June 2024

OWNER'S MANUAL

ILMOR ENGINES

Ilmor Engines

OWNER'S MANUAL
For
ILMOR ENGINES

Ilmor Marine, LLC

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Every effort has been made to ensure accuracy and quality in publication of this document. At the time of printing, content is the most current available. Consumers are encouraged to visit www.ilmor.com/en 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 Limited Warranty Statement.

Due to technological advancements and continuous improvement of our products and products of our component suppliers, Ilmor reserves the right to change specifications without notification. Photographs and illustrations used in this Owner's Manual are intended only as representative reference views and may not depict actual model component parts.

WELCOME

It is our honor to welcome you to the Ilmor Marine, LLC (Ilmor) family of industry leading marine performance engines. By selecting our powertrain, you have chosen a recognized leader in the marine industry. Your powertrain is backed by Ilmor's championship-caliber, high-performance knowledge and service that has cemented our place as the top choice for pulse-pounding quickness without sacrificing reliability or smoothness. We know that you will enjoy the power to plane and quickly realize that Ilmor was the best choice for your boating enjoyment!

INTRODUCTION TO MANUAL

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

For locating the nearest authorized Ilmor service center, please visit https://www.ilmor.com/Resources/Find-a-Dealer or call 844-GO-ILMOR (464-5667).

RECORD OF OWNERSHIP

Please take a few moments to record the information below. A completed Record of Ownership will streamline the service parts ordering process and ensure the correct parts are placed on order with Ilmor Marine.

Date Purchased: _____

Dealer: _____

Dealer Phone: _____

Hull Identification Number (HIN): _____

Boat Manufacturer: _____

Boat Model: _____

Boat Length Overall: _____

Engine Model: _____

Engine Power: _____

Transmission Gear Ratio: _____

Sterndrive Gear Ratio: _____

Propeller Pitch: _____

Propeller Diameter: _____

SAFETY INSTRUCTIONS

Prior to operating the boat for the first time, operators MUST read the entire Owner's Manual. Be certain to pay close attention to proper operation and safety concerns addressed within that publication. Reread the Owner's Manual prior to first operation at beginning of the boating season.

It is a boat owner's and/or operator's responsibility to be aware of safety issues and concerns with the proper operation of the boat. All on-board passengers, regardless of age, physical limitations, and/or previous boating experience (or lack thereof), bear the full responsibility for determining the appropriate behavior and safety precautions required on the boat. These responsibilities also include, but are not limited to, taking active precautions around the engine, engine compartment, transmission, and all moving parts.

A properly prepared and maintained powertrain 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. Safety and maintenance of the powertrain are best described in this Owner's Manual and at www.ilmor.com/Resources/Warranties-Manuals. For additional information, contact the nearest Ilmor service center or call 844-GO-ILMOR.

The following safety precautions are published for 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 installing, operating, or servicing an Ilmor product, it is the owner's/operator's responsibility to ensure full compliance with all applicable safety codes and requirements. All requirements of the Federal Occupational Safety and Health (OSH) Act of 1970 (amended 2004) 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 the local office of the Occupational Safety and Health Administration (OSHA).

Failure to adhere to and comply with safety dangers, warnings, cautions, and notices that appear in this manual can lead to serious illness, injury or death, and/or damage to the boat or property of others. Beyond these warnings, boaters have a personal responsibility to utilize a common-sense safety approach to the boating experience, including keeping individuals off or away from the swim platform and stern area of the boat during engine operation. Personal flotation devices (PFDs) save lives and ensure safer and more positive experiences.

Ilmor offers many proactive, safe approaches to the boating experience, but the consumer is ultimately responsible for the safe and positive operation of the boat.

Please note, safety information statements are categorized for information purposes only and are not presented in any relative order of importance. Each of the statements referenced below, and in other sections of this manual, provide important safety-related information and must be read and followed to avoid injury or damage, as applicable. The owner/operator is strongly encouraged to read the dangers, warnings, cautions, and notices in the context presented by reading and reviewing those sections.

DANGERS, WARNINGS, CAUTIONS, AND NOTICES

DANGER, WARNING, CAUTION, and NOTICE are used throughout this manual to highlight important information. Be certain that the meanings of these alerts are understood by all who work on or near the equipment. Specific safety information is highlighted with symbols designed to draw particular attention to specific information. These will include:

Safety alert symbol appears with most safety statements. It means attention, become alert, personnel 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 improper operation of equipment.

GENERAL SAFETY CONCERNS

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

Whenever an engine is operated within the confines of an engine compartment, it is extremely important to follow the boat manufacturer's instructions regarding ventilation 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 emissions. This is a colorless, odorless, and poisonous gas that accumulates rapidly, both within confined areas and in open areas. 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.

WARNING! Never attempt to stop or slow rotating parts. Keep away from rotating parts. The engine compartment serves as a guard. Be sure the ignition is OFF and the engine is not running 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.

Onboard personnel must be vigilant whenever the engine is running with engine compartment open. Avoid all moving parts. When possible, adjustments to the engine or anything accessible from the engine compartment while the engine is running should be performed by an authorized Ilmor service center, or authorized boat manufacturer dealer. Exercise extreme caution if adjustments are necessary while the boat is in use or in preparation for use.

It is the owner/operator's responsibility to perform all safety checks to the engine(s) prior to, during, and after operation. When properly followed, the maintenance schedules listed in this manual will ensure the long-term operation and performance of the engine. When service and maintenance are required, return the boat to an authorized Ilmor service center. Failure to follow the procedures outlined in this Owner's Manual or through published technical information at www.ilmor.com/en 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 damages to the product. This could lead to voiding the warranty, as well as placing people in an unsafe situation.

SAFETY NOTICES

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

⚠ WARNING! Always use genuine Ilmor 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 non-approved replacement parts from aftermarket or other sources will void the warranty and could result in fire and/or explosion, which could result in serious injury or death.

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

⚠ WARNING! Ensure ignition key and main battery power switch are in the OFF position, and no spark or flame is present when servicing fuel/water separator. Failure to do so could result in fire and/or explosion, which could result in serious injury or death.

⚠ WARNING! Replace fuel system parts with only Ilmor-authorized parts. If the engine fuel system requires attention, adjustment, or replacement, the procedure must be performed by an authorized Ilmor service center. Fuel lines are pressurized and can only be disconnected with specialized tools. Failure to follow this directive will void the warranty and may result in damage to the boat and/or serious injury or death.

⚠ *WARNING! When servicing fuel system components, always have an appropriately-rated fire extinguisher nearby and adequate workspace ventilation. Failure to do so could result in fire or carbon monoxide poisoning, which could result in serious injury or death.*

⚠ *WARNING! The fuel system is under pressure. Allow the engine to completely cool down before servicing the fuel/water separator filter. Failure to do so could result in fire and/or explosion, which could result in serious injury or death.*

⚠ *WARNING! Ensure no fuel leaks are present and engine compartment is well ventilated with no gasoline vapors present before performing any fuel system maintenance. Failure to do so could result in fire and/or explosion, which could result in serious injury or death.*

⚠ *WARNING! Battery posts, terminals, and related accessories may contain lead and lead compounds. These chemicals are known to the State of California to cause cancer, birth defects, or other reproductive harm. Wash hands after handling.*

⚠ *WARNING! Operating, servicing, and maintaining a recreational marine vessel can expose you to chemicals including engine exhaust, carbon monoxide, phthalates, and lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm. To minimize exposure, avoid breathing exhaust, service the vessel in a well ventilated area, and wear gloves or wash hands frequently when servicing this vessel. For more information go to www.P65warnings.ca.gov/marine.*

⚠ *CAUTION! Maintain a safe distance from other operating vessels, docks, shallow waterway bottoms, and/or debris that may result in damage to the vessel. Failure to do so may result in serious injury and/or damages not covered under warranty.*

⚠ *CAUTION! Leaks or restrictions in the cooling system may result in engine overheating. Ensure sufficient water supply to the engine, and that equal amounts of water are flowing out of the exhaust system. Immediately shut off the engine if excessive heat is detected by odor or sight. Failure to do so may result in, including but not limited to, damage to the engine, which is not covered under warranty, and/or damage to the boat, which may result in injury to personnel.*

NOTICE: The engine cooling system must remain free and clear of debris at all times. Operating the engine with a restricted cooling system may cause overheating conditions, resulting in damage to powertrain components. Be sure to inspect/replace the cooling system regularly. Never operate the engine in waters where debris is likely to become ingested into the engine cooling system. (See *MAINTENANCE SCHEDULE section* in the *MAINTENANCE* chapter of this manual.)

NOTICE: Lack of water to the engine cooling system could cause the raw water impeller to fail and lead to severe engine damage. Any leaks or restrictions to the inlet or outlet side of the engine cooling system should be repaired immediately before continued operation of the engine.

NOTICE: Engines operating in brackish or salt water should be flushed with fresh water after every use. Void water on open cooled side.

NOTICE: Do not operate the engine without a properly installed serpentine belt. If serpentine belt is severely worn, misaligned, or has failed, catastrophic engine failure may occur. Resulting engine damage will not be covered by the warranty.

EXHAUST SYSTEM

Ilmor engines are equipped with wet marine exhaust systems where raw water enters the exhaust elbows (downturn adapters) and mixes with exhaust gases. Mixing water with exhaust gases reduces internal combustion noise from the engine. This mixing is important because it also provides cooling to the exhaust rubber components that direct the exhaust outside the vessel. After the water-exhaust gas mixture passes through the system, it exits back into the body of water.

Ilmor engine exhaust systems are equipped with a catalytic converter system. Ilmor strongly recommends that ONLY an authorized Ilmor service center should perform maintenance on the catalytic converter system.

⚠ CAUTION! Never allow excessive exhaust temperature that will damage the exhaust hose, and is symptomatic of a leak or restriction in the cooling system. If safe to do so, shut off engine immediately when excessive heat is detected by odor, sight, or engine cooling faults. Failure to do so may result in more serious consequences including, but not limited to, damage to the engine not covered under warranty and/or damage to the boat that may result in personal injury.

Exhaust manifolds are water-cooled to regulate exhaust temperatures. If an odor of burning rubber (or other materials) exists, shut down the engine immediately and move to a safe location. Often as a symptom of cooling system issues, overheating will damage exhaust manifolds and hoses. Contact the nearest authorized Ilmor service center immediately if the engine exhaust exhibits any of the above symptoms.

FUEL SYSTEM

Ilmor gasoline engines are designed with either a multi-port injection (MPI) or a gasoline direct injection (GDI) fuel delivery system. Ilmor uses the most up-to-date technology to monitor powertrain characteristics and meet emission and driveability requirements of marine applications today.

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

COOLING SYSTEM

Unlike automotive cooling systems that use radiators (air-to-fluid heat exchangers) for cooling, marine engines have two different types of cooling systems for transferring engine heat. Closed cooling systems use fluid-to-fluid heat exchangers. Open cooling systems use water only to transfer heat directly from the engine. Cooling water is provided by the body of water in which the boat is operated. A raw water pump draws water into the engine where it is distributed to the engine's cooling system.

NOTICE: Marine growth occurs in brackish, salt water, and even in fresh (salt-free) water. It is important to flush the cooling system with fresh tap/treated water AFTER EACH USE.

Ilmor engines use two main types of cooling systems. Available cooling system types are determined by the model of engine selected:

1. Open Cooling System

In an open cooling system, the entering water flows directly through the cooling passages of the engine exhaust manifolds and discharges out the tailpipes.

2. Closed Cooling System (Ocean Performance Series)

In a closed cooling system, the entering water is directed to the heat exchangers to transfer engine heat, and discharged via the tailpipes or the One-Drive®.

⚠ WARNING! Never operate the engine without adequate and uninterrupted water flowing through the cooling system. This requires the boat to be in an operational-sized body of water or connected to the suction side of a raw water pump by an Ilmor-approved water supply. If the engine operates without water in the cooling system, the exhaust system will overheat and could potentially create an onboard fire. The raw water pump impeller could be compromised as well. Damages caused to the powertrain, or boat, due to water starvation may void the warranty and may result in serious injury and/or death.

Ensure the engine seacock remains clear of debris at all times. Even small amounts can clog or block the pick-up located beneath the boat. The engine seacock MUST have an uninterrupted supply of water whenever engine is running. (See the *Check Sea Strainer* section in the *OPERATION* chapter of this manual for more information.)

Open Cooling System

The open cooling system is designed for fresh water use only. Even when boating in apparently clean fresh water, it is highly recommended to flush the cooling system after each use. This helps control marine growth and fouling of the cooling system.

In an open cooling system, fresh water is drawn through the engine seacock by the raw water pump. The raw water pump is located on the engine. The seacock is located on the submerged hull of the boat where it can draw water continuously. The engine circulation pump circulates fresh water throughout the engine and exhaust manifolds, and then discharges the water out of the exhaust tailpipes.

Closed Cooling System

The closed cooled system is the required application for boats operating in consistently brackish or salt water. The system provides maximum protection for the engine against corrosion, fouling, and marine growth. As noted above, it is extremely important to flush the cooling system after each use.

In a closed cooling system, fresh water is drawn through the engine seacock, or water inlet ports on the One-Drive® gear housing, by the raw water pump. From there, it is distributed to the heat exchangers and then to the exhaust adapters before exiting the exhaust tailpipes or One-Drive® gear housing. The engine circulation pump recirculates coolant through the engine and exhaust manifolds. Raw water never comes in contact with the engine or exhaust manifolds.

Flushing Procedure

Flushing the engine is a maintenance practice recommended after each use of the engine(s). Flushing the engines reduces the risk of cooling system blockage from items such as aquatic growth, corrosion, and/or foreign debris. Higher salinity areas must be flushed each time to prevent aquatic growth, corrosion, or build up in the cooling system. FLUSHING the engine is NOT the same as WINTERIZING. Consult your authorized Ilmor service center for more information.

NOTICE: Any exposure to brackish or salt water requires a closed cooling system. Operating an open cooled engine in brackish or salt water can and will void the warranty.

1. Select the appropriate flush attachment for the application.

- One-Drive® – attach an appropriate, sterndrive-style, flush attachment and fresh water supply over the water inlet holes on the gear case or to the boat manufacturer's engine-flushing attachment (if equipped).
- Inboard – attach a fresh water supply hose and hull-style flush attachment that covers the engine seacock from the exterior or to the boat manufacturer's engine-flushing attachment (if equipped).

NOTICE: Be sure to remove the flushing device from the engine's water supply inlet (seacock or gear case) when the flushing process is complete.

⚠ CAUTION! Failure to remove the flushing device can result in personal injury and equipment damage not covered under warranty.

2. Secure the flush attachment over the engine seacock inlet. The flush attachment should be tight enough against the inlet to prevent the fresh water supply from spilling. Use tape or a strap to secure the flush attachment, if necessary.
3. Turn ON the fresh water supply to the flush attachment. The fresh water supply must be capable of supplying more than 5 gallons of fresh water per minute to the flush attachment.

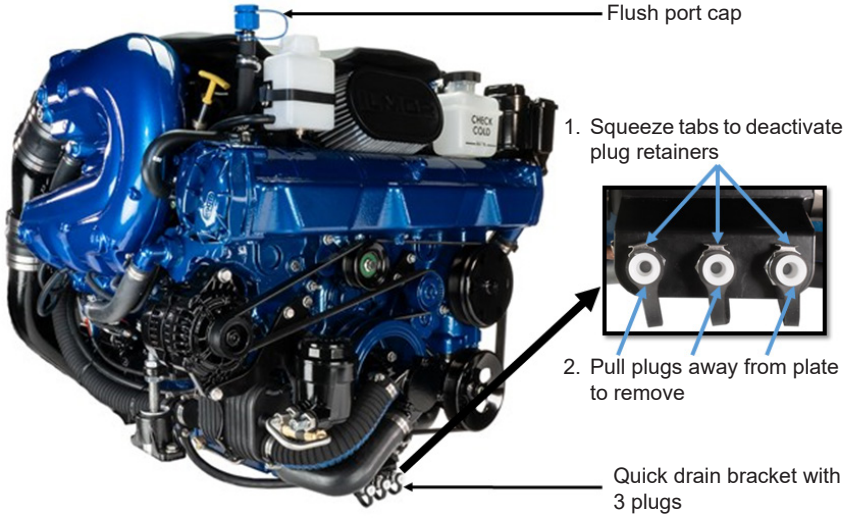
⚠ WARNING! Failure to supply sufficient water flow to the engine cooling system can result in product damage(s) due to overheat, not covered under warranty.

4. Once a sufficient supply of fresh water has reached the flush attachment, START the engine.
5. Monitor the rate of intake of the fresh water supply at the flush attachment. If the engine fails to draw in the fresh water supply or engine operating temperature exceeds the specified operating temperature range, STOP the engine IMMEDIATELY! Turn OFF the fresh water supply, correct any system leaks, and return to Step 2.
6. Continue to run the engine up to its recommended operating temperature. The flushing procedure is complete once all preexisting water in the raw water cooling system has been replaced by the fresh water supply. Remove all attachments, tools, and supplies before the next use.

Quick Drain Procedure (GDI-S Models)

This system allows the operator to drain the engine raw water system. Ilmor recommends performing this procedure after each use of the engine operation. It prevents build up marine growth, corrosion, and blockage in the raw water system. The steps below describe how to use this integrated feature.

Quick Drain



CAUTION! Not opening the flush port cap for the siphon break may result in unwanted water flow into the bilge compartment. Be sure to remove the cap!

1. Verify the engine is OFF.
2. Remove the emergency stop lanyard from safety switch. Leave the throttle/shift control lever in the neutral position.
3. Close the seacock (if equipped).
4. Remove the flush port cap, which will act as a siphon break for the raw water system.
5. Open the three valves by squeezing each port and removing each plug.

DANGER! If the plugs are not reinserted properly or are missing, potential overheat damages to the engine and water intrusion into the bilge may occur.

6. Allow the raw water to completely drain from the system.
7. Reinsert each port plug to the respective port on the quick drain plate.
8. Reinstall the flush port cap.
9. Open the seacock (if equipped).
10. Install the emergency stop lanyard to the safety switch.

CAUTION! Ilmor requires the use of propylene glycol antifreeze used in the raw water cooling system during extended storage and/or winterization. See authorized dealer for this service as outlined in the STORAGE and WINTERIZATION section of this manual.

ELECTRICAL SYSTEM

CAUTION! Any repair, replacement, and/or installation of an electrical system component must meet or exceed the standards, requirements, and excerpts posted within American Boat and Yacht Council (ABYC) Standard E-11 (AC and DC Electrical Systems on Boats), as well as U.S. Coast Guard (USCG) regulations contained in U.S. EPA CFR Title 33 Part 183. Failure to do so could result in damage to equipment or personal injury.

The Ilmor powertrain uses a 12-volt negative ground electrical system. When servicing the vessels battery or batteries, ensure the terminals are installed correctly. Reverse polarity occurs when the terminals are installed on the wrong post. This can cause damage to the electrical system components which will not be covered by warranty.

WARNING! Reverse polarity can cause damage to the electrical system components, electrical shock, or even explosion, which could result in serious injury or death.

WARNING! Always disconnect the negative battery cable (-) first before disconnecting the positive battery cable (+). This minimizes the possibility of electrical contact which may result in serious injury or death.

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

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.

Electronic Power Distribution Module (ePDM)

The ePDM is mounted on the engine. The ePDM replaces the need for a mechanical fuse box, improving reliability and system monitoring abilities. The ePDM is installed on all model year 2021 engines. The ePDM is sealed with a tamper-proof sticker. Never remove the cover from the ePDM as this will void product warranty.

Do NOT remove the cover from the ePDM

Boat/Engine Interface Wiring

The engine electrical system is primarily self-contained in a preassembled unit. The boat wiring interface follows established practices and conforms to regulatory guidelines. Every reasonable effort was exerted to make the electrical connection simplified and straightforward. Consumers are strongly encouraged to seek assistance from an authorized Ilmor service center when dealing with any electrical issues.

ENGINE SENSORS

The engine is equipped with many sensors. These sensors provide performance information such as engine speed, engine coolant temperature, engine oil pressure, and much more.

The engine management system uses these sensors to alert the operator of any irregularities during engine operation. Most sensors trip audible or visual alarms on gauges or other dash displays. DO NOT ignore alarms. Owners are urged to bring the boat to an authorized Ilmor service center for analysis if, or when, a malfunction is suspected after receiving a system alarm.

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. If these alarms are ignored, this may result in serious damage to the equipment that is not covered under warranty.

ALARMS and GAUGES

Read the accompanying boat Owner's Manual for important information regarding alarms and gauges.

The Ilmor engine management system displays a visual alarm whenever any monitored engine parameter is not in operating range. If an alarm is present, throttle back immediately, if safe, and identify which gauge is out of range. Alarms and messages vary between boat models. Most boat models use a centrally mounted gauge with specific engine response. In boats equipped with more than one engine, there will be separate alarms for each engine. Refer to the boat manufacturer's operator manual for more information.

The alarm activation will display if the following conditions occur:

- Return to Neutral
- Water temperature (Engine Coolant Temperature Higher than Expected)
- TPS Error (Engine Throttle Not Responding)
- FPP Error (Foot Pedal Signal Error)
- Fuel Injector Error (Injector Circuit Shorted)
- Low oil pressure
- One-Drive® steering faults
- One-Drive® trim faults
- Exhaust Raw Water Temperature Sensor (GDI-S models only)

NOTE : The engine monitor alarm will display when ignition is turned to running position. The alarm will shut off momentarily. After the engine is started, the alarm will not alert again. If the alarm sounds or displays at any other time, or for any other reason, contact an authorized Ilmor service center before restarting the engine.

Water Temperature

The water temperature alarm appears if the engine coolant exceeds preprogrammed limits. If this occurs, return the engine or engines to idle for cool-down. If the temperature is still increasing, shut engine off immediately, if safe. Confirm that the seacock is open and that the sea strainer is clear. If neither of these is the cause, take the boat to an authorized Ilmor service center.

Analog water temperature gauge

Oil Pressure

The oil pressure alarm appears if the engine oil pressure falls below recommended value for current engine speed. If this occurs, shut the engine off immediately, if it is safe to do so. Before any other steps are taken, check the oil level. Be certain to use the correct weight of oil, as using unapproved engine oil can and will void the warranty. (See the *Engine Oil Type* in the *SPECIFICATION* chapter of this manual for approved oil type and weight.)

Before returning to normal operations, consumers are strongly encouraged to seek assistance from an authorized Ilmor service center when dealing with any oil pressure issues.

Oil pressure gauge

Voltage

The voltage gauge displays the status of battery charge and charging system. With engine running, the voltmeter should read between 13 and 14.7 volts.

Voltmeter

NOTICE: Starting a vessel with a battery or batteries that are in a discharged state places undue strain on the charging system and this can cause premature failure of the vessels alternator(s). Be sure to keep the vessels battery or batteries in an operable state (above 12 volts).

BEFORE STARTING ENGINE

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

1. After performing all the checks and inspections outlined in this Owner's Manual, lift the engine compartment cover.

⚠ DANGER! Open engine compartment and check for fumes, leaks, or presence of fluids in bilge before starting engine. Failure to do so could result in fire or explosion, and severe injury or death.

2. Operate bilge blower for at least 4 minutes with engine compartment cover open. Leave bilge blower ON throughout the starting process and until the boat has planed.
3. The boat is likely equipped with sea strainer valves and seacocks. Ensure these are open prior to starting the engine.

BEFORE EACH USE

Engine Oil

⚠ WARNING! Never use oil additives. Doing so may result in equipment damage not covered under warranty.

NOTICE: Always check fluid levels while the engine is level bow/stern, fore/aft while in the water.

NOTICE: Before operation, follow procedure for checking oil level after engine start-up, located later in this chapter.

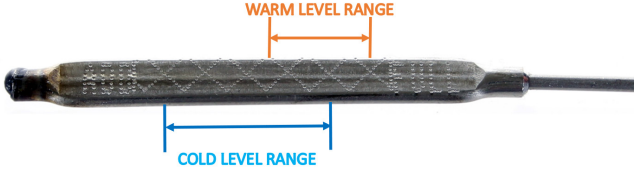
Check the engine oil level prior to starting the engine. Perform oil level check with the boat level (fore-aft and port-stbd), at rest, and in the water. If the engine oil registers within the dipstick operating range, the engine is okay to start. If the level registers higher, or lower, than the dipstick operating range, contact a certified Ilmor service center for more information. For oil fill measurements, the WARM level check must be performed as outlined in Check Engine Oil (Warm).

1. Open the engine compartment and locate the yellow handle engine oil dipstick on the side of the engine.
2. Remove dipstick and wipe it off on a clean rag. Insert dipstick fully, wait 5 seconds, and remove to read level. Check that the oil level on the dipstick is between FULL and ADD marks. See picture below.

NOTICE: Always follow the oil maintenance service interval.

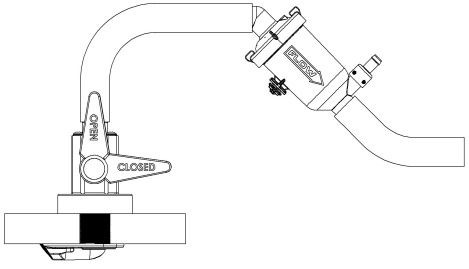
Recommended oil level

DO NOT OVERFILL!



1. Ensure the engine is shut down and the engine safety starting switch is disconnected. Leave throttle/shift control lever in neutral.
2. Open engine compartment and locate seacock. Verify it is in CLOSED position. Remove the strainer screw, screen, and O-ring from cap/lid.
3. Check sea strainer for obstructions, wear, or damage.
4. Reinstall the strainer O-ring, screen, and screw on the cap/lid. Make sure the O-ring is in place before tightening screw. Do not overtighten.
5. Move the seacock to the OPEN position.

Typical seacock and strainer



NOTICE: Ensure the seacock is in the OPEN position before operating the engine. If not, the engine will overheat and the raw water pump impeller could be compromised, causing severe engine problems. Ensure the sea strainer cap/lid is installed correctly and O-ring is not pinched. Failure to do so will cause air to be introduced into the system and could cause the raw water impeller to be compromised, causing severe engine problems.

NOTICE: Monitor all gauges and warning lights for alarms. Ignoring elevated temperatures on a temperature gauge or any other evidence of 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: Checking the sea strainer is a critical function of routine maintenance. Even waterways that appear clean may have finer debris that can enter the cooling system and create blockage. Failure to check the sea strainer 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 the temperature gauge, even when carefully performing this check. Failure of the raw water impeller or blockage of the transmission cooler are some causes of powertrain overheating conditions.

Coolant Level

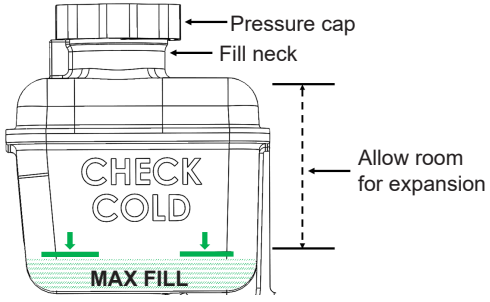
⚠ WARNING! Contents under pressure! Do not remove the cooling system cap when the engine is warm. Allow ample time for engine to cool before checking coolant level. Wear proper protective equipment when checking coolant. Failure to do so may result in severe or fatal burns.

This check applies to boats equipped with closed-cooling systems. Perform this check prior to starting the engine.

1. Verify engine is OFF and engine safety starting switch is disconnected. Leave throttle/shift control lever in neutral.

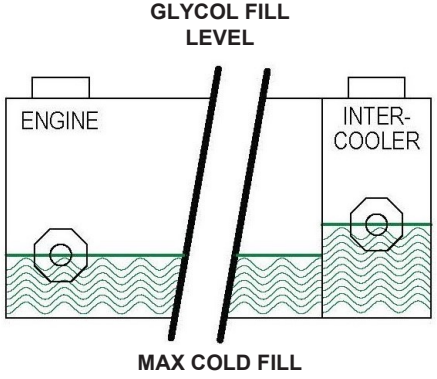
2. Open the engine compartment. Locate the closed-cooling system tank installed on the engine.
3. Remove reservoir cap and check level. Verify coolant is at the MAX FILL line while the engine temperature is equal to ambient air temperature (COLD).
4. If the coolant level is below the MAX FILL line, add 5-year extended warranty propylene glycol coolant premixed 50/50 with water. The cooling system will take between 5.8 gal (22 L) and 6.8 gal (26 L) of coolant.
5. If tank is empty or nearly empty, notify an authorized Ilmor service center for immediate assistance as the engine cooling system will likely require purging. Purging should only be completed by a trained Ilmor service technician.

GDI/-S series closed-cooling reservoir cap and tank



MPI-S series only closed-cooling reservoir cap and tank

Supercharged 6.2L expansion tank



NOTICE: Do not fill tank beyond MAX FILL line while the engine is cold. When engine temperature increases, the coolant will expand.

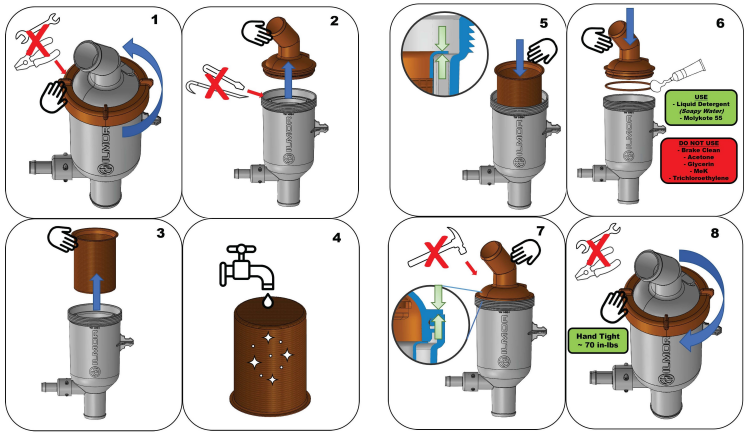
NOTICE: Maintain a correct coolant level. Failure to maintain coolant to the proper level can result in serious engine damage. The warranty does not cover engine damage due to overheating or any other cause associated with improper coolant levels.

Sea Strainer

1. Clean the strainer element if dirt has accumulated. Close the seacock before unscrewing the lid of the water strainer. Remove the strainer element out of the housing and flush the strainer with clean water.
2. Use only water and/or soap to clean your strainer and basket. (Never use solvent-based products to clean or lubricate your strainer.)
3. Re-install the strainer element and grease the O-ring with molykote 55 or liquid detergent "soapy water".
4. **Secure or loosen the lid by hand. Never use tools for this purpose.**
5. Check the seal between lid and housing after cleaning and re-assembling the strainer. An improperly sealed lid will result in air sucked in by the sea water pump of the engine. This will cause the engine to overheat.

Sea Strainer Maintenance and Lid Instillation

Reference page 65 for full sized images



Power Steering Fluid (-S Models)

⚠ CAUTION! Check power steering fluid before starting engine, or allow engine to cool after shutting down. Failure to do so may result in burns from hot engine components.

This procedure applies to engines equipped with power steering systems.

1. Center the steering wheel and verify the engine is shut down.
2. Open the engine compartment and locate the power steering pump
3. Remove the power steering pump fill cap with integrated dipstick (level gauge).
4. Verify fluid level is between the MIN and MAX mark. Adjust the fluid level until it registers between the MIN and MAX mark. (See the *SPECIFICATIONS* chapter for power steering fluid type.)
5. Install the power steering cap and clean any spilled fluid.

Fill Cap with integrated dipstick (level gauge)

MPI-S

GDI-S

NOTE: Ensure the power steering fluid level registers between the MAX and MIN marks on the dipstick. For remote power steering reservoir systems, see boat manufacturer's manual for proper maintenance instructions, or contact an authorized Ilmor service center for assistance.

Serpentine Belt

1. Verify the engine ignition and battery switches are in the OFF position.
2. Open the engine compartment cover and visually inspect the serpentine belt for material defects or indications of wear to include missing material, cracking, layer separation, splits, cuts, etc.
3. Verify the pulleys are secure, aligned, dry, smooth, and undamaged.
4. Close the engine compartment cover and start engine.
5. Listen for abnormal noises coming from the serpentine belt system. Squealing, chirping, growling, grinding, or any other noise inconsistent with normal operation should be addressed immediately by repairing or replacing belt or pulleys. See an authorized Ilmor service center for more information.

Battery Connections and Hold-Downs

⚠ WARNING! Keep sparks, flames, and smoking materials away from battery charging area. When charging, batteries generate small amounts of dangerous, highly-explosive, hydrogen gas. Failure to follow the battery manufacturer's charging instructions may cause electrical shock or even explosion, which could result in serious injury or death.

⚠ WARNING! Battery electrolyte fluid is dangerous. It contains sulfuric acid, which is poisonous, corrosive, and caustic. Avoid spilling battery electrolyte or allowing it to come into contact with skin. If exposed to battery electrolyte, flush the area with large amounts of clean water and immediately seek medical attention.

⚠ CAUTION! Check the battery connections and hold-downs before starting the engine. Always allow the engine to cool after shutting down before attempting engine inspections. Failure to do so may result in burns from hot engine components.

1. Ensure the engine is OFF and the engine safety starting switch is disconnected. Leave throttle/shift control lever in neutral.
2. Locate battery or batteries. They may be placed in a variety of locations, depending on boat model. Refer to boat manufacturer's Owner's Manual for details.
3. Check that the battery post connections are clean and tight. (If not, see *Inspect and Clean Battery Connections and Hold-Downs* section in the *MAINTENANCE* chapter of this manual.)

Battery post connections

Battery Charge

1. After starting the engine, verify voltmeter reads between 13 and 14.7 volts. An erratic reading can be a sign of low voltage.

Voltmeter

NOTE: *The voltage gauge provides a good indication of the current state of the battery, but it is not foolproof. For instance, if the voltage gauge indicates the battery has voltage, yet during a previous outing there was reason to suspect an issue with the battery or batteries, then an issue may still exist. If so, check with an authorized Ilmor service center for assistance.*

2. Verify the age and state of the battery or batteries. If the battery voltage is low, and/or fails to hold a charge, the engine may not start. For additional questions about batteries, contact battery or boat manufacturer's authorized dealer.

⚠ CAUTION! Jump-starting a battery from another boat or battery is dangerous. Jumping a dead battery while it is attached to the alternator will put undue stress on the alternator, and may cause damage to equipment.

3. If battery is below 11.5 volts, charge with a battery charger before attempting to start. Starting a vessel with an undercharged battery system can and will cause undue wear on the vessel's charging system. Never attempt to start a vessel with a battery system under 11.5 volts.

Engine and Engine Controls/Cable

⚠ CAUTION! Inspect engine and engine cables before starting engine, or allow engine to cool after shutting down. Failure to do so may result in burns from hot engine components.

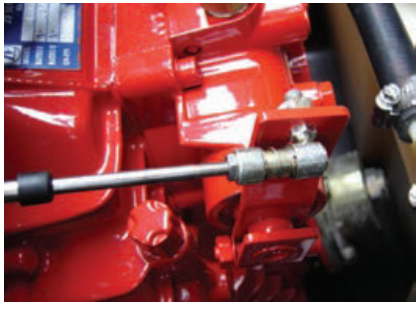
LOOSE OR MISSING HARDWARE

1. Ensure the engine is OFF and the engine safety starting switch is disconnected. Leave the throttle/shift control lever in neutral. Operate bilge blower for at least 4 minutes with engine compartment cover open.
2. Inspect the engine, engine components, and mounts for loose/missing hardware. If concerning items are found, contact an authorized Ilmor service center for maintenance.

CHECK FOR KINKS, WEAR, AND INTERFERENCE OF THROTTLE AND SHIFT CABLES

Follow each control cable and feel for any kinks or wear on the outer jacket. Immediately replace the cable if any sign of cable damage is found. Contact an authorized Ilmor service center for further assistance.

Check Transmission Shift Cable



Fuel and Exhaust Systems

⚠ DANGER! If at any time during operation there is an unexplained odor, or if anyone onboard 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: *This is a preliminary inspection only. Operator and onboard personnel should stay alert while boating for any signs of fuel or exhaust leaks.*

1. Ensure the engine is OFF and the engine safety starting switch is disconnected.
2. Open the engine compartment and inspect the fuel and exhaust systems for leaks, gaps, or cracks. If issues are found, do NOT start the engine. Contact an Ilmor certified service center immediately to repair the issue prior to starting the engine.
3. Start engine and check for fuel and exhaust leaks.
4. If any leaks, gaps, or cracks are discovered in the fuel or exhaust system once the engine is running, shut the engine down immediately, and have the vessel repaired by an authorized Ilmor service center before returning to normal service.

NEW ENGINE BREAK-IN

⚠ DANGER! Prior to operating engine, open engine compartment and check for fumes, leaks, or presence of fluids. If clear, operate bilge blower for at least 4 minutes before starting engine and when at idle or slow-running speed after starting the engine. This will remove any explosive gasoline and/or battery fumes that may be in the engine compartment. Failure to do so may result in explosion or fire, resulting in serious injury or death.

⚠ WARNING! Never operate the engine without an adequate, uninterrupted supply of water to the engine's cooling system. If the engine operates without water in the cooling system, the exhaust system will overheat which could potentially create an onboard fire. Damage(s) caused by improper usage void the product warranty and may also result in serious injury and/or death.

⚠ CAUTION! Ensure there is ample room around the boat when trying to start the engine. Contact with other boats, docks, shallow waterway bottoms, or debris may result in serious injury and/or damage to boat that is not covered under warranty.

NOTICE: Failure to follow new engine break-in and operating procedures as described in this manual will void the warranty. Before operating the boat for the first time, 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 long powertrain life. Proper new engine break-in procedures during the first 25 operating hours for a sterndrive and first 50 for an inboard. This will ensure maximum powertrain performance.

The break-in period allows the engine and transmission components to properly seat components and start normal wear.

Although the Ilmor powertrain may have been lake-tested by the boat manufacturer, the break-in period starts when the retail consumer takes possession of the boat. For break-in and maintenance recommendations, please follow the instructions provided in this

NOTICE: Ilmor engines are filled with break-in oil from the factory. It is imperative to have an authorized Ilmor service center change the break-in oil in a sterndrive at or before 25 hours or an inboard at or before 50 hours of proper break-in operation.

Owner's Manual.

When operating the engine, be sure to monitor the instrument panel gauges closely. Gauges are the first line of defense against engine damage. Well before serious damage occurs to an engine, gauges can alert the operator to circumstances that can lead to major damage.

Adjusting and varying engine speeds can also help the engine during break-in. Keeping engine at a constant speed for more than 3 or 4 minutes at a time places undue stress on the engine's internal components.

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 desired goal.

Some powertrain vibrations are normal during operation. Any abnormal vibrations or unusual noises may be signs of additional problems that are not registered by the engine management system. Do not ignore these signs. It is highly recommended to have an authorized Ilmor service center inspect the system annually.

Sterndrive Initial Hours of Operation (Pre-25 Hours)

DANGER! Prior to operating the engine, open engine compartment to vent and inspect for any presence of any explosive fluids. If the compartment is visibly clear, operate bilge blower for at least 4 minutes before starting engine. This will assist in removing explosive fluids that may be in the engine compartment. Failure to do so may result in explosion or fire, resulting in serious injury or death.

1. Start the engine and allow the engine speed to stabilize (600-800 rpm). Also, allow the engine temperature to warm to normal operating temperature. (See *SPECIFICATIONS* chapter in this manual for specific operating temperatures of each engine model.)
2. Move the throttle/shift control lever forward to plane the boat smoothly and quickly. Return the lever towards a slower engine speed once the boat is on plane.
3. Vary the engine speed for the first hour without exceeding 3,000 rpm, and carry only a light load in the boat. Reduce throttle/shift control lever to idle (neutral) occasionally for a cool-down period. Continue to operate the boat in this manner until the break-in period is complete (at or before 25 operating hours).
4. The boat MUST be returned to an authorized Ilmor service center for mandatory scheduled service between at or before 25 hours of operation.

Continued Sterndrive Initial Hours of Operation (Post-25 Hours)

1. After engine break-in period and scheduled service have been completed, engine may be operated more continuously at speed, but never beyond the maximum advertised speed. It is always advisable to give the engine an occasional cool-down period.
2. Throughout the life of the engine, allow for a warm-up period before operation. Abuse of the engine and transmission is never covered under warranty. Regular maintenance as outlined in this Owner's Manual is very important to ensure a long, trouble-free powertrain life.
3. Subsequent oil changes should be performed per the maintenance schedule outlined in this manual or quarterly if the boat is not used regularly. (See *MAINTENANCE* chapter in this manual for more details.)

NOTICE: Only use Ilmor-specified 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.

Inboard Initial Hours of Operation (Pre-50 Hours)

DANGER! Prior to operating the engine, open engine compartment to vent and inspect for any presence of any explosive fluids. If the compartment is visibly clear, operate bilge blower for at least 4 minutes before starting engine. This will assist in removing explosive fluids that may be in the engine compartment. Failure to do so may result in explosion or fire, resulting in serious injury or death.

1. Start the engine and allow the engine speed to stabilize (600-800 rpm). Also, allow the engine temperature to warm to normal operating temperature. (See *SPECIFICATIONS* chapter in this manual for specific operating temperatures of each engine model.)
2. Move the throttle/shift control lever forward to plane the boat smoothly and quickly. Return the lever towards a slower engine speed once the boat is on plane.
3. Vary the engine speed for the first hour without exceeding 3,000 rpm, and carry only a light load in the boat. Reduce throttle/shift control lever to idle (neutral) occasionally for a cool-down period. Continue to operate the boat in this manner until the break-in period is complete (at or before 50 operating hours).
4. The boat MUST be returned to an authorized Ilmor service center for mandatory scheduled service between at or before 50 hours of operation.

Continued Inboard Initial Hours of Operation (Post-50 Hours)

1. After engine break-in period and scheduled service have been completed, engine may be operated more continuously at speed, but never beyond the maximum advertised speed. It is always advisable to give the engine an occasional cool-down period.
2. Throughout the life of the engine, allow for a warm-up period before operation. Abuse of the engine and transmission are never covered under warranty. Regular maintenance as outlined in this Owner's Manual is very important to ensure a long, trouble-free powertrain life.
3. Subsequent oil changes should be performed per the maintenance schedule outlined in this manual or quarterly if the boat is not used regularly. (See *MAINTENANCE* chapter in this manual for more details.)

NOTICE: Only use Ilmor-specified 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.

AFTER EACH USE

Flush the Engine

1. Place a flushing device on the engine seacock on the bottom of the hull. Some applications may have an engine flushing attachment hose connection on the deck of the boat. Please review the boat manufacturer's Owner's Manual. Turn the water supply 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 the operating temperature for a minimum of 15 minutes. The water supply 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 30 days.

NOTICE: Brackish or salt water boats should be flushed with fresh water after every use. Failure to flush powertrain components regularly may result in cooling system issues and void of product warranty.

Long Term Storage

Ilmor recommends 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 boat has not been operated for more than 30 days and fuel is present in the tank (even stabilized fuel), the engine may run with reduced performance until the existing fuel has been used. Ilmor is not responsible for repairs to components that are damaged from poor-quality fuel as this is not covered under the engine warranty.

NOTICE: Perform proper storage procedures when storing 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 engines MUST be properly prepared for storage periods exceeding 30 days, as outlined in this Owner's Manual. Owners are encouraged to seek assistance from an authorized Ilmor service center to properly prepare the powertrain for periods of inactivity exceeding 30 days. Damage due to improper storage or winterization preparations is not covered under warranty.

FUELING THE ENGINE

DANGER! Never start the engine(s) if gasoline odor is present, or if a gasoline leak appears along the fuel line, fuel tank, in the bilge, or around the engine. Gasoline and gasoline vapors may cause fire or an explosion when starting the engine, which can result in serious injury or death. If gasoline is found, remove the ignition key(s) and call an authorized boat and/or Ilmor service center for repair. Avoid spilling gasoline when fueling. If gasoline is spilled, immediately wipe up all traces with dry rags and dispose of rags properly on-shore.

WARNING! All fuel system lines and connections must meet the requirements of U.S. Coast Guard (USCG) regulations. 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. All fuel hoses 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, must meet or exceed all requirements. Failure to do so may result in serious injury or death. Replace fuel system parts with only Ilmor-authorized parts.

WARNING! Inspect the entire fuel system for leaks and/or deterioration prior to operation, especially after substantial periods of non-use or storage. Ensure inspection includes fuel tank, fuel lines, fuel pump, regulator, fuel rails, carbon canisters, and all fuel system fittings. Never operate engine when any fuel component shows any indications of corrosion, leaks, deterioration, swelling, hardening, or softening. Notify an authorized Ilmor service center and/or boat manufacturer's dealer for replacement parts prior to operating the boat.

The boat fuel system has been specifically developed for use in a marine environment. A number of marine-specific safety measures are incorporated in the fuel system from tank to lines to connections. Please note, these measures include pressurized fuel lines that do not include user-serviceable parts.

Any fuel system services and repairs must be performed by authorized service personnel only with specialized tools and replacement parts that meet the manufacturer's Original Equipment Manufacturer (OEM) specifications.

Ilmor recommends a daily inspection to ensure no fuel lines are leaking. Never start the boat if there is evidence of fuel leaks or fumes.

Throughly read 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.

Fuel Requirements

Most Ilmor engines (5000MPI, 6.0L MPI/-S, 7.4L MPI/-S, 5.3L GDI/-S, and 6.2L GDI/-S) require a minimum of 87 octane gasoline. **It is required to use a minimum of 90 octane gasoline for 6.2L GDI/-S engines. It is required to use a minimum of 93 octane gasoline for the Supercharged 6.2L.** Ilmor recommends 0% Ethanol (E0) gasoline where available. Ilmor prohibits the use of gasoline with ethanol content greater than 10%. 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 motor octane number.

If the engine is subject to heavy usage, the minimum gasoline fuel requirement is Unleaded 90 (R+M)/2 Octane up to 10% Ethanol. Heavy usage is defined as operators using the vessel under the following conditions: loaded with additional ballast and/or weight to achieve total maximum capacity over the OEM specification, commercial or training purposes as defined in the Ilmor warranty, at water temperatures below 55°F (13°C), at elevations greater than 6000 feet (1830 meter) above sea level, and/or 5000 RPM or higher for more than 5% of total boating time.

For optimal 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. Higher-octane fuel causes less knock for the ignition system to process and adjust timing.

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 then replace the old gasoline with fresh gasoline if required.

Many engine manufacturers believe U.S. Environmental Protection Agency's (EPA) detergent levels in gasolines do not provide sufficient deposit controls to allow for optimal engine performance. TOP TIER Detergent Gasoline standards were created to ensure gasolines have all the necessary additives and detergents to reduce buildup of deposits in an engine. Ilmor recommends purchasing fuel from a supplier that meets TOP TIER specifications for the fuel. 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 engines will void the warranty on the engine.

Oxygenated Gasoline or Gasoline Containing Alcohol

NOTICE: USE OF UNSPECIFIED FUELS WILL VOID WARRANTY.

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 the engine.

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

The fuel tank level should NEVER reach below 1/4 tank full. In the event the engine runs out of fuel, refill the fuel tank, cycle ignition key five times, and attempt to start engine. If the engine fails to start and run, repeat this process again up to three times. See an authorized dealer for further assistance and the boat Owner's Manual for more information.

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.

Fuel System Treatment

Boats that are to be stored for extended periods (more than 30 days) or winterized should have special treatment for the fuel system. Always follow the boat Owner's Manual on how to properly winterize the fuel tank prior to storage.

⚠ WARNING! Follow boat manufacturer's instructions on how to properly winterize the fuel tank prior to storage. Fuel leaking 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 serious injury, death or property damage.

A marine-grade fuel stabilizer, such as STA-BIL, may be used during long-term storage and winterization of the engine. Follow the directions provided by the stabilizer's manufacturer.

START ENGINE

⚠ WARNING! Never operate engine without an adequate and uninterrupted amount of water flowing through the cooling system. Failure to do so could result in fire or explosion from overheating, and cause severe injury or death.

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

1. Attach engine safety starting switch tether (also known as a lanyard) between an article of the operator's clothing and the switch. The location will be identified in the boat manufacturer's Owner's Manual.
2. Move throttle/shift control lever to neutral position. The two most common types of start switches are "Pushbutton" and "Turn Key". Follow the instructions below depending on the type of ignition system installed.

⚠ CAUTION! Ensure there is ample room around the boat when starting the engine. Ilmor powertrain systems have safety sensors and safety features integrated into the systems to prevent an 'in-gear' start situation. These features and sensors should not be tampered with. Tampering with or alterations to the sensors and safety features may result in severe injury or damage to equipment.

Pushbutton Start

1. Turn ignition switch to the ON position. Wait 5 seconds to allow the fuel pump to build fuel pressure within the system.
2. Press START button no more than 1 second. The automatic start feature will crank engine until it is running.

NOTE: DO NOT hold the ignition switch in the START position for more than 1 second. The system is equipped with a feature that automatically controls the starting duty cycle. Continuing to hold START button for more than 1 second simulates a stop request and will cause the engine not to start.

Key Switch Start

1. Turn ignition switch to the ON position. Wait 5 seconds to allow the fuel pump to build fuel pressure within the system.
2. Turn ignition key to the START position.
3. Release ignition key once engine begins to crank. The automatic start feature will crank the engine until it is running.

NOTICE: If engine fails to crank, or cranks slowly, check engine battery voltage. If engine battery voltage is below 11.0V (Volts) when the ignition key is turned to the ON position, the available voltage is too low to effectively crank/start engine. Battery must be combined (paralleled) with additional batteries on the boat to start the engine. Locate parallel switch and turn to the ON (COMBINE) position. Turn off any additional electrical circuits that may be causing excessive electrical draw on the battery. Proceed to start the engine. Once the engine is running, move the battery selector switch back to the normal operating position. Combining batteries is intended for emergency starting situations only.

NOTICE: Allow for 2 minutes of rest for every 3 start attempts. This allows the starter motor enough time to cool between start attempts. Without this resting period, the starter may overheat and become damaged. Damage such as these are not covered under warranty.

Always allow engine to warm up to normal operating temperature before boating. (See *SPECIFICATIONS* chapter in this manual for specific engine model operating temperatures.) After engine has warmed to operating temperature, check engine oil level prior to moving. (See *Check Engine Oil Level* section in the *MAINTENANCE* chapter of this manual.)

GEAR SELECTION

In order to maneuver the boat, the operator has three drivetrain gear commands to select from: FORWARD - NEUTRAL - REVERSE. When choosing gears, move the throttle/shift control lever into the desired gear position. Be conscious, direct, and smooth when selecting gear commands. Hesitations, or slow lever movement, can damage shifting mechanism in the transmission, or result in delayed drivetrain response.

Ensure the engine is operating within the recommended operating temperature range before placing the boat in gear. (See the *SPECIFICATIONS* chapter for operating temperature range.)

Always allow the engine speed to return to idle (600 to 800 rpm) before making a gear selection. There are three gear positions while operating the engine.

1. FORWARD (in gear)
2. NEUTRAL (not in gear)
3. REVERSE (in gear)

For **FORWARD** gear, move the throttle/shift control lever from the NEUTRAL position to the engage FORWARD gear controller detent. The lever controls both gearing and throttle response, so continuing to move lever forward (toward the bow) will increase FORWARD speed.

For **NEUTRAL** gear, position the gear equally between the FORWARD and REVERSE gear controller detents. Typically, this positions the lever in the most vertical, upright position. This is also the position the lever must be in to start the engine.

For **REVERSE** gear, move the throttle/shift control lever from the NEUTRAL position to the engage REVERSE gear controller detent. The lever controls both gearing and throttle response, so continuing to move lever rearward (toward the stern) will increase REVERSE speed.

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

STOP THE BOAT

Stopping a boat requires advance planning and operations that must be completed before stopping. Make personal and passenger safety the priority of vessel operation. Always be aware of the surroundings and consider the effects of the resulting stopping wake when operating the vessel.

NOTICE: The following steps do not take into account effects of area conditions such as tides, currents, winds, weather, and/or passing wakes of other nearby vessels. These variables will affect the overall time and distance of the stopping procedure. These recommendations are for IDEAL stopping conditions only. Emergency stopping situations call for actions that are at the sole discretion of the vessel operator to deem necessary for safety. Ilmor is NOT responsible for any resulting damage or injuries that may occur during emergency situations.

1. Once the vessel has overcome its trailing wake and the engine speed is between 600-800 rpm, gradually reduce the throttle to the NEUTRAL gear position to stop the boat. Once the vessel has overcome its trailing wake and the engine speed has stabilized at its idle rpm, move the throttle/shift lever to the NEUTRAL position. When performing this action, be sure to reduce throttle fast enough to bring the vessel to a stop before the target, but also slow enough to not allow trailing wake to overtake boat stern.

NOTICE: Trailing wakes may cause unwanted forward movement, wash into the boat, and/ or potentially cause engine damage not covered by warranty.

2. With engine speed at idle rpm and shift position in NEUTRAL, move throttle/shift lever to the REVERSE position to counteract any forward movement, if required. Additional REVERSE throttle may be necessary to achieve quicker results. Never exceed 1,000 rpm in REVERSE unless in an emergency.
3. Shift between FORWARD - NEUTRAL - REVERSE positions appropriately and as necessary until the vessel has stopped completely at the desired location.

See the boat Owner's Manual for additional stopping tips and support.

OTHER CONSIDERATIONS

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. This places undue strain on the engine components and should be used in **EMERGENCY SITUATIONS ONLY**.

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

HEAVY DUTY USAGE

Heavy usage is defined as operators using the vessel under ANY of the following conditions:

- A loaded vessel with additional ballast and/or weight to achieve total maximum capacity over the OEM specification.
- A commercial or training purposes vessel as defined in the Ilmor warranty.
- A vessel operating at water temperatures below 55°F (13°C).
- A vessel operating at elevations greater than 6,000 feet (1,830 meters) above sea level.
- A vessel operating at, or above, 5,000 RPM for more than 5% of total boating time.

***NOTE**: Vessels operating within these conditions will be required to have more frequent service intervals as specified.*

COMMERCIAL USAGE

Commercial use is defined as any work or employment-related use of the product, or any use of the product that generates income, for any part of the warranty period, even if the product is only occasionally used for such purposes.

MAINTENANCE SCHEDULE

Ilmor recommends that maintenance is performed by an authorized Ilmor service center. Service technicians there have proper equipment, training, and resources to best meet service needs. Please note that routine maintenance is not covered by the Ilmor Limited Warranty. For details, consult limited warranty statement.

Installation, repair, servicing, or operation of any Ilmor products must comply with federal, local, and international boat building standards (ABYC, USCG, RCD, etc.). Always maintain safety as a priority when using or servicing Ilmor products. Apply caution and refer to local and federal regulations when using Ilmor products.

These statements are recommended guidelines. The operator or service professional must determine whether or not the boat and/or Ilmor product is safe to operate, according to circumstances and good judgment. If there is any doubt, please seek assistance from an authorized Ilmor service center.

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

Inboard Scheduled Maintenance Chart

Service Item	***Maintenance items are best performed by a Certified Ilmor Service Center.***												
	I = Inspect										**R= Replace**		
	Before Each Use	Annually (Beg. of Every Season)	First 50 Hours	Every 50 Hours	Every 75 Hours	Every 100 Hours	Every 125 Hours	Every 150 Hours	Every 300 Hours	Every 500 Hours	Every 2 Years	Every 3 Years	Every 5 Years
Air Filter / Spark Arrestor		**I**									**R**		
Cooling System Crossover Tube *(MPI Only)*								**I**	**R**			**R**	
Engine Coolant *(Closed Cooled Only)*	**I**[1]	**I**[1]	**I**[1]								**R**		
Coolant Pressure Cap *(Closed Cooled Only)*								**R**					
Supercharger Drive Belt and Tensioner *(Supercharged 6.2L Only)*		**I**							**R**[*]				
Intercooler Coolant *(Supercharged 6.2L Only)*	**I**[1]	**I**[1]	**I**[1]								**R**		
Engine and Transmission Coolers		**I**											
FEAD Mounted 90 Degree Raw Water Pump Assembly		**I**	**I**					**I**		**R**			**R**
Crankshaft Mounted Raw Water Pump Assembly		**I**	**I**					**I**	**R**				**R**
Raw Water Pump Impeller		**R**[3]			**R**[3]								

Inboard Scheduled Maintenance Chart

Maintenance items are best performed by a Certified Ilmor Service Center.

I = Inspect **R= Replace**

Service Item	Before Each Use	Annually (Beg. of Every Season)	First 50 Hours	Every 50 Hours	Every 75 Hours	Every 100 Hours	Every 125 Hours	Every 150 Hours	Every 300 Hours	Every 500 Hours	Every 2 Years	Every 3 Years	Every 5 Years
Raw Water Pump Impeller *(6.0L MPI Only)*							R				R		
Raw Water Pump Impeller *(Supercharged 6.2L Only)*		R	R										
Anodes		I		I									
Serpentine Belt and Tensioner		I							R*				
Spark Plugs and Wires		I[2]						R					
Engine Oil & Filter	I[1]	R	R[4]	R*									
Engine Timing *(5.7L Only)*		I	I										
Pressure Relief Valve *(Open Cooled Only)*		I		I		R					R		
Powertrain Alignment		I	I					I					
ZF Transmission - Oil and Filter	I[1]	R*	R[4]						R*				

*	*If the engine is subject to heavy usage, the minimum gasoline fuel requirement is Unleaded 90 (R+M)/2 Octane up to 10% Ethanol. Heavy usage is defined as operators using their vessel under the following conditions: loaded with additional ballast and/or weight to achieve total maximum capacity over the OEM specification, commercial, or training purposes as defined in the Ilmor warranty, at water temperatures below 55°F (13°C), at elevations greater than 6000 feet (1830 meter) above sea level, and/or engine speeds of 5000 RPM or more for more than 5% of total boating time.
1	Check for contamination and leaks. Check for fluid fill level. If the level dropped below minimum indicator, top the fluid to the recommended fluid level.
2	Inspect spark plug wires for chafing and heat damage.
3	Inspect the following engine models for corrosion/damage of the Raw Water Pump - Woodruff Key (PV05722). Replace if necessary. Engines: MV8 5.7L, MV8 6.0L, MV8 6.2L, 6.0L MPI-S, 7.4L MPI-S, 7.4L MPI.
4	Recommended service between 10-50 hours.

ONE-DRIVE® "-S" Scheduled Maintenance Chart

Service Item	*Maintenance items are best performed by a Certified Ilmor Service Center.*												
	I = Inspect										**R= Replace**		
	Before Each Use	Annually (Beg. of Every Season)	First 25 Hours	Every 50 Hours	Every 75 Hours	Every 100 Hours	Every 125 Hours	Every 150 Hours	Every 300 Hours	Every 500 Hours	Every 2 Years	Every 3 Years	Every 5 Years
Air Filter / Spark Arrestor		**I**									**R**		
Cooling System Crossover Tube *(MPI-S Only)*								**I**	**R**			**R**	
Engine Coolant	**I**[1]	**I**[1]	**I**[1]								**R**		
Coolant Pressure Cap								**R**					
Engine and Transmission Coolers		**I**											
FEAD Mounted 90 Degree Raw Water Pump Assembly		**I**	**I**					**I**		**R**			**R**
Crankshaft Mounted Raw Water Pump Assembly		**I**	**I**					**I**	**R**				**R**
Raw Water Pump Impeller		**R**[3]			**R**[3]								
Raw Water Pump Impeller *(6.0L MPI-S Only)*							**R**				**R**		
Anodes		**I**		**I**									
Serpentine Belt and Tensioner		**I**							**R***				
Spark Plugs and Wires		**I**[2]						**R**					
Fuel / Water Separator		**R**						**R***					
Engine Oil & Filter	**I**[1]	**R**	**R**[4]		**R***								
High Pressure Fuel Filter *(MPI-S Only)*								**R***					
Drive Oil & Filters	**I**[1]	**R**	**R**					**R***					

ONE-DRIVE® "-S" Scheduled Maintenance Chart

Service Item	*Maintenance items are best performed by a Certified Ilmor Service Center.*												
	I = Inspect												**R= Replace**
	Before Each Use	Annually (Beg. of Every Season)	First 25 Hours	Every 50 Hours	Every 75 Hours	Every 100 Hours	Every 125 Hours	Every 150 Hours	Every 300 Hours	Every 500 Hours	Every 2 Years	Every 3 Years	Every 5 Years
Drive Trim Pump Fluid	I[1]								R				
Power Steering Fluid	I[1]								R				
Powertrain Alignment		I	I					I					
Power Steering & Drive Trim Hoses		I[1]	I[1]					I[1]					
Trim Pump Relays Dielectric Grease		R				R							

*	**If the engine is subject to heavy usage, the minimum gasoline fuel requirement is Unleaded 90 (R+M)/2 Octane up to 10% Ethanol. Heavy usage is defined as operators using their vessel under the following conditions: loaded with additional ballast and/or weight to achieve total maximum capacity over the OEM specification, commercial or training purposes as defined in the Ilmor warranty, at water temperatures below 55°F (13°C), at elevations greater than 6000 feet (1830 meter) above sea level, and/or engine speeds of 5000 RPM or more for more than 5% of total boating time.
1	Check for contamination and leaks. Check for fluid fill level. If the level dropped below minimum indicator, top the fluid to the recommended fluid level.
2	Inspect spark plug wires for chafing and heat damage.
3	Inspect the following engine models for corrosion/damage of the Raw Water Pump - Woodruff Key (PV05722). Replace if necessary. Engines: MV8 6.0L, MV8 6.2L, 6.0L MPI-S, 7.4L MPI-S, 7.4L MPI.
4	Recommended service between10-25 hours.

Custom Scheduled Maintenance Chart

Service Item	*Maintenance items are best performed by a Certified Ilmor Service Center.*												
	I = Inspect										**R= Replace**		
	Before Each Use	Annually (Beg. of Every Season)	First 25 Hours	Every 50 Hours	Every 75 Hours	Every 100 Hours	Every 125 Hours	Every 150 Hours	Every 300 Hours	Every 500 Hours	Every 2 Years	Every 3 Years	Every 5 Years
Air Filter / Spark Arrestor		**I**									**R**		
Cooling System Crossover Tube *(MPI Only)*								**I**	**R**			**R**	
Engine Coolant (*Closed Cooled Only*)	**I**[1]	**I**[1]	**I**[1]								**R**		
Coolant Pressure Cap (Closed Cooled Only)								**R**					
High Pressure Fuel Filter *(MPI Only)*								**R**[*]					
Fuel / Water Separator		**R**						**R**[*]					
Engine and Transmission Coolers		**I**											
FEAD Mounted 90 Degree Raw Water Pump Assembly		**I**	**I**					**I**		**R**			**R**
Crankshaft Mounted Raw Water Pump Assembly		**I**	**I**					**I**	**R**				**R**
Raw Water Pump Impeller		**R**[3]			**R**[3]								
Raw Water Pump Impeller *(6.0L MPI Only)*							**R**				**R**		
Drive Oil & Filters (*Venom Drive Only*)	**I**[1]	**R**	**R**[4]	**R**[*]									
Anodes		**I**		**I**									
Serpentine Belt and Tensioner		**I**							**R**[*]				
Spark Plugs and Wires		**I**[2]						**R**					
Engine Oil & Filter	**I**[1]	**R**	**R**[4]	**R**[*]									

Custom Scheduled Maintenance Chart

Service Item	*Maintenance items are best performed by a Certified Ilmor Service Center.*												
	I = Inspect										**R= Replace**		
	Before Each Use	Annually (Beg. of Every Season)	First 25 Hours	Every 50 Hours	Every 75 Hours	Every 100 Hours	Every 125 Hours	Every 150 Hours	Every 300 Hours	Every 500 Hours	Every 2 Years	Every 3 Years	Every 5 Years
Engine Timing (*5.7L Only*)		**I**	**I**										
Pressure Relief Valve (*Open Cooled Only*)		**I**		**I**		**R**					**R**		
Powertrain Alignment		**I**	**I**					**I**					
ZF Transmission - Oil and Filter	**I**[1]	**R**[*]	**R**[4]						**R**[*]				

*	**If the engine is subject to heavy usage, the minimum gasoline fuel requirement is Unleaded 90 (R+M)/2 Octane up to 10% Ethanol. Heavy usage is defined as operators using their vessel under the following conditions: loaded with additional ballast and/or weight to achieve total maximum capacity over the OEM specification, commercial or training purposes as defined in the Ilmor warranty, at water temperatures below 55°F (13°C), at elevations greater than 6000 feet (1830 meter) above sea level, and/or engine speeds of 5000 RPM or more for more than 5% of total boating time.
1	Check for contamination and leaks. Check for fluid fill level. If the level dropped below minimum indicator, top the fluid to the recommended fluid level.
2	Inspect spark plug wires for chafing and heat damage.
3	Inspect the following engine models for corrosion/damage of the Raw Water Pump - Woodruff Key (PV05722). Replace if necessary. Engines: MV8 6.0L, MV8 6.2L, 6.0L MPI-S, 7.4L MPI-S, 7.4L MPI.
4	Recommended service between10-25 hours.

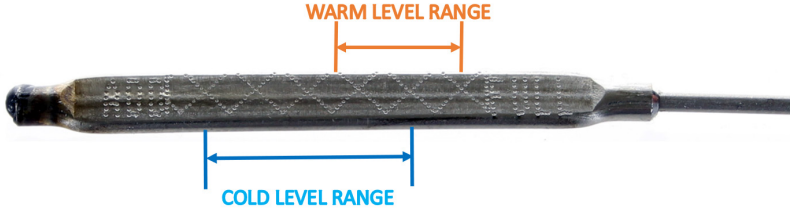
CHECK ENGINE OIL (WARM)

An accurate engine oil level reading will occur only after the engine has run for at least 5 minutes at idle. Run engine while boat is in body of water.

1. After operating the engine at idle for at least 5 minutes, turn engine off and disconnect engine safety-starting switch.
2. Open engine compartment. Engine oil dipstick is located on the side of the engine.
3. Allow approximately 5 minutes before checking. Remove dipstick and wipe it off on a clean rag.
4. Reinsert dipstick. Wait 5 seconds and remove dipstick for reading. Check that oil level is between the ADD and FULL marks on the dipstick.
5. Add oil if necessary through the oil fill neck and only enough to bring oil within the two marks, see picture below. Oil level below the ADD mark or above the FULL mark may result in damage to the engine that may not be covered by the warranty. (See the *SPECIFICATIONS* chapter for engine oil type.)

⚠ CAUTION! Do not use oil additives.

6. Install dipstick and ensure it is properly seated to prevent oil loss.



CHECK TRANSMISSION FLUID/OIL LEVEL

Transmission requires lubrication to function properly. See an authorized dealer to verify the type of transmission in the boat. The amount of transmission fluid/oil varies according to the model. See requirements for transmission fluid/oil in the transmission manufacturer's manual.

NOTICE: Always use the recommended transmission fluid/oil. Ilmor recommends the use of Shell Rotella T4 15W-40® for all Inboard transmission applications. For Sterndrive applications, please reference the Ilmor One-Drive Owners Manual. Damage to the engine by use of low-quality or non-recommended transmission fluid/oil as listed for V-Drive and 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.

SERPENTINE BELT

Inspect Serpentine Belt

⚠ CAUTION! Check belt before starting engine, or allow engine to cool after shutting down. Failure to do so may result in burns from hot engine components.

On engines with serpentine belt systems, belt tension is maintained by the automatic belt tensioner.

1. Ensure engine is OFF and the engine safety starting switch is disconnected. Leave the throttle/shift control lever in neutral. Open engine compartment and locate the serpentine belt.
2. Check serpentine belt tension at the top, midway between the circulating pump pulley and the alternator pulley. The belt should be tight enough so that it will deflect no more than 1/4 to 1/2 in. (6 to 13 mm) when pressed with the thumb or finger.

3. If the belt tension is too loose, or too tight, service is required. This should be scheduled at an authorized Ilmor sales and service center as soon as possible.

NOTE: If the belt is too tight, excessive belt and bearing wear can occur. If the belt is too loose, slippage can occur, resulting in low alternator output and rapid belt wear.

4. Visually check serpentine belt system.

- Ensure the belt lies between the accessory pulley edges and is seated within the groves of the pulleys.
- Check the belt alignment on the pulleys.
- Check belts for signs of wear, such as cracking, fraying, splits, or brittle places.
- Look for missing grooves or places where the belt's layers have separated.
- Look for a buildup of rubber deposits, as well as worn spots that could catch the belt and cause it to break.

5. Visually inspect the pulleys for surface damages, cracks, cuts, rust, and pitting.

6. Listen for irregular audible noises near the engine belt drive area. These sounds likely mean the serpentine belt is worn, loose, or damaged, or there is water on the pulley system surfaces. Slick spots can cause a belt to slip and may be a precursor to overheating and belt cracking. See an authorized Ilmor service center if audible noises exist after replacement.

Replace 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 wear condition of the grooves on the underside of the belt where it makes contact with the pulleys. If unsure of the wear pattern, check against a new belt. If the belt is too loose and/or too tight, this can cause electrical and mechanical systems to malfunction. This could occur during operations, and strand the boaters. Therefore, this maintenance function should be taken very seriously. If there is any uncertainty, seek assistance from an authorized Ilmor service center.

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. A serpentine belt routing label is placed on the front of the engine for identifying the correct belt routing. If the label is missing, do NOT operate or service the belt until a label is furnished, or correct routing of the belt is identified and understood.
2. Using an appropriately sized socket wrench, remove tension from the belt by moving the tensioner to the maximum travel position.
3. Remove serpentine belt by unwrapping it from each of the pulleys.
4. Inspect serpentine belt for wear.
5. After determining the serpentine belt replacement needs, reinstall and route the serpentine belt according to the belt routing label affixed to the engine.
6. Ease the tensioner back into place and ensure that the belt is properly routed around all of the pulleys.
7. Listen for irregular audible noises near the engine belt drive area. These sounds likely mean the serpentine belt is worn, loose, or damaged, or there is water on the pulley system surfaces. Slick spots can cause a belt to slip and may be a precursor to overheating and belt cracking. See an authorized Ilmor service center if audible noises exist after replacement.

seated within the groove of the pulleys.

CLEAN ENGINE COMPARTMENT TO PREVENT CORROSION

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.

⚠ CAUTION! Always cover the spark arrester before cleaning to ensure water does not enter throttle body or intake! Be sure to avoid electrical components and connection of water exposure.

Corrosion can occur in any type of water and on any metal surface, even when components are stainless steel. 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. Also, the exhaust system will always be subject to contact with salt water in these conditions.

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 sacrificial 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 sacrificial anodes should be checked regularly, and when significant erosion is shown, the anodes should be replaced. More information regarding the sacrificial 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 address boat corrosion matters will void product warranty.

INSPECT AND CLEAN THE BATTERY CONNECTIONS AND HOLD-DOWNS

⚠ CAUTION! Always wear protective glasses or goggles and protective clothing when working around batteries. Follow battery manufacturer's instructions on safety and maintenance procedures. Failure to do so may result in severe injury.

1. Check the battery post connections to ensure they are clean and tight.
2. If not, loosen and remove negative terminal connection first. Avoid metal contact between both battery connections at the same time. Tools such as wrenches and pliers may cause spark if the battery terminals are bridged.
3. Remove battery hold-downs and remove the battery from the boat.
4. Clean any corrosion from the battery posts and connections with a battery terminal cleaning brush, or by using a plastic bristle brush and a premixed solution of baking soda and warm distilled water (for every three parts of baking soda, mix one part of distilled water). Use care to avoid allowing the solution to enter the battery vents.

5. Remove all corrosion material from the boat, wipe the battery clean, and dry with a disposable rag. 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.
6. Reconnect positive terminal first, and then the negative. Tighten the terminals.

⚠ CAUTION! Take care to reattach battery cables correctly to avoid reverse polarity.

7. Coat both terminals completely with a thin layer of marine grease to protect against water or any potentially corrosive substance. Be sure the rubber boot covers the positive terminal completely.

NOTICE: Never install accessories or add-on equipment 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, ensure ignition key and all accessories are in the OFF position. Take care to reattach battery cables correctly to avoid reversed polarity, which is addressed in the electric system section in the *FUNCTIONS and DESCRIPTION* chapter of this manual.

STORAGE AND WINTERIZING

Proper storage and/or winterization preparations are just as important as how a powertrain is maintained in use. Since special preparations are necessary, the boat owner should have the work done by an authorized Ilmor service center. Damage that occurs from improper storage and/or winterization is not covered under warranty and must be avoided. If the boat is stored or not used for more than 6 months, one of the recommended fuel stabilizers should be used. If a fuel stabilizer is not used, the fuel will need to be replaced. Follow scheduled maintenance chart as well.

NOTICE: Do not use fogging oil in Ilmor engines. This will damage the catalysts and can void the engine warranty.

NOTICE: It is recommended the engine be started and run up to temperature, and the powertrain re-winterized every 6 months of storage.

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

⚠ 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.

*Please follow the fuel stabilizer manufacturer recommendations for terms of usage and expiration.

⚠ *CAUTION! Failure to correctly winterize the engine may result in catastrophic engine failure not covered under Ilmor warranty, or personal injury. Please see the nearest authorized Ilmor service center for assistance.*

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 boat returns to service. Fuel system on all boats equipped with Ilmor MV8 engines MUST be properly prepared for storage periods exceeding 1 month. Damage due to improper storage or winterization preparations is not covered un-der warranty.

Fuel System Treatment

⚠ *WARNING! Always follow the boat manufacturers 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.

Oil Storage/Winterization
Contaminates 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.

NOTICE: All components which raw water flows through must be drained.

The following steps are recommended for draining of raw water components:
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. Drain exhaust manifolds of raw water by removing the two lower cooling hoses connected to the 90º fittings.
2. Drain engine block of raw water.

- For open cooled 5.7L MPI applications: Remove knock sensor/drain plugs from both sides of the engine block.
- For 6.0L MPI, 6.2L MPI and 7.4L MPI applications:

Remove drain plugs from both sides of engine drain hoses.

- All GDI closed cooled, Supercharged 6.2L, and stern drives engines do not require draining of the engine block.

3. Drain heat exchanger or TCC of raw water.

- Open cooled systems will have an oil/transmission heat exchanger. Remove the drain plug and allow the cooler to completely drain.
- Supercharged 6.2L closed cooling system will have an oil, transmission, Intercooler, and engine Heat exchanger. Remove the lowest 1.5" hose from each and allow the coolers to drain completely. For best results compressed air should be blown through each cooler to confirm Raw water has been removed for the coolers.

4. Reinstall cooling hoses, engine block drain plugs and heat exchanger end caps/drain plug after all raw water has been drained.
5. Fill all components of raw water system with a non-toxic −50°F (−45°C), −60°F (−51°C) or −100°F (−73°C) marine/RV antifreeze. Freeze protection level will depend on climate location.
6. Marine/RV antifreeze will provide freeze protection to water pockets that did not drain and necessary corrosion protection. There are two methods for filling your engine with antifreeze:

- **Open Cooled System**

1. Close thru-hull water pick-up seacock.
2. Fill engine block and heads from thermostat housing. Remove both exhaust header feed hoses. Lift either the port or starboard hose as high as possible and fill until full. The other removed hose allows air to purge.
3. Fill port and starboard exhaust manifolds by removing thermostat hose ends. Lift hose end as high as possible and fill until full.
4. Fill sea strainer if not full.

- **Closed Cooled System**

1. Close thru-hull water pick-up seacock.
2. Fill raw water components by removing both 1 in. hoses from exhaust downturn adapters. Lift either the port or starboard hose as high as possible and fill 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.
3. Fill sea strainer if not full by end of procedure.
4. Fill downturn exhaust adapters with 1/4 to 1/2 gal (1 to 2 L) of antifreeze.
5. Reinstall hoses.

Sea Strainer Winterization

To prevent damage due to frost in the wintertime, the water must be drained, or the installation must be filled with anti-freeze.

Remove the lid and unseat the transparent body from the mount to drain the strainer; the housing is not equipped with a drain plug.

Battery Winterization

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

Recommissioning After Storage/Winterization

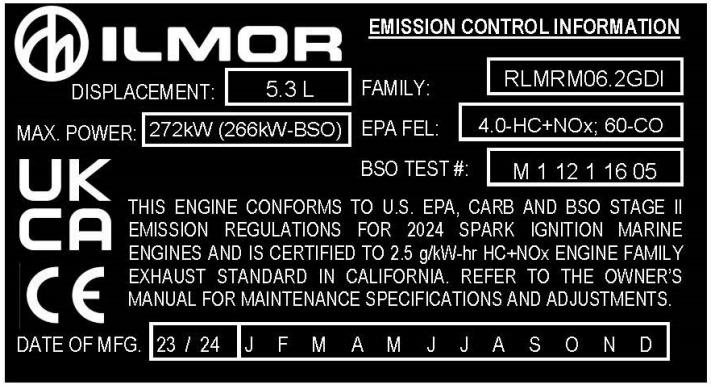
Ilmor recommends recommissioning after storage/winterization be performed by an authorized Ilmor service center. Service technicians there have the proper equipment, training, and resources to best meet any service needs.

EMISSIONS CONTROL INFORMATION LABEL

At the time of manufacture, Ilmor affixes each engine with a tamper-resistant Emission Control Information (ECI) label. This label affirms the required emissions compliance statement, along with the engine family, the family emission limit, and engine displacement (if applicable).

The ECI label contains the date of manufacture. For inboard/sterndrive engines, the label is located at the rear of the engine on an angled face of the engine block.

ECI label



Do not remove or tamper with ECI labels. If a replacement label is required, promptly contact Ilmor for assistance.

Engines that display a Conformité Européenne (CE) mark require a Declaration of Conformity. The Declaration of Conformity verifies the engine's conformance to the appropriate European Community Directive. The CE mark is included on the ECI label.

NOTE: If engine is installed so that the engine's ECI label is hard to read during normal engine maintenance, a duplicate label must be placed on the vessel, as described in 40 CFR 1068.105.

EMISSIONS CONTROL SYSTEM INFORMATION

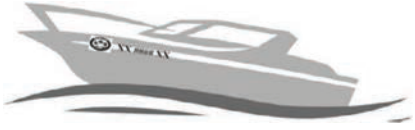
Emission control system information for all engines having the ECI label are as follows: Positive Crankcase Ventilation (PCV), sequential multiport fuel injection or Gasoline Direct Injection (GDI), three-way catalytic converter, heated oxygen sensors, naturally aspirated, On-Board Diagnostics Marine (OBD-M), low-permeation fuel line (hose), electronic throttle control, and electronic engine control.

CALIFORNIA AIR RESOURCE BOARD (CARB) STAR LABEL

CARB Overview

CARB is the clean-air agency in the California Government. Stated goals include attaining and maintaining healthy air quality, protecting public from exposure to toxic air contaminants, and providing innovative approaches for complying with air pollution rules and regulations.

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 following illustration. A conventional power (373 kW / 500 bhp or less) Ilmor GDI engine has a Five Star – Extremely Clean Emission rating. This indicates that the engine has 50% lower emissions than Four Star Super Ultra Low Emission engines.



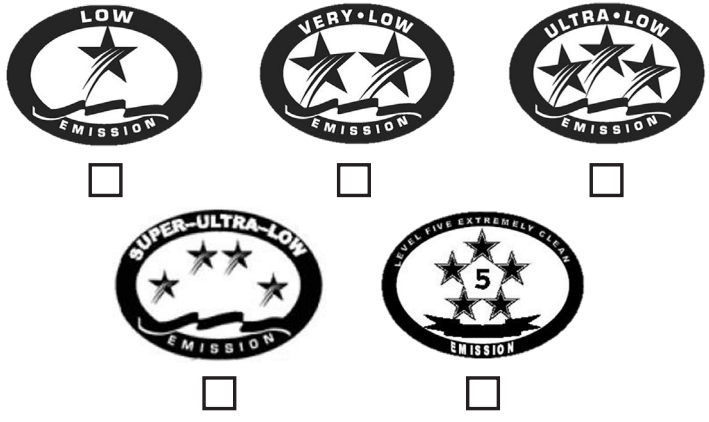
A Star Label is placed on each certified Ilmor engine. A conventional power (373 kW / 500 bhp or less) Ilmor engine has a Four Star - Super Ultra Low Emission rating. This indicates the engine has 90% lower emissions than One Star - Low Emission engines. The Four Star Label identifies the engine as meeting the CARB sterndrive/inboard marine Tier 4 engine exhaust emission standards. A high-performance (>373 kW / 500 bhp) Ilmor engine has a three Star - Ultra Low Emission rating. This indicates the engine has 65% lower emissions than One Star - Low Emission engines. The Three Star Label identifies the engine as meeting the CARB sterndrive/inboard marine Tier 3 engine exhaust emission standards.

Environmental Label

NOTICE: The dealer is responsible for the Environmental Label (hang tag). The dealer must mark the correct box on each hang tag to match the Star Label on the engine and the boat. The Dealer must display the hang tag in a visible location on the boat prior to displaying the boat for sale in California. If only the engine is displayed, a hang tag must be placed in a visible location on the engine. Failure to correctly display the hang tag may result in a citation and possible fine to the dealer from the CARB.

The Star Label Means Cleaner Marine Engines

This engine has been certified as a:



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 Star - Low Emission engines.

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

43939 Plymouth Oaks Blvd.
Plymouth, MI 48170
Ilmor.com

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

OBD-M

All Ilmor engines are equipped with OBD-M to comply with 2009 and later 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 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 such as Diacom PC software.

System malfunction information 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 a flat 6-pin Data Link Connector (DLC). The connector is located on the flywheel side near the top of the engine. Note that the protective DLC cover must be removed prior to connecting the scan tool.

Check cable connections

CALIFORNIA AND U.S. EPA EMISSION CONTROL WARRANTY STATEMENT

Warranty Rights and Obligations

CARB, U.S. EPA, and Ilmor are pleased to explain the emission control system warranty on the 2024 model year and later sterndrive/inboard engine. In the United States, new sterndrive/inboard engines must be designed, built, and equipped to meet all State and Federal mandated anti-smog standards.

Ilmor must warrant the emission control system on the sterndrive/inboard engine for the periods of time listed in the subsection below, provided there has been no abuse, neglect, or improper maintenance. The engine emission control system may include parts such as carburetor or fuel injection system, ignition system, and catalytic converter. Other parts included may be hoses, belts, connectors, and other emission-related assemblies.

Where a warrantable condition exists, Ilmor will repair the sterndrive/inboard engine at no cost to the owner, including diagnosis, parts, and labor.

Warranty Terms

Select electronic emission-related control parts from model year 2024 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 480 hours, whichever first occurs. This includes engines with maximum power less than or equal to 373 kW (500 bhp). Engines with maximum power greater than 373 kW (500 bhp) but less than or equal to 485 kW (650 bhp) are warranted for 3 years or 150 hours of operation, whichever occurs first.

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

For more information on current and/or historical product Warranty policies and guidelines, please visit **www.Ilmor.com/Resources/Warranties-Manuals** or call 844-GO-ILMOR (464-5667).

Owner's Warranty Responsibilities

The owner of the sterndrive/inboard engine is responsible for performing required maintenance listed in the owner's manual. Ilmor recommends retaining all receipts covering maintenance on your sterndrive/inboard engine, but Ilmor cannot deny warranty solely for the lack of receipts or your failure to ensure the performance of all scheduled maintenance. File all powertrain serial numbers and service records with local Ilmor-authorized dealer.

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

The owner is responsible for presenting a sterndrive/inboard engine to an Ilmor-authorized service center as soon as a problem occurs. The warranty repairs will be completed in a reasonable amount of time, not to exceed 30 days.

If there are any questions regarding owner warranty rights and responsibilities, you should contact Ilmor at 844-GO-ILMOR (464-5667).

General Emissions Warranty Coverage

Ilmor 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 US Environmental Protection Agency pursuant to 40 CFR 1045; and
2. Free from defects in materials and workmanship that caused the failure of a warranted part to be identical in all material respects to that part as described in the engine manufacturers 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 extend to emission control systems or parts which are affected or damaged by owner abuse, neglect, improper maintenance, the incorporation of, or use of, add-on(s) or modified part(s), or the unapproved modification of any part.

This warranty does not cover replacement of expendable maintenance items made in connection with required maintenance service 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(s) 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. In the case of non-exempted add-on(s) or modified part(s) causing failure to a warranted part, the warranted part will not be covered.

EMISSION CONTROL SYSTEM WARRANTY:

Select electronic emission control parts from model year 2023 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 480 hours, whichever first occurs. This includes engines with a maximum power less than or equal to 373 kW (500 bhp). Engines with a maximum power greater than 373 kW but less than or equal to 485 kW (650 bhp), are warranted for 3 years or 150 hours of operation, whichever first occurs.

Warranty coverage based on an hourly is only permitted for engines equipped with an hour meter, as defined in §2441(a)(13) or equivalent. If any emission-related part is defective under warranty, the part will be repaired or replaced by Ilmor.

Mechanical Emission-Related Components Warranty

Systems Covered by this Warranty	Parts Description
Fuel Metering	Intake valve(s)
Air Induction	Intake manifold Air filter*
Lubrication	Oil pump (Includes internal parts)
Crankcase Ventilation	PCV pipe Fresh air pipe PCV hose connector Valve cover grommet Oil filler cap
Exhaust	Exhaust manifold (tailpipe not included) Exhaust valve(s)
Miscellaneous Items	Clamps Fittings Sealing gaskets or devices Mounting hardware

* 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 Air/fuel ratio feedback and control system Fuel pump** Fuel pressure regulator**
Ignition	Electronic ignition system 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

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

** When installed by Ilmor only.

Direct Emission-Related Control Parts Warranty

Systems Covered by this Warranty	Parts Description
Catalytic Converter	Catalytic converter(s) Oxygen sensor
Evaporative System	Low-permeation (non-metal) fuel hose(s)

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 of occurrence. Not all possible problems, causes, and solutions are listed here.

When experiencing problems, check surroundings before shutting down the engine. Stopping the power suddenly will result in placing other boats and boaters in jeopardy. Continue until it is safe 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. Throttle/shift control in gear. Main circuit breaker open. Battery terminal corroded. Battery weak or worn out. Loose or corroded battery wiring connectors. Defective starter solenoid. Defective neutral safety switch. Defective starter motor.	Connect the safety switch tether. Shift to neutral. Reset the circuit breaker. Clean the battery terminals. Charge or replace the battery. Clean and tighten the battery wiring connectors. Replace the starter solenoid. See authorized Ilmor service center. Replace the neutral safety switch. See authorized Ilmor service center. Replace the starter motor. See authorized Ilmor service center.
Engine turns over, but will not start.	Safety switch tether not connected. No fuel in the tank. Fuel filter clogged. Contaminated fuel. Weak or shorted ignition coil. Weak or faulty fuel delivery system.	Connect the safety switch tether. Fill the fuel tank. Replace the fuel filter. See authorized Ilmor service center. Drain fuel and replace fuel filter. See authorized Ilmor service center. Replace the ignition coil. See authorized Ilmor service center. See authorized Ilmor service center.
Engine misses or idles rough.	Weak or faulty ignition components. Contaminated or incorrect fuel filters. Plugged PCV valve. Vacuum leak.	See authorized Ilmor service center. Drain fuel and replace fuel filter. See authorized Ilmor service center. Have dealer replace the PCV valve. See authorized Ilmor service center.

Problem	Possible Cause	Potential Solution
Poor boat performance.	Weak or faulty ignition components. Contaminated fuel. Plugged spark arrestor. High intake air temperature. Low oil pressure. Incorrect boat profile. Fuel filter clogged.	See authorized Ilmor service center. Drain fuel and replace fuel filter. See authorized Ilmor service center. Clean the spark arrestor. Verify engine bay is vented adequately. See authorized Ilmor service center. Correct the trim tab, One-Drive® position, and/or remove any excess weight within the vessel. Have dealer replace the fuel filter.
Poor fuel mileage.	Plugged spark arrestor. Inefficient driving habits. Plugged PCV valve. Weak or faulty ignition system components. Incorrect boat profile.	Clean the spark arrestor. Plane the boat quickly, then slow down to desired speed. Have dealer replace the PCV valve. See authorized Ilmor service center. Correct the trim tab, One-Drive® position, and/or remove any excess weight within the vessel.
Serpentine belt noise.	Misalignment in the pulley system. Water on the pulley system. Worn belt. Corroded pulley surfaces.	See authorized Ilmor service center. Remove any bilge water from engine compartment. Replace serpentine belt. Clean or replace pulley.

INBOARD ENGINES

Engine Model	5.3L GDI	6.0L MPI	6.2L GDI	Supercharged 6.2L
Configuration	V-8	V-8	V-8	V-8
Power*	365 HP (272 kW) @ 5400 RPM	373 HP (278 kW) @ 5200 RPM	430 HP (321 kW) @ 5400 RPM	630 HP (470 kW) @ 5500 RPM
Torque*	400 ft-lb (543 NM) @ 4100 RPM	407 ft-lb (552 NM) @ 4200 RPM	479 ft-lb (650 NM) @ 4000 RPM	665 ft-lb (902 NM) @ 3800 RPM
Displacement (L)	5.33	5.96	6.16	6.16
Compression Ratio	11.0:1	9.6:1	11.5:1	10.0:1
Firing Order	1-8-7-2-6-5-4-3			
Gasoline - Fuel Recommendations**	Unleaded 87-93 (R+M)/2 Octane up to 10% Ethanol		Unleaded 90-93 (R+M)/2 Octane up to 10% Ethanol	Unleaded 93 (R+M)/2 Octane up to 10% Ethanol
Max Engine Speed	5400 RPM	5200 RPM	5400 RPM	5500 RPM
Engine Oil Type	Ilmor 5W-30	Ilmor 15W-40	Ilmor 5W-30	Ilmor 0W-40
Engine Oil Change Interval	Check level before each use; change every 50 hours or every year			
Engine Oil Approx. Service Volumes***	7.0 qt (6.6 L)	5.0 qt (4.7 L)	7.0 qt (6.6 L)	7.0 qt (6.6 L)

INBOARD ENGINES

Engine Model	5.3L GDI	6.0L MPI	6.2L GDI	Supercharged 6.2L
Transmission Oil Type	Ilmor Premium Synthetic Blend 15W-40			
Coolant Type (if equipped)	Ilmor Marine Engine Coolant			
Coolant Capacity (if equipped)	5.0 gal (18.9 L) to 6.0 gal (22.7 L)			Engine: 5.28 gal (20L) Intercooler: 1.06 gal (4L)
Normal Operating Temperature Range	160°F (71°C) - 195°F (91°C)	130°F (54°C) - 190°F (88°C)	160°F (71°C) - 195°F (91°C)	145°F (63°C) - 200°F (93°C)

*These engine specifications are the declared values for United States Environmental Protection Agency (EPA).

**If the engine is subject to heavy usage, the minimum gasoline fuel requirement is Unleaded 90 (R+M)/2 Octane up to 10% Ethanol, unless 93 (R+M)/2 Octane up to 10 % Ethanol is specified. Heavy usage is defined as operators using their vessel under the following conditions: loaded with additional ballast and/or weight to achieve total maximum capacity over the OEM specification, commercial or training purposes as defined in the Ilmor warranty, at water temperatures below 55°F (13°C), at elevations greater than 6000 feet (1830 meter) above sea level, and/or engine speeds of 5000 RPM or more for more than 5% of total boating time.

***Oil capacities will vary depending on the volume of oil recovered during service. After changing the engine oil and filter, recheck the oil level. Refer to the Maintenance chapter of the Ilmor MV8 Owner's Manual for proper procedures and additional information.

ONE-DRIVE® ENGINES

Engine Model	5.3L GDI-S	6.0L MPI-S	6.2L GDI-S	7.4L MPI-S	520 MPI-S
Configuration	V-8	V-8	V-8	V-8	V-8
Power*	365 HP (272 kW) @ 5400 RPM	382 HP (285 kW) @ 5200 RPM	430 HP (321 kW) @ 5400 RPM	483 HP (360 kW) @ 5400 RPM	520 HP (382 kW) @ 5600 RPM
Torque*	400 ft-lb (543 NM) @ 4100 RPM	411 ft-lb (557 NM) @ 4200 RPM	479 ft-lb (650 NM) @ 4000 RPM	516 ft-lb (700 NM) @ 4400 RPM	516 ft-lb (700 NM) @ 4400 RPM
Displacement (L)	5.33	5.96	6.16	7.44	7.44
Compression Ratio	11.0:1	9.6:1	11.5:1	10.0:1	10.0:1
Firing Order	1-8-7-2-6-5-4-3				
Gasoline - Fuel Recommendations**	Unleaded 87-93 (R+M)/2 Octane up to 10% Ethanol		Unleaded 90-93 (R+M)/2 Octane up to 10% Ethanol	Unleaded 87-93 (R+M)/2 Octane up to 10% Ethanol	Unleaded 87-93 (R+M)/2 Octane up to 10% Ethanol
Max Engine Speed	5600 RPM				
Engine Oil Type	Ilmor Premium Full Synthetic 15W-50				
Engine Oil Change Interval	Check level before each use; change every 75 hours or every year				
Engine Oil Approx. Service Volumes***	7.0 qt (6.6 L)	5.0 qt (4.7 L)	7.0 qt (6.6 L)	5.5 qt (5.2 L)	7.0 qt (6.6 L)
Power Steering Fluid	Dexron III Automatic Transmission Fluid				

ONE-DRIVE® ENGINES

Engine Model	5.3L GDI-S	6.0L MPI-S	6.2L GDI-S	7.4L MPI-S	520 MPI-S
Coolant Type (if equipped)	Ilmor Marine Engine Coolant				
Coolant Capacity (if equipped)	5.0 gal (18.9 L) to 6.0 gal (22.7 L)				
Normal Operating Temperature Range	160°F (71°C) - 195°F (91°C)	160°F (71°C) - 195°F (91°C)	160°F (71°C) - 195°F (91°C)	160°F (71°C) - 190°F (88°C)	160°F (71°C) - 190°F (88°C)

*These engine specifications are the declared values for United States Environmental Protection Agency (EPA).

**If the engine is subject to heavy usage, the minimum gasoline fuel requirement is Unleaded 90 (R+M)/2 Octane up to 10% Ethanol, unless 93 (R+M)/2 Octane up to 10 % Ethanol is specified. Heavy usage is defined as operators using their vessel under the following conditions: loaded with additional ballast and/or weight to achieve total maximum capacity over the OEM specification, commercial or training purposes as defined in the Ilmor warranty, at water temperatures below 55°F (13°C), at elevations greater than 6000 feet (1830 meter) above sea level, and/or engine speeds of 5000 RPM or more for more than 5% of total boating time.

***Oil capacities will vary depending on the volume of oil recovered during service. After changing the engine oil and filter, recheck the oil level. Refer to the Maintenance chapter of the Ilmor MV8 Owner's Manual for proper procedures and additional information.

CUSTOM INBOARD ENGINES

Engine Model	MV8 5.7L	MV8 5.3L	MV8 6.0L	MV8 6.2L	MV8 7.4L	MV8 570
Type of Fuel Injection	Multi-Port Injection	Direct Injection	Multi-Port Injection	Direct Injection	Multi-Port Injection	Multi-Port Injection
Configuration	V-8	V-8	V-8	V-8	V-8	V-8
Power*	320 HP (239 KW) @ 5000 RPM	365 HP (272 kW) @ 5400 RPM	382 HP (285 kW) @ 5200 RPM	430 HP (321 kW) @ 5400 RPM	522 HP (390 kW) @ 5800 RPM	570 HP (419 kW) @ 6000 RPM
Torque*	370 ft-lb (502 NM) @ 4200 RPM	400 ft-lb (543 NM) @ 4100 RPM	411 ft-lb (557 NM) @ 4200 RPM	479 ft-lb (650 NM) @ 4000 RPM	524 ft-lb (711 NM) @ 4400 RPM	564 ft-lb (765 NM) @ 4400 RPM
Displacement (L)	5.73	5.33	5.96	6.16	7.44	7.44
Compression Ratio	9.4:1	11.0:1	9.6:1	11.5:1	10.7:1	10.7:1
Firing Order	1-8-4-3-6-5-7-2	1-8-7-2-6-5-4-3				
Gasoline - Fuel Recommendations**	Unleaded 87-93 (R+M)/2 Octane up to 10% Ethanol			Unleaded 90-93 (R+M)/2 Octane up to 10% Ethanol	Unleaded 87-93 (R+M)/2 Octane up to 10% Ethanol	
Max Engine Speed	5200 RPM	5600 RPM	5400 RPM	5600 RPM	5800 RPM	6100 RPM
Engine Oil Type	Ilmor Premium Synthetic Blend 15W-40	Ilmor Premium Full Synthetic 5W-30	Ilmor Premium Synthetic Blend 15W-40	Ilmor Premium Full Synthetic 5W-30	Ilmor Premium Full Synthetic 15W-50	LUCAS OIL 20W-50
Engine Oil Change Interval	Check level before each use; change every 50 hours or every year					

CUSTOM INBOARD ENGINES

Engine Model	MV8 5.7L	MV8 5.3L	MV8 6.0L	MV8 6.2L	MV8 7.4L	MV8 570
Engine Oil Approx. Service Volumes* **	5.0 qt (4.7 L)	7.0 qt (6.6 L)	5.0 qt (4.7 L)	7.0 qt (6.6 L)	5.5 qt (5.2 L)	9.0 qt (8.5 L)
Transmission Oil Type	Ilmor Premium Synthetic Blend 15W-40					
Coolant Type (if equipped)	Ilmor 50/50 Premixed Propylene Glycol					
Coolant Capacity (if equipped)	5.0 gal (18.9 L) to 6.0 gal (22.7 L)					2.125 gal (8L)
Normal Operating Temperature Range	130°F (54°C) - 190°F (88°C)	160°F (71°C) - 195°F (91°C)	130°F (54°C) - 190°F (88°C)	160°F (71°C) - 195°F (91°C)	130°F (54°C) - 190°F (88°C)	160°F (71°C) - 190°F (88°C)

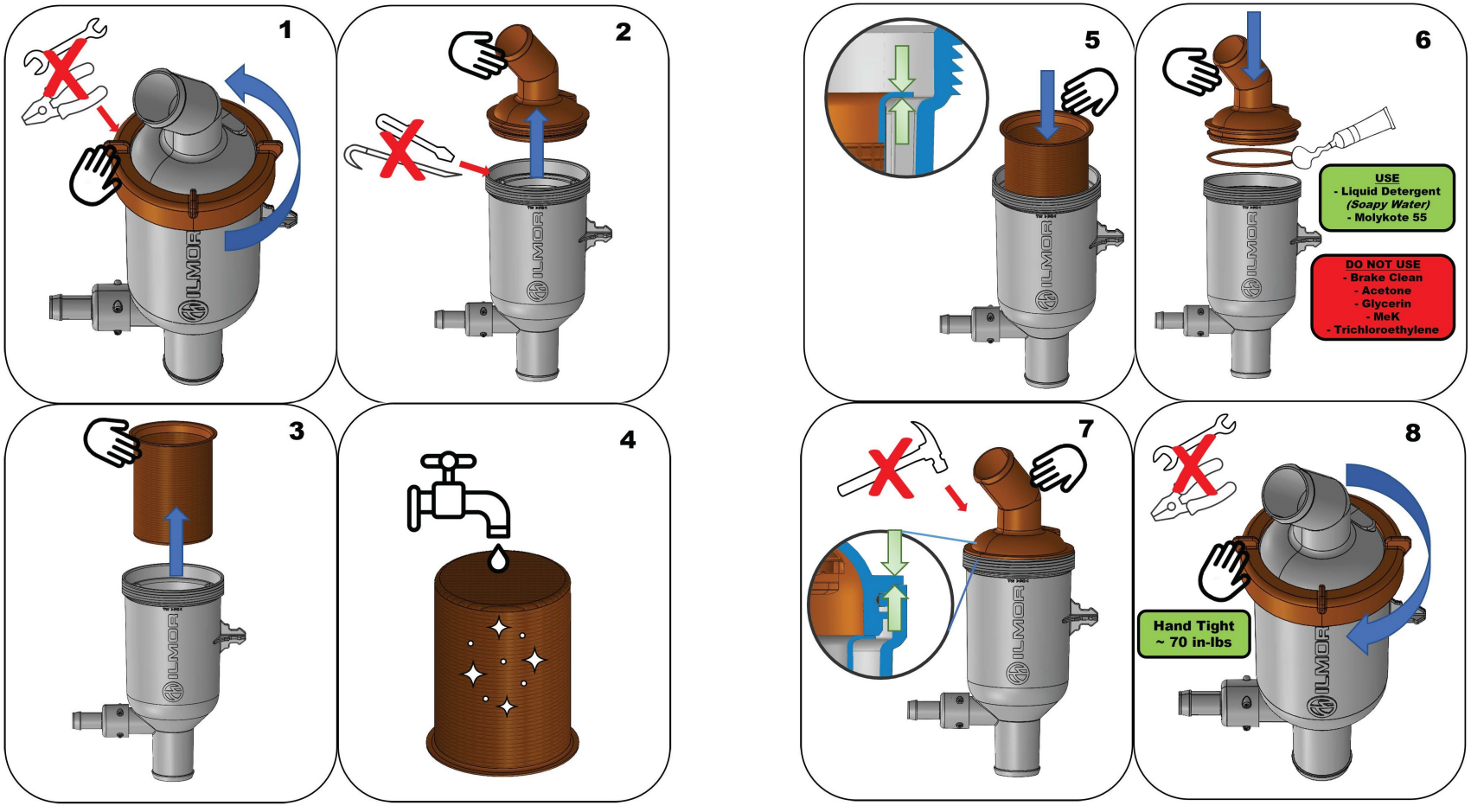
*These engine specifications are the declared values for United States Environmental Protection Agency (EPA).

**If the engine is subject to heavy usage, the minimum gasoline fuel requirement is Unleaded 90 (R+M)/2 Octane up to 10% Ethanol, unless 93 (R+M)/2 Octane up to 10 % Ethanol is specified. Heavy usage is defined as operators using their vessel under the following conditions: loaded with additional ballast and/or weight to achieve total maximum capacity over the OEM specification, commercial or training purposes as defined in the Ilmor warranty, at water temperatures below 55°F (13°C), at elevations greater than 6000 feet (1830 meter) above sea level, and/or engine speeds of 5000 RPM or more for more than 5% of total boating time.

***Oil capacities will vary depending on the volume of oil recovered during service. After changing the engine oil and filter, recheck the oil level. Refer to the Maintenance chapter of the Ilmor MV8 Owner's Manual for proper procedures and additional information.

SERVICE LOG

Record of Ownership	Date	Date	Date	Date	Date	Date
Engine Coolant						
Engine Oil and Filter						
Engine Fuel Filter(s)						
Heat Exchanger(s)						
One-Drive® Fluid, Filters, and Magnet						
Power Steering Fluid						
PRV (Pressure Relief Valve)						
Raw Impeller						
Sacrificial Anodes (Engine)						
Sacrificial Anodes (One-Drive®)						
Serpentine Belt						
Shaft Alignment						
Software update (Engine ECU)						
Software update (Mini, One-Touch)						
Spark Arrestor						
Spark Plug Wires						
Spark Plugs						
Transmission Fluid						
Transmission Filter						


1
2
3
4
5
6
USE
- Liquid Detergent
(Soapy Water)
- Molykote 55
DO NOT USE
- Brake Clean
- Acetone
- Glycerin
- MeK
- Trichloroethylene
7
8
Hand Tight
~ 70 in-lbs