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NOTE: Not all models listed below, see links for additional MerCruiser Models Mercruiser GM V8 454 cid 7.4L 502 cid 8.2L Service Manual Servi 454 Mag MPI Horizon (Serial Number 0L002200 & Up), MIE 8.2L MPI (Serial Number 0L002450 & Up). L-29 Engines - Sterndrive (MCM) Model: MIE 7.4L MPI (Serial Number 0L002006 & Up). Mercury Mercruiser 496 Mag HO 8.1S Horizon HO Service Manual Service (262 cid) Sterndrive (MCM), 4.3L MPI Alpha and Bravo (Serial Number 0M300000 and Above) 1990-1997 MerCruiser GM 3.0L & 3.0LX Inboard Engine, 3.0L/3.0LX Inboard Engine with DDIS & EST Ignition. Models Covered In This Manual :MODEL SERIAL NUMBER MCM 3.0L OC856451 And Above, MCM 3.0L /3.0LX OC868143 And Above. 1 1985-1989 Mercruiser Manual #8 Mercury Marine 4 Cylinder Engines MODELS COVERED IN THIS MANUAL: MCM 170 MR Serial Numbers / 6916779 to 0A475151 MCM 170 Alpha One / Serial Numbers 0A475152 to 0B434940 MCM 165 Alpha One / Serial Numbers 0B424941 to 0B774251 MCM 3.7L Alpha One / Serial Numbers 0B436390 MCM 180 Alpha One / Serial Numbers 0B436391 to 0B775248 MCM 3.7 Liter LX Alpha One / Serial Numbers 0B436390 MCM 180 Alpha One / Serial Numbers 0B436391 to 0B775248 MCM 3.7 Liter LX Alpha One / Serial Numbers 0B436391 to 0B775248 MCM 3.7 Liter LX Alpha One / Serial Numbers 0B436390 MCM 180 Alpha One / Serial Numbers 0B436391 to 0B775248 MCM 3.7 Liter LX Alpha One / Serial Numbers 0B436390 MCM 180 Alpha One / Serial Numbers 0B436390 MCM 180 Alpha One / Serial Numbers 0B436391 to 0B775248 MCM 3.7 Liter LX Alpha One / Serial Numbers 0B436390 MCM 180 Alpha One / Serial Numbers 0B436390 MCM 180 Alpha One / Serial Numbers 0B436391 to 0B775248 MCM 3.7 Liter LX Alpha One / Serial Numbers 0B436390 MCM 180 Alpha One / Serial Numbers 0B436390 MCM 18 Serial Numbers 0B775249 and Above 1 1998-2006 MerCruiser Mercury 3.0L Inboard Engine Service Manual 1 Service Repair Manual 305 CID 5.0L 350 CID 5.7L Service Repair Manual Year Application: 1993 1994 1995 1996 1997 305 CID (5.0L) / 350 CID MCM 260 5.7L MCM 260 TR 5.7L MCM 350 MAGNUM SRX 5.7L MCM 350 MIE 230 MIE 240 MCM 454 MAGNUM SRX 7.4L-H MCM 350 MCM 450 M THIS MANUAL: Transom Assemblies MCM 120/ 140/ 165/ 470/ 485/ 898/228/260 With Serial Numbers - 4893635 to 6237860 / 1.84:1 - Serial Numbers - 4893635 to 6237860 / 1.65:1 - Serial Numbers - 4890460 to 6268064 / 1.50:1 - Serial Numbers - 4893635 to 6237860 / 1.84:1 - Serial Numbers - 4893835 to 6237860 / 1.65:1 - Serial Numbers - 4893635 to 6237860 / 1.84:1 - Serial Numbers - 4893835 to 6237860 / 1.85:1 - Serial Numbers - 4893635 to 6237860 / 1.8 6229157 1978 1979 1980 1981 1982 1 2001-2006 Mercury MerCruiser 5.0L, 5.7L, 6.2L Service Manual 1 Service Manual 1 Service Manual 431 Part Number 90-864260. Exact model application: Models Application: Sterndrive (MCM) starting with serial number OM300000 and above, 5.0L MPI Alpha and Bravo, 350 MAG MPI Alpha and Bravo, 350 MAG MPI Horizon, Inboard, MX 6.2 MPI Horizon, Inboard and Dow Sports (MIE) starting with serial number OM310000, 350 MAG MPI Inboard, 350 MAG MPI Horizon, Inboard, MX 6.2 MPI Inboard, MX 6.2 MPI Horizon Inboard and 350 MAG MPI Tow Sports. 1983, 1984, 1985, 1989, 1990 MerCruiser R MR Alpha One & Alpha SS Sterndrive Manual for Sterndrive Units R-MR-Alpha One & Alpha One SS, MC 120R/140B/185R/488R/898R/228R/260F Serieal Number - 6216687 6849289, MC 120MR/185MR/190MR/200 1992, 1993, 1994, 1995, 1996, 1997 & 1998 MerCruiser #11 Bravo MerCruiser Sterndrive Unit Serial # B892613 and Above, Bravo Three Sterndrive Unit Serial # B892613 and Above, Bravo Transom Assembly (Standard) Serial # * B673048 and Above, Bravo Three Sterndrive Unit Serial # D763691 and Above, Bravo Transom Assembly (Standard) Serial # * B673048 and Above, Bravo Three Sterndrive Unit Serial # D763691 and Above, Bravo Transom Assembly (Standard) Serial # * B673048 and Above, Bravo Three Sterndrive Unit Serial # D763691 and Above, Bravo Three Sterndrive Unit Serial # D763691 and Above, Bravo Three Sterndrive Unit Serial # B892613 and Above, Bravo Three Sterndrive Unit Serial # D763691 and Above, Bravo Three Sterndrive Unit Serial # B892613 and Bravo T Transom Assembly (High Performance) Serial # D796083 and Above, Bravo Transom Assemblies could have been converted to High Performance Transom Assemblies by use of a High Performance Gimbal Ring Kit (822374A2). Refer to Transom Assembly sections of this manual for identification information. 1991 2007 MerCruiser ALPHA 1 Gen 2 Sterndrive Service Manual #14 (#-14, Number 14) 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006 & 2007 Alpha 1 Generations II (Gen 2, Gen II, Gen Two) Outdrive, Sterndrive (Stern Drive) Unit. Mercury Mercruiser Bravo + Sport Master Service Manual Manual Service Manual Ser Application: Bravo One, Bravo One X, Bravo One X, Bravo One X, Bravo Two X, Diesel, (Serial Number 0W198373 and Above). Bravo Two X, Diesel, Bravo Three XR (Serial Number 0W240000 and Above). Bravo Two X, Diesel, Bravo Transom Standard (Serial Number 0W173658 and Above) Transom High Performance(Serial Number 0W150260 and Above) Mercury Mercruiser In-ine Diesel D2.8L D4.2L D-Tronic Manual Service Manual Application: Sterndrive (MCM) Models: D2.8L D-Tronic (Serial Number 0K000001 and Above), D4.2L D-Tronic (Serial Number 0K000001 and Above), D4.2L D-Tronic (Serial Number 0K000001 and Above). Inboard (MIE) Models: D2.8L D-Tronic (Serial Number 0K000001 and Above). manual only covers Engine Repair and does not cover stern drive unit repair or transom assembly. MODELS COVERED IN THIS SERVICE MANUAL: MCM 185R 229 CID (3.8L) - Serial Numbers 6289593 to 6919655 MCM 185MR 262 CID (4.3L) - Serial Numbers 6919656 to OA483580 MCM 185 Alpha One - Serial Numbers 0A483581 to OB455459 MCM 175 Alpha One - Serial Numbers OB455460 to OB773242 MCM 4.3 Liter Alpha One - Serial Numbers OB785483 to B921276 MCM 205 MR - Serial Numbers OB483776 MCM 205 Alpha One - Serial Numbers OB785483 to B921276 MCM 4.3 Liter LX Alpha One - Serial Numbers OB775130 to OF000000 Sea Ray (Note 1) 4.3L - 4 Alpha One - Serial Numbers OB785981 to B922330 Note 1: Sea Ray to Mercruiser Mercury 4-Cylinder Engines Manual #10 MODELS COVERED IN THIS SERVICE MANUAL: MCM 120MR - Serial Numbers 6853914 to 0A492055 MCM 120 Alpha 1 - Serial Numbers 0C856450 and Above MCM 140 MR - Serial Numbers 6852270 to 0A484072 MCM 140 Alpha 1 - Serial Numbers 0C856450 and Above Sea Ray 3.0L - Serial Numbers 0B787205 to B917530 NOTICE: MCM 2.5L Same as MCM 120 MCM 3.0L Sea Ray 3.0L Same as MCM 140 (Later Models are rated at 130HP and have 9.2:1 Compression Ratio) Page 1 Module H of Directive 2003/44/EC is: Det Norske Veritas Norway Notified Body Number: 0575 This declaration is issued under the sole responsibility of Mercury Marine and Mercury Mercruiser. Patrick C. Mackey President - Mercury Merine, Fond du Lac, WI USA... Page 2 Exhaust Gas Emissions Certification Number The serial numbers are the manufacturer's keys to numerous engineering details that apply to your Mercury Mercruiser® power package. When contacting your Authorized Mercury MerCruiser Dealer about service, always specify model and serial numbers. The description and specifications contained herein were in effect at the time this guide was approved for printing. We suggest that this manual remain with the product for ready reference whenever you are on the water. Thank you for purchasing one of our Mercury MerCruiser products. We sincerely hope your boating will be pleasant! Page 4 NOTICE Indicates a situation which, if not avoided, could result in engine or major component failure. IMPORTANT: Identifies information essential to the successful completion of the task. NOTE: Indicates information that helps in the understanding of a Pickups.......82 Checking.......82 Checking.......84 Replacing Belt and/or Adjusting Tension..85 Flushing Attachments......85 Flushing Your Power Package......90 Section 6 - Storage Cold Weather or Extended Storage......94 Manual Single Point MerCruiser will send you an owner resource guide that includes your warranty registration confirmation. If you do not receive your owner resource guide within 60 days from date of new product model and serial numbers, date of sale, type of use, and the selling distributor's and dealer's code number, name, and address. The distributor or dealer also certifies that you are the original purchaser and user of the product. One-, two-, three-, four-, or five- year term plans can be purchased up to 12 months after the original engine registration date. See your participating Mercury MerCruiser dealer for complete program details. Mercury MerCruiser Limited Warranty Coverage Warranty Coverage is available only to retail customers that purchase from a dealer authorized by Mercury M Marine to distribute the product in the country in which the sale occurred, and then only after the pre-delivery inspection process specified by Mercury Marine is completed and documented. Mercury Marine warrants that each new Mercury Marine, Mercury Marine is completed and documented. Mercury Marine outboard, MerCruiser Inboard or Sterndrive engine (Product) will not be rendered inoperative as a direct result of corrosion for the date on which it is first put into service, whichever occurs first. The repair or replacement of service under this warranty does not extend the life of this warranty does not cover the following: • Electrical system corrosion resulting from damage • Corrosion that causes purely cosmetic damage • Abuse or improper service • Corrosion to accessories, instruments, and steering systems •... Section 1 - Warranty Commercial Application: Standard Factory Limited Warranty by Region & Boat Brand Warranty Non-Certified Boat Brand Certified Boat Brand All Boat Brands Standard Region Standard SeaCore Horizon Standard SeaCo All Boat Brands Standard Region Standard Region Standard SeaCore Horizon Standard SeaCore Horizon... California Emissions Limited Warranty NOTE: Mercury Mercruiser product line. In order to comply with CARB warranty regulations, and for that limited purpose only, model year shall have the same meaning as calendar year. As an example, 2003 model year products manufactured during calendar year 2003. Duration Of Coverage NOTE: Mercury Mercruiser product line. In order to comply with CARB warranty regulations, and for that limited purpose only, model year shall have the same meaning as calendar year. As an example, 2003 model... Section 1 - Warranty What Mercury Will Do Mercury Warine's sole and exclusive obligation under this warranty is limited to, at our expense and at our option, repairing or replacing defective parts with new or Mercury Marine certified re-manufactured parts, or refunding the purchase price of the Mercury Marine does not establish model years for the Mercury Marine does not establish model 2003 model year products refers to products refers to products manufactured during calendar year 2003. A tamper-resistant Emission Control Information label is affixed in a visible location to the engine at time of manufacture by Mercury MerCruiser. In addition to the required emissions statement, the label lists the engine serial number, family, FEL (emission level), date of manufacture (month, year), and the engine displacement. Beginning January 1, 2003, one Three-Star label will be included with each factory-certified Mercury MerCruiser engines (500 hp and below) will have a Three-Star label identifies that these engines meet the California Air Resources Board's Sterndrive and Inboard marine engine 2003 exhaust emission standards. Page 25 Section 1 - Warranty The Three-Star label will be affixed on the left side of the hull as shown. XX 1234 XX mc79531 Recommended location Secondary location One Star - Low emission The one-star label identifies personal watercraft, outboard, sterndrive and inboard engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2001 exhaust emission standards. Page 26 Section 1 - Warranty Notes: Page 18 90-860171061 DECEMBER 2006... Section 2 - Getting to Know Your Power Package Section 2 - Getting to Know Your Power Package Table of Contents Identification.......20 Console Mount Features25 Engine Serial Number and Single Engine Trim/Trailer Section 2 - Getting to Know Your Power Package Identification The serial numbers are the manufacture's keys to numerous engineering details which apply to your MerCruiser power package. When contacting MerCruiser about service, always specify model and serial number Se permanent reference for authorized MerCruiser Dealers. 25905 Gimbal housing with serial number stamping Transom assembly serial Number... Section 2 - Getting to Know Your Power Package Lanyard Stop Switch The purpose of a lanyard stop switch is to turn off the engine when the operator moves outside the operator's position (as in accidental ejection from the operator's position). 74608 Stop switch Clips to the operator... Section 2 - Getting to Know Your Power Package Accidental or unintended activation of the switch during normal operation is also a possibility. This could cause any, or all, of the following potentially hazardous situations: • Occupants could be thrown forward due to unexpected loss of forward motion, a particular concern for passengers in the front of the boat who could be ejected over the bow and possibly struck by the propulsion or steering components. Section 2 - Getting to Know Your Power Package Remote Controls. All controls may not have all features shown. Consult your dealer for a description and/or demonstration of your remote control. Section 2 - Getting to Know Your Power Package Console Mount Features mc79503-1 Throttle Only Button Power Trim Switch Control Handle Trailer Switch Throttle Only Button - Allows engine throttle advancement without shifting the engine. This is done by disengaging the shift mechanism from the control handle. The throttle only button can be depressed only when the remote control handle is in the neutral position. Section 2 - Getting to Know Your Power Package For best performance trim the sterndrive unit so that the boat bottom is at a 3-5° angle to the water. 3 - 5 mc79528 Trimming sterndrive unit up/out can: • Generally increase top speed •... Section 2 - Getting to Know Your Power Package Some controls also have a trailer button that trims the sterndrive to a position suitable for trailer purposes only. Dual Engine Trim/Trailer CAUTION Avoid twisting or binding dual engine tie bars. Damage to the tie bar and sterndrives could occur. Page 36 Section 2 - Getting to Know Your Power Package 2. A 90 amp fuse is located on the large post of the starter solenoid. This fuse is designed to protect the engine wiring harness if an electrical overload occurs. mc74907-1 3. Audio Warning System Your Mercury Mercruiser power package may be equipped with an Audio Warning System. The Audio Warning System will not protect the engine immediately. Investigate cause and correct it, if possible. If the cause cannot be determined, contact your authorized Mercury MerCruiser dealer. Testing The Audio Warning System 1. Page 39 Section 3 - On The Water Table of Contents Safe Boating Suggestions.......32 Boats Having An Open Front Deck38 Be Alert To Carbon Monoxide Poisoning... 33 Boats With Front-Mounted, Raised Pedestal Good Ventilation Xhow and obey all nautical rules and laws of the waterways. • Mercury MerCruiser strongly recommends that all powerboat operators complete a boating safety courses are offered in the U.S.A. by: The U.S. Coast Guard Auxiliary, The Power Squadron, The Red Cross and your state or provincial boating law enforcement agency. Most boats are rated and certified for maximum load (weight) capacities (refer to your boat save necessary plate). Know your boat's operating and loading limitations. Know if your boat will float if full of water. When in doubt, contact your authorized Mercury MerCruiser dealer or the boat manufacturer. Section 3 - On The Water Good Ventilation Under certain conditions, permanently enclosed or canvas enclosed cabins or cockpits withough the boat. mc79553-1 Poor Ventilation Under certain conditions, permanently enclosed or canvas enclosed cabins or cockpits withough the boat. insufficient ventilation may draw in carbon monoxide. Section 3 - On The Water Operation Chart BEFORE STARTING WHILE UNDERWAY AFTER STOPPING Close seacock, if Operate bilge blowers. Check steering operation. IMPORTANT: If the boat is operated during periods of freezing temperature, precautions must be taken to prevent freeze damage to the power package. Damage to the power package to the power package. Damage to the power package to the power package. Damage to the power package to the power package. Damage to the power package to the power package. Damage to the power package to the power package to the power package. Damage to the power package to the power package to the power package to the power package. Damage to the power package to the power package to the power package to the power package. Damage to the power package caused by submersion is not covered by the Mercury MerCruiser Limited Warranty. Section 3 - On The Water Passengers. Do not allow any passengers to stand or use seats other than those designated for traveling faster than idle speed. Section 3 - On The Water Wave And Wake Jumping WARNING Avoid serious injury or death from being thrown within or out of a boat when it lands after jumping a wave or wake. Avoid wave or wake jumping whenever possible. Instruct all occupants that if a wake or wave jump occurs, get low and hang on to any boat hand hold. After striking a submerged object, stop the engine as soon as possible and inspect the drive system for any broken or loose parts. If damage is present or suspected, the power package should be taken to an authorized Mercury MerCruiser dealer for a thorough inspection and necessary repair. Section 3 - On The Water NOTICE Operating in shallow water can cause severe engine damage due to clogged water inlets. Ensure that the water inlets on the gearcase do not ingest sand, silt, or other debris, which can restrict cooling water inlets while maneuvering in shallow water. Section 3 - On The Water Elevation And Climate Elevation and climate changes will affect the performance of your power package. Loss of performance on be caused by: • Higher elevations • Higher temperatures • Low barometric pressures • High humidity For you to have optimum engine performance under changing weather conditions, it is essential that the engine be propped to allow the engine to operate at or near the top end of the specified maximum RPM range with a normal boat load during your normal boating... End of First Season Checkup At the end of the first season of operation, contact an authorized Mercury MerCruiser dealer to discuss and/or perform scheduled maintenance items. If you are in an area where the product is operated continuously, year-round, you should contact your dealer at the end of the first 100 hours of operation or once yearly, whichever occurs first. Page 52 Section 3 - On The Water Notes: Page 44 90-860171061 DECEMBER 2006... Section 4 - Specifications Section 4 - Specifications Table of Contents Fuel up to 10% alcohol content in the gasoline. We do not know what percentage your boat's fuel system will withstand. To help obtain optimum engine performance and to provide maximum protection, we strongly recommend the use of the following oils listed in the order of recommendation: 1. MerCruiser / Quicksilver Synthetic Blend, NMMA FC-W rated, 4 cycle oil. 2. MerCruiser / Quicksilver 25W40 NMMA FC-W rated oil. 1. Performance obtained and corrected in accordance with the engine at normal operating temperatures 3. A special procedure must be followed to adjust idle RPM. Consult your Authorized Mercury MerCruiser Dealer before attempting this procedure. Page 57 Section 4 - Specifications 4.3L (262 CID) Models Capacity Fluid Type Mercury/Quicksilver Synthetic Blend MerCruiser 3.8 liters (4 U.S. qt.) Propylene Glycol and Purified Water Seawater Cooling System... Page 58 Section 4 - Specifications Notes: Page 50 90-860171061 DECEMBER 2006... Page 59 Section 5 - Maintenance Sect (Inboard models only) Do It Yourself Maintenance Suggestions Present day marine equipment, such as your Mercruiser power package, are highly technical pieces of machinery. Electronic ignition and special fuel delivery systems provide greater fuel economies, but also are more complex for the untrained mechanic. Scheduled Maintenance NOTE: Only perform maintenance which applies to your particular power package, AFTER THE INITIAL 20 HOUR BREAK-IN PERIOD To help extend the engine oil and filter •... Section 5 - Maintenance • Driveshaft extension models: Lubricate the driveshaft U-joints, and tailstock input and output bearings. EVERY 200 HOURS OR 3 YEARS • Inspect the U-joints, the splines and tross bearing, if equipped with a grease fitting. Section 5 - Maintenance Date Maintenance Performed Engine Hours Sealed Carburetor Mixture Screw CAUTION Do not remove mixture setting on this engine could affect the exhaust emissions level, thus voiding the emissions certification. Fluid type 4.3L (262 cid) 3.8 liters (4 U.S. qt.) 5.0L (305 cid) Mercury/Quicksilver Synthetic Blend MerCruiser Engine Oil 25W-40 4.25 liters (4.5 U.S. qt.) 5.7L (350 cid) Mercury/Quicksilver Synthetic Blend MerCruiser Engine Oil 25W-40 4.25 liters (4.5 U.S. gt.) 5.7L (350 cid) 7. Start the engine, run the engine for three minutes, and check for leaks. Stop the engine fluid. IMPORTANT: If fluid is not visible in pump, contact your authorized Mercury Mercruiser dealer. Filling 1. Remove the fill cap/dipstick and observe the level. 2. Add Quicksilver Power Trim and Steering Fluid or Dexron III Automatic Transmission Fluid (ATF) to bring the fluid level up to the proper level. Heat exchanger cap 2. The coolant level in the heat exchanger should be at the bottom of the filler neck. If the coolant level is low, contact your authorized Mercury MerCruiser dealer. 3. Install the cap onto the heat exchanger. 92-877770K1 Coolant 3. Install the fill cap onto the coolant recovery bottle. Changing Contact your authorized Mercury MerCruiser dealer. Drive Unit Oil CAUTION ENVIRONMENTAL HAZARD! Discharge of oil or oil waste into the environment is restricted by law. Do not spill oil or oil waste into the environment when using or servicing your boat. If any water is visible at the bottom of the monitor or appears at the oil fill/drain plug and/or if oil appears discolored, contact your authorized Mercury MerCruiser dealer immediately. Both conditions may indicate a water leak somewhere in the sterndrive unit. Section 5 - Maintenance Changing 1. Remove the gear lube monitor from the bracket. 6109 Gear lube monitor 2. Empty the container. 3. Install the gear lube monitor in the bracket. 4. Bravo One Models: Remove the oil fill/drain screw and sealing washer and drain the oil. Page 72 IMPORTANT: If any water drained from the oil fill/drain hole, or if the oil appears milky, the sterndrive unit is leaking and should be checked immediately by your authorized Mercury MerCruiser dealer. 7. Lower the sterndrive unit is leaking and should be checked immediately by your authorized Mercury MerCruiser dealer. 7. Lower the sterndrive unit is leaking and should be checked immediately by your authorized Mercury MerCruiser dealer. 7. Lower the sterndrive unit is leaking and should be checked immediately by your authorized Mercury MerCruiser dealer. 7. Lower the sterndrive unit is leaking and should be checked immediately by your authorized Mercury MerCruiser dealer. 7. Lower the sterndrive unit is leaking and should be checked immediately by your authorized Mercury M of... Section 5 - Maintenance Model Capacity Fluid Type Alpha One 1892 ml (64 oz.) Bravo One 2736 ml (92-1/2 oz.) High Performance Gear Lubricant Bravo Two 3209 ml (108-1/2 oz.) High Perform ventilation hose to the fitting on the flame arrestor and valve cover. Positive Crankcase Ventilation valve (PCV) CHANGING IMPORTANT: Use only Mercury MerCruiser replacement parts to ensure compliance with emission regulations. Page 66 90-860171061 DECEMBER 2006... Wipe up any spilled fuel immediately. Ensure that no fuel leaks exist before closing the engine hatch. 1. Allow the engine to cool down. NOTE: Mercury MerCruiser recommends that the engine be shut off for 12 hours prior to filter removal. 2. Close fuel supply valve, if equipped. 10. Start the engine be shut off for 12 hours prior to filter removal. 2. Close fuel supply valve, if equipped. 10. Start the engine hatch. 1. Allow the engine ha installation, clean spilled fuel and properly ventilate the engine compartment. If leaks continue, stop engine immediately and contact your authorized Mercury MerCruiser dealer. Lubricate the steering pin. mc71904-1 Steering pin Tube Ref. No. Description Where Used Part No. Synthetic Blend MerCruiser Engine Steering pin 92-883725K01 Oil SAE25W-40 4. On dual engine boats: Lubricate the tie bar pivot points. Tube Ref. No. Description Where Used Part No. Synthetic Blend MerCruiser Engine Throttle cable pivot points & 92-883725K01 Oil SAE25W-40 guide contact surfaces Shift Cable - Typical 1. Lubricate gimbal bearing by applying approximately 8-10 pumps of grease from a typical hand-operated grease gun. mc77068-1 Gimbal bearing grease fitting Tube Ref No. Description Where Used Part No. U-joint and Gimbal Bearing 92-802870A1 Grease... Section 5 - Maintenance NOTE: If the boat is operated at idle for prolonged periods of time, coupler should be lubricated Bravo Models - every 50 hours; Alpha Models - every 150 hours. 6212 6213 Alpha drive coupler Bravo drive coupler Grease fitting Tube Ref No. Section 5 - Maintenance Propellers Propellers Propellers Removal WARNING Avoid Injury: Remote Control must be in neutral and ignition key removed from switch before removing and/or installing propeller. Section 5 - Maintenance 1. Apply a liberal coat of one of the following lubricant stothe propeller shaft 92-802865A1 Anti-Corrosion Grease Propeller shaft 92-802867A1 2-4-C Marine Lubricant with Propeller shaft 92-802859A1 Teflon... Section 5 - Maintenance IMPORTANT: If reusing tab washer, carefully inspect tabs for cracks or other damage. Replace tab washer if condition is questionable. 6215 Propeller shaft Drive sleeve Thrust hub Locking tab washer if condition is questionable. 6215 Propeller shaft Drive sleeve Thrust hub Locking tab washer if condition is questionable. 6215 Propeller shaft Drive sleeve Thrust hub Locking tab washer if condition is questionable. 6215 Propeller shaft Drive sleeve Thrust hub Locking tab washer if condition is questionable. injury. Place a block of wood between the anti-ventilation plate and the propeller from rotating when removing or installing the propeller nut. 1. Section 5 - Maintenance 6. Bend 3 tabs on the tab washer down into the grooves in spline washer. After the first use, bend the 3 tabs straight and retorque the propeller nut. Bend tabs back down into spline washer. Check propeller at least after 20 hours of operation. Do not operate with loose propeller nut. Bend tabs back down into spline washer. Check propeller at least after 20 hours of operation. Do not operate with loose propeller nut. Bend tabs back down into spline washer. Check propeller at least after 20 hours of operation. Do not operate with loose propeller nut. Rear propeller Propeller Propeller shaft anode screw Rear propeller thrust hub Flat washer Front propeller shaft. Tube Ref No. Description Where Used Part No. Special Lubricant 101 Propeller shaft 92-802865A1 Anti-Corrosion Grease Propeller shaft 802867A1 2-4-C Marine Lubricant with Propeller shaft 92-802859A1 Teflon... Section 5 - Maintenance Description lb. in. lb. ft. Propeller shaft anode screw 38 mm (0.3125-18 x 1.5 in.) long Serpentine Drive Belt WARNING Avoid possible serious injury. Make sure that the engine is turned off and the ignition key is removed before inspecting belts. The flushing procedures for these systems are separated into two categories: sterndrive water pickups and alternative water pickups and alternative water pickups are separated into two categories: sterndrive water pickups and alternative water pickups are separated into two categories: sterndrive water pickups and alternative water pickups are separated into two categories: sterndrive water pickups are separated water pickups are separate sterndrives: dual water, and side pickups. Dual water pickups require the flushing attachment (44357Q 2) and the flush seal kit (881150K 1), and side pickups require the flushing attachment (44357Q 2). Page 91 Section 5 - Maintenance CAUTION If flushing the engine with the boat in the water, seawater can flow into the engine causing damage The water inlet must be closed when flushing the engine. 1. On seawater cooled models: Proceed to Step 5. or Step 6. NOTE: Closed cooled models are equipped with a heat exchanger on the front of the engine. Section 5 - Maintenance CAUTION Engine overheating can cause engine damage. To avoid, observe the water temperature gauge and ensure that the engine is operating in the normal range. 10. Observe the water temperature gauge to ensure that the engine is operating in the normal range. Section 5 - Maintenance 5. Remove the seawater inlet hose from the seawater pump and plug the hose to prevent water from siphoning into the engine or boat. 6147 6. Using a suitable adapter, connect the flushing hose from the water source to the water inlet of the seawater pump. Section 5 - Maintenance WARNING Avoid serious injury from fire or explosion. Do not use jumper cables and a booster battery to start engine. Do not recharge in a ventilated area away from fuel vapors, sparks or flames. WARNING Batteries contain acid which can cause severe burns. Page 95 Section 5 - Maintenance Mercury MerCruiser power packages are equipped with anodes to help protect them from galvanic corrosion under moderate conditions. However, for severe conditions (i.e. when using a stainless steel propeller, docking/mooring in areas with rapid water flow, etc.), it is recommended that a Quicksilver Anti-Corrosion Anode Kit and/or a MerCathode System - Electrode assembly replaces Anodic block. System should be tested to ensure adequate output. The test should be performed where boat is moored, using Quicksilver Reference Electrode and Test Meter. Contact your authorized Mercury MerCruiser dealer. Page 88 90-860171061 DECEMBER 2006... Page 97 Section 5 - Maintenance IMPORTANT: To ensure that the MerCathode controller MerCathode reference electrode is not damaged, do not paint or pressure wash. 6206 MerCathode controller MerCathode assembly Anode Kit (if equipped) - Mounted to the boat transom. 5642 Trim Cylinder Anodes - Mounted on each trim cylinder anodes 90-860171061 DECEMBER 2006... Section 5 - Maintenance Bearing Carrier anode Propshaft Anode (Bravo Three) - Located behind the aft propeller. 5821 Propshaft anode In addition to the corrosion protection between the Mercury MerCruiser Product, Anodic Blocks, or MerCathode System and the paint by allowing a minimum of 40 mm (1-1/2 in.) unpainted area on transom of the boat around these items. Page 92 90-860171061 DECEMBER 2006... Section 6 - Storage Section 6 - Storage Table of Contents Cold Weather or Extended Storage....94 Manual Single Point Drain System....104 Preparing Power Package for Storage...94 Boat in the Water 104 Engine and Fuel System Preparation ...95 Boat out of the Water Section 6 - Storage Cold Weather or Extended Storage IMPORTANT: Mercury MerCruiser dealer. Damage caused by freezing temperatures IS NOT covered by the Mercury MerCruiser Limited Warranty. NOTICE Avoid cooling system and engine damage. Section 6 - Storage NOTICE Avoid cooling system and engine damage. Water trapped in the seawater section of the cooling system is drained immediately after operation, or before any length of storage in cold weather, if the possibility of freezing temperatures exists. Part No. Corrosion Guard Outside of engine 92-802878-55 8. For sterndrive unit lay-up, refer to appropriate Mercury MerCruiser sterndrive service manual. 9. Replace the fuel filter. Refer to the Maintenance section for proper procedure. 10. Change the oil and oil filter. Section 6 - Storage Drain System Identification AIR ACTUATED SINGLE POINT DRAIN SYSTEM 6125 6124 Closed Cooled Models Blue air pump Green indicators Air manifold Blue drain plug locations MANUAL SINGLE POINT DRAIN SYSTEM 6126 Blue drain plug MULTI-POINT DRAIN SYSTEM 6126 Blue drain plug MULTI-POINT DRAIN (MPD) SYSTEM 6127 Side of cylinder block Bottom of exhaust manifolds 6130 Water circulating pump hose Fuel cooler to thermostat housing Page 98 90-860171061 DECEMBER 2006... Section 6 - Storage 6131 Check valve (if equipped) Air Actuated Single Point Drain System BOAT IN THE WATER NOTE: This procedure is written for the air pump that is attached to the engine. However, any air source can be used. 1. Page 108 Section 6 - Storage 7. Immediately remove the blue drain plug from the side of the thermostat housing or the heat exchanger. This must be removed within 30 seconds to properly vent the cooling system. 6125 6124 Closed Cooled Models Seawater Cooled Models recommends leaving the drain system open while transporting the boat or while performing other maintenance. This helps ensure that all water is drained. Page 110 Section 6 - Storage 3. Ensure that the lever on air pump (vertical) to lock pump on the fitting. 8293 Actuator fitting Air pump... Page 111 10. Remove the air manifold and return it to the mounting bracket. 11. Mercury MerCruiser recommends leaving the drain system open while transporting the boat or while performing other maintenance. This helps ensure that all water is drained. Section 6 -Storage 12. Before launching the boat, pull up on the manual release valve. Verify that the green indicators are no longer extended. 6135 Green indicators are no longer extended. 6135 Green indicators Manual Single Point Drain System BOAT IN THE WATER 1. Close the seacock (if equipped) or remove and plug the water inlet hose. 2. 6137 Drain location - orange or red Blue drain plug 5. Allow the system to drain for a minimum of five minutes. Mercury MerCruiser recommends leaving the drain system open while transporting the boat or while performing other maintenance. 6. Reinstall the blue drain for a minimum of five minutes. Mercury MerCruiser recommends leaving the boat or while transporting the boat or while transporting the boat or while performing other maintenance to ensure that all water is draining from each opening. 6. Allow the system to drain for a minimum of five minutes. Mercury MerCruiser recommends leaving the drain system open while transporting the boat or while performing other maintenance to ensure that all water is draining from each opening. 4. Allow the system to drain for a minimum of five minutes. Mercury MerCruiser recommends leaving the drain system open while transporting the boat or while performing other maintenance to ensure that all water is drained. Page 117 Section 6 - Storage Water-circulating pump hose 6143 Drain plug Fuel-cooler-to-thermostat-housing hose 6144 Drain plug Check valve 6131 Drain plug Greek valve 6131 Drain plug Fuel-cooler-to-thermostat-housing hose 6144 Drain plug Fuel-cooler-to-thermostat-housing hose 6144 Drain plug Check valve 6131 Drain plug Fuel-cooler-to-thermostat-housing hose 6144 Drain plug Fuel-cooler-to-thermostat blue drain plugs. If the seawater pickup pump does not have blue drain plugs, or you are unable to access them, loosen the clamps and remove both hoses. 6143 Drain plug Fuel-cooler-to-thermostat-housing hose 6144 Drain plugs... Page 119 Section 6 - Storage Water-circulating pump hose 6143 Drain plugs... plug (if equipped) 90-860171061 DECEMBER 2006 Page 111... Section 6 - Storage 3. On models with a seawater pickup pump, remove the two blue drain plugs... Section 6 -Storage NOTICE The universal joint bellows may develop a set when stored in a raised or up position, causing the bellows to fail when returned to service and allowing water to enter the boat. Store the sterndrive in the full down position. 2. Page 122 Section 6 - Storage Notes: Page 114 90-860171061 DECEMBER 2006... Page 123 Section 7 -Troubleshooting Section 7 - Troubleshooting Table of Contents Starter Motor Will Not Crank Engine, Or Cranks Battery Will Not Start Or Is Hard To Start...116 Excessive Free-play Or Makes Unusual Sounds Engine Runs Rough, Misses And/Or Section 7 - Troubleshooting Starter Motor Will Not Crank Engine, Or Cranks Slow Possible Cause Remedy Battery switch turned off. Turn the switch on. Remote control lever in neutral position. Position the control lever in neutral position. fouled or damaged. Clean or repair as necessary. Ignition problem. See Engine Runs Rough, Misses or Backfires. Engine Temperature Possible Cause Remedy Water inlet or seacock closed. Loose or missing shift and throttle linkages, see authorized Mercury MerCruiser dealer immediately, Straighten cable or have authorized Mercury Shift or throttle cable kinked, MerCruiser dealer replace cable if damaged beyond repair. Steering Wheel Turns Hard Or Jerky Possible Cause Remedy Low power steering pump fluid level. Section 8 - Customer Assistance required in Mercury MerCruiser marine engines to provide long life and dependable performance. 1. Quicksilver parts and accessories are engineered and built by Mercury Mercruiser product is very important to your dealer and to us. If you ever have a problem, question or concern about your power package, contact your dealer or any authorized Mercury MerCruiser dealership. If additional literature that is available for your particular Mercury MerCruiser power package and how to order that literature contact your nearest dealer or contact Mercury Marine Publications P.O. Box 1939.

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