MERCURY
GO BOLDLY.

www.mercurymarine.com.au
41-71 Bessemer Drive
Dandenong South, Victoria 3175 Australia

www.mercurymarine.com
P.O. Box 1939
Fond du Lac, WI 54936-1939 USA

www.brunswick-marine.com
Parc Industriel de Petit-Rechain
B-4800 Verviers, Belgium

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MERCURY

V6 175/200/225 V8 200/225/250/300 FourStroke CMS Outboard

SERVICE MANUAL

90-8M0182078
OCTOBER 2021
Starting serial number 2B529482

MERCURY

V6 175/200/225
V8 200/225/250/300
FourStroke CMS Outboard

SERVICE
MANUAL



FOURSTROKE
PRO XS
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 CMS General Specifications

Model Specifications		
Kilowatts (horsepower)		147 kW (200 hp) 165 kW (225 hp) 184 kW (250 hp) 221 kW (300 hp)
Cylinder configuration		V8—64°, with dual overhead cam (DOHC), and 32 valves
Weight		
Dry weight—L*		229 kg (505 lb)
Dry weight—XL*		240 kg (530 lb)
Dry weight—XXL*		249 kg (548 lb)
Displacement—all hp		4576 cc/4.6 L (279.2 in.³)
Standard bore		92 mm (3.62 in.)
Standard stroke		86 mm (3.38 in.)
RPM		
Idle RPM in neutral **		600 RPM
Idle charge compensation ***		600–725 RPM
Troll control RPM (if equipped)		550–1000 RPM
WOT		250/300 FourStroke—5200–6000 RPM 200/225/250/300 Pro XS—5600–6200 RPM 225/250/300 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 watt 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 (15 lb-ft)
Spark plug hole size		12 mm
Firing order		1-2-7-3-4-5-6-8
Required battery type		12-volt AGM (absorbed glass mat) battery
Battery rating ****	USA (SAE)	800 minimum marine cranking amps (MCA) with a minimum reserve capacity of 135 RC25 rating
	International (EN)	975 minimum 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		6.6 liters (7.0 US qt)
Recommended oil		NMMA Certified FCW SAE10W-30 NMMA Certified FCW SAE 25W-40 or FCW SAE 10W-30—SeaPro models
Engine control system		SmartCraft PCM 112 digital throttle and shift (DTS)

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Model Specifications	
Trim system	Power trim
Maximum trim range	20° (–5° to 15°)
Power trim fluid	Power Trim and Steering Fluid or Automatic Transmission Fluid (ATF) Type F, FA, Dexron II, or Dexron III
Steering system	Hydraulic—required Power—optional Big Tiller—power steering only *****
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.

***** Big Tiller optional for 250 horsepower and below.

V6 CMS General Specifications

Model Specifications		
Kilowatts (horsepower)		129 kW (175 hp) 147 kW (200 hp) 165 kW (225 hp)
Cylinder configuration		V6—64°, with dual overhead cam (DOHC), and 24 valves
Weight		
Dry weight—L*		215 kg (475 lb)
Dry weight—XL*		220 kg (485 lb)
Dry weight—XXL*		225 kg (495 lb)
Displacement—all hp		3432 cc/3.4 L (209.4 $in.^3$)
Bore		92 mm (3.62 in.)
Stroke		86 mm (3.38 in.)
RPM		
Idle RPM in neutral **		600 RPM
Idle charge compensation ***		600–725 RPM
Troll control RPM limit—if equipped		550–1000 RPM
WOT		175—5000–5800 RPM 175 Pro XS—5400–6000 RPM 200—5000–5800 RPM 200 SeaPro—4600–5400 RPM 225—5200-6000 RPM
Induction system		SmartCraft DTS® electronic throttle, naturally aspirated
Fuel system		Computer controlled sequential multiport electronic fuel injection
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, 1071 watt maximum output
Required battery type		12-volt AGM (absorbed glass mat) battery
Battery rating ****	USA (SAE)	800 minimum marine cranking amps (MCA) with a minimum reserve capacity of 135 RC25 rating
	International (EN)	975 minimum cold cranking amps (CCA) with a minimum 65 amp hour (Ah)
Recommended spark plug		NGK LKAR7C-9

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Model Specifications	
Spark plug gap	0.9 mm (0.035 in.)
Spark plug hex size	14 mm
Spark plug torque	20 Nm (15 lb-ft)
Spark plug hole size	12 mm
Firing order	1-2-3-4-5-6
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	6.6 liters (7.0 US qt)
Recommended oil	NMMA Certified FCW SAE10W-30 NMMA Certified FCW SAE 25W-40 or FCW SAE 10W-30—SeaPro models
Engine control system	SmartCraft PCM 112 digital throttle and shift (DTS)
Trim system	Power trim
Maximum trim range	20° (–5° to 15°)
Power trim fluid	Power Trim and Steering Fluid or Automatic Transmission Fluid (ATF) Type F, FA, Dexron II, or Dexron III
Steering system	Hydraulic—required Power—optional Big Tiller—power steering only *****

* 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.

***** Big Tiller optional for 250 horsepower and below.

Ignition Specifications - V8 Models

Description		Specification
Full throttle RPM range	SeaPro	4800–5600
	250 and 300	5200–6000
	Pro XS	5600–6200
Idle RPM (see NOTE)		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

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