

It is of vital importance, before attempting to operate your engine, to read this 'SAFETY INSTRUCTIONS AND WARNINGS' leaflet and to strictly adhere to the advice contained herein. Also, please read through the instruction leaflet or manual supplied with the engine, so as to familiarize yourself with the controls and other features of the engine.

Keep this leaflet and the engine instructions in a safe place so that you may readily refer to them whenever necessary. It is suggested that any instructions supplied with the boat, radio-control equipment, etc., are accessible for checking at the same time.

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

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



NOTES

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 naked 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 or exhaust header pipe, in particular, may result in a serious burn.



NOTES

- This engine was designed for model boats. 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.
- For their safety, keep all onlookers (especially small children) well back (at least 12 feet or 4 metres) when preparing your model for running.
- Take care that the glow plug clip or battery leads do not come into contact with the propeller or any other rotating parts. Also check the linkage to the throttle arm.
- If your engine does not have a built-in recoil starter, use an electric starter. The wearing of safety glasses is also strongly recommended.
- When handling the boat immediately prior to launching, be especially cautious. Keep the propeller and other rotating parts away from you.
- 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.
- 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 fire if the glowplug battery is accidentally reconnected.
- If your engine is fitted with a recoil starter, pull the operating handle straight out when starting the engine, so that the cord does not rub against the hull or engine. This will help prevent the cord from being damaged by abrasion or engine heat.
- Do not extend the starter cord more than 45cm (18"). Do not abruptly release the operating handle. Allow the cord to rewind smoothly while still holding the handle.
- Do not attempt to disassemble the recoil starter. If you do so, the very strong spring inside will be suddenly ejected. This can be very dangerous.

INSTRUCTIONS FOR O.S. MAX-61VR-M ABC, MAX-65VR-M ABC & MAX-81VR-M ABC ENGINES

IMPORTANT: Before attempting to operate your engine, please read through these instructions so as to familiarize yourself with the controls and other features of the engine. Also, pay careful attention to the recommendations contained in the "Safety Instructions and Warnings" leaflet enclosed.

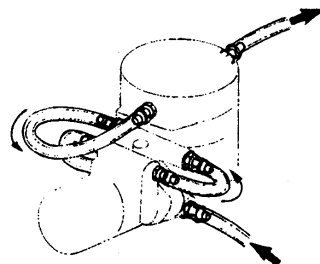
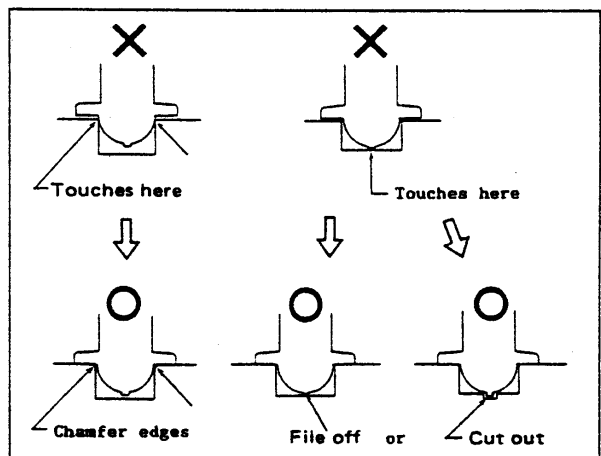
The MAX-61VR-M, 65VR-M and 81VR-M are high-performance power units that have been designed for power boat racing. For increased performance and longer life, they incorporate a specially developed O.S. piston/cylinder construction, chrome-molybdenum steel rear drum valve and heavy duty piston pin and connecting rod. These engines are equipped with the O.S. Type 9B carburettor which provides a correctly balanced mixture of fuel and air at all throttle settings. Fully computerized modern precision machinery and carefully selected top quality materials are employed in the manufacture of each engine to ensure consistent performance and long life.



INSTALLATION NOTES

1. Make sure that the engine-bed mounting beams in the boat are parallel, with their top surfaces in the same plane. Poor installation may not only cause vibration, erratic running and loss of performance, but may also damage the engine itself by deforming the crankcase, bearings, etc.
2. If the holes in the mounting beams do not align perfectly with the engine's mounting lugs, enlarge them slightly with a needle file so that the fixing screws go in perfectly. Avoid forcing the screws.
3. The distance between the carburettor air intake and any bulkhead near the engine should be at least 15mm (0.59"), otherwise the induction efficiency will be reduced.
4. Clean the model's "engine room" before installing the engine, in order to eliminate the risk of foreign matter such as sandpaper residue, glass wool, dust, etc., being drawn through the carburettor.

Note: Temperature around the exhaust port may vary greatly according to atmospheric temperature. For piping water to the water-cooled exhaust adaptor, refer to the explanatory sketch.



GLOW PLUGS

The type of glow plug used may affect the performance of the engine quite considerably, under different atmospheric conditions and on different fuels. Select the best one by practical tests from available long reach type glow plugs. Recommended O.S. plug is No.8. When engines are run at very high speeds and on high-nitro fuels, glowplug elements do not last so long. Therefore, have spare plugs readily available when racing.

PROPELLERS

Suggested propellers are shown in the table. Use well balanced propellers only. Generally, when a model is running at maximum speed, the revolutions of the engine increase by 1,000 to 2,000 r.p.m. from the engine's rated r.p.m. at maximum output measured when the boat is stationary. Therefore, select the propeller which reduces the engine's r.p.m. by 1,000 to 2,000 in order to get the highest model speeds.

Engines	For Deep Vees		For Hydroplanes	
	Diameter(mm)	P/D ratio	Diameter(mm)	P/D ratio
61VR-M & 65VR-M	57 - 59	1.0 - 1.3	62 - 66	1.4 - 1.8
81VR-M	60 - 66	1.0 - 1.3	66 - 72	1.4 - 1.8

UNIVERSAL JOINT COUPLING

Supplied with each engine is a U/J ball which fits a propeller shaft of 5mm dia. or (for American market only) 3/16" dia.

FUEL

Use only top quality model two-stroke engine fuel containing not less than 18% lubricant. These engines can be run on either low or high nitromethane content fuels, i.e. from mild mixtures containing a few percent of nitromethane, up to high-speed racing fuels containing 40%, or more, of nitromethane. Generally, power output is increased - up to a certain point - as the nitromethane content of the fuel is increased. As a starting point, we recommend a fuel containing 10-20% nitromethane, changing to a fuel containing more nitro if necessary. When the nitro content of the fuel is increased or the brand of fuel is changed, it is advisable to run the engine with a richer needle-valve setting, initially, so that the optimum setting for the new fuel may be rechecked as described in the RUNNING-IN paragraph. Please note that, with high-nitro fuels, although power may be increased for competition purposes, glowplug elements do not last so long and engine life will be shortened.

CYLINDER HEAD GASKET

It is advisable to fit an extra cylinder-head gasket, to lower the engine's compression ratio, when a high-nitro fuel is used, as indicated below. Also, it may be necessary to lower the compression ratio when a tuned silencer is set at high-tune (e.g. in heat race), or if glowplugs tend to burn out repeatedly. In such cases, the fitting of an extra cylinder-head gasket (i.e. 0.6mm in total) is recommended.

Nitromethane content	Head-gasket	
Less than 30%	0.4mm	Retain standard 0.4mm aluminium gasket as fitted.
More than 30%	0.4mm + 0.2mm	Fit the 0.2mm thick phosphor bronze gasket supplied, in addition to the standard 0.4mm aluminium gasket.

RUNNING-IN ("Breaking-in")

It has been observed that some modellers consider the running-in of an engine to be complete after simply running it on a bench mount for a time. This is incorrect. For the best performance, the engine should also be run-in under the same conditions as when it is put to full use. Run-in your engine after installing it in your boat, in the following way.

1. For the initial stage, set the needle-valve as much on the rich side as possible without badly affecting the running of the boat. Then, with each successive run, gradually and progressively re-set the needle-valve for increased r.p.m. Set the needle-valve on the rich side for at least the first 10 to 15 runs. If it is intended to use high nitromethane fuels, begin by using one in which the nitromethane content is limited to between 10 and 20 percent.
2. When the engine is capable of running at the optimum setting without over heating or loss of power, a fuel of higher nitromethane content may be used. However, each time the nitromethane percentage is increased, always take the precaution of restarting with a rich needle setting for a further trial run.

Warning: When the engine is installed in the model, avoid running it at high r.p.m. without load just after the engine is started on shore, either by closing the throttle or by opening the needle-valve to reduce speed. Although this engine is designed to run at high r.p.m. even when new, such components as the cylinder, piston, connecting rod, etc. will be seriously damaged if they are allowed to become over-heated. Re-adjust the throttle and/or needle-valve immediately before the model is put in the water.

SILENCER

As these racing type O.S. marine engines have been designed primarily for use with a tuned length exhaust silencer system, a conventional silencer is not supplied. Any of the tuned silencers currently available for .65 to .90 cu.in. engines may be used. Silicone tubing may be employed to connect the silencer to the exhaust adaptor or header pipe. However, remember that, if silicone tubing is exposed directly to exhaust gases, it will deteriorate more quickly. Therefore, when tuning exhaust length to required operating r.p.m., try to limit any exposed length of silicone tube, between the exhaust adaptor and silencer, to not more than 3-5mm (or 1/8"-3/16").

CARBURETTOR

The special O.S. Type 9B automatic carburettor described in the attached instruction sheet is fitted, as standard.

GUARANTEE

O.S. racing engines are constructed from the very best materials available and to the very highest engineering standards, using the most advanced precision machinery. However, the extremely high stresses imposed by top-class power-boat racing (stresses which are exacerbated by the use of powerful fuels containing very high concentrations of nitromethane) constitute hazards which are beyond a manufacturer's control. Accordingly, we regret that it is not possible to extend our usual warranty terms to these particular models - i.e. no guarantee is offered against material wear, or damage resulting therefrom, in actual use.

PARTS LIST

	61VR-M ABC	65VR-M ABC	81VR-M ABC
Crankcase (w/nipple)	27101031	27201011	28101001
Nipple No.3	27143000	27143000	27143000
Front Housing	27501600	27501600	27501600
Rear Housing	27501801	27501801	27501801
Crankshaft	27202030	27202030	28102000
Cylinder & Piston Ass'y	27103000	27203010	28103000
Marine Head Ass'y	27141000	27241000	28141000
Nipple No.2	24025923	24025923	24025923
Connecting Rod	27205001	27205001	27505001
Piston Pin	27106007	27106007	28106000
Piston Pin Retainer	26617004	26617004	28117000
Propeller Washer	26809007	26809007	26809007
Screw Set	27313000	27313000	27313000
Gasket Set	27114000	27214000	28114000
Crankshaft Ball Bearing (F)	26731002	26731002	26731002
Crankshaft Ball Bearing (R)	27330010	27330010	27330010
Rear Rotor	27516000	27516000	27516000
Carburettor Complete (9B)	29381010	29381010	29381010
Carburettor Insert	28281210	-----	-----
Flywheel No.7	71805400	71805400	71805400
Universal Joint	27244002	27244002	27244002
Joint Ball (5.0mm)	25345206	25345206	25345206
Joint Ball (3/16")	25345319	25345319	25345319
Water Cooled Exhaust Header	27126400	27126400	27126400

SPECIFICATIONS

	61VR-M ABC	65VR-M ABC	81VR-M ABC
Displacement	9.95cc 0.607cu.in.	10.63cc 0.648cu.in.	13.01cc 0.794cu.in.
Bore	24.0mm 0.945in.	24.8mm 0.976in.	26.0mm 1.024in.
Stroke	22.0mm 0.866in.	22.0mm 0.866in.	24.5mm 0.965in.
Practical R.P.M.	2,500 - 25,000	2,500 - 25,000	2,500 - 25,000
Power Output	2.8PS/22,000r.p.m.	3.0PS/22,000r.p.m.	4.2PS/22,000r.p.m.
Weight	910g 32.12oz.	913g 32.23oz.	914g 32.26oz.

The specifications are subject to alteration for improvement without notice.

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