Service Manual Outline

Section 1 - Important Information
- A - General Information
- B - Maintenance

Section 2 - Removal and Installation
- A - Sterndrive (MCM) Models
- B - Inboard (MIE) Models

Section 3 - Engine Mechanical
- A - D4.2L 300 Engines

Section 4 - Electrical System
- B - Charging System
- E - Wiring Diagrams

Section 5 - Fuel System
- C - Fuel Injectors
- D - Injection Pump
- E - EDI Diagnosis

Section 6 - Cooling System
- A - Seawater Cooling System
- B - Closed Cooling System

Section 7 - Intake And Exhaust System
- A - Intercooler
- C - Turbocharger

APERÇU — Engine Manual — fichier complet disponible après achat 1/10

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 supplement 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.

APERÇU — Engine Manual — fichier complet disponible après achat 2/10

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 reuse, 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 Mercury Marine 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 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, 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.

APERÇU — Engine Manual — fichier complet disponible après achat 3/10

Cleanliness And Care Of The Product

A marine power product is a combination of many machined, honed, polished and lapped surfaces with tolerances that are sometimes measured in hundredths of a millimeter or ten thousands of an inch. When any product component is serviced, care and cleanliness are important. Throughout this manual, it should be understood that proper cleaning and protection of machined surfaces and friction areas is a part of the repair procedure. This is considered standard shop practice even if not specifically stated.

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

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.

APERÇU — Engine Manual — fichier complet disponible après achat 4/10

Models Covered in This Manual

Sterndrive (MCM) Model	Serial Number
D4.2L 300	0L667439 and Above

Inboard (MIE) Model	Serial Number
D4.2L 300	0L667439 and Above

APERÇU — Engine Manual — fichier complet disponible après achat

IMPORTANT INFORMATION

Section 1A - General Information

Introduction 1A-2
How to Use This Manual 1A-2
Page Numbering 1A-2
Engine Serial Number / Decal Locations . . 1A-3
Operation / Duty Cycle 1A-4
Engine Break-In 1A-4
Initial Break-In Procedure 1A-4
Mercury/Quicksilver Lubricants, Sealants And Adhesives 1A-5

IMPORTANT INFORMATION

Section 1B - Maintenance

Torque Specifications 1B-2
Tools 1B-2
Lubricants / Sealants / Adhesives 1B-2
Engine Specifications 1B-3
Sterndrive (MCM) Engine 1B-3
Inboard (MIE) Engine 1B-4
Capacities 1B-5
Engines 1B-5
Sterndrives 1B-5
Transmissions 1B-5
Maintenance Schedules 1B-6
Maintenance Intervals 1B-6
Sterndrive (MCM) Engine 1B-7
Routine Maintenance 1B-7
Scheduled Maintenance 1B-8
Inboard (MIE) Engine 1B-10
Routine Maintenance 1B-10
Scheduled Maintenance 1B-11
Engine External Views 1B-12
Starboard Side View 1B-12
Front View 1B-13
Port Side View 1B-14
Rear View 1B-16
Sterndrive Unit Oil 1B-17
Checking 1B-17
Filling 1B-18
Changing 1B-19
Transmission Fluid 1B-21
Checking 1B-21
Changing and Filling 1B-21
Flushing The Power Package - Sterndrive (MCM) 1B-22
Sterndrive Water Pickups 1B-22
Alternative Water Pickups 1B-25
Flushing The Power Package - Inboard (MIE) 1B-28

REMOVAL AND INSTALLATION

Section 2A - Sterndrive (MCM) Models

Torque Specifications 2A-3
Torque Specifications 2A-2
Lubricants / Sealants / Adhesives 2A-2
Special Tools 2A-3
Removal 2A-3
Installation 2A-6
Engine Installation And Alignment 2A-6
Engine Connections 2A-14
Throttle Cable Installation and Adjustment 2A-20
Shift Cable Installation and Adjustment 2A-23
Troubleshooting Shift Problems 2A-27
Battery Cables 2A-29

REMOVAL AND INSTALLATION

Section 2B - Inboard (MIE) Models

Torque Specifications 2B-2
Lubricants / Sealants / Adhesives 2B-2
Removal 2B-3
Installation 2B-6
Engine Mount Pre-Adjustment 2B-6
Engine Installation and Initial Engine Alignment 2B-8
Final Engine Alignment 2B-10
Engine Connections 2B-17
Throttle Cable Installation and Adjustment 2B-20
Shift Cable Installation and Adjustment 2B-20
Battery Cables 2B-20

APERÇU — Engine Manual — fichier complet disponible après achat 6/10

ENGINE MECHANICAL

Section 3A - D4.2L 300 Engine

Identification 3A-2
Torque Specifications 3A-3
Lubricants / Sealants / Adhesives 3A-5
Tools 3A-6
  Special Tools 3A-6
Engine Specifications 3A-7
  Pistons 3A-7
  Piston Rings 3A-7
  Cylinder Liner Diameter 3A-8
  Cylinder Liner Protrusion 3A-8
  Head Gaskets 3A-8
  Cylinder Head 3A-8
  Oil Pump 3A-9
  Oil Thermostat 3A-9
  Camshaft 3A-10
  Valve Lifter 3A-10
  Rocker Arm 3A-11
  Valve Adjustment 3A-11
  Valve 3A-11
  Valve Seat 3A-12
  Valve Guide 3A-13
  Valve Spring 3A-13
  Crankshaft 3A-14
  Connecting Rods 3A-15
  Connecting Rod Bushings 3A-15
  Flywheel 3A-15
Precautions 3A-16
General Information 3A-17
  Cylinder Heads 3A-17
  Pistons 3A-17
  Crankshaft Timing Gear 3A-17
  Engine Rotation 3A-18
  Engine Firing Order 3A-18
  Cylinder Head Installation 3A-19
    Installation 3A-19
  Cylinder Head Torque Sequence and Specifications 3A-20
    Torque Procedure During Assembly 3A-21
    Torque Procedure After 20-30 Minute Break-In 3A-22
  Establishing TDC (Top Dead Center) 3A-23
Valve Covers 3A-26
  Removal 3A-26
  Cleaning 3A-28
  Inspection 3A-28
  Installation 3A-29
Oil Separator / Vent System 3A-33
  Exploded View 3A-33
  Removal 3A-34
  Inspection 3A-34
  Installation 3A-35
Timing Cover 3A-37
  Exploded View 3A-37
  Removal 3A-38
  Cleaning 3A-38
  Inspection 3A-38
  Installation 3A-39
Valves 3A-42
  Inspection 3A-42
Valve Guides 3A-43
  Inspection 3A-43
Valve Seats 3A-44
  Inspection 3A-44
Connecting Rod / Piston Assembly 3A-45
  Removal 3A-45
  Disassembly 3A-46
  Cleaning 3A-47
  Inspection 3A-48
    Connecting Rod And Piston Pin . . . 3A-48
    Connecting Rod Bearing Clearance - Plastic Gauge Method 3A-49
    Connecting Rod Bearing Clearance - Micrometer Method 3A-51
    Pistons 3A-53
    Checking Ring End Gap 3A-55
  Assembly 3A-56
  Installation 3A-57
Crankshaft 3A-60
  Timing Gear 3A-60
    Removal 3A-60
    Cleaning 3A-60
    Inspection 3A-61
    Installation 3A-61
Cylinder Block / Piston Cooling Jets (Oil Spray Nozzles) 3A-62
  Exploded View 3A-62
  Removal 3A-63
  Cleaning 3A-63
  Inspection 3A-63
  Installation 3A-64

APERÇU — Engine Manual — fichier complet disponible après achat 7/10

Electrical Systems

Section 4B - Charging System

Identification 4B-2
Replacement Parts Warning 4B-2
Specifications 4B-3
Torque Specifications 4B-3
General Information 4B-3
Exploded View 4B-4
Installation 4B-5

ELECTRICAL SYSTEMS

Section 4E - Wiring Diagrams

Wire Color Abbreviations 4E-2
Special Tools 4E-2
Tools 4E-2
Lubricants / Sealants / Adhesives 4E-3
General Information 4E-3
Sterndrive (MCM) Models 4E-4
Power Trim System Wiring Diagram . . . 4E-4
MerCathode System Wiring Diagram . . 4E-5
Engine Wiring - Starting and Charging System 4E-6
ECM and Fuel System Wiring 4E-8
Quicksilver Primary Station Instrumentation Wiring 4E-10
Quicksilver Second Station Instrumentation 4E-12
Instrument / Extension Harness Connector 4E-13
Inboard (MIE) Models 4E-14
Engine Wiring - Starting and Charging System 4E-14
Quicksilver Primary Station Instrumentation Wiring 4E-16

FUEL SYSTEM

Section 5C - Fuel Injectors

Identification 5C-3
Specifications 5C-2
D4.2L 300 . . . . . 5C-2
Tools 5C-3
Bosch 5C-3
Precautions 5C-4
General Information 5C-5
Testing 5C-6

FUEL SYSTEM

Section 5D - Injection Pump

Identification 5D-2
Pump Code and Identification Number Location 5D-2
Torque Specifications 5D-2
Lubricants / Sealants / Adhesives 5D-3
Specifications 5D-3
Injection Pump 5D-3
Timing 5D-3
Tools 5D-3
Special Tools 5D-4
EDI Tools 5D-4
Kent-Moore Tools 5D-4
Precautions 5D-5
Replacement Parts Warning 5D-6
Repair and Service 5D-7
General Information 5D-7
Service Information 5D-7
Testing Information 5D-8
Exploded View 5D-9
Removal 5D-10
Fuel Injection Pump Installation 5D-18
Installation With Engine Assembled . . 5D-18
Installation During Engine Reassembly 5D-21
Fuel Injection Pump Timing 5D-24
Checking / Setting 5D-24

APERÇU — Engine Manual — fichier complet disponible après achat 8/10

FUEL SYSTEMS

Section 5E - EDI Diagnosis

Torque Specifications 5E-2
Tools 5E-2
Special Tools 5E-2
EDI Tools 5E-2
Kent-Moore Tools 5E-3
Replacement Parts Warning 5E-3
Precautions 5E-4
General Information 5E-6
Introduction 5E-7
Service Precautions 5E-8
System Components 5E-10
Fuel Injection Pump Repair 5E-12
Relay, Module and Sensor Servicing (On-Board Service) 5E-12
ECM (Engine Control Module) 5E-13
Removal 5E-13
Cleaning 5E-14
Inspection 5E-14
Installation 5E-15
Testing 5E-15
Throttle Position (TP) Sensor 5E-16
Removal 5E-16
Cleaning 5E-16
Inspection 5E-16
Installation 5E-17

COOLING SYSTEM

Section 6A - Seawater Cooling System

Lubricants / Sealants / Adhesives 6A-2
Tools 6A-2
Seawater (Raw Water) System Specifications 6A-3
Seawater Pump Delivery Rates 6A-3
Seawater Pickup Connections 6A-3
Seawater Pickup Hose 6A-3
Seacock (Water Inlet Valve) 6A-3
SeaWater Strainer 6A-3
Through the Hull Seawater Pickup . 6A-3
Precautions 6A-4
Exploded View - Seawater Pumps 6A-5
D4.2L 300 . . . . . 6A-5
Seawater Flow Diagram 6A-6
Fuel Cooler 6A-7
General Information 6A-7
Location of Cooler 6A-7
Inspection Before Removal 6A-8
Cleaning Without Removal 6A-8
Removal 6A-9
Installation 6A-10

COOLING SYSTEMS

Section 6B - Closed Cooling System

Torque Specifications 6B-2
Lubricants / Sealants / Adhesives 6B-2
Specifications 6B-3
Closed Cooling System Capacity 6B-3
Coolant Specification 6B-3
Water Pump 6B-3
Thermostats 6B-3
Pressure Cap Rating 6B-3
General Information 6B-4
Engine Water Circulating Pump 6B-4
Exploded View 6B-4
Removal 6B-5
Cleaning and Inspection 6B-5
Installation 6B-6

APERÇU — Engine Manual — fichier complet disponible après achat 9/10

INTAKE AND EXHAUST SYSTEM

Section 7A - Intercooler

Torque Specifications 7A-2
Torque Specifications 7A-2
Lubricants / Sealants / Adhesives 7A-2
General Information 7A-3
Exploded Views 7A-4
D4.2L 300 Intercooler 7A-4
Intercooler 7A-6
Removal 7A-6
Disassembly 7A-9
Cleaning and Inspection 7A-11
Assembly 7A-12
Installation 7A-15

INTAKE / EXHAUST SYSTEM

Section 7C - Turbocharger

Identification 7C-2
Turbocharger Specifications 7C-3
Testing Turbocharger Boost Pressure . . 7C-4
Checking Turbine Bearings (Assembled) 7C-5

APERÇU — Engine Manual — fichier complet disponible après achat 10/10