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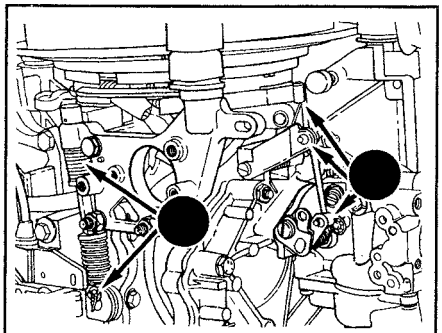

Fig. 31 Carburetor linkage, cam and shifter starter lockout greasing points 18-35 hp two cylinder (521cc) Motors

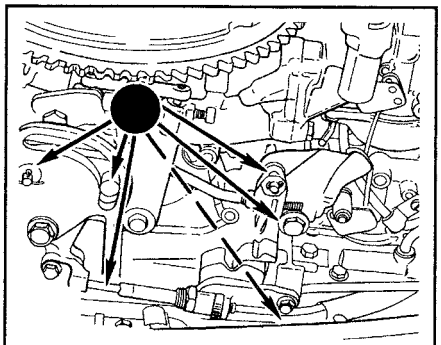

Fig. 32 Carburetor linkage and timer link greasing points on some 40-55 hp two cylinder (737cc) motors, including the 40RP, 40RW, 40WR, 45, 55WR and 55 RescuePro

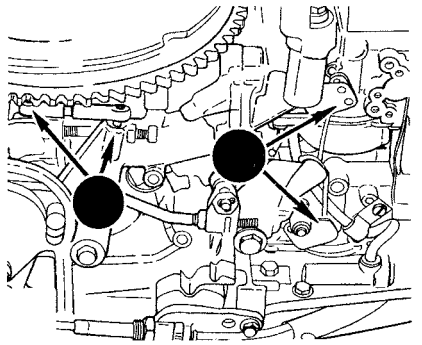

Fig. 33 Throttle and shaft linkage greasing points on some 40-55 hp two cylinder (737cc) motors, including 40RP, 40RW, 40WR, 45, 55WR and 55 RescuePro

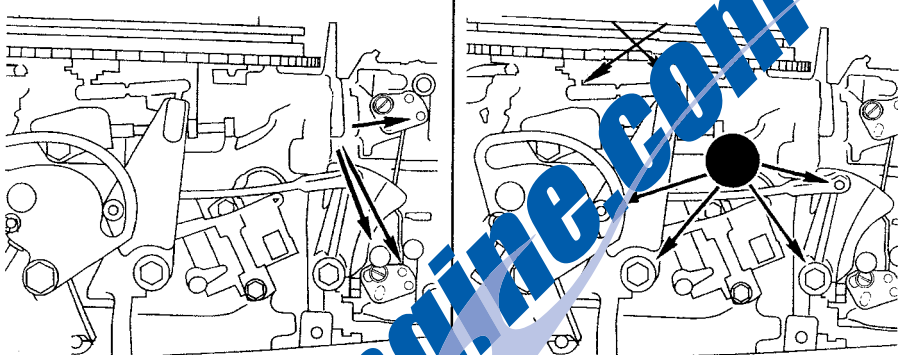

Fig. 34 Carburetor (left) and throttle (right) linkage greasing points on some 25-55 hp two cylinder (737cc) motors including the 25, 35 Jet, 40EL, 40RS, 40TL, 48, 50EL, 50SPL, 50TL and 55WML

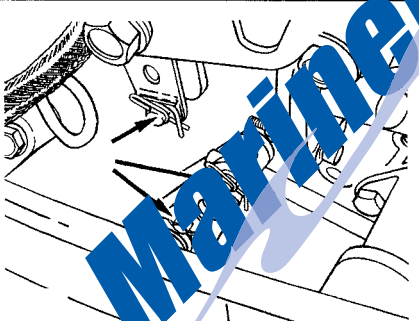

Fig. 35 Shift and throttle shaft fitting lubrication 25-50 hp two cylinder (737cc) motors including the 25, 35 Jet, 40EL, 40RS, 40TL, 48, 50EL, 50SPL and 50TL

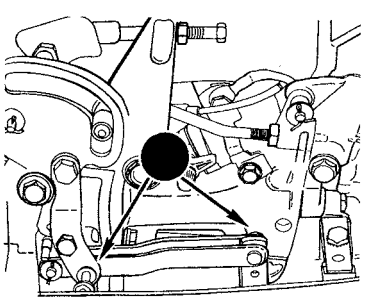

Fig. 36 Shift and throttle shaft greasing points for 55WML two cylinder (737cc) motors

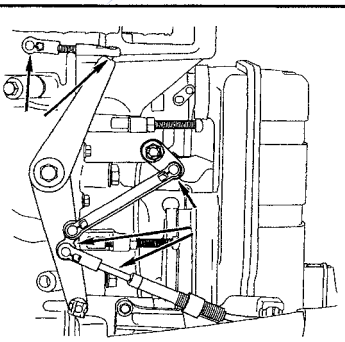

Fig. 37 Throttle and shift linkage greasing points for 25/35 hp (500/565cc) 3-cylinder motors

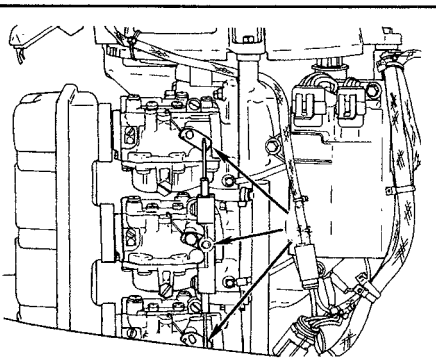

Fig. 38 Carburetor linkage lubrication points for 25/35 hp (500/565cc) 3-cylinder motors

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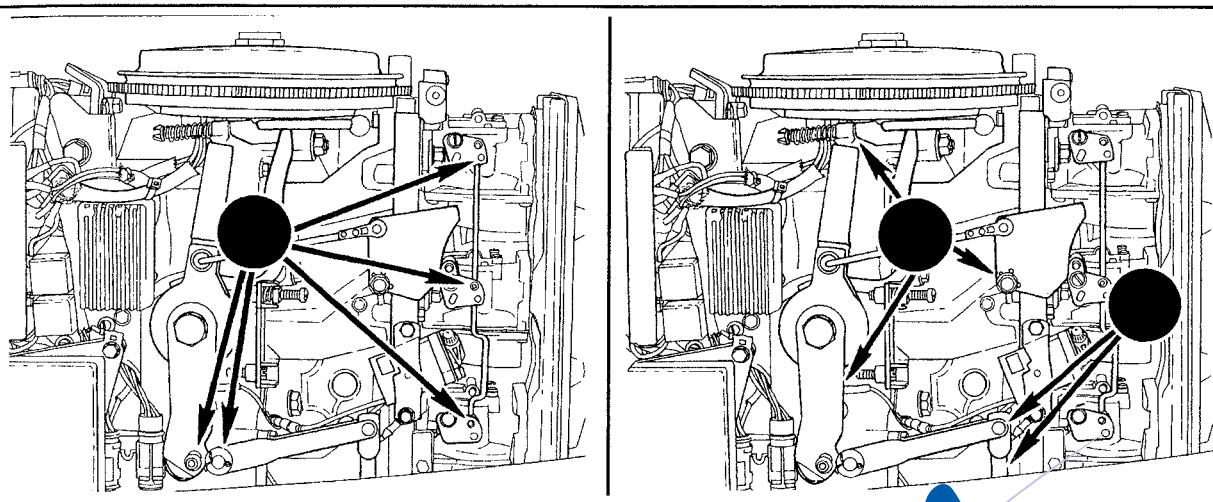

Fig. 39 Carburetor linkage, cam roller, shift shaft and control shaft/lever bushing lubrication points for 25[illegible]913cc) 3-cylinder, 2-stroke motors (except the 65RS, 65WR and some 50-70TTL models)

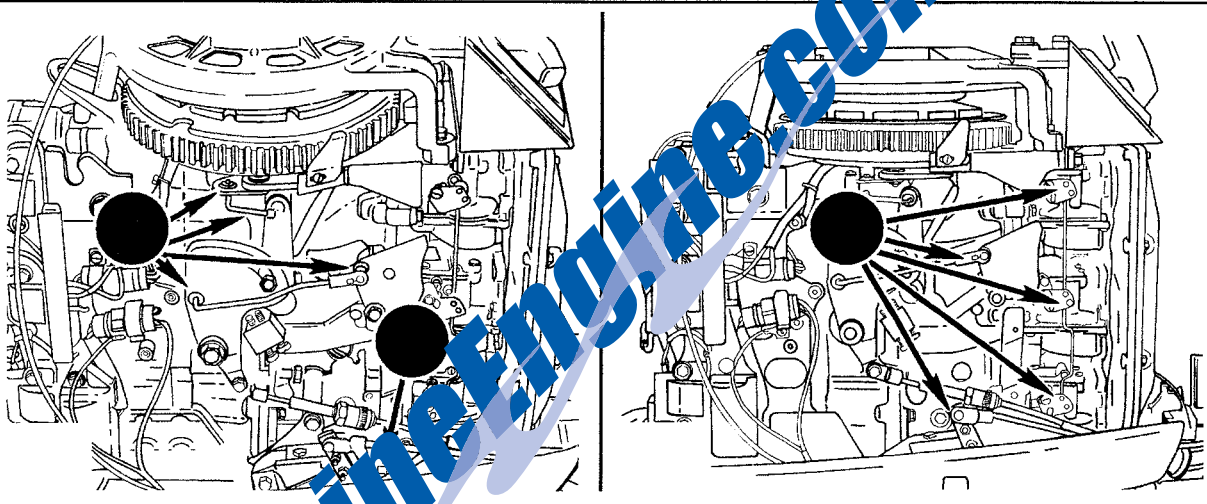

Fig. 40 Shift shaft and linkage and cont[illegible]ring (left) along with shift and throttle cable fittings, carburetor linkage and cam follower (right) lubrication points for 65RS, 65[illegible]me [illegible]-70TTL models of the (913cc) 3-cylinder, 2-stroke motor

40-70 Hp 4-Stroke Motors

◆ See Figures 41 and 42

Steering (Arm/Shaft [illegible] Friction Screw)

◆ See Figures 43 thru 46

RECOMMENDED LUBRICANT

Use OMC Triple-Guard, or an equivalent water-resistant marine grease for lubrication.

LUBRICATION

◆ See Figures 43 thru 46

EASY

All motors covered by this manual are equipped with a tiller control and/or a remote control assembly. On models equipped with a tiller, the arm's pivot point (where it attaches to the engine) should be lubricated periodically. On models with remote controls, the steering arm should be given a light coating of fresh lubricant to prevent corrosion or scoring. Many of the outboards covered by this manual (especially the portable units) are equipped with a steering friction adjustment knob/screw. Coat the exposed threads of the screw with fresh grease during lubrication services.

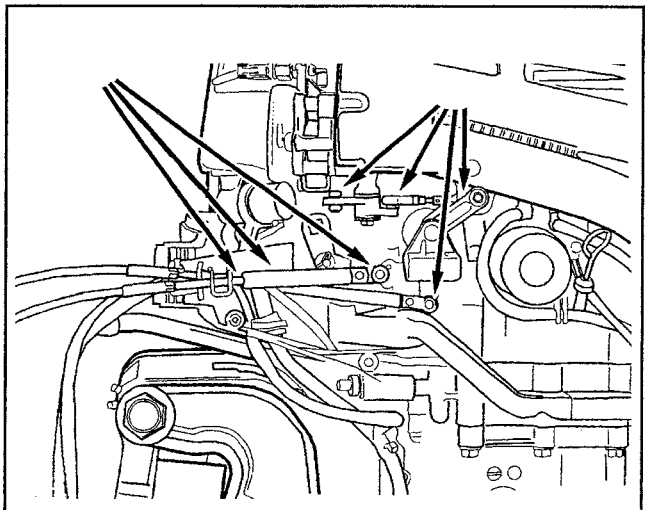

Fig. 41 Shift and throttle linkage lubrication - 40/50 hp (815cc) 3-cylinder, 4-stroke motors

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Fig. 2 Carburetor float bowls are normally equipped with a drain screw

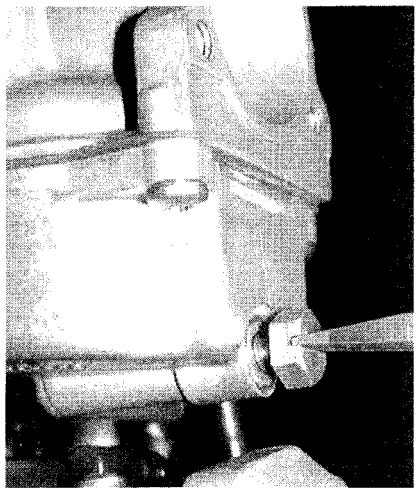

Fig. 3 To drain the carburetor, remove the drain screw. . .

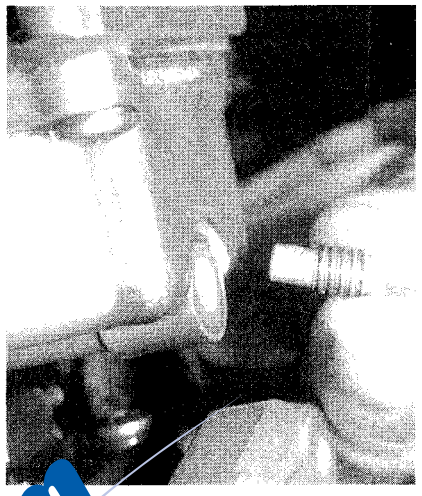

Fig. . . and, if equipped, the orifice plug . . . float bowl

installation instructions for the fuel filters are provided in the Maintenance Section, while fuel pump procedures are found in this section. To check for stale or contaminated fuel:

1. Disconnect the negative battery cable for safety. Secure it or place tape over the end so that it cannot accidentally contact the terminal and complete the circuit.

✳✳ CAUTION

Throughout this procedure, clean up any spilled fuel to prevent a fire hazard.

2. For carbureted motors, remove the float bowl drain screw (or fuel shut-off plug, if equipped), then allow a small amount of fuel to drain into a glass container.

■ If there is no fuel present in the carburetor, disconnect the fuel inlet line from the fuel pump and use the fuel primer bulb to draw fuel as on EFI motors.

3. For EFI motors, disconnect the fuel supply hose at the pump or low pressure fuel filter (as desired), then operate the fuel primer bulb to obtain a small sample of fuel. Place the sample in a clear glass container and reconnect the hose.

■ If a sample cannot be obtained from the filter or pump supply hose, there is a problem with the fuel tank or motor fuel circuit. Check the tank, primer bulb, fuel pump, fitting or inlet needle on carbureted models.

4. Check the appearance and odor of the fuel. An unusual smell, signs of visible debris or a cloudy appearance (or even the obvious presence of water) points to a fuel that should be replaced.

5. If contaminated fuel is found, drain the fuel system and dispose of the fuel in a responsible manner, then clean the entire fuel system. On EFI models, this includes draining the vapor separator tank, then properly draining the high-pressure fuel system by relieving system pressure according to the instructions in this section.

■ If debris is found in the fuel system, clean and/or replace all fuel filters.

6. When finished, reconnect the negative battery cable, then properly pressurize the fuel system and check for leaks.

Fuel System Pressurization

When it comes to safety and outboards, the condition of the fuel system is of the utmost importance. The system must be checked for signs of damage or leakage with every use and checked, especially carefully when portions of the system have been opened for service.

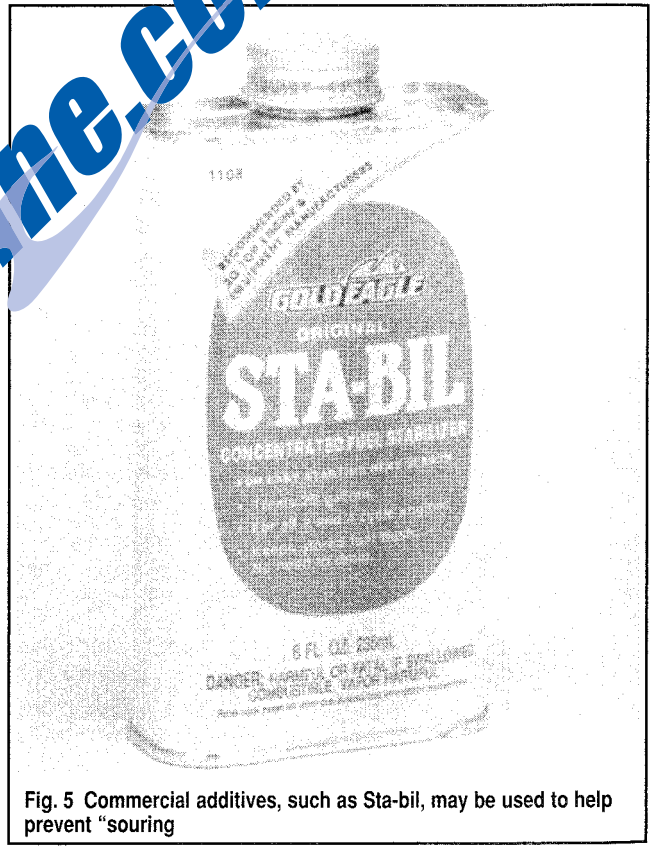

Fig. 5 Commercial additives, such as Sta-bil, may be used to help prevent "souring"

The best method to check the fuel system is to visually inspect the lines, hoses and fittings once the system has been properly pressurized.

Furthermore, EFI motors are equipped with two inter-related fuel circuits, a low pressure circuit that is similar to the circuit that feeds carburetors on other motors and a high pressure circuit that feeds the fuel injection system. As its name implies, the high pressure circuit contains fuel under pressure that, if given the chance, will spray from a damaged/loose hose or fitting. When servicing components of the high pressure system, the fuel pressure must first be relieved in a safe and controlled manner to help avoid the potential explosive and dangerous conditions that would result from simply opening a fitting and allowing fuel to spray uncontrolled into the work area.

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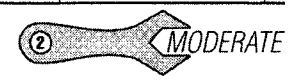
RELIEVING FUEL SYSTEM PRESSURE (EFI MOTORS ONLY)



Before servicing the high pressure fuel circuit or related components, including the vapor separator tank, high pressure filter, fuel rail, injector and related lines, the pressure must be released. Failure to do so in a proper manner could lead to high pressure fuel spray, excessive concentrations of vapors and an extremely dangerous, potentially explosive condition.

40/50 Hp EFI Models

1. Turn the key switch to **OFF**.
2. Tag, then disconnect the wiring (primary lead wire) from each ignition coil.
3. Disconnect the high pressure fuel pump wiring from the vapor separator by pushing down on the connector's lock tab, then pulling the connector free.
4. Use the key switch to crank the engine in 3 second bursts for 10-20 times. This will dissipate the fuel pressure in the lines. After the first couple of bursts, start squeezing the high pressure line to determine when the pressure is released. Once the hose is soft to the touch, crank the engine a few more times to ensure pressure is gone.

■ **Even after most or all of the pressure has been dissipated, there may still be some liquid fuel left in the lines. Always wrap a shop rag around fittings before they are disconnected to catch any escaping fuel.**

5. Unless necessary for service procedures or for safety, reconnect the ignition coil primary leads.
6. Disconnect the negative battery cable for safety during service, or leave the fuel pump wiring disconnected until the maintenance or repairs have been completed.

■ **We still recommend disconnecting the negative battery cable, especially if any work will be one or around electrical components. Any work on or near the gearcase, propeller or other potentially hazardous moving parts is also good reason to keep the battery disconnected.**

7. After maintenance or repairs are finished, fully pressurize the high and low pressure fuel circuits and thoroughly check the system for leakage

70 Hp EFI Models

1. Locate and remove the 15 amp fuse for the high pressure fuel pump circuit from the fuse holder.

■ **The 15 amp fuel pump fuse is found on the port side of the powerhead, mounted between the [illegible] 2 intake manifold runners (if necessary, follow the wiring from the fuel pump connector at the vapor separator tank to the fuse holder).**

2. With power removed from the fuel pump, use the engine to dissipate pressure from the high pressure circuit using one of 3 possible ways, as follows:

a. If the engine operates (is not being repaired for a no start or no run condition), start the engine and allow it to run until it stalls. Then restart or crank the engine 3 more times, to make sure fuel line pressure is dissipated.

b. If the engine cranks, but does not start or remain run properly, crank the engine 5-10 times, in 3 second long bursts in order to dissipate fuel pressure.

✳✳ CAUTION

When releasing fuel pressure using the screw on the top of the fuel rail, use extreme caution to prevent fuel from spraying uncontrolled into the work area. There must be NO open flames, sparks or other sources of ignition. It is imperative that there is proper ventilation in order to dissipate vapors. Wear safety glasses to protect your eyes, gloves to protect your skin and, finally, keep extra rags handy, as one might not do the trick.

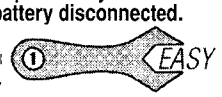
c. If the engine does not crank at all, place a shop rag over the screw on top of the fuel rail and slowly loosen it. Once all pressure is relieved, tighten the screw to 28-30 ft. lbs. (38-41 Nm).

■ **Even after most or all of the pressure has been dissipated, there may still be some liquid fuel left in the lines. Always wrap a shop rag around fittings before they are disconnected to catch any escaping fuel.**

3. Disconnect the negative battery cable for safety during service, or leave the fuel pump fuse disconnected until the maintenance or repairs have been completed.

■ **We still recommend disconnecting the negative battery cable, especially if any work will be one or around electrical components. Any work on or near the gearcase, propeller or other potentially hazardous moving parts is also good reason to keep the battery disconnected.**

4. After maintenance or repairs are finished, fully pressurize the high and low pressure fuel circuits and thoroughly check



PRESSURIZING THE FUEL SYSTEM (CHECKING FOR LEAKS)

✳✳ CAUTION

Fuel leaking from a loose, damaged or incorrectly installed hose or fitting may cause a fire or explosion. ALWAYS pressurize the fuel system and run the motor while inspecting for leaks after servicing any component of the fuel system.

Carbureted Models

The carbureted engines covered by this manual are only equipped with a low pressure fuel system, making pressure release before service an non-issue. However, a low pressure fuel system should be checked following repairs to assure that no leaks are present. Only by checking a fuel system under normal operating pressures can you be sure of the system's integrity.

Most carbureted engines (except some integral tank models with gravity feed) utilize a fuel primer bulb mounted inline between the fuel tank and engine. On models so equipped, the bulb can be used to pressurize that portion of the fuel system. Squeeze the bulb until it and the fuel lines feel firm with gasoline. At this point check all fittings between the tank and motor for signs of leakage and correct, as necessary.

Once fuel reaches the engine it is the job of the fuel pump(s) to distribute it to the carburetors. On 4-stroke motors and pre-mix 2-stroke motors the fuel is pumped directly from the pump to the carburetor. On 2-strokes equipped with the AccuMix oiling system, the one fuel pump draws fuel from the tank, while the other pumps it through the mixing unit to the carburetor(s). When equipped with the VRO2 system, a traditional fuel pump and the VRO pump (consisting of a fuel and oil pump, as well as a fuel/oil mixing unit) is responsible for feeding an fuel/oil mixture to the carburetors.

No matter what system you are inspecting, start and run the motor with the engine top case removed, then check each of the system hoses, fittings and gasket-sealed components to be sure there is no leakage after service.

EFI Models

EFI models covered by this manual utilize 2 fuel circuits. A low pressure circuit consisting of a fuel tank, primer bulb, low pressure fuel pump and low pressure filter and low pressure fuel line to the vapor separator tank all operate in the same manner as the low pressure fuel system of a carbureted motor. The high pressure circuit consists of the electric fuel pump (integral with the vapor separator tank), the high pressure filter, the fuel rail/injectors and the high pressure lines.

Although it is necessary to pressurize and inspect both systems after repairs have been performed on the motor, it is especially important to properly check the high pressure circuit. Leaks from the high pressure circuit will (as you might expect) be under much greater pressures leading to even more potentially hazardous conditions than a low pressure leak. That's not to say the a low pressure leak isn't dangerous, but a high pressure leak can be even more so.

1. Pressurize and check the low pressure circuit as follows: Make sure the fuel tank is sufficiently full to provide an uninterrupted fuel source, then squeeze the bulb until it begins to feel firm. Check the low pressure lines, fittings and components for signs of leakage before continuing.

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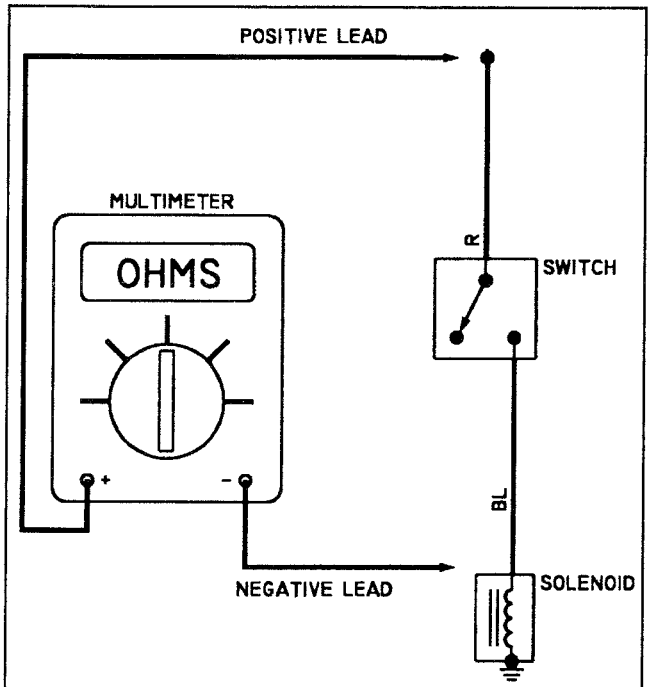

Fig. 11 The easiest way to illustrate an open circuit is to picture a circuit in which the switch is turned OFF (creating an opening in the circuit) that prevents power from reaching the load

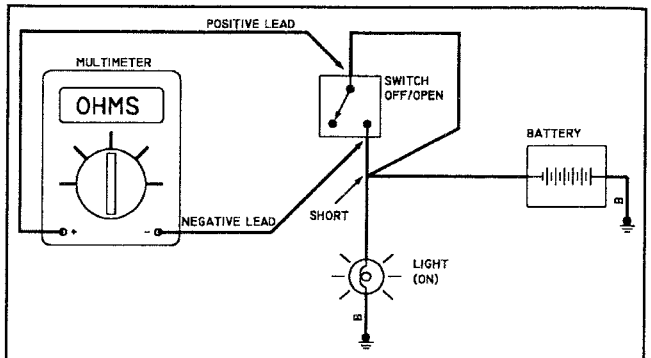

Fig. 12 In this illustration a load (the light) is powered when it should not be (since the switch should be creating an open condition), but a short to power (battery) is powering the circuit. Shorts like this can be caused by chafed wires with worn or broken insulation

starter. Serious burns can result if the band completes the circuit between the positive battery terminal (or a hot wire) and ground.

• Be absolutely sure of the polarity of a booster battery before making connections. Remember that even momentary connection of a booster battery with the polarity reversed will damage charging system diodes. Connect the cables positive-to-positive, and negative (of the good battery) to a good ground on the engine away from the battery to prevent the possibility of an explosion if hydrogen vapors are present from the electrolyte in the discharged battery. Connect positive cables first (starting with the discharged battery) and make the last connection to ground on the body of the booster vessel so that arcing cannot ignite hydrogen gas that may have accumulated near the battery. • Disconnect both vessel battery cables before attempting to charge a battery.

• Never ground the alternator or generator output or battery terminal. Be careful when using metal tools around a battery to avoid creating a short between the terminals.

• When installing a battery, make sure that the positive and negative cables are not reversed.

• Always disconnect the battery (negative cable first) when charging. Never smoke or expose an open flame around the battery. Hydrogen gas is released from battery electrolyte during use and accumulates near the battery. Hydrogen gas is **highly** explosive.

IGNITIONS SYSTEMS (BREAKER POINT/MAGNETO)

General Information

◆ **See Figure 13 and 14**

As of 1996 all Johnson/Evinrude outboard engines use some form of a pointless electronic ignition system, however to say that various models of the 1 hp motors use a point type magneto ignition is misleading. Actually, all Colt/Junior models, certain versions of 2 hp (77.8cc) and certain versions of 1991-95 2/2.3/3.3 hp (77.8cc) motors...

Read and Believe. A battery is required to crank the powerhead does not mean the engine is equipped with a battery-type ignition system. A magneto system uses the battery only to crank the powerhead. Once the powerhead is running, the battery has absolutely no effect on engine operation. Therefore, if the battery is low and fails to crank the powerhead properly for starting, the powerhead may be cranked manually, started, and operated. Under these conditions, the key switch must be turned to the on position or the powerhead will not start by hand cranking.

A magneto system is a self-contained unit. The unit does not require assistance from an outside source for starting or continued operation. Therefore, as previously mentioned, if the battery is dead, the engine may be cranked manually and the powerhead started.

This ignition system uses a mechanically switched, collapsing field to induce spark at the plug. A magnet moving by a coil produces current in the primary coil winding. The current in the primary winding creates a magnetic field. When the points are closed the current goes to ground. As the breaker points open the primary magnetic field collapses across the secondary field. This induces (transforms) a high voltage potential in the secondary coil winding. This high voltage current travels to the spark plug and jumps the gap.

The point type ignition system contains a condenser that works like a sponge in the circuit. Current that is flowing through the primary circuit tries to keep going. When the breaker point switch opens the current will arc over the widening gap. The condenser is wired in parallel with the points. The condenser absorbs some of the current flow as the points open. This reduces arc over and extends the life of the points.

The flywheel-type magneto unit consists of an armature plate and a permanent magnet built into the flywheel. The ignition coil, condenser and breaker points are mounted on the armature plate.

As the pole pieces of the magnet pass over the heels of the coil, a magnetic field is built up about the coil, causing a current to flow through the primary winding.

At the proper time, the breaker points are separated by action of a cam designed into the collar of the flywheel and the primary circuit is broken. When the circuit is broken, the flow of primary current stops and causes the magnetic field about the coil to break down instantly. At this precise moment, an electrical current of extremely high voltage is induced in the fine secondary windings of the coil. This high voltage is conducted to the spark plug where it jumps the gap between the points of the plug to ignite the compressed charge of air-fuel mixture in the cylinder.

The carburetion and ignition principles of two-cycle engine operation must be understood in order to perform a proper tune-up on or troubleshoot an outboard motor.

If you have any doubts concerning your understanding of two-cycle engine operation, it would be best to study the operation theory section in the General Information, Safety and Tools section, before tackling any work on the ignition system.

Troubleshooting

Always attempt to proceed with the troubleshooting in an orderly manner. The "shotgun" approach will only result in wasted time, incorrect diagnosis, replacement of unnecessary parts, and frustration.

Begin the ignition system troubleshooting with the wiring harness and the spark plugs and then continue through the system until the source of trouble is located.

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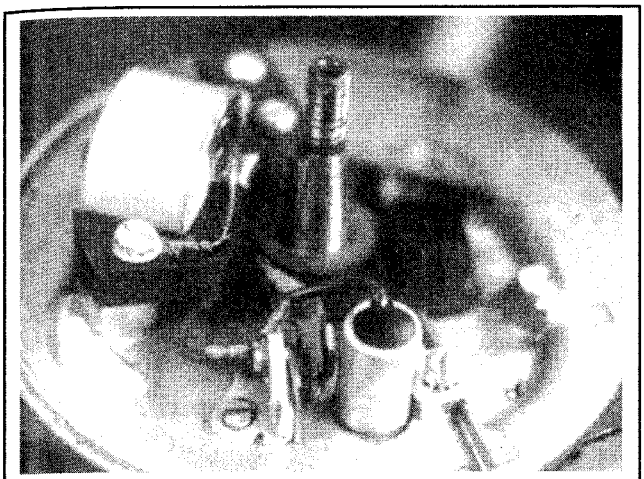

Fig. 13 Typical magneto ignition system installed on a single cylinder powerhead

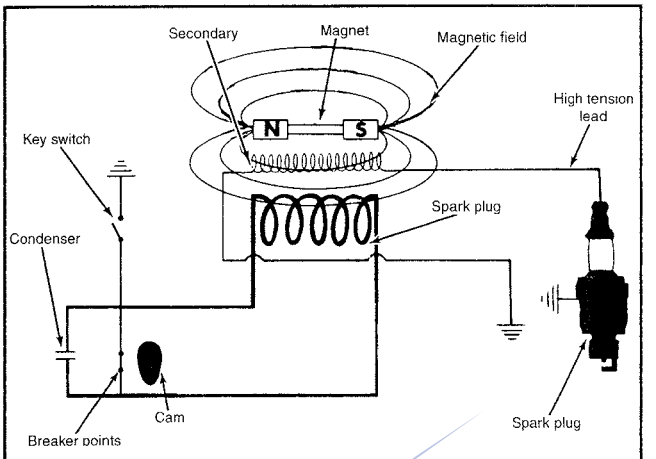

Fig. 14 Schematic diagram of a simple single cylinder magneto ignition system with principal parts identified

Remember, a magneto system is a self-contained unit. Therefore, if the engine has a key switch and wire harness, remove them from the powerhead and then make a test for spark. If a good spark is obtained with these two items disconnected, but no spark is available at the plug when they are connected, then the trouble is in the harness or the key switch. If a test is made for spark at the plug with the harness and switch connected, check to be sure the key switch is turned to the on position.

CHECKING THE WIRING HARNESS & KEYSWITCH

◆ **See Figure 15 and 16**

✳✳ WARNING

These next two paragraphs may well be the most important words in this section. Misuse of the wiring harness is the most single cause of electrical problems with outboard power plants.

A wiring harness is used between the key switch and the power pack. This harness seldom contains wire of sufficient size to allow for additional accessories. Therefore, anytime a new accessory is added, a new wire should be used between the battery and the accessory.

A separate fuse panel must be installed on the boat. To connect the fuse panel, use one red and one black wire from the battery. If a small amount of 12 volt current should accidentally attached

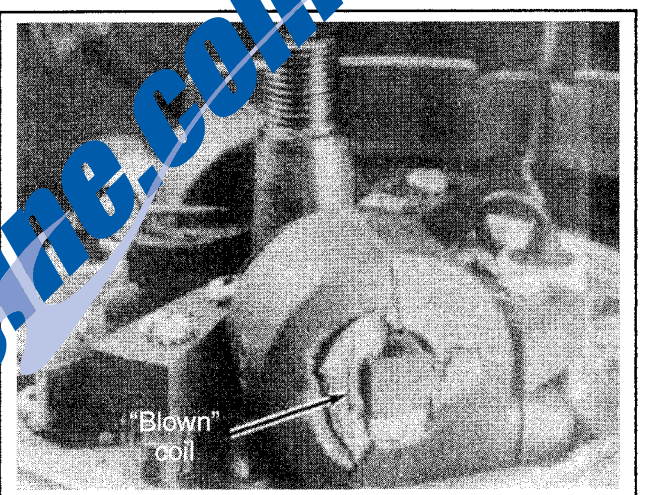

Fig. 15 A coil destroyed when 12 volts was connected into the magneto wiring system. Mechanics report in 85% of the cases, the damage occurs when an accessory is connected through the key switch

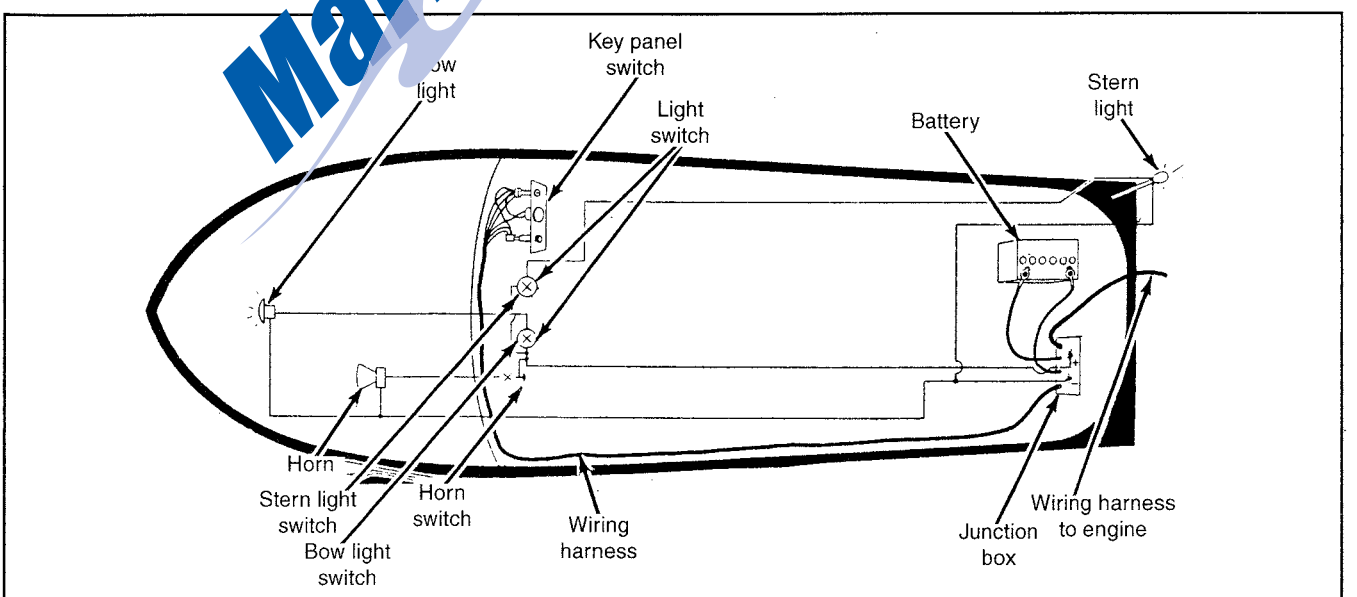

Fig. 16 Functional diagram to illustrate proper hookup of accessories through a junction box. If a junction is not installed on the boat, connect accessories directly to the battery. Never connect accessories through the key switch

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