I'm not a robot

outboard motor boat image by Wimbledon from Fotolia.com Fuel pumps on outboard motors work a little bit differently than they do on automobile engines. The outboard fuel pump has a sensitive diaphragm that receives a suction signal from a piston cylinder so the pump can deliver fuel. If the cylinder has a leak, the pump pulse signal will not be strong enough to send the proper amount of fuel to the cylinder. Outboard fuel pumps rarely fail, and diagnosing a fuel problem involves checking other components that can be easily mistaken for a bad check valve or diaphragm in a fuel pump. A process of elimination will narrow down a bad fuel pump. Turn off your main electrical cutoff switch that governs motor ignition. Unclasp the snaps on your outboard motor upper case and remove the cowl cover. Pull the spark plug wire boot from the tip of the spark plug. Direct the plug wire away from the spark plug hole opening, wedging it or taping it to another component. Use a plug socket and wrench to loosen and remove the spark plug. Screw a compression gauge hose into the spark plug hole. Twist your throttle position wide open with one hand. Pull your rope start with the other hand so the engine turns over at least four or five times. Check the compression reading in psi (pounds per square inch) on the gauge. If you have an electric start motor, have an assistant crank the engine over while pushing the throttle wide open. Refer to your owner's manual for the correct psi your engine needs. If the compression falls below 30 psi, per specifications, your fuel pump will not function adequately due to low pulse pressure. Repair the compression problem first. Unscrew the compression gauge hose and install the spark plug. Tighten the spark plug with a socket and install the plug wire back on the plug tip. Perform this test for multiple cylinder engines. Check to make sure you have enough gas in the tank to be picked up by the sump. The sump pickup screen should be unclogged, as should the tank vent. Blow through the tank vent to make sure it flows freely. Make sure the fuel primer bulb has no cracks or leaks and has not become deformed in any way. Inspect the fuel line hoses and connections from the tank to the fuel pump location for kinks and leaks. There should be none. Loosen the in-line fuel filter hose clamps with a screwdriver and pull the filter free. Blow through both ends of the filter to ensure there are no obstructions. Reinstall the fuel filter and tighten the clamps with a screwdriver. Loosen the clamp on the pulse hose, using a screwdriver. The pulse hose connects to the fuel pump and goes to the intake manifold. Place a coffee can under the hose and pull the starter rope several times. You should see fuel discharge coming from the hose. For an electric start, have an assistant crank the engine over several times; remember to have your ignition cutoff activated and the plug wire removed. Lack of fuel discharge points to a bad fuel pump check valve or diaphragm. Hook up a fuel pressure gauge to the pulse hose that comes out of the fuel pump. Use the pull rope or electric starter to crank the engine over. Read the gauge. A normal fuel pump will put out aproximately five to seven psi of pressure. Any reading below this will indicate a defective fuel pump check valve or diaphragm. Replace the fuel pump or purchase a rebuild kit. Joined 15 Oct 2002 Messages 617 Location New Quay Visit site Hi all, just stripped and cleaned the carburetor on my 8hp Yamaha for the first time, looked at the fuel pump, but didn't strip- (if it ain't broke etc etc), but couldn't figure out how it works, as there doesn't seem to be any external drive to it, it's just bolted to the side of the carb.. The manual tells me how to strip it but not how it's supposed to work. Anyone out there any idea??? Safe sailing Sparkie Joined 5 Apr 2005 Messages 2,631 Location Millbrook, Cornwall Visit site They are usually just a diapam pump operated from the pressure of the piston going up and down.I think /forums/images/graemlins/smile.gif Joined 13 Jul 2002 Messages 48,613 Visit site yes normally you will see a "fuel in" connected to the tank connector a "fuel out" going to the carb, but in this case it may be an integral connection and a connection to the crankcase. The later produces pressure flutuations on one side of the diaphragm. There will be small valves included in the petrol side of things and usually a filter Joined 15 Oct 2002 Messages 617 Location New Quay Visit site Yes there is a "fuel in" conection but everything else happens within the carb itself. There are no connections between the carb and the crankcase except for the inlet tract so I guess the diaphragm must be operated somehow by the pressure pulses in the tract as the reed valves open and close. Dashed clever these Keihin people! Many thanks both Safe sailingSparkie Joined 26 Sep 2002 Messages 2,996 Location Boston MA Visit site Get a spare pair of diaphragms. They stretch over time. Joined 15 Oct 2002 Messages 617 Location New Quay Visit site Thanks for that advice Jimboaw, what symptoms would a stretched pair of diaphragms produce?? I'm having problems at the mo with slow running, engine keeps cutting out and won't restart without choke even when hot.Sparkie Joined 23 Nov 2004 Messages 10,897 Location Norfolk Visit site Just in case it isn't the fuel pump - we had exactly the same symptoms as you describe on our Yam 9.9 - and you really need reliable power when moving a cat in a marina with a cross wind! It turned out to be a combination of two things: 1. The throttle minimum was set too low2. The throttle linkage under the engine cover was sticking.After resetting the first (and there is a very narrow tolerance) and clearing the gunk that had caused the second, we haven't a had a single problem. Joined 15 Oct 2002 Messages 617 Location New Quay Visit site Thanks Simon- haven't checked the linkage out yet- will do. Safe sailingSparkie Joined 19 Aug 2003 Messages 676 Location Lymington Visit site To set up you slow running. Set the throttle stop screw to give you a resonable tickover and the adjust the slow running mixture screw. Screw in the mixture screw - slowly and carefully - do not screw beyond finger tight- until the revs begine to drop and then back half a turn. rest the revs again on the stop screw and then check the mixture screw again. Oh , make sure the engine is wrmed up and the leg / waterline in the same as on the boat as theis wil affect the back pressure in the exhaust and therfore the mixture. It's sometimes a good idea to blip the throttle and let the revs settle down before finishing. Joined 15 Oct 2002 Messages 617 Location New Quay Visit site Thanks Tross, not thought about the effect of the water pressure on the mixture, always set up ashore. Do you know which way the screw works, ie does screwing in richen or weaken the mixture?? The manual doesn't enlighten us.Sparkie Joined 19 Aug 2003 Messages 676 Location Lymington Visit site Hi SparkieScrewing in weakens the mixture. I set my Yam up this year - well I stripped it down to sort out a hole in the exhaust tube and as part of this, cleared the carb out completely. Come to think of it, last year I had to use the choke to start it even when hot but this year I don't ??? It may be I set it up better, maybe it was the exhaust tube weakening the mixture ? How old is your unit, mine is around 1992/4 vintage. You maybe able to drop of the lower part of the leg and shine a torch up to see if there is a hole in the tube. The cost of these tubes is around 20 Joined 15 Oct 2002 Messages 617 Location New Quay Visit site Thanks for that. Mine is a 1995 model, I intend to strip the whole thing next winter and do a thorough check on everything outside of the actual motor head, which seems fine, so I'll certainly have a close look at the exhaust tube. This could definitely affect the mixture as you suggest. SPRING SALE: 15% discount on all OEM parts! Unless prohibited by manufacturer. Does not include aftermarket or Crowley Marine branded products. Priced as marked. Contact Us Search Over 1Million OEMParts Where is my model number? Home Support Documents Fuel Systems Vacuum GaugeA good fuel delivery system will read below 4 inches of mercury on the gauge at all times- and air bubbles will not show in the clear line. A high vacuum reading indicates a fuel restriction.Restrictions can be caused by kinked hoses; fittings that are too small; stuck or poor quality anti-siphon valves; or debris on the fuel tank pick-ups strainer screen. Large air bubbles in the clear hose indicate an air leak in the fuel system. Because fuel may not leak out at the point where air leaks into the system, carefully check all of the fuel systems fittings, connectors, and hoses. Be aware that some small bubbles could also be vapor being drawn out of the fuel, especially if the fuel is warm and the vacuum is approaching 4 inches.A damaged pick-up tube in the fuel tank could also be the source of an air leak. This may not cause a problem when the tank is full. However, when the fuel level is at or below the crack, air will enter the fuel system. A vacuum switch is used in many carbureted V6 models to warn the operator of a fuel restriction. The switch is connected between the fuel supply and the fuel pump, like the vacuum gauge on the boat fuel system test. A restriction in the fuel system will cause a partial vacuum in the fuel line and turn on the switch. The vacuum switch will activate at approximately 6 inches mercury- well above the limit of 4 inches mercury. A partially restricted fuel system usually supplies enough fuel to operate the outboard at slow speeds- so the vacuum switch will not normally activate the warning system at idle. But when the engine is running at high RPM, and fuel demand is at its highest, a restriction in the system will limit the amount of fuel flow. When the vacuum is strong enough, the vacuum switch closes and the warning system activates.Most 40 HP and larger outboards use an in-line fuel filter. When servicing an outboard, inspect the filter for clogged screens, loose fittings, and other damage that could create a leak, a restrict fuel flow. Be sure to service the in-line filter annually or every 100 hours of engine operation, whichever comes first. The primer solenoid- an electrically operated valve- provides additional fuel to make starting a cold engine easier. Pushing in on the key switch opens the valve, allowing the fuel pump to force additional fuel through the valve into the engine.Primer SolenoidPushing the key switch in causes current to flow through the windings of the primer solenoid. This creates a magnetic field that moves the plunger and opens the valve, allowing pressurized fuel to flow through the primer. Turning the red primer knob to the ON position will also open the valve. The knob is used only in case of an electrical failure. Under normal operating conditions the primer knob should be in the OFF position. Turning the primer knob to the OFF position will close the valve. Spring tension keeps the plunger valve against its seat.Windings of the Primer SolenoidRemember, the primer system relies on fuel pump pressure to move fuel. Unless the engine is running, cranking, or the primer bulb is being squeezed, opening the valve will not provide the additonal fuel required when starting a cold engine. Some outboards have a manual primer with three modes: OFF, ENRICHED, and PRIME. Pushing the manual primer knob all the way in, prevents fuel from flowing through the primer. This is the OFF position. Pulling the manual primer knob out so the red stripe is visible, allows fuel flow from the float bowl , through the primer, and into the engine. This is the ENRICHED , or warm-up mode. Pulling the manual primer knob all the way out forces fuel into the engine. Check valves keep the fuel moving in the right direction. This is the PRIME mode- it primes the engine for starting.Manual PrimerPrime ModeThe recirculation system is an important part of the two-stroke powerhead. When the outboard is running some fuel and oil will settle out of the air/fuel mixture and cling to internal powerhead parts.This is especially true when the powerhead is cold. Recirculation systems pick up this puddled fuel/oil mix and redistribute it in the powerhead. The recirculation system consists of check valves, fittings, hoses and internal passages. The fuel system is designed and calibrated with these systems working. If the system is not working properly, fuel may accumulate in the crankcase, and cause a cylinder to run rich. Since a diffrent cylinder normally burns these fluids, that cylinder could run lean.A good understanding of fuel system components, theory of operation, and maintenance procedures will help you to quickly troubleshoot and repair fuel system problems, and keep your customers having fun in the water. Fuel hoses are safety related, so always inspect the hoses and connectors on every outboardyou service. Stiff, cracked, worn, and damaged hoses must be replaced.Special materials are used for fuel hoses. When replacing hoses, use only the correct part asindicated in the parts catalog.A boats fuel system must be capable of providing adequate fuel flow to the outboard. A restrictionin fuel flow can damage the powerhead.When testing a fuel system, a high vacuum reading indicates a restriction. Bubbles and a lowvacuum reading indicate air leaking into the system. If you have high vacuum and bubbles, lookfor and correct any restriction. The bubbles are most likely caused by vapor forming due to thelow pressure.Diaphragm-type fuel pumps are used on many two-stroke and four-stroke models. On twostrokemodels, pressure and vacuum pulses from the outboards crankcase drive the fuel pump.On four-stroke models, a lobe on the crankshaft or camshaft drives the fuel pump.Some older 40 HP and larger, two-stroke outboards used a combination fuel/oil pump thatinjects oil into the fuel. This pump is divided into four sections: The air motor section. The fuel pump section. The oil pump section. The No oil warning section.After servicing a combination fuel/oil pump, make sure to mix oil with the fuel at a 50:1 ratio untilyou can verify the oil injection system is operating.BRP offers three oils that exceed the TCW3 specification: Good XD30 Better XD50 Best XD100Additional fuel to make starting a cold engine easier is supplied by either a primer or a choke.Primers may be manually or electrically operated.The recirculation system is an important part of the two-stroke powerhead. When the outboardis running some fuel and oil will settle out of the air/fuel mixture and cling to internal powerheadparts. This is especially true when the powerhead is cold. Test your knowledge by completing the quiz below!Fuel Systems Quiz Share on social: Crowley Marine, Inc. All Rights Reserved 2017 Carburetor Although a few models have been manufactured using an accelerator pump, most outboard carbs are simply vacuum operated in design Figure 5. At idle, a carb is in the low speed circuit of operation, and an orifice (jet) is used to meter fuel flow as required. As the throttle is advanced, two things happen. First, the throttle linkage contains an arm which advances the ignition timing during movement at a slight instant before the butterfly of the carb opens. This is commonly referred to as the "idle timing". If the ignition timing was not advanced in this manner, the motor would cough and die immediately upon acceleration. Secondly, as the throttle is advanced, the high circuit of the carb (controlled by vacuum condition) takes over automatically, and the fuel is routed through the high speed orifices (jets) to supply fuel/air mixture on demand. Most smaller outboard carbs have a fuel/air idle mixture adjustment, and most larger outboards are metered by an orifice and idle air/fuel mixture cannot be adjusted, nor does it require to be unless operating at high altitudes. In that case, the orifices would have to be changed accordingly. The main problem usually associated with outboard carbs is the varnishing of oil from prolonged storage. A carb overhaul is probably the most common repair performed by repair shops. This can be avoided by performing proper storage procedures. (See "winterizing section") All outboards require a choke when cold starting. Without a choke in proper operating condition, it is just about impossible to get one to start. Chokes can come in two different designs, either a solenoid operated flapper type Figure 5, or a solenoid operated injection type Figure 5. The flapper type choke should be regularly inspected for proper adjustment. By engaging the keyswitch with key in "on" position, you should distinctly hear the flappers operate with a "click" sound. If they do not, remove the air box from the carb/s and check to see that solenoid is getting power when key of ignition switch is depressed, and that the plunger is not sticky or missing. ^Click to enlarge^ The solenoid injection type choke Figure 6 requires no maintenance other than checking regularly for leaking fuel. With this type of choke, you still hear a "click" when activated, but the "click" is VERY faint in volume. You have to listen pretty close to hear it. If you do not hear the solenoid "click", check to make sure that proper voltage is being supplied. The keyswitch should be depressed for about 15 seconds before cranking motor for proper operation and starting during cold start conditions. If starter motor ever fails, the manual valve can be opened for easy rope start choke needs. ^Click to enlarge^ I didn't know where else to put this but, I started watching this video and started wondering how exactly they work. I understand that its a diaphragm pump, so the in and out motion of the spring causes the pumping actions, but what makes the spring move? There's nothing electrical on these small pumps, which means that its got to be activated by some other mechanical means. I'm going to assume that this is somehow tied into the vacuum created by the cylinders, is that correct? Cylinder comes down, creates pressure, compresses the spring moving the diaphragm? The pump you show is like most outboards. They utilize the pumping pressure of one of the pistons to to work the pump. The spring is there just so the diaphram doesnt get stuck against the pumps port. So when the piston goes up in the cylinder it creates a vacuum in the crankcase and that vacuum pulls the pumps diaphram in which in turn sucks fuel from the fuel line into the pump chamber. Then as the piston goes back down it pressurizes the crankcase which pushes the diaphram back out (same direction the spring pushes). When the diaphram is pushed out by the crankcase pressure the fuel is then pushed out a fuel line and up to the carb(s) float bowl. simple and no real moving parts. The pump you show is like most outboards. They utilize the pumping pressure of one of the pistons to to work the pump. The spring is there just so the diaphram doesnt get stuck against the pumps port. So when the piston goes up in the cylinder it creates a vacuum in the crankcase and that vacuum pulls the pumps diaphram in which in turn sucks fuel from the fuel line into the pump chamber. Then as the piston goes back down it pressurizes the crankcase which pushes the diaphram back out (same direction the spring pushes). When the diaphram is pushed out by the crankcase pressure the fuel is then pushed out a fuel line and up to the carb(s) float bowl. simple and no real moving parts. Thanks! So I was thinking correctly but reversed... Gees, when you think about how much that littleDiaphragm moves over the course of its life, its kind of a mechanical marvel. That is why you have to squeeze the primer ball on the gas line first. There is no fuel moving until the motor starts. The above is true for a two stroke. The four strokes work off a cam I remember it well!! A paper thin flat metal "Reed Valve" fuel flow suction apparatus that worked off piston movement pumped gasoline into the single cylinder of my first outboard motor. It was a gold colored 1.7 hp. "Neptune - Mighty Mite" tiny two blade prop engine that I purchased from my own earned money in 1961 at 9 yrs. old. Cost was $77 earned from community area snow shoveling in NY. The reed valve was pressed behind the large-thimble sized "tickle bowl" that held gasoline. Said bowl had a [pencil lead thin] metal spring loaded "tickle post" on its top that you "tickled" up and down to prime the cylinder from the two quart gas tank that set atop motor. Tickle valve often wore out from thousands of flexes and needed replacement... which took minutes by removing two small screws. Then you pulled the motor through with rope starter cord you hand wound on top of motor. If no start - repeat till it does. Always keeping slide bar accelerator bar in mid front of motor in mid position. This was placed on our 6' fiberglass "Pixie" dink. I had great fun! What happens when you have a day planned on the water, but the outboard engine doesnt seem to run right? If you know how to troubleshoot a bad outboard fuel pump, your day doesnt need to be ruined.When the outboard fuel pump is bad, it operates similarly to when the boat runs out of fuel. You might notice sputtering or misfiring before the engine cuts out completely.To help you get back on the water, we will talk about how the outboard fuel system works, discuss ways to troubleshoot the issues and give you some expert pointers along the way.This pump has a sensitive diaphragm in charge or receiving the suction signal from the piston cylinder. This setup allows the pump to deliver the fuel.The fuel pump on an outboard motor works differently than the one found in your car or truck.When the cylinder leaks, the pump pulse signal isnt strong enough to get the right amount of fuel to the cylinder.Thankfully, outboard fuel pumps dont fail often. Typically, what you think is a fuel pump issue is generally another component failing, such as a fuel pump diaphragm or bad check valve.To understand what you are looking at, you must first know the components of the outboard fuel system.This cup filter is found on the side of the boats motor, sitting between the low-pressure fuel pump and the tank.This component draws fuel out of the tank and directs it to the engine.This unit holds the fuel pump and filter.The VST pump pressurizes fuel before it gets to the rail.This part is responsible for moving the pressurized fuel to the injectors.With this filter found within the vapor separator tank, all of the fuel is filtered before it gets to the fuel pump.The in-line filter further separates smaller contaminants from the fuel before getting to the VST.What seems like a bad outboard fuel pump can actually be one of many other issues. Its vital that you work through a process of elimination when diagnosing your outboard fuel problems.Often, other fuel system components are easier to troubleshoot and eliminate. However, if you want to get right to the outboard fuel pump, we have the steps you need to know.Turn off the main electrical cutoff switch.Remove the snaps on the outboard motor upper case and take off the cowl cover.Take the spark plug wire boot off the plug tip. Move this wire around from the opening by taping it to another part or wedging it between components.With your socket wrench, remove the plug.Screw your compression gauge hose to the hole of the spark plug. With your hand, twist the throttle position wide open.With your other hand, pull the rope start, or turn the starter over to turn the engine over four or five times.Read the compression gauge in PSI (pounds per square inch).If you are troubleshooting an electric start motor, you will need a helper to crank the engine while the throttle is wide open.Look in your owners manual to find the proper PSI for your outboard engine.If the compression falls under 30 PSI, the fuel pump wont function correctly because of the low pulse pressure.Look to fix the compression issues first.If the compression seems okay, you can reinstall the spark plug and perform the same test on the other cylinders.There must be enough fuel in the tank to be picked up. Additionally, check the sump pickup screen for clogs.Blow air through the tank vent, ensuring that it is flowing freely.You can also inspect the fuel primer bulb for leaks and cracks.Another form of testing to see if there are fuel tank issues is to pressure test your fuel tank to find leaks, which we cover in this article here.Examine all of the fuel connections and hoses for leaks or kinks.Loosen the fuel filter hose clamps and pull off the filter. You want to blow through both ends to look for obstructions.If the filter is good, reinstall it and tighten the clamps back up with your screwdriver.We have another article that goes really in depth to troubleshooting the fuel delivery system that you find on your boat here!Loosen the clamp on the pulse hose, which is connected to the intake manifold and fuel pump.Make sure you have a container underneath the hose as fuel will discharge.With an electric start, you will need a helper to crank the engine several times. Make sure your ignition cutoff is activated and the plug wire is removed.If there is a lack of fuel discharge, you might have a bad diaphragm or fuel pump check valve.Connect your fuel pressure gauge to the pulse hose. Crank the engine.Normal fuel pumps will put out between five and seven PSI. Readings below this point to a bad diaphragm or pump check valve.You can either replace the fuel pump or opt for a rebuild kit instead.If your outboard motor has a mechanical fuel pump. Which is what we have covered for most of this article. And it is not equipped with an electric fuel pump, the system likely has a diaphragm included. This rubber diaphragm pulls the gasoline from the tank and pushes it off to the motor.When the diaphragm wears out or becomes damaged, the mechanical fuel pump might not work at all or cause performance issues.Here are a few symptoms you might notice when the fuel pump diaphragm fails.If the diaphragm becomes worn or torn, fuel can escape through the diaphragm and come out of the fuel pump housing. Eventually, these will fail completely, causing the engine to stop running.As the fuel pump produces less pressure, the engine fails to operate. You might notice engine stalling or sputtering.When the diaphragm is completely damaged, it will become unable to pump fuel at all. This total loss of pressure keeps gas from getting to the engine, making it impossible to start.On some designs. The fuel pump is driven from the pulses of the crankcase or from a rod that is driven by the crankshaft. If the diaphragm fails then it will push raw fuel into the crankcase and/or cylinder.Allowing the raw fuel to make its way out the exhaust and straight into the water. Then since the fuel is lighter than the water. It will float to the top of the water creating a sheen on the water and you can see bubbles of fuel floating up to the top of the waterLetting you know that the fuel pump diaphragm is bad!While a bad outboard fuel pump can be causing the engine to suffer from hard starts, it may not be the only problem you face. For any gas-powered motor to run correctly, three things are needed:FuelAirSpark that ignites the air/fuel mixtureIf one of these elements isnt supplied, the engine isnt going to start.Most problems are going to be related to one of these three issues. Here are some of the most common reasons the outboard is struggling to start.By stopping flames from contacting other fuel sources, fire is averted. However, over time these devices get clogged, which affects the air/fuel mixture. Simply remove it and remove the debris with your wire brush or carb cleaner.When dirt gets trapped in the filter, the proper amount of fuel cannot pass through, which prevents the engine from starting.If the spark plug is fouled, it can no longer ignite the air/fuel mixture.Running down the battery can also negatively affect the power needed to start the engine.Ethanol fuels shouldnt be kept in the tank for more than thirty days. If you are having trouble starting the engine, put fresh fuel in the tank and try again.If you only have ethanol available to run in your boat. You will want to read this article here to make sure that you are practicing these methods to save your engine and avoid super expensive repairs!You want to run your outboard motor at its peak efficiency. Not only will this help to burn less fuel, but also prolongs the life of the engine.To determine the best speed for your boat, you want to listen to the sound of the engine. When you hit that sweet spot, the engine vibrates less and quiets down.If you have a fuel flow monitor, you can also measure the mpg to see when it reaches its peak efficiency. However, you cant judge simply based on this fact, as slow speeds will naturally improve fuel economy, but also cause the motor to run longer, putting more age on the engine.Is it wrong to run the engine at wide-open throttle? Not at all!In fact, modern outboard engines are designed to handle this. Go ahead and enjoy your boat occasionally.And if you are worried about fuel economy, we can teach you all the tricks you need to know to improve your boats fuel economy here:As well as all the tricks that you need to know about in order to get more hours out of your outboard!Once you have ruled out the fuel pump, its time to look at some other options. Commonly operators use bad gas or have a failing fuel filter.What is bad gas? It could be that you put gas into the tank that is tainted, or it might have gone bad while in the motor or fuel tank from sitting for too long.Water and trash can get into the fuel supply, causing a clog to occur. Additionally, when fuel sits in the tank for too long, it loses octane and starts to separate or gum up the system.The other common complaint is a fuel filter clog. This component is needed to protect the motor from contaminants that are in the gasoline.However, just like your automotive filter, it can clog up over time. When this occurs, the fuel cant pass through freely and a lack of pressure causes trouble.Finally, if you are struggling to get your outboard running correctly, you might consider looking at the fuel lines. Blocked fuel lines keep gas from getting to the engine.Most of the blockages start out partially. In these cases, simply pumping the primer bulb or playing with the hose will start the motor.However, blockages arent going to repair themselves. Eventually, these tactics wont work any longer.To prevent outboard fuel line troubles, consider these tips:Ethanol fuel leads to more problems, but theres no guarantee that using ethanol-free gas will solve the clogs.Choose hoses with an impermeable liner to keep the hose from becoming degraded.Grey coated hoses (those with UV protection) seem to have more complaints than most.Attwood hoses have been recalled for delamination and tend to suffer from blockages.OEM hoses will often last the longest.Its always wise to keep some spare hose clamps and hose on board, just in case you need a quick replacement.Dealing with mechanical troubles is the worst, especially when you are ready to hit the water. To avoid headaches, its best to prevent a failure from occurring in the first place.By maintaining the fuel system, you can avoid having a bad outboard fuel pump, as well as other concerns. Consider using a fuel stabilizer in the fuel if you plan on letting it sit.Before storing it for the winter, run the stabilizer through the tank for a few minutes.Additionally, as part of your boat maintenance, you want to replace the fuel filter once a year. You can find it under the engines main cover.As with anything, if you provide a little TLC throughout the year, you have a better chance of avoiding costly problems in the future.Check Us Out!Check out our YouTube channel for more step-by-step guides and practical tips.Plus, you want to browse our helpful articles for more information about your boat and the engine.What Are the Symptoms of a Bad Coil on an Outboard Motor?Outboard Maintenance Cost & How To Save Money Servicing Your Boat!Why Wont My Outboard Boat Engine Turn Over!? Can anyone explain to me, step-by-step how the fuel system on a small 2-stroke (25 hp) outboard works. I'm stilling having a problem with a rebuilt motor whereas it runs, in nuetral, for a short period of time and then quits as though you shut off the fuel to it. I thought if I understood the fuel system better then I could possibly isolate the problem. Examples of questions I have are: Why is there a fuel pump on the carb when I thought the fuel was pulled, by suction, through the carb and through the reed valves. What function do the reed valves serve? If you can direct me somewhere were I can read more about this I would greatly appreciate it. Thanks Re: 2 stroke fuel system explanation?The fuel pump is to provide a positive flow of fuel from the fuel tank to the carb. The fuel/air mix enters the bottom of the cylinder, through the reed valves, on the upward travel of the piston. They are basically one-way valves that prevent the fuel/air mix going back out the intake when the piston is on the downstroke. The mix is pushed/sucked into the top of the cylinder, after the exhaust port has been uncovered and the exhaust leaves the cylinder and assists by drawing the fuel/air mix into the cylinder on the top of the piston. Re: 2 stroke fuel system explanation?Be careful as the wrong carb mounting gasket without the pulse hole will not allow fuel pump to operate, it will do as you describe.. Re: 2 stroke fuel system explanation?Faztbullet, I will check the gasket because I did replace the gasket (the one between the carb and the intake manifold) prior to the rebuild. I purchased it through the Merc dealer but it's possible that I put it on wrong (assuming it can go back in more than one way). What exactly does the pulse hole do? Would the float level or inlet needle valve cause this sort of problem or would that be more detrimental to WOT performance. This stalling is occurring at idle with the motor in "N" and water muffs on. This same thing was occuring prior to the rebuild and I was hoping the rebuild would cure it but apprently there was more to it than that. Thanks for the help Re: 2 stroke fuel system explanation?might be so obvious that i need not mention. maybe fuel tank vent closed or clogged?! Re: 2 stroke fuel system explanation?Does it start right back up and repeat the problem? You may have an incorrect setting on your float level. Re: 2 stroke fuel system explanation? On the 25 merc, 2-stroke the pulse hole in the gasket creates suction to pulsate the fuel pump that is built into the side of the carb. If the gasket is mounted wrong the only way its going to stay running is keep spraying gas into the carb. When you pull the primer it pushes on a plunger on the opposite side of the carb of the fuel pump. Sprays a little gas in the intake manifold and aids in starting. Once it starts the vaccum caused by the piston stroke runs through the front of the carb through the pulse hole and pulls on the fuel pump diaphram causing it to pulsate and creates a fuel flow into the carb, and into the engine while it runs. While it's at idle, the fuel flow is directed past the idle speed screw on the front, top of the carb...therefore that screw has to be set right to keep it running (about 1 1/4 turn from lightly seated), adjust it in water, in forward gear...idle. When you hit the gas, at about 1,200 RPM's the fuel flow is then pulled from the bottom of the carb through the highspeed jet that is placed in that brass screw in the bottom of your float bowl, bypassing the idle speed screw and taking it out of the equasion while at WOT. When you let off the gas and return to idle the fuel flow is then directed back through the idle speed jet and thats why when you let off the gas, the motor RPM's are a little erratic for about a minute into idle. To the best of my knowledge this is how this carb works. If I'm wrong someone please correct me. Re: 2 stroke fuel system explanation?Thank you everyone for all your help - I REALLY APPRECIATE IT. Tonight I rechecked the setting on the idle speed and low speed mixture screw. I noticed that while setting the idle speed the manual says to turn in until the screw "just touches" the cam follower then an additional 1/2 turn to slightly open the throttle plate. My problem is that I don't see any movement in the throttle plate unless it is awful minute? I noticed that when the motor begins to sputter if I squeeze the primer bulb on the fuel line it will pick up and run fine for awhile then repeat. I hooked up a different tank to it and the same thing happened. If the carb gasket is incorrect would priming the bulb make a difference? Do the fuel pumps on these things malfunction very often? Does this sound like a fuel pump problem (assuming the gasket is the correct replacement). As I said before, I reset the float height, replaced the worn inlet needle valve and cleaned the fuel filter prior to the rebuild. Re: 2 stroke fuel system explanation? Thank you everyone for all your help - I REALLY APPRECIATE IT. Tonight I rechecked the setting on the idle speed and low speed mixture screw. I noticed that while setting the idle speed the manual says to turn in until the screw "just touches" the cam follower then an additional 1/2 turn to slightly open the throttle plate. My problem is that I don't see any movement in the throttle plate unless it is awful minute? I noticed that when the motor begins to sputter if I squeeze the primer bulb on the fuel line it will pick up and run fine for awhile then repeat. I hooked up a different tank to it and the same thing happened. If the carb gasket is incorrect would priming the bulb make a difference? Do the fuel pumps on these things malfunction very often? Does this sound like a fuel pump problem (assuming the gasket is the correct replacement). As I said before, I reset the float height, replaced the worn inlet needle valve and cleaned the fuel filter prior to the rebuild. That is EXACTLY how it will behave if the pulse hole is blocked. Re: 2 stroke fuel system explanation?LOL...Now ask ME how I know about the gasket thing. $150 dollars, thats how much it costed the mechanic to flip it around. And probably not a bad idea to replace the fuel pump also. Re: 2 stroke fuel system explanation?I just wanted to thank you guys, specifically Faztbullet and Will for your suggestions. I took off the carb today and sure enough the gasket the dealer gave me is NOT exactly like the old gasket. It looks fine when you lay it on the carb but if placed on the manifold the vacuum port is blocked. The old gasket had a slotted opening whereas the new gasket just had one circular hole. Incredible! I haven't had time to pick up a new gasket yet and reinstall it but I'm 90% sure that should solve the fuel supply problem. Thanks again I really appreciate the help. 1 - Fuel In2 - Pulse Limiter Hose3 - Fuel Out4 - Back side of fuel pump crankshaft suction hole (not shown in photo) Hi, I am trying to understand the difference in how these fuel pumps work along with the motor. My first question is: I have a 1985's Evinrude and it has the bottom fuel pump with crank shaft hole but no Pulse port installed however, the engine does have a pulse port hole built in, but its closed off with a nut. So would opening up the pulse port, adding a cable and using the Above fuel pump be better? would it make a difference? Same with the 1995 motors, that have the pulse port hose, can you just cap the hose and use the Bottom fuel pump without issue? Or is there a reason that using the Top fuel pump be be better? Any help would be greatly appreciated.Thanks What motor.do.you have? Both pumps work the same way the only difference is where it gets it 's pulse from. The 2 cylinder motors have bosses and a pulse port in the block itself. So you just bolt it on and go. The later 3 cylinder motors do not have the pump mounting cast into the block. So that would use a 3 port pump because you would need a hose from a pulse port. When the VRO pump came around they started capping off the block mounted pump ports. This is because the Vro needs a pulse line. If your motor has the capped off pulse port and the threaded bosses you can use the 2 port pump. I believe some 3/ 4 cylinders had the ports in the block. This is a 40HP two stroke evinrude. So that is what im trying to understand, if i have a capped pulse port, or non capped one, is there any reason or advantage to using a 3 line vs 2 line? Basically I have the same engine, 1 that used a vro, and an older one that uses a 2 line pump. This means I can use a 3 line or 2 line in each motor. So ... does it make a difference what I do? is 3 better then capping the pulse? and using a 2 line pump? Use the port on the block that way you can mount it to something. Either pump will work just fine it is up to you. Both pumps work the same way !-------A positive pressure pulse and a slight negative pulse.------I would mount the 2 line pump directly to the side of the block.----Plug the pulse port that was for the VRO pump. So if i use the 3 Line pump, and connect both the pulse hose + block hole, it will work just as well as using the 2 Line pump, and plugging the pulse port? Is there really no advantage to using the 3 line, with the pulse fitting instead of plugging it? So what is the point of the 3 line pump? if you can just use a 2 line and plug the pulse hose?Thanks The 3 hose pump is for a motor that does not have the mounting bosses and pulse hole cast into the block. The 2 line pump can be bolted to the block over the pulse hose. Use either one makes no difference! 1 last question. If I use the 3 line pump, do I still leave the block hole, open? so it has pulse + block home or, do I cap the block hole, and use just the pulse?Thanks Last edited: Jan 19, 2019 No you do not use the block hole you must plug it. Thanks, is there a reason the 3 line pump has the block hole on the back then? same as the 2 line? If i just have to plug it anyways.Just trying to understand everything about how it works. Last edited: Jan 20, 2019 Its a vent. If you use the 3 line pump you need to remove the pulse limiter or drill it out. Cenkae------You are overthinking this !--------The 2 pumps work exactly the same.------The difference is the way the pump body is drilled to get the pulses to the diaphragm.------The 2 hose pump mounts directly to the intake manifold and the pulse port.------The 3 hose pump uses a remote pulse source via a hose.-----Both pump the same amount of fuel ! What motor.do.you have? Both pumps work the same way the only difference is where it gets it 's pulse from. The 2 cylinder motors have bosses and a pulse port in the block itself. So you just bolt it on and go. The later 3 cylinder motors do not have the pump mounting cast into the block. So that would use a 3 port pump because you would need a hose from a pulse port. When the VRO pump came around they started capping off the block mounted pump ports. This is because the Vro needs a pulse line. If your motor has the capped off pulse port and the threaded bosses you can use the 2 port pump. I believe some 3/ 4 cylinders had the ports in the block. Came here for this same question because I'm replacing my fuel pump and it showed up at my house and has an extra outlet. Is it OK to just use the little black cap that it shipped with to plug the vacuum port (like #2 in the photo). Maybe just add a small hose clamp around it to secure it and prevent air leaks? Mine mounts to the block and the pump has the vacuum port on the back of it. I premix, no VRO. If youre having Yamaha or Mercury outboard fuel pump problems, youre no doubt feeling frustrated. Maybe your engine is sputtering and dying while youre trying to enjoy a day on the water, or youre burning through your fuel faster than ever. Either way, the symptoms of a bad fuel pump on an outboard motor can be a headache you didnt see coming, and now you need to know how to tell if your outboard motor fuel pump is bad.Now for some good news: If youre wondering how to test your fuel pump, troubleshooting the system can take less than 30 minutes with minimal cost to repair.What are the symptoms of a bad fuel pump on an outboard motor?SilenceWhen you try to start your engine, you should be able to hear the sound of the fuel pump engaging. If that familiar sound cant be heard, theres a chance it could be due to issues with the battery. Check the battery first, and depending on other symptoms you may be experiencing, it could be a good idea to troubleshoot other systems with one of our handy guides. Still, if youre missing that motorized sound, thats a strong sign that the fuel pump may be having issues.Slowing, Stopping, or SputteringAnother common symptom of a bad fuel pump is sputtering or misfiring. If youre experiencing a bumpy ride (or possibly losing speed altogether), it could also be a sign of a clogged fuel filter that wont allow a consistent flow. Youll want to check the entire fuel system to ensure that any clogs and blockages in the system are addressed. We outline what parts of the fuel system you need to check in our Yamaha and Mercury troubleshooting guidesGas GuzzlingRapid fuel use is usually a sign that the condition of the fuel pump has deteriorated significantly. Its a good idea to have an idea of how long a tank of gas will last you. If you notice that your tank is emptying faster than usual, its time to check out your fuel system before more problems take hold.HeatIf the temperature on your gauge is on the rise, it could very well be a sign of a failing fuel pump. Keeping in mind that it may be indicative of other problems, it could be reason enough to check out your fuel system for potential issues.If you are experiencing any combination of these symptoms, these are signs that your fuel pump is going out.Performing Fuel Pump TestsHow do you test a fuel pump on an outboard motor? Fortunately, there are simple ways to test your fuel pump. This process assumes that you have already checked the rest of the fuel system for cracks, leaks, and general signs of wear to ensure continuity between the fuel tank and pump. You can check this by pumping the primer bulb until it feels hard. Fuel should travel easily from the tank all the way to the pump. Your outboard fuel filter, located just before the fuel pump, should be full.With the engine off and the cowl cover removed, remove the spark plug wire boot and remove the plugAttach the compression gauge to the spark plug hole. Then, twist the throttle position wide open and either pull the rope start or turn the starter over several times.The proper PSI will vary based on the engine, but in general a low PSI (under 30) means that there is a compression issue that is preventing the fuel pump from working. If you have adequate pressure, this is indicative of a bad fuel pump.The two parts of the fuel pump that are most commonly the source of problems are the diaphragm and the one-way valves. To test them, it will be easiest to remove the pump from the engine.One-Way