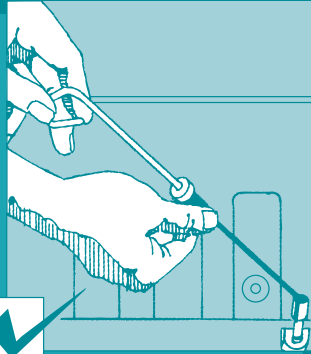
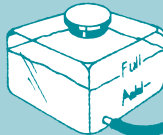




Owners Manual Commercial Marine and Industrial C8.3 Series Engine



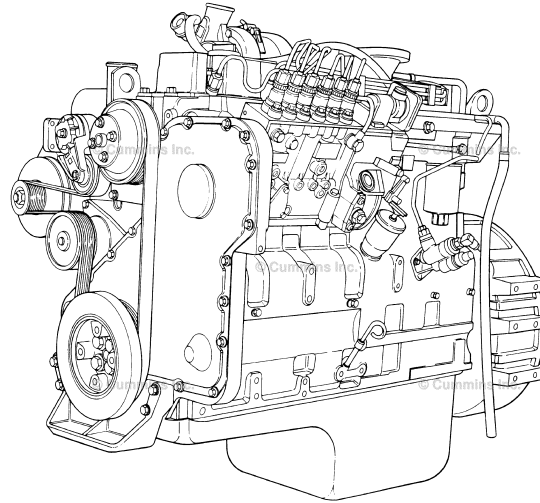
Cummins Customer Assistance Center

1-800-DIESELS™ (1-800-343-7357)

APPLICABLE ONLY IN U.S.A. AND CANADA



Owners Manual Commercial Marine and Industrial C8.3 Series Engine



ew800g

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Foreword

This manual contains information for the correct operation and maintenance of your Cummins engine.

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

Keep this manual with the equipment. If the equipment is traded or sold, give the manual to the new owner.

The information, specifications, and recommended maintenance guidelines in this manual are based on information in effect at the time of printing. Cummins Inc. reserves the right to make changes at any time without obligation. If you find differences between your engine and the information in this manual, contact your local Cummins Authorized Repair Location or call 1-800-DIESELS (1-800-343-7357) toll free in the U.S. and Canada.

The latest technology and the highest quality components were used to produce this engine. When replacement parts are needed, we recommend using only genuine Cummins or ReCon® exchange parts.

NOTE: Warranty information is located in Section W. Make sure you are familiar with the warranty or warranties applicable to your engine.

Table of Contents

	Section
Introduction	i
Engine Identification	E
Operating Instructions	1
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Warranty	W

Important Reference Numbers

Fill in the part name and number in the blank spaces provided below. This will give you a reference whenever service or maintenance is required.

Name	Number	Number
Engine Model		
Engine Serial Number (ESN)		
Control Parts List (CPL)		
Fuel Pump Part Number		
Electronic Control Module (ECM)		
Electronic Control Module Serial Numbers (ECM)		
Filter Part Numbers:		
• Air Cleaner Element		
• Lubricating Oil		
• Fuel		
• Fuel-Water Separator		
• Coolant		
• Crankcase Ventilation		
• Cummins Particulate Filter		
Governor Control Module (GCM) (if applicable)		
Belt Part Numbers:		

•		
•		
•		
Clutch or Marine Gear (if applicable):		
• Model		
• Serial Number		
• Part Number		
• Oil Type		
• Sea Water Pump		
- Model		
- Part Number		

Section i - Introduction

Section Contents

Table with 2 columns: Section Name and Page. Rows include Acronyms and Abbreviations (i-7), General Information (i-7), General Safety Instructions (i-3), Important Safety Notice (i-3), Illustrations (i-2), General Information (i-2), Symbols (i-1), and General Information (i-1).

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Symbols

General Information

The following 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:



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, an assembly, or the engine can be damaged if the caution instructions are not followed.



Indicates a REMOVAL or DISASSEMBLY 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.



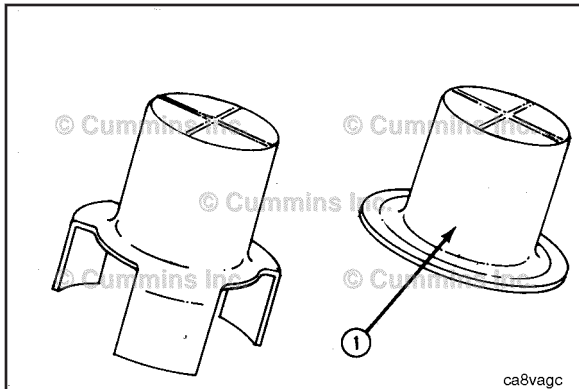
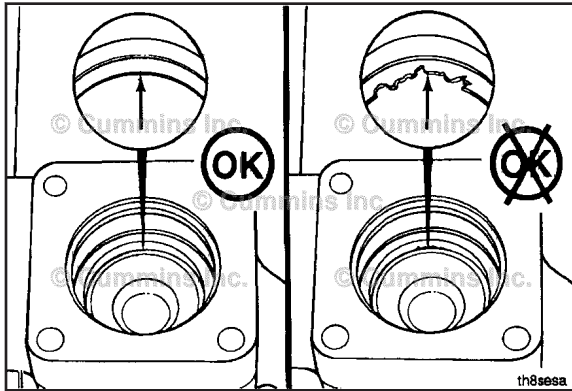
PERFORM an electrical MEASUREMENT.



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



The component weighs 23 kg [50 lb] or more. To avoid 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



Improper practices, carelessness, or ignoring the warnings can cause burns, cuts, mutilation, asphyxiation or other personal injury or death.

Read and understand all of the safety precautions and warnings before performing any repair. This list contains the general safety precautions that must be followed to provide personal safety. Special safety precautions are included in the procedures when they apply.

- Work in an area surrounding the product that is dry, well lit, ventilated, free from clutter, loose tools, parts, ignition sources and hazardous substances. Be aware of hazardous conditions that can exist.
• Always wear protective glasses and protective shoes when working.
• Rotating parts can cause cuts, mutilation or strangulation.
• Do not wear loose-fitting or torn clothing. Remove all jewelry when working.
• Disconnect the battery (negative [-] cable first) and discharge any capacitors before beginning any repair work. Disconnect the air starting motor if equipped to prevent accidental engine starting. Put a "Do Not Operate" tag in the operator's compartment or on the controls.
• Use ONLY the proper engine barring techniques for manually rotating the engine. Do not attempt to rotate the crankshaft by pulling or prying on the fan. This practice can cause serious personal injury, property damage, or damage to the fan blade(s) causing premature fan failure.
• If an engine has been operating and the coolant is hot, allow the engine to cool before slowly loosening the filler cap to relieve the pressure from the cooling system.

- **Always** use blocks or proper stands to support the product before performing any service work. Do **not** work on anything that is supported **ONLY** by lifting jacks or a hoist.
- Relieve all pressure in the air, oil, fuel, and cooling systems before any lines, fittings, or related items are removed or disconnected. Be alert for possible pressure when disconnecting any device from a system that utilizes pressure. Do **not** check for pressure leaks with your hand. High pressure oil or fuel can cause personal injury.
- To reduce the possibility of suffocation and frostbite, wear protective clothing and **ONLY** disconnect liquid refrigerant (Freon) lines in a well ventilated area. To protect the environment, liquid refrigerant systems **must** be properly emptied and filled using equipment that prevents the release of refrigerant gas (fluorocarbons) into the atmosphere. Federal law requires capturing and recycling refrigerant.
- To reduce the possibility of personal injury, use a hoist or get assistance when lifting components that weigh 23 kg [50 lb] or more. Make sure all lifting devices such as chains, hooks, or slings are in good condition and are of the correct capacity. Make sure hooks are positioned correctly. **Always** use a spreader bar when necessary. The lifting hooks **must not** be side-loaded.
- Corrosion inhibitor, a component of SCA and lubricating oil, contains alkali. Do **not** get the substance in eyes. Avoid prolonged or repeated contact with skin. Do **not** swallow internally. In case of contact, immediately wash skin with soap and water. In case of contact, immediately flood eyes with large amounts of water for a minimum of 15 minutes. IMMEDIATELY CALL A PHYSICIAN. KEEP OUT OF REACH OF CHILDREN.
- Naptha and Methyl Ethyl Ketone (MEK) are flammable materials and **must** be used with caution. Follow the manufacturer's instructions to provide complete safety when using these materials. KEEP OUT OF REACH OF CHILDREN.
- To reduce the possibility of burns, be alert for hot parts on products that have just been turned off, exhaust gas flow, and hot fluids in lines, tubes, and compartments.
- **Always** use tools that are in good condition. Make sure you understand how to use the tools before performing any service work. Use **ONLY** genuine Cummins® or Cummins ReCon® replacement parts.

- Always use the same fastener part number (or equivalent) when replacing fasteners. Do not use a fastener of lesser quality if replacements are necessary.
When necessary, the removal and replacement of any guards covering rotating components, drives, and/or belts should only be carried out by a trained technician. Before removing any guards the engine must be turned off and any starting mechanisms must be isolated. All fasteners must be replaced on re-fitting the guards.
Do not perform any repair when fatigued or after consuming alcohol or drugs that can impair your functioning.
Some state and federal agencies in the United States of America have determined that used engine oil can be carcinogenic and can cause reproductive toxicity. Avoid inhalation of vapors, ingestion, and prolonged contact with used engine oil.
Do not connect the jumper starting or battery charging cables to any ignition or governor control wiring. This can cause electrical damage to the ignition or governor.
Always torque fasteners and fuel connections to the required specifications. Overtightening or undertightening can allow leakage. This is critical to the natural gas and liquefied petroleum gas fuel and air systems.
Always test for fuel leaks as instructed, as odorant can fade.
Close the manual fuel valves prior to performing maintenance and repairs, and when storing the vehicle inside.
Coolant is toxic. If not reused, dispose of in accordance with local environmental regulations.
The catalyst reagent contains urea. Do not get the substance in your eyes. In case of contact, immediately flood eyes with large amounts of water for a minimum of 15 minutes. Avoid prolonged contact with skin. In case of contact, immediately wash skin with soap and water. Do not swallow internally. In the event the catalyst reagent is ingested, contact a physician immediately.
The catalyst substrate contains Vanadium Pentoxide. Vanadium Pentoxide has been determined by the State of California to cause cancer. Always wear protective gloves and eye protection when handling the catalyst assembly. Do not get the catalyst material in your eyes. In Case of contact, immediately flood eyes with large amounts of

water for a minimum of 15 minutes. Avoid prolonged contact with skin. In case of contact, immediately wash skin with soap and water.

- The Catalyst substrate contains Vanadium Pentoxide. Vanadium Pentoxide has been determined by the State of California to cause cancer. In the event the catalyst is being replaced, dispose of in accordance with local regulations.
- 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.

Acronyms and Abbreviations

General Information

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

Table with 2 columns: Acronym and Full Name. Rows include ANSI (American National Standards Institute), API (American Petroleum Institute), ASTM (American Society of Testing and Materials), BTU (British Thermal Unit), BTDC (Before Top Dead Center), °C (Celsius), CO (Carbon Monoxide), CCA (Cold Cranking Amperes), CARB (California Air Resources Board), 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), and DPF (Diesel Particulate Filter).

ECM	Engine Control Module
EFC	Electronic Fuel Control
EGR	Exhaust Gas Recirculation
EPA	Environmental Protection Agency
°F	Fahrenheit
ft-lb	Foot-Pound Force
FMI	Failure Mode Identifier
GVW	Gross Vehicle Weight
Hg	Mercury
hp	Horsepower
H ₂ O	Water
inHg	Inches of Mercury
in H ₂ O	Inches of Water
ICM	Ignition Control Module
IEC	International Electrotechnical Commission
km/l	Kilometers per Liter
kPa	Kilopascal
LNG	Liquid Natural Gas
LPG	Liquefied Petroleum Gas
LTA	Low Temperature Aftercooling
MIL	Malfunction Indicator Lamp

MPa	Megapascal
mph	Miles Per Hour
mpq	Miles Per Quart
N•m	Newton-meter
NOx	Mono-Nitrogen Oxides
NG	Natural Gas
O2	Oxygen
OBD	On-Board Diagnostics
OEM	Original Equipment Manufacturer
OSHA	Occupational Safety and Health Administration
PID	Parameter Identification Descriptions
ppm	Parts Per Million
psi	Pounds Per Square Inch
PTO	Power Takeoff
REPTO	Rear Power Take Off
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
VDC	Volts of Direct Current
VS	Variable Speed
VSS	Vehicle Speed Sensor

Section E - Engine Identification

Section Contents

Table with 2 columns: Content and Page. Includes entries for Cummins® Service Engine Model Product Identification, Engine Identification, and various dataplates.

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Engine Identification


Engine Dataplate

Marine and Industrial Applications

The engine dataplates show specific information about your engine. The engine serial number and control parts list (CPL) provide information for ordering parts and service manuals.

NOTE: The engine dataplate must not be changed unless approved by Cummins.

The industrial engine dataplate is located on the top side of the gear housing. Have the following engine data available when communicating with a Cummins Authorized Repair Location. The information on the dataplate is mandatory when sourcing service parts.

 <p>Cummins Engine Company, Inc. Columbus, Indiana 47202-3005 Assembled in U.S.A.</p>	CID/L.		CPL		Engine Serial No.		FEL	EPA
	Family				C/S		Nox	
<p>Warnings: Injury can result and warranty is voided if fuel rate rpm or altitudes exceed published maximum values for this model and application.</p>						Engine Model		Pm
Valve lash		Inch	Int.	Exh	Timing -			
Cold		MM	Int.	Exh	Fuel rate at rated HP/Kw		mm3/st	
Firing Order			1 5 3 6 2 4			FR	Low Idle RPM	
Date of MFG. 20010501		Assembled In U.S.A. 3284906		Gross Rated HP/KW		at RPM		


4 points to CID/L.
1 points to CPL.
2 points to Engine Serial No.
3 points to Engine Model.
5 points to Gross Rated HP/KW.

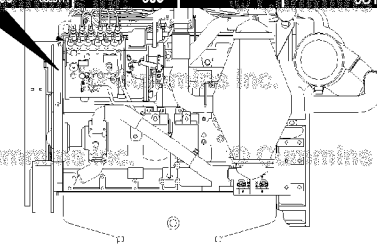
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- 1 Control parts list (CPL)
- 2 Model
- 3 Engine serial number
- 4 Emissions certification
- 5 Horsepower and rpm rating.

**C8.3 Commercial Marine and Ind [...]
Section E - Engine Identification**

Marine dataplate location.

 Cummins Inc. Columbus, Indiana 47283-0001 Made in U.S.A.	Engine	G.D./L.	G.P.L.	Engine Serial No.
	Part. I.D.	505 8.3	2172	45983742
Timing-TDC				Family
23.5 DEGREES				M14TA
<small>Warnings: Many may result and accuracy is voided if fuel rate (p/p) or otherwise exceed published maximum values for this model and application.</small>				Dist. Spec.
Valve lash (adj)		0.012 ^{IN}	0.024 ^{CH}	Rated HP (Metric)
Firing order		1 5 3 6 2 4	450 ^{HP} 2600 ^{rpm}	
Date of Mfg.	20000508	Low life (rpm)	600	Fuel rated at HP
	3883177	E.O.S.		196 mm ³ stroke
				Model Name
				6C2A8.3 MS

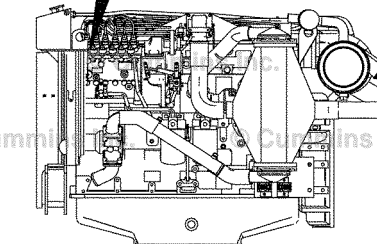


00900309

NOTE: This marine diesel engine conforms to the NOx requirements of the International Maritime Organization (IMO), MARPOL 73/78, Annex VI, Regulation 3 as applicable.

IMPORTANT ENGINE INFORMATION

This marine diesel engine conforms with the NOx requirements of the International Maritime Organization (IMO), MARPOL 73/78, Annex VI, Regulation 13 as applicable.




00900310

Engine Identification

Engine Dataplate Marine and Industrial Applications

Use the information from the marine engine dataplate when discussing service or the source of parts for your engine.

 Cummins Inc. Columbus, Indiana 47202-3005 Made In U.S.A.	Engine Cert. I.D.	C.I.D./ L. 505 8.3	CPL 2172	Engine Serial No. 45983742	
	Timing-TDC Value left cold Firing order	23.5 DEGREES 0.012 Int. 1 5 3 6 2 4	0.024 Exh.	Family Cust. Spec. Rated HP (Metric) Fuel rated at HP	M14TA 341703 450 at 2600 rpm 196 mm 3/stroke
	Date of Mfg.	20000508 3393177	Low Idle (rpm) 600	E.C.S.	Model Name 6CTA8.3-MS
	Warnings: Injury may result and warranty is voided if fuel rate rpm or altitudes exceed published maximum values for this model and application.				

C8.3 Commercial Marine and Ind [...]
Section E - Engine Identification

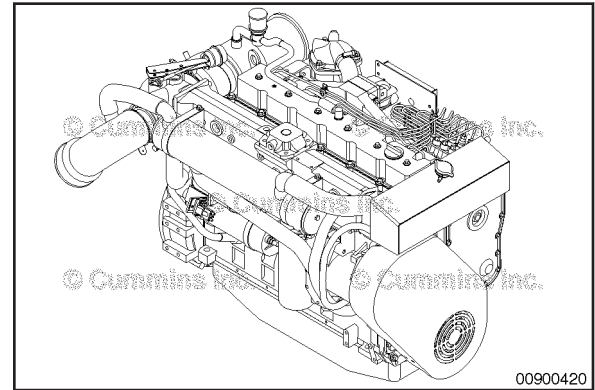
- 1 Cubic inch displacement and liter displacement
- 2 Control Parts List Number
- 3 Engine serial number
- 4 Emission family identification
- 5 Customer specification - base engine part number
- 6 Rated horsepower at rpm
- 7 Fuel rated at horsepower
- 8 Model name
- 9 Emission control system (currently **not** used on marine)
- 10 Firing order
- 11 Valve lash cold
- 12 Timing - top dead center
- 13 Low idle (rpm)
- 14 Date of manufacturing
- 15 Warning tag
- 16 Cummins address:
 - Cummins Incorporated
 - Columbus, Indiana
 - 47202-3005

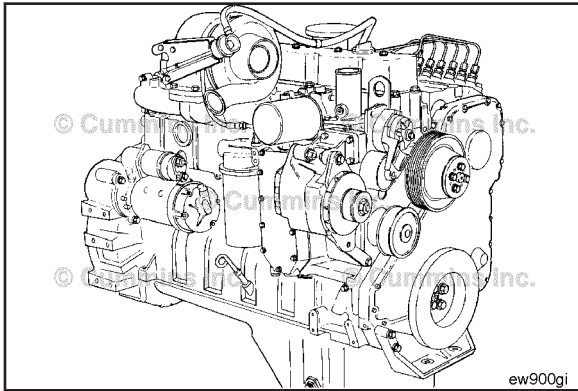
- Made in U.S.A.
- 21 Engine certification identification (currently **not** used on marine).

Cummins® Engine Nomenclature
Marine Applications

6CTA8.3M2 Marine Applications

- 6 = number of cylinders
• C = engine series
• T = turbocharged
• A = aftercooled
• 8.3 = displacement in liters
• M = marine
• 3 = design phase

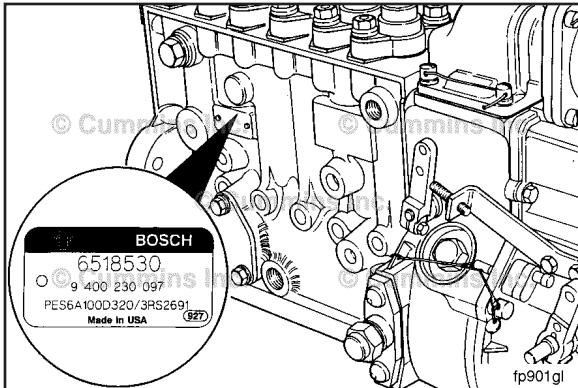




Industrial Applications

6CTAA8.3 Industrial Applications

- 8.3 = displacement in liters
- AA = charge air aftercooled
- T = turbocharged
- C = engine series
- 6 = number of cylinders

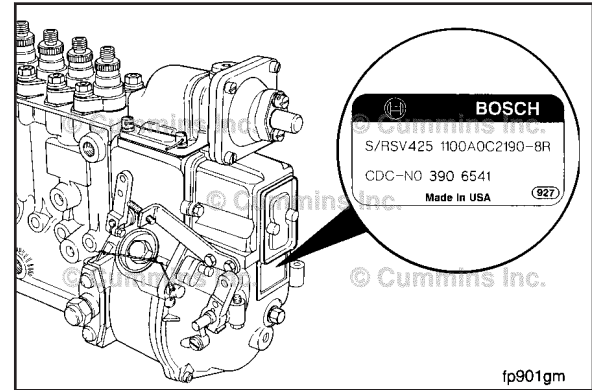


Fuel Injection Pump Dataplate

The Bosch® fuel injection pump dataplate is located on the side of the injection pump. It provides information for fuel pump calibration.

C8.3 Commercial Marine and Ind [...] Section E - Engine Identification

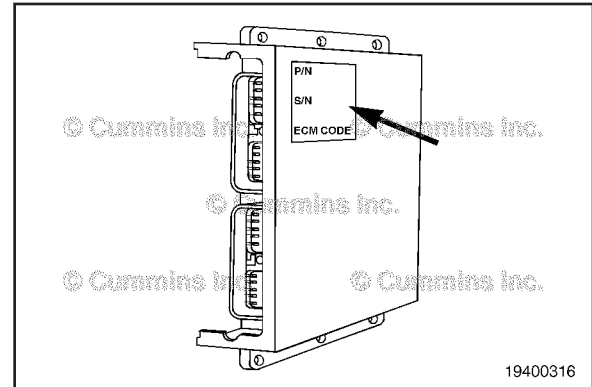
The Cummins part number for the fuel pump-governor combination is located on the governor dataplate.



ECM Dataplate

The external ECM dataplate is located on top of the ECM.

The dataplate contains the ECM part number (P/N), the ECM serial number (S/N), the manufacturing date code (D/C), the engine serial number (ESN), and the ECM code.

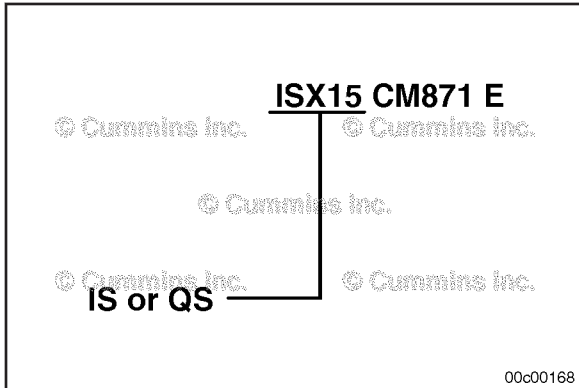




Cummins® Service Engine Model Product Identification

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.

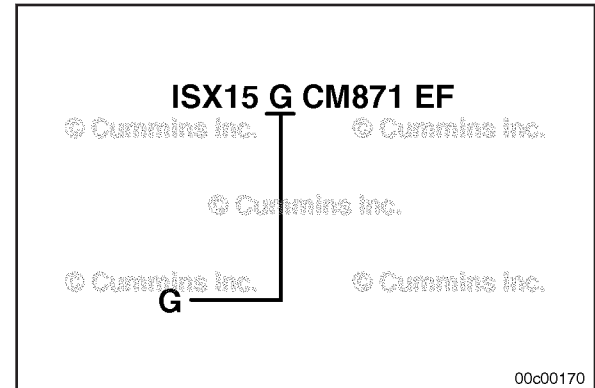
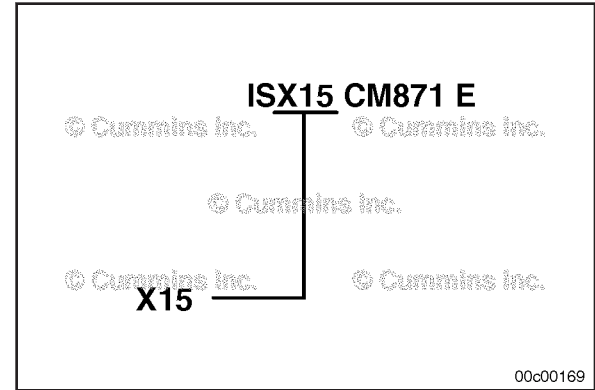


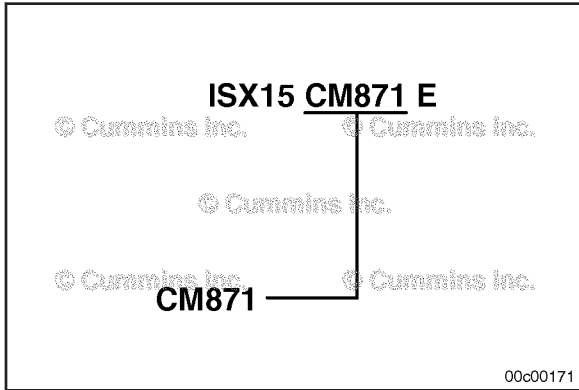
Electronic engines are identified by the first two letters, either an "IS" for On-Highway automotive or "QS" for Off-Highway industrial market applications.

**C8.3 Commercial Marine and Ind [...]
Section E - Engine Identification**

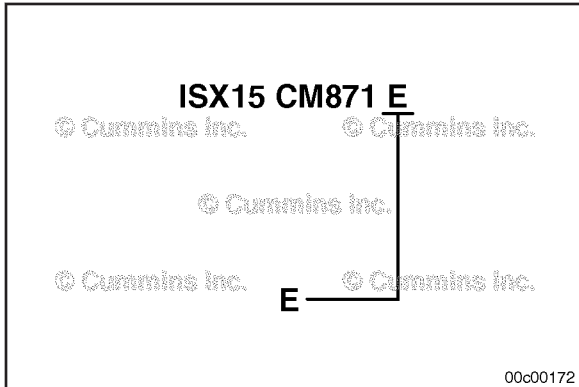
The third letter is the engine platform designation followed by the engine liter size.

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.

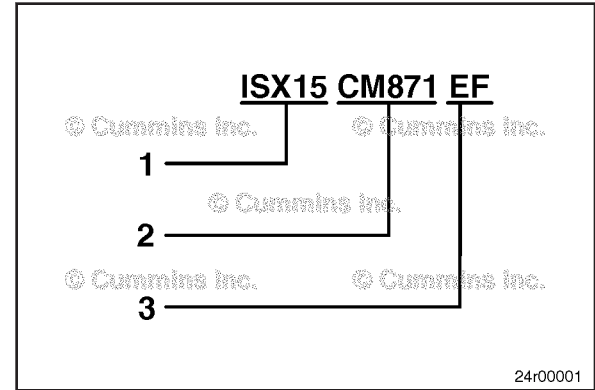


The technology identifier after the control system designates the prevailing technology used with the engine. (See table in this procedure for letter designations.)

C8.3 Commercial Marine and Ind [...]
Section E - Engine 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

Section 1 - Operating Instructions

Section Contents

Table with 2 columns: Section Name and Page. Includes entries like Cold Weather Starting, Electromagnetic Interference (EMI), Engine Operating Range, Engine Shutdown, Normal Starting Procedure, Operating Instructions - Overview, and Operating the Engine.

Winterfronts and Shutters.....	1-21
Starting Procedure After Extended Shutdown or Oil Change	1-19
General Information.....	1-19

Operating Instructions - Overview
General Information

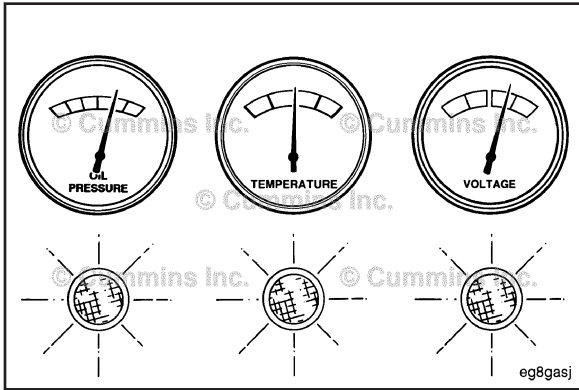


Correct care of your engine will result in longer life, better performance, and more economical operation.

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.

U.S. legislation requires that stationary compression ignition internal combustion engines designated for emergency use are limited to emergency operations and required maintenance and testing.



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 and other engine parameters daily via the PCS front panel to make sure they are operational. Check the panel daily for any new alarm messages. Take appropriate action to rectify the alarm condition or contact your nearest Authorized Cummins® Distributor.

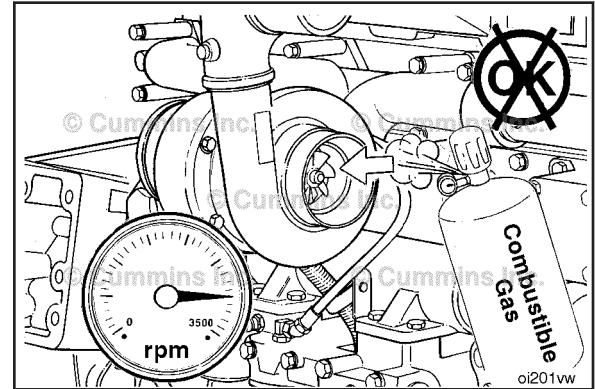
WARNING

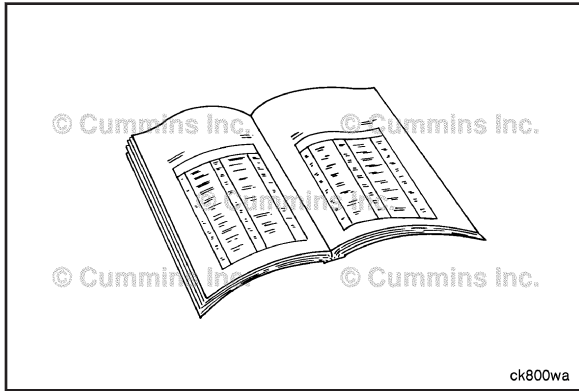
Do not operate a diesel engine where there are or can BE COMBUSTIBLE vapors. These vapors can be sucked through the air intake system and cause engine acceleration and over speeding that can result in a fire, an explosion, and extensive property damage. Numerous safety devices are available, such as 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

Industrial Applications

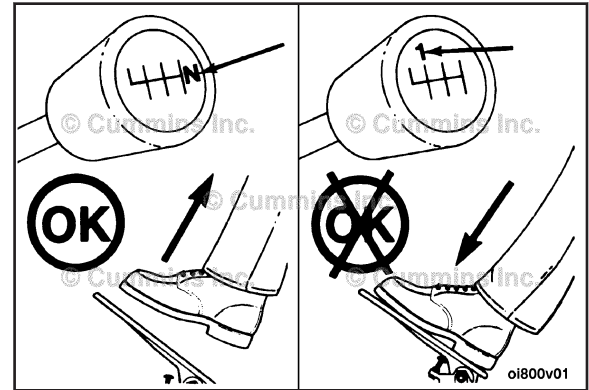
If ambient temperature is below 16°C [60°F], reference the following procedure. Refer to Procedure 101-004 in Section 1.

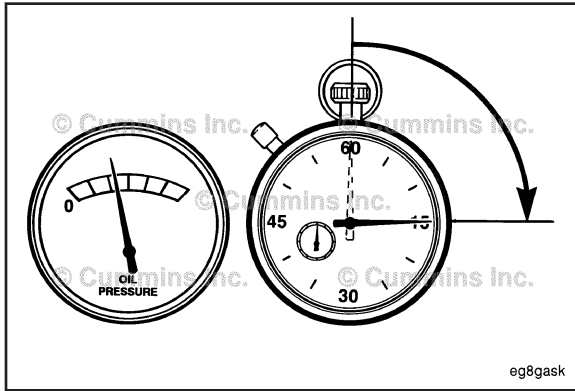
CAUTION

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: Engines equipped with air starting motors require a minimum of 480 kPa [70 psi].

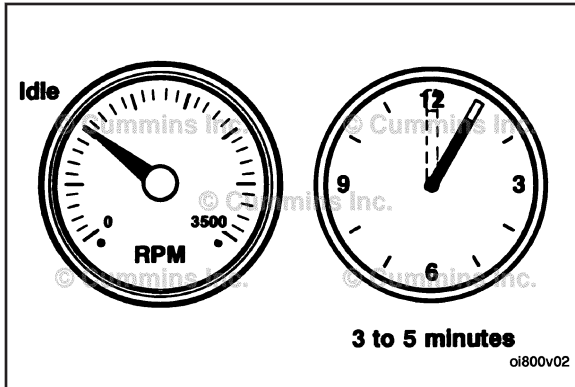
- Disengage the driven unit, or if equipped, put the transmission in neutral.
With the accelerator pedal or lever in the idle position, turn the key switch to the ON position, and wait for the WAIT-TO-START lamp to go out; then, turn the key to the START position.
Full throttle is applied after engaging the starter, after 5 seconds release to idle throttle.
If the engine does not start after three attempts, check the fuel supply system. Absence of blue or white exhaust smoke during cranking indicates no fuel is being delivered.





⚠ CAUTION ⚠

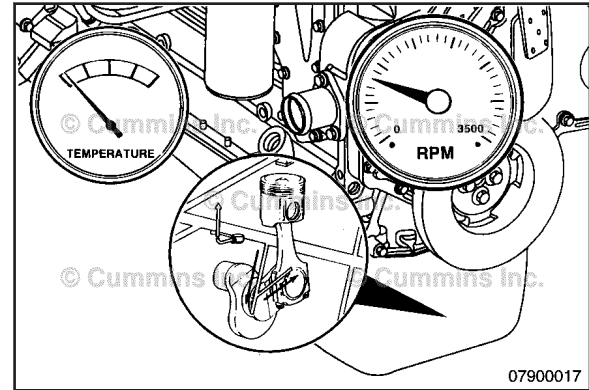
The engine must have adequate oil pressure within 15 seconds after starting. If the WARNING lamp indicating low oil pressure has not gone out or there is no oil pressure indicated on a gauge within 15 seconds, shut off the engine immediately to avoid engine damage. The low oil pressure troubleshooting procedure is located in Troubleshooting Symptoms (Section TS).



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

C8.3 Commercial Marine and Ind [...] Section 1 - Operating Instructions

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.



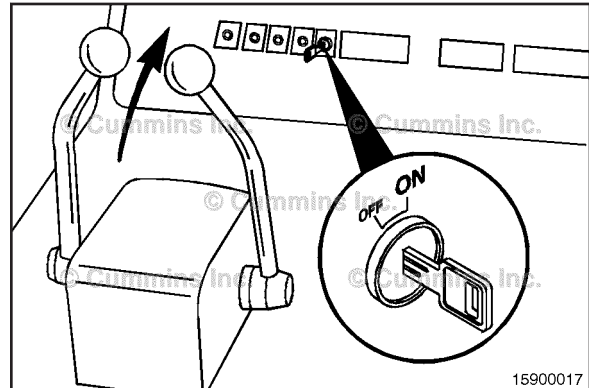
Marine Applications

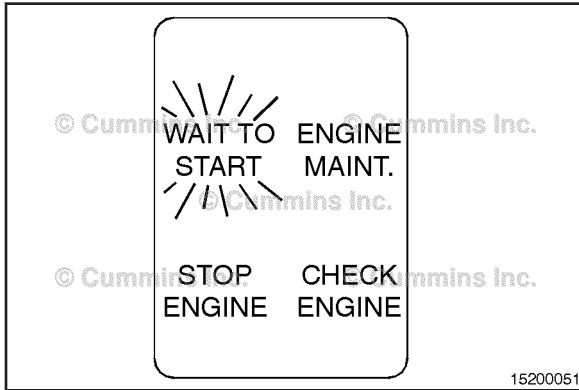
⚠ CAUTION ⚠

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 in 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.

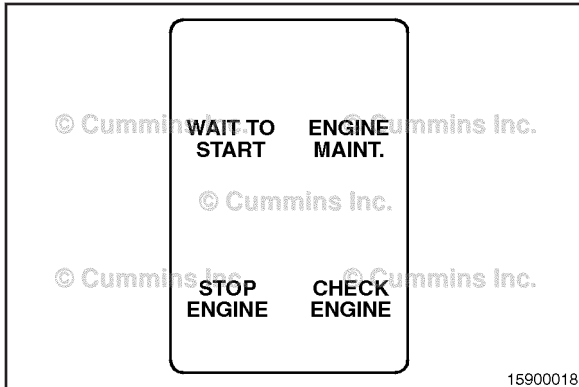
Disengage the drive unit.





Turn the key switch to the ON or RUN position. When the key is in this position, the WAIT TO START lamp will be illuminated for a maximum of 20 seconds. The engine should **not** be cranked until the WAIT TO START lamp shuts off.

NOTE: The controller is reset each time the ignition is turned off and the cycle will start over.

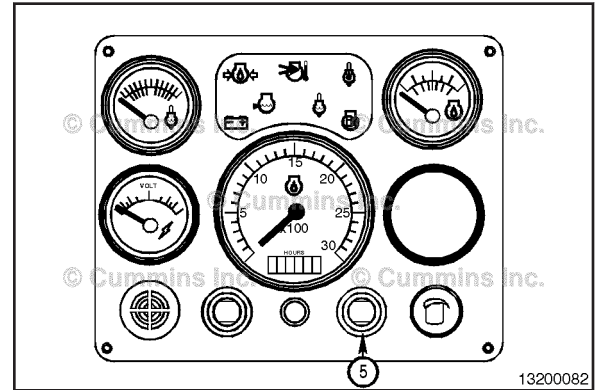


When the WAIT TO START lamp goes out, the preheat cycle is complete.

C8.3 Commercial Marine and Ind [...]
Section 1 - Operating Instructions

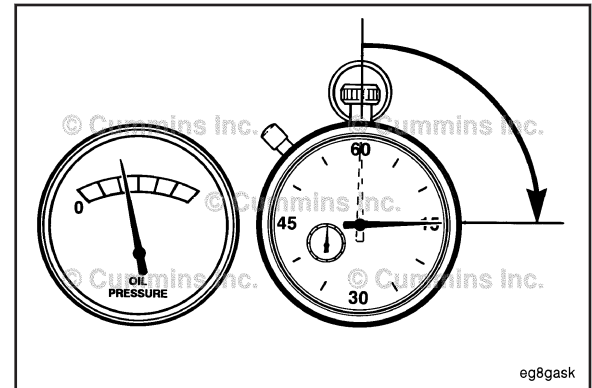
Start the engine with the throttle in the IDLE position.

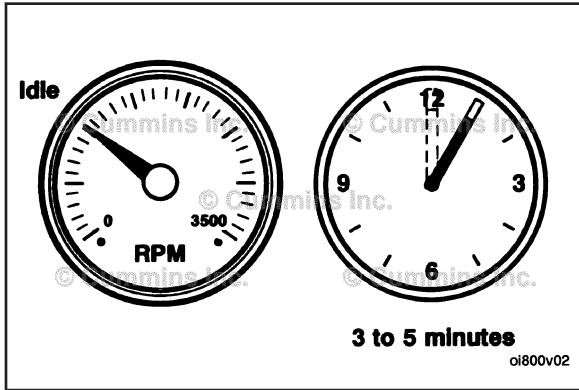
This black push button (5) is used to engage the starter motor.



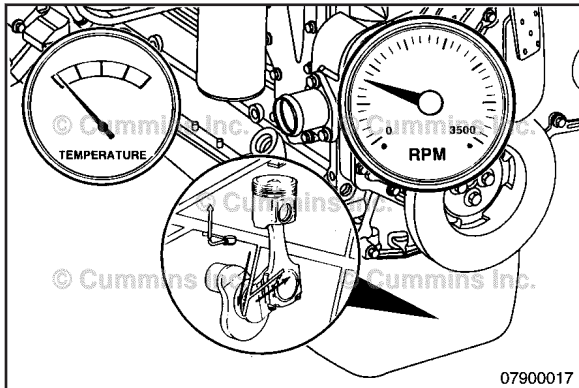
⚠ CAUTION ⚠

The engine must have adequate oil pressure within 15 seconds after starting. If the **WARNING** lamp indicating low oil pressure has not gone out or there is no oil pressure indicated on a gauge within 15 seconds, shut off the engine immediately to avoid engine damage. The low oil pressure troubleshooting procedure is located in Troubleshooting Symptoms (Section TS).





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

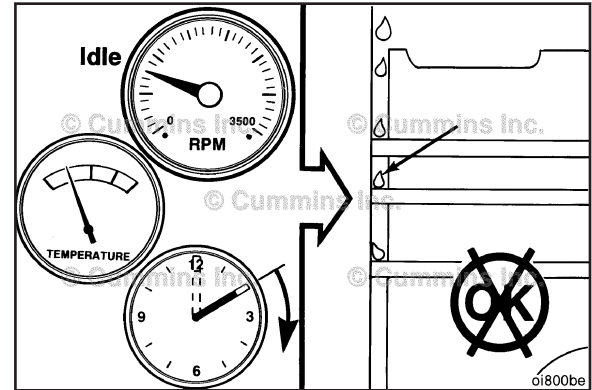


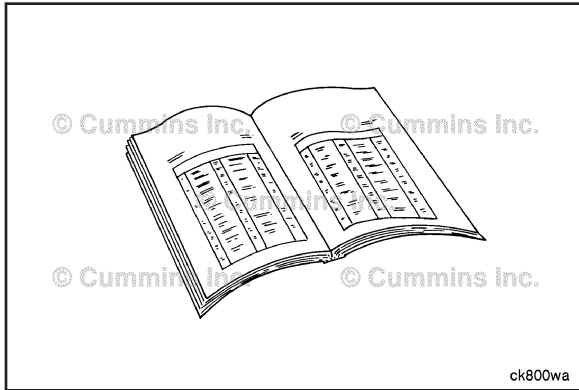
After starting a cold engine, increase the engine speed (rpm) slowly to provide adequate lubrication to the bearings and to allow the oil pressure to stabilize.

CAUTION

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

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





Jump Starting

⚠ WARNING ⚠

Batteries can emit explosive gases. To reduce the possibility of personal injury, always ventilate the compartment before servicing the batteries. To reduce the possibility of arcing, remove the negative (-) battery cable first and attach the negative (-) battery cable last.

⚠ CAUTION ⚠

When using jumper cables to start the engine, make sure to connect the cables in parallel: Positive (+) to positive (+) and negative (-) to negative (-). When using an external electrical source to start the engine, turn the disconnect switch to the OFF position. Remove the key before attaching the jumper cables.

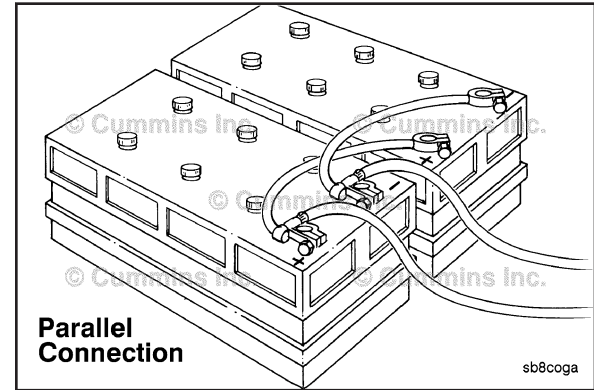
⚠ CAUTION ⚠

To avoid damage to engine parts, do not connect jumper starting or battery charging cable to any fuel system or electronic component.

C8.3 Commercial Marine and Ind [...] Section 1 - Operating Instructions

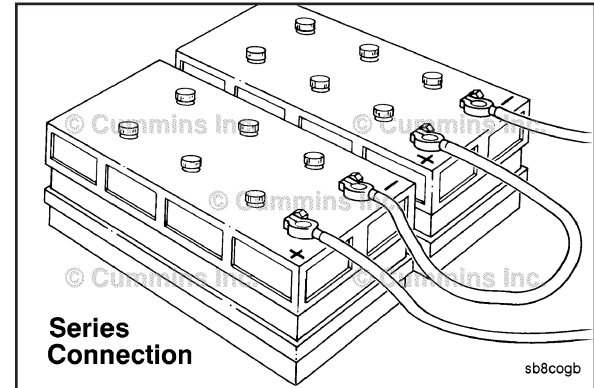
This illustration shows a typical parallel battery connection. This arrangement doubles the cranking amperage.

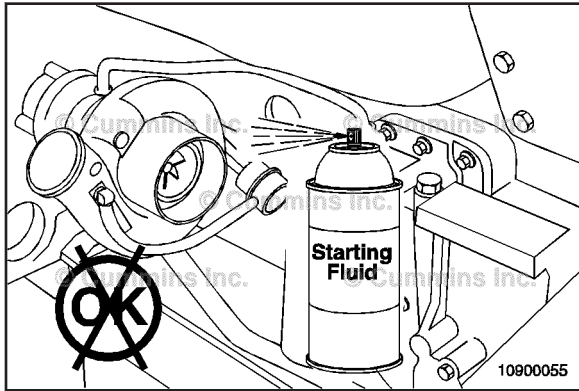
NOTE: Always reference the relevant OEM literature for jump starting procedures. Failure to follow correct procedures can result in damage to the ECM and other electrical equipment.



This illustration shows a typical series battery connection. This arrangement, positive (+) to negative (-), doubles the voltage.

NOTE: Always reference the relevant OEM literature for jump starting procedures. Failure to follow correct procedures can result in damage to the ECM and other electrical equipment.





Cold Weather Starting With Flame Start System

⚠ WARNING ⚠

Do not use starting fluids with this engine. This engine is equipped with a flame start system; use of starting fluid can cause an explosion, fire, personal injury, severe damage to the engine and property damage.

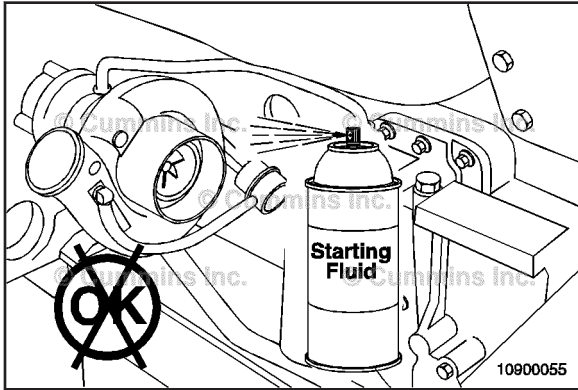
The **only** recommended cold weather starting aids for industrial applications with grid a flame start system, are engine coolant preheaters and oil pan immersion heaters. Contact a Cummins® Authorized Repair Location for more information

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

C8.3 Commercial Marine and Ind [...]
Section 1 - Operating Instructions

In cold weather, the WAIT-TO-START lamp will stay on longer.

If ambient temperature is below 16° C [60° F], fully depress the throttle after engaging the starter. Full throttle on the VE pump makes sure there is sufficient start fuel delivery and helps keep the engine operating once started. The in-line pumps with RQV and RQV-K governors require full throttle position and hold the rack in the start fuel position. The throttle **must** be depressed after engaging the starter to allow the shutoff lever to move to the run position before moving the throttle.



Grid Heater

Industrial Applications

⚠ 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.

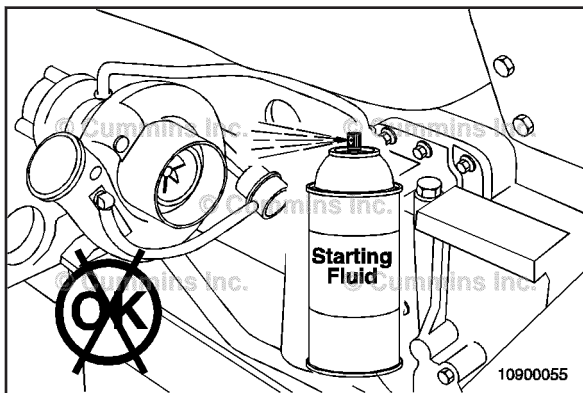
The **only** recommended cold weather starting aids for marine or industrial applications with grid a heater or air intake heater, are engine coolant preheaters and oil pan immersion heaters. Contact a Cummins® Authorized Repair Location for more information

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

C8.3 Commercial Marine and Ind [...]
Section 1 - Operating Instructions

In cold weather, the WAIT-TO-START lamp will stay on longer.

If ambient temperature is below 16° C [60° F], fully depress the throttle after engaging the starter. Full throttle on the VE pump makes sure there is sufficient start fuel delivery and helps keep the engine operating once started. The in-line pumps with RQV and RQV-K governors require full throttle position and hold the rack in the start fuel position. The throttle **must** be depressed after engaging the starter to allow the shutoff lever to move to the run position before moving the throttle.



Ether Starting Aids

Industrial Applications

⚠ WARNING ⚠

Because of the potential for an explosion, do not use volatile cold starting aids in underground mine or tunnel operations. Ask the local U.S. Bureau of Mines inspector for instructions.

⚠ WARNING ⚠

Starting fluid is highly flammable and explosive. Keep flames, sparks, and arcing switches away from starting fluid.

⚠ WARNING ⚠

To reduce the possibility of personal injury, avoid inhalation of starting fluid vapors.

⚠ CAUTION ⚠

Do not use excessive amounts of starting fluid when starting an engine. The use of too much starting fluid will cause damage to the engine.

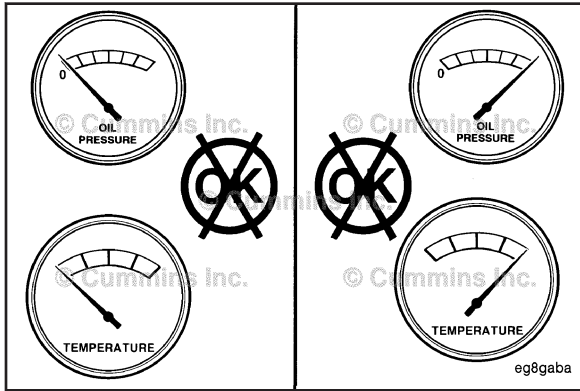
If ambient temperature is below 16° C [60° F], fully depress the throttle after engaging the starter. Full throttle on the VE pump makes sure there is sufficient start fuel delivery and helps keep the engine operating once started. The in-line pumps with RQV and RQV-K governors require full throttle position and hold the rack in the start fuel position. The throttle **must** be depressed after engaging the starter to allow the shutoff lever to move to the run position before moving the throttle.

Spray starting fluid into the air cleaner intake while another person cranks the engine.

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.



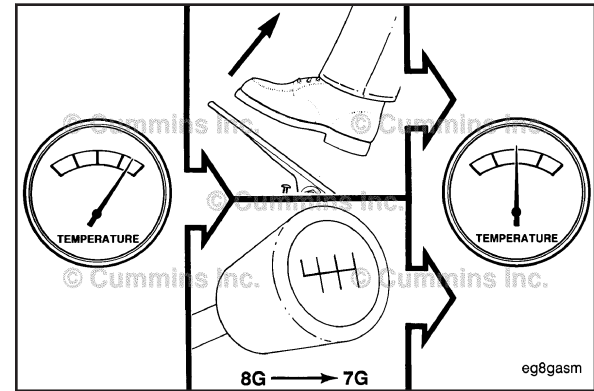
Operating the Engine Normal

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.

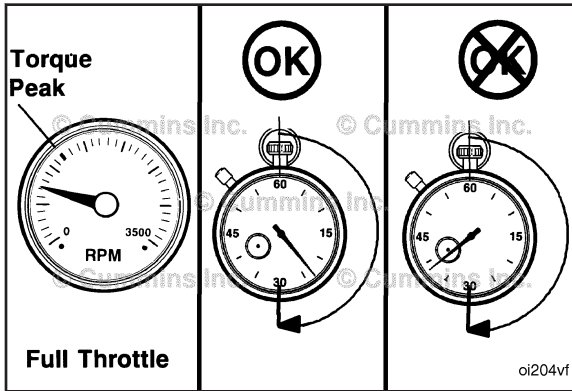
C8.3 Commercial Marine and Ind [...] Section 1 - Operating Instructions

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.



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).



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.

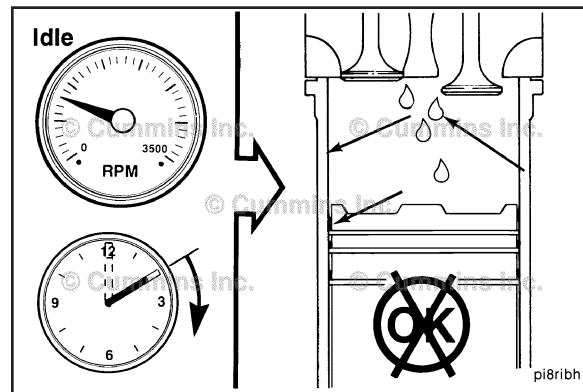
Cummins® engines are designed to operate successfully at full throttle under transient conditions down to peak torque engine speed. This is consistent with recommended operating practices.

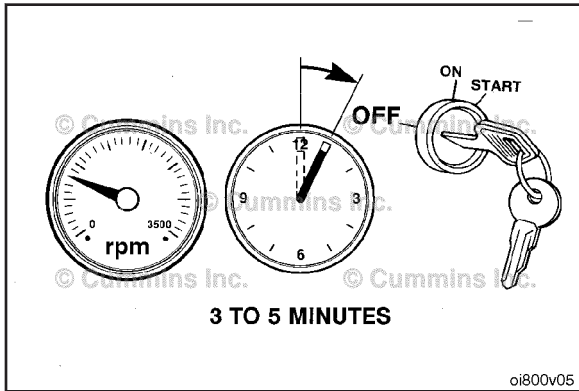
⚠ CAUTION ⚠

Do not 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).

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

NOTE: For engines equipped with an electronic control module (ECM) ensure the keyswitch is turned off for a minimum of 70 seconds prior to disconnecting the continuous (unswitched) battery power supply. If the unswitched battery power supply is disconnected in less than 70 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.

⚠CAUTION⚠

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

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

Table with 2 columns: Section Name and Page. Rows include Maintenance Guidelines - Overview (2-1), Maintenance Record Form (2-9), and Maintenance Schedule (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

Industrial Applications

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

Maintenance Procedures at Daily Interval⁴

- Crankcase Breather Tube - Check
- Fuel-Water Separator - Drain
- Lubricating Oil Level - Check
- Fan, Cooling - Check
- Coolant Level - Check
- Air Intake Piping - Check⁴
- Air Tanks and Reservoirs - Drain⁴
- Drive Belts - Check

Maintenance Procedures at 250 Hours, or 3 Months^{1, 2, 4}

- Fuel Filter (Spin-On Type) - Change
- Lubricating Oil and Filters - Change¹
- Charge-Air Cooler - Check⁴

C8.3 Commercial Marine and Ind [...]
Section 2 - Maintenance Guidelines

- Charge-Air Piping - Check⁴
- Air Cleaner Restriction - Check⁴
- Air Compressor - Check⁴
- Radiator Pressure Cap - Check

Maintenance Procedures at 500 Hours, or 6 Months^{2, 3, 4}

- Coolant Filter - Change
- Supplemental Coolant Additive (SCA) and Antifreeze Concentration - Check^{2, 3}
- Air Compressor Discharge Lines - Check⁴

Maintenance Procedures at 1000 Hours, or 1 Year⁴

- Overhead Set - Adjust
- Cooling Fan Belt Tensioner - Check
- Air Cleaner Assembly (Engine-Mounted) - Change⁴

Maintenance Procedures at 2000 Hours, or 2 Years^{2, 3, 4, 5}

- Vibration Damper, Rubber - Inspect for Reuse
- Vibration Damper, Viscous - Inspect for Reuse
- Cooling System - Flush^{2, 3, 5}
- Air Compressor Discharge Lines - Check⁴

- 1 The lubricating oil and lubricating oil filter interval can be adjusted based on fuel consumption, gross vehicle weight, and idle time. Refer to Oil Drain Intervals in this section.
- 2 Test the SCA concentration level every 6 months unless concentration is over three units; then check at every oil drain interval until concentration is below three units.
- 3 Antifreeze check interval is every oil change or 500 hours or 6 months, whichever occurs first. The operator **must** use a heavy-duty year-round antifreeze that meets the chemical composition of ASTM D6210. The antifreeze change interval is 2 years. Antifreeze is essential for freeze, overheat, and corrosion protection.
- 4 Follow the manufacturer's recommended maintenance procedures for the starter, alternator, generator, batteries, electrical components, engine brakes, exhaust brake, charge-air cooler, air compressor, refrigerant compressor, and fan clutch.
- 5 This cooling system requirement to Flush at this scheduled maintenance includes Drain, Flush, and Fill.

Marine Applications

Maintenance Procedures at Daily Interval¹

- Fuel-Water Separator - Drain
- Lubricating Oil Level - Check
- Coolant Level - Check
- Sea Water Strainer - Clean
- Marine Gear - Check¹
- Drive Belts - Check

Maintenance Procedures at 75 Hours or 3 Months³

C8.3 Commercial Marine and Ind [...]
Section 2 - Maintenance Guidelines

- Zinc Anode - Check³
- Cooling System Hoses - Check
- Sea Water Hoses - Check
- Air Cleaner Restriction - Check
- Batteries - Check
- Battery Cables and Connections - Check
- Component Connector and Pin Inspection - Check

Maintenance Procedures at 300 Hours or 1 Year^{1, 2}

- Fuel Filter (Spin-On Type) - Change
- Fuel-Water Separator Element - Replace
- Lubricating Oil and Filters - Change²
- Coolant Filter - Change
- Engine Coolant Heater - Check
- Marine Gear Oil Cooler - Flush¹
- Supplemental Coolant Additive (SCA) and Antifreeze Concentration - Check²
- Heat Exchanger - Flush
- Sea Water Pump - Replace
- Aftercooler Assembly (Sea Water) - Flush
- Air Cleaner Assembly (Engine-Mounted) - Check

- Air Intake Piping - Check
- Marine Gear Oil - Check¹
- Radiator Pressure Cap - Check
- Engine Wiring Harness - Check

Maintenance Procedures at 600 Hours or 2 Years

- Vibration Damper, Rubber - Inspect for Reuse
- Vibration Damper, Viscous - Inspect for Reuse
- Overhead Set - Adjust
- Cooling System - Flush⁴
- Cooling Fan Belt Tensioner- Check

- 1 Consult the marine gear manufacturer operator's manual for specifications and recommendations.
- 2 Refer to Refer to Procedure 018-024 in Section V.
- 3 Depending upon the quality of electrical bonding and water conditions, increased maintenance is sometimes necessary.
- 4 This cooling system requirement to Flush at this scheduled maintenance includes Drain, Flush, and Fill.

Oil Drain Intervals

Refer to the following flowchart to determine the maximum recommended oil change and filter change intervals in kilometers, miles, hours, or months, whichever comes first.

Is the vehicle one of those listed below?

C8.3 Commercial Marine and Ind [...]
Section 2 - Maintenance Guidelines

- Truck crane/yard spotter
- Paver/crane/backhoe
- Dozer/scrape/skipper

If Yes -

- Select the correct oil drain interval from Table 1.

If No -

- Is the vehicle one of those listed below?
- Tractor/combine/irrigation equipment
- Generator set/air compressor/fire equipment

If Yes -

- Select the correct oil drain interval from Table 2.

If No -

- Select the correct oil drain interval from Table 3.

Table 1, Oil Drain Intervals				
Vehicle/Equipment	Kilometers	Miles	Hours	Months
Truck crane/yard spotter	10,000	6,000	250	3
Paver/crane/backhoe	N/A	N/A	250	3
Dozer/scrapper/skidder	N/A	N/A	250	3

Table 2, Oil Drain Intervals				
Vehicle/Equipment	Kilometers	Miles	Hours	Months
Tractor/combine/ irrigation equipment	N/A	N/A	250	3
Generator set/air compressor/fire pump	N/A	N/A	250	3

Table 3, Oil Drain Intervals				
Vehicle/Equipment	Kilometers	Miles	Hours	Months
All others	10,000	6,000	250	3

Section L - Service Literature

Section Contents

Table with 2 columns: Section Name and Page. Includes entries for Additional Service Literature, Cummins Customized Parts Catalog, and Service Literature Ordering Location.

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Additional Service Literature
General Information

The following publications can be purchased by contacting the nearest local distributor.

Table with 2 columns: Bulletin Number and Title of Publication. Rows include: 3666003 C Series Troubleshooting and Repair Manual, 3666008 C Series Engine Shop Manual, 3666021 C Series Specifications Manual, 3379001 Fuel for Cummins Engines Bulletin, 3666132 Coolant Requirements and Maintenance Bulletin, 3379009 Operation, Cold Weather, 3810340 Cummins Engine Oil Recommendations Bulletin, 3666109 Alternative Repair Manual, B and C Series Engines, 3379000 Air for Your Engines, 3381700 Worldwide Service Locations, 3666109 C Series Alternative Repair Manual.

Service Literature Ordering Location Contact Information

Region

United States and Canada

All Other Countries

Ordering Location

Cummins Distributors

or

Credit Cards at 1-800-646-5609

or

Order online at www.powerstore.cummins.com

Cummins Distributors or Dealers

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 contains 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. Your name and engine model identification even appears on the catalog spine. Everybody will know that Cummins created a catalog specifically for you.

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 the Cummins Electronic Parts Catalog or the Cummins Parts Microfilm System.

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 customers can contact their Cummins Distributor or call Gannett Direct Marketing Services at 1-800-646-5609 and order by credit card. Outside North America order on-line or make an International call to Gannett at (++)502-454-6660.

Ordering On-Line

The Customized Parts Catalog can be ordered On-Line from the Cummins Powerstore by credit card.

Contact GDMS or the CUMMINS POWERSTORE for the current price; Freight may be an additional expense.

Information we need to take your Customized Parts Catalog Order. This information drives the cover content of the CPC.

- Customer Name
- Street Address
- Company Name (optional)
- Telephone no.
- Credit Card No.
- Cummins Engine Serial Number (located on the engine data plate)
- Please identify the required media: Printed Catalog, CD-ROM, or PDF File

Unfortunately not all Cummins Engines can be supported by this parts catalog. 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 - Maintenance Specifications

Section Contents

Table with 2 columns: Section Name and Page. Includes entries like Coolant Recommendations and Specifications (V-13), Cooling System (V-5), Cummins/Fleetguard® Filter Specifications (V-6), Fuel Recommendations and Specifications (V-7), General Engine (V-1), and Lubricating Oil Recommendations and Specifications (V-9).

New Engine Break-in Oils.....	V-9
Precautions and Instructions for Proper Kit Use.....	V-9
Lubricating Oil System	V-3
Specifications.....	V-3

General Engine

Specifications

Industrial

Table with 2 columns: Specification Name and Value. Rows include Bore (114 mm [4.49 in]), Stroke (135 mm [5.32 in]), Displacement (8.27 liters [504.7 C.I.D.]), Engine Weight (dry) with Standard Accessories (603 to 612 kg [1330 to 1350 lb]), Wet Weight (635 to 658 kg [1400 to 1450 lb]), and Firing Order (1-5-3-6-2-4).

Valve Clearances:

Table with 2 columns: Valve Type and Clearance. Rows include Intake (0.30 mm [0.012 in]) and Exhaust (0.61 mm [0.024 in]).

Rotation, Viewed from the Front of the Engine..... Clockwise

Compression Ratio:

Table with 2 columns: Configuration and Ratio. Rows include Naturally Aspirated (16.4:1), Turbocharged (17.3:1), Turbocharged/Aftercooled (16.5:1), and Charge Air Cooled (18.0:1).

Marine

Table with 2 columns: Specification Name and Value. Rows include Type (Four cycle, in-line, six cylinder), Bore and Stroke (114 mm [4.49 in] x 135 mm [5.32 in]), and Displacement (8.3 liters [504.5 C.I.D.]).

Engine Mounting:

Table with 2 columns: Mounting Parameter and Value. Rows include Maximum Allowable Bending Moment at Rear Face of Block (1356 N·m [1000 ft-lb]) and Minimum/Maximum Static Installation Angle for In-line Drives (front up) (0 degrees/12 degrees).

Minimum/Maximum Static Installation Angle for V-Drives (front up).....3 degrees/12 degrees
NOTE: “Front up” refers to front of engines. In V-drives it faces the back of the boat.

Lubricating Oil System

Specifications

Industrial Applications

Oil Pressure

Table with 2 columns: Specification and Value. Rows include: At Idle Speed - Minimum (69 kPa [10 psi]), Normal Operating Speed (205 kPa to 517 kPa [30 psi to 75 psi]), Regulated Pressure (517 kPa [75 psi]), Maximum Allowable Temperature (120°C [250°F]).

Maximum Operational Angularity of Oil Pan (see engine mounting)

Table with 2 columns: Position and Angle. Rows include: Front Down (45 degrees), Front Up (35 degrees), Side to Side (45 degrees).

Oil Capacity of Standard Engine:

Table with 2 columns: Configuration and Capacity. Rows include: Standard Oil Pan (Pan Only) (18.9 liters [20 qt]), Standard Oil Pan with Cylinder Block Stiffener Plate (Pan Only) (19.9 liters [21 qt]).

Oil Pan Low to High:

Table with 2 columns: Configuration and Capacity Range. Rows include: Standard Oil Pan (15.1 to 18.9 liters [16 to 20 qt]), Standard Oil Pan with Cylinder Block Stiffener Plate (16.1 to 19.9 liters [17 to 21 qt]), Total System Capacity (19.9 liters [21 qt]), Total System Capacity (excluding bypass Filter) (21.9 liters [23.2 qt]).

NOTE: Some applications have a slightly different oil pan capacity. Contact the local Cummins Distributor if there are any questions.

Marine Applications

Oil Pressure

Table with 2 columns: Specification and Value. Row includes: At Idle Speed - Minimum (55 kPa [8 psi]).

Normal Operating Range.....	205 to 517 kPa [30 to 75 psi]
Maximum Allowable Oil Temperature.....	120°C [250°F]
Oil Pan Capacity High/Low.....	17/13 liters [18/14 qt]
Total System Capacity (excluding bypass filter).....	21.9 liters [23.2 qt]

Cooling System

Specifications

Industrial

Table with 2 columns: Specification Name and Value. Rows include Coolant Capacity (engine only), Standard Modulating Thermostat - Range, Maximum Allowable Operating Temperature, Minimum Recommended Operating Temperature, and Minimum Recommended Pressure Cap.

Marine

Table with 2 columns: Specification Name and Value. Rows include Coolant Capacity — Engine Only, Coolant Capacity - Engine with Heat Exchanger, Maximum External Pressure Loss in Cooling System, Maximum Static Pressure of Coolant (exclusive of pressure cap), Standard Thermostat (modulating) Range, Maximum Coolant Temperature, Minimum Allowable Coolant Expansion Space, Minimum Coolant Makeup Capacity, Maximum Sea Water Pressure, and Maximum Sea Water Inlet Restriction.

Cummins/Fleetguard® Filter Specifications

General Information

Fleetguard is a subsidiary of Cummins Inc. Fleetguard® filters are developed through joint testing at Cummins and Fleetguard®. Fleetguard® filters 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, insist on products that the supplier has tested to meet Cummins high-quality standards.

Cummins can **not** be responsible for problems caused by nongenuine filters that do **not** meet Cummins performance or durability requirements.

Fuel Filters

Fuel Filter:

- Cummins Part Number 3931063
- Fleetguard® Part Number FF5052.

Fuel-Water Separator:

- Cummins Part Number 3930942
- Fleetguard® Part Number FS1280.

Lubricating Oil Filter

- Cummins Part Number 3401544
- Fleetguard® Part Number LF9009.

Fuel Recommendations and Specifications

Fuel Recommendations



WARNING

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



CAUTION

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.



CAUTION

Lighter fuels can reduce fuel economy and can possibly damage the fuel injection pump.

Cummins recommends the use of ASTM Number 2D fuel. The use of Number 2D 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.

The viscosity of the fuel must be kept above 1.3 cSt at 40°C [104°F] to provide adequate fuel system lubrication.

The following chart lists acceptable alternate fuels for C8.3 Series engines.

Table with 10 columns: Fuel Type, Number 1D Diesel(1)(2), Number 2D Diesel, Number 1K Kerosene, Jet-A, Jet-A1, JP-5, JP-8, Jet-B, JP-4, CITE. Row 1: OK, OK, OK, OK, OK, OK, OK, OK, NOT OK, NOT OK, NOT OK.

Any adjustment to compensate for reduced performance with a fuel system using alternate fuel is **not** warrantable.

Winter blend fuels, such as those found at commercial fuel dispensing outlets, are combinations of Number 1D and Number 2D diesel fuel and are acceptable.

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

Lubricating Oil Recommendations and Specifications

New Engine Break-in Oils



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 a synthetic-based oil does not justify extended oil change intervals. Extended oil change intervals can decrease engine life due to factors such as corrosion, deposits, and wear.

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 used in normal operation.

Additional information regarding lubricating oil availability throughout the world is available in the Lubricating Oils Data Book for Heavy-Duty Automotive and Industrial Engines. It can be ordered from: Engine Manufacturers Association (EMA), Two North LaSalle Street, Chicago, IL 60602; (www.engine-manufacturers.org)

Precautions and Instructions for Proper Kit Use

If an engine is operated in ambient temperatures consistently below -23°C [-9°F], and there are no provisions to keep the engine warm when it is not in operation, use a synthetic CE/SF or higher API classification engine oil with adequate low-temperature properties such as 5W-20 or 5W-30.

The oil supplier is responsible for meeting the performance service specification represented with its product.

General Information

Midrange engines with 1999 U.S.A. certification will have 500-hour maximum oil drain intervals using CES20071 (CH-4) or better lubricating oil.

Non-U.S.A. certified engines will have 500-hour oil drain intervals using CES20071 (CH-4) or better lubricating oil.

The use of quality engine lubricating oils, combined with appropriate oil drain and filter change intervals, are critical factors in maintaining engine performance and durability.

Cummins recommends the use of a high-quality SAE 15W-40 multiviscosity heavy-duty engine oil, such as Cummins Premium Blue®, that meets the requirements of Cummins Engineering Specification CES20071 or CES20076, or the American Petroleum Institute (API) performance classification CG-4 or CH-4.

NOTE: In areas where CG-4 or CH-4 lubricating oils are **not** available, CES20075 can be used but the lubricating oil change interval **must** be reduced to 12,070 km [7500 mi], or 250 hours.

A sulfated ash limit of 1.0 mass percent is suggested for optimum valve and piston deposit and oil consumption control. The sulfated ash **must not** exceed 1.85 mass percent.

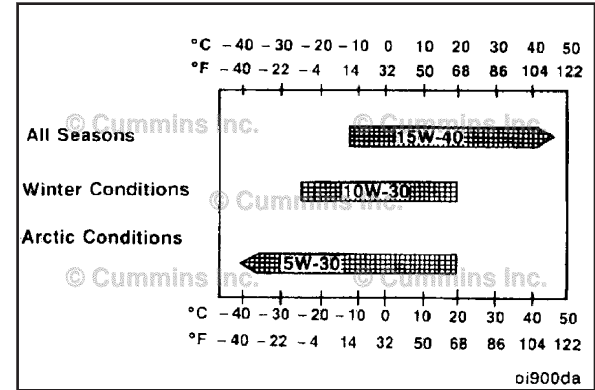
For further details and discussion of engine lubricating oils for Cummins engines, refer to Cummins Engine Oil Recommendations, Bulletin Number 3810340, or a Cummins Authorized Repair Facility.

C8.3 Commercial Marine and Ind [...] Section V - Maintenance Specifications

The use of low-viscosity oils, such as 10W or 10W-30, can be used to aid in starting the engine and in providing sufficient oil flow at ambient temperatures below -5°C [23°F]. However, continuous use of low-viscosity oils can decrease engine life due to wear. Refer to the accompanying chart.



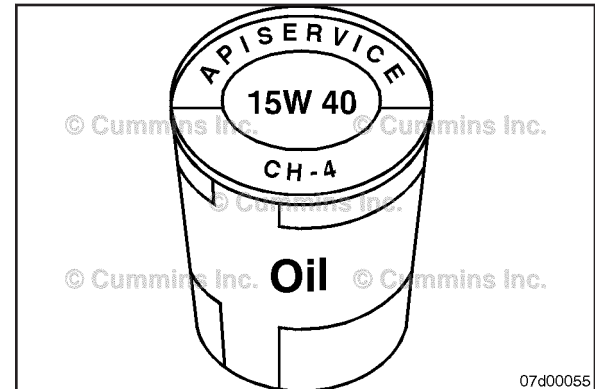
Lubricating Oil Recommendations and Specifications Page V-11

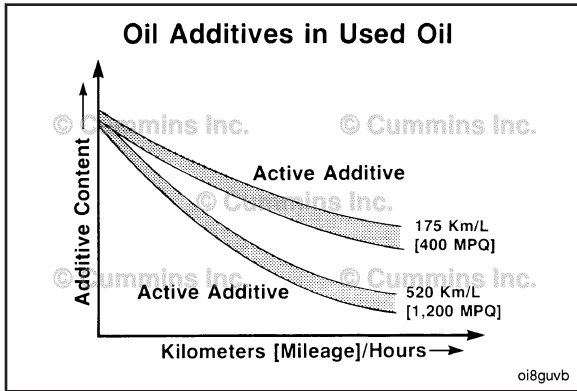


The API service symbols are shown in the accompanying illustration. The upper half of the symbol displays the appropriate oil categories.

The lower half can contain a description of oil energy conserving features.

The center section identifies the SAE oil viscosity grade.





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 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.

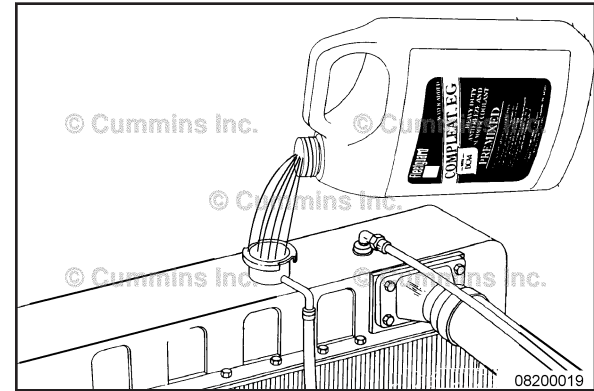
Extending oil and filter change intervals beyond the recommendations will decrease engine life due to factors such as corrosion, deposits, and wear.

Refer to the Oil Drain Interval Chart in this section to determine which oil drain interval to use for an application.

Coolant Recommendations and Specifications

Fully Formulated Coolant/Antifreeze

Cummins, Inc. recommends using either a 50/50 mixture of high-quality water and fully formulated antifreeze or fully formulated coolant when filling the cooling system. The fully formulated antifreeze or coolant **must** meet TMC RP 329 or TMC RP 330 specifications.



⚠ CAUTION ⚠

High-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.

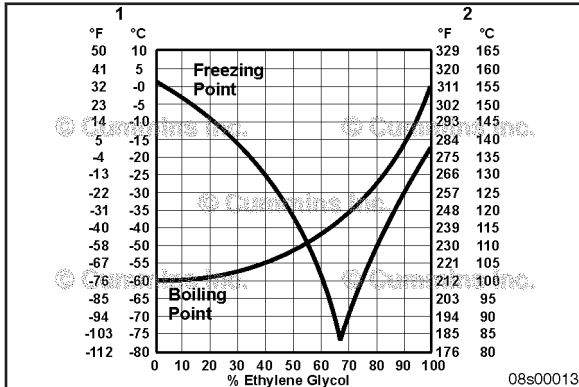
Water Quality	
Calcium Magnesium (Hardness)	Maximum 170 ppm as (CaCO ₃ + MgCO ₃)
Chloride	40 ppm as (Cl)
Sulfur	100 ppm as (SO ₄)

Coolant Recommendations and Specifications
Page V-14

C8.3 Commercial Marine and Ind [...]
Section V - Maintenance Specifications



Cummins, Inc. recommends using Fleetguard® Compleat. It is available in both glycol forms (ethylene and propylene) and complies with TMC standards.



Fully formulated antifreeze **must** be mixed with high-quality water at a 50/50 ratio (40- to 60-percent working range). A 50/50 mixture of antifreeze and water has a -36°C [-33°F] freezing point and a 108°C [226°F] boiling point, which is adequate for 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 silicate gel problem.

Legend

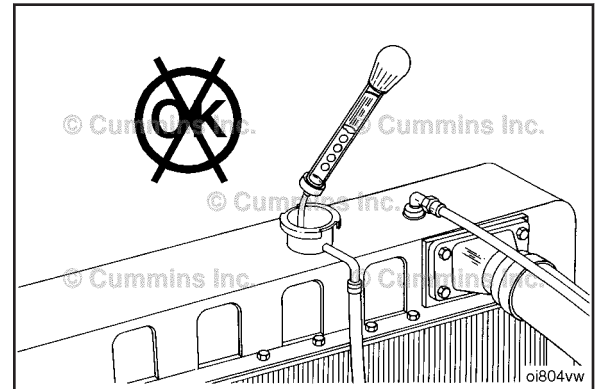
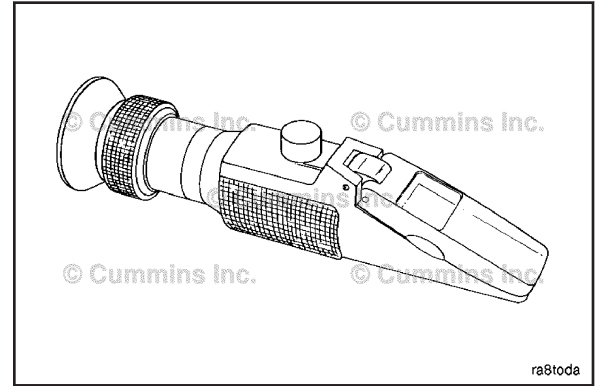
- 1 Freezing Point Temperature Scale
- 2 Boiling Point Temperature Scale

C8.3 Commercial Marine and Ind [...] Section V - Maintenance Specifications

A refractometer **must** be used to measure the freezing point of the coolant accurately.

Do **not** use a floating ball hydrometer. Use of a floating ball hydrometer can give an incorrect reading.

Coolant Recommendations and Specifications Page V-15



Specifications

Use a low-silicate antifreeze that meets ASTM4985 test (GM6038M specification) criteria.

Concentration

Antifreeze **must** be used in any climate for both freezing- and boiling-point protection. Cummins Inc. recommends a 50-percent concentration level (40- to 60-percent range) of ethylene glycol or propylene glycol in most climates. Antifreeze at 68-percent concentration provides the maximum freeze protection and **must never** be exceeded under any condition. Antifreeze protection decreases above 68 percent.

Ethylene Glycol	Propylene Glycol
40% equals -23°C [-9°F]	40% equals -21°C [-6°F]
50% equals -37°C [-35°F]	50% equals -33°C [-27°F]
60% equals -54°C [-65°F]	60% equals -49°C [-56°F]
68% equals -71°C [-96°F]	68% equals -63°C [-81°F]

Concentration Testing

Antifreeze concentration **must** be checked using a refractometer (such as Fleetguard® Part No. CC2800). "Floating-Ball"-type density testers or hydrometers are **not** accurate enough for use with heavy-duty diesel cooling systems.

Coolant Change Recommendation

The coolant **must** be drained and replaced every 2 years or 385,000 km [239,227 mi] to eliminate buildup of harmful chemicals.

Cooling System Additives

Supplemental Coolant Additive (SCA)

Supplemental coolant additives (SCA) are recommended for all Cummins Inc. cooling systems. Antifreeze alone does not provide sufficient protection for heavy-duty diesel engines.

DCA4

DCA4 is the recommended SCA for all Cummins Inc. engines. Other brands can be used if they provide adequate engine protection and do not cause seal or gasket degradation or corrosion/fouling.

SCA Concentration

The recommended concentration level of DCA4 is 1.5 units for every 3.7 liters [1 gal]. The DCA4 concentration must never exceed 3.0 units for every 3.7 liters [1 gal] nor fall below 1.2 units for every 3.7 liters [1 gal].

DCA4 Filter Change Interval

Supplemental coolant additives deplete during normal engine operation. Cummins Inc. recommends that the level be maintained by installation of a service coolant filter on the engine at every 10,000-km [6214 mi], 250-hours, or 3-month interval.

DCA4 Concentration Test

As noted above, the primary method is to maintain proper DCA4 concentration levels by changing the service coolant filter at every 10,000 km [6214 mi], 250 hours, or 3 months. Fleetguard® DCA4 "dipstick" test kit, Part No. CC2626, or Fleetguard® Monitor C™, Part No. CC2700, must be used if testing is deemed necessary due to one of the following reasons:

- Addition of untreated make-up coolant in excess of 5.7 liters [6 qt] between maintenance intervals
• Troubleshooting of cooling system problems in the fleet (such as corrosion or seal leakage)
• An optional program in some fleets to monitor SCA levels to determine if maintenance intervals are acceptable.

NOTE: The practice of using a test kit to determine when to add or change the coolant filter is specifically **not** recommended. No other test kit (such as Fleetguard® titration test kit, Part No. 3300846-S or 3825379-S) can be used on Cummins engines with DCA4.

DCA4 Unit Maintenance Guide

Fleetguard® Part No.	Cummins Part No.	DCA4 Units
DCA4 Liquid		
DCA 60L	3315459	4*
DCA4 Filter		
WF-2070	3318157	2
WF-2071	3315116	4
WF-2072	3318201	6
WF-2073	3315115	8
WF-2074	3316053	12
WF-2077	None	0
*If DCA 60L is used, do not use a coolant filter that contains coolant additives. The combination of liquid and filter coolant additives will result in overconcentration.		

DCA4 Maintenance Guide

Maintenance Intervals

Table with 3 columns: Total Cooling System Capacity, Initial Charge (B), and Coolant Type. Row 1: 30 to 57 liters [8 to 15 gal], WF-2074, WF-2070.

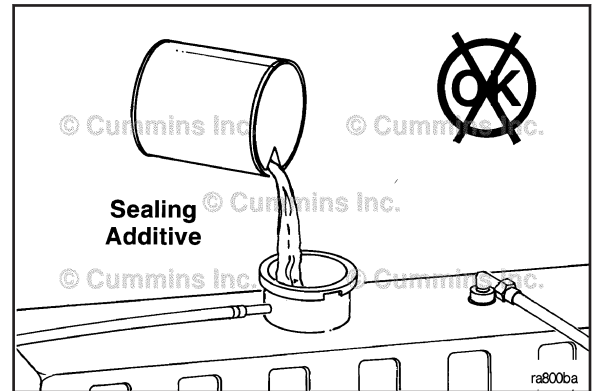
Notes:

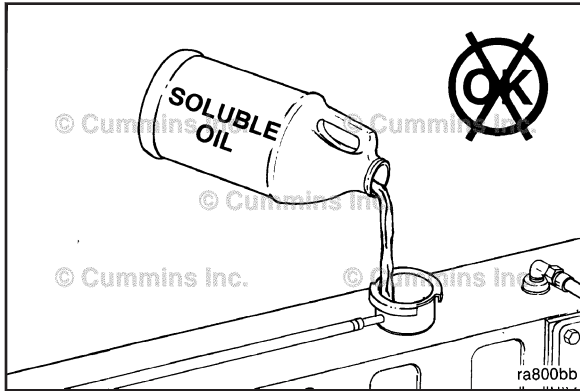
- A Consult the vehicle equipment manufacturer's maintenance information for the total cooling system capacity.
B After draining and replacing the coolant, install the initial per-charge coolant filter to provide the recommended level of DCA4 concentration.
C Change the coolant filter at regular intervals to protect the cooling system.
D Check the coolant additive concentration regularly. Check the cooling system using Fleetguard® DCA4 only with DCA4 coolant test kit, Part No.CC-2626.

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
• Clog coolant filters
• Plug radiator and oil cooler
• Possibly damage water pump seal.





Cooling System Soluble Oils

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

- Allow cylinder liner pitting
- Corrode brass and copper
- Damage heat transfer surfaces
- Damage seals and hoses.

Section W - Warranty

Section Contents

Table with 2 columns: Description and Page. Includes items like 'All Engines Less Than 10L Worldwide New Engine Parts' (W-13), 'California Emission Control System Warranty, Off-Highway' (W-28), 'CMD Commercial Application Marine Propulsion(B/C/N14)' (W-16), 'All Engines International Industrial (Off-Highway)' (W-8), 'All Engines United States And Canada Industrial (Off-Highway)' (W-1), 'Owner's Warranty Responsibilities' (W-30), and 'US Marine (division of Brunswick Corp.) Worldwide Propulsion Products' (W-22).

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All Engines United States And Canada Industrial (Off-Highway)
Coverage

Products Warranted

This Warranty applies to new Engines sold by Cummins and delivered to the first user on or after April 1, 1999, that are used in Industrial (Off-Highway) applications in the United States* and Canada, except for Engines used in marine, generator drive and certain defense applications, for which different Warranty Coverage is provided.

Base Engine Warranty

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

Coverage begins with the sale of the Engine by Cummins. Coverage continues for two years or 2,000 hours of operation, whichever occurs first, from the date of delivery of the Engine to the first user, or from the date the unit is first leased, rented or loaned, or when the Engine has been operated for 50 hours, whichever occurs first. If the 2,000 hour limit is exceeded during the first year, Coverage continues until the end of the first year.

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 Coverage begins with the expiration of the Base Engine Warranty and ends three years or 10,000 (3,000 hours for A Series Engines) hours of operation from the date of delivery of the Engine to the first user, or from the date the unit is first leased, rented or loaned, or from when the Engine has been operated for 50 hours, whichever occurs first.

Consumer Products

The Warranty on Consumer Products in the United States* is a LIMITED Warranty. **CUMMINS IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.** Any implied Warranties applicable to Consumer Products in the United States* 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 Engine resulting from a Warrantable Failure.

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 reasonable costs for mechanics to travel to and from the equipment site, including meals, mileage and lodging, when the repair is performed at the site of the failure.

Cummins will pay 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 Warranty

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

During The Extended Major Components Warranty

Owner is responsible for the cost of all labor needed to repair the Engine, including the labor to remove and reinstall the Engine. When Cummins elects to repair a part instead of replacing it, Owner is not responsible for the labor needed to repair the part.

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

Owner is responsible for the cost of lubricating oil, antifreeze, filter elements and other maintenance items replaced during repair of a Warrantable Failure.

During The Base Engine And Extended Major Components Warranties

Owner is responsible for the operation and maintenance of the Engine as specified in the applicable Cummins Operation and Maintenance Manual. Owner is also responsible for providing proof that all recommended maintenance has been performed.

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.

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.

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 lubricating, cooling or intake systems; improper storage, starting, warm-up, 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.

For power units and fire pumps (package units), this Warranty applies to accessories, except for clutches and filters, supplied by Cummins which bear the name of another company.

For all other Industrial engines (except those previously mentioned), this Warranty does not apply to accessories which bear the name of another company. Such non-warranted accessories include, but are not limited to: alternators, starters, fans**, air conditioning compressors, clutches, filters, transmissions, torque converters, steering pumps, and non-Cummins fan drives, Engine compression brakes and air compressors.

Cummins Compusave units are covered by a separate Warranty.

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

Failures of belts and hoses supplied by Cummins are not covered beyond the first 500 hours or one year of operation, whichever occurs first.

Parts used to repair a Warrantable Failure 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 approved by Cummins.

A new Cummins or Cummins approved rebuilt part used to repair a Warrantable Failure assumes the identity of the part it replaced and is entitled to the remaining Coverage hereunder.

For all A Series Applications, including Industrial, travel reimbursement for non-transportable equipment will be limited to 4.0 hours, \$0.25/mile and 250 miles maximum. Any costs beyond this limit are the customer's responsibility.

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.

This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Emission Warranty

Products Warranted

This Emission Warranty applies to new Engines marketed by Cummins that are used in the United States* and Canada in vehicles designed for Industrial Off-Highway use. This Warranty applies to Engines delivered to the ultimate purchaser on or after April 1, 1999, for Engines up to 750 horsepower and on or after January 1, 2000, for Engines 751 horsepower and over.

Coverage

Cummins warrants to the ultimate purchaser 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 which would cause it not to meet these regulations within the longer of the following periods: (A) ***Five years or 3,000 hours of operation for industrial applications, five years or 3,500 hours of operation for industrial spark-ignited Engines (GTA855, G855, G5.9C, G8.3-C, GTA8.9E, QSK19G) and five years or 2,500 hours of operation for industrial spark-ignited Engines (GKTA19-GC), whichever occurs first, as measured from the date of delivery of the Engine to the ultimate purchaser, or (B) The Base Engine Warranty.

If the vehicle in which the Engine is installed is registered in the state of California, a separate California Emission Warranty also applies.

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, other than those resulting from defects in materials or workmanship, are not covered by this 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, warm-up, 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.

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

** Alternators, starters, and fans ARE covered for the duration of the Base Engine Warranty on A Series and B3.3 Engines.

** Alternators and starters are covered for the duration of the Base Engine Warranty on QSK23 Engines.

*** Emissions Warranty for BLPG Industrial Off-Highway Engines is 5 years / 3,500 hours.

All Engines International Industrial (Off-Highway) Coverage

Products Warranted

This Warranty applies to new Engines sold by Cummins and delivered to the first user on or after April 1, 1999, that are used in Industrial (Off-Highway) applications anywhere in the world where Cummins approved service is available, except the United States and Canada. Different Warranty Coverage is provided for Engines used in marine, generator drive and certain defense applications.

Base Engine Warranty

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

Coverage begins with the sale of the Engine by Cummins. Coverage continues for two years or 2,000 hours of operation, whichever occurs first, from the date of delivery of the Engine to the first user, or from the date the unit is first leased, rented or loaned, or when the Engine has been operated for 50 hours, whichever occurs first. If the 2,000 hour limit is exceeded during the first year, Coverage continues until the end of the first year.

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

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 Coverage begins with the expiration of the Base Engine Warranty and ends three years or 10,000 hours (3,000 hours for A Series Engines) of operation, from the date of delivery of the Engine to the first user, or from the date the unit is first leased, rented or loaned, or when the Engine has been operated for 50 hours, whichever occurs first.

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 Engine resulting from a Warrantable Failure.

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

Cummins will pay reasonable costs for mechanics to travel to and from the equipment site, including meals, mileage and lodging, when the repair is performed at the site of the failure.

Cummins will pay 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 Warranty

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.

During The Extended Major Components Warranty

Owner is responsible for the cost of all labor needed to repair the Engine, including the labor to remove and reinstall the Engine. When Cummins elects to repair a part instead of replacing it, Owner is not responsible for the labor needed to repair the part.

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

Owner is responsible for the cost of lubricating oil, antifreeze, filter elements and other maintenance items replaced during repair of a Warrantable Failure.

During The Base Engine Warranty And Extended Major Components Warranties

Owner is responsible for the operation and maintenance of the Engine as specified in the applicable Cummins Operation and Maintenance Manual. Owner is also responsible for providing proof that all recommended maintenance has been performed.

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 product available for repair by such facility. Service locations are listed in the Cummins Worldwide Service Locator at cummins.com.

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.

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 lubricating, cooling or intake systems; improper storage, starting, warm-up, 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.

For power units and fire pumps (package units) the Warranty applies to accessories, except for clutches and filters supplied by Cummins which bear the name of another company.

Except for the accessories noted previously, Cummins does not warrant accessories which bear the name of another company. Such non-warranted accessories include, but are not limited to: alternators, starters, fans*, air conditioning compressors, clutches, filters, transmissions, torque converters, steering pumps, non-Cummins fan drives and air cleaners.

Cummins Compusave units are covered by a separate Warranty.

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

Failures of belts and hoses supplied by Cummins are not covered beyond the first 500 hours or one year of operation, whichever occurs first.

Parts used to repair a Warrantable Failure 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 approved by Cummins.

A new Cummins or Cummins approved rebuilt part used to repair a Warrantable Failure assumes the identity of the part it replaced and is entitled to the remaining Coverage hereunder.

For all A Series Applications, including Industrial, travel reimbursement for non-transportable equipment will be limited to 4.0 hours, \$0.25/mile and 250 miles maximum. Any costs beyond this limit are the customer's responsibility.

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 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.

* Alternators, starters, and fans ARE covered for the duration of the Base Engine Warranty on A Series and B3.3 Engines.

* Alternators and starters are covered for the duration of the Base Engine Warranty on QSK23 Engines.

All Engines Less Than 10L Worldwide New Engine Parts Coverage

Products Warranted

This Warranty applies to new Parts sold by Cummins when used on or with its Engines less than 10L which are purchased by the first user on or after January 1, 2013. It applies anywhere in the world where Cummins approved service is available through a Cummins distributor.

Coverage

This Warranty covers any failures of the Parts, under normal use and service, which result from defects in material or factory workmanship (Warrantable Failures). The Coverage is for the duration specified within the warranty or specified maintenance interval, whichever occurs first, after the date of first installation.

This Warranty is 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

Cummins will pay for all parts and labor needed to repair the damage to the Engine resulting from the Warrantable Failure.

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

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

Owner Responsibilities

At the time when the Parts are installed, Owner is responsible for the preparation of a written record containing the following: (1) the date of installation of the Parts; (2) the Engine serial number; (3) the Engine miles, hours or kilometers of operation; (4) the Parts installed; and (5) the location of the Parts in the Engine. The purpose of this record is to protect Owner's interests and support any claim for a Warrantable Failure.

Owner is responsible for the operation and maintenance of the Engine as specified in Cummins Operation and Maintenance Manuals. Owner is also responsible for providing proof that all recommended maintenance has been performed.

Before 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. Owner must also deliver the Engine to the repair facility. Locations in the United States and Canada are listed in the United States and Canada Sales and Service Directory; other locations are listed in the Cummins International Sales and Service Directory.

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

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

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

Limitations

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 air intake systems; improper storage, starting, warm-up, run-in or shutdown practices; unauthorized modifications of the Engine. Cummins is also not responsible for failures caused by incorrect fuel or by water, dirt or other contaminants in the fuel.

Except for fuel pumps, Cummins does not warrant parts supplied by Cummins which bear the name of another company. This category of parts includes, but is not limited to: hydraulic pumps, alternators, starters, fans, air conditioning compressors, clutches, filters, power steering pumps, transmissions, torque converters, marine gears, air cleaners, non-Cummins air compressors and Engine compression brakes.

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

Parts used to repair a Warrantable Failure may be new Cummins parts, Cummins ReCon® parts or repaired parts. Cummins is not responsible for failures resulting from the use of parts not approved by Cummins.

A new Cummins or Cummins ReCon® part used to repair a Warrantable Failure assumes the identity of the part it replaced and is entitled to the remaining Coverage hereunder.

This Warranty does not apply to parts furnished by Cummins at no charge to the Owner.

Cummins Inc. reserves the right to interrogate Electronic Control Module (ECM) data for purposes of failure analysis.

CUMMINS DOES NOT COVER WEAR OR WEAROUT OF COVERED PARTS.

CUMMINS IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGE.

THIS WARRANTY IS THE SOLE WARRANTY MADE BY CUMMINS IN REGARD TO THESE PARTS. CUMMINS MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, OR OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state or from province to province.

CMD Commercial Application Marine Propulsion(B/C/N14) Coverage

Engines Included in this Coverage

Marine Propulsion
4B
6B
6C
N14

Products Warranted

This Warranty applies to new Cummins Engines sold by Cummins MerCruiser Diesel, herein after “CMD”, that are used in Marine propulsion applications anywhere in the world where CMD approved service is available*, and delivered to the first user on or after April 29, 2002. The 'Product' consists of a new Cummins Engine, as well as accessories which are approved and supplied by CMD and which are either installed by CMD or a CMD authorized distributor. These Products have the following designation:

MARINE PROPULSION - Intermittent Rating

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 or 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.

MARINE PROPULSION - Medium Continuous Rating

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.

MARINE PROPULSION - Heavy Duty Rating

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.

MARINE PROPULSION - Continuous Rating

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 Product, under normal use and service, which result from a defect in CMD material or factory workmanship (Warrantable Failure). Coverage begins with the sale of the Engine by CMD and continues for the duration stated in the following table. The duration commences on either 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.

Table with 3 columns: Rating, Duration Whichever Occurs First (Years), and Hours. Rows include Intermittent (1 year, 1,500 hours), Medium Continuous (1 year, 3,000 hours), Heavy Duty (1 year, 5,000 hours), and Continuous (1 year, Unlimited hours).

Extended Major Components Warranty

The Extended Major Components Warranty applies to Engines other than B and C Series. It covers Warrantable Failures of the Engine cylinder block, camshaft, crankshaft and connecting rods (Covered Parts). Bushing and bearing failures are not covered. This Coverage begins with the expiration of the Base Engine Warranty and ends after three

years or 10,800 hours of operation, whichever occurs first, from the date of delivery 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.

Consumer Products

The Warranty on Consumer Products in the United States is a limited Warranty. **CMD 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 MerCruiser Diesel Responsibilities

During the Base Engine Warranty

CMD 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 CMD published Standard Repair Time guidelines.

When it is necessary for mechanics to make on-site Warranty repairs, CMD will pay up to six hours total travel expenses, including meals, mileage and lodging, for mechanics to travel to and from the repair dock.

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

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

During the Extended Major Components Warranty

CMD 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 Warranty

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.

During the Extended Major Components Warranty

Owner is responsible for the cost of all labor needed to repair the Engines, including the labor cost for Engine removal and reinstallation. When CMD elects to repair a part instead of replacing it, the Owner is not responsible for the labor needed to repair the part.

Owner is responsible for the cost of all parts required for the repair except for the defective Covered Part and any Covered Part damaged by a Warrantable Failure of the defective Covered Part. Owner is responsible for the cost of lubricating oil, antifreeze, filter elements and other maintenance items replaced during repair of a Warrantable Failure.

During the Base Engine and Extended Major Components Warranties

Owner is responsible for the operation and maintenance of the Product as specified in the applicable CMD Operation and Maintenance Manual. Owner is also responsible for providing proof that all recommended maintenance has been performed.

Before the expiration of the applicable Warranty, Owner must notify a CMD distributor, authorized dealer or other repair location approved by CMD of any Warrantable Failure and make the Engine available for repair by such facility.

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 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 CMD 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.

Limitations

CMD is not responsible for failures or damage resulting from what CMD 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, warm-up, run-in or shutdown practices; unauthorized modifications to the Engine. CMD is also not responsible for failures caused by incorrect oil or fuel, or by water, dirt or other contaminants in the fuel or oil.

CMD is not responsible for failure resulting from:

- 1 Use or application of the Product 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 CMD published standards.

CMD is not responsible for failures of maintenance components supplied by CMD 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 CMD 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.

Except for the accessories noted previously, CMD does not warrant accessories which bear the name of another company.

Parts used in Warranty repairs may be new Cummins parts, Cummins approved rebuilt parts or repaired parts. CMD 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.

CMD DOES NOT COVER WEAR OR WEAROUT OF COVERED PARTS.

CMD IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

THESE WARRANTIES SET FORTH HEREIN ARE THE SOLE WARRANTIES MADE BY CMD IN REGARD TO THESE ENGINES. CMD 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.

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

US Marine (division of Brunswick Corp.) Worldwide Propulsion Products
Coverage

Products Warranted

This warranty applies to new B and C Series Engines and Marine Gears sold by Cummins Inc., herein after 'Cummins', that are installed in Marine (division of Brunswick Corp.) hulls and used in Marine propulsion applications anywhere in the world where Cummins approved service is available* and delivered to the first user on or after May 1, 1995. The 'Product' consists of a new Cummins Engine, as well as accessories approved and installed by Cummins. These Products have the following designation:

High Output Rating

This power rating is for use in variable load applications where full power is limited to one (1) hour out of every eight (8) 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 pleasure/non-revenue generating applications that operate less than 300 hours per year.

Base Engine Warranty

This warranty covers any failures of the Product, 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 ends at the time or mileage stated below. The duration commences on either 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.

Extended Major Components Warranty

The Extended Major Components Warranty covers Warrantable Failures of the following Engine parts or castings (Covered Parts):

- Engine Cylinder Block Casting
- Engine Cylinder Head Casting

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- Engine Camshaft Forging
- Engine Crankshaft Forging
- Engine Connecting Rods
- Engine Gear Train Gears:
 - Crankshaft Gear
 - Camshaft Gear
 - Camshaft Idler Gear
 - Accessory Drive Gear
 - Fuel Pump Gear
- Engine Gear Cover and Housing
- Flywheel Housing

Bushing and bearing failures are NOT covered.

Extended Major Components Warranty continues beyond the expiration of the Base Engine Warranty and continues for the Duration stated below. The Duration commences on either 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.

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.

Warranty Coverage		
	Coverage Duration*	
Coverage Category	Months	Hours
Base Engine Warranty	24	600
Extended Major Components	72	1800

*Whichever occurs first.

Warranty Coverage				
	Repair Charge Paid by Cummins			
Coverage Category	Parts	Labor	Removal & Installation Labor	Travel
Base Engine Warranty	Yes	Yes	Yes	Yes - Up to 6 hours
Extended Major Components	Yes**	Yes	Yes	No

**Covered Parts as listed above.

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 up to six (6) hours total travel expenses, including meals, mileage and lodging, for mechanics to travel to and from the repair dock.

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 of any Covered Part damaged by a Warrantable Failure of the defective Covered Part.

Owner Responsibilities

During the Extended Major Components Warranty

Owner is responsible for the cost of all parts and associated repair expenses required for the repair labor, the defective Covered Part and any Covered Part damaged by a Warrantable Failure of the defective Covered Part.

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 in the applicable Cummins Operation and Maintenance Manual. Owner is also responsible for providing proof that all recommended maintenance has been performed.

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 Product available for repair by such

facility. Locations in the United States and Canada are listed in the Cummins U.S. and Canada Sales and Service Directory; other locations are listed in the Cummins International Sales and Service Directory.

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 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.

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.

Limitations

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, warm-up, 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 failures resulting from:

- 1 Use or application of the Product 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.

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.

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 Inc. reserves the right to interrogate Electronic Control Module (ECM) data for purposes of failure analysis.

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 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.

California Emission Control System Warranty, Off-Highway Products Warranted

This Emission Control System Warranty applies to off-road diesel engines certified with the California Air Resources Board beginning with the year 1996 for engines up to 750 horsepower, beginning with the year 2000 for 751 horsepower and over, marketed by Cummins, and registered in California for use in industrial off-highway applications.

Your Warranty Rights and Obligations

The California Air Resources Board and Cummins Engine Company, Inc., are pleased to explain the emission control system warranty on your engine. In California, new off-road diesel engines must be designed, built and equipped to meet the State's stringent anti-smog standards. Cummins must warrant the emission control system on your engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your engine.

Your emission control system may include parts such as the fuel injection system and the air induction system. Also included may be hoses, belts, connectors and other emission-related assemblies.

Where a warrantable condition exists, Cummins will repair your off-road diesel engine at no cost to you including diagnosis, parts and labor.

Manufacturer's Warranty Coverage

This warranty coverage is provided for 5 years or 3,000 hours of engine operation, whichever first occurs from the date of delivery of the engine to the first user. If any emission-related part on your engine is defective, the part will be repaired or replaced by Cummins.

Coverage

This emission control system warranty applies only to the following A series, B3.3, B3.9, B4.5s, B5.9, B6.7s, QSB3.9-30, QSB4.5-30, QSB5.9-30, QSB5.9-44, C8.3, QSC8.3, and QSL9 emission control parts:

Table with 2 columns listing engine components: Fuel Pump, Intake Manifold, Static Timing, Charge Air Cooler, Delivery Valve, Aftercooler, Injection Control Valve Module, Exhaust Manifold, Injectors, Oxidation Catalyst, Calibration, Needle, Nozzle, Electronic Control System, Spring, Control Module, Turbocharger, Boost Pressure Sensor, Compressor Wheel, Coolant Temperature Sensor, Turbine Wheel, Fuel Pressure Sensor, Turbine Oil Seal, Wastegate Valve.

Owner's Warranty Responsibilities

As the off-road diesel engine owner, you are responsible for the performance of the required maintenance listed in your Cummins Operation and Maintenance Manual. Cummins recommends that you retain all receipts covering maintenance on your off-road diesel engine, but Cummins cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.

You are responsible for presenting your off-road diesel engine to a Cummins dealer as soon as a problem exists. The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days.

As the off-road diesel engine owner, you should also be aware that Cummins may deny you warranty coverage if your off-road diesel engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

Your engine is designed to operate on diesel fuel only. Use of any other fuel may result in your engine no longer operating in compliance with California's emissions requirements.

If you have any questions regarding your warranty rights and responsibilities, you should contact Cummins Customer Assistance Department at 1-800-343-7357 (1-800-DIESELS) or the California Air Resources Board at 9528 Telstar Avenue, El Monte, CA 91731.

Prior to the expiration of the applicable warranty, Owner must give notice of any warranted emission control failure to a Cummins distributor, authorized dealer or other repair location approved by Cummins and deliver the engine to such facility for repair. Repair locations are listed in Cummins United States and Canada Service Directory.

Owner is responsible for incidental costs such as: communication expenses, meals, lodging incurred by Owner or employees of Owner as a result of a warrantable failure.

Owner is responsible for business costs and losses, "downtime" expenses, and cargo damage resulting from a warrantable failure. CUMMINS IS NOT RESPONSIBLE FOR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCIDENTAL OR CONSEQUENTIAL DAMAGES INCLUDE BUT ARE NOT LIMITED TO FINES, THEFT, VANDALISM OR COLLISIONS.

Replacement Parts

Cummins recommends that any service parts used for maintenance, repair or replacement of emission control systems be new, genuine Cummins or Cummins approved rebuilt parts and assemblies, and that the engine be serviced by a Cummins distributor, authorized dealer or the repair location approved by Cummins. 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 will not be covered under this emission control system warranty.

Cummins Responsibilities

Repairs and service will be performed by any Cummins distributor, authorized dealer or other repair location approved by Cummins using new, genuine Cummins or Cummins approved rebuilt parts and assemblies. Cummins will repair any of the emission control parts found by Cummins to be defective without charge for parts or labor (including diagnosis which results in determination that there has been a failure of a warranted emission control part).

Emergency Repairs

In the case of an emergency where a Cummins distributor, authorized dealer, or other repair location approved by Cummins is not available, repairs may be performed by any available repair location using any replacement parts. Cummins will reimburse the Owner for expenses (including diagnosis), not to exceed the manufacturer's suggested retail price for all warranted parts replaced and labor charges based on the manufacturer's recommended time allowance for the warranty repair and the geographically appropriate hourly labor rate. A part not being available within 30 days or a repair not being complete within 30 days constitutes an emergency. Replaced parts and paid invoices must be presented at a Cummins authorized repair facility as a condition of reimbursement for emergency repairs not performed by a Cummins distributor, authorized dealer, or other repair location approved by Cummins.

Warranty Limitations

Cummins is not responsible for failures resulting from Owner or operator abuse or neglect, such as: operation without adequate coolant, fuel or lubricants; overfueling; overspeeding; lack of maintenance of lubricating, cooling or air intake systems; improper storage, starting, warm-up, run-in or shutdown practices.

The manufacturer warrants to the ultimate purchaser and each subsequent purchaser that the engine is designed, built, and equipped so as to conform with all applicable regulations adopted by the Air Resources Board, and that it is free from defects in materials and workmanship which cause the failure of a warranted part.

Any warranted part which is not scheduled for replacement as required maintenance, or which is scheduled only for regular inspection to the effect of "repair or replace as necessary" is warranted for the warranty period.

Any warranted part which is scheduled for replacement as required maintenance is warranted for the period of time prior to the first scheduled replacement point for that part.

The owner will not be charged for diagnostic labor which leads to the determination that a warranted part is defective, if the diagnostic work is performed at a warranty station.

The manufacturer is liable for damages to other engine components caused by the failure under warranty of any warranted part.

Cummins is not responsible for failures resulting from improper repair or the use of parts which are not genuine Cummins or Cummins approved parts.

These warranties, together with the express commercial warranties and emission warranty are the sole warranties of Cummins. There are no other warranties, express or implied, or of merchantability or fitness for a particular purpose.

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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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