

Product: 1998 Mercury MerCruiser Number 11 Bravo Sterndrives Service Repair Workshop Manual
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SERVICE MANUAL

Number 11

Bravo Sterndrives

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MerCruiser #11 Bravo Sterndrives

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Notice

Throughout this publication “Warnings” and “Cautions” (accompanied by the International HAZARD symbol ) are used to alert the mechanic to special instructions concerning a particular service or operation that may be hazardous if performed incorrectly or carelessly - OBSERVE THEM CAREFULLY! These “Safety Alerts” alone cannot eliminate the hazards that they signal. Strict compliance to these special instructions when performing the service, plus “common sense” operation, are major accident prevention measures.

WARNING

WARNING - Hazards or unsafe practices which COULD result in severe personal injury or death.

CAUTION

CAUTION - Hazards or unsafe practices which could result in minor personal injury or product or property damage.

IMPORTANT: Indicates information or instructions that are necessary for proper operation and/or maintenance.

Notice To Users of This Manual

This service manual has been written and published by the service department of the manufacturer to aid our dealers’ mechanics and company service personnel when servicing the product described herein. It is assumed that these personnel are familiar with the servicing procedures of this product, or like or similar products. That they have been trained in the recommended servicing procedures of these products which includes the use of mechanics’ common hand tools from other suppliers.

We could not possibly know of and advise the service trade of all conceivable procedures by which a service might be performed and of all possible hazards and/or results of each method. We have not undertaken any such wide evaluation. Therefore, anyone who uses a service procedure and/or tool which is not recommended by the manufacturer, first must completely satisfy himself that neither his nor the product’s safety will be endangered by the service procedure selected.

All information, illustrations, and specifications contained in this manual are based on the latest product information available at time of publication.

As required, revisions to this manual will be sent to all dealers contracted by us to sell and/or service these products.

Replacement Parts

WARNING

Electrical system components on gasoline engines and MerCruiser Sterndrives are designed and manufactured to comply with U.S. Coast Guard Rules and Regulations to minimize risks of fire or explosion.

Use of replacement electrical systems components, which do not comply to these rules and regulations, could result in a fire or explosion hazard and should be avoided.

When servicing electrical systems, it is extremely important that all components are properly installed and tightened. If not, any electrical component opening would permit sparks to ignite fuel vapors from fuel system leaks, if they exist or develop.

WARNING

Electrical system components on diesel engines are not external ignition protected. DO NOT STORE OR UTILIZE GASOLINE ON BOATS EQUIPPED WITH THESE ENGINES, UNLESS PROVISIONS HAVE BEEN MADE TO EXCLUDE GASOLINE VAPORS FROM ENGINE COMPARTMENT (ref: 33 CFR). Failure to comply could result in fire, explosion and/or severe personal injury.

Models Covered in This Manual

MODEL	SERIAL NUMBER
Bravo One Sterndrive Unit	B664190 and Above
Bravo Two Sterndrive Unit	B892613 and Above
Bravo Three Sterndrive Unit	D763691 and Above
Bravo Transom Assembly (Standard) *	B673048 and Above
Bravo Transom Assembly (High Performance)	D796083 and Above
Bravo Transom Assembly (Magnum)	K104738 and Above

* Some "Standard" 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.

NOTICE

Refer to appropriate engine service manual for engine repair.

Service Manual Outline

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GENERAL INFORMATION

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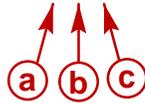
How To Use This Manual

This Manual is divided into sections which represent major components and systems. Some sections are further divided into parts which more fully describe the component. Sections and parts are listed at front of this manual.

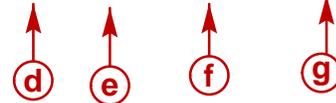
Page Numbering

Two number groups appear at the bottom of each page. Following is an example and description.

Page 1A-2



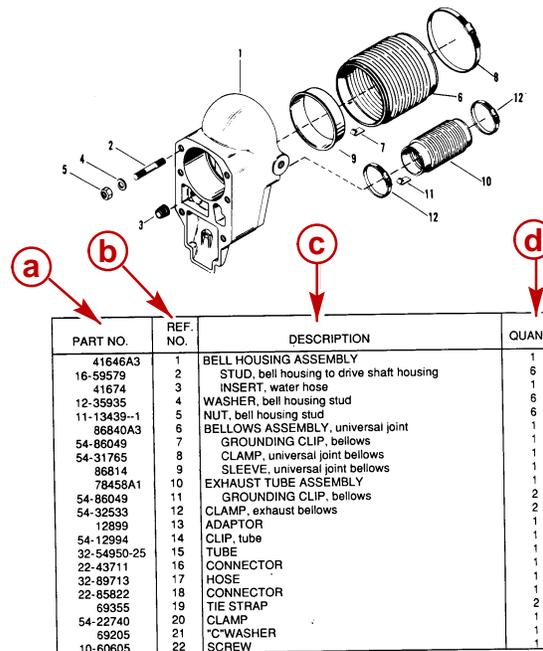
90-17431--4 FEBRUARY 1998



- a - Section Number
- b - Section Part
- c - Page Number
- d - Manual Part Number
- e - Revision Number
- f - Month Printed
- g - Year Printed

How To Read Parts Manual

Bell Housing



Part Number (a): part must be ordered by complete part number.

Reference Number (b): number of part on exploded parts view.

Description (c): this column provides important information.

- (1.) Description of part: Reference 1, on the parts list, is a BELL HOUSING ASSEMBLY; reference 12 is an exhaust bellows clamp, and reference 19 is a TIE STRAP.
- (2.) What parts are included: Reference 1, on the parts list, is "Bell Housing Assembly". Parts listed under the assembly are indented, which indicates that they are included. So, if Part No. 41646A3 is ordered, you will receive the Bell Housing Assembly, including 6 studs, and one water hose insert.
- (3.) Serial number break: If serial number is listed, check product serial number to ensure that correct part is ordered.
- (4.) Special Information: Will often appear after the description, i.e.: "O-ring on DSH," "O-ring on top cover," "Casting #1641-8293C1," etc. This information enables you to select correct parts.

Quantity (d): specifies quantity which must be ordered.

Special Information Block: provides additional information, part numbers for gasket sets, etc.

**GEAR HOUSING
SEAL KIT
26-76868A1
INDICATED BY (*)**

Access Hole Plug Kit 22-88847A1
Contains all necessary parts to allow
removal of swivel shaft without
removing gimbal housing.

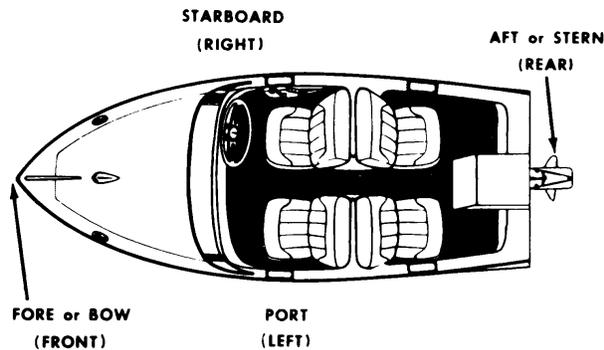
Introduction

This comprehensive overhaul and repair manual is designed as a service guide for the Mer-Cruiser models previously listed. It provides specific information, including procedures for disassembly, inspection, assembly and adjustment, to enable dealers and service mechanics to repair these products.

Before attempting repairs, it is suggested that procedure first be read through to gain knowledge of the methods and tools used and the cautions and warnings required for safety.

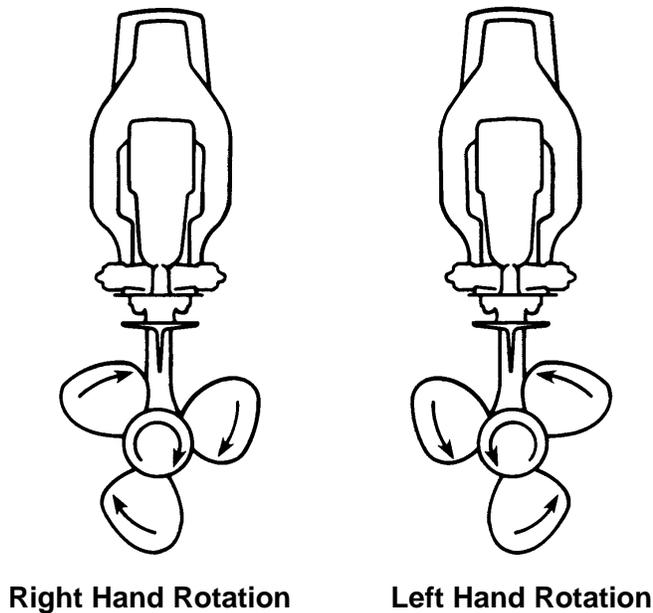
Directional References

Front of boat is bow; rear is stern. Starboard side is right side; port side is left side. In this service manual, all directional references are given as they appear when viewing boat from stern, looking toward bow.



Propeller Rotation

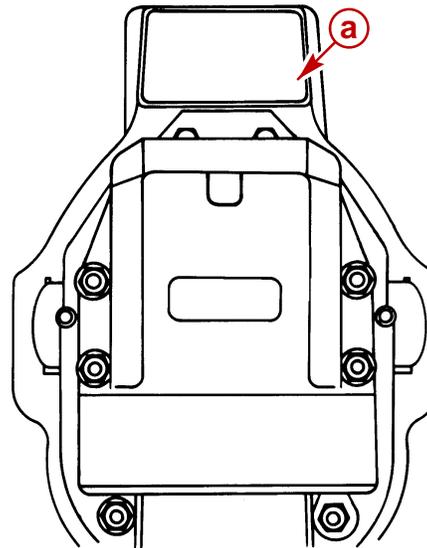
Propeller rotation for sterndrive can be right hand or left hand rotation as viewed from the aft end of the propeller.



Sterndrive Unit 10-Hour Break-In Period (New or With Replacement Gears)

1. Avoid full throttle starts.
2. DO NOT operate at any one constant speed for extended periods of time.
3. DO NOT exceed 75% of full throttle during the first 5 hours. During the next 5 hours, operate at intermittent full throttle.
4. Drive unit should be shifted into forward gear a minimum of 10 times during break-in, with run-in time at moderate RPM after each shift.

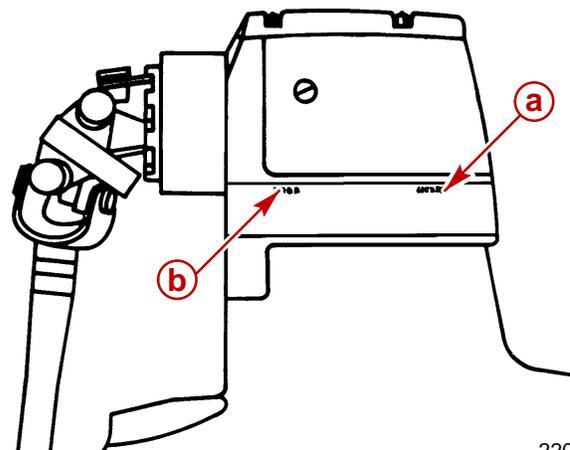
Serial Number Locations and Engine Designation Decal



22031

Transom Assembly Serial Number Location

a - Transom Assembly Serial Number



22026

Sterndrive Unit Serial Number Location - Port Side Decal

a - Sterndrive Unit Serial Number
 b - Sterndrive Unit Gear Ratio

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GENERAL INFORMATION

Section 1B - Maintenance

**1
B**

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Maintenance Schedules

Maintenance Intervals

Maintenance intervals and the tasks to be performed, as shown in this current schedule, or as found in a previously printed schedules, are generally based on an average boating application and environment. However, individual operating habits and personal maintenance preferences can have an impact on the suggested intervals. In consideration of these factors, MerCruiser has adjusted some maintenance intervals and corresponding tasks to be performed. In some cases, this may allow for more individual tasks to be performed in a single visit to the serving dealer, rather than multiple visits. Therefore, it is very important that the boat owner and servicing dealer discuss the current Maintenance Schedule and develop appropriate maintenance intervals to coincide with the individual operating habits, environment, and maintenance requirements.

Scheduled Maintenance That Can Be Performed By Owner/Operator

NOTE: Only perform maintenance which applies to your particular power package.

Task	Interval
Engine Crankcase Oil - Check level	Weekly
Closed Cooling Coolant - Check level	
Power Steering Fluid - Check level	
Sterndrive Unit Oil - Check level	
Battery - Check level and inspect for damage	
Fuel Pump Sight Tube (If Equipped) - Check that no fuel is present	
Power Trim Pump Oil - Check level	
Anodes - Inspect for erosion	
Gear Housing Water Pickups - Check for marine growth or debris	
Drive Belt(s) - Inspect condition and check tension	
Propeller Shaft - Lubricate	Saltwater Use: Every 50 hours of operation or 60 days, whichever occurs first.
Power Package - Exterior Surfaces - Spray with rust preventative	Freshwater Use: Every 100 hours of operation or 120 days, whichever occurs first.
Power Package Exterior Surfaces - Clean and paint	Once a year
Cooling System - Flush seawater section	Saltwater Use: After every use.

Scheduled Maintenance That Can Be Performed by Dealer

NOTE: Only perform maintenance which applies to your particular power package.

Task	Interval
Seawater Pickup Pump - Disassemble and inspect	Whenever insufficient seawater flow is suspected. (If operating temperature exceeds normal range.)
Crankcase Oil and Filter - Change	End of first boating season and thereafter, every 100 hours of operation or once yearly, whichever occurs first.
Ignition system - Clean and inspect condition	
Flame Arrestor and Crankcase Ventilation Hose - Clean and inspect	
Positive Crankcase Ventilation (PCV) Valve (If Equipped) - Change	
Sterndrive Unit Oil - Change	
Gimbal Ring Clamping Screws - Retorque to 40 ft. lb. (54 N·m)	
Rear Engine Mounts - Ensure torque is 30-40 ft. lb. (47-54 N·m)	
Gimbal Bearing - Lubricate	
Cooling System - Clean and inspect	
Engine Alignment - Check	
Engine Coupling Universal Joint Shaft Splines - Lubricate	
Steering System - Lubricate and inspect for loose, damaged or missing parts	
Electrical System - Check for loose or damaged wiring	
Cooling System Hoses and Clamps - Inspect for damage and deterioration. Check clamps for tightness.	
Closed Cooling System Pressure Cap - Clean, inspect and test	
Continuity Circuit - Check components for loose connections, broken or frayed wires	
Shift and Throttle Cable and Linkage - Lubricate and inspect for loose, damaged or missing parts	

Scheduled Maintenance That Can Be Performed by Dealer (Continued)

NOTE: Only perform maintenance which applies to your particular power package.

Task	Interval
Engine Exhaust System - Inspect externally for damage, deterioration and restrictions. Check for tightness.	End of first boating season and thereafter, every 100 hours of operation or once yearly, whichever occurs first.
Ignition System - Check timing and adjust as needed	
Steering Head and Remote Control - Inspect and lubricate	
Carburetor (If Equipped) - Inspect and adjust	
Throttle Body (EFI Models) - Inspect	
Fuel Filters - Replace	Once a Year
Quicksilver Mercathode System - Test output	
Closed Cooling Coolant - Test for Alkalinity	
Heat Exchanger - Clean seawater section	
Drive Unit Bellows and Clamps - Inspect	
Universal Joint Cross Bearings- Inspect and grease	End of first boating season and thereafter, every 200 hours of operation or once yearly, whichever occurs first.
Closed Cooling Coolant - Replace	Every Five Years or 1,000 hours of operation ¹

¹Only if Extended Life 5/100 Ethylene Glycol Antifreeze/Coolant is used. If any non-compatible coolant is added to this coolant, coolant must be changed every 2 years or 400 hours, whichever occurs first. All coolants other than Extended Life 5/100 Ethylene Glycol Antifreeze/Coolant must be changed every 2 years or 400 hours, whichever occurs first.

Specifications

Torque Specification

Drive Unit Fill/Drain Plug	30-50 lb. in. (3.39-5.56 N·m)
Drive Unit Vent Plug	30-50 lb. in. (3.39-5.56 N·m)

Quicksilver Maintenance Products

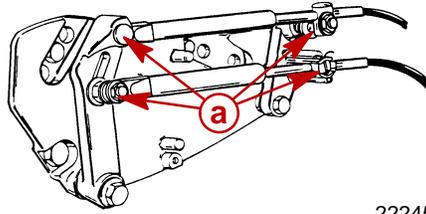
We recommend the use of Quicksilver Maintenance Products where specified.

Fluid Capacities

NOTICE
UNIT OF MEASUREMENT: U.S. Fluid Ounces
(Milliliters)
All capacities are approximate fluid measures.

MODEL	BRAVO ONE	BRAVO TWO	BRAVO THREE
Drive Unit Oil Capacity (With Square Gear Lube Monitor)	88 (2603)	104 (3076)	96 (2839)
Drive Unit Oil Capacity (With Round Gear Lube Monitor)	96 (2840)	112 (3313)	104 (3076)

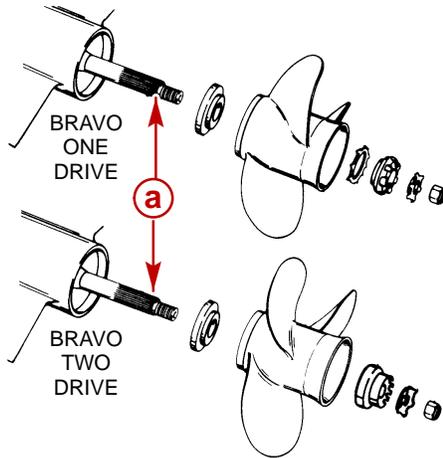
Lubricating Shift Cable Pivot Points



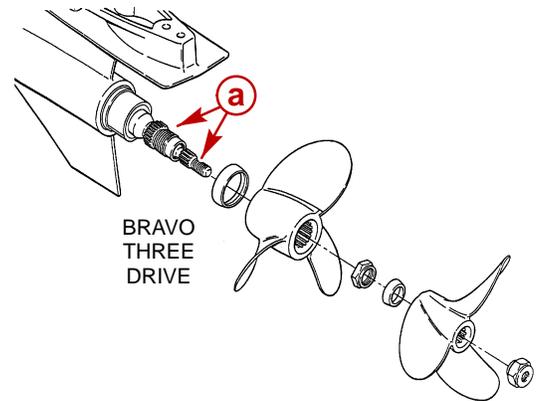
22245

a - Lubricate with SAE 20 or 30 Engine Oil

Lubricating Propeller Shaft



24727



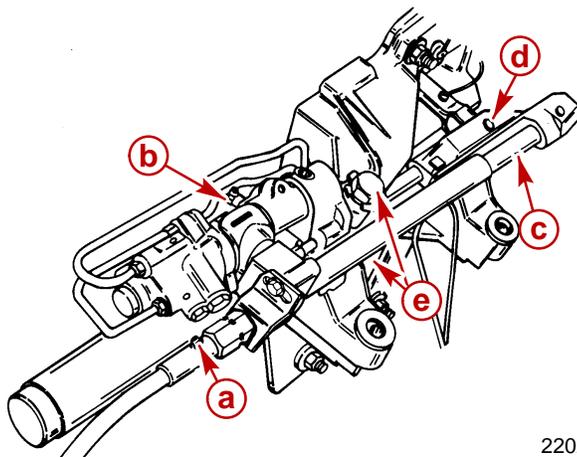
72239

a - Propeller Shaft - Lubricate with Special Lubricant 101, Anti-Corrosion Grease, 2-4-C Marine Lubricant with Teflon (Listed in Order of Effectiveness).

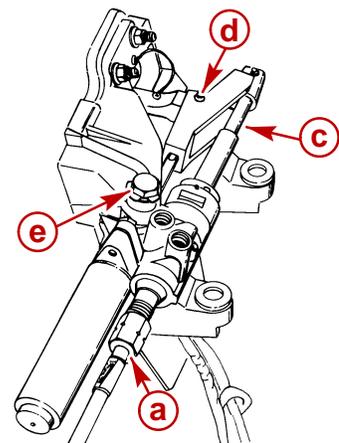
Lubricating Steering System

⚠ WARNING

Transom end of steering cable **MUST BE** fully retracted into cable housing when lubricating cable. If cable is lubricated while extended, hydraulic lock of cable could occur.



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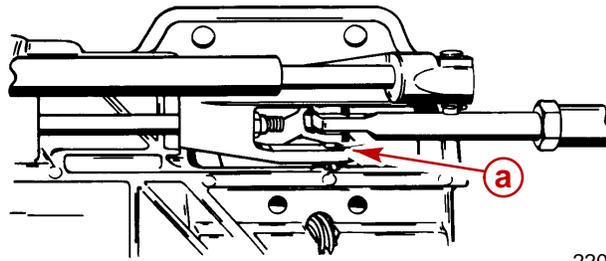
Earlier Style Control Valve

Later Style Control Valve

- a - Steering Cable Grease Fitting - 2-4-C Marine Lubricant with Teflon (See Warning Above)
- b - Control Valve Grease Fitting - 2-4-C Marine Lubricant with Teflon
- c - Steering Cable End - Special Lubricant 101
- d - Pivot Point - SAE 20 or 30 Engine Oil
- e - Pivot Bolts - Special Lubricant 101

Lubricating Tie Bar Pivot Points

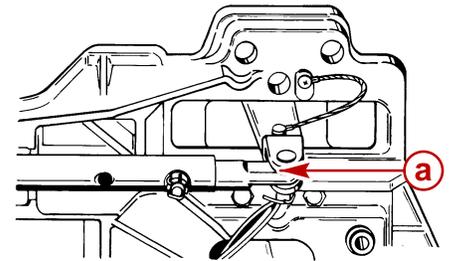
Models With Control Valve Mounted On Starboard Transom Assembly



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Starboard Engine

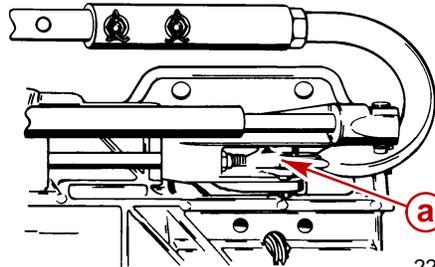
a - SAE 20 or 30 Engine Oil



22079

Port Engine

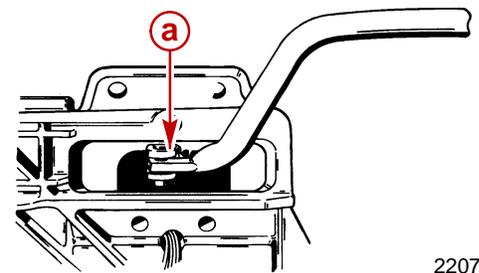
Models With Control Valve Mounted On Port Transom Assembly



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Port Engine

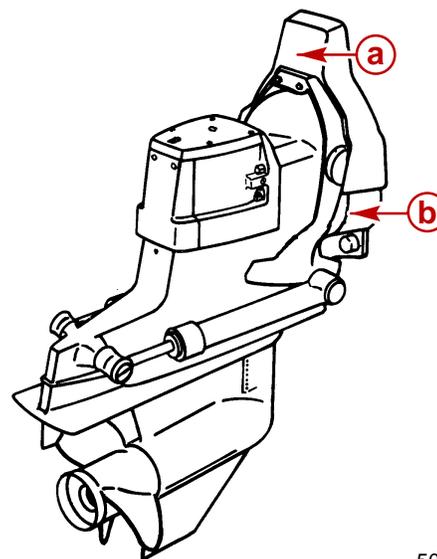
a - SAE 20 or 30 Engine Oil



22079

Starboard Engine

Lubricating Transom Gimbal Housing Assembly Swivel Shaft and Gimbal Bearing



50072

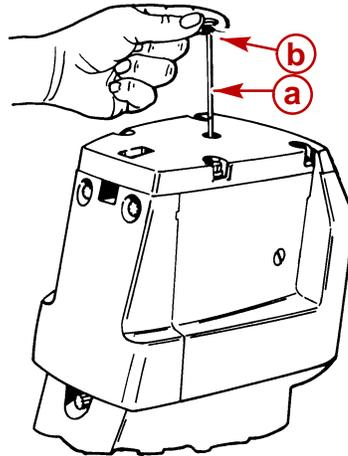
a - Swivel Shaft Grease Fitting - 2-4-C Marine Lubricant with Teflon (On Earlier Models)
 b - Gimbal Bearing Grease Fitting - Quicksilver U-Joint and Gimbal Bearing Grease

Checking and Adding Sterndrive Oil

IMPORTANT: Position sterndrive unit in DOWN/IN position so that anti-ventilation plate is level.

Models Without Drive Unit Gear Lube Monitor

1. Check oil level - oil should come up to line on dipstick. If oil is at proper level, reinstall oil dipstick and sealing washer. If oil is low, proceed to Step 2.



22098

- a - Oil Dipstick
- b - Sealing Washer (on Threads)

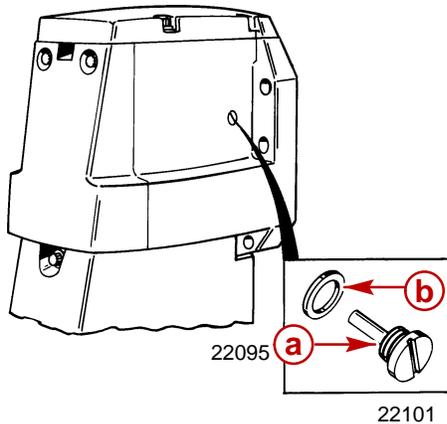
CAUTION

DO NOT attempt to fill drive unit through oil vent hole, as air will be trapped in drive unit and unit will be damaged from lack of lubrication.

CAUTION

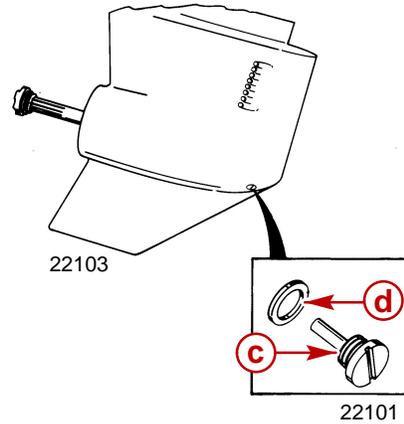
If more than 2 fl. oz. (59 ml) of oil is required to fill drive unit, an oil leak may exist. Find and correct cause of leak before unit is placed in operation.

2. If oil level is low, reinstall dipstick; then, remove oil fill/drain plug and insert lubricant pump into oil fill/drain hole.
3. Remove oil vent plug; then, fill drive unit (through oil fill/drain unit hole) with oil until an air-free stream of oil flows out of oil vent hole.



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22101



22103

22101

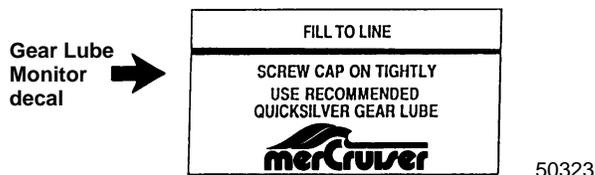
- a - Oil Vent Plug
- b - Sealing Washer or O-ring
- c - Oil Fill/Drain Plug
- d - Sealing Washer or O-ring

4. Without removing lubricant pump from fill/drain hole, reinstall vent plug and sealing washer (or O-ring if equipped). Torque to 30-50 lb. in. (3.39-5.56 N·m).
5. Remove lubricant pump and quickly reinstall fill/drain plug and sealing washer (or O-ring if so equipped). Torque to 30-50 lb. in. (3.39-5.56 N·m).
6. Recheck oil level, using dipstick.

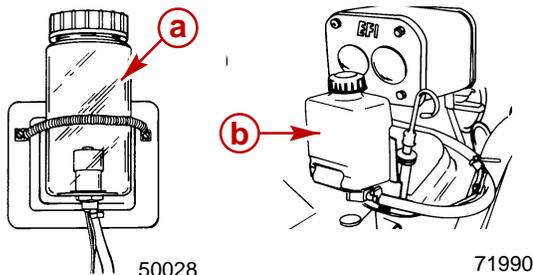
Models With Gear Lube Monitor

IMPORTANT: Position drive unit in **DOWN/IN** position so that anti-ventilation plate is level.

NOTE: Drive unit oil level is checked at gear lube monitor.



IMPORTANT: Oil level in gear lube monitor will rise and fall during drive operation; always check oil level when drive is cool and engine is shut down.



- a - Round Gear Lube Monitor
- b - Square Gear Lube Monitor

1. Fill gear lube monitor to "FULL" line on decal. Lubricate O-ring seal on gear lube monitor neck with sterndrive oil, to ensure ease of installing and removing cap, and install gear lube monitor cap. Do not overtighten cap - 1/4 turn, after cap contacts seal, is sufficient.

⚠ CAUTION

On models with Gear Lube Monitor, that have a dipstick in driveshaft housing cover: DO NOT REMOVE DIPSTICK - DO NOT CHECK OIL LEVEL WITH DIPSTICK. Removal of dipstick results in oil level raising/overflow condition, which can cause oil seal damage; if left open, drive unit will overflow.

2. Check oil level in gear lube monitor.

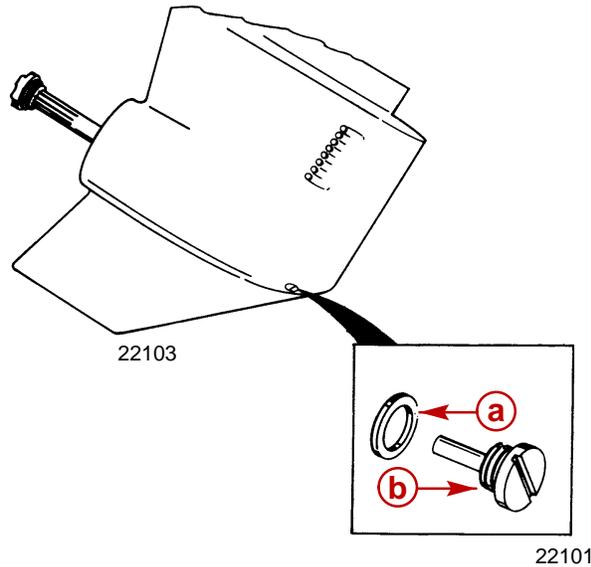
Checking Lubricant for Water

Product: 1998 Mercury MerCruiser Number 11 Bravo Sterndrives Service Repair Workshop Manual
<https://www.aresairmanual.com/downloads/1998-mercury-mercruiser-number-11-bravo-sterndrives-service-repair-workshop-manual/>

Periodically inspect lubricant for water, to ensure that drive unit seals are not leaking.

MODELS WITHOUT DRIVE UNIT GEAR LUBE MONITOR

1. Trim drive unit to the full trim UP/OUT position. Remove fill/drain plug to take a sample of lubricant. If water is observed or if lubricant appears discolored, drive unit is leaking and must be resealed.



- a - Fill/Drain Plug
- b - Sealing Washer or O-ring

2. Reinstall fill/drain plug. Torque to 30-50 lb. in. (3.39-5.56 N-m).

Sample of manual. Download All 596 pages at:

<https://www.aresairmanual.com/downloads/1998-mercury-mercruiser-number-11-bravo-sterndrives-service-repair-workshop-manual/>