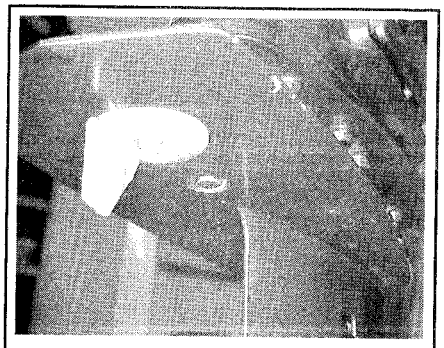


Fig. 25 What a trim tab should look like when it's in good condition

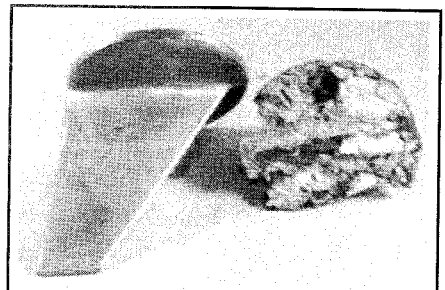


Fig. 26 Such extensive erosion of a trim tab compared with a new tab suggests an electrolysis problem or complete disregard for periodic maintenance

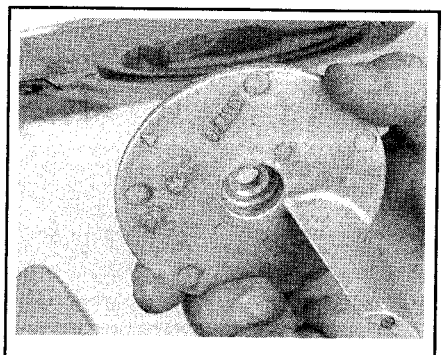


Fig. 27 Although many outboards use the trim tab as an anode . . .

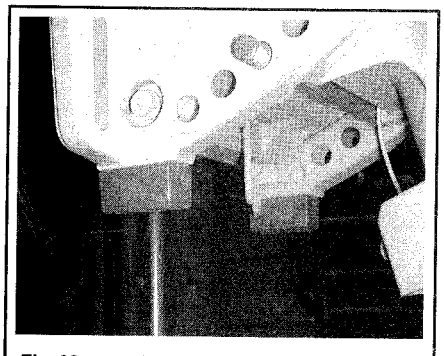


Fig. 28 . . . other types of anodes are also used throughout the outboard, like this one on the stern bracket . . .

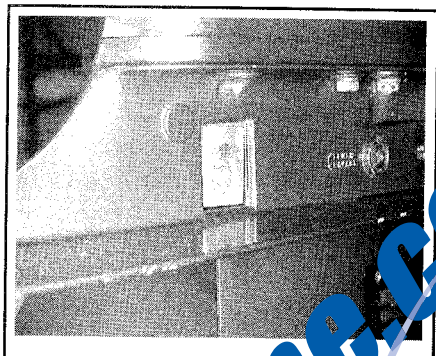


Fig. 29 . . . and this on[illegible]ower unit

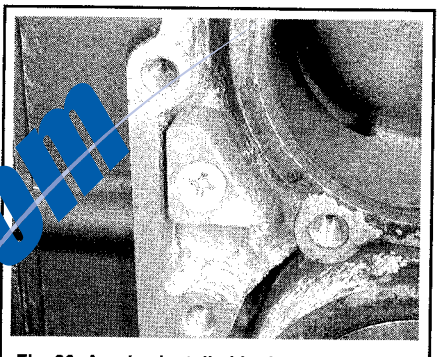


Fig. 30 Anodes installed in the water jacket of a powerhead provide added protection against corrosion

Fig. 31 Most anodes are e[illegible]y removed by loosening and removing their attaching fas[illegible]ners

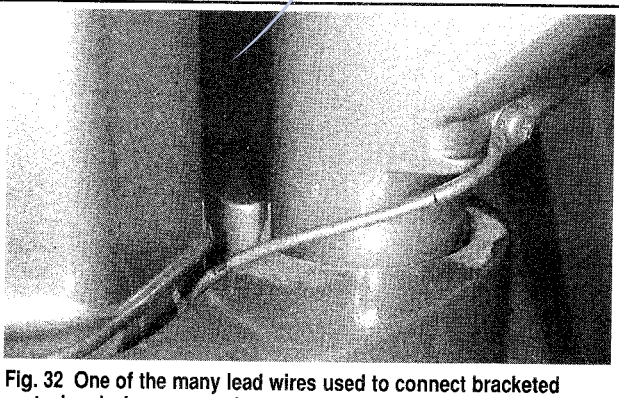


Fig. 32 One of the many lead wires used to connect bracketed parts. Lead wires are used as an assist in reducing corrosion

[illegible]he exterior surface of the unit thoroughly. Inspect the finish for da[illegible] or corrosion. Clean any damaged or corroded areas, and then apply pri[illegible] and matching paint.

Check the entire unit for loose, damaged, or missing parts.

An anode is attached across both clamp brackets. It also serves as protection for the coil of hydraulic hoses beneath the trim/tilt unit between the brackets.

Lead wires provide good electrical continuity between various brackets which might be isolated from the trim tab by a coating of lubricant between moving parts.

Battery

Difficulty in starting accounts for almost half of the service required on boats each year. A survey by Champion Spark Plug Company indicated that roughly one third of all boat owners experienced a "won't start" condition in a given year. When an engine won't start, most people blame the battery when, in fact, it may be that the battery has run down in a futile attempt to start an engine with other problems.

Maintaining your battery in peak condition may be though of as either tune-up or maintenance material. Most wise boaters will consider it to be both. A complete check up of the electrical system in your boat at the beginning of the boating season is a wise move. Continued regular maintenance of the battery will ensure trouble free starting on the water.

A complete battery service procedure is included in the "Maintenance" section of this manual. The following are a list of basic electrical system service procedures that should be performed as part of any tune-up.

- Check the battery for solid cable connections
- Check the battery and cables for signs of corrosion damage
- Check the battery case for damage or electrolyte leakage
- Check the electrolyte level in each cell
- Check to be sure the battery is fastened securely in position
- Check the battery's state of charge and charge as necessary
- Check battery voltage while cranking the starter. Voltage should remain above 9.5 volts
- Clean the battery, terminals and cables
- Coat the battery terminals with dielectric grease or terminal protector

Batteries which are not maintained on a regular basis can fall victim to

parasitic loads (small current drains which are constantly drawing current from the battery). Normal parasitic loads may drain a battery on boat that is in storage and not used frequently. Boats that have additional accessories with increased parasitic load may discharge a battery sooner. Storing a boat with the negative battery cable disconnected or battery switch turned off will minimize discharge due to parasitic loads.

CLEANING

Keep the battery clean, as a film of dirt can help discharge a battery that is not used for long periods. A solution of baking soda and water mixed into a paste may be used for cleaning, but be careful to flush this off with clear water.

■ Do not let any of the solution into the filler holes on non-sealed batteries. Baking soda neutralizes battery acid and will de-activate a battery cell.

CHECKING SPECIFIC GRAVITY

OEM ① EASY

The electrolyte fluid (sulfuric acid solution) contained in the battery cells will tell you many things about the condition of the battery. Because the cell plates must be kept submerged below the fluid level in order to operate, maintaining the fluid level is extremely important. In addition, because the specific gravity of the acid is an indication of electrical charge, testing the fluid can be an aid in determining if the battery must be replaced. A battery in a boat with a properly operating charging system should require little maintenance, but careful, periodic inspection should reveal problems before they leave you stranded.

✳✳ CAUTION

Battery electrolyte contains sulfuric acid. If you should splash any your skin or in your eyes, flush the affected area with plenty of clea water. If it lands in your eyes, get medical help immediately.

As stated earlier, the specific gravity of a battery's electro ve used as an indication of battery charge. At least once a specific gravity of the battery. It should be between 1.2 gravity scale. Most parts stores carry a variety of i esting hydrometers. These can be used on any non-se e specific gravity in each cell.

Conventional Battery

◆ **See Figures 33 and 34**

A hydrometer is requi ec e gravity on all batteries that are not maintenance-fr ro er h a squeeze bulb at one end and a nozzle at the othe ectrolyte is sucked into the hydrometer until the float or pointer is om its seat. The specific gravity is then read by noting the position of the oat/pointer. If gravity is low in one or more cells, the battery should be slowly charged and checked again to see if the gravity has come up. Generally, if after charging, the specific gravity of any two cells varies more than 50 points (0.50), the battery should be replaced, as it can no longer produce sufficient voltage to guarantee proper operation.

Check the battery electrolyte level at least once a month, or more often in hot weather or during periods of extended operation. Electrolyte level can be checked either through the case on translucent batteries or by removing the cell caps on opaque-case types. The electrolyte level in each cell should be kept filled to the split ring inside each cell, or the line marked on the outside of the case.

If the level is low, add only distilled water through the opening until the level is correct. Each cell is separate from the others, so each must be checked and filled individually. Distilled water should be used, because the chemicals and minerals found in most drinking water are harmful to the battery and could significantly shorten its life.

If water is added in freezing weather, the battery should be warmed to allow the water to mix with the electrolyte. Otherwise, the battery could freeze.

Maintenance-Free Batteries

◆ **See Figure 35**

Although some maintenance-free batteries have removable cell caps for access to the electrolyte, the electrolyte condition and level is usually checked using the built-in hydrometer "eye". The exact type of eye varies between battery manufacturers, but most apply a sticker to the battery itself explaining the possible readings. When in doubt, refer to the battery

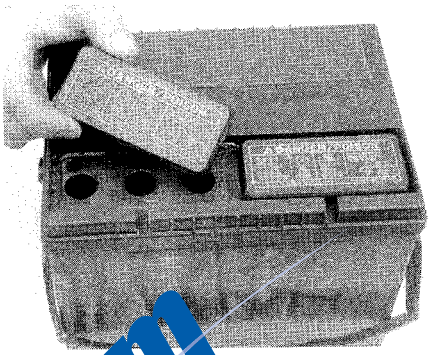


Fig. 33 On non-maint e batteries with translucent cases, the electrolyte le n seen through the case; on other types (such as the one sh n), the cell cap must be removed

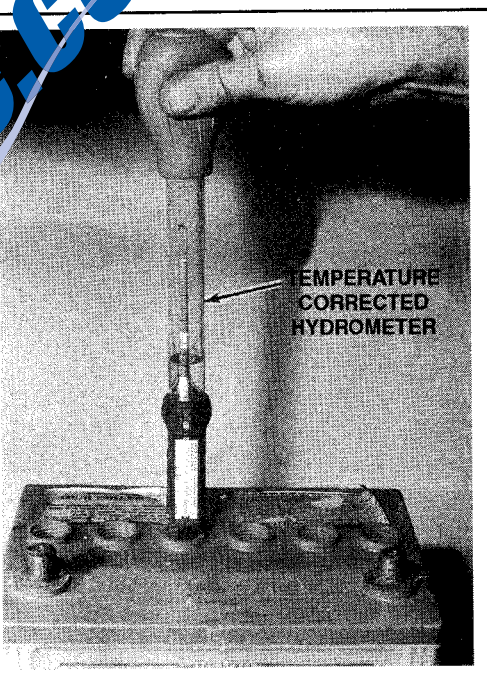
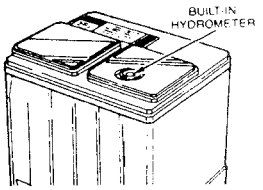
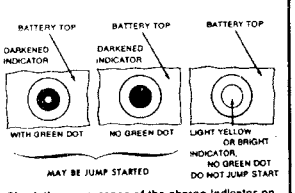


Fig. 34 The best way to determine the condition of a battery is to test the specific gravity of the electrolyte with a battery tester



Location of indicator on sealed battery



Check the appearance of the charge indicator on top of the battery before attempting a jump start; if it's not green or dark, do not jump start the car

Fig. 35 A typical sealed (maintenance-free) battery with a built-in hydrometer - note that the hydrometer eye may vary between manufacturers; always refer to the battery's label

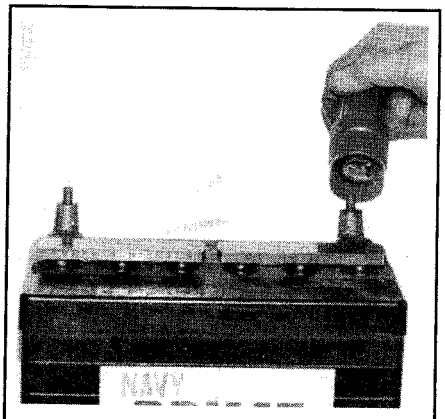


Fig. 36 Place a battery terminal tool over posts, then rotate back and forth. . .

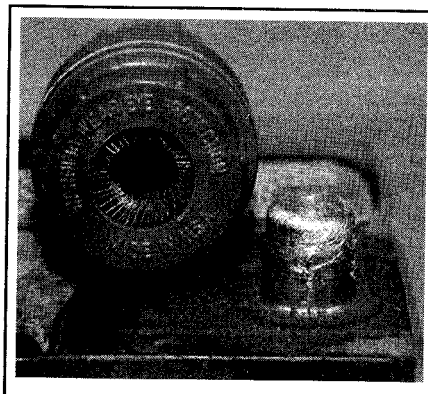


Fig. 37 . . .until the internal brushes expose a fresh, clean surface on the post

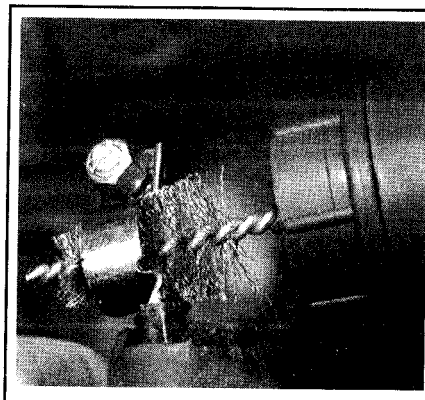
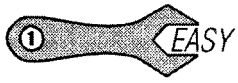


Fig. 38 Clean the insides of cable ring terminals using the tool's wire brush

manufacturer's instructions to interpret battery condition using the built-in hydrometer.

The readings from built-in hydrometers may vary, however a green eye usually indicates a properly charged battery with sufficient fluid level. A dark eye is normally an indicator of a battery with sufficient fluid, but one that may be low in charge. In addition, a light or yellow eye is usually an indication that electrolyte supply has dropped below the necessary level for battery (and hydrometer) operation. In this last case, sealed batteries with an insufficient electrolyte level must usually be discarded.

BATTERY TERMINALS



◆ **See Figures 36, 37 and 38**

At least once a season, the battery terminals and cable clamps should be cleaned. Loosen the clamps and remove the cables, negative cable first. On batteries with top mounted posts, the use of a puller specially made for the purpose is recommended. These are inexpensive and available from most auto parts stores.

Clean the cable clamps and the battery terminal with a wire brush until all corrosion, grease, etc., is removed and the metal is bright. It is important to clean the inside of the clamp thoroughly; a wire brush is useful here), since a small deposit of foreign material or oxidation will prevent a sound electrical connection and inhibit either starting or charging. It is also a good idea to apply some dielectric grease to the terminals, as this will aid in the prevention of corrosion.

After the clamps and terminals are clean, reattach the cables, negative cable last; Do not hammer the clamps onto the posts. Tighten the clamps securely, but do not distort them. Coat the clamps and terminals a thin external coating of grease after installation, to retard corrosion.

Check the cables at the same time that the terminals are cleaned. If the insulation is cracked or broken, or if its end is frayed, that cable should be replaced with a new one of the same length and gauge.

BATTERY AND CHARGING SAFETY PRECAUTIONS

Always follow these safety precautions when charging or handling a battery.

1. Wear eye protection when working around batteries. Batteries contain corrosive acid and produce explosive gas a byproduct of their operation. Acid on the skin should be neutralized with a solution of baking soda and water made into a paste. In case acid contacts the eyes, flush with clear water and seek medical attention immediately.

2. Avoid flame or sparks that could ignite the hydrogen gas produced by the battery and cause an explosion. Connection and disconnection of cables to battery terminals is one of the most common causes of sparks.

3. Always turn a battery charger OFF, before connecting or disconnecting the leads. When connecting the leads, connect the positive lead first, then the negative lead, to avoid sparks.

4. When lifting a battery, use a battery carrier or lift at opposite corners of the base.

5. Ensure there is good ventilation in a room where the battery is being charged.

6. Do not attempt to load-test a maintenance-free battery when the charge indicator is dark, indicating insufficient electrolyte.

7. Disconnect the negative battery cable if the battery is to remain in the boat during the charging process.

8. Be sure the ignition switch is OFF before connecting or turning the charger ON. Sudden power surges can destroy electronic components.

9. Use proper adapters to connect charger leads to batteries with non-conventional terminals.

BATTERY CHARGERS

◆ **See Figure 39**

Before using any battery charger, consult the manufacturer's instructions for proper use. Battery chargers are electrical devices that change Alternating Current (AC) to a lower voltage of Direct Current (DC) that can be used to charge a marine battery. There are two types of battery chargers - manual and automatic.

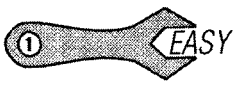
A manual battery charger must be physically disconnected when the battery has come to a full charge. If not, the battery can be overcharged, and possibly fail. Excess charging current at the end of the charging cycle will heat the electrolyte, resulting in loss of water and active material, substantially reducing battery life.

■ **As a rule, on manual chargers, when the ammeter on the charger registers half the rated amperage of the charger, the battery is fully charged. This can vary, and it is recommended to use a hydrometer to accurately measure state of charge.**

Fig. 39 Automatic battery chargers, like the Battery Tender® from Deltran, have an important advantage - they can stay connected to your battery for extended periods without the possibility of overcharging

Automatic battery chargers have an important advantage - they can be left connected (for instance, overnight) without the possibility of overcharging the battery. Automatic chargers are equipped with a sensing device to allow the battery charge to taper off to near zero as the battery becomes fully charged. When charging a low or completely discharged battery, the meter will read close to full rated output. If only partially discharged, the initial reading may be less than full rated output, as the charger responds to the condition of the battery. As the battery continues to charge, the sensing device monitors the state of charge and reduces the charging rate. As the rate of charge tapers to zero amps, the charger will continue to supply a few milliamps of current - just enough to maintain a charged condition.

REPLACING BATTERY CABLES



Battery cables don't go bad very often, but like anything else, they can wear out. If the cables on your boat are cracked, frayed or broken, they should be replaced.

When working on any electrical component, it is always a good idea to disconnect the negative (-) battery cable. This will prevent potential damage to many sensitive electrical components

Always replace the battery cables with one of the same length, or you will increase resistance and possibly cause hard starting. Coat the battery posts with a light film of dielectric grease, or a battery terminal protectant spray once you've installed the new cables. If you replace the cables one at a time, you won't mix them up.

■ Any time you disconnect the battery cables, it is recommended that you disconnect the negative (-) battery cable first. This will prevent you from accidentally grounding the positive (+) terminal when disconnecting it, thereby preventing damage to the electrical system.

Before you disconnect the cable(s), first turn the ignition to the OFF position. This will prevent a draw on the battery which could cause arcing. When the battery cable(s) are reconnected (negative cable last), be sure to check all electrical accessories are all working correctly.

TUNE-UP

Introduction

A proper tune-up is the key to long and trouble-free engine life, and the work can yield its own rewards. Studies have shown that a properly tuned and maintained engine can achieve better fuel mileage than an out-of-tune engine. As a conscientious boater, set aside a Saturday morning, say once a month, to check or replace items which could cause major problems later. Keep your own personal log to jot down which services you performed, how much the parts cost you, the date, and the number of hours on the engine at the time. Keep all receipts for such items as engine oil and filters, so that they may be referred to in case of related problems or to determine operating expenses. As a do-it-yourselfer, these receipts are the only proof you have that the required maintenance was performed. In the event of a warranty problem, these receipts will be invaluable.

The efficiency, reliability, fuel economy and enjoyment available fr engine performance are all directly dependent on having your e tuned properly. The importance of performing service work i sequence cannot be over emphasized. Before making any ad check the specifications. Never rely on memory when ma adjustments.

Before beginning to tune any engine, ensure the compression. An engine with worn or broken scored cylinder walls, will not perform prope much time and expense is spent on the tune-up. Poor co corrected or the tune-up will not give the desired results.

A practical maintenance program will give satisfactory performance. As they say, you can spend time now or a lot of time later.

The extent of the engine is usually dependent on the time lapse since the last service. A complete tune-up of the entire engine would entail almost all of the work outlined in this manual. However, this is usually not necessary in most cases.

In this section, a logical sequence of tune-up steps will be presented in general terms. If additional information or detailed service work is required, refer to the section containing the appropriate instructions.

Each year higher compression ratios are built into modern outboard engines and the electrical systems become more complex. Therefore, the need for reliable, authoritative, and detailed instructions becomes more critical. The information in this section will fulfill that requirement.

Tune-Up Sequence

During a major tune-up, a definite sequence of service work should be followed to return the engine its maximum performance level. This type of work should not be confused with troubleshooting (attempting to locate a problem when the engine is not performing satisfactorily). In many cases, these two areas will overlap, because many times a minor or major tune-up will correct the malfunction and return the system to normal operation.

The following list is a suggested sequence of tasks to perform during a tune-up.

- Perform a compression check of each cylinder.
- Inspect the spark plug for determine their condition. Test for adequate spark at the plug.
- Start the engine and check the water flow through the engine.
- Check the gear oil in the lower unit.
- Check the carburetor adjustments and the need for an overhaul.
- Check the fuel pump for adequate performance and delivery.
- Perform a general inspection of the ignition system.
- Check the starter motor and the solenoid, if so equipped.
- Check the internal wiring.
- Check the timing and synchronization.

Compression Check

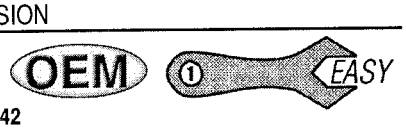
GENERAL INFORMATION

Cylinder compression test results are extremely valuable indicators of internal engine condition. The best marine mechanics automatically check an engine's compression as the first step in a comprehensive tune-up. Obviously, it is useless to try to tune an engine with extremely low or erratic compression readings, since a simple tune-up will not cure the problem.

The pressure created in the combustion chamber may be measured with a gauge that remains at the highest reading it measures during the action of a one-way valve. This gauge is inserted into the spark plug hole. A compression test will uncover many mechanical problems that can cause rough running or poor performance.

If the powerhead shows any indication of overheating, such as discolored or scorched paint, inspect the cylinders visually through the transfer ports for possible scoring. It is possible for a cylinder with satisfactory compression to be scored slightly. Also, check the water pump. A faulty water pump may cause the overheating condition.

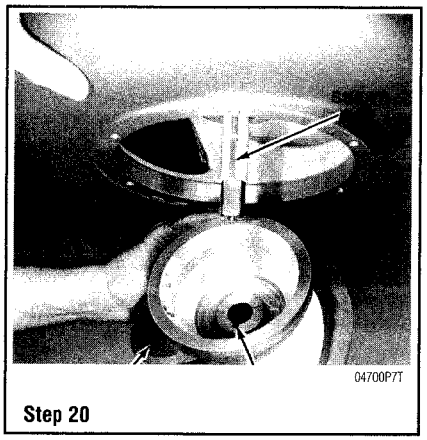
CHECKING COMPRESSION



◆ **See Figures 40, 41 and 42**

Prepare the engine for a compression test as follows:

1. Run the engine until it reaches operating temperature. If the test is performed on a cold engine, the readings will be considerably lower than normal, even if the engine is in perfect mechanical condition.
2. Label and disconnect the spark plug wires. Always grasp the molded cap and pull it loose with a twisting motion to prevent damage to the connection.
3. Clean all dirt and foreign material from around the spark plugs, and then remove all the plugs. Keep them in order by cylinder for later evaluation.
4. Ground the spark plug leads to the engine to render the ignition system inoperative while performing the compression check.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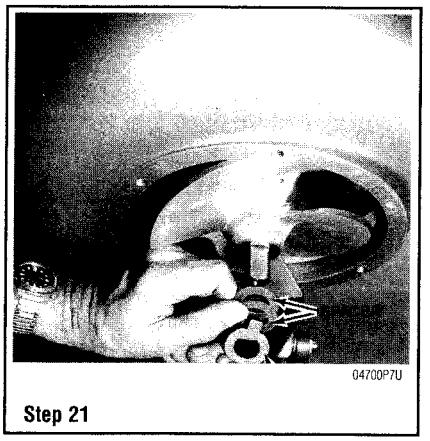
Step 20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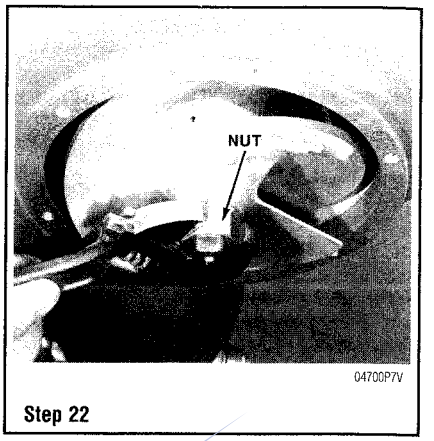
Step 21



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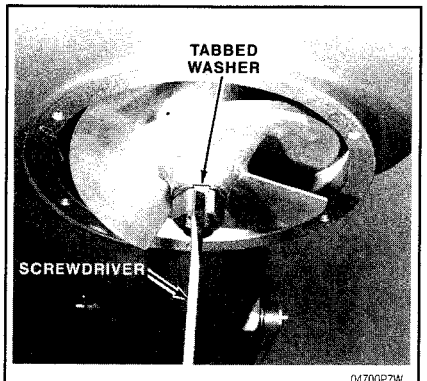
Step 22



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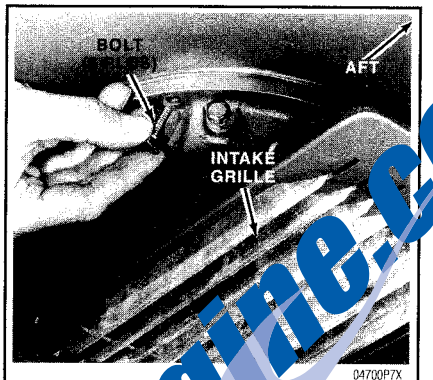
Step 23



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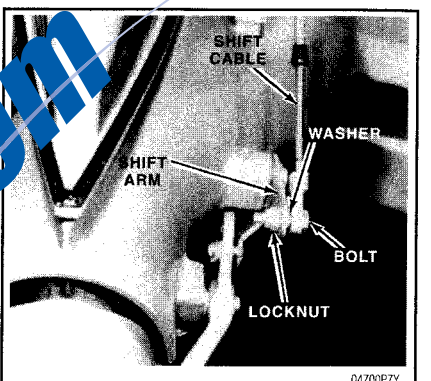
Step 24



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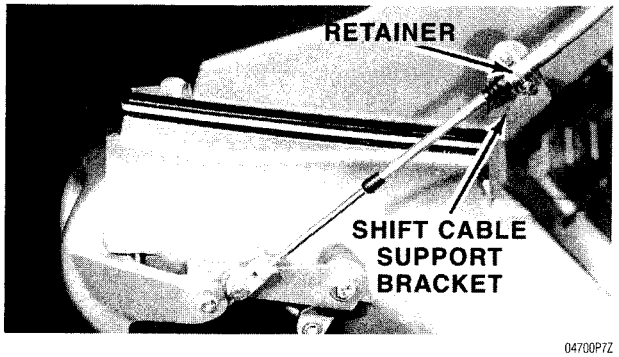
Step 25

20. Slide the jet impeller up onto the driveshaft, with the groo[ve] impeller collar indexing over the shear key.
21. Place the remaining spacers over the driveshaft.
22. Tighten the nut to a torque value of 17 ft. lbs. (23[Nm]). [Make sure] two tabs on the tabbed washer aligns with the sides [of] and washer. Invert the tabbed washer. Turning th[e] tabs [will] change the tabs by approximately 15°. Install and tighten [the] to the required torque value. The tabbed washer is designed to align [with] in one of the two positions described.
23. Bend the tabs up against [the] nut to prevent the nut from backing off and becoming loose.
24. Install the intake gri[lle] housing with the slots facing aft. Install and tighten the six [bo]lts. Tighten ¼ in. bolts to a torque value of 5 ft. lbs. (7Nm). Tighten [¾] in. bolts to 11 ft. lbs. (15Nm).
25. Slide the bolt through the [e]nd of the shift cable, washer and into the shift arm. Install the locknut onto the bolt and tighten the bolt securely.
26. Install the shift cable against the shift cable support bracket and secure it in place with the two bolts.



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Step 26

ADJUSTMENT

Cable Alignment And Free Play

See Figs. 51 and 52

1. Move the shift lever downward into the forward position. The leaf spring should snap over on top of the lever to lock it in position.
2. Remove the locknut, washer and bolt from the threaded end of the shift cable. Push the reverse gate firmly against the rubber pad on the underside of the jet drive housing.

Check to be sure the link between the reverse gate and the shift arm is hooked into the LOWER hole on the gate.

Hold the shift arm up until the link rod and shift arm axis form an imaginary straight line, as indicated in the accompanying illustration. Adjust the length of the shift cable by rotating the threaded end, until the cable can be installed back onto the shift arm without disturbing the imaginary line. Pass the nut through the cable end, washer and shift arm. Install and tighten the locknut.

Neutral Stop Adjustment

See Figures 53, 54, and 55

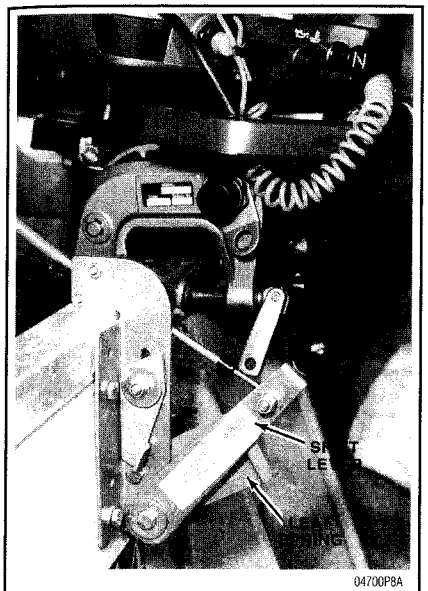
In the forward position, the reverse gate is neatly tucked underneath and clear of the exhaust jet stream.

In the reverse position, the gate swings up and blocks the jet stream deflecting the water in a forward direction under the jet housing to move the boat sternward.

In the neutral position, the gate assumes a happy medium—a balance between forward and reverse when the powerhead is operating at IDLE speed. Actually, the gate is deflecting some water to prevent the boat from moving forward, but not enough volume to move the boat sternward.

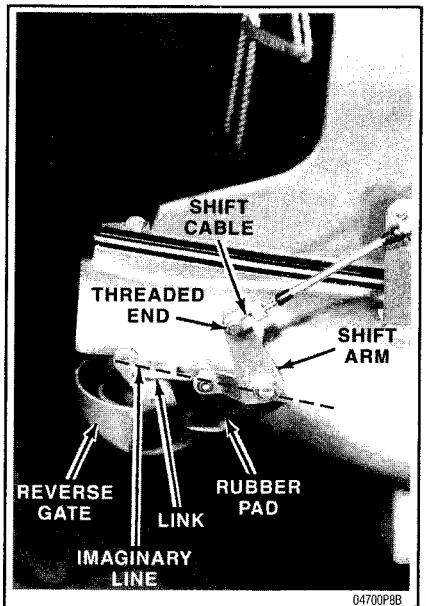
⁂ WARNING

The gate must be properly adjusted for safety of boat and passengers. Improper adjustment could cause the gate to swing up to the



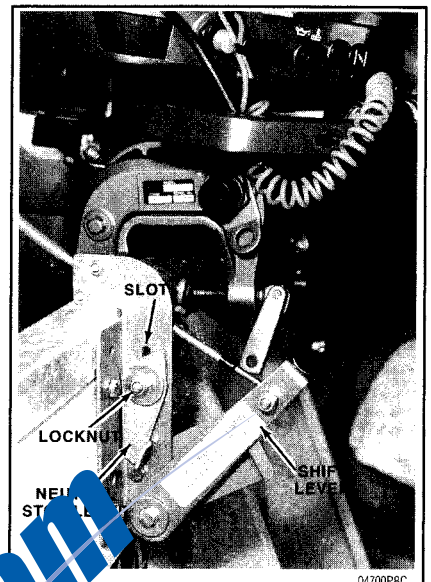
04700P8A

Fig. 51 Move the shift lever downward into the forward position. The leaf spring should snap over on top of the lever to lock it in position



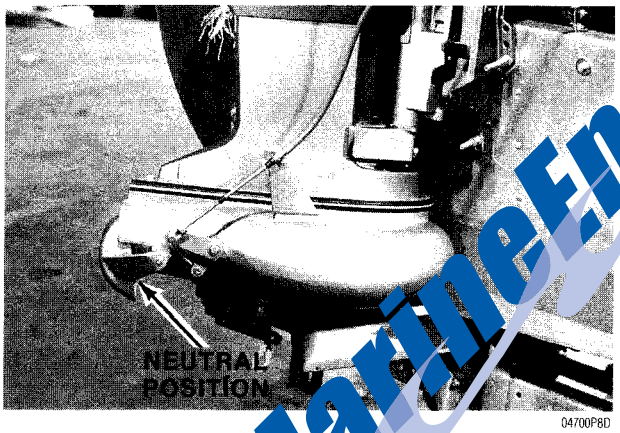
04700P8B

Fig. 52 Remove the locknut, washer and bolt from the threaded end of the shift cable



04700P8C

Fig. 53 Loosen, but do not remove the locknut on the neutral stop lever. Check to be sure the lever will slide up and down along the slot in the shift lever bracket



04700P8D

Fig. 54 Start the powerhead and allow it to operate only at IDLE speed. With the neutral stop lever in the down position, move the shift lever until the jet stream forces on the gate are balanced. Balanced means the water discharged is divided in both directions and the boat moves neither forward nor sternward. The gate is then in the neutral position with the powerhead at idle speed

2. Start the powerhead and allow it to operate only at IDLE speed. With the neutral stop lever in the down position, move the shift lever until the jet stream forces on the gate are balanced. Balanced means the water discharged is divided in both directions and the boat moves neither forward nor sternward. The gate is then in the neutral position with the powerhead at idle speed.

3. Move the neutral stop lever up against the shift lever until the stop lever barely makes contact with the shift lever. Tighten the locknut to maintain this new adjusted position. Shut down the powerhead.

➡**The reverse gate may not swing to the full up position in reverse gear after the previous steps have been performed. Do not be concerned. This condition is acceptable, because water pressure in reverse will close the gate fully under normal operation.**

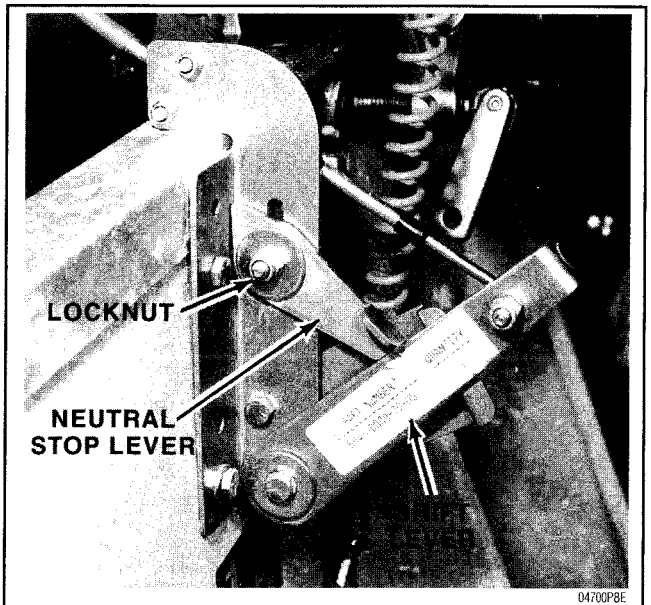
reverse position while the boat is moving forward causing serious injury to boat or passengers.

1. Loosen, but do not remove the locknut on the neutral stop lever. Check to be sure the lever will slide up and down along the slot in the shift lever bracket.

➡**The following procedure must be performed with the boat and jet drive in a body of water. Only with the boat in the water can a proper jet stream be applied against the gate for adjustment purposes.**

⁂ CAUTION

Water must circulate through the lower unit to the powerhead anytime the powerhead is operating to prevent damage to the water pump in the lower unit. Just five seconds without water will damage the water pump impeller.



04700P8E

Fig. 55 Move the neutral stop lever up against the shift lever until the stop lever barely makes contact with the shift lever. Tighten the locknut to maintain this new adjusted position. Shut down the powerhead

➡Overhaul procedures for the tilt cylinder is confined to removal of the end cap, removing the piston and replacing the O-rings. A pin wrench or spanner wrench is required to remove the end cap. Even with the tool, removal of the end cap is not a simple task. The elements, especially if the unit has been used in a salt water atmosphere, will have their corrosive affect on the threads. Any attempt to break the end cap loose may very likely elongate the two holes provided for the wrench. Once the holes are damaged, all hope of removing the end are lost. The only solution in such a case is to replace the cylinder as a unit.

Tilt Switch

Complete diagnosis, testing and servicing procedures for the tilt switch are located in the "Remote Control" section of this manual.

POWER TRIM/TILT

Description and Operation

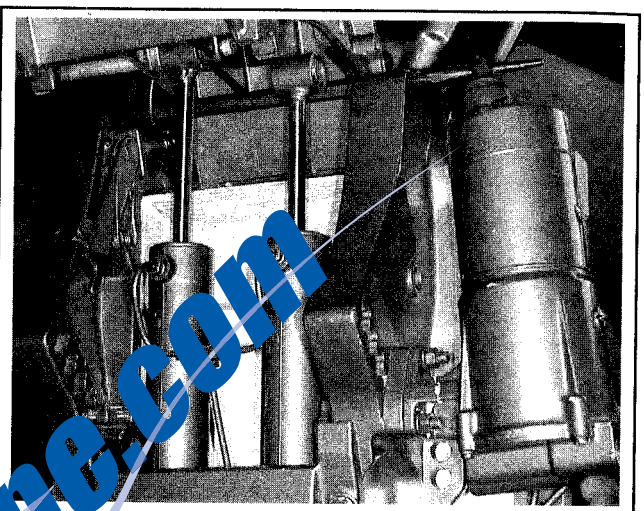
◗ See Figures 8, 9 and 10

The power trim/tilt systems consist of a housing with an electric motor, gear driven hydraulic pump, hydraulic reservoir and at least two trim/tilt cylinders. The cylinders perform a double function as trim/tilt cylinders and also as a shock absorbers, should the lower unit strike an underwater object while the boat is underway.

The necessary valves, check valves, relief valves, and hydraulic passageways are incorporated internally and externally for efficient operation. A manual release valve is provided to permit the outboard unit to be raised or lowered should the battery fail to provide the necessary current to the electric motor or if a malfunction should occur in the hydraulic system.

The gear driven pump operates in much the same manner as an oil circulation pump installed on motor vehicles. The gears rotate in either direction, depending on the desired cylinder movement. One side of the pump is considered the suction side, and the other the pressure side, when the gears rotate in a given direction. These sides are reversed, the suction side becomes the pressure side and the pressure side becomes the suction side when gear movement is changed to the opposite direction.

Depending on the model, up to two relays may be used for the electric motor. The relays are usually located at the bottom cowling pan, where they are fairly well protected from moisture.



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Typical external pump power trim/tilt system. The pump is mounted to the stern bracket and the cylinders (left) are positioned under the outboard

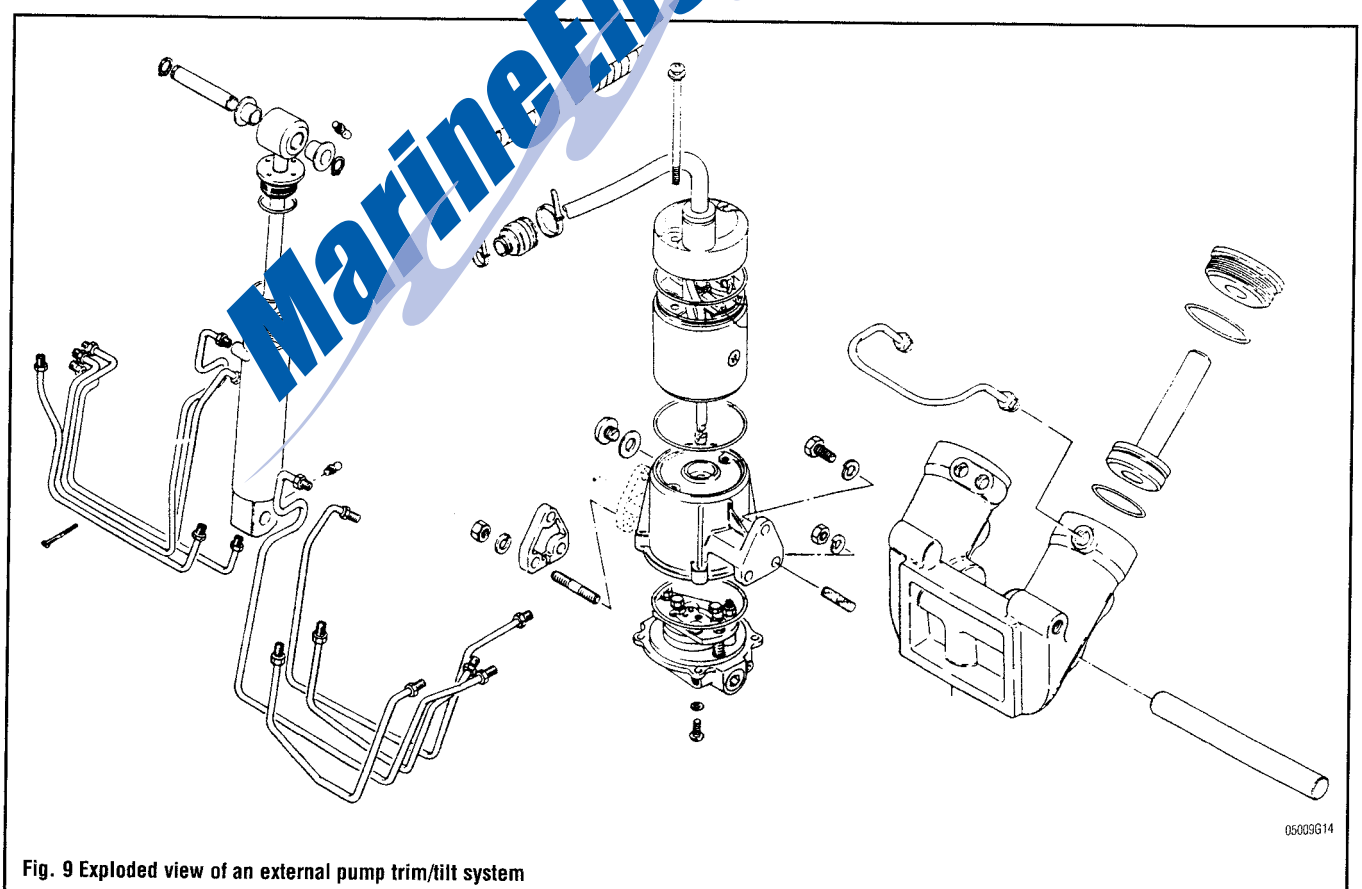

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Fig. 9 Exploded view of an external pump trim/tilt system

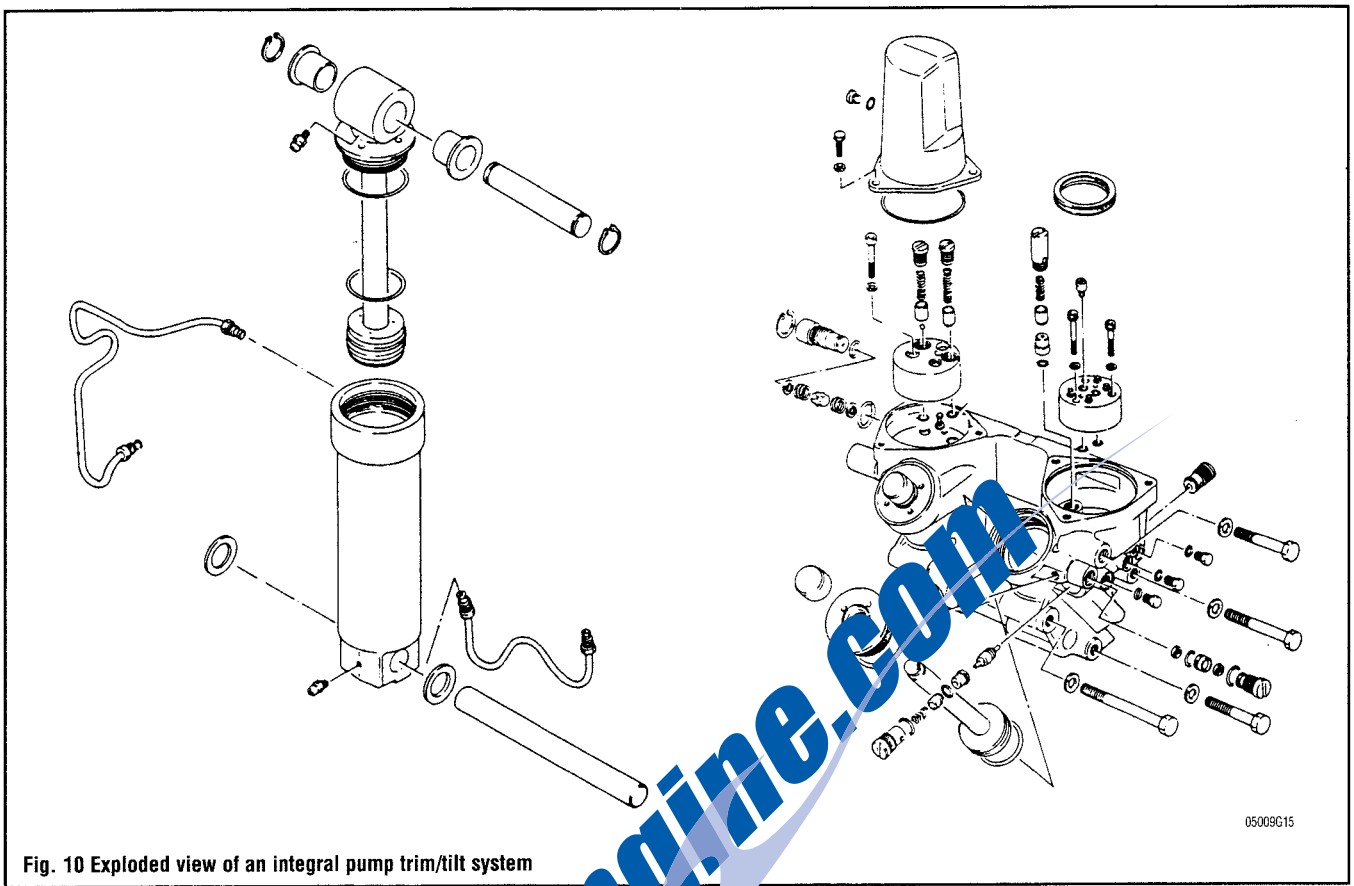

Fig. 10 Exploded view of an integral pump trim/tilt system

➡As a convenience, on some models an auxiliary trim/tilt switch is installed on the exterior cowling.

When the up portion of the trim/tilt switch is depressed, the up circuit through the relay, is closed and the electric motor rotates in a clockwise direction. Pressurized oil from the pump passes through a series of valves to the lower chamber of the trim cylinders, the pistons are extended and the outboard unit is raised. The fluid in the upper chamber of the pistons is routed back to the reservoir as the piston is extended. When the desired position for trim is obtained, the switch on the control handle is released and the outboard is held stationary.

If the trim cylinder pistons should become fully extended, such as in a tilt up situation, fluid pressure in the lower chamber of the trim cylinders increases. This increase in pressure opens an up relief valve and the fluid is routed to the reservoir. The sound of the electric motor and the pump will have a noticeable change.

When the down portion of the trim/tilt switch is depressed, the down circuit, through the relay, is closed and the electric motor rotates in a counterclockwise direction. The pressure side of the pump now becomes the suction side and the original suction side becomes the pressure side. Pressurized oil from the pump passes through a series of valves to the upper chamber of the trim cylinders, the pistons are retracted and the outboard unit is lowered. The fluid in the lower chamber of the pistons is routed back to the reservoir as the retracted is extended. When the desired position for trim is obtained, the switch on the control handle is released and the outboard is held stationary.

If the trim cylinder pistons should become fully retracted, such as in a tilt down situation, fluid pressure in the upper chamber of the trim cylinders increases. This increase in pressure opens an up relief valve and the fluid is routed to the reservoir. The sound of the electric motor and the pump will have a noticeable change.

In the event the outboard lower unit should strike an underwater object while the boat is underway, the tilt piston would be suddenly and forcibly extended, moved upward. For this reason, the lower end of the tilt piston is capped with a free piston. This free piston normally moves up and down with the tilt piston.

The free piston also moves upward but at a much slower rate than the tilt piston. The action of the tilt piston separating from the free piston causes two actions. First, the hydraulic fluid in the upper chamber above the piston is compressed and pressure builds in this area. Second, a vacuum is formed in the area between the tilt piston and the free piston.

This vacuum in the area between the two pistons sucks fluid from the upper chamber. The fluid fills the area slowly and the shock of the lower unit striking the object is absorbed. After the object has been passed the weight of the outboard unit tends to retract the piston. The fluid between the tilt piston and the free piston is compressed and forced through check valves to the reservoir until the free piston reaches its original neutral position.

A manual relief valve, located on the stern bracket, allows easy manual tilt of the outboard should electric power be lost. The valve opens when the screw is turned counterclockwise, allowing fluid to flow through the manual passage. When the relief valve screw is turn fully clockwise, the manual passage is closed and the outboard lock in position.

A thermal valve is used to protect the trim/tilt motor and allow it to maintain a designated trim angle. Oil in the upper chamber is pressurized when force is applied to the outboard from the rear while cruising. Oil is directed through the right side check valve and activates the thermal valve to release oil pressure and lessen the strain on the motor and pump.

Troubleshooting the Power Trim/Tilt System

Any time a problem develops in the power trim/tilt system the first step is to determine whether it is electrical or hydraulic in nature. After the determination is made, then the appropriate steps can be taken to remedy the problem.

The first step in troubleshooting is to make sure all the connectors are properly plugged in and that all the terminals and wires are free of corrosion. The simple act of disconnecting and connecting a terminal may sometimes loosen corrosion that preventing a proper electrical connection. Inspect each terminal carefully and coat each with dielectric grease to prevent corrosion.

The next step is to make sure the battery is fully charged and in good condition. While checking the battery, perform the same maintenance on the battery cables as you did on the electrical terminals. Disconnect the cables (negative side first), clean and coat them and then reinstall them. If the battery is past its useful life, replace it. If it only requires a charge, charge it.

Check the power trim/tilt fuse (as appropriate). Many systems will have a