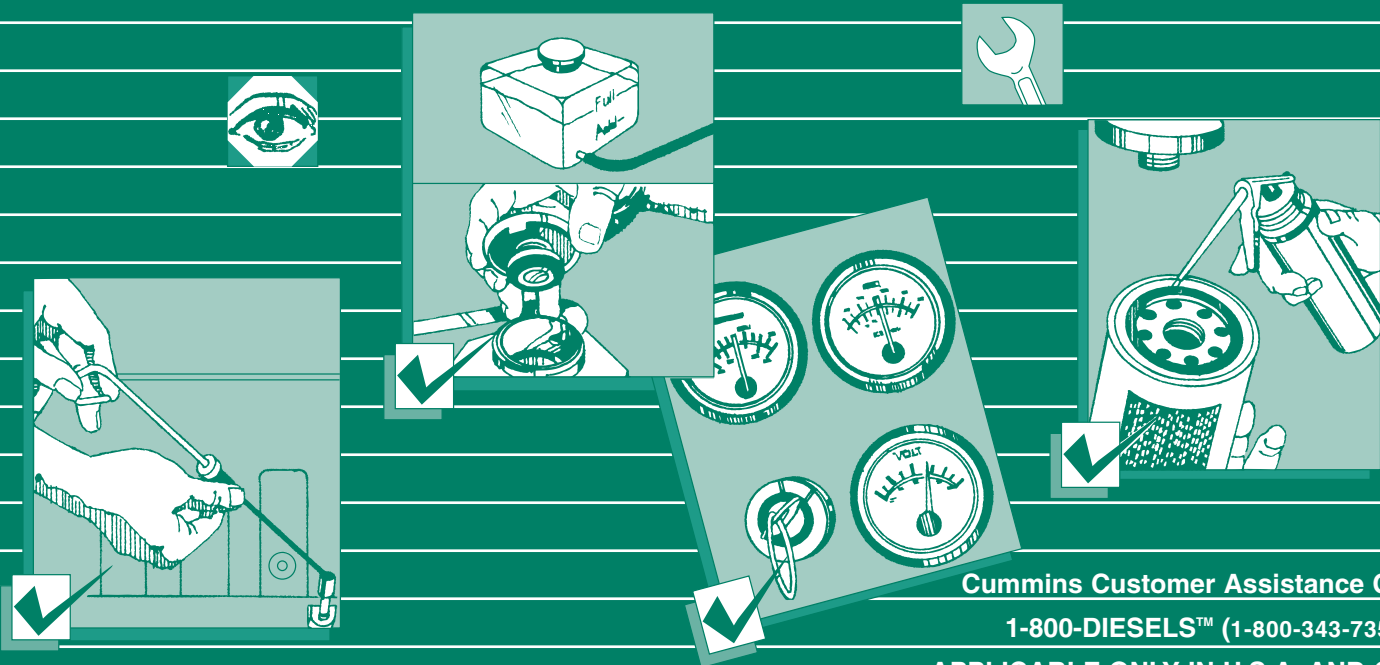




Owners Manual Marine QSB6.7 CM2250



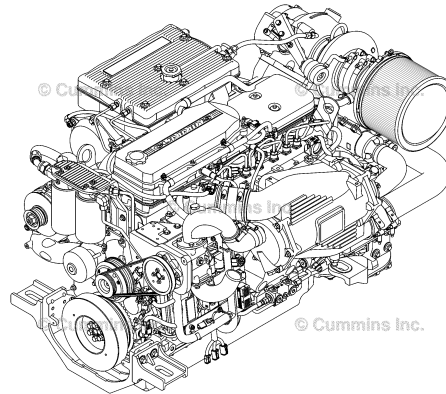
Cummins Customer Assistance Center

1-800-DIESELS™ (1-800-343-7357)

APPLICABLE ONLY IN U.S.A. AND CANADA



Owners Manual Marine QSB6.7 CM2250



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Foreword

Thank you for depending on Cummins® products. If you have any questions about this product, please contact your Cummins® Authorized Repair Location. You can also visit cumminsengines.com or quickserve.cummins.com for more information, or go to locator.cummins.com for Cummins® distributor and dealer locations and contact information.

Read and follow all safety instructions. See the General Safety Instructions in Section i - Introduction.

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Important Reference Numbers

Fill in the blank spaces provided below. This will provide a reference whenever service or maintenance is required.

Description	Number	Comments/Additional Information
Engine		
Engine Model		
Engine Serial Number (ESN)		
Control Parts List (CPL)		
Electronic Control Module (ECM) Part Number(s)		
Electronic Control Module (ECM) Serial Number(s)		
Governor Control Module (GCM) (if applicable)		
Belt Part Number(s)		
Filter Part Numbers:		
Air		
Lubricating Oil		
Fuel*		
Fuel (Water Separator)		
Coolant (if equipped)		
Crankcase/Breather (if equipped)		

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Description	Number	Comments/Additional Information
Eliminator™ Filter Centrifuge (if equipped)		
*The number of fuel filters may vary by application. Record all fuel filters.		
Aftertreatment (if applicable):		
Aftertreatment Diesel Particulate Filter (if equipped)		
Aftertreatment Diesel Exhaust Fluid Dosing Unit Filter (if equipped)		
Aftertreatment Diesel Exhaust Fluid Dosing Air Oil Separator (if equipped)		
Clutch or Marine Gear (if applicable):		
Model		
Serial Number		
Part Number		
Oil Type		
Sea Water Pump:		
Model		
Part Number		

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Section i - Introduction

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Symbols

General Information

The symbols have been used in this manual to help communicate the intent of the instructions. When one of the symbols appears, it conveys the meaning defined below.

NOTE: It is possible to have four symbols for each text and graphic combination.



! WARNING !
Serious personal injury or extensive property damage
can result if the warning instructions are not followed.

△CAUTION△

Minor personal injury can result or a part, and assembly, or the engine can be damaged if the caution instructions are not followed.



Indicates a **REMOVAL** or **Dissassembly** step.

Indicates an **INSTALLATION** or **ASSEMBLY** step.



INSPECTION is required.





CLEAN the part or assembly.



PERFORM a mechanical or time **MEASUREMENT**.

LUBRICATE the part or assembly.



Indicates that a **WRENCH** or **TOOL SIZE** will be given.







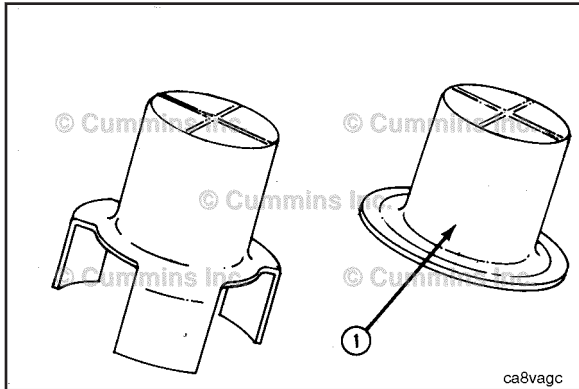
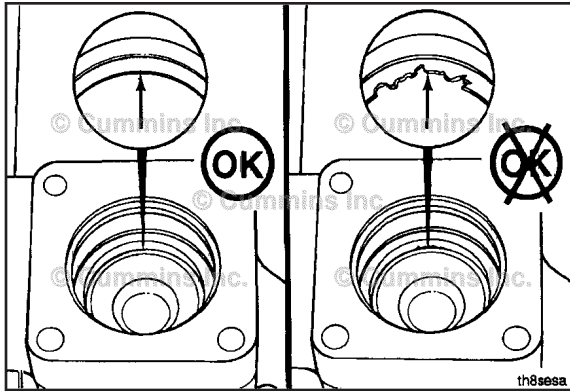
TIGHTEN to a specific torque.



PERFORM an electrical **MEASUREMENT**.

Refer to another location in this manual or another publication for additional information. 

The component weighs 23kg [50 lbs] or more. To reduce the possibility of personal injury, use a hoist or get assistance to lift the component. 



Illustrations General Information

Some of the illustrations throughout this manual are generic and will **not** look exactly like the engine or parts used in your application. The illustrations can contain symbols to indicate an action required and an acceptable or **not** acceptable condition.

The illustrations are intended to show repair or replacement procedures. The procedure will be the same for all applications, although the illustration can differ.

General Safety Instructions

Important Safety Notice

Read and understand the safety information and precautions before performing any repair or operating equipment. This procedure contains general safety precautions that **must** be followed to provide personal safety. **Always** follow procedures to mitigate safety concerns.

Work Environment

Follow these recommended practices when servicing products.

- **Always** follow on-site safety requirements.
- **Always** follow local training, certification, authorization, and specific customer requirements. Do **not** work on products unless proper training has been completed to allow safe repair completion. Do **not** operate equipment unless proper training has been completed to allow safe operation..
- Work in a well-ventilated area away from ignition sources.
- If adverse weather conditions are present, take appropriate safety precautions when performing work.
- **Always** be aware of hazardous conditions that may exist in the work environment.

Best Practices

Follow these recommended practices when servicing or operating equipment.

- **Always** wear protective glasses and protective shoes.
- Remove rings, watches, long jewelry, or metallic items.
- Do **not** wear loose fitting or torn clothing, jewelry, long hair, etc.. These increase the risk for personal injury.

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- Do **not** perform any repairs, or operate equipment, when fatigued or impaired due to drugs or alcohol.
- **Always** use tools that are in good condition.
- Do **not** work on equipment that is running unless otherwise directed by troubleshooting procedures.
- If any work **must** be performed while the unit is running, use extreme caution around hot components, moving parts, etc..
- Exercise caution when working on products that have just been turned off. Hot parts may cause burns or ignite or melt common materials.
- Do **not** bleed the fuel system of a hot engine. Contact with hot manifolds or other components can cause a fire.
- Do **not** attempt to rotate the crankshaft by pulling or prying on the fan. **Only** use proper engine barring techniques.
- Do **not** lift components that weigh 23 kg [50 lb] or more. Use mechanical help or seek assistance.
- Exercise caution when working around rotating parts. Rotating parts can cause cuts, mutilation, or strangulation.
- Exercise caution when working on electrical components. High voltages can cause serious injury or death.
- Relieve system pressure as instructed before removing or disconnecting lines, fittings, or related items.
- **Always** test for pressure leaks as instructed.
- **Always** torque fittings and connections to the required specifications. Over or under tightening can damage threads and create leaks.
- **Always** use the same fastener part number, or equivalent, when replacing fasteners.

Perform the following prior to beginning work on any products.

- Shutdown the equipment unless otherwise directed by troubleshooting procedures.
- **Always** allow the product to cool.

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- **Always** ensure the product is properly supported by blocks or stands. Do **not** work on a product supported **only** by lifting jacks or hoists.
- Disconnect the battery unless otherwise directed by troubleshooting procedures.
- Disconnect the starting motor, if equipped, unless otherwise directed by troubleshooting procedures.
- Place a "Do NOT Operate" tag in the operator area or near the product controls.
- Become familiar with the tools required for performing the task at hand and how to use those tools correctly.
- Use only genuine Cummins or Cummins Recon replacement parts as instructed.

Personal Protective Equipment (PPE)

To reduce the possibility of personal injury, personal protective equipment (PPE) should be utilized. Various types of PPE are listed below. Use proper judgment to determine which types of PPE are required for a given task. **Always** meet on-site safety regulations for required PPE. Proper maintenance of safety equipment **must** be practiced. Integrity of safety equipment **must** be checked to ensure equipment functionality is maintained.

Eye Protection

Eye protection **must always** be worn. Wear appropriate eye protection based on the task being completed. Types of eye protection to consider are listed below.

- Safety glasses. Exposure to flying particles or debris, chemicals or caustic liquids, gases or vapors.
- Polarized safety glasses. Working in outdoor or bright lighting environments.
- Over-the-glass safety glasses. Add protection to prescription glasses.
- Safety goggles. Handling caustic liquids or chemicals.
- Shade or arc rated eyewear. Exposure to welding. Use appropriate filter ratings.

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Foot Protection

Protective shoes **must always** be worn. Wear appropriate foot protection based on the task being completed. Types of protective footwear to consider are listed below.

- Steel toed shoes. Exposure to falling or rolling objects. Working with or around parts, tools, and equipment.
- Chemical resistant. Exposure to chemicals and other fluids.
- Overshoes and overboots. Add protection to everyday work shoes.
- Foot, toe, and metatarsal guards. Add protection to everyday work shoes.
- Electrical hazard safety toe shoes. Exposure to electrical hazards.
- Leather footwear or shoe protectors. Exposure to welding or arc flash.
- Cold protection. Exposure to cold weather.

Head and Face Protection

Wear appropriate face protection based on the task being completed. Types of head and face protection to consider are listed below.

- Hard hats. Exposure varies. Consider welding, heat, or arc-rated.
- Visors. Exposure varies. Consider welding, heat, or arc-rated.
- Face liners. Exposure to cold weather.
- Face shields. Exposure to liquid splash. Handling caustic liquids or chemicals.

Hand Protection

Wear appropriate type and fit of gloves based on the task being completed. Types of protective gloves to consider are listed below.

- Heat resistant or insulated. Exposure to hot items.
- Flame resistant. Exposure to welding or arc flash.
- Impact resistant. Performing repetitive impact and vibration work. Using pneumatic tools.
- Impervious. Exposure to high pressure fluids.
- Chemical resistant. Exposure to chemicals, fluids, or batteries.
- Cut resistant. Handling sharp objects or tools.
- Cold weather. Exposure to cold weather.

Hearing Protection

When working around operating equipment, appropriately rated hearing protection should be worn. Types of hearing protection to consider are listed below.

- Single use ear plugs.
- Pre-formed ear plugs.
- Ear muffs.

Protective Clothing

Wear appropriate protective clothing based on the task being completed. Types of protective clothing to consider are listed below.

- Flame resistant. Exposure to electrical hazards. Exposure to oil and gas or generator set applications. Performing welding.
- Chemical resistant. Exposure to chemicals.

- High visibility. Exposure to reduced visibility working environments. Working on mining, oil and gas, or sites with large equipment.

Respiratory Protection

Wear appropriate respiratory protection based on the task being completed. Types of respiratory protection to consider are listed below.

- Disposable respirators. Exposure to dust and particles, welding fumes, nuisance odors, nuisance level acid gas.
- Reusable respirators. Exposure to cleaning, machining, welding, sanding, grinding, etc.

Fall Protection

Utilize fall protection if a task is being completed more than 1.2 m [4 ft] above a solid surface. Types of fall protection to consider are listed below.

- Fall harness and lanyard combinations.
- Safety nets.
- Guardrails.

Fuels

Follow these recommended practices when interacting with equipment that uses different fuel types. For information regarding proper handling of various substances, refer to the manufacturer's safety data sheet.

Diesel Fuel

- Protect eyes.
- Protect skin.

- **Always** test for fuel leaks as instructed.
- Do **not** dilute.
- Avoid sparks, arcing switches and equipment, cigarettes, pilot lights, flames, and other sources of ignition.
- Provide extra ventilation to the work area.
- Do **not** troubleshoot or repair fuel leaks while the engine is running.
- If material is spilled, avoid contact and dispersal with runoff, soil, waterways, drains, and sewers. Absorb with sand, clay, or commercial absorbent. Transfer to containers and neutralize the material. Flush spill area with soap and excess water.
- Report spills effecting water source contamination to local authorities immediately.
- Proper disposal is required. Dispose of in accordance with local and environmental regulations.
- **Always** torque fittings and connections to the required specifications. over or under tightening can damage threads and create leaks.

Gasoline

- Protect eyes.
- Protect skin.
- **Always** be alert for the smell of gas.
- **Always** test for fuel leaks as instructed.
- Do **not** dilute.
- Avoid sparks, arcing switches and equipment, cigarettes, pilot lights, flames, and other sources of ignition.

- Vapors accumulate near the floor. Check the work floor, sumps, and low lying areas for ignition sources before servicing equipment..
- Provide extra ventilation to the work area.
- Do **not** troubleshoot or repair fuel leaks while the engine is running.
- If material is spilled, avoid contact and dispersal with runoff, soil, waterways, drains, and sewers. Absorb with sand, clay, or commercial absorbent. Transfer to containers and neutralize the material. Flush spill area with soap and excess water.
- Report spills effecting water source contamination to local authorities immediately.
- Proper disposal is required. Dispose of in accordance with local and environmental regulations.
- **Always** torque fittings and connections to the required specifications. over or under tightening can damage threads and create leaks.

Biodiesel

- Protect eyes.
- Protect skin.
- **Always** test for fuel leaks as instructed.
- Do **not** dilute.
- Avoid sparks, arcing switches and equipment, cigarettes, pilot lights, flames, and other sources of ignition.
- Vapors accumulate near the floor. Check the work floor, sumps, and low lying areas for ignition sources before servicing equipment..
- Provide extra ventilation to the work area.
- Do **not** troubleshoot or repair fuel leaks while the engine is running.

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- If material is spilled, avoid contact and dispersal with runoff, soil, waterways, drains, and sewers. Absorb with sand, clay, or commercial absorbent. Transfer to containers and neutralize the material. Flush spill area with soap and excess water.
- Report spills effecting water source contamination to local authorities immediately.
- Proper disposal is required. Dispose of in accordance with local and environmental regulations.
- **Always** torque fittings and connections to the required specifications. over or under tightening can damage threads and create leaks.

Compressed Natural Gas

- Protect eyes.
- Protect skin.
- **Always** be alert for the smell of gas. Compressed natural gas is typically treated with an odor producing chemical for leak detection. Non-refined sources of natural gas (landfill gas, biogas, coal bed gas, wellhead gas, etc.) can **not always** be detected by smell.
- **Always** test for fuel leaks as instructed. Odorant can fade.
- Upon entering a room or approaching a vehicle where the smell of gas is present, immediately shutoff all engines and ignition sources.
- Natural gas ignites when there is a 5% - 15% mixture in the air. Asphyxiation can occur when concentration reaches 21% or more.
- Do **not** start equipment or nearby equipment until a suspected gas leak is corrected and the area is ventilated.
- Avoid sparks, arcing switches and equipment, cigarettes, pilot lights, flames, and other sources of ignition.
- Work in areas that do **not** share common ventilation with areas containing ignition sources.

- Store and service natural gas fueled equipment in large, well-ventilated areas, or outside.
- Provide extra ventilation to the work area.
- Natural gas accumulates near the ceiling. Check the ceiling of the work area for ignition sources before servicing equipment.
- **Only** disconnect gas lines in a well-ventilated area.
- Do **not** troubleshoot or repair gas leaks while the engine is running.
- Natural gas ignition systems produce high voltage during operation. Do **not** touch ignition wiring or components while the engine is operating. If necessary, use **only** insulated tools.
- Natural gas exhaust systems operate at higher temperatures than similar diesel exhaust systems. Do **not** touch exhaust components. Do **not** route lines or hoses which deteriorate from heat exposure near exhaust components or in the flow path of the exhaust.
- **Always** torque fittings and connections to the required specifications. over or under tightening can damage threads and create leaks.

Liquefied Natural Gas

- Protect eyes.
- Protect skin.
- **Always** be alert for the smell of gas. Liquefied natural gas may **not** have an odor. Non-refined sources of natural gas (landfill gas, biogas, coal bed gas, wellhead gas, etc.) can **not always** be detected by smell.
- **Always** test for fuel leaks as instructed. Odorant can fade.
- Upon entering a room or approaching a vehicle where the smell of gas is present, immediately shutoff all engines and ignition sources.

- Natural gas ignites when there is a 5% - 15% mixture in the air. Asphyxiation can occur when concentration reaches 21% or more.
- Do **not** start equipment or nearby equipment until a suspected gas leak is corrected and the area is ventilated.
- Avoid sparks, arcing switches and equipment, cigarettes, pilot lights, flames, and other sources of ignition.
- Work in areas that do **not** share common ventilation with areas containing ignition sources.
- Store and service natural gas fueled equipment in large, well-ventilated areas, or outside.
- Provide extra ventilation to the work area.
- Natural gas accumulates near the ceiling. Check the ceiling of the work area for ignition sources before servicing equipment.
- **Only** disconnect gas lines in a well-ventilated area.
- Do **not** troubleshoot or repair gas leaks while the engine is running.
- Natural gas ignition systems produce high voltage during operation. Do **not** touch ignition wiring or components while the engine is operating. If necessary, use **only** insulated tools.
- Natural gas exhaust systems operate at higher temperatures than similar diesel exhaust systems. Do **not** touch exhaust components. Do **not** route lines or hoses which deteriorate from heat exposure near exhaust components or in the flow path of the exhaust..
- Liquefied natural gas is stored in vehicle tanks at extremely cold temperatures. If there is a liquefied natural gas spill, evacuate the area immediately and do not attempt to make contact with the liquid.
- **Always** torque fittings and connections to the required specifications. over or under tightening can damage threads and create leaks.
- Vapors accumulate near the floor. Check the work floor, sumps, and low lying areas for ignition sources before servicing equipment.

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Liquefied Petroleum Gas

- Protect eyes.
- Protect skin.
- **Always** be alert for the smell of gas. Liquefied petroleum gas is typically treated with an odor producing chemical for leak detection.
- **Always** test for fuel leaks as instructed. Odorant can fade.
- Upon entering a room or approaching a vehicle where the smell of gas is present, immediately shutoff all engines and ignition sources.
- Do **not** start equipment or nearby equipment until a suspected gas leak is corrected and the area is ventilated.
- Avoid sparks, arcing switches and equipment, cigarettes, pilot lights, flames, and other sources of ignition.
- Work in areas that do **not** share common ventilation with areas containing ignition sources.
- Store and service natural gas fueled equipment in large, well-ventilated areas, or outside.
- Provide extra ventilation to the work area.
- Liquefied petroleum gas accumulates near the floor. Check the work floor, sumps, and low lying areas for ignition sources before servicing equipment.
- **Only** disconnect gas lines in a well-ventilated area.
- Do **not** troubleshoot or repair gas leaks while the engine is running.
- Liquefied petroleum gas ignition systems produce high voltage during operation. Do **not** touch ignition wiring or components while the engine is operating. If necessary, use **only** insulated tools.

- Liquefied petroleum gas exhaust systems operate at higher temperatures than similar diesel exhaust systems. Do **not** touch exhaust components. Do **not** route lines or hoses which deteriorate from heat exposure near exhaust components or in the flow path of the exhaust.
- Liquefied natural gas is stored in vehicle tanks at extremely cold temperatures. If there is a liquefied natural gas spill, evacuate the area immediately and do not attempt to make contact with the liquid.
- **Always** torque fittings and connections to the required specifications. over or under tightening can damage threads and create leaks.

Power Generation Applications

Follow these recommended practices when interacting with equipment in generator set applications.

Power generation applications produce high voltage during operation. When servicing a generator set, the following safety precautions **must** be taken.

- Remove any debris from the generator set.
- Keep the floor clean and dry throughout servicing
- Service access doors **must** be secured in the "open" position before working on enclosed generator sets.
- Use insulated or non-conducting tools.
- Prevent accidental or remote starting. Disconnect the starting battery cables. Disconnect the negative (-) terminal first.
- Isolate all auxiliary supplies.
- Switch the generator set control panel "off."
- Place a "Do **Not** Operate" tag on the control panel.

- Lock the generator set circuit breaker in the "Open" position.
- Activate the manual "Emergency Stop" device.
- Do **not** step on the generator set when servicing, entering, or leaving the generator room.

Aftertreatment

Follow these recommended practices when interacting with equipment that utilize aftertreatment systems. For information regarding proper handling of various substances, refer to the manufacturer's safety data sheet.

Diesel Exhaust Fluid

- Avoid breathing vapor or mist.
- Protect eyes. In case of contact with eyes, flush with water for a minimum of 15 minutes.
- Protect skin. In case of contact with skin, wash with soap and water.
- Do **not** ingest. If ingested, contact a physician immediately.

Diesel Particulate Filter

- Protect eyes.
- Protect skin.
- Avoid stirring up exhaust particulate dust.
- Avoid inhalation of exhaust particulate dust. Wear a dust mask. If respiratory irritation or discomfort occurs, leave the dusty area. Utilize breathing assistance or oxygen if necessary.
- Elevated concentrations of metals in the form of dust, soot, and contaminants are contained in these filters. Health regulations may exist for the materials found in these filters such as Zinc, Molybdenum, polynuclear aromatic

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hydrocarbons. Potentially toxic materials found in these filters are oxides of calcium, zinc, phosphorous, silicon, sulfur, and iron.

- Proper disposal of the exhaust dust and filter are required. Dispose of in accordance with local and environmental regulations.
- Diesel particulate filter maintenance **must** be completed by appropriately trained personnel.

Selective Catalytic Reduction (SCR) Catalyst

- Protect eyes.
- Protect skin.
- Avoid stirring up exhaust catalyst dust.
- Avoid inhalation of exhaust catalyst dust. Wear a dust mask. If respiratory irritation or discomfort occurs, leave the dusty area. Utilize breathing assistance or oxygen if necessary.
- Do **not** cut open exhaust catalyst assemblies.
- Proper disposal of the exhaust catalyst is required. Dispose of in accordance with local and environmental regulations.

Oxidation Catalysts

Types of Oxidation Catalysts may include, but are not limited to the following.

- Diesel Oxidation Catalyst (DOC)
- 3-way Oxidation Catalyst

When working with oxidation catalysts, perform the following.

- Protect eyes.

- Protect skin.
- Avoid stirring up exhaust catalyst dust.
- Avoid inhalation of exhaust catalyst dust. Wear a dust mask. If respiratory irritation or discomfort occurs, leave the dusty area. Utilize breathing assistance or oxygen if necessary.
- Do **not** cut open exhaust catalyst assemblies.

Common Substances

Follow these recommended practices when interacting with the following substances. For information regarding proper handling of various substances, refer to the manufacturer's safety data sheet.

Coolant

- Coolant is also referred to as antifreeze.
- Protect eyes. In case of contact with eyes, flush with water for a minimum of 15 minutes. Receive medical attention immediately.
- Protect skin. In case of contact with skin, wash with soap and water. Remove contaminated clothing. If injection occurs, it is a medical emergency. Receive medical attention immediately.
- Do **not** ingest. If ingested, drink excess water for dilution and seek medical attention.
- Do **not** pour used antifreeze into containers that have been used to store other chemicals or products, such as oil or gasoline, unless they have been thoroughly cleaned.
- If material is spilled, avoid contact and dispersal with runoff, soil, waterways, drains, and sewers. Provide adequate ventilation to the area. Absorb with sand, clay, or commercial absorbent. Transfer to containers and neutralize the material. Flush spill area with soap and excess water.

- Report spills effecting water source contamination to local authorities immediately.
- Proper disposal is required. Dispose of in accordance with local and environmental regulations.

Liquid Nitrogen

- Work in a well-ventilated area.
- Protect eyes. In case of contact with eyes, flush with water for a minimum of 15 minutes. Receive medical attention immediately.
- Protect skin. In case of contact with skin, receive medical attention immediately.
- Wear protective clothing and gloves that insulate.
- Handle items with tongs or wire hooks.
- Avoid prolonged breathing of liquid nitrogen vapors. Utilize breathing assistance or oxygen if necessary.

Lubricating Oil

See Lubricating Oil in the "Hazardous Substances" step.

Refrigerant

- Protect eyes. In case of contact with eyes, flush with water for a minimum of 15 minutes. In case of frostbite, use lukewarm water, not hot. Seek medical attention if irritation continues.
- Protect skin. Wear leather or insulated gloves. In case of contact with skin, wash with soap and water. Seek medical attention if irritation continues.
- Proper disposal is required. Dispose of in accordance with local and environmental regulations.
- **Only** disconnect liquid refrigerant lines in a well-ventilated area. liquid refrigerant systems **must** be properly emptied and filled using equipment that prevents the release of refrigerant gas into the atmosphere. Federal law requires capturing and recycling refrigerant in the United States of America.

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Solvents

- Follow the manufacturer's instructions for safe handling practices.
- Follow the manufacturer's recommendations for use.
- Some solvents are flammable and toxic..
- Protect eyes. In case of contact with eyes, follow manufacturer's recommendations.
- Protect skin. In case of contact with skin, follow manufacturer's recommendations.
- Dispose of in accordance with manufacturer's recommendations.

Starting Aids (Starting Fluid)

- Do **not** use starting fluid if the intake air heater option is used.
- Do **not** use volatile cold starting aids in underground mine or tunnel operations. The local United States Bureau of Mines inspector can provide more information and instructions.
- Avoid sparks, arcing switches and equipment, cigarettes, pilot lights, flames, and other sources of ignition.
- Work in a well-ventilated area.
- Avoid inhalation.

Hazardous Substances

Hazardous substances are known to some state and federal agencies to be carcinogenic and cause reproductive harm. Hazardous substances that may be encountered during service events are listed below.

Diesel Engine Exhaust

- Protect eyes. In case of contact with eyes, flush with water for a minimum of 15 minutes.

- Protect skin. In case of contact with skin, wash with soap and water.
- Avoid inhalation.

Lubricating Oil

- Protect eyes. In case of contact with eyes, flush with water for a minimum of 15 minutes.
- Protect skin. In case of contact with skin, wash with soap and water.
- Do **not** ingest. If ingested, contact a physician immediately..
- Proper disposal is required. Dispose of in accordance with local and environmental regulations.
- Do **not** allow water droplets to enter a container of hot oil. A violent reaction can result.

Mercury

- Protect eyes. In case of contact with eyes, flush with water for a minimum of 15 minutes.
- Protect skin. In case of contact with skin, wash with soap and water.
- Do **not** ingest. If ingested, contact a physician immediately.
- Proper disposal is required. Dispose of in accordance with local and environmental regulations.

Vanadium Pentoxide

- Can be found in some selective catalytic reduction (SCR) catalysts.
- Protect eyes. In case of contact with eyes, flush with water for a minimum of 15 minutes.
- Protect skin. In case of contact with skin, wash with soap and water.
- Do **not** ingest. If ingested, contact a physician immediately.
- Avoid inhalation of vapors or airborne particles.

- Proper disposal is required. Dispose of in accordance with local and environmental regulations.

Electrical Components

Follow these recommended practices when interacting with electrical components.

Batteries

- Protect eyes. Wear safety glasses or goggles. In case of battery acid contact with eyes, flush with water for a minimum of 15 minutes. Receive medical attention immediately.
- Protect skin. Wear rubber gloves and a chemical apron. In case of battery acid contact with skin or clothing, rinse with water for several minutes. Avoid spreading the acid. Receive medical attention immediately.
- Do **not** open the battery caps with your face over or near the battery.
- Remove rings, watches, long jewelry, or metallic items when working with or near batteries.
- Ventilate the battery compartment before servicing the battery.
- Work in a well-ventilated area.
- Avoid sparks, arcing switches and equipment, cigarettes, pilot lights, flames, and other sources of ignition.
- Use insulated or non-conducting tools.
- Neutralize static buildup by contacting the nearest ground surface before working on a battery.
- Do **not** lift batteries by the posts.
- Do **not** touch both battery terminals with your bare hands at the same time.
- Disconnect the negative (-) battery cable first.
- Attach the negative (-) battery cable last.

Common Hazards

Follow these recommended practices when interacting with equipment as the following hazards may exist.

High Temperature Area

Be alert for high temperature areas which may cause severe burns. High temperature areas may be encountered in the following situations.

- On products that have just been turned off.
- On or around exhaust related components (turbocharger, aftertreatment systems, etc).
- In exhaust gas flow paths.
- Contacting hot fluid lines, tubes, or compartments.

Recommended Practices:

- Allow components to cool before servicing. Verify the temperature of the component. Utilize an infrared gun, temperature sensor, temperature gauge, or other reliable method to determine component temperature. Take appropriate precautions before starting work.
- Protect eyes.
- Protect skin. Wear insulated gloves.
- Ensure surrounding items do not come in contact with hot components or exhaust. Contact may ignite or melt those materials.

Heavy Objects

Be alert when working with heavy objects.

- Do **not** lift components that weigh 23 kg [50 lb] or more. Use mechanical help or seek assistance.

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- Use mechanical help to move items whenever possible. Make sure the load is securely fastened to the equipment.
- Make sure lifting devices, like chains, hooks, slings, etc., are in good condition and are rated for the correct capacity before use.
- Make sure lifting devices are positioned correctly before use.
- Use a spreader bar when necessary.
- If the item can be lifted manually, squat to lift and lower the item. Do **not** bend at the waist.
- Maintain balance when lifting items by keeping feet apart or staggered if possible.
- If the item must be carried, make sure the path is clear when carrying the item to, and placing the item in, the desired location.

Pressurized Areas

Be alert for pressurized areas. Pressurized areas may be encountered in the following situations.

- Air, Oil, Fuel, and Cooling systems.
- When disconnecting or removing lines, fittings, or related items.
- When disconnecting a device from a pressurized system.
- When removing or loosening caps on tanks or pressurized systems.

Injuries that may result when interacting with pressurized areas are listed below.

- High pressure spray can penetrate the skin. Serious injury or death may result.
- Hot fluid spray can cause burns. See "High Temperature Area."

Recommended Practices:

- Protect skin. Wear impervious gloves. If skin penetration from high pressure spray occurs, it is a medical emergency. Receive medical attention immediately.
- Check for pressure leaks as instructed. **Never** check for pressure leaks with your hand.
- Allow product to cool before accessing pressurized areas.
- Relieve system pressure as instructed.
- Slowly loosen fill caps to relieve pressure before servicing.

Job Safety Assessment

Completing a Job Safety Assessment (JSA) prior to performing work helps identify job safety hazards and prevent incidents. Use the guidelines below to assess if a situation is safe or at risk prior to performing designated work. If determined to be at risk, take appropriate precautions to prepare for, or eliminate, the hazard. If the risks are uncontrollable, consult a knowledgeable resource to find a safe practice solution. A knowledgeable resource may include, but is not limited to, one of the following:

- Site supervisor
- Customer
- Work supervisor

Always check with the site where work is being performed to determine if safety assessment documentation is required.

Work Practices

Job Safety Analysis.

- Assess the job to identify safety hazards that may occur during the repair event.

Ascending or Descending

- Maintain 3 points of contact when using steps, ladders, or entering and exiting a unit.

Communication

- When working with others, make sure you understand what each other is doing to safely complete the task.

Eyes On Hands and Work.

- Confirm if you will be able to maintain an unobstructed view of your hands at all times while performing the task.

Eyes On Path

- Watch for hazards in your path to avoid trip or slip hazards. Examples are pits, platform edges, etc.

Line Of Fire

- Position yourself so that you avoid striking against, or being struck by, anything that can swing, fall, or roll.

Pinch Point

- Prevent exposure of all parts of your body to a nip hazard or pinch point.

Rushing

- Take adequate time to safely perform the job. Do **not** rush or take short cuts.

Follow Procedures

- Utilize QuickServe® Online or other standard procedures when available.
- Make sure the procedures are correct and safe.

Ergonomics

Back-Bending and Twisting

- Avoid bending forward more than 45 at your waist.
- Avoid working with your back twisted with loads over 23 kg [50 lb].

Knee

- Avoid bending your knee more than 90.
- Avoid kneeling for more than 4 hours per day.

Lifting and Lowering

- Squat to pick up parts.
- Keep loads close to the body when lifting or carrying.
- Use a team lift or a lifting device if the object is more than 23 kg [50 lb].

Pulling or Pushing

- Pull with your arms.
- Push with your legs.
- Avoid exerting more force than necessary.
- Avoid moving heavy load(s) too quickly.

Tools and Equipment

Selection

- Select the correct tool or equipment to perform the task.

Condition

- Confirm the tool or equipment is free of defects before use.

- Confirm that safety devices are in place before use.

Use

- Use the tool or equipment as directed.
- Follow the manufacturer's instructions.

Personal Protective Equipment (PPE)

Eye, Face, and Head Protection

- Confirm the eye, face, or head protection you plan to use are adequate for performing the task at hand.

Foot Protection

- Confirm the foot protection you plan to use is adequate for performing the task at hand in the current environment.

Fall Protection

- Fall protection should be used if you are working more than 1.2 m [4 ft] above the floor.
- Use fall protection if you have been properly trained to do so. If you are not trained to use fall protection, allow someone who has received proper training to perform the task.

Hand Protection

- Avoid exposing hands to cuts or burns while completing the task.
- Confirm the proper glove type is being used for the task at hand. Examples are cut-resistant, chemical-resistant, electric shock-resistant, electric arc flash, welding, etc.

Hearing Protection

- Hearing protection should be worn when required or recommended.

Body Protection

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- Body parts should be protected from work hazards.
- Avoid contact with sharp edges, hot surfaces, etc.

Work Procedures

Training

- Confirm if you have received task and safety training for the job being performed.

Working Alone

- Avoid working alone.
- Avoid working where you are **not** able to be seen or heard by another person.
- If you **must** work alone, notify others of your location and schedule check-in times.

Lockout and Tagout

- Lock out or tag out energy sources before work. Examples are electrical, mechanical, hydraulic, and pneumatic.

Barricades and Warnings

- Mark overhead work areas with barricade tape or signs.
- Mark open floor hazards with barricade tape, signs, or cones.

Confined Space

- Confirm if a confined space entry permit is required.
- If required, confirm the permit is posted, signed, and dated correctly.

Hot Work

- Confirm a functional fire extinguisher is readily available.

- Maintain separation between ignition sources and fuel sources.

Place Wheel Chocks

- Place wheel chocks at either the front or back tire of the unit prior to starting the task.

Spotter

- Use a spotter when moving a customer's unit.
- Confirm the driver can see and hear the spotter when moving.

Housekeeping (The 5 S's - Scrap or Segregate, Set to Order, Spotless, Standardize, and Sustain)

- Remove parts, extension cords, air hoses, and liquids from the work area that may cause trip, slip, or fall hazards.

Acronyms and Abbreviations

General Information

The following list contains some of the acronyms and abbreviations used in this manual.

ANSI	American National Standards Institute
API	American Petroleum Institute
ASTM	American Society of Testing and Materials
ATDC	After Top Dead Center
bhp	Brake Horsepower
BTU	British Thermal Unit
BTDC	Before Top Dead Center
°C	Celsius
CAN	Controller Area Network
CO	Carbon Monoxide
CCA	Cold Cranking Amperes
CARB	California Air Resources Board
CES	Cummins Engineering Standard
C.I.B.	Customer Interface Box
C.I.D.	Cubic Inch Displacement
CNG	Compressed Natural Gas
CPL	Control Parts List

cSt	Centistokes
DEF	Diesel Exhaust Fluid
DOC	Diesel Oxidation Catalyst
DPF	Diesel Particulate Filter
ECM	Engine Control Module
EFC	Electronic Fuel Control
EGR	Exhaust Gas Recirculation
EPA	Environmental Protection Agency
ESN	Engine Serial Number
°F	Fahrenheit
ft-lb	Foot-Pound Force
FMI	Failure Mode Identifier
GVW	Gross Vehicle Weight
Hg	Mercury
hp	Horsepower
H₂O	Water
inHg	Inches of Mercury
in H₂O	Inches of Water
ICM	Ignition Control Module
IEC	International Electrotechnical Commission
JSA	Job Safety Assessment

km/l	Kilometers per Liter
kPa	Kilopascal
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
LTA	Low Temperature Aftercooler
MCRS	Modular Common Rail System
MIL	Malfunction Indicator Lamp
MPa	Megapascal
mph	Miles Per Hour
mpq	Miles Per Quart
N•m	Newton-meter
NOx	Nitrogen Oxides
NG	Natural Gas
O2	Oxygen
OAT	Organic Acid Technology
OBD	On-Board Diagnostics
OEM	Original Equipment Manufacturer
OSHA	Occupational Safety and Health Administration
PID	Parameter Identification Descriptions
PPE	Personal Protective Equipment
ppm	Parts Per Million

psi	Pounds Per Square Inch
PTO	Power Takeoff
QSOL	QuickServe® Online
REPTO	Rear Engine Power Takeoff
RGT	Rear Gear Train
rpm	Revolutions Per Minute
SAE	Society of Automotive Engineers
SCA	Supplemental Coolant Additive
SCR	Selective Catalytic Reduction
STC	Step Timing Control
SID	Subsystem Identification Descriptions
TDC	Top Dead Center
TSB	Technical Service Bulletin
ULSD	Ultra Low Sulfur Diesel
VDC	Volts of Direct Current
VGT	Variable Geometry Turbocharger
VS	Variable Speed
VSS	Vehicle Speed Sensor

Section E - Engine and System Identification

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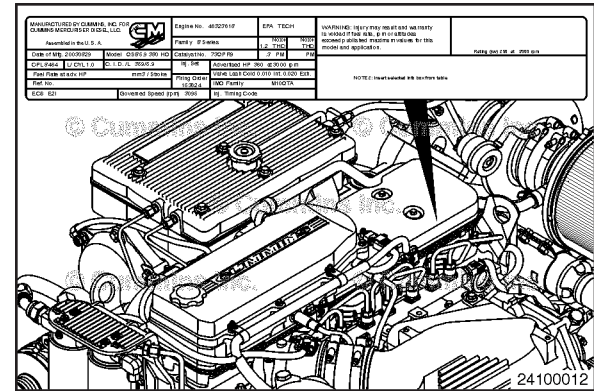
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Engine Identification

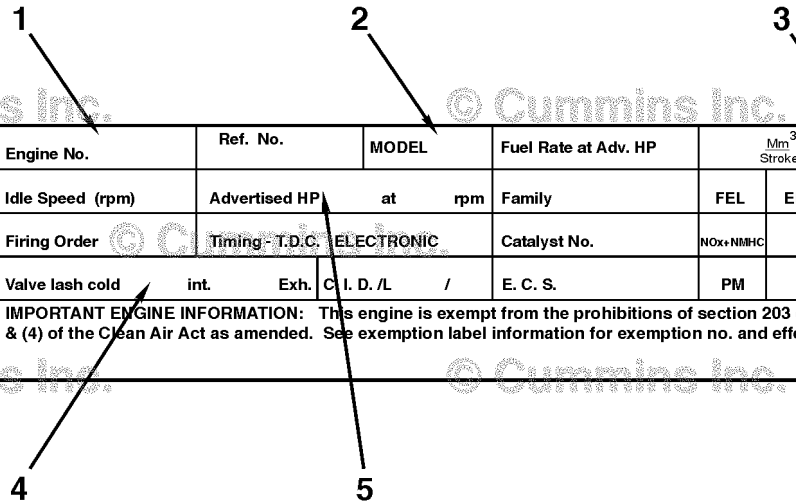
Engine Dataplate

The engine dataplate provides important information about the engine.

The engine serial number (ESN) and control part list (CPL) provide information for service and for ordering parts. The engine dataplate **must not** be changed unless approved by Cummins Inc.



MANUFACTURED BY CUMMINS INC.  <small>Assembled in the USA © 3967607</small> Date of Mfg: WARNING: Injury may result and warranty is voided if fuel rate, rpm or altitudes exceed published maximum values for this model and application.	Engine No.	Ref. No.	MODEL	Fuel Rate at Adv. HP	³ <small>Mm</small> Stroke		CPL
	Idle Speed (rpm)	Advertised HP at rpm		Family	FEL	EPA	CARB
	Firing Order	Timing - T.D.C. ELECTRONIC		Catalyst No.	NOx+NMHC		
	Valve lash cold	int.	Exh.	C.I. D./L /	E. C. S.	PM	
	IMPORTANT ENGINE INFORMATION: This engine is exempt from the prohibitions of section 203 (a) (1) (3) & (4) of the Clean Air Act as amended. See exemption label information for exemption no. and effective date.						



00d00269

Have the following engine data available when communicating with a Cummins® Authorized Repair Location.

- 1 Engine serial number
- 2 Engine model information

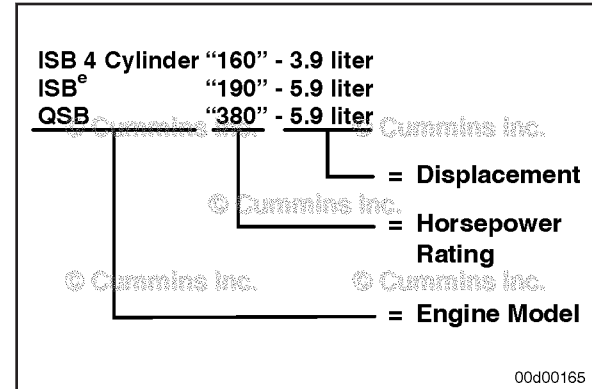
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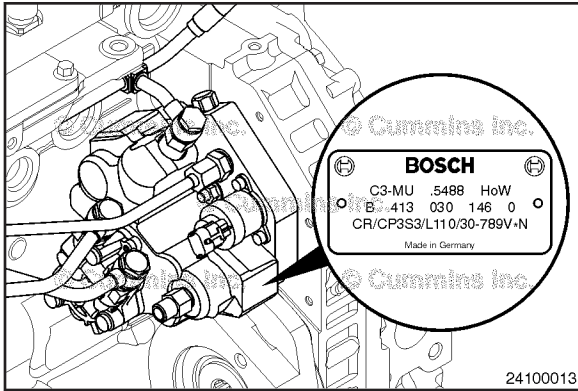
- 3 Control parts list (CPL)
- 4 Valve lash (overhead) setting
- 5 Horsepower and rpm rating.

NOTE: Depending on the manufacturing plant, calibration data may also be found on the engine dataplate.

Cummins® Engine Nomenclature

The Cummins® engine nomenclature provides the data as shown in the illustration.





Fuel Injection Pump Dataplate

The Bosch® fuel injection pump dataplate is located on the fuel pump. The dataplate contains the following information:

- Pump serial number
- Cummins part number
- Factory code
- Bosch® part number
- Date code.

Engine Control Module Dataplate

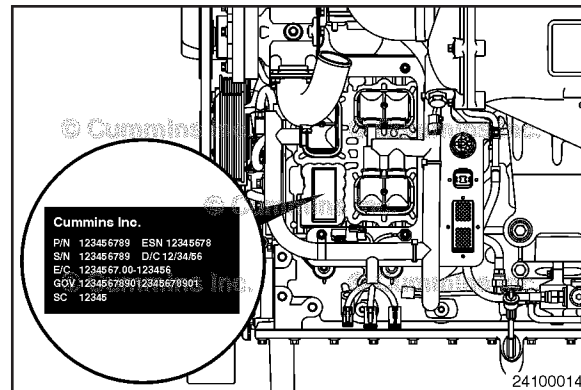
The engine control module (ECM) dataplate shows information about the ECM and how the ECM was programmed. The dataplate is located on the ECM.

The following information is available on the ECM dataplate:

- ECM part number (P/N)
- ECM serial number (S/N)
- ECM date code (D/C)
- Engine serial number (ESN)
- ECM Code (identifies the software in the E/C).

NOTE: Have the ECM code for your engine available when communicating with a Cummins® Authorized Repair Location.

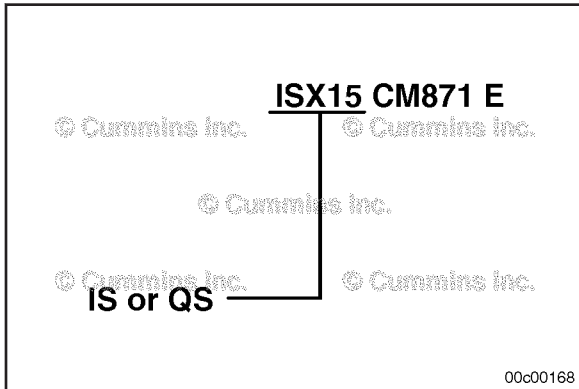
NOTE: The presence of an ECM dataplate depends on the manufacturing plant and the date on which the engine was manufactured. If an ECM dataplate was **not** installed by the manufacturing plant, calibration data can be found on the engine dataplate.



Cummins® Service Engine Model Product Identification General Information

The Cummins® Service Engine Model Nomenclature procedure describes how engines are identified within Cummins service organization. This method was introduced for models after and including manufacture year 2007.

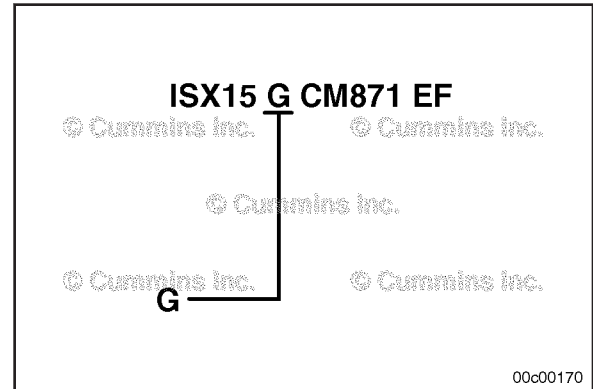
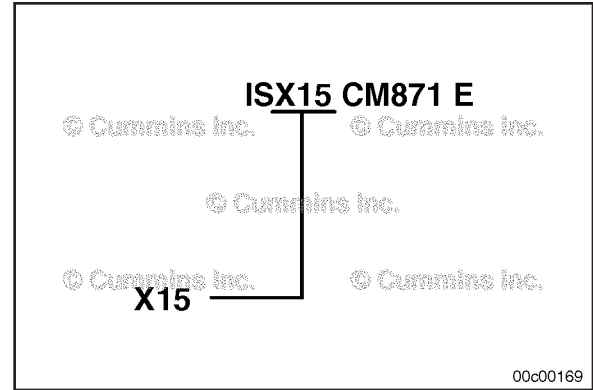
Electronic engines are identified by the first two letters, either an "IS" for On-Highway automotive or "QS" for Off-Highway industrial market applications.



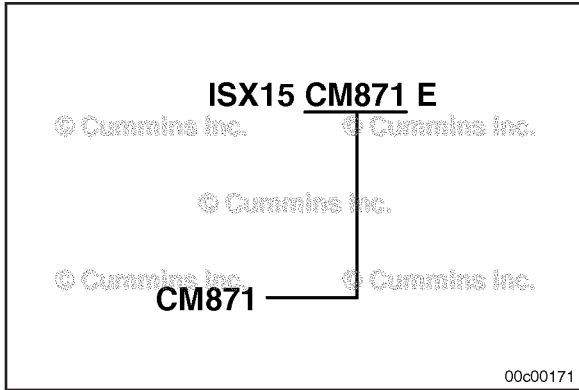
Marine QSB6.7 CM2250
Section E - Engine and System Identification

The third letter is the engine platform designation followed by the engine liter size.

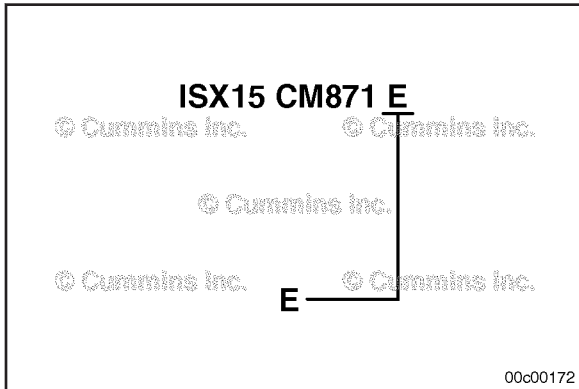
If the engine operates on a fuel type other than diesel, the type will be identified after the liter size.



The control system is identified with the letters "CM" followed by the control system model number.



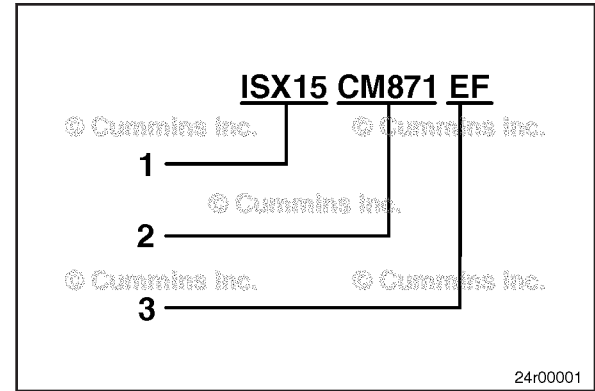
The technology identifier after the control system designates the prevailing technology used with the engine. (See table in this procedure for letter designations.)



Marine QSB6.7 CM2250
Section E - Engine and System Identification

Example:

- 1 On-Highway automotive "X" 15 liter engine
- 2 Control system number 871
- 3 Technology supported; Electric EGR and Diesel Particulate Filter



Technology	Name	Suffix
Exhaust Gas Recirculation	Not used	None
	Pneumatic	P
	Electric	E
Diesel Particulate Filter (DPF)	Not used	None
	Full Flow DPF	F
	Partial Flow DPF	F2
Diesel Oxidation Catalyst	Not used	None
	DOC	C
3-Way Oxidation Catalytic Converter	Not used	None
	3-Way Catalyst	J
Selective Catalytic Reduction System	Not used	None
	Air Driven	S
	Airless	A
Nox Sensor	Not used	None
	Nox Sensor	N
Modular Common Rail System	Used only on QSK19, 38, 50 , 60 HHP Engines	MCRS
Integrated Dosing Control Unit	Not Used	None
	Integrated	I

Technology	Name	Suffix
Urea Quality Sensor	Not Used	None
	UQS	Q

Emission Control System

General Information

The Emission Control System information is located on the engine dataplate. It identifies the engine components in acronyms that make up the emission control system.

NOTE: Engine dataplates vary by manufacturing plant. The dataplate may **not** contain all of the emission control systems for the engine.

Marine QSB6.7 CM2250 engines above 174 horsepower, certified for EPA Tier 2 certified and will be Tier 3 certified by January 2013, are equipped with the following emission control systems:

- DDI - direct diesel injection
- ECM - electronic control module
- TC - turbocharger
- CAC - charge-air cooler

Section 1 - Operating Instructions

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Operating Instructions - Overview

General Information



Correct care of your engine will result in longer life, better performance, and more economical operation.

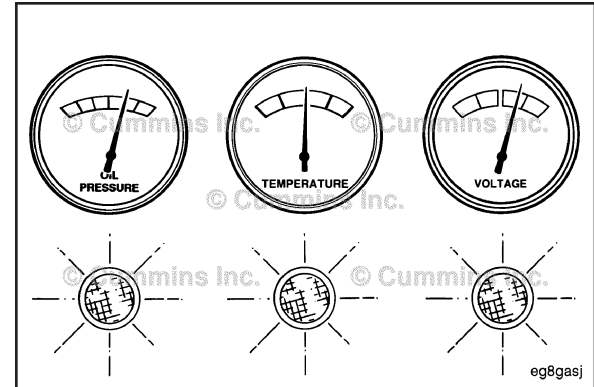
Follow the daily maintenance checks listed in Maintenance Guidelines (Section 2).

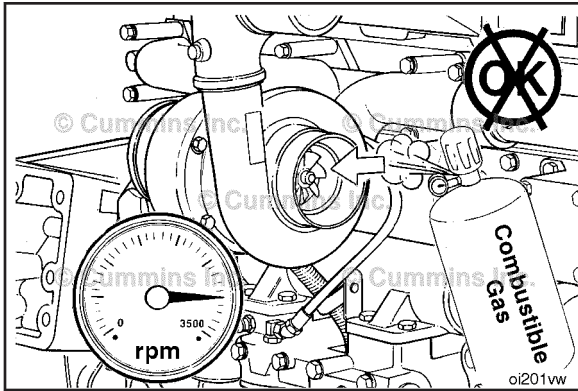
The new Cummins® engine associated with this manual does **not** require a "break-in" procedure. This section of the manual provides all of the necessary information required for proper engine operation.

Check the oil pressure indicators, temperature indicators, warning lights, and other gauges daily to make sure they are operational.



Check the oil pressure, coolant temperatures DEF level, and other engine parameters daily via the OEM front panel to make sure they are operational. Check the panel regularly for any alarm messages. Take appropriate action to rectify the alarm condition or contact your nearest Authorized Cummins® Distributor.





⚠ WARNING ⚠

Do not operate a diesel engine where there are or can BE COMBUSTIBLE vapors. These vapors can be sucked through the air intake system and cause engine acceleration and over speeding that can result in a fire, an explosion, and extensive property damage. Numerous safety devices are available, such as air intake shutoff devices, to minimize the risk of over speeding where an engine, due to its application, is operating in a combustible environment, such as due to a fuel spill or gas leak. Remember, Cummins Inc. has no way of knowing the use you have for your engine. The equipment owner and operator ARE responsible for safe operation in a hostile environment. Consult A Cummins® Authorized Repair Location for further information.

⚠ CAUTION ⚠

Do not expose the engine to corrosive chemicals. Corrosive chemicals can damage the engine.

Cummins recommends the installation of an air intake shutoff device or a similar safety device to minimize the risk of overspeeding when an engine is operating in a combustible environment, such as due to a fuel spill or gas leak.

Normal Starting Procedure

General Information

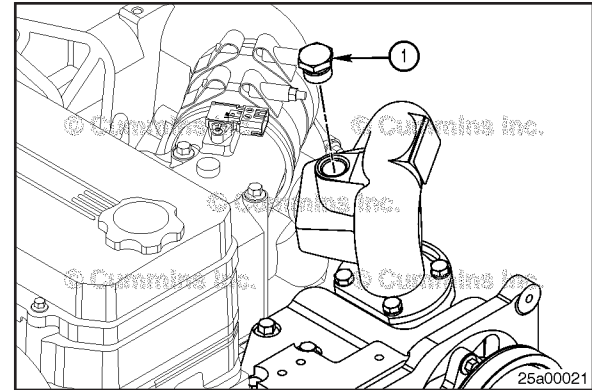
If the engine is going to be started with the boat out of the water, it **must** be equipped with a sea water pump with a fill plug (1).

NOTE: A sea water pump with a fill plug is a special option that allows the engine to be started without the boat being in the water. Most boats do **not** have a sea water pump with fill plug, and are **not** designed to be operated out of the water.

NOTE: The maximum time an engine with a sea water pump with fill plug can be operated while the boat is out of water is 30 minutes at idle rpm. The engine **must not** be operated above idle rpm during this time.

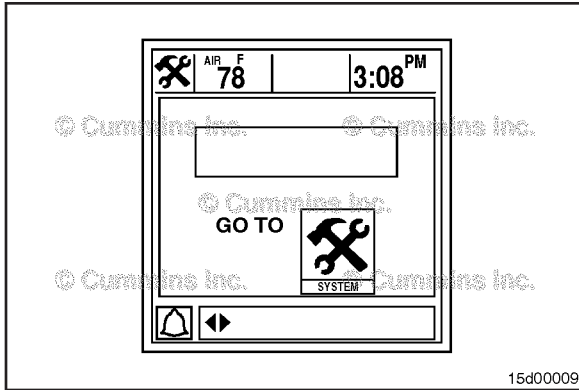
Water **must** be added to the sea water pump at the sea water pump outlet connection fill plug. Remove the fill plug located at the sea water pump outlet connection. Add water until full. It may take up to 20 oz (591 mL) to fill the system. Install the fill plug at the sea water pump outlet connection.

Torque Value: 33 N•m [24 ft-lb]

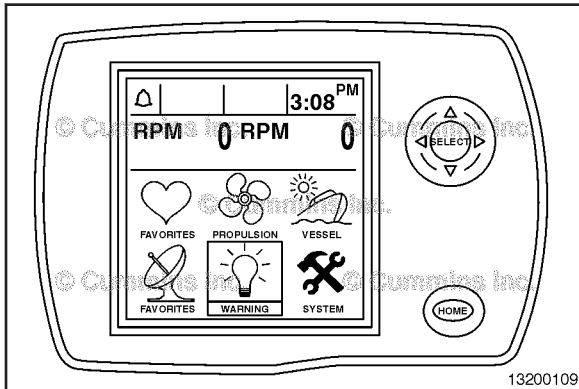


Starting

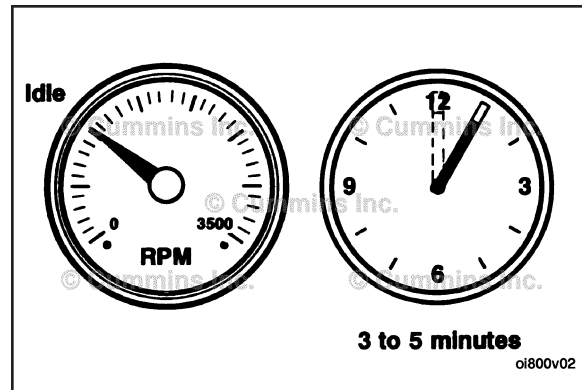
The warning message indicates the need to stop the engine as soon as it can be safely done. The engine **must** remain shut down until the engine can be repaired at the first available opportunity.



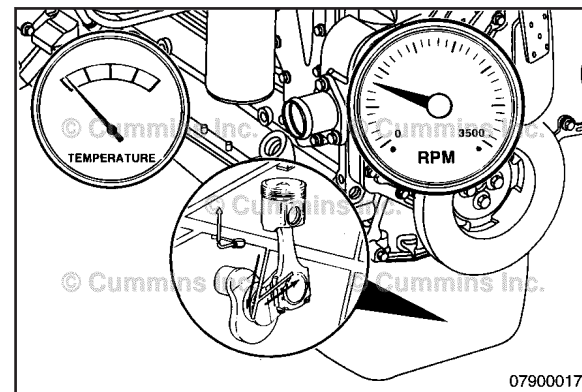
The Vessel View display or gauges will show a warning when a fault code is present.

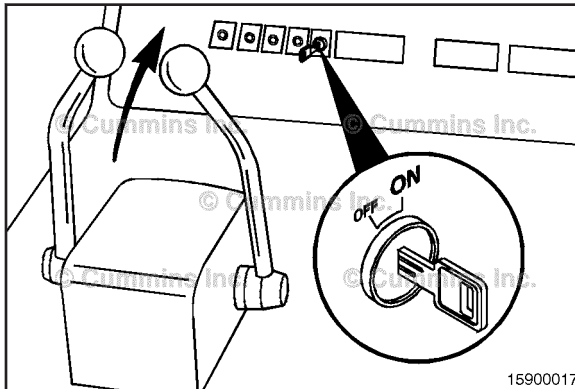
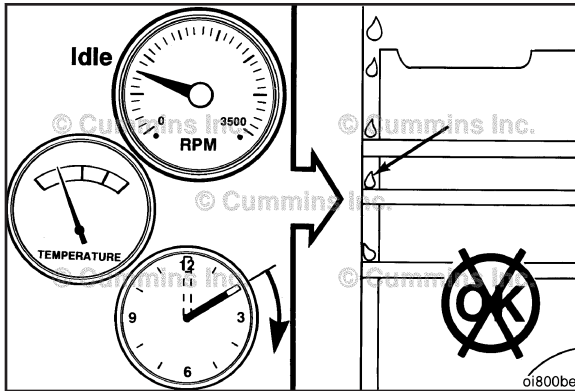


Idle the engine 3 to 5 minutes before operating with a load.



After starting a cold engine, increase the engine speed (rpm) slowly to provide adequate lubrication to the bearings and to allow the oil pressure to stabilize.





⚠ CAUTION ⚠

Do not operate engine at low idle for long periods with engine coolant temperature below the minimum specification. This can result in the following:

- Fuel dilution of the lubricating oil
- Carbon build up in the cylinder
- Cylinder head valve sticking
- Reduced performance

Refer to Procedure 018-018 Section V.

⚠ CAUTION ⚠

To reduce the possibility of damage to the starting motor, do not engage the starting motor for more than 30 seconds. Wait 2 minutes between each attempt to start (electrical starting motors only).

NOTE: There is a separate keyswitch wired to the primary panel. It will be installed at the helm at the boat manufacturer's or installer's desired location. The keyswitch **must** be in the ON or RUN position to crank-start the engine.

Disengage the drive unit prior to cranking or starting the engine.

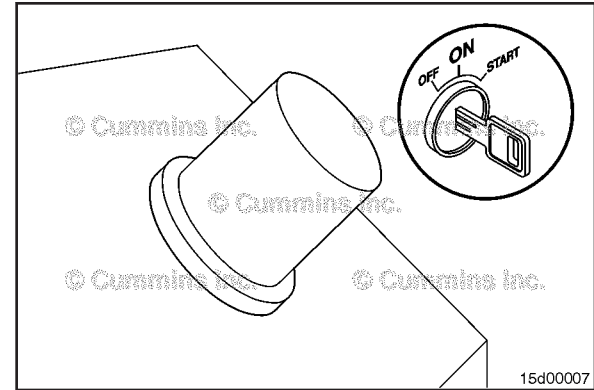
NOTE: Some boats are equipped with the keyswitch activated starter instead of a start button.

Turn the keyswitch to the ON or RUN position. When the key is in this position, wait for 30 seconds to allow the transfer pump to pressurize the system.

Start the engine with the throttle in the IDLE position.

The start button will be installed at the helm at the boat manufacturer's or installer's desired location.

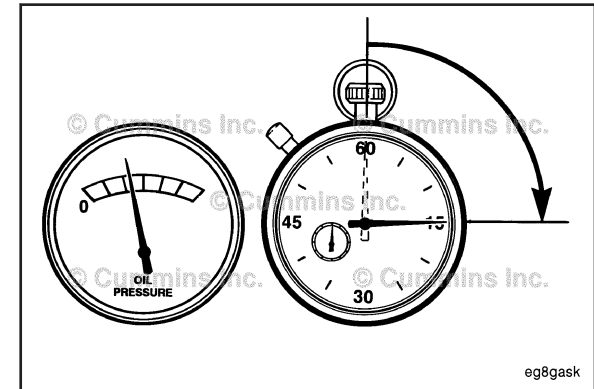
To engage the starter, use the black start button or activate the starter by turning the keyswitch to the START position until the engine starts.

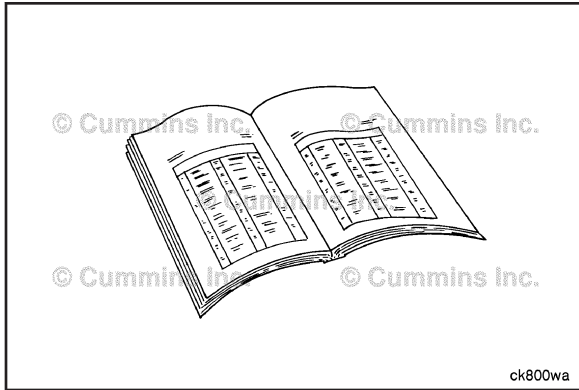


⚠ CAUTION ⚠

The engine must have adequate oil pressure within 15 seconds after starting. If a fault code indicates low oil pressure, or there is no oil pressure indicated on a gauge within 15 seconds, shut off the engine immediately to avoid engine damage.

Contact a Cummins® Authorized Repair Location.





Cold Weather Starting

General Information

Follow the normal starting procedure in this section. If equipped with an intake air heater, the WAIT-TO-START lamp will stay on longer.

See the equipment manufacturer service information for any additional cold weather starting procedures.

Extreme cold conditions can cause oil pressure delays when using 15W-40 viscosity grade engine lubricating oil. For extreme cold conditions, the use of a different engine lubricating oil viscosity is recommended. Reference Procedure 018-003 in Section V in the appropriate Operation and Maintenance Manual.

Using Starting Aids

⚠ WARNING ⚠

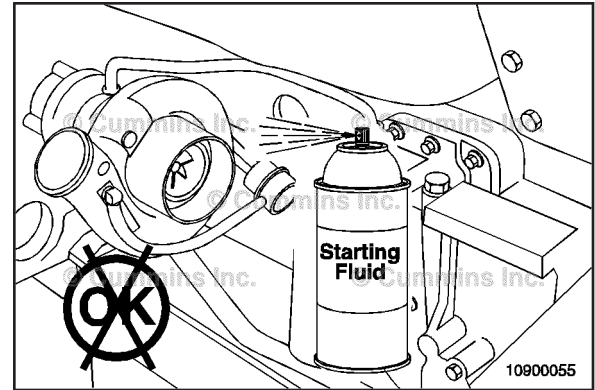
Do not use starting fluids with this engine. This engine is equipped with an intake air heater: use of starting fluid can cause an explosion, fire, personal injury, severe damage to the engine, and property damage.

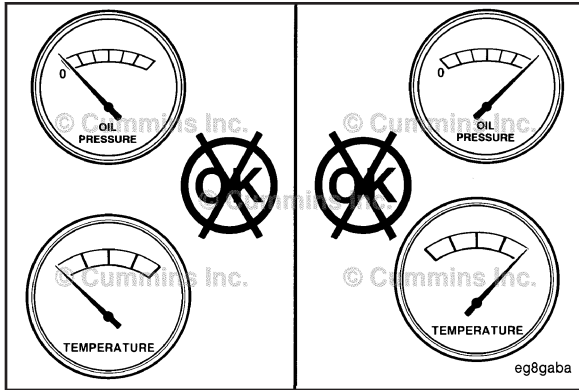
Cold weather starting aids are available for this engine. Contact a Cummins® Authorized Repair Location for more information.

Starting Procedure After Extended Shutdown or Oil Change

General Information

Follow the Normal Starting Procedure in this section. The engine will **not** start until the minimum cranking oil pressure is detected by the ECM. It can take more cranking time to start the engine after an extended shut down or oil change.



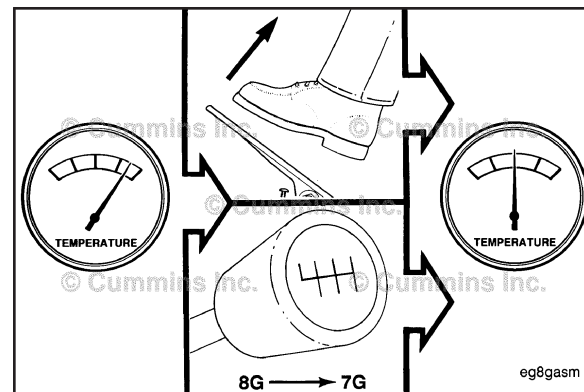


Operating the Engine Normal

If equipped, monitor the oil pressure and coolant temperature gauges frequently. Refer to Lubricating Oil System specifications and Cooling System specifications, in Maintenance Specifications (Section V) for recommended operating pressures and temperatures. Shut off the engine if any pressure or temperature does **not** meet the specifications.

Continuous operation with engine coolant temperature above or below the engine coolant temperature specifications listed in Maintenance Specifications (Section V) can damage the engine.

If an overheating condition starts to occur, reduce the power output of the engine by releasing the accelerator pedal or lever or shifting the transmission to a lower gear, or both, until the temperature returns to the normal operating range. If the engine temperature does **not** return to normal, shut off the engine, and refer to Troubleshooting Symptoms (Section TS), or contact a Cummins® Authorized Repair Location.



⚠ CAUTION ⚠

Do not idle for extended periods of time. Excessive idle time can cause poor engine performance.

Internal combustion engines **must not** operate at low idle speed for extended periods of time. This operating condition may lead to poor engine performance. The idle shutdown feature, available on most Cummins® engines, can be programmed to shut the engine down after a period of low idle speed operation with no driver activity. A flashing warning lamp will inform the driver of an impending shutdown. If an engine **must** idle for an extended period of time, it should be done at fast idle (1000 rpm or greater). The Power Take-Off (PTO) feature, available on most Cummins® engines, can be programmed to adjust engine speed with the use of OEM switches to pre-programmed set points.

Ambient Temperature

0 to -32°C [32 to -25°F]

Use 50-percent ethylene glycol antifreeze and 50-percent water for the engine coolant mixture.

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The Diesel fuel **must** have maximum cloud and pour points 6°C [10°F] lower than the ambient temperature in which the engine operates.

-32 to -54°C [-25 to -65°F]

Use 60-percent ethylene glycol antifreeze and 40-percent water for the engine coolant mixture.

The Diesel fuel **must** have maximum cloud and pour points 6°C [10°F] lower than the ambient temperature in which the engine operates.

The cold weather operating aid is required for cold weather situations.

Winterfronts and Shutters

Winterfronts and shutters can be used on a vehicle or equipment to reduce air flow through the radiator core into the engine compartment. This can reduce the time required to warm the engine and help maintain the engine coolant temperature. The engine coolant temperature specifications are in the Maintenance Specification (Section V).

General Operating Instructions

General Information

Cummins® engines are designed to operate at or below the maximum cruise speed for extended periods of time with intervals of operation above maximum cruise speed allowed depending on the rating. The engine **must** be operated in accordance with the rating. Exceeding the operational parameters of the rating will jeopardize engine reliability and durability.

Rating	Allowable Operation Time Above Maximum Cruise Speed
Continuous Duty (CD)	Unlimited
Heavy Duty (HD)	8 out of 10 hours
Medium Continuous Duty (MD)	6 out of 12 hours
Intermittent Duty (ID)	2 out of 8 hours
Government Service (GS)	1 out of 8 hours
High Output (HO)	1 out of 8 hours

The maximum cruise speed for High Output (HO), GS, and ID ratings is dependent on the rated speed of the engine.

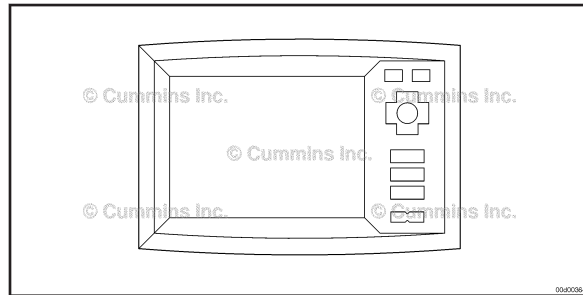
The maximum cruise rpm for MD and HD ratings is 200 rpm less than the rated speed of the engine.

The maximum cruise speed of the CD rating is the same as the rated speed of the engine.

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The rated speed for all engine rating can be found on the engine dataplate. See Section E for more information.

Maximum Cruise Speed (rpm) for HO, GS, and ID Ratings	
Rated Speed (rpm)	Speed Reduction From Rated Speed (rpm)
Less than 2800	200
2801 to 3500	300
3501 to 4500	400



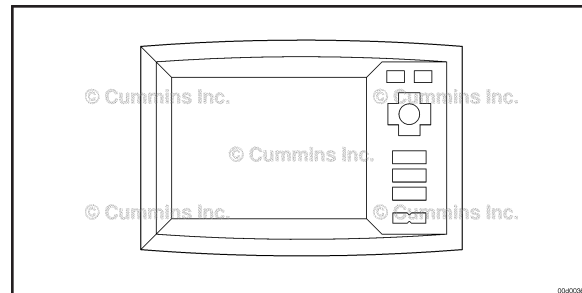
HO, GS, and ID ratings should **not** be operated for extended periods of time with the engine load exceeding 80 percent.

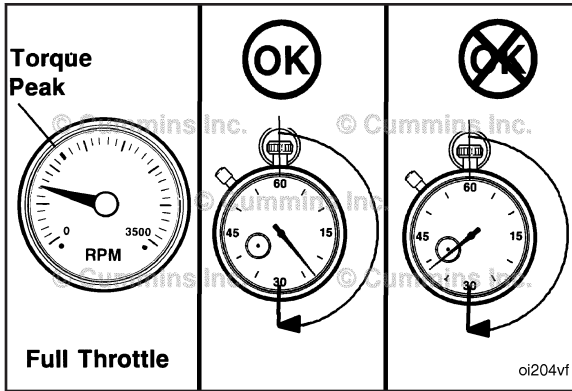
If the engine load exceeds 80 percent during operation at cruising speeds, then the speed of the engine should be reduced so that the engine load is less than or equal to 80 percent.

Marine QSB6.7 CM2250
Section 1 - Operating Instructions

HO engine paired with water-jet propulsion can operate up to a 85 percent load at cruising speeds.

Engine speed and load can be viewed on the engine electronic display.





Engine Operating Range General Information

⚠ CAUTION ⚠

Do not operate the engine at full throttle below peak torque rpm (refer to engine dataplate for peak torque rpm) for more than 30 seconds. Operating the engine at full throttle below peak torque will shorten engine life to overhaul, can cause serious engine damage, and is considered engine abuse.

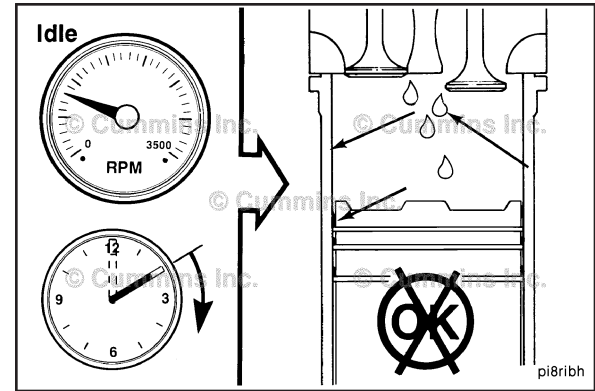
⚠ CAUTION ⚠

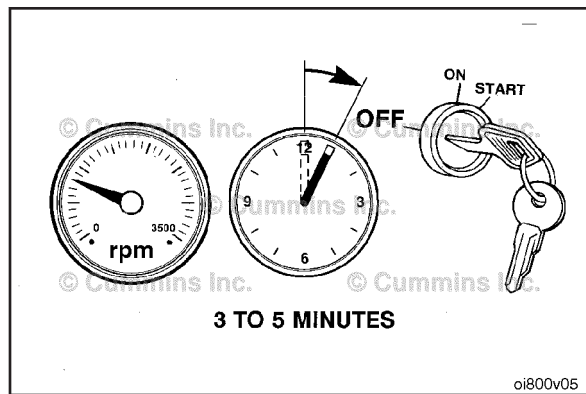
Do not operate the engine beyond the maximum engine speed. Operating the engine beyond the maximum engine speed can cause severe engine damage. Use proper operating techniques for the vehicle, vessel, or equipment to prevent engine overspeed. The maximum engine speed specification is listed in Maintenance Specifications (Section V).

Cummins® engines are designed to operate successfully at full throttle under transient conditions down to peak torque engine speed. This is consistent with recommended operating practices.

⚠ CAUTION ⚠

Do not idle the engine for excessively long periods. Long periods of idling, more than 10 minutes, can cause poor engine performance.





Engine Shutdown General Information

⚠ CAUTION ⚠

Failure to follow the correct shutdown procedure may result in damage to the turbocharger and shorten the turbocharger life.

NOTE: For engines equipped with an electronic control module (ECM) ensure the keyswitch is turned off for a minimum of 100 seconds prior to disconnecting the continuous (unswitched) battery power supply. If the unswitched battery power supply is disconnected in less than 100 seconds after the keyswitch is turned off active fault codes and incorrect ECM information can occur.

Turn the ignition switch to the OFF position. If the engine does **not** shut down, refer to Troubleshooting Symptom (Section TS) in appropriate Operation and Maintenance manual.

Electronic Controlled Fuel System

General Information

The base functions of the control system include fueling and timing control, limiting the engine speed operating range between the low- and the high-idle set points, and optimizing engine performance while maintaining emissions compliance. The system also controls the engine brakes.

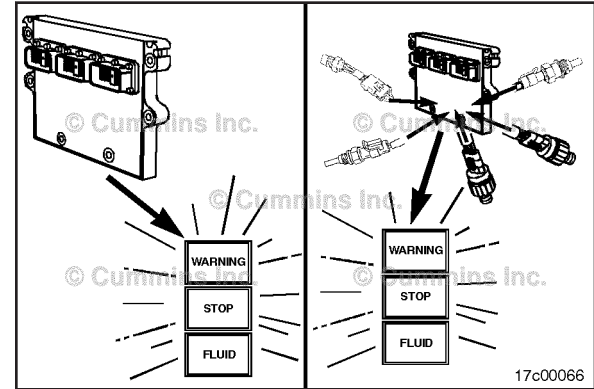
The control system uses inputs from the operator and its sensors to determine the fueling and timing required to operate at the desired engine speed and at the required emissions level.

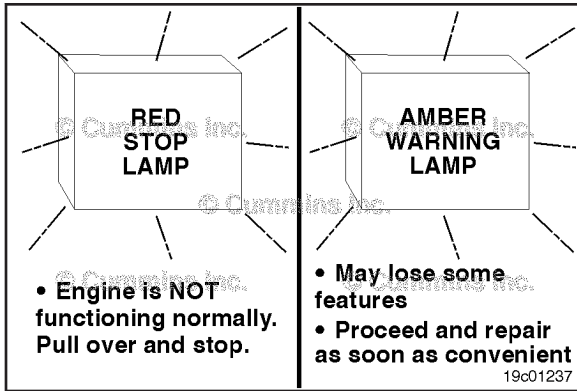
Diagnostic Fault Codes

The electronic engine control system can display and record certain detectable fault conditions. These failures are displayed as fault codes, which make troubleshooting easier. The fault codes are retained in the ECM.

There are two types of diagnostic codes:

- Engine electronic control system fault codes are to inform the operator that there is a problem with the control system that will require troubleshooting.
- Information and engine protection fault codes are to inform the operator that the control system has detected an engine condition outside the normal operating range.





All fault codes recorded will either be active (fault code is presently active on the engine) or inactive (fault code was active at some time, but is **not** presently active).

The "STOP" light is red and indicates the need to stop the engine as soon as it can be safely done. The engine **must** remain shut down until the fault can be repaired.

The "WARNING" light is amber and indicates the need to repair the fault at the first available opportunity.

Maintenance type fault codes will flash the amber WARNING light for 30 seconds after the keyswitch is turned to the ON position when one of the following occurs: maintenance is required (if Maintenance Monitor is turned on) or if water in fuel is detected.

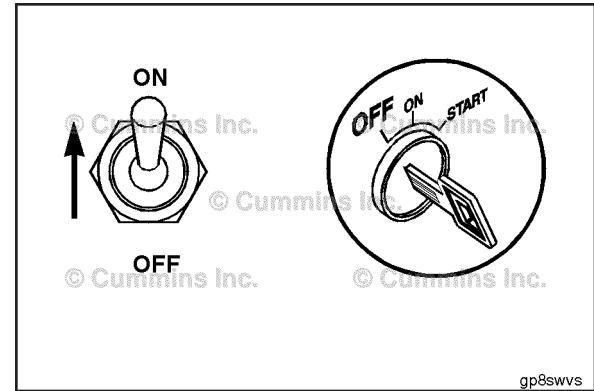
If the WARNING light flashes for 30 seconds at key-on and water is drained from the primary, water-separating filter, the secondary filter **must** be replaced.

If the Water-In-Fuel lamp illuminates and water is drained from the primary, water-separating filter, the secondary filter **must** be replaced.

NOTE: The names and colors of these lamps can vary with equipment manufacturer.

Fault codes can be accessed in at least two different ways; with the electronic service tool or the fault code flash out.

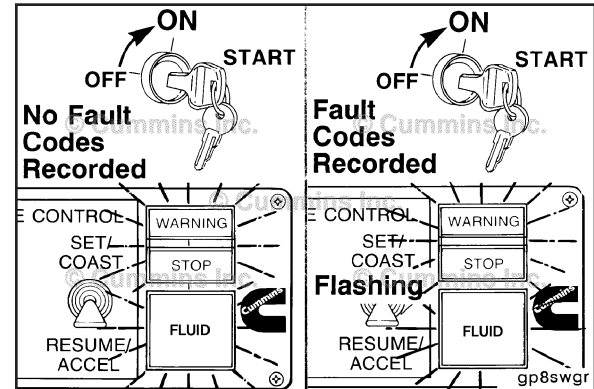
To check for active engine electronic fuel system and engine protection system fault codes, turn the keyswitch OFF and move the diagnostic switch to the ON position.

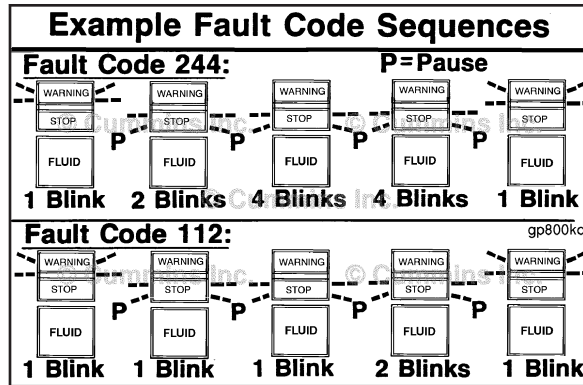


Turn the vehicle keyswitch to the ON position.

If no active fault codes are recorded, both lights will come on and stay on.

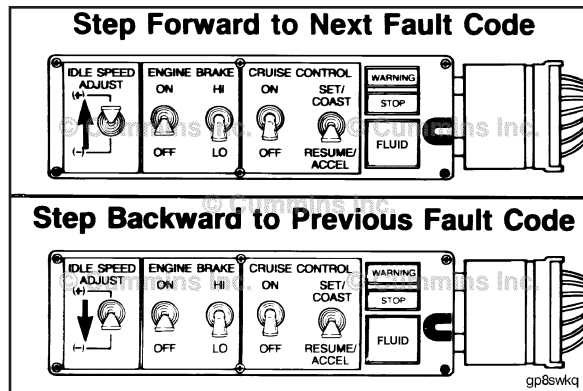
If active fault codes are recorded, both lights will come on momentarily, then begin to flash the code of the recorded faults.





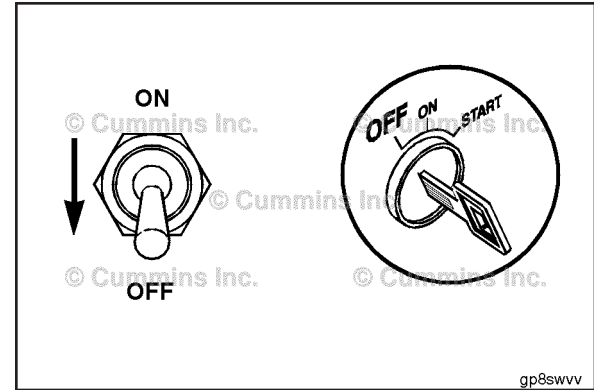
The fault code will flash in the following sequence:

- First, a WARNING (amber) light will flash.
- Then there will be a short one or two second pause after which the number of the recorded fault code will flash in STOP (red).
- There will be a one or two second pause between each number.
- When the number has finished flashing in red, an amber light will appear again.



The lights flash each fault code out three times before advancing to the next code. To skip to the next fault code, move the Increment/Decrement switch, if equipped, momentarily to the increment (+) position. You can go back to the previous fault code by momentarily moving the Increment/Decrement switch, if equipped, to the decrement (-) position. If only one active fault is recorded, the same fault code will continuously be displayed when either (+) or (-) switch is depressed.

When **not** using the diagnostic system, turn off the diagnostic switch.

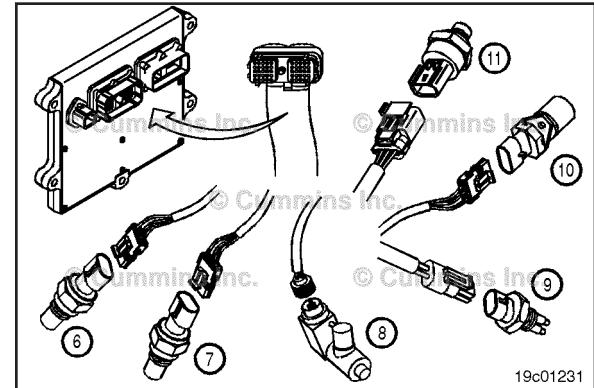


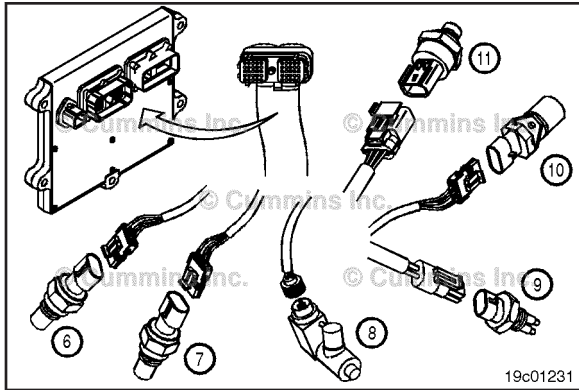
Engine Protection System

⚠ CAUTION ⚠

When the red STOP lamp is illuminated, the driver/operator must pull to the side of the road when it is safe to do so, to reduce the possibility of engine damage.

NOTE: Engine power and speed will gradually be reduced, depending on the level of severity of the observed condition. The engine protection system will **not** shut down the engine unless the engine protection shutdown feature has been enabled.





Fault Code Snapshot Data

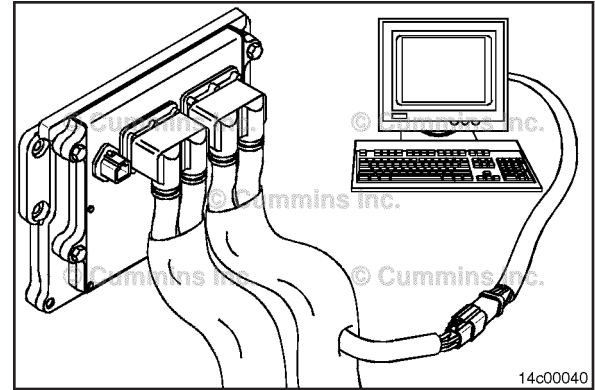
When a diagnostic fault code is recorded in the ECM, the ECM input and output data is recorded from all sensors and switches. Snapshot data allows the relationships between ECM inputs and outputs to be viewed and used during troubleshooting.

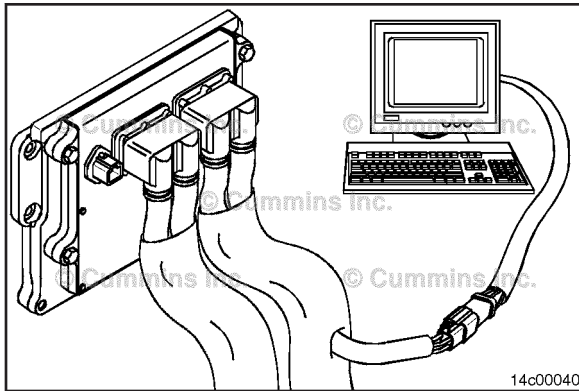
Fault code snapshot data can **only** be viewed using INSITE™ electronic service tool.

INSITE™ Electronic Service Tool Description

INSITE™ electronic service tool is a service tool for the electronic engine control system. Use INSITE™ electronic service tool to:

- Program customer specified information into the ECM (parameter and features)
- Aid in troubleshooting the engine
- Change the engine power or rated speed calibration
- Transfer new or update calibration files to the electronic engine control system (ECM)
- Create and view trip reports, etc.





INSITE™ Electronic Service Tool Monitor Mode

The INSITE™ electronic service tool monitor mode is a useful troubleshooting aid that displays the key ECM inputs and outputs. This feature can be used to spot constant or abnormally fluctuating values.

Electromagnetic Interference (EMI)

General Information

Some applications utilize accessories such as (CB radios, mobile transmitters, etc.) if not installed and used correctly the radio frequency energy generated by these accessories can cause electromagnetic interference (EMI) conditions to exist between the accessory and the Cummins electronically controlled systems. Cummins is **not** liable for any performance problems with either the electronically controlled systems or the accessory due to EMI. EMI is **not** considered by Cummins to be a system failure and therefore is **not** warrantable.

System EMI Susceptibility

Your Cummins product has been designed and tested for minimum sensitivity to incoming electromagnetic energy. Testing has shown that there is no performance degradation at relatively high energy levels; however, if very high

energy levels are encountered, then some noncritical diagnostic fault code logging can occur. The electronically controlled systems EMI susceptibility level will protect your systems from most, if **not** all, electromagnetic energy-emitting devices that meet the legal requirements.

System EMI Radiation Levels

Your Cummins product has been designed to emit minimum electromagnetic energy. Electronic components are required to pass various Cummins and industry EMI specifications. Testing has shown that when the systems are properly installed, they will not interfere with onboard communication equipment or with the vehicle's, equipment's, or vessel's ability to meet any applicable EMI standards and regulated specifications.

If an interference condition is observed, follow the suggestions below to reduce the amount of interference:

- 1 Locate the transmitting antenna as far away from the electronically controlled systems and as high as possible.
- 2 Locate the transmitting antenna as far away as possible from all metal obstructions (e.g., exhaust stacks)
- 3 Consult a representative of the accessory supplier in your area to:
 - Accurately calibrate the device for proper frequency, power output, and sensitivity (both base and remote site devices **must** be properly calibrated)
 - Obtain antenna reflective energy data measurements to determine the optimum antenna location
 - Obtain optimum antenna type and mounting arrangement for your application
 - Make sure your accessory equipment model is built for maximum filtering to reject incoming electromagnetic noise.

Section 2 - Maintenance Guidelines

Section Contents

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Maintenance Data.....	2-5
Maintenance Schedule	2-2
General Information.....	2-2

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Maintenance Guidelines - Overview

General Information

Cummins Inc. recommends that the system be maintained according to the Maintenance Schedule in this section.

If the system is operating in ambient temperatures below -18°C [0°F] or above 38°C [100°F], perform maintenance at shorter intervals. Shorter maintenance intervals are also required if the system is operated in a dusty environment or if frequent stops are made. For gas fueled generator sets, shorter maintenance intervals are also required, if operating at loads below 70% for prolonged periods. Contact your local Cummins® Authorized Repair Location for recommended maintenance intervals.

Some of these maintenance procedures require special tools or must be completed by qualified personnel. Contact your local Cummins® Authorized Repair Location for detailed information.

If your system is equipped with a component or accessory not manufactured or supplied by Cummins Inc., refer to the component manufacturer's maintenance recommendations.

OEM supplied equipment and components can impact on the performance and reliability of the engine if they are not correctly maintained.

Use the chart provided in this section as a convenient way to record maintenance performed.

Maintenance Schedule

General Information

Perform maintenance at whichever interval occurs first. At each scheduled maintenance interval, perform all previous maintenance checks that are due for scheduled maintenance.

Maintenance Procedures at Daily Interval

- Marine Gear Oil - Check
- Sea Water Strainer - Clean
- Coolant Level - Check
- Fuel-Water Separator - Drain
- Lubricating Oil Level - Check
- Air Cleaner Assembly (Engine-Mounted) - Check

Maintenance Procedures at 125 Hours or 3 Months

- Drive Belt, Seawater Pump - Inspect for Reuse
- Air Cleaner Restriction - Check
- Charge-Air Piping - Check
- Battery Cables and Connections - Check
- Engine Wiring Harness - Check
- Air Cleaner Assembly (Engine-Mounted) - Check
- Sea Water Hoses - Check

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- Zinc Anode - Inspect for Reuse

Maintenance Procedures at 250 Hours or 6 Months

- Fuel Filter (Spin-On Type) - Replace
- Lubricating Oil and Filters - Drain¹
- Engine Coolant Antifreeze - Check
- Sea Water Pump - Check
- Fuel-Water Separator - Change
- Heat Exchanger Pressure Cap - Inspect for Reuse

Maintenance Procedures at 500 Hours or 1 Year

- Sea Water Pump - Check
- Charging System Alternator Drive Belt - Check
- Batteries - Check
- Aftercooler Assembly (Sea Water) - Clean
- Marine Gear Oil Cooler - Flush
- Heat Exchanger - Flush
- Air Cleaner Assembly (Engine-Mounted) - Check²
- Engine Mounting Bolts - Inspect for Reuse
- Marine Vibration Isolator - Check

Maintenance Procedures at 2000 Hours or 2 Years

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- Cooling System - Flush³
- Vibration Damper, Viscous - Clean
- Heat Exchanger Pressure Cap - Inspect for Reuse

Maintenance Procedures at 2000 Hours

- Crankcase Ventilation Filter - Inspect for Reuse

Maintenance Procedures at 5000 Hours or 4 Years

- Overhead Set - Adjust

Notes:

- 1 The lubricating oil and filter change interval is 500 hours if Ultra Low Sulphur Diesel (ULSD) fuel is exclusively used.
- 2 For engines equipped with a disposable air cleaner, the air cleaner **must** be replaced at this interval. To determine if the air cleaner is disposable, check the part number on the air cleaner. Refer to Procedure 018-024 in Section V.
- 3 This cooling system requirement to Flush at this scheduled maintenance includes Drain, Flush, and Fill.

Maintenance Record Form

Maintenance Data

Maintenance Record	
Product Serial No.:	Product Model:
Owner's Name:	Equipment Model/Number:

Key to table headings:
A = Date
B = Schedule km [Miles], Hours or Time Interval
C = Actual km [Miles] Hour or Time
D = Maintenance Check Performed
E = Check Performed By
F = Comments

A	B	C	D	E	F

Section L - Service Literature

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Additional Service Literature

General Information

The following publications can be purchased by contacting your Cummins distributor:

Bulletin	Title of Publication
4310611	Marine QSB6.7 CM2250 Service Manual
4310615	Marine QSB6.7 CM2250 Fault Code Troubleshooting Manual
4310614	QSB6.7M CM2250 Wiring Diagram
4310612	Marine QSB6.7 CM2250 Operation and Maintenance Manual
4310613	Marine QSB6.7 CM2250 Owners Manual
3379000	Air for Your Engine
3379001	Fuels for Cummins® Engines
3379009	Operation of Diesel Engines in Cold Climates
3666132	Cummins® Coolant Requirements and Maintenance
3810340	Cummins® Engine Oil and Oil Analysis Recommendations
3884689	Marine Recreational B and C Installation Directions

Service Literature Ordering Location Contact Information

Region	Ordering Location
United States and Canada	Cummins Distributors or Credit Cards at https://store.cummins.com
All Other Countries	Cummins Distributors or Dealers

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Cummins Customized Parts Catalog

General Information

Cummins is pleased to announce the availability of a parts catalog compiled specifically for you. Unlike the generic versions of parts catalogs that support general high volume parts content; Cummins Customized catalogs contain only the new factory parts that were used to build your engine.

The catalog cover, as well as the content, is customized with you in mind. You can use it in your shop, at your worksite, or as a coffee table book in your RV or boat. The cover contains your name, company name, address, and telephone number.

This new catalog was designed to provide you with the exact information you need to order parts for your engine. This will be valuable for customers that do not have easy access to Cummins QuickServe Online.

Additional Features of the Customized Catalog include:

- Engine Configuration Data
- Table of Contents
- Separate Option and Parts Indexes
- Service Kits (when applicable)
- ReCon Part Numbers (when applicable)

Ordering the Customized Parts Catalog

Ordering by Telephone

- North American Distributors, Original Equipment Manufacturers and Cummins Factory personnel order by calling Iron Mountain Fulfillment Services (IMFS) at 1-800-646-5609.

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- International Distributors and Original Equipment Manufacturers order the CPC from their regional Cummins Parts Distribution Centers (PDC).
- International PDC orders are called into Iron Mountain at (++) 630-283-2420.
- Retail Credit Card Orders require a 2 step ordering process.

Ordering On-Line

Access the Cummins QSOL store at <https://store.cummins.com>

- Find the Customized Parts Catalog button located on the left of the homepage
- Select format. Your Price is also shown here
- Finalize Shopping Cart and Check Process as described on the website

North America call Iron Mountain Fulfillment Services (IMFS) at 800-646-5609, International customers call (++) 630-283-2420. Provide IMFS the catalog detail as described on the website. This step is required until we have our On Line form available.

Required information needed for your Customized Parts Catalog Order.

- Customer Name
- Street Address
- Company Name (optional)
- Telephone no.
- Credit Card No.
- Cummins Engine Serial Number (located on the engine data plate)

Unfortunately not all Cummins Engines can be supported by Customized Parts Catalogs. Engines older than 1984 or newer than 3 months may not have the necessary parts information to compile a catalog. We will contact you if this occurs and explain why we are unable to fill your order.

Customized Parts Catalogs are produced specifically for a single customer. This means they are not returnable for a refund. If we make an error and your catalog is not useable, we will correct that error by sending you a new catalog.

Section V - Specifications

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Component or Assembly (Procedure)	Ref.No./ Steps	Metric	U.S.
-----------------------------------	-------------------	--------	------

Operating Instructions - Torque Values

33 N•m

[24 ft-lb]

General Engine

Specifications

Listed below are the general specifications for this engine.

Horsepower.....	Reference the engine dataplate
Bore and Stroke.....	107 mm [4.21 in] X 124 mm [4.88 in]
Displacement.....	6.7 liters [409 C.I.D.]
Firing Order.....	1-5-3-6-2-4
Approximate Engine Dry Weight (with standard accessories).....	657 kg [1448 lb]
Crankshaft Rotation (viewed from the front of the engine).....	Clockwise
Valve Clearance:	
Intake.....	0.254 mm [0.010 in]
Exhaust.....	0.508 mm [0.020 in]
Maximum Overspeed Capability (15 seconds maximum).....	3700 rpm
Minimum Ambient Air Temperature for Unaided Cold Start.....	0°C [32°F]
Engine Idle Speed.....	Minimum 600 rpm
Minimum Engine Cranking Speed.....	150 rpm
Altitude Limit.....	198 m [650 ft]

Lubricating Oil System

Specifications

Oil Pressure

Low Idle (minimum allowed)	48 kPa [7 psi]
At Rated Speed (minimum allowed)	276 kPa [40 psi]
Oil Regulating Valve Opening Pressure Range	552 kPa [80 psi] to 689 kPa [100 psi]
Oil Filter Differential Pressure to Open Bypass (Lubricating oil cooler cover in which the lubricating oil filter is remote mounted on front of the engine.)	517 kPa [75 psi]
Oil Filter Differential Pressure to Open Bypass (Lubricating oil cooler cover in which the lubricating oil filter is mounted on the exhaust side of the engine.)	345 kPa [50 psi]

Lubricating Oil Capacity of Standard Engine (Standard Oil Pan, Aluminum or Steel)

Pan High Level Capacity.....	14.2 liters [15 qt]
Total System Capacity	16.7 liters [17.6 qt]
Pan Low Level Capacity	12.3 liters [13 qt]
Lubricating Oil Filter Capacity.....	0.950 liters [1 qt]
Maximum Oil Temperature.....	135°C [275°F]

NOTE: If the type/oil capacity of each pan is **not** known:

- Contact a Cummins® Authorized Repair Location.
- Determine the capacity of the oil pan option for the engine being serviced by using QuickServe™ Online and the engine serial number.
- Fill the lubricating oil pan to the smallest oil pan capacity listed for the engine being serviced. Then add 0.95 liters [1 qt] of oil at a time until it reaches the high mark on the dipstick. Record the number of liters/quarts added so the capacity is known the next time the oil is drained.

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Cooling System

Specifications

Coolant Capacity (engine only)	9.8 liters [2.6 gal]
Coolant Capacity (engine including heat exchanger, expansion tank, and wet manifold - applies to both options) ..	26.5 liters [7 gal]
Standard Modulating Thermostat - Range	88 to 97°C [160 to 180°F]
Minimum Recommended Heat Exchanger Pressure Cap	103 kPa [15 psi]
Maximum External Pressure Loss in Cooling System	35 kPa [5 psi]
Maximum Static Pressure of Coolant (exclusive of pressure cap)	103 kPa [15 psi]
Maximum Coolant Temperature	96°C [205°F]
Minimum Allowable Coolant Expansion Space	6-12 percent of system capacity
Minimum Coolant Makeup Capacity	1.5 liters [1.6 qt]
Maximum Sea Water Pressure	138 kPa [20 psi]
Maximum Sea Water Inlet Restriction	- 127 mm-Hg [- 5 in-Hg]
Clean Aftercooler Pressure Drop at 2600 rpm (applies to both options)	59 kPa [8.5 psi]
Clean Gear Cooler Pressure Drop at 2600 rpm (applies to both options)	34 kPa [5 psi]
Clean Heat Exchanger Pressure Drop at 2600 rpm (applies to both options)	34 kPa [5 psi]
Clean Exhaust Elbow Pressure Drop at Rated Speed:	
Inboard Application.....	34 kPa [5 psi]
Zeus™ Applications.....	55 kPa [8 psi]

Cummins®/Fleetguard® Filter Specifications

General Information

Cummins Filtration™, which produces Fleetguard® products, is a division of Cummins Inc. Fleetguard® filters are developed through joint testing at Cummins Inc. and are standard on new Cummins® engines. Cummins Inc. recommends their use.

Fleetguard® products meet all Cummins® Source Approval Test standards to provide the quality filtration necessary to achieve the engine's design life. If other brands are substituted, the purchaser **must** insist on products that the supplier has tested to meet Cummins Inc. high-quality standards.

Cummins Inc. can **not** be responsible for problems caused by non-genuine filters that do **not** meet Cummins Inc. performance or durability requirements.

Filter Part Numbers

Lubricating Oil Filter	
Cummins® Part Number	3937743
Fleetguard® Part Number	LF3959
Fuel Filter (Secondary)	
Cummins® Part Number	3959612
Fleetguard® Part Number	FF5488
Fuel Filter (Prefilter with WIF Sensor)¹	
Cummins® Part Number FS 9828 (Single filter head)	3971865
Cummins Part Number FS 9829 (Dual filter head)	3971869

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Fuel Filter (Prefilter with WIF Sensor)¹	
Racor 900 MA	900MA10
1. The fuel filter (Prefilter with WIF Sensor) could be original equipment manufacturer (OEM)-supplied.	
Crankcase Ventilation Filter (Rocker Lever Cover Mounted)	
Cummins® Part Number	4936636
Fleetguard® Part Number	CV5200100
Air Filter (Primary)	
127 x 381 x 203 mm [5 x 15 x 8 in]	
Cummins® Part Number	5261248
Fleetguard® Part Number	AF55005
102 x 381 x 203 mm (4 x 15 x 8 in)	
Cummins® Part Number	5292168
Fleetguard® Part Number	NA
102 x 280 x 216 mm (4 x 11 x 8.5 in) (non-cleanable air filter)	
Cummins® Part Number	3924540
Donaldson Part Number	B085046

Fuel Recommendations and Specifications

Fuel Recommendations



Do not mix gasoline, alcohol, or gasohol with diesel fuel. This mixture can cause an explosion.



Due to the precise tolerances of diesel injection systems, it is extremely important that the fuel be kept clean and free of dirt or water. Dirt or water in the system can cause severe damage to both the fuel pump and the fuel injectors.

Cummins Inc. recommends the use of ASTM number 2D fuel. The use of number 2 diesel fuel will result in optimum engine performance.

At operating temperatures below 0°C [32°F], acceptable performance can be obtained by using blends of number 2D and number 1D.

NOTE: Lighter fuels can reduce fuel economy.

NOTE: Engines equipped with diesel particulate filters require the use of diesel fuel with 30 ppm sulfur maximum. There are no acceptable substitutes.

The viscosity of the fuel **must** be kept above 1.3 cSt at 40°C [104°F] to provide adequate pumping and lubricating characteristics to fuel system components.

The following chart lists acceptable substitute fuels for this engine.

Acceptable Substitute Fuels									
Number 1D Diesel ⁽¹⁾ (2) (3)	Number 2D Diesel ⁽³⁾	Number 1K Kerosene	Jet-A	Jet-A1	JP-5	JP-8	Jet-B	JP-4	CITE
A	OK	Not OK	A	A	A	A	Not OK	Not OK	Not OK
An "A" means OK only if fuel lubricity is adequate. This means the BOCLE number is 3100 or greater as measured by ASTM specification D6078, Scuffing Load Ball On Cylinder Evaluator (SLBOCLE). Lubricity can also be measured by ASTM, specification D6079, ISO 12156, High Frequency Reciprocating Rig (HFRR) in which the fuel must have a wear scar diameter of 0.45 mm [0.02 in] or less.									
Any adjustment to compensate for reduced performance with a fuel system using alternate fuel is not warrantable.									
Winter blend fuels, such as found at commercial fuel-dispensing outlets, are combinations of number 1D and 2D diesel fuels and are acceptable.									

Additional information for fuel recommendations and specifications can be found in Fuel for Cummins Engines, Bulletin 3379001. See ordering information in the back of this manual.

Lubricating Oil Recommendations and Specifications

General Information



Extending the oil and filter change interval beyond the recommendations will decrease the engine life due to factors such as corrosion, deposits, and wear.



A sulfated ash limit of 1.85 percent has been placed on all engine lubricating oils recommended for use in Cummins engines. Higher ash oils can cause valve and/or piston damage and lead to excessive oil consumption.

The use of quality engine lubricating oils, combined with appropriate oil drain and filter change intervals, is a critical factor in maintaining engine performance and durability. Extending the oil and filter change interval beyond the recommendations will decrease engine life due to factors such as corrosion, deposits, and wear. Reference Procedure 102-002 in Section 2 to determine which oil drain interval to use for the application.

Cummins Inc. recommends the use of high-quality SAE 15W-40 heavy-duty engine oil, such as Valvoline® Premium Blue® (USA) or Valvoline Premium Blue Extra (International).

NOTE: The responsibility is with the owner. If recommendations are ignored, warranty could be affected.

API: American Petroleum Institute

CES: Cummins® Engineering Standard

ACEA - Association des Constructeurs Européens d'Automobiles

JAMA - Japanese Automobile Manufacturers Association

Table 1: Cummins® Engineering Standards (CES) for Lubricants			
Cummins Engineering Standard Classification (CES)	North American Classification	International Classifications	Comments
Obsolete. Do not use.	API CD API CE	ACEA E-1	Obsolete. Do not use.
	API CG-4/SH		
CES-20075 ¹	API CF-4/SJ	ACEA E-2	Minimum acceptable oil classification for MidRange engines, but is not recommended.
		ACEA E-3	
		JAMA DH-1	
CES-20071 ²	API CH-4 4/SJ	ACEA E5	Acceptable oil classification for MidRange engines.
CES-20076 ²			
CES-20077 ²			
CES-20078	API CI-4	ACEA E7	Excellent oil for MidRange engines.
CES-20081	API1 CJ-4	ACEA E9	Excellent oil for MidRange engines where ultra-low sulfur diesel fuel is used. ³
		JAMA DH-2	

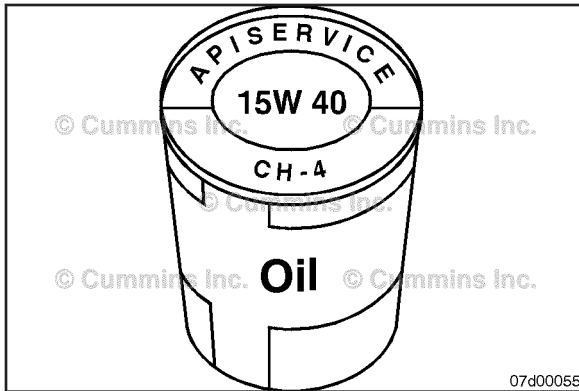
Table Notes

- 1 For MidRange engines, in areas where CH-4/SJ or CG-4/SH oils are **not** available, refer to the oil drain intervals in Section 2. As an alternative, oils meeting CES-20075 can be used, but the oil drain interval and filter change interval **must** be reduced by half.

- 2 Outside North America, where oil meeting CES-20071, CES-20076, or CES20077 might **not** be available, Cummins Inc. primary recommendation is for an oil meeting Global DHD-1, as jointly developed by EMA, ACEA, and JAMA.
- 3 Ultra-low sulfur diesel fuel is defined as diesel fuel **not** exceeding 0.0015 (15 ppm) mass percent sulfur content (ultra-low diesel fuel is also defined by ASTM S-15).

A sulfated ash limit of 1.0 mass percent is suggested for optimum valve and piston deposit and oil consumption control.

For further details and discussion of engine lubricating oils for Cummins engines, refer to Cummins Engine Oil Recommendations, Bulletin 3810340.



The API service symbols are shown in the accompanying illustration. The upper half of the symbols display the appropriate oil categories.

The lower half can contain words to describe oil energy-conserving features.

The center section identifies the SAE oil viscosity grade.

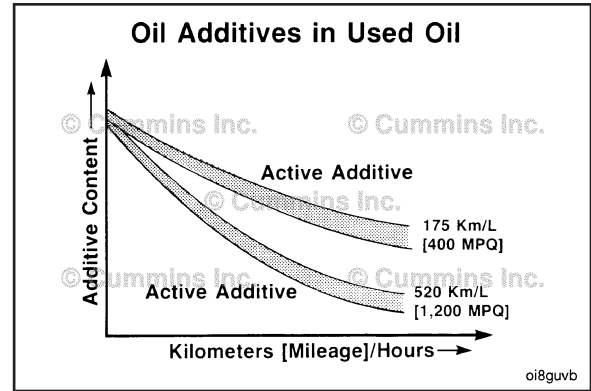
Marine QSB6.7 CM2250
Section V - Specifications

As the engine oil becomes contaminated, essential oil additives are depleted. Lubricating oils protect the engine as long as these additives are functioning properly. Progressive contamination of the oil between oil and filter change intervals is normal. The amount of contamination will vary, depending on the operation of the engine, kilometers or miles on the oil, fuel consumed, and new oil added.

Extending oil and filter change intervals beyond the recommendations will decrease engine life due to factors such as corrosion, deposits, and wear.

Reference the oil drain chart in this section to determine which oil drain interval to use for your application.

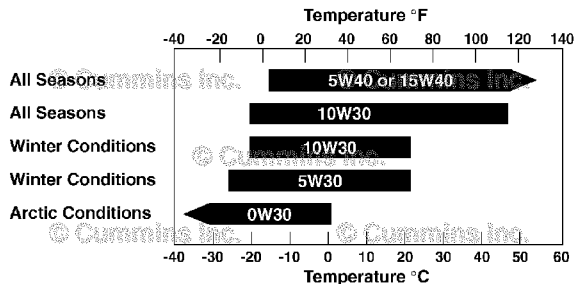
Lubricating Oil Recommendations and Specifications
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The primary Cummins Inc. recommendation is for the use of 15W-40 multigrade lubricating oil for normal operation at ambient temperatures above -15°C [5°F]. The use of multigrade oil reduces deposit formation, improves engine cranking in low temperature conditions, and increases engine durability by maintaining lubrication during high temperature operating conditions. Since multigrade oils have been shown to provide approximately 30 percent lower oil consumption compared with monograde oils, it is important to use multigrade oils to be certain the engine will meet applicable emissions requirements.

Use of "synthetic engine oils" (those made with API group 3 or group 4 base stocks) is permitted, subject to the same performance and viscosity limitations of petroleum (mineral) based engine oils. The same oil change intervals that are applied to petroleum (mineral) based engine oils **must** be applied to synthetic oils.

For further details and discussion of engine lubricating oils for Cummins® engines, refer to the latest revision of Cummins® Engine Oil Recommendations, Bulletin 3810340.



07d00260

While the preferred viscosity grade is 15W-40, lower viscosity multigrade oils can be used in colder climates. See the accompanying chart. Any viscosity grade lower than 15W-40 must still meet CES 20081.

Synthetic engine oils, API Group III and Group IV basestocks, are recommended for use in Cummins® engines operating in ambient temperature conditions consistently below -25°C [-13°F]. Synthetic 0W-30 oils that meet the requirements of API Group III or Group IV basestocks, can be used in operations where the ambient temperature never exceeds 0°C [32°F]. Multiviscosity oils rated 0W-30 do **not** offer the same level of protection against fuel dilution as do higher multigrade oils. Higher cylinder wear can be experienced when using 0W-30 oils in high-load situations.

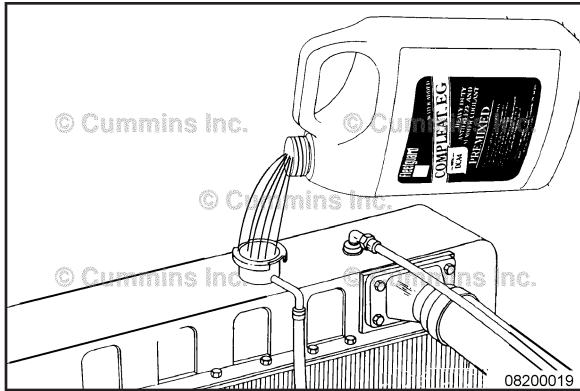
As these oils have directionally thinner oil films than 15W-40 oils, top-quality Fleetguard® filters **must** be used above 20°C [70°F]. Some oil suppliers might claim better fuel economy for these oils. Cummins Inc. can neither approve nor disapprove any product **not** manufactured by Cummins Inc. These claims are between the customer and the oil supplier. Obtain a commitment from the oil supplier that the oil will give satisfactory performance in Cummins® engines, or do **not** use the oil.

New Engine Break-in Oils

Special “break-in” engine lubricating oils are **not** recommended for new or rebuilt Cummins® engines. Use the same type of oil during the break-in as is used in normal operation.

AfterMarket Oil Additive Usage

Cummins Inc. does **not** recommend the use of aftertreatment oil additives. Present high-quality fully additive engine lubricating oils are very sophisticated, with precise amounts of additives blended into the lubricating oil to meet stringent requirements. These oils meet performance characteristics that conform to the lubricant industry standards. Aftermarket lubricating oil additives are **not** necessary to enhance engine oil performance, and in some cases, can reduce the finished oil's ability to protect the engine.



Coolant Recommendations and Specifications

Fully Formulated Coolant/Antifreeze

Cummins Inc. recommends the use of fully formulated antifreeze/coolant meeting Cummins® Engineering Standard (C.E.S.) 14603. For further details and discussion of coolant for Cummins® engines, refer to Coolant Requirements and Maintenance, Bulletin 3666132.

Cummins Inc. recommends using either a 50/50 mixture of good-quality water and fully formulated antifreeze, or fully formulated coolant when filling the cooling system.

Good-quality water is important for cooling system performance. Excessive levels of calcium and magnesium contribute to scaling problems, and excessive levels of chlorides and sulfates cause cooling system corrosion.

Water Quality	
Calcium Magnesium (hardness)	Maximum 170 ppm as (CaCO₃ + MgCO₃)
Chloride	40 ppm as (Cl)
Sulfur	100 ppm as (SO ₄)

Marine QSB6.7 CM2250 Section V - Specifications

Cummins Inc. recommends Cummins Filtration™ antifreeze coolants including Compleat ES™ containing DCA4 Plus, Fleetcool™ EX containing DCA2 Plus, and ES Optimax™ Organic Acid Technology (OAT), which meet the requirements of Cummins® Engineering Standard 14603. However, Cummins Inc., Chevron Corporation and Shell have agreed that Chevron Texaco™, Shell Rotella™ and their private label counterpart Extended Life OAT coolants, which do **not** meet the elastomer compatibility section of Cummins® Engineering Standard 14603, are acceptable for extended service interval use, assuming the initial coolant fill requirements were met from the vehicle's original equipment manufacturer (OEM).

MidRange, Heavy Duty and High Horsepower engine overhauls, or repairs involving the replacement of the following components, using this Extended Life OAT coolant, **must** discard the coolant and replace it with new coolant.

- Rocker lever housing gasket
- Lubricating oil cooler housing gasket
- Cylinder head gasket
- Thermostat housing gasket

If the replacement coolant is Chevron Texaco™, Shell Rotella™ or their private label counterpart Extended Life OAT coolants, which do **not** meet the elastomer compatibility section of Cummins® Engineering Standard 14603, the coolant **must** be treated by adding 0.24 liters [8 oz] of liquid silicate fluid for every 45.5 liters [12 gal] of total coolant system volume. It is critical to **not** overtreat the coolant with silicate fluid.

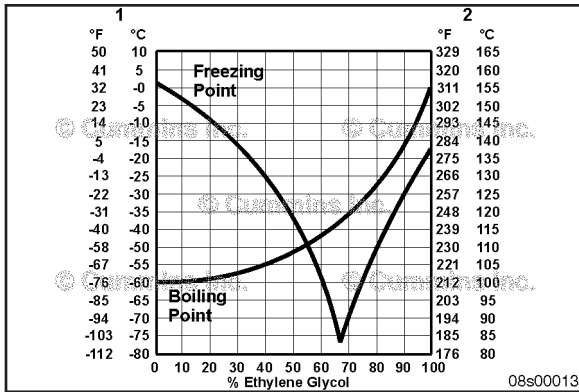
To obtain order forms or ask questions relative to ordering the silicate fluid, contact:

- Silicate Fluid Order Program
- P.O. Box 27388
- Houston, TX
- 77277-7388
- Phone: 800-346-9041
- Fax: 800-876-5317

For further details and discussion of engine coolant for Cummins® engines, refer to Cummins® Coolant Requirements and Maintenance, Bulletin 3666132.

Coolant Recommendations and Specifications Page V-17





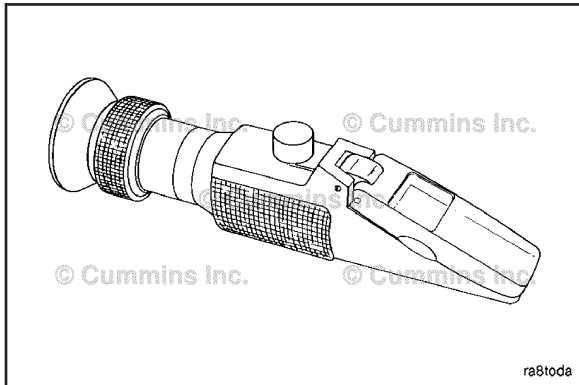
Fully formulated antifreeze **must** be mixed with good-quality water at a 50/50 ratio (40- to 60-percent working range). A 50/50 mixture of antifreeze and water gives a -36°C [-33°F] freezing point and a 108°C [226°F] boiling point, which is adequate for locations in North America. The actual lowest freezing point of ethylene glycol antifreeze is at 68 percent. Using higher concentrations of antifreeze will raise the freezing point of the solution and increase the possibility of a silica gel problem.

Legend

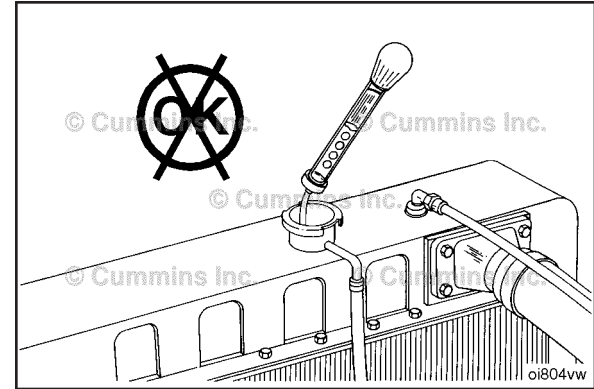
- 1 Freezing Point Temperature Scale
- 2 Boiling Point Temperature Scale



A refractometer **must** be used to measure the freezing point of the coolant accurately. Use Cummins Filtration™ refractometer, Part Number CC2800 or CC2806.



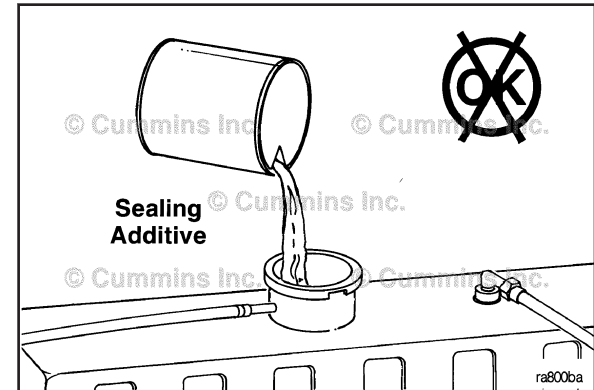
Do **not** use a floating ball hydrometer. Floating ball hydrometers can give incorrect readings.

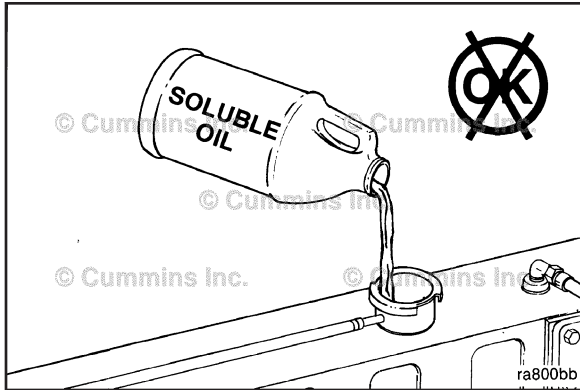


Cooling System Sealing Additives

Do **not** use sealing additives in the cooling system. The use of sealing additives will:

- Build up in coolant low-flow areas
- Plug the radiator and oil cooler
- Possibly damage the water pump seal.





Cooling System Soluble Oils

Do **not** use soluble oils in the cooling system. The use of soluble oils will:

- Corrode brass and copper
- Damage heat transfer surfaces
- Damage seals and hoses.

Section W - Warranty

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Cummins Recreational Marine Propulsion (QSB5.9/QSB6.7/QSC8.3/QSL9/ QSM11)

Coverage

Engines Included In This Coverage

Marine Propulsion: QSB5.9/QSB6.7/QSC8.3/QSL9/QSM11.

Products Warranted

This Warranty applies to new Engines sold by Cummins and delivered to the first user on or after April 28, 2012, used in Recreational Marine Propulsion applications anywhere in the world where Cummins approved service is available.

This Warranty covers any failures of the Engine, under normal use and service, which result from a defect in Cummins material or workmanship (Warrantable Failure). These Products have the following designation.

High Output Rating

The HO rating applies to variable load applications where annual use is less than 500 hours per year and full power is limited to one (1) hour out of every eight (8) hours of operation. Reduced power operation must be at or below cruise speed as defined in the following table.

Rated Speed (rpm)	Cruise Speed (Reduction from rated speed, rpm)
Less than 2,800	200 rpm
2,801 to 3,500 rpm	300 rpm
3,501 to 4,500 rpm	400 rpm

Use of an Engine with this HO rating in commercial applications will void the Warranty. Specifically, a vessel of less than 100 gross tons carrying more than six paying passengers will not be considered a recreational vessel.

Base Engine Warranty

This Warranty covers any failures of the Engine, under normal use and service, which result from a defect in Cummins material or factory workmanship (Warrantable Failure).

This limited Warranty covers the Engine from the date of shipping from the Cummins factory to the end of the Coverage duration. The end of the Coverage duration is calculated based on an in-service date. The Base Coverage duration ends two (2) years after the in-service date or 1,000 hours of total operation, whichever occurs first. The in-service date is defined as 1) the date of the initial delivery of the Engine to the first end user (through purchase, lease, or loan), or 2) the date when 200 hours of operation for Quantum Series Engines (QSB5.9/QSB6.7/QSC8.3/QL9/QSM11) have accumulated.

Engine aftertreatment components included in the Cummins Critical Parts List (CPL) and marked with a Cummins part number are covered under Base Engine Warranty.

Additional Coverage is outlined in the Emission Warranty section.

Extended Major Components Warranty

The Extended Major Components Warranty covers Warrantable Failures of the Engine cylinder block, camshaft, crankshaft and connecting rods (Covered Parts).

Bushing and bearing failures are NOT covered.

This limited Warranty covers the Engine from the date of shipping from the Cummins factory to the end of the Coverage duration. The end of the Coverage duration is calculated based on an in-service date. The Extended Major Components Coverage duration ends six (6) years after the in-service date or 3,000 hours of total operation, whichever occurs first. The in-service date is defined as either 1) the date of the initial delivery of the Engine to the first end-user (through purchase, lease or loan), or 2) the date when 200 hours of operation for Quantum Series Engines (QSB5.9/QSB6.7/QSC8.3/QL9/QSM11) have accumulated.

Consumer Products

The Warranty on Consumer Products in the United States* is a limited Warranty.

To buy Cummins Parts and Service Manuals, Training Guides, or Tools go to our website at <https://store.cummins.com>

CUMMINS IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

Any implied Warranties applicable to Consumer Products terminate concurrently with the expiration of the express Warranties applicable to the Product. In the United States*, some states do not allow the exclusion of incidental or consequential damages, or limitations on how long an implied Warranty lasts, so the limitations or exclusions herein may not apply to you.

These Warranties are made to all Owners in the chain of distribution and Coverage continues to all subsequent Owners until the end of the periods of Coverage.

Cummins Responsibilities

During The Base Engine Warranty

Cummins will pay for all parts and labor needed to repair the damage to the Product resulting from a Warrantable Failure when performed during normal business hours.

All labor costs will be paid in accordance with Cummins published Standard Repair Time guidelines when it is necessary for mechanics to make on-site Warranty repairs.

Cummins will pay reasonable travel expenses, including meals, mileage and lodging, for mechanics to travel to and from the repair dock. Labor must be performed by an authorized Cummins Repair Facility.

Cummins will pay for the lubricating oil, antifreeze, filter elements and other maintenance items that are not reusable due to the Warrantable Failure.

Cummins will pay for reasonable labor costs for Engine removal and reinstallation when necessary to repair a Warrantable Failure.

During The Extended Major Components Warranty

Cummins will pay for the repair or, at its option, replacement of the defective Covered Part and any Covered Part damaged by a Warrantable Failure of the defective Covered Part.

Owner Responsibilities

During Both The Base Engine And The Extended Major Components Warranties

Owner is responsible for the cost of lubricating oil, antifreeze, filter elements and other maintenance items replaced during Warranty repairs unless such items are not reusable due to the Warrantable Failure.

Owner is responsible for the operation and maintenance of the Product as specified by the applicable Cummins Operation and Maintenance Manual. Owner is also responsible for providing proof that all recommended maintenance has been performed. Exceeding the operational parameters of the HO rating will void this Warranty. The Owner of the boat is ultimately responsible for ensuring the Engine is properly operated and maintained. The Warranty will be void on any Engines that are misapplied, not maintained properly or misused.

Before the expiration of the applicable Warranty, Owner must notify a Cummins distributor, authorized dealer or other repair location approved by Cummins of any Warrantable Failure and make the Engine available for repair by such facility. Service locations are listed on the Cummins Worldwide Service Locator at cummins.com.

In the event of any Product failure, Owner is responsible for the cost of towing the boat to the repair dock and for all associated docking and harbor charges.

Owner is responsible for communication expenses, meals, lodging and similar costs incurred as a result of a Warrantable Failure.

Owner is responsible for maintaining the Engine hourmeter in good working order at all times and ensuring that the hourmeter accurately reflects the total hours of operation of the Product.

Owner is responsible for the costs to investigate complaints, unless the problem is caused by a defect in Cummins material or factory workmanship.

Owner is responsible for non-Engine repairs, “downtime” expenses, cargo damage, fines, all applicable taxes, all business costs and other losses resulting from a Warrantable Failure.

During The Extended Major Components Warranty

Owner is responsible for the cost of all other parts and labor used for the repair except for the defective Covered Part and any Covered Part damaged by a Warrantable Failure of the defective Covered Part.

Limitations

Engines with an emissions certification listed below must be operated using only diesel fuel having no more than the corresponding maximum sulfur content. Failure to use the specified fuel as listed in the Cummins Fuel Bulletin #3379001 Table 1 (Cummins Inc. Required Diesel Fuel Specifications) can damage the Engine and aftertreatment system within a short period of time. This damage could cause the Engine to become inoperable and failures attributable to the use of incorrect fuels will be denied Warranty Coverage. Fuel specifications also need to comply with local fuel regulations (EN590 for Europe and ASTM D975 for North America) for Warranty eligibility.

Maximum sulfur levels by emissions certification level as listed on the Engine's dataplate are:

EPA 2007/2010/2013	max. 15 parts per million
EPA Tier 4 Interim / Final	max. 15 parts per million
EU Stage IIIB 2011	max. 15 parts per million
Euro 4/5	max. 50 parts per million
Euro 6	max. 10 parts per million

Cummins is not responsible for failures or damage resulting from what Cummins determines to be abuse or neglect, including, but not limited to: operation without adequate coolants or lubricants; overfueling; overspeeding; lack of maintenance of cooling, lubricating or intake systems; improper storage, starting, warmup, run-in or shutdown practices; unauthorized modifications to the Engine; improper propping that does not allow the Engine to run at its maximum rated speed; submersion, freezing temperatures, improper service, removal of parts or running the Engine out of water; water ingestion, unless caused by a Warrantable Failure. Cummins is also not responsible for failures caused by incorrect oil or fuel, or by water, dirt or other contaminants in the fuel or oil. Cummins is not responsible for failure resulting from:

- 1 Use or application of the Engine inconsistent with its rating designation and Engine duty cycle set forth above.

- 2 Incorrect installation.
- 3 Engines that do not reach rated rpm because of vessel overloading.

Before a claim for excessive oil consumption will be considered, Owner must submit adequate documentation to show that oil consumption exceeds Cummins published standards. Cummins is not responsible for failures of maintenance components supplied by Cummins beyond 90 days after the Coverage duration start date. Maintenance components include, but are not limited to: sea water pump impellers; zinc plugs; oil filters; fuel filters; air filters; water filters; and fuel/water separator filters.

Cummins does not warrant accessories that are not supplied by a Cummins factory.

Parts used in Warranty repairs may be new Cummins parts, Cummins approved rebuilt parts or repaired parts. Cummins is not responsible for failures resulting from the use of parts not supplied by Cummins.

A new Cummins or Cummins approved rebuilt part used to replace a Warranted Part assumes the identity of the Warranted Part it replaced and is entitled to the remaining Coverage hereunder.

CUMMINS DOES NOT COVER WEAR OR WEAROUT OF COVERED PARTS.

CUMMINS IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

THESE WARRANTIES SET FORTH HEREIN ARE THE SOLE WARRANTIES MADE BY CUMMINS IN REGARD TO THESE ENGINES. CUMMINS MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, OR OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

In the United States* and Canada, this Warranty gives you specific legal rights, and you may also have other rights, which vary from state to state.

Outside the United States* and Canada, in the case of consumer sales, in some countries the Owner has statutory rights, which cannot be affected or limited by the terms of this Warranty. Nothing in this Warranty excludes or restricts any contractual rights the Owner may have against third parties.

Emission Warranty

Products Warranted

This Emission Warranty applies to new Engines certified to United States EPA 40 CFR 94 & 1042 sold by Cummins that are installed in vessels flagged or registered in the United States*.

Coverage

Cummins warrants to the first user and each subsequent purchaser that the Engine is designed, built and equipped so as to conform at the time of sale by Cummins with all U.S. Federal emission regulations applicable at the time of manufacture and that it is free from defects in workmanship or material that would cause it not to meet these regulations within the longer of the following periods:

- 1 The Emission Warranty commences on the date of delivery of the Product to the first user, or the date the unit is first leased, rented or loaned, and ends when the Product has accumulated five years or 1,000 hours of operation, whichever occurs first, or
- 2 The Base Engine Warranty.

Limitations

Engines with an emissions certification listed below must be operated using only diesel fuel having no more than the corresponding maximum sulfur content. Failure to use the specified fuel as listed in the Cummins Fuel Bulletin #3379001 Table 1 (Cummins Inc. Required Diesel Fuel Specifications) can damage the Engine and aftertreatment system within a short period of time. This damage could cause the Engine to become inoperable and failures attributable to the use of incorrect fuels will be denied Warranty Coverage. Fuel specifications also need to comply with local fuel regulations (EN590 for Europe and ASTM D975 for North America) for Warranty eligibility.

Maximum sulfur levels by emissions certification level as listed on the Engine's dataplate are:

EPA 2007/2010/2013 max. 15 parts per million

EPA Tier 4 Interim / Final max. 15 parts per million

Maximum sulfur levels by emissions certification level as listed on the Engine's dataplate are:

EU Stage IIIB 2011	max. 15 parts per million
Euro 4/5	max. 50 parts per million
Euro 6	max. 10 parts per million

Failures, except those resulting from a defect in materials or factory workmanship, are not covered by the Warranty.

The Owner may elect to have maintenance, replacement or repair of the emission control parts performed by a facility other than a Cummins distributor, an authorized dealer or a repair location approved by Cummins, and may elect to use parts other than new genuine Cummins or Cummins approved rebuilt parts and assemblies for such maintenance, replacement or repair; however, the cost of such service or parts and subsequent failures resulting from such service or parts will not be covered under this Emission Control Warranty.

Cummins is not responsible for failures or damage resulting from what Cummins determines to be abuse or neglect, including, but not limited to: operation without adequate coolant or lubricants; overfueling; overspeeding; lack of maintenance of lubricating, cooling or intake systems; improper storage, starting, warmup, run-in or shutdown practices; unauthorized modifications of the Engine. Cummins is also not responsible for failures caused by incorrect oil, fuel or diesel exhaust fluid or by water, dirt or other contaminants in the fuel, oil or diesel exhaust fluid.

Cummins is not responsible for non-Engine repairs, "downtime" expenses, cargo damage, fines, all business costs or other losses resulting from a Warrantable Failure

Cummins is not responsible for incidental or consequential damages.

In the United States* and Canada, this Warranty gives you specific legal rights, and you may also have other rights, which vary from state to state. Outside the United States* and Canada, in the case of consumer sales, in some countries the Owner has statutory rights, which cannot be affected or limited by the terms of this Warranty. Nothing in this Warranty excludes or restricts any contractual rights the Owner may have against third parties.

* United States includes American Samoa, the Commonwealth of Northern Mariana Islands, Guam, Puerto Rico and the U.S. Virgin Islands.

Cummins Light Commercial Marine Propulsion (4B/QSB5.9/6B/QSB6.7/6C/ QSC8.3/QSL9/QSM11)

Coverage

Engines Included in this Coverage

Marine Propulsion

4B/QSB5.9/6B/QSB6.7/6C/QSC8.3/QSL9/QSM11

Products Warranted

This Warranty applies to new Engines sold by Cummins and delivered to the first user on or after April 28, 2012, used in Light Commercial and Government Marine Propulsion applications anywhere in the world as permitted by US ITAR and Export Compliance regulations where Cummins approved service is available.

This Warranty covers any failures of the Engine, under normal use and service, which result from a defect in Cummins material or workmanship (Warrantable Failure).

COMMERCIAL USE

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

GOVERNMENT USE

Government use is defined as use by Federal, State and Local agencies in non-revenue producing applications.

MARINE PROPULSION RATINGS

Government Service (GS) Rating

Intended for use in variable load applications where full power is limited to one hour out of every eight hours of operation.

Reduced power operation must be at or below cruise speed (rpm). Cruise speed (rpm) is dependent on the engine rated speed (rpm):

Rated Speed (rpm)	Reduction from rated speed (rpm)
2,000 to 2,800 rpm	200 rpm below rated
2,801 to 3,500	300 rpm below rated
3,501 to 4,500 rpm	400 rpm below rated

Government Service (GS)

The Government Service Rating applies to Government use in variable load applications where annual use is less than 500 hours and full power is one (1) out of every eight (8) hours of operation. Reduced power operation must be at or below cruise speed.

Light Commercial (LC)

The Light Commercial Rating applies to Commercial use in variable load applications where annual use is less than 500 hours and full power is one (1) out of every eight (8) hours of operation. Reduced power operation must be at or below cruise speed.

Intermittent Duty (ID)

This power rating is intended for intermittent use in variable load applications where full power is limited to two hours out of every eight hours of operation. Also, reduced power operations must be at or below 200 rpm of the maximum rated rpm. This rating is an ISO3046 Fuel Stop Power Rating and is for applications that operate less than 1,500 hours per year.

Medium Duty (MD)

This power rating is intended for continuous use in variable load applications where full power is limited to six hours out of every twelve hours of operation. Also, reduced power operations must be at or below 200 rpm of the maximum

rated rpm. This rating is an ISO3046 Fuel Stop Power Rating and is for applications that operate less than 3,000 hours per year.

Heavy Duty (HD)

This power rating is intended for continuous use in variable load applications where full power is limited to eight hours out of every ten hours of operation. Also, reduced power must be at least 200 rpm below the maximum rated rpm. This rating is an ISO3046 Fuel Stop Power Rating and is for applications that operate less than 5,000 hours per year.

Continuous Duty (CD)

This power rating is intended for continuous use in applications requiring uninterrupted service at full power. This rating is an ISO3046 Standard Power Rating.

Base Engine Warranty

This Warranty covers any failures of the Engine, under normal use and service, which result from a defect in Cummins material or factory workmanship (Warrantable Failure). Coverage begins with the sale of the Engine by Cummins and continues for the Duration stated in the following table. The Duration commences on either the date of delivery of the Engine to the first end-user, or the date the unit is first leased, rented or loaned, or when the Product has been operated for 50 hours, whichever occurs first. The Base Coverage duration ends two (2) years after the in-service date or allowed hours of total operation, whichever occurs first.

Components included in the Cummins Critical Parts List (CPL) and marked with a Cummins part number are covered under Base Engine Warranty.

Additional Coverage is outlined in the Emission Warranty section.

Warranty Coverage Periods						
Rating	4B, 6B, 6C		QSB, QSC, QSL		QSM11	
	Coverage ends at whichever occurs first, months or hours of usage.					
	Months	Hours	Months	Hours	Months	Hours
GS	NA	NA	24	1,000	24	1,000
LC	NA	NA	24	1,000	NA	NA
ID	12	1,500	24	3,000	24	3,000
MD	12	3,000	24	5,000	24	6,000
HD	12	5,000	24	5,500	24	8,000
CD	12	ULTD	24	6,500	24	9,000
Government Service (GS)						
Light Commercial (LC)						
Intermittent Duty (ID)						
Medium Duty (MD)						
Heavy Duty (HD)						
Continuous Duty (CD)						

Cummins Responsibilities

During Base Engine Warranty

Cummins will pay for all parts and labor needed to repair the damage to the Product resulting from a Warrantable Failure when performed during normal business hours. All labor costs will be paid in accordance with Cummins published Standard Repair Time guidelines.

When it is necessary for mechanics to make on-site warranty repairs, Cummins will pay reasonable travel expenses, including meals, mileage and lodging, for mechanics to travel to and from the repair dock. Labor must be performed by an authorized Cummins Repair Facility.

Cummins will pay for the lubricating oil, antifreeze, filter elements and other maintenance items that are not reusable due to the Warrantable Failure.

Cummins will pay for reasonable labor costs for Engine removal and reinstallation when necessary to repair a Warrantable Failure.

During The Extended Major Components Warranty

Cummins will pay for the repair or, at its option, replacement of the defective Covered Part and any Covered Part damaged by a Warrantable Failure of the defective Covered Part.

Owner Responsibilities

During The Base Engine And Extended Major Components Warranty

Owner is responsible for the operation and maintenance of the Product as specified in the applicable Cummins Operation and Maintenance Manual. Owner is also responsible for providing proof that all recommended maintenance has been performed. This Warranty does not cover normal wear and tear of covered parts. Exceeding the operational parameters of the rating will void this Warranty. The Owner of the boat is ultimately responsible for ensuring the Engine is properly operated and maintained. The Warranty will be void on any Engines that are misapplied, not maintained properly or misused.

Before the expiration of the applicable Warranty, Owner must notify a Cummins distributor, authorized dealer or other repair location approved by Cummins of any Warrantable Failure and make the Engine available for repair by such facility. Service locations are listed on the Cummins Worldwide Service Locator at [cummins.com](https://store.cummins.com).

Owner is responsible for the cost of lubricating oil, antifreeze, filter elements and other maintenance items replaced during Warranty repairs unless such items are not reusable due to the Warrantable Failure.

Owner is responsible for communication expenses, meals, lodging and similar costs incurred as a result of a Warrantable Failure.

Owner is responsible for non-Engine repairs, “downtime” expenses, cargo damage, fines, all applicable taxes, all business costs and other losses resulting from a Warrantable Failure.

In the event of any Product failure, Owner is responsible for the cost of towing the boat to the repair dock and for all associated docking and harbor charges.

Owner is responsible for maintaining the Engine hourmeter in good working order at all times and to ensure that the hourmeter accurately reflects the total hours of operation of the Product.

Owner is responsible for the costs to investigate complaints, unless the problem is caused by a defect in Cummins material or factory workmanship.

Limitations

Engines with an emissions certification listed below must be operated using only diesel fuel having no more than the corresponding maximum sulfur content. Failure to use the specified fuel as listed in the Cummins Fuel Bulletin #3379001 Table 1 (Cummins Inc. Required Diesel Fuel Specifications) can damage the Engine and aftertreatment system within a short period of time. This damage could cause the Engine to become inoperable and failures attributable to the use of incorrect fuels will be denied Warranty Coverage. Fuel specifications also need to comply with local fuel regulations (EN590 for Europe and ASTM D975 for North America) for Warranty eligibility.

Maximum sulfur levels by emissions certification level as listed on the Engine's dataplate are:

EPA 2007/2010/2013	max. 15 parts per million
EPA Tier 4 Interim / Final	max. 15 parts per million
EU Stage IIIB 2011	max. 15 parts per million

To buy Cummins Parts and Service Manuals, Training Guides, or Tools go to our website at <https://store.cummins.com>

Maximum sulfur levels by emissions certification level as listed on the Engine's dataplate are:

Euro 4/5	max. 50 parts per million
Euro 6	max. 10 parts per million

Cummins supplied alternators and starters limitation (Excludes 4B/6B/C)

- Warranty Coverage is limited to 2 years or 2,000 hours, whichever expires first for rating other than Government Service.
- Warranty Coverage is limited to 2 years or 1,000 hours, whichever expires first for the Government Service rating.

Cummins is not responsible for failures or damage resulting from what Cummins determines to be abuse or neglect, including, but not limited to: operation without adequate coolants or lubricants; overfueling; overspeeding; lack of maintenance of cooling, lubricating or intake systems; improper storage, starting, warmup, run-in or shutdown practices; unauthorized modifications to the Engine. Cummins is also not responsible for failures caused by incorrect oil or fuel, or by water, dirt or other contaminants in the fuel or oil.

Cummins is not responsible for failure resulting from:

- 1 Use or application of the Engine inconsistent with its rating designation set forth above.
- 2 Incorrect installation.

Before a claim for excessive oil consumption will be considered, Owner must submit adequate documentation to show that oil consumption exceeds Cummins published standards.

Cummins is not responsible for failures of maintenance components supplied by Cummins beyond 90 days after the Coverage duration start date. Maintenance components include, but are not limited to: sea water pump impellers; zinc plugs; oil filters; fuel filters; air filters; water filters; fuel/water separator filters; expansion tank pressure caps.

Failure of belts and hoses supplied by Cummins are not covered beyond 90 days after the date of delivery of the Product to the first user, or the date the unit is first leased, rented or loaned, or when the Product has been operated for 50 hours, whichever occurs first.

Cummins does not warrant accessories that are not supplied by a Cummins factory.

Parts used in Warranty repairs may be new Cummins parts, Cummins approved rebuilt parts or repaired parts. Cummins is not responsible for failures resulting from the use of parts not supplied by Cummins.

A new Cummins or Cummins approved rebuilt part used to replace a Warranted Part assumes the identity of the Warranted Part it replaced and is entitled to the remaining Coverage hereunder.

CUMMINS DOES NOT COVER WEAR OR WEAROUT OF COVERED PARTS.

CUMMINS IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

THESE WARRANTIES SET FORTH HEREIN ARE THE SOLE WARRANTIES MADE BY CUMMINS IN REGARD TO THESE ENGINES. CUMMINS MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, OR OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Emission Warranty

Products Warranted

This Emission Warranty applies to new Engines certified to United States EPA 40 CFR 94 & 1042 sold by Cummins that are installed in vessels flagged or registered in the United States*.

Coverage

Cummins warrants to the first user and each subsequent purchaser that the Engine is designed, built, and equipped so as to conform at the time of sale by Cummins with all U.S. Federal emission regulations applicable at the time of manufacture and that it is free from defects in workmanship or material that would cause it not to meet these regulations within the longer of the following periods: (A) Five years or 5,000 hours of operation, whichever occurs first. The Emissions Warranty starts from the date of delivery of the Engine to the first user, or the date the unit is first

leased, rented, or loaned, or when the Engine has been operated for 50 hours, whichever occurs first, or (B) The Base Engine Warranty.

Limitations

Engines with an emissions certification listed below must be operated using only diesel fuel having no more than the corresponding maximum sulfur content. Failure to use the specified fuel as listed in the Cummins Fuel Bulletin #3379001 Table 1 (Cummins Inc. Required Diesel Fuel Specifications) can damage the Engine and aftertreatment system within a short period of time. This damage could cause the Engine to become inoperable and failures attributable to the use of incorrect fuels will be denied Warranty Coverage. Fuel specifications also need to comply with local fuel regulations (EN590 for Europe and ASTM D975 for North America) for Warranty eligibility.

Maximum sulfur levels by emissions certification level as listed on the Engine's dataplate are:

EPA 2007/2010/2013	max. 15 parts per million
EPA Tier 4 Interim / Final	max. 15 parts per million
EU Stage IIIB 2011	max. 15 parts per million
Euro 4/5	max. 50 parts per million
Euro 6	max. 10 parts per million

Failures, except those resulting from a defect in materials or factory workmanship, are not covered by the Warranty.

The Owner may elect to have maintenance, replacement or repair of the emission control parts performed by a facility other than a Cummins distributor, an authorized dealer or a repair location approved by Cummins, and may elect to use parts other than new genuine Cummins or Cummins approved rebuilt parts and assemblies for such maintenance, replacement or repair; however, the cost of such service or parts and subsequent failures resulting from such service or parts will not be covered under this Emission Control Warranty.

Cummins is not responsible for failures or damage resulting from what Cummins determines to be abuse or neglect, including, but not limited to: operation without adequate coolant or lubricants; overfueling; overspeeding; lack of maintenance of lubricating, cooling or intake systems; improper storage, starting, warmup, run-in or shutdown practices; unauthorized modifications of the Engine. Cummins is also not responsible for failures caused by incorrect oil, fuel or diesel exhaust fluid or by water, dirt or other contaminants in the fuel, oil or diesel exhaust fluid.

Cummins is not responsible for non-Engine repairs, "downtime" expenses, cargo damage, fines, all business costs or other losses resulting from a Warrantable Failure

Cummins is not responsible for incidental or consequential damages.

In the United States* and Canada, this Warranty gives you specific legal rights, and you may also have other rights, which vary from state to state. Outside the United States* and Canada, in the case of consumer sales, in some countries the Owner has statutory rights, which cannot be affected or limited by the terms of this Warranty. Nothing in this Warranty excludes or restricts any contractual rights the Owner may have against third parties.

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CALIFORNIA
Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

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