

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. 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.

WARNINGS

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

NOTES

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

WARNINGS

Never touch, or allow any object to come into contact with, the rotating propeller and do not crouch over the engine when it is running.

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.

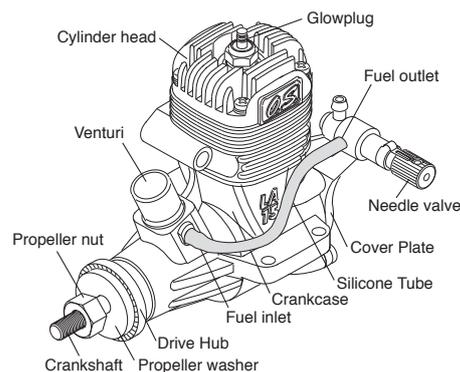
ABOUT THE ENGINE

The "LA-S Series" engines are designed for control line models. They have broad power characteristics which are suitable for both trainer models and stunt models. A separate needle-valve is mounted at the rear, where manual adjustment is safely away from the rotating propeller.

Connect the short length of fuel tubing supplied securely between the fuel outlet and the fuel inlet. In the event of the tube becoming damaged, it should be replaced with a suitable length of best quality 5mm ODX2mm ID silicone tubing. Use similar material to connect the fuel inlet nipple to the fuel tank.

Length	
15LA-S	51-52mm
25LA-S	55-56mm

BASIC ENGINE PARTS



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.



A weakened or loose propeller may disintegrate or be thrown off and, since propeller tip speeds with powerful engines may exceed 600 feet (180 metres) per second, it will be understood that such a failure could result in serious injury, (see 'NOTES' section relating to propeller safety).

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.

NOTES

- This engine was designed for model aircraft. 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.
- Be sure to use the silencer (muffler) supplied with the engine. Frequent exposure to an open exhaust may eventually impair your hearing. Such noise is also likely to cause annoyance to others over a wide area.
- If you remove the glowplug from the engine and check its condition by connecting the battery leads to it, do not hold the plug with bare fingers. Use an appropriate tool or a folded piece of cloth.
- Install a top-quality propeller of the diameter and pitch specified for the engine and aircraft. Locate the propeller on the shaft so that the curved face of the blades faces forward-i.e. in the direction of flight. Firmly tighten the propeller nut, using the correct size wrench.
- Always check the tightness of the propeller nut and retighten it, if necessary, before restarting the engine. Also, check the tightness of all the screws and nuts before restarting the engine.
- If you install a spinner, make sure that it is a precision made product and that the slots for the propeller blades do not cut into the blade roots and weaken them.

INSTALLATION

It is suggested to use as heavy and rigid as possible engine mounting for highest performance and safe running. Install the engine on a plastic mount using at least 3mm steel screws, such as Allen type, with locknuts, for bolting the engine to the bearers.

Make sure that these mounting beams are accurately aligned and firmly integrated with the airframe, reinforcing the adjacent structure to absorb vibration.

Use 3mm or larger steel screws, preferably Allen type hexagon socket head cap screws, with washers and locknuts, for bolting the engine to the bearers.

O.S. Radial Motor Mount

For 15LA-S / Code No.71909310
For 25LA-S / Code No.71908100

NEEDLE-VALVE EXTENSION

Needle Valve Extension Cable Set (Code No. 72200080) is available from O.S. as an optional part.

INSTALLATION OF SILENCER

Secure the silencer to the engine by means of two retaining screws supplied after the engine is securely mounted to a test bench or a model.

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

- Loosen the locknut and assembly screw.
- Set the exhaust outlet at the required position by rotating the rear part of the silencer.
- Re-tighten the assembly screw, followed by the locknut.

It is recommended to seal the fitting faces of engine exhaust and silencer with silicone sealant.

BEFORE STARTING

Propellers

Suggested propeller sizes are given in the table. As the ideal propeller diameter, pitch and blade area vary according to the size, weight and type of model, final propeller selection can be made after practical experiment.

- Preferably, use an electric starter. The wearing of safety glasses is also strongly recommended.
- Discard any propeller which has become split, cracked, nicked or otherwise rendered unsafe. Never attempt to repair such a propeller: destroy it. Do not modify a propeller in any way, unless you are highly experienced in tuning propellers for specialized competition work such as pylon-racing.
- Take care that the glow plug clip or battery leads do not come into contact with the propeller. Also check the linkage to the throttle arm. A disconnected linkage could also foul the propeller.
- After starting the engine, carry out any needle-valve readjustments from a safe position behind the rotating propeller. Stop the engine before attempting to make other adjustments to the carburetor.
- Adjust the throttle linkage so that the engine stops when the throttle stick and trim lever on the transmitter are fully retarded. Alternatively, the engine may be stopped by cutting off the fuel supply. Never try to stop the engine physically.
- Take care that loose clothing (ties, shirt sleeves, scarves, etc.) do not come into contact with the propeller. Do not carry loose objects (such as pencils, screwdrivers, etc.) in a shirt pocket from where they could fall through the propeller arc.
- Do not start your engine in an area containing loose gravel or sand. The propeller may throw such material in your face and eyes and cause injury.
- For their safety, keep all onlookers (especially small children) well back (at least 20 feet or 6 meters) when preparing your model for flight. If you have to carry the model to the take-off point with the engine running, be especially cautious. Keep the propeller pointed away from you and walk well clear of spectators.
- Warning! Immediately after a glowplug-ignition engine has been run and is still warm, conditions sometimes exist whereby it is just possible for the engine to abruptly restart if the propeller is casually flipped over compression WITHOUT the glowplug battery being reconnected. Remember this if you wish to avoid the risk of a painfully rapped knuckle!

	Running-in	Aerobatic & Sport
15LA-S	8x4	8x4-6
25LA-S	9x5	9x6, 10x5

Warning:

Make sure that the propeller is well balanced. An unbalanced propeller and/or spinner can cause serious vibration which may weaken parts of the airframe or affect the safety of the radio-controlled system.

Fuel

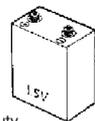
The 15LA-S and 25LA-S should be operated on a methanol based fuel containing not less than 18% (volumetric) castor oil, or a top quality synthetic lubricant (or a mixture of both), plus a small percentage (5-10%) of nitromethane for improved flexibility and power. Some commercial fuels also contain coloring additives as an aid to fuel level visibility. In some cases, these additives have indicated slightly negative effects on the performance. We would suggest that you use such fuels only if you are satisfied that they do not adversely affect running qualities when compared with familiar standard fuels. When changing to a fuel brand or formula that is different from the one to which you are accustomed, it is a wise precaution to temporarily revert to in-flight running-in procedures, until you are sure that the engine is running entirely satisfactorily.

Fuel Tank

A fuel tank of approximately 40cc capacity for 15LA-S and 60cc capacity for 25LA-S is suggested.

Glowplug battery

The power source for heating the glowplug may be either a large heavy-duty 1.5volt dry cell.



1.5 volt heavy-duty dry battery

Battery Leads

These are used to conduct current from the battery to the glowplug. Basically, two leads, with clips, are required, but, for greater convenience, twin leads with special glowplug connectors, as shown on the right, are commercially available.



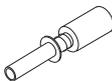
Glow Plug

O.S. No.6 (Former A3) glowplug is supplied with the engine.



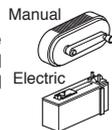
GlowPlug Igniter

Commercially available handy glowplug heater in which the glowplug battery and battery leads are integrated.



Fuel Pump

Alternatively, one of the purpose-made manual or electric fuel pumps may be used to transfer fuel directly from your fuel container to the fuel tank.



Electric Starter and Starter Battery

Required when starting the engine.

12-Volt lead-acid battery



O.S. Super Filter (Fuel Can Filter)

Install a filter on the outlet tube of your refueling container to prevent entry of foreign matter into fuel tank. O.S. 'Super Filters' (large and small) are available as optional extras.



O.S. Non-Bubble Weight

To prevent the pickup from adhering to the tank wall under suction and restricting fuel flow, slots may be filed in the end of the weight. Alternatively, O.S. Non-Bubble Weight is available as an optional extra.



Silicone Fuel Line

Heatproof silicone tubing of approx. 5mm o.d. and 2.5mm i.d. is required for the connection between the fuel tank and engine.



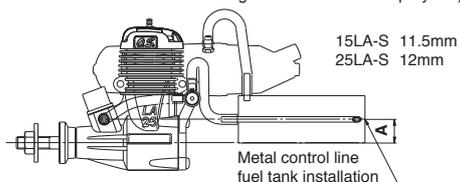
Long Socket Wrench With Plug Grip

Recommended for easy removal and replacement of the angled and recessed glowplug, the O.S. Long Socket Wrench incorporates a special grip.

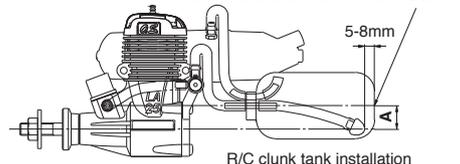
PLUMBING AND FUEL TANK POSITION

Make sure that there are no kinks or folds in the plumbing.

Measurement A (height from the bottom surface of the mounting lug to the center of the spray bar)



Make sure that the center of the spray bar and tank are on the same line.



Note:

Control line models tend to receive more abrupt changes of attitude than R/C models, which results in air bubbles being drawn from the fuel tank. Pay careful attention to the plumbing and fuel tank position.

Silencer (muffler) pressurized fuel system

To reduce variation in fuel "head" and ensure steady fuel delivery at the carburettor, it is advisable to employ a silencer (muffler) pressurized fuel system, i.e. to use the silencer outlet nipple to pressurize the fuel tank.

STARTING THE ENGINE

Preparations

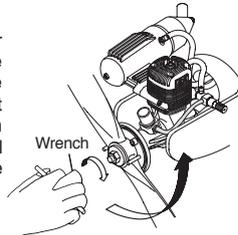
1. Installing the glowplug

Install the washer on the glowplug and screw carefully into cylinder-head, making sure that it is not cross-threaded before tightening firmly.

2. Installing the propeller

First, mount the propeller on the engine by tightening the prop nut or spinner-nut lightly, and make sure of the position where compression is felt, turning the propeller counter-clockwise slowly.

For accurately centering the starter's rubber drive insert, use an O.S. solid alloy spinner-nut. (Available as an optional extra part).



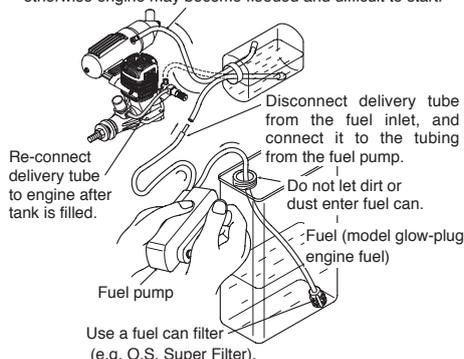
Alternatively, a spinner assembly, enclosing the propeller boss, may be used, but make sure that it is of sturdy construction and that the spinner shell does not loosen when the starter is used.

Warning: When using a spinner assembly, make sure that the notches in the spinner shell are large enough to clear the propeller blades and so do not cut into and weaken the blade roots.

Tighten the spinner nut firmly so that compression is first felt as indicated (i.e. with blades horizontal) when turning the propeller in the direction of arrow.

3. Filling the fuel tank

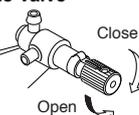
Do not allow fuel to overflow into silencer when refuelling, otherwise engine may become flooded and difficult to start.



4. Opening and closing of the needle-valve

Turn needle-valve clockwise to close (for leaner mixture).

Turn needle-valve counter-clockwise to open (for richer mixture).



5. Setting the needle-valve

Open the needle-valve 3 turns (for 15LA-S), 1 1/2 turns (for 25LA-S) in the direction of arrow from the closed position.

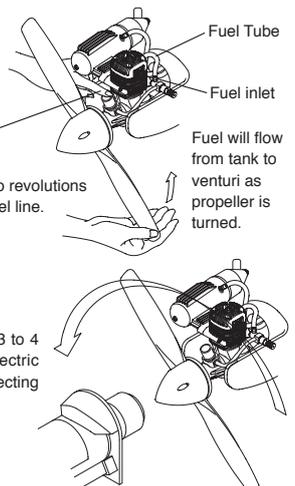
The position where the needle-valve stops is the fully closed position. It may be convenient to remember the position of the mark or set-screw at this time.

6. Priming

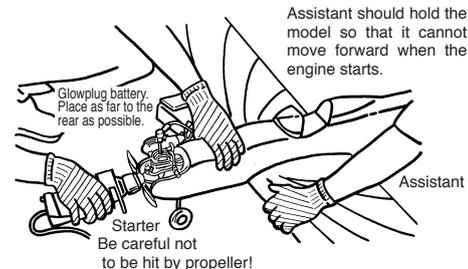
Place your finger over the venturi to choke intake.

Turn the propeller two revolutions while watching the fuel line.

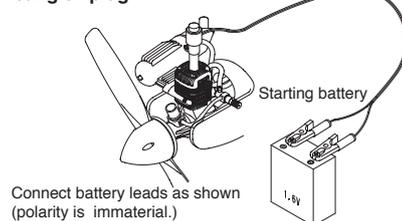
Turn the engine for 3 to 4 seconds by an electric starter without connecting glowplug battery.



7. Hold model securely when starting



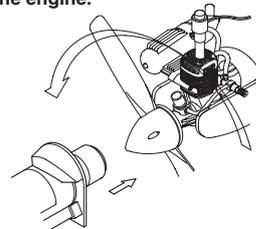
8. Heat glowplug



9. Apply electric starter

Bring the starter into contact with the spinner nut or spinner and depress the starter switch for one or two seconds. Repeat if necessary. When the engine fires, withdraw the starter immediately.

Attention: Never place your finger over the venturi intake when applying the starter. Such an action will cause an excess quantity of fuel to be drawn into the cylinder and result in hydraulic lock that may damage the engine.



Warning!

Since a control line engine is started with the throttle fully opened and reaches full rpm right after starting, be sure to hold the model securely.

10. Engine starts

In the interests of safety, keep your face and other parts of the body away from the vicinity of the propeller.

11. Needle-valve adjustment(1)

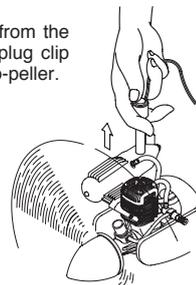
Then gradually close the needle-valve until the exhaust sound changes from an irregular pitch (four-cycle) to a steady pitch (two-cycle).

Close the needlevalve gradually until the engine sound is changing from a four-cycle into a two-cycle in pitch.

12. Disconnect battery leads

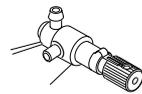
Disconnect the battery leads from the engine with care so that the plug clip does not touch the rotating pro-peller.

If the engine stops when battery leads are disconnected, close the needle-valve a little (approx. 45°) further, and restart the engine.



13. Needle-valve adjustment(2)

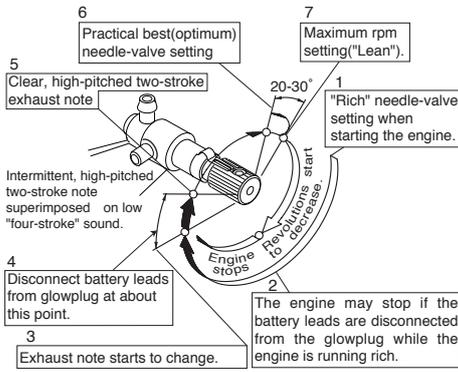
As the needle-valve is closed beyond the initial readjustment, the r.p.m. of the engine will be increased and a continuous high-pitched exhaust note, only, will be heard.



Key to the needle-valve adjustment. (Turn 20-30° at a time.)

Turn the needle-valve 20-30° in the direction of arrow, and wait momentarily for the change of r.p.m. After the r.p.m. of the engine increases, turn the needle-valve another 20-30° and wait for the next change of r.p.m. As the speed of the engine does not instantly change with needle-valve readjustment, small movements, with pauses between, are necessary to arrive at the optimum setting.

14. Needle-valve adjustment(Summary)



Note: Although this is a two-stroke engine it fires like a four-stroke at these rich needle-valve settings-i.e. ignition of the fuel charge takes place at every fourth stroke of the piston instead of at every second stroke.

NOTE: The above sketch is for reference purposes only. Actual needle positions may differ from those shown.

On starting from cold, with the needle-valve set at the rich starting position:

a good deal of white smoke is emitted, accompanied by a relatively low-pitched "four-stroke" exhaust note.

As the needle-valve is closed and the r.p.m. increases:

an intermittent high-pitched two-stroke note will be superimposed on the low-pitched "four-stroke" note. Exhaust smoke will be less dense and grey in colour.

Further needle-valve closure:

exhaust note is now a steady high-pitched sound, rising higher in pitch as needle-valve is closed and increase. The grey smoke will be lighter. (However, make sure that engine is fully run in.)

Finally:

maximum rpm is reached and will fall off (or engine will stop) if needle -valve is closed any further. Exhaust gas will be very light.

Now, re-open needle-valve 20-30°

This will produce the practical best (i.e. optimum) rpm setting (lower than maximum rpm). A light grey exhaust emission may be observed.

Take note of this position of the needle-valve.

15. How to stop the engine

To cut off the fuel supply, pinch the fuel delivery tube to the venturi.

■ RUNNING-IN ("Breaking-in")

All internal-combustion engines benefit, to some degree, from extra care when they are run for the first few times - known as running-in or breaking-in. This is because the working parts of a new engine take a little time to settle down after being subjected to high temperatures and stresses. However, because O.S. engines are made with the aid of the finest modern precision machinery and from the best and most suitable materials, only a very short and simple running-in procedure is required and can be carried out with the engine installed in the model. The process is as follows:

- 1) Start the engine and, with the throttle fully open, open the needle-valve an extra half turn (180°) from the optimum setting. This will produce a rich mixture that will result in cooler running. Allow the engine to run out a full tank on the ground. (Avoid dusty surroundings.)
- 2) Now fly the model with the needle-valve re-set 20-30 degrees open from the optimum setting (i.e. 40-60° from the highest rpm setting).
- 3) Close the needle-valve very slightly on successive flights so that the engine is running on its optimum needle setting at the fifth or sixth flight.

■ CARE AND MAINTENANCE

Please pay attention to the matters described below to ensure that your engine serves you well in regard to performance, reliability and long life.

- As previously mentioned, it is vitally important to avoid operating the engine in conditions where dust, disturbed 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 dirt and dust in the fuel container from entering the fuel tank. O.S. Super Filters (L) and (S) are available as optional extras.
- Install an in-line fuel filter between the tank and carburetor to prevent dirt and dust in the tank from entering the carburetor.
- Clean these filters periodically.
- If these precautions are neglected, restriction of fuel flow may cause the engine to cut out, or the fuel/air mixture to become too lean causing the engine to overheat.
- The use of modern high-performance alcohol based model engine fuels, while promoting cooler running, improved anti-detonation combustion and increased power, have the disadvantage of causing corrosion due to the acid by-products of combustion. The use of nitromethane in the fuel can also contribute to the problem.

- Do not close the needlevalve and mixture control valve too far as this will cause a lean setting and over heating of the engine. This can, in turn, create nitromethane oxide leading to internal rusting of the engine. Always adjust the needlevalve slightly on the rich side of peak rpm.

- Do not leave unused fuel in the engine at the conclusion of a day's flying. Accepted practice is to cut off the fuel supply while the engine is still running at full throttle, then expel as much fuel residue as possible by turning the engine over 5-10 seconds with the electric starter. Finally, inject some after-run oil through the glowplug hole and turn the engine over several times by hand.

- When the engine is not to be used for some months (for example, as between flying seasons), a worthwhile precaution is to remove it from the airframe and, after washing off the exterior with alcohol (not gasoline nor kerosene), remove carefully the carburetor, glow plug and all silicone tubing and put them safely aside. Then, immerse the engine in a container of alcohol. Rotate the crankshaft while the engine is immersed. If foreign matter is visible in the alcohol, rinse the engine again in clean alcohol. Finally, shake off and dry the alcohol, and inject some after-run oil in the glowplug hole and rotate the crankshaft several times by hand.

Reinstall the carburetor and glowplug on the engine and keep it in a dry place after putting in a vinyl bag.

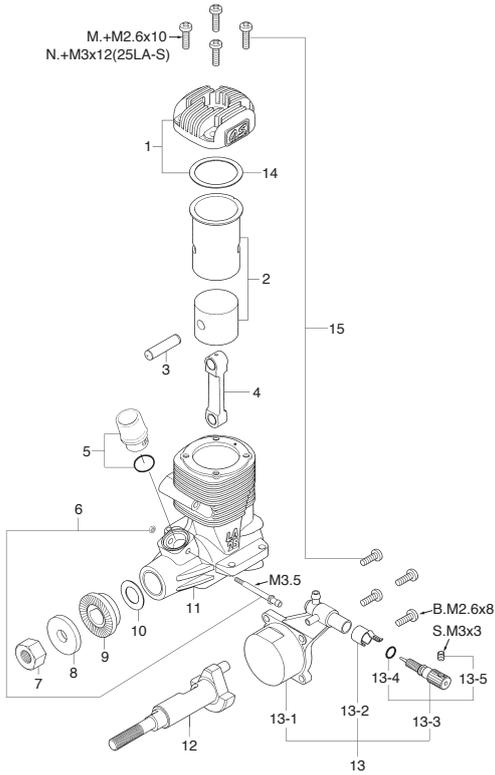
■ O.S. GENUINE PARTS & ACCESSORIES

- **O.S.GLOW PLUG**
No.6 (Former A3) (71605300)
No.7 (71607100)
No.8 (71608001)
- **FANG NUT** (6pcs./sets)
M3 (79870031)
- **LOCK WASHER** (10sets)
M3 (55500002)
- **NON-BUBBLE WEIGHT (S)** (71531010)
- **SUPER FILTER (L)** (72403050)
- **RADIAL MOTOR MOUNT**
15LA-S (71909310)
25LA-S (71908100)
- **SPINNER NUT**
M5 for 15LA-S (20824005)
1/4"-28 for 25LA-S (23024008)
1/4"-28 (L) for 25LA-S (23024009)
- **LONG PROPELLER NUT SETS**
1/4"-28 (73101000) for 25LA-S
- **SILENCER EXTENSION ADAPTORS**
(21125108) for 15LA-S
(22325100) for 25LA-S
- **NEEDLE VALVE EXTENSION CABLE SET** (72200080)
- **LONG SOCKET WRENCH WITH PLUG GRIP** (71521000)

The specifications are subject to alteration for improvement without notice.

ENGINE EXPLODED VIEW & PARTS LIST

MAX-15LA-S / MAX-25LA-S



MAX-15LA-S

No.	Code No.	Description
1	21754010	Cylinder Head (Silver)
2	21753000	Cylinder & Piston Assembly
3	21706000	Piston Pin
4	21205040	Connecting Rod
5	21712010	Venturi
6	21381970	Nozzle For Remote Needle
7	20810007	Propeller Nut
8	21109005	Propeller Washer
9	21758000	Drive Hub
10	21620006	Thrust Washer
11	21751010	Crankcase (Silver)
12	21752000	Crankshaft
13	21757000	Cover Plate Assembly
13-1	21757100	Cover Plate
13-2	26711305	Ratchet Spring
13-3	21781970	Needle
13-4	24981837	"O" Ring
13-5	26381501	Set Screw
14	21714100	Head Gasket
15	21713000	Screw Set
	71605300	Glow Plug N0.6 (Former A3)
	21225000	871 Silencer
	22681957	Pressure Fitting
	22325300	Assembly Screw
	21225400	Retaining Screw(N.+M2.6x25 2pcs.)

MAX-25LA-S

No.	Code No.	Description
1	22554010	Cylinder Head (Silver)
2	22553000	Cylinder & Piston Assembly
3	22606009	Piston Pin
4	22405013	Connecting Rod
5	22312000	Venturi
6	21381980	Nozzle For Remote Needle
7	23210007	Propeller Nut
8	24009000	Propeller Washer
9	22558000	Drive Hub
10	22020001	Thrust Washer
11	22551010	Crankcase (Silver)
12	22302000	Crankshaft
13	22557000	Cover Plate Assembly
13-1	22557100	Cover Plate
13-2	26711305	Ratchet Spring
13-3	24081970	Needle
13-4	24981837	"O" Ring
13-5	26381501	Set Screw
14	22564000	Head Gasket
15	22563000	Screw Set
	71605300	Glow Plug No.6 (Former A3)
	22325020	E-2030 Silencer
	22681957	Pressure Fitting
	22325310	Assembly Screw
	22625404	Retaining Screw(N.+M3x27 2pcs.)

The specifications are subject to alteration for improvement without notice.

*Type of screw

C...Cap Screw T...Tapping Screw
N...Round Head Screw S...Set Screw

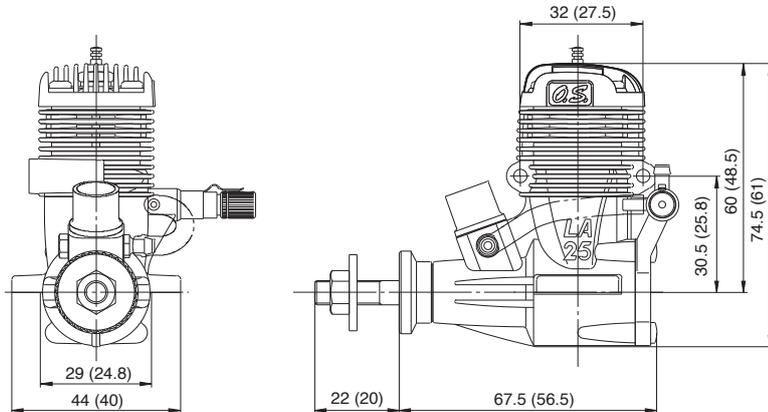
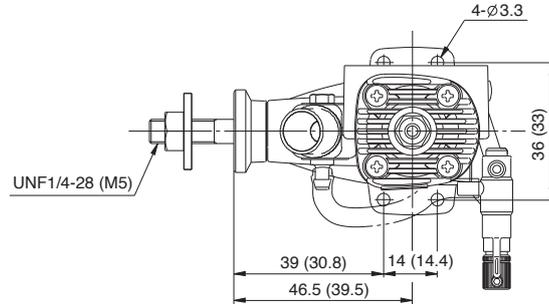
THREE VIEW DRAWING Dimensions(mm)

15LA-S SPECIFICATIONS

Displacement	2.49 cc / 0.152 cu.in.
Bore	15.2 mm / 0.598 in.
Stroke	13.7 mm / 0.539 in.
Output	0.41 ps / 0.40 hp / 17,000r.p.m.
Practical R.P.M.	2,500-18,000 r.p.m.
Weight	129.5 g / 4.56 oz. (Engine) 37 g / 1.31 oz. (Silencer)

25LA-S SPECIFICATIONS

Displacement	4.07 cc / 0.249 cu.in.
Bore	18.0 mm / 0.709 in.
Stroke	16.0 mm / 0.630 in.
Output	0.6 ps / 0.59 hp / 15,000r.p.m.
Practical R.P.M.	2,000-16,000 r.p.m.
Weight	185.5 g / 6.54 oz. (Engine) 62 g / 2.19 oz. (Silencer)



*() 15LA-S

O.S. ENGINES MFG.CO.LTD.

6-15 3-Chome Imagawa Higashiumiyoshi-ku
Osaka 546-0003, Japan TEL. (06) 6702-0225
http://www.os-engines.co.jp FAX. (06) 6704-2722