INTRODUCTION

Please read this Owner's Manual completely prior to operating the engine and boat for the first time. The Owner's Manual contains information critical for safe operation, and to activate and keep the limited warranty statement in effect throughout the applicable warranty period. Continuing the appropriate maintenance and care going forward can ensure long-term enjoyment of your Ilmor High-Performance Marine engine. DO NOT OPERATE THE ENGINE WITHOUT FIRST READING THE ENTIRE OWNER'S MANUAL AND ALL SUPPORTING DOCUMENTATION, AS WELL AS THE BOAT OWNER'S MANUAL.

WELCOME

Welcome to the world of Ilmor High-Performance Marine. We would like to thank you for selecting one of the finest and most durable High-Performance Marine engine packages in the world for your boating needs. These engines represent a new opportunity for the boating world to enjoy a reliable, high-performing power plant. Based on lightweight, high-output designs, these engine packages are designed to deliver high-performance boating pleasure without the typical complications. Along with their high power and torque output, Ilmor High-Performance Marine engines are notable for their smooth acceleration, ease of handling, reduced fuel consumption, excellent drivability and user-friendly characteristics. Please read this manual thoroughly so that you fully understand the proper care and maintenance of your Ilmor High-Performance Marine product.

This Owner's Manual contains operation, maintenance and warranty information specific to the product(s) described on the cover of this manual. The product you have purchased comes with a limited warranty through Ilmor High-Performance Marine. See Ilmor High Performance Marine, LLC Limited Warranty for more information.

This Owner's Manual reflects the most recent product information available at press printing. Nonetheless, Ilmor retains the right to make changes to the engine and/or components as a result of continually improving the Ilmor High-Performance Marine engine. Ilmor reserves the right to make changes to the engine specifications at any time, without prior notice, and to discontinue product. Changes may be made without obligation on Ilmor's part to provide or equip previously manufactured engines with updated specifications. If the retail purchaser determines that updated equipment can be retrofitted on existing product, such changes are at the sole discretion and cost to the retail purchaser. Ilmor bears no responsibility in these instances. Consumers are encouraged to check **www.ilmor.com** regularly for additional information. The website will also track service bulletins and other technical information that may have impact on the consumer's engine operation. Ilmor's obligation regarding such matters is delineated within the Ilmor High-Performance Marine Limited Warranty.

Because of Ilmor's commitment to continual product improvement, some alterations may occur to current model Ilmor High-Performance Marine engines after the publication of this Owner's Manual. Realistically, this Owner's Manual cannot address every potential issue that may arise from the operation and use of Ilmor High-Performance Marine products. A reasonable effort was made to make this Owner's Manual as accurate and complete as possible, but photographs and drawings may be only representational. Suppliers may also change or alter product. The information provided discusses the topics and issues most critical to ensuring a successful, long-term ownership of your Ilmor High-Performance Marine engine.

To contact Ilmor High-Performance Marine directly, please forward any inquiries to the following address. We can also be reached by phone, fax or e-mail. If contacting via mail, fax or e-mail, please send to the attention of: Ilmor High-Performance Marine Sales & Service.

Ilmor High-Performance Marine, LLC
43939 Plymouth Oaks Blvd.
Plymouth, MI 48170
(734) 456-3600
Fax (734) 456-3699

Online contact: **sales@ilmor.com**
service@ilmor.com

Product updates and technical bulletins: **www.ilmor.com**

TRADEMARKS

All non-Ilmor trademarks, service marks, logos, slogans and trade names are the properties of their respective owners. The following is a list of trademarks that may be used throughout this manual.

CorrosionX
Diacom PC Software
Lucas
Mobil 1
Sierra
STA-BIL
WD-40

NOTES

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Section 1

SAFETY

Prior to operating the boat for the first time, boat operators MUST read this Owner's Manual in its entirety. It is also recommended to reread it prior to the first outing each boating season. Keeping the Owner's Manual on-board the boat in a dry, secure location such as a glove box is highly recommended for referral purposes. Be sure to also read the boat Owner's Manual, with particular attention to proper operation and safety concerns addressed within that publication.

It is the boat owner's and the operator's responsibility to be aware of safety issues and concerns in the proper operation of the boat. All people on-board, regardless of age, physical limitations and/or previous boating experience (or lack of experience), bear responsibility for determining the appropriate behavior and safety precautions, including care around the engine, engine compartment, transmission and all moving parts.

Key to safety is the prescribed maintenance of the engine and drive train as described in this Owner's Manual, on **www.ilmor.com**, and through information and directives provided by the suppliers of parts for the drive train. A properly prepared and maintained engine is less likely to stall, misfire or otherwise operate in a manner that could place the boat occupants, as well as others on the same body of water, in unsafe situations.

Throughout this Owner's Manual, specific safety information will be highlighted with symbols designed to draw particular attention to specific information. These will include:

This safety alert symbol appears with most safety statements. It means attention, become alert, your safety is involved! Please read and abide by the message that follows the safety alert symbol.

⚠ DANGER! ***Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.***

⚠ WARNING! ***Indicates a potentially 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.***

NOTICE: Indicates a situation which can cause damage to the engine, personal property and/or the environment, or cause the equipment to operate improperly.

NOTE: Indicates a procedure, practice or condition that should be followed in order for the engine or component to function in the manner intended.

The precautions listed in this Owner's Manual are not all-inclusive. Ilmor cannot anticipate any or all safety issues, nor fully anticipate the extent to which injury may occur. Information contained in this Owner's Manual reflects a consensus of opinion within the marine industry.

DIRECT SAFETY CONCERNS

Whenever the engine is operated within the confines of an engine compartment, it is extremely important to follow the boat manufacturer's instructions regarding venting of the engine compartment prior to or during low-speed/idle operation.

One of the most critical safety matters affecting boaters is the matter of carbon monoxide emission. This is a colorless, odorless and poisonous gas that accumulates rapidly, both within confined areas and even within the open air. Exposure to carbon monoxide can be fatal within minutes, even in low concentrations. Avoid exhaust vent areas of the boat, particularly during slow-speed operation.

⚠ DANGER! ***Always avoid exhaust areas and the engine compartment during the venting of engine exhaust. The engine exhaust emits carbon monoxide, which is colorless, odorless and poisonous even in small concentration. Carbon monoxide can cause serious injury or death in short periods of time.***

All persons on-board must exhibit special care and concern whenever the engine is running and the engine compartment is open. Everyone should avoid all moving parts. If the engine or anything accessible from the engine compartment requires adjustment while the engine is running, the adjustment should be done by an authorized Ilmor High-Performance Marine service center or authorized boat manufacturer dealer if at all possible. If adjustments are necessary while the boat is underway or in preparation for boating, extreme care should be used.

⚠ WARNING! ***Never attempt to stop or slow rotating parts. Keep away from rotating parts. The engine compartment serves as a guard. Always have the engine off whenever the compartment is open, except as directed by the boat manufacturer to vent exhaust fumes or during maintenance. Use extreme care whenever operating the engine with the compartment open. Clothing or body parts can get caught in moving parts, which could result in serious injury or death.***

It is the owner's and/or operator's responsibility to perform all safety checks to the engine(s) prior to, during and after operating the boat. When properly adhered to, the maintenance schedules listed in this Owner's Manual will ensure long-term operation and performance of the engine. When service and maintenance are required, return the boat to an authorized Ilmor High-Performance Marine service center. Failure to follow procedures outlined in this Owner's Manual or through published technical information at **www.ilmor.com** may void the warranty.

The precautions listed in this Owner's Manual, as well as published technical information are not all-inclusive. Any replacement part, fluid or substance that is not specified as recommended should not be used as it may result in engine failure. This could lead to voiding the warranty, as well as placing people in an unsafe situation.

⚠WARNING! ***Always use genuine Ilmor High-Performance Marine replacement parts. The electrical and ignition components have been designed to comply with U.S. Coast Guard regulations intended to minimize the possibility of fire and/or explosion. The use of nonapproved replacement parts from aftermarket or other sources will void the warranty and could result in fire and/or explosion.***

DANGERS, WARNINGS, CAUTIONS AND NOTICES

The following safety precautions are published for your information. Ilmor does not, by the publication of these precautions, imply or in any way represent that they are the sum of all dangers present. If you are installing, operating, or servicing an Ilmor product, it is your responsibility to ensure full compliance with all applicable safety codes and requirements. All requirements of the Federal Occupational Safety and Health Act must be met when Ilmor products are operated in areas that are under the jurisdiction of the United States of America. Ilmor products operated in other countries must be installed, operated and serviced in compliance with any and all applicable safety requirements of that country.

For details on safety rules and regulations in the United States, contact your local office of the Occupational Safety and Health Administration (OSHA).

The words DANGER, WARNING, CAUTION and NOTICE are used throughout this manual to highlight important information. Be certain that the meanings of these alerts are known to all who work on or near the equipment.

Failure to adhere to and comply with the safety dangers, warnings, cautions and notices that appear in this manual can lead to serious illness, injury or even death and/or damage to your boat or the property of others. Beyond these warnings, boaters have a personal responsibility to utilize a common sense approach to the boating experience, including keeping individuals off or away from the swim platform and the stern area of the boat during the engine operation. Personal flotation devices ("PFDs") save lives and ensure positive experiences. Ilmor offers many proactive approaches to the boating experience, but the consumer is ultimately responsible for the positive and safe involvement in boating.

Please note that the safety information statements presented below are categorized for information purposes only, and are not presented in any particular order of importance. Each of the statements referenced below and in the other sections of this manual provide you with important safety-related information and must be read and followed to avoid injury or damage, as applicable. We strongly encourage you to read the dangers, warnings, cautions and notices within the context in which they are presented by reading and reviewing those sections.

⚠ **DANGER!** ***Always avoid exhaust areas and the engine compartment during the venting of engine exhaust. The engine exhaust emits carbon monoxide, which is colorless, odorless and poisonous even in small concentration. Carbon monoxide can cause serious injury or death in short periods of time.***

⚠ **DANGER!** ***Never start the engine if a gasoline odor is present or if gasoline can be seen at any point along the fuel line, along the fuel tank, in the bilge or at the engine. Remove the key from the ignition switch and call an authorized boat and/or authorized Ilmor High-Performance Marine service center for service. Take care not to spill gasoline when fueling. If gas is spilled accidentally, wipe up all traces with dry rags immediately and dispose of rags properly on-shore. Gasoline and its vapors can cause an explosion.***

⚠ **DANGER!** ***Always open the engine compartment and check for fumes, leaks or the presence of fluids in the bilge and operate the bilge blower for at least 4 minutes before starting the engine, and always when at idle or slow-running speed. Explosive gasoline and/or battery fumes may be in the engine compartment. Failure to operate the bilge blower as directed may result in explosion or fire, resulting in serious injury or death.***

⚠ **WARNING!** ***Never attempt to stop or slow rotating parts. Keep away from rotating parts. The engine compartment serves as a guard. Always have the engine off whenever the compartment is open, except as directed by the boat manufacturer to vent exhaust fumes or during maintenance. Use extreme care whenever operating the engine with the compartment open. Clothing or body parts can get caught in moving parts, which could result in serious injury or death.***

⚠ **WARNING!** ***Always use genuine Ilmor High-Performance Marine replacement parts intended for the engine. The electrical and ignition components have been designed to comply with U.S. Coast Guard regulations intended to minimize the possibility of fire and/or explosion. The use of nonapproved replacement parts from aftermarket or other sources will void the warranty and could result in fire and/or explosion.***

⚠**WARNING!** ***Replacement of any part of the fuel system must be done with Ilmor-authorized parts only. If the fuel system supplying the engine requires attention, any adjustment or replacement, the procedure must be done by an authorized Ilmor High-Performance Marine service center. The fuel lines are pressurized and can only be disconnected with specialized tools. Failure to follow this directive will void the warranty and can result in damage to the boat and/or serious injury or death.***

⚠**WARNING!** ***Never operate the engine without an adequate amount of water flowing without interruption through the cooling system. This requires the boat to be in an operational-sized body of water or hooked up to the suction side of a raw water pump by an Ilmor-approved water supply in a dealership. If the engine operates without water in the cooling system, the exhaust system will overheat and could potentially create an on-board fire. The water pump impeller will also fail. Damage caused to the boat under these circumstances will void the warranty and could result in serious injury and/or death.***

⚠**WARNING!** ***Always connect the positive (+) battery cable first. After the positive cable is connected, then the negative (-) battery cable can be attached. This minimizes the possibility of electrical contact.***

⚠**WARNING!** ***Always disconnect the negative battery cable (-) first before disconnecting the positive battery cable (+). After the negative battery cable is disconnected, the positive battery cable can be disconnected. This minimizes the possibility of electrical contact.***

⚠**WARNING!** ***Never realign the wiring or in any way alter the wiring of the engine. Doing so may result in damage to the engine, which is not covered under warranty, and sufficient voltage may be present to cause serious injury and/or death.***

⚠**WARNING!** ***Always inspect the entire fuel system for leaks and/or deterioration prior to each outing. This inspection becomes even more critical after substantial periods of nonuse or storage. Be certain the inspection includes the fuel tank, fuel lines, fuel pump, regulator, fuel rails, carbon canisters and all fittings in the system. Never operate the engine when any component shows even slight signs of corrosion, leakage, deterioration, swelling, hardening or softening. This must be brought to the attention of an authorized Ilmor High-Performance Marine service center and/or boat manufacturer's dealer for replacement prior to using the boat.***

⚠**WARNING!** ***Never allow battery electrolyte to be spilled or placed on any part of the human body. Battery electrolyte fluid is dangerous. It contains sulfuric acid, which is poisonous, corrosive and caustic. If exposed to battery electrolyte, flush the area with large amounts of clean water and immediately seek medical attention.***

⚠WARNING! ***Always keep all sparks, flames and smoking materials away from the battery charging area. When charging, batteries generate small amounts of dangerous hydrogen gas which is highly explosive. Failure to follow instructions when charging a battery can cause an electrical charge or even an explosion of the battery. This could result in serious injury or death.***

⚠WARNING! ***Always follow the boat manufacturer's instructions on how to properly winterize the fuel tank prior to storage. Leaking of fuel into the boat and potentially into the storage area could result in substantial damage to the boat, and contact with any spark (such as a flame-producing pilot light in a heater) could also result in property damage and serious injury or death.***

⚠WARNING! ***Never use jumper cables and a booster battery to start your engine. Serious injury or death could result from fire or explosion.***

⚠WARNING! ***Never recharge your battery in the boat. Always remove the battery for recharging in a well-ventilated area away from fuel vapors, spark or flame. Failure to do so could result in serious injury or death from fire or explosion.***

⚠WARNING! ***Always allow the engine to cool down completely before attempting to service the fuel/water separator filter in order to avoid fire or explosion. The fuel system is under pressure.***

⚠WARNING! ***Always be sure that the ignition key is in the OFF position, the main battery power switch is in the OFF position, and that no spark or flame are present when servicing the fuel/water separator.***

⚠WARNING! ***Always make sure that no fuel leaks exist and that the engine compartment is well ventilated with no gasoline vapors present to avoid fire or explosion hazard before performing any fuel system maintenance.***

⚠WARNING! ***Be sure that the engine has completely cooled before removing the pressure cap. The system is under pressure, and removing the pressure cap without allowing the engine to cool could cause coolant to boil and discharge violently.***

⚠WARNING! ***Never run your boat underway with the engine hatch open. Contact with moving parts or trapped air under the hatch may result in the hatch being blown off or otherwise damaged or causing damage.***

⚠WARNING! ***Always allow the engine to cool down completely before attempting to service the high-pressure fuel filter in order to avoid fire or explosion.***

⚠WARNING! ***Always be sure that the ignition key is in the OFF position, the main battery power switch is in the OFF position, and that no spark or flame are present when servicing the high-pressure fuel filter.***

⚠**WARNING!** ***Always replace parts of the fuel system with Ilmor-authorized parts only. All fuel system lines and connections must meet the requirements of U.S. Coast Guard (USCG) regulations. This means that hoses must meet or exceed SAE Standard J1527 DEC85, and hoses used for fuel delivery must meet or exceed specification in USCG regulations, Sec. 183.540 for recreational boating. Additionally, all fuel hose must meet the 15 g/m² limit for fuel permeation. All plumbing for the fuel system on Ilmor engines, and the boats in which Ilmor authorizes placement, meet or exceed all requirements.***

⚠**CAUTION!** ***Always be certain that there is ample room around the boat when trying to start the engine in forward position as the boat will move forward when the engine starts. Contact with other boats, docks, shallow waterway bottoms, or debris may result in damage to the boat that is not covered under warranty, and may also result in serious injury.***

NOTICE: Always pay attention to the audio and visual alarms. Boats are equipped with a variety of audible and visual alarms that alert operators to potential performance issues. No alarm, whether it sounds an alert or provides information on the gauges, should ever be ignored. The drive train's sensors are often the earliest indication of problems, and if ignored, may result in serious damage to the equipment. This is not covered under warranty.

NOTICE: Always use a high-quality gasoline from a reputable source. Damage to the engine by use of low-quality gasoline or gasoline with an octane rating below the minimum level listed for Ilmor High-Performance Marine engines will void the warranty on the engine.

NOTICE: Always perform the proper storage procedures when storing the boat. Extended storage with fuel in the system can affect fuel stability and may require system inspection and fuel filter replacement when the boat returns to service. Fuel systems on all boats equipped with Ilmor High-Performance Marine engines MUST be properly prepared for storage periods exceeding 30 days. Owners are encouraged to seek assistance from an authorized Ilmor High-Performance Marine service center to properly prepare the drive train for periods of inactivity exceeding one month. Damage due to improper storage and/or winterization preparations is not covered under warranty.

NOTICE: Always use the recommended engine oil. Failure to follow the engine oil recommendation listed in this Owner's Manual can result in accelerated engine wear and engine component failure. Engine damage due to incorrect oil usage, oil changes and oil levels, or other failure to follow engine oil procedures can be costly and may void the warranty.

NOTICE: Always use the recommended transmission fluid/oil. Damage to the engine by use of low-quality or nonrecommended transmission fluid/oil as listed for direct drive transmissions will void the warranty. Overfill or underfill may also result in serious damage to the engine and is not covered under warranty.

NOTICE: Always pay attention to any gauges or warning lights. Ignoring elevated temperatures on a temperature gauge or any other evidence of the engine operating at temperatures above recommended levels can result in serious damage to the engine. Any resulting damage will not be covered by the warranty.

NOTICE: Always maintain the correct coolant level. Failure to maintain coolant at the proper level will cause potentially serious engine damage. The warranty does not cover engine damage due to overheating or any other cause associated with improper coolant levels.

NOTICE: Never install accessories or add-on equipment that is not approved from the manufacturer. Add-on equipment may adversely affect the alternator output or overload the electrical system. Any damage caused as a result will not be covered by the warranty.

NOTICE: Failure to follow the break-in and operating procedures as described in this Owner's Manual will void the warranty. Before operating the boat for the first time, you must read this Owner's Manual completely, as well as the boat manufacturer's Owner's Manual.

NOTICE: Do not remove the factory break-in oil until after a minimum of 10 hours proper operation, but not later than 25 hours. At that time, an oil change should be performed by an authorized Ilmor High-Performance Marine service center, who will be able to "read" the oil and filter to determine if the proper break-in of the engine components appears to be occurring.

NOTICE: Never operate the starter motor continuously for more than 15 seconds without allowing the starter motor to cool for at least 2 minutes. The ignition key must be released after the engine has started to avoid damage to the starter motor and drive. Failure to do so may result in the starter overheating, which is damage not covered under warranty.

NOTICE: Never move between forward-neutral-reverse when the engine is above 800 rpm. Always allow the speed to decrease to 600–800 rpm before completing the shift. Failure to do so may result in damage that is not covered under warranty.

NOTICE: Always properly clean the boat after use. Exposure to salt water causes corrosion, leading to significant damage to metal, including stainless steel and chrome. If evidence of corrosion shows on the boat, carefully clean the engine and transmission with fresh water and a mild soap solution after use in salt water. A protective marine oil may be applied to exposed metal to halt the acceleration of corrosion. Failure to properly clean boat or pay attention to corrosion matters will void the warranty.

NOTICE: Discharge of oil or oil waste products is restricted by law. Take every precaution to prevent the spillage of oil or oil waste into the environment when servicing or using your boat. Contain and dispose of oil or oil waste in accordance with the law.

NOTICE: If power steering fluid is not visible, contact your Ilmor High-Performance marine service center immediately. Severe engine damage could occur.

NOTICE: Make sure the seacock is back in the ON position. If this operation is skipped, the engine will overheat, failing the raw water pump impeller and causing severe engine problems. Make sure that the cap/lid has been installed correctly and has not pinched the sealing o-ring. This will cause air to be introduced into the system and could cause the raw water impeller to fail causing severe engine problems.

NOTICE: This is a critical function of routine maintenance. Even clean-appearing waterways may have debris such as pine needles or moss that can enter the cooling system and create a blockage. Failure to perform this function can result in serious overheating of the engine. Damage to the engine and/or transmission caused by overheating is not covered by warranty. Always pay attention to your temperature gauge, even if you are carefully performing this check. Failure of the raw water impeller or blockage of the transmission cooler are frequent causes of overheating.

NOTICE: If the serpentine belt comes off or wears through, catastrophic engine failure may occur. Do not operate the engine without a properly installed serpentine belt. Any resulting damage will not be covered by the warranty.

NOTICE: Air in the system could cause the raw water impeller to fail, causing severe engine problems. If air in the system is persistent, visit your local Ilmor service center.

Section 2

INTRODUCING ILMOR'S HIGH-PERFORMANCE ENGINES

⚠**WARNING!** ***Always connect the positive (+) battery cable first. After the positive cable is connected, then the negative (-) battery cable can be attached. This minimizes the possibility of electrical contact.***

⚠**WARNING!** ***Always disconnect the negative battery cable (-) first before disconnecting the positive battery cable (+). After the negative battery cable is disconnected, the positive battery cable can be disconnected. This minimizes the possibility of electrical contact.***

⚠**WARNING!** ***Replacement of any part of the fuel system must be done with Ilmor-authorized parts only. If the fuel system supplying the engine requires attention, any adjustment or replacement, the procedure must be done by an authorized Ilmor High-Performance Marine service center. The fuel lines are pressurized and can only be disconnected with specialized tools. Failure to follow this directive will void the warranty and can result in damage to the boat and/or serious injury or death.***

⚠**WARNING!** ***Never operate the engine without an adequate amount of water flowing without interruption through the cooling system. This requires the boat to be in an operational-sized body of water or hooked up to the suction side of a raw water pump by an Ilmor-approved water supply in a dealership. If the engine operates without water in the cooling system, the exhaust system will overheat and could potentially create an on-board fire. The water pump impeller will also fail. Damage caused to the boat under these circumstances will void the warranty and could result in serious injury and/or death.***

⚠**WARNING!** ***Never realign the wiring or in any way alter the wiring of the engine. Doing so may result in damage to the engine, which is not covered under warranty, and sufficient voltage may be present to cause serious injury and/or death.***

⚠**WARNING!** ***Never use jumper cables and a booster battery to start your engine. Serious injury or death could result from fire or explosion.***

⚠**WARNING!** ***Never recharge your battery in the boat. Always remove the battery for recharging in a well-ventilated area away from fuel vapors, spark or flame. Failure to do so could result in serious injury or death from fire or explosion.***

⚠**WARNING!** ***Never run your boat underway with the engine hatch open to avoid contact with moving parts or to avoid trapping air under the hatch which may result in the hatch being blown off or otherwise damaged or causing damage.***

FUEL SYSTEM

Ilmor High-Performance Marine engines are equipped with multi-port sequential fuel injection system, the most up-to-date system available in the industry, featuring engine controllers that are capable of meeting all emission and driveability requirements of marine applications with On-Board Diagnostics Marine (OBD-M).

WARNING! Replacement of any part of the fuel system must be done with Ilmor-authorized parts only. All fuel system lines and connections must meet the requirements of U.S. Coast Guard (USCG) regulations. This means that hoses must meet or exceed SAE Standard J1527 DEC85, and hoses used for fuel delivery must meet or exceed specification in USCG regulations, Sec. 183.540 for recreational boating. Additionally, all fuel hose must meet the 15 g/m^2 limit for fuel permeation. All plumbing for the fuel system on Ilmor engines, and the boats in which Ilmor authorizes placement, meet or exceed all requirements. See Section 3, Fueling the Engine, for additional information.

COOLING SYSTEM

Unlike automotive cooling systems that use radiators (air-to-fluid heat exchangers) for cooling, marine engines use fluid-to-fluid heat exchangers. Cooling is provided by the body of water in which the boat is operated. A raw water pump (rubber impeller pump) draws water into the boat where it is distributed to the engine, exhaust system, and heat exchangers in order to maintain an acceptable range of engine operating temperatures.

Ilmor High-Performance Marine engines use a closed cooling system. In this type of cooling system, engine coolant flows through the engine while raw water flows through the exhaust headers.

WARNING! Never operate the engine without an adequate amount of water flowing without interruption through the cooling system. Ensure that the raw water pick-up remains clear of debris at all times. Even small amounts can clog or block the pick-up, which is located beneath the boat. The raw water pick-up MUST have an uninterrupted input of water whenever the engine is running.

NOTICE: Marine growth occurs in brackish and salt water, and even in what is referred to as "fresh" or salt-free water. Therefore, it is important to flush the boat's cooling system with fresh water after each use.

Accelerated marine growth occurs when operated in salt water. This makes it critical to flush the cooling system with fresh water after each use. This fresh water flushing can be done with the boat either in or out of the water. Instructions for accomplishing this are provided in Section 5, After Each Use.

ELECTRICAL SYSTEM

The electrical system on your Ilmor High-Performance Marine engine is a 12-volt negative ground system. As a result, it is important to keep in mind that operators must avoid reverse polarity, which could lead to extensive damage of the electronics. Any damage occurring as a result of reverse polarity will not be covered by warranty.

Reversed polarity also presents a serious shock risk. Turning off a breaker appears to remove power from the circuit because it turns off whatever is connected to that circuit. But with reversed polarity you have disconnected from ground, not from power. The circuit is live.

WARNING! Always connect the positive (+) battery cable first. The battery positive cable (+) connects at the starter motor battery post.

The positive post of the battery is connected to the large post provided on the starter motor with marine grade single ought (1/0) starter wire and appropriate eyelet. After the connection is made, all other positive engine circuits will be connected to the battery positive from this junction. The supplied heavy rubber boot (red) must be used on the starter motor terminal to shield the terminal and prevent accidental contact.

WARNING! Always disconnect the negative battery cable (-) first before disconnecting the positive battery cable (+). The battery negative (–), or ground, connects to the stud at the engine bell-housing.

WARNING! Never use jumper cables and a booster battery to start your engine.

WARNING! Never recharge your battery in the boat.

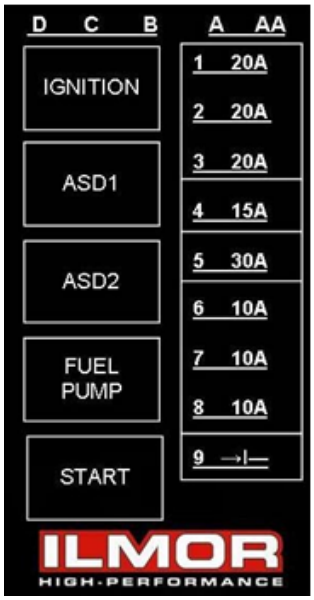
Fuse Box

In addition to circuit breakers in the boat that may impact the engine functionality or ancillary equipment and electronics that borrow power from the engine, the engine is also equipped with a fuse box that adds control over various electronic functions of the engine.

MV10 Fuse Box

The fuse box cover is mounted to the engine by three rubber grommets. To remove the front cover, begin by grasping the back edge of the cover as shown. With light, yet steady pressure, pull directly forward. This will release the grommets from the engine-side mounts. Any twisting motion will increase the chance of damage. To reinstall, apply a non-petroleum based lubricant to each of the three grommets. Align grommets to the mounts and press on.

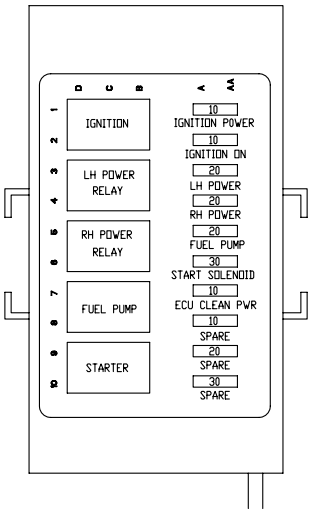
MV10 Power Distribution and Fuse Box Layout:



1) Ignition Power
2) ASD1 Power
3) ASD2 Power
4) Fuel Pump Power
5) Starter Solenoid
6) Dash Gauges
7) ECM "Clean" Power
8) Dash Low Currents
9) ASD Relay Control (Diode)

MV8-570 Fuse Box

In addition to circuit breakers in the boat that may impact the engine functionality or ancillary equipment and electronics that borrow power from the engine, the engine is also equipped with a fuse box that adds control over various electronic functions of the engine. The fuse box is mounted on the rear of each MV8 engine.



Boat/Engine Interface Wiring

WARNING! Never realign the wiring or in any way alter the wiring of the Ilmor High-Performance Marine engine. The electrical system of the engine is primarily self-contained in a preassembled unit. The interface with boat wiring follows established practices and conforms to regulatory guidelines. Every reasonable effort has been made to make the electrical connection simplified and straightforward. Consumers are strongly encouraged to seek assistance from authorized Ilmor High-Performance Marine service centers when dealing with electrical issues.

ENGINE SENSORS

One of the reasons the Ilmor High-Performance Marine engines are reliable and well running is that several sensors monitor performance any time the engine is running. Among the sensors are the throttle position, manifold absolute pressure (MAP), camshaft position, crankshaft position, coolant temperature, knock, oil pressure and oil temperature. Because nearly all sensors are located inside sealed areas of the engine, and diagnostics are normally done utilizing highly technical and expensive tools, consumers are urged to take the boat to an authorized Ilmor High-Performance Marine service center for analysis if or when a malfunction is suspected.

Often issues will be brought to the consumer's attention by way of alarms. Most sensors trip alarms, whether audible or visual, on the gauges. No warning should be ignored. Occasionally, a sensor will malfunction, but in most instances the sensor is correctly identifying and coding problems for analysis.

NOTICE: Always pay attention to the audio and visual alarms. Boats are equipped with a variety of audible and visual alarms that alert operators to potential performance issues. No alarm, whether it sounds an alert or provides information on the gauges, should ever be ignored. The drive train's sensors are often the earliest indication of problems, and if ignored, may result in serious damage to the equipment. This is not covered under warranty.

INSTRUMENTATION

The Ilmor High-Performance Marine engines support engine coolant temperature, oil temperature, oil pressure, battery voltage and seawater pressure through analog or otherwise compatible electric gauges. A 0–5 volt output is provided to indicate drive angle as well as a tachometer signal output.

Through the standard NMEA 2000 or J1939 CAN network, a multitude of parameters for gauges and displays are made available through aftermarket suppliers, allowing you to completely eliminate the use of traditional analog gauges.

Analog Gauges

Temperature: Indicates the temperature of the engine coolant. The required range of the temperature gauge is 100° – 280°F (38° – 138°C). See Operating Specifications on page 11-2 for normal operating temperatures.

Oil Pressure: Indicates the engine oil pressure. The required range of the oil pressure gauge is 0–100 psi (0–689 kPa). See Operating Specifications on page 11-2 for normal oil pressure.

Tachometer: Indicates engine speed in revolutions per minute. The range of the tachometer should be 0–7,000 rpm. See General Specifications on page 11-1 for normal rpm range. The tachometer must be calibrated appropriately for the MV10 or MV8 engines.

Water Pressure: Indicates seawater pressure to the raw water side of the cooling system. See Operating Specifications on page 11-2 for normal seawater pressure. (Not available on the MV8-570.)

Engine Monitoring – Malfunction Indicator Lamp (MIL)

The Ilmor High-Performance Marine engine alarm system uses a visual alarm to indicate an alarm condition in which any of the monitored engine parameters falls out of the nominal operating range. In all cases, the proper response to the alarm is to throttle back immediately and check the gauges to see which system is out of range. The Malfunction Indicator Lamp (MIL) will remain lit until the issue has been corrected and rediagnosed, and the engine has gone through three full operating cycles. If the fault continues to occur, the light will remain on until the failure condition has passed or the boat has been taken to a service center to be correctly diagnosed and repaired.

A MIL will be indicated on the dash for each engine installed.

MIL Activation Conditions

The following conditions will activate the alarm:

NOTICE: The MIL lamp will display when the ignition is in the ON position without the engine running. The MIL will shut off immediately when the engine is started and normal oil pressure exceeds 20 psi (138 kPa). If the MIL displays for any other reason, contact your authorized Ilmor High-Performance Marine service center before restarting the engine.

Water temperature

The MIL light will illuminate if the engine coolant exceeds:

- MV10 – 200°F (93°C)
- MV8-570 – 215°F (102°C)

If this occurs, shut down the overheated engine immediately and take it to an authorized Ilmor High-Performance Marine service center.

Oil pressure

The MIL light will illuminate if the engine oil pressure falls below:

- MV10 – 20 psi (138 kPa)
- MV8-570 – 10 psi (69 kPa)

If this occurs, throttle back and allow the pressure to return above the minimum operating level. If oil pressure remains below the minimum operating level, return the engine(s) to idle. If the pressure continues to drop, shut down the engine(s) immediately and return to port. If at any time the oil pressure drops to zero, shut down the engine immediately. Take the engine to an authorized Ilmor High-Performance Marine service center.

Oil temperature (not available on MV8-570)

The MIL light will illuminate if oil temperature exceeds 266°F (130°C). Return the engine(s) to idle and check the oil temperature gauge. The oil temperature should start to return to normal. If the temperature continues to rise, shut down the overheated engine immediately and take it to an authorized Ilmor High-Performance Marine service center.

VAPOR LOCK

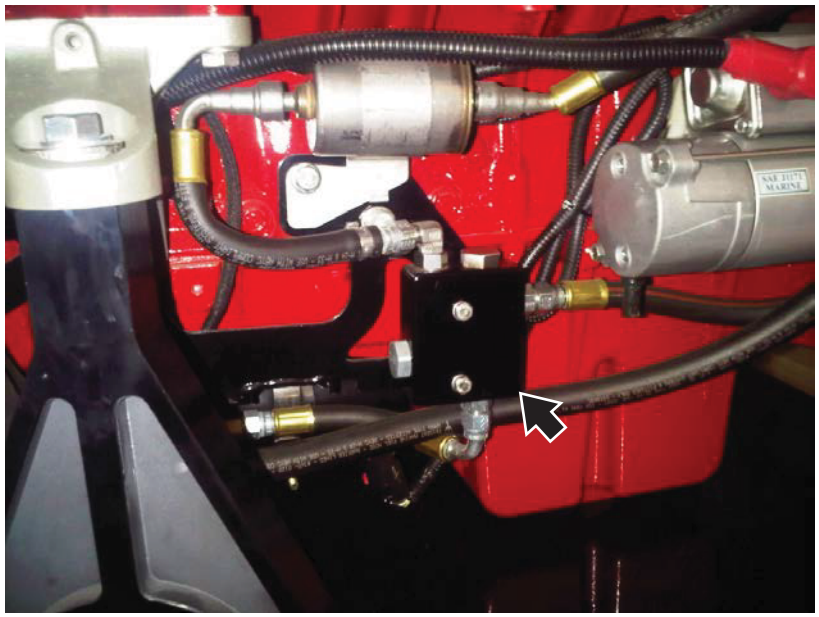
Vapor lock is a condition that is primarily caused by high engine compartment temperatures as a result of idling for long periods, idling after periods of high speed running, or heat soak after shutdown due to the discontinuance of water flow.

NOTICE: Always run your bilge blower for 4 minutes prior to starting the engine and whenever you are operating at low speeds.

All Ilmor High-Performance Marine engines are equipped with our exclusive Anti-Vapor Lock Valve, which separates fuel from vapor and redirects the vapor back to the boat's fuel tank, while directing high-pressure liquid fuel to the engine.

In hotter climates and given the variations in gasoline formulations, the possibility for vapor lock may still exist. Some steps to take to help alleviate vapor lock are:

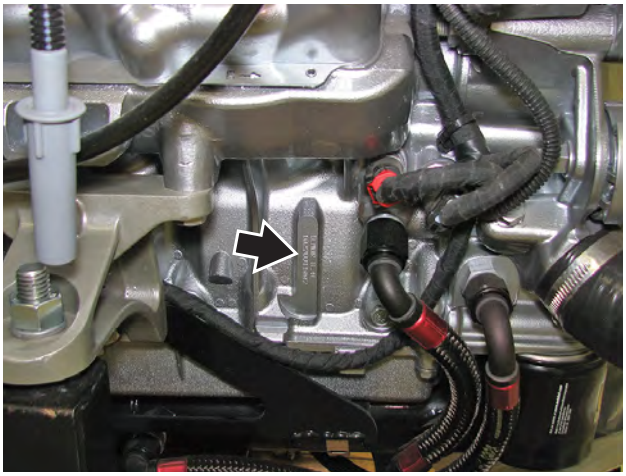
1. Always run your bilge blower for 4 minutes before starting the engine and while running at lower speeds.
2. Partially open the engine hatch to allow for more air circulation prior to starting. **WARNING! Never run your boat underway with the engine hatch open.**
3. If vapor lock condition persists, contact your Ilmor High-Performance Marine service center.



ENGINE SERIAL NUMBER LOCATION

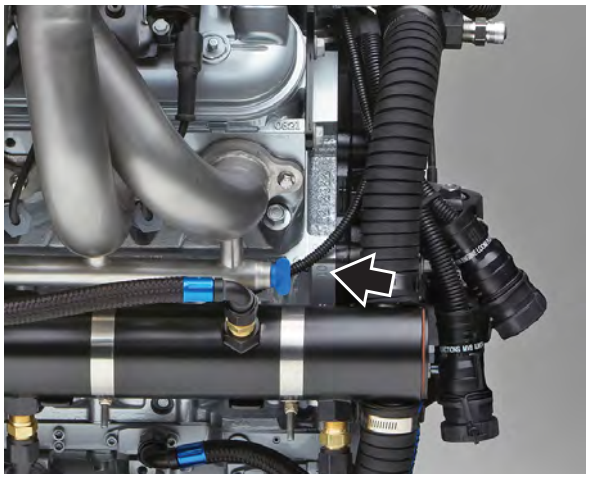
MV10

The MV10 engine serial number is found on the starboard side of the engine block directly behind the alternator.



MV8-570

The engine serial number is found stamped on the port side rear of the engine block adjacent to the cylinder head.



Section 3

FUELING THE ENGINE

⚠ **DANGER!** ***Never start the engine if a gasoline odor is present or if gasoline can be seen at any point along the fuel line, along the fuel tank, in the bilge or at the engine. Remove the key from the ignition switch and call an authorized boat dealer and/or authorized Ilmor High-Performance Marine service center for service. Take care not to spill gasoline when fueling. If gas is spilled accidentally, wipe up all traces with dry rags immediately and dispose of rags properly on-shore. Gasoline and its vapors can cause an explosion.***

⚠ **WARNING!** ***Always inspect the entire fuel system for leaks and/or deterioration prior to each outing. This inspection becomes even more critical after substantial periods of nonuse or storage. Be certain the inspection includes the fuel tank, fuel lines, fuel pump, regulator, fuel rails, carbon canisters and all fittings in the system. Never operate the engine when any component shows even slight signs of corrosion, leakage, deterioration, swelling, hardening or softening. This must be brought to the attention of an authorized Ilmor High-Performance Marine service center and/or boat manufacturer's dealer for replacement prior to using the boat.***

⚠ **WARNING!** ***Always replace parts of the fuel system with Ilmor-authorized parts only. All fuel system lines and connections must meet the requirements of U.S. Coast Guard (USCG) regulations. This means that hoses must meet or exceed SAE Standard J1527 DEC85, and hoses used for fuel delivery must meet or exceed specification in USCG regulations, Sec. 183.540 for recreational boating. Additionally, all fuel hose must meet the 15 g/m² limit for fuel permeation. All plumbing for the fuel system on Ilmor engines, and the boats in which Ilmor authorizes placement, meet or exceed all requirements.***

WARNING! Always inspect the entire fuel system for leaks and/or deterioration prior to each outing. Because the system found on your boat has been developed for use specifically in a marine environment, a number of safety measures are incorporated in the entire fuel system from tank to lines to connections. Please note that, as a result of the pressurized fuel lines, there are no user-serviceable parts.

WARNING! Always replace parts of the fuel system with Ilmor-authorized parts only. Any service required in the fuel system must be performed by authorized service personnel only as they will have the specialized tools and replacement parts that meet the manufacturer's OEM specifications.

Ilmor recommends a daily inspection to ensure that the line is not leaking. Never start the boat if there is evidence of fuel leaks or fumes.

Be certain to read carefully the boat manufacturer's Owner's Manual section on fueling for additional information and details. This is a critical component of safe and enjoyable boating.

DANGER! Never start the engine if a gasoline odor is present or if gasoline can be seen at any point along the fuel line, along the fuel tank, in the bilge or at the engine.

FUEL REQUIREMENTS

The Ilmor High-Performance Marine engines require a minimum of:

MV8-570: 91 octane fuel

MV10: 91 octane fuel

The octane number is based on the pump octane number, which is (R + M)/2, where R is the research octane number and M is the motored octane number.

For better performance, 93 octane fuel is recommended.

Fuels other than specified will negatively alter performance and emissions, and could damage the engine. Use of lower octane fuels will cause spark knock (pinging). Continued heavy spark knock can cause severe engine damage. The engines have knock detection systems that offer the best engine performance by controlling knock through precise ignition timing. The higher octane fuel will cause less knock for the ignition system to process and adjust for.

Poor-quality or old fuels can cause problems such as loss of performance, rough idling, hard starting and hesitation. If the engine experiences any of these symptoms, first try another brand of gasoline and/or replace the old gasoline with fresh gasoline.

Many engine manufacturers believe the U.S. Environmental Protection Agency's (EPA's) detergent levels in gasolines do not provide sufficient deposit controls to allow for optimal engine performance. As a result, TOP TIER Detergent Gasoline standards were created to ensure gasolines have all the necessary additives and detergents to reduce the buildup of deposits in an engine. Ilmor recommends purchasing fuel from a supplier that confirms its fuel meets TOP TIER specifications. For a list of TOP TIER retailers, check www.toptiergas.com, and click on "Retailers."

NOTICE: Always use a high-quality gasoline from a reputable source. Damage to the engine by use of low-quality gasoline or gasoline with an octane rating below the minimum level listed for Ilmor High-Performance Marine engines will void the warranty on the engine.

Oxygenated Gasoline or Gasoline Containing Alcohol

E-85 fuels are not to be used. Use of this fuel may cause engine performance to suffer and may damage vital fuel system components.

Leaded fuels may NOT be used in any Ilmor High-Performance Marine engine.

Gasoline containing levels higher than 10% ethanol or gasoline containing any methanol is **NOT TO BE USED** in Ilmor High-Performance Marine engines. If the presence of alcohol in the gasoline is unknown, frequent inspections of the fuel system are required.

When the Boat Is Not Used for A While

Ilmor recommends the use of STA-BIL fuel stabilizer if the boat consumes less than a tank of fuel every 30 days. Today's fuels are more susceptible to degradation, and the use of a quality stabilizer helps ensure fewer problems if the boat is used only on a limited basis.

If the boat has not been run for more than 30 days and fuel remains in the tank—even stabilized fuel—the engine may run with reduced performance until the existing fuel has been used. The manufacturer will not pay for repairs to components that are damaged from poor-quality fuel as this is not covered under the engine warranty.

NOTICE: Always perform the proper storage procedures when storing the boat. Extended storage with fuel in the system can affect fuel stability and may require system inspection and fuel filter replacement when the boat returns to service. Fuel systems on all boats equipped with Ilmor High-Performance Marine engines MUST be properly prepared for storage periods exceeding 30 days. Owners are encouraged to seek assistance from an authorized Ilmor High-Performance Marine service center to properly prepare the drive train for periods of inactivity exceeding one month. Damage due to improper storage and/or winterization preparations is not covered under warranty.

Fuels Outside the United States and Canada

If the boat is operated outside the United States or Canada, it may be more difficult to obtain lead-free fuel. As the engine components are manufactured to function properly only with unleaded gasoline, it may be necessary to search for refined unleaded gasoline.

NOTES

Section 4

BEFORE EACH USE

⚠WARNING! ***Never allow battery electrolyte to be spilled or placed on any part of the human body. Battery electrolyte fluid is dangerous. It contains sulfuric acid, which is poisonous, corrosive and caustic. If exposed to battery electrolyte, flush the area with large amounts of clean water and immediately seek medical attention.***

⚠WARNING! ***Always keep all sparks, flames and smoking materials away from the battery charging area. When charging, batteries generate small amounts of dangerous hydrogen gas, which is highly explosive. Failure to follow instructions when charging a battery can cause an electrical charge or even an explosion of the battery. This could result in serious injury or death.***

CHECKING ENGINE OIL LEVELS PRE-ENGINE START-UP

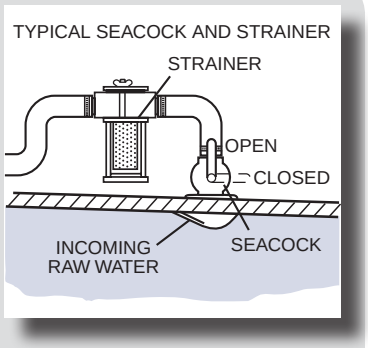
MV10

Although a more accurate engine oil level reading will happen only after the engine has run long enough to thoroughly warm up, it is still important to check the engine oil level prior to starting the engine.

1. Open the engine compartment. The engine oil dipstick is located on the side of the engine.
2. Remove the dipstick and wipe it off on a clean rag. Insert it fully and immediately remove. Check that the oil level is between the FULL and LOW marks on the dipstick.
3. Add oil if necessary through the oil fill neck and only enough to bring oil between the FULL and LOW marks. Overfill may result in damage to the engine that may not be covered by the warranty. Use oil as specified in Fluid Specifications on page 11-1. DO NOT USE OIL ADDITIVES AT ANY TIME.

MV8-570

Before boating, be sure to also follow the procedure in Check the Engine Oil Level on page 4-8.



CHECK THE SEA STRAINER – PRE-ENGINE START-UP

Because this process should be completed while the engine is cool (in order to avoid burns), it is recommended that this check be completed prior to starting the engine. If checking during an outing, allow the engine to cool. Be very careful to avoid burns from contact with hot engine parts.

1. Ensure the engine is OFF and the engine safety starting switch is disconnected. Leave the throttle/shift control lever in neutral.
2. Open the engine compartment and locate the seacock. Make sure this is in the CLOSED position before proceeding.
3. Locate the sea strainer. Remove the cap/lid and check the screen for debris. Remove any debris and rinse with water if necessary.
4. Reinstall the screen and screw on the cap/lid. Make sure the o-ring is in place and do not overtighten.
5. Move the seacock into the OPEN position.

NOTICE: Make sure the seacock is back in the ON position. If this operation is skipped, the engine will overheat, failing the raw water pump impeller and causing severe engine problems. Make sure that the cap/lid has been installed correctly and has not pinched the sealing o-ring. This will cause air to be introduced into the system and could cause the raw water impeller to fail, causing severe engine problems.

NOTICE: Always pay attention to any gauges or warning lights. Ignoring elevated temperatures on a temperature gauge or any other evidence of the engine operating at temperatures above recommended levels can result in serious damage to the engine. Any resulting damage will not be covered by the warranty.

NOTICE: This is a critical function of routine maintenance. Even clean-appearing waterways may have debris such as pine needles or moss that can enter the cooling system and create a blockage. Failure to perform this function can result in serious overheating of the engine. Damage to the engine and/or transmission caused by overheating is not covered by warranty. Always pay attention to your temperature gauge, even if you are carefully performing this check. Failure of the raw water impeller or blockage of the transmission cooler are frequent causes of overheating.

CHECK THE COOLANT LEVEL

Because this process should be completed while the engine is cool (in order to avoid burns), it is recommended that this check be completed prior to starting the engine. If checked during an outing, allow the engine to cool. Be very careful to avoid burns from contact with hot engine parts.

1. Ensure the engine is OFF and the engine safety starting switch is disconnected. Leave the throttle/shift control lever in neutral. Open the engine compartment. Locate the heat exchanger atop the engine.

2. **For MV10:** Check the level on the overflow tank located on the front of the engine. The level should be approximately halfway full. If the level is below that, add 5-year extended warranty antifreeze. Use premixed 50/50 or use a 50/50 mix of extended warranty antifreeze and distilled water. See Fluid Specifications on page 11-1 for engine coolant capacity.

   For MV8-570: Remove the cap and check the level. Verify that the fluid is visible from the top of the heat exchanger. (When the engine heats, the water will expand; that is the reason the tank should not be full when the engine is cold.) If the level is at or below that, add 5-year extended warranty antifreeze. Use premixed 50/50 or use a 50/50 mix of extended warranty antifreeze and distilled water. See Fluid Specifications on page 11-1 for engine coolant capacity.

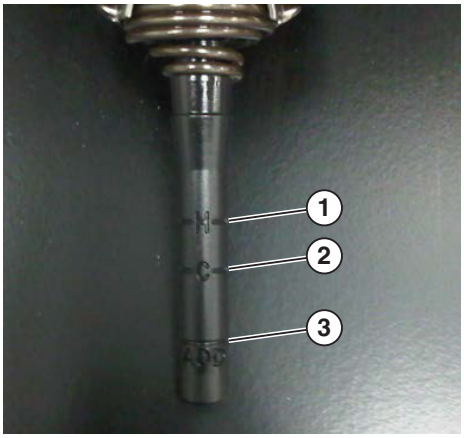
3. If the tank was completely or nearly empty, see your authorized Ilmor High-Performance Marine service center for immediate assistance as the engine cooling system will likely require purging. This function should be completed only by a trained Ilmor service technician.

NOTICE: Always maintain the correct coolant level. Failure to maintain coolant at the proper level will cause potentially serious engine damage. The warranty does not cover engine damage due to overheating or any other cause associated with improper coolant levels.

CHECK THE POWER STEERING FLUID FOR ENGINES WITH INTEGRAL RESERVOIR

Because this process should be completed while the engine is cool (in order to avoid burns), it is recommended that this check be completed prior to starting the engine. If checked during an outing, allow the engine to cool. Be very careful to avoid burns from contact with hot engine parts.

1. Center the steering and stop the engine.
2. Locate the power steering pump at the port side, front of the engine and remove the fill cap with integrated dipstick (level gauge).
3. Proper fluid level is at the FULL mark.
4. If necessary, add fluid to specified level. Use only fluid as outlined in Fluid Specifications on page 11-1.



1) FULL HOT Mark

2) FULL COLD Mark

3) ADD Mark

NOTICE: If power steering fluid is not visible, contact your Ilmor High-Performance Marine Service Center immediately. Severe engine damage could occur.

NOTE: Power steering fluid does not require changing. Review the Maintenance Schedule on page 7-1 for further details.

For remote power steering reservoir systems, see the boat manufacturer's manual for proper maintenance instructions, or contact your authorized Ilmor service center for assistance.

CHECK THE SERPENTINE BELT FOR DAMAGE

Because this process should be completed while the engine is cool (in order to avoid burns), it is recommended that this check be completed prior to starting the engine. If checked during an outing, allow the engine to cool. Be very careful to avoid burns from contact with hot engine parts. On engines with serpentine belt systems, no adjustment is necessary. Belt tension is maintained by the automatic belt tensioner.

1. Ensure the engine is OFF and the engine safety starting switch is disconnected. Leave the throttle/shift control lever in neutral. Open the engine compartment and locate the serpentine belt.

2. Check the condition of the belt. Watch for signs of excessive wear, cuts or weakness across or in the grooves. If there are any signs, have the belt replaced.

MV10

MV8-570

INSPECT THE BATTERY CONNECTIONS AND HOLD-DOWNS

Because this process should be completed while the engine is cool (in order to avoid burns), it is recommended that this check be completed prior to starting the engine.

1. Ensure the engine is OFF and the engine safety starting switch is disconnected. Leave the throttle/shift control lever in neutral. Locate the battery(ies). Batteries are placed in a variety of locations, depending upon the model. Refer to the boat manufacturer's Owner's Manual for details.

2. **WARNING! Never allow battery electrolyte to be spilled or placed on any part of the human body.** Check that the battery post connections are clean and tight. If not, see Inspecting and Cleaning the Battery Connections and Hold-Downs on page 7-12 for proper maintenance procedures.

NOTE: All Ilmor High-Performance engines are equipped with additional wires for a Clean Power connection. The MV10 engines also have a Clean Ground connection. These wires must be connected directly to the respective battery that powers each engine. Otherwise, the engines will not crank.

INSPECT THE ENGINE FOR LOOSE OR MISSING HARDWARE

Because this process should be completed while the engine is cool (in order to avoid burns), it is recommended that this check be completed prior to starting the engine. If checked during an outing, allow the engine to cool. Be very careful to avoid burns from contact with hot engine parts.

1. Ensure the engine is OFF and the engine safety starting switch is disconnected. Leave the throttle/shift control lever in neutral. Open the engine compartment and visually inspect the engine.
2. Systematically check the entire engine for loose and missing hardware. Attempt to shake components by hand, such as the alternator and the motor mounts. If a looseness problem exists, it is important to see an authorized Ilmor High-Performance Marine service center.

INSPECT THE THROTTLE AND SHIFT CABLES FOR KINKS, WEAR AND INTERFERENCE

Because this process should be completed while the engine is cool (in order to avoid burns), it is recommended that this check be completed prior to starting the engine.

1. Ensure the engine is OFF and the engine safety starting switch is disconnected. Leave the throttle/shift control lever in neutral. Open the engine compartment and locate the throttle/shift cables.
2. Follow each cable back under the floorboards and feel for any kinks or wear on the outer jacket. Any sign of cable damage is cause for immediate replacement. See an authorized Ilmor High-Performance Marine service center for assistance.

INSPECT THE FUEL AND EXHAUST SYSTEMS FOR LEAKS

These inspections should initially be done before the engine has been started. Recognize that this is a preliminary inspection only and care should be taken throughout the boating experience to be alert for any signs of fuel or exhaust leaks.

1. Ensure the engine is OFF and the engine safety starting switch is disconnected. Open the engine compartment and visually check as much of the fuel and exhaust systems as possible.
2. If at any time during operation there is an unexplained odor, or if anyone on-board shows signs of unexplained drowsiness or sleepiness, immediately shut down the engine and determine if the odor or unexplained behavior is the result of malfunctions in the fuel or exhaust systems.

NOTE: Perform the next pre-checks after the engine has been run for several minutes and then shut off.

CHECK THE SEA STRAINER – POST-ENGINE START-UP

1. Start the engine.
2. Open the engine compartment and locate the sea strainer.
3. After 20 seconds of run time, check the sea strainer to make sure it is full of water with minimal air bubbles. If you have too much air in the strainer, check to make sure the cap/lid is securely closed and sealed. Check for leaks leading up to the oil/transmission cooler.
4. Close the engine compartment.

NOTICE: Air in the system could cause the raw water impeller to fail, causing severe engine problems. If air in the system is persistent, visit your local Ilmor service center.

CHECK THAT THE BATTERY IS FULLY CHARGED

As the boat is started, check all gauges but pay particular attention to the voltmeter.

With the key on, but before the engine is started, the voltmeter should read above 12 volts. After starting the engine, check that the voltmeter reads between 12.8 and 14.5 volts. An erratic reading can be a sign of low voltage. The voltmeter is the best indication of the state of the battery. However, it is not foolproof. While the reading will indicate that the battery is producing current, if in a previous outing there was reason to suspect a problem with the battery(ies), check with an authorized Ilmor High-Performance Marine service center.

If the charge has fallen too low or if the battery is older or fails to hold a charge at the expected level, the boat may not start. For additional questions about your battery(ies), contact your boat manufacturer's authorized dealer.

WARNING! Always keep all sparks, flames and smoking materials away from the battery charging area. In the event of a dead battery, charge it with a battery charger before attempting to start the engine. Jump-starting from another boat or battery is dangerous. Charging a dead battery with the alternator on the boat will put undue stress on the alternator, and that, in turn, may cause it to fail.

CHECK THE TRANSMISSION FLUID/OIL LEVEL

Transmissions require lubrication to function properly. Your dealer can verify the type of transmission in the boat. The amount of transmission fluid/oil varies according to the product. See the requirements for transmission fluid/oil in the transmission manufacturer's manual.

NOTICE: Always use the recommended transmission fluid/oil. Damage to the engine by use of low-quality or non-recommended transmission fluid/oil will void the warranty. Overfill or underfill may also result in serious damage to the engine and is not covered under warranty.

CHECK THE ENGINE OIL LEVEL

MV10

MV8-570

An accurate engine oil level reading will happen only after the engine has run for at least 3 minutes at idle. This should be one of the last checks performed prior to an outing. Run the engine with the boat in the body of water.

1. After operating the engine at idle for at least 3 minutes, turn the engine OFF and disconnect the engine safety starting switch. Open the engine compartment. The engine oil dipstick is located on the side of the engine.
2. Allow approximately 2 minutes before checking. Remove the dipstick and wipe it off on a clean rag. Insert it fully and immediately remove. Check that the oil level is between the FULL and LOW marks on the dipstick. (Oil will expand as it is heated.)
3. Add oil if necessary through the oil fill neck and only enough to bring oil between the two marks. Overfill may result in damage to the engine that may not be covered by the warranty. Use oil as specified in Fluid Specifications on page 11-1. **DO NOT USE OIL ADDITIVES AT ANY TIME.**

Section 5

AFTER EACH USE

CHECK THE RAW WATER PICK-UP

For all Ilmor equipped boats, a check of the raw water pick-up is necessary. Located at the stern of the boat, either through the drive or beneath the boat, under the water line on the hull is the raw water pick-up. Even when boating on clean-appearing bodies of water, a check of this pick-up should be done after every outing to determine if there is any debris. This should be rinsed with fresh water prior to storage, even of short duration. It will be easier to clean following an outing than waiting and possibly allowing debris to dry.

FLUSH THE RAW WATER/SEA PUMP SYSTEM

1. Place a flushing device on the raw water pick-up on the bottom of the hull. Turn the garden hose ON and start the engine.

2. Cycle engine speed from idle to 2,000 rpm in 10-second intervals, allowing the engine to reach operating temperature. The engine needs to be at its operating temperature for 15 minutes. The garden hose flow rate may need to be adjusted if engine will not warm up; it must warm up to open the thermostat, which is required for proper flushing. If the engine will not warm up, remove thermostat and flush engine with fresh water for 5 minutes while cycling the engine speed from idle to 2,000 rpm in 10-second intervals.

Fresh water boats should be flushed when going to storage or not being used for periods in excess of one month.

Salt water boats should be flushed with fresh water after every use. Boat-in-water flushing can be achieved with a flushing device. The seacock will need to be closed while supplying fresh water to the inlet of the sea pump and allowing it to circulate through the engine.

CHECK FOR LEAKS

Since gaseous and/or fluid leaks are more likely to be apparent at the conclusion of an outing, the operator should open the engine compartment and check for any odor or discoloring of components. Any sign of leakage should be brought to the attention of an authorized Ilmor High-Performance Marine service center immediately.

CLEAN ANY RESIDUE

Normal operations will still result in a small amount of ambient fluids. If a small amount of oil or other innocuous fluids are found on the engine, on the transmission or within the engine compartment, wipe down the residue with a clean rag. Keeping the engine compartment pristine helps to determine if an engine develops a more significant issue later on.

Section 6

STARTING, STOPPING AND NEW ENGINE BREAK-IN

⚠ DANGER! ***Always open the engine compartment and check for fumes, leaks or the presence of fluids in the bilge and operate the bilge blower for at least 4 minutes before starting the engine, and always when at idle or slow-running speed. Explosive gasoline and/or battery fumes may be in the engine compartment. Failure to operate the bilge blower as directed may result in explosion or fire, resulting in serious injury or death.***

⚠ WARNING! ***Never operate the engine without an adequate amount of water flowing without interruption through the cooling system. This requires the boat to be in an operational-sized body of water or hooked up to the suction side of a raw water pump by an Ilmor-approved water supply in a dealership. If the engine operates without water in the cooling system, the exhaust system will overheat and could potentially create an on-board fire. The water pump impeller will also fail. Damage caused to the boat under these circumstances will void the warranty and could result in serious injury and/or death.***

⚠ CAUTION! ***Always be certain that there is ample room around the boat when trying to start the engine in forward position as the boat will move forward when the engine starts. Contact with other boats, docks, shallow waterway bottoms, or debris may result in damage to the boat that is not covered under warranty, and may also result in serious injury.***

NOTICE: Failure to follow the break-in and operating procedures as described in this Owner's Manual will void the warranty. Before operating the boat for the first time, you must read this Owner's Manual completely, as well as the boat manufacturer's Owner's Manual.

Proper break-in of the engine and transmission is critical to ensuring a long life for the drive train. The first 25 hours, when properly completed, will ensure maximum performance as well. The break-in period allows the engine and transmission components to properly seat and begins the wearing process properly.

During the break-in period, maintain the correct oil level to ensure that the internal affected components are well lubricated. Watch the gauges on the instrument panel closely, as they are the first line of defense. Well before serious damage occurs to an engine, gauges can alert the operator to circumstances that can lead to major damage.

Any abnormal vibrations or unusual noises may be symptomatic of additional problems that are not registered by gauges or alarms. Do not ignore them. Have an authorized Ilmor High-Performance Marine service center check out anything that seems unusual. It may be a minor issue that requires a simple tightening of screws or bolts, but it may also signal serious internal issues.

Plane the boat quickly, as low speeds can place more strain on the engine operation. This does not mean to slam the throttle/shift control lever forward; rather a steady, quick hand will help achieve the goal.

BEFORE THE ENGINE IS STARTED

1. After performing all the checks and inspections outlined in this Owner's Manual, lift the engine compartment cover.
2. **DANGER! Always, before starting the engine, open the engine compartment and check for fumes, leaks or the presence of fluids in the bilge.** Operate the bilge blower for at least 4 minutes with the engine compartment cover open. Leave the bilge blower ON throughout the starting process and until the boat has planed.

NOTE: Always start the engine with the throttle/shift control lever in the neutral position. The boat is equipped with a neutral-start safety switch that will not allow engines to start while in gear.

3. **WARNING! Never operate the engine without an adequate amount of water flowing without interruption through the cooling system.** The boat is likely to be equipped with sea strainer valves and seacocks. Ensure these are open prior to starting the engine.

STARTING THE ENGINE

1. Attach the engine safety starting switch tether (also known as a lanyard) between an article of the operator's clothing and the switch, whose location will be identified in the boat manufacturer's Owner's Manual.

2. Leave in or move the throttle/shift control lever to the neutral position. This allows the electronic controls within the engine to correctly meter the fuel and air flows automatically.

3. Insert the ignition key in the ignition slot and turn to the start position. Hold on for no more than 3 to 5 seconds per try. Release the ignition key as soon as the engine starts. If the engine does not start within 10 to 15 seconds total, pull out the neutral detent or push the switch on the control lever (however the boat model may be equipped) and advance the throttle to wide-open throttle. Crank the engine. When the engine fires, quickly return the throttle to the idle position to avoid over-revving the engine and/or losing control of the boat.

CAUTION! Always be certain that there is ample room around the boat when trying to start the engine in forward position as the boat will move forward when the engine starts. Starting the engine with the throttle/shift control lever in any position other than neutral places undue strain on the entire boat and drive train. There are no circumstances under which the engine should ever be started with the lever in reverse. With the lever forward should only be used in exceptional circumstances such as those listed immediately above. Whenever the boat is started with the engine in forward, the lever must immediately be returned to neutral when the engine fires to prevent damage to the engine and to avoid losing control of the boat.

NOTICE: Never operate the starter motor continuously for more than 15 seconds without allowing the starter motor to cool for at least 2 minutes. The ignition key must be released after the engine has started to avoid damage to the starter motor and drive. Failure to do so may result in the starter overheating, which is damage not covered under warranty.

Always allow the engine to warm up to normal operating temperature prior to placing the boat in gear. Electronics will act as a governor, or rev-limiter, to prevent the boat from reaching higher rpm before the engine has warmed up. Also ensure that the engine oil pressure is within the normal oil pressure range (see General Specifications on page 11-1), according to the gauge on the instrument panel.

SHIFTING GEARS

When shifting gears, always move the throttle/shift control lever smoothly and quickly into gear. Hesitations and slow gear movement can damage the shifting mechanism in the transmission. Always allow the engine speed to fall to idle before making a gear shift.

The throttle/shift control lever must move forward 45 degrees of travel from neutral to engage forward gear. Because the lever controls both gearing and throttle response, continuing to move forward will increase speed.

Reverse occurs when the throttle/shift control lever is pulled back from neutral at least 45 degrees of travel.

NOTICE: Never move between forward-neutral-reverse when the engine is above 800 rpm. Always allow the speed to decrease to 600–800 rpm before completing the shift. Failure to do so may result in damage that is not covered under warranty.

STOPPING THE BOAT

This is not a land vehicle. There are no brakes to be applied. To stop a boat requires advance planning and operations that must be completed before reaching the dock or bank.

1. Bring the throttle/shift control lever to neutral.
2. If the boat has been operated for an extended period of time, or at high rpm, allow the engine a cool-down period at idle for several minutes.
3. Turn the key to the OFF position to stop the engine and drive train.
4. Coast into the dock or bank, following instructions provided by the boat manufacturer's Owner's Manual to properly stop the boat without damaging the hull.

ENGINE BREAK-IN PROCEDURE

All Ilmor High-Performance Marine engines are run and tested on a dynamometer at Ilmor High-Performance Marine prior to shipping.

Following delivery, the Ilmor High-Performance Marine engines must follow break-in procedures for the first 25 hours of operation to ensure minimum oil consumption and maximum engine performance. Break-in procedures are as follows:

- Do not operate at idle for extended periods during the first 10 hours.
- During the first 10 hours, operate in gear above 1,500 rpm as conditions permit.
- Continuously vary the engine rpm throughout the 25-hour break-in period.
- Do not exceed 4,725 rpm during the first 10 hours of break-in period.
- After 10 hours, short bursts of wide-open (6,300 rpm for the V10 and 6,000 rpm for the MV8-570) are permissible for short periods (5–7 minutes).
- Accelerate smoothly during break-in and avoid full-throttle acceleration.
- Ensure that the engine has reached normal operating temperature prior to running during break-in.
- It is recommended to perform the break-in procedures in stages with a full cool-down cycle between outings.

NOTE: Check engine oil level frequently during break-in. Add oil as necessary. It is normal to see higher-than-normal engine oil consumption during the break-in period.

After the first 10 hours, when operating at short bursts of wide-open throttle, it is important to verify that the propeller is correct. The correct propeller will allow the engine to achieve rated rpm at wide-open throttle (6,300 rpm for the V10 and 6,000 rpm for the MV8-570) with a normal load of fuel, people, equipment and gear.

OTHER CONSIDERATIONS

Never operate the boat at continuous wide-open-throttle. This places undue strain on the engine components. Wide-open-throttle exists to allow boaters to get out of dangerous encounters or situations, but it represents the upper limit of the engine's capacity.

See also the boat manufacturer's Owner's Manual for operational hints and tips that can enhance the enjoyment of the boat's and drive train's integration.

NOTES

Section 7

MAINTENANCE

In addition to the routine matters addressed earlier, there are a number of other maintenance matters that require periodic attention. The following table indicates the maintenance schedule:

MAINTENANCE SCHEDULE

Item	Service	Every 25 hrs	Every 50 hrs	Every 100 hrs/ Annually#
Engine oil and filter	Change	X		X
Engine coolant*	Check			X**
Power steering fluid* (if equipped)	Check	X		X**
Serpentine belt	Inspect	X		X**
Sea pump – MV10	Basic Rebuild		X**	
	Complete Rebuild*			X**
Sea pump – MV8-570	Basic Rebuild		X**	
Fuel/water separator	Replace	X		X
High-pressure fuel filter	Replace			X
Air filter/spark arrestor	Change			X
Rubber hoses	Inspect			X**
Spark plugs*	Replace			X
Spark plug wires*	Inspect			X
Shaft alignment*	Inspect			X
Engine and transmission coolers	Inspect			X
Zinc anodes	Inspect		X**	

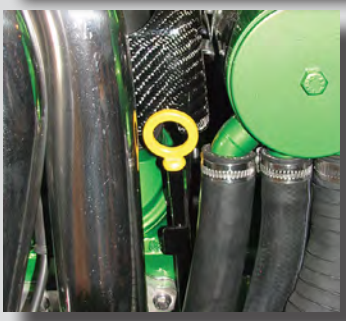
\# Whichever comes first.

* Services best accomplished by a certified Ilmor dealer.

** Replace sooner if regular checks indicate wear or damage.

Ilmor recommends that the maintenance requirements be performed by a certified Ilmor dealer. Service technicians there have the proper equipment, training and resources to best meet your service needs. Please note that routine maintenance is not covered by the Ilmor High-Performance Marine Limited Warranty. For details, consult the limited warranty statement.

MV10



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CHANGE THE ENGINE OIL AND FILTER

The following service must be performed while the engine and boat are out of the water. However, in order to thoroughly and properly drain all the old oil, the boat engine needs to reach at least 140°F (60°C) first. Since the engine must be supplied with water to function, it is recommended to run the engine while the boat is in a body of water, and then promptly remove the boat from the water and immediately perform the service. If you cannot place the boat in a body of water or do not have access to a professional offshore hook-up to protect the engine and drive train components (as some dealerships do), have a certified Ilmor dealer perform this service. A list of recommended oil for use in each MV8 engine can be found in Fluid Specifications on page 11-1. In areas where these recommended oils are not available, please contact your local authorized service center for appropriate equivalents. Use of supplemental oil additives is not recommended.

1. Ensure the engine is OFF and the engine safety starting switch is disconnected. Leave the throttle/shift control lever in neutral. The engine must be warm.
2. Open the engine compartment and locate the oil drain hose, which runs from the bottom of the oil pan. At the loose end of the oil drain hose is a plug.

NOTE: Never drain oil into the bilge or into the water. Wipe up any spilled oil immediately and dispose of the rags and drained oil in a proper manner on-shore. Many bodies of water are environmentally protected by law. Dumping in the water can result in significant fines.

3. Remove the engine oil cap located on the oil fill neck. (This access to air will speed up the oil draining process.)
4. Remove the bilge drain plug to drop the drain hose through the hole. Drain the oil into a container on the ground. Alternatively, a suction pump can be hooked up to the oil drain hose to remove the engine oil.
5. Loosen the end plug to allow the oil to drain.
6. Remove the oil filter and dispose of it properly on-shore.
7. Lightly lubricate the oil filter gasket and spin the new filter on until the gasket makes contact. Hand-tighten the filter three-quarter to one turn after contact. DO NOT use a filter wrench to tighten.
8. Reattach the oil drain plug to the end of the hose and refill the crankcase through the oil cap opening on the fill neck. Hand-tighten the oil cap.
9. Check the oil level with the dipstick. The oil level should read between the ADD and FILL lines. Cable-tie the oil drain hose and water lines to their original factory location to keep them from coming in contact with hot areas in the engine compartment.

10. After the warm-up period the first time after the oil change, turn OFF the engine. Disconnect the engine safety starting switch and leave the throttle/shift control lever in neutral. Open the engine compartment cover and verify that there are no leaks around the new oil filter and fitting, the drain line or the valve covers.

11. Add more oil as necessary and recheck levels if oil is added.

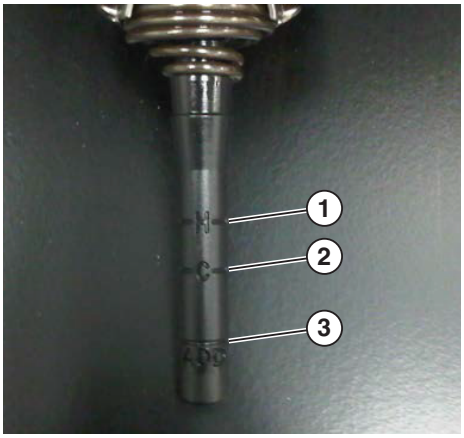
NOTICE: Always use the recommended engine oil. Failure to follow the engine oil recommendation listed in this Owner's Manual can result in accelerated engine wear and engine component failure. Engine damage due to incorrect oil usage, oil changes and oil levels, or other failure to follow engine oil procedures can be costly and may void the warranty.

NOTICE: Discharge of oil or oil waste products is restricted by law. Take every precaution to prevent the spillage of oil or oil waste into the environment when servicing or using your boat. Contain and dispose of oil or oil waste in accordance with the law.

CHECK THE POWER STEERING FLUID FOR ENGINES WITH INTEGRAL RESERVOIR

This procedure applies to boats equipped with power steering systems. Because this process should be completed while the engine is cool (in order to avoid burns), it is recommended that this check be completed prior to starting the engine.

1. Center the steering and stop the engine.
2. Locate the power steering pump at the port side, front of the engine and remove the fill cap with integrated dipstick (level gauge).
3. Proper fluid level is at the FULL mark.
4. If necessary, add fluid to specified level. Use only fluid as outlined in Fluid Specifications on page 11-1.



1) FULL HOT Mark

2) FULL COLD Mark

3) ADD Mark

NOTICE: If power steering fluid is not visible, contact your Ilmor High-Performance Marine service center immediately. Severe engine damage could occur.

NOTE: Power steering fluid does not require changing. Review the Maintenance Schedule on page 7-1 for further details.

For remote power steering reservoir systems, see the boat manufacturer's manual for proper maintenance instructions, or contact your authorized Ilmor service center for assistance.

CHANGE THE AIR FILTER/SPARK ARRESTOR

Ilmor recommends the air filter/spark arrestor be changed every 100 hours or annually, whichever comes first.

1. Ensure the engine is OFF and the engine safety starting switch is disconnected. The engine must be cool.
2. Disconnect the air temperature sensor and remove the breather tube from the air filter/spark arrestor.
3. Loosen the clamps and gently remove the air filter/spark arrestor. Properly discard of the air filter/spark arrestor per local regulations.
4. Carefully install the new air filter/spark arrestor. Make sure the air filter/spark arrestor is seated properly prior to tightening the clamps.
5. Reconnect the air temperature sensors and breather tube.

NOTE: The air filter and spark arrestor are pre-oiled from the manufacturer. No other oils are required for this part replacement.

CHANGE THE FUEL/WATER SEPARATOR

WARNING! Always allow the engine to cool down completely before attempting to service the fuel/water separator filter in order to avoid fire or explosion.

WARNING! Always be sure that the ignition key is in the OFF position, the main battery power switch is in the OFF position, and that no spark or flame are present when servicing the fuel/water separator.

1. Be sure that the key is in the OFF position and that the engine is completely cooled down.
2. Close the fuel supply valve, if applicable.
3. Locate and remove the fuel/water separator and sealing ring, turning counterclockwise, being careful not to spill any fuel. Be sure to clean any spilled fuel immediately.

NOTE: The fuel/water separator is pictured below.

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4. Properly dispose of the used water separator and sealing ring.
5. Coat the new fuel/water separator sealing ring with engine oil.
6. Install the new water separator hand-tight by threading and turning clockwise.

NOTE: Do not overtighten the fuel/water separator. Never use a filter wrench to install the fuel/water separator.

7. Open the fuel supply valve, if applicable.
8. Run bilge blower and be sure that the engine compartment is properly ventilated and free of fuel vapor.
9. Be sure that cooling water is supplied to the engine, and start the engine.
10. **WARNING! Always make sure that no fuel leaks exist and that the engine compartment is well ventilated with no gasoline vapors present to avoid fire or explosion hazard before performing any fuel system maintenance.** Inspect the fuel/water separator for any leaks. Correct any leak if found, clean spilled fuel immediately and repeat steps 8 and 9.

REPLACE THE HIGH-PRESSURE FUEL FILTER

WARNING! Always allow the engine to cool down completely before attempting to service the high-pressure fuel filter in order to avoid fire or explosion.

WARNING! Always be sure that the ignition key is in the OFF position, the main battery power switch is in the OFF position, and that no spark or flame are present when servicing the high-pressure fuel filter.

NOTE: System may be pressurized. It is a good idea to perform the high-pressure fuel filter service and the fuel/water separator service together. After removing the fuel/water separator, the system will be "open" and this is an optimal time to remove the high-pressure fuel filter. Install new filters as instructed in the following procedure.

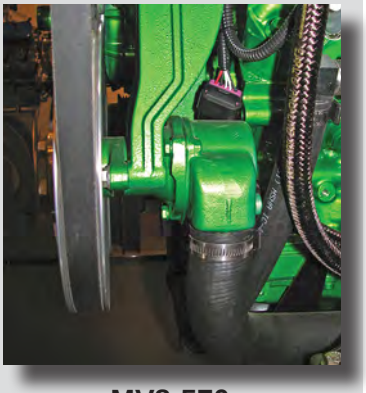
1. Be sure that the key is in the OFF position and that the engine is completely cooled down.
2. Close the fuel supply valve, if applicable.
3. Locate the in-line high-pressure fuel filter. Before removal, note the direction of flow on filter by referencing the black arrow on the filter body.

4. Using a 3/8" automotive-style, quick-disconnect fuel line tool (must be plastic version), carefully remove one fuel line. The tool may need to be split in half for easier removal. If possible, let filter drain into a small pan or bucket before removing the second fuel line.
5. Remove the second fuel line and properly dispose of filter and excess drained fuel.
6. Visually inspect fuel line ends to make sure internal o-rings are still in place, retaining clips are not bent, and no visual obstructions are present. If any components appear to be worn or damaged, contact your authorized Ilmor service center for additional assistance.
7. Install new high-pressure fuel filter, in the previously noted flow direction, inside the mounting clip on the engine.
8. Install both fuel lines onto the new filter. The lines will click when fully engaged.
9. Once system is fully reassembled, with the bilge blowers running, cycle ignition (letting the fuel pump run a full cycle) 3–5 times to prime fuel system and check for leaks. There is no need to start the engine as 3–5 ignition cycles will prime the fuel system.
10. Once you have verified the system is leak-free, start the engine and let it run for approximately 1 minute. Then, turn the engine off and perform a final check of the bilge for any fluid leaks.

WARNING! Always make sure that no fuel leaks exist and that the engine compartment is well ventilated with no gasoline vapors present to avoid fire or explosion hazard before performing any fuel system maintenance. Inspect the high-pressure fuel filter for any leaks. Correct any leak if found, clean spilled fuel immediately and repeat steps 9 and 10.

REPLACE THE RAW WATER IMPELLER/SEA PUMP IMPELLER

MV10



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Because this process should be completed while the engine is cool (in order to avoid burns), it is recommended that this check be completed prior to starting the engine. If checking during an outing, allow the engine to cool. Be very careful to avoid burns from contact with hot engine parts.

1. Ensure the engine is OFF and the engine safety starting switch is disconnected. Leave the throttle/shift control lever in neutral. Open the engine compartment and locate the raw water impeller housing. (This is also sometimes referred to as a sea pump.)
2. Disconnect the intake and outflow hoses on the raw water impeller housing. Remove any debris found inside the hoses and then reconnect.
3. Remove the serpentine belt.
4. Remove the raw water impeller housing, sometimes referred to as a sea pump, by disconnecting the bolts that hold the housing to the engine (MV10) or bracket (MV8-570).
5. Remove the fasteners on the impeller housing and very carefully break the gasket seal. Because a good seal is very important to avoid potentially serious leaks while the engine is in operation, always replace the gasket/o-ring. It is advisable to have some new gaskets/o-rings in in the boat's glove box for such occasions. Leaving any portion of the older gasket on the house or cover can impede good contact.

NOTICE: Always pay attention to any gauges or warning lights. Ignoring elevated temperatures on a temperature gauge or any other evidence of the engine operating at temperatures above recommended levels can result in serious damage to the engine. Any resulting damage will not be covered by the warranty.

6. Inspect the inside of the impeller housing. If any rubber extrusions on the end of the arm appear frayed or worn, it should be replaced. If there is not a slight bend to the paddle-wheel arms, replace it. Debris entering the impeller inevitably will damage it. However, the impeller serves its purpose in deflecting debris and keeping it out of much more expensive internal engine parts.
7. Any uncertainty about the condition of the impeller means that it should be removed and inspected. The impeller fits very snugly and will require some care in removing and reinstalling or installing a new

one. This ensures proper operation. The use of soap or water-based petroleum jelly will help with installation. Note that proper placement on the gear results in a squeeze on the arms. This is the correct installation.

8. Ensure that the gasket surfaces are smooth and clean. Place a gasket/o-ring between the housing and the cover. Reinstall with the fasteners loosened with the face plate that was removed earlier. Do not overtighten the fasteners as it will cause them to break.

9. Reinstall the raw water pump housing back onto the engine or bracket, and replace the serpentine belt. Reconnect the intake and outflow hoses.

FLUSH THE COOLERS

NOTICE: Marine growth occurs in brackish and salt water, and even in what is referred to as "fresh" or salt-free water. Therefore, it is important to flush the boat's cooling system with fresh water after each use.

Accelerated marine growth occurs when operated in salt water. This makes it critical to flush the cooling system with fresh water after each use. This fresh water flushing can be done with the boat either in or out of the water.

Contact your local authorized Ilmor High-Performance Marine service center to determine the best method to flush your engine coolers after each use as each boat/engine installation may vary.

REPLACE THE SERPENTINE BELT

NOTE: A properly installed serpentine belt will be automatically adjusted by the belt tensioner. When the belt is off, attention should also be given to the quality of wear of the grooves on the underside of the belt where it makes contact with the pulleys. If you are unsure of the wear pattern, check against a new belt. If there is any uncertainty, seek assistance from your authorized Ilmor High-Performance Marine service center. If the belt is too loose and or is too tight, it will cause the electrical system to malfunction. This could occur during an outing and strand the boaters. Therefore, take this maintenance function very seriously.

NOTICE: If the serpentine belt comes off or wears through, catastrophic engine failure may occur. Do not operate the engine without a properly installed serpentine belt. Any resulting damage will not be covered by the warranty.

1. The serpentine belt is located on the front of the engine.

2. Using a 15 mm socket wrench, remove tension from the belt by moving the tensioner to its maximum travel position.

3. Remove the serpentine belt by unwrapping it from each of the pulleys.

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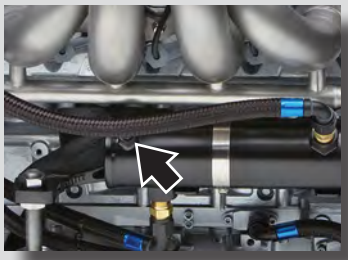
MV10 Oil Cooler Anode

MV10 Heat Exchanger Anode (one each port and starboard)



MV8-570 Oil Cooler Anode

MV8-570 Heat Exchanger Anode

4. Check the wear on the inside grooves and replace as necessary.
5. To install a new belt or to reinstall the existing belt, wrap the belt around the pulleys as shown, and use a 15 mm socket to rotate the tensioner to its maximum travel. This should allow enough slack to slide the belt over the smooth, water pump pulley.
6. Ease the tensioner back into place and ensure that the belt is properly wrapped around all of the pulleys.

REPLACE THE ZINC ANODES (SALTWATER APPLICATIONS)

1. Locate the zinc anodes.
2. Using an 11/16 in. socket wrench, remove the zinc anode from the lower end of the heat exchanger.
3. Inspect the anode for wear. If the anode exhibits signs of excess wear or has reduced to half of its original size, it will need to be replaced.

CLEANING THE ENGINE COMPARTMENT AND CORROSION PREVENTION

The engine compartment should receive a good, general cleaning of the interior as well as the engine and transmission exteriors. There is reward in the cleaning beyond enhancing the overall value of the boat. Cleaning with simple soap and water may reveal if any corrosion has occurred.

Corrosion can occur in any type of water and on any metal surface, even when the type of metal, such as stainless steel, has been chosen for components. But corrosion is of particular concern for boats that will be operated in salt water, even if the system is closed cooling. Salt water may still enter the engine compartment due to the engine compartment cover being open to vent carbon monoxide and prevent explosive fumes. The exhaust system will always be subject to contact with salt water in these conditions, too.

Galvanic corrosion, or electrolysis, is the decomposition of metal due to the effects of electrolytic action. When two dissimilar metals are immersed in a conductive fluid such as salt water, an electric current is produced, much like the action of a battery. As the current flows, it takes with it tiny bits of the softer metal. If left unchecked, severe damage may occur over time.

A boat properly prepared for operation in salt water will have self-sacrificing zinc anodes mounted on the transom, and possibly elsewhere underwater. These anodes are intended to reduce the effects of galvanic corrosion to critical metal areas of the boat. The zinc anodes should be checked regularly, and when significant erosion is shown, the anodes should be replaced. More information regarding the zinc anodes is contained in the boat manufacturer's Owner's Manual.

NOTICE: Always properly clean the engine and transmission if exposed to salt water. Exposure to salt water causes corrosion, leading to significant damage to metal, including stainless steel. If evidence of corrosion shows on the engine, carefully clean the engine and transmission with fresh water and a mild soap solution after use in salt water. A protective marine oil may be applied to exposed metal to halt the acceleration of corrosion. Failure to properly clean boat or pay attention to corrosion matters will void the warranty.

INSPECTING AND CLEANING THE BATTERY CONNECTIONS AND HOLD-DOWNS

1. Check that the battery post connections are clean and tight. If not, loosen and remove the negative terminal connection first. Be careful to avoid touching the positive terminal with the wrench or negative connection. Then loosen and remove the positive terminal connection. Remove the battery hold-downs and remove the battery from the boat. Clean corrosion from the battery posts with a battery terminal cleaner. Clean the battery with a water-and-baking-soda solution. Use care to avoid allowing the solution to enter the battery vents. Rinse the battery with fresh water. Note that this is a generic cleaning method. Battery manufacturers may specify other methods of cleaning. Verify with the battery manufacturer's website the correct cleaning method before undertaking any cleaning.
2. Use a battery terminal cleaning brush to remove corrosion from the inside of the battery terminals. Clean the terminals with a water-and-baking-soda solution and rinse.
3. Reconnect the positive terminal first, and then the negative. Tighten the terminals. Coat both terminals completely with a thin covering of marine grease to protect against water or any potentially corrosive substance. Be sure that the rubber boot covers the positive terminal completely.

NOTICE: Never install accessories or add-on equipment that is not approved by Ilmor. Add-on equipment may adversely affect the alternator output or overload the electrical system. Any damage caused as a result will not be covered by the warranty.

The boat manufacturer specifies a type of marine battery with a certain level of cold-cranking amps at 0°F (–18°C). Check the boat manufacturer's Owner's Manual to determine what this specification is.

Before disconnecting the battery, be sure that the ignition key and all accessories are in the OFF position. Also, take care to reattach battery cables correctly to avoid reversed polarity, which is addressed in Electrical System on page 2-3.

Section 8

STORAGE AND WINTERIZATION

⚠WARNING! ***Always follow the boat manufacturer's instructions on how to properly winterize the fuel tank prior to storage. Leaking of fuel into the boat and potentially into the storage area could result in substantial damage to the boat, and contact with any spark (such as a flame-producing pilot light in a heater) could also result in property damage and serious injury or death.***

Proper storage and/or winterization preparations are just as important as how a drive train is maintained in use. Since special preparations are necessary, the boat owner should have the work done by an authorized Ilmor High-Performance Marine service center. Damage that occurs from improper storage and/or winterization is not covered under warranty and must be avoided.

Engine winterization requires changing the engine oil/filter, draining all raw water from the cooling system and adding marine/RV antifreeze to all raw water engine components.

NOTICE: Always perform the proper storage procedures when storing the boat. Extended storage with fuel in the system can affect fuel stability and may require system inspection and fuel filter replacement when the boat returns to service. Fuel systems on all boats equipped with Ilmor High-Performance Marine engines MUST be properly prepared for storage periods exceeding 30 days. Owners are encouraged to seek assistance from an authorized Ilmor High-Performance Marine service center to properly prepare the drive train for periods of inactivity exceeding one month. Damage due to improper storage and/or winterization preparations is not covered under warranty.

FUEL SYSTEM TREATMENT

Boats that are going to be stored for extended periods (more than one month) or winterized should have the fuel systems prepared according to the boat manufacturer's instructions.

WARNING! Always follow the boat manufacturer's instructions on how to properly winterize the fuel tank prior to storage. A fuel stabilizer, such as STA-BIL, may also be used during long-term storage and winterization of the engine. Follow the directions provided by the stabilizer's manufacturer.

NOTICE: Always perform the proper storage procedures when storing the boat. Extended storage with fuel in the system can affect fuel stability and may require system inspection and fuel filter replacement when the boat returns to service. Fuel systems on all boats equipped with Ilmor High-Performance Marine engines MUST be properly prepared for storage periods exceeding 30 days. Owners are encouraged to seek assistance from an authorized Ilmor High-Performance Marine service center to properly prepare the drive train for periods of inactivity exceeding one month. Damage due to improper storage and/or winterization preparations is not covered under warranty.

OIL STORAGE/WINTERIZATION

Contaminants in used oil can cause engine damage during storage. Perform an oil change and run the engine to operating temperature to allow new oil recirculation.

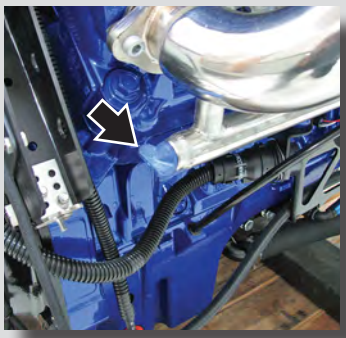
COOLING SYSTEM STORAGE AND WINTERIZATION

Cooling system storage/winterization requires draining and flushing raw water components with marine/RV antifreeze. Engines with closed cooling systems DO NOT REQUIRE DRAINING OF COMPONENTS THROUGH WHICH COOLANT FLOWS. The 50/50 coolant will provide freeze protection down to –26°F (–32°C). However, all components through which raw water flows must be drained. The following steps are recommended for draining of raw water components:

This process should be completed while the engine is OFF and cool (in order to avoid burns).

1. Drain exhaust manifolds of raw water by removing the blue plugs at the rear of the header distribution rail.
2. Drain heat exchangers of raw water. Remove drain plug and allow draining.
3. Reinstall exhaust header drain plugs, and heat exchanger end caps/drain plugs after all raw water has been drained.
4. Fill all components of raw water system with a nontoxic marine/RV antifreeze with a protection level appropriate for your climate location. Freeze protection level will depend on climate location. Marine/RV antifreeze will provide freeze protection to water pockets that did not drain and necessary corrosion protection. Approximately 3–4 gal (11.4–15.1 L) will be needed.
5. Close thru-hull water pick-up seacock.
6. Fill raw water components by removing both 1 in. “jumper” hoses from the exhaust header to the tailpipe. Fill the exhaust header with antifreeze through the 1 in. outlet until full. This should fill the raw water side of the engine heat exchanger, oil/transmission heat exchanger, raw water pump and sea strainer. The sea strainer may need to be opened to purge air.
7. Fill sea strainer with antifreeze if not full by end of procedure.
8. Reinstall hoses with necessary fasteners.

NOTE: Another effective method for cooling system storage and winterization requires circulating coolant throughout all systems with the engine running. We recommend contacting your authorized Ilmor service center for detailed instructions and assistance performing this procedure.



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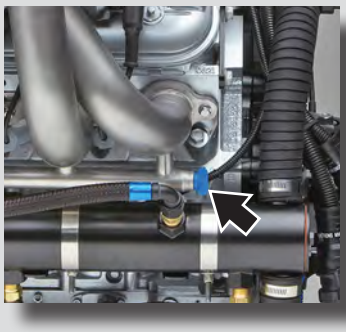

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BATTERY WINTERIZATION

Check the battery and/or boat manufacturer's requirements.

RECOMMISSIONING AFTER STORAGE/ WINTERIZATION

Properly preparing the engine and drive train after a period of storage and/or winterization is equally important. Equal attention must be paid to the same components during recommissioning as during the winterization process.

NOTE: When putting the engine back into service after winterization or long-term storage, perform the procedures listed in Section 4, Before Each Use.

1. Remove raw water pump impeller and check it carefully. If it appears to have weathered or there are any doubts about its ability to function properly, replace it.
2. Check all fluids: oil, transmission, cooling.
3. Reinstall battery(ies) and check the battery voltage. With the key on, but before the engine is started, the voltmeter should read above 12 volts. If it is less, charge the battery(ies).

NOTE: All Ilmor High-Performance engines are equipped with additional wires for a Clean Power connection. The MV10 engines also have a Clean Ground connection. These wires must be connected directly to the respective battery that powers each engine. Otherwise, the engines will not crank.

4. Visually inspect the fuel system. If there appears to have been undue weathering or any leaks have appeared over the storage/winterization period, contact your authorized Ilmor High-Performance Marine service center for correction. DO NOT start the engine if there is any appearance of leakage or rupture of any component of the fuel system.
5. Install boat hull drain plugs.
6. Marine/RV antifreeze should be drained and recycled. It is best accomplished by running the boat on the garden hose and collecting the antifreeze into buckets as it comes out of the exhaust.
7. Review the boat manufacturer's storage and winterization recommissioning directions to ensure that all requirements have been met, prior to launching the boat.

Section 9

EMISSIONS

EMISSIONS WARRANTY INFORMATION

Product Owner's Responsibilities Procedures

It is extremely important that attention be given to gaseous emissions throughout the life of the engine. It is the responsibility of the owner/operator(s) to have routine engine maintenance performed in order to maintain emission levels within the certified standards. The owner/operator(s) may not modify the engine in any manner that would alter the allowable gaseous emission levels to exceed their certified specifications.

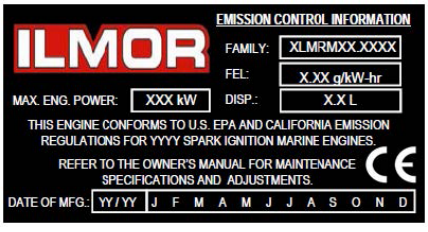
Emissions Control Information Label

At the time of manufacture, each engine is affixed with a tamper-resistant Emission Control Information (ECI) label. This label affirms the required emissions statement, along with the engine "family" name as well as the engine displacement. The engine serial number is stamped on a flat boss surface on the block, in the respective locations shown in the sidebar. The date of manufacture is indicated by punch holes at the bottom of the ECI label.

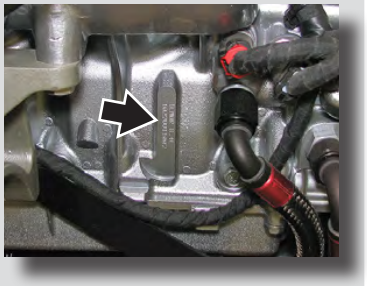
ECI labels must not be removed or tampered with by anyone.

If replacement labels are needed, contact Ilmor High-Performance Marine, LLC promptly.

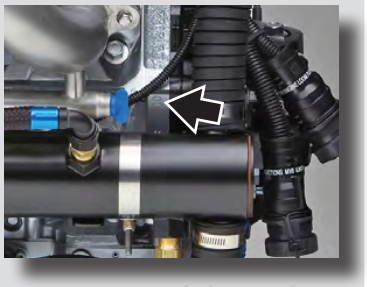
Engines with the CE mark (present in the lower right corner of the ECI label) affirm that the Declaration of Conformity applies. The Declaration of Conformity attests the engine's conformance to the appropriate European Community Directive. The ECI label is located on the electronic engine control mounting bracket on the rear of the engine (MV8 570); it is located on the heat exchanger on the MV10 G4 engines.



Emission Control Information Label



MV10 Serial Number Location



MV8-570 Serial Number Location

Emissions Control System Information

Emission Control System related components for all engines having the Emission Control Information label will be acronized as follows: positive crankcase ventilation (PCV), sequential multiport fuel injection (SFI), naturally aspirated (NAT), On-Board Diagnostic – Marine (OBD-M), low-permeation fuel line (HOSE), electronic throttle control (ETC) and electronic engine control (electronic EC).

Star Label

Beginning January 1, 2009, any boat sold or registered in California must have a Star Label affixed to the port side of the hull either forward or aft of the vessel registration as shown in the illustration below.

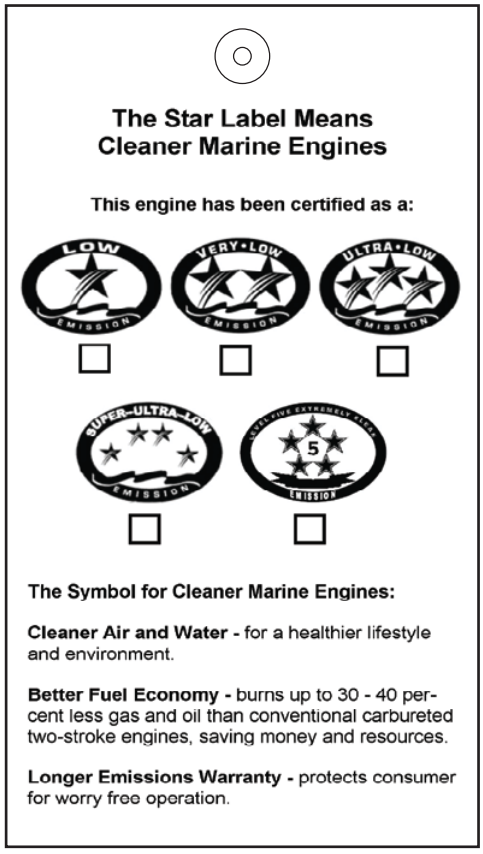
Star Label Location

A Star Label is also placed on the heat exchanger of each certified Ilmor High-Performance Marine, LLC engine. All Ilmor High-Performance Marine engines have a Three Star – Ultra Low Emission rating. This indicates that the engine has sixty five percent (65%) lower emissions than One Star – Low Emission engines. The Three Star Label identifies the engine as meeting the California Air Resources Board's sterndrive/inboard marine engine Tier 3 exhaust emissions standards.

Three Star - Ultra Low Emissions Label

Environmental Label

Each Ilmor High-Performance Marine engine will have attached an Environmental Label (hang tag) with the appropriate Star Label box check-marked, according to the engine's emissions standards compliance level. It is the responsibility of the selling dealer to include the hang tag, and it must be marked in the correct box to match the Star Label on the engine and the boat.



The Star Label Means Cleaner Marine Engines

This engine has been certified as a:

LOW EMISSION ☐ VERY LOW EMISSION ☐ ULTRA LOW EMISSION ☐

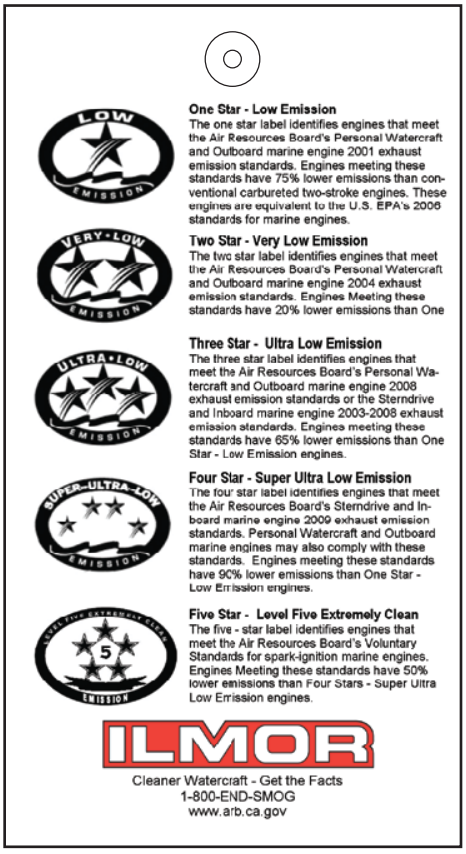
SUPER ULTRA LOW EMISSION ☐ 5 EMISSION ☐

The Symbol for Cleaner Marine Engines:

Cleaner Air and Water - for a healthier lifestyle and environment.

Better Fuel Economy - burns up to 30 - 40 percent less gas and oil than conventional carbureted two-stroke engines, saving money and resources.

Longer Emissions Warranty - protects consumer for worry free operation.



One Star - Low Emission
The one star label identifies engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2001 exhaust emission standards. Engines meeting these standards have 75% lower emissions than conventional carbureted two-stroke engines. These engines are equivalent to the U.S. EPA's 2006 standards for marine engines.

Two Star - Very Low Emission
The two star label identifies engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2004 exhaust emission standards. Engines Meeting these standards have 20% lower emissions than One

Three Star - Ultra Low Emission
The three star label identifies engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2008 exhaust emission standards or the Sterndrive and Inboard marine engine 2003-2008 exhaust emission standards. Engines meeting these standards have 65% lower emissions than One Star - Low Emission engines.

Four Star - Super Ultra Low Emission
The four star label identifies engines that meet the Air Resources Board's Sterndrive and Inboard marine engine 2009 exhaust emission standards. Personal Watercraft and Outboard marine engines may also comply with these standards. Engines meeting these standards have 90% lower emissions than One Star - Low Emission engines.

Five Star - Level Five Extremely Clean
The five - star label identifies engines that meet the Air Resources Board's Voluntary Standards for spark-ignition marine engines. Engines Meeting these standards have 50% lower emissions than Four Stars - Super Ultra Low Emission engines.

ILMOR

Cleaner Watercraft - Get the Facts
1-800-END-SMOG
www.arb.ca.gov

On-Board Diagnostics – Marine (OBD-M)

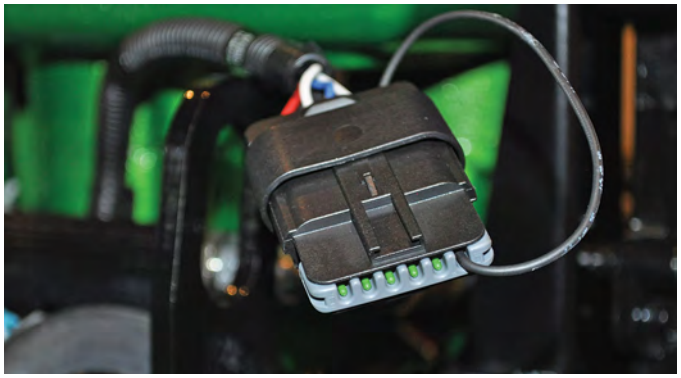
All Ilmor High-Performance Marine engines are equipped with marine on-board diagnostics to comply with the 2009 California-mandated OBD-M specification. The Malfunction Indicator Lamp (MIL) or a Check Engine warning will appear on the dash when emission system problems occur on the boat.

If the MIL is set due to an emissions-related fault, a Diagnostic Trouble Code (DTC) will register. The MIL functions to notify the operator that a problem has occurred so that the owner/operator can arrange for service as soon as possible. DTCs are stored in the engine control unit memory and can be retrieved with a diagnostic scan tool or through Diacom PC Software.

This information about system malfunction assists the service technician in quickly diagnosing system issues. When the MIL lights, the owner / operator should contact an authorized Ilmor service center to arrange a diagnostic scan at the earliest possible opportunity.

The diagnostic scan tool will be connected to the Data Link Connector (DLC), a flat 6-pin connector. The connector is located adjacent to the port side fuel rail. Note that the protective DLC cover must be removed prior to connecting the scan tool.

MV10



MV8-570

CALIFORNIA AND U.S. EPA EMISSION CONTROL WARRANTY STATEMENT

Your Warranty Rights and Obligations

The California Air Resources Board, U.S. Environmental Protection Agency and Ilmor High Performance Marine, LLC are pleased to explain the emission control system warranty on your 2013 model year and later sterndrive/inboard engine. In the United States, new sterndrive/inboard engines must be designed, built and equipped to meet all Federal and State mandated anti-smog standards.

Ilmor High Performance Marine, LLC must warrant the emission control system on your sterndrive/inboard engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your sterndrive/inboard engine. Your emission control system may include parts such as the fuel injection system and the ignition system. Also included may be hoses, belts, connectors and other emission-related assemblies.

Where a warrantable condition exists, Ilmor High Performance Marine, LLC will repair your sterndrive/inboard engine at no cost to you, including diagnosis, parts and labor.

Manufacturer's Warranty Coverage

Select electronic emission-related control parts from model year 2009 and later sterndrive/inboard engines are warranted for 3 years or 480 hours, whichever first occurs. Select mechanical emission-related components are warranted for 3 years or 150 hours, whichever first occurs, for engines with maximum power greater than 373 kW (500 bhp) but less than or equal to 485 kW (650 bhp); or 1 year or 50 hours of operation, whichever first occurs, for engines with power greater than 485 kW (650 bhp).

However, warranty coverage based on the hourly period is only permitted for engines that are equipped with hour meters as defined in § 2441(a)(13) or their equivalent. If any emission-related part on your engine is defective under warranty, the part will be repaired or replaced by Ilmor High Performance Marine, LLC.

Owner's Warranty Responsibilities

As the sterndrive/inboard engine owner, you are responsible for the performance of the required maintenance listed in your owner's manual. Ilmor High Performance Marine, LLC recommends that you retain all receipts covering maintenance on your sterndrive/inboard engine, but Ilmor High Performance Marine, LLC cannot deny warranty solely for the lack of receipts or your failure to ensure the performance of all scheduled maintenance.

Ilmor High Performance Marine, LLC may deny you warranty coverage if your sterndrive/inboard engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

You are responsible for presenting your sterndrive/inboard engine to an Ilmor High Performance Marine, LLC authorized service center as soon as a problem exists. The warranty repairs will be completed in a reasonable amount of time, not to exceed 30 days.

If you have any questions regarding your warranty rights and responsibilities, you should contact ILMOR High Performance Marine, LLC at 1-734-456-3600.

General Emissions Warranty Coverage

Ilmor High Performance Marine, LLC must warrant that the engine is:

(1) Designed, built and equipped so as to conform with all applicable regulations adopted by the Air Resources Board pursuant to its authority in Chapters 1 and 2, Part 5, Division 26 of the Health and Safety Code; and by the U.S. Environmental Protection Agency pursuant to 40 CFR 1045; and

(2) Free from defects in materials and workmanship that cause the failure of a warranted part to be identical in all material respects to that part as described in the engine manufacturer's application for certification.

Exclusions

Failures other than those resulting from defects in material or workmanship are not covered by this warranty. This warranty does not cover damage to emission control systems or parts which are a result of owner abuse, neglect, improper maintenance, the incorporation of, or use of, non-exempted add-on or modified parts, or the unapproved modification of any part.

This warranty does not cover replacement of expendable maintenance items made in connection with required maintenance service after the item's first scheduled replacement as listed in the maintenance section of the product Owner's Manual, examples of which include: spark plugs and filters. If a part is repaired or replaced under this warranty, the life of the warranty is not extended beyond its original expiration date.

Disclaimer

This warranty is applicable only where the California and U.S. EPA emission control system warranty regulation is in effect. The use of add-on or modified part(s) not exempted by the California Air Resources Board or the U.S. EPA may be reason for not warranting a claim, at the discretion of Ilmor High Performance Marine, LLC. In the case of non-exempted add-on or modified part(s) causing failure to a warranted part, the warranted part will not be covered.

Emission Control System Warranty Parts

Ilmor High Performance Marine, LLC will warranty mechanical emission-related components listed below 3 years or 150 hours of operation, whichever first occurs, for engines with maximum power greater than 373 kW (500 bhp) but less than or equal to 485 kW (650 bhp); or for 1 year or 50 hours of operation, whichever first occurs, for engines with maximum power greater than 485 kW (650 bhp); and select electronic and direct emission-related control components for 3 years or 480 hours, whichever first occurs.

Mechanical Emission-Related Components Warranty

Systems Covered by this Warranty	Parts Description
Fuel Metering	Intake valves
Air Induction	Intake manifold Spark Arrestor/Air filter*
Lubrication	Oil pump (includes internal parts)
Positive Crankcase Ventilation (PCV)	PCV valve Oil filler cap
Exhaust System	Exhaust manifold (tailpipe not included) Exhaust valves
Miscellaneous Items	Hoses Clamps Fittings Tubing Sealing gaskets or devices Mounting hardware Pulleys/Idlers Serpentine Belt

* Covered up to, but not including, the first required replacement only. See the Maintenance Schedule in the Owner's Manual.

Electronic Emission-Related Control Parts Warranty

Systems Covered by this Warranty	Parts Description
Fuel Metering	Fuel injectors Fuel pump Pressure regulator
Ignition	Spark plugs* Ignition coil(s) Ignition wire(s)
Miscellaneous Items	Camshaft Position sensor Crankshaft Position sensor Engine Coolant Temperature sensor Intake Air Temperature sensor Knock sensor Manifold Absolute Pressure sensor Throttle Position sensor Electronic Control Unit Electronic Throttle Control Camshaft Position actuator solenoid valve** Oil Pressure sensor** Oxygen sensor**

* Covered up to, but not including, the first required replacement only. See the Maintenance Schedule in the Owner's Manual.

** As applicable

Direct Emission-Related Control Parts Warranty

Systems Covered by this Warranty	Parts Description
Evaporative	Carbon canister Fuel tank Purge valve (if installed) Low-permeation (non-metal) fuel hose(s)

Section 10

TROUBLESHOOTING

The following chart is offered as assistance in identifying and correcting minor issues that may occur. Problems are listed in the order of most-likely to least-likely. Not all possible problems, causes and solutions can be listed here.

When experiencing problems, check surroundings before shutting down the engine. If suddenly stopping the power would result in placing other boats and boaters in jeopardy, continue until it is safe(r) to slow or stop and analyze the situation.

Always be aware of surroundings and how your actions may impact others.

Problem	Possible Cause	Potential Solution
Engine will not turn over.	Safety switch tether not connected.	Connect the safety switch tether.
	Throttle/shift control in gear.	Shift to neutral.
	Main circuit breaker open.	Reset the circuit breaker.
	Battery terminal corroded.	Clean the battery terminals.
	Battery weak or worn out.	Charge or replace the battery.
	Loose or corroded battery wiring connectors.	Clean and tighten the battery wiring connectors.
	Blown fuse.	Check and/or replace fuses and/ or relays.
	Defective starter solenoid.	Replace the starter solenoid.
	Defective neutral safety switch.	Replace the neutral safety switch.
	Defective starter motor.	Replace the starter motor.
	Clean Power/Clean Ground not connected.	Connect Clean Power/Clean Ground to the correct engine battery.
Engine turns over, but will not start.	Safety switch tether not connected.	Connect the safety switch tether.
	No fuel in the tank.	Fill the fuel tank.
	Fuel filter clogged.	Have dealer replace the fuel filter.
	Fuel pump fuse blown.	Check and/or replace fuses and/ or relays.
	Contaminated fuel.	Drain fuel properly and have dealer replace the filter.
	Loose or corroded battery wiring connectors.	Clean and tighten the battery wiring connectors.
	Weak or shorted ignition coil.	Replace the ignition coil.

Problem	Possible Cause	Potential Solution
Engine turns over, but will not start. (Continued)	No fuel to the engine.	See authorized Ilmor High-Performance Marine service center.
	Vapor Lock.	Open engine compartment, run bilge blowers, key ignition on for 5 seconds, then key off (repeat 5 times), check fuel level.
	Clean Power/Clean Ground not connected.	Connect Clean Power/Clean Ground to the correct engine battery.
Engine misses or idles rough.	Fouled spark plugs.	Have dealer replace the spark plugs.
	Loose or defective high-tension leads.	Have dealer tighten or replace the high-tension leads.
	Weak ignition coil.	Have dealer replace the ignition coil.
	Vacuum leak.	Check breather hoses/tubes.
	Clean Power/Clean Ground not connected.	Connect Clean Power/Clean Ground to the correct engine battery.
Poor boat performance.	Fouled spark plugs.	Have dealer replace the spark plugs.
	Contaminated fuel.	Drain fuel properly and have dealer replace the filter.
	Plugged air filter/spark arrestor.	Replace the air filter/spark arrestor.
	Weak ignition coil.	Have dealer replace the ignition coil.
	Fuel filter clogged.	Have dealer replace the fuel filter.

Section 11

SPECIFICATIONS AND SERVICE LOG

GENERAL SPECIFICATIONS

	MV8 570	MV10 650	MV10 725
Full Throttle RPM Range	5,600–6,000 (6,200 rpm limit)	5,600–6,100 rpm (6,300 rpm limit)	5,800–6,300 rpm (6,400 rpm limit)
Displacement	454 cu. in. (7.4 L)	511 cu. in. (8.4 L)	
Compression Ratio	10.7:1	10.4:1	
Alternator	95 amp	160 amp	
Engine Controller	4th Gen. E-Controls	ICE system	
Emissions Certification Standard	U.S. EPA – CARB 3-Star Ultra-Low Emissions and EU RCD (CE) certified		
Fuel Type	91 Octane (R+M)/2 (95 RON)		
Engine Weight (including fluids)	830 lb (377 kg)	810 lb (367 kg)	
Firing Order	1-8-7-2-6-5-4-3	1-10-9-4-3-6-5-8-7-2	

FLUID SPECIFICATIONS

	MV8 570		MV10 650 MV10 725	
	Type	Capacity	Type	Capacity
Engine Coolant	Sierra Brand 5-Year/100,000-mile 50/50 Mix	2.125 gal (8 L)	5-Year/100,000-mile 50/50 Mix	4 gal (15.14 L)
Engine Oil	Lucas Oil 20W-50, bottling date 13086 or later (shown on bottle label). Use Mobil 1 20W-50 V-Twin if Lucas Oil is unavailable.	9 qt (8.5 L)*	0W-40 Mobil 1 Synthetic	10 qt (9.46 L)**
Power Steering Fluid	Synthetic ATF	Boat specific	Synthetic ATF	Boat specific

* 9 qt (8.5 L) for an empty system.
Approximately 6 qt (5.6 L) for an oil change.

** 10 qt (9.46 L) for an empty system.
Approximately 8.5 qt (8.04 L) for an oil change.

NOTE: Always use the dipstick for proper oil level measurement.

OPERATING SPECIFICATIONS

		MV8 570	MV10 650 MV10 725
Normal Oil Pressure @ Idle		15–70 psi (1.0–4.8 bar)	50–75 psi (3.45–5.17 bar)
Normal Fuel Pressure	@ idle	53 psi (3.65 bar)	68 psi (4.69 bar)
	@ wide-open throttle	55 psi (3.77 bar)	72 psi (4.96 bar)
Normal Seawater Pressure	@ idle	0–5 psi (0–0.35 bar)	0–5 psi (0–0.35 bar)
	@ wide-open throttle	30–50 psi (2–3.4 bar)	20–40 psi (1.38–2.76 bar)
Normal Coolant Temperature		185°F (85°C)	155° – 180°F (68° – 82°C)
Normal Oil Temperature		N/A	150° – 230°F (66° – 110°C)

SERVICE LOG

Service	Date	Date	Date	Date	Date	Date
Engine oil and filter						
Engine coolant						
Power steering fluid						
Transmission fluid						
Serpentine belt						
Raw water impeller/sea pump						
Air filter/flame arrestor						
Engine						
Engine timing						
Spark plugs						
Spark plug wires						
Breather hose						
PCV valve						
Shaft alignment						
Heat exchanger(s)						
Zinc anodes						

PARTS QUICK-REFERENCE

Component	Ilmor Part #	
	MV8 570	MV10 650 MV10 725
ANODES, Zinc	PV 05913	PV 05913 and PV 06528
BELT, Serpentine	PV 06554	MVP 0165
CAP, Heat exchanger	MVP 0003	MVP 0003
FILTER, Air; ARRESTOR, Spark:	509-0060A	PE00808C
FILTER, Oil	PV 06486	MVP 0285
FILTER, Fuel – High-pressure	PV 06020	PV 06020
FILTER, Fuel/Water separator	MVP 0162	MVP 0162
IMPELLER, Seawater pump	MV8V-1179	MVP 0102
KIT, Fuses/Relay	TBD	PK00077A
SPARK PLUG	PV 06577	MVP 4560

Service parts are available for purchase online at **www.ilmor.com**.

NOTES