How to service an outboard engine

Tony Davies shows how to service a Mariner 4hp outboard motor and replace its water pump

Servicing a modern small outboard motor is not a difficult task: generally, it involves changing the gearbox oil, cleaning or changing the plug and greasing the few points that are still equipped with nipples.

While you're about it it's also worthwhile checking the condition of the propeller, shaft and shear pin where fitted and greasing them before reassembly, while the fuel filter also benefits from an occasional clean. Checking the condition of the starter cord and recoil assembly helps to prevent unexpected and sudden failure while attempting to start the motor.

Apart from keeping the motor clean this is about the extent of routine servicing but a couple of hours lavished on the outboard at the end of the season will ensure trouble-free running throughout the next.

Starting from the bottom and working up, one job that should ideally be performed every year is removal of the propeller. On small engines this allows the shear pin to be checked for signs of wear and avoids premature pin failure. More importantly it prevents the propeller becoming seized to the shaft due to the effects of corrosion and lack of grease.

This guide features an older Mariner 4hp 2-stroke outboard and there will be some different servicing techniques between makes. However many of procedures shown here are common to a wide range of small engines – but if in doubt check with the manufacturer first.

INFO AT A GLANCE

Time taken
- General Service – 2 hours
- Water pump impeller replacement – 3 hours

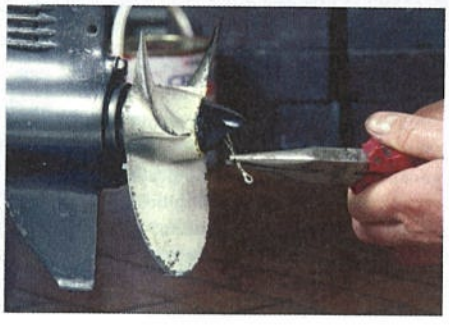
Tools required
- Grease Gun
- Socket set with spark plug socket
- Pliers
- Adjustable spanner
- Flat blade screwdriver
- Feeler gauge

Competence level
Intermediate

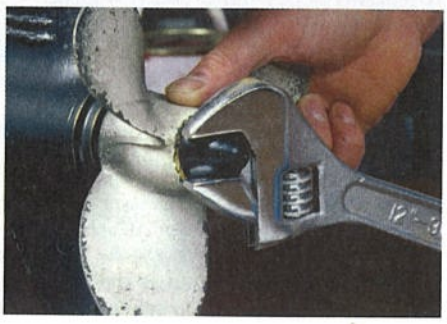
Our thanks to EP Barrus, the UK main Mariner distributor, for supplying the necessary parts for the job.

Removing the propeller

Before starting any work on an outboard motor set it up firmly where it is convenient to work and cannot fall over.



1 **To take off the propeller first remove the locking split pin from the nut and shaft.**



2 **Holding the propeller securely, loosen the nut.**

3 With the nut removed slide the propeller off the shaft. If it is corroded in place, set the outboard down with the shaft vertically upwards and run PlusGas or a similar penetrating lubricant down the shaft and leave to soak overnight or longer. A puller may be required to finally get it moving. If it refuses to budge, heating with a blow-lamp may break the corrosion seal – but care is needed to avoid heating the propeller shaft ring seal in the bottom of the leg so this procedure may be best left to a professional.

4 Remove the shear pin and check it closely for cracks or bending. If it shows signs of serious wear replace it with a new one of the correct size and type. Don't substitute it for a high tensile bolt with the idea of preventing it breaking – it's there to protect the prop from excess damage in the event of it striking hard bottom or floating debris.

5 Smear the propeller shaft generously with waterproof grease prior to reassembly. The propeller nut should be tightened sufficiently to hold the propeller firmly against the shear pin before the locking pin is refitted. Other makes of motor may differ in this respect.

Changing the gearbox oil

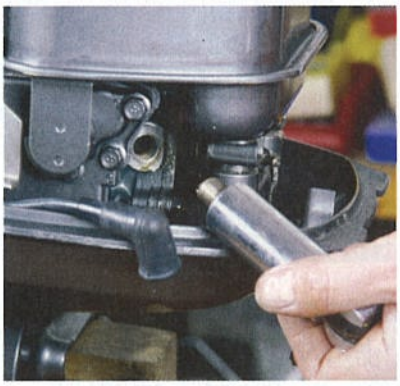
An outboard motor's gearbox oil should be changed once every season, not only to ensure the gears remain properly lubricated, but also to check that the seals are in good condition and no water is entering the gearbox.

1 Place a receptacle beneath the leg and remove the drain screw located just below the propeller shaft housing in the motor skeg.

2 Next remove the level plug located just above the cavitation plate and next to the water flushing plug. Both are clearly marked. Once the level plug is removed the oil will drain into the receptacle. Check the condition of the oil as it drains out. If it is dark like this example there should be little to worry about inside the gearbox. If it is white or milky this indicates water contamination so the O-rings and oil seals will need replacing and the gear assembly inspected for damage and corrosion. These procedures are beyond the scope of this guide. While the oil is draining check the condition of the seals on the drain and level plugs. If damaged replace them with new ones.

3 Once the oil has drained completely refill the gearbox with the correct grade of lubricant. Quicksilver gear lube is the recommended type for the Mariner 4hp and the squeezy container makes filling easy. Cut off the end of the container spout and insert it into the oil drain hole. Squeeze oil into the leg until it rises and appears at the level hole. This ensures there is no air in the gearbox and that the correct amount of oil has been added. Refit the level plug while maintaining the level, followed by the drain plug. Tighten both plugs and clean up any spilled oil.

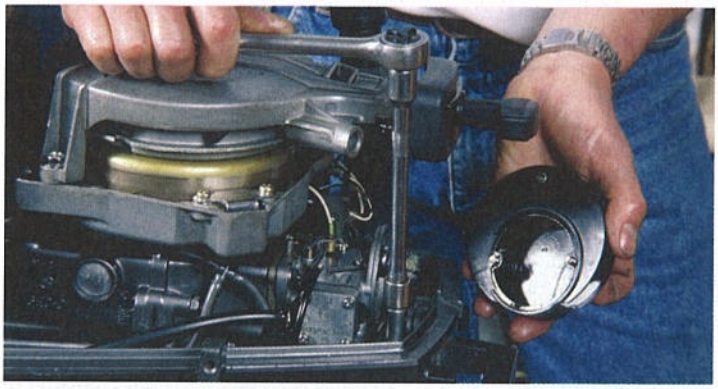
Clean and set the spark plug gap



1 Pull off the plug lead and remove the spark plug using a proper spark plug socket with rubber insert to prevent the ceramic part of the plug being broken. If you don't have one use a standard deep socket, taking care not to apply any sideways pressure to the ceramic part of the plug with the top of the socket.

2 Clean the plug carefully with a wire brush – replace it if the electrodes are damaged. Use a feeler gauge to reset the gap, in this case 0.020-0.025in (0.5-0.6mm). Tap the ground electrode gently if the gap is too wide. The feeler gauge should be a snug fit in the gap so slight resistance is felt as the feeler blade is pulled through. Refit the plug taking great care not to cross thread it. Screw it the first few turns by hand to ensure it runs freely down the thread before finally tightening it carefully with the socket.

Cleaning the fuel tank and filter



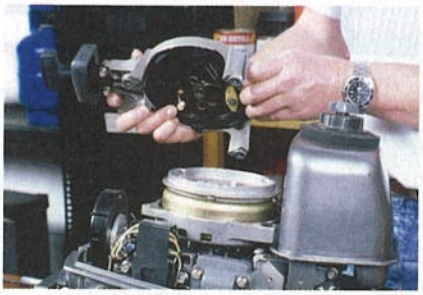
1 On this engine the fuel filter is located within the fuel shut-off cock under the fuel tank. First ensure the fuel cock is in the off position. Undo the two bolts holding the air intake housing onto the carburettor and remove the housing. This gives access to the bolt holding the fuel shut-off shaft. Remove this bolt and pull the shut-off shaft forward to disengage it from the fuel cock. Disconnect the fuel line from the cock by releasing the spring clip and pulling the hose off the fitting. Next remove the two bolts securing the fuel tank – they're located in a recess under the engine. Lift off the tank and give it a swirl to pick up any sediment inside. Drain the fuel into a can for disposal, remembering that petrol vapour is explosive.

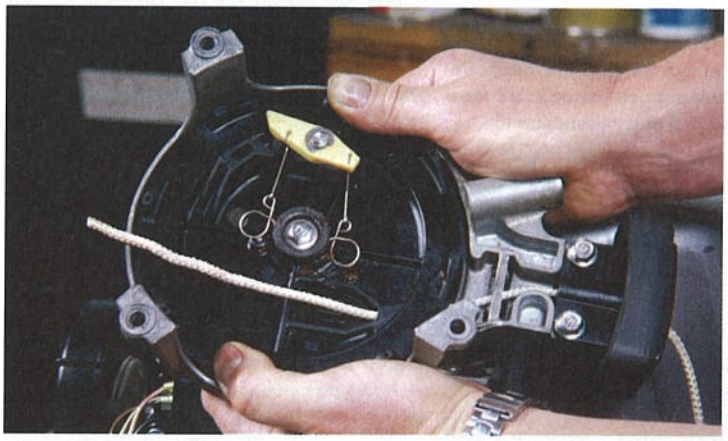
2 Unscrew the shut-off cock and check the filter screen for damage and dirt – this one has picked up a fair bit of debris. Either clean or replace the screen as necessary. Refitting the tank and other reassembly is the reverse of dismantling.

Replacing the recoil starter cord

1 Remove the three bolts securing the recoil assembly and lift the assembly off. On this engine there is no spring pressure to contend with at this stage.

2 Pull the starter cord all the way out against spring pressure and, while holding the pulley to prevent the spring recoiling, examine the entire length of the cord.





3 If the cord is frayed or in any way damaged replace it with a new length by undoing the knot in the pulley recess, removing the old cord and fitting a replacement. Tie a stopper knot in the engine end and push it flush into the pulley recess with the free end secured in the clip provided in the recess. Tie a figure of eight knot in the handle end of the cord. If the old cord was broken, fit the new one in exactly the same way after first tensioning the recoil spring 4½ turns anti-clockwise with the recoil assembly upside down.

General lubrication

There is only one greasing point on this engine requiring the use of a grease gun and that is the gear shift arm. Other areas to be greased manually are the clamp screws that should be screwed right out, greased and then screwed in to distribute the grease throughout the threads, and the throttle control inside the tiller handle.

Replacing the water pump impeller

Although not a regular service item, if the water pump impeller was changed every three years or so there'd be far fewer mid-season breakdowns, overheatings and motor seizures.

Replacement is usually required after dry running of the motor or where it has been left unused for several years without proper preparation for laying-up and where the vanes on the impeller have stuck to the housing.

The job is straightforward but must be performed carefully following the correct procedures. Once the leg is dismantled for impeller replacement it's both worthwhile and cost-effective to replace the pump body and base-plate as a complete unit. How to replace the water pump impeller will vary from engine to engine depending on how it is accessed. Here's the procedure for the Mariner 4hp.

1 **Move the gear lever to the reverse position, then prise off the rubber cover on the outboard leg that allows the shift rod connector to be loosened. Loosen the shift rod connector no more than three turns – this is to prevent the clamp dropping off the rod completely. If it does happen to come off, it should only require a little fiddling about to refit it.**

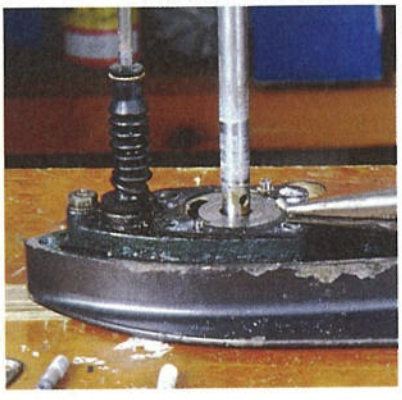
2 **Remove the two bolts and washers that secure the gearbox housing to the leg. Note the ring anode just ahead of the rearmost bolt. While the lower unit is detached, remove this and either clean the scale off or replace it with a new anode.**

3 **Slide the gear housing from the leg. Some persuasion from a soft faced hammer will almost certainly be necessary to break the corrosion seal between the two parts, but light tapping should be all that's required and will avoid distorting the cavitation plate.**

4 **Once the lower unit starts moving it can be drawn off the leg as the water feed tube, shift rod and drive shaft become disconnected within the leg.**

5 **The lower unit can now be set up on the bench ready for disassembly of the water pump. Remove the four bolts along with their support plates and slide the pump housing and impeller up the drive shaft.**

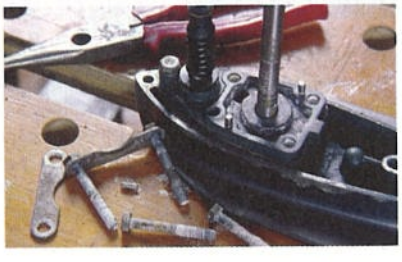
6 **Next remove the impeller dowel pin from the drive shaft.**



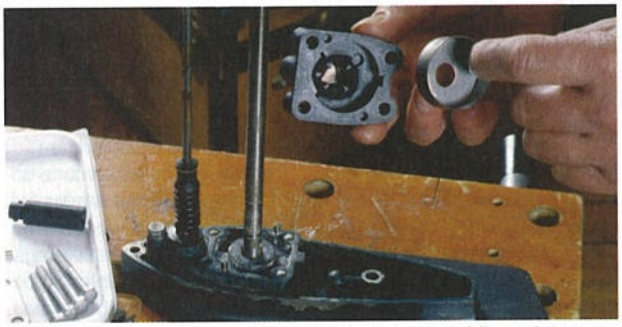
7 **Remove the water pump gasket and face plate and check for salt and corrosion build-up in the water passages beneath – there's plenty in this one.**

8 **The salt and corrosion deposits beneath the face-plate must be fastidiously scraped and cleaned out if the pump is to perform properly.**

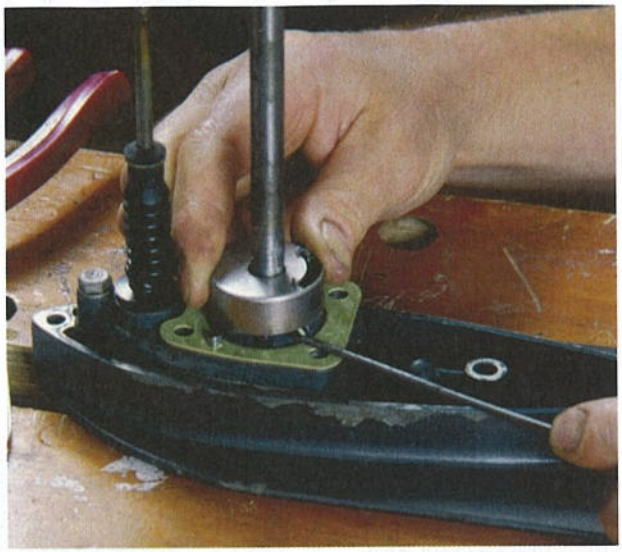
9 **Fine wire wool gives a good clean surface finish to the water passages although there is nothing to be done about pitting of the surfaces. The drive shaft can also be cleaned of corrosion and salts using fine wire wool. Now you can begin reassembly.**



10 The new face-plate is fitted onto the water pump base, installed dry without sealant. This is followed by the gasket lightly smeared with gasket sealant. The new dowel pin is then fitted and the new impeller slid down the shaft onto the pin.



11 The pump body includes a metal insert but it's easiest to slip this over the impeller before installing the pump body.



12 Smear the inside surface of the insert with waterproof grease and gently lower it onto the impeller, slowly turning it anti-clockwise to deflect the impeller blades and allowing it to slide into place. Any errant impeller blades can be gently eased home using a screwdriver.

Lightly smear the outer surface of the pump insert with gasket sealant and install the pump body ensuring that the tabs on the insert locate in the slot on the pump body. Refit the four fixing bolts and their support plates and tighten carefully, remembering that they are threaded in an aluminium casting and therefore must not be overtightened.

Lower leg reassembly

Reassembly of the lower unit onto the leg requires care as there are several items to be located inside the leg which cannot be photographed.

The first job is to ensure the water-tube seal [2] is fitted in the water pump housing. Smear the inside of the seal with waterproof grease to help the tube slide easily into the seal. The water-tube guide must also be in place on the water pump housing to simplify location of the water tube.

Next clean and grease the splines at the top of the drive shaft [3] but don't grease the very end of the shaft as this will prevent the shaft engaging properly due to hydraulic lock-up.

Move the gear lever to the reverse position and push the lower shift rod down to engage reverse in the gearbox. The lower unit can now be offered up by feeding the drive shaft and lower shift rod carefully up into the leg. More or less simultaneously reconnect the shift rods with the loosened clamp [1] while ensuring the water-tube enters the water-pump housing and the drive shaft slides into its mating splines. All should locate freely without any force being applied. If force seems to be required one or more parts are not correctly aligned.

Once the shift rod is located in its clamp it further needs aligning with the guide hole [4] near the top of the leg. If it doesn't line up automatically it can be adjusted by hooking it via the access hole in the side of the leg until it lines up.

The whole lower unit should now locate onto the leg ready for tightening up with the two securing bolts and washers.

Before finally tightening these bolts, tighten the clamp bolt on the shift rod and check the action of the gearlever to ensure forward, neutral and reverse can be properly selected. Finally refit the blanking cover on the side of the leg over the shift rod clamp.