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MERCURY
MerCruiser

SERVICE MANUAL

Number 31

5.0L/5.7L/6.2L MPI GASOLINE ENGINE

Printed in U.S.A.

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SEPTEMBER 2000

Notice

Throughout this publication, Dangers, 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.

⚠ DANGER

Immediate hazards which will result in severe personal injury or death.

⚠ WARNING

Hazards or unsafe practices which could result in severe personal injury or death.

⚠ CAUTION

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

Notice to Users of This Manual

This service manual has been written and published by the Service Department of Mercury Marine to aid our dealers' mechanics and company service personnel when servicing the products described herein.

It is assumed that these personnel are familiar with marine product servicing procedures. Furthermore, it is assumed that they have been trained in the recommended service procedures of Mercury MerCruiser product, including the use of mechanics' common hand tools and the special Mercury Marine or recommended tools from other suppliers.

We could not possibly know of and advise the marine trade of all conceivable procedures and of the possible hazards and/or results of each method. 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 products safety will be endangered.

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

We reserve the right to make changes to this manual without prior notification.

Refer to dealer service bulletins, operation maintenance and warranty manuals and installation manuals for other pertinent information concerning the products described in this manual.

Precautions

It should be kept in mind, while working on the product, that the electrical system and ignition system are capable of violent and damaging short circuits or severe electrical shocks. When performing any work where electrical terminals could possibly be grounded or touched by the mechanic, the battery cables should be disconnected at the battery.

Any time the intake or exhaust openings are exposed during service they should be covered to protect against accidental entrance of foreign material which could enter the cylinders and cause extensive internal damage when the engine is started.

It is important to note, during any maintenance procedure replacement fasteners must have the same measurements and strength as those removed. Numbers on the heads of the metric bolts and on the surfaces of metric nuts indicate their strength. American bolts use radial lines for this purpose, while most American nuts do not have strength markings. Mismatched or incorrect fasteners can result in damage or malfunction, or possibly personal injury. Therefore, fasteners removed should be saved for reuse in the same locations whenever possible. Where the fasteners are not satisfactory for re-use, care should be taken to select a replacement that matches the original.

Engine Mechanical Components

Many of the engine mechanical components are designed for marine applications. Unlike automotive engines, marine engines are subjected to extended periods of heavy load and wide open throttle operation and, therefore, require heavy-duty components. Special marine engine parts have design and manufacturing specifications that are required to provide long life and dependable performance. Marine engine parts also must be able to resist the corrosive action of salt or brackish water that will rust or corrode standard automotive parts within a short period of time.

Failure to use recommended Quicksilver service replacement parts can result in poor engine performance and/or durability, rapid corrosion of parts subjected to salt water and possibly complete failure of the engine.

Replacement Parts

Use of parts other than the recommended service replacement parts, will void the warranty on those parts that are damaged as a result.

⚠ WARNING

Electrical, ignition and fuel system components on Mercury MerCruiser Engines and Stern Drives 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, ignition or fuel system components, which do not comply to these rules and regulations, could result in a fire or explosion hazard and should be avoided.

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

Models Covered in This Manual

Sterndrive (MCM)	Serial Number
5.0L MPI Alpha and Bravo	0M300000
350 MAG MPI Alpha and Bravo	
350 MAG MPI Alpha and Bravo Horizon	
MX 6.2 MPI	
MX 6.2 MPI Horizon	

Inboard and Tow Sports (MIE)	Serial Number
350 MAG MPI Inboard	0M310000
350 MAG MPI Horizon Inboard	
MX 6.2 MPI Inboard	
MX 6.2 MPI Horizon Inboard	
350 MAG MPI Tow Sports	

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IMPORTANT INFORMATION

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1 A

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Introduction

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

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

How To Use This Manual

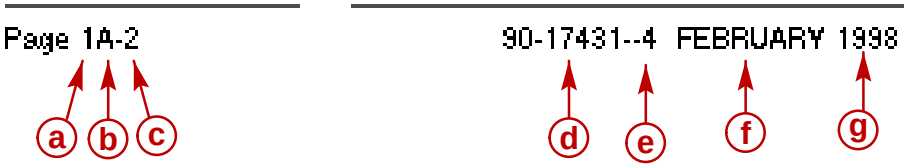
This manual is divided into sections which represent major components and systems.

Some sections are further divided into parts that more fully describe the component.

Refer to the Service Manual Outline following Models Covered In This Manual for section titles.

Page Identification

The service manual number and section title appear at the top of the page. Two number groups appear at the bottom of each page. Following is an example and a description.



a - Section Number
b - Section Part
c - Page Number
d - Manual Number
e - Revision Number
f - Month Printed
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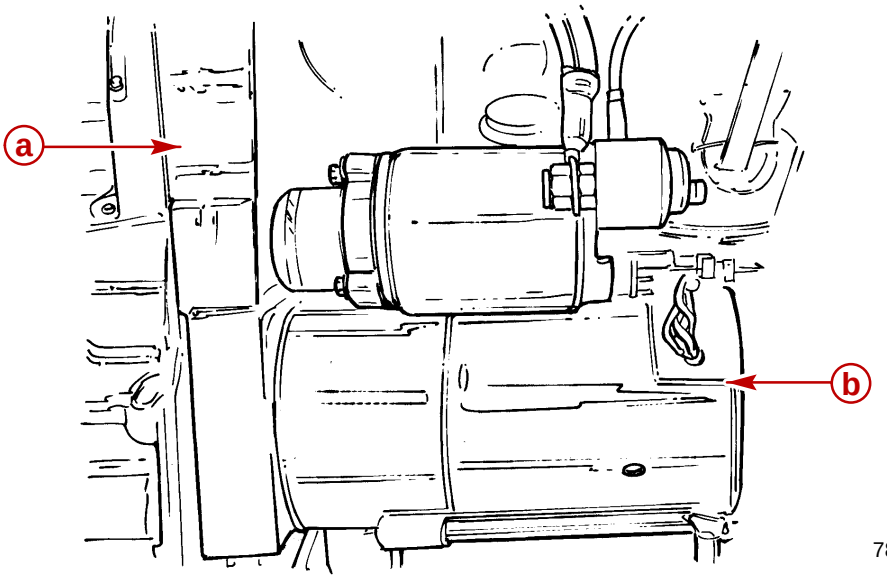
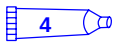
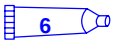
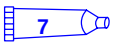
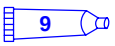
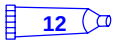
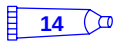
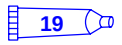
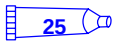
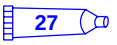
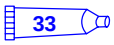
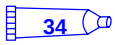
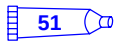
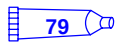
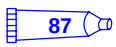
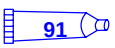
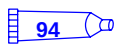
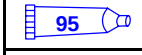
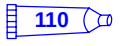
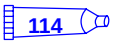
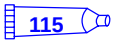
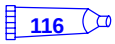
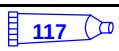
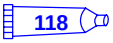
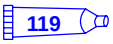
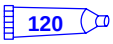
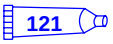
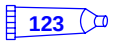
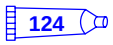
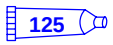
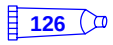
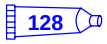
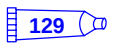
Engine Serial Number Locations



a - Serial Number Plate
b - Starter Motor

Mercury/Quicksilver Lubricants, Sealants And Adhesives

Tube Ref. #	Description	Container Size	Mercury Part Number	Quicksilver Part Number
	Needle Bearing Assy. Lubricant	8 oz (226.8 g) tube	N/A	92-802868A1
	Dielectric Grease	8 oz (226.8 g) can	N/A	92-823506-1
	Loctite 271 - Thread Locker	10 ml tube	N/A	92-809819
	Loctite 567 PST Pipe Sealant	50 ml tube	N/A	92-809822
	Loctite Master Gasket Kit		N/A	92-12564-2
	2 Cycle Premium Outboard Oil	1 US qt (0.94 L)	92-802813A1	92-802813Q1
	Perfect Seal	16 oz (0.45 kg) can	N/A	92-34227-1
	Liquid Neoprene	8 oz (226.8 g) can	N/A	92-25711-3
	Bellows Adhesive	1.5 oz (42.5 g) tube	N/A	92-86166Q1
	Loctite 680 Retaining Compound	10 ml tube	N/A	92-809833
	Special Lubricant 101	8 oz (226.8 g) tube	92-802865A1	92-802865Q1
	U-Joint and Gimbal Bearing Grease		92-802870A1	92-802870Q1
	Loctite 222 Thread Locker	10 ml tube	N/A	92-809818
	Loctite 242 Thread Locker	10 ml tube	N/A	92-809821
	4 Cycle 25W40 Engine Oil		92-802837A1	92-802837Q1
	Premium Gear Lubricant	1 US qt (0.94 L)	92-802846A1	92-802846Q1
	High Performance Gear Lube	1 US qt (0.94 L)	92-802854A1	92-802854Q1
	Engine Coupler Spline Grease	14 oz (0.39 kg) cartridge	92-802869A1	92-802869Q1
	Anti-Corrosion Grease	8 oz (226.8 g) tube	92-802867A1	92-802867Q1
	2-4-C with Teflon	8 oz (226.8 g) tube	92-802859A1	92-802859Q1
	4 Stroke 10W30 Outboard Oil	1 US qt (0.94 L)	92-802833A1	92-802833Q1
	Power Trim & Steering Fluid	8 oz (226.8 g)	92-802880A1	92-802880Q1

Tube Ref. #	Description	Container Size	Mercury Part Number	Quicksilver Part Number
	Premium Plus 2 Cycle TC-W3 Outboard Oil	1 US qt (0.94 L)	92-802824A1	92-802824Q1
	RTV 587 Silcone Sealer	3 oz (85.05 g)	N/A	92-809825
	Loctite 7649 Primer N	4.5 oz (127.57 g)	N/A	92-809824
	Storage Seal Rust Inhibitor	12 oz (325 ml) spray can	92-802878-56	92-802878Q56
	Corrosion Guard	12 oz (325 ml) spray can	92-802878 55	92-802878Q55
	15W40 4-cycle Diesel Engine Oil	1.06 US gal.(4 L)	92-877695K1	92-877695Q1
	Extended Life Antifreeze/Coolant	1 US gal. (3.78 L)	92-877770K1	92-877770K1
	Marine Engine Coolant	1.33 US gal. (5 L)	N/A	92-813054A2
	Fuel System Treatment and Stabilizer Concentrate	16 oz (437 ml)	92-802876A1	92-802876Q1
	Heat Transfer Compound	1.5 oz (42.5 g) tube	N/A	92-805701 1
	Liquid Gasket		N/A	92-808137
	T442 Sealant		N/A	92-862258
	Loctite 5900 Ultra Black RTV Silicone Sealant	13 oz (371 g) tube	N/A	92-809826
	Loctite Gasket Remover	18 oz (532 ml) spray can	N/A	92-809828 1
	Sealer Kit, Two Part Epoxy		N/A	92-65150 1
	Dexron III Automatic Transmission Fluid		Obtain Locally	Obtain Locally
	Loctite 592		Obtain Locally	Obtain Locally
	Loctite Quick Tite		Obtain Locally	Obtain Locally
	Isopropyl Alcohol		Obtain Locally	Obtain Locally
	Hot Glue		Obtain Locally	Obtain Locally
	Loctite 609		Obtain Locally	Obtain Locally
	Loctite 405		Obtain Locally	Obtain Locally
	Cyanacrylate Adhesive		Obtain Locally	Obtain Locally
	3M Permabond #3M08155		Obtain Locally	Obtain Locally
	Loctite 262		Obtain Locally	Obtain Locally

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IMPORTANT INFORMATION

Section 1B - Maintenance

1 B

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Torque Specifications

NOTE: *Securely tighten all fasteners not listed below.*

Description	Nm	lb-in.	lb-ft
Steering Lever Clamping Bolt And Nut	67.8		50
Propeller Nut Alpha One, Bravo One and Bravo Two[1]	75		55
Front Propeller Nut Bravo Three	136		100
Rear Propeller Nut Bravo Three	81		60
Rear Engine Mounts	51.5		38
Flame Arrestor Bracket Nuts	12		9

[1] Amount specified is MINIMUM.

Special Tools

Description	Part Number
Flushing Device	91-44357Q2
Dual Water Pickup Flush Gear Case Seal Kit	91-881150Q1
Low Water Pickups Flushing Attachment	849996T1
Quicksilver Reference Electrode And Test Meter	91-76675T1
Kent Moore Belt Tension Gauge	BT-3373-F

Lubricants / Sealants / Adhesives

Description	Where Used	Part Number
2-4-C Marine Lubricant With Teflon	Hinge pins	92-802859Q1
U-joint And Gimbal Bearing Grease	Sterndrive unit U-joint crosses and bearings, drive shaft	92-828052A2
	Gimbal bearings	
High Performance Gear Lube	Propeller shaft	92-802856Q1
Engine Coupler Spline Grease	Engine coupler splines, U-joint shaft splines	92-816391A4
Dexron III Automatic Transmission Fluid	Power Steering System	Obtain Locally
Engine Oil	Pivot points, guide contact surface, starter motor, detent ball and holes, water separating fuel filter sealing ring, oil filter sealing ring	Obtain Locally
2-Cycle Premium Outboard Oil	Water separating fuel filter layup	92-802813A1
Quicksilver Power Trim And Steering Fluid	Power trim pump	92-802880Q1
Corrosion Guard Spray	Power package	92-802878 55
Mercury Extended Life Coolant/Antifreeze	Closed Cooling System	92-877770K1
Mercury Fuel System Treatment and Stabilizer	Fuel System	92-802875A1
Mercury Fuel System Treatment and Stabilizer Concentrate	Fuel System	92-802876A1
Premium Plus 2-Cycle TC-W3 Outboard Oil	Fuel System	92-802824A1

Engine And Tune-Up Specifications

MCM (Sterndrive) Models

Models	5.0 L MPI	350 MAG MPI Horizon	350 MAG MPI	MX 6.2 MPI	MX 6.2 MPI Horizon
Propshaft Horsepower	260 [1]	300 [1]		320 [1]	
Propshaft Kilowatts	194	224 [1]		238 [1]	
Number of Cylinders	V8				
Displacement	5.0 l (305 cid)	5.7 l (350 cid)		6.2 l (377 cid)	
Bore/Stroke in. (mm)	3.74 x 3.48 (95 x 88.4)	4.0 x 3.48 (101.6 x 88.4)		4.0 x 3.75 (101.6 x 95.25)	
Compression Ratio	9.4:1	9.3:1		9.0:1	
Compression Pressure	Minimum 100 psi (670 kPa) [4]				
Specified WOT rpm Range[2]	4600-5000			4800-5200	
Idle rpm in NEUTRAL[2]	600 rpm [3]				
Oil Pressure @ 2000 rpm [5]	Minimum 124 kPa (18 psi)				
Oil Pressure @ Idle [5]	Minimum 55 kPa (4 psi)				
Fuel Pressure (1800 rpm)	296 kPa (43 psi)				
Thermostat	71 degrees C (160 degrees F)				
Firing Order	1-8-4-3-6-5-7-2				
Electrical System	12-Volt Negative (–) Ground				
Alternator Rating - Hot Operating Amps	65 Amps				
Alternator Rating - Cold Operating Amps	72 Amps				
Minimum Recommended Battery Rating	550 cca / 825 mca / 150 Ah				
Spark Plug Type	AC Platinum (AC 41-932)				
Spark Plug Gap	0.060 in.				

[1] Power rated in accordance with NMMA (National Marine Manufacturers' Association) rating procedures.

[2] Measured using an accurate service tachometer, with the engine at normal operating temperature.

[3] Idle speed on EFI models is not adjustable.

[4] Minimum recorded compression in any one cylinder should not be less than 70 percent of the highest recorded cylinder.

[5] Oil pressure must be checked with the engine at normal operating temperature.

Engine And Tune-Up Specifications (continued)

MIE (Tow Sports and Inboard) Models

Models	350 MAG MPI Tow Sport	350 MAG MPI Horizon	350 MAG MPI	MX 6.2 MPI	MX 6.2 MPI Horizon
Propshaft Horsepower	315 [1]	300 [1]		320 [1]	320 [1]
Propshaft Kilowatts	235 [1]	224 [1]		238 [1]	238 [1]
Number of Cylinders	V8				
Displacement	5.7 l (350 cid)			6.2 l (377 cid)	
Bore/Stroke in. (mm)	4.0 x 3.48 (101.6 x 88.4)			4.0 x 3.75 (101.6 x 95.25)	
Compression Ratio	9.3:1			9.0:1	
Compression Pressure	Minimum 670 kPa (100 psi) [4]				
Specified WOT rpm Range[2]	4600-5000	4400-4800		4600-5000	
Idle rpm in NEUTRAL [2]	600 rpm [3]				
Oil Pressure @ 2000 rpm [5]	Minimum 124 kPa (18 psi)				
Oil Pressure @ Idle [5]	Minimum 55 kPa (4 psi)				
Fuel Pressure (1800 rpm)	296 kPa (43 psi)				
Thermostat	71 degrees C (160 degrees F)				
Firing Order	1-8-4-3-6-5-7-2				
Electrical System	12-Volt Negative (–) Ground				
Alternator Rating - Hot Operating Amps	65 Amps				
Alternator Rating - Cold Operating Amps	72 Amps				
Minimum Recommended Battery Rating	550 cca / 825 mca / 150 Ah				
Spark Plug Type	AC Platinum (AC 41-932)				
Spark Plug Gap	.060 in.				

[1] Power rated in accordance with NMMA (National Marine Manufacturers' Association) rating procedures.

[2] Measured using an accurate service tachometer, with the engine at normal operating temperature.

[3] Idle speed on EFI models is not adjustable.

[4] Minimum recorded compression in any one cylinder should not be less than 70 percent of the highest recorded cylinder.

[5] Oil pressure must be checked with the engine at normal operating temperature.

Fluid Specifications

IMPORTANT: It may be necessary to adjust oil levels depending on the installation angle and the cooling systems (the heat exchanger and the fluid lines).

Engines

NOTE: *All capacities are approximate fluid measures*

All Models	Capacity Liters (U.S. qts)	Fluid Type
Crankcase Oil (With Filter) [1]	5.20 (5-1/2)	Quicksilver 4-Cycle 25W-40 Marine Engine Oil
Seawater Cooling System [2]	20 (21)	Propylene Glycol and Purified Water
Closed Cooling System	19 (20)	Mercury Extended Life Coolant/Antifreeze or Extended Life Ethylene Glycol 5/100 Antifreeze/Coolant mixed 50/50 with Purified Water

[1] Always use the dipstick to determine the exact quantity of oil or fluid required.

[2] Seawater Cooling System capacity information is for winterization use only.

Sterndrives

NOTE: *All capacities are approximate fluid measures*

NOTE: *Drive unit oil capacity is with the gear lube monitor.*

Model	Capacity Liters (U.S. qts)	Fluid Type
Alpha One	1.89 (2)	High Performance Gear Lube
Bravo One	2.60 (2.75)	
Bravo Two	3.08 (3.26)	
Bravo Three	2.84 (3)	

Transmissions

NOTE: *All capacities are approximate fluid measures*

NOTE: *Always use the dipstick to determine the exact fluid level.*

Model	Capacity Liters (U.S. qts)	Fluid Type
5000A	2.84 (3)	Dexron III Automatic Transmission Fluid or Equivalent
5000V	3.30 (3-1/2)	
71C In-Line	1.66 (1-3/4)	Mobil 424 or Dexron III Automatic Transmission Fluid Do Not Mix!
71C Gear Reduction	2.84 (3)	
71C Remote V-Drive	1.66 (1-3/4)	
72C In-Line	1.66 (1-3/4)	Mobil 424 or Universal Tractor Hydraulic Oil Do Not Mix!
72C Gear Reduction	1.66 (1-3/4)	
72C Remote V-Drive	1.66 (1-3/4)	
72C V-Drive	3.79 (4)	
630A	4.00 (4-1/2)	Dexron III Automatic Transmission Fluid
630V	4.00 (4-1/2)	

Maintenance Schedules

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

Maintenance Intervals

Maintenance intervals and the corresponding tasks to be performed, as shown in this current schedule or as found in a previously printed schedule, 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, Mercury MerCruiser has adjusted some maintenance intervals and the corresponding tasks to be performed. In some cases, this may allow for more individual tasks in a single visit to the servicing dealer. Therefore, it is very important that the boat owner and the servicing dealer discuss the current Maintenance Schedule and develop appropriate maintenance intervals to coincide with the individual operating habits, the environment and the maintenance requirements.

⚠ CAUTION

Always disconnect the battery cables from the battery before working around electrical systems components to prevent injury to yourself and damage to the electrical system should a wire be accidentally shorted.