■ **Remember, a liquid will expand if it is heated and will contract if cooled. Such expansion and contraction will cause a definite change in the specific gravity of the liquid, in this case the electrolyte.**

A quality hydrometer will have a thermometer/temperature correction table in the lower portion, as illustrated in the accompanying illustration. By measuring the air temperature around the battery and from the table, a correction factor may be applied to the specific gravity reading of the hydrometer float. In this manner, an accurate determination may be made as to the condition of the battery.

When using a hydrometer, pay careful attention to the following points:

1. Never attempt to take a reading immediately after adding water to the battery. Allow at least 1/4 hour of charging at a high rate to thoroughly mix the electrolyte with the new water. This time will also allow for the necessary gases to be created.
2. Always be sure the hydrometer is clean inside and out as a precaution against contaminating the electrolyte.
3. If a thermometer is an integral part of the hydrometer, draw liquid into it several times to ensure the correct temperature before taking a reading.
4. Be sure to hold the hydrometer vertically and suck up liquid only until the float is free and floating.
5. Always hold the hydrometer at eye level and take the reading at the surface of the liquid with the float free and floating.
6. Disregard the slight curvature appearing where the liquid rises against the float stem. This phenomenon is due to surface tension.
7. Do not drop any of the battery fluid on the boat or on your clothing, because it is extremely caustic. Use water and baking soda to neutralize any battery liquid that does accidentally drop.
8. After drawing electrolyte from the battery cell until the float is barely free, note the level of the liquid inside the hydrometer. If the level is within the charged (usually green) band range for all cells, the condition of the battery is satisfactory. If the level is within the discharged (usually white) band for all cells, the battery is in fair condition.
9. If the level is within the green or white band for all cells except [illegible] which registers in the red, the cell is shorted internally. No amount of charging will bring the battery back to satisfactory condition.
10. If the level in all cells is about the same, even if it falls [illegible] band, the battery may be recharged and returned to service. If it fails to rise above the red band after charging, the only solution is to replace the battery.

STORAGE

EASY

If the boat is to be laid up [illegible] for the winter or for more than a few weeks, special [illegible] to the battery to prevent complete discharge and/or damage to the terminals and wiring. Before putting the boat in storage, disconnect and remove the batteries. Clean them thoroughly of any dirt or corrosion and then charge them to full specific gravity readings. After they are fully charged, store them in a clean cool dry place where they will not be damaged or knocked over, preferably on a couple blocks of wood. Storing the battery up off the deck, will permit air to circulate freely around and under the battery and will help to prevent condensation.

Never store the battery with anything on top of it or cover the battery in such a manner as to prevent air from circulating around the filler caps. All batteries, both new and old, will discharge during periods of storage, more so if they are hot than if they remain cool. Therefore, the electrolyte level and the specific gravity should be checked at regular intervals. A drop in the specific gravity reading is cause to charge them back to a full reading.

In cold climates, care should be exercised in selecting the battery storage area. A fully charged battery will freeze at about 60°F (17°C) below zero. The electrolyte of a discharged battery, almost dead, will begin forming ice at about 19°F (-7°C) above zero.

■ **For more information on batteries and the engine electrical systems, please refer to the Ignition and Electrical section of this manual.**

Fiberglass Hull

INSPECTION AND CARE

EASY

◆ **See Figures 96, 97 and 98**

Fiberglass reinforced plastic hulls are tough, durable and highly resistant to impact. However, like any other material they can be damaged. One of the advantages of this type of construction is the relative ease with which it may be repaired.

A fiberglass hull has almost no internal stresses. Therefore, when the hull is broken or stove-in, it retains its true form. It will not dent to take an out-of-shape set. When the hull sustains a severe blow, the impact will be either absorbed by deflection of the laminated panel or the blow will result in a definite, localized break. In addition to hull damage, bulkheads, stringers and other stiffening structures attached to the hull may also be affected and therefore, should be checked. Repairs are usually confined to the general area of the rupture.

■ **The best way to care for a fiberglass hull is to wash it thoroughly, immediately after [illegible] boat while the hull is still wet.**

A foul bottom [illegible] affect boat performance. This is one reason why racers, large and small, both powerboat and sail, are constantly giving attention to the condition of the hull below the waterline.

In areas where marine growth is prevalent, a coating of vinyl, anti-fouling bottom paint should be applied if the boat is going to be left in the water for extended periods of time such as all or a large part of the season. If growth has developed on the bottom, it can be removed with a diluted solution of muriatic acid applied with a brush or swab and then rinsed with clear water. Always wear rubber gloves when working with Muriatic acid and take extra care to keep it away from your face and hands. The fumes are toxic. Furthermore, work in a well-ventilated area, or if outside, keep your face on the windward side of the work.

■ **If marine growth is not too severe you may avoid the unpleasantness of working with muriatic acid by trying a powerwasher instead. Most marine vegetation can be removed with pressurized water and a little bit of scrubbing using a rough sponge (don't use anything that will scratch or damage the surface).**

Barnacles have a nasty habit of making their home on the bottom of boats that have not been treated with anti-fouling paint. Actually they will not harm the fiberglass hull but can develop into a major nuisance.

Fig. 96 The best way to care for a fiberglass hull is to wash it thoroughly

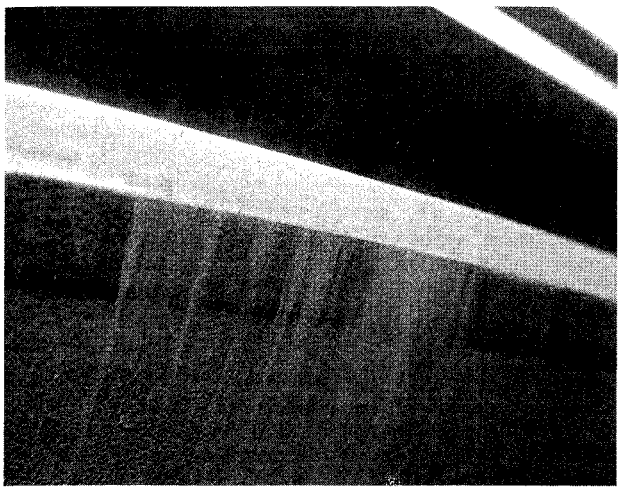


Fig. 97 If marine growth is a problem, apply a coating of anti-foul bottom paint

Fig. 98 Fiberglass, vinyl a... ...ber care products, like those from Meguiar's protect your b...

If barnacles or other crustaceans have attached themselves to the hull, extra work will be required to bring the bottom back to a satisfactory condition. First, if practical, put the boat into a body of fresh water and allow it to remain for a few days. A large percentage of the growth can be removed in this m... ...s remedy is not possible, wash the bottom thoroughly with ...gh-... ...ure fresh water source and use a scraper. Small particles ... ...shell may still hold fast. These can be removed with sandpa...

TUNE-UP

Introduction

A proper tune-up is the key to long and trouble-free outboard life and th... work can yield its own rewards. Studies have shown that a properly t... and maintained outboard can achieve better fuel economy tha... o... tune engine. As a conscientious boater, set aside a Saturday ... ...ing, once a month, to check or replace items that could cause majo... ...den later. Keep your own personal log to jot down which servi... ...d, ...me, how much the parts cost you, the date and the number o... engine at the time. Keep all receipts for such items a... that they may be referred to in case of related ...ro...ms ...to ...ter... operating expenses. These receipts are the o... ...o... ...e that the required maintenance was performed. In th... ...e ...ar...nty problem on newer engines, these receipts will be inva... ...e.

The efficiency, reliability, fuel eco... ...an... ...oyme... available from boating are all directly depend... ...on ... ...outboard tuned properly. The importance of performin... ...e ...h... ...r... ...oper sequence cannot be over emphasized. Befo... ...n... ...just...nts, check the specifications. Never rely o... ...on... ...hen making critical adjustments.

Before tuning any outboa... ...re it has satisfactory compression. An outboard with worn or broken p... ...on rings, burned pistons or scored cylinder walls, will not perform properly no matter how much time and expense is spent on the tune-up. Poor compression must be corrected or the tune-up will not give the desired results.

The extent of the engine tune-up is usually dependent on the time lapse since the last service. 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 of this manual containing the appropriate instructions.

Tune-Up Sequence

A tune-up can be defined as pre-determined series of procedures (adjustments, tests and replacement of worn components) that are performed to bring the engine operating parameters back to original condition (or as near original as possible). The series of steps are important, as the later procedures (especially adjustments) are dependant upon the earlier procedures. In other words, a procedure is performed only when subsequent steps would not change the result of that procedure (this is mostly for adjustments or settings that would be incorrect after changing ...e, par... or setting). For instance, fouled or excessively worn spark ...g... m... affect engine idle. If adjustments were made to the idle speed or ...**before** these plugs were cleaned or replaced, the idle speed or m... ...e might be wrong after replacing the plugs. The possibilities of such an e... ...t become much greater when dealing with multiple adjustments such as timing, idle speed and/or idle mixture. Therefore, be sure to follow each of the steps given here. Since many of the steps listed here are full procedures in themselves, refer to the procedures of the same name in this section for details.

A complete pre-season tune-up should be performed at the beginning of each season or anytime a motor is removed from storage. Operating conditions, amount of use and the frequency of maintenance required by your motor may make one or more additional tune-ups necessary during the season. Perform additional tune-ups as use dictates.

■ **Under normal conditions a tune-up is expected about every 100 hours of operation. Excessive idle or wide-open throttle operation, use of poor quality engine oil or fuels, or other variables may necessitate shortening that timeframe.**

1. Before starting, inspect the motor thoroughly for signs of obvious leaks, damage and loose or missing components. Make repairs, as necessary.

2. If Evinrude/Johnson Carbon Guard of equivalent is not used consistently with each fill-up, remove carbon from the pistons and combustion chamber after every 50 hours of operation. Refer to the Decarboning the Pistons in this section.

■ **Although the service literature and owners manuals do not specifically mention it, every dealer we've talked to felt that the use of Carbon Guard was unnecessary when using FICHT RAM oil with CarbX® combustion cleaner.**

3. Perform a compression check to make sure the motor is mechanically ready for a tune-up. An engine with low compression on one or more cylinder should be overhauled, not tuned. A tune-up will not be successful without sufficient engine compression. Refer to the Compression Test in this section.

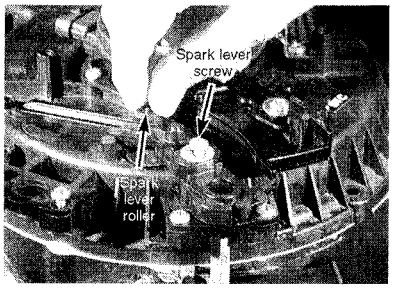


Fig. 137 Loosen the spark lever screw and push the roller away from the cam...

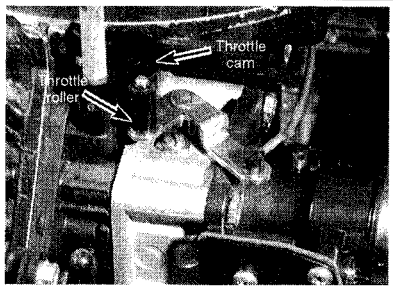


Fig. 138 ...then make sure the throttle cam and cam roller are not touching

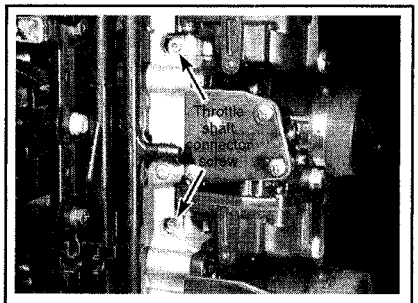


Fig. 139 Throttle shaft connector screws-V6 shown (V4 uses one on each side)

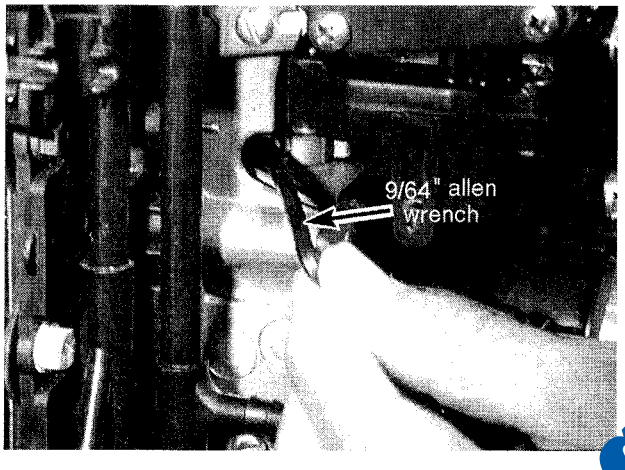


Fig. 140 Use a 9/64 in. hex key or driver to loosen/tighten the throttle shaft connector screws

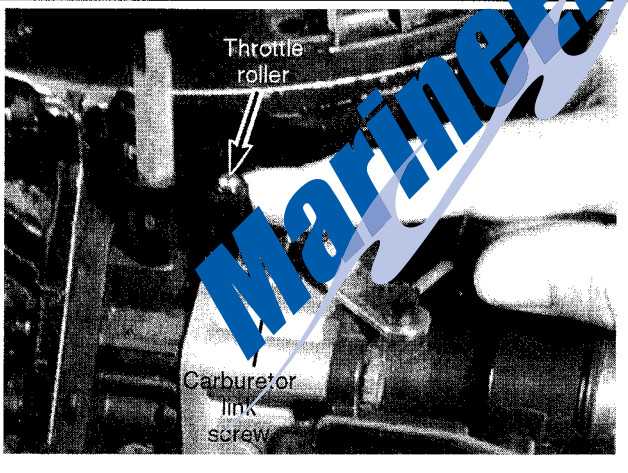


Fig. 141 Light pressure on the roller should hold the throttle plates/linkage closed while tightening the shaft connector and link screws

6. Close all carburetor throttle plates and then tighten the throttle shaft screws.

■ **A second set of hands will be helpful to apply light pressure to the throttle plates, ensuring that they remain closed while the connector and link screws are tightened.**

7. With all of the throttle plates closed and the shaft screws tightened, carefully tighten the carburetor link screw (still supporting the linkage in position as it is tightened).

8. Leave the spark lever screw loose so the Idle Timing can be properly set. Follow the Idle Timing procedure in this section.

Idle Timing

◆ **See Figure 142, 143, 144, 145 and 146**

Idle timing must be set statically using the special Evinrude/Johnson Ignition Analyzer (from the Evinrude/Johnson Ignition Test Kit # 434017) in conjunction with a timing light. We've talked to a number of people who've attempted to make the adjustments dynamically or without the analyzer and most attempts have failed. Therefore, we cannot, in good conscience, instruct you to try. Do your best to get your hands on the Ignition Analyzer and follow the instructions we've provided here.

For proper idle timing specifications, please refer to the Tune-Up Specifications chart.

1. On electric start models, remove the regulator/rectifier cover for access.

2. Disengage the timing sensor plug from the top of the motor, next to the flywheel. Connect the Evinrude/Johnson Ignition Analyzer from the Ignition Test Kit No. 434017 to the timing sensor. Connect the Analyzer to a 12-volt power source (such as a well-charged marine or automotive battery).

■ **Set the Ignition Analyzer switch to position B for V4 motors or to position A for V6 motors.**

3. Loosen the timer base detent screw, then move both the inner and outer detent tabs completely forward on the detent plate.

4. Verify that the timer base lever is against the stop on the flywheel cover (you'll find the base lever and stop just under the perimeter of the flywheel, next to the base detent screw).

5. Using a socket, slowly rotate the crankshaft (CLOCKWISE when viewed from above) until the timing pointer aligns with the idle timing specification. (Idle timing is generally about 4° ATDC for V4 motors and 6° ATDC for V6 motors, but please refer to the Tune-Up Specifications chart to find the spec for your particular motor.)

6. Now, to adjust the idle timing, hold the timing wheel in position and hold the INSIDE detent tab in position against the stop, while you move the detent plate forward until the Ignition Analyzer **CYL** light goes off.

7. Mark the location of the inside detent tab on the detent plate (in case the plate becomes moved during the next procedure), but leave the timer base detent screw loose for the Maximum Spark Advance adjustment, which should be performed next.

■ **This idle timing procedure should provide optimum idle performance, including the maintenance of an idle speed in the specified range of 600-700 rpm, but will vary somewhat with propeller selection. If idle speed is too high after adjustment, check the intake system for air leaks. If idle speed is too low and all other engine systems/components are operating properly, try decreasing the idle timing by one or two degrees (say from 6° ATDC on V6 motors, to 4° ATDC) in order to increase idle speed. If however, idle speed is inconsistent or the engine runs rough or spits, and no problems can be found, suspect an incorrect carburetor mixture problem, refer to Carburetor Initial Low Speed Setting adjustment in the Fuel System section.**

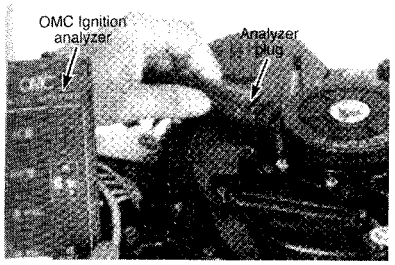


Fig. 142 Connect the Ignition Analyzer to the timing sensor

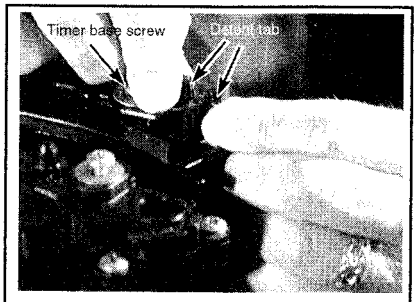


Fig. 143 Loosen the base screw and slide the detent tabs forward...

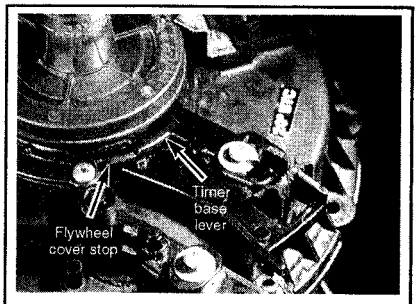


Fig. 144 ...ensure timer base lever is against the cover stop

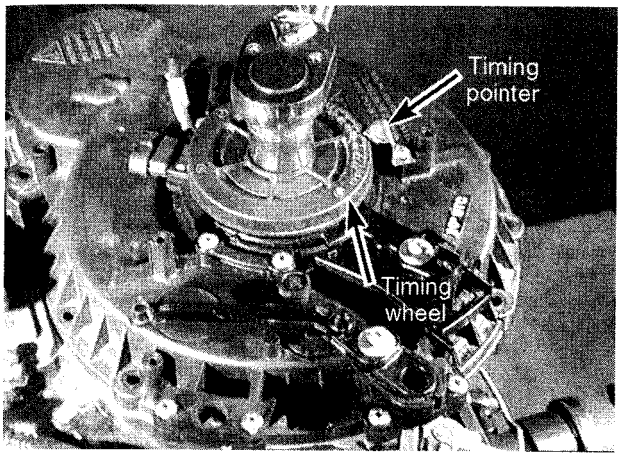
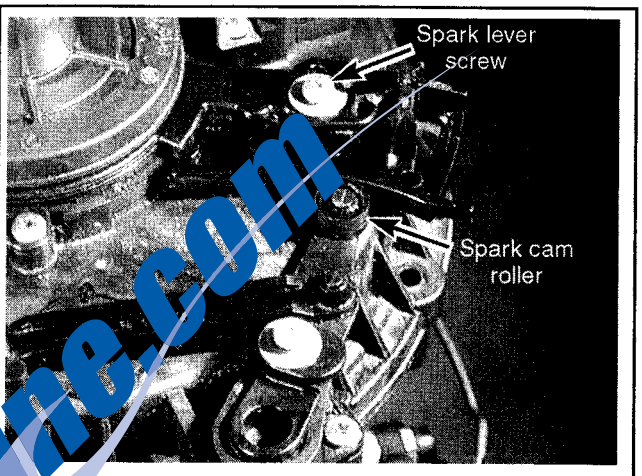


Fig. 145 Rotate the flywheel to align the pointer with the idle timing spec...



Use the spark lever to move the spark cam to the WOT p...on

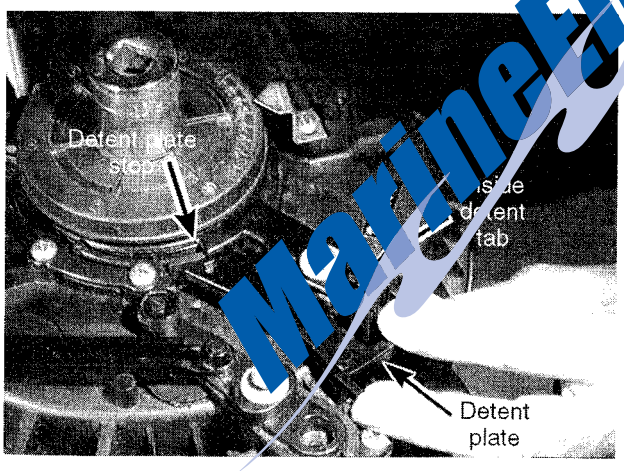


Fig. 146 ...and then slide the detent plate forward until the Analyzer CYL light goes out

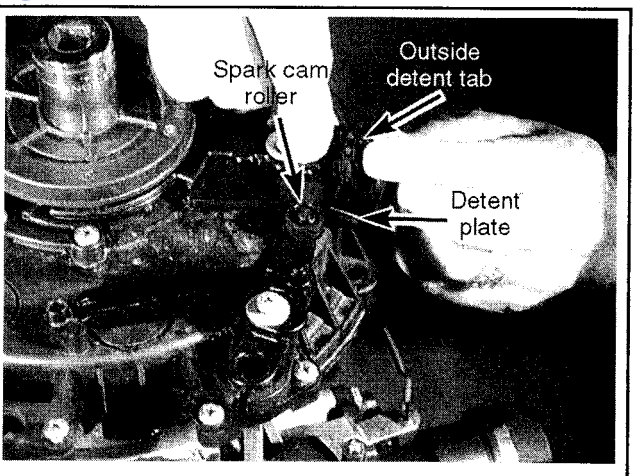


Fig. 148 Adjust max spark advance by moving the OUTSIDE detent tab until the CYL light goes out on the analyzer

Maximum Spark Advance

◆ **See Figures 147, 148 and 149**

Idle timing must be performed statically using the special Evinrude/Johnson Ignition Analyzer (from the Evinrude/Johnson Ignition Test Kit # 434017) is necessary. We've talked to a number of people who've attempted to make the adjustments dynamically or without the analyzer and most attempts have failed. Therefore, we cannot, in good conscience, instruct you to try. It is best to get your hands on the Ignition Analyzer and follow the instructions we've provided here.

■ **For the ignition timing maximum spark advance specifications, please refer to the Tune-Up Specifications chart.**

1. The spark lever screw should still be loose from the Throttle Plate Synchronization and Idle Timing adjustment procedures. But, if necessary, re-loosen it.
2. Using the spark lever, manually advance the spark cam to the Wide-Open-Throttle (WOT) position.
3. With the Evinrude/Johnson Ignition Analyzer still connected to the timing sensor and the base detent screw still loosened from the Idle Timing procedure, slowly rotate the crankshaft (CLOCKWISE when viewed from above), until the timing pointer aligns with the maximum ignition timing specification.

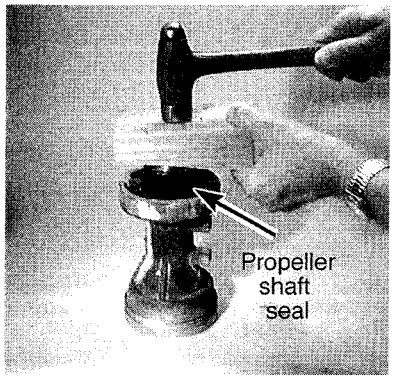


Fig. 114 Carefully drive the seal(s) into position

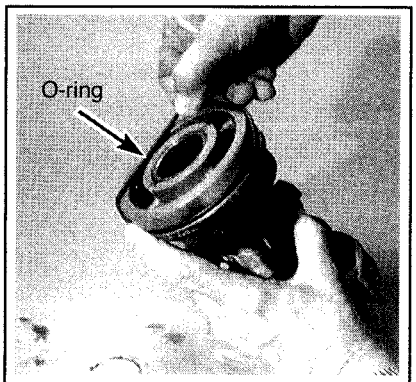


Fig. 115 Grease and install the NEW housing O-ring(s)

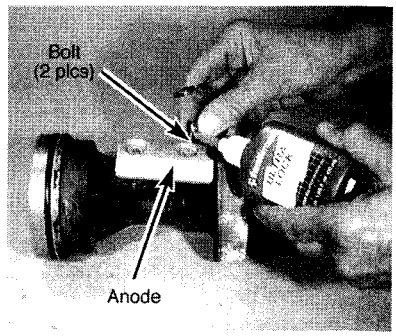


Fig. 116 Check the anode for wear and replace, if necessary

Fig. 117 Install the reverse gear, thrust bearing and thrust washer (some models also use a small thrust washer on the front face of the reverse gear)

3. Apply a coating of Evinrude/Johnson Triple Guard Grease or equivalent to the needle bearing.

4. Some models cover the metal with have a single-double lip seal and others will have two single lip seals installed back-to-back. One seal lip is used to prevent gear lubricant from escaping and the other seal lip is to prevent water from entering.

■ **Apply a coating of Evinrude/Johnson Triple Guard Grease to the inside (spring side), surface of all seals. When installing double-lipped seals, apply a light coating of outboard lubricant to the seal casing in order to ease installation. When installing metal-cased dual back-to-back seals, apply a light coating of Evinrude/Johnson Gasket Sealing Compound or equivalent sealant to the outside case surface of the seal.**

5. Prepare the seal(s) for installation using oil (single seal) or sealant (dual back-to-back seals), as applicable.

■ **A suitably sized seal installer is necessary to tap the seal into position. In some cases a smooth socket or block of wood can be substituted, but only if the seal lips will not be damaged. Obviously, the tool will only work if it allows the seal to seat fully (a block of wood won't work alone for the lower seal in a dual seal arrangement). The manufacturer recommends various Evinrude/Johnson Seal Installers, depending upon the model as follows:**

- V4 # 326551 for dual back-to-back seals or # 342665 for dual-lipped (extended lip) seals.
- V6/V8 # 336311 for dual back-to-back seals or # 341439 for dual-lipped (extended lip) seals.

6. Set the first seal into the housing with the lip of the seal (spring side) facing down. Tap the seal into the housing using a suitable seal installer.

7. Place the second single lip seal into the housing with the lip of the seal (spring side) facing up. Tap the seal into the housing using a wooden block or installer until the seal makes contact with the first seal.

8. Apply a coating of Evinrude/Johnson Triple Guard Grease to the New propeller shaft bearing housing O-ring(s), if used. Slip the O-ring(s) onto the O-ring(s) of the housing and into the groove(s).

9. If not done already, check the anode for wear. If the anode is worn more than 1/3 of its surface, it should be replaced. Apply a few drops of Evinrude/Johnson Ultra-Lock to the threads of the two bolts. Position the anode over the mounting boss on the bearing housing and install the bolts. Tighten the bolts securely.

10. On some models a small thrust washer is located in a recess on the front face of the reverse gear. If the model being serviced contained this washer during disassembly, apply a coating of Evinrude/Johnson Needle Bearing Assembly lube to the washer. Insert the washer into the recess on the front face of the reverse gear.

11. Coat the thrust bearing and thrust washer with gear lubricant and place them onto the hub of the reverse gear. Slide the reverse gear down the propeller shaft and index the teeth of the reverse gear with the teeth of the pinion gear.

12. Install the propeller shaft Bearing Housing using the appropriate procedure in this section. Follow either the Bearing Housing With Snap Rings and 4-Bolt Retainer or the Bearing Housing with 2-Bolt Retainers procedure, as applicable.

② MODERATE

Bearing Housing with Snap Rings and 4-Bolt Retainer-Installation

◆ **See Figures 118 thru 123**

1. Insert the retainer plate over the propeller shaft and into the lower unit against the reverse gear.

✳✳ CAUTION

The snaprings used to secure the retainer plate are spring loaded. If the ring should accidentally slip free of the Truarc pliers, the ring would travel with high speed and could possibly cause serious personal injury. Therefore, always use safety glasses or safety shield while installing the two snap rings.

2. Using a suitable pair of snapring pliers, carefully install the two snaprings to the retainer.
Be sure each ring is fully seated in the groove. Position the ends (gaps) of the snaprings at the top of the housing.

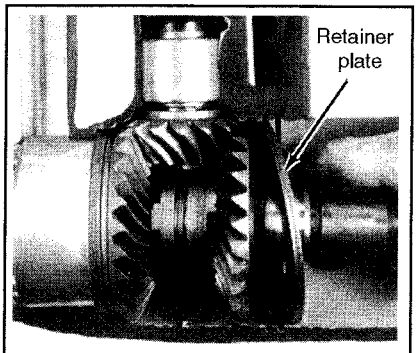


Fig. 118 Insert the retainer plate ...

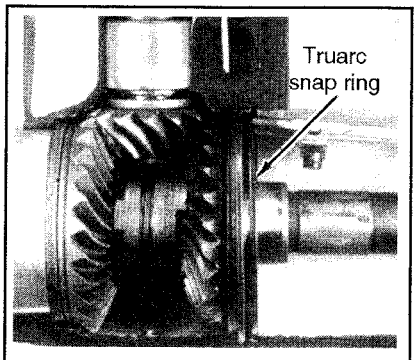


Fig. 119 ... then install the 2 snaprings

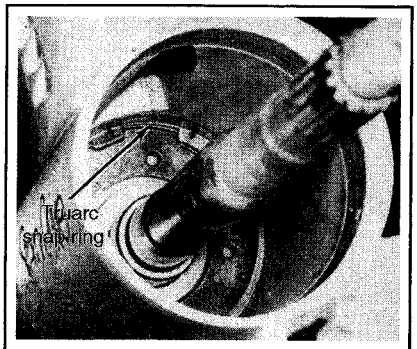


Fig. 120 Make sure the rings are secure in their grooves with their gaps on top

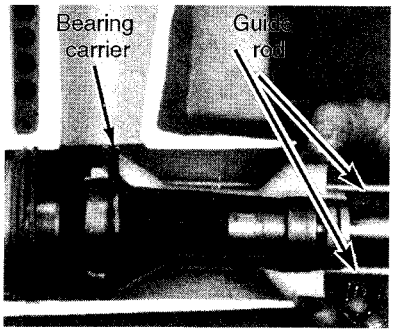


Fig. 121 Using 2 thread-all rods as guides carefully insert the bearing housing ...

Fig. 122 ... with the "UP" marking toward the powerhead

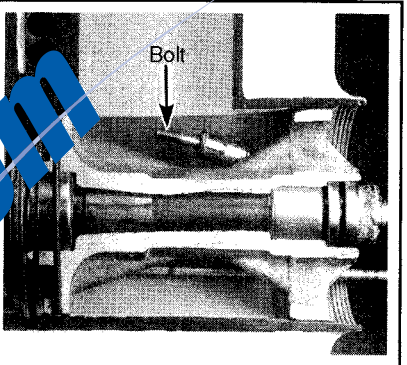


Fig. 123 Install the retaining bolts and tighten to spec

3. Obtain two 1/4 x 18-10 in. thread-all rods to be used as guide pins. Thread the two rods into opposite holes in the retainer plate for no more than two full turns.

4. Apply a coating of Evinrude/Johnson Gasket Sealing Compound to the O-ring flange and the rear support flange. Keep the needle bearings in the propeller bearing housing free of any sealant. Position the bearing housing with the word "up" at the top or 12 o'clock position facing upward toward the powerhead).

5. Slide the propeller bearing housing onto the thread-all guide pins and into the lower unit housing. Be sure the word remains at the top. Apply a coating of Evinrude/Johnson Gasket Sealing Compound to the threads of the four retaining bolts. Install the bolts loosely and remove the 2 guide pin rods. Install the remaining bolts and tighten the 4 bolts to 120-144 inch lbs. (14-16 Nm).

6. If possible, pressure test the gearcase before filling it with lubricant or returning it to service. For details refer to Pressure Testing the Gearcase, in this section.

7. If removed, install the water pump, as detailed in the Lubrication and Cooling section.

8. If the gearcase was removed for overhaul, check and adjust the Shift Rod Height, as detailed in this section, then install the Gearcase Assembly, as also detailed in this section.

② MODERATE

Bearing Housing with 2-Bolt Retainers-Installation

◆ **See Figures 124 and 125**

1. Apply a light coating of Evinrude/Johnson Gasket Sealing Compound to the O-ring flange and, except for models equipped with a gearcase lock wedge, to the rear support flange. Do not allow any sealant on the needle bearings in the propeller bearing housing.

2. Carefully slide the propeller shaft bearing housing into the lower unit with the 2 bolt holes in the housing in the vertical position and the anode facing down. Tap the housing with a soft head mallet to seat the housing and O-ring.

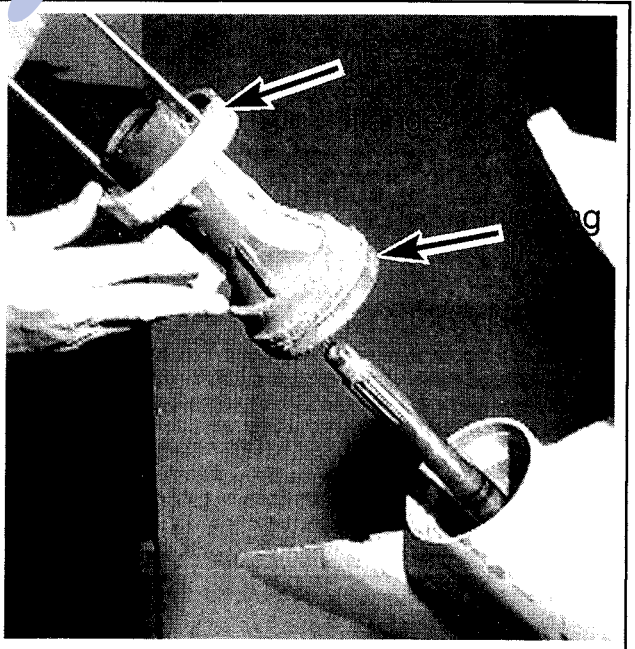


Fig. 124 Carefully insert the bearing housing to the gearcase...

3. On models equipped with a gearcase lock wedge, position the wedge in the cavity between the bearing housing and gearcase, then install the wave washer. Apply a light coating of Evinrude/Johnson Nut Lock, or equivalent threadlock to the wedge screw threads, then install and loosely tighten the screw.

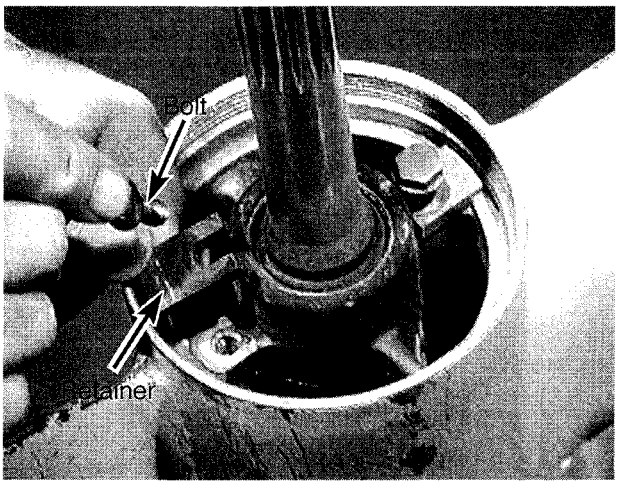


Fig. 125 ... then secure using the retainers (retainer design varies slightly with application)

4. Apply a few drops of Evinrude/Johnson Ultra Lock, or equivalent high-strength threadlock, to the threads of the 2 retainer bolts. Loosely install the retainers (this usually means placing them over the housing and into the groove of the lower unit, though designs will vary slightly), then tighten the 2 bearing housing retainer bolts to 24-26 ft. lbs. (33-35 Nm).
5. For models equipped with a gearcase lock wedge, re-loosen the 2 bearing retainer bolts about 1/4 turn each, then tighten the wedge screw to 16-18 ft. lbs. (1.8-2.0 Nm). Next, retighten the 2 bearing housing retainer bolts to 24-26 ft. lbs. (33-35 Nm) again, and recheck the torque on the wedge screw.
6. If possible, pressure test the gearcase before filling it with lubricant or returning it to service. For details, please refer to Pressure Testing the Gearcase, in this section.
7. If removed, install the water pump, as detailed in the Lubrication and Cooling section.
8. If the gearcase was removed for overhaul, check and adjust the Shift Rod Height, as detailed in this section, then install the Gearcase Assembly, as also detailed in this section.

OEM MODERATE

Pressure Testing the Gearcase

To uncover any possible problems with a newly rebuilt gearcase, or an overlooked problem on a gearcase that was not completely disassembled, use a hand-held vacuum/pressure pump to check the gearcase for leaks before it is filled with fluid and returned to service.

1. Remove the oil level plug from the top side of the gearcase.
2. Attach a hand vacuum pump with pressure gauge to the gearcase, then slowly apply 3-6 psi (21-42 kPa) of pressure to the assembly. Observe the gauge, the pressure gauge should indicate a steady reading. If pressure is leaking, submerge the gearcase in a tank of water and look for bubbles, then disassemble and rectify the leak. Recheck the gearcase after repairs are complete.
3. Remove the pressure pump and connect a vacuum pump (or reverse the connections on dual pump tools). Pump out the air in the gearcase in order to produce 3-5 in. Hg (76-127 mm Hg) of vacuum and watch the gauge to see if it holds. Slowly increase the vacuum to 15 in. Hg (381 mm Hg) and again, watch the gauge to see that it holds. If the needle shows leakage at either level, apply a small amount of gearcase lubricant to the suspected seal and repeat the check. If the leak stops or oil is drawn into the case, replace the defective seal.
4. Once repairs are made and verified, refill the gearcase with lubricant.

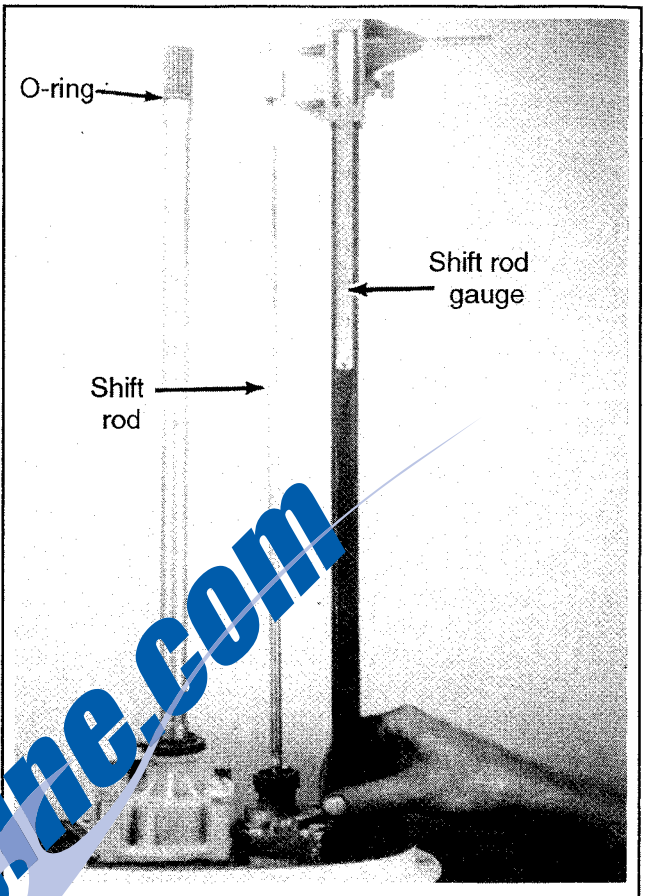


Fig. 126 Measure the rod length from the upper surface of the lower unit to the center of the shift rod opening, using a precision measuring device

OEM 2 MODERATE

Shift Rod Height

◆ **See Figure 126 and Shift Height Adjustment Chart**

If the shift rod positioning is disturbed (if it is turned in or outward on the threads) or it is removed from the gearcase for any reason you must properly adjust the shift rod height before installation. When installing a gearcase to a motor for the first time this adjustment should be verified to ensure proper operation.

If you are rigging an engine to non-Evinrude/Johnson manufactured controls you'll have to check the shift throw (amount of shift cable movement at the engine). These gearcases are only compatible with controls that produce a 1.125-1.330 in. (28.6-33.8mm) throw (movement) at the engine when shifted between **Neutral** and **Forward**.

In order to make this measurement, you need a precision gauge capable of reading measurements between approximately 20 and 30 inches (508 and 762mm). Don't attempt to us a tape measure, as the flexible tape will make your measurement off by more than 1/32 in. (0.8mm) allowed by the range.

The measurement is taken of the installed rod length from the upper surface of the lower unit to the center of the shift rod opening. In order to accurately take the measurement, place the shift rod in the neutral position with the rod offset or hole facing forward.

SHIFT ROD HEIGHT ADJUSTMENT - 60 DEGREE V4 and V6 ENGINES

Year	Model	Shift Rod Height	
		Ideal	Acceptable Range
1992-96	Long Shaft	21 1/4 in. (539.8mm)	21 7/32-21 9/32 (539.0-540.6mm)
	Extra Long Shaft	26 1/4 in. (666.8mm)	26 7/32-26 9/32 (666.0-667.6mm)
1997	20 in. Shaft	21 1/4 in. (539.8mm)	21 7/32-21 9/32 (539.0-540.6mm)
	22.5 in. Shaft	23 3/4 in. (603.3mm)	23 23/32-23 25/32 (602.5-604.1mm)
	25 in. Shaft	26 1/4 in. (666.8mm)	26 7/32-26 9/32 (666.0-667.6mm)
1998-2001	EL, GL. PL, SL, WEL, WGL, WPL, WQL, WSL, and WTPL	21 1/4 in. (539.8mm)	21 7/32-21 9/32 (539.0-540.6mm)
	FT, FPL., FSL, IL, RWL, WEL, WRL, WRP	21 3/4 in. (552.5mm)	21 23/32-21 25/32 (551.7-553.3mm)
	RWY, WRY	23 3/4 in. (603.3mm)	23 23/32-23 25/ 602.5-604.1mm)
	CX, EX, NX, PX, SX, WPX, WQX, WTPX	26 1/4 in. (666.8mm)	26 7 66.0-667.6mm)
	FC, FCX, FPX, FSX,	26 3/4 in. (679.5mm)	6 23/ 6 25/32 (678.7-680.3mm)

Use using Evinrude/Johnson special measuring tool P/N 389997, or an equivalently long precision measuring gauge. Compare the measured rod height with the accompanying data (90º motors) or chart (60º motors) and determine if the rod requires any minor adjustments. Specifications vary by year, model and shaft length (if necessary, refer to the information on Engine Identification and the model ID tag found in the Maintenance and Tune-Up section. Specifications are provided for an ideal shift rod height with an allowable range to account for positioning the shift rod properly the threads. If necessary, rotate the rod clockwise to shorten the rod and counterclockwise to lengthen it.

On 90º V4 Cross-Flow motors, shift rod heights are as f

- Long shaft, ideal height specification of 21 27/32 in. (d. an allowable range of 21 26/32-21 28/32 in. (553.8-55 m)
- Extra-long shaft, ideal height specification of 2 in. n) and an allowable range of 26 26/32-26 28/32 in. m).

On 90º V4 Looper motors, shift rod height ws:

- 20 in. Shaft, ideal height specification in. (557.3mm) and an allowable range of 21 29/32-21 31/ m).
- 22.5 in. Shaft, ideal height s 7/16 in. (620.7mm) and an allowable range of 24 13/32- .5mm).
- 25 in. Shaft, ideal hei 16 in. (684.3mm) and an allowable range of 26 29/ in. (683.5-685.1mm).

On 90º V6 Looper motors, heights are as follows:

- 20 in. Shaft, ideal height s ification of 21 15/16 in. (557.3mm) and an allowable range of 21 29/32-21 31/32 in. (556.5-558.1mm).
- 25 in. Shaft, ideal height specification of 26 15/16 in. (684.3mm) and an allowable range of 26 29/32-26 31/32 in. (683.5-685.1mm).
- 30 in. Shaft, ideal height specification of 31 15/16 in. (811.3mm) and an allowable range of 31 29/32-31 31/32 in. (810.5-812.1mm).

For 90º V8 Looper motors, shift rod heights are as follows:

- 20 in. Shaft, ideal height specification of 22 13/32 in. (569mm) and an allowable range of 22 12/32-22 14/32 in. (568.2-569.8mm).
- 25 in. Shaft, ideal height specification of 27 13/32 in. (696mm) and an allowable range of 27 12/32-27 14/32 in. (695.2-696.8mm).
- 30 in. Shaft, ideal height specification of 32 13/32 in. (823mm) and an allowable range of 32 12/32-32 14/32 in. (822.2-823.8mm).

FUNCTIONAL CHECK

Perform a functional check of the completed work by mounting the outboard in a test tank, in a body of water, or with a flush device attached to the lower unit.

ION

ust circulate through the lower unit to the powerhead any e p werhead is operating to prevent damage to the water pump the lower unit. Just five seconds without water will damage he eller.

Never operate the powerhead above idle rpm with only a flush attachment connected. Without a load on the propeller, the powerhead could exceed the maximum limit-"runaway"-severely damaging the powerhead.

Start the powerhead and observe the tattle-tale flow of water from the rear of the lower cowling. The water pump installation work is verified by a steady stream of water flowing out of the by-pass hose. Shift the powerhead into **Forward** and then back to **Neutral** to for smoothness of operation and satisfactory performance. Wait a few seconds and repeat the process shifting into **Reverse** for the same reason.

Propeller Shaft Seal

If the gearcase oil is contaminated by water or there are signs of leakage at the propshaft seal, the gearcase REALLY should be disassembled, thoroughly inspected and assembled again, using new seals. However, if the propeller shaft seal is the culprit AND you are certain that there is no damage (due to lack of proper oiling or from corrosion) inside the gearcase, you CAN replace just the prop shaft seal. Furthermore, this task can usually be accomplished with the gearcase still attached to the outboard. This is especially handy if you've been diligent about inspecting the gearcase and notice a damaged seal (perhaps from tangled fishing line or the like) i mmediately upon removing the boat/motor from the water after an excursion.

■ **Read and believe, replacing ONLY the propeller shaft seal is rarely the right way to handle the situation (unless you've discovered the problem before most of the oil is lost and before moisture has had the opportunity to do much damage). However, it is often the way the situation is handled. If you want to be certain about the long-life and condition of the components in your gearcase, disassemble and thoroughly overhaul it. Replace all of the seals, not just the propeller shaft. If, however, you decide to only replace the propeller shaft seal, you have been fairly warned.**