



Riverside Outboards^{LLC}

603-210-5095 • riversideoutboards.com

WHAT'S BEEN DONE TO MY ENGINE?

- Compression Tested to Insure OK cylinder, rings, and pistons
- Ignition System calibrated, tested under sustained high RPM, evaluated spark strength, timing Set for best low idle & top RPM
- Fuel System Evaluated for correct pump function, carburetor(s) cleaned and calibrated
- Gearcase seals tested, fluid changed & run under high RPMs, also run in Forward, Neutral, and Reverse
- Cooling System Evaluated for a minimum of 5 minutes of Wide Open Throttle (motors overheat within 30 seconds if the cooling system is in need of service). Impeller/Thermostat serviced as necessary.
- Lubricated articulations as necessary, mechanically evaluated for passable normal usage

DO THE FOLLOWING BEFORE USING YOUR MOTOR:

1. **Read the owner's manual**, available free to download at <http://riversidesoutboards.com>
2. Secure the motor to the transom, either by chain and padlock or by through-transom hardware.
3. Make sure your fuel tank is no more than 18" below the height of the motor (may interfere with fuel pump operation)
4. **Follow the correct start procedure to start the motor if it hasn't run for awhile. ADVANCE THE THROTTLE IN NEUTRAL** to 1/2 – 3/4 to start the motor the 1st time, otherwise it may not start or stall out immediately. **DISREGARD** tiller arm collar checkmarks! If in neutral, it may only go about 1/2 way, this is a normal start-in-gear safety feature. **DO NOT FORCE THE THROTTLE BEYOND THIS POINT!**
5. **For small motors, adjust the low speed carburetor setting.** Your motor will either need a little more or a little less fuel at low RPM's, & this may result in a lower trolling speed, which is good. Clockwise decreases fuel, counter clockwise increases fuel. **Engine sneezes:** cold engine or needs more fuel. **Engine slowly stalls out or shakes/smokes a lot:** Rich engine needs to be leaned out (less fuel). This may change during cold months.
6. **Turn the low idle up if the motor stalls out at low RPMs.** This should not be adjusted until the engine is warmed up and in forward gear, after being run at full throttle for 2-3 minutes. This is explained in the operators manual.
7. **USE 87 OCTANE oil-mixed fuel at 50:1.** High octane, non-ethanol, or special fuels aren't necessary. Run the engine out of gas at the end of the day if it will not be used for several weeks or the season is over. Super high octane fuels can make the engine run wrong. **Use semi or full synthetic Johnson/Evinrude TCW-3 oil.**

COMMON MISTAKES PEOPLE MAKE WITH CARBURETED ENGINES

1. **Hold the primer bulb vertically with arrow pointing UP or it won't work.** Beware of bad fuel, connectors, lines, & tanks.
2. **Load the boat with friends and family the first time out so that it turns into a huge debacle due to inexperience.** If you are not familiar with 2-stroke motors, it is recommended you use the engine with a friend 2-3 times and expect to make a few mistakes while learning. Starting & running a 2-stroke is not like starting a car.
3. **ENGINE FLOODING.** If it is a HOT day, your fuel tank generally will be pressurized already. It may not be necessary to prime/choke your engine as much as usual to get it to run. Seeing a fuel 'sheen' (rainbow) on the water and the motor won't start is an indicator of flooding. The motor has too much fuel and the spark is being extinguished, preventing it from starting.

DO NOT re-prime using the key switch or manual primer. Crank the engine with throttle advanced in neutral for several seconds. Generally the engine will start briefly and usually stall. Wait 10 seconds, and crank again. It will eventually clear out excess fuel and start. You may see a large plume of smoke as the engine burns the extra fuel & returns to normal function.
4. **Use incorrect starting procedures and engage the starter continuously for 10+ seconds.** This will cause the starter to burn out and fail prematurely. If you keep repeating the same steps and see the same results, then you need to change your approach because what you are doing is not working. Don't repeat the same mistake and expect a different outcome.
5. **Believe the engine shakes excessively on acceleration.** Carbureted engines load up on fuel when at idle. When you accelerate, they run rich until they 'clear out' and will shake more until about 1/2 throttle. This is normal behavior.
6. **PANIC if the engine doesn't start.** Panicking does nothing to solve the problem, but a clear mind does. Usually it is something simple; no fuel (kinked fuel line), safety lanyard is ajar or missing, a blown fuse, etc. Work the problem and solve the issue rather than wasting energy panicking.
7. **Fail to maintain the engine.** Every 100hrs or every other year – water pump. Every 50hrs check spark plugs. Winterize the engine at the end of each season. It's YOUR responsibility to take care of the engine by bringing it in for annual service.

NORMAL THINGS TO SEE IN A CARBURETED 2-STROKE OUTBOARD

1. **Smoke when cold or on acceleration after extended idling.** Smoke becomes less when the engine is warm. This is the oil in the gas that is combusting. The warmer the engine, the better the combustion.
2. **Unburned fuel mix ooze from the engine after being run.** This will look dark black, or white and frothy. It will ooze out of the exhaust relief holes, the water relief holes, and or the prop exhaust hole. This can happen for up to a month after being run.. You are seeing the oil and gas that has been unburned evacuate due to gravity.
3. **Fuel leakage if your tank is not vented and the motor is tilted horizontally on a hot day.** Relieve tank pressure by opening the cap/vent. This will stop the leakage; the fuel is being forced out of the open carburetor float(s).

EFFECTS OF MOTOR DEPTH ON LOW RPM RUNNING QUALITY

Carbureted engines behave differently than fuel injected/computer managed modern day engines. They rely heavily on their ability to 'breathe.' An internal combustion engine needs fuel, air, spark, and compression to run properly.

When a motor is deeply submerged, the motor has to work hard to breath because it has to push more water out of the way during each combustion cycle, which happens hundreds, if not thousands of times per minute. Depending on your boat, the trim angle of the motor will directly impact how it runs at low RPMs due to the depth of the motor.

If you trim your motor UP, this **REDUCES back pressure** (which is the pressure applied to the motor by the water as it tries to eject combusted air mixture; or commonly known as EXHAUST).

If you trim your motor DOWN, this **INCREASES back pressure**.

Reduced back pressure allows the motor to work less and run better, particularly at low RPMs. If you trim the motor UP when trying to start it the first time of the day, the motor will start more easily. Also, if you trim the motor partially up while running at idle speed in gear, the motor will run smoother.

CAUTION – *do not trim the motor to the point where the water intake is out of the water, which is located near the bottom of the gearcase, usually ahead of the propeller.*

PROPELLOR SELECTION & INFLUENCE ON RPMS

FAILURE TO MONITOR RPMS WILL CAUSE ENGINE FAILURE.

Your engine has a specific operating range that is very important to understand (see chart). When you run the engine at full throttle, it **MUST** be able to achieve the RPMS it was designed for or **you will damage your engine and cause it to fail**. Most outboards are designed to run between 5000-6000 RPMS when at full throttle, and the boat is trimmed up (bow lifted from the water). The following factors directly influence RPMS:

1. Vessel **load**, vessel **type**, **hull fouling**, and **weather conditions** affect motor performance.
2. **Propeller diameter** – the cross measurement of the propeller blades.
3. **Propeller pitch** – blade angle. The higher the pitch, the more aggressive angle the propeller has.

Between all factors, **PITCH** has the largest effect on the RPMS your motor will turn at all throttle ranges, particularly at Wide Open Throttle (WOT).

You **LOSE 150-200 RPMS** each pitch **UP** you go

You **GAIN 150-200 RPMS** each pitch **DOWN** you go.

You need to have a properly calibrated tachometer to determine what RPMS your motor can turn while at full throttle, vessel trimmed.

RECOMMENDED RPMS FOR OMC OUTBOARDS:	
HORSEPOWER	Minimum RPM at WOT/Trimmed
9.9	5500
15	6500
18-10-25 small block	4500
20 big block	5000
25/28 big block	5200
30/35 big block	5400
25-35 big twin (1954-78)	4800
40-60 2 cyl	5300
60/70 3-cyl	5500
90-140 V4 CV	5300
90-140 V4 90° LV	5700
90-115 V4 60° LV	5300
150-175 V6 60° LV	5300
150-235 V6 90° CV	5300
200-225 V6 90° LV	5700