It is of vital importance, before attempting to operate your engine, to read the general SAFETY INSTRUCTIONS AND WARNINGS in the following section 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.

SAFETY INSTRUCTIONS AND WARNINGS ABOUT YOUR O.S. 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 or abused. 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 O.S. 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 is grouped under two headings according to the degree of damage or danger which might arise through misuse or neglect.

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

These cover the many other possibilities, generally less obvious sources of danger, but which, under certain circumstances, may also cause damage or injury.

WARNINGS

NOTES

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

These cover the many other possibilities, generally less obvious sources of danger, but which, under certain circumstances, may also cause damage or injury.

ABOUT THE ENGINE

• How to adjust the carburetor of this engine is completely different from that for the conventional glow engine carburetor. Please study the CARBURETOR ADJUSTMENT section so as to familiarize yourself with the controls and other features.

• GGT10 is a glow engine ignitioned by a glow plug but using gasoline. So no ignition module and battery is required.

• This engine is designed for experienced fliers. Beginners and newcomers should not use this engine.

• The engine unit, silencer and carburetor are specially designed.

• The normal rotation direction of the engine is counterclockwise facing to the propeller.

• It offers broad power characteristics suitable for sport flight as well as acro flight.

• The large and dense cooling fins ensure sufficient cooling against overheating.

• We apply a "G5" glow plug to GGT10, which is exclusively developed for Glow Gasoline engines. Buy only the same glow plug when you replace it to the new one due to a break or deterioration. The conventional glow plugs for alcohol based glow engines such as No.6 (A3), No.7, No.8, No.10 (A5) are not applicable to GGT10.

• The supplied E-3071 silencer develops very efficient cooling.

STANDARD ACCESSORIES

• Nut (M3x0.5 2pcs.)

• E-3071 Silencer Assembly

• Hexagonal Screw (M3x35 2pcs.)

• E-3071 Retaining Screws (M3x35 2pcs.)

• E-3071 Bead Mount

ENGINE PARTS NAME

Glow Gasoline Engine

Cylinder Head

Carburetor

Type 61HB

Crankshaft

Propeller Nut

Propeller Washer

Drive Hub

Crankcase

Cover Plate

INSTALLATION

• It is suggested to use an engine mount as heavy and rigid as possible for highest performance and safe running. Install the engine on a mount using at least 3mm steel screws, such as Allen type, with locknuts. For the engine in the airplane, please use a locknut.

• Also, use the Nord Lock Washers (optional extra) and other anti-loosening washers or apply locking agent.

• Be sure that there is sufficient air intake and outlet area on the model for engine cooling to avoid overheating. (Pay careful attention to the cooling since a gasoline engine generates more heat than an alcohol based glow engine.)

SECURE the silencer to the engine by means of two retaining screws supplied after the engine is securely mounted on a model.

The exhaust outlet of the silencer can be rotated to any desired position in the following manner:

1. Loosen the locknut of the silencer and assembly screw.

2. Set the exhaust outlet at the required position by rotating the rear part of the silencer.

3. Retighten the assembly screw, followed by the locknut.
**FUEL TANK & LINES**
- Use a tank designed for gasoline. (Tanks designed for glow fuel use a rubber cap which is deteriorated by gasoline.)
- A 160cc tank will provide 12 to 13 minutes flight. (With full throttle, it will provide 8 to 10 minutes flight.)
- Install a commercially available gasoline fuel filter between fuel tank and carburetor. (Clean the filter from time to time.)
- For plumbing use TYGON® F-4040A (Yellow color) or strong nitrile rubber of more than 2.4-3.2mm ID and 4.8-6.4mm OD. Replace tubing periodically as it becomes hardened. (Replace tubing inside the fuel tank every six months.)
- For the plumbing in the fuel tank, we recommend using O.S. fluororubber tube 2 mm ID x 4 mm OD x 500 mm length (code # 23832100).
- Use fuel line keepers of stainless wire, etc. at the end of the tubing to prevent the tubing from coming off.
- This engine does not require a muffler pressurized fuel system but be sure to provide an air vent.
- Be sure to install an in-line fuel filter between the tank and carburetor to prevent foreign matter in the tank from entering the carburetor. Clean the filter periodically.

**CARBURETOR PARTS NAME**

- **The Needle-Valve**
  - For adjusting the mixture strength when the throttle is fully open Needle-valve adjustment effect the mixture strength at round mid speed.

- **The Mixture Control Valve**
  - For adjusting the mixture strength at part-throttle and idle speed, to obtain steady idling and smooth acceleration to mid speed.

Please note with this carburetor, needle-valve adjustment does not affect the mixture control valve adjustment but the mixture control valve adjustment effects the needle-valve adjustment. Therefore, it is required to adjust also the needle-valve when the mixture control valve is adjusted. Mixture control valve is pre-set at the near-best position when the engine leaves the factory. Therefore, it is not necessary to adjust the mixture control valve until running-in is completed.

**CARE OF FUEL PUMP & REGULATOR**
- NEVER disassemble the fuel pump or pressure regulator. Their original performance may not be restored after reassembly.
- DO NOT allow foreign matter to enter the fuel system. Dirt inside the pump or regulator, no matter how small, may obstruct the flow of fuel and prevent these components from working properly.
- NEVER insert anything into the inlet or outlet nipples in an attempt to clear a suspected obstruction.

**DO NOT obstruct the small rectangular hole at the bottom of the regulator, nor the regulator will not function correctly.**

**FUEL TUBE BUBBLES**
- Heat transferred to the PD-08 pump during engine operation may cause bubbles in the fuel tubing between the pump and carburetor. The bubbles will prevent the engine from performing properly. Even if the air temperature is relatively low, heat can be transferred to the pump due to your cowling design. If this happens, you can correct it by (1) cutting a vent in the cowling that allows cool air to pass through, or (2) relocating the pump inside the firewall or outside the cowling.

**FUEL TUBE BUBBLES**
- Heat transferred to the PD-08 pump during engine operation may cause bubbles in the fuel tubing between the pump and carburetor. The bubbles will prevent the engine from performing properly. Even if the air temperature is relatively low, heat can be transferred to the pump due to your cowling design. If this happens, you can correct it by (1) cutting a vent in the cowling that allows cool air to pass through, or (2) relocating the pump inside the firewall or outside the cowling.

**HOW TO RELOCATE THE PD-08 PUMP**
1. Remove the pump.
   Unscreen the M3x28 fixing screws (2 pcs). Take out the pump.
2. Remove the pulse tube.
   Disconnect the short yellow pulse tube that connects the engine cover plate to the pump. You’ll see a pulse spacer inside the short tube. Take it out, set it aside and do not lose it.
3. Extend the pulse tube.
   Use TYGON® F-4040A (yellow) or strong nitrile rubber of at least 2.4 to 3.2mm ID and 4.8 to 6.4mm OD. To avoid engine malfunction, the maximum length of the tube should not exceed 150mm. You may not need to use the pulse tube spacer if the tube is much longer than the factory setting. Otherwise, insert the spacer (which regulates pulse pressure to the pump) into the tube. Use stainless wire keepers at the end of the tubing to prevent it from coming off. The tubing will harden over time, so replace it periodically.
4. Attach the pump.
   If you attach the pump on a frame or cowling, the existing M3 x 28 screws might not be long enough. You may need extra M3 screws and nuts. You can also choose not to attach the pump in the fuselage. In this case, wrap it with foam or sponge so it will not move around. Also be sure to bind the pump itself tightly with the existing screws and M3 nuts (the nuts are sold as standard accessories). If you don’t, fuel may leak from the pump.

**GLOWPLUG IGNITER**
- A glow plug heater for GGT10 is nothing special. You can use a conventional glow plug igniter.
- You may find the G5 glow plug filament does not glow as bright as the conventional glow plugs. But you can start the engine without difficulties since the flashpoint of gasoline is lower than that of alcohol based glow fuel.

**RUNNING-IN**
- Use a fuel with increased oil content and set the needle a little on the rich side. Too rich a needle setting may cause misfiring or erratic running due to fouling of the plug.
- Use a 25:1 fuel/oil mixture if the particular brand of oil states 50:1 mix. Use a 20:1 fuel/oil mixture if the particular brand of oil states 25:1 mix. Set only the high speed needle 200 below maximum rpm. The lower speed needle need not be Richie.
- Make sure to replace the fuel cap periodically as it becomes hardened. (Replace tubing inside the fuel tank every six months.)

**WARNING**
Make sure that the propeller is well balanced. An unbalanced propeller and/or spinner can cause serious vibrations that may weaken parts of the airframe or affect the safety of the radio-control system. Do not use any propeller which has become split, cracked or nicked even very slightly, or received strong impact even if no apparent damage is visible.

Since the GGT10 is intended to be started with an electric starter, the addition of a spinner assembly for centering the starter sleeve is desirable. Special propeller locknut sets are available for use with spinners. Use a good quality well balanced spinner, enclosing the propeller boss. Make sure that it is of precision-made and sturdy construction so that the spinner shell cannot loosen when the starter is used. Make sure the spinner notches do not interfere the propeller. If they do, cut the notches to clear.

**MIXING OF OIL**
- Use regular gasoline. (No need to use high octane gasoline.)
- Alcohol based glow fuel cannot be used in this engine. Not only will the engine not work properly but the internal carburetor plastic parts will be damaged.
- Use high quality commercially available 2 stroke engine oil.
- Follow the oil manufacturer’s recommendations concerning the mixture ratio of gasoline and oil. If there is no recommendation, mix with a 25:30:1.

We have checked the following oils with the mixture of 50:1.

**AMSOIL Saber**
Zenoah Genuine FC Class
Concerning the mixture ratio for running-in, follow the instructions in the RUNNING-IN section.
- With a gasoline engine, passages in the carburetor are narrower than that of a glow engine, and therefore very sensitive against foreign matter such as dust. It is suggested to use optional accessory Super Filter L (Code No. 72403050) when filling a tank in the model from a container used for transportation or storing.

**SPORT/ACRO/SCALE**

<table>
<thead>
<tr>
<th>Type</th>
<th>Size (D)xP</th>
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</thead>
<tbody>
<tr>
<td>12x7-9</td>
<td>13x6-8</td>
</tr>
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</table>

**PROP 120cc**

- Use a fuel with increased oil content and set the needle a little on the rich side. Too rich a needle setting may cause misfiring or erratic running due to fouling of the plug.
- Use a 25:1 fuel/oil mixture if the particular brand of oil states 50:1 mix. Use a 20:1 fuel/oil mixture if the particular brand of oil states 25:1 mix. Set only the high speed needle 200 below maximum rpm. The lower speed needle need not be Richie.
- Make sure to replace the fuel cap periodically as it becomes hardened. (Replace tubing inside the fuel tank every six months.)
WARNING: When ground running the engine, avoid dusty or sandy locations. If dust or grit is drawn into the engine, this can have a ruinous effect, drastically shortening engine life in a matter of minutes.

■ STARTING
- The GGT10 cannot be started by flipping a propeller. Be sure to use an electric starter to start the engine.
- The GGT10 is not equipped with a choke valve.
- Draw the fuel to the carburetor by an electric starter. The GGT10 cannot be started by flipping a propeller.
- 1. Open the needle-valve 2 to 2.5 turns from the fully closed position. (Mixture control valve is pre-set at nearly best position when the engine leaves the factory. Therefore, do not adjust the mixture control valve at this point.)
- 2. Set the throttle at 1/3 open from the fully closed position.
- 3. Tell the helper and onlookers that you will start the engine now and have the helper hold the model securely.
- 4. Connect a glow plug igniter or battery leads to the glow plug.
- 5. Apply an electric starter to start the engine.

NOTE:
- It may be difficult to start the engine when air temperature is below 10 degrees Celsius. In this case, keep running and avoid scratching the carburetor with air for around 10 seconds even the engine starts firing.

■ CARBURETOR ADJUSTMENT
1. Before attempting to operate your engine
- Although the carburetor’s appearance and construction resemble conventional glow engine’s carburetor, how to adjusting is completely different from that for glow engine’s carburetor. Please study the following instructions so as to familiarize yourself with the controls and other features of the engine.
  • It is expected the engine runs a little unstably (uneven RPM and light breathing) until the inside parts of the carburetor get used to the fuel (around when the running-in is completed) but the engine won’t quit. Run the engine as it is. Also, for about 10 seconds after the first starting of the day, it is expected the engine runs unstably but the engine won’t quit. Run the engine as it is.
- 2. Key points for adjustments
  1) Mixture control valve is pre-set at the near-best position when the engine leaves the factory. Therefore, it is not necessary to adjust the mixture control valve until running-in is completed. Adjust the needle-valve only.
  2) With a conventional glow engine, the needle-valve is gradually closed to the rich mixture. On the contrary, with the GGT10, the needle-valve is opened from the lean mixture. Please fully note this difference.

3. Adjustments
1) Needle-valve adjustment
- 1. Gradually open the throttle fully when the engine is started.
- 2. Close the needle-valve and the engine RPM increase. (Close the needle-valve at a pace of 30~45 degrees/second smoothly.)
- 3. When the needle-valve is closed further, engine RPM stop increasing and then RPM start decreasing. Close the needle-valve 60 to 90 degrees further from the point where RPM start decreasing.
- 4. Then, open the needle-valve rather slowly (at a pace of 15 degrees/second) and the engine RPM increase.
- 5. Open the needle-valve 90 degrees further from the point where maximum RPM are obtained. This is the nearly best needle-valve position.

   Fly the model with this needle-valve position until running-in is complete (10 seconds or 2 liters flights). Please observe the general precautions during running-in such as to avoid prolonged full throttle running and increase load gradually.

2) Adjustment after running-in
- 1. Open the mixture control valve 60 degrees from the original position (factory setting).
- 2. Start the engine.
- 3. Open the throttle fully 10 seconds to warm the engine up.
- 4. Close the throttle fully.
- 5. Set the idling RPM at round 3,000 with the throttle trim on the transmitter.
- 6. Stop the engine.
- 7. Close the mixture control valve 15 degrees.
- 8. Start the engine and write down the idling RPM.
- 9. Repeat 6 to 8. The position where 90 degrees opened position from maximum idling RPM is obtained is the optimum mixture control valve position. Warning! Never adjust the mixture control valve while running the engine.
- 10. Readjust the needle-valve according to 3. (1) described above.
- 11. Now the adjustment on the ground is completed.

   Hereafter adjust the needle-valve and/or mixture control valve if required according to the flight conditions. Please note with this carburetor, needle-valve adjustment does not effect the mixture control valve adjustment but the mixture control valve adjustment effects the needle-valve adjustment. Therefore, it is required to adjust also the needle-valve when the mixture control valve is adjusted.

3) Initial mixture control valve position
- While the mixture control valve is set at the near-best position when the engine leaves the factory, it is possible you lost the initial position in repeating the mixture control valve adjustment.

   How to reset the initial mixture control valve position is as follows. Please note this work is very sensitive. Carry out the work very carefully.
  1. Open the mixture control valve one turn (360 degrees).
  2. Repeat opening the throttle fully and closing the throttle fully a few times to make sure there is no resistance during throttle movement.
  3. Close the mixture control valve 30 degrees.
  4. Repeat 2. and 3. until resistance is felt when opening the throttle from fully closed position.
  5. Open the mixture control valve approx. 90 degrees from this point. This is the initial mixture control valve position.

   Note: Generally, a gasoline engine is sensitive to a lean mixture compared with an alcohol based glow engine, and will stop with warning hesitation and stops with overheating symptoms (loss of power at full throttle or exhaust smoke). Also, for about the first several flights, the engine even if the overheating symptoms were not observed during the former flight. In this case, leave it until the engine is still hot, (in hot weather, it may take more than one hour.) or run the engine for 4 to 5 minutes at idle.

■ FLIGHT & MAINTENANCE
1) Checking prior to flight
   - When the engine is started, make sure the radio control system works normally (distance test).
   - Engine does not run erratic with full throttle.
   - Idling is stable.
   - Responds positively to the throttle operation.
   - Warm-up is finished.

   Warm-up is required as with full size aircraft and car engines. Take off with the model after warming the engine for approx. 10 seconds with full throttle.

2) Precautions in flight
   - A slight engine rpm increase and decrease delay is normal. Abrupt throttle operation will cause the engine to quit. Move throttle smoothly.
   - Cooling is more vitally important to a gasoline engine than to an alcohol based glow engine. If overheating symptoms (loss of power at full throttle or exhaust smoke). At mid speed changes from cloudy one to clear one) are observed during flight, immediately stop flying and carry out the following countermeasures.
     1. Enlarge the air intake cutout on the cowling.
     2. Enlarge the air outlet cutout on the cowling. (It is vitally important.)
     3. Partly cover the air intake cutout on the cowling where air does not hit direct the engine.
     4. Install an air guiding plate on the fuselage and cowling so that cooling air may be guided to the cylinder portion of the engine and muffler.

   When the interval between the flights is short and the engine is still hot, it may be possible overheating symptoms are observed by circulating the head from the former flight. This may be even if the overheating symptoms were not observed during the former flight. In this case, leave it until the engine is fully cooled down. (In hot weather, it may take more than one hour.) or run the engine for 4 to 5 minutes at idle.

Maintainance after the day’s flights
- Please pay attention to the matter described below to ensure that your engine serves you well in regard to performance, reliability and long life.
  1. Check the tightening of each screw, especially engine installation screws and silencer installation screws each time. Also, for the first several flights, tighten the screws after each flight.
  2. As previously mentioned, it is vitally important to adjust the engine in conditions where dust, distributed by the propeller, may be deposited on the engine and enter its working parts.

   • Remember to keep your fuel container closed to prevent foreign matter from contaminating the fuel.
   • Install a fuel filter to prevent foreign matter in the fuel container from entering the fuel tank. O.S. Super Filter (L) is available as an optional extra.
   • Install an in-line fuel filter between the tank and carburetor to prevent foreign matter in the tank from entering the carburetor.
   • Clean these filters periodically.

   If these precautions are neglected, restrictions of fuel flow may cause the engine to cut out, or the fuel/air mixture to become too lean causing the engine to overheat.

   • With a gasoline engine rust hardly occurs. Check the exterior to make sure there is nothing wrong and wipe off any oil residues.

   • Fill the carburetor with fuel at the conclusion of a day’s flying. (Pay careful attention to fire and ignition sources when carrying and storing the model.) If the engine is stored without filling the carburetor with fuel the inside parts will dry out and not work properly at the next running. If the engine quits out of fuel, refill the carburetor with fuel.

   • When the engine is not to be used for a long period (more than a year), remove the engine from the model, clean the outside then remove the carburetor, and plug all tubing. Clean inside the engine by rotating the crankshaft with the engine immersed in container filled with gasoline.

   • Also use gasoline to clean the outside of the carburetor. Clean the outside only because the inside parts are sensitive to foreign substances.

   • After cleaning the engine, dry it well then inject a small quantity of oil used to mix fuel and rotate the crankshaft several times to distribute the oil well inside the engine. Finally reassemble the engine and store it in a dry place after inserting it in a heavy vinyl bag.

O.S. GENUINE PARTS & ACCESSORIES
- GLOW GASOLINE ENGINE PLUG GS (71655001)
- LONG PROPELLER NUT SET 1/4”-28 (73101000)
- SPINNER NUT 1/4”-28 (L) (23024009)
- SUPER FILTER (S) (72430501)
- NON-BUBBLE WEIGHT (S) (71531010)
- SUPER FILTER (L) (72430505)
- LOCK WASHER (10sets) M3 (55500002)
- FANG NUT (5pcs./sets) M3 (79670031)
- FLUORO-RUBBER TUBE
  - ID. 2mm x OD. 4mm Length 500mm (28382100)
  - ID. 3mm x OD. 5mm Length 500mm (28382200)
**ENGINE EXPLODED VIEW**

- Type of screw
  - C...Cap Screw
  - N...Round Head Screw

![Three-view Drawing](http://www.os-engines.co.jp)

**CAP SCREW SETS** (10pcs./sets)

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<th>Type</th>
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<td>M3x8</td>
<td>Cover Plate Retaining Screw (4pcs.)</td>
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<td>79871150</td>
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<td>Cylinder Head Retaining Screw (6pcs.)</td>
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<tr>
<td>23875310</td>
<td>M3x28</td>
<td>Pump Unit Retaining Screw (2pcs.)</td>
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**CARBURETOR EXPLODED VIEW & PARTS LIST**

- Type of screw
  - N...Round Head Screw
  - S...Set Screw

![Carburetor Diagram](http://www.os-engines.co.jp)

**THREE VIEW DRAWING**

**SPECIFICATIONS**

- Displacement: 9.73 cc / 0.594 cu.in.
- Bore: 24.0 mm / 0.945 in.
- Stroke: 21.5 mm / 0.846 in.
- Output: 1.6 ps / 1.58 hp / 10,000 r.p.m.
- Practical R.P.M.: 2,000-11,000 r.p.m.
- Weight: 453 g / 15.98 oz. (Engine)
- Weight: 108 g / 3.81 oz. (Silencer)

![Three-view Drawing](http://www.os-engines.co.jp)