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MERCURY

V8 250/300
FourStroke AMS
Outboard
SERVICE MANUAL

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OCTOBER 2021
Starting serial number 2B529482

MERCURY

V8 250/300 FourStroke AMS Outboard

SERVICE MANUAL



VERADO

SEAPRO

Starting serial number 2B529482

Notice to Users of This Manual

Throughout this publication, safety alerts labeled WARNING and CAUTION (accompanied by the 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 these alerts 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

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

Additional alerts provide information that requires special attention:

NOTICE

Indicates a situation which, if not avoided, could result in engine or major component failure.

IMPORTANT: Indicates information essential to the successful completion of the task.

NOTE: *Indicates information that helps in the understanding of a particular step or action.*

This manual has been written and published by the Mercury Marine Service Department 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 Marine power products, including the use of mechanics' common hand tools and the special Mercury Marine tools 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 results of each method. Therefore, anyone who uses a service procedure or tool that is not recommended by the manufacturer must first completely satisfy himself that neither his nor the product's 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 or service these products. We reserve the right to make changes to this manual without prior notification.

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

Precautions

While working on the product, keep in mind that the electrical and ignition systems 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 into the cylinders, which could cause extensive internal damage when the engine is started.

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 reuse, care should be taken to select a replacement that matches the original.

Personnel should not work on or under an engine that is suspended. Engines should be attached to workstands, or lowered to the ground as soon as possible.

Replacement Parts

⚠ WARNING

Avoid fire or explosion hazard. Electrical, ignition, and fuel system components on Mercury Marine products comply with federal and international standards to minimize risk of fire or explosion. Do not use replacement electrical or fuel system components that do not comply with these standards. When servicing the electrical and fuel systems, properly install and tighten all components.

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

Cleanliness and Care of Product

A Mercury Marine power product is a combination of many machined, honed, polished, and lapped surfaces with tight tolerances. When any product component is serviced, care and cleanliness are important. Proper cleaning and protection of machined surfaces and friction areas is an implied part of the repair procedure. This is considered standard shop practice even if not specifically stated.

Whenever components are removed for service, they should be retained in order. At the time of installation, they should be installed in the same locations and with the same mating surfaces as when removed.

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Important Information

Section 1A - Master Specifications

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V8 AMS General Specifications

Description		Specification
Kilowatts (horsepower)		184 kW (250 hp) 221 kW (300 hp)
Cylinder configuration		V8—64°, with dual overhead cam (DOHC) and 32 valves
Dry weight*	L	272 kg (600 lb)
	XL	277 kg (610 lb)
	XXL	281 kg (620 lb)
Displacement		4576 cc/4.6L (279.2 cid)
Cylinder bore		92 mm (3.62 in.)
Stroke		86 mm (3.38 in.)
Engine speed	Idle speed in neutral**	600 RPM
	Idle charge compensation***	600–725 RPM
	Troll control speed (if equipped)	550–1000 RPM
	WOT	250/300 Verado—5200–6000 RPM 300 SeaPro—4800–5600 RPM
Induction system		SmartCraft DTS® electronic throttle, naturally aspirated
Fuel system		Electronic fuel injection—EFI computer controlled with Advanced Range Optimization
Recommended fuel		Unleaded Regular 87 Octane minimum (R+M/2) or 91 RON fuel, 10% Ethanol maximum
Ignition system		SmartCraft propulsion control module (PCM) 112 digital inductive
Charging system		Regulated belt-driven 85 A, 1150 W maximum output Regulated belt-driven 115 A, 1550 W maximum output
Starting system		Electric start with SmartStart protection
Recommended spark plug		NGK LKAR7C-9
Spark plug gap		0.9 mm (0.035 in.)
Spark plug hex size		14 mm
Spark plug torque		20 Nm (177 lb-in.)
Spark plug hole size		12 mm
Firing order		1-2-7-3-4-5-6-8
Required battery type		12-volt absorbed glass mat (AGM)
Minimum battery rating****	USA (SAE)	800 marine cranking amps (MCA) with a minimum reserve capacity of 135 RC25 rating
	International (EN)	975 cold cranking amps (CCA) with a minimum 65 amp-hour (Ah)
Exhaust system		Through the propeller
Cooling system		Water-cooled; thermostat with pressure control
Thermostat	Valve stroke—minimum, at full open temperature	10.0 mm (0.39 in.)
	Start to open temperature	57–61 °C (134.6–141.8 °F)
	Full open temperature	77 °C (170.6 °F)
Lubrication system		Integrated dry sump
Oil capacity		6.6L (7.0 US qt)
Recommended oil	Verado	NMMA™ Certified FC-W® SAE 10W-30
	SeaPro	NMMA™ Certified FC-W® SAE 25W-40 or FC-W® SAE 10W-30
Engine control system		SmartCraft PCM 112 digital throttle and shift (DTS)
Trim system		Power trim
Maximum trim range		20° (–6° to 14°)

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Description	Specification
Power trim fluid	Power Trim and Steering Fluid or Automatic Transmission Fluid (ATF) Type F, FA, Dexron II, or Dexron III
Steering system	Power—required
CARB star rating	3

* Dry weight includes gear lube and steering cylinder.

** Engine at normal operation temperature.

*** The idle charge compensation may automatically increase the engine speed up to 725 RPM to compensate for a low battery charge condition. The increased idle RPM will charge the battery at a higher rate. Activating troll control (optional accessory) will override the idle charge compensation feature.

**** Battery manufacturers may rate and test their batteries to different standards. MCA, CCA, Ah, and reserve capacity (RC) are the ratings recognized by Mercury Marine. Manufacturers that use standards different than these, such as equivalent MCA, do not meet Mercury Marine battery requirements.

Ignition Specifications

Description		Specification
Full throttle RPM range	SeaPro	4800–5600
	Verado	5200–6000
Idle RPM		600
Ignition type		Digital inductive
Spark plug type		NGK LKAR7C-9
Spark plug gap		0.9 mm (0.035 in.)
Spark plug hex size		14 mm
Spark plug torque		20 Nm (177 lb-in.)
Firing order		1-2-7-3-4-5-6-8
Ignition timing at idle		Not adjustable; PCM controlled (approximately 2° ATDC)
Ignition timing at WOT		Not adjustable; PCM controlled

Charging and Starting Specifications

Description		Specification	
Alternator model series		8Si	9Si
Alternator output (regulated)	1800 RPM	37 A	42 A
	6000 RPM	85 A	115 A
Regulator voltage set point		14.5 ± 0.25 V	
Starter current draw	Under load	170–190 A	
	No load	60–80 A	

Fuel System Specifications

Fuel System Specifications	
Recommended fuel octane rating	87 (R+M)/2, 91 RON
Approximate fuel pressure at idle	290–340 kPa (42.1–43.9 psi)
Approximate fuel pressure engine not running	340–370 kPa (49.3–53.7 psi)
Fuel filtration	
Inlet filter, engine mounted	10 microns
Inlet filter, remote boat mounted	10 microns
High-pressure, at fuel rail inlet	46 microns
Fuel pump current draw	12 A ± 2 A (at 14.4 V)
Maximum fuel system inlet vacuum	10.16 kPa (3.0 in. Hg), (1.47 psi)

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V8 Cylinder Block/Crankcase Specifications

V8 Cylinder Block/Crankcase Specifications	
Number of cylinders	8
V-angle	64°
Displacement	4576 cc/4.6L (279.2 cid)
Compression ratio	10:1
Standard bore	92.00 mm (3.6220 in.)
Standard bore service limit	92.015 mm (3.6226 in.)
Stroke	86.00 mm (3.386 in.)
Cylinder bore maximum taper	0.02 mm (0.0007 in.)
Cylinder bore maximum out of round	0.015 mm (0.0006 in.)
Cylinder block main bearing bore	64.988–65.012 mm (2.5586–2.5595 in.)
Crankshaft main bearing journal	59.984–60.000 mm (2.3616–2.3622 in.)
Connecting rod bearing journal	53.984–54.000 mm (2.1254–2.1259 in.)
Crankshaft end play	0.00–0.432 mm (0.000–0.017 in.)
Crankshaft runout	0.05 mm (0.002 in.)
Crankshaft main bearing oil clearance—measured at 20 °C (68 °F), 90° from the split line	0.036–0.070 mm (0.0015–0.0027 in.)
Connecting rod bearing oil clearance—measured at 20 °C (68 °F), 90° from the split line	0.046–0.074 mm (0.0019–0.0029 in.)
Crankshaft thrust bearing surface width	25.95–26.05 mm (1.0217–1.0255 in.)
Connecting rod wrist pin bore diameter	20.014–20.022 mm (0.7880–0.7882 in.)
Connecting rod bore diameter (without bearing inserts)	57.000–57.016 mm (2.2441–2.2447 in.)
Piston skirt standard diameter	91.927–91.937 mm (3.6192–3.6195 in.)
Piston wrist pin bore diameter	20.005–20.010 mm (0.7876–0.7878 in.)
Wrist pin diameter	19.996–20.001 mm (0.7873–0.7874 in.)
Top ring groove width	1.22–1.25 mm (0.0480–0.0492 in.)
Second ring groove width	1.01–1.03 mm (0.0398–0.0405 in.)
Third ring groove width	2.01–2.03 mm (0.0791–0.0799 in.)
Top ring thickness—maximum	1.20 mm (0.0472 in.)
Second ring thickness—maximum	1.00 mm (0.0393 in.)
Top ring side clearance	0.02–0.05 mm (0.0008–0.0019 in.)
Second ring side clearance	0.01–0.03 mm (0.0004–0.0011 in.)
Top ring end gap	0.20–0.215 mm (0.008–0.0084 in.)
Second ring end gap	0.40–0.425 mm (0.016–0.0167 in.)
Oil ring end gap (top and bottom) (expander not applicable)	0.40–0.425 mm (0.016–0.0167 in.)

V8 Cylinder Head Specifications

Description	Specification
Head deck maximum warp	0.1 mm (0.0039 in.)
Number of valves	32
Number of valves per cylinder	4

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