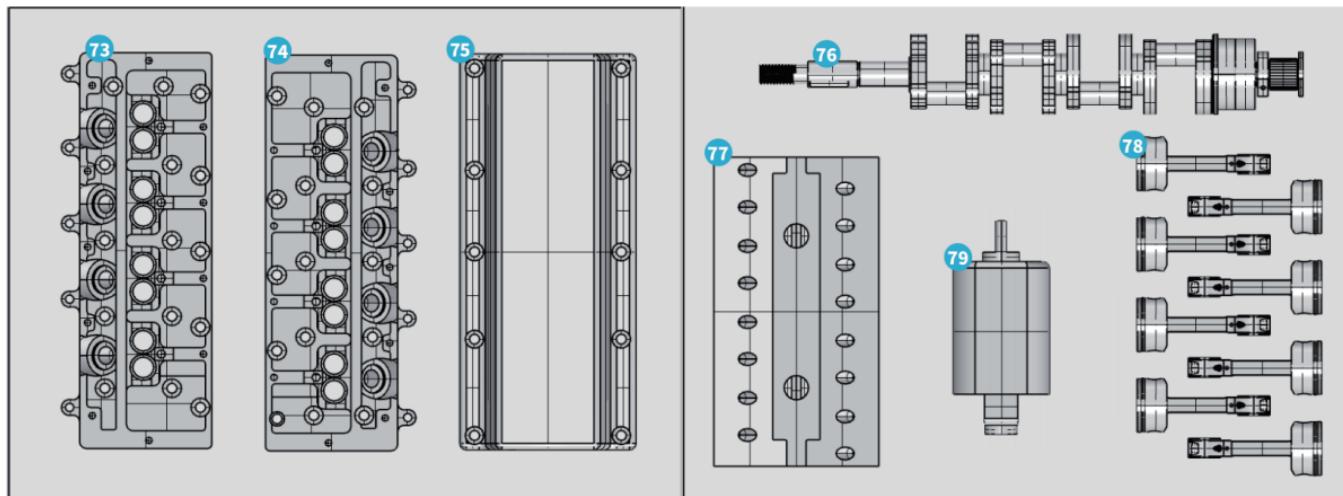
Distribution Diagram of Parts Packaging



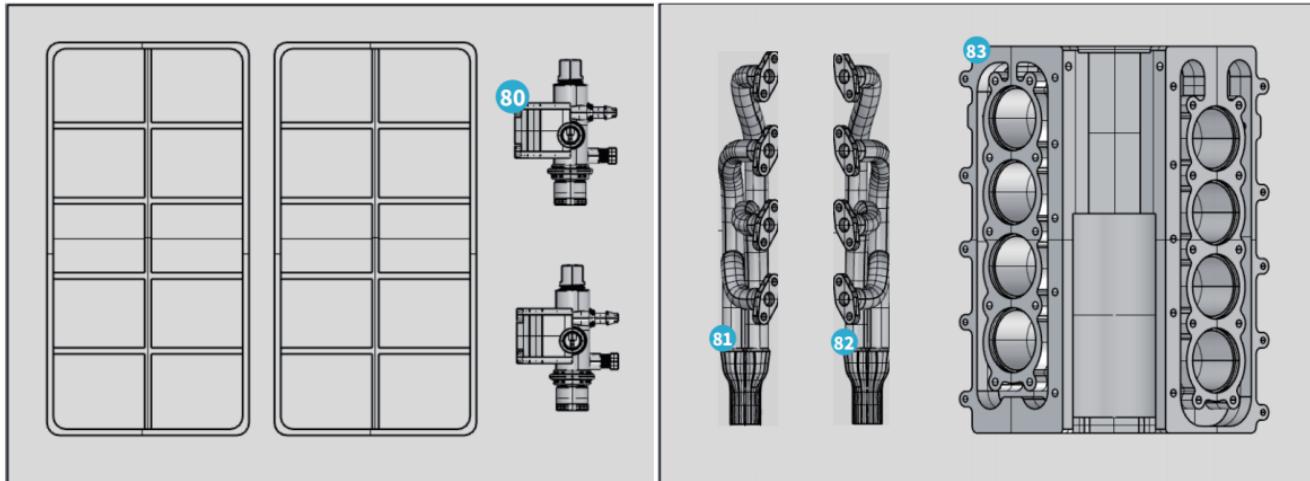
Distribution Diagram of Parts Packaging



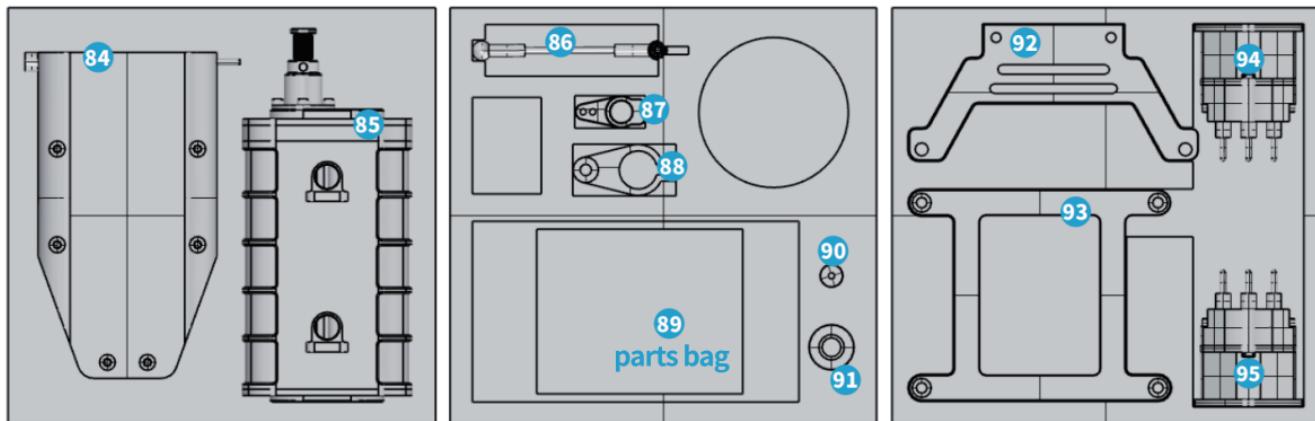
Distribution Diagram of Parts Packaging



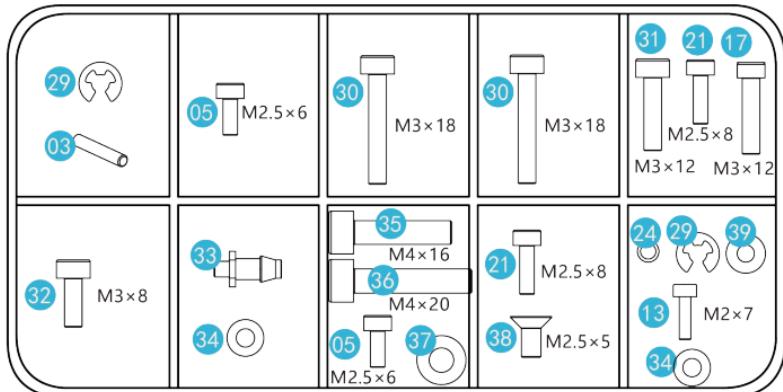
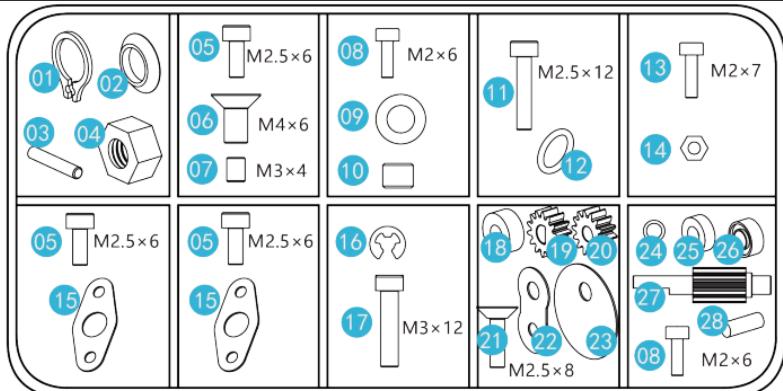
Distribution Diagram of Parts Packaging



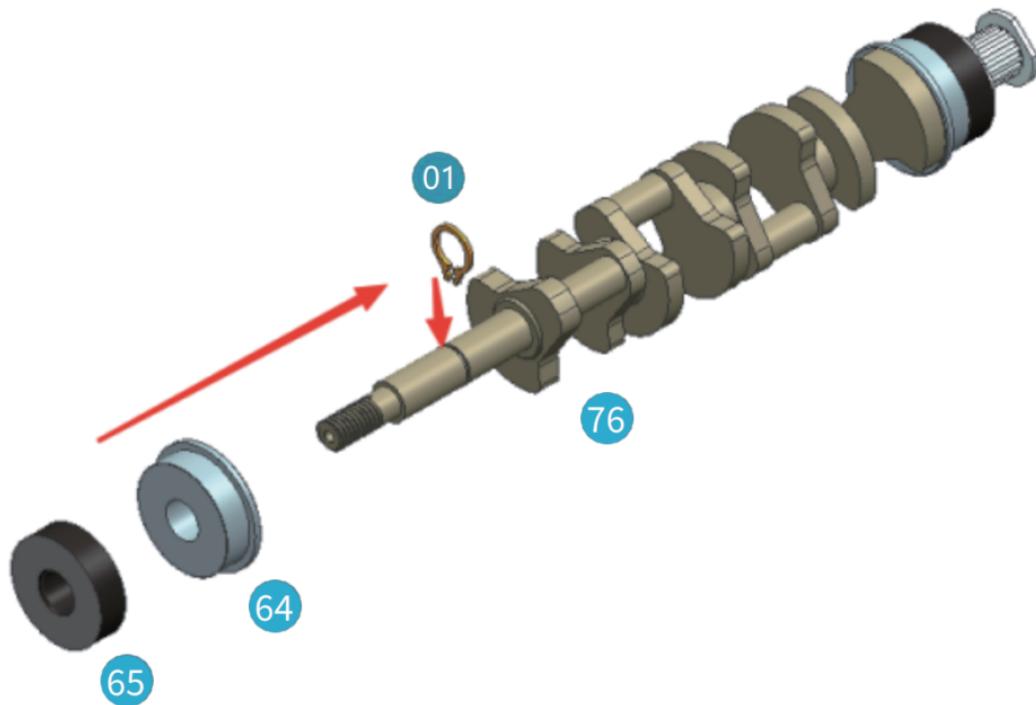
Distribution Diagram of Parts Packaging



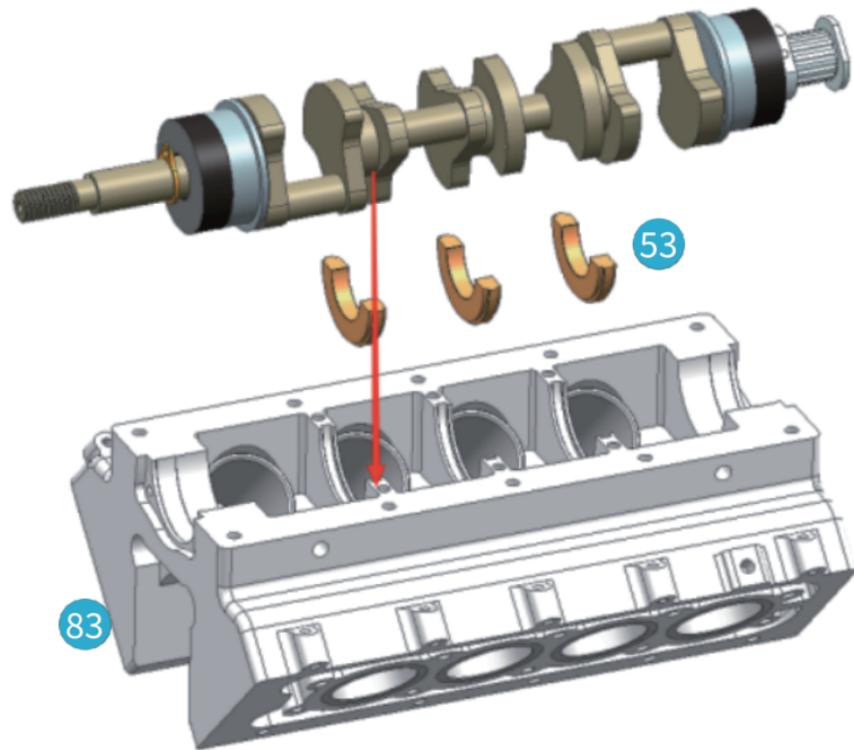
Distribution Diagram of Parts Packaging



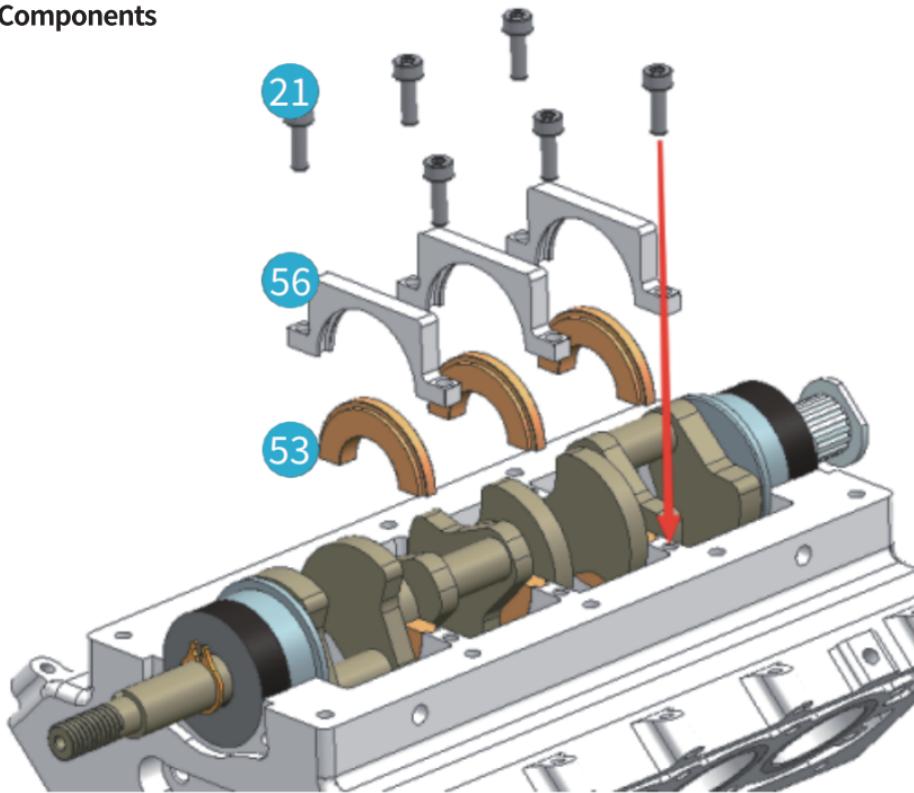
Assembly of Components



Assembly of Components

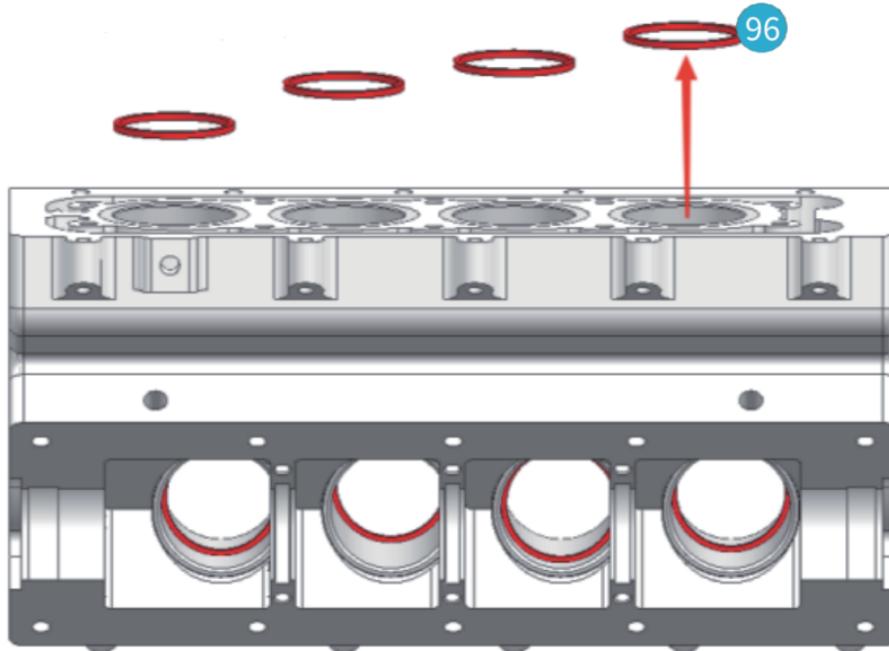


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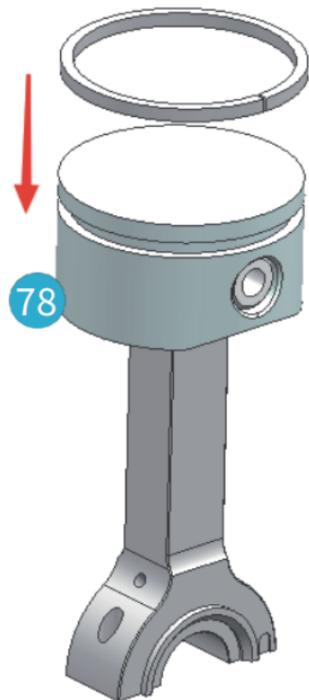


Assembly of Components

The piston rings and cylinder liners have been matched one to one. Remove and install it in the corresponding cylinder liner.



Assembly of Components

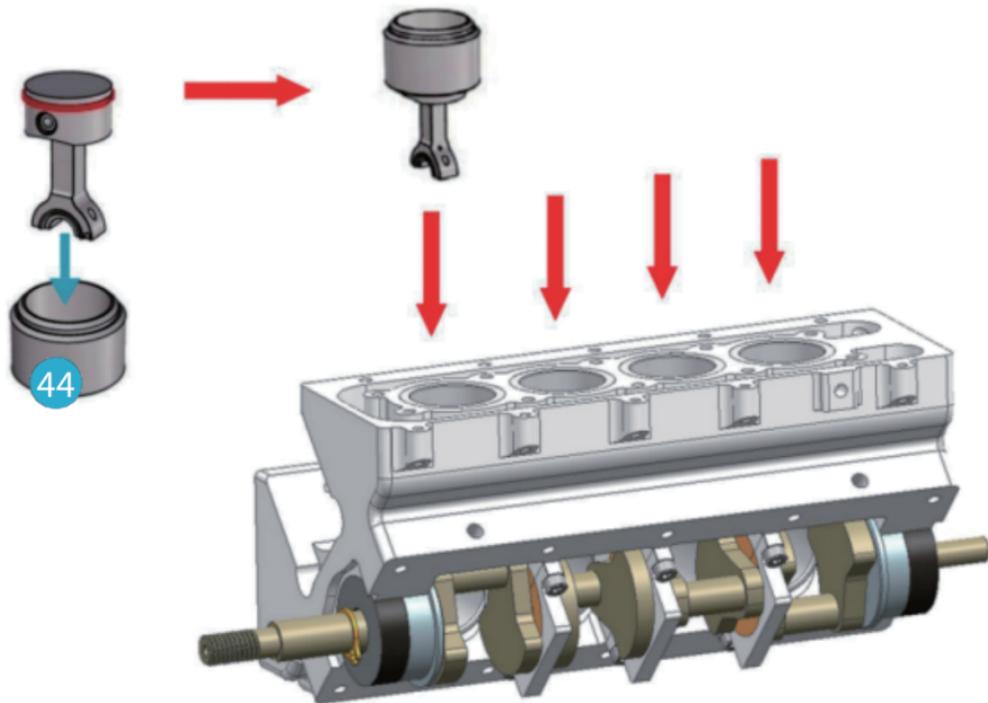


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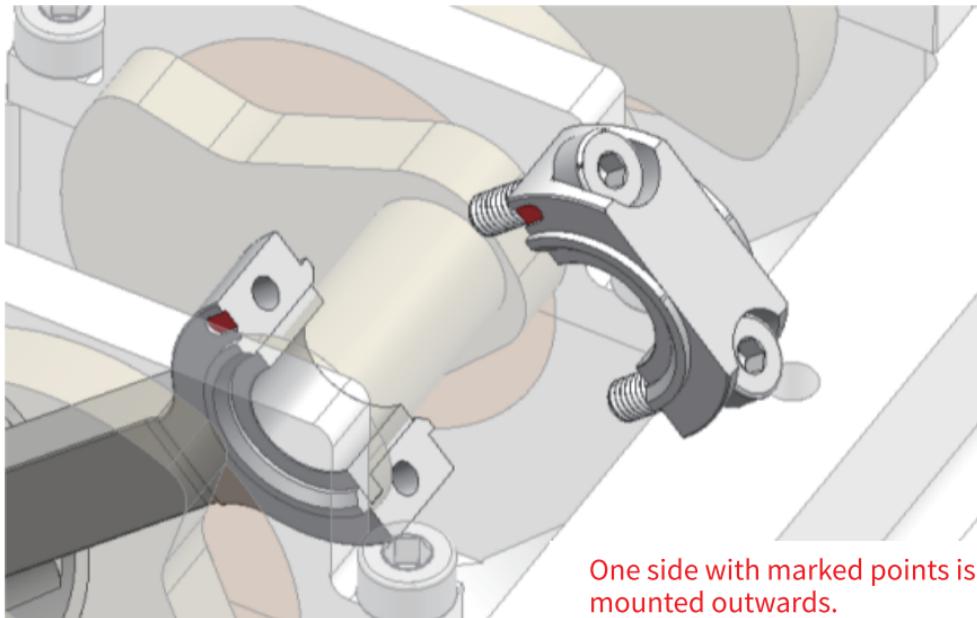
When disassembling, the original pairing should be kept and should not be confused. During installation, the concave points at the arrow should also be kept corresponding.



Assembly of Components

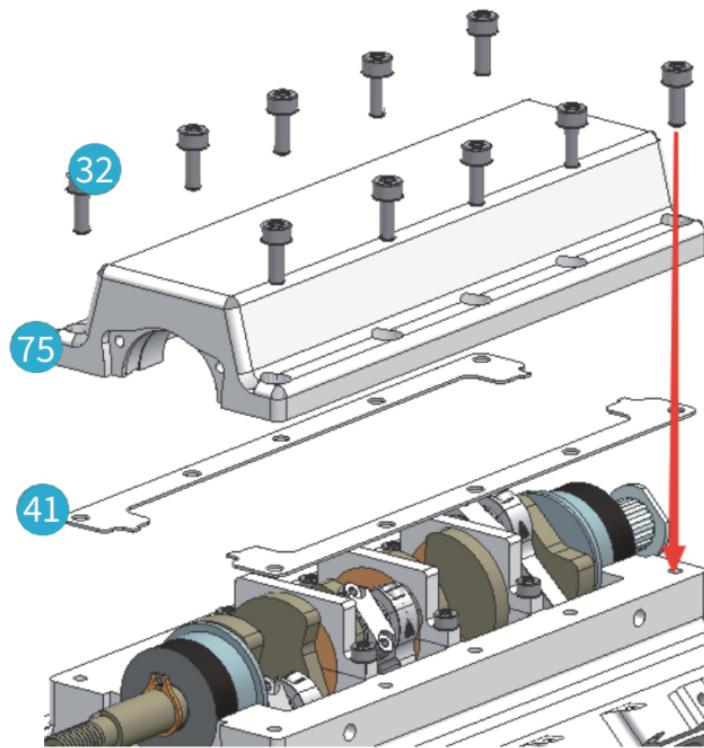


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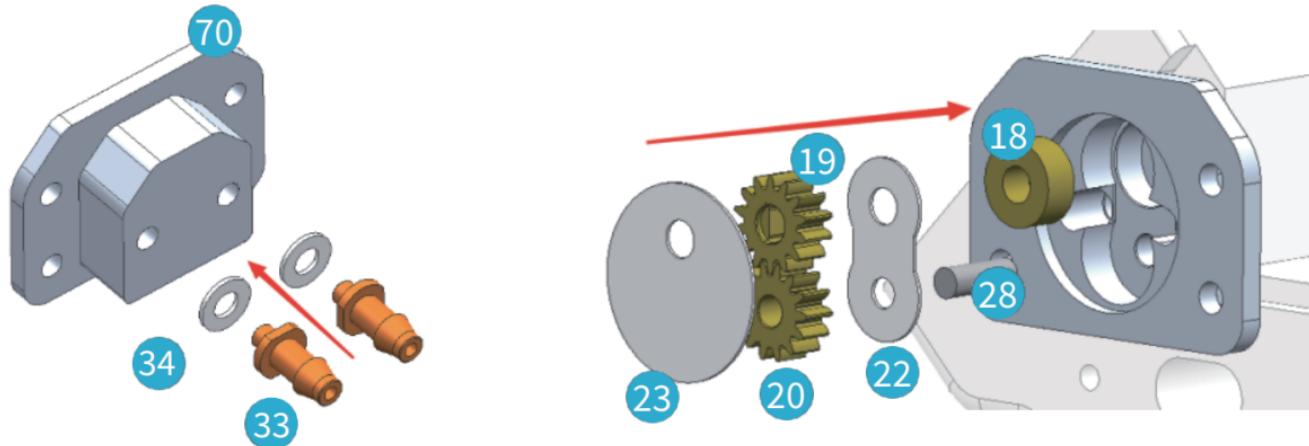


One side with marked points is
mounted outwards.

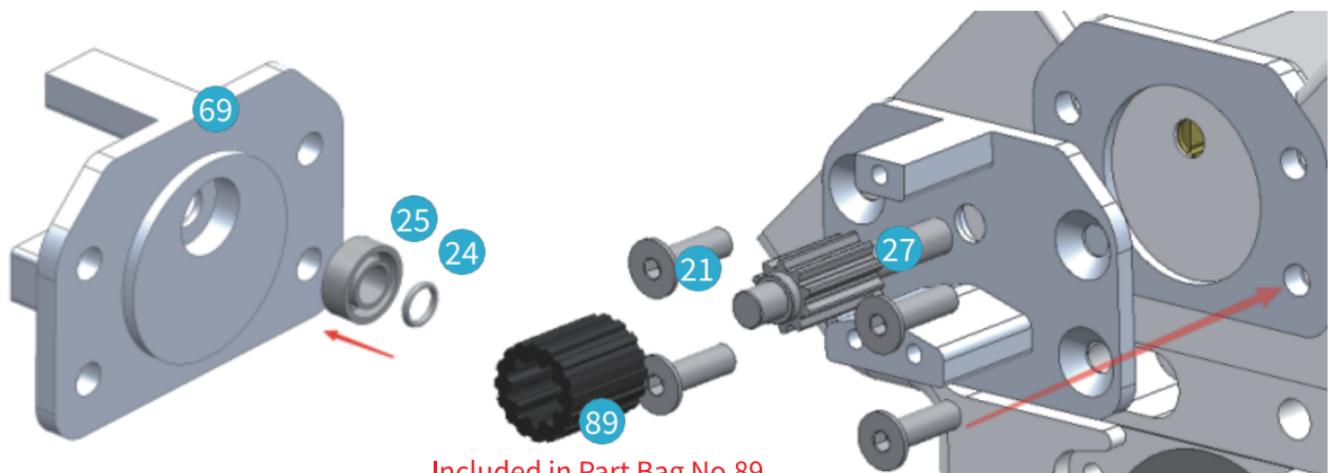
Assembly of Components



Assembly of Components

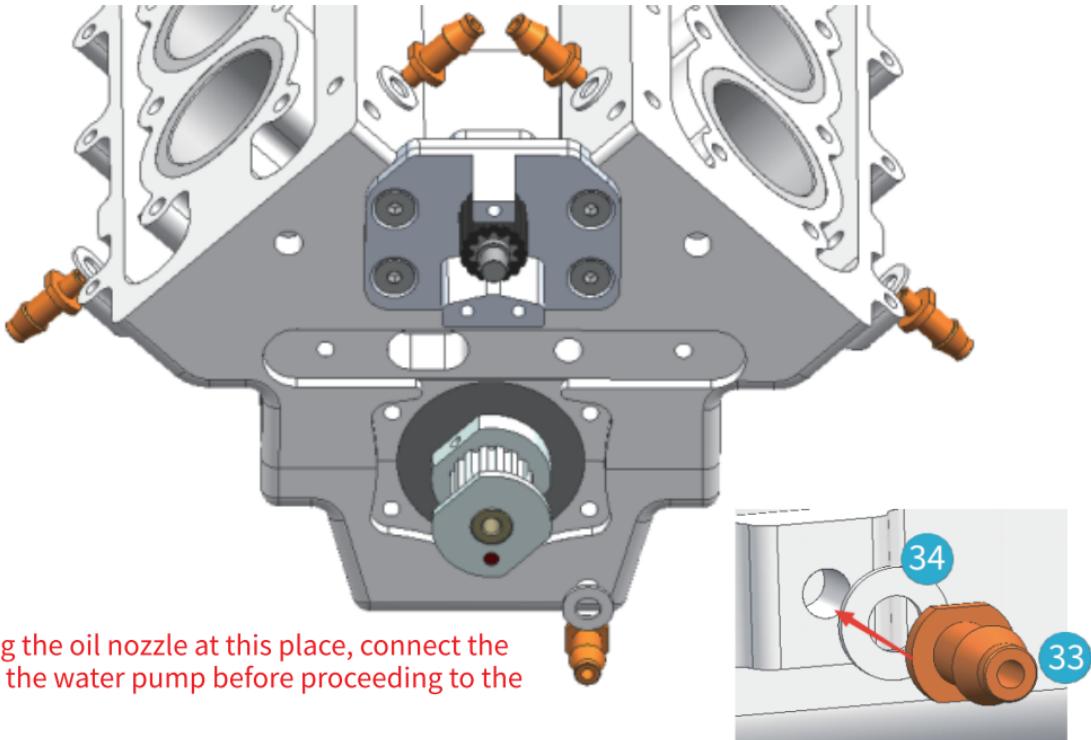


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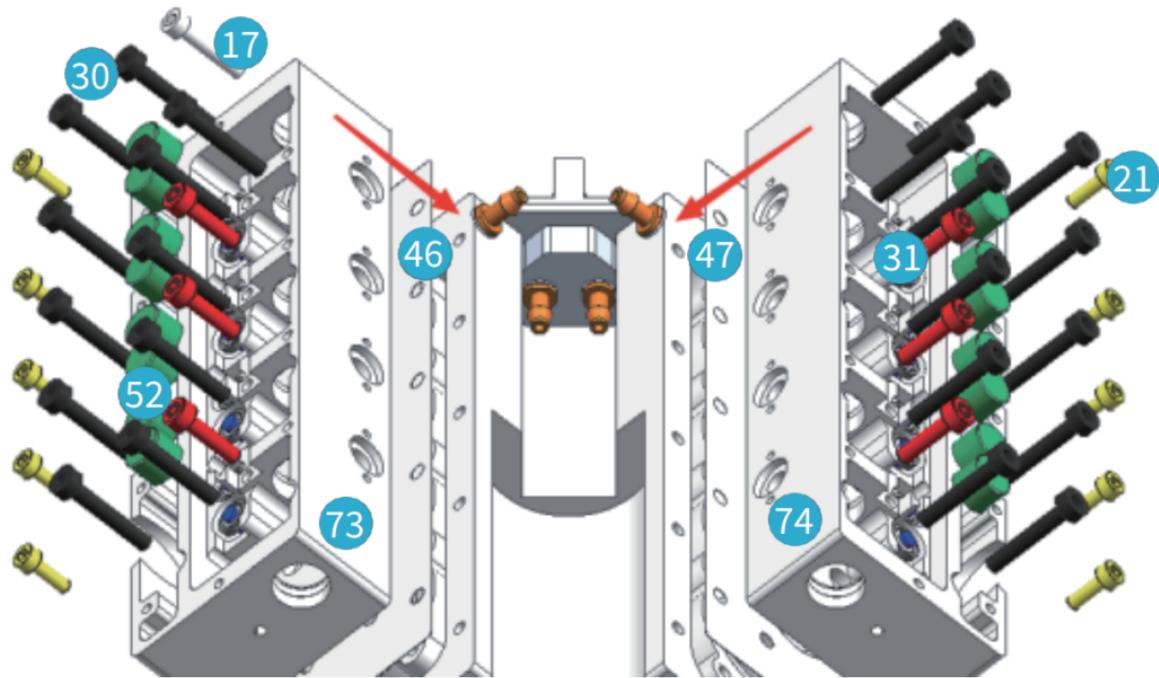
Included in Part Bag No.89

Assembly of Components

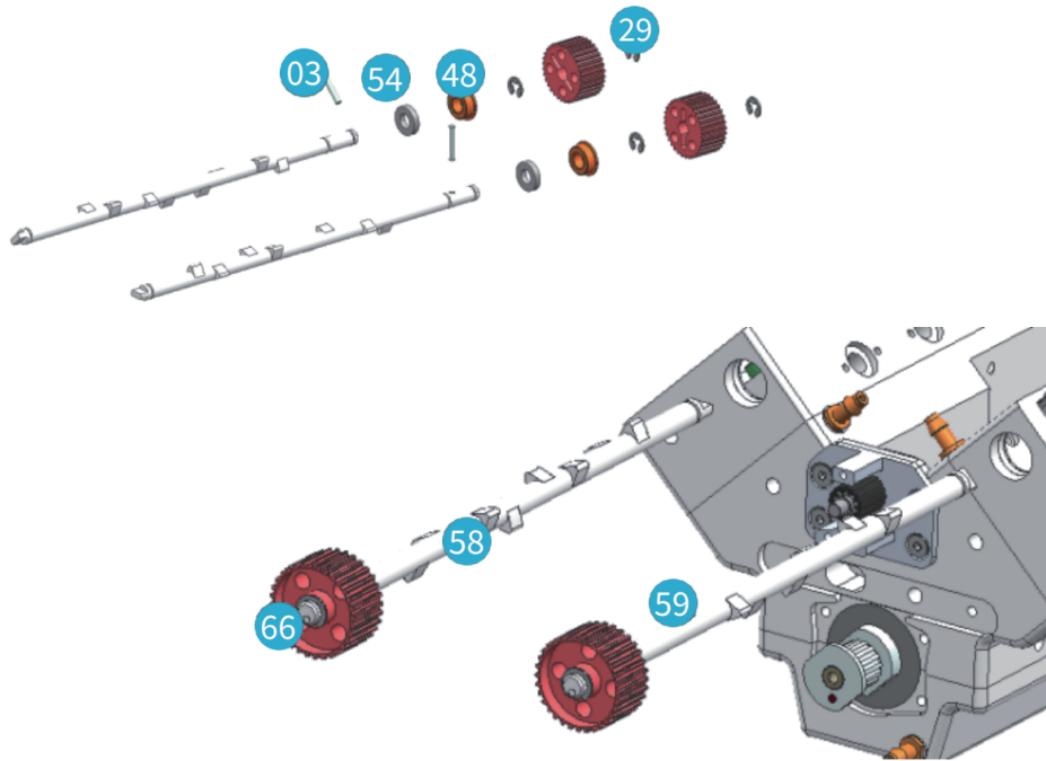


After installing the oil nozzle at this place, connect the water pipe to the water pump before proceeding to the next step.

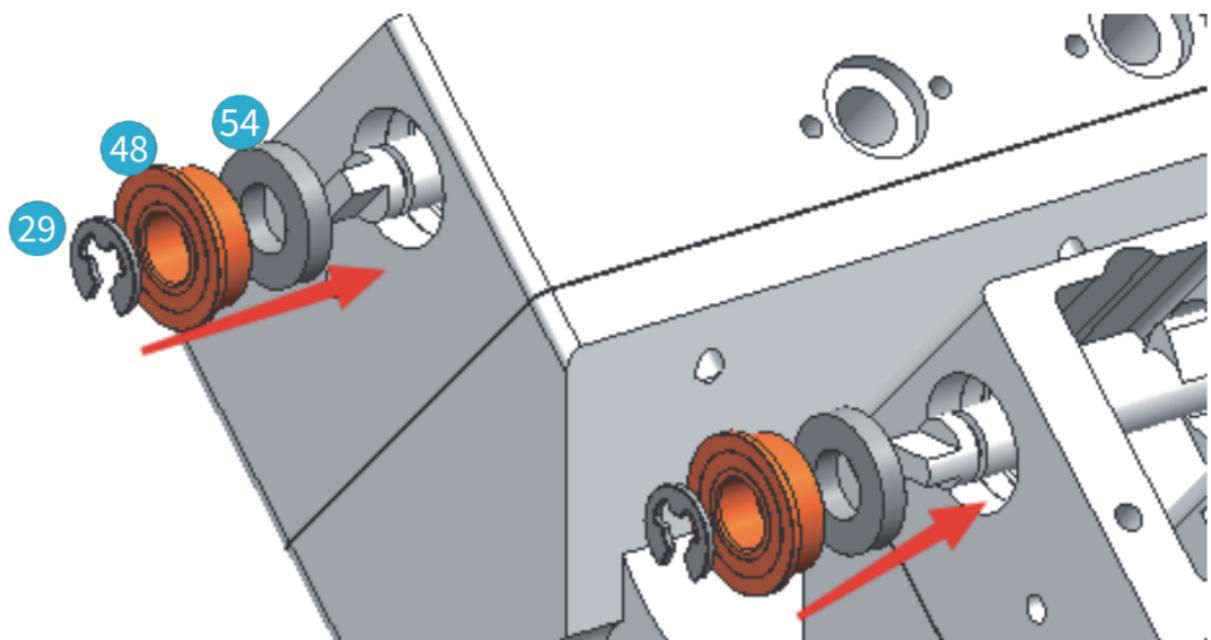
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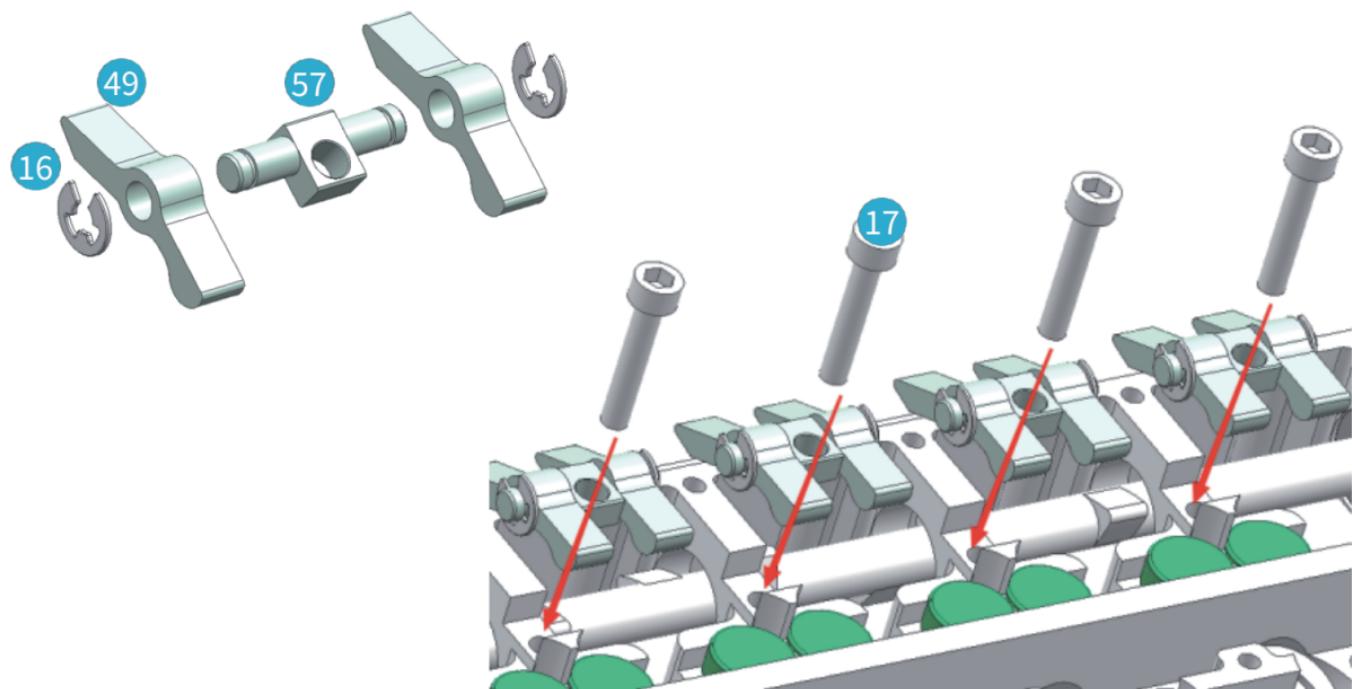
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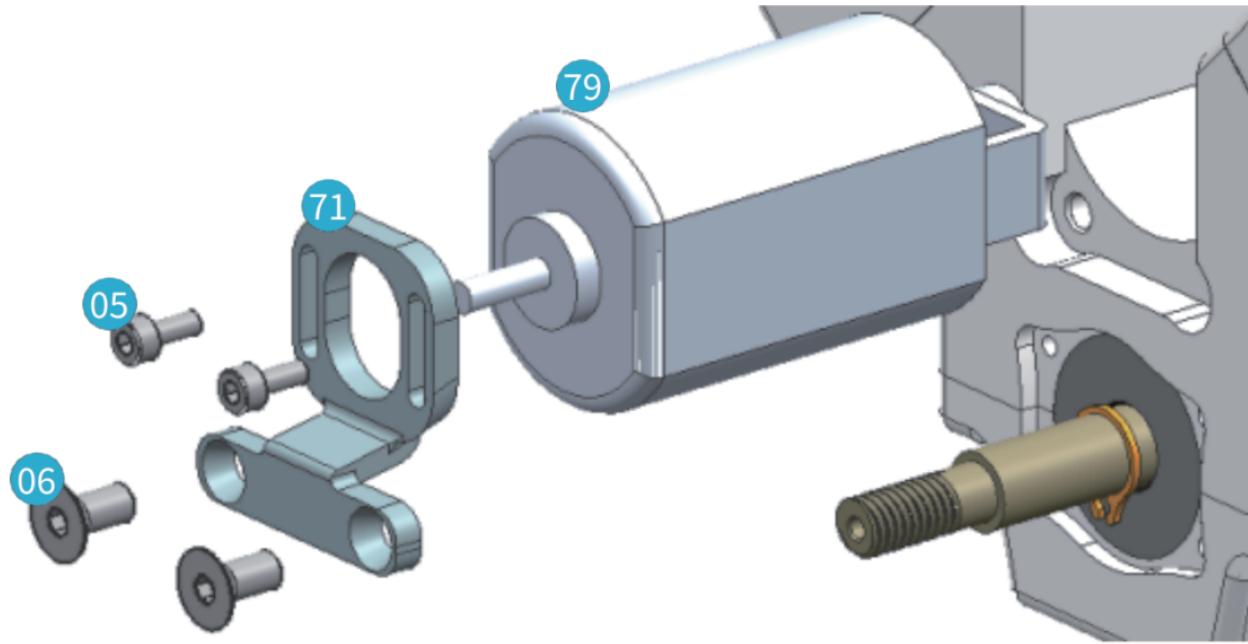
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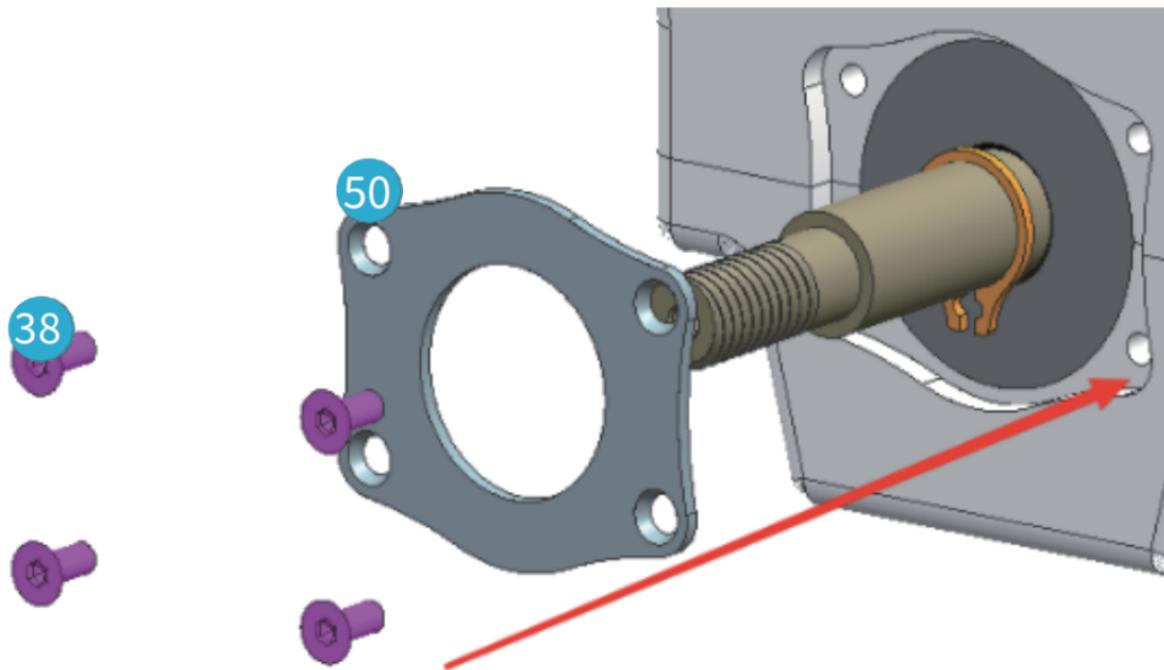
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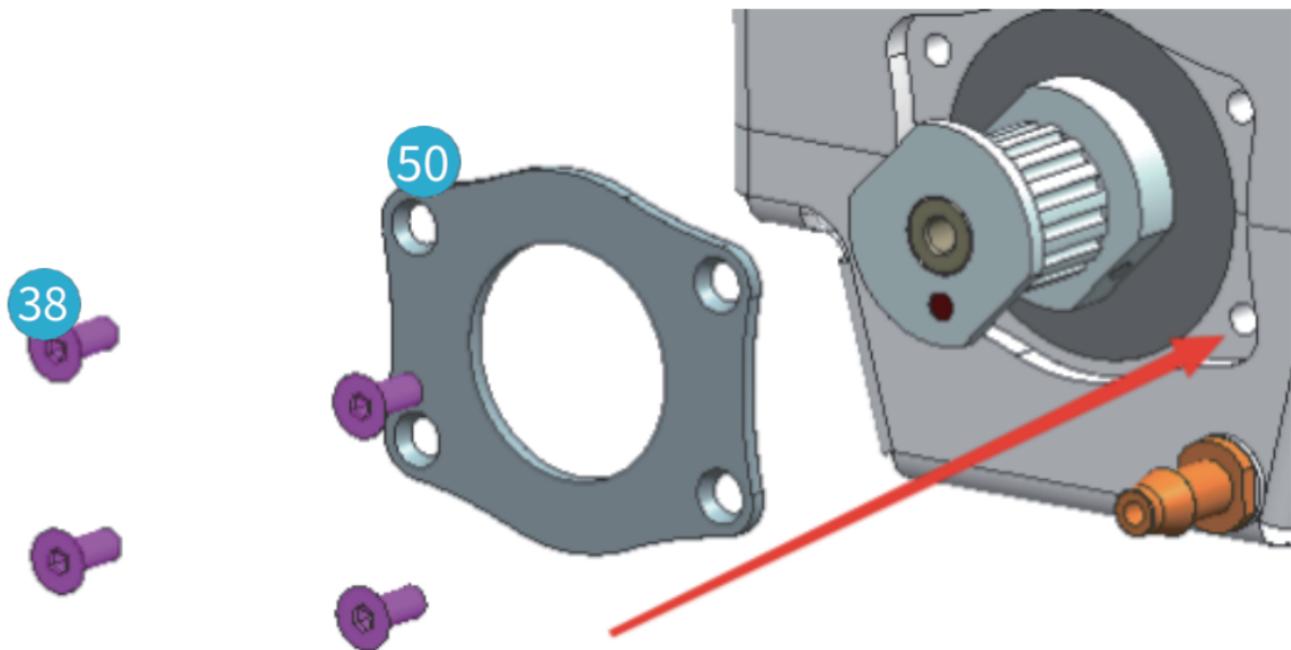
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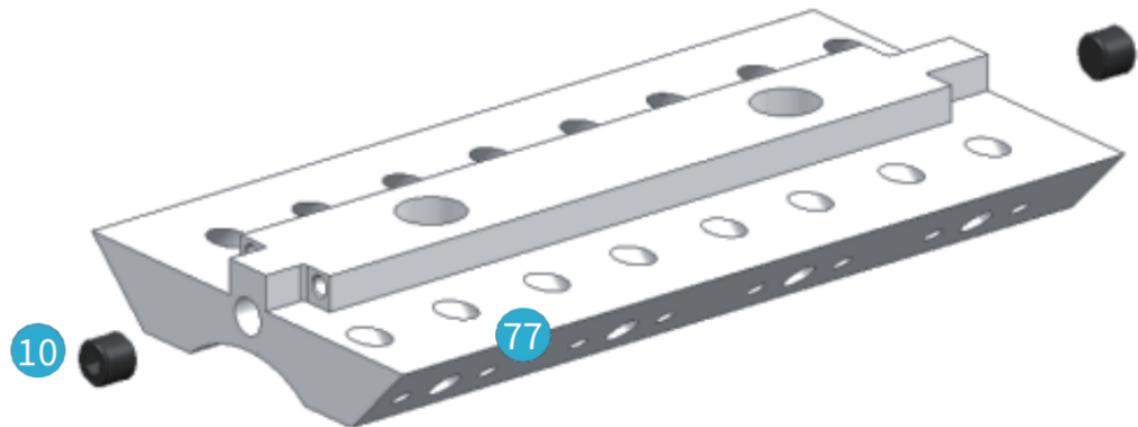
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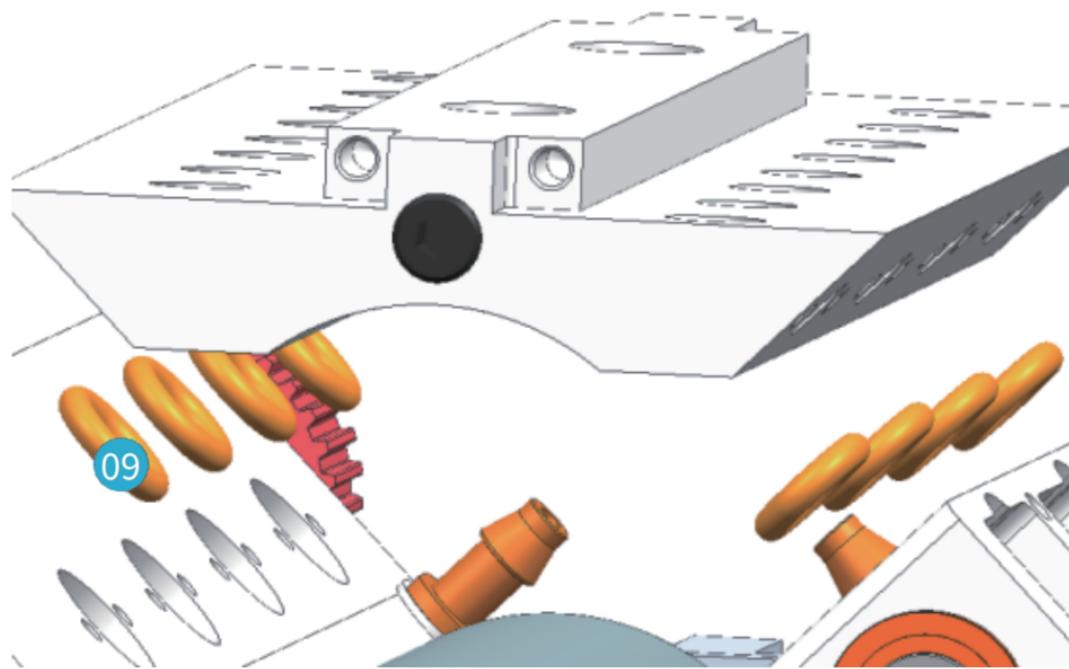
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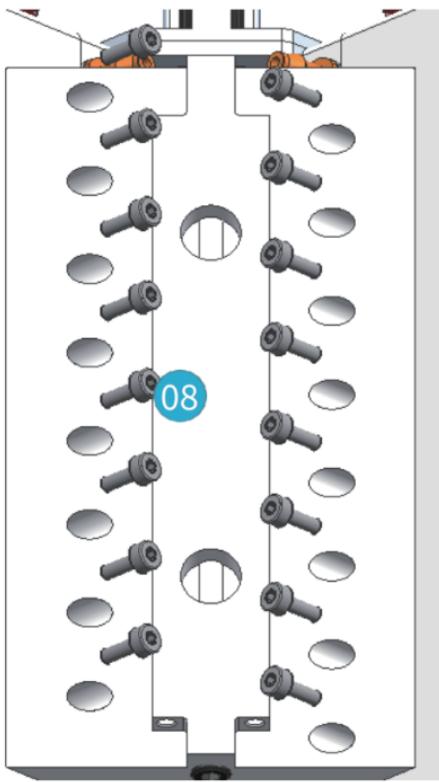
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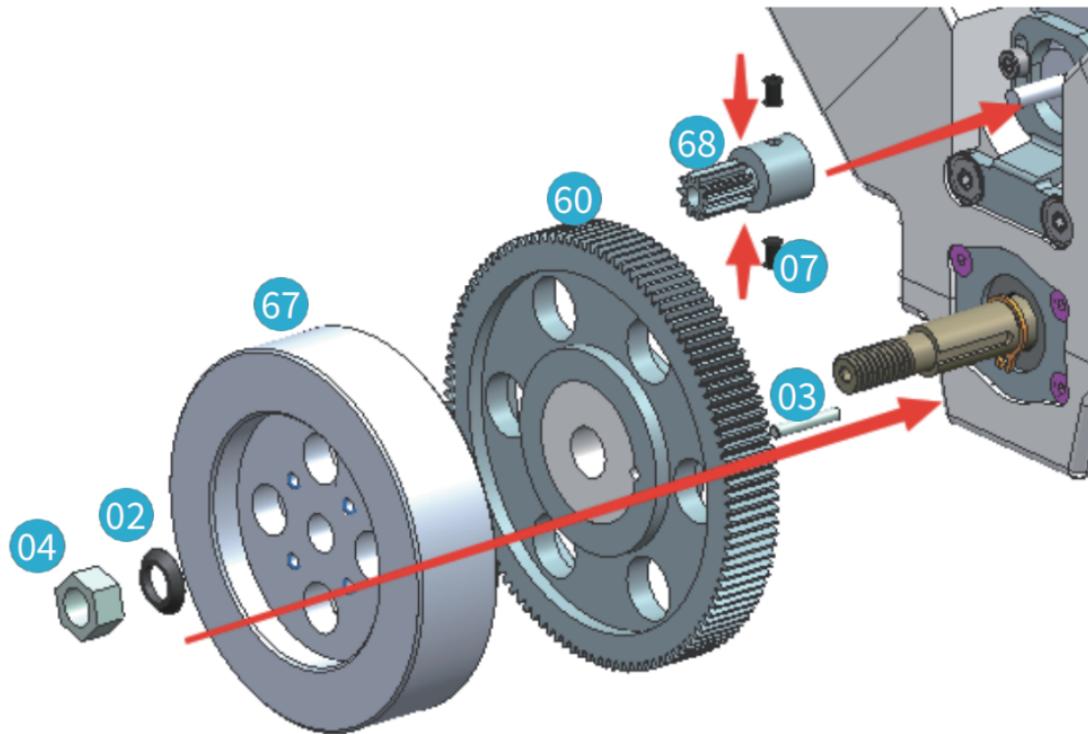
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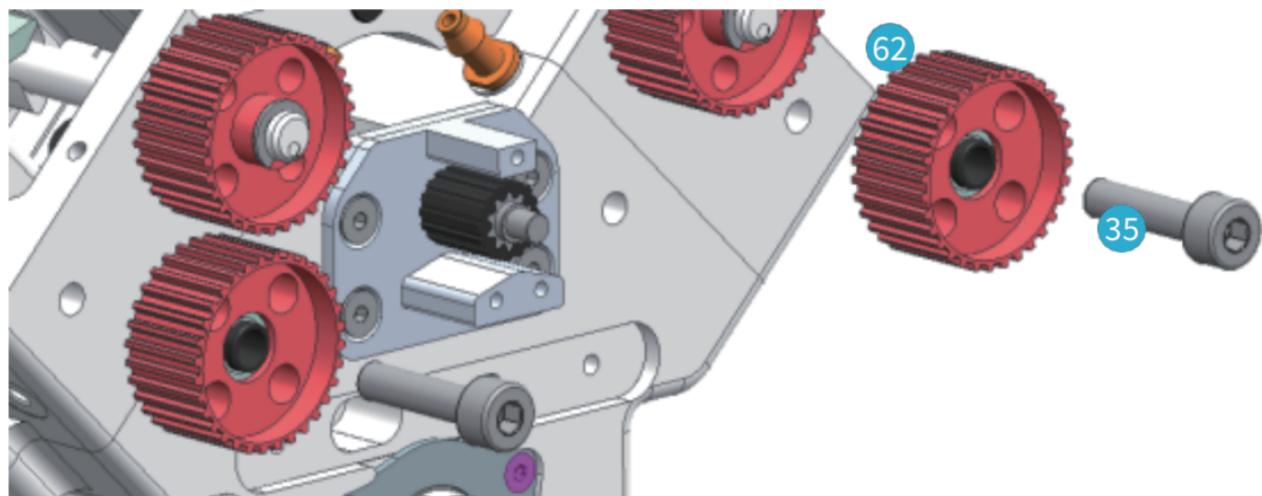
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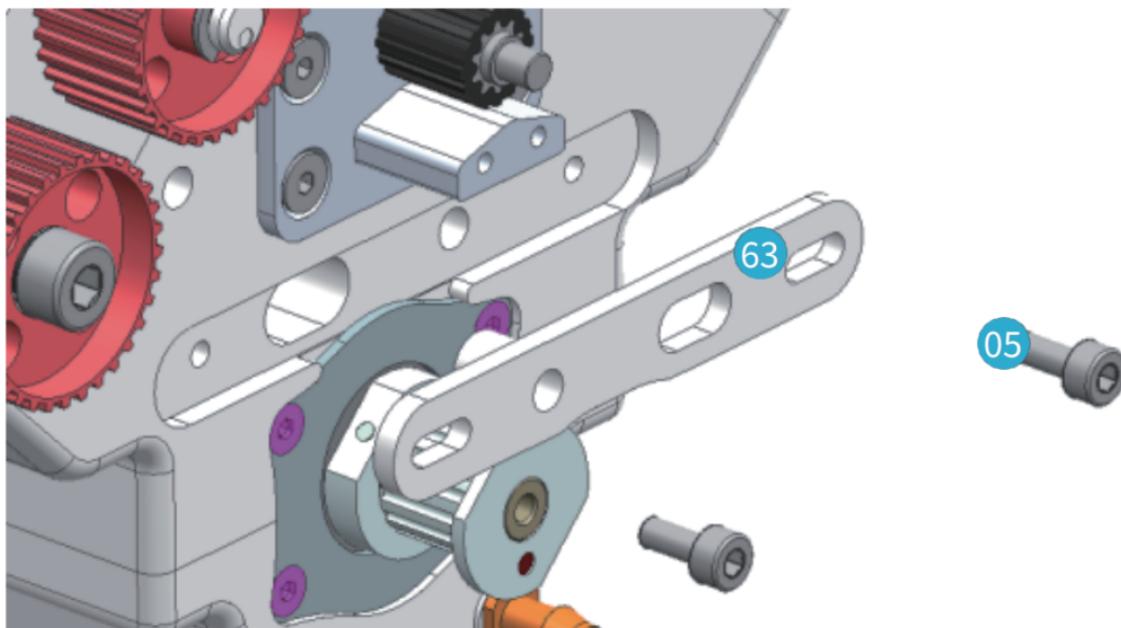
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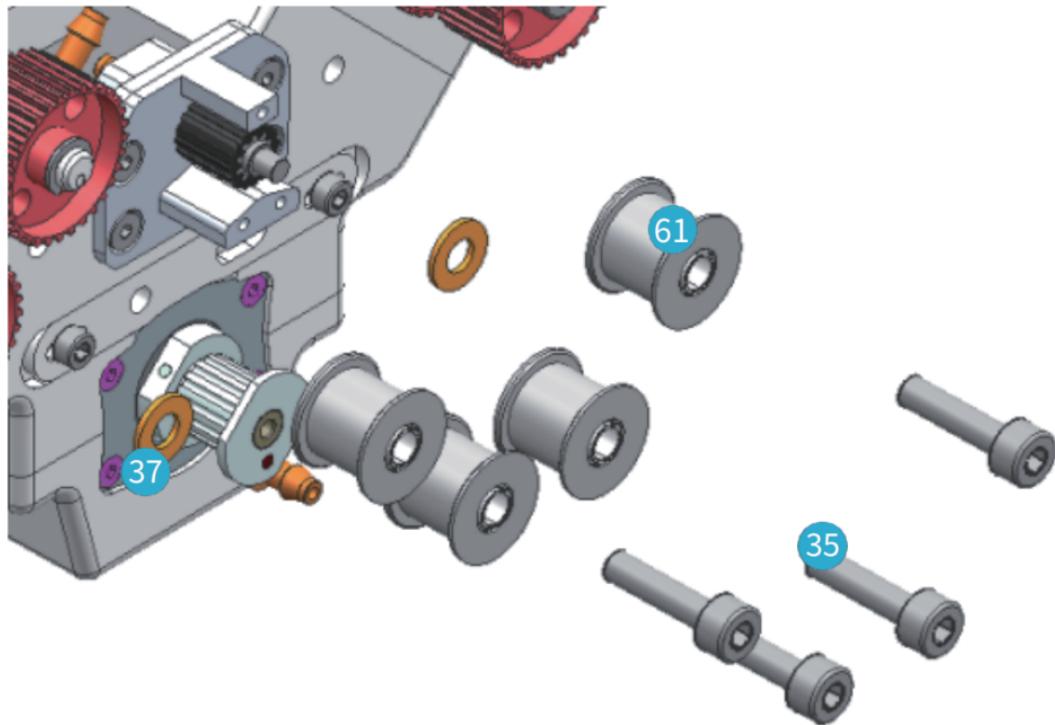
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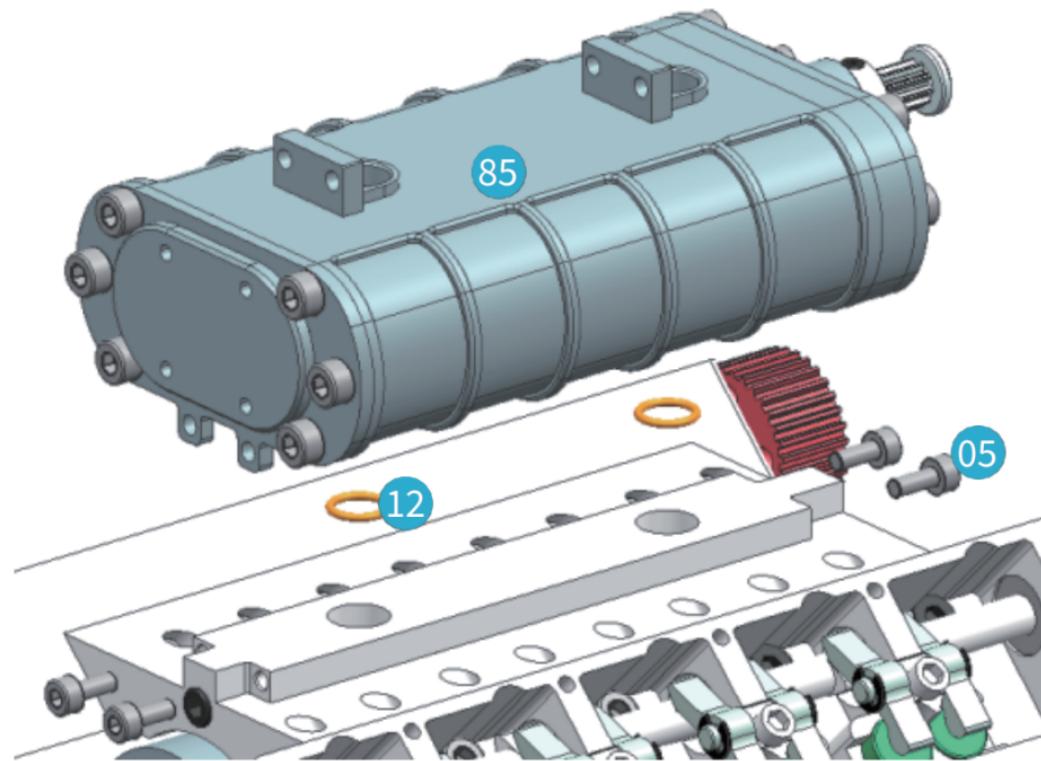
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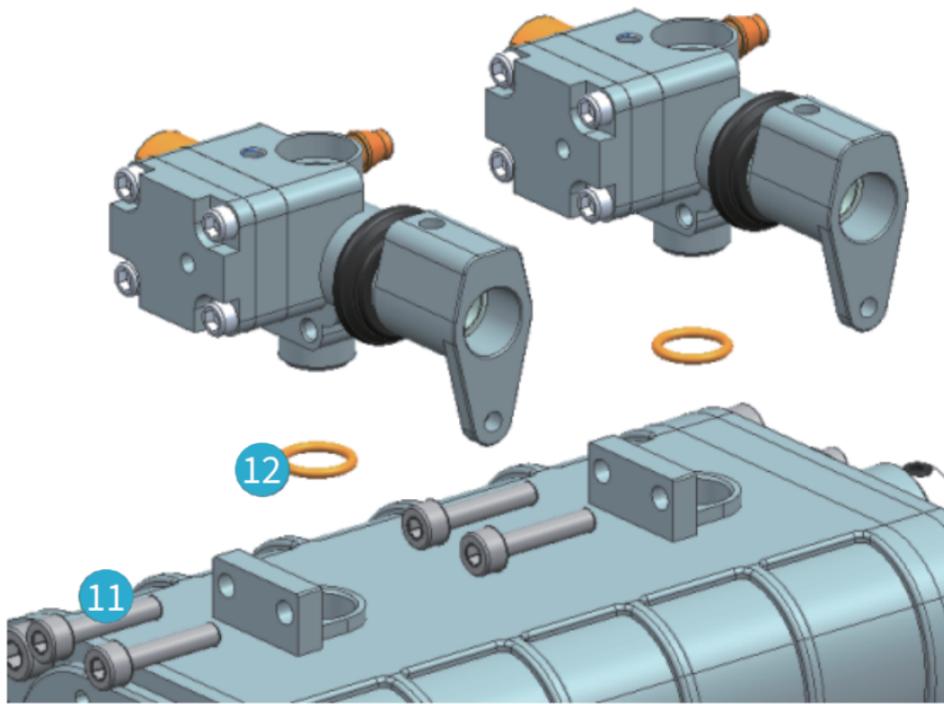
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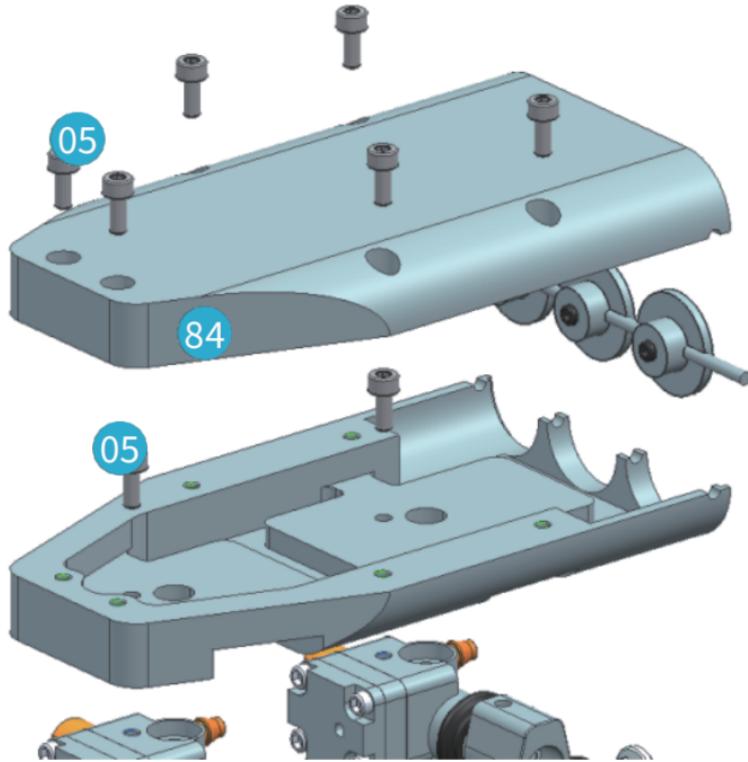
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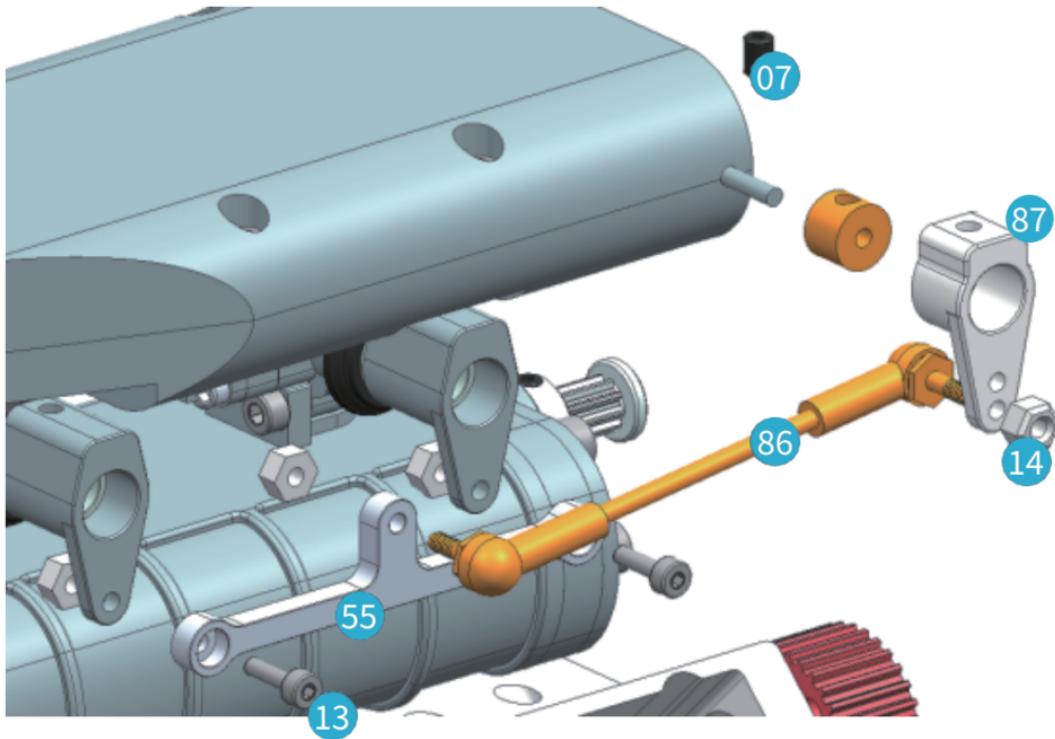
Assembly of Components



Assembly of Components

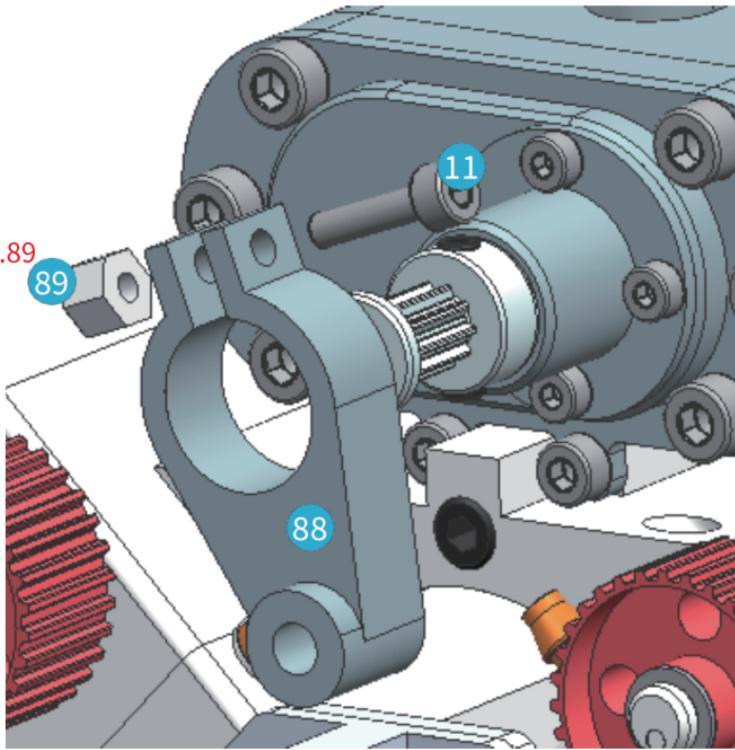


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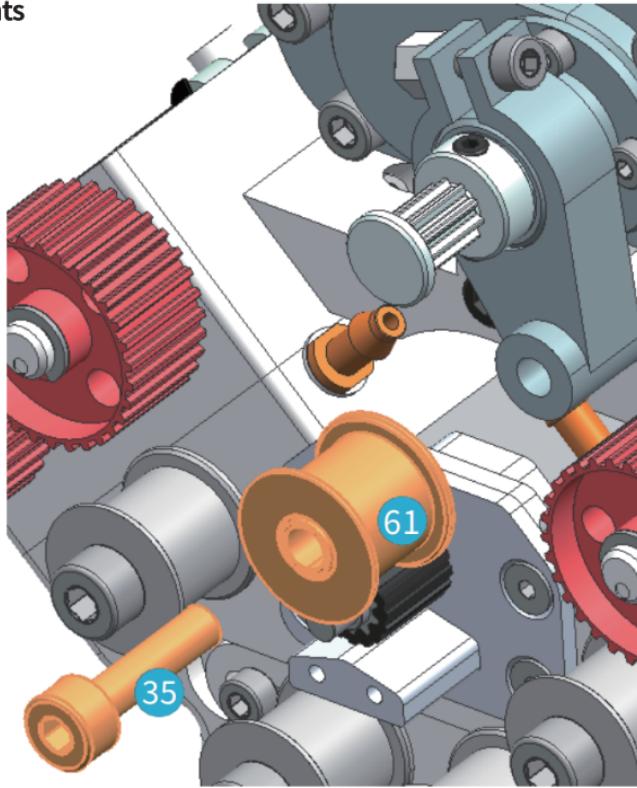


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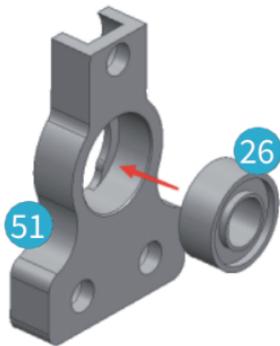
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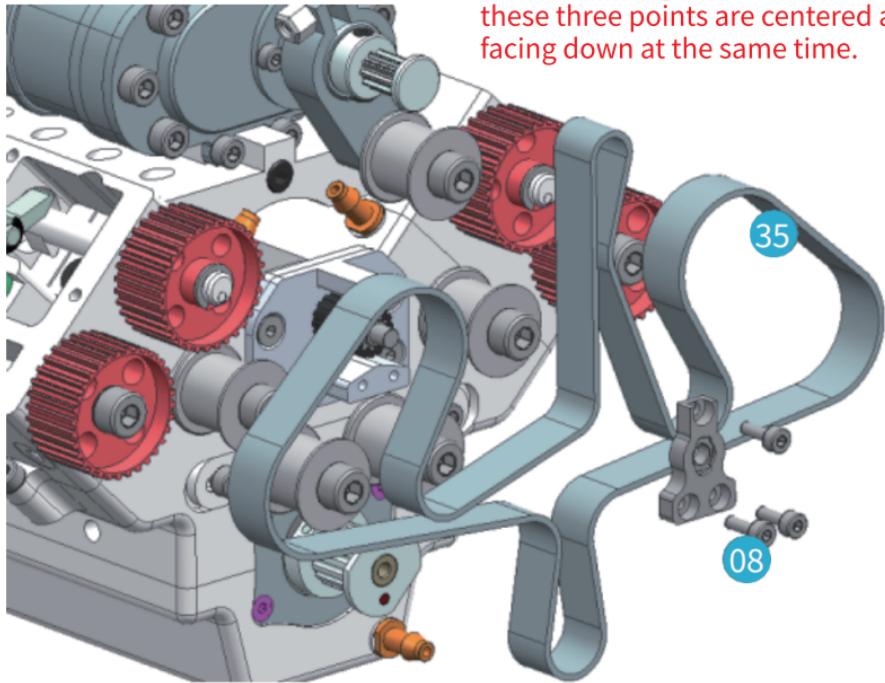
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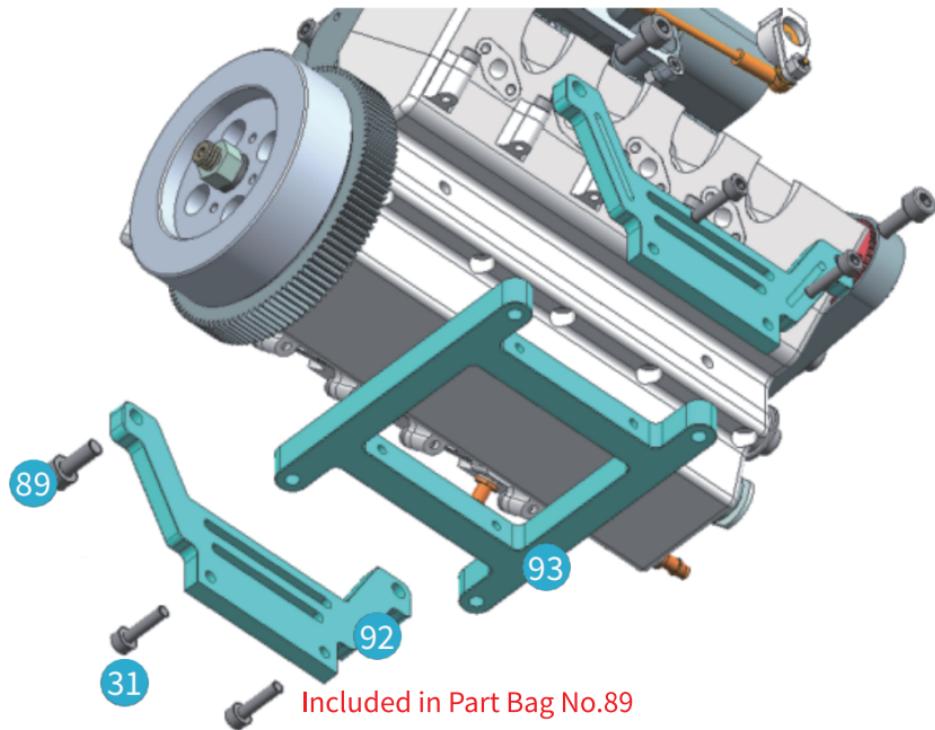
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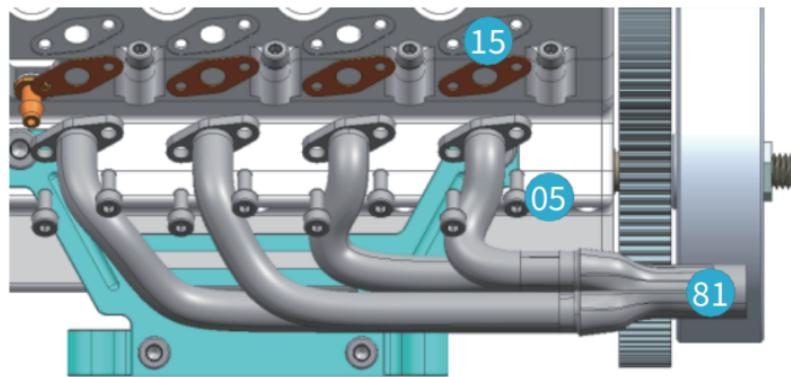
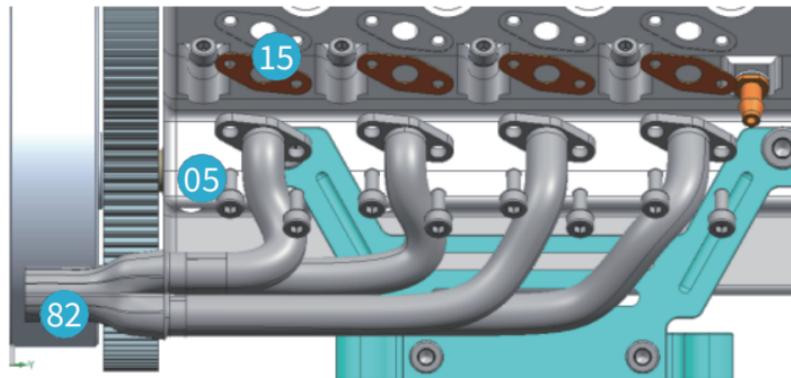
When installing the belt, ensure that these three points are centered and facing down at the same time.



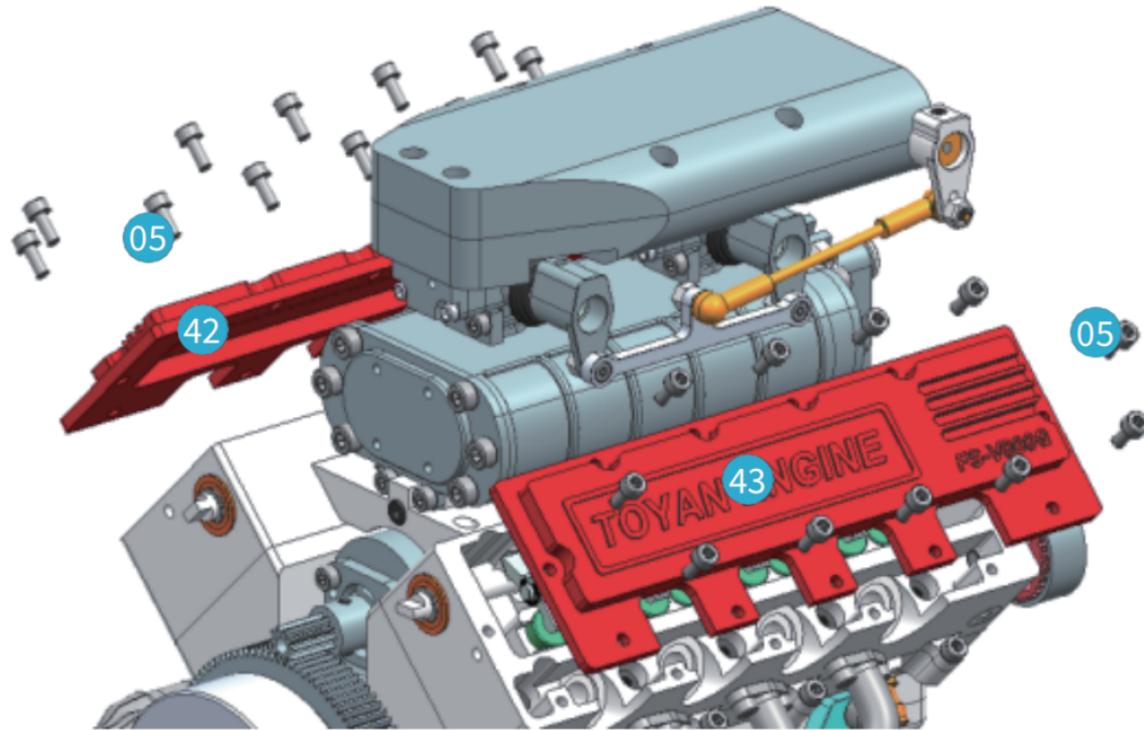
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Assembly of Components

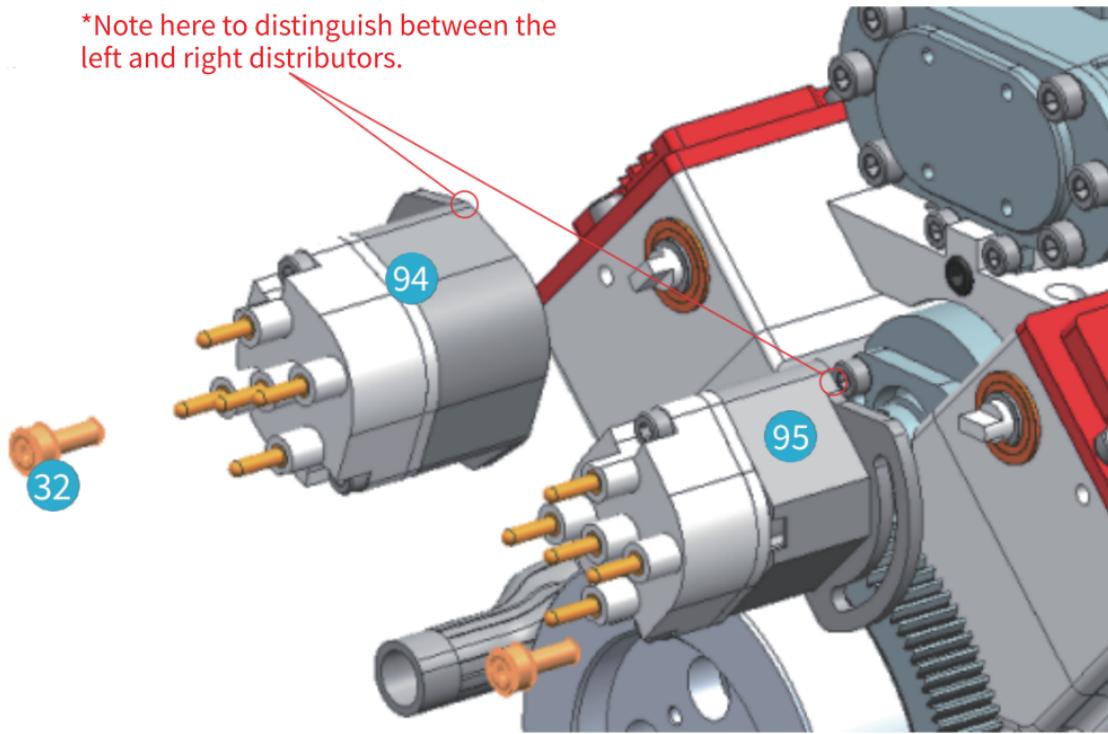


Assembly of Components



Assembly of Components

*Note here to distinguish between the left and right distributors.



Assembly of Components

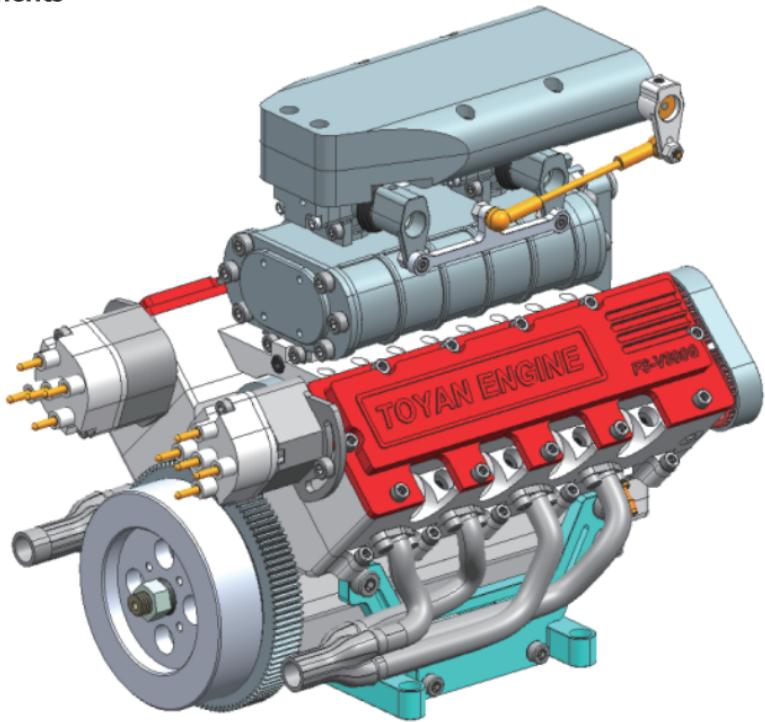


Diagram of Spark Plug Cable Connection

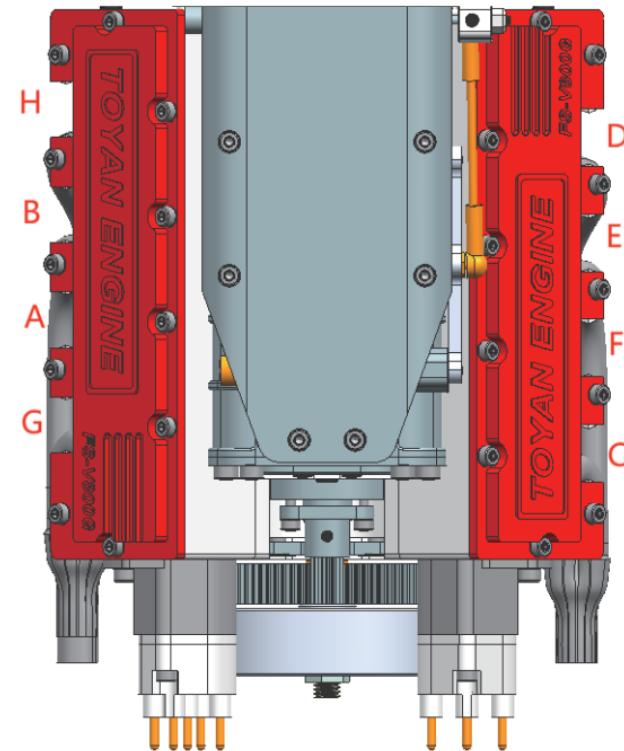


Diagram of the Wire Connection Figure 1

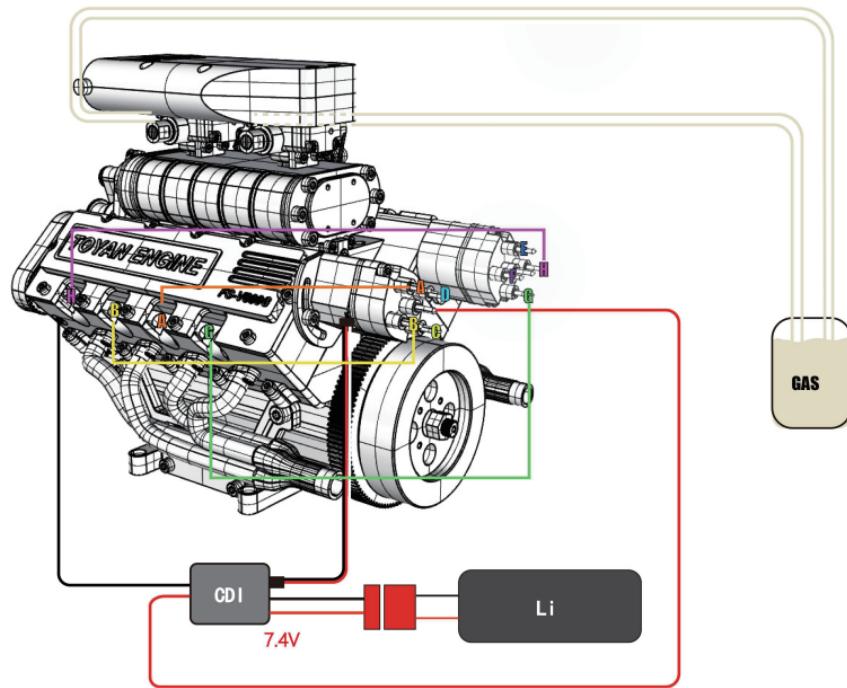
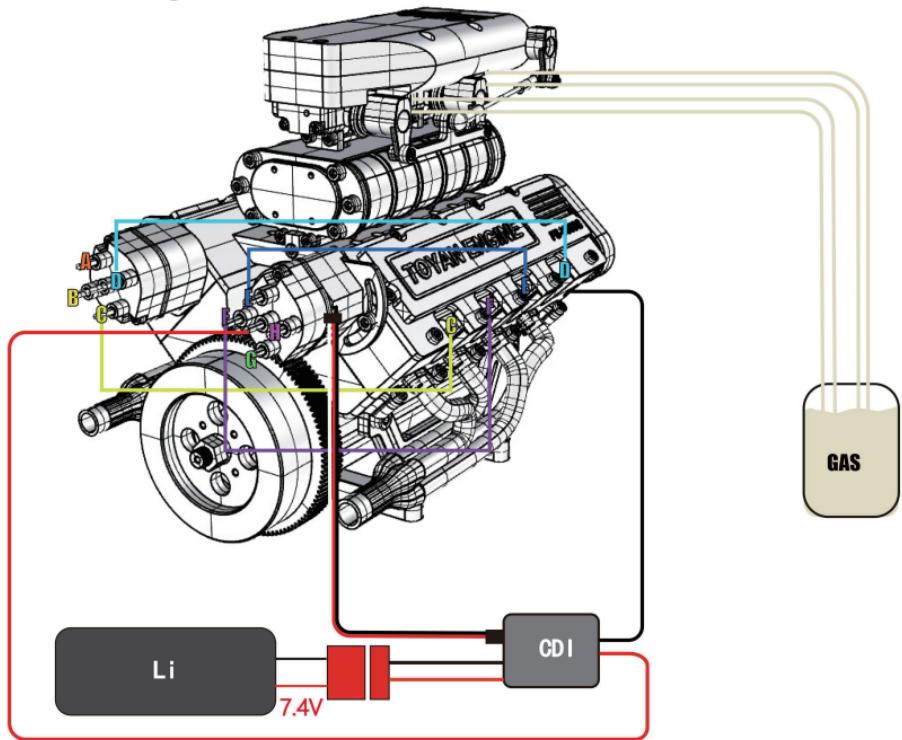


Diagram of the Wire Connection Figure 2



Install the Base

Ensure that the surface for engine mounting is flush and level in order to avoid unstable engine operation and degradation in performance. Any irregularities or misalignment may cause deformation of the crankcase, bearings, and other components. When fixing the engine, it is recommended to use 3.0mm hexagon socket screws. If installed on other engine platforms, please purchase adjustment pads to fit between the engine bracket and the engine.

Cautions for Engine Startup

1. Spark Plug:

The FS-V800GCS requires 8*spark plugs suitable for 4-stroke gasoline engines. The spark plugs should be compatible with the CDI (Capacitor Discharge Ignition) system used in this engine. They play a crucial role in igniting the fuel-air mixture when the piston reaches the TDC (top dead center). The spark plugs generate sparks to ignite the fuel, resulting in the combustion process and power generation.

2. Fuel:

Use high-quality gasoline as the fuel for optimal performance. Using self-mixed fuel or low-quality counterfeit gasoline can significantly reduce engine performance and lifespan. Since this is a 4-stroke engine, it requires a specific fuel-to-oil ratio for proper operation. The recommended ratio is between 1:25 to 1:30. Use 2-stroke internal combustion engine oil for fuel mixture preparation.

Reminder!

When the engine operates at higher RPMs and with gasoline fuel, the spark plug's lifespan is not very long. Please pay attention to the following: Model engine fuel is toxic. Avoid contact with the eyes or mouth. Always store the fuel in a clearly labeled container and keep it out of reach of children. Additionally, model engine fuel is highly flammable. Keep it away from open flames, excessive heat, or any other potential ignition sources.

3.Fuel Tank:

It is recommended to use a 100cc capacity fuel tank. Ensure the fuel tank is installed on the same plane as the engine. Maintain a max 1cm height difference between the fuel output of the tank and the fuel input of the carburetor. (The carburetor should be higher than the fuel tank's output.) Excessive height difference can reduce the carburetor's efficiency, negatively impacting the engine's performance. Use a standard 5mm silicone fuel line for clean fuel supply and install the fuel filter correctly. As the engine relies on negative pressure for fuel suction, consider using a muffler with an additional fuel nipple to provide pressure to the fuel tank.

4.Startup Power:

The FS-V800GCS requires a standard 11.1V 3S lithium battery for startup. Ensure the voltage of the startup battery is within the correct range to avoid damaging the starter motor's lifespan.

5.Startup Environment:

Start the engine in an open and well-ventilated area to avoid inhaling exhaust fumes, which can be harmful to your health.

6.Startup Surface:

Place the engine on a stable and flat surface during startup due to the vibrations after ignition.

Operation and Adjustment

Attention!

Four-stroke engines have stronger torque output than two-stroke engines, so the corresponding measures should be taken during operation.

1.Timing Belt and Camshaft Box Inspection:

Open the hood and apply grease to the mounted camshaft. Use solid grease to ensure stable operation and prevent dry friction of the camshaft. Make sure that the marking points on both pulleys are positioned to face down at the same time

2.Power Supply Check:

Ensure that the voltage of the 7.4V universal ignition power supply, fully charged, is within the normal range.

3.Initial Oil Needle Setting

The prerequisite here is adequate lubrication and cooling. The engine is operated by a very important oil needle setting: the excess oil not only provides rich lubrication, it also conducts heat from the surrounding metal, which is further assisted by a mixture of gasoline and oil.

In 2-stroke model engines, the rich mixture of cooling fuel and air enters the cylinder through the crankcase during pre-heating over a longer duration. However, in 4-stroke engines, the intake pipe and carburetor are mounted high on the cylinder cap, allowing the rich mixture to flow directly into the cylinder.

The engine benefits from fan cooling, providing an excellent operating experience for enthusiasts. Consider purchasing the TOYAN series of water cooling accessories for prolonged stable operation of your engine.

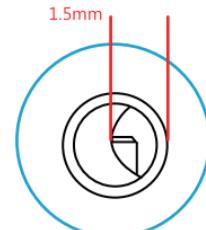
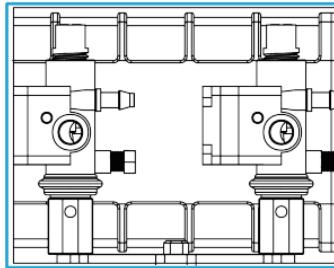
Reminder!

Each engine has been set with the appropriate oil needle configuration before leaving the factory. However, if you have adjusted the oil needle during use and it has become misaligned, we recommend adjusting the Main Oil Needle to 2.0 turns, and the Auxiliary Oil Needle to 1.5 turns.

When the engine operates at low speeds for extended periods, it tends to run in a rich fuel condition, resulting in the spark plug becoming damp, leading to difficulties in ignition. To prevent this issue, it is necessary to periodically increase the engine speed to clear out excess fuel. This helps to avoid running rich at low speeds.

Properly adjusting the intake valve screw is crucial for four-stroke engines as they require a significant amount of air intake. It is recommended to set the minimum throttle valve opening (idle setting) to approximately 1.5mm, suitable for all types of engine enthusiasts. To adjust the throttle valve opening, do not forcefully twist the screw of the throttle valve. Instead, loosen the valve screw to release the throttle valve. Use the throttle rocker arm to adjust, as shown in the diagram.

Loosen the throttle screw
and adjust the size of the
throttle



Maintain the throttle valve
opening of approximately 1.5mm

4. Start

Reminder!

Before starting the engine, ensure the throttle is in the correct position. Recommended initial throttle opening is 30%. Do not open the throttle too far under “no load” conditions to prevent overheating, engine damage, and potential harm to the piston ring and cylinder sleeve.

Connect the ignition switch, CDI, and battery as shown in the diagram. After making the necessary adjustments, press the start button to start the engine. Once the engine has started, disconnect the ignition battery. Keep the engine running slowly under the rich oil needle setting. (If necessary, gently adjust the throttle lever to keep the engine idle steady.) If the engine stops, allow it to cool for 15 seconds before restarting. Press and hold the start key within 5 seconds for each start to preserve the start motor’s lifespan. After starting, allow the engine to warm up for 30 seconds. This allows the fuel oil to lubricate each working part effectively.

If the engine exhibits any of the following conditions:

Rapid drop from high speed to low speed,

Rapid rise from low speed to high speed,

Engine instability,

Slow throttle control,

Flashover.

Please confirm the working status of the carburetor.

● Rich Oil

Symptoms of excessive oil include smoke emission or slow acceleration. To address excessive oil:

- a.Turn the main oil needle clockwise in 15° increments.
- b.Gradually reduce the main oil needle until the engine exhaust sound becomes soft and strong.
- c.The exhaust pipe should emit slight smoke, and the lubricating fuel should spray out.

● Lean Oil

Symptoms of low oil include a sharp engine sound resembling dry metal friction, rapid temperature rise, and engine stalling after acceleration. To address low oil:

- a.Turn the main oil needle counterclockwise in 15° increments.
- b.Gradually reduce the main oil needle until the engine exhaust sound becomes soft and strong.
- c.The exhaust pipe should emit slight smoke, and the lubricating fuel should spray out.

● Idle Stop

If the engine speed changes rapidly or experiences sudden flameout when transitioning from high speed to low speed:

- a.Confirm whether the throttle is closed less than 1.5mm.
- b.Gradually reduce the auxiliary oil needle (clockwise rotation) in 20° increments.
- c.Adjust the auxiliary oil needle until the engine maintains a steady idle speed.

During the adjustment process, avoid excessive reduction of the auxiliary oil needle to prevent lean oil conditions. The recommended minimum value of the auxiliary oil needle should not be less than 1 full turn.

Care and Maintenance

Engine model FS-V800GCS requires timely cleaning and maintenance due to environmental impact and fuel usage. TOYAN provides long-term maintenance services, but basic cleaning and maintenance can be performed by the user.

- Carefully clean the carburetor and remove dirt and grease from the inlet.
- If an air filter is used, ensure it is clean and free from blockage.
- Replace the air filter if it has been used for more than one hour, and remove contaminated filter elements to prevent dirt from entering the carburetor.
- Use alcohol as a cleaning agent to wipe the timing belt. Avoid using corrosive detergents that could cause damage.

Spark plugs must be considered as consumable items, and after prolonged operation, the spark plug may fail to start the engine properly. Extend the life of the spark plug and maintain engine performance by:

- ◆ Using spark plug carefully and using appropriate tools for disassembly.
- ◆ Use gasoline above #92 as the fuel.
- ◆ Avoid overtilting the engine and do not connect the battery while making adjustments.
- Replace the spark plug in the following situations, even if it is not visibly burned
 - a. The spark plug becomes blackened.
 - b. The spark plug becomes deformed.
 - c. The spark plug is soaked for an extended period.

- d. The engine stalls at idle.
- e. The spark during engine startup is weak.

After each operation, empty the fuel tank. Energize the spark plug and attempt to restart the engine to burn any remaining fuel in the tank. Repeat this process until the fuel is cleared from the engine.

Inject some antiseptic oil and briefly start the motor to distribute the oil to the working parts. Avoid injecting this oil into the lubricator nozzles to prevent deterioration of the carburetor O-ring.

Add solid lubricant to the camshaft and valve tappet to ensure sufficient lubrication for each operation in the CAM axle box.

Attention!

There is a risk of corrosion or startup difficulties if the engine is not properly dealt with due to storage after a certain period of time of these parts. If you require assistance, please contact us for professional support.

Replacement of Running Parts

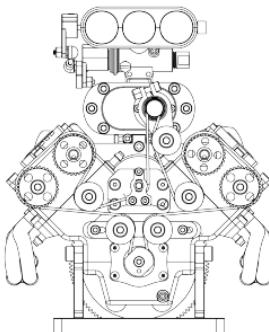
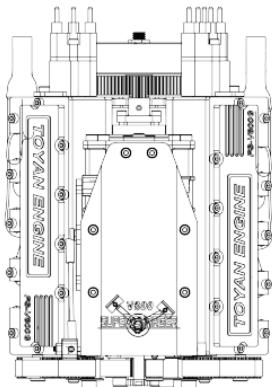
After prolonged operation, friction between engine components may cause wear and excessive gaps. Replacing related parts will help maintain the engine's performance. If you experience issues such as inflexible starting, power reduction, or idle speed instability during use, please provide feedback on your usage process and engine performance to local dealer or TOYAN. We are dedicated to providing comprehensive service and can assist you with parts replacement. Avoid disassembling the engine without professional tools to prevent uncontrollable damage to the engine.

Bug Checking

Reasons for Engine Failure to Start and Troubleshooting Methods:

- Neither the starter nor the engine can turn. First, check the battery charge and wire connections. If the battery is fine, inspect the starter circuit, fuses, and ignition switch.
- Set the throttle to a medium opening and attempt to start the engine with the starter. If the engine starts at this point, it indicates a fault in the idle control valve or its circuit, or an air leak in the intake manifold. If the engine still fails to start with the throttle at a medium opening, proceed to the next step of inspection.
- Perform a visual inspection. Check for any air leaks in the intake manifold, examine the condition of pipes and their connections, and inspect the crankcase ventilation system for leaks.
- Check the high-voltage spark. If the high-voltage spark is not normal, inspect the high-tension wire, ignition induction, distributor, and electronic ignition.
- Check the ignition sequence for correctness.
- Inspect the fuel supply system. Ensure the fuel tank has fuel and check the fuel pressure in the fuel line.
- Check the ignition timing and the ignition sequence for each cylinder.
- Verify the operation of the fuel pump switch installed on the airflow meter.
- Inspect the working condition of each cylinder's spark plug.
- Check the ignition timing. If the ignition timing is incorrect, further inspect the control system for ignition timing.

Three Views

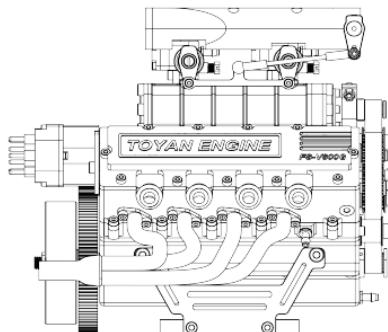


158.20

128.86

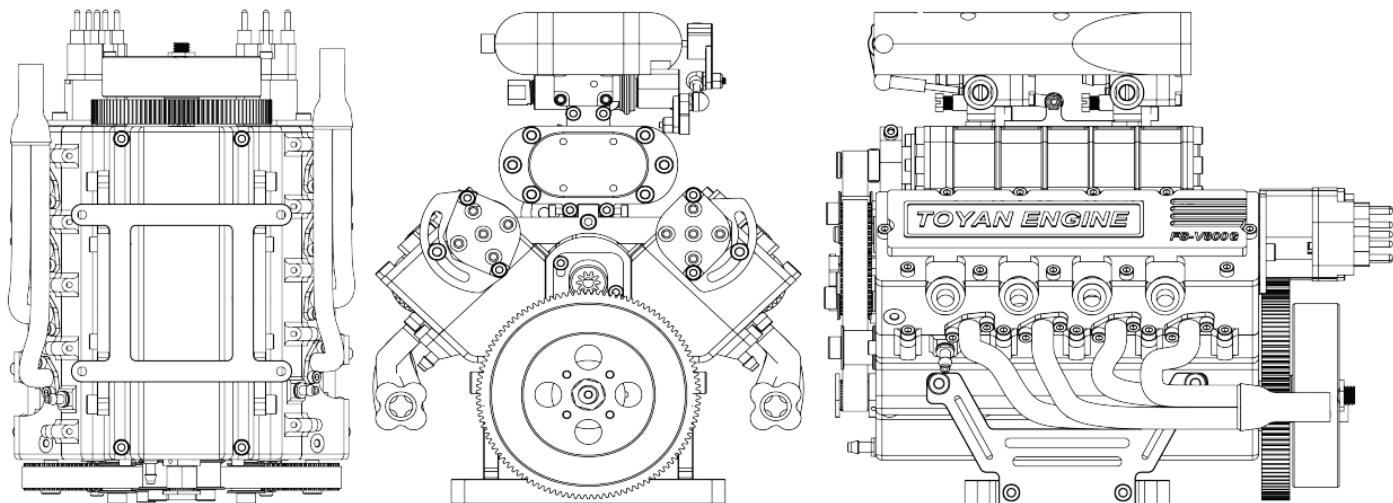
FS-V800 GCS Specification

- Displacement: 3.5ccx8
- Bore: 16.60mm
- Stroke: 17.00mm
- Practical rpm: 1800-12500rpm
- Output: 4.35ps(30%Nitro)
- Weight: 2238g

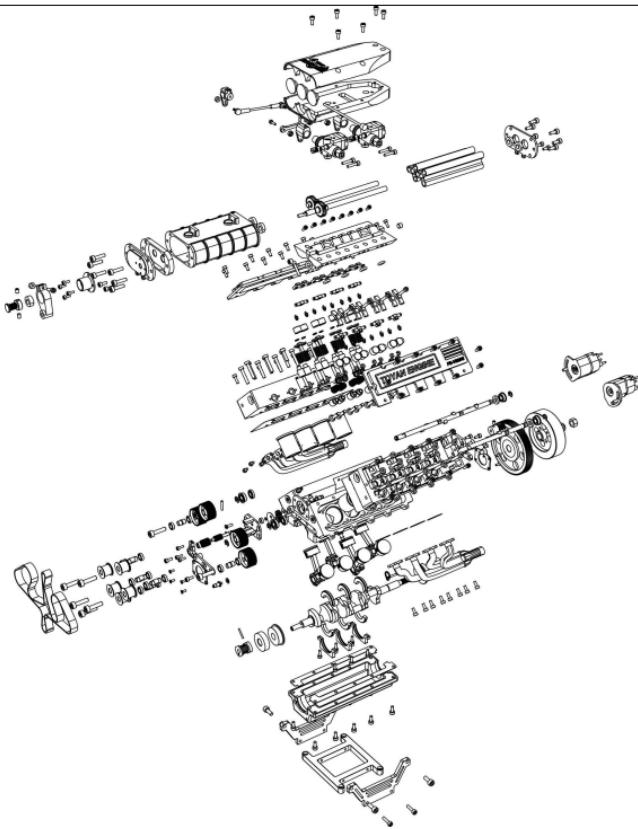


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Multiple Views



Expllosion View



Our Commitment

- Please contact a TOYAN dealer in your country or location for assistance. If you made the purchase online, you can also access various parts and complete services through the Internet. Detailed information about each part can be obtained from the dealer.
- We have a professional team available to answer your technical or usage questions online for free.
- If your distributor is unable to provide technical services, we offer direct technical support to assist you.

BOM List

NO.	Name	PC	NO.	Name	PC	NO.	Name	PC
01	C-type circlip	1	16	E-type circlip ϕ 2.5	16	31	Cylindrical head M3 \times 12	10
02	Butterfly gasket	1	17	Small head screw M3 * 12	8	32	Screw M3 \times 8	12
03	Cylindrical pin 2 \times 12	1	18	Beryllium copper sleeve	1	33	Oil nozzle	7
04	Nut M6	2	19	Water cooled gear 2	1	34	Screw M2.5 \times 8	16
05	Screw M2.5 \times 6	52	20	Water cooled gear 1	1	35	Flat gasket Φ 8	14
06	Screw M4 \times 6	2	21	Countersunk M2.5 \times 8	4	36	Cylinder head M4 \times 20	2
07	Screw M3 \times 4	3	22	Gear gasket	1	37	Spacer ϕ 4.9 \times 0.8	2
08	Screw M2 \times 6	19	23	Gear cover gasket	2	38	Countersunk M2.5 \times 5	8
09	O-ring 4.5 \times 1.8	8	24	O-ring	1	39	Spacer ϕ 3 \times 6 \times 0.5	7
10	Screw M5 \times 4	2	25	Y-shaped oil seal	1	40	5.1 Aluminum sleeve	1
11	Screw M2.5 \times 12	5	26	Bearings	1	41	Bottom gasket of gearbox	2
12	O-ring 8 \times 1	4	27	Gear shaft	1	42	Cylinder head cover (left)	1
13	Screw M2 \times 7	2	28	Cylindrical pin 2.5 \times 7	1	43	Cylinder head cover (right)	1
14	Anti slip nut (M2)	4	29	E-type circlip ϕ 3.5	9	44	Piston ring sleeve	1
15	Exhaust pipe gasket	8	30	Screw M3 \times 18	23	45	8.1 Aluminum sleeve	1

NO.	Name	PC	NO.	Name	PC	NO.	Name	PC
46	Cylinder head gasket (right)	1	62	Mini pressure roller	2	78	Piston connecting rod assembly	8
47	Cylinder head gasket (left)	1	63	Belt tightening parts	1	79	Motor	1
48	Camshaft flange bearing	4	64	Flange bearing	1	80	Pump carburetor	2
49	Rocker arm	16	65	Crankshaft oil seal	1	81	Exhaust pipe (right)	1
50	Oil seal fixing plate	2	66	Timing pulley	2	82	Exhaust pipe (left)	1
51	Axis positioning block	1	67	Flywheel driving gear	1	83	Cylinder block supercharger	1
52	Valve cap	16	68	Water pump cover	1	84	Air filter assembly	1
53	Copper shaft sleeve	6	69	Water toothed pump	1	85	Supercharger assembly	1
54	Camshaft oil seal	4	70	Motor bracket	1	86	Push and pull rod	1
55	Accelerator synchronizer	1	71	Synchronous belt	1	87	Damper rocker arm	1
56	Support frame	3	72	Cylinder head (left)	1	88	Guide element	1
57	Rocker arm bracket	8	73	Cylinder head (right)	1	89	Parts bag	1
58	Camshaft (right)	1	74	Bottom of gearbox	1	90	Intake fan adapter	1
59	Camshaft (left)	1	75	Crankshaft assembly	1	91	Pressure roller	1
60	Driven gear assembly	1	76	Intake duct	1	92	Gearbox bracket	2
61	Pressure roller	5	77	Mini pressure roller	1	93	Gearbox bracket seat	1

TOYAN ENGINE