



# MAINTENANCE GUIDE:

## How to Perform 100-Hour Service on a 4-Stroke Yamaha Outboard



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Performing needed maintenance in a timely manner on your Yamaha outboard is the key to its overall longevity and reliability. Within this maintenance guide we'll explore the process of performing a 100-hour service, or annual service, on a four-stroke Yamaha outboard. While this guide focuses on Yamaha outboards, the process is similar for other major manufacturers' outboards including Mercury, Suzuki, and Honda, as well as for most other gasoline powered four-cycle outboard engines. In addition to being necessary for the longevity and reliability of your outboard, periodic maintenance also affords the engine owner or technician the opportunity for inspection that may uncover a small problem before becoming a large problem.

Too often boat owners are in a rush to complete a service that they don't give the proper attention to what the engine is telling them in the parts and fluids that are being changed out. This maintenance guide will teach you how to look for telltale signs of problems in the engine oil, lower unit oil, spark plugs, and filters you will be replacing as part of your service.



## YAMAHA 4-STROKE MAINTENANCE RESOURCES:

- [Yamaha Engine Specifications and Capacities Chart](#)
- [Yamaha Maintenance Part Library](#)
- [Yamaha Service Manuals](#)
- [Yamaha Schematics](#)



Yamaha Outboard Model (4 stroke)	NIKK Spark Plug	Oil Filter	Engine Oil Capacity	Engine Oil Change Int.	Gear Lube Capacity	Gear Lube Int.
F2.5	NGK (1000-00) NGK (1000-00)	N/A	0.57 qt	F2.5 (1000-00) F2.5 (1000-00)	2.5 qt	F2.5 Gear Lube Int.
F4	NGK (1000-00) NGK (1000-00)	N/A	0.63 qt	F4 (1000-00) F4 (1000-00)	4 qt	
F6	NGK (1000-00) NGK (1000-00)	N/A	0.63 qt	F6 (1000-00) F6 (1000-00)	6 qt	
F8	NGK (1000-00) NGK (1000-00)	N/A	0.83 qt	F8 (1000-00) F8 (1000-00)	8 qt	
F8 HP	NGK (1000-00) NGK (1000-00)	N/A	0.83 qt	F8 HP (1000-00) F8 HP (1000-00)	8 qt	
F9.9	NGK (1000-00) NGK (1000-00)	N/A	0.83 qt	F9.9 (1000-00) F9.9 (1000-00)	12.5 qt	
F20 & F30C	NGK (1000-00) NGK (1000-00)	NGK (1000-00)	1.5 qt	F20 & F30C (1000-00) F20 & F30C (1000-00)	8.5 qt	
F20 & T20A	NGK (1000-00) NGK (1000-00)	NGK (1000-00)	1.7 qt	F20 & T20A (1000-00) F20 & T20A (1000-00)	12.5 qt	
F25	NGK (1000-00) NGK (1000-00)	NGK (1000-00)	1.9 qt	F25 (1000-00) F25 (1000-00)	15 qt	
F40	NGK (1000-00) NGK (1000-00)	NGK (1000-00)	1.8 qt	F40 (1000-00) F40 (1000-00)	18 qt	
F50 & T50	NGK (1000-00) NGK (1000-00)	NGK (1000-00)	2.2 qt	F50 & T50 (1000-00) F50 & T50 (1000-00)	18 qt	
F60 & T60	NGK (1000-00) NGK (1000-00)	NGK (1000-00)	2.2 qt	F60 & T60 (1000-00) F60 & T60 (1000-00)	18 qt	
F70	NGK (1000-00) NGK (1000-00)	NGK (1000-00)	2.2 qt	F70 (1000-00) F70 (1000-00)	18 qt	
F75 & F90	NGK (1000-00) NGK (1000-00)	NGK (1000-00)	3.5 qt	F75 & F90 (1000-00) F75 & F90 (1000-00)	18 qt	



# STEP ONE:

## Engine Oil Change

100-hour service begins with an engine oil and filter change. On a Yamaha four-stroke, engine oil weight and capacity can be found by reviewing the tag on the top plastic shroud on the engine under the cowling cover. Or, you can look in your owner's manual.

Prior to removing the old oil, check the dipstick level by lowering the engine to the running position and removing the cowling. Note if the cowling

latches feel stiff or sticky. Latches are often overlooked during maintenance and are prone to salt accumulation for boaters who primarily boat in saltwater. If you discover salt accumulation on the latches, this residue should be removed – a salt remover may be required.

Yamaha color codes oil as yellow, so locate the dipstick and fill plug by looking for their bright yellow color.

If the engine oil is high on the dipstick, it is possible that the oil was overfilled during the last service, or that the engine is “making” oil due to fuel contamination of the oil from improper ring seating or another serviceable condition. You should also note the smell and color of the oil. Dirty oil will appear dark brown to black in color. Milky brown oil indicates water contamination, whereas a notable 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. This method tends to be very clean and is probably the most widely used among marine technicians. Alternatively, the drain screw itself can be



removed. On inline Yamaha four stroke models (F15 to F150), the Seawell drain kit can be used to minimize the mess. On larger V6 models, to access the drain screw, remove the plastic chaps that cover the midsection of the engine. Be sure to have plenty of drain pan capacity as some of these engines can hold up to seven quarts of oil. We also recommend a petroleum sorbent pad to catch and errant drips and keep your driveway or lawn clean.

In cold climates, it may be necessary to start and warm the engine prior to draining the oil to thin it slightly. It is preferable to perform the engine oil change as the first part of the service if at all possible though as the maximum amount of oil will be in the oil pan already from the engine sitting since its last use. This allows you to extract as much old, dirty oil as possible and minimize contamination of your fresh oil.

### Removing the Old Oil Filter

As the spent oil is draining, you can work on removing the engine oil filter. Depending on your specific Yamaha model, your filter may have a drain lip that will help keep the mess to a minimum when you unscrew the old filter, but most

older engines don't have this feature. We suggest being prepared with plenty of absorbent rags or place a small cup that is cut to be placed below the filter prior to removal. Using a properly sized filter wrench or socket is the best way to loosen the filter and Yamaha even produces a socket for their 5GH sized filters. Some technicians make a practice of puncturing the filter to allow trapped oil to drain back into the block prior to removal, but this will ruin your ability to take the filter apart later for further inspection should you wish.



## Performance Testing of Used Oils Provide Important Insights

On the topic of learning more about your engine oil, several laboratories provide performance testing of used oils to give you some additional insight on your engine. Blackstone Labs is one such provider, and they have a great 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. Results could 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 the internals of your engine, you can also purchase an oil filter cutter and open the spent filter for further inspection. You will be looking for any evidence of contamination, metal dust, or metal shavings. As one example, when a Yamaha inline four cylinder, like the F150, has a damaged fiber gear from the balancer, black contaminant in the oil filter from that fiber gear will typically result.

## Install New Oil Filter and Add Fresh Oil

Once you have inspected to your spent oil and filter, set them aside for proper disposal. If you removed the drain screw to empty your oil, install a new crush gasket and 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 fresh oil filter and gently tighten with your filter wrench to seat the o-ring without over-torquing.

Loosen the yellow oil fill plug on the top of the engine and pour in fresh oil. It is recommended to add just less than stated capacity and check oil level on the

dipstick after allowing a few minutes for the oil to properly drain down into the oil pan with the engine trimmed down. Filling the oil to the lower level on the dipstick will help you to measure if the oil level changes over time after the engine has been in operation.



# RECOMMENDED PARTS & ACCESSORIES FOR OIL CHANGE SERVICE:

## Yamaha Oil Change Kits



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## 4-Stroke Yamalube Oil



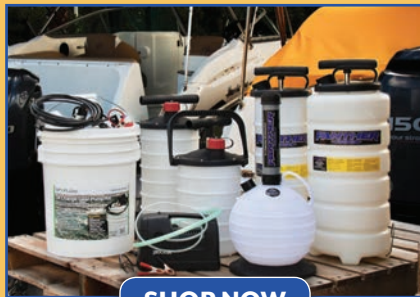
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## Yamaha Oil Filters & Wrenches



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## Engine Oil Extractor Pumps



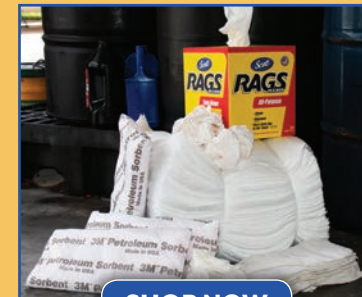
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## All Yamalube Products



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## Petroleum Sorbent Pads & Rags



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## Salt Removers & Mixing Cups



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# STEP TWO:

## Plugs & Compression

Begin this step by removing the plastic shrouding over your spark plugs or ignition coils. Yamaha engines come from the factory with NGK brand spark plugs, and PartsVu carries a wide assortment of these OEM plugs. In most applications, the spark plugs come pre-gapped, but it is advisable to re-check gap to make sure that no plugs were damaged during manufacturing or shipment. Again, the information in your owner's manual is helpful – or you can consult our Yamaha Engine Specifications and Capacities Chart.

As you remove 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, other fouling, or rust – all indicative of other problems. If you were to take your engine to a dealer for 100-hour service, this is the point at which they would perform a compression test by connecting a compression gauge to the cylinders individually and using the starter motor to turn the engine over and check its ability to pressurize the cylinder. If you are going 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



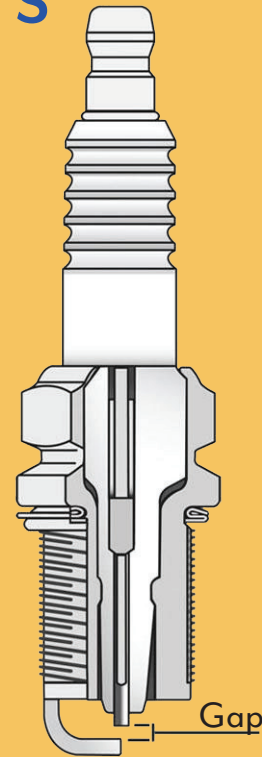
### WHAT'S SPARK PLUG GAP?

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.

NGK spark plugs come from the factory pre-gapped for your Yamaha outboard.



removed. This cranking with the ignition disabled will also prime the fresh oil around the block, reducing friction at startup after the service is complete. 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 a 10 percent variance.

With the compression test completed – or skipped – you can now begin installing your new spark plugs. For ease of removal and to reduce the risk of thread damage to the cylinder head, apply a drop of oil with the tip of your finger to the threads of the plug using care to avoid wetting the electrode or porcelain center of the plug. Thread the plugs into the cylinder head by hand using caution not to cross thread. NGK uses 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 and use a small amount of Yamaha grease for the threads of the bolts, coils and covers.



# RECOMMENDED PARTS & ACCESSORIES FOR PLUGS & COMPRESSION SERVICE:

## NGK Spark Plugs



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## Combustion Chamber Cleaner & Spark Plug Accessories



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## Yamaha Marine Greases



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## Yamaha Store-Rite Engine Fogging Oil



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# STEP THREE:

## Fuel System

Depending on your application and style of boat, you likely have a fuel-water separating filter aboard your vessel. If you have not seen one, simply 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 filter. 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 into and to 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. Larger amounts of water would warrant further investigation. If your filter's mounting location allows it, pre-fill the replacement filter with some gasoline to make re-priming the fuel system easier later. It is also advisable to use a small amount of grease to lubricate the o-ring prior to installation. Spin on and hand tighten only about a half turn to snug.

Move back to the engine and locate the filter element in the clear plastic bowl



## 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.](#)





on the front of your block. Depending on your engine model, this filter cup may be removed by using a special cup wrench – or standard tools and a little caution. If applicable, unplug the water-in-fuel sensor and spin the cup off the housing. Again, drain into your clear container and examine the fuel. If your main water separator was free from water, this filter should be as well. Inspect the o-ring on the top of the filter cup and lightly grease for ease of installation or replace if needed. Replace the filter element with a fresh one and reinstall the cup. Use the cup wrench to tighten. Locate your engine's primer bulb and use the primer to pump up the fuel system. You should observe gasoline entering and filling the filter cup. Check for leaks and prime until the bulb becomes firm. As a tip, primer bulbs work best when the arrow points up, so use any extra hose in the line to help you tilt the bulb vertical.

If you are not running Yamalube Ring Free on a constant basis, the 100-hour service interval is a great time for a "shock treatment." Ring Free is a fuel system conditioner that also helps to remove carbon deposits. A standard dose is 1 oz per 10 gallons, but if you are not running the product all the time, you can double that ratio for more cleaning power. Simply pour the Ring Free into the fuel tank fill and go run the boat - no additional work is needed. It is advisable to inspect your fuel tank fill's o-ring for damage when you add Ring Free as a damaged o-ring can allow water from rain or boat washing into your fuel system.

If you will be storing your boat for the season after service is performed, and liberal application of Yamaha's STOR-RITE Fogging Oil and the addition of Yamalube Fuel Stabilizer & Conditioner Plus is highly recommended.



# RECOMMENDED PARTS & ACCESSORIES FOR FUEL SYSTEM SERVICE:

## Yamaha Ring Free & Fuel Stabilizer



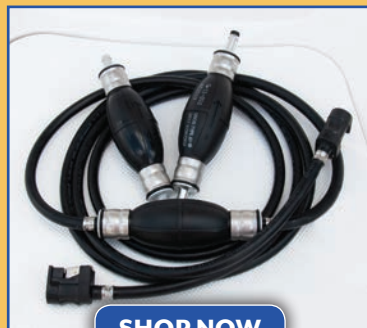
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## Yamaha Fuel/Water Separating Filters & Wrench



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## Yamaha Primer Bulbs & Fuel Line



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## Yamaha Marine Greases



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## Yamaha Primary Fuel Filters & Filter Cup Wrench



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## Yamaha Store-Rite Engine Fogging Oil



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# STEP FOUR:

## Lower Unit

The lower unit gear lube is drained by removing the lower drain screw first and then the upper plug vent to allow air in. On most models, both plugs are clearly visible on the lower unit, but on models with low water pickups, the forward pickup will need to be removed to access the drain plug. Use a properly sized screwdriver assisted by a wrench if necessary to loosen these screws which should be pretty tight. An impact driver and hammer may be needed depending on who serviced your engine last. The drain screw has a magnetic tip, so 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 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 fiber 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 fully drain the old gear oil. Like your engine oil, inspect the spent oil for evidence of water intrusion or 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 and then connect it to the quart of Yamalube gear oil or HD gear oil depending on your model. 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 pumps until clean gear oil without bubbles is flowing from the vent plug. With a fresh fiber 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 and re-install the lower water pickup screen if applicable.



# RECOMMENDED PARTS & ACCESSORIES FOR LOWER UNIT SERVICE:

## Yamaha Gear Lube Kits & Pumps



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## Yamaha Gear Lube



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## Yamaha Marine Greases



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## Propeller Wrench & Hardware



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## Yamaha Water Pump Repair Kits



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## Petroleum Sorbent Pads & Rags



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## Yamaha Zinc Anodes



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# STEP FIVE:

## Grease Points

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 Yamalube marine 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.

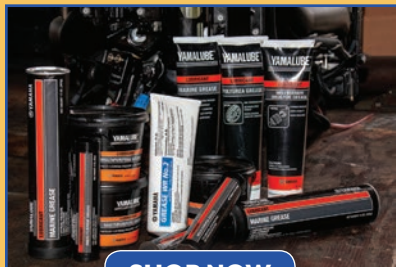
Next, remove the cotter pin from the propeller and loosen the prop nut. Exercise extreme caution as the prop blades can be very sharp. With the nut loosened, remove the propeller and associated prop hardware to inspect the propeller shaft. Look for fishing line that may be behind the prop and near the prop shaft oil seals. Remove any fishing line present and if the seals are intact, apply a fresh coating of grease to the propeller shaft before reinstalling the prop. Tighten and use a new cotter pin to complete the installation. This is also a great time to inspect your external engine anodes. If they are worn beyond 50%, they are spent and should be replaced.

On the powerhead itself, Yamashield Rust & Corrosion Protectant can be liberally applied to the metal surfaces – taking some care to avoid the air intake itself. If any salt residue exists in the engine pan, rinse with a light stream of freshwater prior to applying Yamashield. This product also works well on battery connections, fuel/water separator bases, and trailer parts.



# RECOMMENDED PARTS & ACCESSORIES FOR GREASING POINTS:

## Yamaha Marine Greases



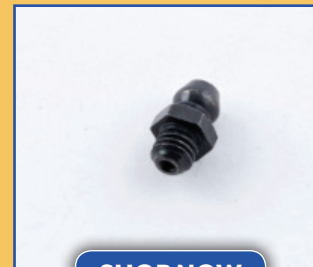
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## Grease Gun



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## Grease Nipple



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## Petroleum Sorbent Pads & Rags



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## Yamalube External Engine Cleaner & Degreaser



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## Yamaha Corrosion Inhibitors



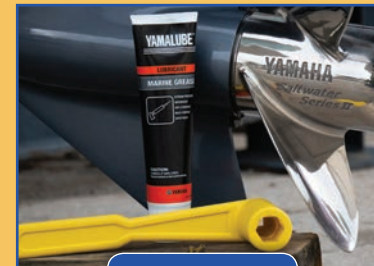
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## Yamaha Zinc Anodes



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## Propeller Wrench & Hardware



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# STEP SIX:

## Check your Work

With the work completed, now is the time to give the engine a final inspection prior to startup. Double check the engine oil level with the dipstick, confirm all plastic covers are reinstalled, check your now empty gear lube container. If you are going to run your engine without taking the boat to the water, be sure to take proper safety precautions, and remove the lower unit intake grates for maximum water flow before installing your rabbit ears and garden hose. It is not recommended to run the engine on the flush attachment 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 with the dipstick.

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 Yamaha four-stroke outboard!



Want more information? Consult your owner's manual or consider purchasing a shop manual for your engine from PartsVu for more detail. Always use proper safety precautions including eye protection, and do not work beyond your comfortable skill level.



# PartsVu



Because there are only so many boating days in the year.



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