How to Perform 100-Hour Service on a 4-Stroke Mercury Outboard
Follow these instructions to perform a 100-hour service on your Mercury four-stroke or Mercury Verado. Keeping your outboard running smoothly takes just a few hours of your time and allows you to tackle small symptoms before they become significant problems. Too many times, we see customers in a rush to complete a service that they don’t give proper attention to signs of trouble within the changed parts and fluids. This Maintenance Guide teaches you to look for telltales in engine oil, lower unit oil, spark plugs, and filters so that you can identify problems early.
STEP ONE:
Engine Oil Change

A 100-hour service begins with an engine oil and filter change. On a Mercury four-stroke, engine oil weight and capacity can be found by reviewing the tag on the engine under the cowling cover, or by looking in your owners’ manual.

Before you start draining your old oil, take notice of the oil level on your dipstick. Lower the engine to the running position and remove the cowling. If your cowling latches feel stiff or sticky, apply a high-quality grease or spray lubricant and work the latches. For Verado owners, you may need cable replacement if the cowling has been overlooked too long.

Mercury color codes oil as yellow, so locate the dipstick and fill plug by looking for the bright yellow color. If the oil level is high on the dipstick, the oil might have been overfilled during the last service. Or, it’s also possible that the engine is “making” oil due to fuel contamination of the oil from improper ring seating or another serviceable condition. If the oil level is low on the dipstick, your engine may be burning or leaking oil – both conditions you should investigate. You should also note the smell and color of the oil. Dirty oil will appear dark brown to black, and a milky brown indicates water contamination. A pronounced gasoline smell indicates that your engine may not be reaching proper operating temperature, or that your rings could be allowing excessive blow-by due to carbon fouling or improper break-in.

Removing the Old Oil
Spent engine oil can be removed from the engine by extraction or via the oil pan drain screw plug. The extraction method requires the use of a vacuum extractor which is inserted down the dipstick tube and uses suction to pull the spent oil from the pan. Oil extraction tends to be very clean and is probably the most widely used among marine technicians. Alternatively, the drain screw itself can be removed. Be sure to have plenty of drain pan capacity as some engines can hold up to seven quarts of oil. We also recommend an oil absorbent pad like the 3M HP156 pad to catch any errant drips that might soil your driveway or lawn.

In cold climates, it may be helpful to start and warm the engine before draining the oil to thin it slightly. However, if possible, perform the engine oil change as the first part of the service since the maximum amount of oil will be in the oil pan already from the engine sitting allowing you to extract as much old oil as possible to minimize contamination of your fresh oil.
Removing the Old Oil Filter
As the old oil is draining, you can work on removing the engine oil filter. Depending on your specific Mercury model, your filter may have a drain lip that helps to keep the mess to a minimum when you unscrew the old filter. However, most older engines do not have this feature. We suggest being prepared with plenty of absorbent rags or placing a small cup that is cut to size below the filter before removal. Using a PartsVu Maintenance Essentials filter wrench is the best way to loosen the filter. Remember when you reinstall the filter, over-tightening will only make your life more difficult when you are ready for the next service. Some technicians puncture the old filter allowing trapped oil to drain back into the block before removal, but this will ruin your ability to take the filter apart for further inspection.

Performance Testing of Used Oils Provide Important Insights
Several laboratories provide performance testing of used oils, allowing you to learn more about the health of your engine. Blackstone Labs is one such provider, and they have a convenient mail-in kit that includes everything you need to submit an oil sample. They can also test gear oils, hydraulic fluids, and oils from your other vehicles or toys. Oil test results can tip you off to an accelerated wear condition inside of your engine long before any other symptoms show up. If you still want to know more about your engine, purchase an oil filter cutter and open the spent filter to look for evidence of contamination and metal dust or shavings.

Install New Oil Filter and Add Fresh Oil
Once you have inspected your spent oil and filter, set them aside for proper disposal. If you removed the drain screw to empty your oil, carefully reinstall the drain plug. The new oil filter should be removed from its package and the o-ring lubricated with a thin coat of fresh engine oil. Spin on the new oil filter and gently tighten to seat the o-ring without over-torquing. Mercury Marine offers a wide assortment of engine oil – both in blend and viscosity. If you are uncertain as to which oil is best for your application, consult your owners’ manual. Loosen the yellow oil fill plug on the top of the engine and pour in fresh oil. We recommend adding slightly less than the stated capacity. With the engine trimmed down, check the oil level on the dipstick after allowing a few minutes for the oil to drain into the oil pan properly. Filling the oil to the lower level on the dipstick will help you to measure if the oil level changes over time with the engine in operation.
RECOMMENDED PARTS & ACCESSORIES
FOUR-STROKE OIL CHANGE SERVICE

Mercury Oil Change Kits

Mercury Oil Filters & Wrenches

Blackstone Oil Analysis Kit

4-Stroke Mercury Engine Oil

Mercury Lubes, Oils & Additives

Engine Oil Extractor Pumps

SHOP NOW

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STEP TWO: Spark Plugs & Compression

This step begins by removing any plastic covers covering your spark plugs or ignition coils. Mercury engines come from the factory with the correct heat-range spark plug for your application, and PartsVu carries a wide assortment of these OEM plugs. For most applications, the spark plugs come pre-gapped, but it is advisable to re-check gap to make sure that plugs were not damaged during manufacturing or shipment.

While removing the old spark plugs, keep track of which plugs come from which cylinders.

- Note if the plug appears to be wet from water, oil, or gasoline.
- Note if the plug exhibits evidence of heavy carbon deposits or other fouling as well as any rust – all indicative of problems.

If you were to take your engine to a dealer for your 100-hour service, they would likely measure the engine’s ability to pressurize the cylinder, you can glean information about the condition of the engine internals. To perform this test at home, you will either need a remote starter button, or a friend who can turn the ignition key with the kill lanyard removed.

WHAT’S SPARK PLUG GAP?

A spark plug’s tip temperature and the voltage necessary to fire the plug are directly affected by the gap setting.

Most manufacturers set the gap from the factory for that plug’s most popular application. Unfortunately, that plug may have hundreds of applications from automobiles to golf carts. Setting the gap for your particular engine is important as insufficient spark plug gap can cause pre-ignition, detonation and even engine damage. Too much gap can result in a higher rate of misfires, loss of power, plug fouling and poor fuel economy.
This cranking with the ignition disabled will also prime the fresh oil around the block, reducing friction at startup after the service. Repeat testing for all cylinders and compare results. Readings will vary from gauge to gauge, so the test is more about measuring the difference in readings with ideal results being less than 10 percent variance.

After the compression test is completed – or skipped – you can now begin installing your new spark plugs. For ease of future removal and to reduce the risk of thread damage to the cylinder head, apply a tiny amount of anti-seize compound to the threads of the plug. Use care to avoid contacting the electrode or porcelain center of the plug. Thread the plugs into the cylinder head by hand using caution not to cross thread.

Most modern spark plugs use a crush washer that will press down and provide a tight seal as you tighten. Full torque is between 18-21 ft. lbs. Reinstall the plug wires or coils in the same order they came off.
RECOMMENDED PARTS & ACCESSORIES FOR PLUGS & COMPRESSION SERVICE:

- Spark Plugs
- Mercury Power Tune Internal Engine Cleaner
- Mercury Corrosion Inhibitors & Greases
- Mercury Storage Seal Fogging Oil
- Locite 242 Threadlocker (10 ML)
STEP THREE: Fuel System

Depending on your application and style of boat, you may have a fuel-water separating filter aboard your vessel. If you have not seen one, follow the routing of your fuel hose from the engine rigging tube backward through the boat. These vary in shape and manufacturer, so be sure to order the identical replacement size for the best fit. Optimax owners may not have an inline filter as the engine has a water separator under the cowling.

Use a filter wrench to loosen the existing filter element and use caution when removing it as it will be filled with gasoline. A clear plastic or glass container is helpful to dump the filter and examine the contents. A small amount of debris is common, as is a small amount of water after the fuel has had a moment to settle. More significant amounts of water would warrant further investigation.

Your Fuel-Water Separating Filter Had a Large Amount of Water in It?

The problem lies in the very physical nature of ethanol. Ethanol prefers to bond with water vs. the gasoline it has been introduced into and subsequently pumped into your boat’s fuel tank. Through the natural process of condensation, being in a water environment and accidental introduction of water into the fuel system, water finds itself in the fuel tank. Read more about why ethanol gasoline is a problem for outboard engines.
If your filter’s mounting location allows it, pre-fill the replacement filter with some gasoline to make re-priming the fuel system easier. It is also advisable to use a small amount of grease or engine oil to lubricate the o-ring before installation. Spin on and hand tighten only about a half turn to snug.

Move back to the engine and locate the filter element(s) on the engine. The scope of this service will only include the low-pressure fuel filter and fuel water separator if applicable by model. Mercury recommends that owners do not service their high-pressure fuel filters. Depending on your engine model, the water separator filter (or castle filter) may be removed by using a wrench, standard tools, and a little caution. Unplug the water-in-fuel sensor if applicable and spin the cap off of the housing. Replace the filter element with a fresh one, lube the o-ring with grease or oil, and carefully reinstall the cap.

For most other models, the low-pressure fuel filter is inline where the fuel supply line passes down the side of the cowling. On applicable models, locate the Schrader valve on the fuel system. Cover the valve with a rag or towel and depress the valve stem to vent the pressure from the system before service. With the pressure vented, remove the inline filter and replace it with a new one paying attention to locate the clamps or zip ties securing the hoses to the filter.

Locate your engine’s primer bulb if applicable and use the primer to pump up the fuel system. You should feel and hear gasoline entering and filling the filter cup. Check for leaks and prime until the bulb becomes firm.

**PRO TIPS**

- Primer bulbs work best when the arrow points up, so use any extra hose in the line to help tilt the bulb to a vertical position.

- If you are not already regularly running Mercury Quickare and/or Quickleen, the 100-hour service interval is an excellent time for a “shock treatment.”

- Quickleen is a fuel system conditioner that also helps to remove carbon deposits. The standard dose is one ounce per ten gallons, but if you are not running the product regularly, you can double that ratio for more cleaning power. Pour the products into the fuel tank fill and run the boat. No additional work is needed.

- It is a great idea to inspect your fuel tank fill’s o-ring for damage when you add fuel or additives as a damaged o-ring can allow water from rain or boat washing into your fuel system.
RECOMMENDED PARTS & ACCESSORIES FOR FUEL SYSTEM SERVICE:

- Mercury Marine Fuel Additives & Fogging Oils
- Mercury Fuel Filters & Wrench
- Mercury Corrosion Inhibitors & Greases
- Mercury Marine Primer Bulbs
- Mercury Storage Seal Fogging Oil
STEP FOUR: Lower Unit

Drain the lower unit gear lube by removing the lower drain screw first, then the upper plug vent to allow air to enter. On some models, both plugs are clearly visible on the lower unit, but on other models, the plugs are located behind the propeller. Use an appropriately sized screwdriver assisted by a wrench if necessary to loosen these screws which should be pretty tight. An impact driver and hammer might be needed. If the drain screw has a magnetic tip, inspect the plug after removal to see if heavy deposits exist. Some fine shavings are normal, but chunks or a large quantity of metal is cause for further inspection. Have a drain pan ready, and extra rags handy as gear lube will begin running down the skeg as soon as you remove the upper vent plug. Be sure to collect the used gaskets from both plugs after removal as these are not reusable and should be discarded.

Allow several minutes with the engine tilted all the way down to drain all the old gear oil fully. Like your engine oil, inspect the spent oil for evidence of water intrusion, other contamination, or metal. If you have purchased one of PartsVu’s handy lower unit oil change kits, you will already have new gaskets, oil, and a pump. Screw the pump into the lower drain hole, then connect it to the container of gear oil.

Begin pumping oil into the lower unit until oil begins to flow from the vent plug at the top. Stop pumping and wait a few minutes for all the air bubbles to work themselves out of the gearcase. After this brief pause, pump a few more times until clean gear oil without bubbles is flowing from the vent plug. With a fresh gasket in place, install and torque the top vent plug. Unscrew your fill hose from the lower drain plug and quickly swap in the lower drain plug with a new gasket — torque to spec.
RECOMMENDED PARTS & ACCESSORIES FOR LOWER UNIT SERVICE:

- **Mercury Gear Lube & Gear Lube Kits**
- **Mercury Zinc Anodes**
- **Mercury Water Pump Repair Kits**
- **Petroleum Sorbent Pads & Rags**
- **Corrosion Inhibitors & Greases**
- **Salt Removers & Mixing Cups**
STEP FIVE: Grease Points

Often we don’t grease early enough for prevention. Instead, we wait until a problem evolves before grabbing the grease gun. It is advisable to grease your engines’ grease fittings more frequently than your 100-hour or annual service, but if you haven’t, now is certainly the time. Make sure you have plenty of fresh Mercury grease loaded in your grease gun and start hitting those Zerk fittings.

Note that fittings can be contaminated by salt – especially the ones near the steering tube – so replace them if they are too corroded to accept grease. Watch as you pump fresh grease into the fitting and see if old, dirty grease or water or both push out from the corresponding space. Ideally, these cavities are filled with clean grease all the time. A light coating of grease on the tip of the trim rams will reduce friction there as well. If your engine is equipped with stainless balls on the tips of the trim rams, work the balls to get the grease inside their cup.

If your prop was not removed for the gear lube change, remove the cotter pin or lock washer from the propeller and loosen the prop nut. Exercise extreme caution as prop blades can be very sharp. With the nut loosened, remove the propeller and associated prop hardware to inspect the propeller shaft.

Look for fishing line that may be behind the prop and near the prop shaft oil seals. Remove any line and if the seals are intact, apply a fresh coating of Mercury 2-4-C grease to the propeller shaft before reinstalling the prop. Tighten and use a new cotter pin to complete the installation if applicable.

Be aware that your boat’s propeller functions like your vehicle’s tires. Wear on the edges of the propeller can reduce traction, causing speed and fuel efficiency loss. Propeller reconditioning or replacement should be considered if you note wear, rounded edges, thin blades, or cracking. You should also inspect, and replace as needed, the hub inside the propeller. Cracking or wobbling can indicate a worn or damaged hub.

This is also a great time to inspect your external engine anodes. Anodes worn beyond 50 percent should be replaced. Be sure to select the correct sacrificial alloy. The proper sacrificial alloy will depend on whether you boat in salt or freshwater. Spend an extra couple of minutes to check fitment because different propeller selections will not work with all anodes.
On the powerhead itself, corrosion inhibitor can be liberally applied to the metal surfaces, taking some care to avoid the air intake itself. We recommend Boeshield’s T-9 brand, but any high-quality marine corrosion inhibitor will help. If any salt residue exists on the engine, rinse with a light stream of fresh water before applying T-9. This product also works well on battery connections, fuel/water separator bases, and trailer parts.

If you have exposed metal surfaces on your lower unit, trim assembly, steering tiller arm, or trim motor itself, consider purchasing a can of Mercury’s Corrosion Guard to supplement paint on these surfaces.

This is also an excellent time to service the engine’s air filter (if equipped). If your engine uses a paper-element air filter like those used in the automotive world, the procedure is as simple as pulling the filter from the housing and installing a new one. For foam air filter equipped engines, the foam element can be gently cleaned using warm soapy water. After completely drying the water, use an air filter oil or a rag with regular motor oil to pat the foam element until it is moist. This oil residue will help to trap small dirt particles and extend the life of the foam.
RECOMMENDED PARTS & ACCESSORIES FOR GREASING POINTS:

- Mercury Corrosion Inhibitors & Greases
- Salt Removers & Mixing Cups
- Petroleum Sorbent Pads & Rags
- Mercury Zinc Anodes
- Boeshield’s T-9 Lubricants
STEP SIX: Check your Work

With all the work completed, now is the time to give the engine a final inspection before startup. Double-check engine oil level with the dipstick, confirm all plastic covers are re-installed, check your now empty gear lube container, and generally double-check before startup. If you are going to run your engine without launching your boat on the water, be sure to take proper safety precautions before installing your rabbit ears and garden hose. It is not recommended to run the engine on the flush attachment alone as the water pump will not receive proper water flow.

Start the engine and let it idle to build temperature. Check again for any leaks. After running to your satisfaction, allow the engine to sit for a few minutes before re-checking the oil level against the dipstick and setting as necessary.

Note that the service routine for 100-hour service and 200-hour service is the same for most Mercury models. However, at the 300-hour service interval, additional service items including the water pump impeller (or kit), high-pressure inline fuel filter, and accessory drive belts are also introduced.

Congratulations your service is complete! Start looking forward to your next fun day on the water, and have pride that the work you completed will extend the reliability of your Mercury four-stroke outboard!

Want more information?
Consult your owner’s manual or consider purchasing a shop manual for your engine from us for more detail.
Always use proper safety precautions, including eye protection, and do not work beyond your comfortable skill level.
Because there are only so many boating days in the year.

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